

beta

Electrical Installations from A to Z

Techn. Information ET B1 T INT • 2006

BETA Modular Installation Devices
 Technical Informationen
 on Catalog ET B1



SIEMENS

Catalogs for the division: Electrical Installation Technology

ALPHA Distribution Boards and Terminal Blocks

ALPHA Small Distribution Boards and Distribution Boards ET A1

Order No.:
E86060-K8210-A101-A6-7600



ALPHA 400-ZS Meter Cabinets ET A2

Regional catalogs available on request
(available in German only)



ALPHA FIX Terminal Blocks ET A5

Order No.:
E86060-K8250-A101-A6-7600 (pdf only)



BETA Modular Installation Devices

Order No.:
E86060-K8220-A101-A7-7600 (pdf only) ET B1



Technical Information ET B1 T

Order No.:
E86060-K8229-A101-A7-7600 (pdf only)



GAMMA Building Management Systems

Order No.:
E86060-K8230-A101-A6-7600 ET G1



DELTA Switches and Outlets

Order No.:
E86060-K8240-A101-A7-7600 ET D1



The A&D Offline Mall

Order No.:
E86060-D4001-A110-C4-7600 (CD-ROM)
E86060-D4001-A510-C4-7600 (DVD) CA 01



Identification codes for fast orientation



New products not contained in the previous catalogs

Ordering

Order nos., prices and weights generally apply to the same quantity:

- Units
- Set or
- Package

The package size (abbreviated as PS) specifies the minimum quantity of a product to be ordered. You can order this quantity or a multiple thereof. The packing unit (abbreviated as P.unit) specifies the number of units, sets or packages in a master carton.

Export regulations

The products listed in this catalog/price list may be subject to European/German and/or US export regulations.

Therefore, any export requiring a license is subject to approval by the competent authorities. According to current provisions, the following export regulations must be observed with respect to the products featured in this catalog/price list:

AL Number of the German Export List

Products marked other than "N" require an export license.

In the case of software products, the export designations of the relevant data medium must also be generally adhered to.

Goods labeled with an "AL not equal to N" are subject to a European or German export authorization when being exported outside the EU.

ECCN Number of the US Export List
(Export Control Classification Number).

Products marked other than "N" are subject to a reexport license in specific countries.

In the case of software products, the export designations of the relevant data medium must also be generally adhered to.

Goods labeled "FCCN not equal to N" are subject to US re-export authorization.

Even without a label, or with an "AL: N" or "ECCN: N" authorization may be required due to the final destination and purpose for which the goods are to be used.

The deciding factors are the AL or ECCN export authorization indicated on order confirmations, delivery notes and invoices.

Errors excepted and subject to change without prior notice.

Internet

Visit our Automation and Drives Web site on the Internet. You will find us at the following addresses

- Automation and Drives:
<http://www.siemens.com/automation>
- Electrical Installation Technology:
<http://www.siemens.com/e-installation>
- for the A&D Mall:
<http://www.siemens.com/automation/mall>

BETA

Modular Installation Devices

Technical Information
ET B1 T INT • 2006
(International Edition)

Invalid: Technical Information
ET B1 T INT · 2005



The products contained in this catalog are also included in the Offline Mall CA 01.
Order No.:
E86060-D4001-A110-C4-7600 (CD-ROM)
E86060-D4001-A510-C4-7600 (DVD)



The products and systems listed in this catalog are manufactured using a quality management system certified by BVQI and according to EN ISO 9001:2000-12 (Certificate No. 117779)

Line Protection Low-Voltage Fuse Systems

SR60 Busbar System

Miniature Circuit-Breakers

Personnel- and Fire Protection Residual Current Protective Devices

Lightning Current, Overvoltage and Device Protection Lightning and Surge Arresters

Manual Switching Switches and Light Indicators

Electrical Switching Switching Devices

Time Switching Timers

Power Supply Power Supply Units

Measuring Measuring Devices

Monitoring Monitoring Devices

Modular Installation Devices, Mounting Depth 55 mm >N<

Notes on Product Changeover

Appendix

Welcome to Automation and Drives

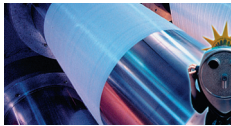
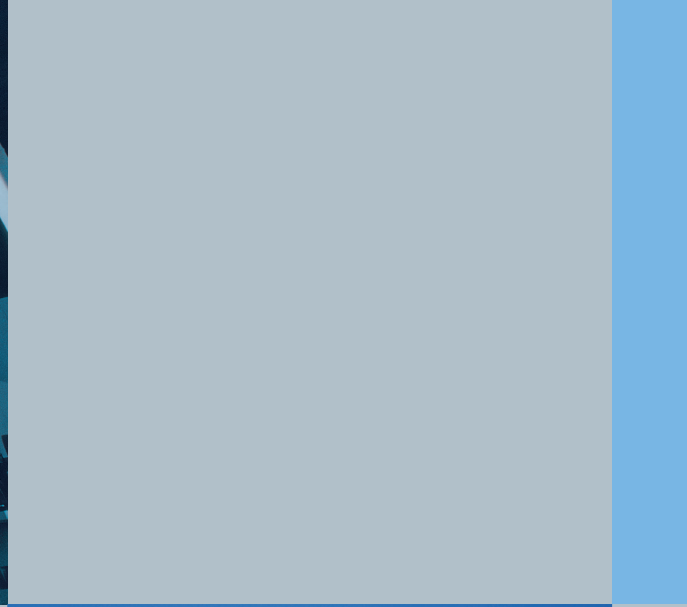
We would like to welcome you to Automation and Drives and our comprehensive range of products, systems, solutions and services for production and process automation and building technology worldwide.

With Totally Integrated Automation and Totally Integrated Power, we deliver solution platforms based on standards that offer you a considerable savings potential.

Discover the world of our technology now. If you need more detailed information, please contact one of your regional Siemens partners.

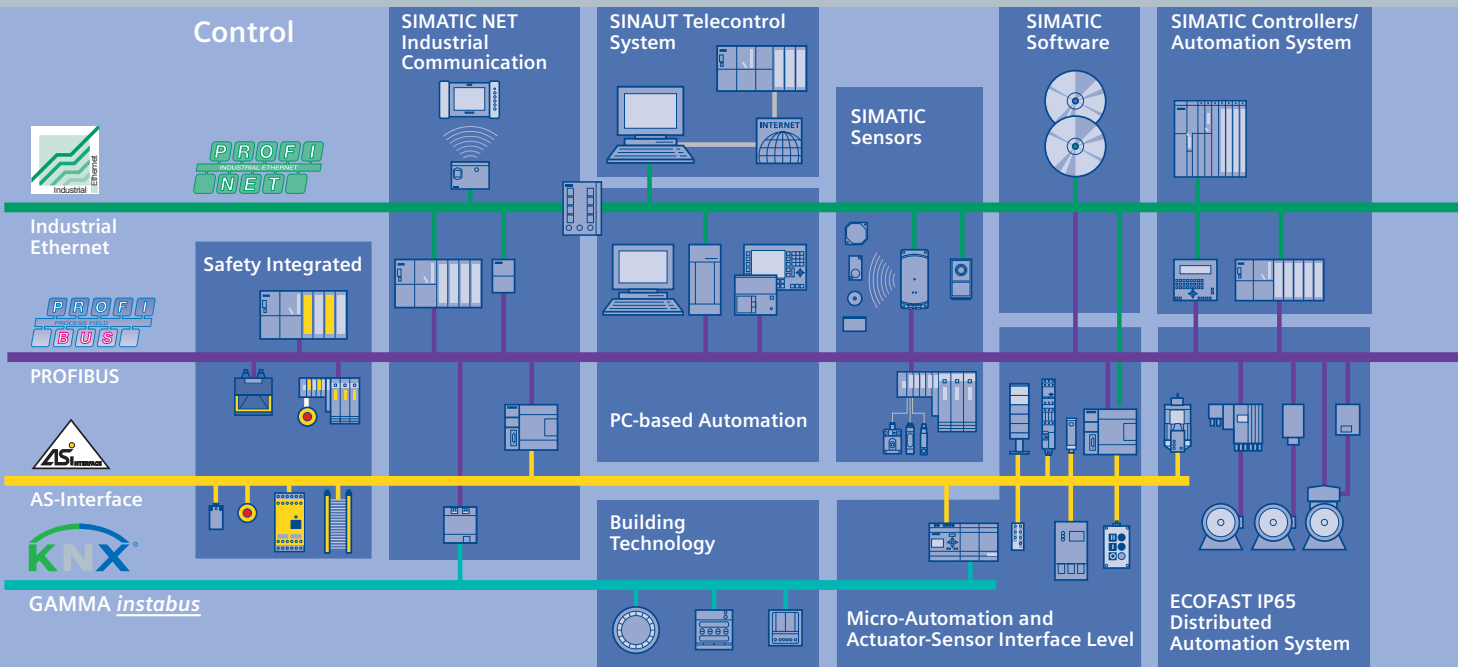
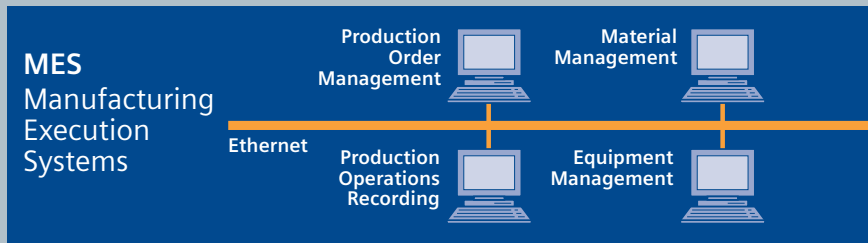
They will be glad to assist you.





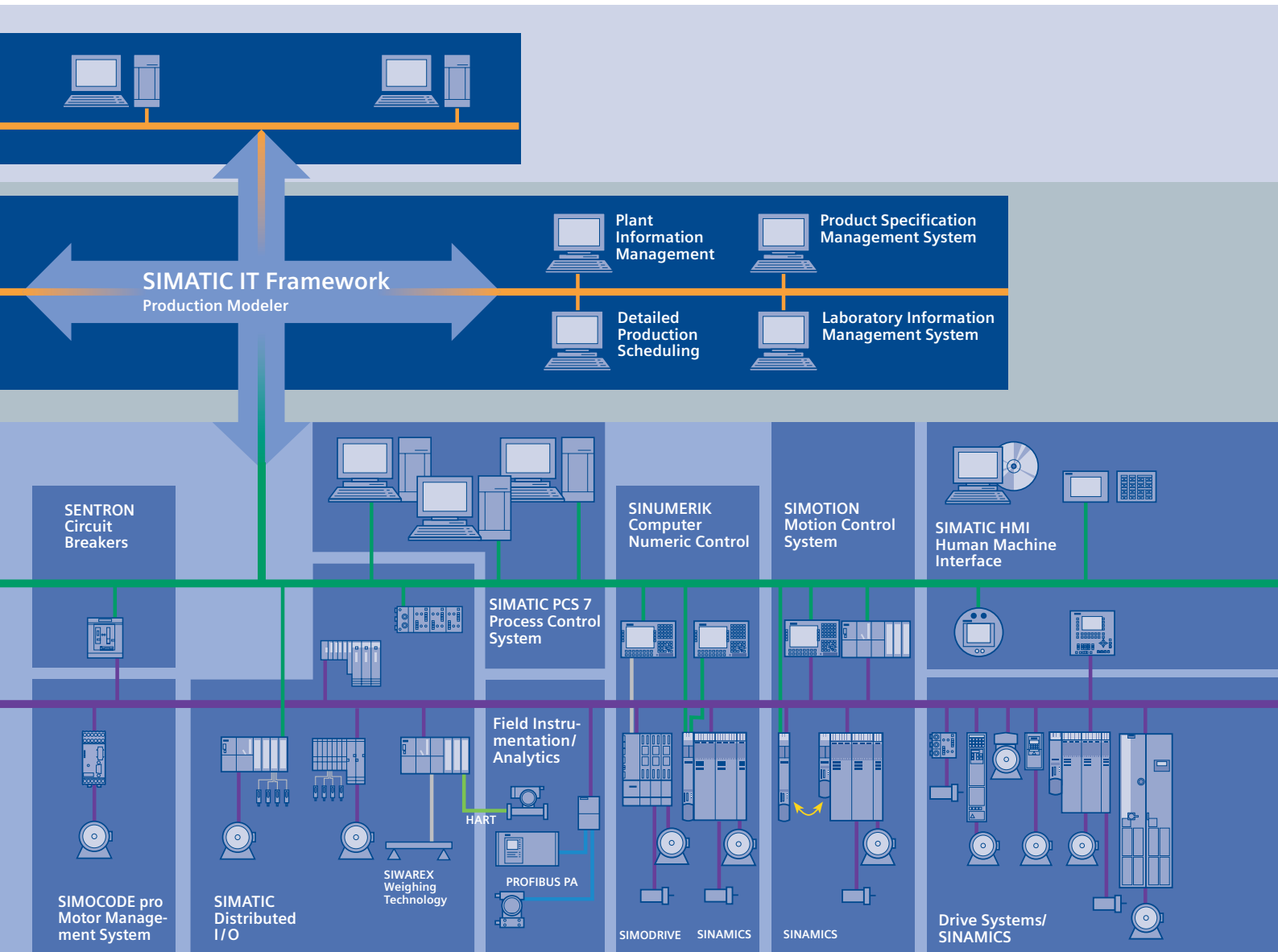
Totally Integrated Automation – innovations for more productivity

With the launch of Totally Integrated Automation, we were the first ones on the market to consistently implement the trend from equipment to an integrated automation solution, and have continuously improved the system ever since. Whether your industry is process- and production-oriented or a hybrid, Totally Integrated Automation is a unique "common solution" platform that covers all the sectors. Totally Integrated Automation is an integrated platform for the entire production line - from receiving to technical processing



and production areas to shipping. Thanks to the system-oriented engineering environment, integrated, open communications as well as intelligent diagnostics options, your plant now benefits in every phase of the life cycle.

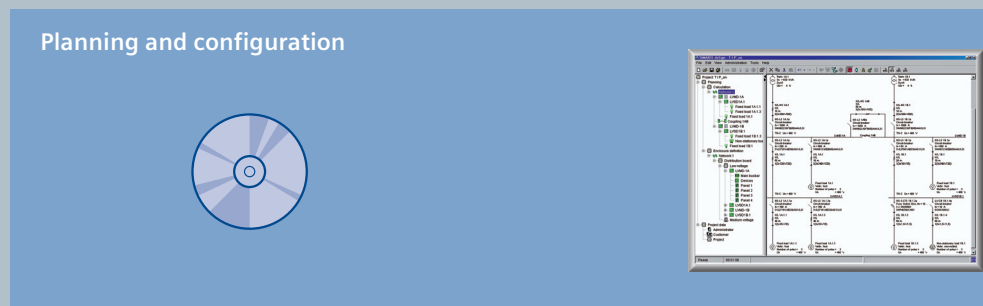
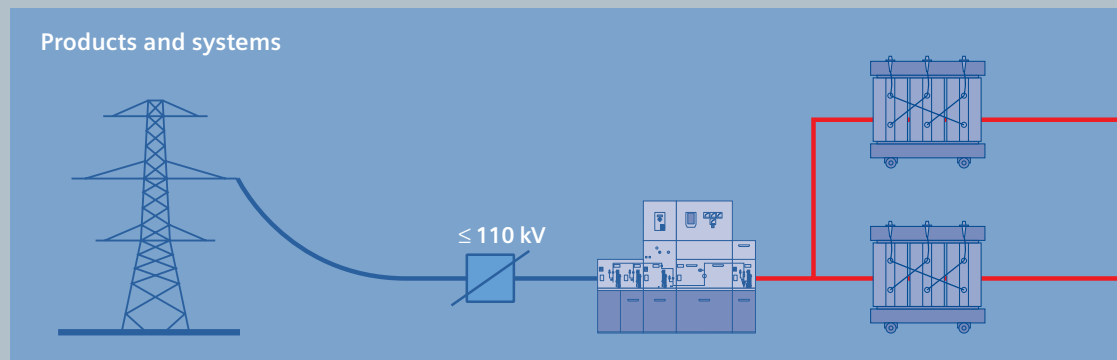
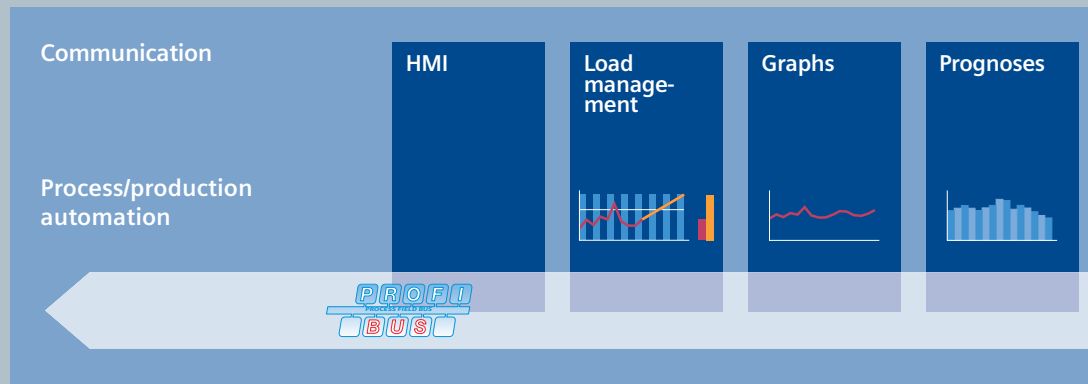
In fact, to this day we are the only company worldwide that can offer a control system based on an integrated platform for both the production and process industry.



Totally Integrated Power – energy distribution and management from one source

Totally Integrated Power by Siemens offers integrated solutions for energy distribution in functional and industrial buildings covering everything from medium-high voltage to power outlets.

Totally Integrated Power is based on integration in planning and configuration as well as coordinated products and systems. In addition, it features communications and software modules for connecting power distribution systems to industrial automation and building automation, thereby offering a substantial savings potential.



Maintenance

- Substation
- Distribution
- Maintenance task

Hall 1 Air conditioning system
Distribution 3 Checkup
Infeed II Replacing circuit breaker contacts
 Replacing meters

Message/error management



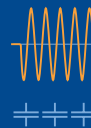
Selective protection



Protocols

Protocol	Address	Port	Device
Modbus	1-255	485	PLC
Profibus	1-127	485	PLC
KNX	1-4095	485	KNX devices
RS-485	1-255	485	Various devices

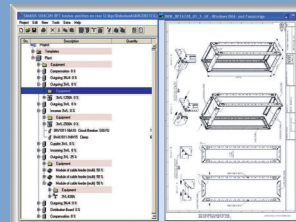
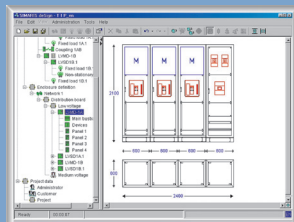
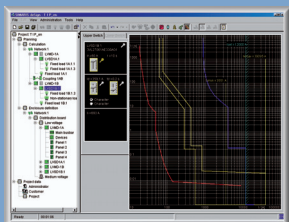
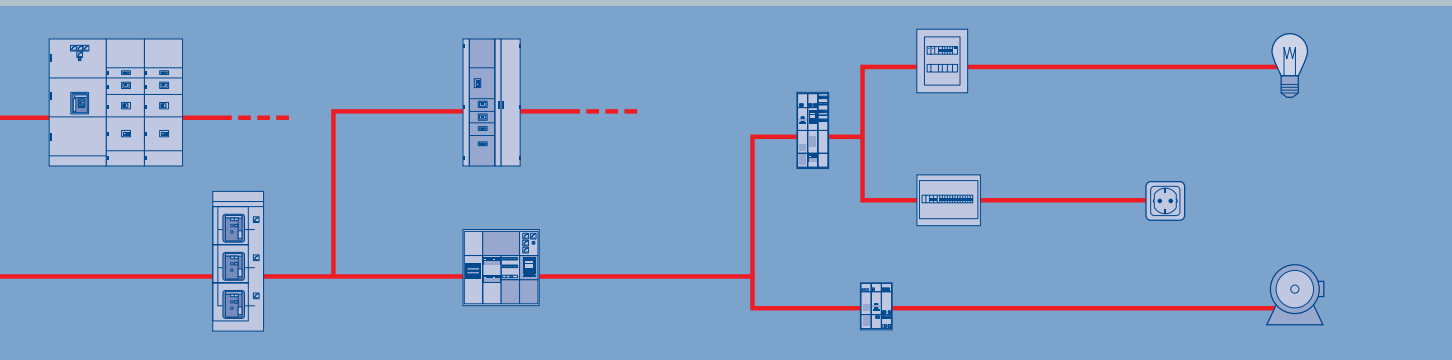
Power quality



Cost center



Building automation



Totally Integrated Power - Circuit Protection Management in this catalog

BETA modular installation devices include low-voltage fuse systems, miniature circuit-breakers, residual current protective devices, lightning and surge arresters, switches, switching devices, timers, power supply units, and measuring and monitoring devices. They provide line protection, personnel and fire protection, lightning current and overvoltage and device protection, thus offering comprehensive all-round plant and device protection.

totally integrated power

Protection concept

Selective line protection



Personnel and fire protection



Overvoltage protection



LAN

Products and systems



Distribution boards



Measuring devices

Fuses



Fuse monitors

B surge arresters



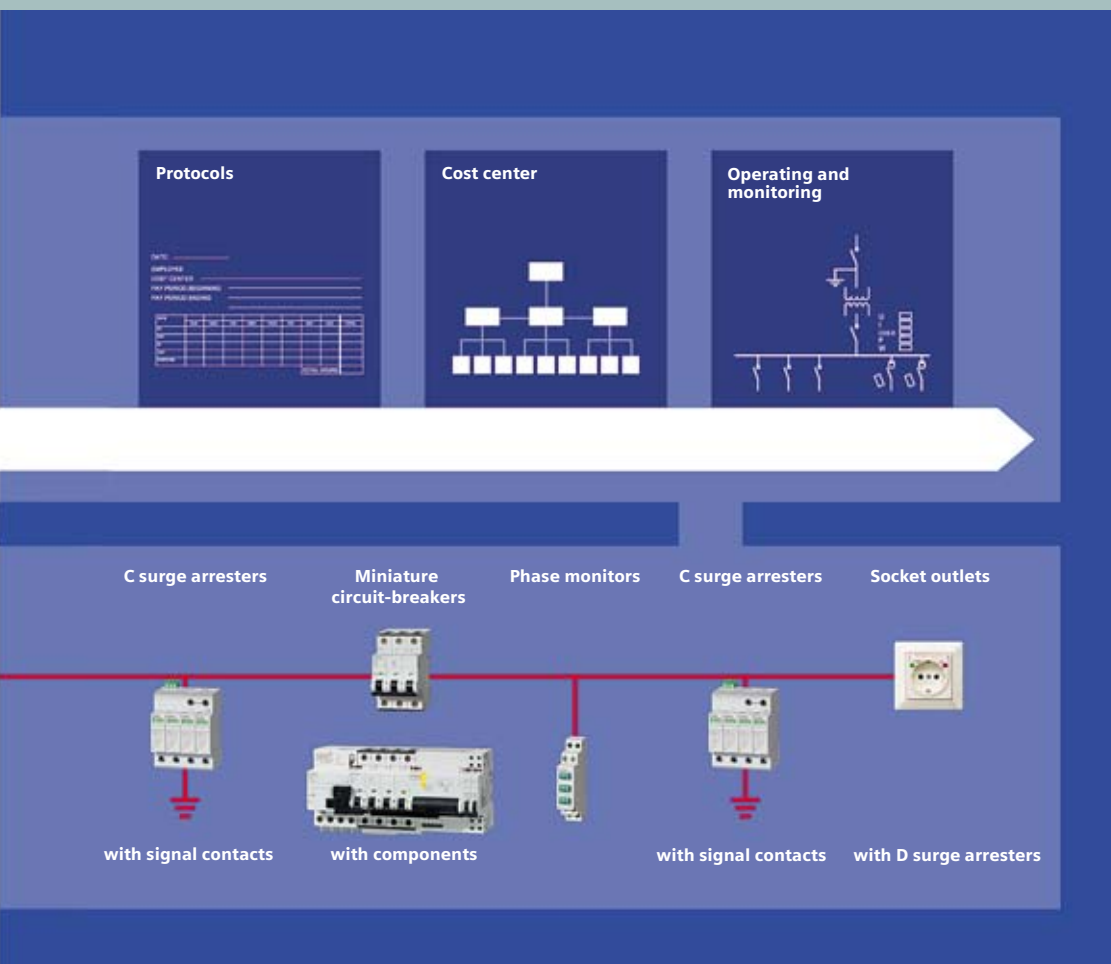
RCCBs with components

However, that in itself does not equal management. Rather it is the communicative options of the measuring devices in conjunction with the remote interrogation of the distribution boards that create the basis for proper Circuit Protection Management.

The monitoring of the capacity utilization of a distribution board and assessment of the type of load are essential for the safe and reliable supply of electrical power.

PROFIBUS terminals can be directly integrated in existing production plants.

This catalog contains all available devices for distribution boards or comparable options for mounting on 35-mm mounting rails.





ALPHA distribution boards and terminal blocks

Our comprehensive range of ALPHA distribution boards and terminal blocks provides all the components you need for fast and safe power distribution – small distribution boards, meter cabinets, as well as wall- and floor-mounted distribution boards – and all up to 630 A.



BETA modular installation devices

Whether for protection, switching or control functions – BETA modular installation devices offer an optimally consistent product range. This ensures maximum flexibility, convenience and safety – from the main distribution system to the end user.



GAMMA building management systems

Thanks to intelligent building management systems with GAMMA *instabus*, you can increase domestic safety and improve home comfort – and save energy at the same time. The two-wire cable or radio system of the GAMMA *instabus* allows convenient state-of-the-art control of virtually any domestic electrical function. While the control of lighting and shutters/blinds are classic examples of such functions, the extreme flexibility of GAMMA *instabus* now opens up a whole new world of options.



DELTA switches and outlets

The DELTA switch and outlet range combines a wide range of different design interfaces with innovative and safe technology. And because the operator interfaces are simple to interchange, you can enjoy complete safety – even when your taste or the environment changes.

A to Z

**Siemens electrical installation:
the whole world of electrical installation technology**

These days, it's hard to imagine daily life without electricity. Modern electrical switching and installation technology is an essential requirement for ensuring that our use of electricity is safe and user-friendly.

Innovative from the outset

The Siemens electrical installation technology group has been working in this sector for more than 110 years and we are constantly developing new products – innovations, which make the use of electricity increasingly safer and more cost effective. Ideal for residential, non-residential or industrial buildings. In accordance with all internationally valid regulations and standards. Using new technologies, such as *instabus EIB*, we have opened up new horizons in the area of private housing. In addition, we are also building bridges between factory automation and building management in the industrial and non-residential building sector.

Quality you can rely on

All our products are subject to the most rigorous quality specifications during production and testing. And we ensure strict compliance with these specifications in order to offer our customers nothing but the very best. Our numerous certificates are further confirmation of our endeavors in this respect. The quality of a product is largely determined in its development phase. From the very outset, reliability demands and the accompanying quality assurance measures are defined and incorporated in the design. The first quality inspections are already run on the pilot and test series.



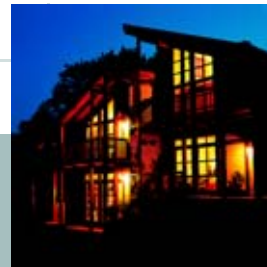
BETA modular installation devices provide solutions in all areas:



Industrial buildings



Non-residential buildings



Residential buildings

Electrical installations from Regensburg and across the globe

Our factory in Regensburg

The Regensburg device factory is now one of the world's leading manufacturers of installation devices and systems. Since it was founded in 1948 it has become one of the largest employers of the region and currently boasts a staff of around 1,500 employees. Development is carried out using cutting-edge tools such as CAD, simulation and automated laboratory equipment. It goes without saying that our devices offer complete electromagnetic compatibility as the proportion of electronic devices in electrical installation technology is constantly on the increase. This is particularly noticeable in building control systems.

Our products are subject to the harshest conditions: the technology used is tried and tested and ensures complete functional reliability. Circuit-breakers must comply with national and international regulations. During testing, our devices are subjected to considerably higher demands than those defined in the regulations. For our customers, this means rugged and long-lasting devices that provide maximum reliability and ease of operation.

Environment-friendly products

In order to preserve our natural resources, the protection of our natural environment has become a crucial task. For this reason we feel we have an obligation to preserve the environment as best we can and use natural resources sparingly.

An environment-friendly product design is an elementary and integral part of product development at A&D ET. This covers all phases of a product's life, beginning with the selection of materials with the lowest possible emission levels, through resource-friendly usage, to the development of suitable recycling strategies. Moreover, integration of the suppliers and the appropriate marketing tools are also aspects of an environment-friendly product design.





Branches worldwide

The products developed here are manufactured not just in Regensburg but worldwide in our factories.

These products (and systems) prove their high performance, quality and reliability on a daily basis.

Services

Always up-to-date – high quality training

Knowledge is the key to success: our seminars help you create the basis for a successful business.

In our modern training center in Regensburg – the first one to be certified by EIBA – or at a range of other locations, our expert training staff will help you acquire the necessary theoretical and practical know-how to succeed. Clearly structured and with multimedia teaching tools. Available in German and English.

Step-by-step, you will be familiarized with GAMMA *instabus* applications – from configuration, commissioning and assembly, through to the implementation of sophisticated customer solutions.

Please note: our seminars cover all levels and are designed to meet all requirements. From PC beginner courses through to special courses for *instabus* experts. Our individual support guarantees a successful seminar: the courses are for a limited number of participants and optimum attention is paid to your individual requirements – for maximum success and a minimum investment of your valuable time. If required, we can also hold in-house courses at your company's premises.

Please do not hesitate to contact us.

Tel.: +49 (0)941 790 2950



Training and sales advice

Save time with planning aids

Whether you are an installation engineer, planner or switchgear engineer – we have tools that help you plan the layout of your distribution boards and meter cabinets. And that gives you more time to spend on other projects.



ALPHA configuration software

Comprehensive service and support

You can rely on Siemens technology – as well as on our services and support. We offer assistance in all matters: from the planning of your electrical installation technology, to training, to marketing, advertising and public relations.

Tel.: +49 (0)911 895 5900

Fax: +49 (0)911 895 5907

E-Mail:

technical-assistance@siemens.com



Personal support

Information material and contacts

If you require any further information, we have a wide range of information material for you and your customers: an overview of our versatile switches and outlets, our building management systems and our modular installation devices and distribution boards. If you have any queries, requirements or suggestions: just call.

Tel.: +49 (0)911 895 5900

Fax: +49 (0)911 895 5907

E-Mail:

technical-assistance@siemens.com

www.siemens.com/e-installation



Comprehensive information material for you and your customers



Ideally equipped for any **S**ituation. ■

B

- With our comprehensive product range:
BETA modular installation devices
for any application.



BETA

New developments

Enhanced fuse base for NEOZED fuse links D01 and D02

Greater operator safety thanks to touch-protected terminals on the ingoing and outgoing circuits. Mounting on pin busbars provides more mounting options and saves time.

More details can be found in the chapter "Low-voltage fuse systems"



MINIZED switch disconnectors for D02 NEOZED fuse links

Even better, even safer, with new draw-out technology. With safe isolation of incoming and outgoing circuit when swapping fuse links.

More details can be found in the chapter "Low-voltage fuse systems"



Cylinder fuse bases

New improved cylinder fuse bases, with even smaller footprints for sizes 8 x 32 mm and 10 x 38 mm, are now available for switchgear and plant engineering.

A range for the export industry.

More details can be found in the chapter "Low-voltage fuse systems"



Miniature circuit-breakers with quick-connect terminals

The manually operated plug-in terminal with inclined, easily accessible cable entry saves assembly time and, used together with a standard pin busbar, ensures clear and convenient access to all connections.

More details can be found in the chapter "Miniature circuit-breakers"



UC sensitive residual current operated circuit breakers

The universal current sensitive fault current detection expands the personnel and fire protection on electrical systems with possible DC residual currents, thus offering optimum operating safety and reliability in systems with capacitive impedances due to rising tripping value.

More details can be found in the chapter "Residual current protective devices".



UC sensitive residual current circuit breakers with integral overcurrent protection (RCBOs)

UC sensitive residual current circuit-breaker with integral overcurrent protection (RCBO) for maximum plant availability thanks to complete protection for personnel, fire and line protection for AC, pulse and smooth DC residual currents. Optimum operating safety and reliability in systems up to 125 A. More details can be found in the chapter "Residual current protective devices"



RCBOs, type A - small and convenient

Maximum plant availability thanks to complete protection for personnel, fire and line protection for AC, pulse fault-current detection, as protection against short-circuits, overload and electrically ignited fires.

More details can be found in the chapter "Residual current protective devices"



Remote switches

For use in residential, non-residential and industrial buildings. With busbar mounting option and fast detection of the operating state through switching position indicator for quiet and safe operation.

More details can be found in the chapter "Switching devices"



Time switches

Energy saving through time switching. Whether digital or mechanical - a completely new product range. Take advantage of the programming options using a PC.

More details can be found in the chapter "Timers"



Socket outlets for distribution board mounting

The right decision for power distribution in the distribution board in the event of maintenance.

Available in national versions for Germany, Belgium, France, Italy and the USA.

More details can be found in the chapter "Power supply units"





Line protection



Line protection



Personnel and fire protection



Lightning current, overvoltage and device protection



Manual and electrical switching



Time switching



Power supply



Measuring



Monitoring

BETA modular installation devices

This is a range you can truly rely on: the BETA modular installation device range. It offers a uniquely consistent product range of control, switching and circuit-protection devices. Whether for fuse systems, miniature circuit-breakers, residual current protective devices or overvoltage protection – everything is complete, compatible and clearly arranged.

And we have expanded this range even further – to include new components with expanded functionality and an even greater selection of types.

- This supports an absolute maximum of flexibility, convenience and safety for building management and industrial applications.

Low-Voltage Fuse Systems

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Fuses and Fuse Systems	NEOZED Fuse Systems	1/4	Product overview
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		1/8	NEOZED fuse bases
		1/20	NEOZED fuse disconnectors
		1/23	MINIZED switch disconnectors
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		1/30	DIAZED fuse links
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	LV HRC Fuse Systems	1/48	Product overview
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American/Canadian Fuses	Class CC Fuses	1/219	DIAZED SILIZED fuse links
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Overview

Selectivity

Several fuses are usually connected in series in one system. And when things get serious, selectivity ensures that only the faulty electrical circuit of a system is switched off and not the entire operational process.

At an operational voltage of up to 400 V AC and a ratio of 1:1.25, Siemens fuses of gG operational class are also inter-selective, i.e. from rated current level to rated current level. This is achieved by means of the considerably smaller spread of $\pm 5\%$ of the time/current characteristics, which far exceeds the demand for a ratio of 1:1.6 specified in the standard.

It is therefore possible to use smaller conductor cross-sections due to the lower rated currents.

Operational classes

Fuses are categorized according to function and operational class. The first letter defines the function class and the second the object to be protected:

1st letter

a $\hat{=}$ Partial range protection (accompanied fuses):

Fuse links that carry currents at least up to their rated current and can switch currents above a specific multiple of their rated current up to their rated breaking capacity.

g $\hat{=}$ Full range protection (general purpose fuses):

Fuse links that can continuously carry currents up to at least their specified rated current and can switch currents from the smallest melting current through to the breaking current. Overload and short-circuit protection.

2nd letter

G $\hat{=}$ Cable and line protection (general applications)

M $\hat{=}$ Switching device protection in motor circuits (for protection of motor circuits)

R $\hat{=}$ Semiconductor protection/thyristor protection (for protection of rectifiers)

L $\hat{=}$ Cable and line protection (in acc. with the old, no longer valid DIN VDE)

B $\hat{=}$ Mine equipment protection

Tr $\hat{=}$ Transformer protection

The designations "slow" and "quick" still apply for DIAZED fuses. These are defined in IEC/CEE/DIN VDE.

In the case of "quick" characteristics, the fuse blows in the breaking range faster than those of gG operational class.

In the case of DIAZED fuse links for DC railway network protection, the "slow" characteristic is particularly suitable for switching off direct currents with greater inductance. Both characteristics are also suitable for the protection of cables and lines.

Full range fuses (gG, gR, quick, slow) reliably break the current in the event of non-permissible overload and short-circuit currents.

Partial range fuses (aM, aR) exclusively serve short-circuit protection.

The following operational classes are included in the product range:

- gG (DIN VDE/IEC) $\hat{=}$ Full range cable and line protection
- aM (DIN VDE/IEC) $\hat{=}$ Partial range switching device protection
- aR (DIN VDE/IEC) $\hat{=}$ Partial range semiconductor protection
- gR (DIN VDE/IEC) $\hat{=}$ Full range semiconductor protection
- gS (DIN VDE/IEC) $\hat{=}$ Full range semiconductor protection and cable and line protection
- Quick (DIN VDE/IEC/CEE) $\hat{=}$ Full range cable and line protection
- Slow (DIN VDE) $\hat{=}$ Full range cable and line protection

gL/gG operational class

These days, many Siemens fuses bear the mark "gL/gG operational class". These fuses mark the transitional period between the no longer valid DIN VDE regulation (gL operational class) and the new international standard (gG operational class). However, all future, fuses will no longer bear the mark "gL operational class".

Breaking capacity

A key feature of these fuses is their high rated breaking capacity and extremely small footprint. The basic demands and circuit data for tests – voltage, power factor, actuating angle etc. – are specified in both national (DIN VDE 0636) and international (IEC 60269) regulations.

However, for a constant failsafe breaking capacity, from the smallest non-permissible overload current through to the highest breaking current, a number of quality characteristics need to be taken into account when designing and manufacturing fuse links. These include the design of the fuse-element with regard to dimensions and punch dimension and its position in the fuse body, as well as its compressive strength and the thermal resistance of the body. The chemical purity, particle size and the density of the quartz sand also play a key role.

The rated breaking capacity for AC voltage for NEOZED and the majority of DIAZED fuses – is 50 kA AC, and in the case of LV HRC fuse links, it is even 120 kA AC.



Faster arcing and precise arc quenching are the requirements for a reliable breaking capacity.

Current limiting

As well as a failsafe rated breaking capacity, the current-limiting effect of a fuse link is of key importance for the cost effectiveness of a system. In the event of short-circuit breaking by a fuse, the breaking current continues to flow through the network until the fuse link is switched off. The breaking current is merely limited through the system impedance.

The simultaneous melting of all the bottlenecks of a fuse-element produce a sequence of tiny partial arcs that ensure a fast breaking operation with strong current limiting. The current limiting is also strongly influenced by the production quality of the fuse – which in the case of Siemens fuses is extremely high. For example, an LV HRC fuse link, size 2 A to (224 A), limits a breaking current with a possible r.m.s. value of approx. 50 kA to a let-through current with a peak value of approx. 18 kA. This strong current limiting provides constant protection for the system against excessive loads.

Overview

Assignment of cable and line protection

When assigning fuses to cable and line protection in the event of an overload, in compliance with DIN VDE 0100 Part 430, the following conditions must be met:

(1) $I_B \leq I_n \leq I_2$ (rated current rule)

(2) $I_2 \leq 1.45 \times I_2$ (tripping rule)

I_B : Operational current of the electrical circuit

I_n : Rated current of the selected protective device

I_2 : Permissible current carrying capacity of the cable or line under specified operating conditions

I_2 : Tripping current of the protective device under specified operating conditions ("conventional tripping current").

These days, the factor 1.45 has become an internationally accepted compromise of the protection and utilization ratio of a line, taking into account the breaking behavior of the protective device (e.g. fuse).

In compliance with the supplementary requirements for DIN VDE 0636, Siemens fuse links of gG operational class comply with the following conditions:

"Load breaking switching with $I_2 = 1.45 \times I_n$ during conventional test duration under special test conditions in accordance with the aforementioned supplementary requirements of DIN VDE 0636".

This therefore permits direct assignment.

Rated power dissipation

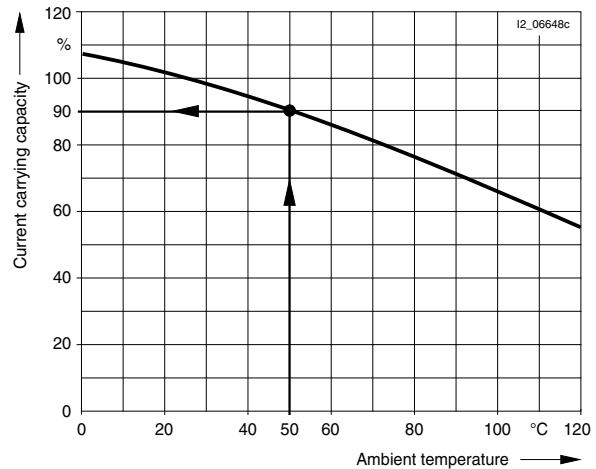
The cost effectiveness of a fuse depends largely on the rated power dissipation (power loss). This should be as low as possible and have low self-heating. However, when assessing the power dissipation of a fuse, it must also be taken into account that there is a physical dependence between the rated breaking capacity and the rated power dissipation. On the one hand, fuse-elements need to be thick in order to achieve the lowest possible resistance value, while a high rated breaking capacity requires the thinnest possible fuse-elements in order to achieve reliable arc quenching.

Siemens fuses have the lowest possible rated power dissipation while also providing the highest possible load breaking reliability.

These values lie far below the limit values specified in the regulations. This means low temperature rises, reliable breaking capacity and high cost effectiveness.

Load capability with increased ambient temperature

The time/current characteristics of the NEOZED/DIAZED/LV HRC fuse links refer to the ambient temperature of $20\text{ }^\circ\text{C} \pm 5\text{ }^\circ\text{C}$ in accordance with DIN VDE 0636. If higher ambient temperatures are used (see diagram) a lower load capability must be used. For example, at an ambient temperature of $50\text{ }^\circ\text{C}$, an LV HRC fuse link is required that can handle 90 % of the rated current. While the short-circuit behavior is not influenced by an increased ambient temperature, it is influenced by overload and operation at rated value.



Influence of the ambient temperature on the load capability of NEOZED, DIAZED and LV HRC fuse links of gG operational class with natural convection in the distribution board.

Low-Voltage Fuse Systems

NEOZED Fuse Systems

Product overview

Overview

Fuse links



- Rated voltage U_n 400 V AC, 250 V AC
- Rated current I_n 2 ... 100 A
- Size D01, D02 and D03
- gG operational class

Fuse bases



- Made of ceramic or molded plastic
- Molded plastic base: Touch-protected to BGV A3 (VBG4)
- 1 and 3-pole
- Size D01 and D02
- Molded plastic base: Combined terminal at ingoing and outgoing feeder
- For rail mounting
- For busbar mounting

Fuse disconnectors



- Draw-out type for safe, no-voltage changing of fuse links
- Touch-protected to BGV A3 (VBG4)
- Size D01
- Anti-slip terminal at ingoing and outgoing feeder
- For rail mounting
- For busbar mounting
- Knob-operated switch can be sealed

MINIZED switch disconnectors







- Draw-out type for safe, no-voltage changing of fuse links
- Touch-protected to BGV A3 (VBG4)
- Size D01 and D02
- Combined terminal at ingoing and outgoing feeder
- For rail mounting
- For busbar mounting
- Knob-operated switch can be sealed
- Suitable for the switching of loads

Technical specifications

NEOZED fuse links		
Standards	DIN VDE 0636-301, IEC 60269-3-1, HD 630.3.1 S3, DIN VDE 0680	
Dimensions	DIN VDE 0636-301, IEC 60269-3-1, HD 630.3.1 S3	
Operational class	gG	
Rated voltage U_n	V AC V DC	400 250
Rated current I_n	A	2 ... 100
Rated breaking capacity	kA AC kA DC	50 8
Mounting position	any, but preferably vertical	
Non-interchangeability	using adapter sleeves	
Resistance to climate	°C	up to 45 at 95 % rel. humidity
Ambient temperature	°C	-5 ... +40, humidity 90 % at 20

Selection and ordering data

Size	I_n	Identification color	Order No.	Weight 1 unit approx.	PS*/P. unit
	A			kg	Unit(s)
Rated voltage 400 V AC/250 V DC, gG operational class					
Consumer packing, pack of 10					
	D01	2	pink	5SE2 302	0.006 10
		4	brown	5SE2 304	0.006 10
		6	green	5SE2 306	0.006 10
		10	red	5SE2 310	0.007 10
		13	black	5SE2 013-2A	0.007 10
	D02	16	gray	5SE2 316	0.007 10
		20	blue	5SE2 320	0.012 10
		25	yellow	5SE2 325	0.013 10
		32	black	5SE2 332	0.014 10
		35	black	5SE2 335	0.014 10
		40	black	5SE2 340	0.014 10
		50	white	5SE2 350	0.015 10
	D03	63	copper	5SE2 363	0.016 10
		80	silver	5SE2 280	0.039 10
		100	red	5SE2 300	0.042 10
Versions for Italy only (no approvals)					
	D01	20	blue	5SE2 820	0.011 10
		25	yellow	5SE2 825	0.012 10

Low-Voltage Fuse Systems

NEOZED Fuse Systems

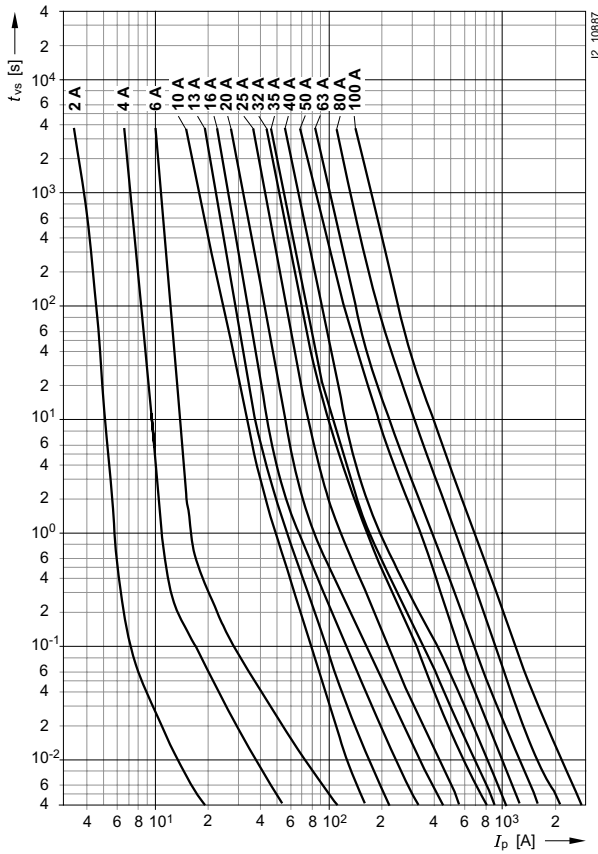
NEOZED fuse links

Characteristic curves

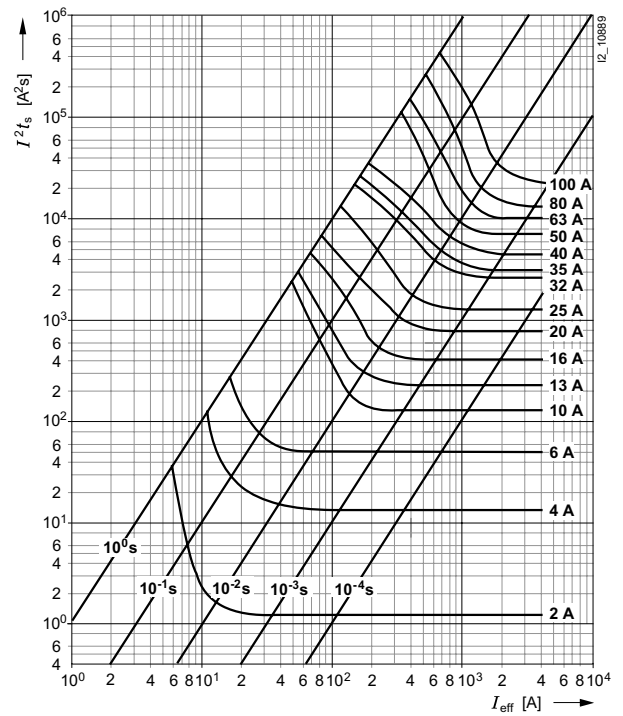
Series 5SE2

Size: D01, D02, D03
 Operational class: gG
 Rated voltage: 400 V AC/250 V DC
 Rated current: 2 ... 100 A

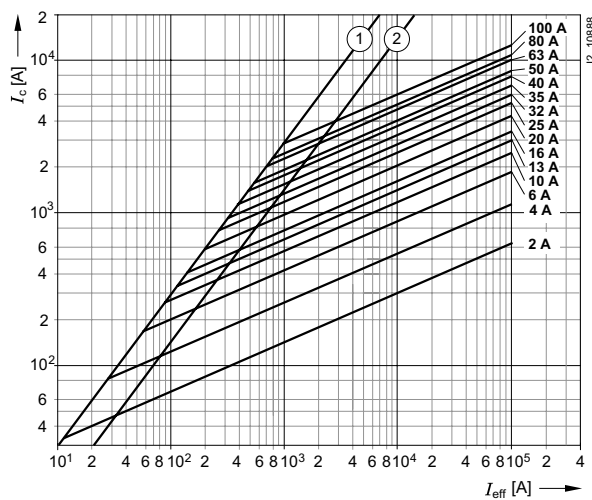
Time/current characteristics diagram



Melting $I^2 t_s$ values diagram



Current limitation diagram



- ① Peak short-circuit current with largest DC component
- ② Peak short-circuit current without DC component

Characteristic curves

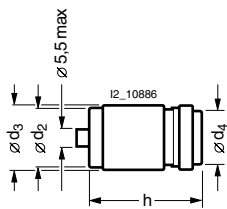
Series 5SE2

Size: D01, D02, D03
 Operational class: gG
 Rated voltage: 400 V AC/250 V DC
 Rated current: 2 ... 100 A

Type	I_n	P_v	$\Delta\theta$	$I^2 t_s$		$I^2 t_a$	
	A	W	k	1 ms A ² s	4 ms A ² s	230 V AC ($t \leq 4$ ms) A ² s	400 V AC A ² s
5SE2 302	2	1.6	19	1.2	1.4	2.9	3.9
5SE2 304	4	1.3	14	12.5	13.6	22	30
5SE2 306	6	1.7	19	46.7	48	58	75
5SE2 310	10	1.3	16	120	136	220	280
5SE2 013-2A	13	1.95	23	220	244	290	370
5SE2 316	16	2.1	24	375	410	675	890
5SE2 320	20	2.4	26	740	810	1250	1650
5SE2 325	25	3.2	33	1210	1300	1900	2600
5SE2 332	32	3.6	34	2560	2800	4300	5500
5SE2 335	35	3.8	36	3060	3500	5100	6500
5SE2 340	40	4	37	4320	4800	7900	9500
5SE2 350	50	4.2	38	6750	7400	10500	13000
5SE2 363	63	5.3	45	10000	10900	16000	20500
5SE2 280	80	5.3	43	13000	15400	25000	34500
5SE2 300	100	6.4	47	22100	30000	46000	60000

Dimensional drawings

5SE2



Size	I_n	Dimensions			
	A	$d_{2 \text{ min}}$	d_3	$d_{4 \text{ max}}$	h
D01	2 ... 16	9.8	11	6	36
D02	20 ... 63	13.8	15.3	10	36
D03	80 ... 100	20.8	22.5	18	43

Low-Voltage Fuse Systems

NEOZED Fuse Systems

NEOZED fuse bases

Overview

Fuse bases made of molded plastic



- Touch-protected to BGV A3 (VBG4)
- 1 and 3-pole
- Size D01 and D02
- For rail mounting
- Combined terminal at ingoing and outgoing feeder
- For busbar mounting



- Touch-protected to BGV A3 (VBG4)
- 1 and 3-pole
- Size D01 and D02
- For rail mounting
- Combined terminal at ingoing and outgoing feeder
- For busbar mounting
- Available with and without cover

Fuse bases made of ceramic



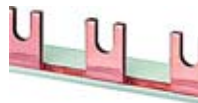
- 1 and 3-pole
- Size D01, D02 and D03
- For mounting rail or screw connection
- Range of terminals available for ingoing and outgoing feeder
- Available with and without cover or alternatively with cap

Covers and caps



- Molded plastic
- Size D01, D02 and D03
- Clip-on or screw-on

Busbars and matching terminals



- Insulated/not insulated
- 1 and 3-pole
- Size D01 and D02

Screw caps



- Molded plastic or ceramic
- Size D01, D02 and D03
- Sealable or with inspection hole

Function

The new 5SG1 301, 5SG1 701, 5SG5 301 and 5SG5 701 fuse bases are part of the D0 fuse system. These devices are used in NEOZED fuse links of gG operational class for cable and line protection and SILIZED fuse links of gR operational class for the protection of semiconductor elements. The fuse bases are available in the standard sizes D01 and D02. The following versions of the devices are available for each product range:

- 1-pole and
- 3-pole

The design of the device enclosures complies with DIN 43880 for modular installation devices, with a mounting depth of 70 mm and a device height of 83 mm. The device width is 1.5 MW per pole.

The fuse bases are simply snapped onto standard 35-mm mounting rails. The devices are fitted with a combined terminal at the ingoing and outgoing feeders. These terminals allow the devices to be rail-mounted with simultaneous connection of cables. They also allow the connection of 2 conductors in a single terminal. Standard fitted sleeves, which are simply inserted in the fuse bases, prevent any interchanging of the fuse links.

Design

Correct infeed

All NEOZED bases must be fed from the bottom to ensure that the threaded ring is insulated during removal of the fuse link.

Types of connection

The terminals of the NEOZED bases are available in different versions to facilitate various installation methods.

New fuse bases

with touch protection to BGV A3 (VBG4), molded plastic combined FR2 terminal at ingoing and outgoing feeder.

Terminals

The terminals of the two type ranges of molded-plastic bases with touch protection comply with BGV A3 (VBG4) and are available in different versions:

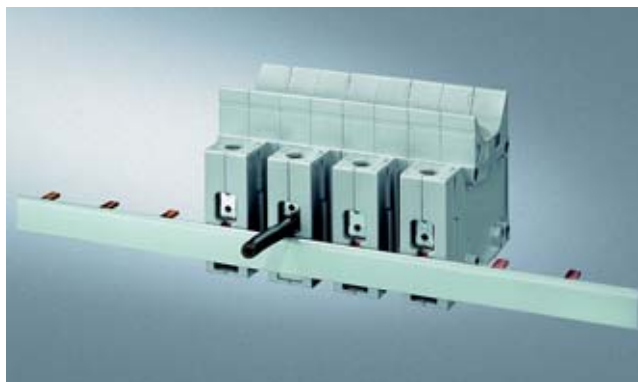
- New type range with combined terminal (rail at the back – infeed at the front) allows connection of 2 conductors
- Type range with combined terminal (rail at the front – infeed at the back)

The terminals of the ceramic NEOZED bases offer the following combinations: KK, SS, KS and BB.

The standard designation signifies the following, e.g. "KS" = :
 1st letter: screw head contact, incoming feeder, bottom terminal
 2nd letter: saddle terminal, outgoing feeder, top terminal



1-pole fuse base



Fuse base	5SG1 301
	5SG1 701
Rail	5ST3 703
End caps	5ST3 748



3-pole fuse base



Fuse base	5SG5 301
	5SG5 701
Rail	5ST3 714
End caps	5ST3 750

Low-Voltage Fuse Systems

NEOZED Fuse Systems

NEOZED fuse bases

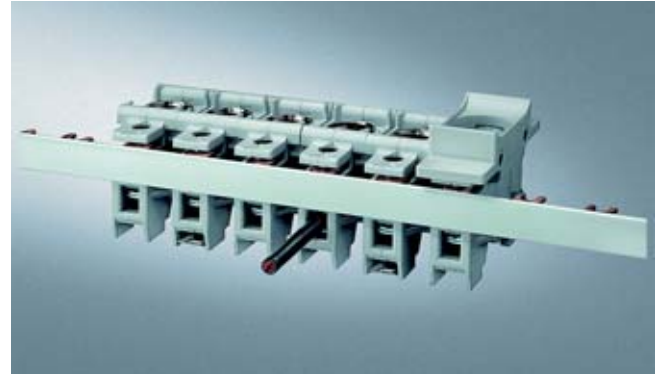
Design

Fuse bases

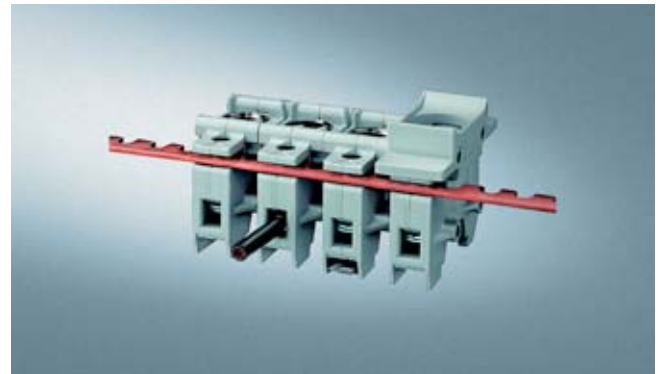
with touch protection to BGV A3 (VBG4), molded plastic
 Combined FR0 terminal at ingoing feeder, R box terminal at outgoing feeder.



1-pole fuse base



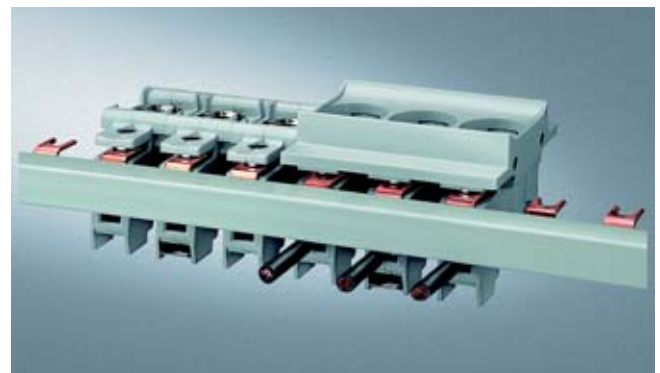
Fuse base 5SG1 330 / 5SG1 331
 5SG1 730 / 5SG1 731
 Rail 5SH5 517
 End cap 5ST3 748



Fuse base 5SG1 330 / 5SG1 331
 5SG1 730 / 5SG1 731
 Rail 5SH5 321 / 5SH5 322



3-pole fuse base



Fuse base 5SG5 330
 5SG5 730
 Rail 5SH5 320
 End caps 5SH5 514

Design

Fuse bases made of ceramic



Fuse base D01
Ingoing feeder: clamp-type terminal B
Outgoing feeder: clamp-type terminal B



Fuse base, 1-pole
Terminal versions
Rail
Terminal

D01 and D02
B and K
5SH5 321 (5SH5 322)
5SH5 328



Fuse base D02
Ingoing feeder: screw head contact K
Outgoing feeder: saddle terminal S



Fuse base, 3-pole
Terminal versions
Rail
Terminal
End caps

D01 and D02
B and K
5SH5 320
5SH5 328
5SH5 514



Fuse base D02
Ingoing feeder: saddle terminal S
Outgoing feeder: saddle terminal S



Fuse base, 3-pole
Terminal version
Rail
Terminal
End caps
(alternative: non-insulated terminals 5ST2 203)

S
5ST3 714
5SH5 327
5ST3 750

Low-Voltage Fuse Systems

NEOZED Fuse Systems

NEOZED fuse bases

Technical specifications

New fuse base made of molded plastic	
Type	5SG1 301 5SG5 301 5SG1 330 5SG1 331 5SG5 330
Size	D01
Valid standards	DIN VDE 0636-301, IEC 60269-3-1, HD 630.3.1 S3
Rated voltage U_n	V 400
Rated current I_n	A 2 ... 16
Rated breaking capacity	20 ... 63
Sealable when installed	
Mounting position	any, but preferably vertical
Mounting depth	mm 64
Degree of protection acc. to IEC 60529	IP20
Terminals touch-protected to BGV A3 (VBG4) at the ingoing and outgoing feeder	Yes
Ambient temperature	°C -5 ... +40, humidity 90 % at 20
Terminals	
Terminals	Anti-slip terminal, combined terminal
Conductor cross-sections	
• Rigid	mm ² 0.75 ... 35
• Solid and stranded	mm ² 0.75 ... 35
• Finely stranded with end sleeve	mm ² 0.75 ... 25
Tightening torque (recommended)	Nm 2.5 ... 3
Hole pitch	MW 1.5

Terminals		B		K		S		FR0/R		FR2	
Terminals		D01	D02	D03	D02	D03	D01	D02	D01	D02	
Size											
Conductor cross-sections											
• Rigid, minimum	mm ²	1.5		10	1.5	10	1.5			0.75	
• Rigid, maximum	mm ²	4	25	50	25	50	25			35	
• Flexible with sleeve, min.	mm ²	1.5	1.5	10	1.5	10	1.5			0.75	
Tightening torques											
• Screw M4	Nm	1.2					--			--	
• Screw M5	Nm	2.0					3			2.5 ... 3	
• Screw M6	Nm	2.5					--			--	
• Screw M8	Nm	3.5					--			--	

Terminal designations

B	Clamp-type terminal
K	Screw head contact
S	Saddle terminal
R	Anti-slip terminal, only one terminal point
FR0	Anti-slip terminal: combined terminal, fork-type rail at the front, incoming feeder at rear, 1.5 MW
FR2	Anti-slip terminal: new type of combined terminal, pin rail at the front, incoming feeder at rear, 1.5 MW

Anti-slip terminals differ in the

- Terminal level for the conductors
- Terminal level for the busbars
- Busbar version (fork-type or pin)
- Hole pitch

Different versions cannot be mounted together. To facilitate assignment of the busbars, we have introduced the terminal markings: R, FR0 and FR2.

Selection and ordering data

	Size	I_n	Matching cover	Terminals ¹⁾	MW	Order No.	Weight 1 unit approx. kg	PS*/ P. unit Unit(s)
Fuse base, molded plastic, with touch protection to BGV A3 (VBG4)								
	1-pole							
		D01 16 D02 63	-- --	FR2	1.5	5SG1 301 5SG1 701	0.123 0.120	1 1
	3-pole							
		D01 16 D02 63	-- --	FR2	4.5	5SG5 301 5SG5 701	0.371 0.360	1 1
	1-pole with cover							
		D01 16 D02 63	(A1) (A1)	FR0/R FR0/R	1.5 1.5	5SG1 330 5SG1 730	0.068 0.087	6 6/2
	1-pole without cover							
		D01 16 D02 63	A1 A1	FR0/R FR0/R	1.5 1.5	5SG1 331 5SG1 731	0.056 0.080	6 6
	3-pole with cover							
		D01 16 D02 63	(A2) (A2)	FR0/R FR0/R	4.5 4.5	5SG5 330 5SG5 730	0.216 0.252	2 2

(A1) means that the fuse base is supplied with cover as standard.
A1 means that the fuse base is delivered without cover, however, this cover can be ordered separately as a spare part.















1) For terminal version, see pages 1/9 and 1/12,
FR0/R = ingoing/outgoing feeder

Low-Voltage Fuse Systems

NEOZED Fuse Systems

NEOZED fuse bases

Selection and ordering data

	Size	I_n	Matching cover	Terminals ¹⁾	MW	Order No.	Weight 1 unit approx.	PS*/P. unit
	A						kg	Unit(s)
Fuse bases made of ceramic								
1-pole								
with cover								
								
	D01	16	(A4)	BB	1.5	5SG1 553	0.083	6
	D02	63	(A10)	SS	1.5	5SG1 653	0.093	6
	D02	63	(A10)	KS	1.5	5SG1 693	0.090	6
without cover								
								
	D01	16	A4	BB	1.5	5SG1 595	0.071	6
	D02	63	A10	SS	1.5	5SG1 655	0.081	6
	D02	63	A10	KS	1.5	5SG1 695	0.078	6
	D03	100	A6, A9	KS	2.5	5SG1 812	0.176	1/10
for screw connection only, without cover								
								
	D01	16	A4	BB	1.5	5SG1 590	0.061	6
	D02	63	A10	SS	1.5	5SG1 650	0.078	6
	D03	100	A6, A9	KS	2.5	5SG1 810	0.176	1/10
with cap								
								
	D01	16	(A8)	BB	1.5	5SG1 594	0.105	6
	D02	63	(A8)	SS	1.5	5SG1 694	0.115	6
	D03	100	(A9)	KS	2.5	5SG1 813	0.242	1/10
3-pole								
with cover								
								
	D01	16	(A5)	BB	4.5	5SG5 553	0.263	2
	D02	63	(A11)	SS	4.5	5SG5 653	0.240	2
	D02	63	(A11)	KS	4.5	5SG5 693	0.290	2
without cover								
								
	D01	16	A5	BB	4.5	5SG5 555	0.228	2
	D02	63	A11	SS	4.5	5SG5 655	0.265	2
	D02	63	A11	KS	4.5	5SG5 695	0.255	2
for screw connection only, without cover								
								
	D01	16	A5	BB	4.5	5SG5 550	0.228	2
	D02	63	A11	SS	4.5	5SG5 650	0.260	2
	D02	63	A11	KS	4.5	5SG5 690	0.250	2

(A4) means that the fuse base is delivered with cover as standard.
A4 means that the fuse base is supplied without cover, however, the cover can be ordered separately as a spare part.

1) For terminal version, see pages 1/9 and 1/12.

Accessories


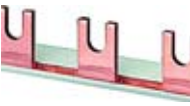

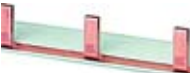



	MW	Order No.	Weight 1 unit approx. kg	PS*/ P. unit Unit(s)
NEOZED covers made of molded plastic				
for fuse bases made of molded plastic				
	Cover A1 (for sizes D01, D02), clip-on	1.5	5SH5 244	0.008 5
	Cover A2 (for sizes D01, D02), clip-on	4.5	5SH5 245	0.017 5
for fuse bases made of ceramic				
	Cover A4 (for size D01), clip-on	1.5	5SH5 251	0.012 5
	Cover A10 (for size D02), clip-on	1.5	5SH5 253	0.020 5
	Cover A5 (for size D01), clip-on	4.5	5SH5 252	0.035 1/5
	Cover A11 (for size D02), clip-on	4.5	5SH5 254	0.045 1/5
	Cover A6 (for size D03), screw-on	2.5	5SH5 233	0.021 5/20
NEOZED caps made of molded plastic				
	Cover A8 (for sizes D01, D02), clip-on	--	5SH5 235	0.034 5
	Cover A9 (for size D03), screw-on	--	5SH5 234	0.066 1/10

Low-Voltage Fuse Systems

NEOZED Fuse Systems














NEOZED fuse bases

Accessories

Size	Length approx. mm	Conductor cross-section mm ²	Load capacity up to A	For terminals ¹⁾	MW	Order No.	Weight 1 unit approx. kg	PS*/P. unit Unit(s)	
Busbars									
The load capacity values are valid for centered infeed.									
Fork-type terminals, non-insulated									
1-pole									
	D01 and	1000	20	116	FR0, K	1.5	5SH5 321	0.214	1/50
	D02	1000	36	168	FR0, K	1.5	5SH5 322	0.321	1/50
Fork-type terminals, insulated									
1-pole									
	D01/D02	1000	24	160	FR0, K	1.5	5SH5 517	0.550	1/50
	3-pole								
	D01/D02	1000	16	120	FR0, K	1.5	5SH5 320	0.843	1
	Pins, insulated								
Degree of pollution 2									
1-pole									
	D01/D02	1000	16	130	FR2, S	1.5	5ST3 703	0.190	1/50
	3-pole								
	D01/D02	1000	16	120	FR2, S	1.5	5ST3 714	0.430	1/20
	End caps for busbars								
	for 5SH5 320					5SH5 514	0.001	10	
	for 5ST3 714					5ST3 750	0.001	1/10	
	for 5SH5 517, 5ST3 701					5ST3 748	0.001	1/10	
Busbar adapters									
	for clipping onto busbars 12 mm x 5 mm, with 40 mm center clearance, device width 4,5 MW, with connecting cables, 3 mm x 16 mm ² for rated current 63 A, for mounting in modular installation devices					5SH5 503	0.280	1	
	Busbar adapter for clipping onto busbars with 60 mm center clearance, see SR60 busbar system								

1) For terminal version, see pages 1/11 and 1/12.

Accessories


Version/size			Order No.	Weight 1 unit approx. kg	PS*/ P. unit Unit(s)	
Busbar terminals						
	Non-insulated, pin-type for conductors from 6 mm ² ... 35 mm ²		5ST2 203	0.001	1/20	
	Insulated, for clipping onto fork-type or pin-type for conductors from 6 mm ² ... 35 mm ²		5ST2 157	0.030	1/10	
	Insulated, fork-type for conductors from 6 mm ² ... 25 mm ²		5SH5 328	0.014	10	
	Insulated, pin-type for conductors from 2 mm ² ... 25 mm ²		5SH5 327	0.014	10	
	Non-insulated, pin-type for two conductors, each from 2 mm ² ... 16 mm ²		5SH5 326	0.016	1/10	
NEOZED screw caps						
	Molded plastic, with inspection hole		5SH4 116 5SH4 163	0.007 0.008	10 10	
	Ceramic		5SH4 316 5SH4 363 5SH4 100	0.014 0.015 0.070	10 10 3	
	Ceramic, with inspection hole		5SH4 317 5SH4 362	0.014 0.017	10 10	
Size	For fuse up to A	Identification color	Order No.	Weight 1 unit approx. kg	PS*/ P. unit Unit(s)	
NEOZED adapter sleeves						
	D01	2	pink	5SH5 002	0.001	10
		4	brown	5SH5 004	0.001	10
		6	green	5SH5 006	0.001	10
		10/13	red	5SH5 010	0.001	10
	D02	20	blue	5SH5 020	0.001	10
		25	yellow	5SH5 025	0.001	10
		32/35/40	black	5SH5 035	0.001	10
		50	white	5SH5 050	0.001	10
		80	silver	5SH5 080	0.001	10
	D03					
For adaptation of NEOZED D01 fuse links from 2 A ... 16 A for insertion in NEOZED bases D02						
	D02	2	pink	5SH5 402	0.001	10
		4	brown	5SH5 404	0.001	10
		6	green	5SH5 406	0.001	10
		10/13	red	5SH5 410	0.001	10
		16	gray	5SH5 416	0.001	10
	NEOZED adapter sleeve fitter		5SH5 100	0.016	1	

Low-Voltage Fuse Systems

NEOZED Fuse Systems

NEOZED fuse bases

Accessories

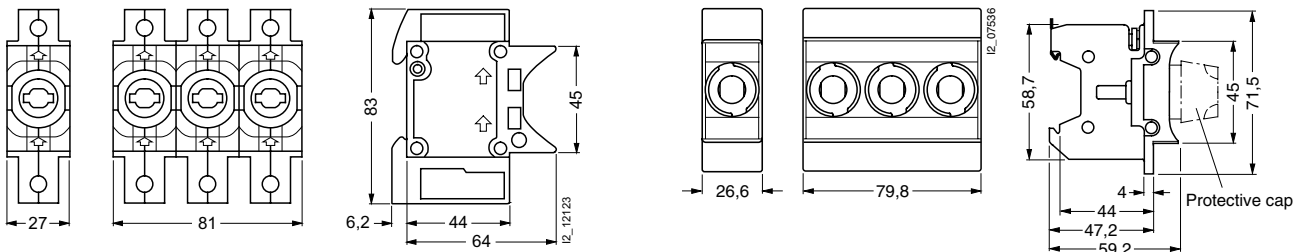
Size	For fuse	Identification color	Order No.	Weight 1 unit approx.	PS*/P. unit
	up to A			kg	Unit(s)
 <p>NEOZED retaining springs for adapting NEOZED D02 screw caps for insertion of NEOZED D01 fuse links</p>	D02	2 ... 16	5SH5 400	0.001	25
	for application in the five new German Laender, for adaptation of DL screw caps to insert NEOZED D01 fuse links in DL bases				
DL	2 ... 16		5SH5 417	0.001	25

Dimensional drawings

Fuse bases, with touch protection to BGV A3 (VBG4), molded plastic

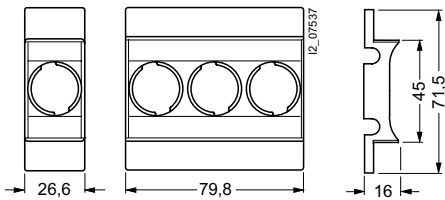
Size D01/D02, can be busbar mounted with combined terminal
5SG1 301, 5SG1 701, 5SG5 301, 5SG5 701

with cover
5SG1 330, 5SG1 331, 5SG1 730, 5SG1 731, 5SG5 330, 5SG5 730

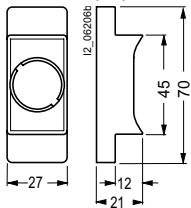


NEOZED covers made of molded plastic

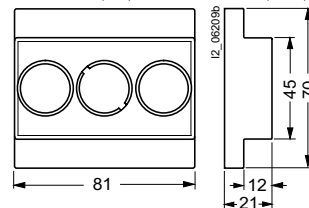
NEOZED covers for NEOZED bases, made of molded plastic
5SH5 244 (A1) and 5SH5 245 (A2)



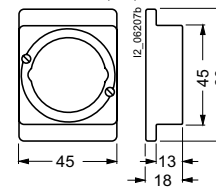
NEOZED cover
5SH5 251 (A4) and 5SH5 253 (A10)



5SH5 252 (A5) and 5SH5 254 (A11)

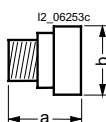


5SH5 233 (A6)



NEOZED screw caps

5SG4



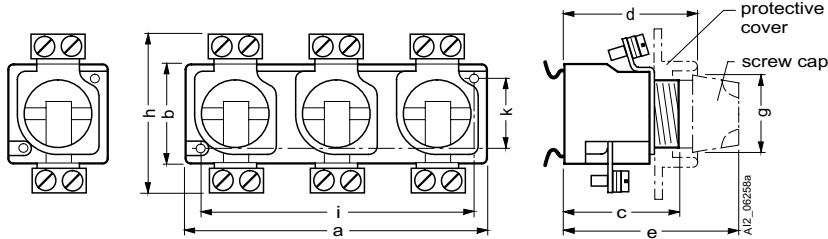
Type	Size	Sealable	For mounting depth	Dimensions a	Dimensions b
5SH4 116	D01	--	55/70	24.5	23
5SH4 163	D02	--	55/70	24.5	23
5SH4 316	D01	x	70	33	26.5
5SH4 363	D02	x	70	33	26.5
5SH4 100	D03	--	76	37	44
5SH4 317	D01	--	70	29.5	25
5SH4 362	D02	--	70	30.5	25

Dimensional drawings

Ceramic

NEOZED base

5SG1, 5SG5



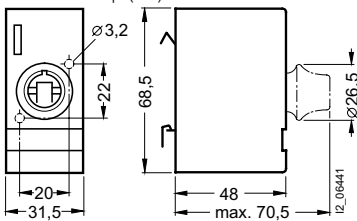
Type	Version	Size	Type of connection	Dimensions									
				a	b	c	d	e	g not sealed/ sealed	h	i	k	
Clip-on with cover													
5SG1 553	1-pole	D01	BB	26.8	36	40	56	70	23/26.5	54	--	--	
5SG1 653		D02	SS	26.8	36	41	56	70	23/26.5	59	--	--	
5SG1 693		D02	KS	26.8	36	41	56	70	23/26.5	60	--	--	
5SG5 553	3-pole	D01	BB	80.8	36	40	56	70	23/26.5	54	--	--	
5SG5 653		D02	SS	80.8	36	41	56	70	23/26.5	59	--	--	
5SG5 693		D02	KS	80.8	36	41	56	70	23/26.5	60	--	--	
Clip-on without cover													
5SG1 595	1-pole	D01	BB	26.8	36	40	56	70	23/26.5	54	--	--	
5SG1 655		D02	SS	26.8	36	41	56	70	23/26.5	59	--	--	
5SG1 695		D02	KS	26.8	36	41	56	70	23/26.5	60	--	--	
5SG1 812		D03	KS	44.9	50	44	54.5	76	44	86	--	--	
5SG5 555	3-pole	D01	BB	80.8	36	40	56	70	23/26.5	54	--	--	
5SG5 655		D02	SS	80.8	36	41	56	70	23/26.5	59	--	--	
5SG5 695		D02	KS	80.8	36	41	56	70	23/26.5	60	--	--	
Screw-on without cover													
5SG1 590	1-pole	D01	BB	26.8	36	40	56	70	23/26.5	54	20	22	
5SG1 650		D02	SS	26.8	36	41	56	70	23/26.5	59	20	22	
5SG1 810		D03	KS	44.9	50	46	54.5	76	44	86	32	32	
5SG5 550	3-pole	D01	BB	80.8	36	40	56	70	23/26.5	54	74	22	
5SG5 650		D02	SS	80.8	36	41	56	70	23/26.5	59	74	22	
5SG5 690		D02	KS	80.8	36	41	56	70	23/26.5	60	74	22	

Type of connection:
 K = screw head contact
 B = clamp-type terminal
 S = saddle terminal

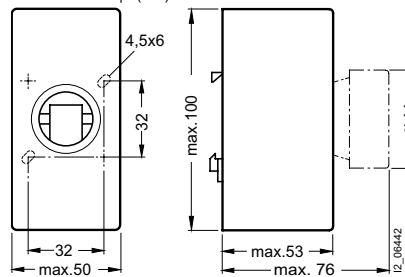
BB = clamp-type terminal at ingoing feeder
 clamp-type terminal at outgoing feeder
 S = saddle terminal at ingoing feeder
 saddle terminal at outgoing feeder
 KS = screw head contact at ingoing feeder
 saddle terminal at outgoing feeder

NEOZED base with cap

D01/D02
 5SG1 594, 5SG1 694
 5SH5 235 cap (A8)



D03
 5SG1 813
 5SH5 234 cap (A9)



Low-Voltage Fuse Systems

NEOZED Fuse Systems

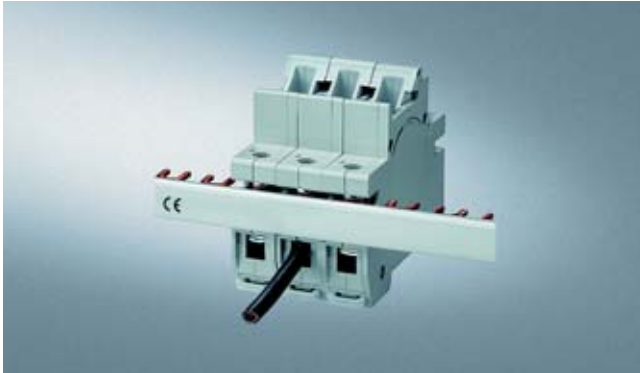
NEOZED fuse disconnectors

Benefits

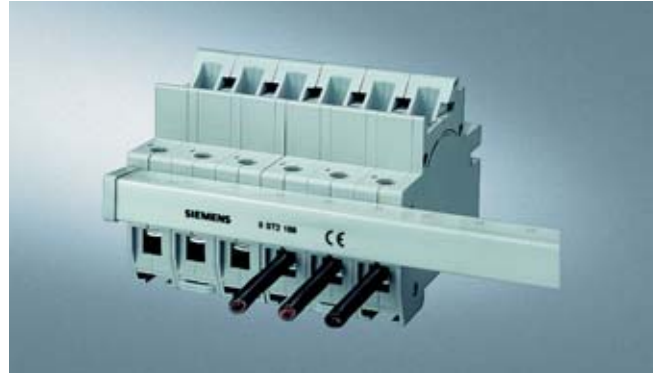
- With draw-out type for safe, no-voltage changing of fuse links
- Rated voltage: 400 V AC/48 V DC
- No switching under load
- With combined terminal according to BGV A3 (VBG4) at incoming and outgoing feeder

Design

Busbar mounting



Fuse disconnectors, 1-pole
5SG7 610
Rail 5ST2 186 or 5ST2 140
End caps 5ST3 748



Fuse disconnectors, 3-pole
5SG7 630
Rail 5ST2 188 or 5ST2 192
End caps 5ST2 177

Technical specifications

NEOZED fuse disconnectors		5SG7 6
Valid standards		DIN VDE 0638, EN 60947-3, DIN VDE 0660-107
Dimensions		DIN 43880
Main switch characteristic		EN 60204-1
Dielectric characteristic		EN 60664-1
Rated voltage U_n	V	230/400 AC, 240/415 AC
	V	48 DC: 1-pole, 110 DC: 2-pole in series
Rated current I_n	A	16
Rated insulation voltage	V AC	400
Rated impulse withstand voltage	V AC	2500
Rated breaking capacity	kA	50 AC
Sealable when switched on		yes
Mounting position		horizontal or vertical
Degree of protection acc. to IEC 60529 in distribution boards with section cover		IP20
Ambient temperature	°C	-5 ... +40, humidity 90 % at 20
Terminals		FR1
Terminals		FR1
Size		D01
Conductor cross-sections		
Minimum conductor cross-section of 1.5 mm ² must be observed in accordance with VDE 0638		
Rigid, minimum	mm ²	1.5
Rigid, maximum	mm ²	16
Flexible with sleeve, min.	mm ²	1.5

Terminal designations


FR1 = anti-slip terminal:
Combined terminal, fork-type rail at the front, incoming feeder at rear, 1 MW

Anti-slip terminals differ in the





- Terminal level for the conductors
- Terminal level for the busbars
- Busbar version (fork-type or pin)
- Hole pitch

Different versions cannot be mounted together. To facilitate assignment of the busbars, we have introduced the terminal marking FR1.

Selection and ordering data

	Number of poles	I_n A	Terminals	MW	Order No.	Weight 1 unit approx. kg	PS*/ P. unit Unit(s)
	1	16	FR1	1	5SG7 610	0.070	1
	1 + N	16	FR1	2	5SG7 650	0.150	1
	2	16	FR1	2	5SG7 620	0.150	1
	3	16	FR1	3	5SG7 630	0.220	1
	3 + N	16	FR1	4	5SG7 660	0.300	1

Accessories

Size	Length approx. mm	Conductor cross-section mm ²	Load capacity up to A	Version	Order No.	Weight 1 unit approx. kg	PS*/ P. unit Unit(s)
The load capacity values are valid for centered infeed.							
Fork, insulated							
Degree of pollution 2							
Busbars, 1-phase							
	D01	220	16	120	with end caps	5ST2 186	0.090
		1000	16	120		5ST2 190	0.500
Busbars, 2-phase							
	D01	220	16	120	with end caps	5ST2 187	0.160
		1000	16	120		5ST2 191	0.710
Busbars, 3-phase							
	D01	220	16	120	with end caps	5ST2 188	0.230
		1000	16	120		5ST2 192	1.100
End caps for busbars							
	1-phase				5ST3 748	0.001	1/10
	2 and 3-phase				5ST2 197	0.001	1/10

Low-Voltage Fuse Systems

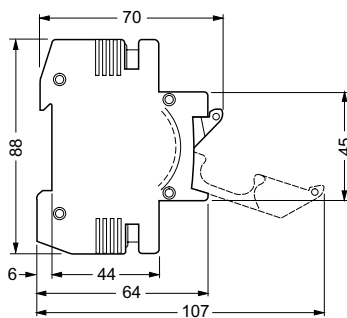
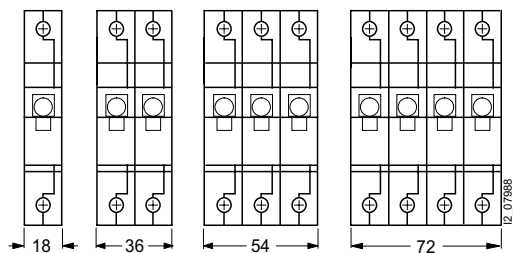
NEOZED Fuse Systems

NEOZED fuse disconnectors

Dimensional drawings

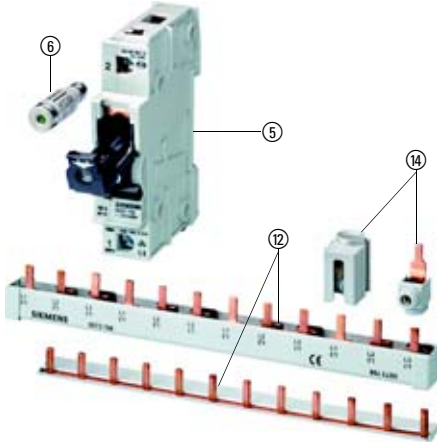
D01, draw-out type

5SG7 6.0



Overview

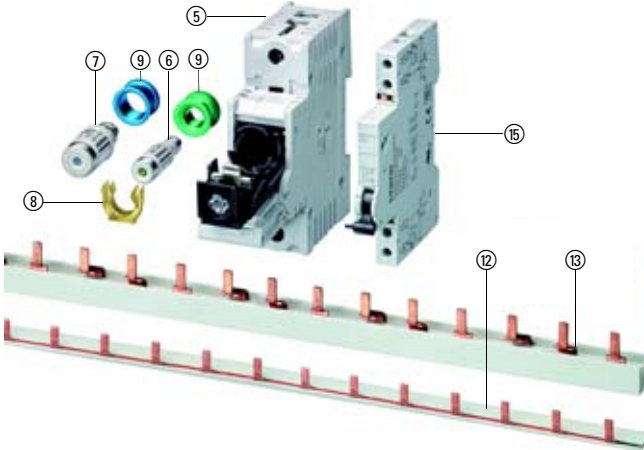
MINIZED switch disconnector D01, draw-out type



- Mounting depth 55 mm
- Touch-protected to BGV A3 (VBG4)
- Size D01
- For rail mounting
- Anti-slip terminal at ingoing and outgoing feeder
- For busbar mounting
- Knob-operated switch can be sealed
- With draw-out technology for safe, no-voltage changing of fuse links
- Special version for Italy for currents up to 25 A
- Suitable for the switching of loads

- ⑤ **MINIZED D01 switch disconnector, draw-out type**
- ⑥ NEOZED D01 fuse link
- ⑫ Busbar, insulated, pins
- ⑭ Terminal, not insulated/insulated, pins

MINIZED D02 switch disconnector, draw-out type



- Mounting depth 70 mm
- Touch-protected to BGV A3 (VBG4)
- Size D02
- For rail mounting
- Combined terminal up to 35 mm² at ingoing and outgoing feeder
- For busbar mounting
- Knob-operated switch can be sealed
- With draw-out technology for fast and safe no-voltage changing of fuse links
- Special VNB version with rated currents 25 A, 35 A and 50 A
- Suitable for the switching of loads

- ⑤ **MINIZED D02 switch disconnector, draw-out type**
- ⑥ NEOZED fuse link, size D01
- ⑦ NEOZED fuse link, size D02
- ⑧ Reducer for fuse links, size D01
- ⑨ NEOZED adapter sleeves, sizes D01 and D02
- ⑫ Busbar, 1-pole, 1.5 MW
- ⑬ Busbar, 3-pole, 1.5 MW
- ⑯ Auxiliary switch

Benefits

Function

MINIZED switch disconnectors belong to the NEOZED fuse system range. They completely disconnect the phase in the incoming and outgoing cable by switching off and are designed for switching loads. NEOZED fuse links of gG operational class are used for cable and line protection.

The switch disconnectors are available in 2 series in sizes D01 and D02. The following poles are available for each series:

- 1-pole
- 1-pole + N
- 2-pole
- 3-pole
- 3-pole + N

For both series, the fuse link is placed in a so-called drawer, which is then pushed into the switch disconnector until it locks into place. This means that changing the fuse is insulated and touch-protected. A mechanical lock prevents connection of the load if the fuse link has not been properly inserted in the correct slot of the switch disconnector. To switch the load, the devices are also equipped with an additional operating lever, i.e. knob.

Universal application

The MINIZED switch disconnectors D02 (5SG7 1.3) can accept both fuse links in the sizes D02 and D01. In order for the smaller D01 fuse links to fit, a reducer is inserted in the drawer of the switch disconnector. In order to ensure that the fuse links are not interchangeable, standard adapter sleeves are inserted, like those usually used in fuse bases.

The devices are fastened by snapping onto standard mounting rails. The infeed can be from the top or the bottom. Because the switch disconnectors are fitted with the same combined terminals at the top and the bottom, the devices can also be rail-mounted at the top or bottom.

The knobs clearly indicate the necessary position of the switch. The switch position can also be determined over an auxiliary switch as a status signal, which can be retrofitted.

The indicator of the fuse link is visible through a window in the knob.

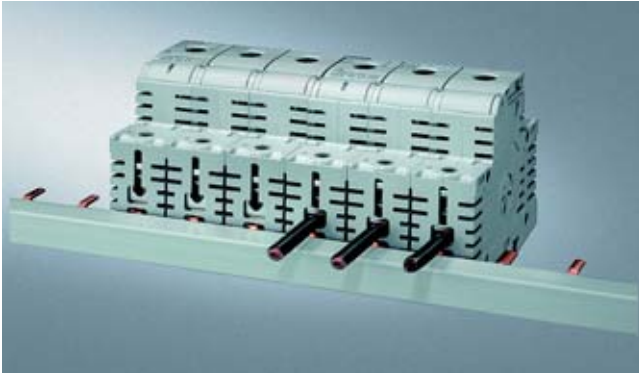
Low-Voltage Fuse Systems

NEOZED Fuse Systems

MINIZED switch disconnectors

Design

Busbar mounting



- New MINIZED D02, 3-pole, with combined FR2 terminals
- Busbar at the back, feeder cable at the front
- Rail: 5ST3 714
- End caps: 5ST3 750

Technical specifications

MINIZED switch disconnectors		5SG7 7	5SG7 1.3	5SG7 133-8BA..
Valid standards		DIN VDE 0660-107, DIN VDE 0638, DIN VDE 0686, EN 60947-3		
Dimensions		DIN 43880		
Main switch characteristic		EN 60204-1/11.98		
Dielectric characteristic		EN 60664-1/11.03		
Rated voltage U_n	V AC V DC	230/400, 240/415 48, 1-pole, 110, 2-pole in series	65, 1-pole, 130, 2-pole in series	65, 1-pole, 130, 2-pole in series
Rated current I_n	A	16	63	25, 35, 50
Rated insulation voltage	V AC	400	500	500
Rated impulse withstand voltage	kV AC	2.5	6	6
Rated breaking capacity	kA AC	50		
Breaking capacities				
Utilization category acc. to VDE 0638	AC-22	A	16	63
	AC-23	A	10	--
	DC-22	A	16	--
Utilization category acc. to EN 60947-3	AC-22B	A	16	63
	AC-23B	A	10	35
	DC-22B	A	16	63
No-voltage changing of fuse links		yes		
Sealable when switched on		yes		
Mounting position		vertical		
Mounting depth	mm	55	70	
Degree of protection acc. to IEC 60529		IP20		
Terminals touch-protected to BGV A3 (VBG4) at incoming and outgoing feeder		yes		
Ambient temperature	°C	-5 ... +40, humidity 90 % at 20		
Terminals				
Terminals		R	FR2	FR2
Sizes		D01	D02	D02
Conductor cross-sections				
Minimum conductor cross-section of 1.5 mm ² must be observed in accordance with VDE 0638				
• Rigid, minimum	mm ²	1.5 ... 16	1.5 ... 35	1.5 ... 35
• Flexible with sleeve	mm ²	1.5 ... 16	1.5 ... 35	1.5 ... 35
Tightening torques	Nm	1.2	4	4
Hole pitches	MW	1	1.5	1.5
















Terminal designations

- R anti-slip terminal – only one terminal point
 FR2 anti-slip terminal: new type of combined terminal, pin rail at the front, incoming feeder at rear, 1.5 MW

- Anti-slip terminals differ in the
- Terminal level for the conductors
 - Terminal level for the busbars
 - Busbar version (fork-type or pin)
 - Hole pitch

Different versions cannot be mounted together. To facilitate assignment of the busbars, we have introduced the terminal markings R and FR2.

Selection and ordering data

	Number of poles	I_n A	Terminals	MW	Order No.	Weight 1 unit approx. kg	PS*/ P. unit Unit(s)
D01, draw-out type, mounting depth 55 mm							
for rail mounting anti-slip terminal at ingoing and outgoing feeder							
		1	16	R	1	5SG7 713	0.080 1/3
		Version for Italy only (no approvals)				5SG7 713-1B	0.080 1/3
		25					
		1 + N	16	R	2	5SG7 753	0.150 1/2
		Version for Italy only (no approvals)				5SG7 753-1B	0.150 1/2
		25					
		2	16	R	2	5SG7 723	0.160 1/2
		Version for Italy only (no approvals)				5SG7 723-1B	0.160 1/2
		25					
		3	16	R	3	5SG7 733	0.254 1
		Version for Italy only (no approvals)				5SG7 733-1B	0.254 1
		25					
		3 + N	16	R	4	5SG7 763	0.310 1
		Version for Italy only (no approvals)				5SG7 763-1B	0.310 1
		25					
D02, draw-out type, mounting depth 70 mm							
for rail mounting N conductor is leading for switch-on and delayed for switch-off anti-slip terminal at ingoing and outgoing feeder							
Enclosure, knob							
<ul style="list-style-type: none"> • Silicone-free, chlorine-free • Heat-resistant up to 140 °C • Self-extinguishing acc. to UL 94 • Creep resistance CTI 200 							
Fuse-carrier							
<ul style="list-style-type: none"> • Silicone-free, halogen-free • Heat-resistant up to 150 °C • Self-extinguishing acc. to UL 94 							
		1	63	FR2	1.5	5SG7 113	0.145 1
		1 + N	63	FR2	3	5SG7 153	0.267 1
		2	63	FR2	3	5SG7 123	0.283 1
		3	63	FR2	4.5	5SG7 133	0.421 1
		Versions for Austria only (with permanently fitted adapter sleeves, incl. fuse link)				5SG7 133-8BA25	
		3	25			5SG7 133-8BA35	
		35			5SG7 133-8BA50		
		50					
		3 + N	63	FR2	6	5SG7 163	0.540 1

Low-Voltage Fuse Systems

NEOZED Fuse Systems

MINIZED switch disconnectors



Accessories

Size	Length approx. mm	Conductor cross-section mm ²	Load capacity up to A	For terminals ¹⁾	MW	Order No.	Weight 1 unit approx. kg	PS*/P. unit Unit(s)
For MINIZED D01, draw-out type, mounting depth: 70 mm								
Busbars								
Pins, insulated, pollution degree 2, 3-pole								
D01	1000	16	120	R	1	5ST3 710	0.430	1/20
D01	216	16	120	R	1	5ST3 708	0.100	1/25
Terminal								
not insulated, up to 25 mm ²								
For MINIZED D02, draw-out type, mounting depth: 55 mm								
Busbars								
Pins, insulated, pollution degree 2								
1-pole								
D02	1000	16	130	FR2	1.5	5ST3 703	0.190	1/50
3-pole								
D02	1000	16	120	FR2	1.5	5ST3 714	0.430	1/20
End caps for busbars								
for 5ST3 708, 5ST3 710, 5ST3 714								
						5ST3 750	0.001	1/10
for 5ST3 701								
						5ST3 748	0.001	1/10

1) For terminal versions, see page 1/24.

Size	Contact load	Order No.	Weight 1 unit approx. kg	PS*/P. unit Unit(s)
For MINIZED D02, draw-out type, mounting depth: 70 mm				
Auxiliary switches				
<ul style="list-style-type: none"> For indication of switching state of the switch disconnector Can be retrofitted individually using factory-fitted brackets 				
1 NO + 1 NC				
Width 0.5 MW				
Min. contact load		50 mA, 24 V		
Max. contact load				
<ul style="list-style-type: none"> NO contacts <ul style="list-style-type: none"> AC-14, 2 A, 400 V AC AC-14, 6 A, 230 V AC DC-13, 1 A, 220 V DC DC-13, 1 A, 110 V DC DC-13, 3 A, 60 V DC DC-13, 6 A, 24 V DC NC contacts <ul style="list-style-type: none"> AC-13, 2 A, 400 V AC AC-13, 6 A, 230 V AC DC-13, 1 A, 220 V DC DC-13, 1 A, 110 V DC DC-13, 3 A, 60 V DC DC-13, 6 A, 24 V DC 				
			0.050	1
			5ST3 010	

Accessories

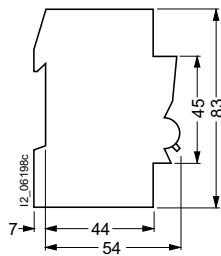
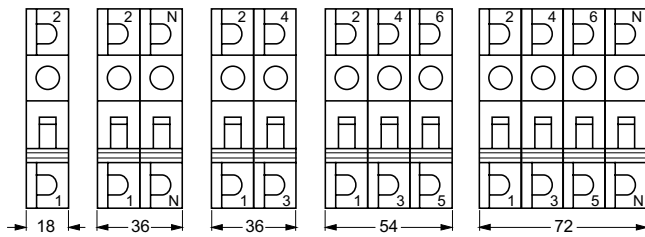
Size	For fuse up to A	Identification color	Order No.	Weight 1 unit approx. kg	PS*/ P. unit Unit(s)
Reducer for NEOZED fuse links D01			5SH5 527	0.003	10
NEOZED adapter sleeves					
 D01	2	pink	5SH5 402	0.001	10
	4	brown	5SH5 404	0.001	10
	6	green	5SH5 406	0.001	10
	10/13	red	5SH5 410	0.001	10
	16	gray	5SH5 416	0.001	10
 D02	20	blue	5SH5 020	0.001	10
	25	yellow	5SH5 025	0.001	10
	32/35/40	black	5SH5 035	0.001	10
	50	white	5SH5 050	0.001	10
	NEOZED adapter sleeve fitter			5SH5 100	0.016

1) For terminal versions, see page 1/24.

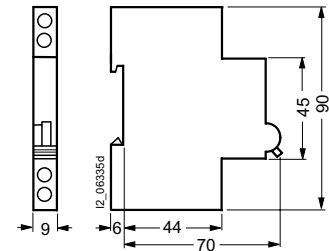
Dimensional drawings

D01, draw-out types, mounting depth 55 mm

5SG7 7.3

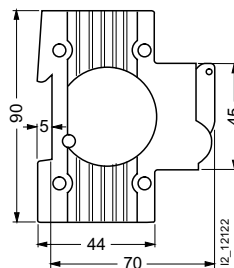
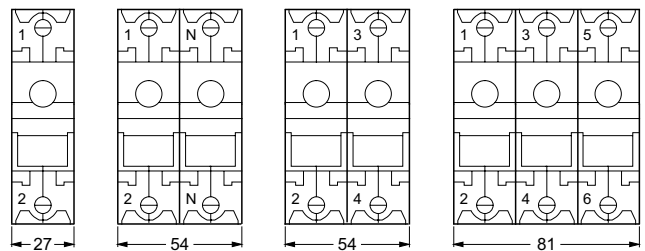


auxiliary switch
5ST3 010



D02, draw-out types, mounting depth 70 mm

5SG7 1.3, 5SG7 133-8BA..



Low-Voltage Fuse Systems

DIAZED Fuse Systems

Product overview

Overview

DIAZED fuse links



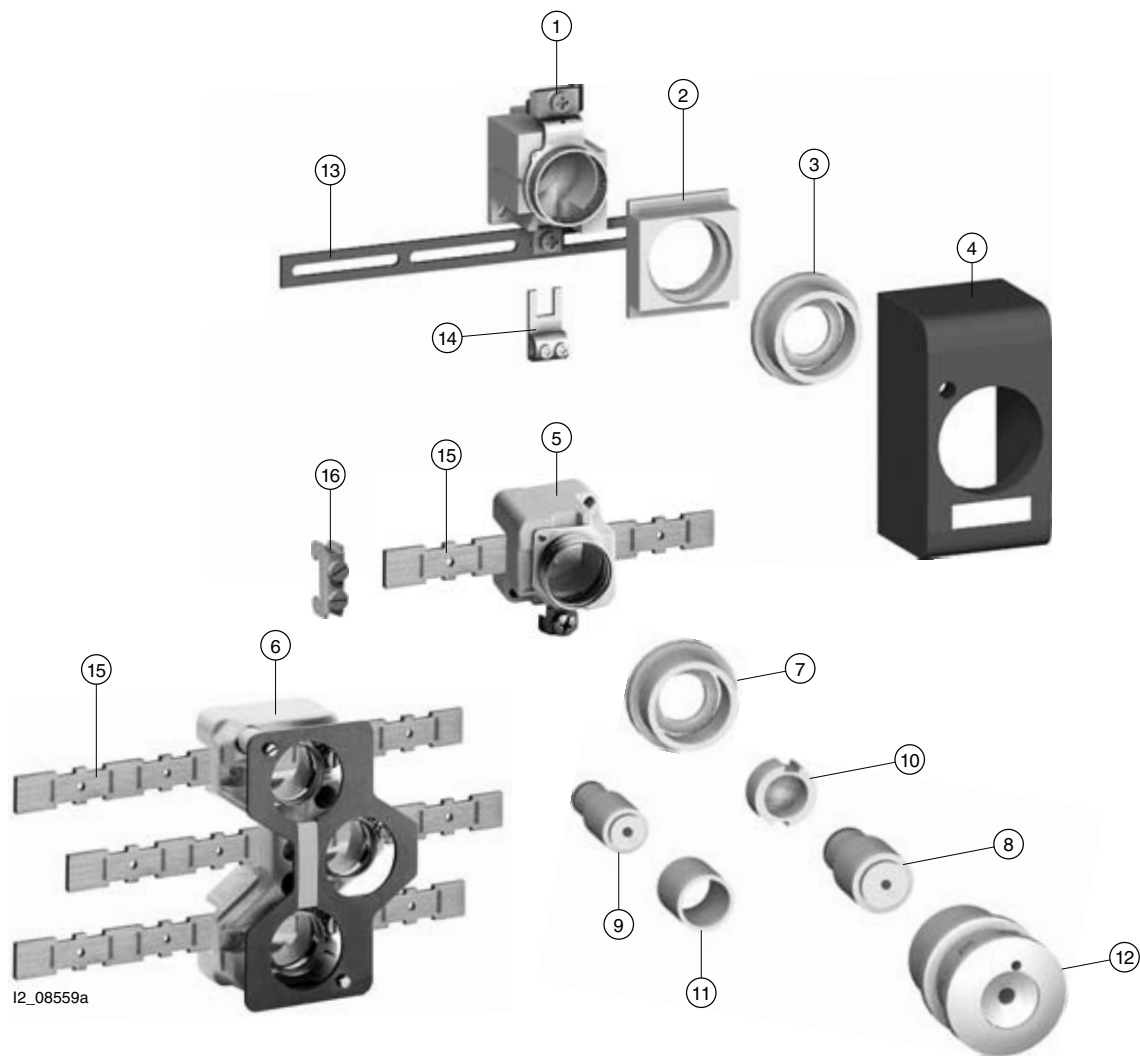
- Rated voltage U_n to 750 V AC, 750 V DC
- Rated current I_n 2 ... 100 A
- gG operational class
- Characteristic, slow or quick

DIAZED fuse bases and accessories



- Sizes DII, DIII, DIV and NDz
- 1 and 3-pole
- Terminals depend on version; clamp-type, screw head contact, saddle terminal, anti-slip terminal or combined
- Matching covers in various versions
- Different screw adapters and adapter sleeves

Overview



I2_08559a

The DIAZED component system

As a result of the well-designed modular system, the components can be combined in any way to meet the various requirements and to facilitate different installation methods. It is particularly suitable for tough operating conditions.

As modular installation devices, the bases are mounted in distribution boards according to DIN 43880 or in switchgear cabinets on a standard mounting rail according to EN 50021. However, bases solely for screw connection are also available.

A special busbar with oblong holes and a load capacity of up to 80 A makes mounting easier.

The EZR bus-mounting system

The high-performing EZR bus-mounting system for screw connection is an outstanding feature.

The busbars, which are particularly suited for bus-mounting bases, have a load capacity of up to 150 A with lateral infeed.

- ① DIAZED base
- ② DIAZED cover
- ③ DIAZED cover ring
- ④ DIAZED cap
- ⑤ DIAZED bus-mounting base, EZR
- ⑥ DIAZED bus-mounting base, EZR, 3-phase
- ⑦ DIAZED cover ring, EZR for bus-mounting base
- ⑧ DIAZED fuse link DII
- ⑨ DIAZED fuse link NDz
- ⑩ DIAZED screw adapter
- ⑪ DIAZED adapter sleeve
- ⑫ DIAZED screw cap
- ⑬ Busbar, oblong hole, single-phase
- ⑭ Terminal, fork-type terminal, non-insulated
- ⑮ EZR busbar
- ⑯ EZR terminal

Low-Voltage Fuse Systems

DIAZED Fuse Systems

DIAZED fuse links

Overview

Correct infeed

All DIAZED bases must be fed from the bottom to ensure that the threaded ring is insulated during removal of the fuse link.

Contact stability

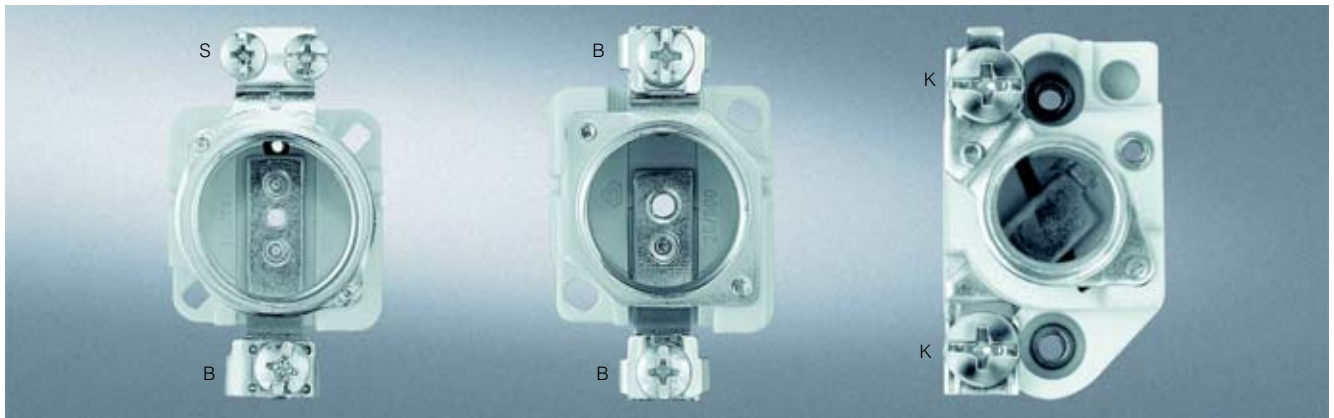
DIAZED screw adapters are essential in the DIAZED base for stable contacting.

Types of connection

B = clamp-type terminal
K = screw head contact
S = saddle terminal

Designation system

The standard designation is as follows, e.g. "BS" = :
1st letter: clamp-type terminal, incoming feeder, bottom terminal
2nd letter: saddle terminal, outgoing feeder, top terminal



DIAZED bus-mounting base DII for 25 A, 5SF6 005 with terminal version "B" mounted onto an EZR 5SH3 54 busbar. The feeding conductors are clamped to the 8JH4 122 bus-mounting terminal. The busbar has a load capacity of up to 150 A.











DIAZED bus-mounting base DII 3-phase for 3 x 25 A, 5SF2 07 with terminal version "B" mounted onto 3 EZR 5SH3 54 busbars. The busbars have a load capacity of 150 A each respectively.

Technical specifications

DIAZED fuse links	
Standards	DIN VDE 0635, DIN VDE 0636-301, DIN VDE 0680, IEC 60269-3-1, CEE 16, HD 630.3.1 S3
Dimensions	DIN VDE 0635, DIN VDE 0636-301, IEC 60269-3-1, HD 630.3.1 S3
Operational class	gG
Characteristic	slow and quick
Rated voltage U_n	V AC 500, 690, 750 V DC 500, 600, 750
Rated current I_n	A 2 ... 100
Rated breaking capacities	kA AC 50, 40 at E16 kA DC 8, 1.6 at E16
Mounting position	any, but preferably vertical
Non-interchangeability	due to screw adapter or adapter sleeves
Degree of protection acc. to IEC 60529 in the distribution board	IP20
Resistance to climate	°C up to 45 at 95 % rel. humidity
Ambient temperature	°C -5 ... +40, humidity 90 % at 20

Selection and ordering data

Size	I_n	Identification color	Thread	Order No.	Weight 1 unit approx.	PS*/P. unit
	A				kg	Unit(s)
Rated voltage 500 V AC/500 V DC						
DIN VDE 0635						
Characteristic: slow						
	TNDz	2	pink	E16	5SA2 11	0.013 10
		4	brown		5SA2 21	0.013 10
		6	green		5SA2 31	0.013 10
		10	red		5SA2 51	0.013 10
		16	gray		5SA2 61	0.013 10
		20	blue		5SA2 71	0.015 10
		25	yellow		5SA2 81	0.016 10
Characteristic: quick						
	NDz	2	pink	E16	5SA1 11	0.013 10
		4	brown		5SA1 21	0.013 10
		6	green		5SA1 31	0.013 10
		10	red		5SA1 51	0.013 10
		16	gray		5SA1 61	0.013 10
		20	blue		5SA1 71	0.015 10
		25	yellow		5SA1 81	0.016 10
DIN VDE 0636-301, IEC 60269-3-1						
Operational class gG						
	DII	2	pink	E27	5SB2 11	0.026 5
		4	brown		5SB2 21	0.026 5
		6	green		5SB2 31	0.026 5
		10	red		5SB2 51	0.027 5
		16	gray		5SB2 61	0.028 5
		20	blue		5SB2 71	0.029 5
		25	yellow		5SB2 81	0.031 5
	DIII	32	black	E33	5SB4 010	0.048 5
		35	black		5SB4 11	0.050 5
		50	white		5SB4 21	0.051 5
		63	copper		5SB4 31	0.054 5
	DIV ¹⁾	80	silver	R1¼"	5SC2 11	0.110 3
		100	red		5SC2 21	0.110 3
DIN VDE 0635						
Characteristic: quick for 5SB1 41, a DIAZED screw adapter for 6 A is used						
	DII	2	pink	E27	5SB1 11	0.026 5
		4	brown		5SB1 21	0.026 5
		6	green		5SB1 31	0.026 5
		10	red		5SB1 41	0.026 5
		10	red		5SB1 51	0.027 5
		16	gray		5SB1 61	0.028 5
		20	blue		5SB1 71	0.029 5
	DIII	25	yellow		5SB1 81	0.031 5
		35	black	E33	5SB3 11	0.050 5
		50	white		5SB3 21	0.051 5
		63	copper		5SB3 31	0.054 5
	DIV	80	silver	R1¼"	5SC1 11	0.110 3
	100	red		5SC1 21	0.110 3	


1) Rated voltage 500 V AC/400 V DC.

Low-Voltage Fuse Systems

DIAZED Fuse Systems

DIAZED fuse links

Selection and ordering data

Size	I_n	Identification color	Thread	Order No.	Weight 1 unit approx.	PS*/P. unit
	A				kg	Unit(s)
Rated voltage 690 V AC/600 V DC						
DIN VDE 0636-301, IEC 60269-3-1						
gG operational class, for fuse links 2 A ... 25 A, DIAZED DII screw adapters are used						
	DIII	2	pink	E33	5SD8 002	0.068 5
		4	brown		5SD8 004	0.068 5
		6	green		5SD8 006	0.068 5
		10	red		5SD8 010	0.068 5
		16	gray		5SD8 016	0.069 5
		20	blue		5SD8 020	0.071 5
		25	yellow		5SD8 025	0.072 5
		35	black		5SD8 035	0.078 5
		50	white		5SD8 050	0.080 5
		63	copper		5SD8 063	0.082 5

Rated voltage 750 V AC/750 V DC

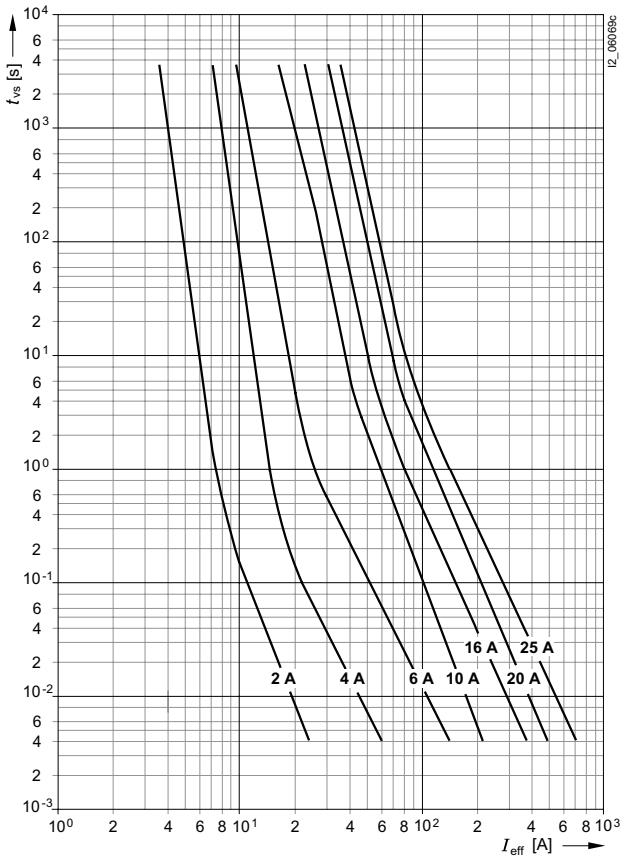
DIN VDE 0635						
for DC railway networks Characteristic: quick, for fuse links 2 A ... 25 A, DIAZED DII screw adapters are used						
	DIII	2	pink	E33	5SD6 01	0.068 5
		4	brown		5SD6 02	0.068 5
		6	green		5SD6 03	0.068 5
		10	red		5SD6 04	0.068 5
		16	gray		5SD6 05	0.069 5
		20	blue		5SD6 06	0.071 5
		25	yellow		5SD6 07	0.072 5
		35	black		5SD6 08	0.078 5
		50	white		5SD6 10	0.080 5
		63	copper		5SD6 11	0.082 5

Characteristic curves

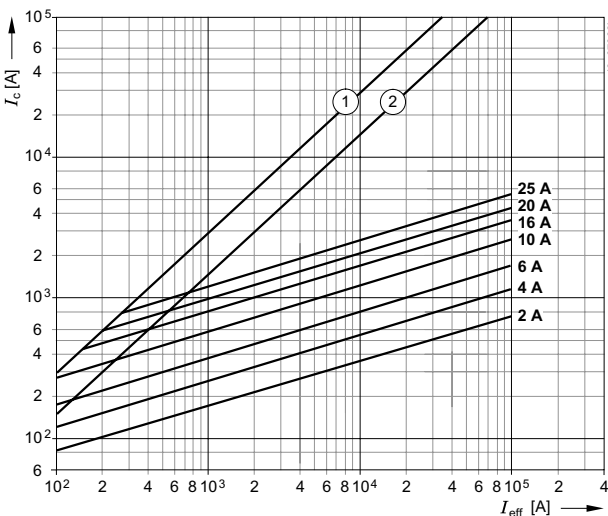
Series 5SA2

Size: E16
 Characteristic: slow
 Rated voltage: 500 V AC/500 V DC
 Rated current: 2 ... 25 A

Time/current characteristics diagram

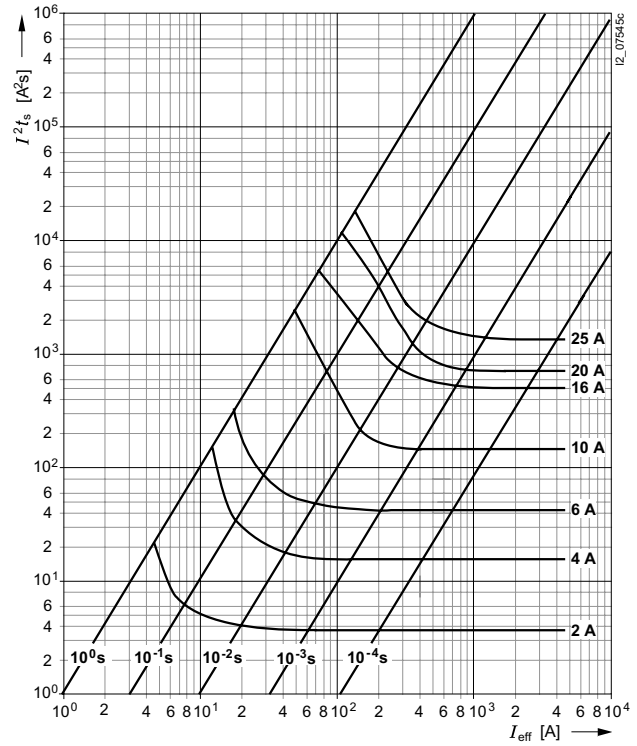


Current limitation diagram



- ① Peak short-circuit current with largest DC component
- ② Peak short-circuit current without DC component

Melting I^2t_s values diagram



Type	I_n A	P_v W	$\Delta\vartheta$ k	I^2t_s 1 ms A ² s	4 ms A ² s
5SA2 11	2	0.85	15	1.2	2.3
5SA2 21	4	1.3	17	8.5	13
5SA2 31	6	1.9	14	40	80
5SA2 51	10	1.4	17	200	190
5SA2 61	16	2.4	30	290	550
5SA2 71	20	2.6	36	470	1990
5SA2 81	25	3.4	34	1000	2090

Type	I^2t_a		
	230 V AC A ² s	320 V AC A ² s	500 V AC A ² s
5SA2 11	6.6	7.8	0.7
5SA2 21	22	26	34
5SA2 31	66	76	100
5SA2 51	240	270	340
5SA2 61	890	950	1090
5SA2 71	1200	1350	1620
5SA2 81	2400	2600	3450

Low-Voltage Fuse Systems

DIAZED Fuse Systems

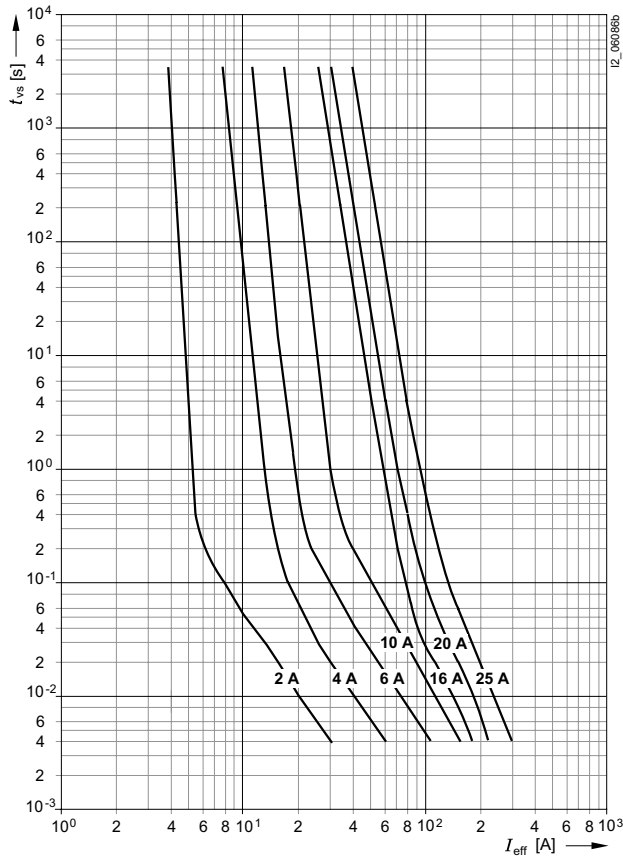
DIAZED fuse links

Characteristic curves

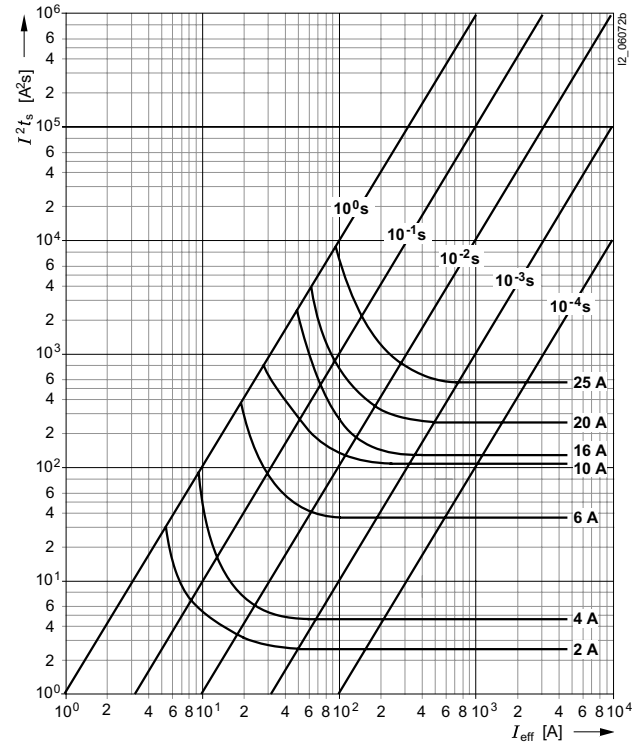
Series 5SA1

Size: E16
 Characteristic: quick
 Rated voltage: 500 V AC/500 V DC
 Rated current: 2 ... 25 A

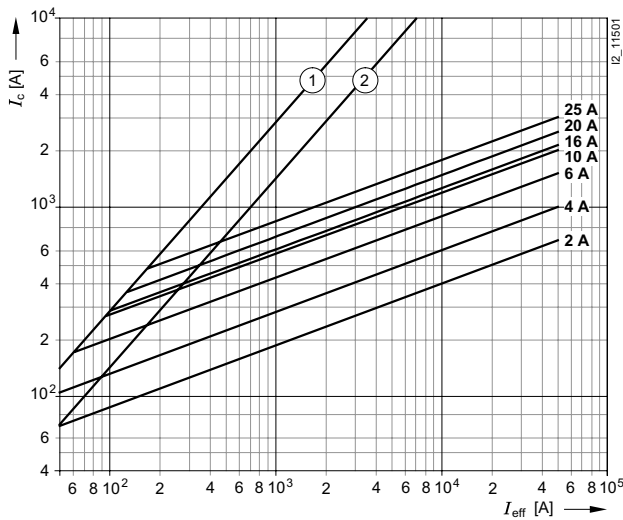
Time/current characteristics diagram



Melting I^2t_s values diagram



Current limitation diagram



Type	I_n A	P_v W
5SA1 11	2	1.5
5SA1 21	4	1.9
5SA1 31	6	2.7
5SA1 51	10	3.4
5SA1 61	16	3.7
5SA1 71	20	4.4
5SA1 81	25	4.9

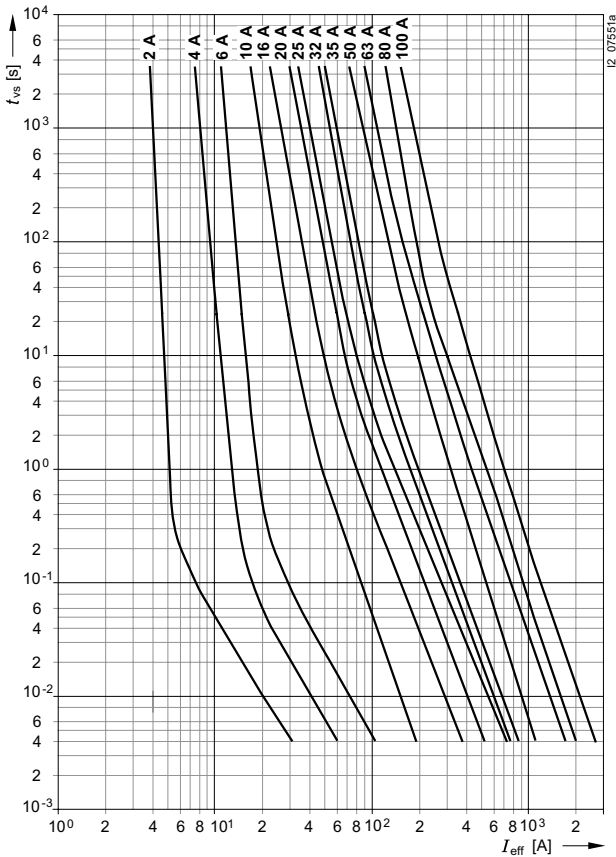
- ① Peak short-circuit current with largest DC component
- ② Peak short-circuit current without DC component

Characteristic curves

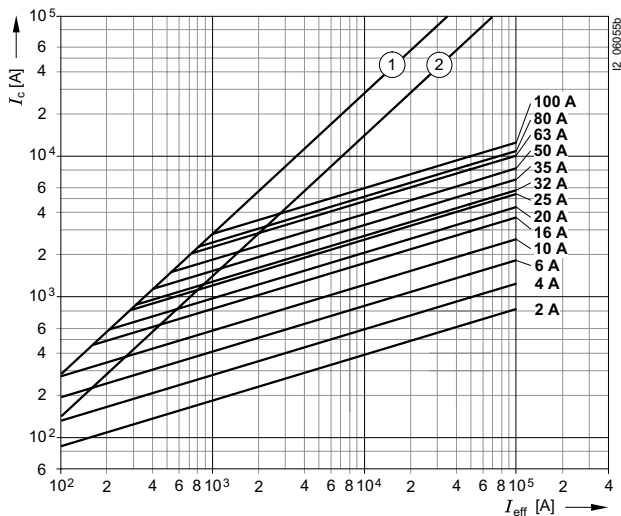
Series 5SB2, 5SB4, 5SC2

Size: DII, DIII, DIV
 Operational class: gG
 Rated voltage: 500 V AC/500 V DC
 Rated current: 2 ... 100 A

Time/current characteristics diagram

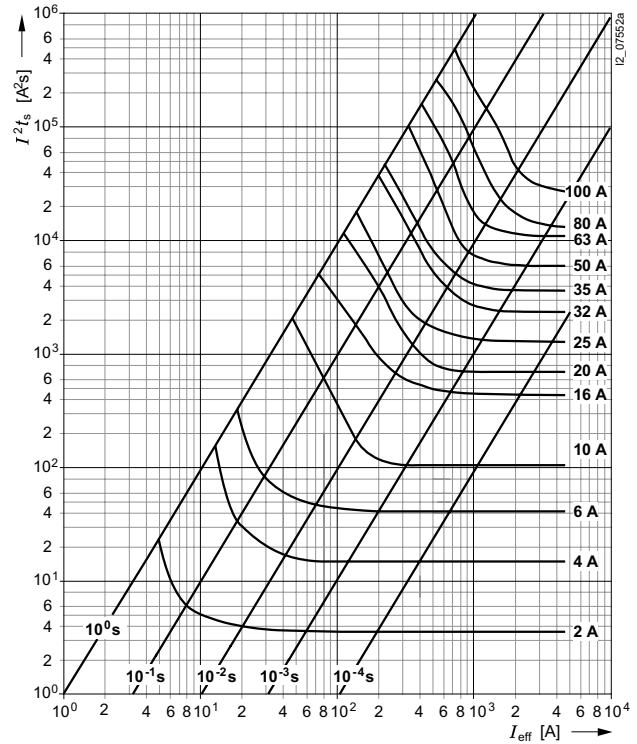


Current limitation diagram



- ① Peak short-circuit current with largest DC component
- ② Peak short-circuit current without DC component

Melting I^2t_s values diagram



Type	I_n	P_v	Δt	I^2t_s	
	A	W	k	1 ms A ² s	4 ms A ² s
5SB2 11	2	2.6	15	3.7	3.9
5SB2 21	4	2.0	13	15	16
5SB2 31	6	2.2	14	42	45
5SB2 51	10	1.6	20	120	140
5SB2 61	16	2.4	23	500	580
5SB2 71	20	2.6	26	750	1100
5SB2 81	25	3.4	38	1600	2000
5SB4 010	32	3.6	23	2300	2500
5SB4 11	35	3.7	25	3450	3000
5SB4 21	50	5.7	41	6500	5200
5SB4 31	63	6.9	48	11000	12000
5SC2 11	80	7.5	33	14600	16400
5SC2 21	100	8.8	46	28600	30000

Type	I^2t_a	320 V AC	500 V AC
	A ² s	A ² s	A ² s
5SB2 11	6.6	8.8	10.7
5SB2 21	22	28	34
5SB2 31	66	85	100
5SB2 51	240	300	340
5SB2 61	890	1060	1090
5SB2 71	1200	1450	1620
5SB2 81	2400	3150	3450
5SB4 010	3450	4150	4850
5SB4 11	5200	6200	7200
5SB4 21	9750	12350	14500
5SB4 31	16500	22200	26500
5SC2 11	23000	28500	32500
5SC2 21	44000	56000	65000

Low-Voltage Fuse Systems

DIAZED Fuse Systems

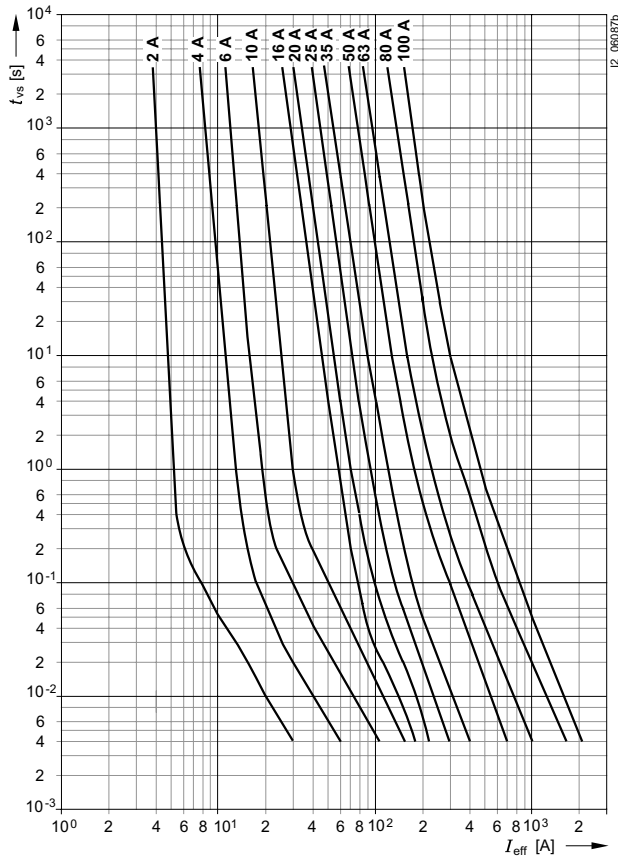
DIAZED fuse links

Characteristic curves

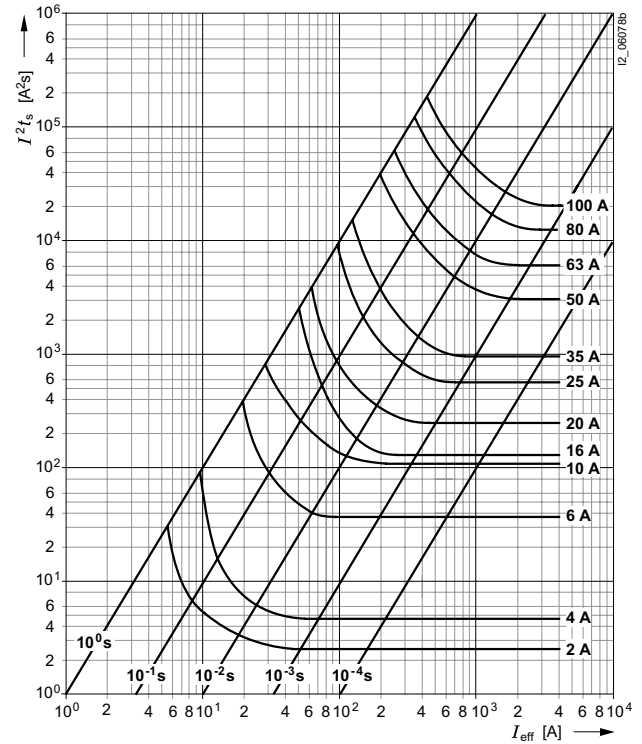
Series 5SB1, 5SB3, 5SC1

Size: DII, DIII, DIV
 Operational class: quick
 Rated voltage: 500 V AC/500 V DC
 Rated current: 2 ... 100 A

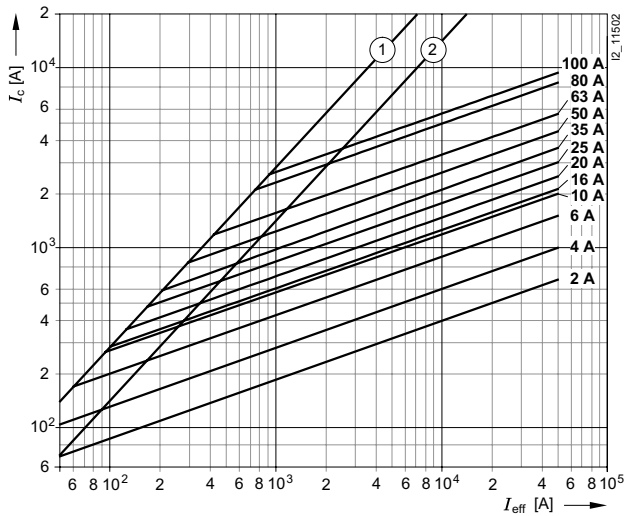
Time/current characteristics diagram



Melting I^2t_s values diagram



Current limitation diagram



- ① Peak short-circuit current with largest DC component
- ② Peak short-circuit current without DC component

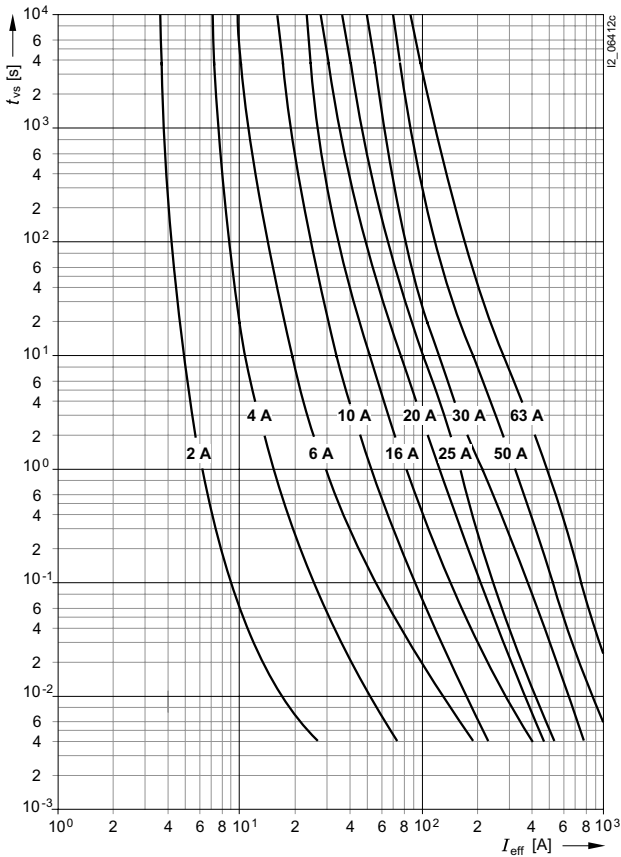
Type	I_n A	P_v W	$\Delta\vartheta$ k	I^2t_s 4 ms A ² s	I^2t_a 500 V AC A ² s
5SB1 11	2	1.5	3	2.5	5
5SB1 21	4	1.9	13	15.6	31.2
5SB1 31	6	2.7	18	36	72
5SB1 41, 5SB1 51	10	3.4	23	102	204
5SB1 61	16	3.7	24	130	260
5SB1 71	20	4.4	31	185	370
5SB1 81	25	4.9	34	250	500
5SB3 11	35	8.3	39	640	1280
5SB3 21	50	9.9	49	1960	3920
5SB3 31	63	12.8	63	3880	7760
5SC1 11	80	12.7	45	10890	21780
5SC1 21	100	15.4	55	17400	34800

Characteristic curves

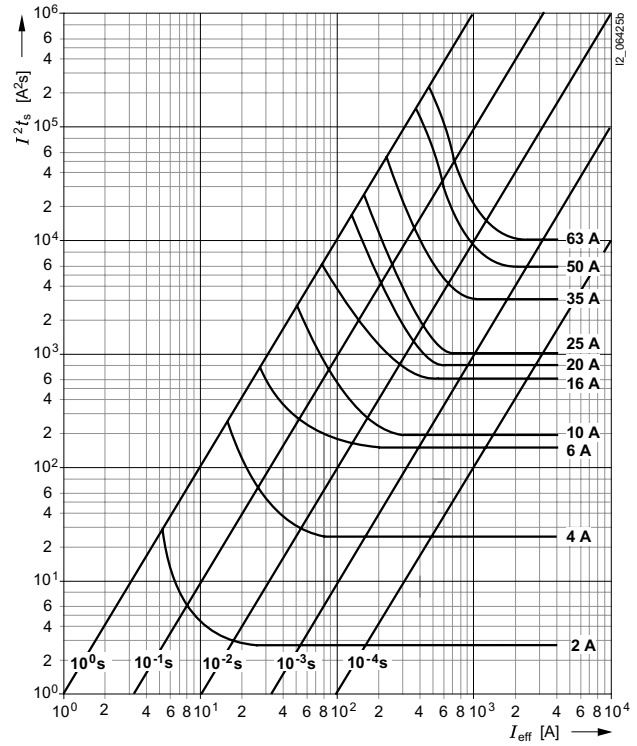
Series 5SD8

Size: DIII
 Operational class: gG
 Rated voltage: 690 V AC/600 V DC
 Rated current: 2 ... 63 A

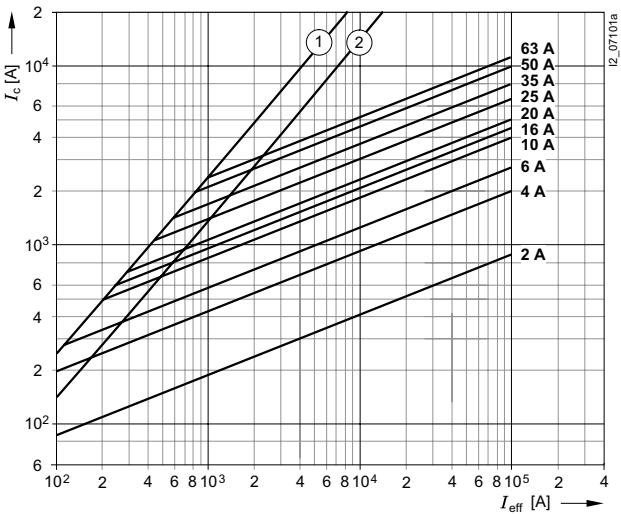
Time/current characteristics diagram



Melting I^2t_s values diagram



Current limitation diagram



- ① Peak short-circuit current with largest DC component
- ② Peak short-circuit current without DC component

Type	I_n A	P_V W	I^2t_s 4 ms A ² s	I^2t_a 242 V AC A ² s
5SD8 002	2	1	4.4	7
5SD8 004	4	1.2	40	62
5SD8 006	6	1.6	88	140
5SD8 010	10	1.4	240	380
5SD8 016	16	1.8	380	600
5SD8 020	20	2	750	1200
5SD8 025	25	2.3	2000	3200
5SD8 035	35	3.1	3300	5100
5SD8 050	50	4.6	7000	11000
5SD8 063	63	5.5	9500	15000

Low-Voltage Fuse Systems

DIAZED Fuse Systems

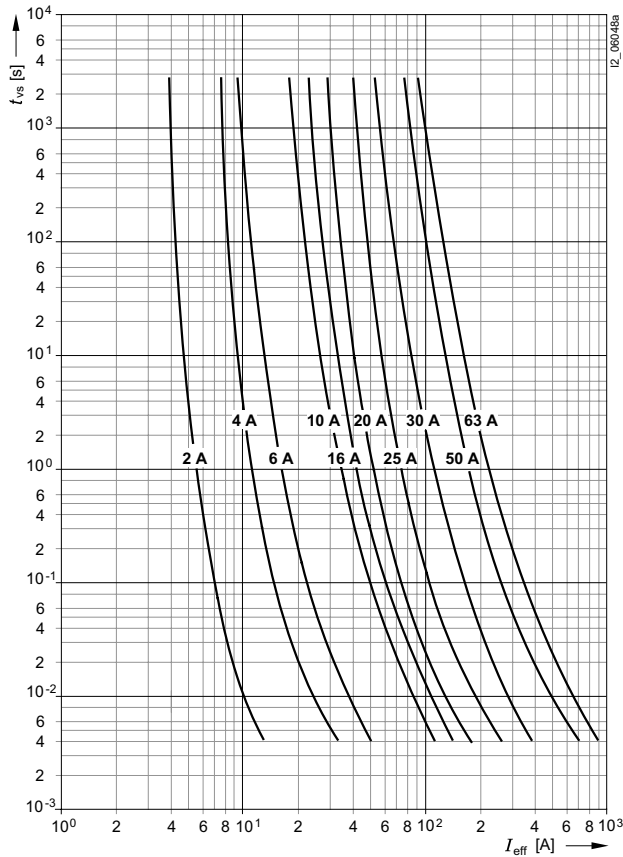
DIAZED fuse links

Characteristic curves

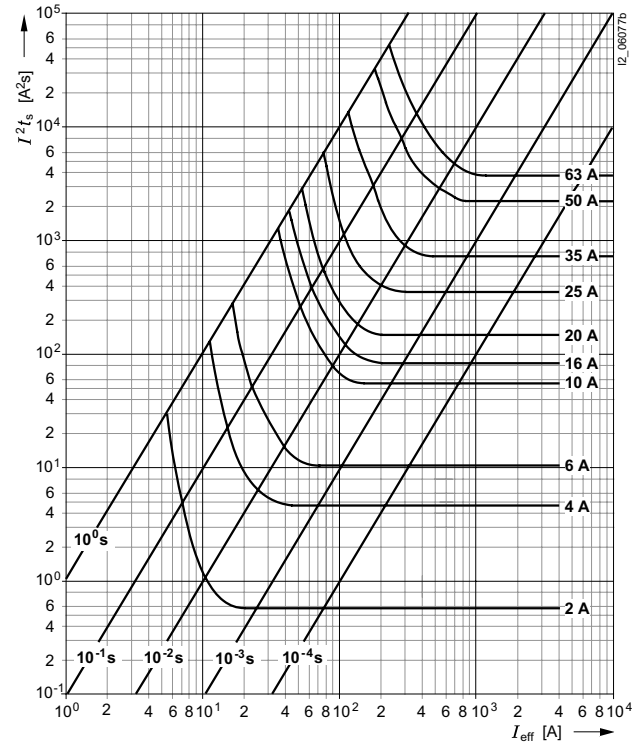
Series 5SD6

Size: DIII
 Operational class: quick (railway network protection)
 Rated voltage: 750 V AC/750 V DC
 Rated current: 2 ... 63 A

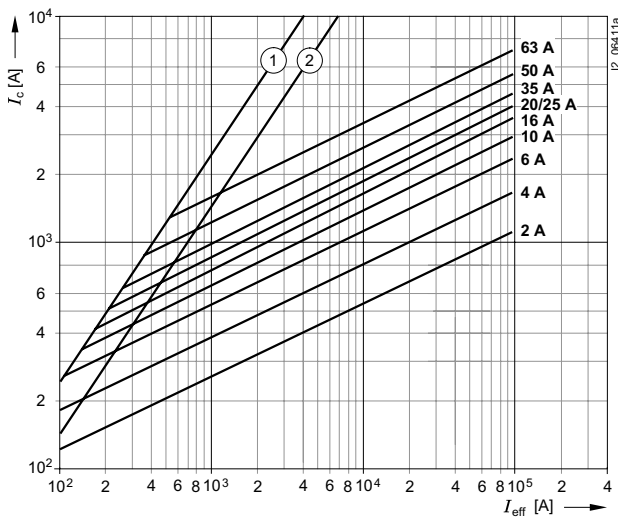
Time/current characteristics diagram



Melting $I^2 t_s$ values diagram



Current limitation diagram



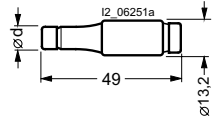
- ① Peak short-circuit current with largest DC component
- ② Peak short-circuit current without DC component

Type	I_n A	P_V W	$I^2 t_s$ 4 ms A ² s	$I^2 t_a$ 500 V AC A ² s
5SD6 01	2	2.8	0.7	2
5SD6 02	4	4	4.5	13
5SD6 03	6	4.8	10	29
5SD6 04	10	4.8	50	135
5SD6 05	16	5.9	78	220
5SD6 06	20	6.3	125	380
5SD6 07	25	8.3	265	800
5SD6 08	35	13	550	1600
5SD6 10	50	16.5	1800	5500
5SD6 11	63	18	3100	9600

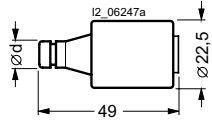
Dimensional drawings

500 V DC

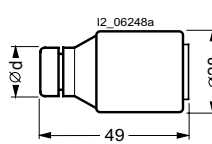
5SA1, 5SA2



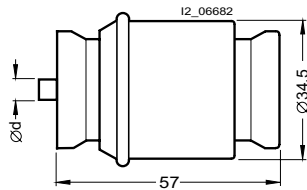
5SB1, 5SB2



5SB3, 5SB4

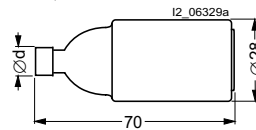


5SC1, 5SC2



690 V AC/600 V DC and 750 V AC/750 V DC

5SD8, 5SD6



Fuse link	TNDz/E16, NDz/E16						
Rated current A	2	4	6	10	16	20	25
Dimension d	6	6	6	8	10	12	14

Fuse link	DII/E27						
Rated current A	2	4	6	10	16	20	25
Dimension d	6	6	6	8	10	12	14

Fuse link	DIII/E33						
Rated current A	32	35	50	63			
Dimension d	16	16	18	20			

Fuse link	DIV/R1¼"						
Rated current A	80	100					
Dimension d	5	7					

Fuse link	DIII/E33									
Rated current A	2	4	6	10	16	20	25	35	50	63
Dimension d	6	6	6	8	10	12	14	16	18	20

Low-Voltage Fuse Systems

DIAZED Fuse Systems

DIAZED fuse bases

Technical specifications

Terminals		B		K			S		R	
Terminals		DII	DIII	NDz	DII	DIII	DIII	DIV	DII	DIII
Sizes										
Conductor cross-sections										
• Rigid, minimum	mm ²	1.5	2.5	1.0	1.5	2.5	2.5	10	1.5	1.5
• Rigid, maximum	mm ²	10	25	6	10	25	25	50	35	35
• Flexible with sleeve, max.	mm ²	10	25	6	10	25	25	50	35	35
Tightening torques										
• Screw M4	Nm	1.2							--	
• Screw M5	Nm	2.0							--	
• Screw M6	Nm	2.5							4	
• Screw M8	Nm	3.5							--	

Terminal designations







B = clamp-type terminal

K = screw head contact

S = saddle terminal









R = anti-slip terminal

Selection and ordering data

	Size	I_n	Thread	Terminals ¹⁾	Order No.	Weight 1 unit approx.	PS*/ P. unit
	A					kg	Unit(s)
Fuse bases made of ceramic							
Rated voltage 500 V AC/500 V DC (for 690 V AC/600 V DC, size DIII bases are to be used together with DIAZED 5SH1 170 screw caps and DIAZED 5SD8 fuse links)							
1-pole							
	NDz	25	E16	KK	5SF1 012	0.060	5
	DII	25	E27	BB	5SF1 005	0.093	5
	DIII	63	E33	BS	5SF1 205	0.191	5
	DIII	63	E33	SS	5SF1 215	0.154	5
for screw connection only							
	NDz	25	E16	KK	5SF1 01	0.055	5
	DII	25	E27	BB	5SF1 024	0.093	5
	DIII	63	E33	BS	5SF1 224	0.137	5
	DIII	63	E33	SS	5SF1 214	0.141	5
	DIV	100	R1¼"	Flat connection	5SF1 401	0.380	1
							
Rated voltage 750 V AC/750 V DC only for DIAZED 5SH1 161 screw cap, only for DIAZED screw adapters DII and DIII, only for DIAZED 5SD6 fuse links with fine thread, with cap.							
1-pole							
	DIII	63	E33S	KK	5SF4 230	0.460	1
Rated voltage 500 V AC/500 V DC (for 690 V AC/600 V DC, size DIII bases are to be used together with DIAZED 5SH1 170 screw caps and DIAZED 5SD8 fuse links)							
3-pole							
with cap and N-type fixpoint terminal							
	DII	3 × 25	E27	BB	5SF5 067	0.400	1
	DIII	3 × 63	E33	BB	5SF5 237	0.580	1
for screw connection only, with cap and N-type fixpoint terminal							
	DII	3 × 25	E27	KB	5SF5 066	0.410	1
	DIII	3 × 63	E33	KB	5SF5 236	0.590	1

1) For terminal markings, see above and page 1/30.

Selection and ordering data

	Size	I_n	Thread	Terminals ¹⁾	Order No.	Weight 1 unit approx.	PS*/ P. unit
	A					kg	Unit(s)
Fuse bases made of molded plastic							
Touch-protected to BGV A3 (VBG4) Rated voltage 500 V AC/500 V DC for mounting rail or screw connection anti-slip terminal at ingoing and outgoing feeder enclosure: silicone-free halogen-free heat-resistant up to 150 °C creep resistance CTI 225 self-extinguishing acc. to UL 94							
	1-pole	DII	25	E27	RR	0.152	3
		DIII	63	E33	RR		
	3-pole	DII	3 × 25	E27	RR	0.457	1
		DIII	3 × 63	E33	RR		
DIAZED bus-mounting bases, EZR							
for clipping onto 5SH3 5 power rail for screw connection only							
	1-pole	DII	25	E27	B	0.072	5
		DIII	63	E33	B		
	3-pole	DII	3 × 25	E27	B	0.351	1/5
							











1) For terminal markings, see pages 1/24 and 1/30.

Low-Voltage Fuse Systems

DIAZED Fuse Systems

DIAZED fuse bases

Accessories

	Size	Thread	Order No.	Weight 1 unit approx. kg	PS*/ P. unit Unit(s)
Mounting parts					
	DIAZED busbars with oblong holes Approx. 1000 mm long				
	Cross-section: 12 mm x 2 mm, load capacity up to 80 A for DII, sufficient for 25 bases,		5SH3 500	0.095	1
	Cross-section: 13 mm x 3 mm, load capacity up to 120 A for DIII, sufficient for 19 bases		5SH3 501	0.180	1
	Terminals, non-insulated Pin, for 2 conductors, from 2 x 1.5 mm ² to 16 mm ²		5SH5 326	0.016	1/10
	Fork-type, for conductors up to 35 mm ²		5SH3 502	0.010	10
	Busbars for DIAZED EZR bus-mounting bases Suitable for fork-type terminal connection, ready-made drill hole with thread for screw adapters, approx. 2000 mm long Cross-section: 16 mm x 3 mm, load capacity up to 150 A for lateral incoming supply				
	for DII	sufficient for 42 5SF6 005 bases	5SH3 54	0.740	1/5
	for DII and DIII	sufficient for 34 5SF6 205 bases	5SH3 55	0.740	1/5
	for DIII	sufficient for 27 5SF2 07 bases	5SH3 56	0.740	1/5
	EZR bus-mounting terminals Non-insulated				
	for conductors up to 16 mm ²		8JH4 122	0.012	1
	for conductors up to 35 mm ²		8JH4 124	0.024	1
DIAZED covers					
	DIAZED covers Molded plastic not for SILIZED fuse links				
	1-pole				
	(5 DIAZED bases = 12 MW) DII E27		5SH2 032	0.017	10
	(4 DIAZED bases = 12 MW) DIII E33		5SH2 232	0.020	10
	Caps Molded plastic				
	1-pole				
	NDz	E16	5SH2 01	0.028	5
	DII	E27	5SH2 02	0.038	5
	DIII	E33	5SH2 22	0.048	5
	Cover rings 1-pole				
	Molded plastic also for bus-mounting base EZR				
	DII	E27	5SH3 401	0.013	5
	DIII	E33	5SH3 411	0.014	5
	Ceramic DII and DIII also for EZR bus-mounting base				
	NDz	E16	5SH3 30	0.020	5
	DII	E27	5SH3 32	0.029	10
	DIII	E33	5SH3 34	0.035	10

Accessories

Size	Thread	For fuse links A	Order No.	Weight 1 unit approx. kg	PS*/ P. unit Unit(s)	
Screw adapters, adapter sleeves						
DIAZED screw adapters						
	NDz	E16	2	5SH3 28	0.002	10
			4	5SH3 31	0.002	10
			6	5SH3 05	0.002	10
			10	5SH3 06	0.002	10
			16	5SH3 07	0.002	10
also for mounting in DIAZED base DIII						
	DII ¹⁾	E27	2	5SH3 10	0.015	10
			4	5SH3 11	0.015	10
			6	5SH3 12	0.015	10
			10	5SH3 13	0.015	10
			16	5SH3 14	0.014	10
			20	5SH3 15	0.012	10
	DIII ¹⁾	E33	25	5SH3 16	0.012	10
			35	5SH3 17	0.019	10
			50	5SH3 18	0.018	10
			63	5SH3 20	0.017	10
DIAZED gauge ring for DIV bases						
	DIV	R1¼"	80	5SH3 21	0.006	10
			100	5SH3 22	0.005	10
DIAZED adapter sleeves						
	for snapping onto DIAZED screw caps, if E16 DIAZED fuse links are inserted in DII DIAZED bases			5SH3 01	0.012	10
	if DII DIAZED fuse links are inserted in DIII DIAZED bases			5SH3 02	0.023	10
DIAZED adapter sleeve fitter for DII/DIII			5SH3 703	0.025	1	
						

1) Suitable for a rated voltage of up to 750 V.

Low-Voltage Fuse Systems

DIAZED Fuse Systems

DIAZED fuse bases

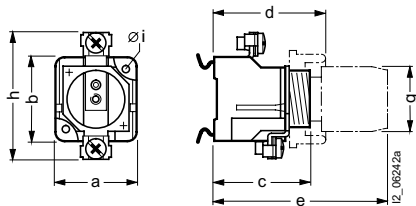
Accessories

Size	I_n	Thread	Order No.	Weight 1 unit approx. kg	PS*/ P. unit Unit(s)
DIAZED screw caps					
Rated voltage 500 V AC/500 V DC					
	Ceramic NDz	25	E16	5SH1 11	0.016 5
	Molded plastic, with inspection hole, black, not for SILIZED fuse links DII	25	E27	5SH1 221	0.026 5
	DIII	63	E33	5SH1 231	0.042 5
	Narrow version, ceramic DII	25	E27	5SH1 12	0.034 5
	DIII	63	E33	5SH1 13	0.059 5
	Mushroom shape, ceramic, with inspection hole, sealable DII	25	E27	5SH1 22	0.050 5
	DIII	63	E33	5SH1 23	0.080 5
	Ceramic DIV	100	R1¼"	5SH1 141	0.181 1
Rated voltage 750 V AC/750 V DC					
	Only for DIAZED 5SD6 fuse links and DIAZED 5SF4 230 fuse bases ceramic, with fine thread DIII	63	E33S	5SH1 161	0.084 1
Rated voltage 690 V AC/600 V DC					
	Only for DIAZED 5SD8 fuse links ceramic, longer version DIII	63	E33	5SH1 170	0.086 1

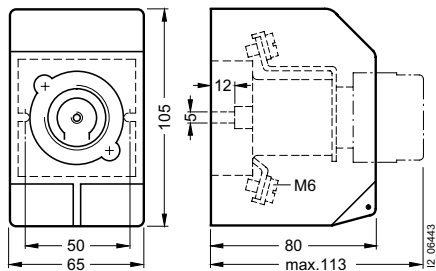
Dimensional drawings

DIAZED bases made of ceramic

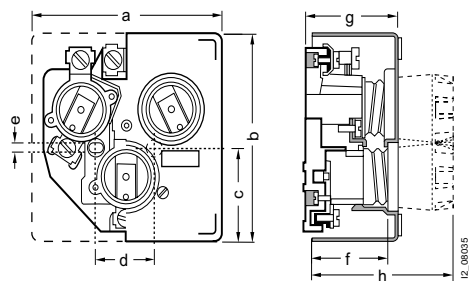
500 V AC/500 V DC
1-pole
5SF1



750 V AC/750 V DC, for DIAZED fuse links 750 V AC
1-pole, with cap
5SF4 230

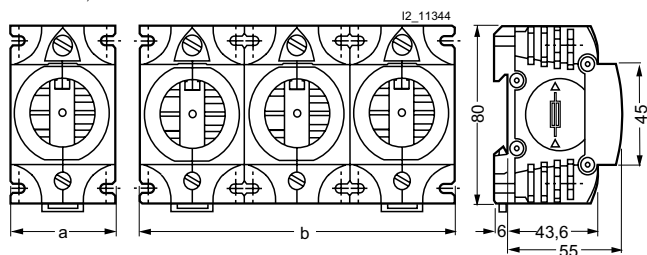


500 V AC/500 V DC
3-pole, with cap, DII/DIII
5SF5



DIAZED bases made of molded plastic

5SF1 060, 5SF1 260
5SF5 068, 5SF5 268



Version	Type	Type of connection	Dimensions							
			a	b	c	d	e	Øg	h	Øi
NDz/25 A		KK	29	49	44.6	55	75	32	49	--
5SF1 012		KK	29	49	44.6	55	75	32	49	4.2
DII/25 A		BB	38.4	41	46.6	53	83	34	63	--
5SF1 005		BB	38.4	41	46.6	53	83	34	63	4.3
DIII/63 A		BS	45.5	46	47	54	83	43	78	--
5SF1 205		SS	45.5	46	47	54	83	43	78	--
5SF1 215		SS	45.5	46	47	54	83	43	78	--
5SF1 224		BS	45.5	46	47	54	83	43	78	4.3
5SF1 214		SS	45.5	46	47	54	83	43	78	4.3
DIV/100 A		Flat connection	68	68	--	79	110	65	116	6.5
5SF1 401		Flat connection	68	68	--	79	110	65	116	6.5

Version	Type	Dimensions							
		a	b	c	d	e	f	g	h
DII/3 x 25 A		106	106	48	--	--	45	52	86
5SF5 067		106	106	48	32	5.2	45	52	86
DIII/3 x 63 A		127	130	54	--	--	45	52	85
5SF5 237		127	130	54	32	5.2	45	52	85
5SF5 236		127	130	54	32	5.2	45	52	85

Type	Dimensions	
	a	b
5SF1 060	40	--
5SF1 260	50	--
5SF5 068	--	120
5SF5 268	--	150

Low-Voltage Fuse Systems

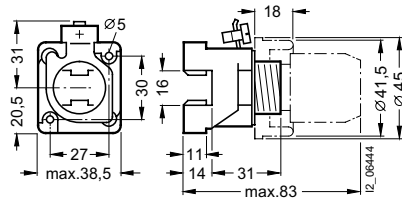
DIAZED Fuse Systems

DIAZED fuse bases

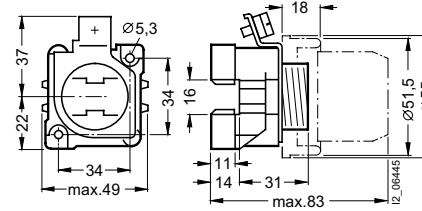
Dimensional drawings

DIAZED EZR bus-mounting bases

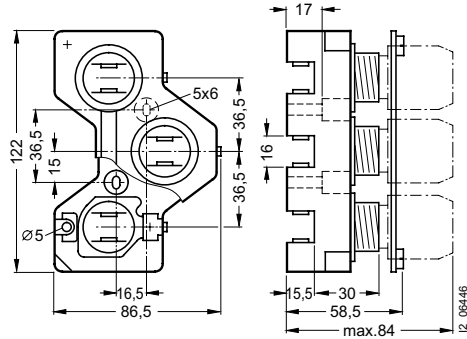
5SF6 005



5SF6 205



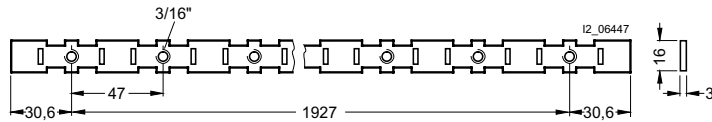
5SF2 07



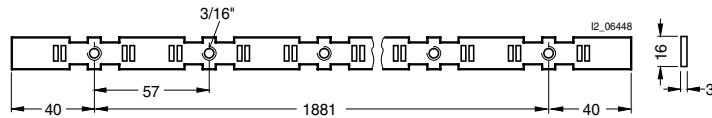
Mounting parts

Busbars for DIAZED EZR bus-mounting bases

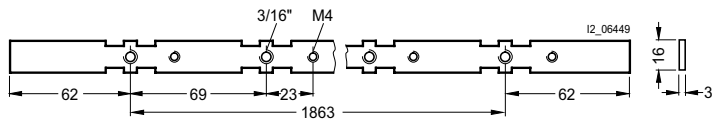
5SH3 54



5SH3 55



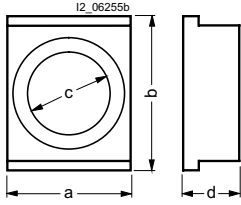
5SH3 56



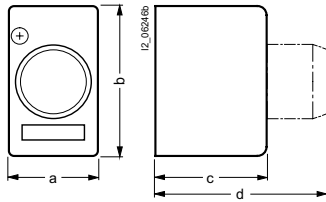
Dimensional drawings

DIAZED covers

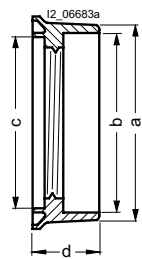
DIAZED cover made of molded plastic
5SH2



Cap made of molded plastic
5SH2

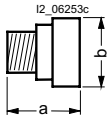


Cover rings made of molded plastic
5SH3



DIAZED screw caps

5SH1



Size	Type	Dimensions			
		Øa	Øb	Øc	d
DII/E27	5SH2 032	41	51	27.5	19
DIII/E33	5SH2 232	52	51	34.5	18.5

Size	Type	Dimensions			
		a max.	b max.	c max.	d max.
NDz/E16	5SH2 01	33	68	51.7	75
DII/E27	5SH2 02	43	74.7	53.6	83
DIII/E33	5SH2 22	51	90.5	53.6	83

Size	Type	Dimensions			
		a	b	Øc	d
DII/E27	5SH3 401	39.5	35.5	33.5	17.5
DIII/E33	5SH3 411	49.5	45.5	41.5	17.5
NDz/E16	5SH3 30	30	26	26	16.5
DII/E27	5SH3 32	41.5	35	38	17.5
DIII/E33	5SH3 34	51.5	45	44	19

Size	Type	Dimensions	
		a	Øb
NDz/E16	5SH1 11	35	28
DII/E27	5SH1 221	42	33
	5SH1 12	45.5	34
	5SH1 22	43	39
DIII/E33	5SH1 231	42	40
	5SH1 13	45.5	43
	5SH1 23	47	45
	750 V AC/750 V DC 5SH1 161	48	48
DIII/E33S	690 V AC/600 V DC 5SH1 170	68	43
	DIV/R1¼"	5SH1 141	53

Low-Voltage Fuse Systems

LV HRC Fuse Systems

Product overview

Overview

LV HRC fuse links gG



- Rated voltage U_n to 690 V AC, 440 V DC
- Rated current I_n 2 ... 1250 A
- gG operational class
- Sizes 000, 00, 1, 2, 3, 4 and 4a
- Insulated or non-insulated grip lugs
- Combination or front indicator in the event of fuse failure

LV HRC fuse bases



- Rated voltage U_n 690 V AC, 250/440 V DC
- Rated current I_n 160 ... 1250 A
- Flat connection, saddle-type terminal connection, box terminal or terminal strip
- Sizes 000 to 4a

LV HRC signal detector



- Signal detector with signal detector link
- Signal detector top

LV HRC fuse switch disconnectors



- Rated insulation voltage U_i 690/800 V
- Rated continuous current I_n 160 ... 4630 A
- Flat or box terminal connection

Overview

The product range

Areas of application

LV HRC fuse links are used for installation systems in non-residential, commercial and industrial buildings as well as in systems of power supply companies. They therefore protect essential building parts and installations.

Non-interchangeability

LV HRC fuse links are fuse systems designed for operation by experts. There are no constructional requirements for non-interchangeability of rated current and touch protection.

The components and auxiliary equipment are designed in such a way as to ensure the safe replacement of LV HRC fuse links or isolation of systems.

Operational classes

LV HRC fuse links are available in the following versions:

- gG for cable and line protection
- aM for short-circuit protection of switching devices in motor circuits (see page 1/127)
- gR or aR for protection of power semiconductors (see page 1/137)
- gS: The new gS operational class combines cable and line protection with semiconductor protection (see page 1/137)

Sizes

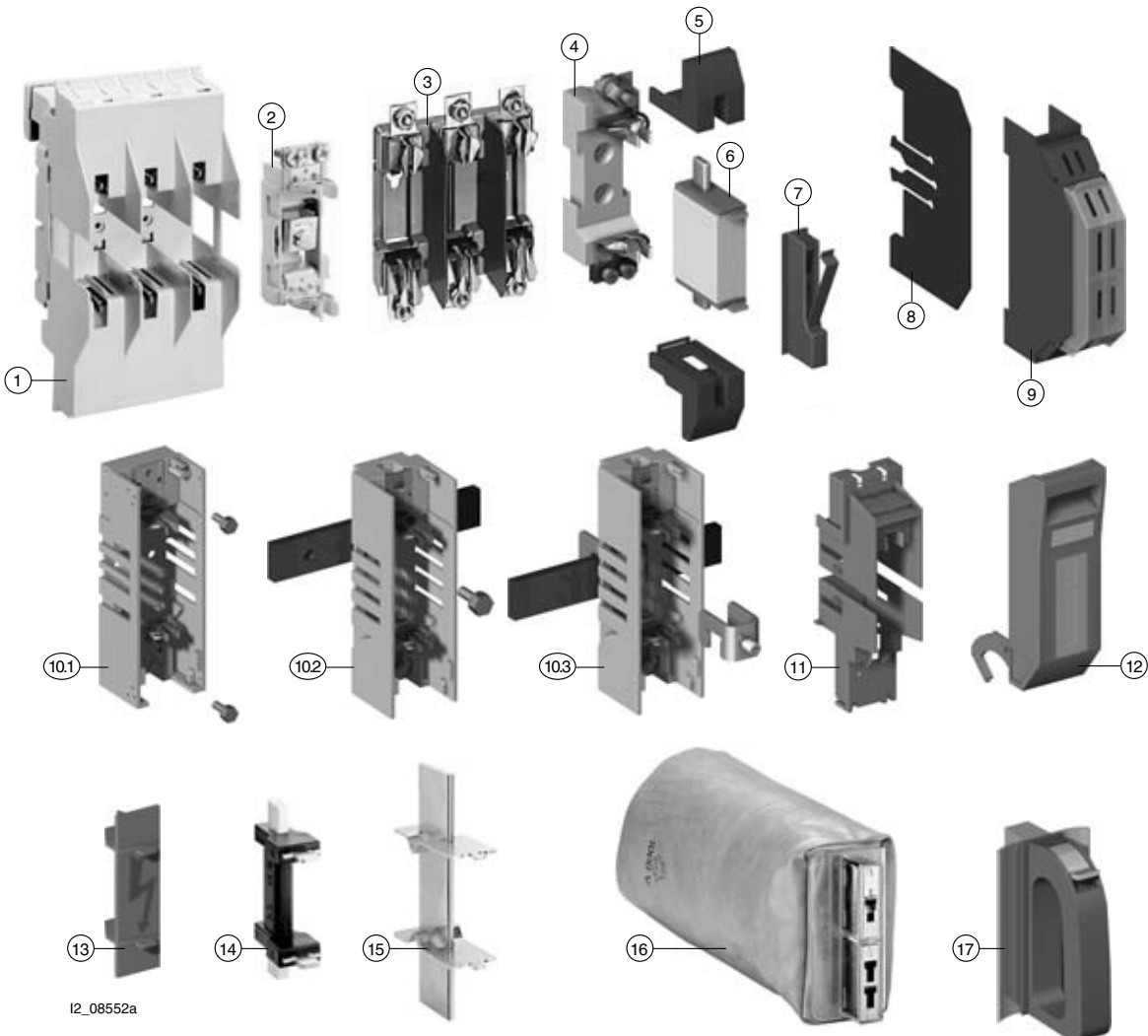
LV HRC fuse links are available in the sizes 000, 00, 0, 1, 2, 3, 4 and 4a.

LV HRC components:

LV HRC fuse links comprise the following components:

- ① LV HRC fuse base from the SR60 busbar system
- ② LV HRC fuse base for busbar mounting
- ③ LV HRC fuse base, 3-pole
- ④ LV HRC fuse base, 1-pole
- ⑤ LV HRC contact covers
- ⑥ LV HRC fuse link
- ⑦ LV HRC signal detector
- ⑧ LV HRC phase barrier
- ⑨ LV HRC protection cover
- ⑩ LV HRC fuse bases with slewing equipment,
- ⑩.1 - with screw connection for mounting plate
- ⑩.2 - with screw connection to busbar system
- ⑩.3 - with claw connection to busbar system
- ⑪ LV HRC protective cover for LV HRC fuse bases with slewing equipment
- ⑫ LV HRC slewing equipment
- ⑬ LV HRC fuse base cover
- ⑭ LV HRC isolating link with insulated grip lugs
- ⑮ LV HRC isolating link with non-insulated grip lugs
- ⑯ LCV HRC fuse puller with sleeve
- ⑰ LV HRC fuse puller

LV HRC components:



I2_08552a

Low-Voltage Fuse Systems

LV HRC Fuse Systems

Product overview

Overview

LV HRC fuse links with combination alarm

Detecting the protection state

It is often difficult to detect failed fuse links within a system. If they are mounted in fuse bases with slewing equipment or LV HRC switch disconnectors, they often don't offer a clear view.

The LV HRC fuse links have a clearly visible center indicator
red: functioning
white: not functioning

Better safe than sorry

In addition to this, the LV HRC fuse links are equipped with a front indicator on the top. This considerably improves the view of one or the other indicator.

The combination alarm

Siemens LV HRC fuse links have a combination alarm, a combination of center indicator and front indicator. This enables fast detection of a failed LV HRC fuse link from different directions.

Front indicator

For standard applications, which are characterized by freely accessible fuse links allowing easy detection of failed fuse links, we offer a range of product series with front indicators and without center indicators.

Insulated grip lugs

Insulated grip lugs must be made of metal. They are integrated in the top and bottom covers of the fuse link and provide greater safety when replacing components. The mark shown below indicates that the grip lugs are insulated:



Silver-plated contact pin

LV HRC fuse links are always equipped with silver-plated contact pins. This means that they are non-corroding and have less contact resistance.



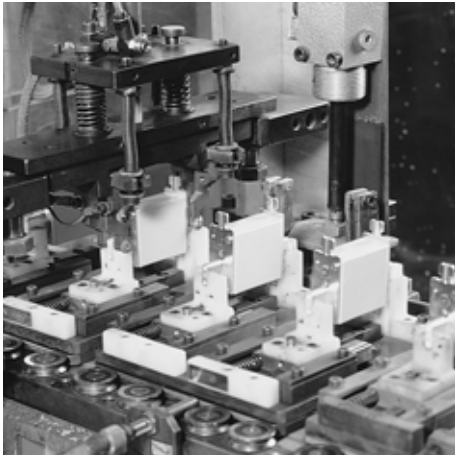
LV HRC fuse links with combination alarm



LV HRC fuse links with front indicator

Overview

Highly-automated manufacturing



An overview of the production line with integrated test stations



Automated manufacturing sequences guarantee quality and precision

Environmental protection is an ongoing task for today's modern industrial society and requires action!

Environmentally compatible recycling of LV HRC/HV HRC fuses

National and global environmental problems – for example global warming, the destruction of the ozone layer, the deterioration of the ground and water resources – have all proven the necessity of common action. The recycling law, which was enacted in Germany at the end of 1996, requires companies to recycle materials and save resources.

Responsibility of the industry

Industry has been called upon to acknowledge its responsibility towards future generations and to take the initiative. Manufacturers of low-voltage and high-voltage fuses and high-voltage HRC fuses are very aware of this responsibility and are determined to focus more than ever on "protecting" the environment and taking care of our natural resources.

How is recycling organized?

Acting on a Siemens AG initiative, various German manufacturers of LV/HV HRC fuses have formed the non-profit association "NH/HH-Recycling e.V." Taking into account the prevailing legal regulations, the committee aims to actively contribute towards the protection of the environment and its natural resources by supporting the proper recycling of fuse links.

How are fuses recycled in Germany?

LV HRC and HV HRC fuse links without packaging will be accepted for recycling. Electrical wholesalers will provide Euro pallet boxes for this purpose. If you require large quantities, Euro pallet boxes can also be delivered to you directly on-site. For further information, please contact our regional Siemens A&D ET sales managers.

Material recycling

The used fuse links are completely melted by an officially certified recycler. The recovered copper and silver are returned to the materials cycle. Residual materials, such as slag, are used in road and dam building. The "NH/HH-Recycling e.V." association plans to donate any profits from these processes to non-profit organizations for the purpose of environmental research.

Please help us: be a part of our initiative and ask for the signs that stand for the recycling of LV HRC fuse links.



Low-Voltage Fuse Systems

LV HRC Fuse Systems





LV HRC fuse links gG

Technical specifications

LV HRC fuse links		3NA6 ...-4/-4KK	3NA6	3NA7	3NA6... -6	3NA7... -6
Operational class		gG				
Rated voltage U_n						
Size 000 and 00	V AC	--	500		690	
	V DC	--	250			
Sizes 1 and 2	V AC	400	500		690	
	V DC	--	440			
Rated current I_n	A	10 ... 400	2 ... 400		2 ... 315	
Rated breaking capacity	kA AC	120				
	kA DC	25				
Combination alarm		yes				
Insulated grip lugs		yes		--	yes	--
Non-insulated grip lugs		--		yes	--	yes
Contact pins		non-corroding, silver-plated				
Resistance to climate at 95 % relative humidity	°C	-20 ... +50				
Standards		DIN VDE 0636-201, DIN VDE 0680-4, IEC 60269-1, -2-1, EN 60269-1, HD 630.2.1 S6				
Dimensions		DIN VDE 0636-201, IEC 60269-2-1				

		3NA3	3NA3... -6
Operational class		gG	
Rated voltage U_n			
Size 000 and 00	V AC	500	690
	V DC	250	
Sizes 1 and 2	V AC	500	690
	V DC	440	
Size 3	V AC	500	690
	V DC	440	
Sizes 4 (IEC design) and 4a	V AC	500	--
	V DC	440	--
Rated current I_n	A	2 ... 1250	2 ... 500
Rated breaking capacity	kA AC	120	
Contact pins		non-corroding, silver-plated	
Front indicator (without center indicator)		yes	
Non-insulated grip lugs		yes	
Resistance to climate at 95 % relative humidity	°C	-20 ... +50	
Standards		DIN VDE 0636-201, DIN VDE 0680-4, IEC 60269-1, -2-1, EN 60269-1, HD 630.2.1 S6	
Dimensions		DIN VDE 0636-201, IEC 60269-2-1	

Selection and ordering data

Size	Width	I_n	U_n	Insulated grip lugs	Weight 1 unit approx.	PS*/ P. unit	
	mm	A	V	Order No.	kg	Unit(s)	
LV HRC fuse links with combination alarm, gG operational class							
LV HRC fuse links of size 000 can also be used in LV HRC fuse bases, LV HRC fuse switch disconnectors, LV HRC fuse strips as well as in LV HRC in-line fuse switch disconnectors of size 00.							
	000	21	10	400 V AC	3NA6 803-4	0.135	3
			16		3NA6 805-4	0.135	3
			20		3NA6 807-4	0.135	3
			25		3NA6 810-4	0.135	3
			32		3NA6 812-4	0.135	3
			35		3NA6 814-4	0.135	3
			40		3NA6 817-4	0.135	3
			50		3NA6 820-4	0.135	3
			63		3NA6 822-4	0.135	3
			80		3NA6 824-4	0.135	3
100	3NA6 830-4	0.135	3				
	00	30	80	400 V AC	3NA6 824-4KK	0.200	3
			100		3NA6 830-4KK	0.200	3
			125		3NA6 832-4	0.200	3
			160		3NA6 836-4	0.200	3
	1	30	35	400 V AC	3NA6 114-4	0.290	3
			40		3NA6 117-4	0.290	3
			50		3NA6 120-4	0.290	3
			63		3NA6 122-4	0.290	3
			80		3NA6 124-4	0.290	3
			100		3NA6 130-4	0.290	3
			125		3NA6 132-4	0.290	3
			160		3NA6 136-4	0.290	3
			47.2		3NA6 140-4	0.430	3
			224		3NA6 142-4	0.430	3
250	3NA6 144-4	0.430	3				
	2	47.2	50	400 V AC	3NA6 220-4	0.450	3
			63		3NA6 222-4	0.450	3
			80		3NA6 224-4	0.450	3
			100		3NA6 230-4	0.450	3
			125		3NA6 232-4	0.450	3
			160		3NA6 236-4	0.450	3
			200		3NA6 240-4	0.450	3
			224		3NA6 242-4	0.450	3
			250		3NA6 244-4	0.450	3
			300		3NA6 250-4	0.650	3
			315		3NA6 252-4	0.650	3
			355		3NA6 254-4	0.650	3
			400		3NA6 260-4	0.650	3

Low-Voltage Fuse Systems

LV HRC Fuse Systems

LV HRC fuse links gG





Selection and ordering data

Size	Overall width	I_n	U_n	Non-insulated grip lugs	Insulated grip lugs	Weight 1 unit approx.	PS*/P. unit
	mm	A	V	Order No.	Order No.	kg	Unit(s)

LV HRC fuse links with combination alarm gG operational class

LV HRC fuse links of size 000 can also be used in LV HRC fuse bases, LV HRC fuse switch disconnectors, LV HRC fuse strips as well as in LV HRC in-line fuse switch disconnectors of size 00.

The 300 A and 355 A fuse links do not conform to a VDE mark. They correspond to the standard, but are not permissible.

	000	21	2	500 V AC/ 250 V DC	3NA7 802	3NA6 802	0.135	3		
			4		3NA7 804	3NA6 804				
			6		3NA7 801	3NA6 801				
			10		3NA7 803	3NA6 803				
			16		3NA7 805	3NA6 805				
			20		3NA7 807	3NA6 807				
			25		3NA7 810	3NA6 810				
			32		3NA7 812	3NA6 812				
			35		3NA7 814	3NA6 814				
			40		3NA7 817	3NA6 817				
			50		3NA7 820	3NA6 820				
			63		3NA7 822	3NA6 822				
			80		3NA7 824	3NA6 824			0.136	3
100	3NA7 830	3NA6 830	0.136	3						
	00	30	80	500 V AC/ 250 V DC	3NA7 824-7	3NA6 824-7	0.211	3		
			100		3NA7 830-7	3NA6 830-7				
			125		3NA7 832	3NA6 832				
			160		3NA7 836	3NA6 836				
	1	30	16	500 V AC/ 440 V DC	3NA7 105	3NA6 105	0.290	3		
			20		3NA7 107	3NA6 107				
			25		3NA7 110	3NA6 110				
			35		3NA7 114	3NA6 114				
			40		3NA7 117	3NA6 117				
			50		3NA7 120	3NA6 120				
			63		3NA7 122	3NA6 122				
			80		3NA7 124	3NA6 124				
			100		3NA7 130	3NA6 130				
			125		3NA7 132	3NA6 132				
			160		3NA7 136	3NA6 136				
			47.2		3NA7 140	3NA6 140			0.440	3
			224		3NA7 142	3NA6 142			0.440	3
250	3NA7 144	3NA6 144	0.440	3						
	2	47.2	35	500 V AC/ 440 V DC	3NA7 214	3NA6 214	0.450	3		
			50		3NA7 220	3NA6 220				
			63		3NA7 222	3NA6 222				
			80		3NA7 224	3NA6 224				
			100		3NA7 230	3NA6 230				
			125		3NA7 232	3NA6 232				
			160		3NA7 236	3NA6 236				
			200		3NA7 240	3NA6 240				
			224		3NA7 242	3NA6 242				
			250		3NA7 244	3NA6 244				
			57.8		--	3NA6 250			0.641	3
			315		3NA7 252	3NA6 252			0.660	3
			355		--	3NA6 254			0.641	3
400	3NA7 260	3NA6 260	0.660	3						





Selection and ordering data

Size	Overall width	I_n	U_n	Non-insulated grip lugs	Insulated grip lugs	Weight 1 unit approx.	PS*/P. unit
	mm	A	V	Order No.	Order No.	kg	Unit(s)

LV HRC fuse links with combination alarm gG operational class

LV HRC fuse links of size 000 can also be used in LV HRC fuse bases, LV HRC fuse switch disconnectors, LV HRC fuse strips as well as in LV HRC in-line fuse switch disconnectors of size 00.

The 300 A fuse links do not conform to a VDE mark. They correspond to the standard, but are not permissible.

	000	21	2	690 V AC/ 250 V DC	3NA7 802-6	3NA6 802-6	0.136	3
			4		3NA7 804-6	3NA6 804-6	0.136	3
			6		3NA7 801-6	3NA6 801-6	0.136	3
			10		3NA7 803-6	3NA6 803-6	0.136	3
			16		3NA7 805-6	3NA6 805-6	0.136	3
			20		3NA7 807-6	3NA6 807-6	0.136	3
			25		3NA7 810-6	3NA6 810-6	0.136	3
			32		3NA7 812-6	3NA6 812-6	0.136	3
	35	3NA7 814-6	3NA6 814-6	0.136	3			
	00	30	40	690 V AC/ 250 V DC	3NA7 817-6	3NA6 817-6	0.211	3
			50		3NA7 820-6	3NA6 820-6	0.211	3
			63		3NA7 822-6	3NA6 822-6	0.211	3
			80		3NA7 824-6	3NA6 824-6	0.211	3
			100		3NA7 830-6	3NA6 830-6	0.211	3
	1	30	50	690 V AC/ 440 V DC	3NA7 120-6	3NA6 120-6	0.290	3
			63		3NA7 122-6	3NA6 122-6	0.290	3
			80		3NA7 124-6	3NA6 124-6	0.290	3
			100		3NA7 130-6	3NA6 130-6	0.290	3
			125		3NA7 132-6	3NA6 132-6	0.290	3
			160		3NA7 136-6	3NA6 136-6	0.290	3
			47.2		3NA7 140-6	3NA6 140-6	0.440	3
	2	47.2	80	690 V AC/ 440 V DC	3NA7 224-6	3NA6 224-6	0.450	3
			100		3NA7 230-6	3NA6 230-6	0.450	3
			125		3NA7 232-6	3NA6 232-6	0.450	3
			160		3NA7 236-6	3NA6 236-6	0.450	3
			200		3NA7 240-6	3NA6 240-6	0.450	3
		57.8	224	3NA7 242-6	3NA6 242-6	0.660	3	
			250	3NA7 244-6	3NA6 244-6	0.660	3	
			300	3NA7 250-6	3NA6 250-6	0.660	3	
			315	3NA7 252-6	3NA6 252-6	0.660	3	





Further versions on request.

Low-Voltage Fuse Systems





LV HRC Fuse Systems

LV HRC fuse links gG

Selection and ordering data

Size	Overall width	I_n	U_n	Non-insulated grip lugs	Weight 1 unit approx.	PS*/ P. unit	
	mm	A	V	Order No.	kg	Unit(s)	
LV HRC fuse links with front indicator, gG operational class							
LV HRC fuse links of size 000 can also be used in LV HRC fuse bases, LV HRC fuse switch disconnectors, LV HRC fuse strips as well as in LV HRC in-line fuse switch disconnectors of size 00.							
	000	21	2 4 6 10 16 20 25 32 35 40 50 63 80 100	500 V AC/ 250 V DC	3NA3 802	0.133	3
					3NA3 804	0.133	3
					3NA3 801	0.133	3
					3NA3 803	0.133	3
					3NA3 805	0.133	3
					3NA3 807	0.133	3
					3NA3 810	0.133	3
					3NA3 812	0.133	3
					3NA3 814	0.133	3
					3NA3 817	0.133	3
					3NA3 820	0.133	3
3NA3 822	0.133	3					
3NA3 824	0.133	3					
3NA3 830	0.133	3					
	00	30	35 50 63 80 100 125 160	500 V AC/ 250 V DC	3NA3 814-7	0.200	3
					3NA3 820-7	0.200	3
					3NA3 822-7	0.200	3
					3NA3 824-7	0.200	3
					3NA3 830-7	0.200	3
					3NA3 832	0.217	3
3NA3 836	0.217	3					
	0	30	6 10 16 20 25 32 35 40 50 63 80 100 125 160	500 V AC/ 440 V DC	3NA3 001	0.340	3
					3NA3 003	0.340	3
					3NA3 005	0.340	3
					3NA3 007	0.340	3
					3NA3 010	0.340	3
					3NA3 012	0.340	3
					3NA3 014	0.340	3
					3NA3 017	0.340	3
					3NA3 020	0.340	3
					3NA3 022	0.340	3
					3NA3 024	0.340	3
3NA3 030	0.340	3					
3NA3 032	0.340	3					
3NA3 036	0.340	3					
	1	30	16 20 25 35 40 50 63 80 100 125 160 200 224 250	500 V AC/ 440 V DC	3NA3 105	0.290	3
					3NA3 107	0.290	3
					3NA3 110	0.290	3
					3NA3 114	0.300	3
					3NA3 117	0.300	3
					3NA3 120	0.300	3
					3NA3 122	0.300	3
					3NA3 124	0.300	3
					3NA3 130	0.300	3
					3NA3 132	0.300	3
					3NA3 136	0.300	3
					3NA3 140	0.440	3
					3NA3 142	0.440	3
					3NA3 144	0.440	3

Selection and ordering data






Size	Overall width	I_n	U_n	Non-insulated grip lugs	Weight 1 unit approx.	PS*/ P. unit		
	mm	A	V	Order No.	kg	Unit(s)		
LV HRC fuse links with front indicator, gG operational class								
The 300 A, 355 A and 425 A fuse links do not conform to a VDE mark. They correspond to the standard, but are not permissible.								
Fuse links, size 4a can only be installed in 3NH7 520 LV HRC fuse base, size 4a.								
	2	47.2	35	500 V AC/ 440 V DC	3NA3 214	0.453	3	
			50		3NA3 220	0.453	3	
			63		3NA3 222	0.453	3	
			80		3NA3 224	0.453	3	
			100		3NA3 230	0.453	3	
			125		3NA3 232	0.453	3	
			160		3NA3 236	0.453	3	
			200		3NA3 240	0.453	3	
			224		3NA3 242	0.453	3	
			250		3NA3 244	0.453	3	
			57.8		300	3NA3 250	0.647	3
					315	3NA3 252	0.647	3
					355	3NA3 254	0.647	3
400	3NA3 260	0.647		3				
	3	57.8	200	500 V AC/ 440 V DC	3NA3 340	0.647	3	
			224		3NA3 342	0.640	3	
			250		3NA3 344	0.647	3	
			300		3NA3 350	0.647	3	
			315		3NA3 352	0.647	3	
			355		3NA3 354	0.647	3	
			400		3NA3 360	0.647	3	
			71.2		425	3NA3 362	1.000	3
					500	3NA3 365	1.000	3
					630	3NA3 372	1.000	3
	4 (IEC design)	101.8	630	500 V AC/ 440 V DC	3NA3 472	2.500	1	
			800		3NA3 475	2.500	1	
			1000		3NA3 480	2.500	1	
			1250		3NA3 482	2.500	1	
	4a	101.8	500	500 V AC/ 440 V DC	3NA3 665	2.700	1	
			630		3NA3 672	2.700	1	
			800		3NA3 675	2.700	1	
			1000		3NA3 680	2.840	1	
			1250		3NA3 682	2.840	1	

Low-Voltage Fuse Systems

LV HRC Fuse Systems

LV HRC fuse links gG

Selection and ordering data

Size	Overall width	I_n	U_n	Non-insulated grip lugs	Weight 1 unit approx.	PS*/ P. unit	
	mm	A	V	Order No.	kg	Unit(s)	
LV HRC fuse links with front indicator, gG operational class							
	000	21	2 4 6 10 16 20 25 32 35	690 V AC/ 250 V DC	3NA3 802-6	0.135	3
					3NA3 804-6	0.135	3
					3NA3 801-6	0.135	3
					3NA3 803-6	0.135	3
					3NA3 805-6	0.135	3
					3NA3 807-6	0.135	3
					3NA3 810-6	0.135	3
					3NA3 812-6	0.135	3
3NA3 814-6	0.135	3					
	00	30	40 50 63 80 100	690 V AC/ 250 V DC	3NA3 817-6	0.200	3
					3NA3 820-6	0.200	3
					3NA3 822-6	0.200	3
					3NA3 824-6	0.200	3
					3NA3 830-6	0.200	3
	1	30	50 63 80 100 125 160 200	690 V AC/ 440 V DC	3NA3 120-6	0.290	3
					3NA3 122-6	0.290	3
					3NA3 124-6	0.290	3
					3NA3 130-6	0.290	3
					3NA3 132-6	0.290	3
					3NA3 136-6	0.290	3
					3NA3 140-6	0.426	3
						2	47.2
3NA3 230-6	0.426	3					
3NA3 232-6	0.426	3					
3NA3 236-6	0.426	3					
3NA3 240-6	0.426	3					
3NA3 242-6	0.660	3					
3NA3 244-6	0.680	3					
3NA3 250-6	0.660	3					
3NA3 252-6	0.680	3					
	3	57.8	250 315	690 V AC/ 440 V DC	3NA3 344-6	0.660	3
					3NA3 352-6	0.660	3
		71.2	355 400 425 ¹⁾ 500	3NA3 354-6	1.000	3	
				3NA3 360-6	1.000	3	
				3NA3 362-6	1.000	3	
				3NA3 365-6	1.000	3	

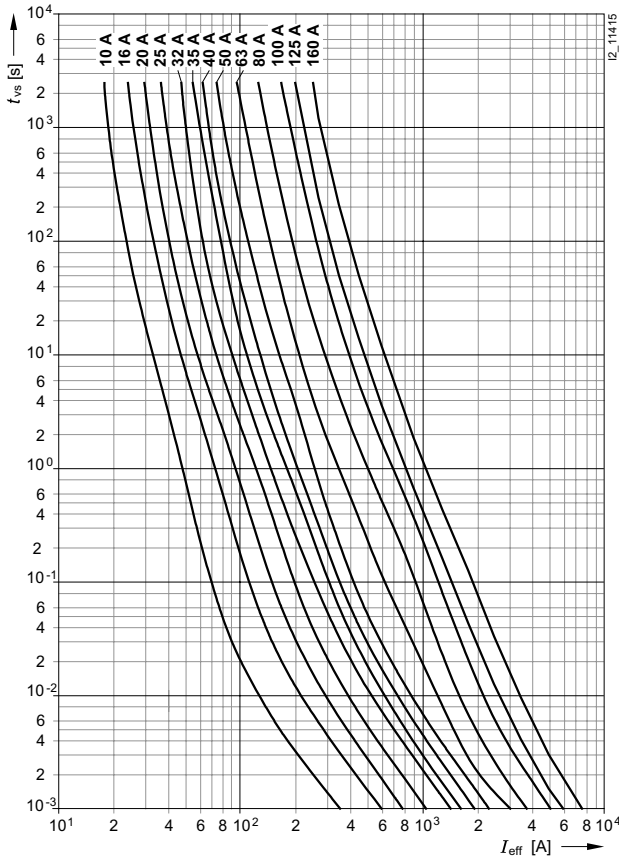
1) The 300 A and 425 A fuse links do not conform to a VDE mark. They correspond to the standard, but are not permissible.

Characteristic curves

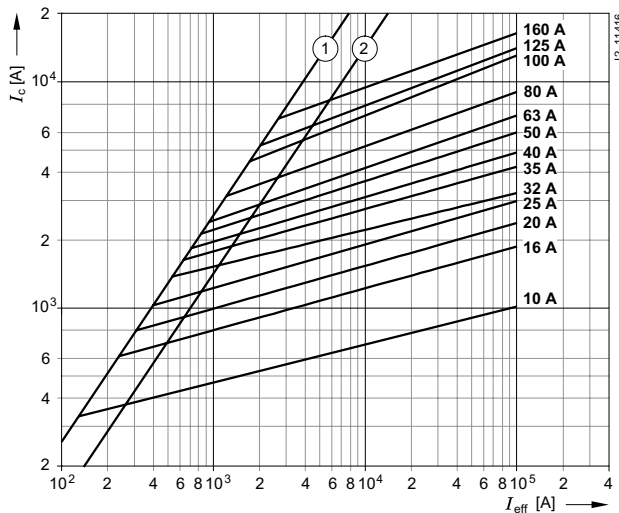
Series 3NA6 8...4/-4KK

Size: 000, 00
 Operational class: gG
 Rated voltage: 400 V AC
 Rated current: 10 ... 160 A

Time/current characteristics diagram

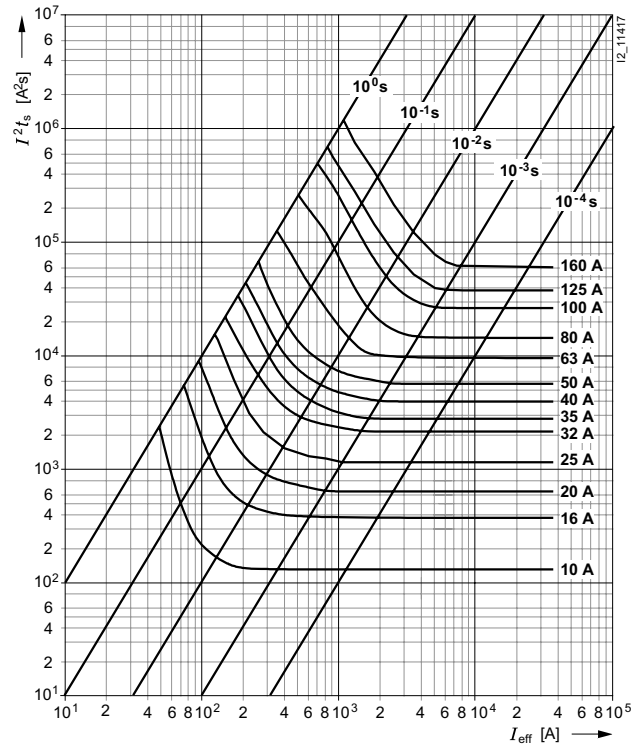


Current limitation diagram



- ① Peak short-circuit current with largest DC component
- ② Peak short-circuit current without DC component

Melting I^2t_s values diagram



Type	I_n	P_v	$\Delta\vartheta$	I^2t_s	
	A	W	K	1 ms A ² s	4 ms A ² s
3NA6 803-4	10	1.0	8	120	130
3NA6 805-4	16	1.7	11	370	420
3NA6 807-4	20	2.0	15	670	750
3NA6 810-4	25	2.3	17	1200	1380
3NA6 812-4	32	2.6	18	2200	2500
3NA6 814-4	35	2.7	21	3000	3300
3NA6 817-4	40	3.1	24	4000	4500
3NA6 820-4	50	3.8	25	6000	6800
3NA6 822-4	63	3.9	23	9300	10250
3NA6 824-4, 3NA6 824-4KK	80	4.9	26	14200	18300
3NA6 830-4, 3NA6 830-4KK	100	5.4	29	25600	33600
3NA6 832-4	125	8.9	44	36000	50000
3NA6 836-4	160	11.3	52	58000	85000

Type	I^2t_a	
	230 V AC A ² s	400 V AC A ² s
3NA6 803-4	180	265
3NA6 805-4	580	750
3NA6 807-4	1000	1370
3NA6 810-4	1800	2340
3NA6 812-4	3400	4550
3NA6 814-4	4900	6750
3NA6 817-4	6100	8700
3NA6 820-4	9100	11600
3NA6 822-4	12400	17900
3NA6 824-4, 3NA6 824-4KK	27000	38000
3NA6 830-4, 3NA6 830-4KK	48300	69200
3NA6 832-4	70000	91300
3NA6 836-4	120000	158000

Low-Voltage Fuse Systems

LV HRC Fuse Systems

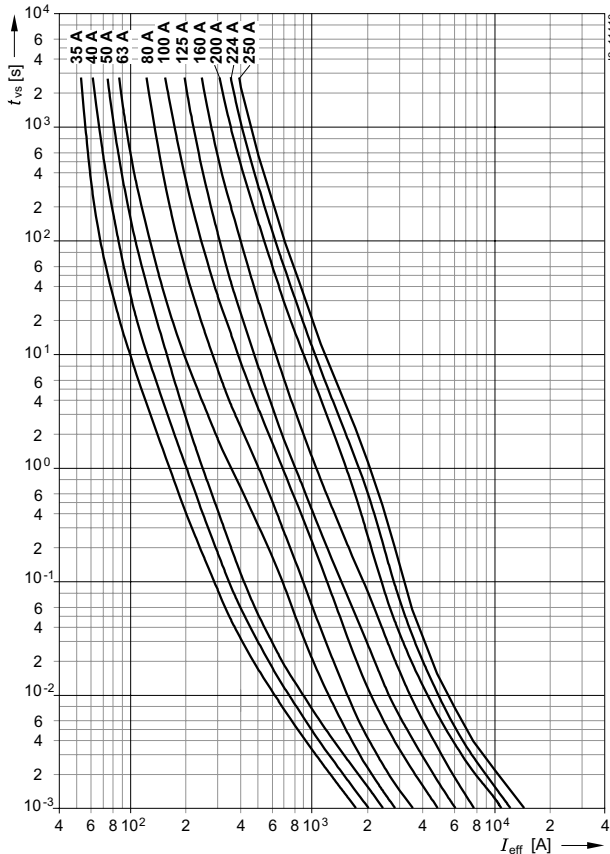
LV HRC fuse links gG

Characteristic curves

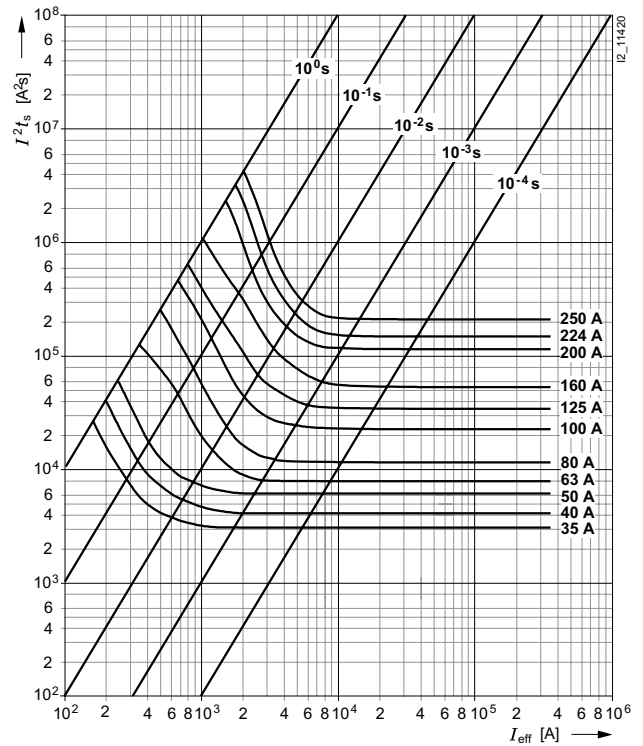
Series 3NA6 1...4

Size: 1
 Operational class: gG
 Rated voltage: 400 V AC
 Rated current: 35 ... 250 A

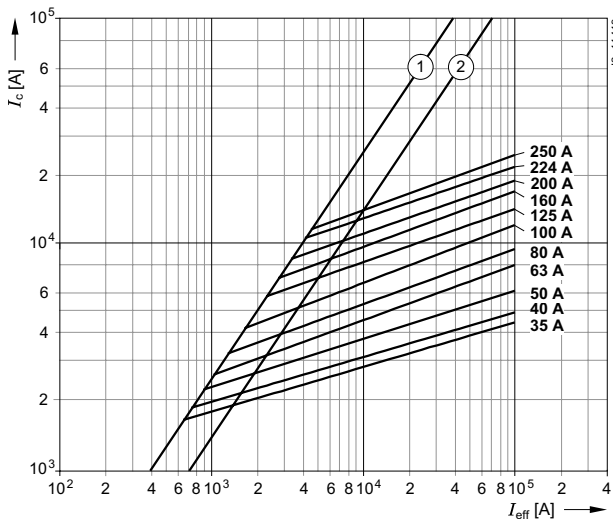
Time/current characteristics diagram



Melting I^2t_s values diagram



Current limitation diagram



- ① Peak short-circuit current with largest DC component
- ② Peak short-circuit current without DC component

Type	I_n A	P_v W	$\Delta\vartheta$ K
3NA6 114-4	35	3.2	16
3NA6 117-4	40	3.6	16
3NA6 120-4	50	4.6	20
3NA6 122-4	63	6.0	21
3NA6 124-4	80	7.5	29
3NA6 130-4	100	8.9	30
3NA6 132-4	125	10.7	31
3NA6 136-4	160	13.9	34
3NA6 140-4	200	15.0	36
3NA6 142-4	224	16.1	37
3NA6 144-4	250	17.3	39

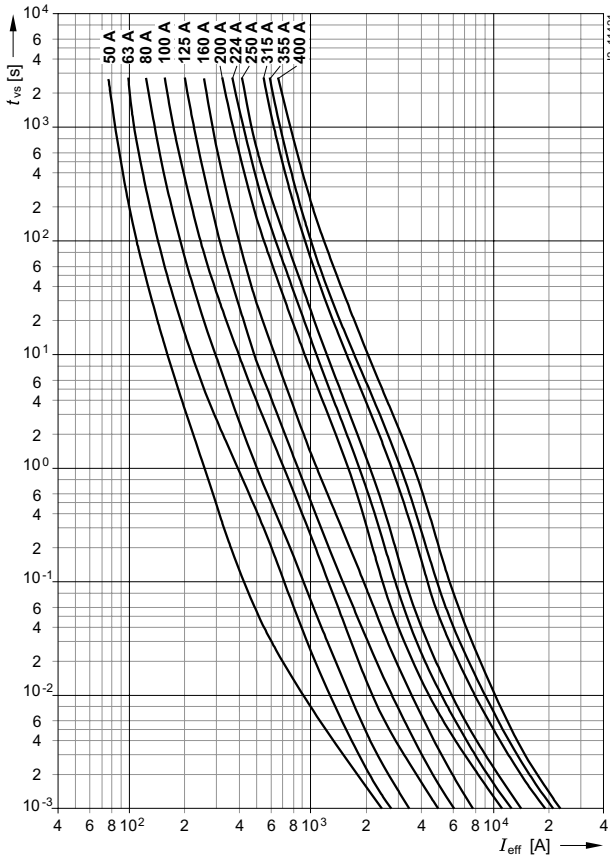
Type	I^2t_s		I^2t_a	
	1 ms A ² s	4 ms A ² s	230 V AC A ² s	400 V AC A ² s
3NA6 114-4	3000	3300	4900	6750
3NA6 117-4	4000	4500	6100	8700
3NA6 120-4	6000	6800	9100	11600
3NA6 122-4	7700	9800	14200	19000
3NA6 124-4	12000	16000	23100	30700
3NA6 130-4	24000	30600	40800	56200
3NA6 132-4	36000	50000	70000	91300
3NA6 136-4	58000	85000	120000	158000
3NA6 140-4	115000	135000	218000	285000
3NA6 142-4	145000	170000	299000	392000
3NA6 144-4	205000	230000	420000	551000

Characteristic curves

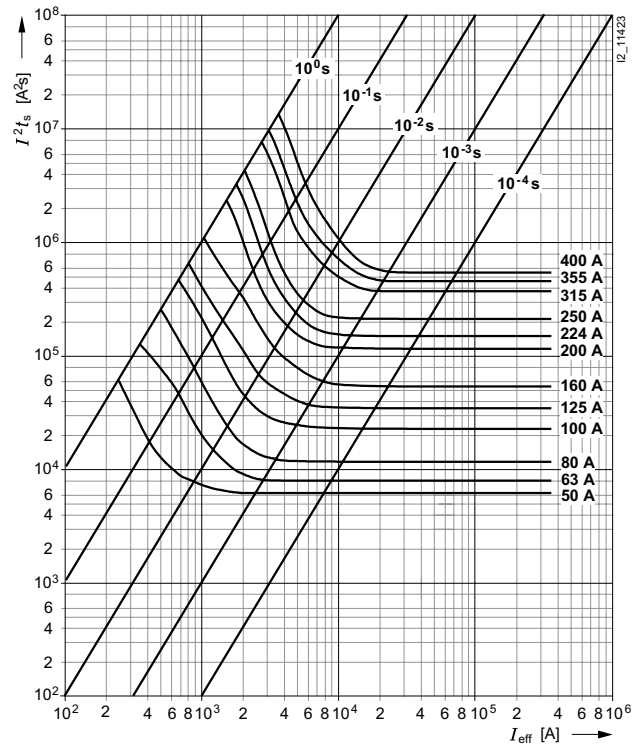
Series 3NA6 2...4

Size: 2
 Operational class: gG
 Rated voltage: 400 V AC
 Rated current: 50 ... 400 A

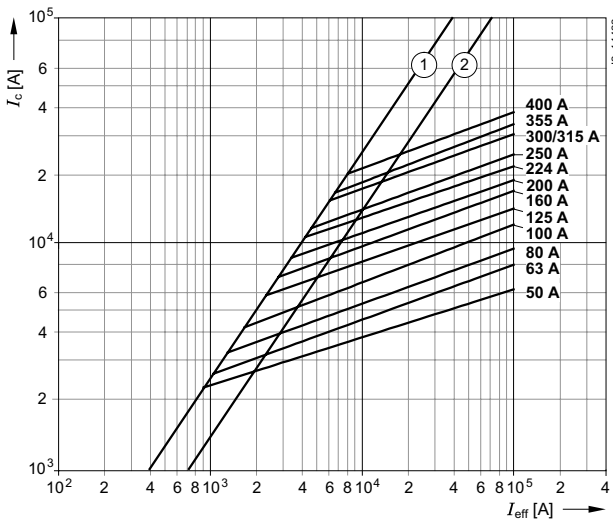
Time/current characteristics diagram



Melting I^2t_s values diagram



Current limitation diagram



- ① Peak short-circuit current with largest DC component
- ② Peak short-circuit current without DC component

Type	I_n A	P_v W	$\Delta\vartheta$ K
3NA6 220-4	50	4.7	16
3NA6 222-4	63	5.9	16
3NA6 224-4	80	6.8	21
3NA6 230-4	100	7.4	22
3NA6 232-4	125	9.8	27
3NA6 236-4	160	12.6	34
3NA6 240-4	200	14.9	33
3NA6 242-4	224	15.4	31
3NA6 244-4	250	17.9	38
3NA6 250-4	300	19.4	34
3NA6 252-4	315	21.4	35
3NA6 254-4	355	26.0	49
3NA6 260-4	400	27.5	52

Type	I^2t_s		I^2t_a	
	1 ms A ² s	4 ms A ² s	230 V AC A ² s	400 V AC A ² s
3NA6 220-4	6000	6800	9100	11600
3NA6 222-4	7700	9800	14200	19000
3NA6 224-4	12000	16000	23100	30700
3NA6 230-4	24000	30600	40800	56200
3NA6 232-4	36000	50000	70000	91300
3NA6 236-4	58000	85000	120000	158000
3NA6 240-4	115000	135000	218000	285000
3NA6 242-4	145000	170000	299000	392000
3NA6 244-4	205000	230000	420000	551000
3NA6 250-4	361000	433000	670000	901000
3NA6 252-4	361000	433000	670000	901000
3NA6 254-4	441000	538000	800000	1060000
3NA6 260-4	529000	676000	1155000	1515000

Low-Voltage Fuse Systems

LV HRC Fuse Systems

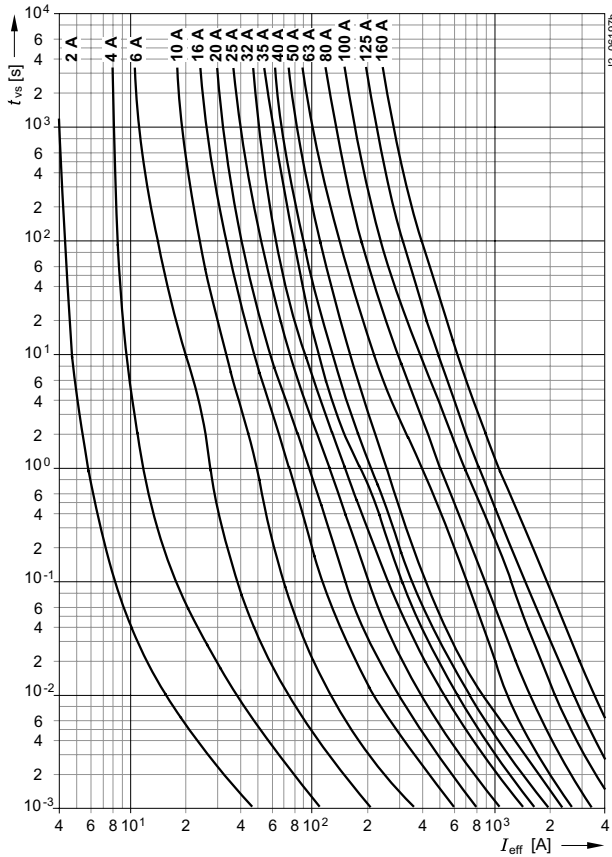
LV HRC fuse links gG

Characteristic curves

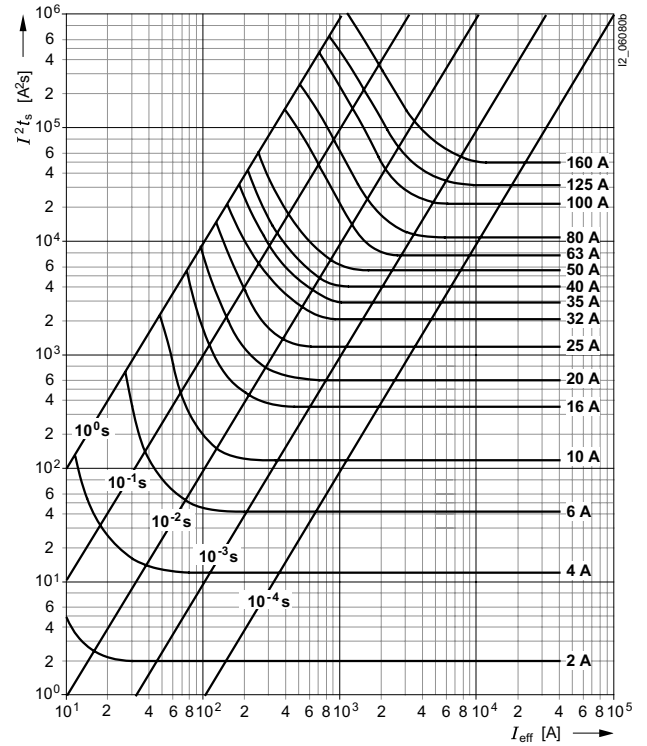
Series 3NA3 8, 3NA6 8, 3NA7 8

Size: 000, 00
 Operational class: gG
 Rated voltage: 500 V AC/250 V DC
 Rated current: 2 ... 160 A

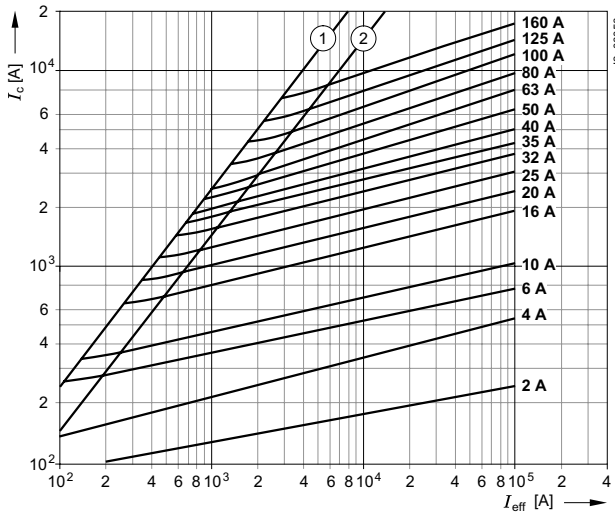
Time/current characteristics diagram



Melting I^2t_s values diagram



Current limitation diagram



- ① Peak short-circuit current with largest DC component
- ② Peak short-circuit current without DC component

Characteristic curves

Series 3NA3 8, 3NA6 8, 3NA7 8

Size: 000, 00
 Operational class: gG
 Rated voltage: 500 V AC/250 V DC
 Rated current: 2 ... 160 A

Type	I_n	P_V	$\Delta\vartheta$	I^2t_s		I^2t_a		
	A	W	K	1 ms A ² s	4 ms A ² s	230 V AC A ² s	400 V AC A ² s	500 V AC A ² s
3NA3 802, 3NA6 802, 3NA7 802	2	1.3	8	2	2	4	6	9
3NA3 804, 3NA6 804, 3NA7 804	4	0.9	6	11	13	18	22	27
3NA3 801, 3NA6 801, 3NA7 801	6	1.3	8	46	50	80	110	150
3NA3 803, 3NA6 803, 3NA7 803	10	1	8	120	130	180	265	370
3NA3 805, 3NA6 805, 3NA7 805	16	1.7	11	370	420	580	750	1000
3NA3 807, 3NA6 807, 3NA7 807	20	2	15	670	750	1000	1370	1900
3NA3 810, 3NA6 810, 3NA7 810	25	2.3	17	1200	1380	1800	2340	3300
3NA3 812, 3NA6 812, 3NA7 812	32	2.6	18	2200	2400	3400	4550	6400
3NA3 814, 3NA3 814-7, 3NA6 814, 3NA7 814	35	2.7	21	3000	3300	4900	6750	9300
3NA3 817, 3NA6 817, 3NA7 817	40	3.1	24	4000	4500	6100	8700	12100
3NA3 820, 3NA3 820-7, 3NA6 820, 3NA7 820	50	3.8	25	6000	6800	9100	11600	16000
3NA3 822, 3NA3 822-7, 3NA6 822, 3NA7 822	63	4.6	28	7700	9800	14200	19000	26500
3NA3 824, 3NA3 824-7, 3NA6 824, 3NA6 824-7, 3NA7 824, 3NA7 824-7	80	5.8	33	12000	16000	23100	30700	43000
3NA3 830, 3NA3 830-7, 3NA6 830, 3NA6 830-7, 3NA7 830, 3NA7 830-7	100	6.6	34	24000	30600	40800	56200	80000
3NA3 832, 3NA6 832, 3NA7 832	125	8.9	44	36000	50000	70000	91300	130000
3NA3 836, 3NA6 836, 3NA7 836	160	11.3	52	58000	85000	120000	158000	223000

Low-Voltage Fuse Systems

LV HRC Fuse Systems

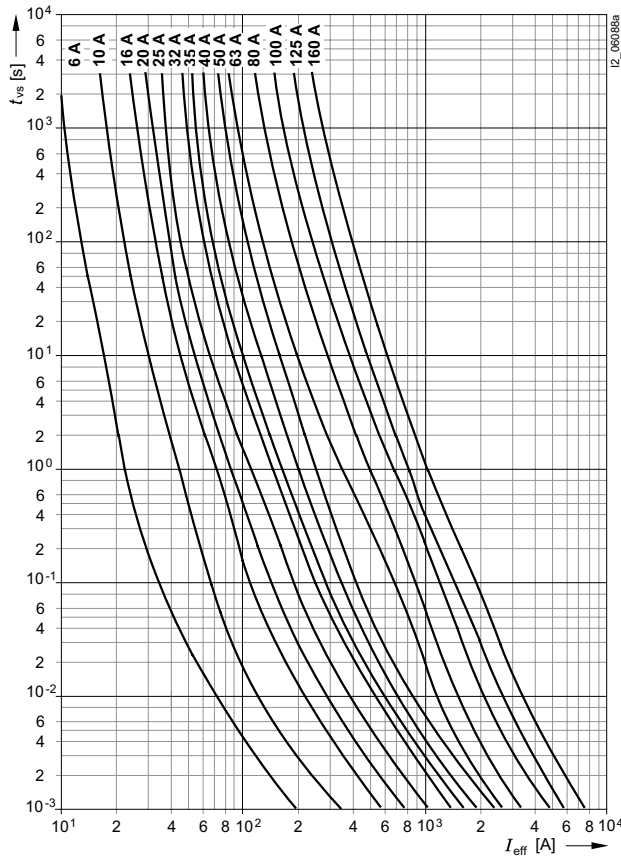
LV HRC fuse links gG

Characteristic curves

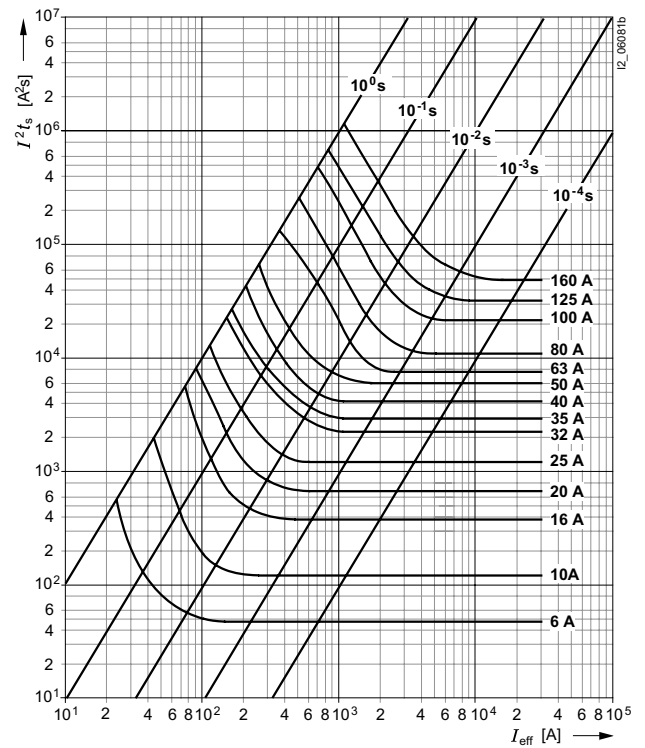
Series 3NA3 0

Size: 0
 Operational class: gG
 Rated voltage: 500 V AC/440 V DC
 Rated current: 6 ... 160 A

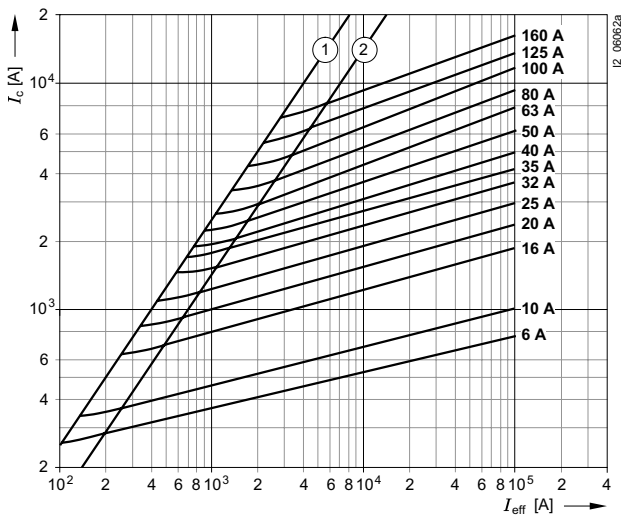
Time/current characteristics diagram



Melting I^2t_s values diagram



Current limitation diagram



- ① Peak short-circuit current with largest DC component
- ② Peak short-circuit current without DC component

Type	I_n A	P_v W	$\Delta\theta$ K	I^2t_s	
				1 ms A ² s	4 ms A ² s
3NA3 001	6	1.5	6	46	50
3NA3 003	10	1	9	120	130
3NA3 005	16	1.9	11	370	420
3NA3 007	20	2.3	13	670	750
3NA3 010	25	2.7	15	1200	1380
3NA3 012	32	3	13	2200	2400
3NA3 014	35	3	17	3000	3300
3NA3 017	40	3.4	17	4000	4500
3NA3 020	50	4.5	24	6000	6800
3NA3 022	63	5.8	27	7700	9800
3NA3 024	80	7	34	12000	16000
3NA3 030	100	8.2	37	24000	30600
3NA3 032	125	10.2	38	36000	50000
3NA3 036	160	13.5	44	58000	85000

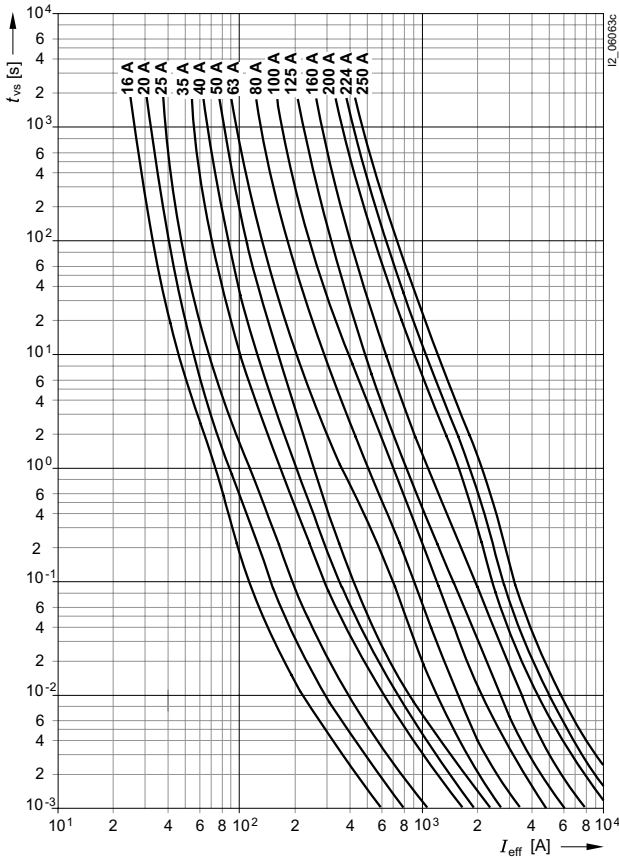
Type	I^2t_a		
	230 V AC A ² s	400 V AC A ² s	500 V AC A ² s
3NA3 001	80	110	150
3NA3 003	180	265	370
3NA3 005	580	750	1000
3NA3 007	1000	1370	1900
3NA3 010	1800	2340	3300
3NA3 012	3400	4550	6400
3NA3 014	4900	6750	9300
3NA3 017	6100	8700	12100
3NA3 020	9100	11600	16000
3NA3 022	14200	19000	26500
3NA3 024	23100	30700	43000
3NA3 030	40800	56200	80000
3NA3 032	70000	91300	130000
3NA3 036	120000	158000	223000

Characteristic curves

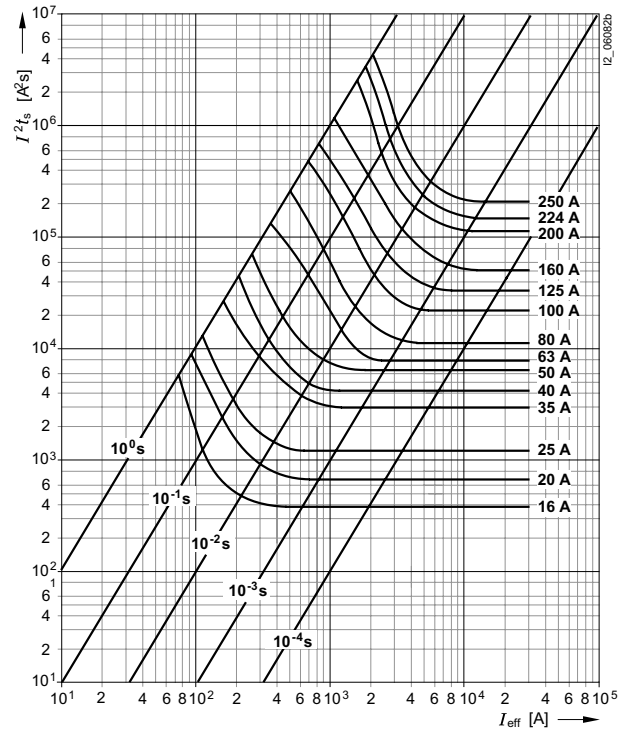
Series 3NA3 1, 3NA6 1, 3NA7 1

Size: 1
Operational class: gG
Rated voltage: 500 V AC/440 V DC
Rated current: 16 ... 250 A

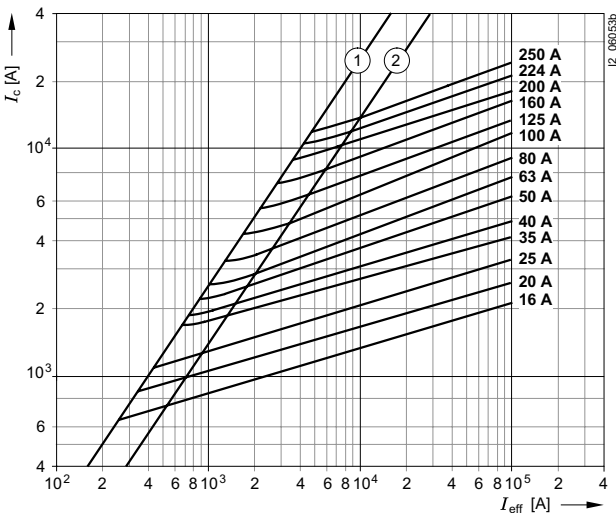
Time/current characteristics diagram



Melting I^2t_s values diagram



Current limitation diagram



- ① Peak short-circuit current with largest DC component
- ② Peak short-circuit current without DC component

Type	I_n	P_v	$\Delta\vartheta$	I^2t_s	
	A	W	K	1 ms A ² s	4 ms A ² s
3NA3 105, 3NA6 105, 3NA7 105	16	2.1	8	370	420
3NA3 107, 3NA6 107, 3NA7 107	20	2.4	10	670	750
3NA3 110, 3NA6 110, 3NA7 110	25	2.8	11	1200	1380
3NA3 114, 3NA6 114, 3NA7 114	35	3.2	16	3000	3300
3NA3 117, 3NA6 117, 3NA7 117	40	3.6	16	4000	4500
3NA3 120, 3NA6 120, 3NA7 120	50	4.6	20	6000	6800
3NA3 122, 3NA6 122, 3NA7 122	63	6	21	7700	9800
3NA3 124, 3NA6 124, 3NA7 124	80	7.5	29	12000	16000
3NA3 130, 3NA6 130, 3NA7 130	100	8.9	30	24000	30600
3NA3 132, 3NA6 132, 3NA7 132	125	10.7	31	36000	50000
3NA3 136, 3NA6 136, 3NA7 136	160	13.9	34	58000	85000
3NA3 140, 3NA6 140, 3NA7 140	200	15	36	115000	135000
3NA3 142, 3NA6 142, 3NA7 142	224	16.1	37	145000	170000
3NA3 144, 3NA6 144, 3NA7 144	250	17.3	39	205000	230000

Type	I^2t_a		
	230 V AC A ² s	400 V AC A ² s	500 V AC A ² s
3NA3 105, 3NA6 105, 3NA7 105	580	750	1000
3NA3 107, 3NA6 107, 3NA7 107	1000	1370	1900
3NA3 110, 3NA6 110, 3NA7 110	1800	2340	3300
3NA3 114, 3NA6 114, 3NA7 114	4900	6750	9300
3NA3 117, 3NA6 117, 3NA7 117	6100	8700	12100
3NA3 120, 3NA6 120, 3NA7 120	9100	11600	16000
3NA3 122, 3NA6 122, 3NA7 122	14200	19000	26500
3NA3 124, 3NA6 124, 3NA7 124	23100	30700	43000
3NA3 130, 3NA6 130, 3NA7 130	40800	56200	80000
3NA3 132, 3NA6 132, 3NA7 132	70000	91300	130000
3NA3 136, 3NA6 136, 3NA7 136	120000	158000	223000
3NA3 140, 3NA6 140, 3NA7 140	218000	285000	400000
3NA3 142, 3NA6 142, 3NA7 142	299000	392000	550000
3NA3 144, 3NA6 144, 3NA7 144	420000	551000	780000

Low-Voltage Fuse Systems

LV HRC Fuse Systems

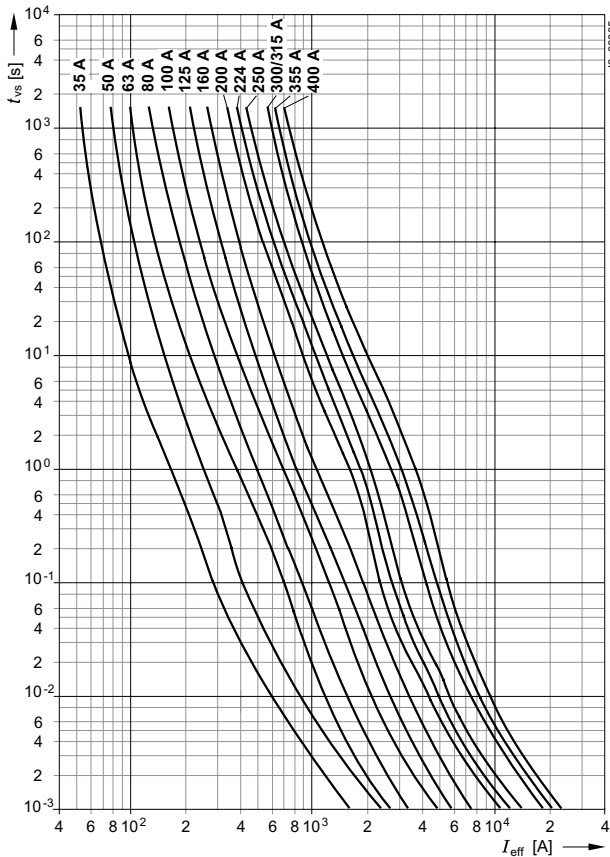
LV HRC fuse links gG

Characteristic curves

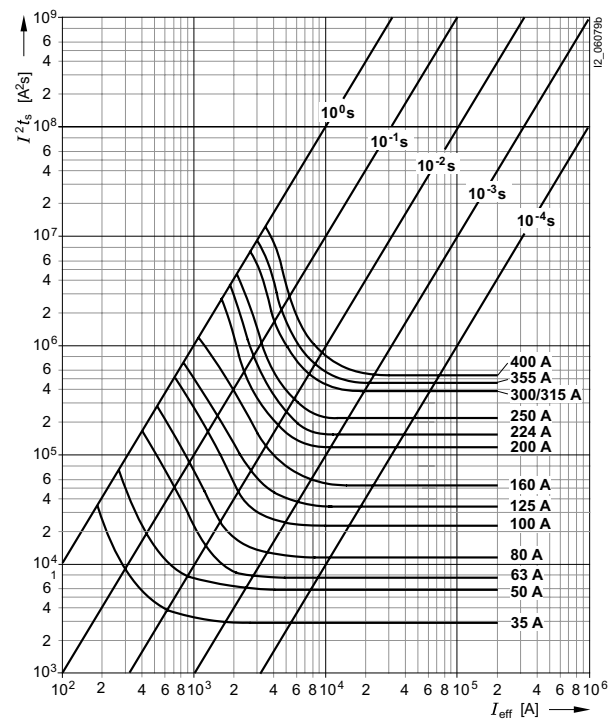
Series **3NA3 2, 3NA6 2, 3NA7 2**

Size: 2
Operational class: gG
Rated voltage: 500 V AC/440 V DC
Rated current: 35 ... 400 A

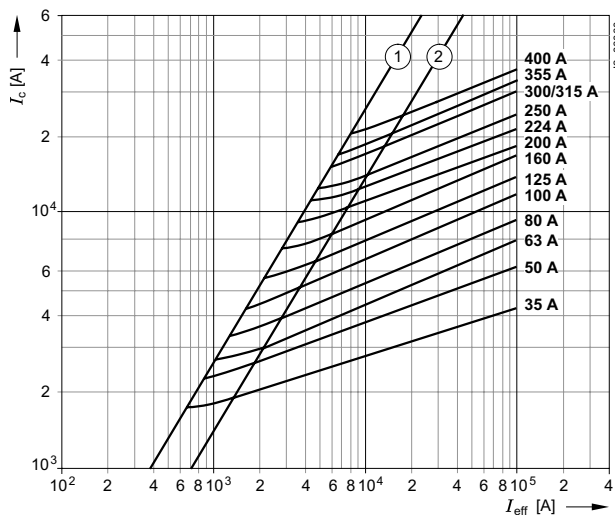
Time/current characteristics diagram



Melting I^2t_s values diagram



Current limitation diagram



- ① Peak short-circuit current with largest DC component
- ② Peak short-circuit current without DC component

Type	I_n	P_v	$\Delta\vartheta$	I^2t_s	
	A	W	K	1 ms A ² s	4 ms A ² s
3NA3 214, 3NA6 214, 3NA7 214	35	3.2	12	3000	3300
3NA3 220, 3NA6 220, 3NA7 220	50	4.7	16	6000	6800
3NA3 222, 3NA6 222, 3NA7 222	63	5.9	16	7700	9800
3NA3 224, 3NA6 224, 3NA7 224	80	6.8	21	12000	16000
3NA3 230, 3NA6 230, 3NA7 230	100	7.4	22	24000	30600
3NA3 232, 3NA6 232, 3NA7 232	125	9.8	27	36000	50000
3NA3 236, 3NA6 236, 3NA7 236	160	12.6	34	58000	85000
3NA3 240, 3NA6 240, 3NA7 240	200	14.9	33	115000	135000
3NA3 242, 3NA6 242, 3NA7 242	224	15.4	31	145000	170000
3NA3 244, 3NA6 244, 3NA7 244	250	17.9	38	205000	230000
3NA3 250, 3NA6 250	300	19.4	34	361000	433000
3NA3 252, 3NA6 252, 3NA7 252	315	21.4	35	361000	433000
3NA3 254, 3NA6 254	355	26.0	49	441000	538000
3NA3 260, 3NA6 260, 3NA7 260	400	27.5	52	529000	676000

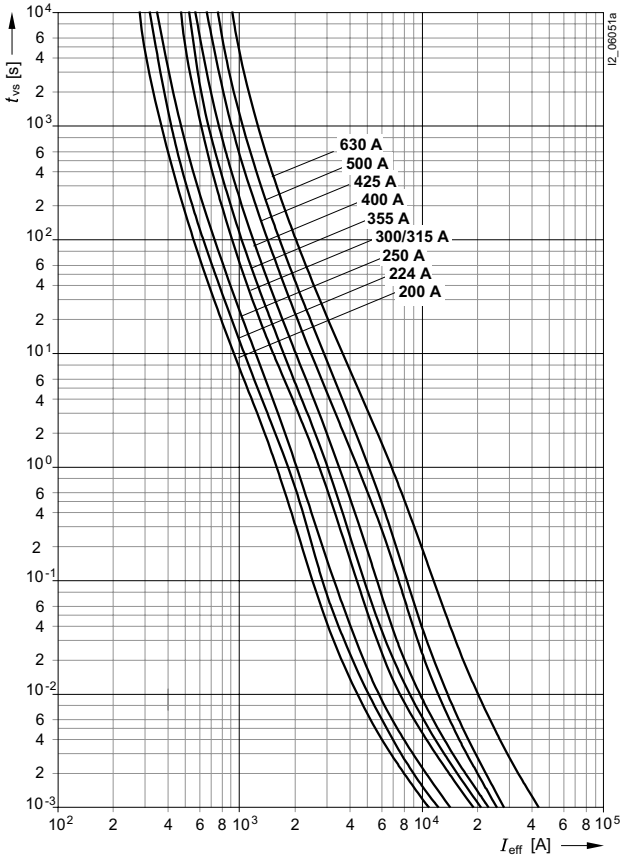
Type	I^2t_a		
	230 V AC A ² s	400 V AC A ² s	500 V AC A ² s
3NA3 214, 3NA6 214, 3NA7 214	4900	6750	9300
3NA3 220, 3NA6 220, 3NA7 220	9100	11600	16000
3NA3 222, 3NA6 222, 3NA7 222	14200	19000	26500
3NA3 224, 3NA6 224, 3NA7 224	23100	30700	43000
3NA3 230, 3NA6 230, 3NA7 230	40800	56200	80000
3NA3 232, 3NA6 232, 3NA7 232	70000	91300	130000
3NA3 236, 3NA6 236, 3NA7 236	120000	158000	223000
3NA3 240, 3NA6 240, 3NA7 240	218000	285000	400000
3NA3 242, 3NA6 242, 3NA7 242	299000	392000	550000
3NA3 244, 3NA6 244, 3NA7 244	420000	551000	780000
3NA3 250, 3NA6 250	670000	901000	1275000
3NA3 252, 3NA6 252, 3NA7 252	670000	901000	1275000
3NA3 254, 3NA6 254	800000	1060000	1500000
3NA3 260, 3NA6 260, 3NA7 260	1155000	1515000	2150000

Characteristic curves

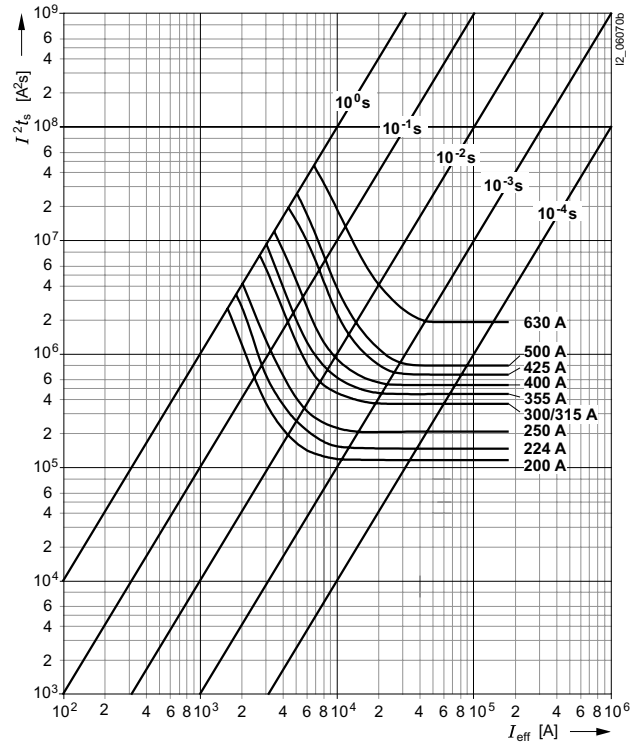
Series 3NA3 3

Size: 3
 Operational class: gG
 Rated voltage: 500 V AC/440 V DC
 Rated current: 200 ... 630 A

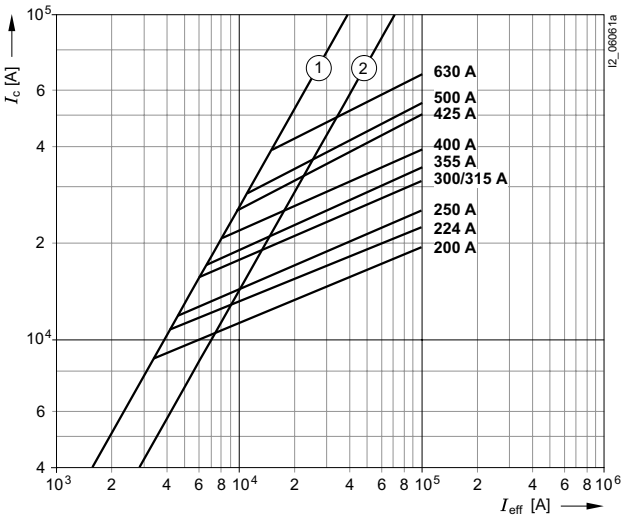
Time/current characteristics diagram



Melting I^2t_s values diagram



Current limitation diagram



- ① Peak short-circuit current with largest DC component
- ② Peak short-circuit current without DC component

Type	I_n	P_v	$\Delta\vartheta$	I^2t_s	
	A	W	K	1 ms A ² s	4 ms A ² s
3NA3 340	200	14.9	32	115000	135000
3NA3 342	224	15.4	31	145000	170000
3NA3 344	250	17.9	36	205000	230000
3NA3 350	300	19.4	19	361000	433000
3NA3 352	315	21.4	22	361000	433000
3NA3 354	355	26.0	26	441000	538000
3NA3 360	400	27.5	28	529000	676000
3NA3 362	425	26.5	34	650000	970000
3NA3 365	500	36.5	41	785000	1270000
3NA3 372	630	44.0	50	1900000	2700000

Type	I^2t_a		
	230 V AC A ² s	400 V AC A ² s	500 V AC A ² s
3NA3 340	218000	285000	400000
3NA3 342	299000	392000	550000
3NA3 344	420000	551000	780000
3NA3 350	670000	901000	1275000
3NA3 352	670000	901000	1275000
3NA3 354	800000	1060000	1500000
3NA3 360	1155000	1515000	2150000
3NA3 362	1515000	1856000	2270000
3NA3 365	1915000	2260000	2700000
3NA3 372	3630000	4340000	5400000

Low-Voltage Fuse Systems

LV HRC Fuse Systems

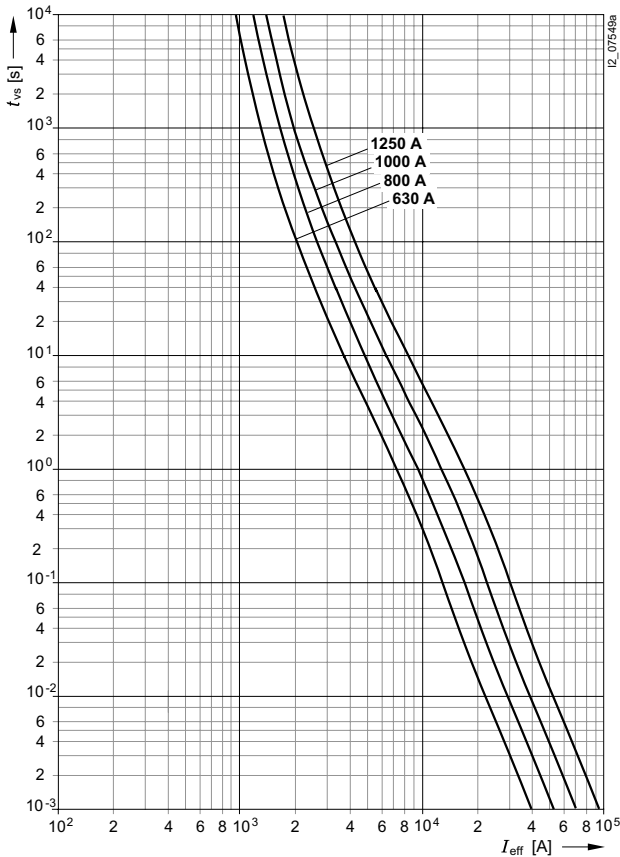
LV HRC fuse links gG

Characteristic curves

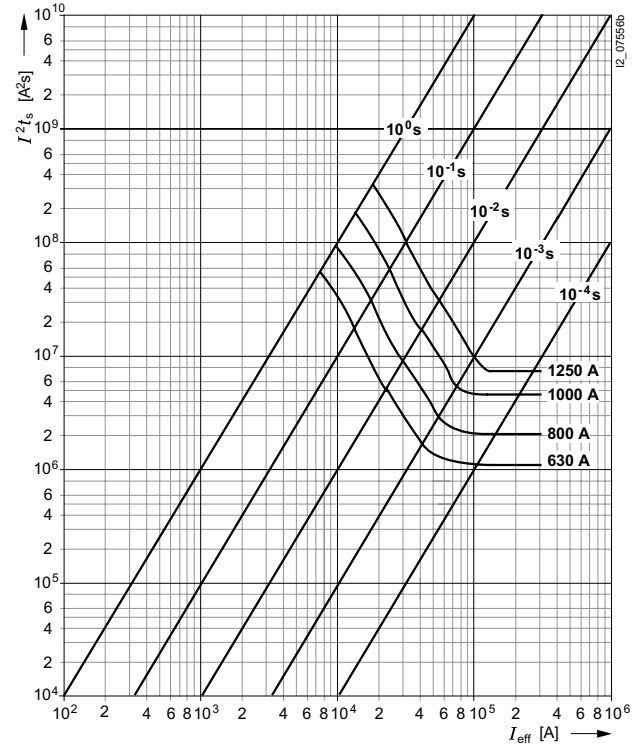
Series 3NA3 4

Size: 4 (IEC design)
 Operational class: gG
 Rated voltage: 500 V AC/440 V DC
 Rated current: 630 ... 1000 A

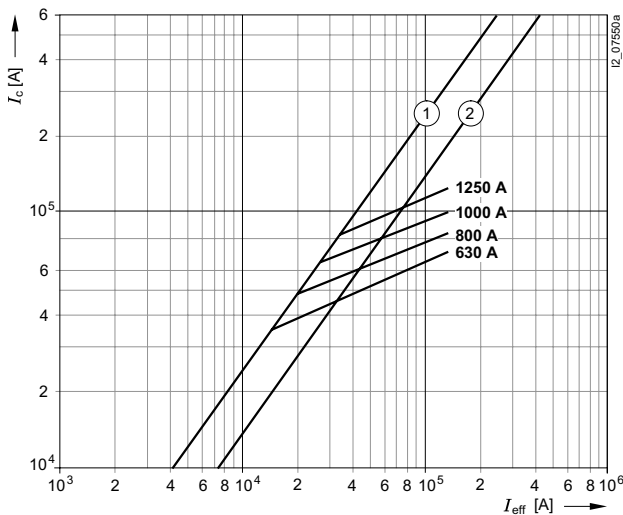
Time/current characteristics diagram



Melting I^2t_s values diagram



Current limitation diagram



Type	I_n	P_v	$\Delta\vartheta$	I^2t_s	
	A	W	K	1 ms A ² s	4 ms A ² s
3NA3 472	630	47	37	1900000	2700000
3NA3 475	800	59	43	3480000	5620000
3NA3 480	1000	74	56	7920000	10400000
3NA3 482	1250	99	65	11880000	18200000

Type	I^2t_a	400 V AC	500 V AC
	A ² s	A ² s	A ² s
3NA3 472	3630000	4340000	5400000
3NA3 475	7210000	8510000	10400000
3NA3 480	13600000	16200000	19000000
3NA3 482	23900000	29100000	34800000

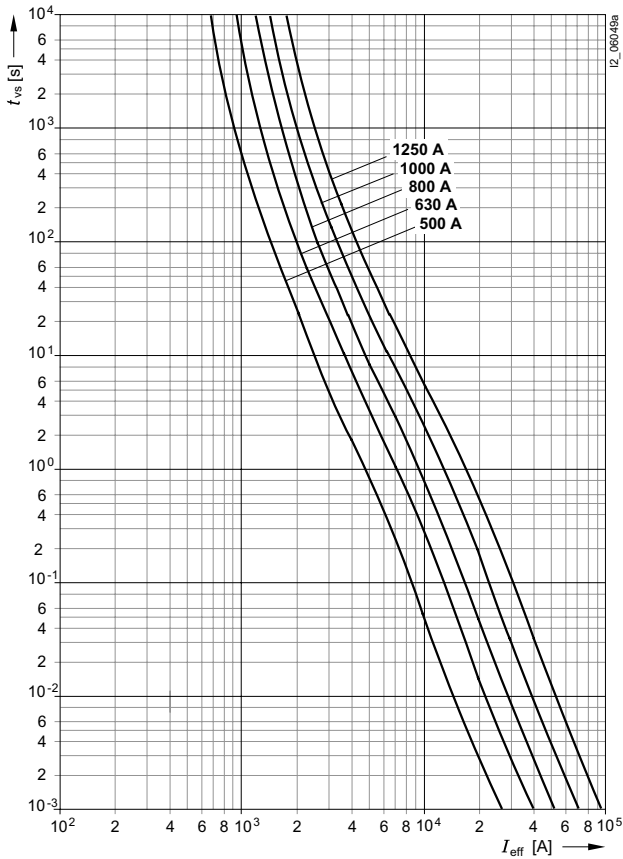
- ① Peak short-circuit current with largest DC component
- ② Peak short-circuit current without DC component

Characteristic curves

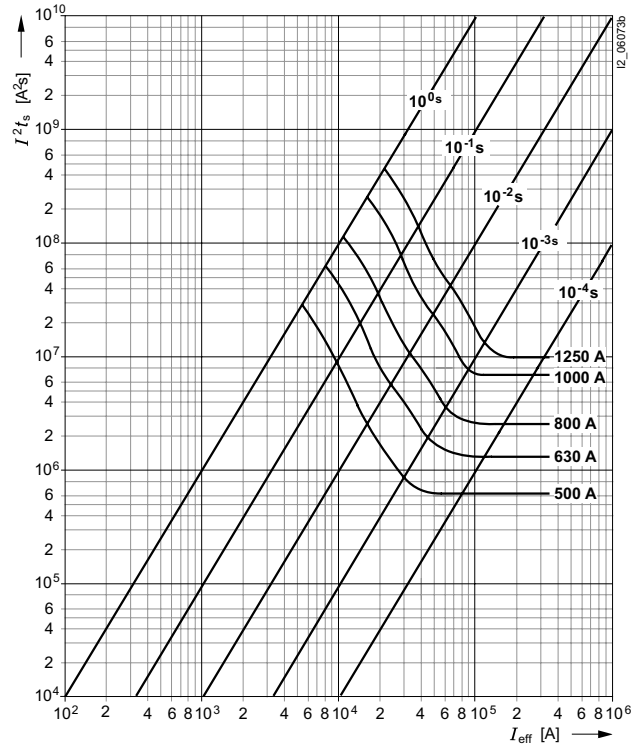
Series 3NA3 6

Size: 4a
 Operational class: gG
 Rated voltage: 500 V AC/440 V DC
 Rated current: 500 ... 1250 A

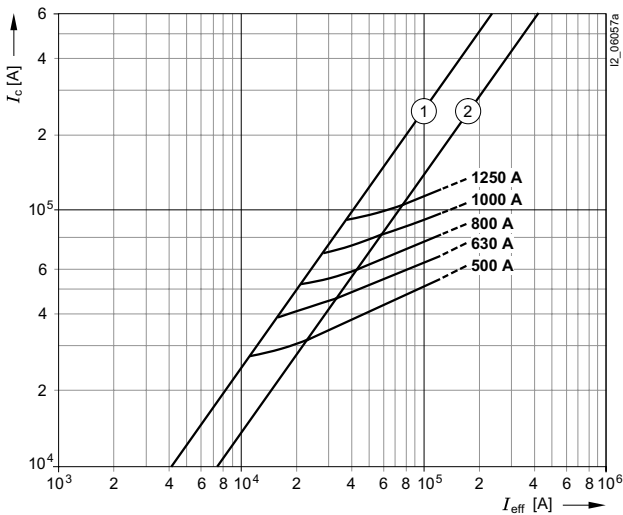
Time/current characteristics diagram



Melting I^2t_s values diagram



Current limitation diagram



- ① Peak short-circuit current with largest DC component
- ② Peak short-circuit current without DC component

Type	I_n	P_v	$\Delta\theta$	I^2t_s	
	A	W	K	1 ms A ² s	4 ms A ² s
3NA3 665	500	43	30	785000	1270000
3NA3 672	630	47	37	1900000	2700000
3NA3 675	800	59	43	3480000	5620000
3NA3 680	1000	74	56	7920000	10400000
3NA3 682	1250	99	65	11880000	18200000

Type	I^2t_a		
	230 V AC A ² s	400 V AC A ² s	500 V AC A ² s
3NA3 665	1915000	2260000	2700000
3NA3 672	3630000	4340000	5400000
3NA3 675	7210000	8510000	10400000
3NA3 680	13600000	16200000	19000000
3NA3 682	23900000	29100000	34800000

Low-Voltage Fuse Systems

LV HRC Fuse Systems

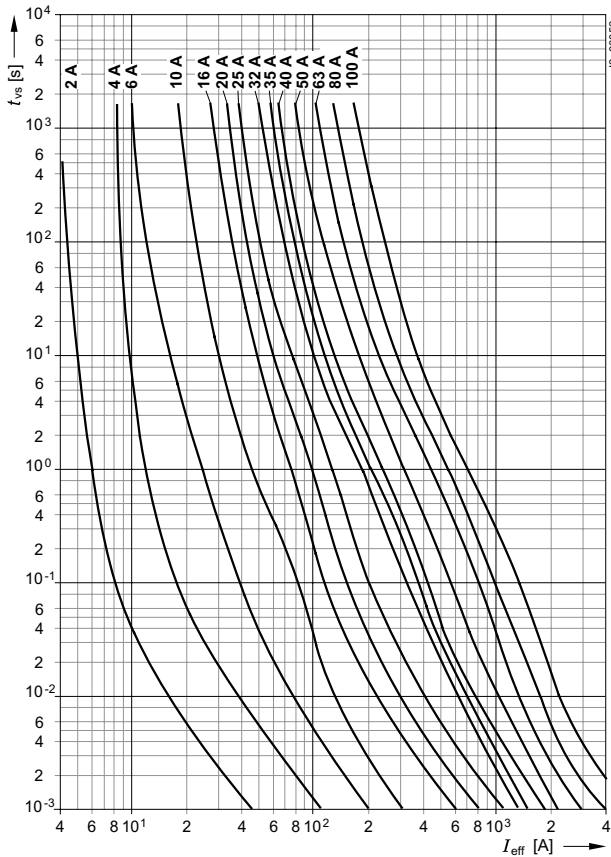
LV HRC fuse links gG

Characteristic curves

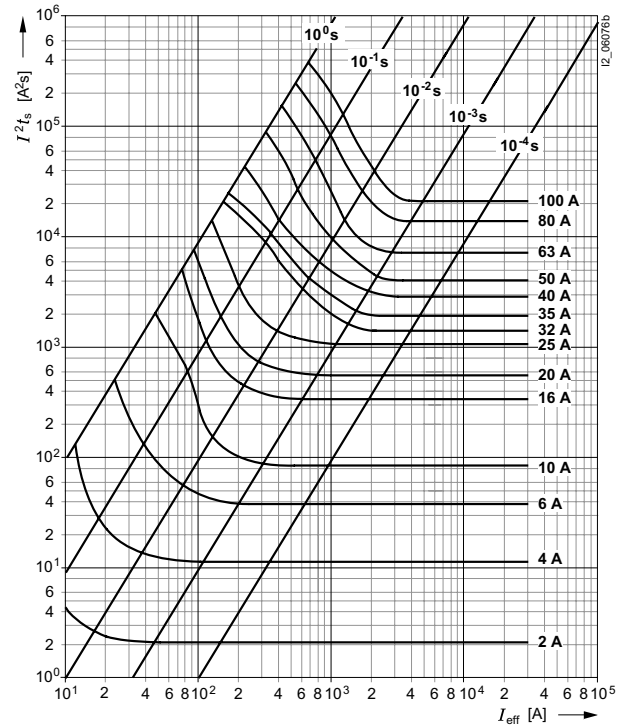
Series **3NA3 8..-6, 3NA6 8..-6, 3NA7 8..-6**

Size: 000, 00
 Operational class: gG
 Rated voltage: 690 V AC/250 V DC
 Rated current: 2 ... 100 A

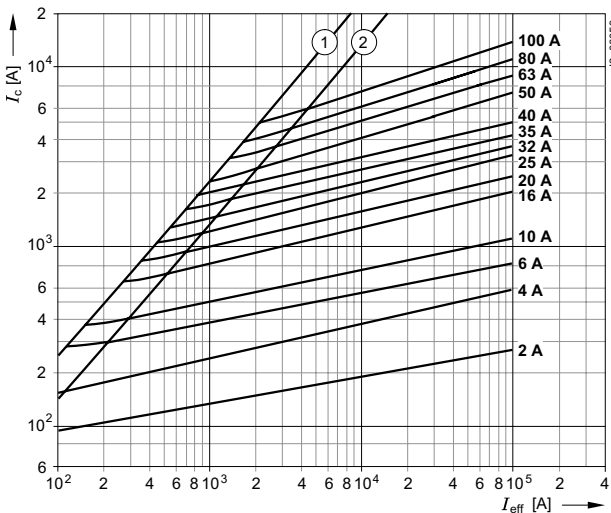
Time/current characteristics diagram



Melting I^2t_s values diagram



Current limitation diagram



- ① Peak short-circuit current with largest DC component
- ② Peak short-circuit current without DC component

Type	I_n	P_v	$\Delta\vartheta$	I^2t_s	
	A	W	K	1 ms A ² s	4 ms A ² s
3NA3 802-6, 3NA6 802-6, 3NA7 802-6	2	1.3	8	2	2
3NA3 804-6, 3NA6 804-6, 3NA7 804-6	4	0.9	6	11	13
3NA3 801-6, 3NA6 801-6, 3NA7 801-6	6	1.3	8	36	44
3NA3 803-6, 3NA6 803-6, 3NA7 803-6	10	1	8	90	120
3NA3 805-6, 3NA6 805-6, 3NA7 805-6	16	1.7	11	330	360
3NA3 807-6, 3NA6 807-6, 3NA7 807-6	20	2	15	570	690
3NA3 810-6, 3NA6 810-6, 3NA7 810-6	25	2.3	17	1200	1380
3NA3 812-6, 3NA6 812-6, 3NA7 812-6	32	3.1	19	1600	2600
3NA3 814-6, 3NA6 814-6, 3NA7 814-6	35	3.6	23	2100	3100
3NA3 817-6, 3NA6 817-6, 3NA7 817-6	40	3.6	18	3200	4700
3NA3 820-6, 3NA6 820-6, 3NA7 820-6	50	4.9	28	4400	7400
3NA3 822-6, 3NA6 822-6, 3NA7 822-6	63	5.7	33	7600	10100
3NA3 824-6, 3NA6 824-6, 3NA7 824-6	80	6.7	38	13500	17000
3NA3 830-6, 3NA6 830-6, 3NA7 830-6	100	9.1	40	21200	30500

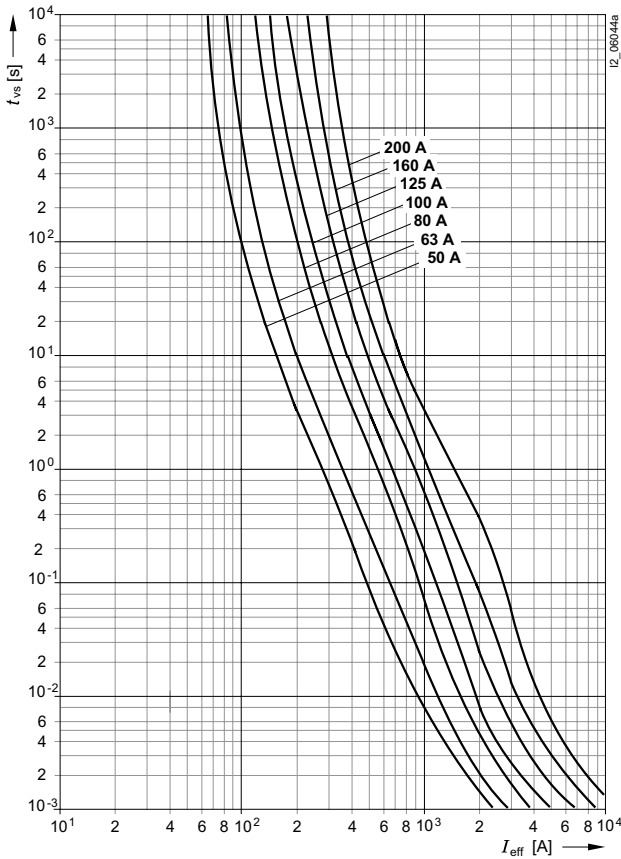
Type	I^2t_a		
	230 V AC A ² s	400 V AC A ² s	690 V AC A ² s
3NA3 802-6, 3NA6 802-6, 3NA7 802-6	4	6	9
3NA3 804-6, 3NA6 804-6, 3NA7 804-6	18	22	27
3NA3 801-6, 3NA6 801-6, 3NA7 801-6	80	110	150
3NA3 803-6, 3NA6 803-6, 3NA7 803-6	180	265	370
3NA3 805-6, 3NA6 805-6, 3NA7 805-6	580	750	1000
3NA3 807-6, 3NA6 807-6, 3NA7 807-6	1000	1370	1900
3NA3 810-6, 3NA6 810-6, 3NA7 810-6	1800	2340	3300
3NA3 812-6, 3NA6 812-6, 3NA7 812-6	3100	4100	5800
3NA3 814-6, 3NA6 814-6, 3NA7 814-6	4000	5000	7800
3NA3 817-6, 3NA6 817-6, 3NA7 817-6	6000	8600	12000
3NA3 820-6, 3NA6 820-6, 3NA7 820-6	9100	11200	19000
3NA3 822-6, 3NA6 822-6, 3NA7 822-6	13600	17000	24000
3NA3 824-6, 3NA6 824-6, 3NA7 824-6	24300	32000	55000
3NA3 830-6, 3NA6 830-6, 3NA7 830-6	42400	52000	75000

Characteristic curves

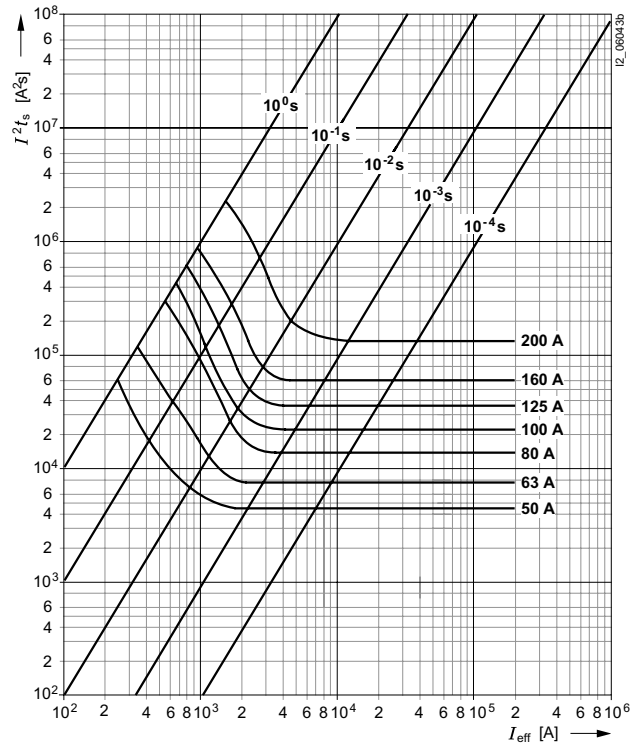
Series 3NA3 1..-6, 3NA6 1..-6, 3NA7 1..-6

Size: 1
Operational class: gG
Rated voltage: 690 V AC/440 V DC
Rated current: 50 ... 200 A

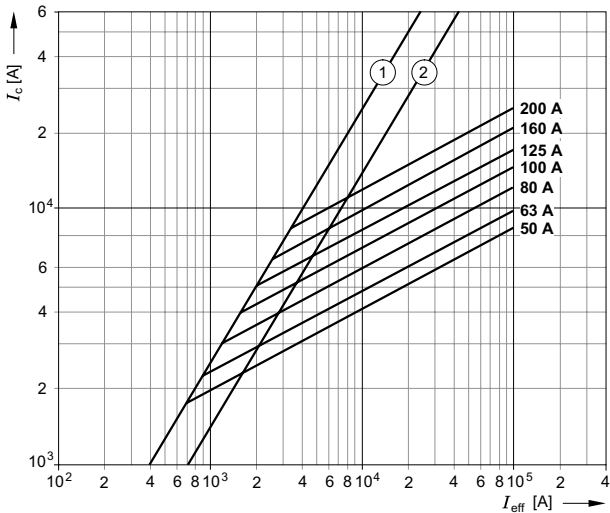
Time/current characteristics diagram



Melting I^2t_s values diagram



Current limitation diagram



- ① Peak short-circuit current with largest DC component
- ② Peak short-circuit current without DC component

Type	I_n	P_v	$\Delta\vartheta$	I^2t_s	
	A	W	K	1 ms A ² s	4 ms A ² s
3NA3 120-6, 3NA6 120-6, 3NA7 120-6	50	6.7	21	440	7400
3NA3 122-6, 3NA6 122-6, 3NA7 122-6	63	7.6	22	7600	10100
3NA3 124-6, 3NA6 124-6, 3NA7 124-6	80	6.7	22	13500	17000
3NA3 130-6, 3NA6 130-6, 3NA7 130-6	100	8.7	28	21200	30500
3NA3 132-6, 3NA6 132-6, 3NA7 132-6	125	10.5	29	36000	50000
3NA3 136-6, 3NA6 136-6, 3NA7 136-6	160	13.8	33	58000	85000
3NA3 140-6, 3NA6 140-6, 3NA7 140-6	200	16.6	35	132000	144000

Type	I^2t_a		
	230 V AC A ² s	400 V AC A ² s	690 V AC A ² s
3NA3 120-6, 3NA6 120-6, 3NA7 120-6	9100	11200	1900
3NA3 122-6, 3NA6 122-6, 3NA7 122-6	13600	17000	24000
3NA3 124-6, 3NA6 124-6, 3NA7 124-6	24300	32000	55000
3NA3 130-6, 3NA6 130-6, 3NA7 130-6	42400	52000	75000
3NA3 132-6, 3NA6 132-6, 3NA7 132-6	69500	82200	130000
3NA3 136-6, 3NA6 136-6, 3NA7 136-6	120000	155000	223000
3NA3 140-6, 3NA6 140-6, 3NA7 140-6	211000	240000	360000

Low-Voltage Fuse Systems

LV HRC Fuse Systems

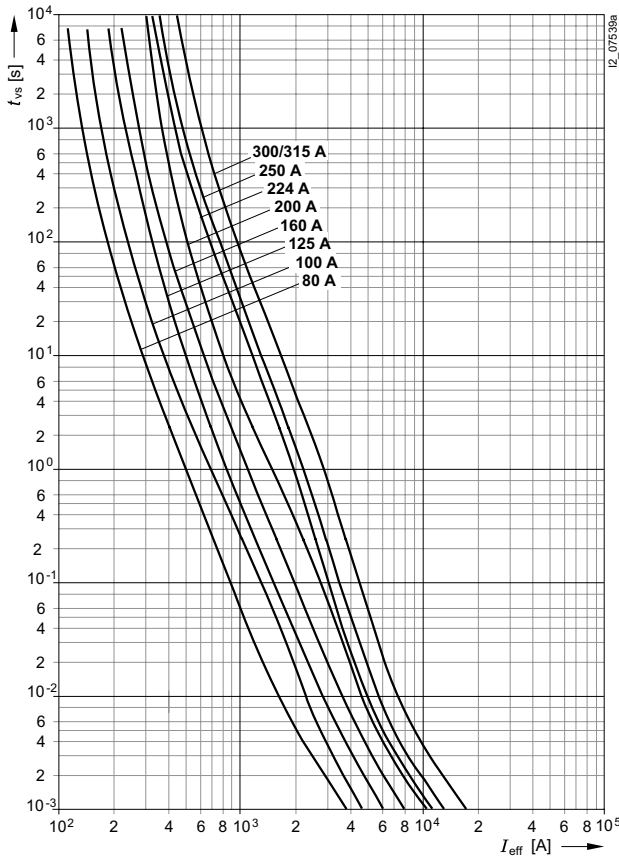
LV HRC fuse links gG

Characteristic curves

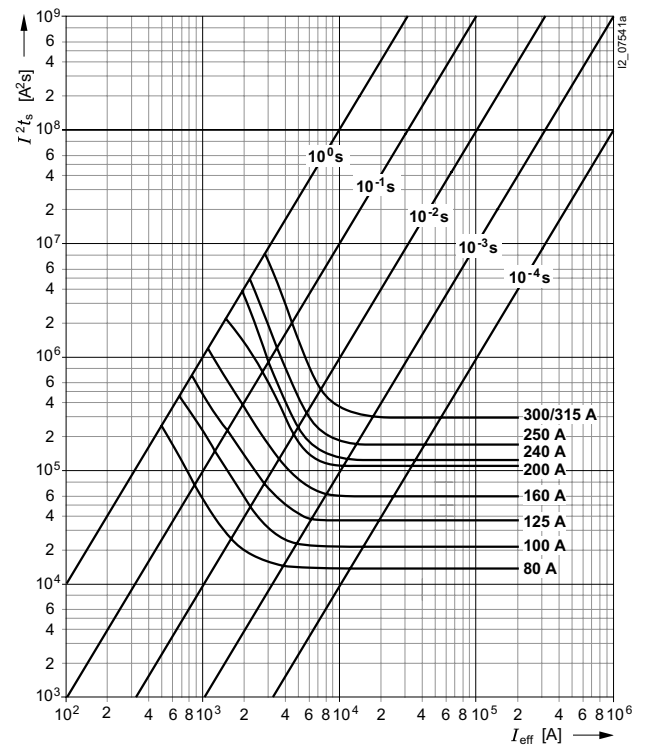
Series **3NA3 2...-6, 3NA6 2...-6, 3NA7 2...-6**

Size: 2
Operational class: gG
Rated voltage: 690 V AC/440 V DC
Rated current: 80 ... 315 A

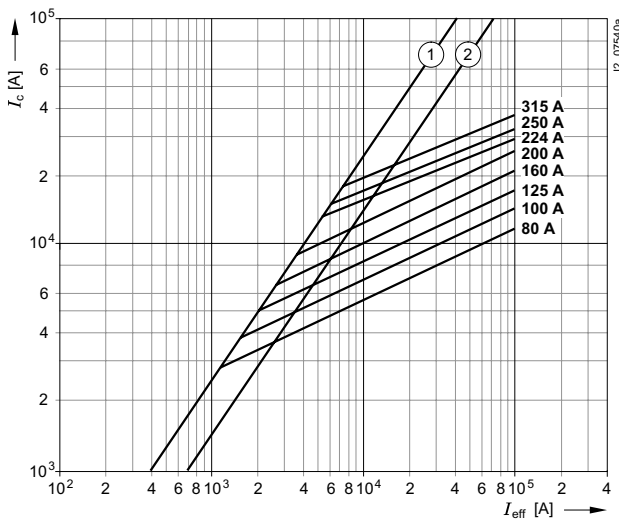
Time/current characteristics diagram



Melting I^2t_s values diagram



Current limitation diagram



- ① Peak short-circuit current with largest DC component
- ② Peak short-circuit current without DC component

Type	I_n	P_v	$\Delta\vartheta$	I^2t_s	
	A	W	K	1 ms A ² s	4 ms A ² s
3NA3 224-6, 3NA6 224-6, 3NA7 224-6	80	6.6	22	13500	17000
3NA3 230-6, 3NA6 230-6, 3NA7 230-6	100	8.5	26	21200	30500
3NA3 232-6, 3NA6 232-6, 3NA7 232-6	125	9.8	29	36000	50000
3NA3 236-6, 3NA6 236-6, 3NA7 236-6	160	13.3	31	58000	85000
3NA3 240-6, 3NA6 240-6, 3NA7 240-6	200	16.1	33	132000	144000
3NA3 242-6, 3NA6 242-6, 3NA7 242-6	224	19.9	38	125000	162000
3NA3 244-6, 3NA6 244-6, 3NA7 244-6	250	23	44	180000	215000
3NA3 250-6, 3NA6 250-6, 3NA7 250-6	300	25.6	38	300000	380000
3NA3 252-6, 3NA6 252-6, 3NA7 252-6	315	28.2	42	300000	380000

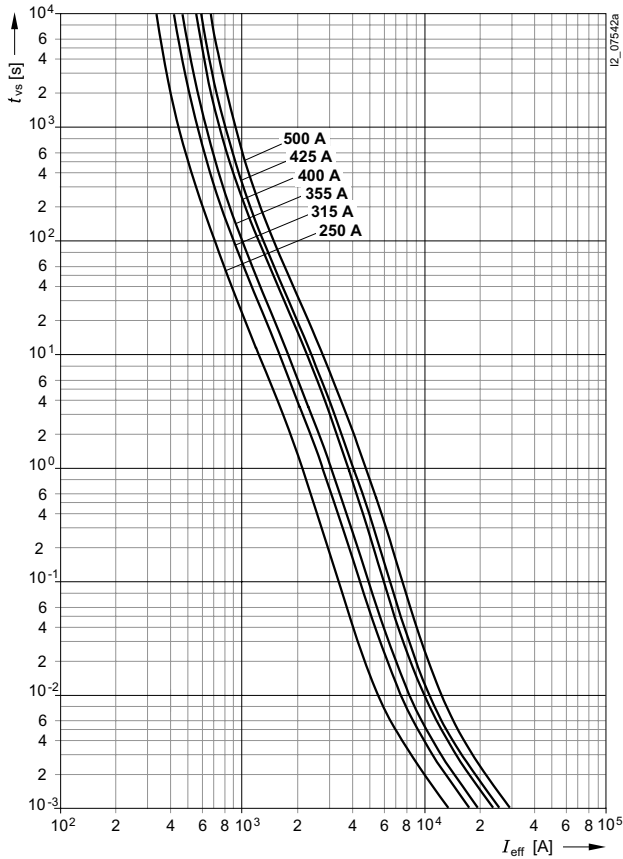
Type	I^2t_a	230 V AC	400 V AC	690 V AC
	A ² s	A ² s	A ² s	A ² s
3NA3 224-6, 3NA6 224-6, 3NA7 224-6	24300	32000	55000	
3NA3 230-6, 3NA6 230-6, 3NA7 230-6	42400	52000	75000	
3NA3 232-6, 3NA6 232-6, 3NA7 232-6	69500	82200	130000	
3NA3 236-6, 3NA6 236-6, 3NA7 236-6	120000	155000	223000	
3NA3 240-6, 3NA6 240-6, 3NA7 240-6	211000	240000	360000	
3NA3 242-6, 3NA6 242-6, 3NA7 242-6	300000	300000	450000	
3NA3 244-6, 3NA6 244-6, 3NA7 244-6	453000	350000	525000	
3NA3 250-6, 3NA6 250-6, 3NA7 250-6	480000	625000	940000	
3NA3 252-6, 3NA6 252-6, 3NA7 252-6	480000	625000	940000	

Characteristic curves

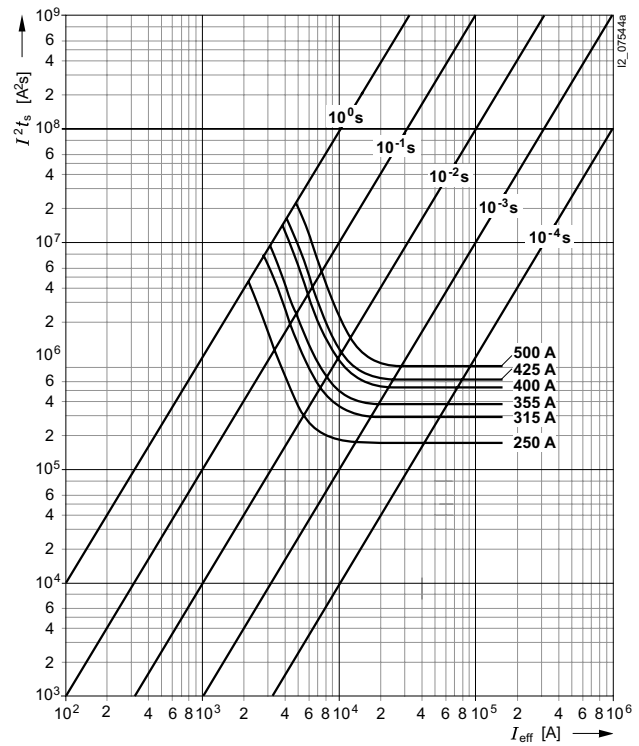
Series 3NA3 3..-6

Size: 3
 Operational class: gG
 Rated voltage: 690 V AC/440 V DC
 Rated current: 250 ... 500 A

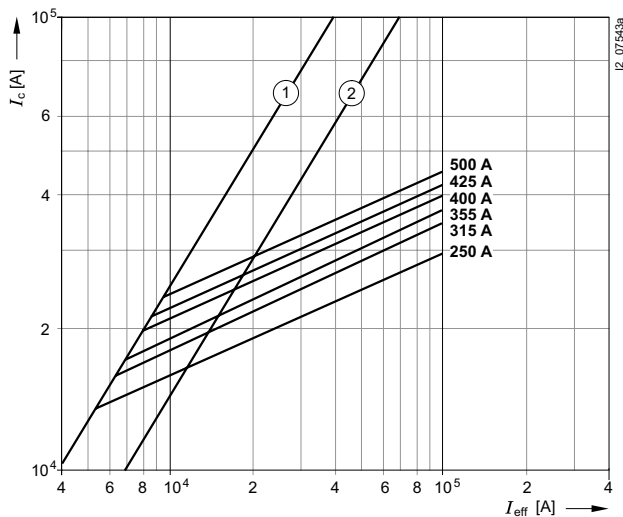
Time/current characteristics diagram



Melting I^2t_s values diagram



Current limitation diagram



- ① Peak short-circuit current with largest DC component
- ② Peak short-circuit current without DC component

Type	I_n	P_v	$\Delta\vartheta$	I^2t_s	
	A	W	K	1 ms A ² s	4 ms A ² s
3NA3 344-6	250	23	44	180000	215000
3NA3 352-6	315	28.2	42	300000	380000
3NA3 354-6	355	32.5	40	380000	470000
3NA3 360-6	400	33.2	42	540000	675000
3NA3 362-6	425	35.3	44	625000	765000
3NA3 365-6	500	43.5	52	810000	1000000

Type	I^2t_a	400 V AC	690 V AC
	A ² s	A ² s	A ² s
3NA3 344-6	453000	350000	525000
3NA3 352-6	480000	625000	940000
3NA3 354-6	585000	760000	1150000
3NA3 360-6	847000	1100000	1650000
3NA3 362-6	925000	1200000	1800000
3NA3 365-6	1300000	1700000	2500000

Low-Voltage Fuse Systems

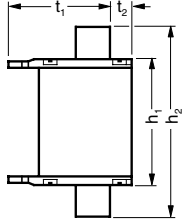
LV HRC Fuse Systems

LV HRC fuse links gG

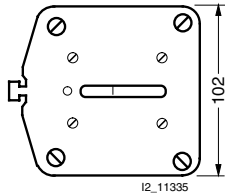
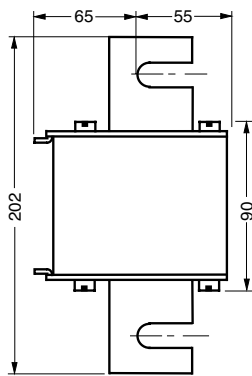
Dimensional drawings

LV HRC fuse links

Sizes 000 to 3 and 4a



Size 4 (IEC design)



Size	I_n A	U_n V	Type	Dimensions				
				b	h_1	h_2	t_1	t_2
000	2 ... 100	500 AC/250 DC	3NA3 8..	21	54	80	45	8
	2 ... 35	690 AC/250 DC	3NA3 8..-6					
	2 ... 100	500 AC/250 DC	3NA6 8..					
	10 ... 100	400 AC	3NA6 8..-4					
	2 ... 35	690 AC/250 DC	3NA6 8..-6					
	10 ... 100	500 AC/250 DC	3NA7 8..					
00	2 ... 35	690 AC/250 DC	3NA7 8..-6	30	54	80	45	14
	35 ... 160	500 AC/250 DC	3NA3 8..					
	40 ... 100	690 AC/250 DC	3NA3 8..-6					
	80 ... 160	500 AC/250 DC	3NA6 8..					
	80 ... 160	400 AC	3NA6 8..-4					
	40 ... 100	690 AC/250 DC	3NA6 8..-6					
0	40 ... 100	500 AC/250 DC	3NA7 8..	30	67	126	45	14
	80 ... 160	500 AC/250 DC	3NA7 8..					
	40 ... 100	690 AC/250 DC	3NA7 8..-6					
	6 ... 160	500 AC/440 DC	3NA3 0..					
	16 ... 160	500 AC/440 DC	3NA3 1..					
	50 ... 160	690 AC/440 DC	3NA3 1..-6					
1	16 ... 160	500 AC/440 DC	3NA6 1..	30	75	137	50	15
	35 ... 160	400 AC	3NA6 1..-4					
	50 ... 160	690 AC/440 DC	3NA6 1..-6					
	16 ... 160	500 AC/440 DC	3NA7 1..					
	50 ... 160	690 AC/440 DC	3NA7 1..-6					
	200 ... 250	500 AC/440 DC	3NA3 1..					
	200	690 AC/440 DC	3NA3 1..-6	47	75	137	51	9
	200 ... 250	500 AC/440 DC	3NA6 1..					
	200 ... 250	400 AC	3NA6 1..-4					
	200	690 AC/440 DC	3NA6 1..-6					
	200 ... 250	500 AC/440 DC	3NA7 1..					
	200	690 AC/440 DC	3NA7 1..-6					
2	35 ... 250	500 AC/440 DC	3NA3 2..	47	75	151	58	10
	80 ... 200	690 AC/440 DC	3NA3 2..-6					
	35 ... 250	500 AC/440 DC	3NA6 2..					
	50 ... 250	400 AC	3NA6 2..-4					
	80 ... 200	690 AC/440 DC	3NA6 2..-6					
	35 ... 250	500 AC/440 DC	3NA7 2..					
	80 ... 200	690 AC/440 DC	3NA7 2..-6	58	74	151	59	13
	300 ... 400	500 AC/440 DC	3NA3 2..					
	224 ... 250	690 AC/440 DC	3NA3 2..-6					
	300 ... 400	500 AC/440 DC	3NA6 2..					
	300 ... 400	400 AC	3NA6 2..-4					
	224 ... 315	690 AC/440 DC	3NA6 2..-6					
3	300 ... 400	500 AC/440 DC	3NA7 2..	58	74	151	71	13
	224 ... 315	690 AC/440 DC	3NA7 2..-6					
	200 ... 400	500 AC/440 DC	3NA3 3..					
	250, 315	690 AC/440 DC	3NA3 3..-6					
4	425 ... 630	500 AC/440 DC	3NA3 3..	71	74	151	70	13
	355 ... 500	690 AC/440 DC	3NA3 3..-6					
	630 ... 1250	500 AC/440 DC	3NA3 4..					
4a	500 ... 1250	500 AC/440 DC	3NA3 6..	102	97	201	95	20

Overview

Terminals for all applications

Terminals are as different as the requirements of individual systems.



