

Residual Current Protective Devices / AFD units



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For further technical product information:

Service&Support Portal:

www.siemens.com/lowvoltage/technical-support

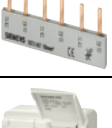
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Residual Current Protective Devices / AFD Units

Introduction

Overview

Devices	Page	Application	Standards	Used in		
				Non-residential buildings	Residential buildings	Industry
	4/4	Personnel, material and fire protection, as well as protection against direct contact. SIGRES with active condensation protection for use in harsh environments. Super resistant and selective versions	IEC/EN 61008 IEC/EN 62423	✓	✓	✓
	4/11	SIQUENCE, the technology of universal current-sensitive residual current protective devices	VDE 0664-100 VDE 0664-200 VDE V 0664-110	✓	--	✓
	4/15	Remote controlled mechanisms, auxiliary switches for all residual current operated circuit breakers. Leakage current measurement device for fault locating and the optimum selection of RCCBs	IEC/EN 62019	✓	--	✓
	4/17	The freely selectable combination of RC units with miniature circuit breakers permits the flexible configuration of RCBO combinations	IEC/EN 61009	✓	--	✓
	4/22	The ideal protection combination for all electrical circuits due to the compact device versions of RCCBs and miniature circuit breakers in a single device	IEC/EN 61009	✓	✓	✓
	4/30	Busbars in 10 mm ² and 16 mm ² save space in the distribution board and time during mounting.	--	✓	✓	✓
	4/33	For retrofitting in existing installations	VDE 0664	✓	✓	✓
	4/34	Locking devices, covers - everything you need for mounting	--	✓	✓	✓
	4/36	Enhanced fire protection through the detection and isolation of arcing faults	Future standard - IEC/EN 62606	✓	✓	--
	Ch. 12	Monitoring of residual currents in electrical plants with indication if a specified limit value is exceeded. see chapter: "Monitoring devices —> Monitoring devices for electrical values —> Residual current monitors"	IEC 62020 EN 62020	✓	--	✓

Residual Current Protective Devices / AFD Units

SIGRES

SIGRES RCCBs were developed for use in harsh ambient conditions, such as swimming baths as protection against chlorine and ozone, in the agricultural sector (ammonia), on building sites and in the chemical industry (nitrogen oxide, sulfur dioxide, solvents), in the food processing industry (hydrogen sulfide) and in unheated rooms (dampness). The patented active condensation protection requires a continuous power supply and bottom infeed if the RCCB is switched off.

When used in ambient conditions as defined in product standard EN 61008-1, the operation interval for pressing the test button can be extended to 1x a year.

Super resistant **K**

Super resistant (short-time delayed) RCCBs meet the maximum permissible break times for instantaneous devices. However, by implementing a short-time delay they prevent unnecessary tripping operations, and thus plant faults, when pulse-shaped leakage currents occur - as is the case when capacitors are switched on.

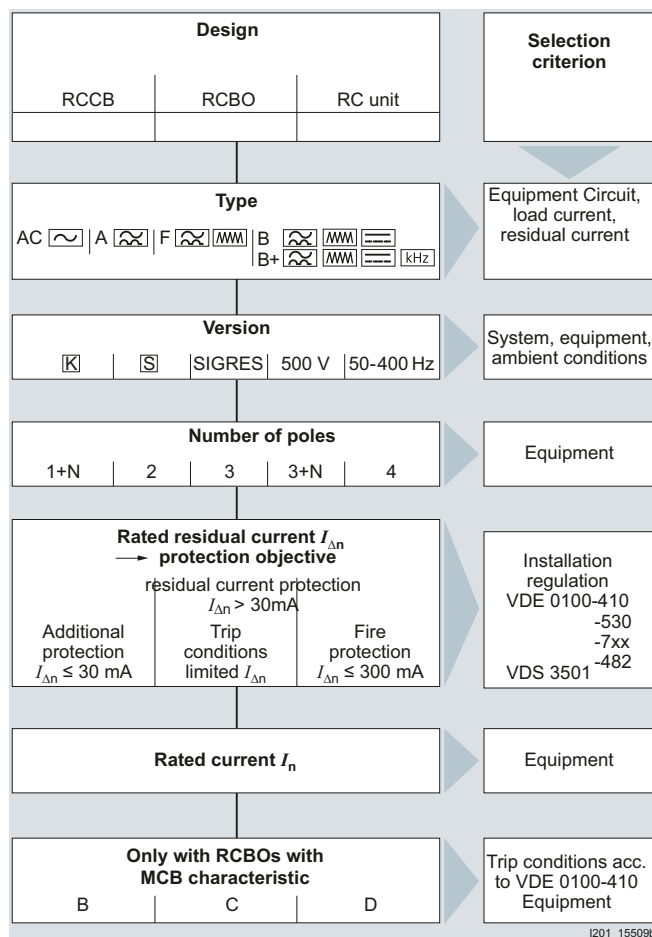
Selective **S**

Can be used as upstream group switch for selective tripping contrary to downstream, instantaneous or short-time delayed RCCBs.

Note:

You will find further information on the subject of residual current protective devices [in the technology primer "Residual Current Protective Devices"](#), Order No.: E10003-E38-2B-G0090-7600 and in the Engineering Manual at: www.siemens.com/lowvoltage/manuals.

Introduction



Selection aid for finding the appropriate residual current protective device

Residual Current Protective Devices / AFD Units

5SM3 RCCBs

Overview

RCCBs are used in all systems up to 240/415 V AC. Devices of type AC trip in the event of sinusoidal AC residual currents, type A also trips in the event of pulsating DC residual currents.

In addition, RCCBs type F also detect residual currents with mixed frequencies up to 1 kHz.

RCCBs with a rated residual current of maximum 30 mA are used for personnel, material and fire protection, as well as for protection against direct contact. RCCBs with a rated residual current of 10 mA are primarily used in areas that represent an increased risk for personnel.

Since the introduction of DIN VDE 0100-410, all socket outlet current circuits up to 20 A must also be fitted with residual current protective devices with a rated residual current of max. 30 mA. This also applies to outdoor electrical circuits up to 32 A for the connection of portable equipment.

Devices with a rated residual current of maximum 300 mA are used as preventive fire protection in case of insulation faults. RCCBs with a rated residual current of 100 mA are primarily used outside Europe.

Benefits

- Instantaneous RCCBs with the N connection on the left-hand side enable simple bus mounting with standard pin busbars with miniature circuit breakers installed on the right-hand side
- Instantaneous RCCBs with the N connection on the right-hand side can be bus-mounted with miniature circuit breakers using a special pin busbar
- Instantaneous type A devices have a surge current withstand capability with current waveform 8/20 μ s of more than 1 kA, super resistant of more than 3 kA and selective of more than 5 kA. This ensures safe operation
- SIGRES has an extremely long service life due to a patented active condensation protection and identical dimensions enable the quick and easy replacement of existing instantaneous RCCBs
- Super resistant devices increase system availability, as unnecessary tripping is prevented in power supply systems with short-time glitches
- Selective RCCBs increase system availability as a staggered tripping time enables the selective tripping of RCCBs connected in series in the event of a fault
- Auxiliary switches or remote controlled mechanisms are also available as additional components
- The operating handle and the test button can be locked by means of a handle locking device.

Technical specifications

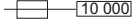
			Instantaneous	SIGRES	Super resistant	Selective
Standards			IEC/EN 61008-1 (VDE 0664-10); IEC/EN 61008-2-1 (VDE 0664-11); IEC/EN 61543 (VDE 0664-30); IEC/EN 62423 (VDE 0664-40)			
Surge current withstand capability						
• Type A with current waveform 8/20 µs	Acc. to DIN VDE 0432-2	kA	> 1		> 3	> 5
• Type F with current waveform 8/20 µs	Acc. to DIN VDE 0432-2	kA	--	--	> 3	--
Minimum operational voltage for test function operation		V AC	100			
Insulation coordination						
• Overvoltage category			III			
Pollution degree			2			
Terminal conductor cross-sections						
• For 2 MW	At I _n = 16 A, 25 A, 40 A	mm ²	1.0 ... 16			
	At I _n = 100 A, 125 A	mm ²	1.5 ... 50			
• For 2.5 MW	At I _n = 63 A, 80 A	mm ²	1.5 ... 25			
• For 4 MW	At I _n = 25 A, 40 A, 63 A, 80 A	mm ²	1.5 ... 25			
	At I _n = 125 A	mm ²	2.5 ... 50			
Terminal tightening torque						
• Up to I _n 80 A		Nm	2.5 ... 3.0			
• at I _n = 100 A, 125 A		Nm	3.0 ... 3.5			
Mains connection			Top or bottom	Bottom	Top or bottom	
Mounting position			Any			
Degree of protection	Acc. to EN 60529 (VDE 0470-1)		IP20, if the distribution board is installed, with connected conductors			
Touch protection	Acc. to EN 50274 (VDE 0660-514)		Finger and back-of-hand safe			
Service life	Test cycle acc. to IEC/EN 61008	Switching cycles	> 10000			
Storage temperature		°C	-40 ... +75			
Ambient temperature		°C	-25 ... +45, marked with 			
Resistance to climate	Acc. to IEC 60068-2-30		28 cycles (55 °C; 95 % rel. air humidity)			
CFC and silicone-free			Yes			

Residual Current Protective Devices / AFD Units

5SM3 RCCBs

Selection and ordering data

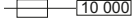


	Rated residual current $I_{\Delta n}$ mA	Rated current I_n A	Max. permissible short-circuit back-up fuse  A	Mounting width MW	DT	Order No.	Price per PU	PU (UNIT, SET, M)	PS*/P. unit	PG	Weight per PU approx. kg
RCCBs, type AC, instantaneous											
	1P+N, 125 ... 230 V AC, 50 ... 60 Hz										
	N connection, right										
	10	16	63	2		5SM3 111-0		1	1 unit	012	0.240
	30	25	63	2		5SM3 312-0		1	1 unit	012	0.243
		40				5SM3 314-0		1	1 unit	012	0.244
		63	100	2.5		5SM3 316-0		1	1 unit	012	0.317
		80				5SM3 317-0		1	1 unit	012	0.317
		100	125	2		5SM3 318-0KK		1	1 unit	012	0.272
		125				5SM3 315-0KK		1	1 unit	012	0.280
	100	25	63	2		5SM3 412-0		1	1 unit	012	0.234
		40				5SM3 414-0		1	1 unit	012	0.236
		63	100	2.5		5SM3 416-0		1	1 unit	012	0.312
		80				5SM3 417-0		1	1 unit	012	0.320
		100	125	2		5SM3 418-0KK		1	1 unit	012	0.263
		125				5SM3 415-0KK		1	1 unit	012	0.254
	300	25	63	2		5SM3 612-0		1	1 unit	012	0.227
		40				5SM3 614-0		1	1 unit	012	0.227
		63	100	2.5		5SM3 616-0		1	1 unit	012	0.293
		80				5SM3 617-0		1	1 unit	012	0.313
		100	125	2		5SM3 618-0KK		1	1 unit	012	0.255
		125				5SM3 615-0KK		1	1 unit	012	0.255
  	3P+N, 230 ... 400 V AC, 50 ... 60 Hz										
	N connection, right										
	30	25	100	4		5SM3 342-0		1	1 unit	012	0.469
		40				5SM3 344-0		1	1 unit	012	0.485
		63				5SM3 346-0		1	1 unit	012	0.500
		80				5SM3 347-0		1	1 unit	012	0.502
		100				5SM3 348-0		1	1 unit	012	0.538
		125	125			5SM3 345-0		1	1 unit	012	0.566
	100	25	100			5SM3 442-0		1	1 unit	012	0.466
		40				5SM3 444-0		1	1 unit	012	0.467
		63				5SM3 446-0		1	1 unit	012	0.479
		100				5SM3 448-0		1	1 unit	012	0.538
		125	125			5SM3 445-0		1	1 unit	012	0.541
	300	25	100			5SM3 642-0		1	1 unit	012	0.454
		40				5SM3 644-0		1	1 unit	012	0.456
		63				5SM3 646-0		1	1 unit	012	0.457
		80				5SM3 647-0		1	1 unit	012	0.456
		100				5SM3 648-0		1	1 unit	012	0.546
		125	125			5SM3 645-0		1	1 unit	012	0.548
	500	25	100			5SM3 742-0		1	1 unit	012	0.449
		40				5SM3 744-0		1	1 unit	012	0.457
		63				5SM3 746-0		1	1 unit	012	0.456
		100				5SM3 748-0		1	1 unit	012	0.538
		125	125			5SM3 745-0		1	1 unit	012	0.525
	1P+N, 125 ... 230 V AC, 50 ... 60 Hz										
	N connection, left										
	10	16	63	2		5SM3 111-0KL		1	1 unit	012	0.240
	30	16	63	2		5SM3 311-0KL		1	1 unit	012	0.280
		25				5SM3 312-0KL		1	1 unit	012	0.244
		40				5SM3 314-0KL		1	1 unit	012	0.246
		63	100	2.5		5SM3 316-0KL		1	1 unit	012	0.317
		80				5SM3 317-0KL		1	1 unit	012	0.320
	100	40	63	2		5SM3 414-0KL		1	1 unit	012	0.280
		63	100	2.5		5SM3 416-0KL		1	1 unit	012	0.310
	300	25	63	2		5SM3 612-0KL		1	1 unit	012	0.227
		40				5SM3 614-0KL		1	1 unit	012	0.229
		63	100	2.5		5SM3 616-0KL		1	1 unit	012	0.299
		80				5SM3 617-0KL		1	1 unit	012	0.302

