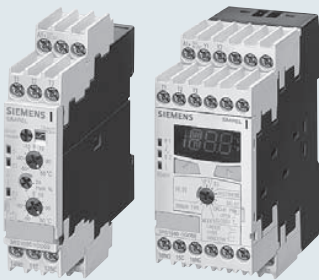


contents

Section Overview	11/2 - 11/3	Level monitoring	
Temperature Monitoring Relays		Level monitoring relays	11/76
Overview	11/4	Level monitoring sensors	11/79
Selection, 3RS10-11, 3RS20-21		Speed monitoring	11/80
Analog with One Threshold Value	11/5	Accessories	11/83
Analog with Two Threshold Values	11/5	Monitoring Relays For Stand-alone Installation for IO-Link	
Digital with Two Threshold Values	11/6	General data	11/84
Technical Data	11/7	Line monitoring	11/87
Configuration	11/8	Voltage monitoring	11/90
Functions	11/9	Current monitoring	11/93
Circuit Diagrams	11/10	Power factor and active current monitoring	11/96
Dimensions	11/11	Residual-current monitoring	
Thermistor Motor Protection		Residual-current monitoring relays	11/100
Overview	11/12	Speed monitoring	11/103
Benefits and Application	11/13	Accessories	11/106
Technical Specifications	11/14 - 11/15	Coupling Relays and Interfaces	
Function Diagrams	11/16	3RQ3 Overview	11/107
Technical Data	11/17 - 11/18	Benefits	11/108
3RN2 Selection and Ordering Data	11/19	Technical Data	11/109 - 11/110
Accessories	11/20	Circuit Diagrams	11/111
Timing Relays		Selection and Ordering	11/112 - 11/114
General Data	11/21	Accessories	11/115
3RP25 Timing Relays, 17.5 mm and 22.5 mm		Wide Input Interface Relay	
Overview	11/22 - 11/23	Overview	11/116
Technical Data	11/25	Selection, 3RS18	11/116
Circuit Diagrams	11/26 - 11/30	Dimensions	11/116
Functions	11/31 - 11/36	Interface Converters	
Selection and Ordering Data	11/37	3RS70 Overview	11/117
Accessories	11/38	Technical Data	11/118 - 11/120
3RP20 Timing Relays, 45mm		Circuit Diagrams	11/121
Overview	11/39	Selection and Ordering	11/122
Technical Data	11/40	Accessories	11/123
Functions	11/41 - 11/42	Power Relays	
Selection and Ordering Data	11/43	Overview	11/125
Accessories	11/44	Selection, 3TG10	11/125
7PV15 Timing Relays, 17.5mm		Technical Data	11/126 - 11/127
Overview	11/45	Accessories	11/128
Technical Data	11/46	Circuit Diagrams	11/128
Circuit Diagrams	11/46 - 11/47	Dimensions	11/128
Functions	11/48 - 11/49	Plug-in Relays	
Selection and Ordering Data	11/50	Selection, 3TX71	11/129 - 11/132
Monitoring Relays for Stand-alone Installation		Technical Data	11/133 - 11/134
General data	11/51	Overview	11/135
Line monitoring	11/53	Circuit Diagrams	11/136 - 11/138
Voltage monitoring	11/58	Dimensions	11/139 - 11/145
Current monitoring	11/61		
Power factor and active current monitoring	11/63		
Residual-current monitoring			
Residual-current monitoring relays	11/66		
3UL23 residual-current transformers	11/68		
Insulation monitoring			
General data	11/69		
For ungrounded AC networks	11/71		
For ungrounded DC and AC networks	11/73		

contents

3RS10/3RS11 temperature
monitoring relays3RS10/3RS20 temperature
monitoring relay
for RTD or Thermocouple

Page

Selection and ordering data

- Overview 11/4
- Screw and Spring-type connection 11/5

Technical data	11/7
Configuration	11/8
Functions	11/9
Circuit diagrams	11/10
Dimension drawings	11/11

3RN2 thermistor
motor protection3RN20 thermistor motor protection
for PTC temperature detectors

Page

Selection and ordering data

- Overview 11/12
- Screw and Spring-type connection 11/13
- Accessories 11/14

Technical data	11/14
Function diagrams	11/15
Functions	11/16
Circuit diagrams	11/17
Dimension drawings	11/19

3RP20 timing

3RP20 timing
relays

Page

Selection and ordering data

- Overview 11/39
- Screw and Spring-type connection 11/43

Technical data	11/40
Function diagrams	11/41

Timing Relays

3RP25 timing
relays

Page

Selection and ordering data

- Overview 11/22
- Screw and Spring-type connection 11/37

Technical data	11/25
Circuit diagrams	11/26
Function diagrams	11/31

7PV solid-state
relay

Page

Selection and ordering data

- Screw connection 11/26
- Accessories 11/26

Technical data	11/26
Dimension drawings	11/26

3RT19 time delay blocks for
mounting on contactors

Selection and ordering data

- See Section 2

contents

3UG3/4 monitoring relays



For electrical quantities

Selection and ordering data

- Selection Data 11/52

Overview	11/51
Technical data	11/53
Dimension drawings	11/54



For non-electrical quantities

Selection and ordering data

- Selection Data 11/78

Overview	11/78
Technical data	11/80
Dimension drawings	11/81

Coupling relays and interfaces



3RQ3 coupling relays slim design

Selection and ordering data

- Selection Data 11/112

Overview	11/107
Technical data	11/109
Accessories	11/115

Coupling relays and interfaces



3RS70 signal converter

Selection and ordering data

- Screw and Spring-type connection 11/122

Overview	11/117
Technical data	11/118
Circuit diagrams	11/121

3TG10 power relay,
20A max. resistance load pole

Selection and ordering data

- AC and DC operation, hum-free With screw connection or tab connector 11/125
- Accessories 11/128

Application	11/125
Technical data	11/126
Circuit diagrams	11/128
Position of terminals	11/128
Dimension drawings	11/128

3TX71 general purpose
plug-in relays

Selection and ordering data

- AC and DC operation 11/129

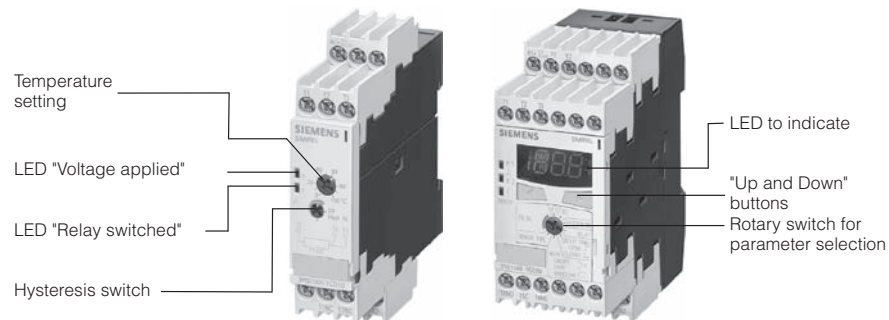
Technical data	11/133
Contact arrangements	11/135
Circuit diagrams	11/136
Dimension drawings	11/139

Temperature Monitoring Relays

3RS10/3RS11

Overview

The 3RS1/3RS2 SIMIREL temperature monitoring relays can be used for measuring temperatures in solid, liquid and gaseous media. The temperature is acquired by the sensor in the medium, evaluated by the device and monitored for overshoot, undershoot or within a range (window function). The family consists of analog adjustable devices with one or two threshold values and digital devices that represent an excellent alternative to thermostats in the low-end performance range. The output relay picks up and releases at the threshold values in accordance with the parameter settings.



Analog evaluation units

- Sensor types: PT100/Type J/Type K
- Measuring principle for 2- and 3-wire sensors
- Electrical isolation between sensor and supply voltage (with the exception of AC/DC 24 V devices)
- Separate designs for overshoot and undershoot
- Measuring range depending on the version for:
 - 50 °C to +50 °C,
 - 0 °C to 100 °C,
 - 0 °C to 200 °C,
 - 0 °C to 600 °C or
 - 500 °C to 1000 °C
- Potentiometer for adjustable limit temperature and hysteresis of 2 to 20 %
- Closed-circuit principle
- Narrow 22.5 mm enclosure with 12 terminals

With one threshold value

- Supply voltage for AC/DC 24 V or AC 110/230 V
- Indication of supply voltage and relay status via LEDs
- One NO and one NC contact

With two threshold values

- Additional potentiometer for $\Delta 2$ (hysteresis for second limit value is 5 % of the measuring range)
- Supply voltage for AC/DC 24 V or 24 to 240 V
- LED indication of supply voltage and both relay states
- Open-circuit/closed-circuit principle switchover
- One NO and one CO contact

Digital evaluation units

- High-end evaluation unit for 1 or 1-3 sensor circuits
- Multifunctional digital display and three LEDs (for threshold values and Ready)
- Adjustable sensor types
- Adjustable overshoot, undershoot or window function
- Switchable open-circuit or closed-circuit principle
- Hysteresis for both threshold values (1 to 99 K)
- Memory function can be selected by means of an external control signal (Y1/Y2)
- One NO and two SPDT contacts
- Adjustable time delay from 0 to 999 s
- Wire-break and short-circuit detection with separate signaling contact (1 NO)
- Non-volatile storage of the set parameters
- 45 mm housing with 24 supply terminals
- Measuring principle for 2- and 3-wire sensors
- Electrical isolation (with the exception of AC/DC 24 V devices)
- In the 3-sensor design, the status of the individual sensors is indicated on limit value overshoot/undershoot

It clearly displays which of the connected sensors has overshoot or undershoot one or both threshold values.

Advantages

- All devices are with Cage Clamp terminals
- All devices with the exception of AC/DC 24 V devices are electrically isolated
- Variants for the evaluation of 1 to 3 sensors in one unit, e.g. for multiple monitoring in a plant or for motor protection
- Easy operation without complex menu systems
- Graduated product range; the right device for every application
- High-end evaluation units with digital display – can be used for a wide temperature range and for different sensor types
- Adjustable hysteresis
- Rapid fault diagnosis due to short-circuit monitoring and sensor wire-break detection
- Power packs with wide range of input voltage reduce the number of variants
- Easy configuration for either two-point or three-point closed-loop control

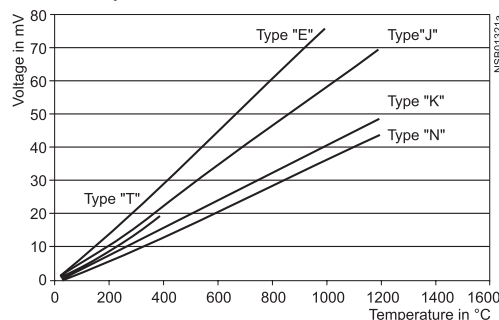
Application

The 3RS1/3RS2 SIMIREL temperature monitoring relays can be used in almost any application in which limit temperatures must not be overshoot or undershoot, e.g.:

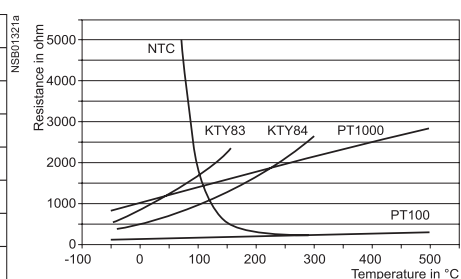
- Monitoring of set limit temperatures and output of alarm messages for:
 - Motor and plant protection
 - Switchgear cabinet temperature monitoring
 - Frost monitoring
 - Temperature limits for process variables, e.g. in the packaging industry or galvanising equipment
 - Control of plants and machines such as heating, air-conditioning and ventilation systems, solar collectors, heat pumps or warm water supplies
 - Monitoring of servo motors with KTY sensors
 - Bearing and gearbox oil-level monitoring
 - Monitoring of cooling liquids

Characteristics for thermocouples and resistance sensors

Thermocouples



Resistance sensors



Temperature Monitoring Relays

3RS10/3RS11

3RS10/3RS11 Temperature monitoring relays					
Sensor	Function	Measuring range	Rated control supply voltage V_s 50–60 Hz AC	Order No.	List Price \$
Analog setting, 1 threshold value, 22.5 mm wide; analog closed-circuit principle, no holding on supply failure function; 1 NO + 1 NC					
PT100 (resistance sensor)	Overrange	–50...+50 °C	24 V AC/DC	3RS10 00-□CD00	
			110/230 V AC	3RS10 00-□CK00	
		0...+100 °C	24 V AC/DC	3RS10 00-□CD10	
			110/230 V AC	3RS10 00-□CK10	
	Underrange	0...+200 °C	24 V AC/DC	3RS10 00-□CD20	
			110/230 V AC	3RS10 00-□CK20	
		–50...+50 °C	24 V AC/DC	3RS10 10-1CD00	
			110/230 V AC	3RS10 10-1CK00	
Typ J (thermocouple)	Overrange	0...+100 °C	24 V AC/DC	3RS10 10-1CD10	
			110/230 V AC	3RS10 10-1CK10	
		0...+200 °C	24 V AC/DC	3RS10 10-1CD20	
			110/230 V AC	3RS10 10-1CK20	
Typ K (thermocouple)	Overrange	0...+200 °C	24 V AC/DC	3RS11 00-□CD20	
			110/230 V AC	3RS11 00-1CK20	
		0...+600 °C	24 V AC/DC	3RS11 00-1CD30	
			110/230 V AC	3RS11 00-1CK30	
		0...+200 °C	24 V AC/DC	3RS11 01-□CD20	
			110/230 V AC	3RS11 01-1CK20	
		0...+600 °C	24 V AC/DC	3RS11 01-1CD30	
			110/230 V AC	3RS11 01-1CK30	
Typ J (thermocouple)	Overrange	+500...+1000 °C	24 V AC/DC	3RS11 01-1CD40	
			110/230 V AC	3RS11 01-1CK40	
		–50...+50 °C	24 V AC/DC	3RS10 20-1DD00	
			24–240 V AC/DC	3RS10 20-1DW00	
		0...+100 °C	24 V AC/DC	3RS10 20-1DD10	
			24–240 V AC/DC	3RS10 20-1DW10	
		0...+200 °C	24 V AC/DC	3RS10 20-1DD20	
			24–240 V AC/DC	3RS10 20-□DW20	
Typ K (thermocouple)	Overrange	–50...+50 °C	24 V AC/DC	3RS10 30-1DD00	
			24–240 V AC/DC	3RS10 30-1DW00	
		0...+100 °C	24 V AC/DC	3RS10 30-1DD10	
			24–240 V AC/DC	3RS10 30-1DW10	
		0...+200 °C	24 V AC/DC	3RS10 30-1DD20	
			24–240 V AC/DC	3RS10 30-□DD20	
		0...+200 °C	24 V AC/DC	3RS11 20-□DD20	
			24–240 V AC/DC	3RS11 20-1DW20	
Typ K (thermocouple)	Overrange	0...+600 °C	24 V AC/DC	3RS11 20-1DD30	
			24–240 V AC/DC	3RS11 20-1DW30	
		0...+200 °C	24–240 V AC/DC	3RS11 21-1DW20	
		0...+600 °C	24–240 V AC/DC	3RS11 21-1DW30	
		+500...+1000 °C	24 V AC/DC	3RS11 21-1DD40	
			24–240 V AC/DC	3RS11 21-1DW40	

Analog setting evaluation devices with one and two threshold values. For analog setting devices, the threshold values and the hysteresis from 2 to 20% are set using a rotary potentiometer. For devices with 2 threshold values, the selectable hysteresis only acts on threshold value 1. For the second threshold value, the hysteresis is permanently set to 5%. This series of products was developed for applications where a setting accuracy of ± 5% is sufficient.

Screw Terminal 1
Spring-type Terminal 2

Temperature Monitoring Relays

3RS10/3RS11

Sensor	Measuring range (measuring range limit depends on the sensor)	Rated control supply voltage V_S 50–60 Hz AC	Order No.	List Price \$
"Temperature monitor" acc. to DIN 3440, digital settings, 2 threshold values, 45 mm wide; 1 CO + 1 CO + 1 NO, memory function can be enabled using an external jumper. Relay parameters have a holding on supply failure function				
PT100/1000; KTY83/84; NTC (resistance sensor) ¹⁾	–50...+500 °C	24 V AC/DC 24–240 V AC/DC	3RS10 40- □ GD50 3RS10 40- □ GW50	
	–50...+932 °F	24 V AC/DC 24–240 V AC/DC	3RS20 40- □ GD50 3RS20 40- □ GW50	
TYPE J, K, T, E, N (thermocouple)	–99...+999 °C	24 V AC/DC 24–240 V AC/DC	3RS11 40- □ GD60 3RS11 40- □ GW60	
	–99...+1830 °F	24 V AC/DC 24–240 V AC/DC	3RS21 40- □ GD60 3RS21 40- □ GW60	
"Temperature limiter" and "temperature monitor" acc. to DIN 3440, digital settings, 2 threshold values, 45 mm wide; 1 CO + 1 CO + 1 NO, tripped state and relay parameters are saved using a holding on supply failure function				
PT100/1000; KTY83/84; NTC (resistance sensor) ¹⁾	–50...+750 °C	24 V AC/DC 24–240 V AC/DC	3RS10 42- □ GD70 3RS10 42- □ GW70	
	–99...+1800 °C	24 V AC/DC 24–240 V AC/DC	3RS11 42- □ GD80 3RS11 42- □ GW80	

Motor monitoring relays, digital settings for up to 3 sensors, 45 mm wide; 1 CO + 1 CO + 1 NO

Sensor	No of sensors	Measuring range	Rated control supply voltage V_S	Order No.	List Price \$
PT100/1000; KTY83/84; NTC (resistance sensor) ¹⁾	1 to 3 sensors	–50...+500 °C	24–240 V AC/DC	3RS10 41- □ GW50	
		–50...+932 °F	24–240 V AC/DC	3RS20 41- □ GW50	

¹⁾ NTC type: B57227-K333-A1 (100 °C: 1.8 k Ω ; 25 °C: 32.762 k Ω)Screw Terminal **1**Spring-type Terminal **2**

The short-circuit and wire breakage detection, as well as the measuring range are restricted, depending on the sensor type:

Measuring ranges in °C for thermocouple

Sensor type	Short- circuit	Wire breakage	3RS11 40 measuring range	3RS11 42 measuring range
J	–	x	–99...999	–99...1200
K	–	x	–99...999	–99...1350
T	–	x	–99...400	–99...400
E	–	x	–99...999	–99...999
N	–	x	–99...999	–99...999
S	–	x	–	0...1750
R	–	x	–	0...1750
B	–	x	–	400...1800

Measuring ranges in °C for resistance sensors

Sensor type	Short- circuit	Wire breakage	3RS10 40 measuring range	3RS10 42 measuring range
PT100	x	x	–50...500	–50...750
PT1000	x	x	–50...500	–50...500
KTY83-110	x	x	–50...175	–50...175
KTY84	x	x	–40...300	–40...300
NTC ¹⁾	x	–	80...160	80...160

¹⁾ NTC type: B57227-K333-A1 (100 °C: 1.8 k Ω ; 25 °C: 32.762 k Ω)

Evaluation units with digital settings

Temperature monitoring relays distinguish themselves due to the fact that they are extremely easy-to-use.

The actual temperature is always displayed on the three-digit LED display. A dedicated relay with one NO contact is integrated to monitor the sensor.

The relay is switched-out in the parameterizing mode.

The following parameters can be set:

- Sensor type
- 2 threshold values J_1 , J_2
- 1 hysteresis; this acts on both thresholds (0–99 K)
- 1 delay time; this acts on both thresholds (0–9999 s)
- Either the open-circuit/closed-circuit principle can be selected
- Function: Overtemperature/Undertemperature (overrange/underrange) or window monitoring within a defined range

Versions with a wide-range voltage have electrical isolation.

The temperature ranges are dependant on the sensor type (refer to the function).

Temperature Monitoring Relays

3RS10/3RS11

Technical data										
General data										
Type		3RS10 00 3RS10 10	3RS11 00	3RS11 01	3RS10 20 3RS10 30	3RS11 20 3RS11 30	3RS11 21 3RS11 31	3RS.0 40 3RS.0 41	3RS.1 40	
Sensor type		PT100	TC Type J	TC Type K	PT100	TC Type J	TC Type K	PT100; 1000 KTY83 / 84; NTC	TC Type J, K, T, E, N	
Width	mm	22.5							45	
Operating range	V	0.85 to 1.1 x U _S								
Rated power	W/VA	< 2 / 4							< 4 / 7	
Auxiliary circuit										
Contacts		1 NO + 1 NC			1 SPDT + 1 NO			1 SPDT + 1 SPDT + 1 NO		
Rated operational current I _e										
AC15 at AC 230 V, 50 Hz	A	3								
DC13 at 24 V	A	1								
DC13 at 240 V	A	0.1								
Required DIAZED fuse										
Utilisation category	gL/gG	A	4							
Electrical endurance	AC 15 at 3 A	100,000								
Mechanical endurance										
Mechanical operating cycles		30 x 10 ⁶								
Tripping unit										
Measuring accuracy at 20°C ambient temperature (T20)		typically < ± 5% of upper limit of scale							< ± 2K ± 1 digit	< ± 5K ± 1 digit
Reference point accuracy		–	< ± 5 K		–	< ± 5 K		–	< ± 5 K	
Deviations due to ambient temperature in % of measuring range		%	<2	<3		<2	<3		0.05 °C per K deviation from T20	
Measuring cycle		ms	500							
Hysteresis adjustments										
for temperature 1		2 to 20 % of upper limit of scale							1 to 99 Kelvin, for both values	
for temperature 2		5 % of upper limit of scale								
Sensor circuit										
Typical sensor current										
PT100	mA	Typically 1	–		Typically 1	–		Typically 1	–	
PT1000 / KTY83 / KTY84 / NTC	mA	Typically 0.2	–		Typically 0.2	–		Typically 0.2	–	
Wire-break detection		No							Yes ¹⁾	Yes
Short-circuit detection		No							Yes	No
3-wire connection		Yes ²⁾	–		Yes ²⁾	–		Yes ²⁾	–	
Enclosure										
Environmental effects										
Permissible ambient temperature	°C	– 25° to 60°								
Permissible storage temperature	°C	– 40° to 80°								
Permissible mounting position		any								
Degree of protection to EN 60 529		Terminals: IP20; cover: IP40								
Rated insulation voltage U _i (pollution degree 3)		AC V	300							
Conductor cross-section										
Screw terminals		M 3.5 (for standard screwdriver Size 2 and Pozidriv 2)								
– solid	mm ²	1 x (0.5 to 4) / 2 x (0.5 to 2.5)								
– finely stranded, with end sleeves	mm ²	1 x (0.5 to 2.5) / 2 x (0.5 to 1.5)								
– solid or stranded AWG conductors	AWG	2 x (20 to 14)								
– Tightening torque	Nm	0.8 to 1.2								
Cage Clamp terminals										
– solid	mm ²	2 x (0.25 to 1.5)								
– finely stranded, with end sleeves	mm ²	2 x (0.25 to 1)								
– finely stranded, without end-sleeves	mm ²	2 x (0.25 to 1.5)								
– solid or stranded AWG conductors	AWG	2 x (24 to 16)								
– corresponding opening tool		8WA2 807								
Vibration performance IEC 68-2-6		5 to 26 Hz/0.75 mm								
Shock resistance IEC 68-2-27		15 g/11 ms								

1) Not for NTC (B57227-K333-A1
(100 °C:1.8 kΩ; 25 °C:32,762 kΩ).

2) 2-wire connection of resistance sensors
with wire jumper between T2 and T3.

Temperature Monitoring Relays

3RS10/3RS11

Configuration

Specifications

The temperature monitoring relays correspond to:

- IEC 60 721-3-3 "Environmental conditions"
- IEC 947-5-1; DIN VDE 0660 "Low-voltage switchgear and controlgear"
- EN 50 081-2 "Basic technical standard for emitted interference (industry)"
- EN 61 000-6-2 "Basic technical standard for interference immunity (industry)"
- DIN EN 50 042 "Terminal marking"
- UL/CSA under application

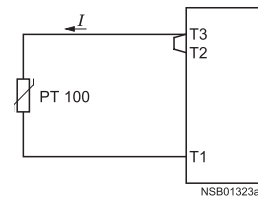
Connection of resistance thermometers

2-wire measurement

When 2-wire temperature sensors are used, the sensor resistance is added to the wire resistance. The system error that results must be taken into

account when the parameters are set for the evaluation unit. A jumper must be clamped between terminals T2 and T3.

The following table can be used to determine the temperature error when a PT100 is used.



Error due to wiring

The error that arises due to the wiring is approx. 2.5 Kelvin/ohm. If the resistance of the wiring is not known and cannot be measured, the wiring error can be estimated by means of the following table.

Temperature error as a function of conductor length and cross-section with PT 100 sensors and 20°C ambient temperature, in K

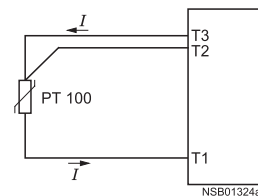
Cable length in m	Cross-section mm ²			
	0.5	0.75	1	1.5
0	0.0	0.0	0.0	0.0
10	1.8	1.2	0.9	0.6
25	4.5	3.0	2.3	1.5
50	9.0	6.0	4.5	3.0
75	13.6	9.0	6.8	4.5
100	18.1	12.1	9.0	6.0
200	36.3	24.2	18.1	12.1
500	91.6	60.8	45.5	30.2

3-wire measurement

To minimise the effects of the wiring resistances, a 3-wire circuit is usually used.

Using the additional wire, it is possible for two measuring circuits to be formed of which one is used as a reference.

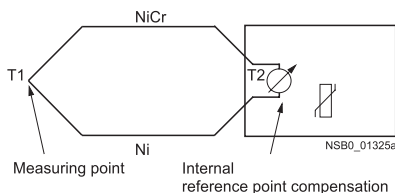
The evaluation unit can then automatically calculate the wiring resistance and take it into account.



Connection of thermoelements

A differential temperature measurement is obtained from the thermo-electrical effect

between the measuring point and the evaluation unit.



This principle assumes that the evaluation unit knows the temperature at the terminal (T2). The 3RS11 temperature monitoring relays have a built-in reference point correction function that determines this reference temperature and uses it to generate the measurement result.

The absolute temperature is therefore calculated from the ambient temperature of the evaluation unit and the temperature difference measured by the thermoelement.

In this manner, temperature acquisition (T1) is possible without knowing the precise ambient temperature at the terminals of the evaluation unit (T2).

The connecting lead is only permitted to be extended using equalising conductors made from the same material as the thermoelement itself. If a different type of lead is used, the measurement will be inaccurate.

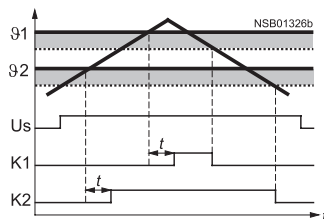
Temperature Monitoring Relays

3RS10/3RS11

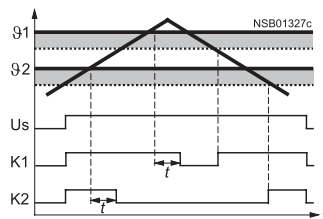
Functions

Temperature overshoot

Open-circuit principle

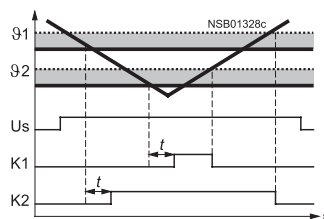


Closed-circuit principle

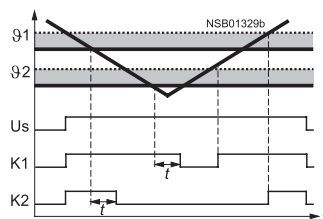


Temperature undershoot

Open-circuit principle

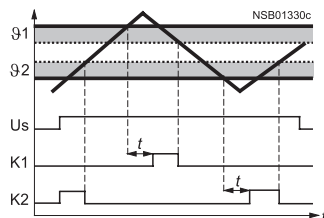


Closed-circuit principle

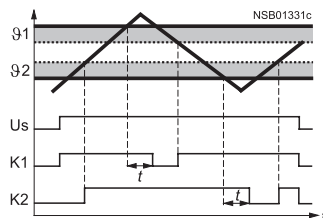


Window monitoring

Open-circuit principle



Closed-circuit principle



Digital evaluation units:

After the temperature has reached the set threshold value ϑ_1 , output relay K1 changes its switching state appropriately as soon as the set time t has elapsed (K2 responds to ϑ_2 similarly).

Analog evaluation units:

When the set threshold value is reached, output relay K1 changes its switching status. For devices with 2 threshold values, relay K2 responds to the second set threshold value.

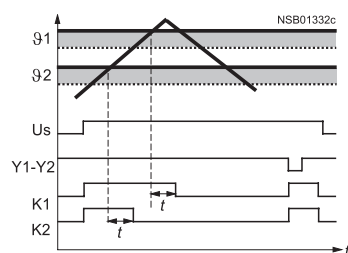
As soon as the temperature reaches the respective set hysteresis value, the relays return immediately to the original state.

A time delay cannot be set ($t = 0$).

When the temperature has reached the upper threshold ϑ_1 and the set delay time t has elapsed, the output relay K1 changes its switching state. As soon as the temperature reaches the respective set hysteresis value, the relay returns immediately to the original state.

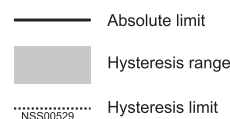
In the same manner, K2 responds to the lower threshold value of ϑ_2 .

Principle of operation with memory function, based on the example of temperature overshoot using the closed-circuit principle



When the temperature has reached the set threshold ϑ_1 and the set delay time t has elapsed, the output relay K1 changes its switching state (similarly, K2 responds to ϑ_2 .)

The relays will only return to the original state when the temperature has fallen below the respective set hysteresis value and the connection Y1-Y2 was briefly interrupted.

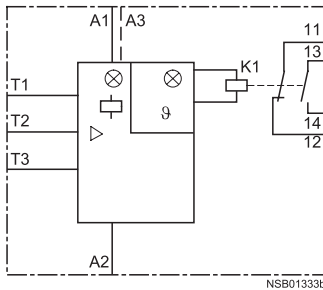
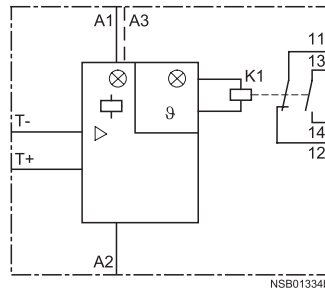
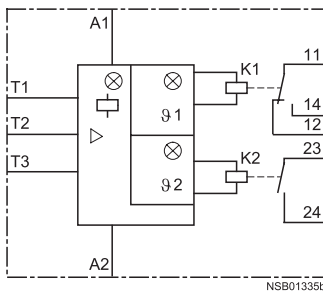
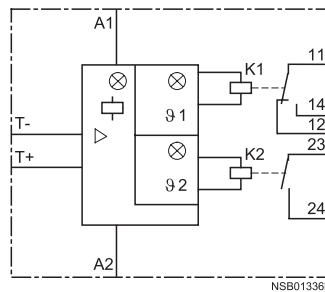
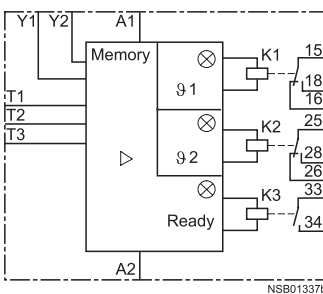
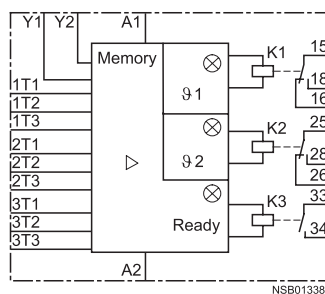
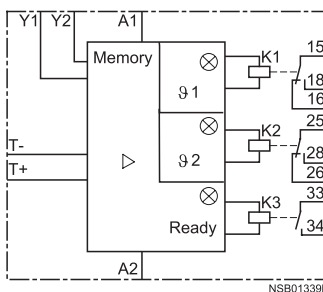


Temperature Monitoring Relays

3RS10/3RS11

Circuit diagrams

Connection examples

3RS10 00
3RS10 103RS11 00
3RS11 013RS10 20
3RS10 303RS11 20/3RS11 30
3RS11 21/3RS11 313RS10 40
3RS20 403RS10 41
3RS20 413RS11 40
3RS21 40

General equipment designations

A1, A2, A3 Rated control supply voltage terminals
K1, K2, K3 Output relays

Equipment designations for:
3RS1000, 3RS1010, 3RS1101, 3RS1100,
3RS1110, 3RS1111, 3RS1020, 3RS1021,
3RS1030, 3RS1031

□ = LED: "Voltage applied"
ø1 = LED: "Relay 1 switched"
ø2 = LED: "Relay 2 switched"
T1 to T3 = Terminals for connection of resistance sensor
T+ / T- = Terminals for connection of thermoelements

Equipment designations for:
3RS1040, 3RS1140, 3RS2040, 3RS2140

ø1 = LED: "Relay 1 switched"
ø2 = LED: "Relay 2 switched"
Ready = LED: "Device operating"
T1 to T3 = Terminals for connection of resistance sensor
T+ / T- = Terminals for connection of thermoelements
Y1/Y2 Terminals for memory jumper
JBiQ

Equipment designations for:
3RS1041, 3RS2041

ø1 = LED: "Relay 1 switched"
ø2 = LED: "Relay 2 switched"
Ready = LED: "Device operating"

1T1 to 1T3 = Terminals for connection of resistance sensor 1
2T1 to 2T3 = Terminals for connection of resistance sensor 2
3T1 to 3T3 = Terminals for connection of resistance sensor 3
Y1/Y2 Terminals for memory jumper



Important!
When resistance sensors are used in a 2-wire connection, a jumper must be installed between T2 and T3.

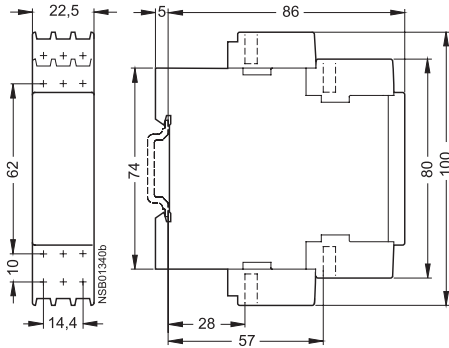
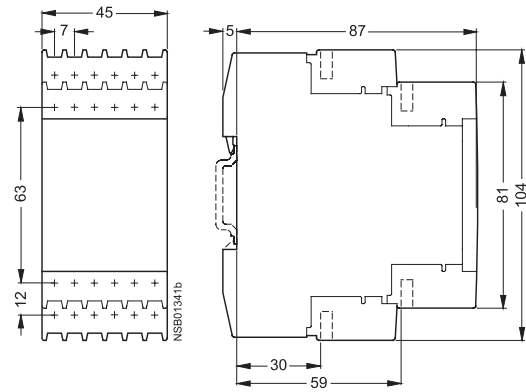
Temperature Monitoring Relays

3RS10/3RS11

Dimension drawings

Temperature monitoring relay

3RS10/3RS11 .. with 22.5 mm enclosure

3RS20/3RS21
3RS10/3RS11 .. with 45 mm enclosure

Thermistor Motor Protection

3RN2

Overview



SIRIUS 3RN2 thermistor motor protection

More information

Homepage, see www.siemens.com/relaysIndustry Mall, see www.siemens.com/product?3RN2For the conversion tool, e.g. from 3RN1 to 3RN2, see www.siemens.com/sirius/conversion-tool

Thermistor motor protection devices are used for direct monitoring of the motor winding temperature. For this purpose, the motors are equipped with temperature-dependent resistors (PTC) that are directly installed in the motor winding and abruptly change their resistance at their temperature limit.

Versions

SIRIUS 3RN2 thermistor motor protection relays are available in the following versions:

- 3RN2000 compact evaluation unit
- 3RN2010 compact/standard evaluation unit
- 3RN2012-.BW31 bistable evaluation unit
- 3RN2011, 3RN2012-...30, 3RN2013 standard evaluation unit with ATEX approval
- 3RN2023 evaluation unit with ATEX approval and 2 sensor circuits for warning and disconnection

They comply with

- IEC 60947-8. Low-voltage switchgear and controlgear – Part 8: "Control units for built-in thermal protection (PTC) for rotating electrical machines"
- IEC 61000-6-2, IEC 61000-6-4. "Electromagnetic compatibility for industrial-process measurement and control equipment"

The 3RN2 thermistor motor protection relays with ATEX approval fulfill SIL1 in compliance with EN 50495.

