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 • Size S0	A A	up to 16 up to 40	up to 16 up to 40	up to 16 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 up to 34 ... 40	--	--
Electronic overload releases	A A	--	0.1 ... 0.4 up to 10 ... 40	0.1 ... 0.4 up to 10 ... 40
Rating for induction motor at 400 V AC	kW	0.04 ... 18.5	0.04 ... 18.5	0.04 ... 18.5
Pages		7/85, 7/86	7/104, 7/105	7/106

Accessories						
For sizes	S00	S0	S00	S0	S00	S0
Terminal brackets for stand-alone installation	✓	✓	✓	✓	✓	✓
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	✓	✓	✓	✓	✓	✓
Pages	7/87, 7/88		7/107, 7/108		7/107, 7/108	

✓ Has this function or can use this accessory

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

[1] The devices 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.

Introduction





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		S2, S3	S2 ... S12	S2 ... S12	S00 ... S12	
Rated operational current I_e						
• Size S2	A	up to 50	up to 50	up to 50	Up to 100[2]	
• Size S3	A	up to 100	up to 100	up to 100	Up to 100[2]	
• Size S6	A	--	up to 200	up to 200	up to 200	
• Size S10/S12, size 14 (3TF68/3TF69)	A	--	up to 630	up to 630	up to 630	
Rated operational voltage U_e	V	690/1 000 AC[3]	690/1 000 AC[4]	690/1 000 AC[4]	690/1 000 AC[5]	
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	5.5 ... 8 up to	--	--	--	
	A	80 ... 100				
Electronic overload releases	A	--	6 ... 25 up to	6 ... 25 up to	0.3 ... 3 up to	
	A		160 ... 630	160 ... 630	63 ... 630	
Rating for induction motor at 400 V AC	kW	3 to	3 ... 11 up to	3 ... 11 up to	0.09 ... 1.1 up to	
	kW	45	90 ... 450	90 ... 450	37 ... 450	
Pages		7/94 ... 7/96	7/115, 7/116	7/117	7/125, 7/127, 7/136	7/133, 7/136

Accessories																	
For sizes	S2	S3	S2	S3	S6	S10/S12	S2	S3	S6	S10/S12	S00	S0	S2	S3	S6	S10/S12
Terminal brackets for stand-alone installation	✓	✓	6)	6)	6)	6)	6)	6)	6)	6)	6)	6)	6)	6)	6)	6)
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 panels for evaluation modules	--	--	--	--	--	--	--	--	--	--	✓	✓	✓	✓	✓	✓
Pages	7/97, 7/98		7/118, 7/119				7/118, 7/119				7/134 ... 7/138					

✓ Has this function or can use this accessory

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

1) The devices 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) Selection of current measuring modules according to the respective operational current.

3) Size S3 up to 1 000 V AC.

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

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

6) Stand-alone installation without accessories is possible.

General data

Overview






Features	3RU21	3RU11	3RB30/3RB31	3RB20/3RB21	3RB22/3RB23	3RB24	Benefits
General data							
Sizes	S00, S0	S2, S3	S00, S0	S2 ... 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 mounting 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	5.5 ... 100 A	0.1 ... 40 A	6 ... 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 unbalance	✓	✓	✓	✓	✓	✓	• Provides optimum inverse-time delayed protection of loads against excessive temperature rises due to phase unbalance
Tripping due to phase failure	✓	✓	✓	✓	✓	✓	• Minimizes heating of induction motors during phase failure
Protection of single-phase loads	✓	✓	--	--	✓	✓	• Enables the protection of single-phase loads
Tripping in the event of overheating by **integrated thermistor motor protection function**	--[2]	--[2]	--[2]	--[2]	✓	✓	• Provides optimum temperature-dependent protection of loads against excessive temperature rises e.g. for stator-critical motors or in the event of insufficient coolant flow, contamination of the motor surface or for long starting or braking operations • Eliminates the need for additional special equipment • Saves space in the control cabinet • Reduces wiring outlay and costs
Tripping in the event of a ground fault by **internal ground-fault detection (activatable)**	--	--	✓ (only 3RB31)	✓ (only 3RB21)	✓	✓	• 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 special equipment • Saves space in the control cabinet • Reduces wiring outlay and costs