Flat termination with screw

Flat terminations with screw connection are suitable for connecting busbars or cable lugs. They have a torsion-proof screw connection with shim, spring washer and nut. When tightening the nut, the torque must be observed because of the considerable leverage effect.

Double busbar connection

This connection differs from the flat terminations in so far as one busbar each can be led over and under the flat terminal.



Box terminal

Modern terminal technology for safe and efficient wiring.



Flat termination with nut

With the flat termination with nut, connection of the nut is torsion-proof. When tightening the nut, the torque must be observed because of the considerable leverage effect.



Terminal strip

Up to three conductors can be clamped to the terminal strip.



Clamp-type terminal connection

The clamp-type terminal connection is equipped for connecting two conductors.



Saddle-type terminal connection

One conductor can be clamped to the saddle-type terminal connection.

Low-Voltage Fuse Systems

LV HRC Fuse Systems

LV HRC fuse bases

Overview



Siemens Lyra contact

The silver-plated Lyra contact provides a large contact area for the contact blade of the LV HRC fuse link. This limits heat transmission, thus reducing oxidation, which in turn reduces power dissipation. The large contact area also facilitates replacement of LV HRC fuse links.

The contact is charged by the spring washer, which has been mechanically galvanized. This will prevent hydrogen embrittlement. The contact is resistant to aging and there will be no dreaded annealing of contacts, which considerably improves operational reliability.










Technical specifications

LV HRC bases, LV HRC bus-mounting bases		000/00	0	1	2	3	4	4a
Sizes								
Rated current I_n	A	160	160	250	400	630	1250	1250
Rated voltage U_n	V AC	690 ¹⁾	690 ¹⁾					
	V DC	250	440					
Rated breaking capacities	kA AC	120						
	kA DC	25						
Flat termination								
Screw		M8		M10		M12		M16
Nut		M8	--					
Max. tightening torque	Nm	14		38			65	
Clamp-type terminal connections								
Conductor cross section	mm ²	2.5 ... 50		--				
Saddle-type terminal connections								
Conductor cross section	mm ²	6 ... 70	--					
Box terminals								
Conductor cross section	mm ²	2.5 ... 50						
Terminal strips								
Conductor cross-section, 3-wire	mm ²	1.5 ... 16	--					
Max. tightening torque for fastening the LV HRC fuse base	Nm	2		2.5			--	

LV HRC fuse bases with slewing equipment		000/00	1	2/3	4a
Sizes					
Rated voltage U_n	V AC	690			
	V DC	440			
Power dissipation	W	4	5	20	32
Flat termination					
Screw		M8	M10	M12	M16
Nut		M8	--		
Max. tightening torque	Nm	14	38		65

1) Also suitable for 1000-V SITOR fuse links.

Selection and ordering data







Size	I_n	Version	Order No.	Weight 1 unit approx. kg	PS*/ P. unit Unit(s)		
LV HRC fuse bases							
	000/00	160	1-pole with flat terminations, screw with clamp-type terminal connections with saddle-type terminal connections	3NH3 030	0.235	3	
				3NH3 031	0.230	3	
				3NH3 032	0.266	3	
		160	160	with flat terminations and terminal strip with flat terminations, nut with flat and saddle-type terminal connection	3NH3 035	0.230	3
					3NH3 038	0.207	3
					3NH3 050	0.227	3
		160	160	made of molded plastic, for mounting rail and screw fixing	3NH3 051	0.160	1/3
				with flat terminations, screw with saddle-type terminal connections	3NH3 052	0.190	1/3
		125	160	with box terminal, up to 50 mm ²	3NH3 053	0.155	1/3
				3-pole, with phase barriers with flat terminations with clamp-type terminal connections with saddle-type terminal connections with flat terminations and terminal strip	3NH4 030	0.700	1
3NH4 031					0.800	1	
3NH4 032	0.800	1					
3NH4 035	0.750	1					
	0	160	1-pole with flat terminations with clamp-type terminal connections	3NH3 120	0.460	3	
				3NH3 122	0.460	3	
	1	250	1-pole with flat terminations with double busbar connections	3NH3 230	0.789	3	
				3NH3 220	0.789	3	
	1	250	3-pole with flat terminations	3NH4 230	2.100	1	
	2	400	1-pole with flat terminations with double busbar connections	3NH3 330	0.843	1	
				3NH3 320	1.000	1	
	3	630	1-pole with flat terminations with double busbar connections	3NH3 430	1.100	1	
				3NH3 420	1.100	1	
	4 (IEC design)	1250	1-pole with flat terminations	3NH3 530	3.000	1	

Low-Voltage Fuse Systems







LV HRC Fuse Systems

LV HRC fuse bases

Selection and ordering data

Size	I_n	Version	Order No.	Weight 1 unit approx. kg	PS*/ P. unit Unit(s)		
LV HRC bus-mounting bases for busbars							
for busbars 12 mm x 5 mm to 12 mm x 10 mm busbar clearance 40 mm							
	000/00	160	1-pole				
			with top saddle-type terminal connection	top	3NH3 036	0.150	1
			terminal strip, top	bottom	3NH3 037 3NH3 048	0.150 0.150	1 1
	000/00	80	3-pole, tandem design				
			3 outgoing feeders, top and bottom with saddle-type terminal connection with 4 phase barriers with 2 non-interrupted phase barriers		3NH4 037 3NH4 045	0.800 0.800	1 1
LV HRC fuse bases with slewing equipment							
Degree of pollution 3 Degree of protection: open IP10, closed IP20 1-pole, with flat termination							
	000/00	160	supplied with additional saddle-type terminal connections				
			with screw connection for mounting plate with claw fixing for non-perforated busbar		3NH7 030 3NH7 031	1.000 1.000	1 1/3
			with screw connection for perforated busbar		3NH7 032	1.000	1/3
	1	250	with screw connection for mounting plate with claw fixing for non-perforated busbar				
			with screw connection for perforated busbar		3NH7 230 3NH7 231	2.500 2.500	1 1
			with screw connection for perforated busbar		3NH7 232	2.500	1
	2/3	400 and 630	with screw connection for mounting plate with claw fixing for non-perforated busbar				
			with screw connection for perforated busbar, which can be used as a disconnecter		3NH7 330 3NH7 331	4.800 4.800	1 1
			with screw connection for perforated busbar, which can be used as a disconnecter		3NH7 332	4.800	1
	4a	1250	with screw connection for mounting plate				
				3NH7 520	5.200 1		

Selection and ordering data






	Size	Order No.	Weight 1 unit approx. kg	PS*/ P. unit Unit(s)	
Mounting parts for LV HRC fuse bases					
	LV HRC contact cover Touch protection for contact pieces				
	000/00	3NX3 105	0.013	2	
	0	3NX3 114	0.010	2	
	1	3NX3 106	0.027	2	
	2	3NX3 107	0.031	2	
	3	3NX3 108	0.038	2	
	LV HRC partitions for side-by-side mounting of LV HRC fuse bases and as end barrier for side-by-side arrangement				
	Type				
	3NH3 0/3NH4 0	000/00	3NX2 023	0.025	2
	3NH3 1	0	3NX2 030	0.050	2
	3NH3 2	1	3NX2 024	0.053	2
	3NH3 3	2	3NX2 025	0.066	2
	3NH3 4	3	3NX2 026	0.101	2
	LV HRC protective cover IP2X for LV HRC fuse bases, size 000/00 1 and 3-pole				
		3NX3 115	0.039	1/10	
	LV HRC cover IP2X for LV HRC protective cover IP2X				
		3NX3 116	0.014	1/10	
Mounting parts for LV HRC bus-mounting bases					
	LV HRC contact covers for mounting onto contacts to ensure touch protection				
	Outgoing terminal	3NX3 105	0.013	2	
	Incoming terminal	3NX3 113	0.006	2	
	LV HRC partitions for 3NH3 0 LV HRC bus-mounting bases Phase barrier	3NX2 027	0.017	2	
	End barrier	3NX2 028	0.020	2	
	for 3NH4 0 LV HRC bus-mounting base in tandem design non-interrupted phase barrier	3NX2 031	0.050	2	

Low-Voltage Fuse Systems

LV HRC Fuse Systems

LV HRC fuse bases

Selection and ordering data

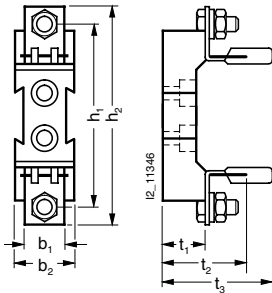
	Size	Order No.	Weight 1 unit approx. kg	PS*/ P. unit Unit(s)
Mounting parts for LV HRC fuses				
	000 ... 4	Fuse pullers for LV HRC fuse links without sleeve	3NX1 013	0.280 1
		with sleeve	3NX1 014	0.480 1
				
Isolating links for LV HRC fuse bases and fuse switch disconnectors with insulated grip lugs silver-plated				
	000/00	3NG1 002	0.080	1/3
	0	3NG1 102	0.110	1
	1	3NG1 202	0.170	1
	2	3NG1 302	0.240	1
	3	3NG1 402	0.290	1
with non-insulated grip lugs				
	4	3NG1 503	0.708	1
	4a	3NG1 505	0.730	1
Fuse-base covers for LV HRC fuse bases acc. to DIN 43620 red with yellow information label "Power supply isolating point"				
	000/00	3NX1 003	0.050	3
	1, 2, 3	3NX1 004	0.100	3

Dimensional drawings

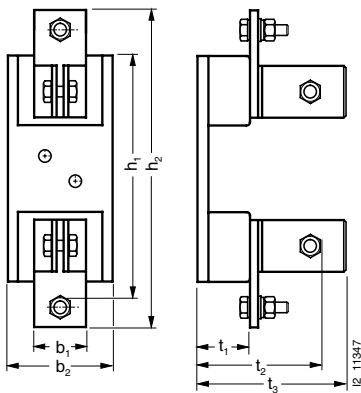
LV HRC fuse bases

1 and 3-pole

Size 000/00 to 3

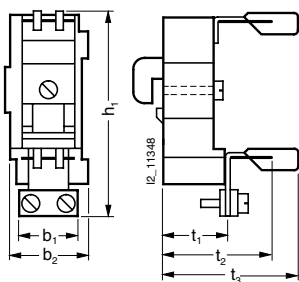


Size 4¹⁾



LV HRC bus-mounting base²⁾

1-pole



1) Size 4 LV HRC fuse links are also screwed onto the base.

2) LV HRC bus-mounting bases are only connected on one side using terminals, the second connection is made through the bottom of the base.

Size	I_n A	Number of poles	Connection	Type	Dimensions						
					b_1	b_2	h_1	h_2	t_1	t_2	t_3
000/00	160	1	M8 plug connection	3NH3 0..	30	34	102	122	24	40	60
			saddle-type terminal connection		29						
			flat termination		23						
	3	M8 plug connection	3NH4 0..	30	102	29	23				
		saddle-type terminal connection		29							
		flat termination		23							
1	saddle-type terminal connection	LV HRC bus mounting base ²⁾	29	37	--	95	28	44	64		
	terminal strip		26							102	
0	160	1	flat termination	3NH3 1..	23	38	150	173	24	39	60
		clamp-type terminal connection	30								
1	250	1	M10 flat termination	3NH3 2..	35	49	177	201	35	55	84
			double busbar connection								
		3	M10 flat termination	3NH4 2..		163					
2	400	1	M10 flat termination	3NH3 3..	35	49	202	226	35	55	90
		double busbar connection									
3	630	1	M12 flat termination	3NH3 4..	35	49	212	241	35	55	101
		double busbar connection									
4	1250	1	M12 flat termination	3NH3 5..	50	102	270	max. 307	51	116 ¹⁾	144
4a	can only be used in bases with slewing equipment										

Low-Voltage Fuse Systems

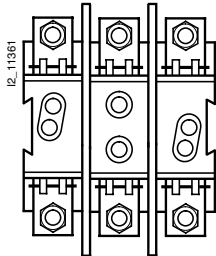
LV HRC Fuse Systems

LV HRC fuse bases

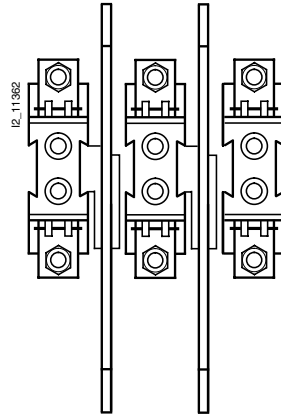
Dimensional drawings

Space requirements when installing LV HRC fuse bases

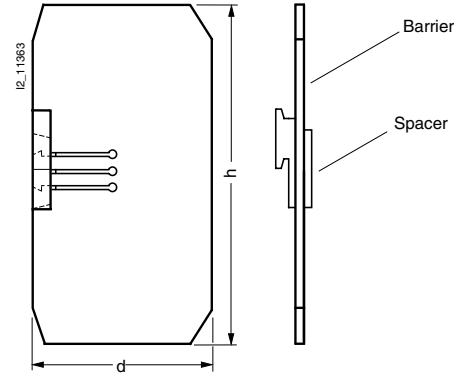
1-piece LV HRC fuse base, 3-pole



3-piece LV HRC fuse base, 1-pole



LV HRC phase barrier



Size	Mounting width (mm) of LV HRC fuse bases				Distance through spacer	Assembly height (mm)	Mounting depth (mm)
	1-piece, 3-pole		3-piece, 1-pole				
	Base with intermediate phase barrier, without side phase barrier	Base with intermediate phase barrier and 2 side phasebarriers	Base with intermediate phase barrier, without side phase barrier	Base with intermediate phase barrier and 2 side phasebarriers			
					3NX2 0.. partitions with matching bases ²⁾		
					h	d	
000/00	102	106	100	104 ¹⁾	2	138	86
	LV HRC bus-mounting base see page 1/81 and page 1/85.				--	114	90
0	--	--	128	142	7	178	90
1	163	177	158	172	7	202	110
2	--	--	184	224	20	227	118
3	--	--	208	272	32	242	132
4	installation without barriers; for mounting see page 1/83 and page 1/84.					n/a	
4a	can only be used in bases with slewing equipment					n/a	

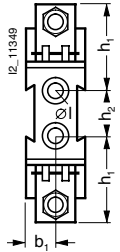
- 1) Placing an additional base on the barrier and plug-on part does not increase the distance, rather the bases lie flat directly on top of one another.
- 2) This measurement specifies the required overall mounting depth with base d and the overall mounting height h.
- 3) If the bases are installed directly on a side wall in the distribution board, one spacer part can be broken off. This would reduce the distance measurement.

Dimensional drawings

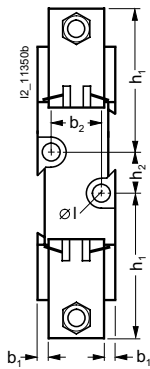
Drill hole dimensions for base plate mounting

LV HRC bases 1-pole

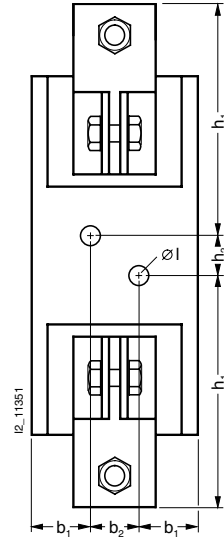
Sizes 000/00 and 0



Sizes 1 to 3

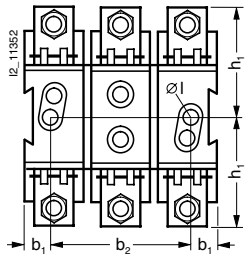


Size 4

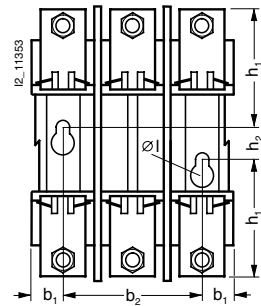


LV HRC bases 3-pole

Size 000/00



Size 1



Size	Type	Dimensions				
		b ₁	b ₂	h ₁	h ₂	l
000/00	3NH3 0..	17	--	48	25	7.5
0	3NH3 1..	19	--	74	25	7.5
1	3NH3 2..	9	30	88	25	10.5
2	3NH3 3..	9	30	100	25	10.5
3	3NH3 4..	9	30	108	25	10.5
4	3NH3 530	36	30	141	25	13

Size	Type	Dimensions				
		b ₁	b ₂	h ₁	h ₂	l
000/00	3NH4 0..	15	70	46	--	7.5
1	3NH4 230	26	110.5	88	25	10

Low-Voltage Fuse Systems

LV HRC Fuse Systems

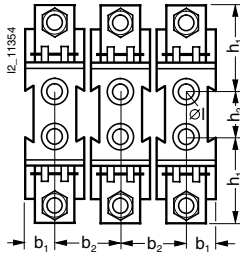
LV HRC fuse bases

Dimensional drawings

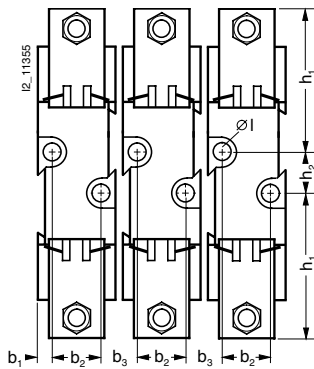
Drill hole dimensions for base plate mounting

LV HRC bases, 3-piece, 1-pole

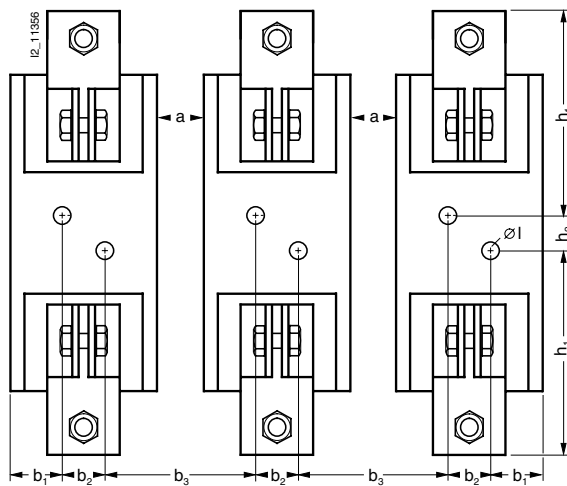
Sizes 000/00 and 0



Sizes 1, 2 and 3



Size 4



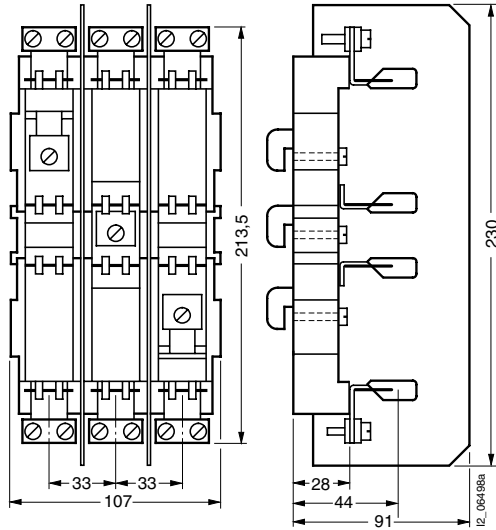
Size	Type	Dimensions					
		b ₁	b ₂	b ₃	h ₁	h ₂	l
000/00	3NH3 0..	17	34	--	48	25.5	7.5
0	3NH3 1..	19	45	--	74	25	7.5
1	3NH3 2..	9	30	25.5	88	25	10.5
2	3NH3 3..	9	30	38.5	100	25	10.5
3	3NH3 4..	9	30	50.5	108	25	10.5
4	3NH3 530	36	30	95	141	25	13

Note:
These LV HRC bases are mounted without phase barriers.
A minimum clearance of a = 25 mm is required.

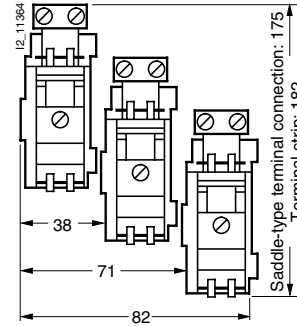
Dimensional drawings

LV HRC bus-mounting bases in tandem design

Busbar center-to-center clearance, 40 mm
3NH4 037, 3NH4 045

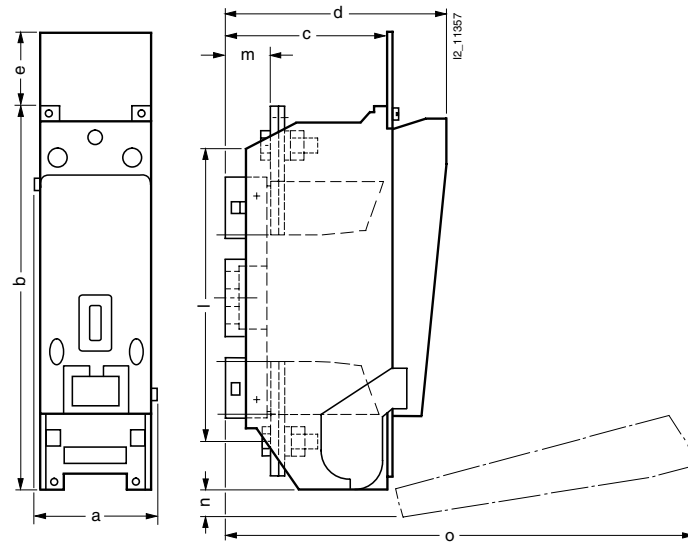


Space requirements for
3-piece, 1-pole LV HRC bus-mounting bases, staggered



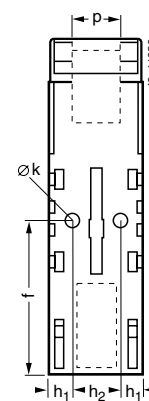
LV HRC bases with slewing equipment, 1-pole

Sizes 000/00 to 4a

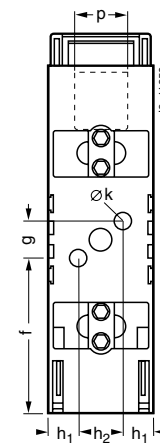


Drill hole dimensions for base plate mounting

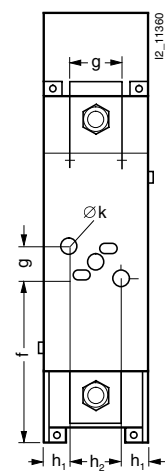
Size
000/00



Sizes
1 and 2/3



Size
4a



Size	I_n A	Type	Dimensions														
			a	b	c	d	e	f	g	h ₁	h ₂	k	l	m	n	o	p
000/00	160	3NH7 03.	44	149	45	88.5	22.5	79	--	9.5	25	7	120	17	18	200	20
1	250	3NH7 23.	68	230	68	123.5	23	102.5	25	19	30	10.5	177	25	40	300	25
2/3	630	3NH7 33.	90	270	96	153.5	15.5	122.5	25	30	30	10.5	220.5	30.5	35	350	40
4a	1250	3NH7 520	116	350	154.5	217.5	69	170	30	31.5	45	13	270	40	26	440	50

Low-Voltage Fuse Systems

LV HRC Fuse Systems

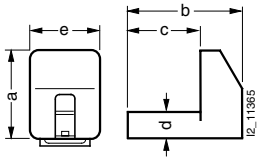
LV HRC fuse bases

Dimensional drawings

Mounting parts for LV HRC fuse bases

LV HRC contact covers

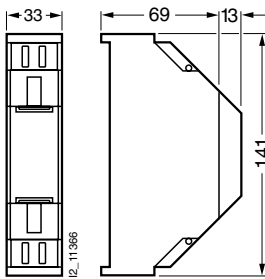
Sizes 000/00 to 3, 3NX3 10



Size	Type	Dimensions				
		a	b	c	d	e
000/00	3NX3 105	38	47.5	34	11.5	30
1	3NX3 106	61.5	57	42.5	35	46
2	3NX3 107	74	65	51	35	46
3	3NX3 108	81.5	77.5	57.5	35	46

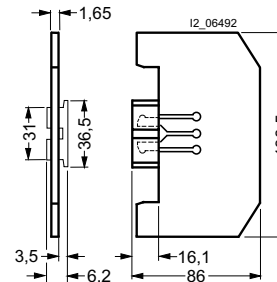
3NX3 115 LV HRC protection cover, with 3NX3 116 LV HRC shrouding cover

Size 000/00, degree of protection IP2X

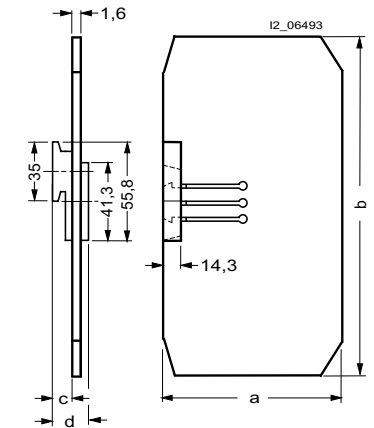


LV HRC partitions

Size 000/00
3NX3 023



Sizes 0 to 3
3NX2 030, 3NX2 024 to 3NX2 026

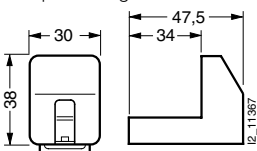


Size	Type	Dimensions			
		a	b	c	d
0	3NX2 030	87.6	178.5	7.7	12.3
1	3NX2 024	107.3	202.5	7.7	12.3
2	3NX2 025	115.3	227.5	14.2	25.1
3	3NX2 026	129.8	242	20.2	37.2

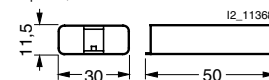
Mounting parts for LV HRC bus-mounting bases

LV HRC contact covers

for 1-pole design and tandem design, 3NX3 105

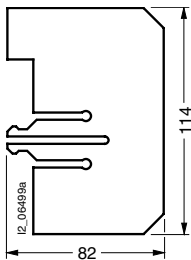


3-pole, 3NX3 113

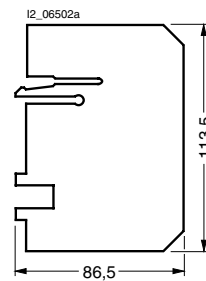


LV HRC partitions

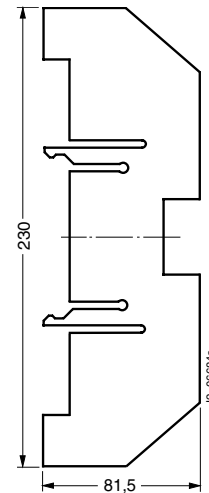
Phase barrier
3NX2 027



End barrier
3NX2 028



for LV HRC bases in tandem design
3NX2 031

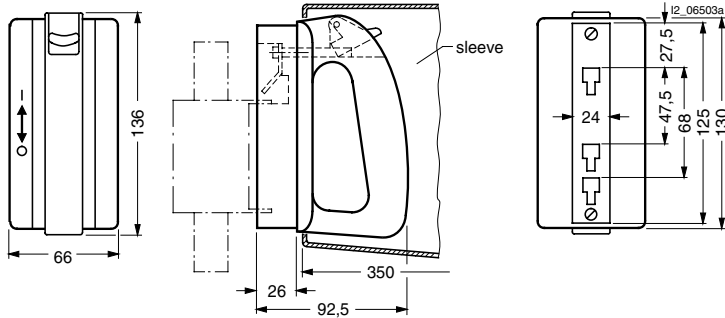


Dimensional drawings

Mounting parts for LV HRC fuses

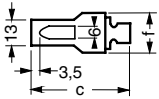
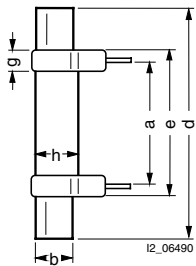
Fuse pullers

Sizes 000 to 4
3NX1 013 (without sleeve), 3NX1 014 (with sleeve)



Isolating links

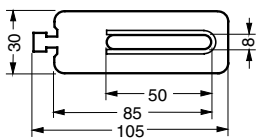
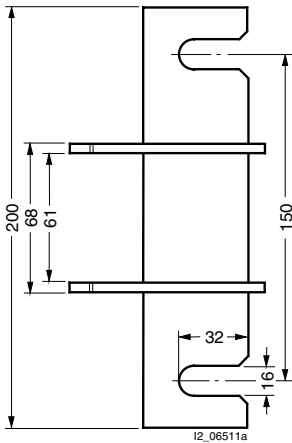
with insulated grip lugs, sizes 000/00 to 3
3NG1 1.02



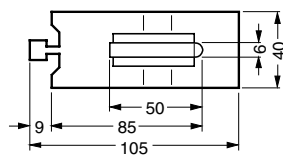
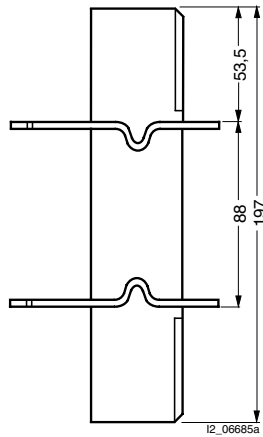
Size	Type	Dimensions							
		a	b	c	d	e	f	g	h
000/00	3NG1 002	44	15	48	78	54	20.5	8	19
0	3NG1 102	60.5	15	48	125	68	20.5	8	19
1	3NG1 202	61	20	53	135	72	23	9	24
2	3NG1 302	61	26	61	150	72	23	9	29
3	3NG1 402	61	32	73	150	72	23	9	36

Isolating links with non-insulated grip lugs

Size 4
3NG1 503



Size 4a
3NG1 505



Low-Voltage Fuse Systems

LV HRC Fuse Systems

LV HRC signal detectors

Benefits

There are three options for remotely indicating that the fuses of LV HRC fuse links have been tripped:

- 3NX1 021 signal detectors with signal detector links
- Signal detector top with 3NX1 024 rocker
- 5TT3 170 fuse monitors

For further information on fuse monitors, please refer to the chapter "Monitoring devices".

3NX1 021 signal detectors with signal detector links

The 3NX1 021 signal detector supports monitoring of LV HRC fuse links of 10 A or higher. The signal detector can be mounted onto any LV HRC fuse link of size 000 to 4 with non-insulated grip lugs.

The signal detector link is connected in parallel to the LV HRC fuse link via spring contacts.

In the event of a fault, the LV HRC fuse link is released simultaneously with the LV HRC fuse signaling link. A tripping pin in the LV HRC fuse signaling link switches a microswitch for 250 V AC/6 A.

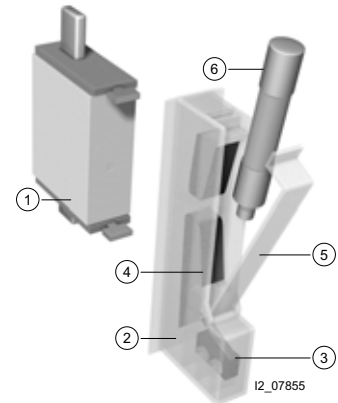
In order to replace the signal detector link, the signal detector is removed from the LV HRC fuse link. It is then off circuit.

3NX1 024 signal detector top

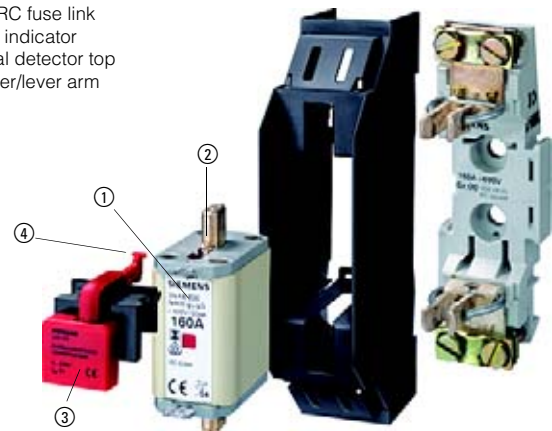
The signal detector top can be used with all LV HRC fuse links, sizes 000 to 2, which are equipped with a front indicator, which means they can also be used with fuse links with a combination alarm. In contrast to the 3NX1 021 signal detector, the signal detector top can be used with fuse links with both insulated and non-insulated grip lugs.

The signal detector top is clipped onto the grip lug at the side of the front indicator. The adjustable tripping lever is positioned so that the end is placed directly above the front indicator. If the fuse is tripped, the front indicator springs open, thus indicating that the fuse link has switched off. Using the rocker, the tripped front indicator activates a microswitch with changeover contact for 230 V AC/5 A.






- ① LV HRC fuse link
- ② Signal detector
- ③ Microswitch
- ④ Spring contact
- ⑤ Hinged lid
- ⑥ Signal detector link



- ① LV HRC fuse link
- ② Front indicator
- ③ Signal detector top
- ④ Rocker/lever arm



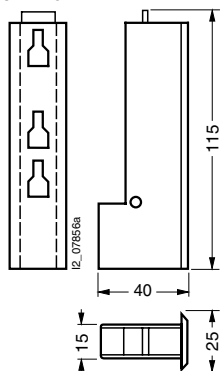
Selection and ordering data

	Size	Order No.	Weight 1 unit approx.	PS*/ P. unit
			kg	Unit(s)
 <p>LV HRC signal detectors for LV HRC fuse links with non-insulated grip lugs</p> <ul style="list-style-type: none"> • Rated voltage: 690 V AC/600 V DC • Contact: microswitch 250 V AC, 6 A • Connection: flat termination 2.3 mm ... 0.5 mm 	000 ... 4	3NX1 021	0.036	1/4
 <p>Signal detector links</p> <ul style="list-style-type: none"> • Rated voltage: 690 V AC/600 V DC Response value > 9 V; 2.5 A; for standard applications Response value > 2 V; 7 A; only for meshed systems 	000 ... 4	3NX1 022 3NX1 023	0.015 0.015	1/12 1/12
 <p>Signal detector tops for LV HRC fuse links with non-insulated or insulated grip lugs</p> <ul style="list-style-type: none"> • Rated voltage: 690 V AC/600 V DC • Contact: microswitch 230 V AC, 5 A, 1 changeover contact • Connection: flat termination 2.3 mm 	000 ... 2	3NX1 024	0.010	1

Dimensional drawings

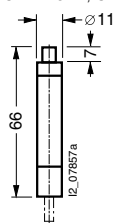
LV HRC signal detector

3NX1 021



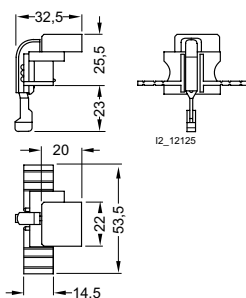
Signal detector link

3NX1 022, 3NX1 023



Signal detector top

3NX1 024



Low-Voltage Fuse Systems

LV HRC Fuse Systems

LV HRC fuse switch disconnectors

Application

SENTRON 3NP4 and 3NP5 fuse switch disconnectors are switching devices for the occasional manual switching/isolating of loads and distribution boards. With the specified rated current (including a specified overload); they can

- switch on,
- control,
- switch off, and
- carry out making operations.

With the SENTRON 3NP4 and 3NP5 fuse switch disconnectors, all poles of downstream electric loads can be safely disconnected from the system under load.

The SENTRON 3NP4 and 3NP5 fuse switch disconnectors are ideal for mounting on and in distribution boards (e.g. ALPHA, SIKUS), meter cabinets (e.g. ALPHA 400-ZS) and molded-plastic distribution systems, such as 8HP.

The fact that they can be mounted on a range of different busbar systems allows their very diverse implementation in switchgear cabinet and control engineering.

The sizes SENTRON 3NP4 LV HRC 000²⁾ und NH 00 can be snapped onto 35 mm standard mounting rails and are ideal for combining with other switching devices e.g. in capacitor modules for p.f. compensation.

SENTRON 3NP4 and 3NP5 fuse switch disconnectors

Used together with semiconductor fuses (e.g. SITOR), they provide effective protection for frequency converters and soft starters.

SENTRON NP fuse switch disconnectors



3NP40 10 **3NP40 70** **3NP52** with opened fuse carrier

The SENTRON 3NP4 and 3NP5 fuse switch disconnectors are climate proof and comply with the specifications of the standard

- IEC 60947-1,
- IEC 60947-3,
- EN 60947-1,
- EN 60947-3,
- DIN VDE 0660 Part 100 and
- DIN VDE 0660 Part 107

For use in heavily sulfurous atmospheres, the SENTRON 3NP5 series, and the 3NP40 1 and 3NP40 7 versions are available as tinned models (delivery on request).

The SENTRON 3NP5 fuse switch disconnector series also complies with the standard BS 5419 and is approved for use in shipboard systems.¹⁾

All SENTRON 3NP4 and 3NP5 fuse switch disconnectors can be sealed as standard (or can be sealed through accessories).

1) Always use approved fuse links.

2) Corresponds to fuse size LV HRC 000 (LV HRC 00C) or LV HRC 00 with reduced dimensions; maximum width 21 mm to DIN VDE 0636 Part 201, IEC 60269-2-1.

Design

The SENTRON 3NP4 and 3NP5 fuse switch disconnectors comprise a base and a removable fuse carrier with view and measuring window.

The base contains integral lyra contacts, arcing chambers and terminal fittings. The fuse links/isolating links are contained in the fuse carrier.

The fuse links can be replaced without tools.

The three conducting paths in the base and the fuse links in the fuse carrier are separated by partitions that overlap when opening and closing the device.

This type of failsafe protection is called "complete compartmentalization" and effectively prevents inter-phase arcing.

SENTRON 3NP5 fuse switch disconnectors are also equipped with locating springs, which are fitted to the side of the base. These enable the "high speed closing" of devices, regardless of the actuation speed of the operator.

The SENTRON 3NP4 and 3NP5 fuse switch disconnectors are used with LV HRC fuse links of sizes LV HRC 000 to LV HRC 3 according to IEC 60269-2-1, DIN VDE 0636-201 and DIN 43620. SITOR semiconductor fuses can continue to be used for a wide range of applications.

For more detailed information, please refer to the instruction manual for the SENTRON 3NP4 and 3NP5 fuse switch disconnectors.

Auxiliary switches

The SENTRON 3NP4 and 3NP5 fuse switch disconnectors can also be retrofitted with auxiliary switches for indicating the switching position of the fuse carrier.

One switch block (1 CO) can be mounted on SENTRON 3NP4 fuse switch disconnectors size LV HRC 000 and two switch blocks (1 CO) on sizes LV HRC 00 to LV HRC 3 respectively.

SENTRON 3NP5 fuse switch disconnectors can also be delivered with a 2-pole auxiliary switch (1 NO + 1 NC) if required. The version with fuse monitoring is fitted with this auxiliary switch as standard.

Function

Fuse monitoring by SIRIUS circuit-breaker

For fuse monitoring, a SIRIUS circuit-breaker is factory-fitted and hard-wired to the fuse carrier of the SENTRON 3NP4 and 3NP5 fuse switch disconnectors.

If the fuse carrier is closed, the three conducting paths of the SIRIUS circuit-breaker are switched in parallel to the fuse links to be monitored. If the fuse carrier is open, all main conducting paths of the circuit-breaker are off circuit.

The internal resistance of the circuit-breaker is great enough not to impair the protective function of the monitored fuse links.

Failure of a fuse will trigger the circuit-breaker. The auxiliary switch of the circuit-breaker can be used for indication purposes or to disconnect the main circuit, e.g. through a contactor.

The signal lead for the SENTRON 3NP4 fuse switch-disconnector size LV HRC 00 needs to be ordered separately. Sizes LV HRC 1 to LV HRC 3 are connected using flat connectors.

Delivery of the SENTRON 3NP5 fuse switch disconnectors includes the signal lead, complete with connector.

SIRIUS circuit-breakers cannot be used for fuse monitoring in branch circuits by circuit-breakers where a fault may result in > 220 V DC feedback.

In the case of parallel cables and meshed systems, only a voltage difference of > 24 V at the switch will trigger the circuit-breaker.

Electronic fuse monitors

For electronic fuse monitoring, the EF monitor is factory-fitted and hard-wired to the fuse carrier of SENTRON 3NP5 fuse switch disconnectors.

The EF monitor works independently of any loads. Failure of a fuse can be relayed to a control room through integrated auxiliary switches (2 NO + 1 NC) by means of a centralized fault indication or used to isolate the load through e.g. a contactor

Actuation of the auxiliary switch depends on the EF version. Version "A" stands for "open-circuit principle", version "R" for "closed-circuit principle" (see block diagram on 1/114).

If a fuse is tripped, a green LED signal flashes (general fault) and the location of the failed fuse is indicated by a red LED. Using more than one device facilitates identification of the affected branch circuit.

The EF monitor is automatically reset to the standby position once the faulty fuses are replaced. This state is indicated visually by the status display (green LED).

The EF monitor is also suitable for use in industrial systems badly afflicted by harmonics.

Low-Voltage Fuse Systems

LV HRC Fuse Systems

LV HRC fuse switch disconnectors

Technical specifications

Type		3NP40 1	3NP40 7	3NP42 7	3NP43 7	3NP44 7
Standards		IEC 60947-1, IEC 60947-3, 60947-1, 60947-3, DIN VDE 0660 Part 100 and Part 107				
Rated continuous current I_u for fuse links acc. to DIN 43620	A Size	160 ¹⁾ 00C/000	160 00	250 1 and 0	400 2 and 1	630 3 and 2
Conventional thermal current I_{th}	A	160 ¹⁾	160	250	400	630
Rated operational voltage U_e 50 Hz/60 Hz AC DC	V V	690 220 (3 conducting paths in series)	690	690 440 (2 conducting paths in series)		
Rated insulation voltage U_i	V	690	690	800 ³⁾	800 ³⁾	800 ³⁾
Rated impulse voltage U_{imp}	kV	6	6	6	6	6
Rated conditional short-circuit currents with fuses (for fast switch-on)						
with fuse links						
Rated current at 400 V AC (690 V)	Size/A kA (rms value)	000/100 (35) 50 (50)	00/160 50	1/250 50	2/400 50	3/630 50
Maximum permissible let-through I^2t value	kA ² s	56 (7.8)	158	551	1515	4340
Permissible let-through current of the fuse	kA (peak value)	11 (5)	15	25	35	55
Short-circuit strength with fuses (switch closed)						
with fuse links						
Rated current at 690 V	Size/A kA (rms value)	000/100 100	00/160 50	1/250 50	2/400 50	3/630 50
Permissible let-through current of the fuse	kA (peak value)	15	15	25	35	55
Rated making and breaking capacities (incoming supply from top or bottom)						
at 400 V AC, with fuse links or isolating links	Size	<u>000</u>	<u>00</u>	<u>1</u>	<u>2</u>	<u>3</u>
Rated breaking current I_c (p.f. = 0.35)	A (rms value)	800 (p.f. = 0.45)	800	2000	3200	5040
Rated operational current I_e at AC-21B, AC-22B	A	160	160	250	400	630
AC-23B	A	100	100	250	400	630
at 500 V AC, with fuse links or isolating links	Size	<u>000</u>	<u>00</u>	<u>1</u>	<u>2</u>	<u>3</u>
Rated breaking current I_c (p.f. = 0.35)	A (rms value)	320 (p.f. = 0.45)	320	750	1200	1890
Rated operational current I_e at AC-21B	A	160	160	250	400	630
AC-22B	A	100	100	250	400	630
AC-23B	A	40	40	--	--	--
at 690 V AC, with fuse links or isolating links	Size	<u>000</u>	<u>00</u>	<u>1</u>	<u>2</u>	<u>3</u>
Rated breaking current I_c (p.f. = 0.35)	A (rms value)	200/240 (p.f. = 0.45/0.95)	200/240 (p.f. = 0.45/0.95)	375	600	945
Rated operational current I_e at AC-21B	A	160	160	250	400	630
AC-22B	A	50	50	--	--	--
AC-23B	A	25	25	--	--	--
at 220 V/240 V DC, with fuse links ²⁾⁴⁾⁵⁾ or isolating links	Size	<u>000</u>	<u>00</u>	<u>1</u>	<u>2</u>	<u>3</u>
Rated operational current I_e at 220 V DC-23B/DC-21B	A	80/160	80/160	--	--	--
440 V DC-21B	A	--	--	250	400	630

1) 125/160 A only with 3NY1 236 supply terminals and with 3NY1 822 (125 A) and 3NY1 824 (160 A) 21 mm wide fuse links; see Accessories.

2) When switching without load (AC-20 B, DC-20 B), direct voltages up to 690 V DC can be applied.

3) For safety monitoring max. 690 V.

4) For degree of soiling 2, the disconnectors can be used up to 1000 V AC-20 B, DC-20 B (switching without load).

5) Conducting paths in series: 3 for 3NP40; 2 for 3NP42, 3NP43 and 3NP44.

Technical specifications

Type		3NP40 1	3NP40 7	3NP42 7	3NP43 7	3NP44 7
Standards		IEC 60947-1, IEC 60947-3, EN 60947-1, EN 60947-3, DIN VDE 0660 Part 100 and Part 107				
Capacitor switching capacities						
at 400 V AC						
Capacitor rating	kvar	50	50	--	--	--
Rated current I_n	A	72	72	--	--	--
at 525 V AC						
Capacitor rating	kvar	50	50	--	--	--
Rated current I_n	A	55	55	--	--	--
Permissible ambient temperature	°C	-25 ... +55 ¹⁾ for operation, -50 ... +80 for storage				
Mechanical endurances	operating cycles	2000	2000	1600	1000	1000
Degree of protection (operator side)						
without insulating cover/cable lug cover		IP00 (3NP40 with box terminal and properly connected conductors: IP20)				
with insulating cover/cable lug cover		IP30 (switch closed), IP20 (switch open)				
Power dissipation of switches at I_{th} (plus power dissipation of fuse links)						
without busbar adapter	W	4.5 (at 100 A)	10	15	30	47
with busbar adapter	W	8.5 (at 100 A)	20	47	83	127
Main conductor connections						
Flat termination for lug, Max. conductor cross-section (stranded)	mm ²	--	up to 2 × 70 (M8)	up to 150 (M10)	up to 240 (M10)	up to 2 × 240 (M12)
Box terminal/terminal (finely stranded with end sleeve)	mm ²	1.5 ... 50 (35)	2.5 ... 70 (50)	70 ... 150	120 ... 240	150 ... 300
Busbar (width × thickness)	mm	--	22 × 5	22 ... 30 × 5 ... 10	22 ... 30 × 5 ... 10	25 ... 40 × 5 ... 10
Laminated Cu strips, non-perforated in terminals (width × thickness)	mm	8 × 8	up to 9 × 8	up to 16 × 8	up to 20 × 10	up to 24 × 10
Tightening torque for terminal screws						
for flat termination	Nm	--	10 ... 12	25	25	30
with SIGUT box terminal/terminal	Nm	3 ... 3.5	8 ... 10	6	8	8
Auxiliary switches 1 CO (accessories)						
3NY3 035 50 Hz/60 Hz to 230 V AC Rated operational current I_e at AC-14	A	0.25 ($I_{th} = 5$ A), at 24 V DC: $I_e = 0.45$ A; flat terminations acc. to DIN 46244: A 2.8 × 0.5				
3NY3 030 50 Hz/60 Hz to 230 V AC Rated operational current I_e at AC-13	A	0.1 ($I_{th} = 0.1$ A); quick-connect terminal acc. to DIN 46245: A 2.8 – 1				
Permissible mounting position		vertical or horizontal installation (no reduction of specified switching capacity)				

1) Only with isolating links; otherwise, please observe specifications of fuse manufacturer.

Low-Voltage Fuse Systems

LV HRC Fuse Systems

LV HRC fuse switch disconnectors

Technical specifications

Type		3NP50	3NP52	3NP53	3NP54
Standards		IEC 60947-1, IEC 60947-3, EN 60947-1, EN 60947-3, DIN VDE 0660 Part 100 and Part 107			
Rated continuous current I_u for fuse links acc. to DIN 43620 (when using semiconductor fuse links, reduction of rated current required)	A Size	160 00	250 1 and 0	400 2 and 1	630 3 and 2
Conventional free air thermal current I_{th}	A	160	250	400	630
Rated operational voltage U_e 50 Hz/60 Hz AC DC	V V	690 440 (3 conducting paths in series), 220 (2 conducting paths in series and with fuse monitoring through 3RV)			
Rated insulation voltage U_i	V	690 ¹⁾	690 ¹⁾	690 ¹⁾	690 ¹⁾
Rated impulse voltage U_{imp}	kV	6	6	6	6
Rated conditional short-circuit currents with fuses (for fast switch-on)					
with fuse links					
Rated current at 500 V AC	Size/A kA (rms value)	00/160 50	1/250 50	2/400 50	3/630 50
Permissible let-through current of the fuses	kA (peak value)	15	25	40	50
Short-circuit strength with fuses (switch closed)					
with fuse links					
Rated current at 500 V AC	Size/A kA (rms value)	00/160 100	1/250 100	2/400 50	3/630 50
Maximum permissible let-through I^2t value	kA ² s	223	780	2150	5400
Permissible let-through current of the fuses	kA (peak value)	23	32	40	60
Rated short-circuit making capacities with isolating links²⁾ at 500 V AC	Size kA (peak value)	00 6	1 17	2 17	3 17
Rated making and breaking capacities²⁾ (incoming supply from top or bottom) ³⁾					
at 400 V AC, with fuse links	Size	00	1	2	3
Breaking current I_c (p.f. = 0.35)	A (rms value)	1600	2500	4000	5040
Rated operational current I_e for AC-21B, AC-22B, AC-23B	A	160	250	400	630
at 500 V AC, with fuse links					
Breaking current I_c (p.f. = 0.35)	A (rms value)	1300	2500	4000	5040
Rated operational current I_e for AC-21B, AC-22B, AC-23B	A	160	250	400	630
at 690 V AC, with fuse links					
Breaking current I_c (p.f. = 0.35)	A (rms value)	800	1280	1600	3200
Rated operational current I_e at AC-21B, AC-22B	A	160	250	400	630
AC-23B	A	100	160	200	315
at 220 V DC, with fuse links					
Breaking current I_c ($L/R = 15$ ms)	A	640	1000	1600	2520
Rated operational current I_e at DC-23B	A	160	250	400	630
Switching capacity with isolating links⁴⁾ (incoming supply from top or bottom) ⁴⁾					
at 400 V AC, with isolating links	Size	00	1	2	3
Breaking current I_c (p.f. = 0.35)	A (rms value)	1600	2500	4000	5040
Rated operational current I_e at AC-21B, AC-22B	A	160	250	400	630
AC-23B	A	160	250	315	500
at 500 V AC, with isolating links					
Breaking current I_c (p.f. = 0.35)	A (rms value)	1300	2500	4000	5040
Rated operational current I_e at AC-21B, AC-22B	A	160	250	400	630
AC-23B	A	160	250	315	500
at 690 V AC, with isolating links					
Breaking current I_c (p.f. = 0.35)	A (rms value)	800	1280	1600	3200
Rated operational current I_e at AC-21B, AC-22B	A	160	250	400	630
AC-23B	A	100	160	200	315
at 220 V DC, with isolating links					
Breaking current I_c ($L/R = 15$ ms)	A	640	1000	1600	2520
Rated operational current I_e at DC-23B	A	160	250	400	630
Switching capacities for horizontal installations up to 690 V AC-22B		no reduction of the specified switching capacity (values for AC-23B to 690 V on request)			

1) When maintaining pollution degree 2 (instead of 3), use of up to $U_i = 1000$ V is also possible.

2) Rated making and breaking current according to IEC 60947-3:
Rated making current $I = 10 \times I_e$ (AC-23); $3 \times I_e$ (AC-22);
 $1.5 \times I_e$ (AC-21);
Rated breaking current $I_e = 8 \times I_e$ (AC-23); $3 \times I_e$ (AC-22);
 $1.5 \times I_e$ (AC-21).

3) When electronic fuse monitors are used, infeed must be from the top.

4) Use silver-plated isolating links.

Technical specifications

Type		3NP50	3NP52	3NP53	3NP54
Capacitor switching capacities					
at 400 V AC					
Capacitor rating	kvar	80	90	150	250
Rated current I_n	A	116	130	216	361
at 525 V AC					
Capacitor rating	kvar	100	125	200	300
Rated current I_n	A	110	137	220	330
Permissible ambient temperatures	°C	-25 ... +55 for operation ¹⁾ , -50 ... +80 for storage			
Mechanical endurance	operating cycles	1600			
Degree of protection					
without molded-plastic cover		IP00 ²⁾			
with insulating cover and closed fuse carrier on the operator side with open handle unit		IP30 IP10			
Power dissipation of switch at I_{th} (plus power dissipation of the fuse links) without busbar adapter	W	7.8 (16.3) ³⁾	7.5	15	39
Main conductor connections					
Cable lug, max. conductor cross-section (stranded)	mm ²	2.5 ... 120	6 ... 150	6 ... 240	6 ... 2 × 240
Busbar	mm	16 ... 22	22 ... 30	22 ... 30	22 ... 30
Clamp connections	mm ²	2.5 ... 50	35 ... 120	--	--
Tightening torques					
with cable lug	Nm	18 ... 22	25 ... 30	25 ... 30	25 ... 30
with busbar	Nm	18 ... 22	25 ... 30	25 ... 30	25 ... 30
with clamp connection	Nm	9 ... 11	5 ... 6	--	--
Terminal screws					
with cable lug		M8	M10	M10	M10
with busbar		M8	M10	M10	M10
with clamp connection		M8	2 × M6	--	--
PE/ground terminals					
Lug acc. to DIN 46234	mm ²	--	2.5 ... 70	6 ... 2 × 70	6 ... 2 × 120
Busbar	mm	--	25	25	30
Terminal screws		--	M8	M10	M10
Auxiliary switches 1 NO + 1 NC (accessories) (the same voltage potential must be applied to both NO and NC contact)					
at 50 Hz/60 Hz to 400 V AC, Rated operational current I_e at AC-12/AC-15A	A	16/6			
Flat termination (DIN 46244)		A 6.3–0.8			
Permissible mounting positions					
horizontal or vertical (switching capacity is sometimes reduced with horizontal installation)					
Fuse monitors with 3RV circuit-breakers					
see circuit-breaker					
Electronic fuse monitoring					
Rated voltage 50 Hz/60 Hz AC	V	400 –15 % ... 500 V +10 %, self-powered (infeed from top)			
Max. making current	A	20			
Continuous current	A	5			
Breaking current	A	5			
Switching capacity	VA	1000			
Short-circuit strength (1 ms)	A	100			
Response time	s	< 1			
Temperature range (operation)	°C	-10 ... +75			
Plug-in connectors/connections		6-pole			
Minimum potential difference required between top and bottom connections of the switch (e.g. for use in meshed systems)	V	>10			
Signal contacts for electronic fuse monitoring					
2 NO + 1 NC					
Rated operational current I_e at 250 V, DC-13	A	0.27			
at 240 V, AC-15	A	1.5			
Rated free air thermal current I_{th}	A	5			

1) When using isolating links. If using fuse links, please observe specifications of fuse manufacturer.

2) For 3NP52 with clamp connection, degree of protection IP10.









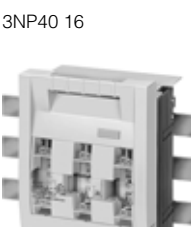

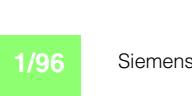
3) With busbar adapter.

Low-Voltage Fuse Systems

LV HRC Fuse Systems

LV HRC fuse switch disconnectors
for power distribution

Selection and ordering data

Rated continuous current I_U	Connection type (double-ended)		For fuse links to DIN VDE 0636-201 ¹⁾	For isolating-links ²⁾	Degree of protection IP00 without fuse links, without isolating links, with terminal screws	Weight 1 unit approx.	PS*/P. unit	
	Connection	for conductor cross-section						
A		mm ²	Size	Size	Order No.	kg	Unit(s)	
For mounting and installation								
up to 160 A, also clip-on for standard mounting rail								
	160 ³⁾	box terminal	1.5–50	000 ⁴⁾	00	3NP40 10-0CH01	0.512	1
	160	flat termination	up to 2 × 70 (M8)	00 and 000	00	3NP40 70-0CA01	0.749	1
		box terminal	2.5–70 or 2 × 2.5–16			3NP40 70-0CH01	0.800	1
	250	flat termination	up to 150 (M10)	1 and 0	1 and 0	3NP42 70-0CA01	2.436	1
	400	flat termination	up to 240 (M10)	2 and 1	2 and 1	3NP43 70-0CA01	3.614	1
630	flat termination	up to 2 × 240 (M12)	3 and 2	3 and 2	3NP44 70-0CA01	4.984	1	
For snapping onto busbar systems, busbar center-to-center clearance, 40 mm								
Rails of width 12 mm or 15 mm and thickness 5 mm or 10 mm ⁵⁾								
• With adapter, deep, e.g. for installation in ALPHA meter cabinets (ALPHA 400-ZS) and ALPHA distribution boards (STAB/SIKUS)								
	160 ³⁾	box terminal	1.5–50	000 ⁴⁾	00	3NP40 15-0CK01 3NP40 15-0CJ01	0.952	1
	160	flat termination	up to 2 × 70 (M8)	00 and 000	00	3NP40 75-0CE01 3NP40 75-0CF01	1.210	1
box terminal		2.5–70 or 2 × 2.5–16					1.244	1
	160 ³⁾	box terminal	1.5–50	000 ⁴⁾	00	3NP40 75-0CK01 3NP40 75-0CJ01	1.290	1
	160	flat termination	up to 2 × 70 (M8)	00 and 000	00 and 000	3NP40 15-1CK01 3NP40 15-1CJ01	0.892	1
	250	flat termination	up to 240 (M10)	1 and 0	1 and 0	3NP40 75-1CE01 3NP40 75-1CF01 3NP40 75-1CK01 3NP40 75-1CJ01	1.186	1
	250	flat termination	up to 240 (M10)	1 and 0	1 and 0	3NP40 75-1CF01 3NP40 75-1CK01 3NP40 75-1CJ01	1.189	1
	250	flat termination	up to 240 (M10)	1 and 0	1 and 0	3NP42 75-1CG01	3.719	1
For snapping onto busbar systems, busbar center-to-center clearance, 60 mm								
Rails of width 12 mm to 30 mm and thickness 5 mm or 10 mm ⁵⁾								
flat, T and I profiles, as well as on Rittal PLS systems								
	160 ³⁾	box terminal ⁶⁾	1.5–50	000 ⁴⁾	00	3NP40 16-1CK01 3NP40 16-1CJ01	0.916	1
	160	flat termination	up to 2 × 70 (M8)	00 and 000	00	3NP40 76-1CE01 3NP40 76-1CF01	1.203	1
box terminal ⁶⁾		2.5–70 or 2 × 2.5–16					1.201	1
	160	flat termination	up to 2 × 70 (M8)	00 and 000	00	3NP40 76-1CK01 3NP40 76-1CJ01	1.295	1
	250	flat termination	up to 150 (M10)	1 and 0	1 and 0	3NP42 76-1CG01	3.713	1
	400	flat termination	up to 240 (M10)	2 and 1	2 and 1	3NP43 76-1CG01	5.440	1
	630	flat termination	up to 2 × 240 (M12)	3 and 2	3 and 2	3NP44 76-1CG01	7.688	1



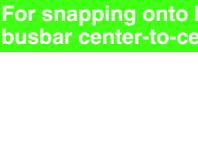
For all fuse switch disconnectors with flat terminations, use the relevant cable lug covers (3NY7 101 to 3NY7 141) in order to ensure protection against finger touch acc. to BGV A3,(VBG4) see Accessories.

- See LV HRC Fuse Links.
- Use silver-plated isolating links.

- 125/160 A only possible with 21 mm fuse links 3NY1 822 (125 A) and 3NY1 824 (160 A), see Accessories.
- Corresponds to 000 with maximum width 21 mm (to IEC 60269-2-1 and DIN VDE 0636-201).
- For mounting on 5 mm thick busbars, a bar thickness compensation is required for 3NP42 and 3NP43, see Accessories. 3NP44 can only be mounted on 10 mm thick busbars!
- No further cover required for 3NP40 with box terminal.

Selection and ordering data

with fuse monitoring by SIRIUS circuit-breaker¹⁾²⁾

Rated continuous current I_u	Connection type (double-ended) Connection	for conductor cross-section	For fuse links to DIN VDE 0636-201 ³⁾	For isolating-links ⁴⁾	Degree of protection IP00 without fuse links, without isolating links, with terminal screws Order No.	Weight 1 unit approx.	PS*/ P. unit	
A	mm ²	Size	Size	Size	kg	Unit(s)		
For mounting and installation								
up to 160 A, also clip-on for standard mounting rail								
	160	flat termination	up to 2 × 70 (M8)	00 and 000	00	3NP40 70-0FA01	1.276	1
		box terminal	2.5–70 or 2 × 2.5–16			3NP40 70-0FH01	1.350	1
	250	flat termination	up to 150 (M10)	1 and 0	1 and 0	3NP42 70-0FA01	2.940	1
	400	flat termination	up to 240 (M10)	2 and 1	2 and 1	3NP43 70-0FA01	4.174	1
630	flat termination	up to 2 × 240 (M12)	3 and 2	3 and 2	3NP44 70-0FA01	5.495	1	
For snapping onto busbar systems, busbar center-to-center clearance, 40 mm								
Rails of width 12 mm or 15 mm and thickness 5 mm or 10 mm ⁵⁾								
• With adapter, deep, e.g. for installation in ALPHA meter cabinets (ALPHA 400-ZS) and ALPHA distribution boards (STAB/SIKUS)								
	160	flat termination	up to 2 × 70 (M8)	00 and 000	00	3NP40 75-0FE01	1.812	1
			• connection, top			3NP40 75-0FF01	1.780	1
		box terminal	2.5–70 or 2 × 2.5–16					
			• connection, top	00 and 000	00	3NP40 75-0FK01	1.820	1
			• connection, bottom			3NP40 75-0FJ01	1.831	1
	• With adapter, flat, acc. to DIN 43620 Part 6, for general applications and ALPHA distribution boards (STAB/SIKUS)							
160	flat termination	up to 2 × 70 (M8)	00 and 000	00 and 000	00	3NP40 75-1FE01	1.616	1
		• connection, top						
	box terminal	2.5–70 or 2 × 2.5–16						
		• connection, bottom	00 and 000	00 and 000	00	3NP40 75-1FF01	1.620	1
		• connection, top				3NP40 75-1FK01	1.717	1
		• connection, bottom				3NP40 75-1FJ01	1.630	1
250	flat termination	up to 240 (M10)	1 and 0	1 and 0	1 and 0	3NP42 75-1FG01	4.210	1
		• connection, top or bottom						
For snapping onto busbar systems, busbar center-to-center clearance, 60 mm								
Rails of width 12 mm to 30 mm and thickness 5 mm or 10 mm ⁵⁾ flat, T and I profiles, as well as on Rittal PLS systems.								
	160	flat termination	up to 2 × 70 (M8)	00 and 000	00	3NP40 76-1FE01	1.670	1
			• connection, top			3NP40 76-1FF01	1.890	1
		box terminal	2.5–70 or 2 × 2.5–16					
			• connection, top	00 and 000	00	3NP40 76-1FK01	1.755	1
		• connection, bottom			3NP40 76-1FJ01	1.915	1	
250	flat termination	up to 150 (M10)	1 and 0	1 and 0	1 and 0	3NP42 76-1FG01	4.171	1
		• connection, bottom or top						
400	flat termination	up to 240 (M10)	2 and 1	2 and 1	2 and 1	3NP43 76-1FG01	5.845	1
		• connection, bottom or top						
630	flat termination	up to 2 × 240 (M12)	3 and 2	3 and 2	3 and 2	3NP44 76-1FG01	8.235	1
		• connection, bottom or top						

With electronic fuse monitoring

by electronic fuse monitoring for stand-alone installation 5TT3 170.

For all fuse switch disconnectors with flat terminations, use the relevant cable lug covers (3NY7 101 to 3NY7 141) in order to ensure protection against finger touch according to BGV A3 (VBG4), see Accessories.

- 1) SIRIUS circuit-breaker as standard with auxiliary switch 1 NO+ 1 NC. On request 3NP40 7 also available with auxiliary switch 2 NO or 2 NC.
- 2) For 3NP40 7 with output socket for auxiliary switch, the signallead must be ordered separately, see Accessories. For 3NP41 to 3NP44, the auxiliary switch must be connected over the flat termination 2.8 mm × 0.5 mm to DIN 46244-A.
- 3) See LV HRC Fuse Links.

4) Use silver-plated isolating links.






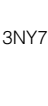
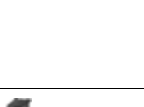





5) For mounting on 5 mm thick busbars, a bar thickness compensation is required for 3NP42 and 3NP43, see Accessories. 3NP44 can only be mounted on 10 mm thick busbars!

Low-Voltage Fuse Systems

LV HRC Fuse Systems

LV HRC fuse switch disconnectors
for power distribution


Accessories

	For fuse switch disconnectors	Version	Order No.	Weight 1 unit approx. kg	PS*/P. unit Unit(s)	
	Quick retaining plates between 2 mounting rails to EN 50022 and EN 50023					
	Busbar center-to-center clearance, 125 mm	3NP40 10, 3NP40 70	3NY1 995	0.135	1	
	Busbar center-to-center clearance, 125 mm	3NP42 70	3NY7 322	0.249	1	
	Cable lug covers and finger-safe cover to BGV A3 (VBG4) (1 set=2 units) for single mounting or 2 adapter devices	3NP40 7 with flat termination ¹⁾ 3NP42 7 3NP43 3NP44	3NY7 101 3NY7 121 3NY7 131 3NY7 141	0.065 0.220 0.221 0.319	1 set 1 set 1 set 1 set	
	Terminals (1 set=3 units)					
		3NP42 7	Conductor cross-section 70 mm ² ... 150 mm ²	3NY7 120	0.333	1 set
		3NP43	120 mm ² ... 240 mm ²	3NY7 130	0.583	1 set
	Triple terminals (1 set=3 units) for mounting on box terminals for mounting on flat termination	3NP40 1, 3NP40 7	Conductor cross-section • solid/stranded: 2.5 mm ² ... 16 mm ² • solid with end sleeve: 2.5 mm ² ... 10 mm ²	3NY7 102	0.131	1 set
		3NP40 7		3NY7 105	0.113	1 set
	3-phase busbars Modular width 90 mm = 5 MW Permissible connection 25 mm ² or supply terminal	3NP40 1	for $I_{u \max} = 225$ A for 2 switch disconnectors for 3 switch disconnectors for 4 switch disconnectors connecting bar	3NY1 237	0.265	1
				3NY1 238	0.434	1
				3NY1 438	0.650	1
				3NY1 263	0.267	1
	Cap for 1 blank space in 3NY1 238	3NP40 1		3NY1 265	0.012	1
	Feeder terminals (1 set = 3 units) for $I_{u \max} = 225$ A	3NP40 1	Conductor cross-section • solid/stranded: 25 mm ² ... 95 mm ² • solid with end sleeve: 16 mm ² ... 70 mm ²	3NY1 236	0.262	1 set
	Overreaching protection	3NP42 7, 3NP43, 3NP44		3NY7 481	0.021	1
	Sealing pins (1 set = 10 units)	3NP42 7, 3NP43, 3NP44		3NY7 482	0.056	10
				3NY7 381	0.064	1 set
	Handle units gray with inscription label with voltage inspection holes	3NP40 1		3NY7 003	0.160	1
		3NP40 7		3NY7 001	0.220	1
	Auxiliary switches 1 CO for sizes 000 and 00 with self-tapping screws for sizes 1 to 3, clip-on	3NP40 1 to 3NP44		3NY3 035	0.004	1
				3NY3 030	0.004	1
	Fuse links size 000 with non-insulated grip lugs, gG operational class for cable and line protection, overall width 21 mm acc. to IEC 60269-2-1 and DIN VDE 0636-201	3NP40 1	400 V/125 A 400 V/160 A	3NY1 822 3NY1 824	0.130 0.129	1 1
	Signal leads for connection to output socket of fuse monitoring size 00 1-m cable with connector 3-m cable with connector	3NP40 7		3NY1 910	0.097	1
		3NP40 7		3NY1 911	0.261	1

1) The fuse switch-disconnector with mounted cable lug covers, together with molded-plastic masking frame for distributor/device field/incoming feeder unit, is easy to install in the meter center.

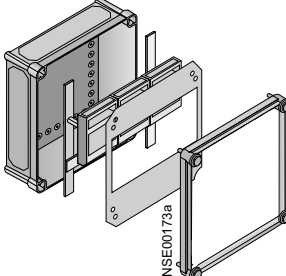
Accessories

Covers

	For fuse switch disconnectors	Height x Width mm	Order No.	Weight 1 unit approx. kg	PS*/ P. unit Unit(s)	
For installation in any distribution board¹⁾						
 3NY1 251	Molded-plastic covers	3NP40 1	215 x 130	3NY1 251	0.052	1
		3NP40 7 with box terminals	215 x 130	3NY7 200	0.037	1
		3NP40 7 with flat termination	215 x 130	3NY7 201	0.046	1
		3NP42 7	375 x 220	3NY7 220	0.112	1
		3NP43	375 x 245	3NY7 230	0.117	1
		3NP44	375 x 290	3NY7 240	0.125	1
For installation in ALPHA 400-ZS meter cabinets see the technical publication "Installation and Mounting", Order No. E20001-P285-A526-V1.						
	Touch protection covers	3NP40 76		3NY7 600	0.095	1
	for installation in ALPHA 400-ZS meter cabinets ³⁾					
	Molded-plastic covers	2 x 3NP40 1	197 x 215.5	3NY1 258	0.063	1
	for distributor/device field					
		1 x 3NP40 1 left	197 x 215.5	3NY1 262	0.093	1
	or suitable for incoming feeder unit in meter cabinets (mounting on busbars)					
		1 x 3NP40 1 right	197 x 215.5	3NY1 264	0.091	1
		1 x 3NP40 7 left	208 x 229	3NY7 500	0.120	1
		1 x 3NP40 7 right	208 x 229	3NY7 501	0.120	1
		2 x 3NP40 7	208 x 229	3NY7 502	0.054	1
		3NP42 7	309 x 216	3NY7 220	0.112	1
		3NP43	375 x 245	3NY7 230	0.117	1
		3NP44	375 x 290	3NY7 240	0.125	1
For installation in ALPHA 160 and ALPHA 400 wall-mounted distribution boards (STAB 160/STAB 400) and the ALPHA 630 floor-mounted distribution board (SIKUS 630)						
	Molded-plastic covers	1 x 3NP40 1 right	166 x 199	3NY1 260	0.082	1
	for attachment on mounting plate or busbars					
		1 x 3NP40 1 left	166 x 199	3NY1 261	0.086	1
		2 x 3NP40 1	166 x 199	3NY1 248	0.036	1
	For further information, see catalog ET A1 "ALPHA distribution systems"					
		1 x 3NP40 7 left	208 x 229	3NY7 500	0.120	1
		1 x 3NP40 7 right	208 x 229	3NY7 501	0.120	1
		2 x 3NP40 7	208 x 236	3NY7 502	0.054	1
		3NP42 7	309 x 216 ²⁾	3NY7 820	0.113	1
		3NP43	375 x 245	3NY7 230	0.117	1
		3NP44	375 x 290	3NY7 240	0.125	1

For installation in STAB/SIKUS Universal 8GF

Covers and fuse assemblies are available for all switch disconnectors for fuse links, sizes 000 to 3. Order numbers and prices on request.

	For fuse switch disconnectors	8HP casing Size	Order No.	Weight 1 unit approx. kg	PS*/ P. unit Unit(s)	
For installation in molded-plastic distribution system SENTRON 8HP						
 NSE00173a	Molded-plastic covers	1 x 3NP40 10	1	8HP6 431	0.221	1
	for installation in 8HP complete enclosure with fuse switch disconnectors					
		1 x 3NP40 70	1	8HP6 422	0.224	1
		2 x 3NP40 10	2	8HP6 432	0.465	1
		3 x 3NP40 10	2	8HP6 432	0.465	1
		1 x 3NP40 70	2	8HP6 423	0.230	1
		2 x 3NP40 70	2	8HP6 424	0.203	1
		1 x 3NP40 70	2.5	8HP6 423	0.230	1
		2 x 3NP40 70	2.5	8HP6 424	0.203	1
		1 x 3NP42 70	2.5	8HP6 427	0.250	1

Also refer to catalog "8HP molded-plastic distribution system", Order No. 8ZX1012-0HP54-5AB1.

1) For installation in ALPHA wall and floor-mounted distributors and meters (STAB, SIKUS, SIPRO) special covers are sometimes required, see Accessories.

2) For mounting on 8GE3 818-0 mounting plate, the 3NY7 220 insulating cover can also be used (for installation in any distribution board).

3) If using fuse links, size 00 (160 A), the permissible load current is $0.9 \times I_n$. In 60 mm systems the conductor cross-section at the outgoing cable unit is limited to 16 mm².



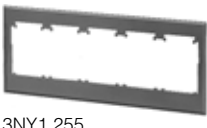


Low-Voltage Fuse Systems

LV HRC Fuse Systems

LV HRC fuse switch disconnectors
for power distribution

Accessories




Covers

	For fuse switch disconnectors	Height × Width mm	Order No.	Weight 1 unit approx. kg	PS*/ P. unit Unit(s)
For installation in 8GD/8GA STAB/SIKUS distribution board "classic" see the technical publication "Installation and Mounting", Order No. E20001-P285-A526-V1.					
 3NY1 250	Molded-plastic covers for attachment between two mounting rails 3NY1 995 with quick fitting plate	1 × 3NP40 10 right with and without auxiliary switches	197 × 215.5 3NY1 256	0.116	1
		1 × 3NP40 10 left with and without auxiliary switches	197 × 215.5 3NY1 257	0.118	1
 3NY1 253	in a field of width B1	2 × 3NP40 10 with and without auxiliary switches	197 × 215.5 3NY1 258	0.063	1
	in a field of width B2/2	2 × 3NP40 10 with and without auxiliary switches	197 × 235 3NY1 250	0.075	1
 3NY1 255	in a field of width B2	3 × 3NP40 10 with and without auxiliary switches (supports included in delivery)	197 × 485 3NY1 253	0.225	1
		4 × 3NP40 10 with and without auxiliary switches (supports included in delivery)	197 × 485 3NY1 254	0.188	1
		5 × 3NP40 10 with and without auxiliary switches	197 × 485 3NY1 255	0.125	1
	Supports (1 set = 10 units) for insulating covers; 3NY1 253 and 3NY1 254	3NP40 1	3NY1 271	0.100	1 set
 3NY1 260	Molded-plastic covers for snapping 3NP40 1 switch disconnectors onto standard mounting rails with special 8GD9 device holders and for mounting onto busbars (except 3NY1 247)	1 × 3NP40 1 right with and without auxiliary switches	166 × 199 3NY1 260	0.082	1
		1 × 3NP40 1 left with and without auxiliary switches	166 × 199 3NY1 261	0.086	1
 3NY1 247	in a field of width B1	2 × 3NP40 1 with and without auxiliary switches	166 × 199 3NY1 248	0.036	1
	in a field of width B2	5 × 3NP40 1 with and without auxiliary switches	166 × 469 3NY1 247	0.072	1
	Blanking covers (1 set = 10 units) for covering a blank space in the 3NY1 2 insulating covers	3NP40 1	Width 90 3NY1 270	0.040	1 set
	Molded-plastic covers for attachment between two mounting rails with 3NY1 995 quick fitting plate	1 × 3NP40 7 left	208 × 219 3NY7 800	0.100	1
		1 × 3NP40 7 right	208 × 219 3NY7 801	0.120	1
	with 3NY1 995 quick fitting plate	2 × 3NP40 7	208 × 222 3NY7 802	0.060	1
	with 3NY1 995 quick fitting plate 3NY1 322	1 × 3NP42 7	309 × 216 3NY7 820	0.113	1
	Molded-plastic covers for attachment on mounting plate 8GD9 100	1 × 3NP40 7 left	208 × 229 3NY7 500	0.120	1
		1 × 3NP40 7 right	208 × 229 3NY7 501	0.120	1
		2 × 3NP40 7	208 × 236 3NY7 502	0.054	1
		1 × 3NP42 70	309 × 216 ¹⁾ 3NY7 820	0.113	1
	Molded-plastic covers for attachment				
	to 8GD9 591 mounting plate	1 × 3NP43 70	375 × 245 3NY7 230	0.117	1
	to 8GD9 592 mounting plate	1 × 3NP44 70	375 × 290 3NY7 240	0.125	1

1) For mounting on 8GD9 590 mounting plate, the 3NY7 220 insulating cover can also be used.

Selection and ordering data

Completely compartmentalized, with high speed closing feature

Rated continuous current I_u	Connection type (double-ended) Connection	for conductor crosssection	For fuse links to DIN VDE 0636-201 ¹⁾	For isolating links	Auxiliary switches on switch disconnectors	Degree of protection IP00, without fuse links, without isolating links, with terminal screws	Weight 1 unit approx.	PS*/P. unit
A		mm ²	Size	Size	Version			
For mounting and installation								
	flat termination ⁶⁾	2.5 ... 150 ²⁾	00 and 000	00	without ³⁾ 1 NO + 1 NC	3NP50 60-OCA00 3NP50 60-OCA10	1.608	1
	clamp connections	1-wire 2.5 ... 50 or 2-wire 1x 2.5 ... 50 1x 2.5 ... 35	00 and 000	00	without ³⁾ 1 NO + 1 NC		3NP50 60-OCB00 3NP50 60-OCB10	1.650 1.739 1.748
	flat termination	6 ... 150 ⁴⁾	1 and 0	1	without 1 NO + 1 NC	3NP52 60-OCA00 3NP52 60-OCA10	5.475	1
	clamp connections	35 ... 120	1 and 0	1	without 1 NO + 1 NC		3NP52 60-OCB00 3NP52 60-OCB10	5.491 5.605 5.814
	flat termination	6 ... 240 ⁴⁾	2 and 1	2	without 1 NO + 1 NC	3NP53 60-OCA00 3NP53 60-OCA10	6.532	1
							3NP53 60-OCB00 3NP53 60-OCB10	6.551
	flat termination	6 ... 2 x 240 ⁴⁾	3 and 2	3	without 1 NO + 1 NC	3NP54 60-OCA00 3NP54 60-OCA10	7.945	1
							3NP54 60-OCB00 3NP54 60-OCB10	7.958
For adaptation to busbar systems⁵⁾, busbar center-to-center clearance, 40 mm								
Rails of width 12 mm and thickness 5 mm or 10 mm								
160	flat termination	2.5 ... 150 ²⁾	00 and 000		without 1 NO + 1 NC	3NP50 65-1CF00 3NP50 65-1CF10	2.380	1
	clamp connections	1-wire 2.5 ... 50 or 2-wire 1x 2.5 ... 50 1x 2.5 ... 35 connection, bottom	00 and 000		without 1 NO + 1 NC		3NP50 65-1CG00 3NP50 65-1CG10	2.370 2.433 2.437

For adaptation to busbar systems⁵⁾, busbar center-to-center clearance, 60 mm

Use switch version "Mounting and installation" and busbar adapter, see Accessories.

- 1) See LV HRC Fuse Links.
- 2) According to DIN 46234 or 16 mm² ... 95 mm² to DIN 46235 (use M10 lug if required).
- 3) If auxiliary switch is retrofitted, additional drill holes are required on the switch.
- 4) According to DIN 46234 or DIN 46235; with lug according to DIN 46235: min. conductor cross-section 16 mm² (use M12 lug if required).
- 5) For accessories and additional devices on busbar systems, see Accessories and catalog LV 1.
- 6) For 3NP50 60 with flat terminations, the relevant 3NY1 106 cable lug covers must be used (see Accessories) for the purpose of protection against accidental contact according to DIN VDE 0106 Part 100.




Low-Voltage Fuse Systems

LV HRC Fuse Systems

LV HRC fuse switch disconnectors
for extended technical requirements

Selection and ordering data





Completely compartmentalized, with high speed closing feature
with fuse monitoring by SIRIUS circuit-breaker¹⁾

Rated continuous current I_u	Connection type (double-ended)		For fuse links to DIN VDE 0636-201 ²⁾	Auxiliary switches on Switch disconnectors	Auxiliary switches on Circuit-breakers	Degree of protection IP00, without fuse links, without isolating links, with terminal screws	Weight 1 unit approx.	PS*/ P. unit
	Connection	for conductor crosssection						
A		mm ²	Size	Version	Version	Order No.	kg	Unit(s)
For mounting and installation								
with plug-in connection of the auxiliary switch connecting cable (length approx. 1 m) to the circuit-breaker								
160	flat termination ⁶⁾	2.5 ... 150 ³⁾	00 and 000	1 NO + 1 NC 1 NO + 1 NC 2 NO	1 NO + 1 NC 1 NO + 1 NC 2 NO	3NP50 60-0EA86 3NP50 60-0EA26	2.484	1
	clamp connections	1-wire 2.5 ... 50 2-wire 1 × 2.5 ... 50 1 × 2.5 ... 35	00 and 000	1 NO + 1 NC 1 NO + 1 NC 2 NO	1 NO + 1 NC 1 NO + 1 NC 2 NO		3NP50 60-0EB86 3NP50 60-0EB26	2.550 2.616 2.650
	flat termination	6 ... 150 ⁴⁾	1 and 0	1 NO + 1 NC 1 NO + 1 NC 2 NO	1 NO + 1 NC 1 NO + 1 NC 2 NO	3NP52 60-0EA86 3NP52 60-0EA26	6.014	1
	clamp connections	35 ... 120	1 and 0	1 NO + 1 NC 1 NO + 1 NC 2 NO	1 NO + 1 NC 1 NO + 1 NC 2 NO		3NP52 60-0EB86 3NP52 60-0EB26	6.867 7.095 6.659
	flat termination	6 ... 240 ⁴⁾	2 and 1	1 NO + 1 NC 1 NO + 1 NC 2 NO	1 NO + 1 NC 1 NO + 1 NC 2 NO	3NP53 60-0EA86 3NP53 60-0EA26	7.083	1
							5.410	1
	flat termination	6 ... 2 × 240 ⁴⁾	3 and 2	1 NO + 1 NC 1 NO + 1 NC 2 NO	1 NO + 1 NC 1 NO + 1 NC 2 NO	3NP54 60-0EA86 3NP54 60-0EA26	8.462	1
							9.233	1
For adaptation to busbar systems⁵⁾, busbar center-to-center clearance, 40 mm								
Rails of width 12 mm and thickness 5 mm or 10 mm								
160	flat termination	2.5 ... 150 ³⁾	00 and 000	1 NO + 1 NC 1 NO + 1 NC 2 NO	1 NO + 1 NC 1 NO + 1 NC 2 NO	3NP50 65-1EF86 3NP50 65-1EF26	2.908	1
	clamp connections	1-wire 2.5 ... 50 2-wire 1 × 2.5 ... 50 1 × 2.5 ... 35 connection, bottom	00 and 000	1 NO + 1 NC 1 NO + 1 NC 2 NO	1 NO + 1 NC 1 NO + 1 NC 2 NO		3NP50 65-1EG86 3NP50 65-1EG26	2.950 3.020 2.973
For adaptation to busbar systems⁵⁾, busbar center-to-center clearance, 60 mm								
Use switch versions "For mounting and installation" and busbar adapter, see Accessories.								

- SIRIUS circuit-breaker on request, also auxiliary switch 2 NC.
- See LV HRC Fuse Links.
- According to DIN 46234 or 16 mm² ... 95 mm² to DIN 46235 (use M10 lug if required).
- According to DIN 46234 or DIN 46235; with lug according to DIN 46235: min. conductor cross-section 16 mm² (use M12 lug if required).
- For accessories and additional devices on busbar systems, see Accessories and distribution board, busbar systems and switchgear.
- For 3NP50 60 with flat terminations, the relevant 3NY1 106 cable lug covers must be used (see Accessories) for the purpose of protection against accidental contact according to DIN VDE 0106 Part 100.

Selection and ordering data

Completely compartmentalized, with high speed closing feature with electronic fuse monitoring EF (self-powered) version "A" (open-circuit principle)¹⁾ for rated operational voltage U_o of 400 V to 500 V Incoming supply must come from above!

Rated continuous current I_u	Connection type (double-ended) Connection for conductor cross-section	For fuse links to DIN VDE 0636-201 ²⁾ Size	Auxiliary switches on Switch disconnectors Version	Auxiliary switches on fuse-monitoring system Version	Degree of protection IP00, without fuse links, without isolating links, with terminal screws Order No.	Weight 1 unit approx. kg	PS*/P. unit Unit(s)
A	mm ²	Size	Version	Version			
For mounting and installation							
with plug-in connection of the auxiliary switch connecting cable (length approx. 1 m) for fuse monitoring Status display: green LED illuminated, Fault indication: green LED flashing Fuse failure : red LED (display per phase)							
	160	flat termination ⁵⁾	2.5 ... 120 ³⁾	00 and 000	1 NO + 1 NC 2 NO + 1 NC	3NP50 60-OHA13	2.375 1
		clamp connections	1-wire 2.5 ... 50 2-wire 1x 2.5 ... 50 1x 2.5 ... 35	00 and 000	1 NO + 1 NC 2 NO + 1 NC	3NP50 60-OHB13	2.500 1
	250	flat connection	6 ... 150 ⁴⁾	1 and 0	1 NO + 1 NC 2 NO + 1 NC	3NP52 60-OHA13	5.865 1
	400	flat connection	6 ... 240 ⁴⁾	2 and 1	1 NO + 1 NC 2 NO + 1 NC	3NP53 60-OHA13	6.951 1
	630	flat termination	6 ... 240 ⁴⁾	3 and 2	1 NO + 1 NC 2 NO + 1 NC	3NP54 60-OHA13	8.513 1

1) Version "R" (closed-circuit principle) on request (see also block diagram on page 1/114)!

2) See LV HRC Fuse Links.

3) According to DIN 46234 or 16 mm² ... 95 mm² to DIN 46235 (use M10 lug if required).

4) According to DIN 46234 or DIN 46235; with lug according to DIN 46235: min. conductor cross-section 16 mm² (use M12 lug if required).

5) For 3NP50 60 with flat terminations, the relevant 3NY1 106 cable lug covers must be used (see Accessories) for the purpose of protection against accidental contact according to DIN VDE 0106 Part 100 (see Accessories).


Low-Voltage Fuse Systems

LV HRC Fuse Systems

LV HRC fuse switch disconnectors
for extended technical requirements

Selection and ordering data

Completely compartmentalized, with high speed closing feature with electronic fuse monitoring EF (self-powered) version "A" (open-circuit principle)¹⁾ for rated operational voltage U_o of 400 V to 500 V Incoming supply must come from above!



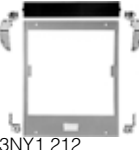



Rated continuous current I_u	Connection type (double-ended) Connection for conductor cross-section	For fuse links to DIN VDE 0636-201 ²⁾	Auxiliary switches on switch disconnectors	Auxiliary switches on fuse monitoring system	Degree of protection IP00, without fuse links, without isolating links, with terminal screws	Weight 1 unit approx.	PS*/P. unit
A	mm ²	Size	Version	Version	Order No.	kg	Unit(s)
For adaptation to busbar systems⁴⁾, busbar center-to-center clearance, 40 mm							
	for rails of width 12 mm and thickness 5 mm or 10 mm						
	160 flat termination	2.5 ... 120 ³⁾ connection bottom	00 and 000	1 NO + 1 NC	2 NO + 1 NC	3NP50 65-1HF13	2.776 1

For adaptation to busbar systems⁴⁾, busbar center-to-center clearance, 60 mm

Use switch versions "For mounting and installation" and busbar adapter, see Accessories.

- Version "R" (closed-circuit principle) on request (see also block diagram on page 1/114)!
- See LV HRC Fuse Links.
- According to DIN 46234 or 16 mm² ... 95 mm² to DIN 46235 (use M10 lug if required).
- For accessories and additional devices on busbar systems, see Accessories and catalog LV 1.

Accessories

	For fuse switch disconnectors	Height x Width mm	Order No.	Weight 1 unit approx. kg	PS*/ P. unit Unit(s)
For installation in any distribution board					
	Molded-plastic covers for installation in the cabinet	3NP50 with and without auxiliary switches	215 x 135	3NY1 105	0.045 1
3NY1 107		with auxiliary switch	215 x 135	3NY1 115	0.044 1
	Molded-plastic covers for installation in metal front plates	with and without auxiliary switches	220 x 160	3NY1 125	0.062 1
3NY1 106					
	Molded-plastic covers for covering terminals	3NP50 with and without auxiliary switches	265 x 135	3NY1 107	0.073 1
	Molded-plastic covers for covering the cable lug connections	3NP50 with and without auxiliary switches	290 x 135	3NY1 106	0.071 1
	Molded-plastic covers for separate covering of top and bottom cable lug connections	with auxiliary switch 3NP50 with and without auxiliary switches	290 x 135 290 x 135	3NY1 116 3NY1 108	0.071 1 0.048 1
	Assembly kits for installation with insulating cover, fixing brackets and small components	3NP50 60 3NP52 60 3NP53 60 3NP54 60	250 x 149 300 x 220 300 x 245 300 x 290	3NY1 208 3NY1 210 3NY1 211 3NY1 212	0.531 1 0.287 1 0.298 1 0.313 1
3NY1 212					
	Covers for cable lug connections (1 set = 6 units) screw onto free screw end, for protection against accidental contact	3NP52 3NP53/3NP54 60	Cover length 99 mm Cover length 95 mm Cover length 120 mm	3NY1 241 3TX6 546-3B 3NY1 245	0.205 1 set 0.260 1 set 0.336 1 set
3TX6 546-3B					
For installation in any distribution board					
	Clamp connections (1 set = 3 units)	3NP50 3NP52	Conductor cross- section 2.5 ... 50 mm ² 1) 35 ... 120 mm ²	3NY1 903 3NY1 907	0.108 1 set 0.225 1 set
3NY1 907					
	Busbar adapters for 60-mm bus- bar system	3NP50 3NP52, 3NP53, 3NP54 ²⁾	108 mm wide 250 mm wide (length 320 mm, M10 terminal screws, connecting cables must be made up)	8US12 91-4SB00 8US12 10-4AG00	0.551 1 3.060 1
8US12 10-4AG00					
	Sealing eyes can be retrofitted (1 set = 10 units)	3NP50		3NY1 940	0.010 1 set

1) Also available in 2-wire version: 1 x 2.5 mm² ... 50 mm² and 1 x 2.5 mm² ... 35 mm².







2) Switch is wider than adapter; however, this can be expanded to 276 mm using two 8US19 98-2BM00 lateral modules.

Low-Voltage Fuse Systems

LV HRC Fuse Systems

LV HRC fuse switch disconnectors
for extended technical requirements

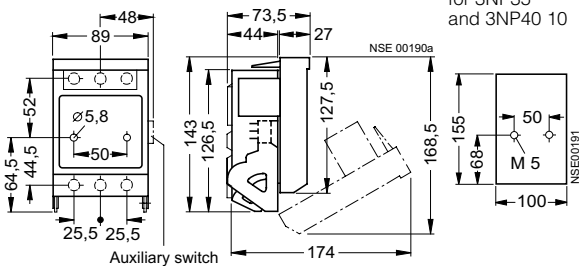
Accessories

		For fuse switch disconnectors	Order No.	Weight 1 unit approx. kg	PS*/ P. unit Unit(s)
 <p>3NY1 074</p>	<p>Handle units</p> <p>with fuse monitoring by 3RV1 motor starter protector (with auxiliary switch 1 NO + 1 NC), with plug-in connection, without connector and connecting cable</p> <p>Connector and connecting cable 1 m long 3 m long</p> <p>with electronic fuse monitoring for 400 V-500 V (with auxiliary switch 2 NO + 1 NC), with plug-in connection, without connector and connecting cable</p> <p>Connector and connecting cable (6-pole) 3 m long</p> <p>Strain relief assembly kit for control cable of the EF</p>	3NP50 6-.C..0	3NY1 074	0.620	1
		3NP52 60-.C..0	3NY1 371	0.263	1
		3NP53 60-.C..0	3NY1 372	1.510	1
		3NP54 60-.C..0	3NY1 373	1.690	1
		3NP50 6-.E..6	3NY1 420	1.405	1
		3NP52 60-.E..6	3NY1 421	1.900	1
		3NP53 60-.E..6	3NY1 422	1.980	1
		3NP54 60-.E..6	3NY1 423	2.600	1
		3NP5 with 3RV1	3NY1 910 3NY1 911	0.097 0.261	1 1
		3NP50 6-.H.13	3NY1 513-0	1.235	1
3NP52 60-.H.13	3NY1 513-2	2.130	1		
3NP53 60-.H.13	3NY1 513-3	2.146	1		
3NP54 60-.H.13	3NY1 513-4	0.325	1		
 <p>3NY1 513-3</p>		3NP5 with EF	3NY1 915	0.372	1
		3NP5 with EF	3NY1 918	0.024	1 set
 <p>3NY1 915</p>					
 <p>3NY3 033</p>	<p>Auxiliary switches 1 NO + 1 NC</p> <p>with actuating cams, screws and washers (mounting kit)</p>	3NP50 ¹⁾	3NY3 033	0.015	1
		3NP52 ... 3NP54	3NY3 034	0.015	1
 <p>3NY3 034</p>	with fixing bracket and screws (mounting kit)				
 <p>3NY4 031</p>	<p>Arc chambers (for 3NP52, 3NP53 and 3NP54, 3 units each are required)</p>	3NP50	3NY4 031	0.218	1
		3NP52	3NY4 011	0.215	1
		3NP53, 3NP54	3NY4 012	0.240	1
 <p>3NY4 011</p>					
	<p>Molded-plastic covers as replacement for covers from assembly kits for installation (without fixing brackets and small components)</p>	<p>300 × 220 mm 3NY1 210</p> <p>300 × 245 mm 3NY1 211</p> <p>300 × 290 mm 3NY1 212</p>	<p>3NY1 102</p> <p>3NY1 103</p> <p>3NY1 104</p>	<p>0.071</p> <p>0.075</p> <p>0.084</p>	<p>1</p> <p>1</p> <p>1</p>

1) If retrofitted, drill holes required.

Dimensional drawings

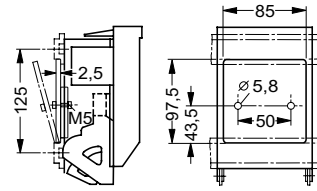
3NP40 10



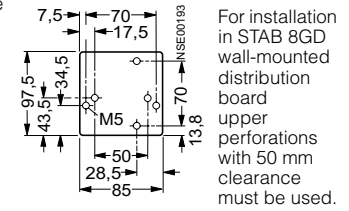
Cutout for 3NP35 and 3NP40 10

3NP40 10

with 3NY1 995 quick fitting plate mounting rail center-to-center clearance 125 mm

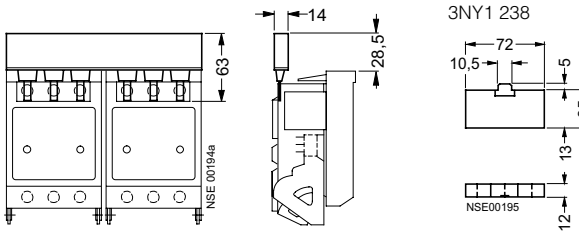


3NY1 995 quick retaining plate for 3NP40 10 and 3NP40 70

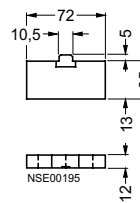


3NP40 10

with 3-phase 3NY1 237 busbar for 2 fuse switch disconnectors

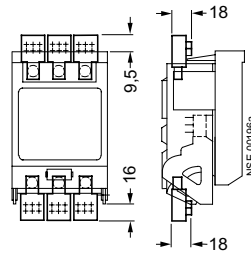


3NY1 265 cap for 3-phase busbar 3NY1 238



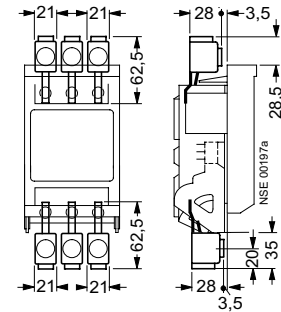
3NP40 10

with 3NY1 235 triple terminal



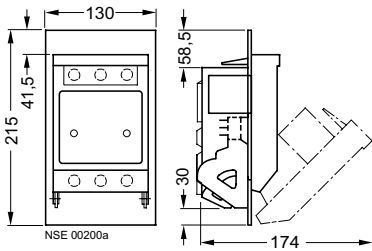
3NP40 10

with 3NY1 236 supply terminal



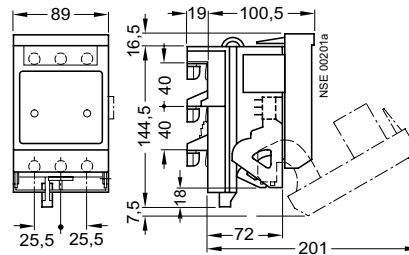
3NP40 10

with 3NY1 251 molded-plastic covers



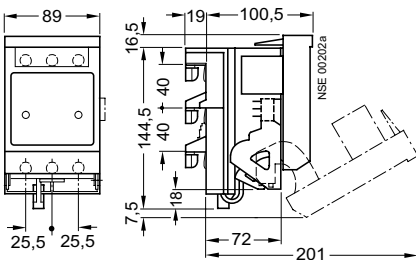
3NP40 15-1CJ01

with busbar adapter, flat, rails of width 12 mm or 15 mm and thickness 5 mm or 10 mm, connection, bottom



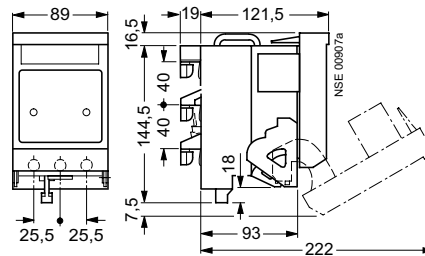
3NP40 15-1CK01

with busbar adapter, flat, rails of width 12 mm or 15 mm and thickness 5 mm or 10 mm, connection, top



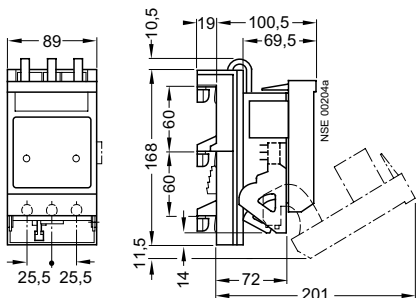
3NP40 15-0CJ01

with busbar adapter, deep, rails of width 12 mm or 15 mm and thickness 5 mm or 10 mm, connection, bottom



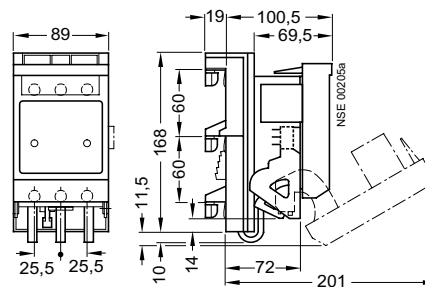
3NP40 16-1CJ01

with busbar adapter, rails of width 12, 15, 20 mm or 30 mm and thickness 5 mm or 10 mm, flat, T and I profiles and other well-known busbar systems, connection, bottom



3NP40 16-1CK01

with busbar adapter, rails of width 12, 15, 20, 25 mm or 30 mm and thickness 5 mm or 10 mm, flat, T and I profiles and other well-known busbar systems, connection, top



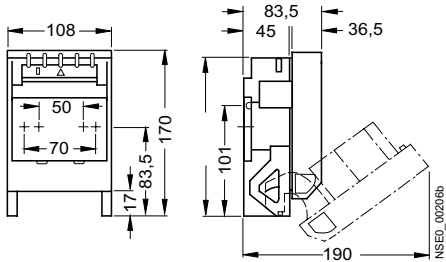
Low-Voltage Fuse Systems

LV HRC Fuse Systems

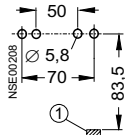
LV HRC fuse switch disconnectors

Dimensional drawings

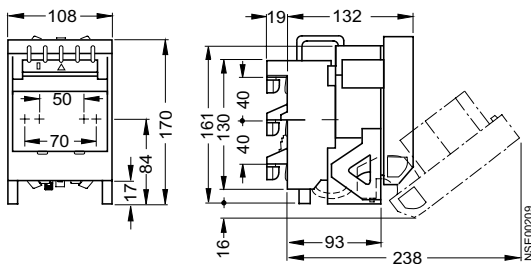
3NP40 70 for installation



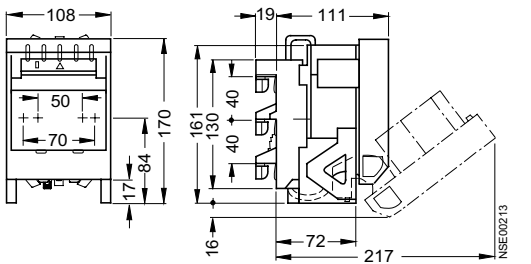
Drilling pattern for 3NP40 70



3NP40 75-0 with busbar adapter, deep, rails of width 12 mm or 15 mm and thickness 5 mm or 10 mm

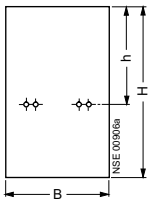


3NP40 75-1 with busbar adapter, flat, rails of width 12 mm or 15 mm and thickness 5 mm or 10 mm



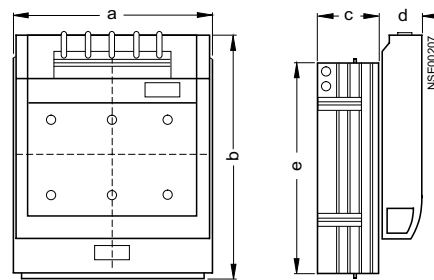
For metal frames

Cutouts for 3NP4



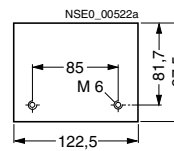
Type	Cover between assembly kit	Cover between assembly kit		Panel cutout min.		
		Type	B	H	B	H
Molded-plastic cover behind panel						
3NP40 1	3NY1 251	130	215	100	180	100
3NP40 7	3NY7 200,	130	215	118	195	110
	3NY7 201					
3NP42 7	3NY7 220	220	375	210	275	157
3NP43 7	3NY7 230	245	375	235	315	174
3NP44 7	3NY7 240	290	375	280	325	178
Molded-plastic cover in front of panel						
3NP40 1	3NY1 251	130	215	100	155	87
3NP40 7	3NY7 200,	130	215	118	195	110
	3NY7 201					
3NP42 7	3NY7 220	220	375	198	275	157
3NP43 7	3NY7 230	245	375	224	315	174
3NP44 7	3NY7 240	290	375	270	325	178

3NP42 70, 3NP43 70, 3NP44 70 for installation

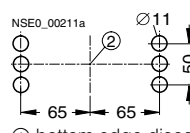


Type	a	b	c	d	e
3NP42 70	184	243	66	45.5	215
3NP43 70	210	288	80	48	255
3NP44 70	256	300	94.5	48	267

3NY73 22 quick retaining plate



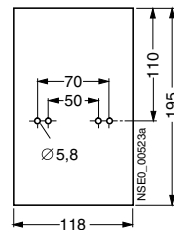
Drilling pattern for 3NP43 70



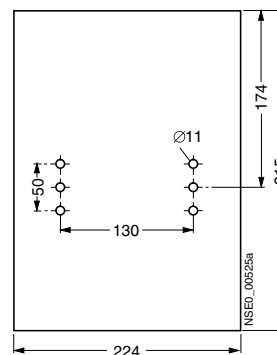
- ① bottom edge disconnector-base
- ② center disconnector-base

For plastic frame

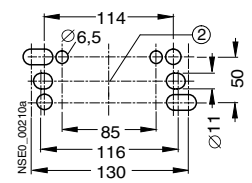
Cutouts²⁾ for 3NP40 70



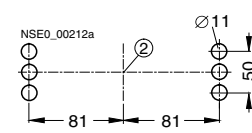
Cutouts²⁾ for 3NP43



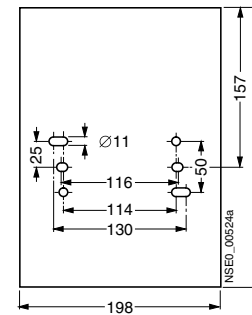
Drilling pattern for 3NP42 70



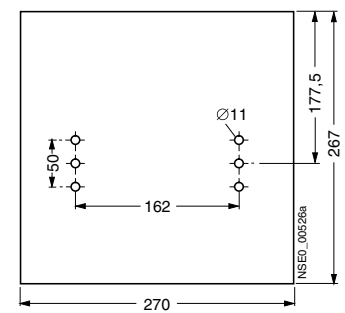
Drilling pattern for 3NP44



Cutouts²⁾ for 3NP42



Cutouts²⁾ for 3NP44



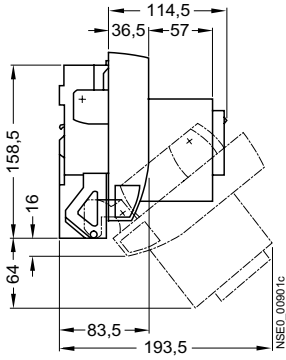
1) h = distance from upper edge of panel cutout to center of disconnector mounting.

2) Cover is placed open on the switchgear cabinet panel, for cover behind control cabinet panel: cutout dimensions on request.

Dimensional drawings

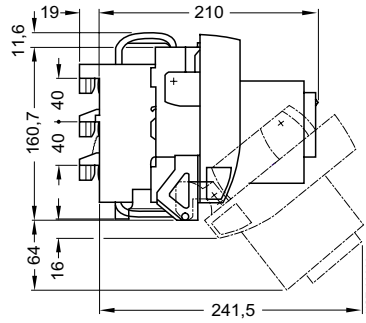
3NP40 70-0F

for mounting and installation



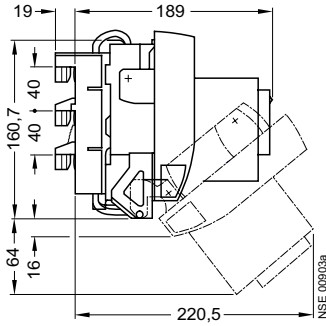
3NP40 75-0F

with busbar adapter, deep, 40 mm,
rails of width 12 mm or 15 mm
and thickness 5 mm or 10 mm



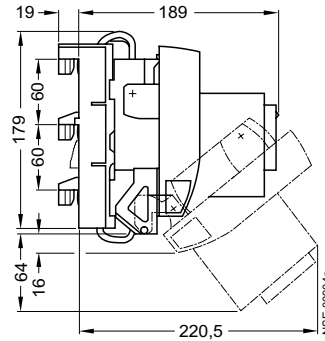
3NP40 75-1F

with busbar adapter, flat, 40 mm,
rails of width 12 mm or 15 mm
and thickness 5 mm or 10 mm



3NP40 76-0F

with busbar adapter, flat, 60 mm,
rails of width 12 mm or 30 mm
and thickness 5 mm or 10 mm



Low-Voltage Fuse Systems

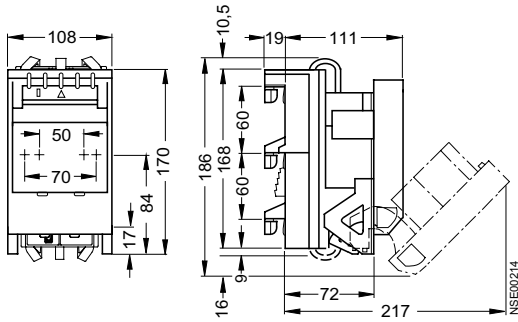
LV HRC Fuse Systems

LV HRC fuse switch disconnectors

Dimensional drawings

3NP40 76-1

with busbar adapter,
rails of width 12 mm to 30 mm
and thickness 5 mm or 10 mm,
flat, T and I profiles



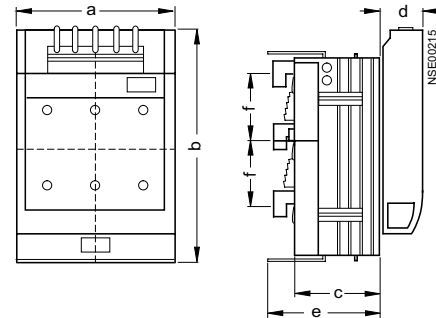
3NP42 75-1

3NP42 76-1

3NP43 76-1

3NP44 76-1

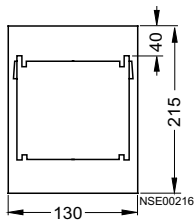
with busbar adapter,
rails of width 12 mm to 30 mm
and thickness 5 mm or 10 mm
flat, T and I profiles



Type	a	b ¹⁾	c	d	e	f
3NP42 75-1	184	243	83 ²⁾	45.5	111	40
3NP42 76-1	184	243	83 ²⁾	45.5	111	60
3NP43 76-1	210	288	97	48	125	60
3NP44 76-1	256	300	112	48	139	60

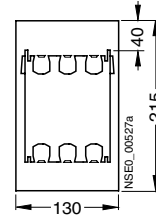
3NY7 200 molded-plastic covers

for 3NP40 7
for installation in any distribution board



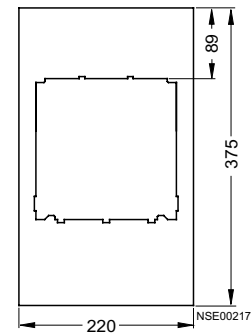
3NY7 201 molded-plastic covers

for 3NP40 7.-
for 3NP40 7.-CA01



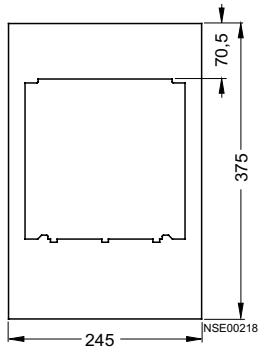
3NY7 220 molded-plastic covers

for 3NP42
for installation in any distribution board



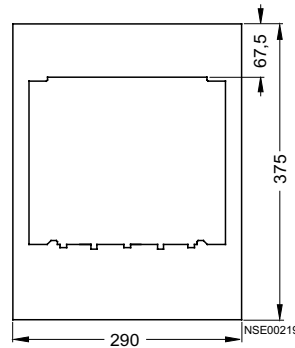
3NY7 230 molded-plastic covers

for 3NP43
for installation in any distribution board



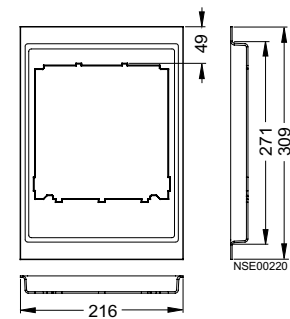
3NY7 240 molded-plastic covers

for 3NP44
for installation in any distribution board



3NY7 820 molded-plastic covers

for 1 3NP42 70 switch disconnector
for installation in ALPHA/SIKUS
distribution boards

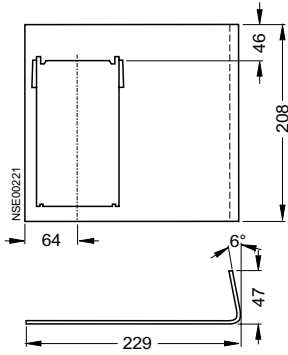


- 1) For BGV A3 (VBG4) plus dimension c of cable lug covers (see page 1/111).
- 2) For installation together with size 000 or size 00 in ALPHA/SIKUS distribution boards, 3NY7 820 molded-plastic cover is used as depth compensation (underneath).

Dimensional drawings

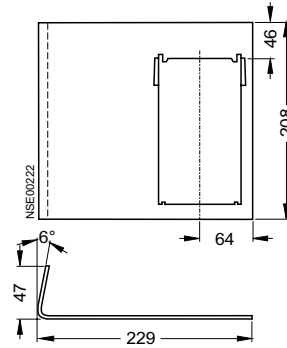
3NY7 500 molded-plastic covers

for 1 3NP40 switch disconnector, left for installation in SIKUS 3200-, ALPHA 160- and 400- and SIKUS 630 distribution boards



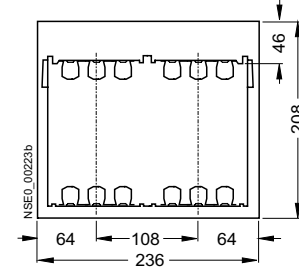
3NY7 501 molded-plastic covers

for 1 3NP40 switch disconnector, right for installation in SIKUS 3200-, ALPHA 160- and 400- and SIKUS 630 distribution boards

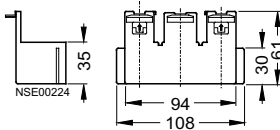


3NY7 502 molded-plastic covers

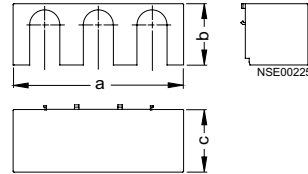
for 2 3NP40 switch disconnectors, for installation in SIKUS 3200-, ALPHA 160- and 400- and SIKUS 630 distribution boards



Cable lug cover for 3NP40 7 with 3NY7 101 flat termination



Cable lug cover for 3NP42 to 3NP44, 3NY7 121, 3NY7 131, 3NY7 141



Type	a	b	c
3NY7 121	181	65	67
3NY7 131	207	79	50
3NY7 141	253	94	47

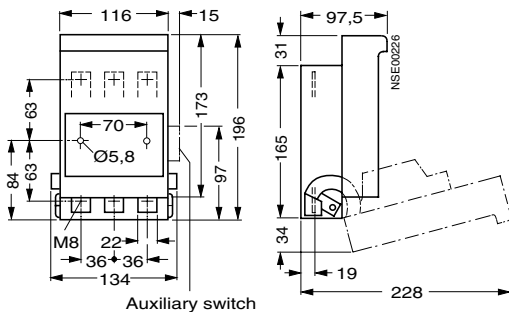
Low-Voltage Fuse Systems

LV HRC Fuse Systems

LV HRC fuse switch disconnectors

Dimensional drawings

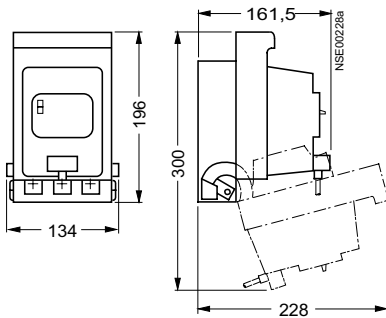
3NP50 60, 160 A for installation



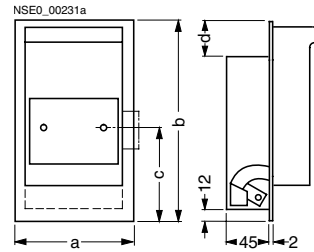
Auxiliary switch

3NP50 60, 160 A

with fuse monitoring through 3RV1 motor starter protectors,
with plug-in connection

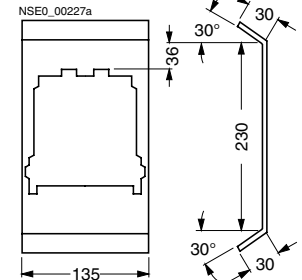


3NP50 60, 160 A with insulating cover for any type of installation



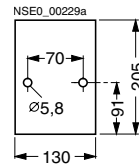
Type	a	b	c	d
3NY1 105	135	215	95.5	38
3NY1 115	135	215	95.5	38
3NY1 106	135	290	144.5	64
3NY1 108	135	290	144.5	64
3NY1 208	149	250	115	53.5

3NY1 107 molded-plastic cover

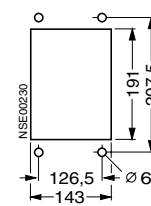


For plastic frame

Cutout
for 3NP50 60, with and
without auxiliary switch

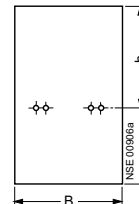


Cutout
for 3NY1 208 mounting kit



For metal frames

Cutouts for 3NP5

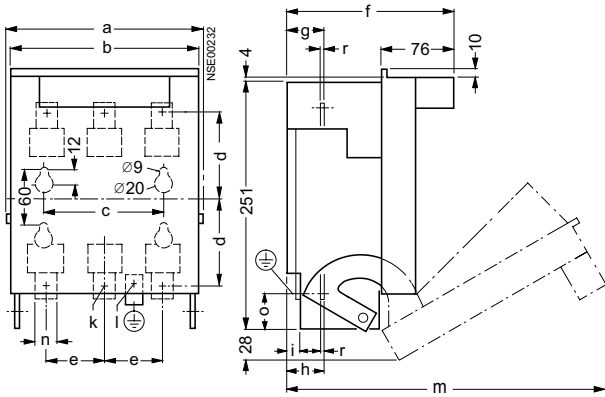


Type	Cover between assembly kit	Panel cutout min.				
		Type	B	H	B	H
Molded-plastic cover behind panel						
3NP50 6	3NY1 105 ²⁾	135	215	130	206	115
3NP50 6	3NY1 125					
3NP52 6	3NY1 210	222	300	210	293	146
3NP53 6	3NY1 211	245	300	235	293	146
3NP54 6	3NY1 212	290	300	280	293	146
Molded-plastic cover in front of panel						
3NP50 6	3NY1 105	135	215	130	205	115
3NP50 6	3NY1 208	149	250	143	191	--
3NP52 6	3NY1 210	220	300	210	262	132
3NP53 6	3NY1 211	245	300	234	262	132
3NP54 6	3NY1 212	290	300	279	262	132

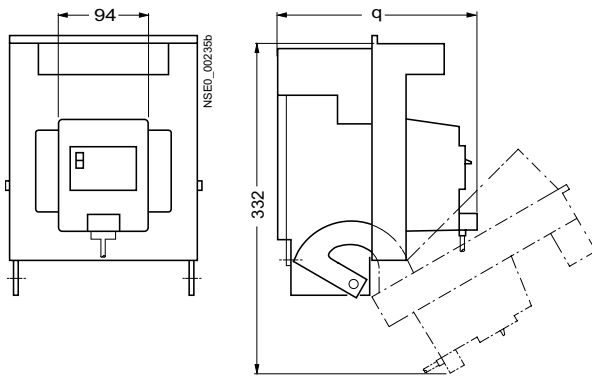
- 1) h = distance from upper edge of panel cutout to center of disconnector mounting.
- 2) With standard molded-plastic cover behind panel and corresponding panel cutout, the standard switching capacity is reduced to the following AC 23B values: at 400 V I_e 160 A, at 500 V from I_e 160 V to 125 A and at 690 V from I_e 100 A to 50 A.

Dimensional drawings

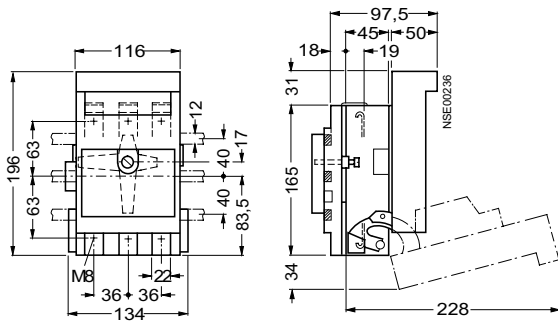
3NP5. 60, 250 to 630 A
for installation



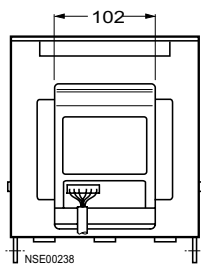
3NP5. 60, 250 to 630 A with fuse monitoring through 3RV circuit-breaker, with plug-in connection



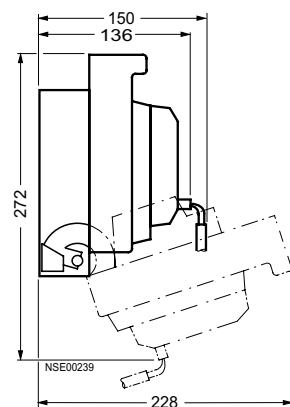
3NP50 65, 160 A with busbar adapter, rails of width 12 mm and thickness 5 mm or 10 mm



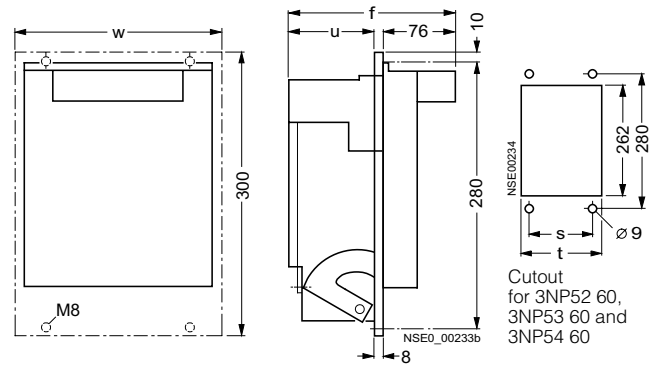
3NP5. 60, 160 to 630 A with electronic fuse monitoring EF, with plug-in connection and control cable



3NP50 60, 160 A with electronic fuse monitoring EF, with plug-in connection and control cable



3NP5. 60, 250 to 630 A with molded-plastic cover, for installation



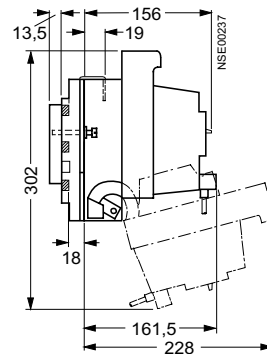
Type	a	b	c	d	e	f	g	h
3NP52 60	207	202	130	93	62	176	38	41
3NP53 60	231	226	130	106	70	192	39	39
3NP54 60	276	271	200	111	85	207	40.5	40.5

Type	l	k ¹⁾	l ¹⁾	m	n	o	q	r
3NP52 60	11.5	M10	M8	336	25	32	212	3.6
3NP53 60	11.5	M10	M10	352	25	25	228	4.4
3NP54 60	11.5	M10	M10	367	30	25	243	6

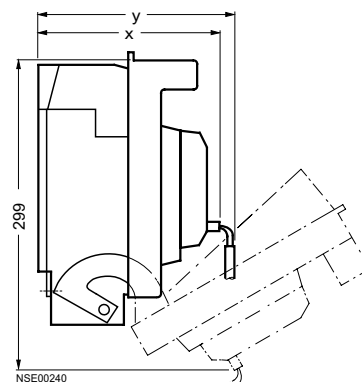
Type	s	t	u	w	x	y
3NP52 60	156	210	89.5	220	186.5	200.5
3NP53 60	180	234	105.5	245	202.5	216.5
3NP54 60	225	279	120.5	290	217.5	231.5

1) Through-hole for screw

3NP50 65, 160 A with busbar adapter, with fuse monitoring through 3RV circuit-breaker, with plug-in connection



3NP5. 60, 250 to 630 A with electronic fuse monitoring EF, with plug-in connection and control cable



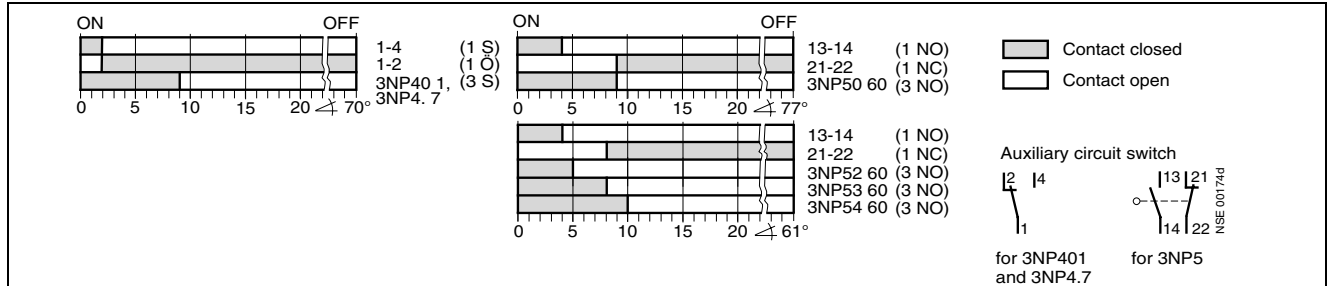
Low-Voltage Fuse Systems

LV HRC Fuse Systems

LV HRC fuse switch disconnectors

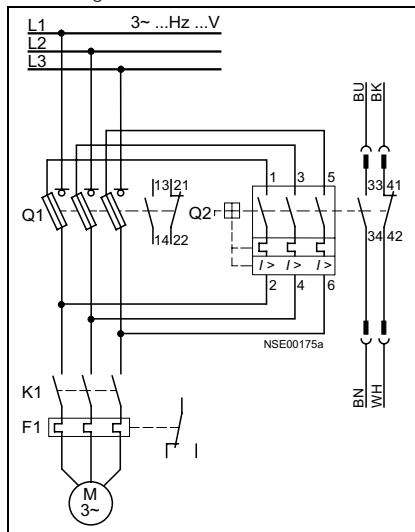
Schematics

Function auxiliary contact – main contact at SENTRON 3NP4 and 3NP5

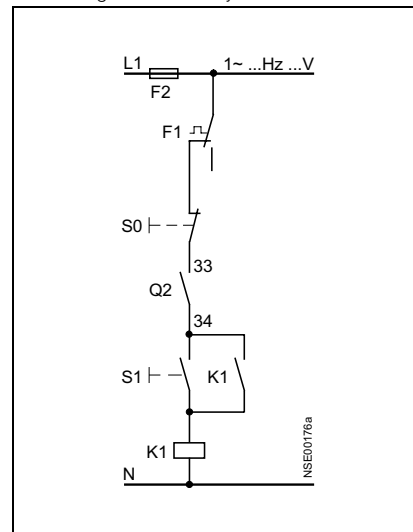


SENTRON 3NP fuse switch disconnectors with fuse monitoring (with 3RV1 motor starter protector, with auxiliary switch 1 NO + 1 NC)

Circuit diagram of main circuit



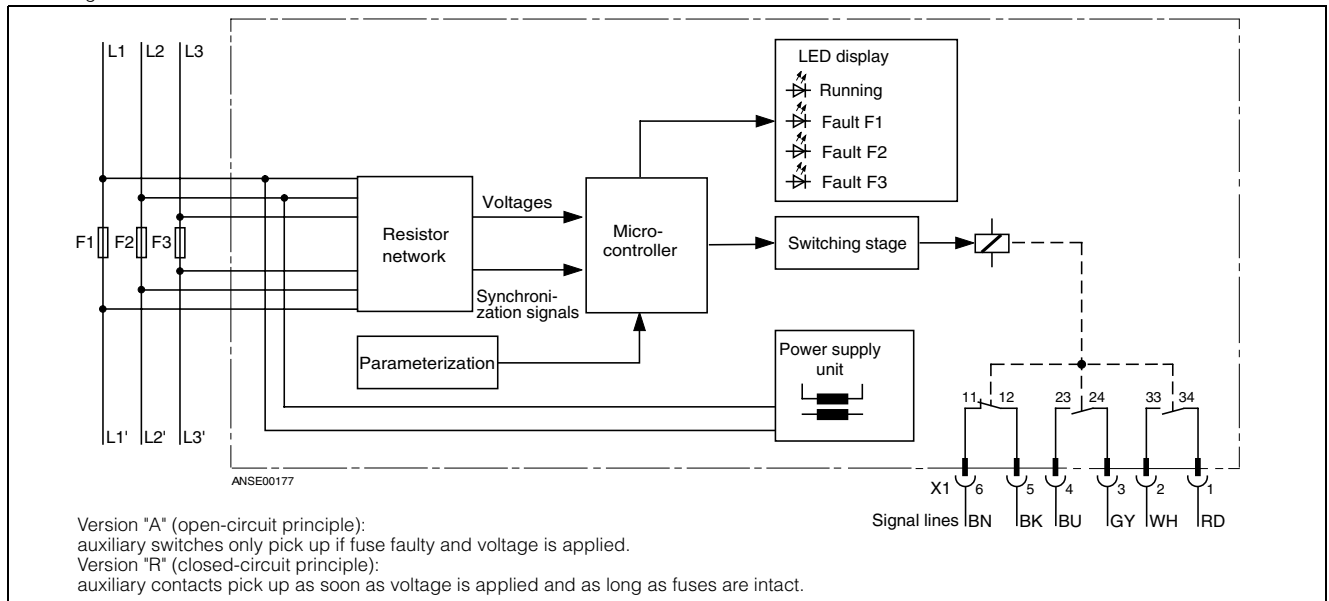
Circuit diagram of auxiliary circuit



- Q1 = fuse switch disconnectors
- Q2 = circuit-breakers
- K1 = contactor
- S1 = ON pushbutton
- S0 = OFF pushbutton
- F1 = overload relay
- F2 = control-circuit fuse

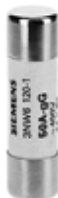
SENTRON 3NP5 fuse switch disconnector with electronic fuse monitoring

Block diagram



Overview

Cylindrical fuse links gG



- Rated voltage U_n 400/500 V AC
- Rated current I_n 0.5 ... 100 A
- gG operational class
- Sizes 8 mm x 32 mm, 10 mm x 38 mm, 14 mm x 51 mm and 22 mm x 58 mm

Bases for cylindrical fuses



- Rated voltage U_n 400/690 V AC
- Rated current I_n 0.5 ... 100 A
- For sizes 8 mm x 32 mm, 10 mm x 38 mm, 14 mm x 51 mm and 22 mm x 58 mm
- Versions with signal detector
- Optional mountable auxiliary circuit switch (for sizes 14 x 51, 22 x 58)

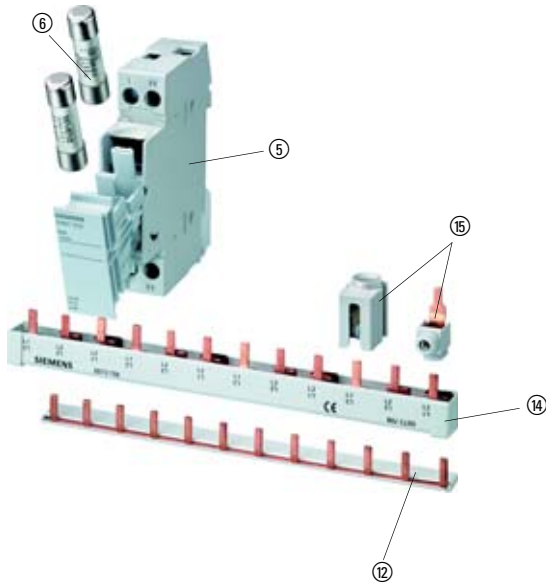
Low-Voltage Fuse Systems

Cylindrical Fuse Systems

Product overview

Overview

New cylinder fuse bases 8 x 32 and 10 x 38



- Mounting depth 70 mm
- Touch-protected to BGV A3 (VBG4)
- Size 8 x 32 and 10 x 38
- For rail mounting
- Anti-slip terminal at ingoing and outgoing feeder
- For busbar mounting
- Sealable fuse holder
- With draw-out technology for safe, no-voltage changing of fuse links

⑤ **Cylinder fuse bases, size 8 x 32 and 10 x 38**

⑥ Cylindrical fuse link 8 x 32 or 10 x 38

⑫ Busbar, 1-pole for L or N

⑭ Busbar, 3-pole

⑮ Terminals (optional)

Benefits

Application

Cylindrical fuses are used internationally for line protection (gG operational class), for protection of switching devices in motor circuits (aM operational class) and for the protection of power semiconductors (operational class aR). The design is used all over the world.

Disconnectors

Cylinder fuse bases are disconnectors that cannot be switched under load.

VDE mark

Cylindrical fuses are not included in the standard DIN VDE 0636-201, the German version of IEC 60269-2-1, so that this design was not awarded the VDE mark.

Safety

No-voltage changing of the fuse links.





Signal detector

When a fuse link fails, an LED in the window of the fuse link flashes.

Technical specifications

Cylindrical fuse links					
Type		3NW6 3..	3NW6 0..	3NW6 1..	3NW6 2..
Size	mm x mm	8 x 32	10 x 38	14 x 51	22 x 58
Standards		IEC 60269-1, -2, -2-1 NF C 60-200, 63-210, 63-211 NBN C 63269-2 and -2-1 CEI 32-4, -12			
Operational class		gG			
Rated voltages U_n	V AC	400 or 500 (see Selection and ordering data)			
Rated current I_n	A	0.5 ... 100			
Rated breaking capacity	kA AC	100, but 400 V versions: 20			
Mounting position		any, but preferably vertical			

Selection and ordering data

Size	I_n	U_n	gG operational class	Weight 1 unit approx.	PS*/ P. unit	
mm x mm	A	V AC	Order No.	kg	Unit(s)	
Cylindrical fuse links						
	8 x 32	2 4 6 10 16 20	400	3NW6 302-1	0.004	10
				3NW6 304-1	0.004	10
				3NW6 301-1	0.004	10
				3NW6 303-1	0.004	10
				3NW6 305-1	0.004	10
				3NW6 307-1	0.004	10
	10 x 38	2 4 6 8 10 12 16 20 25 32	500	3NW6 002-1	0.008	10
				3NW6 004-1	0.008	10
				3NW6 001-1	0.008	10
				3NW6 008-1	0.008	10
				3NW6 003-1	0.008	10
				3NW6 006-1	0.008	10
				3NW6 005-1	0.008	10
				3NW6 007-1	0.008	10
				3NW6 010-1	0.008	10
				3NW6 012-1	0.008	10
	14 x 51	4 6 8 10 12 16 20 25 32 40 50	500	3NW6 104-1	0.019	10
				3NW6 101-1	0.019	10
				3NW6 108-1	0.019	10
				3NW6 103-1	0.019	10
				3NW6 106-1	0.019	10
				3NW6 105-1	0.019	10
				3NW6 107-1	0.019	10
				3NW6 110-1	0.019	10
				3NW6 112-1	0.019	10
				3NW6 117-1	0.019	10
3NW6 120-1	0.019	10				
	22 x 58	8 10 12 16 20 25 32 40 50 63 80 100	500	3NW6 208-1	0.051	10
				3NW6 203-1	0.051	10
				3NW6 206-1	0.051	10
				3NW6 205-1	0.051	10
				3NW6 207-1	0.051	10
				3NW6 210-1	0.051	10
				3NW6 212-1	0.051	10
				3NW6 217-1	0.051	10
				3NW6 220-1	0.051	10
				3NW6 222-1	0.051	10
				3NW6 224-1	0.051	10
3NW6 230-1	0.051	10				

Low-Voltage Fuse Systems

Cylindrical Fuse Systems

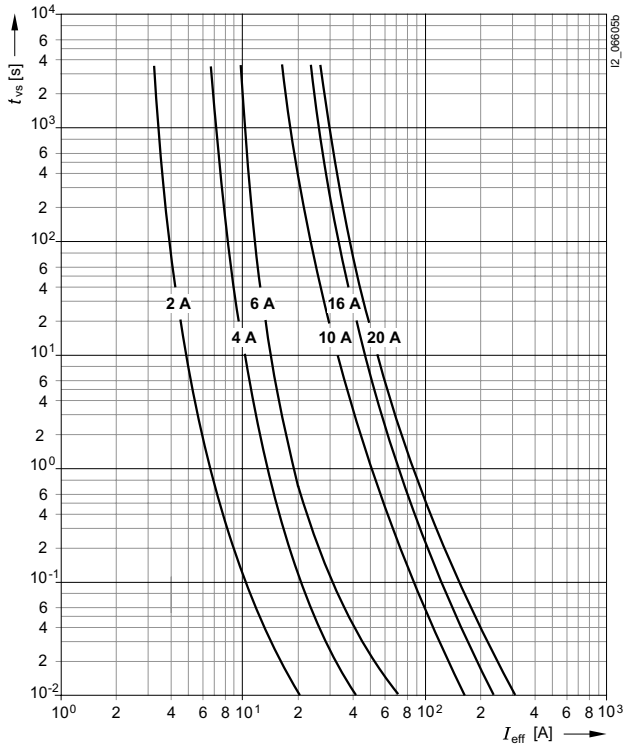
Cylindrical fuse links gG

Characteristic curves

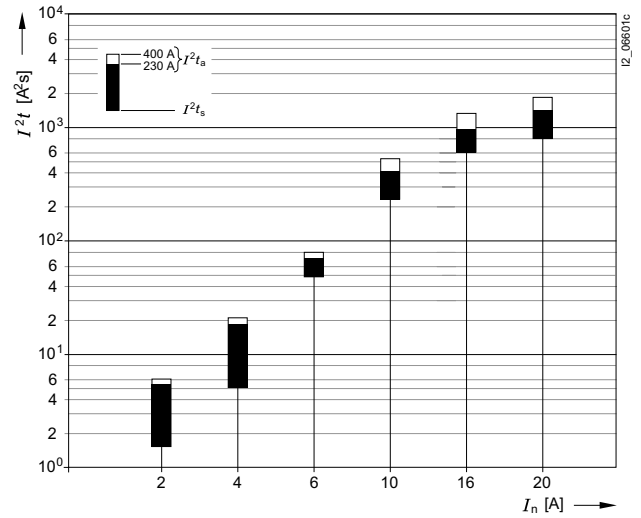
Series 3NW6 30.-1

Size: 8 mm × 32 mm
 Operational class: gG
 Rated voltage: 400 V AC
 Rated current: 2 ... 20 A

Time/current characteristics diagram

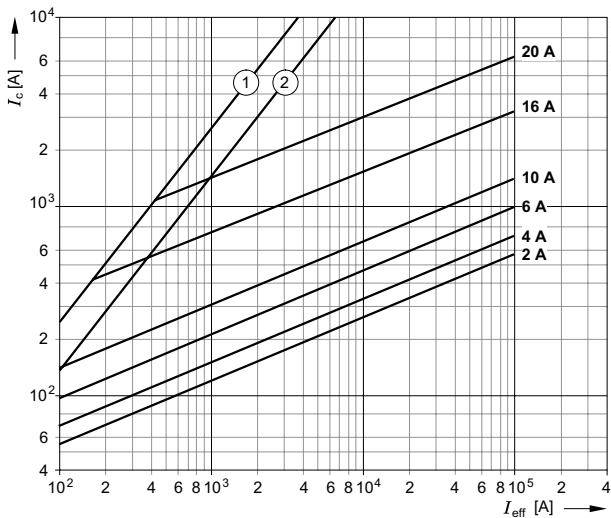


Melting I^2t_s values diagram



Type	I_n A	P_V W	Δt K	I^2t_s 1 ms A ² s	I^2t_a 400 V AC A ² s
3NW6 302-1	2	2	27	1.6	6
3NW6 304-1	4	1.5	19	5	21
3NW6 301-1	6	1.5	20.5	48	85
3NW6 303-1	10	0.7	15	230	530
3NW6 305-1	16	1.1	29	600	1400
3NW6 307-1	20	1.7	34.5	790	1800

Current limitation diagram



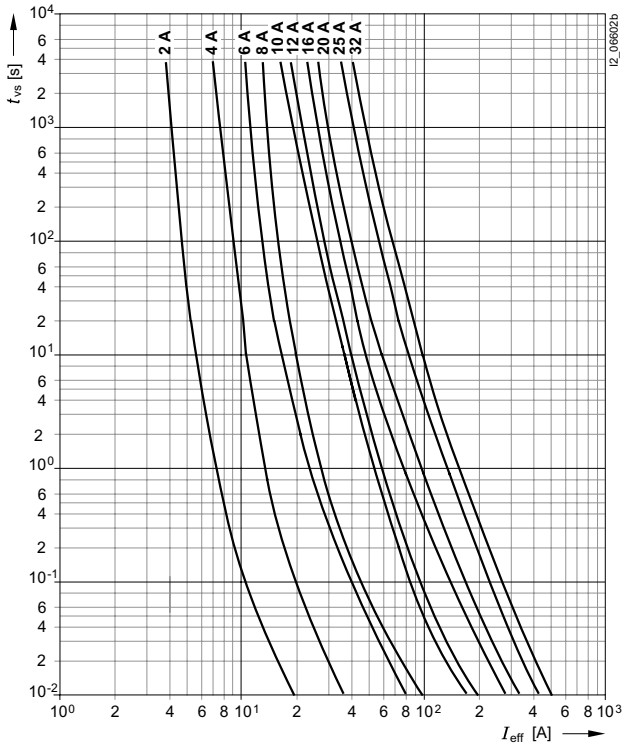
- ① Peak short-circuit current with largest DC component
- ② Peak short-circuit current without DC component

Characteristic curves

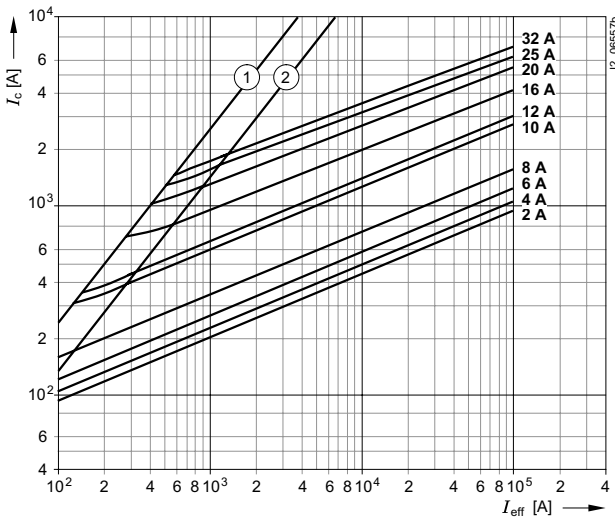
Series 3NW6 0

Size: 10 mm × 38 mm
 Operational class: gG
 Rated voltage: 500 V AC (2 ... 25 A)
 400 V AC (32 A)
 Rated current: 2 ... 32 A

Time/current characteristics diagram

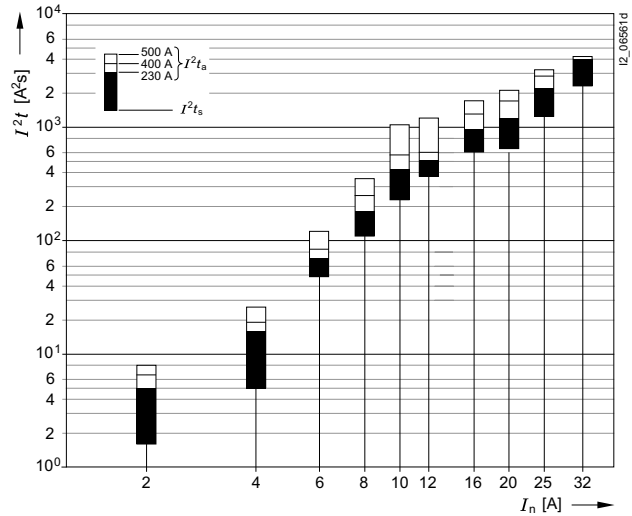


Current limitation diagram



- ① Peak short-circuit current with largest DC component
- ② Peak short-circuit current without DC component

Melting I^2t_s values diagram



Type	I_n	P_v	$\Delta\vartheta$	I^2t_s	I^2t_a		
	A	W	K	1 ms A ² s	230 V AC A ² s	400 V AC A ² s	500 V AC A ² s
3NW6 002-1	2	2.2	32	1.6	5	6.5	8
3NW6 004-1	4	1.2	16.5	5	16	19	26
3NW6 001-1	6	1.6	23	48	70	84	120
3NW6 008-1	8	2.3	35	110	180	140	350
3NW6 003-1	10	0.7	16	230	420	570	1050
3NW6 006-1	12	0.9	33	390	510	600	1200
3NW6 005-1	16	1.3	38	600	950	1300	1700
3NW6 007-1	20	2.1	51.5	640	1200	1700	2100
3NW6 010-1	25	2.1	54	1300	2200	2800	3200
3NW6 012-1	32	2.5	51	2360	4000	4200	--

Low-Voltage Fuse Systems

Cylindrical Fuse Systems

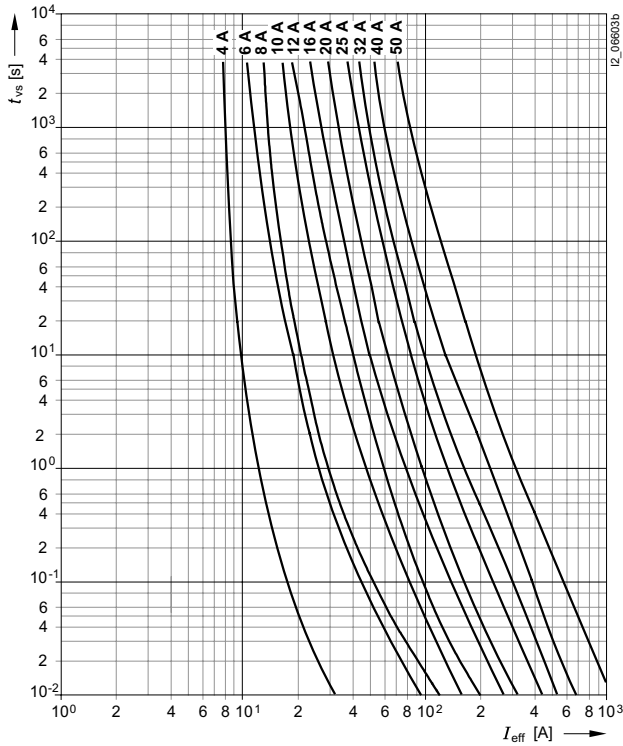
Cylindrical fuse links gG

Characteristic curves

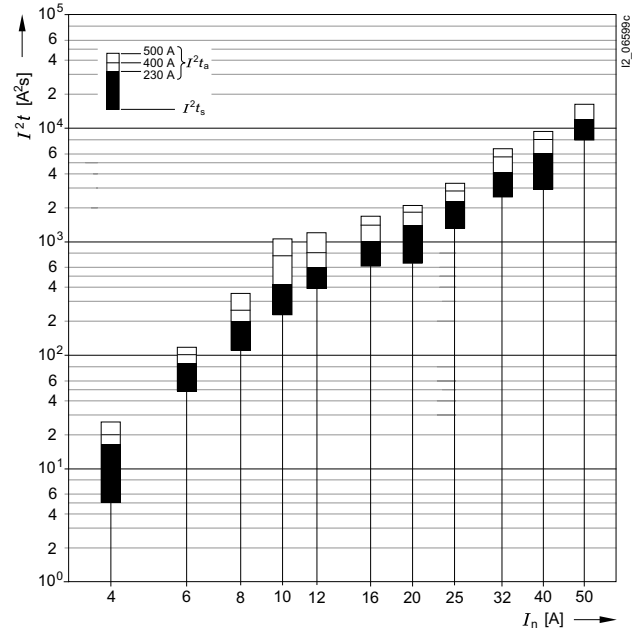
Series 3NW6 1

Size: 14 mm × 51 mm
 Operational class: gG
 Rated voltage: 500 V AC (4 ... 40 A)
 400 V AC (50 A)
 Rated current: 4 ... 50 A

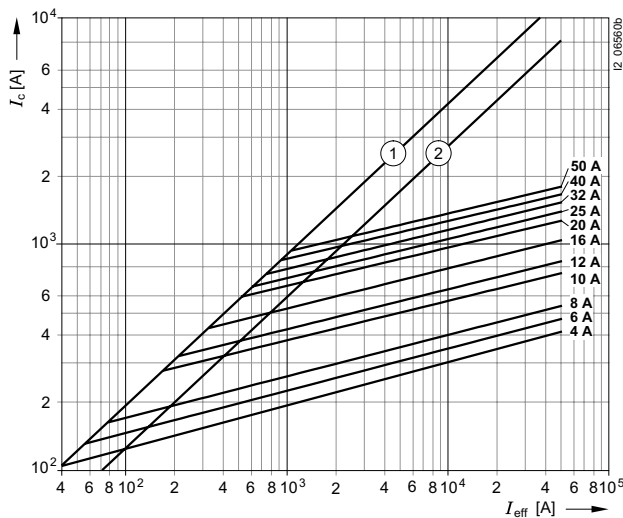
Time/current characteristics diagram



Melting I^2t_s values diagram



Current limitation diagram



- ① Peak short-circuit current with largest DC component
- ② Peak short-circuit current without DC component

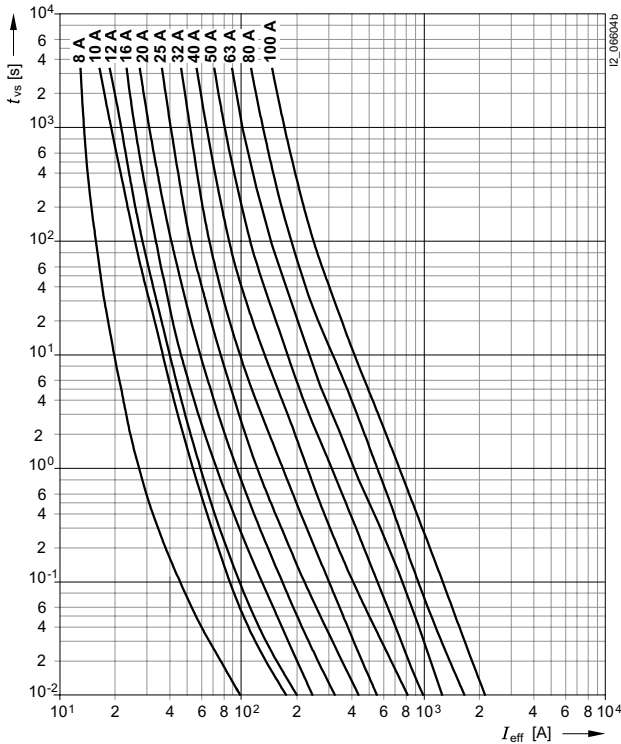
Type	I_n A	P_v W	$\Delta\vartheta$ K	I^2t values			
				1 ms I^2t_s A ² s	230 V AC I^2t_a A ² s	400 V AC A ² s	500 V AC A ² s
3NW6 104-1	4	1.9	19	5	16	20	26
3NW6 101-1	6	2.5	25	48	85	100	120
3NW6 108-1	8	2.4	18	110	200	250	350
3NW6 103-1	10	0.8	12	230	420	750	1050
3NW6 106-1	12	1.0	16	390	600	800	1200
3NW6 105-1	16	1.6	27	600	1000	1400	1700
3NW6 107-1	20	2.3	32.5	670	1400	1800	2100
3NW6 116-1	25	2.2	31.5	1300	2300	2800	3200
3NW6 112-1	32	3.2	39.5	2500	4100	5500	6500
3NW6 117-1	40	4.5	48	3600	6100	8000	9200
3NW6 120-1	50	4.8	55	8000	12200	16000	--

Characteristic curves

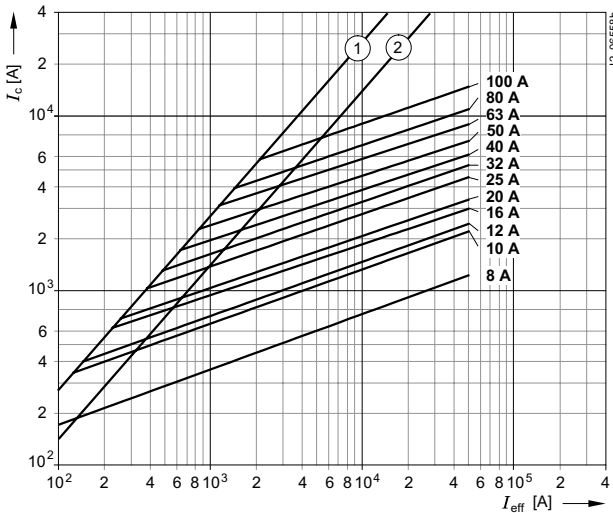
Series 3NW6 2

Size: 22 mm × 58 mm
 Operational class: gG
 Rated voltage: 500 V AC (8 ... 80 A)
 400 V AC (100 A)
 Rated current: 8 ... 100 A

Time/current characteristics diagram

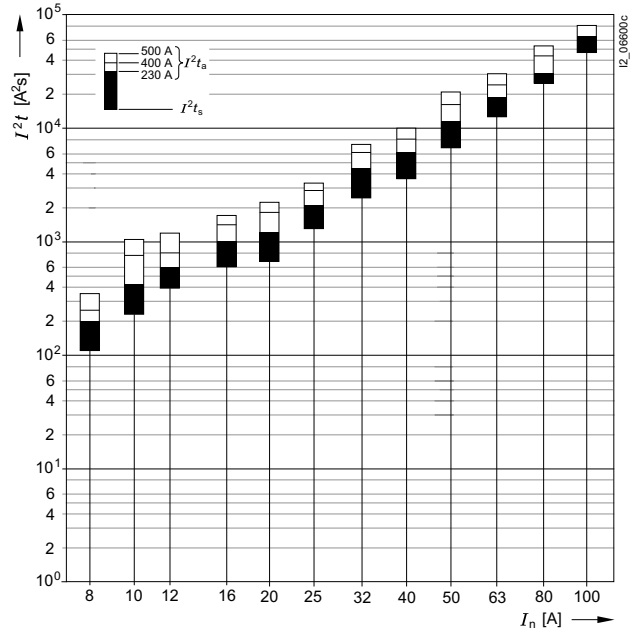


Current limitation diagram



- ① Peak short-circuit current with largest DC component
- ② Peak short-circuit current without DC component

Melting I^2t_s values diagram



Type	I_n	P_v	$\Delta\vartheta$	I^2t_s	I^2t_a		
	A	W	K	1 ms A ² s	230 V AC A ² s	400 V AC A ² s	500 V AC A ² s
3NW6 208-1	8	2.5	15	110	200	170	350
3NW6 203-1	10	0.9	10.5	230	420	760	1050
3NW6 206-1	12	1.1	12	390	600	800	1200
3NW6 205-1	16	1.6	14.5	600	1000	1400	1700
3NW6 207-1	20	2.4	22.5	670	1200	1800	2200
3NW6 210-1	25	2.7	24	1300	2100	2800	3300
3NW6 212-1	32	3.2	28	2450	4400	6100	7200
3NW6 217-1	40	4.9	35	3600	6200	8000	10000
3NW6 220-1	50	5.9	46	6800	11400	16200	20600
3NW6 222-1	63	6.8	48	12500	18800	24000	30000
3NW6 224-1	80	7.5	48	24700	30500	43000	52500
3NW6 230-1	100	8.4	55	46000	64700	80000	--

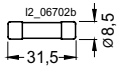
Low-Voltage Fuse Systems

Cylindrical Fuse Systems

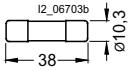
Cylindrical fuse links gG

Dimensional drawings

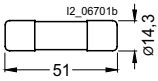
3NW6 3



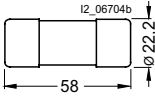
3NW6 0



3NW6 1



3NW6 2



Function

Cylinder fuse bases belong to the fuse disconnecter product range. They are not suitable for switching loads. These devices are used in cylindrical fuse links with gG operational class, for cable and line protection, and with aM operational class for the protection of motor circuits. The cylindrical fuse bases are available in the standard sizes 8 x 32, 10 x 38, 14 x 51 and 22 x 58. The first value designates the diameter of the fuse link, the second the length; both values are in mm. The devices are available with the following poles for each product range:

- 1-pole
- 1-pole + N
- 2-pole
- 3-pole
- 3-pole + N

The devices are also available with or without signal detector. For the versions with signal detector, a small electronic device with LED is located behind a window in the knob. If the inserted fuse link is tripped and the line is load-free, this is indicated by the LED flashing.

New cylinder fuse bases 8 x 32 and 10 x 38

These product series offer the following innovative modifications:

- The devices with 1 + N poles are only available in 1 modular width (MW). This saves 1 MW in mounting space compared to the previous version, i.e. a 50 % reduction in space requirements.

- As well as the 1 + N device, a 3 + N device is also available. No additional modular width is required for this N pole either. Thus offering a 25 % reduction in space requirements.
- The new devices can also accommodate a spare fuse link, which can also help save time and money.
- The new series of cylinder fuse bases with signal detector will be available soon.

Mounting

The devices are fastened by snapping onto standard mounting rails. The infeed can be from the top or the bottom. Because the switch disconnectors are fitted with the same anti-slip terminals at the top and the bottom, the devices can also be rail-mounted at the top or bottom.

Auxiliary switches

For the cylinder fuse bases in sizes 14 x 51 and 22 x 58 auxiliary switches are available. These are simply clipped onto the base using the factory-fitted brackets.

The auxiliary switches support remote indication of fuse failure. However this assumes that Striker fuse links are used (not currently included in our product range). When the fuse is tripped, a small hammer – the striker – shoots out of the front of the fuse. Over an armature link in the auxiliary switch, the kinetic energy of this hammer is used to switch a mini switch, which then initializes this signal over a floating contact.

Technical specifications

Fuse bases for cylindrical fuses							
Type		3NW7 3.2	3NW7 3.3	3NW7 0.3	3NW7 0.2	3NW7 1..	3NW7 2..
Size	mm x mm	8 x 32	8 x 32	10 x 38	10 x 38	14 x 51	22 x 58
Standards		IEC 60269-1, -2, -2-1 NF C 60-200, 63-210, 63-211 NBN C 63269-2en-2-1 CEI 32-4, -12					
UL Approval		UL ¹⁾	available soon		UL ¹⁾	UL ¹⁾	available soon
CSA Approval		CSA			CSA	CSA	
Rated voltage U_n	V AC	400		690			
Rated voltage acc. to UL/CSA	V AC	400		600			
Rated current I_n	A AC	2 ... 20		0.5 ... 32		2 ... 50	8 ... 100
Rated breaking capacity	kA	20		100			
Breaking capacities		AC 20B (switching of resistive loads) DC 20B		AC 20B (switching of resistive loads) DC 20B		AC 20B (switching of resistive loads) DC 20B	
• Utilization categories							
No-voltage changing of fuse links		yes					
Sealable when installed		yes					
Mounting position		any, but preferably vertical					
Mounting depth	mm	66				70	
Degree of protection acc. to IEC 60529		IP20					
Terminals touch-protected to BGV A3 at incoming and outgoing feeder		yes					
Ambient temperatures	°C	-5 ... +40, humidity 90 % at +20					
Terminals							
Terminal		anti-slip terminals					
Conductor cross-sections							
• Rigid	mm ²	1.5 ... 10				2.5 ... 10	4 ... 10
• Stranded	mm ²	2.5 ... 16		1.5 ... 10		2.5 ... 25	4 ... 50
• Finely stranded with end sleeve	mm ²	1.5 ... 10				2.5 ... 16	4 ... 35
Conductor cross-sections acc. to UL/CSA AWG (American wire gauge)		10 ... 18 solid				6 ... 10 solid and stranded	
Tightening torques	Nm	2.0	1.2		2.0		2.5
Hole pitches	MW	1				1.5	2








1) The UL Approval only applies to bases for cylindrical fuses without signal detectors; approval is pending for bases with signal detectors.

Low-Voltage Fuse Systems


Cylindrical Fuse Systems

Bases for cylindrical fuses

Selection and ordering data

	I_n	For fuse links Size	MW	Order No.	Weight 1 unit approx.	PS*/P. unit	
	A	mm x mm			kg	Unit(s)	
Draw-out types							
without signal detectors							
	1-pole						
		20	8 x 32	1	3NW7 313	0.056	1
		32	10 x 38	1	3NW7 013	0.056	1
		50	14 x 51	1.5	3NW7 111	0.095	1
		100	22 x 58	2	3NW7 211	0.145	1
	1-pole + N						
		20	8 x 32	1	3NW7 353	0.069	1
		32	10 x 38	1	3NW7 053	0.069	1
		50	14 x 51	3	3NW7 151	0.215	1
		100	22 x 58	4	3NW7 251	0.330	1
	2-pole						
		20	8 x 32	2	3NW7 323	0.118	1
		32	10 x 38	2	3NW7 023	0.118	1
		50	14 x 51	3	3NW7 121	0.195	1
		100	22 x 58	4	3NW7 221	0.300	1
	3-pole						
		20	8 x 32	3	3NW7 333	0.172	1
		32	10 x 38	3	3NW7 033	0.172	1
		50	14 x 51	4.5	3NW7 131	0.295	1
		100	22 x 58	6	3NW7 231	0.691	1
	3-pole + N						
		20	8 x 32	3	3NW7 363	0.185	1
		32	10 x 38	3	3NW7 063	0.185	1
		50	14 x 51	6	3NW7 161	0.315	1
		100	22 x 58	8	3NW7 261	0.475	1
	with signal detectors						
		1-pole					
			20	8 x 32	1	3NW7 312	0.058
		32	10 x 38	1	3NW7 012	0.080	1
		50	14 x 51	1.5	3NW7 112	0.095	1
		100	22 x 58	2	3NW7 212	0.145	1
1-pole + N							
		20	8 x 32	2	3NW7 352	0.120	1
		32	10 x 38	2	3NW7 052	0.167	1
		50	14 x 51	3	3NW7 152	0.215	1
		100	22 x 58	4	3NW7 252	0.330	1
	2-pole						
		20	8 x 32	2	3NW7 322	0.112	1
		32	10 x 38	2	3NW7 022	0.162	1
		50	14 x 51	3	3NW7 122	0.195	1
		100	22 x 58	4	3NW7 222	0.300	1
	3-pole						
		20	8 x 32	3	3NW7 332	0.167	1
		32	10 x 38	3	3NW7 032	0.243	1
		50	14 x 51	4.5	3NW7 132	0.295	1
		100	22 x 58	6	3NW7 232	0.480	1
	3-pole + N						
		20	8 x 32	4	3NW7 362	0.227	1
		32	10 x 38	4	3NW7 062	0.327	1
		50	14 x 51	6	3NW7 162	0.315	1
		100	22 x 58	8	3NW7 262	0.475	1
	Auxiliary switches						
	for indicating disconnection of the fuse link solely for application of Striker fuse links (not currently included in the Siemens product range) for retrofitting with factory-fitted brackets, 0.5 MW. Contact: 250 V AC, 5 A, Minimum contact load: 12 V, 25 mA						
	for fuse bases		14 x 51	0.5	3NW7 901	0.050	1
	for fuse bases		22 x 58		3NW7 902	0.050	1

Selection and ordering data

Size	Length approx. mm	Conductor crosssection mm ²	Load capacity up to A	Version	Order No.	Weight 1 unit approx. kg	PS*/P. unit Unit(s)
Busbars with pins, insulated							
The load capacity values are valid for centered infeed.							
Degree of pollution 2							
Busbars, 1-phase							
	8 x 32 and	220	16	fully insulated	5ST3 700	0.040	1/50
	10 x 38	1000	16		5ST3 701	0.190	1/50
	14 x 51	1000	16		5SH5 324	0.320	1/50
Busbars, 2-phase							
8 x 32 and	220	16	120	fully insulated	5ST3 704	0.060	1/25
10 x 38	1000	16	120		5ST3 705	0.290	1/20
Busbars, 3-phase							
8 x 32 and	220	16	120		5ST3 708	0.100	1/25
10 x 38	1000	16	120		5ST3 710	0.430	1/20
14 x 51	1000	16	120		5SH5 323	0.843	1/20
End caps for busbars							
1-phase					5ST3 748	0.001	1/10
2 and 3-phase					5ST3 750	0.001	1/10

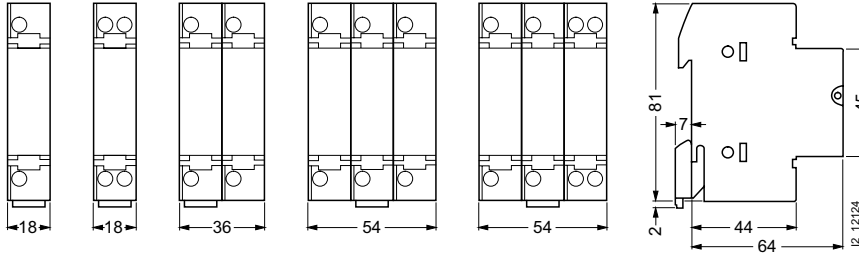
Low-Voltage Fuse Systems

Cylindrical Fuse Systems

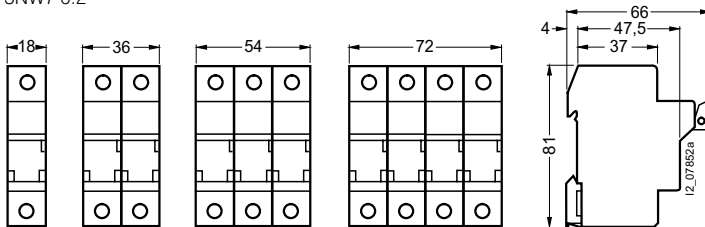
Bases for cylindrical fuses

Dimensional drawings

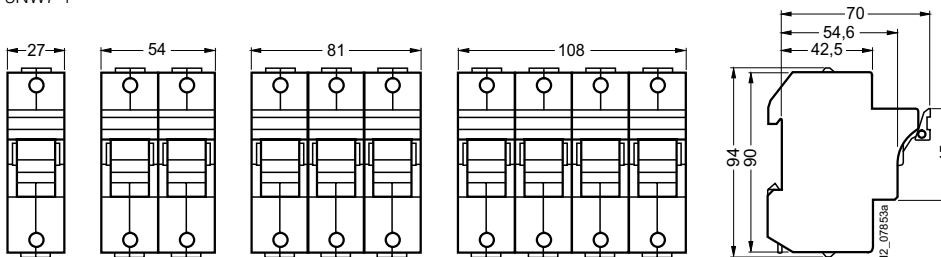
Size 8 mm × 32 mm/without signal detector
3NW7 3.3
Size 10 mm × 38 mm/without signal detector
3NW7 0.3



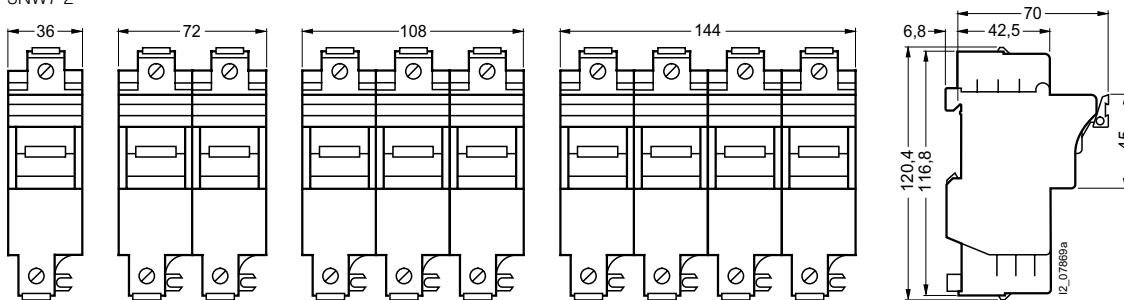
Size 8 mm × 32 mm/with signal detector
3NW7 3.2
Size 10 mm × 38 mm/with signal detector
3NW7 0.2



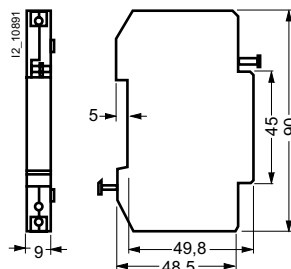
Size 14 mm × 51 mm
3NW7 1



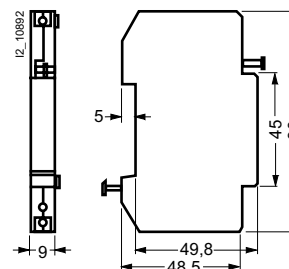
Size 22 mm × 58 mm
3NW7 2



Auxiliary switches
3NW7 901



Auxiliary switches
3NW7 902



Overview

LV HRC fuse links aM



- LV HRC fuse links for switching device protection in motor circuits
- Rated voltage U_n 500 V AC, 690 V
- Rated current I_n 6 ... 630 A
- aM operational class
- Sizes 000, 00, 1, 2, 3
- Non-insulated grip lugs
- Front indicator for fuse failure

Cylindrical fuse links aM



- Rated voltage U_n 400/500 V AC
- Rated current I_n 0.5 ... 100 A
- aM operational class
- Sizes 10 mm x 38 mm, 14 mm x 51 mm and 22 mm x 58 mm

Low-Voltage Fuse Systems






Fuse Links

LV HRC fuse links aM

Technical specifications

Operational class	aM		
Rated voltage U_n			
Sizes 000 and 00	V AC	500	
Sizes 1 and 2	V AC	690	
Size 3	V AC	690	
Rated current I_n	A	6 ... 160, 500, 630	
Rated breaking capacity	kA AC	120	
Contact pins	non-corroding, silver-plated		
Front indicator (without center indicator)	yes		
Non-insulated grip lugs	yes		
Resistance to climate at 95 % relative humidity °C	-20 ... +50		
Standards	DIN VDE 0636-201, DIN VDE 0680-4, IEC 60269-1, -2-1, EN 60269-1, HD 630.2.1 S6		
Dimensions	DIN VDE 0636-201, IEC 60269-2-1		

Selection and ordering data

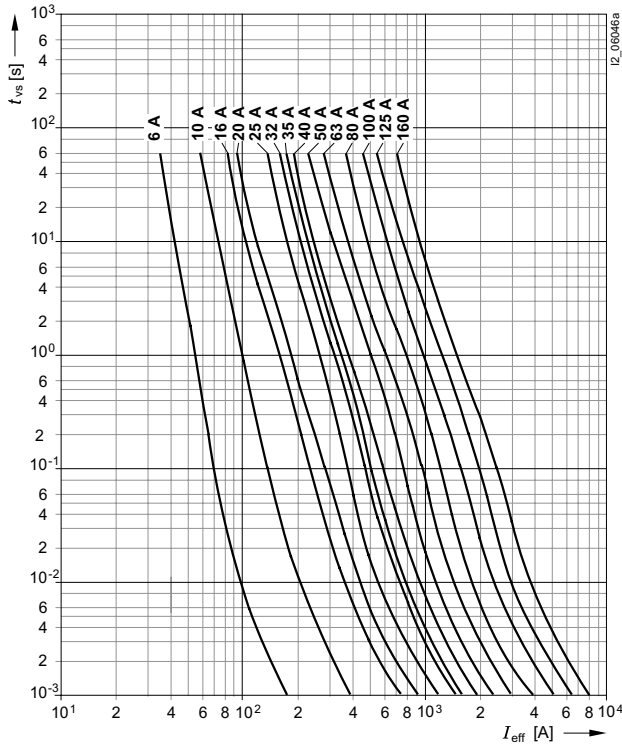
Size	Overall width	I_n	U_n	Non-insulated grip lugs	Weight 1 unit approx.	PS*/ P. unit
	mm	A	V	Order No.	kg	Unit(s)
LV HRC fuse links with front indicator, aM operational class						
	000	21	500 V AC	6	0.130	3
				10		
				16		
				20		
				25		
				32		
				35		
				40		
				50		
				63		
80						
	00	30	500 V AC	100	0.192	3
				125		
				160		
				160		
	1	30	690 V AC	63	0.290	3
				80		
				100		
				100		
	47.2	690 V AC	125	0.440	3	
			160			
			200			
			250			
	2	47.2	690 V AC	125	0.440	3
				160		
				200		
				250		
	57.8	690 V AC	315	0.650	3	
			355			
			400			
			400			
	3	57.8	690 V AC	315	0.650	3
				355		
				400		
	71.2	690 V AC	500	1.030	3	
			630			
			630			

Characteristic curves

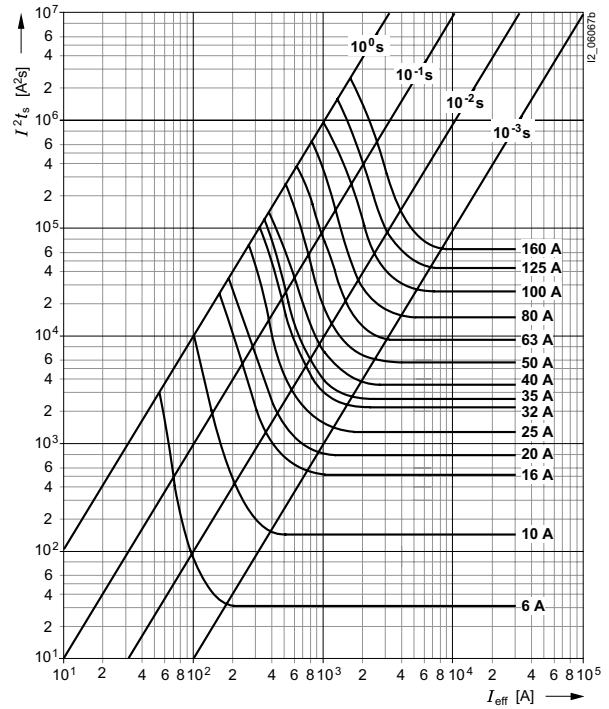
Series 3ND1 8

Size: 000, 00
 Operational class: aM
 Rated voltage: 500 V AC
 Rated current: 6 ... 160 A

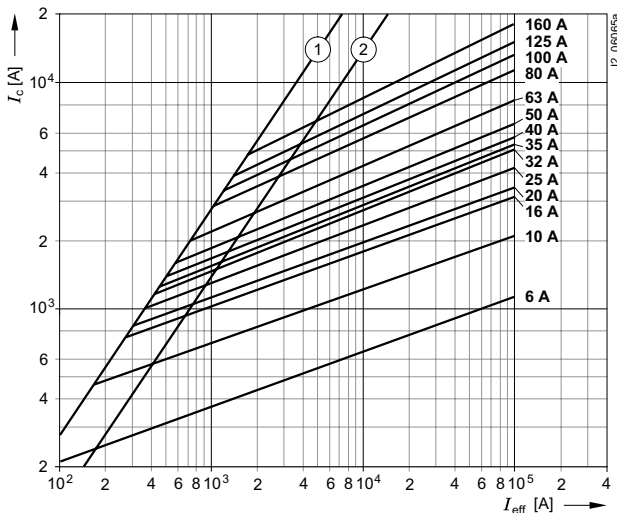
Time/current characteristics diagram



Melting I^2t_s values diagram



Current limitation diagram



- ① Peak short-circuit current with largest DC component
- ② Peak short-circuit current without DC component

Type	I_n	P_v	$\Delta\vartheta$	I^2t_s	
	A	W	K	1 ms A ² s	4 ms A ² s
3ND1 801	6	0.8	7	32	55
3ND1 803	10	0.5	5	150	260
3ND1 805	16	0.8	7	570	800
3ND1 807	20	1	8	830	1200
3ND1 810	25	1.2	9	1400	2000
3ND1 812	32	1.5	10	2300	3300
3ND1 814	35	1.8	11	2600	3800
3ND1 817	40	2	12	3700	5500
3ND1 820	50	2.4	14	5800	8400
3ND1 822	63	3.3	17	9300	13000
3ND1 824	80	4.5	20	15000	21000
3ND1 830	100	4.9	18	26000	37000
3ND1 832	125	6.3	22	41000	60000
3ND1 836	160	9.3	31	64000	92000

Type	I^2t_a	I^2t_a	I^2t_a
	230 V AC A ² s	400 V AC A ² s	500 V AC A ² s
3ND1 801	60	75	110
3ND1 803	280	320	430
3ND1 805	1000	1300	1600
3ND1 807	1300	1600	2200
3ND1 810	2200	2800	3300
3ND1 812	3800	4500	5400
3ND1 814	4200	5100	6300
3ND1 817	5700	7200	9300
3ND1 820	5200	10500	12500
3ND1 822	15000	16500	21000
3ND1 824	21500	27000	34000
3ND1 830	44000	56000	76000
3ND1 832	76000	98000	135000
3ND1 836	105000	130000	170000

Low-Voltage Fuse Systems

Fuse Links

LV HRC fuse links aM

Characteristic curves

Series 3ND1 3..., 3ND2

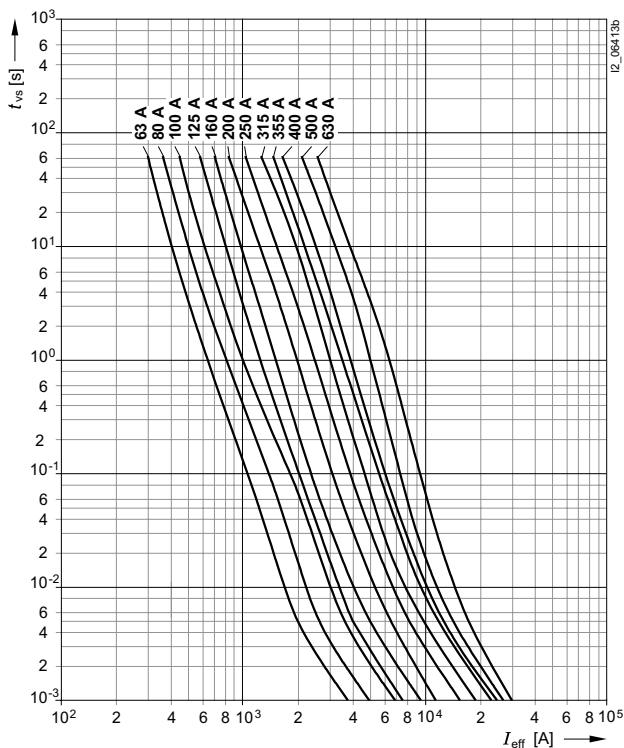
Size: 1, 2, 3

Operational class: aM

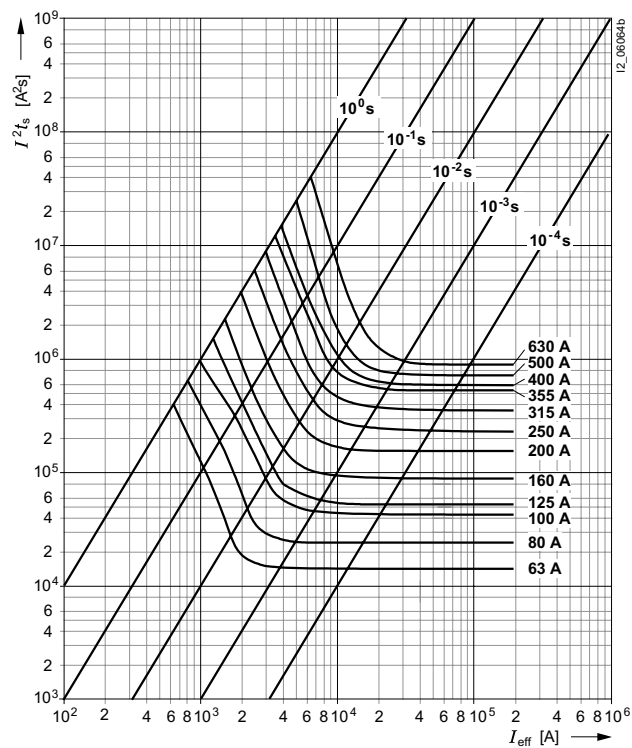
Rated voltage: 690 V AC

Rated current: 63 ... 630 A

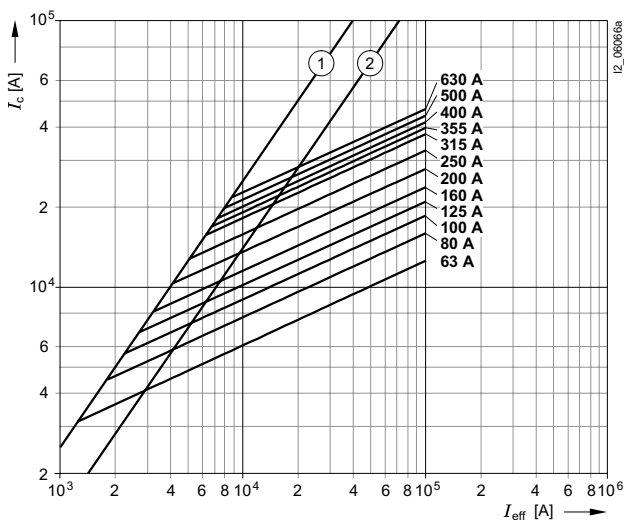
Time/current characteristics diagram



Melting I^2t_s values diagram



Current limitation diagram



- ① Peak short-circuit current with largest DC component
- ② Peak short-circuit current without DC component

Characteristic curves

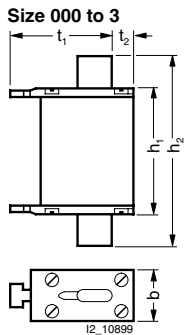
Series 3ND1 3.., 3ND2

Size: 1, 2, 3
 Operational class: aM
 Rated voltage: 690 V AC
 Rated current: 63 ... 630 A

Type	I_n	P_V	$\Delta\vartheta$	I^2t_s		I^2t_a		
	A	W	K	1 ms A ² s	4 ms A ² s	230 V AC A ² s	400 V AC A ² s	690 V AC A ² s
3ND2 122	63	4	12.2	14000	17700	19300	25600	42000
3ND2 124	80	4.9	13	24200	30800	36500	48000	80000
3ND2 130	100	5.8	15	45600	59000	65000	85000	140000
3ND2 132	125	8.1	16.5	57000	74300	73000	97000	160000
3ND2 136	160	11.4	18	90000	114000	107000	142000	235000
3ND2 140	200	14.1	19.5	150000	198000	172000	228000	375000
3ND2 144	250	18	22	250000	313000	260000	340000	565000
3ND2 232	125	8.1	16.5	57000	74300	73000	97000	160000
3ND2 236	160	11.4	18	90000	114000	107000	142000	235000
3ND2 240	200	14.1	19.5	150000	198000	172000	228000	375000
3ND2 244	250	18	22	250000	313000	260000	340000	565000
3ND2 252	315	22.6	30	370000	450000	460000	610000	1000000
3ND2 254	355	24.7	29	540000	643000	645000	855000	1400000
3ND2 260	400	30.8	35	615000	750000	688000	910000	1500000
3ND2 352	315	22.6	30	370000	450000	460000	610000	1000000
3ND2 354	355	24.7	29	540000	643000	645000	855000	1400000
3ND2 360	400	30.8	26	615000	750000	688000	910000	1500000
3ND1 365	500	47	40	730000	933000	876000	1095000	1825000
3ND1 372	630	50	43	920000	1375000	1300000	1800000	2600000

Dimensional drawings

LV HRC fuse links



Size	I_n	U_n	Type	Dimensions				
	A	V		b	h ₁	h ₂	t ₁	t ₂
000	6 ... 80	500 AC	3ND1 8..	21	54	80	45	8
00	100 ... 160			30	54	80	45	14
1	63 ... 100	690 AC	3ND2 1..	30	75	137	50	15
	125 ... 250			47	75	137	51	9
2	125 ... 250	690 AC	3ND2 2..	47	75	151	58	10
	315 ... 400			58	74	151	59	13
3	315 ... 400	690 AC	3ND2 3..	58	74	151	71	13
	500, 630		3ND1 3..	71	74	151	70	13

Low-Voltage Fuse Systems





Fuse Links

Cylindrical fuse links aM

Technical specifications

Cylindrical fuse links				
Type		3NW8 0..	3NW8 1..	3NW8 2..
Size	mm × mm	10 × 38	14 × 51	22 × 58
Standards		IEC 60269-1, -2, -2-1 NF C 60-200, 63-210, 63-211 NBN C 63269-2 and -2-1 CEI 32-4, -12		
Operational class		aM		
Rated voltages U_n	V AC	400 or 500 (see selection table)		
Rated current I_n	A	0.5 ... 100		
Rated breaking capacity	kA AC	100, but 400 V versions: 20		
Mounting position		any, but preferably vertical		

Selection and ordering data

Size	I_n	U_n	aM operational class	Weight 1 unit approx.	PS*/ P. unit	
mm × mm	A	V AC	Order No.	kg	Unit(s)	
Cylindrical fuse links						
	10 × 38	0.5	500	3NW8 000-1	0.003	10
				3NW8 011-1	0.008	10
				3NW8 002-1	0.008	10
				3NW8 004-1	0.008	10
				3NW8 001-1	0.008	10
				3NW8 008-1	0.003	10
				3NW8 003-1	0.008	10
				3NW8 006-1	0.008	10
				3NW8 005-1	0.008	10
				3NW8 007-1	0.008	10
	14 × 51	2	500	3NW8 102-1	0.019	10
				3NW8 104-1	0.019	10
				3NW8 101-1	0.019	10
				3NW8 108-1	0.019	10
				3NW8 103-1	0.019	10
				3NW8 106-1	0.019	10
				3NW8 105-1	0.019	10
				3NW8 107-1	0.019	10
				3NW8 110-1	0.019	10
				3NW8 112-1	0.019	10
	22 × 58	10	500	3NW8 203-1	0.051	10
				3NW8 206-1	0.051	10
				3NW8 205-1	0.051	10
				3NW8 207-1	0.051	10
				3NW8 210-1	0.051	10
				3NW8 212-1	0.051	10
				3NW8 217-1	0.051	10
				3NW8 220-1	0.051	10
				3NW8 222-1	0.051	10
				3NW8 224-1	0.051	10
	22 × 58	400	400	3NW8 117-1	0.019	10
				3NW8 120-1	0.019	10
				3NW8 221-1	0.051	10
				3NW8 230-1	0.051	10

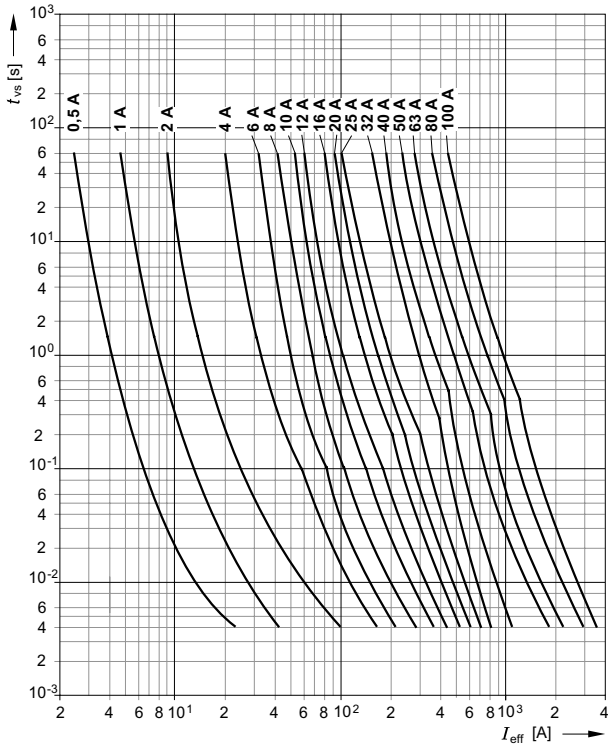
Characteristic curves

Series 3NW8

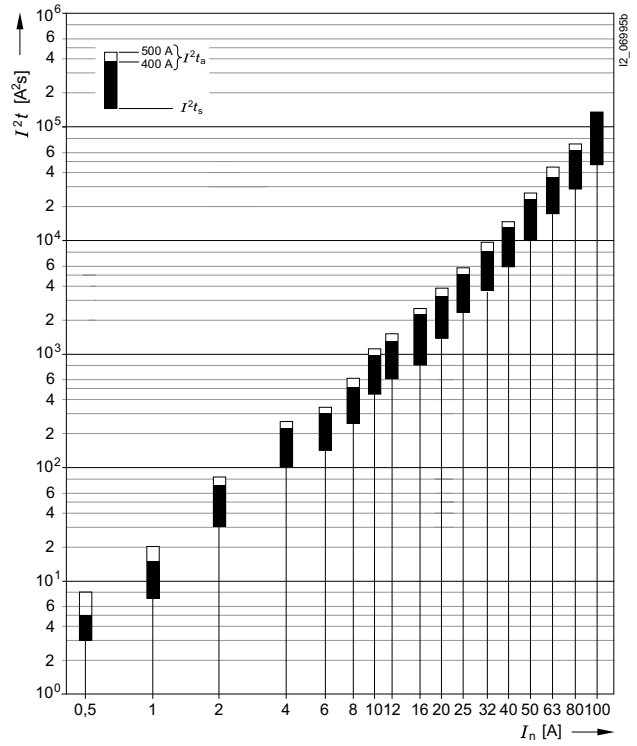
Size: 10 mm × 38 mm
 14 mm × 51 mm
 22 mm × 58 mm

Operational class: aM
 Rated voltage: 500 V AC
 400 V AC (3NW8 120-1, 3NW8 230-1)
 Rated current: 0.5 ... 100 A

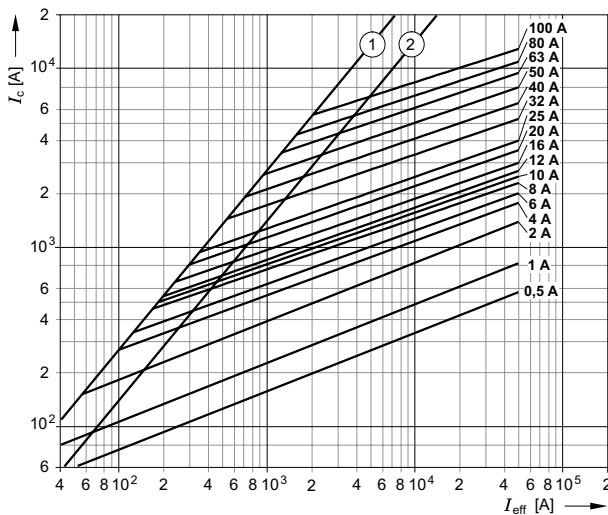
Time/current characteristics diagram



Melting I²t_s values diagram



Current limitation diagram



- ① Peak short-circuit current with largest DC component
- ② Peak short-circuit current without DC component

Low-Voltage Fuse Systems

Fuse Links

Cylindrical fuse links aM

Characteristic curves

Series 3NW8

Size: 10 mm × 38 mm
 14 mm × 51 mm
 22 mm × 58 mm

Operational class: aM

Rated voltage: 500 V AC
 400 V AC (3NW8 120-1, 3NW8 230-1)

Rated current: 0.5 ... 100 A

Type	Size mm	I_n A	P_v W	$\Delta\vartheta$ K	I^2t_s	I^2t_a	I^2t_a	
					1 ms A ² s	400 V AC A ² s	500 V AC A ² s	
3NW8 000-1	10 × 38	0.5	0.5	2.2	3	5	8	
3NW8 011-1		1	0.08	1.5	7	15	20	
3NW8 002-1		2	0.15	2.3	30	70	82	
3NW8 004-1		4	0.25	4.5	100	220	250	
3NW8 001-1		6	0.4	7	140	300	340	
3NW8 008-1		8	0.5	8	240	510	610	
3NW8 003-1		10	0.56	10	440	960	1100	
3NW8 006-1		12	0.66	12.5	600	1300	1500	
3NW8 005-1		16	0.8	15	800	2200	2500	
3NW8 007-1		20	1	20	1350	3200	3200	
3NW8 010-1	25	1.25	23	2300	5000	--		
3NW8 102-1	14 × 51	2	0.2	2.5	30	70	82	
3NW8 104-1		4	0.35	4	100	220	250	
3NW8 101-1		6	0.5	6	140	300	340	
3NW8 108-1		8	0.6	7.5	240	510	610	
3NW8 103-1		10	0.65	8	440	960	1100	
3NW8 106-1		12	0.75	10	600	1300	1500	
3NW8 105-1		16	1.08	14	800	2200	2500	
3NW8 107-1		20	1.3	18.5	1350	3200	3800	
3NW8 110-1		25	1.7	20	2300	5000	5700	
3NW8 112-1		32	1.9	23	3600	8000	9500	
3NW8 117-1		40	2.25	24	5800	13000	14500	
3NW8 120-1		50	2.8	34	10000	23000	--	
3NW8 203-1		22 × 58	10	0.75	7.5	440	960	1100
3NW8 206-1			12	0.8	8.5	600	1300	1500
3NW8 205-1	16		1.2	13	800	2200	2500	
3NW8 207-1	20		1.46	16.6	1350	3200	3800	
3NW8 210-1	25		1.7	17.8	2300	5000	5700	
3NW8 212-1	32		2.5	27	3600	8000	9500	
3NW8 217-1	40		3	23	5800	13000	14500	
3NW8 220-1	50		3.4	29	10000	23000	26000	
3NW8 222-1	63		4.1	32.6	17000	36000	44000	
3NW8 224-1	80		5	38	28000	62000	70000	
3NW8 230-1	100		6.1	43	46000	118000	--	

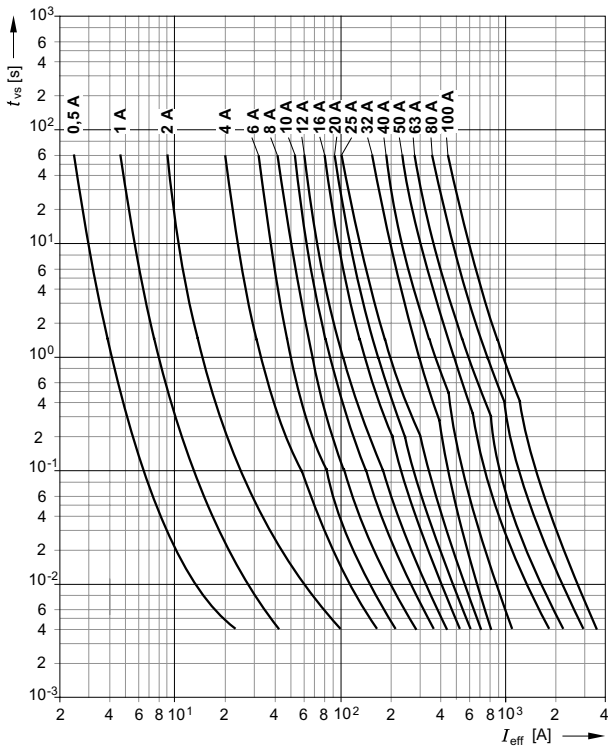
Characteristic curves

Series 3NW8

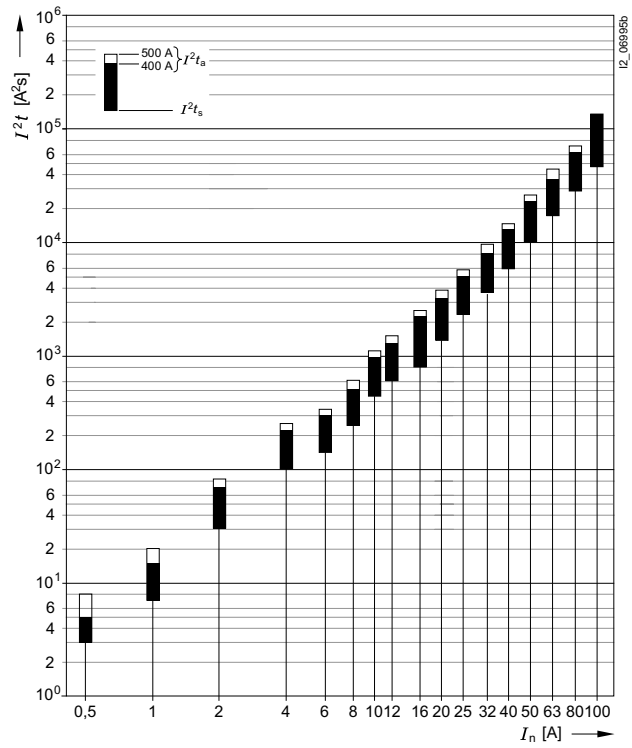
Size: 10 mm × 38 mm
 14 mm × 51 mm
 22 mm × 58 mm

Operational class: aM
 Rated voltage: 500 V AC
 400 V AC (3NW8 120-1, 3NW8 230-1)
 Rated current: 0.5 ... 100 A

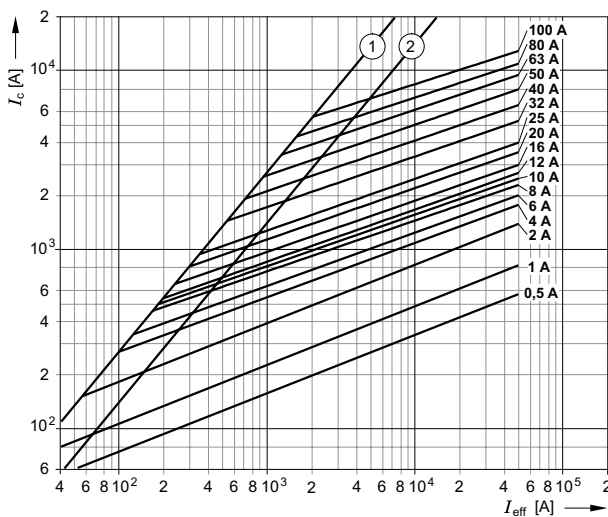
Time/current characteristics diagram



Melting I^2t_s values diagram



Current limitation diagram



- ① Peak short-circuit current with largest DC component
- ② Peak short-circuit current without DC component

Low-Voltage Fuse Systems

Fuse Links

Cylindrical fuse links aM

Characteristic curves

Series 3NW8

Size: 10 mm × 38 mm
 14 mm × 51 mm
 22 mm × 58 mm

Operational class: aM

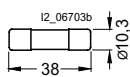
Rated voltage: 500 V AC
 400 V AC (3NW8 120-1, 3NW8 230-1)

Rated current: 0.5 ... 100 A

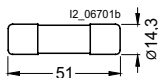
Type	Size mm	I_n A	P_v W	$\Delta\vartheta$ K	$I^2 t_s$	$I^2 t_a$	$I^2 t_a$
					1 ms A ² s	400 V AC A ² s	500 V AC A ² s
3NW8 000-1	10 × 38	0.5	0.5	2.2	3	5	8
3NW8 011-1		1	0.08	1.5	7	15	20
3NW8 002-1		2	0.15	2.3	30	70	82
3NW8 004-1	10 × 38	4	0.25	4.5	100	220	250
3NW8 001-1		6	0.4	7	140	300	340
3NW8 008-1		8	0.5	8	240	510	610
3NW8 003-1	10 × 38	10	0.56	10	440	960	1100
3NW8 006-1		12	0.66	12.5	600	1300	1500
3NW8 005-1		16	0.8	15	800	2200	2500
3NW8 007-1	10 × 38	20	1	20	1350	3200	3200
3NW8 010-1		25	1.25	23	2300	5000	--
3NW8 102-1		14 × 51	2	0.2	2.5	30	70
3NW8 104-1	4		0.35	4	100	220	250
3NW8 101-1	6		0.5	6	140	300	340
3NW8 108-1	14 × 51	8	0.6	7.5	240	510	610
3NW8 103-1		10	0.65	8	440	960	1100
3NW8 106-1		12	0.75	10	600	1300	1500
3NW8 105-1	14 × 51	16	1.08	14	800	2200	2500
3NW8 107-1		20	1.3	18.5	1350	3200	3800
3NW8 110-1		25	1.7	20	2300	5000	5700
3NW8 112-1	14 × 51	32	1.9	23	3600	8000	9500
3NW8 117-1		40	2.25	24	5800	13000	14500
3NW8 120-1		50	2.8	34	10000	23000	--
3NW8 203-1	22 × 58	10	0.75	7.5	440	960	1100
3NW8 206-1		12	0.8	8.5	600	1300	1500
3NW8 205-1		16	1.2	13	800	2200	2500
3NW8 207-1	22 × 58	20	1.46	16.6	1350	3200	3800
3NW8 210-1		25	1.7	17.8	2300	5000	5700
3NW8 212-1		32	2.5	27	3600	8000	9500
3NW8 217-1	22 × 58	40	3	23	5800	13000	14500
3NW8 220-1		50	3.4	29	10000	23000	26000
3NW8 222-1		63	4.1	32.6	17000	36000	44000
3NW8 224-1	22 × 58	80	5	38	28000	62000	70000
3NW8 230-1		100	6.1	43	46000	118000	--

Dimensional drawings

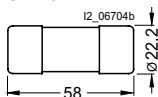
3NW8 0



3NW8 1



3NW8 2



Overview

LV HRC SITOR fuse links



- Rated voltage U_n to 2500 V AC, 700 V DC
- Rated current I_n 16 ... 1000 A
- Operational class gR, aR, gR, gS
- Sizes 000 to 3
- Range of connection types

SITOR cylindrical fuse links



- Rated voltage U_n 600/690 V AC, 400/700 V AC
- Rated current I_n 1 ... 100 A
- aR operational class
- Sizes 10 mm x 38 mm, 14 mm x 51 mm and 22 mm x 58 mm

Accessories



- Fuse switch disconnectors/fuse disconnectors for cylindrical fuse links 10 x 38, 14 x 51, 22 x 58
- Fuse switch disconnectors/fuse disconnectors for cylindrical fuse links 10 x 38, 14 x 51, 22 x 58

Low-Voltage Fuse Systems

SITOR Semiconductor Fuses

Product overview

Application

Properties

SITOR fuse links protect converter equipment against short-circuits.

The power semiconductor used in these devices (diodes, thyristors, GTOs and others) require high-speed elements for protection due to their low thermal capacity. SITOR fuse links (high-speed fuse links for semiconductor protection) are ideal for these types of application.

The following types of short-circuit faults can occur:

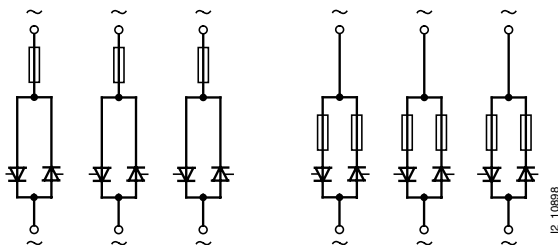
- Internal short circuit:
A faulty semiconductor device causes a short circuit within the power converter.
- External short circuit:
A fault in the load causes a short circuit on the output side of the power converter.
- Shoot-throughs:
In the event of a failure of the power converter control system during inverter operation (commutation failure), the converter connection forms a short-circuit type connection between the DC and AC power supply system.

Fuse links can be arranged in a number of ways within the converter connection. A distinction is made between phase fuses in three-phase current incoming feeders and, if applicable, DC fuses and arm fuses in the arms of the converter connections (see adjacent graphs). In the case of center tap connections, fuse links can only be arranged as phase fuses in three-phase current incoming feeders.

When using SITOR fuse links of aR operational class, the overload protection of converter equipment, up to approx. 3.5 times the rated current of the fuse link, is taken from conventional protective devices (for example, thermal-delayed overload relays) or, in the case of controlled power converters, from the current limiter (exception: full range fuses).

As semiconductor protection, SITOR fuse links of the series 3NE1 ...-0 with gS operational class are also suitable for the overload and short-circuit protection of cables, lines and power rails. All other dual-function fuses of the SITOR series have a gR characteristic. Overload protection is ensured as long as the rated current of the SITOR fuse links of the series 3NE1 ...-0 is selected as $I_n \leq I_z$ (DIN VDE 0100 Part 430).

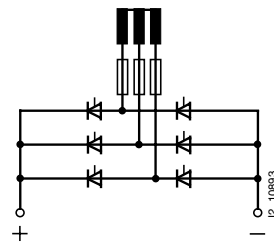
The rules of DIN VDE 0100 Part 430 must be applied when rating short-circuit protection for cables, lines and power rails.



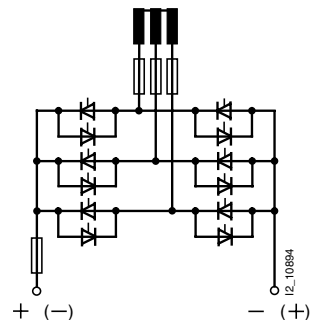
Three-phase bidirectional connection W3 with phase fuses

with arm fuses

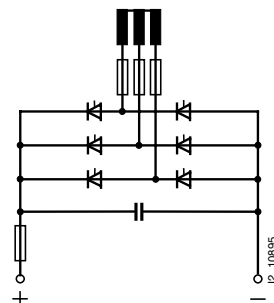
Arrangement options



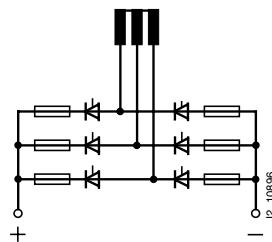
Six-pulse bridge converter B6 with phase fuses



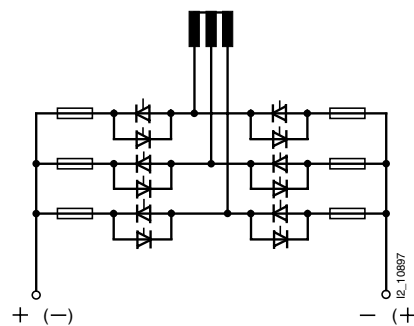
Six-pulse bridge converter B6 with phase fuses and DC fuses (reversible connection)



Six-pulse bridge converter B6 with phase fuses and DC fuses (switching for converter)



Six-pulse bridge converter B6 with arm fuses



Six-pulse bridge converter B6 with arm fuses (reversible connection)

Benefits

The 3KL switch disconnectors with fuses, together with the new 3NE1 ...-2 fuse range, have been awarded UL approval.

Application

When using SITOR semiconductor fuses in 3KL and 3KM switch disconnectors with fuses and 3NP fuse switch disconnectors, the rated current of the fuse must sometimes be reduced due to the higher power dissipation compared to LV HRC fuses for line protection. Sometimes when using SITOR semiconductor fuses in switch disconnectors, the currents designated can be higher than the rated currents of the switches. These higher currents only apply when using SITOR switch disconnectors with semiconductor fuses and cannot be used when using switch disconnectors with standard LV HRC fuses. You will find further details in the following selection table.

When using SITOR semiconductor fuses of the series 3NC24, 3NC84, 3NE33 and 3NE43, the standard switching capacity of the fuse must not be used, as the blades of these fuses (in contrast to LV HRC fuses) are slit. Occasional switching of currents up to the rated current of the fuses is permissible.

Due to the mechanical strain on the comparatively long fuse blade, SITOR semiconductor fuses of the series 3NE41 may only be occasionally switched, and only without load. If only switching without load is permissible, this must be clearly stated on the switch itself.

Using SITOR semiconductor fuses > 63 A for overload protection is not permitted – even if gR fuses are used (exception: 3NE1).

The operating voltage is limited by the rated voltage of the switch disconnector or the fuse. If switching without load, the limit value is the rated insulation voltage of the switch disconnector.

The 3NE1 "double protection fuses" can be used as full range fuses (gR/gS) for semiconductor and line protection.

Due to the dimensions of the SITOR semiconductor fuses, only the fuses shown in the following selection and ordering data can be used with 3KL and 3KM switch disconnectors with fuses and 3NP fuse switch disconnectors.

Low-Voltage Fuse Systems

SITOR Semiconductor Fuses

LV HRC SITOR fuse links

Application

for switch disconnectors			SITOR semiconductor fuses					Order No.
Type	Type	Permissible load current of the SITOR semiconductor safety fuses in switch disconnectors ¹⁾	Required Cu conductor cross-section	Size	Operational class	Rated current	Rated voltage	
		A	mm ²			A	V	
For 3NP fuse switch disconnectors								
3NP35, 3NP50	3NP40 1, 3NP40 7	16	1.5	000	gR/gS	16	690	3NE1 813-0
		20	2.5		gR/gS	20		3NE1 814-0
		25	4		gR/gS	25		3NE1 815-0
		35	6		gR/gS	35		3NE1 803-0
3NP50	3NP40 7	40	10	000	gR/gS	40	690	3NE1 802-0
		50	10		gR/gS	50		3NE1 817-0
		63	16		gR/gS	63		3NE1 818-0
		80	25		gR/gS	80		3NE1 820-0
		80	25	00	gR	80		3NE1 020-2
3NP50	3NP40 7	100	35		gR/gS	100	690	3NE1 021-0
		100/98 ²⁾	35		gR	100		3NE1 021-2
		125	50	00	gR/gS	125		3NE1 022-0
3NP52	3NP42	125/120 ²⁾	50	00	gR	125	690	3NE1 022-2
		160	70	1	gR/gS	160		3NE1 224-0
		160	70		gR	160		3NE1 224-2
		200	95		gR/gS	200		3NE1 225-0
3NP52	3NP42	200/190 ²⁾	95	1	gR	200	690	3NE1 225-2
		250	120		gR/gS	250		3NE1 227-0
		250/235 ²⁾	120		gR	250		3NE1 227-2
		315	2 × 70	1	gR/gS	315		3NE1 230-0
3NP53	3NP43	315	2 × 70		gR	315	690	3NE1 230-2
		350	2 × 95	2	gR/gS	350		3NE1 331-0
3NP53	3NP43	350	2 × 95		gR	350	690	3NE1 331-2
		400	2 × 95		gR/gS	400		3NE1 332-0
		450	2 × 120	2	gR/gS	450		3NE1 333-0
3NP54	3NP44	450/425 ²⁾	2 × 120		gR	450	690	3NE1 333-2
		500	2 × 120		gR/gS	500		3NE1 334-0
		500/465 ²⁾	2 × 120		gR	500		3NE1 334-2
		560	2 × 150	3	gR/gS	560		3NE1 435-0
3NP54	3NP44	560/540 ²⁾	2 × 150		gR	560	690	3NE1 435-2
		630/620 ²⁾	2 × 185	3	gR/gS	630		3NE1 436-0
		625/600 ²⁾	2 × 185		gR	630		3NE1 436-2
3NP54	3NP44	710/690 ²⁾	2 × (40 × 5)	3	gR/gS	710	690	3NE1 437-0
		690/670 ²⁾			gR	710		3NE1 437-1
		710/685 ²⁾			gR	710		3NE1 437-2
3NP54	3NP44	800/750 ²⁾	2 × (50 × 5)	3	gR/gS	800	690	3NE1 438-0
		750/710 ²⁾			gR	690		3NE1 438-1
3NP54		770		3	gR	800	690	3NE1 438-2
		655	2 × (40 × 5)		gR	670		3NE1 447-2
		820	2 × (40 × 8)		gR	850		3NE1 448-2

1) In the case of cyclic loads, the currents may have to be reduced again (precise values on request).

2) The value applies to the 3NP4 fuse switch disconnectors.

Application

for switch disconnectors			SITOR semiconductor fuses					Order No.
Type	Type	Permissible load current of the SITOR semiconductor safety fuses in switch disconnectors ¹⁾	Required Cu conductor cross-section mm ²	Size	Operational class	Rated current A	Rated voltage V	
For switch disconnectors with 3KL5, 3KL6 and 3KM5 fuses								
3KL50 30	3KM50 30	16	1.5	000	gR/gS	16	690	3NE1 813-0 3NE1 814-0 3NE1 815-0 3NE1 803-0
		20	2.5					
		25	4					
		35	6					
		40	10	000	gR/gS	40	690	3NE1 802-0 3NE1 817-0 3NE1 818-0
		50	10					
		63	16					
3KL52 30	3KM52 30	80	25	000		80	690	3NE1 820-0
3KL52 30	3KM52 30	80	25	00	gR gR/gS gR	80	690	3NE1 020-2 3NE1 021-0 3NE1 021-2
		100	35					
		100	35					
3KL52	3KM52	125	50	00	gR/gS gR	125	690	3NE1 022-0 3NE1 022-2
		125	50					
3KL55	3KM55	160	70	1	gR/gS gR	160	690	3NE1 224-0 3NE1 224-2
		160	70					
		200	95	1	gR/gS gR	200	690	3NE1 225-0 3NE1 225-2
		200	95					
250	120	1	gR/gS gR	250	690	3NE1 227-0 3NE1 227-2		
245	120							
3KL57	3KM57	315 280	2 × 70	1	gR/gS gR	315 315	690	3NE1 230-0 3NE1 230-2
3KL61, 3KL57	3KM57	350/330 ²⁾	2 × 95	2	gR/gS gR gR/gS	350	690	3NE1 331-0 3NE1 331-2 3NE1 332-0
		350/300 ²⁾						
		400/375						
3KL61	3KM57	450/400 ²⁾	2 × 120	2	gR/gS gR gR/gS gR	450	690	3NE1 333-0 3NE1 333-2 3NE1 334-0 3NE1 334-2
		450/325 ²⁾						
		500/400 ²⁾						
		500/350 ²⁾						
3KL61, 3KL62	--	560	2 × 150	3	gR/gS gR	560	690	3NE1 435-0 3NE1 435-2
		560						
3KL61, 3KL62	--	630	2 × 185	3	gR/gS gR	630	690	3NE1 436-0 3NE1 436-2
		615/630 ³⁾						
		630/710 ³⁾						
3KL61, 3KL62	--	630/710 ³⁾	2 × (40 × 5)	3	gR/gS gR gR	710	690	3NE1 437-0 3NE1 437-1 3NE1 437-2
		630/710 ³⁾						
		630/700 ³⁾						
3KL61, 3KL62	--	630/800 ³⁾	2 × (50 × 5)	3	gR/gS gR gR	800	690	3NE1 438-0 3NE1 438-1 3NE1 438-2
		630/800 ³⁾						
		630/760 ³⁾						
		630/760 ³⁾						
3KL61, 3KL62	--	630/670 ³⁾	2 × (40 × 5)	3	gR	670	690	3NE1 447-2 3NE1 448-2
		630/790 ³⁾						

- 1) In the case of cyclic loads, the currents may have to be reduced again (precise values on request).
- 2) The value applies to 3KL5, 3KM5 switch disconnectors with fuses.
- 3) The value applies to 3KL62 switch disconnectors with fuses, the rating plate contains standard values according to IEC 60947-3, EN 60947-3.

Low-Voltage Fuse Systems

SITOR Semiconductor Fuses

LV HRC SITOR fuse links

Application

for switch disconnectors		SITOR semiconductor fuses					Order No.					
Type	Permissible load current of the SITOR semiconductor safety fuses in switch disconnectors ¹⁾	Required Cu conductor cross-section	Size	Operational class	Rated current	Rated voltage						
A	mm ²	A	V									
For 3NP fuse switch disconnectors												
3NP40 7, 3NP50	25	4	00	gR	25	690	3NE8 015-1 3NE8 003-1 3NE8 017-1 3NE8 018-1					
	33	6			35							
	45	10			50							
	54	16			63							
	68	25			80							
	89	35	00	aR	100	690	3NE8 020-1 3NE8 021-1 3NE8 022-1 3NE8 024-1					
	106	50			125							
	130	70			160							
	3NP42, 3NP52	32			6			0	gR	32	1000 ²⁾	3NE4 101 3NE4 102 3NE4 117 3NE4 118
		38/40 ³⁾			10					40		
45/50 ³⁾		10	50									
59/63 ³⁾		16	63									
76/80 ³⁾		25	80									
	90/95 ³⁾	35	0	aR	100	1000 ²⁾	3NE4 120 3NE4 121 3NE4 122 3NE4 124					
	115/20 ³⁾	50			125							
	144/50 ³⁾	70			160							
	3NP43, 3NP53	100			35			1	aR	100	1000 ²⁾	3NE3 221 3NE3 222 3NE3 224 3NE3 225 3NE3 227
		120			50					125		
150		70	160									
190		95	200									
230		120	250									
3NP43 7, 3NP53	270/285 ⁴⁾	185	1	aR	315	1000 ²⁾	3NE3 230-0B 3NE3 231 3NE3 232-0B 3NE3 233					
	290/310 ⁴⁾	240			350							
	310/330 ⁴⁾	240			400							
	330/360 ⁴⁾	2 × 150			450							
3NP44 7, 3NP54	345/360 ⁵⁾	240	2	aR	400	1000 ²⁾	3NE3 332-0B 3NE3 333 3NE3 334-0B 3NE3 335					
	385/400 ⁵⁾	2 × 150			450							
	430/450 ⁵⁾	2 × 150			500							
	490/510 ⁵⁾	2 × 185			560							
	560/580 ⁵⁾	2 × 185			630							
	590/630 ⁵⁾	2 × 200	2	aR	710	1000 ²⁾	3NE3 336 3NE3 337-8 3NE3 338-8 3NE3 340-8					
	605/630 ⁵⁾	2 × 200			800							
	630/630 ⁵⁾	2 × (50 × 5)			900							
	3NP44 7, 3NP53, 3NP54	205/210 ⁴⁾ /220 ⁵⁾			120			2	aR	250	800 ²⁾	3NE4 327-0B 3NE4 330-0B 3NE4 333-0B
		260/270 ⁴⁾ /285 ⁵⁾			240					315		
375/400 ⁴⁾ /420 ⁵⁾		2 × (30 × 5)	450									
3NP44 7, 3NP54		410/450 ⁵⁾	2 × (30 × 5)	2	aR	500	800 ²⁾			3NE4 334-0B 3NE4 337		
	540/600 ⁵⁾	2 × (40 × 5)	710									
3NP44 7, 3NP54	140/145 ⁵⁾	70	3	gR	150	500	3NC2 423-3 3NC2 425-3 3NC2 427-3					
	175/180 ⁵⁾	95			200							
	220/225 ⁵⁾	120			250							
		250/255 ⁵⁾	185	3	gR	300	500	3NC2 428-3 3NC2 431-3 3NC2 432-3				
		320/330 ⁵⁾	240			350						
		370/400 ⁵⁾	240			400						
		120/135 ⁵⁾	70			3			gR	150	660	3NC8 423-3 3NC8 425-3 3NC8 427-3 3NC8 431-3 3NC8 434-3
	160/180 ⁵⁾	95	200									
	200/225 ⁵⁾	120	250									
	270/300 ⁵⁾	240	350									
385/425 ⁵⁾	2 × 150	500										
3NP54	800	3 × (60 × 6)	3	aR	1000	600	3NC8 444-3					

- 1) In the case of cyclic loads, the currents may have to be reduced again (precise values on request).
- 2) When maintaining overvoltage category 2 (instead of 3) and pollution degree 2 (instead of 3) to EN 60947-1, the rated insulation voltage of the 3NP fuse switch disconnector is also $U_i = 1000$ V.
- 3) The value applies to 3NP52 switch disconnectors with fuses.
- 4) The value applies to 3NP53 switch disconnectors with fuses.
- 5) The value applies to 3NP54 switch disconnectors with fuses.

Application

for switch disconnectors		SITOR semiconductor fuses						Order No.
Type	Permissible load current of the SITOR semiconductor safety fuses in switch disconnectors ¹⁾	Required Cu conductor cross-section	Size	Operational class	Rated current	Rated voltage		
A	mm ²	A	V					
For switch disconnectors with 3KL5, 3KL6 and 3KM5 fuses								
3KL50, 3KL52	3KM50, 3KM52	25 33/35 ²⁾ 45/50 ²⁾ 54/60 ²⁾	4 6 10 16	00	gR	25 35 50 63	690	3NE8 015-1 3NE8 003-1 3NE8 017-1 3NE8 018-1
3KL52	3KM52	68 89 106 130	25 35 50 70		aR	80 100 125 160	690	3NE8 020-1 3NE8 021-1 3NE8 022-1 3NE8 024-1
3KL55	3KM55	32 40 50 63	6 10 10 16	0	gR	32 40 50 63	1000	3NE4 101 3NE4 102 3NE4 117 3NE4 118
		80 95 120 150	25 35 50 70		aR	80 100 125 160	1000	3NE4 120 3NE4 121 3NE4 122 3NE4 124
3KL55, 3KL57	3KM55, 3KM57	90/95 ²⁾ 110/115 ²⁾ 140/150 ²⁾ 175/180 ²⁾ 210/220 ²⁾	35 50 70 95 120	1	aR	100 125 160 200 250	1000	3NE3 221 3NE3 222 3NE3 224 3NE3 225 3NE3 227
3KL57	3KM57	240 265 290 320	185 240 240 2 × 150		aR	315 350 400 450	1000	3NE3 230-0B 3NE3 231 3NE3 232-0B 3NE3 233
3KL61, 3KL62	3KM57	340/360 ³⁾ /290 ²⁾ 380/400 ³⁾ /320 ²⁾ 440/470 ³⁾ /360 ²⁾ 500/530 ³⁾ /400 ²⁾	240 2 × 150 2 × 150 2 × 185	2	aR	400 450 500 560	1000	3NE3 332-0B 3NE3 333 3NE3 334-0B 3NE3 335
		540/580 ³⁾ /400 ²⁾ 600/640 ³⁾ /400 ²⁾ 630/720 ³⁾ /400 ²⁾ 630/800 ³⁾ /400 ²⁾	2 × 185 2 × 200 2 × 200 2 × (50 × 5)		aR	630 710 800 900	1000 900 800 690	3NE3 336 3NE3 337-8 3NE3 338-8 3NE3 340-8
3KL61, 3KL62	3KM57	200/210 ³⁾ /175 ²⁾ 260/275 ³⁾ /230 ²⁾ 370/390 ³⁾ /340 ²⁾	120 240 240 or 40 × 8		aR	250 315 450	800	3NE4 327-0B 3NE4 330-0B 3NE4 333-0B
		425/450 ³⁾ /380 ²⁾ 600/630 ³⁾ /400 ²⁾	2 × (30 × 5) 2 × (40 × 5)			500 710	800 800	3NE4 334-0B 3NE4 337
3KL61, 3KL62		145/150 ³⁾ 180/190 ³⁾ 225/240 ³⁾	70 95 120	3	gR	150 200 250	500	3NC2 423-3 3NC2 425-3 3NC2 427-3
		255/270 ³⁾ 330/345 ³⁾ 400	185 240 240		gR	300 350 400	500	3NC2 428-3 3NC2 431-3 3NC2 432-3
		135/140 ³⁾ 180/190 ³⁾ 225/240 ³⁾	70 95 120		gR	150 200 250	660	3NC8 423-3 3NC8 425-3 3NC8 427-3
		300/315 ³⁾ 425/450 ³⁾	240 2 × 150			350 500		3NC8 431-3 3NC8 434-3
3KL61, 3KL62		630/800 ³⁾	2 × (60 × 6)		aR	1000	600	3NC8 444-3

- 1) In the case of cyclic loads, the currents may have to be reduced again (precise values on request).
- 2) The value applies to 3KM switch disconnectors with fuses.
- 3) The value applies to 3KL62 switch disconnectors with fuses, the rating plate contains standard values according to IEC 60947-3.

