

4

Residual Current Protective Devices

General Data	4/2	Product overview
	4/3	Description
Residual current operated circuit-breakers (RCCBs)	4/9	5SM3, 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	Auxiliary circuit switches for 5SM3
Residual current operated circuit-breakers (RCCBs), UC sensitive	4/18	5SZ, product overview
	4/21	5SZ, type B, 25 ... 63 A
	4/22	5SM1 930 leakage current measurement unit
RC units for miniature circuit-breakers	4/23	5SM2, product overview
	4/25	5SM2, type AC, 0.3 ... 63 A, for 5SY4, 5SY6, 5SY7, 5SY8
	4/26	5SM2, type A, 0.3 ... 63 A, for 5SY4, 5SY6, 5SY7, 5SY8
	4/28	5SM2, type AC, 80 ... 100 A, for 5SP4
	4/29	5SM2, type A, 80 ... 100 A, for 5SP4
	RCCBs with integral overcurrent protection (RCBOs)	4/30
4/32		5SU1, type AC, 6 ... 40 A, 1-pole + N
4/34		5SU1, type A, 6 ... 40 A, 1-pole + N
4/36		Auxiliary circuit switch/fault signal contact for 5SU1, 1-pole + N
4/37		Shunt trips for 5SU1, 1-pole + N
4/38		5SU1, type AC, 6 ... 32 A, 2-pole
RCCB socket outlets (SRCDs)	4/39	5SM1 and 5SZ9 protective socket outlets
Accessories	4/41	For all product ranges
	4/42	For 5SM3 residual current operated circuit-breakers



Residual Current Protective Devices

General Data

Product overview

Overview

Residual current operated circuit-breakers (RCCBs)



5SM3

- Type AC and 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

Residual current operated circuit-breakers (RCCBs), UC sensitive



5SZ

- Type B
- $I_n = 25 \dots 63 \text{ A}$
- $I_{\Delta n} = 30 \text{ and } 300 \text{ mA}$
- 4-pole (3-pole + N)
- Standard and for medical applications
- Leakage current measurement units

RC units for miniature circuit-breakers



5SM2

- For mounting on miniature circuit-breaker
- Combined personnel and line protection
- Type AC and 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**

RCCBs with integral overcurrent protection (RCBOs)



5SU1

- Combined personnel and line protection
- Type AC and type A
- $I_n = 6 \dots 40 \text{ A}$
- $I_{\Delta n} = 10 \dots 300 \text{ mA}$
- Circuit-breaker characteristic B and C
- Rated short-circuit capacity 4.5 kA, 6 kA and 10 kA
- 2-pole and 1-pole + N

RCCB Socket Outlets (SRCDs)



5SM1 and 5SZ9

- Can be retrofitted in existing installation
- 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 box

Definitions

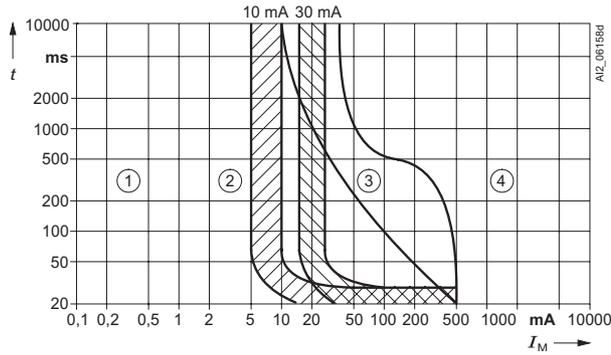
1 MW = 18 mm modular width

Overview

Protection against dangerous leakage currents acc. 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



- 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

Effective current ranges acc. to IEC 60479

Protective action

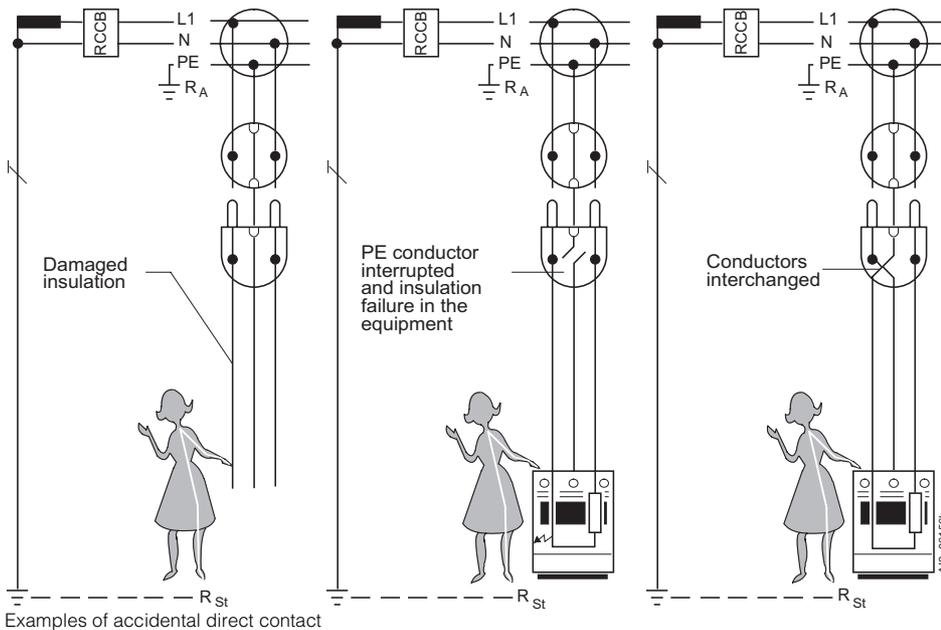
While devices for rated residual current $I_{\Delta n} > 30 \text{ mA}$ provide protection against indirect contact, using devices with $I_{\Delta n} \leq 30 \text{ mA}$ also offers the best possible additional protection against the accidental direct contact of live parts.

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 tripping time lies in the middle between 10 ms and 30 ms.

The permissible tripping time of max. 0.3 s (300 ms) acc. to VDE 0664 or 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 that, e.g. 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.

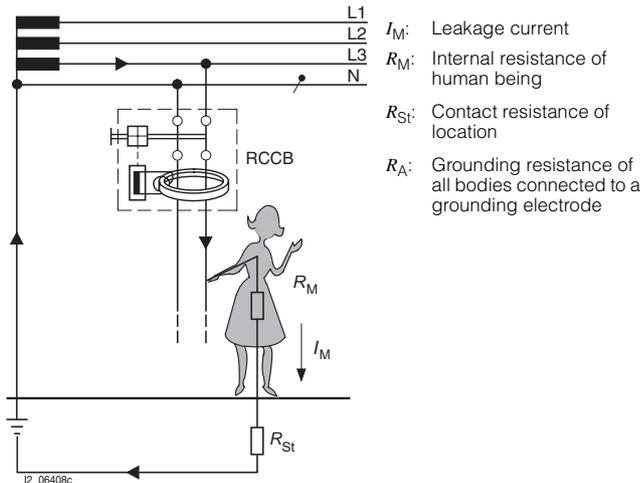
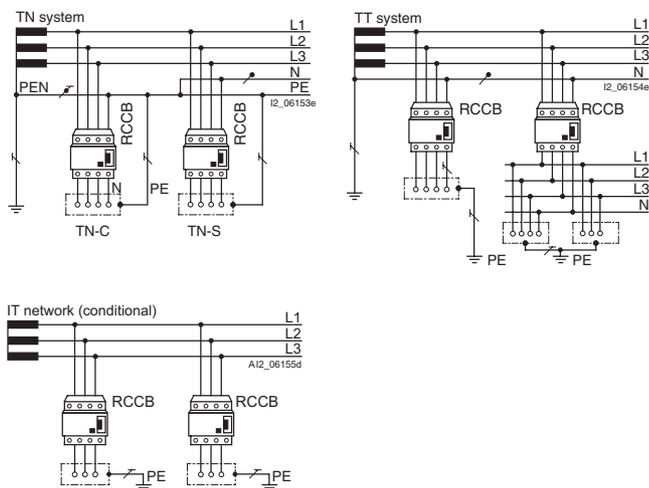


Diagram: Additional protection against direct contact with live parts

Usage

Residual current protective devices can be used in all three system configurations (IEC 364-4-41, HD 384.4.41, DIN VDE 0100-410).

In the IT system, 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 system 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 I_{Dn}	Max. permissible grounding resistance at a max. permissible touch voltage of	
	50 V	25 V
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 acc. to HD 384.4.482, DIN VDE 0100-482

Application

- When using residual current protective devices with $I_{Dn} \leq 300$ mA protection against the occurrence of fires started electrically due to isolation faults

Protective action

HD 384.4.482, 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 is 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 with 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 acc. 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.

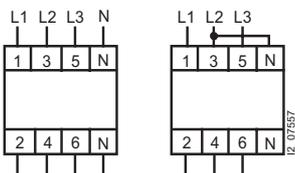
We recommend testing the functionality when commissioning the system and then at regular intervals - approx. every six months. Furthermore, it is also essential to ensure compliance with the test intervals specified in the pertinent rules and regulations (e.g. accident prevention regulations).

The minimum working voltage for operation of the test equipment normally is 100 V AC (series 5SM).

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 and 5 and 2, 4 and 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 acc. 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 has the identification code K.