The terminals of the auxiliary contacts are designated in accordance with EN 60947-1.

3RN2 evaluation units are suitable for snap-on mounting onto TH 35 standard mounting rails according to IEC 60715 or for screw fixing using an adapter (accessory).

Article No. scheme

Product versions		Article number						
Thermistor motor protection relay with PTC sensor, type A		3RN20	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Number and version of the sensor circuits	1 sensor circuit, supply voltage = root voltage	0						
	1 sensor circuit	1						
	2 sensor circuits for warning and disconnection	2						
RESET	Auto RESET	0						
	Manual RESET, with open-circuit and short-circuit detection	1						
	Manual/Auto/Remote RESET, non-volatile, with open-circuit and short-circuit detection	2						
	Manual/Auto/Remote RESET, non-volatile, with open-circuit and short-circuit detection, with protective separation	3						
Connection method	Screw terminals	1						
	Spring-type terminals (push-in)	2						
Auxiliary switches	1 CO	A						
	2 CO	B						
	1 NO + 1 NC	C						
	1 NO + 1 CO	D						
	2 CO, hard gold-plated	G						
Rated control supply voltage	24 V AC/DC	A 3						
	24 ... 240 V AC/DC	W 3						
Response to failure	Monostable	0						
	Bistable	1						
Example		3RN20	0	0	-	1	A	A 3 0

Note:

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

For your orders, please use the article numbers quoted in the selection and ordering data.

Thermistor Motor Protection

3RN2

Benefits

- Thanks to direct motor protection, overdimensioning of the motors is not necessary
- No settings on the device are necessary
- Semiconductor compatible output thanks to versions with hard gold-plated contacts

- Rapid error diagnosis thanks to versions that indicate open and short circuits in the sensor circuit
- All versions with removable terminals
- All versions with screw or spring-type terminals with push-in functionality

Application

Direct motor protection through temperature monitoring of the motor winding offers 100% motor protection even under the most difficult ambient conditions, without the need to make adjustments on the device. Versions with hard gold-plated contacts ensure, in addition, a high switching reliability that is even higher than an electronic control.

Direct motor protection

- At increased ambient temperatures
- When switching frequency is too high
- When start up and braking procedures are too long

ATEX approval for operation in areas subject to explosion hazard

The SIRIUS 3RN2011, 3RN2012-...30, 3RN2013 and 3RN2023 thermistor motor protection relays for PTC sensors are certified according to ATEX Ex II (2) G and D for environments with explosive gas or dust loads.

Motor protection using current- and temperature-dependent protective devices

IEC 60204 stipulates that motors must be protected from overheating at a rating of 0.5 kW and higher. The protection can take the form of overload protection, overtemperature protection or current limiting.

For motors with frequent starting and braking and in environments where cooling may be impaired (e.g. by dust), it is recommended to use the overtemperature protection option in the form of a protective device coordinated with this mode of operation. A good choice in this case is the use of 3RN2 thermistor motor protection devices.

On rotor-critical motors, overtemperature detection in the stator windings can lead to delayed and hence inadequate protection. In this case the standards stipulate additional protection, e.g. by means of an overload relay.

This combination of thermistor motor protection and an overload relay is recommended for full motor protection in case of frequent starting and braking of motors, irregular intermittent duty or excessive switching frequency. To prevent premature tripping of the overload relay in such operating conditions, a higher setting than that normally required for the operational current is chosen. The overload relay then performs stall protection, and the 3RN2 thermistor motor protection relay monitors the temperature of the motor windings.

Application	Motor protection		
	Only current-dependent, e.g. with overload relay	Temperature-dependent only, e.g. with thermistor motor protection relay	Current- and temperature-dependent
Motor protection in case of			
Overloading in uninterrupted duty	✓	✓	✓
Long start up and braking operations	○	✓	✓
Irregular intermittent duty	○	✓	✓
Excessively high switching frequency	○	✓	✓
Single-phase operation and current unbalance	✓	✓	✓
Voltage and frequency fluctuations	✓	✓	✓
Stalling of the rotor	✓	✓	✓
Switching on a stalled rotor of a stator-critical motor	✓	✓	✓
Switching on a stalled rotor of a rotor-critical motor	✓	○	✓
Elevated ambient temperature	--	✓	✓
Impeded cooling	--	✓	✓

- ✓ Full protection
- Conditional protection
- No protection

Thermistor Motor Protection

3RN2

Technical specifications

More information

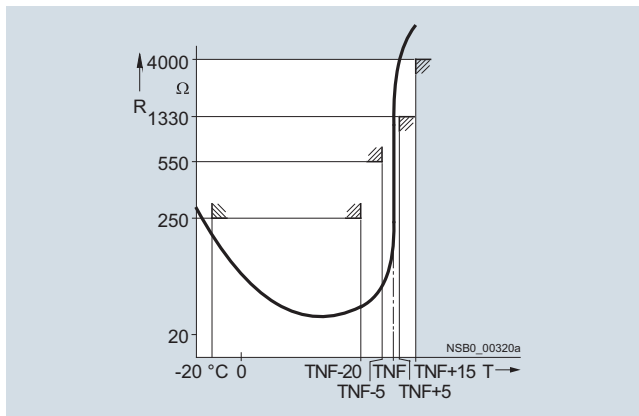
Technical specifications, see
<https://support.industry.siemens.com/cs/ww/en/ps/24302/td>
 Operating instructions and internal circuit diagrams, see
<https://support.industry.siemens.com/cs/ww/en/ps/24302/man>

FAQs, see <https://support.industry.siemens.com/cs/ww/en/ps/24302/faq>
 For more information on explosion protection (ATEX), see
www.siemens.com/sirius/atex

Type A PTC temperature sensor

If a Type A temperature sensor is connected to a Type A evaluation unit, compliance with the operating temperatures is assured (on pick-up and reset) according to IEC 60947-8.

The characteristic curves of the Type A temperature sensors are described in IEC 60947-8, EN 44081 and EN 44082 standards.



Characteristic curve of the 3RN2 evaluation unit

Bimetallic switch

In some applications, bimetallic switches (e.g. Klixon, Thermo-click) are used as sensors instead of PTC temperature sensors. Bimetallic switches are temperature- and current-dependent NC contacts and are available for different temperature ranges. Because bimetallic switches have practically no resistance below their opening temperature, short-circuit detection is not possible when using bimetallic switches. A bimetallic switch can be used for versions 3RN2000 and 3RN2010 on the SIRIUS thermistor motor protection relay.

Note:

Never use bimetallic switches in applications subject to an explosion hazard! Because of their non-standardized tripping characteristic, bimetallic switches must not be used in applications where there is an explosion hazard. Use Type A PTC sensors instead!

Use in hazardous areas

Increased danger in hazardous areas means it is necessary to observe the following notes and standards carefully:

- EN 60079-14/VDE 0165-1 for electrical apparatus for explosive gas atmospheres
- EN 60079-17 Explosive atmospheres – Electrical installations inspection and maintenance
- EN 50495 Safety devices required for the safe functioning of equipment with respect to explosion risks

The following SIRIUS 3RN2 thermistor motor protection relays with short-circuit detection are approved for Equipment Group II, Category (2) in Area "G" (areas in which potentially explosive gas, vapor, mist, or air mixtures are present) and are additionally approved for Area "D" (areas containing combustible dust):

- 3RN2011
- 3RN2012-...30
- 3RN2013
- 3RN2023

PTB 15 ATEX 3011 ex II (2) G (Ex E) (EX d) (Ex px)
 PTB 15 ATEX 3011 ex II (2) D (Ex T) (Ex p)

For 3RN2 thermistor motor protection relays, the EC type examination certificate is available for Group II, Category (2) G [Ex e] [Ex d] [Ex px] and D [Ex t] [Ex p]. The number is PTB 15 ATEX 3011.

SIRIUS 3RN2 thermistor motor protection relays are not intended for installation in hazardous areas. If they are installed in a potentially explosive atmosphere, the SIRIUS 3RN2 thermistor motor protection relays must be adapted to the applicable type of protection.

The machine or plant must shut down immediately if the SIRIUS 3RN2 thermistor motor protection relay is tripped, even if connected through a frequency converter. This must be implemented with circuitry.

SIRIUS 3RN2 thermistor motor protection relays with functional safety in accordance with EN 50495 are suitable for protecting explosion-proof motors/machines.

On evaluation units with a supply voltage of 24 V AC/DC, you must ensure electrical separation with a battery network or a power supply unit with electrical separation (e.g. isolating transformer) (does not apply to 3RN2013-BA30).

A SIRIUS 3RN2 thermistor motor protection relay set to "automatic RESET" mode will be reset automatically after the recovery time has elapsed, without the RESET button being pressed. An additional ON button has to be used to ensure that the motor does not start up automatically following tripping. "Automatic RESET" mode must not be used in applications where there is a risk of personal injury or damage to property if the motor restarts unexpectedly.

Thermistor Motor Protection

3RN2

▲ NOTICE!

When used in a hazardous area, the thermistor motor protection relay must not be operated with automatic RESET (terminal Y1 and Y2 permanently jumpered).

A risk analysis must be performed for the complete plant or machine. If this analysis yields a lower hazard potential (category 1), all SIRIUS 3RN2 thermistor motor protection relays can be used, provided the safety regulations are observed.

▲ WARNING!

All work involved in connecting, commissioning and maintenance must be carried out by qualified, responsible personnel. Improper handling may result in serious personal injury and considerable damage to property.

Cable routing

The measuring circuit leads must be routed as separate control cables. It is not permitted to use cores from the supply line of the motor or any other main supply cables. If extreme inductive or capacitive interference is expected as a result of power lines routed in parallel, shielded control cables must be used.

Maximum length of sensor circuit cables for evaluation units without short-circuit detection in the sensor circuit:

Cable cross-section	3RN2000, 3RN2010
2.5 mm ²	2 x 2800 m
1.5 mm ²	2 x 1500 m
0.5 mm ²	2 x 500 m

Maximum length of sensor circuit cables for evaluation units with short-circuit detection¹⁾

Cable cross-section	3RN2011, 3RN2012, 3RN2013, 3RN2023
2.5 mm ²	2 x 250 m
1.5 mm ²	2 x 150 m
0.5 mm ²	2 x 50 m

¹⁾ A short circuit in the sensor circuit will be detected up to this maximum cable length.

Principle of operation

SIRIUS 3RN2 thermistor motor protection relays are thermal protection devices that are suitable, in combination with type A PTC thermistors, for monitoring temperatures of electrical drives, transformer windings, oils, bearings, air, etc.

The most frequent application is monitoring of three-phase motors in which the motor manufacturer has fitted a PTC sensor into every winding overhang and in which these PTC sensors are connected in series.

The SIRIUS 3RN2 thermistor motor protection relays operate in accordance with the closed-circuit principle and therefore monitor themselves for loss of supply voltage. The exceptions are the warning output on 3RN2023, which always works on the open-circuit principle and the bistable relays of the 3RN2012-.BW31, which always retain the last switching state.

A micro-interruption in the power supply of less than 30 ms does not change the status of the output relays.

For devices with the "Manual RESET" function, the test function can be activated and a trip simulated by pressing the blue Test/RESET button for > 2 seconds.

The 3RN2011, 3RN2012, 3RN2013 and 3RN2023 devices are additionally equipped with open-circuit and short-circuit detection in the sensor circuit. The unit will trip in the event of a short-circuit (resistance in sensor circuit < 10 Ω) or open circuit in the sensor circuit (dynamic open-circuit detection). Tripping as the result of a short-circuit in the sensor circuit is indicated by a flickering red LED (TRIPPED). In the event of a short-circuit in the sensor circuit for warning on the 3RN2023, the yellow warning LED (WARNING) flickers. The devices with dynamic open-circuit detection evaluate the rise time of the sensor circuit resistance. If the sensor circuit resistance rises from 3 300 Ω to 12 kΩ within 200 ms, the unit will not only trip, but also indicate the open circuit via a flashing red LED (TRIPPED). In the event of an open circuit in a sensor circuit, the yellow warning LED (WARNING) flashes for the 3RN2023.

All evaluation units (except for the 3RN2000 compact evaluation unit) feature electrical separation between the control circuit and the sensor circuit. The relay outputs are also electrically separated from all other circuits. The 3RN2013 and 3RN2023 evaluation units incorporate protective electrical separation between all circuits up to $U_i = 300$ V.

3RN2000 compact evaluation unit

The compact unit, which is only 17.5 mm wide, is equipped with a red LED (TRIPPED) for the tripped indicator and a changeover contact. After the unit has tripped, it is automatically reset once the thermistors have cooled down. The root of the changeover contact is connected to the control voltage (terminal 11 is connected to terminal A1). This unit is particularly suitable in circuits in which the control circuit and signaling circuit have the same potential, e.g. in local control boxes.

3RN2010, 3RN2011, 3RN2012 and 3RN2013 compact/standard evaluation units

The units are equipped with two LEDs (READY and TRIPPED) for an operating and tripped display and are available with either 1 NO + 1 NC contacts (3RN2010, overall width 17.5 mm) or with 2 CO contacts. Depending on the version, they are available with Auto RESET (3RN2010), Manual/Remote RESET (3RN2011) or Manual/Auto and Remote RESET (3RN2012 and 3RN2013). Remote RESET can be achieved by connecting an external pushbutton with a normally-open function to terminals Y1 and Y2. If terminals Y1 and Y2 are jumpered, the unit is automatically reset once the thermistors have cooled down (Auto RESET). 3RN2012 and 3RN2013 are non-volatile. This means a previous trip remains stored in the event of a control supply voltage failure – the thermistor motor protection relay remains in the safe state with an opened output relay until it is intentionally reset by pressing the TEST/RESET button of the unit or an external pushbutton.

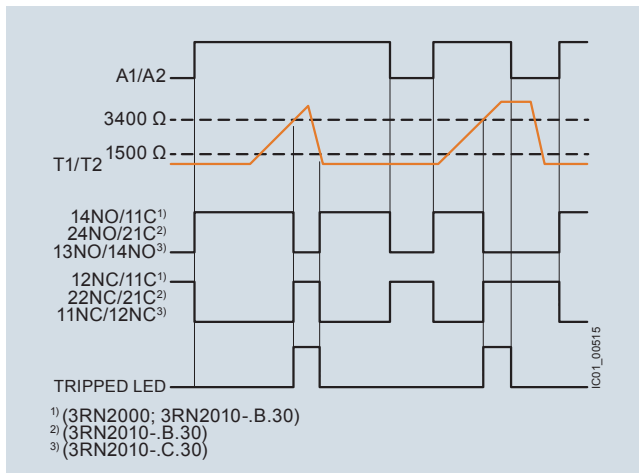
3RN2023 "warning and disconnection" evaluation units

Two sensor circuits can be connected to one 3RN2023 evaluation unit that act on two separate output relays with 1 NO contact for warning and 1 CO contact for disconnection. Thermistors with different rated response temperatures TNF are used to implement the "Warning" and "Disconnection" functions. When sensor circuit 2 for "Warning" responds, a yellow LED is lit and when the "Disconnection" circuit responds, a red LED is lit. The sensor circuits have a different reset response and operating behavior: The "Warning" thermistor sensor circuit 2 (terminals 2T1, 2T2) works only with Auto RESET and according to the open-circuit principle (output relay K2, NO contact). The "Disconnection" thermistor sensor circuit 1, (terminals 1T1, 1T2) can be changed from Manual RESET to Auto RESET by jumpering terminals Y1 and Y2. Remote RESET is implemented by connecting an external pushbutton with a normally-open function to these terminals.

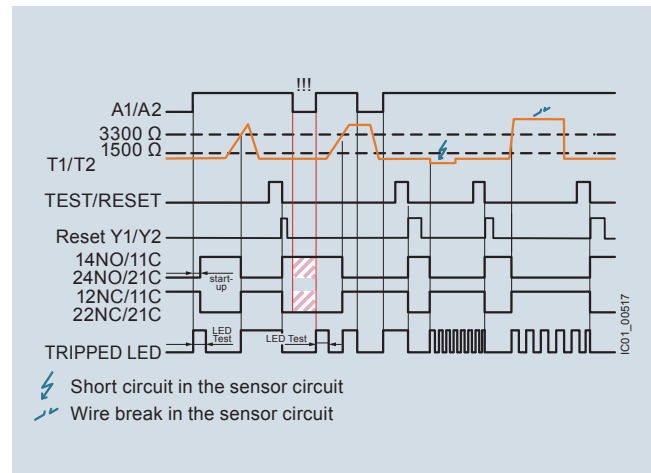
Thermistor Motor Protection

3RN2

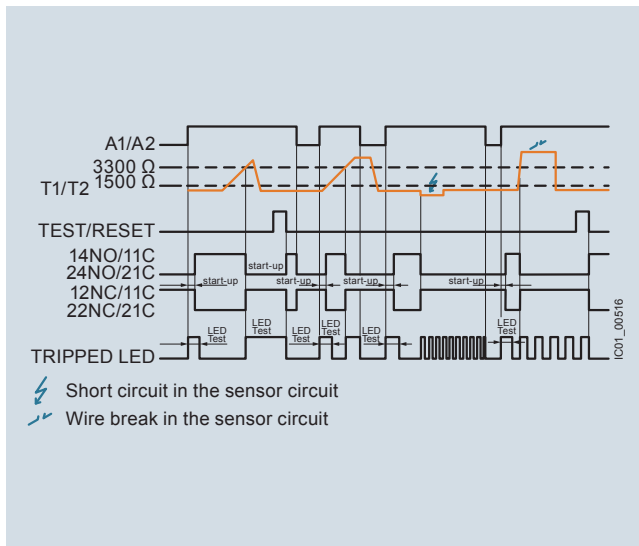
Function diagrams



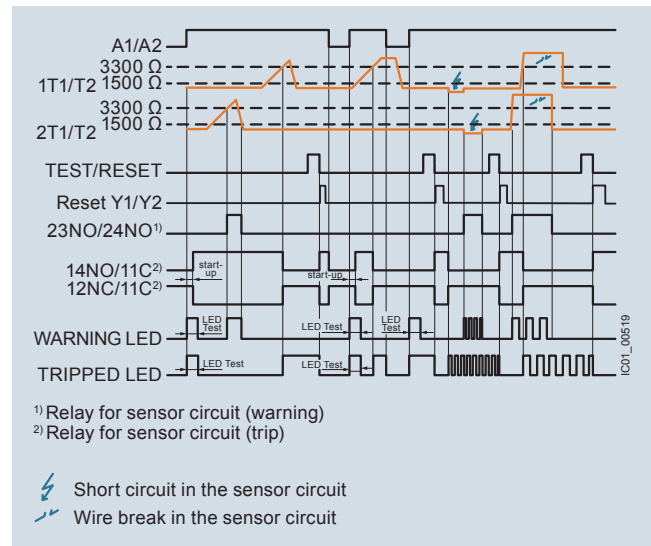
3RN2000, 3RN2010



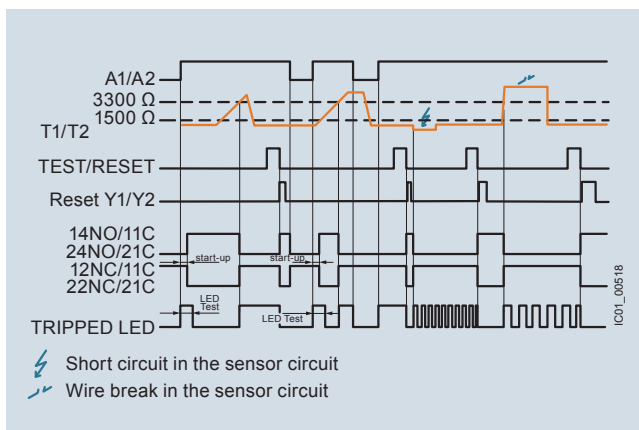
3RN2012-BW31: resetting via the TEST/RESET button or external push-button



3RN2011: resetting via external pushbutton or interruption of the supply voltage



3RN2023: resetting via the TEST/RESET button or external pushbutton

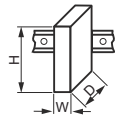


3RN2012-B.30, 3RN2013: resetting via the TEST/RESET button or external pushbutton

Thermistor Motor Protection

3RN2

Article number	3RN2000-.A, 3RN2010-.C	3RN201-.B, 3RN2013-.G, 3RN2023-.D
Width x height x depth	100 x 17.5 x 90	100 x 22.5 x 90





Article number	3RN2000-.AA30	3RN2000-.AW30, 3RN2010-.BW30, 3RN2010-.CW30	3RN2010-.BA30, 3RN2010-.CA30	3RN2011-.BA30, 3RN2012-.BA30	3RN2011-.BW30, 3RN2012-.BW30	3RN2012-.BW31	3RN2013-.BA30	3RN2013-.BW30, 3RN2013-.GW30	3RN2023-.DW30
----------------	---------------	---	---------------------------------	---------------------------------	---------------------------------	---------------	---------------	---------------------------------	---------------

General technical specifications					
Type of electrical isolation		None	Isolated		Protective separation
Electrical endurance (operating cycles) for AC-15 at 230 V		100 000			
Mechanical endurance (operating cycles)		10 000 000			
Insulation voltage for overvoltage category III according to IEC 60664 for pollution degree 3 / rated value	V	300			
Impulse withstand voltage, rated value	kV	4	6		
Minimum mains failure buffering time	ms	40	30		
Pollution degree		3			
Degree of protection		IP20			
Vibration resistance acc. to IEC 60068-2-27		11g/15 ms			
Vibration resistance acc. to IEC 60068-2-6		10 ... 55 Hz: 0.35 mm			
Type of mounting		For screw-fixing and snap-on mounting to 35 mm standard mounting rail			
• Mounting position		Any			
• Installation altitude at height above sea level, maximum	m	2 000			
Ambient temperature during operation	°C	-25 ... +60			
Relative humidity during operation, maximum	%	70			
ATEX					
Ex device group and Ex category according to ATEX product directive 2014/34/EU		--	II 2G, II 2D	--	II 2G, II 2D
Safety device type according to IEC 61508-2		--	Type B	--	Type B
Safety integrity level (SIL) according to IEC 61508		--	SIL1	--	SIL1
Performance level (PL) according to EN ISO 13849-1		--	c	--	c
T1 value for proof test interval or service duration according to IEC 61508	y	--	3	--	3
Measuring circuit					
Number of measuring circuits		12			
Relative measuring accuracy	%	9	2		
Maximum number of sensors in series		6			
Cable length of sensor, maximum	m	2 800	250		
Thermistor resistance response value	Ω	1 500 ... 1 650	1 500 ... 1 550		
Thermistor resistance return value	Ω	3 400 ... 3 600	3 300 ... 3 350		

Thermistor Motor Protection

3RN2

Article number			3RN2000- .AA30	3RN2000- .AW30, 3RN2010- .BW30, 3RN2010- .CW30	3RN2010- .BA30, 3RN2010- .CA30	3RN2011- .BA30, 3RN2012- .BA30	3RN2011- .BW30, 3RN2012- .BW30	3RN2012- .BW31	3RN2013- .BA30	3RN2013- .BW30, 3RN2013- .GW30	3RN2023- .DW30
Control circuit											
Current carrying capacity of the output relay											
• At AC-15 at 250 V at 50/60 Hz	A	3									
• At DC-13 at 24 V	A	1									
• At DC-13 at 125 V	A	0.2									
• At DC-13 at 250 V	A	0.1									
Thermal current of the non-solid-state contact blocks, maximum	A	5									
Continuous current of the output relay's DIAZED fuse link	A	6									
Supply voltage											
Control supply voltage											
• At AC											
- At 50 Hz rated value	V	24 ... 24	24 ... 240	24 ... 24		24 ... 240		24 ... 24	24 ... 240		
- At 60 Hz rated value	V	24 ... 24	24 ... 240	24 ... 24		24 ... 240		24 ... 24	24 ... 240		
• At DC, rated value	V	24 ... 24	24 ... 240	24 ... 24		24 ... 240		24 ... 24	24 ... 240		
Operating range factor of the control supply voltage, rated value											
• At AC at 50 Hz		0.85 ... 1.1									
• At AC at 60 Hz		0.85 ... 1.1									
• At DC		0.85 ... 1.1									

Article number		3RN20..-1	3RN20..-2
Type of electrical connection		 Screw terminals	 Spring-type terminals (push-in)
Tightening torque		Nm 0.6 ... 0.8	--
Type of connectable conductor cross-sections			
• Solid	mm ²	1x (0.5 ... 4.0 mm ²), 2x (0.5 ... 2.5 mm ²)	1x (0.5 ... 4 mm ²)
• Finely stranded with end sleeve	mm ²	1x (0.5 ... 4 mm ²), 2x (0.5 ... 1.5 mm ²)	1x (0.5 ... 2.5 mm ²)
• For AWG cables			
- Solid	AWG	1x (20 ... 12), 2x (20 ... 14)	1x (20 ... 12)
- Stranded	AWG	--	1x (20 ... 12)

Thermistor Motor Protection

3RN2

Selection and ordering data



3RN2000-1AA30



3RN2010-1BA30



3RN2011-1BA30



3RN2012-1BW30



3RN2023-1DW30

Product function	Number of CO contacts for auxiliary contacts	Number of NO contacts for auxiliary contacts	Number of NC contacts for auxiliary contacts	Material of switching contacts	Control supply voltage For AC at 50 Hz rated value	For DC, rated value	SD	Article No.	PU (UNIT, SET, M)	PS*
					V	V	d			

Compact evaluation unit, suitable for bimetallic switch

Terminal A1 jumpered with root of changeover contact

Auto RESET	1	0	0	AgSnO2	24 ... 24	24 ... 24	2	3RN2000-□AA30	1	1 unit
					24 ... 240	24 ... 240	2	3RN2000-□AW30	1	1 unit
	0	1	1	AgSnO2	24 ... 24	24 ... 24	2	3RN2010-□CA30	1	1 unit
					24 ... 240	24 ... 240	2	3RN2010-□CW30	1	1 unit

Standard evaluation unit, suitable for bimetallic switch

Auto RESET	2	0	0	AgSnO2	24 ... 24	24 ... 24	2	3RN2010-□BA30	1	1 unit
					24 ... 240	24 ... 240	2	3RN2010-□BW30	1	1 unit

Bistable evaluation unit, open-circuit and short-circuit detection in the sensor circuit

Does not trigger in the event of control supply voltage failure

Auto RESET	2	0	0	AgSnO2	24 ... 240	24 ... 240	2	3RN2012-□BW31	1	1 unit
Manual RESET										
External RESET										
Error memory										

Standard evaluation unit with ATEX approval, open-circuit and short-circuit detection in the sensor circuit¹⁾

Manual RESET	2	0	0	AgSnO2	24 ... 24	24 ... 24	2	3RN2011-□BA30	1	1 unit
External RESET					24 ... 240	24 ... 240	2	3RN2011-□BW30	1	1 unit

Non-volatile³⁾

Auto RESET	2	0	0	AgSnO2	24 ... 24	24 ... 24	2	3RN2012-□BA30	1	1 unit
Manual RESET					24 ... 240	24 ... 240	2	3RN2012-□BW30	1	1 unit
External RESET										
Error memory										

Protective separation, non-volatile²⁾³⁾

Auto RESET	2	0	0	AgSnO2	24 ... 24	24 ... 24	2	3RN2013-□BA30	1	1 unit
Manual RESET					24 ... 240	24 ... 240	2	3RN2013-□BW30	1	1 unit
External RESET				AgSnO2	24 ... 240	24 ... 240	2	3RN2013-□GW30	1	1 unit
Error memory				Hard gold-plated						

Evaluation unit with ATEX approval and 2 sensor circuits for warning and disconnection, open-circuit and short-circuit detection in both sensor circuits

Protective separation, non-volatile²⁾³⁾

Auto RESET	1	1	0	AgSnO2	24 ... 240	24 ... 240	2	3RN2023-□DW30	1	1 unit
Manual RESET										
External RESET										
Error memory										

Type of electrical connection

- Screw terminals
- Spring-type terminals (push-in)

¹⁾ For 3RN2011: The unit can be reset with the RESET button or by disconnecting the control supply voltage.







²⁾ Protective separation up to 300 V acc. to DIN/VDE 0160, IEC 60947-1.

³⁾ Protection against voltage failure or non-volatile fault storage means that previous tripping due to a fault remains stored even if the control supply voltage fails. The monitoring device is not reset if the voltage fails. With an active fault, meaning a fault which has not been manually confirmed, an automatic restart of the plant upon recovery of the power is prevented therefore and plant safety increased as the result.

Thermistor Motor Protection

3RN2

Accessories

Version	SD	Article No.	PU (UNIT, SET, M)	PS*
	d			
Terminals for SIRIUS devices in the industrial standard mounting rail enclosure				
	Removable terminals		Screw terminals	
	• 2-pole, up to 2 x 2.5 mm² or 1 x 4 mm²	2	3ZY1122-1BA00	1 6 units
	• 2-pole, up to 1 x 4 mm² or 2 x 1.5 mm²	2	Spring-type terminals (push-in)	
			3ZY1122-2BA00	1 6 units
Accessories for enclosures				
	Push-in lugs For wall mounting		3ZY1311-0AA00	1 10 units
	Coding pins For removable terminals of SIRIUS devices in the industrial standard mounting rail enclosure. They enable the mechanical coding of terminals, see Manual "SIRIUS 3RN2 thermistor motor protection", https://support.industry.siemens.com/cs/ww/en/ps/24302/man		3ZY1440-1AA00	1 12 units
Tools for opening spring-type terminals				
	Screwdrivers For all SIRIUS devices with spring-type terminals 3.0 mm x 0.5 mm, length approx. 200 mm, titanium gray/black, partially insulated		Spring-type terminals (push-in)	
			3RA2908-1A	1 1 unit

Timing Relays

3RP25 / 3RP20 / 7PV15

Overview



7PV15, SIRIUS 3RP25 and SIRIUS 3RP20 timing relays

Electronic timing relays are used in control, starting, and protective circuits for all switching operations involving time delays. Their fully developed concept and space-saving, compact design make the SIRIUS 3RP timing relays ideal modules for control cabinet, switchgear and control manufacturers in the industry.

With their narrow design, the 7PV15 timing relays are ideal in particular for use in heating, ventilation and air-conditioning systems and in compressors. All 7PV15 timing relays in this enclosure version are suitable for snap-on mounting onto TH 35 standard mounting rails according to IEC 60175. The enclosure complies with DIN 43880.

Benefits

- Clear-cut basic range with five basic units in the case of the 7PV15 timing relays, and seven basic units in the case of the 3RP timing relays
- Logistic advantages provided by versions with wide voltage range and wire setting range
- No tools required for assembly or disassembly on standard mounting rails
- Cadmium-free relay contacts
- Recyclable, halogen-free enclosure
- Optimum price/performance ratio
- Versions with logical separation
- Low variance: One design for distribution boards and for control cabinets
- Compliance with EMC requirements for buildings
- Environmentally friendly laser inscription instead of printing containing solvents
- Timing relays suitable for the 3RT miniature contactors allow smaller tier spacing
- Versions with screw terminals or alternatively with spring-type terminals

Application

Timing relays with ON-delay

- Interference pulse suppression (gating of interference pulses)
- Gradual startup of motors so as not to overload the power supply

Timing relays with OFF-delay

- Generation of overtravel functions following removal of voltage
- Gradual, delayed shutdown, e.g. of motors or fans, to allow a plant to be shut down selectively

Wye-delta timing relay

- Switchover of motors from wye to delta with a dead interval of 50 ms to prevent phase-to-phase short circuits

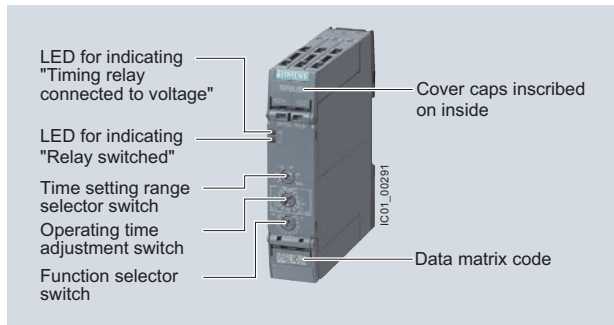
Multifunctional timing relays

- Maximum flexibility, with a device for every application
- Available with relay and semiconductor output

Timing Relays

3RP25 timing relays

Overview



SIRIUS 3RP25 timing relays

Electronic timing relays for general use in control systems and mechanical engineering with:

- 1 or 2 CO, 1 NO (semiconductor) or 3 NO
- Monofunction or multifunction
- Combination voltage
- Wide voltage range
- Single or selectable time setting ranges
- Switch position indication and voltage indication by LED

Standards

The timing relays comply with:

- IEC 60721-3-3 "Classification of environmental conditions"
- IEC 61812-1/DIN VDE 0435 Part 201 "Specified time relays for industrial use"
- IEC 61000-6-2, IEC 61000-6-3 and IEC 61000-6-4 "Electromagnetic compatibility"
- IEC 60947-5-1 "Low-voltage switchgear and controlgear – Electromechanical control circuit devices"

3RP2505 multifunctional timing relays

The functions of the 3RP2505 multifunctional timing relays can be set by means of the function selector switch. Whether both CO contacts are switched in parallel or one CO contact with a delay and one instantaneously and the choice of time setting range are set by means of the time setting range selector switch. The exact operating time can be adjusted with the operating time switch.

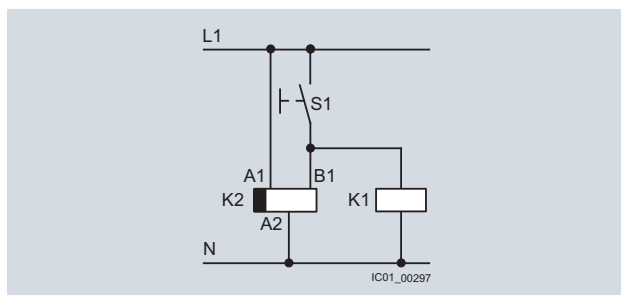
With a set of foil labels the timing relay can be legibly marked with the functions which can be selected on the timing relay. This is supplied together with the multifunctional timing relay.

The same potential must be applied to terminals A. and B.

Functions, [see the overview of functions on page 11/23](#).

Note:

The activation of loads parallel to the start input is permissible when using AC/DC control voltage ([see diagram](#)).



Diagram

Accessories

Push-in lugs for wall mounting



Sealable cover 17.5 mm

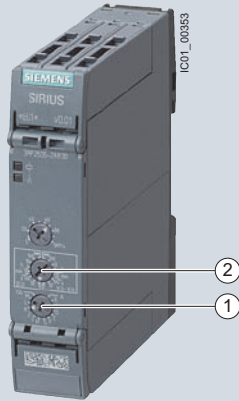


Sealable cover 22.5 mm

Timing Relays

3RP25 timing relays, 17.5 mm and 22.5 mm

Two setting options for implementing the multifunctions (A-M):



- ① Determination of 13 functions by the setting A to M, with 1 CO, 1 NO, 2 CO that switch in parallel.
- ② Extended function variance by selecting the time range and determining, whether 2 CO switch in parallel or whether 1 CO switches with delay + 1 CO switches immediately (1 CO + 1 CO)

Setting the functions on the device

Overview of functions of the 3RP2505 multifunctional timing relay

Identification letter	13 functions 1 CO, 1 NO (semiconductor) or 2 CO switched in parallel	27 functions 13 functions (A - M) 2 CO switched in parallel + 13 functions (A - M) 1 CO delayed + 1 CO instantaneous (1 CO + 1 CO) and wye-delta function
A	ON-delay	ON-delay and instantaneous contact
B	OFF-delay with control signal	OFF-delay with control signal and instantaneous contact
C	ON-delay/OFF-delay with control signal	ON-delay/OFF-delay with control signal and instantaneous contact
D	Flashing, symmetrical, starting with interval	Flashing, symmetrical, starting with interval and instantaneous contact
E	Passing make contact, interval relay	Passing make contact, interval relay and instantaneous contact
F	Retriggerable interval relay with deactivated control signal (passing break contact with control signal)	Retriggerable interval relay with deactivated control signal (passing break contact with control signal) and instantaneous contact
G	Passing make contact, with control signal, not retriggerable (pulse-forming with control signal)	Passing make contact, with control signal, not retriggerable (pulse-forming with control signal) and instantaneous contact
H	Additive ON-delay, instantaneous OFF with control signal	Additive ON-delay, instantaneous OFF with control signal and instantaneous contact
I	Additive ON-delay with control signal	Additive ON-delay with control signal and instantaneous contact
J	Flashing, symmetrical, starting with pulse	Flashing, symmetrical, starting with pulse and instantaneous contact
K	Pulse-delayed (fixed pulse (at 1 s) and settable pulse delay)	Pulse-delayed (fixed pulse (at 1 s) and settable pulse delay) and instantaneous contact
L	Pulse-delayed with control signal (fixed pulse (at 1 s) and settable pulse delay)	Pulse-delayed with control signal (fixed pulse (at 1 s) and settable pulse delay) and instantaneous contact
M	Retriggerable interval relay with activated control signal (watchdog)	Retriggerable interval relay with activated control signal and instantaneous contact (watchdog)
--	--	Wye-delta function

Note:

Conversion tool e.g. from 3RP15 to 3RP25, see
www.siemens.com/sirius/conversion-tool.

