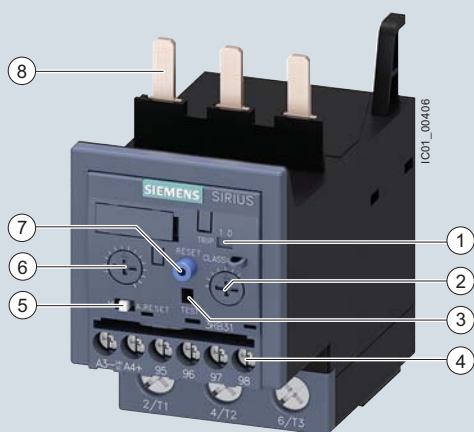


Overload Relays

SIRIUS 3RB3 Electronic Overload Relays

3RB30, 3RB31 up to 80 A for standard applications

Overview



- ① Switch position indicator and TEST function of the wiring:
Indicates a trip and enables the wiring test.
- ② Trip class setting/internal ground-fault detection (only 3RB31):
Using the rotary switch you can set the required trip class and activate the internal ground-fault detection dependent on the start-up conditions.
- ③ Solid-state test (device test):
Enables a test of all important device components and functions.
- ④ Connecting terminals (removable joint block for auxiliary circuits):
Depending on the device version, the terminals for screw and spring-type connection are configured for the main and auxiliary circuit.
- ⑤ Selector switch for manual/automatic RESET:
With the slide switch you can choose between manual and automatic RESET.
- ⑥ Motor current setting:
Setting the device to the rated motor current is easy with the large rotary knob.
- ⑦ A device set to manual RESET can be reset locally by pressing the RESET button. On 3RB31 overload relays an electrical remote RESET is integrated.
- ⑧ Connection for mounting onto contactors:
Optimally adapted in electrical, mechanical and design terms to the contactors 3RT2. The overload relay can be connected directly using these connection pins. Stand-alone installation is possible as an alternative (in conjunction with a terminal support for stand-alone installation).

A sealable transparent cover can be optionally mounted (accessory). It secures the motor current setting against adjustment.

SIRIUS 3RU3133-4.B0 electronic overload relay

The 3RB30/3RB31 electronic overload relays up to 80 A with internal power supply have been designed for inverse-time delayed protection of loads with normal and heavy starting (for "Function", see the manual "SIRIUS Innovations – SIRIUS 3RU2/3RB3 Overload Relays", <http://support.automation.siemens.com/WW/view/en/60298164>) 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 solid-state 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 current setting I_n and is stored in the form of a long-term stable tripping characteristic (see "Characteristic Curves" <http://support.automation.siemens.com/WW/view/en/34290881/134300>).

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. Resetting takes place either manually or automatically after the recovery time has elapsed ("Function", see manual "SIRIUS Innovations – SIRIUS 3RU2/3RB3 Overload Relays", <http://support.automation.siemens.com/WW/view/en/60298164>).

The 3RB3 electronic overload relays are suitable for operation with frequency converters. Please follow the instructions in the manual "SIRIUS Innovations – 3RU2/3RB3 Overload Relays", see <http://support.automation.siemens.com/WW/view/en/60298164>.

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.

3RB20 and 3RB21 overload relays in sizes S2 to S10/S12, see page 7/130 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.

Overload Relays

SIRIUS 3RB3 Electronic Overload Relays

3RB30, 3RB31 up to 80 A for standard applications

Article No. scheme

Digit of the Article No.	1st - 3rd	4th	5th	6th	7th	8th	9th	10th	11th	
	□□□	□	□	□	□	–	□	□	□	□
Electronic overload relays	3 R B									
SIRIUS 3rd generation		3								
Device series			□							
Size, rated operational current and power				□						
Version of the automatic RESET, electrical remote RESET					□					
Trip class (CLASS)						□				
Setting range of the overload release							□			
Connection methods								□		
Installation type									□	
Example	3 R B	3	0	1	6	–	1	R	B	0