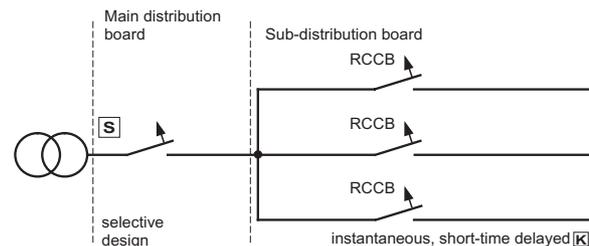
Selective tripping S

Residual current protective devices normally has 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 has a tripping delay.

Furthermore, selective residual current protective devices must have an increased surge current withstand capability of at least 3 kA acc. 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 has 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		
For selective disconnection S		instantaneous design		or 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_06168g

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

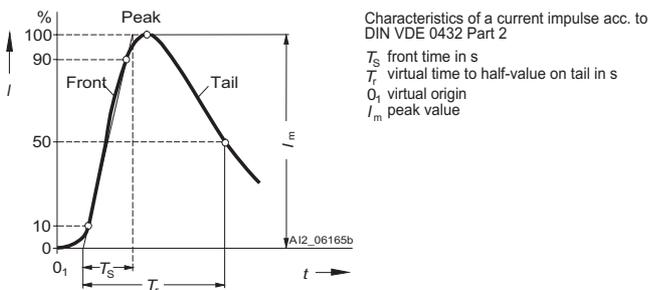
Due to their principle of operation, the standard versions of residual current protective devices are designed for maximum efficiency in 50/60 Hz systems. Product standards and tripping conditions also refer to this frequency. The sensitivity decreases with increasing frequency. In order to implement 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 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 ms.



Surge current wave 8/20 ms (front time 8 ms: Time to half-value 20 ms)

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:

Design	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 the installation regulations IEC 364-4-41, HD 384.4.41, 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 PE 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. According to the VDE regulations, this is the highest possible level of short-circuit strength.

Data for the rated short-circuit capacity acc. 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 for residual current protective device A	Rated short-circuit capacity I_m acc. to IEC/EN 61008 (VDE 0664) at a grid distance of 35 mm A	Maximum permissible short-circuit series fuse NH, DIAZED, NEOZED utilization category gL/gG for residual current protective device	
		125 ... 400 V AC A	500 V AC 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 ... 63	8 MW	630	63

Example:



Short-circuit strength 10 kA with max. permissible short-circuit series fuse 100 A.

Residual Current Protective Devices

General Data

Description

4

Overview

Types of current

Due to the use of electronic components in household appliances and industrial plants, insulation faults can also cause residual currents that are not 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 trips for both sinusoidal AC residual currents and pulsating DC residual currents (type A) is identified by the mark .

Residual current protective devices that also trips for smooth DC residual currents (type B) is 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 VDE 0664, Part 100.

Residual Current Protective Devices

General Data

Description

Application

Standards	Application	Required $I_{\Delta n}$ [mA]	Recommended residual current protective devices		
			5SM.. (Type A)	5SZ.. (Type B)	SIGRES 
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 plants	≤ 30	•	–	–
DIN VDE 0100-559	Lights 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	Worksites, 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	Portable buildings, vehicles, mobile homes for fairgrounds, feeding points	≤ 500	•	–	•
DIN VDE 0100-723 draft	Classrooms with experiment stands	≤ 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 homes	≤ 30	•	–	–
DIN VDE 0118-100	Mining plants	≤ 500	•	–	•
EN 50178 (VDE 0160)	Testing the equipment of power installations with electronic equipment, type B	General requirements for correct selection when using res. current protection	•	•	–
DIN VDE 0832-100	Traffic signals • Class T1 • Class U1	≤ 300	•	–	•
		≤ 30	•	–	•
BG FE BGI 608	Selection and operation of electrical equipment on worksites General: • Socket outlet circuits > 32 A • Socket outlet circuits > 32 A Frequency-controlled equipment: • with plug-and-socket device ≤ 32 A • with plug-and-socket device > 32 A	≤ 30	•	•	•
		≤ 500	•	•	•
		≤ 30	–	•	–
		≤ 500	–	•	–
		30 (recommended)	•	•	•

Note:

For reasons of basic fire protection, we recommend a maximum rated residual current of 300 mA for residual current protection devices.

DIN VDE 0100 is the German publication of IEC 60364, however some parts/sections are modified due to special European or German regulations.

Residual Current Protective Devices

Residual Current Operated Circuit-Breakers (RCCBs)

5SM3, product overview

4

Overview

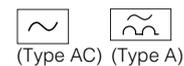
	Number of poles	Rated residual current $I_{\Delta n}$ mA	Rated current I_n A	MW	Mountable auxiliary circuit switch	N-connection	
						right	left
Residual current operated circuit-breakers, type AC ¹⁾, 16 ... 125 A							
instantaneous tripping	2	10 30, 100, 300	16 25 40	2	•	•	–
		30, 100, 300	63 80	2.5	•	•	–
	4	30, 300 100, 500	25	4	•	•	•
		30, 300 100, 500	40		•	•	•
		30, 300 100, 500	63		•	•	•
		30, 300	80		•	•	•
		300	100		•	•	–
		30, 100, 300, 500	125		•	•	–
S selective, surge current withstand capability >3 kA	4	300	100	4	•	•	–
Residual current operated circuit-breakers, type A ²⁾, 16 ... 125 A							
instantaneous tripping, surge current withstand capability >1 kA	2	10, 30 30, 100, 300	16 25 40	2	•	•	–
		30, 100, 300	63 80	2.5	•	•	–
	4	30, 300 500	25	4	•	•	•
		30, 300 100, 500	40		•	•	•
		30, 300 100, 500	63		•	•	•
		30, 300	80		•	•	•
		30, 100, 300, 500	125		•	•	–
K short-time delayed, surge current withstand capability >3 kA	4	30 30, 100	25 40 63	4	•	•	–
S selective, surge current withstand capability >5 kA	2	100, 300	63	2.5	•	•	–
	4	100, 300 100, 1 000 300	40 63	4	•	•	•
		300, 500	125		•	•	–
SIGRES residual current operated circuit-breaker, type A ²⁾, for severe environmental conditions							
instantaneous tripping, surge current withstand capability >1 kA	2	30	25 40	2	•	•	–
		30	63 80	2.5	•	•	–
	4	30 30, 300	25 40 63	4	•	•	–
		30	80		•	•	–
S selective, surge current withstand capability >5 kA	4	300	63	4	•	•	–
Residual current operated circuit-breaker, type A ²⁾, 500 V							
instantaneous tripping, surge current withstand capability >1 kA	4	30, 300	25 40 63	4	•	•	–
Residual current operated circuit-breaker, type A ²⁾, 50 ... 400 Hz							
instantaneous tripping, surge current withstand capability >1 kA	4	30	25 40	4	•	•	–

1)  = type AC for AC fault currents.

2)  = type A for AC and pulsating DC fault currents.

Residual Current Protective Devices

Residual Current Operated Circuit-Breakers (RCCBs)



5SM3, 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, 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 (fork-type) and conductors		Conductor cross-section mm ²
	for 2 MW	at $I_n = 16\text{ A}, 25\text{ A}, 40\text{ A}$	1.0 ... 16
	for 2.5 MW	at $I_n = 63\text{ A}, 80\text{ A}$	1.5 ... 25
	for 4 MW	at $I_n = 25\text{ A}, 40\text{ A}, 63\text{ A}, 80\text{ A}$	1.5 ... 25
		at $I_n = 125\text{ A}$	2.5 ... 50
Recommended terminal tightening torque Nm			2.5 ... 3.0 2.5 ... 3.0 2.5 ... 3.0 3.0 ... 3.5
Supply connection	optionally top or bottom (except SIGRES: incoming supply from 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	16 A ... 80 A 100, 125 A	100 195
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		



Residual Current Protective Devices Residual Current Operated Circuit-Breakers (RCCBs)

5SM3, type AC, 16 ... 125 A

4

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.

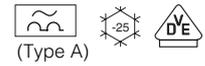
Selection and ordering data

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 item kg	PS*/ P. unit Items
				Order No.	Price 1 item	Order No.			
Instantaneous tripping									
125 ... 230 V AC; 50 ... 60 Hz; 2-pole									
<p>63 A 10 000</p>	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			
<p>100 A 10 000</p>	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									
<p>100 A 10 000</p>	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	5SM3 446-0	—	—	0.473	1			
<p>100 A 10 000</p>	30	25	4	5SM3 642-0	5SM3 642-OKL	0.473	1		
	40	40		5SM3 644-0	5SM3 644-OKL	0.473	1		
	63	63		5SM3 646-0	5SM3 646-OKL	0.473	1		
	80	80		5SM3 647-0	5SM3 647-OKL	0.473	1		
	100	100		5SM3 648-0	—	—	0.473	1	
	500	25		5SM3 742-0	—	—	0.473	1	
40	40	5SM3 744-0	—	—	0.473	1			
63	63	5SM3 746-0	—	—	0.473	1			
<p>125 A 10 000</p>	30	125	4	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									
<p>100 A 10 000</p>	300	100	4	5SM3 648-2	—	—	0.473	1	

For dimension drawings and terminal designations, see page 4/16.