Timing Relays

3RP25 timing relays, 17.5 mm and 22.5 mm

Article No. scheme

Digit of the Article No.	1 st - 5 th	6 th	7 th		8 th	9 th	10 th	11 th	12 th
	□□□□□	□	□	-	□	□	□	□	0
Timing relays in industrial enclosure 17.5 mm and 22.5 mm	3 R P 25								
Functions/time setting ranges		□	□						
Connection type					□				
Contacts						□			
Rated control supply voltage							□	□	
Example	3 R P 25	0	5	-	1	A	W	3	0

Note:

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

For your orders, please use the article numbers quoted in the catalog in the Selection and ordering data.

Benefits

- Easy stock keeping and logistics thanks to low variance of devices
- Reduced space requirement in the control cabinet thanks to variants in width 17.5 mm and 22 mm
- Consistent for all functions thanks to wide voltage range from 12 to 240 V AC/DC
- Up to 27 functions according to IEC 61812 in the multifunctional timing relay with wide voltage range
- Multifunctional timing relay with semiconductor output for high switching frequencies, bounce-free and wear-free switching

Application

Timing relays are used in control, starting, and protective circuits for all switching operations involving time delays. They guarantee a high level of functionality and a high repeat accuracy of timer settings.

Enclosure version

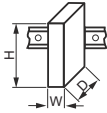
All timing relays are suitable for snap-on mounting onto TH 35 standard mounting rails according to IEC 60715 or for screw fixing.

Timing Relays

3RP25 timing relays, 17.5 mm and 22.5 mm

Technical specifications

Type		3RP2505-A, 3RP2505-C, 3RP251., 3RP2525-A, 3RP2527, 3RP253., 3RP255.	3RP2505-B, 3RP2505-R, 3RP2525-B, 3RP254., 3RP256., 3RP257.
Width	mm	17.5	22.5
Height	mm	100	100
Depth	mm	90	90



Type		3RP25...-AB30, 3RP25...-AW30, 3RP25...-BB30, 3RP25...-BW30, 3RP25...-NW30, 3RP25...-SW30	3RP25...-BT20, 3RP25...-NM20	3RP25...-CW30	3RP25...-EW30	3RP25...-RW30
Insulation voltage For overvoltage category III According to IEC 60664 For pollution degree 3, rated value	V AC	300	500	300	--	300
Ambient temperature • During operation • During storage	°C	-25 ... +60 -40 ... +85				-40 ... +70
Operating range factor Of the control supply voltage, rated value • At AC - At 50 Hz - At 60 Hz • At DC		0.85 ... 1.1 0.85 ... 1.1 0.85 ... 1.1	--	0.85 ... 1.1	0.85 ... 1.1	0.7 ... 1.1 0.7 ... 1.1 0.7 ... 1.1
Switching capacity current With inductive load	A	0.01 ... 3	0.01 ... 3	0.01 ... 1	0.01 ... 6	0.01 ... 3
Operational current of the auxiliary contacts • At AC-15 - At 24 V - At 250 V - At 400 V • At DC-12 - At 24 V - At 125 V - At 250 V • At DC-13 - At 24 V - At 125 V - At 250 V	A	3 3 -- -- -- -- 1 0.2 0.1	3 3 3 -- -- -- 1 0.2 0.1	1 1 -- 1 -- -- -- -- --	-- -- -- -- -- -- -- -- --	3 3 -- -- -- -- 1 0.2 0.1
Uninterrupted thermal current I_{th}	A	5	5	1	0.6	5
Mechanical endurance (Operating cycles) Typical		10 x 10 ⁶				
Electrical endurance For AC-15 at 230 V, typical		1 x 10 ⁵				

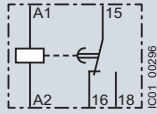
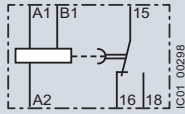
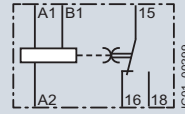
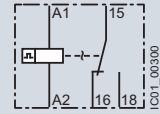
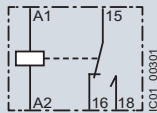
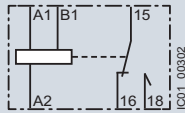
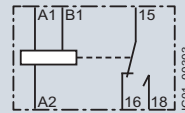
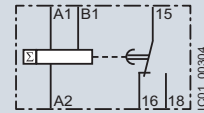
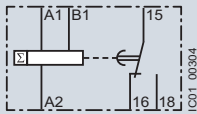
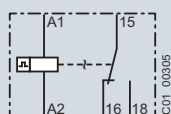
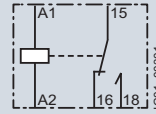
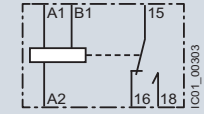
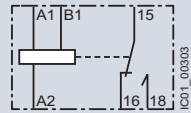
Type		3RP25
Connection type		Screw terminals
• Design of thread of connection screw		M3
• Solid	mm ²	1 x (0.5 ... 4.0)/2 x (0.5 ... 2.5)
• Finely stranded with end sleeve	mm ²	1 x (0.5 ... 4)/2 x (0.5 ... 1.5)
• Solid for AWG cables	AWG	1 x (20 ... 12), 2 x (20 ... 14)
• Stranded for AWG cables	AWG	1 x (20 ... 12), 2 x (20 ... 14)
• Tightening torque	Nm	0.6 ... 0.8
Connection type		Spring-type terminals
• Solid	mm ²	1 x (0.5 ... 4)
• Finely stranded with end sleeve	mm ²	1 x (0.5 ... 2.5)
• AWG cables, solid	AWG	1 x (20 ... 12)

Timing Relays

3RP25 timing relays, 17.5 mm and 22.5 mm

Internal circuit diagrams 3RP25

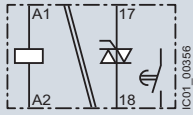
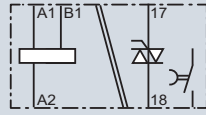
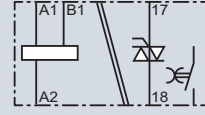
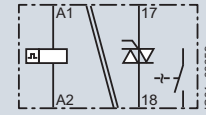
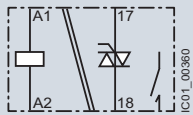
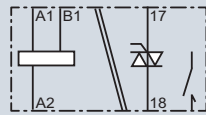
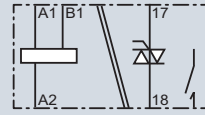
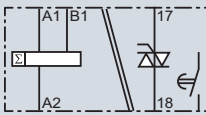
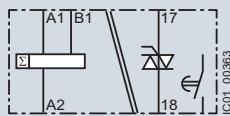
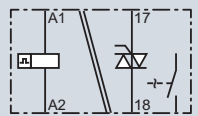
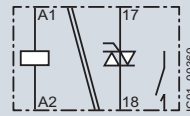
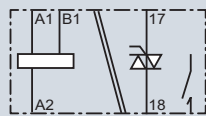
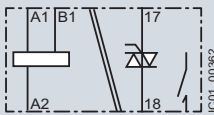
Multifunction 3RP2505-.A, 13 functions, 1 CO

3RP2505-.A (A)
ON-delay3RP2505-.A (B)
OFF-delay with control signal3RP2505-.A (C)
ON-delay/OFF-delay
with control signal3RP2505-.A (D)
Flashing, symmetrical,
starting with interval3RP2505-.A (E)
Passing make contact, interval relay3RP2505-.A (F)
Retriggerable interval relay with
deactivated control signal (passing
break contact with control signal)3RP2505-.A (G)
Passing make contact with
control signal, not retriggerable
(pulse-forming with control signal)3RP2505-.A (H)
Additive ON-delay, instantaneous OFF
with control signal3RP2505-.A (I)
Additive ON-delay with control signal3RP2505-.A (J)
Flashing, symmetrical,
starting with pulse3RP2505-.A (K)
Pulse-delayed (fixed pulse (at 1 s)
and settable pulse delay)3RP2505-.A (L)
Pulse-delayed with control signal (fixed
pulse (at 1 s) and settable pulse delay)3RP2505-.A (M)
Retriggerable interval relay with
activated control signal (watchdog)

Timing Relays

3RP25 timing relays, 17.5 mm and 22.5 mm

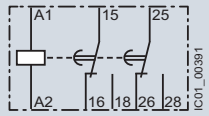
Multifunction 3RP2505-.C, 13 functions, 1 NO (semiconductor)

3RP2505-.C (A)
ON-delay3RP2505-.C (B)
OFF-delay with control signal3RP2505-.C (C)
ON-delay/OFF-delay
with control signal3RP2505-.C (D)
Flashing, symmetrical,
starting with interval3RP2505-.C (E)
Passing make contact, interval relay3RP2505-.C (F)
Retriggerable interval relay with
deactivated control signal (passing
break contact with control signal)3RP2505-.C (G)
Passing make contact with
control signal, not retriggerable
(pulse-forming with control signal)3RP2505-.C (H)
Additive ON-delay, instantaneous OFF
with control signal3RP2505-.C (I)
Additive ON-delay with control signal3RP2505-.C (J)
Flashing, symmetrical,
starting with pulse3RP2505-.C (K)
Pulse-delayed (fixed pulse (at 1 s)
and settable pulse delay)3RP2505-.C (L)
Pulse-delayed with control signal (fixed
pulse (at 1 s) and settable pulse delay)3RP2505-.C (M)
Retriggerable interval relay with
activated control signal (watchdog)

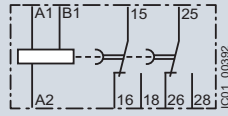
Timing Relays

3RP25 timing relays, 17.5 mm and 22.5 mm

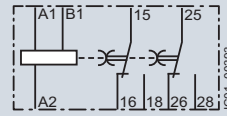
Multifunction 3RP2505-.B, 27 functions, 2 CO switched in parallel with delay/
multifunction 3RP2505-.R, 13 functions, 2 CO positively driven, and switched in parallel with delay (see also note below)



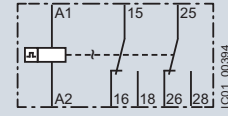
3RP2505-.B (A)
ON-delay



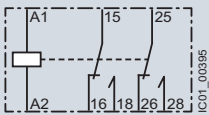
3RP2505-.B (B)
OFF-delay with control signal



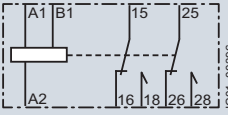
3RP2505-.B (C)
ON-delay/OFF-delay
with control signal



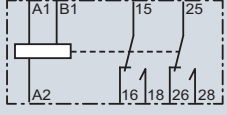
3RP2505-.B (D)
Flashing, symmetrical,
starting with interval



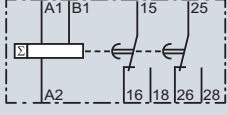
3RP2505-.B (E)
Passing make contact, interval relay



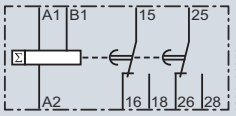
3RP2505-.B (F)
Retriggerable interval relay with
deactivated control signal (passing
break contact with control signal)



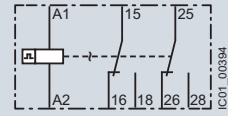
3RP2505-.B (G)
Passing make contact with
control signal, not retriggerable
(pulse-forming with control signal)



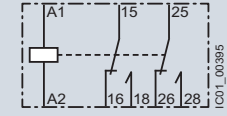
3RP2505-.B (H)
Additive ON-delay, instantaneous OFF
with control signal



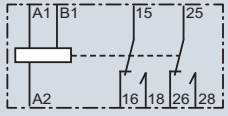
3RP2505-.B (I)
Additive ON-delay with control signal



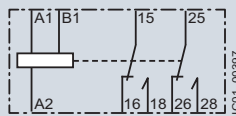
3RP2505-.B (J)
Flashing, symmetrical,
starting with pulse



3RP2505-.B (K)
Pulse-delayed (fixed pulse (at 1 s)
and settable pulse delay)



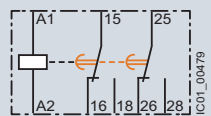
3RP2505-.B (L)
Pulse-delayed with control signal (fixed
pulse (at 1 s) and settable pulse delay)



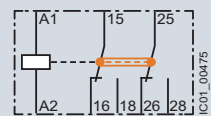
3RP2505-.B (M)
Retriggerable interval relay with
activated control signal (watchdog)

Note:

3RP2505-.RW30 has 13 functions (A to M) like 3RP2505-.B switched in parallel with delay, but with positively driven contacts. The circuit diagrams are identical except for the representation of the symbols for these contacts, see also the example on the right for 3RP2505-.RW30 of the function (A) with ON-delay.



3RP2505-.B (A)
ON-delay

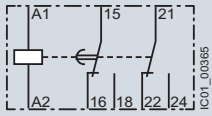


3RP2505-.R (A)
with positively driven contacts
ON-delay

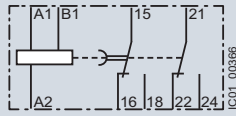
Timing Relays

3RP25 timing relays, 17.5 mm and 22.5 mm

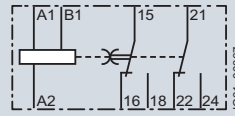
Multifunction 3RP2505-.B, 27 functions, 1 CO delayed + 1 CO instantaneous (continued)



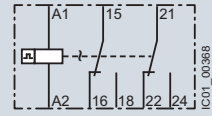
3RP2505-.B (A)
ON-delay and instantaneous contact



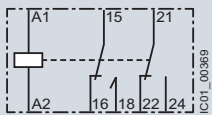
3RP2505-.B (B)
OFF-delay with control signal and
instantaneous contact



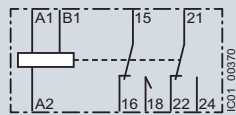
3RP2505-.B (C)
ON-delay/OFF-delay with control
signal and instantaneous contact



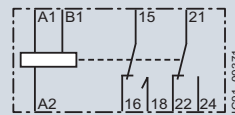
3RP2505-.B (D)
Flashing, symmetrical, starting with
interval and instantaneous contact



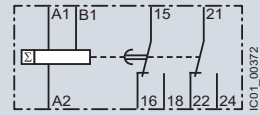
3RP2505-.B (E)
Passing make contact, interval relay
and instantaneous contact



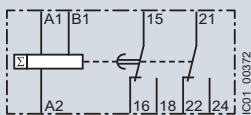
3RP2505-.B (F)
Retriggerable interval relay with
deactivated control signal (passing
break contact with control signal)
and instantaneous contact



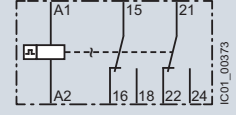
3RP2505-.B (G)
Passing make contact with
control signal, not retriggerable
(pulse-forming with control signal)
and instantaneous contact



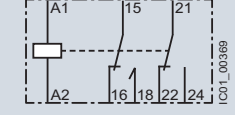
3RP2505-.B (H)
Additive ON-delay, instantaneous OFF
with control signal and instantaneous
contact



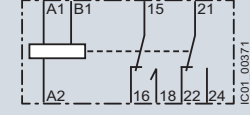
3RP2505-.B (I)
Additive ON-delay with control signal
and instantaneous contact



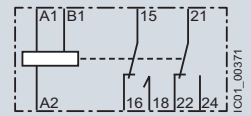
3RP2505-.B (J)
Flashing, symmetrical, starting with
pulse and instantaneous contact



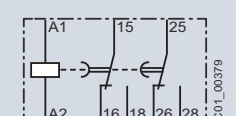
3RP2505-.B (K)
Pulse-delayed (fixed pulse (at 1 s)
and settable pulse delay) and
instantaneous contact



3RP2505-.B (L)
Pulse-delayed with control signal (fixed
pulse (at 1 s) and settable pulse delay)
and instantaneous contact



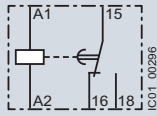
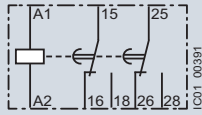
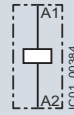
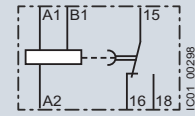
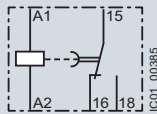
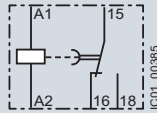
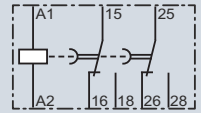
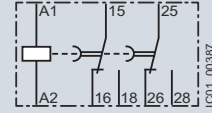
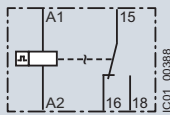
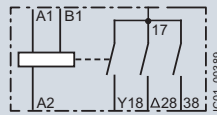
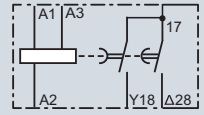
3RP2505-.B (M)
Retriggerable interval relay with
activated control signal and
instantaneous contact (watchdog)



3RP2505-.B
Wye-delta function

Timing Relays

3RP25 timing relays, 17.5 mm and 22.5 mm

Monofunctions 3RP251. up to 3RP257.¹⁾3RP251., 3RP2525-A
ON-delay3RP2525-B
ON-delay3RP2527
ON-delay, two-wire design3RP2535
OFF-delay with control signal3RP2540-A (N)¹⁾
OFF-delay3RP2540-A (O)¹⁾
Positive passing make contact3RP2540-B (N)¹⁾
OFF-delay3RP2540-B (O)¹⁾
Positive passing make contact3RP2555
Flashing, asymmetrical, starting with interval (clock-pulse relay)3RP2560
Wye-delta function with overtravel function (idling)3RP257.
Wye-delta function

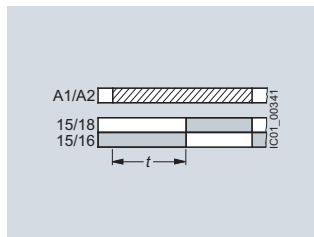
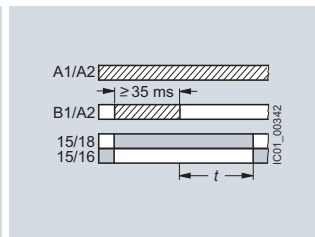
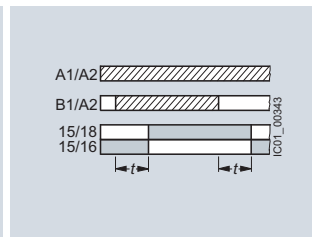
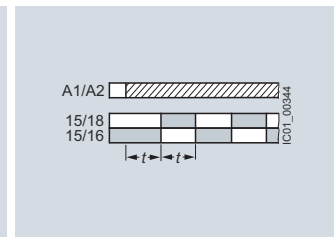
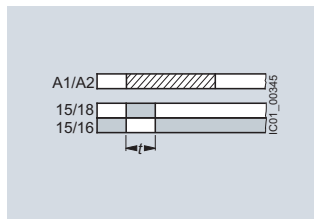
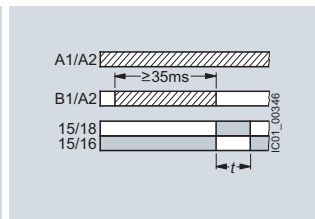
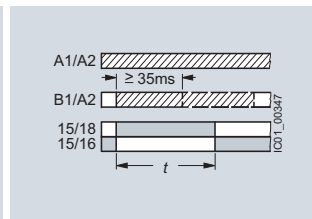
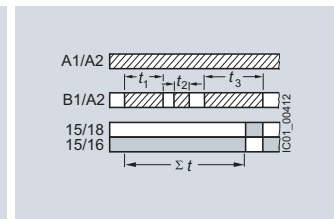
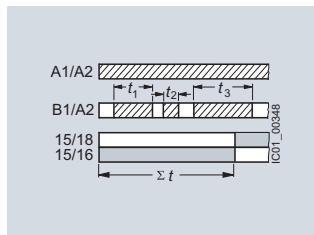
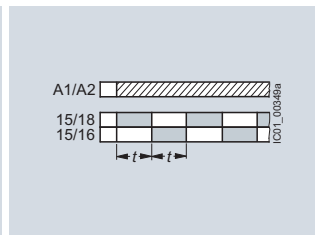
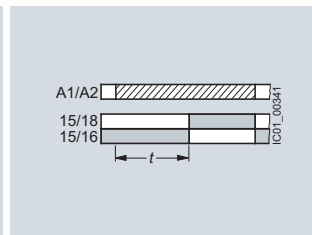
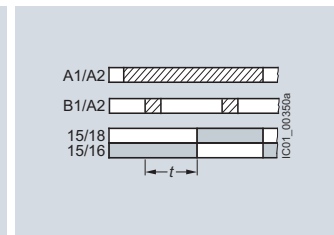
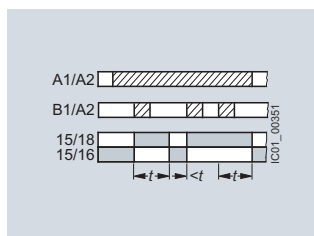
¹⁾ 3RP2540 has a double function:
Function N = OFF-delay
Function O = Positive passing make contact.

Timing Relays

3RP25 timing relays, 17.5 mm and 22.5 mm

3RP25 function diagrams

Multifunction 3RP2505-.A, 1 CO, 13 functions and 3RP2505-.C, 1 NO (semiconductor), 13 functions

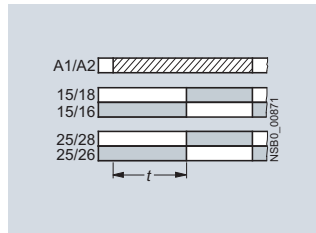
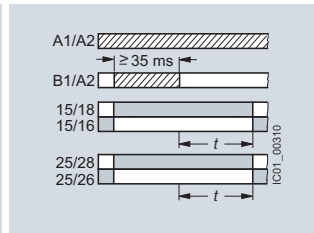
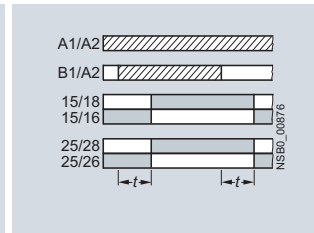
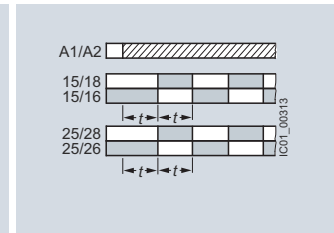
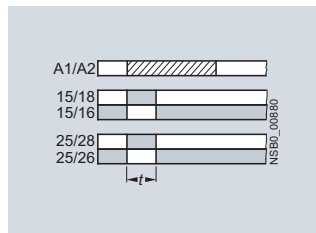
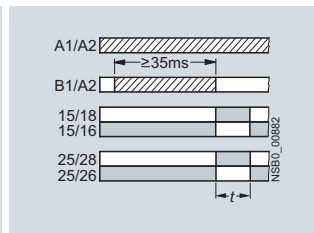
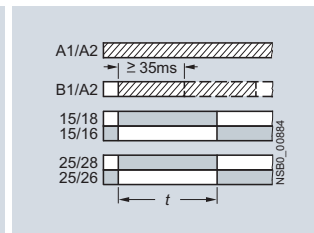
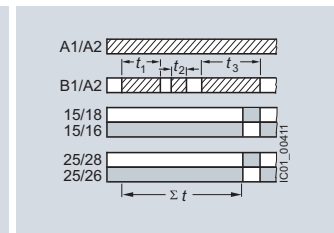
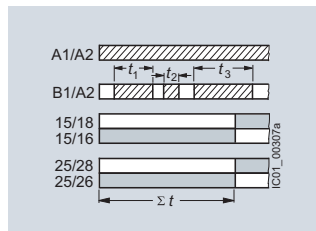
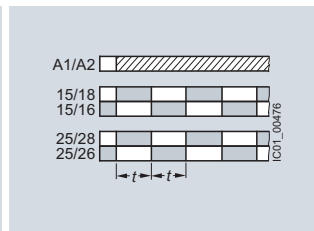
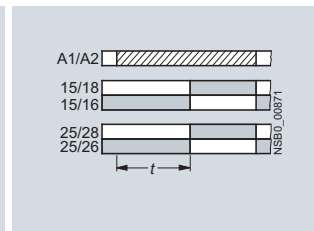
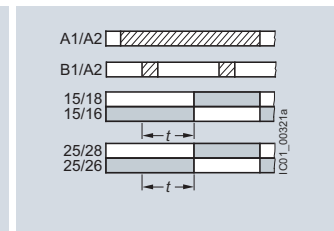
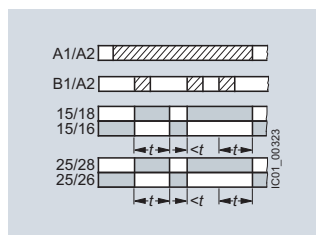
**A**
ON-delay**B**
OFF-delay with control signal**C**
ON-delay/OFF-delay
with control signal**D**
Flashing, symmetrical,
starting with interval**E**
Passing make contact, interval relay**F**
Retriggerable interval relay with
deactivated control signal (passing
break contact with control signal)**G**
Passing make contact with
control signal, not retriggerable
(pulse-forming with control signal)**H**
Additive ON-delay, instantaneous OFF
with control signal**I**
Additive ON-delay, with control signal**J**
Flashing, symmetrical,
starting with pulse**K**
Pulse-delayed (fixed pulse (at 1 s)
and settable pulse delay)**L**
Pulse-delayed with control signal (fixed
pulse (at 1 s) and settable pulse delay)**M**
Retriggerable interval relay with
activated control signal (watchdog)Legend

- A ... M** Identification letters
- Timing relay energized
- Contact closed
- Contact open

Timing Relays

3RP25 timing relays, 17.5 mm and 22.5 mm

Multifunction 3RP2505-B, 13 functions, 2 CO positively driven and switched in parallel with delay

**A**
ON-delay**B**
OFF-delay with control signal**C**
ON-delay/OFF-delay
with control signal**D**
Flashing, symmetrical,
starting with interval**E**
Passing make contact, interval relay**F**
Retriggerable interval relay with
deactivated control signal (passing
break contact with control signal)**G**
Passing make contact with
control signal, not retriggerable
(pulse-forming with control signal)**H**
Additive ON-delay, instantaneous OFF
with control signal**I**
Additive ON-delay with control signal**J**
Flashing, symmetrical,
starting with pulse**K**
Pulse-delayed (fixed pulse at 1 s
and settable pulse delay)**L**
Pulse-delayed with control signal (fixed
pulse at 1 s and settable pulse delay)**M**
Retriggerable interval relay with
activated control signal (watchdog)

Legend

- A ... M** Identification letters
 Timing relay energized
 Contact closed
 Contact open

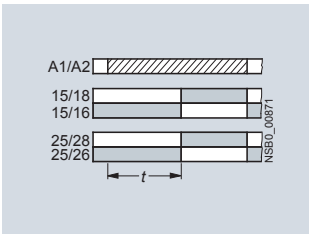
Timing Relays

3RP25 timing relays, 17.5 mm and 22.5 mm

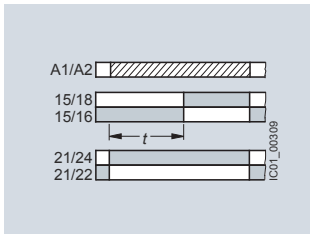
Multifunction 3RP2505-.B, 27 functions, 2 CO

A

2 CO switched in parallel



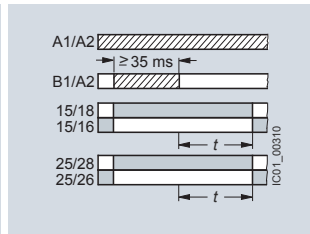
ON-delay

1 CO delayed +
1 CO instantaneous

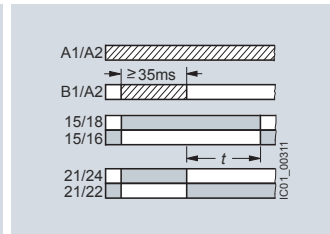
ON-delay and instantaneous contact

B

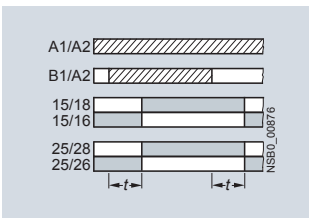
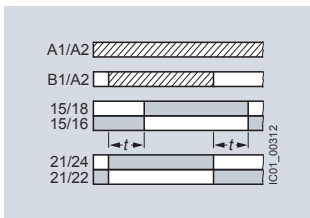
2 CO switched in parallel



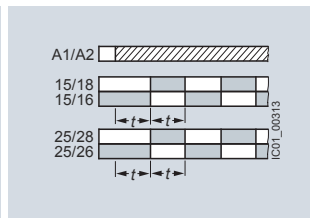
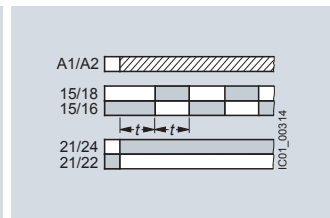
OFF-delay with control signal

1 CO delayed +
1 CO instantaneousOFF-delay with control signal and
instantaneous contact**C**

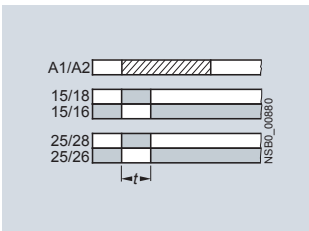
2 CO switched in parallel

ON-delay/OFF-delay
with control signal1 CO delayed +
1 CO instantaneousON-delay/OFF-delay with control
signal and instantaneous contact**D**

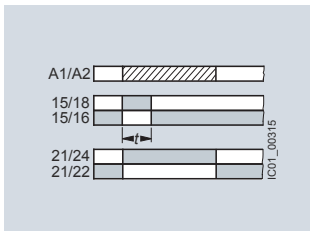
2 CO switched in parallel

Flashing, symmetrical,
starting with interval1 CO delayed +
1 CO instantaneousFlashing, symmetrical, starting with
interval and instantaneous contact**E**

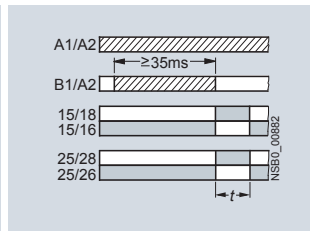
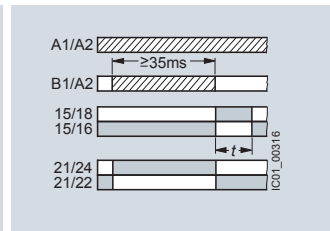
2 CO switched in parallel



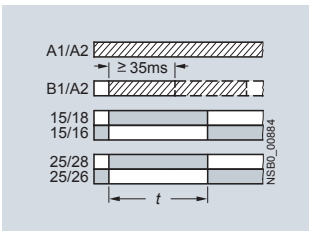
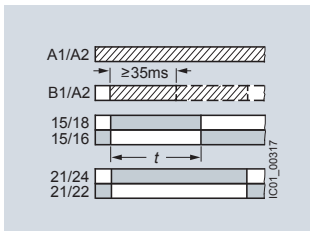
Passing make contact, interval relay

1 CO delayed +
1 CO instantaneousPassing make contact, interval relay
and instantaneous contact**F**

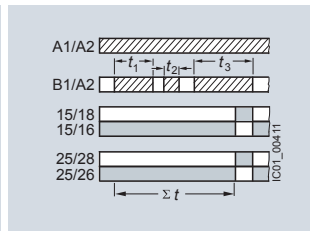
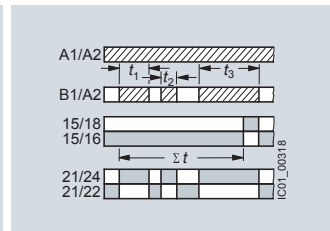
2 CO switched in parallel

Retriggerable interval relay with
deactivated control signal (passing
break contact with control signal)1 CO delayed +
1 CO instantaneousRetriggerable interval relay with
deactivated control signal (passing
break contact with control signal)
and instantaneous contact**G**

2 CO switched in parallel

Passing make contact with
control signal, not retriggerable
(pulse-forming with control signal)1 CO delayed +
1 CO instantaneousPassing make contact with
control signal, not retriggerable
(pulse-forming with control signal)
and instantaneous contact**H**

2 CO switched in parallel

Additive ON-delay, instantaneous
OFF with control signal1 CO delayed +
1 CO instantaneousAdditive ON-delay, instantaneous OFF
with control signal and instantaneous
contact

Legend

- A ... M** Identification letters
 Timing relay energized
 Contact closed
 Contact open

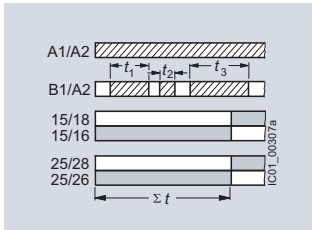
Timing Relays

3RP25 timing relays, 17.5 mm and 22.5 mm

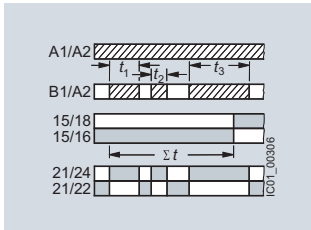
Multifunction 3RP2505-.B, 27 functions, 2 CO (continued)

I

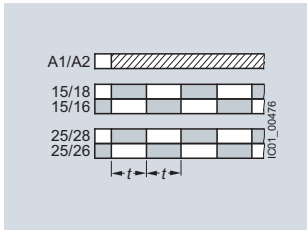
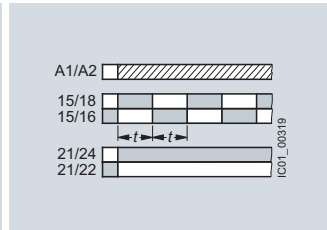
2 CO switched in parallel



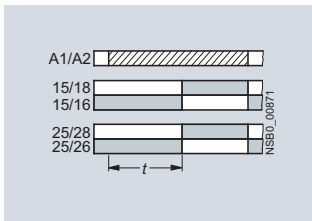
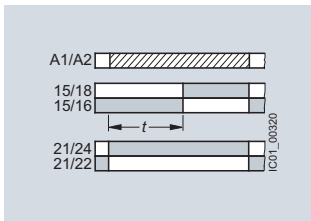
Additive ON-delay with control signal

1 CO delayed +
1 CO instantaneousAdditive ON-delay with control signal
and instantaneous contact**J**

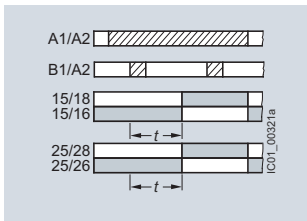
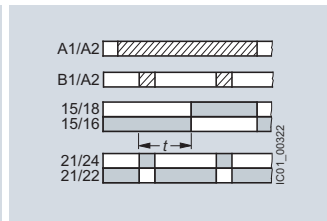
2 CO switched in parallel

Flashing, symmetrical,
starting with pulse1 CO delayed +
1 CO instantaneousFlashing, symmetrical, starting with
pulse and instantaneous contact**K**

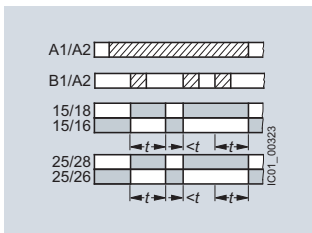
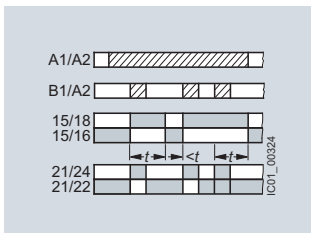
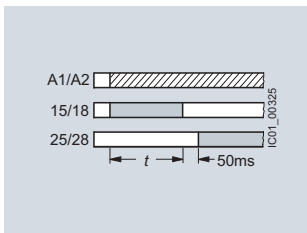
2 CO switched in parallel

Pulse-delayed (fixed pulse at 1 s
and settable pulse delay)1 CO delayed +
1 CO instantaneousPulse-delayed (fixed pulse at 1 s
and settable pulse delay) and
instantaneous contact**L**

2 CO switched in parallel

Pulse-delayed with control signal
(fixed pulse at 1 s and settable pulse
delay)1 CO delayed +
1 CO instantaneousPulse-delayed with control signal
(fixed pulse at 1 s and settable pulse
delay) and instantaneous contact**M**

2 CO switched in parallel

Retriggerable interval relay with
activated control signal (watchdog)1 CO delayed +
1 CO instantaneousRetriggerable interval relay with
activated control signal and
instantaneous contact (watchdog)**YΔ**2 CO switched in parallel or 1 CO
delayed +
1 CO instantaneous

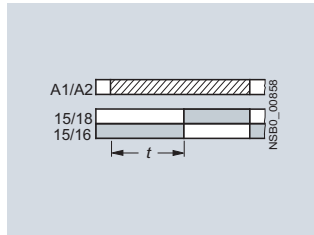
Wye-delta function

Legend

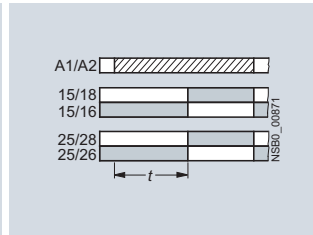
- A ... M** Identification letters
 Timing relay energized
 Contact closed
 Contact open

Timing Relays

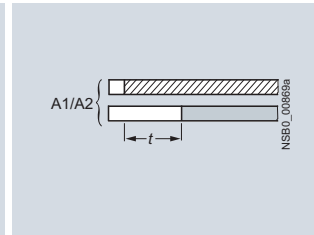
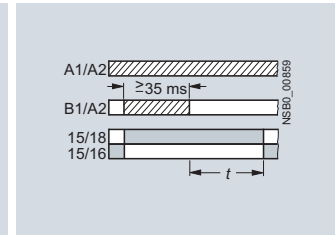
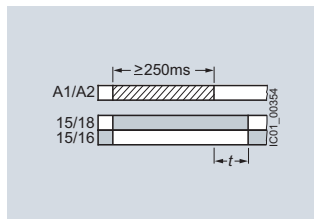
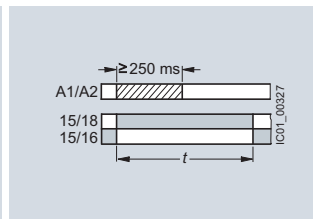
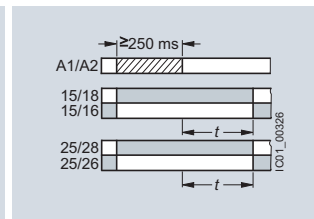
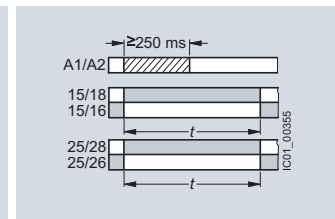
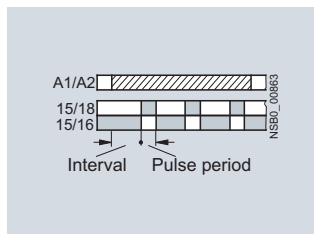
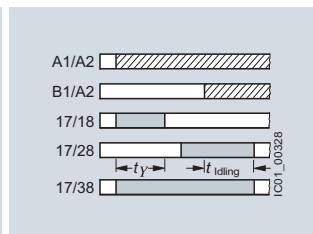
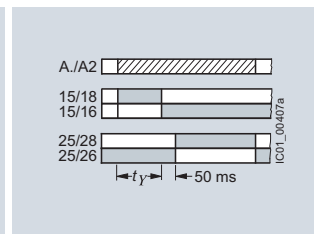
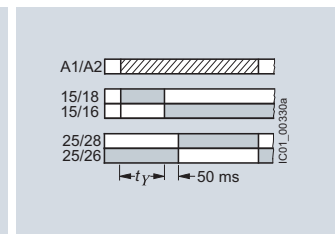
3RP25 timing relays, 17.5 mm and 22.5 mm

Monofunctions 3RP251.. up to 3RP257.¹⁾

3RP251..-AW30, 1 CO, ON-delay



3RP2525..-W30, 2 CO, ON-delay

3RP2527..-EW30, 1 NO
(semiconductor), ON-delay3RP2535..-AW30, 1 CO,
OFF-delay with control signal3RP2540..-A.30, 1 CO,
OFF-delay (N)¹⁾3RP2540..-A.30, 1 CO, positive
passing make contact (O)¹⁾3RP2540..-B.30, 2 CO,
OFF-delay (N)¹⁾3RP2540..-B.30, 2 CO, positive
passing make contact (O)¹⁾3RP2555..-AW30, 1 CO, flashing,
asymmetrical, starting with interval
(clock-pulse relay)3RP2560..-SW30, 3 NO, wye-delta
function with overtravel function
(idling)3RP257..-NM20, 2 NO,
wye-delta function3RP257..-NM30, 2 NO,
wye-delta function

Legend

- Timing relay energized
- Contact closed
- Contact open

¹⁾ 3RP2540 has a double function:
Function N = OFF-delay
Function O = positive passing make contact.