Note:

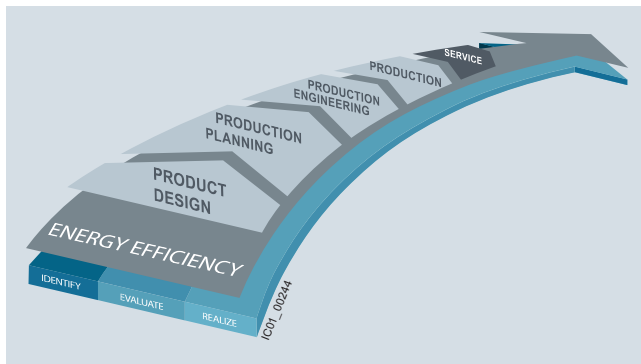
The Article No. scheme is presented here merely for information purposes and for better understanding of the logic behind the article numbers.

For your orders, please use the article numbers quoted in the catalog 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" on page 7/87).

Advantages through energy efficiency



Overview of the energy management process

We offer you a unique portfolio for industrial energy management, using an energy management system that helps to optimally define your energy needs. We split up our industrial energy management into three phases – identify, evaluate and realize – and we support you with the appropriate hardware and software solutions in every process phase.

The innovative products of the SIRIUS industrial controls portfolio can also make a substantial contribution to a plant's energy efficiency (see www.siemens.com/sirius/energysaving).

3RB30/3RB31 electronic overload relays contribute to energy efficiency throughout the plant as follows:

- Reduced inherent power loss
- Less heating of the control cabinet
- Smaller control cabinet air conditioners can be used

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 solid-state 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.

Overload Relays

SIRIUS 3RB3 Electronic Overload Relays

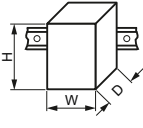
3RB30, 3RB31 up to 80 A for standard applications

Technical specifications

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

Detailed information, see

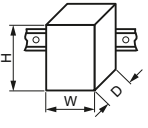
- Manual "SIRIUS Innovations – SIRIUS 3RU2/3RB3 Overload Relays", <http://support.automation.siemens.com/WW/view/en/60298164>
- or specific information on a particular article number via the product data sheet, <http://support.automation.siemens.com/WW/view/en/34290881/133200>

Type Size Dimensions (W x H x D) (overload relay with stand-alone installation support) • Screw terminals • Spring-type terminals		3RB301., 3RB311. S00	3RB302., 3RB312. S0	3RB3036, 3RB3133 S2
		45 x 89 x 80 45 x 102 x 80	45 x 97 x 94 45 x 116 x 95	55 x 105 x 117 55 x 105 x 117
General data				
Trips 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 • Recovery time - For automatic RESET - For manual RESET - For remote RESET		Manual and automatic RESET, 3RB31 has an integrated connection for electrical remote RESET (24 V DC) Approx. 3 min Immediately Immediately		
Features • Display of operating state on device • TEST function • RESET button • STOP button		Yes, by means of switch position indicator slide 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 Yes No		
Protection and operation of explosion-proof motors EC type test certificate number according to directive 94/9/EC (ATEX)		PTB 09 ATEX 3001 ⚠ II (2) G [Ex e] [Ex d] [Ex px] ⚠ II (2) G [Ex t] [Ex p] See http://support.automation.siemens.com/WW/view/en/40591327		On request
Ambient temperatures • Storage/transport • Operation • Temperature compensation • Permissible rated current at - Temperature inside control cabinet 60 °C - Temperature inside control cabinet 70 °C		°C °C °C % %	-40 ... +80 -25 ... +60 +60 100 On request	
Repeat terminals • Coil repeat terminals • Auxiliary contact repeat terminal		Yes Yes	Not required Not required	
Degree of protection acc. to IEC 60529		IP20		
Touch protection acc. to IEC 61140		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 "Tripped" position: 9 g/11 ms)	
			15/11 (signaling contact 97/98 in "Tripped" position: 8 g/11 ms)	
Electromagnetic compatibility (EMC) – Interference immunity • Conductor-related interference - Burst acc. to IEC 61000-4-4 (corresponds to degree of severity 3) - Surge acc. to IEC 61000-4-5 (corresponds to degree of severity 3) • Electrostatic discharge according to IEC 61000-4-2 (corresponds to degree of severity 3) • Field-related interference acc. to IEC 61000-4-3 (corresponds to degree of severity 3)		kV kV kV V/m	2 (power ports), 1 (signal ports) 2 (line to earth), 1 (line to line) 8 (air discharge), 6 (contact discharge) 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	