Residual Current Protective Devices

Residual Current Operated Circuit-Breakers (RCCBs)



5SM3, type A, 16 ... 125 A

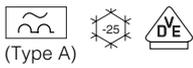
Application

- 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: >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 item kg	PS*/ P. unit Items	
				Order No.	Price 1 item	Order No.				
Instantaneous 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			
		63	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	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			

For additional components, see page 4/17.



Residual Current Protective Devices Residual Current Operated Circuit-Breakers (RCCBs)

5SM3, type A, 16 ... 125 A

Selection and ordering data

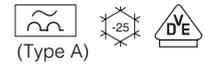
Circuit diagram/ max. permissible short-circuit series fuse	Rated residual current $I_{\Delta n}$ mA	Rated current I_n A1	MW	N-connection, right	N-connection, left	Weight 1 item kg	PS*/ P. unit Items
				Order No.	Order No.		
[K] short-time delayed, surge current withstand capability >3 kA							
230 ... 400 V AC; 50 ... 60 Hz; 4-pole							
	30	25	4	5SM3 342-6KK01 5SM3 344-6KK01 5SM3 346-6KK01 5SM3 446-6KK01	-	0.500	1
	30	40				0.500	1
	30	63				0.500	1
	100	63				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 5SM3 616-8	-	0.300	1
	300	63				0.280	1
230 ... 400 V AC; 50 ... 60 Hz; 4-pole							
	100	40	4	5SM3 444-8 5SM3 446-8 5SM3 644-8 5SM3 646-8 5SM3 846-8	-	0.460	1
	63	63				0.460	1
	300	40				0.440	1
	300	63				0.440	1
	1 000	63				0.515	1
N-connection, right							
	100 A						
N-connection, left							
	100 A						
	300	125		5SM3 645-8 5SM3 745-8	-	0.480	1
	500	125				0.480	1

For additional components, see page 4/17.

4

Residual Current Protective Devices

Residual Current Operated Circuit-Breakers (RCCBs)

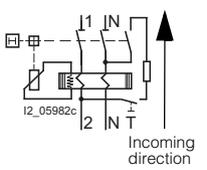
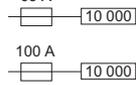
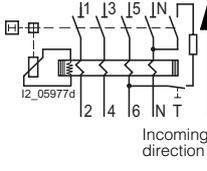
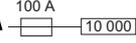


5SM3, type A, SIGRES, for severe environmental conditions [i], 25 ... 80 A

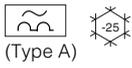
Application

- 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; 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: >5 kA.

Selection and ordering data

Circuit diagram	Maximum permissible short-circuit back-up fuse	Rated residual current $I_{\Delta n}$ mA	Rated current I_n A	MW	Ver- sion	Order No.	Weight 1 item kg	PS*/ P. unit Items		
[i] instantaneous tripping, surge current withstand capability >1 kA										
 <p>125 ... 230 V AC; 50 ... 60 Hz; 2-pole</p>		30	25	2	[i]	5SM3 312-6KK12	0.230	1		
			40				[i]	5SM3 314-6KK12	0.230	1
			63	2.5		[i]	5SM3 316-6KK12	0.320	1	
			80			[i]		5SM3 317-6KK12	0.320	1
 <p>230 ... 400 V AC; 50 ... 60 Hz; 4-pole</p>		30	25	4	[i]	5SM3 342-6KK12	0.500	1		
			40				[i]	5SM3 344-6KK12	0.500	1
			63				[i]	5SM3 346-6KK12	0.500	1
			80				[i]	5SM3 347-6KK12	0.500	1
			300	40			[i]	5SM3 644-6KK12	0.440	1
				63			[i]		5SM3 646-6KK12	0.440
[i], [S] selective, surge current withstand capability >5 kA										
		300	63	4	[i] [S]	5SM3 646-8KK12	0.440	1		

For additional components, see page 4/17.



Residual Current Protective Devices Residual Current Operated Circuit-Breakers (RCCBs)

5SM3, type A, 500 V, 25 ... 63 A

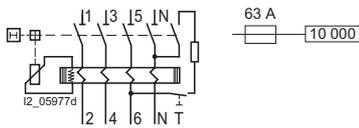
Application

- 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; applicable in systems up to 500 V AC
- 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	Maximum permissible short-circuit back-up fuse	Rated residual current	Rated current	MW	Version	Order No.	Weight 1 item	PS*/P. unit
		$I_{\Delta n}$ mA	I_n A				kg	Items

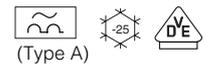
Instantaneous tripping, surge current withstand capability >1 kA

500 V AC; 50 ... 60 Hz; 4-pole		Rated residual current	Rated current	MW	Version	Order No.	Weight 1 item	PS*/P. unit	
		30	25	4		5SM3 352-6	0.500	1	
			40				5SM3 354-6	0.500	1
			63				5SM3 356-6	0.500	1
		300	25				5SM3 652-6	0.440	1
			40				5SM3 654-6	0.440	1
			63				5SM3 656-6	0.440	1

For additional components, see page 4/17.

Residual Current Protective Devices

Residual Current Operated Circuit-Breakers (RCCBs)



5SM3, type A, 50 ... 400 Hz, 25 ... 40 A

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; 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.

Selection and ordering data

Circuit diagram	Maximum permissible short-circuit back-up fuse	Rated residual current	Rated current	MW	Version	Order No.	Weight 1 item	PS*/P. unit
		$I_{\Delta n}$ mA	I_n A				kg	Items

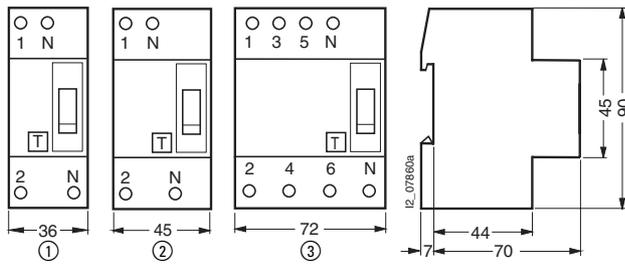
Instantaneous tripping, surge current withstand capability >1 kA

230 ... 400 V AC; 50 ... 400 Hz; 4-pole	Rated residual current	Rated current	MW	Order No.	Weight 1 item	PS*/P. unit
	30	25 40	4	5SM3 342-6KK03 5SM3 344-6KK03	0.500	1
					0.500	1

For additional components, see page 4/17.

Dimensional drawings

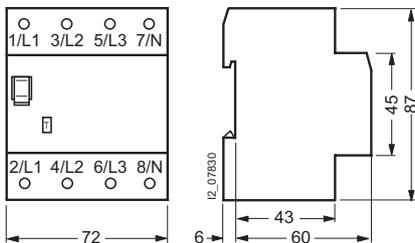
5SM3 residual current protective devices (up to 80 A)



- ① 2-pole
5SM3 111,
5SM3 311, 5SM3 312, 5SM3 314,
5SM3 412, 5SM3 414, 5SM3 416,
5SM3 612, 5SM3 614, 5SM3 616
- 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 442, 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 ... 125 A)

4-pole
5SM3 345, 5SM3 445,
5SM3 645, 5SM3 648,
5SM3 745



Residual Current Protective Devices Residual Current Operated Circuit-Breakers (RCCBs)

Auxiliary circuit switches for 5SM3

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

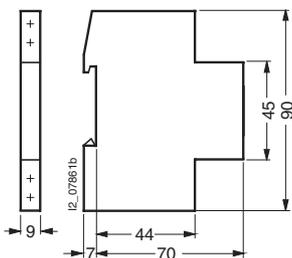
Circuit diagram	Version	MW	Order No.	Weight 1 item kg	PS*/ P. unit Items
Auxiliary circuit switch (AS) on RCCB for 5SM3 up to 80 A					
	Auxiliary circuit switches (AS) 21 13 22 14	1 NO + 1 NC	0.5	5SW3 300	0.042 1
	21 11 22 12	2 NC	0.5	5SW3 301	0.042 1
	23 13 24 14	2 NO	0.5	5SW3 302	0.042 1
Auxiliary circuit switch (AS) on RCCB for 5SM3, 100 ... 125 A					
	Auxiliary circuit switches (AS) 23 11 24 12	1 NO + 1 NC	0.5	5SW3 330	0.040 1

Dimensional drawings

Auxiliary circuit switch (AS), can be retrofitted

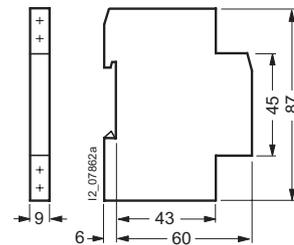
on 5SM3 residual current operated circuit-breakers (RCCBs), up to 80 A

5SW3 30 auxiliary circuit switches, can be retrofitted



on 5SM3 residual current operated circuit-breakers (RCCBs), 100 ... 125 A

5SW3 330 auxiliary circuit switch, can be retrofitted



Residual Current Protective Devices

Residual Current Operated Circuit-Breakers (RCCBs), UC Sensitive

5SZ, product overview

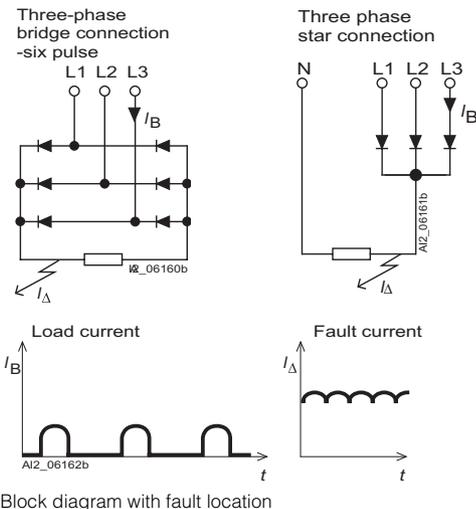
Overview

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 current-using 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 generate 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 include safety isolation; however this can only be achieved using heavy and expensive transformers. Universal current-sensitive residual current protective devices provides a perfect technical and cost-effective solution. This type of residual current protective device (type B) is included in EN 50 178 (DIN VDE 0160) "Equipping power installations with electronic equipment".