Timing Relays

3RP25 timing relays, 17.5 mm and 22.5 mm

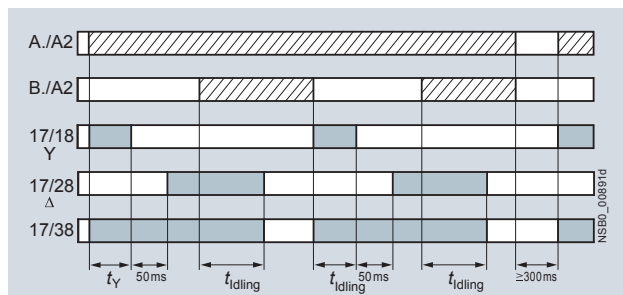
Possibilities of operation of the 3RP2560-.SW30 timing relay

Operation 1: Start contact B./A2 is open when control supply voltage A./A2 is applied

The control supply voltage is applied to A./A2 and there is no control signal on B./A2. This starts the $\Upsilon\Delta$ timing. The idling time (coasting time) is started by applying a control signal to B./A2. When the set time t_{idling} (30 ... 600 s) has elapsed, the output relays (17/38 and 17/28) are reset. If the control signal on B./A2 is switched off (minimum OFF period 270 ms), a new timing is started.

Note:

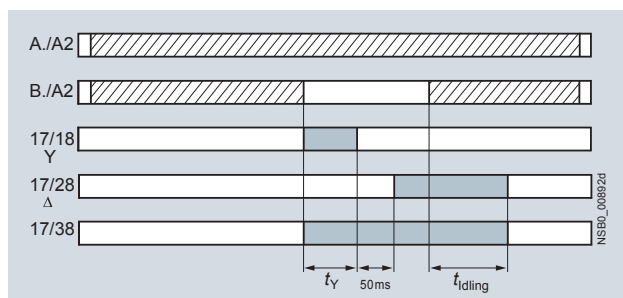
Observe response time (dead time) of 400 ms on energizing control supply voltage until contacts 17/18 and 17/16 close.



Operation 1

Operation 2: Start contact B./A2 is closed when control supply voltage A./A2 is applied

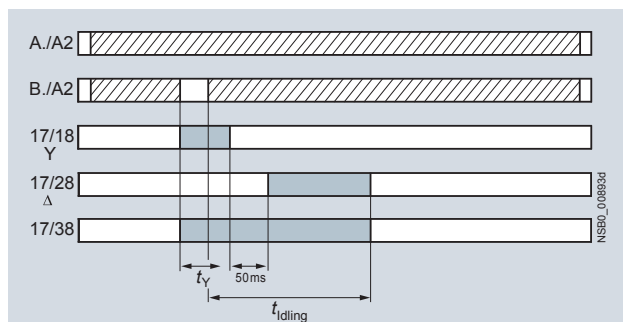
If the control signal B./A2 is already present when the control supply voltage A./A2 is applied, **no** timing is started. The timing is only started when the control signal B./A2 is switched off.



Operation 2

Operation 3: Start contact B./A2 closes while star time is running

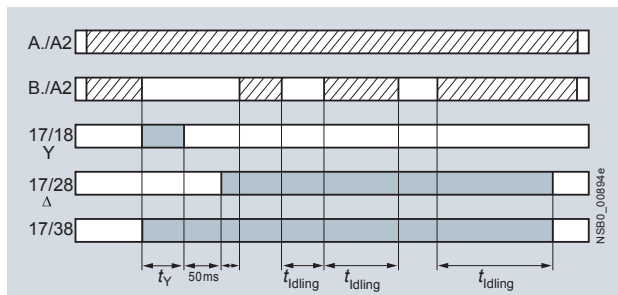
If the control signal B./A2 is applied again during the star time, the idling time starts and the timing is terminated normally.



Operation 3

Operation 4: Start contact B./A2 opens while delta time is running and is applied again

If the control signal on B./A2 is applied and switched off again during the delta time, although the idling time has not yet elapsed, the idling time (coasting time) is reset to zero. If the control signal is re-applied to B./A2, the idling time is restarted.



Operation 4

Legend

- Timing relay energized
- Contact closed
- Contact open

t_Y = Star time 1 ... 20 s

t_{idling} = Idling time (coasting time) 30 ... 600 s

Note:

The following applies to all operations: The pressure switch controls the timing via B./A2.

Application example based on standard operation (operation 1): For example, use of 3RP2560 for compressor control

Frequent starting of compressors strains the network, the machine, and the increased costs for the operator. The new timing relay prevents frequent starting at times when there is high demand for compressed air. A special control circuit prevents the compressor from being switched off immediately when the required air pressure in the tank has been reached. Instead, the valve in the intake tube is closed and the compressor runs in "Idling" mode, i.e. in no-load operation for a specific time which can be set from 30 ... 600 s.

If the pressure falls within this time, the motor does not have to be restarted again, but can return to nominal load operation from no-load operation.

If the pressure does not fall within this idling time, the motor is switched off.

The pressure switch controls the timing via B./A2.

The control supply voltage is applied to A./A2 and the start contact B./A2 is open, i.e. there is no control signal on B./A2 when the control supply voltage is applied. The pressure switch signals "too little pressure in system" and starts the timing by way of terminal B./A2. The compressor is started, enters $\Upsilon\Delta$ operation, and fills the pressure tank.

When the pressure switch signals "sufficient pressure", the control signal B./A2 is applied, the idling time (coasting time) is started, and the compressor enters no-load operation for the set period of time from 30 ... 600 s. The compressor is then switched off. The compressor is only restarted if the pressure switch responds again (low pressure).

Timing Relays

3RP25 timing relays, 17.5 mm and 22.5 mm

Selection and ordering data



3RP2505-2AB30



3RP2505-2BB30



3RP2525-2AW30



3RP2540-2AW30



3RP2555-2AW30



3RP2576-2NW30

PU (UNIT, SET, M) = 1
PS* = 1 unit
PG = 41H

Number of NO contacts		Number of CO contacts		Semi-conductor output	Adjustable time	Control supply voltage		DT	Screw terminals		DT	Spring-type terminals (push-in)	
Instantaneous switching	Delayed switching	Instantaneous switching	Delayed switching			At AC 50/60 Hz	At DC		Article No.	Price per PU		Article No.	Price per PU
						V	V						

3RP2505-.A and 3RP2505-.C timing relays, 13 functions

The functions can be adjusted by means of function selector switches on the device. With a set of foil labels the timing relay can be legibly marked with the functions which can be selected on the timing relay. This is supplied together with the multifunctional timing relay. The same potential must be applied to terminals A. and B. Functions, [see the overview of functions on page 10/41](#)

0	0	0	1	--	0.05 s ... 100 h	24	24	A	3RP2505-1AB30	A	3RP2505-2AB30
					12 ... 240	12 ... 240	A		3RP2505-1AW30	A	3RP2505-2AW30
0	1	0	0	✓	0.05 s ... 100 h	12 ... 240	12 ... 240	A	3RP2505-1CW30	A	3RP2505-2CW30

3RP2505-.R timing relays suitable for railway applications, 13 functions

Start of delivery planned for 11/2015

The functions can be adjusted by means of function selector switches on the device. With a set of foil labels the timing relay can be legibly marked with the functions which can be selected on the timing relay. This is supplied together with the multifunctional timing relay. The same potential must be applied to terminals A. and B. Functions, [see the overview of functions on page 10/41](#)

0	0	--	2 ¹⁾	--	0.05 s ... 100 h	24 ... 240	24 ... 240	A	3RP2505-1RW30	A	3RP2505-2RW30
---	---	----	-----------------	----	------------------	------------	------------	---	---------------	---	---------------

3RP2505-.B timing relay, 27 functions

The functions can be adjusted by means of function selector switches on the device. With a set of foil labels the timing relay can be legibly marked with the functions which can be selected on the timing relay. This is supplied together with the multifunctional timing relay. The same potential must be applied to terminals A. and B. Functions, [see the overview of functions on page 10/41](#)

0	0	--	2 ²⁾	--	0.05 s ... 100 h	24	24	A	3RP2505-1BB30	A	3RP2505-2BB30
					400 ... 440	--	--	A	3RP2505-1BT20	A	3RP2505-2BT20
					12 ... 240	12 ... 240	A		3RP2505-1BW30	A	3RP2505-2BW30

3RP251. and 3RP252. timing relays, ON-delay

0	0	0	1	--	0.5 ... 10 s	12 ... 240	12 ... 240	A	3RP2511-1AW30	A	3RP2511-2AW30
					1 ... 30 s	12 ... 240	12 ... 240	A	3RP2512-1AW30	A	3RP2512-2AW30
					5 ... 100 s	12 ... 240	12 ... 240	A	3RP2513-1AW30	A	3RP2513-2AW30
					0.05 s ... 100 h	12 ... 240	12 ... 240	A	3RP2525-1AW30	A	3RP2525-2AW30
0	0	0	2	--	0.05 s ... 100 h	24	24	A	3RP2525-1BB30	A	3RP2525-2BB30
					12 ... 240	12 ... 240	A		3RP2525-1BW30	A	3RP2525-2BW30
0	1	0	0	✓	0.05 s ... 240 s	12 ... 240	12 ... 240	A	3RP2527-1EW30	A	3RP2527-2EW30

3RP2535 timing relays, OFF-delay with control signal

0	0	0	1	--	0.05 s ... 100 h	12 ... 240	12 ... 240	A	3RP2535-1AW30	A	3RP2535-2AW30
---	---	---	---	----	------------------	------------	------------	---	---------------	---	---------------

3RP2540 timing relays, OFF-delay, without control signal, non-volatile, passing make contact

0	0	0	1	--	0.05 s ... 600 s	24	24	A	3RP2540-1AB30	A	3RP2540-2AB30
					12 ... 240	12 ... 240	A		3RP2540-1AW30	A	3RP2540-2AW30
0	0	0	2	--	0.05 s ... 600 s	24	24	A	3RP2540-1BB30	A	3RP2540-2BB30
					12 ... 240	12 ... 240	A		3RP2540-1BW30	A	3RP2540-2BW30

3RP2555 timing relays, clock-pulse relay, flashing, asymmetrical

0	0	0	1	--	0.05 s ... 100 h	12 ... 240	12 ... 240	A	3RP2555-1AW30	A	3RP2555-2AW30
---	---	---	---	----	------------------	------------	------------	---	---------------	---	---------------

3RP2560 timing relays, wye-delta function with overtravel function (idling)

1	2	0	0	--	1 ... 20 s	12 ... 240	12 ... 240	A	3RP2560-1SW30	A	3RP2560-2SW30
---	---	---	---	----	------------	------------	------------	---	---------------	---	---------------

3RP257. timing relays, wye-delta function

1	1	0	0	--	1 ... 20 s	380 ... 440 ³⁾	--	A	3RP2574-1NM20	A	3RP2574-2NM20
					12 ... 240	12 ... 240	A		3RP2574-1NW30	A	3RP2574-2NW30
1	1	0	0	--	3 ... 60 s	380 ... 440 ³⁾	--	A	3RP2576-1NM20	A	3RP2576-2NM20
					12 ... 240	12 ... 240	A		3RP2576-1NW30	A	3RP2576-2NW30

✓ Available

-- Not available

1) Positively-driven contacts.

2) Optionally 1 CO delayed + 1 CO instantaneous.











³⁾ With 3RP2574-.NM20 and 3RP2576-.NM20, connection of 200 ... 240 V AC, 50/60 Hz control voltage is also possible.

For accessories, [see page 11/38](#).

Timing Relays

3RP25 timing relays, 17.5 mm and 22.5 mm

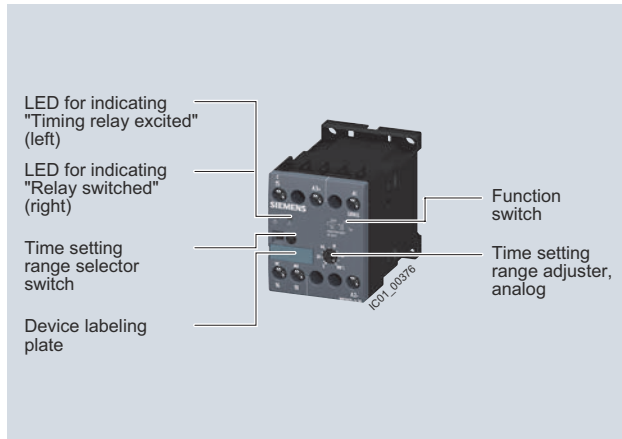
Accessories

Version	DT	Article No.	Price per PU	PU (UNIT, SET, M)	PS*	PG
Accessories for enclosures						
 3ZY1321-1AA00	Sealing covers • 17.5 mm					
	A	3ZY1321-1AA00		1	5 units	41L
 3ZY1321-2AA00	• 22.5 mm					
	A	3ZY1321-2AA00		1	5 units	41L
 3ZY1311-0AA00	Push-in lugs For wall mounting					
	A	3ZY1311-0AA00		1	10 units	41L
 3ZY1440-0AA00	Coding pins For removable terminals of SIRIUS devices in the industrial standard mounting rail enclosure; enable the mechanical coding of terminals					
	A	3ZY1440-1AA00		1	12 units	41L
Terminals for SIRIUS devices in the industrial standard mounting rail enclosure						
 3ZY1122-1BA00	Removable terminals • 2-pole, screw terminals 1 x 4 mm ²					
	A	Screw terminals  3ZY1122-1BA00		1	6 units	41L
 3ZY1122-2BA00	• 2-pole, push-in terminals 1 x 4 mm ²					
	A	Spring-type terminals (push-in)  3ZY1122-2BA00		1	6 units	41L
Tools for opening spring-type terminals						
 3RA2908-1A	Screwdrivers For all SIRIUS devices with spring-type terminals; 3.0 mm x 0.5 mm; length approx. 200 mm, titanium gray/black, partially insulated					
	A	Spring-type terminals  3RA2908-1A		1	1 unit	41B

Timing Relays

3RP20 timing relays, 45 mm

Overview



SIRIUS 3RP20 timing relays

SIRIUS 3RP20 electronic timing relays for use in control systems and mechanical engineering with:

- 1 or 2 CO contacts
- Multifunction or monofunction
- Wide voltage range or combination voltage
- Single or selectable time setting ranges
- Switch position indication and voltage indication by LED

Standards

The timing relays comply with:

- IEC 60721-3-3 "Classification of environmental conditions"
- IEC 61812-1 "Time relays for industrial and residential use"
- IEC 61000-6-2 and EN 61000-6-4 "Electromagnetic compatibility"
- IEC 60947-5-1 "Low-voltage switchgear and controlgear – Electromechanical control circuit devices"
- IEC 60947-1, Appendix N "Protective separation"

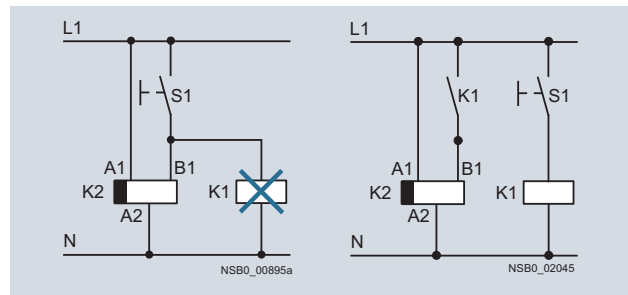
Multifunction

The functions of the 3RP2005 multifunctional timing relays can be set by means of the function selector switch. Insert labels can be used to adjust different functions of the timing relay clearly and unmistakably. The corresponding labels can be ordered as an accessory. The same potential must be applied to terminals A. and B.

For functions, see 3RP2901 label set, page 11/44.

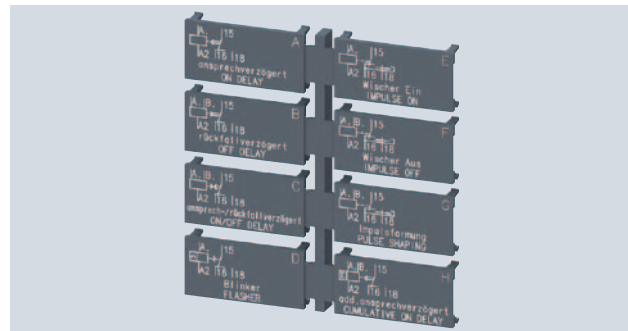
Note:

The activation of loads parallel to the start input is not permissible when using AC control voltage (see diagrams).



Diagrams

Accessories



Label set for marking the multifunctional relay

Article No. scheme

Digit of the Article No.	1st - 5th	6th	7th	8th	9th	10th	11th	12th
	□□□□□	□	□	-	□	□	□	0
SIRIUS timing relays, enclosure 45 mm	3 R P 2 0							
Functions/time setting ranges		□	□					
Connection type					□			
Contacts						□		
Rated control supply voltage							□	□
Example	3 R P 2 0 5 - 1 A P 3 0							

Note:

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

For your orders, please use the article numbers quoted in the catalog in the Selection and ordering data.

Benefits

- Suitable for 3RT miniature contactors
- Uniform design
- Ideal for small distance between standard mounting rails and/or for low mounting depth, e.g. in control boxes
- Labels are used on the multifunctional time relay to document the function that has been set

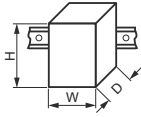


Timing Relays

3RP20 timing relays, 45 mm

Application

Timing relays are used in control, starting, and protective circuits for all switching operations involving time delays. They guarantee a high level of functionality and a high repeat accuracy of timer settings.

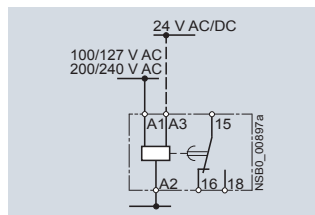
Technical specifications

Type	3RP2005, 3RP2025	
Dimensions (W x H x D)		mm 45 x 57 x 73
Rated insulation voltage Pollution degree 3 Overvoltage category III	V AC	300
Permissible ambient temperature • During operation • During storage	°C °C	-25 ... +60 -40 ... +85
Operating range at excitation¹⁾		0.85 ... 1.1 x U_N at AC; 0.8 ... 1.25 x U_N at DC; 0.95 ... 1.05 times the rated frequency
Mechanical endurance	Operating cycles	10 x 10 ⁶
Electrical endurance at I_N	Operating cycles	1 x 10 ⁵
Connection type	 Screw terminals	
• Terminal screw • Solid • Finely stranded with end sleeve • Stranded • AWG cables • Tightening torque	mm ² mm ² AWG AWG Nm	M3 (for standard screwdriver, size 2 and Pozidriv 2) 2 x (0.5 ... 1.5) ²⁾ , 2 x (0.75 ... 2.5) ²⁾ 2 x (0.5 ... 1.5) ²⁾ , 2 x (0.75 ... 2.5) ²⁾ 2 x (0.5 ... 1.5) ²⁾ , 2 x (0.75 ... 2.5) ²⁾ 2 x (18 ... 14) 0.8 ... 1.2
Connection type	 Spring-type terminals	
• Solid • Finely stranded with end sleeve • Finely stranded without end sleeve • AWG cables, solid or stranded • Max. external diameter of the conductor insulation	mm ² mm ² mm ² AWG mm	2 x (0.25 ... 2.5) 2 x (0.25 ... 1.5) 2 x (0.25 ... 2.5) 2 x (24 ... 14) 3.6

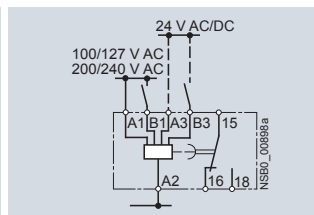
¹⁾ If nothing else is stated.

²⁾ If two different conductor cross-sections are connected to one clamping point, both cross-sections must lie in one of the ranges specified.

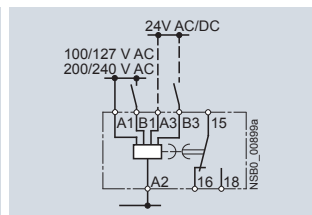
3RP20 internal circuit diagrams



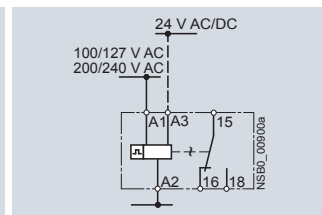
3RP2005, 3RP2025
ON-delay



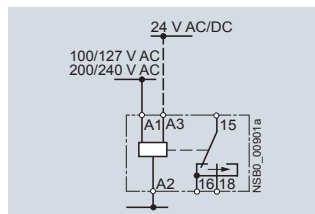
3RP2005
OFF-delay
with control signal



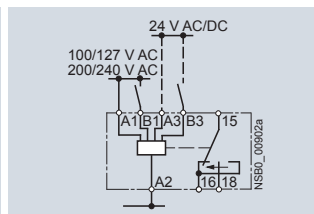
3RP2005
ON-delay and OFF-delay
with control signal



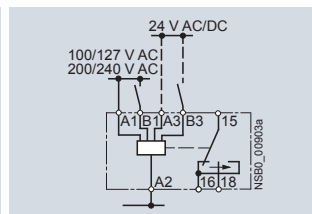
3RP2005
Flashing, starting with interval



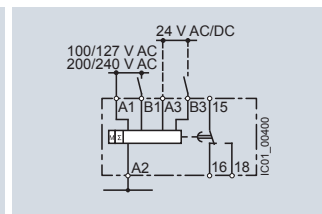
3RP2005
Passing make contact



3RP2005
Passing break contact
with control signal



3RP2005
Pulse-forming
with control signal



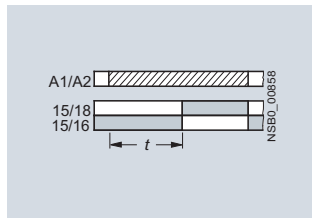
3RP2005
Additive ON-delay
with control signal

Timing Relays

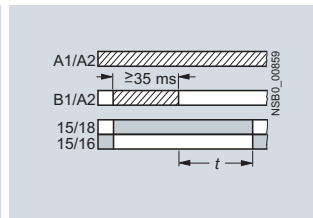
3RP20 timing relays, 45 mm

3RP20 function diagrams and 3RP2901 label set

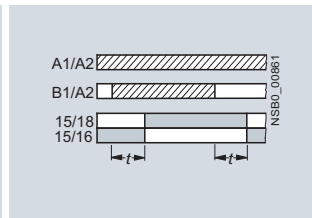
1 CO contact



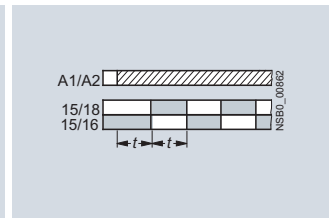
A
3RP2005-.A, 3RP2025
ON-delay



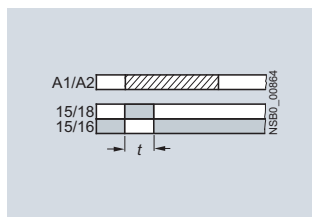
B¹⁾
3RP2005-.A
OFF-delay with control signal



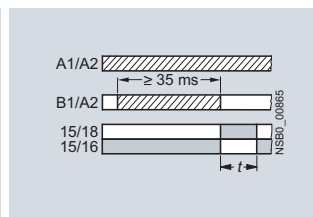
C¹⁾
3RP2005-.A
ON-delay and OFF-delay
with control signal ($t = t_{on} = t_{off}$)



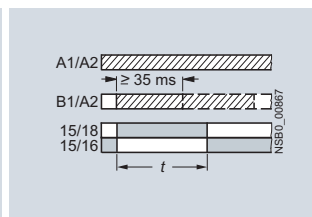
D
3RP2005-.A
Flashing, starting with interval
(pulse/interval 1:1)



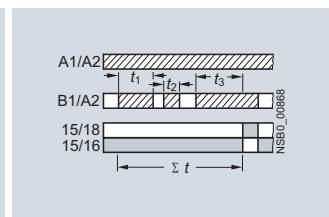
E
3RP2005-.A
Passing make contact



F¹⁾
3RP2005-.A
Passing break contact
with control signal



G¹⁾
3RP2005-.A
Pulse-forming with control signal
(pulse generation at the output does
not depend on duration of energizing)



H¹⁾
3RP2005-.A
Additive ON-delay with control signal

Legend

A ... H Identification letters for 3RP2005

Timing relay energized

Contact closed

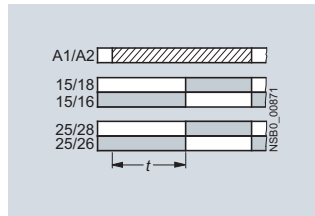
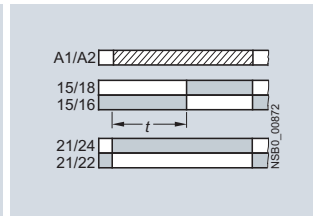
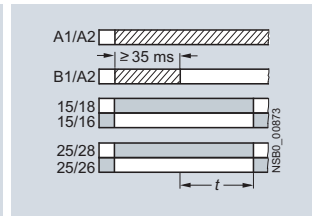
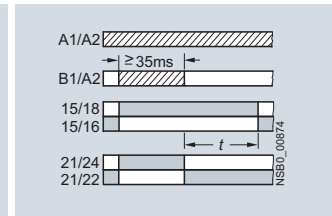
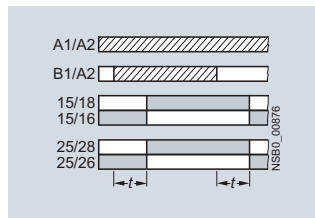
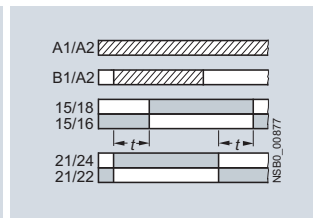
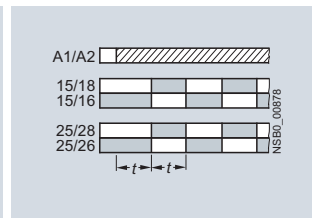
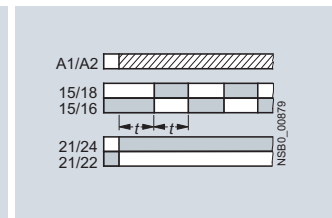
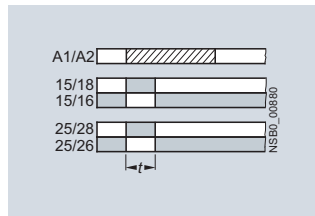
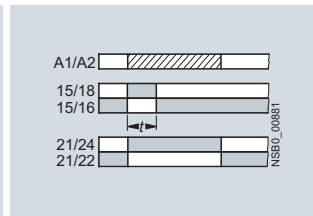
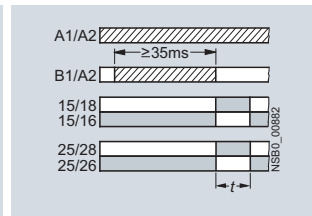
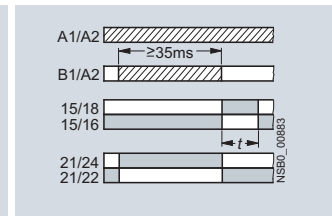
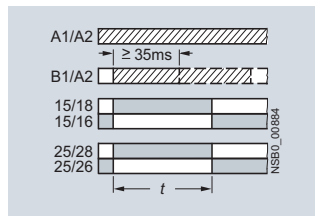
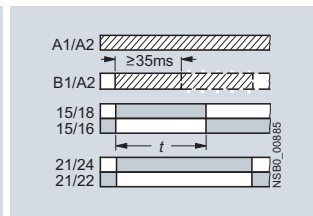
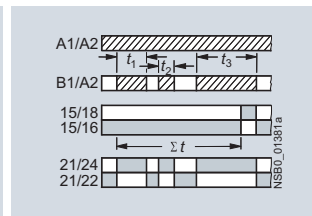
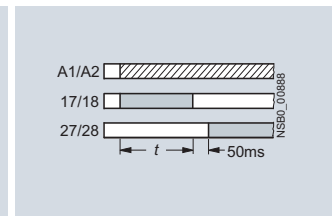
Contact open

¹⁾ Note on function with start contact: A new control signal at terminal B, after the operating time has started, resets the operating time to zero (retriggerable). This does not apply to G, G● and H●, which are not retriggerable.

Timing Relays

3RP20 timing relays, 45 mm

2 CO contacts

**A**3RP2005-.B
ON-delay**A•**3RP2005-.B
ON-delay and instantaneous contact**B¹⁾**3RP2005-.B
OFF-delay with control signal**B•¹⁾**3RP2005-.B
OFF-delay with control signal
and instantaneous contact**C¹⁾**3RP2005-.B
ON-delay and OFF-delay
with control signal ($t = t_{on} = t_{off}$)**C•¹⁾**3RP2005-.B
ON-delay and OFF-delay
with control signal and instantaneous
contact
($t = t_{on} = t_{off}$)**D**3RP2005-.B
Flashing, starting with interval
(pulse/interval 1:1)**D•**3RP2005-.B
Flashing, starting with interval
(pulse/interval 1:1) and instantaneous
contact**E**3RP2005-.B
Passing make contact**E•**3RP2005-.B
Passing make contact and
instantaneous contact**F¹⁾**3RP2005-.B
Passing break contact
with control signal**F•¹⁾**3RP2005-.B
Passing break contact
with control signal
and instantaneous contact**G¹⁾**3RP2005-.B
Pulse-forming with control signal
(pulse generation at the output does
not depend on duration of energizing)**G•¹⁾**3RP2005-.B
Pulse-forming with control signal
and instantaneous contact (pulse
generation at the output does not
depend on duration of energizing)**H•¹⁾**3RP2005-.B
Additive ON-delay with control signal
and instantaneous contact**YΔ**3RP2005-.B
Wye-delta function

Legend

A ... H Identification letters for 3RP2005

▨ Timing relay energized

■ Contact closed

□ Contact open

¹⁾ Note on function with start contact: A new control signal at terminal B, after the operating time has started, resets the operating time to zero (retriggerable). This does not apply to G, G• and H•, which are not retriggerable.

Timing Relays

3RP20 timing relays, 45 mm

Selection and ordering data

PU (UNIT, SET, M) = 1
 PS* = 1 unit
 PG = 41H



3RP2005-1AP30



3RP2005-1BW30



3RP2005-2AP30



3RP2025-2BW30

Version	Time setting range t	Rated control supply voltage U_s		DT	Screw terminals	DT	Spring-type terminals
		50/60 Hz AC	DC				
		V	V		Article No.	Price per PU	Article No.
							Price per PU

3RP2005 timing relays, multifunction, 15 time setting ranges

The functions can be adjusted by means of rotary switches. Insert labels can be used to adjust different functions of the 3RP2005 timing relay clearly and unambiguously. The corresponding labels can be ordered as an accessory. The same potential must be applied to terminals A. and B.
 For functions, see 3RP2901 label set, page 11/44.

