

Overload Relays

SIRIUS 3RB3 Electronic Overload Relays

3RB30, 3RB31 for standard applications

Overview

More information

Homepage, see www.siemens.com/sirius-overloadrelays

Industry Mall, see www.siemens.com/product?3RB3

TIA Selection Tool Cloud (TST Cloud), see

<https://mall.industry.siemens.com/spice/TSTWeb?kmat=ElectronicOverloadRelay>

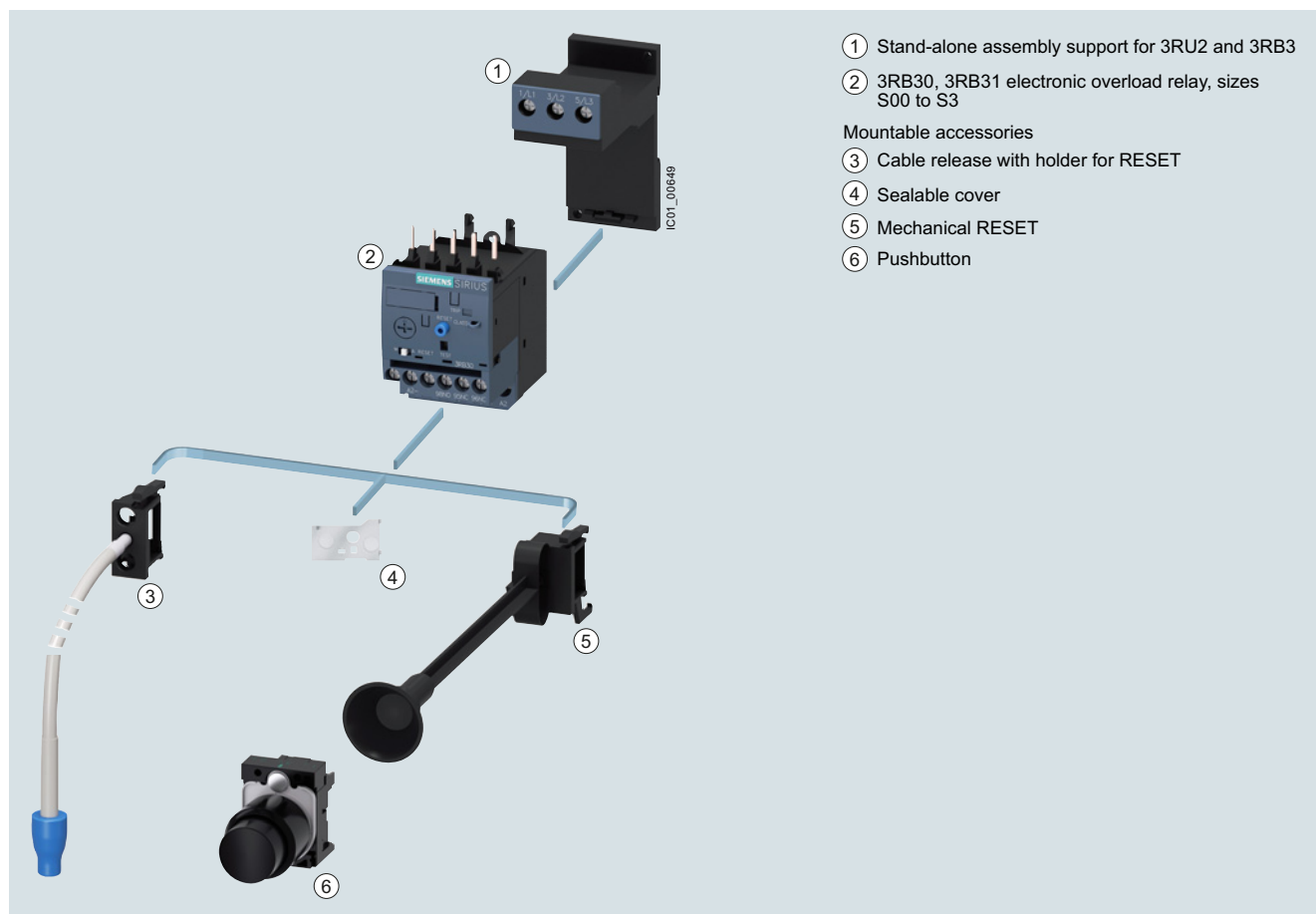
Conversion tool, e.g. from 3RB20/3RB211 to 3RB30/3RB31, see www.siemens.com/sirius/conversion-tool