Overload Relays

SIRIUS 3RB3 Electronic Overload Relays

3RB30, 3RB31 up to 80 A for standard applications

Type		3RB301., 3RB311.	3RB302., 3RB312.	3RB3036, 3RB3133
Size		S00	S0	S2
Dimensions (W x H x D) (overload relay with stand-alone installation support)				
• Screw terminals		45 x 89 x 80	45 x 97 x 94	55 x 105 x 117
• Spring-type terminals		45 x 102 x 80	45 x 116 x 95	55 x 105 x 117
General data (continued)				
Dimensions		"Dimensional drawings", see • Manual "SIRIUS Innovations – SIRIUS 3RU2/3RB3 Overload Relays", http://support.automation.siemens.com/WW/view/en/60298164 • Product data sheet, http://support.automation.siemens.com/WW/view/en/34290881/133200		
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		3RB301., 3RB311.	3RB302., 3RB312.	3RB3036, 3RB3133
Size		S00	S0	S2
Main circuit				
Rated insulation voltage U_i (pollution degree 3)	V	690		
Rated impulse withstand voltage U_{imp}	kV	6		
Rated operational voltage U_e	V	690		
Type of current		No Yes, 50/60 Hz ± 5 %		
• Direct current				
• Alternating current				
Current setting	A	0.1 ... 0.4 up to	0.1 ... 0.4 up to	12.5 ... 50 and
	A	4 ... 16	10 ... 40	20 to 80
Heavy starting		See Manual "SIRIUS Innovations – SIRIUS 3RU2/3RB3 Overload Relays", http://support.automation.siemens.com/WW/view/en/60298164		
Power loss per unit (max.)	W	0.05 ... 0.2		
Short-circuit protection		See "Selection and ordering data" on pages 7/119 to 7/121 "Short-Circuit Protection with Fuses/Motor Starter Protectors for Motor Feeders", see Configuration Manual for "Configuring SIRIUS Innovations – Selection Data for Fuseless and Fused Load Feeders", http://support.automation.siemens.com/WW/view/en/39714188 .		
• With fuse without contactor				
• With fuse and contactor				
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		
Conductor cross-sections of main circuit				
Connection type		 Screw terminals		
Terminal screw		M3, Pozidriv size 2	M4, Pozidriv size 2	
Operating devices	mm	Ø 5 ... 6	Ø 5 ... 6	
Prescribed tightening torque	Nm	0.8 ... 1.2	2 ... 2.5	
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⁾
• 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⁾
• 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⁾
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		

