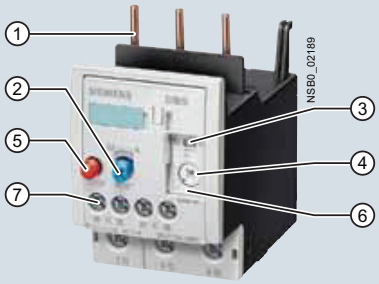
SIRIUS 3RU1 Thermal Overload Relays

3RU11 up to 100 A for standard applications

Overview



(1) Connection for mounting onto contactors:
Optimally adapted in electrical, mechanical and design terms to the contactors. These connecting pins can be used for direct mounting of the overload relay to the contactor. Stand-alone installation is possible as an alternative (partly in conjunction with a terminal bracket for stand-alone installation).

(2) Selector switch for manual/automatic RESET and RESET button:
With this switch you can choose between manual and automatic RESET. A device set to manual RESET can be reset locally by pressing the RESET button. A remote RESET is possible using the RESET modules (accessories), which are independent of size.

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

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

(5) STOP button:
If the STOP button is pressed, the NC contact is opened. This switches off the contactor downstream. The NC contact is closed again when the button is released.

(6) Transparent, sealable cover:
Secures the motor current setting and the TEST function against adjustment.

(7) Supply terminals:
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.

SIRIUS 3RU11 36-1HB0 thermal overload relay

Optimally adapted in electrical, mechanical and design terms to the contactors. The overload relay can be mounted onto a contactor using these pins. Stand-alone installation is possible as an alternative (in some cases in conjunction with a stand-alone installation module).

The 3RU11 thermal overload relays up to 100 A have been designed for inverse-time delayed protection of loads with normal starting against excessive temperature rises due to overload or phase failure.

An overload or phase failure results in an increase of the motor current beyond the set rated motor current. Via heating elements, this current rise heats up the bimetal strips inside the device which then bend and as a result trigger the auxiliary contacts by means of a tripping mechanism. 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_e and is stored in the form of a long-term stable tripping characteristic.

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.

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 3RU11 thermal 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");

EC prototype test certificate for Category (2) G/D exists. It has the number DMT 98 ATEX G 001.

Order No. scheme

Digit of the Order No.	1st - 3rd	4th	5th	6th	7th		8th	9th	10th	11th
	□□□	□	□	□	□	–	□	□	□	□
Thermal overload relays	3 R U									
SIRIUS 1st generation		1								
Device series			□							
Size, rated operational current and power				□	□					
Setting range of the overload release							□	□		
Connection methods									□	
Installation type										□
Example	3 R U	1	1	3	6	–	1	H	B	0

Note:

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

For your orders, please use the order numbers quote in the catalog in the Selection and ordering data.

Application

Industries

The 3RU11 thermal 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 starting conditions (CLASS 10).

Application

The 3RU11 thermal overload relays have been designed for the protection of three-phase and single-phase AC and DC motors.

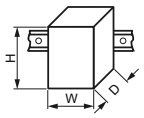
If single-phase AC or DC loads are to be protected by the 3RU11 thermal overload relays, all three bimetal strips must be heated. For this purpose, all main current paths of the relay must be connected in series.

Ambient conditions

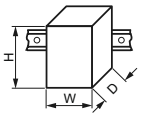
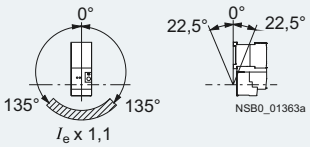
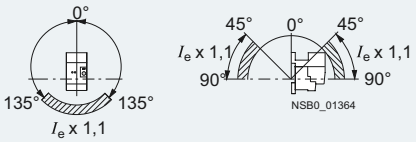
The 3RU11 thermal overload relays have temperature compensation in accordance with IEC 60947-4-1 for the temperature range of –20 to +60 °C. For temperatures from +60 to +80 °C the upper set value of the setting range must be reduced by the factor listed in the table below.