Application Manual "SIRIUS Controls with IE3/IE4 motors", see <https://support.industry.siemens.com/cs/ww/en/view/94770820>

Manual, see <https://support.industry.siemens.com/cs/ww/en/view/60298164>

Characteristics and certificates, see

<https://support.industry.siemens.com/cs/ww/en/ps/16276>

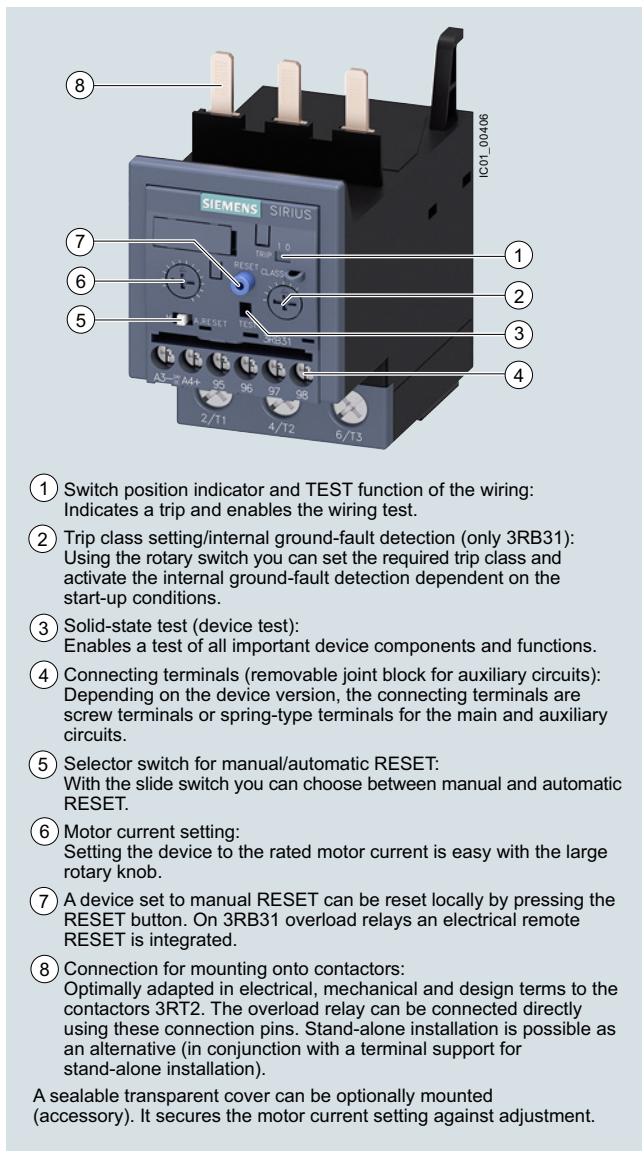


Mountable accessories for 3RB30 and 3RB31 electronic overload relays

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SIRIUS 3RB3133-4.B0 electronic overload relay

The 3RB30/3RB31 electronic overload relays up to 115 A with internal power supply have been designed for current-dependent protection of loads with normal and heavy starting, and to protect against excessive temperature rises due to overload, phase unbalance or phase failure. An overload, phase unbalance or phase failure result in an increase of the motor current beyond the set rated motor current. This current rise is detected by the current transformers integrated into the devices and evaluated by corresponding electronic circuits which then output a pulse to the auxiliary contacts. The auxiliary contacts then switch off the load by means of a contactor. The break time depends on the ratio between the tripping current and the current setting I_e and is stored in the form of a long-term stable tripping characteristic curve (see [Characteristics](#)).

In addition to inverse-time delayed protection of loads against excessive temperature rises due to overload, phase unbalance and phase failure, the 3RB31 electronic overload relays also allow internal ground-fault detection (not possible in conjunction with contactor assemblies for wye-delta starting). This provides protection of loads against high-resistance short circuits due to damage to the insulation material, moisture, condensed water, etc.

The "tripped" status is signaled by means of a switch position indicator. The relay is reset manually or automatically after the recovery time has elapsed.

The 3RB3 electronic overload relays are suitable for operation with frequency converters.