Residual Current Protective Devices / AFD Units

5SM3 RCCBs

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	Rated residual current	Rated current	Max. permissible short-circuit back-up fuse	Mounting width	DT	Order No.	Price per PU	PU (UNIT, SET, M)	PS*/ P. unit	PG	Weight per PU approx.
	$I_{\Delta n}$ mA	I_n A	 10 000 A		MW						kg
	3P+N; 230 ... 400 V AC; 50 ... 60 Hz										
	N connection, left										
	30	25	100	4		5SM3 342-0KL		1	1 unit	012	0.485
		40				5SM3 344-0KL		1	1 unit	012	0.481
		63				5SM3 346-0KL		1	1 unit	012	0.504
		80				5SM3 347-0KL		1	1 unit	012	0.522
	300	25	63	4		5SM3 642-0KL		1	1 unit	012	0.452
		40				5SM3 644-0KL		1	1 unit	012	0.456
		63				5SM3 646-0KL		1	1 unit	012	0.453
		80	100			5SM3 647-0KL		1	1 unit	012	0.460

RCCBs, type AC, instantaneous, surge current withstand capability > 1 kA

	1P+N; 125 V ... 230 V AC; 50 ... 60 Hz										
	N connection, right										
	30	25	63	2		5SM3 312-0LB		1	1 unit	012	0.246
		40				5SM3 314-0LB		1	1 unit	012	0.250
	100	25				5SM3 412-0LB		1	1 unit	012	0.239
		40				5SM3 414-0LB		1	1 unit	012	0.242
	3P+N; 230 ... 400 V AC; 50 ... 60 Hz										
	N connection, right										
	30	25	63	4		5SM3 342-0LB		1	1 unit	012	0.494
		40				5SM3 344-0LB		1	1 unit	012	0.494
		63				5SM3 346-0LB		1	1 unit	012	0.501
	100	25				5SM3 442-0LB		1	1 unit	012	0.475
		40				5SM3 444-0LB		1	1 unit	012	0.474
		63				5SM3 446-0LB		1	1 unit	012	0.488
	300	25				5SM3 642-0LB		1	1 unit	012	0.459
		40				5SM3 644-0LB		1	1 unit	012	0.466
		63				5SM3 646-0LB		1	1 unit	012	0.465

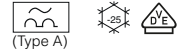
RCCBs, type AC, selective

	3P+N; 230 ... 400 V AC; 50 ... 60 Hz										
	N connection, right										
	300	100	100	4		5SM3 648-2		1	1 unit	012	0.547

Residual Current Protective Devices / AFD Units

5SM3 RCCBs

Selection and ordering data

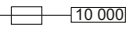


	Rated residual current $I_{\Delta n}$ mA	Rated current I_n A	Max. permissible short-circuit back-up fuse  A	Mounting width MW	DT	Order No.	Price per PU	PU (UNIT, SET, M)	PS*/P. unit	PG	Weight per PU approx. kg
RCCBs, type A, instantaneous											
	1P+N; 125 ... 230 V AC; 50 ... 60 Hz										
	N connection, right										
	10	16	63	2		5SM3 111-6		1	1 unit	011	0.251
	30	16	63	2		5SM3 311-6		1	1 unit	011	0.248
		25				5SM3 312-6		1	1 unit	011	0.248
		40				5SM3 314-6		1	1 unit	011	0.247
		63	100	2.5	▶	5SM3 316-6		1	1 unit	011	0.328
		80				5SM3 317-6		1	1 unit	011	0.330
		100		2		5SM3 318-6KK		1	1 unit	011	0.272
		125				5SM3 315-6KK		1	1 unit	011	0.269
	100	25	63	2		5SM3 412-6		1	1 unit	011	0.240
		40				5SM3 414-6		1	1 unit	011	0.240
		63	100	2.5		5SM3 416-6		1	1 unit	011	0.315
		80				5SM3 417-6		1	1 unit	011	0.324
		100	125	2		5SM3 418-6KK		1	1 unit	011	0.272
		125				5SM3 415-6KK		1	1 unit	011	0.273
	300	25	63	2	▶	5SM3 612-6		1	1 unit	011	0.231
		40			▶	5SM3 614-6		1	1 unit	011	0.233
		63	100	2.5		5SM3 616-6		1	1 unit	011	0.299
		80				5SM3 617-6		1	1 unit	011	0.320
		100	125	2		5SM3 618-6KK		1	1 unit	011	0.256
		125				5SM3 615-6KK		1	1 unit	011	0.255
	3P+N; 230 ... 400 V AC; 50 ... 60 Hz										
	N connection, right										
	30	25	100	4	▶	5SM3 342-6		1	1 unit	011	0.494
		40			▶	5SM3 344-6		1	1 unit	011	0.495
		63			▶	5SM3 346-6		1	1 unit	011	0.530
		80				5SM3 347-6		1	1 unit	011	0.535
		100			▶	5SM3 348-6		1	1 unit	011	0.538
		125	125			5SM3 345-6		1	1 unit	011	0.564
	100	40	100	4		5SM3 444-6		1	1 unit	011	0.474
		63				5SM3 446-6		1	1 unit	011	0.488
		100			▶	5SM3 448-6		1	1 unit	011	0.538
		125	125			5SM3 445-6		1	1 unit	011	0.538
	300	25	100	4	▶	5SM3 642-6		1	1 unit	011	0.457
		40			▶	5SM3 644-6		1	1 unit	011	0.460
		63			▶	5SM3 646-6		1	1 unit	011	0.460
		80				5SM3 647-6		1	1 unit	011	0.462
		100			▶	5SM3 648-6		1	1 unit	011	0.538
		125	125			5SM3 645-6		1	1 unit	011	0.540
	500	25	100	4		5SM3 742-6		1	1 unit	011	0.462
		40				5SM3 744-6		1	1 unit	011	0.463
		63				5SM3 746-6		1	1 unit	011	0.460
		100			▶	5SM3 748-6		1	1 unit	011	0.538
		125	125			5SM3 745-6		1	1 unit	011	0.527
	1P+N; 125 ... 230 V AC; 50 ... 60 Hz										
	N connection, left										
	10	16	63	2		5SM3 111-6KL		1	1 unit	011	0.280
	30	16	63	2		5SM3 311-6KL		1	1 unit	011	0.280
		25				5SM3 312-6KL		1	1 unit	011	0.251
		40				5SM3 314-6KL		1	1 unit	011	0.249
		63	100	2.5		5SM3 316-6KL		1	1 unit	011	0.327
	100	40	63	2		5SM3 414-6KL		1	1 unit	011	0.280
		63	100	2.5		5SM3 416-6KL		1	1 unit	011	0.310
	300	25	63	2		5SM3 612-6KL		1	1 unit	011	0.234
		40				5SM3 614-6KL		1	1 unit	011	0.235
		63	100	2.5		5SM3 616-6KL		1	1 unit	011	0.313

Residual Current Protective Devices / AFD Units

5SM3 RCCBs

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	Rated residual current	Rated current	Max. permissible short-circuit back-up fuse	Mounting width	DT	Order No.	Price per PU	PU (UNIT, SET, M)	PS*/P. unit	PG	Weight per PU approx.
	$I_{\Delta n}$	I_n									
	mA	A	A	MW							kg
3P+N; 230 ... 400 V AC; 50 ... 60 Hz											
N connection, left											
	30	25	100	4		5SM3 342-6KL		1	1 unit	011	0.494
		40									0.495
		63									0.527
		80									0.532
	300	25	100	4		5SM3 642-6KL		1	1 unit	011	0.458
		40									0.463
		63									0.464
		80									0.454
	500	63	100	4		5SM3 746-6KL		1	1 unit	011	0.460

RCCBs, type A, super resistant

	1P+N; 125 ... 230 V AC; 50 ... 60 Hz								
	N connection, right								
	30	25	63	2	5SM3 312-6KK01	1	1 unit	011	0.250
		40				1	1 unit	011	0.247
		63	100	2.5		1	1 unit	011	0.329
300	63	100	2.5	5SM3 616-6KK01	1	1 unit	011	0.314	
	3P+N; 230 ... 400 V AC; 50 ... 60 Hz								
	N connection, right								
	30	25	100	4	5SM3 342-6KK01	1	1 unit	011	0.515
		40			5SM3 344-6KK01	1	1 unit	011	0.520
		63			5SM3 346-6KK01	1	1 unit	011	0.519
	100	63	100	4	5SM3 446-6KK01	1	1 unit	011	0.501
	300	40	100	4	5SM3 644-6KK01	1	1 unit	011	0.492
	63			5SM3 646-6KK01	1	1 unit	011	0.490	
	80			5SM3 647-6KK01	1	1 unit	011	0.498	
	1P+N; 125 ... 230 V AC; 50 ... 60 Hz								
	N connection, left								
	30	25	100	2	5SM3 312-6KL01	1	1 unit	011	0.256
		40			5SM3 314-6KL01	1	1 unit	011	0.259
		63		2.5	5SM3 316-6KL01	1	1 unit	011	0.334
300	63	100	2.5	5SM3 616-6KL01	1	1 unit	011	0.313	

Residual Current Protective Devices / AFD Units

5SM3 RCCBs

	Rated residual current	Rated current	Max. permissible short-circuit back-up fuse	Mounting width	DT	Order No.	Price per PU	PU (UNIT, SET, M)	PS*/P. unit	PG	Weight per PU approx.
	$I_{\Delta n}$	I_n									
	mA	A	A	MW							kg
RCCBs, type A, selective 											
	1P+N; 125 ... 230 V AC; 50 ... 60 Hz										
	N connection, right										
	100	63	100	2.5		5SM3 416-8		1	1 unit	011	0.325
	300	40	63	2		5SM3 614-8		1	1 unit	011	0.248
		63	100	2.5		5SM3 616-8		1	1 unit	011	0.314
	3P+N; 230 ... 400 V AC; 50 ... 60 Hz										
	N connection, right										
	100	40	100	4		5SM3 444-8		1	1 unit	011	0.513
		63				5SM3 446-8		1	1 unit	011	0.531
	300	40	100	4		5SM3 644-8		1	1 unit	011	0.507
	3P+N; 230 ... 400 V AC; 50 ... 60 Hz										
	N connection, left										
	300	40		2		5SM3 614-8KL		1	1 unit	011	0.247
		63		2.5		5SM3 616-8KL		1	1 unit	011	0.314
	3P+N; 230 ... 400 V AC; 50 ... 60 Hz										
	N connection, left										
	300	63	100	4		5SM3 646-8KL		1	1 unit	011	0.513
RCCBs, type A, SIGRES, instantaneous											
	1P+N; 125 ... 230 V AC; 50 ... 60 Hz										
	N connection, right										
	30	25	63	2		5SM3 312-6KK12		1	1 unit	011	0.248
		40				5SM3 314-6KK12		1	1 unit	011	0.251
		63	100	2.5		5SM3 316-6KK12		1	1 unit	011	0.330
	3P+N; 230 ... 400 V AC; 50 ... 60 Hz										
	N connection, right										
	30	25	100	4		5SM3 342-6KK12		1	1 unit	011	0.495
		40				5SM3 344-6KK12		1	1 unit	011	0.499
		63				5SM3 346-6KK12		1	1 unit	011	0.529
	3P+N; 230 ... 400 V AC; 50 ... 60 Hz										
	N connection, left										
	300	40	100	4		5SM3 644-6KK12		1	1 unit	011	0.457
		63				5SM3 646-6KK12		1	1 unit	011	0.458
	1P+N; 125 ... 230 V AC; 50 ... 60 Hz										
	N connection, left										
	30	25	63	2		5SM3 312-6KL12		1	1 unit	011	0.280
		40				5SM3 314-6KL12		1	1 unit	011	0.280

Residual Current Protective Devices / AFD Units

5SM3 RCCBs

4

	Rated residual current	Rated current	Max. permissible short-circuit back-up fuse	Mounting width	DT	Order No.	Price per PU	PU (UNIT, SET, M)	PS*/P. unit	PG	Weight per PU approx.				
	$I_{\Delta n}$ mA	I_n A	 10 000 A	MW							kg				
RCCBs, type A, SIGRES, selective [S]															
	3P+N; 230 ... 400 V AC; 50 ... 60 Hz					5SM3 646-8KK12		1	1 unit	011	0.506				
	N connection, right														
	300	63	100	4											
RCCBs, type A, instantaneous, special versions															
	1P+N; 24 ... 125 V AC; 50 ... 60 Hz					5SM3 311-6KK13 5SM3 312-6KK04		1	1 unit	011	0.248				
	N connection, right														
	30	16	63	2											
		25		2				1	1 unit	011	0.263				
	3P+N; 500 V AC; 50 ... 60 Hz					5SM3 352-6 5SM3 354-6 5SM3 356-6 5SM3 652-6 5SM3 654-6 5SM3 656-6		1	1 unit	011	0.493				
	N connection, right														
	30	25	63	4								1	1 unit	011	0.497
		40										1	1 unit	011	0.531
		63										1	1 unit	011	0.531
300	25	63	4		1	1 unit	011	0.459							
	40				1	1 unit	011	0.461							
	63				1	1 unit	011	0.464							
	3P+N; 230 ... 400 V AC; 50 ... 400 Hz					5SM3 342-6KK03 5SM3 344-6KK03		1	1 unit	011	0.515				
	N connection, right														
	30	25	80	4				1	1 unit	011	0.510				
		40						1	1 unit	011	0.510				
RCCBs, type F, super resistant															
	1P + N; 230 V AC, 50 Hz 					5SM3 312-3 5SM3 314-3 5SM3 316-3		1	1 unit	011	0.250				
	N connection, right														
	30	25	63	2				1	1 unit	011	0.247				
		40						1	1 unit	011	0.297				
		63	100	2.5				1	1 unit	011	0.329				
	3P + N; 400 V AC, 50 Hz 					5SM3 342-3 5SM3 344-3 5SM3 346-3		1	1 unit	011	0.515				
	N connection, right														
	30	25	100	4				1	1 unit	011	0.520				
		40						1	1 unit	011	0.520				
		63						1	1 unit	011	0.519				

SIQUENCE 5SM3 and 5SU1 universal current-sensitive RCCBs, type B and type B+

Overview

Frequency converters, medical devices and UPS systems are seeing increasing use in industry. Smooth DC residual currents or currents with low residual ripple may occur in the event of faults on these devices.