Low-Voltage Fuse Systems

SITOR Semiconductor Fuses

LV HRC SITOR fuse links

Technical specifications

Type		3NC2 423 3NC2 423-3	3NC2 425 3NC2 425-3	3NC2 427 3NC2 427-3	3NC2 428 3NC2 428-3	3NC2 431 3NC2 431-3	3NC2 432 3NC2 432-3	
Operational class (IEC 60269)		gR						aR
Rated voltage U_n	V AC	500						
Rated current I_n	A	150 ¹⁾	200 ¹⁾	250 ¹⁾	300 ¹⁾	350 ¹⁾	400 ¹⁾	
Melting I^2t value I^2t_s ($t_{vs} = 1$ ms)	A ² s	7000	13600	21000	28000	53000	83000	
Breaking I^2t value I^2t_A at U_n	A ² s	33000	64000	99000	132000	249000	390000	
Temperature rise at I_n (body center)	K	26	25	30	40	35	30	
Power dissipation at I_n	W	35	40	50	65	60	50	
Varying load factor WL		0.85						
Weight approx.	kg	0.95						
Accessories								
Fuse base, 1-pole		3NH3 430						
Fuse puller		3NX1 011						
Fuse switch disconnectors		3NP54						
Switch disconnector with fuses		3KL61 30-1.B0						

Type		3NE8 714-1	3NE8 715-1	3NE8 701-1	3NE8 702-1	3NE8 717-1	3NE8 718-1	
Operational class (IEC 60269)		gR						aR
Rated voltage U_n	V	690 AC/700 DC						
Rated current I_n	A	20	25	32	40	50	63	
Melting I^2t value I^2t_s ($t_{vs} = 1$ ms)	A ² s	12	19	40	69	115	215	
Breaking I^2t value I^2t_A at U_n	A ² s	83	140	285	490	815	1550	
Temperature rise at I_n (body center)	K	40		45	55	60	70	
Power dissipation at I_n	W	7	9	10	12	15	16	
Varying load factor WL		0.9						
Certification		acc. to UL 248-13						
Weight approx.	kg	0.13						

Type		3NE8 720-1	3NE8 721-1	3NE8 722-1	3NE8 724-1	3NE8 725-1	3NE8 727-1	3NE8 731-1	
Operational class (IEC 60269)		aR							
Rated voltage U_n	V	690 AC/700 DC							
Rated current I_n	A	80	100	125	160	200	250	315	
Melting I^2t value I^2t_s ($t_{vs} = 1$ ms)	A ² s	380	695	1250	2350	4200	7750	12000	
Breaking I^2t value I^2t_A at U_n	A ² s	2700	4950	9100	17000	30000	55000	85500	
Temperature rise at I_n (body center)	K	80	75	80	100	120	125	150	
Power dissipation at I_n	W	18	19	23	31	36	42	54	
Varying load factor WL		0.9	0.95		0.9			0.85	
Certification		acc. to UL 248-13							
Weight approx.	kg	0.13							

Type		3NC8 423 3NC8 423-3	3NC8 425 3NC8 425-3	3NC8 427 3NC8 427-3	3NC8 431 3NC8 431-3	3NC8 434 3NC8 434-3	3NC8 444-3	
Operational class (IEC 60269)		gR						aR
Rated voltage U_n	V AC	660						600
Rated current I_n	A	150 ¹⁾	200 ¹⁾	250	350 ¹⁾	500 ¹⁾	1000 ¹⁾	
Melting I^2t value I^2t_s ($t_{vs} = 1$ ms)	A ² s	1100	2400	4400	11000	28000	400000	
Breaking I^2t value I^2t_A at U_n	A ² s	17600	38400	70400	176000	448000	2480000	
Temperature rise at I_n (body center)	K	33	46	95	65	75	110	
Power dissipation at I_n	W	40	55	72	95	130	140	
Varying load factor WL		0.85						
Weight approx.	kg	0.95						
Accessories								
Fuse base, 1-pole		3NH3 430						--
Fuse puller		3NX1 011						
Fuse switch disconnectors		3NP54						--
Switch disconnector with fuses		3KL61 30-1AB0						--

1) Cooling air speed 1 m/s. In the case of natural air cooling, reduction of 5 %.

Technical specifications

Type		3NE1 813-0	3NE1 814-0	3NE1 815-0	3NE1 803-0	3NE1 802-0	3NE1 817-0	3NE1 818-0	3NE1 820-0	
Operational class (IEC 60269)		gR/gS								
Rated voltage U_n	V AC	690								
Rated current I_n	A	16	20	25	35	40	50	63	80	
Melting I^2t value I^2t_g ($t_{vs} = 1$ ms)	A ² s	18	41	74	166	295	461	903	1843	
Breaking I^2t value I^2t_A at U_n	A ² s	200	430	780	1700	3000	4400	9000	18000	
Temperature rise at I_n (body center) ¹⁾	K	25		30	35	30	35	40		
Power dissipation at I_n ¹⁾	W	3.0	3.5	4.0	5.0		6.0	7.0	8.0	
Varying load factor WL		1.0								
Certification		acc. to UL 248-13								
Weight approx.	kg	0.13								
Accessories										
Fuse base, 1-pole		3NH3 030								
3-pole		3NH4 030								
Fuse puller		3NX1 011								
Fuse switch disconnectors		3NP40/3NP50								
Switch disconnector with fuses		3KL50 30-1.B00							3KL52 30-1.B00	
		3KM50 30-1.B00							3KM52 30-1.B00	

Type		3NE1 021-0	3NE1 022-0	3NE1 224-0	3NE1 225-0	3NE1 227-0	3NE1 230-0	
Operational class (IEC 60269)		gR/gS						
Rated voltage U_n	V AC	690						
Rated current I_n	A	100	125	160	200	250	315	
Melting I^2t value I^2t_g ($t_{vs} = 1$ ms)	A ² s	3100	6000	7400	14500	29500	46100	
Breaking I^2t value I^2t_A at U_n	A ² s	33000	63000	60000	100000	200000	310000	
Temperature rise at I_n (body center) ¹⁾	K	36	40	60	65	75	80	
Power dissipation at I_n ¹⁾	W	10	11	24	27	30	38	
Varying load factor WL		1.0						
Certification		acc. to UL 248-13						
Weight approx.	kg	0.20		0.55				
Accessories								
Fuse base, 1-pole		3NH3 030		3NH3 230		3NH3 330		
3-pole		3NH4 030		3NH4 230		3NH4 330		
Fuse puller		3NX1 011						
Fuse switch disconnectors		3NP40		3NP42		3NP53		
		3NP50		3NP52				
Switch disconnector with fuses		3KL52 30-1.B00		3KL55 30-1.B00		3KL57 30-1.B00		
		3KM52 30-1.B00		3KM55 30-1.B00		3KM57 30-1.B00		

Type		3NE1 331-0	3NE1 332-0	3NE1 333-0	3NE1 334-0	3NE1 435-0	3NE1 436-0	3NE1 437-0	3NE1 438-0	
Operational class (IEC 60269)		gR/gS								
Rated voltage U_n	V AC	690								
Rated current I_n	A	350	400	450	500	560	630	710	800	
Melting I^2t value I^2t_g ($t_{vs} = 1$ ms)	A ² s	58000	84000	104000	149000	215000	293000	437000	723000	
Breaking I^2t value I^2t_A at U_n	A ² s	430000	590000	750000	950000	1700000	2350000	3400000	5000000	
Temperature rise at I_n (body center) ¹⁾	K	75	85		90	65	70	68	70	
Power dissipation at I_n ¹⁾	W	42	45	53	56	50	55	60	59	
Varying load factor WL		1.0								
Certification		acc. to UL 248-13								
Weight approx.	kg	0.7					0.95			
Accessories										
Fuse base, 1-pole		3NH3 330			3NH3 430					
Fuse puller		3NX1 011								
Fuse switch disconnectors		3NP53			3NP54					
Switch disconnector with fuses		3KL57 30-1.B00			3KL61 30-1AB0					
		3KM57 30-1.B00								
					3KL62					

1) Temperature rise and power dissipation for operation in LV HRC fuse base.

Low-Voltage Fuse Systems

SITOR Semiconductor Fuses

LV HRC SITOR fuse links

Technical specifications

Type	3NE1 437-1		3NE1 438-1	
Operational class (IEC 60269)	gR			
Rated voltage U_n	V AC	600		
Rated current I_n	A	710	800	
Melting I^2t value I^2t_s ($t_{vs} = 1$ ms)	A^2s	321000	437000	
Breaking I^2t value I^2t_A at U_n	A^2s	2460000	3350000	
Temperature rise at I_n (body center) ¹⁾	K	85	95	
Power dissipation at I_n ¹⁾	W	65	72	
Varying load factor WL	1.0			
Certification	acc. to UL 248-13			
Weight approx.	kg	0.95		
Accessories				
Fuse base, 1-pole	3NH3 430			
Fuse puller	3NX1 011			
Fuse switch disconnectors	3NP54			
Switch disconnector with fuses	3KL62 30			

Type	3NE1 020-2	3NE1 021-2	3NE1 022-2	3NE1 224-2	3NE1 225-2	3NE1 227-2	3NE1 230-2	3NE1 331-2	3NE1 332-2		
Operational class (IEC 60269)	gR										
Rated voltage U_n	V AC	690									
Rated current I_n	A	80	100	125	160	200	250	315	350	400	
Melting I^2t value I^2t_s ($t_{vs} = 1$ ms)	A^2s	780	1490	3115	2650	5645	11520	22580	29500	37300	
Breaking I^2t value I^2t_A at U_n	A^2s	5800	11000	23000	18600	51800	80900	168000	177000	224000	
Temperature rise at I_n (body center) ¹⁾	K	45	49	55	70	62	70	75	82	99	
Power dissipation at I_n ¹⁾	W	10.5	11.5	13.5	30	28	35	42	44	54	
Varying load factor WL	1.0										
Certification	acc. to UL 248-13										
Weight approx.	kg	0.2			0.55				0.7		
Accessories											
Fuse base, 1-pole	3NH3 030			3NH3 230							
Fuse puller	3NX1 011										
Fuse switch disconnectors	3NP50				3NP52			3NP53			
Switch disconnector with fuses	3KL52				3KL55			3KL57			

Type	3NE1 333-2	3NE1 334-2	3NE1 435-2	3NE1 436-2	3NE1 447-2	3NE1 437-2	3NE1 438-2	3NE1 448-2	
Operational class (IEC 60269)	gR								
Rated voltage U_n	V AC	690							
Rated current I_n	A	450	500	560	630	670	710	800	850
Melting I^2t value I^2t_s ($t_{vs} = 1$ ms)	A^2s	46100	66400	130000	203000	240000	265000	361000	520000
Breaking I^2t value I^2t_A at U_n	A^2s	276500	398000	890000	1390000	1640000	1818000	2475000	3640000
Temperature rise at I_n (body center) ¹⁾	K	100		80	82	90		95	
Power dissipation at I_n ¹⁾	W	62	65	60	62	65	72	82	76
Varying load factor WL	1.0								
Certification	acc. to UL 248-13								
Weight approx.	kg	0.7		1.0					
Accessories									
Fuse base, 1-pole	3NH3 340								
Fuse puller	3NX1 011								
Fuse switch disconnectors	3NP54				3NP54				
Switch disconnector with fuses	3KL61								

1) Temperature rise and power dissipation for operation in LV HRC fuse base.

Technical specifications

Type	3NE8 015-1	3NE8 003-1	3NE8 017-1	3NE8 018-1	3NE8 020-1	3NE8 021-1	3NE8 022-1	3NE8 024-1	
Operational class (IEC 60269)	gR				aR				
Rated voltage U_n	V AC 690								
Rated current I_n	A	25	35	50	63	80	100	125	160
Melting I^2t value I^2t_g ($t_{vs} = 1$ ms)	A^2s	30	70	120	260	450	850	1400	2800
Breaking I^2t value I^2t_A at U_n	A^2s	180	400	700	1400	2400	4200	6500	1300
Temperature rise at I_n (body center)	K	35	45	65	70	80	90	110	130
Power dissipation at I_n	W	7	9	14	16	19	22	28	38
Varying load factor WL	0.95								
Certification	acc. to UL 248-13								
Weight approx.	kg	0.20							
Accessories									
Fuse base, 1-pole 3-pole	3NH3 030 3NH4 030								
Fuse puller	3NX1 011								
Fuse switch disconnectors	3NP40 3NP50								
Switch disconnector with fuses	3KL50 30-1.B00 3KM50 30-1.B00					3KL52 30-1.B00 3KM52 30-1.B00			

Type	3NE4 327-0B	3NE4 330-0B	3NE4 333-0B	3NE4 334-0B	3NE4 337	
Operational class (IEC 60269)	aR					
Rated voltage U_n	V AC 800					
Rated current I_n	A	250	315	450	500	710
Melting I^2t value I^2t_g ($t_{vs} = 1$ ms)	A^2s	3600	7400	29400	42500	142000
Breaking I^2t value I^2t_A at U_n	A^2s	29700	60700	191000	276000	923000
Temperature rise at I_n (body center)	K	175	170	190	195	170
Power dissipation at I_n	W	105	120	140	155	
Varying load factor WL	0.85				0.95	
Weight approx.	kg	0.7				
Accessories						
Fuse base, 1-pole	3NH3 330			3NH3 430		
Fuse puller	3NX1 011					
Fuse switch disconnectors	3NP53			3NP54		
Switch disconnector with fuses	3KL57 30-1.B00 3KM57 30-1.B00			3KL61		3KL62

Type	3NE4 101	3NE4 102	3NE4 117	3NE4 118	3NE4 120	3NE4 121	3NE4 122	3NE4 124	
Operational class (IEC 60269)	gR			aR					
Rated voltage U_n	V AC 1000								
Rated current I_n	A	32	40	50	63	80	100	125	160
Melting I^2t value I^2t_g ($t_{vs} = 1$ ms)	A^2s	40	75	120	230	450	900	1800	3600
Breaking I^2t value I^2t_A at U_n	A^2s	280	500	800	1500	3000	6000	14000	29000
Temperature rise at I_n (body center)	K	45	50	65	78	82	85	100	120
Power dissipation at I_n	W	12	13	16	20	22	24	30	35
Varying load factor WL	0.9								
Certification	acc. to UL 248-13								
Weight approx.	kg	0.27							
Accessories									
Fuse base, 1-pole 3-pole	3NH3 120 3NH4 230								
Fuse puller	3NX1 011								
Fuse switch disconnectors	3NP42, 3NP52								
Switch disconnector with fuses	3KL55 30-1.B00 3KM55 30-1.B00								

Low-Voltage Fuse Systems

SITOR Semiconductor Fuses

LV HRC SITOR fuse links

Technical specifications

Type		3NE3 221	3NE3 222	3NE3 224	3NE3 225	3NE3 227
Operational class (IEC 60269)		aR				
Rated voltage U_n	V AC	1000				
Rated current I_n	A	100	125	160	200	250
Melting I^2t value I^2t_s ($t_{vs} = 1$ ms)	A ² s	665	1040	1850	4150	6650
Breaking I^2t value I^2t_A at U_n	A ² s	4800	7200	13000	30000	48000
Temperature rise at I_n (body center)	K	65	70	90	80	90
Power dissipation at I_n	W	28	36	42		50
Varying load factor WL		0.95		1.0		
Certification		acc. to UL 248-13				
Weight approx.	kg	0.55				
Accessories						
Fuse base, 1-pole		3NH3 230				
Fuse base, 3-pole		3NH4 230				
Fuse puller		3NX1 011				
Fuse switch disconnectors		3NP42, 3NP52				
Switch disconnector with fuses		3KL55 30-1.B00 3KM55 30-1.B00				

Type		3NE3 230-0B	3NE3 231	3NE3 232-0B	3NE3 233	
Operational class (IEC 60269)		aR				
Rated voltage U_n	V AC	1000				
Rated current I_n	A	315	350	400	450	
Melting I^2t value I^2t_s ($t_{vs} = 1$ ms)	A ² s	13400	16600	22600	29500	
Breaking I^2t value I^2t_A at U_n	A ² s	80000	100000	135000	175000	
Temperature rise at I_n (body center)	K	100	120	140	130	
Power dissipation at I_n	W	65	75	85	95	
Varying load factor WL		0.95	0.9			
Certification		acc. to UL 248-13				
Weight approx.	kg	0.55				
Accessories						
Fuse base, 1-pole		3NH3 330				
Fuse puller		3NX1 011				
Fuse switch disconnectors		3NP53				
Switch disconnector with fuses		3KL57 30-1.B00 3KM57 30-1.B00				

Type		3NE3 332-0B	3NE3 333	3NE3 334-0B	3NE3 335	3NE3 336	3NE3 337-8	3NE3 338-8	3NE3 340-8
Operational class (IEC 60269)		aR							
Rated voltage U_n	V AC	1000					900	800	690
Rated current I_n	A	400	450	500	560	630	710	800	900
Melting I^2t value I^2t_s ($t_{vs} = 1$ ms)	A ² s	22600	29500	46100	66400	104000	149000	184000	223000
Breaking I^2t value I^2t_A at U_n	A ² s	135000	175000	260000	360000	600000	800000	850000	1300000
Temperature rise at I_n (body center)	K	120	125	115	120	110	125	140	160
Power dissipation at I_n	W	85	90		95	100	105	130	165
Varying load factor WL		1.0						0.95	
Certification		acc. to UL 248-13							
Weight approx.	kg	0.7							
Accessories									
Fuse base, 1-pole		3NH3 430							
Fuse puller		3NX1 011							
Fuse switch disconnectors		3NP54							
Switch disconnector with fuses		3KL61 30-1AB0					3KL62		

Technical specifications

Type		3NE3 421	3NE3 626	3NE3 430	3NE3 432	3NE3 635 3NE3 635-6	3NE3 434	3NE3 636	3NE3 637 3NE3 637-1 ¹⁾
Operational class (IEC 60269)		aR							
Rated voltage U_n	V AC	1000							
Rated current I_n	A	100	224	315	400	450	500	630	710
Melting I^2t value I^2t_s ($t_{vs} = 1$ ms)	A ² s	1800	7200	29000	48500	65000	116000	170000	260000
Breaking I^2t value I^2t_A at U_n	A ² s	13500	54000	218000	364000	488000	870000	1280000	1950000
Temperature rise at I_n (body center)	K	45	140	120	130	150	120	136	170
Power dissipation at I_n	W	25	85	80	110		95	132	145
Varying load factor WL		1.0							
Weight approx.	kg	1.15							

Type		3NE5 424	3NE5 426	3NE5 430	3NE5 431	3NE5 433 3NE5 433-1
Operational class (IEC 60269)		aR				
Rated voltage U_n	V AC	1500				
Rated current I_n	A	160	224	315	350	450
Melting I^2t value I^2t_s ($t_{vs} = 1$ ms)	A ² s	7200	18400	41500	57000	116000
Breaking I^2t value I^2t_A at U_n	A ² s	54000	138000	311000	428000	870000
Temperature rise at I_n (body center)	K	75	100	125	150	150
Power dissipation at I_n	W	56	80	115	135	145
Varying load factor WL		1.0				0.95
Weight approx.	kg	1.95				

Type		3NE5 627	3NE5 633	3NE5 643
Operational class (IEC 60269)		aR		
Rated voltage U_n	V AC	1500		
Rated current I_n	A	250	450	600
Melting I^2t value I^2t_s ($t_{vs} = 1$ ms)	A ² s	11200	78500	260000
Breaking I^2t value I^2t_A at U_n	A ² s	84000	590000	1950000
Temperature rise at I_n (body center)	K	170		160
Power dissipation at I_n	W	130	160	145
Varying load factor WL		1.0		
Weight approx.	kg	1.6		

Type		3NE7 425	3NE7 427	3NE7 431	3NE7 432	3NE7 633 3NE7 633-1 ²⁾	3NE7 648-1 ²⁾	3NE7 636 3NE7 636-1 ²⁾	3NE7 637-1 ²⁾
Operational class (IEC 60269)		aR							
Rated voltage U_n	V AC	2000							
Rated current I_n	A	200	250	350	400	450	525	630	710
Melting I^2t value I^2t_s ($t_{vs} = 1$ ms)	A ² s	18400	29000	74000	116000	128000	149000	260000	415000
Breaking I^2t value I^2t_A at U_n	A ² s	138000	218000	555000	870000	960000	1120000	1950000	3110000
Temperature rise at I_n (body center)	K	85	110	105	130	165	210	200	230
Power dissipation at I_n	W	75	110	120	150	160	210	220	275
Varying load factor WL		1.0							
Weight approx.	kg	1.95							

Type		3NE9 632-1	3NE9 634-1	3NE9 636-1A
Operational class (IEC 60269)		aR		
Rated voltage U_n	V AC	2500		
Rated current I_n	A	400	500	630
Melting I^2t value I^2t_s ($t_{vs} = 1$ ms)	A ² s	81000	170000	385000
Breaking I^2t value I^2t_A at U_n	A ² s	620000	1270000	2800000
Temperature rise at I_n (body center)	K	160	180	198
Power dissipation at I_n	W	205	235	275
Varying load factor WL		1.0		
Weight approx.	kg	2.5		

1) Gauge 140 mm, M12 screw connection.




2) M12 screw connection.

Low-Voltage Fuse Systems

SITOR Semiconductor Fuses







LV HRC SITOR fuse links

Selection and ordering data

Size	I_n	Operational class	Order No.	Weight 1 unit approx.	PS*/P. unit	
	A			kg	Unit(s)	
 <p>Rated voltage 500 V AC with bolt-on links Mounting dimensions: 110 mm</p> <p>3¹⁾</p> <p>Special design with 2 oblong slots</p> <p>3</p>	150	gR	3NC2 423-3	1.063	3	
	200	gR	3NC2 425-3	1.057	3	
	250	gR	3NC2 427-3	1.066	3	
	300	gR	3NC2 428-3	1.078	3	
	350	aR	3NC2 431-3	1.056	3	
	400	aR	3NC2 432-3	1.062	3	
	150	gR	3NC2 423	1.055	3	
	200	gR	3NC2 425	1.070	3	
	250	gR	3NC2 427	1.056	3	
	300	gR	3NC2 428	1.056	3	
	350	aR	3NC2 431	1.061	3	
	400	aR	3NC2 432	1.056	1/3	
	 <p>Rated voltage 690 V AC/700 V DC with bolt-on links Mounting dimensions: 80 mm</p> <p>000</p>	20	gR	3NE8 714-1	0.130	10
		25	gR	3NE8 715-1	0.130	10
		32	gR	3NE8 701-1	0.131	10
40		gR	3NE8 702-1	0.131	10	
50		gR	3NE8 717-1	0.132	10	
63		aR	3NE8 718-1	0.132	10	
80		aR	3NE8 720-1	0.131	10	
100		aR	3NE8 721-1	0.130	10	
125		aR	3NE8 722-1	0.131	10	
160		aR	3NE8 724-1	0.132	10	
200		aR	3NE8 725-1	0.130	10	
250		aR	3NE8 727-1	0.133	10	
315		aR	3NE8 731-1	0.134	10	
 <p>Rated voltage 660 V AC with bolt-on links Mounting dimensions: 110 mm</p> <p>3¹⁾</p> <p>Special design with 2 oblong slots</p> <p>3</p>	150	gR	3NC8 423-3	1.062	3	
	200	gR	3NC8 425-3	1.063	3	
	250	gR	3NC8 427-3	1.069	3	
	350	gR	3NC8 431-3	1.072	3	
	500	gR	3NC8 434-3	1.069	3	
	1000	aR	3NC8 444-3	1.085	3	
	150	gR	3NC8 423	1.044	3	
	200	gR	3NC8 425	1.060	3	
	250	gR	3NC8 427	1.074	3	
	350	gR	3NC8 431	1.065	3	
	500	gR	3NC8 434	1.095	3	

1) Cladding dimensions and grip lugs according to IEC 60269-2-1; but blade slotted according to IEC 60269-4-1.

Selection and ordering data







Size	I_n	Operational class	Order No.	Weight 1 unit approx.	PS*/P. unit																		
	A			kg	Unit(s)																		
Rated voltage 690 V AC																							
for mounting in LV HRC fuse bases																							
	000 16 20 25 35 40 50 63 80	gR/gS gR/gS gR/gS gR/gS gR/gS gR/gS gR/gS gR/gS	3NE1 813-0 3NE1 814-0 3NE1 815-0 3NE1 803-0 3NE1 802-0 3NE1 817-0 3NE1 818-0 3NE1 820-0	0.127 0.128 0.127 0.128 0.127 0.128 0.128 0.129	3 3 3 3 3 3 3 3																		
							00 100 125	gR/gS gR/gS	3NE1 021-0 3NE1 022-0	0.202 0.202	3 3												
													1 160 200 250 315	gR/gS gR/gS gR/gS gR/gS	3NE1 224-0 3NE1 225-0 3NE1 227-0 3NE1 230-0	0.580 0.582 0.580 0.581	3 3 3 3						
							2 350 400 450 500	gR/gS gR/gS gR/gS gR/gS	3NE1 331-0 3NE1 332-0 3NE1 333-0 3NE1 334-0	0.766 0.743 0.760 0.766	3 3 3 3												
																			3 560 630 710 800	gR/gS gR/gS gR/gS gR/gS	3NE1 435-0 3NE1 436-0 3NE1 437-0 3NE1 438-0	1.111 1.114 1.117 1.124	3 3 3 3
												for mounting in LV HRC fuse bases											
							3 710 800	gR gR	3NE1 437-1 3NE1 438-1	1.120 1.113	3 3												

Low-Voltage Fuse Systems

SITOR Semiconductor Fuses






LV HRC SITOR fuse links

Selection and ordering data

Size	I_n A	Operational class	Order No.	Weight 1 unit approx. kg	PS*/ P. unit Unit(s)
Rated voltage 690 V AC					
for mounting in LV HRC fuse bases					
	80	gR	3NE1 020-2	0.203	1
	100	gR	3NE1 021-2	0.203	1
	125	gR	3NE1 022-2	0.203	3
	160	gR	3NE1 224-2	0.613	3
	200	gR	3NE1 225-2	0.612	3
	250	gR	3NE1 227-2	0.626	3
	315	gR	3NE1 230-2	0.615	3
	350	gR	3NE1 331-2	0.754	3
	450	gR	3NE1 333-2	0.768	3
	500	gR	3NE1 334-2	0.768	3
	560	gR	3NE1 435-2	1.149	3
	630	gR	3NE1 436-2	1.179	3
	670	gR	3NE1 447-2	1.170	3
	710	gR	3NE1 437-2	1.153	3
	800	gR	3NE1 438-2	1.184	3
	850	gR	3NE1 448-2	1.207	3
	25	gR	3NE8 015-1	0.205	3
	35	gR	3NE8 003-1	0.204	3
	50	gR	3NE8 017-1	0.203	3
	63	gR	3NE8 018-1	0.205	3
	80	aR	3NE8 020-1	0.203	3
	100	aR	3NE8 021-1	0.205	3
	125	aR	3NE8 022-1	0.213	3
	160	aR	3NE8 024-1	0.207	3
	Rated voltage 800 V AC				
with bolt-on links					
Mounting dimensions: 110 mm					
	250	aR	3NE4 327-0B	0.753	3
	315	aR	3NE4 330-0B	0.760	3
	450	aR	3NE4 333-0B	0.760	3
	500	aR	3NE4 334-0B	0.754	3
	710	aR	3NE4 337	0.771	3

1) Cladding dimensions and grip lugs according to IEC 60269-2-1; but blade slotted according to IEC 60269-4-1.

Selection and ordering data

Size	I_n A	Operational class	Order No.	Weight 1 unit approx. kg	PS*/ P. unit Unit(s)	
Rated voltage 1000 V AC						
for mounting in LV HRC fuse bases						
	0	32	gR	3NE4 101	0.278	3
		40		3NE4 102	0.277	3
		50		3NE4 117	0.276	3
		63	aR	3NE4 118	0.279	3
		80		3NE4 120	0.276	3
		100		3NE4 121	0.278	3
		125		3NE4 122	0.279	3
		160		3NE4 124	0.279	3
with bolt-on links						
Mounting dimensions: 110 mm						
	1¹⁾	100	aR	3NE3 221	0.580	3
		125		3NE3 222	0.568	3
		160		3NE3 224	0.573	3
		200		3NE3 225	0.570	3
		250		3NE3 227	0.580	3
		315		3NE3 230-0B	0.585	3
		350		3NE3 231	0.590	3
		400		3NE3 232-0B	0.576	3
		450		3NE3 233	0.720	3
		2¹⁾	400	aR	3NE3 332-0B	0.759
450			3NE3 333	0.748	3	
500			3NE3 334-0B	0.753	3	
560			3NE3 335	0.756	3	
630			3NE3 336	0.760	3	
	710 ²⁾		3NE3 337-8	0.762	3	
	800 ³⁾		3NE3 338-8	0.764	3	
	900 ⁴⁾		3NE3 340-8	0.753	3	
	Mounting dimensions: 130 mm					
		3	100	aR	3NE3 421	1.200
224				3NE3 626	1.300	3
315				3NE3 430	1.241	3
		400		3NE3 432	1.247	3
		450		3NE3 635	1.179	3
		450 ⁵⁾		3NE3 635-6	1.184	3
		500		3NE3 434	1.490	3
		630		3NE3 636	1.213	3
		710		3NE3 637	1.190	3
		Mounting dimensions: 140 mm, M12 screw connection				
3	710	aR	3NE3 637-1	1.246	3	
Rated voltage 1500 V AC						
with bolt-on links						
Mounting dimensions: 210 mm						
	3	160	aR	3NE5 424	1.900	2
		224		3NE5 426	1.968	2
		315		3NE5 430	2.000	2
		350		3NE5 431	1.959	2
		450		3NE5 433	2.100	2
		450 ⁶⁾		3NE5 433-1	1.961	2
Mounting dimensions: 170 mm						
	3	250		3NE5 627	1.562	3
		450		3NE5 633	1.585	3
		600		3NE5 643	1.587	3

1) Cladding dimensions and grip lugs according to IEC 60269-2-1; but blade slotted according to IEC 60269-4-1.

2) Rated voltage 900 V AC.

3) Rated voltage 800 V AC.

4) Rated voltage 690 V AC.

5) Design corresponds to 3NE6 4.. and 3NE9 4..



6) M12 screw connection.

Low-Voltage Fuse Systems

SITOR Semiconductor Fuses

LV HRC SITOR fuse links

Selection and ordering data

Size	I_n A	Operational class	Order No.	Weight 1 unit approx. kg	PS*/ P. unit Unit(s)
 <p>Rated voltage 2000 V AC with bolt-on links Mounting dimensions: 210 mm 3</p>	200	aR	3NE7 425	2.100	2
	250		3NE7 427	1.970	2
	350		3NE7 431	1.980	2
	400		3NE7 432	1.973	2
	450		3NE7 633	1.968	2
	450 ¹⁾		3NE7 633-1	1.983	2
	525 ¹⁾		3NE7 648-1	1.975	2
	630		3NE7 636	1.997	2
	630 ¹⁾		3NE7 636-1	2.024	2
	710 ¹⁾		3NE7 637-1	1.997	2
 <p>Rated voltage 2500 V AC with bolt-on links Mounting dimensions: 260 mm 3</p>	400 ¹⁾	aR	3NE9 632-1	2.542	1
	500 ¹⁾		3NE9 634-1	2.550	1
	630 ¹⁾		3NE9 636-1A	2.557	1

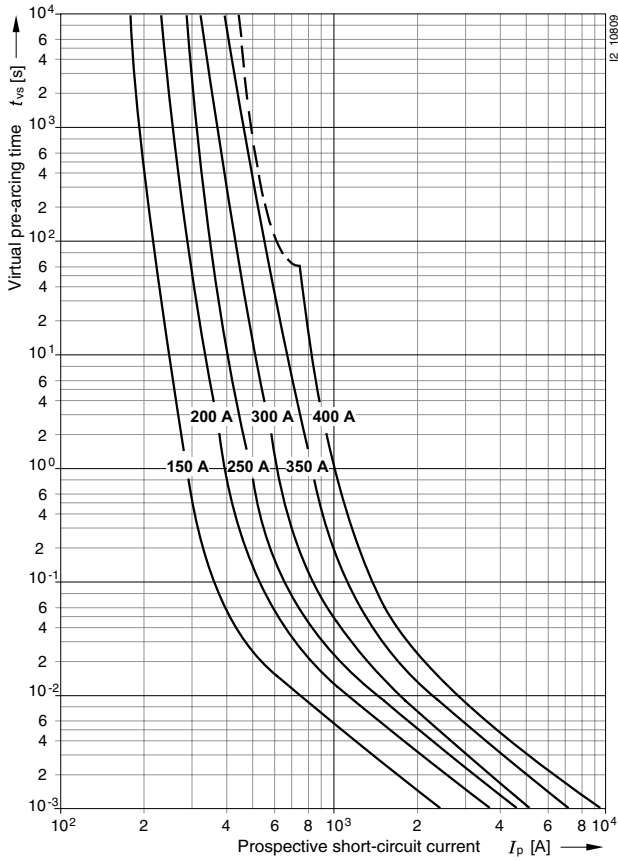
1) M12 screw connection.

Characteristic curves

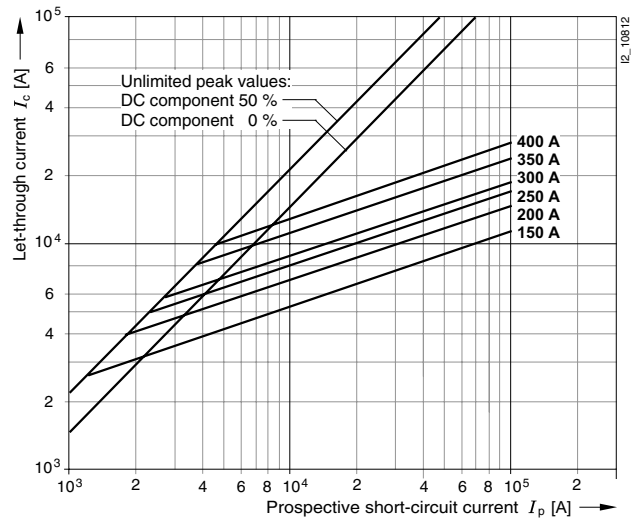
Series 3NC2 4..

Size: 3
 Operational class: gR or aR
 Rated voltage: 500 V AC
 Rated current: 150 ... 400 A

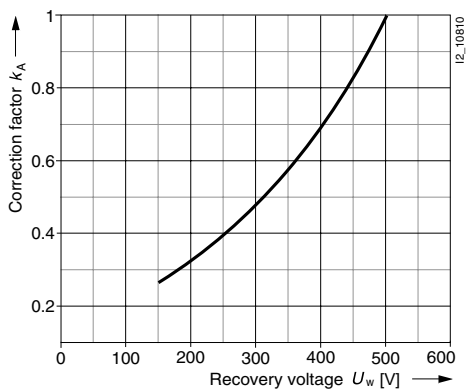
Time/current characteristics diagram



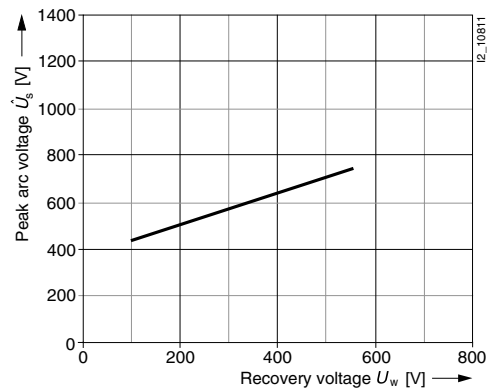
Let-through characteristics (current limitation at 50 Hz)



Correction factor k_A for breaking I^2t value



Peak arc voltage



Low-Voltage Fuse Systems

SITOR Semiconductor Fuses

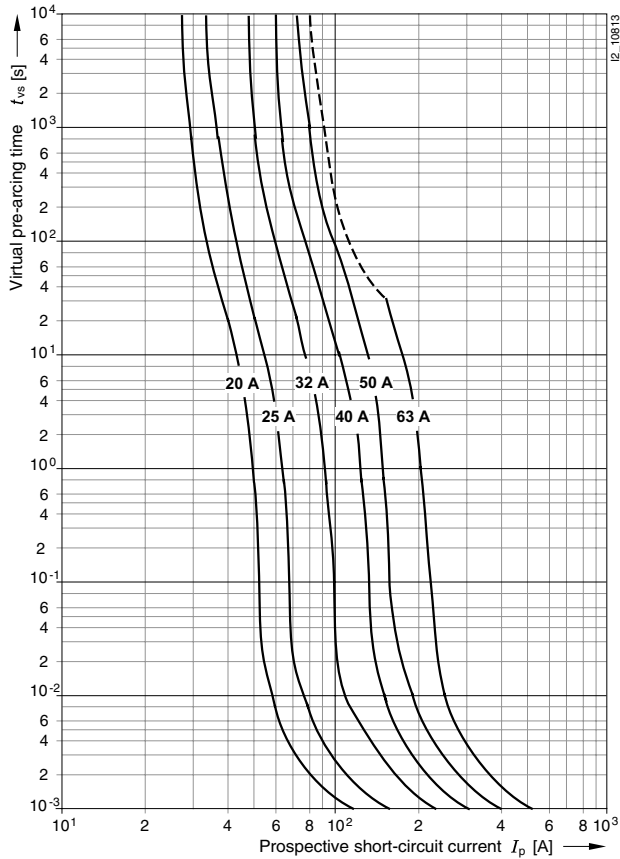
LV HRC SITOR fuse links

Characteristic curves

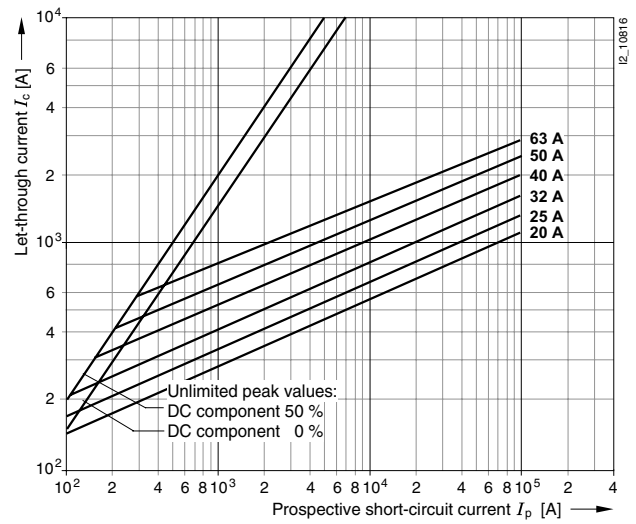
Series 3NE8 71.-1, 3NE8 70.-1

Size: 000
 Operational class: gR or aR
 Rated voltage: 690 V AC/700 V DC
 Rated current: 20 ... 63 A

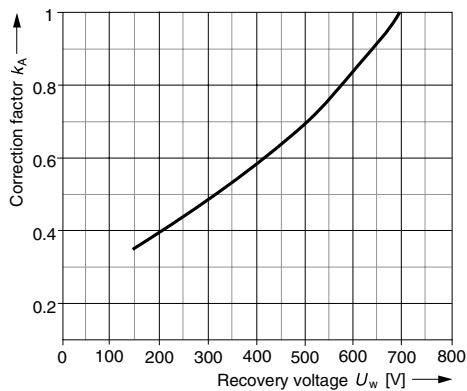
Time/current characteristics diagram



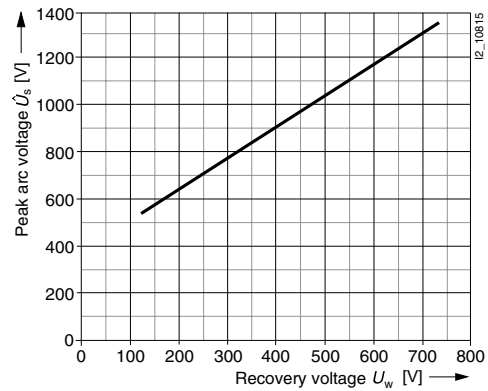
Let-through characteristics (current limitation at 50 Hz)



Correction factor k_A for breaking I^2t value



Peak arc voltage

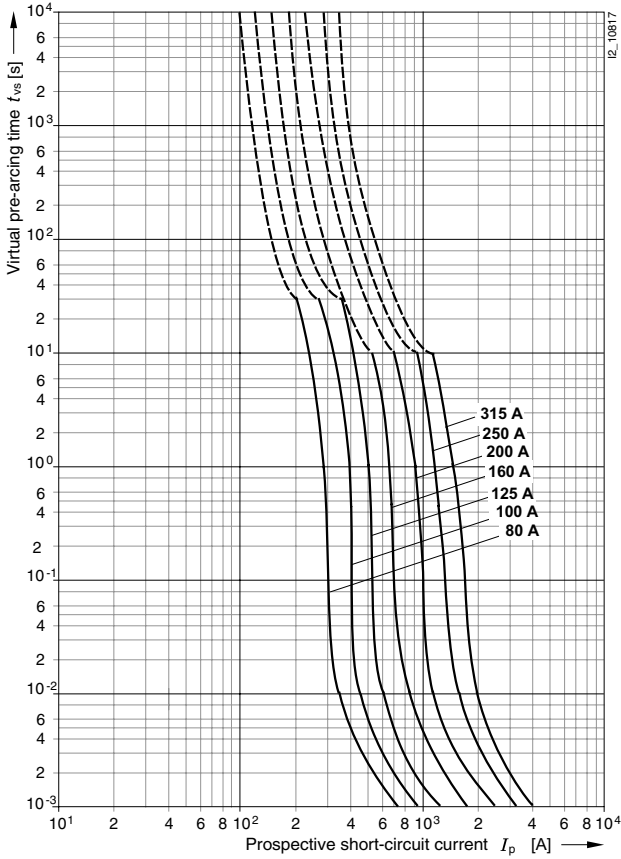


Characteristic curves

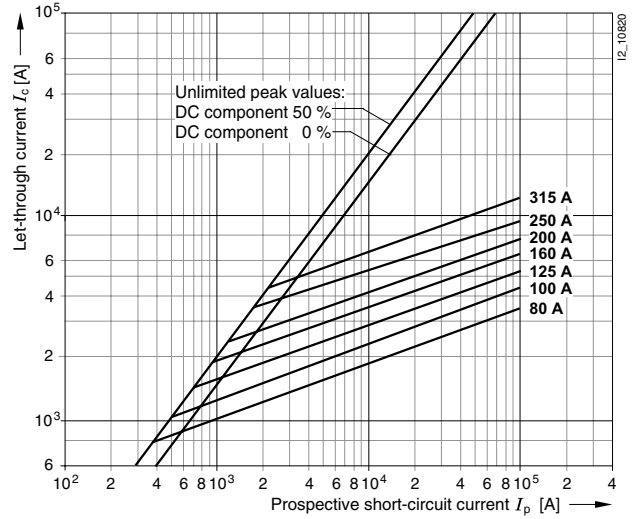
Series 3NE8 72.-1, 3NE8 731-1

Size: 000
 Operational class: aR
 Rated voltage: 690 V AC/700 V DC
 Rated current: 80 ... 315 A

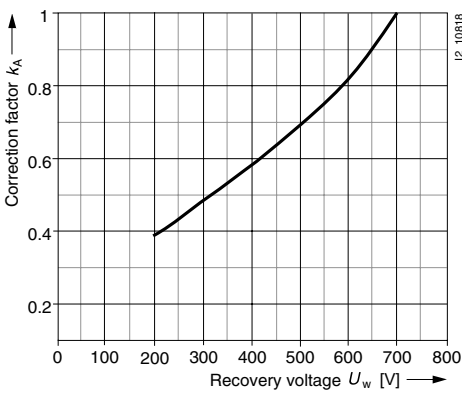
Time/current characteristics diagram



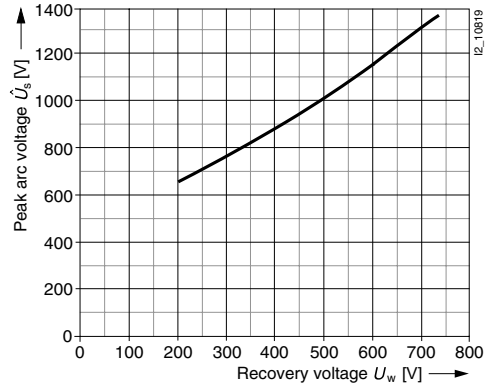
Let-through characteristics (current limitation at 50 Hz)



Correction factor k_A for breaking I^2t value



Peak arc voltage



Low-Voltage Fuse Systems

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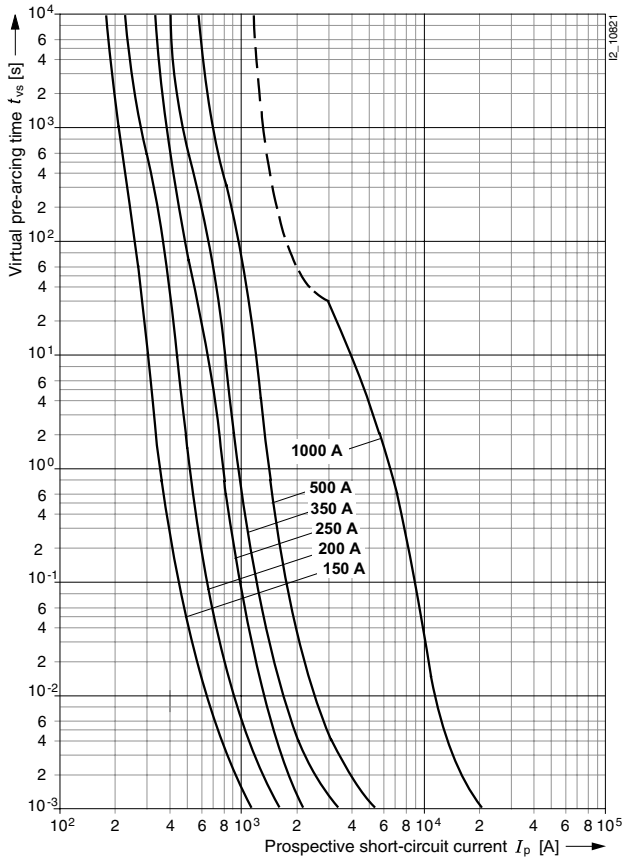
LV HRC SITOR fuse links

Characteristic curves

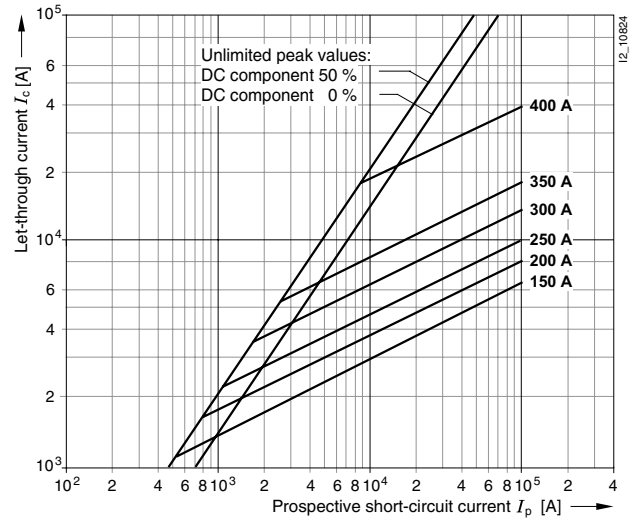
Series 3NC8 4..

Size: 3
 Operational class: gR or aR
 Rated voltage: 660 V AC
 Rated current: 150 ... 1000 A

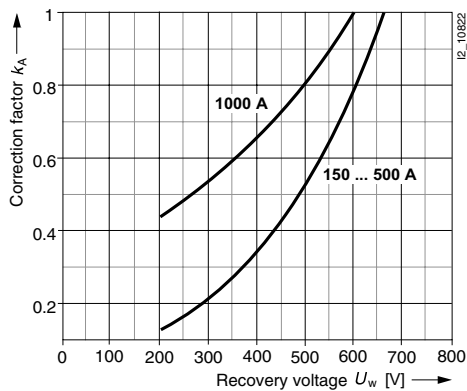
Time/current characteristics diagram



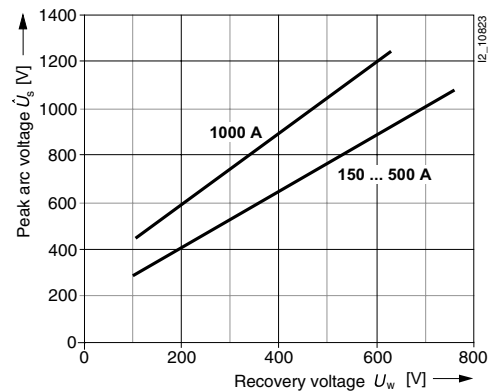
Let-through characteristics (current limitation at 50 Hz)



Correction factor k_A for breaking I^2t value



Peak arc voltage

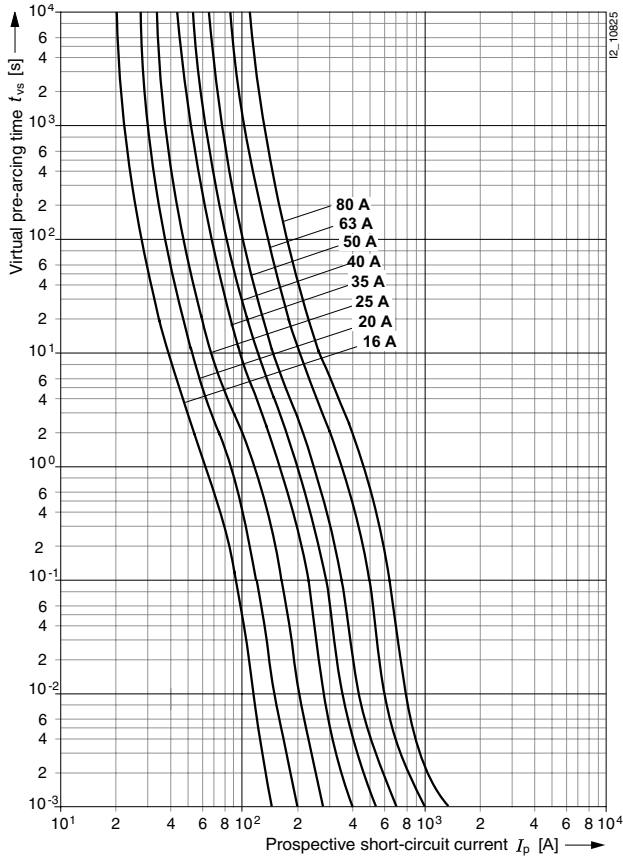


Characteristic curves

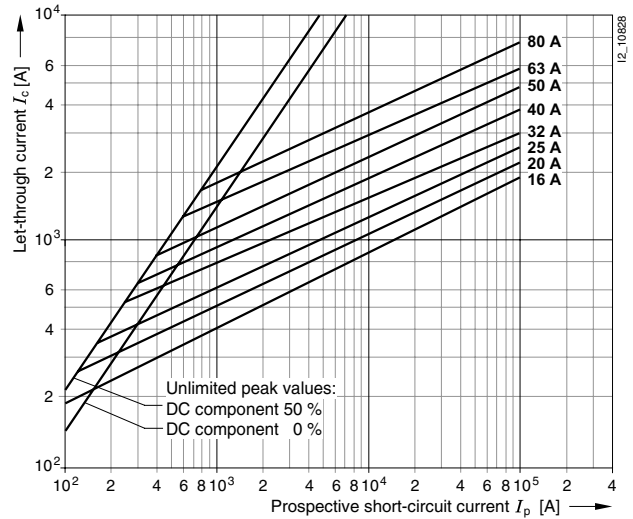
Series 3NE1 8...0

Size: 000
 Operational class: gR/gS
 Rated voltage: 690 V AC
 Rated current: 16 ... 80 A

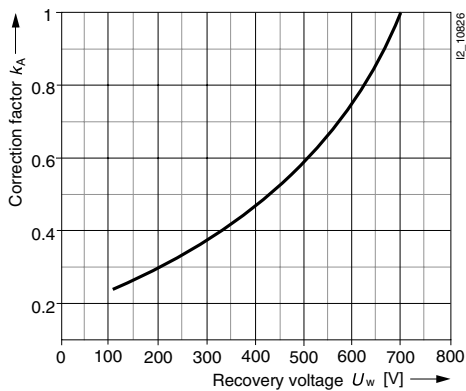
Time/current characteristics diagram



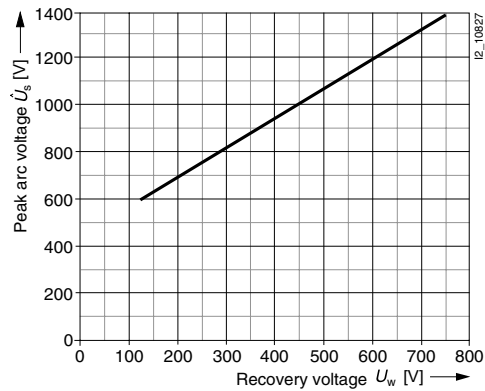
Let-through characteristics (current limitation at 50 Hz)



Correction factor k_A for breaking I^2t value



Peak arc voltage



Low-Voltage Fuse Systems

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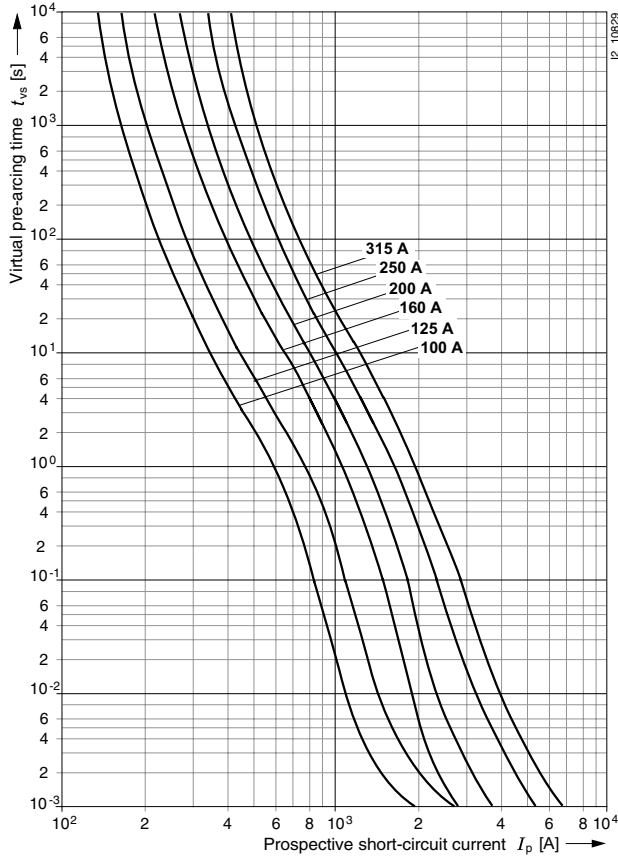
LV HRC SITOR fuse links

Characteristic curves

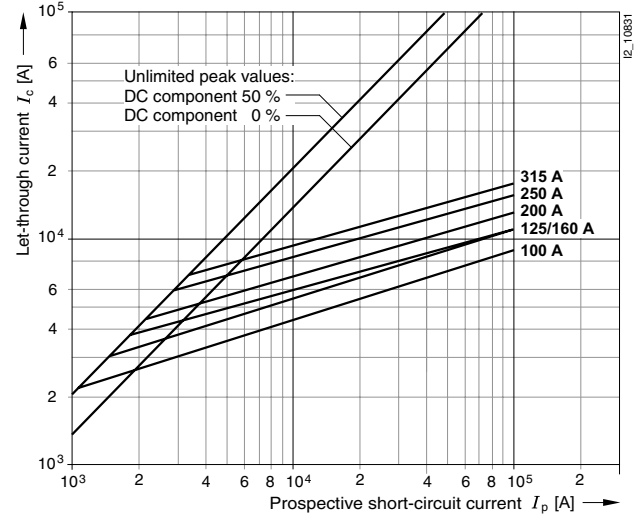
Series **3NE1 02.-0**, **3NE1 2.-0**

Size: 00, 1
 Operational class: gR/gS
 Rated voltage: 690 V AC
 Rated current: 100 ... 315 A

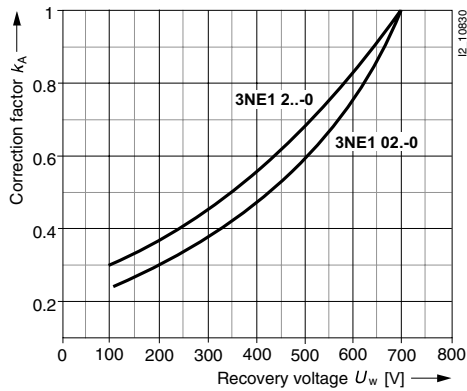
Time/current characteristics diagram



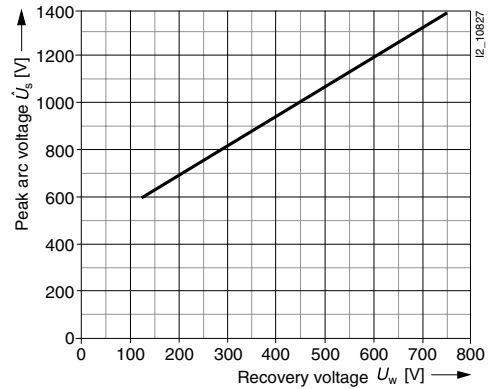
Let-through characteristics (current limitation at 50 Hz)



Correction factor k_A for breaking I^2t value



Peak arc voltage

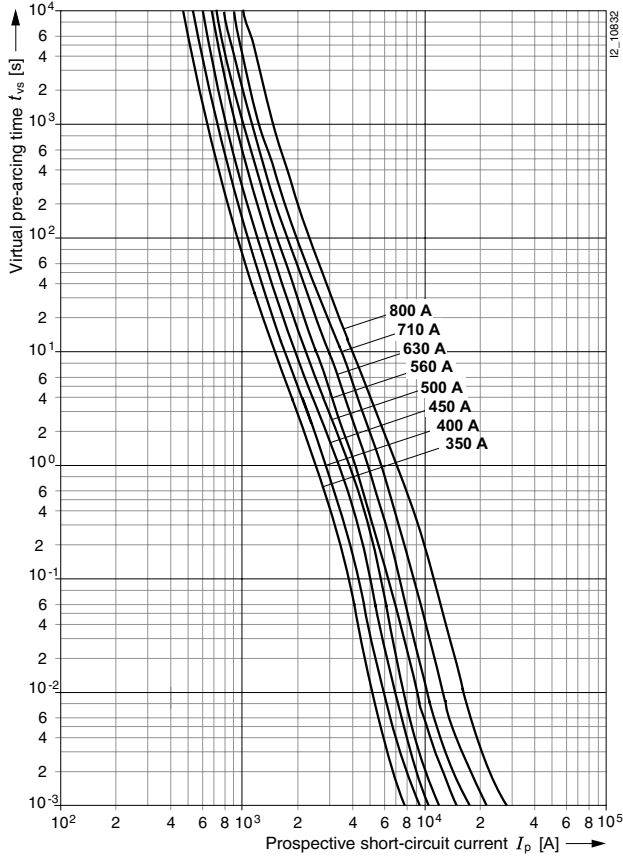


Characteristic curves

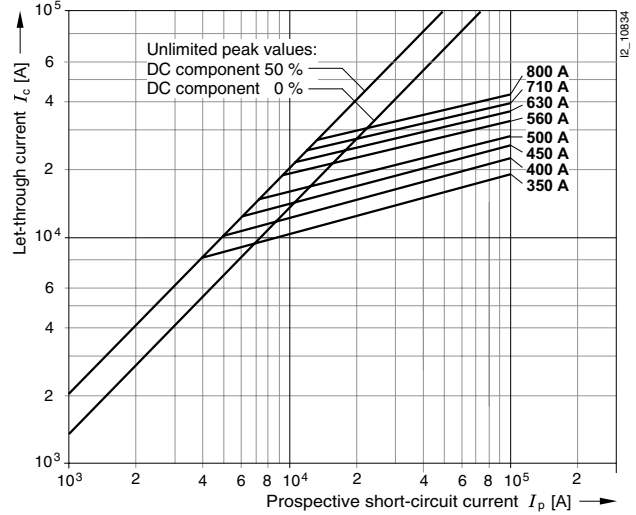
Series 3NE1 33.-0, 3NE1 43.-0

Size: 2, 3
 Operational class: gR/gS
 Rated voltage: 690 V AC
 Rated current: 350 ... 800 A

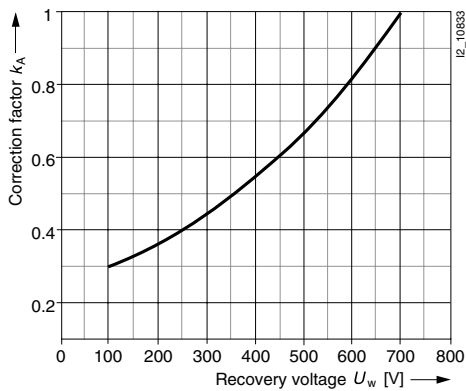
Time/current characteristics diagram



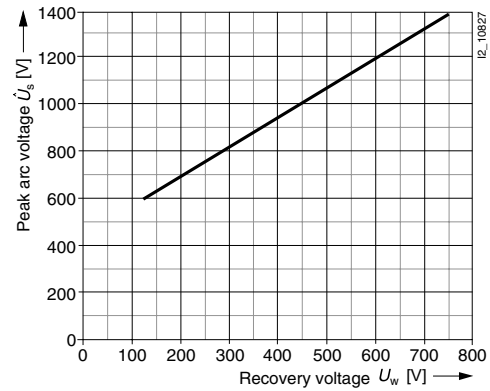
Let-through characteristics (current limitation at 50 Hz)



Correction factor k_A for breaking I^2t value



Peak arc voltage



Low-Voltage Fuse Systems

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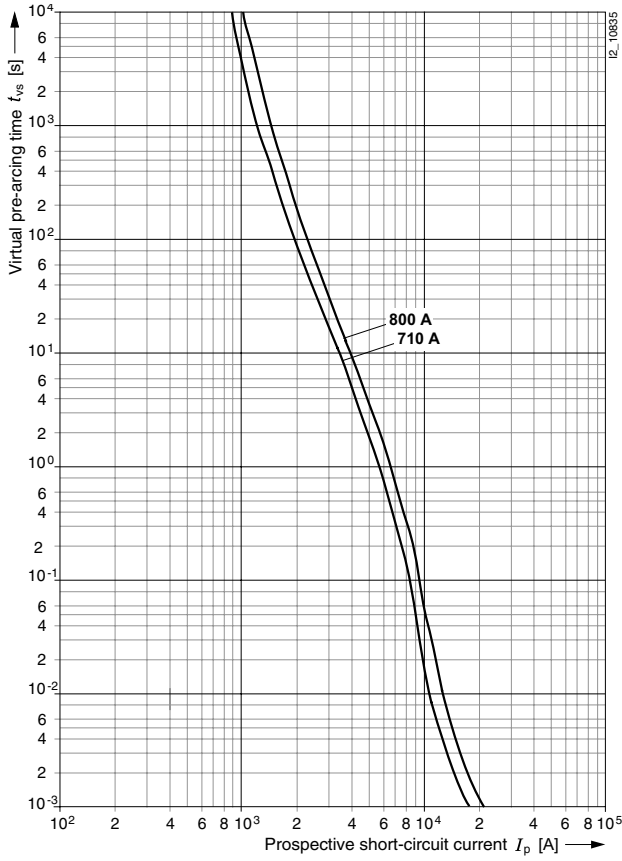
LV HRC SITOR fuse links

Characteristic curves

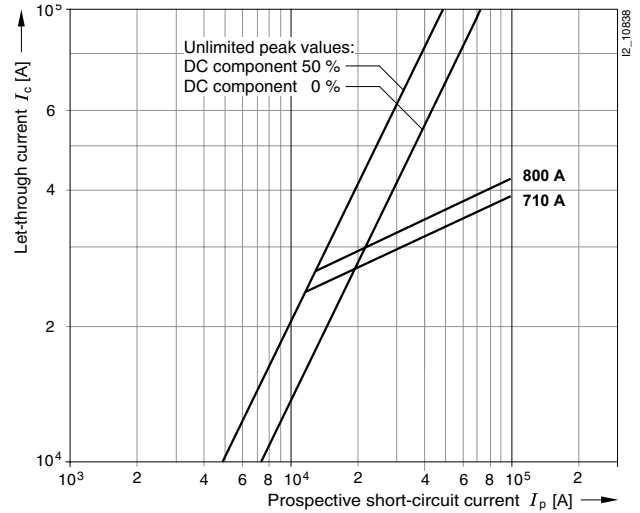
Series 3NE1 437.-1, 3NE1 438.-1

Size: 3
 Operational class: gR
 Rated voltage: 600 V AC
 Rated current: 710 ... 800 A

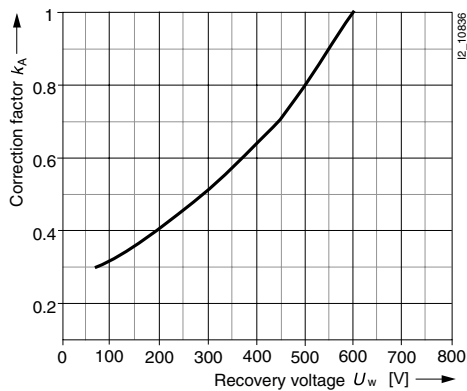
Time/current characteristics diagram



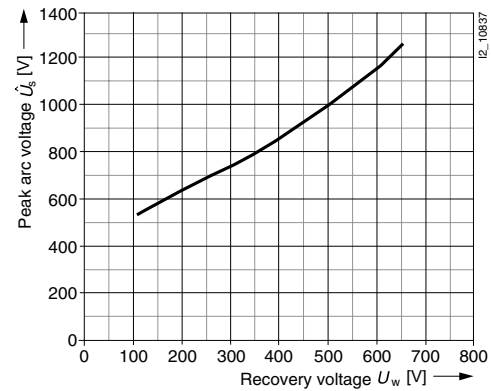
Let-through characteristics (current limitation at 50 Hz)



Correction factor k_A for breaking I^2t value



Peak arc voltage

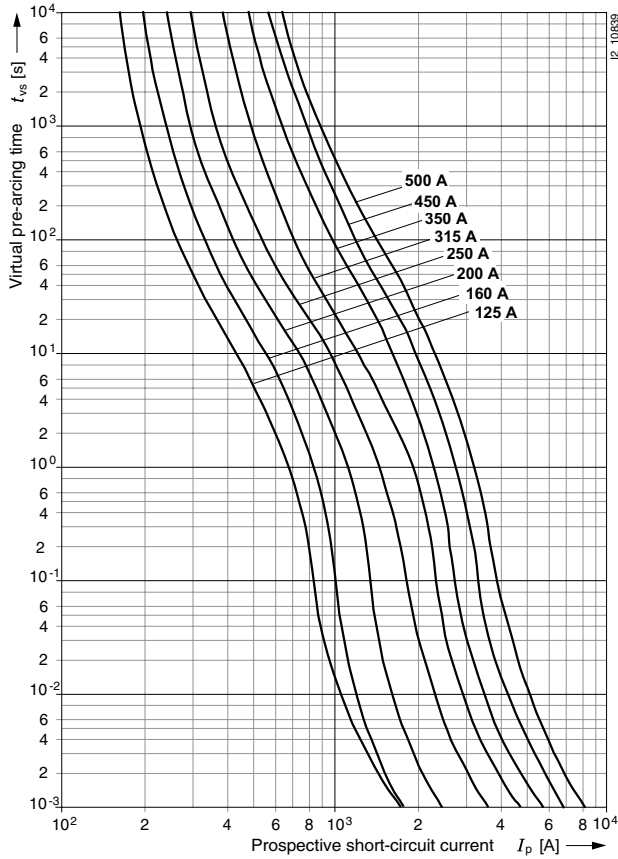


Characteristic curves

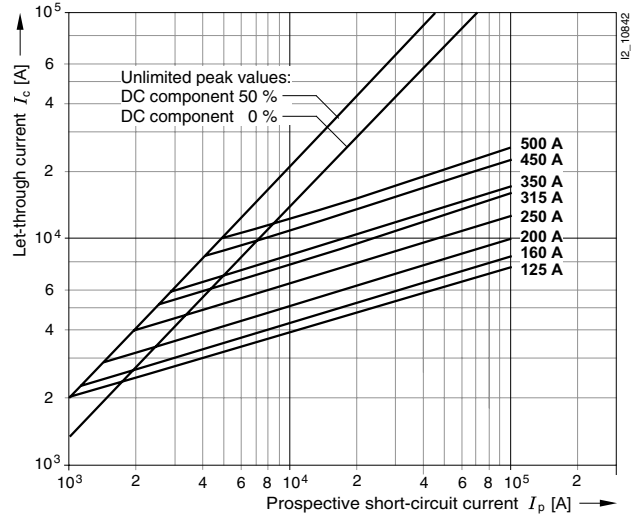
Series 3NE1 022-2, 3NE1 2..-2, 3NE1 33.-2

Size: 00, 1
 Operational class: gR
 Rated voltage: 690 V AC
 Rated current: 125 ... 500 A

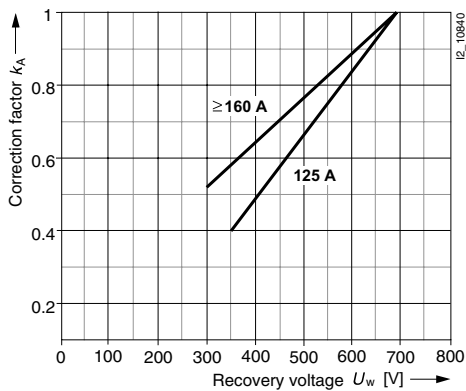
Time/current characteristics diagram



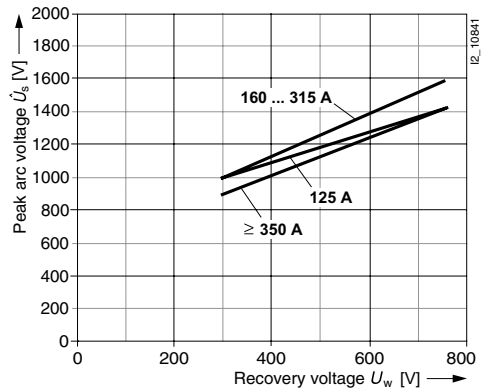
Let-through characteristics (current limitation at 50 Hz)



Correction factor k_A for breaking I^2t value



Peak arc voltage



Low-Voltage Fuse Systems

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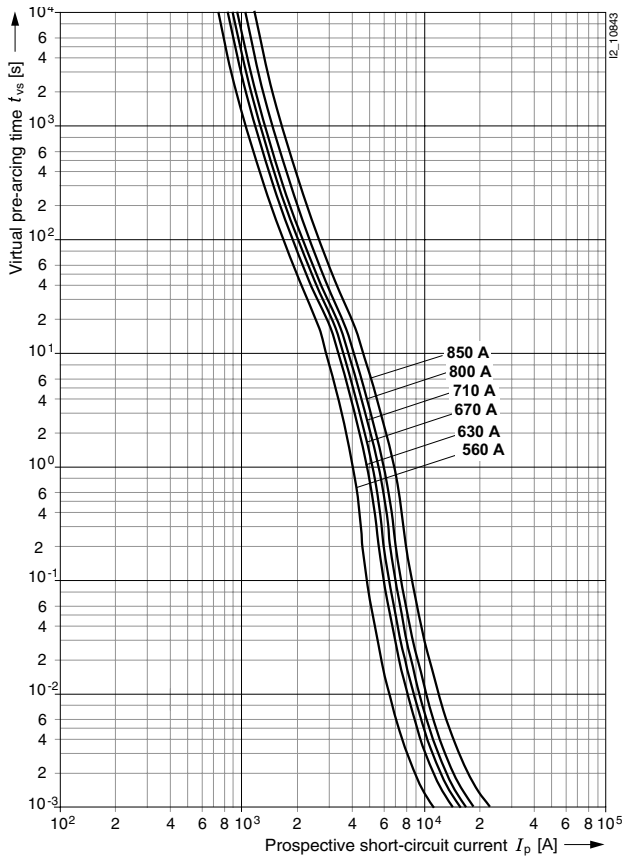
LV HRC SITOR fuse links

Characteristic curves

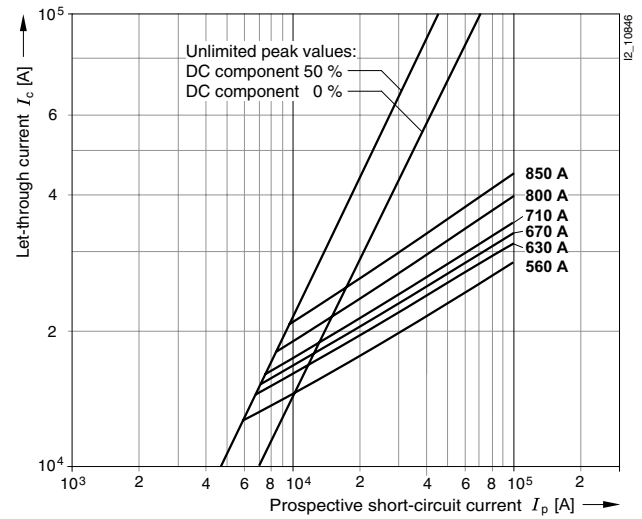
Series 3NE1 4..-2

Size: 3
 Operational class: gR
 Rated voltage: 690 V AC
 Rated current: 560 ... 850 A

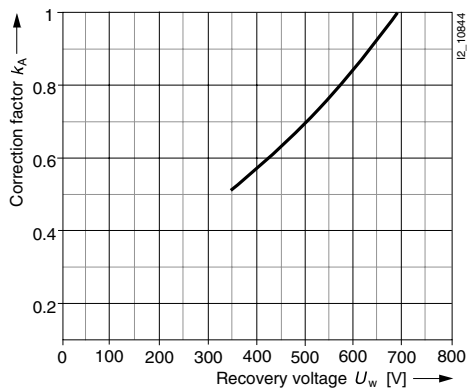
Time/current characteristics diagram



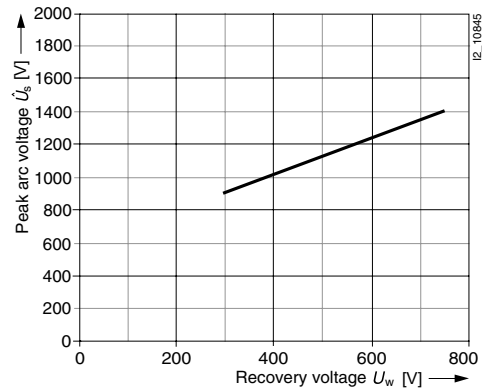
Let-through characteristics (current limitation at 50 Hz)



Correction factor k_A for breaking I^2t value



Peak arc voltage

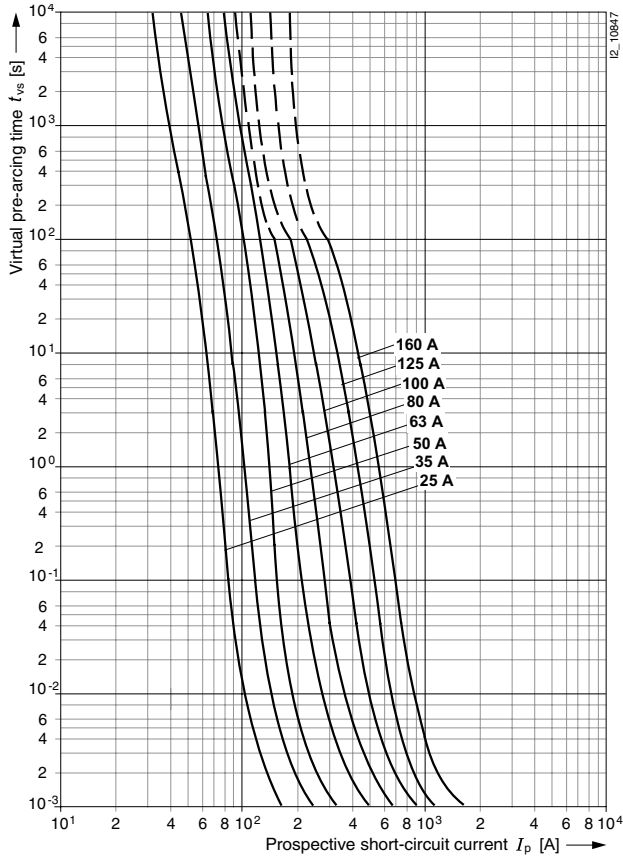


Characteristic curves

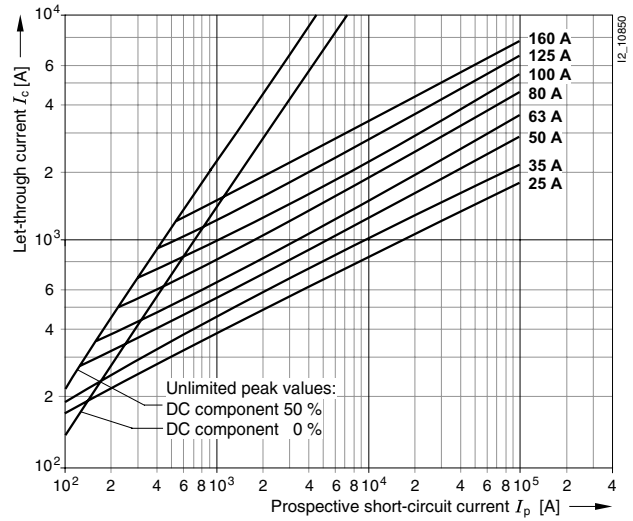
Series 3NE8 0...-1

Size: 00
 Operational class: gR or aR
 Rated voltage: 690 V AC
 Rated current: 25 ... 160 A

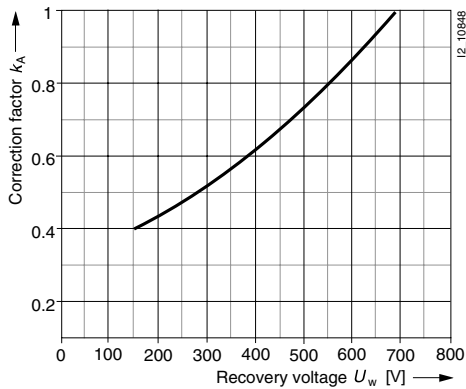
Time/current characteristics diagram



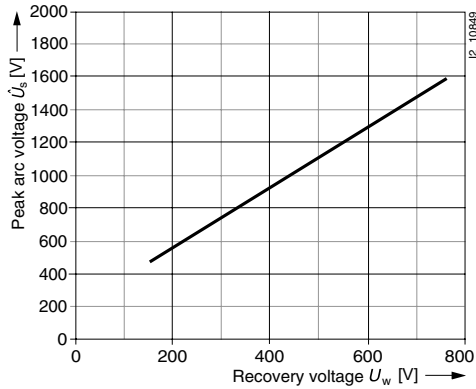
Let-through characteristics (current limitation at 50 Hz)



Correction factor k_A for breaking I^2t value



Peak arc voltage



Low-Voltage Fuse Systems

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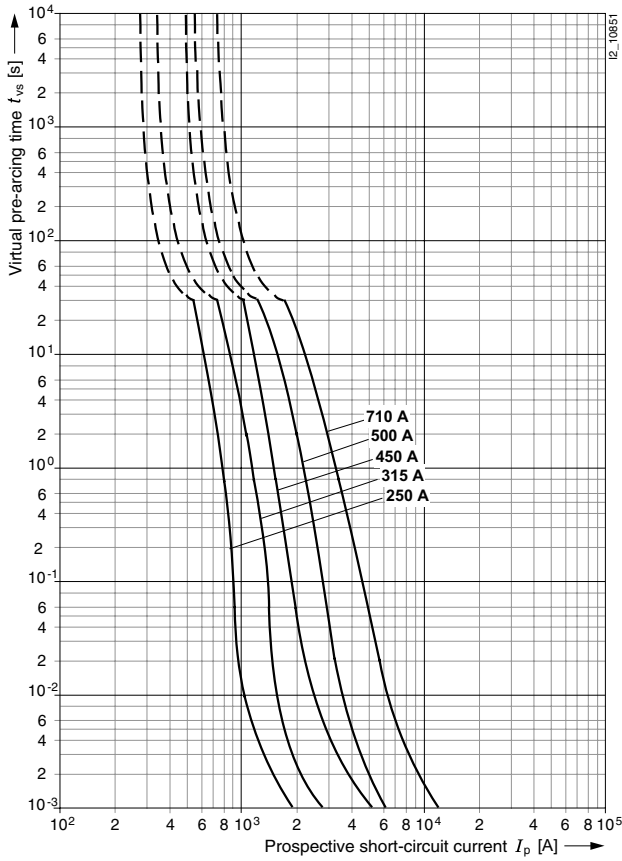
LV HRC SITOR fuse links

Characteristic curves

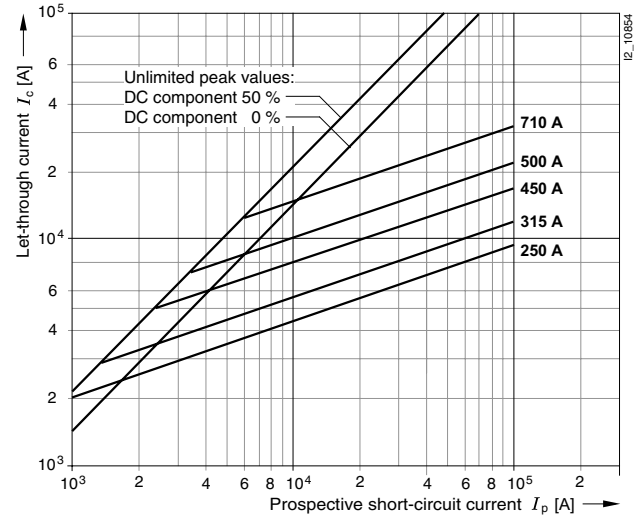
Series **3NE4 3...0B, 3NE4 337**

Size: 2
 Operational class: aR
 Rated voltage: 800 V AC
 Rated current: 250 ... 710 A

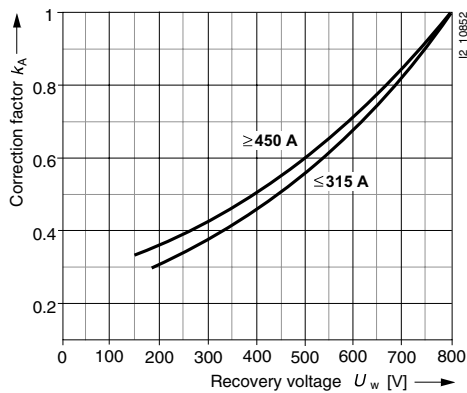
Time/current characteristics diagram



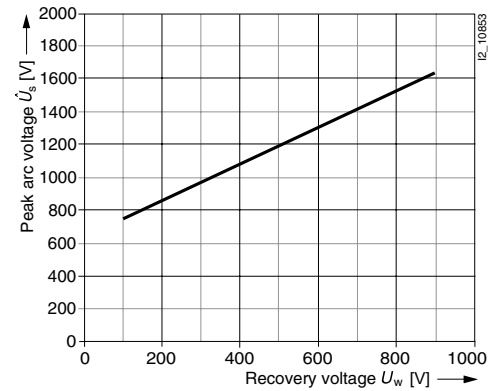
Let-through characteristics (current limitation at 50 Hz)



Correction factor k_A for breaking I^2t value



Peak arc voltage

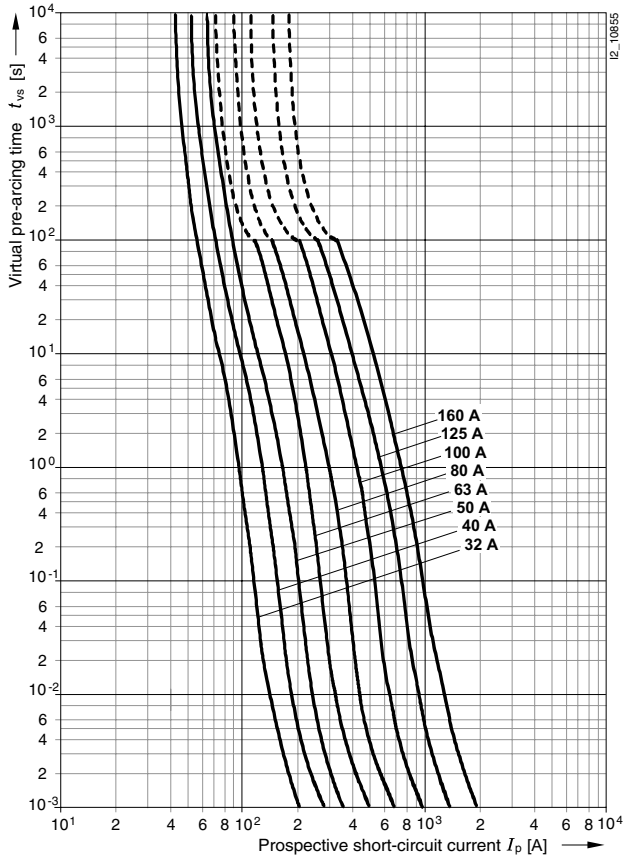


Characteristic curves

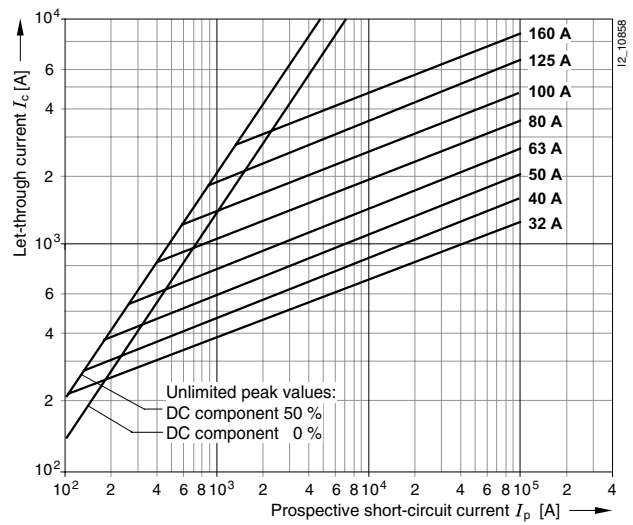
Series 3NE4 1..

Size: 0
 Operational class: gR or aR
 Rated voltage: 1000 V AC
 Rated current: 32 ... 160 A

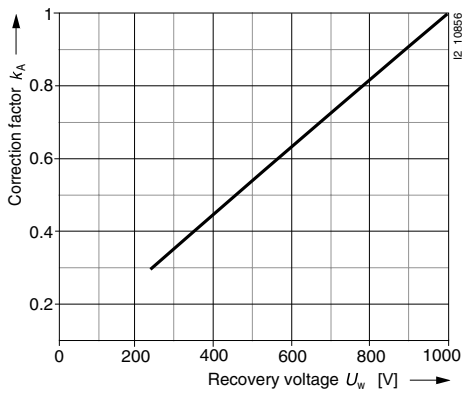
Time/current characteristics diagram



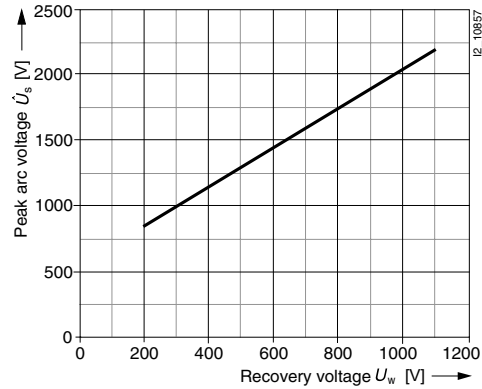
Let-through characteristics (current limitation at 50 Hz)



Correction factor k_A for breaking I^2t value



Peak arc voltage



Low-Voltage Fuse Systems

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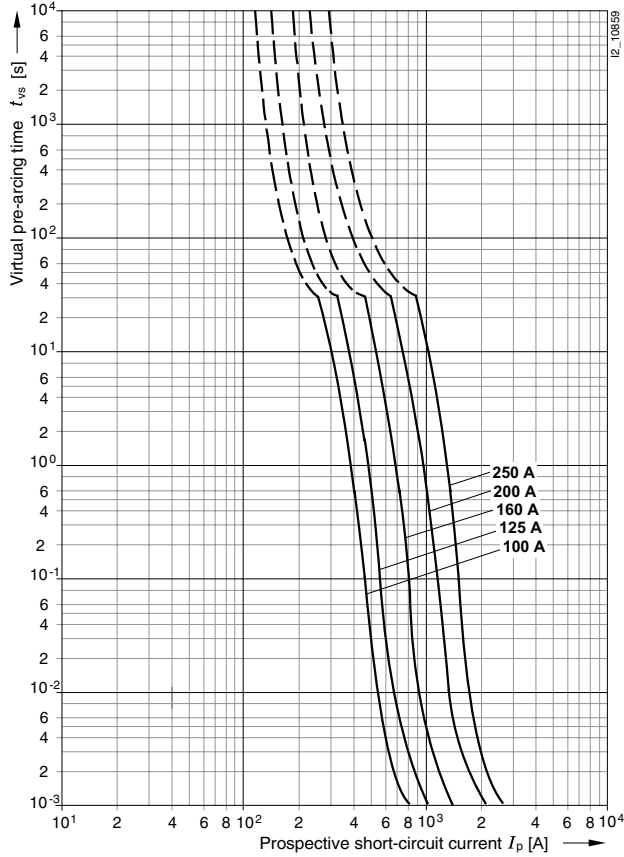
LV HRC SITOR fuse links

Characteristic curves

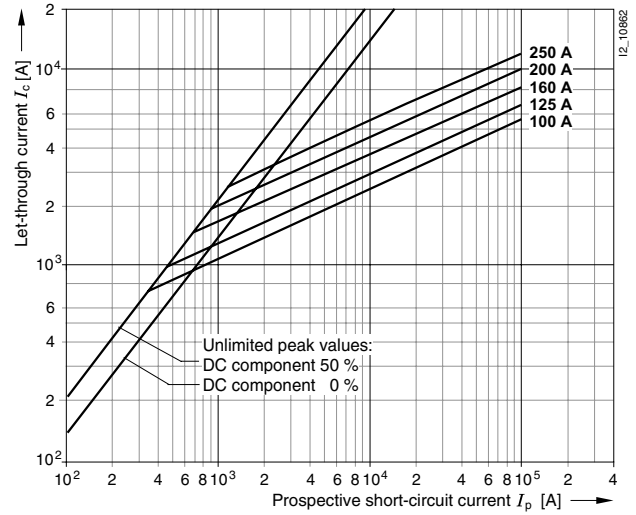
Series 3NE3 22.

Size: 1
 Operational class: aR
 Rated voltage: 1000 V AC
 Rated current: 100 ... 225 A

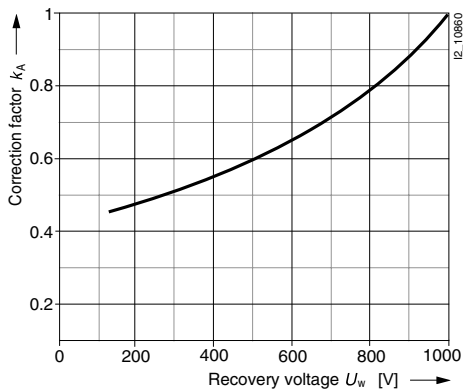
Time/current characteristics diagram



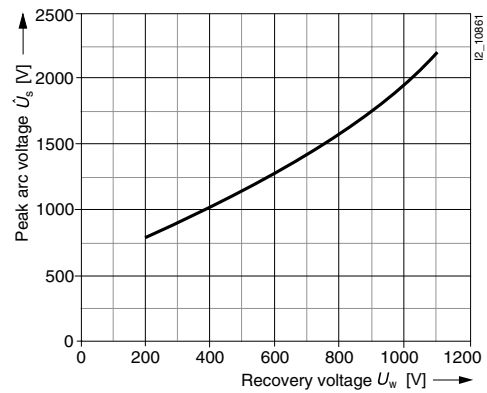
Let-through characteristics (current limitation at 50 Hz)



Correction factor k_A for breaking I^2t value



Peak arc voltage

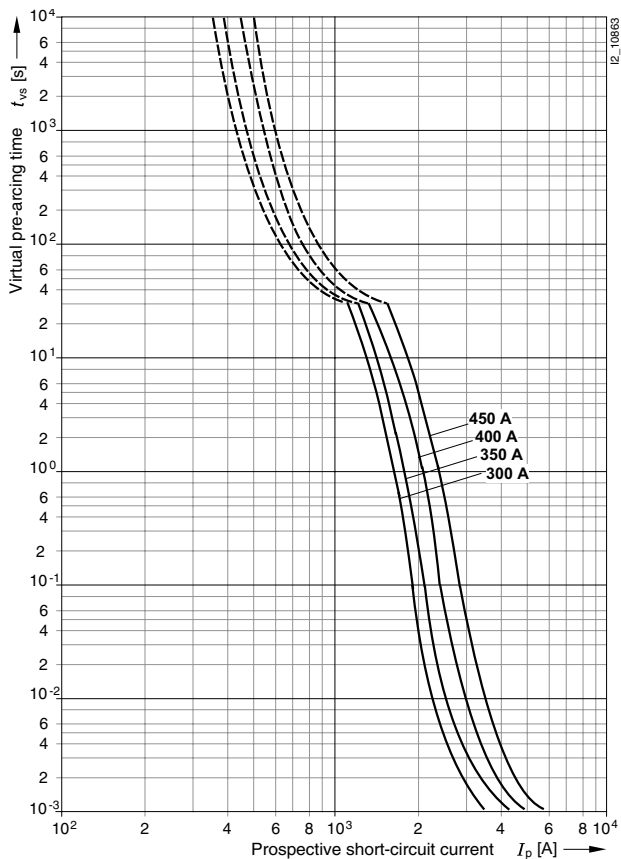


Characteristic curves

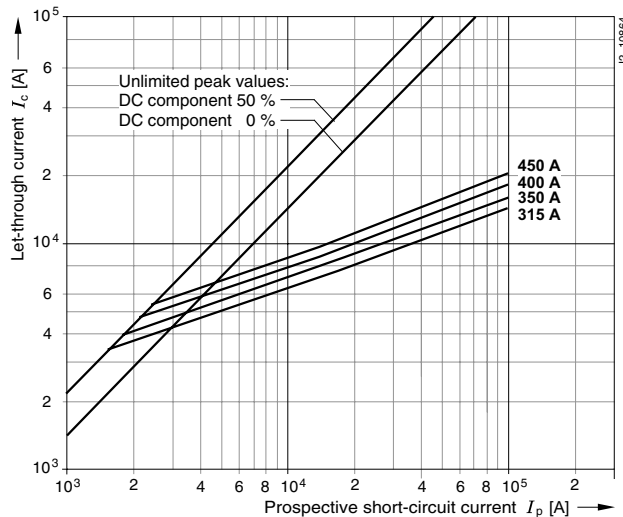
Series 3NE3 23.

Size: 1
 Operational class: aR
 Rated voltage: 1000 V AC
 Rated current: 315 ... 450 A

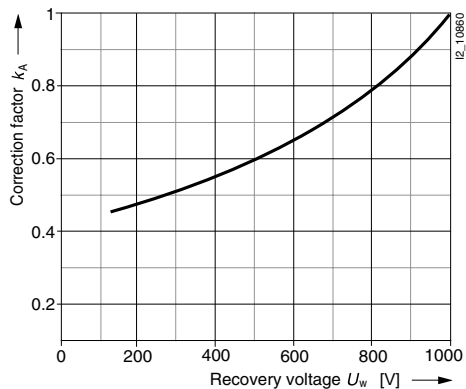
Time/current characteristics diagram



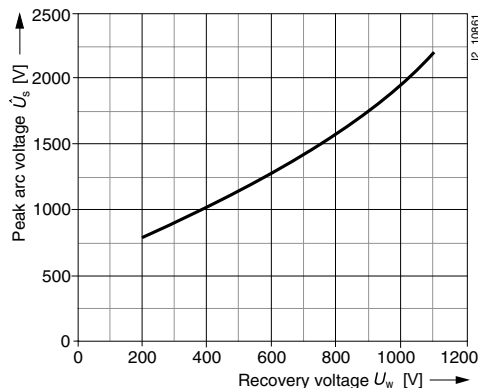
Let-through characteristics (current limitation at 50 Hz)



Correction factor k_A for breaking I^2t value



Peak arc voltage



Low-Voltage Fuse Systems

SITOR Semiconductor Fuses

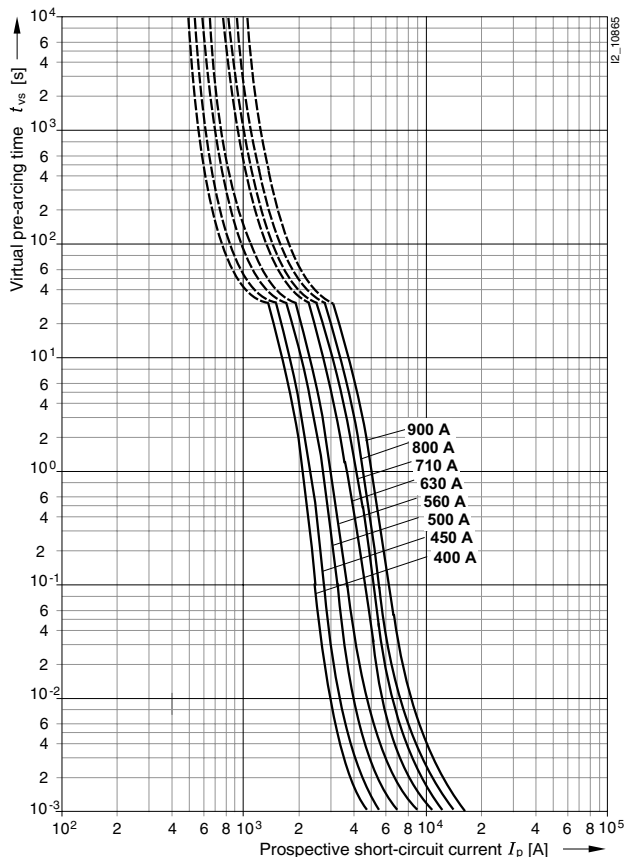
LV HRC SITOR fuse links

Characteristic curves

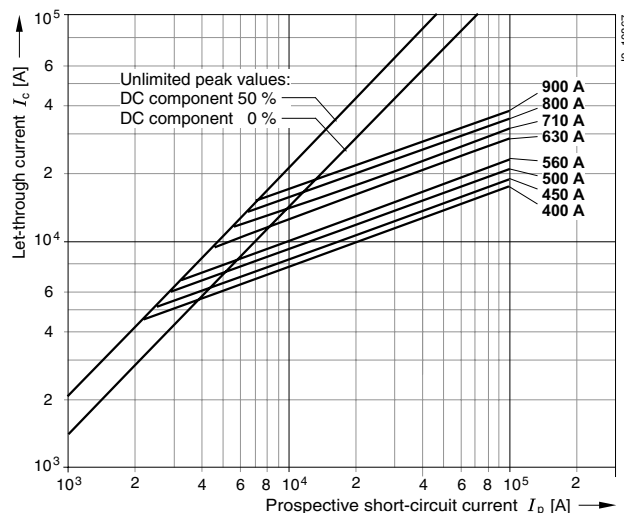
Series 3NE3 3..

Size: 2
 Operational class: aR
 Rated voltage: 1000 V AC (to 630 A)
 900 V AC (710 A)
 800 V AC (800 A)
 690 V AC (900 A)
 Rated current: 400 ... 900 A

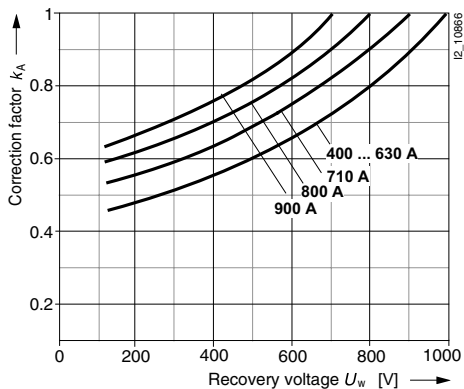
Time/current characteristics diagram



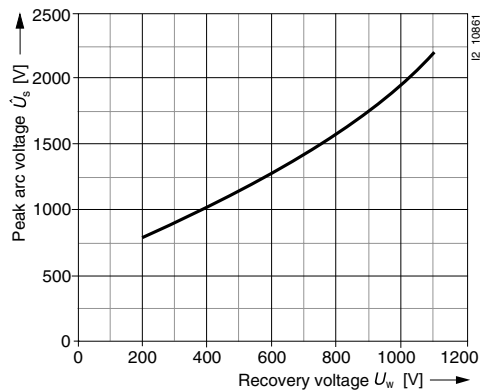
Let-through characteristics (current limitation at 50 Hz)



Correction factor k_A for breaking I^2t value



Peak arc voltage

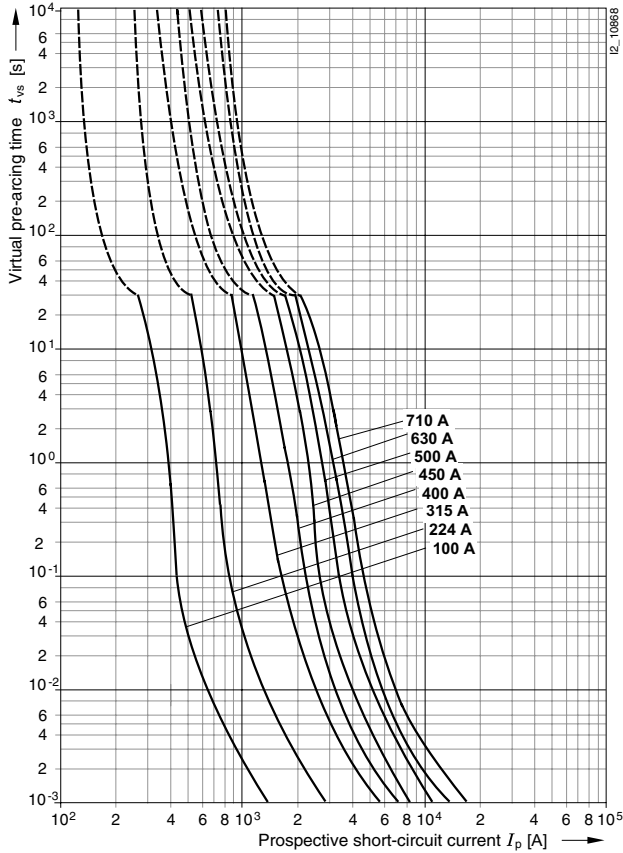


Characteristic curves

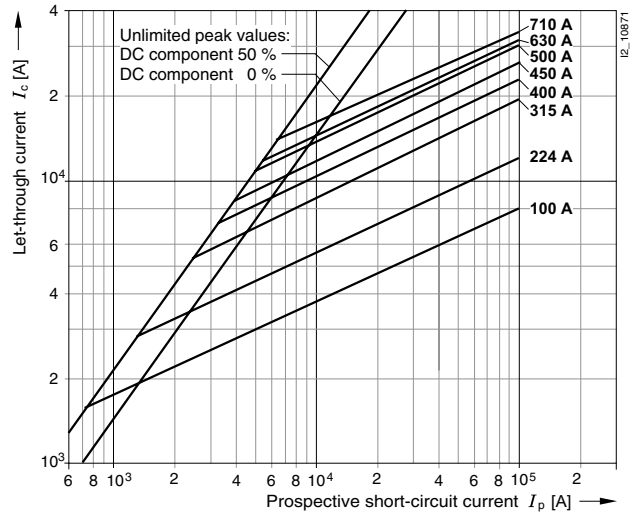
Series 3NE3 4..., 3NE3 6..

Size: 3
 Operational class: aR
 Rated voltage: 1000 V AC
 Rated current: 100 ... 710 A

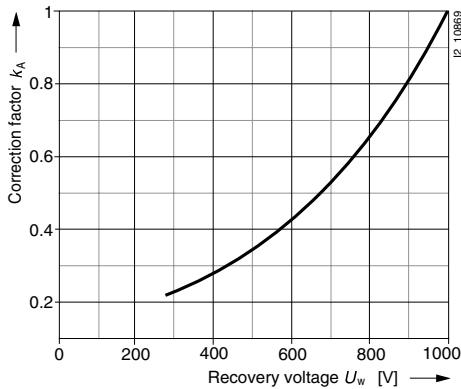
Time/current characteristics diagram



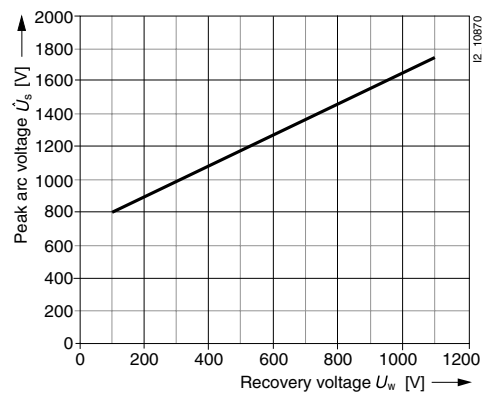
Let-through characteristics (current limitation at 50 Hz)



Correction factor k_A for breaking I^2t value



Peak arc voltage



Low-Voltage Fuse Systems

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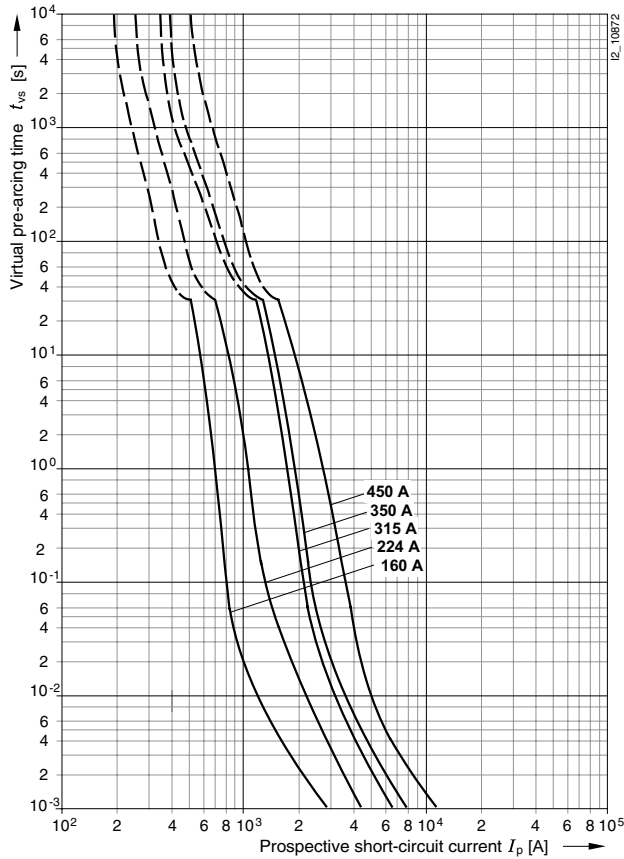
LV HRC SITOR fuse links

Characteristic curves

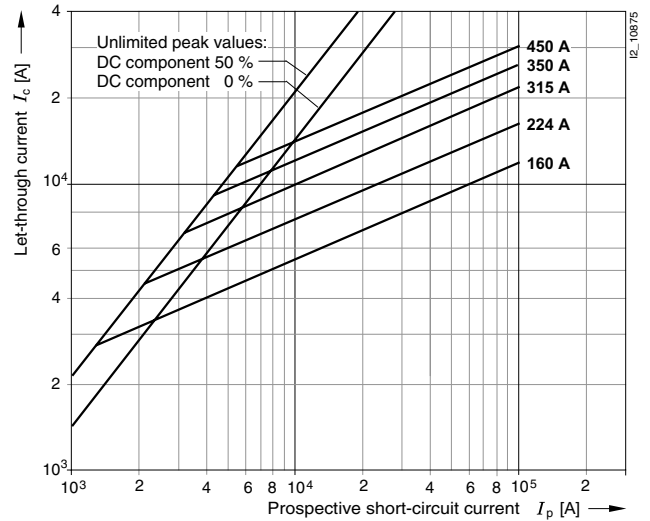
Series 3NE5 4..

Size: 3
 Operational class: aR
 Rated voltage: 1500 V AC
 Rated current: 160 ... 600 A

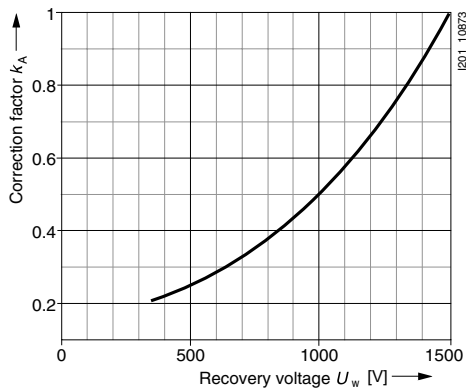
Time/current characteristics diagram



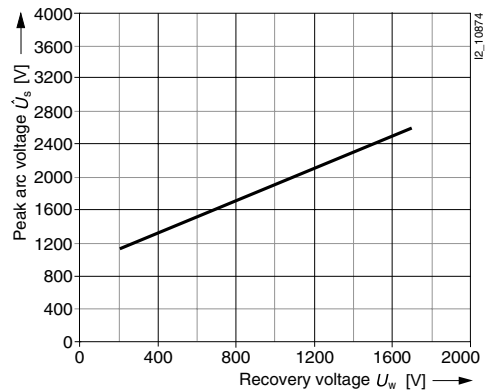
Let-through characteristics (current limitation at 50 Hz)



Correction factor k_A for breaking I^2t value



Peak arc voltage

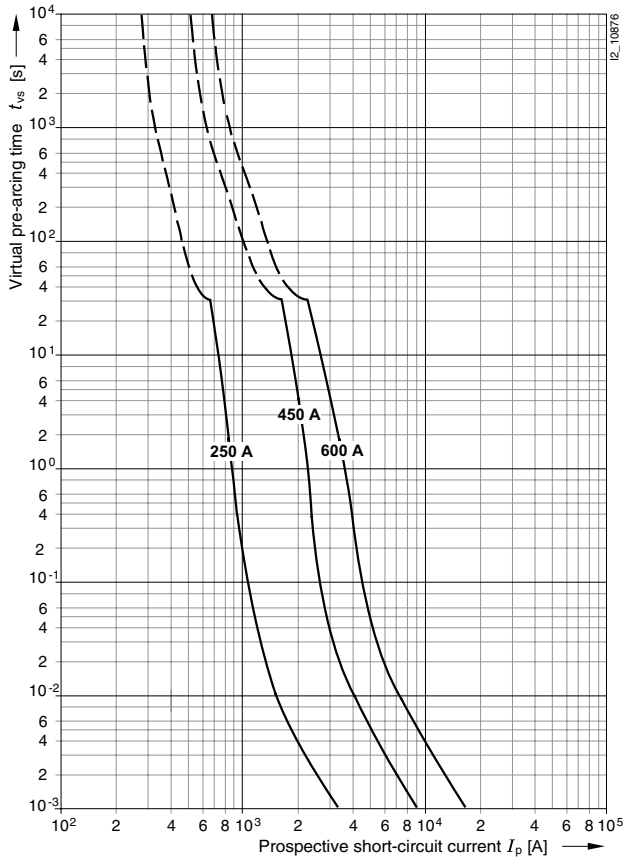


Characteristic curves

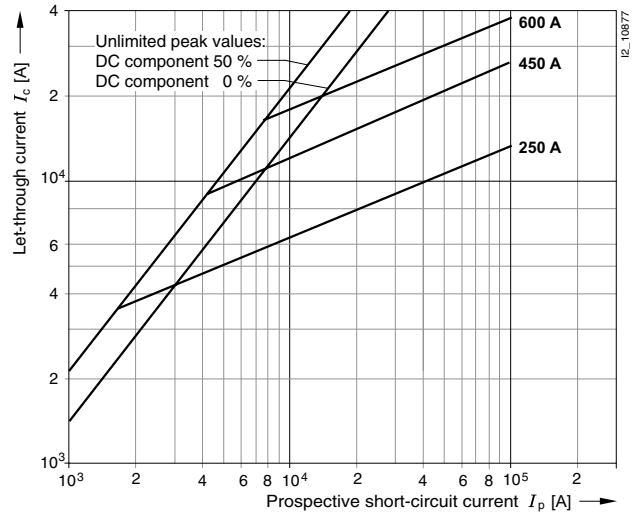
Series 3NE5 6..

Size: 3
 Operational class: aR
 Rated voltage: 1500 V AC
 Rated current: 250 ... 600 A

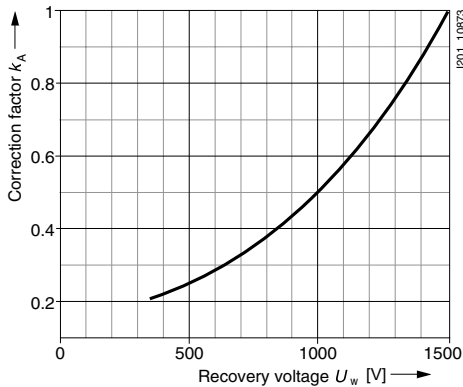
Time/current characteristics diagram



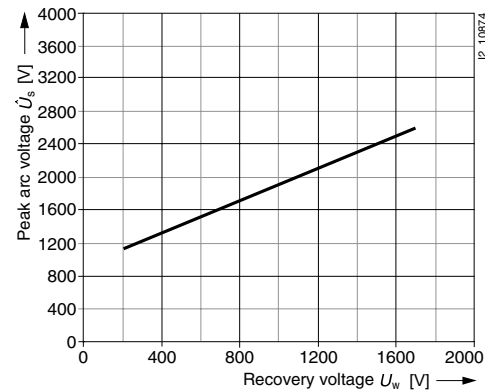
Let-through characteristics (current limitation at 50 Hz)



Correction factor k_A for breaking I^2t value



Peak arc voltage



Low-Voltage Fuse Systems

SITOR Semiconductor Fuses

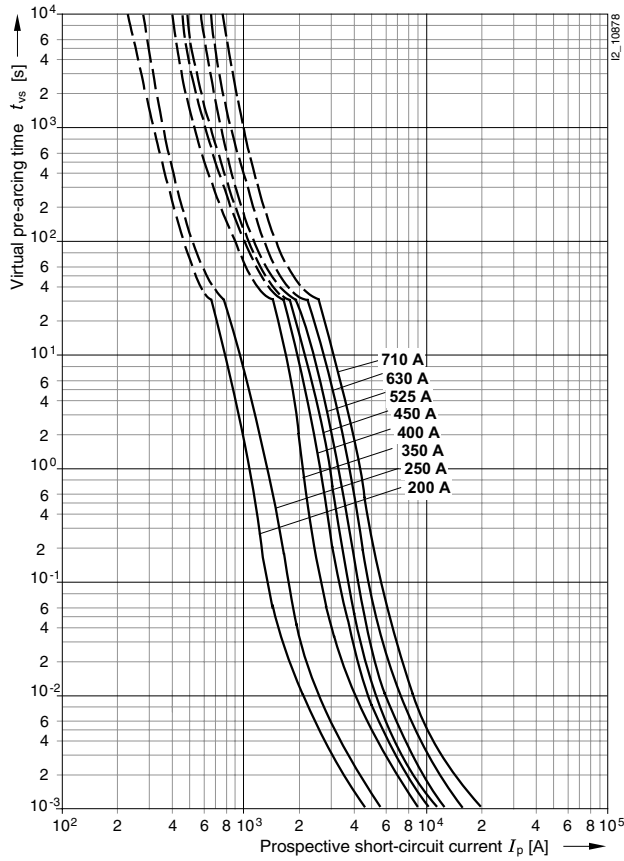
LV HRC SITOR fuse links

Characteristic curves

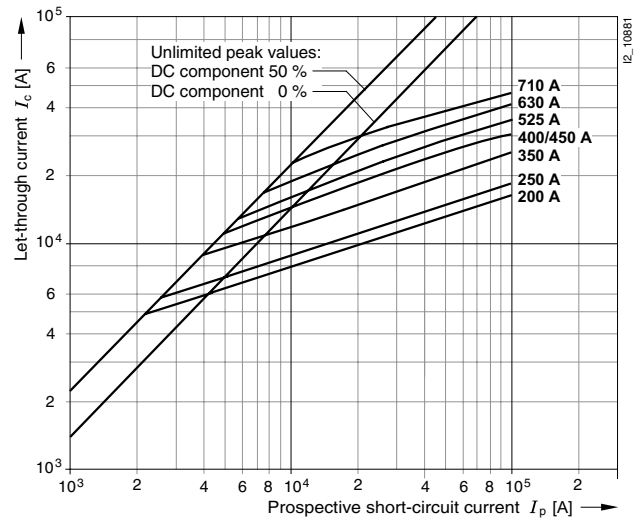
Series 3NE7 4..., 3NE7 6..

Size: 3
 Operational class: aR
 Rated voltage: 2000 V AC
 Rated current: 200 ... 710 A

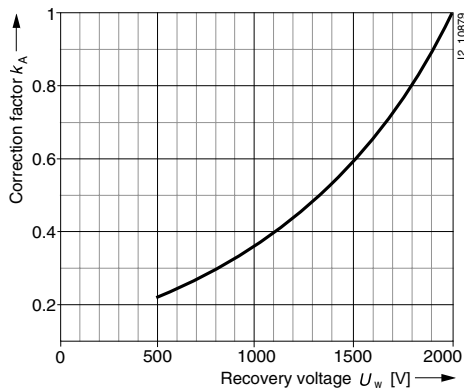
Time/current characteristics diagram



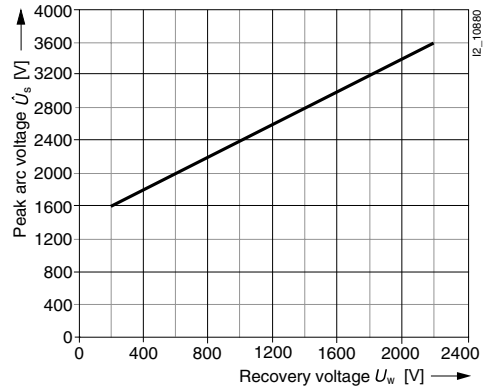
Let-through characteristics (current limitation at 50 Hz)



Correction factor k_A for breaking I^2t value



Peak arc voltage

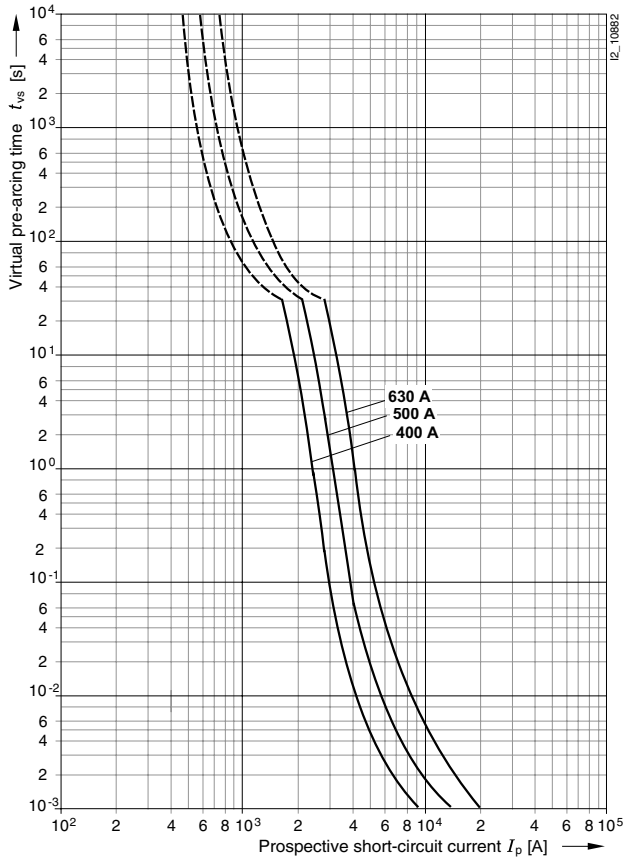


Characteristic curves

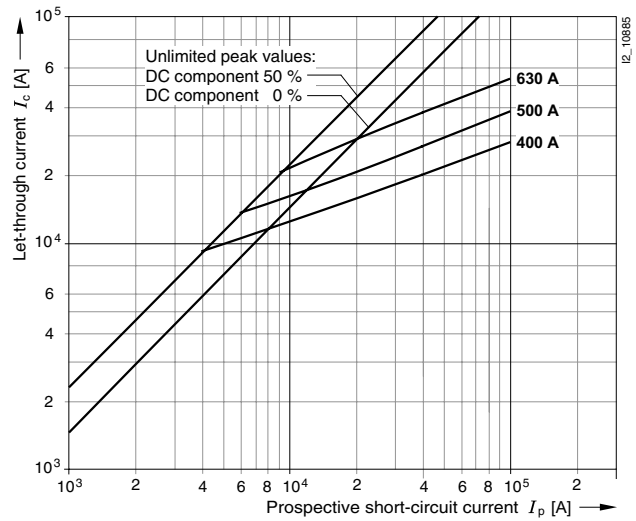
Series 3NE9 63.

Size: 3
 Operational class: aR
 Rated voltage: 2500 V AC
 Rated current: 400 ... 630 A

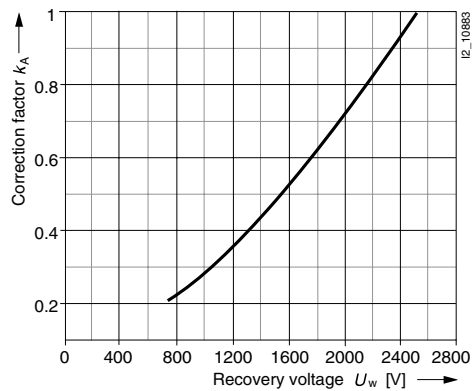
Time/current characteristics diagram



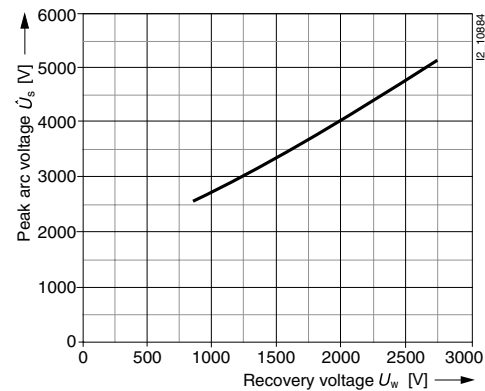
Let-through characteristics (current limitation at 50 Hz)



Correction factor k_A for breaking I^2t value



Peak arc voltage



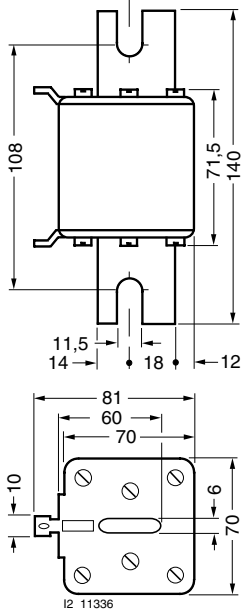
Low-Voltage Fuse Systems

SITOR Semiconductor Fuses

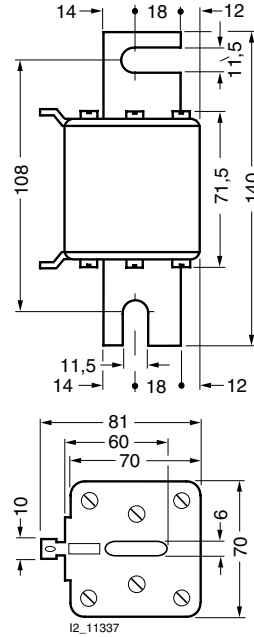
LV HRC SITOR fuse links

Dimensional drawings

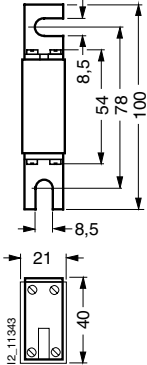
3NC2 4.., 3NC8 4..



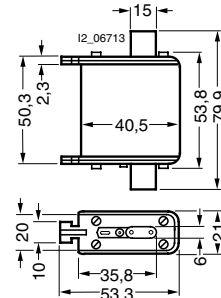
3NC2 4..-3, 3NC8 4..-3



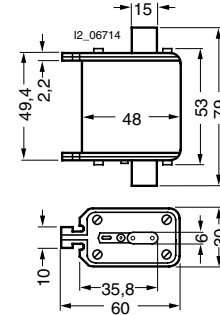
3NE8 7..-1



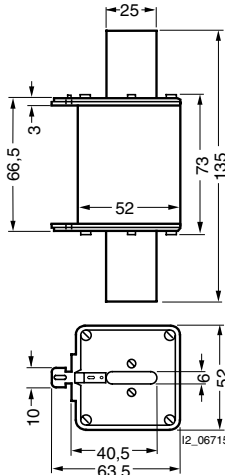
3NE1 8..-0



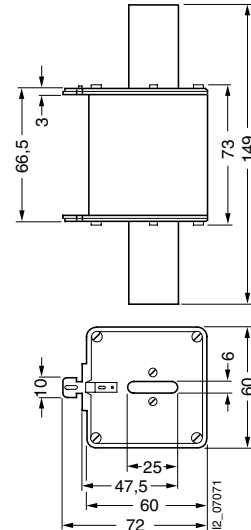
3NE1 02..-0, 3NE1 022-2, 3NE8 0..-1



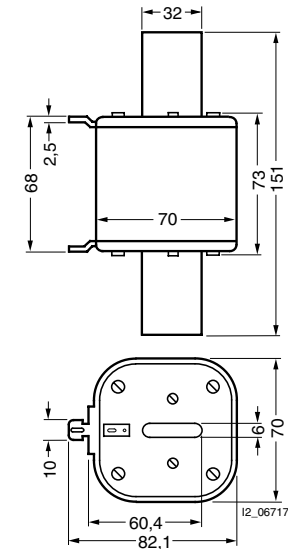
3NE1 2..-0, 3NE1 2..-2



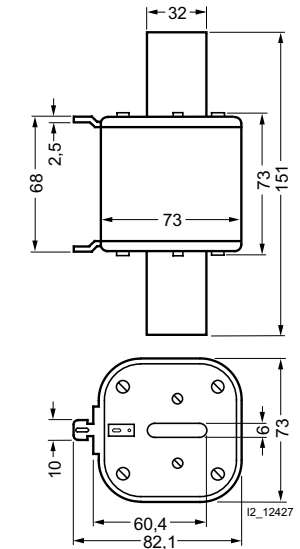
3NE1 33..-0, 3NE1 33..-2



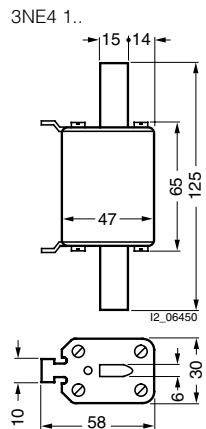
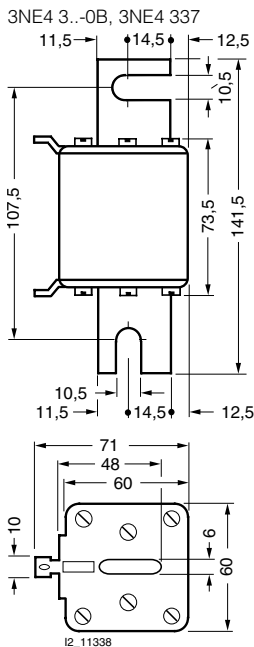
3NE1 43..-0, 3NE1 43..-1



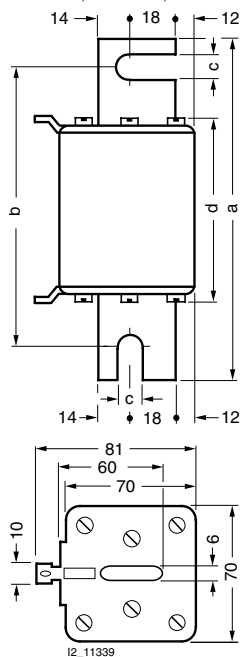
3NE1 4..-2



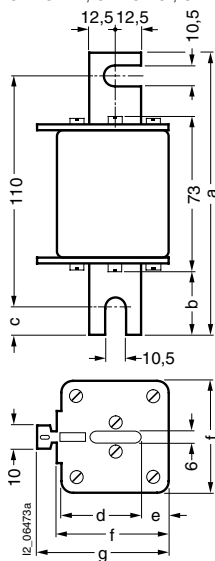
Dimensional drawings



3NE3 4..., 3NE3 6..., 3NE3 637-1,
3NE5 4..., 3NE5 433-1, 3NE5 6...,
3NE7 4..., 3NE7 6..., 3NE9 63.-1



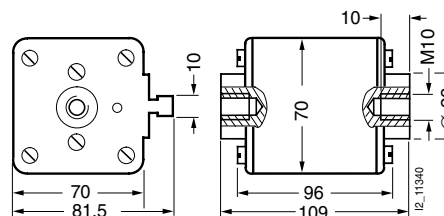
3NE3 22., 3NE3 23., 3NE3 3..



Type	Dimensions						
	a	b	c	d	e	f	g
3NE3 22., 3NE3 23.	135	31	12.5	40.5	13.5	52	63.5
3NE3 3..	149	38	19.5	47.5	15	60	72

Type	Dimensions			
	a	b	c	d
3NE3 4..., 3NE3 6..	160	128	11.5	91.5
3NE3 635-6	see adjacent drawing			
3NE3 637-1	170	138	13	91.5
3NE5 4..., 3NE7 4..., 3NE7 6..	240	208	11.5	171.5
3NE5 433-1, 3NE7 6.-1	240	208	13	171.5
3NE5 6..	200	168	11.5	131.5
3NE9 63.-1	287	255	13	220

3NE3 635-6



Low-Voltage Fuse Systems

SITOR Semiconductor Fuses

LV HRC SITOR fuse links

More information



Standards

The SITOR fuse links comply with the following standards:

- IEC 60269-4
- EN 60269-4


If noted in the selection and ordering data and characteristic curves, the SITOR fuse links also comply with the following standards and regulations:

- IEC 60269-2-1
DIN VDE 0636-201
(for installation in LV HRC fuse bases to VDE 0636/201 and in fuse switch disconnectors and switch disconnectors with fuses)

-  The following SITOR fuse links and LV HRC fuse bases are also  recognized:

Series	Registration number	Reference
3NC1 0.. 3NC1 4.. 3NC2 2.. 3NE1 ... 3NE3 2.. 3NE3 3.. 3NE4 1.. 3NE8 0..-1 3NE8 7..-1	JFHR2	E167357
3NC1 1..	JDDZ	E223216
3NC1 038-.. 3NC1 09.. 3NC1 49.. 3NC2 29..	IZLT2	E220063
3NH3 030 3NH3 120 3NH3 230 3NH3 330 3NH3 430	(JFHR2)	(E171267)

- IEC 60269-4-1
DIN VDE 0636-401
(for screwing onto busbars). SITOR fuse links of size 1 to 3 with gauge 110 mm are also suitable for installation in LV HRC fuse bases according to IEC 60269-2-1 and in fuse switch disconnectors and switch disconnectors with fuses.

-  All SITOR fuse links with rated voltages $U_n \leq 1000$ V are CE marked in accordance with the low-voltage directive 73/23/EWG. The CE marking confirms conformance of the products with the requirements of the directive.

Environment-friendly recycling

In 1995, seven German manufacturers of LV HRC/HV HRC fuse links founded a non-profit association.



The objective is to provide a useful recycling option for used fuse links and determine an acceptable disposal concept that meets all the requirements of modern environment protection.

Used fuse links are sorted according to product type and are accepted back without packaging for recycling, melted down and the recovered materials are fed back into the material cycle.

In accordance with the regulations, statutes and articles of the association, any surplus from the recycling process is donated to a university in order to encourage research in the area of fuse link technology.

For further information, please visit our Web site at:

<http://www.nh-hh-recycling.de>

Disclaimer

The products described here were developed as part of an overall plant or machine to perform safety-related functions. A complete failsafe system usually contains sensors, evaluation units, signaling devices and concepts for failsafe disconnection. It is the responsibility of the manufacturer of a plant or machine to ensure the correct overall function. Siemens AG, its branches and affiliated companies (hereafter "Siemens"), is not in a position to guarantee the function of an overall plant or machine that was not designed by Siemens.

Siemens can accept no liability for recommendations, either explicit or implicit, contained in the following description. Furthermore, no warranty or liability claims above and beyond those provided for in the Siemens General Terms and Conditions can be derived from the description.

Caution

Fuses must always be fitted by a qualified technician.

Overview

Load capability of SITOR cylindrical fuses without strikers in cylindrical fuse disconnectors

For SITOR fuse links	Rated voltage V AC	Rated current I_n A	Required conductor cross-section Cu mm ²	Cylindrical fuse bases						Cylindrical fuse switch disconnectors												
				1-pole Type	I_{max} A	2-pole Type	I_{max} A	3-pole Type	I_{max} A	1-pole Type	I_{max} A	2-pole Type	I_{max} A	3-pole Type	I_{max} A							
Size 10 x 38																						
3NC1 003	600	3	1	3NC1 038-1	3	3NC1 038-2 2 x 3NC1 038-1	3	3NC1 038-3 3 x 3NC1 038-1	3	3NC1 091	3	3NC1 092 2 x 3NC1 091	3	3NC1 093 3 x 3NC1 091	3							
3NC1 006		6	1		6		/		6		/		6		6	/	6	/	6			
3NC1 008		8	1		8		2 x		8		3 x		8		8	2 x	8	3 x	8			
3NC1 010		10	1.5		10				10				10		10		10		10			
3NC1 012		12	1.5		12				12				12		12		12		12			
3NC1 016		16	2.5		16				16				16		16		16		16			
3NC1 020		20	2.5		20				20				20		20		20		20			
3NC1 025		25	4		25				24				24		25		25		25			
3NC1 032		32	6		32				28				28		30		32		29			
Size 14 x 51																						
3NC1 401	660	1	1		3NC1 451-1		1		--		--		--		3NC1 491	1	3NC1 492 2 x 3NC1 491	1	3NC1 493 3 x 3NC1 491	1		
3NC1 402		2	1				2									2		/		2	/	2
3NC1 403		3	1				3									3		2 x		3	3 x	3
3NC1 404		4	1	4					4		4		4									
3NC1 405	690	5	1	5					5		5		5									
3NC1 406		6	1	6					6		6		6									
3NC1 410		10	1.5	10					10		10		10									
3NC1 415		15	1.5	15					15		15		15									
3NC1 420		20	2.5	20					20		20		20									
3NC1 425		25	4	25					25		24		23									
3NC1 430		30	6	30					28		27		25									
3NC1 432		32	6	32					31		30		30									
3NC1 440		40	10	40					38		37		36									
3NC1 450		50	10	50				48		46		44										
Size 22 x 58																						
3NC2 220	690	20	2.5	3NC2 258-1	20	--	--	--	3NC2 291	20	3NC2 292 2 x 3NC2 291	20	3NC2 293 3 x 3NC2 291	20								
3NC2 225		25	4		25					25		/		25	/	25						
3NC2 232		32	6		32					32		2 x		32	3 x	32						
3NC2 240		40	10		40					40				39		38						
3NC2 250		50	10		50					50				48		46						
3NC2 263		63	16		63					60				58		56						
3NC2 280		80	25		80					74				71		69						
3NC2 200	600	100	35		100					95				90		85						

Fuse tongs: 3NC1 000

1) These values apply for stand-alone operation with open mounting and natural convection. If several devices are butt-mounted (side-by-side) and/or subject to unfavorable cooling conditions, these values may be reduced still further.

Load capability of SITOR cylindrical fuses with strikers in cylindrical fuse disconnectors

For SITOR fuse links	Rated voltage V AC	Rated current I_n A	Required conductor cross-section Cu mm ²	Cylindrical fuse disconnectors					
				1-pole Type	I_{max} A	2-pole Type	I_{max} A	3-pole Type	I_{max} A
Size 14 x 51									
3NC1 410-5	690	10	1.5	3NC1 491	10	3NC1 492/ 2 x 3NC1 491-5	10	3NC1 493/ 3 x 3NC1 491-5	10
3NC1 415-5		15	1.5		15		15		
3NC1 420-5		20	2.5		20		20		
3NC1 425-5		25	4		25		25		
3NC1 430-5		30	6		30		30		
3NC1 432-5		32	6		32		32		
3NC1 440-5		40	10		38		35		
3NC1 450-5		50	10		48		46		
Size 22 x 58									
3NC2 220-5	690	20	2.5	3NC2 291	20	3NC2 292/ 2 x 3NC2 291-5	20	3NC2 293/ 3 x 3NC2 291-5	20
3NC2 225-5		25	4		25		25		
3NC2 232-5		32	6		32		31		
3NC2 240-5		40	10		40		39		
3NC2 250-5		50	10		45		43		
3NC2 263-5		63	16		59		55		
3NC2 280-5		80	25		71		69		
3NC2 200-5		600	100		35		94		90

Low-Voltage Fuse Systems

SITOR Semiconductor Fuses

SITOR cylindrical fuse links

Technical specifications

Type		3NC1 003	3NC1 006	3NC1 008	3NC1 010	3NC1 012	3NC1 016	3NC1 020	3NC1 025	3NC1 032	
Operational class (IEC 60269)		aR									
Rated voltage U_n	V	600 AC/400 DC									
Rated current I_n	A	3	6	8	10	12	16	20	25	32	
Melting I^2t value I^2t_s ($t_{vs} = 1$ ms)	A ² s	3	4	6	9	15	25	34	60	95	
Breaking I^2t value I^2t_A at U_n	A ² s	8	20	30	60	110	150	200	250	500	
Temperature rise at I_n (body center)	K	30		25	40	50	60	80	90	110	
Power dissipation at I_n	W	1.2	1.5	2	2.5	3	3.5	4.8	6	7.5	
Weight approx.	kg	0.01									

Type		3NC1 401	3NC1 402	3NC1 403	3NC1 404	3NC1 405	3NC1 406	3NC1 410	
Operational class (IEC 60269)		aR							
Rated voltage U_n	V	660 AC/700 DC				690 AC/700 DC			
Rated current I_n	A	1	2	3	4	5	6	10	
Melting I^2t value I^2t_s ($t_{vs} = 1$ ms)	A ² s	--				1.6	--	3.6	
Breaking I^2t value I^2t_A at U_n	A ² s	1.2	10	15	25	9	12	20	
Temperature rise at I_n (body center)	K	90	30	40	50	20	30	50	
Power dissipation at I_n	W	5	3	2.5	3	1.5	1.5	4	
Certification		acc. to UL 248-13							
Weight approx.	kg	0.02							

Type		3NC1 415	3NC1 420	3NC1 425	3NC1 430	3NC1 432	3NC1 440	3NC1 450	
Operational class (IEC 60269)		aR							
Rated voltage U_n	V	690 AC/700 DC							
Rated current I_n	A	15	20	25	30	32	40	50	
Melting I^2t value I^2t_s ($t_{vs} = 1$ ms)	A ² s	10	26	44	58	95	110	220	
Breaking I^2t value I^2t_A at U_n	A ² s	75	120	250	300	700	900	1800	
Temperature rise at I_n (body center)	K	60	70	80			100	110	
Power dissipation at I_n	W	5.5	6	7	9	7.6	8	9	
Certification		acc. to UL 248-13							
Weight approx.	kg	0.02							


Type		3NC2 220	3NC2 225	3NC2 232	3NC2 240	3NC2 250	3NC2 263	3NC2 280	3NC2 200
Operational class (IEC 60269)		aR							
Rated voltage U_n	V	690 AC/700 DC							600 AC/700 DC
Rated current I_n	A	20	25	32	40	50	63	80	100
Melting I^2t value I^2t_s ($t_{vs} = 1$ ms)	A ² s	34	50	80	100	185	310	620	1250
Breaking I^2t value I^2t_A at U_n	A ² s	220	300	450	700	1350	2600	5500	8000
Temperature rise at I_n (body center)	K	40	50	65	80	90	100	110	
Power dissipation at I_n	W	4.6	5.6	7	8.5	9.5	11	13.5	16
Certification		acc. to UL 248-13							
Weight approx.	kg	0.06							

Technical specifications

Type		3NC1 410-5	3NC1 415-5	3NC1 420-5	3NC1 425-5	3NC1 430-5	3NC1 432-5	3NC1 440-5	3NC1 450-5
Operational class (IEC 60269)		aR							
Rated voltage U_n	V	690 AC/700 DC ¹⁾							
Rated current I_n	A	10	15	20	25	30	32	40	50
Melting I^2t value I^2t_s ($t_{vs} = 1$ ms)	A ² s	3.6	9	26	47	58	68	84	200
Breaking I^2t value I^2t_A at U_n	A ² s	90	100	500	400	500	600	900	2000
Temperature rise at I_n (body center)	K	50	60	70	80	80	80	100	110
Power dissipation at I_n	W	4	5.5	6	7	9	7.6	8	9
Certification		acc. to UL 248-13							
Weight approx.	kg	0.02							

Type		3NC2 220-5	3NC2 225-5	3NC2 232-5	3NC2 240-5	3NC2 250-5	3NC2 263-5	3NC2 280-5	3NC2 200-5
Operational class (IEC 60269)		aR							
Rated voltage U_n	V	690 AC/700 DC ¹⁾							
Rated current I_n	A	20	25	32	40	50	63	80	100
Melting I^2t value I^2t_s ($t_{vs} = 1$ ms)	A ² s	19	34	54	68	135	280	600	1100
Breaking I^2t value I^2t_A at U_n	A ² s	240	350	500	800	1500	3000	6000	8500
Temperature rise at I_n (body center)	K	40	50	65	80	90	100	110	110
Power dissipation at I_n	W	5	6	8	9	9.5	11	13.5	16
Certification		acc. to UL 248-13							
Weight approx.	kg	0.06							

1) UL recognized.

Fuse bases			
Size		10 x 38	14 x 51
Rated voltage U_n	V AC	600	690
	V DC	600	690
Rated current I_n	A	32	50
Fuse switch disconnectors/fuse disconnectors			
Classifications		Fuse switch disconnectors	
Sizes		10 x 38	14 x 51
			with and without alarm switch
Rated voltage U_n	V AC	690	
Rated current I_n	A	32	50
max. power dissipation of fuse link ¹⁾	W	3 (6 mm ²) 4.3 (10 mm ²)	5 (10 mm ²) 6.5 (25 mm ²)
Supply terminals	mm ²	1.5 ... 25	1.5 ... 35
Utilization categories		22B/32 A/400 V AC 22B/10 A/690 V AC	22B/50 A/400 V AC 22B/20 A/690 V AC
Rated conditional short-circuit current			
• at 400 V	kA	50 (32 A gG)	100 (50 A gG)
Approvals			

1) These devices have been specially developed for the application of SITOR fuse links with regard to heat tolerance with heat dissipation and are therefore not recommended for standard applications.

Low-Voltage Fuse Systems




SITOR Semiconductor Fuses

SITOR cylindrical fuse links


Selection and ordering data

Size	I_n	U_n	Operational class	Order No.	Weight 1 unit approx.	PS*/P. unit
mm x mm	A	V AC/V DC			kg	Unit(s)
Cylindrical fuse links						
	10 x 38	3	600/--	aR	3NC1 003	0.009 10
		6			3NC1 006	0.009 10
		8			3NC1 008	0.009 10
		10			3NC1 010	0.009 10
		12			3NC1 012	0.009 10
		16			3NC1 016	0.009 10
		20			3NC1 020	0.009 10
		25			3NC1 025	0.009 10
		32			3NC1 032	0.009 10
	14 x 51	1	660/700	aR	3NC1 401	0.020 10
		2			3NC1 402	0.020 10
		3			3NC1 403	0.020 10
		4			3NC1 404	0.020 10
	5	690/700		3NC1 405	0.020 10	
	6			3NC1 406	0.020 10	
	10			3NC1 410	0.020 10	
	15			3NC1 415	0.020 10	
	20			3NC1 420	0.020 10	
	25			3NC1 425	0.020 10	
	30			3NC1 430	0.020 10	
	32			3NC1 432	0.020 10	
	40			3NC1 440	0.020 10	
	50			3NC1 450	0.020 10	
22 x 58	20	690/700	aR	3NC2 220	0.056 5	
	25			3NC2 225	0.056 5	
	32			3NC2 232	0.056 5	
	40			3NC2 240	0.056 5	
	50			3NC2 250	0.056 5	
	63			3NC2 263	0.056 5	
	80			3NC2 280	0.056 5	
	100	600/700		3NC2 200	0.056 5	
Cylindrical fuse links with striking pin						
14 x 51	10	690/700	aR	3NC1 410-5	0.020 10	
	15			3NC1 415-5	0.020 10	
	20			3NC1 420-5	0.020 10	
	25			3NC1 425-5	0.020 10	
	30			3NC1 430-5	0.020 10	
	32			3NC1 432-5	0.020 10	
	40			3NC1 440-5	0.020 10	
	50			3NC1 450-5	0.020 10	
22 x 58	20	690/700	aR	3NC2 220-5	0.056 5	
	25			3NC2 225-5	0.056 5	
	32			3NC2 232-5	0.056 5	
	40			3NC2 240-5	0.056 5	
	50			3NC2 250-5	0.056 5	
	63			3NC2 263-5	0.056 5	
	80			3NC2 280-5	0.056 5	
	100	600/700		3NC2 200-5	0.056 5	

Accessories

	Size	Version	Order No.	Weight 1 unit approx. kg	PS*/ P. unit Unit(s)
Fuse tongs					
	10 x 38, 14 x 51, 22 x 58		3NC1 000	0.069	1
Cylindrical fuse switch disconnectors					
	10 x 38	1-pole	3NC1 091	0.065	12
		2-pole	3NC1 092	0.131	6
		3-pole	3NC1 093	0.197	4
	14 x 51	1-pole	3NC1 491	0.125	6
		2-pole	3NC1 492	0.233	3
		3-pole	3NC1 493	0.350	2
Cylindrical fuse disconnectors					
	22 x 58	1-pole	3NC2 291	0.193	6
		2-pole	3NC2 292	0.381	3
		3-pole	3NC2 293	0.584	2
Cylindrical fuse switch disconnectors with alarm switches					
	for fuse links with striking pin 14 x 51	1-pole	3NC1 491-5	0.125	6
Cylindrical fuse switch disconnectors with alarm switches					
	for fuse links with striking pin 22 x 58	1-pole	3NC2 291-5	0.193	6
Cylindrical fuse bases					
	10 x 38	1-pole	3NC1 038-1	0.042	10
		2-pole	3NC1 038-2	0.077	8
		3-pole	3NC1 038-3	0.113	6
	14 x 51	1-pole ¹⁾	3NC1 451-1	0.120	3
	22 x 58	1-pole ¹⁾	3NC2 258-1	0.238	3
	Cylindrical fuse clip				
	for fuses 10 x 38 for fuses 14 x 51		3NC1 038 3NC1 451	0.002 0.005	20 20

1) The cylindrical fuse bases can be modularly expanded to make multi-pole bases.

	Size	Length approx. mm	Conductor crosssection mm ²	Load capacity up to A	Version	Order No.	Weight 1 unit approx. kg	PS*/ P. unit Unit(s)
Busbars								
	The load capacity values are valid for centered infeed.							
	Pins, insulated							
	Degree of pollution 2							
	Busbars, 1-phase							
	8 x 32 and 10 x 38	220 1000	16 16	120 120	fully insulated	5ST3 700	0.040	1/50
						5ST3 701	0.190	1/50
	14 x 51	1000	16	120		5SH5 324	0.320	1/50
	Busbars, 2-phase							
	8 x 32 and 10 x 38	220 1000	16 16	120 120	fully insulated	5ST3 704	0.060	1/25
						5ST3 705	0.290	1/20
	Busbars, 3-phase							
	8 x 32 and 10 x 38	220 1000	16 16	120 120		5ST3 708	0.100	1/25
						5ST3 710	0.430	1/20
	14 x 51	1000	16	120		5SH5 323	0.843	1/20
	End caps for busbars							
	1-phase					5ST3 748	0.001	1/10
	2 and 3-phase					5ST3 750	0.001	1/10

Low-Voltage Fuse Systems

SITOR Semiconductor Fuses

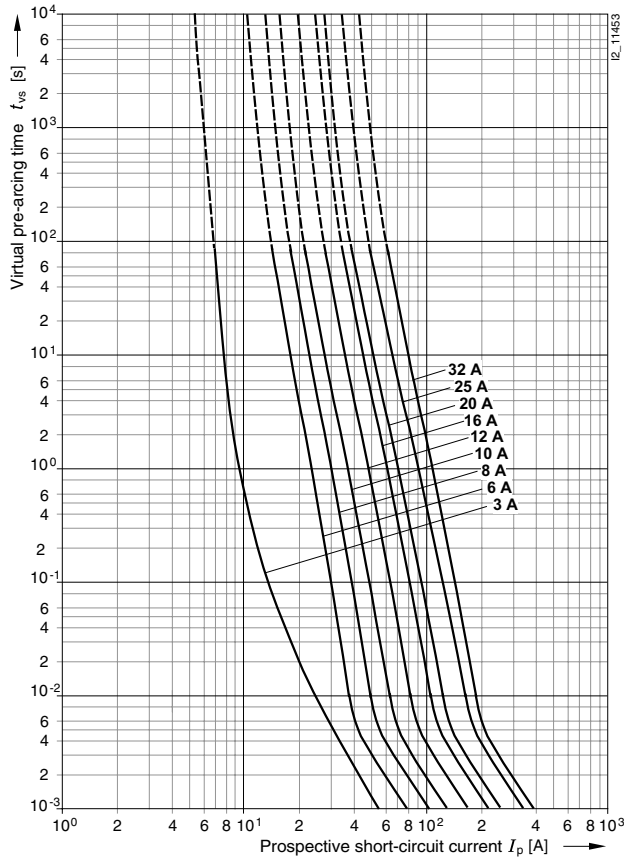
SITOR cylindrical fuse links

Characteristic curves

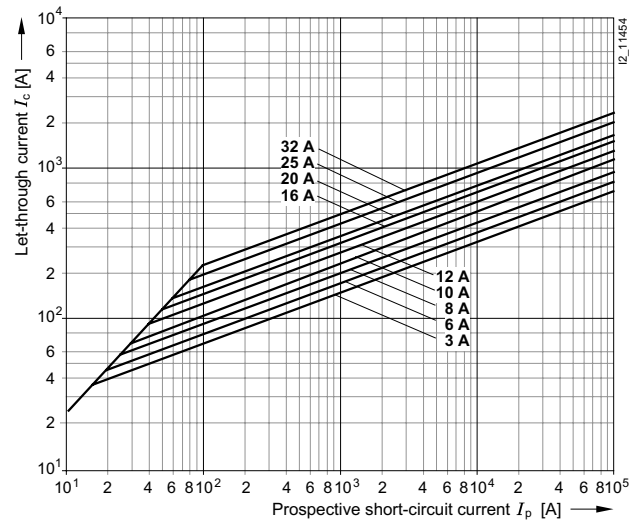
Series 3NC1 0

Size: 10 mm × 38 mm
 Operational class: aR
 Rated voltage: 600 V AC/ 400 V DC
 Rated current: 3 ... 32 A

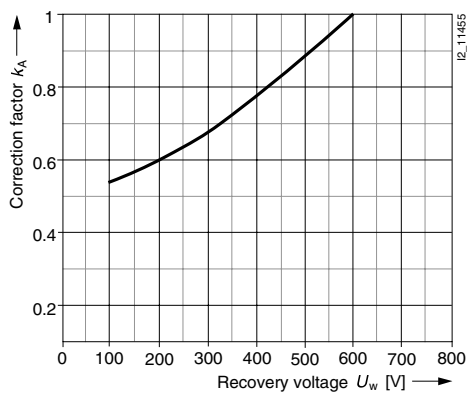
Time/current characteristics diagram



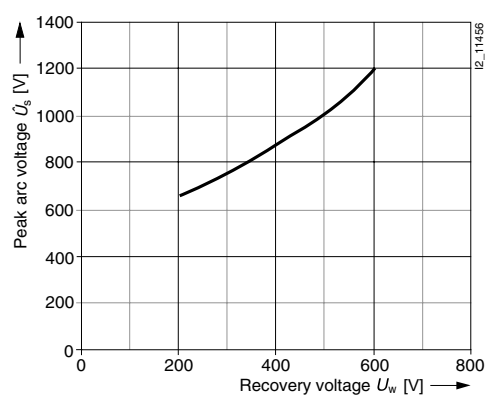
Let-through characteristics (current limitation at 50 Hz)



Correction factor k_A for breaking I^2t value



Peak arc voltage

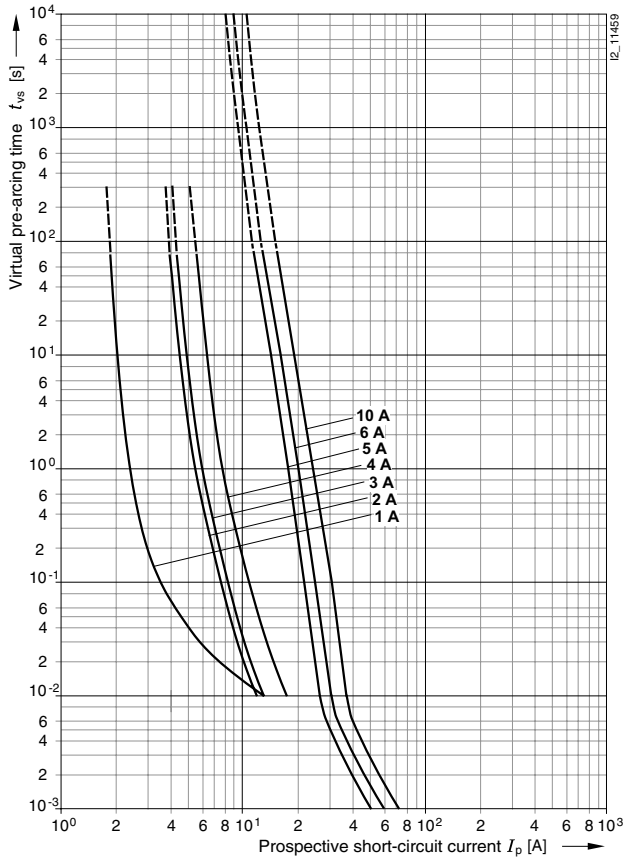


Characteristic curves

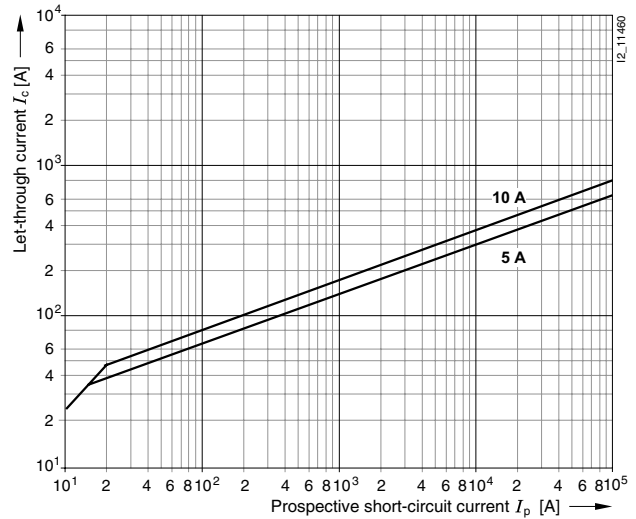
Series 3NC1 40, 3NC1 41

Size: 14 mm × 51 mm
 Operational class: aR
 Rated voltage: 660 V AC/700 V DC 1 ... 4 A); 690 V AC/ 700 V AC (5 ... 50 A)
 Rated current: 1 ... 10 A

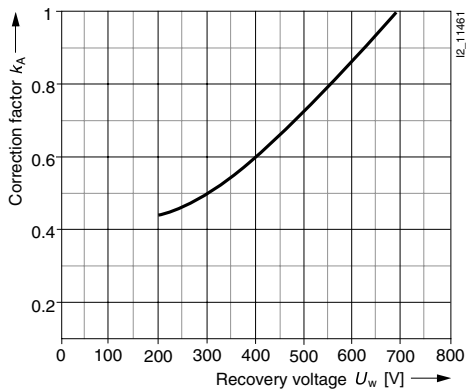
Time/current characteristics diagram



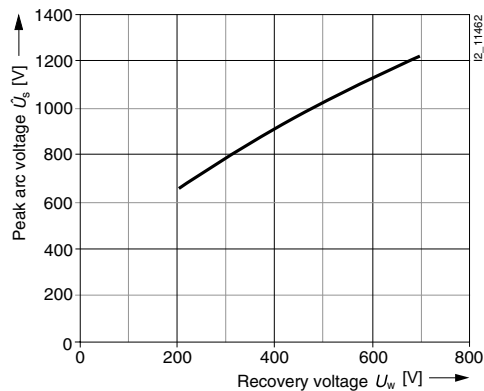
Let-through characteristics (current limitation at 50 Hz)



Correction factor k_A for breaking I^2t value



Peak arc voltage



Low-Voltage Fuse Systems

SITOR Semiconductor Fuses

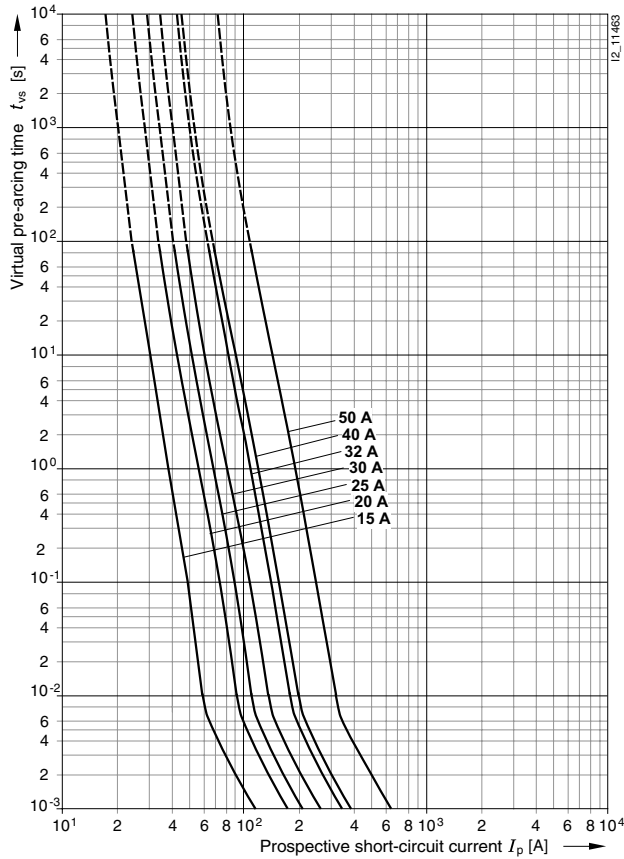
SITOR cylindrical fuse links

Characteristic curves

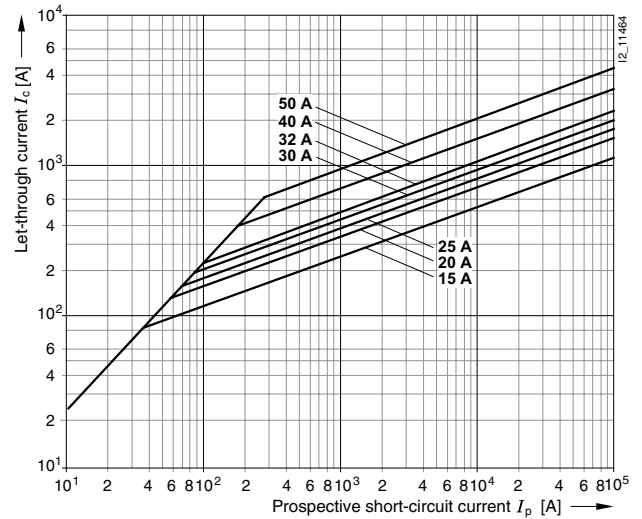
Series 3NC1 415, 3NC1 42., 3NC1 440, 3NC1 450

Size: 14 mm × 51 mm
 Operational class: aR
 Rated voltage: 690 V AC/ 700 V DC
 Rated current: 15 ... 50 A

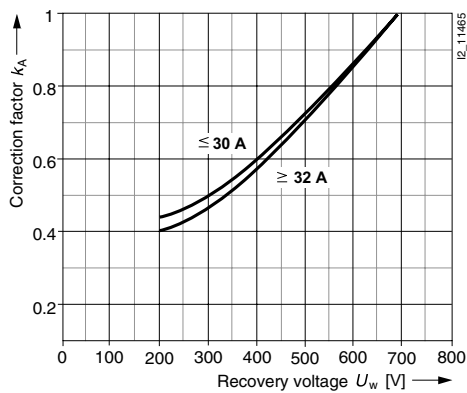
Time/current characteristics diagram



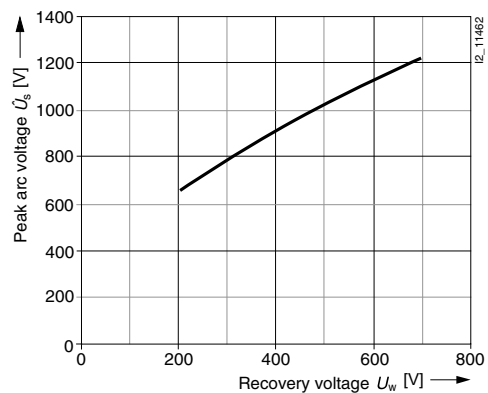
Let-through characteristics (current limitation at 50 Hz)



Correction factor k_A for breaking I^2t value



Peak arc voltage

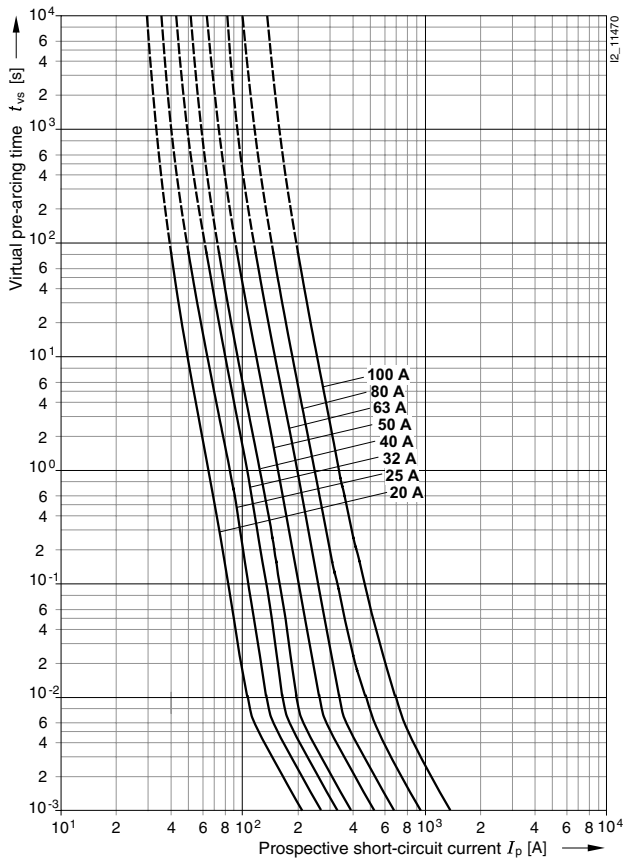


Characteristic curves

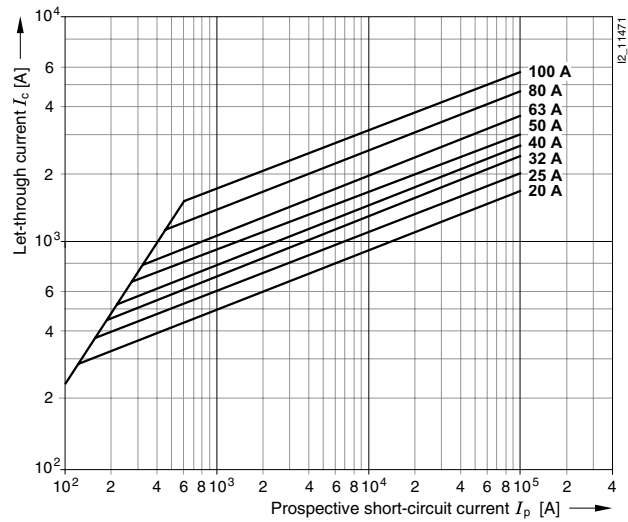
Series 3NC2 2

Size: 22 mm × 58 mm
 Operational class: aR
 Rated voltage: 690 V AC/700 V DC 20 ... 80 A
 600 V AC/ 700 V DC (100 A)
 Rated current: 20 ... 100 A

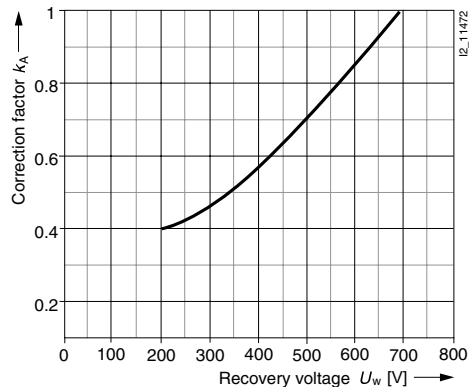
Time/current characteristics diagram



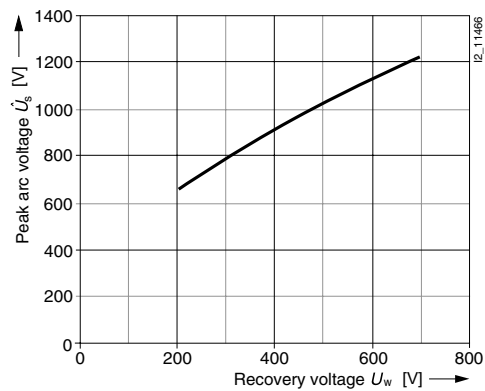
Let-through characteristics (current limitation at 50 Hz)



Correction factor k_A for breaking I^2t value



Peak arc voltage



Low-Voltage Fuse Systems

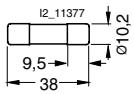
SITOR Semiconductor Fuses

SITOR cylindrical fuse links

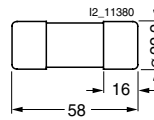
Dimensional drawings

Cylindrical fuse links

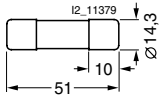
3NC1 0



3NC2 2

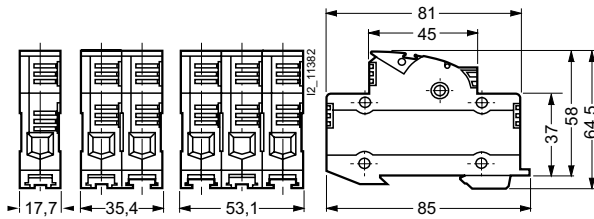


3NC1 4

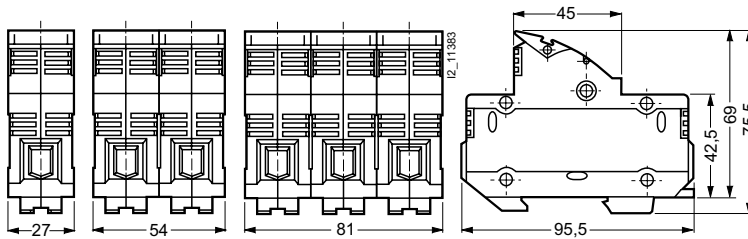


Cylindrical fuse switch disconnectors

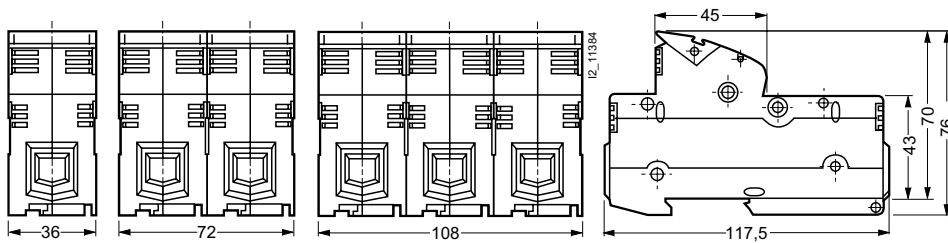
3NC1 09.



3NC1 49.



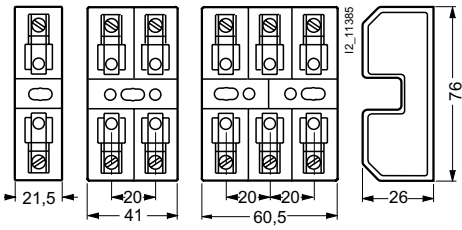
3NC2 29.



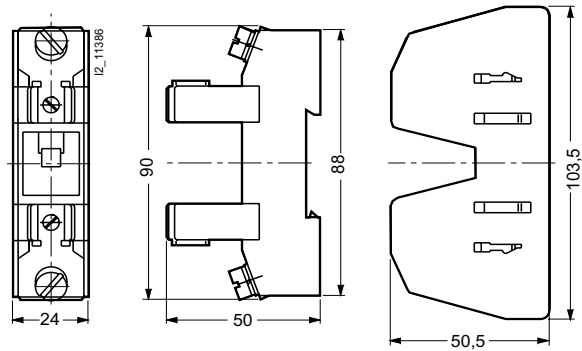
Dimensional drawings

Cylindrical fuse bases

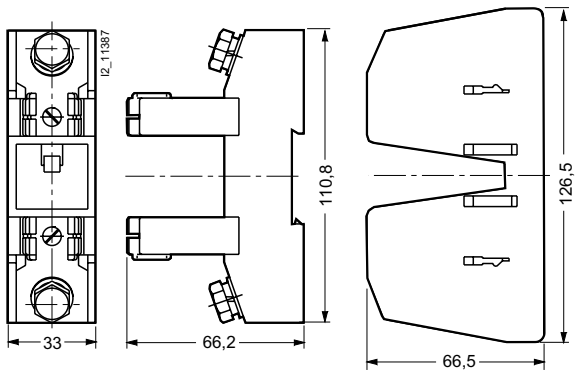
3NC1 038-1 to 3NC1 038-3



3NC1 451-1



3NC2 258-1



Low-Voltage Fuse Systems

SITOR Fuse Links for Special Applications

Product overview

Overview

For rectifiers in electrolysis systems



- Rated voltage U_n 600 ... 1000 V AC
- Rated current I_n 350 ... 1250 A
- aR, gR operational class

For SITOR thyristor sets



- Rated voltage U_n 800/1000 V AC
- Rated current I_n 50 ... 710 A
- aR, gR operational class

For railway supply rectifiers



- Rated voltage U_n 680 V AC
- Rated current I_n 250/350 A
- aR operational class

Technical specifications

Type		3NC5 531 ¹⁾	3NC5 841 ¹⁾	3NC5 840 ¹⁾	3NC5 838 ¹⁾
Operational class (IEC 60269)		aR			
Rated voltage U_n	V AC	800		1000	
Rated current I_n	A	350 ²⁾	630 ²⁾	600 ²⁾	800 ²⁾
Melting I^2t value I^2t_s ($t_{vs} = 1$ ms)	A ² s	66000	185000		360000
Breaking I^2t value I^2t_A at U_n	A ² s	260000	888000		1728000
Temperature rise at I_n (body center)	K	200	110		130
Power dissipation at I_n	W	80	145	150	170
Varying load factor WL		0.9			
Weight approx.	kg	0.67	1.2	1.4	1.2

Type		3NE9 440-6	3NE9 450	3NE6 437	3NE6 444	3NE9 450-7	3NE6 437-7
Operational class (IEC 60269)		gR	aR				
Rated voltage U_n	V AC	600		900		600	900
Rated current I_n	A	850	1250 ⁴⁾	710 ⁴⁾	900 ⁴⁾	1250 ⁵⁾	710 ⁵⁾
Melting I^2t value I^2t_s ($t_{vs} = 1$ ms)	A ² s	400000		100000	400000		100000
Breaking I^2t value I^2t_A at U_n	A ² s	2480000		620000	1920000	2480000	620000
Temperature rise at I_n (body center)	K	74	80			105	110
Power dissipation at I_n	W	85	210	150	170	210	150
Varying load factor WL		1.0	0.9				
Weight approx.	kg	1.0			1.1	1.0	

Selection and ordering data

I_n	U_n	Operational class	Order No.	Weight 1 unit approx.	PS*/P. unit
A	V AC			kg	Unit(s)

For rectifiers in electrolysis systems

for screwing onto water-cooled power rails



350	800	aR	3NC5 531	0.671	1/3
600	1000		3NC5 840	1.408	3
630	800		3NC5 841	1.185	3
800	1000		3NC5 838	1.196	3
710	900		3NE6 437-7	1.168	3
1250	600		3NE9 450-7	1.245	3

For air-cooled rectifiers in electrolysis systems



710	800	gR	3NE6 437	1.093	3
850	1000		3NE9 440-6	1.082	3
900	1000	aR	3NE6 444	1.175	3
1250	800		3NE9 450	1.114	3

- Maximum tightening torque:
 - M10 thread (with indicator): 40 Nm
 - M10 capped thread: 50 Nm, depth of screw entry ≥ 9 mm
 - M24 \times 1.5 thread: 60 Nm.
- Temperature of water-cooled busbar max. +45 °C.
- Maximum tightening torque: M10 capped thread: 35 Nm, depth of screw entry ≥ 9 mm.
- Cooling air speed ≥ 2 m/s.
- Bottom (cooled) connection max. +60 °C, top connection (M10) max. +110 °C.

Low-Voltage Fuse Systems

SITOR Fuse Links for Special Applications

For rectifiers in electrolysis systems

Characteristic curves

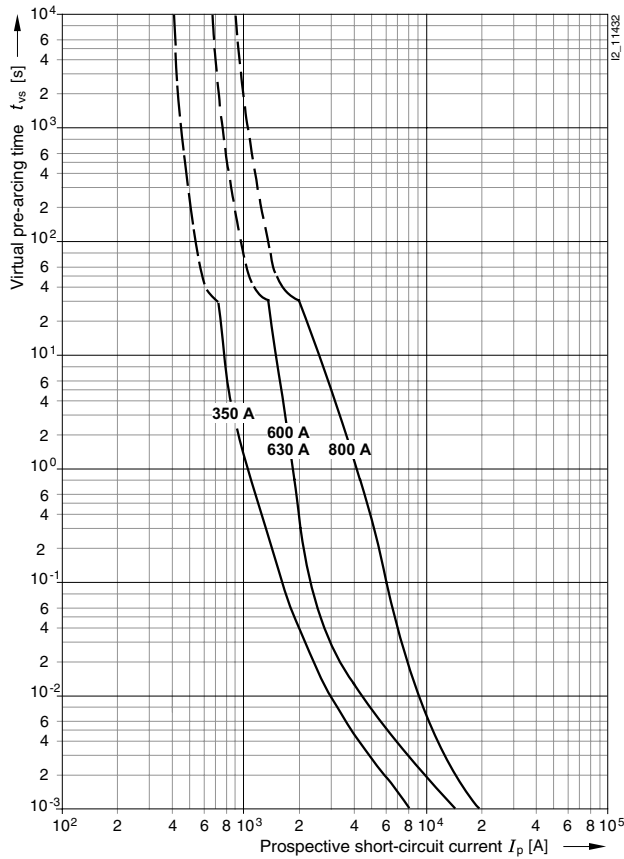
Series 3NC5 531, 3NC5 8..

Operational class: aR

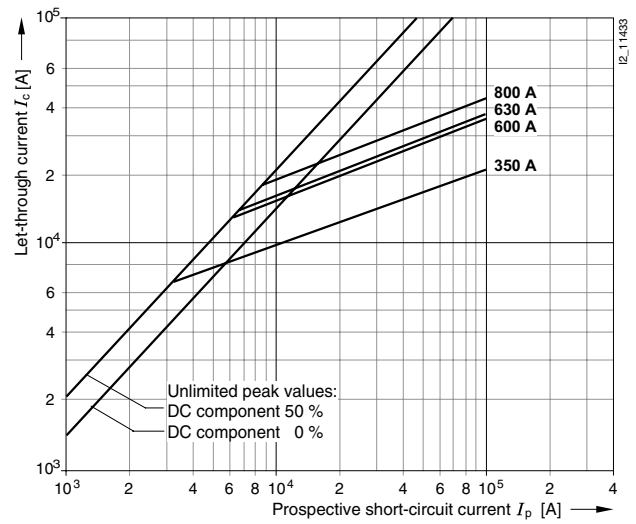
Rated voltage: 800 V AC (350 A, 600 A),
1000 V AC (600 A, 800 A)

Rated current: 350 ... 800 A

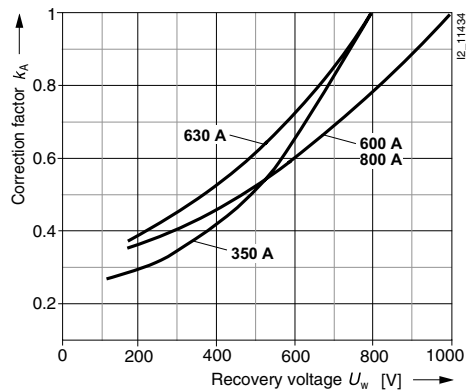
Time/current characteristics diagram



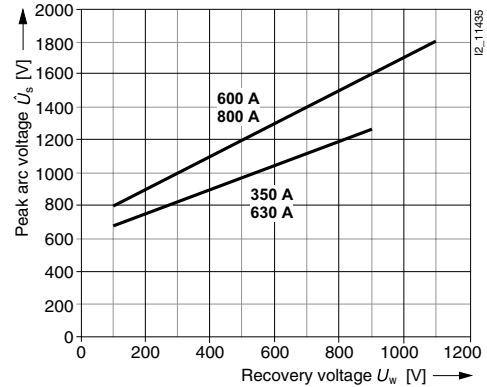
Let-through characteristics (current limitation at 50 Hz)



Correction factor k_A for breaking I^2t value



Peak arc voltage



Characteristic curves

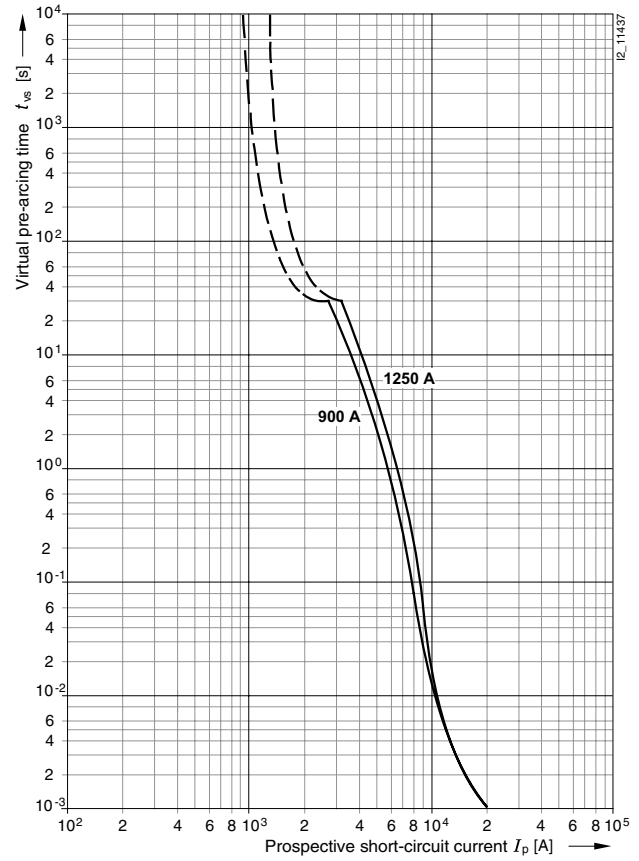
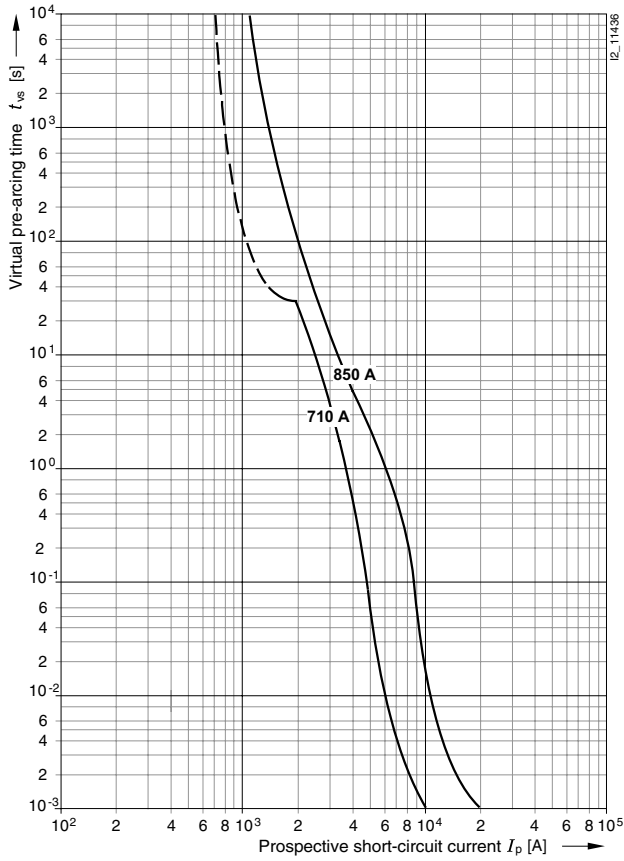
Series 3NE6 4..., 3NE9 4..

Operational class: aR, gR

Rated voltage: 600 V AC (1250 A),
800 V AC (710 A, 1250 A)
900 V AC (710 A)

Rated current: 710 ... 1250 A

Time/current characteristics diagrams



Low-Voltage Fuse Systems

SITOR Fuse Links for Special Applications

For rectifiers in electrolysis systems

Characteristic curves

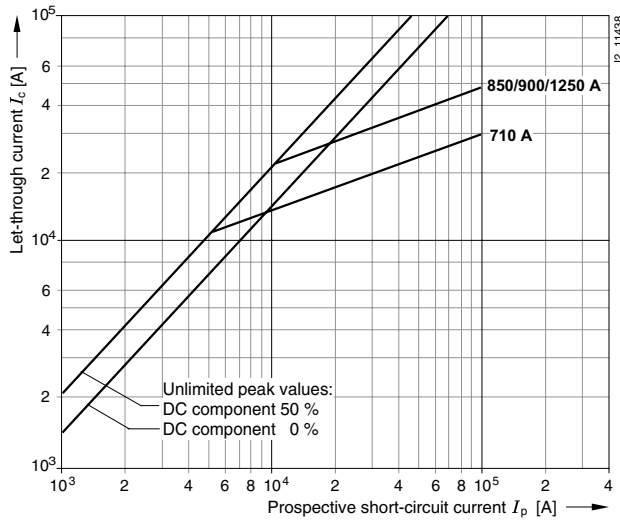
Series 3NE6 4.., 3NE9 4..

Operational class: aR, gR

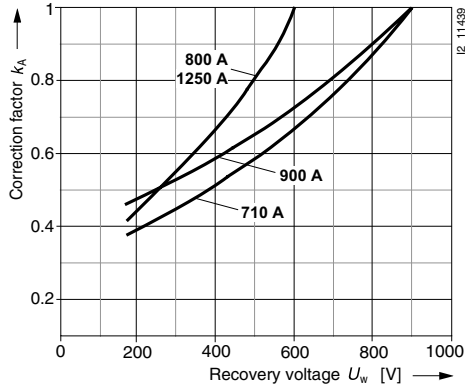
Rated voltage: 600 V AC (1250 A),
800 V AC (710 A, 1250 A)
900 V AC (710 A)

Rated current: 710 ... 1250 A

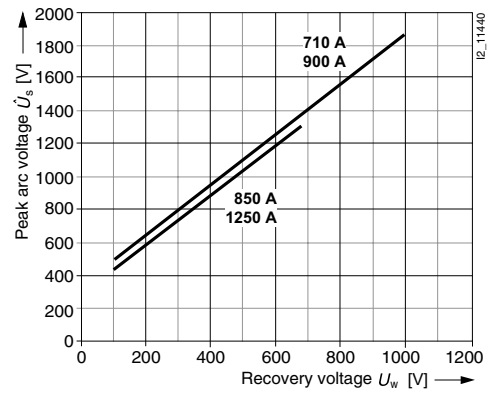
Let-through characteristics (current limitation at 50 Hz)



Correction factor k_A for breaking I^2t value



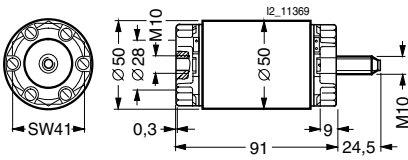
Peak arc voltage



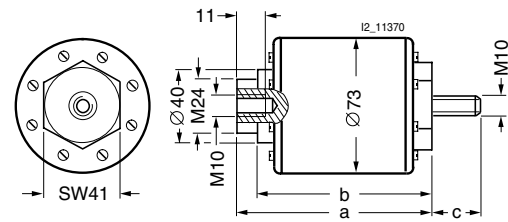
For rectifiers in electrolysis systems

Dimensional drawings

3NC5 531

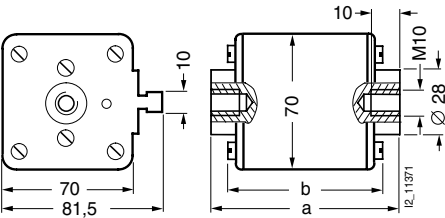


3NC5 8..



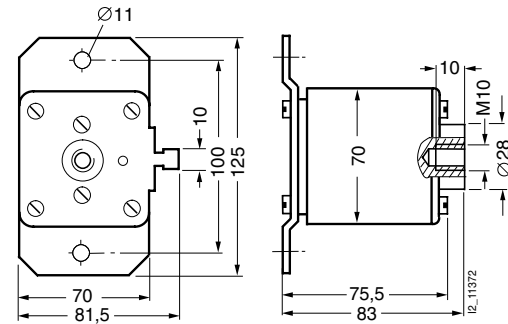
Type	Dimensions		
	a	b	c
3NC5 838, 3NC5 841	98	88.5	25
3NC5 844	119	109.5	20.5

3NE6 4..., 3NE9 4...



Type	Dimensions	
	a	b
3NE6 437, 3NE9 440-6, 3NE9 450	89	76
3NE6 444	99	86

3NE6 4..-7, 3NE9 4..-7



Low-Voltage Fuse Systems

SITOR Fuse Links for Special Applications

For SITOR thyristor sets

Technical specifications



Type		3NE4 117-5	3NE4 121-5	3NE4 146-5	3NE3 525-5 ¹⁾	3NE3 535-5 ¹⁾
Operational class (IEC 60269)		gR	aR			
Rated voltage U_n	V AC	1000		800	1000	
Rated current I_n	A	50	100	170	200 ²⁾	450 ²⁾
Melting I^2t value I^2t_s ($t_{vs} = 1$ ms)	A ² s	135	900	7370	7150	64500
Breaking I^2t value I^2t_A at U_n	A ² s	1100	7400	60500	44000	395000
Temperature rise at I_n (body center)	K	95	135	142	75	130
Power dissipation at I_n	W	20	35	43	50	90
Varying load factor WL		0.85				
Weight approx.	kg	0.28				0.7

Type		3NE4 327-6B ¹⁾	3NE4 330-6B ¹⁾	3NE4 333-6B ¹⁾	3NE4 334-6B ¹⁾	3NE4 337-6 ¹⁾
Operational class (IEC 60269)		aR				
Rated voltage U_n	V AC	800				
Rated current I_n	A	250	315	450	500	710
Melting I^2t value I^2t_s ($t_{vs} = 1$ ms)	A ² s	3600	7400	29400	42500	142000
Breaking I^2t value I^2t_A at U_n	A ² s	29700	60700	191000	276000	923000
Temperature rise at I_n (body center)	K	175	170	190	195	170
Power dissipation at I_n	W	105	120	140	155	
Varying load factor WL		0.85				0.95
Weight approx.	kg	0.65				

1) Maximum tightening torque: M10 capped thread: 35 Nm, depth of screw entry ≥ 9 mm.

2) Cooling air speed ≥ 0.5 m/s. In the case of natural air cooling, reduction of 5%.

Selection and ordering data

	I_n	U_n	Operational class	Order No.	Weight 1 unit approx.	PS*/P. unit
	A	V AC			kg	Unit(s)
For SITOR 6QG10 thyristor sets						
	200	1000	aR	3NE3 525-5	0.744	3
	450			3NE3 535-5	0.746	3
For SITOR 6QG11 thyristor sets						
	50	1000	gR	3NE4 117-5	0.303	1/3
	100		aR	3NE4 121-5	0.309	1/3
	170	800		3NE4 146-5	0.311	1/3
For SITOR 6QG12 thyristor sets						
	250	800	aR	3NE4 327-6B	0.692	3
	315			3NE4 330-6B	0.688	3
	450			3NE4 333-6B	0.690	3
	500			3NE4 334-6B	0.688	3
	710			3NE4 337-6	0.689	3

Characteristic curves

Series 3NE3 5.5-5, 3NE4 1..-5

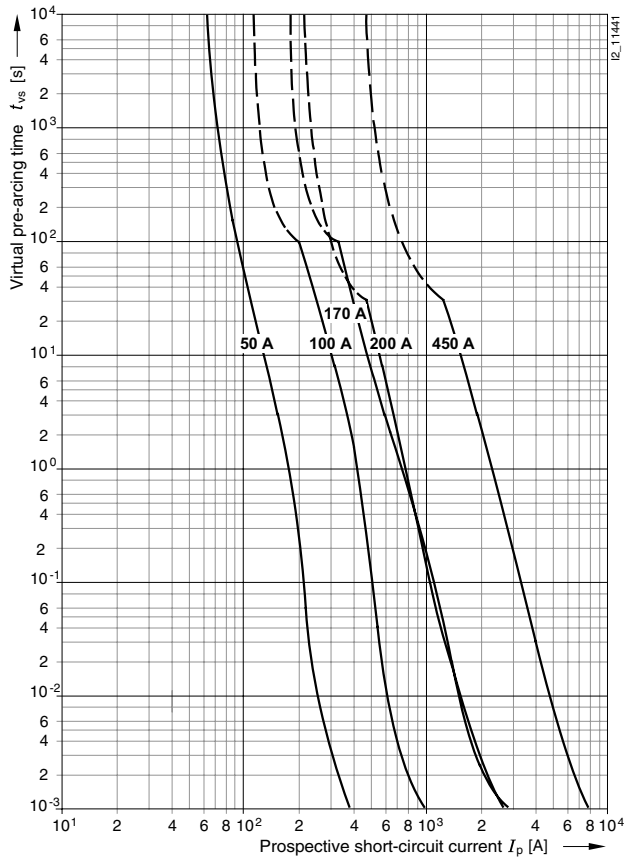
Operational class: aR, gR

Rated voltage: 800 V AC (170 A)

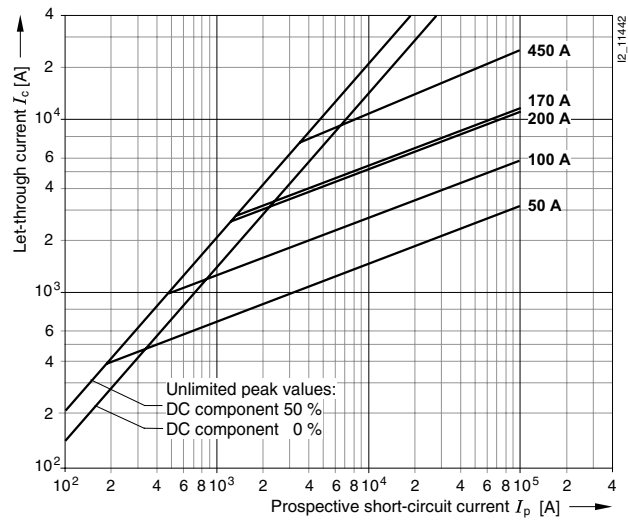
1000 V AC (50 A, 100 A, 200 A, 450 A)

Rated current: 50 ... 450 A

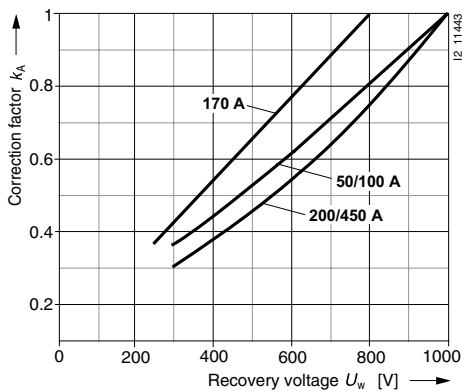
Time/current characteristics diagram



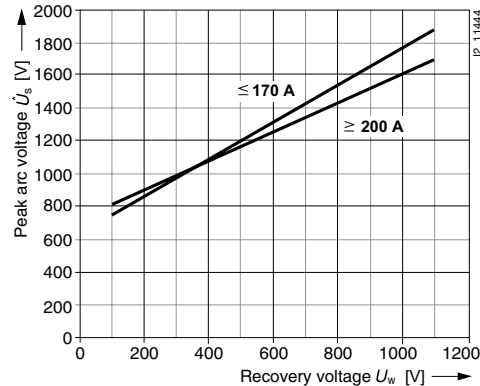
Let-through characteristics (current limitation at 50 Hz)



Correction factor k_A for breaking I^2t value



Peak arc voltage



Low-Voltage Fuse Systems

SITOR Fuse Links for Special Applications

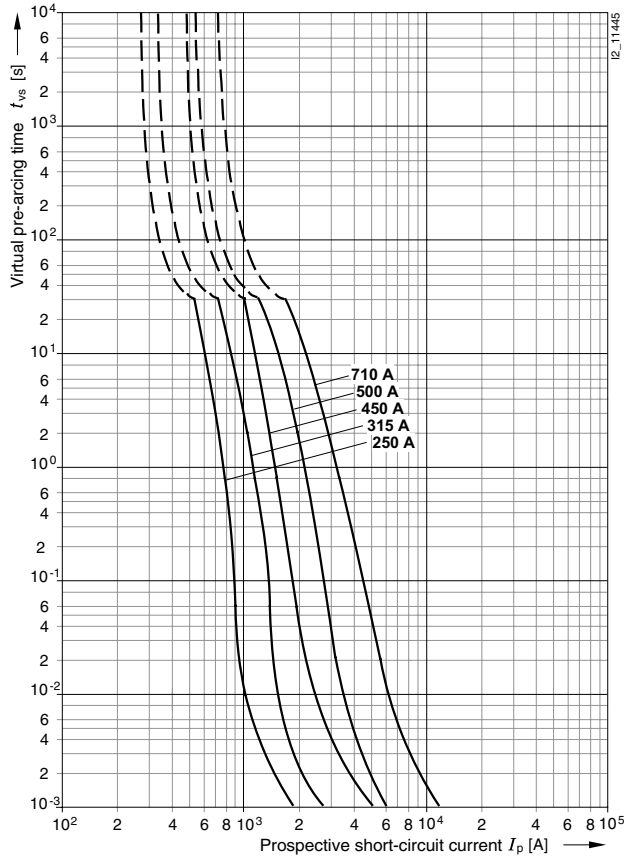
For SITOR thyristor sets

Characteristic curves

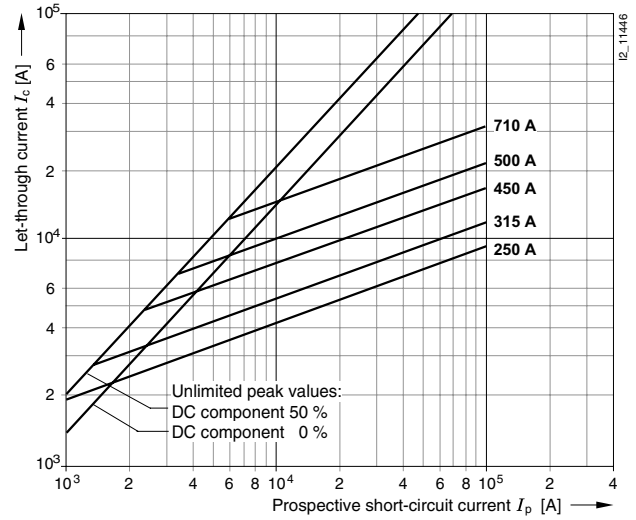
Series 3NE4 3...6B, 3NE4 337-6

Operational class: aR
 Rated voltage: 800 V AC
 Rated current: 250 ... 710 A

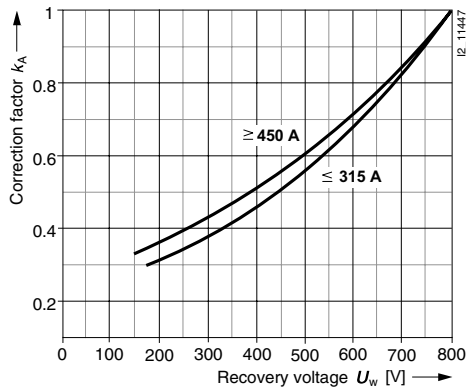
Time/current characteristics diagram



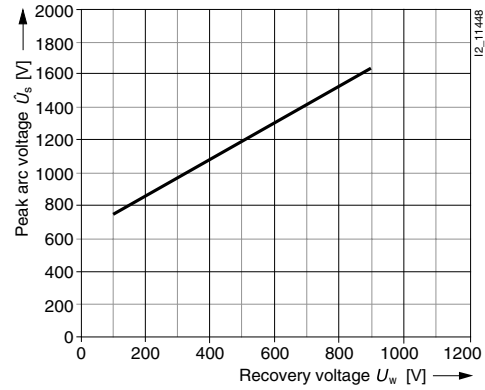
Let-through characteristics (current limitation at 50 Hz)



Correction factor k_A for breaking I^2t value

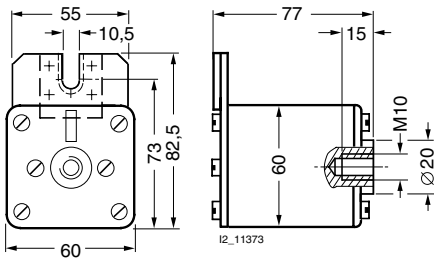


Peak arc voltage

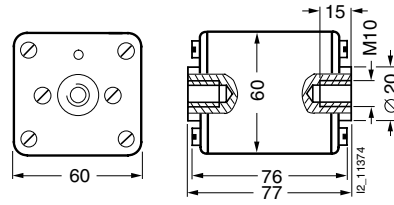


Dimensional drawings

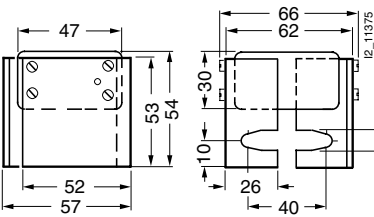
3NE3 5..-5



3NE4 3..-6B, 3NE4 337-6



3NE4 1..-5



Low-Voltage Fuse Systems

SITOR Fuse Links for Special Applications

For railway supply rectifiers

Technical specifications

Type		3NC7 327-2	3NC7 331-2
Operational class (IEC 60269)		aR	
Rated voltage U_n	V AC	680	
Rated current I_n	A	250	350
Melting I^2t value I^2t_s ($t_{vs} = 1$ ms)	A ² s	244000	550000
Breaking I^2t value I^2t_A at U_n	A ² s	635000	1430000
Temperature rise at I_n (body center)	K	45	66
Power dissipation at I_n	W	25	32
Varying load factor WL		0.9	
Weight approx.	kg	0.7	

Selection and ordering data

	I_n	U_n	Operational class	Order No.	Weight 1 unit approx.	PS*/P. unit
	A	V AC			kg	Unit(s)
For railway supply rectifiers	250	680	aR	3NC7 327-2	0.725	3
	350			3NC7 331-2	0.740	3

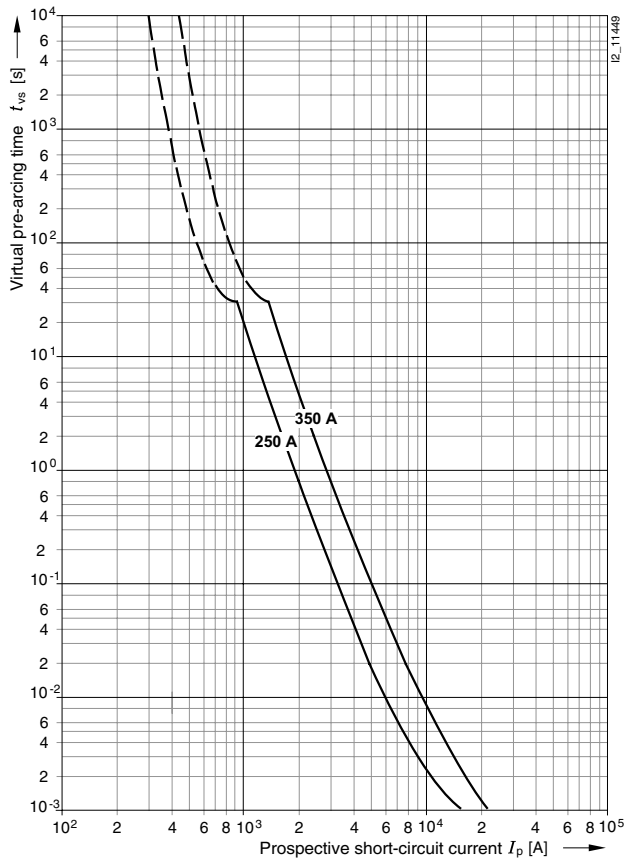


Characteristic curves

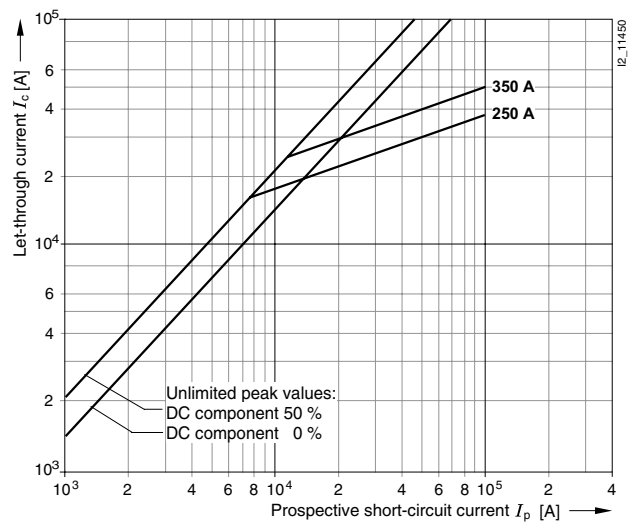
Series 3NC7 3..-2

Operational class: aR
 Rated voltage: 680 V AC
 Rated current: 250 A, 350 A

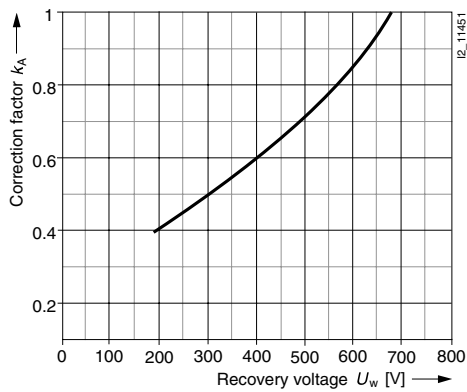
Time/current characteristics diagram



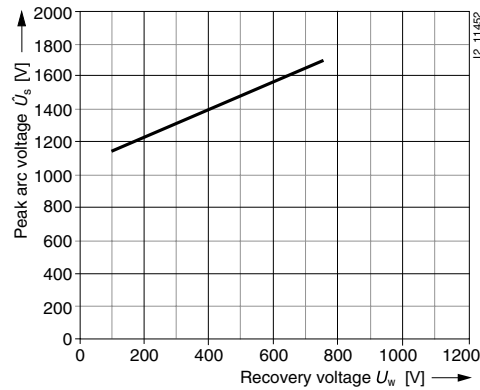
Let-through characteristics (current limitation at 50 Hz)



Correction factor k_A for breaking I^2t value



Peak arc voltage



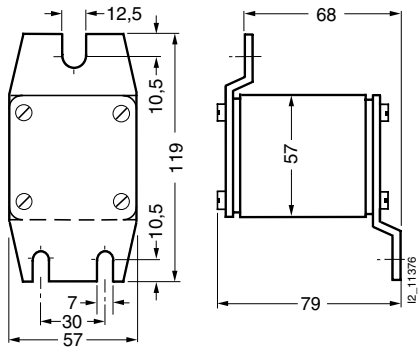
Low-Voltage Fuse Systems

SITOR Fuse Links for Special Applications

For railway supply rectifiers

Dimensional drawings

3NC7 3..-2



Overview

The fuse links are selected according to rated voltage, rated current, breaking I^2t value I^2t_A and varying loadfactor, taking into consideration other specified conditions. Unless stated otherwise, all of the following data refer to AC operation from 45 Hz to 62 Hz.

Rated voltage U_n

The rated voltage of a SITOR fuse link is the voltage specified as the r.m.s. value of the AC voltage on the fuse link and in the order and configuration data and the characteristics.

Always ensure that the rated voltage of the fuse link you select is such that the fuse link will reliably quench the voltage driving the short-circuit current. The driving voltage must not exceed the value $U_n + 10\%$. Please note that the supply voltage U_{V0} of a power converter can also be increased by 10%. If, in the shorted circuit, two arms of a converter connection are connected in series, and if the short-circuit current is sufficiently high, it can be assumed that voltage sharing is uniform. It is essential to observe the instructions in 'Series connection of fuse links' on page 1/209.

Rectifier operation

With converter equipment that can only be used for rectifier operation, the supply voltage U_{V0} is the driving voltage.

Inverter operation

With converter equipment that can also be used for inverter operation, shoot-throughs may occur as faults. In this case, the driving voltage U_{WK} in the shorted circuit is the sum of the infeed direct voltage (e.g. the e.m.f. of the DC generator) and the AC-line supply voltage. When rating a fuse link, this sum can be replaced by an AC voltage whose r.m.s. value is 1.8 times that of the AC-line supply voltage, which corresponds to ($U_{WK} = 1.8 U_{V0}$). The fuse links must be rated so that they reliably quench the voltage U_{WK} .

Rated current I_n , load capability

The rated current of a SITOR fuse link is the current specified as r.m.s. value of the alternating current for the frequency range 5 Hz to 62 Hz in the Selection and ordering data and Characteristic curves, as well as on the fuse link itself.

When operating fuse links with rated current, the following are considered normal operating conditions:

- Natural air cooling with an ambient temperature of +45 °C
- Conductor cross-sections equal test cross-sections (see Test cross-sections table), for operation in LV HRC fuse bases and switch disconnectors, please refer to the Selection and ordering data
- Conduction angle of a half-period 120 °el
- Continuous load maximum with rated current.

For operating conditions that deviate from the above, the permissible load current I_n' of the SITOR fuse link can be determined using the following formula:

$$I_n' = k_u \times k_q \times k_\lambda \times k_i \times WL \times I_n$$

whereby

I_n Rated current of the fuse link¹⁾

k_u Correction factor; ambient temperature (see page 1/204)

k_q Correction factor; conductor cross-section (see page 1/204)

k_λ Correction factor; conduction angle (see page 1/204)

k_i Correction factor; forced-air cooling (see page 1/204)

WL Varying load factor (see page 1/205)

Test cross-sections

Rated current I_n	Test cross-sections	
	(series 3NC1 0, 3NC1 1, 3NC1 4, 3NC1 5, 3NC2 2, 3NE1 ..., 3NE8 0..., 3NE4 1)	(all other series)
A	Cu mm ²	Cu mm ²
10	1.0	--
16	1.5	--
20	2.5	45
25	4	45
35	6	45
40	10	45
50	10	45
63	16	45
80	25	45
100	35	60
125	50	80
160	70	100
200	95	125
224	--	150
250	120	185
315	2 x 70	240
350	2 x 95	260
400	2 x 95	320
450	2 x 120	320
500	2 x 120	400
560	2 x 150	400
630	2 x 185	480
710	2 x (40 x 5)	560
800	2 x (50 x 5)	560
900	2 x (80 x 4)	720
1000	--	720
1250	--	960

1) When using SITOR fuse links in LV HRC fuse bases according to IEC/EN 60269-2-1 and fuse switch-disconnectors and switch disconnectors with fuses, please also refer to the data in the Selection and ordering data.

Low-Voltage Fuse Systems

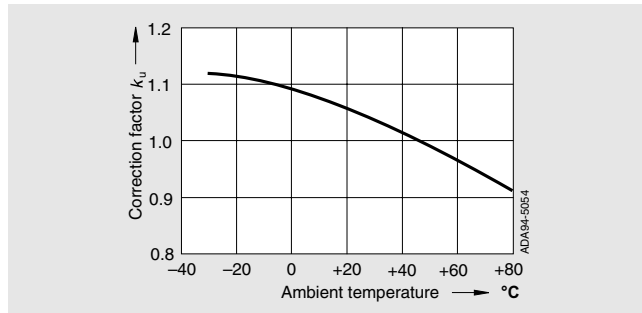
General Information on SITOR Semiconductor Fuses

Technical explanations

Overview

Correction factor; ambient temperature k_u

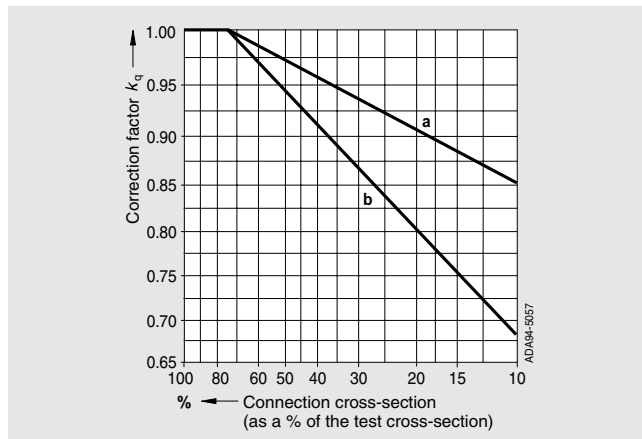
The influence of the ambient temperature on the permissible load of the SITOR fuse links is taken into account using the correction factor k_u as shown in the following graph.



Correction factor; conductor cross-section k_q

The rated current of the SITOR fuse links applies to operation with conductor cross-sections that correspond to the respective test cross-section (see the table on page 1/203).

In the case of reduced conductor cross-sections, the correction factor k_q must be used as shown in the following graph.

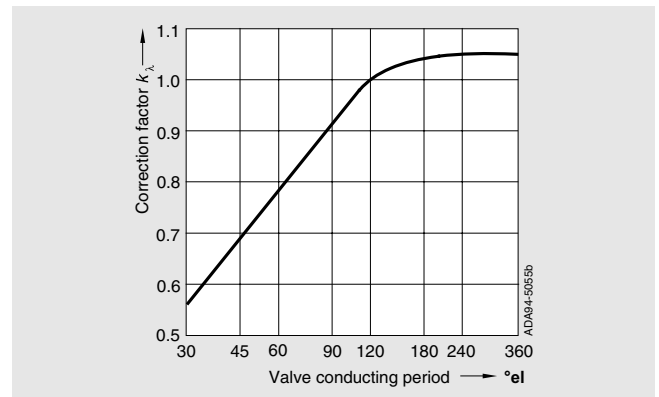


a = reduction of cross-section of one connection

b = reduction of cross-section of both connections

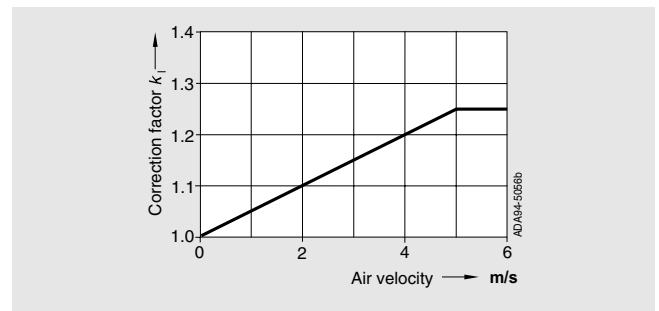
Correction factor; conduction angle k_λ

The rated current of the SITOR fuse links is based on a sinusoidal alternating current (45 Hz to 62 Hz). However, in converter operation, the arm fuses are loaded with an intermittent current, whereby the conduction angle is generally 180 °el or 120 °el. With this load current wave form, the fuse link can still carry the full rated current. In the case of smaller conduction angles, the current must be reduced in accordance with the following graph.



Correction factor; forced-air cooling k_f

In the case of increased air cooling, the current carrying capacity of the fuse link increases with the air speed, air speeds > 5 m/s do not effect any significant further increase of current carrying capacity.



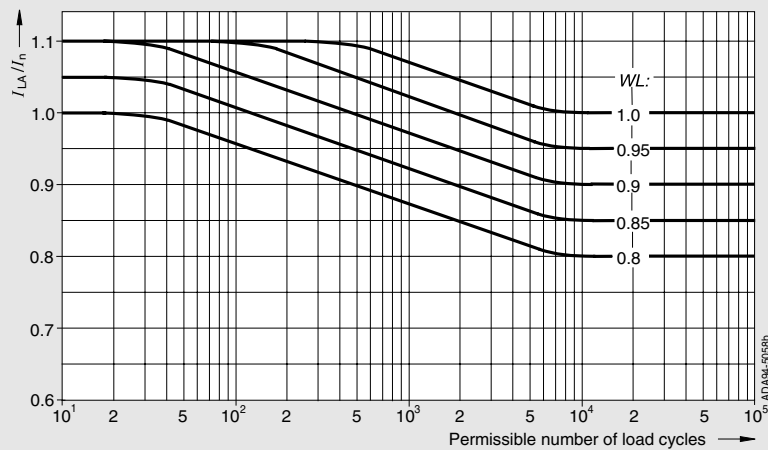
Overview

Varying load factor WL

The varying load factor WL is a reduction factor by which the non-aging current carrying capacity of the fuse links can be determined for any load cycles. Due to their design, the SITOR fuse links have a range of different varying load factors. In the characteristic curves of the fuse links, the respective varying load factor WL for > 10000 load changes (1 hour "ON", 1 hour "OFF") is specified for the expected operating time of the fuse links. In the event of a lower number of

load changes during the expected operating time, it may be possible to use a fuse link with a smaller varying load factor WL as shown in the following graph.

In the case of uniform loads (no load cycles and no shutdowns), the varying load factor can be taken as $WL = 1$. For load cycles and shutdowns that last longer than 5 min. and are more frequent than once a week, you need to select the varying load factor WL specified in the characteristic curves of the individual fuse links.



Waveform of the varying load factor WL for load cycles

Fuse currents for operation in power converter

The r.m.s. value of the fuse current can be calculated for the most common converter connections from the (smoothed) direct current I_d or the conductor current I_L according to the following table.

Converter connection		R.m.s. value of the conductor current (phase fuse)	R.m.s. value of the branch-circuit current (arm fuse)
One-pulse center tap connection	(M1)	$1.57 I_d$	--
Double-pulse center tap connection	(M2)	$0.71 I_d$	--
Three-pulse center tap connection	(M3)	$0.58 I_d$	--
Six-pulse center tap connection	(M6)	$0.41 I_d$	--
Double three-pulse center tap connection (parallel)	(M3.2)	$0.29 I_d$	--
Two-pulse bridge connection	(B2)	$1.0 I_d$	$0.71 I_d$
Six-pulse bridge connection	(B6)	$0.82 I_d$	$0.58 I_d$
Single-phase bidirectional connection	(W1)	$1.0 I_L$	$0.71 I_L$

Low-Voltage Fuse Systems

General Information on SITOR Semiconductor Fuses

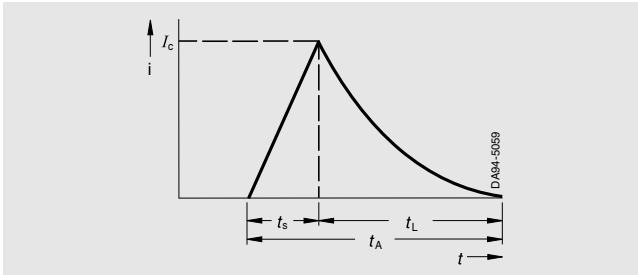
Technical explanations

Overview

I^2t values

In the event of a short-circuit, the current of the fuse link increases during melting time t_s up to let-through current I_c (melting current peak).

During the arc quenching time t_L , the electric arc develops and the short-circuit current is quenched (see the following graph).



Current path when switching fuse links

The integral of the current squared ($\int I^2 dt$) over the entire switching period ($t_s + t_L$), known as the breaking I^2t value, determines the heat to be fed to the semiconductor device that is to be protected during the breaking procedure.

In order to ensure sufficient protection, the breaking I^2t value of the fuse link must be smaller than the I^2t value of the semiconductor device. As the temperature increases, i.e. preloading increases, the breaking I^2t value of the fuse link decreases almost in the same way as the I^2t value of a semiconductor device, so that it is enough to compare the I^2t values in a non-loaded (cold) state.

The breaking I^2t value (I^2t_A) is the sum of the melting I^2t value (I^2t_s) and the quenching I^2t value (I^2t_L).

$(\int I^2 dt)$ (semiconductor, $t_{vj} = 25^\circ\text{C}$,
 $t_p = 10 \text{ ms}) > (\int I^2 dt_A)$ (fuse link)

Melting I^2t value I^2t_s

The melting I^2t value can be calculated for the value pairs of the time/current characteristic curve of the fuse link for any periods.

As the melting time decreases, the melting I^2t value tends towards a lower limit value at which almost no heat is dissipated from the bottleneck of the fuse-element to the environment during the melting process. The melting I^2t values specified in the Selection and ordering data and in the characteristic curves correspond to the melting time $t_{vs} = 1 \text{ ms}$.

Melting I^2t value I^2t_L

While the melting I^2t value is a characteristic of the fuse link, the quenching I^2t value depends on circuit data, such as

- the recovery voltage U_w
- the power factor of the shorted circuit
- the prospective current I_p (current at the installation point of the fuse link if this is bridged)

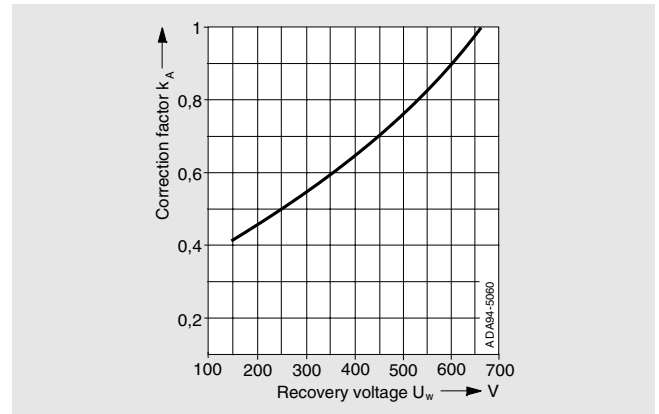
The maximum quenching I^2t value is reached at a current of $10 \times I_n$ to $30 \times I_n$.

Breaking I^2t value I^2t_A , correction factor k_A

The breaking I^2t values of the fuse link are specified in the characteristics for the rated voltage U_n . In order to determine the breaking I^2t value for recovery voltage U_w the correction factor k_A must be taken into account.

$$I^2t_A \text{ (at } U_w) = I^2t_A \text{ (at } U_n) \times k_A$$

The characteristics "correction factor k_A " (see the following graph) is specified in the characteristic curves for the individual fuse series. The breaking I^2t values determined in this way apply to prospective currents $I_p \geq 10 \times I_n$ and $= 0.35$.



Correction factor k_A for breaking I^2t value

Example: Series 3NE8 0..

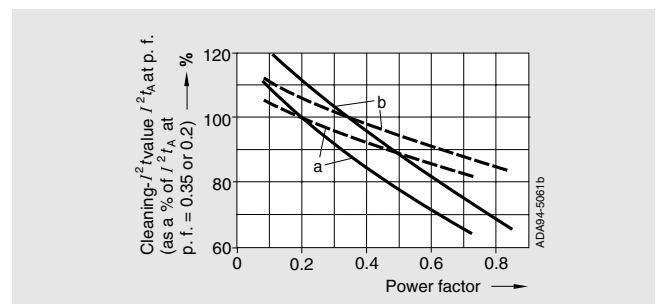
Taking into account the recovery voltage U_w

The recovery voltage U_w is derived from the voltage driving the short-circuit current. For most faults, the driving voltage is equal to the supply voltage U_{V0} , however, for shoot-throughs it is 1.8 times the value for the supply voltage U_{V0} (see rated voltage, page 1/203). If the shorted circuit contains two arms of a converter connection and thus two fuse links in series, and if the short-circuit current is sufficiently high (see series connection, page 1/209) it can be assumed that there is a uniform voltage sharing, i.e. $U_w = 0.5 \times U_{V0}$ or, in the case of shoot-throughs $U_w = 0.9 \times U_{V0}$.

Influence of the power factor

The specifications in the characteristic curves for the breaking I^2t values (I^2t_A) refer to power factor = 0.35 (exception: for SITOR fuse links 3NC5 8.., 3NE6 4.., 3NE9 4.. the following applies: power factor = 0.2).

The dependence of the breaking I^2t values on the power factor at $1.0 \times U_n$ and at $0.5 \times U_n$ is shown in the following graph.



Dependence of breaking I^2t value I^2t_A of SITOR fuse links on power factor

- at $1.0 U_n$
- - - at $0.5 U_n$

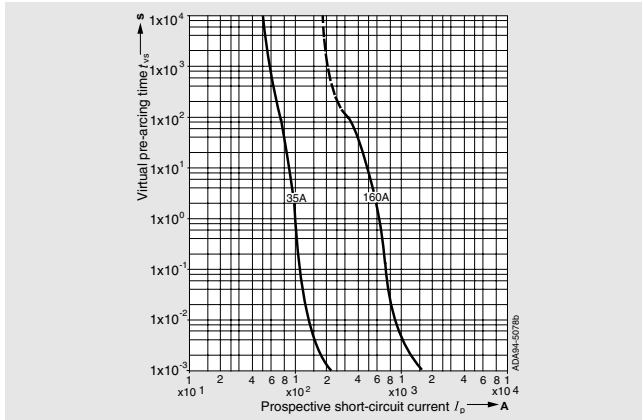
a = for SITOR fuse links 3NC5 8.., 3NE6 4.., 3NE9 4.. (reference to power factor = 0.2)

b = for all other SITOR fuse links (reference to power factor = 0.35)

Overview

Time/current characteristics

The solid time/current characteristic curves in the following graph specify the time to melting for the non-loaded fuse link in a cold state (max. +45 °C) an.



35 A: gR operational class

160 A: aR operational class

If the time/current characteristic curve in the long-time range ($t_{vs} > 30$ s) is dashed (fuse links of aR operational class), this specifies the limit of the permissible overload in a cold state. If the dashed part of the characteristic curve is exceeded, there is a risk of damage to the ceramic body of the fuse link. The fuse links can only be used for short-circuit protection. In this case, an additional protective device (overload relay, circuit-breaker) is required to protect against overload. In the case of controlled converter equipment, the current limiter is sufficient.

If the time/current characteristic curve is solid over the entire time range (fuse links of gR or gS operational class), then the fuse link can operate in this range. This means it can be used both for overload and short-circuit protection.

Actual melting time

The virtual melting time t_{vs} is specified in the time/current characteristic curve, depending on the prospective current. It is a value that applies to the current squared ($di/dt = \infty$).

In the case of melting times $t_{vs} < 20$ ms the virtual melting time t_{vs} deviates from the actual melting time t_s . The actual melting time may be several milliseconds longer (depending on the rate of current rise).

Within a range of several milliseconds, during which the rise of the short-circuit current can be assumed to be linear, the actual melting time for a sinusoidal current rise and 50 Hz is as follows:

$$t_s = \frac{3xI^2 t_s}{I_c^2}$$

Taking into account preloading, residual value factor RW

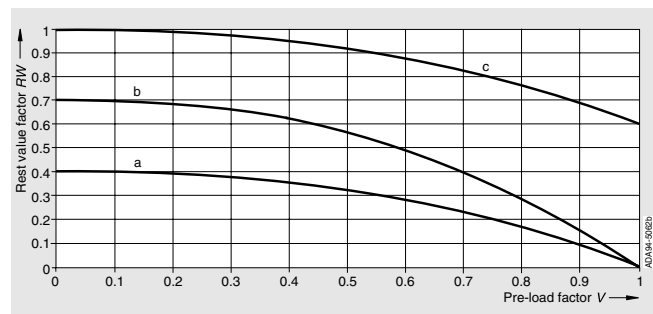
Preloading the fuse link shortens the permissible overload duration and the melting time.

The residual value factor RW can be used to determine the time that a fuse link can be operated during a periodic or non-periodic load cycle, above and beyond the previously determined permissible load current I_n' , with any overload current I_{La} without aging.

The residual value factor RW is dependent on the preloading V (I_{eff} r.m.s. value of the fuse current during the load cycle at permissible load current I_n')

$$V = \frac{I_{eff}}{I_n'}$$

and the frequency of the overloads (see the following graph, curves a and b).



Permissible overload and melting time for previous load

a = frequent surge/load cycle currents (> 1/week)

b = infrequent surge/load cycle currents (< 1/week)

c = melting time for preloading

Permissible overload duration = residual value factor RW x melting time t_{vs} (time/current characteristic curve)

A reduction of the melting time of a fuse link in the case of preloading can be derived from curve c.

Melting time = residual value factor RW x melting time t_{vs} (time/current characteristic curve)

Low-Voltage Fuse Systems

General Information on SITOR Semiconductor Fuses

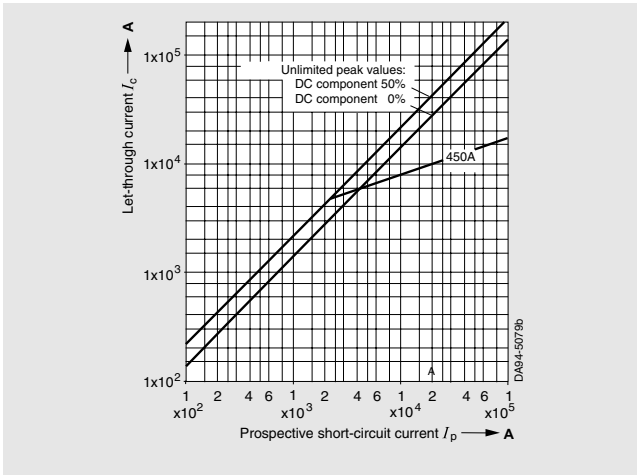
Technical explanations

Overview

Let-through current I_c

The let-through current I_c can be determined from the current limiting characteristics (current limitation at 50 Hz) specified for the respective fuse link. This depends on the prospective current and the DC component when the short-circuit occurs (instant of closing).

The following graph shows the let-through current I_c of a fuse link, depending on the prospective short-circuit current I_p using the 3NE4 333-0B SITOR fuse link as an example.



Example:
3NE4 333-0B SITOR fuse link

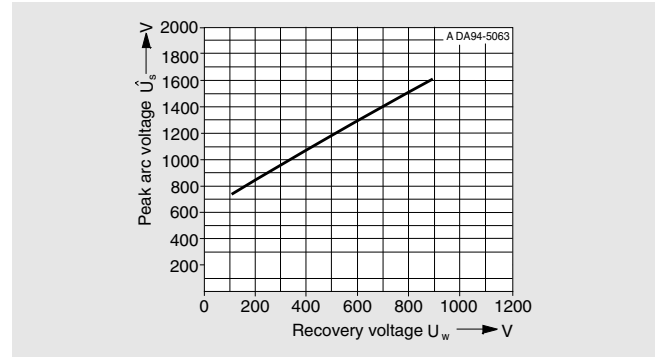
Rated breaking capacity

The rated breaking capacity of all SITOR fuse links is at least 50 kA, unless higher values are specified in the characteristic curves. This data applies to a test voltage of $1.1 \times U_n$, 45 Hz to 62 Hz and $0.1 \leq \text{p.f.} \leq 0.2$. In the case of inception voltages that are below the rated voltage, or rated currents of the fuse links that are below the maximum rated current of a fuse series, the breaking capacity is considerably higher than the rated breaking capacity.

Peak arc voltage \hat{U}_s

During the quenching process, a peak arc voltage \hat{U}_s occurs at the connections of the fuse link, which can significantly exceed the supply voltage. The level of the peak arc voltage depends on the design of the fuse link and the level of the recovery voltage.

The characteristic curve shown below depends on the recovery voltage U_w (see the following graph).



Example:
3NE4 333-0B SITOR fuse link

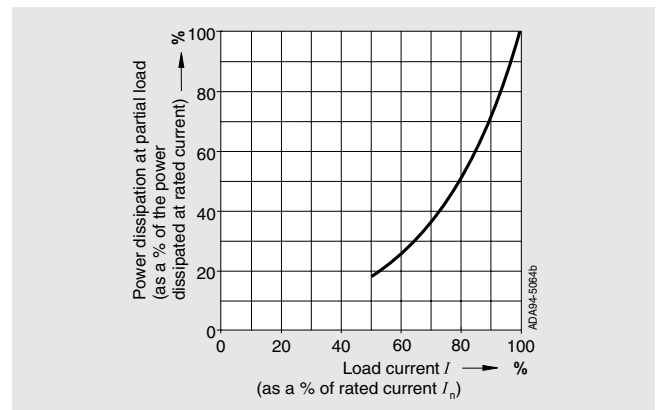
The peak arc voltage occurs as a cutoff voltage at the semiconductor devices not in the shorted circuit. In order to prevent voltage-related hazards, the peak arc voltage must not exceed the peak cutoff voltage of the semiconductor devices.

Power dissipation, temperature rise

On reaching the rated current, the fuse-elements of the SITOR fuse links have a considerably higher temperature than the fuse elements of line protection fuse links.

The power dissipation specified in the characteristic curve is the upper variance coefficient if the fuse link is loaded with the rated current.

In the case of partial loads, this power dissipation decreases as shown in the following graph.



The temperature rise specified in the characteristic curve applies to the respective reference point and is determined when testing the fuse link (test setup according to DIN VDE 0636, Part 23 and IEC 269-4).

Overview

Parallel and series connection of fuse links

Parallel connection

If an arm of a converter connection has several semiconductor devices so that the fuse links are connected in parallel, only the fuse link connected in series to the faulty semiconductor device is tripped in the event of an internal short-circuit. It must quench the full supply voltage.

To boost the voltage, two or more parallel fuse links can be assigned to a single semiconductor device without reducing the current. The resulting breaking I^2t value increases with the square of the number of parallel connections. In this case, in order to prevent incorrect distribution of the current, you should only use fuse links of the same type.

Series connection

There are two kinds of series connection available:

- Series connection in the converter arm
- 2 fused converter arms through which a short-circuit current flows in series

In both cases, uniform voltage sharing can only be assumed if the melting time of the SITOR fuse link does not exceed the value specified in the following table.

SITOR fuse links	Maximum melting time for uniform voltage sharing
Type	ms
3NC1 0..	10
3NC1 1..	
3NC1 4..	
3NC1 5..	
3NC2 2..	
3NC2 4..	40
3NC5 8..	
3NC7 3..	10
3NC8 4..	
3NE1 0..	10
3NE1 2..	
3NE1 3..	
3NE1 4..	
3NE1 8..	
3NE3 2..	10
3NE3 3..	
3NE3 4..	20
3NE3 5..	
3NE3 6..	
3NE4 1..	10
3NE4 3..	
3NE5 4..	20
3NE5 6..	
3NE6 4..	10
3NE7 4..	20
3NE7 6..	
3NE8 0..	10
3NE8 7..	
3NE9 4..	10
3NE9 6..	

Cooling conditions for series-connected fuse links should be approximately the same. If faults are expected, during which the specified melting times are exceeded (as a result of a slower current rise), it can no longer be assumed that voltage sharing is uniform. The voltage of the fuse links must then be rated so that a single fuse link can quench the full supply voltage.

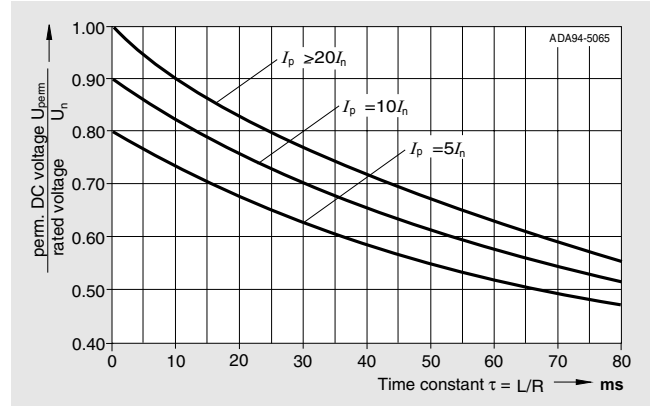
It is best to avoid the series connection of fuse links in a converter connection arm and instead use a single fuse link with a suitably high rated voltage.

Use with direct current

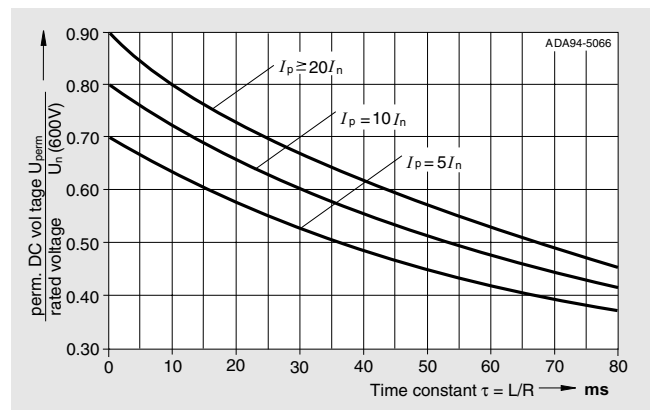
For fuse links that are to be used in DC circuits, some data may vary from the data specified in the characteristic curves for alternating current.

Permissible direct voltage

The permissible direct voltage U_{perm} of the fuse links depends on the rated voltage U_n , of the time constants $\tau = L/R$ in the DC circuit and on the prospective current I_p . The permissible direct voltage refers to the rated voltage U_n and is specified depending on the time constants τ , the prospective current is a parameter (see the following graphs).



Applies to all series except 3NE1 0.., 3NE1 8..



Applies to all series except 3NE1 0.., 3NE1 8..

Melting I^2t value I^2t_A

The breaking I^2t value I^2t_A depends on the voltage, on the time constants $\tau = L/R$ and on the prospective current I_p . It is calculated from the I^2t_A value specified in the characteristics curve for the respective fuse link at rated voltage U_n and correction factor k_A whereby, instead of the recovery voltage U_W , the direct voltage is used against which the fuse link is to switch.

The breaking I^2t value determined in this way applies under the following conditions:

- time constants $L/R \leq 25$ ms for $I_p \geq 20 \times I_n$
- time constants $L/R \leq 10$ ms for $I_p = 10 \times I_n$
- the breaking I^2t values increases by 20 %
- for $I_p \geq 20 \times I_n$ and time constants $L/R = 60$ ms
- for $I_p = 10 \times I_n$ and time constants $L/R = 35$ ms

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Peak arc voltage \hat{U}_s

The peak arc voltage \hat{U}_s is determined from the curve specified in the characteristics for the respective fuse link, whereby instead of the recovery voltage U_w , the direct voltage is used against which the fuse link is to switch.

The peak arc voltage determined in this way applies under the following conditions:

- Time constants $L/R \leq 20$ ms for $I_p \geq 20 I_n$
- Time constants $L/R \leq 35$ ms for $I_p = 10 I_n$

The switching voltages increase by 20 %

- For $I_p \geq 20 I_n$ and time constants $L/R = 45$ ms
- For $I_p = 10 I_n$ and time constants $L/R = 60$ ms

Indicator

An indicator shows the switching of the fuse link. The indicator of the SITOR fuse links has a transformer operating voltage between 20 V ($U_n \leq 1000$ V) and 40 V ($U_n > 1000$ V).

Accessories

Fuse bases, fuse pullers

Some of the SITOR fuse links can be inserted in matching fuse bases. The matching fuse bases (single-pole and three-pole) and the respective fuse pullers are listed in the technical specifications, from page 1/144.

Note

Even if the values of the rated voltage and/or current of the fuse bases are lower than that of the allocated fuse link, the values of the fuse link apply.

Fuse switch disconnectors, switch disconnectors with fuses

Some series of SITOR fuse links are suitable for operation in fuse switch disconnectors 3NP4 and 3NP5 or in switch disconnectors with fuses 3KL and 3KM (see catalog LV 1).

When using switch disconnectors, the following points must be observed:

- Because, compared to LV HRC fuses, the power dissipation of the SITOR fuse links is higher, the permissible load current of the fuse links sometimes needs to be reduced, see below (Configuration manual).
- Fuse links with rated currents $I_n > 63$ A may also not be used for overload protection when they have gR operational class.

Note

All fuse links of the series 3NE1 ... with rated currents I_n from 16 A to 850 A and gR or gS operational classes can be used for overload protection.

- The rated voltage and rated isolation voltage of the switch disconnectors must at least correspond to the available voltage.
- When using fuse links of the series 3NE3 2.., 3NE3 3.., 3NE4 3.., 3NC2 4.. and 3NC8 4.. the switching capacity of the fuse switch disconnectors must not be fully utilized due to the slotted blade. Occasional switching of currents up to the rated current of the fuse link is permissible.
- When used in fuse switch disconnectors, fuse links of the series 3NE4 1.. may only be occasionally switched, and only without load, as this places the fuse blade under great mechanical stress.

In the technical specifications, from page 1/144, the switch disconnectors are allocated to their respective individual fuse links.

The permissible load of the fuse link and the required conductor cross-section can be found in the configuration manual "Configuring SITOR", Order No.: E20001-A700-P302.

Overview

Specification of the rated current I_n for non-aging operation with varying load

Power converters are often operated not with a continuous load, but with varying loads, that can also temporarily exceed the rated current of the power converter.

The selection process for non-aging operation of SITOR fuse links for four typical types of load is as follows:¹⁾

- Continuous load
- Unknown varying load, but with known maximum current
- Varying load with known load cycle
- Occasional surge load from preloading with unknown surge outcome

The diagrams for the correction factors k_u , k_q , k_λ , k_1 , see page 1/204, and the residual value factor RW , page 1/207, must be observed. The varying load factor WL for the fuse links is specified on page 1/205.

Determining the required rated current I_n of the fuse link is carried out in two steps:

1. Determining the rated current I_n based on the r.m.s. value I_{rms} of the load current:

$$I_n > I_{\text{eff}} \times \frac{1}{k_u \times k_q \times k_\lambda \times k_1 \times WL}$$

Permissible load current I_n' of the selected fuse link:

$$I_n' = k_u \times k_q \times k_\lambda \times k_1 \times WL \times I_n$$

2. Checking the permissible overload duration of current blocks exceeding the permissible fuse load current I_n' .

Melting time t_{vs} (time/current characteristics) x residual value factor $RW \geq$ overload duration t_k

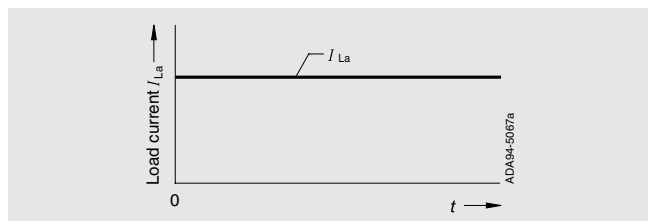
To do this, you require the previous load ratio

$$V = \frac{I_{\text{eff}}}{I_n'}$$

as well as the characteristic curve 'permissible overload and melting time for previous load' (page 1/207, curve a) and the 'time/current characteristic curve' for the selected fuse link.

If a determined overload duration is less than the respective required overload duration, then you need to select a fuse link with a greater rated current I_n (taking into account the rated voltage U_n and the permissible breaking I^2t value) and repeat the check.

Continuous load



Rated voltage U_n of the fuse link

$$I_n \geq I_{L_a} \times \frac{1}{k_u \times k_q \times k_\lambda \times k_1 \times WL}$$

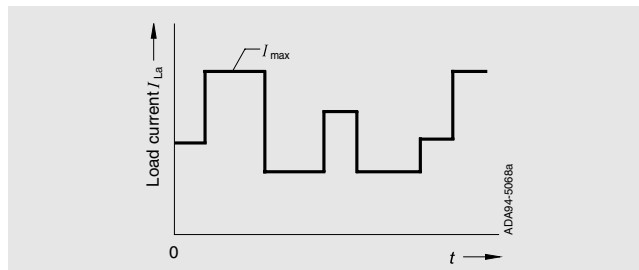
I_{L_a} = load current of the fuse link (r.m.s. value)

Fewer than 1 shutdown per week: $WL = 1$

More than 1 shutdown per week: WL = see technical specifications, on page 1/144.

1) In the case of varying loads that cannot be assigned to one of the four types of load shown here, please contact us.

Unknown varying load, but with known maximum current I_{max}

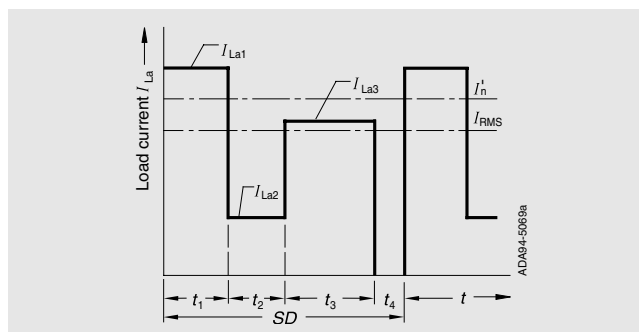


Rated voltage U_n of the fuse link

$$I_n \geq I_{\text{max}} \times \frac{1}{k_u \times k_q \times k_\lambda \times k_1 \times WL}$$

I_{max} = maximum load current of the fuse link (r.m.s. value)

Varying load with known load cycle



$$I_{\text{eff}} = \sqrt{\frac{\sum_{k=1}^{k=n} I_{Lak}^2 \times t_k}{SD}}$$

$$I_{\text{eff}} = \sqrt{\frac{I_{La1}^2 t_1 + I_{La2}^2 t_2 + I_{La3}^2 t_3}{SD}}$$

I_{Lk} = maximum load current of the fuse link (r.m.s. value)

Low-Voltage Fuse Systems

General Information on SITOR Semiconductor Fuses

Specifying the rated current

Overview

Occasional surge load from preloading with unknown surge outcome

Specifying the required rated current I_n of the fuse link is carried out in two steps:

1. Specifying the rated current I_n based on the previous load current I_{prev} :

$$I_n > I_{prev} \times \frac{1}{k_u \times k_q \times k_\lambda \times k_1 \times WL}$$

Permissible load current I_n' of the selected fuse link:

$$I_n' = k_u \times k_q \times k_\lambda \times k_1 \times WL \times I_n$$

2. Checking the permissible overload duration of the surge current I_{surge}

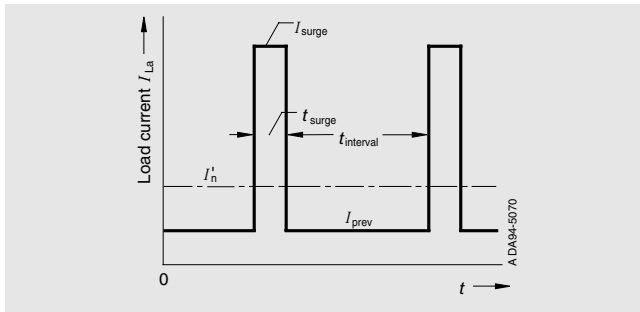
Melting time t_{vs} (time/current characteristics) x residual value factor $RW \geq$ surge-wave duration t_{surge}

To do this, you require the previous load ratio

$$V = \frac{I_{eff}}{I_n'}$$

as well as the characteristic curve 'permissible overload and melting time for previous load' (page 1/207, curve a or b) and the 'time/current characteristic curve' for the selected fuse link.

If a determined overload duration is less than the required overload duration t_{surge} , then you need to select a fuse link with a greater rated current I_n (taking into account the rated voltage U_n and the permissible breaking I^2t value) and repeat the check.



Condition:

$$t_{interval} \geq 3 \times t_{surge}$$

$$t_{interval} \geq 5 \text{ min}$$

Sample selections

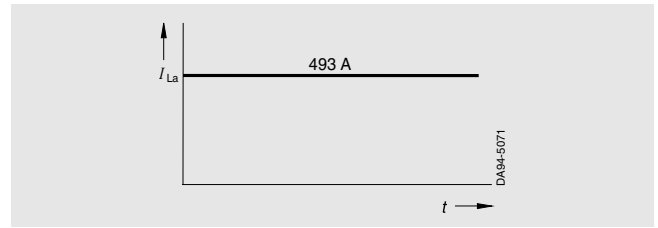
For a converter assembly in circuit (B6) A (B6) C, whose rated direct current is $I_{dn} = 850$ A, fuse links that can be installed as arm fuses should be selected. The choice of fuse is shown for different duty types of the converter assembly.

Data for converter assembly

- Supply voltage
 $U_N = 350$ Hz 400 V AC
- Recovery voltage
 $U_W = 360$ V = $U_N \times 0.9$ (for shoot-throughs)
- Thyristor T 508N (eupec),
 I^2t value
 $\int I^2 dt = 320 \times 10^3 \text{ A}^2\text{s}$ (10 ms, cold)
- Fuse links, natural air cooling,
ambient temperature $\vartheta_u = +35$ °C
- Conductor cross-section for copper fuse link: 160 mm²
- Conversion factor
Direct current I_d /fuse load current I_{La} : $I_{La} = I_d \times 0.58$

For the following examples, it is assumed, in the case of loads that exceed the rated direct current of the converter assembly, that the converter assembly is rated for this load.

