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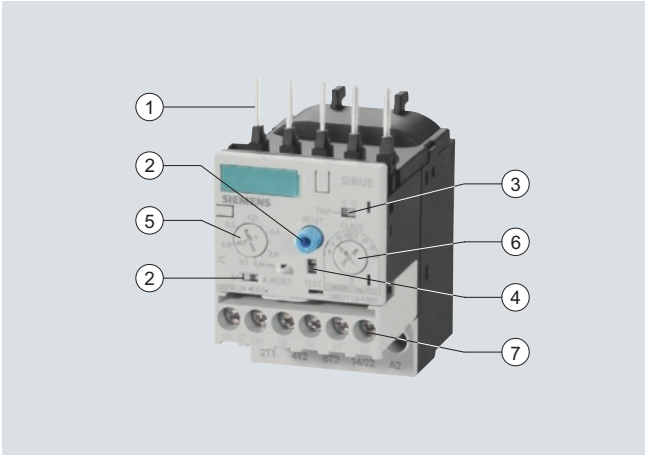
Overview



① Connection for mounting onto contactors:
Optimally adapted in electrical, mechanical and design terms to the contactors and soft starters. Connecting pins can be used for direct mounting of the overload relays. Stand-alone installation is possible as an alternative (in some cases in conjunction with a stand-alone installation module).

② Selector switch for manual/automatic RESET and RESET button:
With the slide switch you can choose between manual and automatic RESET. A device set to manual RESET can be reset locally by pressing the RESET button. On the 3RB21 a solid-state remote RESET is integrated.

③ Switch position indicator and TEST function of the wiring:
Indicates a trip and enables the wiring test.

④ Solid-state test (device test):
Enables a test of all important device components and functions.

④ Motor current setting:
Setting the device to the rated motor current is easy with the large rotary knob.

⑥ Trip class setting/internal ground-fault detection (only 3RB21):
Using the rotary switch you can set the required trip class and activate the internal ground-fault detection dependent on the start-up conditions.

⑦ Connecting terminals (removable joint block for auxiliary circuits):
The generously sized terminals permit connection of two conductors with different cross-sections for the main and auxiliary circuits. The auxiliary circuit can be connected with screw terminals and alternatively with spring-type terminals.

The 3RB20 and 3RB21 solid-state overload relays up to 630 A with internal power supply have been designed for inverse-time delayed protection of loads with normal and heavy starting (for "Function" see note on Technical Information on page 5/1) 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 set current I_e and is stored in the form of a long-term stable tripping characteristic (for "Characteristic Curves" see the note on Technical Information on page 5/1).

In addition to inverse-time delayed protection of loads against excessive temperature rises due to overload, phase unbalance and phase failure, the 3RB21 solid-state 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 a recovery time has elapsed (for "Function" see note on Technical Information on page 5/1).

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.

"Increased safety" type of protection EEx e according to ATEX directive 94/9/EC

The 3RB20/3RB21 solid-state overload relays are suitable for the overload protection of explosion-proof motors with "increased safety" type of protection EEx e. The relays meet the requirements of EN 60079-7 (Electrical apparatus for areas subject to explosion hazards – Increased safety "e"); see Catalog IC 10.

EC type test certificate for Group II, Category (2) G/D exists. It has the number PTB 06 ATEX 3001.

Benefits

The most important features and benefits of the 3RB20/3RB21 solid-state overload relays are listed in the overview table (see "General Data" on page 5/42).

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3RB20, 3RB21 for standard applications

Application

Industries

The 3RB20/3RB21 solid-state 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 5 to CLASS 30), minimize project completion times, inventories and power consumption, and optimize plant availability and maintenance management.

Application

The 3RB20/3RB21 solid-state overload relays have been designed for the protection of induction motors in sinusoidal 50/60 Hz voltage networks. The relays are not suitable for the protection of single-phase AC or DC loads.

The 3RU11 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 3RU11 thermal overload relay.

Ambient conditions

The devices are insensitive to external influences such as shocks, corrosive environments, ageing and temperature fluctuation.

For the temperature range from –25 °C to +60 °C, the 3RB20/3RB21 solid-state overload relays compensate the temperature according to IEC 60947-4-1.

For the 3RB20/3RB21 solid-state overload relays with the sizes S6, S10 and S12, the upper set value of the setting range must be reduced for ambient temperatures > 50 °C by a certain factor (see tables below).