Type A residual current protective devices are unable to detect these smooth DC residual currents. Furthermore, such smooth DC residual currents make type A devices increasingly insensitive to AC residual currents and pulsating DC residual currents. If a fault occurs, there is therefore no tripping and the desired protective function is no longer assured.

UC-sensitive residual current protective devices of types B and B+ have an additional transformer which is supplied with a control signal. This enables an evaluation of the change of the transformer's operating range caused by smooth DC residual currents, thus ensuring the desired protective function.

The residual current protective devices of type B are suitable for use in three-phase current systems before input circuits with rectifiers. They are not intended for use in DC systems and in networks with operating frequencies other than 50 Hz or 60 Hz.

The devices in this series are designed as residual current operated circuit breakers (RCCBs) up to 80 A and as residual current circuit breakers with integral overcurrent protection (RCBOs) for 100 A or 125 A in Characteristics C or D.

Type B+ residual current protective devices also offer enhanced, preventative fire protection. In these versions, the tripping value is limited to a maximum of 420 mA up to 20 kHz.

All universal current-sensitive RCCBs, type B or B+ are now also available in a SIGRES version, meaning they are also ideal for use in harsh ambient conditions.

Benefits

- Universal current-sensitive residual current protective devices detect not only AC residual currents and pulsating DC residual currents, but also smooth DC residual currents, thus ensuring the desired protective function with all types of residual current.
- With type B, the tripping characteristic is adapted to suit the increase of leakage currents at higher frequencies in systems with capacitive impedances, thus ensuring greater operating safety
- Type B+ versions offer enhanced preventative fire protection and correspond to the prestandards DIN V VDE V 0664-110 and/or DIN V VDE V 0664-210 and VdS Directive 3501
- The RCBO is a compact device for up to 125 A. It provides not only personnel, material and fire protection but also overload and short-circuit protection for cables. This reduces wiring and mounting outlay
- The RCBOs offer external remote tripping over terminals Y1/Y2. This supports implementation of central OFF circuits.

Technical specifications

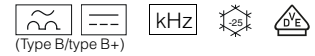
	SIQUENCE, RCCBs type B and type B+ 5SM3		SIQUENCE RCBOs type B and type B+ 5SU1
Standards	IEC/EN 61008-1 (VDE 0664-10); VDE 0664-100; IEC/EN 61543 (VDE 0664-30); IEC 62423 and additionally applicable for type B+: DIN V VDE V 0664-110		IEC/EN 61009-1 (VDE 0664-20); VDE 0664-200; IEC/EN 61543 (VDE 0664-30); IEC 62423
Versions	1P+N	3P+N	4P
Tripping characteristic	--	--	C, D
Surge current withstand capability with current waveform 8/20 µs Acc. to DIN VDE 0432-2			
• Super resistant	kA	> 3	> 3
• Selective	kA	--	> 5
Minimum operational voltage for test function operation	V AC	195	195
Rated voltages U_n	V AC	230	400, 480
Rated frequency f_n	Hz	50 ... 60	
Rated currents I_n	A	16, 25, 40, 63	25, 40, 63, 80
Rated residual currents $I_{\Delta n}$	mA	30, 300	30, 300, 500
Rated making and breaking capacity			
• I_m	A	800	--
• I_{cn}	kA	--	10
Insulation coordination • Overvoltage category		III	
Conductor cross-sections • Solid and stranded • Finely stranded, with end sleeve	mm ² mm ²	1.5 ... 25 1.5 ... 16	6 ... 50 6 ... 35
Terminal tightening torque for all devices	Nm	2.5 ... 3.0	3.0 ... 3.5
Mains connection		Either top or bottom	
Mounting position		Any	
Degree of protection according to EN 60529 (VDE 0470-1)		IP20, if the distribution board is installed, with connected conductors	
Touch protection Acc. to EN 50274 (VDE 0660-514)		Finger and back-of-hand safe	
Service life electrical and mechanical; (test cycle according to regulations)		> 10 000 switching cycles	
Storage temperature	°C	-40 ... +75	
Ambient temperature	°C	-25 ... +45, marked with 	
Resistance to climate acc. to IEC 60068-2-30		28 cycles (55 °C; 95 % rel. air humidity)	
CFC and silicone-free		Yes	

I^2t characteristic curves, see Engineering Manual at: www.siemens.com/lowvoltage/manuals

Residual Current Protective Devices / AFD Units

SIQUENCE 5SM3 and 5SU1 universal current-sensitive RCCBs, type B and type B+

Selection and ordering data

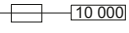


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	Rated residual current	Rated current	Max. permissible short-circuit back-up fuse	Mounting width	DT	Order No.	Price per PU	PU (UNIT, SET, M)	PS*/P. unit	PG	Weight per PU approx.					
	$I_{\Delta n}$ mA	I_n A	 10 000 A	MW							kg					
SIQUENCE RCCBs, type B, super resistant [K]																
	1P+N; 230 V AC; 50 ... 60 Hz															
	30	16	100	4		5SM3 321-4		1	1 unit	013	0.590					
		25				5SM3 322-4		1	1 unit	013	0.590					
		40				5SM3 324-4		1	1 unit	013	0.588					
		63				5SM3 326-4		1	1 unit	013	0.591					
	300	16	100	4		5SM3 621-4		1	1 unit	013	0.600					
		25				5SM3 622-4		1	1 unit	013	0.600					
		40				5SM3 624-4		1	1 unit	013	0.591					
		63				5SM3 626-4		1	1 unit	013	0.586					
	3P+N; 230 ... 400 V AC; 50 ... 60 Hz															
	30	25	100	4		5SM3 342-4		1	1 unit	013	0.582					
		40				5SM3 344-4		1	1 unit	013	0.578					
		63				5SM3 346-4		1	1 unit	013	0.581					
		80				5SM3 347-4		1	1 unit	013	0.587					
	300	25	100	4		5SM3 642-4		1	1 unit	013	0.592					
		40				5SM3 644-4		1	1 unit	013	0.581					
		63				5SM3 646-4		1	1 unit	013	0.576					
		80				5SM3 647-4		1	1 unit	013	0.585					
	500	63	100	4		5SM3 746-4		1	1 unit	013	0.575					
		80				5SM3 747-4		1	1 unit	013	0.575					
SIQUENCE RCCBs, type B, selective [S]																
	3P+N; 230 ... 400 V AC; 50 ... 60 Hz															
	300	63	100	4		5SM3 646-5		1	1 unit	013	0.578					
		80				5SM3 647-5		1	1 unit	013	0.587					
	500	63	100	4		5SM3 746-5		1	1 unit	013	0.520					
		80				5SM3 747-5		1	1 unit	013	0.520					
	SIQUENCE RCCBs, type B+, super resistant [K]															
	1P+N; 230 V AC; 50 ... 60 Hz															
	30	16	100	4		5SM3 321-4KK14		1	1 unit	013	0.587					
		25				5SM3 322-4KK14		1	1 unit	013	0.600					
		40				5SM3 324-4KK14		1	1 unit	013	0.600					
		63				5SM3 326-4KK14		1	1 unit	013	0.600					
	300	16	100	4		5SM3 621-4KK14		1	1 unit	013	0.600					
		25				5SM3 622-4KK14		1	1 unit	013	0.600					
		40				5SM3 624-4KK14		1	1 unit	013	0.600					
		63				5SM3 626-4KK14		1	1 unit	013	0.600					
	3P+N; 230 ... 400 V AC; 50 ... 60 Hz															
	30	25	100	4		5SM3 342-4KK14		1	1 unit	013	0.600					
		40				5SM3 344-4KK14		1	1 unit	013	0.600					
		63				5SM3 346-4KK14		1	1 unit	013	0.600					
		80				5SM3 347-4KK14		1	1 unit	013	0.600					
	300	25	100	4		5SM3 642-4KK14		1	1 unit	013	0.600					
		40				5SM3 644-4KK14		1	1 unit	013	0.600					
		63				5SM3 646-4KK14		1	1 unit	013	0.600					
		80				5SM3 647-4KK14		1	1 unit	013	0.600					
		SIQUENCE RCCBs, type B+, selective [S]														
						3P+N; 230 ... 400 V AC; 50 ... 60 Hz										
300	63		100	4		5SM3 646-5KK14		1	1 unit	013	0.600					
	80					5SM3 647-5KK14		1	1 unit	013	0.600					

Residual Current Protective Devices / AFD Units

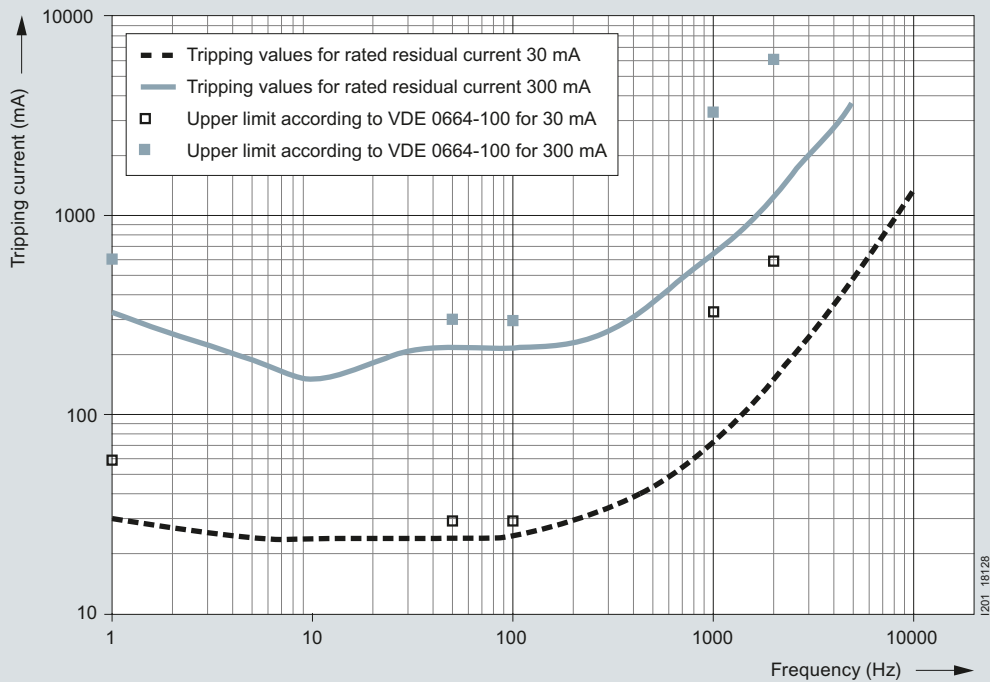
SIQUENCE 5SM3 and 5SU1 universal
current-sensitive RCCBs, type B and type B+

	Rated residual current	Rated current	Max. permissi- ble short-circuit back-up fuse	Mounting width	DT	Order No.	Price per PU	PU (UNIT, SET, M)	PS*/ P. unit	PG	Weight per PU approx.
	$I_{\Delta n}$ mA	I_n A	 10 000								kg
SIQUENCE RCBOs, type B, super resistant [K], rated breaking capacity 10 kA											
	4P; 400 V AC; 50 ... 60 Hz										
	Characteristic C										
	30	100		11		5SU1 374-7AK81		1	1 unit	010	2.067
		125				5SU1 374-7AK82		1	1 unit	010	2.053
	300	100		11		5SU1 674-7AK81		1	1 unit	010	2.069
		125				5SU1 674-7AK82		1	1 unit	010	2.088
	Characteristic D										
	30	100		11		5SU1 374-8AK81		1	1 unit	010	2.084
	300	100		11		5SU1 674-8AK81		1	1 unit	010	2.082
	4P; 480 V AC; 50 ... 60 Hz										
	Characteristic C										
	300	100		11		5SU1 674-7CK81		1	1 unit	010	2.050
		125				5SU1 674-7CK82		1	1 unit	010	2.050
SIQUENCE RCBOs, type B, selective [S], rated breaking capacity 10 kA											
	4P; 400 V AC; 50 ... 60 Hz										
	Characteristic C										
	300	125		11		5SU1 674-7BK82		1	1 unit	010	2.082
	Characteristic D										
	300	100		11		5SU1 674-8BK81		1	1 unit	010	2.078
SIQUENCE RCBOs, type B+, super resistant [K], rated breaking capacity 10 kA											
	4P; 400 V AC; 50 ... 60 Hz										
	Characteristic C										
	30	100		11		5SU1 374-7DK81		1	1 unit	010	2.067
		125				5SU1 374-7DK82		1	1 unit	010	2.053
	300	100		11		5SU1 674-7DK81		1	1 unit	010	2.069
		125				5SU1 674-7DK82		1	1 unit	010	2.088
	Characteristic D										
	30	100		11		5SU1 374-8DK81		1	1 unit	010	2.084
	300	100		11		5SU1 674-8DK81		1	1 unit	010	2.082
	4P; 480 V AC; 50 ... 60 Hz										
	Characteristic C										
	300	100		11		5SU1 674-7FK81		1	1 unit	010	2.050
		125				5SU1 674-7FK82		1	1 unit	010	2.050
SIQUENCE RCBOs, type B+, selective [S], rated breaking capacity 10 kA											
	4P; 400 V AC; 50 ... 60 Hz										
	Characteristic C										
	300	125		11		5SU1 674-7EK82		1	1 unit	010	2.082
	Characteristic D										
	300	100		11		5SU1 674-8EK81		1	1 unit	010	2.078