Continuous, no-break load



Direct current $I_d = I_{dn} = 850$ A

$$I_{La} = I_d \times 0.58 = 493 \text{ A}$$

Selected:

3NE3 335 SITOR fuse link

(560 A/1000 V), $WL = 1$

Breaking I^2t value

$$I^2t_A = 360 \times 10^3 \times 0.53 = 191 \times 10^3 \text{ A}^2\text{s}$$

Test cross-section acc. to page 1/203: 400 mm²

The following correction factors are to be applied:

$$k_u = 1.02 (\vartheta_u = +35 \text{ °C})$$

$$k_q = 0.91 \text{ (conductor cross-section, double-ended, 40 \% of test cross-section)}$$

$$k_\lambda = 1.0 \text{ (conduction angle } \lambda = 120^\circ)$$

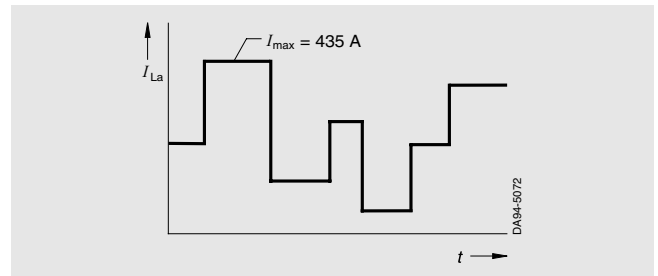
$$k_1 = 1.0 \text{ (no forced-air cooling)}$$

Required rated current I_n of the SITOR fuse link:

$$I_n \geq I_{La} \times \frac{1}{k_u \times k_q \times k_\lambda \times k_1 \times WL} =$$

$$493 \text{ A} \times \frac{1}{1,02 \times 0,91 \times 1,0 \times 1,0 \times 1,0} = 531 \text{ A}$$

Unknown varying load, but with known maximum current



Max. direct current $I_{dmax} = 750$ A

$$\text{Max. fuse current } I_{max} = I_{dmax} \times 0.58 = 435 \text{ A}$$

Selected:

3NE3 334-0B SITOR fuse link

(560 A/1000 V), $WL = 1$

Breaking I^2t value

$$I^2t_A = 260 \times 10^3 \times 0.53 = 138 \times 10^3 \text{ A}^2\text{s}$$

Test cross-section acc. to page 1/203: 400 mm²

The following correction factors are to be applied:

$$k_u = 1.02 (\vartheta_u = +35 \text{ °C})$$

$$k_q = 0.91 \text{ (conductor cross-section, double-ended, 40 \% of test cross-section)}$$

$$k_\lambda = 1.0 \text{ (conduction angle } \lambda = 120^\circ)$$

$$k_1 = 1.0 \text{ (no forced-air cooling)}$$

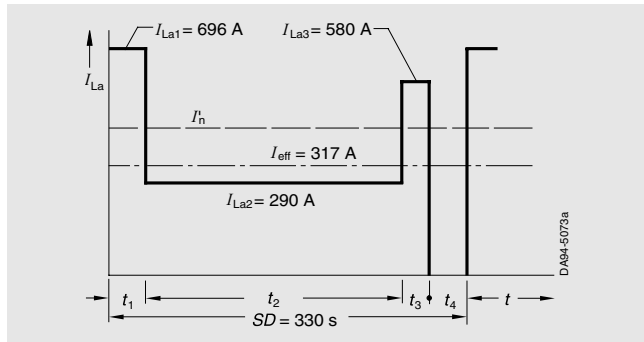
Required rated current I_n of the SITOR fuse link:

$$I_n \geq I_{max} \times \frac{1}{k_u \times k_q \times k_\lambda \times k_1 \times WL} =$$

$$435 \text{ A} \times \frac{1}{1,02 \times 0,91 \times 1,0 \times 1,0 \times 1,0} = 469 \text{ A}$$

Overview

Varying load with known load cycle



Direct current:

$$I_{d1} = 1200 \text{ A} \quad t_1 = 20 \text{ s}$$

$$I_{d2} = 500 \text{ A} \quad t_2 = 240 \text{ s}$$

$$I_{d3} = 1000 \text{ A} \quad t_3 = 10 \text{ s}$$

$$I_{d4} = 0 \text{ A} \quad t_4 = 60 \text{ s}$$

Fuse current:

$$I_{La1} = 1200 \times 0.58 = 696 \text{ A}$$

$$I_{La2} = 500 \times 0.58 = 290 \text{ A}$$

$$I_{La3} = 1000 \times 0.58 = 580 \text{ A}$$

r.m.s. value of load current

$$I_{\text{eff}} = \sqrt{\frac{696^2 \times 20 + 290^2 \times 240 + 580^2 \times 10}{330}} = 317 \text{ A}$$

Selected:

3NE3 333 SITOR fuse link
(450 A/1000 V), $WL = 1$
Breaking I^2t value $I^2t_A = 175 \times 10^3 \times 0.53 = 93 \times 10^3 \text{ A}^2\text{s}$
Test cross-section acc. to page 1/203: 320 mm²

The following correction factors are to be applied:

$$k_U = 1.02 \quad (\vartheta_U = +35^\circ \text{C})$$

$$k_Q = 0.94 \quad (\text{conductor cross-section, double-ended, 50 \% of test cross-section})$$

$$k_\lambda = 1.0 \quad (\text{conduction angle } \lambda = 120^\circ)$$

$$k_1 = 1.0 \quad (\text{no forced-air cooling})$$

1. Required rated current I_n of the SITOR fuse link:

$$I_n \geq I_{\text{eff}} \times \frac{1}{k_U \times k_Q \times k_\lambda \times k_1 \times WL}$$

$$317 \text{ A} \times \frac{1}{1.02 \times 0.94 \times 1.0 \times 1.0 \times 1.0} = 331 \text{ A}$$

Permissible load current I_n' of the selected fuse link:

$$I_n' = k_U \times k_Q \times k_\lambda \times k_1 \times WL \times I_n = 1.02 \times 0.94 \times 1.0 \times 1.0 \times 1.0 \times 450 = 431 \text{ A}$$

2. Checking the permissible overload duration of current blocks exceeding the permissible fuse load current I_n'

Previous load ratio:

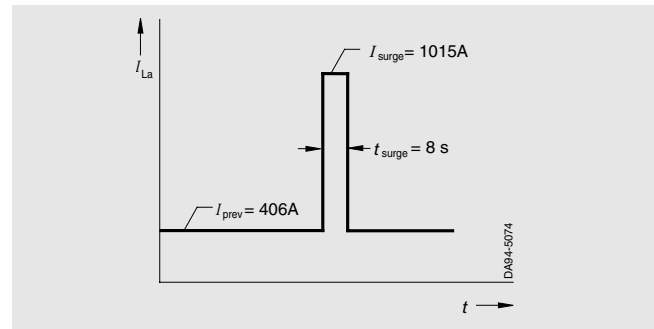
$$V = \frac{I_{\text{eff}}}{I_n'} = \frac{317}{431} = 0.74$$

Residual value factor RW : for $V = 0.74$ of curve a (characteristic page 1/207, frequent surge/load cycle currents) $RW = 0.2$

Current block I_{La1} : melting time t_{VS} : 230 s (from time/current characteristic curve for 3NE3 333) $t_{VS} \times RW = 230 \text{ s} \times 0.2 = 46 \text{ s} > t_1$

Current block I_{La3} : melting time t_{VS} : 1200 s from time/current characteristic curve for 3NE3 333) $t_{VS} \times RW = 1200 \text{ s} \times 0.2 = 240 \text{ s} > t_3$

Occasional surge load from preloading with unknown surge outcome



Direct current:

$$I_{d\text{prev}} = 700 \text{ A}$$

$$I_{d\text{surge}} = 500 \text{ A} \quad t_{\text{surge}} = 8 \text{ s}$$

Fuse current:

$$I_{\text{prev}} = I_{d\text{prev}} \times 0.58 = 406 \text{ A}$$

$$I_{\text{surge}} = I_{d\text{surge}} \times 0.58 = 1015 \text{ A}$$

Conditions

$$t_{\text{interval}} \geq 3 t_{\text{surge}} \text{ and } t_{\text{interval}} \geq 5 \text{ min is met.}$$

Selected:

3NE3 333 SITOR fuse link
(560 A/1000 V), $WL = 1$
Breaking I^2t value $I^2t_A = 360 \times 10^3 \times 0.53 = 191 \times 10^3 \text{ A}^2\text{s}$
Test cross-section acc. to page 1/203: 400 mm²

The following correction factors are to be applied:

$$k_U = 1.02 \quad (\vartheta_U = +35^\circ \text{C})$$

$$k_Q = 0.91 \quad (\text{conductor cross-section, double-ended, 40 \% of test cross-section})$$

$$k_\lambda = 1.0 \quad (\text{conduction angle } \lambda = 120^\circ)$$

$$k_1 = 1.0 \quad (\text{no forced-air cooling})$$

1. Required rated current I_n of the SITOR fuse link:

$$I_n \geq I_{\text{prev}} \times \frac{1}{k_U \times k_Q \times k_\lambda \times k_1 \times WL}$$

$$406 \text{ A} \times \frac{1}{1.02 \times 0.91 \times 1.0 \times 1.0 \times 1.0} = 437 \text{ A}$$

Permissible load current I_n' of the selected fuse link:

$$I_n' = k_U \times k_Q \times k_\lambda \times k_1 \times WL \times I_n = \frac{191 \times 10^3 \text{ A}^2\text{s}}{1.02 \times 0.91 \times 1.0 \times 1.0 \times 1.0 \times 560} = 520 \text{ A}$$

2. Checking the permissible overload duration of the surge current I_{surge}

Previous load ratio:

$$V = \frac{I_{\text{prev}}}{I_n'} = \frac{406}{520} = 0.78$$

Residual value factor RW : for $V = 0.78$ of curve a (characteristic page 1/207, frequent surge/load cycle currents) $RW = 0.18$

Surge current I_{surge} : melting time t_{VS} : 110 s (from time/current characteristic curve for 3NE3 333) $t_{VS} \times RW = 110 \text{ s} \times 0.18 = 19.8 \text{ s} > t_{\text{surge}}$

Correction factors can be found on page 1/203 and page 1/204.

Low-Voltage Fuse Systems

General Information on SITOR Semiconductor Fuses

Terms

Overview

The following explains the key terms used in connection with fuse links for semiconductor protection. Further definitions can be found in EN 60269-1.

Rated breaking capacity

The rated breaking capacity is the highest prospective short-circuit current I_p that the fuse link can blow under prescribed conditions at 1.1 rated voltage.

Rated frequency

The rated frequency is the frequency for which the fuse link is rated with regard to power dissipation, current, voltage, characteristic curve and breaking capacity.

Rated voltage U_n

The rated voltage is the designated voltage of the fuse and according to which test conditions and operating voltage limits are determined.

For SITOR fuse links, the rated voltage is always the r.m.s. value of an AC voltage.

Rated voltage U_n

The rated current of a fuse link is the designated current of the fuse link and is the current up to which it can be continuously loaded under prescribed conditions (see page 1/203) without adverse affects.

Operational class

The operational class is the designation of the function class of a fuse link in connection with the object to be protected.

- gS operational class:
Full range semiconductor safety fuse for use in safety switching devices
- gR operational class:
Full range semiconductor protection
- aR operational class:
Back-up semiconductor protection

Let-through current I_c

The let-through current I_c is the maximum instantaneous value of the current reached during a switching operation of the fuse.

Let-through current characteristic curve

The let-through current characteristic curve specifies the value of the let-through current at 50 Hz as a function of the prospective current.

Function class

The function class means the ability of a fuse link to carry specific currents without damage and to switch off over-currents within a certain range (breaking capacity range).

Function class a

Back-up fuses:
Fuse links, that carry currents at least up to their rated current and can interrupt currents above a specific multiple of their rated current up to their rated breaking capacity.

Function class g

Full range fuse:
Fuse links that can continuously carry currents up to at least their rated current and can interrupt currents from the smallest melting current through to the rated breaking capacity.

I^2t value

The I^2t value (joule integral) is the integral of the current squared over a specific time interval:

$$I^2t = \int_{t_0}^{t_1} i^2 dt$$

Specifies the I^2t values for the melting process (I^2t_m) and for the shutdown cycle ($I^2t_A \triangleq$ sum of melting and quenching I^2t value).

Power dissipation

Power dissipation is the power loss during the load of a fuse link with its rated current under prescribed conditions.

Peak arc voltage \hat{U}_s

The peak arc voltage is the highest value of the voltage that occurs at the contacts of the fuse link during the arc quenching time.

Residual value factor RW

The residual value factor is a reduction factor for determining the permissible load period of the fuse link with currents that exceed the permissible load current I_n' (see rated current I_n).

Prospective short-circuit current I_p

The prospective short-circuit current is the r.m.s. value of the line-frequency AC component, or the value of the direct current to be expected in the event of a short-circuit occurring after the fuse, were the fuse to be replaced by a component of negligible impedance.

Virtual time t_v

The virtual time is the time span calculated when a I^2t value is divided by the square of the prospective current:

$$t_v = \frac{\int i^2 dt}{I_p^2}$$

The time/current characteristic curve gives the virtual melting time t_{vs}

Varying load factor WL

The varying load factor is a reduction factor for the rated current with varying load states.

Recovery voltage U_w

The recovery voltage (r.m.s. value) is the voltage that occurs at the contacts of a fuse link after the power is cut off.

Time/current characteristic curve

The time/current characteristic curve specifies the virtual time (e.g. the melting time) as a function of the prospective current under specific operating conditions.

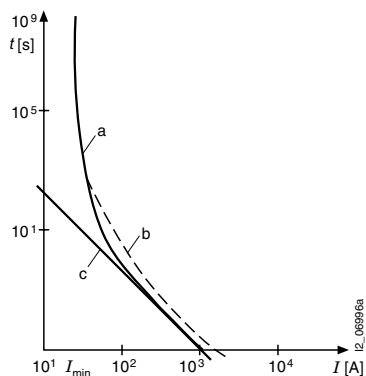
Overview

Legend

- t_{vs} = virtual melting time
- I_C = max. let-through current
- I_{eff} = r.m.s. value of the prospective short-circuit current
- $I^2 t_s$ = melting $I^2 t$ value
- $I^2 t_a$ = breaking $I^2 t$ value
- I_n = rated current
- P_v = rated power dissipation
- $\Delta\vartheta$ = temperature rise
- k_a = correction factor for $I^2 t$ value
- U_w = recovery voltage
- \hat{U}_s = peak arc voltage
- i_p = peak short-circuit current
- ① = peak short-circuit current with largest DC component
- ② = peak short-circuit current without DC component
- U = voltage
- i = current
- t_s = melting time
- t_L = quenching time

Time/current characteristics

Melting times of fuse links are shown in the time/current diagrams with logarithmic scale and depending on their currents. The melting time characteristic curve runs from the smallest melting current, which just melts the fuse element, asymptotic to the $I^2 t$ line of the same joule value in the range of the higher short-circuit currents, which specifies the constant joule value $I^2 t$. To avoid overcomplication, the time/current characteristic curve diagrams omit the $I^2 t$ lines (c).



General representation of the time/current characteristic curve of a fuse link of gL/gG operational class

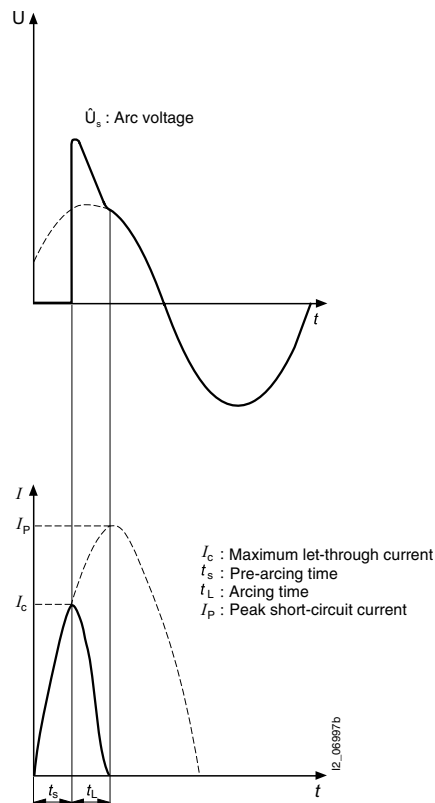
- I_{min} : smallest melting current
- a : melting time-current characteristic curve
- b : break time characteristic curve
- c : $I^2 t$ line

The shape of the characteristic curve depends on the outwards heat transfer from the fuse-element. DIN VDE 0636 specifies tolerance-dependent time/current ranges within which the characteristic curves of the fuse must lie. Deviations of $\pm 10\%$ are permissible in the direction of the current axis. With Siemens LV HRC fuse links of gL/gG operational class, the deviations work out at less than $\pm 5\%$, a mark of outstanding quality. For currents up to approx. $20 I_n$, the melting time-current characteristic curves are the same as the break time characteristic curves. In the case of higher short-circuit currents, the two characteristic curves move apart, influenced by the respective arc quenching time.

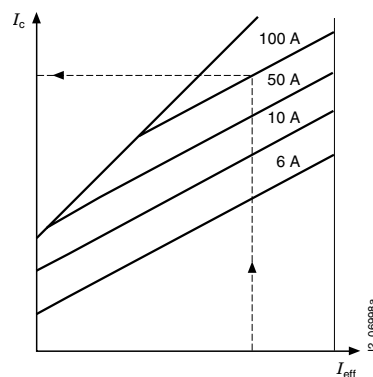
The difference between both lines (= arc quenching time) also depends on the power factor, the operational voltage and the breaking current.

The Siemens characteristic curves show the mean virtual melting time characteristic curves recorded at an ambient temperature of $(20 \pm 5)^\circ\text{C}$. They do not apply to preloaded fuse links.

The fuse-element of the fuse links melts so quickly at very high currents that the surge short-circuit current I_p is prevented from occurring. The highest instantaneous value of the current reached during the shutdown cycle is called the let-through current I_c . The current limitations are specified in the current limiting diagrams, otherwise known as let-through current diagrams.



Oscillograph of a short-circuit current shutdown through a fuse link



Current limitation diagram, let-through current diagram of LV HRC fuse links size 00, gL/gG operational class, rated currents 6 A, 10 A, 50 A, 100 A

Low-Voltage Fuse Systems

SILIZED Semiconductor Fuses (gR Operational Class)

Product overview

Overview

NEOZED SILIZED fuse links



- Rated voltage U_n 400 V AC, 250 V AC
- Rated current I_n 10 ... 63 A
- Size D01 and D02
- gR operational class

DIAZED SILIZED fuse links



- Rated voltage U_n 500 V AC, 500 V AC
- Rated current I_n 16 ... 100 A
- gR operational class
- Super quick

Benefits

There is a comprehensive range of fuse bases and accessories available for users. When using fuse links with higher power dissipation than standard fuse links, it is essential to comply with the maximum permissible power dissipation of the fuse base. This particularly applies to safety switching devices, such as MINIZED.

Low-Voltage Fuse Systems

SILIZED Semiconductor Fuses (gR Operational Class)

1

NEOZED SILIZED fuse links

Technical specifications

Series 5SE1

NEOZED SILIZED fuse links			
Standards	DIN VDE 0636-301, IEC 60269-3-1, HD 630.3.1 S3, DIN VDE 0680		
Dimensions	DIN VDE 0636-301, IEC 60269-3-1, HD 630.3.1 S3		
Operational class	gR		
Rated voltage U_n	V AC	400	
	V DC	250	
Rated current I_n	A	10 ... 63	
Rated breaking capacities	kA AC	50	
	kA DC	8	
Mounting position	any, but preferably vertical		
Non-interchangeability	using adapter sleeves		
Resistance to climate	°C	up to 45 at 95 % rel. humidity	
Ambient temperature	°C	-5 ... +40, humidity 90 % at 20	



Type	Size	I_n	P_v	$\Delta\theta$	$I^2 t_s$		$I^2 t_a$	
		A	W	k	1 ms A ² s	4 ms A ² s	230 V AC A ² s	400 V AC A ² s
5SE1 310	D01	10	6.9	64	30	30	56	73
5SE1 316		16	6.2	61	31	34	92	120
5SE1 320	D02	20	8.1	64	50	56	146	190
5SE1 325		25	8.2	63	120	120	166	215
5SE1 335		35	16.7	100	145	182	361	470
5SE1 350		50	12.0	80	460	540	1510	1960
5SE1 363		63	15.5	96	845	932	3250	4230

Selection and ordering data

Size	I_n	Order No.	Weight 1 unit approx.	PS*/ P. unit
A			kg	Unit(s)

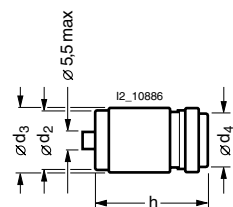
Rated voltage 400 V AC/250 V DC, gR operational class

Consumer packings, pack of 10

	D01	10	5SE1 310	0.006	10
		16			
	D02	20	5SE1 320	0.012	10
		25	5SE1 325	0.012	10
		35	5SE1 335	0.012	10
		50	5SE1 350	0.013	10
		63	5SE1 363	0.014	10

Dimensional drawings

5SE1



Size	I_n	Dimensions	
	A	d	h
D01	10 ... 16	11	36
D02	20 ... 63	15.3	36

Low-Voltage Fuse Systems

SILIZED Semiconductor Fuses (gR Operational Class)

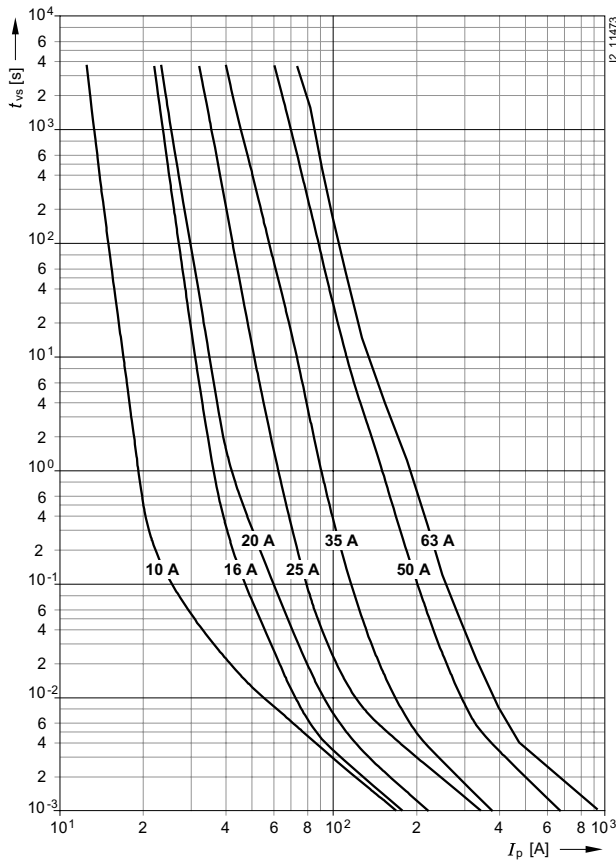
NEOZED SILIZED fuse links

Characteristic curves

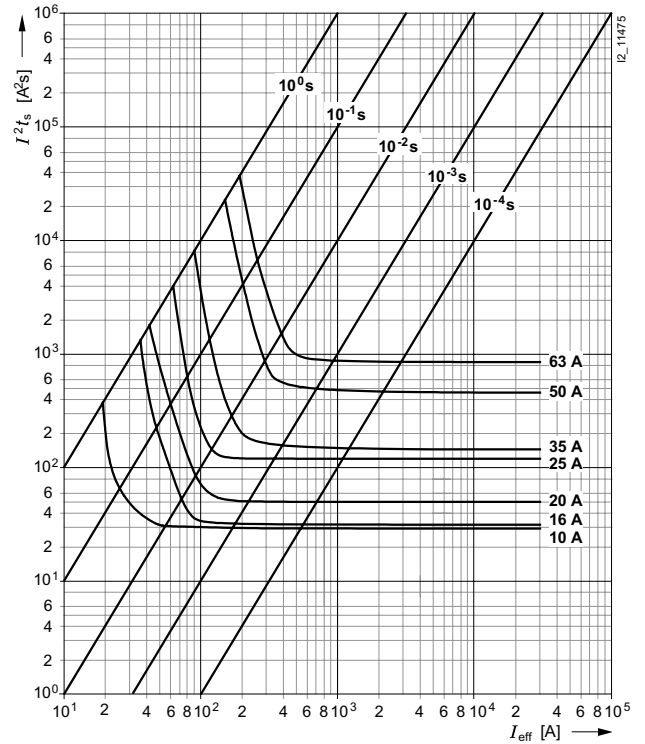
Series 5SE1 3..

Size: D01, D02
 Operational class: gR
 Rated voltage: 400 V AC/250 V DC
 Rated current: 10 ... 63 A

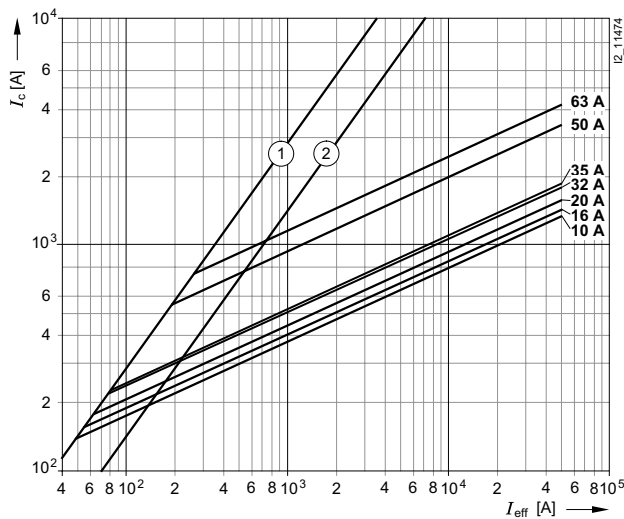
Time/current characteristics diagram



Melting I^2t_s values diagram



Current limitation diagram



- ① Peak short-circuit current with largest DC component
- ② Peak short-circuit current without DC component

Low-Voltage Fuse Systems

SILIZED Semiconductor Fuses (gR Operational Class)

1

DIAZED SILIZED fuse links

Technical specifications

DIAZED SILIZED fuse links		
Standards	DIN VDE 0635, DIN VDE 0636-301, DIN VDE 0680, IEC 60269-3-1, CEE 16, HD 630.3.1 S3	
Dimensions	DIN VDE 0636-301, IEC 60269-3-1, HD 630.3.1 S3	
Operational class	gR	
Characteristic	super quick	
Rated voltage U_n	V AC	500
	V DC	500
Rated current I_n	A	16 ... 100
Rated breaking capacities	kA AC	50, 40
	kA DC	8, 1.6
Mounting position	any, but preferably vertical	
Non-interchangeability	due to screw adapter or adapter sleeves	
Degree of protection acc. to IEC 60529 in the distribution board	IP20	
Resistance to climate	°C	up to 45 at 95 % rel. humidity
Ambient temperature	°C	-5 ... +40, humidity 90 % at 20

Selection and ordering data

Size	I_n	Identification color	Thread	Order No.	Weight 1 unit approx.	PS*/P. unit
	A				kg	Unit(s)

Rated voltage 500 V AC/500 V DC

DIN VDE 0636-301

for semiconductor protection, designation, yellow ring
gR operational class, characteristic: super quick.
For 30 A fuse links, the DIAZED DII screw adapter for 25 A is used



DII	16	gray	E27	5SD4 20	0.028	5
	20	blue		5SD4 30	0.029	5
	25	yellow		5SD4 40	0.031	5
DIII	30		E33	5SD4 80	0.031	5
	35	black		5SD4 50	0.050	5
	50	white		5SD4 60	0.051	5
DIV	63	copper	R1¼"	5SD4 70	0.054	5
	80	silver		5SD5 10	0.110	3
	100	red		5SD5 20	0.110	3

Low-Voltage Fuse Systems

SILIZED Semiconductor Fuses (gR Operational Class)

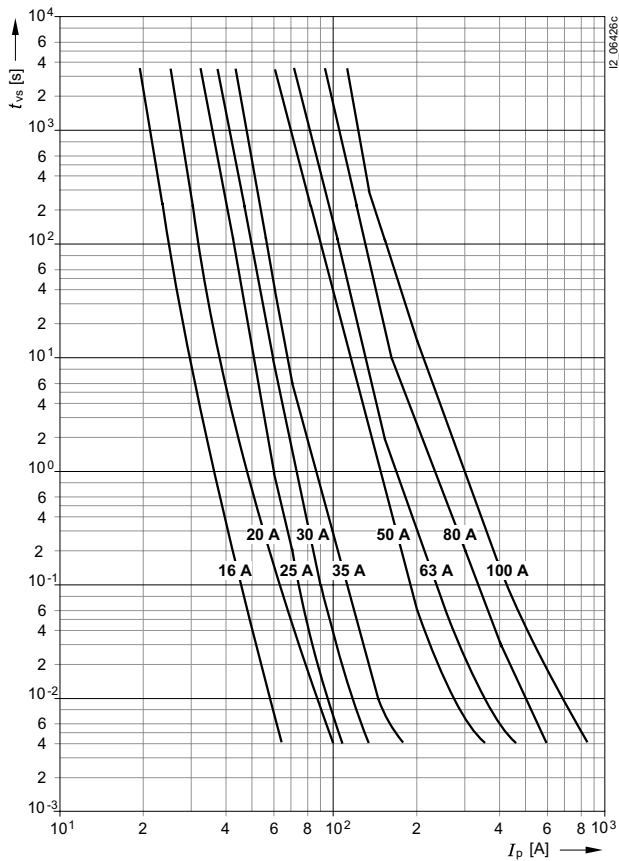
DIAZED SILIZED fuse links

Characteristic curves

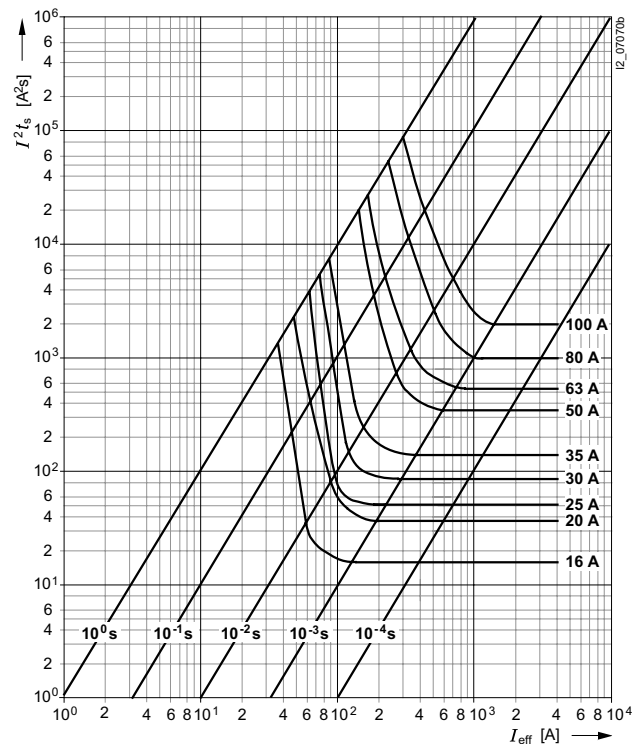
Series 5SD4, 5SD5

Size: DII, DIII, DIV
 Operational class: gR
 Characteristic: super quick
 Rated voltage: 500 V AC/500 V DC
 Rated current: 16 ... 100 A

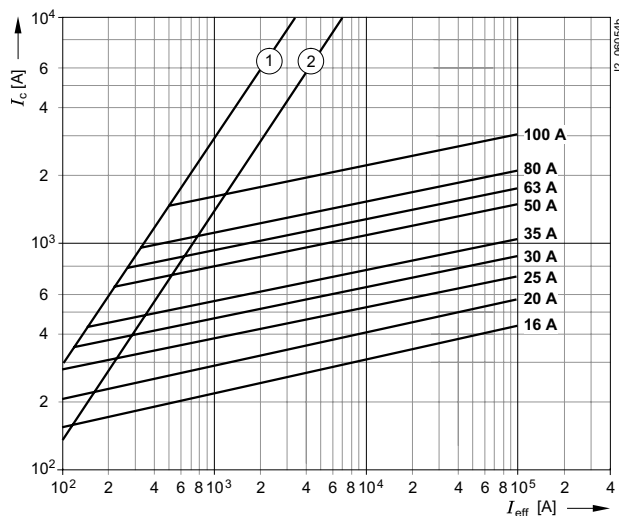
Time/current characteristics diagram



Melting I^2t_s values diagram



Current limitation diagram



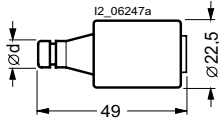
- ① Peak short-circuit current with largest DC component
- ② Peak short-circuit current without DC component

Type	I_n A	P_v W	$\Delta\vartheta$ k	I^2t_s 1 ms A^2s	I^2t_a 500 V AC A^2s
5SD4 20	16	12.1	63	16.2	60
5SD4 30	20	12.3	69	35.8	139
5SD4 40	25	12.5	61	48.9	205
5SD4 80	30	13.4	65	85	310
5SD4 50	35	14.8	62	135	539
5SD4 60	50	18.5	66	340	1250
5SD4 70	63	28	84	530	1890
5SD5 10	80	34.3	77	980	4200
5SD5 20	100	41.5	83	1950	8450

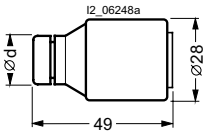
Dimensional drawings

500 V AC/500 V DC

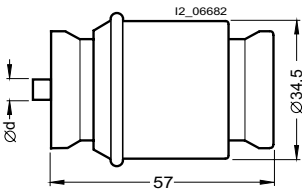
5SD4 20, 5SD4 30, 5SD4 40, 5SD4 80



5SD4 50, 5SD4 60, 5SD4 70



5SD5 10, 5SD5 20



Fuse link	DII/E27			
Rated current A	16	20	25	30
Dimension d	10	12	14	14

Fuse link	DIII/E33		
Rated current A	35	50	63
Dimension d	16	18	20

Fuse link	DIV/R1¼"	
Rated current A	80	100
Dimension d	5	7

Low-Voltage Fuse Systems

Class CC Fuses

Product overview

Overview

Class CC fuse links

- Rated voltage U_n 600 V AC, 300 V DC
- Rated voltage I_n 0.6 ... 30 A
- Three different characteristics

Class CC fuse holders



- Rated voltage U_n 600 V AC
- Rated voltage I_n 30 A
- 1-pole, 1-pole + N, 2-pole, 3-pole, 3-pole + N

Benefits

Key features of these fuses for industrial applications are their high switching capacity, high current limitation and ultra-compact design.

In order to prevent confusion with the American Midget fuses or European fuses, size 10 x 38 mm, the Class CC fuses are distinguished by a "Rejection Tip" on the contact cap. This prevents the use of Midget fuses (with lower switching capacity) in CC fuse holders.



Application

Just three series cover the majority of all applications:

- 3NW1 ...-0HG: slow, for the protection of control transformers, reactors and inductances. Significantly slower than the minimum requirements specified by UL for Class CC fuses of 12 s at $2 \times I_n$.
- 3NW2 ...-0HG: quick for a wide range of applications, "branch circuit protection" for the protection of lighting systems, heating, controls.
- 3NW3 ...-0HG: slow; i.e. slow in the event of overload and quick in the event of short-circuit, high current limitation, for protection of motor circuits, for "branch circuit protection".

Technical specifications

Class CC fuses		3NW1 ...-0HG	3NW2 ...-0HG	3NW3 ...-0HG
Characteristic		slow	quick	slow, current limited
Rated voltage	V AC V DC	600		600 (3 ... 15 A) 150 (3 ... 15 A) 300 (< 3 A, > 15 A)
Rated breaking capacity	kA AC	200		
Approvals		UL US		

Selection and ordering data

Rated current A	Characteristic slow	Characteristic quick	Characteristic slow, current limited	Weight 1 unit approx. kg	PS*/P. unit Unit(s)
	Order No.	Order No.	Order No.		
Class CC fuses					
0.6 (6/10)	3NW1 006-0HG	--	--	0.008	10
0.8 (8/10)	3NW1 008-0HG	--	--	0.008	10
1	3NW1 010-0HG	3NW2 010-0HG	3NW3 010-0HG	0.008	10
1.5 (1½)	3NW1 015-0HG	--	--	0.008	10
2	3NW1 020-0HG	3NW2 020-0HG	3NW3 020-0HG	0.008	10
3	3NW1 030-0HG	3NW2 030-0HG	3NW3 030-0HG	0.008	10
4	3NW1 040-0HG	3NW2 040-0HG	3NW3 040-0HG	0.008	10
5	3NW1 050-0HG	3NW2 050-0HG	3NW3 050-0HG	0.008	10
6	3NW1 060-0HG	3NW2 060-0HG	3NW3 060-0HG	0.008	10
8	3NW1 080-0HG	3NW2 080-0HG	3NW3 080-0HG	0.008	10
10	3NW1 100-0HG	3NW2 100-0HG	3NW3 010-0HG	0.008	10
12	3NW1 120-0HG	3NW2 120-0HG	3NW3 120-0HG	0.008	10
15	3NW1 150-0HG	3NW2 150-0HG	3NW3 150-0HG	0.008	10
20	3NW1 200-0HG	3NW2 200-0HG	3NW3 200-0HG	0.008	10
25	3NW1 250-0HG	3NW2 250-0HG	3NW3 250-0HG	0.008	10
30	3NW1 300-0HG	3NW2 300-0HG	3NW3 300-0HG	0.008	10

Version	Rated voltage V	Rated current A	MW	Order No.	Weight 1 unit approx. kg	PS*/P. unit Unit(s)
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Class CC fuse holders



1-pole	600	30	1	3NW7 513-0HG	0.056	1
1-pole + N	600	30	1	3NW7 553-0HG	0.069	1
2-pole	600	30	2	3NW7 523-0HG	0.118	1
3-pole	600	30	3	3NW7 533-0HG	0.172	1
3-pole + N	600	30	3	3NW7 563-0HG	0.185	1
4-pole	600	30	4	3NW7 543-0HG	0.236	1

Low-Voltage Fuse Systems

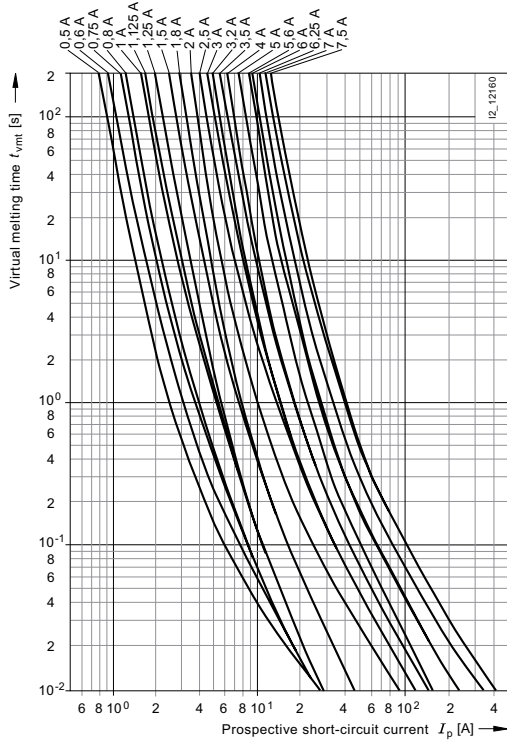
Class CC Fuses

Class CC fuse links and holders

Characteristic curves

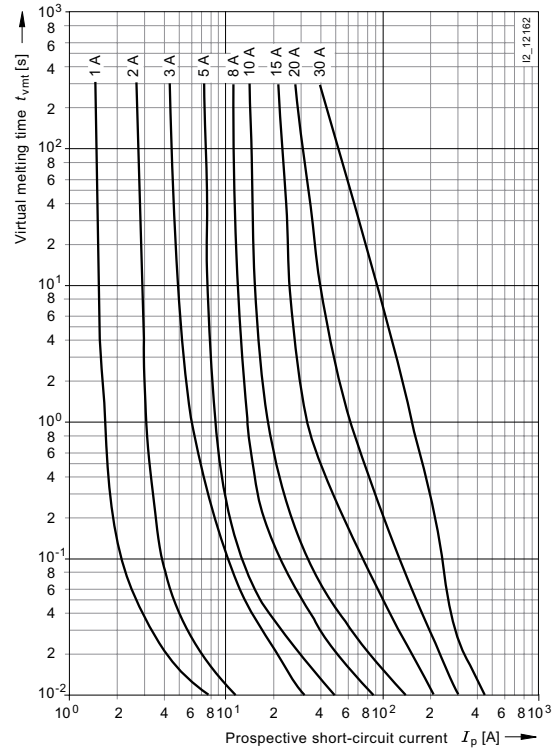
Series 3NW1 ...-0HG

Time/current characteristics diagram



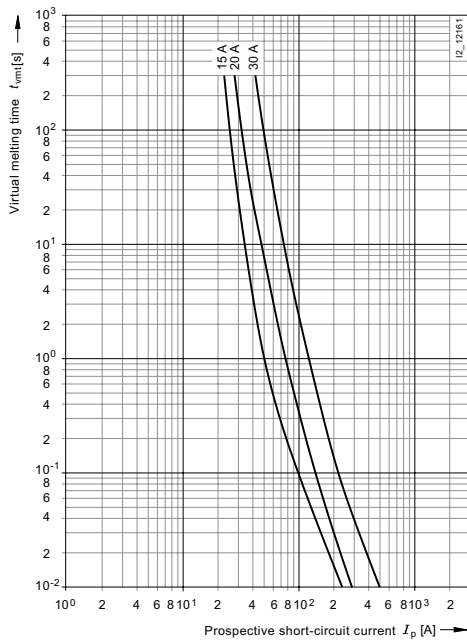
Series 3NW2 ...-0HG

Time/current characteristics diagram



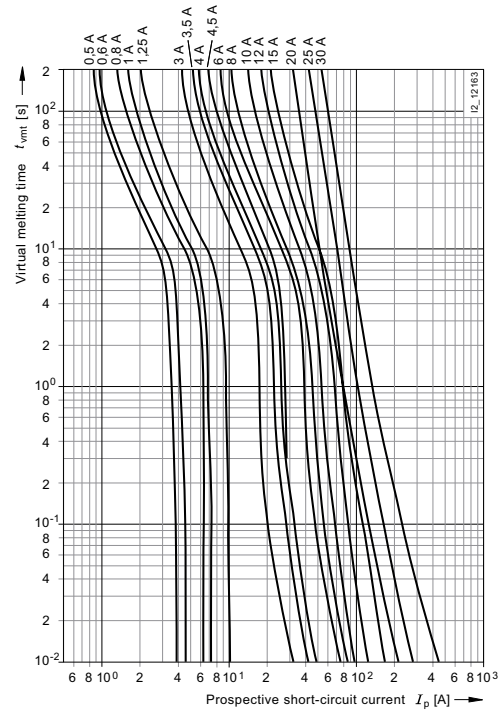
Time/current characteristics diagram

Series 3NW1 ...-0HG



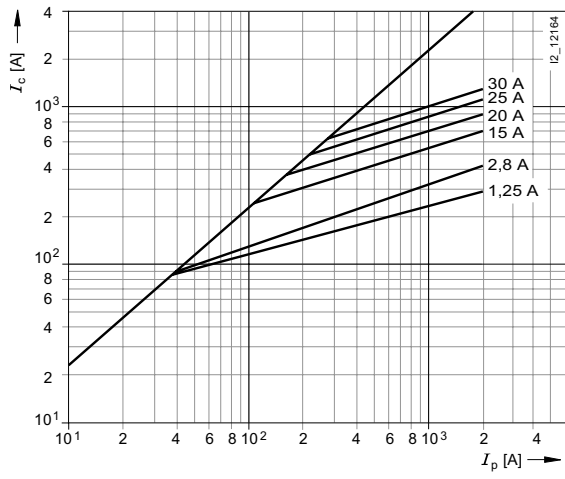
Time/current characteristics diagram

Series 3NW3 ...-0HG

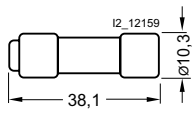


Characteristic curves

Series 3NW3 ...-0HG



Dimensional drawings



Low-Voltage Fuse Systems

Notes



2

SR60 Busbar System

- 2/2 **System design**
- 2/6 **Busbar supports,
connection methods**
- 2/9 **Components with fuses**
- 2/15 **Partition components**

SR60 Busbar System

System design

Overview

The SR60 busbar system is a modular system for busbars, for installation in distribution boards. The busbar clearance is 60 mm.

The basic elements are

- Busbar routings
- Mounting components for mounting onto busbars
- Covers for ensuring protection against contact.

Version

- DIN VDE 0636, DIN VDE 0660 Part 500/Part 107
- Rated voltages: 690 V AC
- Rated short-circuit strength: 50 kA at 250 mm support spacing
- Rated current: depending on selected busbar, up to 630 A AC
- The modular design facilitates planning and installation
- The design can be freely selected
- The terminal can be freely positioned
- Switching and modular installation devices can be integrated
- Adjustable multi-range busbar support for busbars 12 x 5 mm to 30 x 10 mm
- The set busbar width can be read at the side on the busbar holder
- Fast mounting using mounting components, which can be plugged on and locked in place
- Fast mounting using snap-on covers and touch-protection elements
- Terminals can be retrofitted onto the busbars without having to be inserted.

High-quality material

Busbar supports and fuse bases are manufactured from glass-fiber reinforced, thermoplastic polyester with the color RAL 7035 (light gray). The material ensures excellent mechanical, chemical and electrical properties. Furthermore, the material has extremely low flammability and meets the requirements of UL 94 V0.

Planning

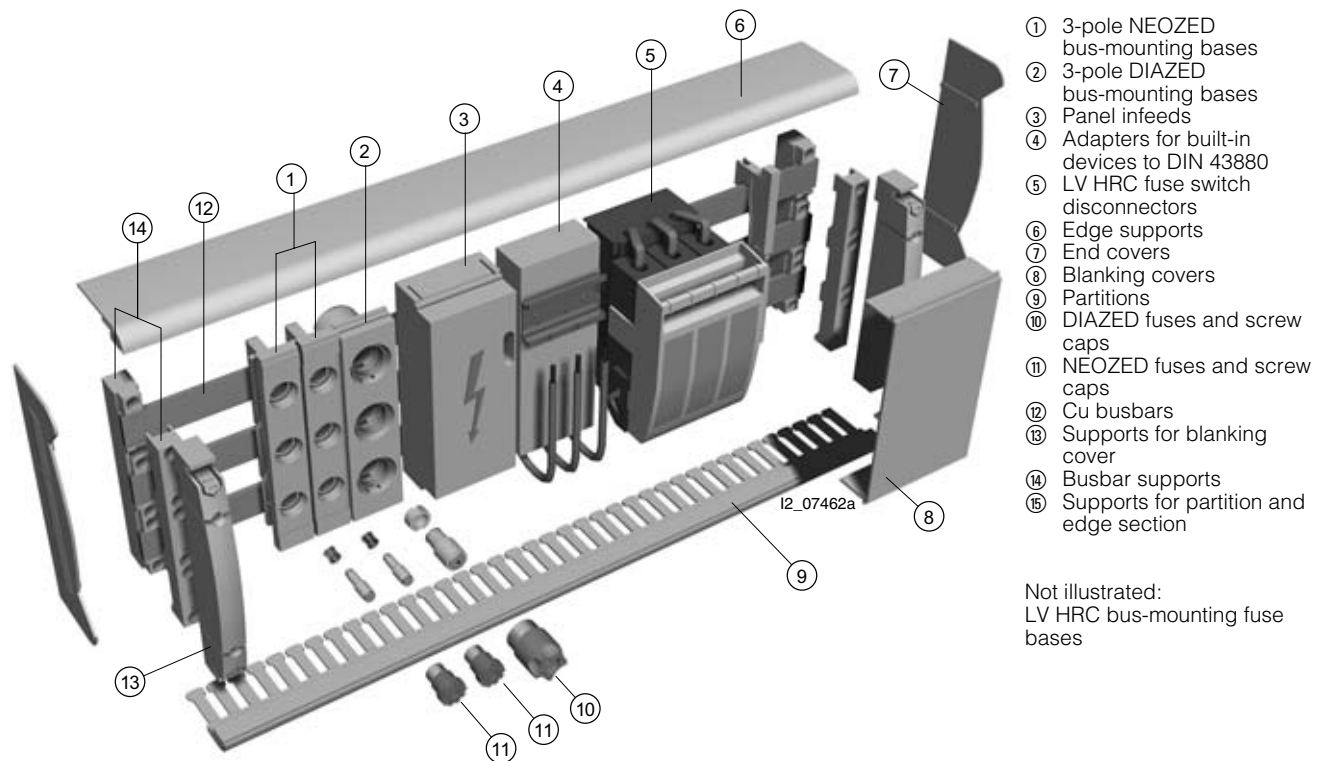
When dimensioning the busbar routings, depending on rated currents, the ambient temperature and the Cu busbar temperature must also be taken into account. The location and the ability of the busbar system to dissipate heat through convection also plays a key role in this calculation. As conditions can differ in each distribution system, planning instructions can be found on page 2/3.

Panel widths:

The SR60 busbar system is designed for ALPHA distribution systems and is suitable for the following panel widths

- B1 = 250 mm
- B2 = 500 mm
- B3 = 750 mm
- B4 = 1000 mm and
- B5 = 1250 mm

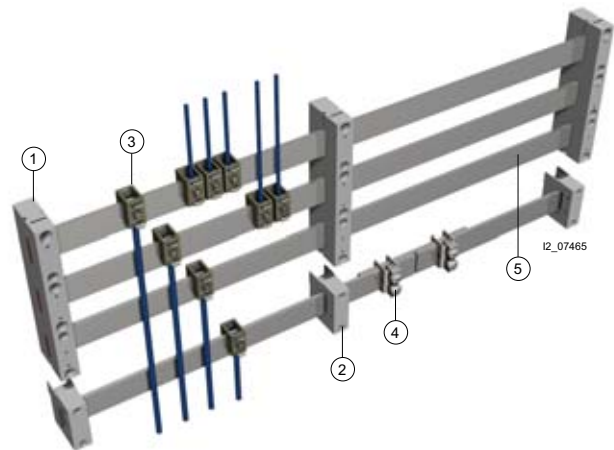
The panel widths determine the required busbar length.



Overview

The busbar supports are set by adjusting their spacers to the required busbar dimensions. After inserting the busbars in the busbar supports, they are positioned by screwing together the busbar supports. The recommended spacing for supports is 250 mm. The terminals can be subsequently mounted onto the busbars without having to be threaded in from the side.

- ① Busbar support, 3-phase
- ② N/PE busbar support
- ③ Incoming and outgoing terminals
- ④ Terminal
- ⑤ Cu busbars



Application

The use of busbar systems with their versatile rail-adaptable connection, switching and installation devices is an ideal and cost-effective electrotechnical enhancement of modern distribution boards due to their small footprint, compact design and quick assembly contacts.

Mounting is carried out on distribution board rails or mounting plates. The direct snap-on contacts of the rail-adaptable switching and installation devices on the Cu busbars drastically reduces assembly times and the number of distribution panels required, as well as the transfer resistance of the connections compared to conventional installation.

The basic elements are:

Busbar holders, enclosures and cover parts, channels and supports, as well as the rail-adaptable connection, switching and installation range such as incoming/outgoing terminals, incoming supply, adapters for modular installation devices according to DIN 43880, LV HRC fuse switch disconnectors and three-pole NEOZED and DIAZED bus-mounting fuses.

Busbar holders and fuse bases are manufactured from glass-fiber reinforced, thermoplastic polyester (color RAL 7035, light gray). The material ensures excellent mechanical, chemical and electrical properties. Furthermore, the material has extremely low flammability and meets the requirements of UL 94 V0. This satisfies the load requirements at rated operational voltage 500 V and rated currents at 200 A to 630 A, as well as the rated short-circuit strength 50 kA. When dimensioning the busbars, depending on rated currents, the ambient temperature and the Cu busbar temperature must also be taken into account. The location and the ability of the busbar system to dissipate heat through convection also plays a key role in this calculation. Because conditions can vary for each distribution board, the values in the following table serve as a guideline only. However, they must be applied to the entire busbar length.

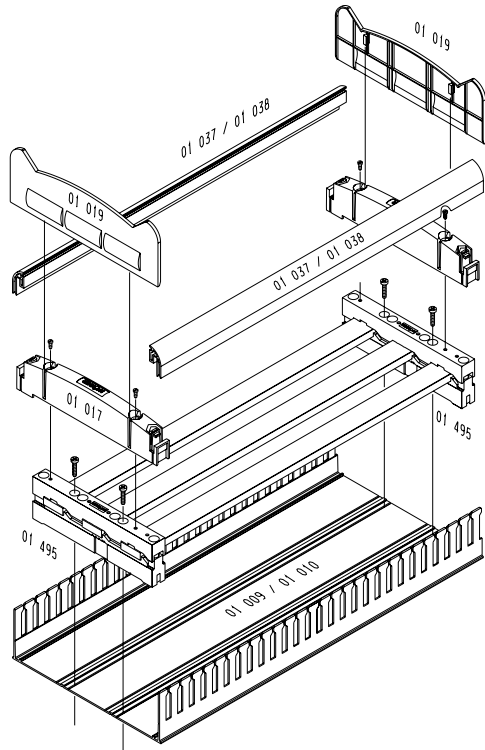
SR60 Busbar System

System design

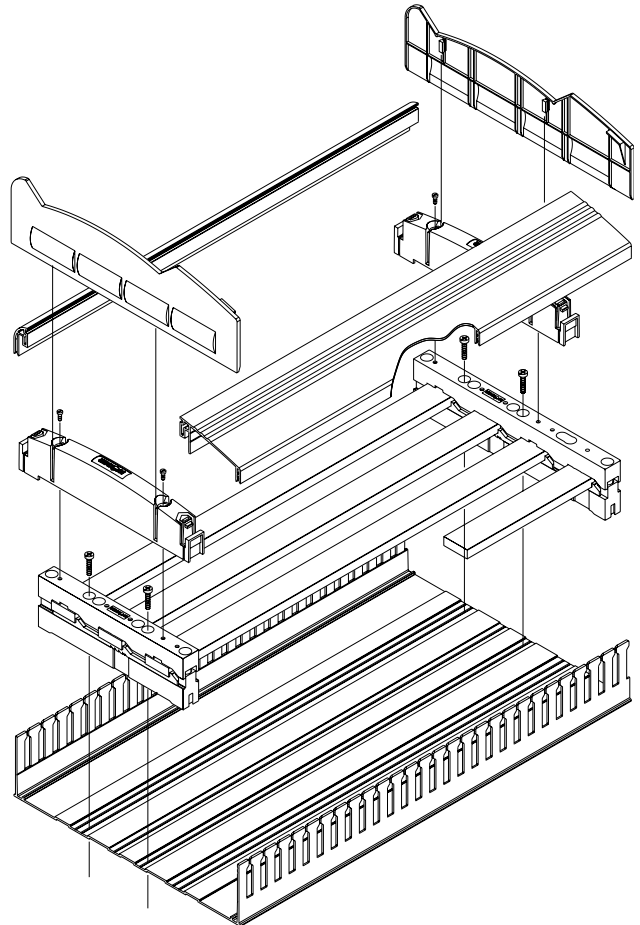
Design

SR60 busbar system – system partitions

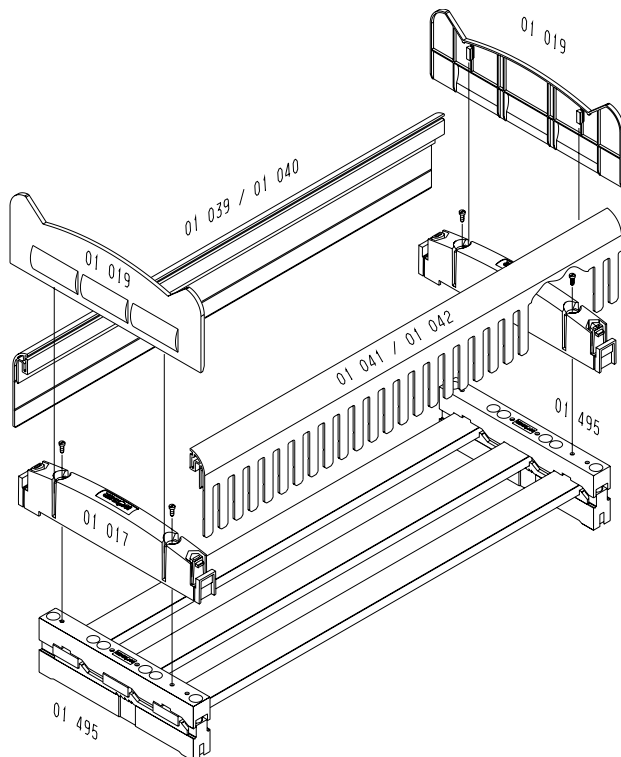
3-pole with base



4-pole with base



3-pole without base



Function

Dynamic rated short-circuit strength

The electrodynamic load of the busbar run depends on the level of short-circuit current, the length of the busbar section through which the current flows, the support spacing of the busbar supports and, of course, on the distance between the busbars themselves.

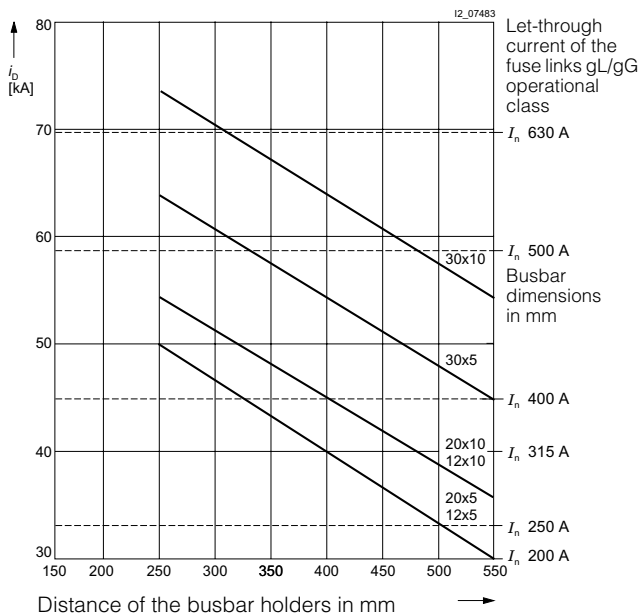
Because, for example, an LV HRC fuse is connected upstream to the busbars in the protective device, the let-through current i_D is the maximum current to flow through this protective device. The value i_D depends in turn on the maximum system short-circuit current and the current-limiting action of the protective device used.

The possible let-through values of the protective equipment are specified by the manufacturers in the form of a current limitation diagram as a function of the so-called prospective short-circuit current (r.m.s. value of the possible rated short-circuit current for the system). You will find the current-limiting characteristics for Siemens fuse links in the Chapter "Low-voltage fuse systems".

For busbar holders with busbars of 12 x 5 mm to 20 x 5 mm, the distance between the holders of the support spacing should be adapted to suit the bars in the distribution board and, if possible, should not exceed 250 mm.

When using busbars of 25 x 5 mm, 30 x 5 mm, 12 x 10 mm to 30 x 10 mm, the distance can also be up to 500 mm. In the case of larger distances, subcarriers must be fitted as increased support spacing reduces the dynamic stability. It is essential to ensure that the permissible current carrying capacity of the individual busbars is not exceeded. A center infeed is required in the limit range. However, the infeed can also be carried out from both sides of the busbar ends.

Diagram of the dynamic short-circuit strength of the busbars



i_D : Let-through values (kA) of the LV HRC fuse links, gL/gG operational class with rated current 200 A to 630 A for a prospective short-circuit current $I_D = 120$ kA.

SR60 Busbar System

Busbar supports, connection methods





Technical specifications

Continuous currents depending on the Cu busbar dimensions and Cu busbar temperatures at 35 °C ambient temperature









Cu busbars dimensions H × D mm × mm	Continuous current for open busbar run ambient temperature 35 °C A	Continuous current of fuse link operational class gL/gG A
12 × 5	200	200
12 × 10	360	315
15 × 5	250	250
15 × 10	447	400
20 × 5	320	315
20 × 10	520	500
25 × 5	400	400
25 × 10	580	500
30 × 5	447	400
30 × 10	630	630

As far as other types of upstream protective devices are concerned, please observe the permissible continuous current of the busbar.

Selection and ordering data

	Dimensions W × H × D mm × mm × mm	Order No.	Weight 1 unit approx. kg	PS*/ P. unit Unit(s)
 <p>Busbar supports for SR60 busbar system for busbars with a bar thickness of 5 or 10 mm and a 12, 15, 20, 25 or 30 mm busbar height 60 mm busbar distance</p> <p>external 3-phase internal 3-phase internal 4-phase</p>	20 × 215 × 50	8US19 23-2AA01	0.200	10
	20 × 191 × 50	8US19 23-3AA01	0.200	10
	20 × 245 × 51/56	8US19 23-4AA00	0.269	10
 <p>N/PE busbar supports for mounting onto busbar supports, can also be used as single support 1-phase</p>	26 × 63 × 51	5SH3 506	0.070	4
 <p>SR60 connecting terminal plates 3-phase, for conductors from 150 to 300 mm² (illustration without cover)</p>		5SH3 535	1.657	1
 <p>Connector blocks for SR60 busbars 3-phase, for conductors from 35 to 120 mm²</p>		8US19 21-1AA00	0.607	1

Accessories

		Conductor cross-section	Tightening torque	Order No.	Weight 1 unit approx.	PS*/P. unit
		up to mm ²	Nm		kg	Unit(s)
Terminals						
Terminals for one busbar 12 mm × 5 mm						
		1.5 ... 16	1.4	8JH4 102	0.010	1
8JH4 102	8JH4 104	16 ... 35	3.0	8JH4 104	0.030	1
		16 ... 70	6.0	8JH4 105	0.030	1
8JH4 105	8JK3 061	16 ... 95	10.0	8JH4 106	0.070	1
		25 ... 120	10.0	8JK3 061	0.090	1
Terminals for two busbars 12 mm × 10 mm						
		16 ... 35	6.0	8JH4 105	0.030	1
8JH4 105	8JK3 061	16 ... 70	10.0	8JH4 106	0.070	1
		25 ... 50	10.0	8JK3 061	0.090	1
Extension terminals for 12 mm × 5 mm busbar busbar not included in delivery (1 set = 2 units)						
			6.0	1 set 8JK3 201	1 set 0.100	1 set
Terminals for circular conductors 20 mm × 5 mm to 30 mm × 10 mm						
		150 ... 240		8US19 41-2BB00	0.307	6

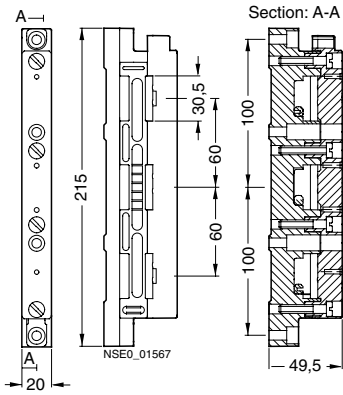
SR60 Busbar System

Busbar supports, connection methods

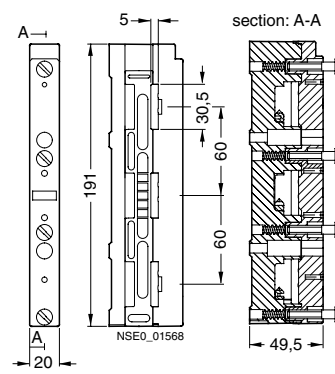
Dimensional drawings

8US19 23 busbar holders for SR60 busbar system

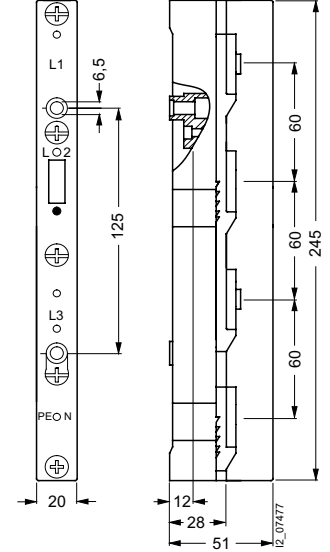
8US19 23-2AA01



8US19 23-3AA01

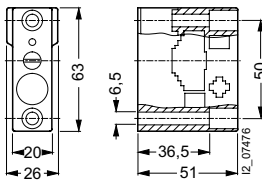


8US19 23-4AA00



N/PE busbar supports

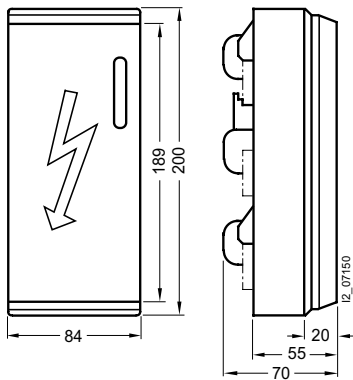
5SH3 506



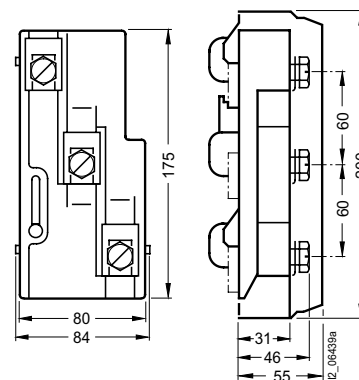
Connector blocks for SR60 busbars

8US19 21-1AA00

shown closed

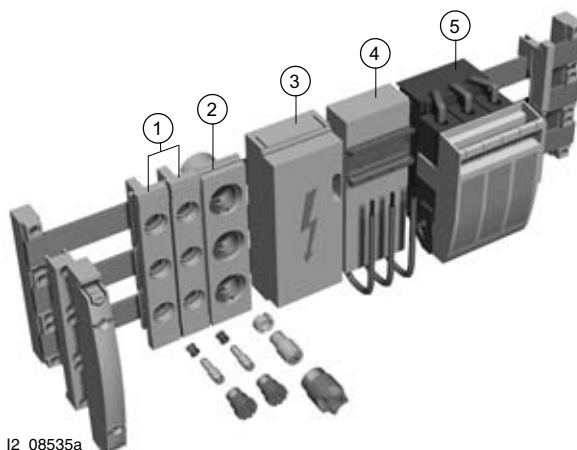


shown open



Overview

- ① 3-pole NEOZED bus-mounting base
- ② 3-pole DIAZED bus-mounting base
- ③ Panel infeed
- ④ Adapter for modular installation devices according to DIN 43880
- ⑤ LV HRC fuse switch disconnecter



I2_08535a





Selection and ordering data

Size	Rated current	Rated voltage	Order No.	Weight	PS*/
				1 unit approx.	P. unit
	A	V		kg	Unit(s)
NEOZED SR60 bus-mounting bases					
for busbar thickness 5 mm					
for NEOZED adapter sleeves					
3-pole					
	D02	63	400	5SG6 202	0.141 4
excess width with clearance for wiring					
	D02	63	400	5SG6 204	0.154 4
for busbar thickness 10 mm					
for NEOZED adapter sleeves					
3-pole					
	D02	63	400	5SG6 203	0.138 4
excess width with clearance for wiring					
	D02	63	400	5SG6 205	0.149 4
DIAZED SR60 bus-mounting bases					
for busbar thickness 5 mm					
for use of DIAZED SR60 adapter rings					
3-pole					
	DII	25	500	5SF6 014	0.230 2
	DIII	63	690	5SF6 214	0.318 2
for use of DIAZED screw adapters					
3-pole					
	DII	25	500	5SF6 015	0.222 2
	DIII	63	690	5SF6 215	0.310 2
for busbar thickness 10 mm					
for use of DIAZED SR60 adapter rings					
3-pole					
	DII	25	500	5SF6 016	0.233 2
	DIII	63	690	5SF6 216	0.316 2
for use of DIAZED screw adapters					
3-pole					
	DII	25	500	5SF6 017	0.220 2
	DIII	63	690	5SF6 217	0.328 2

SR60 Busbar System


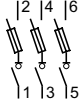

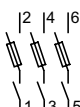

Components with fuses

Selection and ordering data

Size	MW	Order No.	Weight 1 unit approx. kg	PS*/ P. unit Unit(s)		
NEOZED SR60 covers						
	D02	1.5	5SH5 241	0.026	4	
	excess width with clearance for wiring			0.031	4	
	D02	2		5SH5 242	0.031	4
	with double width for a larger clearance for wiring		5SH5 243	0.040	4	
	D02	3		0.040	4	
DIAZED SR60 covers						
	DII	2.3	5SH2 042	0.050	2	
	DIII	3.2		5SH2 242	0.061	2
	with double width for a larger clearance for wiring		5SH2 043	0.084	2	
	DII	4.7		5SH2 243	0.106	2
	DIII	6.4		5SH2 243	0.106	2
Size	Thread	For fuse links	Order No.	Weight 1 unit approx. kg	PS*/ P. unit Unit(s)	
			A			
DIAZED SR60 adapter rings						
only for DIAZED SR60 bus-mounting bases						
	DII	E 27	2	5SH3 071	0.005	10
			4	5SH3 072	0.005	10
			6	5SH3 073	0.005	10
			10	5SH3 074	0.005	10
			16	5SH3 075	0.005	10
	DIII	E 33	20	5SH3 076	0.004	10
			2	5SH3 078	0.008	10
			4	5SH3 080	0.008	10
			6	5SH3 081	0.008	10
			10	5SH3 082	0.008	10
		16	5SH3 083	0.008	10	
		20	5SH3 084	0.006	10	
		25	5SH3 085	0.007	10	
		35	5SH3 086	0.006	10	
		50	5SH3 087	0.005	10	

For NEOZED screw caps, adapter sleeves and fuse links, see the Chapter "Low-voltage fuse systems", NEOZED fuse systems
 For NEOZED screw caps, screw adapters and fuse links, see the Chapter "Low-voltage fuse systems", DIAZED fuse systems.


Selection and ordering data


	AC rated current	AC rated voltage	Order No.	Weight 1 unit approx.	PS*/P. unit	
	A	V		kg	Unit(s)	
 <p>NEOZED SR60 bus-mounting switch disconnectors for bar thickness 5 and 10 mm for 3-phase busbar system Width: 1.5 MW 3-pole Size D02</p> 	63	400	5SG7 230	0.700	1	
	 <p>SR60 bus-mounting disconnectors for cylindrical fuses 10 x 38 mm for bar thickness 5 and 10 mm for 3-phase busbar system 3-pole</p> 	32	690	3NW7 430	0.700	1
		<p>Auxiliary switches 1 changeover contact, 24 to 230 V AC, 2 A AC</p>		5SH5 525	0.007	1
 <p>Lateral modules for NEOZED SR60 bus-mounting switch disconnectors for better heat conduction at permanent loads over 35 A Width: 0.5 MW</p>			5SH5 526	0.060	1/5	
	<p>Reducers for NEOZED fuse links D01 in the SR60 bus-mounting switch disconnectors</p>		5SH5 527	0.003	10	

SR60 Busbar System

Components with fuses

Selection and ordering data

	Order No.	Weight 1 unit approx. kg	PS*/ P. unit Unit(s)
 <p>SR60 LV HRC bus-mounting fuse bases size 000 and 00 with cover, top terminals, for busbar thickness 5 and 10 mm 3-pole Terminals up to 70 mm² Rated voltage 690 V AC with saddle-type terminal connection with flat termination, screw M8</p>	3NH4 052	0.641	1
	3NH4 053	0.646	1

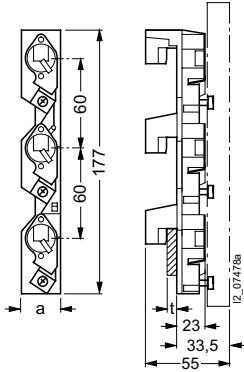
I_u	For LV HRC links	Conductor cross- section	Type of connection/ adapter	Order No.	Weight 1 unit approx. kg	PS*/ P. unit Unit(s)	
A	Size	up to mm ²					
 <p>Fuse switch disconnectors for SR60 busbars climate-proof, rated operational voltage 690 V AC supplied without LV HRC fuse links</p>	100	000 and 00	1.5 ... 35	top bottom	3NP40 16-1CK01 3NP40 16-1CJ01	0.916 0.950	1 1
	160	000 and 00	up to 2 × 70	top bottom	3NP40 76-1CE01 3NP40 76-1CF01	1.203 1.201	1 1
	160	000 and 00	2.5 ... 70 (SIGUT terminal)	top bottom	3NP40 76-1CK01 3NP40 76-1CJ01	1.295 1.249	1 1
	250	0 and 1	max. 150	top or bottom	3NP42 76-1CG01	3.713	1
	400	2	max. 240	top or bottom	3NP43 76-1CG01	5.440	1
	630	3	max. 2 × 240	top or bottom	3NP44 76-1CG01	7.688	1

For additional busbar adapters, see Catalog LV 1.
For additional fuse switch disconnectors, Chapter "Low-voltage fuse systems".

Dimensional drawings

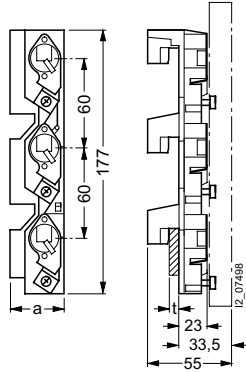
NEOZED SR60 bus-mounting bases

D02/63 A (a = 27 mm)
(t = busbar thickness)



5SG6 202 (t = 5 mm),
5SG6 203 (t = 10 mm)

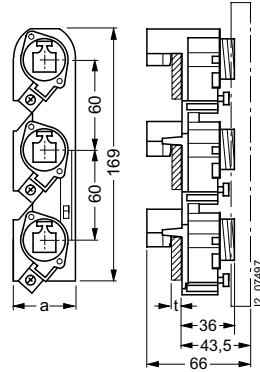
D02/63 A (a = 36 mm)



5SG6 204 (t = 5 mm),
5SG6 205 (t = 10 mm)

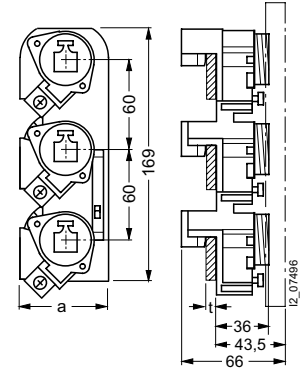
DIAZED SR60 bus-mounting bases

DII/25 A (a = 42 mm)



5SF6 014, 5SF6 015 (t = 5 mm),
5SF6 016, 5SF6 017 (t = 10 mm)

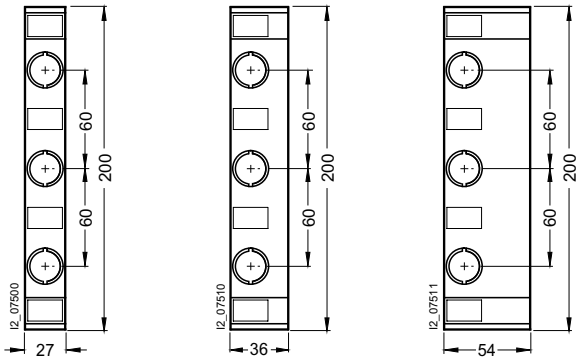
DIII/63 A (a = 57 mm)



5SF6 214, 5SF6 215 (t = 5 mm),
5SF6 216, 5SF6 217 (t = 10 mm)

NEOZED SR60 covers

D02/63 A



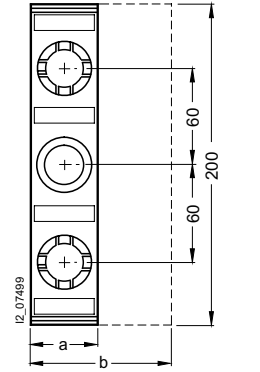
5SH5 241
1-fold

5SH5 242
1.33-fold

5SH5 243
2-fold

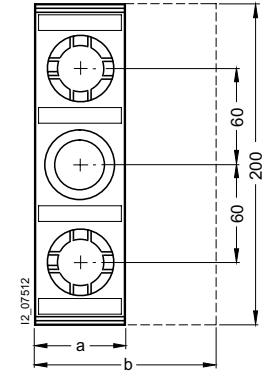
DIAZED SR60 covers

DII/25 A



5SH2 042 (1-fold: a = 42 mm)
5SH2 043 (2-fold: b = 84 mm)

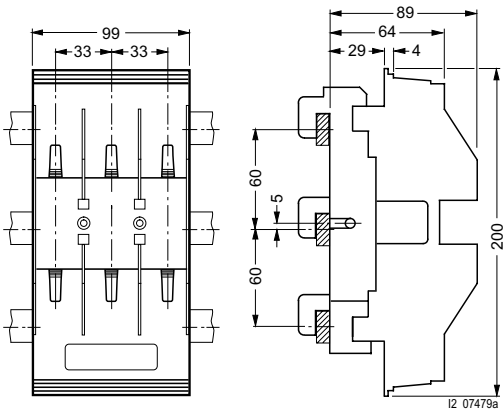
DIII/63 A



5SH2 242 (1-fold: a = 57 mm)
5SH2 243 (2-fold: a = 114 mm)

LV HRC SR60 bus-mounting fuse bases, 3-pole

3NH4 052, 3NH4 053



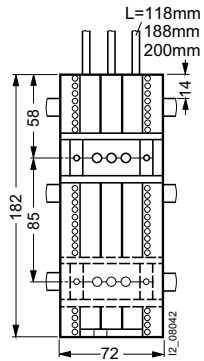
SR60 Busbar System

Components with fuses

Dimensional drawings

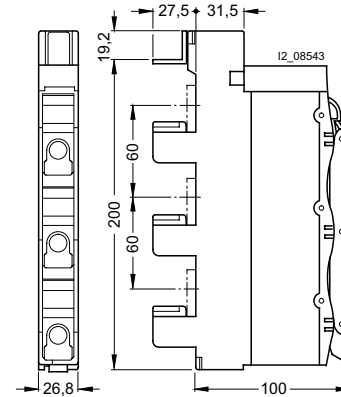
Busbar adapters for SR60 busbars

8US12 81-6NA00
8US12 71-2NA20



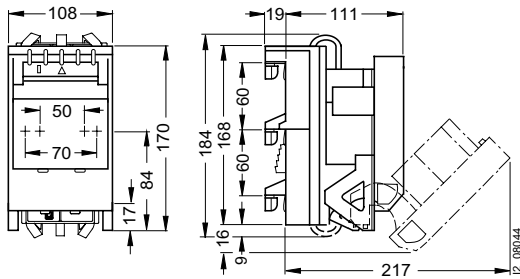
NEOZED SR60 bus-mounting switch disconnectors/ SR60 bus-mounting disconnectors

5SG7 230
3NW7 430

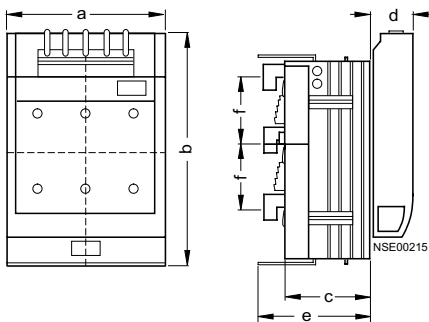


Fuse switch disconnectors for SR60 busbars

Busbar distance 60 mm
3NP40 76



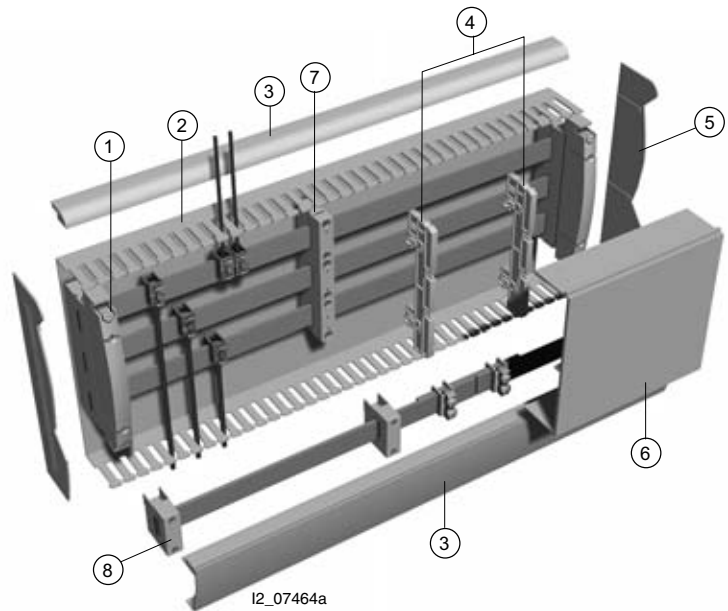
3NP4. 76 (not 3NP40 76)








Type	Dimensions				
	a	b	c	d	f
3NP42 76	184	243	66	45.5	60
3NP43 76	210	288	80	48	60
3NP44 76	256	300	94.5	48	60

Overview

- ① Edge support
- ② Base
- ③ Edge
- ④ Support for the blanking cover
- ⑤ End cover
- ⑥ Blanking cover
- ⑦ Busbar support, 3-phase
- ⑧ N/PE busbar support






Selection and ordering data

	Length mm	Order No.	Weight 1 unit approx. kg	PS*/ P. unit Unit(s)
SR60 covers				
 Bases height 230 mm, for 3 busbars 290 mm, for 4 busbars	1100	5SH3 526 5SH3 527	1.100 1.300	2 2
 Blanking covers depth 32 mm	1000	5SH3 537	0.075	2
 Cover profiles for busbars up to 30 x 5 mm up to 30 x 10 mm	1000	8US19 22-2AA00 8US19 22-2BA00	0.156 0.105	10 10
 Edges H x W 17 x 36 mm, for 3 busbars 77 x 36 mm, for 4 busbars	1100	5SH3 528 5SH3 530	0.311 0.583	2 2
 Partitions slotted H x W 17 x 86 mm	1100	5SH3 531	0.365	2

SR60 Busbar System

Partition components

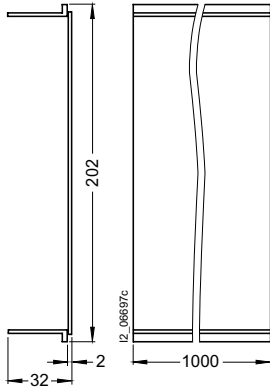
Selection and ordering data

		Order No.	Weight 1 unit approx. kg	PS*/ P. unit Unit(s)
SR60 covers				
	End covers for busbar supports, lateral height 230 mm	5SH3 533	0.038	4
	290 mm (1 set = 2 right and 2 left end covers)	5SH3 534	0.048	4
End covers for busbar supports, top				
	3-pole	8US19 22-1AC00	0.020	10
	4-pole	8US19 22-1AB00	0.055	1
	Edge supports and supports for partitions	5SH3 532	0.106	2
	Supports for the blanking cover for blanking cover	5SH3 536	0.040	4

Dimensional drawings

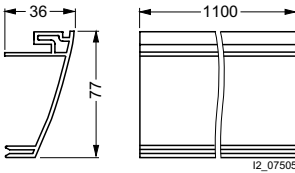
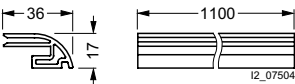
Blanking covers

5SH3 537



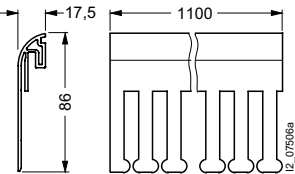
Edges

5SH3 528, 5SH3 530



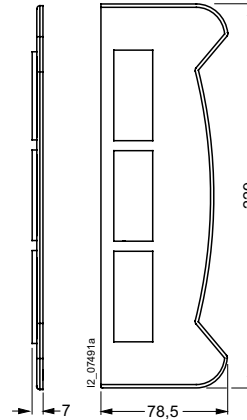
Partitions

5SH3 531

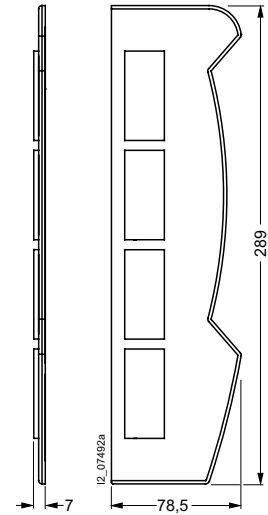


End covers for busbar supports, lateral

5SH3 533

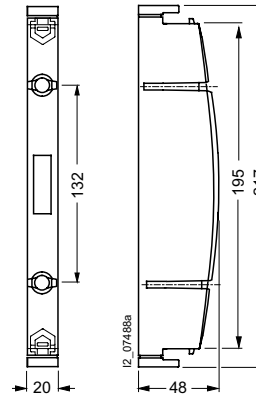


5SH3 534



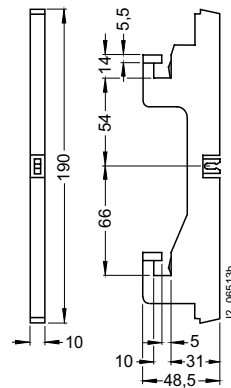
Edge supports and support for partitions

5SH3 532



Supports for the blanking cover

5SH3 536



SR60 Busbar System

Notes



General Data	3/2	Product overview
	3/7	Introduction
Standard Product Range	3/24	5SY6 ...-KV, 6 kA
	3/25	Auxiliary circuit switches/fault signal contacts for 5SY6 ...-KV
	3/26	5SJ6, 5SY6, 6 kA
	3/27	5SY6, 6 kA
	3/30	5SJ6 ...-KS, 6 kA
High-Capacity Product Range	3/32	5SJ4 ...-HG40, 14 kA
	3/33	5SY4, 10 kA
	3/39	5SY7, 15 kA
	3/43	5SY8, 25 kA
UC product Range	3/46	5SY5, 10 kA
High-Current Product Range	3/48	5SP4, 10 kA
Additional Components	3/49	5SM2, product overview
	3/51	5SM2, type AC, 0.3 ... 63 A, for 5SY4, 5SY6, 5SY7, 5SY8
	3/52	5SM2, type A, 0.3 ... 63 A, for 5SY4, 5SY6, 5SY7, 5SY8
	3/54	5SM2, type AC, 80 ... 100 A, for 5SP4
	3/55	5SM2, type A, 80 ... 100 A, for 5SP4
	3/56	Auxiliary circuit switches/fault signal contacts for 5SY. and 5SP4
	3/57	Remote controlled mechanisms for 5SY. and 5SP4
	3/58	Shunt trips/undervoltage releases for 5SY. and 5SP4
Accessories	3/59	For 5SJ6, 5SY. and 5SP4
Power Supply Company Product range	3/63	5SP3, 25 kA, mounting depth 92 mm
	3/65	Accessories for 5SP3, 25 kA



Miniature Circuit-Breakers

General Data

Product overview

Overview

Version	Tripping characteristics	Device mounting depth [mm]	Rated currents I_n	Standards	Rated short-circuit capacity Energy limitation class	Usage		
						Non-residential buildings	Residential buildings	Industry
Standard product range								
5SJ6	B	70	2 ... 32 A	EN 60898	6 000 3	•	•	•
5SY6	B		2 ... 63 A			•	•	•
	C		0.3 ... 63 A			•	•	•
	D		0.3 ... 63 A			•	•	•
High-capacity product range								
5SJ4	B	70	6 ... 63 A	UL 489 CSA 22.2 No. 5-02	14 kA	•	•	•
	C		0.3 ... 63 A			•	•	•
	D		0.3 ... 63 A			•	•	•
5SY4	A		1 ... 63 A	EN 60898	10 000 3	•		•
	B		6 ... 80 A			•		•
	C		0.3 ... 80 A			•		•
	D		0.3 ... 63 A			•		•
5SY7	B		6 ... 63 A		15 000 3	•		•
	C		0.3 ... 63 A			•		•
	D		0.3 ... 63 A			•		•
5SY8	C		0.3 ... 63 A	EN 60947-2	25 kA	•		•
	D		0.3 ... 63 A			•		•
UC product range								
5SY5	B	70	2 ... 63 A	EN 60898	10 000 3			•
	C		0.3 ... 63 A					•
High-current product range								
5SP4	B	70	80 ... 125 A	EN 60898	10 000	•		•
	C		80 ... 125 A			•		•
	D		80 ... 100 A			•		•
Power supply company product range								
5SP3	E	92	16 ... 100 A	DIN VDE 0645	25 000	•	•	

Approvals	VDE	IMQ	RA	UL	BV	DNV	GL	LRS	CCC
Standard product range									
5SJ6	•								
5SY6	•	•	•		•	•	•	•	•
High-capacity product range									
5SJ4				•					
5SY4	•	•	•		•	•	•	•	•
5SY7	•	•	•		•	•	•	•	•
5SY8			•						
UC product range									
5SY5	•								
High-current product range									
5SP4	•		•				•		•
Power supply company product range									
5SP3	•								

Benefits

- High rated breaking capacity up to 15 000 A according to EN 60 898/25 kA according to EN 60947-2
- Excellent current limiting and selectivity characteristics
- Tripping characteristic A, B, C and D
- Protection against contact with fingers or back of hand according to VBG 4/BGV A2
- Combined terminals enable a simultaneous connection of busbars and feeder cables
- The handle locking device effectively prevents any unauthorized operation of the handle

Features of 5SJ

- Particularly suitable for installation in small distribution boards for building installations
- Double screwless outgoing terminal for fast connection and disconnection of conductors

Features of 5SY

- Safe and rapid connection of the feeder cables due to relocation of busbar at the rear
- Identical terminals at both sides for an optional infeed from the top or the bottom
- Reach-round protection exceeds requirements according to VBG 4/BGV A2
- No tools required for mounting or dismounting
- Supports fast and convenient removal from the assembly
- Variable designation system
- Separate switching position indicator
- Uniform additional components that can be mounted individually, quickly and on-site thanks to their snap-on technique

Features of 5SP4

- Disconnection characteristics according to DIN VDE 0660 Part 107
- Main switch characteristics according to EN 60204
- Variable designation system
- Can also be screwed onto base
- Separate switching position indicator
- Uniform additional components that can be mounted individually, quickly and on-site thanks to their snap-on technique

Application

Miniature circuit-breakers primarily serve to protect cables and lines against overload and short-circuit. Thus, they also serve to protect electrical equipment against excessive overheating according to DIN VDE 0100 Part 430.

Under certain conditions, miniature circuit-breakers also offer protection against dangerous leakage currents caused by excessive touch voltage due to insulation faults according to DIN VDE 0100 Part 410.

Thanks to their fixed rated current settings, the miniature circuit-breakers may also be used for limited motor protection applications.

Various tripping characteristics are available, depending on the respective application. These are explained in detail in the introduction. The EN 60898, DIN VDE 0641 Part 11 and IEC 60898 standards form the basis for the miniature circuit-breakers' design and approval.

When used for industrial applications and for system and plant engineering applications, the miniature circuit-breakers can be supplemented by individually mountable add-on components, such as auxiliary circuit switches, fault signal contacts, shunt trips, undervoltage releases, RCCB modules and individually mountable accessories, such as busbar systems and mounting parts.

Design

Miniature circuit-breakers are equipped with a delayed overload/time-dependent thermal release (thermal bimetal) for low over-currents and with an instantaneous electromagnetic release for higher overload and short-circuit currents.

The special contact materials used guarantee a long service life and offer a high degree of protection against contact welding.

Function

Thanks to the extremely fast contact separation in cases of failures and the rapid quenching of the arc consequently generated in the arcing chamber, the miniature circuit-breakers ensure safe and current-limiting disconnection.

The permissible limit I^2t values of the energy limitation class 3 specified in DIN VDE 0641 Part 11 are generally undercut by 50 %. This guarantees an excellent selectivity towards upstream overcurrent protection devices.

Miniature Circuit-Breakers

General Data

Product overview

Technical specifications

		5SY4	5SY5	5SY6	5SY7	5SY8	5SP4
Tripping characteristics		A, B, C, D	B, C	B, C, D	B, C, D	C, D ¹⁾	B, C, D
Number of poles	1	•	•	•	•	•	•
	1 + N	•		•	•	•	
	2	•	•	•	•	•	•
	3	•		•	•	•	•
	3 + N	•		•	•	•	•
4	•		•	•	•	•	
Rated voltage	V AC	230/400					
	V DC	--	220/440	--			
Operational voltage	min. V AC/DC	24					
	max. V DC/pole	60 ²⁾	220	60 ²⁾			
	max. V AC	440					
Rated breaking capacity acc. to EN 60898	kA AC	10		6	15		10
	kA DC	--	10	--			
	kA AC	--				25	--
Insulation coordination Rated insulation voltage	V AC	250/440					
	Degree of pollution for overvoltage category III	2					
Touch protection acc. to EN 50274		•	•	•	•	•	•
Main switch characteristics acc. to EN 60204		•	•	•	•	•	•
Sealable in handle end position		•	•	•	•	•	•
Device depth acc. to DIN 43880	mm	70					
Degree of protection		IP20 acc. to DIN 60529, IP40 when mounted in distribution boards					
CFC and silicone-free		yes					
Mounting technique		can be snapped onto 35 mm standard mounting rails (EN 60715); additionally with • 5SY: quick-assembly system (no tools required for assembly) • 5SP4: screw mounting also possible					
Terminals		5SY: combined terminals at both sides for a simultaneous connection of busbars (pin-type) and conductors 5SP4: tunnel terminals at both sides					
Terminal tightening torques	recommended	Nm	2.5 ... 3				3 ... 3.5
	Conductor cross-sections						
Solid and stranded	• Upper terminal	mm ²	0.75 ... 35				0.75 ... 50
	• Lower terminal	mm ²	0.75 ... 35				0.75 ... 50
Finely stranded with end sleeve	• Upper terminal	mm ²	0.75 ... 25				0.75 ... 35
	• Lower terminal	mm ²	0.75 ... 25				0.75 ... 35
Differing conductor cross-sections may be clamped together simultaneously; details are available upon request.							
Feeder connection		as required, the specified polarity must be observed for DC applications with 5SY5					
Mounting position		any					
Service life		on average: 20,000 operations at the rated load ³⁾					
Ambient temperature	°C	-25 ... +45, occasionally +55, max. 95 % humidity, storage temperature: -40 ... +75					
Resistance to climate		6 cycles acc. to IEC 60068-2-30					
Resistance to vibrations	m/s ²	60 at 10 Hz ... 150 Hz acc. to IEC 60068-2-6					

1) ≙ Version without thermal tripping also available.

2) ≙ Battery charging voltage of 72 V.

3) ≙ 10,000 operations for 5SY5, 40 A, 50 A and 63 A at the rated load.

Technical specifications

		5SJ6	5SJ4	5SY6 ...-KV	5SP3
Tripping characteristics		B	B, C, D	B, C	E
Number of poles	1	•	•	•	•
	1 + N				
Rated voltage	V AC	230/400	240	230	230/400
Operational voltage	min. V AC/DC	24			
	max. V DC/pole	60			
	max. V AC	250	240	250	440
Rated short-circuit capacity acc. to					
EN 60898	kA AC	6	--	6	--
DIN VDE 0645	kA AC	--	--	--	25
UL 489, CSA 22.2 No. 5-02	kA AC	--	14	--	--
Insulation coordination					
Rated insulation voltage	V AC	250			690
Degree of pollution					
Overvoltage category		2/III			3/IV
Touch protection		•	•	•	--
acc. to DIN VDE 106 Part 100					
Main switch characteristics		--	--	--	•
acc. to EN 60204					
Sealable in handle end position		•	•	•	•
Device depth	mm	70			92
acc. to DIN 43880					
Degree of protection		IP20 acc. to EN 60529 for 5SP3, IP40 when mounted in distribution boards			
CFC and silicone-free		yes			
Mounting technique		can be snapped onto 35 mm standard mounting rails (EN 60715) additionally with 5SP3: screw mounting also possible			
Terminals		5SJ6, 5SJ4, 5SY6 ...-KV tunnel terminals at both ends, 5SJ6 ...-KS screwless terminals on the outgoing terminal for 1.5 ... 4 mm ² 5SP3 saddle terminals at both ends			
Conductor cross-sections					
Solid and stranded					
• Upper terminal	mm ²	0.75 ... 25		0.75 ... 16	max. 70
• Lower terminal	mm ²	0.75 ... 25		0.75 ... 16	max. 70
Finely stranded with end sleeve					
• Upper terminal	mm ²	0.75 ... 25		0.75 ... 16	max. 50
• Lower terminal	mm ²	0.75 ... 25		0.75 ... 16	max. 50
Feeder connection		any			
Mounting position		any			
Service life		on average: 20,000 operations at the rated load			
Ambient temperature		°C -25 ... +45, occasionally +55, max. 95 % humidity, storage temperature: -40 ... +75			
Resistance to climate		6 cycles acc. to IEC 60068-2-30			
Resistance to vibrations		m/s ² 60 at 10 Hz ... 150 Hz acc. to IEC 60068-2-6			

Miniature Circuit-Breakers

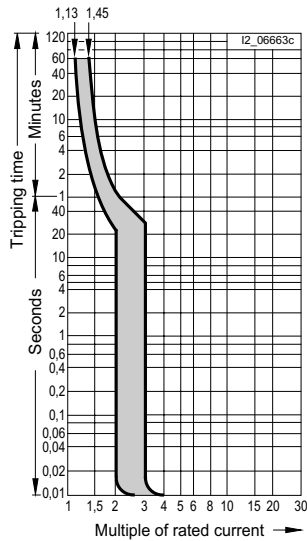
General Data

Product overview

Characteristic curves

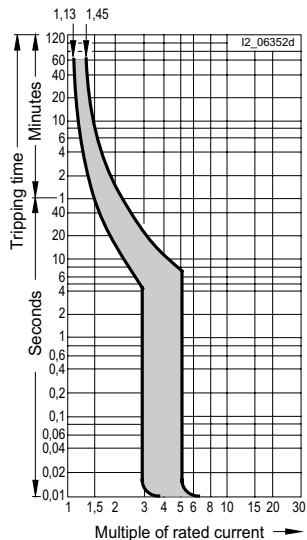
Tripping characteristic according to EN 60898, DIN VDE 0641 Part 11

Tripping characteristic A



- For limited semiconductor protection
- Protection of measuring circuits with converters
- Protection of circuits with significant cable lengths and a requirement for tripping in 0.4 s according to DIN VDE 0100 Part 410

Tripping characteristic B



- Line protection mainly in outlet circuits; no proof required regarding personal safety.

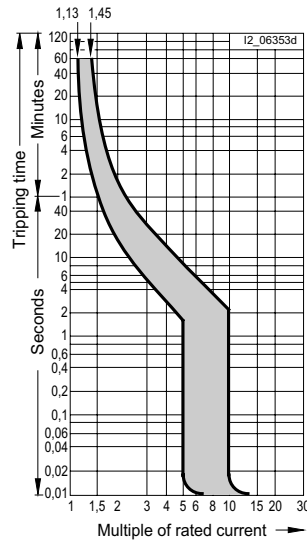
In the case of different ambient temperatures, the current values of the delayed tripping operation change by approx. 5 % per 10 K temperature difference (> for temperatures lower and < for temperatures higher than 30 °C).

For direct voltages, the maximum current values of the instantaneous tripping operation increase by a factor of 1.2.

If more than one electrical circuit is loaded in a series of circuit-breakers the resulting increase in ambient temperature affects the characteristic curve.

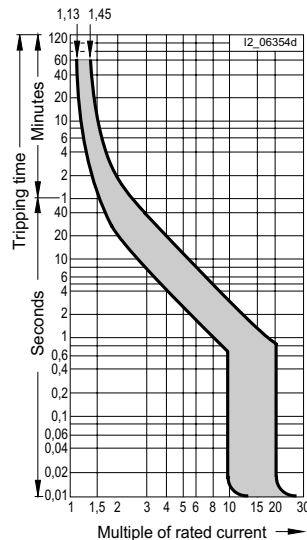
In this case an additional correction factor, specific to the rated current of the circuit-breaker, must be taken into account.

Tripping characteristic C



- General line protection, especially advantageous with higher starting currents (lamps, motors, etc.)

Tripping characteristic D



- Tripping range adapted to operating equipment involving significant pulse generation (transformers, solenoid valves)

Number	1	2 ... 3	4 ... 6	> 7
Correction factor K	1.00	0.90	0.88	0.85

Overview

Tripping characteristics

Tripping characteristics at an ambient temperature of 30 °C

Tripping characteristics	Standards	Thermal releases				Electromagnetic releases		
		Test currents:				Test currents:		
		limiting no-damage current	minimum no-damage current	tripping time		hold	latest tripping instant	tripping time
		I_1	I_2	$I_n \leq 63 \text{ A}$	$I_n > 63 \text{ A}$	I_4	I_5	t
A		$1.13 \times I_n$	$1.45 \times I_n$	> 1 h < 1 h	> 2 h < 2 h	$2 \times I_n$	$3 \times I_n$	$\geq 0.1 \text{ s}$ < 0.1 s
B	IEC 60898/EN 60898 DIN VDE 0641 Part 11	$1.13 \times I_n$	$1.45 \times I_n$	> 1 h < 1 h	> 2 h < 2 h	$3 \times I_n$	$5 \times I_n$	$\geq 0.1 \text{ s}$ < 0.1 s
C		$1.13 \times I_n$	$1.45 \times I_n$	> 1 h < 1 h	> 2 h < 2 h	$5 \times I_n$	$10 \times I_n$	$\geq 0.1 \text{ s}$ < 0.1 s
D		$1.13 \times I_n$	$1.45 \times I_n$	> 1 h < 1 h	> 2 h < 2 h	$10 \times I_n$	$20 \times I_n$	$\geq 0.1 \text{ s}$ < 0.1 s

(IEC 60898: $50 \times I_n$)

Breaking capacity

Particular demands are made on miniature circuit-breakers with regard to breaking capacity.

The values are standardized and are determined according to the test conditions of EN 60898 or DIN VDE 0641 Part 11.

The most common values are 6 000 and 10 000.

For other test conditions, different values can be specified that are higher than those of EN 60898 or DIN VDE 0641 Part 11.

One such standard is EN 60947-2 or DIN VDE 0660 Part 101 for circuit-breakers.

Rated short-circuit capacity

Rated current	I_n [A]	EN 60898 (IEC 60898)		EN 60947-2 (IEC 60947-2)	
		1-pole 230 V AC	2, 3 and 4-pole 400 V AC	1-pole 230 V AC	2, 3 and 4-pole 400 V AC
		I_{cn} [kA]	I_{cn} [kA]	I_{cu} [kA]	I_{cu} [kA]
5SY6	0.3 ... 6	6	6	30	30
	8 ... 32	6	6	15	15
	40 ... 63	6	6	10	10
5SY4	0.3 ... 6	10	10	35	35
	8 ... 32	10	10	20	20
	40 ... 63	10	10	15	15
5SY7	0.3 ... 2	15	15	50	50
	3 ... 6	15	15	40	40
	8 ... 10	15	15	30	30
	13 ... 32	15	15	25	25
	40 ... 63	15	15	20 ¹⁾	20 ¹⁾
5SY8	0.3 ... 2	--	--	70	70
	3 ... 6	--	--	50	50
	8 ... 10	--	--	40	40
	13 ... 32	--	--	30	30
	40 ... 63	--	--	25 ²⁾	25 ²⁾
5SP4	80 ... 125	10	10	20 ³⁾	20 ³⁾

Rated current	I_n [A]	EN 60898-2		EN 60898-2	
		1-pole 230 V AC	2-pole 400 V AC	1-pole 220 V DC	2-pole 440 V DC
		I_{cn} [kA]	I_{cn} [kA]	I_{cn} [kA]	I_{cn} [kA]
5SY5	0.3 ... 63	10	10	15	15

1) D50 and D63: $I_{cu} = 15 \text{ kA}$.

2) D50 and D63: $I_{cu} = 20 \text{ kA}$.

3) D80 and D100: $I_{cu} = 15 \text{ kA}$.

Miniature Circuit-Breakers

General Data

Introduction

Overview

Selective miniature circuit-breakers/fuses

Distribution systems are usually set up as radial networks. An overcurrent protection device is required for each reduction of the cable cross section. This produces a series connection staggered according to rated currents, which should, if possible, be "selective".

Selectivity means that, in the event of a fault, only the protective device that is directly next to the fault in the current circuit is tripped. This means that current circuits in parallel can maintain a power flow.

In the case of miniature circuit-breakers with upstream fuses, the selectivity limit depends largely on the current limiting and tripping characteristics of the miniature circuit-breaker and the melting I^2t value of the fuse.

This produces different selectivity limits for miniature circuit-breakers with different characteristics and rated short-circuit capacity.

The following tables provide information on the short-circuit currents up to which selectivity exists between miniature circuit-breakers and upstream fuse according to DIN VDE 0636 Part 21. The values specified in kA are limit values that were determined under unfavorable test conditions. Under normal practical conditions, you can often expect considerably better values, depending on the upstream fuses.

Limit values of selective miniature circuit-breakers/fuses in kA		Upstream fuses							
Downstream miniature circuit-breakers	I_n [A]	16 A	20 A	25 A	35 A	50 A	63 A	80 A	100 A
		5SY6							
Characteristic B	6	0.3	0.4	0.7	1.2	3.0	3.2	•	•
	10	--	0.4	0.6	1.0	2.2	3.0	5.0	•
	13	--	--	0.5	1.0	2.2	3.0	5.0	•
	16	--	--	--	1.0	2.0	2.4	4.0	•
	20	--	--	--	--	2.0	2.4	4.0	•
	25	--	--	--	--	--	2.0	3.5	•
	32	--	--	--	--	--	1.7	2.9	•
	40	--	--	--	--	--	--	2.0	4.0
	50	--	--	--	--	--	--	--	4.0
	50	--	--	--	--	--	--	--	--
Characteristic C	≤ 2	0.3	0.5	1.2	1.7	•	•	•	•
	3	0.3	0.4	0.8	1.4	4.0	5.0	•	•
	4	0.3	0.4	0.6	1.1	3.0	4.0	•	•
	6	--	0.4	0.6	1.0	2.4	3.2	•	•
	8	--	--	0.5	0.9	1.4	2.6	3.1	•
	10	--	--	0.5	0.9	1.4	2.1	3.1	•
	13	--	--	--	0.8	1.3	2.0	3.0	•
	16	--	--	--	0.8	1.3	2.0	3.0	•
	20	--	--	--	--	1.3	2.0	2.7	•
	25	--	--	--	--	--	2.0	2.4	5.0
	32	--	--	--	--	--	--	2.2	4.0
	40	--	--	--	--	--	--	--	3.5
	50	--	--	--	--	--	--	--	3.0
	63	--	--	--	--	--	--	--	3.0

• $\hat{=}$ \geq rated short-circuit capacity 5SY6 according to EN 60898 6 000.

Overview

Selective miniature circuit-breakers/fuses

In the event of a short-circuit, there is selectivity between the 5SY4, 5SY7, 5SP4 miniature circuit-breakers and fuses according to DIN VDE 0636 Part 21 up to the specified values in kA.

Limit values of selective line miniature circuit-breakers/fuses in kA										
Downstream miniature circuit-breakers	I_n [A]	Upstream fuses								
		16 A	20 A	25 A	35 A	50 A	63 A	80 A	100 A	125 A
5SY4, 5SY7										
Characteristic A, B	6	0.3	0.4	0.8	1.4	3.2	4.5	9.0	•	•
	10	--	0.4	0.7	1.2	2.5	3.5	5.0	•	•
	13	--	--	0.7	1.2	2.5	3.5	5.0	•	•
	16	--	--	--	1.0	2.0	2.8	4.2	9.0	•
	20	--	--	--	1.0	2.0	2.6	4.2	9.0	•
	25	--	--	--	--	1.7	2.2	3.7	7.0	•
	32	--	--	--	--	1.7	2.2	3.7	7.0	•
	40	--	--	--	--	--	1.6	2.2	4.0	6.0
	50	--	--	--	--	--	--	2.2	4.0	6.0
	63	--	--	--	--	--	--	--	3.0	5.0
Characteristic C	≤ 2	0.3	0.5	1.5	2.0	9.0	•	•	•	•
	3	0.3	0.4	1.1	1.6	5.0	6.0	•	•	•
	4	0.3	0.4	0.9	1.4	3.5	5.0	9.0	•	•
	6	--	0.4	0.8	1.4	2.7	4.5	6.0	•	•
	8	--	--	0.6	1.2	2.2	3.5	5.0	7.0	•
	10	--	--	0.5	1.2	2.0	3.0	4.2	7.0	•
	13	--	--	--	1.0	1.6	2.4	3.4	6.0	•
	16	--	--	--	1.0	1.5	2.2	3.0	6.0	•
	20	--	--	--	--	1.3	2.2	3.0	6.0	•
	25	--	--	--	--	--	2.2	2.9	5.0	9.0
	32	--	--	--	--	--	--	2.4	4.0	7.0
	40	--	--	--	--	--	--	2.0	3.5	4.0
	50	--	--	--	--	--	--	--	3.0	4.0
63	--	--	--	--	--	--	--	3.0	3.5	
Characteristic D	≤ 2	0.3	0.4	1.0	1.8	5.0	7.0	•	•	•
	3	0.3	0.4	0.9	1.5	4.0	5.0	8.0	•	•
	4	--	0.4	0.8	1.2	3.0	3.8	5.5	•	•
	6	--	--	0.7	1.1	2.5	3.1	4.4	8.1	•
	8	--	--	--	0.9	2.1	2.5	3.5	6.2	9.3
	10	--	--	--	--	2.1	2.5	3.5	6.2	9.3
	13	--	--	--	--	--	2.5	3.5	6.2	9.3
	16	--	--	--	--	--	2.2	3.1	5.1	7.5
	20	--	--	--	--	--	--	2.7	4.3	6.3
	32	--	--	--	--	--	--	--	4.0	5.5
	40	--	--	--	--	--	--	--	3.5	4.8
	50	--	--	--	--	--	--	--	--	4.0
	63	--	--	--	--	--	--	--	--	--

• \geq rated short-circuit capacity 5SY4 according to EN 60898 10 000

Limit values of selective line miniature circuit-breakers/fuses in kA							
Downstream miniature circuit-breakers	I_n [A]	Upstream fuses					
		100 A	125 A	160 A	200 A	224 A	250 A
5SP4							
Characteristic B	80	2.8	3.8	5.7	8.1	•	•
	100	--	3.5	5.2	7.0	•	•
	125	--	--	5.2	7.0	•	•
Characteristic C	80	2.5	3.5	5.1	7.5	9.2	•
	100	--	3.3	4.5	6.5	8.0	•
	125	--	--	4.5	6.5	8.0	•
Characteristic D	80	2.3	3.3	4.6	6.9	8.1	•
	100	--	2.8	4.3	6.2	7.5	9.2

• \geq rated short-circuit capacity 5SP4 to EN 60898 10 000

Values for 5SY8 on request.

Miniature Circuit-Breakers

General Data

Introduction

Overview

Selective miniature circuit-breakers/circuit-breakers

Distribution systems can also be set up without fuses. In such cases, a circuit-breaker acts as an upstream protective device.

The selectivity limit in this case depends on the level of peak current I let through by the miniature circuit-breaker and the tripping current of the circuit-breaker.

The following tables show the short-circuit current in kA up to which selectivity is guaranteed between miniature circuit-breakers and upstream circuit-breaker according to IEC 60947-2 or DIN VDE 0660, Part 101 at 230/400 V AC, 50 Hz.

Limit values of selective miniature circuit-breakers in kA												
Downstream miniature circuit-breakers				Upstream circuit-breakers								
I_n [A]	$I > [A]$	I_{cn} [kA]		3RV1.1		3RV1.2						
				10	12	8	10	12.5	16	20	22	25
				120	144	96	120	150	192	240	264	300
				50	50	100	100	100	50	50	50	50
				Selectivity limits [kA] ¹⁾								
5SY4 ...-5												
Characteristic A	2	6	10	0.2	0.2	--	--	0.2	0.2	0.6	1.2	1.5
	10	30	10	--	--	--	--	--	--	0.3	0.5	0.5
	16	48	10	--	--	--	--	--	--	0.3	0.4	0.5
	32	96	10	--	--	--	--	--	--	--	--	--
	40	120	10	--	--	--	--	--	--	--	--	--
5SY6, 5SY4, 5SY7 ...-6												
Characteristic B	6	30	6/10/15	0.2	0.2	--	--	0.2	0.2	0.3	0.5	0.5
	10	50	6/10/15	--	0.2	--	--	0.2	0.2	0.3	0.4	0.5
	13	65	6/10/15	--	--	--	--	--	0.2	0.2	0.4	0.4
	16	80	6/10/15	--	--	--	--	--	--	0.2	0.4	0.4
	20	100	6/10/15	--	--	--	--	--	--	--	--	0.4
	25	125	6/10/15	--	--	--	--	--	--	--	--	--
	32	160	6/10/15	--	--	--	--	--	--	--	--	--
	40	200	6/10/15	--	--	--	--	--	--	--	--	--
50	250	6/10/15	--	--	--	--	--	--	--	--	--	
5SY6, 5SY4, 5SY7 ...-7												
Characteristic C	0.5	5	6/10/15	0.2	0.2	0.1	0.1	0.2	0.2	0.5	0.6	0.6
	1	10	6/10/15	0.2	0.2	0.1	0.1	0.2	0.2	0.5	0.6	0.6
	1.6	16	6/10/15	0.2	0.2	0.1	0.1	0.2	0.2	0.5	0.6	0.6
	2	20	6/10/15	0.2	0.2	0.1	0.1	0.2	0.2	0.5	0.6	0.6
	3	30	6/10/15	--	0.2	--	--	0.2	0.2	0.3	0.4	0.5
	4	40	6/10/15	--	0.2	--	--	0.2	0.2	0.3	0.4	0.5
	6	60	6/10/15	--	0.2	--	--	0.2	0.2	0.3	0.4	0.5
	8	80	6/10/15	--	0.2	--	--	0.2	0.2	0.2	0.4	0.4
	10	100	6/10/15	--	0.2	--	--	0.2	0.2	0.2	0.4	0.4
	13	130	6/10/15	--	--	--	--	--	0.2	0.2	0.4	0.4
	16	160	6/10/15	--	--	--	--	--	--	0.2	0.4	0.4
	20	200	6/10/15	--	--	--	--	--	--	--	--	0.4
	25	250	6/10/15	--	--	--	--	--	--	--	--	--
	32	320	6/10/15	--	--	--	--	--	--	--	--	--
	40	400	6/10/15	--	--	--	--	--	--	--	--	--
50	500	6/10/15	--	--	--	--	--	--	--	--	--	
63	630	6/10/15	--	--	--	--	--	--	--	--	--	
5SY6, 5SY4, 5SY7 ...-8												
Characteristic D	2	40	6/10/15	--	--	--	--	0.2	0.2	0.4	0.6	0.6
	6	120	6/10/15	--	--	--	--	--	--	0.3	0.4	0.4
	10	200	6/10/15	--	--	--	--	--	--	0.2	0.4	0.4
	16	320	6/10/15	--	--	--	--	--	--	--	--	--
	32	640	6/10/15	--	--	--	--	--	--	--	--	--
	40	800	6/10/15	--	--	--	--	--	--	--	--	--
	50	1 000	6/10/15	--	--	--	--	--	--	--	--	--

Values for 5SY8 on request.

1) In 240/415 V, 50 Hz systems, the selectivity limits are reduced by 10 %.

$I > \hat{=}$ tripping current.

Overview

Selective miniature circuit-breakers/circuit-breakers

In the event of a short-circuit, there is selectivity between miniature circuit-breakers and circuit-breakers according to IEC 60947-2 or DIN VDE 0660 Part 101 up to the specified values in kA.

Limit values of selective line miniature circuit-breakers/fuses in kA				Upstream circuit-breakers								
Downstream miniature circuit-breakers	I_n [A]	$I > [A]$	I_{cn} [kA]	3RV1.3								
				16	20	25	32	40	45	50	50	
				192	240	300	384	480	540	600	50	
				50	50	50	50	50	50	50	50	
				Selectivity limits [kA] ¹⁾								
5SY4 ...-5												
Characteristic A	2	6	10	0.2	0.8	1.2	2.5	3	6	6		
	10	30	10	0.2	0.4	0.5	0.6	0.8	1	1.2		
	16	48	10	--	0.3	0.4	0.6	0.8	0.8	1		
	32	96	10	--	--	--	--	0.6	0.8	0.8		
	40	120	10	--	--	--	--	--	--	0.8		
5SY4, 5SY7...-6												
Characteristic B	6	30	6/10/15	0.2	0.3	0.5	0.6	0.8	1	1.2		
	10	50	6/10/15	0.2	0.3	0.4	0.6	0.8	1	1.2		
	13	65	6/10/15	0.2	0.3	0.4	0.6	0.8	1	1		
	16	80	6/10/15	--	0.3	0.4	0.6	0.8	1	1		
	20	100	6/10/15	--	--	0.4	0.6	0.8	1	1		
	25	125	6/10/15	--	--	--	0.5	0.6	0.8	0.8		
	32	160	6/10/15	--	--	--	--	0.6	0.8	0.8		
	40	200	6/10/15	--	--	--	--	--	--	0.8		
	50	250	6/10/15	--	--	--	--	--	--	--		
5SY6, 5SY4, 5SY7 ...-7												
Characteristic C	0.5	5	6/10/15	0.3	0.5	0.6	1	1	1.5	3		
	1	10	6/10/15	0.3	0.5	0.6	1	1	1.5	3		
	1.6	16	6/10/15	0.3	0.5	0.6	1	1	1.5	3		
	2	20	6/10/15	0.3	0.5	0.6	1	1	1.5	3		
	3	30	6/10/15	0.2	0.3	0.4	0.6	0.8	1	1		
	4	40	6/10/15	0.2	0.3	0.4	0.6	0.8	1	1		
	6	60	6/10/15	0.2	0.3	0.4	0.6	0.8	1	1		
	8	80	6/10/15	0.2	0.2	0.4	0.6	0.6	0.8	1		
	10	100	6/10/15	0.2	0.2	0.4	0.6	0.6	0.8	1		
	13	130	6/10/15	0.2	0.2	0.4	0.6	0.6	0.8	1		
	16	160	6/10/15	--	0.2	0.4	0.6	0.6	0.8	1		
	20	200	6/10/15	--	--	0.4	0.6	0.6	0.8	1		
	25	250	6/10/15	--	--	--	0.5	0.6	0.8	0.8		
	32	320	6/10/15	--	--	--	--	0.6	0.8	0.8		
	40	400	6/10/15	--	--	--	--	--	--	0.8		
50	500	6/10/15	--	--	--	--	--	--	--			
63	630	6/10/15	--	--	--	--	--	--	--			
5SY6, 5SY4, 5SY7 ...-8												
Characteristic D	2	40	6/10/15	0.3	0.5	0.6	0.8	1.2	1.5	1.5		
	6	120	6/10/15	0.2	0.3	0.4	0.6	0.8	1	1		
	10	200	6/10/15	--	0.3	0.4	0.5	0.6	0.8	0.8		
	16	320	6/10/15	--	--	--	0.5	0.6	0.6	0.8		
	32	640	6/10/15	--	--	--	--	--	0.6	0.6		
	40	800	6/10/15	--	--	--	--	--	--	--		
	50	1 000	6/10/15	--	--	--	--	--	--	--		

1) In 240/415 V, 50 Hz systems, the selectivity limits are reduced by 10 %.
 $I > \cong$ tripping current.

Miniature Circuit-Breakers

General Data

Introduction

Overview

Selective miniature circuit-breakers/circuit-breakers

In the event of a short-circuit, there is selectivity between miniature circuit-breakers and circuit-breakers according to IEC 60947-2 or DIN VDE 0660 Part 101 up to the specified values in kA.

Limit values of selective miniature circuit-breaker in kA				Upstream circuit-breakers									
Downstream miniature circuit-breakers				3RV1.4									
I_n [A]	$I >$ [A]	I_{cn} [kA]		16	20	25	32	40	50	63	75	90	100
				192	240	300	384	480	600	756	900	1 080	1 140
				100	100	100	100	100	100	100	100	100	100
				Selectivity limits [kA] ¹⁾									
5SY4 ...-5													
Characteristic A	2	6	10	0.5	0.8	1.5	2.5	3	6/7.5	6/10	6/10	6/10	6/10
	10	30	10	0.3	0.4	0.5	0.6	0.8	1.2	1.5	2.5	3	4
	16	48	10	--	0.3	0.5	0.6	0.6	1	1.5	2	3	3
	32	96	10	--	--	--	--	0.6	0.8	1.5	2	2.5	3
	40	120	10	--	--	--	--	--	0.8	1.2	1.5	2	2
5SY6, 5SY4, 5SY7 ...-6													
Characteristic B	6	30	6/10/15	0.2	0.4	0.5	0.6	0.8	1.2	2	3	6/10/15	6/10/15
	10	50	6/10/15	0.2	0.3	0.5	0.6	0.8	1	1.5	2.5	4	4
	13	65	6/10/15	0.2	0.3	0.5	0.6	0.8	1	1.5	2	3	3
	16	80	6/10/15	--	0.3	0.5	0.6	0.8	1	1.5	2	3	3
	20	100	6/10/15	--	--	0.5	0.6	0.8	1	1.5	2	3	3
	25	125	6/10/15	--	--	--	0.5	0.8	0.8	1.5	2	3	3
	32	160	6/10/15	--	--	--	--	0.6	0.8	1.5	2	3	3
	40	200	6/10/15	--	--	--	--	0.6	0.8	1.2	1.5	2.5	2.5
50	250	6/10/15	--	--	--	--	--	--	1.2	1.5	2.5	2.5	
5SY6, 5SY4, 5SY7 ...-7													
Characteristic C	0.5	5	6/10/15	0.4	0.6	0.8	0.8	1	3	6/10/15	6/10/15	6/10/15	6/10/15
	1	10	6/10/15	0.4	0.6	0.8	0.8	1	3	6/10/15	6/10/15	6/10/15	6/10/15
	1.6	16	6/10/15	0.4	0.6	0.8	0.8	1	3	6/10/15	6/10/15	6/10/15	6/10/15
	2	20	6/10/15	0.4	0.6	0.8	0.8	1	3	6/10/15	6/10/15	6/10/15	6/10/15
	3	30	6/10/15	0.2	0.3	0.5	0.6	0.8	1	2	2.5	5	5
	4	40	6/10/15	0.2	0.3	0.5	0.6	0.8	1	2	2.5	5	5
	6	60	6/10/15	0.2	0.3	0.5	0.6	0.8	1	2	2.5	5	5
	8	80	6/10/15	0.2	0.3	0.4	0.6	0.6	1	1.5	2	3	3
	10	100	6/10/15	0.2	0.3	0.4	0.6	0.6	1	1.5	2	3	3
	13	130	6/10/15	0.2	0.3	0.4	0.6	0.6	1	1.5	2	3	3
	16	160	6/10/15	--	0.3	0.4	0.6	0.6	1	1.5	2	3	3
	20	200	6/10/15	--	--	0.4	0.6	0.6	1	1.5	2	3	3
	25	250	6/10/15	--	--	--	0.5	0.6	0.8	1.2	1.5	2.5	2.5
	32	320	6/10/15	--	--	--	--	0.6	0.8	1.2	1.5	2.5	2.5
	40	400	6/10/15	--	--	--	--	--	0.6	1	1.5	2	2
	50	500	6/10/15	--	--	--	--	--	--	1	1.2	1.5	2
63	630	6/10/15	--	--	--	--	--	--	--	--	1.5	1.5	
5SY6, 5SY4, 5SY7 ...-8													
Characteristic D	2	40	6/10/15	0.4	0.5	0.6	0.8	1	1.5	3	4	6/10/15	6/10/15
	6	120	6/10/15	0.2	0.3	0.4	0.6	0.6	1	1.5	2.5	3	3
	10	200	6/10/15	--	0.3	0.4	0.5	0.6	0.8	1.5	2	3	3
	16	320	6/10/15	--	--	--	0.5	0.6	0.8	1.2	1.5	2.5	2.5
	32	640	6/10/15	--	--	--	--	--	0.6	1	1.5	2	2
	40	800	6/10/15	--	--	--	--	--	--	1	1.2	1.5	1.5
	50	1 000	6/10/15	--	--	--	--	--	--	1	1.2	1.5	1.5
5SP4...-7													
Characteristic C	80	1 600	10	--	--	--	--	--	--	--	--	--	1.2
	100	2 000	10	--	--	--	--	--	--	--	--	--	--
5SP4...-8													
Characteristic D	80	1 600	10	--	--	--	--	--	--	--	--	--	--
	100	2 000	10	--	--	--	--	--	--	--	--	--	--

Values for 5SY8 on request.

1) In 240/415 V, 50 Hz systems, the selectivity limits are reduced by 10 %.
 $I >$ $\hat{=}$ tripping current.

Overview

Selective miniature circuit-breakers/circuit-breakers

In the event of a short-circuit, there is selectivity between miniature circuit-breakers and circuit-breakers according to IEC 60947-2 or DIN VDE 0660 Part 101 up to the specified values in kA.

Limit values of selective miniature circuit-breaker in kA																
Downstream miniature circuit-breakers			Upstream circuit-breakers													
			3VF3 adjustable						3VF3 non-adjustable							
I_n [A]	$I >$ [A]	I_{cn} [kA]	50	63	80	100	125	160	50	63	80	100	125	160		
			500	630	800	1 000	1 250	1 600	400	500	630	800	1 000	1 280		
			40/70/	40/70/	40/70/	40/70/	40/70/	40/70/	40/70/	40/70/	40/70/	40/70/	40/70/	40/70/	40/70/	
			100	100	100	100	100	100	100	100	100	100	100	100	100	
Selectivity limits [kA] ¹⁾																
5SY6, 5SY4, 5SY7																
Characteristic A			2	6	10	10	10	10	10	10	10	10	10	10	10	10
	10	30	10	1.6	4.7	6	10	10	10	2.5	4	4	4.5	4.9	10	
	16	48	10	1.4	4.7	6	10	10	10	2.3	3.7	3.7	4.4	5	10	
	32	96	10	1.2	3.6	4.6	10	10	10	1.8	3	3	3.5	3.7	6	
	40	120	10	1	2.5	3.1	6	10	10	1.5	2	2	2.4	2.7	3.2	
Characteristic B			6	30	6/10/15	2.1	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15
	10	50	6/10/15	1.8	6/6.6	6/10/15	6/10/15	6/10/15	6/10/15	2.5	6/6.2	4.8	6/6.2	6/6.5	6/10/15	
	13	65	6/10/15	1.6	5.1	6/8.2	6/10/15	6/10/15	6/10/15	2.3	4.6	3.8	4.6	5.1	6/8.9	
	16	80	6/10/15	1.6	5.1	6/8.2	6/10/15	6/10/15	6/10/15	2.3	4.6	3.8	4.6	5.1	6/8.9	
	20	100	6/10/15	1.6	5.1	6/8.2	6/10/15	6/10/15	6/10/15	2.3	4.6	3.8	4.6	5.1	6/8.9	
	25	125	6/10/15	1.4	3.5	4.6	5.5	6	6/10/15	2.1	3.4	3	3.4	3.7	5.2	
	32	160	6/10/15	1.4	3.5	4.6	5.5	6	6/10/15	2.1	3.4	3	3.4	3.7	5.2	
	40	200	6/10/15	1.3	2.4	2.8	3.3	4.5	6.7	1.8	2.3	2.2	2.4	2.7	3.6	
	50	250	6/10/15	--	2.4	2.8	3.3	4.3	5.8	--	2.3	2.2	2.4	2.7	3.6	
Characteristic C			0.5	5	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15
	1	10	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	
	1.5	15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	
	2	20	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	
	3	30	6/10/15	1.9	6/9.5	6/10/15	6/10/15	6/10/15	6/10/15	2.5	6/8.2	6/6.3	6/8.2	6/8.6	6/10/15	
	4	40	6/10/15	1.9	6/9.5	6/10/15	6/10/15	6/10/15	6/10/15	2.5	6/8.2	6/6.3	6/8.2	6/8.6	6/10/15	
	6	60	6/10/15	1.9	6/9.5	6/10/15	6/10/15	6/10/15	6/10/15	2.5	6/8.2	6/6.3	6/8.2	6/8.6	6/10/15	
	8	80	6/10/15	1.7	4.2	6/7.9	6/10/15	6/10/15	6/10/15	2.3	3.7	3.8	3.8	4.6	6/9.4	
	10	100	6/10/15	1.7	4.2	6/7.9	6/10/15	6/10/15	6/10/15	2.3	3.7	3.8	3.8	4.6	6/9.4	
	13	130	6/10/15	1.5	4.2	5.5	6/10/15	6/10/15	6/10/15	2.1	3.7	3.8	3.8	4.4	6/7.5	
	16	160	6/10/15	1.5	4.2	5.5	6/10/15	6/10/15	6/10/15	2.1	3.7	3.8	3.8	4.4	6/7.5	
	20	200	6/10/15	1.5	4.2	5.5	6/10/15	6/10/15	6/10/15	2.1	3.7	3.8	3.8	4.4	6/7.5	
	25	250	6/10/15	1.1	3.4	4.5	5.4	5.7	6/8.8	1.9	3	3	3	3.6	4.9	
	32	320	6/10/15	1.1	3.4	4.5	5.4	5.7	6/8.8	1.9	3	3	3	3.6	4.9	
	40	400	6/10/15	0.9	2.2	2.6	2.8	3.1	4.8	1.4	2.1	2.2	2.2	2.3	2.9	
	50	500	6/10/15	--	2.1	2.5	2.8	3.1	4.8	--	--	2.1	2.1	2.2	2.9	
Characteristic D			2	40	6/10/15	2.4	6	6	6	6	4.2	6	6	6	6	6
	6	120	6/10/15	1.4	4.2	4.8	6	6	6	2.3	4.1	4.2	4.2	4.3	6	
	10	200	6/10/15	1.3	3.9	5.5	6	6	6	1.9	3.7	3.7	3.7	4	6	
	16	320	6/10/15	1.1	3.5	4.2	4.9	6	6	1.7	3.3	3.7	3.3	3.5	4.7	
	32	640	6/10/15	--	--	3.3	3.9	4.2	6	--	--	--	2.4	2.7	3.7	
	40	800	6/10/15	--	--	--	3.1	3.3	4.9	--	--	--	--	1.5	3	
	50	1 000	6/10/15	--	--	--	--	2.9	4.8	--	--	--	--	--	2.6	
5SP4																
Characteristic C			80	800	10	--	--	--	1.5	1.5	2.5	--	--	--	1.2	1.5
	100	1 000	10	--	--	--	--	--	1.5	2	--	--	--	--	1.5	
Characteristic D			80	1 600	10	--	--	--	--	--	--	--	--	--	--	--
	100	1 200	10	--	--	--	--	--	--	--	--	--	--	--	--	

Values for 5SY8 on request.

1) In 240/415 V, 50 Hz systems, the selectivity limits are reduced by 10 %.
 The selectivity limits for adjustable releases apply to the maximum value,
 I_n = rated current.
 $I >$ = tripping current.

Miniature Circuit-Breakers

General Data

Introduction

Overview

Selective miniature circuit-breakers/circuit-breakers

In the event of a short-circuit, there is selectivity between miniature circuit-breakers and circuit-breakers according to IEC 60947-2 or DIN VDE 0660 Part 101 up to the specified values in kA.

Limit values of selective miniature circuit-breakers/ circuit-breakers in kA														
I_n [A]	Upstream circuit-breakers													
	3VF4				3VF5				3VF6		3VF7	3VF8	3WN1	3WN6
$I > [A]$	125	160	200	250	200	250	315	400	315	400-800	400-1250	800-2500	315-6300	315-3200
I_{cn} [kA]	1250	1600	2000	2500	2000	2500	3150	4000	3200	1575-6400	15000	20000	3780-75600	3780-48000
	40/70/ 100	40/70/ 100	40/70/ 100	40/70/ 100	45/70/ 100	45/70/ 100	45/70/ 100	45/70/ 100	45/70/ 100	45/70/ 100	50/70/ 100	70/100	65/80/ 100	65/75
	Selectivity limits [kA] ¹⁾													

5SY6, 5SY4, 5SY7															
Characteristic A															
2	6	10	10	10	10	10	10	10	10	10	10	10	10	10	10
10	30	10	10	10	10	10	10	10	10	10	10	10	10	10	10
16	48	10	10	10	10	10	10	10	10	10	10	10	10	10	10
32	96	10	10	10	10	10	10	10	10	10	10	10	10	10	10
40	120	10	3.9	4.6	6	6	10	10	10	10	10	10	10	10	10
Characteristic B															
6	30	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15
10	50	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15
13	65	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15
16	80	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15
20	100	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15
25	125	6/10/15	6/9.6	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15
32	160	6/10/15	6/9.6	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15
40	200	6/10/15	6	6	6	6	6	6	6	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15
50	250	6/10/15	5.1	5.9	6	6	6	6	6	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15
Characteristic C															
0.5	5	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15
1	10	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15
1.5	15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15
2	20	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15
3	30	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15
4	40	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15
6	60	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15
8	80	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15
10	100	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15
13	130	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15
16	160	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15
20	200	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15
25	250	6/10/15	6/8	6/9.1	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15
32	320	6/10/15	6/8	6/9.1	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15
40	400	6/10/15	3.6	4.8	6/6.5	6/6.5	6/6.5	6/6.5	6/6.5	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15
50	500	6/10/15	3.6	4.8	6/6.2	6/6.2	6/6.2	6/6.3	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15	6/10/15
Characteristic D															
2	40	6/10/15	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10
6	120	6/10/15	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10
10	200	6/10/15	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10
16	320	6/10/15	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10
32	640	6/10/15	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10
40	800	6/10/15	4	4.9	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10
50	1 000	6/10/15	4	4.8	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10

5SP4															
Characteristic C															
80	800	10	1.5	2	3	3	3	3	3	6	8	10	10	10	10
100	1 000	10	1.5	2	3	3	3	3	3	5	6	10	10	10	10
Characteristic D															
80	1 600	10	--	--	3	3	2.5	3	3	5	6	10	10	10	10
100	2 000	10	--	--	--	2.5	--	3	3	5	6	10	10	10	10

Values for 5SY8 on request.

1) In 240/415 V, 50 Hz systems, the selectivity limits are reduced by 10 %.

The selectivity limits for adjustable releases apply to the maximum value,

I_n = rated current.

$I > \hat{=}$ tripping current.

Overview

Selective miniature circuit-breakers/miniature circuit-breakers

Within narrow limits, miniature circuit-breakers also offer selectivity between circuit-breakers in a fuseless distribution board. This depends on the let-through peak current I of the downstream miniature circuit-breaker and on the tripping current of the upstream miniature circuit-breaker.

The following table shows the short-circuit current in kA up to which there is selectivity between series-connected circuit-breakers at 230 V AC.

Limit values of selective miniature circuit-breakers in kA				Upstream miniature circuit-breakers											
Downstream miniature circuit-breakers				5SY4 ...-7 Characteristic C					5SP4 ...-7 Characteristic C		5SP4 ...-8 Characteristic D				
I_n [A]	$I >$ [A]	I_{cn} [kA]		20	25	32	40	50	80	100	80	100	1 200	1 500	
				Selectivity limits [kA] ¹⁾											
5SY															
Characteristic B				6	30	6/10/15	0.2	0.2	0.3	0.5	0.5	0.8	1.5	3	5
	10	50	6/10/15	0.2	0.2	0.3	0.5	0.5	0.8	1.2	3	3	4		
	13	65	6/10/15	0.2	0.2	0.3	0.4	0.5	0.8	1.2	2	2	3		
	16	80	6/10/15	0.2	0.2	0.3	0.4	0.5	0.8	1.2	2	2	3		
	20	100	6/10/15	--	0.2	0.3	0.4	0.5	0.8	1.2	2	2	3		
	25	125	6/10/15	--	--	--	0.4	0.4	0.6	1.2	1.5	1.5	3		
	32	160	6/10/15	--	--	--	0.4	0.4	0.6	1.2	1.5	1.5	3		
	40	200	6/10/15	--	--	--	--	0.4	0.6	1.2	1.5	1.5	2.5		
	50	250	6/10/15	--	--	--	--	--	0.6	1	1.5	1.5	2.5		
Characteristic C				0.5	5	6/10/15	0.2	0.3	0.5	0.8	0.8	1.2	4	6/10/15	6/10/15
	1	10	6/10/15	0.2	0.3	0.5	0.8	0.8	1.2	4	6/10/15	6/10/15	6/10/15		
	1.5	15	6/10/15	0.2	0.3	0.5	0.8	0.8	1.2	4	6/10/15	6/10/15	6/10/15		
	2	20	6/10/15	0.2	0.3	0.5	0.8	0.8	1.2	4	6/10/15	6/10/15	6/10/15		
	3	30	6/10/15	0.2	0.2	0.3	0.5	0.5	0.8	1.5	3	3	4		
	4	40	6/10/15	0.2	0.2	0.3	0.5	0.5	0.8	1.5	3	3	4		
	6	60	6/10/15	0.2	0.2	0.3	0.5	0.5	0.8	1.5	3	3	4		
	8	80	6/10/15	0.2	0.2	0.3	0.4	0.4	0.6	1.2	2.5	2.5	3		
	10	100	6/10/15	0.2	0.2	0.3	0.4	0.4	0.6	1.2	2.5	2.5	3		
	13	130	6/10/15	0.2	0.2	0.3	0.4	0.4	0.6	1.2	2	2	3		
	16	160	6/10/15	0.2	0.2	0.3	0.4	0.4	0.6	1.2	2	2	3		
	20	200	6/10/15	--	0.2	0.3	0.4	0.4	0.6	1.2	2	2	3		
	25	250	6/10/15	--	--	--	0.3	0.4	0.6	1	1.5	1.5	2.5		
	32	320	6/10/15	--	--	--	0.3	0.4	0.6	1	1.5	1.5	2.5		
	40	400	6/10/15	--	--	--	--	--	--	0.8	1.5	1.5	2		
	50	500	6/10/15	--	--	--	--	--	--	0.8	1.5	1.5	2		
	63	630	6/10/15	--	--	--	--	--	--	0.8	1.2	1.2	1.5		

1) In 240/415 V, 50 Hz systems, the selectivity limits are reduced by 10 %.
 The selectivity limits for adjustable releases apply to the maximum value,
 I_n = rated current.
 $I >$ $\hat{=}$ tripping current.

Miniature Circuit-Breakers

General Data

Introduction

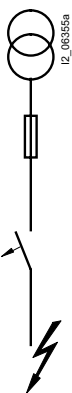
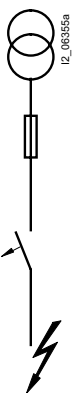
Overview

Back-up protection miniature circuit-breakers/fuses

If the maximum short-circuit current of the miniature circuit-breaker at the installation site is unknown, or if the specified rated short-circuit capacity is exceeded, an additional protective device must be connected upstream as back-up protection to prevent overloading of the miniature circuit-breaker. This is usually a fuse.

The following table shows the short-circuit currents in kA up to which back-up protection is guaranteed when using fuses according to DIN VDE 0636 Part 2.1.

Limit values of back-up protection miniature circuit-breakers/fuses in kA

Downstream miniature circuit-breakers	I_n [A]	Upstream fuses					
		50 A	63 A	80 A	100 A	125 A	160 A
5SY6		no back-up protection required up to 50 kA					
	0.3 ... 4	no back-up protection required up to 50 kA					
	6	50	50	50	50	50	35
	8	50	50	50	50	50	35
	10	50	50	50	50	50	35
	13	50	50	50	35	35	30
	16	50	50	50	35	30	30
	20	50	50	50	35	25	25
	25	50	50	50	35	30	25
	32	50	50	50	35	30	25
	40	50	50	50	50	25	15
	50	50	50	50	50	25	15
63	50	50	35	25	25	15	
5SY4, 5SY7		no back-up protection required up to 50 kA					
	0.3 ... 6	no back-up protection required up to 50 kA					
	8	50	50	50	50	45	45
	10	50	50	50	50	45	45
	13	50	50	50	45	40	35
	16	50	50	50	45	40	35
	20	50	50	50	40	35	30
	25	50	50	50	40	35	30
	32	50	50	50	45	40	30
	40	50	50	50	45	40	30
	50	50	50	50	40	35	25
	63	50	50	45	40	35	25

Test circuit data:

$U_p = 250$ V
p.f. = 0.3 ... 0.5

Test cycle:

acc. to EN 60947 – 2 (0 – C0)

Overview

Back-up protection miniature circuit-breakers/circuit-breakers

If miniature circuit-breakers are installed in fuseless distribution boards, circuit-breakers according to EN 60947-2 or DIN VDE 0660 Part 101 must be used as back-up protection.

The following tables show the short-circuit currents – in kA – up to which back-up protection is guaranteed when using circuit-breakers.

Limit values of back-up protection miniature circuit-breakers/fuses in kA

Downstream miniature circuit-breakers			Upstream circuit-breakers											
I_n [A]	$I > [A]$	I_{cn} [kA]	3VF3 adjustable						3VF3 non-adjustable					
			50	63	80	100	125	1 60	50	63	80	100	125	160
			40/70/	40/70/	40/70/	40/70/	40/70/	40/70/	40/70/	40/70/	40/70/	40/70/	40/70/	40/70/
			100	100	100	100	100	100	100	100	100	100	100	100
			Back-up protection up to kA											
5SY6														
Characteristic B,	0.3 ... 6	6	70	70	70	70	70	65	70	70	70	65	65	65
Characteristic C,	8 ... 32	6	15	15	15	15	15	15	15	15	15	10	10	10
Characteristic D,	40 ... 63	6	10	10	10	10	10	10	10	10	10	10	10	10
5SY4														
Characteristic A,	0.3 ... 6	10/15	80	80	80	80	80	80	80	80	80	80	80	80
Characteristic B,	8 ... 32	10/15	30	30	30	30	30	20	35	35	35	35	35	35
Characteristic C,	40 ... 63	10/15	15	15	15	15	15	15	15	35	35	35	35	35
Characteristic D														
5SY7														
Characteristic B,	0.3 ... 6	10/15	100	100	100	100	100	100	100	100	100	100	100	100
Characteristic C,	8 ... 10	10/15	70	70	70	70	70	65	70	70	70	65	65	65
Characteristic D	13 ... 32	10/15	65	60	60	65	65	45	65	50	50	45	45	45
	40 ... 63	10/15	30	30	30	30	30	20	30	30	30	20	20	20
Downstream miniature circuit-breakers			Upstream circuit-breakers											
I_n [A]	$I > [A]$	I_{cn} [kA]	3VF4				3VF5				3VF6	3VF7	3VF8	3WN1/3WS1
			125	160	200	250	200	250	315	400	315 ... 630	400 ... 1 250	1 600 ... 2 000	315 ... 630
			1 250	1 600	2 000	2 500	2 000	2 500	3 150	4 000	3 200 ... 6 300	15 000	20 000	3 780 ... 75 600
			40/70/	40/70/	40/70/	40/70/	45/70/	45/70/	45/70/	45/70/	45/70/	50/70/	70/100	65 ... 100
			100	100	100	100	100	100	100	100	100	100	100	100
			Back-up protection up to kA											
5SY6														
Characteristic B,	0.3 ... 6	6	34	34	34	34	30	30	30	30	30	30	30	30
Characteristic C,	8 ... 32	6	15	15	15	15	15	15	15	15	15	15	15	15
Characteristic D,	40 ... 63	6	10	10	10	10	10	10	10	10	10	10	10	10
5SY4														
Characteristic A,	0.3 ... 6	10/15	50	50	50	50	50	45	45	45	35	35	35	35
Characteristic B,	8 ... 32	10/15	20	20	20	20	20	20	20	20	20	20	20	20
Characteristic C,	42 ... 63	10/15	15	15	15	15	15	15	15	15	15	15	15	15
Characteristic D														
5SY7														
Characteristic B,	0.3 ... 2	10/15	100	100	100	100	100	100	100	100	65	50	50	50
Characteristic C,	3 ... 6	10/15	70	70	70	70	65	65	65	65	40	40	40	40
Characteristic D ¹⁾	8 ... 10	10/15	34	34	34	34	30	30	30	30	30	30	30	30
	13 ... 32	10/15	25	25	25	25	25	25	25	25	25	25	25	25
	40 ... 63	10/15	20	20	20	20	20	20	20	20	20	20	20	20

1) 50 and 63 A, characteristic D: 15 kA.

Miniature Circuit-Breakers

General Data

Introduction

Overview

Internal resistance and power dissipation		Data per pole (loaded with I_n)							
I_n [A]		Type AC and type A		Type B		Type C		Type D	
		R_1	P_V	R_1	P_V	R_1	P_V	R_1	P_V
		mΩ	W	mΩ	W	mΩ	W	mΩ	W
5SY6, 5SY4, 5SY7, 5SY8, 5SY5									
0.3	--	--	--	--	--	10 500	0.9	10 200	1
0.5	--	--	--	--	--	3 400	0.9	3 120	0.8
1	1955	2.0	--	--	--	1 210	1.2	1 030	1.0
1.6	786	2.0	--	--	459	1.2	409	1.1	
2	510	2.0	375	1.5	295	1.2	292	1.2	
3	205	1.9	--	--	137	1.2	131	1.2	
4	134	2.1	91	1.45	81	1.3	73	1.2	
5	--	--	--	--	86	2.1	--	--	
6	58	2.1	55	2.0	44	1.6	43	1.6	
8	27	1.7	--	--	14	0.9	12	0.7	
10	18.1	1.8	13	1.3	10	1.0	8.4	0.8	
13	11.4	1.9	9.5	1.6	8.0	1.4	8.0	1.4	
15	--	--	--	--	6.3	1.4	--	--	
16	8.4	2.2	6.6	1.7	5.9	1.5	5.8	1.5	
20	6.2	2.5	5.2	2.1	4.0	1.6	3.8	1.5	
25	4.6	2.9	3.4	2.2	3.3	2.1	3.0	1.9	
30	--	--	--	--	2.4	2.2	--	--	
32	3	3.1	2.3	2.4	2.4	2.5	1.9	2.0	
35	--	--	--	--	2.0	2.4	--	--	
40	2.2	3.5	2.1	3.4	2.1	3.3	1.8	2.8	
45	--	--	--	--	1.4	2.9	--	--	
50	1.7	4.3	1.5	3.8	1.4	3.5	1.4	3.5	
60	--	--	--	--	1.1	4.1	--	--	
63	1.5	5.9	1.4	5.4	1.1	4.4	1.1	4.4	
80	--	--	1.0	6.4	1.0	6.4	--	--	
5SP4									
80	--	--	1.1	7.0	1.1	6.7	1.1	6.7	
100	--	--	0.8	8.0	0.88	8	0.8	8	
125	--	--	0.7	10.1	0.7	10.9	--	--	

Correction factor for power dissipation

- Direct current and alternating current up to 60 Hz x 1.0
- Alternating current
 - 200 Hz x 1.1
 - 400 Hz x 1.15
 - 1 100 Hz x 1.3

Overview

Personnel safety with miniature circuit-breakers

According to DIN VDE 0100 Part 410, in order to protect against dangerous leakage currents in the TN system, the cross-sections of the conductor, or its distance from the protective device, must be dimensioned such that if a fault with negligible impedance (i.e. short-circuit) at any point between an outer conductor and a PE conductor, or a connected exposed conductive part, automatic tripping is achieved within the specified times of 0.4 s/5 s.

This requirement is met through the following condition:

$$Z_s \times I_a \leq U_o$$

Z_s $\hat{=}$ Impedance of the fault loop of all electrical circuits

I_a $\hat{=}$ Current that trips within the specified times

U_o $\hat{=}$ Voltage against ground

Maximum permissible impedance of fault loop at $U_o = 230$ V AC for compliance with trip conditions according to DIN VDE 0100 Part 410

I_n [A]	Characteristic A		Characteristic B		Characteristic C		Characteristic D	
	$t_a \leq 0.4$ s Ω	≤ 5 s Ω	$t_a \leq 0.4$ s Ω	≤ 5 s Ω	$t_a \leq 0.4$ s Ω	≤ 5 s Ω	$t_a \leq 0.4$ s Ω	≤ 5 s Ω
5SY, 5SP								
0.3	--	--	--	--	76.6	153	--	--
0.5	--	--	--	--	46	92	--	92
1.0	76.6	76.6	--	--	23	46	15.3	46
1.6	47.9	47.9	--	--	14.4	28.8	9.6	28.8
2	38.3	38.3	--	--	11.5	23	7.6	23
3	25.5	25.5	--	--	7.7	15.4	5.1	15.4
4	19.1	19.1	--	--	5.8	11.6	3.8	11.6
6	12.7	12.7	7.6	7.6	3.8	7.6	2.5	7.6
8	--	--	--	--	2.8	5.7	1.9	5.7
10	7.6	7.6	4.6	4.6	2.3	4.6	1.1	4.6
13	--	--	--	3.57	1.7	3.4	0.9	3.4
16	4.7	4.7	2.9	2.9	1.4	2.8	0.7	2.8
20	3.8	3.8	2.3	2.3	1.1	2.2	0.5	2.2
25	3.0	3.0	1.8	1.8	0.9	1.8	0.4	1.8
32	2.4	2.4	1.4	1.4	0.7	1.4	0.3	1.4
40	1.9	1.9	1.1	1.1	0.6	1.2	0.28	1.2
50	--	--	0.9	0.9	0.5	1.0	0.23	1.0
63	--	--	0.7	0.7	0.4	0.8	0.2	0.8
80	--	--	--	--	0.3	0.6	0.14	0.6
100	--	--	--	--	0.2	0.4	0.1	0.4
125	--	--	--	--	0.16	0.3	0.1	0.3

at $U_o = 240$ V AC $Z_s \times 1.04$ applies

at $U_o = 127$ V AC $Z_s \times 0.55$ applies

Miniature Circuit-Breakers

General Data

Introduction

Overview

Fusing of luminaire circuits

Maximum permissible lamp load of a miniature circuit-breaker when operating fluorescent lamps L 18 W, L 36 W, L 38 W, L 58 W.

Maximum number of fluorescent lamps			Electronic ballast											
I_n [A]	Lamp	Full switching at 230 V 1-lamp ¹⁾						Group switching at 230 V 1-lamp ²⁾						
		B		C		D		B		C		D		
5SY4, 5SY7			B	C	D	B	C	D	B	C	D	B	C	D
6	L 18 W	17	37	66	17	35	35	66	66	66	35	35	35	
	L 36 W	17	37	37	17	19	19	37	37	37	19	19	19	
	L 58 W	17	19	19	12	12	12	19	19	19	12	12	12	
8	L 18 W	--	50	88	--	47	47	--	88	88	--	--	47	
	L 36 W	--	50	50	--	25	25	--	50	50	--	25	25	
	L 58 W	--	25	25	--	16	16	--	25	25	--	16	16	
10	L 18 W	36	67	111	36	58	58	111	111	111	58	58	58	
	L 36 W	36	62	62	32	32	32	62	62	62	32	32	32	
	L 58 W	32	32	32	20	20	20	32	32	32	20	20	20	
13	L 18 W	44	81	144	44	76	76	144	144	144	76	76	76	
	L 36 W	44	81	81	41	41	41	81	81	81	41	41	41	
	L 58 W	41	41	41	26	26	26	41	41	41	26	26	26	
16	L 18 W	56	100	177	56	94	94	177	177	177	94	94	94	
	L 36 W	56	100	100	51	51	51	100	100	100	51	51	51	
	L 58 W	51	51	51	32	32	32	51	51	51	32	32	32	
20	L 18 W	70	117	222	70	117	117	222	222	222	117	117	117	
	L 36 W	70	117	125	64	64	64	125	125	125	64	64	64	
	L 58 W	64	64	64	40	40	40	64	64	64	40	40	40	
25	L 18 W	85	157	277	85	147	147	277	277	277	147	147	147	
	L 36 W	85	156	156	80	80	80	156	156	156	80	80	80	
	L 58 W	80	80	80	51	51	51	80	80	80	51	51	51	
32	L 18 W	100	144	355	100	144	188	355	355	355	188	188	188	
	L 36 W	100	144	200	100	103	103	200	200	200	103	103	103	
	L 58 W	100	103	103	65	65	65	103	103	103	65	65	65	
40	L 18 W	126	216	444	126	216	235	444	444	444	235	235	235	
	L 36 W	126	216	250	126	129	129	250	250	250	129	129	129	
	L 58 W	126	129	129	81	81	81	129	129	129	81	81	81	
50	L 18 W	180	247	555	180	247	294	555	555	555	294	294	294	
	L 36 W	180	247	312	161	161	161	312	312	312	161	161	161	
	L 58 W	161	161	161	102	102	102	161	161	161	102	102	102	
63	L 18 W	170	340	567	170	340	370	700	700	700	370	370	370	
	L 36 W	170	340	393	170	203	203	393	393	393	203	203	203	
	L 58 W	170	203	203	128	128	128	203	203	203	128	128	128	

1) All ECGs are turned on simultaneously.

2) The ECGs are turned on in groups one after the other.

Circuit impedance:

The specified lamp load values apply, taking into account a line impedance of 800 mΩ.

At 400 mΩ the permissible values are reduced by 10 %.

Reduction factors for miniature circuit-breakers for the simultaneously switching on of filament lamp load taking into account the rated current of the miniature circuit-breaker and the summated current of the lamps

	Derating factor	
	Switching with miniature circuit-breaker	Switching with separate switch
5SY, 5SP4		
Characteristic A	0.3	0.35
Characteristic B	0.5	0.6
Characteristic C	1	1
Characteristic D	1	1

Overview

Current carrying capacity of circuit-breakers with corrected and uncorrected HQ, HQI and NAV lamps (no.)

		Lamp power [W]							
		35	70	150	250	400	1 000	2 000	3 500
Lamp current	[A]	0.5	1	1.8	3	3.5	9.5	10.3	18
Corrected lamp current	[A]	0.3	0.5	1	1.5	2	6	5.5	9.8
Inrush peak	[A]	10	18	36	60	70	120	125	220

I_n [A]		Lamp power [W]							
		35	70	150	250	400	1 000	2 000	3 500

5SY4, 5SY7

Characteristic B	6	2	1	0	0	0	0	0	0
	10	5	3	1	1	0	0	0	0
	13	7	4	2	1	1	0	0	0
	16	8	5	2	1	1	0	0	0
	20	11	6	3	1	1	1	1	0
	25	13	7	3	2	2	1	1	0
	32	16	8	4	2	2	1	1	0
	40	20	11	5	3	3	1	1	1
	50	28	15	7	4	4	2	2	1
63	26	14	7	4	3	2	2	1	
Characteristic C	6	6	3	1	1	0	0	0	0
	8	8	4	2	1	1	0	0	0
	10	10	6	3	1	1	0	0	0
	13	13	7	3	2	1	1	1	0
	16	16	9	4	2	2	1	1	0
	20	18	10	5	3	2	1	1	0
	25	25	14	7	4	3	2	1	1
	32	22	12	6	3	3	2	1	1
	40	33	18	9	5	4	2	2	1
50	38	21	10	6	5	3	3	1	
63	53	29	14	9	7	4	4	2	
Characteristic D	6	8	4	2	1	1	0	0	0
	8	11	5	3	2	1	0	0	0
	10	14	7	4	2	2	0	0	0
	13	18	9	5	3	2	1	1	0
	16	22	11	6	3	3	1	1	0
	20	28	14	7	4	4	1	1	0
	25	35	17	9	5	5	2	1	1
	32	44	22	12	7	6	2	2	1
	40	56	28	15	9	8	3	2	1
50	70	35	19	11	10	4	3	2	
63	88	44	24	14	12	4	4	2	

5SP4

Characteristic C	80	76	42	21	12	11	6	6/5	3
	100	98	54	27	16	14	8/7	8/6	4
	125	116	64	32	19	16	9	9/8	5
Characteristic D	80	143/112	80/56	40/31	24/18	20/16	9/6	10/5	5/3
	100	186/140	103/70	51/39	31/23	26/20	11/7	12/6	7/4
	125	186/175	103/87	51/48	31/29	26/25	14/9	15/8	8/5

Different data for corrected/uncorrected lamps.

Miniature Circuit-Breakers

General Data

Introduction

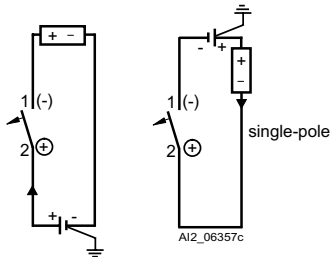
Overview

Direct current, universal current

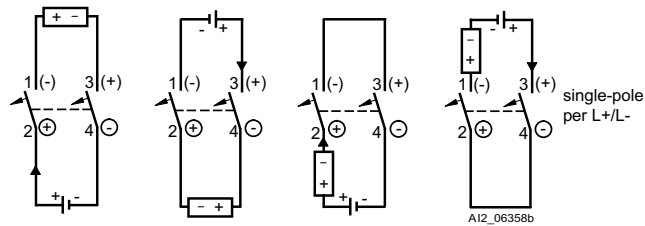
In direct current systems up to 60 V or 120 V, all 5SJ, 5SY und 5SP4 miniature circuit-breakers (both 1-pole and 2-pole) can be used.

For higher voltages, the version 5SY5 is required. Contrary to other product ranges, the arcing chamber area of the 5SY5 is equipped with an additional permanent magnet to support the positive quenching of the arc.

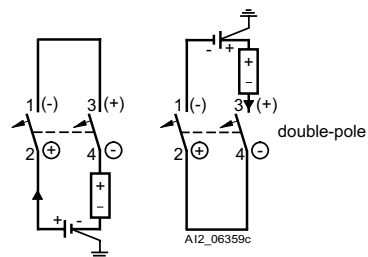
For this reason, the polarity of the switch is coded, which it is essential to observe when connecting the conductor.



Up to max. 220 V DC battery voltage



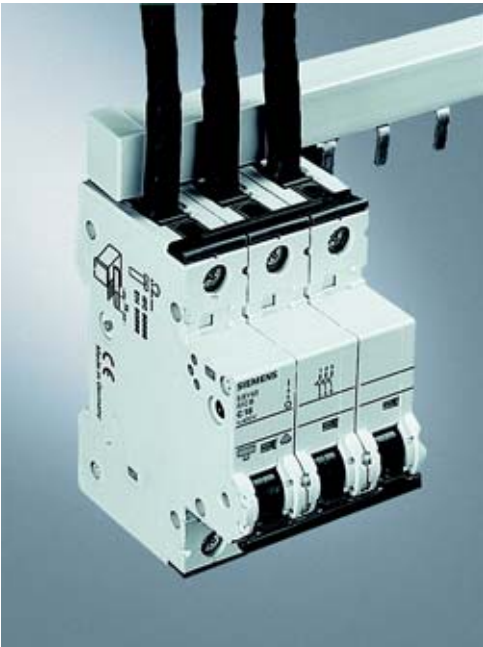
Up to max. 220 V DC battery voltage



Up to max. 440 V DC battery voltage

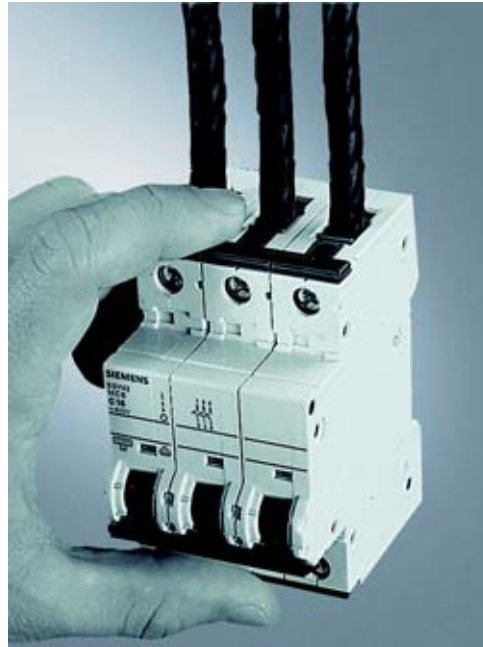
Benefits

Features of the 5SY miniature circuit-breakers¹⁾



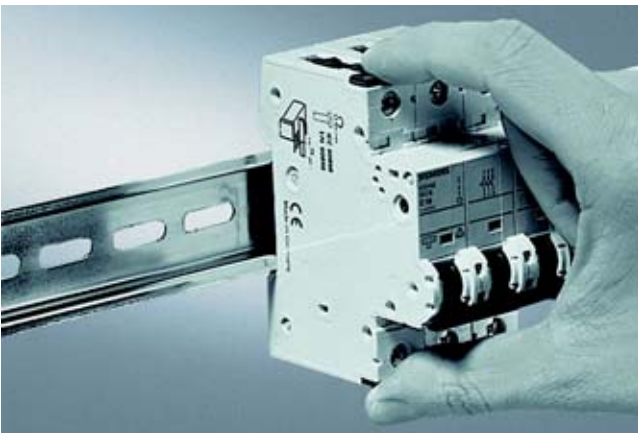
Easier, faster, enlarged wiring space

- Identical top and bottom terminals
- Connection of feeder cables vis-à-vis of the busbar
- Larger and more accessible wiring space for the feeder cable
- Comfortable insertion of the conductor into the terminal
- Clear and visible conductor connection that can be easily checked
- Infeed from all sides through busbar mounting from the top or bottom



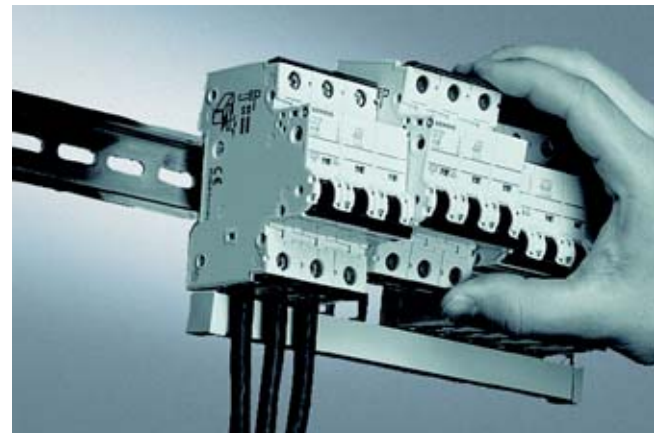
Protection against contact with clear advantages

- Integrated movable terminal covers located at the feeder cable input section
- When the screws are tightened, the terminals are fully enclosed
- Effective protection against contact, also when the device is grasped
- Considerably exceeds the requirements of the German VBG 4/BGV A2 accident prevention regulations



Flexible and no use of tools required

- Manual quick-assembly and disassembly systems requiring no use of tools
- Fast assembly and disassembly of the 5SY miniature circuit-breakers to and from the standard mounting rail according to DIN EN 60715
- All devices can be easily and conveniently replaced at any time



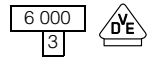
Removal from the assembly

Thanks to the combination of the various features stated above, the 5SY miniature circuit-breakers can be easily and quickly removed from the assembly when circuits need to be changed: it is no longer necessary to remove the busbar.

1) Not for 5SY6 ...-K.V.

Miniature Circuit-Breakers

Standard Product Range



5SY6 ...-KV, 6 kA


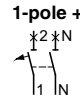
Application

Miniature circuit-breaker 5SY6 ...-KV

- U_n : 230 V AC, 50 to 60 Hz
- Standards: EN 60898, DIN VDE 0641 Part 11, IEC 60898

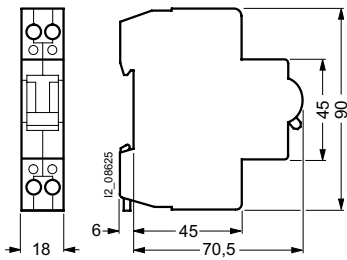
- 1+N in 1 MW for distribution applications with only little available space
- Additional components can be retrofitted

Selection and ordering data

	I_n	MW	Characteristic B	Characteristic C	Weight 1 unit approx. kg	PS*/ P. unit Unit(s)
	A		Order No.	Order No.		
 <p>1-pole + N</p> 	2	1	--	5SY6 002-7KV	0.132	1/12
	4		--	5SY6 004-7KV	0.132	1/12
	6		5SY6 006-6KV	5SY6 006-7KV	0.132	1/12
	8		--	5SY6 008-7KV	0.132	1/12
	10		5SY6 010-6KV	5SY6 010-7KV	0.132	1/12
	13		5SY6 013-6KV	5SY6 013-7KV	0.132	1/12
	16		5SY6 016-6KV	5SY6 016-7KV	0.132	1/12
	20		5SY6 020-6KV	5SY6 020-7KV	0.132	1/12
	25		5SY6 025-6KV	5SY6 025-7KV	0.132	1/12
	32		5SY6 032-6KV	5SY6 032-7KV	0.132	1/12
	40		5SY6 040-6KV	5SY6 040-7KV	0.132	1/12

Dimensional drawings

5SY6 ...-KV miniature circuit-breaker.



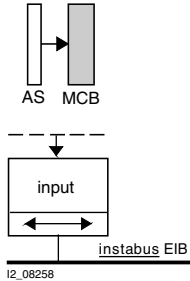
Miniature Circuit-Breakers Standard Product Range

Auxiliary circuit switches/fault signal contacts
for 5SY6 ...-KV

3

Benefits

- An auxiliary circuit switch or fault signal contact can be retro-fitted to the left-hand side of the circuit-breaker housing
- Mounting with factory-fitted screws
- Can be connected to *instabus* KNX *EIB* and AS-Interface bus or PROFIBUS through binary inputs




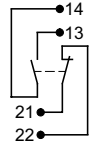


Application

- Auxiliary circuit switches: indications of the circuit state of the miniature circuit-breaker: ON/OFF
- Fault signal contacts: signaling of electrical triggering, no signaling of mechanical shut-down
- Short-circuit protection ensured by miniature circuit-breakers of characteristic B or C with $I_n = 4$ A or fuse gL 4 A
- Product standards: IEC/EN 62019 (VDE 0640)

Technical specifications

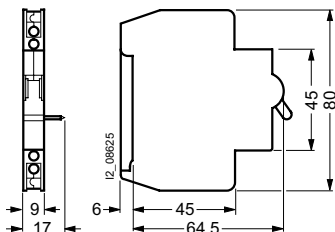
			5ST3 018-0KV, 5ST3 028-0KV
Terminals			
• Conductor cross section	mm ²		0.5 ... 2.5
• Recommended tightening torque	Nm		0.6 ... 0.8
Min. contact load			50 mA/24 V
Max. contact load			
• 230 V AC, AC-15	A		2
• 230 V AC, AC-13	A		3
• 110 V DC, DC-12	A		0.5

Selection and ordering data

	Version	MW	Order No.	Weight 1 unit approx. kg	PS*/ P. unit Unit(s)
Auxiliary circuit switches (AS) for 5SY6 ...-KV					
		1 NO + 1 NC	0.5	5ST3 018-0KV	0.037 1
Fault signal contacts (FC) for 5SY6 ...-KV					
		2 W	0.5	5ST3 028-0KV	0.050 1

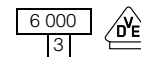
Dimensional drawings

5ST3 018-0KV auxiliary circuit switches/5ST3 028-0KV fault signal contacts
for 5SY6 ...-KV miniature circuit-breakers.



Miniature Circuit-Breakers

Standard Product Range











5SJ6, 5SY6, 6 kA

Application

- U_n : 230/400 V, 50 to 60 Hz, can be used in systems up to 250/440 V AC, 60 V DC per pole
- Standards: IEC/EN 60898, DIN VDE 0641 Part 11
- Additional components can be retrofitted

Selection and ordering data


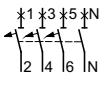

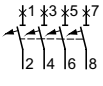
	I_n	MW	Characteristic B Order No.	Weight 1 unit approx. kg	PS*/ P. unit Unit(s)
 <p>1-pole¹⁾</p> 	A	1			
	2		5SY6 102-6	0.165	1/12
	4		5SY6 104-6	0.165	1/12
	6 ¹⁾		5SJ6 106-6	0.165	1
	6		5SY6 106-6	0.165	1
	10 ¹⁾		5SJ6 110-6	0.165	1
	10		5SY6 110-6	0.165	1
	13		5SY6 113-6	0.165	1
	16 ¹⁾		5SJ6 116-6	0.165	1/12
	16		5SY6 116-6	0.165	1/12
	20 ¹⁾		5SJ6 120-6	0.165	1
	20		5SY6 120-6	0.165	1
	25 ¹⁾		5SJ6 125-6	0.165	1
	25		5SY6 125-6	0.165	1
	32 ¹⁾²⁾		5SJ6 132-6	0.165	1
32 ²⁾		5SY6 132-6	0.165	1	
40		5SY6 140-6	0.165	1	
50		5SY6 150-6	0.165	1	
63		5SY6 163-6	0.165	1	
 <p>1-pole + N</p> 		2			
	6		5SY6 506-6	0.330	1
	10		5SY6 510-6	0.330	1
	13		5SY6 513-6	0.330	1
	16		5SY6 516-6	0.330	1
	20		5SY6 520-6	0.330	1
	25		5SY6 525-6	0.330	1
	32		5SY6 532-6	0.330	1
	40		5SY6 540-6	0.330	1
	50		5SY6 550-6	0.330	1
63		5SY6 563-6	0.330	1	
 <p>2-pole</p> 		2			
	6		5SY6 206-6	0.330	1
	10		5SY6 210-6	0.330	1
	13		5SY6 213-6	0.330	1
	16		5SY6 216-6	0.330	1
	20		5SY6 220-6	0.330	1
	25		5SY6 225-6	0.330	1
	32		5SY6 232-6	0.330	1
	40		5SY6 240-6	0.330	1
	50		5SY6 250-6	0.330	1
63		5SY6 263-6	0.330	1	
 <p>3-pole</p> 		3			
	6		5SY6 306-6	0.495	1
	10		5SY6 310-6	0.495	1
	13		5SY6 313-6	0.495	1
	16		5SY6 316-6	0.495	1
	20		5SY6 320-6	0.495	1
	25		5SY6 325-6	0.495	1
	32 ²⁾		5SY6 332-6	0.495	1
	40		5SY6 340-6	0.495	1
	50		5SY6 350-6	0.495	1
	63		5SY6 363-6	0.495	1

The 5SY6 versions are certified acc. to UL 1077 and CSA 22.2 No. 235-M 89 and can be installed as "supplementary protectors" up to 277 V AC (1-pole, 1-pole + N) and 480 V AC (2-pole, 3-pole, 3-pole + N, 4-pole).

For additional components, see page 3/52;
for accessories, see page 3/59.

- 1) Type 5SJ6 1..-6: no additional components can be mounted.
- 2) Also suitable for 21-kW active power with three-phase currents of 400 V (e.g. continuous-flow heaters with short-time operation duty) or 7-kW active power at 230 V AC (e.g. storage in not-continuous duty). For continuous load applications, the use of miniature circuit-breakers of characteristic B or C and $I_n = 40$ A is recommended.

Selection and ordering data

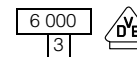
	I_n A	MW	Characteristic B Order No.	Weight	PS*/
				1 unit approx. kg	P. unit Unit(s)
 <p>3-pole + N</p> 	6	4	5SY6 606-6	0.660	1
	10		5SY6 610-6	0.660	1
	13		5SY6 613-6	0.660	1
	16		5SY6 616-6	0.660	1
	20		5SY6 620-6	0.660	1
	25		5SY6 625-6	0.660	1
	32		5SY6 632-6	0.660	1
	40		5SY6 640-6	0.660	1
	50		5SY6 650-6	0.660	1
	63		5SY6 663-6	0.660	1
 <p>4-pole</p> 	6	4	5SY6 406-6	0.660	1
	10		5SY6 410-6	0.660	1
	13		5SY6 413-6	0.660	1
	16		5SY6 416-6	0.660	1
	20		5SY6 420-6	0.660	1
	25		5SY6 425-6	0.660	1
	32		5SY6 432-6	0.660	1
	40		5SY6 440-6	0.660	1
	50		5SY6 450-6	0.660	1
	63		5SY6 463-6	0.660	1

The 5SY6 versions are certified acc. to UL 1077 and CSA 22.2 No. 235-M 89 and can be installed as "supplementary protectors" up to 277 V AC (1-pole, 1-pole + N) and 480 V AC (2-pole, 3-pole, 3-pole + N, 4-pole).

For additional components, see page 3/52;
for accessories, see page 3/59.

Miniature Circuit-Breakers

Standard Product Range






5SY6, 6 kA

Application

- U_n : 230/400 V, 50 to 60 Hz, can be used in systems up to 250/440 V AC, 60 V DC per pole

- Standards: IEC/EN 60898, DIN VDE 0641 Part 11
- Additional components can be retrofitted

Selection and ordering data




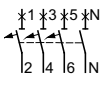

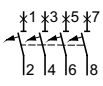
	I_n	MW	Characteristic C Order No.	Characteristic D Order No.	Weight 1 unit approx. kg	PS*/ P. unit Unit(s)
	A					
 <p>1-pole</p> 	0.3	1	5SY6 114-7	5SY6 114-8	0.165	1
	0.5		5SY6 105-7	5SY6 105-8	0.165	1
	1		5SY6 101-7	5SY6 101-8	0.165	1
	1.6		5SY6 115-7	5SY6 115-8	0.165	1
	2		5SY6 102-7	5SY6 102-8	0.165	1
	3		5SY6 103-7	5SY6 103-8	0.165	1
	4		5SY6 104-7	5SY6 104-8	0.165	1
	6		5SY6 106-7	5SY6 106-8	0.165	1
	8		5SY6 108-7	5SY6 108-8	0.165	1
	10		5SY6 110-7	5SY6 110-8	0.165	1
	13		5SY6 113-7	5SY6 113-8	0.165	1
	16		5SY6 116-7	5SY6 116-8	0.165	1
	20		5SY6 120-7	5SY6 120-8	0.165	1
	25		5SY6 125-7	5SY6 125-8	0.165	1
	32 ¹⁾		5SY6 132-7	5SY6 132-8	0.165	1
	40		5SY6 140-7	5SY6 140-8	0.165	1
50	5SY6 150-7	5SY6 150-8	0.165	1		
63	5SY6 163-7	5SY6 163-8	0.165	1		
 <p>1-pole + N</p> 	0.3	2	5SY6 514-7	5SY6 514-8	0.330	1
	0.5		5SY6 505-7	5SY6 505-8	0.330	1
	1		5SY6 501-7	5SY6 501-8	0.330	1
	1.6		5SY6 515-7	5SY6 515-8	0.330	1
	2		5SY6 502-7	5SY6 502-8	0.330	1
	3		5SY6 503-7	5SY6 503-8	0.330	1
	4		5SY6 504-7	5SY6 504-8	0.330	1
	6		5SY6 506-7	5SY6 506-8	0.330	1
	8		5SY6 508-7	5SY6 508-8	0.330	1
	10		5SY6 510-7	5SY6 510-8	0.330	1
	13		5SY6 513-7	5SY6 513-8	0.330	1
	16		5SY6 516-7	5SY6 516-8	0.330	1
	20		5SY6 520-7	5SY6 520-8	0.330	1
	25		5SY6 525-7	5SY6 525-8	0.330	1
	32		5SY6 532-7	5SY6 532-8	0.330	1
	40		5SY6 540-7	5SY6 540-8	0.330	1
50	5SY6 550-7	5SY6 550-8	0.330	1		
63	5SY6 563-7	5SY6 563-8	0.330	1		
 <p>2-pole</p> 	0.3	2	5SY6 214-7	5SY6 214-8	0.330	1
	0.5		5SY6 205-7	5SY6 205-8	0.330	1
	1		5SY6 201-7	5SY6 201-8	0.330	1
	1.6		5SY6 215-7	5SY6 215-8	0.330	1
	2		5SY6 202-7	5SY6 202-8	0.330	1
	3		5SY6 203-7	5SY6 203-8	0.330	1
	4		5SY6 204-7	5SY6 204-8	0.330	1
	6		5SY6 206-7	5SY6 206-8	0.330	1
	8		5SY6 208-7	5SY6 208-8	0.330	1
	10		5SY6 210-7	5SY6 210-8	0.330	1
	13		5SY6 213-7	5SY6 213-8	0.330	1
	16		5SY6 216-7	5SY6 216-8	0.330	1
	20		5SY6 220-7	5SY6 220-8	0.330	1
	25		5SY6 225-7	5SY6 225-8	0.330	1
	32		5SY6 232-7	5SY6 232-8	0.330	1
	40		5SY6 240-7	5SY6 240-8	0.330	1
50	5SY6 250-7	5SY6 250-8	0.330	1		
63	5SY6 263-7	5SY6 263-8	0.330	1		

The 5SY6 versions are certified acc. to UL 1077 and CSA 22.2 No. 235-M 89 and can be installed as "supplementary protectors" up to 277V AC (1-pole, 1-pole + N) and 480 V AC (2-pole, 3-pole, 3-pole + N, 4-pole).

For additional components, see page 3/52;
for accessories, see page 3/59.

1) Also suitable for 21-kW active power with three-phase currents of 400 V (e.g. continuous-flow heaters with short-time operation duty) or 7-kW active power at 230 V AC (e.g. storage in not-continuous duty). For continuous load applications, the use of miniature circuit-breakers of characteristic B or C and $I_n = 40$ A is recommended.

Selection and ordering data

	I_n A	MW	Characteristic C	Characteristic D	Weight 1 unit approx. kg	PS*/ P. unit Unit(s)
			Order No.	Order No.		
 <p>3-pole</p> 	0.3	3	5SY6 314-7	5SY6 314-8	0.495	1
	0.5		5SY6 305-7	5SY6 305-8	0.495	1
	1		5SY6 301-7	5SY6 301-8	0.495	1
	1.6		5SY6 315-7	5SY6 315-8	0.495	1
	2		5SY6 302-7	5SY6 302-8	0.495	1
	3		5SY6 303-7	5SY6 303-8	0.495	1
	4		5SY6 304-7	5SY6 304-8	0.495	1
	6		5SY6 306-7	5SY6 306-8	0.495	1
	8		5SY6 308-7	5SY6 308-8	0.495	1
	10		5SY6 310-7	5SY6 310-8	0.495	1
	13		5SY6 313-7	5SY6 313-8	0.495	1
	16		5SY6 316-7	5SY6 316-8	0.495	1
	20		5SY6 320-7	5SY6 320-8	0.495	1
	25		5SY6 325-7	5SY6 325-8	0.495	1
	32 ¹⁾		5SY6 332-7	5SY6 332-8	0.495	1
40	5SY6 340-7	5SY6 340-8	0.495	1		
50	5SY6 350-7	5SY6 350-8	0.495	1		
63	5SY6 363-7	5SY6 363-8	0.495	1		
 <p>3-pole + N</p> 	0.3	4	5SY6 614-7	5SY6 614-8	0.660	1
	0.5		5SY6 605-7	5SY6 605-8	0.660	1
	1		5SY6 601-7	5SY6 601-8	0.660	1
	1.6		5SY6 615-7	5SY6 615-8	0.660	1
	2		5SY6 602-7	5SY6 602-8	0.660	1
	3		5SY6 603-7	5SY6 603-8	0.660	1
	4		5SY6 604-7	5SY6 604-8	0.660	1
	6		5SY6 606-7	5SY6 606-8	0.660	1
	8		5SY6 608-7	5SY6 608-8	0.660	1
	10		5SY6 610-7	5SY6 610-8	0.660	1
	13		5SY6 613-7	5SY6 613-8	0.660	1
	16		5SY6 616-7	5SY6 616-8	0.660	1
	20		5SY6 620-7	5SY6 620-8	0.660	1
	25		5SY6 625-7	5SY6 625-8	0.660	1
	32		5SY6 632-7	5SY6 632-8	0.660	1
40	5SY6 640-7	5SY6 640-8	0.660	1		
50	5SY6 650-7	5SY6 650-8	0.660	1		
63	5SY6 663-7	5SY6 663-8	0.660	1		
 <p>4-pole</p> 	0.3	4	5SY6 414-7	5SY6 414-8	0.660	1
	0.5		5SY6 405-7	5SY6 405-8	0.660	1
	1		5SY6 401-7	5SY6 401-8	0.660	1
	1.6		5SY6 415-7	5SY6 415-8	0.660	1
	2		5SY6 402-7	5SY6 402-8	0.660	1
	3		5SY6 403-7	5SY6 403-8	0.660	1
	4		5SY6 404-7	5SY6 404-8	0.660	1
	6		5SY6 406-7	5SY6 406-8	0.660	1
	8		5SY6 408-7	5SY6 408-8	0.660	1
	10		5SY6 410-7	5SY6 410-8	0.660	1
	13		5SY6 413-7	5SY6 413-8	0.660	1
	16		5SY6 416-7	5SY6 416-8	0.660	1
	20		5SY6 420-7	5SY6 420-8	0.660	1
	25		5SY6 425-7	5SY6 425-8	0.660	1
	32		5SY6 432-7	5SY6 432-8	0.660	1
40	5SY6 440-7	5SY6 440-8	0.660	1		
50	5SY6 450-7	5SY6 450-8	0.660	1		
63	5SY6 463-7	5SY6 463-8	0.660	1		

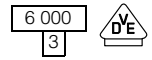
The 5SY6 versions are certified acc. to UL 1077 and CSA 22.2 No. 235-M 89 and can be installed as "supplementary protectors" up to 277V AC (1-pole, 1-pole + N) and 480 V AC (2-pole, 3-pole, 3-pole + N, 4-pole).

For additional components, see page 3/52;
for accessories, see page 3/59.

1) Also suitable for 21-kW active power with three-phase currents of 400 V (e.g. continuous-flow heaters with short-time operation duty) or 7-kW active power at 230 V AC (e.g. storage in not-continuous duty). For continuous load applications, the use of miniature circuit-breakers of characteristic B or C and $I_n = 40$ A is recommended.

Miniature Circuit-Breakers

Standard Product Range



5SJ6 ...-KS, 6 kA

Benefits

- Quicker and safer connection of load circuits using screwless terminal pairs on the outgoing terminals
- If using flexible conductors, no end sleeve necessary
- Touch-protected to VBG4/BGV A2
- Simple voltage test thanks to test point on side of outgoing terminal
- Complete compatibility with all other 5SJ and 5SY miniature circuit-breakers







Function

- Double, screwless outgoing terminal for rigid and flexible conductors from 1.5 to 4 mm²
- Tool-free disconnection and manual removal

Application

- U_n : 230/400 V, 50 to 60 Hz, can be used in systems up to 250/440 V AC, 60 V DC per pole
- Standards: EN 60898, DIN VDE 0641 Part 11, IEC 60898
- Particularly suitable for use in residential buildings

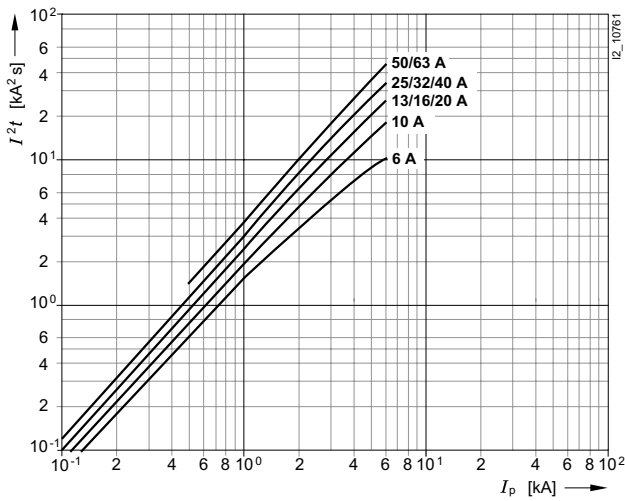
Selection and ordering data

	I_n	MW	Characteristic B Order No.	Characteristic C Order No.	Weight 1 unit approx. kg	PS*/ P. unit Unit(s)
	A					
 <p>1-pole</p> 	10	1	5SJ6 110-6KS	5SJ6 110-7KS	0.111	1
	13		5SJ6 113-6KS	5SJ6 113-7KS	0.111	1
	16		5SJ6 116-6KS	5SJ6 116-7KS	0.111	1
	20		5SJ6 120-6KS	5SJ6 120-7KS	0.111	1
 <p>1-pole + N</p> 	10	2	5SJ6 510-6KS	5SJ6 510-7KS	0.185	1
	13		5SJ6 513-6KS	5SJ6 513-7KS	0.185	1
	16		5SJ6 516-6KS	5SJ6 516-7KS	0.185	1
	20		5SJ6 520-6KS	5SJ6 520-7KS	0.185	1
 <p>2-pole</p> 	10	2	5SJ6 210-6KS	5SJ6 210-7KS	0.225	1
	13		5SJ6 213-6KS	5SJ6 213-7KS	0.225	1
	16		5SJ6 216-6KS	5SJ6 216-7KS	0.225	1
	20		5SJ6 220-6KS	5SJ6 220-7KS	0.225	1

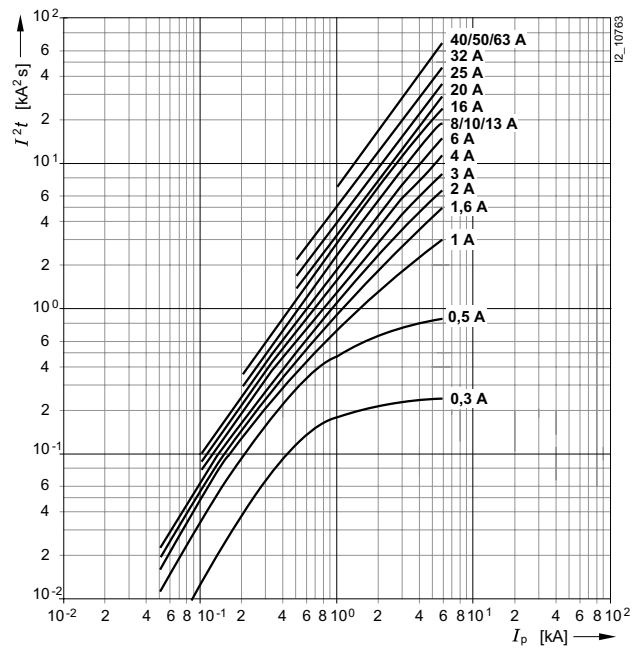
Characteristic curves

Melting I^2t values

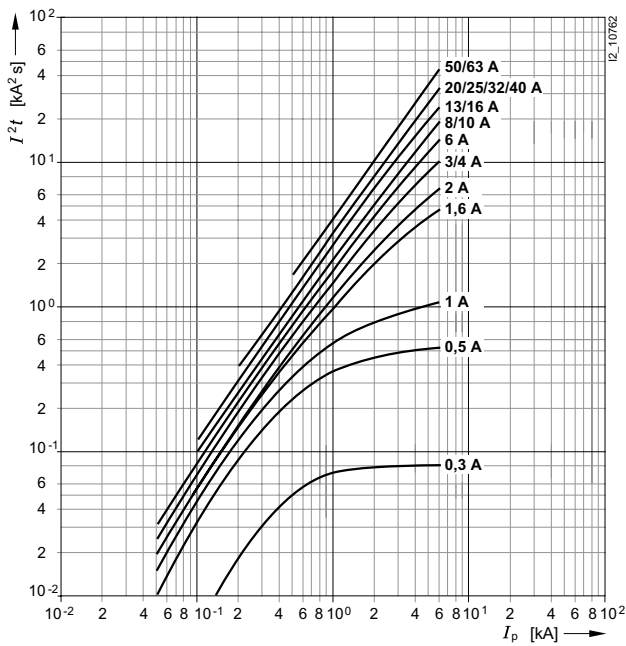
Characteristic B



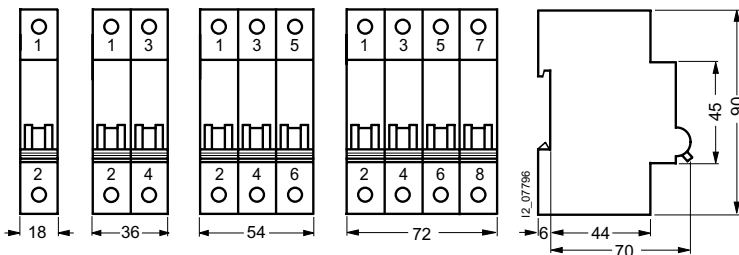
Characteristic D



Characteristic C



Dimensional drawings



Miniature Circuit-Breakers

High-Capacity Product Range

NEW

5SJ4 ...-HG40, 14 kA


Benefits


- Can be used for all NEMA applications according to UL 489 or CSA C22.2 No. 5-02 "Branch Circuit Protection", no restrictions with regard to backup protection
- Can be used for "field wiring" applications, AWG 14 to AWG 4, Cu only
- For all applications in residential, non-residential and industrial buildings

Application

- U_n : 240 V, 50 to 60 Hz, can be used in systems up to 250/440 V AC, 60 V DC per pole
 - Can be used in systems up to
 - 240 V AC, switching capacity 14 kA
 - 60 V AC, switching capacity 10 kA
- Standards: UL 489, CSA C22.2 No. 5-02

Selection and ordering data

	I_n A	MW	Characteristic B Order No.	Weight 1 unit approx. kg	PS*/ P. unit Unit(s)
 <p>1-pole 1 2</p>	6	1	5SJ4 106-6HG40	0.120	1/12
	10		5SJ4 110-6HG40	0.120	1/12
	13		5SJ4 113-6HG40	0.120	1/12
	15		5SJ4 118-6HG40	0.120	1/12
	16		5SJ4 116-6HG40	0.120	1/12
	20		5SJ4 120-6HG40	0.120	1/12
	25		5SJ4 125-6HG40	0.120	1/12
	30		5SJ4 130-6HG40	0.120	1/12
	32		5SJ4 132-6HG40	0.120	1/12
	35		5SJ4 135-6HG40	0.120	1/12
	40		5SJ4 140-6HG40	0.120	1/12
	45		5SJ4 145-6HG40	0.120	1/12
	50		5SJ4 150-6HG40	0.120	1/12
	60		5SJ4 160-6HG40	0.120	1/12
	63		5SJ4 163-6HG40	0.120	1/12

	I_n A	MW	Characteristic C Order No.	Characteristic D Order No.	Weight 1 unit approx. kg	PS*/ P. unit Unit(s)
 <p>1-pole 1 2</p>	0.3	1	5SJ4 114-7HG40	5SJ4 114-8HG40	0.120	1/12
	0.5		5SJ4 105-7HG40	5SJ4 105-8HG40	0.120	1/12
	1		5SJ4 101-7HG40	5SJ4 101-8HG40	0.120	1/12
	1.6		5SJ4 115-7HG40	5SJ4 115-8HG40	0.120	1/12
	2		5SJ4 102-7HG40	5SJ4 102-8HG40	0.120	1/12
	3		5SJ4 103-7HG40	5SJ4 103-8HG40	0.120	1/12
	4		5SJ4 104-7HG40	5SJ4 104-8HG40	0.120	1/12
	5		5SJ4 111-7HG40	5SJ4 111-8HG40	0.120	1/12
	6		5SJ4 106-7HG40	5SJ4 106-8HG40	0.120	1/12
	8		5SJ4 108-7HG40	5SJ4 108-8HG40	0.120	1/12
	10		5SJ4 110-7HG40	5SJ4 110-8HG40	0.120	1/12
	13		5SJ4 113-7HG40	5SJ4 113-8HG40	0.120	1/12
	15		5SJ4 118-7HG40	5SJ4 118-8HG40	0.120	1/12
	16		5SJ4 116-7HG40	5SJ4 116-8HG40	0.120	1/12
	20		5SJ4 120-7HG40	5SJ4 120-8HG40	0.120	1/12
	25		5SJ4 125-7HG40	5SJ4 125-8HG40	0.120	1/12
	30		5SJ4 130-7HG40	5SJ4 130-8HG40	0.120	1/12
	32		5SJ4 132-7HG40	5SJ4 132-8HG40	0.120	1/12
	35		5SJ4 135-7HG40	5SJ4 135-8HG40	0.120	1/12
	40		5SJ4 140-7HG40	5SJ4 140-8HG40	0.120	1/12
45		5SJ4 145-7HG40	5SJ4 145-8HG40	0.120	1/12	
50		5SJ4 150-7HG40	5SJ4 150-8HG40	0.120	1/12	
60		5SJ4 160-7HG40	5SJ4 160-8HG40	0.120	1/12	
63		5SJ4 163-7HG40	5SJ4 163-8HG40	0.120	1/12	

Application

- U_n : 230/400 V, 50 to 60 Hz, can be used in systems up to 250/440 V AC, 60 V DC per pole

- Standards: IEC/EN 60898, DIN VDE 0641 Part 11
- Additional components can be retrofitted

Selection and ordering data

	I_n	MW	Characteristic A Order No.	Characteristic B Order No.	Weight 1 unit approx. kg	PS*/ P. unit Unit(s)
<p>1-pole</p>	A	1	5SY4 101-5	--	0.165	1
	1.6	1	5SY4 115-5	--	0.165	1
	2	1	5SY4 102-5	--	0.165	1
	3	1	5SY4 103-5	--	0.165	1
	4	1	5SY4 104-5	--	0.165	1
	6	1	5SY4 106-5	5SY4 106-6	0.165	1/12
	8	1	5SY4 108-5	--	0.165	1
	10	1	5SY4 110-5	5SY4 110-6	0.165	1/12
	13	1	5SY4 113-5	5SY4 113-6	0.165	1
	16	1	5SY4 116-5	5SY4 116-6	0.165	1/12
	20	1	5SY4 120-5	5SY4 120-6	0.165	1
	25	1	5SY4 125-5	5SY4 125-6	0.165	1
	32 ¹⁾	1	5SY4 132-5	5SY4 132-6	0.165	1
	40	1	5SY4 140-5	5SY4 140-6	0.165	1
	50	1	5SY4 150-5	5SY4 150-6	0.165	1
	63	1	5SY4 163-5	5SY4 163-6	0.165	1
80 ²⁾	1	--	5SY4 180-6	0.165	1/12	
<p>1-pole + N</p>	1	2	5SY4 501-5	--	0.330	1
	1.6	2	5SY4 515-5	--	0.330	1
	2	2	5SY4 502-5	--	0.330	1
	3	2	5SY4 503-5	--	0.330	1
	4	2	5SY4 504-5	--	0.330	1
	6	2	5SY4 506-5	5SY4 506-6	0.330	1
	8	2	5SY4 508-5	--	0.330	1
	10	2	5SY4 510-5	5SY4 510-6	0.330	1
	13	2	5SY4 513-5	5SY4 513-6	0.330	1
	16	2	5SY4 516-5	5SY4 516-6	0.330	1
	20	2	5SY4 520-5	5SY4 520-6	0.330	1
	25	2	5SY4 525-5	5SY4 525-6	0.330	1
	32	2	5SY4 532-5	5SY4 532-6	0.330	1
	40	2	5SY4 540-5	5SY4 540-6	0.330	1
50	2	5SY4 550-5	5SY4 550-6	0.330	1	
63	2	5SY4 563-5	5SY4 563-6	0.330	1	
<p>2-pole</p>	1	2	5SY4 201-5	--	0.330	1
	1.6	2	5SY4 215-5	--	0.330	1
	2	2	5SY4 202-5	--	0.330	1
	3	2	5SY4 203-5	--	0.330	1
	4	2	5SY4 204-5	--	0.330	1
	6	2	5SY4 206-5	5SY4 206-6	0.330	1
	8	2	5SY4 208-5	--	0.330	1
	10	2	5SY4 210-5	5SY4 210-6	0.330	1/6
	13	2	5SY4 213-5	5SY4 213-6	0.330	1
	16	2	5SY4 216-5	5SY4 216-6	0.330	1/6
	20	2	5SY4 220-5	5SY4 220-6	0.330	1
	25	2	5SY4 225-5	5SY4 225-6	0.330	1
	32	2	5SY4 232-5	5SY4 232-6	0.330	1
	40	2	5SY4 240-5	5SY4 240-6	0.330	1
	50	2	5SY4 250-5	5SY4 250-6	0.330	1
	63	2	5SY4 263-5	5SY4 263-6	0.330	1
80 ²⁾	2	--	5SY4 280-6	0.330	1/6	

The 5SY4 versions are certified acc. to UL 1077 and CSA 22.2 No. 235-M 89 and can be installed as "supplementary protectors" up to 277V AC (1-pole, 1-pole + N) and 480 V AC (2-pole, 3-pole, 3-pole + N, 4-pole).

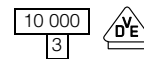
For additional components, see page 3/52;
for accessories, see page 3/59.

1) Only applicable for 5SY4 132-6:
Also suitable for 21-kW active power with three-phase currents of 400 V (e.g. continuous-flow heaters with short-time operation duty) or 7-kW active power at 230 V AC (e.g. storage in not-continuous duty). For continuous load applications, we recommend using miniature circuit-breakers, characteristic B or C and $I_n = 40$ A.

2) No


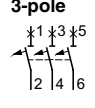

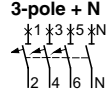

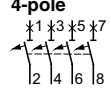
Miniature Circuit-Breakers

High-Capacity Product Range



5SY4, 10 kA

Selection and ordering data

	I_n	MW	Characteristic A Order No.	Characteristic B Order No.	Weight 1 unit approx. kg	PS*/ P. unit Unit(s)
 <p>3-pole</p> 	A	3				
	1		5SY4 301-5	--	0.495	1
	1.6		5SY4 315-5	--	0.495	1
	2		5SY4 302-5	--	0.495	1
	3		5SY4 303-5	--	0.495	1
	4		5SY4 304-5	--	0.495	1
	6		5SY4 306-5	5SY4 306-6	0.495	1
	8		5SY4 308-5	--	0.495	1
	10		5SY4 310-5	5SY4 310-6	0.495	1
	13		5SY4 313-5	5SY4 313-6	0.495	1
	16		5SY4 316-5	5SY4 316-6	0.495	1/4
	20		5SY4 320-5	5SY4 320-6	0.495	1
	25		5SY4 325-5	5SY4 325-6	0.495	1
	32 ¹⁾		5SY4 332-5	5SY4 332-6	0.495	1
	40		5SY4 340-5	5SY4 340-6	0.495	1
50		5SY4 350-5	5SY4 350-6	0.495	1	
63		5SY4 363-5	5SY4 363-6	0.495	1	
80 ²⁾		--	5SY4 380-6	0.495	1/4	
 <p>3-pole + N</p> 	A	4				
	1		5SY4 601-5	--	0.660	1
	1.6		5SY4 615-5	--	0.660	1
	2		5SY4 602-5	--	0.660	1
	3		5SY4 603-5	--	0.660	1
	4		5SY4 604-5	--	0.660	1
	6		5SY4 606-5	5SY4 606-6	0.660	1
	8		5SY4 608-5	--	0.660	1
	10		5SY4 610-5	5SY4 610-6	0.660	1
	13		5SY4 613-5	5SY4 613-6	0.660	1
	16		5SY4 616-5	5SY4 616-6	0.660	1
	20		5SY4 620-5	5SY4 620-6	0.660	1
	25		5SY4 625-5	5SY4 625-6	0.660	1
	32		5SY4 632-5	5SY4 632-6	0.660	1
	40		5SY4 640-5	5SY4 640-6	0.660	1
50		5SY4 650-5	5SY4 650-6	0.660	1	
63		5SY4 663-5	5SY4 663-6	0.660	1	
 <p>4-pole</p> 	A	4				
	1		5SY4 401-5	--	0.660	1
	1.6		5SY4 415-5	--	0.660	1
	2		5SY4 402-5	--	0.660	1
	3		5SY4 403-5	--	0.660	1
	4		5SY4 404-5	--	0.660	1
	6		5SY4 406-5	5SY4 406-6	0.660	1
	8		5SY4 408-5	--	0.660	1
	10		5SY4 410-5	5SY4 410-6	0.660	1
	13		5SY4 413-5	5SY4 413-6	0.660	1
	16		5SY4 416-5	5SY4 416-6	0.660	1
	20		5SY4 420-5	5SY4 420-6	0.660	1
	25		5SY4 425-5	5SY4 425-6	0.660	1
	32		5SY4 432-5	5SY4 432-6	0.660	1
	40		5SY4 440-5	5SY4 440-6	0.660	1
50		5SY4 450-5	5SY4 450-6	0.660	1	
63		5SY4 463-5	5SY4 463-6	0.660	1	
80 ²⁾		--	5SY4 480-6	0.660	1/3	

The 5SY4 versions are certified acc. to UL 1077 and CSA 22.2 No. 235-M 89 and can be installed as "supplementary protectors" up to 277 V AC (1-pole, 1-pole + N) and 480 V AC (2-pole, 3-pole, 3-pole + N, 4-pole).

For additional components, see page 3/52;







for accessories, see page 3/59.

1) Only applicable for 5SY4 332-6:

Also suitable for 21-kW active power with three-phase currents of 400 V (e.g. continuous-flow heaters with short-time operation duty) or 7-kW active power at 230 V AC (e.g. storage in not-continuous duty). For continuous load applications, we recommend using miniature circuit-breakers, characteristic B or C and $I_n = 40$ A.

2) No 

Selection and ordering data

	I_n	MW	Characteristic C Order No.	Characteristic D Order No.	Weight 1 unit approx. kg	PS*/ P. unit Unit(s)
1-pole						
		0.3	5SY4 114-7	5SY4 114-8	0.165	1
		0.5	5SY4 105-7	5SY4 105-8	0.165	1
		1	5SY4 101-7	5SY4 101-8	0.165	1
		1.6	5SY4 115-7	5SY4 115-8	0.165	1
		2	5SY4 102-7	5SY4 102-8	0.165	1
		3	5SY4 103-7	5SY4 103-8	0.165	1
		4	5SY4 104-7	5SY4 104-8	0.165	1
		6	5SY4 106-7	5SY4 106-8	0.165	1
		8	5SY4 108-7	5SY4 108-8	0.165	1
		10	5SY4 110-7	5SY4 110-8	0.165	1
		13	5SY4 113-7	5SY4 113-8	0.165	1
		16	5SY4 116-7	5SY4 116-8	0.165	1
		20	5SY4 120-7	5SY4 120-8	0.165	1
		25	5SY4 125-7	5SY4 125-8	0.165	1
		32 ¹⁾	5SY4 132-7	5SY4 132-8	0.165	1
		40	5SY4 140-7	5SY4 140-8	0.165	1
		50	5SY4 150-7	5SY4 150-8	0.165	1
63	5SY4 163-7	5SY4 163-8	0.165	1		
80 ²⁾	5SY4 180-7	--	0.165	1/12		
1-pole + N						
		0.3	5SY4 514-7	5SY4 514-8	0.330	1
		0.5	5SY4 505-7	5SY4 505-8	0.330	1
		1	5SY4 501-7	5SY4 501-8	0.330	1
		1.6	5SY4 515-7	5SY4 515-8	0.330	1
		2	5SY4 502-7	5SY4 502-8	0.330	1
		3	5SY4 503-7	5SY4 503-8	0.330	1
		4	5SY4 504-7	5SY4 504-8	0.330	1
		6	5SY4 506-7	5SY4 506-8	0.330	1
		8	5SY4 508-7	5SY4 508-8	0.330	1
		10	5SY4 510-7	5SY4 510-8	0.330	1
		13	5SY4 513-7	5SY4 513-8	0.330	1
		16	5SY4 516-7	5SY4 516-8	0.330	1
		20	5SY4 520-7	5SY4 520-8	0.330	1
		25	5SY4 525-7	5SY4 525-8	0.330	1
		32	5SY4 532-7	5SY4 532-8	0.330	1
		40	5SY4 540-7	5SY4 540-8	0.330	1
		50	5SY4 550-7	5SY4 550-8	0.330	1
63	5SY4 563-7	5SY4 563-8	0.330	1		
80 ²⁾	5SY4 580-7	--	0.330	1/6		
2-pole						
		0.3	5SY4 214-7	5SY4 214-8	0.330	1
		0.5	5SY4 205-7	5SY4 205-8	0.330	1
		1	5SY4 201-7	5SY4 201-8	0.330	1
		1.6	5SY4 215-7	5SY4 215-8	0.330	1
		2	5SY4 202-7	5SY4 202-8	0.330	1
		3	5SY4 203-7	5SY4 203-8	0.330	1
		4	5SY4 204-7	5SY4 204-8	0.330	1
		6	5SY4 206-7	5SY4 206-8	0.330	1
		8	5SY4 208-7	5SY4 208-8	0.330	1
		10	5SY4 210-7	5SY4 210-8	0.330	1
		13	5SY4 213-7	5SY4 213-8	0.330	1
		16	5SY4 216-7	5SY4 216-8	0.330	1
		20	5SY4 220-7	5SY4 220-8	0.330	1
		25	5SY4 225-7	5SY4 225-8	0.330	1
		32	5SY4 232-7	5SY4 232-8	0.330	1
		40	5SY4 240-7	5SY4 240-8	0.330	1
		50	5SY4 250-7	5SY4 250-8	0.330	1
63	5SY4 263-7	5SY4 263-8	0.330	1		
80 ²⁾	5SY4 280-7	--	0.330	1		

The 5SY4 versions are certified acc. to UL 1077 and CSA 22.2 No. 235-M 89 and can be installed as "supplementary protectors" up to 277 V AC (1-pole, 1-pole + N) and 480 V AC (2-pole, 3-pole, 3-pole + N, 4-pole).

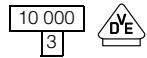
For additional components, see page 3/52;
for accessories, see page 3/59.

1) Only applicable for 5SY4 132-7:
Also suitable for 21-kW active power with three-phase currents of 400 V (e.g. continuous-flow heaters with short-time operation duty) or 7-kW active power at 230 V AC (e.g. storage in not-continuous duty). For continuous load applications, we recommend using miniature circuit-breakers, characteristic B or C and $I_n = 40$ A.

2) No 




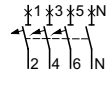


Miniature Circuit-Breakers

High-Capacity Product Range



5SY4, 10 kA

Selection and ordering data

	I_n	MW	Characteristic C Order No.	Characteristic D Order No.	Weight 1 unit approx. kg	PS*/ P. unit Unit(s)
 <p>3-pole</p> 	A					
	0.3	3	5SY4 314-7	5SY4 314-8	0.495	1
	0.5		5SY4 305-7	5SY4 305-8	0.495	1
	1		5SY4 301-7	5SY4 301-8	0.495	1
	1.6		5SY4 315-7	5SY4 315-8	0.495	1
	2		5SY4 302-7	5SY4 302-8	0.495	1
	3		5SY4 303-7	5SY4 303-8	0.495	1
	4		5SY4 304-7	5SY4 304-8	0.495	1
	6		5SY4 306-7	5SY4 306-8	0.495	1
	8		5SY4 308-7	5SY4 308-8	0.495	1
	10		5SY4 310-7	5SY4 310-8	0.495	1
	13		5SY4 313-7	5SY4 313-8	0.495	1
	16		5SY4 316-7	5SY4 316-8	0.495	1
	20		5SY4 320-7	5SY4 320-8	0.495	1
	25		5SY4 325-7	5SY4 325-8	0.495	1
	32 ¹⁾		5SY4 332-7	5SY4 332-8	0.495	1
	40		5SY4 340-7	5SY4 340-8	0.495	1
50		5SY4 350-7	5SY4 350-8	0.495	1	
63		5SY4 363-7	5SY4 363-8	0.495	1	
80 ²⁾		5SY4 380-7	--	0.495	1	
 <p>3-pole + N</p> 	0.3	4	5SY4 614-7	5SY4 614-8	0.660	1
	0.5		5SY4 605-7	5SY4 605-8	0.660	1
	1		5SY4 601-7	5SY4 601-8	0.660	1
	1.6		5SY4 615-7	5SY4 615-8	0.660	1
	2		5SY4 602-7	5SY4 602-8	0.660	1
	3		5SY4 603-7	5SY4 603-8	0.660	1
	4		5SY4 604-7	5SY4 604-8	0.660	1
	6		5SY4 606-7	5SY4 606-8	0.660	1
	8		5SY4 608-7	5SY4 608-8	0.660	1
	10		5SY4 610-7	5SY4 610-8	0.660	1
	13		5SY4 613-7	5SY4 613-8	0.660	1
	16		5SY4 616-7	5SY4 616-8	0.660	1
	20		5SY4 620-7	5SY4 620-8	0.660	1
	25		5SY4 625-7	5SY4 625-8	0.660	1
	32		5SY4 632-7	5SY4 632-8	0.660	1
	40		5SY4 640-7	5SY4 640-8	0.660	1
	50		5SY4 650-7	5SY4 650-8	0.660	1
63		5SY4 663-7	5SY4 663-8	0.660	1	
80 ²⁾		5SY4 680-7	--	0.660	1/3	
 <p>4-pole</p> 	0.3	4	5SY4 414-7	5SY4 414-8	0.660	1
	0.5		5SY4 405-7	5SY4 405-8	0.660	1
	1		5SY4 401-7	5SY4 401-8	0.660	1
	1.6		5SY4 415-7	5SY4 415-8	0.660	1
	2		5SY4 402-7	5SY4 402-8	0.660	1
	3		5SY4 403-7	5SY4 403-8	0.660	1
	4		5SY4 404-7	5SY4 404-8	0.660	1
	6		5SY4 406-7	5SY4 406-8	0.660	1
	8		5SY4 408-7	5SY4 408-8	0.660	1
	10		5SY4 410-7	5SY4 410-8	0.660	1
	13		5SY4 413-7	5SY4 413-8	0.660	1
	16		5SY4 416-7	5SY4 416-8	0.660	1
	20		5SY4 420-7	5SY4 420-8	0.660	1
	25		5SY4 425-7	5SY4 425-8	0.660	1
	32		5SY4 432-7	5SY4 432-8	0.660	1
	40		5SY4 440-7	5SY4 440-8	0.660	1
	50		5SY4 450-7	5SY4 450-8	0.660	1
63		5SY4 463-7	5SY4 463-8	0.660	1	
80 ²⁾		5SY4 480-7	--	0.660	1/3	

The 5SY4 and 5SY7 versions are certified acc. to UL 1077 and CSA 22.2 No. 235-M 89 and can be installed as "supplementary protectors" up to 277 V AC (1-pole, 1-pole + N) and 480 V AC (2-pole, 3-pole, 3-pole + N, 4-pole).

For additional components, see page 3/52;
for accessories, see page 3/59.

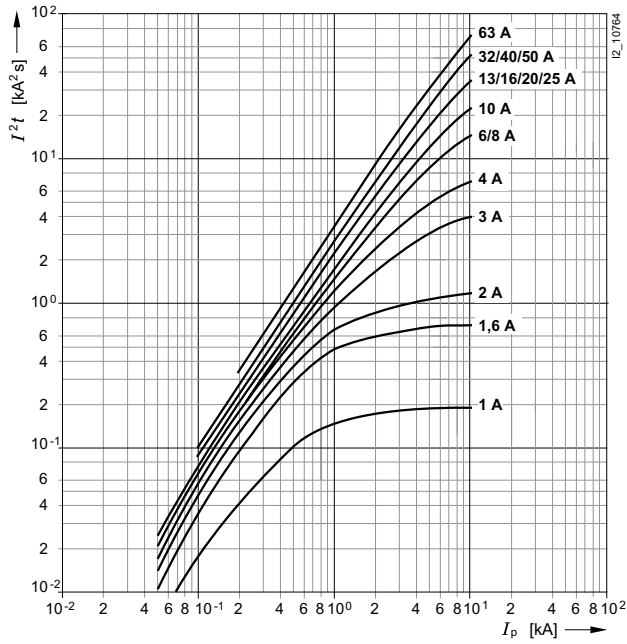
1) Only applicable for 5SY4 332-7 and 5SY7 132-6:
Also suitable for 21-kW active power with three-phase currents of 400 V (e.g. continuous-flow heaters with short-time operation duty) or 7-kW active power at 230 V AC (e.g. storage in not-continuous duty). For continuous load applications, we recommend using miniature circuit-breakers, characteristic B or C and $I_n = 40$ A.

2) No 

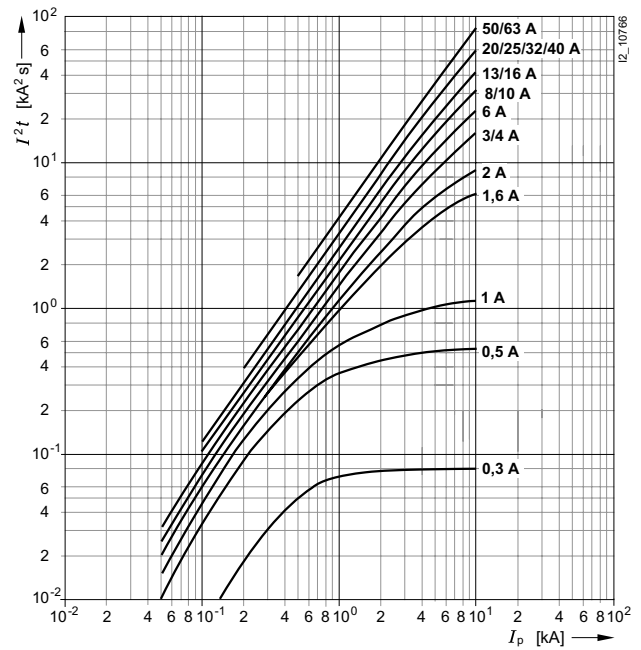
Characteristic curves

Melting I^2t values

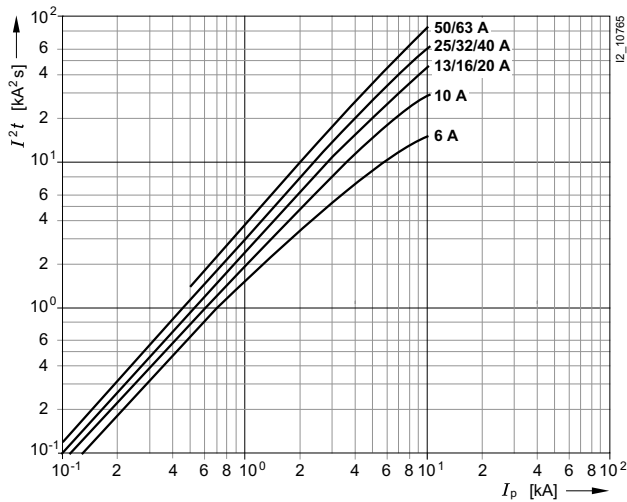
Characteristic A



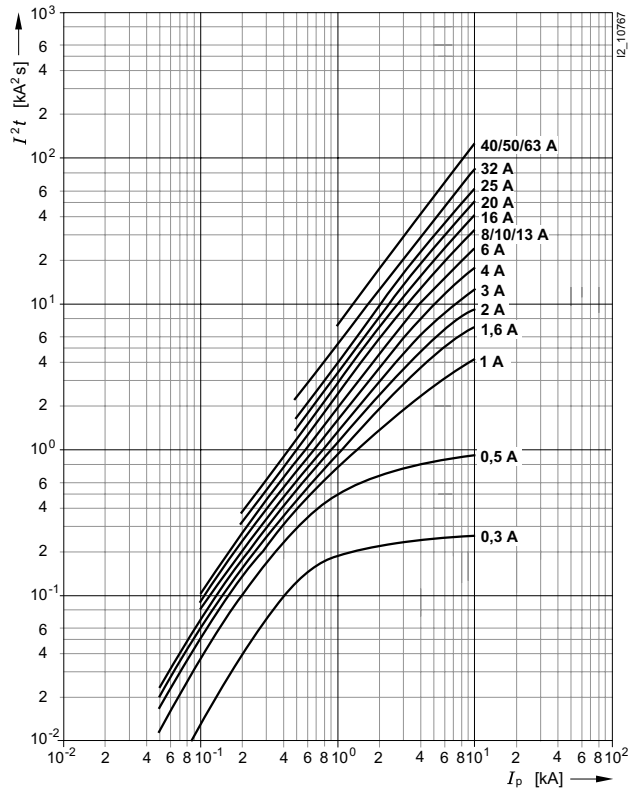
Characteristic C



Characteristic B



Characteristic D

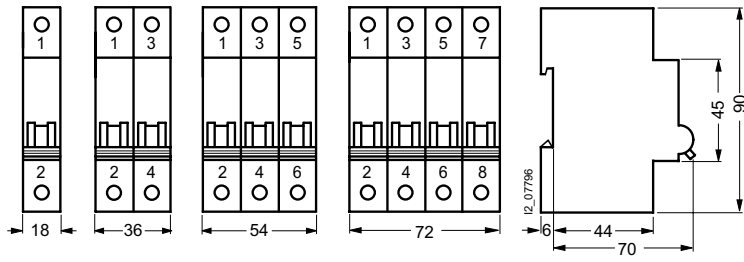


Miniature Circuit-Breakers

High-Capacity Product Range

5SY4, 10 kA

Dimensional drawings










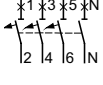

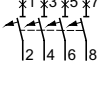


Application

- U_n : 230/400 V, 50 to 60 Hz, can be used in systems up to 250/440 V AC, 60 V DC per pole

- Standards: IEC/EN 60898, DIN VDE 0641 Part 11
- Additional components can be retrofitted

Selection and ordering data

	I_n	MW	Characteristic B Order No.	Weight 1 unit approx. kg	PS*/ P. unit Unit(s)
	A				
 <p>1-pole</p> 	6	1	5SY7 106-6	0.165	1
	10		5SY7 110-6	0.165	1
	13		5SY7 113-6	0.165	1
	16		5SY7 116-6	0.165	1
	20		5SY7 120-6	0.165	1
	25		5SY7 125-6	0.165	1
	32 ¹⁾		5SY7 132-6	0.165	1
	40		5SY7 140-6	0.165	1
	50		5SY7 150-6	0.165	1
	63		5SY7 163-6	0.165	1
 <p>1-pole + N</p> 	6	2	5SY7 506-6	0.330	1
	10		5SY7 510-6	0.330	1
	13		5SY7 513-6	0.330	1
	16		5SY7 516-6	0.330	1
	20		5SY7 520-6	0.330	1
	25		5SY7 525-6	0.330	1
	32		5SY7 532-6	0.330	1
	40		5SY7 540-6	0.330	1
	50		5SY7 550-6	0.330	1
	63		5SY7 563-6	0.330	1
 <p>2-pole</p> 	6	2	5SY7 206-6	0.330	1
	10		5SY7 210-6	0.330	1
	13		5SY7 213-6	0.330	1
	16		5SY7 216-6	0.330	1
	20		5SY7 220-6	0.330	1
	25		5SY7 225-6	0.330	1
	32		5SY7 232-6	0.330	1
	40		5SY7 240-6	0.330	1
	50		5SY7 250-6	0.330	1
	63		5SY7 263-6	0.330	1
 <p>3-pole</p> 	6	3	5SY7 306-6	0.495	1
	10		5SY7 310-6	0.495	1
	13		5SY7 313-6	0.495	1
	16		5SY7 316-6	0.495	1
	20		5SY7 320-6	0.495	1
	25		5SY7 325-6	0.495	1
	32		5SY7 332-6	0.495	1
	40		5SY7 340-6	0.495	1
	50		5SY7 350-6	0.495	1
	63		5SY7 363-6	0.495	1
 <p>3-pole + N</p> 	6	4	5SY7 606-6	0.660	1
	10		5SY7 610-6	0.660	1
	13		5SY7 613-6	0.660	1
	16		5SY7 616-6	0.660	1
	20		5SY7 620-6	0.660	1
	25		5SY7 625-6	0.660	1
	32		5SY7 632-6	0.660	1
	40		5SY7 640-6	0.660	1
	50		5SY7 650-6	0.660	1
	63		5SY7 663-6	0.660	1
 <p>4-pole</p> 	6	4	5SY7 406-6	0.660	1
	10		5SY7 410-6	0.660	1
	13		5SY7 413-6	0.660	1
	16		5SY7 416-6	0.660	1
	20		5SY7 420-6	0.660	1
	25		5SY7 425-6	0.660	1
	32		5SY7 432-6	0.660	1
	40		5SY7 440-6	0.660	1
	50		5SY7 450-6	0.660	1
	63		5SY7 463-6	0.660	1

For information and footer, see page 3/40.

Miniature Circuit-Breakers







High-Capacity Product Range

15 000
3



5SY7, 15 kA

Selection and ordering data

	I_n	MW	Characteristic C Order No.	Characteristic D Order No.	Weight 1 unit approx. kg	PS*/ P. unit Unit(s)
 <p>1-pole</p> 	A					
	0.3	1	5SY7 114-7	5SY7 114-8	0.165	1
	0.5		5SY7 105-7	5SY7 105-8	0.165	1
	1		5SY7 101-7	5SY7 101-8	0.165	1
	1.6		5SY7 115-7	5SY7 115-8	0.165	1
	2		5SY7 102-7	5SY7 102-8	0.165	1
	3		5SY7 103-7	5SY7 103-8	0.165	1
	4		5SY7 104-7	5SY7 104-8	0.165	1
	6		5SY7 106-7	5SY7 106-8	0.165	1
	8		5SY7 108-7	5SY7 108-8	0.165	1
	10		5SY7 110-7	5SY7 110-8	0.165	1
	13		5SY7 113-7	5SY7 113-8	0.165	1
	16		5SY7 116-7	5SY7 116-8	0.165	1
	20		5SY7 120-7	5SY7 120-8	0.165	1
	25		5SY7 125-7	5SY7 125-8	0.165	1
32 ¹⁾		5SY7 132-7	5SY7 132-8	0.165	1	
40		5SY7 140-7	5SY7 140-8	0.165	1	
50		5SY7 150-7	5SY7 150-8	0.165	1	
63		5SY7 163-7	5SY7 163-8	0.165	1	
 <p>1-pole + N</p> 	0.3	2	5SY7 514-7	5SY7 514-8	0.330	1
	0.5		5SY7 505-7	5SY7 505-8	0.330	1
	1		5SY7 501-7	5SY7 501-8	0.330	1
	1.6		5SY7 515-7	5SY7 515-8	0.330	1
	2		5SY7 502-7	5SY7 502-8	0.330	1
	3		5SY7 503-7	5SY7 503-8	0.330	1
	4		5SY7 504-7	5SY7 504-8	0.330	1
	6		5SY7 506-7	5SY7 506-8	0.330	1
	8		5SY7 508-7	5SY7 508-8	0.330	1
	10		5SY7 510-7	5SY7 510-8	0.330	1
	13		5SY7 513-7	5SY7 513-8	0.330	1
	16		5SY7 516-7	5SY7 516-8	0.330	1
	20		5SY7 520-7	5SY7 520-8	0.330	1
	25		5SY7 525-7	5SY7 525-8	0.330	1
	32		5SY7 532-7	5SY7 532-8	0.330	1
40		5SY7 540-7	5SY7 540-8	0.330	1	
50		5SY7 550-7	5SY7 550-8	0.330	1	
63		5SY7 563-7	5SY7 563-8	0.330	1	
 <p>2-pole</p> 	0.3	2	5SY7 214-7	5SY7 214-8	0.330	1
	0.5		5SY7 205-7	5SY7 205-8	0.330	1
	1		5SY7 201-7	5SY7 201-8	0.330	1
	1.6		5SY7 215-7	5SY7 215-8	0.330	1
	2		5SY7 202-7	5SY7 202-8	0.330	1
	3		5SY7 203-7	5SY7 203-8	0.330	1
	4		5SY7 204-7	5SY7 204-8	0.330	1
	6		5SY7 206-7	5SY7 206-8	0.330	1
	8		5SY7 208-7	5SY7 208-8	0.330	1
	10		5SY7 210-7	5SY7 210-8	0.330	1
	13		5SY7 213-7	5SY7 213-8	0.330	1
	16		5SY7 216-7	5SY7 216-8	0.330	1
	20		5SY7 220-7	5SY7 220-8	0.330	1
	25		5SY7 225-7	5SY7 225-8	0.330	1
	32		5SY7 232-7	5SY7 232-8	0.330	1
40		5SY7 240-7	5SY7 240-8	0.330	1	
50		5SY7 250-7	5SY7 250-8	0.330	1	
63		5SY7 263-7	5SY7 263-8	0.330	1	

Information and footer to 3/39 and 3/40:




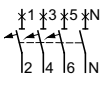

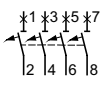
The 5SY7 versions are certified acc. to UL 1077 and CSA 22.2 No. 235-M 89 and can be installed as "supplementary protectors" up to 277 V AC (1-pole, 1-pole + N) and 480 V AC (2-pole, 3-pole, 3-pole + N, 4-pole).

For additional components, see page 3/52;
for accessories, see page 3/59.

1) Only applies to 5SY7 132-6 and 5SY7 132-7:

Also suitable for 21-kW active power with three-phase currents of 400 V (e.g. continuous-flow heaters with short-time operation duty) or 7-kW active power at 230 V AC (e.g. storage in not-continuous duty). For continuous load applications, we recommend using miniature circuit-breakers, characteristic B or C and $I_n = 40$ A.

Selection and ordering data

	I_n	MW	Characteristic C Order No.	Characteristic D Order No.	Weight 1 unit approx. kg	PS*/ P. unit Unit(s)
 <p>3-pole</p> 	A					
	0.3	3	5SY7 314-7	5SY7 314-8	0.495	1
	0.5		5SY7 305-7	5SY7 305-8	0.495	1
	1		5SY7 301-7	5SY7 301-8	0.495	1
	1.6		5SY7 315-7	5SY7 315-8	0.495	1
	2		5SY7 302-7	5SY7 302-8	0.495	1
	3		5SY7 303-7	5SY7 303-8	0.495	1
	4		5SY7 304-7	5SY7 304-8	0.495	1
	6		5SY7 306-7	5SY7 306-8	0.495	1
	8		5SY7 308-7	5SY7 308-8	0.495	1
	10		5SY7 310-7	5SY7 310-8	0.495	1
	13		5SY7 313-7	5SY7 313-8	0.495	1
	16		5SY7 316-7	5SY7 316-8	0.495	1
	20		5SY7 320-7	5SY7 320-8	0.495	1
	25		5SY7 325-7	5SY7 325-8	0.495	1
32 ¹⁾		5SY7 332-7	5SY7 332-8	0.495	1	
40		5SY7 340-7	5SY7 340-8	0.495	1	
50		5SY7 350-7	5SY7 350-8	0.495	1	
63		5SY7 363-7	5SY7 363-8	0.495	1	
 <p>3-pole + N</p> 	0.3	4	5SY7 614-7	5SY7 614-8	0.660	1
	0.5		5SY7 605-7	5SY7 605-8	0.660	1
	1		5SY7 601-7	5SY7 601-8	0.660	1
	1.6		5SY7 615-7	5SY7 615-8	0.660	1
	2		5SY7 602-7	5SY7 602-8	0.660	1
	3		5SY7 603-7	5SY7 603-8	0.660	1
	4		5SY7 604-7	5SY7 604-8	0.660	1
	6		5SY7 606-7	5SY7 606-8	0.660	1
	8		5SY7 608-7	5SY7 608-8	0.660	1
	10		5SY7 610-7	5SY7 610-8	0.660	1
	13		5SY7 613-7	5SY7 613-8	0.660	1
	16		5SY7 616-7	5SY7 616-8	0.660	1
	20		5SY7 620-7	5SY7 620-8	0.660	1
	25		5SY7 625-7	5SY7 625-8	0.660	1
	32		5SY7 632-7	5SY7 632-8	0.660	1
40		5SY7 640-7	5SY7 640-8	0.660	1	
50		5SY7 650-7	5SY7 650-8	0.660	1	
63		5SY7 663-7	5SY7 663-8	0.660	1	
 <p>4-pole</p> 	0.3	4	5SY7 414-7	5SY7 414-8	0.660	1
	0.5		5SY7 405-7	5SY7 405-8	0.660	1
	1		5SY7 401-7	5SY7 401-8	0.660	1
	1.6		5SY7 415-7	5SY7 415-8	0.660	1
	2		5SY7 402-7	5SY7 402-8	0.660	1
	3		5SY7 403-7	5SY7 403-8	0.660	1
	4		5SY7 404-7	5SY7 404-8	0.660	1
	6		5SY7 406-7	5SY7 406-8	0.660	1
	8		5SY7 408-7	5SY7 408-8	0.660	1
	10		5SY7 410-7	5SY7 410-8	0.660	1
	13		5SY7 413-7	5SY7 413-8	0.660	1
	16		5SY7 416-7	5SY7 416-8	0.660	1
	20		5SY7 420-7	5SY7 420-8	0.660	1
	25		5SY7 425-7	5SY7 425-8	0.660	1
	32		5SY7 432-7	5SY7 432-8	0.660	1
40		5SY7 440-7	5SY7 440-8	0.660	1	
50		5SY7 450-7	5SY7 450-8	0.660	1	
63		5SY7 463-7	5SY7 463-8	0.660	1	

The 5SY7 versions are certified acc. to UL 1077 and CSA 22.2 No. 235-M 89 and can be installed as "supplementary protectors" up to 277 V AC (1-pole, 1-pole + N) and 480 V AC (2-pole, 3-pole, 3-pole + N, 4-pole).

For additional components, see page 3/52;
for accessories, see page 3/59.

1) Only applicable for 5SY7 332-7:

Also suitable for 21-kW active power with three-phase currents of 400 V (e.g. continuous-flow heaters with short-time operation duty) or 7-kW active power at 230 V AC (e.g. storage in not-continuous duty). For continuous load applications, we recommend using miniature circuit-breakers, characteristic B or C and $I_n = 40$ A.

Miniature Circuit-Breakers

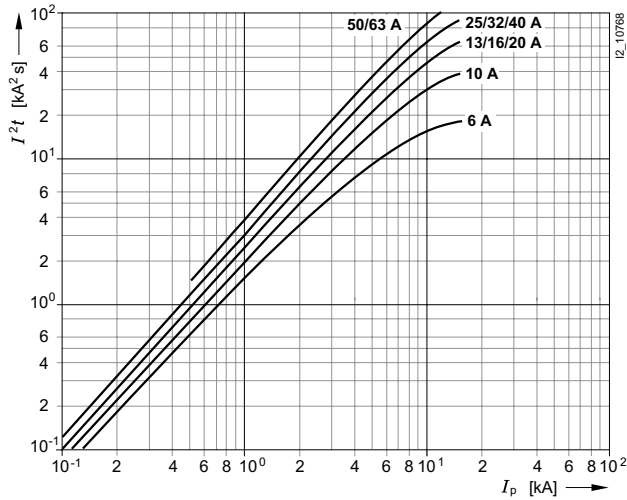
High-Capacity Product Range

5SY7, 15 kA

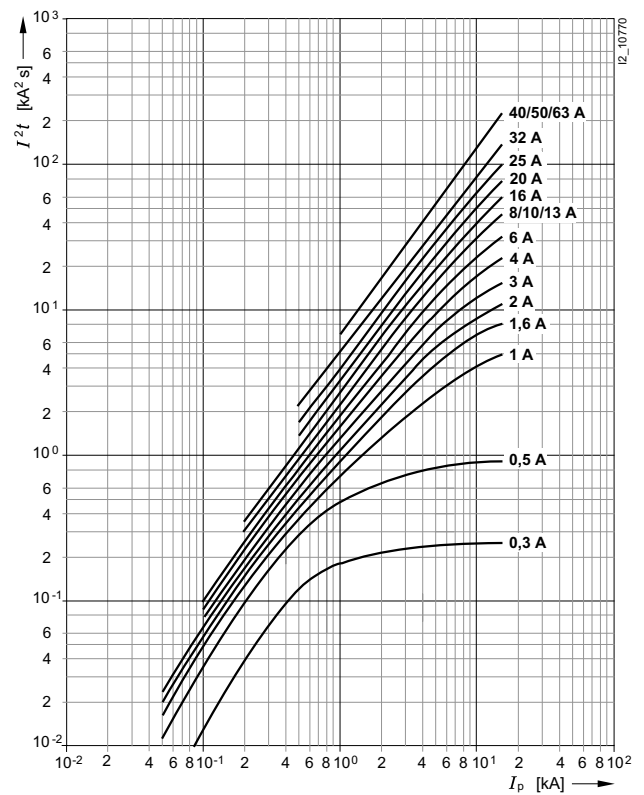
Characteristic curves

Melting I^2t values

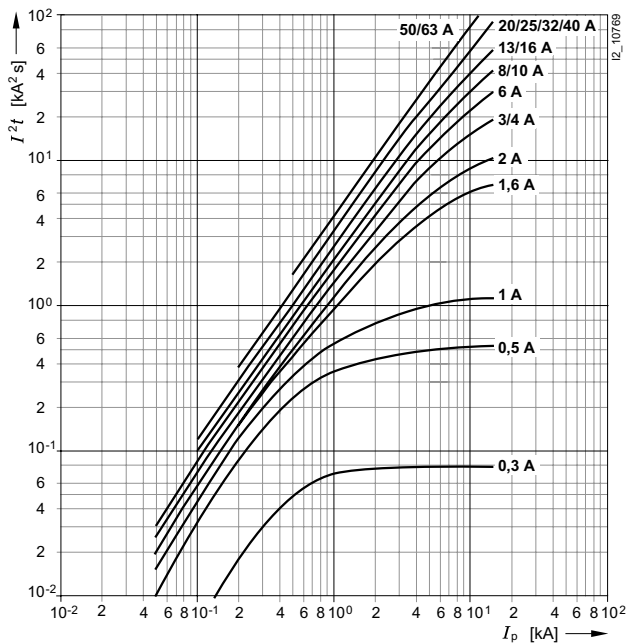
Characteristic B



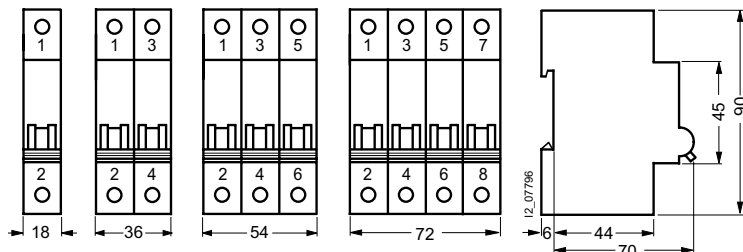
Characteristic D



Characteristic C



Dimensional drawings



Miniature Circuit-Breakers High-Capacity Product Range

5SY8, 25 kA

3

Application

- U_n : 230/400 V, 50 to 60 Hz, can be used in systems up to 250/440 V AC, 60 V DC per pole
- Standards: IEC/EN 60947-2
- Additional components can be retrofitted




Characteristic C

General line protection, especially advantageous with higher starting currents (lamps, motors, etc.).

Characteristic D

Tripping range adapted to operating equipment involving significant pulse generation (transformers, solenoid valves).

Selection and ordering data

	I_n	MW	Characteristic C Order No.	Characteristic D Order No.	Weight 1 unit approx. kg	PS*/ P. unit Unit(s)
	A					
 <p>1-pole</p> <p>$\begin{matrix} *1 \\ \swarrow \\ 1 \\ \searrow \\ 2 \end{matrix}$</p>	0.3	1	5SY8 114-7	5SY8 114-8	0.165	1
	0.5		5SY8 105-7	5SY8 105-8	0.165	1
	1		5SY8 101-7	5SY8 101-8	0.165	1
	1.6		5SY8 115-7	5SY8 115-8	0.165	1
	2		5SY8 102-7	5SY8 102-8	0.165	1
	3		5SY8 103-7	5SY8 103-8	0.165	1
	4		5SY8 104-7	5SY8 104-8	0.165	1
	6		5SY8 106-7	5SY8 106-8	0.165	1
	8		5SY8 108-7	5SY8 108-8	0.165	1
	10		5SY8 110-7	5SY8 110-8	0.165	1
	13		5SY8 113-7	5SY8 113-8	0.165	1
	16		5SY8 116-7	5SY8 116-8	0.165	1
	20		5SY8 120-7	5SY8 120-8	0.165	1
	25		5SY8 125-7	5SY8 125-8	0.165	1
	32 ¹⁾		5SY8 132-7	5SY8 132-8	0.165	1
	40		5SY8 140-7	5SY8 140-8	0.165	1
50		5SY8 150-7	5SY8 150-8	0.165	1	
63		5SY8 163-7	5SY8 163-8	0.165	1	
 <p>1-pole + N</p> <p>$\begin{matrix} *1 *N \\ \swarrow \searrow \\ 1 \\ \searrow \swarrow \\ 2 \end{matrix}$</p>	0.3	2	5SY8 514-7	5SY8 514-8	0.330	1
	0.5		5SY8 505-7	5SY8 505-8	0.330	1
	1		5SY8 501-7	5SY8 501-8	0.330	1
	1.6		5SY8 515-7	5SY8 515-8	0.330	1
	2		5SY8 502-7	5SY8 502-8	0.330	1
	3		5SY8 503-7	5SY8 503-8	0.330	1
	4		5SY8 504-7	5SY8 504-8	0.330	1
	6		5SY8 506-7	5SY8 506-8	0.330	1
	8		5SY8 508-7	5SY8 508-8	0.330	1
	10		5SY8 510-7	5SY8 510-8	0.330	1
	13		5SY8 513-7	5SY8 513-8	0.330	1
	16		5SY8 516-7	5SY8 516-8	0.330	1
	20		5SY8 520-7	5SY8 520-8	0.330	1
	25		5SY8 525-7	5SY8 525-8	0.330	1
	32		5SY8 532-7	5SY8 532-8	0.330	1
	40		5SY8 540-7	5SY8 540-8	0.330	1
50		5SY8 550-7	5SY8 550-8	0.330	1	
63		5SY8 563-7	5SY8 563-8	0.330	1	
 <p>2-pole</p> <p>$\begin{matrix} *1 *3 \\ \swarrow \searrow \\ 1 \\ \searrow \swarrow \\ 2 \end{matrix}$</p>	0.3	2	5SY8 214-7	5SY8 214-8	0.330	1
	0.5		5SY8 205-7	5SY8 205-8	0.330	1
	1		5SY8 201-7	5SY8 201-8	0.330	1
	1.6		5SY8 215-7	5SY8 215-8	0.330	1
	2		5SY8 202-7	5SY8 202-8	0.330	1
	3		5SY8 203-7	5SY8 203-8	0.330	1
	4		5SY8 204-7	5SY8 204-8	0.330	1
	6		5SY8 206-7	5SY8 206-8	0.330	1
	8		5SY8 208-7	5SY8 208-8	0.330	1
	10		5SY8 210-7	5SY8 210-8	0.330	1
	13		5SY8 213-7	5SY8 213-8	0.330	1
	16		5SY8 216-7	5SY8 216-8	0.330	1
	20		5SY8 220-7	5SY8 220-8	0.330	1
	25		5SY8 225-7	5SY8 225-8	0.330	1
	32		5SY8 232-7	5SY8 232-8	0.330	1
	40		5SY8 240-7	5SY8 240-8	0.330	1
50		5SY8 250-7	5SY8 250-8	0.330	1	
63		5SY8 263-7	5SY8 263-8	0.330	1	

For additional components, see page 3/52;
for accessories, see page 3/59.

1) Only applicable for 5SY8 132-7:




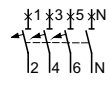


Also suitable for 21-kW active power with three-phase currents of 400 V (e.g. continuous-flow heaters with short-time operation duty) or 7-kW active power at 230 V AC (e.g. storage in not-continuous duty). For continuous load applications, we recommend using miniature circuit-breakers, characteristic C and $I_n = 40$ A.

Miniature Circuit-Breakers

High-Capacity Product Range

5SY8, 25 kA

Selection and ordering data

	I_n	MW	Characteristic C Order No.	Characteristic D Order No.	Weight 1 unit approx. kg	PS*/ P. unit Unit(s)
 <p>3-pole</p> 	A					
	0.3	3	5SY8 314-7	5SY8 314-8	0.495	1
	0.5		5SY8 305-7	5SY8 305-8	0.495	1
	1		5SY8 301-7	5SY8 301-8	0.495	1
	1.6		5SY8 315-7	5SY8 315-8	0.495	1
	2		5SY8 302-7	5SY8 302-8	0.495	1
	3		5SY8 303-7	5SY8 303-8	0.495	1
	4		5SY8 304-7	5SY8 304-8	0.495	1
	6		5SY8 306-7	5SY8 306-8	0.495	1
	8		5SY8 308-7	5SY8 308-8	0.495	1
	10		5SY8 310-7	5SY8 310-8	0.495	1
	13		5SY8 313-7	5SY8 313-8	0.495	1
	16		5SY8 316-7	5SY8 316-8	0.495	1
	20		5SY8 320-7	5SY8 320-8	0.495	1
25		5SY8 325-7	5SY8 325-8	0.495	1	
32 ¹⁾		5SY8 332-7	5SY8 332-8	0.495	1	
40		5SY8 340-7	5SY8 340-8	0.495	1	
50		5SY8 350-7	5SY8 350-8	0.495	1	
63		5SY8 363-7	5SY8 363-8	0.495	1	
 <p>3-pole + N</p> 	A					
	0.3	4	5SY8 614-7	5SY8 614-8	0.660	1
	0.5		5SY8 605-7	5SY8 605-8	0.660	1
	1		5SY8 601-7	5SY8 601-8	0.660	1
	1.6		5SY8 615-7	5SY8 615-8	0.660	1
	2		5SY8 602-7	5SY8 602-8	0.660	1
	3		5SY8 603-7	5SY8 603-8	0.660	1
	4		5SY8 604-7	5SY8 604-8	0.660	1
	6		5SY8 606-7	5SY8 606-8	0.660	1
	8		5SY8 608-7	5SY8 608-8	0.660	1
	10		5SY8 610-7	5SY8 610-8	0.660	1
	13		5SY8 613-7	5SY8 613-8	0.660	1
	16		5SY8 616-7	5SY8 616-8	0.660	1
	20		5SY8 620-7	5SY8 620-8	0.660	1
25		5SY8 625-7	5SY8 625-8	0.660	1	
32		5SY8 632-7	5SY8 632-8	0.660	1	
40		5SY8 640-7	5SY8 640-8	0.660	1	
50		5SY8 650-7	5SY8 650-8	0.660	1	
63		5SY8 663-7	5SY8 663-8	0.660	1	
 <p>4-pole</p> 	A					
	0.3	4	5SY8 414-7	5SY8 414-8	0.660	1
	0.5		5SY8 405-7	5SY8 405-8	0.660	1
	1		5SY8 401-7	5SY8 401-8	0.660	1
	1.6		5SY8 415-7	5SY8 415-8	0.660	1
	2		5SY8 402-7	5SY8 402-8	0.660	1
	3		5SY8 403-7	5SY8 403-8	0.660	1
	4		5SY8 404-7	5SY8 404-8	0.660	1
	6		5SY8 406-7	5SY8 406-8	0.660	1
	8		5SY8 408-7	5SY8 408-8	0.660	1
	10		5SY8 410-7	5SY8 410-8	0.660	1
	13		5SY8 413-7	5SY8 413-8	0.660	1
	16		5SY8 416-7	5SY8 416-8	0.660	1
	20		5SY8 420-7	5SY8 420-8	0.660	1
25		5SY8 425-7	5SY8 425-8	0.660	1	
32		5SY8 432-7	5SY8 432-8	0.660	1	
40		5SY8 440-7	5SY8 440-8	0.660	1	
50		5SY8 450-7	5SY8 450-8	0.660	1	
63		5SY8 463-7	5SY8 463-8	0.660	1	

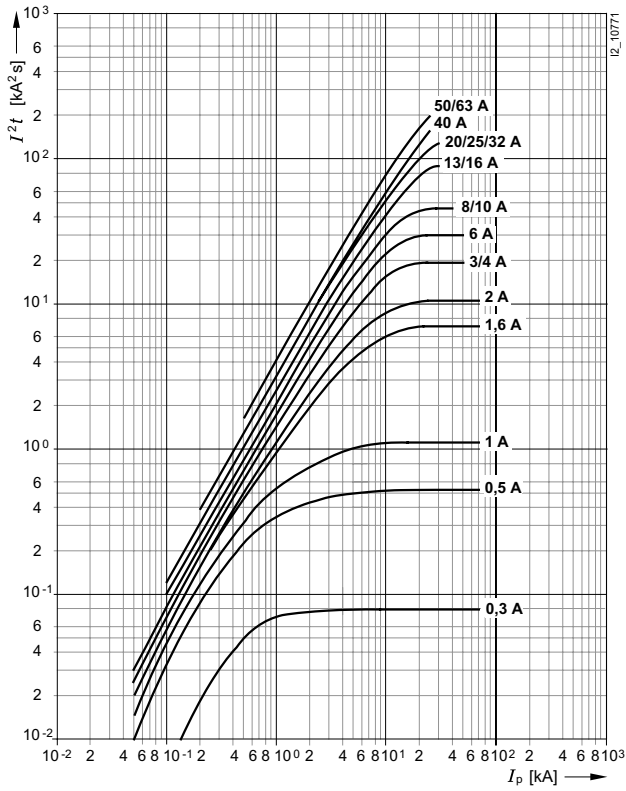
For additional components, see page 3/52;
for accessories, see page 3/59.

2) Only applicable for 5SY8 332-7:
Also suitable for 21-kW active power with three-phase currents of 400 V (e.g. continuous-flow heaters with short-time operation duty) or 7-kW active power at 230 V AC (e.g. storage in not-continuous duty). For continuous load applications, we recommend using miniature circuit-breakers, characteristic C and $I_n = 40$ A.

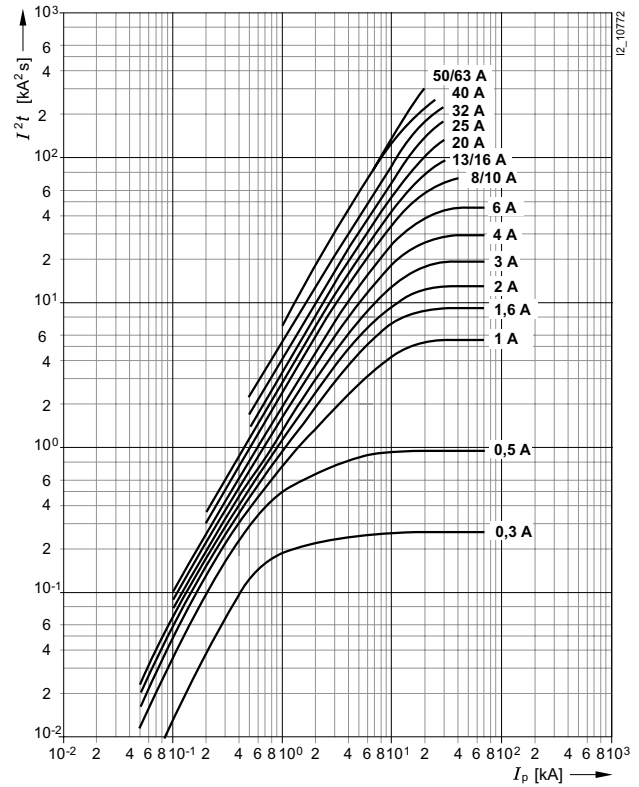
Characteristic curves

Melting I^2t values

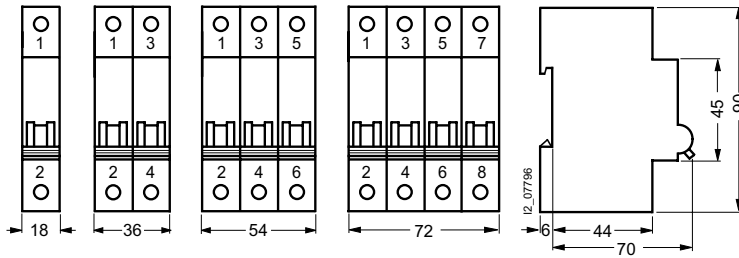
Characteristic C



Characteristic D



Dimensional drawings



Miniature Circuit-Breakers



UC Product Range

5SY5, 10 kA

Application

- U_n : 230/400 V, 50 to 60 Hz, 220 V DC per pole, can be used in systems up to 250/440 V AC
 - 220 V DC: 1-pole
 - 440 V DC: 2-pole
- Standards: IEC/EN 60898, DIN VDE 0641 Part 11
- Additional components can be retrofitted

Selection and ordering data

	I_n	MW	Characteristic B Order No.	Characteristic C Order No.	Weight 1 unit approx. kg	PS*/ P. unit Unit(s)
1-pole						
 <p>Terminal diagram for 1-pole: $-*1$ (top), $+2$ (bottom)</p>	A					
	0.3	1	--	5SY5 114-7	0.165	1
	0.5		--	5SY5 105-7	0.165	1
	1		--	5SY5 101-7	0.147	1
	1.6		--	5SY5 115-7	0.165	1
	2	PS	5SY5 102-6	5SY5 102-7	0.165	1
	3		--	5SY5 103-7	0.165	1
	4	PS	5SY5 104-6	5SY5 104-7	0.165	1
	6		5SY5 106-6	5SY5 106-7	0.165	1
	8		--	5SY5 108-7	0.165	1
	10		5SY5 110-6	5SY5 110-7	0.165	1
	13		5SY5 113-6	5SY5 113-7	0.165	1
	16		5SY5 116-6	5SY5 116-7	0.165	1
	20		5SY5 120-6	5SY5 120-7	0.165	1
	25		5SY5 125-6	5SY5 125-7	0.165	1
32 ¹⁾		5SY5 132-6	5SY5 132-7	0.165	1	
40		5SY5 140-6	5SY5 140-7	0.165	1	
50		5SY5 150-6	5SY5 150-7	0.165	1	
63		5SY5 163-6	5SY5 163-7	0.165	1	
2-pole						
 <p>Terminal diagram for 2-pole: $-*1$ (top left), $+*3$ (top right), $+2$ (bottom left), -4 (bottom right)</p>	A					
	0.3	2	--	5SY5 214-7	0.330	1
	0.5		--	5SY5 205-7	0.330	1
	1		--	5SY5 201-7	0.330	1
	1.6		--	5SY5 215-7	0.330	1
	2		--	5SY5 202-7	0.330	1
	3		--	5SY5 203-7	0.330	1
	4		--	5SY5 204-7	0.330	1
	6		5SY5 206-6	5SY5 206-7	0.330	1
	8		--	5SY5 208-7	0.330	1
	10		5SY5 210-6	5SY5 210-7	0.330	1
	13		5SY5 213-6	5SY5 213-7	0.330	1
	16		5SY5 216-6	5SY5 216-7	0.330	1
	20		5SY5 220-6	5SY5 220-7	0.330	1
	25		5SY5 225-6	5SY5 225-7	0.330	1
32		5SY5 232-6	5SY5 232-7	0.330	1	
40		5SY5 240-6	5SY5 240-7	0.330	1	
50		5SY5 250-6	5SY5 250-7	0.330	1	
63		5SY5 263-6	5SY5 263-7	0.330	1	

The terminal section indicates the DC polarity value, which it is essential to observe during connection.

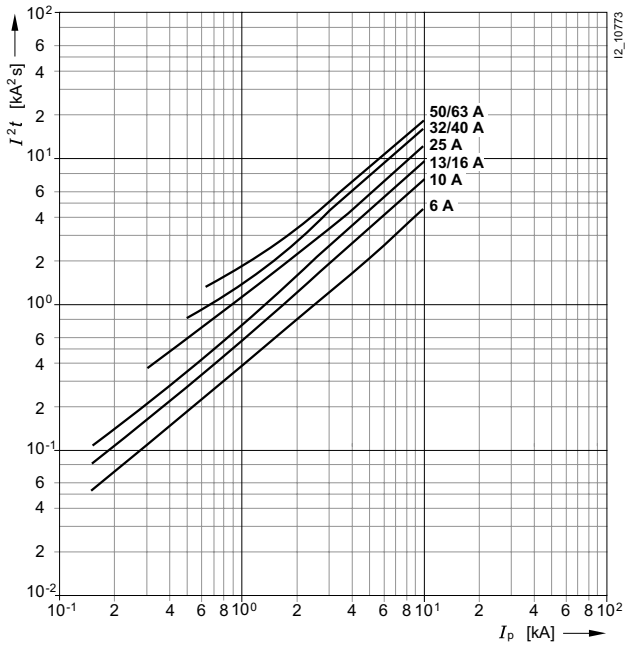
For additional components, see page 3/52;
for accessories, see page 3/59.

1) Also suitable for 21-kW active power with three-phase currents of 400 V (e.g. continuous-flow heaters with short-time operation duty) or 7-kW active power at 230 V AC (e.g. storage in not-continuous duty). For continuous load applications, we recommend using 5SY. ...-6/-7 with $I_n = 40$ A.

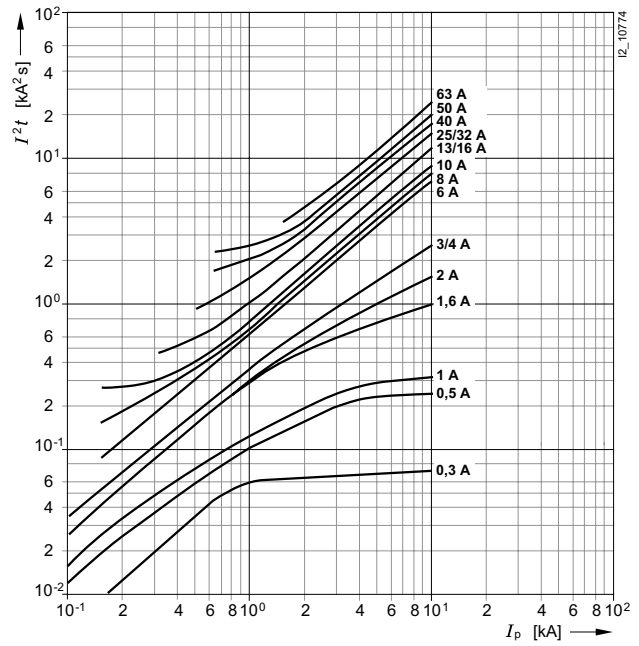
Characteristic curves

Melting I^2t values

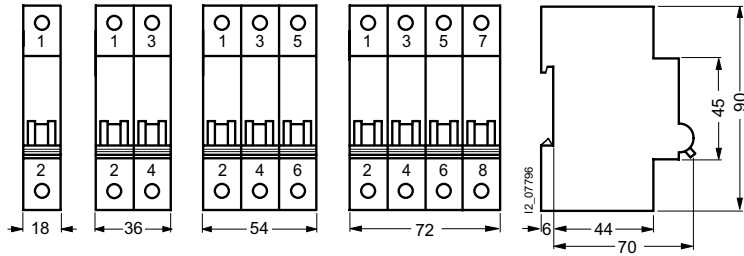
Characteristic B



Characteristic C



Dimensional drawings



Miniature Circuit-Breakers

High-Current Product Range

10 000











5SP4, 10 kA

Application

- U_n : 230/400 V, 50 to 60 Hz, can be used in systems up to 250/440 V AC, 60 V DC per pole
- Standards: EN 60204, EN/IEC 60898, DIN VDE 0641 Part 11
- Additional components can be retrofitted individually.
- Main switch characteristics according to EN 60204

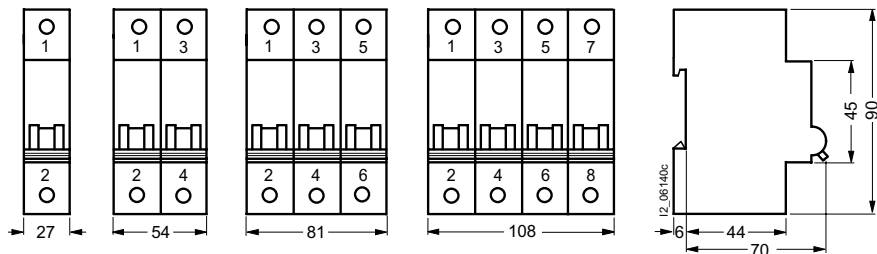
- Can be snapped onto standard mounting rail according to EN 60715
- Can be screwed onto bases
- As main and miniature circuit-breakers in non-residential and industrial buildings

Selection and ordering data



	I_n A	MW	Characteristic B Order No.	Characteristic C Order No.	Characteristic D Order No.	Weight 1 unit approx. kg	PS*/ P. unit Unit(s)
 <p>1-pole</p> 	80	1.5	5SP4 180-6 5SP4 191-6 5SP4 192-6	5SP4 180-7 5SP4 191-7 5SP4 192-7	5SP4 180-8 5SP4 191-8 --	0.258	1
	100					0.258	1
	125					0.258	1
 <p>2-pole</p> 	80	3	5SP4 280-6 5SP4 291-6 5SP4 292-6	5SP4 280-7 5SP4 291-7 5SP4 292-7	5SP4 280-8 5SP4 291-8 --	0.516	1
	100					0.516	1
	125					0.516	1
 <p>3-pole</p> 	80	4.5	5SP4 380-6 5SP4 391-6 5SP4 392-6	5SP4 380-7 5SP4 391-7 5SP4 392-7	5SP4 380-8 5SP4 391-8 --	0.762	1
	100					0.762	1
	125					0.762	1
 <p>4-pole</p> 	80	6	5SP4 480-6 5SP4 491-6 5SP4 492-6	5SP4 480-7 5SP4 491-7 5SP4 492-7	5SP4 480-8 5SP4 491-8 --	1.032	1
	100					1.032	1
	125					1.032	1


For additional components, see page 3/52;
for accessories, see page 3/59.