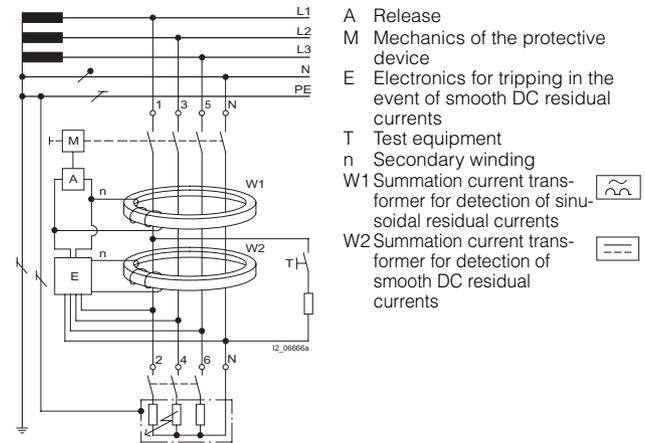


Block diagram with fault location

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.



- A Release
- M Mechanics of the protective device
- E Electronics for tripping in the event of smooth DC residual currents
- T Test equipment
- n Secondary winding
- W1 Summation current transformer for detection of sinusoidal residual currents
- W2 Summation current transformer for detection of smooth DC residual currents

Method of operation

In order to provide maximum security of supply, the power supply of the electronic unit is taken from all three outer 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 outer 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 outer conductors and the neutral conductor fail - if the remaining intact outer conductor presents a fire hazard due to a ground fault.

The residual current protective devices of type B is 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

Residual- Current Operated Circuit-Breakers (RCCBs), UC Sensitive

5SZ, 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 acc. 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 current compatibility curves

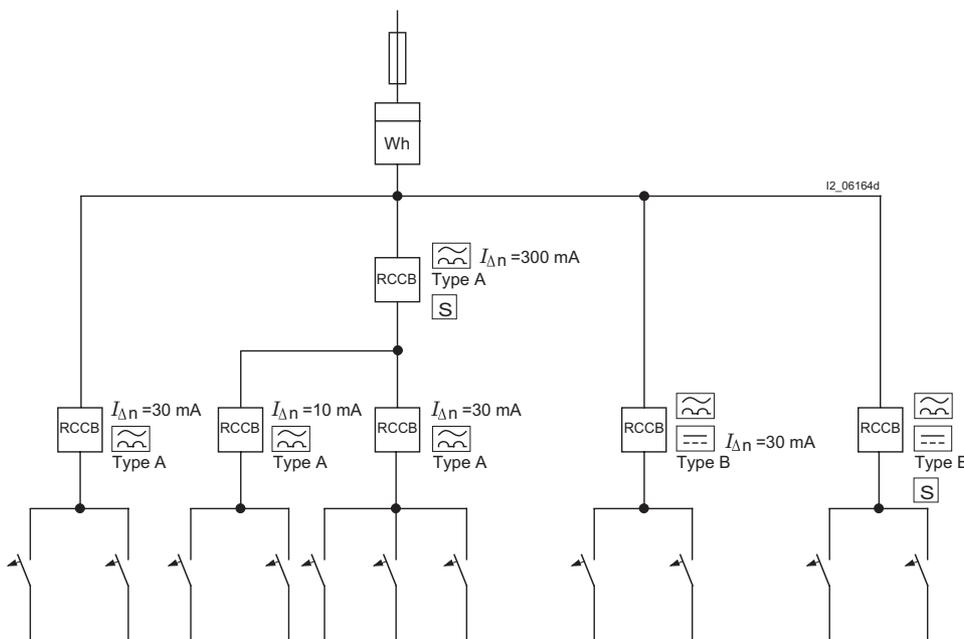
acc. to IEC 60479 for a range between 0.5 to 2.0 times the rated residual current.

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  .

Note:

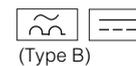
RCCBs with mounted auxiliary circuit switches support the integration of residual current protective devices in building management systems instabus KNX EIB and AS-i bus or PROFIBUS.



Configuration example with residual current protective devices type A and type B

Residual Current Protective Devices

Residual Current Operated Circuit-Breakers (RCCBs), UC Sensitive



5SZ, product overview

Overview

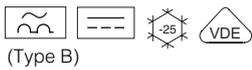
	Number of poles	Rated residual current $I_{\Delta n}$ mA	Rated current I_n A	MW	Mountable auxiliary circuit switch
Residual current operated circuit-breaker, type B ¹⁾					
instantaneous tripping, surge current withstand capability > 1 kA	4	30, 300	25 40 63	8	– – –/fixed mounted
S selective, surge current withstand capability > 5 kA	4	300	63	8	–/fixed mounted
for medical equipment, instantaneous tripping, surge current withstand capability > 1 kA	4	30, 300	63	8	–/fixed mounted

1)  = type B for AC fault currents, pulsating and smooth DC fault currents

Technical specifications

- Version with fixed mounted auxiliary circuit switch:
contact 1 NO + 1 NC, 6 A/ 230 V AC, 1 A/220 V DC;
Terminals for conductor cross-sections up to 2.5 mm²

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, 50 ... 60 Hz	
Rated currents I_n	A	25, 40, 63	
Rated residual currents $I_{\Delta n}$	mA	30, 300	
Enclosure	gray molded-plastic (RAL 7035)		
Mounting depth	mm	55	
Terminals	Tunnel terminals at both ends with wire protection		Conductor cross-section mm ²
	$I_n = 25$ A, 40 A, 63 A		1.5 ... 25
	Screw terminals for auxiliary circuit switches		0.75 ... 2.5
			Recommended terminal tightening torque Nm
			2.5 ... 3.0
			0.6 ... 0.8
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	100	
Device service life	> 10,000 operations (electrical and mechanical; Test cycle acc. to regulations)		
Storage temperature	°C	-40 ... +60	
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 Residual Current Operated Circuit-Breakers (RCCBs), UC Sensitive

5SZ, type B, 25 ... 63 A

4

Application

- Systems with equipment in which smooth DC fault currents can also arise (e.g. with B6 bridge circuit on frequency converters and medical equipment)
- 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); 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; 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 circuit-breaker. Very high surge current withstand capability: >5 kA.

Selection and ordering data

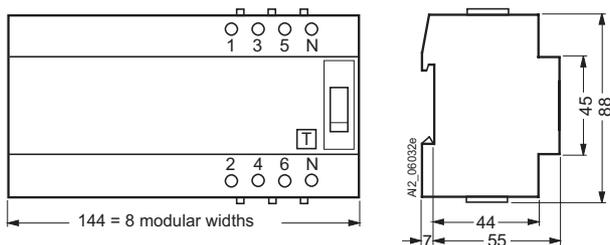
Circuit diagram	Maximum permissible short-circuit back-up fuse	Rated residual current $I_{\Delta n}$ mA	Rated current I_n A	MW	Ver- sion	Order No.	Weight 1 item kg	PS*/ P. unit Items	
Instantaneous tripping, surge current withstand capability >1 kA									
<p>230 ... 400 V AC; 50 ... 60 Hz; 4-pole</p>	63 A	30	25	8		5SZ3 426-0KG00	0.746	1	
			40				5SZ3 446-0KG00	0.746	1
			63				5SZ3 466-0KG00	0.746	1
		300	25	8		5SZ6 426-0KG00	0.706	1	
			40				5SZ6 446-0KG00	0.706	1
			63				5SZ6 466-0KG00	0.706	1
		30	63	8.5		5SZ3 466-0KG30	0.750	1	
		300				5SZ6 466-0KG30	0.750	1	
S selective, surge current withstand capability >5 kA									
		300	63	8	S	5SZ6 468-0KG00	0.706	1	
		300	63	8.5	S	5SZ6 468-0KG30	0.765	1	
For medical equipment, instantaneous tripping, surge current withstand capability >1 kA									
		230 ... 400 V AC; 50 ... 60 Hz; 4-pole for medical equipment (e. g. x-ray generators)							
		30	63	8		5SZ3 466-0KG05	0.710	1	
		300				5SZ6 466-0KG05	0.710	1	
		30	63	8.5		5SZ3 466-0KG35	0.750	1	
		300				5SZ6 466-0KG35	0.750	1	

Dimensional drawings

Residual current operated circuit-breakers, type B

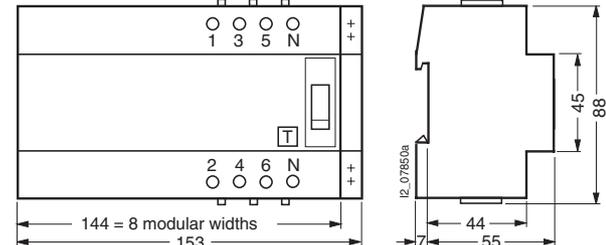
25 A to 63 A, universal current sensitive

5SZ3 426-0KG00, 5SZ3 446-0KG00, 5SZ3 466-0KG0., 5SZ6 426-0KG00, 5SZ6 446-0KG00, 5SZ6 466-0KG0., 5SZ6 468-0KG00



63 A, universal current sensitive, with auxiliary circuit switches, fixed mounted

5SZ3 466-0KG3., 5SZ6 466-0KG3., 5SZ6 468-0KG30



Residual Current Protective Devices

Residual Current Operated Circuit-Breakers (RCCBs), UC Sensitive

5SM1 930 leakage current measurement unit

Benefits

- The leakage current measurement unit enables systematic selection of the rated residual current for the RCCB, thus preventing accidental trippings. 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)
- 55 mm mounting depth

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 $> 1 \text{ M}\Omega$ can determine the leakage current. Measuring range for AC voltage: U_{eff} : 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.