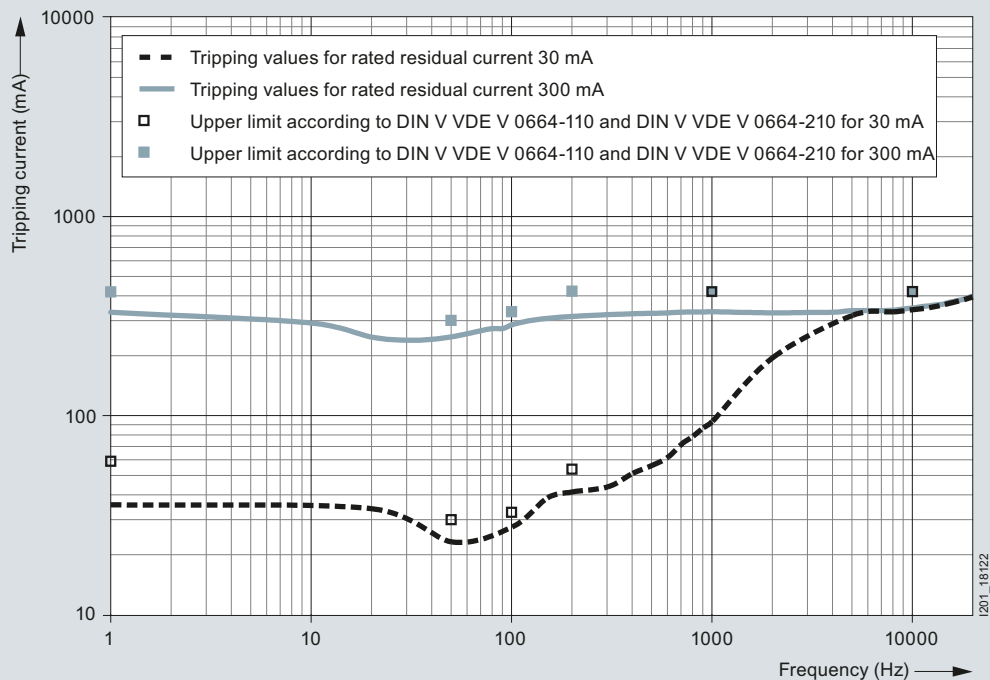
Residual Current Protective Devices / AFD Units

**SIQUENCE 5SM3 and 5SU1 universal
current-sensitive RCCBs, type B and type B+**

Characteristic curves



Tripping current as a function of frequency for type B



Tripping current as a function of frequency for type B+

Overview

Auxiliary switches (AS) signal the contact position of the RCCB. Remote controlled mechanisms are used for the remote ON/OFF switching of RCCBs. They also enable local manual switching. A blocking function permits maintenance work. A tripped RCCB must be acknowledged prior to switching back on.

The leakage current measurement device detects the leakage currents - like the circuit breaker - thus providing a direct statement as to the current loading of the RCCB. It is used to measure leakage currents up to 300 mA. This requires a voltmeter with an internal resistance over 1 MΩ/V and a measuring range for AC voltages of $U_{rms} = 1 \text{ mV to } 2 \text{ V}$. For the fault-free operation of an RCCB, the measured leakage current should be no greater than 1/3 of the rated residual current.

Benefits

- Using captive brackets, the remote controlled mechanism can be attached (or retrofitted) to the right-hand side of the basic device without the need for tools
- Bus systems, such as *instabus* KNX, AS-Interface bus or PROFIBUS, can be integrated in the communication over binary inputs
- The leakage current measurement device enables the systematic selection of the rated residual current, thus preventing the inadvertent tripping of RCCBs.

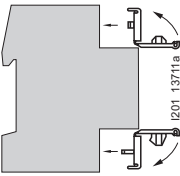
Technical specifications

		Auxiliary switches (AS) 5SW3 30.	Auxiliary switches (AS) 5SW3 330
Standards		EN 62019	IEC/EN 60947-5-1 (VDE 0660-200)
Approvals			IEC/EN 60947-5-1 (VDE 0660-200)
Terminals			
• Conductor cross-section	mm ²	0.75 ... 2.5	
• Tightening torques	Nm	0.6 ... 0.8	
Short-circuit protection		B6 or C6 or gL/gG 6 A fuse	
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

Residual Current Protective Devices / AFD Units

Additional components

Selection and ordering data

Version	Mounting width MW	DT	Order No.	Price per PU	PU (UNIT, SET, M)	PS*/P. unit	PG	Weight per PU approx. kg
	Auxiliary switches (AS) for 5SM3 residual current protective devices up to 80 A							
	1 NO + 1 NC	0.5	▶ 5SW3 300		1	1/10 units	015	0.050
	2 NC	0.5	5SW3 301		1	1/10 units	015	0.049
	2 NO	0.5	5SW3 302		1	1/10 units	015	0.050
	Auxiliary switches (AS) for 5SM3 residual current protective devices up to 100 ... 125 A, 3P+N							
	1 NO + 1 NC	0.5	5SW3 330		1	1 unit	015	0.041
	Remote controlled mechanisms (RC) For 5SM3 RCCBs up to 80 A							
	Rated voltage $U_n = 230$ V AC	3.5	▶ 5ST3 051		1	1 unit	020	0.449
	Leakage current measurement devices							
	Rated voltage $U_n = 500$ V AC; 50 ... 60 Hz; 4P Rated residual current $I_{\Delta n} = 0 ... 300$ mA Rated current $I_n = 63$ A.	4	5SM1 930-0		1	1 unit	015	0.489
	Covers for connection terminals							
	For residual current operated circuit breakers up to 80 A, sealable (2 units in plastic bag)							
		2	5SW3 010		1	1/50 units	015	0.008
		2.5	5SW3 011		1	1/50 units	015	0.008
	Locking devices							
	For RCCBs up to 80 A, sealable and lockable 4.5 mm lock hasp diameter							
			5SW3 303		1	10 units	015	0.009
	Padlocks							
	For 5SW3 303 locking device		5ST3 802		1	1 unit	020	0.031
	Locking devices with padlock Comprising 5SW3 303 locking device and 5ST3 802 padlock		5SW3 312		1	1 set	015	0.028
	Gland for N conductor							
	For easier wiring in various circuit versions and bus mountings or as a support terminal for N conductors from 2.5 mm ² to 50 mm ² with blue color marking 1P Rated operational current I_e 125 A Rated operational voltage U_e 230 V AC Conductor cross-sections up to 50 mm ²		5TE9 113		1	1 unit	029	0.114

Overview

RC units are used in all supply systems up to 240/415 V AC. Devices of type AC trip in the event of sinusoidal AC residual currents, type A also trips in the event of pulsating DC residual currents.

In addition, RC units, type F also detect residual currents with mixed frequencies up to 1 kHz.

RCCBs with a rated residual current of maximum 30 mA are used for personnel, material and fire protection, as well as for protection against direct contact.

Devices with a rated residual current of maximum 300 mA are used as preventative fire protection in case of insulation faults.

RC units are combined with miniature circuit breakers with characteristics A, B, C and D, provided that these are available in the MCB range. The two components are simply plugged together without the need for any tools.

They then form a combination of RCCB and MCB for personnel, fire and line protection.

The dimensioning of the rated residual current depends on the size of the plant.

Benefits

- Our wide variety of RC unit types and comprehensive range of miniature circuit breakers offer a huge spectrum of combinations for all applications
- Instantaneous type A devices have a surge current withstand capability with current waveform 8/20 μ s of more than 1 kA, super resistant of more than 3 kA and selective of more than 5 kA. This ensures safe operation
- All additional components for miniature circuit breakers can be retrofitted on the right-hand side
- All 100 A and 125 A RC units offer external remote tripping over terminals Y1/Y2. This supports implementation of central OFF circuits.
- Both components can be simply plugged into each other and secured with captive metal brackets - no tools required. This saves considerable time when mounting.



Technical specifications

		5SM2
Standards		IEC/EN 61009-1 (VDE 0664-20), IEC/EN 61009-2-1 (VDE 0664-21), IEC/EN 61543 (VDE 0664-30), IEC/EN 62423 (VDE 0664-40)
Surge current withstand capability		
• Type A with current waveform 8/20 μ s	Acc. to DIN VDE 0432-2	
- Instantaneous	kA	> 1
- Super resistant	kA	> 3
- Selective	kA	> 5
• Type F with current waveform 8/20 μ s	Acc. to DIN VDE 0432-2	kA > 3
Minimum operational voltage for test function operation		
• Up to $I_n = 63$ A, 2 and 3-pole	V AC	195
• Up to $I_n = 63$ A, 4-pole	V AC	100
• At $I_n = 80 \dots 100$ A	V AC	100
Rated voltage U_n	V AC	230 ... 400
Rated frequency f_n	Hz	50 ... 60
Rated currents I_n	A	0.3 ... 16; 0.3 ... 40; 0.3 ... 63; 80 ... 100
Rated residual currents $I_{\Delta n}$	mA	10, 30, 100, 300, 500, 1000
Insulation coordination		
• Overvoltage category		III
Pollution degree		2
Terminal conductor cross-sections		
• Up to I_n 63 A	mm ²	1.5 ... 25
• At $I_n = 80 \dots 100$ A	mm ²	6.0 ... 50
Terminal tightening torque	Nm	2.5 ... 3.0
Mains connection		Either top or bottom
Mounting position		Any
Degree of protection	Acc. to EN 60529 (VDE 0470-1)	IP20, if the distribution board is installed, with connected conductors
Touch protection	Acc. to EN 50274 (VDE 0660-514)	Finger and back-of-hand safe
Service life	Test cycle acc. to DIN/EN 61009	> 10 000 switching cycles
Storage temperature	°C	-40 ... +75
Ambient temperature	°C	-25 ... +45, marked with
Resistance to climate	Acc. to IEC 60068-2-30	28 cycles (55 °C; 95 % rel. air humidity)
CFC and silicone-free		Yes

Residual Current Protective Devices / AFD Units

5SM2 RC units

Selection and ordering data



(Type AC)



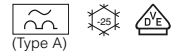
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	Rated residual current $I_{\Delta n}$ mA	Rated current I_n A	Mounting width MW	DT	Order No.	Price per PU	PU (UNIT, SET, M)	PS*/P. unit	PG	Weight per PU approx. kg
RC units, type AC, instantaneous										
For 5SY miniature circuit breakers, not suitable for use with 5SY5, 5SY3 0 and 5SY6 0										
2P, 230 ... 400 V AC, 50 ... 60 Hz										
	10 ¹⁾	0.3 ... 40	2		5SM2 121-0		1	1 unit	012	0.198
	30				5SM2 322-0		1	1 unit	012	0.205
	300				5SM2 622-0		1	1 unit	012	0.193
	30	0.3 ... 63			5SM2 325-0		1	1 unit	012	0.215
	300				5SM2 625-0		1	1 unit	012	0.195
	500				5SM2 725-0		1	1 unit	012	0.195
	1000				5SM2 825-0		1	1 unit	012	0.218
3P; 230 ... 400 V AC; 50 ... 60 Hz										
	30	0.3 ... 40	3		5SM2 332-0		1	1 unit	012	0.304
	300				5SM2 632-0		1	1 unit	012	0.290
	30	0.3 ... 63			5SM2 335-0		1	1 unit	012	0.358
	300				5SM2 635-0		1	1 unit	012	0.290
	500				5SM2 735-0		1	1 unit	012	0.290
4P, 230 ... 400 V AC, 50 ... 60 Hz										
	30	0.3 ... 40	3	►	5SM2 342-0		1	1 unit	012	0.328
	300			►	5SM2 642-0		1	1 unit	012	0.321
	30	0.3 ... 63			5SM2 345-0		1	1 unit	012	0.395
	300				5SM2 645-0		1	1 unit	012	0.320
	500				5SM2 745-0		1	1 unit	012	0.321
RC units, type AC, selective 										
For 5SY miniature circuit breakers, not suitable for use with 5SY5, 5SY3 0 and 5SY6 0										
2P, 230 ... 400 V AC, 50 ... 60 Hz										
	300	0.3 ... 40	2		5SM2 622-2		1	1 unit	012	0.210
	300	0.3 ... 63			5SM2 625-2		1	1 unit	012	0.213
4P, 230 ... 400 V AC, 50 ... 60 Hz										
	300	0.3 ... 63	3		5SM2 645-2		1	1 unit	012	0.373
	1000				5SM2 845-2		1	1 unit	012	0.330
RC units, type AC, instantaneous										
For 5SP4 miniature circuit breakers (characteristics B and C)										
2P, 230 ... 400 V AC, 50 ... 60 Hz										
	30	80 ... 100	3.5		5SM2 327-0		1	1 unit	012	0.532
	300				5SM2 627-0		1	1 unit	012	0.446
4P, 230 ... 400 V AC, 50 ... 60 Hz										
	30	80 ... 100	5		5SM2 347-0		1	1 unit	012	0.935
	300				5SM2 647-0		1	1 unit	012	0.678

¹⁾ 2SM2 RC units with $I_{\Delta n} = 10$ mA can be combined with switches $I_n = 16$ A

Residual Current Protective Devices / AFD Units

5SM2 RC units



Rated residual current	Rated current	Mounting width	DT	Order No.	Price per PU	PU (UNIT, SET, M)	PS*/P. unit	PG	Weight per PU approx.
$I_{\Delta n}$ mA	I_n A	MW							kg

RC units, type A, instantaneous

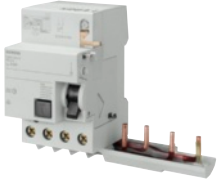
For 5SY miniature circuit breakers,
not suitable for use with 5SY5, 5SY8 and 5SY6 0. . .