Dimensional drawings



Overview

	Number of poles	Rated current I_n A	Rated residual current $I_{\Delta n}$ mA	MW	Additional components can be retrofitted	 (type AC) ¹⁾	 (Type A) ²⁾
RC units for 5SY4, 5SY6, 5SY7, 5SY8 miniature circuit-breakers³⁾							
Instantaneous tripping, surge current withstand capability > 1 kA ⁴⁾	2	0.3 ... 16	10	2	at the MCB	•	•
	2	0.3 ... 40	30, 300	2	at the MCB	•	•
		0.3 ... 63	30, 100, 300, 500		at the MCB	•	•
	3	0.3 ... 40	30, 300	3	at the MCB	•	•
0.3 ... 63		30, 100, 300, 500	at the MCB		•	•	
4	0.3 ... 40	30, 300	3	at the MCB	•	•	
	0.3 ... 63	30, 100, 300, 500		at the MCB	•	•	
[K] short-time delayed surge current withstand capability > 3 kA	4	0.3 ... 40	30	3	at the MCB	--	•
		0.3 ... 63			at the MCB	--	•
[S] selective surge current withstand capability > 5 kA	2	0.3 ... 40	300	2	at the MCB	--	•
		0.3 ... 63			at the MCB	--	•
	3	0.3 ... 63	300, 500, 1 000	3	at the MCB	--	•
		0.3 ... 63	300, 500, 1 000		at the MCB	--	•
RC units for 5SP4 miniature circuit-breakers							
Instantaneous tripping, surge current withstand capability > 1 kA ⁴⁾	2	80 ... 100	30, 300	3.5	at the MCB	•	•
	4	80 ... 100	30, 300	5	at the MCB	•	•
[S] selective surge current withstand capability > 5 kA	2	80 ... 100	300	3.5	at the MCB	--	•
	4	80 ... 100	300, 1 000	5	at the MCB	--	•

1)  = type AC for AC fault currents.

2)  = type A for AC and pulsating DC residual currents.

3) Not for 5SY6 ...-KV

4) For type A.

Installation



The RC units for 5SM2 ... miniature circuit-breakers are selected according to numbers of poles, I_n and $I_{\Delta n}$.



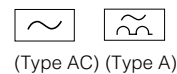
The miniature circuit-breaker is selected from the series 5SY4, 5SY6, 5SY7 or 5SY8 with the same number of poles as the desired characteristic (A, B, C or D) and suitable I_n .



The two components are simply plugged together without the need for any tools. After the connecting screws of the conductor connection between the RC unit and the MCB have been tightened, the two devices form an RCBO.


Miniature Circuit-Breakers

Additional Components



5SM2, product overview

Technical specifications

Standards	IEC/EN 61009, VDE 0664 Part 20, IEC/EN 61543, VDE 0664 Part 30		
Versions	2-pole, 3-pole and 4-pole		
Rated voltages U_n	V AC	230 ... 400, 50 ... 60 Hz	
Rated currents I_n	A	0.3 ... 16; 0.3 ... 40; 0.3 ... 63; 80 ... 100	
Rated residual currents $I_{\Delta n}$	mA	10, 30, 100, 300, 500, 1 000	
Enclosure	gray molded-plastic (RAL 7035)		
Mounting depth	mm	70	
Terminals	Tunnel terminals with wire protection	Conductor cross-section mm ² (solid and stranded)	Recommended tightening torque Nm
	up to $I_n = 63$ A	1.0 ... 25	2.5 ... 3.0
	$I_n = 80/100$ A	6.0 ... 50	3.0 ... 3.5
Supply connection	either top or bottom		
Mounting position	any		
Mounting technique	can be snapped onto 35 mm standard mounting rail (TH 35 acc. to EN 60715)		
Degree of protection	IP20 acc. to EN 60529 (VDE 0470 Part 1) IP40 if installed in distribution boards IP54 if installed in molded-plastic enclosure		
Protection against contact	Protection against contact with fingers or the back of the hand acc. to EN 50274 (VDE 0660 Part 514)		
Minimum operational voltage for test function operation	V AC	up to $I_n = 63$ A, 4-pole	100
		up to $I_n = 63$ A, 2 and 3-pole	195
		$I_n = 80/100$ A	100
Device service life	>10 000 operations (electrical and mechanical; test cycle acc. to regulations)		
Storage temperature	°C	-40 ... +75	
Ambient temperature	°C	-5 ... +45, for versions with the symbol  : -25 ... +45	
Resistance to climate acc. to IEC 60068-2-30	28 cycles (55 °C; 95 % rel. humidity)		
CFC and silicone-free	yes		



(Type AC)

Miniature Circuit-Breakers Additional Components

5SM2, type AC, 0.3 ... 63 A,
for 5SY4, 5SY6, 5SY7, 5SY8

3


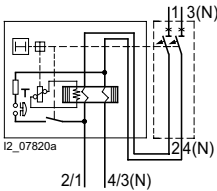

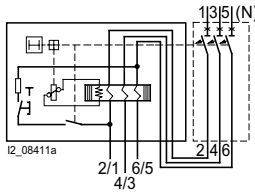

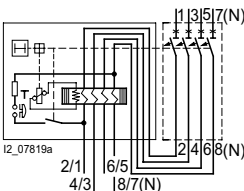
Benefits

- High application flexibility
- Customers can combine the device characteristics of RC units and miniature circuit-breakers
- Used together with miniature circuit-breakers achieves a combined personnel and line protection

Application

- Personnel and fire protection
 - $I_{\Delta n} \leq 30$ mA: Additional protection in the case of direct contact
 - $I_{\Delta n} \leq 300$ mA: Preventative fire protection in the case of ground fault currents
- Product standards: IEC/EN 61009-1; IEC/EN 61009-2-1; IEC/EN 61543 (VDE 0664, Part 30)
- Rated voltage for 2, 3 and 4-pole devices: 230 to 400 V AC; 50 to 60 Hz; applicable in systems up to: 250/440 V AC
- Can be combined with miniature circuit-breakers of characteristic A, B, C and D.

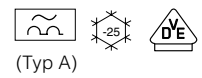
Selection and ordering data

Circuit diagram	Rated residual current $I_{\Delta n}$ mA	Rated current I_n A	MW	Order No.	Weight 1 unit approx. kg	PS*/ P. unit Unit(s)
Instantaneous tripping ¹⁾						
230 ... 400 V AC; 50 ... 60 Hz; 2-pole						
 	10	0.3 ... 16	2	5SM2 121-0	0.170	1
	30	0.3 ... 40		5SM2 322-0	0.170	1
	300			5SM2 622-0	0.170	1
	30	0.3 ... 63		5SM2 325-0	0.170	1
	300			5SM2 625-0	0.170	1
	500			5SM2 725-0	0.170	1
1000			5SM2 825-0	0.170	1	
230 ... 400 V AC; 50 ... 60 Hz; 3-pole						
 	30	0.3 ... 40	3	5SM2 332-0	0.260	1
	300			5SM2 632-0	0.260	1
	30	0.3 ... 63		5SM2 335-0	0.260	1
	300			5SM2 635-0	0.260	1
230 ... 400 V AC; 50 ... 60 Hz; 4-pole						
 	30	0.3 ... 40	3	5SM2 342-0	0.290	1
	300			5SM2 642-0	0.290	1
	30	0.3 ... 63		5SM2 345-0	0.290	1
	300			5SM2 645-0	0.290	1

1) Not for 5SY6 ...-KV.

Miniature Circuit-Breakers

Additional Components



5SM2, type A, 0.3 ... 63 A,
for 5SY4, 5SY6, 5SY7, 5SY8

Benefits




- High application flexibility
- Customers can combine the device characteristics of RC units and miniature circuit-breakers
- Used together with miniature circuit-breakers achieves a combined personnel and line protection

Application

- Personnel and fire protection
 - $I_{\Delta n} \leq 30$ mA: Additional protection in the case of direct contact
 - $I_{\Delta n} \leq 300$ mA: Preventative fire protection in the case of ground fault currents

- Product standards: IEC/EN 61009-1 (VDE 0664, Part 20); IEC/EN 61009-2-1 (VDE 0664, Part 21); IEC/EN 61543 (VDE 0664, Part 30)
- Rated voltage for 2, 3 and 4-pole version: 230 to 400 V AC; 50 to 60 Hz; applicable in systems up to: 250/440 V AC
- Can be combined with miniature circuit-breakers of characteristic A, B, C and D
- Definition of surge current withstand capability with current waveform 8/20 μ s according to DIN VDE 0432, Part 2
- **S** S-Type: Can be used as upstream group switch for selective tripping contrary to a downstream standard RCCB or RC unit. Very high surge current withstand capability: > 5 kA
- **K** K-Type: Short-time delayed tripping in the case of transient leakage currents. High surge current withstand capability: > 3 kA

Selection and ordering data

	Rated residual current $I_{\Delta n}$ mA	Rated current I_n A	MW	Version	Order No.	Weight 1 unit approx. kg	PS*/ P. unit Unit(s)		
Instantaneous tripping, surge current withstand capability > 1 kA¹⁾									
	230 ... 400 V AC; 50 ... 60 Hz; 2-pole								
		10	0.3 ... 16	2	5SM2 121-6	0.180	1		
		30	0.3 ... 40	2	5SM2 322-6	0.170	1		
		300			5SM2 622-6	0.170	1		
		30	0.3 ... 63		5SM2 325-6	0.170	1		
	100			5SM2 425-6	0.170	1			
	300			5SM2 625-6	0.170	1			
	500			5SM2 725-6	0.170	1			
	230 ... 400 V AC; 50 ... 60 Hz; 3-pole								
		30	0.3 ... 40	3	5SM2 332-6	0.260	1		
		300			5SM2 632-6	0.260	1		
		30	0.3 ... 63		5SM2 335-6	0.260	1		
		100			5SM2 435-6	0.260	1		
	300			5SM2 635-6	0.260	1			
	500			5SM2 735-6	0.260	1			
	230 ... 400 V AC; 50 ... 60 Hz; 4-pole								
		30	0.3 ... 40	3	5SM2 342-6	0.290	1		
		300			5SM2 642-6	0.290	1		
		30	0.3 ... 63		5SM2 345-6	0.290	1		
		100			5SM2 445-6	0.290	1		
	300			5SM2 645-6	0.290	1			
	500			5SM2 745-6	0.290	1			
K short-time delayed; surge current withstand capability > 3 kA¹⁾									
230 ... 400 V AC; 50 ... 60 Hz; 4-pole			30	0.3 ... 40	3	K	5SM2 342-6KK01	0.350	1
			30	0.3 ... 63		K	5SM2 345-6KK01	0.350	1
S selective; surge current withstand capability > 5 kA¹⁾									
230 ... 400 V AC; 50 ... 60 Hz; 2-pole			300	0.3 ... 40	2	S	5SM2 622-8	0.170	1
			300	0.3 ... 63		S	5SM2 625-8	0.170	1
230 ... 400 V AC; 50 ... 60 Hz; 3-pole			300	0.3 ... 63	3	S	5SM2 635-8	0.260	1
			500			S	5SM2 735-8	0.260	1
			1 000			S	5SM2 835-8	0.260	1
230 ... 400 V AC; 50 ... 60 Hz; 4-pole			300	0.3 ... 63	3	S	5SM2 645-8	0.290	1
			500			S	5SM2 745-8	0.290	1
			1 000			S	5SM2 845-8	0.290	1

1) Not for 5SY6 ...-KV and 5SY5.

Miniature Circuit-Breakers Additional Components

5SM2, type A, 0.3 ... 63 A,
for 5SY4, 5SY6, 5SY7, 5SY8

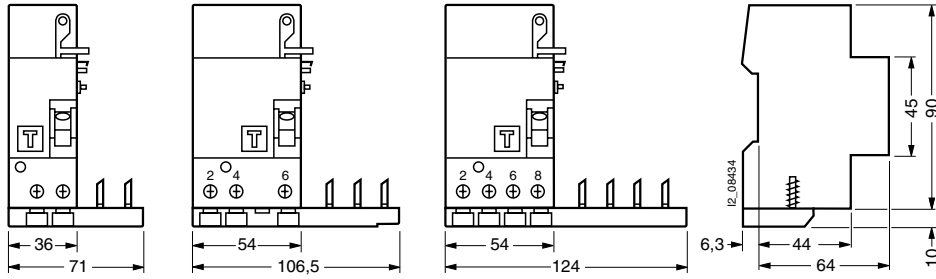
3

Dimensional drawings

5SM2 121-.,
5SM2 322-.,
5SM2 325-.,
5SM2 622-.,
5SM2 625-.,
5SM2 725-.,
5SM2 825-0

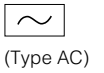
5SM2 332-.,
5SM2 335-.,
5SM2 632-.,
5SM2 635-.,
5SM2 735-.,
5SM2 835-8,

5SM2 342-.,
5SM2 345-.,
5SM2 642-.,
5SM2 645-.,
5SM2 745-.,
5SM2 845-8,



Miniature Circuit-Breakers

Additional Components



5SM2, type AC, 80 ... 100 A, for 5SP4


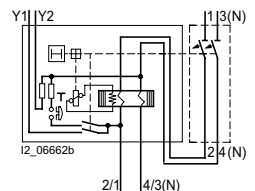

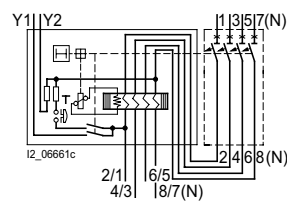
Benefits

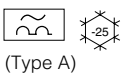
- High application flexibility
- Customers can combine the device characteristics of RC units and miniature circuit-breakers
- Used together with miniature circuit-breakers achieves a combined personnel and line protection
- External remote tripping over Y1/Y2 terminals

Application

- Personnel and fire protection
 - $I_{\Delta n} \leq 30$ mA: Additional protection in the case of direct contact
 - $I_{\Delta n} \leq 300$ mA: Preventative fire protection in the case of ground fault currents
- Product standards: IEC/EN 61009-1; IEC/EN 61009-2-1; IEC/EN 61543 (VDE 0664, Part 30)
- Rated voltage
 - 2-pole: 125 ... 230 V AC; 50 to 60 Hz; applicable in networks up to 125/240 V AC
 - 4-pole: 230 to 400 V AC; 50 to 60 Hz; applicable in networks up to 230/400 V AC
- Can be combined with miniature circuit-breakers of characteristic B and C.

Selection and ordering data

Circuit diagram	Rated residual current $I_{\Delta n}$ mA	Rated current I_n A	MW	Order No.	Weight 1 unit approx. kg	PS/ P. unit Unit(s)
Instantaneous tripping						
 <p>125 ... 230 V AC; 50 ... 60 Hz; 2-pole</p>  <p>I2_06662b</p>	30	80 ... 100	3.5	5SM2 327-0 5SM2 627-0	0.550	1
	300					0.550
 <p>230 ... 400 V AC; 50 ... 60 Hz; 4-pole</p>  <p>I2_06661c</p>	30	80 ... 100	5	5SM2 347-0 5SM2 647-0	0.944	1
	300					0.944



(Type A)

Miniature Circuit-Breakers

Additional Components

5SM2, type A, 80 ... 100 A, for 5SP4

3

Benefits


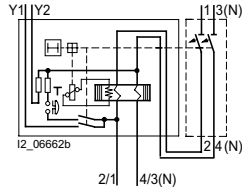

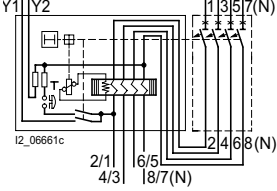
- High application flexibility
- Customers can combine the device characteristics of RC units and miniature circuit-breakers
- Used together with miniature circuit-breakers achieves a combined personnel and line protection
- External remote tripping over Y1/Y2 terminals

Application

- Personnel and fire protection
- $I_{\Delta n} \leq 30$ mA: additional protection in the case of direct contact
- $I_{\Delta n} \leq 300$ mA: preventative fire protection in the case of ground fault currents

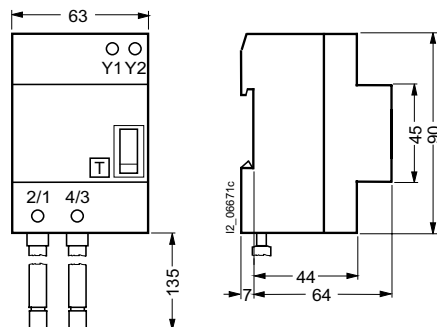
- Product standards: IEC/EN 61009-1 (VDE 0664, Part 20); IEC/EN 61009-2-1 (VDE 0664, Part 21); IEC/EN 61543 (VDE 0664, Part 30)
- Rated voltage
 - 2-pole: 125 to 230 V AC; 50 to 60 Hz; can be used in systems up to 125/240 V AC
 - 4-pole: 230 to 400 V AC; 50 to 60 Hz; can be used in systems up to 230/400 V AC
- Can be combined with miniature circuit-breakers, characteristic B and C
- Definition of surge current withstand capability with current waveform 8/20 μ s according to DIN VDE 0432, Part 2
- **S** S-Type: can be used as upstream group switch for selective tripping contrary to a downstream standard RCCB or RC unit. Very high surge current withstand capability: > 5 kA

Selection and ordering data

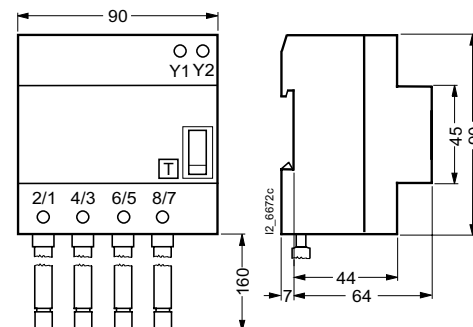
	Rated residual current $I_{\Delta n}$ mA	Rated current I_n A	MW	Version	Order No.	Weight 1 unit approx. kg	PS*/ P. unit Unit(s)	
Instantaneous tripping, surge current withstand capability > 1 kA								
	125 ... 230 V AC; 50 ... 60 Hz; 2-pole			30 300	80 ... 100 3.5	5SM2 327-6 5SM2 627-6	0.410 1 0.410 1	
								
	230 ... 400 V AC; 50 ... 60 Hz; 4-pole			30 300	80 ... 100 5	5SM2 347-6 5SM2 647-6	0.630 1 0.630 1	
								
S selective; surge current withstand capability > 5 kA								
125 ... 230 V AC; 50 ... 60 Hz; 2-pole				300	80 ... 100	S	5SM2 627-8	0.410 1
230 ... 400 V AC; 50 ... 60 Hz; 4-pole				300 1 000	80 ... 100	S S	5SM2 647-8 5SM2 847-8	0.630 1 0.630 1

Dimensional drawings

5SM2 327-.,
5SM2 627-.



5SM2 347-.,
5SM3 647-.,
5SM2 847-8



Miniature Circuit-Breakers

Additional Components

Auxiliary circuit switches/fault signal contacts for 5SY and 5SP4

Benefits

- Can be retrofitted individually (for mounting concept, see page 3/57)
- Mounting with factory-fitted brackets
- Short-circuit protection ensured by miniature circuit-breakers, characteristic B or C and $I_n = 6$ A or fuse gL 6 A
- Wide range of applications due to additional version for controlling programmable controllers (PLCs) according to EN 61131-2
- Can be connected to *instabus* KNX *EIB* and AS-Interface bus over binary inputs

Application

- Indication of the miniature circuit-breaker's switching state:
 - AS: ON/OFF
 - FC: tripped

Auxiliary circuit switch (AS)

5ST3 013
5ST3 014
5ST3 015









- Area of application 1 mA/5 V DC to 50 mA/30 V DC

Auxiliary circuit switches (AS) and fault signal contacts (FC)

5ST3 0.0
5ST3 0.1
5ST3 0.2

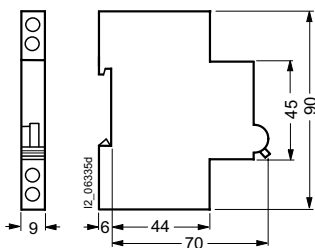
- min. contact load:
50 mA, 24 V
- max. contact load:
NO contacts:
2 A, 400 V AC, AC-14
6 A, 230 V AC, AC-14
1 A, 220 V DC, DC-13
1 A, 110 V DC, DC-13
3 A, 60 V DC, DC-13
6 A, 24 V DC, DC-13
NC contacts:
2 A, 400 V AC, AC-13
6 A, 230 V AC, AC-13
1 A, 220 V DC, DC-13
1 A, 110 V DC, DC-13
3 A, 60 V DC, DC-13
6 A, 24 V DC, DC-13

Selection and ordering data

Version	MW	Order No.	Weight 1 unit approx. kg	PS*/ P. unit Unit(s)	
Auxiliary circuit switches (AS) for 5SY miniature circuit-breakers¹⁾					
	 13 21 22 14	for small output	1 NO + 1 NC 0.5	5ST3 010 5ST3 013	0.050 1 0.050 1
	 13 23 24 14	for small output	2 NO	5ST3 011 5ST3 014	0.050 1 0.050 1
	 11 21 22 12	for small output	2 NC	5ST3 012 5ST3 015	0.050 1 0.050 1
Fault signal contacts (FC) for 5SY miniature circuit-breakers¹⁾					
	 13 21 22 14		1 NO + 1 NC 0.5	5ST3 020	0.050 1
	 13 23 24 14		2 NO	5ST3 021	0.050 1
	 11 21 22 12		2 NC	5ST3 022	0.050 1

1) Not for 5SY6 ...-KV.

Dimensional drawings



Miniature Circuit-Breakers Additional Components

Remote controlled mechanisms for 5SY and 5SP4

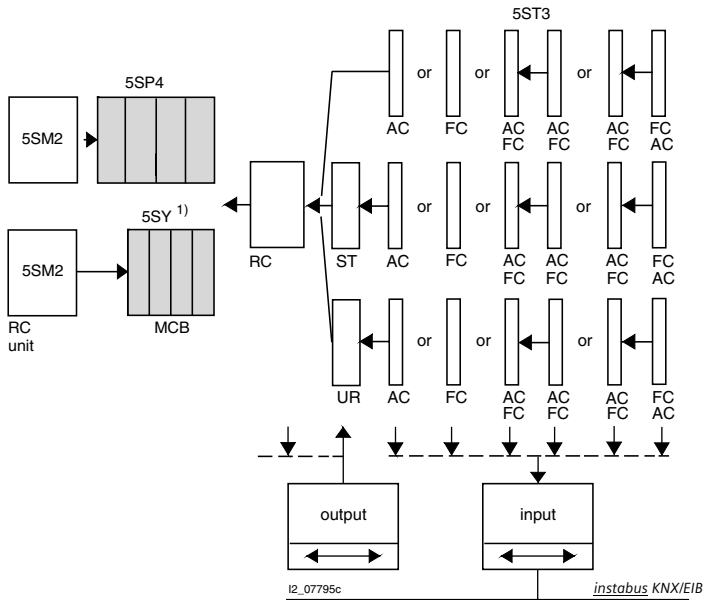
3

Benefits

- Can be retrofitted individually (for mounting concept, see below)
- Mounting with factory-fitted brackets
- Can be mechanically latched and locked
- Further additional components can be attached
- Function switch on the front
- Can be connected over binary inputs and outputs to *instabus* KNX EIB and AS-Interface
- $U_N = 230\text{ V}$, 50 to 60 Hz

Mounting concept


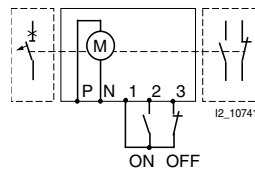
Using this mounting concept, all additional 5ST3 components can be combined with miniature circuit-breaker of the 5SY¹⁾ and 5SP4 series:



Function

- ON/OFF remote control switch of miniature circuit-breaker and ON remote control switch of RC unit
- Remote switching ON is possible following acknowledgment of fault occurrence
- Manual switching on-site possible
- Remote display of switching status of remote controlled mechanisms and miniature circuit-breakers

Selection and ordering data

	Rated voltage U_n V AC	MW	Order No.	Weight 1 unit approx. kg	PS*/ P. unit Unit(s)
 <p>Remote controlled mechanism (RC) for 5SY¹⁾, 5SP4 miniature circuit-breakers</p> 	230	3.5	5ST3 050	0.395	1

For detailed application information, see manual.

1) Not for 5SY6...-KV.

Miniature Circuit-Breakers

Additional Components

Shunt trips/undervoltage releases for 5SY. and 5SP4

Benefits

Shunt releases

- Can be retrofitted individually (for mounting concept, see page 3/57)
- Response limits according to DIN VDE 0660 Part 100, 7.2.1.4
- Can be connected over binary outputs to *instabus* KNX *EIB* and AS-Interface bus

Undervoltage releases

- Can be retrofitted individually (for mounting concept, see page 3/57)
- Response limits according to DIN VDE 0660 Part 100, 7.2.1.3
- For voltages:
 - 230 V AC,
 - 110 V DC,
 - 24 V DC
- Can be connected over binary outputs to *instabus* KNX *EIB* and AS-Interface bus

Application



Shunt releases

- Remote tripping of the miniature circuit-breakers
- For voltages:
 - 110 to 415 V AC,
 - 110 V DC,
 - 24 to 48 V AC/DC

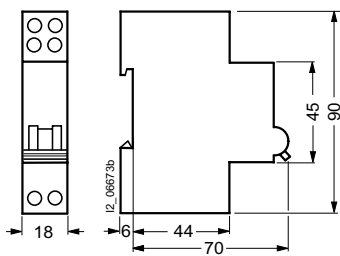
Undervoltage releases

- Can be used as remote trip in an EMERGENCY-OFF loop
- Ensures disconnection of the control circuit according to EN 60204
- In cases of interrupted or insufficient voltage, the undervoltage release trips the miniature circuit-breaker or prevents it from switching on
- For voltages:
 - 230 V AC,
 - 110 V DC,
 - 24 V DC

Selection and ordering data

	Rated voltage U_n	MW	Order No.	Weight 1 unit approx. kg	PS*/ P. unit Unit(s)
	Shunt trips (ST) for miniature circuit-breakers 5SY4, 5SY6, 5SY7, 5SY8, 5SY5, 5SP4 ¹⁾				
	110 ... 415 V AC	1	5ST3 030	0.098	1
	24 ... 48 V AC/DC	1	5ST3 031	0.098	1
	Undervoltage releases (UR) for miniature circuit-breakers 5SY4, 5SY6, 5SY7, 5SY8, 5SY5, 5SP4 ¹⁾				
	230 V AC	1	5ST3 040	0.115	1
	110 V DC		5ST3 041	0.115	1
	24 V DC		5ST3 042	0.115	1
	230 V AC	1	5ST3 043	0.115	1
110 V DC		5ST3 044	0.115	1	
24 V DC		5ST3 045	0.115	1	

Dimensional drawings



1) Not for 5SY6 ...-KV.

Application

5ST3 7 busbar system

- According to DIN 57606 and DIN 57659
- Load at infeed single-sided/in center
 - 50 A/90 A for 10 mm²
 - 65 A/120 A for 16 mm²
- Pin-type connections
- Single and multi-phase
- Cu 10 mm², 16 mm² fully insulated
- Lug spacing: 18 mm
- No additional connection terminal required for stranded connections up to 35 mm²
- Excellent accessibility of the feeder cables



5ST3 6 busbar system

- According to IEC 60664, 500 V (40 °C), fully insulated
- Load at infeed single-sided/in center
 - 50 A/90 A for 10 mm²
 - 65 A/120 A for 16 mm²

Application

- Pin-type connections
- Any length possible thanks to the combination of 3 fixed busbar lengths
- Favorable current and temperature conduction thanks to the overlapping of individual components
- No further need for time-consuming work such as cutting, cutting to length, deburring, cleaning of cut surfaces as well as mounting of end caps
- Safe protection against contact for non-assigned connections

Selection and ordering data



	Length	Order No.	Weight 1 unit approx.	PS*/ P. unit	
	mm		kg	Unit(s)	
5ST3 7 busbar systems for miniature circuit-breakers 5SJ6, 5SY6, 5SY4, 5SY7, 5SY8, 5SY5					
	Busbars 10 mm²				
				fully insulated	
		214	5ST3 730	0.040	1/50
			5ST3 732	0.040	1/50
			5ST3 734	0.060	1/25
			5ST3 736	0.060	1/25
			5ST3 738	0.100	1/25
			5ST3 741	0.100	1/25
			5ST3 743	0.100	1/25
			5ST3 745	0.150	1/20
					3-phase, for a 5SM3 RCCB, 4-pole with 8 miniature circuit-breakers
			5ST3 747	0.150	1/25
					3/N + 8 terminals
					without end caps
		1016	5ST3 731	0.190	1/50
			5ST3 733	0.190	1/50
		5ST3 735	0.290	1/20	
		5ST3 737	0.290	1/20	
		5ST3 740	0.430	1/20	
		5ST3 742	0.430	1/20	
		5ST3 744	0.430	1/20	
		5ST3 746	0.700	1/15	
	Busbars 16 mm²				
				fully insulated	
		214	5ST3 700	0.040	1/50
			5ST3 702	0.040	1/50
			5ST3 704	0.060	1/25
			5ST3 706	0.060	1/25
			5ST3 708	0.100	1/25
			5ST3 711	0.100	1/25
			5ST3 713	0.100	1/25
			5ST3 715	0.150	1/20
					3-phase, for a 5SM3 RCCB, 4-pole with 8 miniature circuit-breakers
			5ST3 717	0.150	1/25
					3/N + 8 terminals
					without end caps
		1016	5ST3 701	0.190	1/50
			5ST3 703	0.190	1/50
		5ST3 705	0.290	1/20	
		5ST3 707	0.290	1/20	
		5ST3 710	0.430	1/20	
		5ST3 712	0.430	1/20	
		5ST3 714	0.430	1/20	
		5ST3 716	0.700	1/15	

Miniature Circuit-Breakers

Accessories

For 5SJ6, 5SY. and 5SP4





Selection and ordering data

		Order No.	Weight 1 unit approx. kg	PS*/ P. unit Unit(s)
5ST3 7 busbar systems for miniature circuit-breakers 5SJ6, 5SY6, 5SY4, 5SY7, 5SY8, 5SY5				
	End caps for lateral insulation of cut-to-length busbars			
	1-phase	5ST3 748	0.001	1/10
	2 and 3-phase	5ST3 750	0.001	1/10
	4-phase	5ST3 718	0.001	10
5ST3 6 busbar systems for miniature circuit-breakers 5SJ6, 5SY6, 5SY4, 5SY7, 5SY8, 5SY5				
	Busbars 10 mm² fully insulated			
5ST3 613	1-phase			
	2 x 1-phase	5ST3 600	0.005	1/10
	6 x 1-phase	5ST3 601	0.018	1/10
	12 x 1-phase	5ST3 602	0.036	1/10
5ST3 614	2 x (1-phase + AS/FC)	5ST3 603	0.008	1/10
	6 x (1-phase + AS/FC)	5ST3 604	0.024	1/10
	9 x (1-phase + AS/FC)	5ST3 605	0.036	1/10
5ST3 615	2-phase			
	2 x 2-phase	5ST3 606	0.016	1/10
	3 x 2-phase	5ST3 607	0.024	1/10
	6 x 2-phase	5ST3 608	0.048	1/10
	2 x (2-phase + AS/FC)	5ST3 610	0.020	1/10
	3 x (2-phase + AS/FC)	5ST3 611	0.030	1/10
	5 x (2-phase + AS/FC)	5ST3 612	0.050	1/10
	3-phase			
	2 x 3-phase	5ST3 613	0.039	1/10
	3 x 3-phase	5ST3 614	0.060	1/10
	4 x 3-phase	5ST3 615	0.076	1/10
	2 x (3-phase + AS/FC)	5ST3 616	0.040	1/10
	4 x (3-phase + AS/FC)	5ST3 617	0.080	1/10
	2 x (3 x (single-phase) + AS/FC) ¹⁾	5ST3 618	0.044	1/10
	3 x (3 x (single-phase) + AS/FC) ¹⁾	5ST3 620	0.066	1/10
	4-phase			
	2 x 4-phase	5ST3 621	0.051	1/10
	3 x 4-phase	5ST3 622	0.078	1/10
	2 x 3 x (single-phase + N) ²⁾	5ST3 623	0.078	1/10
	3-phase, for a 5SM3 RCCB, 4-pole, with 8 miniature circuit-breakers			
	3/N + 8 terminals	5ST3 624	0.075	1/10
	Touch protection for free connections, yellow (RAL 1004)	5ST3 655	0.003	1/10
	Assortment 20 x 5ST3 613 + 10 x 5ST3 614 + 50 x 5ST3 615 + 50 x 5ST3 655	5ST3 656	5.330	1 set

1) 3 x (single-phase + AS/FC) ≅ 3 x (L 1 + AS/FC, L 2 + AS/FC, L 3 + AS/FC).

2) 3 x (single-phase + N) ≅ 3 x (L 1 + N, L 2 + N, L 3 + N).

Selection and ordering data

		Order No.	Weight 1 unit approx. kg	PS*/ P. unit Unit(s)
5ST3 6 busbar systems for miniature circuit-breakers 5SJ6, 5SY6, 5SY4, 5SY7, 5SY8, 5SY5				
Busbars 16 mm²				
fully insulated				
 5ST3 643	1-phase			
	2 x 1-phase	5ST3 630	0.008	1/10
	6 x 1-phase	5ST3 631	0.025	1/10
 5ST3 644	12 x 1-phase	5ST3 632	0.048	1/10
	2 x (1-phase + AS/FC)	5ST3 633	0.013	1/10
	6 x (1-phase + AS/FC)	5ST3 634	0.039	1/10
	9 x (1-phase + AS/FC)	5ST3 635	0.059	1/10
	2-phase			
 5ST3 645	2 x 2-phase	5ST3 636	0.024	1/10
	3 x 2-phase	5ST3 637	0.039	1/10
	6 x 2-phase	5ST3 638	0.076	1/10
	2 x (2-phase + AS/FC)	5ST3 640	0.026	1/10
	3 x (2-phase + AS/FC)	5ST3 641	0.045	1/10
	5 x (2-phase + AS/FC)	5ST3 642	0.084	1/10
	3-phase			
	2 x 3-phase	5ST3 643	0.058	1/10
	3 x 3-phase	5ST3 644	0.083	1/10
	4 x 3-phase	5ST3 645	0.110	1/10
2 x (3-phase + AS/FC)	5ST3 646	0.060	1/10	
4 x (3-phase + AS/FC)	5ST3 647	0.120	1/10	
2 x (3 x (single-phase) + AS/FC) ¹⁾	5ST3 648	0.061	1/10	
3 x (3 x (single-phase) + AS/FC) ¹⁾	5ST3 650	0.093	1/10	
4-phase				
2 x 4-phase	5ST3 651	0.080	1/10	
3 x 4-phase	5ST3 652	0.116	1/10	
2 x 3 x (single-phase + N) ²⁾	5ST3 653	0.116	1/10	
3-phase, for a 5SM3 RCCB, 4-pole, with 8 miniature circuit-breakers				
3/N + 8 terminals	5ST3 654	0.114	1/10	
 5ST3 655	Touch protection	5ST3 655	0.003	1/10
	for free connections, yellow (RAL 1004)			
Assortment				
20 x 5ST3 643 + 10 x 5ST3 644 + 50 x 5ST3 645 + 50 x 5ST3 655		5ST3 657	7.890	1 set

1) 3 x (single-phase + AS/FC) ≅ 3 x (L 1 + AS/FC, L 2 + AS/FC, L 3 + AS/FC).








2) 3 x (single-phase + N) ≅ 3 x (L 1 + N, L 2 + N, L 3 + N).

Miniature Circuit-Breakers

Accessories

For 5SJ6, 5SY. and 5SP4

Selection and ordering data

	MW	Order No.	Weight 1 unit approx. kg	PS*/ P. unit Unit(s)
Accessories for miniature circuit-breakers 5SJ6, 5SY6, 5SY4, 5SY7, 5SY8, 5SY5,				
		5ST3 800	0.001	5/10
Terminal covers can be used with all pole types, for additional covering of screw openings, also prevents removal of the device from the mounting rail, sealable				
		5ST3 801	0.008	1
Handle locking devices can be used with all pole types, to prevent unwanted manual ON/OFF switching, sealable, padlock with a shackle of max. 3 mm				
		5ST3 802	0.027	1
Padlocks for 5ST3 801 handle locking device				
		5ST3 803	1 set 0.035	1 set
Locking devices comprising 5ST3 801 handle locking device and 5ST3 802 padlock				
	0.5	5TG8 240	0.010	2
Spacers contour for modular devices with a mounting depth of 70 mm, can be snapped onto either side of the busbar, so that two spacers allow for convenient cable routing				
		5ST2 112	0.008	1/50
Snap-on terminals for 35-mm mounting rail, for conductors up to 16 mm ² solid or conductors up to 10 mm ² stranded, width: 0.5 MW				
		5ST2 121 5ST2 201	0.017 0.012	1/10 1/20
Fixing parts 1 MW (sheet metal) 4 MW (plastic)				
		5ST2 173	1 set 0.038	1 set
Inscription labels (white) 15 mm x 9 mm, 3 frames à 44 labels, can be mounted on lower casing collar <ul style="list-style-type: none"> • Self-adhesive • Inscription options 				
Labeling system to download the labeling program free of charge, please visit our Web site at: www.siemens.com/beta recommended labels ELAT-3-747 can be ordered at: Brady GmbH Otto-Hahn-Str. 5-7 D-63222 Langen Tel: +49-6103/7598-660				

Overview

Voltage-independent and selective main miniature circuit-breakers (SHU) according to DIN VDE 0645

Selective main miniature circuit-breakers are generally based on the function principle of ordinary miniature circuit-breakers and are equipped with a delayed thermal release for overload protection, as well as an electromagnetic fast release with an impact cutout blade for short-circuit protection.

In addition, they also comprise a selectivity device which detects whether or not downstream miniature circuit-breakers in the load circuit are capable of coping independently with a short circuit. If it detects that this will exceed the capacity of the miniature circuit-breaker, the selective main miniature circuit-breaker will trip.

Regardless of the rated current of the SHU switch, this ensures a selectivity for downstream miniature circuit-breakers according to EN 60898 or DIN VDE 0641 Part 11, up to its rated short-circuit capacity.

6 000
3

The selective main miniature circuit-breakers also offer back-up protection of up to 25 kA to all downstream miniature circuit-breakers.

In the past, melting fuses installed at the meter panel were usually sealed in order to prevent the theft of power supplies.

Due to the various function principles and thus, the different characteristic curves, only limited short-circuit selectivity is possible in a cascade of upstream melting fuses and downstream miniature circuit-breakers. This selectivity also depends on the respective rated currents. This meant that, in the past, if a meter back-up fuse blew due to an overcurrent or a short circuit, it was necessary to contact the engineers of the power supply company to replace the sealed fuse as this could not be done by non-specialists.

However, the new selective main miniature circuit-breakers can be switched on again – even by non-specialists.

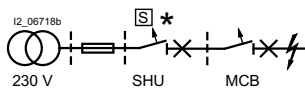
The new selective main miniature circuit-breakers offer the following advantages to system operators:

- Improved current limiting characteristics thanks to the selective main miniature circuit-breakers supporting downstream miniature circuit-breakers
- System-compatibility as no operation characteristics of other devices are influenced – apart from downstream miniature circuit-breakers
- High and safe selectivity between sub-distribution and meter panel
- Safe, fast and cost-favorable on-switching after failures – even by non-specialists
- Prevention of on-switching until the cause of the short-circuit has been eliminated
- Tariff monitoring function to assure network-compatible power consumption
- Insulation characteristics with contact position indication according to EN 60204

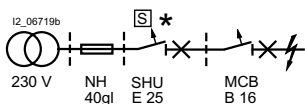
Application examples

Selectivity towards downstream miniature circuit-breakers up to the rated short-circuit capacity

6 000
3



Selectivity towards upstream fuses up to 2.000 A



Application

- U_n : 230/400 V, 50-60 Hz, can be used in systems up to: 250/440 V AC
- Standards: DIN VDE 0645
- As main miniature circuit-breakers at the meter
- As group miniature circuit-breakers in distribution board applications
- Characteristic E:
adapted to the special application requirements for cascade circuits between melting fuses and miniature circuit-breakers.

At a glance



- Protection of insulated cables against overcurrents
- Disconnecting loads
- Assurance of network-compatible power consumption
- Can be switched on again after failures even by non-specialists
- Complies with defined selectivity requirements for upstream and downstream overcurrent protection devices
- Can be screwed onto mounting plates
- Can be clipped onto busbars using adapters
- Can be snapped onto standard mounting rails using mounting plates according to EN 60715

Miniature Circuit-Breakers

Power Supply Company Product Range

5SP3, 25 kA,
mounting depth 92 mm

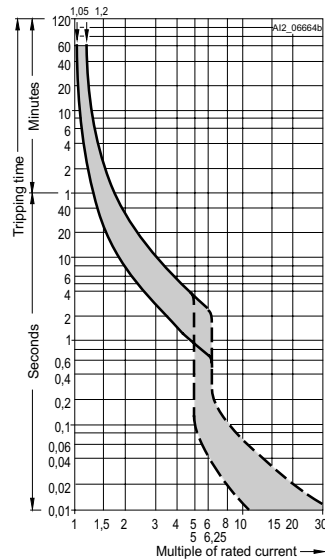
Selection and ordering data

	I_n	MW	Characteristic E Order No.	Weight 1 unit approx. kg	PS*/ P. unit Unit(s)
Selective main miniature circuit-breakers					
	16	2	5SP3 716	0.550	1/3
	20		5SP3 720	0.550	1/3
	25		5SP3 725	0.550	1/3
	32		5SP3 732	0.550	1/3
	35		5SP3 735	0.550	1/3
	40		5SP3 740	0.550	1/3
	50		5SP3 750	0.550	1/3
	63		5SP3 763	0.550	1/3
	80		5SP3 780	0.550	1/3
	100		5SP3 791	0.550	1/3
Selective main miniature circuit-breakers					
	3 x 1-pole, premounted to 5ST1 324 busbar adapter; can be clipped onto busbar (spacing: 40 mm); including three 5ST1 323 transparent operating protective covers				
	16	6	5SP3 716-1	1.700	1 set
	20		5SP3 720-1	1.700	1 set
	25		5SP3 725-1	1.700	1 set
	32		5SP3 732-1	1.700	1 set
	35		5SP3 735-1	1.700	1 set
	40		5SP3 740-1	1.700	1 set
	50		5SP3 750-1	1.700	1 set
	63		5SP3 763-1	1.700	1 set
	80		5SP3 780-1	1.700	1 set
100	5SP3 791-1		1.700	1 set	

Characteristic curves

Tripping characteristics according to DIN VDE 0645

Tripping characteristics E

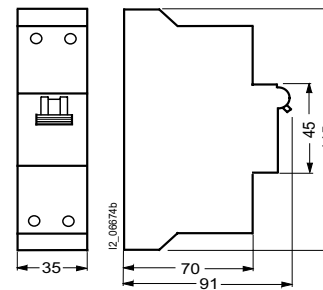


- For reliable and high selectivity at meter mounting boards

Dimensional drawings

5SP3 7 main circuit-breakers (SHU)

Device mounting depth 91 mm







Miniature Circuit-Breakers

Power Supply Company Product Range

Accessories
for 5SP3, 25 kA

3

Selection and ordering data

		Order No.	Weight 1 unit approx. kg	PS*/ P. unit Unit(s)
Accessories for main miniature circuit-breakers (SHU)				
	Busbar adapters suitable for a busbar spacing of 40 mm; can be equipped with 3 main miniature circuit-breakers; for clip-on assembly	5ST1 328	0.234	1
	Breaker blocking covers to prevent manual off-switching	5ST1 318	0.001	3/10
	Transparent operating protective covers offering multiple locking options against accidental and deliberate operation <ul style="list-style-type: none"> • Padlocks • Phillips screwdrivers • Special wrenches (Antilux) • These can be installed by the operator or the power supply company 	5ST1 323	0.012	1/3
	Terminal covers 2 units required per device for covering terminals within the overall dimensions complies with DIN 43880	5ST1 316	0.001	6

Miniature Circuit-Breakers

Power Supply Company Product Range

Notes




4

Residual Current Protective Devices

General Data

4/2 Product overview
4/3 Description

Residual Current Operated Circuit-Breakers (RCCBs)

4/9 5SM3, type AC and type A, product overview
4/11 5SM3, type AC, 16 ... 125 A
4/12 5SM3, type A, 16 ... 125 A
4/14 5SM3, type A, SIGRES, for severe environmental conditions , 25 ... 80 A
4/15 5SM3, type A, 500 V, 25 ... 63 A
4/16 5SM3, type A, 50 ... 400 Hz, 25 ... 40 A
4/17 5SM3, type A, 24 V, 16 A

SQUENCE RCCBs, UC Sensitive

4/18 5SM3, type B, product overview
4/21 5SM3, type B, 25 ... 80 A

Additional Components/ Accessories for RCCBs

4/22 Remote controlled mechanisms for 5SM3
4/23 Auxiliary circuit switches for 5SM3
4/24 Accessories for 5SM3
4/26 5SM1 930 leakage current measurement units

RCCBs with Integral Over-Current Protection (RCBOs)

4/27 5SU1, product overview
4/28 5SU1, general data

SQUENCE RCCBs with Integral Overcurrent Protection (RCBOs), UC Sensitive

4/30 5SU1, type B, product overview
4/31 5SU1, type B, 100 ... 125 A

RCCBs with Integral Over-Current Protection (RCBOs)

4/32 5SU1, type AC and type A, product overview
4/34 5SU1, type AC, 6 ... 40 A, (1 + N)-pole
4/36 5SU1, type A, 6 ... 40 A, (1 + N)-pole
4/39 5SU1, type AC, 6 ... 32 A, 2-pole

Additional Components/ Accessories for RCBOs

4/40 Remote controlled mechanisms for 5SU1
4/41 Auxiliary circuit switches/fault signal contacts for 5SU1
4/42 Shunt trips/undervoltage releases for 5SU1
4/43 Accessories for 5SU1

RC Units for Miniature Circuit-Breakers

4/44 5SM2, product overview
4/46 5SM2, type AC, 0.3 ... 63 A, for 5SY4, 5SY6, 5SY7, 5SY8
4/47 5SM2, type A, 0.3 ... 63 A, for 5SY4, 5SY6, 5SY7, 5SY8
4/49 5SM2, type AC, 80 ... 100 A, for 5SP4
4/50 5SM2, type A, 80 ... 100 A, for 5SP4

RCCB Socket Outlets (SRCDs)

4/51 5SM1 and 5SZ9 protective socket outlets

Accessories

4/53 For all product ranges



Residual Current Protective Devices

General Data

Product overview

Overview

Residual current operated circuit-breakers (RCCBs)



5SM3

- Type AC, type A
- $I_n = 16 \dots 125 \text{ A}$
- $I_{\Delta n} = 10 \text{ mA} \dots 1 \text{ A}$
- 2-pole (1-pole + N) and 4-pole (3-pole + N)
- N-connection, right and left
- Versions **K** and **S**
- SIGRES for severe environmental conditions **i**
- Version for 500 V
- Version 50 ... 400 Hz

SIQUENCE RCCBs, UC sensitive



5SM3

- Type B
- $I_n = 25 \dots 80 \text{ A}$
- $I_{\Delta n} = 30, 300 \text{ mA}$
- 4-pole (3-pole + N)
- Versions **K** and **S**
- Leakage current measurement units

SIQUENCE RCCBs with integral overcurrent protection (RCBOs), UC sensitive



5SU1

- Combined personnel and line protection
- Type B
- $I_n = 100, 125 \text{ A}$
- $I_{\Delta n} = 30, 300 \text{ mA}$
- MCB characteristic C, D
- Rated short-circuit capacity 10 kA
- 4-pole
- Version **K**

RCCBs with integral overcurrent protection (RCBOs)



5SU1

- Combined personnel and line protection
- Type AC, type A
- $I_n = 6 \dots 40 \text{ A}$
- $I_{\Delta n} = 10 \dots 300 \text{ mA}$
- MCB characteristic B and C
- Rated short-circuit capacity 4.5 kA, 6 kA and 10 kA
- 2-pole (1-pole + N)

RC units for miniature circuit-breakers



5SM2

- For mounting on miniature circuit-breakers
- Combined personnel and line protection
- Type AC, type A
- $I_n = 0.3 \dots 100 \text{ A}$
- $I_{\Delta n} = 10 \text{ mA} \dots 1 \text{ A}$
- 2, 3 and 4-pole
- Versions **K** and **S**

RCCB Socket Outlets (SRCDs)



5SM1 and 5SZ9

- Can be retrofitted in existing installations
- Increased protection level
- Type A
- $I_n = 16 \text{ A}$
- $I_{\Delta n} = 10 \text{ and } 30 \text{ mA}$

Accessories



- Locking device
- Cu busbars
- Covers
- Wall enclosure

Definitions

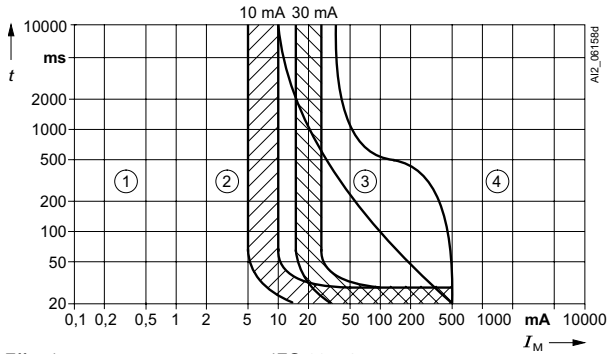
1 MW = 18 mm modular width

Overview

Protection against dangerous leakage currents according to DIN VDE 0100 Part 410

Application

- Protection against indirect contact (indirect personnel protection) – as leakage protection through tripping in the event of higher touch voltages due to short-circuits to frame on equipment
- Using residual current protective devices with $I_{\Delta n} \leq 30 \text{ mA}$ also largely protects against direct contact (direct personnel protection) – as additional protection through tripping as soon as live parts are touched



Effective current ranges acc. to IEC 60479

- Range ① Usually, the effect is not perceived.
- Range ② Usually, there are no noxious effects.
- Range ③ Usually, no danger of heart fibrillation.
- Range ④ Heart fibrillation danger.

I_M : Shock current
 t : Duration

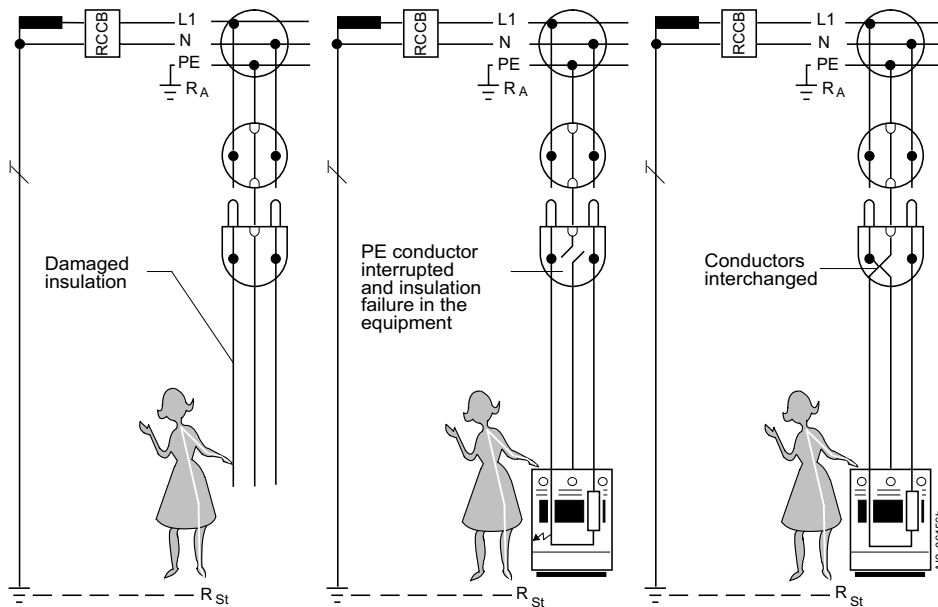
Protective action

While devices for rated residual current $I_{\Delta n} > 30 \text{ mA}$ provide protection against indirect contact, using devices with $I_{\Delta n} \leq 30 \text{ mA}$ also offers the best possible additional protection against accidental direct contact with live parts.

The diagram above shows a summary of the physiological reactions of the human body to power flows in the effective current ranges. The dangerous values are the current/time values in range 4 as they can trigger ventricular fibrillations, which can cause death. It also shows the tripping range of the residual current protection device with rated residual current 10 mA and 30 mA. The instantaneous tripping time lies in the middle between 10 ms and 30 ms.

The permissible tripping time of max. 0.3 s (300 ms) according to EN 61008 or IEC 61008 is not reached. Residual current protective devices with rated residual current 10 or 30 mA also offer reliable protection when a current flows through a person after accidental direct contact with live parts. This protective action is not matched by any other comparable protective measure in the event of indirect contact.

However, when using residual current protective devices, a suitably grounded PE conductor must also be fitted to the devices and equipment to be protected. This means that it is only possible for a person to be subjected to a flow of current if two faults occur or in the event of accidental contact with live parts.



Examples of accidental direct contact

If live parts are directly touched, two resistors determine the level of the current – the internal resistance of the person R_M and the contact resistance of the location R_{St} . For a proper assessment of the accident risk, the worst case scenario must be assumed, which is that the contact resistance of the location is virtually zero.

Residual Current Protective Devices

General Data

Description

Overview

The resistance of the human body depends on the current path. Measurements have shown, for example, that a current path of hand/hand or hand/foot has a resistance of approx. 1 000 Ω . Taking into account a fault voltage of 230 V AC, this produces a current of 230 mA for the current path hand/hand.

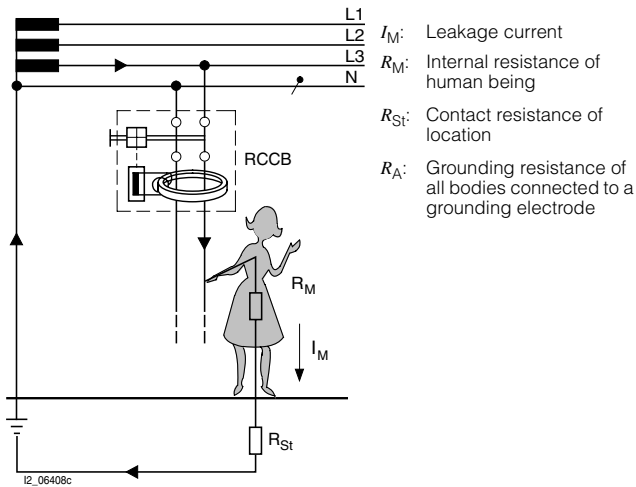


Diagram: Additional protection against direct contact with live parts

Usage

Residual current protective devices can be used in all three network configurations (IEC 364-4-41, HD 384.4.41, DIN VDE 0100-410).

In the IT network, tripping is not required for the first fault as this situation cannot produce any dangerous touch voltages. It is essential that an insulation monitoring device is fitted so that the first fault is indicated by an acoustic or visual signal and the fault can be eliminated as quickly as possible. Tripping is not requested until the 2nd fault. Depending on the grounding situation, the tripping conditions of the TN or TT network must be complied with. A residual current protective device is also a suitable circuit-protective device, whereby a separate residual current protective device is required for each piece of current-using equipment.

Grounding resistances

When using residual current protective devices in a TT system, the maximum grounding resistances (as shown in the following table) must be complied with, depending on the rated residual current and the max. permissible touch voltage.

Rated residual current	Max. permissible grounding resistance at a max. permissible touch voltage of	
	50 V	25 V
$I_{\Delta n}$		
10 mA	5000 Ω	2500 Ω
30 mA	1660 Ω	830 Ω
100 mA	500 Ω	250 Ω
300 mA	166 Ω	83 Ω
500 mA	100 Ω	50 Ω
1 A	50 Ω	25 Ω

Fire protection according to HD 384.4.482, DIN VDE 0100-482

Application

- When using residual current protective devices with $I_{\Delta n} \leq 300$ mA protection against the occurrence of fires started electrically due to isolation faults

Protective action

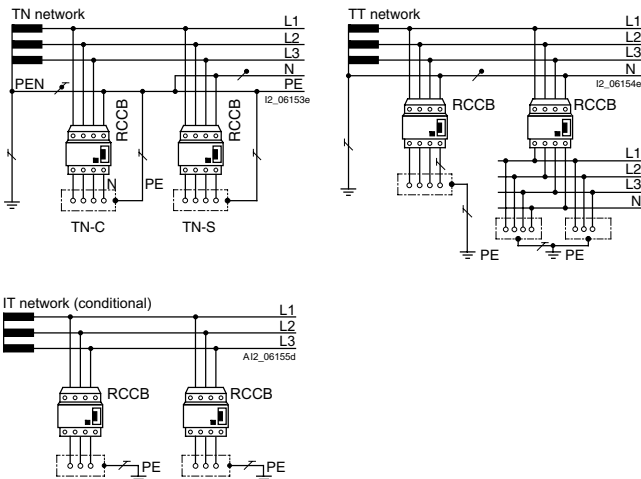
DIN VDE 0100-482 requires measures to be taken to prevent fires in "Locations exposed to fire hazards" that may result from isolation faults.

Electrical equipment must be selected and set up taking external influences into account so that their temperature rise during normal operation, and the foreseeable temperature rise, cannot cause a fire in the event of a fault.

This is achieved by ensuring the equipment is suitably designed or by implementing additional safety measures during installation. For this reason, additional residual current protective devices with a rated residual current of max. 300 mA are required for TN and TT systems used in "Locations exposed to fire hazards".

Where resistance-related faults may cause a fire (e.g. when using ceiling heating with panel heating elements), the rated residual current must not exceed max. 30 mA.

The additional protection against fires provided by separate residual current protective devices should not just be restricted to locations exposed to fire hazards, rather it should be universally implemented.



Overview

Setup and method of operation of residual current protective devices

- The setup of residual current protective devices is largely determined by 3 function groups:
- 1) Summation current transformers for fault-current detection
 - 2) Releases to convert the electrical measured quantities into a mechanical tripping operation
 - 3) Breaker mechanism with contacts

The summation current transformer covers all conductors required to conduct the current, i.e. also the neutral conductor where applicable.

In a fault-free system, the magnetizing effects of the conductors through which current is flowing cancel each other out for the summation current transformer as, in accordance with Kirchhoff's current law, the sum of all currents is zero. There is no residual magnetic field left that could induce a voltage in the secondary winding.

However, by contrast, if a residual current is flowing due to an isolation fault, this destroys the equilibrium and a residual magnetic field is left in the core of the converter. This generates a voltage in the secondary winding, which then uses the release and the breaker mechanism to switch off the electrical circuit afflicted by the isolation fault.

This tripping principle operates independently of the system voltage or an auxiliary power supply. This is also a condition for the high protection level, offered by residual current protective devices according to IEC/EN 61008 (VDE 0664).

Only this way can it be ensured that the full protective action of the residual current protective device is maintained even in the event of a system fault, e.g. failure of an outer conductor or an interruption in the neutral conductor.

Test button

You can test whether the residual current protective device is ready to run by simply pressing a test button, with which every residual current protective device is equipped. Pressing the test button generates an artificial residual current – the residual current protective device must trip.

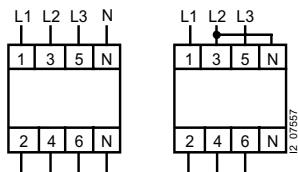
We recommend testing the functionality when commissioning the system and then at regular intervals – approx. every six months. Furthermore, it is also essential to ensure compliance with the test intervals specified in the pertinent rules and regulations (e.g. accident prevention regulations).

The minimum working voltage for operation of the test equipment normally is 100 V AC (series 5SM3). For detailed information see Technical specifications.

3-pole connection

4-pole residual current protective devices can also be operated in 3-pole systems. In this case, connection must be at terminals 1, 3, 5 and 2, 4, 6.

The function of the test equipment is only ensured if a jumper is fitted between terminals 3 and N.



SIGRES RCCB for severe environmental conditions **i**

Our SIGRES RCCBs have been developed for use in environments with increased pollution gas loads, such as

- Indoor swimming pools: chlorine gas atmosphere;
- Agriculture: ammoniac;
- Worksite distribution boards, chemical industry: nitrogen oxides [NO_x], sulfur dioxide [SO₂]

The SIGRES RCCBs are identified by the symbol **i**.

A significant increase in service life is achieved using our patented active condensation protection.

When using SIGRES RCCBs, the following points must be observed:

- The incoming supply must always be from below, from terminals 2/N or 2/4/6/N.
- Before carrying out insulation tests on installation systems with voltages greater than 500 V, the SIGRES RCCB must be switched off or the cables on the input side (underneath) must be disconnected.

Short-time delayed tripping **K**

Electrical loads that temporarily produce high leakage currents when they are switched on (e.g. temporary residual currents flowing through interference-suppression capacitors between outer conductor and PE) may trip instantaneous residual current protective devices, if the leakage current exceeds the rated residual current $I_{\Delta n}$ of the residual current protective device.

Short-time delayed residual current protective devices can be installed for this type of application, where it is not possible, or only partially possible, to eliminate such interference sources.

These devices have a minimum tripping delay of 10 ms, i.e., they should not trip for a residual current pulse of 10 ms.

This complies with the maximum permissible break times according to IEC/EN 61008-1 (VDE 0664 Part 10). The devices have a high surge current withstand capability of 3 kA.

Short-time delayed residual current protective devices have the identification code **K**.

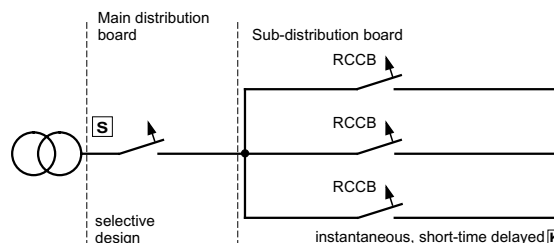
Selective tripping **S**

Residual current protective devices normally have an instantaneous tripping operation. This means that a series connection of this type of residual current protective devices does not provide selective tripping in the event of a fault. In order to achieve selectivity for a series connection of residual current protective devices, both the tripping time and the rated residual current of series-connected devices must be time graded. Selective residual current protective devices have a tripping delay.

Furthermore, selective residual current protective devices must have an increased surge current withstand capability of at least 3 kA according to IEC/EN 61008-1 (VDE 0664, Part 10). Siemens devices have a surge current withstand capability of ≥ 5 kA.

Selective residual current protective devices have the identification code **S**.

The table below shows the time grading options available for residual current protective devices for selective tripping in series connection with devices without time delay and with short-time delay **K**.



Upstream RCCB		Downstream RCCB or instantaneous or short-time delayed design		
For selective disconnection S		instantaneous design		short-time delayed design K
$I_{\Delta n}$	Disconnection time (at $5I_{\Delta n}$)	$I_{\Delta n}$	Disconnection time (at $5I_{\Delta n}$)	Disconnection time (at $5I_{\Delta n}$)
300 mA	60...110 ms	10 mA, 30 mA or 100 mA	< 20 ms ¹⁾	20...< 40 ms
500 mA		10 mA, 30 mA or 100 mA		
1000 mA		10 mA, 30 mA, 100 mA, 300 mA or 500 mA		

12_061689

1) For residual current circuit-breakers of type AC: <40 ms.

Residual Current Protective Devices

General Data

Description

Overview

Versions for 50 to 400 Hz

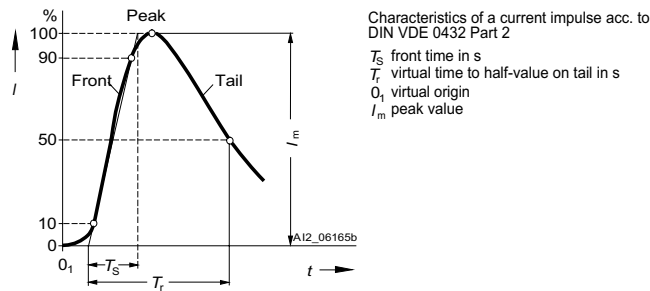
Due to their principle of operation, the standard versions of residual current protective devices are designed for maximum efficiency in 50/60 Hz systems. Product standards and tripping conditions also refer to this frequency. The sensitivity decreases with increasing frequency. In order to implement an effective fault-current protection for applications in systems up to 400 Hz (e.g. industry), you need to use suitable devices. This type of residual current protective devices fulfills the tripping conditions up to the specified frequency and provides the appropriate level of protection.

Residual current circuit-breaker with left-side N-connection

Because the RCCBs are usually located to the left of the circuit-breakers, but have their N wire connection on the right-hand side, this interferes with the integrated busbar connection. For this reason, when used with circuit-breakers, RCCBs require a special busbar. In order to enable the use of standard busbars, 4-pole RCCBs are also provided with their N connection on the left-hand side. This means that RCCBs can continue to be installed to the left of miniature circuit-breakers using standard busbar connections.

Surge current withstand capability

During thunderstorms, atmospheric overvoltages in the form of traveling waves can penetrate the installations of a system over an overhead system and trip the residual current protective devices. To prevent such inadvertent tripping operations, residual current protective devices sensitive to power pulse currents must pass specific tests proving its surge current withstand capability. These tests are carried out using a surge current of the standardized surge current wave 8/20 μ s.



Surge current wave 8/20 μ s (front time μ s: Time to half-value 20 μ s)

Siemens residual current protective devices of types A and B all have a high surge current withstand capability. The following table shows the surge current withstand capability of the various versions:

Version	Surge current withstand capability
Instantaneous	>1 kA
Short-time delayed [K]	>3 kA
Selective [S]	>5 kA

Switching capacity, short-circuit strength

In accordance with installation regulations DIN VDE 0100 Part 410 (protection against electric shock) residual current protective devices can be installed in three system types (TN, TT and IT systems).

However, if using the neutral conductor as protection conductor in TN systems, a fault may cause residual currents similar to a short-circuit. For this reason, residual current protective devices must be installed together with a series fuse and have the appropriate short-circuit strength. Tests have been defined for this purpose. The short-circuit strength of the combination must be specified on the devices.

Siemens residual current protective devices, together with a suitable series fuse, have a short-circuit strength of 10 000 A. This is the highest possible level of short-circuit strength as specified in the VDE regulations.

Data for the rated short-circuit capacity according to IEC/EN 61008 i.e. the maximum permissible short-circuit series fuses for residual current protective devices are contained in the following table:

Rated current of the residual current protective device	Rated short-circuit capacity I_m acc. to IEC/EN 61008 (VDE 0664) for a grid distance of 35 mm	Maximum permissible short-circuit series fuse NH, DIAZED, NEOZED utilization category gL/gG for residual current protective device	
		125 ... 400 V AC	500 V AC
A	A	A	A
Type A			
16 ... 40	2 MW	500	63
63	2.5 MW	800	100
80	2.5 MW	800	100
25	4 MW	800	100
40	4 MW	800	100
63	4 MW	800	100
80	4 MW	800	100
125	4 MW	1250	125
Type B			
25 ... 80	4 MW	800	100

Example:



Short-circuit strength 10 kA with max. permissible short-circuit series fuse 100 A.

Residual Current Protective Devices

General Data

Description


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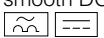
Overview



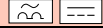





Types of current

Due to the use of electronic components in household appliances and industrial plants, insulation faults can also cause non-AC residual currents to flow through residual current protective devices, even in the case of devices with ground terminals (Safety class I).

The regulations for residual current protective devices contain additional requirements and test regulations for residual currents whose line frequency is zero or virtually zero within a certain period.

Residual current protective devices that trip for both sinusoidal AC residual currents and pulsating DC residual currents (type A) are identified by the mark .

Residual current protective devices that also trip for smooth DC residual currents (type B) are identified by the mark .

Type of current	Current waveform	Correct function of residual current protective devices of type			Tripping current ¹⁾
		AC 	A 	B 	
AC residual current		•	•	•	0.5 ... 1.0 $I_{\Delta n}$
Pulsating DC residual currents (pos. or neg. half-waves)		--	•	•	0.35 ... 1.4 $I_{\Delta n}$
Started half-wave currents Start angle 90°el Start angle 135°el		--	• •	• •	0.25 ... 1.4 $I_{\Delta n}$ 0.11 ... 1.4 $I_{\Delta n}$
Half-wave current during superimposition with smooth direct current of 6 mA		--	•	•	max. 1.4 $I_{\Delta n}$ + 6 mA
Smooth direct current		--	--	•	0.5 ... 2.0 $I_{\Delta n}$

1) Tripping currents acc. to IEC/EN 61008-1 (VDE 0664, Part 10); specified for smooth DC residual currents acc. to IEC 60755.

Residual Current Protective Devices

General Data

Description

Application


Standards	Application	Required $I_{\Delta n}$ [mA]	Recommended residual current protective device		
			5SM.. (Type A)	5SM.. (Type B)	SIGRES [i]
DIN VDE 0100-470	Socket outlets up to 20 A, outdoor plants	≤ 30	•	--	--
DIN VDE 0100-482	Fire protection for particular risks or safety hazard	30, 300	•	•	--
DIN VDE 0100-551	Low-voltage generating sets	≤ 30	•	--	--
DIN VDE 0100-559	Luminaires and lighting installations, display stands for lights	≤ 30	•	--	--
DIN VDE 0100-701	Rooms with baths or showers, socket outlets in zone 3	≤ 30	•	--	--
DIN VDE 0100-702	Swimming pools, zone 1 and 2	≤ 30	•	--	•
DIN VDE 0100-704	Construction and demolition site installations, socket outlet current circuits (single-phase operation) up to 32 A and for hand-held equipment	≤ 30	•	--	•
DIN VDE 0100-705	Agricultural and general horticultural premises	≤ 500	•	--	•
	Socket outlet current circuits	≤ 30	•	--	•
DIN VDE 0100-706	Conductive areas with limited freedom of movement	≤ 30	•	--	--
DIN VDE 0100-708	Feeding points for caravan parking spaces, camping sites	≤ 30	•	--	--
DIN VDE 0100-710	Medical premises, depending on application group 1 or 2 and equipment	≤ 30 or ≤ 300	•	•	--
			•	•	--
DIN VDE 0100-722	Temporary buildings, vehicles for travelling exhibitions and caravans	≤ 500	•	--	•
DIN VDE 0100-723	Classrooms with experiment equipment	≤ 30	•	•	--
DIN VDE 0100-738	Fountains zone 2, general	≤ 500	•	--	•
	Socket outlets in zone 2	≤ 30	•	--	•
	Zones 0 and 1	≤ 30	•	--	•
DIN VDE 0100-739	Additional protection against direct contact in home dwellings	≤ 30	•	--	--
DIN VDE 0118-100	Mining plants	≤ 500	•	--	•
EN 50178 (VDE 0160)	Electronic equipment for use in power installations	General requirements for correct selection when using residual current protection	•	•	--
DIN VDE 0832-100	Traffic signals				
	• Class T1	≤ 300	•	--	•
	• Class U1	≤ 30	•	--	•
BG FE BGI 608	Selection and operation of electrical equipment on worksites				
	General:				
	• Socket outlet circuits ≤ 32 A	≤ 30	•	•	•
	• Socket outlet circuits > 32 A	≤ 500	•	•	•
	Frequency-controlled equipment:				
	• With plug-and-socket device ≤ 32 A	≤ 30	--	•	--
	• With plug-and-socket device > 32 A	≤ 500	--	•	--
	Chemical industry and food processing industries	30 (recommended)	•	•	•

Note:

For reasons of basic fire protection, we recommend a maximum rated residual current of 300 mA for residual current protection devices.

Overview

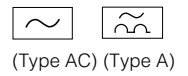
	Number of poles	Rated current I_n A	Rated residual current $I_{\Delta n}$ mA	MW	Auxiliary circuit switches can be retrofitted	N-connection		
						right	left	
Residual current operated circuit-breakers, type AC¹⁾, 16 ...125 A								
Instantaneous tripping	2	16	10	2	•	•	--	
		25	30, 100, 300		•	•	--	
		40			•	•	--	
	4	63	30, 100, 300	2.5	•	•	--	
		80			•	•	--	
		25	30, 300, 100, 500		4	•	•	•
		40	30, 300, 100, 500			•	•	--
		63	30, 300, 100, 500			•	•	•
		80	30, 300			•	•	•
		100	300			•	•	--
125	30, 100, 300, 500	•	•	--				
[S] selective, surge current withstand capability >3 kA	4	100	300	4	•	•	--	
Residual current operated circuit-breakers, type A²⁾, 16 ...125 A								
Instantaneous tripping, surge current withstand capability >1 kA	2	16	10, 30	2	•	•	--	
		25	30, 100, 300		•	•	--	
		40			•	•	--	
	4	63	30, 100, 300	2.5	•	•	--	
		80			•	•	--	
		25	30, 300, 500		4	•	•	•
		40	30, 300, 100, 500			•	•	--
		63	30, 300, 100, 500			•	•	•
		80	30, 300			•	•	•
		125	30, 100, 300, 500			•	•	--
[K] short-time delayed, surge current withstand capability >3 kA	4	25	30	4	•	•	--	
		40			•	•	--	
		63	30, 100		•	•	--	
[S] selective, surge current withstand capability >5 kA	2	63	100, 300	2.5	•	•	--	
	4	40	100, 300	4	•	•	--	
		63	100, 1 000		•	•	--	
			300		•	•	•	
	125	300, 500		•	•	--		
SIGRES residual current operated circuit-breakers, type A²⁾, for severe environmental conditions								
Instantaneous tripping, surge current withstand capability >1 kA	2	25	30	2	•	•	--	
		40			•	•	--	
		63	30		2.5	•	•	--
	80		•	•		--		
	4	25	30	4		•	•	--
		40	30, 300		•	•	--	
63			•		•	--		
		80	30		•	•	--	
[S] selective, surge current withstand capability >5 kA	4	63	300	4	•	•	--	

1)  = type AC for AC fault currents.

2)  = type A for AC and pulsating DC residual currents.

Residual Current Protective Devices

Residual Current Operated Circuit-Breakers (RCCBs)



5SM3, type AC and type A, product overview

Overview

	Number of poles	Rated current I_n A	Rated residual current $I_{\Delta n}$ mA	MW	Auxiliary circuit switches can be retrofitted	N-connection	
						right	left
Residual current operated circuit-breakers, type A¹⁾, 500 V							
Instantaneous tripping, surge current withstand capability >1 kA	4	25 40 63	30, 300	4	• • •	• • •	-- -- --
Residual current operated circuit-breakers, type A¹⁾, 50 ... 400 Hz							
Instantaneous tripping, surge current withstand capability >1 kA	4	25 40	30	4	• •	• •	-- --
Residual current operated circuit-breakers, type A¹⁾, 24 ... 125 V							
Instantaneous tripping, surge current withstand capability >1 kA	2	16	30	2	•	•	--

1) = type A for AC and pulsating DC residual currents.

Technical specifications

Standards	IEC/EN 61008-1, VDE 0664 Part 10, IEC/EN 61543, VDE 0664 Part 30		
Versions	2 and 4-pole		
Rated voltages U_n	V AC	24 ... 125 125 ... 230 230 ... 400 500	50 ... 60 Hz 50 ... 60 Hz, 50 ... 60 Hz, 50 ... 400 Hz 50 ... 60 Hz
Rated currents I_n	A	16, 25, 40, 63, 80, 100, 125	
Rated residual currents $I_{\Delta n}$	mA	10, 30, 100, 300, 500, 1 000	
Enclosure	gray molded-plastic (RAL 7035)		
Mounting depth	mm	70	
Terminals	Tunnel terminals at both ends with wire protection, lower combined terminal for simultaneous connection of busbars and conductors		Conductor cross-section mm ² (solid and stranded)
	for 2 MW	at $I_n = 16$ A, 25 A, 40 A	1.0 ... 16
	for 2.5 MW	at $I_n = 63$ A, 80 A	1.5 ... 25
	for 4 MW	at $I_n = 25$ A, 40 A, 63 A, 80 A	1.5 ... 25
		at $I_n = 100, 125$ A	2.5 ... 50
Supply connection	optionally top or bottom (except SIGRES: incoming supply from bottom)		
Mounting position	any		
Mounting technique	can be snapped onto 35 mm standard mounting rails (TH 35 acc. to EN 60715)		
Degree of protection	IP20 acc. to EN 60529 (VDE 0470 Part 1) IP40 if installed in distribution boards IP54 if installed in molded-plastic enclosure		
Protection against contact	Protection against contact with fingers or the back of the hand acc. to EN 50274 (VDE 0660 Part 514)		
Minimum operational voltage for test function operation	V AC	100 195	16 ... 80 A 100 A, 125 A
Device service life	>10 000 operations (electrical and mechanical; test cycle acc. to regulations)		
Storage temperature	°C	-40 ... +75	
Ambient temperature	°C	-5 ... +45, for versions with the symbol : -25 ... +45	
Resistance to climate acc. to IEC 60068-2-30	28 cycles (55 °C; 95 % rel. humidity)		
CFC and silicone-free	yes		



(Type AC)

Residual Current Protective Devices Residual Current Operated Circuit-Breakers (RCCBs)

5SM3, type AC, 16 ... 125 A

4

Benefits

- Terminals with wire protection can be directly rail-mounted with devices with terminals in the modular width, e.g. with 5SY miniature circuit-breakers.
- An auxiliary circuit switch can be fitted to the right-hand side of the enclosure by the customer
- Operating handle and test button can be locked by means of a handle locking device
- N-connection on the left allows easy busbar-mounting with pin busbars if the miniature circuit-breakers are fitted on the right.

Application

- Personnel and fire protection
 - $I_{\Delta n} \leq 30$ mA: additional protection in the case of direct contact
 - $I_{\Delta n} \leq 300$ mA: preventative fire protection in the case of ground fault currents
- Product standards: IEC/EN 61008-1 (VDE 0664, Part 10); IEC 61008-2-1 (VDE 0664, Part 11); IEC/EN 61543 (VDE 0664, Part 30)
- U_n 230/400 V; 50 to 60 Hz; applicable in systems up to 240/415 V AC
- Definition of surge current withstand capability with current waveform 8/20 μ s acc. to DIN VDE 0432, Part 2
- **S** S-type: Can be used as upstream group switch for selective tripping contrary to a downstream standard RCCB. Very high surge current withstand capability: >3 kA.

Selection and ordering data

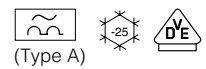
Circuit diagram/ max. permissible short-circuit series fuse	Rated residual current $I_{\Delta n}$ mA	Rated current I_n A	MW	N-connection, right		N-connection, left		Weight 1 unit approx. kg	PS*/ P. unit Unit(s)
				Order No.	Order No.	Order No.	Order No.		
Instantaneous tripping									
125 ... 230 V AC; 50 ... 60 Hz; 2-pole									
	10	16	2	5SM3 111-0		--		0.220	1
	30	25		5SM3 312-0		--		0.220	1
	40	40		5SM3 314-0		--		0.220	1
	100	25		5SM3 412-0		--		0.220	1
	40	40		5SM3 414-0		--		0.220	1
	300	25		5SM3 612-0		--		0.220	1
40	40	5SM3 614-0		--		0.220	1		
	30	63	2.5	5SM3 316-0		--		0.300	1
	80	80		5SM3 317-0		--		0.300	1
	100	63		5SM3 416-0		--		0.300	1
	80	80		5SM3 417-0		--		0.300	1
	300	63		5SM3 616-0		--		0.300	1
	80	80		5SM3 617-0		--		0.300	1
230 ... 400 V AC; 50 ... 60 Hz; 4-pole									
	30	25	4	5SM3 342-0		5SM3 342-OKL		0.473	1
	40	40		5SM3 344-0		5SM3 344-OKL		0.473	1
	63	63		5SM3 346-0		5SM3 346-OKL		0.473	1
	80	80		5SM3 347-0		5SM3 347-OKL		0.473	1
	100	25		5SM3 442-0		--		0.473	1
	40	40		5SM3 444-0		--		0.473	1
	63	63	500	5SM3 446-0		--		0.473	1
	100	100		5SM3 446-0		--		0.473	1
	63	63		5SM3 646-0		5SM3 642-OKL		0.473	1
	80	80		5SM3 647-0		5SM3 644-OKL		0.473	1
	100	100		5SM3 648-0		5SM3 646-OKL		0.473	1
	25	25		5SM3 742-0		5SM3 647-OKL		0.473	1
	40	40	125	5SM3 744-0		--		0.473	1
	63	63		5SM3 746-0		--		0.473	1
	30	125		5SM3 345-0		--		0.500	1
	100	100		5SM3 445-0		--		0.480	1
	300	300		5SM3 645-0		--		0.480	1
	500	500		5SM3 745-0		--		0.480	1
S selective, surge current withstand capability >3 kA									
230 ... 400 V AC; 50 ... 60 Hz; 4-pole									
	300	100	4	5SM3 648-2		--		0.473	1

For dimension drawings and terminal designations, see page 4/17.

* You can order this quantity or a multiple thereof.

Residual Current Protective Devices

Residual Current Operated Circuit-Breakers (RCCBs)



5SM3, Type A, 16 ... 125 A

Benefits

- Terminals with wire protection can be directly rail-mounted with devices with terminals in the modular width, e.g. with 5SY miniature circuit-breakers.
- An auxiliary circuit switch can be fitted to the right-hand side of the enclosure by the customer
- Operating handle and test button can be locked by means of a handle locking device
- N-connection on the left allows easy busbar-mounting with pin busbars if the miniature circuit-breakers are fitted on the right.

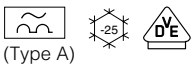
Application

- Personnel and fire protection
 - $I_{\Delta n} \leq 30$ mA: additional protection in the case of direct contact
 - $I_{\Delta n} \leq 300$ mA: preventative fire protection in the case of ground fault currents
- Product standards: IEC/EN 61008-1 (VDE 0664, Part 10); IEC 61008-2-1 (VDE 0664, Part 11); IEC/EN 61543 (VDE 0664, Part 30)
- U_n 230/400 V; 50 to 60 Hz; can be used in systems up to: 240/415 V AC
- Definition of surge current withstand capability with current waveform 8/20 μ s according to DIN VDE 0432, Part 2
- **S** S-type: can be used as upstream group switch for selective tripping contrary to a downstream standard RCCB. Very high surge current withstand capability: >5 kA.
- **K** K-type: short-time delayed tripping in the case of transient leakage currents. High surge current withstand capability: >3 kA.

Selection and ordering data

Circuit diagram/ max. permissible short-circuit series fuse	Rated residual current $I_{\Delta n}$ mA	Rated current I_n A	MW	N-connection, right	N-connection, left	Weight 1 unit approx.	PS*/ P. unit			
				Order No.	Order No.			kg	Unit(s)	
Instant. tripping, surge current withstand capability >1 kA										
125 ... 230 V AC; 50 ... 60 Hz; 2-pole										
		10	16	2	5SM3 111-6	--	0.230	1		
		30	16		5SM3 311-6	--	0.230	1		
			25		5SM3 312-6	--	0.230	1		
			40		5SM3 314-6	--	0.230	1		
			100		25	5SM3 412-6	--	0.230	1	
			40		5SM3 414-6	--	0.230	1		
		300	25	5SM3 612-6	--	0.210	1			
			40	5SM3 614-6	--	0.210	1			
				30	63	2.5	5SM3 316-6	--	0.320	1
					80	5SM3 317-6	--	0.320	1	
					100	63	5SM3 416-6	--	0.300	1
					80	5SM3 417-6	--	0.300	1	
	300			63	5SM3 616-6	--	0.280	1		
	80			5SM3 617-6	--	0.280	1			
230 ... 400 V AC; 50 ... 60 Hz; 4-pole										
		30	25	4	5SM3 342-6	5SM3 342-6KL	0.500	1		
			40	5SM3 344-6	5SM3 344-6KL	0.500	1			
			63	5SM3 346-6	5SM3 346-6KL	0.500	1			
			80	5SM3 347-6	5SM3 347-6KL	0.500	1			
			100	40	5SM3 444-6	--	0.460	1		
			63	5SM3 446-6	--	0.460	1			
		300	25	5SM3 642-6	5SM3 642-6KL	0.440	1			
			40	5SM3 644-6	5SM3 644-6KL	0.440	1			
			63	5SM3 646-6	5SM3 646-6KL	0.440	1			
			80	5SM3 647-6	5SM3 647-6KL	0.440	1			
			500	25	5SM3 742-6	--	0.440	1		
			40	5SM3 744-6	--	0.440	1			
	63	5SM3 746-6	--	0.440	1					
		30	125	5SM3 345-6	--	0.500	1			
		100	5SM3 445-6	--	0.480	1				
		300	5SM3 645-6	--	0.480	1				
		500	5SM3 745-6	--	0.480	1				

Additional components see page 4/22.



Residual Current Protective Devices Residual Current Operated Circuit-Breakers (RCCBs)

5SM3, Type A, 16 ... 125 A

Selection and ordering data

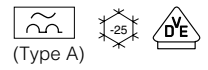
Circuit diagram/ max. permissible short- circuit series fuse	Rated residual current $I_{\Delta n}$ mA	Rated current I_n A	MW	N-connection, right Order No.	N-connection, left Order No.	Weight 1 unit approx. kg	PS*/ P. unit Unit(s)
[K] short-time delay; surge current withstand capability > 3 kA							
230 ... 400 V AC; 50 ... 60 Hz; 4-pole							
	30	25	4	5SM3 342-6KK01	--	0.500	1
		40		5SM3 344-6KK01	--	0.500	1
	30	63		5SM3 346-6KK01	--	0.500	1
	100			5SM3 446-6KK01	--	0.460	1
[S] selective; surge current withstand capability > 5 kA							
125 ... 230 V AC; 50 ... 60 Hz; 2-pole							
	100	63	2.5	5SM3 416-8	--	0.300	1
	300			5SM3 616-8	--	0.280	1
230 ... 400 V AC; 50 ... 60 Hz; 4-pole							
	100	40	4	5SM3 444-8	--	0.460	1
		63		5SM3 446-8	--	0.460	1
	300	40		5SM3 644-8	--	0.440	1
		63		5SM3 646-8	5SM3 646-8KL	0.440	1
	1 000	63		5SM3 846-8	--	0.515	1
N-connection, right 100 A 							
N-connection, left 100 A 							
	300	125		5SM3 645-8	--	0.480	1
	500			5SM3 745-8	--	0.480	1

Additional components see page 4/22.

4

Residual Current Protective Devices

Residual Current Operated Circuit-Breakers (RCCBs)



5SM3, type A, SIGRES,
for severe environmental conditions **i**, 25 ... 80 A

Benefits

- Our patented active condensation protection significantly increases service life under harsh ambient conditions
- Terminals with wire protection can be directly busbar-mounted with devices with terminals in the modular width, e.g. with 5SY miniature circuit-breakers.
- An auxiliary circuit switch can be fitted to the right-hand side of the enclosure by the customer
- Operating handle and test button can be locked by means of a handle locking device

Application

- For use in areas with high levels of pollution gas and humidity, such as indoor swimming pools, in agriculture, construction distribution boards or in the chemical industry
- Personnel and fire protection
 - $I_{\Delta n} \leq 30$ mA: additional protection in the case of direct contact
 - $I_{\Delta n} \leq 300$ mA: preventative fire protection in the case of ground fault currents
- Product standards: IEC/EN 61008-1 (VDE 0664, Part 10); IEC 61008-2-1 (VDE 0664, Part 11); IEC/EN 61543 (VDE 0664, Part 30)
- U_n 230/400 V; 50 to 60 Hz; can be used in systems up to: 240/415 V AC
- Definition of surge current withstand capability with current waveform 8/20 μ s according to DIN VDE 0432, Part 2
- **S** S-type: can be used as upstream group switch for selective tripping contrary to a downstream standard RCCB. Very high surge current withstand capability: >5 kA.

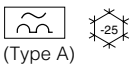
Function

- Function of condensation protection with switched off RCCBs through supply from below (2/N or 2/4/6/N terminals).

Selection and ordering data

Circuit diagram	Maximum permissible short-circuit series fuse	Rated residual current	Rated current	MW	Version	Order No.	Weight 1 unit approx.	PS*/P. unit
		$I_{\Delta n}$ mA	I_n A					
i Instantaneous tripping, surge current withstand capability >1 kA								
125 ... 230 V AC; 50 ... 60 Hz; 2-pole								
	63 A	30	25 40	2	i	5SM3 312-6KK12 5SM3 314-6KK12	0.230	1
	100 A		63 80	2.5	i	5SM3 316-6KK12 5SM3 317-6KK12	0.320	1
230 ... 400 V AC; 50 ... 60 Hz; 4-pole								
	100 A	30	25 40 63 80	4	i	5SM3 342-6KK12 5SM3 344-6KK12 5SM3 346-6KK12 5SM3 347-6KK12	0.500	1
		300	40 63			i	5SM3 644-6KK12 5SM3 646-6KK12	0.500
i, S selective; surge current withstand capability >5 kA								
230 ... 400 V AC; 50 ... 60 Hz; 4-pole								
		300	63	4	i S	5SM3 646-8KK12	0.440	1

Additional components see page 4/22.



Residual Current Protective Devices

Residual Current Operated Circuit-Breakers (RCCBs)

5SM3, type A, 500 V, 25 ... 63 A

4


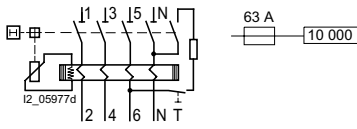
Benefits

- Terminals with wire protection can be directly busbar-mounted with devices with terminals in the modular width, e.g. with 5SY miniature circuit-breakers.
- An auxiliary circuit switch can be fitted to the right-hand side of the enclosure by the customer
- Operating handle and test button can be locked by means of a handle locking device

Application

- Personnel and fire protection
 - $I_{\Delta n} \leq 30$ mA: additional protection in the case of direct contact
 - $I_{\Delta n} \leq 300$ mA: preventative fire protection in the case of ground fault currents
- Product standards: IEC/EN 61008-1 (VDE 0664, Part 10); IEC 61008-2-1 (VDE 0664, Part 11); IEC/EN 61543 (VDE 0664, Part 30); VDE 0664 Part 101
- U_n 500 V; 50 to 60 Hz; can be used in systems up to: 500 V AC
- Definition of surge current withstand capability with current waveform 8/20 μ s according to DIN VDE 0432, Part 2

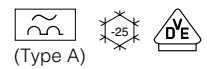
Selection and ordering data

Circuit diagram	Maximum permissible short-circuit series fuse	Rated residual current	Rated current	MW	Order No.	Weight 1 unit approx.	PS*/P. unit	
		$I_{\Delta n}$ mA	I_n A			kg	Unit(s)	
Instantaneous tripping, surge current withstand capability >1 kA								
  500 V AC; 50 ... 60 Hz; 4-pole		30	25	4	5SM3 352-6	0.500	1	
			40	40		5SM3 354-6	0.500	1
			63	63		5SM3 356-6	0.500	1
		300	25	40		5SM3 652-6	0.440	1
			40	63		5SM3 654-6	0.440	1
			63	63		5SM3 656-6	0.440	1

Additional components see page 4/22.

Residual Current Protective Devices

Residual Current Operated Circuit-Breakers (RCCBs)



5SM3, Type A, 50 ... 400 Hz, 25 ... 40 A

Benefits

- Terminals with wire protection can be directly busbar-mounted with devices with terminals in the modular width, e.g. with 5SY miniature circuit-breakers.
- An auxiliary circuit switch can be fitted to the right-hand side of the enclosure by the customer
- Operating handle and test button can be locked by means of a handle locking device

Application

- For use with line frequencies between 50 and 400 Hz
- Personnel and fire protection
 - $I_{\Delta n} \leq 30$ mA: additional protection in the case of direct contact
- Product standards: IEC/EN 61008-1 (VDE 0664, Part 10); IEC 61008-2-1 (VDE 0664, Part 11); IEC/EN 61543 (VDE 0664, Part 30)
- U_n 230/400 V; 50 to 400 Hz; can be used in systems up to: 240/415 V AC
- Definition of surge current withstand capability with current waveform 8/20 μ s according to DIN VDE 0432, Part 2

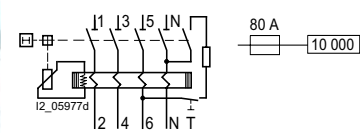
Selection and ordering data

Circuit diagram	Maximum permissible short-circuit series fuse	Rated residual current $I_{\Delta n}$ mA	Rated current I_n A	MW	Order No.	Weight 1 unit approx. kg	PS*/ P. unit Unit(s)
-----------------	---	--	-----------------------------	----	-----------	-----------------------------------	----------------------------

Instantaneous tripping, surge current withstand capability >1 kA

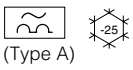


230 ... 400 V AC; 50 ... 400 Hz; 4-pole



30 25 4
mA A

5SM3 342-6KK03	0.500	1
5SM3 344-6KK03	0.500	1



Residual Current Protective Devices Residual Current Operated Circuit-Breakers (RCCBs)

NEW

5SM3, type A, 24 V, 16 A

4

Benefits

- Terminals with wire protection can be directly busbar-mounted with devices with terminals in the modular width, e.g. with 5SY miniature circuit-breakers.
- An auxiliary circuit switch can be fitted to the right-hand side of the enclosure by the customer
- Operating handle and test button can be locked by means of a handle locking device.

Application

- For special applications (e.g. laboratories)
- Personnel and fire protection
- $I_{\Delta n} = 30$ mA: additional protection in the case of direct contact
- Product standards: IEC/EN 61008-1 (VDE 0664, Part 10); IEC 61008-2-1 (VDE 0664, Part 11); IEC/EN 61543 (VDE 0664, Part 30)
- U_n 24 to 125 V; 50 to 60 Hz; can be used in systems up to: 125 V AC
- Definition of surge current withstand capability with current waveform 8/20 μ s according to DIN VDE 0432, Part 2

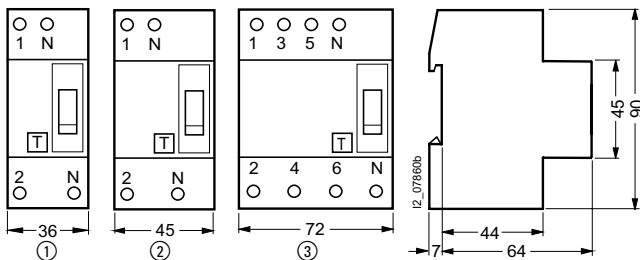
Selection and ordering data

Circuit diagram	Maximum permissible short-circuit series fuse	Rated residual current $I_{\Delta n}$ mA	Rated current I_n A	MW	Order No.	Weight 1 unit approx. kg	PS*/ P. unit Unit(s)
Instantaneous tripping, surge current withstand capability >1 kA							
		30	16	2	5SM3 311-6KK13	0.230	1

Additional components see page 4/22.

Dimensional drawings

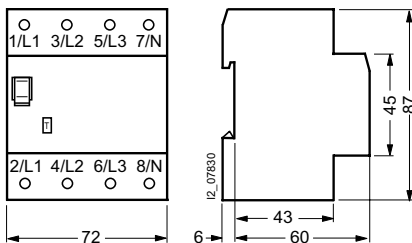
5SM3 residual current protective devices (up to 80 A)



- ① 2-pole
5SM3 111,
5SM3 311, 5SM3 312, 5SM3 314,
5SM3 412, 5SM3 414,
5SM3 612, 5SM3 614
- ② 2-pole
5SM3 316, 5SM3 317,
5SM3 416, 5SM3 417,
5SM3 616, 5SM3 617
- ③ 4-pole
5SM3 342, 5SM3 344, 5SM3 346, 5SM3 347,
5SM3 352, 5SM3 354, 5SM3 356,
5SM3 444, 5SM3 446,
5SM3 642, 5SM3 644, 5SM3 646, 5SM3 647,
5SM3 652, 5SM3 654, 5SM3 656,
5SM3 742, 5SM3 744, 5SM3 746,
5SM3 846

5SM3 residual current protective devices (100 A and 125 A)

- 5SM3 345
5SM3 445
5SM3 645, 5SM3 648
5SM3 745



Residual Current Protective Devices

SIQUENCE RCCBs, UC Sensitive

5SM3, type B, product overview

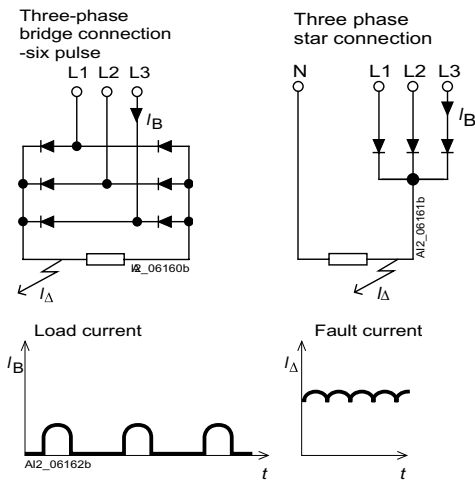
Overview

DC residual currents

Industrial current-using equipment is increasingly using connection methods where smooth DC residual currents or currents with low residual ripple may occur in the case of faults. This is illustrated in the following diagram of current-using equipment with three-phase rectifier circuits. Such equipment includes frequency converters, medical devices (e.g. x-ray devices and CT systems) and UPS systems.

Pulse-current-sensitive residual current protective devices are not able to detect and switch off such DC residual currents, which also negatively influence their tripping functions.

For this reason, current-using equipment that generates these kind of residual currents in the event of a fault should not be operated with pulse-current-sensitive residual current protective devices connected to the electrical power supply. Protective measures may be e.g. safety isolation; however this can only be achieved using heavy and expensive transformers. Universal current-sensitive residual current protective devices provide a perfect technical and cost-effective solution. This type of residual current protective device (type B) is mentioned also in EN 50178 (DIN VDE 0160) "Equipping power installations with electronic equipment".

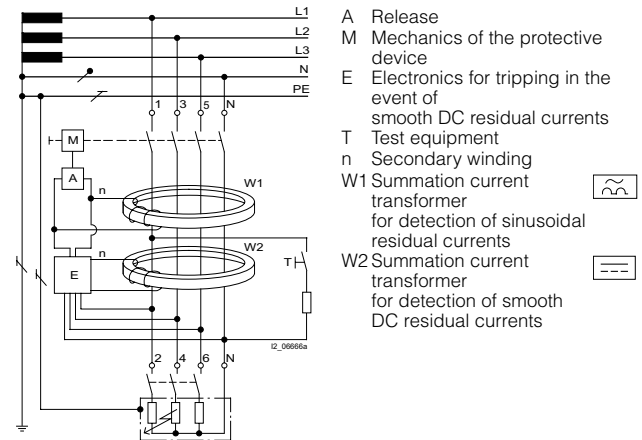


Block diagram with fault location

Design

Universal current sensitive protective devices are based on a pulse-current-sensitive circuit-protective device with tripping independent of line voltage, supplemented with an auxiliary unit for the detection of smooth DC residual currents. The diagram below shows the basic setup.

The summation current transformer W1 monitors the electrical system for AC and pulse current-type residual currents, as always. The summation current transformer W2 detects the smooth DC residual currents and, in the event of a fault, relays the tripping command through electronic unit E to release A.



Method of operation

In order to provide maximum security of supply, the power supply of the electronic unit is taken from all three phase conductors and the neutral conductor. Furthermore, it is dimensioned so that the electronics still reliably trip even with a voltage reduction of up to 70 % (e.g. between phase conductor and neutral conductor). This ensures tripping for smooth DC residual currents, as long as such residual current waveforms can occur, even in the event of faults in the electrical power supply, e.g. an N-conductor break. This means that the pulse-current-sensitive switch part, which trips regardless of line voltage, will still reliably trigger the tripping operation – even in the highly unlikely event that two phase conductors and the neutral conductor fail – if the remaining intact phase conductor presents a fire hazard due to a ground fault.

The residual current protective devices of type B are suitable for use in three-phase current systems with 50/60 Hz before input circuits with rectifiers. They are not intended for use in DC systems and in networks with operating frequencies other than 50/60 Hz.

They can be used for the detection and disconnection of residual currents that can occur in three-phase loads with electronic components (rectifiers) in the power supply unit (e.g. frequency converters, computer tomographs).

In addition to the described residual current waveforms (AC residual currents, pulsating and smooth DC residual currents), AC residual currents with a wide range of frequencies may also occur on this type of electronic equipment, such as at the outgoing terminal of a frequency converter.

Requirements for frequencies up to 2 kHz are defined in the device regulations VDE 0664 Part 100 for residual current protective devices of type B.

To date, only limited statements can be made with regard to the risk of ventricular fibrillations (up to 1 kHz) for frequencies higher than 100 Hz. No reliable statements can be made on any further effects and influences on the human organism (thermal, electrolytic). For this reason, protection against direct contact is only possible for frequencies up to 100 Hz. For higher frequencies, protection against indirect contact must be implemented under consideration of the frequency response of the residual current protective device, the maximum permissible touch voltages (e.g. 50 V) and permissible grounding resistance derived from this information.

Residual Current Protective Devices

SIQUENCE RCCBs, UC Sensitive

5SM3, type B, product overview

4

Overview

Configuration



When configuring and erecting electrical plants, electrical loads that can generate smooth DC residual currents in the event of a fault must be assigned a separate electrical circuit with a universal current sensitive residual current protective device (type B) (see configuration example).

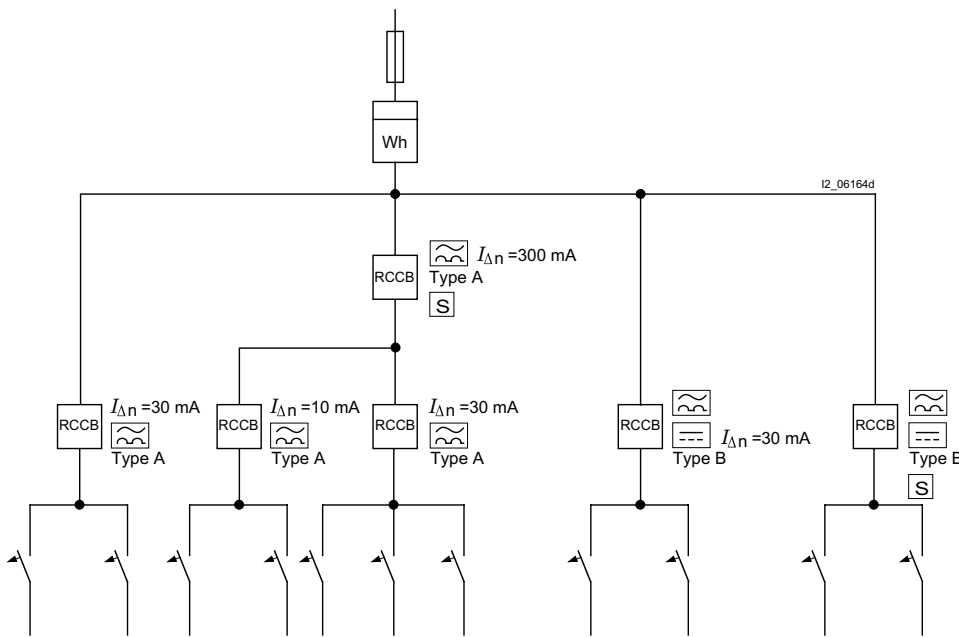
It is not permitted to branch electrical circuit with these types of electrical loads after pulse-current-sensitive residual current protective devices (type A). Loads, which can be the source of smooth DC residual currents in the event of a fault, would restrict the tripping of the pulse-current-sensitive residual current protective devices (type A).

The tripping conditions are defined according to VDE 0664 Part 100 (for residual current protective devices of type B) and are the same as those for type A for AC and pulse residual currents. The tripping values for smooth DC residual currents have been defined in this



product standard, taking into account current compatibility curves according to IEC 60479 for a range between 0.5 to 2.0 times the rated residual current.



The residual current protective devices of type B are suitable for *use in three-phase current systems with 50/60 Hz*. On no account may they be used in direct voltage networks or in systems with changing frequencies or frequencies other than 50/60 Hz (e.g. after frequency converters).

Universal current sensitive residual current protective devices (type B) are marked with the symbol  .



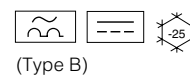
Configuration example with residual current protective devices type A and type B

	Number of poles	Rated current I_n A	Rated residual current $I_{\Delta n}$ mA	MW	Auxiliary circuit switches can be retrofitted	N-connection right
SIQUENCE residual current operated circuit-breakers, type B¹⁾, 25 ... 80 A						
 short-time delayed, surge current withstand capability > 3 kA	4	25 40 63 80	30, 300	4	• • • •	• • • •
 selective, surge current withstand capability > 5 kA	4	63 80	300	4	• •	• •

1)   = type B for AC residual currents, pulsating and smooth DC residual currents.


Residual Current Protective Devices

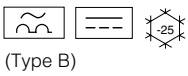
SIQUENCE RCCBs, UC Sensitive



5SM3, type B, product overview

Technical specifications

Standards	IEC/EN 61008, VDE 0664 Part 10, IEC/EN 61543, VDE 0664 Part 30, VDE 0664 Part 100	
Versions	4-pole	
Rated voltages U_n	V AC	230 ... 400
Rated currents I_n	A	25, 40, 63, 80
Rated residual currents $I_{\Delta n}$	mA	30, 300
Enclosure	gray molded-plastic (RAL 7035)	
Mounting depth	mm	70
Terminals	Tunnel terminals at both ends with wire protection, lower combined terminal for simultaneous connection of busbars (pin-type) and conductors	
<ul style="list-style-type: none"> Conductor cross-section, solid and stranded 	mm ²	1.5 ... 25
<ul style="list-style-type: none"> Terminal tightening torque, recommended 	Nm	2.5 ... 3.0
Supply connection	either top or bottom	
Mounting position	any	
Mounting technique	can be snapped onto 35 mm standard mounting rails (TH 35 acc. to EN 60715)	
Degree of protection	IP20 acc. to EN 60529 (VDE 0470 Part 1) IP40 if installed in distribution boards IP54 if installed in molded-plastic enclosure	
Protection against contact	Protection against contact with fingers or the back of the hand acc. to EN 50274 (VDE 0660 Part 514)	
Minimum operational voltage for test function operation	V AC	150
Device service life	>10 000 operations (electrical and mechanical; test cycle acc. to regulations)	
Storage temperature	°C	-40 ... +75
Ambient temperature	°C	-5 ... +45, for versions with the symbol  : -25 ... +45
Resistance to climate acc. to IEC 60068-2-30	28 cycles (55 °C; 95 % rel. humidity)	
CFC and silicone-free	yes	



(Type B)

Residual Current Protective Devices

SIQUENCE RCCBs, UC Sensitive

NEW

5SM3, type B, 25 ... 80 A

4

Benefits

- UC sensitive: for detection of AC residual currents, pulsating and smooth DC residual currents
- Terminals with wire protection can be directly busbar-mounted with devices with terminals in the modular width, e.g. with 5SY miniature circuit-breakers.
- Increased operating safety in systems with capacitive impedances due to adapted tripping characteristic
- An auxiliary circuit switch can be fitted to the right-hand side of the enclosure by the customer
- Operating handle and test button can be locked by means of a handle locking device.

Application

- Systems with equipment in which smooth DC residual currents can also arise (e.g. with B6 bridge circuit on frequency converters and medical equipment)
- Product standards: IEC/EN 61008-1 (VDE 0664, Part 10); VDE 0664 Part 100; IEC/EN 61543 (VDE 0664, Part 30)
- For use in three-phase current systems
- U_n 230/400 V; 50 to 60 Hz; can be used in systems up to: 240/415 V AC
- Definition of surge current withstand capability with current waveform 8/20 μ s according to DIN VDE 0432, Part 2
- **K** K-type: short-time delayed tripping in the case of transient leakage currents. High surge current withstand capability: >3 kA
- **S** S-type: can be used as upstream group switch for selective tripping contrary to a downstream standard RCCB. Very high surge current withstand capability: >5 kA.

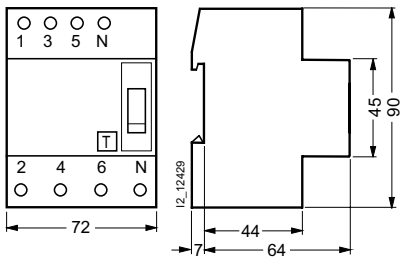
Selection and ordering data

Circuit diagram	Maximum permissible short-circuit series fuse	Rated residual current	Rated current	MW	Version	Order No.	Weight 1 unit approx.	PS*/P. unit				
		$I_{\Delta n}$ mA	I_n A									
K short-time delayed; surge current withstand capability > 3 kA												
		30	25	4	K	5SM3 342-4	0.520	1				
		40	40						K	5SM3 344-4	0.520	1
		63	63						K	5SM3 346-4	0.520	1
		80	80						K	5SM3 347-4	0.520	1
		300	25	4	K	5SM3 642-4	0.520	1				
		40	40						K	5SM3 644-4	0.520	1
		63	63						K	5SM3 646-4	0.520	1
		80	80						K	5SM3 647-4	0.520	1
		S selective; surge current withstand capability > 5 kA										
				300	63	4	S	5SM3 646-5	0.520	1		
80	80			S	5SM3 647-5						0.520	1

Dimensional drawings

Residual current operated circuit-breakers, type B

5SM3 342-4, 5SM3 344-4, 5SM3 346-4, 5SM3 347-4, 5SM3 642-4, 5SM3 644-4, 5SM3 646-4, 5SM3 647-4, 5SM3 646-5, 5SM3 647-5



Residual Current Protective Devices Additional Components/Accessories for RCCBs

Remote controlled mechanisms for 5SM3

NEW


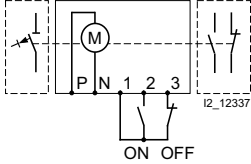
Benefits

- Can be retrofitted individually
- Mounting with factory-fitted brackets
- Can be mechanically latched and locked
- An auxiliary circuit switch can also be retrofitted to the remote controlled mechanism
- Function switch on the front
- Can be connected over binary inputs and outputs to *instabus* KNX *EIB* and AS-Interface
- $U_n = 230\text{ V}$, 50 to 60 Hz.

Function

- Remote ON/OFF switching of 5SM3 RCCBs ($\leq 80\text{ A}$)
- Remote switching ON is possible following acknowledgment of fault occurrence
- Manual switching on-site possible
- Remote display of switching status of remote controlled mechanisms and RCCBs.

Selection and ordering data

	Rated voltage U_n V AC	MW	Order No.	Weight 1 unit approx. kg	PS*/ P. unit Unit(s)
 <p>Remote controlled mechanisms (RC) for 5SM3 RCCBs ($\leq 80\text{ A}$)</p> 	230	3.5	5ST3 051	0.395	1

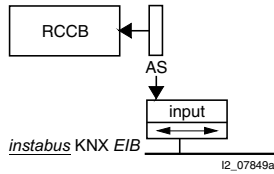
For detailed application information, see operator guide.

Residual Current Protective Devices Additional Components/Accessories for RCCBs

Auxiliary circuit switches for 5SM3

Benefits

- An auxiliary circuit switch can be fitted to the right-hand side of the RCCB enclosure by the customer
- Mounting with factory-fitted brackets
- Can be connected to *instabus* KNX EIB and AS-Interface bus or PROFIBUS through binary inputs.



Application

- Indications of the circuit state of the RCCB: ON/OFF
- Short-circuit protection ensured by miniature circuit-breakers of characteristic B or C with $I_n = 6$ A or fuse gL 6 A
- Product standards: IEC/EN 62019 (VDE 0640)

Technical specifications

		5SW3 30.	5SW3 330
Terminals			
• Conductor cross-section	mm ²	0.75 ... 2.5	
• Recommended tightening torque	Nm	0.6 ... 0.8	
Min. contact load		50 mA/24 V	
Max. contact load			
• 230 V AC, AC-12	A	6	5
• 230 V AC, AC-14	A	3.6	--
• 220 V DC, DC-12	A	1	0.5

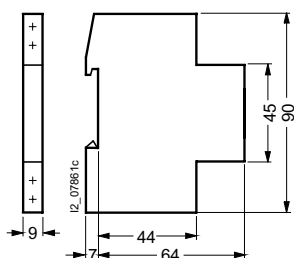
Selection and ordering data

Circuit diagram	Version	MW	Order No.	Weight 1 unit approx. kg	PS*/ P. unit Unit(s)
Auxiliary circuit switches (AS) on RCCBs for 5SM3 up to 80 A					
	Auxiliary switch (AS)				
		1 NO + 1 NC	0.5	5SW3 300	0.042 1
		2 NC	0.5	5SW3 301	0.042 1
	2 NO	0.5	5SW3 302	0.042 1	
Auxiliary circuit switches (AS) on RCCBs for 5SM3, 100 A and 125 A					
	Auxiliary switch (AS)				
		1 NO + 1 NC	0.5	5SW3 330	0.040 1

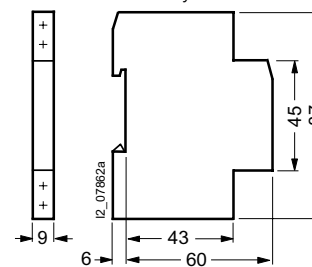
Dimensional drawings

Auxiliary circuit switches (AS), can be retrofitted

on 5SM3 residual current operated circuit-breakers (RCCBs) up to 80 A, 5SW3 30. auxiliary circuit switches, can be retrofitted



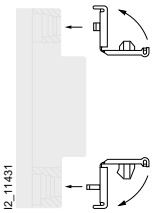


on 5SM3 residual current operated circuit-breakers (RCCBs), 100 A and 125 A, 5SW3 330 auxiliary circuit switches, can be retrofitted



Residual Current Protective Devices Additional Components/Accessories for RCCBs

Accessories for 5SM3

Accessories











Version	Order No.	Weight 1 unit approx. kg	PS*/ P. unit Unit(s)
 <p>Covers for connection terminals for residual current operated circuit-breakers up to 80 A, sealable (2 units in plastic bag)</p> <p>2 MW 2.5 MW 4 MW</p>	5SW3 010	0.003	1
	5SW3 011	0.004	1
	5SW3 008	0.006	1
 <p>Locking devices for residual current operated circuit-breakers up to 80 A, sealable and lockable 4.5 mm lock hasp diameter</p>	5SW3 303	0.008	1
 <p>Padlocks for 5SW3 303 locking device</p>	5ST3 802	0.027	1
<p>Locking devices with padlock Comprising 5SW3 303 locking device and 5ST3 802 padlock</p>	5SW3 312	1 set 0.035	1 set

Residual Current Protective Devices Additional Components/Accessories for RCCBs

Accessories for 5SM3

4

Accessories

	Version	Order No.	Weight 1 unit approx. kg	PS*/ P. unit Unit(s)
	Cu busbars 10 mm² for the busbar mounting of RCCBs fully insulated			
	2-phase			
	2 x 2-phase	5ST3 606	0.016	1/10
	3 x 2-phase	5ST3 607	0.024	1/10
	6 x 2-phase	5ST3 608	0.048	1/10
	2 x (2-phase + AS)	5ST3 610	0.020	1/10
	3 x (2-phase + AS)	5ST3 611	0.030	1/10
	5 x (2-phase + AS)	5ST3 612	0.050	1/10
	3-phase			
	2 x 3-phase	5ST3 613	0.039	1/10
	3 x 3-phase	5ST3 614	0.060	1/10
	4 x 3-phase	5ST3 615	0.076	1/10
	2 x (3-phase + AS)	5ST3 616	0.040	1/10
	4 x (3-phase + AS)	5ST3 617	0.080	1/10
	3-phase + N			
	2 x 3-phase + N	5ST3 621	0.051	1/10
	3 x 3-phase + N	5ST3 622	0.078	1/10
	3-phase, for a 5SM3 RCCB, 4-pole, with 8 miniature circuit-breakers			
	3/N + 8 terminals	5ST3 624	0.075	1/10
	without end caps length 1016 mm			
	2-phase	5ST3 735	0.290	1/20
	2-phase + AS	5ST3 737	0.290	1/20
	3-phase	5ST3 740	0.430	1/20
	Cu busbars 16 mm² for the busbar mounting of RCCBs fully insulated			
	2-phase			
	2 x 2-phase	5ST3 636	0.024	1/10
	3 x 2-phase	5ST3 637	0.039	1/10
	6 x 2-phase	5ST3 638	0.076	1/10
	2 x (2-phase + AS)	5ST3 640	0.026	1/10
	3 x (2-phase + AS)	5ST3 641	0.045	1/10
	5 x (2-phase + AS)	5ST3 642	0.084	1/10
	3-phase			
	2 x 3-phase	5ST3 643	0.058	1/10
	3 x 3-phase	5ST3 644	0.083	1/10
	4 x 3-phase	5ST3 645	0.110	1/10
	2 x (3-phase + AS)	5ST3 646	0.060	1/10
	4 x (3-phase + AS)	5ST3 647	0.120	1/10
	3-phase + N			
	2 x 3-phase + N	5ST3 651	0.080	1/10
	3 x 3-phase + N	5ST3 652	0.116	1/10
	3-phase, for a 5SM3 RCCB, 4-pole, with 8 miniature circuit-breakers			
	3/N + 8 terminals	5ST3 654	0.114	1/10
	without end caps length 1016 mm			
	2-phase	5ST3 705	0.290	1/20
	2-phase + AS	5ST3 707	0.290	1/20
	3-phase	5ST3 710	0.430	1/20
	End caps for lateral insulation of cut-to-length busbars	2 and 3-phase	5ST3 750	0.001 1/10
	Protection against contact for free connections, yellow (RAL 1004)		5ST3 655	0.003 1/10

Further busbar versions see accessories for miniature circuit-breakers.

Residual Current Protective Devices

Additional Components/Accessories for RCCBs

5SM1 930 leakage current measurement units

Benefits

- The leakage current measurement unit enables systematic selection of the rated residual current for the RCCB, thus preventing accidental tripping. The measured leakage current should be a maximum of 1/3 of the rated residual current of the RCCBs. If this condition is not met due to the rated current required to protect the RCCB, remedial action must be taken at the equipment that generates the leakage current.
- This makes it considerably easier to determine the cause when RCCBs are accidentally tripped, particularly in extended systems
- Matching of measuring curve, particularly on residual current operated circuit-breakers, universal current sensitive (Type B)
- Mounting depth 55 mm

Application

- Rated voltage: up to 500 V AC; 50 to 60 Hz
- For measuring leakage currents of up to 300 mA in electrical systems
- Using the enclosed calibration curve, a voltmeter with an internal resistance of $> 1 \text{ M}\Omega/\text{V}$ can determine the leakage current. Measuring range for AC voltage: U_{rms} : 1 mV to 2 V.

Function

- **Leakage currents** are currents, which, during uninterrupted operation, leak from the PE conductor or other ground connections. As a result, the difference of the currents flowing to and from the device will be higher than zero due to the RCCB. If the tripping current of the RCCB is reached, it then trips since leakage currents are similarly recorded and evaluated as fault currents.
- The leakage current measuring unit lets you determine the static leakage currents flowing during plant runtime. The device records and evaluates the currents like the RCCB, thus providing a direct statement on how much the RCCB has already been pre-loaded.

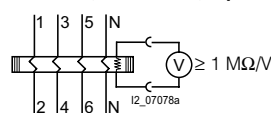
Selection and ordering data

Circuit diagram	Rated residual current $I_{\Delta n}$ mA	Rated current I_n A	MW	Order No.	Weight 1 unit approx. kg	PS*/ P. unit Unit(s)
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5SM1 930 leakage current measurement units



500 V AC; 50 ... 60 Hz; 4-pole



0 ... 300

63

4

5SM1 930-0

0.430

1

Gossen-Metrawatt offers suitable test devices for RCCB function tests and for testing protective measures.

Information is available at:

Gossen-Metrawatt GmbH
Thomas-Mann-Str. 16-20
D-90471 Nuremberg

Tel. +49 (0)911 86 02 111
Fax +49 (0)911 86 02 777

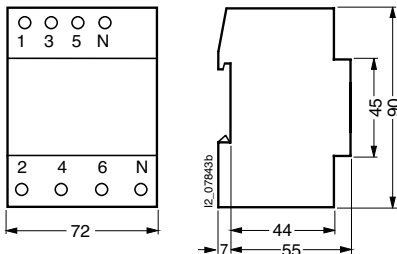
<http://www.gmc-instruments.com>

e-mail:

info@gmc-instruments.com

Dimensional drawings

5SM1 930-0 leakage current measurement unit



Residual Current Protective Devices RCCBs with Integral Overcurrent Protection, (RCBOs)

5SU1, product overview

4

Design

RCBOs are made up of one part for fault-current detection and one part for overcurrent detection. These are equipped with a delayed overload/time-dependent thermal release (thermal bimetal) for low overcurrents and with an instantaneous electromagnetic release for higher overload and short-circuit currents.

The special contact materials used guarantee a long service life and offer a high degree of protection against contact welding.

Function

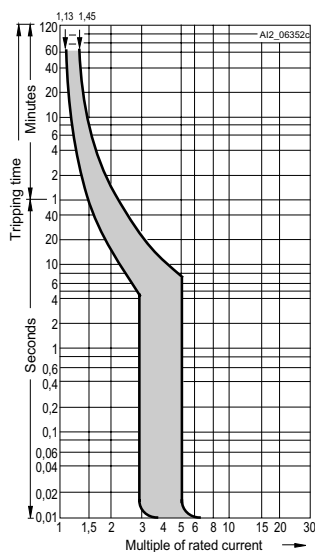
Thanks to the extremely fast contact separation in cases of failures and the rapid quenching of the arc consequently generated in the arcing chamber, the RCBOs ensure safe and current-limiting disconnection.

The permissible limit I^2t values of the energy limitation class 3 specified in EN 61009-1 (VDE 0664 Part 20) are generally undercut by 50%. This guarantees an excellent selectivity towards upstream overcurrent protection devices.

Characteristic curves

Tripping characteristics according to EN 61009-1 (VDE 0664 Part 20)

Tripping characteristic B



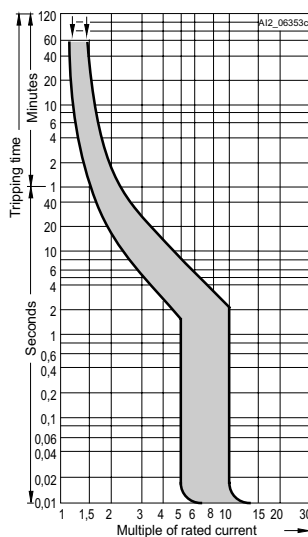
- Line protection mainly in outlet circuits; no proof required regarding personal safety.

In the case of ambient temperatures that differ from 30°C, the current values of the delayed tripping operation change by approx. 5 % per 10 K temperature difference > for temperatures lower and < for temperatures higher than 30 °C.

If more than one electrical circuit is loaded in a series of MCBs or RCBOs, the resulting increase in ambient temperature affects the characteristic curve.

In this case an additional correction factor, specific to the rated current of the RCBOs, must be taken into account.

Tripping characteristic C



- General line protection, especially advantageous with higher starting currents (lamps, motors, etc.)

Number	1	2 ... 3	4 ... 6	> 7
Correction factor K	1.00	0.90	0.88	0.85

Residual Current Protective Devices

RCCBs with Integral Overcurrent Protection, (RCBOs)

5SU1, general data

Overview

Tripping characteristics

Tripping characteristics at an ambient temperature of 30 °C

Tripping characteristic	Standards	Thermal releases				Electromagnetic releases		
		Test currents:		tripping time		Test currents:		
		limiting no-damage current I_1	minimum no-damage current I_2	$I_n \leq 63 \text{ A}$ t	$I_n > 63 \text{ A}$ t	hold I_4	latest tripping instant I_5	tripping time t
B	IEC 61009-1/EN 61009-1 VDE 0664 Part 20	$1.13 \times I_n$	$1.45 \times I_n$	$> 1 \text{ h}$ $< 1 \text{ h}$	$> 2 \text{ h}$ $< 2 \text{ h}$	$3 \times I_n$	$5 \times I_n$	$\geq 0.1 \text{ s}$ $< 0.1 \text{ s}$
C		$1.13 \times I_n$	$1.45 \times I_n$	$> 1 \text{ h}$ $< 1 \text{ h}$	$> 2 \text{ h}$ $< 2 \text{ h}$	$5 \times I_n$	$10 \times I_n$	$\geq 0.1 \text{ s}$ $< 0.1 \text{ s}$

Breaking capacity

Particular demands are made on the MCB part of the RCBO with regard to breaking capacity.

The values are standardized and are determined according to the test conditions of EN 61009-1 (VDE 0664 Part 20).

The most common values are $6\,000$ and $10\,000$.

Residual Current Protective Devices RCCBs with Integral Overcurrent Protection, (RCBOs)

5SU1, general data

4

Overview

Selectivity of RCBOs/fuses

Distribution systems are usually set up as radial networks. An overcurrent protection device is required for each reduction of the cable cross-section. This produces a series connection staggered according to rated currents, which should, if possible, be "selective".

Selectivity means that, in the event of a fault, only the protective device that is directly next to the fault in the current circuit is tripped. This means that current circuits in parallel can maintain a power flow.

In the case of RCBOs with upstream fuses, the selectivity limit depends largely on the current limiting and tripping characteristics of the RCBO and the melting I^2t value of the fuse.

This produces different selectivity limits for RCBOs with different characteristics and rated short-circuit capacity.

The following tables provide information on the short-circuit currents up to which selectivity exists between RCBOs and upstream fuse according to DIN VDE 0636 Part 21. The values specified in kA are limit values that were determined under unfavorable test conditions. Under normal practical conditions, you can often expect considerably better values, depending on the upstream fuses.

Limit values of selectivity of RCBOs/fuses in kA

Downstream RCBOs	I_n [A]	Upstream fuses							
		16 A	20 A	25 A	35 A	50 A	63 A	80 A	100 A
5SU1.53 / 5SU1.56									
Characteristic B	6	0.4	0.7	1.1	2.0	4.1	•	•	•
	10	--	0.5	0.75	1.4	2.4	3.4	4.2	•
	13	--	0.45	0.7	1.3	2.0	2.7	3.6	•
	16	--	0.45	0.7	1.3	2.0	2.7	3.6	•
	20	--	--	0.7	1.3	2.0	2.7	3.6	•
	25	--	--	--	1.3	2.0	2.7	3.6	•
	32	--	--	--	--	2.0	2.7	3.6	•
	40	--	--	--	--	1.8	2.7	3.6	•
Characteristic C	6	0.35	0.55	0.8	1.5	2.8	4.7 ¹⁾	•	•
	8	--	0.45	0.7	1.4	2.3	3.3	4.2	•
	10	--	0.45	0.7	1.4	2.3	3.3	4.2	•
	13	--	0.4	0.6	1.2	2.0	3.0	3.5	•
	16	--	0.4	0.6	1.2	2.0	3.0	3.5	•
	20	--	--	0.6	1.2	2.0	3.0	3.5	•
	25	--	--	--	1.2	2.0	3.0	3.5	•
	32	--	--	--	--	2.0	2.8	3.5	•
40	--	--	--	--	1.8	2.8	3.5	•	

• \geq rated short-circuit capacity acc. to EN 61009-1 4 500 (type 5SU1.53) / 6 000 (type 5SU1.56).

1) Only type 5SU1.56 6 000

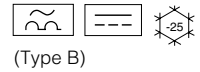
Limit values of selectivity of RCBOs/fuses in kA

Downstream RCBOs	I_n [A]	Upstream fuses								
		16 A	20 A	25 A	35 A	50 A	63 A	80 A	100 A	125 A
5SU1.54										
Characteristic B	6	0.45	0.7	1.1	2.2	5.0	•	•	•	•
	10	--	0.55	0.8	1.5	2.8	4.6	7.0	•	•
	13	--	0.5	0.75	1.4	2.3	3.9	6.0	•	•
	16	--	0.5	0.75	1.4	2.3	3.9	6.0	•	•
	20	--	--	0.75	1.4	2.3	3.9	6.0	•	•
	25	--	--	--	1.2	2.0	3.1	4.5	8.0	•
	32	--	--	--	--	2.0	3.1	4.5	8.0	•
	40	--	--	--	--	1.8	2.8	4.0	7.0	•
Characteristic C	6	0.4	0.6	0.9	1.7	3.3	6.5	•	•	
	8	--	0.5	0.8	1.5	2.7	5.0	7.0	•	
	10	--	0.5	0.8	1.5	2.7	5.0	7.0	•	
	13	--	0.5	0.7	1.3	2.3	4.0	5.0	•	
	16	--	0.5	0.7	1.3	2.3	4.0	5.0	•	
	20	--	--	0.6	1.2	2.0	3.2	4.4	8.0	
	25	--	--	--	1.2	2.0	3.2	4.4	8.0	
	32	--	--	--	--	1.8	2.8	3.6	7.0	
40	--	--	--	--	1.8	2.8	3.6	7.0		

• \geq rated short-circuit capacity acc. to EN 61009-1 10 000

Residual Current Protective Devices

SIQUENCE RCCBs with Integral Overcurrent Protection (RCBOs), UC Sensitive



5SU1, type B, product overview

Overview

	Number of poles	Rated current I_n A	Rated residual current $I_{\Delta n}$ mA	MW	Additional components can be retrofitted
SIQUENCE RCBOs, type B¹⁾, 100 ... 125 A					
[K] Short-time delayed tripping, surge current withstand capability > 3kA Rated short-circuit capacity 10 kA					
<ul style="list-style-type: none"> Rated voltage 400 V AC; Characteristic C 	4	100 125	30, 300	11	•
<ul style="list-style-type: none"> Rated voltage 400 V AC; Characteristic D 	4	100	30, 300	11	•
<ul style="list-style-type: none"> Rated voltage 480 V AC; Characteristic C 	4	100 125	300	11	•

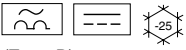
1) = type B for AC fault currents, pulsating and smooth DC fault currents.

Technical specifications

Standards	IEC/EN 61009, VDE 0664 Part 20, IEC/EN 61543, VDE 0664 Part 30, VDE 0664 Part 200	
Versions	4-pole	
Rated voltages U_n	V AC	400 and 480, 50 ... 60 Hz
Rated currents I_n	A	100, 125
Rated residual currents $I_{\Delta n}$	mA	30, 300
Rated short-circuit capacity	kA	10
Enclosure	gray molded-plastic (RAL 7035)	
Mounting depth	mm	70
Terminals	on both sides tunnel terminals with wire protection	
<ul style="list-style-type: none"> Conductor cross-section - solid and stranded - finely stranded with end sleeve Terminal tightening torque, recommended 	mm ² mm ² Nm	6 ... 50 6 ... 35 3.0 ... 3.5
Supply connection	either top or bottom	
Mounting position	any	
Mounting technique	can be snapped onto 35 mm standard mounting rail (TH 35 acc. to EN 60715)	
Degree of protection	IP20 acc. to EN 60529 (VDE 0470 Part 1) IP40 for installation in distribution boards IP54 for installation in molded-plastic enclosure	
Protection against contact	Protection against contact with fingers or the back of the hand acc. to EN 50274 (VDE 0660 Part 5.14)	
Minimum operational voltage for test function operation	V AC	150
Device service life	> 10 000 operations (electrical and mechanical; test cycle acc. to regulations)	
Storage temperature	°C	-40 ... +75
Ambient temperature	°C	-5 ... +45, for versions with the symbol : -25 ... +45
Resistance to climate acc. to IEC 60068-2-30	28 cycles (55 °C; 95 % rel. humidity)	
CFC and silicone-free	yes	

Residual Current Protective Devices

SIQUENCE RCCBs with Integral Overcurrent Protection (RCBOs), UC Sensitive



(Type B)

NEW

5SU1, type B, 100 ... 125 A

4


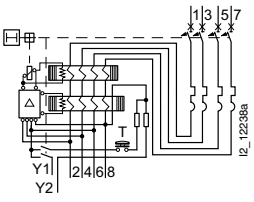
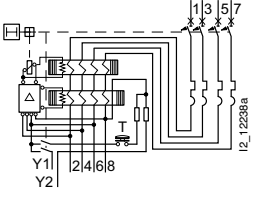
Benefits

- UC sensitive: for detection of AC residual currents, pulsating and smooth DC residual currents
- Time-saving wiring and simplified device co-ordination thanks to RCBO for combined personnel and line protection in a single device
- Increased operating safety in systems with capacitive impedances due to adapted tripping characteristic
- Additional components can be retrofitted by the customer
- External remote tripping over Y1/Y2 terminals.

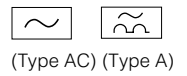
Application

- Systems with equipment in which smooth DC residual currents can also arise (e.g. with B6 bridge circuit on frequency converters and medical equipment)
- Product standards: IEC/EN 61009-1 (VDE 0664, Part 10); VDE 0664 Part 200; IEC/EN 61543 (VDE 0664, Part 30)
- For use in three-phase current systems
- $U_n = 400 \text{ V}$ or $U_n = 480 \text{ V}$; 50 ... 60 Hz
- Definition of surge current withstand capability with current waveform 8/20 μs according to DIN VDE 0432 Part 2
- **K** K-type: short-time delayed tripping in the case of transient leakage currents. High surge current withstand capability: > 3kA.

Selection and ordering data

Circuit diagram	Rated residual current $I_{\Delta n}$ mA	Rated current I_n A	MW	MCB characteristic C Order No.	MCB characteristic D Order No.	Weight 1 unit approx. kg	PS*/ P. unit Unit(s)
K short-time delayed tripping, surge current withstand capability >3 kA							
 	400 V AC; 50 ... 60 Hz; 4-pole						
	10 000	30	100	11	5SU1 374-7AK81	5SU1 374-8AK81	1.950 1
			125		5SU1 374-7AK82	--	1.950 1
		300	100	11	5SU1 674-7AK81	5SU1 674-8AK81	1.950 1
		125		5SU1 674-7AK82	--	1.950 1	
	480 V AC; 50 ... 60 Hz; 4-pole						
	10 000	300	100	11	5SU1 674-7CK81	--	1.950 1
			125		5SU1 674-7CK82	--	1.950 1

Residual Current Protective Devices RCCBs with Integral Overcurrent Protection (RCBOs)



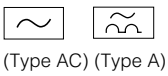
5SU1, type AC and type A, product overview

Overview

	Number of poles	Rated current I_n A	Rated residual current $I_{\Delta n}$ mA	MW	Additional components can be retrofitted
RCBOs, type AC¹⁾ and type A²⁾, 6 ... 40 A, (1 + N)-pole					
instantaneous tripping, surge current withstand capability >1 kA Rated short-circuit capacity 4.5 kA 4 500 • Characteristic B and C 3	2	6 10 13 16 20 25 32 40	10, 30, 300 30, 300	2	• • • • • • •
Rated short-circuit capacity 6 kA 6 000 • Characteristic B and C 3	2	6 8 10 13 16 20 25 32 40	30, 300 30, 300 30, 300	2	• • • • • • •
Rated short-circuit capacity 10 kA 10 000 • Characteristic B and C 3	2	6 8 10 13 16 20 25 32 40	10, 30, 300 30 10, 30, 300 30, 300	2	• • • • • • •
RCBOs, type AC¹⁾, 6 ... 32 A, 2-pole					
instantaneous tripping Rated short-circuit capacity 4.5 kA 4 500 • Characteristic B 3	2	6 10 16 20 25 32	30 30	4	• • • • •

1) = type AC for AC fault currents.

2) = type A for AC and pulsating DC residual currents.




Residual Current Protective Devices RCCBs with Integral Overcurrent Protection (RCBOs)

5SU1, type AC and type A, product overview

4

Technical specifications

Standards	IEC/EN 61009, VDE 0664 Part 20, IEC/EN 61543, VDE 0664 Part 30	
Versions	2- (1 + N)-pole	
Rated voltages U_n	V AC	125 ... 230, 50 ... 60 Hz
Rated currents I_n	A	6, 8, 10, 13, 16, 20, 25, 32, 40
Rated residual currents $I_{\Delta n}$	mA	10, 30, 300
Rated short-circuit capacity	kA	4.5, 6, 10
Energy limitation class	3	
Enclosure	gray molded-plastic (RAL 7035)	
Mounting depth	mm	70
Terminals	Combined terminals at both sides for a simultaneous connection of busbars (pin-type) and conductors	
<ul style="list-style-type: none"> Conductor cross-section - solid and stranded - finely stranded with end sleeve Terminal tightening torque, recommended 	mm ² mm ² Nm	0.75 ... 35 0.75 ... 25 2.5 ... 3.0
Supply connection	either top or bottom	
Mounting position	any	
Mounting technique	can be snapped onto 35 mm standard mounting rail (TH 35 acc. to EN 60715)	
Degree of protection	IP20 acc. to DIN EN 60529 (VDE 0470 Part 1) IP40 for installation in distribution boards IP54 for installation in molded-plastic enclosure	
Protection against contact	Protection against contact with fingers or the back of the hand acc. to EN 50274 (VDE 0660 Part 514)	
Minimum operational voltage for test function operation	V AC	100
Device service life	> 10 000 operations (electrical and mechanical; test cycle acc. to regulations)	
Storage temperature	°C	-40 ... +75
Ambient temperature	°C	-5 ... +45, for versions with the symbol  : -25 ... +45
Resistance to climate acc. to IEC 60068-2-30	28 cycles (55 °C; 95 % rel. humidity)	
CFC and silicone-free	yes	

Residual Current Protective Devices RCCBs with Integral Overcurrent Protection (RCBOs)

4 500 3 6 000 3 (Type AC)

5SU1, type AC, 6 ... 40 A, (1 + N)-pole

NEW

Benefits

- Compact device version for personnel and line protection
- Simplified device co-ordination thanks to unit comprising residual current operated circuit-breaker RCCB and miniature circuit-breaker
- Saves time with wiring
- Maximum plant availability thanks to assignment of a device to a specific electrical circuit
- Excellent current limiting and selectivity characteristics
- Combination terminal for simultaneous connection of pin busbars and feeder cables
- Simple connection of feeder cables due to rear relocation of busbar connection
- Identical terminals at both sides for an optional infeed from the top or the bottom
- Operating handle and test button can be locked by means of a handle locking device
- Customers can retrofit additional components to the miniature circuit-breakers for additional uses.


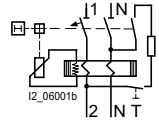
Additional features of the 10 kA version:

- Reach-round protection exceeds requirements according to BGV A3
- No tools required for rail mounting or dismounting
- Separate switching position indicator.

Application

- Personnel and fire protection
 - $I_{\Delta n} \leq 30$ mA: additional protection in the case of direct contact
 - $I_{\Delta n} \leq 300$ mA: preventative fire protection in the case of ground fault currents
- Product standards: IEC/EN 61009-1; IEC 61009-2-1; IEC/EN 61543 (VDE 0664, Part 30)
- $U_n = 230$ V; 50 ... 60 Hz
- Miniature circuit-breaker characteristic B or C
- Definition of surge current withstand capability with current waveform 8/20 μ s acc. to DIN VDE 0432, Part 2.

Selection and ordering data

Circuit diagram	Rated residual current $I_{\Delta n}$ mA	Rated current I_n A	MW	MCB characteristic B	MCB characteristic C	Weight 1 unit approx. kg	PS*/ P. unit Unit(s)	
				Order No.	Order No.			
 <p>230 V AC; 50 ... 60 Hz; 2- (1 + N)-pole</p>  <p>4 500 3</p>	10	6	2	5SU1 153-0KK06	5SU1 153-1KK06	0.250	1	
		10		5SU1 153-0KK10	5SU1 153-1KK10	0.250	1	
		13		5SU1 153-0KK13	5SU1 153-1KK13	0.250	1	
		16		5SU1 153-0KK16	5SU1 153-1KK16	0.250	1	
		30		6	5SU1 353-0KK06	5SU1 353-1KK06	0.250	1
				10	5SU1 353-0KK10	5SU1 353-1KK10	0.250	1
				13	5SU1 353-0KK13	5SU1 353-1KK13	0.250	1
				16	5SU1 353-0KK16	5SU1 353-1KK16	0.250	1
	20	20	5SU1 353-0KK20	5SU1 353-1KK20	0.250	1		
		25	5SU1 353-0KK25	5SU1 353-1KK25	0.250	1		
		32	5SU1 353-0KK32	5SU1 353-1KK32	0.250	1		
		40	5SU1 353-0KK40	5SU1 353-1KK40	0.250	1		
		300	6	5SU1 653-0KK06	5SU1 653-1KK06	0.250	1	
			10	5SU1 653-0KK10	5SU1 653-1KK10	0.250	1	
			13	5SU1 653-0KK13	5SU1 653-1KK13	0.250	1	
			16	5SU1 653-0KK16	5SU1 653-1KK16	0.250	1	
	 <p>230 V AC; 50 ... 60 Hz; 2- (1 + N)-pole</p>  <p>6 000 3</p>	10	6	2	5SU1 156-0KK06	5SU1 156-1KK06	0.250	1
			10		5SU1 156-0KK10	5SU1 156-1KK10	0.250	1
			13		5SU1 156-0KK13	5SU1 156-1KK13	0.250	1
			16		5SU1 156-0KK16	5SU1 156-1KK16	0.250	1
30			6		5SU1 356-0KK06	5SU1 356-1KK06	0.250	1
			10		5SU1 356-0KK10	5SU1 356-1KK10	0.250	1
			13		5SU1 356-0KK13	5SU1 356-1KK13	0.250	1
			16		5SU1 356-0KK16	5SU1 356-1KK16	0.250	1
20		20	5SU1 356-0KK20	5SU1 356-1KK20	0.250	1		
		25	5SU1 356-0KK25	5SU1 356-1KK25	0.250	1		
		32	5SU1 356-0KK32	5SU1 356-1KK32	0.250	1		
		40	5SU1 356-0KK40	5SU1 356-1KK40	0.250	1		
		300	6	5SU1 656-0KK06	5SU1 656-1KK06	0.250	1	
			10	5SU1 656-0KK10	5SU1 656-1KK10	0.250	1	
			13	5SU1 656-0KK13	5SU1 656-1KK13	0.250	1	
			16	5SU1 656-0KK16	5SU1 656-1KK16	0.250	1	
20		20	5SU1 656-0KK20	5SU1 656-1KK20	0.250	1		
		25	5SU1 656-0KK25	5SU1 656-1KK25	0.250	1		
		32	5SU1 656-0KK32	5SU1 656-1KK32	0.250	1		
		40	5SU1 656-0KK40	5SU1 656-1KK40	0.250	1		

Residual Current Protective Devices RCCBs with Integral Overcurrent Protection (RCBOs)

NEW

5SU1, type AC, 6 ... 40 A, (1 + N)-pole

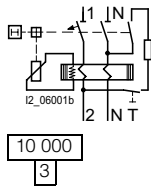
Selection and ordering data

Circuit diagram	Rated residual current $I_{\Delta n}$ mA	Rated current I_n A	MW	MCB characteristic B	MCB characteristic C	Weight 1 unit approx. kg	PS*/ P. unit Unit(s)
				Order No.	Order No.		

Instantaneous tripping,
surge current withstand capability >1 kA



230 V AC; 50 ... 60 Hz; 2- (1 + N)-pole



10	6	2	5SU1 154-0KK06	5SU1 154-1KK06	0.250	1
			5SU1 154-0KK10	5SU1 154-1KK10		
			5SU1 154-0KK13	5SU1 154-1KK13		
			5SU1 154-0KK16	5SU1 154-1KK16		
30	6	2	5SU1 354-0KK06	5SU1 354-1KK06	0.250	1
			5SU1 354-0KK10	5SU1 354-1KK10		
			5SU1 354-0KK13	5SU1 354-1KK13		
			5SU1 354-0KK16	5SU1 354-1KK16		
	20		5SU1 354-0KK20	5SU1 354-1KK20	0.250	1
			5SU1 354-0KK25	5SU1 354-1KK25		
			5SU1 354-0KK32	5SU1 354-1KK32		
			5SU1 354-0KK40	5SU1 354-1KK40		
300	6	2	5SU1 654-0KK06	5SU1 654-1KK06	0.250	1
			5SU1 654-0KK10	5SU1 654-1KK10		
			5SU1 654-0KK13	5SU1 654-1KK13		
			5SU1 654-0KK16	5SU1 654-1KK16		
	20		5SU1 654-0KK20	5SU1 654-1KK20	0.250	1
			5SU1 654-0KK25	5SU1 654-1KK25		
			5SU1 654-0KK32	5SU1 654-1KK32		
			5SU1 654-0KK40	5SU1 654-1KK40		

4

Residual Current Protective Devices RCCBs with Integral Overcurrent Protection (RCBOs)

4 500
3

6 000
3

(Type A)

-25

DE

5SU1, type A, 6 ... 40 A, (1 + N)-pole

NEW

Benefits

- Compact device version for personnel and line protection
- Simplified device co-ordination thanks to unit comprising residual current operated circuit-breaker RCCB and miniature circuit-breaker
- Saves time with wiring
- Maximum plant availability thanks to assignment of a device to a specific electrical circuit
- Excellent current limiting and selectivity characteristics
- Combination terminal for simultaneous connection of pin busbars and feeder cables
- Simple connection of feeder cables due to rear relocation of busbar connection
- Identical terminals at both sides for an optional infeed from the top or the bottom
- Operating handle and test button can be locked by means of a handle locking device
- Customers can retrofit additional components to the miniature circuit-breakers for additional uses.

Additional features of the 10 kA version:

- Reach-round protection exceeds requirements according to BGV A3
- No tools required for rail mounting or dismounting
- Separate switching position indicator.


Application


- Personnel and fire protection
 - $I_{\Delta n} \leq 30$ mA: additional protection in the case of direct contact
 - $I_{\Delta n} \leq 300$ mA: preventative fire protection in the case of ground fault currents
- Cable and line protection against overload and short-circuits
- Product standards: IEC/EN 61009-1 (VDE 0664, Part 20); IEC/EN 61009-2-1 (VDE 0664, Part 21); IEC/EN 61543 (VDE 0664, Part 30)
- $U_n = 230$ V; 50 ... 60 Hz
- Miniature circuit-breaker characteristic B or C
- Definition of surge current withstand capability with current waveform 8/20 μ s according to DIN VDE 0432, Part 2.

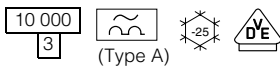
Selection and ordering data

Circuit diagram	Rated residual current $I_{\Delta n}$ mA	Rated current I_n A	MW	MCB characteristic B Order No.	MCB characteristic C Order No.	Weight 1 unit approx. kg	PS*/ P. unit Unit(s)
-----------------	--	-----------------------------	----	-----------------------------------	-----------------------------------	-----------------------------------	----------------------------

Instantaneous tripping, surge current withstand capability >1 kA

230 V AC; 50 ... 60 Hz; 2- (1 + N)-pole		Rated residual current $I_{\Delta n}$ mA	Rated current I_n A	MW	MCB characteristic B Order No.	MCB characteristic C Order No.	Weight 1 unit approx. kg	PS*/ P. unit Unit(s)	
	12_06001b	10	6	2	5SU1 153-6KK06	5SU1 153-7KK06	0.250	1	
			10	6	5SU1 153-6KK10	5SU1 153-7KK10	0.250	1	
			13	6	5SU1 153-6KK13	5SU1 153-7KK13	0.250	1	
			16	6	5SU1 153-6KK16	5SU1 153-7KK16	0.250	1	
			30	6	2	5SU1 353-6KK06	5SU1 353-7KK06	0.250	1
				10	2	5SU1 353-6KK10	5SU1 353-7KK10	0.250	1
		13		2	5SU1 353-6KK13	5SU1 353-7KK13	0.250	1	
		16		2	5SU1 353-6KK16	5SU1 353-7KK16	0.250	1	
		300	6	2	5SU1 353-6KK20	5SU1 353-7KK20	0.250	1	
			25	2	5SU1 353-6KK25	5SU1 353-7KK25	0.250	1	
			32	2	5SU1 353-6KK32	5SU1 353-7KK32	0.250	1	
			40	2	5SU1 353-6KK40	5SU1 353-7KK40	0.250	1	
			6	6	2	5SU1 653-6KK06	5SU1 653-7KK06	0.250	1
				10	2	5SU1 653-6KK10	5SU1 653-7KK10	0.250	1
				13	2	5SU1 653-6KK13	5SU1 653-7KK13	0.250	1
				16	2	5SU1 653-6KK16	5SU1 653-7KK16	0.250	1
6	20	2	5SU1 653-6KK20	5SU1 653-7KK20	0.250	1			
	25	2	5SU1 653-6KK25	5SU1 653-7KK25	0.250	1			
	32	2	5SU1 653-6KK32	5SU1 653-7KK32	0.250	1			
	40	2	5SU1 653-6KK40	5SU1 653-7KK40	0.250	1			

230 V AC; 50 ... 60 Hz; 2- (1 + N)-pole		Rated residual current $I_{\Delta n}$ mA	Rated current I_n A	MW	MCB characteristic B Order No.	MCB characteristic C Order No.	Weight 1 unit approx. kg	PS*/ P. unit Unit(s)	
	12_06001b	30	6	2	5SU1 356-6KK06	5SU1 356-7KK06	0.260	1	
			8	2	5SU1 356-6KK08	5SU1 356-7KK08	0.260	1	
			10	2	5SU1 356-6KK10	5SU1 356-7KK10	0.260	1	
			13	2	5SU1 356-6KK13	5SU1 356-7KK13	0.260	1	
			16	2	5SU1 356-6KK16	5SU1 356-7KK16	0.260	1	
			20	6	2	5SU1 356-6KK20	5SU1 356-7KK20	0.260	1
		25		2	5SU1 356-6KK25	5SU1 356-7KK25	0.260	1	
		32		2	5SU1 356-6KK32	5SU1 356-7KK32	0.260	1	
		40		2	5SU1 356-6KK40	5SU1 356-7KK40	0.260	1	
		300	6	2	5SU1 656-6KK06	5SU1 656-7KK06	0.260	1	
			10	2	5SU1 656-6KK10	5SU1 656-7KK10	0.260	1	
			13	2	5SU1 656-6KK13	5SU1 656-7KK13	0.260	1	
			16	2	5SU1 656-6KK16	5SU1 656-7KK16	0.260	1	
			20	6	2	5SU1 656-6KK20	5SU1 656-7KK20	0.260	1
				25	2	5SU1 656-6KK25	5SU1 656-7KK25	0.260	1
				32	2	5SU1 656-6KK32	5SU1 656-7KK32	0.260	1
40	2			5SU1 656-6KK40	5SU1 656-7KK40	0.260	1		



Residual Current Protective Devices RCCBs with Integral Overcurrent Protection (RCBOs)

NEW

5SU1, type A, 6 ... 40 A, (1 + N)-pole

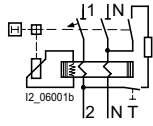
Selection and ordering data

Circuit diagram	Rated residual current $I_{\Delta n}$ mA	Rated current I_n A	MW	MCB characteristic B Order No.	MCB characteristic C Order No.	Weight 1 unit approx. kg	PS*/ P. unit Unit(s)
-----------------	--	-----------------------------	----	-----------------------------------	-----------------------------------	-----------------------------------	----------------------------

Instantaneous tripping, surge current withstand capability >1 kA



230 V AC; 50 ... 60 Hz; 2- (1 + N)-pole



10	6	2	5SU1 154-6KK06	5SU1 154-7KK06	0.260	1
	10		5SU1 154-6KK10	5SU1 154-7KK10	0.260	1
	13		5SU1 154-6KK13	5SU1 154-7KK13	0.260	1
	16		5SU1 154-6KK16	5SU1 154-7KK16	0.260	1
30	6	2	5SU1 354-6KK06	5SU1 354-7KK06	0.260	1
	8		--	5SU1 354-7KK08	0.260	1
	10		5SU1 354-6KK10	5SU1 354-7KK10	0.260	1
	13		5SU1 354-6KK13	5SU1 354-7KK13	0.260	1
	16		5SU1 354-6KK16	5SU1 354-7KK16	0.260	1
	20		5SU1 354-6KK20	5SU1 354-7KK20	0.260	1
	25		5SU1 354-6KK25	5SU1 354-7KK25	0.260	1
	32		5SU1 354-6KK32	5SU1 354-7KK32	0.260	1
	40		5SU1 354-6KK40	5SU1 354-7KK40	0.260	1
300	6	2	5SU1 654-6KK06	5SU1 654-7KK06	0.260	1
	10		5SU1 654-6KK10	5SU1 654-7KK10	0.260	1
	13		5SU1 654-6KK13	5SU1 654-7KK13	0.260	1
	16		5SU1 654-6KK16	5SU1 654-7KK16	0.260	1
	20		5SU1 654-6KK20	5SU1 654-7KK20	0.260	1
	25		5SU1 654-6KK25	5SU1 654-7KK25	0.260	1
	32		5SU1 654-6KK32	5SU1 654-7KK32	0.260	1
	40		5SU1 654-6KK40	5SU1 654-7KK40	0.260	1

4

Residual Current Protective Devices RCCBs with Integral Overcurrent Protection (RCBOs)

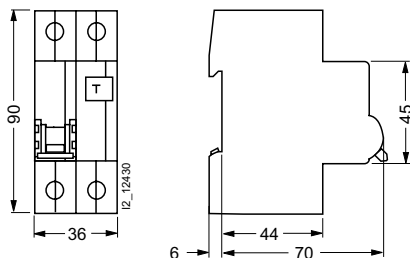
5SU1, type A, 6 ... 40 A, (1 + N)-pole

Dimensional drawings

5SU1 RCCBs with integral overcurrent protection in two modular widths

6 A ... 40 A

5SU1 153-.KK..., 5SU1 154-.KK..., 5SU1 156-.KK...,
5SU1 353-.KK..., 5SU1 354-.KK..., 5SU1 356-.KK...,
5SU1 653-.KK..., 5SU1 654-.KK..., 5SU1 656-.KK..




Residual Current Protective Devices RCCBs with Integral Overcurrent Protection (RCBOs)

5SU1, type AC, 6 ... 32 A, 2-pole

Application

- Personnel and fire protection
 - $I_{\Delta n} \leq 30$ mA: additional protection in the case of direct contact
- Product standards: IEC/EN 61009-1; IEC 61009-2-1; IEC/EN 61543 (VDE 0664, Part 30)
- $U_n = 230 \dots 400$ V AC; 50 to 60 Hz
- Miniature circuit-breaker characteristic C.

Technical specifications

Standards	IEC/EN 61009, VDE 0664 Part 20, IEC/EN 61543, VDE 0664 Part 30		
Versions	2-pole		
Rated voltages U_n	V AC	230 ... 400, 50 ... 60 Hz	
Rated currents I_n	A	6, 10, 16, 20, 25, 32	
Rated residual currents $I_{\Delta n}$	mA	30	
Rated short-circuit capacity	kA	4.5	
Energy limitation class	3		
Enclosure	gray molded-plastic (RAL 7035)		
Mounting depth	mm	70	
Terminals		RCCB part pillar terminal with wire protection	MCB part multi-purpose terminal for connecting busbars simultaneously (pin version) and conductors
• Conductor cross-section	mm ²	1.0 ... 25	0.75 ... 35
• Terminal tightening torque, recommended	Nm	2.5 ... 3.0	2.5 ... 3.0
Supply connection	either top or bottom		
Mounting position	any		
Mounting technique	can be snapped onto standard mounting rail 35 mm (TH 35 acc. to EN 60715)		
Degree of protection	IP20 acc. to EN 60529 (VDE 0470 Part 1) IP40 for installation in distribution boards IP54 for installation in molded-plastic enclosure		
Protection against contact	Protection against contact with fingers or the back of the hand acc. to EN 50274 (VDE 0660 Part 514)		
Minimum operating voltage for test function operation	V AC	195	
Device service life	> 10,000 operations (electrical and mechanical; Test cycle acc. to regulations)		
Storage temperature	°C	-40 ... +75	
Ambient temperature	°C	-5 ... +45, for versions with the symbol  : -25 ... +45	
Resistance to climate acc. to IEC 60068-2-30	28 cycles (55 °C; 95 % rel. humidity)		
CFC and silicone-free	yes		

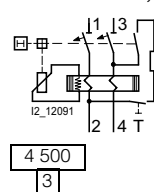
Selection and ordering data

Circuit diagram	Rated residual current $I_{\Delta n}$ mA	Rated current I_n A	MW	Order No.	Weight 1 unit approx. kg	PS*/ P. unit approx. Unit(s)
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Instantaneous tripping



230 ... 400 V AC; 50 ... 60 Hz; 2-pole

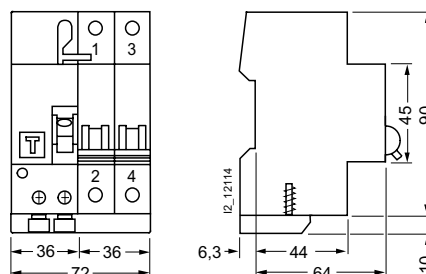


30	6	4
	10	
	16	
	20	
	25	
	32	

5SU1 323-1BB06	0.250	1
5SU1 323-1BB10	0.250	1
5SU1 323-1BB16	0.250	1
5SU1 323-1BB20	0.250	1
5SU1 323-1BB25	0.250	1
5SU1 323-1BB32	0.250	1

Dimensional drawings

5SU1 323-1BB..



Residual Current Protective Devices Additional Components/Accessories for RCBOs

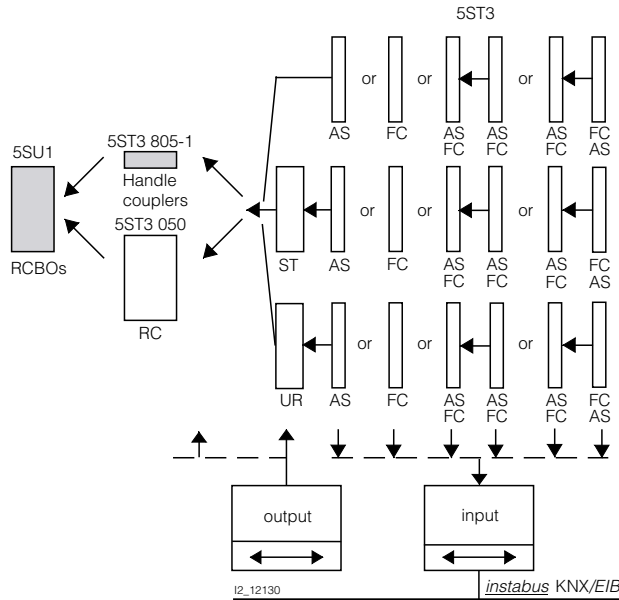
Remote controlled mechanisms for 5SU1

Benefits

- Can be retrofitted individually (see below)
- Mounting with factory-fitted brackets
- Can be mechanically latched and locked
- Further additional components can be attached
- Function switch on the front
- $U_n = 230\text{ V}$, 50 to 60 Hz
- Additional components are identical to those for 5SY miniature circuit-breakers.

Mounting concept

Using this mounting concept, all additional 5ST3 components can be combined with miniature circuit-breakers of the 5SY¹⁾ and 5SP4 series and the 5SU1 RCBO series:


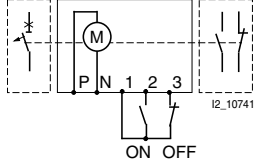


1) Not for 5SY6 ...-KV.

Function

- Remote ON/OFF switching of the RCBO.
- Remote switching ON is possible following acknowledgment of fault occurrence
- Manual switching on-site possible
- Remote display of switching status of remote controlled mechanisms and RCBOs.

Selection and ordering data

	Rated voltage U_n V AC	MW	Order No.	Weight 1 unit approx. kg	PS*/ P. unit Unit(s)
 <p>Remote controlled mechanisms (RC) for 5SU1 RCBOs</p> 	230	3.5	5ST3 050	0.395	1

For detailed application information, see operator guide.

Residual Current Protective Devices Additional Components/Accessories for RCBOs

Auxiliary circuit switches/fault signal contacts for 5SU1

Benefits

- Can be retrofitted individually (see page 4/40)
- Mounting with factory-fitted brackets
- Short-circuit protection ensured by miniature circuit-breakers, characteristic B or C and $I_n = 6\text{ A}$ or fuse gL 6 A
- Wide range of applications due to additional version for controlling programmable controllers (PLCs) according to EN 61131-2
- Can be connected to *instabus* KNX *EIB* and AS-Interface bus over binary inputs.

Application

- Indication of the switching state of the RCBO
 - AS: ON/OFF
 - FC: tripped.

Auxiliary circuit switches (AS)

5ST3 013
5ST3 014
5ST3 015











- Area of application 1 mA/5 V DC to 50 mA/30 V DC.

Auxiliary circuit switches (AS) and fault signal contacts (FC)

5ST3 0.0
5ST3 0.1
5ST3 0.2

- Min. contact load:
50 mA, 24 V
- Max. contact load:
NO contacts:
2 A, 400 V AC, AC-14
6 A, 230 V AC, AC-14
1 A, 220 V DC, DC-13
1 A, 110 V DC, DC-13
3 A, 60 V DC, DC-13
6 A, 24 V DC, DC-13
NC contacts:
2 A, 400 V AC, AC-13
6 A, 230 V AC, AC-13
1 A, 220 V DC, DC-13
1 A, 110 V DC, DC-13
3 A, 60 V DC, DC-13
6 A, 24 V DC, DC-13

Selection and ordering data

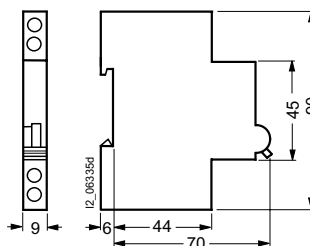
	Version	MW	Order No.	Weight 1 unit approx. kg	PS*/ P. unit Unit(s)	
	Auxiliary circuit switches (AS) for 5SU1 RCBOs¹⁾					
		1 NO + 1 NC for small output	0.5	5ST3 010 5ST3 013	0.050 0.050	1 1
		2 NO for small output		5ST3 011 5ST3 014	0.050 0.050	1 1
		2 NC for small output		5ST3 012 5ST3 015	0.050 0.050	1 1
		Fault signal contacts (FC) for 5SU1 RCBOs¹⁾				
			1 NO + 1 NC	0.5	5ST3 020	0.050
		2 NO		5ST3 021	0.050	1
		2 NC		5ST3 022	0.050	1
	Handle couplers for additional components For mounting the additional components: auxiliary switches, fault signal contacts, shunt trips and undervoltage releases onto 5SU1 ...-KK.. RCBOs, you require a handle coupler. 1 set = 5 units			5ST3 805-1	1 set 0.008	1 set

1) Additionally required for mounting onto 5SU1 ...-KK.. RCBOs: 5ST3 805-1 handle coupler.

Dimensional drawings

Auxiliary circuit switches/fault signal contacts

5ST3 010, 5ST3 011, 5ST3 012
5ST3 013, 5ST3 014, 5ST3 015
5ST3 020, 5ST3 021, 5ST3 022



For dimensional drawing of 5ST3 805-1 handle coupler, please see next page.

Residual Current Protective Devices Additional Components/Accessories for RCBOs

Shunt trips/undervoltage releases for 5SU1

Benefits

Shunt trips

- Can be retrofitted individually (see page 4/40)
- Response limits according to DIN VDE 0660 Part 100, 7.2.1.4
- Can be connected over binary outputs to *instabus* KNX *EIB* and AS-Interface bus.

Undervoltage releases

- Can be retrofitted individually (see page 4/40)
- Response limits according to DIN VDE 0660 Part 100, 7.2.1.3
- Can be connected over binary outputs to *instabus* KNX *EIB* and AS-Interface bus.

Application




Shunt trips

- Remote tripping of the RCBO.
- For voltages:
110 to 415 V AC,
110 V DC,
24 to 48 V AC/DC

Undervoltage releases

- Can be used as remote trip in an EMERGENCY-OFF loop
- Ensures disconnection of the control circuit according to EN 60204
- In cases of interrupted or insufficient voltage, the undervoltage release trips the miniature circuit-breaker or prevents it from switching on.
- For voltages:
230 V AC,
110 V DC,
24 V DC

Selection and ordering data

	Rated voltage	MW	Order No.	Weight 1 unit approx.	PS*/ P. unit
	U_n			kg	Unit(s)
	Shunt trips (ST) for 5SU1 RCBOs¹⁾				
	110 ... 415 V AC	1	5ST3 030	0.098	1
	24 ... 48 V AC/DC	1	5ST3 031	0.098	1
	Undervoltage releases (UR) for 5SU1 RCBOs¹⁾				
	230 V AC	1	5ST3 040	0.115	1
	110 V DC		5ST3 041	0.115	1
	24 V DC		5ST3 042	0.115	1
	230 V AC	1	5ST3 043	0.115	1
110 V DC		5ST3 044	0.115	1	
24 V DC		5ST3 045	0.115	1	
	Handle couplers for additional components			1 set	
	For mounting the additional components: auxiliary switches, fault signal contacts, shunt trips and undervoltage releases onto 5SU1 ...-KK.. RCBOs, you require a handle coupler. 1 set = 5 units		5ST3 805-1	0.008	1 set

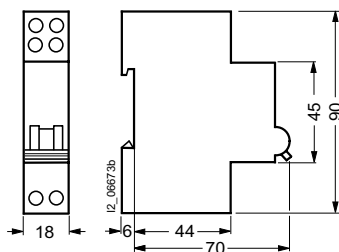
1) Additionally required for mounting onto 5SU1 ...-KK.. RCBOs: 5ST3 805-1 handle coupler.

Dimensional drawings

Shunt trips/undervoltage releases

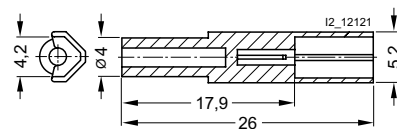
5ST3 030, 5ST3 031

5ST3 040, 5ST3 041, 5ST3 042, 5ST3 043, 5ST3 044, 5ST3 045



Handle coupler







5ST3 805-1



Residual Current Protective Devices Additional Components/Accessories for RCBOs

Accessories for 5SU1

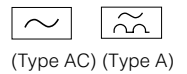
Accessories

Version	Order No.	Weight 1 unit approx. kg	PS*/ P. unit Unit(s)
 <p>Locking devices for 5SU1 ...-KK. RCBOs sealable and lockable 4.5 mm lock hasp diameter</p>	5ST3 801-1	0.010	1
 <p>Padlocks for 5ST3 801-1 locking device</p>	5ST3 802	0.027	1
<p>Cu busbars 10 mm² for busbar mounting 5SU1 ...-KK... RCBOs together Fully insulated</p> <p>2-phase</p> <p>2 x 2-phase 3 x 2-phase 6 x 2-phase</p> <p>2 x (2-phase + AS/FC) 3 x (2-phase + AS/FC) 5 x (2-phase + AS/FC)</p>  <p>Without end caps length 1016 mm</p> <p>2-phase 2-phase + AS/FC</p>	<p>5ST3 606 5ST3 607 5ST3 608 5ST3 610 5ST3 611 5ST3 612</p> <p>5ST3 735 5ST3 737</p>	<p>0.016 0.024 0.048 0.020 0.030 0.050</p> <p>0.290 0.290</p>	<p>1/10 1/10 1/10 1/10 1/10 1/10</p> <p>1/20 1/20</p>
<p>Cu busbars 16 mm² for busbar mounting 5SU1 ...-KK... RCBOs together Fully insulated</p> <p>2-phase</p> <p>2 x 2-phase 3 x 2-phase 6 x 2-phase</p> <p>2 x (2-phase + AS/FC) 3 x (2-phase + AS/FC) 5 x (2-phase + AS/FC)</p>  <p>without end caps length 1016 mm</p> <p>2-phase 2-phase + AS/FC</p>	<p>5ST3 636 5ST3 637 5ST3 638 5ST3 640 5ST3 641 5ST3 642</p> <p>5ST3 705 5ST3 707</p>	<p>0.024 0.039 0.076 0.026 0.045 0.084</p> <p>0.290 0.290</p>	<p>1/10 1/10 1/10 1/10 1/10 1/10</p> <p>1/20 1/20</p>
 <p>End caps for lateral insulation of cut-to-length busbars</p>	2 and 3-phase 5ST3 750	0.001	1/10
 <p>Protection against contact for free connections, yellow (RAL 1004)</p>	5ST3 655	0.003	1/10

Further busbar versions see accessories for miniature circuit-breakers.

Residual Current Protective Devices

RC Units for Miniature Circuit-Breakers



5SM2, product overview

Overview

	Number of poles	Rated current I_n A	Rated residual current $I_{\Delta n}$ mA	MW	Additional components can be retrofitted	(type AC) ¹⁾	(Type A) ²⁾
RC units for 5SY4, 5SY6, 5SY7, 5SY8 miniature circuit-breakers³⁾⁴⁾							
Instantaneous tripping, surge current withstand capability > 1 kA ⁵⁾	2	0.3 ... 16	10	2	at the MCB	•	•
	2	0.3 ... 40	30, 300	2	at the MCB	•	•
		0.3 ... 63	30, 100, 300, 500		at the MCB	•	•
	3	0.3 ... 40	30, 300	3	at the MCB	•	•
0.3 ... 63		30, 100, 300, 500	at the MCB		•	•	
4	0.3 ... 40	30, 300	3	at the MCB	•	•	
	0.3 ... 63	30, 100, 300, 500		at the MCB	•	•	
[K] short-time delayed surge current withstand capability > 3 kA	4	0.3 ... 40 0.3 ... 63	30	3	at the MCB at the MCB	-- --	• •
[S] selective surge current withstand capability > 5 kA	2	0.3 ... 40	300	2	at the MCB	--	•
		0.3 ... 63			at the MCB	--	•
	3	0.3 ... 63	300, 500, 1 000	3	at the MCB	--	•
		4	0.3 ... 63		300, 500, 1 000	at the MCB	--
RC units for 5SP4 miniature circuit-breakers³⁾							
Instantaneous tripping, surge current withstand capability > 1 kA ⁵⁾	2	80 ... 100	30, 300	3.5	at the MCB	•	•
	4	80 ... 100	30, 300	5	at the MCB	•	•
[S] selective surge current withstand capability > 5 kA	2	80 ... 100	300	3.5	at the MCB	--	•
	4	80 ... 100	300, 1 000	5	at the MCB	--	•

1) = type AC for AC fault currents.

2) = type A for AC and pulsating DC residual currents.

3) RC unit, additional components for 5SY. and 5SP4 miniature circuit-breakers, see also section, "Miniature circ.-break./Additional components".

4) Not for 5SY6 ...-KV..

5) For type A.

Installation



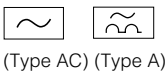
The RC units for 5SM2 ... miniature circuit-breakers are selected according to numbers of poles, I_n and $I_{\Delta n}$.



The miniature circuit-breaker is selected from the series 5SY4, 5SY6, 5SY7 or 5SY8 with the same number of poles as the desired characteristic (A, B, C or D) and suitable I_n .



The two components are simply plugged together without the need for any tools. After the connecting screws of the conductor connection between the RC unit and the MCB have been tightened, the two devices form an RCBO.




Residual Current Protective Devices

RC Units for Miniature Circuit-Breakers

5SM2, product overview

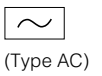
4

Technical specifications

Standards	IEC/EN 61009, VDE 0664 Part 20, IEC/EN 61543, VDE 0664 Part 30		
Versions	2-pole, 3-pole and 4-pole		
Rated voltages U_n	V AC	230 ... 400, 50 ... 60 Hz	
Rated currents I_n	A	0.3 ... 16; 0.3 ... 40; 0.3 ... 63; 80 ... 100	
Rated residual currents $I_{\Delta n}$	mA	10, 30, 100, 300, 500, 1 000	
Enclosure	gray molded-plastic (RAL 7035)		
Mounting depth	mm	70	
Terminals	Tunnel terminals with wire protection	Conductor cross-section mm ² (solid and stranded)	Recommended tightening torque Nm
	up to $I_n = 63$ A	1.0 ... 25	2.5 ... 3.0
	$I_n = 80/100$ A	6.0 ... 50	3.0 ... 3.5
Supply connection	either top or bottom		
Mounting position	any		
Mounting technique	can be snapped onto 35 mm standard mounting rail (TH 35 acc. to EN 60715)		
Degree of protection	IP20 acc. to EN 60529 (VDE 0470 Part 1) IP40 if installed in distribution boards IP54 if installed in molded-plastic enclosure		
Protection against contact	Protection against contact with fingers or the back of the hand acc. to EN 50274 (VDE 0660 Part 514)		
Minimum operational voltage for test function operation	V AC	up to $I_n = 63$ A, 4-pole	100
		up to $I_n = 63$ A, 2 and 3-pole	195
		$I_n = 80/100$ A	100
Device service life	>10 000 operations (electrical and mechanical; test cycle acc. to regulations)		
Storage temperature	°C	-40 ... +75	
Ambient temperature	°C	-5 ... +45, for versions with the symbol  : -25 ... +45	
Resistance to climate acc. to IEC 60068-2-30	28 cycles (55 °C; 95 % rel. humidity)		
CFC and silicone-free	yes		

Residual Current Protective Devices

RC Units for Miniature Circuit-Breakers



**5SM2, type AC, 0.3 ... 63 A,
for 5SY4, 5SY6, 5SY7, 5SY8**


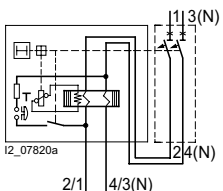

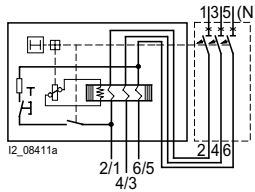

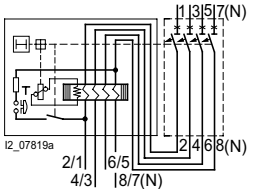
Benefits

- High application flexibility
- Customers can combine the device characteristics of RC units and miniature circuit-breakers
- Used together with miniature circuit-breakers achieves a combined personnel and line protection.

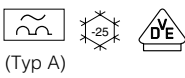
Application

- Personnel and fire protection
 - $I_{\Delta n} \leq 30$ mA: additional protection in the case of direct contact
 - $I_{\Delta n} \leq 300$ mA: preventative fire protection in the case of ground fault currents
- Product standards: IEC/EN 61009-1; IEC/EN 61009-2-1; IEC/EN 61543 (VDE 0664, Part 30)
- Rated voltage for 2, 3 and 4-pole devices: 230 to 400 V AC; 50 to 60 Hz; applicable in systems up to: 250/440 V AC
- Can be combined with miniature circuit-breakers of characteristic A, B, C and D.

Selection and ordering data

Circuit diagram	Rated residual current $I_{\Delta n}$ mA	Rated current I_n A	MW	Order No.	Weight 1 unit approx. kg	PS*/ P. unit Unit(s)
Instantaneous tripping ¹⁾						
230 ... 400 V AC; 50 ... 60 Hz; 2-pole						
		10 30 300 30 300 500 1000	0.3 ... 16 2 30 0.3 ... 40 30 0.3 ... 63	5SM2 121-0 5SM2 322-0 5SM2 622-0 5SM2 325-0 5SM2 625-0 5SM2 725-0 5SM2 825-0	0.170 0.170 0.170 0.170 0.170 0.170 0.170	1 1 1 1 1 1 1
230 ... 400 V AC; 50 ... 60 Hz; 3-pole						
		30 300 30 300	0.3 ... 40 3 0.3 ... 63	5SM2 332-0 5SM2 632-0 5SM2 335-0 5SM2 635-0	0.260 0.260 0.260 0.260	1 1 1 1
230 ... 400 V AC; 50 ... 60 Hz; 4-pole						
		30 300 30 300	0.3 ... 40 3 0.3 ... 63	5SM2 342-0 5SM2 642-0 5SM2 345-0 5SM2 645-0	0.290 0.290 0.290 0.290	1 1 1 1

1) Not for 5SY6 ...-KV.



Residual Current Protective Devices

RC Units for Miniature Circuit-Breakers

5SM2, type A, 0.3 ... 63 A,
for 5SY4, 5SY6, 5SY7, 5SY8

Benefits


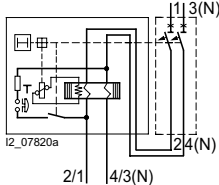

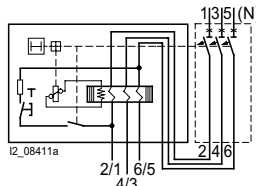

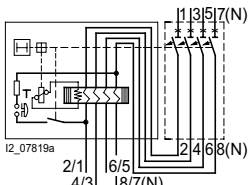
- High application flexibility
- Customers can combine the device characteristics of RC units and miniature circuit-breakers
- Used together with miniature circuit-breakers achieves a combined personnel and line protection.

Application

- Personnel and fire protection
 - $I_{\Delta n} \leq 30$ mA: additional protection in the case of direct contact
 - $I_{\Delta n} \leq 300$ mA: preventative fire protection in the case of ground fault currents

- Product standards: IEC/EN 61009-1 (VDE 0664, Part 20); IEC/EN 61009-2-1 (VDE 0664, Part 21); IEC/EN 61543 (VDE 0664, Part 30)
- Rated voltage for 2, 3 and 4-pole version: 230 to 400 V AC; 50 to 60 Hz; applicable in systems up to: 250/440 V AC
- Can be combined with miniature circuit-breakers of characteristic A, B, C and D
- Definition of surge current withstand capability with current waveform 8/20 μ s according to DIN VDE 0432, Part 2
- **S** S-Type: can be used as upstream group switch for selective tripping contrary to a downstream standard RCCB. Very high surge current withstand capability: >5 kA
- **K** K-Type: Short-time delayed tripping in the case of transient leakage currents. High surge current withstand capability: >3 kA.

Selection and ordering data

Circuit diagram	Rated residual current $I_{\Delta n}$ mA	Rated current I_n A	MW	Version	Order No.	Weight 1 unit approx. kg	PS*/ P. unit Unit(s)
Instantaneous tripping, surge current withstand capability > 1 kA¹⁾							
230 ... 400 V AC, 50 ... 60 Hz, 2-pole							
 	10	0.3 ... 16	2		5SM2 121-6	0.180	1
	30	0.3 ... 40	2		5SM2 322-6	0.170	1
	300	0.3 ... 40	2		5SM2 622-6	0.170	1
	30	0.3 ... 63			5SM2 325-6	0.170	1
	100				5SM2 425-6	0.350	1
	300				5SM2 625-6	0.170	1
500				5SM2 725-6	0.350	1	
230 ... 400 V AC, 50 ... 60 Hz, 3-pole							
 	30	0.3 ... 40	3		5SM2 332-6	0.260	1
	300	0.3 ... 40	3		5SM2 632-6	0.260	1
	30	0.3 ... 63			5SM2 335-6	0.260	1
	100				5SM2 435-6	0.365	1
	300				5SM2 635-6	0.260	1
	500				5SM2 735-6	0.260	1
230 ... 400 V AC, 50 ... 60 Hz, 4-pole							
 	30	0.3 ... 40	3		5SM2 342-6	0.290	1
	300	0.3 ... 40	3		5SM2 642-6	0.290	1
	30	0.3 ... 63			5SM2 345-6	0.290	1
	100				5SM2 445-6	0.400	1
	300				5SM2 645-6	0.290	1
	500				5SM2 745-6	0.290	1
K short-time delayed; surge current withstand capability > 3 kA¹⁾							
230 ... 400 V AC, 50 ... 60 Hz, 4-pole							
	30	0.3 ... 40	4	K	5SM2 342-6KK01	0.350	1
		0.3 ... 63		K	5SM2 345-6KK01	0.350	1
S selective; surge current withstand capability > 5 kA¹⁾							
230 ... 400 V AC, 50 ... 60 Hz, 2-pole							
	300	0.3 ... 40	2	S	5SM2 622-8	0.170	1
	300	0.3 ... 63		S	5SM2 625-8	0.170	1
230 ... 400 V AC, 50 ... 60 Hz, 3-pole							
	300	0.3 ... 63	3	S	5SM2 635-8	0.260	1
	500			S	5SM2 735-8	0.400	1
	1 000			S	5SM2 835-8	0.260	1
230 ... 400 V AC, 50 ... 60 Hz, 4-pole							
	300	0.3 ... 63	4	S	5SM2 645-8	0.290	1
	500			S	5SM2 745-8	0.400	1
	1 000			S	5SM2 845-8	0.290	1

1) Not for 5SY6 ...-KV.

For miniature circuit-breakers, see Chapter "Miniature circuit-breakers".

Residual Current Protective Devices

RC Units for Miniature Circuit-Breakers

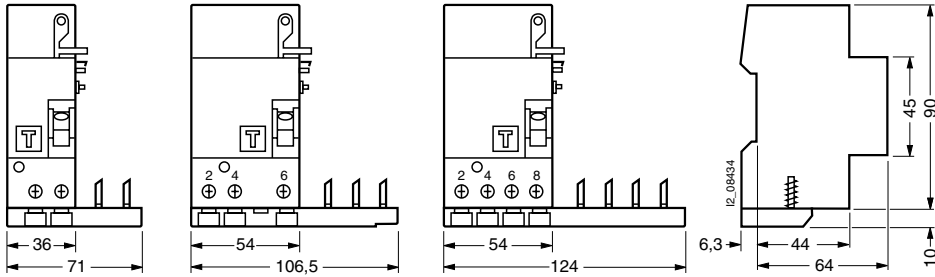
5SM2, type A, 0.3 ... 63 A,
for 5SY4, 5SY6, 5SY7, 5SY8

Dimensional drawings

5SM2 121-.,
5SM2 322-.,
5SM2 325-.,
5SM2 622-.,
5SM2 625-.,
5SM2 725-.,
5SM2 825-0

5SM2 332-.,
5SM2 335-.,
5SM2 632-.,
5SM2 635-.,
5SM2 735-.,
5SM2 835-8,

5SM2 342-.,
5SM2 345-.,
5SM2 642-.,
5SM2 645-.,
5SM2 745-.,
5SM2 845-8,





(Type AC)

Residual Current Protective Devices RC Units for Miniature Circuit-Breakers

5SM2, type AC, 80 ... 100 A, for 5SP4

4


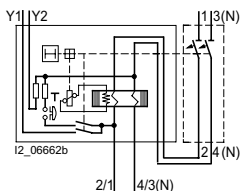

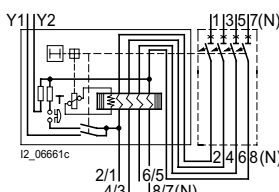
Benefits

- High application flexibility
 - Customers can combine the device characteristics of RC units and miniature circuit-breakers
 - Used together with miniature circuit-breakers achieves a combined personnel and line protection
- External remote tripping over Y1/Y2 terminals.

Application

- Personnel and fire protection
 - $I_{\Delta n} \leq 30$ mA: additional protection in the case of direct contact
 - $I_{\Delta n} \leq 300$ mA: preventative fire protection in the case of ground fault currents
- Product standards: IEC/EN 61009-1; IEC/EN 61009-2-1; IEC/EN 61543 (VDE 0664, Part 30)
- Rated voltage
 - 2-pole: 125 ... 230 V AC; 50 to 60 Hz; applicable in networks up to 125/240 V AC
 - 4-pole: 230 to 400 V AC; 50 to 60 Hz; applicable in networks up to 230/400 V AC
- Can be combined with miniature circuit-breakers of characteristic B and C.

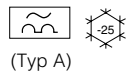
Selection and ordering data

Circuit diagram	Rated residual current $I_{\Delta n}$ mA	Rated current I_n A	MW	Order No.	Weight 1 unit approx. kg	PS*/ P. unit Unit(s)
Instantaneous tripping						
 <p>125 ... 230 V AC; 50 ... 60 Hz; 2-pole</p>  <p>I2_06662b</p>	30	80 ... 100	3.5	5SM2 327-0 5SM2 627-0	0.550	1
	300					0.550
 <p>230 ... 400 V AC; 50 ... 60 Hz; 4-pole</p>  <p>I2_06661c</p>	30	80 ... 100	5	5SM2 347-0 5SM2 647-0	0.944	1
	300					0.944

* You can order this quantity or a multiple thereof.

Residual Current Protective Devices

RC Units for Miniature Circuit-Breakers



5SM2, type A, 80 ... 100 A, for 5SP4

Benefits

- High application flexibility
- Customers can combine the device characteristics of RC units and miniature circuit-breakers
- Used together with miniature circuit-breakers achieves a combined personnel and line protection
- External remote tripping over Y1/Y2 terminals.

Application

- Personnel and fire protection
 - $I_{\Delta n} \leq 30$ mA: additional protection in the case of direct contact
 - $I_{\Delta n} \leq 300$ mA: preventative fire protection in the case of ground fault currents

- Product standards: IEC/EN 61009-1 (VDE 0664, Part 20); IEC/EN 61009-2-1 (VDE 0664, Part 21); IEC/EN 61543 (VDE 0664, Part 30)
- Rated voltage
 - 2-pole: 125 to 230 V AC; 50 to 60 Hz; can be used in systems up to 125/240 V AC
 - 4-pole: 230 to 400 V AC; 50 to 60 Hz; can be used in systems up to 230/400 V AC
- Can be combined with miniature circuit-breakers, charact. B and C
- Definition of surge current withstand capability with current waveform 8/20 μ s according to DIN VDE 0432, Part 2
- **S** S-Type: can be used as upstream group switch for selective tripping contrary to a downstream standard RCCB. Very high surge current withstand capability: >5 kA.

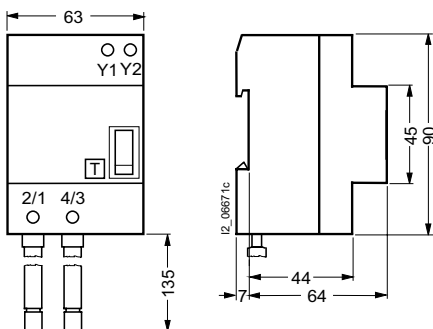
Selection and ordering data

Circuit diagram	Rated residual current $I_{\Delta n}$ mA	Rated current I_n A	MW	Version	Order No.	Weight 1 unit approx. kg	PS*/ P. unit Unit(s)
Instantaneous tripping, surge current withstand capability > 1 kA							
<p>125 ... 230 V AC, 50 ... 60 Hz, 2-pole</p>	30	80 ... 100	3.5		5SM2 327-6 5SM2 627-6	0.410	1
	300						0.410
<p>230 ... 400 V AC, 50 ... 60 Hz, 4-pole</p>	30	80 ... 100	5		5SM2 347-6 5SM2 647-6	0.630	1
	300						0.630
S selective; surge current withstand capability > 5 kA							
	300	80 ... 100		S	5SM2 627-8	0.410	1
	300 1 000	80 ... 100		S S	5SM2 647-8 5SM2 847-8	0.630 0.630	1 1

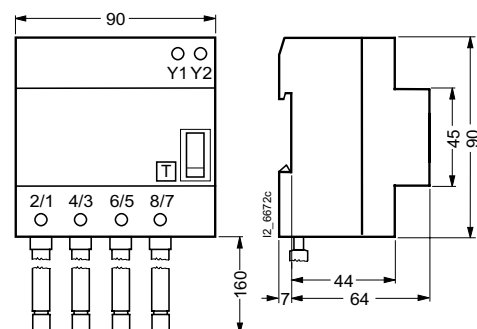
For miniature circuit-breakers, see Chapter "Miniature circuit-breakers".

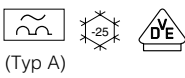
Dimensional drawings

5SM2 327-.,
5SM2 627-.



5SM2 347-.,
5SM3 647-.,
5SM2 847-8





(Typ A)

Residual Current Protective Devices RCCB Socket Outlets (SRCDs)

5SM1 and 5SZ9 protective socket outlets

4

Overview

	Number of poles	Rated current I_n A	Rated residual current $I_{\Delta n}$ mA	(Type A)
RCCB protective socket outlets				
For mounting onto switch and socket box, equipped with RCCB and 2 (SCHUKO) socket outlets	2	16	10, 30	•
Molded-plastic enclosures, equipped with RCCB and (SCHUKO) socket outlet	2	16	10	•
RCCB protective socket outlets for a higher level of protection				
(SCHUKO) DELTA profil socket outlets, titanium white	2	16	10, 30	•

= type A for AC and pulsating DC residual currents.

Application

Molded-plastic enclosures, equipped with RCCB and flush-mounting (SCHUKO) socket outlets or flush-type (SCHUKO) double socket outlets

- Rated voltage: 230 V AC, 50 to 60 Hz
- For electrical devices which, when damaged, could lead to a risk of accidental contact with live parts.
- For outdoor connection of gardening equipment and socket outlets in workshops or for agricultural purposes
- Degree of protection IP54 (5SZ9).

RCCB protective socket outlets acc. to VDE 0662, DELTA profil

- Rated voltage: 230 V AC, 50 to 60 Hz
- Childproof (SCHUKO) socket outlets with integrated RCCB
- For retrofitting in existing install. or for additional protection in children's rooms, bathroom, garage, workshop, kindergarten, schools, etc.
- With VDE mark of conformity acc. to the DIN VDE 0662 (stationary protective socket outlet for a higher level of protection, SRCD)
- The mode of operation is not dependent on the system voltage
- The protective conductor is monitored but not switched
- Degree of protection, IP21
- With screwless terminals 1.5 to 2.5 mm², for Cu and Al conductors
- For installation in conventional switch and socket boxes, Ø 60 mm, for screw connection
- Can be used in TN-S systems, TN-C systems and TT systems
- Including frame, single frame, with cutout 48 mm × 48 mm.

Note:

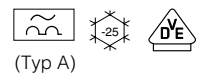
The protective measures according to DIN VDE 0100 must also be observed when RCCB protective socket outlets are used.

Selection and ordering data

	Rated residual current $I_{\Delta n}$ mA	Rated current I_n A	Order No.	Weight 1 unit approx. kg	PS*/ P. unit Unit(s)
<p>RCCB protective socket outlets acc. to VDE 0664 for installation in switch and socket box, fitted with residual current operated circuit-breaker (RCCB) and 2 (SCHUKO) childproof socket outlets</p>	10	16	5SM1 920-5 5SM1 920-8	0.500	1
	30			0.500	1
<p>RCCB protective socket outlets acc. to VDE 0664 in molded-plastic enclosure, fitted with residual current operated circuit-breaker (RCCB) and flush-type (SCHUKO) socket outlet</p>	10	16	5SZ9 206 5SZ9 216	0.760	1
	30			0.760	1

* You can order this quantity or a multiple thereof.

Residual Current Protective Devices RCCB Socket Outlets (SRCDs)



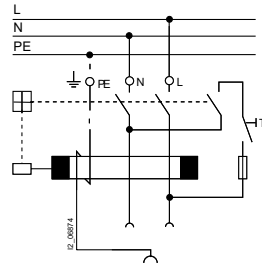
(Typ A)

5SM1 and 5SZ9 protective socket outlets

Selection and ordering data

	Rated residual current $I_{\Delta n}$ mA	Rated current I_n A	Order No.	Weight 1 unit approx. kg	PS*/ P. unit Unit(s)
--	--	-----------------------------	-----------	-----------------------------------	----------------------------

RCCB protective socket outlets acc. to VDE 0662 for increased protection level
(SCHUKO) DELTA profil socket outlets, childproof, titanium white



10
30

16

5SZ9 211
5SZ9 212

0.160 1
0.160 1

Suitable for mounting on 5TG1 825 surface-mounting enclosures.

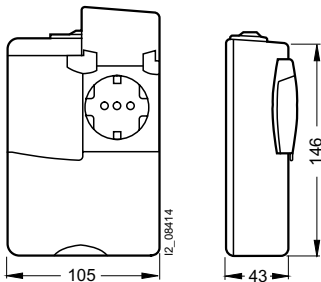
For more cutout frames for multiple combinations, please see Catalog ET D1, "DELTA switches and socket outlets".

Dimensional drawings

5SM1 920 RCCB protective socket outlets

acc. to VDE 0664 for mounting on switch and socket boxes, equipped with residual current operated circuit-breakers and 2 childproof (SCHUKO) socket outlets

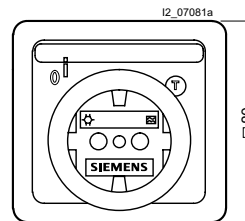
5SM1 920-5,
5SM1 920-8



5SZ9 21. RCCB protective socket outlets

(SCHUKO) DELTA profil socket outlets, childproof

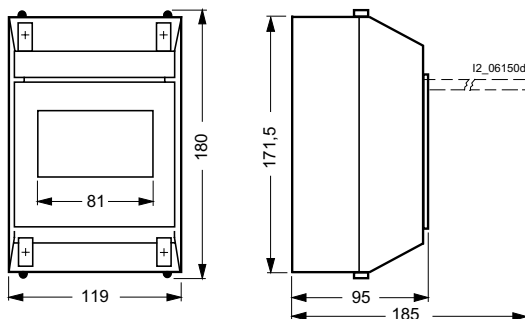
5SZ9 211,
5SZ9 212










5SZ9 2.6 RCCB protective socket outlets

molded-plastic enclosure, equipped with RCCB and flush-mounting (SCHUKO) socket outlets

5SZ9 206,
5SZ9 216



Accessories

		Order No.	Weight 1 unit approx. kg	PS*/ P. unit Unit(s)
	Terminal covers, gray for surface mounting, degree of protection IP40, sealable, with 35 mm standard mounting rail up to 2.5 MW up to 4.5 MW	5SW3 004 5SW3 005	0.084 0.114	1/10 1/5
	Wall enclosures, gray for surface mounting, degree of protection IP40, with 35 mm standard mounting rail up to 2.5 MW up to 4.5 MW	5SW3 006 5SW3 007	0.126 0.147	1 1/5
	Molded-plastic enclosures, gray surface mounting, IP54 with 35 mm standard mounting rail, sealable, with transparent hinged lid, for 4.5 MW	5SW1 200	0.450	1
	Covers can be assembled as mini distribution board, suitable for all devices, cover parts prepared for rail mounting of conventional label caps, comprising: <ul style="list-style-type: none"> • End plates (for snapping onto standard mounting rail) • Angled profile (approx. 1 m long) or, alternatively • Flat profile (as a cover between the rows of devices length approx. 1 m) 	5ST2 134 5ST2 135 5ST2 136	0.022 0.330 0.260	1/10 1/5 1/5
	Snap-on terminals for 35 mm standard mounting rail, for conductors up to 16 mm ² , solid or conductors up to 10 mm ² , stranded width: 0.5 MW	5ST2 112	0.008	1/50
	Fixing parts 4 MW (plastic)	5ST2 201	0.012	1/20
	Inscription labels (white) 15 mm x 9 mm, 3 frames with 44 labels each, any attachment and inscription, self-adhesive	5ST2 173	1 set 0.038	1 set
	Labeling system To download the labeling program free of charge, please visit our Web site at: http://www.siemens.com/beta Recommended labels ELAT-3-747 can be ordered at: Brady GmbH Otto-Hahn-Str. 5-7 D-63222 Langen Tel. +49 (0)6103/7598-660			

Residual Current Protective Devices

Notes



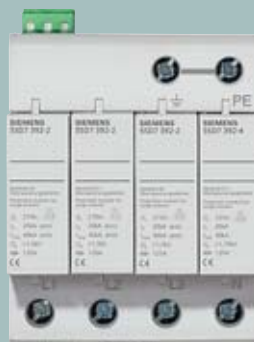
5

Lightning and Surge Arresters

Note:

At present new products of the product range 'Lightning and Surge Arresters' are being designed. These products will be available soon.

An updated version of chapter five will briefly be at your disposal on the Internet and as printed paper.



Lightning and Surge Arresters

Notes



6

Switches and Light Indicators






- 6/2 Introduction
- 6/3 5TE8 control switches
- 6/9 5TE4 8 pushbuttons
- 6/14 5TE5 8 indicator lights
- 6/17 5TE8 ON/OFF switches
- 6/22 5TE1 switch disconnectors



Switches and Light Indicators

Introduction

Overview

Devices	Application	Standards	Usage		
			Non-residual buildings	Residual buildings	Industry
 <p>5TE8 control switches</p> <ul style="list-style-type: none"> • 5TE8 two-way switches 20 A • 5TE8 group switches with center position 20 A • 5TE8 control switches 20 A 	For the switching of luminaires, motors and other electrical devices	IEC 60947-3, EN 60947-3 (VDE 0660 Part 107) IEC 60669-1, EN 60669-1 (VDE 0632 Part 1)	•	•	•
	For the application of logical links in control cabinets		•	•	•
 <p>5TE4 8 pushbuttons</p> <ul style="list-style-type: none"> • 5TE4 8 pushbuttons with/without maintained-contact function 	To be used as pushbuttons in control systems, e.g. to switch on self-locking circuits or as pushbuttons with latching function for manual use, as control switches or for the switching of loads	IEC 60947-3, EN 60947-3 (VDE 0660 Part 107) IEC 60669-1, EN 60669-1 (VDE 0632 Part 1)	•		•
 <p>Indicator lights</p> <ul style="list-style-type: none"> • 5TE5 8 indicator lights 	Optical signaling in installations and control circuits to indicate switching states or faults	DIN VDE 0710-1	•		•
 <p>5TE8 ON/OFF switches</p> <ul style="list-style-type: none"> • 5TE8 ON/OFF switches 20 A to 125 A 	For the application of logical links in control cabinets	16 A to 25 A and 40 A to 100 A: IEC 60947-3, EN 60947-3 (VDE 0660 Part 107) IEC 60669-1, EN 60669-1 (VDE 0632 Part 1) 32 A and 125 A: IEC 60947-3, EN 60947-3 (VDE 0660 Part 107)	•	•	•
 <p>5TE1 switch disconnectors</p> <ul style="list-style-type: none"> • 5TE1 switch disconnectors 100 A to 200 A 	For the switching of system components	IEC 60947-3, EN 60947-3, KEMA approved to UL 508	•		•

Definitions

- I_e = rated operational current
 U_e = rated operational voltage
 I_c = rated control current
 U_c = rated control voltage
 P_s = rated operational power
 1 MW = modular width 18 mm

Overview

Devices for rated operational current 20 and 32 A



Uniform auxiliary switches

With a few exceptions, the 5TE8 switches (20 A and 32 A) can be retrofitted with auxiliary switches without the use of tools. Some switches (e.g. 4-pole designs, right) that cannot be retrofitted are available in a fully assembled design ex works. The auxiliary switches can be installed as 1 NO + 1 NC, 2 NO or 2 NC. They can also be applied with the 5SY and 5SP4 miniature circuit-breakers. Advantage: Easier to store.



Uniform busbar mounting of switches

All 5TE8 switches (20 A and 32 A) can be fed via the single or two-phase 5TE9 busbar. The 5TE4 8 pushbuttons, 5TE5 8 indicator lights, 5TT4 1 remote switches and 5TT4 2 switching relays can be busbar mounted in the same way. Advantage: Easier to store.



New infeed for the busbar mounting of switches

The 5TE9 phase bar is fed in at the socket terminal for conductors up to 6 mm² to 32 A.



Flexible handling of busbar mounting

The 5TE9 phase bars can be cut to length, terminal lugs can be cut out if necessary. Perforations have not been used as they would only reduce the cross-section and an inexact perforation detachment would no longer guarantee the required insulation spacing to the terminals which must be infeed separately.



One tool for both mounting and connection

All 5TE8 switches (20 A and 32 A) can be connected or removed from the mounting rail using a Pozidriv 1 or 4-mm screwdriver. The same applies to 5TE4 8 pushbuttons, 5TE5 8 indicator lights, 5TT4 1 remote switches and 5TT4 2 switching relays.



Safe positioning on the mounting rail

The tried and tested latching slide for all 5TE8 switches (20 A and 32 A) ensures secure and straight fixing on the standard mounting rail. Unpack, mount and press into place without the use of tools. Furthermore, the latching slide does not protrude from the device, so that it is not concealed by cables. 5TE8 switches (20 A and 32 A), 5TE4 8 pushbuttons, 5TE5 8 light indicators, 5TT4 1 remote control switches, 5TT4 2 switching relays and 5TT5 7 Insta contactors are also fitted with the latching slide technology.

Switches and Light Indicators

5TE8 control switches

Overview



Spacers

Spacers can be used as a compensating element and have a width of 0.5 MW. They come with an integrated wiring duct for the insertion of conductors. Two oppositely installed spacers thus offer space for large conductor cross-sections up to a 15 mm diameter.



Uniform terminal covers and handle locking devices

The handle locking device prevents unwanted manual on and off switching. It can be sealed. Regardless of that, all 5TE8 switches can also be sealed in the ON and OFF position.

The sealable terminal cover ensures access to the terminal with all switches 32 A to 125 A. With switches 32 A to 63 A, it also prevents the removal of the devices from the mounting rail.

	<ul style="list-style-type: none"> • Changeover switches • Group switches in center position • Control switches 	ON/OFF switches		
		20 A	20 A and 32 A	32 ... 63 A
Separate handle locking device	•	•	•	•
Sealable switch position	•	•	•	•
Mountable auxiliary circuit switch	5TE8 151 5TE8 161	•	•	•
Position indicator red/green	--	--	•	•
Optional: red handle (instead of gray)	--	--	•	•

Technical specifications

			5TE8 1
Acc. to IEC 60947-3, EN 60947-3 (VDE 0660 Part 107) Acc. to IEC 60669-1, EN 60669-1 (VDE 0632 Part 1)			
Rated operational current I_e	per current path	A	20
Rated operational voltage U_e	1-pole	V AC	230
	multipole	V AC	400
Rated power dissipation P_v	contact ¹⁾ per pole	VA	0.7
Thermal rated current I_{the}		A	20
Rated breaking capacity	at p.f. = 0.65	A	60
Rated making capacity	at p.f. = 0.65	A	60
Short-circuit strength Used together with a fuse with the same rated operational current (EN 60269 gL/gG)		kA	10
Rated impulse withstand voltage U_{imp}		kV	> 5
Clearances	open contacts ²⁾	mm	2 x > 2
	between the poles	mm	> 7
Creepage distances		mm	> 7
Mechanical lifetime	switching cycles		25 000
Electrical service life	switching cycles		10 000
Minimum contact load		V; mA	10; 300
Rated short-time currents³⁾ per current path at p.f. = 0.7	up to 0.2 s	A	650
	up to 0.5 s	A	400
	up to 1 s	A	290
	up to 3 s	A	170
Terminals/max. tightening torque	± screw (Pozidrive); Nm		1; 1.2
Conductor cross-sections	rigid	mm ²	1.5 ... 6
	flexible with sleeve	min. mm ²	1
Permissible ambient temperature		°C	-5 ... +40
Resistance to climate Acc. to DIN 50015 at 95 % relative humidity		°C	45

1) For rated operational current.





2) For 5TE8 14. switches with center position = 2 x 2.5 mm.

3) The respective rated surge current can be established by multiplying by factor 1.5.

Switches and Light Indicators

5TE8 control switches

Selection and ordering data

Version	U_e V AC	I_e A	Conductor cross-sections up to mm ²	MW	Order No.	Weight 1 unit approx. kg	PS*/ P. unit Unit(s)	
 5TE8 151	Changeover switches (20 A) with separate handle locking device, sealable switch position, mountable auxiliary switch							
		400	20	6	1	5TE8 151	0.062 1	
		400	20	6	1	5TE8 152	0.081 1	
		400	20	6	1	5TE8 153	0.082 1	
	 5TE8 162		230	20	6	1	5TE8 161	0.060 1
			400	20	6	1	5TE8 162	0.076 1
Group switches with center position (20 A) max. mounting depth 73.5 mm in center position with separate handle locking device, sealable switch position, auxiliary switch cannot be mounted								
 5TE8 141		230	20	6	1	5TE8 141	0.060 1	
		400	20	6	1	5TE8 142	0.077 1	
 5TE8 101	Control switches (20 A) with fixed mounted 230 V glow lamp or diode 48 V, replaceable, white luminescent cap, with separate handle locking device, sealable switch position, auxiliary switch cannot be mounted							
		230	20	6	1	5TE8 101	0.057 1	
		48	20	6	1	5TE8 101-3	0.057 1	
		230	20	6	1	5TE8 105	0.057 1	
	 5TE8 108		400	20	6	1	5TE8 102	0.066 1
			400	20	6	1	5TE8 103	0.078 1
		400	20	6	1.5	5TE8 108	0.128 1	
		400	20	6	1.5	5TE8 108	0.128 1	

Accessories

Version	MW	Order No.	Weight 1 unit approx. kg	PS*/ P. unit Unit(s)
 5ST3 010	Auxiliary switches (AS) For all 5TE8 switches, for right-side retrofitting using factory installed brackets, for further technical specifications, please see also the chapter "Miniature circuit-breakers".			
	1 NO contact + 1 NC contact	0.5	5ST3 010	0.050 1
	2 NO contacts	0.5	5ST3 011	0.050 1
	2 NC contacts	0.5	5ST3 012	0.050 1
	Handle locking devices For all 5TE8 switches, to prevent unwanted manual ON/OFF switching, sealable, for padlock with max. 3 mm shackle		5ST3 801	0.008 1
	Single-phase busbars For all 5TE8 switches, 20 A and 32 A, in the 12 MW design for the cutting of unused terminal lugs to ensure insulation clearances if one device terminal is to be supplied separately despite being mounted on the busbar modular clearance = 1 MW Infeed of the busbar to the device terminal with conductor cross-section of 6 mm ² to 32 A, can be mounted top or bottom in the front or rear terminal area		5TE9 100	0.040 1/10
	Two-phase busbars For all 5TE8 switches, 20 and 32 A, in 12 MW design, each with 1 MW division, whereby the two rails are offset by 0.5 MW. Both copper conductors of the two-phase bar are insulated together. Infeed of the busbar at the device terminal with a conductor cross-section of 6 mm ² to 32 A, can be mounted from top or bottom, or in the front or rear terminal area, thus allowing realization of a 4-conductor connection using two two-phase busbars.		5TE9 101	0.060 1/10
	End caps for two-phase busbars End caps for 5TE9 101 two-phase busbars to keep insulation clearances when the bar is being cut. 1 set = 10 units		5TE9 102	1 set 0.001 1 set
	5ST3 7 busbar systems For all 5TE8 switches, 32 A to 125 A in 1 MW per pole version, for ordering data, see the chapter "Miniature circuit-breakers", "Accessories for 5SJ6, 5SY. and 5SP4"			
	Spacers Contours for modular devices with a mounting depth of 70 mm; can be snapped onto either side of the busbar, so that two spacers allow for convenient cable routing		5TG8 240	0.010 2
	Cap sets For manual changing of the luminous plates for 5TE8 10 control switches Cap set comprising 1 red, green, and yellow plate each		5TG8 068	1 set 0.006 1 set

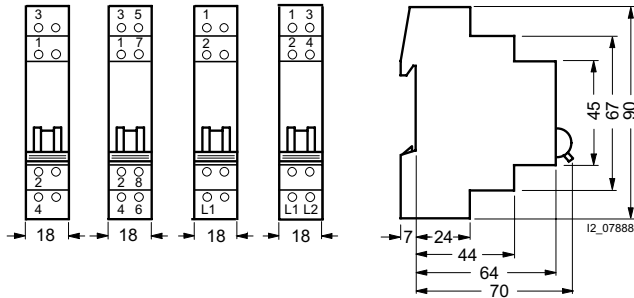
Switches and Light Indicators

5TE8 control switches

Dimensional drawings

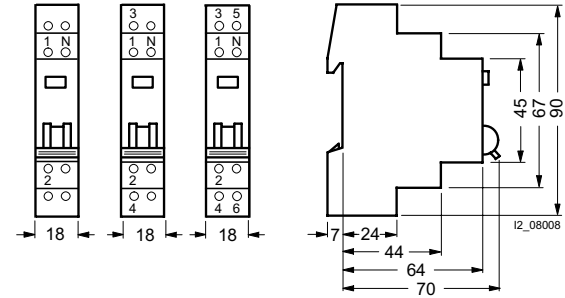
Group switches with intermediate position, two-way switches 5TE8, 20 A

5TE8 151 5TE8 152 5TE8 141 5TE8 142
5TE8 153 5TE8 161 5TE8 162



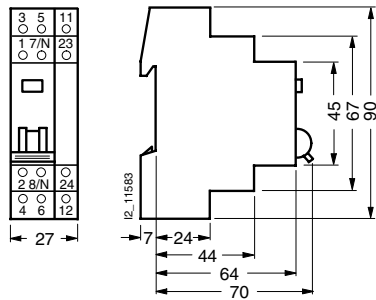
5TE8 control switches, 20 A, with lamps

5TE8 101 5TE8 102 5TE8 103
5TE8 101-3
5TE8 105



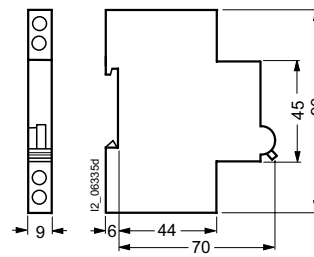
5TE8 control switches, 20 A, with lamp and auxiliary switches

5TE8 108



5ST3 auxiliary switches

5ST3 010
5ST3 011
5ST3 012



Schematics

5TE8 151



5TE8 152



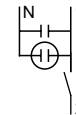
5TE8 153



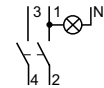
5TE8 101
5TE8 101-3



5TE8 105



5TE8 102



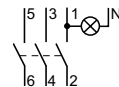
5TE8 161



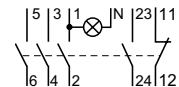
5TE8 162



5TE8 103



5TE8 108



5TE8 141



5TE8 142



5ST3 010



5ST3 011



5ST3 012



Overview



Two functions in one device

Pushbuttons with setting function for momentary-contact or maintained-contact operation can be changed over after installation and connection as the setting switch is always accessible.



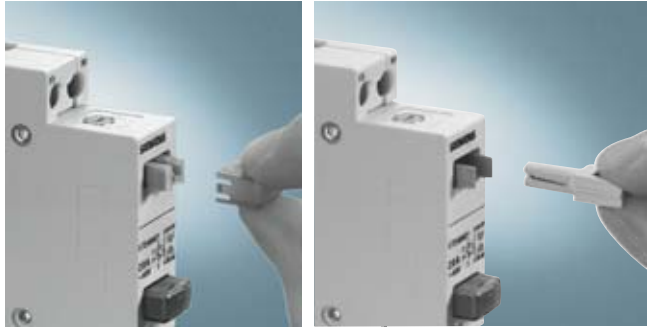
Pushbuttons and light indicators with separate infeed in one device

Control pushbuttons with pilot light in one modular width in momentary-contact or maintained-contact operation save room. The lights are fed via isolated terminals. Thus, they can also be used for voltages other than the switching voltage.



Double functions, 2 systems in one device

Double pushbuttons and double pushbuttons with pilot lights for separate infeed – even voltages differing from the switching voltage – in one modular width help to save mounting space. Changeover from momentary to maintained-contact operation is done separately for each pushbutton from top to bottom. Thus, two systems have been incorporated in one device.



Changing of lamps and caps without the use of tools

Pilot lights and caps can safely be replaced during operation without the use of tools. Transparent caps in different colors allow signaling of system states according to IEC 60073, e.g. red: danger, yellow: warning and green: safety.



Always correctly polarized

The pilot lights, depending on the voltage either glow lamp or diode, are nested in a slotted base. Thus correct polarization is always ensured for DC applications.

Features

- Momentary-contact/maintained-contact changeover after installation and connection in disconnected state
- Double pushbuttons
- Pushbuttons with pilot lights
- Caps and lamps can be changed
- Lamps also available with voltages other than 230 V (Standard: 230 V)

Switches and Light Indicators

5TE4 8 pushbuttons

Technical specifications






			5TE4 8
Acc. to IEC 60947-3, EN 60947-3 (VDE 0660 Part 107) Acc. to IEC 60669-1, EN 60669-1 (VDE 0632 Part 1)			
Rated operational current I_e	per current path	A	20
Rated operational voltage U_e	1-pole	V AC	230
	multipole	V AC	400
Rated power dissipation P_v	per pole	VA	0.6
Thermal rated current I_{the}		A	20
Rated breaking capacity	at p.f. = 0.65	A	60
Rated making capacity	at p.f. = 0.65	A	60
Rated impulse withstand voltage U_{imp}		kV	> 5
Clearances	open contacts	mm	2 x > 2
	between the poles	mm	> 7
Creepage distances		mm	> 7
Mechanical lifetime	switching cycles		25 000
Minimum contact load		V; mA	10; 300
Rated short-time currents¹⁾ per current path at p.f. = 0.7	up to 0.2 s	A	650
	up to 0.5 s	A	400
	up to 1 s	A	290
	up to 3 s	A	170
Terminals/tightening torque	± screw (Pozidrive); Nm		1; 1.2
Conductor cross-sections	rigid	mm ²	1.5 ... 6
	flexible with sleeve	min. mm ²	1
Permissible ambient temperature		°C	-5 ... +40
Resistance to climate Acc. to DIN 50015 at 95 % relative humidity		°C	45

Power dissipation of 5TG8 05. lamps		5TG8 050	5TG8 051	5TG8 052	5TG8 053	5TG8 054	5TG8 055
Rated operational voltage U_e	V AC	12	24	48	60	115	230
Rated power dissipation P_v	mW AC	70	160	350	420	70	170
Rated operational voltage U_e	V DC	12	24	48	60	110	220
Rated power dissipation P_v	mW DC	85	190	450	550	50	135

Color	Color coding acc. to IEC 60073		
	Safety of people or environment	Process state	System state
Red	Danger	Emergency	Faulty
Yellow	Warning/Caution	Abnormal	
Green	Safety	Normal	
Blue	Stipulation		
White Gray Black	No special significance assigned		

1) The respective rated surge current can be established by multiplying by factor 1.5.


Selection and ordering data

Version	U_e V AC	I_e A	Conductor cross-sections up to mm ²	MW	Order No.	Weight 1 unit approx. kg	PS*/ P. unit Unit(s)
Pushbuttons without maintained-contact function							
 5TE4 800	1 NO contact, 1 NC contact 1 gray pushbutton	230	20	6	1	5TE4 800	0.061 1
	1 NO contact, 1 NC contact 1 green pushbutton, 1 blue pushbutton	230	20	6	1	5TE4 804	0.053 1
	1 NO contact, 1 NC contact 1 red pushbutton	230	20	6	1	5TE4 805	0.061 1/12
	1 NO contact, 1 NC contact 1 green pushbutton	230	20	6	1	5TE4 806	0.061 1/12
	1 NO contact, 1 NC contact 1 yellow pushbutton	230	20	6	1	5TE4 807	0.061 1/12
	1 NO contact, 1 NC contact 1 blue pushbutton	230	20	6	1	5TE4 808	0.061 1/12
Pushbutton with maintained-contact function							
 5TE4 820	1 NO contact, 1 NC contact 1 gray pushbutton	230	20	6	1	5TE4 810	0.060 1
	2 NO contacts 1 gray pushbutton	400	20	6	1	5TE4 811	0.061 1
	3 NO contacts + N 1 gray pushbutton	400	20	6	1	5TE4 812	0.080 1
	4 NC contacts 1 gray pushbutton	400	20	6	1	5TE4 813	0.080 1
	2 CO contacts 1 gray pushbutton	400	20	6	1	5TE4 814	0.075 1
	Control pushbuttons with maintained-contact function or momentary-contact function and 230 V lamp for max. 5 m cable length						
 5TE4 820	1 NO contact, 1 NC contact 1 red pushbutton	400	20	6	1	5TE4 820	0.071 1
	1 NO contact 1 red pushbutton	230	20	6	1	5TE4 821	0.078 1
	2 NO contact 1 red pushbutton	400	20	6	1	5TE4 823	0.080 1
	2 NC contacts 1 red pushbutton	400	20	6	1	5TE4 824	0.080 1
Control pushbuttons with maintained-contact function or momentary-contact function and 230 V lamp for max. 150 m cable length							
 5TE4 830	1 NO contact 1 red pushbutton	400	20	6	1	5TE4 822	0.078 1
	Double pushbuttons with maintained-contact function and/or momentary-contact function						
 5TE4 830	1 NO contact and 1 NC contact 1 red pushbutton, 1 green pushbutton	400	20	6	1	5TE4 830	0.065 1
	1 NO contact, 1 NC contact and 1 NO contact, 1 NC contact 1 red pushbutton, 1 green pushbutton	400	20	6	1	5TE4 831	0.084 1



Switches and Light Indicators

5TE4 8 pushbuttons

Selection and ordering data

Version	U_e V AC	I_e A	Conductor cross-sections up to mm ²	MW	Order No.	Weight 1 unit approx. kg	PS*/ P. unit Unit(s)	
 5TE4 840	Double pushbuttons with maintained-contact function and/or momentary-contact function and two 230 V lamps for max. 5 m cable length							
	1 NO contact and 1 NO contact 1 red pushbutton, 1 green pushbutton	400	20	6	1	5TE4 840	0.080	1
	1 NO contact and 1 NC contact 1 red pushbutton, 1 green pushbutton	400	20	6	1	5TE4 841	0.080	1

Accessories

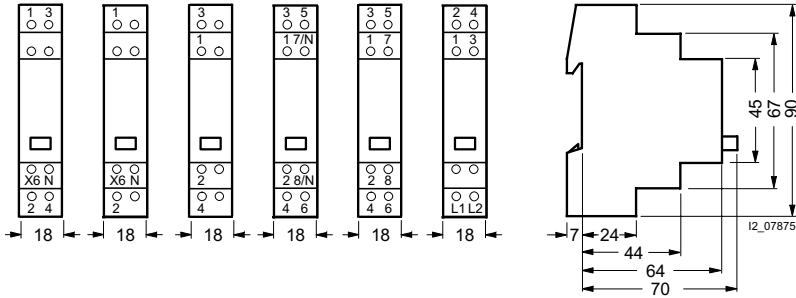
Version	U_e V	Order No.	Weight 1 unit approx. kg	PS*/ P. unit Unit(s)
 5TG8 050	Lamps, manually removable for voltages other than 230 V or as spare lamps with label			
	LED	12 AC/DC	5TG8 050	0.001 1
	LED	24 AC/DC	5TG8 051	0.001 1
	LED	48 AC/DC	5TG8 052	0.001 1
	LED	60 AC/DC	5TG8 053	0.001 1
	glow lamp	115 AC 110 DC	5TG8 054	0.001 1
	glow lamp	230 AC 220 DC	5TG8 055	0.001 1
 5TG8 060	Cap sets for manual changing of colored caps with and without lamp fittings			
	gray, non-transparent (1 set = 5 units)		5TG8 060	0.002 1 set/ 10 sets
	red, transparent (1 set = 5 units)		5TG8 061	0.002 1 set/ 10 sets
	green, transparent (1 set = 5 units)		5TG8 062	0.002 1 set/ 10 sets
	yellow, transparent (1 set = 5 units)		5TG8 063	0.002 1 set/ 10 sets
	blue, transparent (1 set = 5 units)		5TG8 064	0.002 1 set/ 10 sets
	black, non-transparent (1 set = 5 units)		5TG8 065	0.002 1 set/ 10 sets
	white, transparent (1 set = 5 units)		5TG8 066	0.002 1 set/ 10 sets
	red and green (1 set contains 10 units per color), yellow, blue and white (1 set contains 5 units per color)		5TG8 067	0.012 1 set/ 10 sets
	red, green, yellow (1 set = 3 units)		5TG8 070	0.002 1 set/ 10 sets

5TG8 061

Dimensional drawings

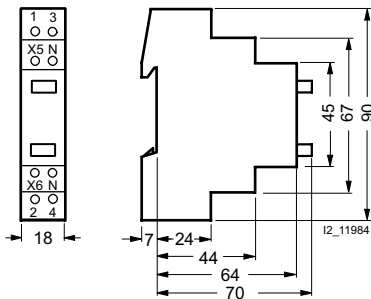
5TE4 8 pushbuttons

5TE4 820 5TE4 821 5TE4 800 5TE4 812 5TE4 813 5TE4 814
 5TE4 823 5TE4 822 5TE4 805
 5TE4 824 5TE4 806
 5TE4 807
 5TE4 808
 5TE4 810
 5TE4 811



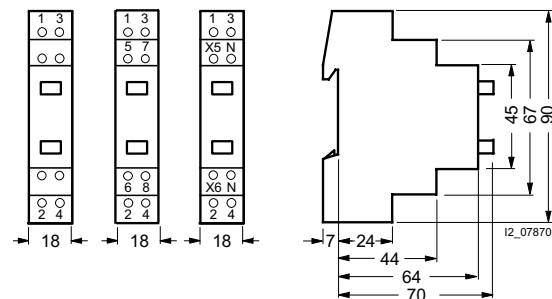
5TE4 804 pushbuttons

5TE4 804



5TE4 8 double pushbuttons with maintained-contact function

5TE4 830 5TE4 831 5TE4 840
 5TE4 841



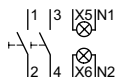
Schematics

5TE4 8 pushbuttons

5TE4 800
 5TE4 805
 5TE4 806
 5TE4 807
 5TE4 808



5TE4 804



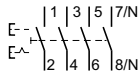
5TE4 810



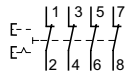
5TE4 811



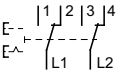
5TE4 812



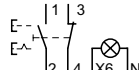
5TE4 813



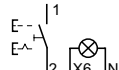
5TE4 814



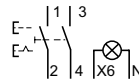
5TE4 820



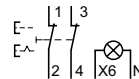
5TE4 821



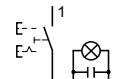
5TE4 823



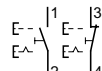
5TE4 824



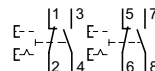
5TE4 822



5TE4 830



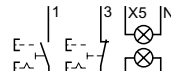
5TE4 831



5TE4 840



5TE4 841



Switches and Light Indicators

5TE5 8 indicator lights

Overview



Changing of lamps and caps without the use of tools

Caps and lamps can safely be replaced during operation without the use of tools. Transparent caps in different colors allow signaling of system states according to IEC 60073, e.g. red: danger, yellow: warning/caution and green: safety.



Always correctly polarized

The pilot lights, depending on the voltage either glow lamp or diode, are nested in a slotted base. Thus correct polarization is always ensured for DC applications.



Preferred positions for the busbar mounting of N conductors

In order to be able to mount the N terminals on busbars, preferred positions are provided for them at the device. This also applies to the 5TE8 switches with pilot lamps.

The option for busbar mountings is described in the chapter "Miniature circuit-breakers".



Triple light indicator

A light indicator with three lamps and green caps enables three-phase signaling within one modular width. A cap set is available for a "traffic light warning" according to IEC 60073 with "red: danger, yellow: warning/caution, green: safety".



Color coding according to IEC 60073

Color	Meaning		
	Safety of people and environment	Process state	System state
Red	Danger	Emergency	Faulty
Yellow	Warning/ Caution	Abnormal	
Green	Safety	Normal	
Blue	Stipulation		
White Gray Black	No special significance assigned		

Technical specifications

				5TE5 8
DIN VDE 0710-1				230 (for a different voltage see 5TG8 lamps)
Rated operational voltage U_e	max.	V AC		
Rated power dissipation P_V		VA		see 5TG8 lamp
Clearances	between the terminals	mm		> 7
Terminals/tightening torque	± screw (Pozidrive); Nm			1; 1.2
Conductor cross-sections	rigid	mm ²		1.5 ... 6
	flexible with sleeve	min. mm ²		1
Permissible ambient temperature		°C		-5 ... +40
Resistance to climate	acc. to DIN 50015 at 95 % relative humidity	°C		45
				5TG8 05.
Rated power dissipation P_V				
• LED		VA		0.4
• glow lamp		VA		0.4



Selection and ordering data

	U_e	Conductor cross-sections	MW	Order No.	Weight 1 unit approx.	PS*/P. unit				
	V AC	up to mm ²			kg	Unit(s)				
	Indicator lights for a max. cable length of up to 5 m									
				with 1 red lamp	230	6	1	5TE5 800	0.060	1/12
				with 2 lamps, red and green				5TE5 801	0.056	1
				with 3 green lamps				5TE5 802	0.063	1
	Indicator lights for a max. cable length of up to 250 m									
				with 1 red lamp	230	6	1	5TE5 804	0.060	1

Switches and Light Indicators

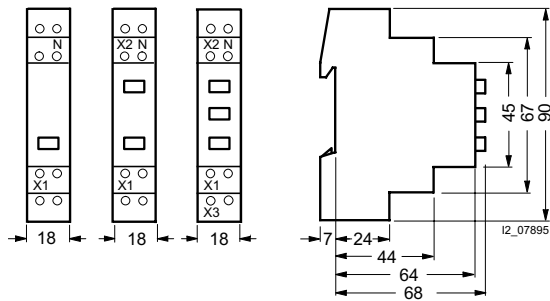
5TE5 8 indicator lights

Accessories

	I_e	U_e	Order No.	Weight 1 unit approx.	PS*/ P. unit	
	mA	V		kg	Unit(s)	
 5TG8 050	Lamps, manually removable for voltages other than 230 V or as spare lamps with label					
	LED	0.4	12 AC/DC	5TG8 050	0.001	1
	LED		24 AC/DC	5TG8 051	0.001	1
	LED		48 AC/DC	5TG8 052	0.001	1
	LED		60 AC/DC	5TG8 053	0.001	1
	glow lamp		115 AC 110 DC	5TG8 054	0.001	1
	glow lamp		230 AC 220 DC	5TG8 055	0.001	1
 5TG8 061	Cap sets for manual changing of colored caps				1 set	
	red, transparent (1 set = 5 units)			5TG8 061	0.002	1 set/ 10 sets
	green, transparent (1 set = 5 units)			5TG8 062	0.002	1 set/ 10 sets
	yellow, transparent (1 set = 5 units)			5TG8 063	0.002	1 set/ 10 sets
	blue, transparent (1 set = 5 units)			5TG8 064	0.002	1 set/ 10 sets
	white, transparent (1 set = 5 units)			5TG8 066	0.002	1 set/ 10 sets
	red and green (1 set = contains 10 units per color), yellow, blue and white (1 set contains 5 units per color), red, green, yellow (1 set = 3 units)			5TG8 067 5TG8 070	0.012 0.002	1 set/ 10 sets 1 set/ 10 sets

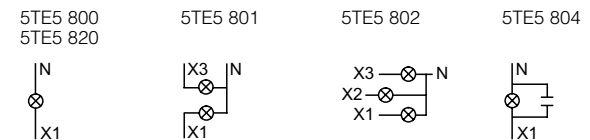
Dimensional drawings

5TE5 800 5TE5 801 5TE5 802
5TE5 804
5TE5 820



Schematics

Circuit diagrams



Technical specifications

			5TE8 1	5TE8 2
20 A:	acc. to IEC 60947-3, EN 60947-3 (VDE 0660 Part 107) as well as IEC 60669-1, EN 60669-1 (VDE 0632 Part 1)			
32 A:	acc. to IEC 60947-3, EN 60947-3 (VDE 0660 Part 107)			
Rated operational current I_e	per current path	A	20	32
Rated operational voltage U_e	1-pole multipole	V AC V AC	230 400	
Rated power dissipation P_v	per pole, max.	VA	0.7	
Thermal rated current I_{the}		A	20	32
Rated breaking capacity	at p.f. = 0.65	A	60	96
Rated making capacity	at p.f. = 0.65	A	60	96
Short-circuit strength	Used together with a fuse with the same rated operational current (EN 60269 gL/gG)		kA	10
Rated impulse withstand voltage U_{imp}		kV	> 5	
Clearances	open contacts ¹⁾ between the poles	mm mm	2 x > 2 > 7	
Creepage distances		mm	> 7	
Mechanical lifetime	switching cycles		25 000	
Electrical service life	switching cycles		10 000	
Minimum contact load		V; mA	10; 300	
Rated short-time currents²⁾	per current path at p.f. = 0.7			
	up to 0.2 s	A	650	1 000
	up to 0.5 s	A	400	630
	up to 1 s	A	290	450
	up to 3 s	A	170	250
Terminals/max. tightening torque	± screw (Pozidrive); Nm		1; 1.2	
Conductor cross-sections	rigid flexible with sleeve	mm ² min. mm ²	1.5 ... 6 1	
Permissible ambient temperature		°C	-5 ... +40	
Resistance to climate	Acc. to DIN 50015 at 95 % relative humidity		°C	45

			5TE8 3	5TE8 4	5TE8 5	5TE8 6	5TE8 7	5TE8 8
40 A ... 100 A:	acc. to IEC 60947-3, EN 60947-3 (VDE 0660 Part 107) as well as IEC 60669-1, EN 60669-1 (VDE 0632 Part 1)							
32 A and 125 A:	acc. to IEC 60947-3, EN 60947-3 (VDE 0660 Part 107)							
Rated operational current I_e	per current path	A	32	40	63	80	100	125
Rated operational voltage U_e	1-pole multipole	V AC V AC	230 400					
Rated power dissipation P_v	per pole, max.	VA	0.7	0.9	2.2	3.5	5.5	8.6
Thermal rated current I_{the}		A	32	40	63	80	100	125
Rated breaking capacity	at p.f. = 0.65	A	96	120	196	240	300	375
Rated making capacity	at p.f. = 0.65	A	96	120	196	240	300	375
Short-circuit strength	Used together with a fuse with the same rated operational current (EN 60269 gL/gG)		kA	10				
Rated impulse withstand voltage U_{imp}		kV	> 5					
Clearances	open contacts between the poles	mm mm	> 7 > 7					
Creepage distances		mm	> 7					
Mechanical lifetime	switching cycles		20 000					
Electrical service life	switching cycles		10 000	5 000	1 000			
Minimum contact load		V; mA	24; 300					
Rated power	1-pole	kW	5	6.5	10	13	16	16
	2-pole	kW	9	11	18	22	28	28
	3-/4-pole	kW	15	15	30	39	48	48
Rated short-time currents²⁾	per current path at p.f. = 0.7							
	up to 0.2 s	A	760	950	1 500	2 700	3 400	3 400
	up to 0.5 s	A	500	630	1 000	1 650	2 100	2 100
	up to 1 s	A	400	500	800	1 350	1 700	1 700
	up to 3 s	A	280	350	560	800	1 000	1 000
Terminals/max. tightening torque	± screw (Pozidrive); Nm		2; 3.5					
Conductor cross-sections	rigid flexible with sleeve	mm ² min. mm ²	1 ... 35 1			2.5 ... 50 2.5		
Permissible ambient temperature		°C	-5 ... +40					
Resistance to climate	Acc. to DIN 50015 at 95 % relative humidity		°C	45				





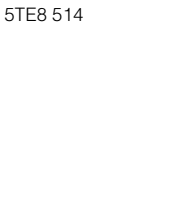



1) For 5TE8 14. switches with center position = 2 x 2.5 mm.

2) The respective rated surge current can be established by multiplying by factor 1.5.


Switches and Light Indicators

5TE8 ON/OFF switches

Selection and ordering data







Version	U_e V AC	I_e A	Conductor cross-sections up to mm ²	MW	Order No.	Weight 1 unit approx. kg	PS*/ P. unit Unit(s)						
ON/OFF switches (20 A and 32 A)													
with separate handle locking device, sealable switch position, auxiliary switch can be mounted													
 5TE8 111	230	20	6	1	5TE8 111	0.053	1						
		32											
		2 NO contacts	400	20	6	1	5TE8 112	0.062					
32													
 5TE8 218	400	20	6	1	5TE8 113	0.072	1						
		32											
		3 NO contacts + N auxiliary switch cannot be mounted	400	20	6	1	5TE8 114	0.082					
32													
	400	20	6	1.5	5TE8 118	0.128	1						
		32											
		3 NO contacts + N with mounted auxiliary switch					5TE8 218	0.128	1				
ON/OFF switches (32 ... 125 A)													
can be used as switch disconnecter acc. to EN 60947-1													
with separate handle locking device, sealable switch position, auxiliary switch, can be mounted, position indication red/green													
 5TE8 511	230	63	35	1	5TE8 521	0.100	1						
		100	50										
		32	35					5TE8 311	0.100	1			
		40											
		63									5TE8 411	0.100	1
		80	50										
100		5TE8 511	0.100	1									
125													
 5TE8 514	400				63	35	2	5TE8 522	0.204	1			
					100	50							
					32	35					5TE8 312	0.204	1
					40								
		63		5TE8 412	0.204	1							
		80	50										
100		5TE8 512	0.204				1						
125													
 5TE8 514	400							63	35	3	5TE8 523	0.307	1
								100	50				
				32	35	5TE8 313		0.307	1				
				40									
		63		5TE8 413	0.307		1						
		80	50										
100		5TE8 513	0.307							1			
125													
 5TE8 514	400					63		35	4		5TE8 524	0.413	1
						100		50					
				32	35	5TE8 314	0.410	1					
				40									
		63		5TE8 414	0.410					1			
		80	50										
100		5TE8 514	0.413						1				
125													
 5TE8 514	400					63	35	4			5TE8 524	0.413	1
						100	50						
				32	35	5TE8 315	0.410			1			
				40									
		63		5TE8 415	0.410				1				
		80	50										
100		5TE8 515	0.413					1					
125													
 5TE8 514	400					63	35			4	5TE8 524	0.413	1
						100	50						
				32	35	5TE8 315	0.410		1				
				40									
		63		5TE8 415	0.410			1					
		80	50										
100		5TE8 515	0.413							1			
125													

Selection and ordering data

Version	U_e	I_e	Conductor cross-sections	MW	Order No.	Weight 1 unit approx.	PS*/P. unit
	V AC	A	up to mm ²			kg	Unit(s)
ON/OFF switches (32 ... 125 A) can be used as switch disconnecter acc. to EN 60947-1 Terminal access from the bottom and off-position lockable with special key (exclusive power supply company tool). Reduced lower terminal entry for conductors with approx. 7 mm diameter 3 NO contacts							
	400	63	35	3	5TE8 533	0.263	1

5TE8 533



Accessories

Version	MW	Order No.	Weight 1 unit approx.	PS*/P. unit
			kg	Unit(s)
Auxiliary switches (AS) For all 5TE8 switches, for right-side retrofitting using factory installed brackets, for further technical specifications, please see also the chapter "Miniature circuit-breakers"				
	0.5	5ST3 010	0.050	1
	0.5	5ST3 011	0.050	1
	0.5	5ST3 012	0.050	1
Handle locking devices For all 5TE8 switches, to prevent unwanted manual ON/OFF switching, sealable, for padlock with max. 3 mm shackle				
		5ST3 801	0.008	1
Terminal covers For all 5TE8 5 to 5TE8 8 switches, in 1 MW per pole version, for covering the screw openings, sealable				
		5ST3 800	0.001	5/10
Spacers Contours for modular devices with a mounting depth of 70 mm; can be snapped onto either side of the busbar, so that two spacers allow for convenient cable routing				
	0.5	5TG8 240	0.010	2
Fixpoint terminals With snap-on mounting for rail mounting and side cable entry, can also be used as RCCB terminal, with 3 terminals for conductors from 1.5 ... 10 mm ² and with 1 terminal for conductors from 1.5 ... 25 mm ²				
		8GB4 576	0.026	1
Snap-on terminals With snap-on mounting for rail mounting, with terminals for conductors from 16 mm ² , solid and 10 mm ² , stranded				
		5ST2 112	0.008	1/50

Switches and Light Indicators

5TE8 ON/OFF switches

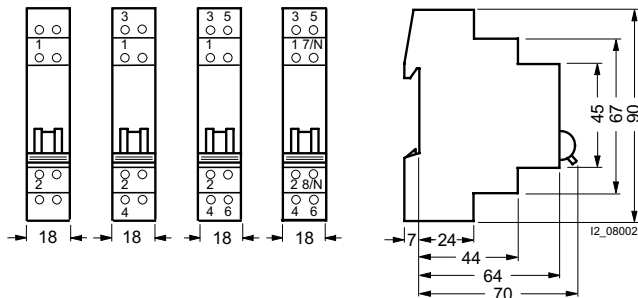
Accessories

Version	U_e	I_e	Conductor cross-sections	MW	Order No.	Weight 1 unit approx.	PS*/P. unit
	V AC	A	up to mm ²			kg	Unit(s)
	Phase connectors				5TE9 112	0.111	1
	For easier wiring in various wiring versions and busbars or as a fixpoint terminal for conductors from 2.5 ... 50 mm ²						
1-pole	230	125	50	1			
	N conductor connectors				5TE9 113	0.111	1
	For easier wiring in various wiring versions and busbar mountings or as a fixpoint terminal for N conductors from 2.5 ... 50 mm ² with blue color marking						
1-pole	230	125	50	1			

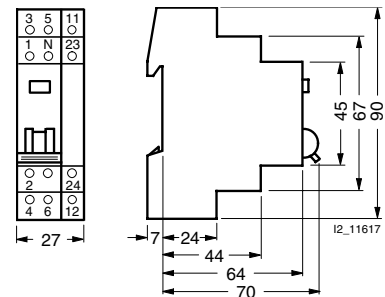
Dimensional drawings

5TE8 ON/OFF switches, 20 A and 32 A

5TE8 111 5TE8 112 5TE8 113 5TE8 114
5TE8 211 5TE8 212 5TE8 213 5TE8 214

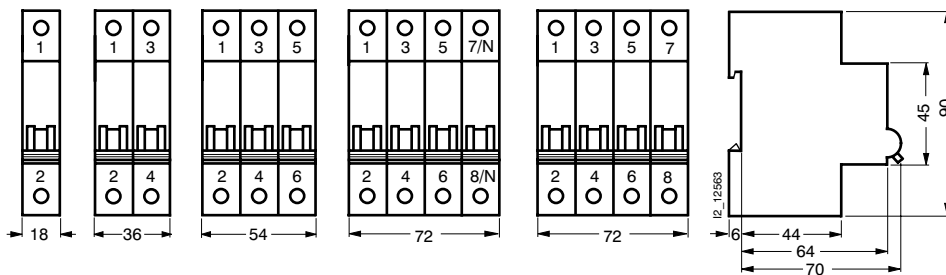


5TE8 118
5TE8 218



5TE8 ON/OFF switches, 32 to 125 A

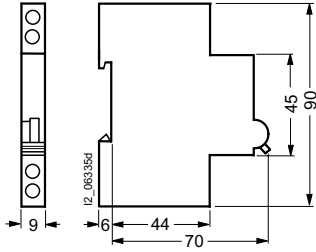
5TE8 311 5TE8 312 5TE8 313 5TE8 314 5TE8 315
5TE8 411 5TE8 412 5TE8 413 5TE8 414 5TE8 415
5TE8 511 5TE8 512 5TE8 513 5TE8 514 5TE8 515
5TE8 521 5TE8 522 5TE8 523 5TE8 524 5TE8 524
5TE8 533
5TE8 611 5TE8 612 5TE8 613 5TE8 614 5TE8 615
5TE8 711 5TE8 712 5TE8 713 5TE8 714 5TE8 715
5TE8 721 5TE8 722 5TE8 723 5TE8 724
5TE8 811 5TE8 812 5TE8 813 5TE8 814 5TE8 815



Dimensional drawings

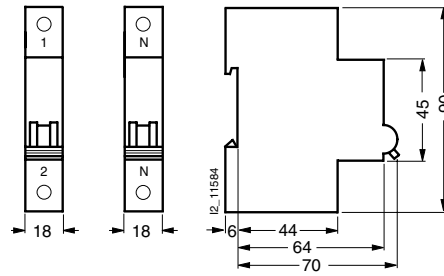
5ST3 auxiliary switches

5ST3 010
5ST3 011
5ST3 012



Phase connectors/N-conductor connectors

5TE9 112 5TE9 113



Schematics

5TE8 ON/OFF switches

5TE8 111
5TE8 211



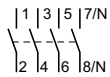
5TE8 112
5TE8 212



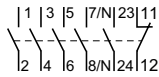
5TE8 113
5TE8 213



5TE8 114
5TE8 214



5TE8 118
5TE8 218



5TE8 311
5TE8 411
5TE8 511
5TE8 521
5TE8 533
5TE8 611
5TE8 711
5TE8 721
5TE8 811



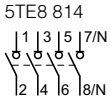
5TE8 312
5TE8 412
5TE8 512
5TE8 522



5TE8 313
5TE8 413
5TE8 513
5TE8 523



5TE8 314
5TE8 414
5TE8 514
5TE8 524
5TE8 614
5TE8 714
5TE8 724
5TE8 814



5TE8 315
5TE8 415
5TE8 515



Auxiliary switches

5ST3 010



5ST3 011



5ST3 012



Switches and Light Indicators

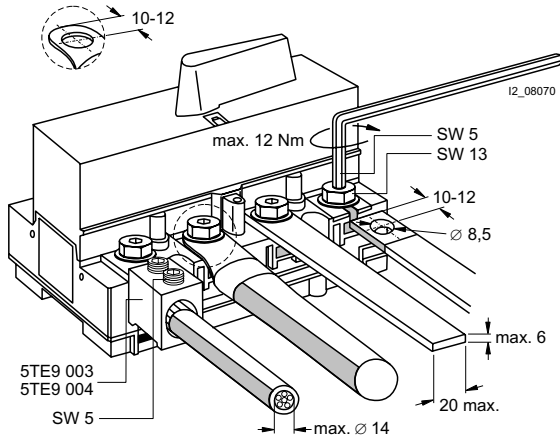
5TE1 switch disconnectors

Overview

- From 160 A: supplied with one terminal cover
- 160 A and 200 A: version for connection with lug
- Installation on standard mounting rail according to EN 60715, which is raised at least 5 mm from the base plate
- Screw connection on base plate

Design

Connection versions of 5TE1 .3 and 5TE1 .4 switches, 160 A and 200 A versions





Technical specifications

Acc. to IEC 60947-3, EN 60947-3 UL 508 KEMA approved			5TE1 .1	5TE1 .2	5TE1 .3	5TE1 .4
Rated operational current I_e With utilization category AC-21A	per current path at $U_e =$	400 V A	100	125	160	200
		415 V A	100	125	160	200
		500 V A	100	125	160	200
		690 V A	100	125	160	200
Rated operational current I_e With utilization category AC-22A	per current path at $U_e =$	400 V A	100	125	160	200
		415 V A	100	125	160	200
		500 V A	100	100	160	200
		690 V A	63		160	200
Rated operational current I_e With utilization category AC-23A	per current path at $U_e =$	400 V A	80		125	160
		415 V A	80		125	160
		500 V A	50		125	
		690 V A	40		63	80
Rated operational current I_e With utilization category DC-23A	2 poles in series	110 V A	100		160	
	2 poles in series	220 V A	--		100	
	4 poles in series	220 V A	100		160	
Rated operational voltage U_e		V AC	690			
Rated insulation voltage U_i		V AC	690			
Rated impulse withstand voltage U_{imp}	2 000 m	kV	8			
Impulse test voltage	at sea level	kV	12.3			
Max. rated operational power AC-23A	at $U_e =$	400 V kW	44		69	88
		415 V kW	46		72	92
		500 V kW	35		86	86
		690 V kW	36		60	76
Thermal rated current I_{the}	at 40 °C, 50 °C and 60 °C	A	100	125	160	200
Rated making capacity	at 415 V AC-23A	A	1 875		3 200	4 000
Rated breaking capacity	at 415 V AC-23A	A	1 000		1 920	2 400
Rate ultimate short-circuit making capacity I_{cm}	per current path at $U_e =$	400 V kA	10			
		415 V kA	10			
		500 V kA	6.7			
		690 V kA	6.7			
Rated short-time withstand current I_{cw} (peak value)	per current path	0.25 s kA	5		6	
		1 s kA	2.5		3	
Rated conditional short-circuit current With back-up protection with back-up fuse With identical rated current	at $U_e =$	400 V kA	50			
		415 V kA	50			
		500 V kA	50			
		690 V kA	33	33	20	18
Capacitive load	at 400 V	kvar	50	60	77	97
Number of poles		poles	2/3/4			
Rated power dissipation P_v	per pole	VA	2.9	4.5	6.5	10
Frequency		Hz	50/60			

Technical specifications

Acc. to IEC 60947-3, EN 60947-3 UL 508 KEMA approved			5TE1 .1	5TE1 .2	5TE1 .3	5TE1 .4
Conductor cross-sections		mm ²	6 ... 50		Cu busbar max. 20 × 6	
Service life (switching cycles)	electrical		1 500		1 000	
	mechanical		20 000		10 000	
Acc. to UL 508	I_n	A	--		100	125
UL 508 General Use 480 V	FLA	A	--		34	40
UL 508 Manual motor controller 480 V	power	HP	--		25	30
UL 508 Short circuit at 480 V	K5 fuses	kA	--		10	
	J fuses	kA	--		50	








Selection and ordering data

Version	U_e	I_e	MW	Order No.	Weight 1 unit approx.	PS*/ P. unit	
	V AC	A			kg	Unit(s)	
 5TE1 210	Switch disconnectors, lockable, with gray knob and transparent enclosure, mounting depth 92 mm						
	2 NO contacts	690	100	5	5TE1 210	0.480	1
			125		5TE1 220	0.480	1
			160	8	5TE1 230	0.620	1
			200		5TE1 240	0.620	1
	3 NO contacts	690	100	5	5TE1 310	0.540	1
			125		5TE1 320	0.540	1
			160	8	5TE1 330	0.730	1
			200		5TE1 340	0.730	1
	4 NO contacts	690	100	5	5TE1 410	0.590	1
			125		5TE1 420	0.590	1
			160	8	5TE1 430	0.770	1
	200			5TE1 440	0.770	1	
3 NO contacts with N conductor through-type terminal	690	100	5	5TE1 610	0.590	1	
		125		5TE1 620	0.590	1	
		160	8	5TE1 630	0.770	1	
		200		5TE1 640	0.770	1	
 5TE1 315	Switch disconnectors with red knob and yellow cap, can be used as emergency system interrupter acc. to IEC 60204-1, EN 60204-1 (VDE 0113 T1), if switch is easily accessible, mounting depth 92 mm						
	3 NO contacts	690	100	5	5TE1 315	0.540	1
			125		5TE1 325	0.540	1
			160	8	5TE1 335	0.730	1
			200		5TE1 345	0.730	1
	4 NO contacts	690	100	5	5TE1 415	0.590	1
			125		5TE1 425	0.590	1
			160	8	5TE1 435	0.770	1
	200			5TE1 445	0.770	1	

Switches and Light Indicators

5TE1 switch disconnectors

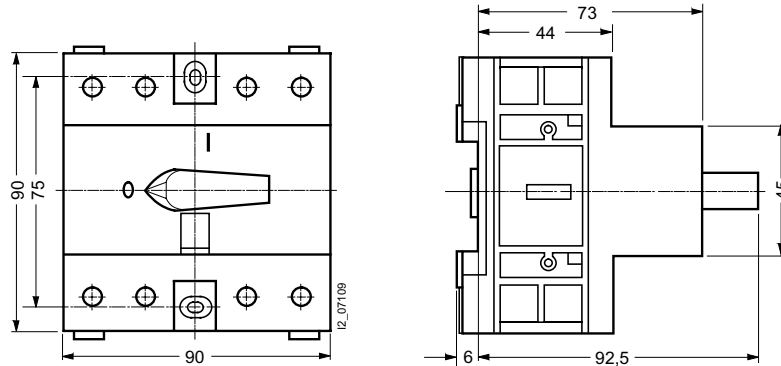
Accessories

Version	U_e V AC	I_e A AC	Order No.	Weight 1 unit approx. kg	PS*/ P. unit Unit(s)
Terminal covers					
 5TE9 000	for 100 A and 125 A switch disconnectors; sealable		5TE9 000	0.060	1
 5TE9 001	for 160 A and 200 A switch disconnectors; sealable		5TE9 001	0.050	1
Cage Clamp terminals					
 5TE9 003	for 160 A and 200 A switch disconnectors terminal diameter 14.5 mm for 92 mm ² conductors 5 mm Allen screw				1 set
	Set comprising three Cage Clamp terminals		5TE9 003	0.080	1 set
	Set comprising four Cage Clamp terminals		5TE9 004	0.080	1 set
Auxiliary switches					
 5TE9 005	Auxiliary switches can be optionally mounted left or right, or both sides (2 units) minimum load 24 V, 50 mA				
	1-pole CO contact	230	6	5TE9 005	0.080 1
	2-pole CO contact	230	6	5TE9 006	0.080 1
Locking units					
 5TE9 014	for up to three padlocks with max. Ø 8 mm		5TE9 014	0.230	1
Conversion kits, 4-pole for 100 A and 125 A for the connection of busbars or cables with cable lugs					
 5TE9 015	for busbars max. 15 mm wide including terminal cover		5TE9 015	0.110	1 set
Rotary actuators with extension axes for mounting on hinged doors or enclosure lids, lockable, IP65					
 5TE9 010.	Black knob				
	Shaft length		200 mm	5TE9 010	0.550 1
			400 mm	5TE9 011	0.550 1
	Red knob				
	Shaft length		200 mm	5TE9 012	0.550 1
			400 mm	5TE9 013	0.550 1

Dimensional drawings

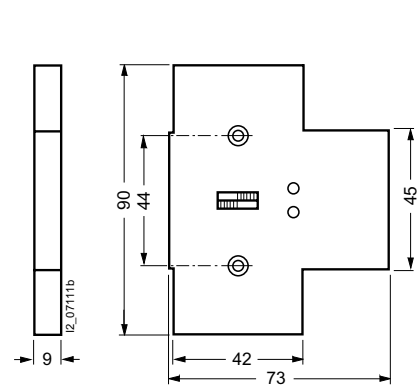
5TE1 switch disconnectors, 100 A and 125 A

5TE1 210	5TE1 310	5TE1 410	5TE1 610
5TE1 220	5TE1 320	5TE1 420	5TE1 620
	5TE1 315	5TE1 415	
	5TE1 325	5TE1 425	



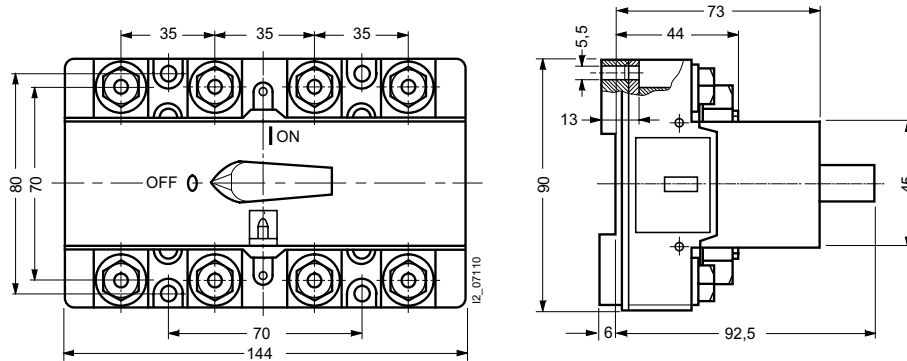
5TE9 auxiliary switches

5TE9 005
5TE9 006

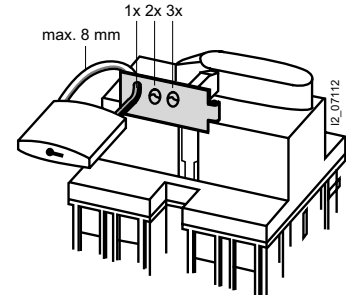


5TE1 switch disconnectors, 160 A and 200 A

5TE1 230	5TE1 330	5TE1 430	5TE1 630
5TE1 240	5TE1 335	5TE1 435	5TE1 640
	5TE1 340	5TE1 440	
	5TE1 345	5TE1 445	

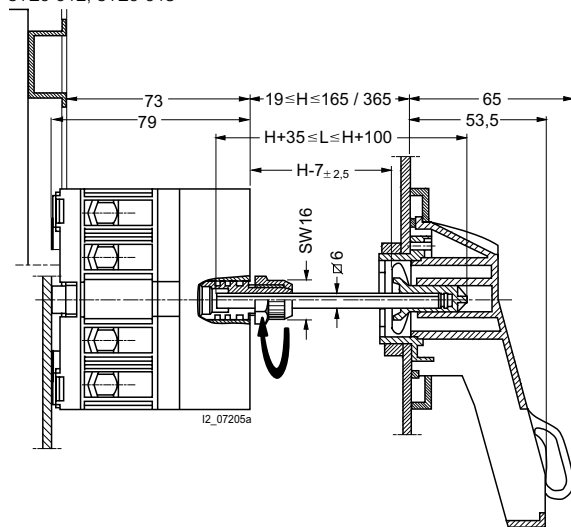


5TE9 004 locking units

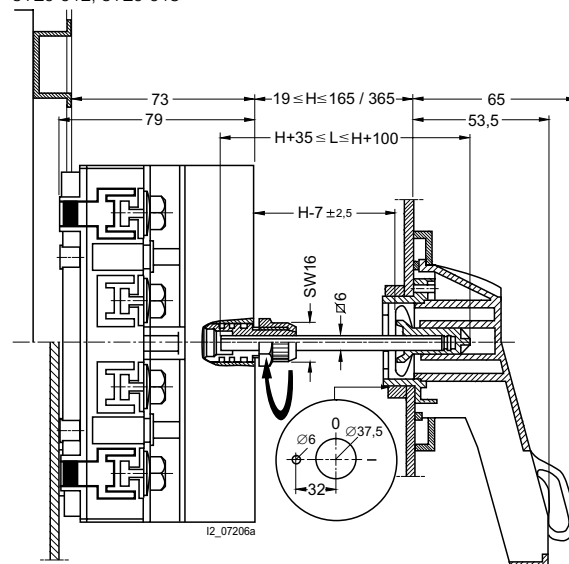


5TE9 rotary actuators with extension axis

with 100 A and 125 A switch disconnectors
5TE9 010, 5TE9 011,
5TE9 012, 5TE9 013



with 160 A and 200 A switch disconnectors
5TE9 010, 5TE9 011,
5TE9 012, 5TE9 013



It is possible to open the door in both a connected and disconnected state.