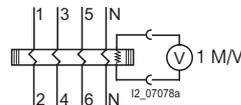
Selection and ordering data

Circuit diagram	Rated residual current $I_{\Delta n}$ mA	Rated current I_n A	MW	Order No.	Weight 1 item kg	PS*/ P. unit Items
-----------------	--	-----------------------------	----	-----------	------------------------	--------------------------

5SM1 930 leakage current measurement unit



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-90 471 Nürnberg

Tel. +49 (0)911 86 02 111
Fax +49 (0)911 86 02 777

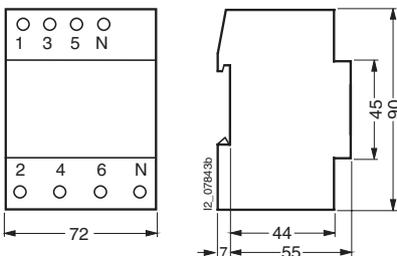
<http://www.gmc-instruments.com>

e-mail:

info@gmc-instruments.com

Dimensional drawings

5SM1 930-0 leakage current measurement unit



Residual Current Protective Devices RC Units for Miniature Circuit-Breakers

5SM2, product overview

4

Overview

	Number of poles	Rated residual current $I_{\Delta n}$ mA	Rated current I_n A	MW	Additional components can be retrofitted	 (type AC) ¹⁾	 (type A) ²⁾
RC units for 5SY4, 5SY6, 5SY7, 5SY8 miniature circuit-breakers ³⁾							
instantaneous tripping, surge current withstand capability >1 kA ⁴⁾	2	10	0.3 ... 16	2	at the MCB	•	•
	2	30, 300	0.3 ... 40	2	at the MCB at the MCB	•	•
		30, 300, 500	0.3 ... 63			•	•
	3	30, 300	0.3 ... 40	3	at the MCB at the MCB	•	•
30, 300, 500		0.3 ... 63	•			•	
4	30, 300	0.3 ... 40	3	at the MCB at the MCB	•	•	
	30, 300, 500	0.3 ... 63			•	•	
[K] short-time delayed surge current withstand capability >3 kA	4	30	0.3 ... 40 0.3 ... 63	3	at the MCB at the MCB	– –	• •
[S] selective surge current withstand capability >5 kA	2	300	0.3 ... 40 0.3 ... 63	2	at the MCB at the MCB	– –	• •
	3	300, 500, 1 000	0.3 ... 63	3	at the MCB	–	•
		300, 500, 1 000				–	•
RC units for 5SP4 miniature circuit-breakers ³⁾							
instantaneous tripping, surge current withstand capability >1 kA ⁴⁾	2	30, 300	80 ... 100	3.5	at the MCB	•	•
	4	30, 300	80 ... 100	5	at the MCB	•	•
[S] selective surge current withstand capability >5 kA	2	300	80 ... 100	3.5	at the MCB	–	•
	4	300, 1 000	80 ... 100	5	at the MCB	–	•

1)  = type AC for AC fault currents.

2)  = type A for AC and pulsating DC fault currents.

3) RC unit, additional components for 5SY- and 5SP4 miniature circuit-breakers, see also section, "Miniature circuit-breakers".

4) For type A.

Installation



The RC unit for 5SM2 ... miniature circuit-breaker is selected in accordance with the number of poles, I_n and $I_{\Delta n}$.



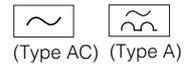
The miniature circuit-breaker is selected from the series 5SY4, 5SY6, 5SY7 or 5SY8 with the same number of poles as the desired characteristic (A, B, C or D) and suitable I_n .



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 miniature circuit-breaker have been tightened, the two devices form an RCBO.

Residual Current Protective Devices

RC Units for Miniature Circuit-Breakers



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, 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	Recommended terminal 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 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	up to $I_n = 63$ A, 4-pole up to $I_n = 63$ A, 2 and 3-pole $I_n = 80/100$ A	100 195 100
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		



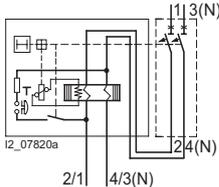
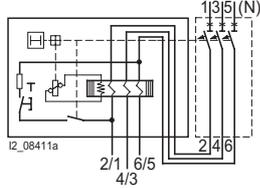
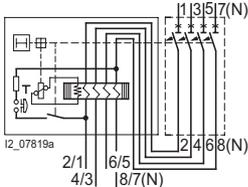
Residual Current Protective Devices RC Units for Miniature Circuit-Breakers

5SM2, type AC, 0.3 ... 63 A,
for 5SY4, 5SY6, 5SY7, 5SY8

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

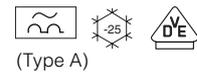
Circuit diagram	Rated residual current $I_{\Delta n}$ mA	Rated current I_n A	MW	Ver- sion	Order No.	Weight 1 item kg	PS*/ P. unit Items
Instantaneous tripping ¹⁾							
  <p>230 ... 400 V AC; 50 ... 60 Hz; 2-pole</p>	10	0.3 ... 16	2		5SM2 121-0	0.170	1
	30	0.3 ... 40			5SM2 322-0	0.170	1
	300				5SM2 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	
  <p>230 ... 400 V AC; 50 ... 60 Hz; 3-pole</p>	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
  <p>230 ... 400 V AC; 50 ... 60 Hz; 4-pole</p>	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,
see section 3, "Miniature circuit-breakers".

Residual Current Protective Devices

RC Units for Miniature Circuit-Breakers



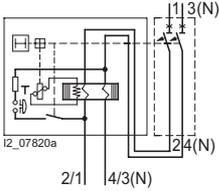
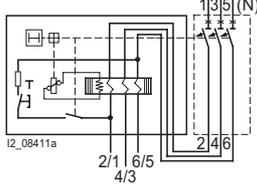
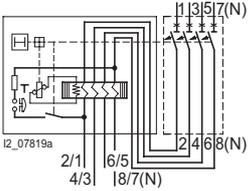
**5SM2, type A, 0.3 ... 63 A,
for 5SY4, 5SY6, 5SY7, 5SY8**

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

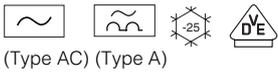
- Definition of surge current withstand capability with current waveform 8/20 μ s acc. to DIN VDE 0432, Part 2
- **S** S-type: Can be used as upstream group switch for selective tripping contrary to a downstream standard RCCB or RC unit. Very high surge current withstand capability: >5 kA
- **K** K-type: Short-time delayed disconnection 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 item kg	PS*/ P. unit Items		
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	0.170	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		MS	5SM2 325-6	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	0.3 ... 40	3		5SM2 632-6	0.260	1		
	30	0.3 ... 63			5SM2 335-6	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	0.3 ... 40	3		5SM2 642-6	0.290	1		
	30	0.3 ... 63			5SM2 345-6	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	0.290	1
			30	0.3 ... 63		K	5SM2 345-6KK01	0.290	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.

Miniature circuit-breakers,
see section 3, "Miniature circuit-breakers".