2P, 230 ... 400 V AC, 50 ... 60 Hz

10	0.3 ... 16	2	▶	5SM2 121-6		1	1 unit	011	0.207
30	0.3 ... 40			5SM2 322-6		1	1 unit	011	0.209
300				5SM2 622-6		1	1 unit	011	0.199
30	0.3 ... 63			5SM2 325-6		1	1 unit	011	0.215
100				5SM2 425-6		1	1 unit	011	0.211
300				5SM2 625-6		1	1 unit	011	0.203
500				5SM2 725-6		1	1 unit	011	0.198

3P; 230 ... 400 V AC; 50 ... 60 Hz

30	0.3 ... 40	3		5SM2 332-6		1	1 unit	011	0.314
300				5SM2 632-6		1	1 unit	011	0.295
30	0.3 ... 63			5SM2 335-6		1	1 unit	011	0.359
100				5SM2 435-6		1	1 unit	011	0.327
300				5SM2 635-6		1	1 unit	011	0.298
500				5SM2 735-6		1	1 unit	011	0.322

4P, 230 ... 400 V AC, 50 ... 60 Hz

30	0.3 ... 40	3	▶	5SM2 342-6		1	1 unit	011	0.337
300			▶	5SM2 642-6		1	1 unit	011	0.326
30	0.3 ... 63			5SM2 345-6		1	1 unit	011	0.397
100				5SM2 445-6		1	1 unit	011	0.357
300				5SM2 645-6		1	1 unit	011	0.328
500				5SM2 745-6		1	1 unit	011	0.326

For 5SP4 miniature circuit breakers
(characteristics B and C)

2P, 125 ... 230 V AC, 50 ... 60 Hz

30	80 ... 100	3.5		5SM2 327-6		1	1 unit	011	0.529
300				5SM2 627-6		1	1 unit	011	0.458

4P, 230 ... 400 V AC, 50 ... 60 Hz

30	80 ... 100	5		5SM2 347-6		1	1 unit	011	0.934
300				5SM2 647-6		1	1 unit	011	0.682

Residual Current Protective Devices / AFD Units

5SM2 RC units

4

Rated residual current	Rated current	Mounting width	DT	Order No.	Price per PU	PU (UNIT, SET, M)	PS*/P. unit	PG	Weight per PU approx.
$I_{\Delta n}$ mA	I_n A	MW							kg

RC units, type A, super resistant **[K]**

For 5SY miniature circuit breakers,
not suitable for use with 5SY5, 5SY8 and 5SY6 0. . ,



2P, 230 ... 400 V AC, 50 ... 60 Hz

30	0.3 ... 40	2	5SM2 322-6KK01	1	1 unit	011	0.215
30	0.3 ... 63		5SM2 325-6KK01	1	1 unit	011	0.214



3P, 230 ... 400 V AC, 50 ... 60 Hz

30	0.3 ... 40	3	5SM2 332-6KK01	1	1 unit	011	0.365
30	0.3 ... 63		5SM2 335-6KK01	1	1 unit	011	0.365



4P, 230 ... 400 V AC, 50 ... 60 Hz

30	0.3 ... 40	3	5SM2 342-6KK01	1	1 unit	011	0.390
30	0.3 ... 63		5SM2 345-6KK01	1	1 unit	011	0.388

RC units, type A, selective **[S]**

For 5SY miniature circuit breakers,
not suitable for use with 5SY5, 5SY8 and 5SY6 0. . ,



2P, 230 ... 400 V AC, 50 ... 60 Hz

300	0.3 ... 40	2	5SM2 622-8	1	1 unit	011	0.210
1000			5SM2 822-8	1	1 unit	011	0.204
300	0.3 ... 63		5SM2 625-8	1	1 unit	011	0.210
1000			5SM2 825-8	1	1 unit	011	0.202



3P, 230 ... 400 V AC, 50 ... 60 Hz

1000	0.3 ... 40	3	5SM2 832-8	1	1 unit	011	0.301
300	0.3 ... 63	3	5SM2 635-8	1	1 unit	011	0.341
500			5SM2 735-8	1	1 unit	011	0.323
1000			5SM2 835-8	1	1 unit	011	0.304



4P, 230 ... 400 V AC, 50 ... 60 Hz

1000	0.3 ... 40	3	5SM2 842-8	1	1 unit	011	0.343
300	0.3 ... 63		5SM2 645-8	1	1 unit	011	0.373
500			5SM2 745-8	1	1 unit	011	0.333
1000			5SM2 845-8	1	1 unit	011	0.333

Residual Current Protective Devices / AFD Units

5SM2 RC units

	Rated residual current	Rated current	Mounting width	DT	Order No.	Price per PU	PU (UNIT, SET, M)	PS*/P. unit	PG	Weight per PU approx.
	$I_{\Delta n}$ mA	I_n A	MW							kg
	For 5SP4 miniature circuit breakers (characteristics B and C)									
	2P, 125 ... 230 V AC, 50 ... 60 Hz									
	300	80 ... 100	3.5		5SM2 627-8		1	1 unit	011	0.519
	1000	80 ... 100	3.5		5SM2 827-8		1	1 unit	011	0.464
	4P, 230 ... 400 V AC, 50 ... 60 Hz									
	300	80 ... 100	5		5SM2 647-8		1	1 unit	011	0.838
	1000				5SM2 847-8		1	1 unit	011	0.706

RC units, type F, super resistant

For 5SY miniature circuit breakers,
not suitable for use with 5SY5, 5SY8 and 5SY6 0..,

NEW

**2P, 230 ... 400 V AC, 50 ... 60 Hz**

30	0.3 ... 40	2
30	0.3 ... 63	2

5SM2 322-3
5SM2 325-3

1	1 unit	011	0.215
1	1 unit	011	0.214

5SU1 RCBOS

Overview

RCBOs are a combination of an RCCB and a miniature circuit breaker in a compact design for personnel, fire and line protection. For personnel protection and fire protection, the residual current part of the type AC trips in the event of sinusoidal AC residual currents, type A also trips in the event of pulsating DC residual currents.

In addition, RCBOs type F also detect residual currents with mixed frequencies up to 1 kHz.

RCBOs with a rated residual current of maximum 30 mA are used for personnel, material and fire protection, as well as for protection against direct contact. RCBOs with a rated residual current of 10 mA are primarily used in areas that represent an increased risk for personnel and in the outdoor installations of residential buildings.

Devices with a rated residual current of maximum 300 mA are used as preventative fire protection in case of insulation faults.

The MCB part of the RCBO protects lines against overload and short circuits and is available in characteristics B and C.

Since DIN VDE 0100-410 came into effect in June 2007, all socket outlet current circuits up to 20 A must now also be fitted with residual current protective devices with a rated residual cur-

rent of max. 30 mA. This also applies to outdoor electrical circuits up to 32 A for the connection of portable equipment.

In order to implement this protection, we recommend the national use of RCBOs with 30 mA.

Assignment to each individual branch circuit helps prevent the undesired tripping of fault-free circuits induced by the accumulation of operation-related leakage currents or by transient current pulses during switching operations.

Additional components of the 5SY miniature circuit breakers can be mounted at the side and carry out additional functions.

For further details on additional components, please refer to the chapter ["Miniature circuit breakers"](#).

RCBOs comprise one part for fault-current detection and one part for overcurrent detection. They are equipped with a delayed overload/time-dependent thermal release (thermal bimetal) for low overcurrents and with an instantaneous electromagnetic release for higher overload and short-circuit currents.

The special contact materials used guarantee a long service life and offer a high degree of protection against contact welding.

Benefits



For all versions

- Clear and visible conductor connection in front of the rear busbar facilitates controls
- Large and easily accessible wiring space enables easy insertion of conductor in the terminals.
- The surge current withstand capability of over 1 kA ensures safe and reliable operation.
- All additional components for miniature circuit breakers can be retrofitted on the right-hand side.

For all 10 kA versions up to 40 A

- Integrated movable terminal covers located at the cable entries ensure the terminals are fully insulated when the screws are tightened. The effective touch protection when grasping the device considerably exceeds the requirements of BGV A3.
- The RCBOs can be quickly and easily removed from the assembly by hand if connections need to be changed. This saves time if parts need to be replaced because the busbars no longer need to be freed from the adjacent miniature circuit breakers.



For all 125 A versions

- The RCBOs offer external remote tripping over terminals Y1/Y2. This supports implementation of central OFF circuits.

Technical specifications

			Up to 40 A	125 A
Standards			IEC/EN 61009-1 (VDE 0664-20); IEC/EN 61009-2-1 (VDE 0664-21) IEC/EN 61543 (VDE 0664-30); IEC/EN 62423 (VDE 0664-40)	
Rated voltages U_n	V AC		125 ... 230	400
Rated frequency f_n	Hz		50 ... 60	
Rated currents I_n	A		6, 8, 10, 13, 16, 20, 25, 32, 40	125
Rated residual currents $I_{\Delta n}$	mA		10, 30, 100, 300	30, 300, 1000
Rated breaking capacity	kA		6 / 10	10
Energy limitation class			3	--
Surge current withstand capability, type A				
• with current waveform 8/20 μ s acc. to DIN VDE 0432-2				
- Instantaneous	kA		> 1	
- Super resistant	kA		> 3	--
- Selective	kA		> 5	
• Type F with current waveform 8/20 μ s			kA	> 3
Minimum voltage for operation of the test equipment			V AC	100
Insulation coordination				
• Overvoltage category			III	
Pollution degree			2	
Terminal conductor cross-sections				
• Solid and stranded			mm ²	0.75 ... 35
• Finely stranded with end sleeve			mm ²	0.75 ... 25
				6 ... 50
				6 ... 35
Terminal tightening torque	Nm		2.5 ... 3.0	3.0 ... 3.5
Mains connection			Top or bottom	
Mounting position			Any	
Degree of protection	Acc. to EN 60529 (VDE 0470-1)		IP20, if the distribution board is installed, with connected conductors	
Touch protection	Acc. to EN 50274 (VDE 0660-514)		Finger and back-of-hand safe	
Service life	Test cycle acc. to IEC/EN 61009	Switching cycles	> 10000	
Storage temperature		°C	-40 ... +75	
Ambient temperature		°C	-25 ... +45,  marked with 	
Resistance to climate	Acc. to IEC 60068-2-30		28 cycles (55 °C; 95 % rel. air humidity)	
CFC and silicone-free			Yes	

Residual Current Protective Devices / AFD Units

5SU1 RCBOs

Selection and ordering data



4

Rated residual current $I_{\Delta n}$ mA	Rated current I_n A	Moun- ting width MW	DT	Tripping characteristic B Order No.	Price per PU	PG	DT	Tripping characteristic C Order No.	Price per PU	PU (UNIT, SET, M)	PS*/ P. unit	PG	Weight per PU approx.
RCBOs, type AC, instantaneous													
1P + N, 230 V AC, 50 ... 60 Hz													
4 500													
3													
N connection, right													
30	6	2	--					5SU1 353-1KK06		1	1 unit	004	0.284
	8		--					5SU1 353-1KK08		1	1 unit	004	0.292
	10		--					5SU1 353-1KK10		1	1 unit	004	0.284
	13		--					5SU1 353-1KK13		1	1 unit	004	0.309
	16		--					5SU1 353-1KK16		1	1 unit	004	0.284
	20		--					5SU1 353-1KK20		1	1 unit	004	0.294
	25		--					5SU1 353-1KK25		1	1 unit	004	0.293
	32		--					5SU1 353-1KK32		1	1 unit	004	0.298
	40		--					5SU1 353-1KK40		1	1 unit	004	0.295
300	6	2	--					5SU1 653-1KK06		1	1 unit	004	0.285
	10		--					5SU1 653-1KK10		1	1 unit	004	0.277
	13		--					5SU1 653-1KK13		1	1 unit	004	0.288
	16		--					5SU1 653-1KK16		1	1 unit	004	0.276
	20		--					5SU1 653-1KK20		1	1 unit	004	0.287
	25		--					5SU1 653-1KK25		1	1 unit	004	0.286
	32		--					5SU1 653-1KK32		1	1 unit	004	0.289
	40		--					5SU1 653-1KK40		1	1 unit	004	0.288
N connection, left													
30	6	2	--					5SU1 353-1KL06		1	1 unit	004	0.292
	10		--					5SU1 353-1KL10		1	1 unit	004	0.292
	13		--					5SU1 353-1KL13		1	1 unit	004	0.296
	16		--					5SU1 353-1KL16		1	1 unit	004	0.294
	20		--					5SU1 353-1KL20		1	1 unit	004	0.303
	25		--					5SU1 353-1KL25		1	1 unit	004	0.302
	32		--					5SU1 353-1KL32		1	1 unit	004	0.304
	40		--					5SU1 353-1KL40		1	1 unit	004	0.305
300	6		--					5SU1 653-1KL06		1	1 unit	004	0.285
	10		--					5SU1 653-1KL10		1	1 unit	004	0.277
	16		--					5SU1 653-1KL16		1	1 unit	004	0.276
	20		--					5SU1 653-1KL20		1	1 unit	004	0.287
	25		--					5SU1 653-1KL25		1	1 unit	004	0.286
	32		--					5SU1 653-1KL32		1	1 unit	004	0.289
	40		--					5SU1 653-1KL40		1	1 unit	004	0.288
6 000													
3													
N connection, right													
30	6	2		5SU1 356-0KK06	004			5SU1 356-1KK06		1	1 unit	004	0.284
	8			--				5SU1 356-1KK08		1	1 unit	004	0.289
	10			5SU1 356-0KK10	004			5SU1 356-1KK10		1	1 unit	004	0.285
	13			5SU1 356-0KK13	004			5SU1 356-1KK13		1	1 unit	004	0.289
	16			5SU1 356-0KK16	004			5SU1 356-1KK16		1	1 unit	004	0.281
	20			5SU1 356-0KK20	004			5SU1 356-1KK20		1	1 unit	004	0.294
	25			5SU1 356-0KK25	004			5SU1 356-1KK25		1	1 unit	004	0.295
	32			5SU1 356-0KK32	004			5SU1 356-1KK32		1	1 unit	004	0.300
	40			5SU1 356-0KK40	004			5SU1 356-1KK40		1	1 unit	004	0.302
300	6	2		5SU1 656-0KK06	004			5SU1 656-1KK06		1	1 unit	004	0.280
	10			5SU1 656-0KK10	004			5SU1 656-1KK10		1	1 unit	004	0.278
	13			5SU1 656-0KK13	004			5SU1 656-1KK13		1	1 unit	004	0.280
	16			5SU1 656-0KK16	004			5SU1 656-1KK16		1	1 unit	004	0.276
	20			5SU1 656-0KK20	004			5SU1 656-1KK20		1	1 unit	004	0.293
	25			5SU1 656-0KK25	004			5SU1 656-1KK25		1	1 unit	004	0.292
	32			5SU1 656-0KK32	004			5SU1 656-1KK32		1	1 unit	004	0.288
	40			5SU1 656-0KK40	004			5SU1 656-1KK40		1	1 unit	004	0.284