Switches and Light Indicators

5TE1 switch disconnectors

Schematics

5TE1 switch disconnectors

5TE1 210
5TE1 220
5TE1 230
5TE1 240



5TE1 310
5TE1 320
5TE1 330
5TE1 340



5TE1 410
5TE1 420
5TE1 430
5TE1 440



5TE1 610
5TE1 620
5TE1 630
5TE1 640



5TE1 315
5TE1 325
5TE1 335
5TE1 345



5TE1 415
5TE1 425
5TE1 435
5TE1 445



Auxiliary switches

5TE9 005



5TE9 006



7 Switching Devices





- 7/2 **Product overview**
- 7/3 **5TT4 1 remote switches**
- 7/8 **5TT4 2 switching relays**
- 7/11 **5TT5 7 Insta contactors**
- 7/16 **5TT3 4 soft-starting devices**
- 7/18 **5TT5 2 EMERGENCY-STOP modules**
- 7/21 **Electrical switching**



Switching Devices

Product overview

Overview

Devices	Application	Standards	Usage		
			Non-residual buildings	Residual buildings	Industry
 <p>Remote control switches</p> <ul style="list-style-type: none"> • Without central switching • With central switching <p>Blind and series remote control switches</p>	Switching of lighting by pushbutton	EN 60669 (VDE 0632)	•	•	
 <p>Relays</p> <ul style="list-style-type: none"> • For PLCs 	Switching of small loads or application in controllers	EN 60669 (VDE 0632)	•		•
 <p>Insta contactors</p>	Switching of motors, heating or lighting, such as fluorescent lamps or filament lamps, and resistive and inductive loads	EN 60947-4-1, EN 60947-5-1, EN 61095	•	•	•
 <p>Soft-starting devices</p> <ul style="list-style-type: none"> • 5TT3 441, 230 V AC • 5TT3 440, 400 V AC 	Protection of machines with transmission, belt or chain drives, conveyor belts, fans, pumps, compressors, packing machines, door operating mechanisms	EN 60947-4-2, (VDE 0660 Part 117)			•
<p>>N-type< EMERGENCY-STOP modules</p> <ul style="list-style-type: none"> • 5TT5 200, 10 A 	EMERGENCY-STOP switching of machines in industrial, commercial and private economic applications	Acc. to the 98/37/EC EC Directive for machines, EN 954-1	•		•
<p>Electrical switching</p>	There are a number of general operational demands that need to be taken into consideration during planning, particularly with regard to the switching of lighting. The technical background represented here is for illustration and clarification purposes and is intended to help you avoid planning errors and prevent the time and hassle caused by premature failures.				

Definitions

I_e	= rated operational current
U_e	= rated operational voltage
I_c	= rated control current
U_c	= rated control voltage
P_s	= rated operational power
1 MW	= modular width 18 mm

Overview

	Remote control switches 5TT4 10 5TT4 11 5TT4 12	Blind and series remote control switches 5TT4 13 5TT4 14
Manual operation	•	•
Switching position indication	•	–
Fuse protected against continuous voltage	•	•

Function

Remote control switches are used to switch lightings by means of several pushbuttons. This makes complex cross/two-way switching unnecessary. With each pushbutton impulse, the remote control switch changes its contact position from OFF to ON, etc. In the event of a power failure, the last switch position is mechanically stored.

Pushbutton malfunction

Pushbuttons can jam, which may expose remote control switches to a continuous voltage. All our remote control switches are protected against such malfunction.

Central switching functions

Versions with central ON/OFF function allow the central switching of all connected remote control switches. Such central switching can also be actuated using a time switch. All remote control switches are switched to the ON or OFF switching state, regardless of the current switching state.

Parallel connection of remote control switches

It is not possible to control more than one remote control switch using just one pushbutton or contact. This would lead to an undefined contact position as there is no synchronization.

Technical specifications

Data according to EN 60669 (VDE 0632), EN 60669 -2-2 and EN 60669 -2-2/A1			5TT4 101 5TT4 102 5TT4 105	5TT4 103 5TT4 104	5TT4 12...0	5TT4 132-0 5TT4 142-..
Contact types	1 NO 2 NOs 1 NO 1 NC		5TT4 101 5TT4 102 5TT4 105			
	3 NOs 4 NOs			5TT4 103 5TT4 104		
	ZEZA shutter/blind series				5TT4 12...0	5TT4 132-0 5TT4 142-..
Rated control voltage U_c		V AC	see selection table			
Operating range		$\times U_c$	0.8 ... 1.1			
Rated power dissipation P_v	magnet coil, only pulse per contact at 16 A	app. VA app. VA	8 1.2	20 1.2	8 1.2	8 1.2
Minimum pulse duration		ms	50			
Contact gap		mm	>1.2			
Rated operational voltage U_e	1-pole 2-pole 3-pole 4-pole	V AC V AC V AC V AC	250 400 400 400		– 250 – –	
Protective separation	creepage and clearances magnet coil/contact	mm	>6			
Different phases	magnet coil/contact Magnet coil/terminals for central input		permissible yes		–	
Rated operational current I_e	at p.f. = 1	A	16			
Rated impulse withstand voltage U_{imp}		kV	>4			
Pushbutton malfunction			yes, safe through design 100% ON-time	yes, protection through PTC –	yes, safe through design 100% ON-time	
• Fuse protected against continuous voltage	magnet coil					
Minimum contact load		V; mA	10; 100			
Electrical service life	at I_e and U_e or specified lamp load	switching cycles	50 000			
Terminals	\pm screw (Pozidriv)		1			
Conductor cross-sections	rigid, max. Flexible with sleeve, min.	mm ² mm ²	1.5 ... 6 1			
Permissible ambient temperature		°C	-10 ... +40			
Degree of protection	according to EN 60529		IP20			
Resistance to climate	according to DIN 50015 at °C 95% relative humidity		35			
Humidity class	complies with DIN 50016		–		FW 24	

5TT4 1 remote switches

NEW

Selection and ordering data

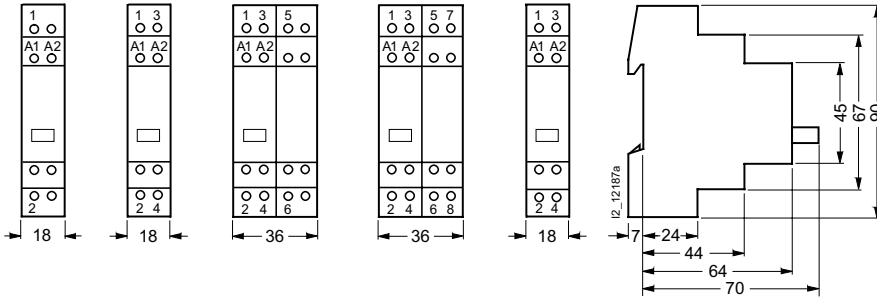
Version	U_e	I_e	U_c	MW	Order No.	Weight 1 unit approx. kg	PS*/ P. unit Unit(s)
	V AC	A AC	V AC				
Remote control switches							
1 NO contacts	250	16	230	1	5TT4 101-0	0.126	1
			115		5TT4 101-1	0.120	1
			24		5TT4 101-2	0.121	1
			12		5TT4 101-3	0.118	1
2 NO contacts	400	16	230	1	5TT4 101-4	0.124	1
			115		5TT4 102-0	0.138	1
			24		5TT4 102-1	0.132	1
			12		5TT4 102-2	0.132	1
3 NO contacts	400	16	230	2	5TT4 102-3	0.130	1
			24		5TT4 102-4	0.136	1
4 NO contacts	400	16	230	2	5TT4 103-0	0.200	1
			24		5TT4 103-2	0.195	1
1 NO contact + 1 NC contact	250	16	230	1	5TT4 104-0	0.211	1
			115		5TT4 104-2	0.206	1
			24		5TT4 105-0	0.137	1
			12		5TT4 105-1	0.132	1
			8		5TT4 105-2	0.132	1
					5TT4 105-3	0.129	1
					5TT4 105-4	0.135	1
Remote control switches with central switching							
2 NO contacts	400	16	230	1	5TT4 122-0	0.181	1
3 NO contacts	400	16	230	2	5TT4 123-0	0.194	1
1 NO contact + 1 NC contact	250	16	230	1	5TT4 125-0	0.182	1
Series remote control switches							
Contact sequence 1 + 2 - 2 - 1 - 0							
2 NO contacts	250	16	230	1	5TT4 132-0	0.138	1
Blind remote control switches							
Contact sequence 1 - 0 - 2 - 0							
2 NO contacts	250	16	230	1	5TT4 142-0	0.138	1
			24		5TT4 142-2	0.132	1
			12		5TT4 142-3	0.130	1
Auxiliary switches							
1 CO contact • For small outputs ¹⁾	250	5	-	0.5	5TT4 900	0.054	1
					5TT4 901	0.054	1

1) Minimum AC load switched: 1 mA at 5 V / DC: 1 mA at 5 V;
Maximum AC load switched: 100 mA at 250 V / DC: 100 mA at 30 V.

Dimensional drawings

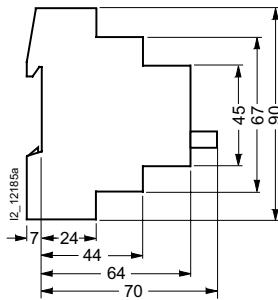
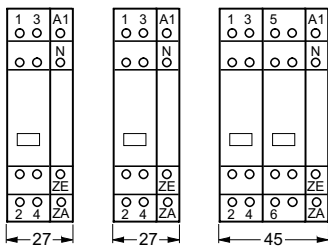
5TT4 1 remote switches

5TT4 101-0 5TT4 102-0 5TT4 103-0 5TT4 104-0 5TT4 105-0
 5TT4 101-1 5TT4 102-1 5TT4 103-2 5TT4 104-2 5TT4 105-1
 5TT4 101-2 5TT4 102-2 5TT4 105-2
 5TT4 101-3 5TT4 102-3 5TT4 105-3
 5TT4 101-4 5TT4 102-4 5TT4 105-4



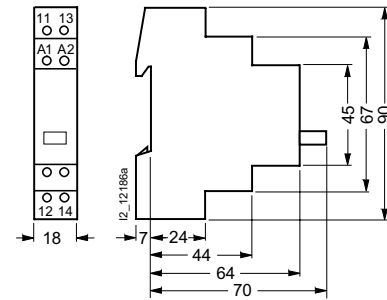
5TT4 12 remote control switches, central ON/OFF

5TT4 122-0 5TT4 125-0 5TT4 123-0



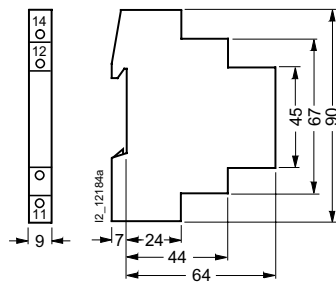
5TT4 142 blind remote control switches and 5TT4 132-0 series remote control switches

5TT4 142-0 5TT4 132-0
 5TT4 142-2
 5TT4 142-3



5TT4 90 auxiliary switches

5TT4 900
 5TT4 901



Switching Devices

5TT4 1 remote switches

Schematics

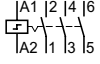
5TT4 101-.



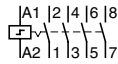
5TT4 102-.



5TT4 103-.



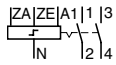
5TT4 104-.



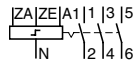
5TT4 105-.



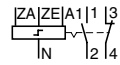
5TT4 122-0



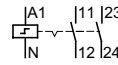
5TT4 123-0



5TT4 125-0



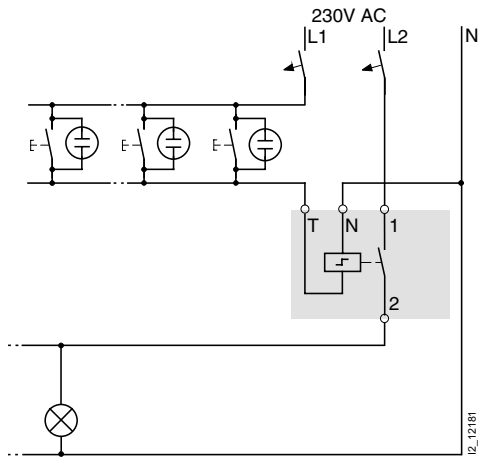
5TT4 142-
5TT4 132-0



5TT4 90

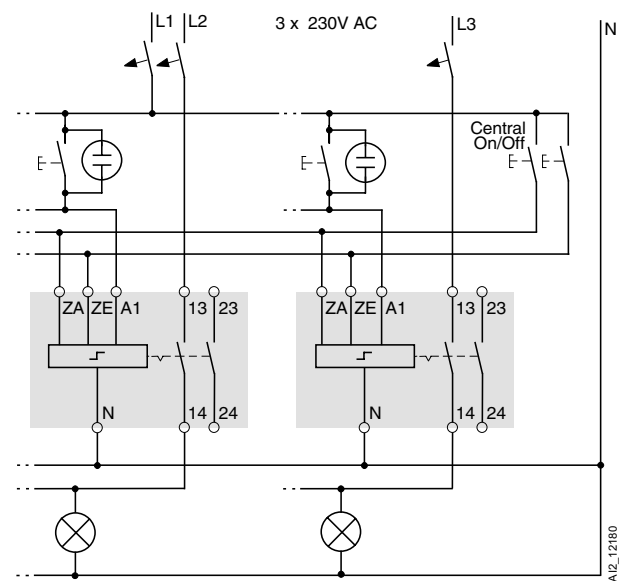


Switching example: 5TT4 101-0



Single-phase lighting circuit with 230 V AC actuation, e.g. in office buildings

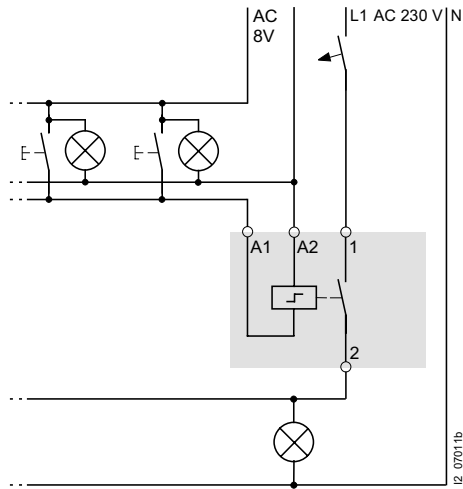
Switching example: 5TT4 122-0 with central ON/OFF switching



With the 2-pushbutton central "ON" and "OFF" function, all remote control switches can be switched on or off from a central point, e.g. at the start and end of work. A time switch with a one-second pulse can also be used if desired. Once a central on/off switching operation has been executed, the remote control switches can also be switched on and off locally at any time. The phase relation of ZA, ZE and A1 is arbitrary.

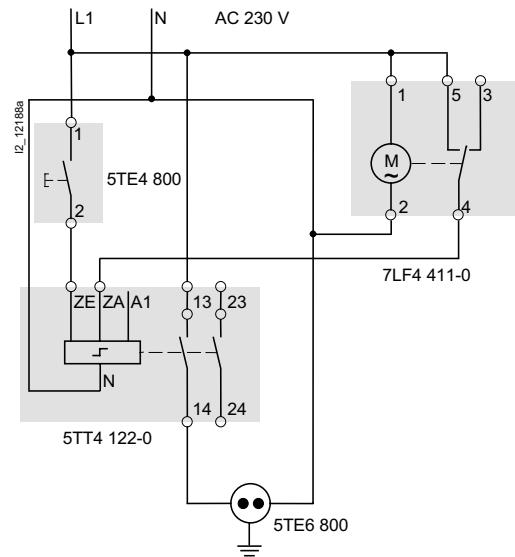
Schematics

Switching example: 5TT4 101-4



Single-phase lighting circuit with safety extra-low voltage 8 V AC, pushbutton and glow lamp.

Switching example: 5TT4 122-0 with ON/OFF time switching



Printers and copiers are to be switched on with the pushbutton at the beginning of the working day. At the end of the working day, e.g. 6 p.m. to 10 p.m., an hourly one-second pulse of the time switch switches the outlet off. This ensures that printers and copiers are not "forgotten". If the device is switched on again after 6 p.m., a switch-off is actuated again hourly.

5TT4 2 switching relays

Overview

Function

Switching relays are used in control systems as coupling relays, for the electrical or safe isolation of electrical circuits.

Protective separation

The magnet coil and the contacts meet the requirements for safety extra-low voltage from the actuating voltage safely through to disconnection.

Checking functions using the manual switch

Switching relays have a manual switch that shows the switching position. This switch can be used to manually switch the switching relay, thus allowing system devices and control functions to be checked.


Technical specifications

According to EN 60669 (VDE 0632), EN 60669 -2-2 and EN 60669 -2-2/A1			5TT4 201-	5TT4 202- 5TT4 204- 5TT4 205- 5TT4 206- 5TT4 207-
Contact types	1 NO 2 NOs 1 NO 1 NC 1 CO 2 COs 4 NOs		5TT4 201-	5TT4 202- 5TT4 205- 5TT4 206- 5TT4 207- 5TT4 204-
Rated control supply voltage U_c		V AC V DC	8, 12, 24, 115 or 230 –	
Operating range		$\times U_c$	0.8 ... 1.1	
Rated power dissipation P_V	per contact	VA	1.1 ... 1.2	1.1 ... 1.2
Rated frequency	AC versions	Hz	50	
Response time/returning time		ms	50	
Contact gap		mm	>1.2	
Rated operational voltage U_e	1-pole	V AC	250	
Protective separation	creepage and clearances magnet coil/contact	mm	>6	
Different phases	magnet coil/contact		permissible	
Rated operational current I_e	at p.f. = 1	A	16	
Rated impulse withstand voltage U_{imp}	magnet coil/contact contact/contact	kV kV	>4 >2.5	
Minimum contact load		V; mA	10; 100	
Electrical service life	at I_e and U_e or specified lamp load	Switching cycles	50 000	
Terminals	\pm screw (Pozidriv)		1	
Conductor cross-sections	rigid, max. Flexible with sleeve, min.	mm ² mm ²	1.5 ... 6 1	
Permissible ambient temperature		°C	-20 ... +45	
Safety class	according to EN 60730-1		IP20	



5TT4 2 switching relays

Selection and ordering data

Version	U_e	I_e	U_c	MW	Order No.	Weight 1 unit approx. kg	PS*/ P. unit Unit(s)	
	V AC	A AC	V AC					
 5TT4 201-0	Switching relays							
	1 NO contacts	250	16	230	1	5TT4 201-0	0.126	1
				115		5TT4 201-1	0.120	1
				24		5TT4 201-2	0.120	1
				12		5TT4 201-3	0.118	1
	2 NO contacts	400	16	230	1	5TT4 201-4	0.124	1
				115		5TT4 202-0	0.137	1
				24		5TT4 202-1	0.131	1
				12		5TT4 202-2	0.131	1
	4 NO contacts	400	16	230	2	5TT4 202-3	0.129	1
				115		5TT4 202-4	0.135	1
				24		5TT4 204-0	0.270	1
				12		5TT4 204-1	0.258	1
	1 NO contact + 1 NC contact	400	16	230	1	5TT4 204-2	0.259	1
				115		5TT4 204-3	0.254	1
				24		5TT4 204-4	0.266	1
				12		5TT4 205-0	0.137	1
	1 CO contact	250	16	230	1	5TT4 205-1	0.131	1
				115		5TT4 205-2	0.131	1
				24		5TT4 205-3	0.129	1
				12		5TT4 205-4	0.135	1
	2 CO contact	400	16	230	1	5TT4 206-0	0.127	1
				115		5TT4 206-1	0.121	1
				24		5TT4 206-2	0.122	1
12				5TT4 206-3		0.120	1	
			230		5TT4 206-4	0.125	1	
			115		5TT4 207-0	0.140	1	
			24		5TT4 207-1	0.134	1	
			12		5TT4 207-2	0.135	1	
			230		5TT4 207-3	0.133	1	
			115		5TT4 207-4	0.138	1	
			24					
			12					
			8					



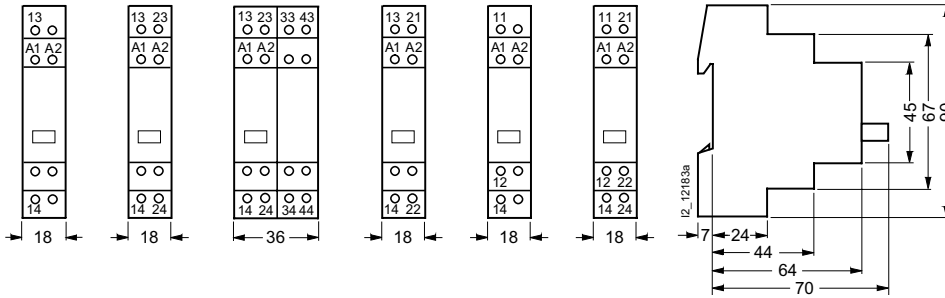
Switching Devices

5TT4 2 switching relays

Dimensional drawings

5TT4 2 switching relays

5TT4 201-, 5TT4 202-, 5TT4 204-, 5TT4 205-, 5TT4 206-, 5TT4 207-.



Schematics

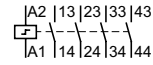
5TT4 201-.



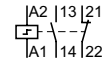
5TT4 202-.



5TT4 204-.



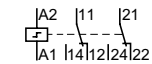
5TT4 205-.



5TT4 206-.



5TT4 207-.



Overview



Low-noise contactors, 24, 40 and 63 A devices

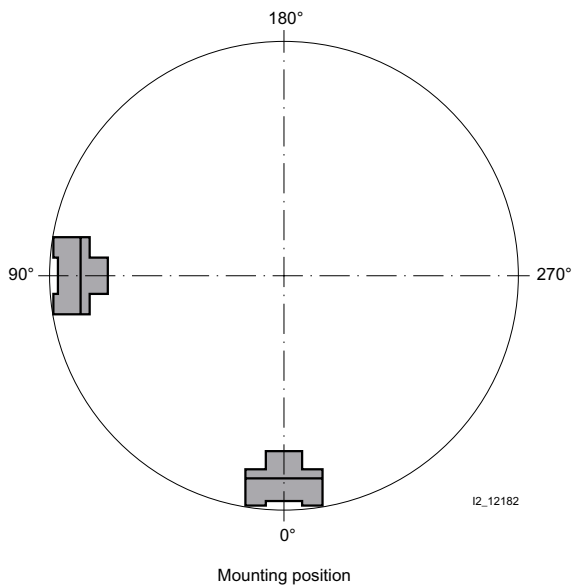
The 5TT5 73., 5TT5 74. and 5TT5 75. Insta contactors are equipped with a DC magnetic system. Apart from a very quiet switching noise, they are noise-free. They are therefore especially suitable for applications in residential buildings.

Spacers

Spacers can be used as a compensating element and have a width of ½ MW. They come with an integrated wiring duct for the insertion of conductors. Two oppositely installed spacers thus offer space for large conductor cross-sections up to a 14 mm diameter.

Mounting position of installation contactors 24 A, 40 A, 63 A

For normal mounting position (see figure, 0° to 90°), there are no restrictions. For mounting positions between 100° and 260°, the level of control voltage must be at least 100% of the rated value.



Heat dissipation

If Insta contactors are installed in distribution boards, they should be designed for a standard temperature of 40 °C. If more than one Insta contactor is installed, a 5TG8 240 spacer must be installed after every second contactor.

5TT5 7 Insta contactors

Technical specifications

			5TT5 70 2-pole	5TT5 73 4-pole	5TT5 74 4-pole	5TT5 75 4-pole
Rated frequency	at AC	Hz	50 60	40 ... 450		
Rated control voltage U_c	V AC		24, 230	27...28, 255	24, 115, 230	24, 230
		V DC	–		24, 110, 220	24, 220
Operating range $\times U_c$			0.85 ... 1.1			
Rated operational voltage U_e		V	250	440	440	440
Rated operational current I_e • AC-1/AC-7a, NO contacts • AC-1/AC-7a, NC contacts • AC-3/AC-7b, NO contacts • AC-3/AC-7b, NC contacts		A	20	24	40	63
		A	20	24	30	30
		A	9	9	22	30
		A	9	6	–	–
		A	9	6	–	–
Rated power dissipation P_v • Pick-up power • Holding power • Per contact AC-1/AC-7a		VA/W	8/5	4/4	5/5	65/65
		VA/W	3.2/1.2	4/4	5/5	4.2/4.2
		VA	1	1.5	3	6
		VA	1	1.5	3	6
Switching times • Closing (NO contacts) • Opening (NO contacts)		ms	≤12	≤40	≤40	≤40
		ms	≤12	≤40	≤40	≤40
Rated impulse withstand voltage U_{imp}		kV	≤4	≥4		
Contact gap	(NO contacts) min.	mm	1.5	2.4	2.8	2.6
Electrical service life in switching cycles at I_e and load	AC-1/AC-7a AC-3/AC-7b		150 000 150 000	500 000	170 000	240 000
Mechanical lifetime			1 million			
Maximum switching frequency at load	AC-1/AC-7a AC-3/AC-7b		300 operations/h 600 operations/h			
Switching of resistive loads AC-1 for rated operational power P_s (S-contacts)		V AC	230	230	230	230
	1-phase	kW	4	5.3	8.8	13.8
	3-phase	kW	–	16	26	41
Switching of three-phase asynchronous motors AC-3 for rated operational power P_s (S-contacts)		V AC	230	400	400	400
	1-phase	kW	1.3	–	–	–
	3-phase	kW	–	4	11	15
Minimum switching capacity			≥ 17 V, ≥ 200 mA			
Overload withstand capability per current path (NO contacts only)	at 10 s	A	72	72	176	240
Short-circuit protection, according to coordination type 1 Back-up fuse	Characteristic gL/gG	A	20	35	63	80
Terminals • Coil connection • Main connection	± screw (Pozidriv)		1	1	1	1
			1	1	2	2
Tightening torques • Coil connection • Main connection		Nm	0.9	0.9	0.9	0.9
		Nm	1.2	1.0	2.5	2.5
Conductor cross-sections • Coil connection • Main connection	rigid	mm ²	1.0 ... 2.5	1.5 ... 4	1.5 ... 4	1.5 ... 4
		flexible with sleeve	mm ²	1.0 ... 2.5	1.5 ... 2.5	1.5 ... 2.5
	flexible with sleeve	mm ²	1.0 ... 4	1.5 ... 10	2.5 ... 25	2.5 ... 25
		mm ²	1.0 ... 4	1.5 ... 6	2.5 ... 16	2.5 ... 16
Permissible ambient temperature • For operation • For storage		°C	-25 ... +55	-25 ... +55	-25 ... +55	-25 ... +55
		°C	-40 ... +70	-50 ... +80	-50 ... +80	-50 ... +80
Degree of protection	according to EN 60529		IP20			

Switching of direct voltages DC-1

Permissible DC switching currents for NO contacts at p. f. = 1 4 contacts in series are not recommended for 24 V due to unreliable contacts			1 contact	2 contacts in series	3 contacts in series	4 contacts in series
5TT5 70 , 2-pole, 20 A	I_e at $U_e = 24$ V DC	A	20	20	–	–
	I_e at $U_e = 220$ V DC	A	–	–	–	–
5TT5 73 , 4-pole, 24 A	I_e at $U_e = 24$ V DC	A	24	24	24	24
	I_e at $U_e = 110$ V DC	A	2	4	6	8
	I_e at $U_e = 220$ V DC	A	0.5	1.5	2.5	3.5
5TT5 74 , 4-pole, 40 A	I_e at $U_e = 24$ V DC	A	40	40	40	40
	I_e at $U_e = 220$ V DC	A	0.8	5	15	18
5TT5 75 , 4-pole, 63 A	I_e at $U_e = 24$ V DC	A	50	63	63	63
	I_e at $U_e = 220$ V DC	A	0.8	5.5	17	20

Technical specifications

Switching of lamps

Incandescent lamp loads				
5TT5 70, 2-pole, 20 A	per current path	W	1000	
5TT5 73, 4-pole, 24 A	per current path	W	1000	
5TT5 74, 4-pole, 40 A	per current path	W	3000	
5TT5 75, 4-pole, 63 A	per current path	W	5000	

Maximum number of lamps, per conducting path at 230 V AC, 50 Hz.

Fluorescent and compact lamps in ballast operation (permissible number of lamps per electrical circuit at 230 V AC, 50 Hz)

Lamp type Capacitor capacitance	W	μF	Uncorrected			Parallel-corrected			DUO circuit 2-lamps		
			L18	L36	L58	L18 4.5	L36 4.5	L58 7.0	2 x L18	2 x L36	2 x L58
5TT5 70, 2-pole	20 A	NO contacts	22	17	10	6	6	4	22	17	10
5TT5 73, 4-pole	24 A	NO contacts	26	20	12	8	8	5	26	20	12
5TT5 74, 4-pole	40 A	NO contacts	85	65	40	16	16	10	85	65	40
5TT5 75, 4-pole	63 A	NO contacts	135	105	65	67	67	43	140	105	65

Fluorescent and compact lamps with electronic ballast (ECG) (permissible number of lamps per electrical circuit at 230 V AC, 50 Hz)

Lamp type	W	1-lamp			2-lamps			
		1 x L18	1 x L36	1 x L58	2 x L18	2 x L36	2 x L58	
5TT5 70, 2-pole	20 A	NO contacts	15	12	11	8	7	6
5TT5 73, 4-pole	24 A	NO contacts	24	16	14	18	11	8
5TT5 74, 4-pole	40 A	NO contacts	55	34	32	34	20	17
5TT5 75, 4-pole	63 A	NO contacts	76	47	46	48	29	24

High-pressure mercury-vapor lamps (permissible number of lamps per electrical circuit 230 V AC, 50 Hz)

Lamp type Capacitor capacitance	W	μF	Uncorrected							Parallel-corrected						
			50	80	125	250	400	700	1 000	50	80	125	250	400	700	1 000
5TT5 70, 2-pole	20 A	NO contacts	12	7	5	3	1	0	0	4	3	2	1	0	0	0
5TT5 73, 4-pole	24 A	NO contacts	14	10	7	4	2	1	1	5	4	3	2	1	0	0
5TT5 74, 4-pole	40 A	NO contacts	36	27	19	10	7	4	3	10	8	6	3	3	1	1
5TT5 75, 4-pole	63 A	NO contacts	50	38	26	14	10	6	4	43	37	26	15	10	5	4

Halogen metal-vapor lamps (HQI) (permissible no. of lamps per electrical circuit at 230 V AC, 50 Hz)

Lamp type Capacitor capacitance	W	μF	Uncorrected					Parallel-corrected						
			70	150	250	400	1 000	2 000	70	150	250	400	1 000	
5TT5 70, 2-pole	20 A	NO contacts	0	0	0	0	0	0	0	0	0	0	0	0
5TT5 73, 4-pole	24 A	NO contacts	5	3	2	1	0	0	3	1	1	0	0	0
5TT5 74, 4-pole	40 A	NO contacts	14	8	5	4	1	1	5	3	2	2	0	0
5TT5 75, 4-pole	63 A	NO contacts	20	11	7	6	2	1	18	9	5	4	1	1







High-pressure sodium-vapor lamps (NAV) (permissible no. of lamps per electrical circuit at 230 V AC, 50 Hz)

Lamp type Capacitor capacitance	W	μF	Uncorrected				Parallel-corrected				
			150	250	400	1 000	150	250	400	1 000	
5TT5 70, 2-pole	20 A	NO contacts	0	0	0	0	0	0	0	0	0
5TT5 73, 4-pole	24 A	NO contacts	4	3	1	0	1	1	0	0	0
5TT5 74, 4-pole	40 A	NO contacts	15	9	6	3	3	2	1	0	0
5TT5 75, 4-pole	63 A	NO contacts	20	15	8	4	15	9	6	2	2

Switching Devices

5TT5 7 Insta contactors

Selection and ordering data

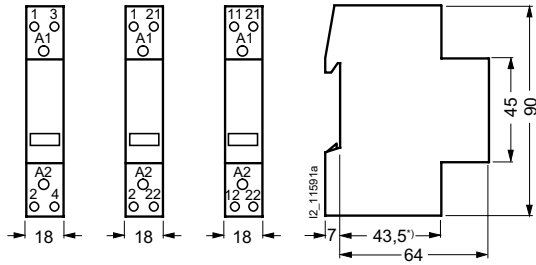
Version	U_e		I_e		U_c		MW	Order No.	Weight 1 unit approx. kg	PS*/ P. unit Unit(s)
	V AC	A AC	V AC	V DC	V AC	V DC				
	Insta contactors									
	for alternating current continuous operation, with switch position indication, with alternating current magnetic system									
	2 NO contacts	250	20	230	–	1		5TT5 700-0	0.132	1
				24	–			5TT5 700-2	0.132	1
	1 NO contact, 1 NC contact	250	20	230	–	1		5TT5 701-0	0.132	1
				24	–			5TT5 701-2	0.132	1
	2 NC contacts	250	20	230	–	1		5TT5 702-0	0.132	1
				24	–			5TT5 702-2	0.132	1
5TT5 700-0	for AC or DC continuous operation, with switch position indication, with direct current magnetic system									
	4 NO contacts	440	24	230	220	2		5TT5 730-0	0.247	1
				115	110			5TT5 730-1	0.247	1
				24	24			5TT5 730-2	0.247	1
	3 NO contacts, 1 NC contact	440	24	230	220	2		5TT5 731-0	0.247	1
				24	24			5TT5 731-2	0.247	1
	2 NO contacts, 2 NC contacts	440	24	230	220	2		5TT5 732-0	0.247	1
				24	24			5TT5 732-2	0.247	1
5TT5 730-0	4 NC contacts	440	24	230	220	2		5TT5 733-0	0.247	1
				24	24			5TT5 733-2	0.247	1
	4 NO contacts	440	40	230	220	3		5TT5 740-0	0.410	1
				24	24			5TT5 740-2	0.410	1
	3 NO contacts, 1 NC contact	440	40 ¹⁾	230	220	3		5TT5 741-0	0.410	1
				24	24			5TT5 741-2	0.410	1
	2 NO contacts, 2 NC contacts	440	40 ¹⁾	230	220	3		5TT5 742-0	0.410	1
				24	24			5TT5 742-2	0.410	1
	4 NO contacts	440	63	230	220	3		5TT5 750-0	0.410	1
				24	24			5TT5 750-2	0.410	1
5TT5 740-0	3 NO contacts, 1 NC contact	440	63 ¹⁾	230	220	3		5TT5 751-0	0.410	1
				24	24			5TT5 751-2	0.410	1
	2 NO contacts, 2 NC contacts	440	63 ¹⁾	230	220	3		5TT5 752-0	0.410	1
				24	24			5TT5 752-2	0.410	1
	Auxiliary switches									
	For left-sided mounting on the 24-A, 40-A and 63-A Insta contactor; max. one auxiliary switch per Insta contactor. minimum contact load 24 V AC; 5 mA									
	2 NO contacts	230, AC-15	4			0.5		5TT5 900	0.039	1
	1 NO contact, 1 NC contact	230, AC-15	4			0.5		5TT5 901	0.039	1
5TT5 900										
	Spacers									
	For heat conduction between the Insta contactors. We recommend placing a spacer between each second Insta contactor. Can be mounted reciprocally, so that two spacers enable greater cable penetration									
						0.5		5TG8 240	0.010	2
5TG8 240										
	Sealable terminal covers									
	for Insta contactors 24 A, (1 set = 2 units)									
						2		5TT5 902	0.010	1 set
	for Insta contactors 40 A and 63 A, (1 set = 2 units)									
						3		5TT5 903	0.010	1 set
5TT5 903										

1) For NC contacts 30 A.

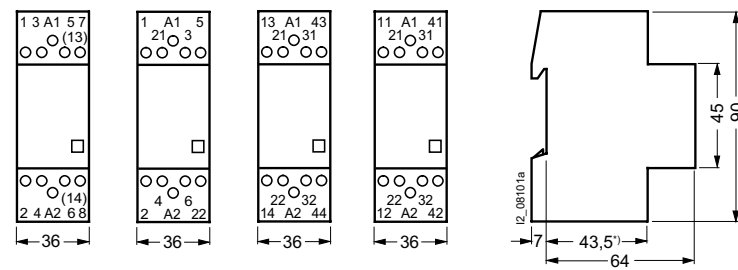
Dimensional drawings

5TT5 7 Insta contactors

5TT5 700 5TT5 701 5TT5 702

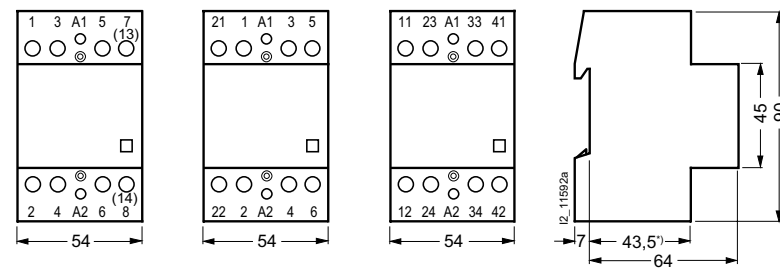


5TT5 730 5TT5 731 5TT5 732 5TT5 733

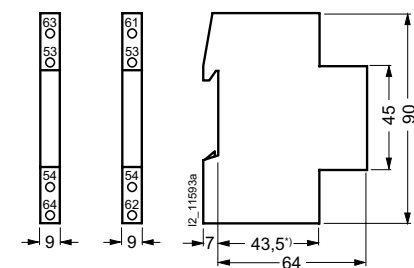


*) Without sealable terminal cover

5TT5 740 5TT5 750 5TT5 741 5TT5 751 5TT5 742 5TT5 752



5TT5 900 5TT5 901



Schematics

5TT5 700



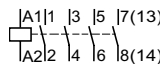
5TT5 701



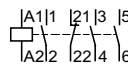
5TT5 702



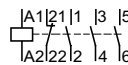
5TT5 730
5TT5 740
5TT5 750



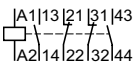
5TT5 731



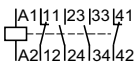
5TT5 741
5TT5 751



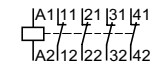
5TT5 732



5TT5 742
5TT5 752



5TT5 733



5TT5 900



5TT5 901



Switching Devices

5TT3 4 soft-starting devices

Overview


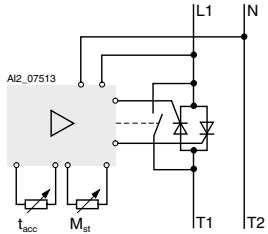

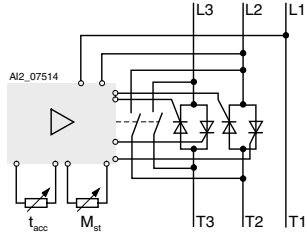
- 1-phase 1.5 kW
- 3-phase 5.5 kW
- Increases the service life of one-phase asynchronous motors and mechanical drive equipment
- Can also be retrofitted in existing systems
- Separate setting of acceleration time and starting torque
- With LED display for startup or continuous operation
- The power semiconductors are bridged after completion of start-up.

Technical specifications

Data according to EN 60947-4-2 (VDE 0660 Part 117)		5TT3 440	5TT3 441
Supply/motor voltage	V AC	400	230
Operating range $\times U_c$		0.8 ... 1.1	
Rated power	VA	3.5	1.4
Rated frequency	Hz	50/60	
Rated power dissipation P_v	coil/drive contact ¹⁾ per pole	3.5 4.6	1.7 0.7
Max. rated motor power	at 400 V	5 500	1 500
Min. rated motor power	at 400 V	300	100
Startup voltage	%	30 ... 70	20 ... 70
Starting ramp	s	0.1 ... 10	
Recovery time	ms	100	200
Switching frequency			
$3 \times I_N, T_{AN} = 10 \text{ s}, v_U = 20 \%$	switching cycles/h	36 (to 3 kW)	10
$3 \times I_N, T_{AN} = 10 \text{ s}, v_U = 20 \%$	switching cycles/h	20 (from 3 ... 5.5 kW)	
Semiconductor fuse	super quick	A	20
Conductor cross-sections	rigid flexible with sleeve	max. mm ² min. mm ²	2 \times 2.5 1 \times 0.5
Permissible ambient temperature	°C	-20 ... +60	-20 ... +55
Resistance to climate	according to EN 60068-1	20/60/4	20/55/4

1) For rated operational current.

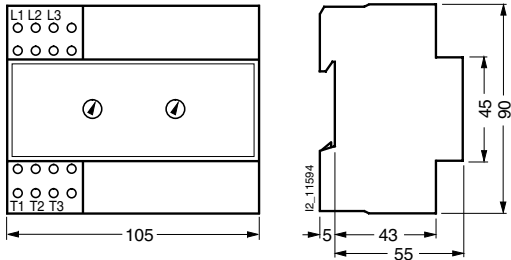
Selection and ordering data

Version	U_e	P_c	MW	Order No.	Weight 1 unit approx.	PS*/ P. unit
	V AC	W			kg	Unit(s)
 Soft-starting devices with transparent caps 1-phase	230	100 ... 1 500	2	5TT3 441	0.135	1
 t_{acc} : Acceleration time M_{st} : Starting torque						
 Soft-starting devices, mounting depth 55 mm 3-phase, 2-phase motor actuation	400	300 ... 5 500	6	5TT3 440	0.430	1
 t_{acc} : Acceleration time M_{st} : Starting torque						

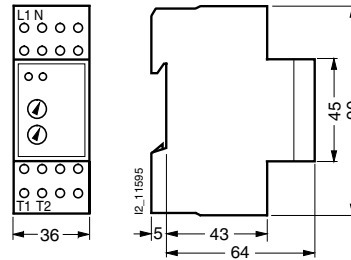
Dimensional drawings

5TT3 44 soft-starting devices

5TT3 440

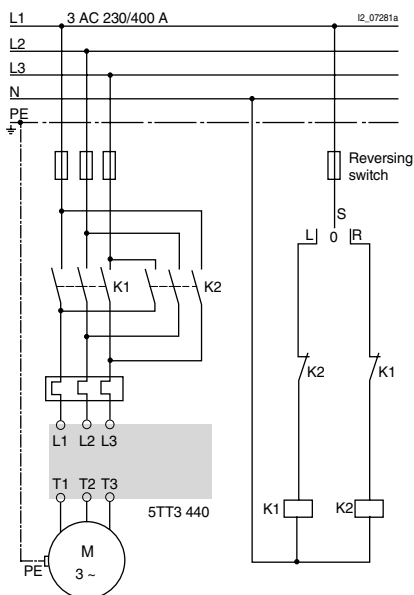


5TT3 441



Schematics

Switching example: 5TT3 440



The soft-starting device is an electronic control for the soft startup of three-phase asynchronous machines. Two of three phases are influenced by the phase control such that the current rises steadily. This also increases the motor torque and the drive starts up smoothly.

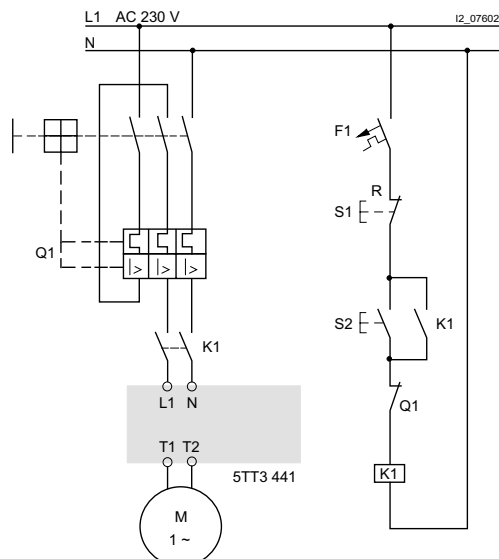
Because drive elements are handled more gently they can be designed more cost-effectively. As well as a considerable reduction in startup noise, this also helps prevent the tipping or sliding of materials to be transported. The starting current is reduced to a minimum.

To prevent losses in the device, the power electronics are bridged with relay contacts after startup.

Note:

There is no speed adjustment. There is no marked soft start behavior without a mechanically connect load. In the case of high switching frequencies, we recommend installing a thermistor motor protection for monitoring the permissible motor temperature. The soft-starting device must not be operated with capacitive load. There must be no source of heat located underneath the device. However, soft-starting devices can be arranged next to each other.

Switching example: 5TT3 441



The soft-starting device is an electronic control for the soft startup of one-phase asynchronous machines. A phase control causes the current to rise steadily. This also increases the motor torque and the drive starts up smoothly.

Because drive elements are handled more gently they can be designed more cost-effectively. As well as a considerable reduction in startup noise, this also helps prevent the tipping or sliding of materials to be transported. The starting current is minimized.

To prevent losses in the device, the power electronics are bridged with relay contacts after startup.

Note:

There is no speed adjustment. There is no marked soft start behavior without a mechanically connect load. If the power semiconductor is to be protected against short circuits or ground faults during startup, a super-quick fuse must be installed. Otherwise, the usual line and motor protective measures must be used. In the case of high switching frequencies, we recommend installing a thermistor motor protection for monitoring the permissible motor temperature. The soft-starting device must not be operated with capacitive load. In order to ensure the safety of persons and systems, only suitably qualified personnel should work on these devices.

Overview

Regulations

The Machine Directive 98/37/EG, valid from 31.12.1994, only specifies global safety standards. Details on how to implement individual safety demands are defined in standards, e.g. by the European Committee for Electrotechnical Standardization (CENELEC), which are based on international standards.

Key standards

- **EN 60204-1 (VDE 0113 Part 1):1998**
"Safety of machinery – Electrical equipment of machines Part 1: General requirements"
- **EC Machine Directive 98/37/EG**
- **EN 292-1:1991**
"Basic concepts, general principles for design Part 1: Basic terminology, methodology"

- **EN 292-2:1991 and EN 292-2/A1:1995**
"Basic concepts, general principles for design Part 2: Technical principles and specifications"
- **EN 418:1992**
"Safety of machinery – EMERGENCY STOP equipment, functional aspects; principles for design "
- **EN 954-1:1996**
"Safety of machinery – Safety-related parts of control systems Part 1: General principles for design"
- **EN 1088:1995**
"Safety of machinery – Interlocking devices associated with guards – Principles for design and selection"

Category of safety-related parts of control systems according to CEN/TC 114 EN 954-1

Category	Summary of requirements	System behavior
B	The safety-related parts of machine control systems and/or their protective devices and their components must be state of the art and designed, selected, assembled and combined such that they can withstand the expected influences.	The occurrence of a fault can lead to the loss of the safety function. Some faults remain undetected.
1	The requirements of B must be fulfilled. Use of proven safety components and principles.	As described for category B, but with a higher level of safety-related reliability
2	The requirements of B must be fulfilled and tried and tested safety principles must be implemented. The safety functions must be tested at suitable intervals by the control system of the machine. Note: What is considered suitable depends on the application and the type of machine.	The occurrence of a fault can lead to the loss of safety function between testing intervals. The fault is detected by the test.
3	The requirements of B must be fulfilled and tried and tested safety principles must be implemented. The control systems must be designed so that: a) A single fault in the control system does not lead to the loss of the safety function(s) and b) wherever practically possible, the single fault is detected by the appropriate means, which must be state-of-the-art.	If a single fault occurs, the safety function is always maintained. Some, but not all, faults are detected. An accumulation of undetected faults may lead to the loss of the safety functions.
4	The requirements of B must be fulfilled and tried and tested safety principles must be implemented. A control system must be designed so that: a) A single fault in the control system does not lead to the loss of the safety function(s) and b) whenever possible, a single fault is detected at or before the next request for the safety function or c) if b) is not possible, that an accumulation of faults does not lead to the loss of the safety function.	If faults occur, the safety function is always maintained. The faults are detected in time to prevent the loss of the safety function.

Overview

Scope

The scope of the EC Machine Directive is no longer restricted to industrial machinery, but now covers virtually all machines used in all areas of commercial and private trade and industry and applies to all

- stationary
- movable,
- hand-held,
- mobile
- machine tools and processing machines
- prime movers and production machines
- compressors

Risk analysis and selection of a suitable category

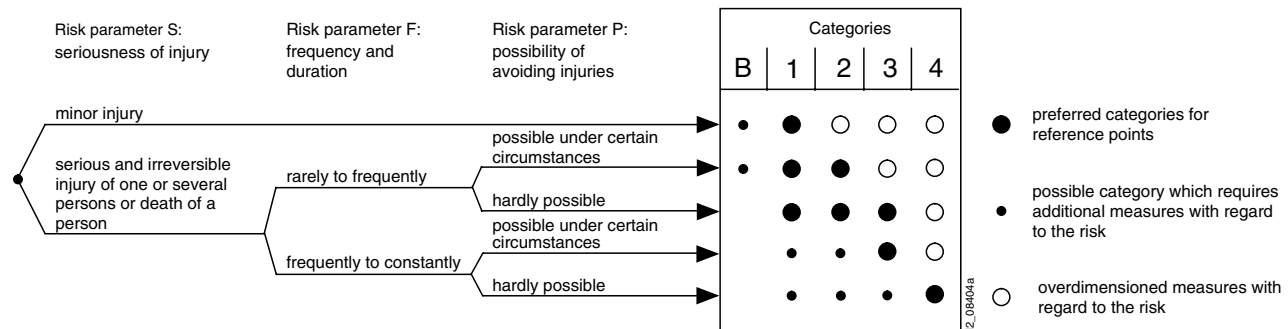
Engineers and operators assume responsibility for the correct risk assessment.

It is difficult to make a quantitative assessment of the risk, so that when selecting the category, the reasonable risk can be determined within a broad band width.

- operating and packaging machines
- machines in underground mining
- earthmoving machines and harvesters
- hoisting equipment
- floor conveyors
- machines for lifting persons
- plants
- interchangeable equipment, such as snow ploughs and mountable sweeping devices

This becomes clear if you select "F2 – frequently to continuous" instead of "F1 – rarely to frequently", for the risk parameters "F – Frequency and duration" when drawing up a risk graph (see image).

The whole band width of safety categories may lie between the assessment of "often" and "frequently".



Benefits

- According to the 98/37/EC EC Machine Directive
- Safety category 4 according to EN 954-1
- According to the 98/37/EC EC Machine Directive
- Safety category 4 according to EN 954-1
- Electrical isolation between electric circuit and control
- LED display for operation and circuit state

Technical specifications

Data according to IEC 60204-1; EN 60204-1 (VDE 0113 Part 1)				5TT5 200
Rated control voltage U_c		V AC		230
Rated power dissipation P_v	coil/drive contact ¹⁾ per pole			3.5 0.8
Operating range $\times U_c$				0.8 ... 1.1
Rated frequency		Hz		50
Control voltage	terminal Y1	V AC/DC		24
Control current	terminal Y1	DC mA		45
Recovery time		ms		500
Electrical isolation	creepage and clearances actuator/contact	mm		3
Rated impulse withstand voltage U_{imp}	actuator/contact	kV		>4
Contact	NO contacts	AC-15	A	3
	NC contacts	AC-15	A	2
	NO contact/ NC contact	AC-1	A	5
Contact gap		mm		>1
Electrical service life	AC-15, 2A, 230 V AC	Operating cycles		10 ⁵
Reliable switching frequency		Switching cycles/h		600
Vibration resistance	10 to 55 Hz	amplitude in mm		0.35
Terminals	+/- screw (Pozidriv)			1
Conductor cross-sections	rigid	max. mm ²		2 × 2.5
	flexible with sleeve	min. mm ²		1 × 0.5
Permissible ambient temperature		°C		0 ... +50
Resistance to climate	According to EN 60068-1			0/55/04

1) For rated operational current.

Switching Devices

5TT5 2 EMERGENCY-STOP modules

Selection and ordering data

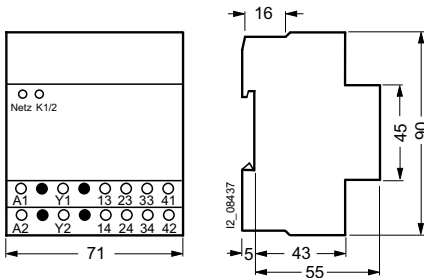
Version	U_e	I_e	U_c	MW	Order No.	Weight 1 unit approx.	PS*/ P. unit
	V AC	A	V AC			kg	Unit(s)
EMERGENCY-STOP modules, mounting depth 55 mm							
	400	5	230	4	5TT5 200	0.250	1



5TT5 200

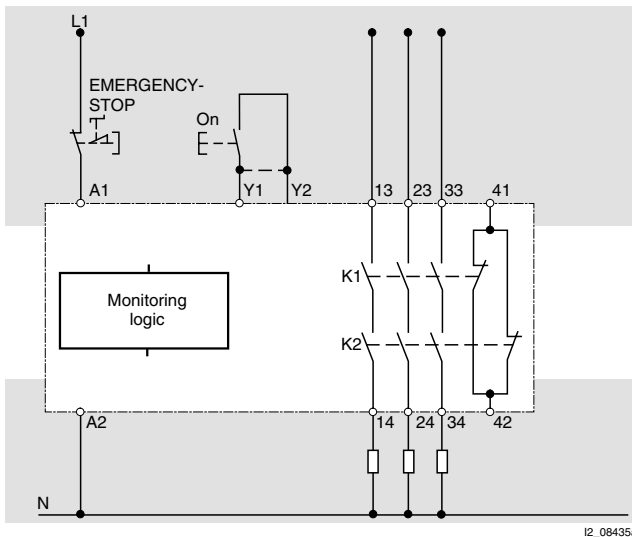
Dimensional drawings

5TT5 200 EMERGENCY STOP modules



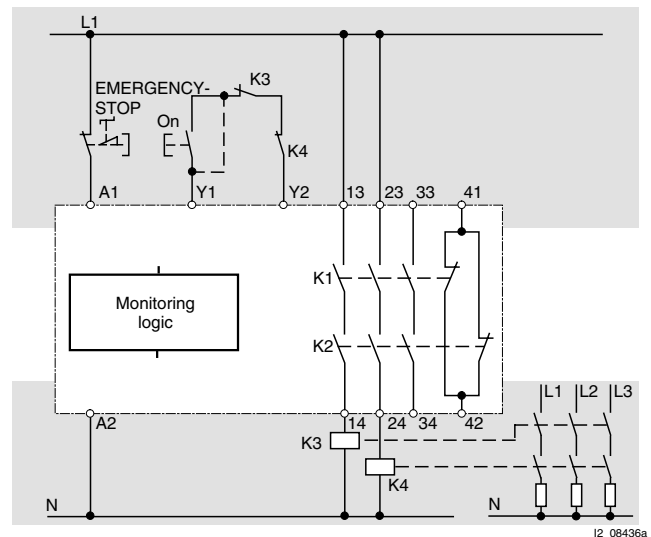
Schematics

Switching examples



Direct connection 230 V/400 V to 5 A

The monitoring logic checks internal relay contacts (not shown) to see whether both relays have been released prior to switching on. This ensures that no contacts are welded. In addition, the voltage level at terminal A1 is monitored. The parallel NC contacts K1 and K2 (terminals 41 and 42) can be connected as required.



Connection of external contactors

External contactors may be used when they are equipped with positively driven contacts according to safety regulations ZH1/457 of the German Trade Association. Contactors with 3 NO contacts and 1 NC contact must be used, whereby the NC contacts must be integrated in the monitoring loop – terminals Y1/Y2. The parallel NC contacts K1 and K2 (terminals 41 and 42) can be connected as required.

Overview

Connecting loads

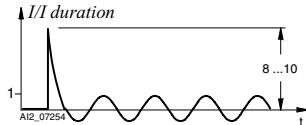
Often, the increased starting currents of different loads, and thus the risk of contacts welding, is underestimated.

Resistive load:

The resistive load, e.g. electrical heating, does not increase the starting current.

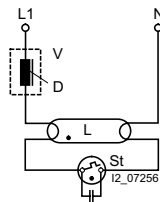
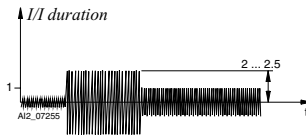
Incandescent lamps:

The cold coiled filament in incandescent lamps or halogen lamps causes a 6 to 10-fold starting current for approx. 10 ms.



Uncorrected fluorescent lamps:

When switched on over several periods, the heating current of the coiled filament and the operational current produce a 2 to 2.5-fold inductive current.



Selecting contacts for lighting installations

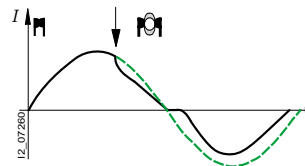
A wide range of different contacts are used for modular installation devices:

- Contacts as for contactors with >3 mm contact gap, as for remote switches
- Relay contacts with >3 mm contact gap, as for Insta contactors
- Manually operated contacts with >3 mm contact gap, as for switches
- Relay contacts with μ contacts (contact gap >0.5 mm), like those used on the printed boards of electronic devices.

The selection tables in the technical specifications help you to find the correct switching device for the different lighting installations.

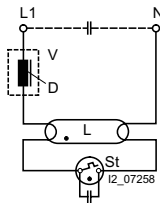
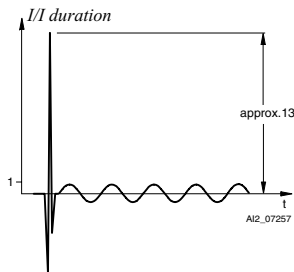
Disconnecting loads

If a contact with current flowing through it opens, this always ignites an electric arc of around 24 to 30 V. This electric arc depends on the voltage, the length of the isolating distance, contact speed, actuating angle and current intensity. The principle of the so-called zero cutoff is that after no more than 1½ half-waves, the electric arc is quenched in the current zero. There are no further quenching aids or current limiters, as is the case with the miniature circuit-breakers.



Parallel corrected fluorescent lamps:

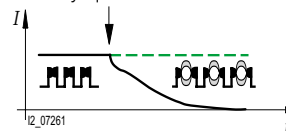
When switched on, for approx. 10 ms, the capacitor causes an extreme, up to 13-fold current.



Disconnecting direct currents

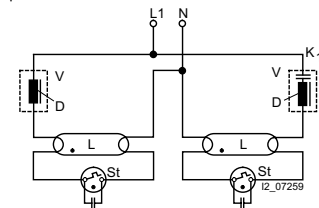
When switching direct voltages, there is no zero-crossing of the current to quench the electric arc. In order to still be able to switch appreciable currents, contacts are connected in series to increase the isolating distance.

Some switching devices are provided with planning data for switching direct currents. Compliance with these planning data is essential. If the data values are exceeded the electric arc is not reliably quenched and there is a risk of fire.



Fluorescent lamps in Duo circuit:

The series capacitor effects a correction. In spite of this, an increased starting current is produced over several periods, just as for uncorrected fluorescent lamps.



Protective separation

When operating 230 V and safety extra-low voltage SELV – voltage of bell transformers or transformers for permanent load – on a device, it is essential to ensure "safe isolation". This requires at least 8 mm creepage distances and clearances and a voltage endurance greater than 4 kV. If these conditions – 8 mm or 4 kV – are not fulfilled, the term "electrical isolation" as "not SELV" is used instead of the term "safe isolation".

Switching Devices

Notes



8

Timers

General Data

8/2

Introduction

Timers for Buildings

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7LF6 1, 5TT1 3 timers

Timers for Industrial Applications

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5TT3 1 timers

Time Switches

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7LF4 4 digital time switches

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7LF5 3 mechanical time switches







Timers

General Data

Introduction

Overview

Devices	Applications	Standards	Usage			
			Non-res.	Res. bldgs.	Industry	
 <p>Timers for buildings</p> <ul style="list-style-type: none"> • 7LF6 110, 7LF6 111 stairwell lighting timers • 7LF6 113 stairwell lighting timers with advance warning • 5TT1 303 stairwell lighting timers (ECGs) • 7LF6 114 lighting timers with advance warning • 7LF6 115 energy-saving timers with advance warning • 7LF6 112 time switches for fans 	Energy saving in stairwell lighting	EN 60669, IEC 60699	•	•		
	With warning through flashing prior to switching off the stairwell lighting in apartment houses	EN 60669, IEC 60699, DIN 18015	•	•		
	For controlling electronic primary switching devices for fluorescent lamps and warning by dimming prior to switching off the stairwell lighting in stairwells with multiple apartments	EN 60669, IEC 60699, DIN 18015	•	•		
	For saving energy in little or variously used rooms, with warning by flashing prior to switching off the stairwell lighting in stairwells with apartment houses	EN 60669, IEC 60699, DIN 18015	•	•		
	Energy saving in toilet facilities	EN 60699, IEC 60699	•	•		
 <p>Timers for industrial applications</p> <ul style="list-style-type: none"> • 5TT3 185 multifunction timers • 5TT3 181 delay timers • 5TT3 182 wiping timers • 5TT3 183 flashing timers • 5TT3 184 off-delay timers 	For influencing time sequences in control systems	EN 60255, IEC 60255			•	
					•	
						•
						•
						•
 <p>7LF4 4 digital time switches</p> <ul style="list-style-type: none"> • 7LF4 40 Mini time switches • 7LF4 41 Top time switches • 7LF4 42 Profi time switches • 7LF4 43 Astro time switches 	To-the-minute switching of devices and plant components in daily, weekly and yearly sequences	VDE 0631 Part 1 and Part 2-7, IEC 60730-1 and 60730-2-7, EN 60730-1 and EN 60730-2-7	•		•	
			•		•	
			•		•	
			•		•	
 <p>7LF5 3 mechanical time switches</p> <ul style="list-style-type: none"> • 7LF5 300-1, 300-5, 300-6, 300-7, 301-0 synchronous time switches without power reserve • 7LF5 301-1, 301-4, 301-5, 301-6, 301-7, 305-0 quartz-clock time switches with power reserve 	Switching accurate to 30 minutes in daily and weekly sequences	VDE 0631 Part 1 and Part 2-7, IEC 60730-1 and 60730-2-7, EN 60730-1 and EN 60730-2-7	•		•	
			•		•	

Definitions

I_e = rated operational current
 U_e = rated operational voltage
 I_c = rated control current
 U_c = rated control voltage
 P_s = rated operational power
 1 MW = modular width 18 mm

Overview

	Stairwell lighting timers				Lighting timers	Energy saving timers	Timers for fans
	7LF6 110	7LF6 111	7LF6 113	5TT1 303	7LF6 114	7LF6 115	7LF6 112
Setting range in minutes	0.5 ... 10	0.5 ... 10	0.5 ... 10	1 ... 10	0.5 ... 10	3 ... 60	0.5 ... 10
Manual switch, steady light	•	•	•	•	•	•	continuous operation
Resettable	--	•	•	•	•	•	•
Switch off warning	--	--	flashing	dimming	flashing	flashing	--
ECG control	--	--	--	•	--	--	--
Quadruple runtime extension by extended pressing of pushbutton	--	--	--	--	•	--	--
Switch off by pressing pushbutton twice	--	--	--	--	--	•	--
4-wire circuit, L-momentary contact	--	•	•	--	•	•	--
3-wire circuit, L-momentary contact	•	--	--	--	--	--	--
3-wire circuit, N-momentary contact	--	•	•	--	•	•	--

Design

Stairwell lighting

Stairwell lighting is required in order to comply with DIN 18015-2 "Electrical systems in residential buildings; type and scope of minimum equipment". What is less known is that, in compliance with EN 12464-1 "Lighting of workplaces", section 5.3, 100 lux is required for traffic areas and corridors. This means that approx. 60 W incandescent lamps, 25 W energy-saving lamps or 25 W fluorescent lamps need to be used. It is hard to see why lesser requirements should apply to stairwells in residential buildings than stipulated in EN 12464-1.

4-wire circuit, L-momentary contact

4 conductors are installed within the building. The timing interval is started by pressing phase L. During the runtime, the timer can be reset at all times.

3-wire circuit, L-momentary contact

3 conductors are installed within the building. The timing interval is started by pressing phase L. No resetting is possible during the runtime as the pushbutton's input and output are exposed to the same potential during this period. The glow lamps are switched off during the runtime.

3-wire circuit, N-momentary contact

3 conductors are installed within the building. The timing interval is started by pressing the N-conductor. During the runtime, the timer can be reset at all times. However, this switching no longer corresponds to DIN VDE 0100 and is now only used in old installations.

Function

Safety through warning prior to switch-off

DIN 18015-2 "Electrical systems in residential buildings; type and scope of minimum equipment" stipulates that the automatic lighting-off control in stairwells of multifunctional dwellings must be equipped with a warning function to prevent sudden darkness in the building. This contribution towards safety is offered by 4 device models. The 7LF6 113 stairwell lighting timer, the 7LF6 114 lighting timer and the 7LF6 115 energy-saving timer warn of an impending off by flashing, the 5TT1 303 stairwell lighting timer ECG warns of the impending switch-off by dimming, allowing sufficient time for the light switch to be pressed again.

Manual switches

All timers have a manual switch for the function Automatic/ON. This allows the operator to switch to permanent light in the event of moving house or emergencies.

Useful continuous contact

Pushbuttons should never jam. For this reason, all our timers have a safeguard to prevent this type of malfunction. Even better, this feature can be used (e.g. by caretakers of properties) to switch to a permanent steady light in the event of moving house or emergencies.

Setting accuracy

The electronic remote switches offer a high degree of accuracy. The runtime can be set precisely to +30 seconds using the push-to-lock knurling wheel setting. The factory settings ensure that the limit values of 1 and 10 or 60 minutes can be reliably set.

Short-circuit strength

Stairwell lighting timers are primarily used for the switching of incandescent lamps, which may occasionally be subject to short-circuits. A key feature of all devices is their high short-circuit strength without the contacts welding.

Switching of fluorescent lamps

In order to extend their service life as far as possible, fluorescent lamps should only be switched using a stairwell lighting timer if the switching frequency is not excessive. Using electronic ballast (ECG) to operate them is more gentle on the device and saves energy. The 5TT1 303 stairwell lighting timer ECG switches the electronic ballast and warns of the impending switch-off by dimming.

Switching of energy-saving lamps

The switching of energy-saving lamps has provoked heated discussions. Energy-saving lamps require a certain time before they produce their full light output. The characteristic of the electronics is not ideal for flashing operation. They do not dim. It is difficult to find suppliers of energy-saving lamps that are suitable for stairwell lighting timers and comply with the required specifications.

Timers



Timers for Buildings

7LF6 1, 5TT1 3 timers

Technical specifications

			7LF6 110	7LF6 111	7LF6 113	5TT1 303	7LF6 114	7LF6 115	7LF6 112
Rated control supply voltage U_c		V AC	230						
Operating range	at 50/60 Hz	$\times U_c$	0.9 ... 1.1						
Rated power dissipation P_s		approx. VA	5						
Setting range		min	0.5 ... 10			1 ... 10	0.5 ... 10	3 ... 60	0.5 ... 10
Accuracy		s	±30						
Incandescent lamp load		mA	50			--	50		--
Manual switch	automatic/permanent		yes						
Minimum push duration		ms	30						
Continuous voltage	at pushbutton input (pushbutton malfunction)		yes						
Contact	contact gap	mm	> 3						
	minimum contact load	V; mA	10; 300						
Rated operational voltage U_e		V AC	250						
Rated operational current I_s	at p.f. = 1	A	16	--		10	--		
Short-circuit strength		A	700			--			
Max. incandescent lamp load		W	2000						--
Max. fan load		VA	--						200
Fluorescent lamp load 58 W			20		--				
• Uncorrected			2 x 20		--				
• DUO circuit	1 lamp		10		--				
• Siemens ECG	2 lamps		2 x 5		--				
Terminals	± screw (Pozidrive)		1						
Conductor cross-sections	rigid	mm ²	1.5 ... 6						
	flexible with sleeve, min.	mm ²	1						
Degree of protection			IP20						
Permissible ambient temperature		°C	-10 ... +50						
Resistance to climate	complies with DIN 50016		FW 24						

Selection and ordering data

	U_e	I_e	U_c	MW	Order No.	Weight 1 unit approx. kg	PS*/ P. unit Unit(s)
	V AC	A	V				
	Stairwell lighting timers						
	with switch for steady light and latch setting, setting range 0.5 ... 10 minutes						
	for 3-wire circuit, L-momentary contact, not resettable						
	250	16	230	1	7LF6 110	0.085	1
	for 4-wire circuit, L-momentary contact, resettable or 3-wire circuit, N-momentary contact, resettable						
	250	16	230		7LF6 111	0.085	1
	Warning prior to switch-off by flashing, for 4-wire circuit, L-momentary contact, resettable or 3-wire circuit, N-momentary contact, resettable						
	250	--	230		7LF6 113	0.085	1
	Lighting timers						
	with switch for steady light and latch setting, with warning prior to switch-off by flashing, setting range 0.5 ... 10 minutes, quadruple extension of runtime by pressing pushbutton for 1 second, for 4-wire circuit, L-momentary contact, or 3-wire circuit, N-momentary contact						
	250	--	230	1	7LF6 114	0.085	1
	Energy saving timers						
	with switch for steady light and latch setting, with warning prior to switch-off by flashing, setting range 3 ... 60 minutes, switch off by pressing pushbutton second time as with remote control switch, for 4-wire circuit, L-momentary contact, resettable or 3-wire circuit, N-momentary contact, resettable						
	250	--	230	1	7LF6 115	0.085	1
	Timers for fans up to 200 VA						
	with switch for steady light and latch setting, setting range 0.5 ... 10 minutes, for delayed switch-on of fan						
	250	--	230	1	7LF6 112	0.085	1
	ECG control switches with transparent cap, for ECG dynamic						
	with transparent cap, with switch for steady light and latch setting, setting range 1 ... 10 minutes, with warning prior to switch-off by dimming, direct current output 1 to 10 V for control of 20 ECG dynamics, mounting depth 55 mm						
	250	10	230	2	5TT1 303	0.130	1

Dimensional drawings

7LF6 110

7LF6 111

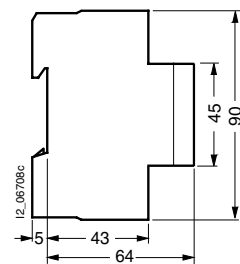
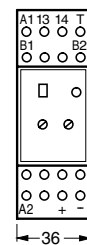
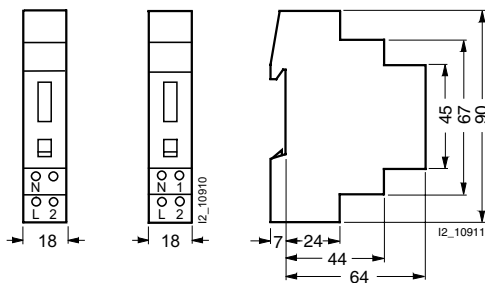
7LF6 112

7LF6 113

7LF6 114

7LF6 115

5TT1 303



Timers

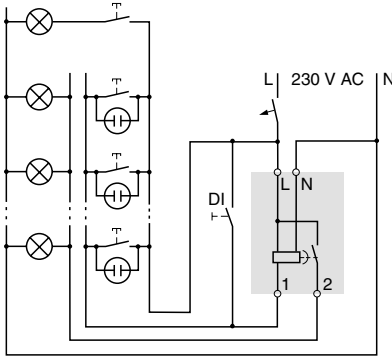
Timers for Buildings

7LF6 1, 5TT1 3 timers

Schematics

Switching example: 7LF6 111 timer in 4-wire circuit, L-momentary contact, resettable

Usual circuit for new installation with separate cable routing for pushbuttons and lights. The additional DI switch allows external switching to permanent light. A time switch can also be used, if desired. An additional attic circuit is also available, which operates independently of the timer, but on the same electrical circuit. The timer can be restarted before the set time expires.

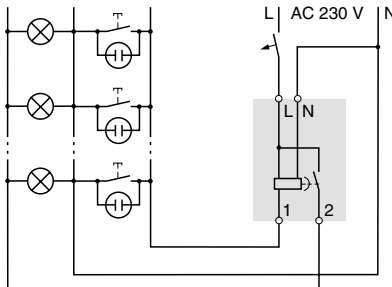


I2_10912a

t_e = runtime

Switching example: 7LF6 111 timer in 3-wire circuit, N-momentary contact, resettable

Can only be used with a limited number of wires. The timer can be restarted before the set time expires. While this 3-wire circuit with N-momentary contact is technically possible, it does not comply with DIN VDE 0100 Part 460. However, it is used in old systems for replacement purposes.

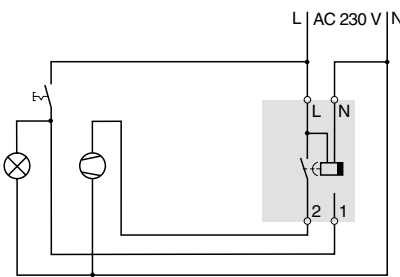


I2_10913

t_e = runtime

Switching example: 7LF6 112 timer for fans up to 200 VA

The switch switches the light on immediately, e.g. in a toilet. After a delay of approx. 1 minute, the fan is switched on. When the light is switched off, the fan continues to run for the time set at the timer.

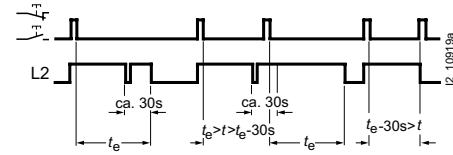


I2_10914

t_e = runtime

Switching example: 7LF6 115 energy-saving timer with warning

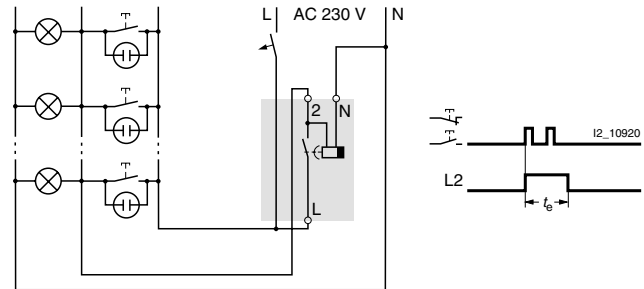
The timer is connected in the same way as the 7LF6 111 timer in a 4-wire circuit or 3-wire circuit. The energy-saving timer switches on if pressed once and switches off when it is pressed again. If it is not switched off manually, it is automatically switched off after the set time, or max. 60 minutes. 40 seconds before expiry of the set time, the timer flashes briefly to warn of the impending switch-off. The timing interval can be switched off before the start of the warning time and can be reset after the start of the warning time.



t_e = runtime

Switching example: 7LF6 110 timer in 3-wire circuit, L-momentary contact, not resettable

Circuit for new installation with shared cable routing for pushbuttons and lights. The timer can only be restarted after the set time expires.

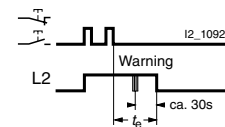


I2_10915

t_e = runtime

Switching example: 7LF6 113 timer with warning

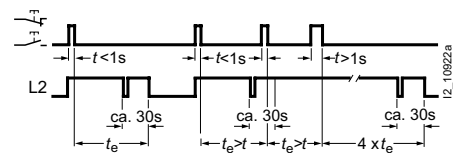
The timer is connected in the same way as the 7LF6 111 timer in a 4-wire circuit or 3-wire circuit. 40 seconds before expiry of the set time, the timer flashes briefly to warn of the impending switch-off.



t_e = runtime

Switching example: 7LF6 114 lighting timer with warning

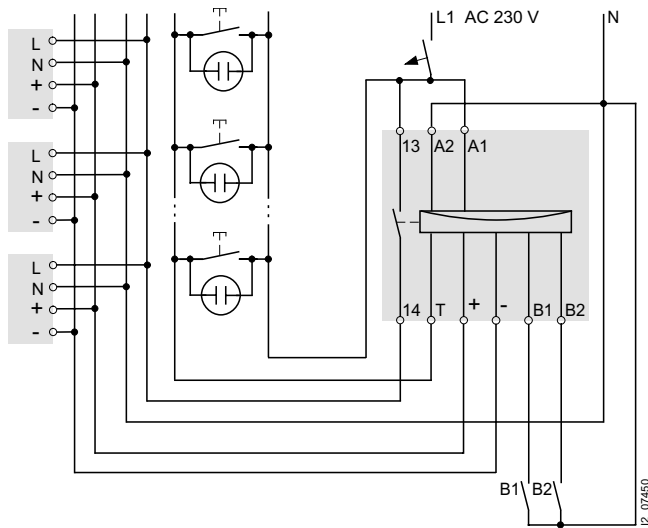
The timer is connected in the same way as the 7LF6 111 timer in a 4-wire circuit or 3-wire circuit. When pressed, the lighting timer switches on for the set runtime, up to 5 minutes. If the switch is pressed for more than one second, the light is switched on for four times the set time, i.e. up to 20 minutes. The last press of the pushbutton is decisive. 40 seconds before expiry of the set time, the timer flashes briefly to warn of the impending switch-off. The timing interval restarts each time the button is pressed.



t_e = runtime

Schematics

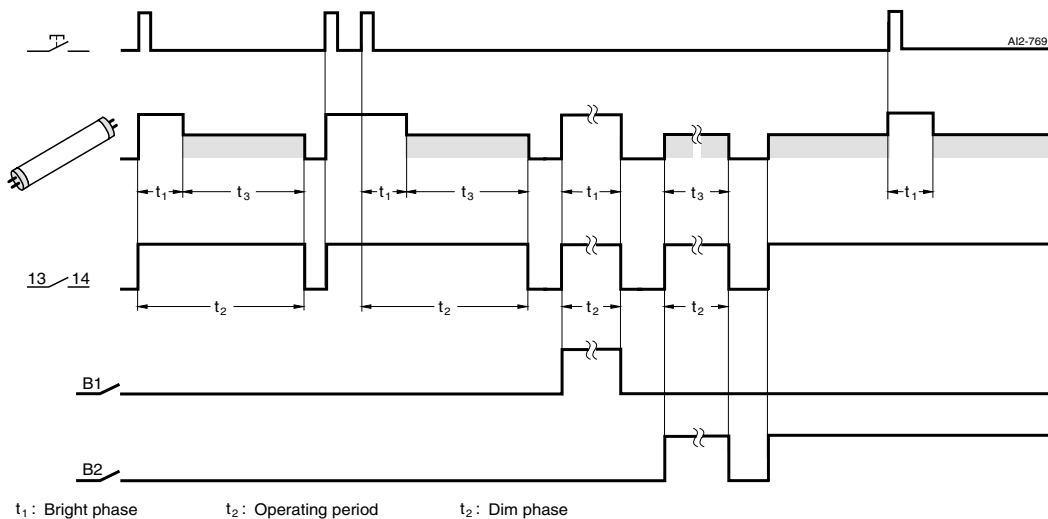
Switching example: 5TT1 303 ECG control switch



The device is fitted with a direct voltage input for the control of an 5LZ. ...-4 ECG dynamic. When the pushbutton is actuated, the power supply is released and the ECG dynamic is brightened, depending on the setting of the timer, for up to 10 minutes.

On expiry of this time, the ECG dynamic is dimmed according to the set dimmer level, if pressed again it brightens again. If the switch is not pressed for 30 minutes, the lighting switches off completely. In addition to these functions, the dimming time and brightness period can also be controlled using a separate pushbutton or timer over control inputs B1 and B2.

Switching the ECG dynamic and the fluorescent lamp as little as possible extends the service life.



t_1 : Bright phase t_2 : Operating period t_3 : Dim phase

Corridor lighting in homes for the elderly

At mealtimes, from 5 to 7 p.m., the light in the corridors can be permanently switched on using a time switch (contact B1). Between 7 and 10 p.m., the lighting is dimmed using switch B2. Simply press the corridor pushbutton again to return the lighting to the brighter setting at any time. After 10 p.m., the light is switched off. It can be switched back on at any time by pressing the corridor pushbutton.

Corridor lighting in hospitals

During the day – during peak periods, lunch times, visiting times, shift changes, doctor's rounds – the light is switched on. During quiet periods, i.e. afternoons and nights, the light is switched to a dimmed state. A patient can switch the light back to the bright setting at any time by pressing the corridor pushbutton. In emergencies, the nurse can switch the light to "emergency operation", i.e. permanently bright, using switch B1 (no time limit of bright period).

Timers

Timers for Industrial Applications

5TT3 1 timers

Overview

	Multifunction timers 5TT3 185	Delay timers 5TT3 181	Wiper timers 5TT3 182	Flashing timers 5TT3 183	Off-delay timers 5TT3 184
Setting range	0.02 s ... 300 h	0.25 ... 640 s	1 ... 10 s	1 ... 10 s	0.5 ... 10 s
Number	8	4	1	1	1
LED for switch position indication	•	•	•	•	•
LED for operation indication	•	--	--	--	--
Large voltage range	•	--	--	--	--
Programmable	•	--	--	--	--
Repeat accuracy $\leq 1\%$	--	--	--	•	•

Function

5TT3 185

Setting aids

The period of the flashing of the green LED 1 when set for a timing interval is $1\text{ s} \pm 4\%$, which can therefore be used as a setting aid. This is particularly useful in the lower time setting range and for long delay times, because the multiplication factors between the individual time ranges are exact.

Example:

Delay time to be set: 40 min.

Using the fine setting, this delay time can be set within the time range 3 ... 300 min. However, in this case it takes a long time to check the time and requires several operational sequences in realtime. To speed up the setting process, the time range will be switched to 0.03 ... 3 min. In this case, the required value corresponds to a delay time 0.4 min (= 24 s). The timing interval is triggered and the potentiometer is set to 24 flashing periods of the yellow LED 2. The device is then set back to the time range 3 ... 300 min and the setting process is completed.

Time operation interruption/time addition

For the functions AV, EW, IE, BI, the timing interval can be interrupted at any time by activating B1 (+) and by removing the control voltage continued again (time addition).

Control input B1

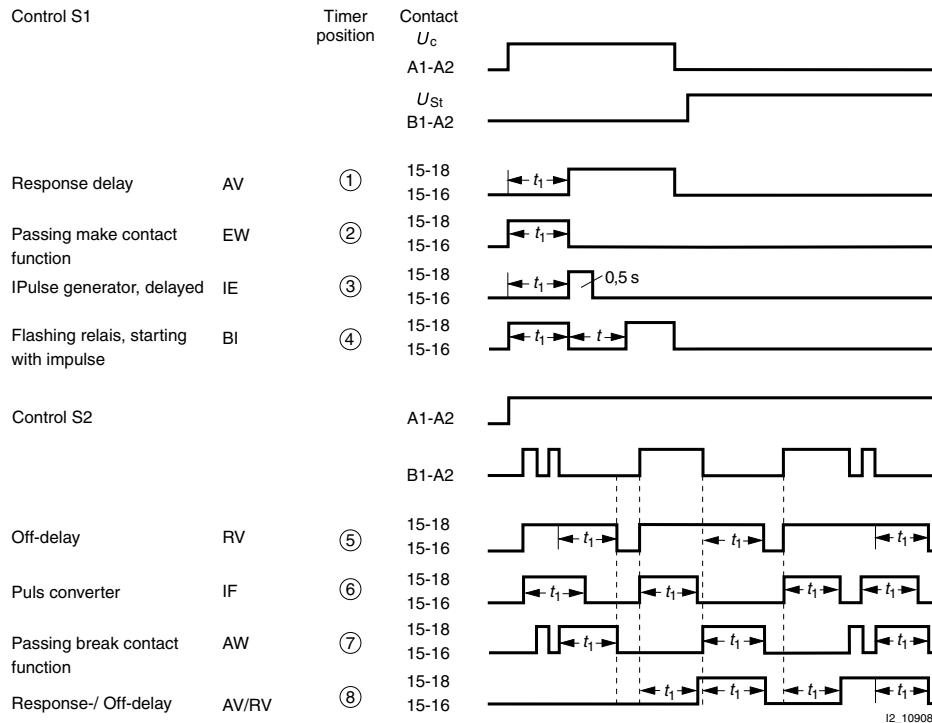
The functions RV, IF, AW, AV/RV can be controlled using the control input B1 (+) with potential against terminal A2. The auxiliary voltage of terminal A1 can be used for this purpose, as well as any other voltage within the range 12 ... 240 V AC/DC. The operation of parallel loads (e.g. contactors) from B1 (+) to A2 is also permissible. If voltage is simultaneously applied to the control input B1 (+) and A1 for the IF function, this triggers an output pulse with the set time interval t_1 .

Technical specifications

Data acc. to DIN VDE 0435-110, EN 60255		5TT3 185	5TT3 181 5TT3 182 5TT3 183	5TT3 184
Rated control supply voltage U_c	V AC V DC	12 ... 240 12 ... 240	220 ... 240 –	110 ... 240 110 ... 240
Operating range	$\times U_c$	0.8 ... 1.1		
Rated frequency	Hz	45 ... 400	50/60	
Rated power dissipation P_v	VA	approx. 1.5	approx. 5	approx. 1
Setting ranges		please refer to time setting ranges and time sequences		
Recovery time	ms	15 ... 80	approx. 40	approx. 100
Rated impulse withstand voltage U_{imp}	input/output kV	> 4		
Rated operational voltage U_e	V AC	250		
Rated operational current I_e	A	4	8	5
Contact gap, minimum contact load	mm V; mA	μ contact 10; 300		
Electrical service life	in switching cycles at AC-15	1.5×10^5 –	– 1.5×10^5	1.5×10^5 –
Terminals	\pm screw (Pozidrive)	2		
Conductor cross-sections	rigid flexible with sleeve	max. mm^2 min. mm^2	2×2.5 2×1.5	
Permissible ambient temperature		$^\circ\text{C}$	-40 ... +60	
Resistance to climate	acc. to EN 60068-1	40/60/4		

Technical specifications

5TT3 185 multifunction timers

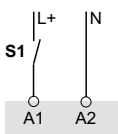


Possible time setting ranges t

0.02	...	1 s
0.06	...	6 s
0.3	...	30 s
0.03	...	3 min
0.3	...	30 min
3	...	300 min
0.3	...	30 h
3	...	300 h

- ① AV = response delay
- ② EW = passing make contact function
- ③ IE = pulse generator, delayed
- ④ BI = flashing relay, begin with pulse
- ⑤ RV = off-delay
- ⑥ IF = pulse shape
- ⑦ AW = passing break contact function
- ⑧ AV/RV = response/off delay

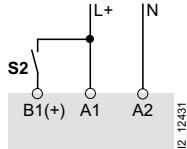
Control S1



Contact S1

For the following functions: response delay, passing make contact function, pulse generator, delayed, clock generator – (start with pulse) – the timing interval is triggered by closing the switch contact S1.

Control S2



Control contact S2

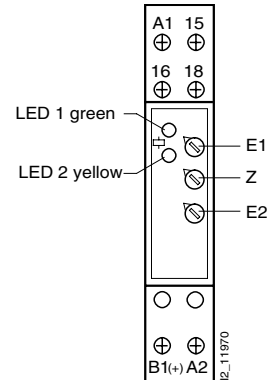
The functions off-delay, pulse shape, passing break contact function, response and off-delay are triggered by continuous power supply over the control contact S2 between A1 and B1 (+).

Operator interface

- LED 1 status indication
- LED 2 switch position indication
- E1 time range adjuster
- Z fine adjuster for time ranges
- E2 function settings for timing intervals

device indications

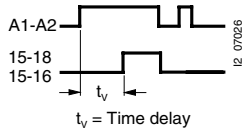
- LED 1 lights up if operational voltage is applied (green)
- LED 2 indicates the timing interval and state of the equalizing relay (yellow)
- Steady light
 - off output relay not activated, no timing interval
 - on output relay not activated, no timing interval
- Flashing light
 - short on, long off output relay not activated, timing interval
 - long on, short off output relay activated, timing interval



Front view

- LED 1 green: status indication
- LED 2 yellow: switch position indication
- E1: time range adjuster interval
- Z: fine adjuster for time-ranges
- E2: function settings for timing intervals

5TT3 181 delay timers

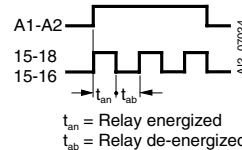


Possible time setting ranges t_v

0.25 s	...	2.5 s
1 s	...	10 s
8 s	...	80 s
64 s	...	300 s

Response delay

5TT3 183 flashing timers

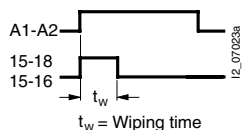


Possible joint time setting range of t_{an} und t_{ab}

1 s ... 10 s

Flashing function

5TT3 182 wiper timers

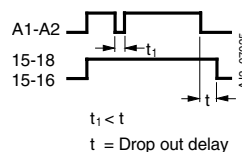


Possible time setting ranges t_w

1 s ... 10 s

Wiping function

5TT3 184 off-delay timers



Possible time setting ranges t_1

1 s ... 10 s


Off-delay

Timers

Timers for Industrial Applications

5TT3 1 timers

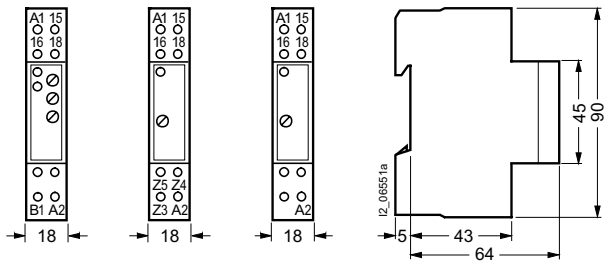
Selection and ordering data

	U_e	I_e	U_c	MW	Order No.	Weight 1 unit approx. kg	PS*/ P. unit Unit(s)
	V AC	A	V				
	Multifunction timers with transparent cap						
	programmable for: response delay; passing make contact function; delayed pulse generator; clock-pulse relay starting with impulse; off-delay; pulse converter; passing break contact function; response/off-delay						
	1 CO contacts	250	4	12 ... 240 DC 12 ... 240 AC	1	5TT3 185	0.065 1
	Delay timers with transparent cap						
	1 CO contact	250	8	220 ... 240	1	5TT3 181	0.100 1
Wiping timers with transparent cap							
1 CO contact	250	8	220 ... 240	1	5TT3 182	0.100 1	
Flashing timers with transparent cap							
pulse duration is equal to idle time							
1 CO contact	250	8	220 ... 240	1	5TT3 183	0.100 1	
Off-delay timers with transparent cap							
1 CO contact	250	5	110 ... 240 AC 110 ... 240 DC	1	5TT3 184	0.100 1	

Dimensional drawings

5TT3 185 5TT3 182 5TT3 181

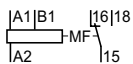
5TT3 183
5TT3 184



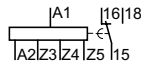
Schematics

Circuit diagrams

5TT3 185



5TT3 181



5TT3 182



5TT3 183
5TT3 184



Overview



	Mini 7LF4 401	Top 7LF4 411 7LF4 412	Profi 7LF4 421 7LF4 422	Astro 7LF4 431 7LF4 432
Text-assisted programming concept	--	•	•	•
Display	LCD	DOT matrix	DOT matrix	DOT matrix
Background lighting	--	•	•	•
Operating mode	digital	digital	digital	digital
Switching channels	1	1 and 2	1 and 2	1 and 2
Automatic daylight savings	•	•	•	•
Manual switching	•	•	•	•
Special voltages	--	•	•	--
Modular width MW	1	2	2	2
Programming				
• Data key	--	--	•	•
• Hour program	•	•	•	•
• Day program	•	•	•	•
• Week program	•	•	•	•
• Astro program	--	--	--	•
• Single-shot date switching	--	•	•	•
• Year program	--	--	--	--
• Pulse and random program	--	--	•	--
• Counters	--	--	•	•
Sealable cover	•	•	•	•
EEPROM memory for backup of switchprograms	--	•	•	•

Timers Time Switches

7LF4 4 digital time switches

Benefits

Digital time switches: Top, Profi and Astro

Whether you are programming locally using the text-assisted programming, or sitting comfortably in front of your PC, the task is quicker and easier with the digital time switches: Top, Profi and Astro.



Everything at a glance

- Clearly arranged display with text-assisted programming

Simple operation

- With four programming keys, everything you need is at your fingertips

Text-assisted programming

Plain text assistance with the digital time switches: Top, Profi and Astro. Programming digital time switches has never been easier. The digital time switches Top, Profi and Astro take you through the menu step-by-step.

Each entry required is clearly indicated so that you don't even need the operating instructions. And, particularly practical: you can even program the digital time switches without the system voltage being applied. And if you need to change the settings of the digital time switch at the back of a dark control cabinet, the integral background lighting will help you to see the keys and display.

Startup

Select the required language. The time, date and daylight savings for Central Europe are already factory-set on delivery. You can get started with the programming straight away.

Digital time switches: Profi and Astro

The key to greater safety and convenience. The digital time switches Profi and Astro can also be conveniently programmed at your PC using a USB adapter, software and a data key.

The data key makes your task even easier. You can create your switching program for the digital time switches conveniently at your PC in the office and store them on the data key. It couldn't be easier with the supplied software and PC adapter. Your created programs can then be stored, changed, managed and used again and again.

Faster programming

The software and PC adapter makes configuring your basic setting and programming even easier. Even complex switching programs can be created at your PC in no time at all. The finished program with all its basic settings is then downloaded onto the data key using the PC adapter. This is then inserted directly into the digital time switch, which automatically switches to the menu item "KEY". Select "READ" and the program data are transmitted directly to the digital time switch.

Greater flexibility

Your created programs can then be stored and are simple to change, manage and use again and again. For example, you can use the key to read out a program from the digital time switch and transfer it to PC, where it can be saved and edited. If customers require different programs for a digital time switch, you can simply use more than one data key. It then takes just a matter of seconds to switch programs. And if you create a key with a backup copy, you can offer the fastest possible service if the digital time switch has been manipulated.

Useful even without a PC

The data key is also useful without a PC. Even programs created on the digital time switch can be written to the key and transferred to other digital time switches. Even in this case, it always pays to make a backup copy.

Profi digital time switches

The Profi digital time switches offer more than just reliable switching. Numerous integral and convenient functions mean that the Profi digital time switches are versatile and easy-to-use problem solvers.

Vacation program

What about vacations? Should the time switch be switched off or remain permanently on? A simple task: enter a vacation period with start and end date, select the relay position "CONTINUOUSLY ON" or "CONTINUOUSLY OFF" and activate. At the end of the vacation, the digital time switch then automatically returns to normal mode.

Random program

The Profi digital time switch can also control presence simulation, which switches on the light(s) each day at a different time. Simply enter the switching time and activate the random program – done! The program will now randomly vary the on and off times each day by ± 30 minutes.

Operating hours meter

For commercial fields of application in particular, it may be necessary to establish the running time of the switched load, e.g. lighting. Use the integral operating hours meter: it shows the total on-time per channel and the date of the last reset.

Contrast

In order to maintain an overview even in bad light conditions and extreme temperatures, the contrast of the display can be adjusted – virtually down to the last detail!

Pulse function

The 1-channel time switch can be used as a pulse clock with up to 84 start times and selectable pulse durations of 1 s ... 59 s. For example, the break bell of a school can now be controlled using a standard weekly time switch.

Program slots

The 1-channel time switch supports entry of up to 56 switching programs, the 2-channel time switch supports up to 28 programs per channel. This means that the Profi time switch is ideally equipped for even the most complex of tasks.

Benefits

Astro digital time switch

Astro function

The Astro digital time switch can do so much more: it doesn't just know when the sun rises every day, it also knows when the sun sets. And it goes about its task silently.

It's great strength is the Astro function: for every location and every day in the year, it is programmed with the sunrise and sunset times. The connected lighting is only switched on when it is dark – whether it is winter when the days are shorter or in summer when the days are much longer. The benefits are obvious:

- Cost-savings, because electricity is only used when the lighting is really needed, and because this prolongs the service life of the lighting itself.
- Safety and convenience, because the light is switched on when it is dark.
- Ease-of-use, because the digital time switch doesn't have to be reprogrammed throughout the year.

Even installation couldn't be easier, as the digital time switch works from the distribution board. No further need for laborious cable laying to the lighting. The compact 2-MW series is also ideally suited for subsequent installation or replacement.

Dawn/dusk-dependent lighting control made easy

The Astro digital time switch is useful anywhere where dawn/dusk-dependent lighting control is required. Shop windows that need to be lit up for several hours after shop closure, or streets that need to be continually lit during the night, are just a couple of examples. Advertising lighting or menus that need to be illuminated outside restaurants are further areas of application. But the Astro time switch is also ideal for use in private areas, such as housing and garden lighting.

And of course, the Astro digital time switch doesn't just switch at sunrise and sunset, it can also handle complex, combined programs. You always have the choice between astronomically calculated and individually set switching times, which can also be combined.

Function

Digital time switches: Top, Profi and Astro

Text assistance

The digital time switches: Top, Profi and Astro take you step-by-step through programming and setting in plain text. Each step is easy to read and understand and the currently active function is signaled by flashing. Integral background display and keylighting makes operation easy even in bad light conditions.

Setting the language

The "MENU" pushbutton lets you select a language of your choice. The device is factory-set to English on delivery.

Time, date, daylight savings

The digital time switch is factory-set to the current time and current date. The time can be changed using "MENU" + "SET".

Reset

Simultaneously pressing all pushbuttons for more than 2 seconds deletes all data. Language, date/time, daylight saving times and switching times are set to the default value.

Programming

A program consists of an ON time, an OFF time and assigned ON and OFF days. The switching days must be entered prior to entering the switching times. Preset blocks are available for selection; "MONDAY-SUNDAY", "MONDAY-FRIDAY" or "SATURDAY-SUNDAY" and "INDIVIDUAL". By selecting "INDIVIDUAL" you can choose switching times on any days of your choice. This selection also lets you implement switches at midnight.

Digital time switches: Profi and Astro

Relay functions

The menu item "MENU" and "FUNCTIONS" lets you change the relay setting. The "AUTO" function is preset, the digital time switch switches according to the programmed times. You can also select the following functions: "CONTINUOUSLY ON", "CONTINUOUSLY OFF" and "EXTRA". If you select "EXTRA", this changes the program-defined switching state. With the next switching command, the programmed switching times take over switching ON and OFF again.

Vacation periods

In the vacation program, you need to enter the vacation period with start and end date and then select the program item "ACTIVE" to activate or "PASSIVE" to deactivate the program. If the vacation program is activated, the digital time switch does not carry out any programmed switching commands during the specified period, but is, depending on input, "CONTINUOUSLY OFF" or "CONTINUOUSLY ON" for the duration of the vacation. At the end of the specified vacation period, the digital time switch automatically resumes execution of the switching commands according to the programmed switching times.

Basic setting over PC and data key

All the aforementioned basic settings, with the exception of the current time and date, can be created using the BETASoft software and the data key (Order No. 7LF4 490-1) and read into the digital time switch.

Setting the contrast

This function lets you adjust the contrast of the display.

Operating hours meter

This displays the on-time of the relay and the date of the last reset.

Data key

If the time switch is powered, inserting a data key automatically activates the menu item "KEY-READ-WRITE".

- "WRITE": program data are written from the digital time switch to the key. Caution: Any data on the key will be overwritten.
- "READ": program data are read from the key and written to the digital time switch. Any switching programs programmed in the digital time switch will be overwritten.

Profi time switch: the digital time switch or data key only supports storage of one clock program, comprising 56 switching programs (1-channel time switch), 2 x 28 switching programs (2-channel-time switch), or one pulse program (1-channel time switch) respectively.

Astro time switch: The digital time switch or data key supports storage of all programs of the respective digital time switch plus the basic settings. Example: Astro 1-channel maximum 28 programs plus basic settings.

If the data key is inserted when the time switch is not powered, the menu item "KEY-READ-WRITE" is not automatically activated. The "KEY" function must be selected over the menu and it is then possible to select the required function without the supply voltage being connected.

PC programming

As well as simple, text-assisted programming directly at the digital time switch, switching programs can also be created at your PC using the software BETASoft and transferred to the digital time switch using the data key. In order to transfer switching programs and settings created on a PC to the data key, you require a read/write device, Order No. 7LF4 940-0. The device is connected to the PC over a USB connector. In addition to this read/write device, delivery includes a CD-ROM with the BETASoft program and the necessary driver.

PC system requirements:

- USB connection
- Windows 98 Second Edition, Windows 2000, Windows ME or Windows XP
- 40 MB free disk space

Timers

Time Switches

7LF4 4 digital time switches

Function

Profi digital time switches

Pulse function (only 1-channel device)

In the pulse function, up to 84 start times and one pulse time can be entered in the digital time switch. The pulse duration can be selected between 1 s and 59 min 59 s.

Random function

If the random function is activated, the set switching times are shifted within a range of ± 30 min.

Astro digital time switches

Location

The daily changing sunrise and sunset times are automatically calculated for the location programmed in the Astro digital time switch. For optimum operation it is therefore essential to enter the respective location. This can be done in two ways: selecting "MENU", "SET" and "ASTRO" will take you to the two selection options: "LOCATION" and "COORDINATES".

- "LOCATION": this menu item lets you select the country and town closest to the location of operation.
- "COORDINATES": alternatively, the coordinates of the location can be entered under this menu item.

You will find data on coordinates and time zones on the time zone card included with every time switch.

Offset

Selecting "MENU", "SET", "ASTRO" and "OFFSET" lets you set differential times to the calculated switching times. Entering a differential time offsets the switching time by up to ± 120 min. against the sunrise and sunset times. The differential time for sunrise and sunset is set separately.

1h-Test

The "1H-TEST" function can be used for switching simulation. If the "1H-TEST" function is activated, the switching outputs are switched for one hour. At the end of that time, the digital time switch automatically resumes execution of the switching commands according to the programmed switching times.

PIN code

Input and programming can be disabled using a four-digit "PIN CODE" and enabled again by entering the "PIN CODE". The blocking device can also be canceled by using the "RESET" function. However, this also deletes all settings and programs.

Delay time (only 1-channel device)

The 1-channel Astro time switch has a control input with an adjustable delay time. The control input enables an additional switching of the relay, parallel to the switching program. Adjustable delay time 0 min ... 23 h 59 min, the delay time begins as soon as the voltage drops out at the control input.

Technical specifications

		Mini 7LF4 401	Top 7LF4 411 7LF4 412	Profi 7LF4 421 7LF4 422	Astro 7LF4 431 7LF4 432
Supply					
Rated control supply voltage U_c	V AC	230	120, 230	120, 230, 24 AC/DC	230
Operating range	% U_c	-15/+10	-15/+10	-15/+10 ¹⁾	-15/+10
Rated frequency	Hz	50	50/60	50/60 ¹⁾	50/60
Frequency range	Hz	50/60	50/60	50/60 ¹⁾	50/60
Rated power dissipation P_V	VA	1.5	2		
Channels/contacts					
Switching channels		1	1 or 2		
Rated operational voltage U_e	V	250			
Rated operational current I_e	at p.f. = 1 at p.f. = 0.6	A A	16 10		
Contacts			CO contact 30 000 000	10 000 000 80 000	100 000
• Mechanical operations					
• Electrical operations	at p.f. = 1				
Minimum contact loads	V; mA	12; 100			
Incandescent lamp ratings	A	5	8		
Fluorescent lamps	at 7 μ F uncorrected	VA VA	-- 1400	60	
Safety					
Different phases	actuator/contact permissible contact/contact		• --	• •	• •
• 2-channel device					
Electrical isolation	creepage and clearances				
• 1-channel device	actuator/contact	mm	4/3	8/6	8/6
• 2-channel device	actuator/contact contact/contact	mm mm	4/3 --	4/3 4/3	4/3 4/3
Rated impulse withstand voltage U_{imp}		kV	4		
• EMC: burst acc. to IEC 61000-4-4		kV	> 4.4		
• EMC: surge acc. to IEC 61000-4-5		kV	> 2.0		
• Electrostatic discharge acc. to IEC 61000-4-2		kV	> 8.0		
Power reserve storage			> 100 h	10 a	
• Minimum loading time			48 h	--	
• Battery type			NiMH cell	Li primary cell	
• Service life	at 20 °C at 40 °C	a a	10 5	6 5	
Program storage	non-volatile		--	•	
Overvoltage category	acc. to EN 61010-1		III		
Function					
Minimum switching sequences	min	1			
Make and break cycles	min	1			
Clock error per days	typical	s/day	± 2.5	± 0.86	± 0.2
Control inputs					
• 1-channel device	S terminal		--		•
Memory spaces	programs ²⁾		8	56 (2 x 28)	56 (2 x 28)
• 1-channel device	pulse (alternatively) pulse cycle		-- --	84 1 s ... 59 min 59 s	28 (2 x 14) -- --
Connections					
Terminals	screw (Pozidrive)		PZ1		
Conductor cross-sections of main current paths					
• Rigid, max.	mm ²	4			
• Rigid, min.	mm ²	1.5			
• Flexible with sleeve	mm ²	2.5			
• Flexible without sleeve	mm ²	4			
Environmental conditions					
Permissible ambient temperature	°C	-10 ... +55	-20 ... +55		
Storage temperature	°C	-20 ... +60			
Resistance to climate	acc. to EN 60068-1		EN 60730-1		
Degree of protection	acc. to EN 60529		IP20		
Safety class	acc. to EN 60730-1		II		

1) For 24-V devices (7LF4 4212 and 4222): tolerance -10/+10 %; frequency range 0 ... 60 Hz.

2) A program consists of an ON time, an OFF time and assigned ON and OFF days or day blocks.

Timers Time Switches

7LF4 4 digital time switches

NEW



Selection and ordering data

Contact	U_e V AC	I_e A	U_c V AC	MW	Order No.	Weight 1 item approx. kg	PS*/ P. unit Unit(s)
Mini digital time switches							
<ul style="list-style-type: none"> • Week program 							
Mini digital time switches, 1 channel							
1 CO contact	250	16	230	1	7LF4 401-0	0.185	1
Top digital time switches							
<ul style="list-style-type: none"> • Week program • With text-assisted programming concept - Languages: German, English, French, Italian, Spanish 							
Top digital time switches, 1 channel							
• 56 programs							
1 CO contact	250	16	230	2	7LF4 411-0	0.230	1
1 CO contact	250	16	120	2	7LF4 411-1	0.230	1
Top digital time switches, 2 channels							
• 56 programs (28 per channel)							
2 CO contacts	250	16	230	2	7LF4 412-0	0.230	1
2 CO contacts	250	16	120	2	7LF4 412-1	0.230	1
Profi digital time switches							
<ul style="list-style-type: none"> • Week program • With text-assisted programming concept - Languages: German, English, French, Italian, Spanish • Simple creation of programs using a PC, the software BETASoft and data key • Vacation program • Random program • Operating hours meter, counting range: 65535 h 							
Profi digital time switches, 1 channel							
• 56 programs							
• Pulse function, 84 start times							
1 CO contacts	250	16	230	2	7LF4 421-0	0.235	1
1 CO contacts	250	16	120	2	7LF4 421-1	0.235	1
1 CO contacts	250	16	24	2	7LF4 421-2	0.235	1
Profi digital time switches, 2 channels							
• 56 programs (28 per channel)							
2 CO contacts	250	16	230	2	7LF4 422-0	0.270	1
2 CO contacts	250	16	120	2	7LF4 422-1	0.270	1
2 CO contacts	250	16	24	2	7LF4 422-2	0.270	1
Astro digital time switches							
<ul style="list-style-type: none"> • Week program • Astro function • With text-assisted programming concept - Languages: German, English, French, Italian, Dutch, Spanish • Simple creation of programs using a PC, the software BETASoft and data key • Vacation program • 1h-Test • Input disable over PIN code • Operating hours meter, counting range: 65535 h 							
Astro digital time switches, 1 channel							
• 28 programs							
• With control input, delay time 0 min ... 23 h 59 min							
1 CO contacts	250	16	230	2	7LF4 431-0	0.235	1
Astro digital time switches, 2 channels							
• 28 programs (14 per channel)							
2 CO contacts	250	16	230	2	7LF4 432-0	0.270	1

NEW

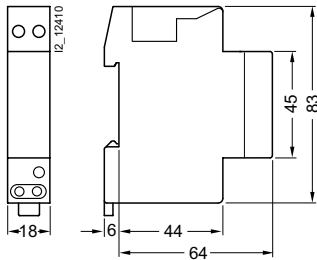
7LF4 4 digital time switches

Selection and ordering data

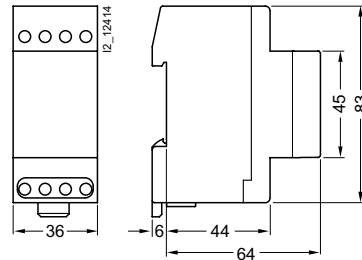
Version	Order No.	Weight 1 item approx. kg	PS*/ P. unit Unit(s)
Accessories			
 <p>USB adapter and software for digital time switches; Profi and Astro</p> <ul style="list-style-type: none"> • For the reading and writing of data keys at the PC • Incl. programming software BETASoft • Incl. a data key, Order No. 7LF4 940-1 • Can be connected over USB interface • System requirements: <ul style="list-style-type: none"> - Windows 2000, Windows ME, Windows XP, or Windows 98 Second Edition - USB connection - 40 MB free disk space 	7LF4 940-0	0.125	1
 <p>Data key for digital time switches; Profi and Astro</p> <ul style="list-style-type: none"> • Programming at the PC (7LF4 940-0 USB adapter and software required) • Read-in of programs to the time switch • Writing programs from the time switch • Transfer of programs <ul style="list-style-type: none"> - from PC to time switch and vice versa - from time switch to time switch 	7LF4 940-1	0.300	1

Dimensional drawings

7LF4 401

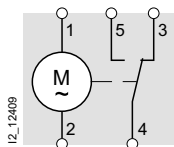


7LF4 41
7LF4 42.
7LF4 43.

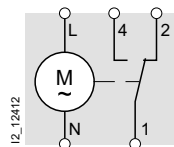


Schematics

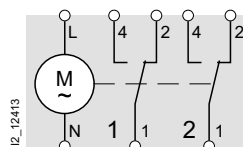
7LF4 401



7LF4 411
7LF4 421
7LF4 431



7LF4 412
7LF4 422
7LF4 432



Timers Time Switches

7LF5 3 mechanical time switches

Overview

	Synchronous time switches without power reserve					Quartz-clock time switch with power reserve					
	7LF5 300-1	7LF5 300-5	7LF5 300-6	7LF5 300-7	7LF5 301-0	7LF5 301-1	7LF5 301-4	7LF5 301-5	7LF5 301-6	7LF5 301-7	7LF5 305-0
Display	index disk					index disk					
Switching channels	1					1					
Operating mode	synchronous					quartz					
Automatic daylight savings	--	•	•	•	•	--	•	•	--	--	--
Manual switching	•	•	•	•	•	•	•	•	•	•	•
Modular widths	1	3	3	1	--	1	3	3	3	3	--
Programming											
• Hour program	--	--	--	•	--	--	--	--	--	--	--
• Day program	•	•	--	--	•	•	•	--	•	--	•
• Week program	--	--	•	--	--	--	--	•	--	•	--
Sealable cover	•	•	•	•	•	•	•	•	•	•	•
Manual switching											
• ON/Automatic	•	--	--	•	--	•	--	--	--	--	--
• ON/Automatic/OFF	--	•	•	--	•	--	•	•	•	•	•

Benefits

7LF5 301-4 and 7LF5 301-5 mechanical time switches

Plug & Play technology

Plug & play makes installation of the 7LF5 301-4 und 7LF5 301-5 mechanical time switches fast and simple: unpack, set switching times, connect - done!

Time is money – and with our new Plug & Play mechanical time switches, you automatically save both:

- Time set during commissioning
- Automatic daylight savings
- Time reset after power failure

These tasks can now be left entirely to the 7LF5 301-4 und 7LF5 301-5 mechanical time switches and their precision quartz clock mechanism.

Time set automatically during commissioning

The mechanical time switch automatically sets the correct day and time in fast mode during commissioning. It is no longer necessary to set the pointer.

Automatic daylight savings

The automatic daylight savings function is just as easy and convenient as commissioning. Thanks to Plug & Play, the 7LF5 301-4 und 7LF5 301-5 mechanical time switches automatically set themselves to the correct time, whereby the programmed switching operations can be processed that much more quickly in fast mode. The changeover data for Central Europe are stored in the internal quartz clock mechanism. An LED indicates the current state.

Automatic time reset after faults

A further advantage of Plug & Play technology: as soon as the system voltage is reapplied after a power failure, the correct time is automatically reset with quartz precision. And what do we mean by precision? The internal precision clockwork has an accuracy of ± 1 min per year.

And as well as the renowned precision and automatic reliability of digital clocks, the 7LF5 301-4 and 7LF5 301-5 mechanical time switches also offer all the convenience of analog technology. The setting and control of switching times and cycles is just as simple and intuitive as for analog time switches.

Application

Mechanical time switches can be used for all applications of digital time switches, provided that the minimum switching intervals are sufficiently long. The switching control pins can be set without the use of tools.

Function

Synchronous time switches without power reserve

The control gear is driven by a synchronous motor, hence it depends on the power supply frequency. If this frequency is unstable, the devices cannot be used. In the event of a power failure, the time switch will stop.

Quartz-clock time switch with power reserve

A quartz electronic circuit supplies the drive with a stabilized frequency so that the time switch is not dependent on the power supply frequency. In the event of a power failure, the time switch continues to operate.

7LF5 301-4 and 7LF5 301-5 mechanical time switches

Automatic daylight savings

The time switches are programmed with the switchover data for Central Europe. Switchover is at 02:00 CET or 03:00 CET respectively. The clock sets itself to the correct time in fast mode.

Automatic setting during commissioning

When the supply voltage is applied and after a power failure, the clock automatically sets itself to the correct time. As with the daylight saving function, the time is set in fast mode.

Manual setting

The pointer should not be manually adjusted if no voltage is applied or in fast mode, as this could subsequently cause the incorrect time to be displayed. It is not possible to externally influence the internal clock mechanism. If the pointer is in the wrong position, this can be corrected manually when the voltage is applied and the automatic setting is finished (LED on or LED flashing).

Switching program during fast mode

The set switching programs can be executed considerably faster in fast mode.

LED display

- LED off: there is no supply voltage or, if there is, the clock is in automatic setting mode. No current time.
- LED on: automatic setting has ended and the daylight savings function is activated. A time error can be corrected manually.
- LED flashes: automatic daylight saving is irreversibly deactivated, e.g. due to overvoltage damage to the internal electronics. The clock continues operation with quartz-precision without power reserve. The clock can only be manually set or corrected.

Technical specifications

Data acc. to EN 60730-1, EN 60730-2-7	Synchronous time switches without power reserve					Quartz-clock time switches with power reserve						
	7LF5 300-1	7LF5 300-5	7LF5 300-6	7LF5 300-7	7LF5 301-0	7LF5 301-1	7LF5 301-4	7LF5 301-5	7LF5 301-6	7LF5 301-7	7LF5 305-0	
Operating mode	synchronous					quartz						
Time program	day	day	week	hour	day	day	day	week	day	week	day	
Supply												
Rated control supply voltage U_c	V AC	230					230					
Operating range	% U_c	-15/+10					-15/+10					
Rated frequency	Hz	50					50					
Frequency range	Hz	50					50/60					
Rated power dissipation P_V	W	1					1	0.2	0.2	1	1	1
Channels/contacts												
Switching channels		1					1					
Rated operational voltage U_e	V AC	250					250					
Rated operational current I_e	at p.f. = 1	A	16				16					
	at p.f. = 0.6	A	4				4					
Contact		NO contacts	CO contacts	CO contacts	NO contacts	CO contacts	NO contacts	CO contacts				
<ul style="list-style-type: none"> Mechanical operations Electrical operations (at p.f. = 1) 		20 000 000					20 000 000					
		100 000					100 000					
Minimum contact loads	V; mA	4; 1					4; 1					
Incandescent lamp ratings	A	5					5					
Fluorescent lamps	at 7 μ A uncorrected	VA	60				60					
		VA	1400				1400					
Safety												
Different phases	actuator/contact permissible	yes					yes					
Electrical isolation	creepage and clearances											
	actuator/contact	mm	8/6				8/6					
Rated impulse withstand voltage U_{imp}	actuator/contact	kV	4				4					
• EMC: burst acc. to IEC 61000-4-4		kV	> 4.4				> 4.4					
• EMC: surge acc. to IEC 61000-4-5		kV	> 2.0				> 2.0					
• Electrostatic discharge acc. to IEC 61000-4-2		kV	> 8.0				> 8.0					
Power reserve storage		h	--					100 h	6 a	100 h		
• Minimum loading time		h	--					48	--	48		
• Battery type			--					NiMH	Li primary cell	NiMH		
• Service life	at 20 °C	a	--					6	10	6		
	at 40 °C	a	--					5				
Overvoltage category	acc. to EN 61010-1	III					III					
Function												
Minimum switching intervals	min	30	30	240	5	30	30	30	240	30	240	30
Make and break cycles	min	15	15	120	37.5 s	10	15	15	120	15	120	10
Switching accuracy	\pm min	5	5	30	0.2	5	5	5	30	5	30	5
Clock errors per day	s	system-synchronized					\pm 2.5	\pm 60/year		\pm 2.5	\pm 2.5	
Connections												
Terminals	screw (Pozidrive)	PZ 1					PZ 1					
Conductor cross-sections main current paths												
• Rigid, max.	mm ²	4					4					
• Rigid, min.	mm ²	1					1					
• Flexible with sleeve	mm ²	2.5					2.5					
• Flexible without sleeve	mm ²	4					4					
Environmental conditions												
Permissible ambient temperature	°C	-10 ... +55					-10 ... +55					
Storage temperature	°C	-10 ... +60					-10 ... +60					
Resistance to climate	acc. to EN 60068-1	EN 60 730-1					EN 60 730-1					
Degree of protection	acc. to EN 60529	IP20					IP20					
Safety class	acc. to EN 60730-1	II					II					

Timers Time Switches

7LF5 3 mechanical time switches

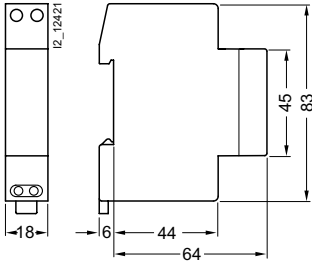
NEW

Selection and ordering data

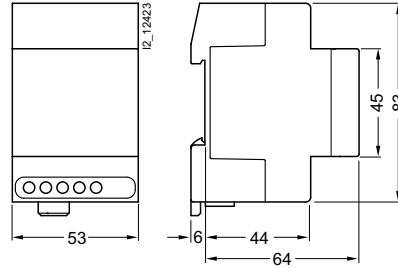
Contact	U_e V AC	I_e A	U_c V AC	MW	Order No.	Weight 1 item approx. kg	PS*/nP. unit Unit(s)
Synchronous time switches without power reserve							
	Synchronous time switches						
• Day disk 1 NO contact	250	16	230	1	7LF5 300-1	0.850	1
• Hour disk 1 NO contact	250	16	230	1	7LF5 300-7	0.850	1
	Synchronous time switches						
• Day disk 1 CO contact	250	16	230	3	7LF5 300-5	0.155	1
• Week disk 1 CO contact	250	16	230	3	7LF5 300-6	0.155	1
	Synchronous time switches for wall mounting						
• Day disk 1 CO contact	250	16	230	--	7LF5 301-0	0.220	1
Quartz-clock time switch with power reserve							
	Quartz-clock time switches						
• Day disk 1 NO contact	250	16	230	1	7LF5 301-1	0.900	1
	Quartz-clock time switches						
Time set automatically during commissioning automatic daylight savings with quartz clock mechanism clock accuracy +/- 0.2 s/day power reserve (time buffer in the event of a power failure) 5 years							
• Day disk 1 CO contact	250	16	230	3	7LF5 301-4	0.165	1
• Week disk 1 CO contact	250	16	230	3	7LF5 301-5	0.165	1
	Quartz-clock time switches						
clock accuracy ± 2.5 s/day							
• Day disk 1 CO contact	250	16	230	3	7LF5 301-6	0.165	1
• Week disk 1 CO contact	250	16	230	3	7LF5 301-7	0.165	1
	Quartz-clock time switches for wall mounting						
• Day disk 1 CO contact	250	16	230	--	7LF5 305-0	0.230	1

Dimensional drawings

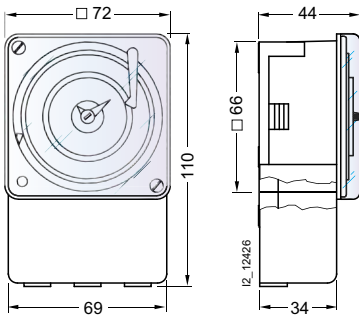
7LF5 300-1
7LF5 300-7
7LF5 301-1



7LF5 300-5
7LF5 300-6
7LF5 301-4
7LF5 301-5
7LF5 301-6
7LF5 301-7

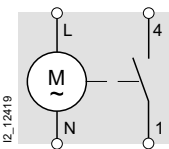


7LF5 301-0
7LF5 305-0

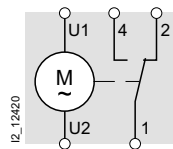


Schematics

7LF5 300-1
7LF5 300-7
7LF5 301-1



7LF5 300-5
7LF5 300-6
7LF5 301-0
7LF5 301-4
7LF5 301-5
7LF5 301-6
7LF5 301-7
7LF5 305-0



Timers

Time Switches

Notes



9

Power Supply Units





- 9/2 Introduction
- 9/3 4AC3 0, 4AC3 1 bell transformers
- 9/5 4AC3 4, 4AC3 5, 4AC3 6 transformers
- 9/8 4AC2 4 power supply units
- 9/10 5TE6 8 socket outlets



Power Supply Units

Introduction

Overview

Devices	Application	Standards	Usage		
			Non-residual buildings	Residual buildings	Industry
 <p>Bell transformers 4AC3 0, 4AC3 1</p>	AC voltage/current supply up to 40 VA as safety extra-low voltage for the supply of gongs, buzzers, bells, door openers, intercoms, remote control switches and AC power supplies for safety e.l.v. systems for short-time operation.	EN 61558-2-8	•	•	
 <p>Transformers For permanent load 4AC3 4, 4AC3 5, 4AC3 6</p>	AC voltage/current supply up to 63 VA as safety extra-low voltage for the supply of calibration circuits, switching relays, Insta contactors and AC power supplies for safety e.l.v. systems for continuous operation.	EN 61558-2-2	•		•
 <p>Power supply units For direct voltages 4AC2 4</p>	Direct voltage/current supply up to 24 V DC, 2.0 A as safety extra-low voltage for the supply of gongs, buzzers, bells, door openers, switching relays, Insta contactors and DC power supplies for safety e.l.v. systems for continuous operation.	EN 61558-2-6	•	•	•
 <p>Socket outlets 5TE6 8</p>	For power supply during maintenance in distribution boards	DIN VDE 0620-1, CEE 7 standard sheet V, CEI 23-50, UL 498	•	•	•

Definitions

I_e = rated operational current
 U_e = rated operational voltage
 I_c = rated control current
 U_c = rated control voltage
 P_s = rated operational power
 1 MW = modular width 18 mm

4AC3 0, 4AC3 1 bell transformers

Overview

Certification

The bell transformers are IMQ and VDE approved.

Uniform standards

The standard EN 61558 distinguishes between transformers for short-time loading and those for permanent loading. This means that clear requirements for bell transformers are defined. A bell transformer must maintain 100 % of its rated power for 1 min. or 20 % for 5 min, without shutting down.

Failsafe with PTC

Siemens bell transformers are protected against short circuit or moderate overload by a PTC resistor. If a disconnection occurs, the bell transformer must be switched off for approx. 30 min to cool down the PTC resistor.

Two secondary voltages

The 12 V outputs must be switched in parallel or in series. In parallel connection, they can be used, e.g. for 12 V 8 VA, in series connection for 24 V 8 VA. In these types of circuits, the PTC resistor ensures full protection of the transformer.

Typical applications

Short-time use, as occurs with bells, gongs, door openers or remote control switches in residential buildings.

Technical specifications

Data acc. to EN 61558-2-8			4AC3 008	4AC3 016	4AC3 108	4AC3 116	4AC3 140
Rated operational power P_s	VA		8	16	8	16	40
Rated operational voltage U_e	V AC		230				
Operating range $\times U_e$	at 50/60 Hz		0.9 ... 1.06				
Rated frequency	Hz		50				
Operating frequency range	Hz		48 ... 62				
Secondary rated voltage U_{sec}	V AC		2 x 4		2 x 12		
	V AC	in series connection	8		24		
Secondary rated current I_{sec}	A AC	at 4 V	2 x 1.0	2 x 2.0	--		
	A AC	at 8 V	1	2	--		
	A AC	at 12 V	--	--	2 x 0.33	2 x 0.67	2 x 1.67
	A AC	at 24 V	--	--	0.33	0.67	1.67
Rated power dissipation P_V	W	in no-load operation	1.8	2.4	1.6	8.2	1.2
	W	at rated load	5	23	3.6	17.2	
Protective separation	mm	creepage and clearances	> 3				
Insulation class			B				
Test voltage, 50Hz 1 minute	kV	primary against secondary winding	> 3.75				
Terminals		\pm screw (Pozidriv)	1				
Conductor cross-sections	max. mm ²	rigid	1.5 ... 6				
	min. mm ²	flexible with sleeve	0.75				
Permissible ambient temperature	°C		-10 ... +25				
Permissible humidity	%		≤ 80				
Degree of protection		acc. to EN 60529	IP20				
Safety class		acc. to EN 60730	II				

Selection and ordering data

U_e	U_{sec}	I_{sec}	P_s	MW	Order No.	Weight 1 unit approx.	PS*/ P. unit
V AC	V AC	A AC	VA			kg	Unit(s)
Bell transformers							
with PTC protection for AC voltage/current supply as safety extra-low voltage for short-time operation, for the supply of gongs, buzzers, bells, door openers, intercoms and remote control switches,							
with two secondary voltages, optionally for series or parallel switching							
230	2 x 4/8	2 x 1/1	8	2	4AC3 008	0.290	1
		2 x 2/2	16	2	4AC3 016	0.370	1
	2 x 12/24	2 x 0.33/0.33	8	2	4AC3 108	0.260	1
		2 x 0.67/0.67	16	2	4AC3 116	0.320	1
		2 x 1.67/1.67	40	3	4AC3 140	0.490	1

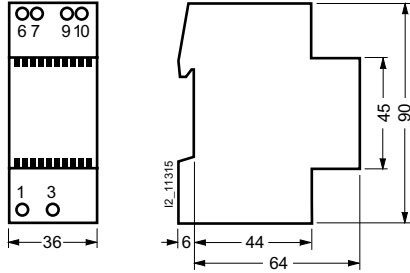


Power Supply Units

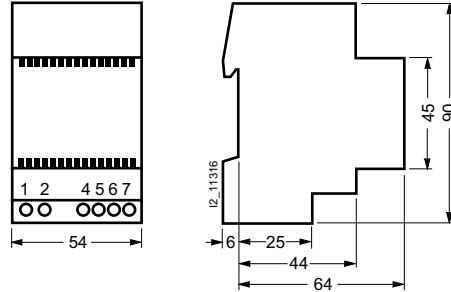
4AC3 0, 4AC3 1 bell transformers

Dimensional drawings

4AC3 008
4AC3 016
4AC3 108
4AC3 116



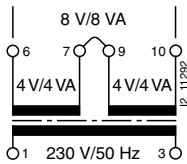
4AC3 140



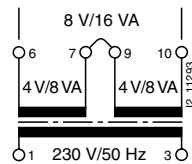
Schematics

Circuit diagrams

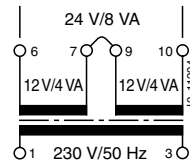
4AC3 008



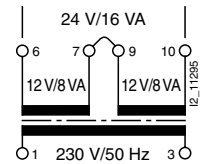
4AC3 016



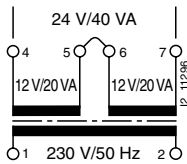
4AC3 108



4AC3 116

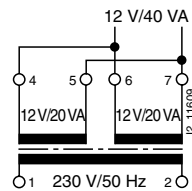


4AC3 140



4AC3 140

Parallel switching



The 12 V outputs must be switched in parallel or in series. Our example shows the 4AC3 140. In parallel connection, they can be used for 12 V/40 VA, in series connection for 24 V/40 VA. In these types of circuits, the PTC resistor ensures full protection of the transformer.

Overview

Certification

The transformers are IMQ and VDE approved.

Uniform standards

The standard EN 61558 distinguishes between transformers for short-time loading and those for permanent loading.

Failsafe with PTC

Siemens transformers for permanent loading are protected against short circuit or moderate overload by a PTC resistor. If a disconnection occurs, the transformer must be switched off for approx. 30 min to cool down the PTC resistor.

Two secondary voltages

The 12 V outputs must be switched in parallel or in series. In parallel connection, they can be used, e.g. for 12 V and 16 VA, in series connection for 24 V and 16 VA. In these types of circuits, the PTC resistor ensures full protection of the transformer.

Hum-free

The transformers with 24, 40 and 63 VA cores are molded, which means that they are hum-free and suitable for installation in sound-sensitive distribution boards.

Voltage stability

EN 61558-2-2 specifies that the difference between the non-loaded output voltage and the output voltage loaded with the rated load for transformers for permanent loading must not exceed 10 %. This requirement places the highest demands on the design of this type of transformer. It can only be met by using high-quality core materials and a core design with an extraordinarily high efficiency, such as type EI according to DIN 41302.

Typical applications

AC voltage/current supply for 8, 12 or 24 V AC up to 63 VA as safety extra-low voltage for the supply of calibration circuits, switching relays or Insta contactors in continuous duty.

Technical specifications

Data acc. to EN 61558-2-2		4AC3 408	4AC3 516	4AC3 524	4AC3 540	4AC3 616	4AC3 624	4AC3 640	4AC3 663
Rated operational power P_s	VA	8	16	24	40	16	24	40	63
Rated short-time power p.f. = 0.5; t = 10 s	VA	10	18	27	48	18	27	48	80
Rated operational voltage U_e	V AC	230							
Operating range $\times U_e$ at 50/60 Hz		0.9 ... 1.1							
Rated frequency	Hz	50							
Operating frequency range	Hz	48 ... 62							
Secondary rated voltage U_{sec} in series connection	V AC V AC	8 --	2 x 4 8	8 --		2 x 12 24			
Secondary rated current I_{sec} at 4 V at 8 V at 12 V at 24 V	A AC A AC A AC A AC	-- 1 -- --	2 x 2 2	-- 3	5	-- 2 x 0.67 0.67	2 x 1 1	2 x 1.67 1.67	2 x 2.62 2.62
Rated power dissipation P_V in no-load operation at rated load	VA W	3.5 2.6	10.3 4.6	8.0 2.7	13.8 6.9	8.0 3.6	13.1 6.3	8.3 5.7	23.0 10.0
Hum-free core molded		--		yes		--	yes		
Protective separation Creepage and clearances	mm	≥ 3							
Insulation class		B							
Test voltage, 50 Hz, 1 minute Primary against secondary winding	kV	≥ 4							
Terminals ± screw (Pozidriv)		1							
Conductor cross-sections rigid flexible with sleeve	mm ² min. mm ²	1 ... 6 0.75							
Permissible ambient temperature in operation	°C	-10 ... +40							
Permissible humidity	%	≤ 80							
Degree of protection acc. to EN 60529		IP20							
Safety class acc. to EN 60730		II							

Power Supply Units

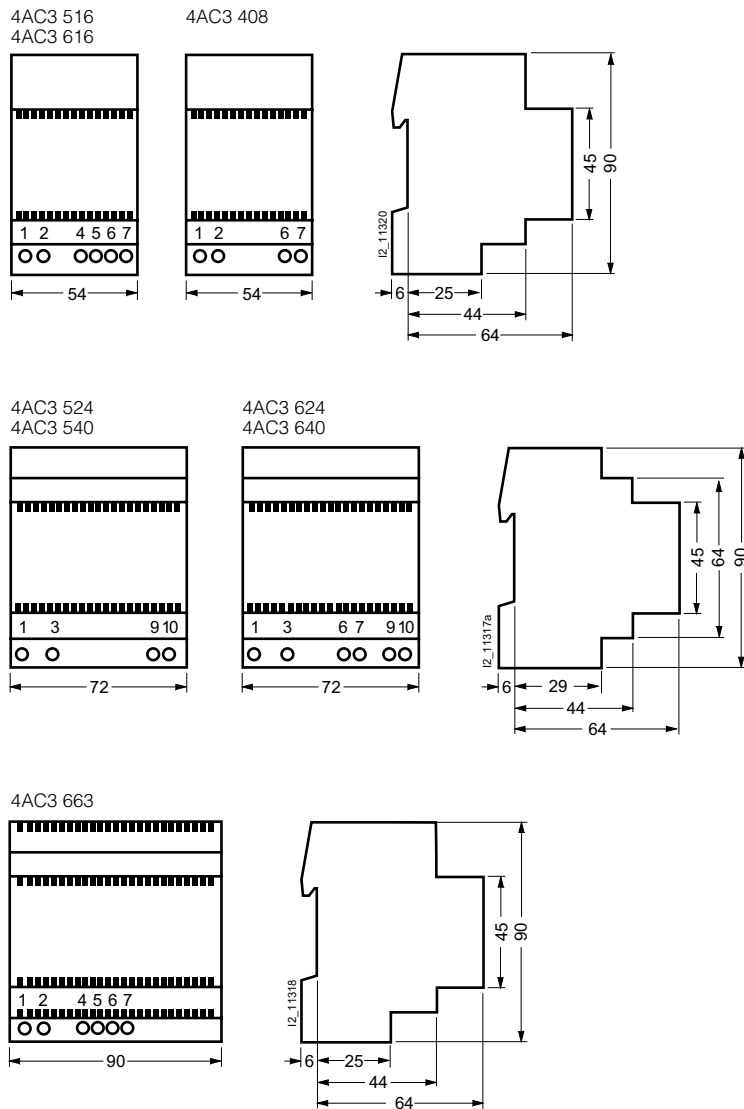
4AC3 4, 4AC3 5, 4AC3 6 transformers

Selection and ordering data

U_e	U_{sec}	I_{sec}	P_s	MW	Order No.	Weight 1 unit approx.	PS*/ P. unit
V AC	V AC	A AC	VA			kg	Unit(s)
Transformers for permanent loads							
with PTC protection for AC voltage/current supply as safety extra-low voltage for continuous operation for the supply of calibration circuits, switching relays and Insta contactors,							
with one secondary voltage							
230	8	1	8	3	4AC3 408	0.320	1
		3	24	4	4AC3 524	0.940	1
		5	40	4	4AC3 540	0.870	1
with two secondary voltages, optionally for series or parallel switching							
230	2 x 4/8	2 x 2/2	16	3	4AC3 516	0.600	1
	2 x 12/24	2 x 0.67/0.67	16	3	4AC3 616	0.600	1
		2 x 1.0/1.0	24	4	4AC3 624	0.910	1
		2 x 1.67/1.67	40	4	4AC3 640	0.840	1
		2 x 2.62/2.62	63	5	4AC3 663	1.170	1



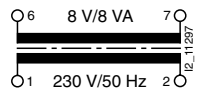
Dimensional drawings



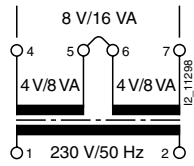
Schematics

Circuit diagrams

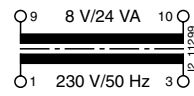
4AC3 408



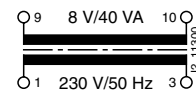
4AC3 516



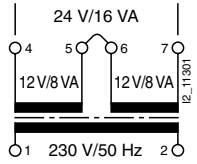
4AC3 524



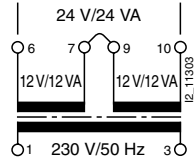
4AC3 540



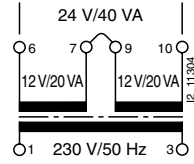
4AC3 616



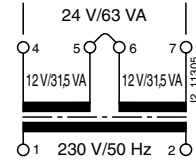
4AC3 624



4AC3 640

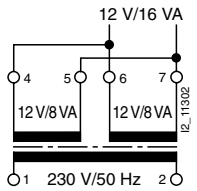


4AC3 663



4AC3 616

Parallel connection



The 12 V outputs must be switched in parallel or in series. Our example shows the 4AC3 616. In parallel connection, they can be used for 12 V/16 VA, in series connection for 24 V/16 VA. In these types of circuits, the PTC resistor ensures full protection of the transformer.

Power Supply Units

4AC2 4 power supply units

Overview

Certification

The power supply units are IMQ and VDE approved.

Failsafe with PTC

Siemens power supply units are protected against short circuit or moderate overload by a PTC resistor. If a disconnection occurs, the power supply unit must be switched off for approx. 30 min to cool down the PTC resistor.

Typical applications

Direct current supply up to 24 V DC, 2.0 A with safety extra-low voltage for the supply of gongs, bells, door openers, switching relays, remote control switches, Insta contactors and DC power supplies for safety e.l.v. systems in continuous operation.

Technical specifications

Data acc. to EN 61558-2-6		4AC2 400	4AC2 401
Rated operational power P_s	W	24	48
Rated operational voltage U_e	V AC	230	
Operating range $\times U_e$	at 50/60 Hz	0.9 ... 1.1	
Rated frequency	Hz	50	
Operating frequency range	Hz	48 ... 52	
Secondary rated voltage U_{sec}	V DC	12	24
Secondary rated current I_{sec}	A DC	2.0	2.0
Rated power dissipation P_V	in no-load operation at rated load	W W	5 10 6 15
Hum-free	core molded	Yes	
Protective separation	creepage and clearances	mm	8
Insulation class		B	
Test voltage 50 Hz, 1 min.	primary against secondary winding	kV	> 4
Terminals	\pm screw (Pozidriv)		1
Conductor cross-sections	rigid flexible with sleeve	mm ² min. mm ²	1.5 ... 6 0.75
Permissible ambient temperature		°C	-10 ... +40
Permissible humidity		%	\leq 80
Degree of protection	acc. to EN 60529		IP20
Safety class	acc. to EN 60730		II

Selection and ordering data

U_e	U_{sec}	I_{sec}	P_s	MW	Order No.	Weight 1 unit approx.	PS* P. unit
V AC	V DC	A DC	W			kg	Unit(s)



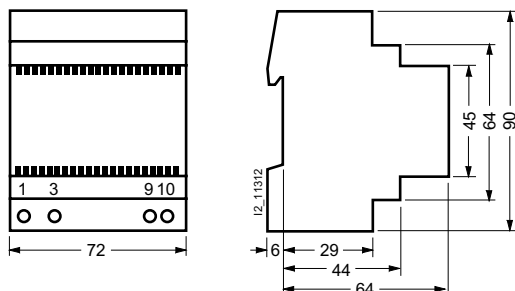
Power supply units

with transformer for safety extra-low voltage,
with bridge rectifier

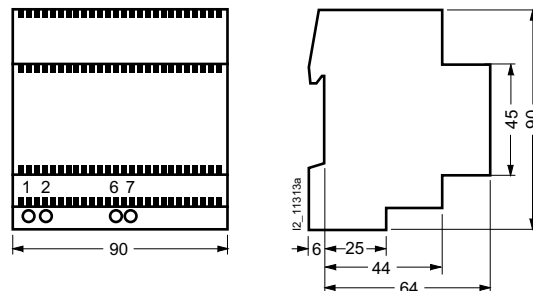
230	12	2.0	24	4	4AC2 400 4AC2 401	0.830	1
	24	2.0	48	5		1.160	1

Dimensional drawings

4AC2 400



4AC2 401

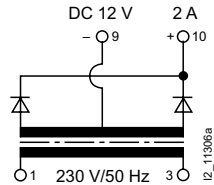


4AC2 4 power supply units

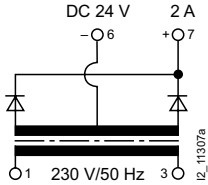
Schematics

Circuit diagrams

4AC2 400



4AC2 401



Power Supply Units

5TE6 8 socket outlets

Overview

Socket outlets for rail mounting according to DIN 50022 have since become the standard in modern switchgear/distribution boards. The 5TE6 8 socket outlets can be used without covers for 55 mm mounting depth, and with covers for 70 mm mounting depth. The cover can be retrofitted on all devices. The cover can be opened at an angle of 180°.

By pulling on the hinges, the cover stays open, which facilitates plugging in.

To make mounting easier, the touch-protected terminals L, N and PE are located on the side of the socket outlet.

The 5TE6 8 socket outlets are available in the following country versions (in compliance with the pertinent standards):

- For Germany (VDE)
- For Belgium/France (CEE 7)
- For Italy (DEI) and
- For USA (UL)

Application

- Power supply for maintenance purposes (mounting tools, service devices), when required in distribution boards in buildings and in switchgear. In order to make sure that it is possible to work on the distribution board in the event of a power failure, we recommend that the socket outlet is fed from the incoming supply using a short-circuit current proof cable installation and a separate fuse.
- For connection of plug-in communication devices in communication distribution boards or in private plants for the occasional use of devices with heavy starting and separate fusing.

Technical specifications

Data acc. to DIN VDE 0620, CEE 7 standard sheet V, CEI 23-50 or UL 498		5TE6 800	5TE6 801	5TE6 802	5TE6 803	5TE6 804
Manufacture acc. to		•	•	--	--	--
• DIN VDE 0620-1		--	--	•	--	--
• CEI 23-50		--	--	--	•	--
• CEE 7 standard sheet V		--	--	--	--	•
• UL 498		--	--	--	--	•
Rated operational voltage U_e	V AC	250				125
Rated voltage I_B	A AC	16				15
Terminals	± screw (Pozidriv)	1				
Conductor cross-sections	rigid	max. mm ² 1.5 ... 6				
	flexible with sleeve	min. mm ² 0.5				
Permissible ambient temperature	°C	-10 ... +50				
Degree of protection	acc. to EN 60529	IP20				
Mounting position		without cover: any, with cover: vertical only				



5TE6 8 socket outlets

Selection and ordering data

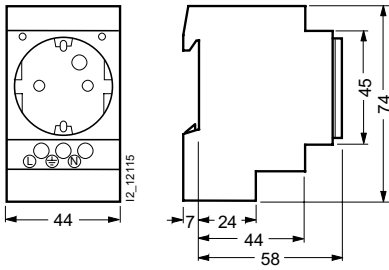
	U_e V AC	I_e A	Conductor cross-section mm ²	MW	Order No.	Weight 1 unit approx. kg	PS*/ P. unit Unit(s)
 <p>VDE Socket outlets acc. to DIN VDE 0620-1 • Without cover</p>	250	16	6	2.5	5TE6 800	0.102	1
 <p>VDE Socket outlets acc. to DIN VDE 0620-1 • With hinged lid</p>	250	16	6	2.5	5TE6 801	0.109	1
 <p>Socket outlets acc. to CEI 23-50 • With hinged lid</p>	250	16	6	2.5	5TE6 802	0.111	1
 <p>Socket outlets acc. to CEE 7 Standard sheet V • Without cover, with grounding pin</p>	250	16	6	2.5	5TE6 803	0.104	1
 <p>Socket outlets UL 498 • Without cover</p>	125	15	6	2.5	5TE6 804	0.099	1
 <p>Hinged lids for 5TE6 80 socket outlets.</p>				2.5	5TE9 120	0.018	1

Power Supply Units

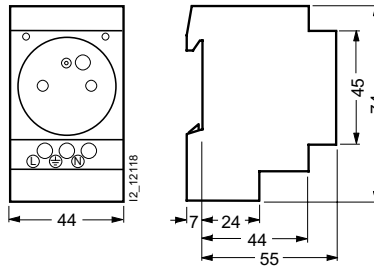
5TE6 8 socket outlets

Dimensional drawings

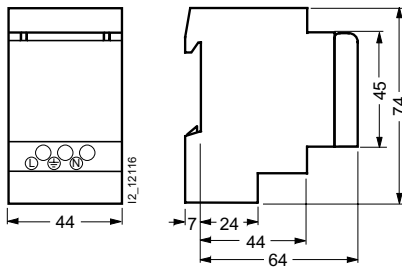
5TE6 800



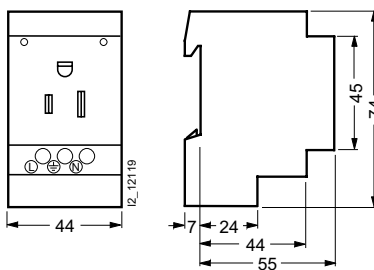
5TE6 803



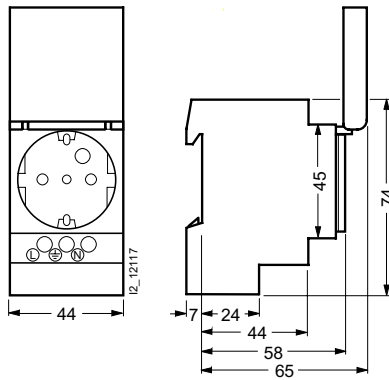
5TE6 801



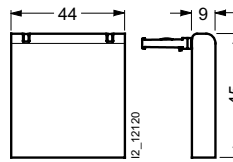
5TE6 804



5TE6 802



5TE9 120



10

Measuring Devices







- 10/2 **Introduction**
- 10/4 **7KT5 8 time and pulse counters**
- 10/6 **7KT5 5 and 7KT5 6 time counters for front-panel mounting**
- 10/8 **7KT1 0 analog measuring devices**
- 10/9 **7KT1 1 digital measuring devices**
- 10/11 **7KT1 30 multimeters**
- 10/16 **7KT1 3 multiconverters**
- 10/23 **7KT1 14 E-counters, single-phase**
- 10/25 **7KT1 5 E-counters, three-phase**
- 10/29 **7KT1 16 E-counters, three-phase, *instabus* KNX EIB**
- 10/33 **7KT1 390 LAN couplers**
- 10/36 **7KT9 0 measuring selector switches**
- 10/37 **7KT1 2 current transformers**









Measuring Devices

Introduction

Overview

Devices	Application	Standards	Usage		
			Non-residential buildings	Residential buildings	Industry
 <p>Time and pulse counters</p> <ul style="list-style-type: none"> • Time counters 7KT5 80 and 7KT5 82 • Pulse counters 7KT5 81 and 7KT5 83 	Monitoring of operating hours and starting operations of devices or plants	IEC 60255-6, EN 60255-6 (VDE 0435 T 301) UL 94	• •	• •	• •
 <p>Time counters for front-panel mounting 7KT5 5 and 7KT5 6</p>	Monitoring of operating hours of devices or plants	IEC 60255-6, EN 60255-6 (VDE 0435 T 301)	•	•	•
 <p>Analog measuring devices 7KT1 0</p>	For measuring voltages and currents, for monitoring input and output currents or device currents	IEC 60051-2, EN 60051-2	•		•
 <p>Digital measuring devices 7KT1 1</p>	For measuring voltages and currents, for monitoring input and output currents or device currents	DIN 43751-1, DIN 43751-2	•		•
 <p>Multimeters 7KT1 30</p>	For the display and assessment of 23 electrical measured values in switchgear, incoming supplies and outgoing feeders	IEC 60051-2, EN 60051-2 IEC 61010-1, EN 61010-1 (VDE 0411 T 1)	•		•
 <p>Multicounters 7KT1 31, 7KT1 34, 7KT1 35</p>	For the display and assessment of 35 electrical measured values and consumption values in switchgear, incoming supplies and outgoing feeders	IEC 60051-2, EN 60051-2 IEC 61010-1, EN 61010-1 (VDE 0411 T 1) IEC 62053-21, EN 62053-21 (VDE 0418 T 3-21)	•		•

Overview

Devices	Application	Standards	Usage		
			Non-residential buildings	Residential buildings	Industry
 <p>E-counters, single-phase 7KT1 14</p>	For the measurement of kWh in single-phase systems, e.g. in industrial plants, offices and apartments in apartment houses	IEC 62053-11, EN 62053-11 (VDE 0418 T 3-11) IEC 62053-21, EN 62053-21 (VDE 0418 T 3-21)	•	•	•
 <p>E-counters, three-phase 7KT1 50, 7KT1 51, 7KT1 52</p>	For the measurement of kWh in single and three-phase systems, e.g. in industrial plants, offices and apartments in apartment houses	IEC 61010-1, EN 61010-1 (VDE 0411 T 1) IEC 62053-11, EN 62053-11 (VDE 0418 T 3-11) IEC 62053-21, EN 62053-21 (VDE 0418 T 3-21)	•	•	•
 <p>E-counters, three-phase, <i>instabus</i> KNX EIB 7KT1 16</p>	With <i>instabus</i> KNX EIB interface, for the measurement of kWh in single and three-phase systems in industrial plants, offices and apartments in apartment houses	IEC 61036 EN 61036 (VDE 0418 T7)	•		•
 <p>LAN couplers 7KT1 390</p>	Worldwide data communication with measuring devices using LAN/Internet	IEEE 802	•		•
 <p>Measuring selector switches 7KT9 0</p>	For switching over the phases for voltmeters and ammeters		•		•
 <p>Current transformers 7KT1 2</p>	For non-contact measuring of primary currents of a 3-phase system	IEC 60044-1, EN 60044-1 (VDE 0414 T 44-1)	•		•

Definitions

- I_e = rated operational current
- U_e = rated operational voltage
- I_c = rated control supply current
- U_c = rated control supply voltage
- P_s = rated operational power
- 1 MW = modular width 18 mm

7KT5 8 time and pulse counters

Overview

The counters are designed for installation in switching, control and distribution boards and can be snapped onto standard 35 mm mounting rails according to EN 60715.

Function

Time counters count the time in hours with an accuracy of two decimal places (hundredths of hours). The pulse counter sums up the number of pulses, e.g. the making operations of devices.



In the case of electronic counters, the counting result is saved indefinitely in the event of a power failure (EEPROM). On recovery of the power, the counting is continued from the saved value.

Technical specifications

Data acc. to DIN VDE 0435-110, EN 60255-6, UL 94			7KT5 801	7KT5 802	7KT5 803	7KT5 804	7KT5 806	7KT5 807
Rated control supply voltage U_c	V AC		--	24	115	230	115	230
	V DC		12 ... 24	--				
Operating range	at 50/60 Hz	$\times U_c$	0.9 ... 1.1					
Rated frequency		Hz	--	50			60	
Rated power dissipation P_v		VA	< 1		< 2			
Method of operation	counting of		hours					
Display	drum-type register	h	00000.00					
Terminals	\pm screw (Phillips)		1					
Conductor cross-sections	rigid	mm ²	1.5					
	flexible with sleeve, min.	mm ²	0.75					
Permissible ambient temperature		°C	-10 ... +70					
Degree of protection	acc. to EN 60529		IP20					
Safety class	acc. to EN 60730-1		II					
Permissible humidity		%	< 80					

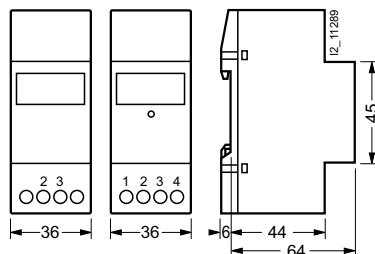
Data acc. to DIN VDE 0435-110, EN 60255-6, UL 94			7KT5 811	7KT5 812	7KT5 814	7KT5 821	7KT5 822	7KT5 823	7KT5 833
Rated control supply voltage U_c	V AC		--	24	230	24 ... 240			
	V DC		12 ... 24	--	--	12 ... 150			
Operating range	at 50/60 Hz	$\times U_c$	0.9 ... 1.1						
Rated frequency		Hz	--	50/60					
Rated power dissipation P_v		VA	< 1		< 2	< 1			
Method of operation	counting of		pulses			hours		pulses	
Display	drum-type register		0000000		--		--		--
	LCD	h	--	000000.0			--		--
			--	0000000					
Counting frequency		Hz	10			--		10	
Pulse duration		ms	50			--		50	
Resetting	electrical		--			•	•	•	
	mechanical		--				•	•	
Terminals	\pm screw (Phillips)		1						
Conductor cross-sections	rigid	mm ²	1.5						
	flexible with sleeve, min.	mm ²	0.75						
Permissible ambient temperature		°C	-10 ... +70						
Degree of protection	acc. to EN 60529		IP20						
Safety class	acc. to EN 60730-1		II						
Permissible humidity		%	< 80						

Selection and ordering data

	U_c	Frequency	MW	Order No.	Weight 1 unit approx.	PS*/ P. unit	
	V	Hz			kg	Unit(s)	
	Time counters						
	Mechanical registers, display 00000.00 h without resetting						
		12 ... 24 DC	--	2	7KT5 801	0.095	1
		24 AC	50		7KT5 802	0.095	1
		115 AC			7KT5 803	0.095	1
		230 AC			7KT5 804	0.095	1
		115 AC	60		7KT5 806	0.095	1
	230 AC			7KT5 807	0.095	1	
7KT5 801	Pulse counters						
	Mechanical register, display 0000000 \square \square without resetting						
		10 ... 24 DC	--	2	7KT5 811	0.095	1
		24 AC	50/60		7KT5 812	0.095	1
	230 AC			7KT5 814	0.095	1	
	Electronic time counters						
	LCD 000000.0 h without resetting						
		12 ... 150 DC, 24 ... 240 AC	50/60	2	7KT5 821	0.080	1
		with electrical resetting			7KT5 822	0.080	1
		12 ... 150 DC, 24 ... 240 AC	50/60		7KT5 823	0.080	1
	with electrical and mechanical resetting			7KT5 823	0.080	1	
7KT5 823	Electronic pulse counters						
	LCD display 0000000 \square \square						
		with electrical and mechanical resetting			7KT5 833	0.080	1
	10 ... 150 DC, 24 ... 240 AC	50/60	2	7KT5 833	0.080	1	

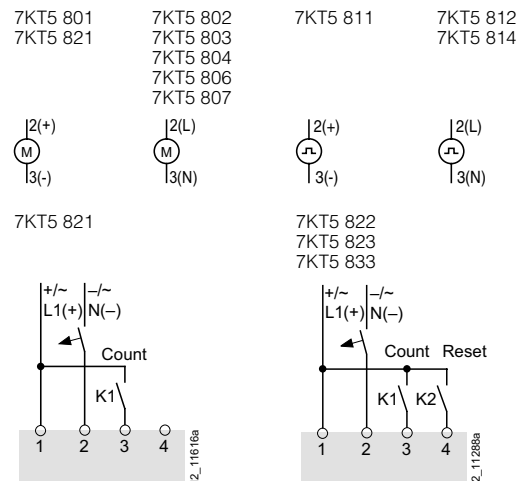
Dimensional drawings

7KT5 801 7KT5 821
 7KT5 802 7KT5 822
 7KT5 803 7KT5 823
 7KT5 804 7KT5 833
 7KT5 806
 7KT5 807
 7KT5 821
 7KT5 811
 7KT5 812
 7KT5 814



Schematics

Connections



Electronic counters

A power supply is required at terminals 1 and 3 so that the device can continuously show the measured value.

Once terminal 3 is supplied with voltage (for DC "+"), the counting procedure starts. If terminal 4 is supplied short-time with voltage (for DC "+"), the counter is reset.

In the event of a power failure, the counting result is indefinitely stored in EEPROM. On recovery of the power, the counting is continued from the saved value.

7KT5 5 and 7KT5 6 time counters for front-panel mounting

Application

Areas of application are time and pulse recording for switchgear cabinets, control and mechanical engineering, e.g. boilers, machine tools or compressors.

Preventive maintenance

Time counters provide support when planning preventive maintenance. In-time and regular maintenance is the best protection against unexpected shutdowns and ensures high plant availability.

Function

Time counters count the time in hours with an accuracy of two decimal places (hundredths of hours).



Technical specifications

Data acc. to DIN VDE 0435-110, EN 60255-6		7KT5 500	7KT5 501	7KT5 502	7KT5 503	7KT5 504	7KT5 505
Rated control supply voltage U_c	V AC	--	115	230	115	230	24
	V DC	10 ... 80	--				
Operating range	$\times U_c$	0.9 ... 1.1					
Rated frequency	Hz	--	50		60		50
Rated power dissipation P_v	VA	< 1	0.2	1.8	0.9	1.8	0.2
Method of operation	counting of	hours					
Display	drum-type register	h	00000.00				
Pulse duration	pulse length, pulse interval	ms	50				
Front-panel mounting	switchboard cutout						
	• Without cover 55 mm × 55 mm • With cover 55 mm × 55 mm	mm × mm Ø mm	45.2 × 45.2 ^{+0.3} 50.2 ^{+0.3}				
Terminals	± screw (Phillips)	1					
Conductor cross-sections	rigid	mm ²	1.5				
	flexible with sleeve, min.	mm ²	0.75				
Permissible ambient temperature		°C	-10 ... +70				
Degree of protection	acc. to EN 60529						
	• Front panel • Installation with seal • Terminals		IP65 IP43 IP20				
Safety class	acc. to EN 60730-1	II					
Permissible humidity		%	< 93				

Data acc. to DIN VDE 0435-110, EN 60255-6		7KT5 600	7KT5 601	7KT5 602	7KT5 603	7KT5 604
Rated control supply voltage U_c	V AC	--	115	230	115	230
	V DC	10 ... 50	--			
Operating range	$\times U_c$	0.9 ... 1.1				
Rated frequency	Hz	--	50		60	
Rated power dissipation P_v	VA	< 1				
Method of operation	counting of	hours				
Display	drum-type register	h	00000.00			
Pulse duration	pulse length, pulse interval	ms	50			
Front-panel mounting	switchboard cutout	mm × mm	68 ^{+0.5} × 68 ^{+0.5}			
Terminals	± screw (Phillips)	1				
Conductor cross-sections	rigid	mm ²	1.5			
	flexible with sleeve, min.	mm ²	0.75			
Permissible ambient temperature		°C	-10 ... +70			
Degree of protection	acc. to EN 60529					
	• Front panel • Terminals		IP52 IP00			
Safety class	acc. to EN 60730-1	II				
Permissible humidity		%	< 93			

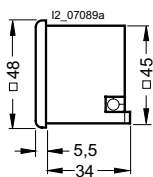
7KT5 5 and 7KT5 6 time counters for front-panel mounting

Selection and ordering data

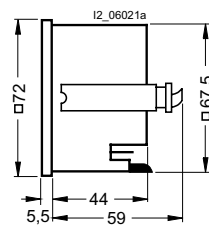
	U_c	Frequency	MW	Order No.	Weight 1 unit approx.	PS*/ P. unit	
	V	Hz			kg	Unit(s)	
 7KT5 500	Time counters						
	Mechanical register, display 00000.00 h, for front-panel mounting, front frame 48 mm x 48 mm						
		10 ... 80 DC	--		7KT5 500	0.045	1
		24 AC	50		7KT5 505	0.045	1
		115 AC			7KT5 501	0.045	1
	230 AC			7KT5 502	0.045	1	
	115 AC	60		7KT5 503	0.045	1	
	230 AC			7KT5 504	0.045	1	
 7KT5 600	For front-panel mounting, front frame 72 mm x 72 mm with narrow frame acc. to DIN 43700						
		10 ... 50 DC	--	2	7KT5 600	0.120	1
		115 AC	50		7KT5 601	0.120	1
		230 AC			7KT5 602	0.120	1
		115 AC	60		7KT5 603	0.120	1
	230 AC			7KT5 604	0.120	1	
Covers for 7KT5 5 time counter							
55 mm x 55 mm				7KT9 020	0.015	5/1	
Sealing rings for 7KT9 020 cover							
IP 43-installation in switchboards with smooth surfaces (1 set = 5 units)				7KT9 000	1 set		
				7KT9 000	0.020	1 set	
Terminal covers for 7KT5 6 time counter							
Degree of protection IP20				7KT9 021	0.010	5	

Dimensional drawings

7KT5 5



7KT5 6



Schematics

Connections

7KT5 5, 7KT5 6



Measuring Devices

7KT1 0 analog measuring devices

Overview

These devices for measuring voltages and currents can be used for monitoring input and output currents or device currents. The devices are suitable for direct connection in single-phase systems or over a measuring converter for three-phase systems. Depending on the transformer, the ammeter for transformer connection can be fitted

with interchangeable scales of 60, 100, 250, 400, 600 and 1000 A AC.



Main features of the devices are:

- Extensive scale
- Continuous overload up to 20 %

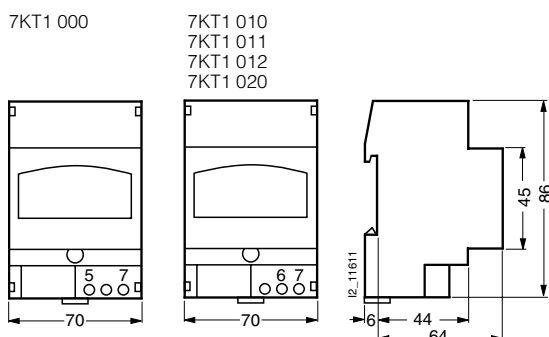
Technical specifications

Data acc. to EN 60051-2		7KT1 000	7KT1 01.	7KT1 020
Measuring ranges				
• Direct measurement	V AC	0 ... 500	--	--
	A AC	--	0 ... 25	--
	A AC	--	0 ... 40	--
	A AC	--	0 ... 60	--
	A AC	--	--	0 ... 150/5
• Transformer measurement				
Max. permissible measuring frequency	Hz	45 ... 65		
Display		pointer		
Measuring accuracy	at 23 ±1 °C	±3	±1.5	
Rated operational power P_s	VA	< 2	< 1.1	
Temperature influence	%/°C	±0.03		
Overload capability	continuous short-time for 1 s	$1.2 \times U_{meas}$ $2 \times U_{meas}$	$1.2 \times I_{meas}$ $10 \times I_{meas}$	
Test voltage	50 Hz, 1 min	kV	> 2	
Terminals	+/- screw (Pozidriv)		1	2
Conductor cross-sections	rigid, max. flexible with sleeve, min.	mm ² mm ²	1 x 6/2 x 4 0.75	1 x 25/2 x 16 1 x 6/2 x 4 0.75
Permissible ambient temperature		°C	-10 ... +55	
Degree of protection			IP20	

Selection and ordering data

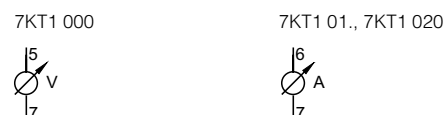
	U_{meas}	I_{meas}	MW	Order No.	Weight 1 unit approx.	PS*/ P. unit
	V AC	A AC			kg	Unit(s)
	Analog voltmeters					
	500		4	7KT1 000	0.105	1
	Analog ammeters for direct connection					
		25 40 60	4	7KT1 010 7KT1 011 7KT1 012	0.110 0.125 0.135	1 1 1
	Analog ammeters for transformer connection with scale 0 to 150 A AC					
		0 ... 150/5	4	7KT1 020	0.105	1
	Changeable scales for 7KT1 020 ammeter					
	Easy on-site replacement					
		60		7KT9 001	0.005	1
		100		7KT9 002	0.005	1
		250		7KT9 004	0.005	1
		400		7KT9 005	0.005	1
		600		7KT9 006	0.005	1
	1000		7KT9 007	0.005	1	

Dimensional drawings



Schematics

Connections



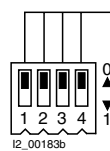
Overview

These devices for measuring voltages and currents can be used for monitoring input and output currents or device currents. They are suitable for direct connection to single-phase systems or, over a measuring selector switch, to three-phase systems.

The measuring ranges of the ammeter are set at the device with a coding switch.

Function

Range selector switch for 7KT1 120 digital ammeter



Position	Direct measurement	Transformer measurement
0	0 0 0 0	20 A AC
1	1 0 0 0	25/5A AC
2	0 1 0 0	40/5A AC
3	1 1 0 0	50/5A AC
4	0 0 1 0	60/5A AC
	1 0 1 0	80/5A AC
	0 1 1 0	100/5A AC
	1 1 1 0	150/5A AC
	0 0 0 1	200/5A AC
	1 0 0 1	250/5A AC
	0 1 0 1	400/5A AC
	1 1 0 1	500/5A AC
	0 0 1 1	600/5A AC
	1 0 1 1	800/5A AC
	0 1 1 1	999/5A AC



Technical specifications

Data acc. to DIN 43751-1 and DIN 43751-2		7KT1 110	7KT1 120
Rated control supply voltage U_c		V AC	230
Operating range		$\times U_c$	0.9 ... 1.15
Rated frequency		Hz	45 ... 65
Rated operational power P_s		VA	< 2
Measuring range			
• Voltage	direct measurement	V AC	12 ... 600
• Current	direct measurement	A AC	--
	transformer measurement	A AC	0.4 ... 20 direct 0.1 ... 1000/5
Display			3 LEDs red; height 10 mm
• Voltage	voltage > 600 V	HHH	--
	voltage < 12 V	-- -- --	--
• Current	direct current > 20 A	--	HHH
	current transformer > 5 A	--	HHH
	direct current < 0.4 A	--	-- -- --
	current transformer < 0.1 A	--	-- -- --
Measuring cycle		/s	4 times
Measuring accuracy		at 23 °C	% $\pm 0.5 \pm 1$ digit
Temperature influence		%/°C	± 0.03
Overload capability			
• Voltage	continuous	V	720
	short-time for 1 s	V	780
• Current	continuous, direct	A	--
	continuous transformer	A	22
	short-time for 1 s, direct	A	--
	short-time for 1 s, transformer	A	200
			50
Electrical isolation			
• Clearances		mm	≥ 3
• Creepage distances in the device		mm	≥ 4.3
• Creepage distances on the printed board	printed boards not installed	mm	≥ 3.0
Test voltage		50 Hz, 1 min	kV
			2.2
Terminals		+/- screw (Pozidriv)	1
Conductor cross-sections		rigid, max.	mm ²
	flexible with sleeve, min.	mm ²	1 x 6/2 x 4 0.75
Permissible ambient temperature		°C	-10 ... +55
Degree of protection			IP20

Measuring Devices

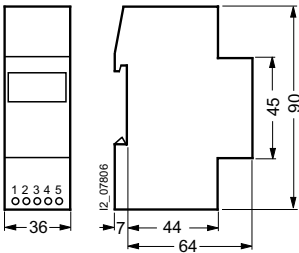
7KT1 1 digital measuring devices

Selection and ordering data

	U_c	U_{meas}	I_{meas}	MW	Order No.	Weight 1 unit approx.	PS*/ P. unit
	V AC	V AC	A AC			kg	Unit(s)
	Digital voltmeters				7KT1 110	0.190	1
	230	600					
	Digital ammeters for direct and transformer connection				7KT1 120	0.200	1
	230		0 ... 20 trans- former/5				

Dimensional drawings

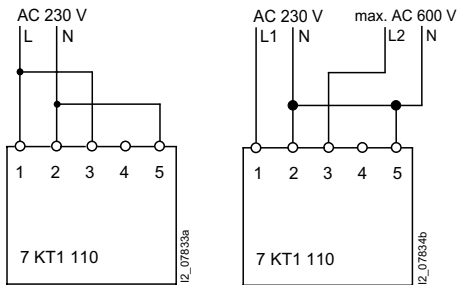
7KT1 110,
7KT1 120



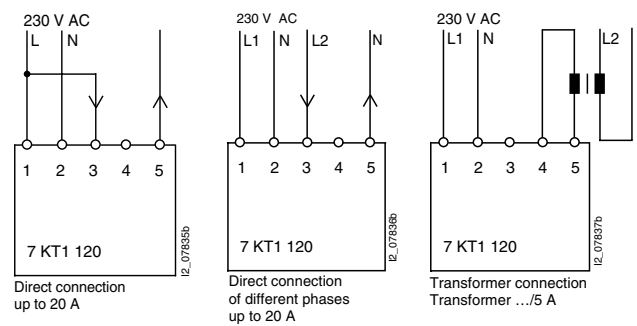
Schematics

Switching examples

Digital voltmeters



Digital ammeters



Overview

- All required measuring values of an installation clearly visible at a glance
- Innovative matrix selection of assignment and selection of measurement data of the display registers
- For direct connection 63 A or for transformer /1A or /5A
- For transformer primary current of 10 to 5000 A. Input is in 5 A increments
- Size, 11 mm high, attractive green 7-segment display for measured values
- Clearly recognizable orange text display of units assigned to the displays where the measured value appears
- Representation of measured values on 5 triple 7-segment displays and an auxiliary 7-segment display for input of primary current
- Detection of connection errors (phase transposition)
- With error detection in the case of incorrect connection
- Measuring accuracy for voltage, current and output: $\pm 2\% \pm 1$ digit

Application

Extremely compact multifunction display for direct or transformer connection in a three-phase system with star-delta measurement for the display of up to 31 different electrical measured values in a switchgear, incoming or outgoing feeders.

A special feature is the analysis of the different loads on the phases. Phase displacement, unsymmetrical or unbalanced loads can cause partial overloads. In this case, the multimeter offers a range of different options to combine measured values and assess them.

Function

Voltage measurement

The multimeter measures the delta voltages L1 against L2; L2 against L3 and L3 against L1 or the star voltages L1, L2, L3 against N.

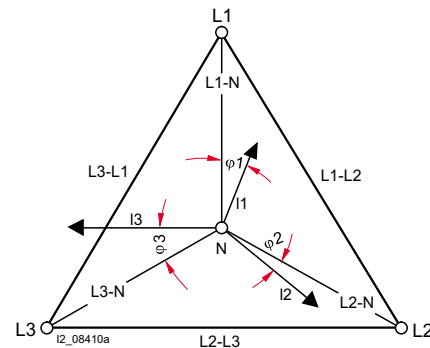
Readout data

Of the following 23 options, you can continuously display 5 indicated values.

Number	Measured value	Display	Unit	Assignment
1	Active power	D1	W	L1
2	Voltage	D1	V	L1
3	Current	D1	A	L1
4	Apparent power	D1	VA	L1
5	p.f.	D1	p.f.	L1
6	Voltage	D1	V	L1 - L2
7	Active power	D2	W	L2
8	Voltage	D2	V	L2
9	Current	D2	A	L2
10	Apparent power	D2	VA	L2
11	p.f.	D2	p.f.	L2
12	Voltage	D2	V	L2 - L3
13	Active power	D3	W	L3
14	Voltage	D3	V	L3
15	Current	D3	A	L3
16	Apparent power	D3	VA	L3
17	p.f.	D3	p.f.	L3
18	Voltage	D3	V	L3 - L1
19	Active power	D5	W	ΣL
20	Apparent power	D1, D2, D3, D5	VA	ΣL
21	Reactive power	D5	var	ΣL
22	Frequency	D4	Hz	ΣL
23	p.f.	D1, D2, D3, D4	p.f.	ΣL
2 set values are also indicated				
24	Transformer setting	D5	CT/A	/1 or /5
25	Transformer setting	D5	CT/A	10 ... 5000

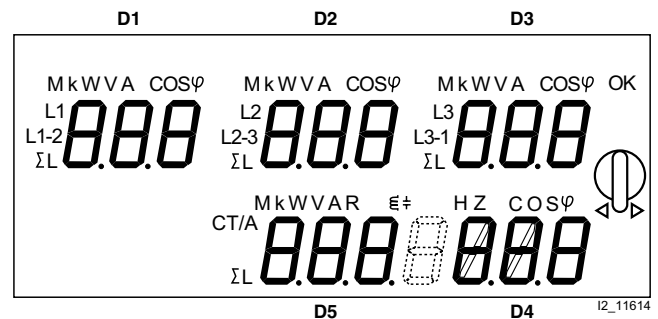
ΣL - symbol for 3-phase system

This indicates that all physical units shown under this symbol are always 3-phase.



Display

The multimeters have a covered brightly lit LED display. The measured values are indicated on an 11 mm high, green, 7-segment LED, the physical units are indicated on an orange LED. Both colors are easier to read than the previously used red LED. Capacitive loads are automatically indicated by a capacitor, inductive loads by a coil.



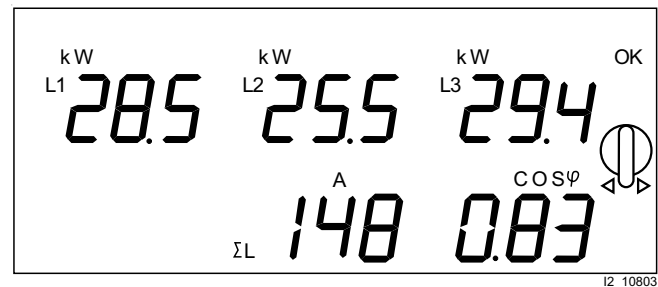
Matrix selection

Conventional measuring devices usually provide voltage, current or other similar values for three phases. Multimeters with their matrix selection are considerably more flexible and more universal.

The 3-fold indications are selected using the rotary and the desired indications confirmed with OK. This is followed by the horizontal selection e.g. W - V - A or p.f., and then the vertical selection, e.g. L1 - L1 - L2 - ΣL . Your matrix selection is set.

The vertical data on the display can be assigned to any measured value in the horizontal data. The letters M and k are automatically assigned according to measuring range, i.e. measured value, e.g.: kW or MW. Capacitive loads are automatically indicated by a capacitor, inductive loads by a coil.

The following diagram shows an example of what your matrix selection might look like.



7KT1 30 multimeters



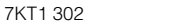
Technical specifications

Data acc. to DIN 43751-1, DIN 43751-2 and EN 61010-1			7KT1 300	7KT1 301	7KT1 302
Supply					
• Rated control supply voltage U_C	V AC		230		
• Operating range	$\times U_C$		0.8 ... 1.2		
• Rated frequency	Hz		50		
• Frequency range	Hz		45 ... 65		
• Rated power dissipation	VA		≤ 10		
Overload capability					
• Voltage	continuous: phase/phase	V	480		
	1 second: phase/phase	V	800		
	continuous: phase/N	V	276		
	1 second: phase/N	V	460		
• Current	continuous	A	76	6	
	0.5 s	A	--	110	
	10 ms	A	1000	--	
Measuring input					
• Type of connection			direct	transformer/1 A or /5 A	
• Voltage U_e	phase/phase	V	400		
	phase/N	V	230		
• Operating range voltage	phase/phase	V	87 ... 480		
	phase/N	V	50 ... 276		
• Current I_e		A	63	1 or 5	
• Operating range current		A	0.3 ... 76	0.012 ... 6	
• Transformer current	primary current of the transformer	A	--	10 ... 5000	
	smallest input step	A	--	5	
• Frequency		Hz	50		
• Operating frequency range		Hz	45 ... 65		
Display					
• Connection errors	inverted phases		Err		
• Voltage: 3 displays, 3-digit	delta L1-L2, L2-L3, L3-L1	V	87 ... 480		
	star L1/N - L2/N - L3/N	V	50 ... 276		
	voltage > 480/276 V		H H H		
	voltage < 87/50 V		-- -- --		
• Current: 3 displays, 3-digit	L1 - L2 - L3	A or kA	0.3 ... 76	0.1 ... 1.2	
	for current > 76; 1.2 or 6 A x transformer conversion ratio		H H H		
	at current < 0.1; 0.01 A x transformer conversion ratio		O O O		
• Frequency: 1 display, 3-digit	ΣL	Hz	45.0 ... 65.0		
• Active power: 3 displays, 3-digit or 1 display, 3 of 7 digits	L1 - L2 - L3; ΣL display with floating decimal point	W, kW or MW	0 ... 999		
• Reactive power: 1 display, 3-digit	ΣL , with capacitive or inductive indication; display with floating decimal point	var, kvar or Mvar	0 ... 999		
• Apparent power: 3 displays, 3-digit or 1 display, 3-digit	L1 - L2 - L3; ΣL , display with floating decimal point	VA, kVA or MVA	0 ... 999		
• P.f.: 3 displays, 3-digit or 1 display, 3-digit	L1 - L2 - L3; ΣL , display with floating decimal point		0.01 ... 1.00		
• Transformer primary current	only if set	A	--	10 ... 5000	
• Transformer secondary current	only if set	A	--	1 or 5	
• Display period		/s	2		
• Storage of setting			EEPROM		
Measuring accuracy					
• Voltage		%	$\pm 2 \pm 1$ digit		
• Current		%	$\pm 2 \pm 1$ digit		
• Power		%	$\pm 2 \dots 4 \pm 1$ digit		
• P.f.		%	$\pm 2 \dots 10 \pm 1$ digit		
• Frequency		%	$\pm 1 \pm 1$ digit		

Technical specifications

Data acc. to DIN 43751-1, DIN 43751-2 and EN 61010-1			7KT1 300	7KT1 301	7KT1 302
Safety acc. to EN 61010-1					
• Degree of pollution			2		
• Overvoltage category			II		
• Operational voltage		V	600		
• Clearances		mm	≥ 3.0		
• Creepage distances	in device	mm	≥ 4.3		
	on printed boards (not installed)	mm	≥ 3.0		
• Test pulse voltage	1.2/50 µs	kV	4		
• Test voltage	50 Hz, 1 min	kV	2.2		
Terminals					
• Main current paths	± screw (Pozidriv)		2	1	
• Supply terminals	blade for slotted screw	mm × mm	4 × 2.5		
• Conductor cross-sections main current paths	rigid, max.	mm ²	1 × 25 or 2 × 16	1 × 6 or 2 × 4	
	rigid, min.	mm ²	1 × 1.5		
• Conductor cross-sections for supply terminals	rigid, max.	mm ²	1 × 2.5 or 2 × 1.5		
	flexible with sleeve, min.	mm ²	1 × 0.75		
Environmental conditions					
• Temperature		°C	0 ... +55		
• Relative humidity		%	≤ 80		
• Vibrations	sinusoidal amplitude at 50 Hz	mm	±0.25		
• Safety class	acc. to EN 61010-1		II		
• Degree of protection	acc. to EN 60529		IP20		
	front panel, 96 mm × 96 mm		IP54		

Selection and ordering data

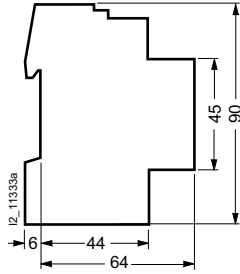
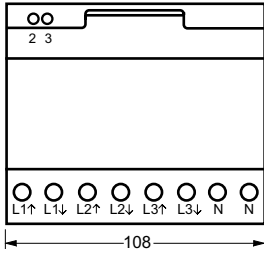
	U_c	I_e	U_e	MW	Order No.	Weight 1 unit approx.	PS*/ P. unit
	V AC	A AC	V AC			kg	Unit(s)
Multimeters							
 7KT1 300	For the display of 23 electrical values, of which 5 values can be continuously displayed. For 3-phase, 3/4-wire connection For direct connection				7KT1 300	0.400	1
	230	63	3 × 230/400 6				
 7KT1 301	For transformer connection of 10 ... 5000 A, adjustable in 5 A increments Secondary current, optionally 1 A or 5 A				7KT1 301	0.380	1
	230	/1 or /5	3 × 230/400 6				
 7KT1 302	For front-panel mounting 96 mm × 96 mm For transformer connection of 10 to 5000 A, adjustable in 5 A increments Secondary current, optionally 1 A or 5 A				7KT1 302	0.378	1
	230	/1 or /5	3 × 230/400				

Measuring Devices

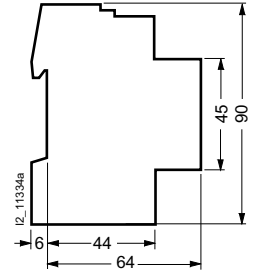
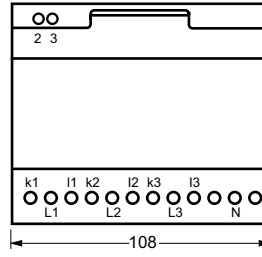
7KT1 30 multimeters

Dimensional drawings

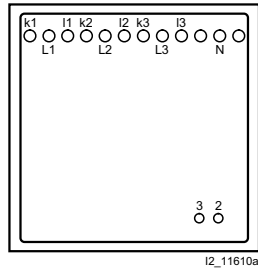
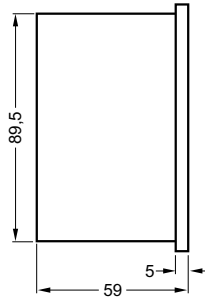
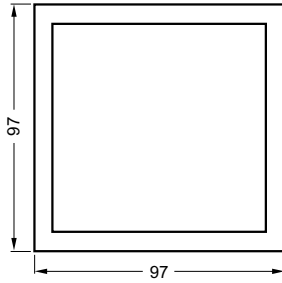
7KT1 300



7KT1 301



7KT1 302

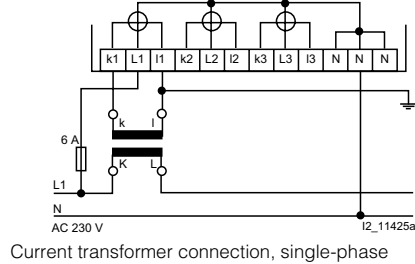
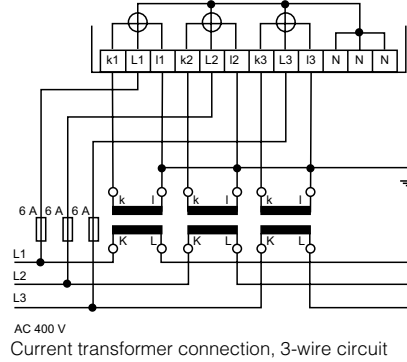
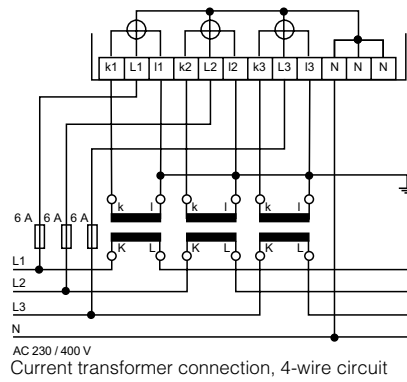
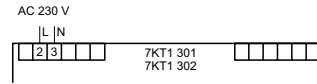
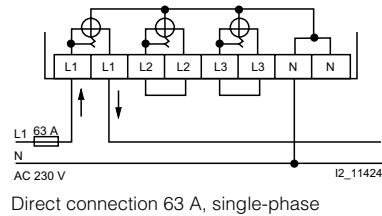
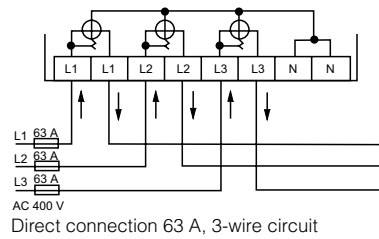
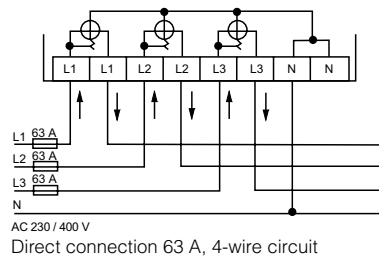
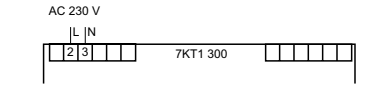


Schematics

Instructions for the connection of transformer counters

In the case of cross-section reduction, a short-circuit resistant cable is required for the power supply of terminals 2, 5 and 8, depending on the fusing for phases L1, L2, L3. A fuse of 6 A is recommended for the line protection.

Current transformers must not be operated with open terminals as dangerously high voltages can occur, which may result in personal injuries and property damage. It may also lead to a thermal overload of the transformers.



7KT1 3 multimeters

Overview

- All required measuring values of an installation clearly visible at a glance
- Innovative matrix selection of assignment and selection of measurement data of the display registers
- For direct connection 63 A or for transformer /1A or /5A
- For transformer primary current of 10 to 5000 A. Input is in 5 A increments
- Size, 11 mm high, attractive green 7-segment display for measured values
- Clearly recognizable orange text display of units assigned to the displays where the measured value appears
- Display of measured values on 4 three-fold 7-segment displays and a 7-fold 7-segment display
- Selection of display for active, reactive and apparent energy value, 3 or 7-digit
- Detection of connection errors (phase transposition)
- Accuracy class 2 according to IEC 62053-21, -23
- Version with LAN and MS user interface

Application

Extremely compact multifunction display for direct or transformer connection in a three-phase system with star-delta measurement for the display of up to 35 different electrical measured values in a switchgear, incoming or outgoing feeders.

A special feature is the analysis of the different loads on the phases. Phase displacement, unsymmetrical or unbalanced loads can cause partial overloads. In this case, the multimeter offers a range of different options to combine measured values and assess them.

You will find information on LAN operation and the MS Excel user interface under LAN coupler.

Function

Voltage measurement

The multimeter measures the delta voltages L1 against L2; L2 against L3 and L3 against L1 or the star voltages L1, L2, L3 against N.

Readout data

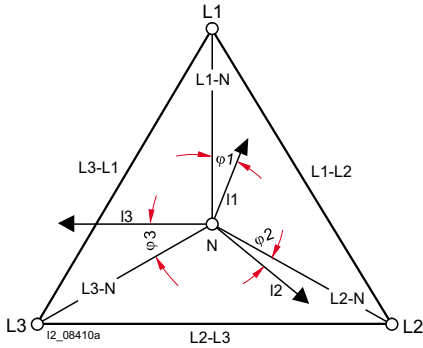
Of the following 35 options, you can continuously display 5 indicated values.

Number	Measured value	Display	Unit	Assignment
1	Active power	D1	W	L1
2	Voltage	D1	V	L1
3	Current	D1	A	L1
4	Apparent power	D1	VA	L1
5	p.f.	D1	p.f.	L1
6	Voltage	D1	V	L1 – L2
7	Active power	D2	W	L2
8	Voltage	D2	V	L2
9	Current	D2	A	L2
10	Apparent power	D2	VA	L2
11	p.f.	D2	p.f.	L2
12	Voltage	D2	V	L2 – L3
13	Active power	D3	W	L3
14	Voltage	D3	V	L3
15	Current	D3	A	L3
16	Apparent power	D3	VA	L3
17	p.f.	D3	p.f.	L3
18	Voltage	D3	V	L3 – L1
19	Temperature	D6	°C	–
20	Current, N-conductor	D6	A	ΣL
21	Active power	D4	W	ΣL
22	Reactive power	D5	var	ΣL
23	Apparent power	D5	VA	ΣL
24	Frequency	D6	Hz	ΣL
25	p.f.	D1, D2, D3, D6	p.f.	ΣL
26	Active energy rate 1	D4	Wh	ΣL →
27	Active energy rate 2	D4	Wh	ΣL →
28	Active energy rate 1	D4	Wh	ΣL ←
29	Active energy rate 2	D4	Wh	ΣL ←
30	Reactive energy rate 1	D5	varh	ΣL, ind.
31	Reactive energy rate 2	D5	varh	ΣL, ind.
32	Reactive energy rate 1	D5	varh	ΣL, cap.
33	Reactive energy rate 2	D5	varh	ΣL, cap.
34	Apparent energy rate 1	D5	VAh	ΣL
35	Apparent energy rate 2	D5	VAh	ΣL
2 set values are also indicated				
36	Transformer setting	D4	CT/A	/1 or /5
37	Transformer setting	D5	CT/A	10 ... 5000

Function

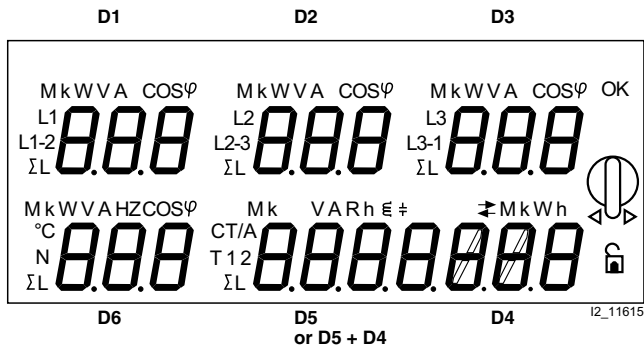
ΣL - symbol for 3-phase system

This indicates that all physical units shown under this symbol are always 3-phase.



Display

The multimeters have a covered brightly lit LED display. The measured values are indicated on an 11 mm high, green, 7-segment LED, the physical units are indicated on an orange LED. Both colors are easier to read than the previously used red LED.



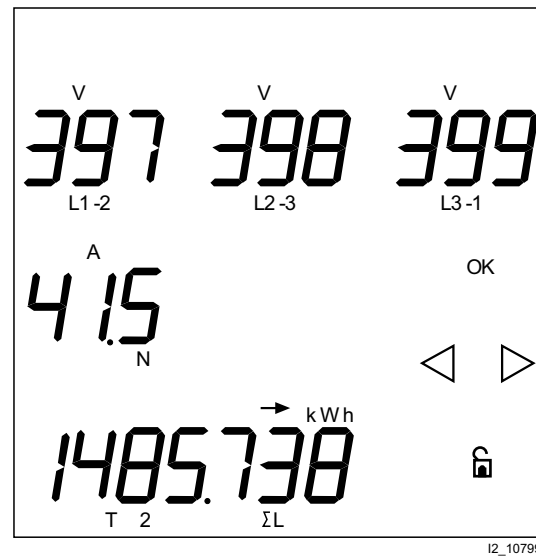
Matrix selection

Conventional measuring devices usually provide voltage, current or other similar values for three phases. Multimeters with their matrix selection are considerably more flexible and more universal.

The 3-fold indications are selected using the rotary and the desired indications confirmed with OK. This is followed by the horizontal selection e.g. W – V – A – VA or p.f., and then the vertical selection, e.g. L1 – L1 – L2 – ΣL . Your matrix selection is set.

The vertical data on the display can be assigned to any measured value in the horizontal data. The letters M and k are automatically assigned according to measuring range, i.e. measured value, e.g.: kW or MW. Capacitive loads are automatically indicated by a capacitor, inductive loads by a coil.

The following diagram shows an example of what your matrix selection might look like.



7KT1 3 multimeters

Technical specifications

Data acc. to EN 61010-1, EN 62053-21, -23, -31				7KT1 310	7KT1 311, 7KT1 312	7KT1 340	7KT1 341, 7KT1 342
Supply							
• Rated control supply voltage U_C		V AC	230				
• Operating range		$\times U_C$	0.8 ... 1.2				
• Rated frequency		Hz	50				
• Frequency range		Hz	45 ... 65				
• Rated power dissipation		VA	≤ 10				
Overload capability							
• Voltage	continuous: phase/phase	V	480				
		V	800				
	1 second: phase/phase	V	276				
		V	460				
• Current	continuous	A	76	6	76	6	
		A	--	110	--	110	
	0.5 s	A	2000	--	2000	--	
		A					
10 ms	A						
	A						
Measuring inputs							
• Type of connection			direct	transformer /1 A or /5 A	direct	transformer /1 A or /5 A	
• Voltage U_e	phase/phase	V	400				
		V	230				
• Operating range voltage	phase/phase	V	87 ... 480				
		V	50 ... 276				
• Current I_e	phase/N	A	63	1 or 5	63	1 or 5	
		A	0.3 ... 76	0.012 ... 6	0.3 ... 76	0.012 ... 6	
• Transformer current	primary current of the transformer	A	--	10 ... 5000	--	10 ... 5000	
		A	--	5	--	5	
• Frequency		Hz	50				
• Operating frequency range		Hz	45 ... 65				
Display							
• Connection errors	inverted phases		Err				
• Voltage: 3 displays, 3-digit	delta L1-L2, L2-L3, L3-L1	V AC	87 ... 480				
		V AC	50 ... 276				
	star L1/N - L2/N - L3/N	V AC	H H H				
		V AC	L L L				
• Current	L1 - L2 - L3 - N conductor	A or kA	0.3 ... 76	(0.1 ... 1.2 or 6) \times transformer conversionratio	0.3 ... 76	(0.1 ... 1.2 or 6) \times transformer conversionratio	
		A or kA	H H H				
	for current > 76; (1.2 or 6 A) \times transformer conversion ratio at current < 0.3 A; 0.012 A \times transformer conversion ratio		O O O				
• Frequency: 1 display, 3-digit	ΣL	Hz	45.0 ... 65.0				
• Active power: 3 displays, 3-digit	L1 - L2 - L3, display with floating decimal point	W, kW or MW	0 ... 999				
		W, kW or MW	0 ... 999				
• Active power: 1 display, 3-digit, 3 of 7 digits + display import or export	ΣL , display with floating decimal point	W, kW or MW	0 ... 999				
		var, kvar or Mvar	0 ... 999				
• Reactive power: 1 display, 3 of 7 digits + capacitive or inductive indication	ΣL , display with floating decimal point	var, kvar or Mvar	0 ... 999				
		VA, kVA or MVA	0 ... 999				
• Apparent power: 3 displays, 3-digit	L1 - L2 - L3, display with floating decimal point	VA, kVA or MVA	0 ... 999				
		VA, kVA or MVA	0 ... 999				
• Apparent power: 5 displays, 3-digit, adjustable	ΣL , display with floating decimal point	VA, kVA or MVA	0 ... 999				
		Wh, kWh or MWh	0 ... 99999999 or 0 ... 999				
• Active energy: 1 display, 7-digit + display import or export, + display rate 1 or 2	ΣL , display with floating decimal point	Wh, kWh or MWh	0 ... 99999999 or 0 ... 999				
		varh, kvarh or Mvarh	0 ... 99999999 or 0 ... 999				
• Reactive energy: 1 display, 7-digit + capacitive or inductive indication	ΣL , display with floating decimal point	VAh, kVAh or MVAh	0 ... 99999999 or 0 ... 999				
		VAh, kVAh or MVAh	0 ... 99999999 or 0 ... 999				
• P.f.: 3 displays, 3-digit	L1 - L2 - L3		0.01 ... 1.00				
• P.f.: 4 displays, 3-digit, adjustable	ΣL		0.01 ... 1.00				

Technical specifications

Data acc. to EN 61010-1, EN 62053-21, -23, -31				7KT1 310	7KT1 311, 7KT1 312	7KT1 340	7KT1 341, 7KT1 342
Display (contd.)							
• Transformer primary current	only if set	A	--	10 ... 5000	--	10 ... 5000	
• Transformer secondary current	only if set	A	--	1 or 5	--	1 or 5	
• Temperature		°C	0 ... +99				
• Display period		/s	2				
• Storage of setting and energy values			EEPROM				
S0 interfaces				Class A			
• Terminal output	acc. to IEC 62053-31 for direct connection 63 A, adjustable	Imp/kWh	10–1–0.1–0.01– 0.001	--			
	depending on transformer factor, adjustable	Imp/kWh	--	10–1–0.1–0.01– 0.001	--		
• Pulse duration		ms	125 ... 300				
• Minimum interval between 2 pulses		ms	300				
• Required voltage		V DC	5 ... 30				
• Current ON/OFF		mA	10 ... 27/0 ... 2				
LAN interfaces				--		• • +, –, shielding	
Measuring accuracy							
• Voltage		%	±2 ± 1 digit				
• Current		%	±2 ± 1 digit				
• Power		%	±2 ... 4 ± 1 digit				
• Active energy acc. to IEC 62053-21			Class 2				
• Reactive energy acc. to IEC 62053-23			Class 3				
• P.f.		%	±2 ... 10±1 digit				
• Frequency		%	1 ± 1 digit				
Safety acc. to EN 61010-1							
• Degree of pollution			2				
• Overvoltage category			II				
• Operational voltage		V	600				
• Clearances		mm	≥ 3.0				
• Creepage distances	in device	mm	≥ 4.3				
	on printed boards (not installed)	mm	≥ 3.0				
• Test pulse voltage	1.2/50 μs	kV	4				
• Test voltage	50 Hz, 1 min	kV	2.2				
Terminals							
• Main current paths	± screw (Pozidriv)		2	1	2	1	
• Supply and control terminals	blade for slotted screw	mm × mm	4 × 2.5				
• Conductor cross-sections of main current paths	rigid, max.	mm ²	1 × 25 or 2 × 16	1 × 6 or 2 × 4	1 × 25 or 2 × 16	1 × 6 or 2 × 4	
	rigid, min.	mm ²	1 × 1.5				
• Conductor cross-sections supply and control terminals	rigid, max. flexible with sleeve, min.	mm ² mm ²	1 × 6 or 2 × 4 1 × 0.75				
Environmental conditions							
• Temperature		°C	0 ... +55				
• Relative humidity		%	≤ 80				
• Vibrations	sinusoidal amplitude at 50 Hz	mm	±0.25				
• Safety class	acc. to EN 61010-1		II				
• Degree of protection	acc. to EN 60529 front panel, 96 mm × 96 mm		IP20	--	IP54	--	IP54

7KT1 3 multimeters

Selection and ordering data

	U_c	I_e	U_e	MW	Order No.	Weight 1 unit approx.	PS*/ P. unit
	V AC	A AC	V AC			kg	Unit(s)
Multimeters							
For the display of 38 electrical values, of which 5 or 6 values can be continuously displayed, for 3-phase, 3/4-wire connection							
With S0 interface							
For direct connection							
	230	63	3 × 230/400	6	7KT1 310	0.420	1
For transformer connection of 10 ... 5000 A, adjustable in 5 A increments, secondary current optionally 1 or 5 A							
	230	/1 or /5	3 × 230/400	6	7KT1 311	0.410	1
For transformer connection of 10 ... 5000 A, adjustable in 5 A increments, secondary current optionally 1 or 5 A, for front-panel mounting 96 mm × 96 mm							
	230	/1 or /5	3 × 230/400		7KT1 312	0.410	1
With LAN interface for connection to LAN coupler							
For direct connection							
	230	63	3 × 230/400	6	7KT1 340	0.420	1
For transformer connection of 10 ... 5000 A, adjustable in 5 A increments, secondary current optionally 1 or 5 A							
	230	/1 or /5	3 × 230/400	6	7KT1 341	0.420	1
For transformer connection of 10 ... 5000 A, adjustable in 5 A increments, secondary current optionally 1 or 5 A, for front-panel mounting 96 mm × 96 mm							
	230	/1 or /5	3 × 230/400		7KT1 342	0.430	1



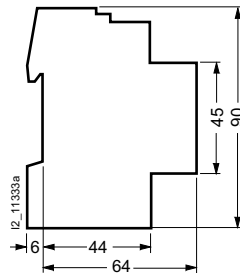
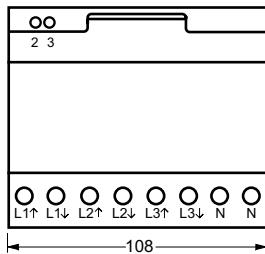
7KT1 310



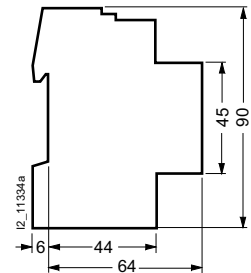
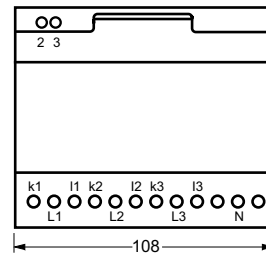
7KT1 312

Dimensional drawings

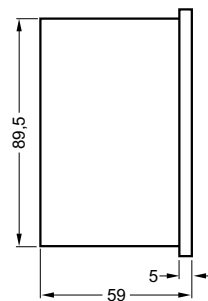
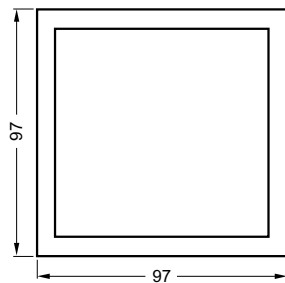
7KT1 3.0



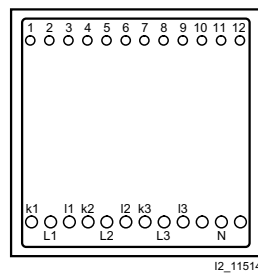
7KT1 3.1



7KT1 3.2



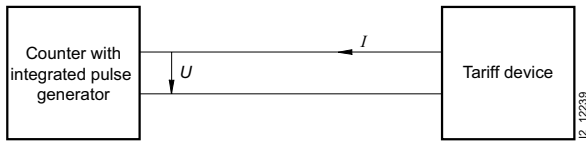
Rear panel



Schematics

S0 interface

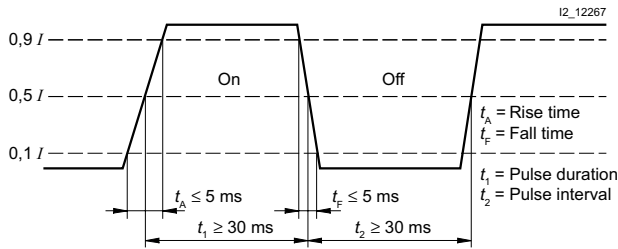
The S0 interface is a current interface for pulse transmission between a counter with integral pulse generator device and tariff rate device.



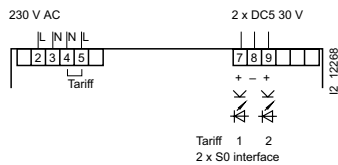
U : Voltage at terminals of tariff device
 I : Current via counter with integrated pulse generator

The tariff rate device is connected to the S0 interface of the counter over a 2-wire conductor and supplies the – working as a passive electrical two-pole – pulse generator with a direct current.

The following diagram shows the dependency of the current path on the time according to DIN 43864.



In the following illustration, the pulse output (S0 interface) is shown for a two-tariff rate counter, e.g. rate 1 → normal rate, rate 2 → special rate.



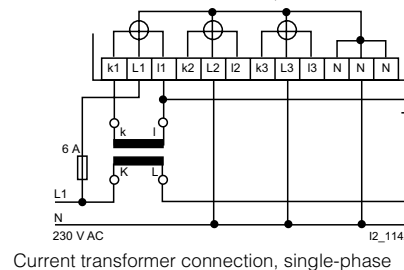
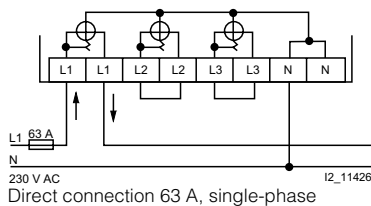
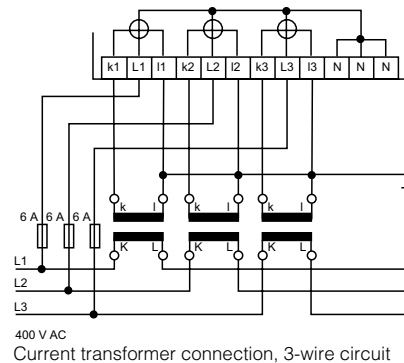
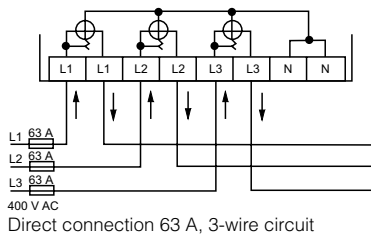
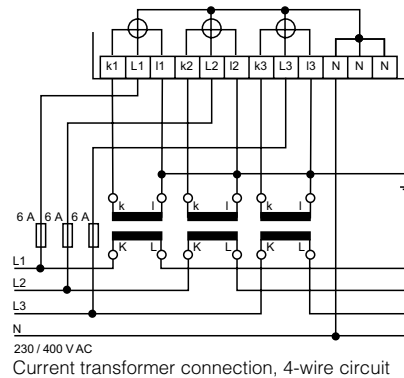
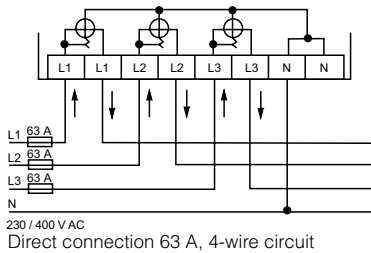
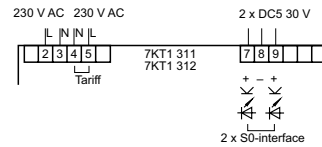
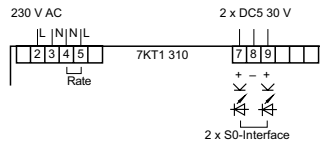
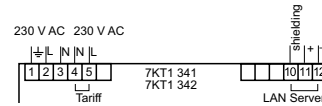
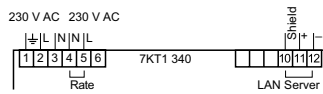
The short-circuit resistant optocoupler (for a description, see page 10/32) is operated at 5 to 30 V. The current must be selected within a range of max. 20 mA. The pulse duration is 125 ms. The minimum pulse interval is also 125 ms.

Grounding terminal

The interpolation point grounding terminals required for the transmission technology only serve to shield the transmission cables and do not have a protective function.

7KT1 3 multimeters

Schematics



Instructions for the connection of transformer counters

In the case of cross-section reduction, a short-circuit resistant cable is required for the power supply of terminals 2, 5 and 8, depending on the fusing for phases L1, L2, L3. A fuse of 6 A is recommended for the line protection.

Current transformers must not be operated with open terminals as dangerously high voltages can occur, which may result in personal injuries and property damage. It may also lead to a thermal overload of the transformers.

Overview

Features

- Accuracy class 2 according to IEC 62053-11
- With drum-type register 4×1.2 mm
- Short-circuit resistant pulse output

Application

E-counters serve the measurement of kWh in single-phase systems, e.g. in industrial plants, offices and apartments in apartment houses

Technical specifications

Data acc. to EN 62053-11, -31		7KT1 140	7KT1 141
Supply			
• Rated control supply voltage U_c	V AC	230	
• Operating range U_c	$\times U_c$	0.80 ... 1.20	
• Rated frequency	Hz	50	
• Operating frequency range	Hz	45 ... 65	
• Rated power dissipation P_v	VA	1	
Measuring input			
• Type of connection		direct	
• Voltage	V	230	
• Operating range voltage	V	184 ... 276	
• Current	A	63	
• Operating range current	direct connection	A	0.005 ... 63
• Minimum operating current		mA	5
• Frequency		Hz	50
• Operating frequency range	intermodulation distortion $\leq 3\%$; symmetric sine curve	Hz	45 ... 65
Overload capability			
• Voltage U_e	continuous: phase/N 1 second: phase/N	V V	276 300
• Current I_e	continuous 1 second	A A	63 126
Display			
• Rate		single	double
• Active energy	drum-type register H \times W 7-digit with 1 decimal	mm \times mm 4 \times 1.2 0 ... 999999.9	2 \times (4 \times 1.2) 2 \times (0 ... 999999.9)
Measuring accuracy			
Active energy	at 23 °C ± 1 °C	%	± 2
Safety			
• Separation of current and voltage circuit			electrical
• Rated insulation voltage		V	600
• Rated impulse withstand voltage	inputs against ground for 1 min. at 50 Hz	kV	4
• Overvoltage category	acc. to EN 60664-1		III
Pulse output			
• S0 interface acc. to DIN 43864, IEC 62053-31	IR test output LED terminals, output	Imp/Wh Imp/kWh	10 10
	pulse duration	ms	125
	minimum interval between 2 pulses	ms	125
	required voltage	V DC	5 ... 30
	permissible current range	mA	10 ... 20
Terminals			
• Main current paths	\pm screw (Pozidriv)		2
• S0 interface/control terminals	blade for slotted screw	mm	0.4 \times 2.5
• Conductor cross-sections main current paths	rigid, max. rigid, min.	mm ² mm ²	1 \times 35 1 \times 1.5
• Conductor cross-sections S0 interface/control terminals	rigid, max. flexible with sleeve, min.	mm ² mm ²	1 \times 2.5 1 \times 0.75
Ambient conditions			
• Temperature	storage operation	°C °C	-40 ... +70 0 ... +55
• Relative air humidity	storage operation	% %	≤ 98 ≤ 80
• Minimum vibration	amplitude at 50 Hz	mm	± 0.25
• Degree of pollution	acc. to EN 60664-1		2
• Degree of protection			IP20

Measuring Devices

7KT1 14 E-counters, single-phase

Selection and ordering data

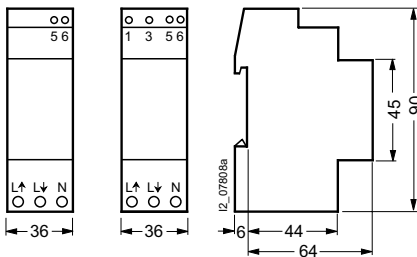
U_c	I_e	U_e	MW	Order No.	Weight 1 unit approx.	PS*/ P. unit
V AC	A AC	V AC			kg	Unit(s)
E-counters for active energy						
With drum-type register 4 × 12 mm, with S0 interface, for 1-phase operation						
Direct connection, single rate						
230	63	230	2	7KT1 140	0.400	1
Direct connection, double rate						
230	63	230	2	7KT1 141	0.400	1



7KT1 140

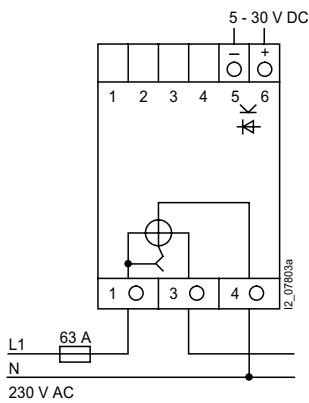
Dimensional drawings

7KT1 141 7KT1 140

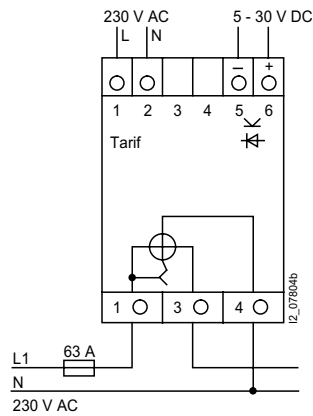


Schematics

7KT1 140

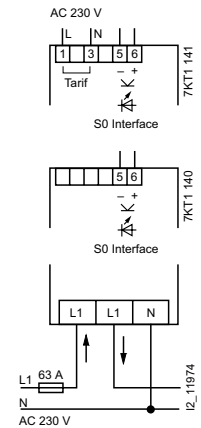


7KT1 141



Rate switchover

If there is a voltage of 230 V AC at terminal 1, the rate is switched to 2.



Overview

Features

- 1 or 3-phase measurement for 3 or 4-wire connection and center-tap calculation for 3-wire connection
- For direct connection 63 A or for transformer /5A
- For transformer primary current of 10 A to 5000 A Input is in 5 A increments
- 7-fold 7-segment display for energy values and additional function indication
- Detection of connection errors (phase transposition)
- Versions with LAN interface and MS Excel user interface
- Accuracy class 2 according to IEC 61036

Application

E-counters serve the measurement of kWh in single and three-phase systems, e.g. in industrial plants, offices and apartments in apartment houses.

Versions with LAN interface with LCD are used for consumption analysis and minimization of operating costs in industrial plants and office buildings. For information on LAN operation and the MS Excel user interface, see "LAN Coupler" on page 10/33.

Function

Display

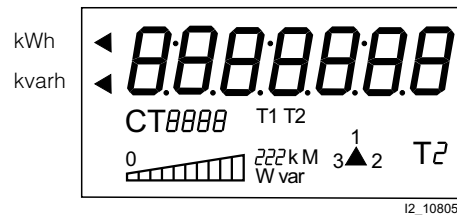
		Unit	ID
Active energy	Rate 1	kWh	Arrow and T1
	Rate 2	kWh	Arrow and T2
Reactive energy	Rate 1	kvarh	Arrow and T1
	Rate 2	kvarh	Arrow and T2
Active power		kW	Utilization and instantaneous value
Reactive power		kvar	Utilization and instantaneous value
Phase-sequence indication	1–2–3		Flashing triangle next to left-hand phase sequence
Primary transformer current	10 ... 5000 A		CT (Current Transformer)

LAN communication

6 measured values, active energy rate 1 and rate 2, reactive energy rate 1 and rate 2, active power and reactive power are transmitted.

Transformer setting

The primary transformer current is set at the device switch. With regard to the transformer setting, the device display is internally converted.



12_10805

Technical specifications

Data acc. to EN 61010-1, EN 62053-11, -21, -31			7KT1 500, 7KT1 502, 7KT1 510, 7KT1 512, 7KT1 520	7KT1 501, 7KT1 503, 7KT1 511, 7KT1 513, 7KT1 521
Supply				
• Rated control supply voltage U_c	V AC		230	
• Operating range	$\times U_c$		0.80 ... 1.20	
• Rated frequency	Hz		50	
• Operating frequency range	Hz		45 ... 65	
• Rated power dissipation P_v	VA		≤ 10	
Measuring input				
• Type of connection			direct	transformer /5 A
• Voltage U_e	phase/phase	V	400	
	phase/N	V	230	
• Operating range voltage	phase/phase	V	87 ... 480	
	phase/N	V	50 ... 276	
• Current I_e		A	75	5
• Operating range current	direct connection	A	0.3 ... 76	--
	transformer connection	A	--	0.012 ... 6
• Transformer current	primary current	A	--	5 ... 5000
	smallest input step	A	--	5
• Frequency		Hz	50	
• Operating frequency range		Hz	45 ... 65	
Overload capability				
• Voltage U_e	continuous: phase/phase	V	480	
	1 second: phase/phase	V	800	
	continuous: phase/N	V	276	
	1 second: phase/N	V	460	
• Current I_e	continuous	A	76	6
	0.5 seconds	A	--	110
	10 ms	A	2000	--

7KT1 5 E-counters, three-phase

Technical specifications

Data acc. to EN 61010-1, EN 62053-11, -21, -31			7KT1 500, 7KT1 502, 7KT1 510, 7KT1 512, 7KT1 520	7KT1 501, 7KT1 503, 7KT1 511, 7KT1 513, 7KT1 521
Display				
• Connection errors	discernible from phase-sequence indication		•	
• Active energy: 1 display, 7-digit + display import or export (arrow)		kWh	000000.0 ... 999999.9	
• Reactive energy: 1 display, 7-digit + display import or export (arrow)		kvarh	000000.0 ... 999999.9	
• Active power: 1 display, 3-digit + display import or export (arrow)		kW or MW	000 ... 999	
• Reactive power: 1 display, 3-digit + display import or export (arrow)		kvar or Mvar	000 ... 999	
• Instantaneous rate measurement: 1 display, 1-digit	for 7KT1 500, 7KT1 501, 7KT1 502, 7KT1 503		1	
	for 7KT1 510, 7KT1 511, 7KT1 512, 7KT1 513, 7KT1 520, 7KT1 521		1 or 2	
• Display rate identifier	for 7KT1 510, 7KT1 511, 7KT1 512, 7KT1 513, 7KT1 520, 7KT1 521		T1 or T2	
• Transformer primary current	adjustable in 5 A steps	A	--	5 ... 5000
• Display period		/s	2	
• Storage of setting and energy values			EEPROM	
Measuring accuracy				
• Active energy acc. to IEC 62053-21			Class 2	
• Reactive energy acc. to IEC 62053-23			Class 3	
• Active or reactive power		%	±2 ... 4 ±1 digit	
S0 interfaces				
	acc. to IEC 62053-31		Class A	
• Terminal output	for 7KT1 500 fixed	Imp/kWh	10	--
	for 7KT1 502, 7KT1 510, 7KT1 512 for direct connection 63 A, adjustable	Imp/kWh	10–1–0.1–0.01–0.001	--
	for 7KT1 501 fixed	Imp/kWh	--	1
	for 7KT1 503, 7KT1 511, 7KT1 513 depending on the transformer factor, adjustable	Imp/kWh	--	10–1–0.1–0.01–0.001
• Pulse duration		ms	125 ... 300	
• Minimum interval between 2 pulses		ms	300	
• Required voltage		V DC	5 ... 30	
• Current ON/OFF		mA	10 ... 27/0 ... 2	
LAN interfaces				
	only for 7KT1 520, 7KT1 521			
• Plug-and-play technology			•	
• Terminals			+ , - , shielding	
Safety acc. to EN 61010-1				
• Degree of pollution			2	
• Overvoltage category			II	
• Operational voltage		V	600	
• Clearances		mm	≥ 3.0	
• Creepage distances	in device	mm	≥ 4.3	
	on printed boards (not installed)	mm	≥ 3.0	
• Test pulse voltage	1.2/50 µs	kV	4	
• Test voltage	50 Hz, 1 min	kV	2.2	
Terminals				
• Main current paths	± screw (Pozidriv)		2	1
• Supply and control terminals	blade for slotted screw	mm × mm	0.4 × 2.5	
• Conductor cross-sections of main current paths	rigid (max.)	mm ²	1 × 2.5 or 2 × 16	1 × 6 or 2 × 4
	rigid (min.)	mm ²	1 × 1.5	1 × 0.95
• Conductor cross-sections supply and control terminals	rigid (max.)	mm ²	1 × 2.5 or 2 × 1.5	
	flexible with sleeve (min.)	mm ²	0.75	
Ambient conditions				
• Ambient temperature		°C	0 ... +55	
• Relative humidity	storage	%	≤ 80	
• Vibration	sinusoidal amplitude at 50 Hz	mm	± 0.25	
• Degree of protection	(terminal area)		IP40 (IP20)	
• Safety class	acc. to EN 61010-1		II	

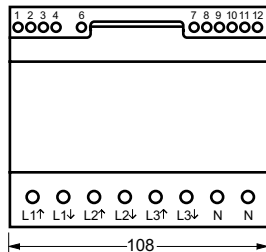
Selection and ordering data

U_c	I_e	U_e	MW	Order No.	Weight 1 unit approx. kg	PS*/ P. unit Unit(s)
V AC	A AC	V AC				
E-counters for active energy						
With S0 interface, for 3-phase, 3/4-wire connection						
For direct connection, single rate						
230	63	3 × 230/400	6	7KT1 500	0.400	1
For transformer connection, single rate						
230	transformer /5	3 × 230/400	6	7KT1 501	0.390	1
For direct connection, double rate						
230	63	3 × 230/400	6	7KT1 510	0.400	1
For transformer connection, double rate						
230	transformer /5	3 × 230/400	6	7KT1 511	0.396	1
E-counters for active and reactive energy						
With S0 interface, for 3-phase, 3/4-wire connection						
For direct connection, single rate						
230	63	3 × 230/400	6	7KT1 502	0.400	1
For transformer connection, single rate						
230	transformer /5	3 × 230/400	6	7KT1 503	0.396	1
For direct connection, double rate						
230	63	3 × 230/400	6	7KT1 512	0.396	1
For transformer connection, double rate						
230	transformer /5	3 × 230/400	6	7KT1 513	0.396	1
E-counters for active and reactive energy						
With LAN interface for connection to LAN coupler for 3-phase, 3/4-wire connection						
For direct connection, double rate						
230	63	3 × 230/400	6	7KT1 520	0.410	1
For transformer connection, double rate						
230	transformer /5	3 × 230/400	6	7KT1 521	0.400	1

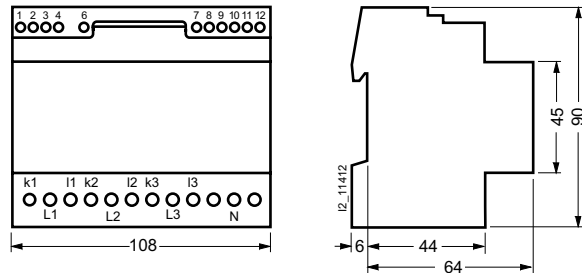


Dimensional drawings

7KT1 500, 7KT1 502,
7KT1 510, 7KT1 512,
7KT1 520



7KT1 501, 7KT1 503,
7KT1 511, 7KT1 513,
7KT1 521



Schematics

Grounding terminal

The grounding terminals required for the transmission technology for 7KT1 520 and 7KT1 521 versions only serve to shield the transmission cables and do not have a protective function.

Instructions for the connection of transformer counters

In the case of cross-section reduction, a short-circuit resistant cable is required for the power supply of terminals L1, L2 and L3 depending on the fusing for phases L1, L2 and L3. A fuse of 6 A is recommended for the line protection.

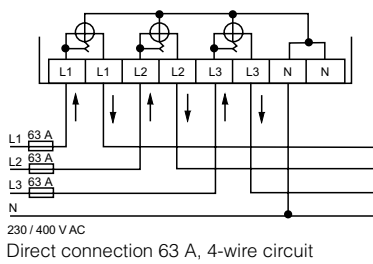
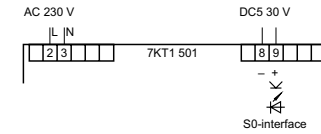
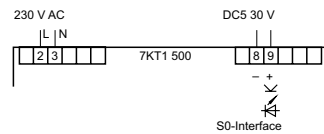
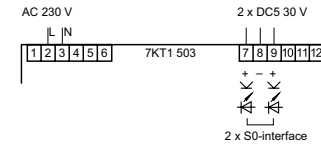
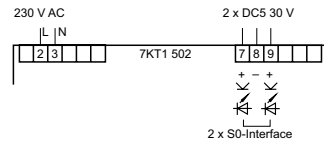
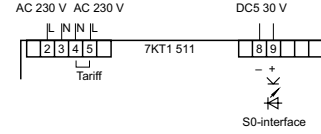
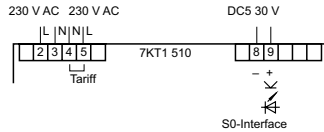
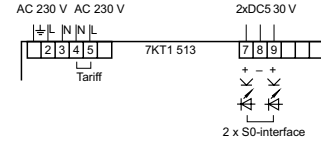
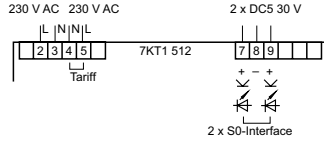
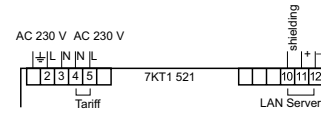
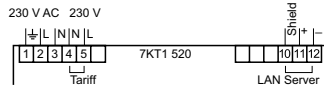
Current transformers must not be operated with open terminals as dangerous high voltages can occur, which may result in personal injuries and property damage. In addition to this, the transformers are exposed to thermal overload.

Rate switchover

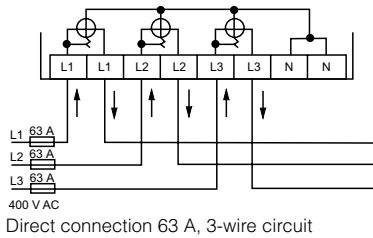
If there is a voltage of 230 V AC at terminals 4 and 5, the rate is switched to 2.

Measuring Devices

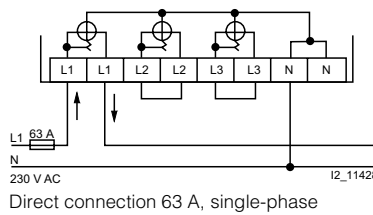
7KT1 5 E-counters, three-phase



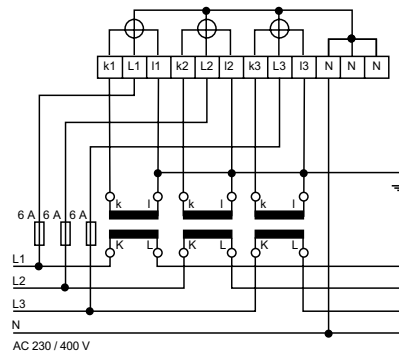
230 / 400 V AC
Direct connection 63 A, 4-wire circuit



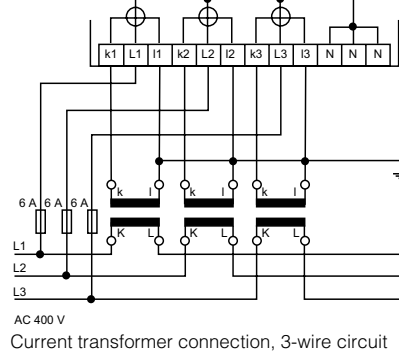
400 V AC
Direct connection 63 A, 3-wire circuit



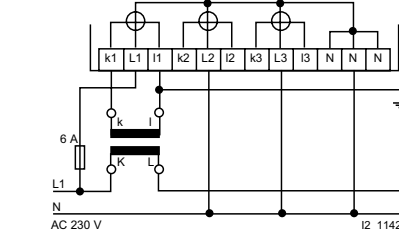
230 V AC
Direct connection 63 A, single-phase



AC 230 / 400 V
Current transformer connection, 4-wire circuit



AC 400 V
Current transformer connection, 3-wire circuit

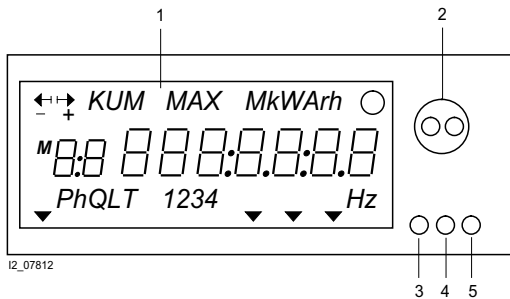


AC 230 V
Current transformer connection, single-phase

7KT1 16 E-counters, three-phase, instabus KNX EIB

Overview

E-counter with LCD display



- 1 Large-format 7-digit LCD 8 x 4 mm
- 2 IR readout interface for mounting the readout measuring head
- 3 Display pushbutton
- 4 IR test output LED (10 IMP/W)
- 5 Sealable Set/Reset pushbutton

Readout data for consumption analysis

Manual readout

The above data can be called up and manually displayed directly on the E-counter by pressing pushbuttons 5) Set/Reset pushbutton and 3) Display pushbutton. The E-counter calculates the consumption costs when the price per kWh has been entered. The ability to input the device number facilitates assignment to a number system and cost assignment to one of the various cost centers.

Readout software for the IR measuring head

The data of the above table are read into a PC using the magnetic IR measuring head and stored in an ASCII file in compliance with IEC 61107. This ASCII file can be further processed in an Excel or Access file. The product range can be run under Windows 95, 98 and Windows NT.

Readout data on the LCD or over IR interface

			7KT1 162 7KT1 165
Active energy	rate 1/2	kWh	x/x
Price per kWh, adjustable	rate 1/2	Cost/ kWh	x/x
Total costs	rate 1/2	Total cost	x/x
Reactive energy	rate 1/2	kvarh	x/x
Apparent energy	rate 1/2	kVAh	--
Maximum active power	rate 1/2	kW	--
Integration periods, adjustable	rate 1/2	min	--
Instantaneous active power	sum total	kW	x
	phase L1/L2/L3	kW	x
Instantaneous voltage	phase L1/L2/L3	V	--
Instantaneous imported kWh	sum total	A	--
	phase L1/L2/L3	A	--
Instantaneous current factor		FA I	x ¹⁾
Instantaneous reactive power	sum total	kvar	--
	phase L1/L2/L3	kvar	--
Instantaneous apparent power	sum total	kVA	--
	phase L1/L2/L3	kVA	--
Instantaneous p.f.	phase L1/L2/L3	p.f.	--
Instantaneous frequency		Hz	--
Device number, adjustable		No.	x

x = data are displayed

1) Only for transformer meters.

Data transmission *instabus* KNX EIB

The 7KT1 162 and 7KT1 165 counters are intended for the following data transmission:

- Active energy (kWh) rate 1
- Active energy (kWh) rate 2
- Device number
- Active power (kW) phase L1
- Active power (kW) phase L2
- Active power (kW) phase L3

Visualization software "Recording of consumption data and maximum time analysis" (available soon)

The software can read out and assign counter readings, and prepare the data for accounting.

The system does not differentiate between counters that are read out manually or in online operation.

A maximum time analysis can be carried out over several days on the PC in online operation. Graphical analyses are also available.

Energy flow direction

Counting is only carried out in the specified energy flow direction. For meters with transformer connection, the energy flow direction of the transformer (primary and secondary) as well as the correct assignment of the voltage and current paths must be taken into account.

Benefits

- PTB-approved
- Accuracy class 2
- LCD
- Short-circuit resistant pulse output
- With network analysis functions and direct cost display

Application

For the measurement of kWh in single and three-phase systems, e.g. in industrial plants, offices and apartments in apartment houses. The versions with LCD display are used as network analysis devices for consumption analysis and minimization of operating costs in industrial plants and office buildings.

Measuring Devices

7KT1 16 E-counters, three-phase, instabus KNX EIB

Technical specifications


			7KT1 162	7KT1 165
Supply				
Rated control voltage U_e		V AC	230	
Operating range U_e			0.80 ... 1.20	
Rated frequency		Hz	50	
Operating frequency range		Hz	45 ... 65	
Power consumption	per phase	VA	0.8	
Measuring input				
Type of connection			direct	transformer
Voltage		V	400	
Operating range voltage		V	320 ... 480	
Current		A	63	5
Operating range current	direct connection	A	0.005 ... 63	
	transformer connection	A		0.005 ... 6
Minimum operating current		mA	5	
Current factor	of transformer, input in full digits	FAI	0 ... 255	
Frequency		Hz	50	
Operating frequency range	intermodulation distortion $\leq 3\%$; symmetric sine curve	Hz	45 ... 65	
Overload capability				
Voltage	duration: phase/N	V	276	
	1 second: phase/N	V	460	
	duration: phase/phase	V	480	
	1 second: phase/phase	V	800	
Current	duration	A	76	6
	1 second	A	126	10
Display				
Rate	LCD H x W readout data	mm x mm	double 8 x 4 1)	
	7-digit with decimal points		Active/reactive	
Active energy	drum-type register H x W: 7-digit with 1 decimal point	mm x mm		
Display period		/s	0.5	
Storage of measured values		kWh	EEPROM	
Measuring accuracy at 23 °C ± 1 °C				
Active energy	acc. to IEC 61036	class	2	
Safety				
Supply measuring circuit isolation			electrical	
Rated insulation voltage		V	600	
Rated impulse withstand voltage	inputs against ground for 1 min. at 50 Hz	kV	4	
Overvoltage category	VDE 0110 T1		III	
Pulse output , S0 interface				
	acc. to IEC 61393/ DIN 43864			
	IR test output LED	Imp/Wh	10	
	terminals, output	Imp/kWh	10	1
	minimum pulse duration	ms	125	
	external voltage	V DC	5 ... 30	
	current	mA	10 ... 20	
	resistance	k Ω	0.5 ... 1.5	
<i>instabus</i> KNX EIB interface				
Standard			EIS 9	
Readout data			1)	
Terminals				
Main current paths	\pm screw (Pozidriv)		2	
Supply/control-circuit terminals	blade for slotted screw	mm	0.4 x 2.5	
Conductor cross-sections, main current paths	rigid (max.)	mm ²	1 x 10	
	rigid (min.)	mm ²	1 x 1.5	
Conductor cross-sections, supply/control-circuit terminals	rigid (max.)	mm ²	1 x 2.5	
	flexible with sleeve	mm ²	1 x 0.75	

1) See table on page 10/29.

Technical specifications

			7KT1 162	7KT1 165
Ambient conditions				
Temperature	storage	°C	-40 ... +70	
	operation	°C	0 ... +55	
Relative air humidity	storage	%	≤ 98	
	operation	%	≤ 80	
Minimum vibration	amplitude at 50 Hz	mm	±0.25	
Degree of pollution	VDE 0110-1		2	
Degree of protection	(terminal area)		IP40 (IP20)	

Selection and ordering data

Display	I_e A AC	U_e V AC	MW	Order No.	Weight 1 unit approx. kg	PS*/ P. unit Unit(s)
 <p>E-counters for 3/4 wire connection, with LCD, with IR interface for double rate</p> <p>Direct connection, with 2 S0 pulse outputs and <i>instabus</i> KNX <i>EIB</i> interface</p> <p>Active and reactive energy</p>	10(63)	3 × 230/400	6	7KT1 162	0.450	1
	transformers/5(6)	3 × 230/400	6	7KT1 165	0.390	1

7KT1 162

Accessories

Order No.	Weight 1 unit approx. kg	PS*/ P. unit Unit(s)
7KT9 030	0.170	1

IR measuring head for 7KT1 16.
For reading out data acc. to IEC 61107 with 9-pole COM connector and readout software

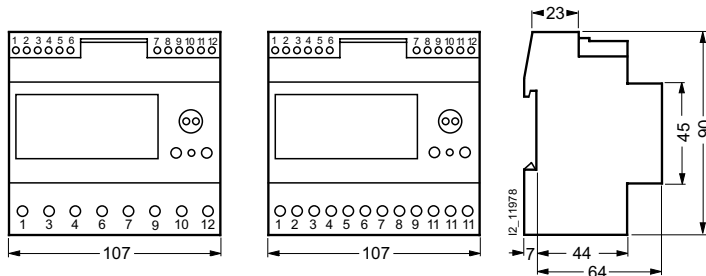


Dimensional drawings

E-counters

7KT1 162

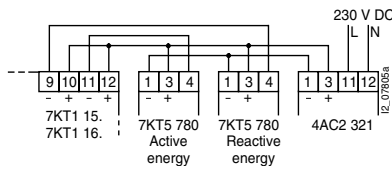
7KT1 165



7KT1 16 E-counters, three-phase, instabus KNX EIB

Schematics

S0 interface



Connection with S0 interface

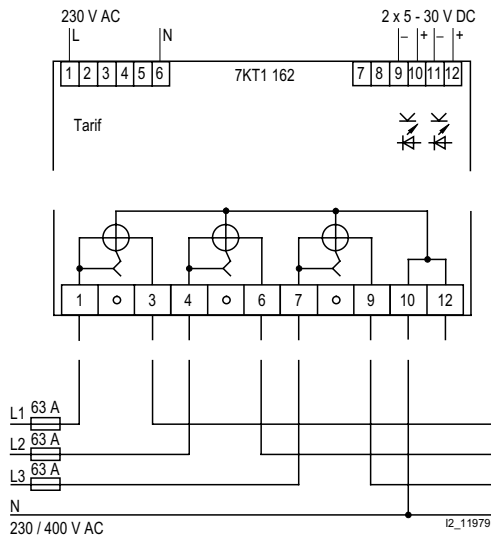
The short-circuit resistant optocoupler is operated at 5 ... 30 V DC. The current must be selected within a range of max. 20 mA. The pulse duration is 125 ms.

The circuit diagram shows the connection with 7KT5 780 or 7KT5 751 pulse counters and the 4AC2 321 power supply unit for the external display of rates 1 and 2.

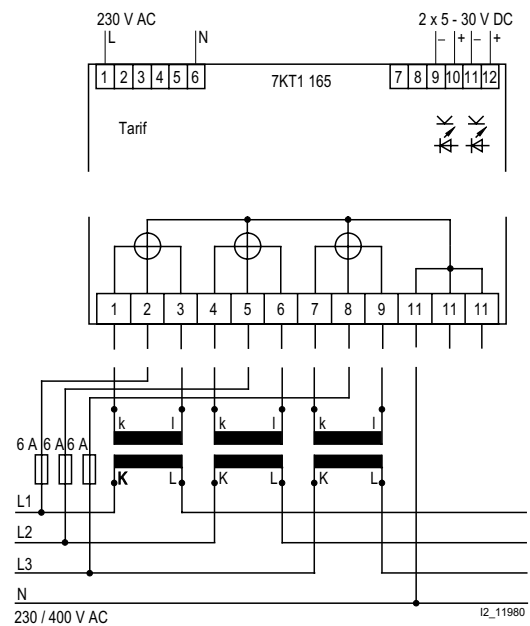
Instructions for the connection of transformer counters

In the case of cross-section reduction, a short-circuit resistant cable is required for the power supply of terminals 2, 5 and 8, depending on the fusing for phases L1, L2, L3. A 6 A fuse is recommended for the line protection.

Direct connection 10 (63 A)



Transformer connection 5 (6 A)



Overview

- Worldwide communication with measuring devices
- TCP/IP data protocol
- One LAN coupler for 10 devices
- Plug-and-play technology
- Microsoft Excel user interface (MS Excel)
- Limit value signals can be set for all measured values
- Limit violations are signaled with time information
- Analysis of 35 measured values with the 7KT1 340 or 7KT1 341 multiconverters

Application

LAN servers are the data communication link between a PC and a group of up to 10 measuring devices (multiconverters or E-counters) with one LAN interface. The LAN server can either be linked directly to a PC or in a company-specific LAN.

All devices are switched in parallel with a shielded 2-wire LAN interface line. The hardware interface between the devices and the LAN coupler supports plug-and-play technology.

Function

Operator interface

The operator interface is already well-known and widely used for office communications. It enables all operators to configure their own programs to suit individual requirements. The integrated macros are based on MS Visual Basic and are disclosed. This enables all software manufacturers to create their own company software or to integrate their devices in an existing software.

The MS Excel operator interface supports:

- Selection of any device that is connected to a LAN server
- Definition of limit values (alarm tripping) for up to 10 measured values for each device
- Running diagnostics of a system
- Copying and separate storage of instantaneous measured values for documentation purposes

Measured values

The measured values vary according to the measuring device specifications of the multiconverters and E-counters. The following applies: all manually read out measured values are transmitted from the LAN server and listed in MS Excel.

Messwert	Anzeige	Einheit	Zuordnung	Wert	Status	Alarmgrenze	größer	Verzögerung	Datum	Alarm	Wert
Wirkleistung	1	W	L1	16420							
Spannung	1	V	L1	235							
Strom	1	A	L1	845							
Scheinleistung	1	VA	L1	167364							
cos φ	1	cosφ	L1	0,96							
Spannung	1	V	L1,2	406							
Wirkleistung	2	W	L2	16420							
Spannung	2	V	L2	235							
Strom	2	A	L2	799							
Scheinleistung	2	VA	L2	166924							
cos φ	2	cosφ	L2	11,00							
Spannung	2	V	L2,3	13487							
Wirkleistung	3	W	L3	45							
Spannung	3	V	L3	1997							
Strom	3	A	L3	66							
Scheinleistung	3	VA	L3	219							
cos φ	3	cosφ	L3	47,96							
Spannung	3	V	L3,1	436							
Wirkleistung	4	W	L3	2221							
Scheinleistung	4	VA	L3	11							
Wirkleistung	4	W	L3	3714							
Frequenz	6	Hz	L3	50							
cos φ	1,2,3,5	cosφ	L3	1761,00							

Plug and play

Each device has a factory-set 12-digit software number. This number allows the LAN coupler to recognize the connected device and initialize the appropriate data protocol. This software number is entered on the device and can be read in MS Excel. This enables the identification of a device and its installation location.

Limit value signal

Microsoft Excel supports the setting of any limit values as minimum and maximum values. The delay specifies how long a measured value should be pending before a signal indicates that it is exceeded.

Data protocol

The data communication between the LAN coupler and PC uses the TCP/IP protocol.

Date and time

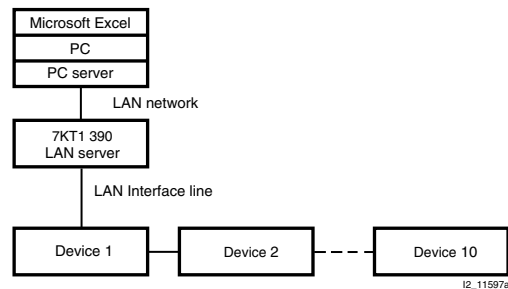
The date and time of the PC is used.

Transmission rate

The data transmission rate is limited due to the LAN characteristic, e.g. the internet or the internal network. The transmission rate of data between the LAN coupler and the connected devices is considerably higher and does not reduce the overall results.

Data storage

Address data of the devices and the PC and the continuously received measured values are stored in the LAN coupler for a minimum of 10 years. In the event of a power failure, a warning is sent over the LAN. On power recovery, the LAN coupler automatically restarts and the saved data are automatically sent to the PC.




Block diagram of a system

7KT1 390 LAN couplers

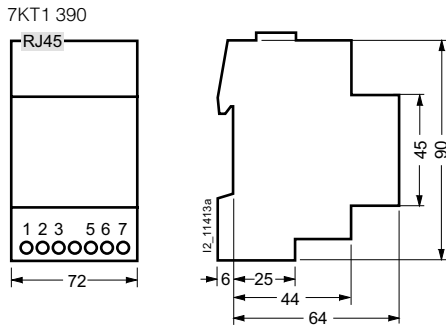
Technical specifications

Data acc. to EN 61010-1		7KT1 390	
Supply			
• Rated control supply voltage U_c	V AC	230	
• Operating range	$\times U_c$	0.8 ... 1.2	
• Rated frequency	Hz	50	
• Frequency range	Hz	45 ... 65	
• Rated power dissipation P_v	VA	≤ 5	
Functions			
• System start			automatic when the control supply voltage is switched on
• LAN coupler identification			through IP of the PC
• Device identification	automatic		plug and play
• Transmission rate	limited due to LAN	Mbit/s	≤ 100
• Operator interface	Microsoft Excel		version 6 or higher
• Operating system			MS Windows 2000 and XP
LAN interfaces			
• Line	version min. max. line capacity impedance	mm^2 pF/m Ω	STP (shielded twisted pair) 2×0.2 ; 24 AWG < 50 100
• Cable length	max.	M	100
• Type of installation			parallel connection
• Data storage	flash memory	years	10
Safety acc. to EN 61010-1			
• Degree of pollution			2
• Overvoltage category			II
• Operating voltage category		V	600
• Material			II
• Clearances		mm	> 3
• Creepage distances	in device on printed board, not installed	mm mm	> 4.3 > 3
• Test pulse voltage	1.2/50 μs	kV	4
• Test voltage	50 Hz, 1 min	kV	2.2
Terminals			
	\pm screw (Pozidriv)		1
• Conductor cross-sections	rigid, max. flexible with sleeve, min.	mm^2 mm^2	1×2.5 or 2×1.5 1×0.75
Ambient conditions			
• Ambient temperature	in operation	$^{\circ}\text{C}$	0 ... +55
• Relative humidity	in operation	%	≤ 80
• Vibration	sinusoidal amplitude at 50 Hz	mm	± 0.25
• Degree of protection	acc. to EN 60529		IP20
• Safety class	acc. to EN 61010-1		II

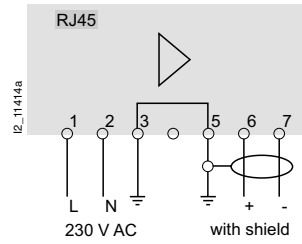
Selection and ordering data

	U_c	MW	Order No.	Weight 1 unit approx.	PS*/ P. unit
	V AC			kg	Unit(s)
 LAN coupler For connection of 10 devices with LAN interface, with software for installation and startup routines and Microsoft Excel and tables for operating, setting limit values and monitoring	230	4	7KT1 390	0.300	1

Dimensional drawings



Schematics

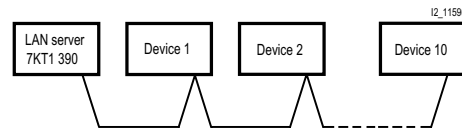


Connection of devices to the LAN coupler

All devices are switched in parallel with a shielded 2-wire line. Point-to-point installations, junctions or ring installations are not possible.

Grounding potential

Both the LAN cable with the RJ45 connector and the shielded cable of the LAN interface must be grounded. This also applies to devices connected to the LAN coupler.



Measuring Devices

7KT9 0 measuring selector switches



Overview

- According to EN 60947-3
- Rated insulation voltage 660 V

Application

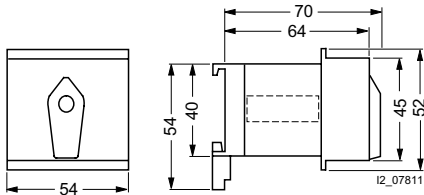
For switching over the phases for voltmeters and ammeters.

Selection and ordering data

	U_e	I_e	Conductor cross-sections up to mm ²	MW	Order No.	Weight 1 unit approx. kg	PS*/P. unit Unit(s)
 Voltmeter selector switches 7KT9 010	400	12	6	3	7KT9 010	0.110	1
 Ammeter selector switches for transformer operation 7KT9 011	400	12	6	3			

Dimensional drawings

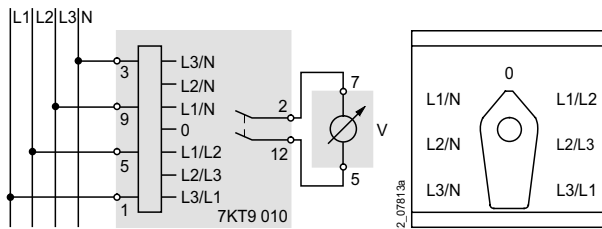
7KT9 010
7KT9 011



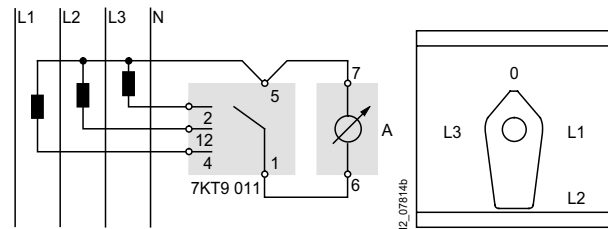
Schematics

Circuit diagrams

Voltmeter switching



Ammeter switching



Overview

- Three-phase current transformer set
- Accuracy class 1 according to EN 60044-1
- Straight-through transformer for conductors with a diameter of up to 13 mm, e.g. H07V-R with 50 mm² conductor cross-section
- Primary rated current 60 A, 100 A and 150 A
- Transformer ratio 60/5 A, 100/5 A and 150/5 A

Application

Straight-through transformer set in modular distribution board design according to DIN 43880 for installation in distribution boards. It is possible to route the measuring leads straight through the transformer and vertically to the standard mounting rail according to EN 60715.

With this type of construction, the current transformer is suitable for supply systems or outgoing conductors in connection with the installation of a 5TE8 switch or a 5TE1 disconnecter as the primary connecting leads do not have to be interrupted.

Note:

Current transformers must not be operated with open terminals as this may cause dangerous high voltages, which may result in personal injuries and property damage. It also exposes the transformer to thermal overload.