Type	Setting range	Derating factor for the upper set value for **stand-alone installation** at ambient temperature	
		+50 °C	+60 °C
3RB20 56, 3RB21 56	50 ... 200 A	100 %	100 %
3RB20 66, 3RB21 66	55 ... 250 A	100 %	100 %
3RB20 66, 3RB21 66	160 ... 630 A	100 %	90 %

Type	Setting range	Derating factor for the upper set value for **mounting onto contactor** at ambient temperature	
		+50 °C	+60 °C
3RB20 56, 3RB21 56	50 ... 200 A	100 %	70 %
3RB20 66, 3RB21 66	55 ... 250 A	100 %	70 %
3RB20 66, 3RB21 66	160 ... 630 A	100 %	70 %

Accessories

The following optional accessories are available for the 3RB20/3RB21 solid-state overload relays:

- One terminal bracket each for the overload relays size S00 and S0 (sizes S2 to S12 can be installed as stand-alone installation without a terminal bracket)
- One mechanical remote RESET module for all sizes
- One cable release for resetting devices which are difficult to access (for all sizes)
- One sealable cover for all sizes
- Terminal covers for sizes S2 to S10/S12
- Box terminal blocks for sizes S6 and S10/S12

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Selection and ordering data

3RB20 solid-state overload relays for direct mounting[1)2)] and stand-alone installation[2)3)], CLASS 10

Features and technical specifications:
- 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

PU (UNIT, SET, M)= 1
PS* = 1 unit
PG = 101


3RB20 16-1RB0


3RB20 26-1QD0


3RB20 36-1UB0


3RB20 46-1ED0


3RB20 56-1FW2


3RB20 66-1MF2

Size of contactor[4)]	Rating for induction motor Rated value[5)]	Current setting of the inverse-time delayed overload release	Short-circuit protection with fuse, type of coordination 2, gL/gG operational class[6)]	DT	**Screw terminals** (on auxiliary current side) Order No.	Price per PU	Weight per PU approx.	DT	**Spring-type terminals** (on auxiliary current side) Order No.	Price per PU	Weight per PU approx.
	kW	A	A				kg				kg
Size S00[1)]											
S00	0.04 … 0.09	0.1 … 0.4	1	►	**3RB20 16-1RB0**		0.200 A		**3RB20 16-1RD0**		0.200
	0.12 … 0.37	0.32 … 1.25	2	►	**3RB20 16-1NB0**		0.200 A		**3RB20 16-1ND0**		0.200
	0.55 … 1.5	1 … 4	10	►	**3RB20 16-1PB0**		0.200 A		**3RB20 16-1PD0**		0.200
	1.1 … 5.5	3 … 12	20	►	**3RB20 16-1SB0**		0.200 A		**3RB20 16-1SD0**		0.200
Size S0[1)]											
S0	0.04 … 0.09	0.1 … 0.4	1	►	**3RB20 26-1RB0**		0.220 A		**3RB20 26-1RD0**		0.220
	0.12 … 0.37	0.32 … 1.25	2	►	**3RB20 26-1NB0**		0.220 A		**3RB20 26-1ND0**		0.220
	0.55 … 1.5	1 … 4	10	►	**3RB20 26-1PB0**		0.220 A		**3RB20 26-1PD0**		0.220
	1.1 … 5.5	3 … 12	20	►	**3RB20 26-1SB0**		0.220 A		**3RB20 26-1SD0**		0.220
	3 … 11	6 … 25	35	►	**3RB20 26-1QB0**		0.220 A		**3RB20 26-1QD0**		0.220
Size S2[1)3)7)]											
S2	3 … 11	6 … 25	63	►	**3RB20 36-1QB0**		0.360 A		**3RB20 36-1QD0**		0.360
				►	**3RB20 36-1QW1**		0.230 A		**3RB20 36-1QX1**		0.230
	7.5 … 22	12.5 … 50	80	►	**3RB20 36-1UB0**		0.360 A		**3RB20 36-1UD0**		0.360
				►	**3RB20 36-1UW1**		0.230 A		**3RB20 36-1UX1**		0.230
Size S3[1)3)7)]											
S3	7.5 … 22	12.5 … 50	160	►	**3RB20 46-1UB0**		0.560 A		**3RB20 46-1UD0**		0.560
	11 … 45	25 … 100	315	►	**3RB20 46-1EB0**		0.560 A		**3RB20 46-1ED0**		0.560
				►	**3RB20 46-1EW1**		0.450 A		**3RB20 46-1EX1**		0.450
Size S6[2)7)]											
S6 with busbar connections	22 … 90	50 … 200	315	►	**3RB20 56-1FC2**		1.030 A		**3RB20 56-1FF2**		1.030
S6 with box terminals				►	**3RB20 56-1FW2**		0.690 A		**3RB20 56-1FX2**		0.690
Size S10/S12[2)]											
S10/S12 and size 14 (3TF68/ 3TF69)	22 … 110	55 … 250	400	►	**3RB20 66-1GC2**		1.820 A		**3RB20 66-1GF2**		1.820
	90 … 450	160 … 630	800	►	**3RB20 66-1MC2**		1.820 A		**3RB20 66-1MF2**		1.820

1) The relays with an Order No. ending with **"0"** are designed for direct mounting. With the matching terminal brackets (see "Accessories", page 5/60) the sizes S00 and S0 can also be installed as stand-alone units.

2) The relays with an Order No. ending with **"2"** are designed for direct mounting and stand-alone installation. For 3TF68/3TF69 contactors, direct mounting is not possible.