Residual Current Protective Devices / AFD Units

5SU1 RCBOS

Rated residual current	Rated current	Mounting width	DT	Tripping characteristic B Order No.	Price per PU	PG	DT	Tripping characteristic C Order No.	Price per PU	PU (UNIT, SET, M)	PS*/P. unit	PG	Weight per PU approx.
$I_{\Delta n}$ mA	I_n A	MW											

RCBOs, type AC, instantaneous

1P + N, 230 V AC, 50 ... 60 Hz



10 000

3

30	6	2	5SU1 354-0KK06	004	5SU1 354-1KK06	1	1 unit	004	0.288
	8		--		5SU1 354-1KK08	1	1 unit	004	0.260
	10		5SU1 354-0KK10	004	5SU1 354-1KK10	1	1 unit	004	0.288
	13		5SU1 354-0KK13	004	5SU1 354-1KK13	1	1 unit	004	0.292
	16		5SU1 354-0KK16	004	5SU1 354-1KK16	1	1 unit	004	0.288
	20		5SU1 354-0KK20	004	5SU1 354-1KK20	1	1 unit	004	0.292
	25		5SU1 354-0KK25	004	5SU1 354-1KK25	1	1 unit	004	0.293
	32		5SU1 354-0KK32	004	5SU1 354-1KK32	1	1 unit	004	0.297
	40		5SU1 354-0KK40	004	5SU1 354-1KK40	1	1 unit	004	0.296
100	6	2	--		5SU1 454-1KK06	1	1 unit	004	0.283
	10		--		5SU1 454-1KK10	1	1 unit	004	0.284
	13		--		5SU1 454-1KK13	1	1 unit	004	0.290
	16		--		5SU1 454-1KK16	1	1 unit	004	0.286
	20		--		5SU1 454-1KK20	1	1 unit	004	0.289
	25		--		5SU1 454-1KK25	1	1 unit	004	0.289
	32		--		5SU1 454-1KK32	1	1 unit	004	0.288
	40		--		5SU1 454-1KK40	1	1 unit	004	0.293
300	6	2	5SU1 654-0KK06	004	5SU1 654-1KK06	1	1 unit	004	0.280
	10		5SU1 654-0KK10	004	5SU1 654-1KK10	1	1 unit	004	0.282
	13		5SU1 654-0KK13	004	5SU1 654-1KK13	1	1 unit	004	0.280
	16		5SU1 654-0KK16	004	5SU1 654-1KK16	1	1 unit	004	0.282
	20		5SU1 654-0KK20	004	5SU1 654-1KK20	1	1 unit	004	0.287
	25		5SU1 654-0KK25	004	5SU1 654-1KK25	1	1 unit	004	0.284
	32		5SU1 654-0KK32	004	5SU1 654-1KK32	1	1 unit	004	0.287
	40		5SU1 654-0KK40	004	5SU1 654-1KK40	1	1 unit	004	0.286

RCBOs, type AC, instantaneous

2P, 400 V AC, 50 ... 60 Hz



10 000

30	125	6.5	5SU1 324-0KK82	004	5SU1 324-1KK82	1	1 unit	004	1.224
300	125		5SU1 624-0KK82	004	5SU1 624-1KK82	1	1 unit	004	0.930

4P, 400 V AC, 50 ... 60 Hz

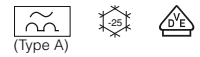


10 000

30	125	11	5SU1 344-0KK82	004	5SU1 344-1KK82	1	1 unit	004	2.017
300	125		5SU1 644-0KK82	004	5SU1 644-1KK82	1	1 unit	004	2.026

Residual Current Protective Devices / AFD Units

5SU1 RCBOs



4

Rated residual current $I_{\Delta n}$ mA	Rated current I_n A	Mounting width MW	DT	Tripping characteristic B			PG	DT	Tripping characteristic C			PU (UNIT, SET, M)	PS*/ P. unit	PG	Weight per PU approx. kg
				Order No.	Price per PU				Order No.	Price per PU					

RCBOs, type A, instantaneous

1P+N, 230 V AC, 50 ... 60 Hz



4 500
3

N connection, right

30	6	2	--
	8		--
	10		--
	13		--
	16		--
	20		--
	25		--
	32		--
	40		--

300	6	2	--
	10		--
	13		--
	16		--
	20		--
	25		--
	32		--
	40		--

N connection, left

30	6	2	--
	10		--
	16		--
	20		--
	25		--
	32		--
	40		--

6 000
3

N connection, right

30	6	2	5SU1 353-7KK06
	8		5SU1 353-7KK08
	10		5SU1 353-7KK10
	13		5SU1 353-7KK13
	16		5SU1 353-7KK16
	20		5SU1 353-7KK20
	25		5SU1 353-7KK25
	32		5SU1 353-7KK32
	40		5SU1 353-7KK40

300	6	2	5SU1 653-7KK06
	10		5SU1 653-7KK10
	13		5SU1 653-7KK13
	16		5SU1 653-7KK16
	20		5SU1 653-7KK20
	25		5SU1 653-7KK25
	32		5SU1 653-7KK32
	40		5SU1 653-7KK40



30	6	2	5SU1 356-6KK06
	8		5SU1 356-6KK08
	10		5SU1 356-6KK10
	13		5SU1 356-6KK13
	16		5SU1 356-6KK16
	20		5SU1 356-6KK20
	25		5SU1 356-6KK25
	32		5SU1 356-6KK32
	40		5SU1 356-6KK40

300	6	2	5SU1 656-6KK06
	10		5SU1 656-6KK10
	13		5SU1 656-6KK13
	16		5SU1 656-6KK16
	20		5SU1 656-6KK20
	25		5SU1 656-6KK25
	32		5SU1 656-6KK32
	40		5SU1 656-6KK40

1	1 unit	008	0.275
1	1 unit	008	0.293
1	1 unit	008	0.280
1	1 unit	008	0.278
1	1 unit	008	0.280
1	1 unit	008	0.291
1	1 unit	008	0.292
1	1 unit	008	0.296
1	1 unit	008	0.295
1	1 unit	008	0.279
1	1 unit	008	0.282
1	1 unit	008	0.284
1	1 unit	008	0.278
1	1 unit	008	0.292
1	1 unit	008	0.292
1	1 unit	008	0.292
1	1 unit	008	0.294
1	1 unit	008	0.292
1	1 unit	008	0.292
1	1 unit	008	0.294
1	1 unit	008	0.303
1	1 unit	008	0.303
1	1 unit	008	0.304
1	1 unit	008	0.305

Residual Current Protective Devices / AFD Units

5SU1 RCBOs

	Rated residual current	Rated current	Moun- ting width	DT	Tripping characteristic B			Tripping characteristic C			PU (UNIT, SET, M)	PS*/ P. unit	PG	Weight per PU approx.
	$I_{\Delta n}$	I_n		Order No.	Price per PU	PG	DT	Order No.	Price per PU					
	mA	A	MW											
RCBOs, type A, instantaneous														
	1P+N; 230 V AC; 50 ... 60 Hz													
	10 000 3													
	10	6	2		5SU1 154-6KK06		008		5SU1 154-7KK06		1	1 unit	008	0.288
		10		5SU1 154-6KK10		008		5SU1 154-7KK10		1	1 unit	008	0.287	
		13		5SU1 154-6KK13		008		5SU1 154-7KK13		1	1 unit	008	0.290	
		16		5SU1 154-6KK16		008	▶	5SU1 154-7KK16		1	1 unit	008	0.284	
	30	6	2		5SU1 354-6KK06		008	▶	5SU1 354-7KK06		1	1 unit	008	0.283
		8		—		008	▶	5SU1 354-7KK08		1	1 unit	008	0.260	
		10		5SU1 354-6KK10		008	▶	5SU1 354-7KK10		1	1 unit	008	0.283	
		13		5SU1 354-6KK13		008		5SU1 354-7KK13		1	1 unit	008	0.288	
		16		▶ 5SU1 354-6KK16		008	▶	5SU1 354-7KK16		1	1 unit	008	0.282	
		20		5SU1 354-6KK20		008		5SU1 354-7KK20		1	1 unit	008	0.289	
		25		5SU1 354-6KK25		008		5SU1 354-7KK25		1	1 unit	008	0.288	
		32		5SU1 354-6KK32		008		5SU1 354-7KK32		1	1 unit	008	0.292	
		40		5SU1 354-6KK40		008		5SU1 354-7KK40		1	1 unit	008	0.286	
	300	6	2		5SU1 654-6KK06		008		5SU1 654-7KK06		1	1 unit	008	0.284
		10		5SU1 654-6KK10		008		5SU1 654-7KK10		1	1 unit	008	0.282	
		13		5SU1 654-6KK13		008		5SU1 654-7KK13		1	1 unit	008	0.288	
		16		5SU1 654-6KK16		008		5SU1 654-7KK16		1	1 unit	008	0.281	
		20		5SU1 654-6KK20		008		5SU1 654-7KK20		1	1 unit	008	0.285	
		25		5SU1 654-6KK25		008		5SU1 654-7KK25		1	1 unit	008	0.285	
		32		5SU1 654-6KK32		008		5SU1 654-7KK32		1	1 unit	008	0.287	
		40		5SU1 654-6KK40		008		5SU1 654-7KK40		1	1 unit	008	0.289	

Residual Current Protective Devices / AFD Units

5SU1 RCBOs

4

	Rated residual current	Rated current	Moun- ting width	DT	Tripping characteristic B			Tripping characteristic C			PU (UNIT, SET, M)	PS*/ P. unit	PG	Weight per PU approx.
	$I_{\Delta n}$ mA	I_n A	MW		Order No.	Price per PU	PG	DT	Order No.	Price per PU				kg
	2P; 230 V AC; 50 ... 60 Hz													
	10 000													
	3													
	30	6	3		5SU1 324-6FA06	008			5SU1 324-7FA06		1	1 unit	008	0.421
		10		▶	5SU1 324-6FA10	008	▶		5SU1 324-7FA10		1	1 unit	008	0.414
		13			5SU1 324-6FA13	008			5SU1 324-7FA13		1	1 unit	008	0.423
		16		▶	5SU1 324-6FA16	008	▶		5SU1 324-7FA16		1	1 unit	008	0.414
		20			5SU1 324-6FA20	008			5SU1 324-7FA20		1	1 unit	008	0.427
		25			5SU1 324-6FA25	008			5SU1 324-7FA25		1	1 unit	008	0.432
		32			5SU1 324-6FA32	008			5SU1 324-7FA32		1	1 unit	008	0.427
		40			5SU1 324-6FA40	008			5SU1 324-7FA40		1	1 unit	008	0.427
	2P; 400 V AC; 50 ... 60 Hz													
	10 000													
	30	125	6.5		5SU1 324-6KK82	008			5SU1 324-7KK82		1	1 unit	008	1.212
	4P; 400 V AC; 50 ... 60 Hz													
	10 000													
	30	125	11		5SU1 344-6KK82	008			5SU1 344-7KK82		1	1 unit	008	2.024
		300	125		5SU1 644-6KK82	008			5SU1 644-7KK82		1	1 unit	008	2.025
	RCBOs, type A, super resistant K													
	1P+N; 230 V AC; 50 ... 60 Hz													
	10 000													
	3													
	30	10	2	--					5SU1 354-7VK10		1	1 unit	008	0.293
		16		--					5SU1 354-7VK16		1	1 unit	008	0.292
		20		--					5SU1 354-7VK20		1	1 unit	008	0.296
		25		--					5SU1 354-7VK25		1	1 unit	008	0.296
		32		--					5SU1 354-7VK32		1	1 unit	008	0.297
		40		--					5SU1 354-7VK40		1	1 unit	008	0.296
	RCBOs, type A, selective S													
	2P; 400 V AC; 50 ... 60 Hz													
	10 000													
	4P; 400 V AC; 50 ... 60 Hz													
	10 000													
	300	125	11		5SU1 644-6WK82	008			5SU1 644-7WK82		1	1 unit	008	2.018
		1000	125		5SU1 844-6WK82	008			5SU1 844-7WK82		1	1 unit	008	0.999
	RCBO, type F NEW													
	1P+N, 230 V AC, 50 ... 60 Hz													
	30	6	2		5SU1 354-3KK06	008			5SU1 354-4KK06		1	1 unit	008	0.290
		10			5SU1 354-3KK10	008			5SU1 354-4KK10		1	1 unit	008	0.291
		13			5SU1 354-3KK13	008			5SU1 354-4KK13		1	1 unit	008	0.296
		16			5SU1 354-3KK16	008			5SU1 354-4KK16		1	1 unit	008	0.294
		20			5SU1 354-3KK20	008			5SU1 354-4KK20		1	1 unit	008	0.296
		25			5SU1 354-3KK25	008			5SU1 354-4KK25		1	1 unit	008	0.291
		32			5SU1 354-3KK32	008			5SU1 354-4KK32		1	1 unit	008	0.296
		40			5SU1 354-3KK40	008			5SU1 354-4KK40		1	1 unit	008	0.293