With LED and 1 CO contact ¹⁾ , 8 functions	0.05 ... 1 s 0.15 ... 3 s 0.5 ... 10 s 1.5 ... 30 s	24/100 ... 127 24/200 ... 240	24 24	▶	3RP2005-1AQ30 3RP2005-1AP30	A	3RP2005-2AQ30 3RP2005-2AP30
With LED and 2 CO contacts, 16 functions	0.05 ... 1 min 5 ... 100 s 0.15 ... 3 min 0.5 ... 10 min 1.5 ... 30 min 0.05 ... 1 h 5 ... 100 min 0.15 ... 3 h 0.5 ... 10 h 1.5 ... 30 h 5 ... 100 h ∞ ²⁾	24 ... 240 ³⁾	24 ... 240 ⁴⁾	▶	3RP2005-1BW30	A	3RP2005-2BW30

3RP2025. timing relays, ON-delay, 15 time setting ranges

With LED and 1 CO contact ¹⁾	0.05 ... 1 s 0.15 ... 3 s 0.5 ... 10 s 1.5 ... 30 s 0.05 ... 1 min 5 ... 100 s 0.15 ... 3 min 0.5 ... 10 min 1.5 ... 30 min 0.05 ... 1 h 5 ... 100 min 0.15 ... 3 h 0.5 ... 10 h 1.5 ... 30 h 5 ... 100 h ∞ ²⁾	24/100 ... 127 24/200 ... 240	24 24	▶	3RP2025-1AQ30 3RP2025-1AP30	▶	3RP2025-2AQ30 3RP2025-2AP30
---	--	----------------------------------	----------	---	--------------------------------	---	--------------------------------

For accessories, see page 11/44.

¹⁾ Units with protective separation.

²⁾ With switch position ∞ no timing. For test purposes (ON/OFF function) on site. Relay is constantly on when activated, or relay remains constantly off when activated. Depending on which function is set.

³⁾ Operating range 0.8 to 1.1 x U_s .

⁴⁾ Operating range 0.7 to 1.1 x U_s .

Timing Relays

3RP20 timing relays, 45 mm

11

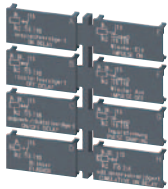
RELAYS, INTERFACES
& CONVERTERS

Accessories

Version	Function	Identifi- cation letter	Use	DT	Article No.	Price per PU	PU (UNIT, SET, M)	PS*	PG
---------	----------	-------------------------------	-----	----	-------------	-----------------	-------------------------	-----	----

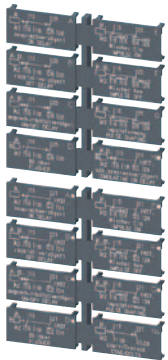
Label sets for 3RP20

Accessories for 3RP20 (not included in the scope of supply).
The label set offers the possibility of labeling timing relays
with the set function in English and German.



3RP2901-0A

1 label set (1 unit) with 8 functions	ON-delay OFF-delay with control signal ON-delay and OFF-delay with control signal Flashing, starting with interval Passing make contact Passing break contact with control signal Pulse-forming with control signal Additive ON-delay with control signal	A B C D E F G H	For devices with 1 CO	C	3RP2901-0A		1	5 units	41H
--	---	--------------------------------------	-----------------------------	---	-------------------	--	---	---------	-----



3RP2901-0B

1 label set (1 unit) with 16 functions	ON-delay OFF-delay with control signal ON-delay and OFF-delay with control signal Flashing, starting with interval Passing make contact Passing break contact with control signal Pulse-forming with control signal ON-delay and instantaneous con- tact OFF-delay with control signal and instantaneous contact ON-delay and OFF-delay with control signal and instantaneous contact Flashing, starting with interval, and instantaneous contact Passing make contact and instan- taneous contact Passing break contact with control signal and instantaneous contact Pulse-forming with control signal and instantaneous contact Additive ON-delay with control signal and instantaneous contact Wye-delta function	A B C D E F G A• B• C• D• E• F• G• H• YΔ	For devices with 2 CO contacts	C	3RP2901-0B		1	5 units	41H
---	---	---	---	---	-------------------	--	---	---------	-----

Blank inscription labels for 3RP20

Blank labels, 20 mm x 7 mm, pastel turquoise ¹⁾	For 3RP20	D	3RT1900-1SB20	100	340 units	41B
---	-----------	---	----------------------	-----	-----------	-----

¹⁾ PC labeling system for individual inscription of unit
labeling plates available from:
murrplastik Systemtechnik GmbH

Timing Relays

7PV15 timing relays in enclosure, 17.5 mm

Overview



7PV15 timing relay

Electronic timing relays for general use and in control systems, mechanical engineering and infrastructure with:

- 1 or 2 CO contacts
- Multifunction or monofunction
- Wide voltage range or combination voltage
- Single or selectable time setting ranges
- Switch position indication and voltage indication by LED

Standards

The timing relays comply with:

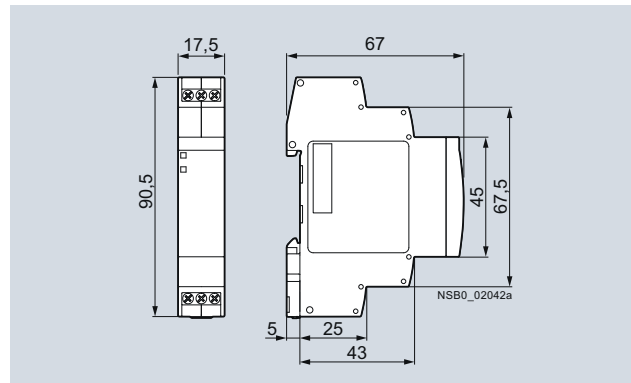
- IEC 60721-3-3 "Classification of environmental conditions"
- IEC 61812-1 "Time relays for industrial and residential use"
- IEC 61000-6-2 and EN 61000-6-4 "Electromagnetic compatibility"
- IEC 60947-5-1 "Low-voltage switchgear and controlgear – Electromechanical control circuit devices"
- DIN 43880 "Built-in equipment for electrical installations; overall dimensions and related mounting dimensions"

Multifunction

The functions of the 7PV1508-1A multifunctional timing relays can be set by means of rotary switches. The identification letters A to G are printed on the front alongside the rotary selector switch of the unit. The related function can be found in the form of a bar graph on the side of the device.

Enclosure version

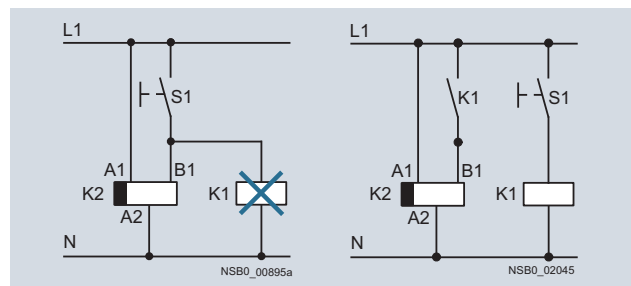
All timing relays are suitable for snap-on mounting onto TH 35 standard mounting rails according to IEC 60715. The enclosure complies with DIN 43880, 1 MW.



Dimensions

Note:

The activation of loads parallel to the start input is not permissible when using AC control voltage (see diagrams).



Diagrams

Article No. scheme

Digit of the Article No.	1 st - 5 th	6 th	7 th	8 th	9 th	10 th	11 th	12 th
	□□□□□	□	□	-	□	□	□	0
Timing relays in industrial enclosure, 17.5 mm	7 P V 1 5							
Functions/time setting ranges	□ □							
Connection type	□							
Contacts	□							
Rated control supply voltage	□ □							
Example	7 P V 1 5 0 8 - 1 A W 3 0							

Note:

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

For your orders, please use the article numbers quoted in the catalog in the Selection and ordering data.

Timing Relays

7PV15 timing relays in enclosure, 17.5 mm


Benefits

- Wide voltage range 12 to 240 V AC/DC
- High switching capacity, e.g. AC-15 at 230 V, 3 A
- Combination voltage, e.g. 24 V AC/DC and 200 to 240 V AC
- Changes to the time setting range during operation
- Changes to the function in the de-energized state
- High level of functionality and a high repeat accuracy of timer settings
- Integrated surge suppressor
- Function charts printed on the side of the device for reliable device adjustment

Application

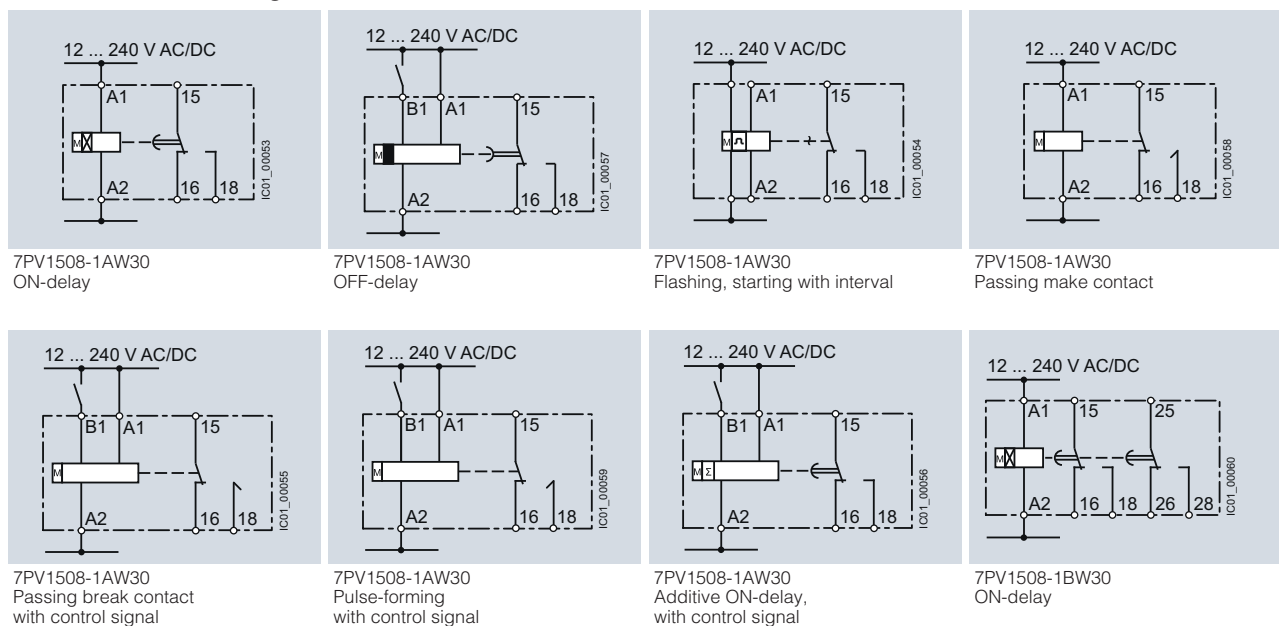
Timing relays are used in control, starting and protective circuits for all switching operations involving time delays, e.g. in non-residential buildings, airports, industrial buildings etc.

Technical specifications

Type	7PV15	
Rated insulation voltage Pollution degree 2, overvoltage category III	V AC	300
Permissible ambient temperature	°C	-25 ... +55
• During operation	°C	-40 ... +70
• During storage		
Operating range at excitation¹⁾		0.85 ... 1.1 x U_N at V AC/DC, 50/60 Hz 0.8 ... 1.25 x U_N 24 V DC 0.95 ... 1.05 times the rated frequency
Rated operational current I_e		
• AC-15 at 24 ... 240 V, 50 Hz	A	3
• DC-13 at		
- 24 V	A	1
- 125 V	A	0.2
Uninterrupted thermal current I_{th}	A	5
Mechanical endurance	Operating cycles	1 x 10 ⁶
Electrical endurance at I_e	Operating cycles	1 x 10 ⁵
Connection type	 Screw terminals	
• Terminal screw		M3 (for standard screwdriver, size 2 and Pozidriv 2)
• Solid	mm ²	1 x (0.2 ... 2.5)
• Finely stranded with end sleeve	mm ²	1 x (0.25 ... 1.5)
• Finely stranded without end sleeve	mm ²	1 x (0.2 ... 1.5)
• AWG cables, solid or stranded	AWG	1 x (24 ... 14)
• Tightening torque	Nm	0.4 ... 0.5

¹⁾ If nothing else is stated.

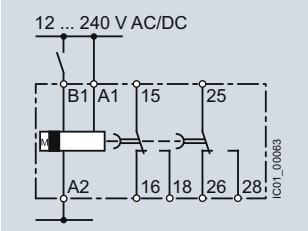
7PV15 internal circuit diagrams



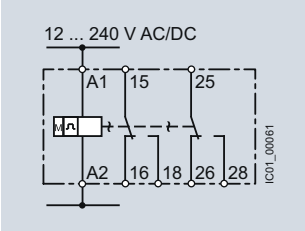
Timing Relays

7PV15 timing relays in enclosure, 17.5 mm

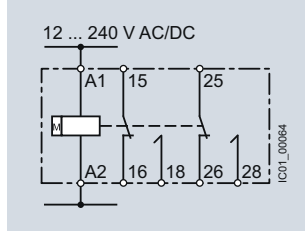
7PV15 internal circuit diagrams (continued)



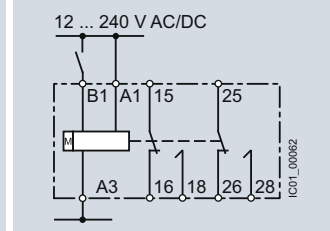
7PV1508-1BW30
OFF-delay
with control signal



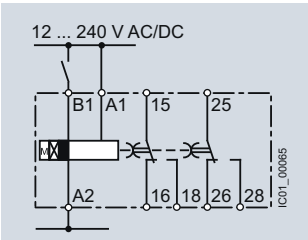
7PV1508-1BW30
Flashing,
starting with interval



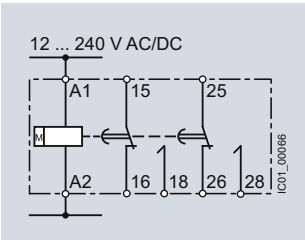
7PV1508-1BW30
Passing make contact



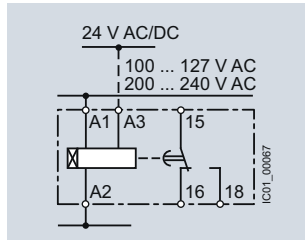
7PV1508-1BW30
Pulse-forming
with control signal



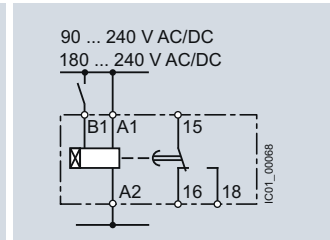
7PV1508-1BW30
ON and OFF-delay



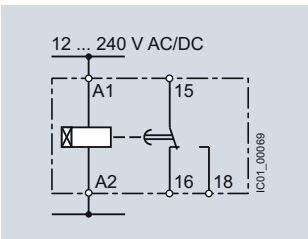
7PV1508-1BW30
Fixed pulse after ON-delay



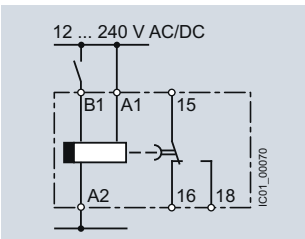
7PV151.-1AQ30, 7PV151.-1AP30
ON-delay



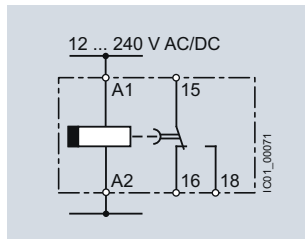
7PV1518-1AJ30, 7PV1518-1AN30
ON-delay



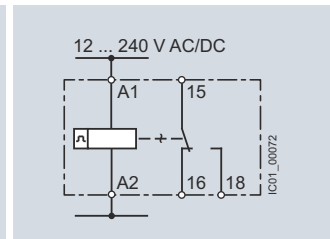
7PV1518-1AW30
ON-delay



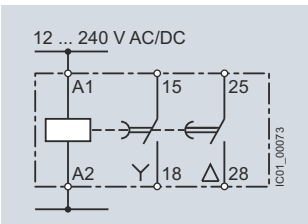
7PV1538-1AW30
OFF-delay
with control signal



7PV1540-1AW30
OFF-delay
without control signal



7PV1558-1AW30
Clock-pulse relay



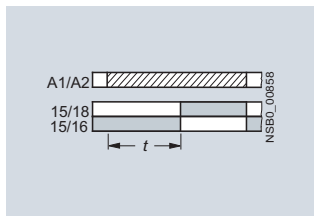
7PV1578-1BW30
Wye-delta

Timing Relays

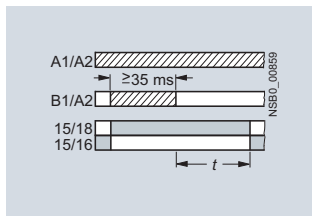
7PV15 timing relays in enclosure, 17.5 mm

7PV15 function diagrams

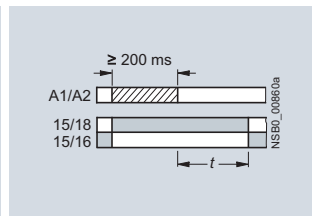
1 CO contact



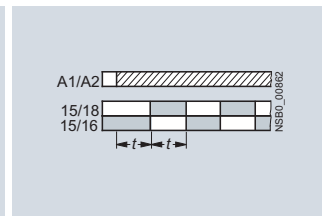
A
7PV1508-1A, 7PV1511, 7PV1512,
7PV1513, 7PV1518
ON-delay



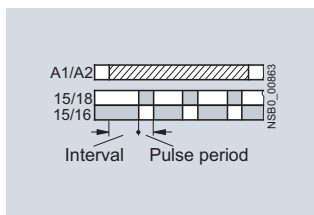
B¹⁾
7PV1508-1A, 7PV1538
OFF-delay with control signal



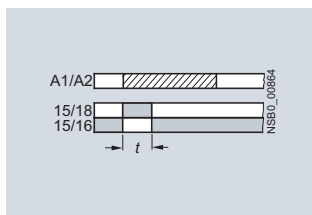
--
7PV1540
OFF-delay without control signal



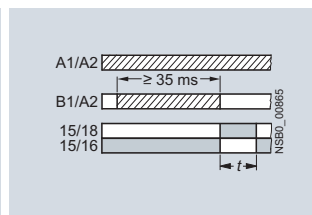
C
7PV1508-1A
Flashing, starting with interval
(pulse/interval 1:1)



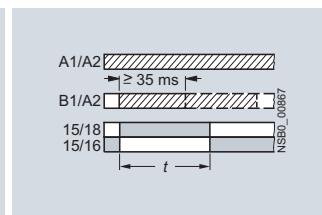
--
7PV1558
Clock-pulse, starting with interval
(dead period, pulse time, and time
setting ranges each separately
adjustable)



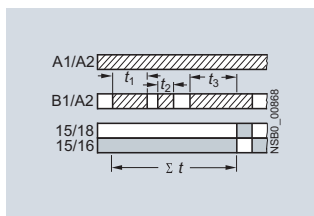
D
7PV1508-1A
Passing make contact



E¹⁾
7PV1508-1A
Passing break contact with control
signal



F¹⁾
7PV1508-1A
Pulse-forming with control signal
(pulse generation at the output does
not depend on duration of energizing)



G¹⁾
7PV1508-1A
Additive ON-delay with control signal

Legend

A ... G Identification letters for 7PV1508

▨ Timing relay energized

■ Contact closed

□ Contact open

¹⁾ Note on function with start contact: A new control signal at terminal B, after the operating time has started, resets the operating time to zero (retriggerable). This does not apply to E, F and G, which are not retriggerable.

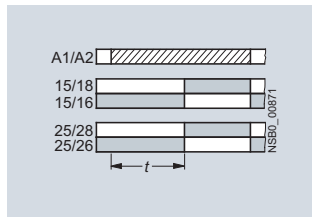
Note:

With the 7PV1508-1A multifunctional relay the identification letters A to G are printed on the front alongside the rotary selector switch of the unit. The related function can be found in the form of a bar graph on the side of the device.

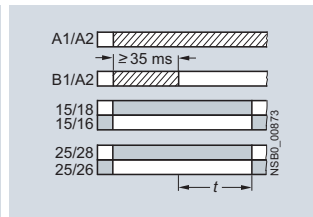
Timing Relays

7PV15 timing relays in enclosure, 17.5 mm

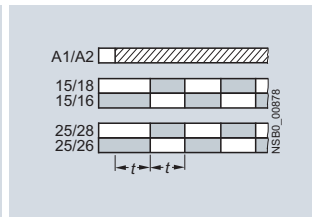
2 CO contacts



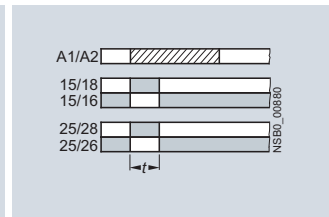
A
7PV1508-1B
ON-delay



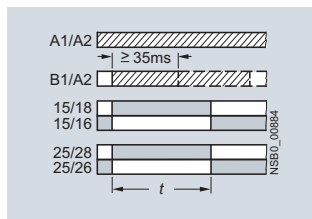
B¹⁾
7PV1508-1B
OFF-delay with control signal



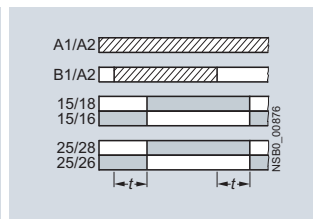
C
7PV1508-1B
Flashing, starting with interval
(pulse/interval 1:1)



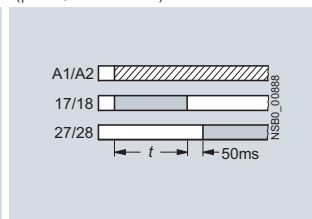
D
7PV1508-1B
Passing make contact



F¹⁾
7PV1508-1B
Pulse-forming with control signal
(pulse generation at the output does
not depend on duration of
energizing)

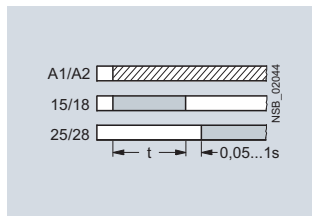


H¹⁾
7PV1508-1B
ON-delay and OFF-delay
with control signal



I
7PV1508-1B
Fixed pulse after ON-delay

2 NO contacts



--
7PV1578
Wye-delta function²⁾

Legend

A ... D, F, H, I Identification letters for 7PV1508

Timing relay energized

Contact closed

Contact open

¹⁾ Note on function with start contact: A new control signal at terminal B, after the operating time has started, resets the operating time to zero (retriggerable). This does not apply to E, F and G, which are not retriggerable.

²⁾ With 7PV1578 the contacts 16 and 26 are not needed for the wye-delta function.

Note:

With the 7PV1508-1B multifunctional relay the identification letters A to D, F, H, I are printed on the front alongside the rotary selector switch of the unit. The related function can be found in the form of a bar graph on the side of the device.

Timing Relays

7PV15 timing relays in enclosure, 17.5 mm

Selection and ordering data



7PV1508-1AW30



7PV1512-1AP30



7PV1518-1AW30



7PV1538-1AW30



7PV1540-1AW30



7PV1558-1AW30



7PV1578-1BW30

Version	Time setting range t adjustable by rotary switch to	Rated control supply voltage U_s	DT	Screw terminals	PU (UNIT, SET, M)	PS*	PG
		50/60 Hz AC V	DC V	Article No.	Price per PU		

7PV1508 timing relays, multifunction, 7 time setting ranges

The functions can be adjusted by means of rotary switches. The same potential must be applied to terminals A. and B.

With LED and 1 CO contact, 7 functions	0.05 ... 1 s 0.5 ... 10 s 5 ... 100 s	12 ... 240	12 ... 240	▶	7PV1508-1AW30	1	1 unit	41H
With LED and 2 CO contacts, 7 functions	30 s ... 10 min 3 min ... 1 h 30 min ... 10 h 5 ... 100 h	12 ... 240	12 ... 240	▶	7PV1508-1BW30	1	1 unit	41H

7PV151. timing relays, ON-delay, 1 time setting range

With LED and 1 CO contact	0.05 ... 1 s	24/200 ... 240	24	▶	7PV1511-1AP30	1	1 unit	41H
	0.5 ... 10 s	24/100 ... 127	24	▶	7PV1512-1AQ30	1	1 unit	41H
		24/200 ... 240	24	▶	7PV1512-1AP30	1	1 unit	41H
	5 ... 100 s	24/100 ... 127	24	▶	7PV1513-1AQ30	1	1 unit	41H
		24/200 ... 240	24	▶	7PV1513-1AP30	1	1 unit	41H

7PV1518 timing relays, ON-delay, 7 time setting ranges

With LED and 1 CO contact	0.05 ... 1 s	12 ... 240	12 ... 240	▶	7PV1518-1AW30	1	1 unit	41H
	0.5 ... 10 s	90 ... 127	90 ... 127	▶	7PV1518-1AJ30	1	1 unit	41H
	5 ... 100 s	180 ... 240	180 ... 240	▶	7PV1518-1AN30	1	1 unit	41H
	30 s ... 10 min							
	3 min ... 1 h							
	30 min ... 10 h							
	5 ... 100 h							

7PV1538 timing relays, OFF-delay, with control signal, 7 time setting range

With LED and 1 CO contact	0.05 ... 1 s	12 ... 240	12 ... 240	▶	7PV1538-1AW30	1	1 unit	41H
	0.5 ... 10 s							
	5 ... 100 s							
	30 s ... 10 min							
	3 min ... 1 h							
	30 min ... 10 h							
	5 ... 100 h							

7PV1540 timing relays, OFF-delay, without control signal, 7 time setting ranges

With LED and 1 CO contact	0.05 ... 1 s	12 ... 240	12 ... 240	▶	7PV1540-1AW30	1	1 unit	41H
	0.15 ... 3 s							
	0.3 ... 6 s							
	0.5 ... 10 s							
	1.5 ... 30 s							
	3 ... 60 s							
	5 ... 100 s							

7PV1558 timing relays, clock-pulse relay, 7 time setting ranges

With LED and 1 CO contact	0.05 ... 1 s	12 ... 240	12 ... 240	▶	7PV1558-1AW30	1	1 unit	41H
	0.5 ... 10 s							
	5 ... 100 s							
	30 s ... 10 min							
	3 min ... 1 h							
	30 min ... 10 h							
	5 ... 100 h							

7PV1578 timing relays, wye-delta function, 7 time setting ranges

With LED and 2 NO contacts, dead interval 0.05 ... 1 s adjustable	0.05 ... 1 s	12 ... 240	12 ... 240	▶	7PV1578-1BW30	1	1 unit	41H
	0.5 ... 10 s							
	5 ... 100 s							
	30 s ... 10 min							
	3 min ... 1 h							
	30 min ... 10 h							
	5 ... 100 h							

3UG45, 3UG46 Monitoring Relays for Stand-Alone Installation

General data

Overview



SIRIUS 3UG4 monitoring relay

More information

Homepage, see www.siemens.com/relays

Industry Mall, see www.siemens.com/product?3UG45

For the conversion tool, e.g. from 3UG3 to 3UG4, see www.siemens.com/sirius/conversion-tool

The field-proven SIRIUS monitoring relays for electrical and mechanical variables enable constant monitoring of all important characteristic quantities that provide information about the functional capability of a plant. Both sudden disturbances and gradual changes, which may indicate the need for maintenance, are detected. Thanks to their relay outputs, the monitoring relays permit direct disconnection of the affected system components as well as alerting (e.g. by switching a warning lamp).

Thanks to adjustable delay times the monitoring relays can respond very flexibly to brief faults such as voltage dips or load changes. This avoids unnecessary alarms and disconnections while enhancing plant availability.

The individual 3UG4 monitoring relays offer the following functions in various combinations:

- Undershooting and/or overshooting of liquid levels
- Phase sequence
- Phase failure, neutral conductor failure
- Phase asymmetry
- Undershooting and/or overshooting of limit values for voltage
- Undershooting and/or overshooting of limit values for current
- Undershooting and/or overshooting of limit values for power factor
- Monitoring of the active current or the apparent current
- Monitoring of the residual current
- Monitoring of the insulation resistance
- Undershooting and/or overshooting of limit values for speed

Article No. scheme

Product versions		Article number									
Monitoring relays		3UG4	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	0
Type of setting	e.g. 5 = analogically adjustable		<input type="checkbox"/>								
Functions	e.g. 11 = line monitoring		<input type="checkbox"/>	<input type="checkbox"/>							
Connection type	Screw terminals							1			
	Spring-type terminals							2			
Contacts	e.g. A = 1 CO contact								<input type="checkbox"/>		
Supply voltage	e.g. N2 = 160 ... 260 V AC									<input type="checkbox"/>	<input type="checkbox"/>
Example		3UG4	5	1	1	-	1	A	N	2	0

Note:

The Article No. scheme shows an overview of product versions for better understanding of the logic behind the article numbers.

For your orders, please use the article numbers quoted in the selection and ordering data.

3UG45, 3UG46 Monitoring Relays for Stand-Alone Installation

General data

Benefits

- Customary screw and spring-type terminals for quick and reliable wiring
- Fast commissioning thanks to menu-guided parameterization and actual value display for limit value determination
- Reduced space requirement in the control cabinet thanks to a consistent width of 22.5 mm
- Parameterizable monitoring functions, delay times, RESET response, etc.
- Reduced stockkeeping thanks to minimized variance and large measuring ranges
- Wide-voltage power supply units for global applicability
- Device replacement without renewed wiring thanks to removable terminals
- Reliable system diagnostics thanks to actual value display and connectable fault memory
- Rapid diagnostics thanks to unambiguous error messages on the display

Application

The SIRIUS 3UG4 monitoring relays monitor the most diverse electrical and mechanical quantities in the feeder, and provide reliable protection against damage in the plant. For this purpose, they offer freely parameterizable limit values and diverse options for adapting to the respective task, and in the event of a fault, they provide clear diagnostics information.

The digitally adjustable products also display the current measured values direct on the device. This not only facilitates the display of valuable plant status information during operation, it also enables adjustment of the monitored limit values in accordance with the actual conditions.

The positive result: More selective avoidance of production faults – sustained increases in availability and productivity.

The 3UG4 monitoring relays are available for the following applications:

- Line and single-phase voltage monitoring
- Single-phase current monitoring or power factor and active current monitoring
- Residual current monitoring
- Insulation monitoring
- Level monitoring
- Speed monitoring

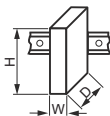


Technical specifications

More information

Technical specifications, see <https://support.industry.siemens.com/cs/ww/en/ps/16367/td>

Manual and internal circuit diagrams, see <https://support.industry.siemens.com/cs/ww/en/view/54397927>

FAQs, see <https://support.industry.siemens.com/cs/ww/en/ps/16367/faq>

Type	3UG		
General data			
Dimensions (W x H x D)			
• For 2 terminal blocks			
- Screw terminals		mm	22.5 x 83 x 91
- Spring-type terminals		mm	22.5 x 84 x 91
• For 3 terminal blocks			
- Screw terminals		mm	22.5 x 92 x 91
- Spring-type terminals		mm	22.5 x 94 x 91
• For 4 terminal blocks			
- Screw terminals	mm	22.5 x 103 x 91	
- Spring-type terminals	mm	22.5 x 103 x 91	
Permissible ambient temperature			
• During operation	°C	-25 ... +60	
Connection type		 Screw terminals	
• Terminal screw		M3 (for standard screwdriver, size 2 and Pozidriv 2)	
• Solid	mm ²	1 x (0.5 ... 4)/2 x (0.5 ... 2.5)	
• Finely stranded with end sleeve	mm ²	1 x (0.5 ... 2.5)/2 x (0.5 ... 1.5)	
• AWG cables, solid or stranded	AWG	2 x (20 ... 14)	
Connection type		 Spring-type terminals	
• Solid	mm ²	2 x (0.25 ... 1.5)	
• Finely stranded, with end sleeve acc. to DIN 46228	mm ²	2 x (0.25 ... 1.5)	
• Finely stranded	mm ²	2 x (0.25 ... 1.5)	
• AWG cables, solid or stranded	AWG	2 x (24 ... 16)	

3UG45, 3UG46 Monitoring Relays for Stand-Alone Installation

Line monitoring

Overview



SIRIUS 3UG4615 monitoring relay

Electronic line monitoring relays provide maximum protection for mobile machines and plants or for unstable networks. Network and voltage faults can thus be detected early and rectified before far greater damage ensues.

Depending on the version, the relays monitor phase sequence, phase failure with and without N conductor monitoring, phase asymmetry, undervoltage or overvoltage.

Phase asymmetry is evaluated as the difference between the greatest and the smallest phase voltage relative to the greatest phase voltage. Undervoltage or overvoltage exists when at least one phase voltage deviates by 20% from the set rated system voltage or the directly set limit values are overshoot or undershot. The rms value of the voltage is measured.

With the 3UG4617 or 3UG4618 relay, a wrong direction of rotation can also be corrected automatically.

Benefits

- Can be used without auxiliary voltage in any network from 160 to 630 V AC worldwide thanks to wide voltage range
- Variably adjustable to overshoot, undershoot or range monitoring
- Freely configurable delay times and RESET response
- Width 22.5 mm
- Permanent display of actual value and line fault type on the digital versions
- Automatic correction of the direction of rotation by distinguishing between power system faults and wrong phase sequence
- All versions with removable terminals
- All versions with screw or spring-type terminals

Application

The relays are used above all for mobile equipment, e.g. air conditioning compressors, refrigerating containers, building site compressors and cranes.

Function	Application
Phase sequence	<ul style="list-style-type: none"> • Direction of rotation of the drive
Phase failure	<ul style="list-style-type: none"> • A fuse has tripped • Failure of the control supply voltage • Broken cable
Phase asymmetry	<ul style="list-style-type: none"> • Overheating of the motor due to asymmetrical voltage • Detection of asymmetrically loaded networks
Undervoltage	<ul style="list-style-type: none"> • Increased current on a motor with corresponding overheating • Unintentional resetting of a device • Network collapse, particularly with battery power
Overvoltage	<ul style="list-style-type: none"> • Protection of a plant against destruction due to overvoltage

Technical specifications

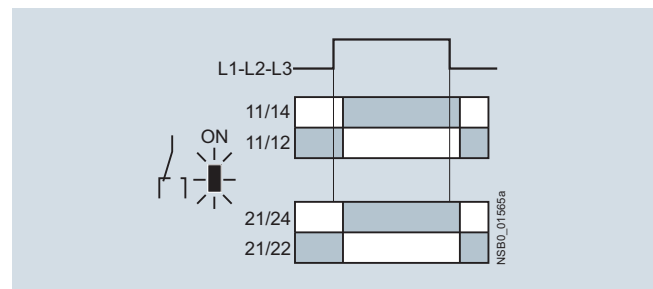
3UG4511 monitoring relays

The 3UG4511 phase sequenced relay monitors the phase sequence in a three-phase network. No adjustments are required for operation. The device has an internal power supply and works using the closed-circuit principle. If the phase sequence at the terminals L1-L2-L3 is correct, the output relay picks up after the delay time has elapsed and the LED is lit. If the phase sequence is wrong, the output relay remains in its rest position.

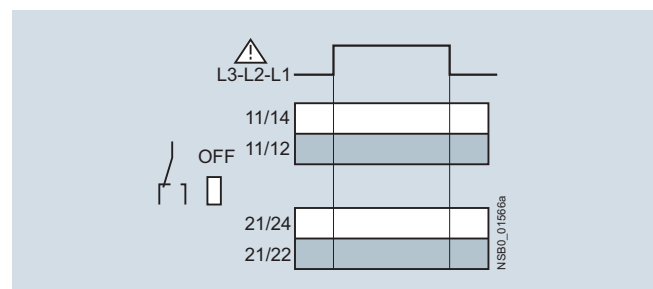
Note:

When one phase fails, connected loads (motor windings, lamps, transformers, coils, etc.) create a feedback voltage at the terminal of the failed phase due to the network coupling. Because the 3UG4511 relays are not resistant to voltage feedback, such a phase failure is not detected. Should this be required, then the 3UG4512 monitoring relay must be used.

Correct phase sequence



Wrong phase sequence



3UG45, 3UG46 Monitoring Relays for Stand-Alone Installation

Line monitoring

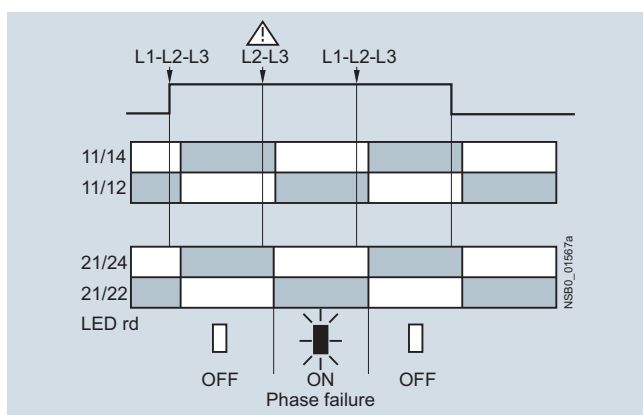
3UG4512 monitoring relays

The 3UG4512 line monitoring relay monitors three-phase networks with regard to phase sequence, phase failure and phase unbalance of 10%. Thanks to a special measuring method, a phase failure is reliably detected in spite of the wide voltage range from 160 to 690 V AC and feedback through the load of up to 90%. The device has an internal power supply and works using the closed-circuit principle. No adjustments are required. If the line voltage is switched on, the green LED will light up. If the phase sequence at the terminals L1-L2-L3 is correct, the output relay picks up. If the phase sequence is wrong, the red LED flashes and the output relay remains in its rest position. If a phase fails, the red LED is permanently lit and the output relay drops.

