Introduction

Overview

Type		3RU21	3RB30	3RB31
SIRIUS overload relays up to 40 A				
Applications				
• System protection		✓[1)]	✓[1)]	✓[1)]
• Motor protection		✓	✓	✓
• Alternating current, three-phase		✓	✓	✓
• Alternating current, single-phase		✓	--	--
• Direct current		✓	--	--
Size of contactor		S00, S0	S00, S0	S00, S0
Rated operational current I_e				
• Size S00	A	Up to 16	Up to 16	Up to 16
• Size S0	A	Up to 40	Up to 40	Up to 40
Rated operational voltage U_e	V	690 AC	690 AC	690 AC
Rated frequency	Hz	50/60	50/60	50/60
Trip class		CLASS 10	CLASS 10, 20	CLASS 5, 10, 20, 30 adjustable
Thermal overload releases	A A	0.11 ... 0.16 to 34 ... 40	--	--
Electronic overload releases	A A	--	0.1 ... 0.4 to 10 ... 40	0.1 ... 0.4 to 10 ... 40
Rating for three-phase motor at 400 V AC	kW	0.04 ... 18.5	0.04 ... 18.5	0.04 ... 18.5

Accessories						
For sizes	S00	S0	S00	S0	S00	S0
Terminal supports for stand-alone assembly	✓	✓	✓	✓	✓	✓
Mechanical RESET	✓	✓	✓	✓	✓	✓
Cable releases for RESET	✓	✓	✓	✓	✓	✓
Electrical remote RESET	✓	✓	--	--	Integrated in the unit	
Terminal covers for ring terminal lug connections	✓[2)]	✓[2)]	--	--	--	--
Sealable covers for setting knobs	✓	✓	✓	✓	✓	✓

✓ Has this function or can use this accessory

-- Does not have this function or cannot use this accessory

1) The units are responsible in the main circuit for overload protection of the assigned electrical loads (e.g. motors), feeder cable, and other switching and protection devices in the respective load feeder.

2) Terminal covers for ensuring finger-safe touch protection are available for 3RU21 overload relays with ring terminal lug connections for mounting onto contactors.





Type		3RU11	3RB20	3RB21	3RB22, 3RB23	3RB24
SIRIUS overload relays up to 630 A						
Applications						
• System protection		✓[1]	✓[1]	✓[1]	✓[1]	
• Motor protection		✓	✓	✓	✓	
• Alternating current, three-phase		✓	✓	✓	✓	
• Alternating current, single-phase		✓	--	--	✓	
• Direct current		✓	--	--	--	
Size of contactor		S00 ... S3	S00 ... S12	S00 ... S12	S00 ... S12	
Rated operational current I_e						
• Size S0	A	Up to 12	Up to 12	Up to 12	Up to 25 and 45 mm width with current measuring module 3RB29 06-2BG1/3RB29 06-2DG1	
• Size S00	A	Up to 25	Up to 25	Up to 25		
• Size S2	A	Up to 50	Up to 50	Up to 50	Up to 100 and 55 mm width with current measuring module 3RB29 06-2JG1	
• Size S3	A	Up to 100	Up to 100	Up to 100		
• Size S6	A	--	Up to 200	Up to 200	Up to 200 and 120 mm width with current measuring module 3RB29 56-2TH2/3RB29 56-2TG2	
• Size S10/S12	A	--	Up to 630	Up to 630	Up to 630 and 145 mm width with current measuring module 3RB29 66-2WH2	
• Size 14 (3TF68/3TF69)	A	--	Up to 630	Up to 630	Up to 820 with current measuring module 3RB29 06-2BG1 and transformer 3UF18 68-3GA00	
Rated operational voltage U_e	V	690/1 000 AC[2]	690/1 000 AC[3]	690/1 000 AC[3]	690/1 000 AC[4]	
Rated frequency	Hz	50/60	50/60	50/60	50/60	
Trip class		CLASS 10	CLASS 10, 20	CLASS 5, 10, 20, 30 adjustable	CLASS 5, 10, 20, 30 adjustable	
Thermal overload releases	A A	0.11 ... 0.16 to 80 ... 100	--	--	--	
Electronic overload releases	A A	--	0.1 ... 0.4 to 160 ... 630	0.1 ... 0.4 to 160 ... 630	0.3 ... 3 to 63 ... 630	
Rating for three-phase motor at 400 V AC	kW kW	0.04 to 45	0.04 ... 0.09 to 90 ... 450	0.04 ... 0.09 to 90 ... 450	0.09 ... 1.1 to 37 ... 450	