Technical specifications

Data acc. to EN 60044-1		7KT1 200	7KT1 201	7KT1 202
Rated operational current I_e	A AC	3 × 60	3 × 100	3 × 150
Secondary rated current strength	A	5		
Accuracy class	Cl.	1		
Rated operational voltage U_e	V AC	720		
Rated power	VA	1.25	2.5	3.75
Rated frequency	Hz	50/60		
Thermal current limit I_{th}	A	60 × I_e (short-time)		
Thermal continuous current	A	1 × I_e		
Overcurrent limit factor	FS	5		
Rated impulse withstand voltage U_{imp}	kV	> 3		
Creepage and clearances	mm	> 3		
Terminals	+/- screw (Pozidriv)	1		
Conductor cross-sections	rigid	mm ² 0.5 ... 4		
	flexible with sleeve	mm ² 0.5 ... 2.5		
Permissible ambient temperature	°C	-5 ... +60		
Resistance to climate	acc. to EN 60068-1	20/60/4		

Selection and ordering data

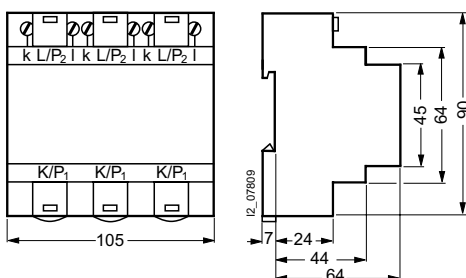
	U_e	I_{sec}	Measuring range	MW	Order No.	Weight 1 unit approx.	PS*/P. unit
	V AC	A	A AC			kg	Unit(s)
Current transformers	720	5	3 × 60	6	7KT1 200	0.460	1
			3 × 100		7KT1 201	0.460	1
			3 × 150		7KT1 202	0.465	1



7KT1 200

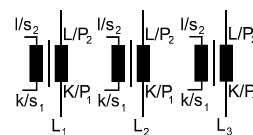
Dimensional drawings

7KT1 200
7KT1 201
7KT1 202



Schematics

7KT1 200
7KT1 201
7KT1 202



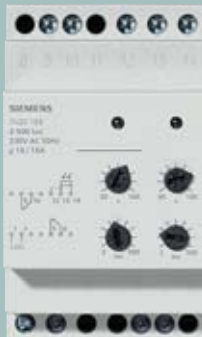
Measuring Devices

Notes



Monitoring Devices







11/2	Introduction
11/5	4AC3 0, 4AC3 1 bells, buzzers
11/7	5TT3 46 fault signaling units
11/9	7LQ2 1, 5TT3 3 dusk switches
11/12	7LQ2 0 temperature controllers
11/15	5TT3 170 fuse monitors
11/17	5TT3 171 circuit relays
11/19	5TT3 42 phase/phase sequence monitors
11/21	5TT3 1 and 5TT3 4 voltage relays
11/28	5TT6 1 current relays
11/34	5TT6 10 priority switches
11/36	5TT3 47 insulation monitors for industrial applications
11/39	7LQ3 35 insulation monitors for medical premises
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11/49	5TT3 435 level relays
11/52	5TT3 43 thermistor motor protection relays










Monitoring Devices

Introduction

Overview

Devices	Application	Standards	Usage		
			Non-residual buildings	Residual buildings	Industry
 <p>Bells, buzzers with 4AC3 004, 4AC3 104 power supply units</p>	Bells or buzzers with 230 V AC connection in a device that can also be pushbutton-operated with safety extra-low voltage 12 V AC	EN 61558-2-8		•	
 <p>Fault signaling units</p> <ul style="list-style-type: none"> • 5TT3 460 centralized fault signaling units • 5TT3 461 expansion fault signaling units 	Evaluation and display of fault alarms and alarm messages for monitoring industrial plants and control units	IEC 60255, DIN VDE 0435-303	• •		• •
 <p>Dusk switches 7LQ2 1, 5TT3 3</p>	For demand-oriented switching of lighting installations for shop windows or paths in order to cut costs	EN 60730	•	•	
 <p>Temperature controllers 7LQ2 0</p>	Controlling and limiting of temperatures	EN 60730	•	•	•
<p>Fuse monitors 5TT3 170</p>	Monitoring of all types of fuses	IEC 60255, DIN VDE 0435	•		•
 <p>Circuit relays 5TT3 171</p>	Shutdown of unused lines	IEC 60255, DIN VDE 0435		•	
 <p>Phase/phase sequence monitors 5TT3 421/5TT3 423</p>	Monitoring of the phase sequence of a system and the power supply	IEC 60255, DIN VDE 0435			•



Overview

Devices	Application	Standards	Usage		
			Non-residual buildings	Residual buildings	Industry
 <p>Voltage relays</p> <ul style="list-style-type: none"> • Undervoltage relays 5TT3 400 to 5TT3 403 • Undervoltage relays 5TT3 404 to 5TT3 406 • Short-time voltage relays 5TT3 407 • Under/overvoltage relays 5TT3 408 • Under/overvoltage relays 5TT3 410 • Overvoltage relays 5TT3 19 	Monitoring of the power supply of emergency lighting in public buildings	IEC 60255, DIN VDE 0435-303, DIN VDE 0108	•		
	Monitoring of the power supply for short-time failures of 20 ms	–			•
	Monitoring of the power supply for ensuring operational parameters for devices or plant sections	IEC 60255, DIN VDE 0435			•
	Monitoring of the neutral conductor for breaks	DIN VDE 0633	•		•
	Monitoring of the power supply for ensuring operational parameters for devices or plant sections	IEC 60255, DIN VDE 0435			•
 <p>Current relays 5TT6 1</p> <p>Priority switches 5TT6 10</p>	Monitoring of emergency and signal lighting and motors	IEC 60255, DIN VDE 0435-303	•		•
	Switching of system loads in residential buildings	IEC 60669 (VDE 0632), BTO § 6 Clause 4		•	
 <p>Insulation monitors for industrial applications 5TT3 4</p> <p>Insulation monitors for medical premises 7LQ3 350</p>	For monitoring the insulation resistance in non-grounded systems	IEC 60255, IEC 61557			•
	For monitoring the insulation resistance in non-grounded systems on medical premises	EN 61557-8 (VDE 0413 Part 8) IEC 61557-8:1997-02 EN 61557-8:1997-03 DIN VDE 0100-710 (VDE 0100, Part 710):2002-11 OVE-EN 7-1991 ASTM F1207/1996-00 IEC 60364-7-710:2002-11	•		
 <p>Signaling and test combinations 7LQ3 351</p>	For displaying operation and error messages of the insulation monitor	IEC 60364-7-710:2002-11 DIN VDE 0100-710 (VDE 0100, Part 710):2002-11	•		
 <p>Power supply units 7LQ3 352</p>	For powering a max. of 3x 7LQ3 351 signaling and test combinations	IEC 60742:1983 + A1:1992, modified, EN 60742:1995-09 EN 61558-1:1997-07 IEC 61558-1:1997, modified	•		
 <p>Measuring current transformers 7LQ3 353</p>	7LQ3 353 measuring current transformers for monitoring power supplies on medical premises. They record the load current and convert it into a usable signal for evaluation devices	EN 60044-1:2001-11 Measuring transformers – Part 1: Current transformers (IEC 60044-1:1999 + A1:2000), German version EN 60044-1:2001-11	•		
 <p>P.f. monitors 5TT3 472</p>	For monitoring of the underload of motors up to approx. 5 A AC by making p.f. measurements	IEC 60255 IEC 61557			•

Monitoring Devices

Introduction

Overview

Devices	Application	Standards	Usage		
			Non-residual buildings	Residual buildings	Industry
 <p>Level relays 5TT3 430/5TT3 435</p>	Control of liquid levels in containers	IEC 60255, DIN VDE 0435	•		•
 <p>Thermistor motor protection relays 5TT3 43</p>	Thermal protection of motor windings	IEC 60255, DIN VDE 0435			•

Definitions

- I_e = rated operational current
- U_e = rated operational voltage
- I_c = rated control current
- U_c = rated control voltage
- P_s = rated operational power
- 1 MW = 18 mm modular width

Transparent caps



Adding a transparent cap extends the 55 mm mounting depth of a device to 70 mm. This is a useful option for improving the appearance of a distribution board.

Overview

Integrated power supply

The bell or the buzzer is fitted with a transformer as a combination device in a space-saving enclosure with a width of only 2 MW. Actuation is using safety extra-low voltage 12 V AC.



Typical applications

Bells or buzzers with 230 V AC connection as a combination device that can also be pushbutton-operated with safety extra-low voltage 12 V AC. These devices are used in residential buildings.

Technical specifications

Data acc. to EN 61558-2-8		4AC3 004	4AC3 104
Rated operational power P_s	VA	4	
Rated operational voltage U_e	V AC	230	
Operating range $\times U_e$	at 50/60 Hz	0.9 ... 1.1	
Secondary rated voltage U_{sec}	V AC	12	
Rated frequency	Hz	50	
Operating frequency range	Hz	48 ... 62	
Rated power dissipation P_V	in no-load operation	W	1.7
Volume	in 1 m distance	dB (A)	82 66
Protective separation	creepage and clearances	mm	3
Insulation class			B
Test voltage, 50 Hz, 1 minute	primary against secondary winding	kV	> 3.75
Terminals	\pm screw (Pozidriv)		1
Conductor cross-sections	rigid flexible with sleeve	mm ² min. mm ²	1.5 ... 8 0.75
Permissible ambient temperature		°C	-10 ... +25
Permissible humidity		%	\leq 80
Degree of protection	acc. to EN 60529		IP20
Safety class	acc. to EN 60730		II

Selection and ordering data

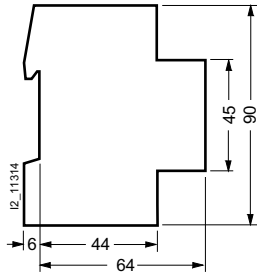
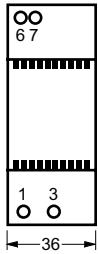
	U_e	U_c	MW	Order No.	Weight 1 unit approx.	PS*/ P. unit
	V AC	V AC			kg	Unit(s)
 <p>Bells with transformer for safety extra-low voltage, which can be pushbutton-operated with extra-low voltage, volume 82 dB (A) at a distance of 1 m</p>	230	12	2	4AC3 004	0.280	1
 <p>Buzzers with transformer for safety extra-low voltage, which can be pushbutton-operated with extra-low voltage, volume 66 dB (A) at a distance of 1 m</p>	230	12	2	4AC3 104	0.270	1

Monitoring Devices

4AC3 0, 4AC3 1 bells, buzzers

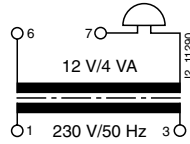
Dimensional drawings

4AC3 004
4AC3 104



Circuit diagrams

4AC3 004



4AC3 104



Overview

- 4 fault signal inputs with LED
- 1 LED as centralized fault indicator
- One unit each for centralized fault indication and acoustic signaling
- With acknowledgment for acoustic indicators
- Open-/closed-circuit principle to the 4 inputs can be set via jumpers X1-X2
- A maximum of 39 5TT3 461 expansion fault signaling units can be connected to the 5TT3 460 centralized fault signaling unit



Function

A fault is indicated as a centralized fault at the LED, and a centralized fault indication is initiated. The LED is lit for as long as there is still a fault. Until the acknowledgment, momentary faults can be identified by the remaining centralized fault.

Technical specifications

Data acc. to DIN VDE 0435-110, -303, IEC 60255		5TT3 460	5TT3 461
Rated control voltage U_c	V AC	230	
Operating range $\times U_c$		0.8 ... 1.1	
Rated frequency	Hz	50/60	
Fault signaling inputs S1... S4	V AC	230	
Noise pulse duration	ms	≥ 100	
Acknowledgment pulse duration	ms	≥ 200	
Rated operational voltage U_e	V AC	230	–
Rated operational current I_e	A	5	–
Minimum contact load	V/mA	10/100	–
Terminals	1 screw (Pozidriv)	1	
Conductor cross-sections	rigid flexible with sleeve	max. mm ² min. mm ²	2 × 2.5 1 × 0.5
Permissible ambient temperature		°C	-20 ... +60
Humidity class	acc. to IEC 60068-2-30		F

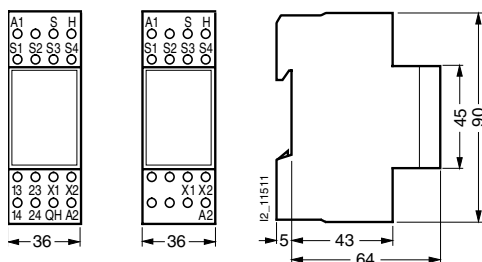
Selection and ordering data

	U_e	I_e	U_c	MW	Order No.	Weight 1 unit approx.	PS*/ P. unit
	V AC	A	V AC			kg	Unit(s)
 Centralized fault signaling units with transparent caps	230	5	230	2	5TT3 460	0.130	1
 Expansion fault signaling units with transparent caps	230			2	5TT3 461	0.110	1

Dimensional drawings

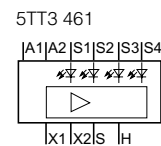
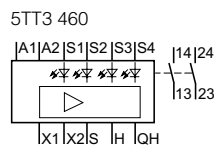
5TT3 460

5TT3 461



Schematics

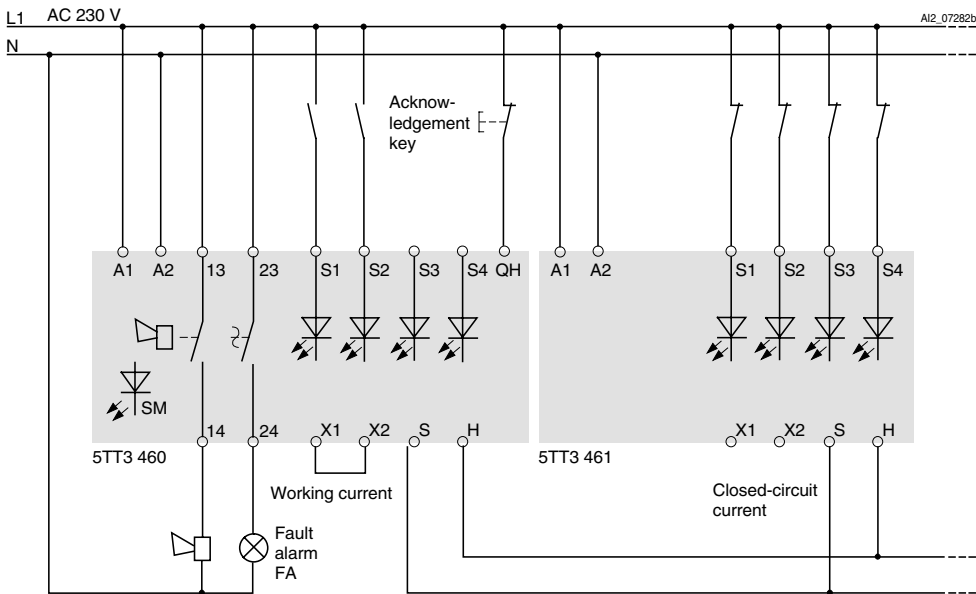
Circuit diagrams



5TT3 46 fault signaling units

Schematics

Switching example, functional diagram



The terminals A1, S1 to S4 and QH must be operated in-phase. If no external acknowledgement key is connected, terminal QH must be laid to L1.

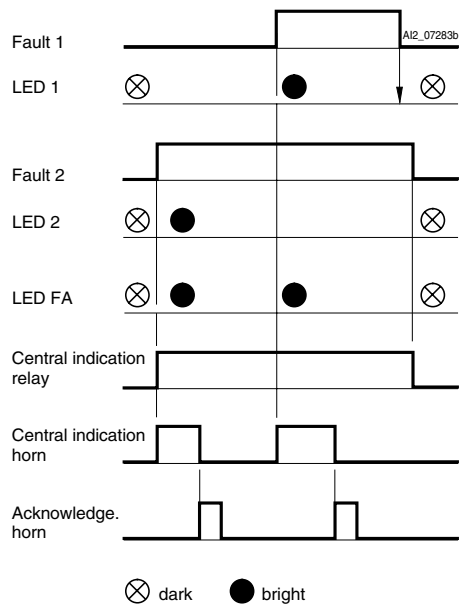
If jumper X1/X2 is fitted, open-circuit protection (otherwise closed-circuit protection).

Contacts 13/14 and 23/24 close in the event of an incoming fault. The assigned LED and the centralized fault indication LED SM light up.

The alarm sensor (contact 13/14) is switched off using the acknowledgement key. The assigned LED and the centralized fault indication LED continue to light up and contact 23/24 remains closed until the fault is eliminated.

Cables S and H carry an extra-low voltage. In the case of long connections between different distribution boards a shielded cable must be laid parallel to the installed load lines.

As a light signal sensor for the group messages, we recommend devices 5TE5 7 or 5TE5 8; as alarm sensor, the devices 5TT3 450 to 5TT3 453.



Overview

	7LQ2 100	7LQ2 101	7LQ2 102	7LQ2 103	5TT3 303
Setting ranges in lux	2 ... 500	2 x 2 ... 500	2 ... 500	2 x 2 ... 500	2 ... 2000
Adjustable time delay	no	yes	no	yes	–
Switching status indication	yes	yes	yes	yes	yes
Light sensor, max. cable length	50 m	50 m	50 m	50 m	–
Switching channels	1	2	1	2	1
Incandescent lamp rating	2000 W	2 x 2000 W	2000 W	2 x 2000 W	1200 W

Function

A light sensor measures the level of daylight. Switching depends on the desired brightness. A time delay and the switching hysteresis prevent clock-pulse behavior.

The sensor must be mounted so that it is not influenced by the lighting (feedback).

Energy saving

Dusk switches are used for the demand-oriented switching of lighting installations for shop windows or paths in order to cut operating costs.

A single light sensor serves several switching channels

The devices 7LQ2 101 and 7LQ2 103 have 2 switching channels that can be set independently of each other. 12 of these devices can be switched parallel to a light sensor. This saves the multiple installation of light sensors in a single system. All switching channels operate independently of each other and can be adjusted individually.







Technical specifications

Data acc. to EN 60730		7LQ2 100	7LQ2 101	7LQ2 102	7LQ2 103	5TT3 303
Rated control voltage U_c		V AC		230		
Operating range $\times U_c$	at 50/60 Hz	0.85 ... 1.15				0.85 ... 1.1
Rated frequency		Hz				50
Measuring ranges, setting ranges		Lux				2 ... 2000
Time delays	non-adjustable adjustable	s	75 ± 25 –	– 2 × 50 ... 100	75 ± 25 –	– 2 × 50 ... 100
Contacts	μ contact		1 NO contact	2 NO contacts	1 NO contact	2 NO contacts
Contact switching	closes with approaching darkness	Terminals	3/4	5/6 and 9/10	3/4	5/6 and 9/10
Status indication, LED	switching status indication switching state OFF switching state ON		instantaneous green red			– – –
Rated operational voltage U_e		V AC		250		
Rated operational current I_s	at p.f. = 1 at p.f. = 0.4	A A	16 4			10 2
Incandescent lamp ratings		W	2 000	2 × 2 000	2 000	2 × 2 000
Different phases	actuator/contact permissible contact/contact		yes –	yes yes	yes –	yes yes
Electrical isolations	creepage and clearances actuator/contact contact/contact	mm mm	4 –	4 4	4 –	4 4
Rated impulse withstand voltage U_{imp} 1.2/50 μs	actuator/contact contact/contact	kV kV	> 2.5 –	> 2.5 > 2.5	> 2.5 –	> 2.5 > 2.5
Minimum contact loads		V; mA	10; 100			
Terminals	+/- screw (Pozidriv)		1			
Conductor cross-sections	rigid flexible with sleeve	mm ² min. mm ²	1.5 ... 6 0.75			1.5 0.5
Permissible ambient temperature	device light sensor	°C °C	–10 ... +55 –30 ... +70			– –
Permissible humidity	device light sensor	% %	< 80 < 98			– –
Resistance to climate	acc. to DIN 50016					FW 24
Degree of protection	acc. to EN 60529 device light sensor		IP20 IP55		IP65	IP54 –
Safety class	acc. to EN 61010		II			

Monitoring Devices

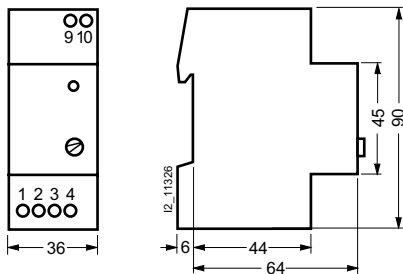
7LQ2 1, 5TT3 3 dusk switches

Selection and ordering data

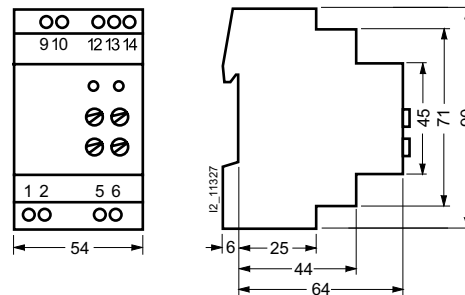
	U_e	I_e	U_c	MW	Order No.	Weight 1 unit approx.	PS*/ P. unit
	V AC	A	V AC			kg	Unit(s)
Dusk switches							
 7LQ2 100	setting range 2 ... 500 lux						
	1-channel version, with 7LQ2 910 light sensor for surface mounting, IP55		250	16	230	2	0,210
 7LQ2 101	2-channel version, with 7LQ2 910 light sensor, for surface mounting, IP55 expandable to 24 channels through parallel switching of 12 devices, which can be mutually controlled through a light sensor.		250	16	230	0.210	1
	1-channel version, with 7LQ2 911 light sensor for flush wall mounting, IP65		250	16	230	2	0.210
 7LQ2 103	2-channel version, with 7LQ2 911 light sensor, for flush wall mounting, IP65 expandable to 24 channels through parallel switching of 12 devices, which can be mutually controlled through a light sensor.		250	16	230	0.210	1
	setting range 2 ... 2000 lux						
 5TT3 303	1-channel version, for surface mounting, IP55, with integrated light sensor		250	10	230	0.190	1
Replacement light sensors							
 7LQ2 910	with watertight/resistant resin molding material, heat-resistant to 70 °C					0.060	1
	degree of protection IP55, for 7LQ2 100 and 7LQ2 101, for surface mounting, 2 ... 500 lux						
 7LQ2 911	degree of protection IP65, for 7LQ2 102 and 7LQ2 103, for flush wall mounting, 2 ... 500 lux					0.060	1

Dimensional drawings

7LQ2 100
7LQ2 102



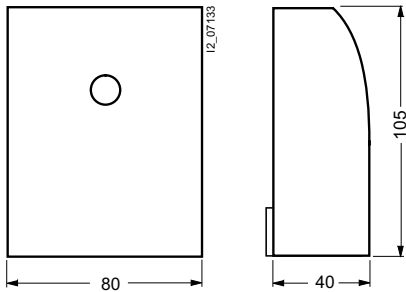
7LQ2 101
7LQ2 103



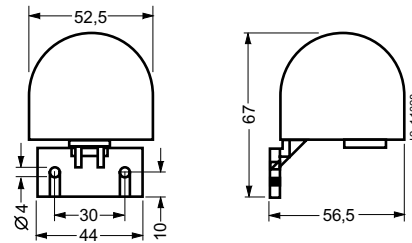
Dimensional drawings

5TT3 303

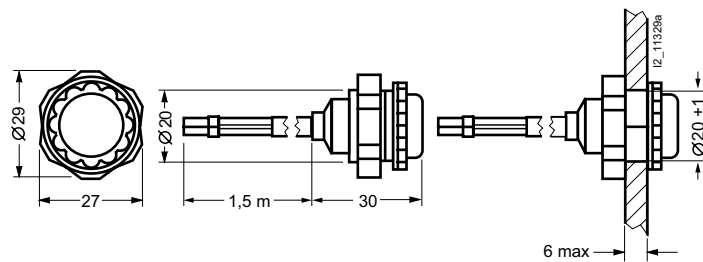
Wall-mounted version



7LQ2 910

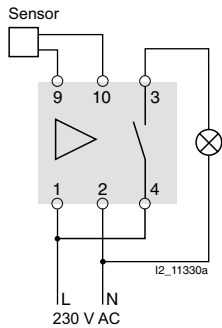


7LQ2 911

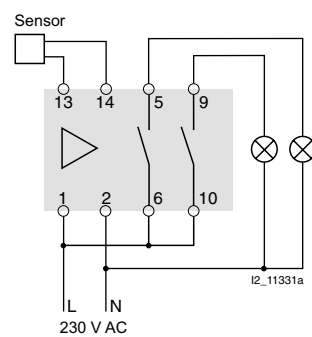


Schematics

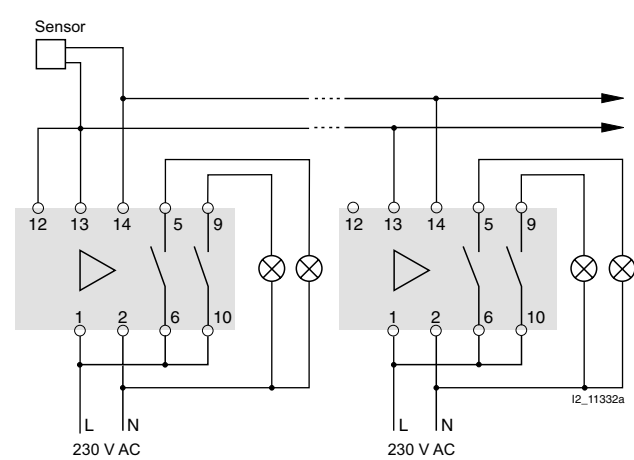
Dusk switches
7LQ2 100
7LQ2 102



Dusk switches
7LQ2 101
7LQ2 103



Up to 12 dusk switches with a single sensor
7LQ2 101
7LQ2 103



Up to 12 dusk switches can be operated with a single sensor.

The cable length between the device and the light sensor must not exceed a maximum of 50 m. The conductor cross-section must be a minimum of $2 \times 0.75 \text{ mm}^2$.

If the device measures a light level below the set value or if the device is no-voltage, the contacts are in the position shown.

- If the surrounding light level increases by approx. 30 to 100 % above the set value, the light is switched off after the set time delay.
- If the surrounding light level falls below the set value, the light is switched on after the set time delay.

7LQ2 0 temperature controllers

Overview

	7LQ2 001	7LQ2 002	7LQ2 003	7LQ2 005
Setting ranges in °C	-30 ... +30	0 ... +60	+40 ... +100	+2 ... +400
Switching status indication	yes	yes	yes	yes
Adjustable switching hysteresis in °C	1 ... 5	1 ... 5	1 ... 5	1 ... 20
Temperature sensor, measuring element	KTY 11-6	KTY 11-6	KTY 11-6	for PT100
Max. cable length	100 m	100 m	100 m	100 m

Application

The temperature controllers are used for controlling or limiting temperatures in residential and non-residential buildings, as well as in industrial areas. They are used for heating registers, panel and hot air heating and direct floor heating, as a limiting thermostat for air-conditioning systems and cooling systems, switchgear cabinet cooling, etc. as well as for temperature control in humid and dusty rooms. Can also be used for inaccessible room temperature setting for rooms in public buildings, such as schools, dayrooms and comparable applications.



Function

Electronic 2-element temperature controllers with LED red/green for voltage indication, switching status indication and temperature sensor monitoring. The temperature sensor with the measuring element KTY or a PT100 measuring element is monitored for short-circuits and interruptions.

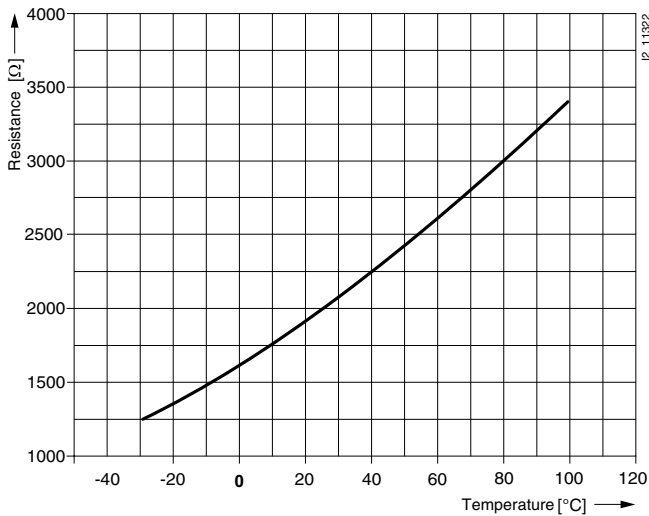
Technical specifications

			7LQ2 001	7LQ2 002	7LQ2 003	7LQ2 005
Data acc. to EN 60730						
Rated control voltage U_c		V AC	230			
Operating range $\times U_c$	at 50/60 Hz		0.85 ... 1.15			
Rated frequency		Hz	48 ... 62			
Measuring ranges, setting ranges		°C	-30 ... +30	0 ... +60	+40 ... +100	2 ... +400
Switching hysteresis	adjustable	°C	1 ... 5			4 ... 20
Contacts	μ contact		1 CO contact			
Contact switching	closes with increasing temperature	Terminals	3/4			
Status indication, LED	switching status indication actuating voltage switching state ON break or short-circuit of sensor conductor		green red red flashing			
Rated operational voltage U_e		V AC	250			
Rated operational current I_e	at p.f. = 1 at p.f. = 0.4	A	16 4			
Different phases	actuator/contact permissible		yes			
Electrical isolations	creepage and clearances actuator/contact	mm	4			
Rated impulse withstand voltage U_{imp} 1.2/50 μs	actuator/contact	kV	> 2.5			
Minimum contact loads		V; mA	10; 100			
Terminals	\pm screw (Pozidriv)		1			
Conductor cross-sections	rigid flexible with sleeve	mm ² min. mm ²	1.5 ... 6 0.75			
Permissible ambient temperature	device temperate sensor	°C	-10 ... +55 -30 ... +105			-10 ... +55 -
Permissible humidity	device temperate sensor	%	\leq 80 \leq 98			\leq 80 -
Degree of protection	acc. to EN 60529 device temperature sensor		IP20 IP65			IP20 -
Safety class	acc. to EN 61010		II			

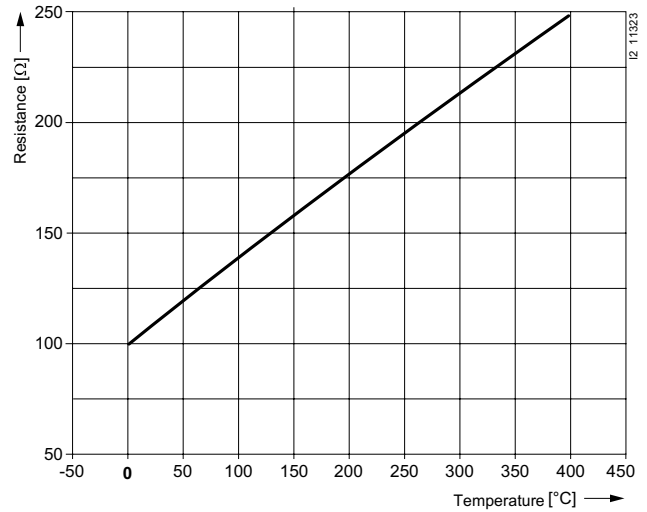
Selection and ordering data

	U_e	I_e	U_c	MW	Order No.	Weight 1 unit approx. kg	PS*/ P. unit Unit(s)
	V AC	A	V AC				
 7LQ2 001	Temperature controllers						
	with temperature sensor KTY 11-6						
	Setting range -30 ... +30 °C, 1 CO contact						
	250	16	230	2	7LQ2 001	0.210	1
Setting range 0 ... +60 °C, 1 CO contact							
250	16	230	2	7LQ2 002	0.210	1	
Setting range +40 ... +100 °C, 1 CO contact							
250	16	230	2	7LQ2 003	0.210	1	
Temperature controllers without temperature sensor							
for PT 100 measuring element (not included in delivery)							
Setting range +2 ... +400 °C, 1 CO contact							
	250	16	230	2	7LQ2 005	0.210	1
 KTY 11-6 replacement temperature sensors	Safety class IP65, for 7LQ2 001, 7LQ2 002 and 7LQ2 003, encapsulated, with watertight/resistant resin material, with 1 m silicone line, heat-resistant up to 105 °C, can be extended up to 100 m						
			230		7LQ2 900	0.040	1

Characteristic curves



Resistor characteristic curves KTY11-6



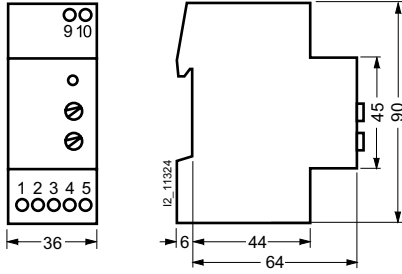
Resistor characteristic curves PT100 according to EN 60751 (96)

Monitoring Devices

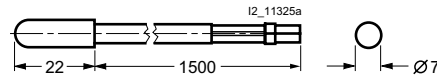
7LQ2 0 temperature controllers

Dimensional drawings

7LQ2 00.



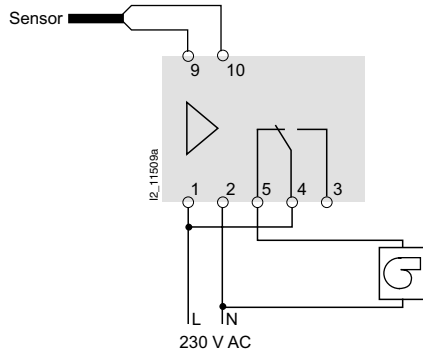
7LQ2 900



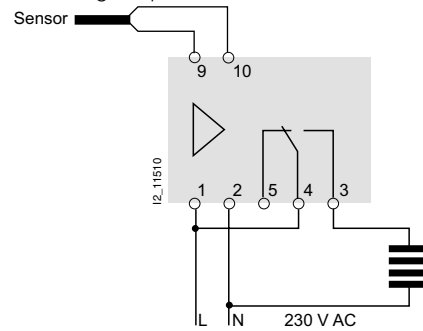
Schematics

Switching examples

7LQ2 0 temperature controllers in cooling operation with adjustable functioning temperature difference



7LQ2 0 temperature controllers in cooling operation with adjustable functioning temperature difference



The cable length between the device and the temperature sensor must not exceed a maximum of 100 m. The conductor cross-section must be a minimum of 2 x 0.75 mm².

Overview

- For all fuse systems
- Signal is output even when load is shut off
- Also suitable for asymmetrical networks, networks with harmonics or motors with feedback
- With two display LEDs, 1 for "Fuse OK" and 1 for "Fuse Failed"

Application

For the fuse monitoring of all kinds of fuses, in particular for the automatic shutdown and closing lockout of three-phase AC motors in the event of the failure of one or more phase fuses.


Note:

The internal resistance of the measuring paths of the fuse monitor is in the MΩ range so that the VDE regulations with regard to touch voltage are met in the event of faulty fuses (> 1 000 Ω/V). To isolate, the main switch must be switched off. The enclosed label should be affixed to the switchgear as a reminder.

Technical specifications

Data acc. to DIN VDE 0435-110, IEC 60255			5TT3 170
Rated control voltage U_c	V		3 x 380 ... 415 AC
Operating range $\times U_c$			0.8 ... 1.1
Rated frequency	Hz		50 ... 400
Internal resistance	of measuring paths	Ω/V	> 1 000
Max. permissible rear feed		%	90
Response/release time		ms	< 50
Rated impulse withstand voltage U_{imp}	input/output	kV	> 4
Rated operational voltage U_e		V AC	250
Rated operational current I_e	AC-1	A	4
Electrical service life	in switching cycles at 1 A AC-11		1.5×10^5
Terminals	+/- screw (Pozidriv)		1
Conductor cross-sections	rigid flexible with sleeve	max. mm ² min. mm ²	2 x 2.5 1 x 0.5
Permissible ambient temperature		°C	-20 ... +45
Resistance to climate	acc. to EN 60068-1		20/45/4

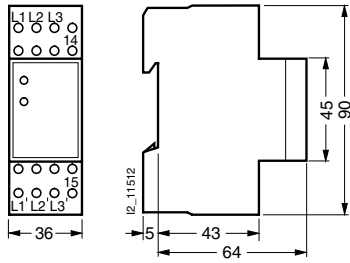
Selection and ordering data

	U_e	I_e	U_c	MW	Order No.	Weight 1 unit approx.	PS*/ P. unit
	V AC	A	V			kg	Unit(s)
 <p>Fuse monitors with transparent caps For all low-voltage fuse systems. Can be used in asymmetric systems afflicted with harmonics and regenerative feedback motors. Alarm also for disconnected loads.</p>	230	4	3 x 380 ... 415 AC 2		5TT3 170	0.150	1

Monitoring Devices

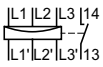
5TT3 170 fuse monitors

Dimensional drawings

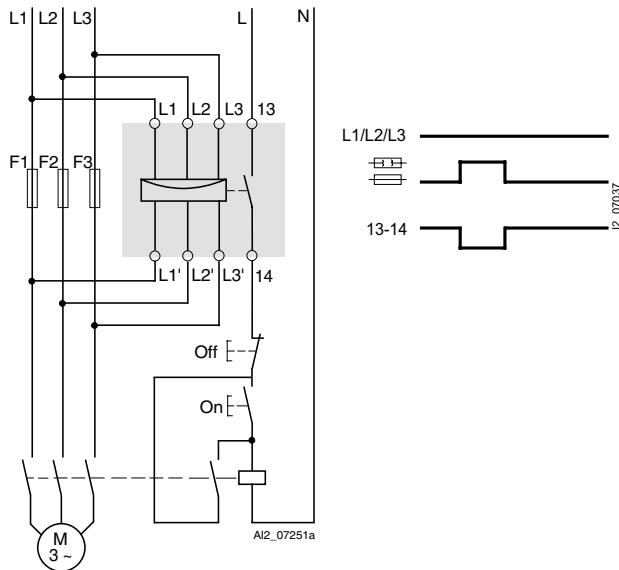


Schematics

Circuit diagram



Switching example, functional diagram



If the fuse fails, the motor is immediately disconnected (prevention of two-phase run). After changing the fuse, the motor can be restarted by pressing the "ON" button. Unlike conventional motor circuit-breakers, it is not possible to switch the motor on if the fuse is faulty.

Note:

The internal resistance of the measuring paths of the fuse monitor is in the MΩ range so that the VDE regulations with regard to touch voltage are met in the event of faulty fuses (> 1 000 Ω/V). To isolate, the main switch must be switched off. The enclosed label should be affixed to the switchgear as a reminder.

Overview

- Adjustable from 2 to 20 VA
- With status display for contact position
- With switch continuously ON
- With safety information on stickers for outlets and distribution boards

Application

For disconnecting the voltage or field circuit of electrical systems even when loads are disabled. The gateway switches off the plant section, but is not a device for ensuring isolation in the sense of safe disconnection.

Function


If loads are disconnected manually, and if the gateway measures a usage of only 2 to 20 VA (adjustable), it disconnects the cable to the system voltage and switches over to extra-low voltage. As soon as loads are reconnected, the gateway detects the increase in usage and switches back to the system voltage.

It detects resistive, capacitive and inductive loads. The gateway cannot detect a load with electronic power supply units, e.g. electronically controlled vacuum cleaners. It is advisable to connect these types of devices to a base load resistor (PTC resistor) so that the gateway always switches back to system voltage.

Technical specifications

Data acc. to DIN VDE 0435-110, IEC 60255			5TT3 171
Rated control voltage U_c		V AC	230
Operating range $\times U_c$			0.85 ... 1.15
Rated frequency		Hz	50/60
Rated power dissipation P_v	electronics	VA	5
	contact	VA	2.6
Monitoring voltages		V	3
Response values	adjustable	VA	2 ... 20
Release values	% of the response value		70
Rated impulse withstand voltage U_{imp}	input/output	kV	> 4
Rated operational voltage U_e		V AC	250
Rated operational current I_e	AC-1 AC	A	16
	AC-11 AC	A	3
Contacts			μ contact
Electrical service life	in switching cycles at 3 A, AC-11		5×10^5
Terminals	+/- screw (Pozidriv)		1
Conductor cross-sections	rigid	max. mm ²	2 × 2.5
	flexible with sleeve	min. mm ²	1 × 0.5
Permissible ambient temperature		°C	-20 ... +60
Degree of protection	acc. to DIN 60529		IP20
Safety class	acc. to EN 60730-1		II
Humidity class	acc. to IEC 60068-2-30		F

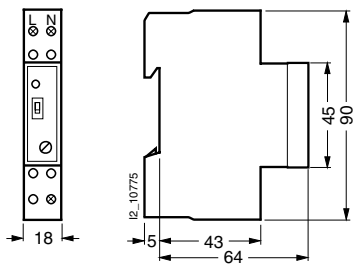
Selection and ordering data

	U_e	I_e	U_c	MW	Order No.	Weight 1 unit approx.	PS*/ P. unit
	V AC	A	V AC			kg	Unit(s)
 5TT3 171	Circuit relays with transparent caps						
	For disconnecting the voltage or field circuit of electrical systems even when loads are disabled.						
	250	16	230	1	5TT3 171	0.072	1
	Base load resistors for electronic devices						
	With 15-cm connection wires, end sleeves and shrink sleeving				5TG8 222	0.010	1

Monitoring Devices

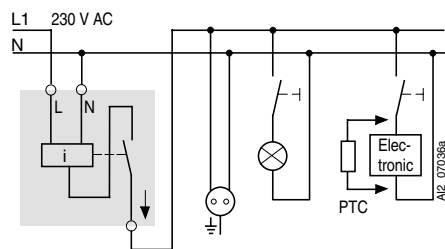
5TT3 171 circuit relays

Dimensional drawings



Schematics

Switching example



If the output falls to 2 to 20 VA (adjustable), the gateway disconnects the line from the system voltage and switches over to extra-low voltage. Once consumption increases, it reconnects. An electronic load must be connected with the 5TG8 222 base load resistor.

5TT3 42 phase/phase sequence monitors

Overview

- Phase monitors with 3-fold LED display
- Phase sequence monitors with single LED display

Application

For visual detection/signaling of phase failures in a 3-phase system.



The phase sequence is arbitrary. The device is also suitable for 1, 2 or 3-phase operation.

Indication of phase sequence in 3-phase system.

Technical specifications

Data acc. to DIN VDE 0435, IEC 60255		5TT3 421	5TT3 423
Rated control voltage U_c	V AC	230/400	400
Operating range $\times U_c$		0.8 ... 1.1	
Rated frequency	Hz	50/60	
Rated power dissipation P_v	electronics contact	VA VA	9 0.2
Rated operational voltage U_e		V AC	250
Rated operational current I_e		A	4
Minimum contact load		V/mA	10/100
Rated insulation voltage U_i	between coil/contact	kV	4
Contacts	μ contact (AC-11)	A	3
Electrical isolations	creepage and clearances actuator/contact	mm	4
Rated impulse withstand voltage U_{imp}	actuator/contact	kV	> 2.5
Terminals	+/- screw (Pozidriv)		1
Conductor cross-sections	rigid flexible with sleeve	max. mm ² min. mm ²	2 \times 2.5 -
Degree of protection	acc. to EN 60529		IP20
Safety class	acc. to EN 60730-1		II
Permissible ambient temperature		°C	-20 ... +60
Resistance to climate	acc. to EN 60068-1		20/60/4

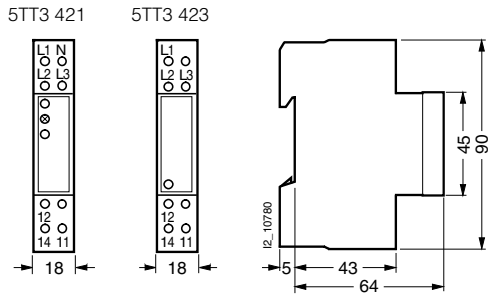
Selection and ordering data

	U_e	I_e	U_c	MW	Order No.	Weight 1 unit approx.	PS*/ P. unit
	V AC	A	V AC			kg	Unit(s)
	Phase monitors with transparent caps				5TT3 421	0.060	1
	with 3 green LEDs for 3 phases						
	250	4	230/400	1			
	Phase sequence monitors with transparent caps				5TT3 423	0.050	1
	with one green LED, which lights up for right-rotating field						
	250	4	400	1			

Monitoring Devices

5TT3 42 phase/phase sequence monitors

Dimensional drawings



Schematics

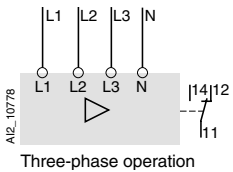
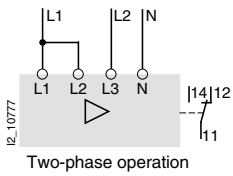
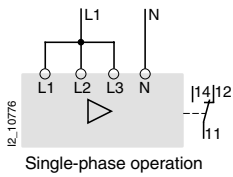
Circuit diagrams



Switching examples

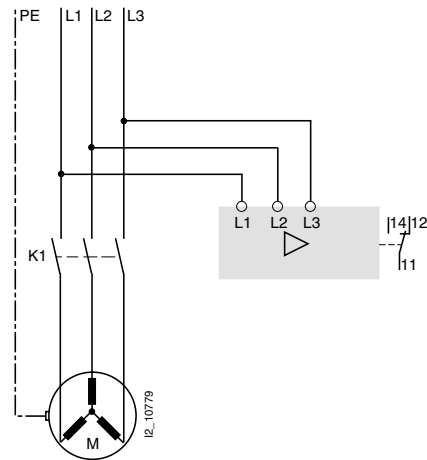
5TT3 421 phase monitors

The phase monitor can be operated either in 1, 2 or 3-phase operation.



5TT3 423 phase sequence monitors

Phase sequence monitors must always be connected in 3-phase.



Overview

	5TT3 194	5TT3 195	5TT3 400	5TT3 401	5TT3 402	5TT3 403	5TT3 404	5TT3 405	5TT3 406	5TT3 407	5TT3 408	5TT3 410
General monitoring	•	•	•	–	•	–	•	–	–	–	–	–
Monitoring of safety light devices	–	–	–	•	–	•	–	•	–	–	–	–
Monitoring of medical facilities	–	–	–	–	–	–	–	–	•	–	–	–
Monitoring of N-conductor	–	–	–	–	–	–	–	–	–	–	–	•
Monitoring of short-time interruptions	–	–	–	–	–	–	–	–	–	•	–	–
Overvoltage	•	•	–	–	–	–	–	–	–	–	•	–
Undervoltage	–	–	•	•	•	•	•	•	•	•	•	–
1, 2, 3-phase against N	•	–	•	•	•	•	–	–	–	•	–	–
3 phases against N	–	•	–	–	–	–	•	•	•	–	•	–
Asymmetry detection	–	•	–	–	–	–	•	•	•	–	•	•
N-conductor monitoring	•	•	–	–	–	–	•	•	•	•	•	•
Reverse voltage detection	–	•	–	–	–	–	•	•	•	–	•	–
Short-time failure detection	–	–	–	–	–	–	–	–	–	•	–	–
Phase failure detection	•	•	•	•	•	•	•	•	•	•	•	–
Switching thresholds:	–	–	–	–	–	–	–	–	–	–	–	–
0.7 / 0.9 x U_C, not adjustable	–	–	•	–	•	–	•	–	–	–	–	–
0.8 / 0.85 x U_C, not adjustable	–	–	–	–	–	–	–	–	–	•	–	–
0.85 / 0.95 x U_C, not adjustable	–	–	–	•	–	•	–	•	–	–	–	–
0.7 ... 0.95 x U_C, 5 % hysteresis, adjustable	–	–	–	–	–	–	–	–	•	–	–	–
0.7 ... 1.1 x U_C, 4 % hysteresis, adjustable	–	–	–	–	–	–	–	–	–	–	•	–
0.9 ... 1.3 x U_C, 4 % hysteresis, adjustable	•	•	–	–	–	–	–	–	–	–	•	–
Adjustable time delay	–	–	–	–	–	–	–	–	–	–	•	–
Contact: 1 CO contact	–	–	•	•	–	–	–	–	–	–	–	–
Contact: 2 CO contacts	•	•	–	–	•	•	•	•	•	•	•	•

Application

General voltage monitoring

For general device and plant protection, voltage relays with switching thresholds of $0.7 \times U_C$, i.e. 161 V are used. If they have fixed, unchangeable switching thresholds, they switch back to normal operation at $0.85 \times U_C$, 195 V or at $0.9 \times U_C$, 207 V, depending on the version. If they have adjustable threshold values, they switch back to normal operation with 4 % hysteresis, 9 V.

1, 2 or 3 phases against N or 3 phases against N

All voltage relays require an N-conductor. Devices for 1, 2 or 3 phases against N can be used for 1, 2, or 3-phase operation. Devices for 3 phases against N require all three phases, whereby the sequence in which they are connected is irrelevant.

Asymmetry detection

If different voltages occur in a 3-phase network, this is called phase asymmetry. Some voltage relays detect an asymmetry of approx. 6 to 8 % of the phase-to-neutral voltage, i.e. approx. 14 to 16 V and switch off. This type of operation is used to protect motors against a "skew" (for example).

N-conductor monitoring

An N-conductor break causes a skew, depending on the phase load. In extreme cases, this could cause 380 V to be applied to a phase and destroy the connected devices. Each voltage relay with asymmetry detection is tripped by an N-conductor break, if the phase displacement is at least 14 to 18 V.

The 5TT3 410 N-conductor monitor detects a phase displacement of 5 %, which is roughly 12 V. This provides earlier protection against overvoltage for connected devices. The N-conductor monitor does not react if the voltage drops or rises in all phases simultaneously; or if a phase is swapped with the N-conductor.

Reverse voltage detection

If a phase fails, the motors feed a reverse voltage to the missing phase. However, voltage relays with reverse voltage detection will disconnect in this case because they are monitoring the phase angle.

Phase failure detection

If a phase fails completely, the voltage relays disconnect with a delay as specified in the technical specifications.

Short-time failure detection

Short-time failures upwards of 20 ms cannot be detected with conventional voltage relays. However, they can occur in the case of system transfers or lightning strikes and can lead to uncertainty for sensitive process sequences or measuring procedures.

The 5TT3 407 short-time voltage relay has a reset function that allows a procedure to be permanently interrupted after a fault.

Series fuse 2 A

The voltage relays do not require a series fuse as device protection. However, they are often installed in junctions, i.e. in main supply systems with high fusing. In this case, the supply lead to the voltage relay must be short-circuit resistant. The series fuse only serves as line protection.

Monitoring of safety light devices

DIN VDE 0108 requires that buildings/rooms where "people meet" have emergency lighting. Depending on what the rooms are used for the emergency lighting must be switched on after 0.5 to 15 s if the voltage falls 15 % below the rated voltage of 230 V, i.e. 195 V. This switching threshold must not be adjustable. The voltage relays for safety light devices react after 150 ms. At 5 % undervoltage, i.e. at 218 V, they switch back to normal operation.

Monitoring of medical premises according to DIN VDE 0107

In the case of undervoltage, there is no guarantee that medical equipment will continue to function. Because of the risk this presents to patients, e.g. during operations, it is essential that systems switch to an emergency power supply in the event of undervoltage.

5TT3 1 and 5TT3 4 voltage relays

Technical specifications

Data acc. to DIN VDE 0435-110, -303, IEC 60255				5TT3 400 5TT3 401 5TT3 402 5TT3 403	5TT3 404 5TT3 405	5TT3 406	5TT3 194	5TT3 195
Rated control voltage U_c	V AC		230/400					400
Operating range $\times U_c$ (overload capability)			1.1				1.35	
Rated frequency	Hz		50/60					
Back-up fuse	terminals L1/L2/L3	A	2					
Response values $\times U_c$	on-switching off-switching		0.9/0.95 0.7/0.85		4 % hysteresis 0.7 ... 0.95		0.9 ... 1.3	
Minimum contact loads	V/mA		10/100					
Phase asymmetry	%		–		approx. 6 ... 8		–	approx. 6 ... 8
Phase failure detection	at L1 or L2 at L3	ms ms	100 100				140 30	
N-conductor monitoring			–		yes		–	
Rated insulation voltage U_i	between coil/contact	kV	4					
Contacts	μ contact (AC-11)	A	4					
Electrical isolations	creepage and clearances actuator/contact	mm	3		5.5			
Rated impulse withstand voltage U_{imp}	actuator/contact	kV	> 2.5		> 4			
Terminals	+/- screw (Pozidriv)		1					
Conductor cross-sections	rigid flexible with sleeve	max. mm ² min. mm ²	2 x 2.5 0.5					
Permissible ambient temperature		°C	-20 ... +60					
Resistance to climate	acc. to EN 60068-1		20/60/4					


Data acc. to DIN VDE 0435-110, IEC 60255				5TT3 407	5TT3 408	5TT3 410
Rated control voltage U_c	V AC		230/400			
Operating range $\times U_c$ (overload capability)			1.1		1.35	1.2
Rated frequency	Hz		50/60			
Back-up fuse	terminals L1/L2/L3	A	2			
Response values $\times U_c$	overvoltage: off-switching on-switching undervoltage: off-switching on-switching		– – 0.8 0.85		0.9 ... 1.3 U_c 4 % hysteresis 0.7 ... 1.1 U_c 4 % hysteresis	– – – –
Minimum contact load	V/mA		10/100			
Phase asymmetry	%		approx. 6 ... 8			> 5
Phase failure detection	at L1, L2 or L3	ms	\geq 20		100	–
OFF delay		s	–		0.1 ... 20	–
Automatic reclosing delay		s	0.2 ... 20		–	–
Rated insulation voltage U_i	between coil/contact	kV	4			
Contacts	μ contact (AC-11)	A	3		1	4
Electrical isolations	creepage and clearances contact/contact actuator/contact	mm mm	– 4		4	– 5.5
Rated impulse withstand voltage U_{imp}	actuator/contact	kV	> 4			
Rated operational power P_s	AC operation: 230 V and p.f. = 1 230 V and p.f. = 0.4 DC operation: $U_e = 24$ V and $I_e = 6$ A $U_e = 60$ V and $I_e = 1$ A $U_e = 110$ V and $I_e = 0.6$ A $U_e = 220$ V and $I_e = 0.5$ A	VA VA W W W W	2 000 1 250 max. 100 max. 100 max. 100 max. 100		– – – –	– – – –
Terminals	+/- screw (Pozidriv)		1			
Conductor cross-sections	rigid flexible with sleeve	max. mm ² min. mm ²	2 x 2.5 0.5			
Permissible ambient temperature		°C	-20 ... +60			
Humidity class	acc. to IEC 60068-2-30		F			

Selection and ordering data

	U_e	I_e	U_c	MW	Order No.	Weight 1 unit approx.	PS*/ P. unit
	V AC	A	V AC			kg	Unit(s)
Voltage relays with transparent cap							
	for general overvoltage monitoring of 1, 2 or 3 phases against N, with reverse voltage and phase failure detection switching thresholds: 0.9 ... 1.3 x U_c , 4 % hysteresis, adjustable						
5TT3 194	230	4	230/400	2	5TT3 194	0.150	1
	for general overvoltage monitoring of 3 phases against N, with asymmetry, reverse voltage and phase failure detection, with N-conductor monitoring, switching thresholds: 0.7 ... 0.9 x U_c , not adjustable						
5TT3 195	230	4	230/400	2	5TT3 195	0.150	1
	for general undervoltage monitoring of 1, 2 or 3 phases against N, with phase failure detection, switching thresholds: 0.7/0.9 x U_c , not adjustable						
5TT3 400	230	4	230/400	1	5TT3 400	0.065	1
	for undervoltage monitoring of safety light devices of 1, 2 or 3 phases against N, with phase failure detection, switching thresholds: 0.85/0.95 x U_c , not adjustable						
5TT3 401	230	4	230/400	1	5TT3 401	0.065	1
	for general undervoltage monitoring of 1, 2 or 3 phases against N, with phase failure detection, switching thresholds: 0.7/0.9 x U_c , not adjustable						
5TT3 402	230	4	230/400	2	5TT3 402	0.110	1
	for general undervoltage monitoring of 1, 2 or 3 phases against N, with phase failure detection, switching thresholds: 0.9 ... 0.95 x U_c , 5 % hysteresis, adjustable						
5TT3 403	230	4	230/400	2	5TT3 403	0.110	1
	for general undervoltage monitoring of 3 phases against N with asymmetry, reverse voltage and phase failure detection, with N-conductor monitoring, switching thresholds: 0.7/0.9 x U_c , not adjustable						
5TT3 404	230	4	230/400	2	5TT3 404	0.110	1
	for undervoltage monitoring of medical premises of 3 phases against N, with asymmetry, reverse voltage and phase failure detection, with N-conductor monitoring, switching thresholds: 0.9 ... 0.95 x U_c , 5 % hysteresis, adjustable						
5TT3 405	230	4	230/400	2	5TT3 405	0.110	1
	for undervoltage monitoring of short-time failure detection ≥ 20 ms of 1, 2 or 3 phases against N, with phase failure detection and N-conductor monitoring, switching thresholds: 0.8 ... 0.85 x U_c , not adjustable						
5TT3 406	230	4	230/400	2	5TT3 406	0.110	1
	for general under and overvoltage monitoring of 3 phases against N, with asymmetry, reverse voltage and phase failure detection, with N-conductor monitoring and adjustable time delay of 0.1 ... 20 s, switching thresholds: undervoltage: 0.7 ... 1.1 x U_c , 4 % hysteresis, adjustable overvoltage: 0.9 ... 1.3 x U_c , 4 % hysteresis, adjustable						
5TT3 407	230	4	230/400	2	5TT3 407	0.110	1
	for general under and overvoltage monitoring of 3 phases against N, with asymmetry, reverse voltage and phase failure detection, with N-conductor monitoring and adjustable time delay of 0.1 ... 20 s, switching thresholds: undervoltage: 0.7 ... 1.1 x U_c , 4 % hysteresis, adjustable overvoltage: 0.9 ... 1.3 x U_c , 4 % hysteresis, adjustable						
5TT3 408	230	4	230/400	2	5TT3 408	0.110	1

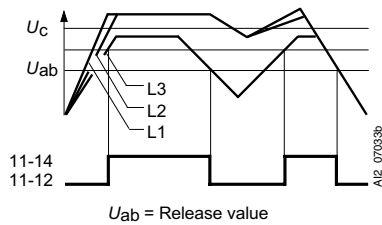
5TT3 1 and 5TT3 4 voltage relays

Selection and ordering data

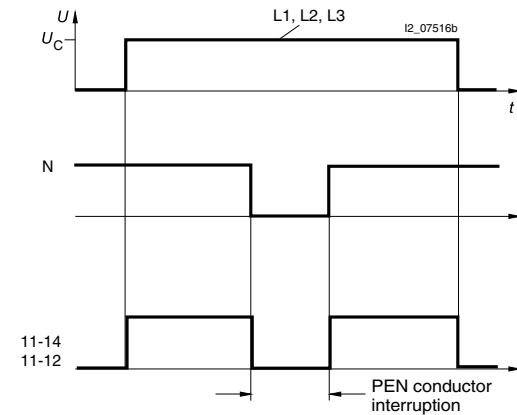
	U_e	I_e	U_c	MW	Order No.	Weight 1 unit approx.	PS*/ P. unit
	V AC	A	V AC			kg	Unit(s)
 N-conductor monitors with transparent cap with asymmetry detection and N-conductor monitoring Contact, 2 CO contacts	230	4	230/400	2	5TT3 410	0.110	1

Characteristic curves

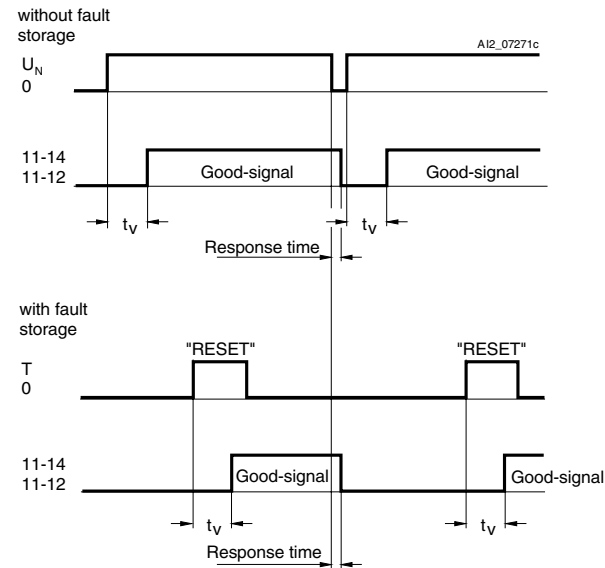
Timing interval of 5TT3 400 – 5TT3 406 undervoltage relays



Timing interval of 5TT3 410 N-conductor monitors



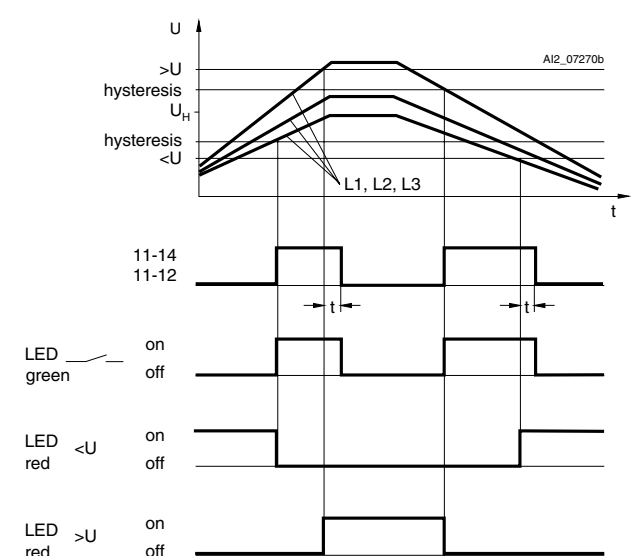
Timing interval of 5TT3 407 short-time voltage relays



t_v : adjustable automatic reclosing delay 0.2 to 20 s

The undervoltage relay switches at a phase asymmetry of approx. 6 to 8 %, regardless of the response values for undervoltage. The above diagram shows the timing interval for undervoltage or asymmetry.

Timing interval of 5TT3 408 under/overvoltage relays



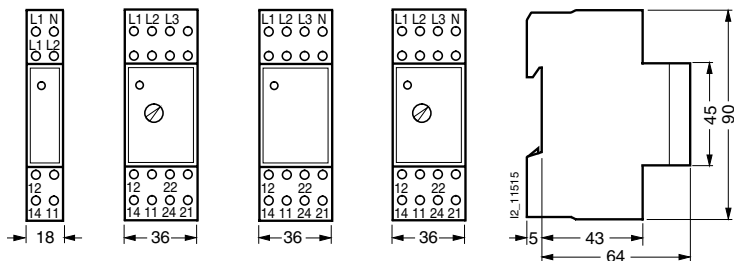
t : adjustable OFF delay 0.1 to 20 s

The undervoltage relay switches at a phase asymmetry of approx. 6 to 8 %, regardless of the response values for undervoltage. The above diagram shows the timing interval for undervoltage.

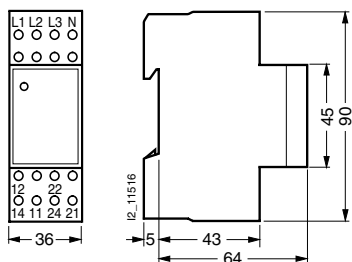
Dimensional drawings

5TT3 1 and 5TT3 4 voltage relays

5TT3 400 5TT3 402 5TT3 404 5TT3 194
 5TT3 401 5TT3 403 5TT3 405 5TT3 195
 5TT3 407 5TT3 406
 5TT3 408



5TT3 410 N-conductor monitors

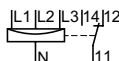
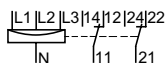


Schematics

Circuit diagrams

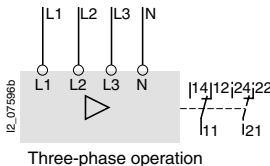
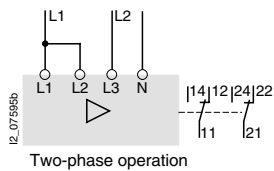
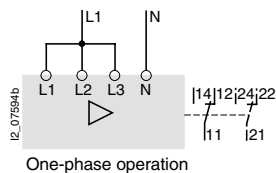
5TT3 194 5TT3 402 5TT3 406
 5TT3 195 5TT3 403 5TT3 407
 5TT3 404 5TT3 408
 5TT3 405 5TT3 410

5TT3 400
 5TT3 401



Switching example for 5TT3 195, 5TT3 40 voltage relays

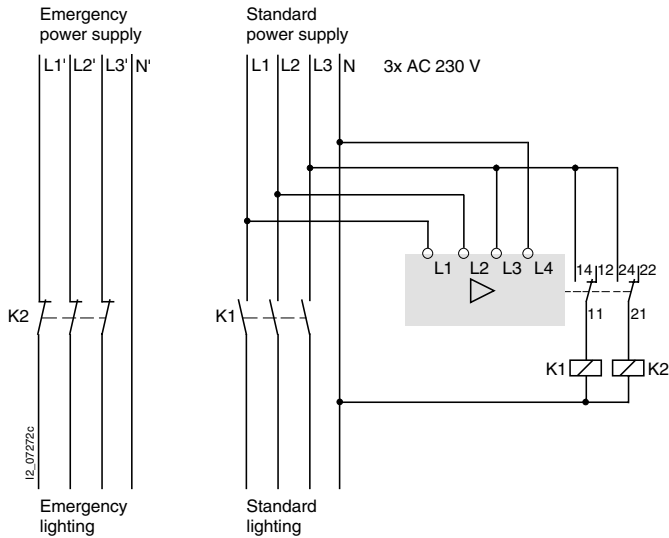
1, 2, 3-phase operation against N



5TT3 1 and 5TT3 4 voltage relays

Schematics

Switching example for 5TT3 401, 5TT3 403, 5TT3 405 undervoltage relays

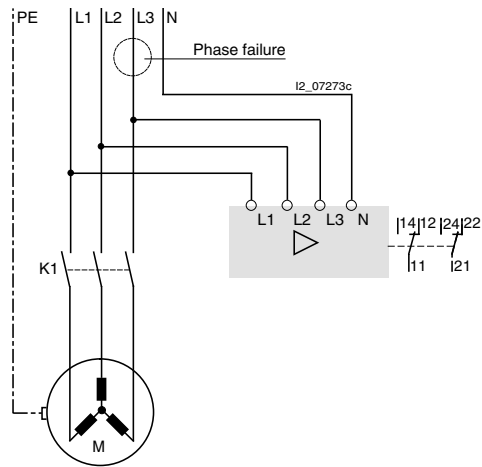


Application of the undervoltage relay is in accordance with DIN VDE 0108, which stipulates switching to a supply system for safety service after a fault. Buildings are distinguished according to use, such as business premises, exhibition areas or guest houses. These are all covered generically as rooms/buildings where "people meet".

There is a fault if the voltage of the general power supply drops for 0.5 seconds > 15 % in relation to the rated voltage (i.e. 195 V at 230 V).

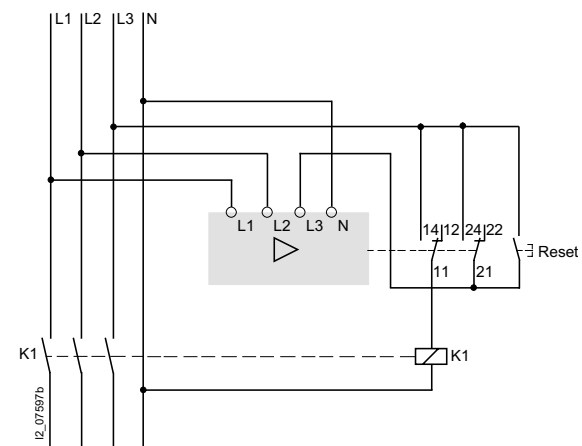
In this case, depending on the type of use of the building, the lighting must be switched to a safety power supply after 0.5 to 15 s. A safety power supply may be: battery system, generating set or a quick-starting standby generating set.

Switching example for 5TT3 404, 5TT3 405, 5TT3 406, 5TT3 408 voltage relays



These voltage relays can only be used for 3-phase operation. They monitor not only under and overvoltages in accordance with their description, but also reverse voltage, asymmetry and N-conductor breaks.

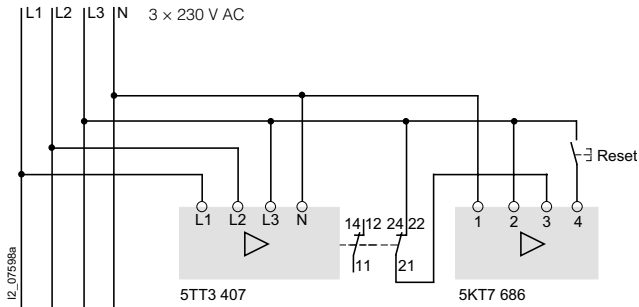
Switching example for 5TT3 407 short-time voltage relay



In the case of sensitive technical sequences, it is often not possible to tell whether this interrupt has interfered with the process sequence. The switch disconnects the power supply, which can then be switched back by using the reset pushbutton.

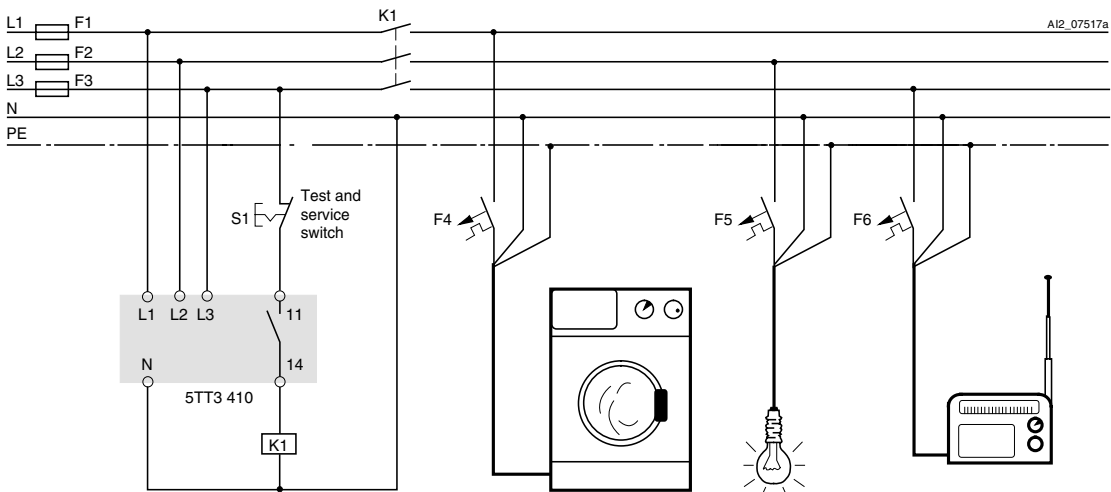
Schematics

Switching example for 5TT3 407 short-time voltage relay



In simple cases, it may be sufficient that a short-time interrupt is registered without the need to disconnect the power supply. In the case of a short-time interrupt, this is counted by the pulse counter. The pulse counter can be reset if required.

Switching example of 5TT3 410 N-conductor monitors



Monitoring Devices

5TT6 1 current relays

Overview

Direct measurement, transformer measurement

All current relays can be connected with direct measurement or through transformers.

N potential

Versions 5TT6 113 to 5TT6 120 can be connected with a separate N potential.

Response time

Current relays are not circuit-protection devices for lines. They switch with a delay in the ms range.

Overload capability

Independent of the set measuring range and set measured value, current relays can be permanently overloaded up to 15 A and 20 A; for 3 s, even up to 20 A and 30 A.

Device overview	5TT6 111	5TT6 112	5TT6 113	5TT6 114	5TT6 115	5TT6 120
Undercurrent	•	–	•	–	•	•
Overcurrent	–	•	–	•	•	•
1-phase	•	•	•	•	•	–
3-phase	–	–	–	–	–	•
Separate N potential	–	–	•	•	•	•
Measuring ranges:						
Link:						
0.1 ... 1 A Z1-Z2	–	–	•	•	•	–
0.5 ... 5 A Z1-Z3	–	–	•	•	•	•
1 ... 10 A Z1-Z4	•	•	•	•	•	–
1.5 ... 15 A Z1-Z3-Z4	–	–	•	•	•	–
Can be programmed over links	–	–	•	•	•	–
Contact						
1 CO contact	•	•	–	–	–	–
2 CO contacts	–	–	•	•	•	•

Application

Current relays provide 1 and 3-phase monitoring of the over/under-current in an AC system. They are used to monitor lighting and motors.

Buildings/object-safe guiding lights

In the approach corridors of planes, high buildings must be fitted with position lighting. The same planning instructions apply to the monitoring of this type of lighting and runway lighting as the monitoring of emergency lighting.

Monitoring of emergency lighting with incandescent lamps

The function of emergency lighting according to DIN VDE 0108 must be checked at regular intervals. The operating current is continuously monitored using current relays. It is irrelevant whether this lighting is integrated in the general lighting or is only supplied on demand with emergency current.

The current relay is set so that it is switched on at the max. lamp current. If an incandescent lamp fails, a fault is signaled.

Monitoring of motors

If the warning is sent early enough, the fault can be eliminated before the motor starts to overheat and the circuit-breaker switches the motor off.

Current relays reliably safeguard the monitoring of fault-free running motors and, in some cases, are more suitable than a voltage relay, which is geared more towards motor protection.

Example: screw conveyor

Hard objects in screw conveyors, e.g. in sewage treatment plants, often lead to the conveyor system to getting blocked up. Appropriately set, the current relay signals over its contact(s) that a hazardous situation has occurred and threatens to block the motor.

Example: stirrer

As with the conveyor processes, changes to the viscosity can lead to an overload of the motors.

Example: crane motor control system

The current monitoring of the main motor (hoisting motor) ensures that the electrical holding brake is not released until the main motor is in operation and the load is held.

Example: dust extraction

In the interests of work safety and to protect against massive dust development, it is essential to ensure that the dust extraction system is working perfectly before a saw or sanding machine is switched on.

Function

Planning the monitoring of an incandescent lamp

Current relays have a hysteresis of approx. 4 %. The smallest lamp must not exceed the set measuring range by more than 8 %.

Example: 12 lamps à 100 W = 1200 W, which corresponds to a current of approx. 5.2 A. If a lamp fails, the current drops by 0.4 A. This 0.4 A corresponds to 8 % of the set measured value 5.2 A.

Response time

The response time of the fault signal is produced by the "Adjustable switching delay" (see Technical Specifications) and an additional delay, which is determined from the actual current and the set value.

F	Pick-up ms	Dropout ms
1	10	250
2	70	70
5	120	30
10	180	15
20	220	10
30	240	12

$$F = \frac{I_{act}}{I_{meas}}$$

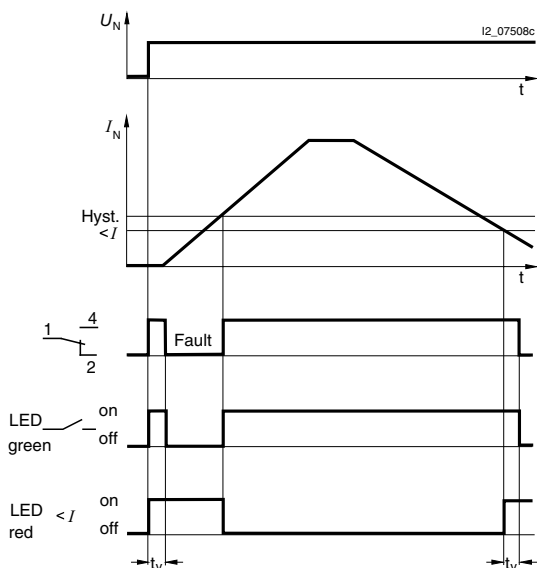
I_{act} : Actual current

I_{meas} : Set current threshold value to be measured

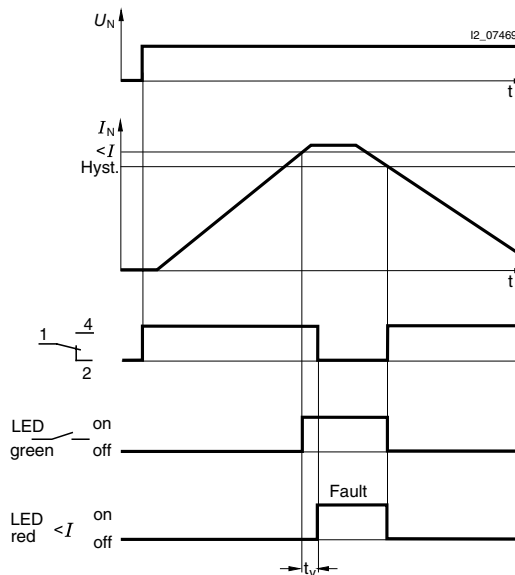
Pick-up: With an overcurrent relay, the contact 11-14 (21-24) to the fault signal closes when the actual current flowing is higher than the switching threshold. The relay picks up.

Dropout: With an undercurrent relay, the contact 11-12 (21-22) to the fault signal closes when the actual current flowing is lower than the switching threshold. The relay drops out.

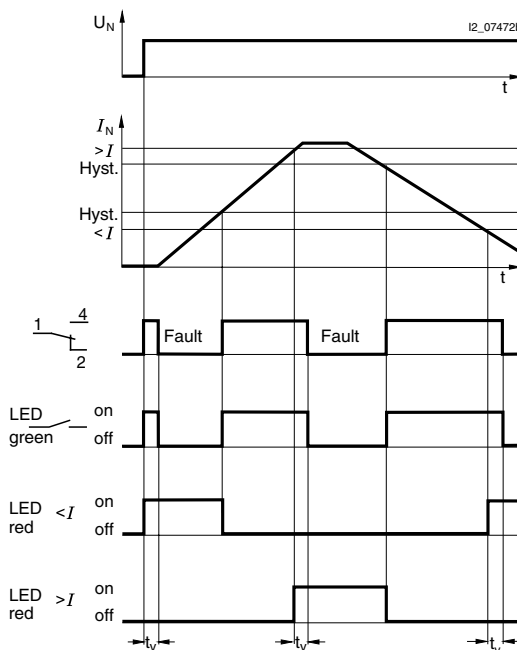
Function chart for 5TT6 1 undercurrent relay signal



5TT6 1 overcurrent relay signal



Function chart for 5TT6 115 under/overcurrent relay signal



Contrary to all other current relays, a fault signal is always output over the contact 11-14 (21-24). The red LEDs indicate whether the signal is for an undercurrent or an overcurrent.

5TT6 1 current relays





Technical specifications

Data acc. to DIN VDE 0435-303, IEC 60255		5TT6 111	5TT6 112
Rated control current I_c	A	1 ... 10	
Rated control voltage U_c	V AC	230	
Operating range $\times U_c$		0.9 ... 1.1	
Overload capability, continuous	A	15	
Overload capability, short-time	at 50 °C ambient temperature max. 3 s A	20	
Rated frequency	Hz	50/60	
Response values $\times I_c$	switching on infinitely variable, switching off non-adjustable	0.1 ... 1 4 % hysteresis	
Switching delay t_v	infinitely adjustable	s	0.1 ... 20
Response time	non-adjustable	ms	1)
Minimum contact loads		V/mA	10/100
Rated insulation voltage U_i	between coil/contact	kV	2.5
Contacts	μ contact (AC-15) NO contacts NC contacts	A A	3 1
Electrical isolations	creepage and clearances actuator/contact	mm	3
Rated impulse withstand voltage U_{imp}	actuator/contact	kV	> 4
Terminals	+/- screw (Pozidriv)		1
Conductor cross-sections	rigid flexible with sleeve	max. mm ² min. mm ²	2 \times 2.5 1 \times 0.5
Permissible ambient temperature		°C	-20 ... +60
Resistance to climate	acc. to EN 60068-1		20/60/4

Data acc. to DIN VDE 0435-303, IEC 60255		5TT6 113	5TT6 114	5TT6 115	5TT6 120
Rated control current I_c	A	4 ranges 0.1 ... 1 0.5 ... 5 1 ... 10 1.5 ... 15			1 area 0.5 ... 5
Rated control voltage U_c	V AC	230			
Operating range $\times U_c$		0.9 ... 1.1			
Overload capability, continuous	A	20			15
Overload capability independent of measuring range	at 50 °C ambient temperature max. 3 s A	30			
Rated frequency	Hz	50/60			
Response values $\times I_c$	switching on infinitely variable, switching off non-adjustable	1 ... 10 4 % hysteresis			
Switching delay t_v	infinitely adjustable	s	0.1 ... 20		
Response time	non-adjustable	ms	see page 11/29		
Minimum contact loads		V/mA	10/100		
Rated insulation voltage U_i	between coil/contact	kV	2.5		
Contacts	μ contact (AC-15) NO contacts NC contacts	A A	5 1		
Electrical isolations	creepage distances and clearances actuator/contact	mm	3		
Rated impulse withstand voltage U_{imp}	actuator/contact	kV	> 4		
Terminals	+/- screw (Pozidriv)		1		
Conductor cross-sections	rigid flexible with sleeve	max. mm ² min. mm ²	2 \times 2.5 1 \times 0.5		
Permissible ambient temperature		°C	-20 ... +60		
Resistance to climate	acc. to EN 60068-1		20/60/4		

1) Current corresponds to the rating of the continuous-flow heater.

Selection and ordering data

	U_e	I_e	Measuring range	MW	Order No.	Weight 1 unit approx.	PS*/P. unit	
	V AC	A	A AC			kg	Unit(s)	
 5TT6 111	Current relays with transparent cap for single-phase loads up to 230 V AC, auxiliary voltage and measuring circuit, not isolated							
	Undervoltage monitoring, single-phase 1 CO contact				1	5TT6 111	0.065	1
 5TT6 113	Current relays with transparent cap for single-phase loads up to 230 V AC, auxiliary voltage and measuring circuit, isolated							
	Undervoltage monitoring, single-phase 2 CO contacts				2	5TT6 113	0.122	1
 5TT6 115	Overvoltage monitoring, single-phase 2 CO contacts				2	5TT6 114	0.122	1
	Over/undervoltage monitoring, 1-phase 2 CO contacts				2	5TT6 115	0.122	1
 5TT6 120	Current relays, mounting depth 55 mm, for 3-phase loads for 3 x 400 V AC, separate signal with N-wire connection							
Over/undervoltage monitoring, 3-phase 2 changeovers each for overcurrent/undercurrent respectively				4	5TT6 120	0.220	1	

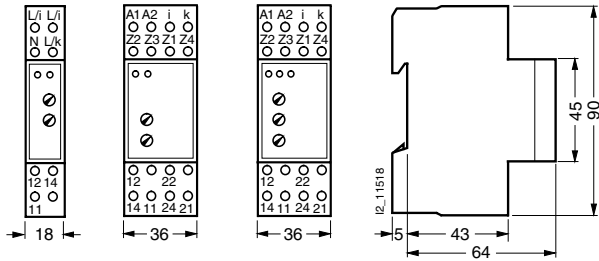
Monitoring Devices

5TT6 1 current relays

Dimensional drawings

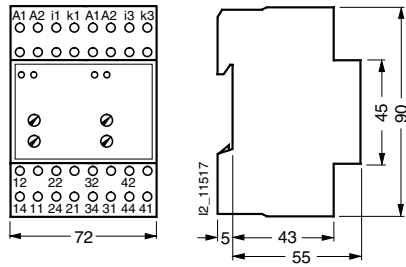
5TT6 11 current relays

5TT6 111 5TT6 113 5TT6 115
5TT6 112



5TT6 120 current relays

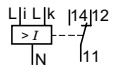
5TT6 120



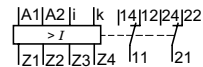
Schematics

Circuit diagrams

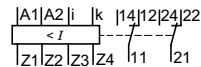
5TT6 111
5TT6 112



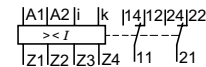
5TT6 113



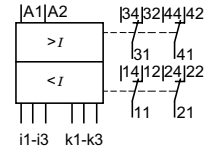
5TT6 114



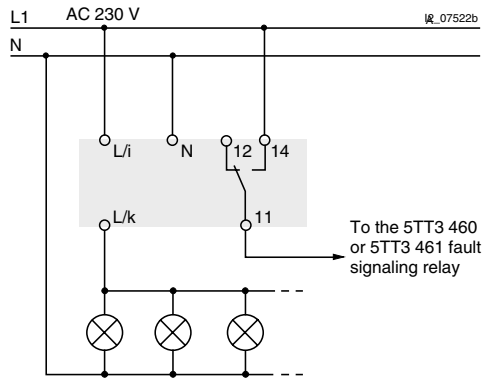
5TT6 115



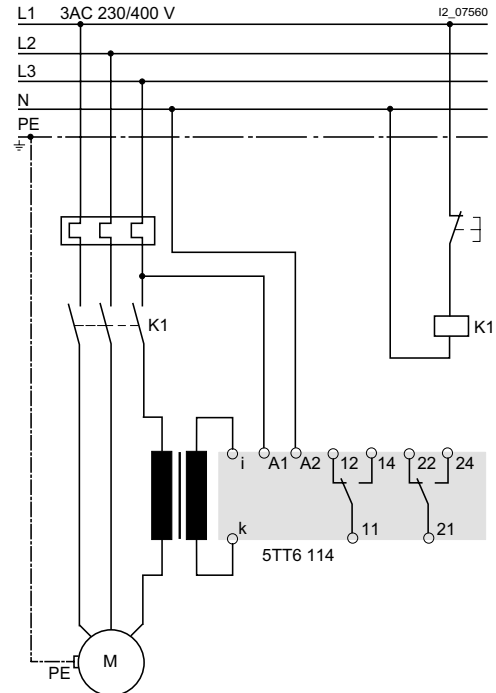
5TT6 120



Switching example: 5TT6 111 undercurrent relay

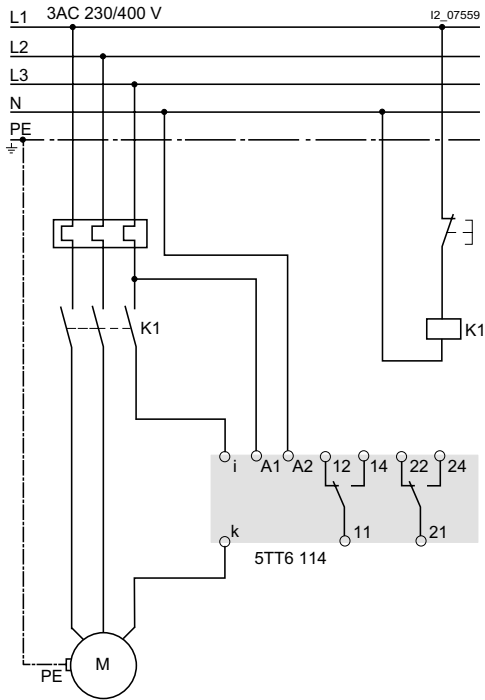


Switching example: 5TT6 114 with transformer measurement for overcurrent measurement

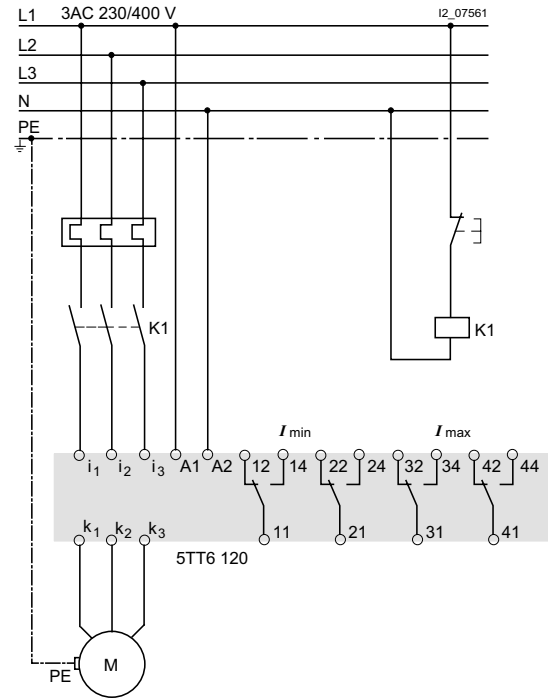


Schematics

Switching example: 5TT6 114 with direct measurement up to 15 A for overcurrent measurement



Switching example: 5TT6 120 with direct measurement up to 5 A for under/overcurrent measurement



5TT6 10 priority switches

Overview

- Control circuit terminals, sealable
- Reduction of the connection fee, which depends on the maximum load to be supplied (BTO, German Federal Regulation on Tariffs § 6 Section 4), when used in systems with continuous-flow heaters and electric storage heaters where the continuous-flow heaters are switched with priority.

Application

In mixed operation of electric hot water and electric storage heaters, the priority switch interrupts the charging procedure of the storage heater if hot water is required during the low-tariff time, thus limiting the connected load.


Technical specifications

Data acc. to EN 60669 (VDE 0632), BTO § 6 Section 4		5TT6 101	5TT6 102	5TT6 103
Rated control current I_c	A	40 ¹⁾	54 ¹⁾	6 ... 40 ¹⁾
Rated frequency	Hz	50		
Response currents	A	13 ²⁾	23 ²⁾	6
Rated operational power	for continuous-flow heaters up to 230 V AC to 3 × 230 V AC	kW 9 27	12 36	1.5 ... 9 4.5 ... 27
Rated impulse withstand voltage U_{imp}		kV > 2.5		
Rated operational voltage U_e		V AC 250		
Rated operational current I_e	at $U_e = 230$ V AC	A 1		
Terminals	+/- screw (Pozidriv)	1		
Conductor cross-sections	Coil, for conductor cross-sections up to Contact, for conductor cross-sections up to	mm ² 10 mm ² 2 × 2.5		
Permissible ambient temperature		°C -20 ... +40		
Resistance to climate	acc. to DIN 50 016	FW 24		

1) Current corresponds to the rating of the continuous-flow heater.

2) Continuous rise not permissible.

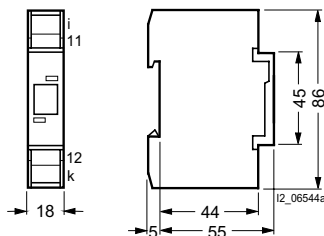
Selection and ordering data

	U_e V AC	I_e A	Response- current A	MW	Order No.	Weight 1 unit approx. kg	PS*/ P. unit Unit(s)
 5TT6 101	Priority switches, mounting depth 55 mm						
	for continuous-flow heaters up to 27 kW						
	230	40	13	1	5TT6 101	0.100	1
	for continuous-flow heaters up to 33 kW						
	230	54	23	1	5TT6 102	0.100	1
	for electronically controlled continuous-flow heaters up to 27 kW						
	230	40	6 ... 40	1	5TT6 103	0.100	1

Dimensional drawings

5TT6 10 priority switches

5TT6 101, 5TT6 102, 5TT6 103
with terminal cover



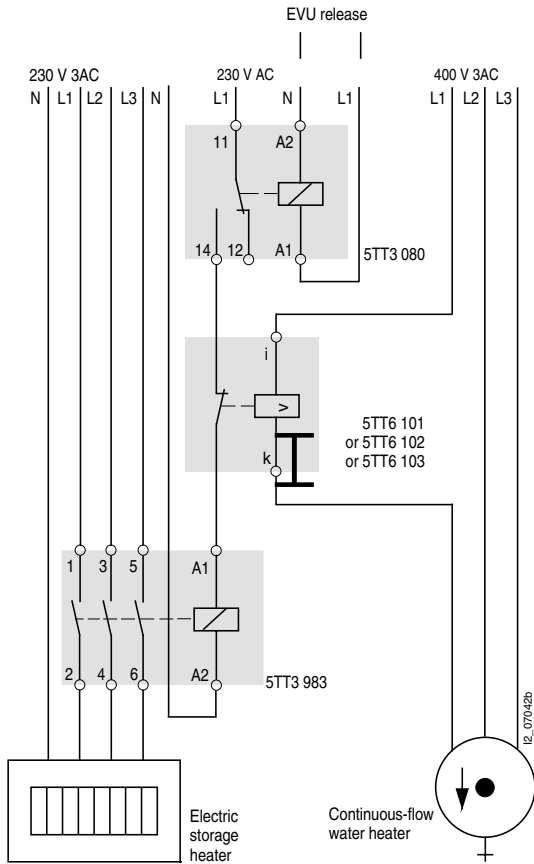
Schematics

Circuit diagram

5TT6 101
5TT6 102
5TT6 103



Switching example: 5TT6 10



In mixed operation of electric hot water and electric storage heaters, the priority switch interrupts the charging procedure of the storage heater if hot water is required during the low-tariff time, thus limiting the connected load.

Monitoring Devices

5TT3 47 insulation monitors for industrial applications

Overview

Version for AC voltage:

- For AC voltage systems from 0 to 500 V AC and 10 to 1000 Hz
- Adjustable alarm value 2 to 100 k Ω
- Electrical insulation of measuring circuit, power supply and contact voltage
- Also supports monitoring in current-free systems

Version for direct voltage:

- For direct voltage systems from 12 to 280 V DC
- Adjustable alarm value 2 to 200 k Ω
- Selective insulation-fault detection according to L+ and L-
- Electrical insulation of measuring circuit contact voltage

Both versions:

- Closed-circuit principle
- Adjustable fault storage and hysteresis
- LED display for operation and insulation faults
- With canceling and test button

Application

We recommend using insulation monitors in all non-grounded systems according to regulations:

- VDE 0100 Erection of power installations up to 1000 V
- VDE 0105 Operation of power installations up to 1000 V
- VDE 0113 Working and processing machines
- VDE 0118 Underground mining
- VDE 0168 Open-pit mining, quarries and others

Function

If the insulation resistance of the system falls below the value set at the device, the output relay drops out. If the insulation resistance improves after a while, the relay picks up again after a hysteresis.


Alternatively the response can be stored through wiring. The reset is then implemented by pressing a pushbutton or by briefly disconnecting the device.

Actuating the test button "Test" simulates an insulation fault so that the functionality of the device can be tested.

Technical specifications

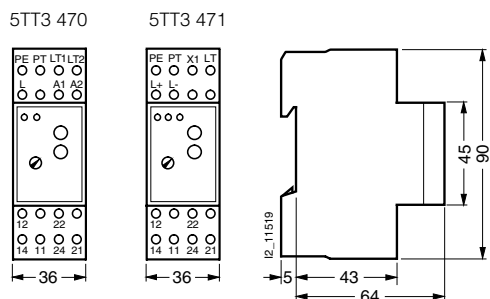
			5TT3 470	5TT3 471
Rated control voltage U_c		V AC V DC	220 ... 240 –	– 12 ... 280
Operating range $\times U_c$	for AC supply for DC supply		0.8 ... 1.1 –	– 0.9 ... 1.25
Frequency range for U_c		Hz	45 ... 400	–
Rated power dissipation P_v	for AC supply for DC supply	approx. VA approx. W	2 –	– 1
Rated impulse withstand voltage U_{imp}	terminals A1 to A2 terminals L to PE terminals A1, A2 to L, PE terminals against contacts	kV kV kV kV	< 4 < 4 < 4 < 6	< 4 < 4 < 3 < 6
Measuring circuits			for AC systems	for direct voltage systems
Measurement voltage range U_{meas}		V AC V DC	0 ... 500 –	– 12 ... 280
Operating range $\times U_{meas}$			0 ... 1.1	0.9 ... 1.1
Frequency range for U_{meas}		Hz	10 ... 1000	–
Alarm value	measuring shunt R_{AL}	k Ω	5 ... 10	5 ... 200
Setting of alarm value	on absolute scale		infinitely variable	infinitely variable
Alternating current internal resistance	internal testing resistor	k Ω	> 250	–
Direct current internal resistance	internal testing resistor L+ and L- acc. to PE	k Ω k Ω	> 250 –	– 75 each
Measurement voltage	internal	approx. V DC	15	–
Max. measurement current	short-circuit	mA	< 0.1	0.2 ... 4 depending on the voltage
Direct interference voltage	max. permissible	V DC	500	–
Response delay	at R_{AL} 50 k Ω and 1 μ F and ∞ up to 0.9 $\times R_{meas}$ and R_{meas} from ∞ to 0 Ω	s s	< 1.3 < 0.7	0.8 0.4
Switching hysteresis	at R_{meas} 50 k Ω	%	15	10 ... 15
Contacts	μ contact		2 CO contacts	2 CO contacts
Rated operational voltage U_e		V AC	250	250
Rated operational current I_e	thermal current limit I_{th} AC 13 at 24 V DC AC 13 at 250 V DC AC 15 AC 15 NO contact AC 15 NC contact	A A A A A A	4 – – – 5 2	– 3 0.2 3 – –
Terminals	+/- screw (Pozidriv)		2	2
Conductor cross-sections	rigid flexible with sleeve	max. mm ² min. mm ²	2 \times 2.5 1 \times 0.50	
Permissible ambient temperature		$^{\circ}$ C	-20 ... +60	
Degree of protection	IEC 60529, EN 60669	$^{\circ}$ C	IP20	
Resistance to climate	acc. to EN 60068-1		20 / 060 / 04	

Selection and ordering data

	U_c	U_e	Measuring range	MW	Order No.	Weight 1 unit approx.	PS*/P. unit
	V AC	V	k Ω			kg	Unit(s)
 <p>Insulation monitors with transparent caps For monitoring the insulation resistance in ungrounded AC and three-phase systems, from 10 ... 1000 Hz Contacts, 2 CO contacts</p>	250	0 ... 500 V AC	5 ... 100	2	5TT3 470	0.160	1
	250	12 ... 280 V AC	5 ... 200	2			

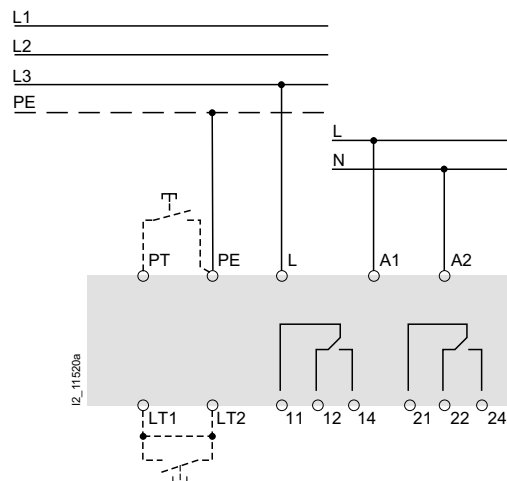
5TT3 470

Dimensional drawings



Schematics

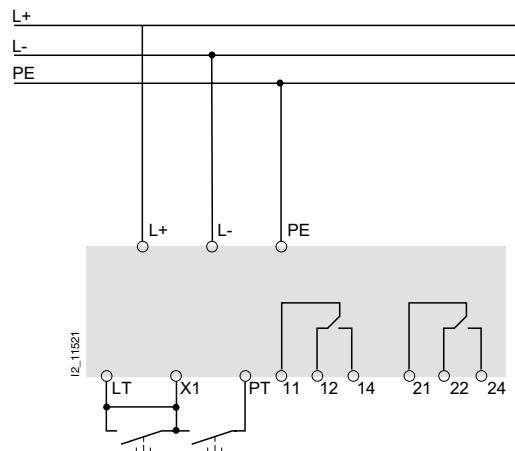
5TT3 470 for AC and three-phase systems



Switching example for monitoring a non-grounded system of 3 x 0 ... 500 V AC with a frequency of 10 ... 1000 Hz

The actuating voltage of terminals A1 – A2 can be taken from the system being monitored. However, in this case it is important to comply with the voltage range according to the technical specifications. With a jumper LT1 – LT2: a fault signal is not stored; the device is automatically released again if the insulation resistance improves. Without a jumper LT1 – LT2: the error message is stored; pressing the pushbutton terminals LT1 – LT2 clears the fault signal. Pressing the pushbutton terminals PT – PE simulates a fault.

5TT3 471 for direct voltage systems



Switching example for monitoring a non-grounded direct voltage system 12 ... 280 V DC

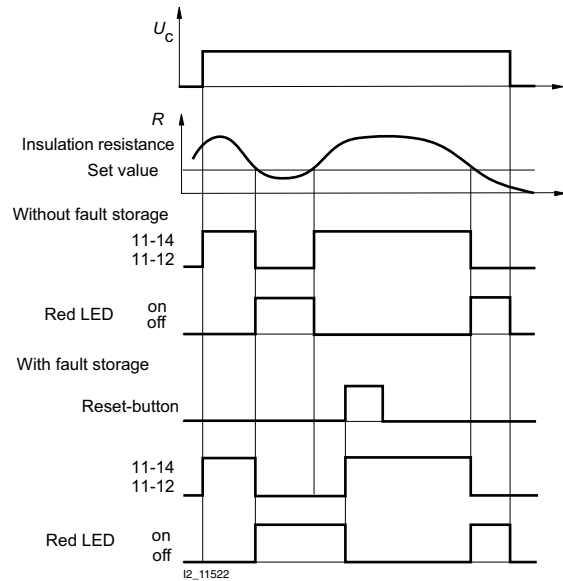
The actuating voltage for the terminals L+ and L- is also the measurement voltage. With a jumper LT – X1: a fault signal is not stored; the device is automatically released again if the insulation resistance improves. Without a jumper LT – X1: the error message is stored; pressing the pushbutton terminals LT – X1 clears the fault signal. Pressing the pushbutton terminals PT – X1 simulates a fault.

5TT3 47 insulation monitors for industrial applications

More information

Function chart

5TT3 470, 5TT3 471



5TT3 470 for AC and three-phase systems

While direct interference voltages do not damage the devices they often interfere with conditions in the measuring circuit. In a system being monitored, only one insulation monitor should be connected. This must be taken into account if gateways are used.

System capacitances against the protective ground do not corrupt the insulation measurement as these are implemented with direct current. However, it may extend the response time in the event of an insulation fault, primarily in the case of the time constant RE times CE . The auxiliary power of the insulation monitor can be taken from a separate system or from the one being monitored. In this case the voltage range of the auxiliary power input must be taken into account.

LEDs:

- Green LED lights up if actuating voltage U_c is applied.
- Red LED lights up in the event of an insulation fault.

5TT4 71 for direct voltage systems

The insulation monitor can be installed in systems with higher leakage capacitance against PE. In the case of high resistance alarm values, a transient alarm signal may occur when switching on the system being monitored due to an existing ground leakage capacitance.

For the following set values for R , these values for the CE capacitance are approx.:

- $R = 200 \text{ k}\Omega$: $CE > 0.8 \text{ }\mu\text{F}$
- $R = 50 \text{ k}\Omega$: $CE > 2.0 \text{ }\mu\text{F}$
- $R = 20 \text{ k}\Omega$: $CE > 4.5 \text{ }\mu\text{F}$

In these applications, you should work without an alarm storage.

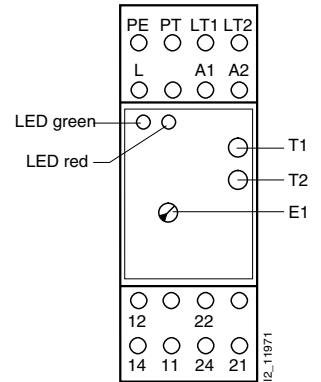
Due to the measuring function with bridge circuit, the insulation monitor does not respond in the event of a simultaneous, exactly symmetric ground fault of $L+$ and $L-$. However, exactly symmetric ground faults are highly unlikely in practice.

LEDs:

- Green LED lights up if actuating voltage U_c is applied
- Red LED 1 lights up for insulation fault $L+$ against PE
- Red LED 2 lights up for insulation fault $L-$ against PE

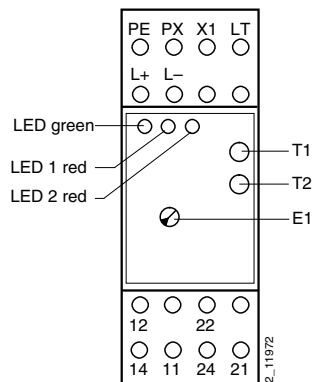
Front views

5TT3 470



- LED green: status display (ON)
- LED red: insulation fault (AL)
- E1: alarm value adjuster (RAL)
- T1: Test
- T2: Reset

5TT3 471



- LED green: status display (ON)
- LED 1 red: insulation fault $L-$ ($RE-$)
- LED 2 red: insulation fault $L+$ ($RE+$)
- E1: alarm value adjuster (RAL)
- T1: Test
- T2: Reset

Overview

7LQ3 350 insulation monitors

The 7LQ3 350 insulation monitor is a combination monitoring device for:

- Insulation monitoring of an AC IT system
- Load current monitoring of an IT system transformer up to 50 A
- Monitoring of an IT system transformer for a non-permissible temperature rise

Device features:

- Adjustable response value 50 kΩ to 500 kΩ
- Load and temperature monitoring
- Alarm LED
- Connection monitoring for system, ground, current transformer and temperature sensor
- TEST pushbutton
- RS485 interface
- Group alarm relay with floating CO contact
- Illuminated plain text display

7LQ3 351 signaling and test combinations

The 7LQ3 351 signaling and test combination serves the display of status and error messages of the insulation monitor.

7LQ3 352 power supply units

The 7LQ3 352 power supply unit serves the supply of the 7LQ3 351 signaling and test combination with a power supply of 20 V AC and a total power input of maximum 9 VA.

7LQ3 353 measuring current transformers

The 7LQ3 353 measuring current transformers are used for monitoring power supplies on medical premises. They record the load current and convert it into a usable signal for evaluation devices.

Application

7LQ3 350 insulation monitors

The 7LQ3 350 insulation monitors are used for monitoring the insulation resistance of non-grounded systems on medical premises, such as hospitals, doctors' surgeries and outpatient treatment centers. They also simultaneously monitor the load current and the temperature of the IT system transformer. Used together with the 7LQ3 351 signaling and test combination they comply with the demands of the standards DIN VDE 0100, Part 710 (VDE 0100-710):2002-11 and IEC 60364-7-710:2002-11.

7LQ3 351 signaling and test combinations

The alarm and event messages output by the 7LQ3 350 insulation monitors are displayed by the 7LQ3 351 with different LEDs and acoustic signals.

7LQ3 352 power supply units

This supplies a maximum of 3x 7LQ3 351 signaling and test combinations.

7LQ3 353 measuring current transformers

The measuring current transformer converts currents with a transformation ratio of 50/0.05. The measuring current transformer is connected to terminals k and l of the 7LQ3 350 insulation monitor.

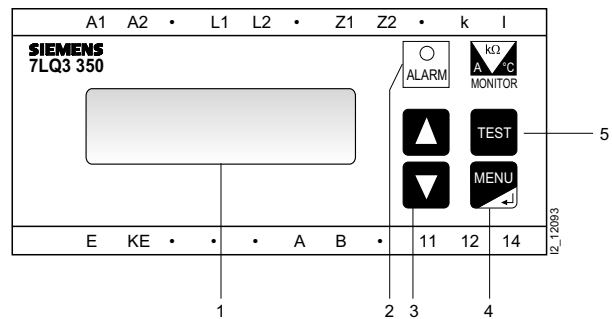
Measuring range:

- Primary rated current min. 0.5 A
- Primary rated current max. 50 A

Function

7LQ3 350 insulation monitors

- Insulation monitoring
The device measures the insulation resistance in single-phase AC IT systems, which may also contain DC components. Adaptation to the system leakage capacitance (max. 5 μF) is automatic.
- Load current measurement
In AC systems, a measuring current transformer records the load current.
- Temperature measurement
The temperature in the transformer development is recorded over PTC thermistor or NC contacts.
- Evaluation
If one of the values is outside the limit values, an alarm (group message) is triggered. The "ALARM" LED lights up, the alarm relay switches and a message appears in the LCD. This alarm is forwarded to the 7LQ3 351 signaling and test combination over the measuring device interface link.



Legend for control elements

- 1 Illuminated text display (2 x 16 characters).
- 2 "ALARM" LED (yellow) lights up if a response value is exceeded.
- 3 Arrow keys
In display mode: no function.
In menu mode: for navigation within the menu and for changing parameters.
- 4 "MENU/ENTER" pushbutton
In display mode: for switching from display mode to menu mode.
In menu mode: for confirming the selected menu items or confirming the selected parameters.
- 5 "TEST" pushbutton
In display mode: activates the TEST function (self-test).
In menu mode: from any position, returns you to the display mode. If pressed while changing a parameter, the last change is not saved.

Monitoring Devices

7LQ3 35 insulation monitors for medical premises

Function

7LQ3 351 signaling and test combinations

The following is shown on LEDs:

- Ready to run (green)
- Insulation fault (yellow)
- Overload (yellow)
- Overtemperature (yellow)
- CPU malfunctions of the 7LQ3 351 and the 7LQ3 350

Self-test

The TEST pushbutton can be used to start a self-test of the 7LQ3 351 and the respective insulation monitoring device. If the TEST pushbutton is pressed for longer than one second, all the respective LEDs light up. If the TEST pushbutton is released, the lamp test is terminated.

At the same time, the respective connected 7LQ3 350 insulation monitor receives a command over the measuring device interface link to carry out its own self-test. The alarms are shown after a few seconds by the LEDs of the signaling combination. The internal buzzer also sounds. The signaling combination then switches back to normal mode.

The messages of the self-test are only displayed on the signaling and test combination at which the test was triggered.

Muting the alarm buzzer

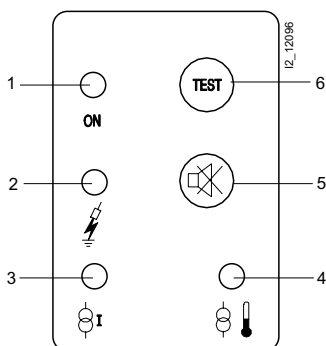
Pressing the "Mute" pushbutton silences the alarm buzzer.

By adjusting the jumper, the buzzer can be reactivated at three different times.

Parameter assignment

The 7LQ3 351 signaling and test combination has one DIP switch and a 4-position jumper for the purpose of parameter assignment.

Display and control elements

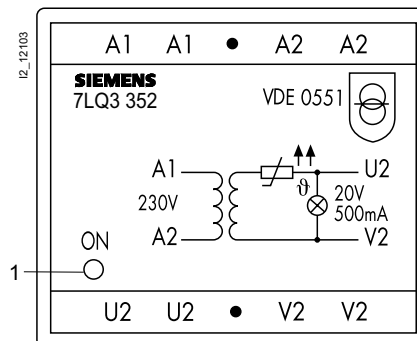


LED/push-button	Meaning
1 LED "ON"	Status display
2 LED	Alarm signal: insulation fault
3 LED	Alarm signal: overload
4 LED	Alarm signal: overtemperature
5 Pushbutton	Mute alarm buzzer
6 "TEST" push-button	Triggers self-test and test for connected insulation monitoring device

7LQ3 352 power supply units

A 230 V AC power supply is connected to terminals A1/A2. A 20 V AC output voltage is available at terminals U2/V2. Input and output terminals are available in pairs so that several 7LQ3 352 can be switched in parallel. However, the A1/A2 and U2/V2 are not interchangeable.

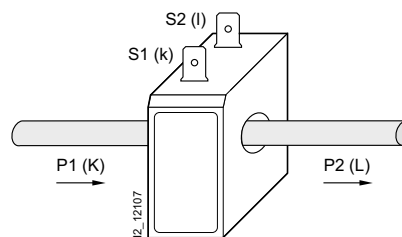
The secondary circuit of the in-built safety transformer is protected by a PTC thermistor.



- 1 The "ON" LED (green) lights up when the power supply unit is in operation.

7LQ3 353 measuring current transformers

The 7LQ3 353 measuring current transformer monitors the load current of a phase for the incoming supply of medical premises. The evaluation is implemented over the 7LQ3 350 insulation monitor (for example).



- P1 (K) from the power supply unit
 P2 (L) to the load
 S1 (k), S2 (l) measuring current transformer connections

Technical specifications

		7LQ3 350 insulation monitors	7LQ3 351 signaling and test combinations	7LQ3 352 power supply units	7LQ3 353 measuring current transformers
Co-ordination of insulation acc. to IEC 60664-1					
Rated voltage	V AC	250	250	250	500
Rated impulse voltage/degree of soiling	kV	4	4	4	2.5
Degree of pollution		3	3	3	
Voltage ranges					
Rated system voltage U_n	V	230			
Rated frequency f_n	Hz	50 ... 60			
Power supply U_s	V	230	24	230	–
Operating range U_s	V	0.85 ... 1.15 x U_s	12 ... 28	0.85 ... 1.1 x U_s	–
Power consumption max.	VA	3	2.5		–
Secondary fuse (internal)		–		PTC thermistor	–
Output voltage AC, 50 ... 60 Hz	V AC	–	–	20	–
Output frequency	Hz	–	–	50 ... 60	–
Max. total rated output	VA	–	–	9	–
General Data					
EMC immunity to interference acc. to		EN 61326	EN 61000-6-2	EN 61000-6-2	–
EMC emitted interference acc. to		EN 61326	EN 61000-6-4	EN 61000-6-4	–
Shock resistance acc. to IEC 60068-2-27 (device in operation)	g/ms	15/11			
Bumping acc. to IEC 60068-2-29 (transport)	g/ms	40/6			
Vibration strain acc. to IEC 60068-2-6					
• Device in operation	g/Hz	1/10 ... 150			
• Transport	g/Hz	2/10 ... 150			
Ambient temperature					
• Operation	°C	-10 ... +55	-5 ... +55	-5 ... +50	0 ... +85
• Transport	°C	-40 ... +70	-25 ... +60	-25 ... +60	-40 ... +85
Climatic category acc. to DIN IEC 60721-3-3		3K5			
Operating mode		continuous duty			
Mounting position		any			
Type of connection		terminal blocks			FASTON connector 6.3 x 0.8
Tightening torque	Nm lb. in	0.5 ... 0.6 4.3 ... 5.3			–
Connection capacity					
• Rigid	mm ²	0.2 ... 4			–
• Flexible	mm ²	0.2 ... 2.5			–
• Flexible with end sleeve	mm ²	0.25 ... 2.5			–
Conductor size (AWG)	AWG	24 ... 12	–	24 ... 12	–
Degree of protection acc. to EN 60529					
• Built-in components		IP30	IP50	IP30	–
• Terminals		IP20	IP20	IP20	–
Screw-type attachment		2 x M4	–	2 x M4	–
Quick fastening onto DIN-rail acc. to		IEC 60715	–	IEC 60715	–
Flammability class		UL 94V-0	UL 94V-0	UL 94V-0	–
Weight approx.	kg	0.400	0.150	0.360	–
Installation		screw mounting, DIN-rail, distribution boards	flush mounting, cable duct, panel	screw mounting, DIN-rail, distribution boards	–
Housing type		–	flush-mounting enclosure	–	–
Standard		–	–	–	IEC60044-1
Measuring circuit insulation monitoring					
Response value R_{resp}	k Ω	50 ... 500	–		
Response deviation	%	0 ... +10	–		
Response time t_{resp}					
• At $RF = 0.5 \times R_{resp}$	s	3	–		
• At $C_e = 1 \mu F$	s	3	–		
Hysteresis	%	25	–		
Measurement voltage U_m	V	≤ 12	–		
Measurement current $I_{m \max}$ (at $RF = 0 \Omega$)	μA	≤ 50	–		
Internal resistance DC R_i	k Ω	≥ 240	–		
Impedance Z_i at 50 Hz	k Ω	≥ 200	–		
Permissible direct interference voltage $U_{fg} = DC$	V	≤ 375	–		
Permissible system leakage capacitance C_e	μF	≤ 5	–		
Measuring circuit load current monitoring					
Response value	A	5 ... 50	–		
Hysteresis	%	4	–		
Temperature influence	%/°C	< 0.15	–		
Measuring circuit temperature monitoring					
Response value	k Ω	4	–		
Release value	k Ω	1.6	–		
PTC thermistor acc. to DIN 44081, max.	Unit(s)	6 in series	–		

Monitoring Devices

7LQ3 35 insulation monitors for medical premises





Technical specifications

		7LQ3 350 insulation monitors	7LQ3 351 signaling and test combinations	7LQ3 352 power supply units	7LQ3 353 measuring current transformers
Display and control elements					
Display (illuminated)		LCD	–		
Characters		2 x 16	–		
• Number of rows x characters	mm	3.5	–		
• Height					
Display area measured value	kΩ	10 ... 5000	–		
Operating error		acc. to IEC 61557-8	–		
LEDs		–	ON, insulation fault, overload, overtemperature	–	
Pushbuttons		–	isometer test buzzer muting	–	
Interfaces					
Interface		RS 485	RS 485/terminals A/B	–	
Cable length, max.	m	1200	1200	–	
Recommended cable (shielded, shield single-sided at PE)		JY(ST)Y 2 x 0.6	JY(ST)Y 2 x 0.6	–	
Terminating resistor	Ω	120 (0.25 W)	120 (0.5 W)	–	
Device address		2	1, 3 ... 7	–	
Switching elements					
Alarm relay		1 CO contact	–		
Method of operation, adjustable		quiescent current or working current	–		
Factory presetting		working current	–		
Electrical service life	switch- ing cycles	12000	–		
Contact class IIB (IEC60255-0-20)		IIB (IEC 60255-0-20)	–		
Rated contact voltage					
• AC	V	250	–		
• DC	V	300	–		
Making capacity					
• AC	A	5	–		
• DC	A	5	–		
Breaking capacity at					
• 230 V AC, p.f. = 0.4		2	–		
• 220 V DC, L/R = 0.04 s		0.2	–		
Connecting cable to measuring current transformer					
Cable length, max.					
• Individual wires = 0.75 mm ²	m	–			1
• Individual wires, twisted = 0.75 mm ²	m	–			10
• Shield cable = 0.6 mm ² (shield single-sided at PE) e.g. JY(ST)Y 2 x 0.6	m	–			40
Screw-type attachment		–			M3
Flammability class		–			UL 94V-0
Measuring circuit					
Rated transmission ratio k_n	A	–			50/0.5
Rated load	Ω	–			65
Primary rated current					
• min.	A	–			0.5
• max.	A	–			50
Rated output	VA	–			2
Rated frequency	Hz	–			50 ... 400
Internal resistance	Ω	–			23
Accuracy class		–			1
Thermal rated continuous current	A	–			60
Thermal rated short-time current (1 s)	A	–			300
Dynamic rated current (30 s)	A	–			600



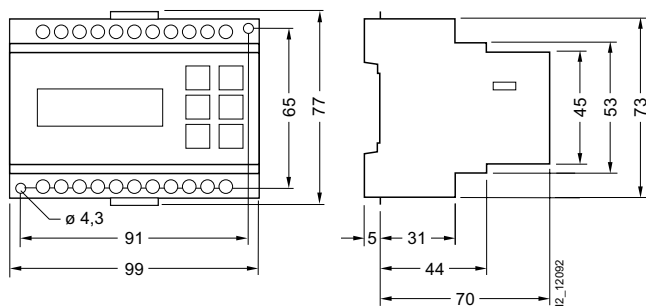
7LQ3 35 insulation monitors for medical premises

Selection and ordering data

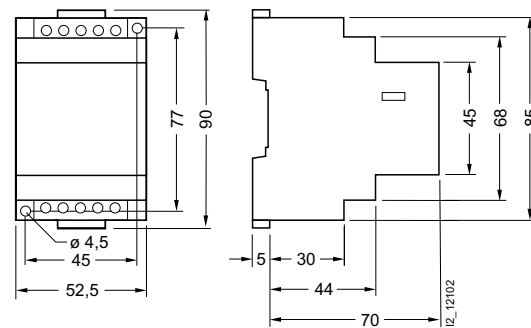
	U_e	MW	Order No.	Weight 1 unit approx.	PS*/ P. unit
	V AC			kg	Unit(s)
 <p>Insulation monitors with load and temperature monitoring Contacts, 2 CO contacts Response value 50 ... 500 kΩ</p>	250	5.5	7LQ3 350	0.523	1
 <p>Signaling and test combinations With flush-mounting box</p>	250		7LQ3 351	0.250	1
 <p>Power supply units</p>	250	3	7LQ3 352	0.560	1
 <p>Measuring current transformers 50 A/50 mA AC With snap-in base, mounting bracket, tapping screws 3 x 8, capscrews M3 x 6, connectors Measuring range 0.5 ... 50 A</p>	250		7LQ3 353	0.100	1

Dimensional drawings

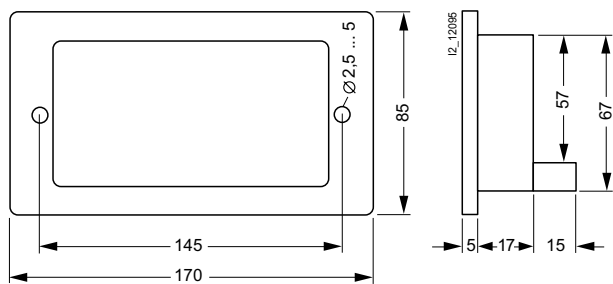
7LQ3 350 insulation monitors with transformer monitoring



7LQ3 352 power supply units



7LQ3 351 signaling and test combinations

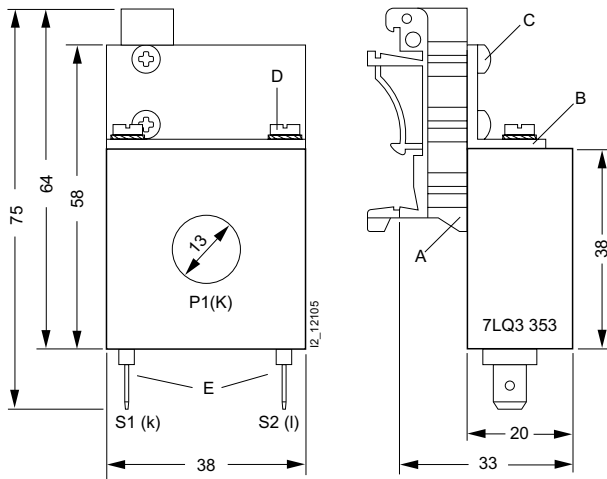


7LQ3 35 insulation monitors for medical premises

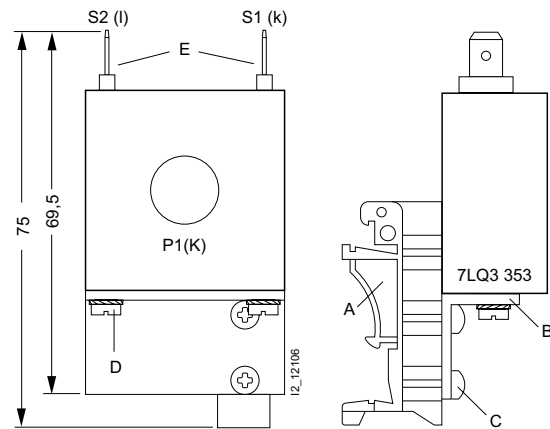
Dimensional drawings

7LQ3 353 measuring current transformers

Mounting option 1



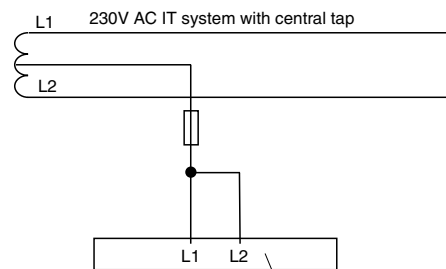
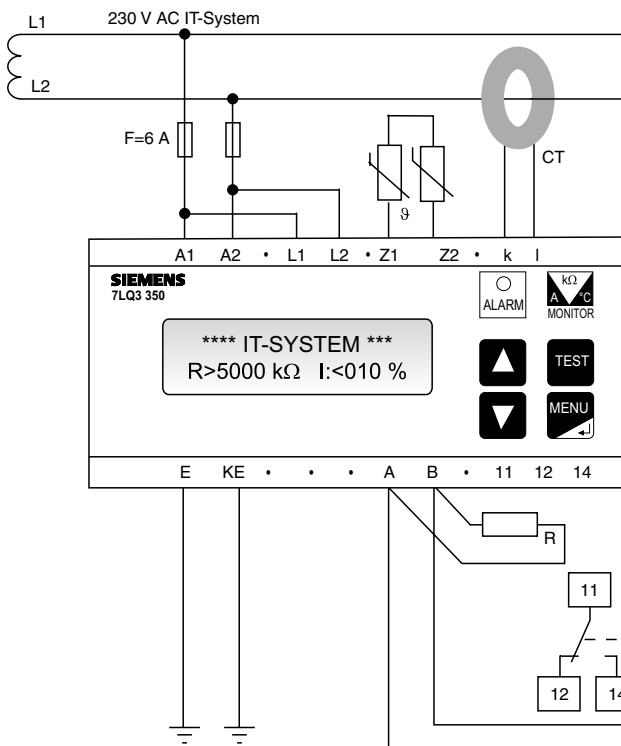
Mounting option 2



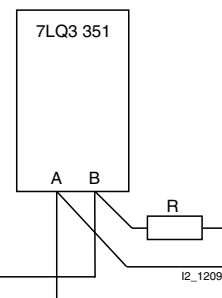
- A Snap-in base
- B Mounting bracket
- C Tapping screw 3 mm x 8 mm
- D Cap screw M3 x 6 mm
- E Connector
- P1 (K) from the power supply unit
- P2 (L) to the load
- S1 (k), S2 (l) measuring current transformer connections

Schematics

7LQ3 350 insulation monitors with transformer monitoring



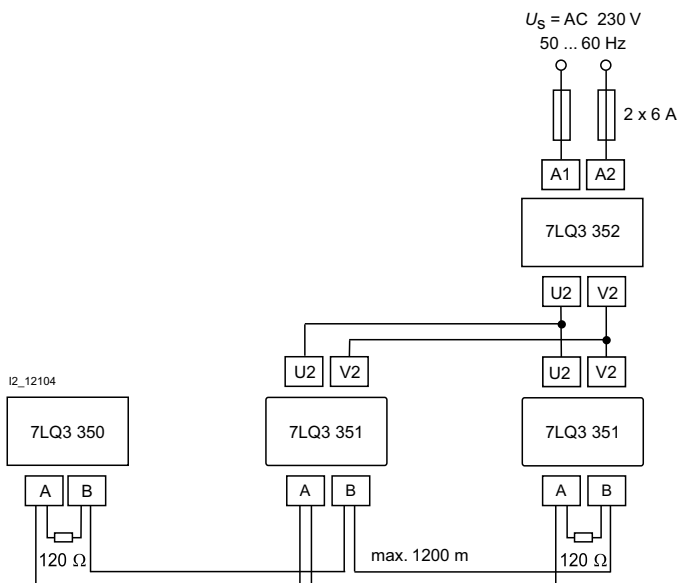
Only connections are shown, which differ from the drawing on the left.



- | | | | |
|------------|---------------------------------------|----------|---|
| A1, A2 | Connection of the power supply U_s | F | Back-up fuse 6 A (power supply U_s) |
| L1, L2 | Connection of monitored system | CT | 7LQ3 353 measuring current transformers for load current monitoring |
| Z1, Z2 | Connection of temperature monitoring | δ | PTC thermistors (or NC contact) in the transformerwinding, max. 6 PTC thermistors may be connected in series |
| k, l | Connection of load current monitoring | K | Alarm relay without error memory for indication of insulation, over-current, overtemperature and CPU malfunctions |
| E, KE | Dual connection to PE | | |
| A, B | Link of measuring device – interface | | |
| 11, 12, 14 | Connection of alarm relay K | | |

Schematics

7LQ3 351 signaling and test combinations



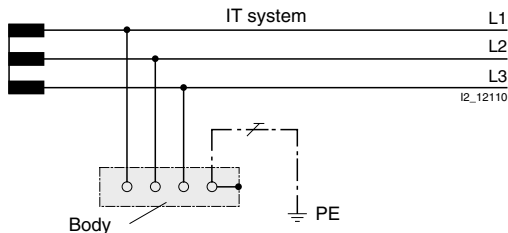
- 7LQ3 350 Insulation monitors
- 7LQ3 351 Signaling and test combinations for insulation monitors
- 7LQ3 352 Power supply units for insulation monitors
- A1, A2 Connection of the power supply U_s
- U2, V2 Output voltage

More information

IT system

In the IT system designation, the first letter describes the grounding conditions of the power source. I stands for insulation of all live parts from the ground or the linking of a point to the ground over an impedance.

The second letter designates the grounding conditions of the body of the electrical plant. T means that the body is directly grounded, independently of any existing grounding of a point of the power source.

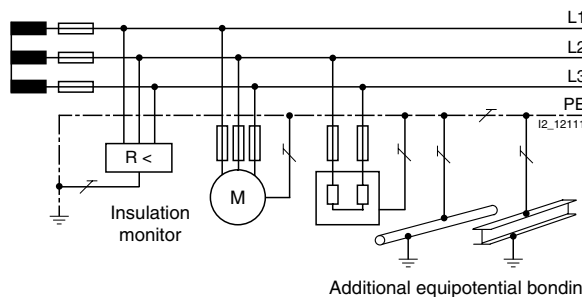


IT system according to DIN VDE 0100-300:1996-01/IEC 364-3: 1933 and DIN VDE 0100 Part 300/IEC 60364-3

The IT system with additional equipotential bonding and insulation monitor

The IT system is powered over an isolating transformer or an independent power source (e.g. a battery). The special feature here is the fact that no active conductor is directly linked to the ground in this system. This has the advantage that only a small residual current can flow in the event of an insulation fault. This is largely due to the system leakage capacitances. The upstream fuse does not respond so that the power supply, and therefore operation, is maintained, even in the event of a single-pole ground fault.

The high reliability of an IT system is ensured by continuous insulation monitoring. The insulation monitor detects insulation faults as they develop and signals in good time if a value falls below a limit value, before any further insulation faults can lead to an unexpected shutdown.



Typical configuration of an IT system with additional equipotential bonding and insulation monitoring

7LQ3 35 insulation monitors for medical premises

More information

Electrical safety for man and machine

Insulation resistance is of key importance when considering the protection objectives. Without sufficient insulation resistance:

- The protection cannot be guaranteed in the event of direct and/or indirect contact
- Safety measures against overcurrent or residual currents will continuously lead to shutdowns
- Short-circuit current and ground-fault current fires may occur and destroy plants or plant sections
- High costs are incurred due to shutdowns and damage

What influences the insulation resistance?

Electrical influences:

- Static overvoltage
- Transient overvoltage
- Frequency changes
- Effects of lighting
- Overcurrent
- Voltage waveform

Mechanical influences:

- Shocks, surges
- Kinks, bending
- Vibrations
- Penetration of foreign bodies

Environmental influences:

- Climate
- Humidity, temperature
- Chemical influences
- Pollution, dust, oil
- Corrosive exhaust air, vapor
- Aging

Other influences:

- Animals (e.g. biting)
- Plants
- Incorrect connection

Result of insulation faults

Danger to persons due to

- High touch voltage
- Risk of injury

High costs due to

- Absence of personnel due to injury
- Shutdowns
- Damage to equipment

Risk of fire/explosions due to

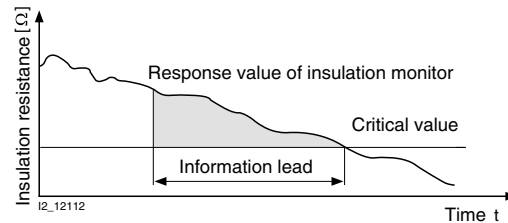
- Electric arcs
- Heat

Shutdowns due to

- Unwanted shutdowns
- Defective devices
- Maloperation

Information lead in the IT system

Early information on falling insulation resistance is crucial, particularly in highly sensitive areas, such as that of medical engineering. The insulation monitors in IT systems provide the necessary information lead.



Information lead in the IT system

Principle of operation of insulation monitors

The insulation monitor is connected between the active conductors and ground (PE conductor) and superimposes a measurement voltage onto the system. This may be a direct voltage or a pulsing voltage, depending on the system to be monitored. If an insulation fault occurs, the measuring circuit closes, a small measurement current flows. This measurement current is a measure for the insulation resistance and is evaluated by the device electronics.

Measuring accuracy

Modern systems contain a broad interference spectrum, which can often prevent or corrupt the measurement of the insulation resistance. However, due to the use of cutting edge measurement techniques and carefully selected components, Siemens monitoring devices are able to blank out such interferences and produce accurate measurements of the insulation resistance. A key feature is our patented AMP measuring method, which is used in all IT systems, particularly in IT systems with converters.

Overview

- For AC and three-phase loads, such as motors
- Adjustable p.f. response value, from 0 to 0.97
- Current range up to 8 A
- For motors up to approx. 5 A, phase-sequence independent
- Suitable for transformer connection
- LED display for operation and alarm
- Automatic resetting of alarm

Application

Monitoring of asynchronous motors for underload and no-load operation, e.g. for fan monitoring in the case of V-belt breakage, for monitoring filters in the event of filter blockages, for pump monitoring in the event of valve closure or dry runs, or for general power factor monitoring.

Function


The p.f. monitors monitor the phase displacement between current and voltage. Because the phase displacement angle changes with the load of the motor, this measurement method is ideal for the monitoring of asynchronous motors for underloading and no-load operation, independent of size. However, in some cases, the p.f. barely changes if the load of the motor changes, e.g. in the case of relatively minor load changes on large-scale motors or single-phase split-pole motors or collector motors.

If the p.f. value set at the p.f. monitor is fallen below for the duration of the set response delay, the output relay switches to the alarm state and the red LED lights up. If it exceeds the p.f. value, the output relay switches back without any significant delay.

Technical specifications

			5TT3 472
Rated control voltage U_c		3 V AC	400
Operating range $\times U_c$	for AC supply		0.8 ... 1.1
Frequency ranges		Hz	45 ... 65
Rated power dissipation P_V		approx. VA	11
Rated impulse withstand voltage U_{imp}	against contacts	kV	< 4
Current measuring circuits			for AC systems
Current measuring range I_{meas}		A AC	0.4 ... 8
Short-time overload capability	for 2 s for 0.5 s	A A	20 40
Current transformer , Class 3 or better	secondary current	A	1 or 5
Setting ranges	adjustable	p.f.	0 ... 0.97
Response delays	adjustable	s	1 ... 100
Contacts	μ contact		1 CO contact
Rated operational voltage U_e		V AC	250
Rated operational current I_e	thermal current 15 AC NO contacts 15 AC NC contacts 13 AC at 24 V DC	A A A A	4 3 1 1
Short-circuit strength	fuse 4 A gL	A	4
Minimum contact loads		V/mA	10/100
Terminals	+/- screw (Pozidriv)		2
Conductor cross-sections	rigid flexible with sleeve	max. mm ² min. mm ²	2 \times 2.5 1 \times 0.5
Permissible ambient temperature		°C	-20 ... +60
Degree of protection	acc. to EN 60529		IP20
Resistance to climate	acc. to EN 60068-1		20/060/04

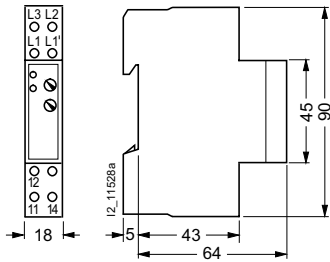
Selection and ordering data

	I_e	U_c	Measuring range	MW	Order No.	Weight 1 unit approx.	PS*/P. unit
	A	V AC	A AC			kg	Unit(s)
 <p>P.f. monitors with transparent cap For monitoring of the underload of motors up to approx. 5 A AC by making p.f. measurements, setting range p.f. from 0 to 0.97 Contact, 1 CO contact</p>	4	3 \times 400	0.4 ... 8	1	5TT3 472	0.065	1

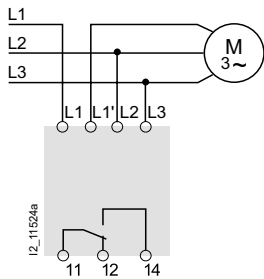
Monitoring Devices

5TT3 472 p.f. monitors

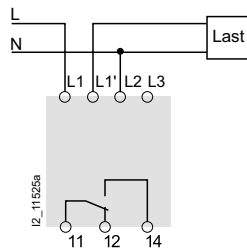
Dimensional drawings



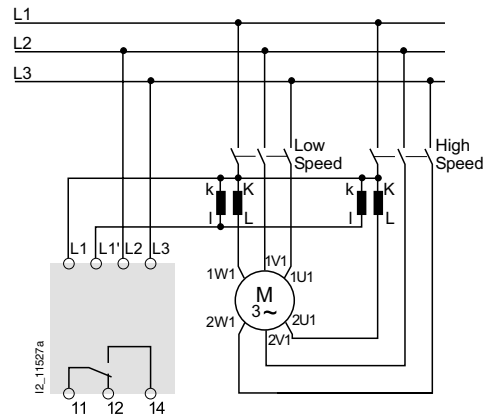
Schematics



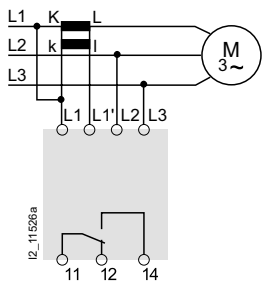
Connection of three-phase load



Connection of single-phase load



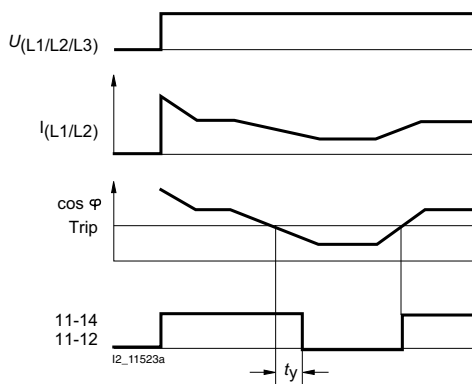
Connection of motors with separate windings



Connection of three-phase load with external current transformer. Whereby the winding sense of the current transformer must be taken into account.

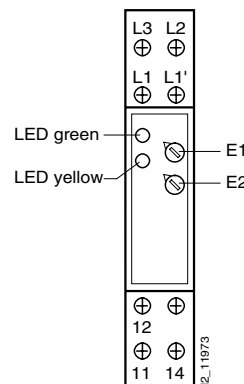
More information

Function chart



If the p.f. value set at the p.f. monitor has fallen below for the duration of the set response delay, the output relay switches to the alarm state and the red LED lights up. Contact 11-14 closes and the red LED lights up.

Front view



LED 1 green: Status display (U)

LED 2 yellow: Underloading indicator (p.f. alarm)

E1: Response value

E2: Response delay t_y

Overview

- 3 electrode connections for 1-step and 2-step level control
- All current products can be used as electrodes
- High immunity to interference of the measuring circuit isolated from the system
- Max. cable length to the electrodes: 1500 m
- Large setting range: 2 to 450 k Ω which enables differentiation between foam and liquid
- Programmable for open-circuit principle (with jumper X2 COM) or closed-circuit principle (without jumper)
- Separately adjustable delay times for $t_{v \min.}$ and $t_{v \max.}$, 0.2 to 2 s

Application

Level monitoring and control of conductive liquids and powders, e.g. maximum and minimum levels, overflow and dry run protection. Monitoring and control of mixture ratio of conductive liquids. General resistance monitoring tasks, e.g. temperature limit detection with PTC.

LED displays:

- Green LED: lights up if operational voltage is applied
- Yellow LED: lights up if MIN output relay is activated
- Red LED: lights up if MAX output relay is activated.



Technical specifications

Data acc. to DIN VDE 0435-110, IEC 60255			5TT3 435
Rated control voltage U_c	V AC		230
Operating range $\times U_c$			0.8 ... 1.1
Rated frequency	Hz		50/60
Setting range of the liquid level	k Ω		2 ... 450
Switching point hysteresis of set value	at 450 k Ω	%	3
	at 2 k Ω	%	6
Voltage temperature influence	from set value	%	< 2
Max. cable length to the Electrodes at 100 μF/km	Setting value k Ω		
	450	m	50
	100	m	200
	35	m	500
	10	m	1500
	5	m	3000
Electrode voltage, max.	AC	V	approx. 10
Electrode current, max.	AC	mA	approx. 1.5
Response delay	adjustable	s	0.2 ... 20
OFF-delay	adjustable	s	0.2 ... 20
Rated operational voltage U_e		V	250
Rated operational current I_e		A	5
Test voltage	input/auxiliary circuit	kV	4
	input/output circuit	kV	4
	auxiliary/output circuit	kV	4
Terminals	+/- screw (Pozidriv)		2
Conductor cross-sections	rigid	max. mm ²	2 \times 2.5
	flexible with sleeve	min. mm ²	1 \times 0.5
Permissible ambient temperature		$^{\circ}$ C	-20 ... +60
Resistance to climate	acc. to EN 60068-1		20/60/4

Monitoring Devices

5TT3 435 level relays

Selection and ordering data

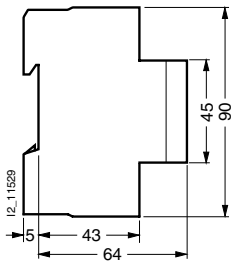
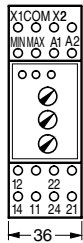
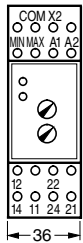
	U_e	I_e	U_c	MW	Order No.	Weight 1 unit approx. kg	PS*/ P. unit Unit(s)
	V AC	A	V AC				
 <p>Level relays with transparent caps</p>	230	4	230	2	5TT3 435	0.162	1
 <p>Immersion electrodes</p> <ul style="list-style-type: none"> Made of stainless steel, with PG13 sealing cap Temperature range 0 ... 60 °C Suitable for pure water in open containers <p>With terminal connection</p>					5TG8 223	0.100	1

Dimensional drawings

5TT3 43 level relays

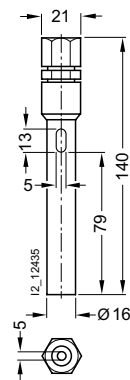
5TT3 430

5TT3 435



5TG8 223 immersion electrodes

5TG8 223



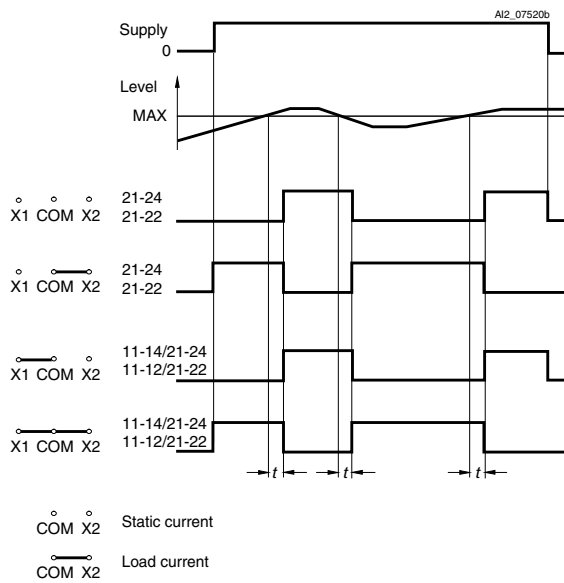
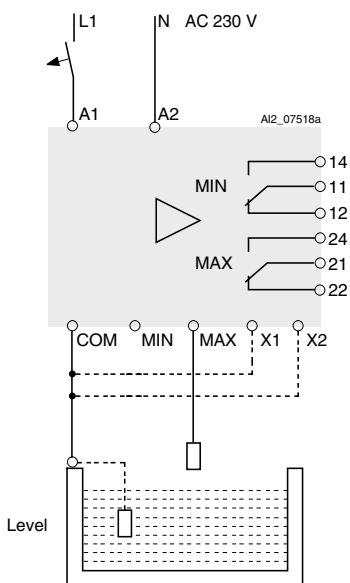
Schematics

Circuit diagram



Switching example: 5TT3 435

One-step level control



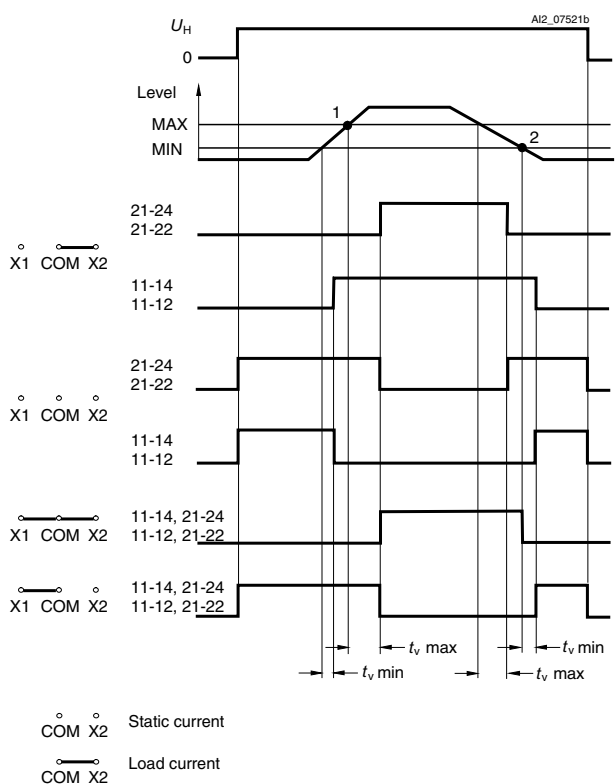
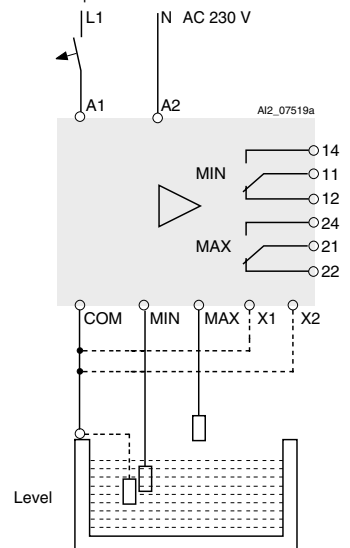
$t = t_{v \max}$ adjustable from 0.2 s to 20 s

The one-step level control is particularly suitable for dry run or overrun protection with free inflow/outflow.

The COM reference electrode and the MAX electrode are required.

Without jumper X1-COM, only relay 21-22-24 switches. With jumper X1-COM, both relays switch together.

Two-step level control



$t_{v \max}$ and $t_{v \min}$ adjustable from 0.2 s to 20 s

The 2-step level control keeps the liquid level between a minimum and a maximum level. Three electrodes are required: MIN, MAX and COM.

Without the jumper X1-COM, switching is as follows:

- If the max. level has fallen below/exceeded, only relay 21-22-24 switches.
- If the min. level has fallen below/exceeded, only relay 11-12-14 switches.

With the jumper X1-COM, both relays switch together if the max. level has exceeded or the min. level has fallen below.

5TT3 43 thermistor motor protection relays

Overview

- For the detection of
 - temperature limits being exceeded
 - wire breaks in sensor circuits
- 1 input for 1 to 6 thermistors
- With 2 LEDs green/yellow for ready-to-run and fault
- Response value: 3.2 to 3.8 k Ω
- Release value: 1.5 to 1.8 k Ω
- Max. cable length of sensor supply cable NYM 2 x 1.5 is 100 m
- Remote reset: over A1/A2 (NC contact) or over X1/X2 (NO contact)

Application

For the prevention of thermal motor overloads, e.g. due to high switching frequency, single-phasing, disabled cooling or excessive ambient temperatures.

LED displays:

- Green LED: lights up if operational voltage is applied
- Red LED: lights up in the event of excess temperatures or an interruption in the sensor circuit

Technical specifications

Data acc. to DIN VDE 0435-110, IEC 60255		5TT3 431 5TT3 432
Rated control voltage U_c	V AC	230
Operating range x U_c		0.9 ... 1.1
Rated frequency	Hz	50/60
Response values	k Ω	3.2 ... 3.8
Release values	k Ω	1.5 ... 1.8
Rated operational voltage U_e	V AC	230
Rated operational current I_e	A	5
Minimum contact load	V/mA	10/100
Rated insulation voltage U_i	between coil/contact	kV 4
Contacts	μ contact (AC-11)	A 3
Electrical isolations	creepage and clearances actuator/contact	mm 4
Rated impulse withstand voltage U_{imp}	actuator/contact	kV > 2.5
Terminals	+/- screw (Pozidriv)	1
Conductor cross-sections	rigid flexible with sleeve	max. mm ² 2 x 2.5 min. mm ² 1 x 0.5
Permissible ambient temperature		°C -20 ... +60
Resistance to climate	acc. to EN 60068-1	20/60/4

Selection and ordering data

	U_e	I_e	U_c	MW	Order No.	Weight 1 unit approx.	PS*/ P. unit
	V AC	A	V AC			kg	Unit(s)



5TT3 431

Thermistor motor protection relays with transparent caps

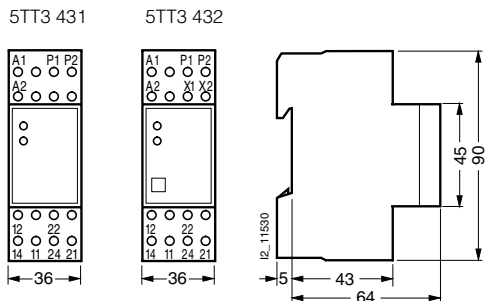
With fault storage,
reset pushbutton and remote reset

230	5	230	2	5TT3 431	0.160	1
230	5	230	2	5TT3 432	0.160	1

5TT3 43 thermistor motor protection relays

Dimensional drawings

5TT3 43 thermistor motor protection relays

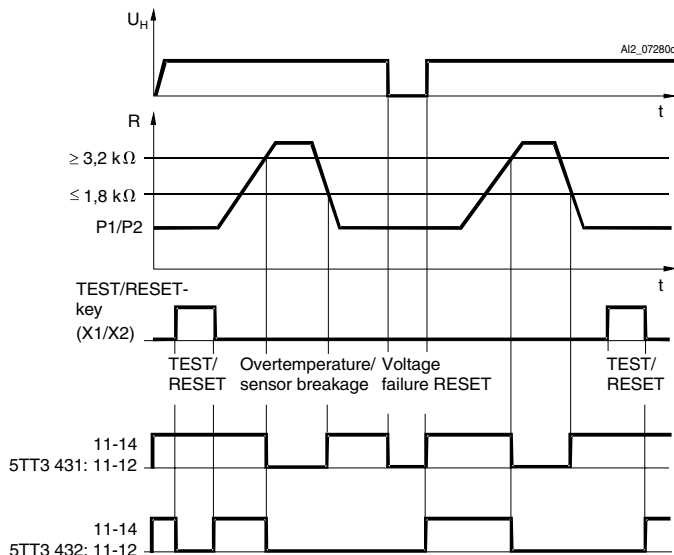
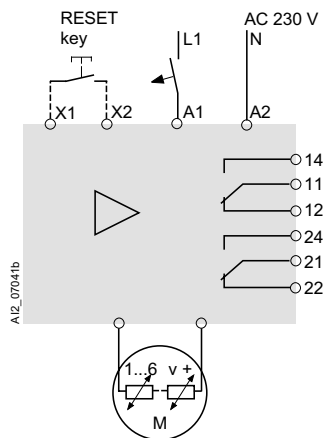


Schematics

Circuit diagrams



Switching examples: 5TT3 431, 5TT3 432



If one of the thermistors (possible for up to 6) reaches the response temperature, the device switches.

5TT3 431 (without terminals X1/X2 and without RESET pushbutton) switches back on after cooling and after the value falls below that permanently set for the hysteresis. To switch on before this time, briefly disconnect the power supply.

5TT3 432 stores the fault and remains switched off until the RESET pushbutton is pressed.

Monitoring Devices

Notes



Miniature Circuit-Breakers	12/2	Introduction
	12/6	Overview
	12/7	Introduction
	12/26	5SQ2, 3 kA
	12/28	5SX2, 6 kA
	12/32	5SX4, 10 kA
	12/34	5SX5, 4.5 kA (10 kA)
	12/35	Additional components for 5SX
	12/36	Accessories for 5SX
	12/39	Accessories for 5SQ2, 5SX
Residual Current Protective Devices	12/40	5SM1, product overview
	12/42	5SM1 RCCBs, type AC, 16 ... 80 A
	12/43	5SM1 RCCBs, type A, 16 ... 80 A
	12/45	Additional components for 5SM1
	12/46	Accessories for 5SM1
Switches	12/47	5TE7 1 ... 5TE7 3 switches
	12/51	5TE4 7 pushbuttons
	12/53	5TE7 4 ... 5TE7 8 switches
Switching Devices	12/56	5TT5 remote control switches
	12/66	5TT3 0 switching relays
	12/70	5TT3 8 and 5TT3 9 Insta contactors
Timers	12/76	5TT1 3 timers for building lighting
	12/82	7LF4 4 digital time switches
	12/86	7LF5 3 mechanical time switches
Power Supply Units	12/89	4AC2 9 transformers
	12/92	7KT5 7 time and pulse counters
Measuring Devices	12/95	5TE5 70 light signals
	12/97	7LQ2 1 dusk switches
Monitoring Devices	12/99	5TT3 45 alarm signaling devices, 55/70 mm
	12/100	5TT3 42 phase and phase sequence indicators, 55/70 mm
	12/102	5TT3 196 direct voltage monitors, 55/70 mm



Note:





This chapter lists all devices with a mounting depth of 55 mm.



These product ranges and devices are not being discontinued and will continue to be available as part of our basic range. Depending on demand, we estimate that these devices will continue to be available for at least 5 years.

Modular Installation Devices, Mounting Depth 55 mm >N<







Introduction

Overview

Devices	Tripping characteristic	Rated currents I_n	Standards	Rated short-circuit capacity Energy limitation class	Usage		
					Non-residual buildings	Residual buildings	Industry
Miniature circuit-breakers Standard product range							
 5SQ2	B	6 ... 40 A	IEC/EN 60898	3 000	•	•	
	C	0.5 ... 63 A					
 5SX2	A	1 ... 40 A	IEC/EN 60898 DIN VDE 0641 Part 11	6 000 3	•	•	
	B	6 ... 50 A					
	C	0.3 ... 63 A					
	D	0.5 ... 50 A					
 5SX4	B	6 ... 50 A	IEC/EN 60898	10 000 3	•	•	
	C	0.5 ... 50 A					
 5SX5	B	6 ... 32 A	DIN VDE 0641 Part 12	4 500 10 000 T4 3	•	•	
	C	0.5 ... 32 A					

Devices	Application	Standards	Usage		
			Non-residual buildings	Residual buildings	Industry
Residual current operated circuit-breakers (RCCBs)					
 5SM1 <ul style="list-style-type: none"> Type AC and type A $I_n = 16 \dots 80$ A $I_{\Delta n} = 10$ mA ... 1 A 2-pole (1+N) and 4-pole (3+N) Versions K and S Version for 500 V Version 50 ... 400 Hz 		IEC/EN 61008	•	•	•
	Switches				
 Switches <ul style="list-style-type: none"> 5TE7 changeover switches, 16 A 5TE7 group switches with center position, 16 A 5TE7 control switches, 16 A 5TE7 ON/OFF switches, 16 A to 125 A 	For the switching of luminaires, motors and other electrical devices	16 A to 25 A and 80 A to 100 A: IEC 60947-3, EN 60947-3 and VDE 0660 Part 107 IEC 60669-1, EN 60669-1 and VDE 0632 Part 101	•		•
	For the application of logical links in control cabinets	32 A and 125 A: IEC 60947-3, EN 60947-3 and VDE 0660 Part 107	•		•







Overview

Devices	Application	Standards	Usage		
			Non-residual buildings	Residual buildings	Industry
Switches					
 <p>Pushbuttons</p> <ul style="list-style-type: none"> • 5TE4 7 pushbuttons 	In control systems, e.g. for switching on latching electrical circuits	IEC 60669-1, EN 60669-1 and VDE 0632 Part 101	•		•
 <p>Remote control switches</p> <ul style="list-style-type: none"> • Without central switching • With central switching • With central and group switching <p>Blind and series remote control switches Electronic series remote control switches Flush-mounting remote control switches System remote control switches</p> <ul style="list-style-type: none"> • Without central switching • With central switching • With central and group switching 	Switching of lighting by pushbutton	EN 61095 (VDE 0637) EN 60669 (VDE 0632)	• • • • •	•	
 <p>Relays</p> <ul style="list-style-type: none"> • For PLCs • For capacitive loads 	Switching of small loads or application in controllers Specially suited for the switching of luminaires such as fluorescent lamps or high-pressure and metal-halide lamps, with capacitive properties	EN 60255 (VDE 0435)	• •		•
 <p>Insta contactors >N< with direct voltage magnetic system</p> <ul style="list-style-type: none"> • 5TT3 8, 40 A to 63 A • 5TT3 9, 20 A 	Switching of motors, heating or lighting, such as fluorescent lamps or filament lamps, and resistive and inductive loads	EN 60947, DIN VDE 0660 Safety regulation ZH 1/457	• •	• •	• •
Timers					
 <p>Time switches for building lighting</p> <ul style="list-style-type: none"> • 5TT1 310-1 and 5TT1 311-1 stairwell time switches, 16 A • 5TT1 313-1 prewarning timers, 10 A • 5TT1 300 energy saving timers • 5TT1 301 lighting timers 	Energy saving in stairwell lighting Warns of impending off of stairwell lighting in apartment houses Energy saving in rooms with infrequent or varied usage	EN 60669 EN 60669, DIN VDE 0632, DIN VDE 18 015 IEC 669, DIN VDE 0632	• • • •	• • •	
 <p>Digital time switches</p> <ul style="list-style-type: none"> • 7LF4 48 Mini time switches • 7LF4 49 Top time switches 	To-the-minute switching in daily, weekly and yearly sequences	VDE 0631 Part 1 and Part 2-7, IEC 60730-1 and 60730-2-7, EN60730-1 and 60730-2-7	• •	• •	• •




Modular Installation Devices, Mounting Depth 55 mm >N<

Introduction

Overview

Devices	Application	Standards	Usage		
			Non-residual buildings	Residual buildings	Industry
Timers					
 <p>Mechanical time switches</p> <ul style="list-style-type: none"> • 7LF5 39 synchronous time switches without power reserve • 7LF5 39 quartz-clock time switches with power reserve 	Switching of day and week program, accurate to 30 minutes	VDE 0631 Part 1 and Part 2-7, IEC 60730-1 and 60730-2-7, EN60730-1 and 60730-2-7	•		•
Power supply units					
 <p>Transformers for permanent loading 4AC2 9</p>	AC voltage/current supply up to 40 VA as safety extra-low voltage for the supply of calibration circuits, switching relays, Insta contactors and AC power supplies for SELF systems for continuous operation.		•		•
Measuring devices					
 <p>Time counters and pulse counters</p> <ul style="list-style-type: none"> • 7KT5 7 time counters • 7KT5 7 pulse counters • 7KT5 77 time counters • 7KT5 78 pulse counters 	Monitoring of operating hours and making operations of devices and plants	DIN VDE 0435	•	•	•
Monitoring devices					
 <p>Light signal 5TE5 70</p>	Visual signal output in PLCs for the indication of switching states or faults	DIN VDE 0710 T1	•		•
 <p>Dusk switches 7LQ2 1</p>	For demand-oriented switching of lighting installations for shop windows or paths in order to cut costs	EN 60730	•		•
 <p>Alarm signaling devices, 55/70 mm 5TT3 45</p>	Acoustic alarm output of fault indications	IEC 60255, DIN VDE 0435 T303	•		•

Overview

Devices	Application	Standards	Usage		
			Non-residual buildings	Residual buildings	Industry
Monitoring devices					
 <p>Phase indicators, 55/70 mm 5TT3 420</p>	Monitoring of power supply	IEC 60255, DIN VDE 0435			•
 <p>Phase sequence indicators, 55/70 mm 5TT3 422</p>	Monitoring of the direction of rotation of a power supply	IEC 60255, DIN VDE 0435			•
 <p>Direct voltage monitors, 55/70 mm 5TT3 196</p>	Monitoring of 24-V DC power supplies	IEC 60255, DIN VDE 0435			•

Definitions

I_e	= Rated operational current
U_e	= Rated operational voltage
I_c	= Rated control current
U_c	= Rated control voltage
P_s	= Rated operational power
1 MW	= Modular width 18 mm
55/70 mm	= Mounting depth either 55 mm or 70 mm, due to transparent cap; see adjacent figure.



Transparent caps

Adding a transparent cap extends the 55 mm mounting depth of a device to 70 mm. This is a useful option for improving the appearance of a distribution board. All products that are marked with 55/70 mm are supplied with an extra transparent cap as shown here. You will find the product designation 55/70 mm in the Chapters, "Switching devices", "Power supply units" and "Monitoring devices".

Modular Installation Devices, Mounting Depth 55 mm >N< Miniature Circuit-Breakers

Overview

Technical specifications

		5SQ2	5SX2	5SX4	5SX5
Tripping characteristic		B, C	A, B, C, D	B, C	B, C
Number of poles	1	•	•	•	•
	1 + N	•	•	•	--
	2	•	•	•	•
	3	•	•	•	--
	3 + N	•	•	•	--
	4	--	•	•	--
Rated voltage	V AC	230/400			
Operational voltage	min.	V AC/DC	24		
	max.	V DC/pole	60 ¹⁾		
	max.	V AC	440		
Rated breaking capacity					
acc. to EN 60898	kA AC	3			
Insulation coordination					
Rated insulation voltage	V AC	250/440			
Degree of soiling for overvoltage category III		2			
Protection against contact		Protection against contact with fingers or the back of the hand acc. to EN 50274			
Sealable in handle end position		•	•	•	•
Device depth acc. to DIN 43880	mm	55			
Degree of protection		IP00 acc. to DIN EN 60529, IP40 for installation in distribution boards			
CFC and silicone-free		yes			
Mounting technique		can be snapped onto 35 mm standard mounting rails (EN 60715)			
Terminals		5SQ2 with box terminals at both sides 5SX2, 5SX4, 5SX5 with combination terminals underneath for the simultaneous connection of busbars (fork-type version) and conductors, box terminals above			
Terminal tightening torque , recommended	Nm	2.5 ... 3			
Conductor cross-sections					
Solid and stranded, max.					
• Upper terminal	mm ²	25	16		
• Lower terminal	mm ²	25	25		
Finely stranded with end sleeve, max.					
• Upper terminal	mm ²	16 ²⁾	10		
• Lower terminal	mm ²	16 ²⁾	16		
Different conductor cross-sections may be clamped together simultaneously; further details available on request.					
Feeder connection		any, observe the polarity for DC applications			
Mounting position		any			
Service life		an average of 20.000 operations at the rated load			
Ambient temperature	°C	-25 ... +45, occasionally +55, max. 95% humidity, storage temperature: -40 ... +75			
Resistance to climate		6 cycles acc. to IEC 60068-2-30			
Resistance to vibrations		60 at 10 Hz ... 150 Hz acc. to IEC 60068-2-6			

1) ≙ Battery charging voltage of 72 V.

2) ≙ For rated currents ≤ 32 A: 10 mm².

Modular Installation Devices, Mounting Depth 55 mm >N< Miniature Circuit-Breakers

Introduction

Overview

Tripping characteristics

Tripping characteristics at an ambient temperature of 30 °C

Tripping characteristic	Standards	Thermal trips				Electromagnetic trips		
		Test currents:		Tripping time		Test currents:		
		Limiting no-damage current I_1	Minimum no-damage current I_2	$I_n \leq 63$ A t	$I_n > 63$ A t	Hold I_4	Latest tripping instant I_5	Tripping time t
A	IEC/EN 60898	$1.13 \times I_n$	$1.45 \times I_n$	> 1 h < 1 h	> 2 h < 2 h	$2 \times I_n$	$3 \times I_n$	≥ 0.1 s < 0.1 s
B	IEC/EN 60898 DIN VDE 0641 Part 11	$1.13 \times I_n$	$1.45 \times I_n$	> 1 h < 1 h	> 2 h < 2 h	$3 \times I_n$	$5 \times I_n$	≥ 0.1 s < 0.1 s
C	IEC/EN 60898	$1.13 \times I_n$	$1.45 \times I_n$	> 1 h < 1 h	> 2 h < 2 h	$5 \times I_n$	$10 \times I_n$	≥ 0.1 s < 0.1 s
D	DIN VDE 0641 Part 12	$1.13 \times I_n$	$1.45 \times I_n$	> 1 h < 1 h	> 2 h < 2 h	$10 \times I_n$	$20 \times I_n$	≥ 0.1 s < 0.1 s

Breaking capacity

Particular demands are made on miniature circuit-breakers with regard to breaking capacity.

The values are standardized and are determined according to the test conditions of IEC/EN 60898.

The most common values are 6 000 and 10 000.

For other test conditions, different values can be specified that are higher those of IEC/EN 60898.

One such standard is IEC/EN 60947-2 for circuit-breakers.

Rated short-circuit capacity

Rated current	I_n [A]	EN 60898 (IEC 60898)		EN 60947-2 (IEC 60947-2)	
		1-pole 230 V AC I_{cn} [kA]	2, 3 and 4-pole 400 V AC I_{cn} [kA]	1-pole 230 V AC I_{cu} [kA]	2, 3 and 4-pole 400 V AC I_{cu} [kA]
5SQ2	0.5 ... 63	3	3	4.5	4.5
5SX2	0.5 ... 63	6	6	10 ¹⁾	10 ¹⁾
5SX4	0.5 ... 50	10	10	15 ²⁾	15 ²⁾
Rated current	I_n [A]	E DIN VDE 0641 Part 12		E DIN VDE 0641 Part 12	
		1-pole 230 V AC I_{cn} [kA]	2-pole 400 V AC I_{cn} [kA]	1-pole 220 V AC I_{cu} [kA]	2-pole 440 V AC I_{cu} [kA]
5SX5	0.5 ... 32	4.5	4.5	10 ¹⁾	10 ¹⁾

1) $I_n = 63$ A corresponds to $I_{cu} = 6$ kA

2) $I_n = 40$ A and 50 A corresponds to $I_{cu} = 10$ kA

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Modular Installation Devices, Mounting Depth 55 mm >N< Miniature Circuit-Breakers

Introduction

Overview

Selective miniature circuit-breakers/fuses

Distribution systems are usually set up as radial networks. An over-current protection device is required for each reduction of the cable cross-section. This produces a series connection staggered according to rated currents, which should, if possible, be "selective".

Selectivity means that, in the event of a fault, only the protective device that is directly next to the fault in the current circuit is tripped. This means that current circuits in parallel can maintain a power flow.

In the case of miniature circuit-breakers with upstream fuses, the selectivity limit depends largely on the current limiting and tripping characteristics of the miniature circuit-breaker and the melting I^2t value of the fuse.

This produces different selectivity limits for miniature circuit-breakers with different characteristics and rated short-circuit capacity.

The following tables provide information on the short-circuit currents up to which selectivity exists between miniature circuit-breakers and upstream fuse according to IEC 60269-2-1, DIN VDE 0636-201. The values specified in kA are limit values that were determined under unfavorable test conditions. Under normal practical conditions, you can often expect considerably better values, depending on the upstream fuses.

Limit values of selective line miniature circuit-breakers/fuses in kA

Downstream miniature circuit-breakers	I_n [A]	Upstream fuses								
		16 A	20 A	25 A	35 A	50 A	63 A	80 A	100 A	
5SX2										
Characteristic A	≤ 2	0.4	0.7	2.0	•	•	•	•	•	
	3	0.3	0.6	1.6	2.0	•	•	•	•	
	4	0.3	0.6	0.9	1.6	•	•	•	•	
	6	0.2	0.4	0.8	1.2	3.0	3.2	•	•	
	10	--	0.4	0.6	1.1	2.2	3.0	•	•	
	16	--	--	0.5	1.0	2.0	2.6	4.5	•	
	20	--	--	--	1.0	2.0	2.4	4.1	•	
	25	--	--	--	--	1.5	2.0	3.7	•	
	32	--	--	--	--	1.2	1.8	3.0	5.0	
	40	--	--	--	--	--	1.7	2.5	4.0	
	50	--	--	--	--	--	--	--	4.0	
Characteristic B	6	0.3	0.4	0.7	1.2	3.0	3.2	•	•	
	10	--	0.4	0.6	1.0	2.2	3.0	5.0	•	
	13	--	--	0.5	1.0	2.2	3.0	5.0	•	
	16	--	--	--	1.0	2.0	2.4	4.0	•	
	20	--	--	--	--	2.0	2.4	4.0	•	
	25	--	--	--	--	--	2.0	3.5	•	
	32	--	--	--	--	--	1.7	2.9	•	
	40	--	--	--	--	--	--	--	4.0	
	50	--	--	--	--	--	--	--	4.0	
	Characteristic C	≤ 2	0.3	0.5	1.2	1.7	•	•	•	•
		3	0.3	0.4	0.8	1.4	4.0	5.0	•	•
4		0.3	0.4	0.6	1.1	3.0	4.0	•	•	
6		--	0.4	0.6	1.0	2.4	3.2	•	•	
8		--	--	0.5	0.9	1.4	2.6	3.1	•	
10		--	--	0.5	0.9	1.4	2.1	3.1	•	
13		--	--	--	0.8	1.3	2.0	3.0	•	
16		--	--	--	0.8	1.3	2.0	3.0	•	
20		--	--	--	--	1.3	2.0	2.7	•	
25		--	--	--	--	--	2.0	2.4	5.0	
32		--	--	--	--	--	--	2.2	4.0	
40		--	--	--	--	--	--	--	3.5	
50		--	--	--	--	--	--	--	3.0	
63	--	--	--	--	--	--	--	3.0		
Characteristic D	≤ 2	0.3	0.5	0.7	1.3	3.0	•	•	•	
	3	0.3	0.4	0.7	1.2	3.0	•	•	•	
	4	--	0.4	0.6	1.0	2.5	4.0	•	•	
	6	--	--	0.5	0.9	2.0	3.0	•	•	
	8	--	--	--	0.7	1.4	2.0	3.1	•	
	10	--	--	--	--	1.4	2.0	3.1	•	
	13	--	--	--	--	--	1.7	3.0	•	
	16	--	--	--	--	--	1.7	3.0	•	
	20	--	--	--	--	--	--	2.4	5.0	
	25	--	--	--	--	--	--	--	5.0	
	32	--	--	--	--	--	--	--	4.0	
	40	--	--	--	--	--	--	--	--	
	50	--	--	--	--	--	--	--	--	

• $\hat{=}$ \geq rated short-circuit capacity 5SX2 acc. to EN 60898 6 000.

Modular Installation Devices, Mounting Depth 55 mm >N< Miniature Circuit-Breakers

Introduction

Overview

Selective miniature circuit-breakers/fuses

In the event of a short circuit, when using the 5SX4 MCBs and fuses according to IEC 60269-2-1, DIN VDE 0636-201, selectivity is provided up to the indicated values in kA.

Limit values of selective line miniature circuit-breakers/fuses in kA										
Downstream miniature circuit-breakers	I_n [A]	Upstream fuses								
		16 A	20 A	25 A	35 A	50 A	63 A	80 A	100 A	125 A
5SX4										
Characteristic B	6	0.3	0.4	0.8	1.4	3.2	4.5	9.0	•	•
	10	--	0.4	0.7	1.2	2.5	3.5	5.0	•	•
	13	--	--	0.7	1.2	2.5	3.5	5.0	•	•
	16	--	--	--	1.0	2.0	2.8	4.2	9.0	•
	20	--	--	--	1.0	2.0	2.6	4.2	9.0	•
	25	--	--	--	--	1.7	2.2	3.7	7.0	•
	32	--	--	--	--	1.7	2.2	3.7	7.0	•
	40	--	--	--	--	--	1.6	2.2	4.0	6.0
	50	--	--	--	--	--	--	2.2	4.0	6.0
	63	--	--	--	--	--	--	--	3.0	5.0
Characteristic C	≤ 2	0.3	0.5	1.5	2.0	9.0	•	•	•	•
	3	0.3	0.4	1.1	1.6	5.0	6.0	•	•	•
	4	0.3	0.4	0.9	1.4	3.5	5.0	9.0	•	•
	6	--	0.4	0.8	1.4	2.7	4.5	6.0	•	•
	8	--	--	0.6	1.2	2.2	3.5	5.0	7.0	•
	10	--	--	0.5	1.2	2.0	3.0	4.2	7.0	•
	13	--	--	--	1.0	1.6	2.4	3.4	6.0	•
	16	--	--	--	1.0	1.5	2.2	3.0	6.0	•
	20	--	--	--	--	1.3	2.2	3.0	6.0	•
	25	--	--	--	--	--	2.2	2.9	5.0	9.0
	32	--	--	--	--	--	--	2.4	4.0	7.0
	40	--	--	--	--	--	--	2.0	3.5	4.0
	50	--	--	--	--	--	--	--	3.0	4.0
63	--	--	--	--	--	--	--	--	--	

• \geq rated short-circuit capacity 5SX4 acc. to EN 60898 10 000.

Modular Installation Devices, Mounting Depth 55 mm >N<

Miniature Circuit-Breakers

Introduction

Overview

Selective miniature circuit-breakers/circuit-breakers

Distribution systems can also be set up without fuses. In such cases, a circuit-breaker acts as an upstream protective device.

In this case, the selectivity limit depends on the level of peak current \hat{I} let through by the miniature circuit-breaker and the tripping current of the circuit-breaker.

The following tables show the short-circuit current in kA up to which selectivity is guaranteed between miniature circuit-breakers and upstream circuit-breaker according to IEC/EN 60947-2 at 230/400 V AC, 50 Hz.

Limit values of selective miniature circuit-breakers/circuit-breakers in kA

Downstream miniature circuit-breakers				Upstream circuit-breakers									
I_n [A]	$I > [A]$	I_{cn} [kA]	3RV1.1			3RV1.2							
			10	12	8	10	12.5	16	20	22	25		
			120	144	96	120	150	192	240	264	300		
			50	50	100	100	100	50	50	50	50		
Selectivity limits [kA] ¹⁾													
5SX2													
Characteristic A	2	6	6	0.2	0.2	--	--	0.2	0.2	0.6	1.2	1.5	
	10	30	6	--	--	--	--	--	--	0.3	0.5	0.5	
	16	48	6	--	--	--	--	--	--	0.3	0.4	0.5	
	32	96	6	--	--	--	--	--	--	--	--	--	
	40	120	6	--	--	--	--	--	--	--	--	--	
5SX2/5SX4													
Characteristic B	6	30	6/10	0.2	0.2	--	--	0.2	0.2	0.3	0.5	0.5	
	10	50	6/10	--	0.2	--	--	0.2	0.2	0.3	0.4	0.5	
	13	65	6/10	--	--	--	--	--	0.2	0.2	0.4	0.4	
	16	80	6/10	--	--	--	--	--	--	0.2	0.4	0.4	
	20	100	6/10	--	--	--	--	--	--	--	--	0.4	
	25	125	6/10	--	--	--	--	--	--	--	--	--	
	32	160	6/10	--	--	--	--	--	--	--	--	--	
	40	200	6/10	--	--	--	--	--	--	--	--	--	
	50	250	6/10	--	--	--	--	--	--	--	--	--	
5SX2/5SX4													
Characteristic C	0.5	5	6/10	0.2	0.2	0.1	0.1	0.2	0.2	0.5	0.6	0.6	
	1	10	6/10	0.2	0.2	0.1	0.1	0.2	0.2	0.5	0.6	0.6	
	1.6	16	6/10	0.2	0.2	0.1	0.1	0.2	0.2	0.5	0.6	0.6	
	2	20	6/10	0.2	0.2	0.1	0.1	0.2	0.2	0.5	0.6	0.6	
	3	30	6/10	--	0.2	--	--	0.2	0.2	0.3	0.4	0.5	
	4	40	6/10	--	0.2	--	--	0.2	0.2	0.3	0.4	0.5	
	6	60	6/10	--	0.2	--	--	0.2	0.2	0.3	0.4	0.5	
	8	80	6/10	--	0.2	--	--	0.2	0.2	0.2	0.4	0.4	
	10	100	6/10	--	0.2	--	--	0.2	0.2	0.2	0.4	0.4	
	13	130	6/10	--	--	--	--	--	0.2	0.2	0.4	0.4	
	16	160	6/10	--	--	--	--	--	--	0.2	0.4	0.4	
	20	200	6/10	--	--	--	--	--	--	--	--	0.4	
	25	250	6/10	--	--	--	--	--	--	--	--	--	
	32	320	6/10	--	--	--	--	--	--	--	--	--	
	40	400	6/10	--	--	--	--	--	--	--	--	--	
50	500	6/10	--	--	--	--	--	--	--	--	--		
63	630	6	--	--	--	--	--	--	--	--	--		
5SX2													
Characteristic D	2	40	6	--	--	--	--	0.2	0.2	0.4	0.6	0.6	
	6	120	6	--	--	--	--	--	--	0.3	0.4	0.4	
	10	200	6	--	--	--	--	--	--	0.2	0.4	0.4	
	16	320	6	--	--	--	--	--	--	--	--	--	
	32	640	6	--	--	--	--	--	--	--	--	--	
	40	800	6	--	--	--	--	--	--	--	--	--	
	50	1,000	6	--	--	--	--	--	--	--	--	--	

1) In 240/415 V, 50 Hz systems, the selectivity limits are reduced by 10 %.
 $I > \hat{I}$ tripping current.

Modular Installation Devices, Mounting Depth 55 mm >N< Miniature Circuit-Breakers

Introduction

Overview

Selective miniature circuit-breakers/circuit-breakers

In the event of a short-circuit, there is selectivity between miniature circuit-breakers and circuit-breakers according to IEC/EN 60947-2 up to the specified values in kA.

Limit values of selective line miniature circuit-breakers/fuses in kA										
Downstream miniature circuit-breakers				Upstream circuit-breakers						
I_n [A]	$I > [A]$	I_{cn} [kA]	3RV1.3							
			16	20	25	32	40	45	50	
			192	240	300	384	480	540	600	
			50	50	50	50	50	50	50	50
Selectivity limits [kA] ¹⁾										
5SX2										
Characteristic A	2	6	6	0.2	0.8	1.2	2.5	3	6	6
	10	30	6	0.2	0.4	0.5	0.6	0.8	1	1.2
	16	48	6	--	0.3	0.4	0.6	0.8	0.8	1
	32	96	6	--	--	--	--	0.6	0.8	0.8
	40	120	6	--	--	--	--	--	--	0.8
5SX2/5SX4										
Characteristic B	6	30	6/10	0.2	0.3	0.5	0.6	0.8	1	1.2
	10	50	6/10	0.2	0.3	0.4	0.6	0.8	1	1.2
	13	65	6/10	0.2	0.3	0.4	0.6	0.8	1	1
	16	80	6/10	--	0.3	0.4	0.6	0.8	1	1
	20	100	6/10	--	--	0.4	0.6	0.8	1	1
	25	125	6/10	--	--	--	0.5	0.6	0.8	0.8
	32	160	6/10	--	--	--	--	0.6	0.8	0.8
	40	200	6/10	--	--	--	--	--	--	0.8
	50	250	6/10	--	--	--	--	--	--	--
5SX2/5SX4										
Characteristic C	0.5	5	6/10	0.3	0.5	0.6	1	1	1.5	3
	1	10	6/10	0.3	0.5	0.6	1	1	1.5	3
	1.6	16	6/10	0.3	0.5	0.6	1	1	1.5	3
	2	20	6/10	0.3	0.5	0.6	1	1	1.5	3
	3	30	6/10	0.2	0.3	0.4	0.6	0.8	1	1
	4	40	6/10	0.2	0.3	0.4	0.6	0.8	1	1
	6	60	6/10	0.2	0.3	0.4	0.6	0.8	1	1
	8	80	6/10	0.2	0.2	0.4	0.6	0.6	0.8	1
	10	100	6/10	0.2	0.2	0.4	0.6	0.6	0.8	1
	13	130	6/10	0.2	0.2	0.4	0.6	0.6	0.8	1
	16	160	6/10	--	0.2	0.4	0.6	0.6	0.8	1
	20	200	6/10	--	--	0.4	0.6	0.6	0.8	1
	25	250	6/10	--	--	--	0.5	0.6	0.8	0.8
	32	320	6/10	--	--	--	--	0.6	0.8	0.8
	40	400	6/10	--	--	--	--	--	--	0.8
	50	500	6/10	--	--	--	--	--	--	--
	63	630	6	--	--	--	--	--	--	--
5SX2										
Characteristic D	2	40	6	0.3	0.5	0.6	0.8	1.2	1.5	1.5
	6	120	6	0.2	0.3	0.4	0.6	0.8	1	1
	10	200	6	--	0.3	0.4	0.5	0.6	0.8	0.8
	16	320	6	--	--	--	0.5	0.6	0.6	0.8
	32	640	6	--	--	--	--	--	0.6	0.6
	40	800	6	--	--	--	--	--	--	--
	50	1000	6	--	--	--	--	--	--	--

1) In 240/415 V, 50 Hz systems, the selectivity limits are reduced by 10 %.
 $I > \hat{=}$ tripping current.

Modular Installation Devices, Mounting Depth 55 mm >N< Miniature Circuit-Breakers

Introduction

Overview

Selective miniature circuit-breakers/circuit-breakers

In the event of a short-circuit, there is selectivity between miniature circuit-breakers and circuit-breakers according to IEC/EN 60947-2 up to the specified values in kA.

Limit values of selective miniature circuit-breakers/circuit-breakers in kA

Downstream miniature circuit-breakers

I_n [A]
 $I > [A]$
 I_{cn} [kA]

Upstream circuit-breakers

3RV1.4

16	20	25	32	40	50	63	75	90	100
192	240	300	384	480	600	756	900	1 080	1 140
100	100	100	100	100	100	100	100	100	100

Selectivity limits [kA] ¹⁾

5SX2

Characteristic A	2	6	6	0.5	0.8	1.5	2.5	3	6	6	6	6	6
	10	30	6	0.3	0.4	0.5	0.6	0.8	1.2	1.5	2.5	3	4
	16	48	6	--	0.3	0.5	0.6	0.6	1	1.5	2	3	3
	32	96	6	--	--	--	--	0.6	0.8	1.5	2	2.5	3
	40	120	6	--	--	--	--	--	0.8	1.2	1.5	2	2

5SX2/5SX4

Characteristic B	6	30	6/10	0.2	0.4	0.5	0.6	0.8	1.2	2	3	6/10	6/10
	10	50	6/10	0.2	0.3	0.5	0.6	0.8	1	1.5	2.5	4	4
	13	65	6/10	0.2	0.3	0.5	0.6	0.8	1	1.5	2	3	3
	16	80	6/10	--	0.3	0.5	0.6	0.8	1	1.5	2	3	3
	20	100	6/10	--	--	0.5	0.6	0.8	1	1.5	2	3	3
	25	125	6/10	--	--	--	0.5	0.8	0.8	1.5	2	3	3
	32	160	6/10	--	--	--	--	0.6	0.8	1.5	2	3	3
	40	200	6/10	--	--	--	--	0.6	0.8	1.2	1.5	2.5	2.5
	50	250	6/10	--	--	--	--	--	--	1.2	1.5	2.5	2.5

5SX2/SX4

Characteristic C	0.5	5	6/10	0.4	0.6	0.8	0.8	1	3	6/10	6/10	6/10	6/10
	1	10	6/10	0.4	0.6	0.8	0.8	1	3	6/10	6/10	6/10	6/10
	1.6	16	6/10	0.4	0.6	0.8	0.8	1	3	6/10	6/10	6/10	6/10
	2	20	6/10	0.4	0.6	0.8	0.8	1	3	6/10	6/10	6/10	6/10
	3	30	6/10	0.2	0.3	0.5	0.6	0.8	1	2	2.5	5	5
	4	40	6/10	0.2	0.3	0.5	0.6	0.8	1	2	2.5	5	5
	6	60	6/10	0.2	0.3	0.5	0.6	0.8	1	2	2.5	5	5
	8	80	6/10	0.2	0.3	0.4	0.6	0.6	1	1.5	2	3	3
	10	100	6/10	0.2	0.3	0.4	0.6	0.6	1	1.5	2	3	3
	13	130	6/10	0.2	0.3	0.4	0.6	0.6	1	1.5	2	3	3
	16	160	6/10	--	0.3	0.4	0.6	0.6	1	1.5	2	3	3
	20	200	6/10	--	--	0.4	0.6	0.6	1	1.5	2	3	3
	25	250	6/10	--	--	--	0.5	0.6	0.8	1.2	1.5	2.5	2.5
	32	320	6/10	--	--	--	--	0.6	0.8	1.2	1.5	2.5	2.5
	40	400	6/10	--	--	--	--	--	0.6	1	1.5	2	2
	50	500	6/10	--	--	--	--	--	--	1	1.2	1.5	2
	63	630	6/10	--	--	--	--	--	--	--	--	1.5	1.5

5SX2

Characteristic D	2	40	6	0.4	0.5	0.6	0.8	1	1.5	3	4	6	6
	6	120	6	0.2	0.3	0.4	0.6	0.6	1	1.5	2.5	3	3
	10	200	6	--	0.3	0.4	0.5	0.6	0.8	1.5	2	3	3
	16	320	6	--	--	--	0.5	0.6	0.8	1.2	1.5	2.5	2.5
	32	640	6	--	--	--	--	--	0.6	1	1.5	2	2
	40	800	6	--	--	--	--	--	--	1	1.2	1.5	1.5
	50	1000	6	--	--	--	--	--	--	1	1.2	1.5	1.5

1) In 240/415 V, 50 Hz systems, the selectivity limits are reduced by 10 %.
 $I > \hat{=}$ tripping current.

Modular Installation Devices, Mounting Depth 55 mm >N< Miniature Circuit-Breakers

Introduction

Overview

Selective miniature circuit-breakers/circuit-breakers

In the event of a short-circuit, there is selectivity between miniature circuit-breakers and circuit-breakers according to IEC/EN 60947-2 up to the specified values in kA.

Limit values of selective miniature circuit-breakers/circuit-breakers in kA															
Downstream miniature circuit-breakers				Upstream circuit-breakers											
I_n [A]	$I > [A]$	I_{cn} [kA]	3VF3 adjustable						3VF3 non-adjustable						
			50	63	80	100	125	160	50	63	80	100	125	160	
				500	630	800	1 000	1 250	1 600	400	500	630	800	1 000	1 280
				40/70/100	40/70/100	40/70/100	40/70/100	40/70/100	40/70/100	40/70/100	40/70/100	40/70/100	40/70/100	40/70/100	40/70/100
				Selectivity limits [kA] ¹⁾											
5SX2															
Characteristic A	2	6	6	6	6	6	6	6	6	6	6	6	6	6	
	10	30	6	1.6	4.7	6	6	6	6	2.5	4	4	4.5	4.9	
	16	48	6	1.4	4.7	6	6	6	6	2.3	3.7	3.7	4.4	5	
	32	96	6	1.2	3.6	4.6	6	6	6	1.8	3	3	3.5	3.7	
	40	120	6	1	2.5	3.1	6	6	6	1.5	2	2	2.4	2.7	
5SX2/3SX4															
Characteristic B	6	30	6/10	2.1	6/10	6/10	6/10	6/10	6/10	3.2	6/10	6/9.7	6/10	6/10	
	10	50	6/10	1.8	6/8	6/10	6/10	6/10	6/10	2.5	6/6.2	4.8	6/6.2	6/6.5	
	13	65	6/10	1.6	5.1	8.2	6/10	6/10	6/10	2.3	4.6	3.8	4.6	5.1	
	16	80	6/10	1.6	5.1	8.2	6/10	6/10	6/10	2.3	4.6	3.8	4.6	5.1	
	20	100	6/10	1.6	5.1	8.2	6/10	6/10	6/10	2.3	4.6	3.8	4.6	5.1	
	25	125	6/10	1.4	3.5	4.6	5.5	6	6/10	2.1	3.4	3	3.4	3.7	
	32	160	6/10	1.4	3.5	4.6	5.5	6	6/10	2.1	3.4	3	3.4	3.7	
	40	200	6/10	1.3	2.4	2.8	3.3	4.5	6.7	1.8	2.3	2.2	2.4	2.7	
	50	250	6/10	--	2.4	2.8	3.3	4.3	5.8	--	2.3	2.2	2.4	2.7	
5SX2/3SX4															
Characteristic C	0.5	5	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	
	1	10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	
	1.5	15	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	
	2	20	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	
	3	30	6/10	1.9	6/9.5	6/10	6/10	6/10	6/10	2.5	6/8.2	6/6.3	6/8.2	6/8.6	
	4	40	6/10	1.9	6/9.5	6/10	6/10	6/10	6/10	2.5	6/8.2	6/6.3	6/8.2	6/8.6	
	6	60	6/10	1.9	6/9.5	6/10	6/10	6/10	6/10	2.5	6/8.2	6/6.3	6/8.2	6/8.6	
	8	80	6/10	1.7	4.2	6/7.9	6/10	6/10	6/10	2.3	3.7	3.8	3.8	4.6	
	10	100	6/10	1.7	4.2	6/7.9	6/10	6/10	6/10	2.3	3.7	3.8	3.8	4.6	
	13	130	6/10	1.5	4.2	5.5	6/10	6/10	6/10	2.1	3.7	3.8	3.8	4.4	
	16	160	6/10	1.5	4.2	5.5	6/10	6/10	6/10	2.1	3.7	3.8	3.8	4.4	
	20	200	6/10	1.5	4.2	5.5	6/10	6/10	6/10	2.1	3.7	3.8	3.8	4.4	
	25	250	6/10	1.1	3.4	4.5	5.4	5.7	6/8.8	1.9	3	3	3	3.6	
	32	320	6/10	1.1	3.4	4.5	5.4	5.7	6/8.8	1.9	3	3	3	3.6	
	40	400	6/10	0.9	2.2	2.6	2.8	3.1	4.8	1.4	2.1	2.2	2.2	2.3	
	50	500	6/10	--	2.1	2.5	2.8	3.1	4.8	--	--	2.1	2.1	2.2	
5SX2															
Characteristic D	2	40	6	2.4	6	6	6	6	6	4.2	6	6	6	6	
	6	120	6	1.4	4.2	4.8	6	6	6	2.3	4.1	4.2	4.2	4.3	
	10	200	6	1.3	3.9	5.5	6	6	6	1.9	3.7	3.7	3.7	4	
	16	320	6	1.1	3.5	4.2	4.9	6	6	1.7	3.3	3.7	3.3	3.5	
	32	640	6	--	--	3.3	3.9	4.2	6	--	--	--	2.4	2.7	
	40	800	6	--	--	--	3.1	3.3	4.9	--	--	--	--	1.5	
	50	1000	6	--	--	--	--	2.9	4.8	--	--	--	--	3	

1) In 240/415 V, 50 Hz systems, the selectivity limits are reduced by 10 %.
The selectivity limits for adjustable trips apply to the maximum value,
 I_n = rated current.
 $I > \hat{=}$ tripping current.

Modular Installation Devices, Mounting Depth 55 mm >N< Miniature Circuit-Breakers

Introduction

Overview

Selective miniature circuit-breakers/circuit-breakers

In the event of a short-circuit, there is selectivity between miniature circuit-breakers and circuit-breakers according to IEC/EN 60947-2 up to the specified values in kA.

Limit values of selective miniature circuit-breakers/circuit-breakers in kA

Downstream miniature circuit-breakers			Upstream circuit-breakers														
I_n [A]	$I > [A]$	I_{cn} [kA]	3VF4				3VF5				3VF6		3VF7	3VF8	3WN1	3WN6	
			125	160	200	250	200	250	315	400	315	400-800	400-1250	800-2500	315-6300	315-3200	
			1250	1600	2000	2500	2000	2500	3150	4000	3200	1575-6400	15000	20000	3780-75600	3780-48000	
			40/70/100	40/70/100	40/70/100	40/70/100	45/70/100	45/70/100	45/70/100	45/70/100	45/70/100	45/70/100	45/70/100	50/70/100	70/100	65/80/100	65/75
			Selectivity limits [kA] ¹⁾														
5SX2/3SX4																	
Characteristic A	2	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
	10	30	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
	16	48	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
	32	96	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
	40	120	6	3.9	4.6	6	6	6	6	6	6	6	6	6	6	6	6
Characteristic B	6	30	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10
	10	50	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10
	13	65	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10
	16	80	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10
	20	100	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10
	25	125	6/10	6/9.6	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10
	32	160	6/10	6/9.6	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10
	40	200	6/10	6	6	6	6	6	6	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10
Characteristic C	0.5	5	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10
	1	10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10
	1.5	15	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10
	2	20	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10
	3	30	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10
	4	40	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10
	6	60	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10
	8	80	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10
	10	100	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10
	13	130	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10
	16	160	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10
	20	200	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10
	25	250	6/10	6/8	6/9.1	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10
32	320	6/10	6/8	6/9.1	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	
40	400	6/10	3.6	4.8	6/6.5	6/6.5	6/6.5	6/6.5	6/6.5	6/10	6/10	6/10	6/10	6/10	6/10	6/10	
50	500	6/10	3.6	4.8	6/6.2	6/6.2	6/6.2	6/6.3	6/10	6/10	6/10	6/10	6/10	6/10	6/10	6/10	
Characteristic D	2	40	6	6	6	6	6	6	6	6	6	6	6	6	6	6	
	6	120	6	6	6	6	6	6	6	6	6	6	6	6	6	6	
	10	200	6	6	6	6	6	6	6	6	6	6	6	6	6	6	
	16	320	6	6	6	6	6	6	6	6	6	6	6	6	6	6	
	32	640	6	6	6	6	6	6	6	6	6	6	6	6	6	6	
	40	800	6	4	4.9	6	6	6	6	6	6	6	6	6	6	6	
50	1000	6	4	4.8	6	6	6	6	6	6	6	6	6	6	6		

1) In 240/415 V, 50 Hz systems, the selectivity limits are reduced by 10 %.
The selectivity limits for adjustable trips apply to the maximum value,
 I_n = rated current.
 $I >$ ≙ tripping current.

Modular Installation Devices, Mounting Depth 55 mm >N< Miniature Circuit-Breakers

Introduction

Overview

Selective miniature circuit-breakers/miniature circuit-breakers

Within narrow limits, miniature circuit-breakers also offer selectivity between circuit-breakers in a fuseless distribution board. This depends on the let-through peak current I of the downstream miniature circuit-breaker and on the tripping current of the upstream miniature circuit-breaker.

The following table shows the short-circuit current in kA up to which there is selectivity between series-connected circuit-breakers at 230 V AC.

Limit values of selective miniature circuit-breakers/miniature circuit-breakers in kA

Downstream miniature circuit-breakers

Upstream miniature circuit-breakers

5SX4 7

Characteristic C

5SP4 7

Characteristic C

5SP4 8

Characteristic D

I_n [A]

$I > [A]$

I_{cn} [kA]

20	25	32	40	50	80	100	80	100
200	250	320	400	500	800	1 000	1 200	1 500
10	10	10	10	10	10	10	10	10

Selectivity limits [kA]

5SX2/5SX4

Characteristic B	6	30	6/10	0.2	0.2	0.3	0.5	0.5	0.8	1.5	3	5
	10	50	6/10	0.2	0.2	0.3	0.5	0.5	0.8	1.2	3	4
	13	65	6/10	0.2	0.2	0.3	0.4	0.5	0.8	1.2	2	3
	16	80	6/10	0.2	0.2	0.3	0.4	0.5	0.8	1.2	2	3
	20	100	6/10	--	0.2	0.3	0.4	0.5	0.8	1.2	2	3
	25	125	6/10	--	--	--	0.4	0.4	0.6	1.2	1.5	3
	32	160	6/10	--	--	--	0.4	0.4	0.6	1.2	1.5	3
	40	200	6/10	--	--	--	--	0.4	0.6	1.2	1.5	2.5
50	250	6/10	--	--	--	--	--	0.6	1	1.5	2.5	
Characteristic C	0.5	5	6/10	0.2	0.3	0.5	0.8	0.8	1.2	4	6/10	6/10
	1	10	6/10	0.2	0.3	0.5	0.8	0.8	1.2	4	6/10	6/10
	1.5	15	6/10	0.2	0.3	0.5	0.8	0.8	1.2	4	6/10	6/10
	2	20	6/10	0.2	0.3	0.5	0.8	0.8	1.2	4	6/10	6/10
	3	30	6/10	0.2	0.2	0.3	0.5	0.5	0.8	1.5	3	4
	4	40	6/10	0.2	0.2	0.3	0.5	0.5	0.8	1.5	3	4
	6	60	6/10	0.2	0.2	0.3	0.5	0.5	0.8	1.5	3	4
	8	80	6/10	0.2	0.2	0.3	0.4	0.4	0.6	1.2	2.5	3
	10	100	6/10	0.2	0.2	0.3	0.4	0.4	0.6	1.2	2.5	3
	13	130	6/10	0.2	0.2	0.3	0.4	0.4	0.6	1.2	2	3
	16	160	6/10	0.2	0.2	0.3	0.4	0.4	0.6	1.2	2	3
	20	200	6/10	--	0.2	0.3	0.4	0.4	0.6	1.2	2	3
	25	250	6/10	--	--	--	0.3	0.4	0.6	1	1.5	2.5
	32	320	6/10	--	--	--	0.3	0.4	0.6	1	1.5	2.5
	40	400	6/10	--	--	--	--	--	--	0.8	1.5	2
	50	500	6/10	--	--	--	--	--	--	0.8	1.5	2
	63	630	6	--	--	--	--	--	--	0.8	1.2	1.5

Modular Installation Devices, Mounting Depth 55 mm >N< Miniature Circuit-Breakers

Introduction

Overview

Back-up protection miniature circuit-breakers/fuses

If the maximum short-circuit current of the miniature circuit-breaker at the installation site is unknown, or if the specified rated short-circuit capacity is exceeded, an additional protective device must be connected upstream as back-up protection to prevent overloading of the miniature circuit-breaker. This is usually a fuse.

The following table shows the short-circuit currents in kA up to which back-up protection is guaranteed when using fuses according to IEC 60269-2-1, DIN VDE 0636-201.

Limit values of back-up protection miniature circuit-breakers/fuses in kA

Downstream miniature circuit-breakers

Upstream fuses

5SX2/5SX4



I_n [A]

0.3 ... 4
6
8
10
13
16
20
25
32
40
50
63

50 A	63 A	80 A	100 A	125 A	160 A
no back-up protection required up to 50 kA					
50	50	50	50	50	35
50	50	50	50	50	35
50	50	50	50	50	35
50	50	50	35	35	30
50	50	50	35	30	30
50	50	50	35	25	25
50	50	50	35	30	25
50	50	50	35	30	25
50	50	50	50	25	15
50	50	50	50	25	15
50	50	35	25	25	15

Test circuit data:

$U_p = 250$ V
p.f. = 0.3 ... 0.5

Test cycle:

Acc. to EN 60947-2 (0 - C0)

Modular Installation Devices, Mounting Depth 55 mm >N< Miniature Circuit-Breakers

Introduction

Overview

Back-up protection miniature circuit-breakers/circuit-breakers

If MCBs are used in fuseless distribution boards, circuit-breakers are to be provided as back-up protection according to IEC/EN 60947-2.

The following table shows the short-circuit currents in kA up to which back-up protection is guaranteed if circuit-breakers are used.

Limit values of back-up protection miniature circuit-breakers/circuit-breakers in kA

Downstream MCBs			Upstream circuit-breakers											
I_n [A]	$I > [A]$	I_{cn} [kA]	3VF3 adjustable						3VF3 non-adjustable					
			50	63	80	100	125	160	50	63	80	100	125	160
			40/70/100	40/70/100	40/70/100	40/70/100	40/70/100	40/70/100	40/70/100	40/70/100	40/70/100	40/70/100	40/70/100	40/70/100
			Back-up-protection up to kA											
5SX2/5SX4			No back-up protection required up to 50 kA											
Characteristic A, <small>I_z 0,35kA</small>	0.3 ... 4	6/10	No back-up protection required up to 50 kA											
Characteristic B	6	6/10	50	50	50	50	50	50	50	50	50	50	50	50
Characteristic C	8 ... 20	6/10	25	25	25	25	25	25	25	25	25	25	25	25
Characteristic D	25	6/10	20	20	20	20	20	20	20	20	20	20	20	20
	32	6/10	20	20	20	20	20	20	20	20	20	20	20	20
	40	6/10	20	20	20	20	20	20	20	20	20	20	20	20
	50	6/10	10	10	10	10	10	10	10	10	10	10	10	10
	63	6	10	10	10	10	10	10	10	10	10	10	10	10
5SQ2														
Characteristic B	0.5 ... 2	3	6	6	6	6	6	6	6	6	6	6	6	6
Characteristic C	3, 4	3	4	4	4	4	4	4	4	4	4	4	4	4
	6 ... 63	3	4,5	4,5	4,5	4	4	4	4,5	4,5	4,5	4,5	4	4
Downstream MCBs			Upstream circuit-breakers											
I_n [A]	$I > [A]$	I_{cn} [kA]	3VF4				3VF5				3VF6	3VF7	3VF8	3WN1/ 3WS1
			125	160	200	250	200	250	315	400	315 - 630	400 - 1 250	1 600 - 2 000	315 - 6 300
			40/70/100	40/70/100	40/70/100	40/70/100	45/70/100	45/70/100	45/70/100	45/70/100	45/70/100	50/70/100	70/100	65-100
			Back-up-protection up to kA											
5SX2/5SX4			No back-up protection required up to 50 kA											
Characteristic A, <small>I_z 0,35kA</small>	0.3 ... 4	6/10	No back-up protection required up to 50 kA											
Characteristic B	6	6/10	50	50	50	50	50	50	50	50	50	50	50	50
Characteristic C	8 ... 20	6/10	25	25	25	25	25	25	25	25	25	25	25	25
Characteristic D	25	6/10	20	20	20	20	20	20	20	20	20	20	20	20
	32	6/10	20	20	20	20	20	20	20	20	20	20	20	20
	40	6/10	20	20	20	20	20	20	20	20	20	20	20	20
	50	6/10	10	10	10	10	10	10	10	10	10	10	10	10
	63	6	10	10	10	10	10	10	10	10	10	10	10	10
5SQ2														
Characteristic B	0.5 ... 2	3	3	6	6	6	6	6	6	6	6	6	6	6
Characteristic C	3, 4	3	3	4	4	4	4	4	4	4	4	4	4	4
	6 ... 63	3	3	3	3	3	3	3	3	3	3	3	3	3



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Modular Installation Devices, Mounting Depth 55 mm >N< Miniature Circuit-Breakers

Introduction

Overview

Internal resistance and power dissipation I_n [A]	Data per pole (loaded with I_n)							
	Type A		Type B		Type C		Type D	
	R_1 mΩ	P_V W	R_1 mΩ	P_V W	R_1 mΩ	P_V W	R_1 mΩ	P_V W
5SX2, 5SX4, 5SX5								
0.3	--	--	--	--	10 500	0.95	--	--
0.5	--	--	--	--	3 000	0.75	3 000	0.75
1	1 400	1.4	--	--	640	0.64	650	0.65
1.6	540	1.4	--	--	312	0.80	270	0.7
2	380	1.5	--	--	212	0.85	165	0.66
3	170	1.5	--	--	82	0.74	77	0.7
4	120	1.9	--	--	53	0.85	60	1
6	43	1.5	28	1.0	19	0.70	20	0.7
8	--	--	--	--	15	0.96	14	0.9
10	18	1.8	16.5	1.65	12.5	1.25	12	1.2
13	--	--	11.5	1.94	9	1.52	10	1.7
16	10	2.5	8.5	1.17	7.8	2	7	1.8
20	7.5	3	6.5	2.6	6	2.4	5.6	2.2
25	4.7	2.9	4.8	3	4.5	2.8	4.5	2.8
32	3.1	3.6	4	4.1	3.7	3.8	2.9	3
40	2.6	4.2	2.7	4.3	2.5	4	2.4	3.8
50	--	--	2	5	1.9	4.7	1.8	4.5
63	--	--	--	--	1.6	6.6	--	--
5SQ2								
0.5	--	--	--	--	8 000	2	--	--
1	--	--	--	--	1 850	1.85	--	--
1.6	--	--	--	--	631	1.62	--	--
2	--	--	--	--	690	2.76	--	--
3	--	--	--	--	260	2.34	--	--
4	--	--	--	--	170	2.72	--	--
6	--	--	77	2.8	68	2.45	--	--
8	--	--	--	--	42.5	2.72	--	--
10	--	--	16.2	1.6	13.5	1.95	--	--
13	--	--	10.3	1.7	8.1	1.37	--	--
16	--	--	8	2.1	6.8	1.74	--	--
20	--	--	5.9	2.3	5.5	2.2	--	--
25	--	--	5.2	3.2	4.6	2.87	--	--
32	--	--	3.9	4	2.6	2.66	--	--
40	--	--	3.1	4.96	2.3	3.68	--	--
50	--	--	--	--	1.8	4.5	--	--
63	--	--	--	--	1.5	5.95	--	--

Correction factor for power dissipation

- Direct current and alternating current up to 60 Hz: x 1.0
- Alternating current
 - 200 Hz: x 1.1
 - 400 Hz: x 1.15
 - 1 100 Hz: x 1.3

Modular Installation Devices, Mounting Depth 55 mm >N< Miniature Circuit-Breakers

Introduction

Overview

Personnel safety with miniature circuit-breakers

According to DIN VDE 0100-410 (IEC 60364-4-41), in order to protect against dangerous leakage currents in the TN system, the cross-sections of the conductor, or its distance from the protective device, must be dimensioned such that if a fault with negligible impedance occurs (i.e. a short-circuit) at any point between an phase conductor and a PE conductor, or a connected exposed conductive part, automatic tripping is achieved within the specified times of 0.4 s / 5 s.

This requirement is met through the following condition:

$$Z_s \times I_a \leq U_0$$

Z_s $\hat{=}$ Impedance of the fault loop of all electrical circuits

I_a $\hat{=}$ Current that trips within the specified times

U_0 $\hat{=}$ Voltage against ground

Maximum permissible impedance of fault loop at $U_0 = 230$ V AC for compliance with trip conditions according to DIN VDE 0100-410.

I_n [A]	Characteristic A		Characteristic B		Characteristic C		Characteristic D	
	$t_a \leq 0.4$ s	≤ 5 s	$t_a \leq 0.4$ s	≤ 5 s	$t_a \leq 0.4$ s	≤ 5 s	$t_a \leq 0.4$ s	≤ 5 s
	Ω	Ω	Ω	Ω	Ω	Ω	Ω	Ω
5SX, 5SQ								
0.3	--	--	--	--	76.6	153	--	--
0.5	--	--	--	--	46	92	--	92
1.0	76.6	76.6	--	--	23	46	15.3	46
1.6	47.9	47.9	--	--	14.4	28.8	9.6	28.8
2	38.3	38.3	--	--	11.5	23	7.6	23
3	25.5	25.5	--	--	7.7	15.4	5.1	15.4
4	19.1	19.1	--	--	5.8	11.6	3.8	11.6
6	12.7	12.7	7.6	7.6	3.8	7.6	2.5	7.6
8	--	--	--	--	2.8	5.7	1.9	5.7
10	7.6	7.6	4.6	4.6	2.3	4.6	1.1	4.6
13	--	--	--	3.57	1.7	3.4	0.9	3.4
16	4.7	4.7	2.9	2.9	1.4	2.8	0.7	2.8
20	3.8	3.8	2.3	2.3	1.1	2.2	0.5	2.2
25	3.0	3.0	1.8	1.8	0.9	1.8	0.4	1.8
32	2.4	2.4	1.4	1.4	0.7	1.4	0.3	1.4
40	1.9	1.9	1.1	1.1	0.6	1.2	0.28	1.2
50	--	--	0.9	0.9	0.5	1.0	0.23	1.0
63	--	--	0.7	0.7	0.4	0.8	0.2	0.8
80	--	--	--	--	0.3	0.6	0.14	0.6
100	--	--	--	--	0.2	0.4	0.1	0.4
125	--	--	--	--	0.16	0.3	0.1	0.3

At $U_0 = 240$ V AC, $Z_s \times 1.04$ applies.

At $U_0 = 127$ V AC, $Z_s \times 0.55$ applies.

Modular Installation Devices, Mounting Depth 55 mm >N< Miniature Circuit-Breakers

Introduction

Overview

Fusing of luminaire circuits

Maximum permissible lamp load of a miniature circuit-breaker when operating fluorescent lamps L 18 W, L 36 W, L 38 W, L 58 W.

Maximum number of fluorescent lamps										
	I_n [A]	Lamp	Conventional ballast		Electronic ballast					
			Single-lamp uncorrected	parallel corrected	Full switching single lamp		two lamps	Group switching single lamp		two lamps
5SX			all	all	B	C	B	C	all	all
10	L 18 W	L 18 W	21	26	20	40	27	56	80	92
		L 36 W	18	26	20	40	27	48	46	48
		L 38 W	18	26	20	40	27	46	44	46
		L 58 W	11	16	13	28	12	25	30	30
13	L 18 W	L 18 W	28	34	26	52	35	72	104	121
		L 36 W	24	34	26	52	35	62	60	62
		L 38 W	24	34	26	52	35	60	57	60
		L 58 W	15	21	17	36	16	33	40	40
16	L 18 W	L 18 W	34	42	32	65	44	89	128	150
		L 36 W	29	42	32	65	44	76	75	76
		L 38 W	29	42	32	65	44	75	70	75
		L 58 W	18	27	22	44	20	41	48	49
20	L 18 W	L 18 W	43	52	40	81	56	112	160	187
		L 36 W	36	52	40	81	56	96	93	96
		L 38 W	36	52	40	81	56	92	88	92
		L 58 W	23	33	28	56	25	52	60	62
25	L 18 W	L 18 W	53	66	51	102	68	139	200	235
		L 36 W	46	66	51	102	68	120	117	120
		L 38 W	46	66	51	102	68	116	110	116
		L 58 W	29	42	34	69	32	65	76	78
32	L 18 W	L 18 W	68	84	65	131	89	179	250	300
		L 36 W	59	84	65	131	89	153	150	153
		L 38 W	59	84	65	131	89	150	141	150
		L 58 W	37	54	44	89	41	84	98	99

Comments:

Circuit impedance: The specified lamp load values apply, taking into account a line impedance of 800 mΩ. At 400 mΩ the permissible values are reduced by 10 %, at 200 mΩ by 20 %.

Reduction factors for miniature circuit-breakers for the simultaneously switching on of filament lamp load taking into account the rated current of the miniature circuit-breaker and the summated current of the lamps

	Reduction factors	
	Switching with miniature circuit-breaker	Switching with separate switch
5SX, 5SQ2		
Characteristic A	0.3	0.35
Characteristic B	0.5	0.6
Characteristic C	1	1
Characteristic D	1	1

Modular Installation Devices, Mounting Depth 55 mm >N< Miniature Circuit-Breakers

Introduction

Overview

Current carrying capacity of circuit-breakers with corrected and uncorrected HQ, HQI and NAV lamps (number)

		Lamp power [W]							
		35	70	150	250	400	1 000	2000	3 500
Lamp current	[A]	0.5	1	1.8	3	3.5	9.5	10.3	18
Corrected lamp current	[A]	0.3	0.5	1	1.5	2	6	5.5	9.8
Inrush peak	[A]	10	18	36	60	70	120	125	220

		Lamp power [W]							
I_n [A]		35	70	150	250	400	1 000	2000	3 500
5SX2, 5SX4									
Characteristic B									
	6	3	1	0	0	0	0	0	0
	10	5	2	1	0	0	0	0	0
	13	6	3	1	1	1	0	0	0
	16	8	4	2	1	1	0	0	0
	20	10	5	2	1	1	0	0	0
	25	13	7	3	2	1	1	1	0
	32	16	8	4	2	2	1	1	0
	40	20	11	5	3	3	1	1	1
	50	21	12	6	3	3	1	1	1
Characteristic C									
	1	1	0	0	0	0	0	0	0
	1.6	2	1	0	0	0	0	0	0
	2	2	1	0	0	0	0	0	0
	3	3	1	0	0	0	0	0	0
	4	4	2	1	0	0	0	0	0
	6	6	3	1	1	0	0	0	0
	8	8	4	2	1	1	0	0	0
	10	10	5	2	1	1	0	0	0
	13	13	7	3	2	1	1	1	0
	16	16	9	4	2	2	1	1	0
	20	20	11	5	3	2	1	1	0
	25	25	14	7	4	3	2	1	1
	32	32	17	8	5	4	2	2	1
	40	40	22	11	6	5	3	3	1
	50	50	27	13	8	7	4	3	2
Characteristic D									
	1	1	0	0	0	0	0	0	0
	1.6	2	1	0	0	0	0	0	0
	2	2	1	0	0	0	0	0	0
	3	3	2	1	0	0	0	0	0
	4	5	2	1	1	0	0	0	0
	6	8	4	2	1	1	0	0	0
	8	11	5	3	2	1	0	0	0
	10	14	7	4	2	2	0	0	0
	13	18	9	5	3	2	1	1	0
	16	22	11	6	3	3	1	1	0
	20	28	14	7	4	4	1	1	0
	25	35	17	9	5	5	2	1	1
	32	44	22	12	7	6	2	2	1
	40	56	28	15	9	8	3	3	1
	50	70	35	19	11	10	4	3	2

Modular Installation Devices, Mounting Depth 55 mm >N< Miniature Circuit-Breakers

Introduction

Overview

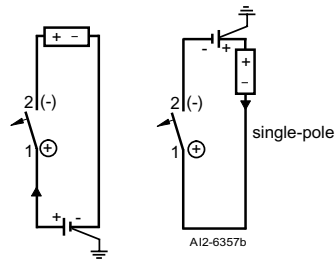
MCBs for DC and AC/DC

In DC networks up to 60 V or 120 V, all MCBs 5SX2 and 5SX4 are suitable for single-pole and double-pole application.

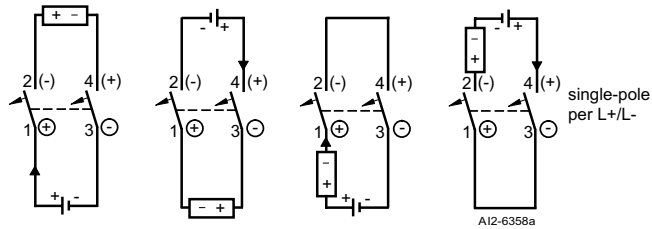
The 5SX5 design is required for higher voltages. Contrary to the standard product range, the 5SX5 MCBs are equipped with additional permanent magnets in the quenching chamber to support arc suppression.

For this reason, the polarity of the MCB is clearly marked and must be observed when connecting the cables and conductors.

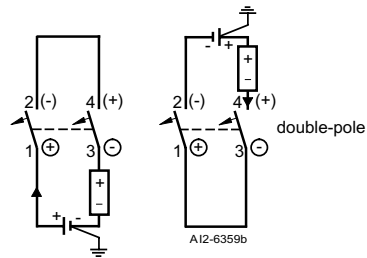
Up to max. 220 V DC
battery voltage



Up to max. 220 V DC
battery voltage



Up to max. 440 V DC
battery voltage



Modular Installation Devices, Mounting Depth 55 mm >N< Miniature Circuit-Breakers

Introduction

Benefits

Sample applications for 5SX miniature circuit-breakers

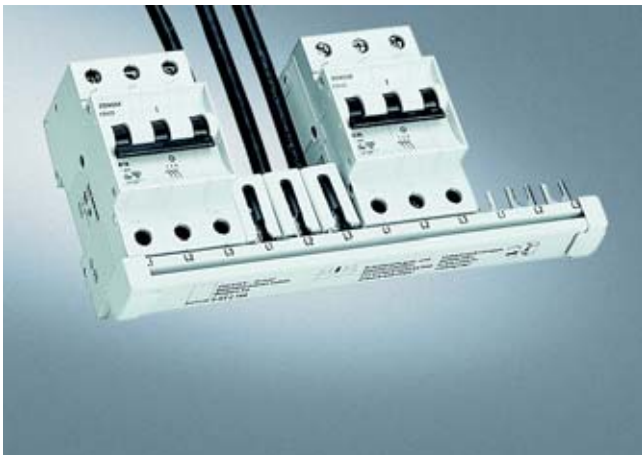


Simultaneous connection of the supply leads coming from below with cross-sections of up to 25 mm² and the three-pole 5ST2 144 busbar to the combination terminal of the miniature circuit-breaker.

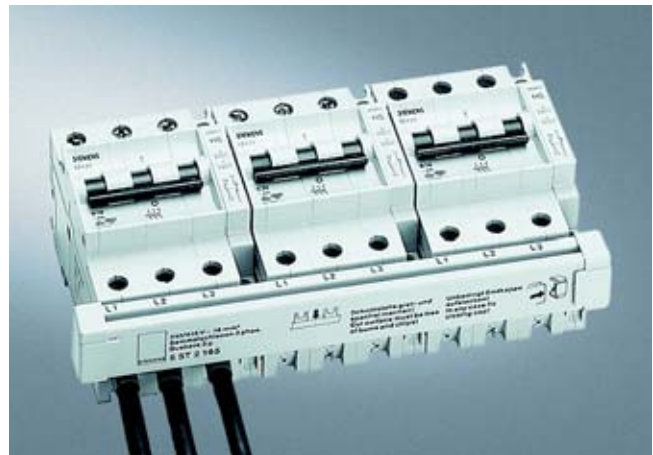


Simultaneous connection of the supply leads coming from below with cross-sections of up to 35 mm² and 2-pole 5ST2 143 busbar over 5ST2 166 terminal.

The process is the same if the connecting cables are fed in from above.



Connection of the supply leads coming from above with cross-sections of up to 35 mm² to 5ST2 144 busbar over additional terminal 5ST2 157.



Simultaneous connection of supply leads of up to 25 mm² and 5ST2 165 busbar to combination terminal of the miniature circuit-breaker with auxiliary switches that have been added on-site.

The busbars and connection terminals are described on page 12/36.

12

Modular Installation Devices, Mounting Depth 55 mm >N< Miniature Circuit-Breakers

Introduction

Benefits

- High rated breaking capacity up to 10 000 A acc. to IEC/EN 60898
- Excellent current limiting and selectivity characteristics
- Tripping characteristics A, B, C and D
- Terminals offer protection against contact with fingers or the back of the hand acc. to the German accident prevention regulations VBG 4/BGV A3
- Combined terminals enable a simultaneous connection of busbars and feeder cables
- Uniform additional components which can be mounted individually, quickly and on-site thanks to their snap-on technique
- The handle locking device effectively prevents any unauthorized operation of the handle
- Particularly suitable for installation in flat distribution boards for building installations

Application

N-system miniature circuit-breakers primarily serve to protect cables and lines against overload and short circuit. Thus, they also serve to protect electrical equipment against excessive overheating acc. to DIN VDE 0100-430 (see also IEC 60364-4).

Under certain conditions, miniature circuit-breakers also offer protection against dangerous leakage currents caused by excessive touch voltage due to insulation faults acc. to DIN VDE 0100-410.

Thanks to their fixed rated current settings, the miniature circuit-breakers may also be used for limited motor protection applications.

A range of different tripping characteristics are available for the applications described here. The IEC/EN 60898 standards form the basis for the miniature circuit-breakers' design and approval.

When used for industrial applications and for system and plant engineering applications, the *N-system* miniature circuit-breakers can be supplemented by individually mountable add-on components such as auxiliary circuit switches, fault signal contacts, shunt trips and individually mountable accessories, such as busbar systems and mounting parts.

Design

N-system miniature circuit-breakers are equipped with a delayed overload/time-dependent thermal release (thermal bimetal) for low overcurrents and with an instantaneous electromagnetic release for higher overload and short-circuit currents.

The special contact materials used guarantee a long service life and offer a high degree of protection against contact welding.

Function

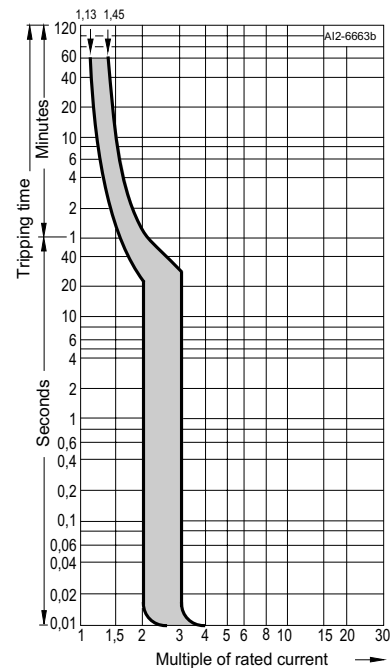
Thanks to the extremely fast contact separation in cases of failures and the rapid quenching of the arc consequently generated in the arcing chamber, the *N-system* miniature circuit-breakers ensure safe and current-limiting disconnection.

The permissible limit I^2t values of the energy limitation class 3 specified in IEC/EN 60898 are generally undercut by 50 %. This guarantees an excellent selectivity towards upstream overcurrent protection devices.

Characteristic curves

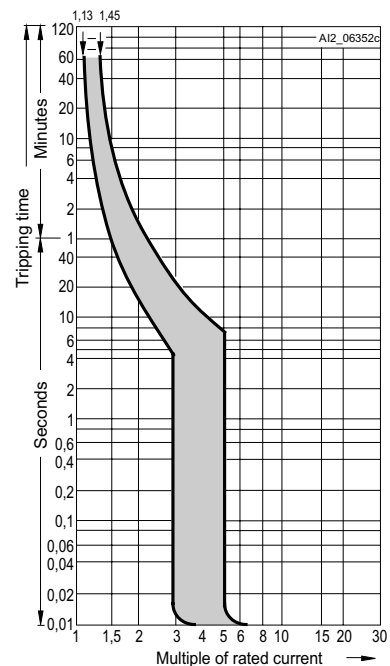
Tripping characteristic acc. to IEC/EN 60898

Tripping characteristic A



- For limited semiconductor protection
- Protection of measuring circuits with transformers
- Protection of circuits with long cable lengths which will require tripping within 0.4 s acc. to DIN VDE 0100-410

Tripping characteristic B



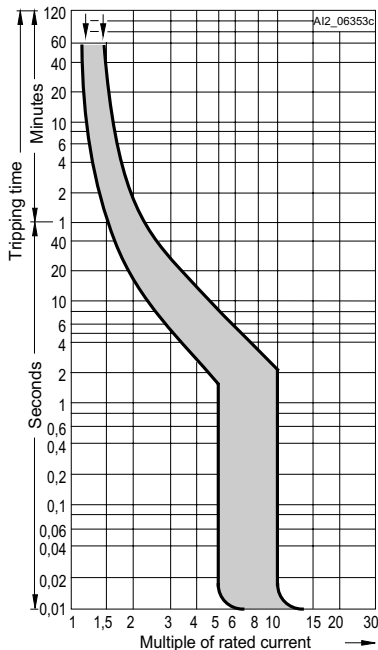
- Line protection mainly in socket outlet circuits; no proof required regarding personnel safety

Modular Installation Devices, Mounting Depth 55 mm >N< Miniature Circuit-Breakers

Introduction

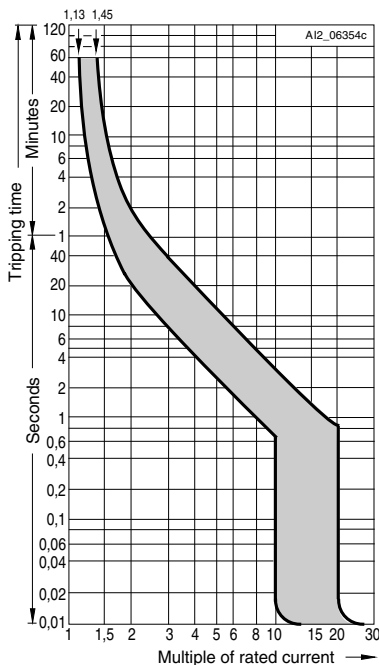
Characteristic curves

Tripping characteristic C



- General line protection, especially advantageous with higher starting currents (lamps, motors, etc.).

Tripping characteristic D



- The tripping range has been matched to applications involving equipment generating significant pulses (transformers, solenoid valves)

In the case of different ambient temperatures, the current values of the delayed tripping operation change by approx. 5% per 10 K temperature difference > for temperatures lower and < for temperatures higher than 30 °C.


For direct voltages, the maximum current values of the instantaneous tripping operation increase by a factor of 1.2.

If more than one electrical circuit is loaded in a series of circuit-breakers the resulting increase in ambient temperature affects the characteristic curve.

In this case an additional correction factor, specific to the rated current of the circuit-breaker, must be taken into account.

Number	1	2 ... 3	4 ... 6	> 7
Correction factor K	1.00	0.90	0.88	0.85

Modular Installation Devices, Mounting Depth 55 mm >N< Miniature Circuit-Breakers

3 000 







5SQ2, 3 kA

Application

• U_n : 230/400 V, 50 to 60 Hz, can be used in systems up to 250/440 V AC, 60 V DC per pole


• Standards: IEC/EN 60898

Selection and ordering data

	I_n	MW	Characteristic B Order No.	Characteristic C Order No.	Weight 1 unit approx.	PS*/ P. unit
	A				kg	Unit(s)
 <p>1-pole</p> 	0.5	1	--	5SQ2 170-0KA05	0.100	1/12
	1		--	5SQ2 170-0KA01	0.100	1/12
	1.6		--	5SQ2 170-0KA15	0.100	1/12
	2		--	5SQ2 170-0KA02	0.100	1/12
	3		--	5SQ2 170-0KA03	0.100	1/12
	4		--	5SQ2 170-0KA04	0.100	1/12
	6		5SQ2 160-0KA06	5SQ2 170-0KA06	0.100	1/12
	8		--	5SQ2 170-0KA08	0.100	1/12
	10		5SQ2 160-0KA10	5SQ2 170-0KA10	0.100	1/12
	13		5SQ2 160-0KA13	5SQ2 170-0KA13	0.100	1/12
	16		5SQ2 160-0KA16	5SQ2 170-0KA16	0.100	1/12
	20		5SQ2 160-0KA20	5SQ2 170-0KA20	0.100	1/12
	25		5SQ2 160-0KA25	5SQ2 170-0KA25	0.100	1/12
	32		5SQ2 160-0KA32	5SQ2 170-0KA32	0.100	1/12
40		5SQ2 160-0KA40	5SQ2 170-0KA40	0.100	1/12	
50		--	5SQ2 170-0KA50	0.100	1/12	
63		--	5SQ2 170-0KA63	0.100	1/12	
 <p>1-pole + N</p> 	0.5	2	--	5SQ2 570-0KA05	0.180	1/6
	1		--	5SQ2 570-0KA01	0.180	1/6
	1.6		--	5SQ2 570-0KA15	0.180	1/6
	2		--	5SQ2 570-0KA02	0.180	1/6
	3		--	5SQ2 570-0KA03	0.180	1/6
	4		--	5SQ2 570-0KA04	0.180	1/6
	6		5SQ2 560-0KA06	5SQ2 570-0KA06	0.180	1/6
	8		--	5SQ2 570-0KA08	0.180	1/6
	10		5SQ2 560-0KA10	5SQ2 570-0KA10	0.180	1/6
	13		5SQ2 560-0KA13	5SQ2 570-0KA13	0.180	1/6
	16		5SQ2 560-0KA16	5SQ2 570-0KA16	0.180	1/6
	20		5SQ2 560-0KA20	5SQ2 570-0KA20	0.180	1/6
	25		5SQ2 560-0KA25	5SQ2 570-0KA25	0.180	1/6
	32		5SQ2 560-0KA32	5SQ2 570-0KA32	0.180	1/6
40		5SQ2 560-0KA40	5SQ2 570-0KA40	0.180	1/6	
50		--	5SQ2 570-0KA50	0.180	1/6	
63		--	5SQ2 570-0KA63	0.180	1/6	
 <p>2-pole</p> 	0.5	2	--	5SQ2 270-0KA05	0.200	1/6
	1		--	5SQ2 270-0KA01	0.200	1/6
	1.6		--	5SQ2 270-0KA15	0.200	1/6
	2		--	5SQ2 270-0KA02	0.200	1/6
	3		--	5SQ2 270-0KA03	0.200	1/6
	4		--	5SQ2 270-0KA04	0.200	1/6
	6		5SQ2 260-0KA06	5SQ2 270-0KA06	0.200	1/6
	8		--	5SQ2 270-0KA08	0.200	1/6
	10		5SQ2 260-0KA10	5SQ2 270-0KA10	0.200	1/6
	13		5SQ2 260-0KA13	5SQ2 270-0KA13	0.200	1/6
	16		5SQ2 260-0KA16	5SQ2 270-0KA16	0.200	1/6
	20		5SQ2 260-0KA20	5SQ2 270-0KA20	0.200	1/6
	25		5SQ2 260-0KA25	5SQ2 270-0KA25	0.200	1/6
	32		5SQ2 260-0KA32	5SQ2 270-0KA32	0.200	1/6
40		5SQ2 260-0KA40	5SQ2 270-0KA40	0.200	1/6	
50		--	5SQ2 270-0KA50	0.200	1/6	
63		--	5SQ2 270-0KA63	0.200	1/6	




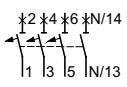
For accessories, see page 12/39.

Modular Installation Devices, Mounting Depth 55 mm >N< Miniature Circuit-Breakers

3 000 

5SQ2, 3 kA

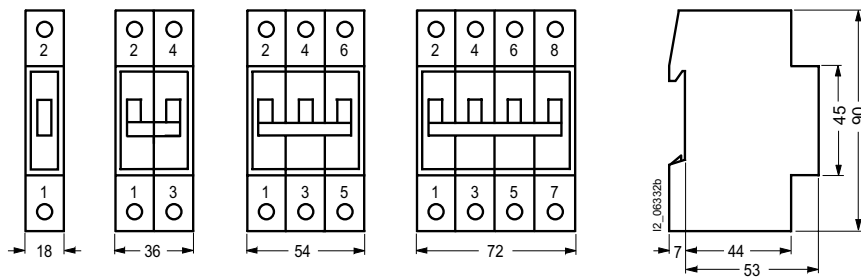
Selection and ordering data

	I_n A	MW	Characteristic B		Characteristic C		Weight 1 unit approx. kg	PS*/ P. unit Unit(s)
			Order No.	Order No.				
 <p>3-pole</p> 	0.5	3	--	5SQ2 370-0KA05	0.300	1/4		
	1		--	5SQ2 370-0KA01	0.300	1/4		
	1.6		--	5SQ2 370-0KA15	0.300	1/4		
	2		--	5SQ2 370-0KA02	0.300	1/4		
	3		--	5SQ2 370-0KA03	0.300	1/4		
	4		--	5SQ2 370-0KA04	0.300	1/4		
	6		5SQ2 360-0KA06	5SQ2 370-0KA06	0.300	1/4		
	8		--	5SQ2 370-0KA08	0.300	1/4		
	10		5SQ2 360-0KA10	5SQ2 370-0KA10	0.300	1/4		
	13		5SQ2 360-0KA13	5SQ2 370-0KA13	0.300	1/4		
	16		5SQ2 360-0KA16	5SQ2 370-0KA16	0.300	1/4		
	20		5SQ2 360-0KA20	5SQ2 370-0KA20	0.300	1/4		
	25		5SQ2 360-0KA25	5SQ2 370-0KA25	0.300	1/4		
	32		5SQ2 360-0KA32	5SQ2 370-0KA32	0.300	1/4		
40		5SQ2 360-0KA40	5SQ2 370-0KA40	0.300	1/4			
50		--	5SQ2 370-0KA50	0.300	1/4			
63		--	5SQ2 370-0KA63	0.300	1/4			
 <p>3-pole + N</p> 	0.5	4	--	5SQ2 670-0KA05	0.380	1/3		
	1		--	5SQ2 670-0KA01	0.380	1/3		
	1.6		--	5SQ2 670-0KA15	0.380	1/3		
	2		--	5SQ2 670-0KA02	0.380	1/3		
	3		--	5SQ2 670-0KA03	0.380	1/3		
	4		--	5SQ2 670-0KA04	0.380	1/3		
	6		--	5SQ2 670-0KA06	0.380	1/3		
	8		--	5SQ2 670-0KA08	0.380	1/3		
	10		--	5SQ2 670-0KA10	0.380	1/3		
	13		--	5SQ2 670-0KA13	0.380	1/3		
	16		--	5SQ2 670-0KA16	0.380	1/3		
	20		--	5SQ2 670-0KA20	0.380	1/3		
	25		--	5SQ2 670-0KA25	0.380	1/3		
	32		--	5SQ2 670-0KA32	0.380	1/3		
40		--	5SQ2 670-0KA40	0.380	1/3			
50		--	5SQ2 670-0KA50	0.380	1/3			
63		--	5SQ2 670-0KA63	0.380	1/3			

For accessories, see page 12/39.

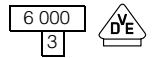
Dimensional drawings

5SQ2



12

Modular Installation Devices, Mounting Depth 55 mm >N< Miniature Circuit-Breakers











5SX2, 6 kA

Application

• U_n : 230/400 V, 50 to 60 Hz, can be used in systems up to 250/440 V AC, 60 V DC per pole

• Standards: IEC/EN 60898, DIN VDE 0641 Part 11
• Additional components can be retrofitted individually.

Selection and ordering data

	I_n	MW	Characteristic A Order No.	Characteristic B Order No.	Weight 1 unit approx.	PS*/ P. unit
	A				kg	Unit(s)
 <p>1-pole</p> 	1	1	5SX2 101-5	--	0.150	1/12
	1.6		5SX2 115-5	--	0.150	1/12
	2		5SX2 102-5	--	0.150	1/12
	3		5SX2 103-5	--	0.150	1/12
	4		5SX2 104-5	--	0.150	1/12
	6		5SX2 106-5	5SX2 106-6	0.150	1/12
	10		5SX2 110-5	5SX2 110-6	0.150	1/12
	13		--	5SX2 113-6	0.150	1/12
	16		5SX2 116-5	5SX2 116-6	0.150	1/12
	20		5SX2 120-5	5SX2 120-6		
	25		5SX2 125-5	5SX2 125-6	0.150	1/12
	32		5SX2 132-5	5SX2 132-6	0.150	1/12
	40		5SX2 140-5	5SX2 140-6	0.150	1/12
	50		--	5SX2 150-6	0.150	1/12
 <p>1-pole + N</p> 	6	2	--	5SX2 506-6	0.210	1/6
	10		--	5SX2 510-6	0.210	1/6
	13		--	5SX2 513-6	0.210	1/6
	16		--	5SX2 516-6	0.210	1/6
	20		--	5SX2 520-6	0.210	1/6
	25		--	5SX2 525-6	0.210	1/6
	32		--	5SX2 532-6	0.210	1/6
	40		--	5SX2 540-6	0.210	1/6
	50		--	5SX2 550-6	0.210	1/6
	 <p>2-pole</p> 	1	2	5SX2 201-5	--	0.300
1.6			5SX2 215-5	--	0.300	1/6
2			5SX2 202-5	--	0.300	1/6
3			5SX2 203-5	--	0.300	1/6
4			5SX2 204-5	--	0.300	1/6
6			5SX2 206-5	5SX2 206-6	0.300	1/6
10			5SX2 210-5	5SX2 210-6	0.300	1/6
13			--	5SX2 213-6	0.300	1/6
16			5SX2 216-5	5SX2 216-6	0.300	1/6
20			5SX2 220-5	5SX2 220-6	0.300	1/6
25			5SX2 225-5	5SX2 225-6	0.300	1/6
32			5SX2 232-5	5SX2 232-6	0.300	1/6
40			5SX2 240-5	5SX2 240-6	0.300	1/6
50			--	5SX2 250-6	0.300	1/6
 <p>3-pole</p> 	1	3	5SX2 301-5	--	0.450	1/4
	1.6		5SX2 315-5	--	0.450	1/4
	2		5SX2 302-5	--	0.450	1/4
	3		5SX2 303-5	--	0.450	1/4
	4		5SX2 304-5	--	0.450	1/4
	6		5SX2 306-5	5SX2 306-6	0.450	1/4
	10		5SX2 310-5	5SX2 310-6	0.450	1/4
	13		--	5SX2 313-6	0.450	1/4
	16		5SX2 316-5	5SX2 316-6	0.450	1/4
	20		5SX2 320-5	5SX2 320-6	0.450	1/4
	25		5SX2 325-5	5SX2 325-6	0.450	1/4
	32 ¹⁾		5SX2 332-5	5SX2 332-6	0.450	1/4
	40		5SX2 340-5	5SX2 340-6	0.450	1/4
	50		--	5SX2 350-6	0.450	1/4

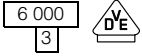
The versions 5SX2 B 6 ... 32 1-pole, 2-pole and 3-pole are certified to UL 1077 and CSA 22.2 No. 235-M 89 and can be used as supplementary protectors up to 277 V AC (1-pole) and 480 V AC (2-pole, 3-pole).

For additional components see page 12/35.

For accessories see pages 12/36 to 12/39.


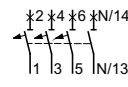

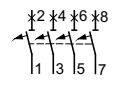
1) Also suitable for 21-kW active power with three-phase currents of 40 V (e.g. continuous-flow heaters with short-time operation duty) or 7-kW active power at 230 V AC (e.g. storage in not-continuous duty). For continuous load applications, the use of miniature circuit-breakers of characteristic B or C and $I_n = 40$ A is recommended.

Modular Installation Devices, Mounting Depth 55 mm >N< Miniature Circuit-Breakers




5SX2, 6 kA

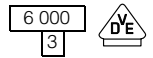
Selection and ordering data

	I_n	MW	Characteristic A Order No.	Characteristic B Order No.	Weight 1 unit approx. kg	PS*/ P. unit Unit(s)
3-pole + N						
 	10	2	--	5SX2 610-6	0.450	1/3
	13		--	5SX2 613-6	0.450	1/3
	16		--	5SX2 616-6	0.450	1/3
	20		--	5SX2 620-6	0.450	1/3
	25		--	5SX2 625-6	0.450	1/3
	32		--	5SX2 632-6	0.450	1/3
	40		--	5SX2 640-6	0.450	1/3
50	--	5SX2 650-6	0.450	1/3		
4-pole						
 	20 ¹⁾		--	5SX2 420-6	0.590	1/3
	25 ¹⁾		--	5SX2 425-6	0.590	1/3
	32 ¹⁾		--	5SX2 432-6	0.590	1/3
	40		--	5SX2 440-6	0.590	1/3

For additional components see page 12/35.
For accessories see pages 12/36 to 12/39.







1) Without  mark.

Modular Installation Devices, Mounting Depth 55 mm >N< Miniature Circuit-Breakers



5SX2, 6 kA

Selection and ordering data

	I_n	MW	Characteristic C		Characteristic D		Weight 1 unit approx. kg	PS*/ P. unit Unit(s)
			Order No.		Order No.			
 <p>1-pole</p> 	A							
	0.3	1	5SX2 114-7		--		0.140	1/12
	0.5		5SX2 105-7		5SX2 105-8		0.140	1/12
	1		5SX2 101-7		5SX2 101-8		0.140	1/12
	1.6		5SX2 115-7		5SX2 115-8		0.140	1/12
	2		5SX2 102-7		5SX2 102-8		0.140	1/12
	3		5SX2 103-7		5SX2 103-8		0.140	1/12
	4		5SX2 104-7		5SX2 104-8		0.140	1/12
	6		5SX2 106-7		5SX2 106-8		0.140	1/12
	8		5SX2 108-7		5SX2 108-8		0.140	1/12
	10		5SX2 110-7		5SX2 110-8		0.140	1/12
	13		5SX2 113-7		5SX2 113-8		0.140	1/12
	16		5SX2 116-7		5SX2 116-8		0.140	1/12
	20		5SX2 120-7		5SX2 120-8		0.140	1/12
	25		5SX2 125-7		5SX2 125-8		0.140	1/12
32 ¹⁾		5SX2 132-7		5SX2 132-8		0.140	1/12	
40 ²⁾		5SX2 140-7		5SX2 140-8		0.150	1/12	
50 ²⁾		5SX2 150-7		5SX2 150-8		0.150	1/12	
63 ³⁾		5SX2 163-7		--		0.150	1/12	
 <p>1-pole + N</p> 								
	6	2	5SX2 506-7		--		0.210	1/6
	10		5SX2 510-7		--		0.210	1/6
	13		5SX2 513-7		--		0.210	1/6
	16		5SX2 516-7		--		0.210	1/6
	20		5SX2 520-7		--		0.210	1/6
	25		5SX2 525-7		--		0.210	1/6
	32		5SX2 532-7		--		0.210	1/6
	40		5SX2 540-7		--		0.210	1/6
	50		5SX2 550-7		--		0.210	1/6
 <p>2-pole</p> 								
	0.5	2	5SX2 205-7		5SX2 205-8		0.280	1/6
	1		5SX2 201-7		5SX2 201-8		0.280	1/6
	1.6		5SX2 215-7		5SX2 215-8		0.280	1/6
	2		5SX2 202-7		5SX2 202-8		0.280	1/6
	3		5SX2 203-7		5SX2 203-8		0.280	1/6
	4		5SX2 204-7		5SX2 204-8		0.280	1/6
	6		5SX2 206-7		5SX2 206-8		0.280	1/6
	8		5SX2 208-7		5SX2 208-8		0.280	1/6
	10		5SX2 210-7		5SX2 210-8		0.280	1/6
	13		5SX2 213-7		5SX2 213-8		0.280	1/6
	16		5SX2 216-7		5SX2 216-8		0.280	1/6
	20		5SX2 220-7		5SX2 220-8		0.280	1/6
	25		5SX2 225-7		5SX2 225-8		0.280	1/6
	32		5SX2 232-7		5SX2 232-8		0.280	1/6
40		5SX2 240-7		5SX2 240-8		0.300	1/6	
50 ²⁾		5SX2 250-7		5SX2 250-8		0.300	1/6	
63 ³⁾		5SX2 263-7		--		0.300	1/6	


The versions 5SX2 C 0.5 ... 32 1-pole, 2-pole and 3-pole are certified to UL 1077 and CSA 22.2 No. 235-M 89 and can be used as supplementary protectors up to 277 V AC (1-pole) and 480 V AC (2-pole, 3-pole).

For additional components see page 12/35.

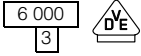
For accessories see pages 12/36 to 12/39.

1) Also suitable for 21-kW active power with three-phase currents of 400 V (e.g. continuous-flow heaters with short-time operation duty) or 7-kW active power at 230 V AC (e.g. storage in not-continuous duty). For continuous load applications, the use of miniature circuit-breakers of characteristic B or C and $I_n = 40$ A is recommended.

2) Rated breaking capacity 4.5 kA is only valid for characteristic D.




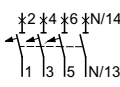

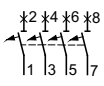
3) Without  mark.

Modular Installation Devices, Mounting Depth 55 mm >N< Miniature Circuit-Breakers



5SX2, 6 kA

Selection and ordering data

	I_n	MW	Characteristic C		Characteristic D		Weight 1 unit approx. kg	PS*/ P. unit Unit(s)
			Order No.		Order No.			
 <p>3-pole</p> 	A							
	0.5	3	5SX2 305-7		5SX2 305-8		0.440	1/4
	1		5SX2 301-7		5SX2 301-8		0.440	1/4
	1.6		5SX2 315-7		5SX2 315-8		0.440	1/4
	2		5SX2 302-7		5SX2 302-8		0.440	1/4
	3		5SX2 303-7		5SX2 303-8		0.440	1/4
	4		5SX2 304-7		5SX2 304-8		0.440	1/4
	6		5SX2 306-7		5SX2 306-8		0.440	1/4
	8		5SX2 308-7		5SX2 308-8		0.440	1/4
	10		5SX2 310-7		5SX2 310-8		0.440	1/4
	13		5SX2 313-7		5SX2 313-8		0.440	1/4
	16		5SX2 316-7		5SX2 316-8		0.440	1/4
	20		5SX2 320-7		5SX2 320-8		0.440	1/4
	25		5SX2 325-7		5SX2 325-8		0.440	1/4
32 ¹⁾		5SX2 332-7		5SX2 332-8		0.440	1/4	
40 ²⁾		5SX2 340-7		5SX2 340-8		0.450	1/4	
50 ²⁾		5SX2 350-7		5SX2 350-8		0.450	1/4	
63 ³⁾		5SX2 363-7		--		0.450	1/4	
 <p>3-pole + N</p> 		4						
	6		5SX2 606-7		--		0.450	1/3
	10		5SX2 610-7		--		0.450	1/3
	13		5SX2 613-7		--		0.450	1/3
	16		5SX2 616-7		--		0.450	1/3
	20		5SX2 620-7		--		0.450	1/3
	25		5SX2 625-7		--		0.450	1/3
	32		5SX2 632-7		--		0.450	1/3
	40		5SX2 640-7		--		0.450	1/3
	50		5SX2 650-7		--		0.450	1/3
 <p>4-pole</p> 		4						
	6 ³⁾		5SX2 406-7		--		0.590	1/3
	10 ³⁾		5SX2 410-7		--		0.590	1/3
	13 ³⁾		5SX2 413-7		--		0.590	1/3
	16 ³⁾		5SX2 416-7		--		0.590	1/3
	20 ³⁾		5SX2 420-7		--		0.590	1/3
	25 ³⁾		5SX2 425-7		--		0.590	1/3
	32 ³⁾		5SX2 432-7		--		0.590	1/3
	40		5SX2 440-7		--		0.590	1/3
	50		5SX2 450-7		--		0.590	1/3

The versions 5SX2 C 0.5 ... 32 1-pole, 2-pole and 3-pole are certified to UL 1077 and CSA 22.2 No. 235-M 89 and can be used as supplementary protectors up to 277 V AC (1-pole) and 480 V AC (2-pole, 3-pole).

For additional components see page 12/35.

For accessories see pages 12/36 to 12/39.

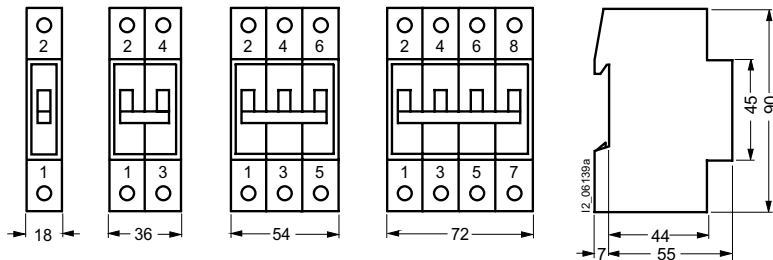
1) Also suitable for 21-kW active power with three-phase currents of 400 V (e.g. continuous-flow heaters with short-time operation duty) or 7-kW active power at 230 V AC (e.g. storage in not-continuous duty). For continuous load applications, the use of miniature circuit-breakers of characteristic B or C and $I_n = 40$ A is recommended.

2) Rated breaking capacity 4.5 kA is only valid for characteristic D.

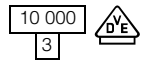
3) Without  mark.

Dimensional drawings

5SX2



Modular Installation Devices, Mounting Depth 55 mm >N< Miniature Circuit-Breakers






5SX4, 10 kA

Application

- U_n : 230/400 V, 50 to 60 Hz, can be used in systems up to 250/440 V AC, 60 V DC per pole

- Standards: IEC/EN 60898
- Additional components can be retrofitted individually.

Selection and ordering data

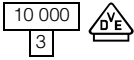
	I_n	MW	Characteristic B Order No.	Characteristic C Order No.	Weight 1 unit approx. kg	PS*/ P. unit Unit(s)
1-pole						
	0,5	1	--	5SX4 105-7	0,140	1/12
	1		--	5SX4 101-7	0,140	1/12
	1,6		--	5SX4 115-7	0,140	1/12
	2		--	5SX4 102-7	0,140	1/12
	3		--	5SX4 103-7	0,140	1/12
	4		--	5SX4 104-7	0,140	1/12
	6		5SX4 106-6	5SX4 106-7	0,140	1/12
	8		--	5SX4 108-7	0,140	1/12
	10		5SX4 110-6	5SX4 110-7	0,140	1/12
	13		5SX4 113-6	5SX4 113-7	0,140	1/12
	16		5SX4 116-6	5SX4 116-7	0,140	1/12
	20		5SX4 120-6	5SX4 120-7	0,140	1/12
	25		5SX4 125-6	5SX4 125-7	0,140	1/12
	32 ¹⁾		5SX4 132-6	5SX4 132-7	0,140	1/12
40	5SX4 140-6	5SX4 140-7	0,115	1/12		
50	5SX4 150-6	5SX4 150-7	0,115	1/12		
1-pole + N						
	6	2	5SX4 506-6	5SX4 506-7	0,210	1/6
	10		5SX4 510-6	5SX4 510-7	0,210	1/6
	13		5SX4 513-6	5SX4 513-7	0,210	1/6
	16		5SX4 516-6	5SX4 516-7	0,210	1/6
	20		5SX4 520-6	5SX4 520-7	0,210	1/6
	25		5SX4 525-6	5SX4 525-7	0,210	1/6
	32		5SX4 532-6	5SX4 532-7	0,210	1/6
	40		5SX4 540-6	5SX4 540-7	0,300	1/6
	50		5SX4 550-6	5SX4 550-7	0,300	1/6
	2-pole					
	0,5	2	--	5SX4 205-7	0,280	1/6
	1		--	5SX4 201-7	0,280	1/6
	1,6		--	5SX4 215-7	0,280	1/6
	2		--	5SX4 202-7	0,280	1/6
	3		--	5SX4 203-7	0,280	1/6
	4		--	5SX4 204-7	0,280	1/6
	6		5SX4 206-6	5SX4 206-7	0,280	1/6
	8		--	5SX4 208-7	0,280	1/6
	10		5SX4 210-6	5SX4 210-7	0,280	1/6
	13		5SX4 213-6	5SX4 213-7	0,280	1/6
	16		5SX4 216-6	5SX4 216-7	0,280	1/6
	20		5SX4 220-6	5SX4 220-7	0,280	1/6
	25		5SX4 225-6	5SX4 225-7	0,280	1/6
	32		5SX4 232-6	5SX4 232-7	0,280	1/6
	40		5SX4 240-6	5SX4 240-7	0,280	1/6
	50		5SX4 250-6	5SX4 250-7	0,280	1/6

For additional components see page 12/35.

For accessories see pages 12/36 to 12/39.






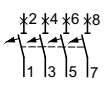
1) Also suitable for 21 kW active power with three-phase currents of 400 V (e.g. continuous-flow heaters with short-time operation duty) or 7 kW active power at 230 V AC (e.g. storage in not-continuous duty). For continuous load applications, the use of miniature circuit-breakers of characteristic B or C and $I_n = 40$ A is recommended.

Modular Installation Devices, Mounting Depth 55 mm >N< Miniature Circuit-Breakers




5SX4, 10 kA

Selection and ordering data

	I_n	MW	Characteristic B		Characteristic C		Weight 1 unit approx. kg	PS*/ P. unit Unit(s)
			Order No.	Order No.	Order No.	Order No.		
 <p>3-pole</p> 	A							
	0,5	3	--		5SX4 305-7		0,440	4
	1		--		5SX4 301-7		0,440	4
	1,6		--		5SX4 315-7		0,440	4
	2		--		5SX4 302-7		0,440	4
	3		--		5SX4 303-7		0,440	4
	4		--		5SX4 304-7		0,440	4
	6		5SX4 306-6		5SX4 306-7		0,044	4
	8		--		5SX4 308-7		0,440	4
	10		5SX4 310-6		5SX4 310-7		0,440	4
	13		5SX4 313-6		5SX4 313-7		0,440	4
	16		5SX4 316-6		5SX4 316-7		0,440	4
	20		5SX4 320-6		5SX4 320-7		0,440	4
	25		5SX4 325-6		5SX4 325-7		0,440	4
32 ¹⁾		5SX4 332-6		5SX4 332-7		0,450	4	
40		5SX4 340-6		5SX4 340-7		0,450	4	
50		5SX4 350-6		5SX4 350-7		0,450	4	
 <p>3-pole + N</p> 								
	6	4	--		5SX4 606-7		0,450	3
	10		5SX4 610-6		5SX4 610-7		0,450	1
	13		5SX4 613-6		5SX4 613-7		0,450	3
	16		5SX4 616-6		5SX4 616-7		0,450	3
	20		5SX4 620-6		5SX4 620-7		0,450	3
	25		5SX4 625-6		5SX4 625-7		0,450	3
	32		5SX4 632-6		5SX4 632-7		0,450	3
	40		5SX4 640-6		5SX4 640-7		0,610	3
	50		5SX4 650-6		5SX4 650-7		0,610	3
 <p>4-pole</p> 								
	6	4	--		5SX4 406-7		0,590	3
	10		--		5SX4 410-7		0,590	3
	13		--		5SX4 413-7		0,590	3
	16		--		5SX4 416-7		0,590	3
	20		--		5SX4 420-7		0,590	3
	25		--		5SX4 425-7		0,590	3
	32		--		5SX4 432-7		0,590	3
	40		--		5SX4 440-7		0,590	3
	50		--		5SX4 450-7		0,590	3

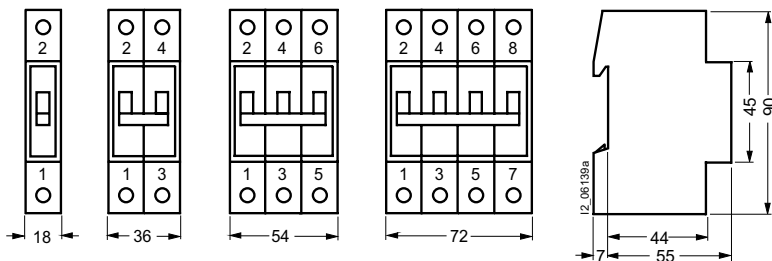
For additional components see page 12/35.
For accessories see pages 12/36 to 12/39.

1) Also suitable for 21 kW active power with three-phase currents of 400 V (e.g. continuous-flow heaters with short-time operation duty) or 7 kW active power at 230 V AC (e.g. storage in not-continuous duty). For continuous load applications, the use of miniature circuit-breakers of characteristic B or C and $I_n = 40$ A is recommended.

2) Without  mark.