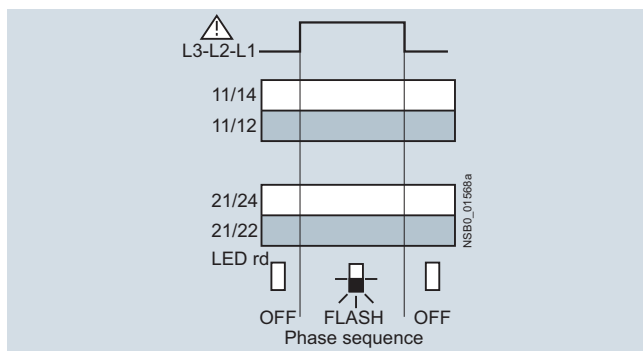
Note:

The red LED is a fault diagnostic indicator and does not show the current relay status. The 3UG4512 monitoring relay is suitable for line frequencies of 50/60 Hz.

Phase failure



Wrong phase sequence

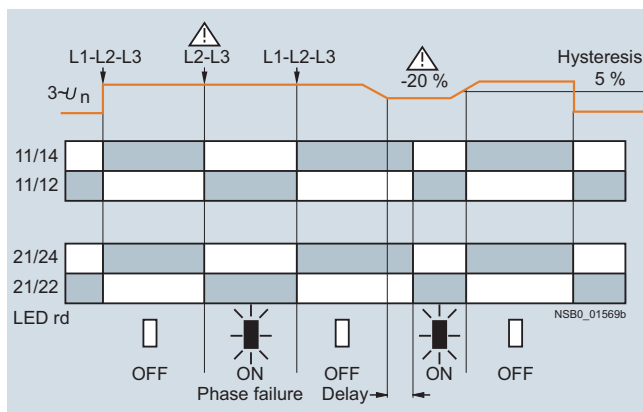
**3UG4513 monitoring relays**

The 3UG4513 line monitoring relay monitors three-phase networks with regard to phase sequence, phase failure, phase asymmetry and undervoltage of 20%. The device has an internal power supply and works using the closed-circuit principle. The hysteresis is 5%. The integrated response delay time T is adjustable from 0 to 20 s and responds to undervoltage. If the direction is incorrect, the device switches off immediately. Thanks to a special measuring method, a phase failure is reliably detected in spite of the wide voltage range from 160 to 690 V and feedback through the load of up to 80%. If the line voltage is switched on, the green LED will light up. If the phase sequence at the terminals L1-L2-L3 is correct, the output relay picks up. If the phase sequence is wrong, the red LED flashes and the output relay remains in its rest position. If a phase fails, the red LED is permanently lit and the output relay drops.

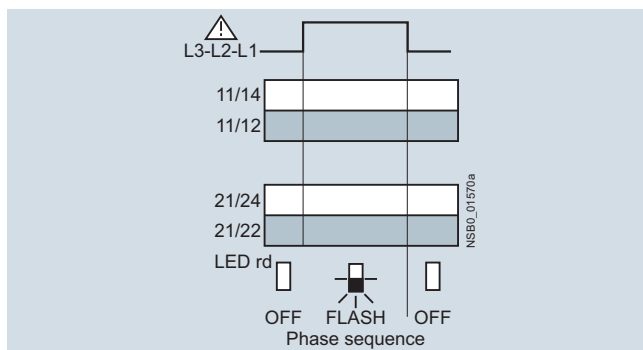
Note:

The red LED is a fault diagnostic indicator and does not show the current relay status. The 3UG4513 monitoring relay is suitable for line frequencies of 50/60 Hz.

Phase failure and undervoltage



Wrong phase sequence



3UG45, 3UG46 Monitoring Relays for Stand-Alone Installation

Voltage monitoring

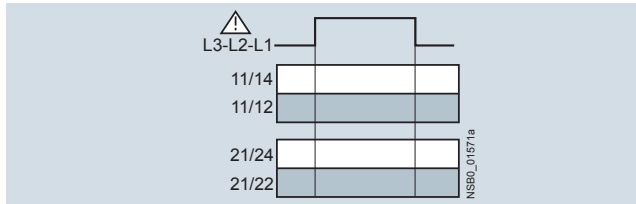
3UG4614 monitoring relays

The 3UG4614 line monitoring relay has a wide voltage range input and an internal power supply. The device is equipped with a display and is parameterized using three buttons. The unit monitors three-phase networks with regard to phase asymmetry from 5 to 20%, phase failure, undervoltage and phase sequence. The hysteresis is adjustable from 1 to 20 V. In addition the device has a response delay and ON-delay from 0 to 20 s in each case. The integrated response delay time responds to phase asymmetry and undervoltage. If the direction is incorrect, the device switches off immediately. Thanks to a special measuring method, a phase failure is reliably detected in spite of the wide voltage range from 160 to 690 V and feedback through the load of up to 80%.

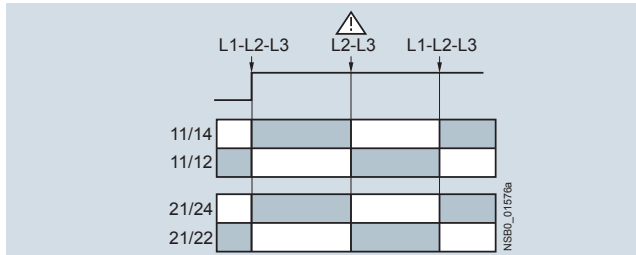
The 3UG4614 monitoring relay can be operated on the basis of either the open-circuit or closed-circuit principle and with Manual or Auto RESET.

With the closed-circuit principle selected

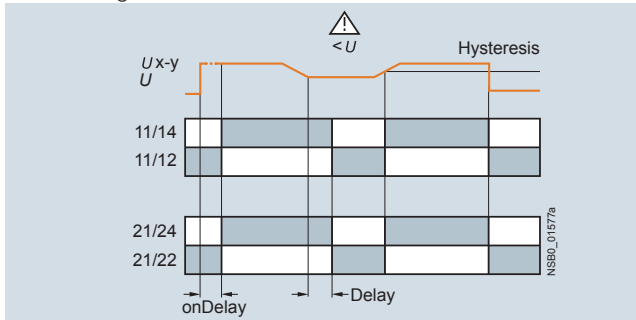
Wrong phase sequence



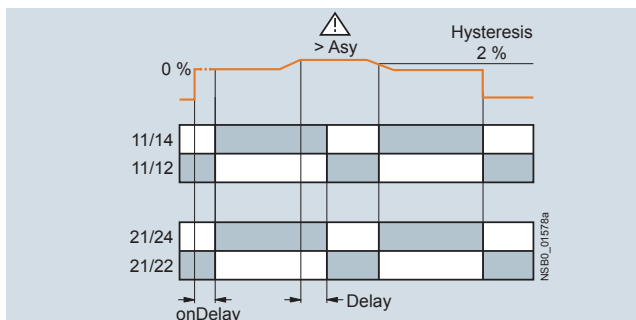
Phase failure



Undervoltage



Unbalance

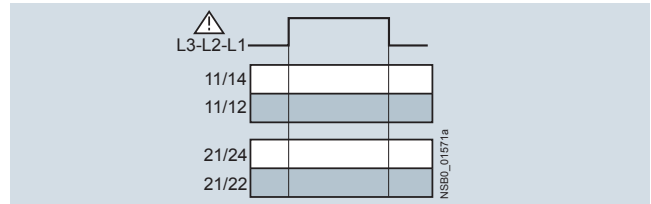
**3UG4615/3UG4616 monitoring relays**

The 3UG4615/3UG4616 line monitoring relay has a wide voltage range input and an internal power supply. The device is equipped with a display and is parameterized using three buttons. The 3UG4615 device monitors three-phase networks with regard to phase failure, undervoltage, overvoltage and phase sequence. The 3UG4616 monitoring relay monitors the neutral conductor as well. The hysteresis is adjustable from 1 to 20 V. In addition the device has two separately adjustable delay times for overvoltage and undervoltage from 0 to 20 s in each case. If the direction of rotation is incorrect, the device switches off immediately. Thanks to a special measuring method, a phase failure is reliably detected in spite of the wide voltage range from 160 to 690 V and feedback through the load of up to 80%.

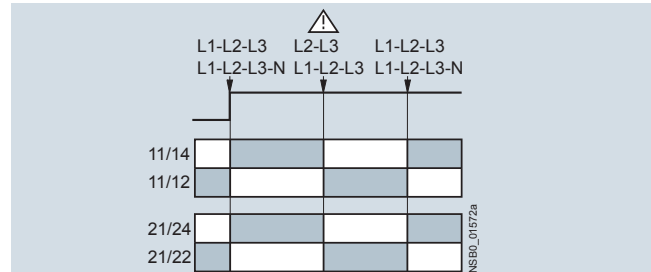
The 3UG4615/3UG4616 monitoring relay can be operated on the basis of either the open-circuit or closed-circuit principle and with Manual or Auto RESET.

With the closed-circuit principle selected

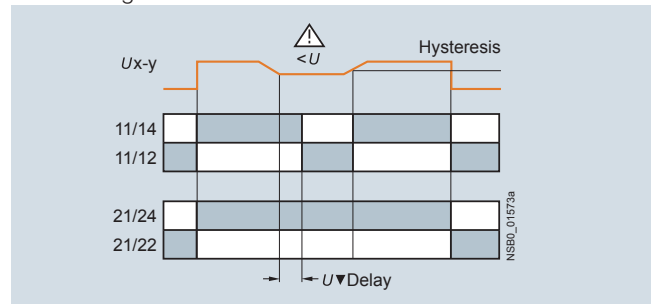
Wrong phase sequence



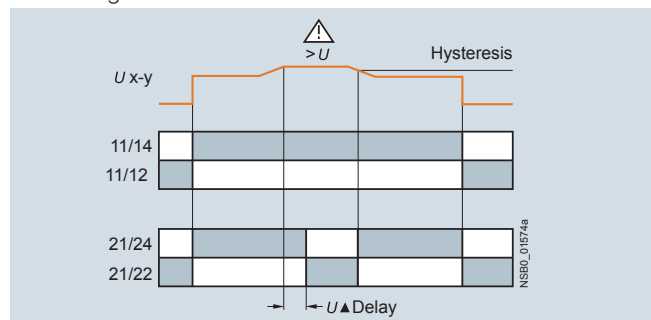
Phase failure



Undervoltage



Overvoltage



3UG45, 3UG46 Monitoring Relays for Stand-Alone Installation

Line monitoring

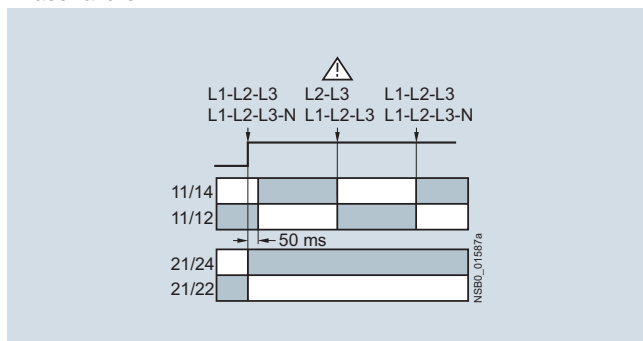
3UG4617/3UG4618 monitoring relays

The 3UG4617/3UG4618 line monitoring relay has an internal power supply and can automatically correct a wrong direction of rotation. Thanks to a special measuring method, a phase failure is reliably detected in spite of the wide voltage range from 160 to 690 V AC and feedback through the load of up to 80%. The device is equipped with a display and is parameterized using three buttons. The 3UG4617 line monitoring relay unit monitors three-phase networks with regard to phase sequence, phase failure, phase unbalance, undervoltage and overvoltage. The 3UG4618 monitoring relay monitors the neutral conductor as well. The hysteresis is adjustable from 1 to 20 V. In addition the device has delay times from 0 to 20 s in each case for overvoltage, undervoltage, phase failure and phase unbalance. The 3UG4617/3UG4618 monitoring relay can be operated on the basis of either the open-circuit or closed-circuit principle and with Manual or Auto RESET.

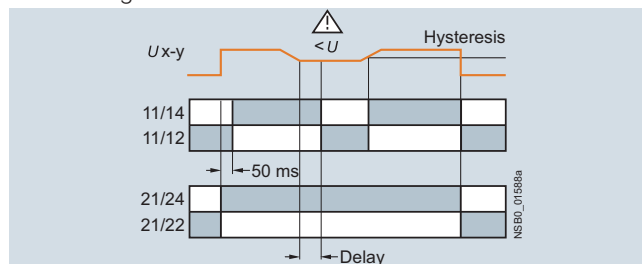
The one changeover contact is used for warning or disconnection in the event of power system faults (voltage, asymmetry), the other responds only to a wrong phase sequence. In conjunction with a contactor reversing assembly it is thus possible to change the direction automatically.

With the closed-circuit principle selected

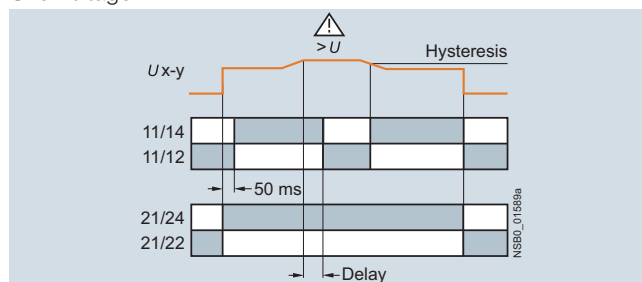
Phase failure



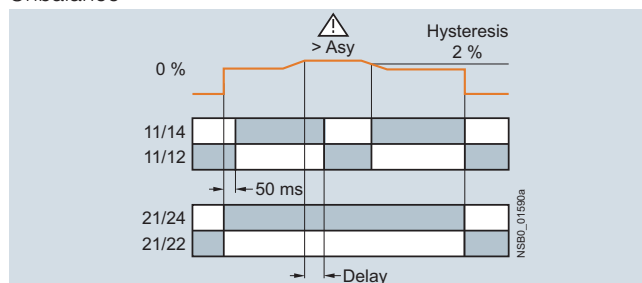
Undervoltage



Overvoltage



Unbalance



Type	3UG4511 ... 3UG4513, 3UG4614 ... 3UG4618	
General data		
Rated insulation voltage U_i Pollution degree 3 Overvoltage category III acc. to VDE 0110	V	690
Rated impulse withstand voltage U_{imp}	kV	6
Control circuit		
Load capacity of the output relay • Thermal current I_{th}	A	5
Rated operational current I_e at • AC-15/24 ... 400 V • DC-13/24 V • DC-13/125 V • DC-13/250 V	A A A A	3 1 0.2 0.1
Minimum contact load at 17 V DC	mA	5
Electrical endurance AC-15	Million operating cycles	0.1
Mechanical endurance	Million operating cycles	10

3UG45, 3UG46 Monitoring Relays for Stand-Alone Installation

Line monitoring

Selection and ordering data

PU (UNIT, SET, M) = 1
 PKG* = 1 UNIT
 PG = 41H



3UG4511-1AP20



3UG4615-1CR20



3UG4616-1CR20



3UG4617-1CR20



3UG4618-1CR20



3UG4511-2BP20



3UG4512-2BR20

Adjustable hysteresis	Under-voltage detection	Over-voltage detection	Stabilization time adjustable stDEL	Tripping delay time adjustable Del	Version of auxiliary contacts	Measurable line voltage ¹⁾	SD	Screw terminals	SD	Spring-type terminals
					CO contact	V	d	Article No.	Price per PU	Article No.
										Price per PU
Monitoring of phase sequence										
Auto RESET										
--	--	--	--	--	1	160 ... 260 AC	2	3UG4511-1AN20	2	3UG4511-2AN20
					2		2	3UG4511-1BN20	2	3UG4511-2BN20
					1	320 ... 500 AC	2	3UG4511-1AP20	2	3UG4511-2AP20
					2		2	3UG4511-1BP20	2	3UG4511-2BP20
					1	420 ... 690 AC	2	3UG4511-1AQ20	5	3UG4511-2AQ20
					2		2	3UG4511-1BQ20	5	3UG4511-2BQ20
Monitoring of phase sequence, phase failure and phase unbalance										
Auto RESET, closed-circuit principle, unbalance threshold permanently 10%										
--	--	--	--	--	1	160 ... 690 AC	2	3UG4512-1AR20	2	3UG4512-2AR20
					2		2	3UG4512-1BR20	2	3UG4512-2BR20
Monitoring of phase sequence, phase failure, unbalance and undervoltage										
Analogically adjustable, Auto RESET, closed-circuit principle, asymmetry and undervoltage threshold permanently 20%										
5% of set value	✓	--	--	0.1 ... 20	2	160 ... 690 AC	2	3UG4513-1BR20	2	3UG4513-2BR20
Digitally adjustable, Auto RESET or Manual RESET, open-circuit or closed-circuit principle, asymmetry threshold 0 or 5 ... 20%										
adjustable 1 ... 20 V	✓	--	--	0.1 ... 20	2	160 ... 690 AC	2	3UG4614-1BR20	2	3UG4614-2BR20
Monitoring of phase sequence, phase failure, overvoltage and undervoltage										
Digitally adjustable, Auto RESET or Manual RESET, open-circuit or closed-circuit principle										
adjustable 1 ... 20 V	✓	✓	--	0.1 ... 20 ²⁾	2 ²⁾	160 ... 690 AC	2	3UG4615-1CR20	2	3UG4615-2CR20
Monitoring of phase sequence, phase and N conductor failure, overvoltage and undervoltage										
Digitally adjustable, Auto RESET or Manual RESET, open-circuit or closed-circuit principle										
adjustable 1 ... 20 V	✓	✓	--	0.1 ... 20 ²⁾	2 ²⁾	90 ... 400 AC against N	2	3UG4616-1CR20	2	3UG4616-2CR20
Automatic correction of the direction of rotation in case of wrong phase sequence, phase failure, unbalance, overvoltage and undervoltage										
Digitally adjustable, Auto RESET or Manual RESET, open-circuit or closed-circuit principle, asymmetry threshold 0 or 5 ... 20%										
adjustable 1 ... 20 V	✓	✓	--	0.1 ... 20	2 ³⁾	160 ... 690 AC	2	3UG4617-1CR20	2	3UG4617-2CR20
Automatic correction of the direction of rotation in case of wrong phase sequence, phase and N conductor failure, phase unbalance, overvoltage and undervoltage										
Digitally adjustable, Auto RESET or Manual RESET, open-circuit or closed-circuit principle, asymmetry threshold 0 or 5 ... 20%										
adjustable 1 ... 20 V	✓	✓	--	0.1 ... 20	2 ³⁾	90 ... 400 AC against N	2	3UG4618-1CR20	2	3UG4618-2CR20

✓ Function available

-- Function not available

1) Absolute limit values.

2) 1 CO contact each and one tripping delay time each for U_{min} and U_{max} .

3) 1 CO contact each for power system fault and phase sequence correction.

For accessories, see page 11/83

3UG45, 3UG46 Monitoring Relays for Stand-Alone Installation

Voltage monitoring

Overview



SIRIUS 3UG4631 monitoring relay

The relays monitor single-phase AC voltages (rms value) and DC voltages against the set threshold value for overshoot and undershoot. The devices differ with regard to their power supply (internal or external).

Benefits

- Versions with wide voltage supply range
- Variably adjustable to overshoot, undershoot or range monitoring
- Freely configurable delay times and RESET response
- Width 22.5 mm
- Display of ACTUAL value and status messages
- All versions with removable terminals
- All versions with screw or spring-type terminals

Application

- Protection of a plant against destruction due to overvoltage
- Switch-on of a plant at a defined voltage and higher
- Protection from undervoltage due to overloaded control supply voltages, particularly with battery power
- Threshold switch for analog signals from 0.1 to 10 V

Technical specifications

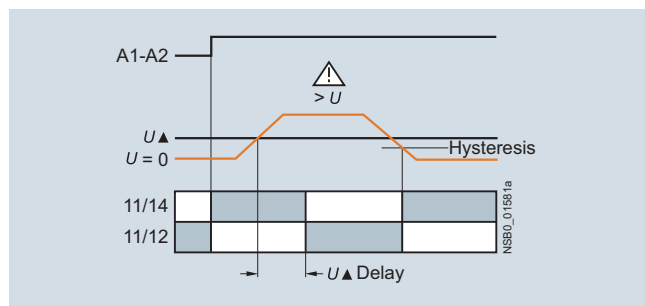
3UG4631/3UG4632 monitoring relays

The 3UG4631/3UG4632 voltage monitoring relay is supplied with an auxiliary voltage of 24 V AC/DC or 24 to 240 V AC/DC and performs overshoot, undershoot or range monitoring of the voltage depending on parameterization. The device is equipped with a display and is parameterized using three buttons.

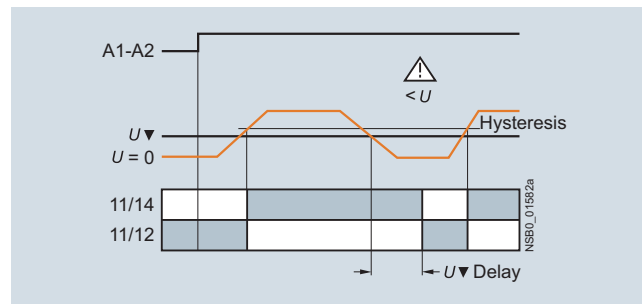
The measuring range extends from 0.1 to 60 V or 10 to 600 V AC/DC. The threshold values for overshoot or undershoot can be freely configured within this range. If one of these threshold values is reached, the output relay responds according to the set principle of operation as soon as the delay time has elapsed. This delay time U_{Del} can be set from 0.1 to 20 s. The hysteresis can be set from 0.1 to 30 V or 0.1 to 300 V. The device can be operated on the basis of either the open-circuit or closed-circuit principle and with Manual or Auto RESET. One output changeover contact is available as signaling contact.

With the closed-circuit principle selected

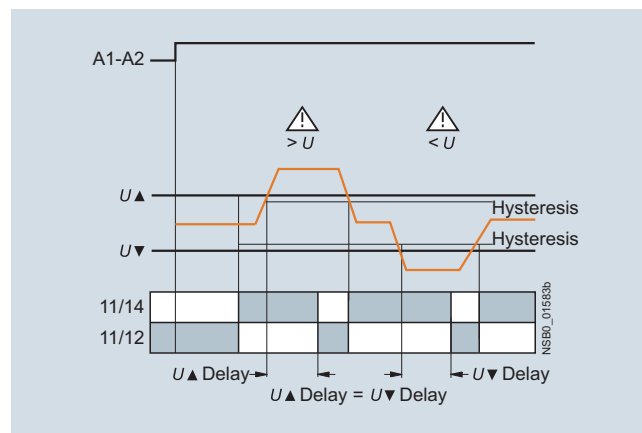
Overvoltage



Undervoltage



Range monitoring



33UG45, 3UG46 Monitoring Relays for Stand-Alone Installation

Voltage monitoring

3UG4633 monitoring relay

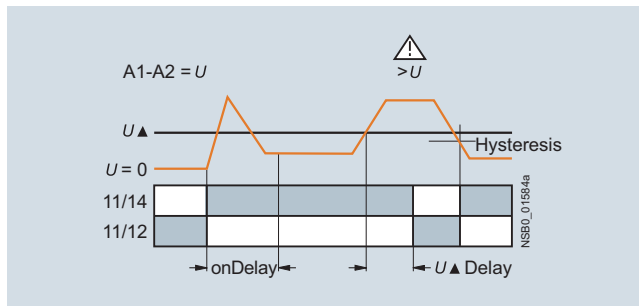
The 3UG4633 voltage monitoring relay has an internal power supply and performs overshoot, undershoot or range monitoring of the voltage depending on parameterization. The device is equipped with a display and is parameterized using three buttons.

The operating and measuring range extends from 17 to 275 V AC/DC. The threshold values for overshoot or undershoot can be freely configured within this range. If one of these threshold values is reached, the output relay responds according to the set principle of operation as soon as the tripping delay time has elapsed. This delay time U_{Del} can also be adjusted, just like the ON-delay time on_{Del} , from 0.1 to 20 s.

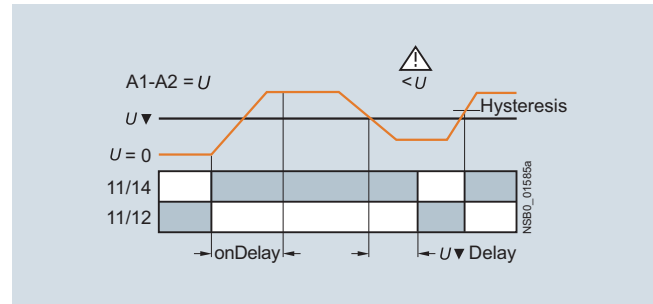
The hysteresis is adjustable from 0.1 to 150 V. The device can be operated on the basis of either the open-circuit or closed-circuit principle and with Manual or Auto RESET. One output change-over contact is available as signaling contact.

With the closed-circuit principle selected

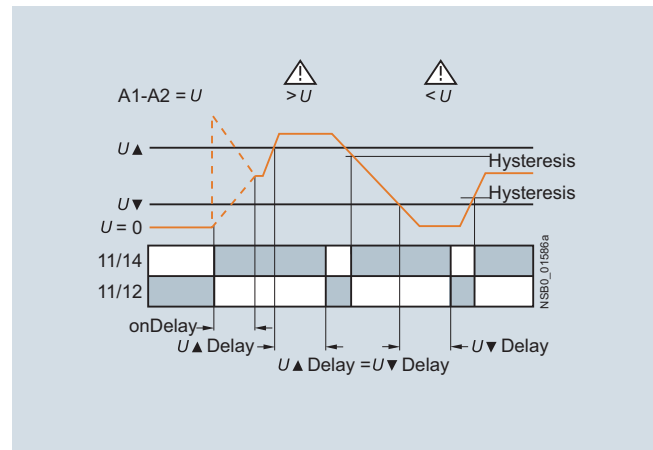
Overvoltage



Undervoltage



Range monitoring



Type		3UG4631	3UG4632	3UG4633
General data				
Rated insulation voltage U_i	V	690		
Pollution degree 3 Overvoltage category III acc. to VDE 0110				
Rated impulse withstand voltage U_{imp}	kV	6		
Measuring circuit				
Permissible measuring range single-phase AC/DC voltage	V	0.1 ... 68	10 ... 650	17 ... 275
Measuring frequency	Hz	40 ... 500		
Setting range single-phase voltage	V	0.1 ... 60	10 ... 600	17 ... 275
Control circuit				
Load capacity of the output relay				
• Thermal current I_{th}	A	5		
Rated operational current I_o at				
• AC-15/24 ... 400 V	A	3		
• DC-13/24 V	A	1		
• DC-13/125 V	A	0.2		
• DC-13/250 V	A	0.1		
Minimum contact load at 17 V DC	mA	5		

3UG45, 3UG46 Monitoring Relays for Stand-Alone Installation

Voltage monitoring

Selection and ordering data

- Digitally adjustable, with illuminated LCD
- Auto or Manual RESET
- Open- or closed-circuit principle
- 1 CO contact

PU (UNIT, SET, M) = 1
 PKG* = 1 UNIT
 PG = 41H



3UG4631-1AA30



3UG4633-2AL30

Measuring range	Adjustable hysteresis	Rated control supply voltage U_s	SD	Screw terminals	SD	Spring-type terminals
V	V	V	d	Article No.	Price per PU	Article No.
Internal power supply without auxiliary voltage, separately adjustable ON-delay and tripping delay 0.1 ... 20 s						
17 ... 275 AC/DC	0.1 ... 150	17 ... 275 AC/DC ¹⁾	2	3UG4633-1AL30	2	3UG4633-2AL30
Externally supplied with auxiliary voltage, tripping delay adjustable 0.1 ... 20 s						
0.1 ... 60 AC/DC	0.1 ... 30	24 AC/DC	2	3UG4631-1AA30	2	3UG4631-2AA30
10 ... 600 AC/DC	0.1 ... 300		2	3UG4632-1AA30	2	3UG4632-2AA30
0.1 ... 60 AC/DC	0.1 ... 30	24 ... 240 AC/DC	2	3UG4631-1AW30	2	3UG4631-2AW30
10 ... 600 AC/DC	0.1 ... 300		2	3UG4632-1AW30	2	3UG4632-2AW30

¹⁾ Absolute limit values.

For accessories, see page 11/83

3UG45, 3UG46 Monitoring Relays for Stand-Alone Installation

Current monitoring

Overview



SIRIUS 3UG4622 monitoring relay

The relays monitor single-phase AC currents (rms value) and DC currents against the set threshold value for overshoot and undershoot. They differ with regard to their measuring ranges and control supply voltage types.

Benefits

- Versions with wide voltage supply range
- Variably adjustable to overshoot, undershoot or range monitoring
- Freely configurable delay times and RESET response
- Width 22.5 mm
- Display of ACTUAL value and status messages
- All versions with removable terminals
- All versions with screw or spring-type terminals

Application

- Overcurrent and undercurrent monitoring
- Monitoring the functionality of electrical loads
- Open-circuit monitoring
- Threshold switch for analog signals from 4 to 20 mA

Technical specifications

3UG4621/3UG4622 monitoring relays

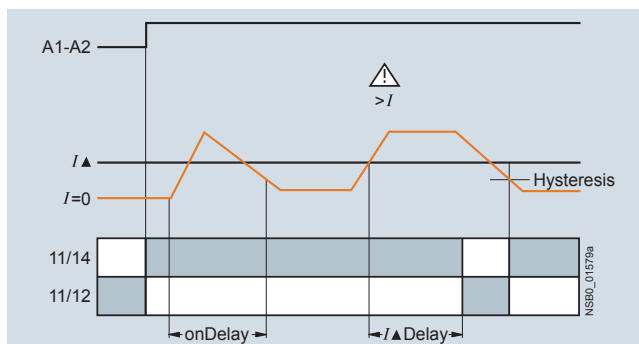
The 3UG4621 or 3UG4622 current monitoring relay is supplied with an auxiliary voltage of 24 V AC/DC or 24 to 240 V AC/DC and performs overshoot, undershoot or range monitoring of the current depending on parameterization. The device is equipped with a display and is parameterized using three buttons.

The measuring range extends from 3 to 500 mA or 0.05 to 10 A. The rms value of the current is measured. The threshold values for overshoot or undershoot can be freely configured within this range. If one of these threshold values is reached, the output relay responds according to the set principle of operation as soon as the tripping delay time I_{Del} has elapsed. This time and the ON-delay time on_{Del} are adjustable from 0.1 to 20 s.

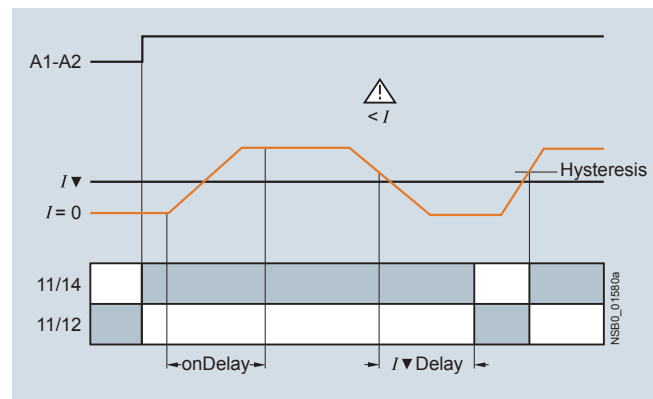
The hysteresis is adjustable from 0.1 to 250 mA or 0.01 to 5 A. The device can be operated with Manual or Auto RESET and on the basis of either the open-circuit or closed-circuit principle. You can decide here whether the output relay is to respond when the supply voltage $U_s = ON$ is applied, or not until the lower measuring range limit of the measuring current ($I > 3 \text{ mA}/50 \text{ mA}$) is reached. One output changeover contact is available as signaling contact.

With the closed-circuit principle selected upon application of the control supply voltage

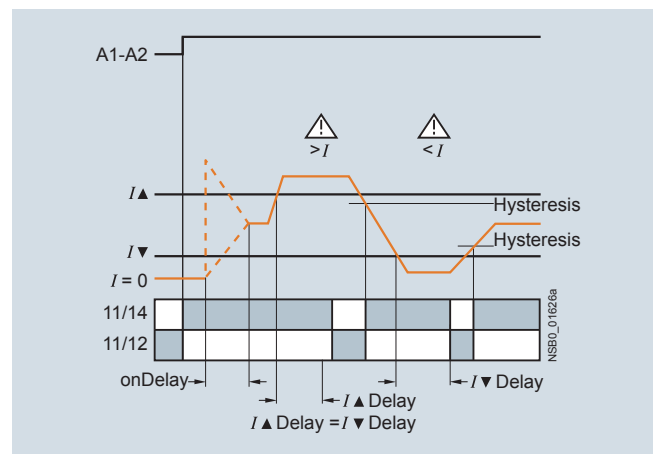
Current overshoot



Current undershoot



Range monitoring



3UG45, 3UG46 Monitoring Relays for Stand-Alone Installation

Current monitoring

Type		3UG4621-AA	3UG4621-AW	3UG4622-AA	3UG4622-AW
General data					
Rated insulation voltage U_i Pollution degree 3; overvoltage category III according to VDE 0110	V	690			
Rated impulse withstand voltage U_{imp}	kV	6			
Measuring circuit					
Measuring range for single-phase AC/DC current	A	0.003 ... 0.6		0.05 ... 15	
Measuring frequency	Hz	40 ... 500			
Setting range for single-phase current	A	0.003 ... 0.5		0.05 ... 10	
Load supply voltage	V	24	Max. 300 ¹⁾ Max. 500 ²⁾	24	Max. 300 ¹⁾ Max. 500 ²⁾
Control circuit					
Load capacity of the output relay • Thermal current I_{th}	A	5			
Rated operational current I_e at • AC-15/24 ... 400 V • DC-13/24 V • DC-13/125 V • DC-13/250 V	A A A A	3 1 0.2 0.1			
Minimum contact load at 17 V DC	mA	5			

1) With protective separation.

2) With simple separation.

Selection and ordering data

- Digitally adjustable, with illuminated LCD
- Auto or Manual RESET
- Open- or closed-circuit principle
- 1 CO contact

PU (UNIT, SET, M) = 1
 PKG* = 1 UNIT
 PG = 41H



3UG4621-1AA30



3UG4622-2AW30

Measuring range	Adjustable hysteresis	Rated control supply voltage U_s	SD	Screw terminals	SD	Spring-type terminals
		V	d	Article No.	Price per PU	Article No.
					d	Price per PU
Monitoring of undercurrent and overcurrent, start up delay and tripping delay times can be adjusted separately 0.1 ... 20 s						
3 ... 500 mA AC/DC	0.1 ... 250 mA	24 AC/DC ¹⁾	2	3UG4621-1AA30	2	3UG4621-2AA30
0.05 ... 10 A AC/DC	0.01 ... 5 A		2	3UG4622-1AA30	2	3UG4622-2AA30
3 ... 500 mA AC/DC	0.1 ... 250 mA	24 ... 240 AC/DC ²⁾	2	3UG4621-1AW30	2	3UG4621-2AW30
0.05 ... 10 A AC/DC	0.01 ... 5 A		2	3UG4622-1AW30	2	3UG4622-2AW30

1) No electrical separation. Load supply voltage 24 V.

2) Electrical separation between control circuit and measuring circuit.
Load supply voltage for protective separation max. 300 V, for simple separation max. 500 V.

For accessories, see page 11/83

With AC currents $I > 10$ A it is possible to use 4NC current transformers as an accessory.

3UG45, 3UG46 Monitoring Relays for Stand-Alone Installation

Power factor and active current monitoring

Overview



SIRIUS 3UG4641 monitoring relay

The 3UG4641 power factor and active current monitoring device enables the load monitoring of motors.

Whereas power factor (p.f.) monitoring is used above all for monitoring no-load operation, the active current monitoring option can be used to observe and evaluate the load factor over the entire torque range.