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

3RB30, 3RB31 up to 80 A for standard applications

Type		3RB301., 3RB311.	3RB302., 3RB312.	3RB3036, 3RB3133
Size		S00	S0	S2
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 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	
• 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 contact, NO contact 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 value $< I_{motor} < 3.5 \times$ upper current setting value		
• 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	
CSA, UL, UR rated data				
Auxiliary circuit – switching capacity		3RB30: B600, R300; 3RB31: B300, R300		
Conductor cross-sections for auxiliary circuit				
Connection type		 Screw terminals		
Terminal screw		M3, Pozidriv size 2		
Operating devices		mm	$\varnothing 5 \dots 6$	
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	$1 \times (0.5 \dots 4)^{1)}$ $2 \times (0.5 \dots 2.5)^{1)}$	
• Finely stranded with end sleeve (DIN 46228-1)		mm ²	$1 \times (0.5 \dots 2.5)^{1)}$ $2 \times (0.5 \dots 1.5)^{1)}$	
• AWG cables, solid or stranded		AWG	$2 \times (20 \dots 14)$	
Connection type		 Spring-type terminals		
Operating devices		mm	3.0 x 0.5	
Conductor cross-sections (min./max.), 1 or 2 conductors can be connected				
• Solid or stranded		mm ²	$2 \times (0.25 \dots 1.5)$	
• Finely stranded without end sleeve		mm ²	$2 \times (0.25 \dots 1.5)$	
• Finely stranded with end sleeve (DIN 46228-1)		mm ²	$2 \times (0.25 \dots 1.5)$	
• AWG cables, solid or stranded		AWG	$2 \times (24 \dots 16)$	

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

3RB30, 3RB31 up to 80 A for standard applications

3RB30 electronic overload relays, CLASS 20E

Features and technical specifications:

- Connection methods
 - Sizes S00 and S0: Main and auxiliary circuit: Either screw or spring-type terminals
 - Size S2: 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 ²⁾	Trip class	Current setting value of the inverse-time delayed overload release	Short-circuit protection with fuse, type of coordination "2", operational class gG ¹⁾	DT	Screw terminals		DT	Spring-type terminals	
	CLASS	A	A		Article No.	Price per PU		Article No.	Price per PU
Size S00									
S00	Devices for mounting onto contactor ²⁾								
	20E	0.1 ... 0.4	4	▶	3RB3016-2RB0		A	3RB3016-2RE0	
	20E	0.32 ... 1.25	6	▶	3RB3016-2NB0		A	3RB3016-2NE0	
	20E	1 ... 4	20	▶	3RB3016-2PB0		A	3RB3016-2PE0	
	20E	3 ... 12	25	▶	3RB3016-2SB0		A	3RB3016-2SE0	
	20E	4 ... 16	25	▶	3RB3016-2TB0		A	3RB3016-2TE0	
Size S0									
S0	Devices for mounting onto contactor ²⁾								
	20E	0.1 ... 0.4	4	▶	3RB3026-2RB0		A	3RB3026-2RE0	
	20E	0.32 ... 1.25	6	▶	3RB3026-2NB0		A	3RB3026-2NE0	
	20E	1 ... 4	20	▶	3RB3026-2PB0		A	3RB3026-2PE0	
	20E	3 ... 12	25	▶	3RB3026-2SB0		A	3RB3026-2SE0	
	20E	6 ... 25	50	▶	3RB3026-2QB0		A	3RB3026-2QE0	
	20E	10 ... 40	50	▶	3RB3026-2VB0		A	3RB3026-2VE0	
Size S2									
S2	Devices with screw terminals (main current side) and for mounting onto contactor ²⁾								
	20E	12 ... 50	250	NEW A	3RB3036-2UB0		A	3RB3036-2UD0	
	20E	20 ... 80	250	NEW A	3RB3036-2WB0		A	3RB3036-2WD0	
	Devices with straight-through transformer for stand-alone installation								
	20E	12 ... 50	250	NEW A	3RB3036-2UW1		A	3RB3036-2UX1	
	20E	20 ... 80	250	NEW A	3RB3036-2WW1		A	3RB3036-2WX1	

¹⁾ Maximum protection by fuse only for overload relay, type of coordination "2". Fuse values in connection with contactors, see Configuration Manual "Configuring SIRIUS Innovations – Selection Data for Fuseless and Fused Load Feeders"
<http://support.automation.siemens.com/WW/view/en/39714188>.

²⁾ With the appropriate terminal supports (see "Accessories", page 7/122), these overload relays can also be installed as stand-alone units.