3) The relays with an Order No. ending with **"1"** are designed for stand-alone installation.

4) Observe maximum rated operational current of the devices.

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

6) Maximum protection by fuse for overload relay, type of coordination 2. For fuse values in conjunction with contactors, see "Technical specifications" --> "Short-circuit protection with fuses for motor feeders", see note on Technical Information on page 5/1.

7) The relays with an Order No. with **"W"** or **"X"** in penultimate position are equipped with a straight-through transformer.

*** You can order this quantity or a multiple thereof.**

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SIRIUS 3RB2 Solid-State Overload Relays

3RB20, 3RB21 for standard applications

3RB20 solid-state overload relays for direct mounting[1)2)] and stand-alone installation[2)3)], CLASS 20

Features and technical specifications:
- 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

PU (UNIT, SET, M)= 1
PS* = 1 unit
PG = 101


3RB20 16-2RB0


3RB20 26-2QD0


3RB20 36-2UB0


3RB20 46-2ED0


3RB20 56-2FW2


3RB20 66-2MF2

Size of contactor[4)]	Rating for induction motor Rated value[5)]	Current setting value of the inverse-time delayed overload release	Short-circuit protection with fuse, type of coordination 2, gL/gG operational class[6)]	DT	**Screw terminals** (on auxiliary current side) Order No.	Price per PU	Weight per PU approx.	DT	**Spring-type terminals** (on auxiliary current side) Order No.	Price per PU	Weight per PU approx.
	kW	A	A				kg				kg
Size S00[1)]											
S00	0.04 … 0.09	0.1 … 0.4	1	►	**3RB20 16-2RB0**		0.200 A		**3RB20 16-2RD0**		0.200
	0.12 … 0.37	0.32 … 1.25	2	►	**3RB20 16-2NB0**		0.200 A		**3RB20 16-2ND0**		0.200
	0.55 … 1.5	1 … 4	10	►	**3RB20 16-2PB0**		0.200 A		**3RB20 16-2PD0**		0.200
	1.1 … 5.5	3 … 12	20	►	**3RB20 16-2SB0**		0.200 A		**3RB20 16-2SD0**		0.200
Size S0[1)]											
S0	0.04 … 0.09	0.1 … 0.4	1	►	**3RB20 26-2RB0**		0.220 A		**3RB20 26-2RD0**		0.220
	0.12 … 0.37	0.32 … 1.25	2	►	**3RB20 26-2NB0**		0.220 A		**3RB20 26-2ND0**		0.220
	0.55 … 1.5	1 … 4	10	►	**3RB20 26-2PB0**		0.220 A		**3RB20 26-2PD0**		0.220
	1.1 … 5.5	3 … 12	20	►	**3RB20 26-2SB0**		0.220 A		**3RB20 26-2SD0**		0.220
	3 … 11	6 … 25	35	►	**3RB20 26-2QB0**		0.220 A		**3RB20 26-2QD0**		0.220
Size S2[1)3)7)]											
S2	3 … 11	6 … 25	63	►	**3RB20 36-2QB0**		0.360 A		**3RB20 36-2QD0**		0.360
				►	**3RB20 36-2QW1**		0.230 A		**3RB20 36-2QX1**		0.230
	7.5 … 22	12.5 … 50	80	►	**3RB20 36-2UB0**		0.360 A		**3RB20 36-2UD0**		0.360
				►	**3RB20 36-2UW1**		0.230 A		**3RB20 36-2UX1**		0.230
Size S3[1)3)7)]											
S3	7.5 … 22	12.5 … 50	160	►	**3RB20 46-2UB0**		0.560 A		**3RB20 46-2UD0**		0.560
	11 … 45	25 … 100	315	►	**3RB20 46-2EB0**		0.560 A		**3RB20 46-2ED0**		0.560
				►	**3RB20 46-2EW1**		0.450 A		**3RB20 46-2EX1**		0.450
Size S6[2)7)]											
S6 with busbar connections	22 … 90	50 … 200	315	►	**3RB20 56-2FC2**		1.030 A		**3RB20 56-2FF2**		1.030
S6 with box terminals				►	**3RB20 56-2FW2**		0.690 A		**3RB20 56-2FX2**		0.690
Size S10/S12[2)]											
S10/S12 and size 14 (3TF68/ 3TF69)	22 … 110	55 … 250	400	►	**3RB20 66-2GC2**		1.820 A		**3RB20 66-2GF2**		1.820
	90 … 450	160 … 630	800	►	**3RB20 66-2MC2**		1.820 A		**3RB20 66-2MF2**		1.820

1) The relays with an Order No. ending with **"0"** are designed for direct mounting. With the matching terminal brackets (see "Accessories", page 5/60) the sizes S00 and S0 can also be installed as stand-alone units.

2) The relays with an Order No. ending with **"2"** are designed for direct mounting and stand-alone installation. For 3TF68/3TF69 contactors, direct mounting is not possible.

3) The relays with an Order No. ending with **"1"** are designed for stand-alone installation.