Residual Current Protective Devices RC Units for Miniature Circuit-Breakers

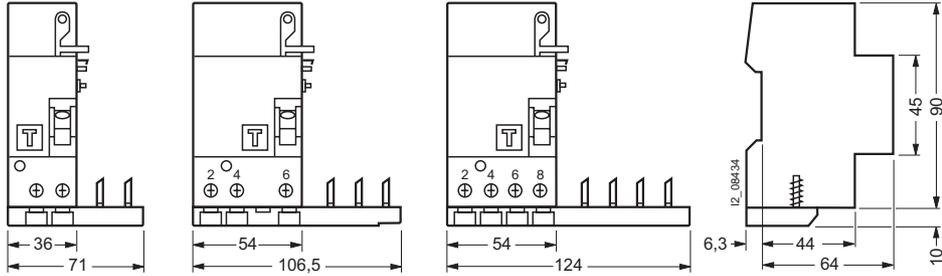
5SM2, type A, 0.3 ... 63 A,
for 5SY4, 5SY6, 5SY7, 5SY8

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,



Residual Current Protective Devices RC Units for Miniature Circuit-Breakers

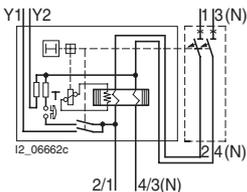
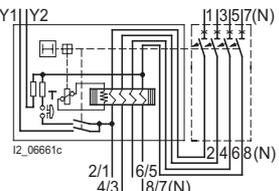


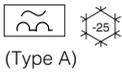
5SM2, type AC, 80 ... 100 A, for 5SP4

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	Version	Order No.	Weight 1 item kg	PS*/ P. unit Items
 <p>125 ... 230 V AC; 50 ... 60 Hz; 2-pole</p>  <p>Y1 Y2 1 3(N) 2/1 4/3(N)</p> <p>I2_06662c</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>Y1 Y2 1 3 5 7(N) 2/1 6/5 4/3 8/7(N)</p> <p>I2_06661c</p>	30	80 ... 100	5		5SM2 347-0 5SM2 647-0	0.944	1
	300						0.944



(Type A)

Residual Current Protective Devices RC Units for Miniature Circuit-Breakers

5SM2, type A, 80 ... 100 A, for 5SP4

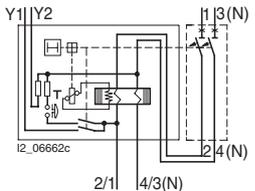
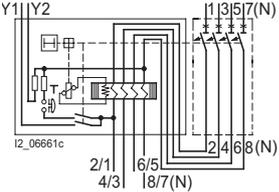
4

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 ... 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
- 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: >5 kA.

Selection and ordering data

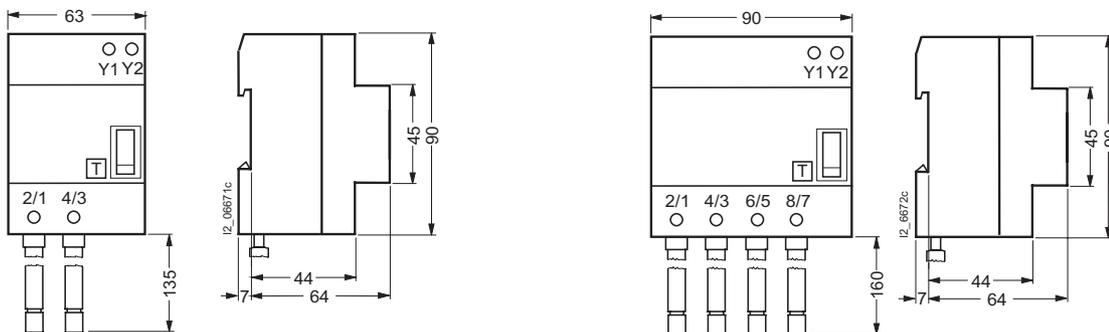
Circuit diagram	Rated residual current $I_{\Delta n}$ mA	Rated current I_n A	MW	Ver- sion	Order No.	Weight 1 item kg	PS*/ P. unit Items
Instantaneous tripping, surge current withstand capability >1 kA							
 125 ... 230 V AC; 50 ... 60 Hz; 2-pole 	30	80 ... 100	3.5		5SM2 327-6 5SM2 627-6	0.410	1
	300						0.410
 230 ... 400 V AC; 50 ... 60 Hz; 4-pole 	30	80 ... 100	5		5SM2 347-6 5SM2 647-6	0.630	1
	300						0.630
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	80 ... 100		S	5SM2 647-8 5SM2 847-8	0.630	1
	1 000			S			0.630

Miniature circuit-breakers, see section 3, "Miniature circuit-breakers".

Dimensional drawings

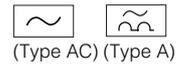
5SM2 327-.,
5SM2 627-.,

5SM2 347-.,
5SM3 647-.,
5SM2 847-8



* You can order this quantity or a multiple thereof.

Residual Current Protective Devices RCCBs with Integral Overcurrent Protection (RCBO)



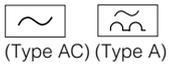
5SU1, product overview

Overview

	Number of poles	Rated residual current $I_{\Delta n}$ mA	Rated current I_n A	MW	Additional components can be retrofitted
RCBOs 6 ... 40 A; Type AC ¹⁾ and type A ²⁾					
instantaneous tripping, surge current withstand capability >250 A Rated short-circuit capacity 4.5 kA 4 500 • Characteristic B and C 3	1-pole + N	10, 30, 300 30, 300	6 10 13 16 20 25 32 40	2	• • • • • • •
Rated short-circuit capacity 6 kA 6 000 • Characteristic B and C 3	1-pole + N	10, 30, 300 30, 300	6 10 13 16 20 25 32 40	2	• • • • • • •
Rated short-circuit capacity 10 kA 10 000 • Characteristic B and C 3	1-pole + N	10, 30, 300 30, 300	6 10 13 16 20 25 32 40	2	• • • • • • •
RCBOs 6 ... 32 A; Type AC ¹⁾					
instantaneous tripping Rated short-circuit capacity 4.5 kA 4 500 • Characteristic B 3	2	30 30	6 10 16 20 25 32	4	• • • • • •

1) = type AC for AC fault currents.

2) = type A for AC and pulsating DC fault currents.



Residual Current Protective Devices RCCBs with Integral Overcurrent Protection (RCBO)

5SU1, product overview

4

Technical specifications

Standards	IEC/EN 61009, VDE 0664 Part 20, IEC/EN 61543, VDE 0664 Part 30	
Versions	1-pole + N	
Rated voltages U_n	V AC	125 ... 230, 50 ... 60 Hz
Rated currents I_n	A	6, 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	Tunnel terminals at both ends with wire protection	
• Conductor cross-section	mm ²	1.0 ... 25
• Terminal tightening torque, recommended	Nm	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	

Residual Current Protective Devices RCCBs with Integral Overcurrent Protection (RCBO)

4 500
3

6 000
3

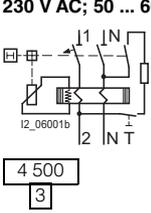
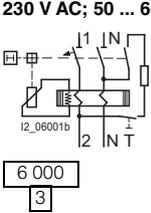

(Type AC)

5SU1, type AC, 6 ... 40 A, 1-pole + N

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 to 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

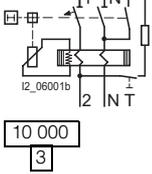
Circuit diagram/ max. permissible short-circuit series fuse	Rated residual current $I_{\Delta n}$ mA	Rated current I_n A	MW	MCB characteristic B		MCB characteristic C		Weight 1 item kg	PS*/ P. unit Items
				Order No.	Price 1 item	Order No.			
  <div style="border: 1px solid black; padding: 2px; display: inline-block;">4 500 3</div>	230 V AC; 50 ... 60 Hz; 1-pole + N								
	10	6	2	5SU1 153-0KV06		5SU1 153-1KV06	0.250	1	
		10		5SU1 153-0KV10		5SU1 153-1KV10	0.250	1	
		13		5SU1 153-0KV13		5SU1 153-1KV13	0.250	1	
		16		5SU1 153-0KV16		5SU1 153-1KV16	0.250	1	
	30	6	2	5SU1 353-0KV06		5SU1 353-1KV06	0.250	1	
		10		5SU1 353-0KV10		5SU1 353-1KV10	0.250	1	
		13		5SU1 353-0KV13		5SU1 353-1KV13	0.250	1	
		16		5SU1 353-0KV16		5SU1 353-1KV16	0.250	1	
		20		5SU1 353-0KV20		5SU1 353-1KV20	0.250	1	
		25		5SU1 353-0KV25		5SU1 353-1KV25	0.250	1	
		32		5SU1 353-0KV32		5SU1 353-1KV32	0.250	1	
		40		5SU1 353-0KV40		5SU1 353-1KV40	0.250	1	
		300	2	5SU1 653-0KV06		5SU1 653-1KV06	0.250	1	
		10		5SU1 653-0KV10		5SU1 653-1KV10	0.250	1	
		13		5SU1 653-0KV13		5SU1 653-1KV13	0.250	1	
	16		5SU1 653-0KV16		5SU1 653-1KV16	0.250	1		
	20		5SU1 653-0KV20		5SU1 653-1KV20	0.250	1		
	25		5SU1 653-0KV25		5SU1 653-1KV25	0.250	1		
	32		5SU1 653-0KV32		5SU1 653-1KV32	0.250	1		
	40		5SU1 653-0KV40		5SU1 653-1KV40	0.250	1		
  <div style="border: 1px solid black; padding: 2px; display: inline-block;">6 000 3</div>	230 V AC; 50 ... 60 Hz; 1-pole + N								
	10	6	2	5SU1 156-0KV06		5SU1 156-1KV06	0.250	1	
		10		5SU1 156-0KV10		5SU1 156-1KV10	0.250	1	
		13		5SU1 156-0KV13		5SU1 156-1KV13	0.250	1	
		16		5SU1 156-0KV16		5SU1 156-1KV16	0.250	1	
	30	6	2	5SU1 356-0KV06		5SU1 356-1KV06	0.250	1	
		10		5SU1 356-0KV10		5SU1 356-1KV10	0.250	1	
		13		5SU1 356-0KV13		5SU1 356-1KV13	0.250	1	
		16		5SU1 356-0KV16		5SU1 356-1KV16	0.250	1	
		20		5SU1 356-0KV20		5SU1 356-1KV20	0.250	1	
		25		5SU1 356-0KV25		5SU1 356-1KV25	0.250	1	
		32		5SU1 356-0KV32		5SU1 356-1KV32	0.250	1	
		40		5SU1 356-0KV40		5SU1 356-1KV40	0.250	1	
		300	2	5SU1 656-0KV06		5SU1 656-1KV06	0.250	1	
		10		5SU1 656-0KV10		5SU1 656-1KV10	0.250	1	
		13		5SU1 656-0KV13		5SU1 656-1KV13	0.250	1	
	16		5SU1 656-0KV16		5SU1 656-1KV16	0.250	1		
	20		5SU1 656-0KV20		5SU1 656-1KV20	0.250	1		
	25		5SU1 656-0KV25		5SU1 656-1KV25	0.250	1		
	32		5SU1 656-0KV32		5SU1 656-1KV32	0.250	1		
	40		5SU1 656-0KV40		5SU1 656-1KV40	0.250	1		

For accessories, see page 3/36.