The devices are manufactured in accordance with environmental guidelines and contain environmentally friendly and reusable materials. They comply with all important worldwide standards and approvals.

For 3RB20 and 3RB21 overload relays in sizes S6 to S10/S12, see [page 7/117 onwards](#).

Use in hazardous areas

The 3RB30/3RB31 electronic overload relays are suitable for the overload protection of motors with the following types of protection:

- Ex II (2) G [Ex e] [Ex d] [Ex px]
- Ex II (2) D [Ex t] [Ex p]

EC type test certificate for Group II, Category (2) G/D exists. It has the number PTB 09 ATEX 3001.

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Article No. scheme

Product versions		Article number						
Electronic overload relays		3RB3 □ □ □ - □ □ □ □						
Device type	e.g. 0 = standard device, with internal supply, for three-phase loads	□						
Size, rated operational current and power	e.g. 1 = 16 A (7.5 kW) for size S00	□						
Version of the automatic RESET, electrical remote RESET	e.g. 6 = switchable between manual/auto RE-SET		□					
Trip class (CLASS)	e.g. 1 = CLASS 10E				□			
Setting range of the overload release	e.g. R = 0.1 ... 0.4 A					□		
Connection methods	e.g. B = screw terminals for main and auxiliary circuits						□	
Installation type	e.g. 0 = mounting on contactor							□
Example		3RB3 0 1 6 - 1 R B 0						

Note:

The Article No. scheme shows an overview of product versions for better understanding of the logic behind the article numbers.

For your orders please use the article numbers quoted in the selection and ordering data.

Benefits

The most important features and benefits of the 3RB30/3RB31 electronic overload relays are listed in the overview table (see "General data" page 7/79 onwards).

Application

Industries

The 3RB30/3RB31 electronic overload relays are suitable for customers from all industries who want to guarantee optimum inverse-time delayed protection of their electrical loads (e.g. motors) under normal and heavy starting conditions (CLASS 5E to 30E), minimize project completion times, inventories and energy consumption, and optimize plant availability and maintenance management.

Application

The 3RB30/3RB31 electronic overload relays have been designed for the protection of three-phase motors in sinusoidal 50/60 Hz voltage networks. The relays are not suitable for the protection of single-phase AC or DC loads.

The 3RU21 thermal overload relay or the 3RB22/3RB23/3RB24 electronic overload relay can be used for single-phase AC loads. For DC loads we recommend the 3RU21 thermal overload relay.

Ambient conditions

The devices are insensitive to external influences such as shocks, corrosive ambient conditions, ageing and temperature fluctuations.

For the temperature range from -25 °C to +60 °C, the 3RB30/3RB31 electronic overload relays compensate the temperature in accordance with IEC 60947-4-1.

Use of SIRIUS protection devices in conjunction with IE3/IE4 motors

Note:

For the use of 3RB30/3RB31 electronic overload relays in conjunction with highly energy-efficient IE3/IE4 motors, please observe the information on dimensioning and configuring, see [Application Manual](#).

For more information, see [page 1/7](#).

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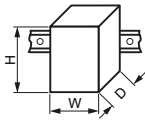
Technical specifications

More information

System Manual "SIRIUS – System Overview", see <https://support.industry.siemens.com/cs/ww/en/view/60311318>
 Configuration Manual "Load Feeders – SIRIUS Modular System", see <https://support.industry.siemens.com/cs/ww/en/view/39714188>

Manual, see <https://support.industry.siemens.com/cs/ww/en/view/60298164>
 Technical specifications, see <https://support.industry.siemens.com/cs/ww/en/ps/16276/td>

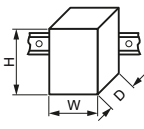
The following technical information is intended to provide an initial overview of the various types of device and functions.