Benefits

- Can be used worldwide thanks to wide voltage range from 90 to 690 V (absolute limit values)
- Monitoring of even small single-phase motors with a no-load supply current below 0.5 A
- Simple determination of threshold values by the direct collection of measured variables on motor loading
- Range monitoring and active current measurement enable detection of cable breaks between control cabinets and motors, as well as phase failures
- Power factor (p.f.) or I_{res} (active current) can be selected as the measurement principle
- Width 22.5 mm
- All versions with removable terminals

Application

- No-load monitoring and load shedding, such as in the event of a V-belt tear
- Underload monitoring in the low-end performance range, e.g. in the event of pump no-load operation
- Monitoring of overload, e.g. due to a dirty filter system
- Simple power factor monitoring in power systems for control of compensation equipment
- Broken cable between control cabinet and motor

Technical specifications

3UG4641 monitoring relay

The 3UG4641 monitoring relay is self-powered and serves the single-phase monitoring of the power factor or performs overshoot, undershoot or range monitoring of the active current depending on how it is parameterized. The load to be monitored is connected upstream of the IN terminal. The load current flows through the terminals IN and Ly/N. The setting range for the power factor is 0.1 to 0.99 and for the active current I_{res} it is 0.2 to 10 A. If the control supply voltage is switched on and no load current flows, the display will show $I < 0.2$ A and a symbol for overrange, underrange or range monitoring. If the motor is now switched on and the current exceeds 0.2 A, the set ON-delay time begins. During this time, if the set limit values are undershot or exceeded, this does not lead to a relay reaction of the changeover contact. If the operational flowing active current and/or the power factor value falls below or exceeds the respective set threshold value, the spike delay begins. When this time has expired, the relay changes its switch position. The relevant measured variables for overshooting and undershooting in the display flash. If monitoring for active current undershoot is switched off ($I_{res} \nabla = \text{OFF}$), and if the load current undershoots the lower measuring range threshold (0.2 A), the CO contacts remain unchanged. If a threshold value is set for the monitoring of active current undershooting, then undershooting of the measuring range threshold (0.2 A) will result in a response of the CO contacts.

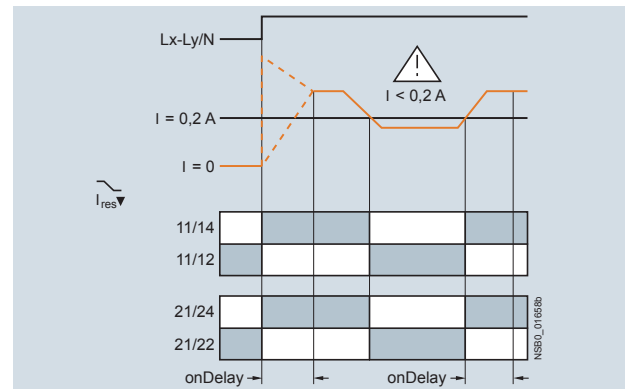
The relay operates either according to the open-circuit or closed-circuit principle. If the device is set to Auto RESET (Memory = No), depending on the set principle of operation, the switching relay returns to its initial state and the flashing ends when the hysteresis threshold is reached.

If Manual RESET is selected in the menu (Memory = Yes), the switching relay remains in its current switching state and the current measured value and the symbol for undershooting and overshooting continues to flash, even when the measured variable reaches a permissible value again. This stored fault status can be reset by simultaneously pressing the UP▲ and DOWN▼ keys for 2 seconds, or by switching the supply voltage off and back on again.

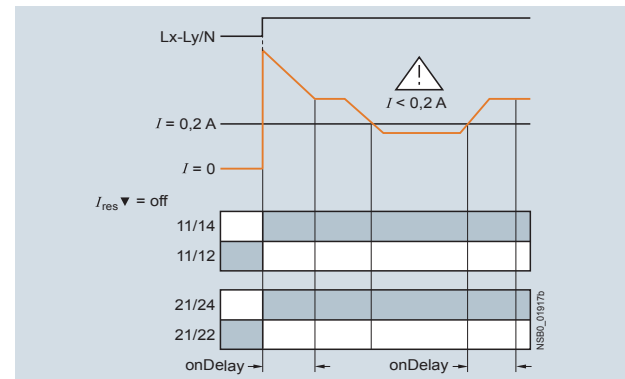
With the closed-circuit principle selected

Response in the event of undershooting the measuring range limit

- With activated monitoring of $I_{res} \nabla$



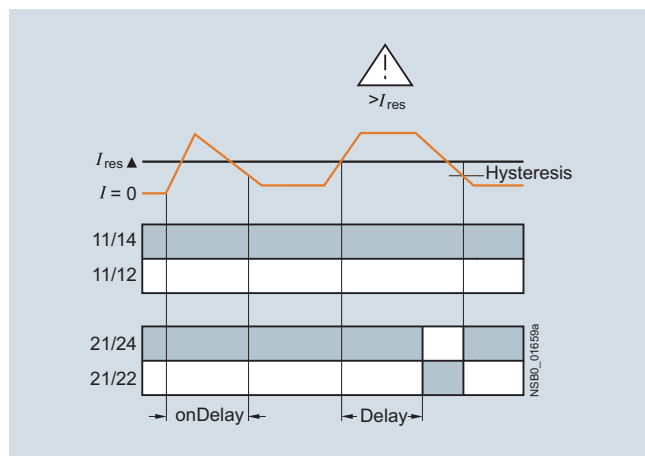
- With deactivated monitoring of active current undershooting



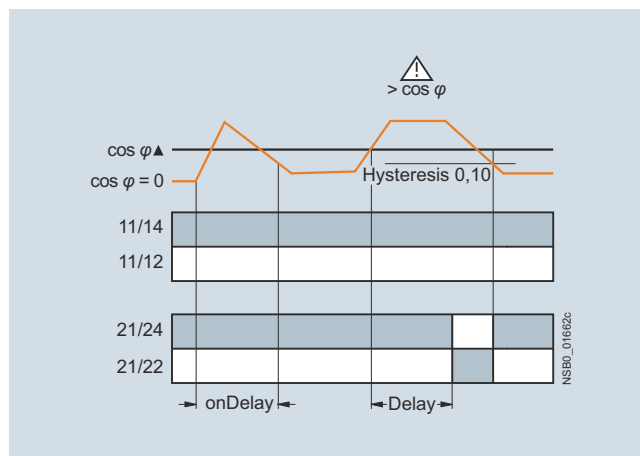
3UG45, 3UG46 Monitoring Relays for Stand-Alone Installation

Power factor and active current monitoring

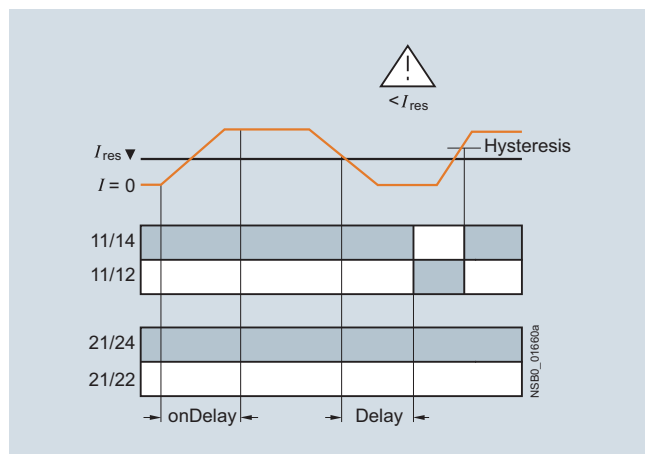
Overshooting of active current



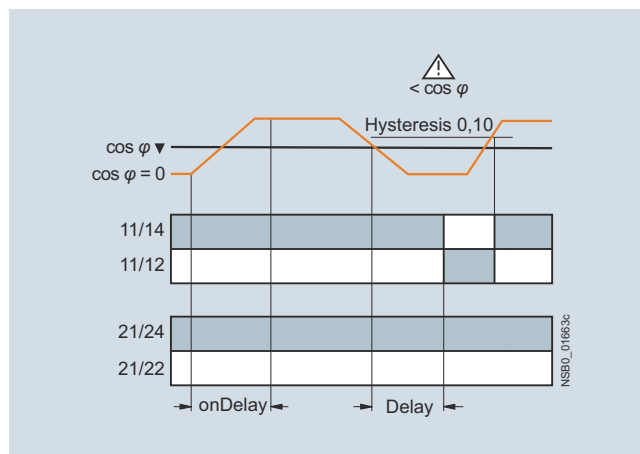
Overshooting of power factor



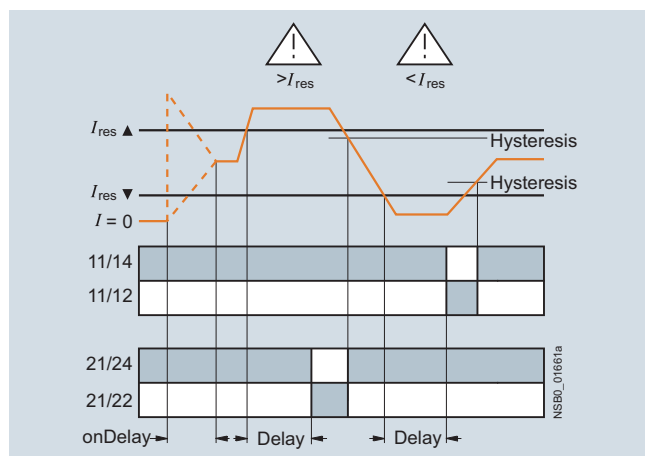
Undershooting of active current



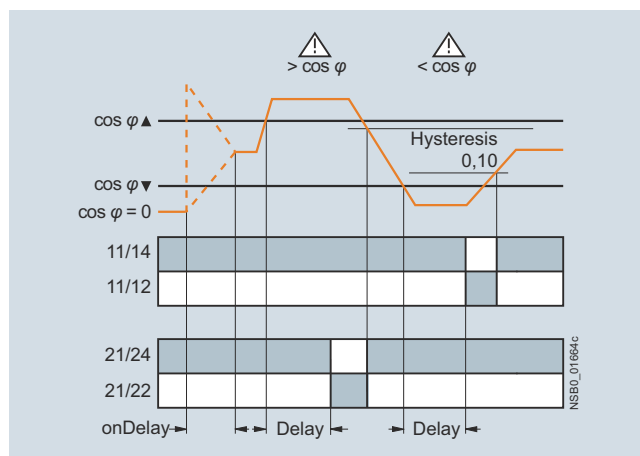
Undershooting of power factor



Range monitoring of active current



Range monitoring of power factor



3UG45, 3UG46 Monitoring Relays for Stand-Alone Installation



Power factor and active current monitoring

Type	3UG4641	
General data		
Rated insulation voltage U_i Pollution degree 3 Overvoltage category III acc. to VDE 0110	V	690
Rated impulse withstand voltage U_{imp}	kV	6
Control circuit		
Number of CO contacts for auxiliary contacts		2
Load capacity of the output relay • Thermal current I_{th}	A	5
Rated operational current I_e at • AC-15/24 ... 400 V • DC-13/24 V • DC-13/125 V • DC-13/250 V	A A A A	3 1 0.2 0.1
Minimum contact load at 17 V DC	mA	5

Selection and ordering data

- For monitoring the power factor and the active current I_{res} (p.f. $\times I$)
- Suitable for single- and three-phase currents
- Digitally adjustable, with illuminated LCD
- Overshoot, undershoot or range monitoring adjustable
- Upper and lower threshold value can be adjusted separately
- Permanent display of actual value and tripping state
- 1 changeover contact each for undershoot/overshoot

PU (UNIT, SET, M) = 1
 PKG* = 1 UNIT
 PG = 41H

Measuring range		Adjustable hysteresis		ON-delay time adjustable onDel	Tripping delay time adjustable $I\blacktriangle\text{Del}/I\blacktriangledown\text{Del}, \varphi\blacktriangle\text{Del}/\varphi\blacktriangledown\text{Del}$	Rated control supply voltage U_s ¹⁾ 50/60 Hz AC	SD	Screw terminals 	SD	Spring-type terminals 		
For power factor	For active current I_{res}	For power factor	For active current I_{res}									
P.f.	A	P.f.	A	s	s	V	d	Article No.	Price per PU	d	Article No.	Price per PU
0.10 ... 0.99	0.2 ... 10.0	0.1	0.1 ... 2.0	0 ... 99	0.1 ... 20.0	90 ... 690	2	3UG4641-1CS20		2	3UG4641-2CS20	

¹⁾ Absolute limit values.

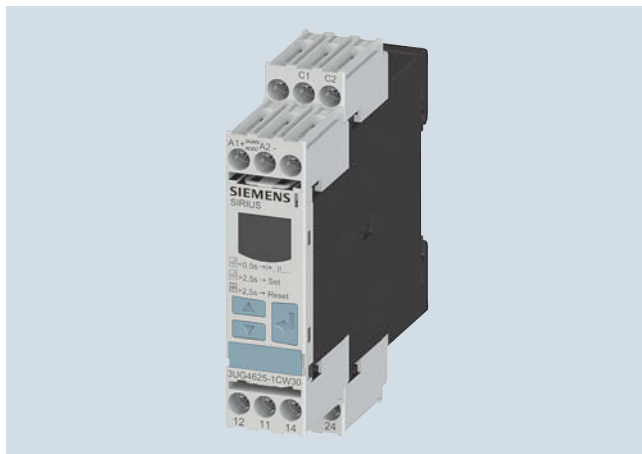
For accessories, see page 10/111.

With AC active currents $I_{res} > 10$ A it is possible to use 4NC current transformers as an accessory, see Catalog LV 10.

3UG45, 3UG46 Monitoring Relays for Stand-Alone Installation

Residual-current monitoring relays

Overview



SIRIUS 3UG4625 monitoring relay

The 3UG4625 residual-current monitoring relays are used in conjunction with the 3UL23 residual-current transformers for monitoring plants in which higher residual currents are increasingly expected due to ambient conditions. Monitoring encompasses pure AC residual currents or AC residual currents with a pulsating DC fault current component (transformer type A in accordance with DIN VDE 0100-530/IEC TR 60755).

Technical specifications

3UG4625 monitoring relays

The main conductor, and any neutral conductor to which a load is connected, are routed through the opening of the annular ring core of a residual-current transformer. A secondary winding is placed around this annular strip-wound core to which the monitoring relay is connected.

If operation of a plant is fault-free, the sum of the inflowing and outward currents equals zero. No current is then induced in the secondary winding of the residual-current transformer.

However, if an insulation fault occurs downstream of the residual current operated circuit breaker, the sum of the inflowing currents is greater than that of the outward currents. The differential current – i.e. the residual current – induces a secondary current in the secondary winding of the transformer. This current is evaluated in the monitoring relay and is used on the one hand to display the actual residual current and on the other, to switch the relay if the set warning or tripping threshold is overshoot.

If the measured residual current exceeds the set warning value, the associated changeover contact instantly changes the switching state and an indication appears on the display.

If the measured residual current exceeds the set tripping value, the set delay time begins and the associated relay symbol flashes. On expiry of this time, the associated changeover contact changes the switching state.

ON-delay time for motor start

To be able to start a drive when a residual current is detected, the output relays switch to the OK state for an adjustable ON-delay time depending on the selected open-circuit principle or closed-circuit principle.

The changeover contacts do not react if the set threshold values are overshoot during this period.

Benefits

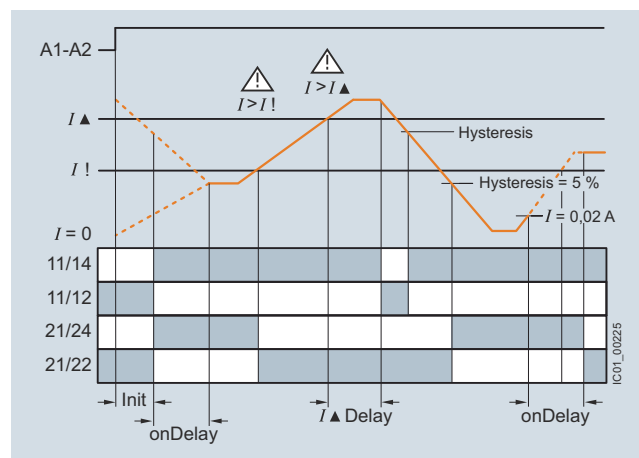
- Worldwide use thanks to wide voltage range from 24 to 240 V AC/DC
- High measuring accuracy of $\pm 7.5\%$
- Permanent self-monitoring
- Variable threshold values for warning and disconnection
- Freely configurable delay times and RESET response
- Permanent display of the actual value and fault diagnostics via the display
- High level of flexibility and space saving through installation of the transformer inside or outside the control cabinet
- Width 22.5 mm
- All versions with removable terminals
- All versions with screw or spring-type terminals

Application

Monitoring of plants in which residual currents can occur, e.g. due to dust deposits or moisture, porous cables and leads, or capacitive residual currents.

With the closed-circuit principle selected

Residual current monitoring with Auto RESET (Memory = no)



If the device is set to Auto RESET, the relay switches back to the OK state for the tripping value once the value falls below the set hysteresis threshold and the display stops flashing.

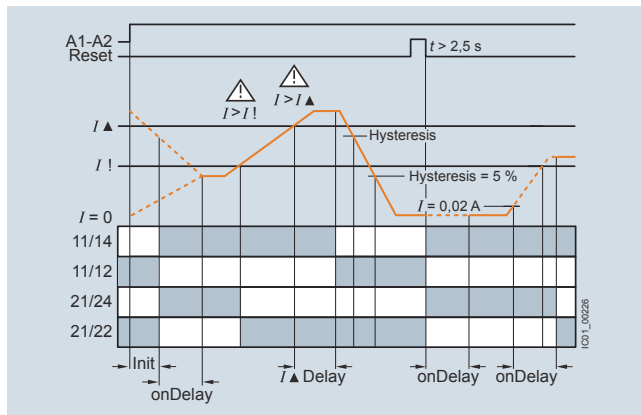
The associated relay changes its switching state if the value falls below the fixed hysteresis value of 5% of the set warning value.

Any overshoots are therefore not stored.

3UG45, 3UG46 Monitoring Relays for Stand-Alone Installation

Residual-current monitoring relays

Residual current monitoring with Manual RESET (Memory = yes)



If Manual RESET is selected in the menu, the output relays remain in their current switching state and the current measured value and the symbol for overshooting continues to flash, even when the measured residual current returns to a permissible value. This stored fault status can be reset by simultaneously pressing the UP▲ and DOWN▼ keys for > 2 seconds, or by switching the supply voltage off and back on again.

Note:

Do not ground the neutral conductor downstream of the residual-current transformer as otherwise residual current monitoring functions can no longer be ensured.

Type	3UG4625-1CW30, 3UG4625-2CW30	
General data		
Insulation voltage for overvoltage category III to IEC 60664 for pollution degree 3, rated value	V	300
Impulse withstand voltage, rated value U_{imp}	kV	4
Control circuit		
Number of CO contacts for auxiliary contacts		2
Thermal current of the non-solid-state contact blocks, maximum	A	5
Current carrying capacity of the output relay		
• At AC-15 at 250 V at 50/60 Hz	A	3
• At DC-13		
- At 24 V	A	1
- At 125 V	A	0.2
- At 250 V	A	0.1
Operational current at 17 V, minimum	mA	5

Selection and ordering data

- For monitoring residual currents from 0.03 to 40 A, from 16 to 400 Hz
- For 3UL23 residual-current transformers with feed-through opening from 35 to 210 mm
- Permanent self-monitoring
- Certified in accordance with IEC 60947, functionality corresponds to IEC 62020
- Digitally adjustable, with illuminated LCD

- Permanent display of actual value and tripping state
- Separately adjustable limit value and warning threshold
- 1 changeover contact each for warning threshold and tripping threshold

PU (UNIT, SET, M) = 1
PS* = 1 unit
PG = 41H



3UG4625-1CW30



3UG4625-2CW30

Measur-able current	Adjustable response value current	Switching hysteresis	Adjustable ON-delay time	Control supply voltage			SD	Screw terminals		SD	Spring-type terminals	
A	A	%	s	For AC at 50 Hz rated value	For AC at 60 Hz rated value	At DC rated value	d	Article No.	Price per PU	d	Article No.	Price per PU
0.01 ... 43	0.03 ... 40	0 ... 50	0 ... 20	24 ... 240	24 ... 240	24 ... 240	2	3UG4625-1CW30		2	3UG4625-2CW30	

For accessories, [see page 11/83](#)For 3UL23 residual-current transformers, [see page 11/68](#).

3UG45, 3UG46 Monitoring Relays for Stand-Alone Installation

3UL23 residual-current transformers

Overview



SIRIUS 3UL23 residual-current transformer

The 3UL23 residual-current transformers detect residual currents in machines and plants. They are suitable for pure AC residual currents or AC residual currents with a pulsating DC fault current component (transformer type A in accordance with DIN VDE 0100-530/IEC TR 60755).


Together with the 3UG4625, 3UG4825 residual-current monitoring relays for IO-Link or the SIMOCODE 3UF motor management and control device they enable residual-current and ground-fault monitoring.

The 3UL2302-1A and 3UL2303-1A residual-current transformers with a feed-through opening from 35 to 55 mm can be mounted in conjunction with the 3UL2900 accessories on a TH 35 standard mounting rail according to IEC 60715.

Selection and ordering data

Diameter of the bushing opening	Connectable cross-section of the connecting terminal	SD	Screw terminals	PU (UNIT, SET, M)	PS*	PG
mm	mm ²	d	Article No.	Price per PU		
Residual-current transformers (essential accessories for 3UG4625, 3UG4825)						
35	2.5	2	3UL2302-1A	1	1 unit	41H
55	2.5	2	3UL2303-1A	1	1 unit	41H
80	2.5	2	3UL2304-1A	1	1 unit	41H
110	2.5	2	3UL2305-1A	1	1 unit	41H
140	2.5	2	3UL2306-1A	1	1 unit	41H
210	4	2	3UL2307-1A	1	1 unit	41H

Accessories

Version	SD	Article No.	Price per PU	PU (UNIT, SET, M)	PS*	PG
	d					
Adapters						
	2	3UL2900		1	2 units	41H
Adapters						
For mounting onto standard rail for 3UL23 to diameter 55 mm						

3UL2900

3UG45, 3UG46 Monitoring Relays for Stand-Alone Installation

Insulation monitoring

Overview



SIRIUS 3UG458. insulation monitor

Insulation monitoring relays are used for monitoring the insulation resistance between ungrounded single or three-phase AC supplies and a protective conductor.

Ungrounded, i.e. isolated networks (IT networks) are always used where high demands are placed on the reliability of the power supply, e.g. emergency lighting systems. IT systems are supplied via an isolating transformer or by power supply sources such as batteries or a generator. While an initial insulation fault between a phase conductor and the ground effectively grounds the conductor, as a result no circuit has been closed, so it is possible to continue work in safety (single-fault safety). However, the fault must be rectified as quickly as possible before a second insulation fault occurs (e.g. according to DIN VDE 0100-410). For this purpose insulation monitoring relays are used, which constantly measure the resistance to ground of the phase conductor and the neutral conductor, reporting a fault immediately if insulation resistance falls below the set value so that either a controlled shutdown can be performed or the fault can be rectified without interrupting the power supply.

Two device series

- 3UG4581 insulation monitoring relays for ungrounded AC networks
- 3UG4582 and 3UG4583 insulation monitoring relays for ungrounded DC and AC networks

Benefits

- Devices for AC and DC systems
- All devices have a wide control supply voltage range
- Direct connection to networks with mains voltages of up to 690 V AC and 1 000 V DC by means of a voltage reducer module
- For AC supply systems: Frequency range 15 to 400 Hz
- Monitoring of broken conductors
- Monitoring of setting errors
- Safety in use thanks to integrated system test after startup
- Option of resetting and testing (by means of button on front or using control contact)
- New predictive measurement principle allows very fast response times

Application

IT networks are used, for example:

- In emergency power supplies
- In safety lighting systems
- In industrial production facilities with high availability requirements (chemical industry, automobile manufacturing, printing plants)
- In shipping and railways
- For mobile generators (aircraft)
- For renewable energies, such as wind energy and photovoltaic power plants
- In the mining industry

3UG45, 3UG46 Monitoring Relays for Stand-Alone Installation

Insulation monitoring general data

Technical specifications

More information

For manuals, see

- <https://support.industry.siemens.com/cs/ww/en/view/54382552>
- <https://support.industry.siemens.com/cs/ww/en/view/54382528>

Type	3UG4581-1AW30	3UG4582-1AW30	3UG4583-1CW30
General data			
Setting range for the setpoint response values			
• 1 ... 100 kΩ	✓	✓	✓
• 2 ... 200 kΩ	--	--	✓
Rated voltage of the network being monitored			
• 0 ... 250 V AC	--	✓	--
• 0 ... 440 V AC	✓	--	✓ ¹⁾
• 0 ... 690 V AC	--	--	✓ ¹⁾
• 0 ... 300 V DC	--	✓	--
• 0 ... 600 V DC	--	--	✓ ¹⁾
• 0 ... 1 000 V DC	--	--	✓ ¹⁾
Max. leakage capacitance of the system			
• 10 μF	✓	✓	--
• 20 μF	--	--	✓
Output contacts			
• 1 CO	✓	✓	--
• 2 CO or 1 CO + 1 CO, adjustable	--	--	✓
Number of limit values			
• 1	✓	✓	--
• 1 or 2, adjustable	--	--	✓
Principle of operation	Closed-circuit principle	Closed-circuit principle	Open-circuit/closed-circuit principle, adjustable
Rated control supply voltage			
• 24 ... 240 V AC/DC	✓	✓	✓
Rated frequency			
• 15 ... 400 Hz	--	✓	✓
• 50/60 Hz	✓	--	--
Auto or Manual RESET	✓ Adjustable	✓ Adjustable	✓ Adjustable
Remote RESET	✓ Via control input	✓ Via control input	✓ Via control input
Non-volatile error memory	--	--	✓ Adjustable
Broken wire detection	--	--	✓ Adjustable
Replacement for			
Rated control supply voltage U_s	Voltage range of the network being monitored		
3UG3081-1AK20			
110 ... 130/220 ... 240 V AC/DC	3 x 230/400 V AC	✓	--
3UG3081-1AW30			
24 ... 240 V AC/DC	3 x 230/400 V AC	✓	--
3UG3082-1AW30			
24 ... 240 V AC/DC	24 ... 240 V DC	--	✓

✓ Available

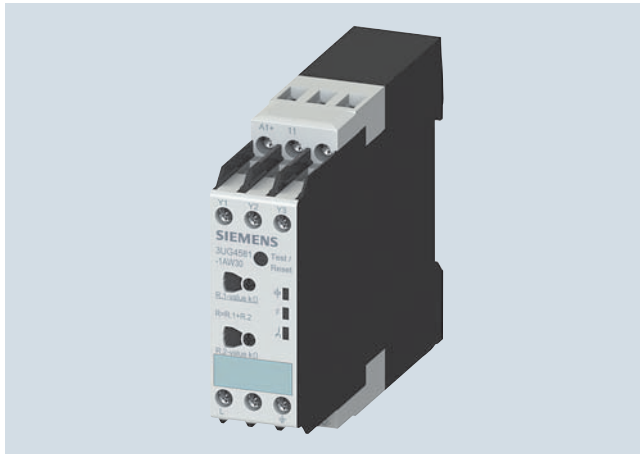
-- Not available

¹⁾ With voltage reducer module.

3UG45, 3UG46 Monitoring Relays for Stand-Alone Installation

Insulation monitoring for ungrounded AC networks

Overview



SIRIUS 3UG4581 insulation monitor

The 3UG4581 insulation monitoring relays are used to monitor insulation resistance according to IEC 61557-8 in ungrounded AC networks with rated voltages of up to 400 V.

These devices can monitor control circuits (single-phase) and main circuits (three-phase).

They measure insulation resistances between system cables and system ground. If the value falls below the threshold value, the output relays are switched to fault status.

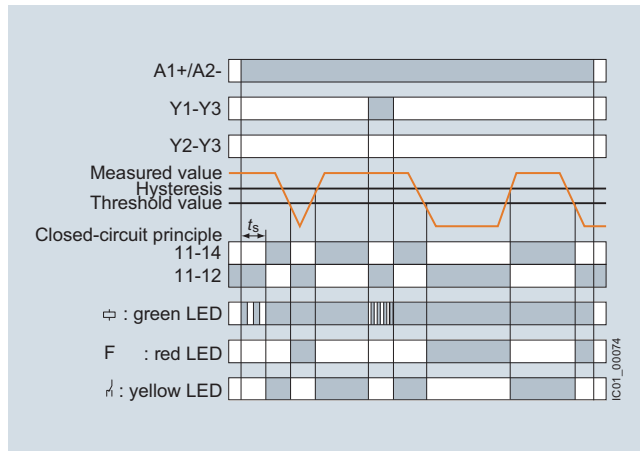
In the case of 3UG4581 a higher-level DC measuring signal is used. The higher-level DC measuring signal and the resulting current are used to determine the value of the insulation resistance of the network which is to be measured.

Technical specifications

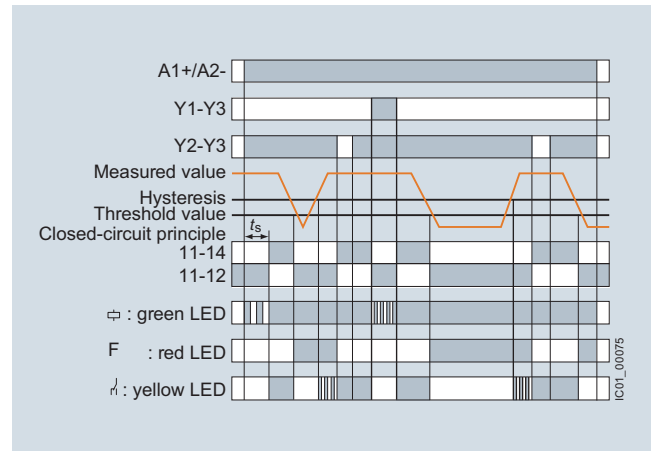
3UG4581 monitoring relay

With the closed-circuit principle selected

Insulation resistance monitoring without fault storage, with Auto RESET

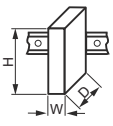



Insulation resistance monitoring with fault storage and Manual RESET




3UG45, 3UG46 Monitoring Relays for Stand-Alone Installation

Insulation monitoring for ungrounded AC networks

Type	3UG4581		
Dimensions (W x H x D)	 mm	22.5 x 100 x 100	
Connection type	 Screw terminals		
<ul style="list-style-type: none">• Solid• Finely stranded with end sleeve• AWG cables, solid or stranded	mm ² mm ² AWG	2 x (0.5 ... 4) 2 x (0.75 ... 2.5) 2 x (20 ... 14)	
General data			
Rated insulation voltage U_i Pollution degree 3 Overvoltage category III acc. to IEC 60664	V	400 supply circuit/measuring circuit 300 supply circuit/output circuit	
Rated impulse withstand voltage U_{imp}	kV	6	
Rated control supply voltage	V	24 ... 240 AC/DC	
Rated frequency	Hz	15 ... 400	
Measuring circuit			
Rated line voltage of the network being monitored	V	0 ... 400	
Rated frequency of the network being monitored	Hz	50 ... 60	
Setting range for insulation resistance	kΩ	1 ... 100	
Control circuit			
Load capacity of the output relay <ul style="list-style-type: none">• Thermal current I_{th}	A	4	
Rated operational current I_e at <ul style="list-style-type: none">• AC-15/24 ... 400 V• DC-13/24 V	A A	3 2	
Minimum contact load at 24 V DC	mA	10	

Selection and ordering data

- Auto or Manual RESET
- Closed-circuit principle
- 1 CO contact
- Fault memory adjustable using control input (Y2-Y3)
- Reset by means of button on front or using control input (Y2-Y3)
- Test by means of button on front or using control input (Y1-Y3)

Rated line voltage U_n	Measuring range U_e	Rated control supply voltage U_s	System leakage capacitance	SD	Screw terminals 	PU (UNIT, SET, M)	PS*	PG
V AC	kΩ	V	μF	d	Article No.	Price per PU		
Insulation monitors for ungrounded AC networks								
0 ... 400	1 ... 100	24 ... 240 AC/DC	Max. 10	5	3UG4581-1AW30		1	1 unit 41H



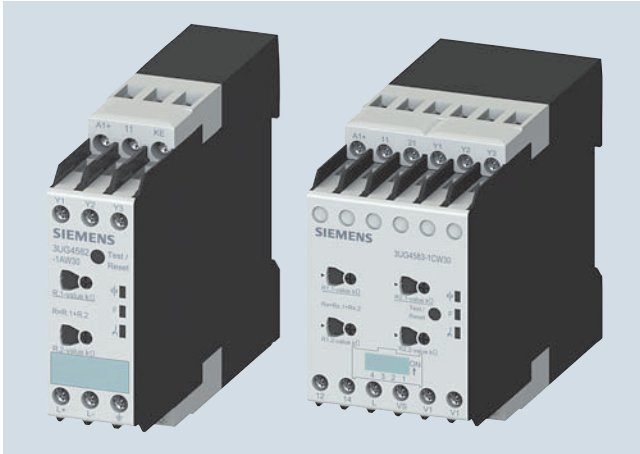
3UG4581-1AW30

For accessories, see page 11/83

3UG45, 3UG46 Monitoring Relays for Stand-Alone Installation

Insulation monitoring for ungrounded DC and AC networks

Overview



SIRIUS 3UG4582 and 3UG4583 insulation monitors

The 3UG4582 and 3UG4583 insulation monitoring relays are used to monitor insulation resistance in ungrounded IT AC or DC networks according to IEC 61557-8.

They measure insulation resistances between system cables and system ground. If the value falls below the threshold value, the output relays are switched to fault status. With these devices, which are suitable for both AC and DC networks, a pulsed test signal is fed into the network to be monitored and the isolation resistance is determined.

The pulsed test signal changes its form according to insulation resistance and network loss capacitance. The changed form is used to predict the changed insulation resistance.

If the predicted insulation resistance matches the insulation resistance calculated in the next measurement cycle, and is lower than the threshold value, the output relays are activated or deactivated, depending on the device configuration. This measurement principle is also suitable for identifying symmetrical insulation faults.

3UG4983 voltage reducer module

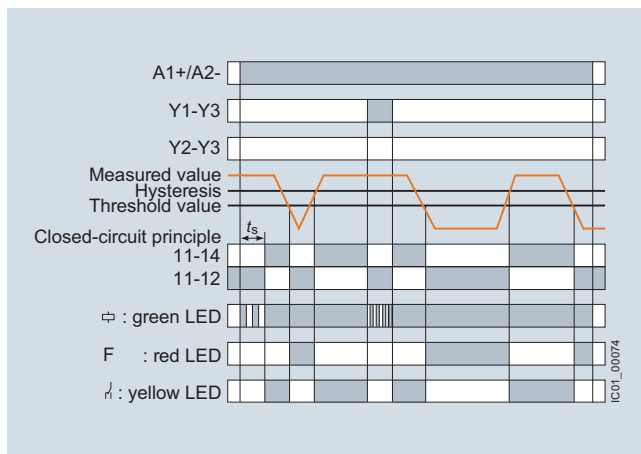
The 3UG4983 passive voltage reducer module can be used to allow the 3UG4583 insulation monitoring relay to be used for insulation monitoring of IT networks with rated voltages of up to 690 V AC and 1 000 V DC.