Accessories

For sizes	3RU11				3RB20						3RB21						3RB22, 3RB23					
	S00	S0	S2	S3	S00	S0	S2	S3	S6	S10/S12	S00	S0	S2	S3	S6	S10/S12	S00	S0	S2	S3	S6	S10/S12
Terminal supports for stand-alone assembly	✓	✓	✓	✓	✓	✓	5)	5)	5)	5)	✓	✓	5)	5)	5)	5)	5)	5)	5)	5)	5)	5)
Mechanical RESET	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	--	--	--	--	--	--
Cable releases for RESET	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	--	--	--	--	--	--
Electrical remote RESET	✓	✓	✓	✓	--	--	--	--	--	--	Integrated in the unit						Integrated in the unit					
Terminal covers	--	--	✓	✓	--	✍ ✍	✍ ✍	✓	✓	✓	--	✍ ✍	--	✓	✓	✓	--	--	--	✓	✓	✓
Sealable covers for setting knobs	Integrated in the unit				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Operator-control block for 3RB24 evaluation module	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	✓	✓	✓	✓	✓	✓

✓ Has this function or can use this accessory

-- Does not have this function or cannot use this accessory

1) The units are responsible in the main circuit for overload protection of the assigned electrical loads (e.g. motors), feeder cable, and other switching and protection devices in the respective load feeder.

2) Size S3 up to 1 000 V AC.

3) Size S2 (only with straight-through transformer), S3, S6, S10, S12 up to 1 000 V AC.

4) With reference to the 3RB29 .6 current measuring modules.

5) Stand-alone assembly without accessories is possible.

Overload relays

General data

Overview






Features	3RU21	3RU11	3RB30/3RB31	3RB20/3RB21	3RB22/3RB23	3RB24	Benefits
General data							
Sizes	S00, S0	S00 ... S3	S00, S0	S00 ... S12	S00 ... S12	S00 ... S12	• Are coordinated with the dimensions, connections and technical characteristics of the other devices in the SIRIUS modular system (contactors, etc.) • Permit the assembly of slim and compact load feeders in widths of 45 mm (S00), 45 mm (S0), 55 mm (S2), 70 mm (S3), 120 mm (S6), and 145 mm (S10/S12), this does not include the current measuring modules for the 3RB22 to 3RB24 evaluation modules sizes S00 to S3. • Simplify configuration
Seamless current range	0.11 ... 40 A	0.11 ... 100 A	0.1 ... 40 A	0.1 ... 630 A	0.3 ... 630 A (up to 820 A)[1]	0.3 ... 630 A (up to 820 A)[1]	• Allows easy and consistent configuration with one series of overload relays (for small to large loads)
Protection functions							
Tripping due to overload	✓	✓	✓	✓	✓	✓	• Provides optimum inverse-time delayed protection of loads against excessive temperature rises due to overload
Tripping due to phase asymmetry	✓	✓	✓	✓	✓	✓	• Provides optimum inverse-time delayed protection of loads against excessive temperature rises due to phase asymmetry
Tripping due to phase failure	✓	✓	✓	✓	✓	✓	• Minimizes the temperature rise of three-phase motors in the event of a phase failure
Protection of single-phase loads	✓	✓	--	--	✓	✓	• Enables the protection of single-phase loads
Tripping due to overheating by **integrated thermistor motor protection function**	--[2]	--[2]	--[2]	--[2]	✓	✓	• Permits optimum temperature-dependent protection of the loads against excessive temperature rises, e.g. for stator-critical motors, if the coolant flow is obstructed, if the motor surface is soiled, or if long starting and braking operations are required • Eliminates the need for additional single device • Saves space in the control cabinet • Reduces wiring overhead and costs
Tripping due to ground fault by **internal ground-fault detection (can be activated)**	--	--	✓ (3RB31 only)	✓ (3RB21 only)	✓	✓	• Provides optimum protection of loads against high-resistance short circuits or ground faults due to moisture, condensed water, damage to the insulation material, etc. • Eliminates the need for additional single device • Saves space in the control cabinet • Reduces wiring overhead and costs