4) Observe maximum rated operational current of the devices.

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

6) Maximum protection by fuse for overload relay, type of coordination 2. For fuse values in conjunction with contactors, see "Technical specifications" --> "Short-circuit protection with fuses for motor feeders", see note on Technical Information on page 5/1.

7) The relays with an Order No. with **"W"** or **"X"** in penultimate position are equipped with a straight-through transformer.

*** You can order this quantity or a multiple thereof.**

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3RB21 solid-state overload relays for direct mounting[1)2)] and stand-alone installation[2)3)], CLASS 5, 10, 20 and 30 adjustable

Features and technical specifications:
- Overload protection, phase failure protection and unbalance protection
- Internal ground-fault detection (activatable)
- Internal power supply
- Auxiliary contacts 1 NO + 1 NC
- Manual and automatic RESET
- Electrical remote RESET integrated
- Switch position indicator
- TEST function and self-monitoring

PU (UNIT, SET, M)= 1
PS* = 1 unit
PG = 101


3RB21 13-4RB0


3RB21 23-4QD0


3RB21 33-4UB0


3RB21 43-4ED0


3RB21 53-4FX2


3RB21 63-4MC2

Size of contactor[4)]	Rating for induction motor Rated value[5)]	Current setting value of the inverse-time delayed overload release	Short-circuit protection with fuse, type of coordination 2, gL/gG operational class[6)]	DT	**Screw terminals** (on auxiliary current side) Order No.	Price per PU	Weight per PU approx.	DT	**Spring-type terminals** (on auxiliary current side) Order No.	Price per PU	Weight per PU approx.
	kW	A	A				kg				kg
Size S00[1)]											
S00	0.04 … 0.09	0.1 … 0.4	1	▶	**3RB21 13-4RB0**		0.200	A	**3RB21 13-4RD0**		0.200
	0.12 … 0.37	0.32 … 1.25	2	▶	**3RB21 13-4NB0**		0.200	A	**3RB21 13-4ND0**		0.200
	0.55 … 1.5	1 … 4	10	▶	**3RB21 13-4PB0**		0.200	A	**3RB21 13-4PD0**		0.200
	1.1 … 5.5	3 … 12	20	▶	**3RB21 13-4SB0**		0.200	A	**3RB21 13-4SD0**		0.200
Size S0[1)]											
S0	0.04 … 0.09	0.1 … 0.4	1	▶	**3RB21 23-4RB0**		0.220	▶	**3RB21 23-4RD0**		0.220
	0.12 … 0.37	0.32 … 1.25	2	▶	**3RB21 23-4NB0**		0.220	▶	**3RB21 23-4ND0**		0.220
	0.55 … 1.5	1 … 4	10	▶	**3RB21 23-4PB0**		0.220	▶	**3RB21 23-4PD0**		0.220
	1.1 … 5.5	3 … 12	20	▶	**3RB21 23-4SB0**		0.220	A	**3RB21 23-4SD0**		0.220
	3 … 11	6 … 25	35	▶	**3RB21 23-4QB0**		0.220	A	**3RB21 23-4QD0**		0.220
Size S2[1)3)7)]											
S2	3 … 11	6 … 25	63	▶	**3RB21 33-4QB0**		0.360	A	**3RB21 33-4QD0**		0.360
				▶	**3RB21 33-4QW1**		0.230	A	**3RB21 33-4QX1**		0.230
	7.5 … 22	12.5 … 50	80	▶	**3RB21 33-4UB0**		0.360	A	**3RB21 33-4UD0**		0.360
				▶	**3RB21 33-4UW1**		0.230	A	**3RB21 33-4UX1**		0.230
Size S3[1)3)7)]											
S3	7.5 … 22	12.5 … 50	160	▶	**3RB21 43-4UB0**		0.560	A	**3RB21 43-4UD0**		0.560
	11 … 45	25 … 100	315	▶	**3RB21 43-4EB0**		0.560	A	**3RB21 43-4ED0**		0.560
				▶	**3RB21 43-4EW1**		0.450	A	**3RB21 43-4EX1**		0.450
Size S6[2)7)]											
S6 with busbar connections	22 … 90	50 … 200	315	▶	**3RB21 53-4FC2**		1.030	A	**3RB21 53-4FF2**		1.030
S6 with box terminals				▶	**3RB21 53-4FW2**		0.690	A	**3RB21 53-4FX2**		0.690
Size S10/S12[2)]											
S10/S12 and size 14 (3TF68/ 3TF69)	22 … 110	55 … 250	400	▶	**3RB21 63-4GC2**		1.820	A	**3RB21 63-4GF2**		1.820
	90 … 450	160 … 630	800	▶	**3RB21 63-4MC2**		1.820	A	**3RB21 63-4MF2**		1.820

1) The relays with an Order No. ending with **"0"** are designed for direct mounting. With the matching terminal brackets (see "Accessories", page 5/60) the sizes S00 and S0 can also be installed as stand-alone units.