Residual Current Protective Devices RCCBs with Integral Overcurrent Protection (RCBO)

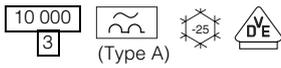
5SU1, type AC, 6 ... 40 A, 1-pole + N

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	MCB characteristic B		MCB characteristic C	Weight 1 item kg	PS*/ P. unit Items
				Order No.	Price 1 item	Order No.		
Instantaneous tripping, surge current withstand capability >250 A								
 	230 V AC; 50 ... 60 Hz; 1-pole + N							
	10	6	2	5SU1 154-0KV06		5SU1 154-1KV06	0.250	1
		10		5SU1 154-0KV10		5SU1 154-1KV10		
		13		5SU1 154-0KV13		5SU1 154-1KV13		
		16		5SU1 154-0KV16		5SU1 154-1KV16		
	30	6	2	5SU1 354-0KV06		5SU1 354-1KV06		
		10		5SU1 354-0KV10		5SU1 354-1KV10		
		13		5SU1 354-0KV13		5SU1 354-1KV13		
		16		5SU1 354-0KV16		5SU1 354-1KV16		
		20		5SU1 354-0KV20		5SU1 354-1KV20		
		25		5SU1 354-0KV25		5SU1 354-1KV25		
		32		5SU1 354-0KV32		5SU1 354-1KV32		
		40		5SU1 354-0KV40		5SU1 354-1KV40		
	300	6	2	5SU1 654-0KV06		5SU1 654-1KV06		
		10		5SU1 654-0KV10		5SU1 654-1KV10		
		13		5SU1 654-0KV13		5SU1 654-1KV13		
	16		5SU1 654-0KV16		5SU1 654-1KV16			
	20		5SU1 654-0KV20		5SU1 654-1KV20			
	25		5SU1 654-0KV25		5SU1 654-1KV25			
	32		5SU1 654-0KV32		5SU1 654-1KV32			
	40		5SU1 654-0KV40		5SU1 654-1KV40			

4

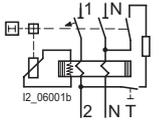
For accessories, see page 3/36.



Residual Current Protective Devices RCCBs with Integral Overcurrent Protection (RCBO)

5SU1, type A, 6 ... 40 A, 1-pole + N

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	MCB characteristic B		MCB characteristic C	Weight 1 item kg	PS*/ P. unit Items
				Order No.	Price 1 item	Order No.		
Instantaneous tripping, surge current withstand capability >250 A								
  	230 V AC; 50 ... 60 Hz; 1-pole + N							
	10	6	2	5SU1 154-6KV06		5SU1 154-7KV06	0.250	1
		10		5SU1 154-6KV10		5SU1 154-7KV10	0.250	1
		13		5SU1 154-6KV13		5SU1 154-7KV13	0.250	1
		16		5SU1 154-6KV16		5SU1 154-7KV16	0.250	1
	30	6	2	5SU1 354-6KV06		5SU1 354-7KV06	0.250	1
		10		5SU1 354-6KV10		5SU1 354-7KV10	0.250	1
		13		5SU1 354-6KV13		5SU1 354-7KV13	0.250	1
		16		5SU1 354-6KV16		5SU1 354-7KV16	0.250	1
		20		5SU1 354-6KV20		5SU1 354-7KV20	0.250	1
		25		5SU1 354-6KV25		5SU1 354-7KV25	0.250	1
		32		5SU1 354-6KV32		5SU1 354-7KV32	0.250	1
		40		5SU1 354-6KV40		5SU1 354-7KV40	0.250	1
	300	6	2	5SU1 654-6KV06		5SU1 654-7KV06	0.250	1
		10		5SU1 654-6KV10		5SU1 654-7KV10	0.250	1
		13		5SU1 654-6KV13		5SU1 654-7KV13	0.250	1
		16		5SU1 654-6KV16		5SU1 654-7KV16	0.250	1
		20		5SU1 654-6KV20		5SU1 654-7KV20	0.250	1
		25		5SU1 654-6KV25		5SU1 654-7KV25	0.250	1
		32		5SU1 654-6KV32		5SU1 654-7KV32	0.250	1
	40		5SU1 654-6KV40		5SU1 654-7KV40	0.250	1	

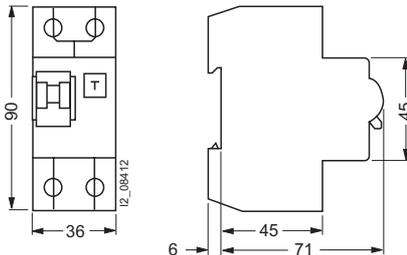
4

Dimensional drawings

5SU1 RCCBs with integral overcurrent protection in two modular widths

6 A ... 40 A

5SU1 153-.KV..., 5SU1 154-.KV..., 5SU1 156-.KV...,
5SU1 353-.KV..., 5SU1 354-.KV..., 5SU1 356-.KV...,
5SU1 653-.KV..., 5SU1 654-.KV..., 5SU1 656-.KV..

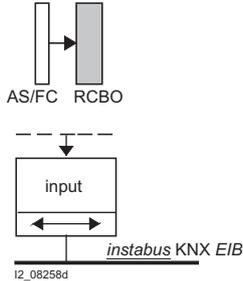


Residual Current Protective Devices RCCBs with Integral Overcurrent Protection (RCBO)

Auxiliary circuit switch/fault signal contact for 5SU1, 1-pole + N

Benefits

- An auxiliary circuit switch or fault signal contact can be fitted to the left-hand side of the RCBO housing by the customer
- Mounting with factory-fitted screws
- Can be connected to *instabus* KNX EIB and AS-Interface bus or PROFIBUS through binary inputs



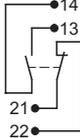
Application

- Auxiliary circuit switches: Indications of the circuit state of the RCBO: 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

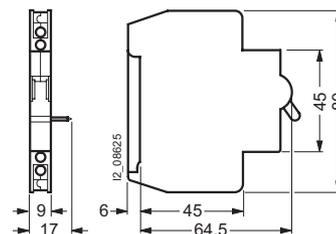
Circuit diagram	Version	MW	Order No.	Weight 1 item kg	PS*/ P. unit Items
Auxiliary circuit switch (AS) for 5SU1 RCBO (1-pole + N) ¹⁾					
	Auxiliary circuit switch (AS) 	1 NO + 1 NC	0.5	5ST3 018-0KV	0.037 1
Fault signal contact (FC) for 5SU1 RCBO (1-pole + N) ¹⁾					
	Fault signal contact (FC) 	2 CO	0.5	5ST3 028-0KV	0.045 1

1) Also suitable for fitting to 5SY6 ...-KV miniature circuit-breakers.

Dimensional drawings

Auxiliary circuit switches (AS)/fault signal contacts (FC), can be mounted on 5SU1 RCCBs with integral overcurrent protection (RCBO) ¹⁾

5ST3 018-0KV and 5ST3 028-0KV, can be retrofitted



Residual Current Protective Devices RCCBs with Integral Overcurrent Protection (RCBO)

NEW

Shunt trips for 5SU1, 1-pole + N

4

Benefits

- A shunt trip can be fitted to the left-hand side of the RCBO housing by the customer
- An additional auxiliary circuit switch or fault signal contact to the shunt trip can be mounted on the left side.

Application

- Remote tripping of the RCBO.

Technical data

5ST3 037-0KV, 5ST3 038-0KV

Terminals

- | | | |
|---------------------------------|-----------------|-----------|
| • Conductor cross-section | mm ² | 1 ... 25 |
| • Recommended tightening torque | Nm | 2.5 ... 3 |

Selection and ordering data

	Operating voltage range	MW	Order No.	Weight 1 item kg	PS*/P. unit Items
Shunt trip (ST) for 5SU1 RCBO (1-pole + N) ¹⁾					
	Shunt trips (ST)				
		12 ... 110 V AC/ 12 ... 60 V DC 110 ... 415 V AC/ 110 ... 220 V DC	1	5ST3 037-0KV 5ST3 038-0KV	0.095 1 0.095 1

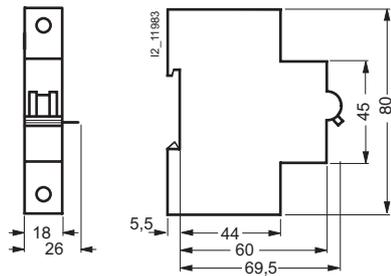
1) Also suitable for fitting to miniature circuit-breakers 5SY6 ...-KV.