✓ Available
-- Not available

[1] Motor currents up to 820 A can be recorded and evaluated, for example, by a 3RB29 06-2BG1 current measuring module (0.3 A to 3 A) in combination with a series transformer 3UF18 68-3GA00 (820 A/1 A).
For 3UF18 transformers, see "Monitoring and control devices" → "SIMOCODE 3UF motor management and control devices".

[2] In combination with the SIRIUS 3RN thermistor motor protection devices, an additional temperature-sensitive protection can also be implemented here.






Features	3RU21	3RU11	3RB30/3RB31	3RB20/3RB21	3RB22/3RB23	3RB24	Benefits
Features							
RESET function	✓	✓	✓	✓	✓	✓	• Allows manual or automatic resetting of the device
Remote RESET function	✓ (by means of separate module)	✓ (by means of separate module)	✓ (only with 3RB31 and external auxiliary voltage 24 V DC)	✓ (only with 3RB21 and external auxiliary voltage 24 V DC)	✓ (electrically via external button)	✓ (electrically with button or via IO-Link)	• Enables remote resetting of the device
TEST function for auxiliary contacts	✓	✓	✓	✓	✓	✓	• Allows easy checking of function and wiring
TEST function for electronics	--	--	✓	✓	✓	✓	• Allows checking of the electronics
Status display	✓	✓	✓	✓	✓	✓	• Indicates the current operating state
Large current adjustment button	✓	✓	✓	✓	✓	✓	• Facilitates the exact setting of the relay to the correct current value
Integrated auxiliary contacts (1 NO + 1 NC)	✓	✓	✓	✓	✓ (2 ×)	--	• Allow the load to be disconnected in the event of an irregularity • Can be used to output signals
Integrated auxiliary contacts (1 CO and 1 NO in series)	--	--	--	--	--	✓	• Permits control of the contactors directly from the higher-level control through IO-Link
IO-Link connection	--	--	--	--	--	✓	• Reduces the wiring in the control cabinet • Enables communication
Connection of optional hand-held device	--	--	--	--	--	✓	• Enables local operation
Communications capability via IO-Link							
Full starter functionality via IO-Link	--	--	--	--	--	✓	• Permits the configuration of communication-capable motor starters (direct-on-line/reversing and star-delta (wye-delta) starting) in combination with the SIRIUS 3RT contactors
Read-out of diagnostic functions	--	--	--	--	--	✓	• Permits the read-out of diagnostic information such as overload, open circuit, ground fault
Read-out of current values	--	--	--	--	--	✓	• Permits the read-out of current values and direct further processing in the higher-level control
Read-out of all set parameters	--	--	--	--	--	✓	• Permits the read-out of all set parameters, e.g. for plant documentation