2) The relays with an Order No. ending with **"2"** are designed for direct mounting and stand-alone installation. For 3TF68/3TF69 contactors, direct mounting is not possible.

3) The relays with an Order No. ending with **"1"** are designed for stand-alone installation.

4) Observe maximum rated operational current of the devices.

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

6) Maximum protection by fuse for overload relay, type of coordination 2. For fuse values in conjunction with contactors, see "Technical specifications" --> "Short-circuit protection with fuses for motor feeders", see note on Technical Information on page 5/1.

7) The relays with an Order No. with **"W"** or **"X"** in penultimate position are equipped with a straight-through transformer.

*** You can order this quantity or a multiple thereof.**

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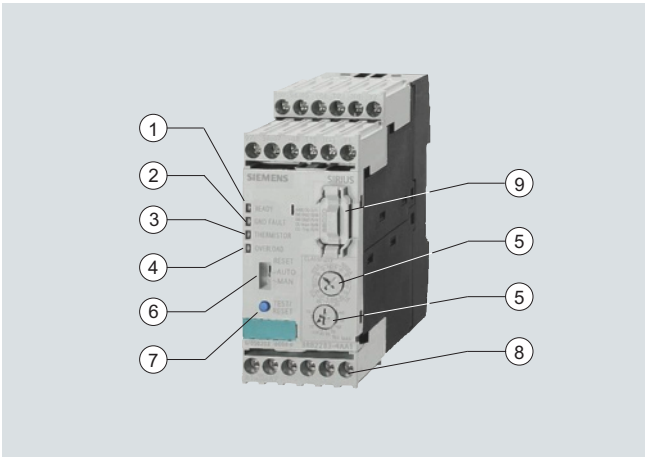
3RB22, 3RB23 for high-feature applications

Overview



3RB22/3RB23 evaluation module

① Green LED "READY":
A continuous green light signals that the device is working correctly.

② Red LED "GND FAULT":
A continuous red light signals a ground-fault tripping.

③ Red LED "THERMISTOR":
A continuous red light signals an active thermistor trip.

④ Red LED "OVERLOAD":
A continuous red light signals an active overload trip; a flickering red light signals an imminent trip (overload warning).

⑤ Motor current and trip class setting:
Setting the device to the motor current and to the required trip class dependent on the start-up conditions is easy with the two rotary switches.

⑥ Selector switch for manual/automatic RESET:
With this switch you can choose between manual and automatic RESET.

⑦ Test/RESET button:
Enables testing of all important device components and functions, plus resetting of the device after a trip when manual RESET is selected.

⑧ Connecting terminals (removable joint block):
The generously sized terminals permit connection of two conductors with different cross-sections for the auxiliary, control and sensor circuits. Connection is possible with screw connection and alternatively with spring-type connection.

⑨ 3RB29 85 function expansion module:
Enables more functions to be added, e. g. internal ground-fault detection and/or an analog output with corresponding signals.

3RB29 06 current measuring module

The modular, solid-state overload relays with external power supply type 3RB22 (with monostable auxiliary contacts) and type 3RB23 (with bistable auxiliary contacts) up to 630 A (up to 820 A possible with a series transformer) have been designed for inverse-time delayed protection of loads with normal and heavy starting (for "Function" see note on Technical Information on page 5/1) 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 means of a current measuring module and electronically evaluated by a special evaluation module which is connected to it. The evaluation electronics sends a signal 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 set current I_e and is stored in the form of a long-term stable tripping characteristic (for "Characteristic Curves" see the note on Technical Information on page 5/1). The "tripped" status is signaled by means of a continuous red "OVERLOAD" LED.

The LED indicates imminent tripping of the relay due to overload, phase unbalance or phase failure by flickering when the limit current has been violated. This warning can also be issued as a signal through auxiliary contacts.

In addition to the described inverse-time delayed protection of loads against excessive temperature rises, the 3RB22/3RB23 solid-state overload relays also allow direct temperature monitoring of the motor windings (full motor protection) by connection with broken-wire interlock of a PTC sensor circuit. With this temperature-dependent protection, the loads can be protected against overheating caused indirectly by reduced coolant flow, for example, which cannot be detected by means of the current alone. In the event of overheating, the devices switch off the contactor, and thus the load, by means of the auxiliary contacts. The "tripped" status is signaled by means of a continuously illuminated "THERMISTOR" LED.

To also protect the loads against high-resistance short-circuits due to damage to the insulation, humidity, condensed water, etc., the 3RB22/3RB23 solid-state overload relays offer the possibility of internal ground-fault detection in conjunction with a function expansion module (for details see "Selection and ordering data"); not possible in conjunction with contactor assembly for wye-delta starting. In the event of a ground fault the 3RB22/3RB23 relays trip instantaneously. The "tripped" status is signaled by means of a continuous red "Ground Fault" LED. Signaling through auxiliary contacts is also possible.