Type		3RB3016, 3RB3113	3RB3026, 3RB3123	3RB3036, 3RB3133	3RB3046, 3RB3143
Size		S00	S0	S2	S3
Dimensions (W x H x D) (overload relay with stand-alone installation support)					
• Screw terminals	mm	45 x 89 x 80	45 x 97 x 94	55 x 105 x 117	70 x 106 x 124
• Spring-type terminals	mm	45 x 102 x 80	45 x 116 x 95	55 x 105 x 117	70 x 106 x 124
General data					
Tripping in the event of		Overload, phase failure, and phase unbalance + ground fault (for 3RB31 only)			
Trip class acc. to IEC 60947-4-1		CLASS 3RB30: 10E, 20E; 3RB31: 5E, 10E, 20E or 30E adjustable			
Phase failure sensitivity		Yes			
Reset and recovery					
• Reset options after tripping		Manual and automatic RESET, 3RB31 has an integrated connection for electrical remote RESET (24 V DC)			
• Recovery time		Approx. 3 min			
- For automatic RESET		Immediately			
- For manual RESET		Immediately			
- For remote RESET		Immediately			
Features					
• Display of operating state on device		Yes, by means of switch position indicator slide			
• TEST function		Yes, test of electronics by pressing the TEST button/ test of auxiliary contacts and wiring of control circuit by actuating the switch position indicator slide/ self-monitoring			
• RESET button		Yes			
• STOP button		No			
Protection and operation of explosion-proof motors					
EC type-examination certificate number according to directive 2014/34/EU (ATEX)		PTB 09 ATEX 3001 ⚠ II (2) G [Ex e] [Ex d] [Ex px] ⚠ II (2) G [Ex t] [Ex p] see https://support.industry.siemens.com/cs/ww/en/view/40591327			
Ambient temperatures					
• Storage/transport	°C	-40 ... +80			
• Operation	°C	-25 ... +60			
• Temperature compensation	°C	+60			
• Permissible rated current at					
- Temperature inside control cabinet 60 °C	%	100			
- Temperature inside control cabinet 70 °C	%	On request			
Repeat terminals					
• Coil repeat terminals		Yes	Not required		
• Auxiliary contact repeat terminal		Yes	Not required		
Degree of protection acc. to IEC 60529					
• Screw terminals/spring-type terminals		IP20	- IP20 (front side) - Terminal IP00 (use additional terminal covers for higher degree of protection)		
• Straight-through transformers		--	IP20		
Touch protection acc. to IEC 60529		Finger-safe		Finger-safe, for vertical contact from the front	
Shock resistance with sine acc. to IEC 60068-2-27		g/ms	15/11 (signaling contact 97/98 in position "tripped": 9 g/11 ms)	15/11 (signaling contact 97/98 in position "tripped": 8 g/11 ms)	

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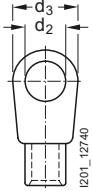
Type			3RB3016, 3RB3113	3RB3026, 3RB3123	3RB3036, 3RB3133	3RB3046, 3RB3143
Size			S00	S0	S2	S3
Dimensions (W x H x D) (overload relay with stand-alone installation support)						
• Screw terminals	mm	45 x 89 x 80	45 x 97 x 94	55 x 105 x 117	70 x 106 x 124	
• Spring-type terminals	mm	45 x 102 x 80	45 x 116 x 95	55 x 105 x 117	70 x 106 x 124	
General data (continued)						
Electromagnetic compatibility (EMC) – Interference immunity						
• Conductor-related interference						
- Burst acc. to IEC 61000-4-4 (corresponds to degree of severity 3)	kV	2 (power ports), 1 (signal port)				
- Surge acc. to IEC 61000-4-5 (corresponds to degree of severity 3)	kV	2 (line to earth), 1 (line to line)				
• Electrostatic discharge acc. to IEC 61000-4-2 (corresponds to degree of severity 3)	kV	8 (air discharge), 6 (contact discharge)				
• Field-related interference acc. to IEC 61000-4-3 (corresponds to degree of severity 3)	V/m	10				
Electromagnetic compatibility (EMC) – Emitted interference		Degree of severity B acc. to EN 55011 (CISPR 11) and EN 55022 (CISPR 22)				
Resistance to extreme climates – Air humidity		%	95			
Installation altitude above sea level		m	Up to 2 000			
Mounting position		Any				
Type of mounting		Direct mounting/stand-alone installation with terminal support				