✓ Available

-- Not available

Overload relays

General data






Features	3RU21	3RU11	3RB30/3RB31	3RB20/3RB21	3RB22/3RB23	3RB24	Benefits
Design of load feeders							
Short-circuit strength up to 100 kA at 690 V (in conjunction with the corresponding fuses or the corresponding motor starter protector)	✓	✓	✓	✓	✓	✓	• Provides optimum protection of the loads and operating personnel in the event of short-circuits due to insulation faults or faulty switching operations
Electrical and mechanical matching to 3RT contactors	✓	✓	✓	✓	✓[1]	✓[1]	• Simplifies configuration • Reduces wiring overhead and costs • Enables stand-alone assembly as well as space-saving direct mounting
Straight-through transformers for main circuit[2] (in this case the cables are routed directly to the box terminals of the contactor through the feed-through openings of the overload relay)	--	--	--	✓ (S2 ... S6)	✓ (S00 ... S6)	✓ (S00 ... S6)	• Reduces the contact resistance (only one point of contact) • Saves wiring costs (simple, no need for tools, and fast) • Reduces material costs • Reduces installation costs
Spring-type connection system for main circuit[2]	✓	--	✓	--	--	--	• Enables fast connections • Permits vibration-resistant connections • Enables maintenance-free connections
Spring-type connection system for auxiliary circuits[2]	✓	✓	✓	✓	✓	✓	• Enables fast connections • Permits vibration-resistant connections • Enables maintenance-free connections
Ring terminal lug connection system for main and auxiliary circuits[2]	✓	--	--	--	--	--	• Enables fast connections • Permits vibration-resistant connections • Enables maintenance-free connections
Full starter functionality via IO-Link	--	--	--	--	--	✓	• Permits the configuration of communication-capable motor starters (direct-on-line/reversing and star-delta (wye-delta) starting) in combination with the SIRIUS 3RT contactors
Starter function	--	--	--	--	--	✓	• Integration of feeders via IO-Link to controllers up to 630 A or 820 A

✓ Available

-- Not available

[1] Exception: up to size S3 only stand-alone assembly is possible.

[2] Alternatively available for screw terminals.






Features	3RU21	3RU11	3RB30/3RB31	3RB20/3RB21	3RB22/3RB23	3RB24	Benefits
Other characteristics							
Temperature compensation	✓	✓	✓	✓	✓	✓	• Allows the use of the relays without derating even at high temperatures • Prevents premature tripping • Allows compact control cabinet installation without distances between the devices/load feeders • Simplifies configuration • Enables space to be saved in the control cabinet
Very high long-term stability	✓	✓	✓	✓	✓	✓	• Provides reliable protection of loads even after years of use under severe operating conditions
Wide setting ranges	--	--	✓ (1:4)	✓ (1:4)	✓ (1:10)	✓ (1:10)	• Minimize the configuration outlay and costs • Minimize storage overheads, storage costs, tied-up capital
Fixed trip class	CLASS 10	CLASS 10	3RB30: CLASS 10 or CLASS 20	3RB20: CLASS 10 or CLASS 20	--	--	• Optimum motor protection for standard starts
Trip classes (CLASS 5, 10, 20, 30) adjustable on the device	--	--	✓ (3RB31 only)	✓ (3RB21 only)	✓	✓	• Enables solutions for very fast starting motors requiring special protection measures (e.g. Ex motors) • Enable solutions for heavy starting • Reduces the number of versions • Minimizes the configuring overhead and costs • Permits the reduction of storage overhead, storage costs, and tied-up capital
Low power loss	--	--	✓	✓	✓	✓	• Reduces energy consumption (energy consumption is up to 98% less than with thermal overload relays) and thus energy costs • Minimizes the temperature rise of the contactor and the control cabinet - in some cases this may eliminate the need for control cabinet cooling • Enables space to be saved through direct mounting onto the contactor even at high motor currents (i.e. no heat decoupling is required)
Intrinsic power supply	--[1)]	--[1)]	✓	✓	--	--	• Eliminates the need for configuration and connecting an additional control circuit
External power supply via IO-Link	--	--	--	--	--	✓	• Eliminates the need for configuration and connecting an additional control circuit

✓ Available

-- Not available

[1)] SIRIUS 3RU11 and 3RU21 thermal overload relays work on the basis of the bimetal principle and therefore they do not require a control supply voltage.