After tripping due to overload, phase unbalance, phase failure, thermistor or ground-fault tripping, the relay is reset manually or automatically after the recovery time has elapsed (for "Function" see note on Technical Information on page 5/1). In conjunction with a function expansion module the motor current measured by the microprocessor can be output in the form of an analog signal 4 ... 20 mA DC for operating rotary coil instruments or for feeding into analog inputs of programmable logic controllers. With an additional AS-Interface analog module the current values can also be transferred over the AS-i bus system.

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.

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"Increased safety" type of protection EEx e according to ATEX directive 94/9/EC

The 3RB22 (monostable) solid-state overload relays are suitable for the overload protection of explosion-proof motors with "increased safety" type of protection EEx e. The relays meet the requirements of EN 60079-7 (Electrical apparatus for areas subject to explosion hazards – Increased safety "e"); see Catalog IC 10.

EC type test certificate for Group II, Category (2) G/D exists. It has the number PTB 05 ATEX 3022.

Benefits

The most important features and benefits of the 3RB22/3RB23 solid-state overload relays are listed in the overview table (see "General Data" on page 5/42).

Application

Industries

The 3RB22/3RB23 solid-state overload relays are suitable for customers from all industries who want to guarantee optimum inverse-time delayed and temperature-dependent protection of their electrical loads (e. g. motors) under normal and heavy starting conditions (CLASS 5 to CLASS 30), minimize project completion times, inventories and power consumption, and optimize plant availability and maintenance management.

Application

The 3RB22/3RB23 solid-state overload relays have been designed for the protection of three-phase asynchronous and single-phase AC motors.

If single-phase AC motors are to be protected by the 3RB22/3RB23 solid-state overload relays, the main current paths of the current measuring modules must be series-connected (for "Schematics" see note on Technical Information on page 5/1).

Ambient conditions

The devices are insensitive to external influences such as shocks, corrosive environments, ageing and temperature fluctuation.

For the temperature range from –25 °C to +60 °C, the 3RB22/3RB23 solid-state overload relays compensate the temperature according to IEC 60947-4-1.

Configuration notes for use of the devices below –25 °C or above +60 °C on request.

Accessories

The following optional accessories are available for the 3RB22/3RB23 solid-state overload relays:

- A sealable cover for the evaluation module
- Terminal covers for the current measuring modules size S6 and S10/S12
- Box terminal blocks for the current measuring modules size S6 and S10/S12
- Push-in lugs for screw fixing the 3RB22/3RB23 overload relays and the 3RB29 06 current measuring modules.

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Selection and ordering data

3RB22/3RB23 solid-state overload relays for full motor protection with screw terminals or spring-type terminals for stand-alone installation, CLASS 5, 10, 20 and 30 adjustable

Features and technical specifications:

- Overload protection, phase failure protection and unbalance protection
- External power supply 24 ... 240 V
- Auxiliary contacts 2 NO + 2 NC
- Manual and automatic RESET
- Electrical remote RESET integrated
- 4 LEDs for operating and status displays
- TEST function and self-monitoring
- Internal ground-fault detection with function expansion module
- Screw terminals or spring-type terminals for auxiliary, control and sensor circuits
- Input for PTC sensor circuit
- Analog output with function expansion module

Size of contactor	Version	DT	**Screw terminals** Order No.	Price per PU	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx. kg
Evaluation modules								
S00 ... S12	Monostable	▶	**3RB22 83-4AA1**		1	1 unit	101	0.300
	Bistable	▶	**3RB23 83-4AA1**		1	1 unit	101	0.300


3RB2. 83-4AA1

Size of contactor	Version	DT	**Spring-type terminals** Order No.	Price per PU	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx. kg
Evaluation modules								
S00 ... S12	Monostable	A	**3RB22 83-4AC1**		1	1 unit	101	0.300
	Bistable	A	**3RB23 83-4AC1**		1	1 unit	101	0.300


3RB2. 83-4AC1

Size of contactor	Version	DT	Order No.	Price per PU	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx. kg
Function expansion modules								
	For plugging into evaluation module (1 unit)							
S00 ... S12	**Analog Basic 1 modules**[1] Analog output DC 4 ... 20 mA, with overload warning	▶	**3RB29 85-2AA0**		1	1 unit	101	0.030
	Analog Basic 1 modules[1)2)] Analog output DC 4 ... 20 mA, with internal ground-fault detection and overload warning	▶	**3RB29 85-2AA1**		1	1 unit	101	0.030
	Analog Basic 2 modules[1)2)] Analog output DC 4 ... 20 mA, with internal ground-fault detection and ground-fault signaling	▶	**3RB29 85-2AB1**		1	1 unit	101	0.030
	Basic 1 GF modules[2)] with internal ground-fault detection and overload warning	▶	**3RB29 85-2CA1**		1	1 unit	101	0.030
	Basic 2 GF modules[2)] with internal ground-fault detection and ground-fault signaling	▶	**3RB29 85-2CB1**		1	1 unit	101	0.030

Note:
Analog input modules, e. g. SM 331, must be configured for 4-wire measuring transducers. In this case the analog input module must not supply current to the analog output of the 3RB22/ 3RB23 relay.