Dimensional drawings

5SX4



Modular Installation Devices, Mounting Depth 55 mm >N< Miniature Circuit-Breakers

4 500	10 000	T4
3		



5SX5, 4.5 kA (10 kA)

Application

- U_n : 230/400 V, 50 to 60 Hz, 220 V DC per pole, can be used in systems up to 250/440 V AC,
 - 1-pole: 220 V DC
 - 2-pole: 440 V DC

- Standards: DIN VDE 0641 Part 12
- Additional components can be retrofitted individually.

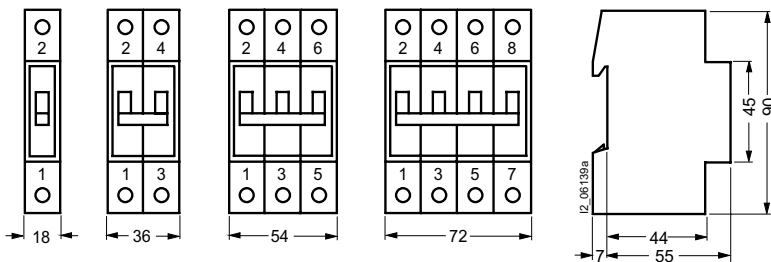
Selection and ordering data

	I_n	MW	Characteristic		Weight 1 unit approx.	PS*/ P. unit
			Order No.	Order No.		
1-pole						
	A				kg	Unit(s)
	0,5	1	--	5SX5 105-7	0,145	1/12
	1		--	5SX5 101-7	0,145	1/12
	1,6		--	5SX5 115-7	0,145	1/12
	2		--	5SX5 102-7	0,145	1/12
	3		--	5SX5 103-7	0,145	1/12
	4		--	5SX5 104-7	0,145	1/12
	6		5SX5 106-6	5SX5 106-7	0,145	1/12
	8		--	5SX5 108-7	0,145	1/12
	10		5SX5 110-6	5SX5 110-7	0,145	1/12
	13		5SX5 113-6	5SX5 113-7	0,145	1/12
	16		5SX5 116-6	5SX5 116-7	0,145	1/12
	20		5SX5 120-6	5SX5 120-7	0,145	1/12
25		5SX5 125-6	5SX5 125-7	0,145	1/12	
32		5SX5 132-6	5SX5 132-7	0,145	1/12	
2-pole						
	0,5	2	--	5SX5 205-7	0,290	1/6
	1		--	5SX5 201-7	0,290	1/6
	1,6		--	5SX5 215-7	0,290	1/6
	2		--	5SX5 202-7	0,290	1/6
	3		--	5SX5 203-7	0,290	1/6
	4		--	5SX5 204-7	0,290	1/6
	6		5SX5 206-6	5SX5 206-7	0,290	1/6
	8		--	5SX5 208-7	0,290	1/6
	10		5SX5 210-6	5SX5 210-7	0,290	1/6
	13		5SX5 213-6	5SX5 213-7	0,290	1/6
	16		5SX5 216-6	5SX5 216-7	0,290	1/6
	20		5SX5 220-6	5SX5 220-7	0,290	1/6
	25		5SX5 225-6	5SX5 225-7	0,290	1/6
32		5SX5 232-6	5SX5 232-7	0,290	1/6	

For additional components see page 12/35.
For accessories see pages 12/36 to 12/39.

Dimensional drawings

5SX5



Modular Installation Devices, Mounting Depth 55 mm >N< Miniature Circuit-Breakers

Additional components for 5SX

Benefits

Additional components

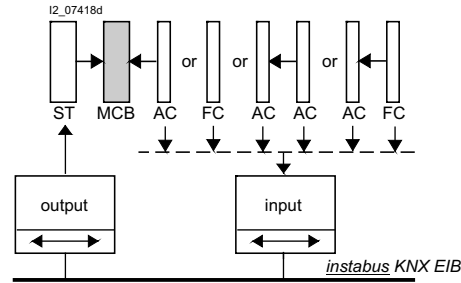
- Can be retrofitted individually
- Can be connected to *instabus* KNX EIB and AS-Interface bus over binary inputs.

Auxiliary switches (AS) and fault signal contacts (FC)


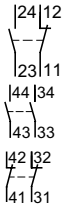

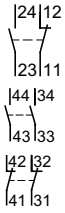

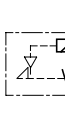
- Mounting with factory-fitted brackets
- Max. contact load:
6 A, 230 V AC, AC-15
1 A, 220 V DC, DC-13
according to DIN VDE 0660 Part 200
- Short-circuit protection through 5SX2 miniature circuit-breakers ...-6, ...-7 with $I_n = 6$ A or gL 6 A fuse, depending on the version.
- Remote indication of the miniature circuit-breaker switching state
 - AS: ON/OFF
 - FS: Tripped.

Shunt trips (ST)

- Assembly with enclosed screws
- Applicable for voltages of 110 to 415 V AC
- Short-circuit protection through 5SX2 miniature circuit-breakers ...-7 with $I_n \geq 16$ A
- Remote tripping of the miniature circuit-breaker

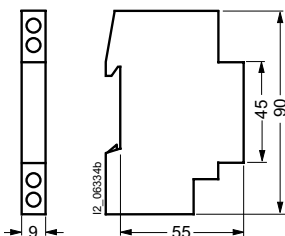


Selection and ordering data

Version	MW	Order No.	Weight 1 unit approx. kg	PS*/ P. unit Unit(s)	
Auxiliary circuit switches (AS)					
 	1 NO + 1 NC	0.5	5SX9 100	0.040	1
	2 NO		5SX9 101	0.040	1
	2 NC		5SX9 102	0.040	1
Fault signal contacts (FC)					
 	1 NO + 1 NC	0.5	5SX9 200	0.040	1
	2 NO		5SX9 201	0.040	1
	2 NC		5SX9 202	0.040	1
Shunt trips (ST) 100 % duty ratio					
 		1	5SX9 300	0.141	1

Dimensional drawings

5SX9 1.., 5SX9 2..



Modular Installation Devices, Mounting Depth 55 mm >N< Miniature Circuit-Breakers

Accessories for 5SX

Application

5ST2 1 busbar system

- According to DIN 57606 and DIN 57659
- Load at infeed single-sided/in center
50 A/90 A for 10 mm²
65 A/120 A for 16 mm²
- Fork-type connections
- Single and multi-phase
- Cu 10 mm² to 16 mm², fully insulated

5ST2 13, 5ST2 14, 5ST2 15, 5ST2 16 busbar systems

- Lug spacing: 18 mm
- No additional connection terminal required for bottom connection.

5ST2 18, 5ST2 19 busbar systems

- Lug spacing: 17.8 mm








5ST2 4 busbar system

- According to IEC 60664, 500 V (40 °C), fully insulated
- Load for center infeed:
1-phase up to 70 A
2- to 4-phase to 120 A.

Application

- Fork-type connections
- Any length possible thanks to the combination of 3 fixed busbar lengths
- Favorable current and temperature conduction thanks to the overlapping of individual components
- No further need for time-consuming and tedious tasks, such as cutting, cutting to length, deburring, cleaning of cut surfaces and mounting of end caps.
- Safe protection against contact for non-assigned connections.

Selection and ordering data




Version	Length	Order No.	Weight 1 unit approx.	PS*/ P. unit	
	mm		kg	Unit(s)	
5ST2 13, 5ST2 14, 5ST2 15, 5ST2 16 busbar systems					
Cu busbars 10 mm²					
	with end caps				
	1-phase	210	5ST2 137	0.088	1/25
	2-phase		5ST2 138	0.103	1/10
	3-phase		5ST2 140	0.153	1/10
	without end caps				
	1-phase	1 000	5ST2 146	0.408	1/10
	2-phase		5ST2 147	0.523	1/5
	3-phase		5ST2 148	0.838	1/10
Cu busbars 16 mm²					
	with end caps				
	1-phase	210	5ST2 142	0.102	1/25
	2-phase		5ST2 143	0.154	1/10
	3-phase		5ST2 144	0.231	1/10
	3-phase + N		5ST2 145	0.315	1/10
	without end caps				
	1-phase	1 000	5ST2 151	0.487	1/10
	2-phase		5ST2 152	0.692	1/5
	3-phase		5ST2 153	1.100	1/10
	3-phase + N		5ST2 154	1.498	1/5
	without end caps				
	lug spacing to match busbar mountings of devices 1-pole, 2-pole, 3-pole, each with 1 auxiliary circuit switch respectively	1 000	5ST2 163	0.460	1/5
	1-phase + AS		5ST2 164	0.900	1/5
	2-phase + AS		5ST2 165	1.490	1/10
	3-phase + AS				
	End caps for lateral insulation of cut-to-length busbars				
	1 and 2-phase		5ST2 155	0.013	10
	3 and 4-phase		5ST2 156	0.017	10
	Connection terminals up to 35 mm² (stranded) for top or bottom direct infeed into miniature circuit-breakers; side-by-side mounting possible for 1- and 2-phase busbars for 3- and 4-phase busbars				
			5ST2 166	0.020	1/10
			5ST2 167	0.020	1/10
	Connection terminals up to 35 mm² (stranded) for direct infeed into miniature circuit-breakers, can be mounted side-by-side				
			5ST2 157	0.030	1/10

For sample applications of busbars, see page 12/23.

Modular Installation Devices, Mounting Depth 55 mm >N< Miniature Circuit-Breakers

Accessories for 5SX








Selection and ordering data

Version	Length	Order No.	Weight 1 unit approx.	PS*/ P. unit
	mm		kg	Unit(s)
5ST2 18, 5ST2 19 busbar systems				
Cu busbars 10 mm²				
				
with end caps				
1-phase	220	5ST2 180	0.060	1/50
2-phase		5ST2 181	0.080	1/25
3-phase		5ST2 182	0.110	1/25
without end caps				
1-phase	1 000	5ST2 183	0.290	1/20
2-phase		5ST2 184	0.600	1/20
3-phase		5ST2 185	0.820	1/20
Cu busbars 16 mm²				
				
with end caps				
1-phase	220	5ST2 186	0.090	1/50
2-phase		5ST2 187	0.160	1/25
3-phase		5ST2 188	0.230	1/25
without end caps				
1-phase	1 000	5ST2 190	0.500	1/20
2-phase		5ST2 191	0.710	1/20
3-phase		5ST2 192	1.100	1/20
without end caps				
lug spacing to match busbar mountings of devices				
1-pole, 2-pole, 3-pole, each with 1 auxiliary circuit switch respectively				
1-phase + AS	1 000	5ST2 193	0.450	1/10
2-phase + AS		5ST2 194	0.890	1/10
3-phase + AS		5ST2 195	1.470	1/10
End caps				
				
for Cu busbars, for the lateral insulation of cut-to-length busbars				
1-phase		5ST2 196	0.001	1/10
2 and 3-phase		5ST2 197	0.001	1/10

Modular Installation Devices, Mounting Depth 55 mm >N< Miniature Circuit-Breakers

Accessories for 5SX

Selection and ordering data

Version	Order No.	Weight 1 unit approx.	PS*/ P. unit
Number of electrical circuits		kg	Unit(s)
5ST2 4 busbar systems			
Cu busbars			
 1-phase			
2 x 1-phase	5ST2 400	0.006	1/20
6 x 1-phase	5ST2 401	0.017	1/20
12 x 1-phase	5ST2 402	0.033	1/20
2 x (1-phase + AS/FC)	5ST2 403	0.008	1/20
6 x (1-phase + AS/FC)	5ST2 404	0.024	1/20
9 x (1-phase + AS/FC)	5ST2 405	0.036	1/20
 2-phase			
2 x 2-phase	5ST2 406	0.011	1/10
3 x 2-phase	5ST2 407	0.017	1/10
6 x 2-phase	5ST2 408	0.033	1/10
2 x (2-phase + AS/FC)	5ST2 410	0.023	1/10
3 x (2-phase + AS/FC)	5ST2 411	0.034	1/10
5 x (2-phase + AS/FC)	5ST2 412	0.056	1/10
 3-phase			
2 x 3-phase	5ST2 413	0.037	1/10
3 x 3-phase	5ST2 414	0.055	1/10
4 x 3-phase	5ST2 415	0.086	1/10
2 x (3-phase + AS/FC)	5ST2 416	0.057	1/10
4 x (3-phase + AS/FC)	5ST2 417	0.065	1/10
2 x (3 x (1-phase) + AS/FC) ¹⁾	5ST2 418	0.057	1/10
3 x (3 x (1-phase) + AS/FC) ¹⁾	5ST2 420	0.086	1/10
 4-phase			
2 x 4-phase	5ST2 421	0.046	1/5
3 x 4-phase	5ST2 422	0.091	1/5
2 x 3 x (single-phase + N) ²⁾	5ST2 423	0.060	1/5
 3-phase, for a 5SM1 4-pole RCCB module with 8 miniature circuit-breakers:			
3/N + 8 terminals	5ST2 424	0.091	1/5
 Feeder terminals can be mounted side-by-side, for supply to 35 mm ² busbar system (stranded)	5ST2 425	0.024	1/10
 Protection against contact for free connections, yellow (RAL 1004)	5ST2 426	0.004	1/10


1) 3 x (1-phase + AS/FC) ≅ 3 x (L 1 + AS/FC, L 2 + AS/FC, L 3 + AS/FC).

2) 3 x (1-phase + N) ≅ 3 x (L 1 + N, L 2 + N, L 3 + N).

Modular Installation Devices, Mounting Depth 55 mm >N< Miniature Circuit-Breakers

Accessories for 5SQ2, 5SX

Selection and ordering data

Version	Length	Order No.	Weight 1 unit approx.	PS*/ P. unit
	mm		kg	Unit(s)
Mounting and cover parts				
	Cable links cross-section 6 mm ² end sleeves at both ends	125 250	5ST1 292 5ST1 293	0.008 5/50 0.017 5/50
	Snap-on terminals for 16 mm ² 1-wire or 10 mm ² stranded width: 0.5 MW		5ST2 112	0.008 1/50
	Spacers (contour miniature circuit-breakers, 0.5 MW)		5ST2 122	0.009 1/10
	Elevation parts for increasing height from 53 to 60 mm snap-on adapter 1 MW		5ST2 120	0.002 1/10
	Fixing parts 1 MW (sheet metal) 4 MW (plastic)		5ST2 121 5ST2 201	0.017 1/10 0.012 1/20
	Handle locking devices for 5SX miniature circuit-breaker 1-pole for protection against accidental mechanical switching on (part red) switching off (part transparent)		5ST2 168 5ST2 170	0.007 1/10 0.007 1/10
	Terminal covers, gray surface mounting, degree of protection, IP40 with 35 mm standard mounting rail, sealable up to 2.5 MW up to 4.5 MW		5SW3 004 5SW3 005	0.084 1/10 0.114 1/5
	flush mounting, degree of protection, IP40 with 35 mm standard mounting rail up to 2.5 MW up to 4.5 MW		5SW3 006 5SW3 007	0.126 1 0.147 1/5
	Molded-plastic covers surface mounting, IP54 with 35 mm mounting rail, sealable, with transparent hinged lid up to 4.5 MW		5SW1 200	0.450 1
	Covers can be assembled as mini distribution board cover parts prepared for rail mounting of conventional label caps, comprising: <ul style="list-style-type: none">• End plates (for snapping onto standard mounting rail)• Angle section (approx. 1 m long)• Flat section (as cover between the device types)		5ST2 134 5ST2 135 5ST2 136	0.022 1/10 0.330 1/5 0.260 1/5


* You can order this quantity or a multiple thereof.


Modular Installation Devices, Mounting Depth 55 mm >N< Residual Current Protective Devices

5SM1, product overview

Overview

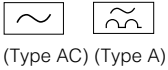
	Number of poles	Rated current I_n A	Rated residual current $I_{\Delta n}$ mA	MW	Mountable auxiliary switch
Residual current operated circuit-breakers, type AC¹⁾, 16 ..80 A					
	2	16 25 40	10 30, 100, 300	2	• • •
	2	63 80	30, 100, 300	2.5	• • •
	4	25 40 63 80	30, 100, 300, 500 30, 300	4	• • • •
Residual current operated circuit-breakers, type A²⁾, 16 ..80 A					
	2	16 25 40	10, 30 30, 100, 300	2	• • •
	2	63 80	30, 100, 300	2.5	• • •
	4	25 40 63 80	30, 300, 500 30, 100, 300, 500 30, 300	4	• • • •
<input checked="" type="checkbox"/> short-time delayed	4	25 40 63	30 30, 100	4	• • •
<input checked="" type="checkbox"/> selective	2	63	300	2.5	•
	4	40 63	100, 300 300, 1 000	4	• •
for 50 Hz to 400 Hz	4	25 40	30	4	• •
for 500 V AC	4	25 40 63	30, 300	4	• • •

1)  = Type AC for AC residual-currents

2)  = Type A for AC and pulsating DC residual currents


For description, see chapter "Residual Current Protective Devices, General data".

Modular Installation Devices, Mounting Depth 55 mm >N< Residual Current Protective Devices

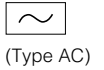


5SM1, product overview

Technical specifications

Standards	IEC/EN 61008, VDE 0664 Part 10, IEC/EN 61543, VDE 0664 Part 30		
Versions	2 and 4-pole		
Rated voltages U_n	V AC	125 ... 230 230 ... 400 500	50 ... 60 Hz 50 ... 60 Hz, 50 ... 400 Hz 50 ... 60 Hz
Rated currents I_n	A	16, 25, 40, 63, 80	
Rated residual currents $I_{\Delta n}$	mA	10, 30, 100, 300, 500, 1 000	
Enclosures	gray molded plastic (RAL 7035)		
Terminals		Tunnel terminals at both ends with wire protection, lower combined terminal for simultaneous connection of busbars (fork-type) and conductors	Conductor cross-section mm ²
		for 2 MW at $I_n = 16$ A, 25 A, 40 A	1.0 ... 16
		for 2.5 MW at $I_n = 63$ A, 80 A	1.5 ... 25
		for 4 MW at $I_n = 25$ A, 40 A, 63 A, 80 A	1.5 ... 25
		Screw terminals for auxiliary circuit switches	0.75 ... 2.5
			Recommended tightening torque Nm
			2.5 ... 3.0
			2.5 ... 3.0
			2.5 ... 3.0
			0.6 ... 0.8
Feeder connection	either top or bottom		
Mounting position	any		
Mounting technique	can be snapped onto 35 mm standard mounting rail (TH 35 acc. to EN 60715)		
Degree of protection	IP20 acc. to VDE 0470 Part 1 IP40 for installation in distribution boards IP54 for installation in molded-plastic housing		
Protection against contact	Protection against contact with fingers or the back of the hand acc. to EN 50274 (VDE 0660 Part 514)		
Minimum operational voltage for test function operation	V AC	100	
Device service life	> 10 000 operations (electrical and mechanical; test cycle according to regulations)		
Storage temperature	°C	-40 ... +75	
Ambient temperature	°C	-5 ... +45, for versions with the symbol  : -25 ... +45	
Resistance to climate acc. to IEC 60068-2-30	28 cycles (55 °C; 95 % rel. air humidity)		
CFC and silicone-free	yes		

Modular Installation Devices, Mounting Depth 55 mm >N< Residual Current Protective Devices



5SM1 RCCBs, type AC, 16 ... 80 A

Benefits

- Terminals with wire protection can be directly busbar-mounted to the underneath of devices with terminals in the hole pitch, e.g. with 5SX miniature circuit-breakers.
- An auxiliary switch can be fitted to the right-hand side of the enclosure by the customer
- Operating handle and test button can be locked by means of a handle locking device
- Ideal for installation in flat distribution boards

Application

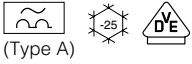
- Personnel and fire protection
 - $I_{\Delta n} \leq 30$ mA: additional protection in the case of direct contact
 - $I_{\Delta n} \leq 300$ mA: preventative fire protection in the case of ground fault currents
- Product standards: IEC/EN 61008-1 (VDE 0664, Part 10); IEC/EN 61008-2-1 (VDE 0664, Part 11); IEC/EN 61543 (VDE 0664, Part 30)
- U_n 230/400 V; 50 to 60 Hz; applicable in networks up to 240/415 V AC

Selection and ordering data

	Maximum permissible short-circuit series fuse	Rated residual current $I_{\Delta n}$ mA	Rated current I_n A	MW	Ver-sion	Order No.	Weight 1 unit approx. kg	PS*/ P. unit Unit(s)
Instantaneous tripping								
	125 ... 230 V AC; 50 ... 60 Hz; 2-pole 		10	16	2	5SM1 111-0	0.220	1
			30	25		5SM1 312-0	0.220	1
			40	40		5SM1 314-0	0.220	1
			100	25		5SM1 412-0	0.220	1
			40	40		5SM1 414-0	0.220	1
			300	25		5SM1 612-0	0.220	1
40	40	5SM1 614-0	0.220	1				
	125 ... 230 V AC; 50 ... 60 Hz; 2-pole 		30	63	2.5	5SM1 316-0	0.300	1
			80	80		5SM1 317-0	0.300	1
			100	63		5SM1 416-0	0.300	1
			80	80		5SM1 417-0	0.300	1
			300	63		5SM1 616-0	0.300	1
			80	80		5SM1 617-0	0.300	1
	230 ... 400 V AC; 50 ... 60 Hz; 4-pole 		30	25	4	5SM1 342-0	0.473	1
			40	40		5SM1 344-0	0.473	1
			63	63		5SM1 346-0	0.473	1
			80	80		5SM1 347-0	0.473	1
			100	25		5SM1 442-0	0.473	1
			40	40		5SM1 444-0	0.473	1
			63	63		5SM1 446-0	0.473	1
			300	25		5SM1 642-0	0.473	1
			40	40		5SM1 644-0	0.473	1
			63	63		5SM1 646-0	0.473	1
			80	80		5SM1 647-0	0.473	1
			500	25		5SM1 742-0	0.473	1
40	40	5SM1 744-0	0.473	1				
63	63	5SM1 746-0	0.473	1				

Additional components and accessories see from page 12/45.

Modular Installation Devices, Mounting Depth 55 mm >N< Residual Current Protective Devices



5SM1 RCCBs, type A, 16 ... 80 A

Benefits

- Terminals with wire protection can be directly busbar-mounted to the underneath of devices with terminals in the hole pitch, e.g. with 5SX miniature circuit-breakers.
- An auxiliary switch can be fitted to the right-hand side of the enclosure by the customer
- Operating handle and test button can be locked by means of a handle locking device
- Ideal for installation in flat distribution boards

Application

- Personnel and fire protection
 - $I_{\Delta n} \leq 30$ mA: additional protection in the case of direct contact
 - $I_{\Delta n} \leq 300$ mA: preventative fire protection in the case of ground fault currents
- Product standards: IEC/EN 61008-1 (VDE 0664, Part 10); IEC/EN 61008-2-1 (VDE 0664, Part 11); IEC/EN 61543 (VDE 0664, Part 30)
- U_n 230/400 V; 50 to 60 Hz; can be used in systems up to 240/415 V AC
- U_n 500 V; 50 to 60 Hz; can be used in systems up to 500 V AC
- Definition of surge current withstand capability with current waveform 8/20 μ s according to DIN VDE 0432, Part 2
- **S**-type: Can be used as upstream group switch for selective tripping against downstream standard RCCBs. Very high surge current withstand capability > 5 kA
- **K**-type: Short-time delayed tripping in the case of transient leakage currents. High surge current withstand capability: > 3kA
- 50 ... 400 Hz – version for use with line frequencies between 50 and 400 Hz

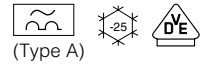
Selection and ordering data

	Maximum permissible short-circuit series fuse	Rated residual current $I_{\Delta n}$ mA	Rated current I_n A	MW	Version	Order No.	Weight	PS*/							
							1 unit approx.	P. unit							
							kg	Unit(s)							
Instantaneous tripping, surge current withstand capability > 1 kA															
125 ... 230 V AC; 50 ... 60 Hz															
		63 A		10	16	2	5SM1 111-6	0.218	1						
							5SM1 311-6	0.218	1						
							5SM1 312-6	0.218	1						
							5SM1 314-6	0.218	1						
							5SM1 412-6	0.218	1						
							5SM1 414-6	0.218	1						
							5SM1 612-6	0.218	1						
							5SM1 614-6	0.218	1						
							100 A		30	63	2.5	80	5SM1 316-6	0.300	1
													5SM1 317-6	0.300	1
5SM1 416-6	0.280	1													
							5SM1 417-6	0.280	1						
							5SM1 616-6	0.280	1						
							5SM1 617-6	0.280	1						
230 ... 400 V AC; 50 ... 60 Hz															
		100 A		30	25	4	5SM1 342-6	0.473	1						
							5SM1 344-6	0.473	1						
							5SM1 346-6	0.473	1						
							5SM1 347-6	0.473	1						
							5SM1 444-6	0.483	1						
							5SM1 446-6	0.509	1						
							100	40	63	80	500	25	5SM1 642-6	0.473	1
													5SM1 644-6	0.473	1
													5SM1 646-6	0.473	1
														5SM1 647-6	0.473
							5SM1 742-6	0.473	1						
							5SM1 744-6	0.473	1						
							5SM1 746-6	0.473	1						

Additional components and accessories see from page 12/45.

Modular Installation Devices, Mounting Depth 55 mm >N< Residual Current Protective Devices

5SM1 RCCBs, type A, 16 ... 80 A



Selection and ordering data

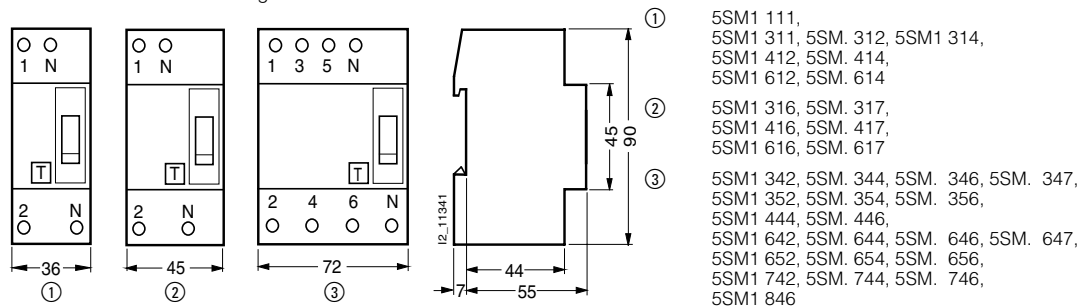
	Maximum permissible short-circuit series fuse	Rated residual current $I_{\Delta n}$ mA	Rated current I_n A	MW	Version	Order No.	Weight 1 unit approx. kg	PS*/ P. unit Unit(s)	
[K] short-time delayed, surge current withstand capability > 3 kA									
<p>230 ... 400 V AC; 50 ... 400 Hz 4-pole</p>		30	25	4	[K]	5SM1 342-6KK01	0.473	1	
		100	40		[K]	5SM1 344-6KK01	0.473	1	
		100	63		[K]	5SM1 446-6KK01	0.473	1	
[S] selective, surge current withstand capability > 5 kA									
<p>125 ... 230 V AC; 50 ... 400 Hz 2-pole</p>		300	63	2.5	[S]	5SM1 616-8	0.280	1	
		230 ... 400 V AC; 50 ... 400 Hz 4-pole							
<p>230 ... 400 V AC; 50 ... 400 Hz 4-pole</p>		100	40	4	[S]	5SM1 444-8	0.473	1	
		300	40		[S]	5SM1 644-8	0.473	1	
		300	63		[S]	5SM1 646-8	0.473	1	
		1 000	63		[S]	5SM1 846-8	0.473	1	
Type A, 500 V, 25 ... 63 A									
<p>500 V AC¹⁾; 50 ... 60 Hz 4-pole</p>		30	25	4		5SM1 352-6	0.515	1	
		40					5SM1 354-6	0.515	1
		63					5SM1 356-6	0.515	1
		300	25				5SM1 652-6	0.515	1
		40					5SM1 654-6	0.515	1
		63					5SM1 656-6	0.515	1
Type A, 50 ... 400 Hz, 25 ... 40 A									
<p>230 ... 400 V AC; 50 ... 400 Hz 4-pole</p>		30	25	4		5SM1 342-6KK03	0.473	1	
		40					5SM1 344-6KK03	0.473	1

Additional components and accessories see from page 12/45.

1) Approval according to IEC/EN 61008 (VDE 0664) only to 440 V.

Dimensional drawings

16 ... 80 A for busbar mounting

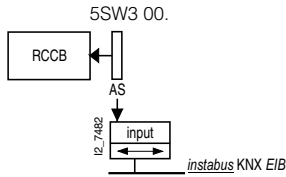


Modular Installation Devices, Mounting Depth 55 mm >N< Residual Current Protective Devices

Additional components for 5SM1

Benefits

- An auxiliary switch can be fitted to the right-hand side of the RCCB enclosure by the customer
- Mounting with factory-fitted brackets
- Ideal for installation in flat distribution boards
- Can be connected to *instabus* KNX EIB and AS-Interface bus or PROFIBUS through binary inputs.




Application

- Remote indications of the circuit state of the RCCB: ON/OFF
- Short-circuit protection ensured by miniature circuit-breakers, characteristic B or C with $I_n = 6$ A or gL 6 A fuse
- Product standards: IEC/EN 62019 (VDE 0640);

Technical specifications

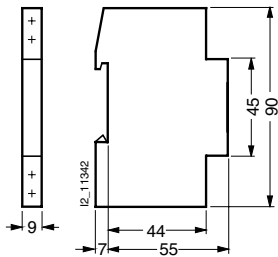
Type	5SW3 00.	
Terminals		
• Conductor cross-section	mm ²	0.75 ... 2.5
• Recommended tightening torque	Nm	0.6 ... 0.8
Minimum contact load	50 mA / 24 V	
Maximum contact load		
• 230 V AC, AC-12	A	6
• 230 V AC, AC-14	A	3.6
• 220 V DC, DC-12	A	1

Selection and ordering data

	MW	Order No.	Weight 1 unit approx. kg	PS*/ P. unit Unit(s)
 Auxiliary circuit switches (AS) 21 13 22 14 21 11 22 12 23 13 24 14	1 NO + 1 NC	0.5	5SW3 000	0.042 1
	2 NC	0.5	5SW3 001	0.042 1
	2 NO	0.5	5SW3 002	0.042 1

Dimensional drawings

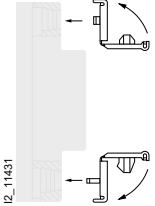





5SW3 auxiliary circuit switches, can be retrofitted



Modular Installation Devices, Mounting Depth 55 mm >N< Residual Current Protective Devices

Accessories for 5SM1

Selection and ordering data

	Length	Order No.	Weight 1 unit approx.	PS* P. unit
	mm		kg	Unit(s)
 <p>Covers for connection terminals for residual-current operated circuit-breakers up to 80 A, sealable (2 pcs in plastic bag) 2 MW 2.5 MW 4 MW</p>		5SW3 010	0.003	1
		5SW3 011	0.004	1
		5SW3 008	0.006	1
 <p>Locking devices sealable and lockable 4.5 mm lock hasp diameter</p>		5SW3 003	0.008	1/10
 <p>Padlocks for 5SW3 003 locking device</p> <p>Locking devices with padlock comprising 5SW3 003 locking device and 5ST3 802 padlock</p>		5ST3 802	0.027	1
		5SW3 012	1 set	
			0.035	1 set
 <p>Cu busbars 16 mm² for horizontal busbar mounting of 5SM1 RCCBs, with 5SX2 miniature circuit-breakers or 5TE7 flush-mounting switches with I_e 40 A ... 100 A</p>	2-phase	210 5ST2 143	0.154	1/10
		1 000 5ST2 152	0.692	1/5
	3-phase	210 5ST2 144	0.231	1/10
		1 000 5ST2 153	1.100	1/10
	3-phase + N	210 5ST2 145	0.315	1/10
		1 000 5ST2 154	1.498	1/5
 <p>End caps required for lateral insulation of cut-to-length busbars</p>	1 and 2-phase	5ST2 155	0.013	10
	3 and 4-phase	5ST2 156	0.017	10
 <p>Busbars, 3-phase for a 4-pole 5SM1 RCCB module with 8 miniature circuit-breakers 3/N + 8 terminals</p>		5ST2 424	0.091	1/5

For further busbar versions, see section "Miniature Circuit-Breakers".

Technical specifications

				5TE7 1	5TE7 2 5TE7 3
16 A, 25 A and 40 A acc. to DIN VDE 0632 Part 101 and DIN VDE 0660 Part 107					
32 A acc. to EN 60947-3 and DIN VDE 0660 Part 107					
40 A to 125 A acc. to EN 60947-3 utilization category AC-22b but for conductor cross-sections up to 9.5 mm diameter and without complying with the bending test					
Rated operational current I_e	per current path	A		16	25, 32
Rated operational voltage U_e	1-pole	V AC		230	
	multipole	V AC		400	
Thermal rated current I_{th}		A		16	25
Rated breaking capacity	at p.f. = 0.65	A		48	75
Rated making capacity	at p.f. = 0.65	A		48	75
Short-circuit strength	used together with fuse of the same rated operational current (DIN VDE 0636 gL/gG)	kA		10	
Rated impulse withstand voltage U_{imp}		kV		> 5	
Clearances	open contacts	mm		2 × 4.5	
	between the poles	mm		> 7	
	• Creepage distances	mm		> 7	
Mechanical service life	switching cycles			25 000	
Minimum contact load		V; mA		10; 300	
Switching of lamp loads	incandescent lamp rating	kW		2.4	
	halogen lamps with transformer	kW		1.2	
• Electrical service life	switching cycles			20 000	
Rated power	1-pole	kW		2.5	--
	2-pole	kW		4.5	--
	3-/4-pole	kW		8	12
• Electrical service life	switching cycles			20 000	
Rated power	1-pole	kW		1.1	--
	2-pole	kW		1.9	--
	3-/4-pole	kW		3.5	5
• Electrical service life	switching cycles			20 000	10 000
Rated power	1-pole	kW		0.5	--
	2-pole	kW		0.7	--
	3-/4-pole	kW		1.2	2
• Electrical service life	switching cycles			20 000	10 000
Switching of direct voltages¹⁾	per current path up to	24 V DC A		16	25
	per current path at	24 V DC A		4	
		100 V DC A		0.9	
		220 V DC A		0.45	
Rated short-time currents²⁾ at p.f. = 0.7	per current path up to	0.2 s A		650	1 000
		0.5 s A		400	630
		1 s A		290	450
		3 s A		170	260
Terminals	± screw (Pozidriv)			1	
Conductor cross-sections	rigid	mm ²		1.5 ... 6	
	flexible with sleeve	min. mm ²		1	
Permissible ambient temperature		°C		-5 ... +40	
Resistance to climate	acc. to DIN 50015 at 95 % relative humidity	°C		45	

1) The switches are designed as zero-current interrupters and have no additional quenching aids.
The rated breaking current for voltages over 24 V DC is very limited due to the safety hazard of the non-quenching electric arc.

2) The corresponding rated surge current can be established through multiplying by factor 1.5.

Modular Installation Devices, Mounting Depth 55 mm >N< Switches

5TE7 1 ... 5TE7 3 switches

Technical specifications

Devices for switching lamps

Fluorescent and compact lamps (DULUX) in ballast operation (KVG)

Maximum number of lamps per current path at 230 V, 50 Hz

Lamp type Capacitor capacitance	W μ F	Uncorrected					Parallel-corrected				
		S11	L18	L24	L36	L58	S11	L18	L24	L36	L58
Switches											
5TE7 111	16 A	--	35	--	35	25	--	50	--	50	35
5TE7 112											
5TE7 113											

Fluorescent lamps with electronic primary switching device (ballast)

Maximum number of lamps per current path at 230 V, 50 Hz














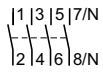
Lamp type	W	DUO circuit specifications are for lights with 2 lamps each respectively					AC operation 1-lamp			2-lamp		
		S11	L18	L24	L36	L58	L18	L36	L58	L18	L36	L58
Switches												
5TE7 111	16 A	--	30	--	30	20	45	45	30	2 × 22	2 × 22	2 × 15
5TE7 112												
5TE7 113												

Rated power dissipation

Order No.	Short designation	Power dissipation P_v (VA) contact ¹⁾ per pole
5TE7 101	switch 16 A, 1 NO contact indicator light	0.8
5TE7 105	switch 16 A, 1 NO contact indicator light, 150 m	0.8
5TE7 111	switch 16 A, 1 NO contact	0.6
5TE7 112	switch 16 A, 2 NO contacts	0.6
5TE7 113	switch 16 A, 3 NO contacts	0.6
5TE7 141	switch 16 A, 1 CO contact, group	0.6
5TE7 142	switch 16 A, 2 CO contacts, group	0.6
5TE7 161	switch 16 A, 1 CO contact	0.6
5TE7 162	switch 16 A, 1 CO contact	0.6
5TE7 211	switch 32 A, 1 NO contact	0.6
5TE7 212	switch 32 A, 2 NO contacts	0.6
5TE7 213	switch 32 A, 3 NO contacts	2.5
5TE7 214	switch 32 A, 4 NO contacts	2.5
5TE7 313	switch 25 A 3 NO contacts	1.5
5TE7 314	switch 25 A 4 NO contacts	1.5

1) For rated operational current.

Selection and ordering data

	U_e	I_e	Conductor cross-sections	MW	Order No.	Weight 1 unit approx.	PS*/P. unit	
	V AC	A	up to mm ²			kg	Unit(s)	
Changeover switches								
	with sealable switch position							
	1 CO contact							
	230	16	6	1	5TE7 161	0.058	1/12	
								
	2 CO contact							
400	16	6	2	5TE7 162	0.110	1		
								
	2 NO contacts + 2 NC contacts							
400	16	6	2	5TE7 165	0.120	1		
								
Group switches with center position								
	with sealable switch position							
	1 CO contacts							
	230	16	6	1	5TE7 141	0.058	1/12	
								
	2 CO contacts							
400	16	6	2	5TE7 142	0.110	1		
								
Control switches with glow lamp								
	with sealable switch position							
	for max. 5 m cable length							
	230	16	6	1	5TE7 101	0.055	1/12	
								
	for max. 150 m cable length							
230	16	6	1	5TE7 105	0.055	1		
								
ON/OFF switches (16 A to 32 A)								
	with sealable switch position							
	1 NO contact							
	230	16 32	6	1	5TE7 111 5TE7 211	0.050 0.050	1/12 1	
								
		2 NO contact						
400	16 32	6	1	5TE7 112 5TE7 212	0.060 0.060	1 1		
								
	3 NO contacts							
400	16 25 32	6	2	5TE7 113 5TE7 313 5TE7 213	0.100 0.100 0.100	1 1 1/6		
								
	3 NO contacts + N							
400	25 32	6	2	5TE7 314 5TE7 214	0.120 0.120	1 1/6		
								

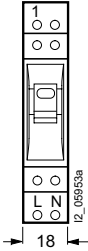
Modular Installation Devices, Mounting Depth 55 mm >N< Switches

5TE7 1 ... 5TE7 3 switches

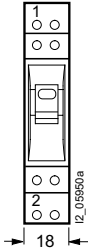
Dimensional drawings

5TE7 1, 2, 3 switches

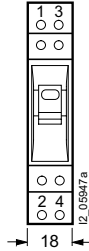
5TE7 101
5TE7 105



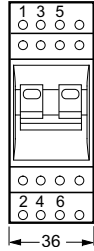
5TE7 111
5TE7 211



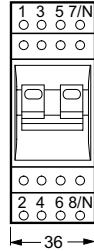
5TE7 112
5TE7 212



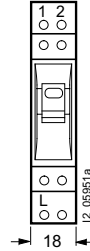
5TE7 113
5TE7 213
5TE7 313



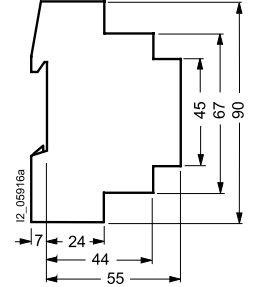
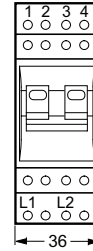
5TE7 165
5TE7 214
5TE7 314



5TE7 141
5TE7 161



5TE7 142
5TE7 162



Overview

Color coding acc. to IEC 60073			
Color	Safety of people or environment	Process state	System state
Red	Danger	Emergency	Faulty
Yellow	Warning/Caution	Abnormal	
Green	Safety	Normal	
Blue	Stipulation		
White Gray Black	No special significance assigned		

Benefits

- Control glow lamp, white, transparent

Technical specifications

Acc. to IEC 60947-3, EN 60947-3 and VDE 0660 Part 107 and IEC 60669-1, EN 60669-1				5TE4 7
Rated operational current I_e	per current path	A		16
Rated operational voltage U_e	1-pole	V AC		230
	multipole	V AC		400
Thermal rated current I_{th}		A		20
Rated breaking capacity	at p.f. = 0.65	A		60
Rated making capacity	at p.f. = 0.65	A		60
Rated impulse withstand voltage U_{imp}		kV		> 5
Clearances	open contacts	mm		2 x > 2
	between the poles	mm		> 7
		mm		> 7
• Creepage distances				
Mechanical service life	switching cycles			25 000
Minimum contact load		V; mA		10; 300
Rated short-time currents¹⁾ at p.f. = 0.7	per current path	0.2 s	A	650
	up to	0.5 s	A	400
		1 s	A	290
		3 s	A	170
Terminals/tightening torque	± screw (Pozidriv); Nm			1; 1.2
Conductor cross-sections	rigid	mm ²		1.5 ... 6
	flexible with sleeve	min. mm ²		1
Permissible ambient temperature		°C		-5 ... +40

Rated power dissipation






Order No.	Short designation	Power dissipation P_v (VA)	
		coil/drive	contact ¹⁾ per pole
5TE4 700	16 A pushbutton 1NO contact 1 NC contact, gray	--	0.1
5TE4 701	230 V AC pushbutton 16 A 1 NO contact, gray, indicator light	0.2	0.1
5TE4 702	230 V AC pushbutton 16 A 1 NC contact, gray, indicator light	0.2	0.1
5TE4 703	230 V AC pushbutton 16 A 1 NO contact, gray, indicator light	0.2	0.1
5TE4 704	16 A pushbutton 1 NO contact 1 NC contact, red	--	0.1
5TE4 705	16 A pushbutton 1 NO contact 1 NC contact, green	--	0.1
5TE4 706	16 A pushbutton 1 NO contact 1 NC contact, yellow	--	0.1
5TE4 707	16 A pushbutton 1 NO contact 1 NC contact, blue	--	0.1

1) For rated operational current.

Modular Installation Devices, Mounting Depth 55 mm >N< Switches

5TE4 7 pushbuttons

Selection and ordering data

	U_e	I_e	Conductor cross-sections	MW	Order No.	Weight 1 unit approx.	PS*/P. unit	
	V AC	A	up to mm ²			kg	Unit(s)	
Pushbuttons								
 <p>1 NO contacts, 1 NC contact</p>  <p>gray pushbutton red pushbutton green pushbutton yellow pushbutton blue pushbutton</p>	230	16	6	1	5TE4 700 5TE4 704 5TE4 705 5TE4 706 5TE4 707	0.050 0.050 0.050 0.050 0.050	1/12 1 1 1 1	
	Pushbuttons with glow lamp for max. 5 m cable length							
	1 NO contact	230	16	6	1	5TE4 701	0.050	1
	 <p>gray pushbutton</p>							
	1 NC contact	230	16	6	1	5TE4 702	0.050	1
	 <p>gray pushbutton</p>							
Pushbuttons with glow lamp for max. 150 m cable length								
1 NO contact	230	16	6	1	5TE4 703	0.060	1	
 <p>gray pushbutton</p>								

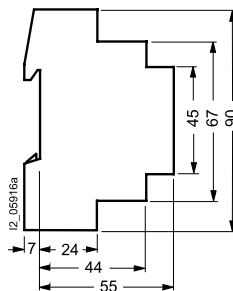
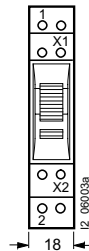
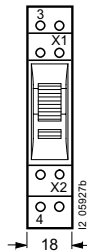
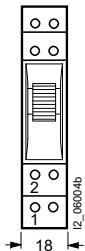
Dimensional drawings

5TE4 7 pushbuttons

5TE4 700
5TE4 703
5TE4 704
5TE4 705
5TE4 706
5TE4 707

5TE4 701

5TE4 702



Technical specifications

				5TE7 4	5TE7 5	5TE7 6	5TE7 7 5TE7 8	
16 A, 25 A and 40 A acc. to DIN VDE 0632 Part 101 and DIN VDE 0660 Part 107								
32 A acc. to EN 60947-3 and DIN VDE 0660 Part 107								
40 A to 125 A acc. to EN 60947-3 utilization category AC-22b but for conductor cross-sections up to 9.5 mm diameter and without complying with the bending test								
Rated operational current I_e	per current path	A		40	63	80	100	
Rated operational voltage U_e	1-pole	V AC		230				
	multipole	V AC		400				
Thermal rated current I_{th}		A		40	63	80	100	
Rated breaking capacity	at p.f. = 0.65	A		120	190	240	300	
Rated making capacity	at p.f. = 0.65	A		120	190	240	300	
Short-circuit strength	used together with fuse of the same rated operational current (DIN VDE 0636 gL/gG)	kA		10				
Rated impulse withstand voltage U_{imp}		kV		> 7				
Clearances	open contacts	mm		> 7				
	between the poles	mm						
• Creepage distances		mm						
Mechanical service life	switching cycles			25 000				
Minimum contact load		V; mA		24; 300				
Switching of lamp loads	incandescent lamp rating halogen lamps with transformer	kW		3.6	6.9	7.6	9.6	
		kW		1.2				
• Electrical service life	switching cycles			20 000				
Rated power	1-pole	kW		6.5	10	13	--	
	• Switching of resistive load including moderate overload AC-21	2-pole	kW	11.5	18	22	28	
	3-4-pole	kW		20	30	39	48	
• Electrical service life	switching cycles			10 000	3 000	1 000		
Rated power	1-pole	kW		2.7	4	5.5	--	
	• Switching of mixed resistive and inductive load including moderate overload AC-22	2-pole	kW	4.5	7.3	9.3	11.5	
	3-4-pole	kW		8	13	16	20	
• Electrical service life	switching cycles			5 000	1 000			
Rated power	1-pole	kW		1	1.6	2	--	
	• Switching of motor loads to other highly inductive loads AC-23	2-pole	kW	1.8	2.8	3.5	4.4	
	3-4-pole	kW		3	5	6	7.5	
• Electrical service life	switching cycles			5 000	1 000			
Switching of direct voltages¹⁾	per current path up to	24 V DC	A	40	63	80	100	
		per current path at	24 V DC	A	4			
		100 V DC	A	0.9				
		220 V DC	A	0.45				
Rated short-time currents²⁾ at p.f. = 0.7	per current path up to	0.2 s	A	1 350	2 000	2 700	3 400	
		0.5 s	A	840	1 300	1 650	2 100	
		1 s	A	680	1 000	1 350	1 700	
		3 s	A	400	580	800	1 000	
Terminals	± screw (Poqidriv)			2				
Conductor cross-sections	rigid	mm ²		6 ... 50				
	flexible with sleeve	min. mm ²		2.5				
Permissible ambient temperature		°C		-5 ... +40				
Resistance to climate	acc. to DIN 50015 at 95 % relative air humidity	°C		45				

1) The switches are designed as zero-current interrupters and have no additional quenching aids.
The rated breaking current for voltages over 24 V DC is very limited due to the safety hazard of the non-quenching electric arc.

2) The corresponding rated surge current can be established through multiplying by factor 1.5.

Modular Installation Devices, Mounting Depth 55 mm >N< Switches

5TE7 4 ... 5TE7 8 switches







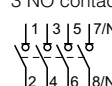



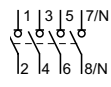
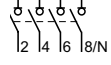
Technical specifications

Rated power dissipation

Order No.	Short designation	Power dissipation P_v (VA) contact ¹⁾ per pole
5TE7 411	Switch 40 A, 1 NO contact	0.9
5TE7 412	Switch 40 A, 2 NO contacts	0.9
5TE7 413	Switch 40 A, 3 NO contacts	0.9
5TE7 414	Switch 40 A, 4 NO contacts	0.9
5TE7 511	Switch 63 A, 1 NO contact	2.2
5TE7 512	Switch 63 A, 2 NO contacts	2.2
5TE7 513	Switch 63 A, 3 NO contacts	2.2
5TE7 513-2	Switch 63 A, 4 NO contacts, lockable	2.2
5TE7 514	Switch 63 A, 4 NO contacts	2.2
5TE7 514-2	Switch 63 A, 4 NO contacts, lockable	2.2
5TE7 611	Switch 80 A, 1 NO contact	3.5
5TE7 612	Switch 80 A, 2 NO contacts	3.5
5TE7 613	Switch 80 A, 3 NO contacts	3.5
5TE7 614	Switch 80 A, 4 NO contacts	3.5
5TE7 711	Switch 100 A, 1 NO contact	5.5
5TE7 712	Switch 100 A, 2 NO contacts	5.5
5TE7 713	Switch 100 A, 3 NO contacts	5.5
5TE7 714	Switch 100 A, 4 NO contacts	5.5
5TE7 813	Switch 125 A, 3 NO contacts	8.6

1) For rated operational current.

Selection and ordering data




	U_e	I_e	Conductor cross-sections	M W	Order No.	Weight 1 unit approx.	PS*/ P. unit
	V AC	A	up to mm ²			kg	Unit(s)
ON/OFF switches (40 A to 125 A)							
can be used as switch-disconnector acc. to EN 60947-1							
with sealable switch position							
	1 NO contact	230	40	50	1		
			63				
			80				
			100				
	2 NO contacts	400	40	50	2		
			63				
			80				
			100				
	3 NO contacts	400	40	50	3		
			63				
			80				
			100				
			125				
	3 NO contacts + N	400	40	50	4		
			63				
			80				
			100				
	3 NO contacts	400	63	50	3		
			80				
			100				
	3 NO contacts + N	400	63	50	4		
			80				
			100				

5ST2 400 to 5ST2 424 for 5TE7 411 to 5TE7 813 busbars see page 12/38.

Modular Installation Devices, Mounting Depth 55 mm >N< Switches

5TE7 4 ... 5TE7 8 switches

Accessories

	U_e	I_e	Conductor cross-sections	MW	Order No.	Weight 1 unit approx.	PS*/P. unit
	V AC	A	up to mm ²			kg	Unit(s)
Phase connectors							
for easier wiring in various wiring versions and busbar mountings or as a fixpoint terminal for conductors from 2.5 mm ² to 50 mm ²							
	1-pole						
	1	230	125	50	1	0.111	1
	2						
N conductor connectors							
for easier wiring in various wiring versions and busbar mountings or as a fixpoint terminal for conductors from 2.5 mm ² to 50 mm ² with blue color marking							
	1-pole						
	N	230	125	50	1	0.111	1
	N						
Handle locking devices							
for all 5TE7 switches with 1 MW for protection against accidental switching on or off							
	switching on (part red)				5ST2 168	0.007	1/10
	switching off (part transparent)				5ST2 170	0.007	1/10

Dimensional drawings

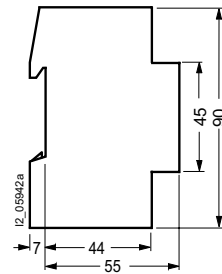
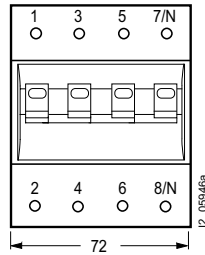
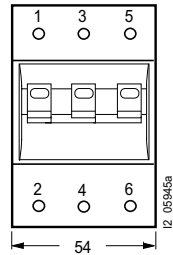
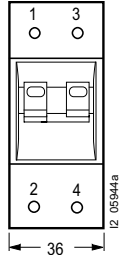
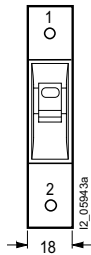
5TE7 4, 5TE7 5, 5TE7 6, 5TE7 7, 5TE7 8 switches

5TE7 411
5TE7 511
5TE7 611
5TE7 711
5TE9 110

5TE7 412
5TE7 512
5TE7 612
5TE7 712

5TE7 413
5TE7 513
5TE7 513-2
5TE7 613
5TE7 713
5TE7 813

5TE7 414
5TE7 514
5TE7 514-2
5TE7 614
5TE7 714



Modular Installation Devices, Mounting Depth 55 mm >N<

Switching Devices

5TT5 remote control switches

Overview

	Remote control switches 5TT5 5 5TT5 15	Blind and series remote control switches 5TT5 16	Electronic series remote control switches 5TT5 650	System remote control switches 5TT5 60 5TT5 61 5TT5 62
Manual operation	•	•	--	--
Switch position indication	•	--	--	--
Fuse protected against continuous voltage	•	•	--	•
For different phases between magnet coil and terminals for central and group input	yes, 5TT5 15 no	no	no	yes
Operating noises	standard	quiet	very quiet	very quiet
Short-circuit current proof up to 800 A	•	--	--	--

Function

Remote control switches are used to switch lightings by means of several pushbuttons. This makes complex cross/two-way switching unnecessary. With each pushbutton impulse, the remote control switch changes its contact position from OFF to ON, etc. In the event of a power failure, the last switch position is mechanically stored.

Pushbutton malfunction

Pushbuttons may jam, thus exposing the remote control switch to a continuous voltage. It will then no longer react when a second pushbutton is actuated. All our remote control switches are protected against such malfunction.

Central switching functions

Versions with central ON/OFF or group ON/OFF functions allow the central switching of all connected remote control switches. Such central switching can also be actuated using a time switch. All remote control switches are switched to the ON or OFF switching state, regardless of the current switching state.

System remote control switches

A 2-MW casing holds up to four remote control switches, which are wired in the device. This saves space and mounting time. These remote control switches offer particularly quiet switching properties. These are superior to electronic remote control switches because they do not require a permanent power supply for the electronics and the switching position is maintained even in the event of a power failure. The operating noises are the same as those for the electronic remote control switches.

Parallel connection of remote control switches

It is not possible to control more than one remote control switch using just one pushbutton or contact. This would lead to an undefined contact position as there is no synchronization.

Short-circuit strength

Remote control switches are primarily used for the switching of incandescent lamps, which may occasionally be subject to short-circuits during operation. A feature of the 5TT5 5 remote control switches is their short-circuit strength of 800 A.

Central lockout device

System remote control switches also allow actuation of the central functions during continuous operation. However, this means that the room pushbutton can no longer be switched. This range is specially suited for emergency lighting in switching rooms of banks, object lighting, sales premises but also prisons.

Glow lamp load, compensator

If the installed glow lamp load is too high, or if the system has a high line capacity, the 5TG8 230 compensator can be used to increase the glow lamp load of a remote control switch. The incandescent lamp load stated always refers to a 230-V actuation. The compensators are switched parallel to the coil. Several compensators can be switched in parallel.

		1 compensator	2 compensators
For 5TT5 53	from 10 mA	to 30 mA	to 50 mA
For 5TT5 15	from 4 mA	to 14 mA	to 24 mA
For 5TT5 16	from 4 mA	to 26 mA	to 48 mA
For 5TT5 6	from 5 mA	to 20 mA	to 35 mA

Modular Installation Devices, Mounting Depth 55 mm >N< Switching Devices

5TT5 remote control switches

Technical specifications

5TT5 5, 5TT5 1, 5TT5 4 acc. to EN 61095 (VDE 0637) and EN 60669 (VDE 0632) 5TT5 6 acc. to EN 60669 (VDE 0632)			5TT5 5 5TT5 15	5TT5 16	5TT5 650	5TT5 153	5TT5 60 5TT5 61 5TT5 62
Rated control voltage U_c	V AC		see selection table				
Operating range $\times U_c$			0.9 ... 1.1				
Rated power dissipation P_v	magnet coil, pulse only	approx. VA	30	11	20	20	30
	per contact at 16 A	VA	0.9	1.5	0.8	0.9	0.9
	at 8 and 10 A	VA	--	--	--	--	0.8
Minimum pulse duration	ms		30				
Fuse protected against continuous voltage	magnet coil		yes				
Contact gap	mm		> 3	μ contact	μ contact	μ contact	> 3
Rated operational voltage U_e	1-pole	V AC	230	230	230	230	230
	2-pole	V AC	400	230	--	--	--
	3-pole	V AC	400	--	--	--	--
Protective separation	creepage and clearances magnet coil/contact	mm	> 8				> 3
Different phases	magnet coil/contact		permissible				
	magnet coil/terminals for central-and group input		yes, 5TT5 15 no	--	--	--	yes
Rated operational current I_s	at p.f. = 1	A	16				
Rated impulse withstand voltage U_{imp}	kV		> 4				
Minimum contact load	V; mA		10; 100				
Electrical service life	in switching cycles at I_e and U_e or specified lamp load		50000				
Terminals	\pm screw (Pozidriv)		1				
Conductor cross-sections	rigid	max. mm ²	1.5 ... 4	2 x 2.5		1.5 ... 2.5	
	flexible with sleeve	min. mm ²	0.5	0.5		0.5	
Permissible ambient temperature	°C		-10 ... +40	-20 ... +45		-10 ... +40	
Degree of protection	acc. to EN 60529		IP20			--	IP20
Resistance to climate	acc. to DIN 50015 at 95% relative air humidity	°C	45	--	--	45	--
Humidity class	acc. to DIN 50016		--	FW 24	--	--	--
	acc. to IEC 60068-2-30		--	--	F	--	F

Switching of lamps





			5TT5 5 1-pole and 1 CO con- tact	5TT5 5 multipole and 5TT5 511	5TT5 1	5TT5 650	5TT5 60 5TT5 61 5TT5 62
Incandescent lamp loads	W		2400	1200	1500	1500	1500
Transformers for halogen lamps	W		1200	800	--	--	--
Fluorescent and compact lamps in ballast operation			Unit(s)	Unit(s)	Unit(s)	Unit(s)	Unit(s)
• Uncorrected	L18	W	35	30	--	--	--
	L36	W	35	30	--	--	--
	L58	W	25	20	20	--	--
• Parallel-corrected	L18/4.5	W/ μ F	40	50	--	--	--
	L36/4.5	W/ μ F	40	50	--	--	--
	L58/7	W/ μ F	28	30	--	--	--
• DUO switching, 2-lamp	L18	W	2 x 30	2 x 24	--	--	2 x 22
• 2 lamps	L36	W	2 x 30	2 x 24	--	--	2 x 22
	L58	W	2 x 20	2 x 16	--	--	2 x 14
Fluorescent and compact lamps with electronic ballast (ECG)			Unit(s)	Unit(s)	Unit(s)	Unit(s)	Unit(s)
• AC operation, 1-lamp	L18	W	36	30	--	--	--
	L36	W	36	30	--	--	--
	L58	W	24	20	--	--	--
• AC operation, 2-lamp	L18/4.5	W/ μ F	2 x 22	2 x 18	--	--	--
	L36/4.5	W/ μ F	2 x 22	2 x 18	--	--	--
	L58/7	W/ μ F	2 x 15	2 x 12	--	--	--

Modular Installation Devices, Mounting Depth 55 mm >N<

Switching Devices

5TT5 remote control switches













Selection and ordering data

Version	U_e	I_e	U_c		MW	Order No.	Weight 1 unit approx. kg	PS*/ P. unit Unit(s)	
	V AC	A AC	V AC	V DC					
 5TT5 511  5TT5 150	Remote control switches contact gap 3 mm, short-circuit strength up to 800 A								
	1 NO contact	230	16	8	--	1	5TT5 511	0.090	1
				12	--		5TT5 501	0.090	1
				--	12		5TT5 551	0.090	1
				24	24		5TT5 521	0.090	1
				110	110		5TT5 541	0.090	1
				230	220		5TT5 531	0.090	1
	2 NO contacts	400	16	8	--	1	5TT5 512	0.097	1
				12	--		5TT5 502	0.097	1
				--	12		5TT5 552	0.097	1
				24	24		5TT5 522	0.097	1
				110	110		5TT5 542	0.097	1
				230	220		5TT5 532	0.097	1/12
	1 CO contact	230	16	8	--	1	5TT5 516	0.091	1
				12	--		5TT5 506	0.091	1
24				24	5TT5 526		0.091	1	
110				110	5TT5 546		0.091	1	
230				220	5TT5 536		0.091	1	
with central switching, contact gap 3 mm, short-circuit current strength up to 800 A									
1 CO contact	230	16	230	--	1	5TT5 535	0.091	1	
2 NO contacts	400	16	230	--	1	5TT5 534	0.114	1	
3 NO contacts	400	16	230	--	2	5TT5 537	0.137	1	
with central and group switching, μ contact, very quiet operation									
1 NO contact	230	16	24	--	2	5TT5 150	0.150	1	
			230	--		5TT5 151	0.150	1	
2 NO contact	230	16	24	--	2	5TT5 152	0.150	1	
			230	--		5TT5 153	0.150	1	
 5TT5 503	Remote control switches contact gap 3 mm, short-circuit strength up to 800 A								
	3 NO contacts	400	16	12	--	2	5TT5 503	0.150	1
				24	24		5TT5 523	0.150	1
				110	110		5TT5 543	0.150	1
				230	220		5TT5 533	0.150	1
Blind remote control switches contact sequence 1 – 0 – 2 – 0, contact gap 3 mm									
2 NO contacts	230	16	230	--	1	5TT5 163	0.100	1	
 5TT5 166	Series remote control switches contact sequence 1 – 2 – 1 + 2 – 0, contact gap 3 mm								
	2 NO contacts	230	16	12	--	1	5TT5 166	0.100	1
				24	--		5TT5 165	0.100	1
				230	--		5TT5 164	0.100	1

Modular Installation Devices, Mounting Depth 55 mm >N< Switching Devices

5TT5 remote control switches

Selection and ordering data

Version	U_e	I_e	U_c		MW	Order No.	Weight 1 unit approx. kg	PS*/ P. unit Unit(s)	
	V AC	A AC	V AC	V DC					
Electronic series remote control switches									
 5TT5 650	contact sequence 1 – 2 – 1 + 2 – 0, μ contact gap					1	5TT5 650	0.100	1
	2 NO contacts	230	16	12	--				
System remote control switches μ contact, very quiet operation									
 5TT5 601	1 NO contact	230	16	24 230 12	-- -- --	1	5TT5 601 5TT5 602 5TT5 603	0.065 0.065 0.073	1 1 1
	with 2 switching systems								
	1 NO contact per switching system	230	10	24 230 12	-- -- --	1	5TT5 605 5TT5 606 5TT5 607	0.080 0.065 0.073	1 1 1
 5TT5 613	with central switching								
	1 NO contact	230	10	230	--	1	5TT5 611	0.065	1
 5TT5 612	with central switching, with 2 switching systems								
	1 NO contact per switching system	230	8	230	--	1	5TT5 612	0.080	1
 5TT5 614	with central switching, with 3 switching systems								
	1 NO contact per switching system	230	10	230	--	2	5TT5 613	0.140	1
 5TT5 621	with central switching, with 3 switching systems								
	1 NO contact per switching system	230	10	230	--	2	5TT5 614	0.160	1
 5TT5 623	with central and group switching, with transparent cap								
	1 NO contact	230	10	230	--	1	5TT5 621	0.065	1
 5TT5 623	with central and group switching, with 3 switching systems								
	1 NO contact per switching system	230	10	230	--	2	5TT5 623	0.140	1
Compensators									
 5TG8 230	PTC resistor combination for increasing glow lamp loads					1	5TG8 230	0.050	1
	230	--	--	--	--				
Transparent caps for conversion of devices from 55 mm to 70 mm mounting depth									
 5TG8 236	spare part for devices with an overall width of 1 MW 5TT5 5. only for devices with an overall width of 1 MW. (1 set = 5 units)					1	5TG8 236	0.025	1 set
	 5TG8 238	spare part for 5TT3 0., 5TT3 1., 5TT3 4., 5TT5 1. and 5TT5 6. devices with an overall width of 1 MW					1	5TG8 237	0.025
2 transparent caps are required for 5TT5 1. devices with an overall width of 2 MW (1 set = 5 units)									
 5TG8 238	spare part for 5TT3 4., 5TT5 6. and 5TT6 1. devices with an overall width of 2 MW (1 set = 5 units)					2	5TG8 238	0.045	1 set

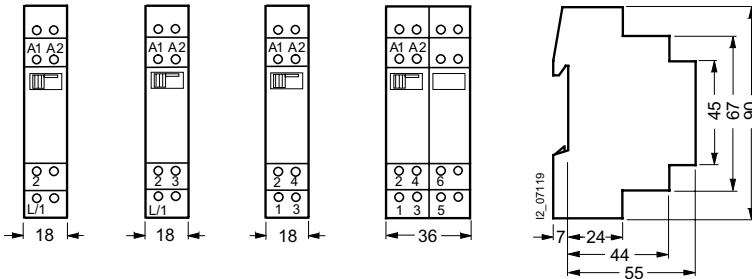
Modular Installation Devices, Mounting Depth 55 mm >N< Switching Devices

5TT5 remote control switches

Dimensional drawings

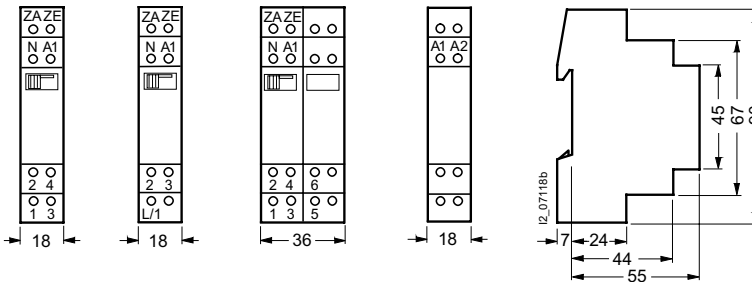
5TT5 5 remote control switches

5TT5 501	5TT5 506	5TT5 502	5TT5 503
5TT5 511	5TT5 516	5TT5 512	5TT5 523
5TT5 521	5TT5 526	5TT5 522	5TT5 533
5TT5 531	5TT5 536	5TT5 532	5TT5 543
5TT5 541	5TT5 546	5TT5 542	
5TT5 551		5TT5 552	



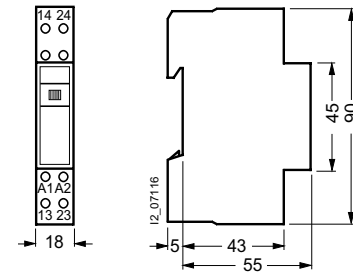
5TT5 remote control switches, central ON/OFF

5TT5 534	5TT5 535	5TT5 537	5TG8 230 compensators
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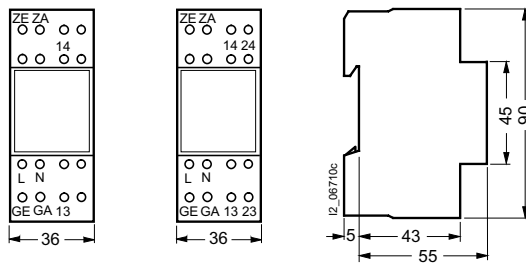


5TT5 16 blind and series remote control switches/5TT5 650 electronic series remote control switches

5TT5 163
5TT5 164
5TT5 165
5TT5 166
5TT5 650

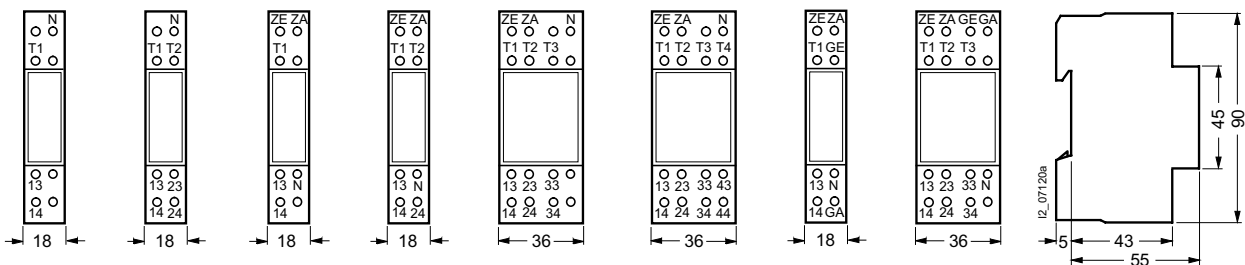


5TT5 150	5TT5 152
5TT5 151	5TT5 153



5TT5 6 remote control switch systems

5TT5 601	5TT5 605	5TT5 611	5TT5 612	5TT5 613	5TT5 614	5TT5 621	5TT5 623
5TT5 602	5TT5 606						
5TT5 603	5TT7 607						



Modular Installation Devices, Mounting Depth 55 mm >N< Switching Devices

5TT5 remote control switches

Schematics

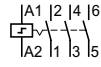
5TT5 5.1



5TT5 5.2



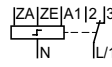
5TT5 5.3



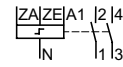
5TT5 5.6



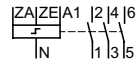
5TT5 535



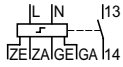
5TT5 534



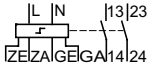
5TT5 537



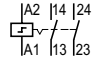
5TT5 150
5TT5 151



5TT5 152
5TT5 153



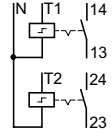
5TT5 16



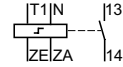
5TT5 601
5TT5 602
5TT5 603



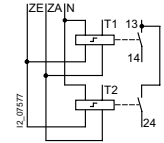
5TT5 605
5TT5 606
5TT5 607



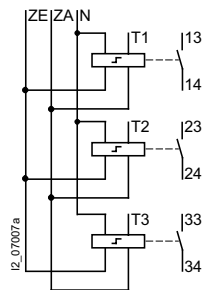
5TT5 611



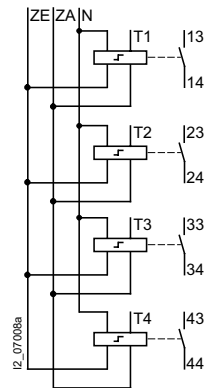
5TT5 612



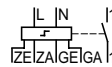
5TT5 613



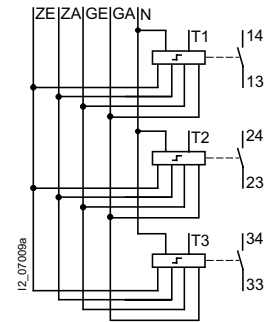
5TT5 614



5TT5 621



5TT5 623



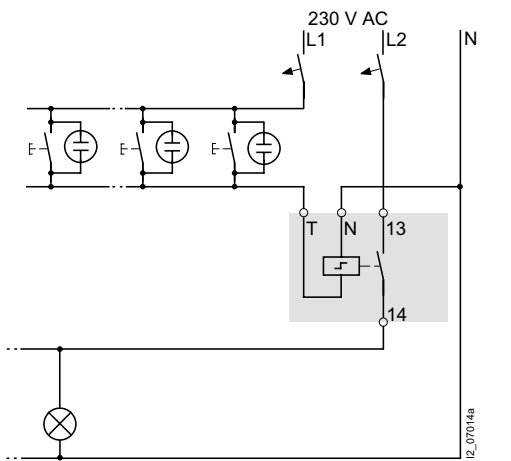
5TT5 431



5TG8 230

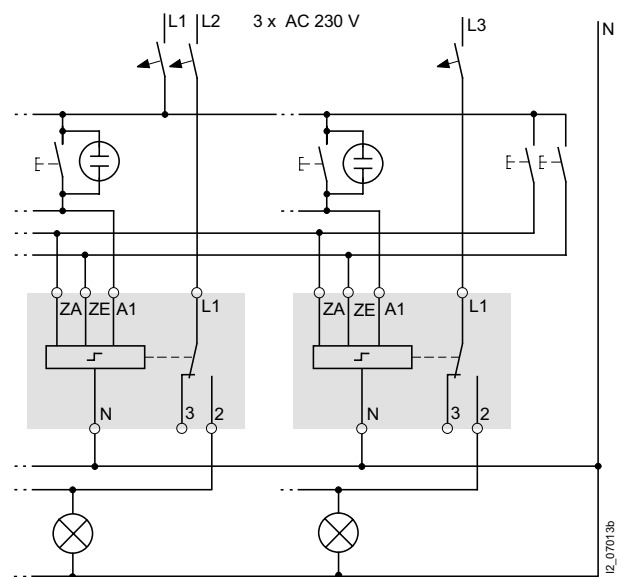


Switching example: 5TT5 602



Single-phase lighting circuit with 230 V AC actuation, e.g. in office buildings

Switching example: 5TT5 535 with central ON/OFF switching



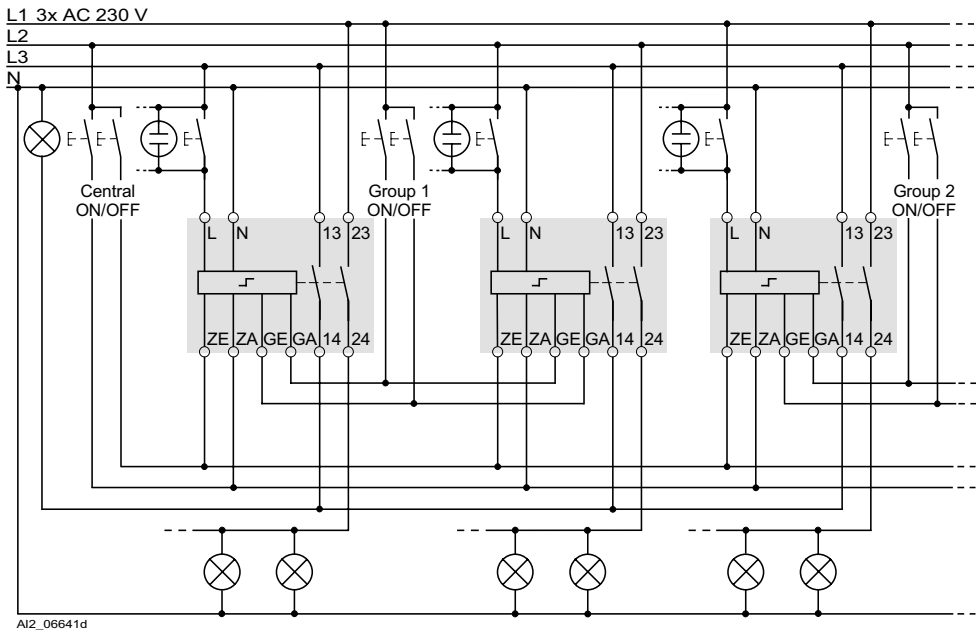
With the 2-pushbutton central "ON" and "OFF" function, all remote control switches can be switched on or off from a central point, e.g. at the start and end of work. A time switch with a one-second pulse can also be used if desired. Once a central ON/OFF switching operation has been executed, the remote control switches can also be switched on and off locally at any time. The phase relation of ZA, ZE and A1 is arbitrary.

Modular Installation Devices, Mounting Depth 55 mm >N< Switching Devices

5TT5 remote control switches

Schematics

Switching example: 5TT5 153 with central ON/OFF switching

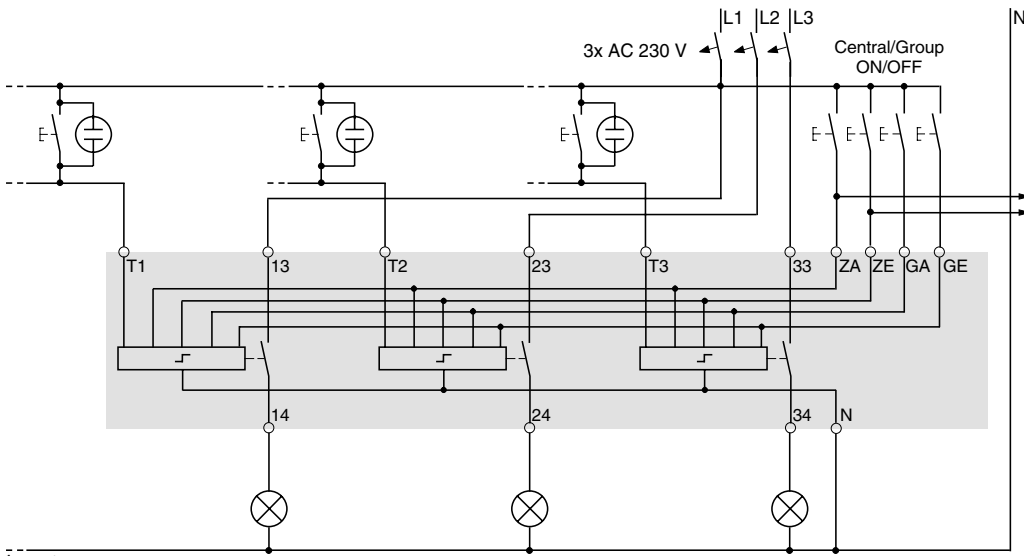


AI2_06641d

With the 2-pushbutton central "ON" and "OFF", all remote control switches can be switched on or off from a central point, e.g. at the start and end of work. With the 2 pushbutton group "ON" and "OFF" function, all remote control switches assigned to the respective group, e.g. halls, are switched ON/OFF. A time switch with a one-second pulse can also be used with the "central" and "group" function if desired.

Once a central ON/OFF switching operation has been executed, the remote control switches can also be switched on and off locally at any time. The phase relation of ZA, ZE and GA, GE and L do not have to be the same. If the contact 13/14 is used for the central "ON" and "OFF" function as a check-back contact, as shown above, terminals 13 of all remote control switches must be in-phase.

Switching example: 5TT5 623



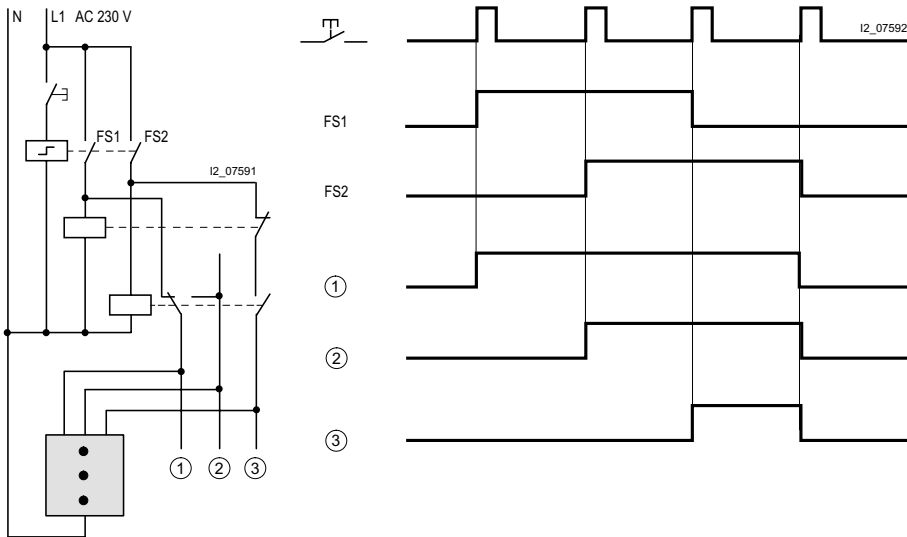
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The 5TT5 623 remote control switch comprises 3 separately controlable remote control switches for central/group ON/OFF with housing-internal wiring of the central/group ON/OFF function. In our example, we have used pushbuttons to control the central/group ON/OFF function. However, if the room pushbuttons T1 to T3 are to

be permanently locked, then switches must be used for the central/group ON/OFF function instead of pushbuttons. Voltage must not be applied to ZA/ZE and GA and GE simultaneously. This type of priority, the permanent locking of system pushbuttons, e.g. prisons, security areas (banks, exhibitions), should only be switched centrally.

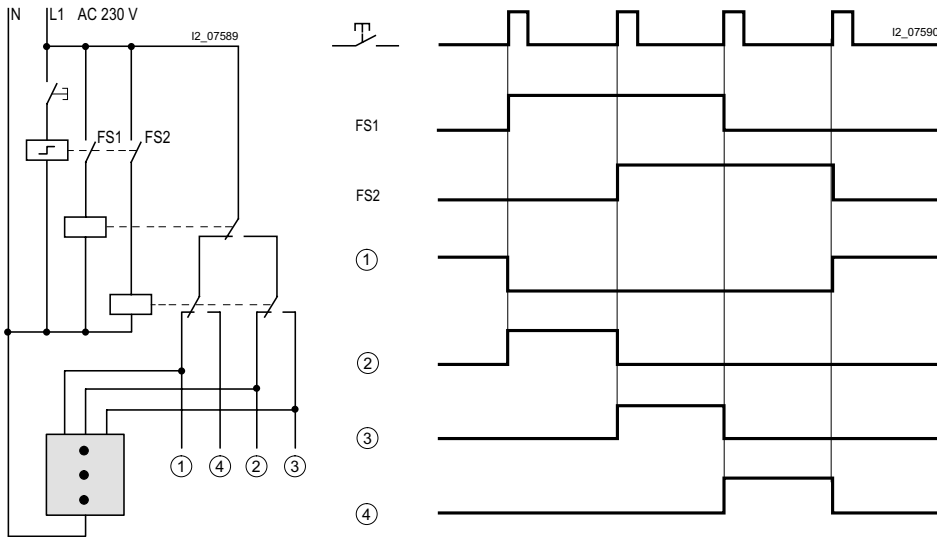
Schematics

Switching example: triple tap-changing gear and neutral position – 1 and 2 and 3



- Devices required:
- 5TT5 164 series remote control switch
 - 5TT3 065 or 5TT3 075 switching relay
 - 5TE5 804 indicator lights

Switching example: quadruple tap-changing gear – 1 or 2 or 3 or 4



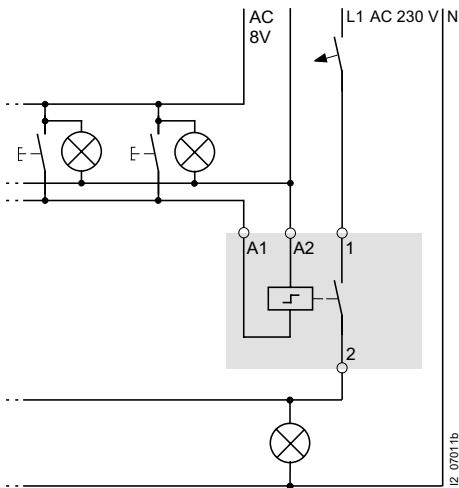
- Devices required:
- 5TT5 164 series remote control switch
 - 5TT3 065 or 5TT3 075 switching relay
 - 5TE5 804 indicator lights

Modular Installation Devices, Mounting Depth 55 mm >N< Switching Devices

5TT5 remote control switches

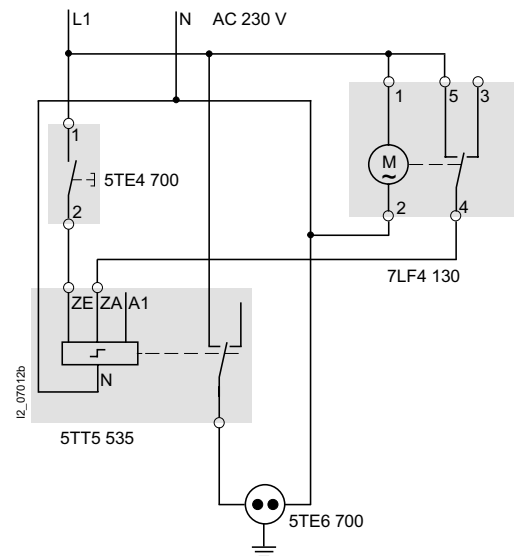
Schematics

Switching example 5TT5 511



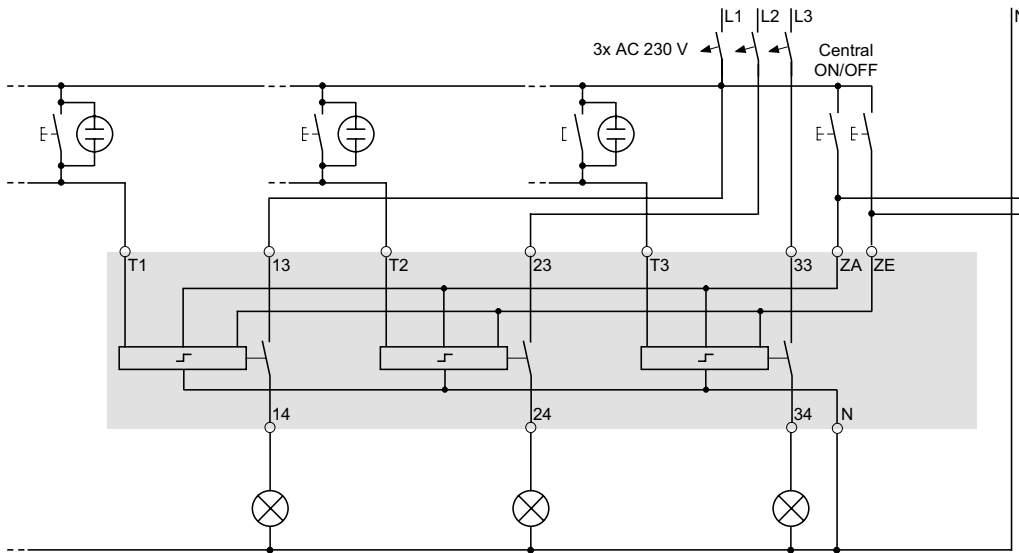
Single-phase lighting circuit with safety extra-low voltage 8 V AC, pushbutton and glow lamp.

Switching example: 5TT5 535 with ON/OFF time switching



Printers and copiers are to be switched on with the pushbutton at the beginning of the working day. At the end of the working day, e.g. 6 p.m. to 10 p.m., an hourly one-second pulse of the time switch switches the outlet off. This ensures that printers and copiers are not "forgotten". If the device is switched on again after 6 p.m., a switch-off is actuated again hourly.

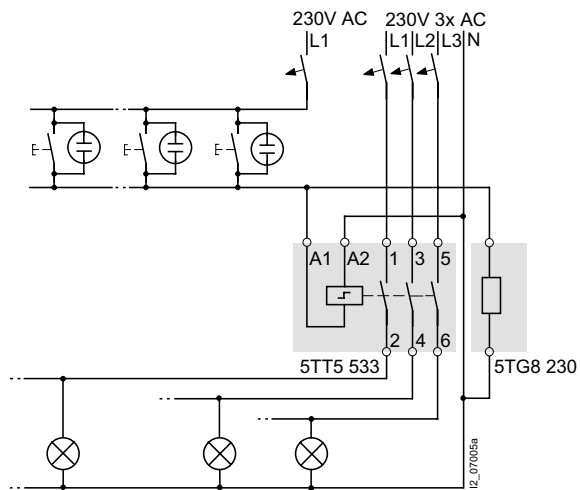
Switching example: 5TT5 613 with central ON/OFF switching



The 5TT5 613 remote control switch comprises 3 separately controllable remote control switches for central ON/OFF switching with housing-internal wiring of the central ON/OFF function. In our example, pushbuttons have been used to control the central ON/OFF function. However, if room pushbuttons T1 to T3 are to be permanently locked, switches must be used for the central ON/OFF function instead of pushbuttons. Voltage must not be applied simultaneously to the ZA and ZE terminals. Suitable switches are the 5TE7 141 group switches with center position or double changeover switches for wall mounting.

Schematics

Glow lamp load and line capacity



When the pushbutton is open, the glow lamps in the pushbuttons draw their current over the magnet coil of the remote control switch. If the current is too high, this can prevent the armature from dropping.

The 5TG8 230 compensator, which is switched in parallel to the magnet coil, discharges the current.

Modular Installation Devices, Mounting Depth 55 mm >N<

Switching Devices

5TT3 0 switching relays

Overview

Function

Switching relays are used in control systems as coupling relays, for the electrical or safe isolation of electrical circuits.

Protective separation

The magnet coil and the contacts meet the requirements for safety extra-low voltage from the actuating voltage safely through to disconnection.

Checking functions using the manual switch

Switching relays have a manual switch that shows the switching position. This switch can be used to manually switch the switching relay, thus allowing system devices and control functions to be checked.

Technical specifications

Acc. to EN 60255 (VDE 0435)			5TT3 05. 5TT3 06. 5TT3 07. 5TT3 080	5TT3 04	5TT3 081	5TT3 085
Rated control supply voltage U_c	V AC V DC		8, 12, 24, 110 or 230 12, 24, 30 or 110, depending on type			
Operating range	$\times U_c$		0.9 ... 1.1			
Rated power dissipation P_v	pick-up power, approx. 20 ms holding power per contact	VA VA VA	2.1 1.3 1	1.1 1.8 1	2.1 1.3 1	1.1 1.8 1
Rated frequency	AC versions	Hz	50			
Response time/returning time		ms	30			
Contact gap		mm	μ contact			
Rated operational voltage U_e	1-pole	V AC	250			
Protective separation	creepage and clearances magnet coil/contact	mm	> 8			
Different phases	magnet coil/contact		permissible			
Rated operational current I_s	at p.f. = 1	A	16			
Rated impulse withstand voltage U_{imp}	magnet coil/contact contact/contact	kV kV	> 4 > 2.5			
Minimum contact load		V; mA	10; 100			
Terminals	\pm screw (Pozidriv)		1			
Conductor cross-sections	rigid flexible with sleeve	max. mm ² min. mm ²	2 x 2.5 0.5			
Permissible ambient temperature		°C	-20 ... +45			
Safety class	acc. to EN 60730-1		IP20			
Degree of protection	acc. to EN 60529		II			
Humidity class	acc. to DIN 50016 acc. to IEC 60068-2-30		FW 24			

Modular Installation Devices, Mounting Depth 55 mm >N< Switching Devices

5TT3 0 switching relays

Technical specifications

Switching of lamps




				5TT3 0..	5TT3 081
Incandescent lamp loads				W	1200
Fluorescent and compact lamps in ballast operation					
• Uncorrected	W	L18	Unit(s)	36	--
	W	L36	Unit(s)	31	--
	W	L58	Unit(s)	20	--
• Parallel-corrected	W/μF	S11/4.5	Unit(s)	--	20
	W/μF	L18/4.5	Unit(s)	--	20
	W/μF	L24/4.5	Unit(s)	--	20
	W/μF	L36/4.5	Unit(s)	--	20
	W/μF	L58/7	Unit(s)	--	13
• DUO switching, 2-lamp	W	L18	Unit(s)	--	--
	W	L36	Unit(s)	--	--
	W	L58	Unit(s)	--	--
Fluorescent and compact lamps with electronic ballast (ECG)					
AC operation, 1-lamp	W	L18	Unit(s)	58	--
	W	L36	Unit(s)	32	--
	W	L58	Unit(s)	20	--
Metal-vapor and high-pressure mercury-vapor lamps					
• Uncorrected	W	50	Unit(s)	16	--
	W	80	Unit(s)	12	--
	W	125	Unit(s)	8	--
	W	250	Unit(s)	4	--
	W	400	Unit(s)	3	--
	W	700	Unit(s)	2	--
	W	1000	Unit(s)	1	--
• Parallel-corrected	W/μF	50/ 7	Unit(s)	--	13
	W/μF	80/ 8	Unit(s)	--	11
	W/μF	125/10	Unit(s)	--	9
	W/μF	250/18	Unit(s)	--	5
	W/μF	400/25	Unit(s)	--	3
	W/μF	700/40	Unit(s)	--	2
W/μF	1000/60	Unit(s)	--	1	
Halogen metal-vapor lamps					
• Uncorrected	W	70	Unit(s)	10	--
	W	150	Unit(s)	5	--
	W	250	Unit(s)	3	--
	W	400	Unit(s)	2	--
• Parallel-corrected	W/μF	70/12	Unit(s)	--	7
	W/μF	150/20	Unit(s)	--	4
	W/μF	250/20	Unit(s)	--	3
	W/μF	400/35	Unit(s)	--	2
	W/μF	1000/85	Unit(s)	--	1
High-pressure sodium-vapor lamps					
• Uncorrected	W	50	Unit(s)	13	--
	W	70	Unit(s)	10	--
	W	110	Unit(s)	8	--
	W	150	Unit(s)	5	--
	W	250	Unit(s)	2	--
• Parallel-corrected	W/μF	50/8	Unit(s)	--	11
	W/μF	70/12	Unit(s)	--	7
	W/μF	110/12	Unit(s)	--	7
	W/μF	150/20	Unit(s)	--	4
	W/μF	250/36	Unit(s)	--	2
	W/μF	400/45	Unit(s)	--	2

Modular Installation Devices, Mounting Depth 55 mm >N<

Switching Devices

5TT3 0 switching relays

Selection and ordering data

Version	U_e		I_e		U_c		MW	Order No.	Weight 1 unit approx. kg	PS* / P. unit Unit(s)
	V AC	A AC	V AC	V DC	V AC	V DC				
Switching relays¹⁾										
 5TT3 041  5TT3 061	1 NO contact									
	230	16	8	--	1	5TT3 041	0.100	1		
			12	--		5TT3 042	0.100	1		
			24	--		5TT3 043	0.100	1		
			110	--		5TT3 044	0.100	1		
			230	--		5TT3 045	0.100	1		
	2 NO contacts									
	230	16	8	--	1	5TT3 051	0.100	1		
			12	--		5TT3 052	0.100	1		
			24	--		5TT3 053	0.100	1		
			110	--		5TT3 054	0.100	1		
			230	--		5TT3 055	0.100	1		
	1 CO contact									
	230	16	8	--	1	5TT3 061	0.100	1		
			12	--		5TT3 062	0.100	1		
		24	--		5TT3 063	0.100	1			
		110	--		5TT3 064	0.100	1			
		230	--		5TT3 065	0.100	1			
2 CO contacts										
230	16	8	--	1	5TT3 071	0.100	1			
		12	--		5TT3 072	0.100	1			
		24	--		5TT3 073	0.100	1			
		110	--		5TT3 074	0.100	1			
		230	--		5TT3 075	0.100	1			
for control with direct voltage										
2 CO contacts										
230	16	--	12	1	5TT3 078	0.105	1			
		--	24		5TT3 076	0.100	1			
		--	30		5TT3 082	0.120	1			
		--	110		5TT3 077	0.100	1			
for switching capacitive loads; of lighting										
1 NO contact										
230	16	230	--	1	5TT3 081	0.100	1			
for control of PLCs contact: 15 to 60 V, 2 to 30 mA acc. to EN 61131-2, type 1										
1 NO contact										
230	16	230	--	1	5TT3 085	0.110	1			
Sealable enable relays										
used for boiler /storage relays. In the case of continuous duty, a distance of 1 MW must be maintained between the devices.										
 5TT3 080	1 CO contact									
230	16	230	--	1	5TT3 080	0.100	1			

1) Transparent caps see page 12/59.

Modular Installation Devices, Mounting Depth 55 mm >N< Switching Devices

5TT3 0 switching relays

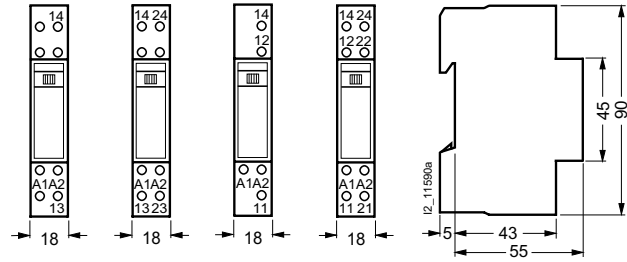
Dimensional drawings

5TT3 0 switching relays

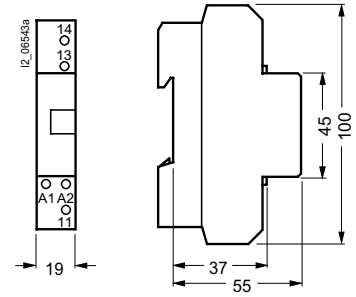
5TT3 04.
5TT3 085

5TT3 05.
5TT3 06.

5TT3 07.
5TT3 080
5TT3 082



5TT3 081



Schematics

5TT3 04.
5TT3 081
5TT3 085



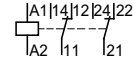
5TT3 05.



5TT3 06.



5TT3 07.
5TT3 080
5TT3 082



Modular Installation Devices, Mounting Depth 55 mm >N< Switching Devices

5TT3 8 and 5TT3 9 Insta contactors

Overview



Noiseless direct current magnetic system

5TT3 8 und 5TT3 9 Insta contactors are equipped with a direct current magnetic system. Apart from a quiet switching noise, they are noise-free. They are therefore especially suitable for applications in residential buildings.

Heat dissipation

If Insta contactors are installed in distribution boards, they should be designed for a standard temperature of 40 °C. If more than one Insta contactor is installed, a spacer (5ST2 122 or 5TG8 240) must be installed after every second contactor.



Safe cable entry

Generously sized cable lead-in funnels enable easy cable entry. These are insulated right through to the cable entry, thus ensuring complete finger protection.

Spacers

Spacers can be used as a compensating element and have a width of 1/2 MW. They come with an integrated wiring duct for the insertion of conductors. Two oppositely installed spacers thus offer space for large conductor cross-sections up to a 15 mm diameter.

Modular Installation Devices, Mounting Depth 55 mm >N< Switching Devices

5TT3 8 and 5TT3 9 Insta contactors

Technical specifications

Data acc. to DIN VDE 0660, EN 60947, ZH 1/457				5TT3 8 40 A 4-pole		5TT3 8 63 A 4-pole		5TT3 9 20 A 4-pole				
Rated control voltage U_c				V		230 AC, 220 DC		24 AC, 24 DC 110 AC, 230 AC				
Operating range $\times U_c$				0.85 – 1.1								
Rated power of coil				holding power	VA	4.6		3.5				
				pick-up power	VA	4.6		3.5				
Rated frequency				Hz		50/60						
Switching times				ON-switching	ON-delay NO OFF-delay NC	ms	AC 15 - 20 10 - 15	DC 20 - 30 10 - 15	AC 15 - 20 10 - 15	DC 20 - 30 10 - 15	DC 10 - 50 5 - 45	DC 11 - 50 9 - 45
				OFF-switching	OFF-delay NO ON-delay NC	ms	35 - 45 40 - 50	30 - 40 35 - 45	35 - 45 40 - 50	30 - 40 35 - 45	20 - 30 20 - 30	2 - 5 3 - 7
				arcing time		ms	< 10		10 - 15			
Protective separation				creepage and clearances magnet/contact contact/contact		mm mm	8 8		< 8			
Contact gap						mm	> 3					
Positively driven contacts				no								
Rated impulse withstand voltage U_{imp}				kV		> 4						
Rated operational voltage U_e				V AC		400				400		
Rated operational current I_e				A		40		63		20		
Power dissipation P_v				coil/drive	VA	3.6				3.5		
				contact per pole for rated operational voltage	VA	4		7.5		1.7		
Minimum contact load				V; mA		24; 300				10; 300		
Max. capacitive load				μF		220		300		--		
Switching of lamp loads				incandescent lamp rating per current path fluorescent lamp loads high-pressure and halogen lamps	W	3 000		5 000		1 600		
						1) 1)						
Switching of resistive loads AC-1				rated operational power P_s	at V AC kW	230 14	400 26	230 23	400 40	230 7.5	400 13	
Switching of three-phase Asynchronous motors AC-3				rated operational power P_s	at V AC kW	400 11		15		4		
Electrical service life				for switching cycles at I_e and AC-1	NO contacts NC contacts	100 000 50 000				100 000		
Overload withstand capability acc. to IEC 60947-4				per current path	at 1 s at 3 s at 10 s	A A A	625 375 200	750 450 240	-- -- --			
Max. making/breaking current with p.f. = 0.45 (NO contacts only) acc. to IEC 60947-4-1				making current breaking current	A A	200 160	305 240	-- -- --				
Short-circuit protection acc. to VDE 0636/IEC 60269				back-up fuse characteristic gL/gG	A	40	63	--				
Terminals				coil current path	\pm screw (Pozidriv)	1 2			1			
Conductor cross-sections				rigid flexible with sleeve	mm ² mm ²	1.5 - 25 0.5 - 16			1 - 4 0.5			
Permissible ambient temperature				for operation for storage	$^{\circ}C$ $^{\circ}C$	-25 ... +55 -50 ... +80	-25 ... +55 ²⁾		-25 ... +55			

1) See table on page 12/72.

2) For 3-pole operation. For 4-pole operation, -25 $^{\circ}C$ to +45 $^{\circ}C$.

Switching loads		5TT3 8				5TT3 9
		40 A NO contacts	40 A NC contacts	63 A NO contacts	63 A NC contacts	20 A
• Utilization categories:						
- AC-1	A	40	240	63	63	20
- AC-3	kW	11	--	15	--	4
• Incandescent lamp load:	W/pole	3 000	2 000	5 000	3 000	1 600
• Fluorescent lamp load 58 W:						
- Uncorrected	unit/pole	40	28	60	49	24
- Parallel-corrected	unit/pole	25	15	43	34	10
- DUO circuit	unit/pole	2 x 40	2 x 28	2 x 60	2 x 49	2 x 28

Modular Installation Devices, Mounting Depth 55 mm >N< Switching Devices

5TT3 8 and 5TT3 9 Insta contactors

Technical specifications

Switching of lamps

Maximum number of lamps per current path at 230 V, 50 Hz			5TT3 8		5TT3 8		5TT3 9
A			NO	NC	NO	NC	NO
			40		63		20
Lamp loads	Lamp type		Unit(s)	Unit(s)	Unit(s)	Unit(s)	Unit(s)
Fluorescent and compact lamps (DULUX) in ballast operation (KVG)							
• Uncorrected	S11 W		210	138	310	223	100
	L18 W		90	78	140	122	43
	L24 W		90	63	140	89	47
	L36 W		65	57	95	79	37
	L58 W		40	28	60	49	24
• Parallel-corrected	S11/4.5 W/μF		45	32	70	51	15
	L18/4.5 W/μF		45	38	70	57	15
	L24/4.5 W/μF		45	38	70	57	15
	L36/4.5 W/μF		45	38	70	57	15
	L58/7.0 W/μF		25	19	43	34	10
• DUO circuit specifications are for lights with 2 lamps each respectively	S11 W		150	122	320	262	--
	L18 W		100	78	150	136	--
	L24 W		78	62	115	94	--
	L36 W		65	53	95	79	--
	L58 W		40	28	60	49	--
Fluorescent lamps with electronic primary switching device							
• AC operation, 1-lamp	L18 W		60	50	80	54	39
	L36 W		30	28	42	31	39
	L58 W		22	17	30	22	26
• AC operation, 2-lamp	L18 W		2 × 20	2 × 16	2 × 24	2 × 18	2 × 26
	L36 W		2 × 10	2 × 6	2 × 13	2 × 9	2 × 26
	L58 W		2 × 8	2 × 3	2 × 9	2 × 6	2 × 12
• DC operation, 3 current paths in series, 1-lamp	L18 W		50	42	75	67	22
	L36 W		30	23	40	32	12
	L58 W		16	11	25	18	8
• DC operation, 3 current paths in series, 2-lamp	L18 W		2 × 25	2 × 19	2 × 38	2 × 31	2 × 12
	L36 W		2 × 15	2 × 11	2 × 20	2 × 13	2 × 6
	L58 W		2 × 8	2 × 5	2 × 12	2 × 7	2 × 4
Metal-vapor and high-pressure mercury-vapor lamps							
• Uncorrected	50 W		47	42	74	49	13
	80 W		36	28	56	31	9
	125 W		25	19	39	22	6
	250 W		13	10	21	11	3
	400 W		8	6	13	9	2
	700 W		5	3	8	4	1
	1000 W		3	1	6	2	1
• Parallel-corrected	50/7 W/μF		30	22	45	19	10
	80/8 W/μF		25	18	40	33	9
	125/10 W/μF		20	13	33	22	7
	250/18 W/μF		12	8	18	11	4
	400/25 W/μF		8	5	13	9	3
	700/40 W/μF		5	3	8	5	1
	1000/60 W/μF		3	1	5	3	1
Halogen metal-vapor lamps							
• Uncorrected	70 W		25	19	39	23	6
	150 W		14	10	22	13	5
	250 W		8	5	13	9	3
	400 W		7	3	11	7	2
	1000 W		1	1	2	1	0
	2000 W		0	0	1	1	0
• Parallel-corrected	70/12 W/μF		18	12	26	22	6
	150/20 W/μF		10	7	16	13	3
	250/32 W/μF		6	3	10	6	2
	400/35 W/μF		6	3	9	4	2
	1000/85 W/μF		1	1	2	1	0
High-pressure sodium-vapor lamps							
• Uncorrected	50 W		28	21	44	31	13
	70 W		22	14	34	19	10
	110 W		18	11	28	13	8
	150 W		12	7	19	8	5
	250 W		7	4	11	5	3
	400 W		5	2	7	3	2
	1000 W		2	1	3	2	1
• Parallel-corrected	50/8 W/μF		22	15	33	22	8
	70/12 W/μF		18	11	27	19	5
	110/12 W/μF		18	11	27	19	5
	150/20 W/μF		10	5	16	11	3
	250/36 W/μF		6	3	9	4	1
	400/45 W/μF		4	2	7	3	1
	1000/100 W/μF		2	1	3	2	0

Modular Installation Devices, Mounting Depth 55 mm >N< Switching Devices

5TT3 8 and 5TT3 9 Insta contactors

Technical specifications




Permissible DC switching currents for NO contacts at p.f. = 1				1 path	2 paths in series	3 paths in series	4 paths in series
5TT3 8 Insta contactors, switching of DC voltages							
5TT3 8	I_e at $U_e = 24$ V DC	A	40				40 ¹⁾
40 A	I_e at $U_e = 110$ V DC	A	4	10	30		40
4-pole	I_e at $U_e = 220$ V DC	A	0.8	6	20		40
5TT3 8	I_e at $U_e = 24$ V DC	A	63				63 ¹⁾
63 A	I_e at $U_e = 110$ V DC	A	4	10	35		63
4-pole	I_e at $U_e = 220$ V DC	A	0.8	6	30		63
5TT3 9 Insta contactors, switching of DC voltages							
5TT3 9	I_e at $U_e = 24$ V DC	A	10	--	16		--
20 A	I_e at $U_e = 110$ V DC	A	1.1	--	6		--
4-pole	I_e at $U_e = 220$ V DC	A	0.5	--	2.5		--

Four NO contacts in series are not recommended
for small voltages due to unreliable contacts.

Modular Installation Devices, Mounting Depth 55 mm >N< Switching Devices

5TT3 8 and 5TT3 9 Insta contactors

Selection and ordering data

	U_e	I_e	U_c	MW	Order No.	Weight 1 unit approx. kg	PS*/ P. unit Unit(s)	
	V AC	A	V					
5TT3 8 Insta contactors								
	Insta contactors, 40 A for DC or AC continuous operation, with position indication and DC magnetic system							
	4 NO contacts (+) A1 1 3 5 7 (13) (-) A2 2 4 6 8 (14)	400	40	230 AC, 220 DC 24 AC/DC	3	5TT3 806 5TT3 816	0.395 0.395	1 1
	3 NO contacts, 1 NC contact (+) A1 1 3 5 21 (-) A2 2 4 6 22	400	40	230 AC, 220 DC 24 AC/DC	3	5TT3 821 5TT3 841	0.400 0.400	1 1
	2 NO contacts, 2 NC contacts (+) A1 13 21 31 43 (-) A2 14 22 32 44	400	40	230 AC, 220 DC 24 AC/DC	3	5TT3 822 5TT3 842	0.400 0.400	1 1
4 NC contacts (+) A1 11 21 31 41 (-) A2 12 22 32 42	400	40	230 AC, 220 DC 24 AC/DC	3	5TT3 823 5TT3 843	0.400 0.400	1 1	
	Insta contactors, 63 A for DC or AC continuous operation, with position indication and DC magnetic system							
	4 NO contacts (+) A1 1 3 5 7 (13) (-) A2 2 4 6 8 (14)	400	63	230 AC, 220 DC 24 AC/DC	3	5TT3 807 5TT3 817	0.395 0.395	1 1
	3 NO contacts, 1 NC contact (+) A1 1 3 5 21 (-) A2 2 4 6 22	400	63	230 AC, 220 DC 24 AC/DC	3	5TT3 824 5TT3 844	0.400 0.400	1 1
	2 NO contacts, 2 NC contacts (+) A1 13 21 31 43 (-) A2 14 22 32 44	400	63	230 AC, 220 DC 24 AC/DC	3	5TT3 825 5TT3 845	0.400 0.400	1 1
5TT3 9 Insta contactors								
	Insta contactors, 20 A for continuous operation, sealable, conductor cross-sections up to 4 mm ² , with DC magnetic system							
	4 NO contacts A1 1 3 5 13 A2 2 4 6 14	400	20	24 DC 24 AC 110 AC 230 AC	2	5TT3 986 5TT3 985 5TT3 984 5TT3 983	0.160 0.160 0.160 0.160	1/10 1/10 1/10 1/10
	3 NO contacts, 1 NC contact A1 1 3 5 21 A2 2 4 6 22	400	20	24 DC 24 AC 110 AC 230 AC	2	5TT3 991 5TT3 990 5TT3 988 5TT3 987	0.160 0.160 0.160 0.160	1/10 1/10 1/10 1/10

Accessories

	U_e	I_e	MW	Order No.	Weight 1 unit approx. kg	PS*/ P. unit Unit(s)
	V AC	A				

Accessories for 5TT3 8 Insta contactors



Spacers

contour miniature circuit-breakers >N<
(mounting depth 55 mm)

0.5

5ST2 122

0.009

1/10

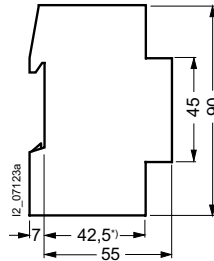
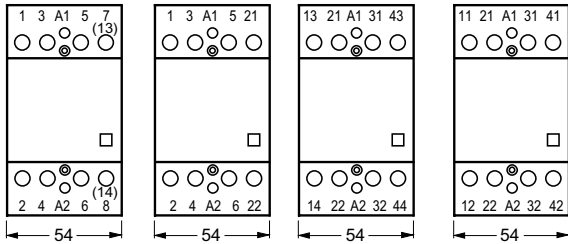
Modular Installation Devices, Mounting Depth 55 mm >N< Switching Devices

5TT3 8 and 5TT3 9 Insta contactors

Dimensional drawings

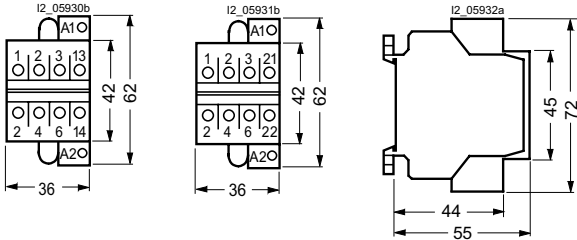
5TT3 80. to 5TT3 84. contactors

5TT3 806	5TT3 821	5TT3 822	5TT3 823
5TT3 816	5TT3 841	5TT3 842	5TT3 843
5TT3 807	5TT3 824	5TT3 825	
5TT3 817	5TT3 844	5TT3 845	



5TT3 9 contactors

5TT3 983	5TT3 987
5TT3 984	5TT3 988
5TT3 985	5TT3 990
5TT3 986	5TT3 991



Timers

5TT1 3 timers for building lighting

Overview

Switching lighting	5TT1 300 and 5TT1 301	5TT1 310-1 and 5TT1 311-1	5TT1 313-1
• Incandescent lamp load:	1200 W	1200 W	1200 W
• Fluorescent lamp load 58 W			
- Uncorrected	20 Unit(s)	15 Unit(s)	--
- Parallel-corrected	--	-- Unit(s)	--
- DUO circuit	2 x 20 Unit(s)	2 x 15 Unit(s)	--
- ECG Siemens, 1-lamp	--	10 Unit(s)	--
2-lamp	--	2 x 5 Unit(s)	--

Benefits

	Energy saving timers	Lighting timers	Stairwell lighting timers		
	5TT1 300	5TT1 301	5TT1 310-1	5TT1 311-1	5TT1 313-1
Setting ranges	3 ... 60 min	0.3 ... 5 min	0.5 ... 10 min	0.5 ... 10 min	0.5 ... 10 min
3-wire circuit, L-momentary contact, can be reset	--	--	•	--	--
4-wire circuit, L-momentary contact, can be reset	•	•	--	•	•
3-wire circuit, N-momentary contact, cannot be reset	•	•	--	•	•
Early deactivation by pushing the button a 2nd time	•	2 ... 5 min	--	--	--
Warning of impending switch off	--	--	--	--	•

4-conductor circuit, L-momentary contact

4 conductors are installed within the building. The timing interval is started with a phase L. During the runtime, the device can be reset at any time, i.e. the runtime restarts.

3-conductor circuit, N-momentary contact

3 conductors are installed within the building. The timing interval is started with the neutral conductor. During the runtime, the timer can be reset at all times. However, this switching no longer corresponds to DIN VDE 0110 T460. It is only still in use in old installations.

3-conductor circuit, L-momentary contact

3 conductors are installed within the building. The timing interval is started with a phase L. No resetting is possible during the runtime as the pushbutton's input and output are exposed to the same potential during the runtime. The glow lamps are switched off during the runtime.

High setting accuracy

The electronic remote control switch works very accurately. The setting can be made every +30 seconds exactly. The factory settings ensure reliable setting of the 1 and 10 minute limit values.

Useful continuous contact

If pushbuttons jam, a so-called pushbutton malfunction, this does not damage the devices but produces a steady light. This feature can be used (e.g. by caretakers of properties) to switch to a permanent steady light in the event of moving house or emergencies.

Short-circuit strength

Stairwell lighting timers are primarily used for the switching of incandescent lamps, which may occasionally be subject to short-circuits during operation.

Technical specifications

		5TT1 300	5TT1 301
Data acc. to DIN VDE 0632			
Rated control voltage U_c	V AC	230	
Operating range $\times U_c$		0.8 ... 1.1	
Rated frequency	Hz	50/60	
Setting ranges	operating time connection B1 degree of dimming connection B2	min % -- --	0.5 ... 5/20 -- -- --
Minimum pulse duration		ms	20
Max. On period	in the event of pushbutton malfunction	%	100
Incandescent lamp load		mA	10
Rated impulse withstand voltage U_{imp}		kV	> 2.5
Direct current output	for the control of ECG dynamic	V	--
Rated operational voltage U_e		V AC	250
Rated operational current I_e	at p.f. = 1	A	10
Contact gap, minimum contact load		mm V; mA	μ contact 10; 300
Switching of lamp loads	incandescent lamp rating fluorescent lamp loads	W	1 200 1)
Electrical service life	In switching cycles at I_e or specified lamp load and $U_e = 230$ V AC		50 000
Terminals	\pm screw (Pozidriv)		2
Conductor cross-sections	rigid flexible with sleeve	max. mm ² min. mm ²	2 \times 2.5 1 \times 0.5
Permissible ambient temperature		°C	-20 ... +60
Resistance to climate	acc. to DIN IEC 60068-1		20/60/4

1) See table on the next page.

		5TT1 310-1, 5TT1 311-1	3TT1 313-1
Data acc. to EN 60669			
Rated control voltage U_c	V AC	230	230
Operating range $\times U_c$		0.8 ... 1.1	0.8 ... 1.1
Rated frequency	Hz	50 ... 60	50 ... 60
Setting range/accuracy		0.5 ... 10 min	0.5 ... 10 min
Minimum pulse duration		ms	30
Incandescent lamp load		mA	10
Rated operational voltage U_e		V AC	250
Rated operational current I_e	at p.f. = 1	A	16
Rated power dissipation	Apparent power Active power	VA W	4 1
Contact gap		mm	3
Minimum contact load		V; mA	10; 300
Switching of lamp loads	incandescent lamp rating	W	1 200
Electrical service life	In switching cycles at I_e or specified lamp load and $U_e = 230$ V AC		50 000
Terminals	\pm screw (Pozidriv)		2
Conductor cross-sections	rigid flexible with sleeve	max. mm ² min. mm ²	2 \times 2.5 2 \times 1.5
Permissible ambient temperature		°C	-20 ... +60
Resistance to climate	acc. to IEC 60068-1		20/60/04

Modular Installation Devices, Mounting Depth 55 mm >N<

Timers

5TT1 3 timers for building lighting

Technical specifications

Devices for switching lamps

Fluorescent and compact lamps (DULUX) in ballast operation (KVG)

Maximum number of lamps per current path at 230 V, 50 Hz

Lamp type	W	Uncorrected					Parallel-corrected					DUO circuit specifications are for lights with 2 lamps each respectively				
		S11	L18	L24	L36	L58	S11	L18	L24	L36	L58	S11	L18	L24	L36	L58
Capacitor capacitance	μF	--	--	--	--	--	4.5	4.5	4.5	4.5	7.0	--	--	--	--	--
Timers																
5TT1 300	10 A	--	22	--	22	14	--	--	--	--	--	--	21	--	21	10
5TT1 301																

Fluorescent lamps with electronic primary switching device (ballast)

Maximum number of lamps per current path at 230 V, 50 Hz

Lamp type	W	AC operation 1-lamp			2-lamp			DC operation, 3 current paths in series								
		L18	L36	L58	L18	L36	L58	1-lamp			2-lamp					
								L18	L36	L58	L18	L36	L58	L18	L36	L58
Timers																
5TT1 300¹⁾	10 A	26	26	18	2 × 12	2 × 12	2 × 8	--	--	--	--	--	--	--	--	--
5TT1 301¹⁾																








1) Max. capacitive load 10 μF .

Rated power dissipation

Order No.	Short designation	Power dissipation P_v (VA)	
		coil/drive	contact ¹⁾ per pole
5TT1 300	time switch 230 V AC 10 A 1 CO contact energy-saving	3	0.9
5TT1 301	time switch 230 V AC 10 A 1 CO contact, lighting	5	0.9

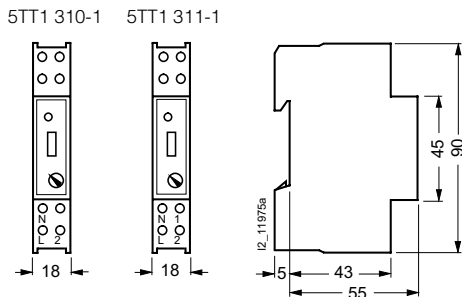
1) For rated operational current.

Selection and ordering data

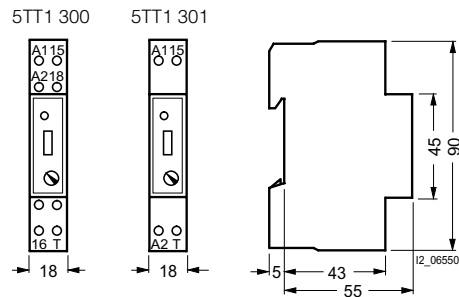
	U_e	I_e	U_c	MW	Order No.	Weight 1 unit approx.	PS*/ P. unit
	V AC	A	V AC			kg	Unit(s)
 <p>Stairwell lighting timers, setting range 0.5 to 10 minutes, manual switch four-wire connection L-momentary contact or three-wire connection N-momentary contact, can be reset</p> <p> 230 10 230 1</p> <p>5TT1 311-1 0.080 1</p> <p>for 3-wire circuit, L-momentary contact, cannot be reset</p> <p> 230 10 230 1</p> <p>5TT1 310-1 0.080 1</p> <p>for four-wire connection L-momentary contact or three-wire connection N-momentary contact, can be reset, with warning prior to switch-off</p> <p>230 16 230 1</p>							
 <p>Energy-saving timers, 55/70 mm setting range 3 to 60 minutes, manual switch switch-off through timing interval or 2nd press of the button four-wire connection L-momentary contact or 3-wire circuit N-momentary contact</p> <p> 230 10 230 1</p> <p>5TT1 300 0.075 1</p>							
 <p>Lighting time switches, 55/70 mm setting range 0.5 to 5 minutes, manual switch if the button is pushed for longer than 1 second, the runtime is extended by 20 minutes four-wire connection L-momentary contact</p> <p> 230 10 230 1</p> <p>5TT1 301 0.075 1</p>							

Dimensional drawings

5TT1 31 time switches for stairwell lighting and fans



5TT1 300 energy-saving timers 5TT1 301 lighting time switches

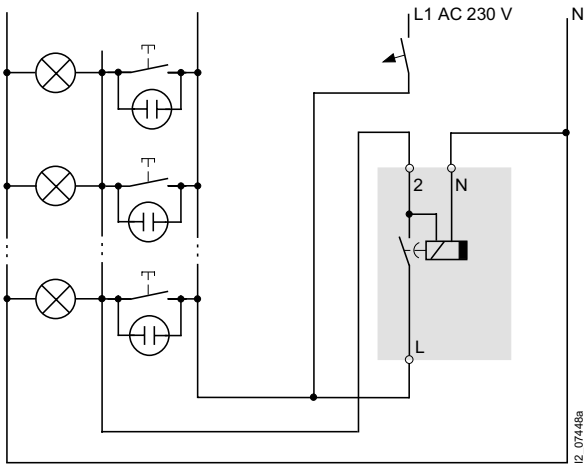


Timers

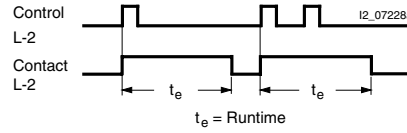
5TT1 3 timers for building lighting

Schematics

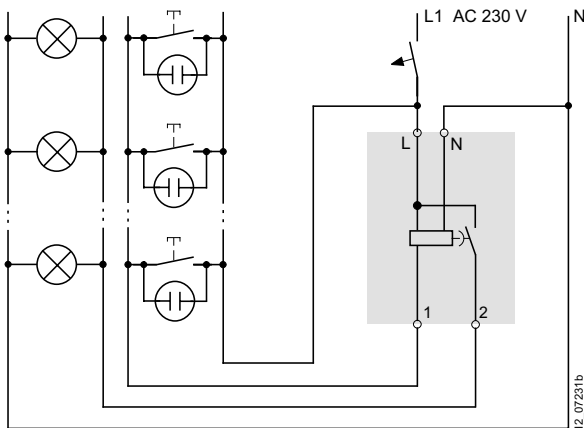
Switching example: 5TT1 310-1 time switch in 3-wire circuit, L-momentary contact



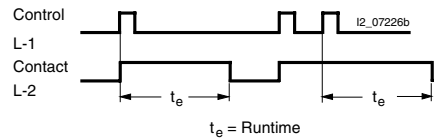
Circuit for new installation with shared cable routing for pushbuttons and lights.
The timer can only be restarted after the set time expires.



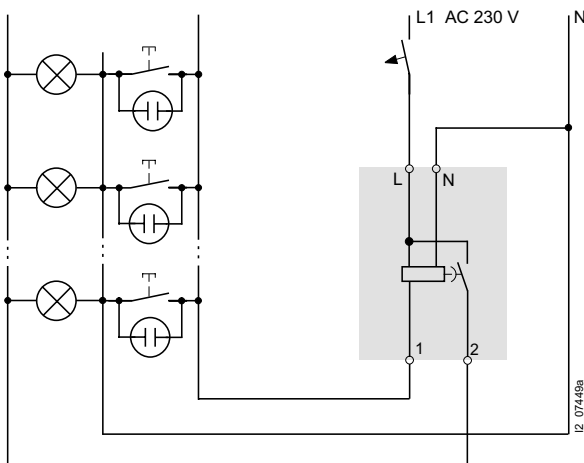
Switching example: 5TT1 311-1 time switch in four-wire connection, L-momentary contact with permanent light and attic circuit



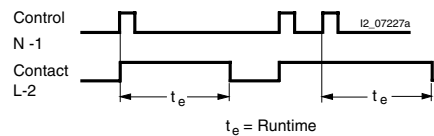
Usual circuit for new installation with separate cable routing for pushbuttons and lights.
The additional DI switch allows external switching to permanent light. A time switch can also be used.
An additional attic circuit is also available, which operates independently of the timer, but on the same electrical circuit.
The timer can be restarted before the set time expires.



Switching example: 5TT1 311-1 time switch in 3-wire circuit, N-momentary contact

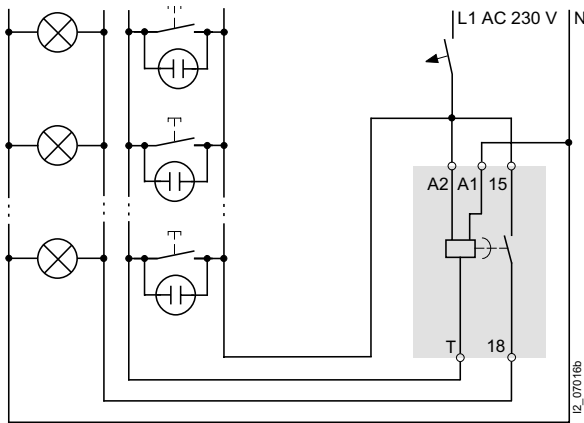


Can only be used with a limited number of wires.
The timer can be restarted before the set time expires.
While this 3-wire circuit with N-momentary contact is technically possible, it does not comply with DIN VDE 0110 Part 460.
However, it is used in old systems for replacement purposes.

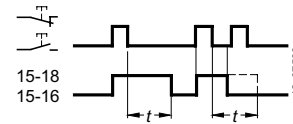


Schematics

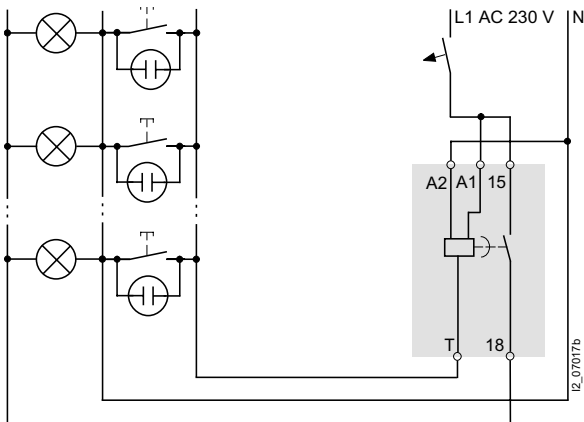
Switching example: 5TT1 300 energy-saving timer in four-wire connection, L-momentary contact



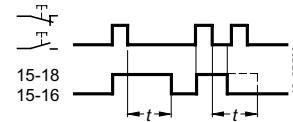
The energy-saving timer switches on if pressed once and switches off at the 2nd press of the button. If it is not switched off manually, it is automatically switched off after the set time, or max. 60 minutes.



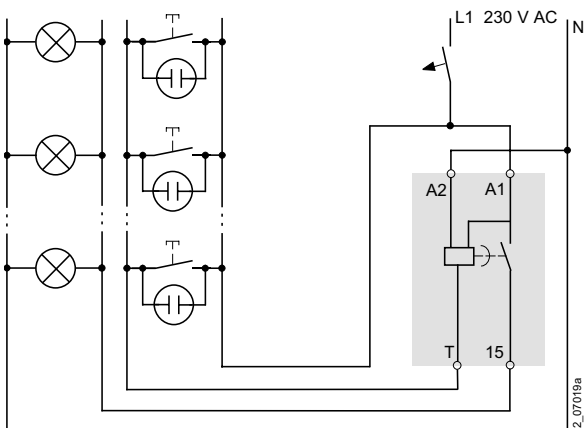
Switching example: 5TT1 300 energy-saving timer in 3-wire circuit, N-momentary contact



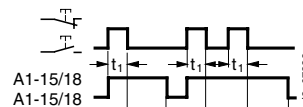
The energy-saving timer switches on if pressed once and switches off at the 2nd press of the button. If it is not switched off manually, it is automatically switched off after the set time, or max. 60 minutes. While this 3-wire circuit with N-momentary contact is technically possible, it does not comply with DIN VDE 0110 Part 460. However, it is used in old systems for replacement purposes.



Switching example: 5TT1 301 lighting time switch in four-wire connection, L-momentary contact



When pressed, the lighting timer switches on for the set runtime, up to 5 minutes. If the switch is pressed for more than one second, the light is switched on for four times the set time, i.e. up to 20 minutes. The last press of the pushbutton is decisive.



Pushbutton < 1 s: short-time up to 5 min.
Pushbutton > 1 s: long-time up to 20 min.

Timers

7LF4 4 digital time switches

Overview



	Mini 7LF4 481-0	Top 1 channel 7LF4 491-0	2 channel 7LF4 492-0
Text-assisted programming concept	--	•	•
Display	LCD	DOT matrix	DOT matrix
Background lighting	--	•	•
Operating mode	digital	digital	digital
Switching channels	1	1	2
Automatic daylight savings	•	•	•
Manual switching	•	•	•
Modular width MW	1	2	2
Programming			
• Hour program	•	•	•
• Day program	•	•	•
• Week program	•	•	•
Sealable cover	•	•	•

Benefits

Top digital time switches

Everything at a glance

- Clearly arranged display with text-assisted programming

Simple operation

- With four programming keys, everything you need is at your fingertips

Text-assisted programming

Plain text assistance with Top digital time switches. Programming digital time switches has never been easier. Top, Profi and Astro digital time switches take you through the menu step-by-step.

Each entry required is clearly indicated so that you don't even need the operating instructions. And, particularly practical: you can even program the time switches without the system voltage being applied. And if you need to change the settings of the time switch at the back of a dark control cabinet, the integral background lighting will help you to see the keys and display.

Function

Top digital time switches

Text assistance

Top digital time switches take you step-by-step through programming and setting in plain text. Each step is easy to read and understand and the currently active function is signaled by flashing. Integral background display and key lighting makes operation easy even in bad light conditions.

Setting the language

The "MENU" pushbutton lets you select a language of your choice. On delivery, the device is factory-set to English.

Time, date, daylight savings

The Top digital time switch is factory-set to the current time and current date. The time can be changed using "MENU" + "SET".

Reset

Simultaneously pressing all pushbuttons for more than 2 seconds deletes all data. Language, date/time, daylight saving times and switching times then need to be reset.

Programming

A program consists of an ON time, an OFF time and assigned ON and OFF days. The switching days must be entered prior to entering the switching times. Preset blocks are available for selection; "MONDAY-SUNDAY", "MONDAY-FRIDAY", "SATURDAY-SUNDAY" and "INDIVIDUAL". By selecting "INDIVIDUAL" you can choose switching times on any days of your choice. This selection also lets you implement switches at midnight.

Technical specifications

		Mini 7LF4 481-0	Top 1 channel 7LF4 491-0	2 channel 7LF4 492-0
Supply				
Rated control supply voltage U_c	V AC	230		
Operating range	% U_c	-15/+10		
Rated frequency	Hz	50		
Frequency ranges	Hz	50/60		
Rated power dissipation P_V	VA	1.5	2	
Channels/contacts				
Switching channels		1	2	
Rated operational voltage U_e	V	250		
Rated operational current I_e	at p.f. = 1	A	16	
	at p.f. = 0.6	A	10	
Contacts		CO contacts		
• Mechanical operations		30 000 000	10 000 000	
• Electrical operations	at p.f. = 1	80 000	100 000	
Minimum contact load	V; mA	12; 100		
Incandescent lamp rating	A	5	8	
Fluorescent lamps	at 7 μ F	VA	--	60
	uncorrected	VA	1400	
Safety				
Different phases	actuator/contact permissible contact/contact	• --	• --	• •
Electrical isolation	creepage and clearances actuator/contact contact/contact	mm mm	4/3 --	8/6 -- 4/3 4/3
Rated impulse withstand voltage U_{imp}	kV	4		
• EMC: burst acc. to IEC 61000-4-4	kV	> 4.4		
• EMC: surge acc. to IEC 61000-4-5	kV	> 2.0		
• Electrostatic discharge to IEC 61000-4-2	kV	> 8.0		
Power reserve storage		> 100 h	10 a	
• Minimum loading time		48 h	--	
• Battery type		NiMH cell	Li primary cell	
• Service life	at 20 °C	a	10	6
	at 40 °C	a	5	5
Program storage	non-volatile	--	•	
Overvoltage category	acc. to EN 61010-1	III		
Function				
Display		--	illuminated	
Minimum switching sequences	min	1		
Make and break cycles	min	1		
Switching program		see overview		
Clock errors per day	s/day	± 2.5	± 0.1	
Memory spaces	programs ¹⁾	8	56	2 x 28
Connections				
Terminals	screw (Pozidriv)	PZ1		
Conductor cross-sections main current paths				
• Rigid, max.	mm ²	4		
• Rigid, min.	mm ²	1.5		
• Flexible with sleeve	mm ²	2.5		
• Flexible without sleeve	mm ²	4		
Environmental conditions				
Permissible ambient temperature	°C	-10 ... +55	-20 ... +55	
Storage temperature		-20 ... +60		
Resistance to climate	acc. to EN 60068-1	EN 60730-1		
Degree of protection	acc. to EN 60529	IP20		
Safety class	acc. to EN 60730-1	II		

1) A program consists of an ON time, an OFF time and assigned ON and OFF days or day blocks.


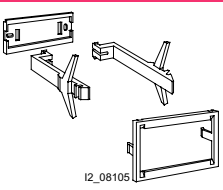
Modular Installation Devices, Mounting Depth 55 mm >N<

Timers

7LF4 4 digital time switches

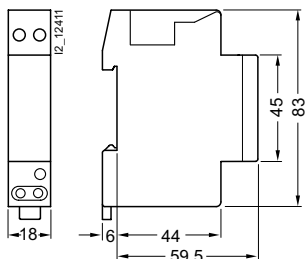
NEW

Selection and ordering data

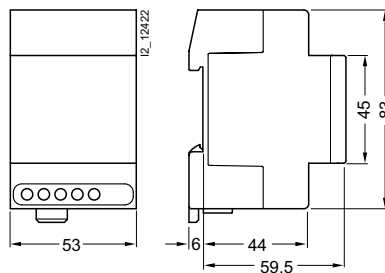
Contacts	U_e	I_e	U_c	MW	Order No.	Weight 1 unit approx. kg	PS*/ P. unit Unit(s)
	V AC	A	V AC				
Mini digital time switches							
 <ul style="list-style-type: none"> • Week program 							
Mini digital time switches, 1 channel							
1 CO contact	250	16	230	1	7LF4 481-0	0.180	1
Top digital time switches							
 <ul style="list-style-type: none"> • Week program • With text-assisted programming concept - Languages: German, English, French, Italian, Spanish 							
Top digital time switches, 1 channel							
• 56 programs							
1 CO contact	250	16	230	2	7LF4 491-0	0.225	1
Top digital time switches, 2 channels							
• 56 programs (28 per channel)							
2 CO contacts	250	16	230	2	7LF4 492-0	0.225	1
7LF9 00 mount for the front-mounting of time switches							
 <p>for mounting on panels with a sheet thickness of up to 2.5 mm. the mount must be completely filled with devices.</p>							
for devices with 2 MW							
cutout dimensions H x W: 45 ^{+0.5} mm x 45 ^{+0.5} mm							
front dimensions H x W: 72 mm x 55 mm							
		--		2	7LF9 002	0.017	1
for devices with 4 MW							
cutout dimensions H x W: 45 ^{+0.5} mm x 81 ^{+0.5} mm							
front dimensions H x W: 72 mm x 90 mm							
		--		4	7LF9 003	0.017	1
universal application for devices from 1 to 6 MW							
cutout dimensions:							
height 45 ^{+0.5} mm							
width: 23, 41, 59, 77, 95 or 113 mm							
		--		4	7LF9 006	0.071	1

Dimensional drawings

7LF4 481



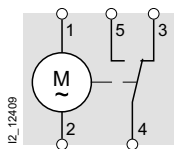
7LF4 491
7LF4 492



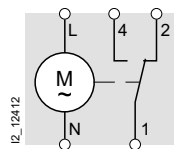
With a mounting depth of 59.5 mm, the digital time switches can also be used in N-distribution boards.

Schematics

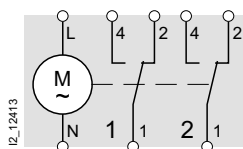
7LF4 481



7LF4 491



7LF4 492



Timers

7LF5 3 mechanical time switches

Overview

	Synchronous time switches without power reserve	Quartz-clock time switch with power reserve		
	7LF5 30-1	7LF5 31-1	7LF5 31-6	7LF5 31-7
Display	index disk			
Switching channels	1			
Operating mode	synchronous	quartz		
Manual switching	•			
Modular widths	1	1	3	3
Programming				
• Hour program	--	--	--	--
• Day program	•	•	•	--
• Week program	--	--	--	•
Sealable cover	•	•	•	•
Manual switching				
• ON/Automatic	•	•	--	--
• ON/Automatic/OFF	--	--	•	•

Application

Mechanical time switches can be used for all applications of digital time switches, provided that the minimum switching intervals are sufficiently long. The switching control pins can be set without the use of tools.

Function

Synchronous time switches without power reserve

The control gear is driven by a synchronous motor so it is dependent on the power supply frequency. If this frequency is unstable, the devices cannot be used. In the event of a power failure, the time switch will stop.

Quartz-clock time switch with power reserve

A quartz electronic circuit supplies the drive with a stabilized frequency so that the time switch is not dependent on the power supply frequency. In the event of a power failure, the time switch continues to operate.

Technical specifications




Data acc. to EN 60730-1, EN 60730-2-7		Synchronous time switches without power reserve		Quartz time switches with power reserve		
		7LF5 30-1		7LF5 31-1	7LF5 31-6	7LF5 31-7
Operating mode		synchronous		quartz		
Time program		day		day	day	week
Supply						
Rated control supply voltage U_c	V AC	230				
Operating range	% U_c	-15/+10				
Rated frequency	Hz	50				
Frequency ranges	Hz	50		50/60		
Rated power dissipation P_V	W	1				
Channels/contacts						
Switching channels		1				
Rated operational voltage U_e	V AC	250				
Rated operational current I_s	at p.f. = 1	A	16			
	at p.f. = 0.6	A	4			
Contacts		NO contacts		CO contacts		
• Mechanical operations		20 000 000				
• Electrical operations (at p.f. = 1)		100 000				
Minimum contact load	V; mA	4; 1				
Incandescent lamp rating	A	5				
Fluorescent lamps	at 7 μ A	VA	60			
	uncorrected	VA	1400			
Safety						
Different phases	actuator/contact permissible	yes				
Electrical isolation	creepage and clearances					
	actuator/contact	mm	8/6			
Rated impulse withstand voltage						
U_{imp}	actuator/contact	kV	4			
• EMC: burst acc. to IEC 61000-4-4		kV	> 4.4			
• EMC: surge acc. to IEC 61000-4-5		kV	> 2.0			
• Electrostatic discharge to IEC 61000-4-2		kV	> 8.0			
Power reserve storage			--	100 h		
• Minimum loading time		h	--	48		
• Battery type			--	NiMH		
• Service life	at 20 °C	a	--	6		
	at 40 °C	a	--	5		
Overvoltage category acc. to EN 61010-1		III				
Function						
Minimum switching interval	min	30		240		
Make and break cycles	min	15		120		
Switching accuracy	\pm min	5		30		
Clock errors per day	s	system-synchronized		\pm 2.5		
Connections						
Terminals	screw (Pozidriv)	PZ 1				
Conductor cross-sections main current paths						
• Rigid, max.		mm ²	4			
• Rigid, min.		mm ²	1			
• Flexible with sleeve		mm ²	2.5			
• Flexible without sleeve		mm ²	4			
Environmental conditions						
Permissible ambient temperature	°C	-10 ... +55				
Storage temperature		-10 ... +60				
Resistance to climate	acc. to EN 60068-1	EN 60730-1				
Degree of protection	acc. to EN 60529	IP20				
Safety class	acc. to EN 60730-1	II				

Timers

7LF5 3 mechanical time switches

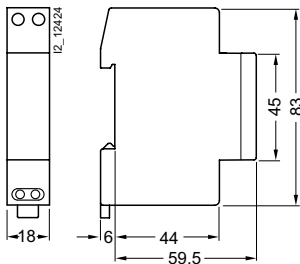


Selection and ordering data

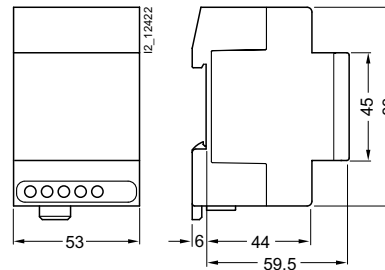
	U_e	I_e	U_c	MW	Order No.	Weight 1 unit approx. kg	PS* / P. unit Unit(s)	
	V AC	A	V AC					
Synchronous time switches without power reserve								
	Synchronous time switches				7LF5 390-1	0.800	1	
	• Day disk 1 NO contact	250	16	230				1
Quartz-clock time switch with power reserve								
	Quartz-clock time switches				7LF5 391-1	0.850	1	
	• Day disk 1 NO contact	250	16	230				1
	Quartz time switch with transparent cap, 3 MW				7LF5 391-6	0.160	1	
	• Day disk 1 CO contact	250	16	230				3
	• Week disk 1 CO contact	250	16	230				3

Dimensional drawings

7LF5 390-1
7LF5 391-1



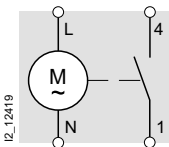
7LF5 391-6
7LF5 391-7



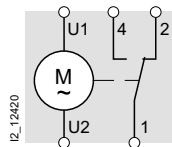
With a mounting depth of 59.5 mm, the mechanical time switches can also be used in N-distribution boards.

Schematics

7LF5 390-1
7LF5 391-1



7LF5 391-6
7LF5 391-7



Modular Installation Devices, Mounting Depth 55 mm >N< Power Supply Units

4AC2 9 transformers

Overview

Certification

VDE approval pending.

Uniform standards

The standard EN 61558 distinguishes between transformers for short-time loading and those for permanent loading.

Failsafe with PTC

Siemens transformers for permanent loading are protected against short circuit or moderate overload by a PTC resistor. If a disconnection occurs, the transformer must be switched off for approx. 30 mins. to cool down the PTC resistor.

Two secondary voltages

The 12 V outputs must be switched in parallel or in series. In parallel connection, they can be used, e.g. for 12 V and 16 VA, in series connection for 24 V and 16 VA. In these types of circuits, the PTC resistor ensures full protection of the transformer.

Hum-free

The transformers with 24 and 40 VA cores are molded, which means that they are virtually hum-free and highly suitable for installation in sound-sensitive distribution boards.

Voltage stability

DIN EN 61558-2-2 specifies that the difference between the non-loaded output voltage and the output voltage loaded with the rated load for transformers for permanent loading must not exceed 10 %. This requirement places the highest demands on the design of this type of transformer. It can only be met by using high-quality core materials and a core design with an extraordinarily high efficiency, such as type EI according to DIN 41302.

Typical applications

AC voltage/current supply for 8, 12 or 24 V AC, up to 40 VA as safety extra-low voltage with a mounting depth of 55 mm for the supply of calibration circuits, switching relays or Insta contactors in continuous duty.

Technical specifications

Data acc. to EN 61558-2-2		4AC2 940-8	4AC2 951-6	4AC2 952-4	4AC2 961-6	4AC2 962-4	4AC2 964-0
Rated operational power P_g	VA	8	16	24	16	24	40
Rated short-time power P.f. = 0.5; t = 10 s	VA	10	18	27	18	27	48
Rated operational voltage U_e	V AC	230					
Operating range $\times U_c$	at 50/60 Hz	0.9 ... 1.1					
Rated frequency	Hz	50					
Operating frequency range	Hz	48 ... 62					
Rated secondary voltage U_{sec} In series connection	V AC V AC	8 --	2 x 4 8	8 --	2 x 12 24		
Rated secondary current I_{sec} At 4 V At 8 V At 12 V At 24 V	A AC A AC A AC A AC	-- 1 -- --	2 x 2 2	-- 3	-- 0.67 0.67	1 1	1.67 1.67
Rated power dissipation P_V In no-load operation At rated load	VA W	3.5 2.6	10.3 4.6	8.0 2.7	8.0 3.6	13.1 6.3	8.3 5.7
Core molded		--	yes	yes	--	yes	yes
Protective separation Creepage and clearances	mm	≥ 3					
Insulation class		B					
Test voltage, 50 Hz 1 minute Primary against secondary winding	kV	≥ 4					
Terminals	± screw (Pozidriv)	1					
Conductor cross-sections Rigid Flexible with sleeve	mm ² min. mm ²	1 ... 6 0.75					
Permissible ambient temperature In operation	°C	-10 ... +40					
Permissible humidity	%	≤ 80					
Degree of protection	acc. to EN 60529	IP20					
Safety class	acc. to EN 60730	II					

Modular Installation Devices, Mounting Depth 55 mm >N< Power Supply Units

4AC2 9 transformers

Selection and ordering data

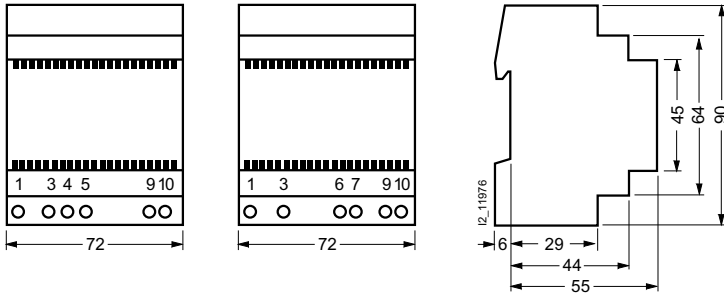
U_e	U_{sec}	I_{sec}	P_s	MW	Order No.	Weight 1 unit approx.	PS*/ P. unit
V AC	V AC	A AC	VA			kg	Unit(s)
Transformers for permanent loads							
with PTC protection for AC voltage/current supply as safety extra-low voltage for continuous operation for the supply of calibration circuits, switching relays and Insta contactors							
with one secondary voltage							
230	8	1	8	3	4AC2 940-8	0.380	1
		3	24	4	4AC2 952-4	0.940	1
with two secondary voltages, optionally for series or parallel switching							
230	2x4/8	2x2/2	16	3	4AC2 951-6	0.600	1
	2x12/24	2x0.67/0.67	16	3	4AC2 961-6	0.600	1
		2x1.0/1.0	24	4	4AC2 962-4	0.590	1
		2x1.67/1.67	40	4	4AC2 964-0	0.840	1



Dimensional drawings

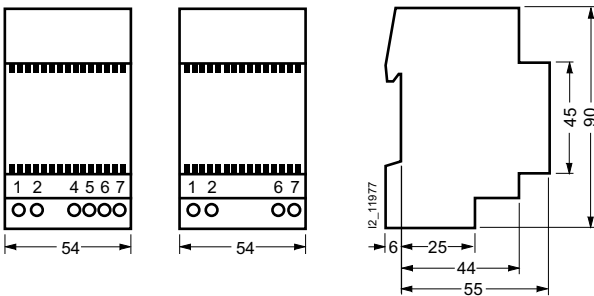
4AC2 952-4

4AC2 962-4
4AC2 964-0



4AC2 951-6
4AC2 961-6

4AC2 940-8

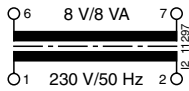


Modular Installation Devices, Mounting Depth 55 mm >N< Power Supply Units

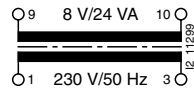
4AC2 9 transformers

Schematics

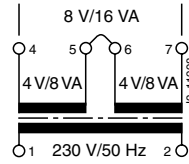
4AC2 940-8



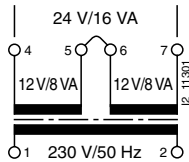
4AC2 952-4



4AC2 951-6

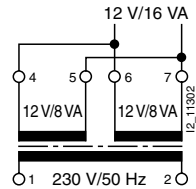


4AC2 961-6

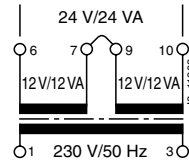


4AC2 961-6

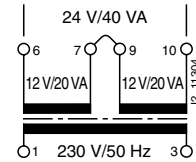
Parallel connection



4AC2 962-4



4AC2 964-0



The 12 V outputs must be switched in parallel or in series. Our example shows the 4AC3 616. In parallel connection, they can be used for 12 V/16 VA, in series connection for 24 V/16 VA. In these types of circuits, the PTC resistor ensures full protection of the transformer.

Modular Installation Devices, Mounting Depth 55 mm >N<

Measuring Devices

7KT5 7 time and pulse counters

Benefits

- Counting mechanism 00000.0 h or 000000 \square \square
- Suppression of leading zero from the 3rd decade onwards
- 7-Segment display, 6-digit, height 5 mm
- Start/Stop and Reset function
- Unlimited data backup in the event of a power failure
- Ambient temperature -30 °C to +65 °C (below -5 °C increasing slowness/delay of indication)

Technical specifications






Data acc. to DIN VDE 0435			7KT5 745-0 7KT5 745-1 7KT5 745-2 7KT5 745-3 7KT5 745-4
Display			00000.0 or 00000 \square \square
Data backup	unlimited		EEPROM
Minimum pulse lengths		ms	20
Max. counting frequency	pulse	s	15
Terminals	\pm screw (Pozidriv)		1
Conductor cross-sections	rigid	max. mm ²	2 × 2.5
Ambient temperature		°C	-30 ... +65

Order No.	Short designation	Power dissipation P_v (VA) coil/drive
7KT5 745	time counters, 12 ... 24 V DC	0.1
7KT5 745-0	time counters, 115 V AC 50 Hz	0.9
7KT5 745-1	time counters, 230 V AC 50 Hz	1.8
7KT5 745-2	time counters, 115 V AC 60 Hz	0.9
7KT5 745-3	time counters, 230 V AC 60 Hz	1.8
7KT5 745-4	time counters, 24 V AC 50 Hz	0.2
7KT5 751	pulse counters, 24 V DC	0.1
7KT5 752	pulse counters, 24 V AC 50 Hz	0.1
7KT5 753	pulse counters, 230 V AC 50 Hz	0.1
7KT5 761	time counters, 2 × 230 V AC 50 Hz	1.6
7KT5 762	time/pulse counters, 2 × 230 V AC 50 Hz	1.9
7KT5 763	pulse counters, 2 × 230 V AC 50 Hz	2.2

Modular Installation Devices, Mounting Depth 55 mm >N< Measuring Devices

7KT5 7 time and pulse counters

Selection and ordering data

	U_c	P_s	MW	Order No.	Weight 1 unit approx. kg	PS*/ P. unit Unit(s)	
		VA					
	Time counters with one counting mechanism						
	• Counting mechanism 00000.0 h						
	$\begin{matrix} 2(+) \\ \text{M} \\ 3(-) \end{matrix}$	10 ... 27 V DC	0.07 ... 0.09	2	7KT5 745	0.084	1
	$\begin{matrix} 2(L) \\ \text{M} \\ 3(N) \end{matrix}$	24 V AC, 50 Hz	0.2	2	7KT5 745-4	0.087	1
		115 V AC, 50 Hz	0.9		7KT5 745-0	0.060	1
		230 V AC, 50 Hz	1.8		7KT5 745-1	0.087	1
115 V AC, 60 Hz		0.9		7KT5 745-2	0.087	1	
	230 V AC, 60 Hz	1.8		7KT5 745-3	0.087	1	
	Time counters with two counting mechanisms						
	• Counting mechanism 00000.00 h						
$\begin{matrix} 1 & 3 \\ \text{M} & \text{M} \\ 2 & 4 \end{matrix}$	$2 \times 230 \text{ V AC, } 50 \text{ Hz}$	0.8^1 each	2	7KT5 761	0.108	1	
	Pulse counters with one counting mechanism						
	• Counting mechanism 0000000 \square \square						
	• Counting frequency 10 Imp/s						
	• Pulse duration/interval 10 ms						
$\begin{matrix} 1(-) \\ \text{M} \\ 3(+) \end{matrix}$	24 V DC	0.1	2	7KT5 751	0.092	1	
$\begin{matrix} 1 \\ \text{M} \\ 3 \end{matrix}$	24 V AC, 50 Hz	0.1	2	7KT5 752	0.092	1	
	230 V AC, 50 Hz	1.1		7KT5 753	0.092	1	
	Pulse counters with two counting mechanisms						
	• Counting mechanism 0000000 \square \square						
• Counting frequency 10 Imp/s							
• Pulse duration/interval 10 ms							
$\begin{matrix} 1 & 3 \\ \text{M} & \text{M} \\ 2 & 4 \end{matrix}$	$2 \times 230 \text{ V AC, } 50 \text{ Hz}$	2×1.1	2	7KT5 763	0.108	1	
	Combined time and pulse counters						
	• Counting mechanism 00000.00 h and 0000000 \square \square						
• Counting frequency 10 Imp/s							
• Pulse duration/interval 10 ms							
$\begin{matrix} 1 & 3 \\ \text{h} & \text{M} \\ 2 & 4 \end{matrix}$	$2 \times 230 \text{ V AC, } 50 \text{ Hz}$	$0.8^1/1.1$	2	7KT5 762	0.108	1	

1) Clocked power consumption: Max. 10 mA.

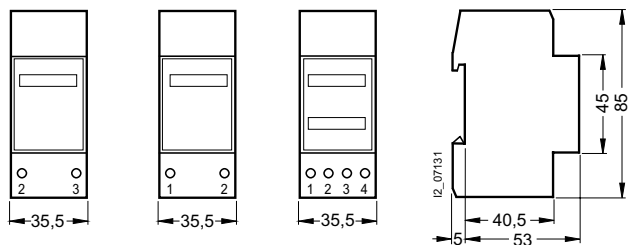
Modular Installation Devices, Mounting Depth 55 mm >N< Measuring Devices

7KT5 7 time and pulse counters

Dimensional drawings

7KT5 7 time and pulse counters

7KT5 745	7KT5 751	7KT5 761
7KT5 745-0 to	7KT5 752	7KT5 762
7KT5 745-4	7KT5 753	7KT5 763



Modular Installation Devices, Mounting Depth 55 mm >N< Monitoring Devices

5TE5 70 light signals

Benefits

- According to DIN VDE 0710 T1
- With glow lamp 230 V, E10 socket, without cap
- Colors according to IEC 60073


Technical specifications

Data acc. to DIN VDE 0710 T1			5TE5 7
Rated operational voltage U_e	V AC		230
Clearances	between the terminals	mm	> 7
Terminals/tightening torque	± screw (Pozidriv); Nm		1; 1.2
Conductor cross-sections	rigid flexible with sleeve	mm ² min. mm ²	1.5 ... 6 1
Permissible ambient temperature		°C	-5 ... +40
Resistance to climate	acc. to DIN 50015 at 95 % relative humidity	°C	45



Rated power dissipation

Order No.	Short designation	Power dissipation P_v (VA) coil/drive
5TE5 700	light signal 230 V AC lamp without cap	see lamp 5TG8
5TE5 702	light signal 230 V AC lamp without cap	see lamp 5TG8
5TG8 004	glow lamp 230 AC for light signal	0.4
5TG8 006	glow lamp 230 AC green for light signal	0.4
5TG8 037	filament lamp 24 V for light signal	1
5TG8 040	glow lamp 110 AC for light signal	0.4

Selection and ordering data

	U_e	Conductor cross-section	MW	Order No.	Weight 1 unit approx.	PS*/ P. unit
	V AC	up to mm ²			kg	Unit(s)
 <p>Light signals for max. cable length 5 m, without cap</p> <p>1 ⊗ 2</p> <p>for max. cable length 250 m, without cap</p> <p>1 ⊗ 2</p>	230	6	1	5TE5 700	0.045	1/12
	230	6	1	5TE5 702	0.045	1

Accessories

	U_e	Order No.	Weight 1 unit approx.	PS*/ P. unit
	V AC		kg	Unit(s)
 <p>Caps clear red green yellow blue</p>		5TG8 036	0.002	5
		5TG8 034	0.002	5
		5TG8 035	0.002	5
		5TG8 041	0.001	5
		5TG8 042	0.001	5
	<p>Spare glow lamps for red, yellow, blue and clear caps</p>	230	5TG8 004	0.002
230		5TG8 006	0.002	1/10
115		5TG8 040	0.003	5/10
 <p>Incandescent lamps 1.2 W, 24 V, E10 socket, clear 1 set comprises 10 Incandescent lamps and a lamp extractor</p>			5TG8 037	1 set 0.020

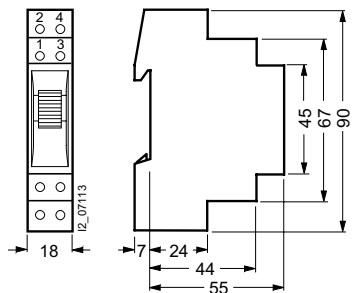
Modular Installation Devices, Mounting Depth 55 mm >N< Monitoring Devices

5TE5 70 light signals

Dimensional drawings

5TE5 70 light signal

5TE5 700, 5TE5 702



Modular Installation Devices, Mounting Depth 55 mm >N< Monitoring Devices

7LQ2 1 dusk switches

Overview

	7LQ2 100-1
Setting ranges in Lux	2 ... 500
Adjustable time delay	no
Switching status indication	yes
Light sensor, max. cable length	50 m
Switching channels	1
Incandescent lamp rating	2000 W

Function

A light sensor measures the level of daylight. Switching depends on the desired brightness. A time delay and the switching hysteresis prevent clock-pulse behavior.

The sensor must be mounted so that it is not influenced by the lighting (feedback).

Energy saving

Dusk switches are used for the demand-oriented switching of lighting installations for shop windows or paths in order to cut operating costs.

Technical specifications

		7LQ2 100-1
Data acc. to EN 60730		
Rated control voltage U_c	V AC	230
Operating range $\times U_c$	at 50/60 Hz	0.8 ... 1.2
Rated frequency	Hz	48 ... 62
Measuring ranges, setting ranges	Lux	2 ... 500
Time delay	non-adjustable adjustable	s 75 \pm 25 --
Contacts	μ contact	1 NO contact
Contact switching	closes with approaching darkness	Terminals 3/4
Status indication, LED	switching status indication switching state OFF switching state ON	instantaneous green red
Rated operational voltage U_e	V AC	250
Rated operational current I_s	at p.f. = 1 at p.f. = 0.4	A 16 A 4
Incandescent lamp rating	W	2 000
Different phases	actuator/contact permissible contact/contact	yes --
Electrical isolation	creepage and clearances actuator/contact contact/contact	mm mm 4 --
Rated impulse withstand voltage U_{imp} 1.2/50 μ s	actuator/contact contact/contact	kV kV > 2.5 --
Minimum contact load	V; mA	10; 100
Terminals	\pm screw (Pozidriv)	1
Conductor cross-sections	rigid flexible with sleeve	mm ² min. mm ² 1.5 ... 6 0.75
Permissible ambient temperature	device light sensor	°C °C -10 ... +55 -30 ... +70
Permissible humidity	device light sensor	% % < 80 < 98
Resistance to climate	acc. to DIN 50016	
Degree of protection	acc. to EN 60529 device light sensor	IP20 IP55
Safety class	acc. to EN 61010	II



Modular Installation Devices, Mounting Depth 55 mm >N<

Monitoring Devices

7LQ2 1 dusk switches

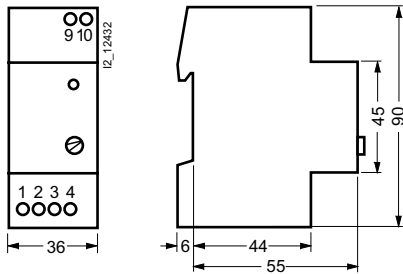
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Selection and ordering data

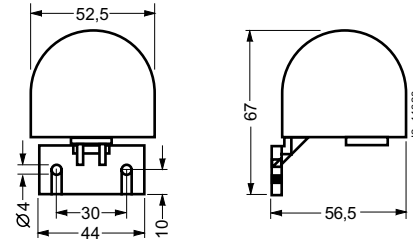
	U_e	I_e	U_c	MW	Order No.	Weight 1 unit approx. kg	PS*/ P. unit Unit(s)
	V AC	A	V AC				
 Dusk switches 55 mm setting range 2 ... 500 lux 1-channel version, with light sensor for surface mounting, IP55 7LQ2 100-1	250	16	230	2	7LQ2 100-1	0.210	1
 Replacement light sensors with watertight/resistant resin molding material, heat-resistant to 70 °C degree of protection IP55, for 7LQ2 100 and 7LQ2 101, for surface mounting, 2 ... 500 lux 7LQ2 910					7LQ2 910	0.060	1

Dimensional drawings

7LQ2 100-1

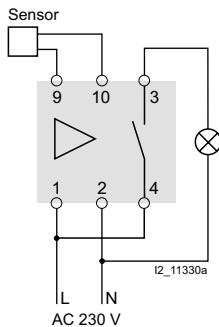


7LQ2 910



Schematics

7LQ2 100-1
Dusk switches



The cable length between the device and the light sensor must not exceed a maximum of 50 m. The conductor cross-section must be a minimum of $2 \times 0.75 \text{ mm}^2$.

If the device measures a light level below the set value or if the device is no-voltage, the contacts are in the position shown.

- If the surrounding light level increases by approx. 30 to 100 % above the set value, the light is switched off after the set time delay.
- If the surrounding light level falls below the set value, the light is switched on after the set time delay.

Modular Installation Devices, Mounting Depth 55 mm >N< Monitoring Devices

5TT3 45 alarm signaling devices,
55/70 mm

Benefits

- Continuous tone, fixed pitch
- Interval/continuous tone, adjustable


Technical specifications

Data acc. to DIN VDE 0435, IEC 60255		5TT3 450 5TT3 451	5TT3 452 5TT3 453
Rated control voltage U_c	V AC	24, 230	
Operating range $\times U_c$ (overload capability)		0.8 ... 1.1	
Rated frequency	Hz	50/60	
Continuous tone	kHz	3.8	2.4/4.8 adjustable
Interval	pulse/interval s	--	0.25/0.25
Volume	in 2-m distance dB (A)	80	55 at 2.4 kHz/75 at 4.8 kHz
Terminals	\pm screw (Pozidriv)	1	
Conductor cross-sections	rigid flexible with sleeve	max. mm ² min. mm ²	2 \times 2.5 1 \times 0.5
Permissible ambient temperature		°C	-20 ... +60
Humidity class	acc. to IEC 60068 Parts 2 to 30	F	

Rated power dissipation

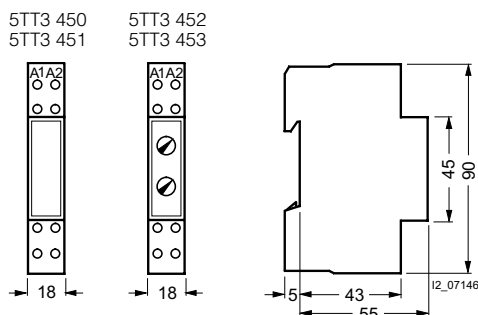
Order No.	Short designation	Power dissipation P_v (VA) coil/drive
5TT3 450	alarm sensor 230 V AC, non-adjustable	5
5TT3 451	alarm sensor 24 V AC, non-adjustable	5
5TT3 452	alarm sensor 230 V AC, adjustable	5
5TT3 453	alarm sensor 24 V AC, adjustable	5

Selection and ordering data

	U_c	MW	Order No.	Weight 1 unit approx.	PS*/ P. unit	
	V AC			kg	Unit(s)	
	Alarm signaling devices					
	non-adjustable continuous tone and pitch					
	JA1	230	1	5TT3 450	0.110	1
	JA2	24		5TT3 451	0.110	1
adjustable pitch and continuous tone/interval						
JA1	230	1	5TT3 452	0.110	1	
JA2	24		5TT3 453	0.110	1	

Dimensional drawings

5TT3 45 alarm signaling devices



Modular Installation Devices, Mounting Depth 55 mm >N<

Monitoring Devices

5TT3 42 phase/phase sequence indicators, 55/70 mm

Benefits

Phase indicators

- LED display for each phase
- 1 CO contact
- Any phase sequence
- Conductor cross-sections up to $2 \times 2.5 \text{ mm}^2$

Phase sequence indicators

- LED display for the phase sequence

Application

Phase indicators

for visual detection/signaling of phase failures in a 3-phase system.

The three LEDs can all be controlled with the same phase.

Phase sequence indicators

for optical detection or indication of the phase sequence L1, L2, L3 in a 3-phase system.





Technical specifications

		5TT3 420	5TT3 422
Data acc. to DIN VDE 0435, IEC 60255			
Rated control voltage U_c	V AC	230/400	400
Operating range $\times U_c$		0.8 ... 1.1	
Rated frequency	Hz	50/60	
Rated operational current I_e	A	1	--
Terminals	\pm screw (Pozidriv)	1	
Conductor cross-sections	rigid	max. mm^2	2×2.5
	flexible with sleeve	min. mm^2	1×0.5
Permissible ambient temperature	$^{\circ}\text{C}$	-20 ... +60	
Resistance to climate	acc. to EN 60068-1	20/60/4	

Rated power dissipation

Order No.	Short designation	Power dissipation P_V (VA) coil/drive
5TT3 420	Phase indicators, 230 V AC	4.6
5TT3 422	Phase sequence indicators, 230 V AC	9

Selection and ordering data

		U_c	MW	Order No.	Weight 1 unit approx.	PS*/ P. unit
		V AC			kg	Unit(s)
	Phase indicators for optical monitoring of phases 	230/400	1	5TT3 420	0.050	1
	Phase sequence indicators for optical monitoring of the phase sequence 	400	1	5TT3 422	0.050	1

Modular Installation Devices, Mounting Depth 55 mm >N< Monitoring Devices

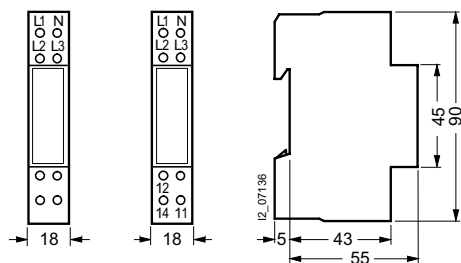
5TT3 42 phase/phase sequence indicators,
55/70 mm

Dimensional drawings

5TT3 42 phase indicators

5TT3 420

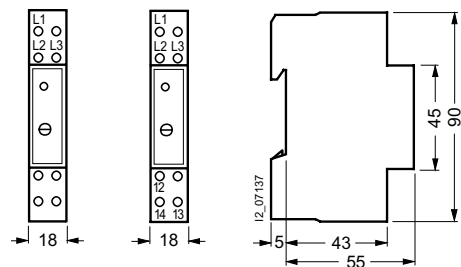
5TT3 421



5TT3 42 phase sequence indicators

5TT3 422

5TT3 423



Modular Installation Devices, Mounting Depth 55 mm >N< Monitoring Devices

5TT3 196 direct voltage monitors, 55/70 mm

Benefits

- Residual ripple detection 0 % to 15 %, adjustable
- For undervoltage $U_{\text{from}} = 0.82$
- For overvoltage $U_{\text{from}} = 1.18$
- Conductor cross-sections up to $2 \times 2.5 \text{ mm}^2$

Application



For monitoring under- and overvoltages and residual ripple of a 24 V direct voltage system.

Technical specifications

Data acc. to DIN VDE 0435, IEC 60255		5TT3 196	
Rated control voltage U_c	V DC	24	
Rated power dissipation P_v			
• Coil/drive	VA	0.6	
• Contact ¹⁾ per pole	VA	0.8	
Hysteresis	%	4	
Response values $\times U_c$	undervoltage overvoltage	0.82 1.18	
Residual ripple tripping ΔU_c	infinitely variable	%	0 ... 15
Overload capability	33 V DC 35 V DC 45 V DC	ms	continuous 500 10
Creepage and clearances		mm	4
Rated impulse withstand voltage U_{imp}	input/output	kV	> 2.5
Minimum contact load		V/mA	24/300
Rated operational current I_e	AC-11 AC-1	A	1 4
Contacts		μ contact	
Electrical service life	in switching cycles at I_e		5×10^5
Terminals	\pm screw (Pozidriv)		1
Conductor cross-sections	rigid flexible with sleeve	max. mm^2 min. mm^2	2×2.5 1×0.5
Permissible ambient temperature		$^{\circ}\text{C}$	-20 ... +60
Resistance to climate	acc. to EN 60068-1		20/60/4

1) For rated operational current.

Selection and ordering data

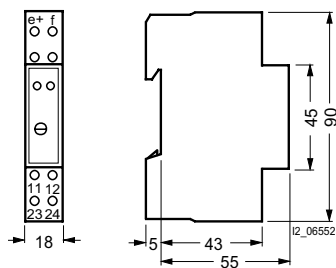
	U_e	I_e	U_c	MW	Order No.	Weight 1 unit approx. kg	PS*/ P. unit Unit(s)
	V AC	A	V DC				
 <p>Direct voltage monitors</p> 	230	5	24	1	5TT3 196	0.150	1

Modular Installation Devices, Mounting Depth 55 mm >N< Monitoring Devices

5TT3 196 direct voltage monitors, 55/70 mm

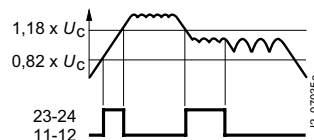
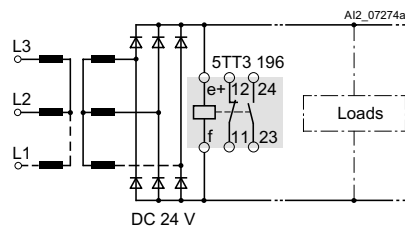
Dimensional drawings

5TT3 196 direct voltage monitors



Schematics

Switching example, functional diagram



If $0.82 \times U_c$ is fallen below, $1.18 \times U_c$ exceeded, or in the event of excessive residual ripple, contact 11/12 is closed and contact 23/24 opened.

Modular Installation Devices, Mounting Depth 55 mm >N<

Notes



13

Notes on Product Changeover

13/2

Product changeover

Notes on Product Changeover

Product Changeover

Overview

In this chapter you will find notes on the product changeover:

- Devices that are available for delivery over the long term
- Replacement products for devices with a mounting depth of 55 mm (from the chapter "Modular Installation Devices, Mounting Depth 55 mm >N<")
- Successor products for devices with a mounting depth of 55 mm
- Successor products for devices with a mounting depth of 70 mm

Type	Product	Mount. depth mm	Type	Successor product	Mount. depth mm	Chapter
4AC2 020	Transformer 8 V, 1 A	55	4AC2 940-8	Transformer, continuous duty, 8 V, 8 VA, PTC	55	12
4AC2 020	Transformer 8 V, 1 A	55	4AC3 408	Transformer, continuous duty, 8 V, 8 VA, PTC	70	9
4AC2 021	Transformer 8 V, 1 A, switch	55	--	Without switch: 4AC2 940-8	55	12
4AC2 021	Transformer 8 V, 1 A, switch	55	--	Without switch: 4AC3 408	70	9
4AC2 022	Transformer 4/8/12 V, 1/1/0.67 A	55	--	4 V: 4AC2 951-6; 8 V: 4AC2 940-8; 12 V: 4AC2 961-6	55	12
4AC2 022	Transformer 4/8/12 V, 1/1/0.67 A	55	--	4 V: 4AC3 516; 8 V: 4AC3 516; 12 V- 4AC3 616	70	9
4AC2 023	Transformer 4/6/8 V, 1/1/1 A PTC	55	--	4 V: 4AC2 951-6; 6 V: no replacement; 8 V: 4AC2 951-6	55	12
4AC2 023	Transformer 4/6/8 V, 1/1/1 A PTC	55	--	4 V: 4AC3 516; 6 V: no replacement 8 V: 4AC3 516	70	9
4AC2 100	Transformer 8 V, 1 A, PTC	55	4AC2 940-8	Transformer, continuous duty, 8 V, 8 VA, PTC	55	12
4AC2 100	Transformer 8 V, 1 A, PTC	55	4AC3 408	Transformer, continuous duty, 8 V, 8 VA, PTC	70	9
4AC2 101	Transformer 8 V, 2 A, PTC	55	4AC2 951-6	Transformer, continuous duty, 4+4 V, 16 VA, PTC	55	12
4AC2 101	Transformer 8 V, 2 A, PTC	55	4AC3 524	Transformer, continuous duty, 8 V, 24 VA, PTC	70	9
4AC2 102	Transformer 12 V, 1.33 A, PTC	55	4AC2 961-6	Transformer, continuous duty, 12+12 V, 16 VA, PTC	55	12
4AC2 102	Transformer 12 V, 1.33 A, PTC	55	4AC3 616	Transformer, continuous duty, 12+12 V, 16 VA, PTC	70	9
4AC2 103	Transformer 8 V, 1 A, PTC, switch	55	--	Without switch: 4AC2 940-8	55	12
4AC2 103	Transformer 8 V, 1 A, PTC, switch	55	--	Without switch: 4AC3 408	70	9
4AC2 104	Transformer 8 V, 2 A, PTC, switch	55	--	Without switch: 4AC2 952-4	55	12
4AC2 104	Transformer 8 V, 2 A, PTC, switch	55	--	Without switch: 4AC3 524	70	9
4AC2 105	Transformer 12 V, 1.33 A, PTC, switch	55	--	Without switch: 4AC2 961-6	55	12
4AC2 105	Transformer 12 V, 1.33 A, PTC, switch	55	--	Without switch: 4AC3 616	70	9
4AC2 120	Transformer 4/8/12 V, 2/2/2 A, PTC	55	--	4 V: 4AC2 951-6; 8 V: 4AC2 951-6; 12 V: 4AC2 962-4	55	12
4AC2 120	Transformer 4/8/12 V, 2/2/2 A, PTC	55	--	4 V: 4AC3 516; 8 V: 4AC3 516; 12 V- 4AC3 624	70	9
4AC2 121	Transformer 8/12/24 V, 2/2/1 A, PTC	55	--	8 V: 4AC2 951-6; 12 V: 4AC2 962-4; 24 V: 4AC2 962-4	55	12
4AC2 121	Transformer 8/12/24 V, 2/2/1 A, PTC	55	--	8 V: 4AC3 524; 12 V- 4AC3 624; 24 V: 4AC3 624	70	9
4AC2 122	Transformer 24 V, 1 A, PTC	55	4AC2 962-4	Transformer, continuous duty, 12+12 V, 24 VA, PTC	55	12
4AC2 122	Transformer 24 V, 1 A, PTC	55	4AC3 624	Transformer, continuous duty, 12+12 V, 24 VA, PTC	70	9
4AC2 123	Transformer 12/24 V, 5.25/2.65 A PTC	55	4AC3 663	Transformer, continuous duty, 12+12 V, 63 VA, PTC	70	9
4AC2 222	Transformer 24 V, 1.25 A, FS	55	4AC2 964-0	Transformer, continuous duty, 12+12 V, 40 VA, PTC	55	12
4AC2 222	Transformer 24 V, 1.25 A, FS	55	4AC3 640	Transformer, continuous duty, 12+12 V, 40 VA, PTC	70	9
4AC2 223	Transformer 12/24 V, 1/1/0.67 A, FS	55	4AC2 961-6	Transformer, continuous duty, 12+12 V, 16 VA, PTC	55	12
4AC2 223	Transformer 12/24 V, 1/1/0.67 A, FS	55	4AC3 616	Transformer, continuous duty, 12+12 V, 16 VA, PTC	70	9
4AC2 224	Transformer 4/8/12 V, 3/3/2.5 A, FS	55	--	4 V: no replacement; 8 V: 4AC2 952-4; 12 V: 4AC2 964-0	55	12
4AC2 224	Transformer 4/8/12 V, 3/3/2.5 A, FS	55	--	4 V: no replacement; 8 V: 4AC3 524; 12 V- 4AC3 640	70	9

Overview

Type	Product	Mount. depth mm	Type	Successor product	Mount. depth mm	Chapter
4AC2 225	Transformer 2 x 12/24 V, 2 x 1.5/1 A, FS	55	4AC2 962-4	Transformer, continuous duty, 12+12 V, 24 VA, PTC	55	12
4AC2 225	Transformer 2 x 12/24 V, 2 x 1.5/1 A, FS	55	4AC3 640	Transformer, continuous duty, 12+12 V, 40 VA, PTC	70	9
4AC2 320	Power supply unit 12 V DC, 1 A	55	4AC2 400	Power supply unit 12 V DC, 40 VA	70	9
4AC2 321	Power supply unit 24 V DC, 1 A	55	4AC2 401	Power supply unit 24 V DC, 63 VA	70	9
5SG7 111	MINIZED switch disconn. f. NEOZED, 2 ... 63 A, D02, 1-pole	55	5SG7 113	MINIZED switch disconn. f. NEOZED, D02, 1-pole, draw-out assembly	70	1
5SG7 121	MINIZED switch disconn. f. NEOZED, 2 ... 63 A, D02, 2-pole	55	5SG7 123	MINIZED switch disconn. f. NEOZED, D02, 2-pole, draw-out assembly	70	1
5SG7 131	MINIZED switch disconn. f. NEOZED, 2 ... 63 A, D02, 3-pole	55	5SG7 133	MINIZED switch disconn. f. NEOZED, D02, 3-pole, draw-out assembly	70	1
5SG7 151	MINIZED switch disconn. f. NEOZED, 2 ... 63 A, D02, 1+N-pole	55	5SG7 153	MINIZED switch disconn. f. NEOZED, D02, 1+N-pole, draw-out assembly	70	1
5SG7 161	MINIZED switch disconn. f. NEOZED, 2 ... 63 A, D02, 3+N-pole	55	5SG7 163	MINIZED switch disconn. f. NEOZED, D02, 3+N-pole, draw-out assembly	70	1
5SM1 111-6	RCCB, type A, 16 A, 2-pole, 10 mA, 2 MW	55	5SM3 111-6	RCCB, type A, 16 A, 2-pole, 10 mA, 2 MW	70	4
5SM1 311-6	RCCB, type A, 16 A, 2-pole, 30 mA, 2 MW	55	5SM3 311-6	RCCB, type A, 16 A, 2-pole, 30 mA, 2 MW	70	4
5SM1 312-6	RCCB, type A, 25 A, 2-pole, 30 mA, 2 MW	55	5SM3 312-6	RCCB, type A, 25 A, 2-pole, 30 mA, 2 MW	70	4
5SM1 314-6	RCCB, type A, 40 A, 2-pole, 30 mA, 2 MW	55	5SM3 314-6	RCCB, type A, 40 A, 2-pole, 30 mA, 2 MW	70	4
5SM1 316-6	RCCB, type A, 63 A, 2-pole, 30 mA, 2.5 MW	55	5SM3 316-6	RCCB, type A, 63 A, 2-pole, 30 mA, 2.5 MW	70	4
5SM1 317-6	RCCB, type A, 80 A, 2-pole, 30 mA, 2.5 MW	55	5SM3 317-6	RCCB, type A, 80 A, 2-pole, 30 mA, 2.5 MW	70	4
5SM1 342-6	RCCB, type A, 25 A, 4-pole, 30 mA, 4 MW	55	5SM3 342-6	RCCB, type A, 25 A, 4-pole, 30 mA, 4 MW	70	4
5SM1 342-6KK01	RCCB, type A, 25 A, 4-pole, 30 mA, 4 MW	55	5SM3 342-6KK01	RCCB, type A, 25 A, 4-pole, 30 mA, 4 MW	70	4
5SM1 342-6KK03	RCCB, type A, 25 A, 4-pole, 30 mA, 50 ... 400 Hz	55	5SM3 342-6KK03	RCCB, type A, 25 A, 4-pole, 30 mA, 4 MW, 50 ... 400 Hz	70	4
5SM1 344-6	RCCB, type A, 40 A, 4-pole, 30 mA, 4 MW	55	5SM3 344-6	RCCB, type A, 40 A, 4-pole, 30 mA, 4 MW	70	4
5SM1 344-6KK01	RCCB, type A, 40 A, 4-pole, 30 mA, 4 MW	55	5SM3 344-6KK01	RCCB, type A, 40 A, 4-pole, 30 mA, 4 MW	70	4
5SM1 344-6KK03	RCCB, type A, 40 A, 4-pole, 30 mA, 50 ... 400 Hz	55	5SM3 344-6KK03	RCCB, type A, 40 A, 4-pole, 30 mA, 4 MW, 50 ... 400 Hz	70	4
5SM1 346-6	RCCB, type A, 63 A, 4-pole, 30 mA, 4 MW	55	5SM3 346-6	RCCB, type A, 63 A, 4-pole, 30 mA, 4 MW	70	4
5SM1 347-6	RCCB, type A, 80 A, 4-pole, 30 mA, 4 MW	55	5SM3 347-6	RCCB, type A, 80 A, 4-pole, 30 mA, 4 MW	70	4
5SM1 352-6	RCCB, type A, 25 A, 4-pole, 30 mA, 500 V, 4 MW	55	5SM3 352-6	RCCB, type A, 25 A, 4-pole, 30 mA, 500 V, 4 MW	70	4
5SM1 354-6	RCCB, type A, 40 A, 4-pole, 30 mA, 500 V, 4 MW	55	5SM3 354-6	RCCB, type A, 40 A, 4-pole, 30 mA, 500 V, 4 MW	70	4
5SM1 356-6	RCCB, type A, 63 A, 4-pole, 30 mA, 500 V, 4 MW	55	5SM3 356-6	RCCB, type A, 63 A, 4-pole, 30 mA, 500 V, 4 MW	70	4
5SM1 412-6	RCCB, type A, 25 A, 2-pole, 0.1 A, 2 MW	55	5SM3 412-6	RCCB, type A, 25 A, 2-pole, 0.1 A, 2 MW	70	4
5SM1 414-6	RCCB, type A, 40 A, 2-pole, 0.1 A, 2 MW	55	5SM3 414-6	RCCB, type A, 40 A, 2-pole, 0.1 A, 2 MW	70	4
5SM1 416-6	RCCB, type A, 63 A, 2-pole, 0.1 A, 2.5 MW	55	5SM3 416-6	RCCB, type A, 63 A, 2-pole, 0.1 A, 2.5 MW	70	4
5SM1 417-6	RCCB, type A, 80 A, 2-pole, 0.1 A, 2.5 MW	55	5SM3 417-6	RCCB, type A, 80 A, 2-pole, 0.1 A, 2.5 MW	70	4
5SM1 444-6	RCCB, type A, 40 A, 4-pole, 0.1 A, 4 MW	55	5SM3 444-6	RCCB, type A, 40 A, 4-pole, 0.1 A, 4 MW	70	4
5SM1 444-8	RCCB, type A, 40 A, 4-pole, 0.1 A, 4 MW, sel.	55	5SM3 444-8	RCCB, type A, 40 A, 4-pole, 0.1 A, 4 MW, sel.	70	4
5SM1 446-6	RCCB, type A, 63 A, 4-pole, 0.1 A, 4 MW	55	5SM3 446-6	RCCB, type A, 63 A, 4-pole, 0.1 A, 4 MW	70	4
5SM1 446-6KK01	RCCB, type A, 63 A, 4-pole, 0.1 A, 4 MW	55	5SM3 446-6KK01	RCCB, type A, 63 A, 4-pole, 0.1 A, 4 MW	70	4
5SM1 612-6	RCCB, type A, 25 A, 2-pole, 0.3 A, 2 MW	55	5SM3 612-6	RCCB, type A, 25 A, 2-pole, 0.3 A, 2 MW	70	4
5SM1 614-6	RCCB, type A, 40 A, 2-pole, 0.3 A, 2 MW	55	5SM3 614-6	RCCB, type A, 40 A, 2-pole, 0.3 A, 2 MW	70	4
5SM1 616-6	RCCB, type A, 63 A, 2-pole, 0.3 A, 2.5 MW	55	5SM3 616-6	RCCB, type A, 63 A, 2-pole, 0.3 A, 2.5 MW	70	4
5SM1 616-8	RCCB, type A, 63 A, 2-pole, 0.3 A, 2.5 MW, sel.	55	5SM3 616-8	RCCB, type A, 63 A, 2-pole, 0.3 A, 2.5 MW, sel.	70	4
5SM1 617-6	RCCB, type A, 80 A, 2-pole, 0.3 A, 2.5 MW	55	5SM3 617-6	RCCB, type A, 80 A, 2-pole, 0.3 A, 2.5 MW	70	4
5SM1 642-6	RCCB, type A, 25 A, 4-pole, 0.3 A, 4 MW	55	5SM3 642-6	RCCB, type A, 25 A, 4-pole, 0.3 A, 4 MW	70	4
5SM1 644-6	RCCB, type A, 40 A, 4-pole, 0.3 A, 4 MW	55	5SM3 644-6	RCCB, type A, 40 A, 4-pole, 0.3 A, 4 MW	70	4
5SM1 644-8	RCCB, type A, 40 A, 4-pole, 0.3 A, 4 MW, sel.	55	5SM3 644-8	RCCB, type A, 40 A, 4-pole, 0.3 A, 4 MW, sel.	70	4
5SM1 646-6	RCCB, type A, 63 A, 4-pole, 0.3 A, 4 MW	55	5SM3 646-6	RCCB, type A, 63 A, 4-pole, 0.3 A, 4 MW	70	4
5SM1 646-8	RCCB, type A, 63 A, 4-pole, 0.3 A, 4 MW, sel.	55	5SM3 646-8	RCCB, type A, 63 A, 4-pole, 0.3 A, 4 MW, sel.	70	4
5SM1 647-6	RCCB, type A, 80 A, 4-pole, 0.3 A, 4 MW	55	5SM3 647-6	RCCB, type A, 80 A, 4-pole, 0.3 A, 4 MW	70	4
5SM1 652-6	RCCB, type A, 25 A, 4-pole, 0.3 A, 500 V, 4 MW	55	5SM3 652-6	RCCB, type A, 25 A, 4-pole, 0.3 A, 500 V, 4 MW	70	4
5SM1 654-6	RCCB, type A, 40 A, 4-pole, 0.3 A, 500 V, 4 MW	55	5SM3 654-6	RCCB, type A, 40 A, 4-pole, 0.3 A, 500 V, 4 MW	70	4
5SM1 656-6	RCCB, type A, 63 A, 4-pole, 0.3 A, 500 V, 4 MW	55	5SM3 656-6	RCCB, type A, 63 A, 4-pole, 0.3 A, 500 V, 4 MW	70	4
5SM1 742-6	RCCB, type A, 25 A, 4-pole, 0.5 A, 4 MW	55	5SM3 742-6	RCCB, type A, 25 A, 4-pole, 0.5 A, 4 MW	70	4
5SM1 744-6	RCCB, type A, 40 A, 4-pole, 0.5 A, 4 MW	55	5SM3 744-6	RCCB, type A, 40 A, 4-pole, 0.5 A, 4 MW	70	4
5SM1 746-6	RCCB, type A, 63 A, 4-pole, 0.5 A, 4 MW	55	5SM3 746-6	RCCB, type A, 63 A, 4-pole, 0.5 A, 4 MW	70	4
5SM1 846-8	RCCB, type A, 63 A, 4-pole, 1.0 A, 4 MW, sel.	55	5SM3 846-8	RCCB, type A, 63 A, 4-pole, 1.0 A, 4 MW, sel.	70	4
5SX2 101-7	MCB, 6 kA, 1-pole, Char. C, 1 A	55	5SY6 101-7	MCB, 6 kA, 1-pole, Char. C, 1 A	70	3

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Type	Product	Mount. depth mm	Type	Successor product	Mount. depth mm	Chapter
5SX2 102-7	MCB, 6 kA, 1-pole, Char. C, 2 A	55	5SY6 102-7	MCB, 6 kA, 1-pole, Char. C, 2 A	70	3
5SX2 103-7	MCB, 6 kA, 1-pole, Char. C, 3 A	55	5SY6 103-7	MCB, 6 kA, 1-pole, Char. C, 3 A	70	3
5SX2 104-7	MCB, 6 kA, 1-pole, Char. C, 4 A	55	5SY6 104-7	MCB, 6 kA, 1-pole, Char. C, 4 A	70	3
5SX2 105-7	MCB, 6 kA, 1-pole, Char. C, 0.5 A	55	5SY6 105-7	MCB, 6 kA, 1-pole, Char. C, 0.5 A	70	3
5SX2 106-6	MCB, 6 kA, 1-pole, Char. B, 6 A	55	5SJ6 106-6	MCB, 6 kA, 1-pole, Char. B, 6 A, no addit. compon.	70	3
5SX2 106-7	MCB, 6 kA, 1-pole, Char. C, 6 A	55	5SY6 106-7	MCB, 6 kA, 1-pole, Char. C, 6 A	70	3
5SX2 108-7	MCB, 6 kA, 1-pole, Char. C, 8 A	55	5SY6 108-7	MCB, 6 kA, 1-pole, Char. C, 8 A	70	3
5SX2 110-6	MCB, 6 kA, 1-pole, Char. B, 10 A	55	5SJ6 110-6	MCB, 6 kA, 1-pole, Char. B, 10 A, no addit. compon.	70	3
5SX2 110-7	MCB, 6 kA, 1-pole, Char. C, 10 A	55	5SY6 110-7	MCB, 6 kA, 1-pole, Char. C, 10 A	70	3
5SX2 113-6	MCB, 6 kA, 1-pole, Char. B, 13 A	55	5SY6 113-6	MCB, 6 kA, 1-pole, Char. B, 13 A	70	3
5SX2 113-7	MCB, 6 kA, 1-pole, Char. C, 13 A	55	5SY6 113-7	MCB, 6 kA, 1-pole, Char. C, 13 A	70	3
5SX2 114-7	MCB, 6 kA, 1-pole, Char. C, 0.3 A	55	5SY6 114-7	MCB, 6 kA, 1-pole, Char. C, 0.3 A	70	3
5SX2 115-7	MCB, 6 kA, 1-pole, Char. C, 1.6 A	55	5SY6 115-7	MCB, 6 kA, 1-pole, Char. C, 1.6 A	70	3
5SX2 116-6	MCB, 6 kA, 1-pole, Char. B, 16 A	55	5SJ6 116-6	MCB, 6 kA, 1-pole, Char. B, 16 A, no addit. compon.	70	3
5SX2 116-7	MCB, 6 kA, 1-pole, Char. C, 16 A	55	5SY6 116-7	MCB, 6 kA, 1-pole, Char. C, 16 A	70	3
5SX2 120-6	MCB, 6 kA, 1-pole, Char. B, 20 A	55	5SJ6 120-6	MCB, 6 kA, 1-pole, Char. B, 20 A, no addit. compon.	70	3
5SX2 120-7	MCB, 6 kA, 1-pole, Char. C, 20 A	55	5SY6 120-7	MCB, 6 kA, 1-pole, Char. C, 20 A	70	3
5SX2 125-6	MCB, 6 kA, 1-pole, Char. B, 25 A	55	5SJ6 125-6	MCB, 6 kA, 1-pole, Char. B, 25 A, no addit. compon.	70	3
5SX2 125-7	MCB, 6 kA, 1-pole, Char. C, 25 A	55	5SY6 125-7	MCB, 6 kA, 1-pole, Char. C, 25 A	70	3
5SX2 132-6	MCB, 6 kA, 1-pole, Char. B, 32 A	55	5SJ6 132-6	MCB, 6 kA, 1-pole, Char. B, 32 A, no addit. compon.	70	3
5SX2 132-7	MCB, 6 kA, 1-pole, Char. C, 32 A	55	5SY6 132-7	MCB, 6 kA, 1-pole, Char. C, 32 A	70	3
5SX2 140-6	MCB, 6 kA, 1-pole, Char. B, 40 A	55	5SY6 140-6	MCB, 6 kA, 1-pole, Char. B, 40 A	70	3
5SX2 140-7	MCB, 6 kA, 1-pole, Char. C, 40 A	55	5SY6 140-7	MCB, 6 kA, 1-pole, Char. C, 40 A	70	3
5SX2 150-6	MCB, 6 kA, 1-pole, Char. B, 50 A	55	5SY6 150-6	MCB, 6 kA, 1-pole, Char. B, 50 A	70	3
5SX2 150-7	MCB, 6 kA, 1-pole, Char. C, 50 A	55	5SY6 150-7	MCB, 6 kA, 1-pole, Char. C, 50 A	70	3
5SX2 163-6	MCB, 6 kA, 1-pole, Char. B, 63 A	55	5SY6 163-6	MCB, 6 kA, 1-pole, Char. B, 63 A	70	3
5SX2 163-7	MCB, 6 kA, 1-pole, Char. C, 63 A	55	5SY6 163-7	MCB, 6 kA, 1-pole, Char. C, 63 A	70	3
5SX2 201-7	MCB, 6 kA, 2-pole, Char. C, 1 A	55	5SY6 201-7	MCB, 6 kA, 2-pole, Char. C, 1 A	70	3
5SX2 202-7	MCB, 6 kA, 2-pole, Char. C, 2 A	55	5SY6 202-7	MCB, 6 kA, 2-pole, Char. C, 2 A	70	3
5SX2 203-7	MCB, 6 kA, 2-pole, Char. C, 3 A	55	5SY6 203-7	MCB, 6 kA, 2-pole, Char. C, 3 A	70	3
5SX2 204-7	MCB, 6 kA, 2-pole, Char. C, 4 A	55	5SY6 204-7	MCB, 6 kA, 2-pole, Char. C, 4 A	70	3
5SX2 205-7	MCB, 6 kA, 2-pole, Char. C, 0.5 A	55	5SY6 205-7	MCB, 6 kA, 2-pole, Char. C, 0.5 A	70	3
5SX2 206-6	MCB, 6 kA, 2-pole, Char. B, 6 A	55	5SY6 206-6	MCB, 6 kA, 2-pole, Char. B, 6 A	70	3
5SX2 206-7	MCB, 6 kA, 2-pole, Char. C, 6 A	55	5SY6 206-7	MCB, 6 kA, 2-pole, Char. C, 6 A	70	3
5SX2 208-7	MCB, 6 kA, 2-pole, Char. C, 8 A	55	5SY6 208-7	MCB, 6 kA, 2-pole, Char. C, 8 A	70	3
5SX2 210-6	MCB, 6 kA, 2-pole, Char. B, 10 A	55	5SY6 210-6	MCB, 6 kA, 2-pole, Char. B, 10 A	70	3
5SX2 210-7	MCB, 6 kA, 2-pole, Char. C, 10 A	55	5SY6 210-7	MCB, 6 kA, 2-pole, Char. C, 10 A	70	3
5SX2 213-6	MCB, 6 kA, 2-pole, Char. B, 13 A	55	5SY6 213-6	MCB, 6 kA, 2-pole, Char. B, 13 A	70	3
5SX2 213-7	MCB, 6 kA, 2-pole, Char. C, 13 A	55	5SY6 213-7	MCB, 6 kA, 2-pole, Char. C, 13 A	70	3
5SX2 215-7	MCB, 6 kA, 2-pole, Char. C, 1.6 A	55	5SY6 215-7	MCB, 6 kA, 2-pole, Char. C, 1.6 A	70	3
5SX2 216-6	MCB, 6 kA, 2-pole, Char. B, 16 A	55	5SY6 216-6	MCB, 6 kA, 2-pole, Char. B, 16 A	70	3
5SX2 216-7	MCB, 6 kA, 2-pole, Char. C, 16 A	55	5SY6 216-7	MCB, 6 kA, 2-pole, Char. C, 16 A	70	3
5SX2 220-6	MCB, 6 kA, 2-pole, Char. B, 20 A	55	5SY6 220-6	MCB, 6 kA, 2-pole, Char. B, 20 A	70	3
5SX2 220-7	MCB, 6 kA, 2-pole, Char. C, 20 A	55	5SY6 220-7	MCB, 6 kA, 2-pole, Char. C, 20 A	70	3
5SX2 225-6	MCB, 6 kA, 2-pole, Char. B, 25 A	55	5SY6 225-6	MCB, 6 kA, 2-pole, Char. B, 25 A	70	3
5SX2 225-7	MCB, 6 kA, 2-pole, Char. C, 25 A	55	5SY6 225-7	MCB, 6 kA, 2-pole, Char. C, 25 A	70	3
5SX2 232-6	MCB, 6 kA, 2-pole, Char. B, 32 A	55	5SY6 232-6	MCB, 6 kA, 2-pole, Char. B, 32 A	70	3
5SX2 232-7	MCB, 6 kA, 2-pole, Char. C, 32 A	55	5SY6 232-7	MCB, 6 kA, 2-pole, Char. C, 32 A	70	3
5SX2 240-6	MCB, 6 kA, 2-pole, Char. B, 40 A	55	5SY6 240-6	MCB, 6 kA, 2-pole, Char. B, 40 A	70	3
5SX2 240-7	MCB, 6 kA, 2-pole, Char. C, 40 A	55	5SY6 240-7	MCB, 6 kA, 2-pole, Char. C, 40 A	70	3
5SX2 250-6	MCB, 6 kA, 2-pole, Char. B, 50 A	55	5SY6 250-6	MCB, 6 kA, 2-pole, Char. B, 50 A	70	3
5SX2 250-7	MCB, 6 kA, 2-pole, Char. C, 50 A	55	5SY6 250-7	MCB, 6 kA, 2-pole, Char. C, 50 A	70	3
5SX2 263-6	MCB, 6 kA, 2-pole, Char. B, 63 A	55	5SY6 263-6	MCB, 6 kA, 2-pole, Char. B, 63 A	70	3
5SX2 263-7	MCB, 6 kA, 2-pole, Char. C, 63 A	55	5SY6 263-7	MCB, 6 kA, 2-pole, Char. C, 63 A	70	3
5SX2 301-7	MCB, 6 kA, 3-pole, Char. C, 1 A	55	5SY6 301-7	MCB, 6 kA, 3-pole, Char. C, 1 A	70	3
5SX2 302-7	MCB, 6 kA, 3-pole, Char. C, 2 A	55	5SY6 302-7	MCB, 6 kA, 3-pole, Char. C, 2 A	70	3

Notes on Product Changeover

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Type	Product	Mount. depth mm	Type	Successor product	Mount. depth mm	Chapter
5SX4 616-7	MCB, 10 kA, 3-pole + N, Char. C, 16 A	55	5SY4 616-7	MCB, 10 kA, 3-pole + N, Char. C, 16 A	70	3
5SX4 620-6	MCB, 10 kA, 3-pole + N, Char. B, 20 A	55	5SY4 620-6	MCB, 10 kA, 3-pole + N, Char. B, 20 A	70	3
5SX4 620-7	MCB, 10 kA, 3-pole + N, Char. C, 20 A	55	5SY4 620-7	MCB, 10 kA, 3-pole + N, Char. C, 20 A	70	3
5SX4 625-6	MCB, 10 kA, 3-pole + N, Char. B, 25 A	55	5SY4 625-6	MCB, 10 kA, 3-pole + N, Char. B, 25 A	70	3
5SX4 625-7	MCB, 10 kA, 3-pole + N, Char. C, 25 A	55	5SY4 625-7	MCB, 10 kA, 3-pole + N, Char. C, 25 A	70	3
5SX4 632-6	MCB, 10 kA, 3-pole + N, Char. B, 32 A	55	5SY4 632-6	MCB, 10 kA, 3-pole + N, Char. B, 32 A	70	3
5SX4 632-7	MCB, 10 kA, 3-pole + N, Char. C, 32 A	55	5SY4 632-7	MCB, 10 kA, 3-pole + N, Char. C, 32 A	70	3
5SX4 640-6	MCB, 10 kA, 3-pole + N, Char. B, 40 A	55	5SY4 640-6	MCB, 10 kA, 3-pole + N, Char. B, 40 A	70	3
5SX4 640-7	MCB, 10 kA, 3-pole + N, Char. C, 40 A	55	5SY4 640-7	MCB, 10 kA, 3-pole + N, Char. C, 40 A	70	3
5SX4 650-6	MCB, 10 kA, 3-pole + N, Char. B, 50 A	55	5SY4 650-6	MCB, 10 kA, 3-pole + N, Char. B, 50 A	70	3
5SX4 650-7	MCB, 10 kA, 3-pole + N, Char. C, 50 A	55	5SY4 650-7	MCB, 10 kA, 3-pole + N, Char. C, 50 A	70	3
5SZ3 426-0KG00	RCCB, UC sens., type B, 25 A, 4-pole, 30 mA, 8 MW	55	5SM3 342-4	RCCB, SIQUENCE, UC sens., type B, 25 A, 4-pole, 30 mA, 4 MW	70	4
5SZ3 446-0KG00	RCCB, UC sens., type B, 40 A, 4-pole, 30 mA, 8 MW	55	5SM3 344-4	RCCB, SIQUENCE, UC sens., type B, 40 A, 4-pole, 30 mA, 4 MW	70	4
5SZ3 466-0KG00	RCCB, UC sens., type B, 63 A, 4-pole, 30 mA, 8 MW	55	5SM3 346-4	RCCB, SIQUENCE, UC sens., type B, 63 A, 4-pole, 30 mA, 4 MW	70	4
5SZ3 466-0KG05	RCCB, UC sens., type B, 63 A, 4-pole, 30 mA, 8 MW, med.	55	5SM3 346-4	RCCB, SIQUENCE, UC sens., type B, 63 A, 4-pole, 30 mA, 4 MW	70	4
5SZ3 466-0KG30	RCCB, UC sens., type B, 63 A, 4-pole, 30 mA, 8,5 MW, AS	55	5SM3 346-4 + 5SW3 300	RCCB, SIQUENCE, UC sens., type B, 63 A, 4-pole, 30 mA, 4 MW + AS	70	4
5SZ3 466-0KG35	RCCB, UC sens., type B, 63 A, 4-pole, 30 mA, 8 MW, med., AS	55	5SM3 346-4 + 5SW3 300	RCCB, SIQUENCE, UC sens., type B, 63 A, 4-pole, 30 mA, 4 MW + AS	70	4
5SZ6 426-0KG00	RCCB, UC sens., type B, 25 A, 4-pole, 300 mA, 8 MW	55	5SM3 642-4	RCCB, SIQUENCE, UC sens., type B, 25 A, 4-pole, 300 mA, 4 MW	70	4
5SZ6 446-0KG00	RCCB, UC sens., type B, 40 A, 4-pole, 300 mA, 8 MW	55	5SM3 644-4	RCCB, SIQUENCE, UC sens., type B, 40 A, 4-pole, 300 mA, 4 MW	70	4
5SZ6 466-0KG00	RCCB, UC sens., type B, 63 A, 4-pole, 300 mA, 8 MW	55	5SM3 646-4	RCCB, SIQUENCE, UC sens., type B, 63 A, 4-pole, 300 mA, 4 MW	70	4
5SZ6 466-0KG05	RCCB, UC sens., type B, 63 A, 4-pole, 300 mA, 8 MW, med.	55	5SM3 646-4	RCCB, SIQUENCE, UC sens., type B, 63 A, 4-pole, 300 mA, 4 MW	70	4
5SZ6 466-0KG30	RCCB, UC sens., type B, 63 A, 4-pole, 300 mA, 8,5 MW, AS	55	5SM3 646-4 + 5SW3 300	RCCB, SIQUENCE, UC sens., type B, 63 A, 4-pole, 300 mA, 4 MW + AS	70	4
5SZ6 466-0KG35	RCCB, UC sens., type B, 63 A, 4-pole, 300 mA, 8 MW, med., AS	55	5SM3 646-4 + 5SW3 300	RCCB, SIQUENCE, UC sens., type B, 63 A, 4-pole, 300 mA, 4 MW + AS	70	4
5SZ6 468-0KG00	RCCB, UC sens., type B, 63 A, 4-pole, 300 mA, 8 MW, sel.	55	5SM3 646-5	RCCB, SIQUENCE, UC sens., type B, 63 A, 4-pole, 300 mA, 4 MW, sel.	70	4
5SZ6 468-0KG30	RCCB, UC sens., type B, 63 A, 4-pole, 300 mA, 8,5 MW, sel., AS	55	5SM3 646-5 + 5SW3 300	RCCB, SIQUENCE, UC sens., type B, 63 A, 4-pole, 300 mA, 4 MW, sel. + AS	70	4
5TE4 700	Pushbutton, 16 A, 1NO, 1NC, gray	55	5TE4 800	Pushbutton, 1NO, 1NC, 1 button, without maintained-contact function	70	6
5TE4 701	Pushbutton, 16 A, 1NO, gray, illuminated	55	5TE4 821	Pushbutton, 1NO, 1 button, lamp	70	6
5TE4 702	Pushbutton, 16 A, 1NC, gray, illuminated	55	5TE4 820	Pushbutton, 1NO, 1NC, 1 button, lamp	70	6
5TE4 703	Pushbutton, 16 A, 1NO, gray, illuminated	55	5TE4 822	Pushbutton, 1NO, 1 button, lamp, for long cable	70	6
5TE4 704	Pushbutton, 16 A, 1NO, 1NC, red	55	5TE4 805	Pushbutton, 16 A, 1NO, 1NC, red	70	6
5TE4 705	Pushbutton, 16 A, 1NO, 1NC, green	55	5TE4 806	Pushbutton, 16 A, 1NO, 1NC, green	70	6
5TE4 706	Pushbutton, 16 A, 1NO, 1NC, yellow	55	5TE4 807	Pushbutton, 16 A, 1NO, 1NC, yellow	70	6
5TE4 707	Pushbutton, 16 A, 1NO, 1NC, blue	55	5TE4 808	Pushbutton, 16 A, 1NO, 1NC, blue	70	6
5TE4 708	Pushbutton, 16 A, 1NO, 1NC, blue	55	5TE4 808	Pushbutton, 16 A, 1NO, 1NC, blue	70	6
5TE5 700	Light signal, lamp without cap	55	5TE5 800	Light indicator, 1 lamp	70	11
5TE5 701	Light signal, 230 V AC 2 diodes	55	--	No replacement	--	--
5TE5 702	Light signal, lamp without cap, for long cables	55	5TE5 804	Light indicator, 1 lamp, for long cables	70	11
5TE6700	SCHUKO socket outlet, 230V AC, 16A	55	5TE6 800	SCHUKO Socket outlet, without cover, 230V AC, 16A	55/70	9
5TE6710	Socket outlet acc. to CEE7, 230V AC, 16A	55	5TE6 803	Socket outlet acc. to CEE 7, with grounding pin, without cover, 230V AC, 16A	55/70	9
5TE6711	Socket outlet acc. to CEE7, child-proof device	55	5TE6 803	Socket outlet acc. to CEE 7, with grounding pin, without cover, 230V AC, 16A	55/70	9
5TE7 101	Switch with pilot lamp, 16 A, 1-pole, 16 A, OFF	55	5TE8 101	Switch with pilot lamp, 20 A, 1NO, 1 lamp	70	6
5TE7 105	Switch with pilot lamp, 16 A, 1-pole, 16 A, OFF	55	5TE8 105	Control switch, 20 A, 1NO, 1 lamp, for long cable	70	6
5TE7 111	ON/OFF switch, 16 A, 1-pole, 16 A, OFF, sealed	55	5TE8 111	ON/OFF switch, 20 A, 1NO	70	6
5TE7 112	ON/OFF switch, 16 A, 2-pole, 16 A, OFF, sealed	55	5TE8 112	ON/OFF switch, 20 A, 2NO	70	6
5TE7 113	ON/OFF switch, 16 A, 3-pole, 16 A, OFF, sealed	55	5TE8 113	ON/OFF switch, 20 A, 3NO	70	6
5TE7 141	Group switch, 16 A, 1-pole,	55	5TE8 141	Group switch, 20 A, 1 group	70	6
5TE7 142	Group switch, 16 A, 2-pole	55	5TE8 142	Group switch, 20 A, 2 groups	70	6

Overview

Type	Product	Mount. depth mm	Type	Successor product	Mount. depth mm	Chapter
5TE7 161	Changeover switch, 16 A, 1-pole	55	5TE8 151	Changeover switch, 20 A, 1NO, 1NC	70	6
5TE7 162	Changeover switch, 16 A, 2-pole	55	5TE8 152	Changeover switch, 20 A, 2NO, 2NC	70	6
5TE7 165	Changeover switch, 16 A, 2NO, 2NC	55	5TE8 152	Changeover switch, 20 A, 2NO, 2NC	70	6
5TE7 211	ON/OFF switch, 32 A, 1-pole, sealed	55	5TE8 211	ON/OFF switch, 32 A, 1NO, terminal 6 mm ²	70	6
5TE7 212	ON/OFF switch, 32 A, 2-pole, sealed	55	5TE8 212	ON/OFF switch, 32 A, 2NO, terminal 6 mm ²	70	6
5TE7 213	ON/OFF switch, 32 A, 3-pole, sealed	55	5TE8 213	ON/OFF switch, 32 A, 3NO, terminal 6 mm ²	70	6
5TE7 214	ON/OFF switch, 32 A, 3-pole + N, sealed	55	5TE8 214	ON/OFF switch, 32 A, 3NO+N, terminal 6 mm ²	70	6
5TE7 313	ON/OFF switch, 25 A, 3-pole, sealed	55	5TE8 213	ON/OFF switch, 32 A, 3NO, terminal 6 mm ²	70	6
5TE7 314	ON/OFF switch, 25 A, 3-pole + N, sealed	55	5TE8 218	ON/OFF switch, 32 A, 3NO+N+AS, terminal 6 mm ²	70	6
5TE7 411	ON/OFF switch, 40 A, 1-pole, sealed	55	5TE8 411	ON/OFF switch, 40 A, 1NO	70	6
5TE7 412	ON/OFF switch, 40 A, 2-pole, sealed	55	5TE8 412	ON/OFF switch, 40 A, 2NO	70	6
5TE7 413	ON/OFF switch, 40 A, 3-pole, sealed	55	5TE8 413	ON/OFF switch, 40 A, 3NO	70	6
5TE7 414	ON/OFF switch, 40 A, 3-pole + N, sealed	55	5TE8 414	ON/OFF switch, 40 A, 3NO+N	70	6
5TE7 511	ON/OFF switch, 63 A, 1-pole, sealed	55	5TE8 511	ON/OFF switch, 63 A, 1NO	70	6
5TE7 512	ON/OFF switch, 63 A, 2-pole, sealed	55	5TE8 512	ON/OFF switch, 63 A, 2NO	70	6
5TE7 513	ON/OFF switch, 63 A, 3-pole, sealed	55	5TE8 513	ON/OFF switch, 63 A, 3NO	70	6
5TE7 513-2	ON/OFF switch, 63 A, 3-pole, 63 A, lockable	55	--	No replacement	--	--
5TE7 514	ON/OFF switch, 63 A, 3-pole + N, sealed	55	5TE8 514	ON/OFF switch, 63 A, 3NO+N	70	6
5TE7 514-2	ON/OFF switch, 63 A, 3-pole + N, 63 A, lockable	55	--	No replacement	--	--
5TE7 611	ON/OFF switch, 80 A, 1-pole, sealed	55	5TE8 611	ON/OFF switch, 80 A, 1NO	70	6
5TE7 612	ON/OFF switch, 80 A, 2-pole, sealed	55	5TE8 612	ON/OFF switch, 80 A, 2NO	70	6
5TE7 613	ON/OFF switch, 80 A, 3-pole, sealed	55	5TE8 613	ON/OFF switch, 80 A, 3NO	70	6
5TE7 614	ON/OFF switch, 80 A, 3-pole + N, sealed	55	5TE8 614	ON/OFF switch, 80 A, 3NO+N	70	6
5TE7 711	ON/OFF switch, 100 A, 1-pole, sealed	55	5TE8 711	ON/OFF switch, 100 A, 1NO	70	6
5TE7 712	ON/OFF switch, 100 A, 2-pole, sealed	55	5TE8 712	ON/OFF switch, 100 A, 2NO	70	6
5TE7 713	ON/OFF switch, 100 A, 3-pole, sealed	55	5TE8 713	ON/OFF switch, 100 A, 3NO	70	6
5TE7 714	ON/OFF switch, 100 A, 3-pole + N, sealed	55	5TE8 714	ON/OFF switch, 100 A, 3NO+N	70	6
5TE7 813	ON/OFF switch, 125 A, 3-pole, sealed	55	5TE8 813	ON/OFF switch, 125 A, 3NO	70	6
5TE9 110	Phase connector, 50 mm ²	55	5TE9 112	Phase connector, 50 mm ²	70	6
5TE9 111	Neutral conductor connector, 50 mm ²	55	5TE9 113	Neutral conductor connector, 50 mm ²	70	6
5TT1 300	Energy-saving timer, 230 V	55	7LF6 115	Energy-saving timer, 230 V AC	70	8
5TT1 301	Lighting timer, 230 V	55	7LF6 114	Lighting timer, 230 V AC	70	8
5TT1 310	Timer 230 V, 3-wire switch., L-momentary contact	55	5TT1 310-1	Timer 230 V, 3-wire switch., L-momentary contact	55	12
5TT1 310	Timer 230 V, 3-wire switch., L-momentary contact	55	7LF6 110	Time switch 230 V, 2000 W, 3-wire switch., L-momentary contact	70	8
5TT1 311	Timer 230 V, 3/4-wire switch., N/L-momentary contact	55	5TT1 311-1	Timer 230 V, 3/4-wire switch., N/L-momentary contact	55	12
5TT1 311	Timer 230 V, 3/4-wire switch., N/L-momentary contact	55	7LF6 111	Time switch 230 V, 2000 W, 3/4-wire switch., N/L-momentary contact	70	8
5TT1 312	Time switch, 230 V, fan	55	7LF6 112	Time switch, 230 V AC, fan	70	8
5TT1 313	Time switch, 3/4-wire switch., 230 V, advance warning	55	5TT1 313-1	Time switch, 230 V, 3/4-wire switch., warning	55	12
5TT1 313	Time switch, 3/4-wire switch., 230 V, advance warning	55	7LF6 113	Time switch, 230 V AC, warning	70	8
5TT3 045	Switching relay, 230 V AC, 16 A, 1NO	55	--	Available long-term	--	--
5TT3 080	Switching relay, sealable	55	--	No changeover	--	--
5TT3 180	Multifunctional time switch, 24 ... 230 V	55	5TT3 185	Multifunctional time switch, 12 ... 230 V	70	8
5TT3 304	Dusk switch, 500 lux, 1 channel	55	7LQ2 100	Dusk switch, 500 lux, 1 channel, 230 V	70	11
5TT3 305	Dusk switch, 500 lux, 2 channels	55	7LQ2 101	Dusk switch, 500 lux, 2 channels, 230 V	70	11
5TT3 306	Dusk switch, 500 lux, 1 channel	55	7LQ2 100	Dusk switch, 500 lux, 1 channel, 230 V	70	11
5TT3 420	Phase indication, 230 V AC	55	5TE5 802	Phase monitor, 3 lamps	70	11
5TT3 422	Rotation indication, 230 V AC	55	5TT3 423	Phase sequence monitor, 230 V, 4 A	70	11
5TT3 450	Alarm signaling device, 230 V	55	--	No replacement	--	--
5TT3 451	Alarm signaling device, 24 V	55	--	No replacement	--	--
5TT3 452	Alarm signaling device, 230 V AC, adjustable	55	--	No replacement	--	--
5TT3 453	Alarm signaling device, 24 V, adjustable	55	--	No replacement	--	--
5TT3 600	Temperature controller, ON/OFF/Frost	55	--	No replacement	--	--
5TT3 601	Temperature controller, Summer/OFF/Winter	55	--	No replacement	--	--
5TT3 602	Temperature controller, Summer/Winter	55	--	No replacement	--	--
5TT3 608	Temperature display, for 5TT3 602	55	--	No replacement	--	--
5TT3 610	Temperature controller, -30 ... +30 °C	55	7LQ2 001	Temperature controller, -30 ... +30 °C, KTY	70	11

Notes on Product Changeover

Product Changeover

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Type	Product	Mount. depth mm	Type	Successor product	Mount. depth mm	Chapter
5TT3 611	Temperature controller, -20 ... +40 °C	55	7LQ2 001	Temperature controller, -30 ... +30 °C, KTY	70	11
5TT3 612	Temperature controller, 0 ... +60 °C	55	7LQ2 002	Temperature controller, 0 ... +60 °C, KTY	70	11
5TT3 613	Temperature controller, +40 ... +100 °C	55	7LQ2 003	Temperature controller, +40 ... +100 °C, KTY	70	11
5TT3 701	Insta contactor, 230 V, 24 A, 4NO	70	5TT5 730-0	Insta contactor, 230 V AC/DC, 24 A, 4NO	70	7
5TT3 702	Insta contactor, 230 V, 24 A, 3NO, 1NC	70	5TT5 731-0	Insta contactor, 230 V AC/DC, 24 A, 3NO, 1NC	70	7
5TT3 703	Insta contactor, 230 V, 24 A, 2NO, 2NC	70	5TT5 732-0	Insta contactor, 230 V AC/DC, 24 A, 2NO, 2NC	70	7
5TT3 704	Insta contactor, 230 V, 24 A, 4NC	70	5TT5 733-0	Insta contactor, 230 V AC/DC, 24 A, 4NC	70	7
5TT3 706	Insta contactor, 230 V, 40 A, 4NO	70	5TT5 740-0	Insta contactor, 230 V AC/DC, 40 A, 4NO	70	7
5TT3 707	Insta contactor, 230 V, 63 A, 4NO	70	5TT5 750-0	Insta contactor, 230 V AC/DC, 63 A, 4NO	70	7
5TT3 711	Insta contactor, 24 V, 24 A, 4NO	70	5TT5 730-2	Insta contactor, 24 V AC/DC, 24 A, 4NO	70	7
5TT3 712	Insta contactor, 24 V, 24 A, 3NO, 1NC	70	5TT5 731-2	Insta contactor, 24 V AC/DC, 24 A, 3NO, 1NC	70	7
5TT3 713	Insta contactor, 24 V, 24 A, 2NO, 2NC	70	5TT5 732-2	Insta contactor, 24 V AC/DC, 24 A, 2NO, 2NC	70	7
5TT3 714	Insta contactor, 24 V, 24 A, 4NC	70	5TT5 733-2	Insta contactor, 24 V AC/DC, 24 A, 4NC	70	7
5TT3 716	Insta contactor, 24 V, 40 A, 4NO	70	5TT5 740-2	Insta contactor, 24 V AC/DC, 40 A, 4NO	70	7
5TT3 717	Insta contactor, 24 V, 63 A, 4NO	70	5TT5 750-2	Insta contactor, 24 V AC/DC, 63 A, 4NO	70	7
5TT3 721	Insta contactor, 230 V, 40 A, 3NO, 1NC	70	5TT5 741-0	Insta contactor, 230 V AC/DC, 40 A, 3NO, 1NC	70	7
5TT3 722	Insta contactor, 230 V, 40 A, 2NO, 2NC	70	5TT5 742-0	Insta contactor, 230 V AC/DC, 40 A, 2NO, 2NC	70	7
5TT3 723	Insta contactor, 230 V, 40 A, 4NC	70	--	No replacement	--	--
5TT3 724	Insta contactor, 230 V, 63 A, 3NO, 1NC	70	5TT5 751-0	Insta contactor, 230 V AC/DC, 63 A, 3NO, 1NC	70	7
5TT3 725	Insta contactor, 230 V, 63 A, 2NO, 2NC	70	5TT5 752-0	Insta contactor, 230 V AC/DC, 63 A, 2NO, 2NC	70	7
5TT3 726	Insta contactor, 230 V, 63 A, 4NC	70	--	No replacement	--	--
5TT3 731	Insta contactor, 115 V, 24 A, 4NO	70	5TT5 730-1	Insta contactor, 115 V AC/DC, 24 A, 4NO	70	7
5TT3 735	Insta contactor, 230 V, 21 A, 4NO	70	--	No replacement	--	--
5TT3 741	Insta contactor, 24 V, 40 A, 3NO, 1NC	70	5TT5 741-2	Insta contactor, 24 V AC/DC, 40 A, 3NO, 1NC	70	7
5TT3 742	Insta contactor, 24 V, 40 A, 2NO, 2NC	70	5TT5 742-2	Insta contactor, 24 V AC/DC, 40 A, 2NO, 2NC	70	7
5TT3 743	Insta contactor, 24 V, 40 A, 4NC	70	--	No replacement	--	--
5TT3 744	Insta contactor, 24 V, 63 A, 3NO, 1NC	70	5TT5 751-2	Insta contactor, 24 V AC/DC, 63 A, 3NO, 1NC	70	7
5TT3 745	Insta contactor, 24 V, 63 A, 2NO, 2NC	70	5TT5 752-2	Insta contactor, 24 V AC/DC, 63 A, 2NO, 2NC	70	7
5TT3 746	Insta contactor, 24 V, 63 A, 4NC	70	--	No replacement	--	--
5TT3 761	Insta contactor, 230 V, 20 A, 2NO	70	5TT5 700-0	Insta contactor, 230 V AC, 20 A, 2NO	70	7
5TT3 762	Insta contactor, 230 V, 20 A, 1NO, 1NC	70	5TT5 701-0	Insta contactor, 230 V AC, 20 A, 1NO, 1NC	70	7
5TT3 763	Insta contactor, 230 V, 20 A, 2NC	70	5TT5 702-0	Insta contactor, 230 V AC, 20 A, 2NC	70	7
5TT3 764	Insta contactor, 230 V, 25 A, 1NO	70	--	No replacement	--	--
5TT3 765	Insta contactor, 230 V, 25 A, 1NC	70	--	No replacement	--	--
5TT3 771	Insta contactor, 24 V, 20 A, 2NO	70	5TT5 700-2	Insta contactor, 24 V AC, 20 A, 2NO	70	7
5TT3 772	Insta contactor, 24 V, 20 A, 1NO, 1NC	70	5TT5 701-2	Insta contactor, 24 V AC, 20 A, 1NO, 1NC	70	7
5TT3 773	Insta contactor, 24 V, 20 A, 2NC	70	5TT5 702-2	Insta contactor, 24 V AC, 20 A, 2NC	70	7
5TT3 774	Insta contactor, 24 V, 25 A, 1NO	70	--	No replacement	--	--
5TT3 775	Insta contactor, 24 V, 25 A, 1NC	70	--	No replacement	--	--
5TT3 791	Auxiliary circuit switch, 230 V, 6 A, 2NO	70	--	No replacement	--	--
5TT3 792	Auxiliary circuit switch, 230 V, 6 A, 1NO, 1NC	70	--	No replacement	--	--
5TT3 794	Auxiliary circuit switch, 48 V, 1 A, 1CO	70	--	No replacement	--	--
5TT3 801	Remote switch, 230 V, 24 A, 4NO	55	5TT5 730-0	Insta contactor, 230 V AC/DC, 24 A, 4NO	70	7
5TT3 802	Remote switch, 230 V, 24 A, 3NO, 1NC	55	5TT5 731-0	Insta contactor, 230 V AC/DC, 24 A, 3NO, 1NC	70	7
5TT3 803	Remote switch, 230 V, 24 A, 2NO, 2NC	55	5TT5 732-0	Insta contactor, 230 V AC/DC, 24 A, 2NO, 2NC	70	7
5TT3 804	Remote switch, 230 V, 24 A, 4NC	55	5TT5 733-0	Insta contactor, 230 V AC/DC, 24 A, 4NC	70	7
5TT3 806	Remote switch, 230 V, 40 A, 4NO	55	5TT5 740-0	Insta contactor, 230 V AC/DC, 40 A, 4NO	70	7
5TT3 807	Remote switch, 230 V, 63 A, 4NO	55	5TT5 750-0	Insta contactor, 230 V AC/DC, 63 A, 4NO	70	7
5TT3 811	Remote switch, 24 V, 24 A, 4NO	55	5TT5 730-2	Insta contactor, 24 V AC/DC, 24 A, 4NO	70	7
5TT3 812	Remote switch, 24 V, 24 A, 3NO, 1NC	55	5TT5 731-2	Insta contactor, 24 V AC/DC, 24 A, 3NO, 1NC	70	7
5TT3 813	Remote switch, 24 V, 24 A, 2NO, 2NC	55	5TT5 732-2	Insta contactor, 24 V AC/DC, 24 A, 2NO, 2NC	70	7
5TT3 814	Remote switch, 24 V, 24 A, 4NC	55	5TT5 733-2	Insta contactor, 24 V AC/DC, 24 A, 4NC	70	7
5TT3 816	Remote switch, 24 V, 40 A, 4NO	55	5TT5 740-2	Insta contactor, 24 V AC/DC, 40 A, 4NO	70	7
5TT3 817	Remote switch, 24 V, 63 A, 4NO	55	5TT5 750-2	Insta contactor, 24 V AC/DC, 63 A, 4NO	70	7
5TT3 821	Remote switch, 230 V, 40 A, 3NO, 1NC	55	5TT5 741-0	Insta contactor, 230 V AC/DC, 40 A, 3NO, 1NC	70	7
5TT3 822	Remote switch, 230 V, 40 A, 2NO, 2NC	55	5TT5 742-0	Insta contactor, 230 V AC/DC, 40 A, 2NO, 2NC	70	7
5TT3 823	Remote switch, 230 V, 40 A, 4NC	55	--	No replacement	--	--
5TT3 824	Remote switch, 230 V, 63 A, 3NO, 1NC	55	5TT5 751-0	Insta contactor, 230 V AC/DC, 63 A, 3NO, 1NC	70	7
5TT3 825	Remote switch, 230 V, 63 A, 2NO, 2NC	55	5TT5 752-0	Insta contactor, 230 V AC/DC, 63 A, 2NO, 2NC	70	7
5TT3 831	Remote switch, 115 V, 24 A, 4NO	55	5TT5 730-1	Insta contactor, 115 V AC/DC, 24 A, 4NO	70	7

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Type	Product	Mount. depth mm	Type	Successor product	Mount. depth mm	Chapter
5TT3 835	Remote switch, 230 V, 21 A, 4NO	55	--	No replacement	--	--
5TT3 841	Remote switch, 24 V, 40 A, 3NO, 1NC	55	5TT5 741-2	Insta contactor, 24 V AC/DC, 40 A, 3NO, 1NC	70	7
5TT3 842	Remote switch, 24 V, 40 A, 2NO, 2NC	55	5TT5 742-2	Insta contactor, 24 V AC/DC, 40 A, 2NO, 2NC	70	7
5TT3 843	Remote switch, 24 V, 40 A, 4NC	55	--	No replacement	--	--
5TT3 844	Remote switch, 24 V, 63 A, 3NO, 1NC	55	5TT5 751-2	Insta contactor, 24 V AC/DC, 63 A, 3NO, 1NC	70	7
5TT3 845	Remote switch, 24 V, 63 A, 2NO, 2NC	55	5TT5 752-2	Insta contactor, 24 V AC/DC, 63 A, 2NO, 2NC	70	7
5TT3 861	Remote switch, 230 V, 20 A, 2NO	55	5TT5 700-0	Insta contactor, 230 V AC, 20 A, 2NO	70	7
5TT3 862	Remote switch, 230 V, 20 A, 1NO, 1NC	55	5TT5 701-0	Insta contactor, 230 V AC, 20 A, 1NO, 1NC	70	7
5TT3 863	Remote switch, 230 V, 20 A, 2NC	55	5TT5 702-0	Insta contactor, 230 V AC, 20 A, 2NC	70	7
5TT3 864	Remote switch, 230 V, 25 A, 1NO	55	--	No replacement	--	--
5TT3 865	Remote switch, 230 V, 25 A, 1NC	55	--	No replacement	--	--
5TT3 871	Remote switch, 24 V, 20 A, 2NO	55	5TT5 700-2	Insta contactor, 24 V AC, 20 A, 2NO	70	7
5TT3 872	Remote switch, 24 V, 20 A, 1NO, 1NC	55	5TT5 701-2	Insta contactor, 24 V AC, 20 A, 1NO, 1NC	70	7
5TT3 873	Remote switch, 24 V, 20 A, 2NC	55	5TT5 702-2	Insta contactor, 24 V AC, 20 A, 2NC	70	7
5TT3 874	Remote switch, 24 V, 25 A, 1NO	55	--	No replacement	--	--
5TT3 875	Remote switch, 24 V, 25 A, 1NC	55	--	No replacement	--	--
5TT3 893	Interference voltage limiter	55	--	No replacement	--	--
5TT3 983	Remote switch, 230 V, 20 A, 4NO	55	--	Available long-term	--	--
5TT3 984	Remote switch, 110 V, 20 A, 4NO	55	--	Available long-term	--	--
5TT3 985	Remote switch, 24 V, 20 A, 4NO	55	--	Available long-term	--	--
5TT3 986	Remote switch, 24 V DC, 20 A, 4NO	55	--	Available long-term	--	--
5TT3 987	Remote switch, 230 V, 20 A, 3NO, 1NC	55	--	Available long-term	--	--
5TT3 988	Remote switch, 110 V, 20 A, 3NO, 1NC	55	--	Available long-term	--	--
5TT3 990	Remote switch, 24 V, 20 A, 3NO, 1NC	55	--	Available long-term	--	--
5TT3 991	Remote switch, 24 V DC, 20 A, 3NO, 1NC	55	--	Available long-term	--	--
5TT5 163	Blind remote switch, 230 V, 2NO	55	--	Available long-term	--	--
5TT5 164	Series remote switch, 230 V, 2NO	55	--	Available long-term	--	--
5TT5 166	Series remote switch, 12 V, 2NO	55	--	Available long-term	--	--
5TT5 501	Remote switch, 12 V AC, 16 A, OFF, 1-pole	55	--	Available long-term	--	--
5TT5 502	Remote switch, 12 V AC, 16 A, OFF, 2-pole	55	--	Available long-term	--	--
5TT5 511	Remote switch, 8 V, 16 A, OFF, 1-pole	55	--	Available long-term	--	--
5TT5 512	Remote switch, 8 V, 16 A, OFF, 2-pole	55	--	Available long-term	--	--
5TT5 521	Remote switch, 24 V, 16 A, OFF, 1-pole	55	--	Available long-term	--	--
5TT5 522	Remote switch, 24 V, 16 A, OFF, 2-pole	55	--	Available long-term	--	--
5TT5 531	Remote switch, 230 V, 16 A, OFF, 1-pole	55	--	Available long-term	--	--
5TT5 532	Remote switch, 230 V, 16 A, OFF, 2-pole	55	--	Available long-term	--	--
5TT6 110	Current monitor, 230 V, 5 A, for transformer	55	--	No replacement	--	--
7KT1 130	Multimeter with S0 interface, direct connection	70	7KT1 310	Multicounter with S0 interface	70	10
7KT1 131	Multimeter with S0 interface, transformer connection	70	7KT1 311	Multicounter with S0 interface, transformer connection	70	10
7KT1 132	Multimeter with S0 interface, direct connection	70	7KT1 310	Multicounter with S0 interface	70	10
7KT1 133	Multimeter with S0 interface, transformer connection	70	7KT1 311	Multicounter with S0 interface, transformer connection	70	10
7KT1 151	E-counter, 3/4-w., 63 A, S0 pulse output, single rate	70	7KT1 500	E-counter, 63 A, kWh, single rate	70	10
7KT1 152	E-counter, 3/4-w., 63 A, S0 pulse output, double rate	70	7KT1 510	E-counter, 63 A, kWh, double rate	70	10
7KT1 154	E-counter, 3/4-w., /5 A, S0 pulse output, single rate	70	7KT1 501	E-counter, /5 A, kWh, single rate	70	10
7KT1 155	E-counter, 3/4-w., /5 A, S0 pulse output, double rate	70	7KT1 511	E-counter, /5 A, kWh, double rate	70	10
7KT1 160	E-counter, 3/4-w., 63 A 1 x S0 pulse output	70	7KT1 502	E-counter, 63 A, kWh/kvarh, single rate	70	10
7KT1 161	E-counter, 3/4-w., 63 A 2 x S0 pulse output	70	7KT1 512	E-counter, 63 A, kWh/kvarh, double rate	70	10
7KT1 163	E-counter, 3/4-w., /5 A 1 x S0 pulse output	70	7KT1 503	E-counter, /5 A, kWh/kvarh, single rate	70	10
7KT1 164	E-counter, 3/4-w., /5 A 2 x S0 pulse output	70	7KT1 513	E-counter, /5 A, kWh/kvarh, double rate	70	10
7KT5 745	Time counter, 12 ... 24 V DC	55	7KT5 801	Mech. time counter, 10 ... 27 V DC	70	10
7KT5 745-0	Time counter, 115 V AC 50 Hz	55	7KT5 803	Mech. time counter, 115 V AC 50 Hz	70	10
7KT5 745-1	Time counter, 230 V AC 50 Hz	55	7KT5 804	Mech. time counter, 230 V AC 50 Hz	70	10
7KT5 745-2	Time counter, 115 V AC 60 Hz	55	7KT5 806	Mech. time counter, 115 V AC 60 Hz	70	10
7KT5 745-3	Time counter, 230 V AC 60 Hz	55	7KT5 807	Mech. time counter, 230 V AC 60 Hz	70	10
7KT5 745-4	Time counter, 24 V AC 50 Hz	55	7KT5 802	Mech. time counter, 24 V AC 50 Hz	70	10
7KT5 751	Pulse counter 24 V DC	55	7KT5 811	Mech. pulse counter, 24 V DC	70	10
7KT5 752	Pulse counter, 24 V AC 50 Hz	55	7KT5 812	Mech. pulse counter, 24 V AC 50/60 Hz	70	10

Notes on Product Changeover

Product Changeover

Overview

Type	Product	Mount. depth mm	Type	Successor product	Mount. depth mm	Chapter
7KT5 753	Pulse counter, 230 V AC 50 Hz	55	7KT5 814	Mech. pulse counter, 230 V AC 50/60 Hz	70	10
7KT5 761	Time counter 2 x 230 V AC 50 Hz	55	--	No replacement	--	--
7KT5 762	Time/pulse counter, 2 x 230 V AC	55	--	No replacement	--	--
7KT5 763	Pulse counter, 2 x 230 V AC 50 Hz	55	--	No replacement	--	--
7KT5 770	Time counter, 12 ... 60 V DC	55	7KT5 821	El. time counter, 12 ... 150 V DC, 24 ... 240 V AC 50/60 Hz	70	10
7KT5 771	Time counter, 80 ... 230 V AC 50 Hz	55	7KT5 821	El. time counter, 12 ... 150 V DC, 24 ... 240 V AC 50/60 Hz	70	10
7KT5 775	Time counter, 12 ... 60 V DC, reset	55	7KT5 822	El. time counter, 12 ... 150 V DC, 24 ... 240 V AC 50/60 Hz, el. reset	70	10
7KT5 776	Time counter, 80 ... 230 V AC 50 Hz, reset	55	7KT5 822	El. time counter, 12 ... 150 V DC, 24 ... 240 V AC 50/60 Hz, el. reset	70	10
7KT5 780	Pulse counter, 12 ... 60 V DC	55	7KT5 833	El. pulse counter, 12 ... 150 V DC, 24 ... 240 V AC 50/60 Hz, el./mech. reset	70	10
7KT5 781	Pulse counter, 80 ... 230 V AC 50 Hz	55	7KT5 833	El. pulse counter, 12 ... 150 V DC, 24 ... 240 V AC 50/60 Hz, el./mech. reset	70	10
7KT5 785	Pulse counter, 12 ... 60 V DC, reset	55	7KT5 833	El. pulse counter, 12 ... 150 V DC, 24 ... 240 V AC 50/60 Hz, el./mech. reset	70	10
7KT5 786	Pulse counter, 80 ... 230 V AC 50 Hz, reset	55	7KT5 833	El. pulse counter, 12 ... 150 V DC, 24 ... 240 V AC 50/60 Hz, el./mech. reset	70	10
7LF4 101	Dig. time switch, 1 channel, 230 V, 16 A	55	7LF4 401-0	Dig. time switch Mini, 1 channel, week, 230 V	70	8
7LF4 110	Dig. time switch, 1 channel, day, 230 V, 16 A	55	7LF4 411-0	Dig. time switch Top, 1 channel, week, 230 V	70	8
7LF4 111	Dig. time switch, 1 channel, week, 230 V, 16 A	55	7LF4 411-0	Dig. time switch Top, 1 channel, week, 230 V	70	8
7LF4 112	Dig. time switch, 1 channel, week, 24 V, 16 A	55	7LF4 421-2	Dig. time switch Profi, 1 channel, week, 24 V	70	8
7LF4 114	Dig. time switch, 1 channel, week, 230 V, 16 A	55	7LF4 421-0	Dig. time switch Profi, 1 channel, week, 230 V	70	8
7LF4 120	Dig. time switch, 2 channels, week, 230 V	55	7LF4 412-0	Dig. time switch Top, 2 channels, week, 230 V	70	8
7LF4 121	Dig. time switch, 2 channels, week, 230 V	55	7LF4 422-0	Dig. time switch Profi, 2 channels, week, 230 V	70	8
7LF4 143	DC F-77 power supply unit	55	--	No replacement	--	--
7LF4 144	DC F-77 power supply unit + IR interface	55	--	No replacement	--	--
7LF4 150	Dig. time switch, year	55	--	Planned	--	--
7LF4 151	Dig. time switch, 2 channels, year	55	--	Planned	--	--
7LF4 152	Dig. time switch, 3 channels, year	55	--	Planned	--	--
7LF4 153	Dig. time switch, 3 channels, year, 24 V	55	--	Planned	--	--
7LF4 154	Dig. time switch, 3 channels, year, 12 V	55	--	No replacement	--	--
7LF5 101	Synchronous time switch, 1 MW	55	7LF5 390-1	Synchronous time switch, 1NO, day, 1 MW	55	12
7LF5 141	Quartz time switch, day, 1 MW	55	7LF5 391-1	Quartz time switch 1NO, day, 1 MW	55	12
7LF5 201	Synchronous time switch, 1NO, day, 1 MW	55	7LF5 300-1	Synchronous time switch, 1NO, day, 1 MW	70	8
7LF5 211	Quartz time switch, day, 1NO, 1 MW	55	7LF5 301-1	Quartz time switch 1NO, day, 1 MW	70	8
7LF5 216	Quartz time switch, 1CO, day, 3 MW	55	7LF5 301-6	Quartz time switch, 1CO, day, 3 MW	70	8
7LF5 217	Quartz time switch, 1CO, week, 3 MW	55	7LF5 301-7	Quartz time switch, 1CO, week, 3 MW	70	8
7LQ1 005	Quartz time switch, 1NO, day	55	7LF5 391-1	Quartz time switch 1NO, day, 1 MW	55	12
7LQ1 005	Quartz time switch, 1NO, day	55	7LF5 301-1	Quartz time switch 1NO, day, 1 MW	70	8
7LQ1 006	Quartz time switch, 1CO, day	55	7LF5 391-6	Quartz time switch, 1CO, day, 3 MW	55	12
7LQ1 006	Quartz time switch, 1CO, day	55	7LF5 301-6	Quartz time switch, 1CO, day, 3 MW	70	8
7LQ1 007	Quartz time switch, day/week	55	7LF5 391-7	Quartz time switch, 1CO, week, 3 MW	55	12
7LQ1 007	Quartz time switch, day/week	55	7LF5 301-7	Quartz time switch, 1CO, week, 3 MW	70	8
7LQ1 008	Quartz time switch, day/week	55	--	No replacement	--	--
7LQ1 106	Quartz time switch, day, 3 MW	55	7LF5 391-6	Quartz time switch, 1CO, day, 3 MW	55	12
7LQ1 107	Quartz time switch, week, 3 MW	55	7LF5 391-7	Quartz time switch, 1CO, week, 3 MW	55	12
7LS1 004	Synchronous time switch, 1NO, day	55	7LF5 390-1	Synchronous time switch, 1NO, day, 1 MW	55	12
7LS1 004	Synchronous time switch, 1NO, day	55	7LF5 300-1	Synchronous time switch, 1NO, day, 1 MW	70	8
7LS1 005	Synchronous time switch, 1CO, day	55	7LF5 300-5	Synchronous time switch, 1CO, day, 3 MW	70	8
7LS1 006	Synchronous time switch, 1CO, week	55	7LF5 300-6	Synchronous time switch, 1CO, week, 3 MW	70	8
7LS1 007	Synchronous time switch, 1CO, hour	55	7LF5 300-7	Synchronous time switch, 1NO, hour, 1 MW	70	8
7LS1 008	Synchronous time switch, day/week	55	--	No replacement	--	--
7LS1 010	Synchronous time switch, day/day	55	--	No replacement	--	--
7LS1 105	Synchronous time switch, day, 3 MW	55	7LF5 300-5	Synchronous time switch, 1CO, day, 3 MW	70	8
7LS1 106	Synchronous time switch, week, 3 MW	55	7LF5 300-6	Synchronous time switch, 1CO, week, 3 MW	70	8
7LS1 107	Synchronous time switch, hour, 3 MW	55	7LF5 300-7	Synchronous time switch, 1NO, hour, 1 MW	70	8

14 Appendix

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Ordering notes

Ag and Cu surcharges

All products containing silver/copper shall be subject to surcharges if the limit value is exceeded. The level of the surcharges is calculated as follows:

NE metal surcharges =
("quote for metal"¹) – "limit value" x the metal weight contained in the respective product

The limit value is as follows

- for copper (Cu) 150,- €/100 kg
- for silver (Ag) 150,- €/001 kg.

- 1) for Cu: Previous month's average of the upper DEL quotation + 1% handling fee
for Ag: "German quotation processed"; both to be found in the EIS of GPL.

Registered Trademarks

All product designations may be registered trademarks or product names of Siemens AG or other supplying companies. Third parties using these trademarks or product names for their own purposes might infringe upon the rights of the trademark owners.

Ordering special designs

When ordering products that differ from the standard designs, the Order No. in the catalog must be supplemented by a "**-Z**"; the required characteristics must then be specified either by means of brief alphanumeric data or in plain text.

Ordering very small quantities

When ordering very small quantities, the cost of order processing often exceeds the order value. We therefore recommend that you combine several small orders. Where this is not possible, please note that we are obliged to make a small processing charge: for orders with a net goods value of less than 100,- € we charge a 15,- € supplement to cover our order processing and invoicing costs.

Internet

You can also visit our Automation & Drives site on the Internet at the following addresses:

- for the sector Automation and Drives:
<http://www.siemens.com/automation>
- for Installation Technology:
<http://www.siemens.com/e-installation>
- for the A&D Mall:
<http://www.siemens.com/automation/mall>

Notes

All technical data, dimensions and weights are subject to change without notice unless otherwise specified on the pages of this catalog.

All dimensions are specified in mm, the illustrations are for reference purposes only.

The technical data are for general information. The instruction manuals and the instructions on the products must be observed during assembly, operation and maintenance.

Siemens contacts in the WWW



At:

<http://www.siemens.com/automation/partner>

you can find details of Siemens contact partners worldwide responsible for particular technologies.

You can obtain in most cases a contact partner for

- Technical Support,
- Spare parts/repairs,
- Service,
- Training,
- Sales or
- Consultation/engineering.

You start by selecting a

- Country,
- Product or
- Sector.

By further specifying the remaining criteria you will find exactly the right contact partner with his/her respective expertise.



Appendix A&D-Online Services

Information and Ordering in the Internet and on CD-ROM

A&D in the WWW



A detailed knowledge of the range of products and services available is essential when planning and configuring automation systems. It goes without saying that this information must always be fully up-to-date.

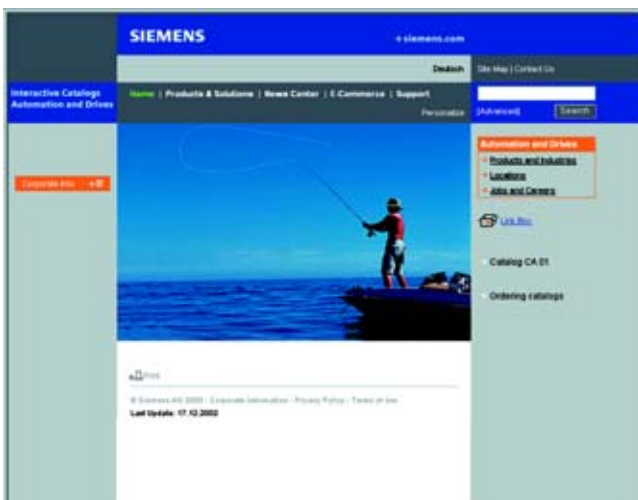
The Siemens Automation and Drives Group (A&D) has therefore built up a comprehensive range of information in the World Wide Web, which offers quick and easy access to all data required.

Under the address

<http://www.siemens.com/automation>

you will find everything you need to know about products, systems and services.

Product Selection Using the Offline Mall of Automation and Drives



Detailed information together with convenient interactive functions: The Offline Mall CA 01 covers more than 80,000 products and thus provides a full summary of the Siemens Automation and Drives product base.

Here you will find everything that you need to solve tasks in the fields of automation, switchgear, installation and drives. All information is linked into a user interface which is easy to work with and intuitive.

After selecting the product of your choice you can order at the press of a button, by fax or by online link.

Information on the Offline Mall CA 01 can be found on the Internet under

<http://www.siemens.com/automation/ca01>

or on CD-ROM or DVD.

Easy Shopping with the A&D Mall



The A&D Mall is the virtual department store of Siemens AG in the Internet. Here you have access to a huge range of products presented in electronic catalogs in an informative and attractive way.

Data transfer via EDIFACT allows the whole procedure from selection through ordering to tracking of the order to be carried out online via the Internet.

Numerous functions are available to support you.

For example, powerful search functions make it easy to find the required products, which can be immediately checked for availability. Customer-specific discounts and preparation of quotes can be carried out online as well as order tracking and tracing.

Please visit the A&D Mall on the Internet under:

<http://www.siemens.com/automation/mall>

Our Services for Every Phase of Your Project

General



In the face of harsh competition you need optimum conditions to keep ahead all the time: A strong starting position. A sophisticated strategy and team for the necessary support - in every phase. Service & Support from Siemens provides this support with a complete range of different services for automation and drives.

In every phase: from planning and startup to maintenance and upgrading.

Our specialists know when and where to act to keep the productivity and cost-effectiveness of your system running in top form.

Online support



The comprehensive information system available round the clock via Internet ranging from Product Support and Service & Support services to Support Tools in the Shop.

<http://support.automation.siemens.com>

Technical support



Competent consulting in technical questions covering a wide range of customer-oriented services for all our products and systems.

Tel.: +49 (0)911 895 5900¹⁾
 Fax: +49 (0)911 895 5907¹⁾
 E-Mail: technical-assistance@siemens.com

Technical consulting



Support in the planning and designing of your project from detailed actual-state analysis, target definition and consulting on product and system questions right to the creation of the automation solution.¹⁾

Configuration and software engineering



Support in configuring and developing with customer-oriented services from actual configuration to implementation of the automation project.¹⁾

Service on site



With Service On Site we offer services for startup and maintenance, essential for ensuring system availability.

In Germany Tel.:
+49 (0)180 50 50 444¹⁾

Repairs and spare parts



In the operating phase of a machine or automation system we provide a comprehensive repair and spare parts service ensuring the highest degree of operating safety and reliability.

In Germany Tel.:
+49 (0)180 50 50 448¹⁾

Optimization and upgrading



To enhance productivity and save costs in your project we offer high-quality services in optimization and upgrading.¹⁾

¹⁾ For country-specific telephone numbers go to our Internet site at: <http://www.siemens.com/automation/service&support>

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Automation and Drives	<i>Catalog</i>		
Interactive catalog on CD-ROM and on DVD			
• The Offline Mall of Automation and Drives	CA 01		
Automation Systems for Machine Tools			
SINUMERIK & SIMODRIVE	NC 60		
SINUMERIK & SINAMICS	NC 61		
Drive Systems			
<u>Variable-Speed Drives</u>			
SINAMICS G130 Drive Converter Chassis Units, SINAMICS G150 Drive Converter Cabinet Units	D 11		
SINAMICS G110 Inverter Chassis Units	D 11.1		
SINAMICS GM150/SINAMICS SM150 Medium-Voltage Converter 0.6 MVA to 28 MVA	D 12		
SINAMICS S120 Vector Control Drive System	D 21.1		
SINAMICS S120 Servo Control Drive System	D 21.2		
SINAMICS S150 Drive Converter Cabinet Units	D 21.3		
Asynchronous Motors Standardline	D 86.1		
DC Motors	DA 12		
SIMOREG DC MASTER 6RA70 Digital Chassis Converters	DA 21.1		
SIMOREG K 6RA22 Analog Chassis Converters	DA 21.2		
SIMOREG DC MASTER 6RM70 Digital Converter Cabinet Units	DA 22		
SIMOVERT PM Modular Converter Systems	DA 45		
SIEMOSYN Motors	DA 48		
MICROMASTER 410/420/430/440 Inverters	DA 51.2		
MICROMASTER 411/COMBIMASTER 411	DA 51.3		
SIMOVERT MASTERDRIVES Vector Control	DA 65.10		
SIMOVERT MASTERDRIVES Motion Control	DA 65.11		
Synchronous and asynchronous servomotors for SIMOVERT MASTERDRIVES	DA 65.3		
SIMODRIVE 611 universal and POSMO	DA 65.4		
<u>Low-Voltage Three-Phase-Motors</u>			
Squirrel-Cage Motors, Totally Enclosed, Fan-Cooled	M 11		
<u>Automation Systems for Machine Tools SIMODRIVE</u>	NC 60		
• Main Spindle/Feed Motors			
• Converter Systems SIMODRIVE 611/POSMO			
<u>Automation Systems for Machine Tools SINAMICS</u>	NC 61		
• Main Spindle/Feed Motors			
• Drive System SINAMICS S120			
<u>Drive and Control Components for Hoisting Equipment</u>	HE 1		
Electrical Installation Technology			
ALPHA Small Distribution Boards and Distribution Boards	ET A1		
<i>PDF: ALPHA 8HP Molded-Plastic Distribution System</i>	ET A3		
<i>PDF: ALPHA FIX Terminal Blocks</i>	ET A5		
BETA Modular Installation Devices	ET B1		
DELTA Switches and Outlets	ET D1		
GAMMA Building Management Systems	ET G1		
Human Machine Interface Systems SIMATIC HMI	ST 80		
Industrial Communication for Automation and Drives		<i>Catalog</i>	IK PI
Low-Voltage			
Controls and Distribution – SIRIUS, SENTRON, SIVACON			LV 1
Controls and Distribution – Technical Information SIRIUS, SENTRON, SIVACON			LV 1 T
Circuit-Breakers from 10 A to 3200 A			LV 35
SIDAC reactors and filters			LV 60
SIVACON 8PS Busbar trunking systems CD, BD01, BD2 up to 1250 A			LV 70
Motion Control System SIMOTION			PM 10
Process Instrumentation and Analytics			
Field Instruments for Process Automation			FI 01
Measuring Instruments for Pressure, Differential Pressure, Flow, Level and Temperature, Positioners and Liquid Meters			
<i>PDF: Indicators for panel mounting</i>			MP 12
SIREC Recorders and Accessories			MP 20
SIPART, Controllers and Software			MP 31
SIWAREX Weighing Systems			WT 01
Continuous Weighing and Process Protection			WT 02
Process Analytical Instruments			PA 01
<i>PDF: Process Analytics, Components for the System Integration</i>			PA 11
SIMATIC Industrial Automation Systems			
SIMATIC PCS Process Control System			ST 45
Products for Totally Integrated Automation and Micro Automation			ST 70
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Add-ons for the SIMATIC PCS 7 Process Control System			ST PCS 7.1
Migration solutions with the SIMATIC PCS 7 Process Control System			ST PCS 7.2
pc-based Automation			ST PC
SIMATIC Control Systems			ST DA
SIMATIC Sensors			FS 10
SIPOS Electric Actuators			
Electric Rotary, Linear and Part-turn Actuators			MP 35
Electric Rotary Actuators for Nuclear Plants			MP 35.1/2
Systems Engineering			
Power supplies SITOP power			KT 10.1
System cabling SIMATIC TOP connect			KT 10.2
System Solutions			
Applications and Products for Industry are part of the interactive catalog CA 01			
TELEPERM M Process Control System			
<i>PDF: AS 488/TM automation systems</i>			PLT 112

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