Ambient temperature in °C	Derating factor for the upper set value
+60	1.0
+65	0.94
+70	0.87
+75	0.81
+80	0.73

Technical specifications

Type			**3RU11 36**	**3RU11 46**
Size			S2	S3
Dimensions (W x H x D) (overload relay with stand-alone installation support)		mm	55 x 105 x 118	70 x 120 x 140
General data				
Trips in the event of			Overload and phase failure	
Trip class acc. to IEC 60947-4-1		CLASS	10	
Phase failure sensitivity			Yes	
Overload warning			No	
Reset and recovery				
• Reset options after tripping			Manual, Automatic and Remote RESET (Remote RESET in combination with the corresponding accessories)	
• Recovery time				
- For automatic RESET		min	Depends on the strength of the tripping current and characteristic	
- For manual RESET		min	Depends on the strength of the tripping current and characteristic	
- For remote RESET		min	Depends on the strength of the tripping current and characteristic	
Features				
• Display of operating state on device			Yes, by means of TEST function/switch position indicator slide	
• TEST function			Yes	
• RESET button			Yes	
• STOP button			Yes	
Safe operation of motors with "increased safety" type of protection EC type test certificate number acc. to directive 94/9/EC (ATEX)			DMT 98 ATEX G 001 Ex II (2) GD, DMT 98 ATEX G 001 N1	
Ambient temperature				
• Storage/transport		°C	-55 ... +80	
• Operation		°C	-20 ... +70	
• Temperature compensation		°C	Up to 60	
• Permissible rated current at				
- Temperature inside control cabinet 60 °C		%	100 (over +60 °C current reduction is not required)	
- Temperature inside control cabinet 70 °C		%	87	
Repeat terminals				
• Coil repeat terminals			Not required	
• Auxiliary contact repeat terminal			Not required	
Degree of protection acc. to IEC 60529			IP20 (terminal compartment: IP00 degree of protection)	
Touch protection acc. to IEC 61140			Finger-safe	
Shock resistance with sine acc. to IEC 60068-2-27		*g*/ms	8/10	

3RU11 up to 100 A for standard applications

Type			**3RU11 36**	**3RU11 46**
Size			S2	S3
Dimensions (W x H x D) (overload relay with stand-alone installation support)		mm	55 x 105 x 118	70 x 120 x 140
General data (continued)				
Electromagnetic compatibility (EMC) – Interference immunity				
• Conductor-related interference				
- Burst acc. to IEC 61000-4-4 (corresponds to degree of severity 3)		kV	EMC interference immunity is not relevant for thermal overload relays	
- Surge acc. to IEC 61000-4-5 (corresponds to degree of severity 3)		kV	EMC interference immunity is not relevant for thermal overload relays	
• Electrostatic discharge acc. to IEC 61000-4-2 (corresponds to degree of severity 3)		kV	EMC interference immunity is not relevant for thermal overload relays	
• Field-related interference acc. to IEC 61000-4-3 (corresponds to degree of severity 3)		V/m	EMC interference immunity is not relevant for thermal overload relays	
Electromagnetic compatibility (EMC) – Emitted interference			EMC interference immunity is not relevant for thermal overload relays	
Resistance to extreme climates – air humidity		%	100	
Dimensions			See "Dimensional drawings"	
Installation altitude above sea level		m	Up to 2000; above this, please enquire	
Mounting position			The diagrams show the permissible mounting positions for mounting onto contactors and stand-alone installation. For installation in the hatched area, a setting correction of 10 % must be implemented. Stand-alone installation:  Contactor + overload relay: 	
Type of mounting			Direct mounting/stand-alone installation with terminal bracket (For screw and snap-on mounting on TH 35 standard mounting rail; size S3 also for TH 75 standard mounting rail).	