1) The analog signal DC 4 ... 20 mA can be used for operating rotary coil instruments or for feeding into analog inputs of programmable logic controllers.

2) The following information on ground-fault protection refers to sinusoidal residual currents at 50/60 Hz:
- With a motor current of between 0.3 and 2 times the set current I_e the unit will trip at a ground-fault current equal to 30 % of the set current.
- With a motor current of between 2 and 8 times the set current I_e the unit will trip at a ground-fault current equal to 15 % of the set current.
- The response delay amounts to between 0.5 and 1 second.

*** You can order this quantity or a multiple thereof.**

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Current measuring modules for direct mounting[1] and stand-alone installation[1][2]

	Size of contactor[3]	Rating for induction motor rated value[4]	Current setting of the inverse-time delayed overload release	Short-circuit protection with fuse, type of coordination 2, gL/gG operational class[5]	DT	Order No.	Price per PU	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx.
		kW	A								kg
Size S00/S0[2][6]											
 3RB29 06-2.G1	S00/S0	0.09 … 1.1	0.3 … 3	20	▶	**3RB29 06-2BG1**		1	1 unit	101	0.100
		1.1 … 11	2.4 … 25	63	▶	**3RB29 06-2DG1**		1	1 unit	101	0.150
Size S2/S3[2][6]											
 3RB29 06-2JG1	S2/S3	5.5 … 45	10 … 100	315	▶	**3RB29 06-2JG1**		1	1 unit	101	0.350
Size S6[1][6]											
 3RB29 56-2TG2	S6 with busbar connection	11 … 90	20 … 200	315	▶	**3RB29 56-2TH2**		1	1 unit	101	1.000
	S6 with box terminals				▶	**3RB29 56-2TG2**		1	1 unit	101	0.600
Size S10/S12[1]											
 3RB29 66-2WH2	S10/S12 and size 14 (3TF68/ 3TF69)	37 … 450	63 … 630	800	▶	**3RB29 66-2WH2**		1	1 unit	101	1.750

Note:
The connecting cable between the current measuring module and the evaluation module is not included in the scope of supply; please order separately.

1) The current measuring modules with an Order No. ending with **"2"** are designed for direct mounting and stand-alone installation. For 3TF68/3TF69 contactors, direct mounting is not possible.

2) The current measuring modules with an Order No. ending with **"1"** are designed for stand-alone installation.

3) Observe maximum rated operational current of the devices.

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

5) Maximum protection by fuse for overload relay, type of coordination 2. For fuse values in conjunction with contactors, see "Technical specifications" --> "Short-circuit protection with fuses for motor feeders", see note on Technical Information on page 5/1.

6) The modules with an Order No. with "G" in penultimate position are equipped with a straight-through transformer.

Accessories

	Size of contactor	Version	DT	Order No.	Price per PU	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx.
									kg
Connecting cables (essential accessory)									
 3RB29 87-2.		For connection between evaluation module and current measuring module							
	S00 ...S3	• Length 0.1 m (only for mounting of the evaluation module directly onto the current measuring module)	▶	**3RB29 87-2B**		1	1 unit	101	0.010
	S00 ... S12	• Length 0.5 m	▶	**3RB29 87-2D**		1	1 unit	101	0.020

For more accessories, see page 5/60.

* You can order this quantity or a multiple thereof.

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Accessories

Overview

Overload relays for standard applications

The following optional accessories are available for the 3RB20/3RB21 solid-state overload relays:

- One terminal bracket each for the overload relays size S00 and S0 (sizes S2 to S12 can be installed as stand-alone installation without a terminal bracket)
- One mechanical remote RESET module for all sizes
- One cable release for resetting devices which are difficult to access (for all sizes)
- One sealable cover for all sizes
- Terminal covers for sizes S2 to S10/S12
- Box terminal blocks for sizes S6 and S10/S12

Overload relays for high-feature applications

The following optional accessories are available for the 3RB22/3RB23 solid-state overload relays:

- A sealable cover for the evaluation module
- Terminal covers for the current measuring modules size S6 and S10/S12
- Box terminal blocks for the current measuring modules size S6 and S10/S12
- Push-in lugs for screw fixing the 3RB22/3RB23 overload relays and the 3RB29 06 current measuring modules.

Selection and ordering data

Version	Size	DT	Order No.	Price	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx. kg
Terminal brackets for stand-alone installation[1]								
 3RB29 .3-0AA1								
For separate mounting of the overload relays; screw and snap-on mounting onto TH 35 standard mounting rail	S00	▶	**3RB29 13-0AA1**		1	1 unit	101	0.060
	S0	▶	**3RB29 23-0AA1**		1	1 unit	101	0.080
Mechanical RESET[2]								
 3RU19 00-1A with pushbutton and extension plunger								
Resetting plungers, holders and formers	S00 ... S10/S12	▶	**3RU19 00-1A**		1	1 unit	101	0.038
Pushbuttons with extended stroke (12 mm), IP65, Ø 22 mm		B	**3SB30 00-0EA11**		1	1 unit	102	0.020
Extension plungers For compensation of the distance between a pushbutton and the unlatching button of the relay		A	**3SX1 335**		1	1 unit	102	0.004
Cable releases with holder for RESET[2]								
 3RU19 00-1.								
For Ø 6.5 mm holes in the control panel; max. control panel thickness 8 mm	S00 ... S10/S12							
• Length 400 mm		▶	**3RU19 00-1B**		1	1 unit	101	0.063
• Length 600 mm		▶	**3RU19 00-1C**		1	1 unit	101	0.073

1) Only for 3RB20/3RB21.