✓ Available
-- Not available

[1] Motor currents up to 820 A can be recorded and evaluated by a current measuring module, e.g. 3RB29 06-2BG1 (0.3 to 3 A), in combination with a 3UF18 68-3GA00 (820 A/1 A) series transformer.
3UF18 transformers see Chapter 10, "Monitoring and Control Devices" → "SIMOCODE 3UF Motor Management and Control Devices".

[2] The SIRIUS 3RN thermistor motor protection devices can be used to provide additional temperature-dependent protection.






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)	• Allows the remote resetting of the device
TEST function for auxiliary contacts	✓	✓	✓	✓	✓	✓	• Allows easy checking of the function and wiring
TEST function for electronics	--	--	✓	✓	✓	✓	• Allows checking of the electronics
Status display	✓	✓	✓	✓	✓	✓	• Displays the current operating state
Large current adjustment button	✓	✓	✓	✓	✓	✓	• Makes it easier to set the relay exactly to the correct current value
Integrated auxiliary contacts (1 NO + 1 NC)	✓	✓	✓	✓	✓ (2 ×)	--	• Allows the load to be switched off if necessary • Can be used to output signals
Integrated auxiliary contacts (1 CO and 1 NO in series)	--	--	--	--	--	✓	• Enables the controlling of contactors directly from the higher-level control system through IO-Link
IO-Link connection	--	--	--	--	--	✓	• Reduction of wiring in the control cabinet • Enables communication
Connection of optional hand-held device	--	--	--	--	--	✓	• Enables local operation
Communication capability through IO-Link							
Full starter functionality through IO-Link	--	--	--	--	--	✓	• Enables in combination with the SIRIUS 3RT contactors the assembly of communication-capable motor starters (direct-on-line, reversing and wye-delta starting)
Reading out of diagnostics functions	--	--	--	--	--	✓	• Enables the reading out of diagnostics information such as overload, open circuit, ground fault, etc.
Reading out of current values	--	--	--	--	--	✓	• Enables the reading out of current values and their direct processing in the higher-level control system
Reading out all set parameters	--	--	--	--	--	✓	• Enables the reading 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 outlay and costs • Enables stand-alone installation as well as space-saving direct mounting
Straight-through transformers for main circuit[2] (in this case the cables are routed through the feed-through openings of the overload relay and connected directly to the box terminals of the contactor)	--	--	--	✓ (S2 ... S6)	✓ (S00 ... S6)	✓ (S00 ... S6)	• Reduces the contact resistance (only one point of contact) • Saves wiring costs (easy, no need for tools, and fast) • Saves 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 method for main and auxiliary circuits[2]	✓	--	--	--	--	--	• Enables fast connections • Permits vibration-resistant connections • Enables maintenance-free connections
Full starter functionality through IO-Link	--	--	--	--	--	✓	• Enables in combination with the SIRIUS 3RT contactors the assembly of communication-capable motor starters (direct-on-line, reversing and wye-delta starting)
Starter function	--	--	--	--	--	✓	• Integration of feeders via IO-Link in the control system up to 630 A or 820 A

✓ Available
-- Not available

[1] Exception: up to size S3, only stand-alone installation is possible.
[2] Alternatively available for screw terminals.