Type		3RB3016, 3RB3113	3RB3026, 3RB3123	3RB3036, 3RB3133	3RB3046, 3RB3143
Size		S00	S0	S2	S3
Main circuit					
Rated insulation voltage U_i (pollution degree 3)	V	690		690 1 000 with straight-through transformer	1000
Rated impulse withstand voltage U_{imp}	kV	6		6 8 with straight-through transformer	8
Rated operational voltage U_e	V	690		690 1 000 with straight-through transformer	1000
Type of current					
• Direct current		No			
• Alternating current		Yes, 50/60 Hz ± 5%			
Current setting	A	0.1 ... 0.4 to 4 ... 16	0.1 ... 0.4 to 10 ... 40	12.5 ... 50 and 20 ... 80	12.5 ... 50 and 32 ... 115
Heavy starting		see Manual			
Power loss per unit (max.)	W	0.1 ... 1.1	0.1 ... 4.5	0.5 ... 4.6	0.9 ... 4.6
Short-circuit protection					
• With fuse without contactor		See "Selection and ordering data", pages 7/105 ... 7/107			
• With fuse and contactor		"Short-Circuit Protection with Fuses/Motor Starter Protectors for Motor Feeders", see Configuration Manual.			
Protective separation between main and auxiliary current paths					
Acc. to IEC 60947-1 (pollution degree 2)					
• For systems with grounded neutral point	V	690			
• For systems with ungrounded neutral point	V	600			

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Type		3RB3016, 3RB3113	3RB3026, 3RB3123	3RB3036, 3RB3133	3RB3046, 3RB3143
Size		S00	S0	S2	S3
Conductor cross-sections of main circuit					
Connection type		 Screw terminals			 Screw terminals with box terminal
Terminal screw		M3, Pozidriv size 2	M4, Pozidriv size 2		4 mm Allen screw
Operating devices	mm	Ø 5 ... 6	Ø 5 ... 6		4 mm Allen screw
Prescribed tightening torque	Nm	0.8 ... 1.2	2 ... 2.5		4.5 ... 6
Conductor cross-sections (min./max.), 1 or 2 conductors can be connected					
• Solid or stranded	mm ²	2 x (0.5 ... 1.5) ¹⁾ , 2 x (0.75 ... 2.5) ¹⁾ , 2 x (0.5 ... 4) ¹⁾	2 x (1 ... 2.5) ¹⁾ , 2 x (2.5 ... 10) ¹⁾	1 x (1 ... 50) ¹⁾ , 2 x (1 ... 35) ¹⁾	2 x (2.5 ... 16) ¹⁾ , 2 x (10 ... 50) ¹⁾ , 1 x (10 ... 70) ¹⁾
• Finely stranded with end sleeve (DIN 46228-1)	mm ²	2 x (0.5 ... 1.5) ¹⁾ , 2 x (0.75 ... 2.5) ¹⁾	2 x (1 ... 2.5) ¹⁾ , 2 x (2.5 ... 6) ¹⁾ , max. 1 x 10	2 x (1 ... 25) ¹⁾ , 1 x (1 ... 35) ¹⁾	2 x (2.5 ... 35) ¹⁾ , 1 x (2.5 ... 50) ¹⁾
• AWG cables, solid or stranded	AWG	2 x (20 ... 16) ¹⁾ , 2 x (18 ... 14) ¹⁾ , 2 x 12	2 x (16 ... 12) ¹⁾ , 2 x (14 ... 8) ¹⁾	2 x (18 ... 2) ¹⁾ , 1 x (18 ... 1) ¹⁾	2 x (10 ... 1/0) ¹⁾ , 1 x (10 ... 2/0) ¹⁾
Removable box terminals ²⁾					
• With copper bars ³⁾	mm	--	--	--	2 x 12 x 4
• With cable lugs ⁴⁾					
- Terminal screw		--	--	--	M6
- Prescribed tightening torque	Nm	--	--	--	4.5 ... 6
- Usable ring terminal lugs	mm	--	--	--	d ₂ = min. 6.3 d ₃ = max. 19
					
Connection type		 Spring-type terminals			
Operating devices	mm	3.0 x 0.5 and 3.5 x 0.5			
Conductor cross-sections (min./max.), 1 conductor can be connected					
• Solid or stranded	mm ²	1 x (0.5 ... 4)	1 x (1 ... 10)	--	
• Finely stranded without end sleeve	mm ²	1 x (0.5 ... 2.5)	1 x (1 ... 6)	--	
• Finely stranded with end sleeve (DIN 46228-1)	mm ²	1 x (0.5 ... 2.5)	1 x (1 ... 6)	--	
• AWG cables, solid or stranded	AWG	1 x (20 ... 12)	1 x (18 ... 8)	--	
Connection type		 Straight-through transformers			
Diameter of opening	mm	--		15	18

¹⁾ If two different conductor cross-sections are connected to one clamping point, both cross-sections must be in the range specified.