2) Only for 3RB20/3RB21. The accessories are identical to those of the 3RU11 thermal overload relays.

* You can order this quantity or a multiple thereof.

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	Version	Size	DT	Order No.	Price per PU	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx. kg
Sealable covers									
	For covering the setting knobs								
	• For 3RB20/3RB21 for standard applications	S00 ... S10/S12	▶	**3RB29 84-0**		1	10 units	101	0.020
	• For 3RB22/3RB23 for high-feature applications	--	▶	**3RB29 84-2**		1	10 units	101	0.050
Terminal covers									
 3RT19 46-4EA1	**Covers for cable lugs and busbar connections**								
	• Length 55 mm[1]	S3	▶	**3RT19 46-4EA1**		1	1 unit	101	0.040
	• Length 100 mm	S6	▶	**3RT19 56-4EA1**		1	1 unit	101	0.070
	• Length 120 mm	S10/S12	▶	**3RT19 66-4EA1**		1	1 unit	101	0.130
 3RT19 36-4EA2	**Covers for box terminals**								
	• Length 20.6 mm[1]	S2	▶	**3RT19 36-4EA2**		1	1 unit	101	0.020
	• Length 20.8 mm[1]	S3	▶	**3RT19 46-4EA2**		1	1 unit	101	0.025
	• Length 25 mm	S6	▶	**3RT19 56-4EA2**		1	1 unit	101	0.030
	• Length 30 mm	S10/S12	▶	**3RT19 66-4EA2**		1	1 unit	101	0.040
The figures show mounting on the contactor	**Covers for screw terminals** between contactor and overload relay, without box terminals (1 unit required per combination)	S6	▶	**3RT19 56-4EA3**		1	1 unit	101	0.020
		S10/S12	▶	**3RT19 66-4EA3**		1	1 unit	101	0.060
Box terminal blocks									
 3RT19 5.-4G	For round and ribbon cables								
	• Up to 70 mm²	S6[2]	▶	**3RT19 55-4G**		1	1 unit	101	0.230
	• Up to 120 mm²	S6	▶	**3RT19 56-4G**		1	1 unit	101	0.260
	• Up to 240 mm²	S10/S12	▶	**3RT19 66-4G**		1	1 unit	101	0.676
	For technical specifications for conductor cross-sections see note on Technical Information on page 5/1.								
Push-in lugs									
 3RP19 03	For screw fixing of 3RB22/3RB23 overload relays	--	B	**3RP19 03**		1	10 units	101	0.002
 3RB19 00-0B	For screw fixing the 3RB29 06 current measuring modules (2 units are required per module)	S00 ... S3	A	**3RB19 00-0B**		100	10 units	101	0.100

1) Only for 3RB20/3RB21. The accessories are identical to those of the 3RU11 thermal overload relays.

2) In the scope of supply for 3RT10 54-1 contactors (55 kW).

* You can order this quantity or a multiple thereof.

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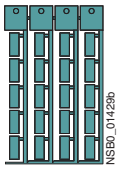
Accessories

	Version	Size/ Color	Use	DT	Order No.	Price per PU	PU (UNIT, SET, M)	PS*	PG	Weight per PU approx. kg
Tools for opening Cage Clamp terminals										
 8WA2 803	**Screwdrivers**									
	3.5 mm x 0.5 mm, length approx. 175 mm; suitable for a max. conductor cross-section of 2.5 mm^2	Green, partially insulated	Main and auxiliary circuit connections	C	**8WA2 880**		1	1 unit	041	0.035
		Green		C	**8WA2 803**		1	1 unit	041	0.024
Blank labels										
 3RT19 00-1SB10	**Unit labeling plates** for SIRIUS devices	20 mm x 7 mm, pastel turquoise		D	**3RT19 00-1SB20**		100	340 units	101	0.200
	Inscription labels for sticking For SIRIUS devices	19 mm x 6 mm, pastel turquoise	3RB2, 3RU11	C	**3RT19 00-1SB60**		100	3060 units	101	0.100
		19 mm x 6 mm, zinc yellow		C	**3RT19 00-1SD60**		100	3060 units	101	0.100
	Computer labeling systems For individual inscription of unit labeling plates Obtainable from: **murrplastik Systemtechnik GmbH** www.murrplastik.de									

* You can order this quantity or a multiple thereof.