Features	3RU21	3RU11	3RB30/3RB31	3RB20/3RB21	3RB22/3RB23	3RB24	Benefits
Other features							
Temperature compensation	✓	✓	✓	✓	✓	✓	• Allows the use of the relays at high temperatures without derating • Prevents premature tripping • Allows compact installation of the control cabinet without distance between the devices/load feeders • Simplifies configuration • Enables space to be saved in the control cabinet
Very high long-term stability	✓	✓	✓	✓	✓	✓	• Provides safe protection for the loads even after years of use in 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 adjustable on the device CLASS 5, 10, 20, 30	--	--	3RB31: ✓	3RB21: ✓	✓	✓	• Enables solutions for very fast starting motors requiring special protection (e.g. Ex motors) • Enables heavy starting solutions • Reduces the number of versions • Minimizes the configuring outlay and costs • Minimizes storage overhead, storage costs, and tied-up capital
Low power loss	--	--	✓	✓	✓	✓	• Reduces energy consumption and energy costs (up 98 % less energy is used than for thermal overload relays). • Minimizes temperature rises of the contactor and control cabinet – in some cases this may eliminate the need for control-gear cabinet cooling. • Direct mounting to contactor saves space, even for high motor currents (i.e. no heat decoupling is required).
Internal power supply	--[1)]	--[1)]	✓	✓	--	--	• Eliminates the need for configuration and connecting an additional control circuit
Supplied from an external voltage through IO-Link	--	--	--	--	--	✓	• Eliminates the need for configuration and connecting an additional control circuit

✓ Available

-- Not available

[1)] SIRIUS 3RU11 and 3RU21 thermal overload relays use a bimetal contactor and therefore do not require a control supply voltage.

General data






Features	3RU21	3RU11	3RB30/3RB31	3RB20/3RB21	3RB22/3RB23	3RB24	Benefits
Further characteristics (continued)							
Overload warning	--	--	--	--	✓	✓	• Indicates imminent tripping of the relay directly on the device due to overload, phase unbalance or phase failure through flickering of the LEDs or in the case of the 3RB24 as a signal through IO-Link • Allows the imminent tripping of the relay to be signaled • Allows measures to be taken in time in the event of inverse-time delayed overloading of the load for an extended period over the current limit • Eliminates the need for an additional device • Saves space in the control cabinet • Reduces wiring outlay and costs
Analog output	--	--	--	--	✓	✓	• Allows 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 outlay 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 3.**	**3RT10 4.**	**3RT10 5.**	**3RT10 6.**	**3RT10 7**	**3TF68/3TF69**
				S00	S0	S2	S3	S6	S10	S12	Size 14
	Type	Type	A	3/4/5.5/7.5	5.5/7.5/11/15/18.5	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 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 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 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 use of the overload relays with trip class ≥ CLASS 20 can be found in "Short-circuit protection with fuses for motor feeders",
see "System Manual for Industrial Controls – SIRIUS Innovations", order information under "Accessories" on page 7/88;
and in the configuration manuals

- "Configuring SIRIUS – Selection Data for Load Feeders in Fuseless Designs",
  Order No. 3ZX1012-0RA21-0AB0,
- "Configuring SIRIUS Innovations – Selection Data for Load Feeders in Fuseless and Fused Designs", Order No. 3ZX1012-0RA21-1AB0.

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 3**	**3RT10 4**	**3RT10 5**	**3RT10 6**	**3RT10 7**	**3TF68/3TF69**
			S00	S0	S2	S3	S6	S10	S12	Size 14
Type	Type	A	3/4/5.5/7.5	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 use of the overload relays with trip class ≥ CLASS 20 can be found in "Short-circuit protection with fuses for motor feeders",
see "System Manual for Industrial Controls – SIRIUS Innovations", order information under "Accessories" on page 7/88;
and in the configuration manuals
- "Configuring SIRIUS – Selection Data for Load Feeders in Fuseless Designs",
  Order No. 3ZX1012-0RA21-0AB0,
- "Configuring SIRIUS Innovations – Selection Data for Load Feeders in Fuseless and Fused Designs", Order No. 3ZX1012-0RA21-1AB0.

Connection methods

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

The 3RU11 thermal overload relays come with screw terminals.

The electronic overload relays 3RB20 and 3RB21 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 electronic overload relays for High-Feature applications.

Screw terminals

Spring-type terminals

Ring terminal lug connections

The terminals are indicated in the corresponding tables by the symbols shown on orange backgrounds.