Overload relays

General data






Features	3RU21	3RU11	3RB30/3RB31	3RB20/3RB21	3RB22/3RB23	3RB24	Benefits
Other characteristics (continued)							
Overload warning	--	--	--	--	✓	✓	• Indicates imminent tripping of the relay due to an overload, phase asymmetry, or phase failure directly on the device through flickering LEDs or in the case of 3RB24 as a signal via IO-Link • Permits the signaling of an imminent tripping of the relay • Permits the timely implementation of remedial measures in the event of a inverse-time delayed overloading of the load for an extended period exceeding the current limit • Eliminates the need for additional device • Saves space in the control cabinet • Reduces wiring overhead and costs
Analog output	--	--	--	--	✓	✓	• Permits the output of an analog output signal for actuating moving-coil instruments, feeding programmable logic controllers, or transfer to bus systems • Eliminates the need for an additional measuring transducer and signal converter • Saves space in the control cabinet • Reduces wiring overhead and costs

✓ Available

-- Not available

Overview of overload relays – matching contactors

	Overload relays	Current measure-ment	Current range	**Contactors** (type, size, rating in kW)									
				3RT20 1.	**3RT20 2.**	**3RT10 1.**	**3RT10 2.**	**3RT10 3.**	**3RT10 4.**	**3RT10 5.**	**3RT10 6.**	**3RT10 7.**	**3TF68/ 3TF69**
				S00	S0	S00	S0	S2	S3	S6	S10	S12	14
	Type	Type	A	3/4/5.5/ 7.5	5.5/7.5/11/ 15/18.5	3/4/5.5	5.5/7.5/ 11	15/18.5/ 22	30/37/45	55/75/90	110/132/ 160	200/250	375/450
SIRIUS 3RU21 thermal overload relays													
 3RU21	3RU21 1	Integrated	0.11 … 16	✓	--	--	--	--	--	--	--	--	--
	3RU21 2	Integrated	1.8 … 40	--	✓	--	--	--	--	--	--	--	--
SIRIUS 3RU11 thermal overload relays													
 3RU11	3RU11 1	Integrated	0.11 … 12	--	--	✓	--	--	--	--	--	--	--
	3RU11 2	Integrated	18 … 25	--	--	--	✓	--	--	--	--	--	--
	3RU11 3	Integrated	5.5 … 50	--	--	--	--	✓	--	--	--	--	--
	3RU11 4	Integrated	18 … 100	--	--	--	--	--	✓	--	--	--	--
SIRIUS 3RB30 solid-state overload relays[1]													
 3RB30	3RB30 1	Integrated	0.1 … 16	✓	--	--	--	--	--	--	--	--	--
	3RB30 2	Integrated	0.1 … 40	--	✓	--	--	--	--	--	--	--	--
SIRIUS 3RB31 solid-state overload relays[1]													
 3RB31	3RB31 1	Integrated	0.1 … 16	✓	--	--	--	--	--	--	--	--	--
	3RB31 2	Integrated	0.1 … 40	--	✓	--	--	--	--	--	--	--	--
SIRIUS 3RB20 solid-state overload relays[1]													
 3RB20	3RB20 1	Integrated	0.1 … 12	--	--	✓		--	--	--	--	--	--
	3RB20 2	Integrated	0.1 … 25	--	--	--	✓	--	--	--	--	--	--
	3RB20 3	Integrated	6 … 50	--	--	--	--	✓	--	--	--	--	--
	3RB20 4	Integrated	12.5 … 100	--	--	--	--	--	✓	--	--	--	--
	3RB20 5	Integrated	50 … 200	--	--	--	--	--	--	✓	--	--	--
	3RB20 6	Integrated	55 … 630	--	--	--	--	--	--	--	✓	✓	✓
	3RB20 1 + 3UF18	Integrated	630 … 820	--	--	--	--	--	--	--	--	--	✓
SIRIUS 3RB21 solid-state overload relays[1]													
 3RB21	3RB21 1	Integrated	0.1 … 12	--	--	✓		--	--	--	--	--	--
	3RB21 2	Integrated	0.1 … 25	--	--	--	✓	--	--	--	--	--	--
	3RB21 3	Integrated	6 … 50	--	--	--	--	✓	--	--	--	--	--
	3RB21 4	Integrated	12.5 … 100	--	--	--	--	--	✓	--	--	--	--
	3RB21 5	Integrated	50 … 200	--	--	--	--	--	--	✓	--	--	--
	3RB21 6	Integrated	55 … 630	--	--	--	--	--	--	--	✓	✓	✓
	3RB21 1 + 3UF18	Integrated	630 … 820	--	--	--	--	--	--	--	--	--	✓