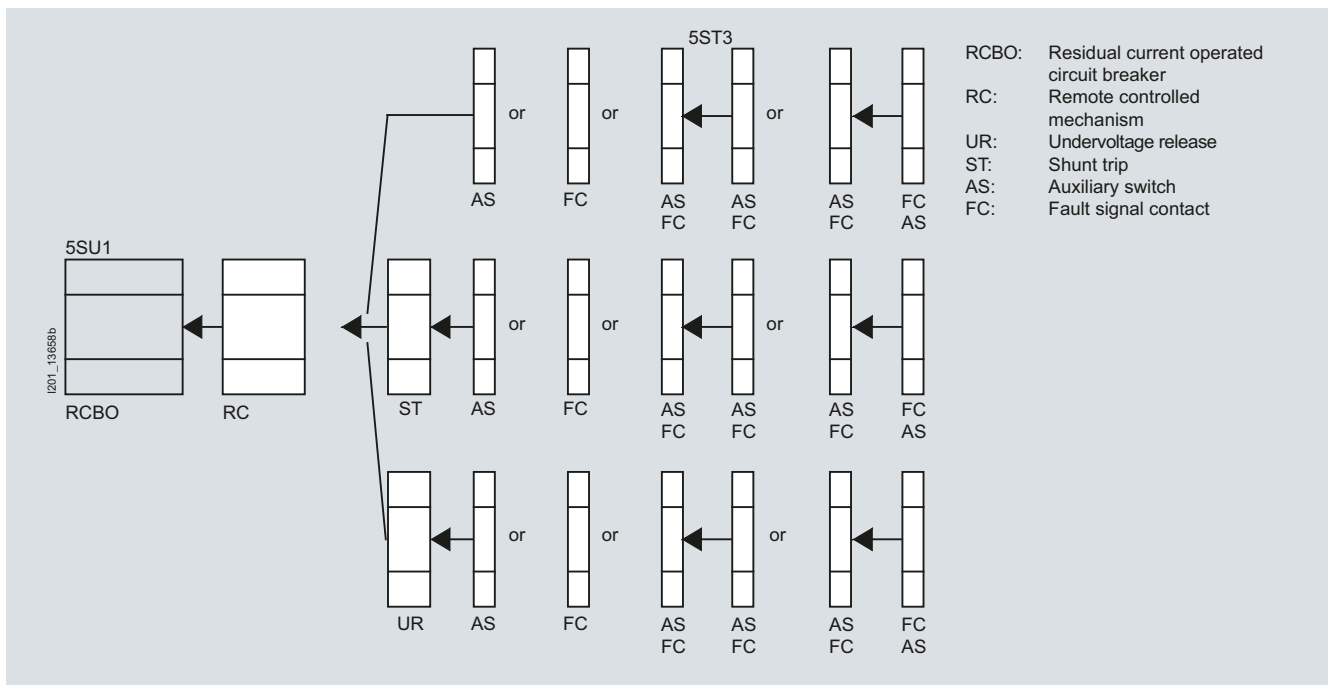
Residual Current Protective Devices / AFD Units

5SU1 RCBs

Version	DT	Order No.	Price per PU	PU (UNIT, SET, M)	PS*/ P. unit	PG	Weight per PU approx. kg
 Handle couplers for additional components For mounting the additional components auxiliary switches, fault signal contacts, shunt trips and undervoltage releases onto 5SU1 RCBs, you require a handle coupler (1 set - 5 units).	▶	5ST3 805-1		1	1 set	020	0.006
		5ST3 801-1		1	1 unit	020	0.013
 Locking devices For RCBs, sealable and lockable							

Note:

The same additional components are used for RCBs as for miniature circuit breakers. [See chapter "Miniature circuit breakers"](#).



Residual Current Protective Devices / AFD Units

Busbars

Overview

4-pole 5SM3 RCCBs are bus-mounted either together or in combination with miniature circuit breakers. RCCBs with an N wire connection on the left-hand side facilitate installation because standard busbars are used, as those used for bus mounting miniature circuit breakers.

Busbars in 10 mm² and 16 mm² versions are available.

The extremely flexible 5ST3 6 busbar system with fixed lengths enables installation in any length as the busbars can be overlapped.

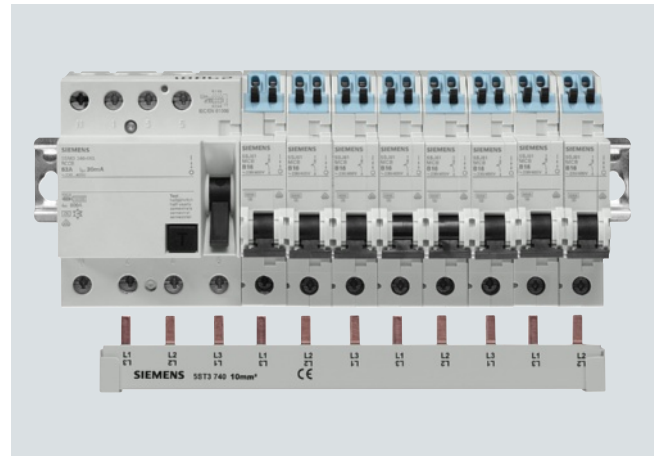
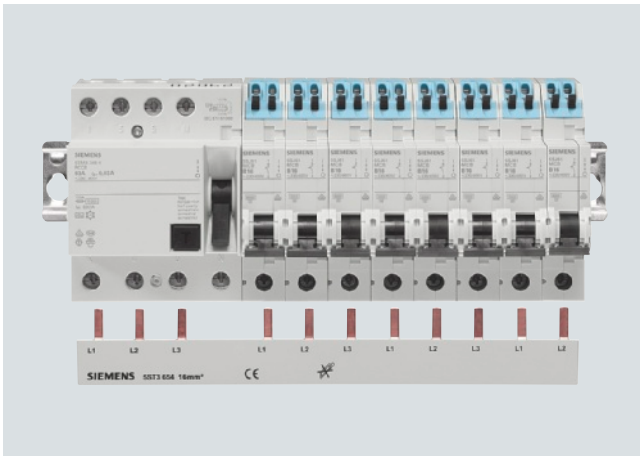
No further need for time-consuming tasks, such as cutting, cutting to length, deburring, cleaning of cut surfaces and mounting of end caps.

Any free pins on the busbars can be made safe by covering with touch protection.

If several RCBOs are bus-mounted together, this is implemented with two-phase busbars, which are used as 1+N busbars.

Benefits

- Connection of miniature circuit breakers to 4-pole RCCBs with N connection right and three-phase busbar, using busbar specially designed for this application. No cutting or end caps required.
- Connection of miniature circuit breakers to 4-pole RCCBs with N connection left, with three-phase busbar that can be cut. No additional items to be stored and busbars that are always available.



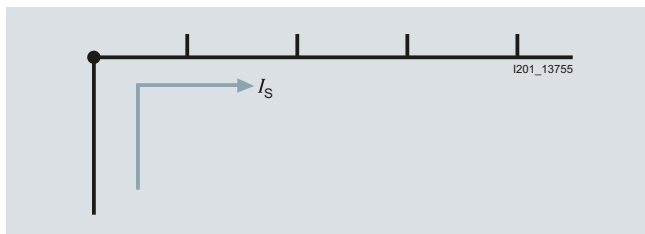
- Connection of 1P+N RCBOs with two-phase busbar. No cutting or end caps required.
- Bus-mounting of RCCBs on busbar (3-phase +N) that can be cut. A proven and frequently used application.



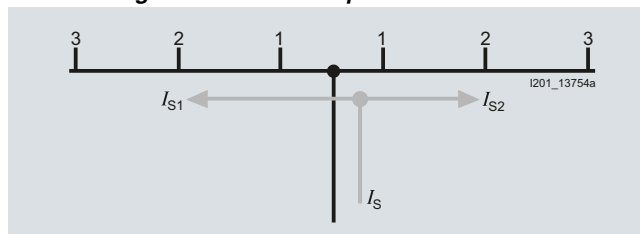
Technical specifications

5ST3, 5ST2		
Standards	EN 60439-1 (VDE 0660-500): 2005-01	
Busbar material	SF-Cu F 24	
Partition material	Plastic, Cycloy 3600 Heat-resistant over 90 °C flame-retardant and self-extinguishing, dioxin and halogen-free	
Rated operational voltage U_e	V AC	400
Rated current I_n		
• Cross-section 10 mm ²	A	63
• Cross-section 16 mm ²	A	80
Rated impulse withstand voltage U_{imp}	kV	4
Test pulse voltage (1.2/50)	kV	6.2
Rated conditional short-circuit current I_{cc}	kA	25
Resistance to climate		
• Constant atmosphere	Acc. to DIN 50015	23/83; 40/92; 55/20
• Humid heat	Acc. to IEC 68-2-30	28 cycles
Insulation coordination	Acc. to IEC 664 (VDE 0110-1)	
• Overvoltage category	III	
• Pollution degree	2	
Maximum busbar current I_S /phase		
• Infeed at the start of the busbar		
- Cross-section 10 mm ²	A	63
- Cross-section 16 mm ²	A	80
• Infeed at the center of the busbar		
- Cross-section 10 mm ²	A	100
- Cross-section 16 mm ²	A	130

Infeed at the start or end of the busbar



Infeed along the busbar or midpoint infeed



The sum of the outgoing current per branch (1, 2, 3 ... n) must not be greater than the max. busbar current I_S /phase.

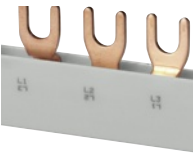
Selection and ordering data

Version	Pin spacing	Length	DT	Order No.	Price per PU	PU (UNIT, SET, M)	PS*/P. unit	PG	Weight per PU approx.
	MW	mm							kg
5ST3 6 busbar systems, fixed lengths, cannot be cut, fully insulated									
For 1 FI 4P, N connection right, and 8 MCB 1P									
• 3-phase 10 mm ²	1	210		5ST3 624		1	10 units	020	0.077
• 3-phase 16 mm ²	1	210		5ST3 654		1	10 units	020	0.108
For 6 RCBOs 1P+N together									
• 2-phase 10 mm ²	1	210		5ST3 608		1	10 units	020	0.063
• 2-phase 16 mm ²	1	210		5ST3 638		1	10 units	020	0.089
5ST3 7 busbar systems, 12 MW, can be cut to length, with end caps									
For 1 FI 4P, N connection right, and 8 MCB 1P									
• 3-phase 16 mm ²	1	214		5ST3 717		1	25 units	020	0.115
for 6 RCBOs 1P+N									
• 2-phase 10 mm ²	1	216		5ST3 734		1	1 unit	020	0.070
• 2-phase 16 mm ²	1	216		5ST3 704		1	1 unit	020	0.092

Residual Current Protective Devices / AFD Units

Busbars

4

Version	Pin spacing	Length	DT	Order No.	Price per PU	PU (UNIT, SET, M)	PS*/P. unit	PG	Weight per PU approx.
	MW	mm							kg
5ST3 6 busbar systems, 10 mm², for MCBs, fixed lengths, cannot be cut, fully insulated for 6 RCBOs 1P+N	1	215		5ST3 623		1	10 units	020	0.087
5ST3 6 busbars, 16 mm², for MCBs, fixed lengths, cannot be cut, fully insulated for 6 RCBOs 1P+N	1	215		5ST3 653		1	10 units	020	0.118
5ST3 7 busbar systems, with end caps, can be cut to length, with touch protection For RCBO 1P+N and MCB 2P									
• 4-phase 10 mm ²	1	1008		5ST3 770-2		1	10 units	020	0.400
• 4-phase 16 mm ²	1	1008		5ST3 770-3		1	10 units	020	0.550
For RCCBs 4P, N right and 6 MCBs 1P+N									
• 4-phase 10 mm ²	1	288		5ST3 770-4		1	10 units	020	0.100
• 4-phase 16 mm ²	1	288		5ST3 770-5		1	10 units	020	0.160
End caps for 5ST3 7, can be cut									
• For two-phase and three-phase busbars			►	5ST3 750		1	10 units	020	0.001
• For four-phase busbars			►	5ST3 718		1	10 units	020	0.002
 Touch protection For free connections, yellow (RAL 1004) 5 x 1 pin			►	5ST3 655		1	10 units	020	0.003
 Busbar, 12 MW, with fork-type connections, can be cut to length, with end caps For bus mounting RCCBs together Three-phase + N, 16 mm ²	1	216		5ST2 145		1	1 unit	020	0.145
 End caps for 5ST2 145 busbars, can be cut to length For three-phase busbars			►	5ST2 156		1	10 units	020	0.002
 Terminals up to 35 mm² (stranded), for direct infeed of 5ST2 145 busbar Side-by-side mounting possible				5ST2 157		1	5 units	020	0.028

Residual Current Protective Devices / AFD Units

5SM1 and 5SZ9 RCCB socket outlets

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 enclosures, equipped with RCCB and SCHUKO® socket outlet	2	16	10	✓

 = type A for AC and pulsating DC residual currents

Application

RCCB protective socket outlets

- Molded-plastic enclosure equipped with RCCB and flush-mounted SCHUKO® socket outlet or flush-mounted SCHUKO® double socket outlet
- For electrical devices where there is a risk of accidental contact with live parts in the event of damage
- Rated voltage: 230 V AC, 50 Hz to 60 Hz
- For outdoor connection of gardening equipment and socket outlets in workshops or for agricultural purposes
- Degree of protection IP21 (5SM1 920-), Degree of protection IP54 (5SZ9 2.6).