Type		3RU11 36	3RU11 46
Size		S2	S3
Main circuit			
Rated insulation voltage U_i (pollution degree 3)	V	690	1000
Rated impulse withstand voltage U_{imp}	kV	6	8
Rated operational voltage U_e	V	690	1000
Type of current			
• Direct current		Yes	
• Alternating current		Yes, frequency range up to 400 Hz	
Current setting	A	5.5 ... 8 to 40 ... 50	18 ... 25 to 80 ... 100
Power loss per unit (max.)	W	6 ... 9	10 ... 16.5
Short-circuit protection			
• With fuse without contactor		See "Selection and ordering data"	
• With fuse and contactor		See "Technical specifications" --> "Short-circuit protection with fuses/ motor starter protectors for motor feeders"	
Protective separation between main and auxiliary conducting path acc. to IEC 60947-1	V	690	
Conductor cross-section of the main circuit			
Connection type		**Screw terminals with box terminal**	
Terminal screw		M6, Pozidriv size 2	M8, 4 mm Allen screw
Operating devices	mm	ø 5 ... 6	4 mm Allen screw
Prescribed tightening torque	Nm	3 ... 4.5	4 ... 6
Conductor cross-sections (min./max.), 1 or 2 conductors can be connected			
• Solid	mm^2	2 x (0.75 ... 16)	2 x (2.5 ... 16)
• Finely stranded with end sleeve	mm^2	2 x (0.75 ... 16), 1 x (0.75 ... 25)	2 x (2.5 ... 35), 1 x (2.5 ... 50)
• Stranded	mm^2	2 x (0.75 ... 25), 1 x (0.75 ... 35)	2 x (10 ... 50), 1 x (10 ... 70)
• AWG cables, solid or stranded	AWG	2 x (18 ... 3), 1 x (18 ... 1)	2 x (10 ... 1/0), 1 x (10 ... 2/0)
• Ribbon cable conductors (number x width x thickness)	mm	2 x (6 x 9 x 0.8)	2 x (6 x 9 x 0.8)
Connection type		**Busbar connection**[1)]	
Terminal screw		--	M6 x 20
Prescribed tightening torque	Nm	--	4 ... 6
Conductor cross-sections (min./max.)			
• Finely stranded with cable lug	mm^2	--	2 x 70
• Stranded with cable lug	mm^2	--	3 x 70
• AWG cables, solid or stranded, with cable lug	AWG	--	2/0
• With connecting bar (max. width)	mm	--	12

1) The box terminal is removable. Rail and cable lug connections are possible if the box terminal is removed.

3RU11 up to 100 A for standard applications

Type		3RU11 36	3RU11 46
Size		S2	S3
Auxiliary circuit			
Number of NO contacts		1	
Number of NC contacts		1	
Auxiliary contacts – assignment		1 NO for the signal "tripped"; 1 NC for disconnecting the contactor	
Rated insulation voltage U_i (pollution degree 3)	V	690	
Rated impulse withstand voltage U_{imp}	kV	6	
Contact rating of the auxiliary contacts			
• 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	
- 230 V	A	3	
- 400 V	A	2	
- 600 V	A	0.6	
- 690 V	A	0.5	
• NO contact with alternating current AC-14/AC-15, rated operational current I_e at U_e:			
- 24 V	A	3	
- 120 V	A	3	
- 125 V	A	3	
- 230 V	A	2	
- 400 V	A	1	
- 600 V	A	0.6	
- 690 V	A	0.5	
• NC contact, NO contact with direct current DC-13, rated operational current I_e at U_e:			
- 24 V	A	1	
- 60 V	A	On request	
- 110 V	A	0.22	
- 125 V	A	0.22	
- 220 V	A	0.11	
• Conventional thermal current I_{th}	A	6 (up to $I_k \leq 0.5$ kA; ≤ 260 V)	
• Contact reliability (suitability for PLC control; 17 V, 5 mA)		Yes	
Short-circuit protection			
• With fuse			
- Operational class gG	A	6	
- Quick	A	10	
• With miniature circuit breaker (C characteristic)	A	6	
Protective separation between auxiliary conducting paths acc. to IEC 60947-1	V	415	
CSA, UL, UR rated data			
Auxiliary circuit – switching capacity		B600, R300	
Conductor cross-sections of the auxiliary circuit			
Connection type		**Screw terminals**	
Terminal screw		M3, Pozidriv size 2	
Operating devices	mm	ø 5 ... 6	
Prescribed tightening torque	Nm	0.8 ... 1.2	
Conductor cross-sections (min./max.), 1 or 2 conductors can be connected			
• Solid	mm^2	2 x (0.5 ... 1.5)[1], 2 x (0.75 ... 2.5)[1]	
• Finely stranded without end sleeve	mm^2	--	
• Finely stranded with end sleeve	mm^2	2 x (0.5 ... 1.5)[1], 2 x (0.75 ... 2.5)[1]	
• Stranded	mm^2	2 x (0.5 ... 1.5)[1], 2 x (0.75 ... 2.5)[1]	
• AWG cables, solid or stranded	AWG	2 x (18 ... 14)	

1) If two different conductor cross-sections are connected to one clamping point, both cross-sections must lie in the range specified. If identical crosssections are used, this restriction does not apply.