²⁾ Cable lug and busbar connection possible after removing the box terminals.

³⁾ If bars larger than 12 mm x 10 mm are connected, a 3RT2946-4EA2 cover is needed to maintain the required phase clearance, [see page 7/109](#).

⁴⁾ When conductors larger than 25 mm² are connected, the 3RT2946-4EA2 cover is needed to maintain the required phase clearance, [see page 7/109](#).

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Type		3RB3016, 3RB3113	3RB3026, 3RB3123	3RB3036, 3RB3133	3RB3046, 3RB3143
Size		S00	S0	S2	S3
Auxiliary circuit					
Number of NO contacts		1			
Number of NC contacts		1			
Auxiliary contacts – Assignment		1 NO for the signal "tripped"; 1 NC for disconnecting the contactor			
Rated insulation voltage U_i (pollution degree 3)	V	300			
Rated impulse withstand voltage U_{imp}	kV	4			
Auxiliary contacts – Contact rating					
• NC, NO contact with alternating current AC-14/AC-15, rated operational current I_e at U_e					
- 24 V	A	4			
- 120 V	A	4			
- 125 V	A	4			
- 250 V	A	3			
• NC, NO contacts with direct current DC-13, rated operational current I_e at U_e					
- 24 V	A	2			
- 60 V	A	0.55			
- 110 V	A	0.3			
- 125 V	A	0.3			
- 250 V	A	0.11			
• Conventional thermal current I_{th}	A	5			
• Contact reliability (suitability for PLC control; 17 V, 5 mA)		Yes			
Short-circuit protection					
• With fuse, operational class gG	A	6			
Ground-fault protection (only 3RB31)					
• Tripping value I_{Δ}		The information refers to sinusoidal residual currents at 50/60 Hz. > $0.75 \times I_{motor}$			
• Operating range I		Lower current setting < I_{motor} < 3.5 × upper current setting			
• Response time t_{trip} (in steady-state condition)	s	< 1			
Integrated electrical remote RESET (only 3RB31)					
Connecting terminals A3, A4		24 V DC, max. 200 mA for approx. 20 ms, then < 10 mA			
Protective separation between auxiliary current paths acc. to IEC 60947-1	V	300			

Type		3RB3016, 3RB3113	3RB3026, 3RB3123	3RB3036, 3RB3133	3RB3046, 3RB3143
Size		S00	S0	S2	S3
CSA, UL, UR rated data					
Auxiliary circuit – Switching capacity		B600, R300			
Conductor cross-sections for auxiliary circuit					
Connection type		 Screw terminals			
Terminal screw		M3, Pozidriv size 2			
Operating devices	mm	ø 5 ... 6			
Prescribed tightening torque	Nm	0.8 ... 1.2			
Conductor cross-sections (min./max.), 1 or 2 conductors can be connected					
• Solid or stranded	mm ²	1 × (0.5 ... 4) ¹⁾ , 2 × (0.5 ... 2.5) ¹⁾			
• Finely stranded with end sleeve (DIN 46228-1)	mm ²	1 × (0.5 ... 2.5) ¹⁾ , 2 × (0.5 ... 1.5) ¹⁾			
• AWG cables, solid or stranded	AWG	2 × (20 ... 14)			
Connection type		 Spring-type terminals			
Operating devices	mm	3.0 × 0.5			
Conductor cross-sections (min./max.), 1 or 2 conductors can be connected					
• Solid or stranded	mm ²	2 × (0.25 ... 1.5)			
• Finely stranded without end sleeve	mm ²	2 × (0.25 ... 1.5)			
• Finely stranded with end sleeve (DIN 46228-1)	mm ²	2 × (0.25 ... 1.5)			
• AWG cables, solid or stranded	AWG	2 × (24 ... 16)			

¹⁾ If two different conductor cross-sections are connected to one clamping point, both cross-sections must be in the range specified.