Selection and ordering data

	Rated residual current $I_{\Delta n}$ mA	Rated current I_n A	DT	Order No.	Price per PU	PU (UNIT, SET, M)	PS*/P. unit	PG	Weight per PU approx. kg
	RCCB protective socket outlets								
	• RCCB protective socket outlets according to VDE 0664, for mounting on device boxes, equipped with residual current operated circuit breaker and 2 childproof SCHUKO® socket outlets, degree of protection IP21								
	10	16		5SM1 920-5		1	1 unit	015	0.513
	30			5SM1 920-8		1	1 unit	015	0.533
	• RCCB protective socket outlet according to VDE 0664 in molded-plastic enclosure, equipped with residual current operated circuit breaker and flush-mounted SCHUKO® socket outlet, degree of protection IP54								
	10	16		5SZ9 206		1	1 unit	015	0.761
	30			5SZ9 216		1	1 unit	015	0.763

Residual Current Protective Devices / AFD Units

Accessories

Accessories

	Version	DT	Order No.	Price per PU	PU (UNIT, SET, M)	PS*/ P. unit	PG	Weight per PU approx. kg
	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		1	1 unit	015	0.091
			5SW3 005		1	1 unit	015	0.171
	Wall enclosures, 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		1	1/4 units	015	0.133
			5SW3 007		1	1 unit	015	0.162
	Molded-plastic enclosures, gray for surface mounting, degree of protection IP54, sealable, with 35 mm standard mounting rail, with transparent hinged lid for 4.5 MW		5SW1 200		1	1 unit	015	0.447
	Covers can be assembled as mini distribution board, suitable for all devices, cover parts prepared for rail mounting of conventional label caps, comprising: • End plates (for snapping onto standard mounting rail) ▶ • Angled profile (approx. 1 m long) • Alternative flat profiles (as a cover between the rows of devices length approx. 1 m)		5ST2 134		1	10 units	020	0.021
			5ST2 135		1	5 units	020	0.288
			5ST2 136		1	5 units	020	0.239
	Touch protection For RCCBs up to 80 A 1 set contains 12 units		5SW3 313		1	1 set	015	0.012
	Fixing parts Plastic 4 MW		5ST2 201		1	1 unit	020	0.013
	Inscription labels (white) 15 × 9 mm, 3 frames with 44 labels each any attachment and inscription, self-adhesive		5ST2 173		1	1 set	020	0.049

Labeling system

Inscription on self-adhesive labels for a uniform and tidy appearance in electrical power distribution.
The labeling program can be downloaded to your PC free of charge at:

www.siemens.com/beta

Recommended ELAT-3-747 labels for printing
on normal printers can be ordered at:

Brady GmbH
Otto-Hahn-Str. 5-7
D-63222 Langen
Tel.: +49 (6103) 7598-660

Application

Standards	Application	Required $I_{\Delta n}$ [mA]	Recommended Siemens residual current protective devices			
			Type A	Type F	SEQUENCE type B/type B+	SIGRES
DIN VDE 0100-410	Protection against electric shock	30 ... 500	✓	✓	✓	✓
	Socket outlets up to 20 A, outdoor plants	10 ... 30	✓	✓	--	--
DIN VDE 0100-482	Fire protection for particular risks or safety hazards	30, 300	✓	✓	✓	--
DIN VDE 0100-701	Rooms with baths or showers, socket outlets in zone 3	10 ... 30	✓	✓	--	--
DIN VDE 0100-702	Basins for swimming pools and other basins	10 ... 30	✓	--	--	✓
DIN VDE 0100-703	Rooms and cabins with sauna heating	10 ... 30	✓	--	--	✓
DIN VDE 0100-704 BGI 608	Building sites, socket outlet current circuits up to 32 A and for handheld equipment, plug-and-socket devices $I_n > 32$ A	≤ 30	✓	✓	✓	✓
		≤ 500	✓	✓	✓	✓
DIN VDE 0100-705	Agricultural and general horticultural premises, socket outlet current circuits	≤ 500	✓	✓	--	✓
		≤ 30	✓	✓	--	✓
DIN VDE 0100-706	Conductive areas with limited freedom of movement, permanently mounted equipment	10 ... 30	✓	--	--	--
DIN VDE 0100-708	Electrical installations on camping sites, fixed feeding points for every socket outlet and every final circuit	10 ... 30	✓	--	--	✓
DIN VDE 0100-710	Medical premises in TN-S system, depending on application group 1 or 2 and equipment	10 ... 30	✓	--	✓	--
		≤ 300	✓	--	✓	--
DIN VDE 0100-712	Solar PV power supply systems (without simple separation)	≤ 300	--	--	✓	--
DIN VDE 0100-723	Classrooms with experiment equipment	10 ... 30	--	--	✓	--
DIN VDE 0100-739	Additional protection against direct contact in homes	10 ... 30	✓	--	--	--
EN 50178 (VDE 0160)	Fitting of power installations with electronic equipment	General requirements for correct selection when using res. current protection	✓	✓	✓	--
DIN VDE 0832-100	Traffic signal systems					
	• Class T1	≤ 300	✓	--	--	✓
	• Class U1	≤ 30	✓	--	--	✓
	Food processing and chemical industry	≤ 30 (recommended)	✓	--	--	✓

Note:

For reasons of basic fire protection, we recommend the use of residual current protective devices with maximum 300 mA rated residual current.

Residual Current Protective Devices / AFD Units

5SM6 AFD units



Overview

4



Characteristics

The Siemens portfolio of protective devices has been proving itself in the field for many years. This range of fuses, circuit breakers and residual current protective devices has now been expanded to include AFDDs (arc fault detection devices). These AFDDs are able to detect arcing faults caused by serial faults or loose contacts or as a result of insulation faults that enable contact between phase conductors or between phase and protective conductors. They therefore offer extremely effective protection against fires started by electrical faults.

Generally speaking, arcing faults can result from damage to cables and other insulations, such as that caused by vibrations, thermal expansion and shrinkage, mechanical loads and aging, which, either alone, or in connection with soiling can cause electric arcs in the circuit.

A distinction is made between 3 types of arcing faults:

Serial arcing faults:

These are caused by breaks in the conductor or when a loose contact is in the circuit in series with the load. As the current flow in such cases is always lower than the operational load current, miniature circuit breakers and residual current protective devices are unable to detect such faults and initiate tripping.

The AFDD is specially designed to detect the specific characteristics of these arcing faults and reliably disconnects the affected circuit as soon as the limit values are exceeded.

Parallel arcing faults between phase conductor/neutral conductor or phase conductor/phase conductor:

These are caused by electric arcs resulting from damage to the insulation that permits contact between the two conductors. In this case, the level of current is determined by the impedances in the circuit. Depending on the rated current of the overcurrent protection device (for instance a miniature circuit breaker), this can be disconnected. However, if the impedance in the circuit is too high to reach the trip current of the overcurrent protection device, no tripping takes place. AFDDs disconnect the currents of arcing faults upwards of 2.5 A, thus providing reliable protection in the case of such faults.

Parallel arcing faults between phase conductor/protective conductor:

Arcing faults against the protective conductor are reliably detected and shut down by residual current protective devices. Residual current protective device with rated residual currents up to max. 300 mA have already been providing effective fire protection in such cases for many years. AFDDs also detect these arcing faults and provide fire protection where no residual current protective device is implemented.

Closing of the safety gap on the IEC market

Type of fault	Protection according to IEC standard
Serial 	
Parallel Phase-Neutral/Phase-Phase 	
Parallel Phase-Protective conductor 	

AFDD Arc fault detection device
 MCB Miniature circuit breaker
 RCD Residual current protective device

Preventing undesired tripping operations

Electric arcs and high-frequency signals occur during normal operation in networks with multiple electrical loads (e.g. electric motors, light switches, dimmers). However, this should not cause the AFDD to trip.

Thanks to the sophisticated detection logic of our AFDDs, they are able to clearly distinguish between normal operational interference signals and hazardous arcing faults.

Product versions and application

Siemens offers two product versions, which can be used in various combinations with a range of 1MW/2MW wide miniature circuit breakers and/or RCBOs up to max. 16 A rated current.

This simplifies product selection and reduces inventory, while enabling coverage of every conceivable application. It also means that our tried and tested circuit protection devices (MCBs, RCBOs) can be combined with the new functionality provided by arc fault protection. In particular, the version with RCBOs offers a circuit protection device that provides comprehensive personnel, short-circuit, overload and fire protection in a single device.

The version combined with a compact miniature circuit breaker in 1 MW is a space-saving alternative that is ideal for retrofitting.



Whether auxiliary switch or fault signal contact – the AFDD can be combined at random with the versatile range of additional components from the renowned portfolio of 5SY miniature circuit breakers and 5SU1 RCBOs.

This also enables connection to a higher-level I&C system.

The AFDDs can be connected easily and quickly. The MCBs / RCBOs can be mounted quickly and simply by just snapping them onto the mounting rail without the need for tools. For a fast and reliable power supply, the infeed can be implemented via a busbar assembly.

The AFDDs are primarily intended for protection of final circuits in cases where

- there is an increased risk of fire due to flammable materials being stored or processed (e.g. wood processing)
- flammable building materials are in use (e.g. wood paneling)
- valuable goods need to be protected (e.g. museums)
- there are rooms in which a fire might not be noticed immediately (e.g. bedrooms, children's bedrooms).

Status displays and self tests

In order to facilitate fault locating in the event of tripping, AFDDs have a display with 5 LEDs that provides information on the cause of tripping (serial/parallel arcing faults, overvoltage). The sophisticated detection electronics system also automatically checks the functionality of the AFDD. If the self-monitoring process detects a fault, the AFDD switches off and displays the corresponding indication.

Technical specifications

Standards		Future standard - IEC/EN 62606
Versions		2-pole
Rated voltage U_n	V	230
Rated current I_n	A	Up to 16
Rated frequency	Hz	50
Mains connection		Bottom
Tripping in the event of overvoltage	V	> 275
Degree of protection	Acc. to EN 60529 (VDE 0470-1)	IP20, with connected conductors
Surge current withstand capability with current waveform 8/20 μ s		kA
		3
Touch protection	Acc. to EN 50274 (VDE 0660-514)	Finger and back-of-hand safe
Terminal tightening torque	Nm	2.5 ... 3.0
Terminal/conductor cross-sections		
• Solid and stranded		mm ²
• Finely stranded with end sleeve		mm ²
		0.75 ... 16 0.75 ... 10
Overvoltage category		III
Mounting position		Any
Service life	Switching cycles	> 10000
Ambient temperature	°C	-25 ... +45, marked with
Storage temperature	°C	-40 ... +75
Resistance to climate	Acc. to IEC 60068-2-30	28 cycles (55 °C; 95 % rel. air humidity)
Pollution degree		2
CFC and silicone-free		Yes

5SM6 AFD units

		System is safe	
		A fault has occurred: Serial arcing fault	L — LOAD N —
		A fault has occurred: Parallel arcing fault	L — LOAD N —
		A fault has occurred: Overvoltage in the network	L — LOAD N — >280 V AC
		AFDD is defective	
		Defective AFDD or no mains voltage	

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Integrated overvoltage protection

Depending on the load distribution in the three-phase current system, an interruption on the infeed side of the neutral conductor may cause a shift of the neutral point and thus an increase in voltage between the phase conductor and the neutral conductor. This increase in voltage can damage the loads or present a fire risk due to overloaded components.

In order to ensure all-round protection, the AFDDs are fitted with an overvoltage release that disconnects when the voltage between phase conductor and neutral conductor exceeds 275 V, thus isolating downstream loads from the hazardous line voltage.

Residual Current Protective Devices / AFD Units

5SM6 AFD units



Selection and ordering data

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Version	Rated current I_n	Mounting width	DT	Order No.	Price per PU	PU (UNIT, SET, M)	PS*/ P. unit	PG	Weight per PU approx.
	A	MW							kg
Arc fault detection units, AFD units									
 For 5SY6 0 miniature circuit breakers (1 MW) 2-pole; 230 V AC; 50 Hz	Up to 16	2		5SM6 011-1		1	1 unit	007	0.113
 For 5SU1 .5 RCBOs (2 MW) and 5SY MCBs (2 MW), however not suitable for 5SY5, 5SY8, 5SY6 0 2-pole; 230 V AC; 50 Hz	Up to 16	3		5SM6 021-1		1	1 unit	007	0.113

Version	Length	Pin spacing	Isolation	DT	Order No.	Price per PU	PU (UNIT, SET, M)	PS*/ P. unit	PG	Weight per PU approx.
	MW	MW								kg
5ST3 7 pin busbars, can be cut to length										
For 5SM6 011-1 AFD units										
	• 1-phase 10 mm ²	54	2	grey	5ST3 764-1		1	10 units	020	0.145
	• 1-phase 10 mm ²	54	2	blue	5ST3 765-1		1	10 units	020	0.145
	• 3-phase 10 mm ²	58	2	grey	5ST3 740-1		1	1 unit	020	0.440
For 5SM6 021-1 AFD units										
	• 2-phase 10 mm ²	56	1/2	grey	5ST3 735-1		1	1 unit	020	0.350
	• 4-phase 10 mm ²	52	1/2	grey	5ST3 746-1		1	1 unit	020	0.505