Selection and ordering data

3RU11 thermal overload relays with screw terminals on the auxiliary current side for mounting onto contactor[1], CLASS 10

Features and technical specifications:

- Overload and phase failure protection
- Auxiliary contacts 1 NO + 1 NC
- Manual and automatic RESET
- Switch position indicator
- TEST function
- STOP button
- Integrated, sealable cover

	Size of contactor[2]	Rating for induction motor rated value[3]	Current setting of the inverse-time delayed overload release	Short-circuit protection with fuse, type of coordination "2", operational class gG[4]	**Screw terminals** (on auxiliary current side)
					Order No.
		kW	A	A	
Size S2					
 3RU11 36-..B0	S2	3	5.5 ... 8	25	**3RU11 36-1HB0**
		4	7 ... 10	35	**3RU11 36-1JB0**
		5.5	9 ... 12.5	35	**3RU11 36-1KB0**
		7.5	11 ... 16	40	**3RU11 36-4AB0**
		7.5	14 ... 20	50	**3RU11 36-4BB0**
		11	18 ... 25	63	**3RU11 36-4DB0**
		15	22 ... 32	80	**3RU11 36-4EB0**
		18.5	28 ... 40	80	**3RU11 36-4FB0**
		22	36 ... 45	100	**3RU11 36-4GB0**
		22	40 ... 50	100	**3RU11 36-4HB0**
Size S3					
 3RU11 46-..B0	S3	11	18 ... 25	63	**3RU11 46-4DB0**
		15	22 ... 32	80	**3RU11 46-4EB0**
		18.5	28 ... 40	80	**3RU11 46-4FB0**
		22	36 ... 50	125	**3RU11 46-4HB0**
		30	45 ... 63	125	**3RU11 46-4JB0**
		37	57 ... 75	160	**3RU11 46-4KB0**
		45	70 ... 90	160	**3RU11 46-4LB0**
		45	80 ... 100[5]	200	**3RU11 46-4MB0**

1) With the suitable terminal brackets (see "Accessories"), the 3RU11 overload relays for mounting onto contactor can also be installed as stand-alone units.

2) Observe maximum rated operational current of the devices.

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

4) Maximum protection by fuse for overload relay, type of coordination "2".

5) For overload relays > 100 A see 3RB2 solid-state overload relays starting on page 4/___.

SIRIUS 3RU1 Thermal Overload Relays

3RU11 up to 100 A for standard applications

3RU11 thermal overload relays with screw terminals on the auxiliary current side for stand-alone installation[1], CLASS 10

Features and technical specifications:

- Overload and phase failure protection
- Auxiliary contacts 1 NO + 1 NC
- Manual and automatic RESET
- Switch position indicator
- TEST function
- STOP button
- Integrated, sealable cover

	Size of contactor[2]	Rating for induction motor rated value[3]	Current setting of the inverse-time delayed overload release	Short-circuit protection with fuse, type of coordination "2", operational class gG[4]	**Screw terminals** (on auxiliary current side)
					Order No.
		kW	A	A	
Size S2					
 3RU11 36-4EB1	S2	15 18.5 22 22	22 ... 32 28 ... 40 36 ... 45 40 ... 50	80 80 100 100	**3RU11 36-4EB1** **3RU11 36-4FB1** **3RU11 36-4GB1** **3RU11 36-4HB1**
Size S3					
 3RU11 46-4JB1	S3	30 37 45 45	45 ... 63 57 ... 75 70 ... 90 80 ... 100[5]	125 160 160 200	**3RU11 46-4JB1** **3RU11 46-4KB1** **3RU11 46-4LB1** **3RU11 46-4MB1**

1) Sizes S2 and S3 for screw and snap-on mounting onto TH 35 standard mounting rails, size S3 also for TH 75 standard mounting rails.