Dimensional drawings

Shunt trip (ST), can be retrofitted

to 5SU1 RCCB with integral overcurrent protection (RCBO) ¹⁾

5ST3 0370-0KV and 5ST3 0380-0KV, can be retrofitted



Residual Current Protective Devices RCCBs with Integral Overcurrent Protection (RCBO)

4 500
3

(Type AC)

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 ... 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
<ul style="list-style-type: none"> Conductor cross-section Terminal tightening torque, recommended 	mm ² Nm	1.0 ... 25 2.5 ... 3.0 0.75 ... 35 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	

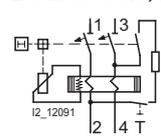
Selection and ordering data

Circuit diagram/ max. permissible short-circuit series fuse	Rated residual current	Rated current	MW	Order No.	Weight 1 item	PS*/ P. unit
	$I_{\Delta n}$ mA	I_n A			kg	Items

Instantaneous tripping



230 ... 400 V AC; 50 ... 60 Hz; 2-pole



4 500
3

30

6
10
16
20
25
32

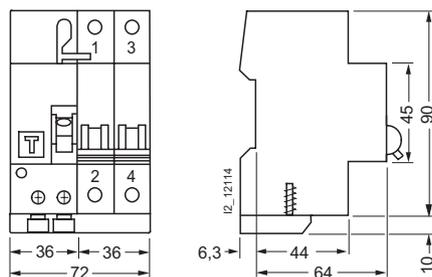
4

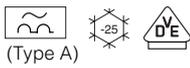
5SU1 323-1BB06
5SU1 323-1BB10
5SU1 323-1BB16
5SU1 323-1BB20
5SU1 323-1BB25
5SU1 323-1BB32

0.250 1
0.250 1
0.250 1
0.250 1
0.250 1
0.250 1

Dimensional drawings

5SU1 323-1BB..





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 device box, equipped with RCCB and 2 (SCHUKO) socket outlets	2	16	10, 30	•
Molded-plastic enclosure, equipped with RCCB and (SCHUKO) socket outlet	2	16	10	•
RCCB protective socket outlet for a higher level of protection				
(SCHUKO) DELTA profil socket outlet, titanium white	2	16	10, 30	•

= Type A for AC and pulsating DC residual currents

Application

Molded-plastic enclosure equipped with residual current operated circuit-breaker and flush-type (SCHUKO) socket outlet or flush-type (SCHUKO) double socket outlet

- Rated voltage: 230 V AC, 50 to 60 Hz
- For electric devices where, in the event of damage, there is 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 outlet (SRCD) acc. to VDE 0662, DELTA profil

- Rated voltage: 230 V AC, 50 to 60 Hz
- Childproof (SCHUKO) socket outlet with integrated RCCB
- For retrofitting in existing installations 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) draft
- The mode of operation is independent of 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 device boxes, 60 mm, for screw connection
- Operable in TN-S system, TN-C system and TT system
- Incl. frame, single frame, with cutout 48 mm × 48 mm.

Note:

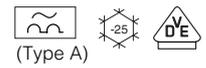
The protective measures acc. to DIN VDE 0100 must also be observed when RCCB protective socket outlets (SRCDs) are used.

Selection and ordering data

	Rated residual current $I_{\Delta n}$ mA	Rated current I_n A	Order No.	Weight 1 item kg	PS*/ P. unit Items
<p>RCCB protective socket outlet according to VDE 0664 for mounting on switch and socket box, equipped with residual current operated circuit-breaker and 2 childproof (SCHUKO) socket outlets</p>	10	16	5SM1 920-5 5SM1 920-8	0.500	1
	30			0.500	1
<p>RCCB protective socket outlet according to VDE 0664 in molded-plastic housing, equipped with residual current operated circuit-breaker and flush-mounted (SCHUKO) socket outlet</p>	10	16	5SZ9 206 5SZ9 216	0.760	1
	30			0.760	1

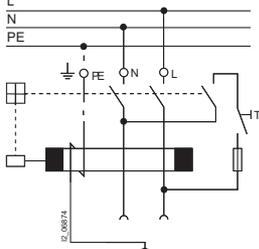
* You can order this quantity or a multiple thereof.

Residual Current Protective Devices RCCB Socket Outlets (SRCDs)



5SM1 and 5SZ9 protective socket outlets

Selection and ordering data

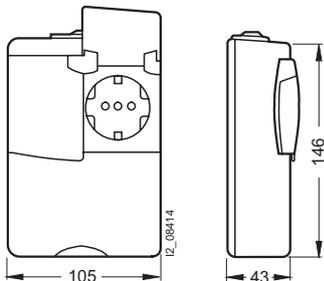
	Rated residual current $I_{\Delta n}$ mA	Rated current I_n A	Order No.	Weight 1 item kg	PS*/ P. unit Items
 <p>RCCB protective socket outlet (SRCD) according to VDE 0662 for increased protection level Childproof (SCHUKO) DELTA profil socket outlet, titanium white</p>  <p>Suitable for mounting on 5TG1 825 surface-mounting enclosures.</p> <p>For further cutout frames for multiple combinations, see the catalog ET D1, "DELTA switches and outlets".</p>	10	16	5SZ9 211	0.160	1
	30		5SZ9 212	0.160	1

Dimensional drawings

5SM1 920 RCCB protective socket outlet

according to VDE 0664 for mounting on switch and socket box, equipped with residual current operated circuit-breaker and 2 childproof (SCHUKO) socket outlets

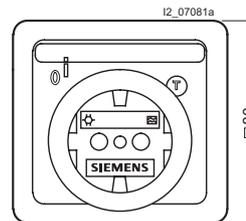
5SM1 920-5,
5SM1 920-8



5SZ9 21 RCCB protective socket outlet

childproof (SCHUKO) DELTA profil socket outlet

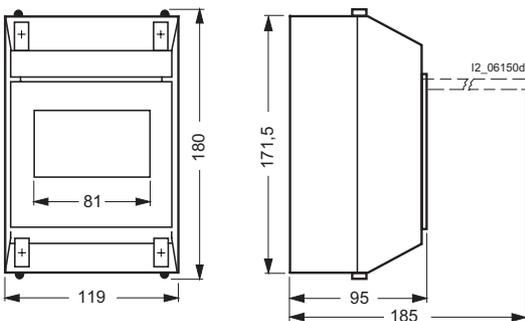
5SZ9 211,
5SZ9 212



5SZ9 2.6 RCCB protective socket outlet

molded-plastic enclosure, equipped with RCCB and flush-mounting (SCHUKO) socket outlet

5SZ9 206,
5SZ9 216



Residual Current Protective Devices Accessories

for all product ranges

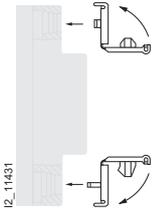
Accessories

		Order No.	Weight 1 item kg	PS*/ P. unit Items
	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	0.084	1
		5SW3 005	0.114	1
	Wall box, gray for flush mounting, degree of protection IP40 with 35 mm standard mounting rail up to 2.5 MW up to 4.5 MW	5SW3 006	0.126	1
		5SW3 007	0.147	1
	Molded-plastic enclosure, 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 plate (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	0.022	1/10
		5ST2 135	0.330	1/5
		5ST2 136	0.260	1/5
	Snap-on terminal 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 × 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.de/beta Recommended labels ELAT-3-747 can be ordered at: Brady GmbH Otto-Hahn-Str. 5-7 D-63222 Langen Tel. +49 (0)61 03 75 98 660				

Residual Current Protective Devices Accessories

for 5SM3 residual current operated
circuit-breakers

Accessories

Version	Order No.	Weight 1 item	PS*/ P. unit		
		kg	Items		
 <p>Covers for connection terminals for RCCBs up to 80 A, sealable (2 items in plastic bag) 2 MW 2.5 MW 4 MW</p>	5SW3 010	0.003	1 set		
	5SW3 011	0.004	1 set		
	5SW3 008	0.006	1 set		
 <p>Locking device for RCCBs up to 80 A, sealable and lockable 4.5 mm lock hasp diameter</p>	5SW3 303	0.008	1		
 <p>Padlock for 5SW3 303 locking device</p>	5ST3 802	0.027	1		
 <p>Locking device with padlock comprising 5SW3 303 locking device and 5ST3 802 padlock</p>	5SW3 312	1 set 0.035	1 set		
 <p>Cu busbars 16 mm² for horizontal busbar mounting on 5SM3 RCCBs with 5SY miniature circuit-breakers</p>	fully insulated: length 214 mm	2-phase 2-phase + AS 3-phase	5ST3 704 5ST3 706 5ST3 708	0.060 0.060 0.100	1/25 1/25 1/25
		3-phase for a 4-pole 5SM3 RCCB (N-connection, right) with 8 miniature circuit-breakers			
		3/N + 8 terminals	5ST3 717	0.150	1/25
	without end caps: length 1016 mm	2-phase 2-phase + AS 3-phase	5ST3 705 5ST3 707 5ST3 710	0.290 0.290 0.430	1/20 1/20 1/20
 <p>End caps for lateral insulation of cut-to-length busbars</p>	2- and 3-phase	5ST3 750	0.001	1/10	