✓ Can be used

-- Cannot be used

[1] "Technical specifications" for the use of overload relays with trip class ≥ CLASS 20 can be found in "Short-circuit protection with fuses for motor feeders", see Configuration Manuals

- "SIRIUS Configuration – Selection data for Fuseless Load Feeders", http://support.automation.siemens.com/WW/view/en/40625241
- "Configuring SIRIUS Innovations – Selection data for Fuseless and Fused Load Feeders", http://support.automation.siemens.com/WW/view/en/39714188.

Overload relays

General data

Overview of overload relays – matching contactors (continued)

Overload relays	Current measure-ment	Current range	**Contactors** (type, size, rating in kW)									
			3RT20 1.	**3RT20 2.**	**3RT10 1.**	**3RT10 2.**	**3RT10 3.**	**3RT10 4.**	**3RT10 5.**	**3RT10 6.**	**3RT10 7.**	**3TF68/ 3TF69**
			S00	S0	S00	S0	S2	S3	S6	S10	S12	14
Type	Type	A	3/4/5.5/ 7.5	5.5/7.5/11/ 15/18.5	3/4/5.5	5.5/7.5/ 11	15/18.5/ 22	30/37/45	55/75/90	110/132/ 160	200/250	375/450
SIRIUS 3RB22 to 3RB24 solid-state overload relays[1]												
3RB22 83/ 3RB23 83/ 3RB24 83+	3RB29 0	0.3 … 25	✓	✓	✓	✓	--	--	--	--	--	--
	3RB29 0	10 … 100	✓	✓	✓	✓	✓	✓	--	--	--	--
	3RB29 5	20 … 200	--	✓	--	--	✓	✓	✓	--	--	--
	3RB29 6	63 … 630	--	--	--	--	--	--	--	✓	✓	✓
	3RB29 0 + 3UF18	630 … 820	--	--	--	--	--	--	--	--	--	✓

3RB22, 3RB23

3RB24

✓ Can be used

-- Cannot be used

[1] "Technical specifications" for the use of overload relays with trip class ≥ CLASS 20 can be found in "Short-circuit protection with fuses for motor feeders", see Configuration Manuals

- "SIRIUS Configuration – Selection data for Fuseless Load Feeders", http://support.automation.siemens.com/WW/view/en/40625241
- "Configuring SIRIUS Innovations – Selection data for Fuseless and Fused Load Feeders", http://support.automation.siemens.com/WW/view/en/39714188.

Connection methods

Depending on the device version of the 3RU2 and 3RB3 overload relays, the terminals for screw, spring-type or ring terminal lug connection are configured for both the main and auxiliary circuit.

The 3RU11 thermal overload relays come with screw terminals.

The 3RB20 and 3RB21 solid-state overload relays are available with screw terminals (box terminals) or spring-type terminals on the auxiliary current side; the same applies for the evaluation modules of the 3RB22 to 3RB24 solid-state overload relays for High Feature applications.

The 3RB29 current measuring modules are designed as straight-through modules. From size S6 upwards they are also available with an optional busbar connection.