2) Observe maximum rated operational current of the devices.

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

4) Maximum protection by fuse for overload relay, type of coordination "2".

5) For overload relays > 100 A see 3RB2 solid-state overload relays starting on page 4/___.

Overview

Overload relays for standard applications

The following optional accessories are available for the 3RU11 thermal overload relays:

- Terminal bracket for stand-alone installation of overload relay sizes S2 and S3
- Mechanical RESET (for all sizes)
- Cable release for resetting devices which are difficult to access (for all sizes)
- Electrical remote RESET module in three voltage variants (for all sizes)
- Terminal covers

Technical specifications

Terminal brackets for stand-alone installation

Type		3RU19 36-3AA01	3RU19 46-3AA01
For overload relays		**3RU11 36**	**3RU11 46**
Mounting type		For screw and snap-on mounting onto TH 35 standard mounting rails, size S2 also for TH 75 standard mounting rails	
Connection for main circuit			
Connection type		**Screw terminals with box terminal**	
Terminal screw		M6, Pozidriv size 2	4 mm Allen screw
Operating devices	mm	ø 5 ... 6	4 mm Allen screw
Prescribed tightening torque	Nm	3 ... 4.5	4 ... 6
Conductor cross-sections (min./max.), 1 or 2 conductors can be connected			
• Solid	mm^2	2 x (0.75 ... 16)	2 x (2.5 ... 16)
• Finely stranded without end sleeve	mm^2	--	--
• Finely stranded with end sleeve	mm^2	2 x (0.75 ... 16), 1 x (0.75 ... 25)	2 x (2.5 ... 35), 1 x (2.5 ... 50)
• Stranded	mm^2	2 x (0.75 ... 25), 1 x (0.75 ... 35)	2 x (10 ... 50), 1 x (10 ... 70)
• AWG cables, solid or stranded	AWG	2 x (18 ... 3), 1 x (18 ... 1)	2 x (10 ... 1/0), 1 x (10 ... 2/0)
• Ribbon cable conductors (number x width x thickness)	mm	2 x (6 x 9 x 0.8)	2 x (6 x 9 x 0.8)

Selection and ordering data

	Version	Size	Order No.
Terminal brackets for stand-alone installation			
 3RU19 .6-3AA01	For separate mounting of overload relays; screw and snap-on mounting onto TH 35 standard mounting rail; size S3 also for TH 75 standard mounting rail	S2 S3	**3RU19 36-3AA01** **3RU19 46-3AA01**
Mechanical RESET			
 3RU19 00-1A with pushbutton and extension plunger	**Resetting plungers, holders and formers**	S2, S3	**3RU19 00-1A**
	Pushbuttons with extended stroke (12 mm), IP65, ø 22 mm	S2, S3	**3SB30 00-0EA11**
	Extension plungers For compensation of the distance between the pushbutton and the unlatching button of the relay	S2, S3	**3SX1 335**

Accessories

	Version	Size	Order No.
Cable releases with holder for RESET			
 3RU19 00-1.	For ø 6.5 mm holes in the control panel; max. control panel thickness 8 mm	S2, S3	
	• Length 400 mm		**3RU19 00-1B**
	• Length 600 mm		**3RU19 00-1C**
Modules for remote RESET, electrical			
 3RU19 00-2A.71	Operating range 0.85 ... 1.1 × U_s, power consumption AC 80 VA, DC 70 W, ON period 0.2 ... 4 s, switching frequency 60/h		
	• 24 ... 30 V AC/DC	S2, S3	**3RU19 00-2AB71**
	• 110 ... 127 V AC/DC	S2, S3	**3RU19 00-2AF71**
	• 220 ... 250 V AC/DC	S2, S3	**3RU19 00-2AM71**
Terminal covers			
	Covers for cable lugs and busbar connections		
	• Length 55 mm	S3	**3RT19 46-4EA1**
	Covers for box terminals		
	• Length 20.6 mm	S2	**3RT19 36-4EA2**
	• Length 20.8 mm	S3	**3RT19 46-4EA2**