Overload Relays

SIRIUS 3RB3 Electronic Overload Relays

IE3/IE4 ready 3RB30, 3RB31 for standard applications

Selection and ordering data

3RB30 electronic overload relays, CLASS 10E

Features and technical specifications:

- Connection methods
 - Sizes S00 and S0:
Main and auxiliary circuit: Either screw or spring-type terminals
 - Sizes S2 and S3:
Main circuit: Screw terminals with box terminal or as straight-through transformer
Auxiliary circuit: Either screw or spring-type terminals
- Overload protection, phase failure protection and unbalance protection

- Internal power supply
- Auxiliary contacts 1 NO + 1 NC
- Manual and automatic RESET
- Switch position indicator
- TEST function and self-monitoring
- Sealable covers (optional accessory)

 PU (UNIT, SET, M) = 1
 PS* = 1 unit
 PG = 41G


Size contactor	Rated power for three-phase motors, rated value ¹⁾	Current setting value of the inverse-time delayed overload release	Short-circuit protection with fuse, type of coordination "2", operational class gG ²⁾	SD	Screw terminals		SD	Spring-type terminals	
	kW	A	A	d	Article No.	Price per PU	d	Article No.	Price per PU
Size S00									
S00	Devices for mounting onto contactor ³⁾								
	0.04 ... 0.09	0.1 ... 0.4	4	▶	3RB3016-1RB0	2		3RB3016-1RE0	
	0.12 ... 0.37	0.32 ... 1.25	6	▶	3RB3016-1NB0	2		3RB3016-1NE0	
	0.37 ... 1.5	1 ... 4	20	▶	3RB3016-1PB0	2		3RB3016-1PE0	
	1.5 ... 5.5	3 ... 12	25	▶	3RB3016-1SB0	2		3RB3016-1SE0	
	2.2 ... 7.5	4 ... 16	25	▶	3RB3016-1TB0	2		3RB3016-1TE0	
Size S0									
S0	Devices for mounting onto contactor ³⁾								
	0.04 ... 0.09	0.1 ... 0.4	4	▶	3RB3026-1RB0	2		3RB3026-1RE0	
	0.12 ... 0.37	0.32 ... 1.25	6	▶	3RB3026-1NB0	2		3RB3026-1NE0	
	0.37 ... 1.5	1 ... 4	20	▶	3RB3026-1PB0	2		3RB3026-1PE0	
	1.5 ... 5.5	3 ... 12	25	▶	3RB3026-1SB0	2		3RB3026-1SE0	
	3 ... 11	6 ... 25	50	▶	3RB3026-1QB0	2		3RB3026-1QE0	
	5.5 ... 18.5	10 ... 40	50	▶	3RB3026-1VB0	2		3RB3026-1VE0	
Size S2									
S2	Devices with screw terminals (main current side) and for mounting onto contactor ³⁾								
	7.5 ... 22	12.5 ... 50	250	▶	3RB3036-1UB0	▶		3RB3036-1UD0	
	11 ... 37	20 ... 80	250	▶	3RB3036-1WB0	▶		3RB3036-1WD0	
	Devices with straight-through transformer for stand-alone installation								
	7.5 ... 22	12.5 ... 50	250	▶	3RB3036-1UW1	▶		3RB3036-1UX1	
	11 ... 37	20 ... 80	250	▶	3RB3036-1WW1	▶		3RB3036-1WX1	
Size S3									
S3	Devices with screw terminals (main current side) and for mounting onto contactor ³⁾								
	7.5 ... 22	12.5 ... 50	200	1	3RB3046-1UB0	2		3RB3046-1UD0	
	18.5 ... 55	32 ... 115	315	1	3RB3046-1XB0	2		3RB3046-1XD0	
	Devices with straight-through transformer for stand-alone installation								
	7.5 ... 22	12.5 ... 50	200	1	3RB3046-1UW1	2		3RB3046-1UX1	
	18.5 ... 55	32 ... 115	315	1	3RB3046-1XW1	2		3RB3046-1XX1	

¹⁾ Guide value for 4-pole standard motors at 50 Hz 400 V AC. The actual starting and rated data of the motor to be protected must be considered when selecting the units.

²⁾ Maximum protection by fuse only for overload relays, type of coordination "2".
For fuse values in connection with contactors, see Configuration Manual.

³⁾ With the appropriate terminal supports (see "Accessories", page 7/108), these overload relays can also be installed as stand-alone units.

Note:

For reliable operational current, note derating information, see Manual.