Technical specifications

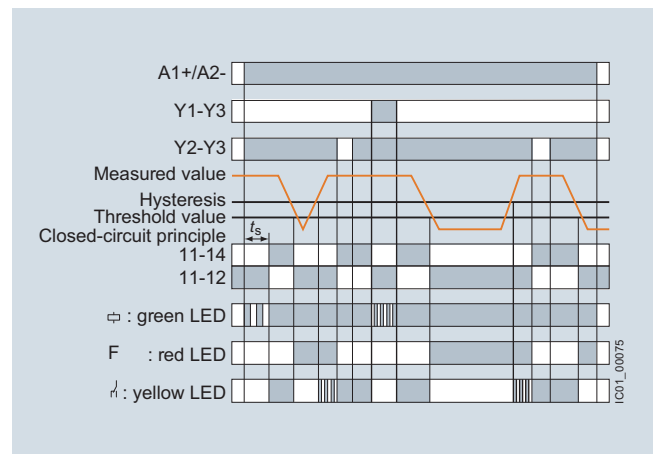
3UG4582 monitoring relays

With the closed-circuit principle selected

Insulation resistance monitoring without fault storage, with Auto RESET



Insulation resistance monitoring with fault storage and Manual RESET



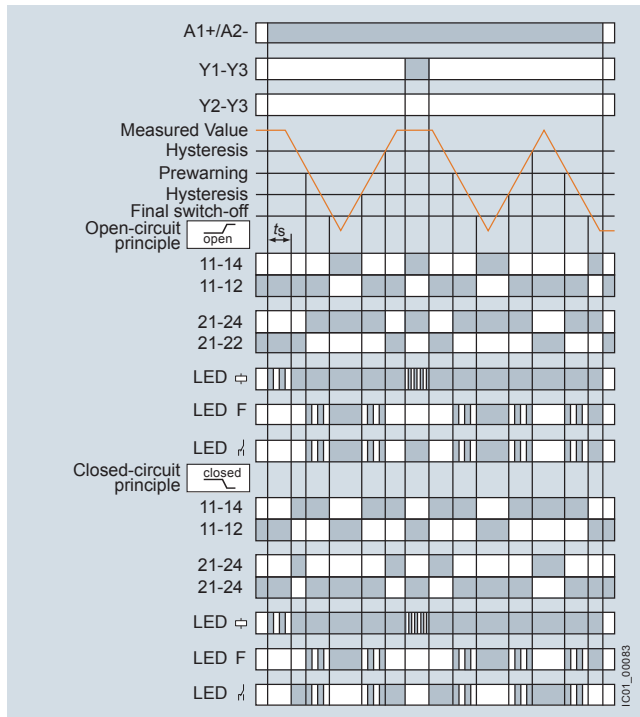
3UG45, 3UG46 Monitoring Relays for Stand-Alone Installation

Insulation monitoring for ungrounded DC and AC networks

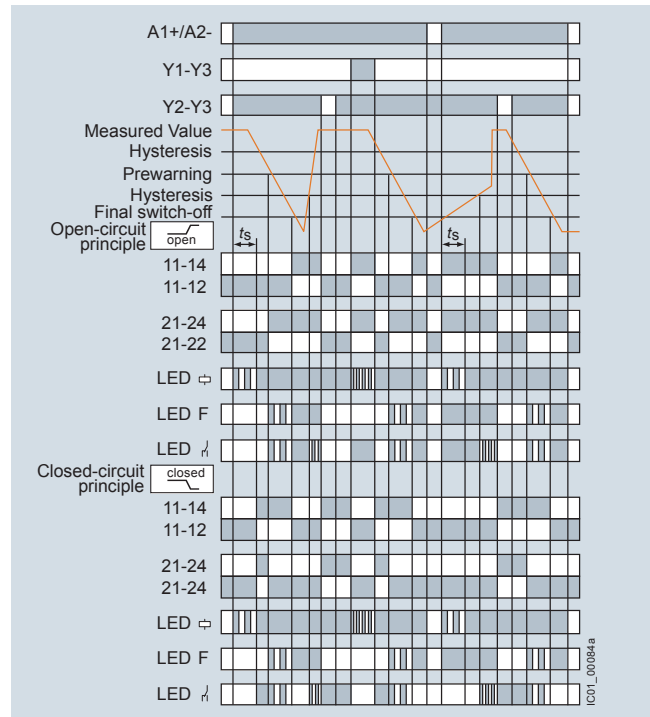
3UG4583 monitoring relays

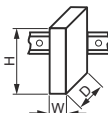

With the closed-circuit principle selected

Insulation resistance monitoring without fault storage, with Auto RESET



Insulation resistance monitoring with fault storage and Manual RESET



Type		3UG4582	3UG4583	
Dimensions (W x H x D)		mm	22.5 x 100 x 100	45 x 100 x 100
Connection type		 Screw terminals		
<ul style="list-style-type: none">• Solid• Finely stranded with end sleeve• AWG cables, solid or stranded	mm ² mm ² AWG	2 x (0.5 ... 4) 2 x (0.75 ... 2.5) 2 x (20 ... 14)		
General data				
Rated insulation voltage U_i Pollution degree 3 Overvoltage category III acc. to IEC 60664	V	400 supply circuit/measuring circuit, 300 supply circuit/output circuit	400 supply circuit/measuring circuit 300 supply circuit/output circuit, 300 output circuit 1/output circuit 2	
Rated impulse withstand voltage U_{imp}	kV	6		
Rated control supply voltage	V AC/DC	24 ... 240		
Rated frequency	Hz	15 ... 400		
Measuring circuit				
Rated line voltage of the network being monitored	V V	0 ... 250 AC, 0 ... 300 DC	0 ... 300 AC, 0 ... 690 AC with 3UG49 83 0 ... 600 DC, 0 ... 1 000 DC with 3UG49 83	
Rated frequency of the network being monitored	Hz	DC or 15 ... 400		
Setting range for insulation resistance	k	1 ... 100	1 ... 100, 2 ... 200 for 2nd limit value (disconnectable)	
Control circuit				
Number of CO contacts for auxiliary contacts		1	2 or 1 + 1, adjustable	
Load capacity of the output relay <ul style="list-style-type: none">• Thermal current I_{th}	A	4		
Rated operational current I_o at <ul style="list-style-type: none">• AC-15/24 ... 400 V• DC-13/24 V	A A	3 2		
Minimum contact load at 24 V DC	mA	10		

3UG45, 3UG46 Monitoring Relays for Stand-Alone Installation

Insulation monitoring for ungrounded DC and AC networks

Selection and ordering data

- Auto or Manual RESET
- Rated control supply voltage U_s 24 ... 240 V AC/DC
- 3UG4582: Closed-circuit principle
- 3UG4583: Open-circuit or closed-circuit principle, adjustable
- 1 or 2 CO contacts
- Fault memory adjustable using control input (Y2-Y3)
- Reset by means of button on front or using control input (Y2-Y3)
- Test by means of button on front or using control input (Y1-Y3)
- 3UG4583: Non-volatile fault storage can be configured
- 3UG4583: 2 separate limit values (e.g. for warning and disconnection) or 2 CO contacts for one limit value (e.g. for a local alarm and signaling to the PLC via separate circuits) can be configured

Note:

With the 3UG4983-1A coupling unit, connection to networks with voltages of up to 690 V AC and 1 000 V DC is possible, see below.

	Rated line voltage U_n	System leakage capacitance	Output relays	Measuring range U_o	Broken wire detection in the measuring range	SD	Screw terminals	PU (UNIT, SET, M)	PS*
	V	μF		k Ω		d	Article No.	Price per PU	
 3UG4582-1AW30	3UG4582 insulation monitors								
	0 ... 250 AC, 0 ... 300 DC	Max. 10	1 CO	1 ... 100	✓	5	3UG4582-1AW30		1 1 unit
 3UG4583-1CW30	3UG4583 insulation monitors								
	0 ... 400 AC, 0 ... 600 DC ¹⁾	Max. 20	2 CO or 1 CO + 1 CO, adjustable	1 ... 100, 2 ... 200 for 2nd limit value, adjustable	✓ Adjustable	5	3UG4583-1CW30		1 1 unit
 3UG4983-1A	Voltage reducer module for 3UG4583								
	For extending the network voltage range to max. 690 V AC and 1 000 V DC						3UG4983-1A		1 1 unit

✓ Available

¹⁾ With 3UG4983-1A voltage reducer module suitable also for the insulation monitoring of IT networks of up to 690 V AC and 1 000 V DC.

For accessories, see page 11/83

SIRIUS 3UG Monitoring Relays for Stand-Alone Installation

Insulation monitoring for ungrounded DC and AC networks

Overview



SIRIUS 3UG4501 monitoring relay

The 3UG4501 level monitoring relay is used in combination with 2- or 3-pole sensors to monitor the levels of conductive liquids.

Technical specifications

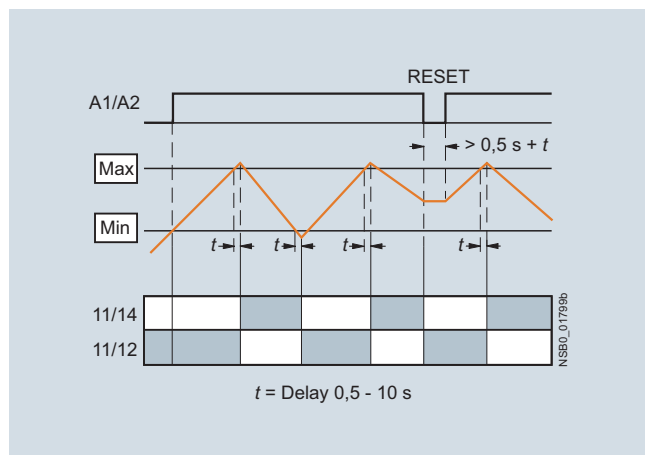
3UG4501 monitoring relays

The principle of operation of the 3UG4501 level monitoring relay is based on measuring the electrical resistance of the liquid between two immersion sensors and a reference terminal. If the measured value is lower than the sensitivity set at the front, the output relay changes its switching state. In order to exclude electrolytic phenomena in the liquid, the sensors are supplied with alternating current.

Two-point control

The output relay changes its switching state as soon as the liquid level reaches the maximum sensor, while the minimum sensor is submerged. The relay returns to its original switching state as soon as the minimum sensor no longer has contact with the liquid.

OVER, two-point control



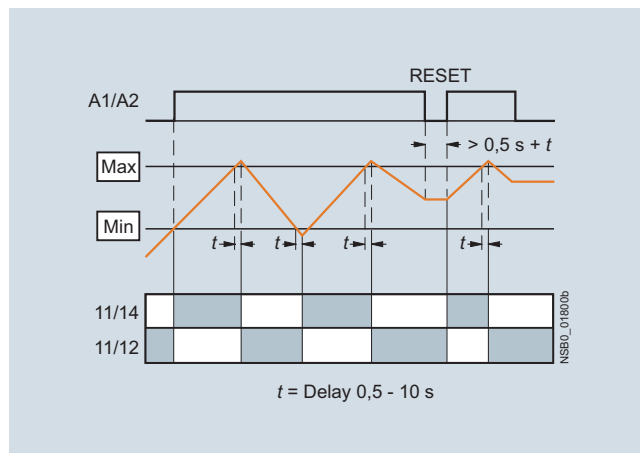
Benefits

- Can be used worldwide thanks to wide voltage range from 24 to 240 V (absolute limit values)
- Individually shortenable 2- and 3-pole wire electrodes for easy mounting from above/below
- Bow electrodes for installation from the side, for larger filling levels and minimum space requirements
- Can be flexibly adapted to different conductive liquids through analog setting of the sensitivity from 2 to 200 k Ω
- Compensation for wave movements through tripping delay times from 0.1 to 10 s
- Upstream or downstream function selectable
- All versions with removable terminals
- All versions with screw or spring-type terminals

Application

- Single-point and two-point level monitoring
- Overflow protection
- Dry run protection
- Leak monitoring

UNDER, two-point control

Note:

It is also possible to connect other resistance sensors to the Min and Max terminals in the range 2 to 200 k Ω , e.g. photoresistors, temperature sensors, encoders based on resistance, etc. The monitoring relay can therefore also be used for other applications as well as for monitoring the levels of liquids.

SIRIUS 3UG Monitoring Relays for Stand-Alone Installation

Insulation monitoring for ungrounded DC and AC networks

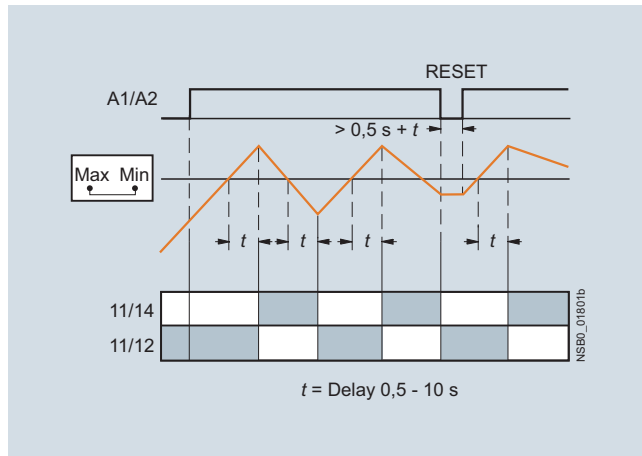
Single-point control

If only one level is being controlled, the terminals for Min and Max on the monitoring relay are bridged. The output relay changes its switching state as soon as the liquid level is reached and returns to its original switching state once the sensor no longer has contact with the liquid.

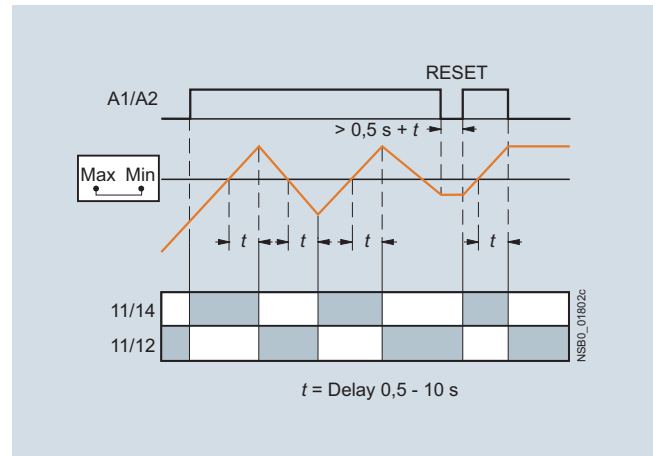
In order to prevent premature tripping of the switching function caused by wave motion or frothing, even though the set level has not been reached, it is possible to delay this function by 0.5 to 10 s.

For safe resetting, the control supply voltage must be interrupted for at least the set delay time of +0.5 s.

OVER, single-point control



UNDER, single-point control



Type	3UG4501	
General data		
Rated insulation voltage U_i Pollution degree 3 Overvoltage category III acc. to VDE 0110	V	300
Rated impulse withstand voltage U_{imp}	kV	4
Measuring circuit		
Electrode current, max. (typ. 70 Hz)	mA	1
Electrode voltage, max. (typ. 70 Hz)	V	15
Sensor feeder cable	m	Max. 100
Conductor capacitance of sensor cable ¹⁾	nF	Max. 10
Control circuit		
Load capacity of the output relay Thermal current I_{th}	A	5
Rated operational current I_e at • AC-15/24 ... 400 V • DC-13/24 V • DC-13/125 V • DC-13/250 V	A A A A	3 1 0.2 0.1
Minimum contact load at 17 V DC	mA	5

¹⁾ The sensor cable does not necessarily have to be shielded, but we do not recommend installing this cable parallel to the power supply lines. It is also possible to use a shielded cable, whereby the shield has to be connected to the M terminal.



3UG45, 3UG46 Monitoring Relays for Stand-Alone Installation

Level monitoring: Level monitoring relays

Selection and ordering data

- For level monitoring of electrically conductive liquids
- Control principle: inlet or sequence control adjustable per rotary switch
- Single-point and two-point control possible
- Analogically adjustable sensitivity (specific resistance of the liquid)
- Analogically adjustable tripping delay time
- 1 yellow LED for displaying the relay state
- 1 green LED for displaying the applied control supply voltage
- 1 CO contact

PU (UNIT, SET, M) = 1
 PKG* = 1 UNIT
 PG = 41H

Sensitivity	Tripping delay time	Rated control supply voltage U_s	SD	Screw terminals 		SD	Spring-type terminals 	
				Article No.	Price per PU		Article No.	Price per PU
k Ω	s	V	d					
		AC/DC						
2 ... 200	0.5 ... 10	24 ¹⁾	2	3UG4501-1AA30		2	3UG4501-2AA30	
		24 ... 240	2	3UG4501-1AW30		2	3UG4501-2AW30	

¹⁾ The rated control supply voltage and the measuring circuit are not electrically separated.

For accessories, [see page 11/83](#)

For level monitoring sensors, [see page 11/79](#)






3UG45, 3UG46 Monitoring Relays for Stand-Alone Installation

Level monitoring: Level monitoring sensors

Technical specifications

Type		3UG3207-3A Three-pole	3UG3207-2A Two-pole	3UG3207-2B Two-pole	3UG3207-1B Single-pole	3UG3207-1C Single-pole
Length	mm	500		--		
Insulation	Teflon insulation (PTFE)	Yes			--	Yes
Installation		Vertical		Lateral		
Screw-in gland width A/F		22				
Thread	inch	R 3/8				
Connecting cable	mm ²	3 x 0.5, 2 m long				
Operating temperature	°C	90				
Operating pressure	bar	10				
Cable/electrode assignment						
• Cable brown		Center electrode	Not assignable	Gland		
• Cable white		Not assignable			Electrode	
• Cable green		Not assignable	--	Not assignable	--	

Selection and ordering data

Version	SD	Article No.	Price per PU	PU (UNIT, SET, M)	PS*
Level monitoring sensors (essential accessory)					
The wire electrodes can be cut or bent to the required length before or after installation. The Teflon insulation must be removed over a length of approx. 5 mm.					
 3UG3207-3A		Three-pole wire electrodes, 500 mm long	2	3UG3207-3A	1 1 unit
		For 2-point liquid level control in an insulating tank. One electrode each for the min. and max. value and a common reference electrode.			
 3UG3207-2A		Two-pole wire electrodes, 500 mm long	2	3UG3207-2A	1 1 unit
		For alarm indication in the event of overflow or low level and for 2-point liquid level control, when the conductive tank is used as the reference electrode.			
 3UG3207-2B		Two-pole bow electrodes	2	3UG3207-2B	1 1 unit
		Thanks to the small space requirements due to lateral fitting, ideal for use in small containers and pipes, as a leak monitor and level monitor or for warning of water entering an enclosure.			
 3UG3207-1B		Single-pole bow electrodes for lateral fitting	2	3UG3207-1B	1 1 unit
		As a max. value electrode for lateral fitting or for alarm indication in conductive tanks or pipes.			
 3UG3207-1C		Single-pole rod electrodes for lateral fitting	2	3UG3207-1C	1 1 unit
		For high flow velocities or for intensively sparkling fluids.			

3UG45, 3UG46 Monitoring Relays for Stand-Alone Installation

Speed monitoring

Overview



SIRIUS 3UG4651 monitoring relay

The 3UG4651 monitoring relay is used in combination with a sensor to monitor motor drives for overspeed and/or under-speed.

Furthermore, the monitoring relay is ideal for all functions where a continuous pulse signal needs to be monitored (e.g. belt travel monitoring, completeness monitoring, passing monitoring, clock-time monitoring).

Benefits

- Can be used worldwide thanks to wide voltage range from 24 to 240 V (absolute limit values)
- Variably adjustable to overshoot, undershoot or range monitoring
- Freely configurable delay times and RESET response
- Permanent display of actual value and fault type
- Use of up to 10 sensors per rotation for extremely slowly rotating motors
- 2- or 3-wire sensors and sensors with a mechanical switching output or semiconductor output can be connected
- Auxiliary voltage for sensor integrated
- All versions with removable terminals
- All versions with screw or spring-type terminals

Application

- Slip or tear of a belt drive
- Overload monitoring
- Transport monitoring for completeness

Technical specifications

3UG4651 monitoring relay

The speed monitoring relay operates according to the principle of period duration measurement.

In the monitoring relay, the time between two successive rising edges of the pulse encoder is measured and compared to the minimum and/or maximum permissible period duration calculated from the set limit values for the speed.

Thus, the period duration measurement recognizes any deviation in speed after just two pulses, even at very low speeds or in the case of extended pulse gaps.

By using up to ten pulse encoders evenly distributed around the circumference, it is possible to shorten the period duration, and in turn the response time. By taking into account the number of sensors in the monitoring relay, the speed continues to be indicated in rpm.

ON-delay time for motor start

To be able to start a motor drive, and depending on whether the open-circuit or closed-circuit principle is selected, the output relay switches to the GO state during the ON-delay time, even if the speed is still below the set value.

The ON-delay time is started by either switching on the auxiliary voltage or, if the auxiliary voltage is already applied, by actuating the respective NC contact (e.g. auxiliary contact).

Speed monitoring with Auto RESET (Memory = no)

If the device is set to Auto RESET, the output relay switches to the GO state, once the adjustable hysteresis threshold is reached in the range of 0.1 to 99.9 rpm and the flashing stops. Any overshoots or undershoots are therefore not stored.

Speed monitoring with Manual RESET (Memory = yes)

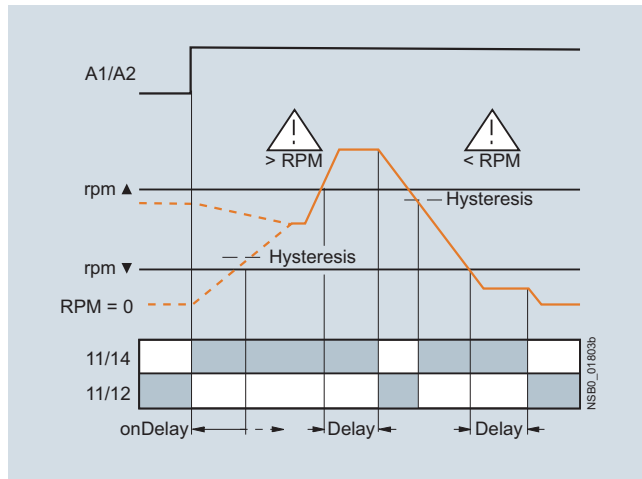
If Manual RESET is selected in the menu, the output relay remains in its current switching state and the current measured value and the symbol for overshooting/undershooting continue to flash, even when the speed returns to a permissible value. This stored fault status can be reset by simultaneously pressing the UP▲ and DOWN▼ keys for > 2 s, by connecting the RESET device terminal to 24 V DC or by switching the control supply voltage off and back on again.

3UG45, 3UG46 Monitoring Relays for Stand-Alone Installation

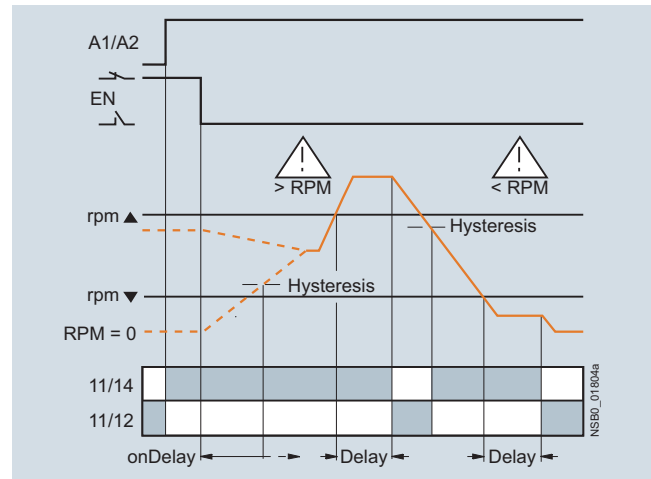
Speed monitoring

With the closed-circuit principle selected

Range monitoring without enable input



Range monitoring with enable input





Type	3UG4651	
General data		
Rated insulation voltage U_i Pollution degree 3 Overvoltage category III acc. to VDE 0110	V	300
Rated impulse withstand voltage U_{imp}	kV	4
Measuring circuit		
Sensor supply • For 3-wire sensor (24 V/0 V) • For 2-wire NAMUR sensor (8V2)	mA mA	Max. 50 Max. 8,2
Signal input • IN1 • IN2	kΩ kΩ	16, 3-wire sensor, pnp operation 1, floating contact, 2-wire NAMUR sensor
Voltage level • For level 1 at IN1 • For level 0 at IN1	V V	4.5 ... 30 0 ... 1
Current level • For level 1 at IN2 • For level 0 at IN2	mA mA	> 2.1 < 1.2
Minimum pulse duration of signal	ms	5
Minimum interval between 2 pulses	ms	5
Control circuit		
Number of CO contacts for auxiliary contacts		1
Load capacity of the output relay Thermal current I_{th}	A	5
Rated operational current I_e at • AC-15/24 ... 400 V • DC-13/24 V • DC-13/125 V • DC-13/250 V	A A A A	3 1 0.2 0.1
Minimum contact load at 17 V DC	mA	5

3UG45, 3UG46 Monitoring Relays for Stand-Alone Installation

Speed monitoring

Selection and ordering data

- For speed monitoring in revolutions per minute (rpm)
 - Two- or three-wire sensor with mechanical or electronic switching output can be connected
 - Two-wire NAMUR sensor can be connected
 - Sensor supply 24 V DC/50 mA integrated
 - Input frequency 0.1 to 2 200 pulses rpm (0.0017 to 36.7 Hz)
 - With or without enable signal for the drive to be monitored
 - Digitally adjustable, with illuminated LCD
 - Overshoot, undershoot or range monitoring adjustable
 - Number of pulses per revolution can be adjusted
 - Upper and lower threshold value can be adjusted separately
 - Auto, manual or remote RESET options after tripping
 - Permanent display of actual value and tripping state
 - 1 CO contact
- PU (UNIT, SET, M) = 1
PKG* = 1 UNIT

Measuring range	Hysteresis	ON-delay time	Tripping delay time	Pulses per revolution	Rated control supply voltage U_s AC/DC	SD	Screw terminals		SD	Spring-type terminals	
rpm	rpm	s	s		V	d	Article No.	Price per PU	d	Article No.	Price per PU
0.1 ... 2 200	OFF 0.1 ... 99.9	0 ... 900	0.1 ... 99.9	1 ... 10	24 ¹⁾	2	3UG4651-1AA30		2	3UG4651-2AA30	
					24 ... 240	2	3UG4651-1AW30		2	3UG4651-2AW30	

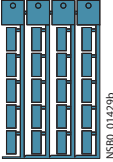






¹⁾ The rated control supply voltage and the measuring circuit are not electrically separated.

For accessories, [see page 11/83](#)

3UG45, 3UG46 Monitoring Relays for Stand-Alone Installation

Accessories

Selection and ordering data

Use	Version	SD	Article No.	Price per PU	PU (UNIT, SET, M)	PS*
		d				
Blank labels						
 3RT1900-1SB20	For 3UG4	Unit labeling plates For SIRIUS devices 20 mm x 7 mm, pastel turquoise	20	3RT1900-1SB20	100	340 units
	For 3UG4	Adhesive labels for SIRIUS devices	15	3RT1900-1SB60	100	3 060 units
		• 19 mm x 6 mm, pastel turquoise	15	3RT1900-1SD60	100	3 060 units
		• 19 mm x 6 mm, zinc yellow	15			
Push-in lugs and covers						
 3RP1903	For 3UG4	Push-in lugs For screw fixing, 2 units are required for each device	5	3RP1903	1	10 units
 3RP1902	For 3UG4	Sealable covers For securing against unauthorized adjustment of setting knobs	5	3RP1902	1	5 units
	For 3UG45	Sealing foil For securing against unauthorized adjustment of setting knobs	▶	3TK2820-0AA00	1	1 unit
Covers for insulation monitoring relays						
Sealable, transparent covers						
 3UG4981-0C	For 3UG4581 and 3UG4582		5	3UG4981-0C	1	1 unit
 3UG4983-0C	For 3UG4583		5	3UG4983-0C	1	1 unit
Tools for opening spring-type terminals						
 3RA2908-1A	For auxiliary circuit connections	Screwdrivers For all SIRIUS devices with spring-type terminals; 3.0 mm x 0.5 mm; length approx. 200 mm, titanium gray/black, partially insulated	2	Spring-type terminals  3RA2908-1A	1	1 unit

Note:

For products for mechanical bearing monitoring, e.g. condition monitoring systems, see www.siemens.com/siplus-cms.

3UG48 Monitoring Relays for Stand-Alone Installation for IO-Link

General data

Overview



SIRIUS 3UG48 monitoring relays

More information

Homepage, see www.siemens.com/relays

Industry Mall, see www.siemens.com/product?3UG48

For the conversion tool, e.g. from 3UG3 to 3UG4, see www.siemens.com/sirius/conversion-tool

The SIRIUS 3UG4 monitoring relays for electronic and mechanical variables monitor all important characteristics that allow conclusions to be drawn about the functionality of a plant. Both sudden disturbances and gradual changes, which may indicate the need for maintenance, are detected.

Thanks to their relay outputs, the monitoring relays permit direct disconnection of the affected system components and alerting, e.g. by the triggering of a warning light. Thanks to adjustable delay times the 3UG4 monitoring relays can respond very flexibly to brief faults such as voltage dips or load changes and can thus avoid unnecessary alarms and disconnections and increase system availability.

3UG48 monitoring relays for IO-Link

The SIRIUS 3UG48 monitoring relays for IO-Link also offer many other options based upon the monitoring functions of the tried-and-tested SIRIUS 3UG4 monitoring relays:

- Measured value transmission to a controller, including resolution and unit, may be parameterizable as to which value is cyclically transmitted
- Transmission of alarm flags to a controller
- Full diagnosis capability by inquiry as to the cause of the fault in the diagnosis data record
- Remote parameterization is also possible, in addition to or instead of local parameterization
- Rapid parameterization of the same devices by duplication of the parameterization in the controller
- Parameter transmission through uploading to a controller by IO-Link call or by parameter server (if IO-Link master from IO-Link Specification V1.1 and higher is used)
- Consistent central data storage in the event of parameter change locally or via a controller
- Automatic reparameterizing when devices are exchanged
- Blocking of local parameterization via IO-Link possible
- Faults are saved in parameterizable and non-volatile fashion to prevent an automatic start up after voltage failure and to make sure diagnostics data is not lost

- Integration into the automation level provides the option of parameterizing the monitoring relays at any time via a display unit, or displaying the measured values in a control room or locally at the machine/control cabinet

Even without communication via IO-Link the devices continue to function fully autonomously:

- Parameterization can take place locally at the device, independently of a controller.
- In the event of failure or before the controller becomes available the monitoring relays work as long as the control supply voltage (24 V DC) is present.
- If the monitoring relays are operated without the controller, the 3UG48 monitoring relays have, thanks to the integrated SIO mode, an additional semiconductor output, which switches when the adjustable warning threshold is exceeded.

Thanks to the combination of autonomous monitoring relay function and integrated IO-Link communication, redundant sensors and/or analog signal converters – which previously took over the transmission of measured values to a controller, leading to considerable extra cost and wiring outlay – are no longer needed.

Because the output relays are still present, the monitoring relays increase the functional reliability of the system, since only the controller can fulfill the control tasks if the current measured values are available, whereas the output relays can also be used for the disconnection of the system if limit values that cannot be reached during operation are exceeded.

The individual 3UG48 monitoring relays for IO-Link offer the following functions in different combinations:

- Phase sequence
- Phase failure, neutral conductor failure
- Phase asymmetry
- Undershooting and/or overshooting of limit values for voltage
- Undershooting and/or overshooting of limit values for current
- Undershooting and/or overshooting of power factor limit values
- Monitoring of the active current or the apparent current
- Monitoring of the residual current
- Undershooting and/or overshooting of limit values for speed

Note:

For more information on the IO-Link bus system, [click here](#).

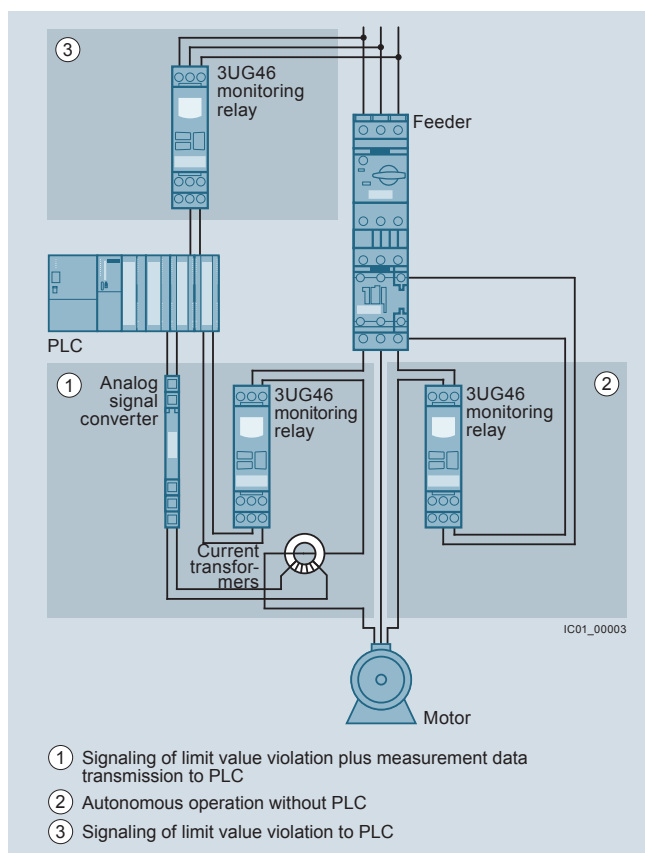
Notes on security

In order to protect plants, systems, machines and networks against cyber threats, it is necessary to implement – and continuously maintain – a holistic, state-of-the-art industrial security concept. Siemens products and solutions represent only one component of such a concept.

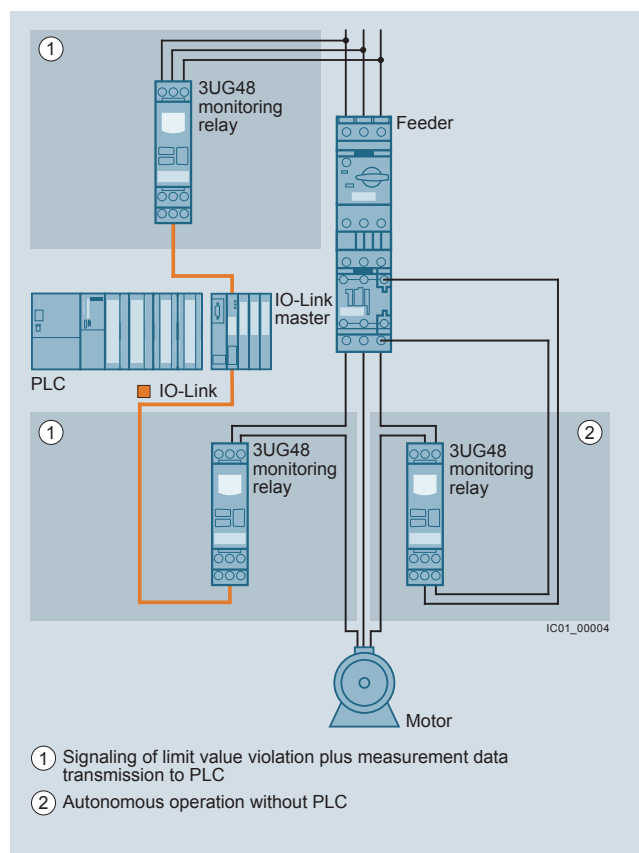
For more information on Industrial Security, see www.siemens.com/industrialsecurity.

3UG48 Monitoring Relays for Stand-Alone Installation for IO-Link

General data



Use of conventional monitoring relays



Monitoring relays for IO-Link

Notes:

Devices required for the communication via IO-Link:

- Any controller that supports the IO-Link (e.g. ET 200SP with CPU or S7-1200).
- IO-Link master (e.g. CM 4xIO-Link for SIMATIC ET 200SP or SM 1278 for S7-1200).

Each monitoring relay requires an IO-Link channel.

Article No. scheme

Product versions		Article number	
3UG4 monitoring relay with IO-Link		3UG4	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> - <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> 0
Type of setting	e.g. 8 = analogically adjustable	<input type="checkbox"/>	
Functions	e.g. 15 = line monitoring	<input type="checkbox"/> <input type="checkbox"/>	
Connection type	Screw terminals		1
	Spring-type terminals (push-in)		2
Contacts	e.g. A = 1 CO contact	<input type="checkbox"/>	
Supply voltage	e.g. A4 = 160 ... 690 V AC		<input type="checkbox"/> <input type="checkbox"/>
Example		3UG4	8 1 5 - 1 A A 4 0

Note:

The Article No. scheme shows an overview of product versions for better understanding of the logic behind the article numbers.

For your orders, please use the article numbers quoted in the selection and ordering data.

Benefits

- Simple cyclical transmission of the current measured values, relay switching states and events to a controller
- Remote parameterization
- Automatic reparameterizing when devices are exchanged
- Simple duplication of identical or similar parameterizations
- Reduction of control current wiring
- Elimination of testing costs and wiring errors
- Reduction of configuration work
- Integration in TIA means clear diagnostics if a fault occurs
- Cost saving and space saving in control cabinet due to the elimination of AI and IO modules as well as analog signal converters and duplicated sensors

3UG48 Monitoring Relays for Stand-Alone Installation for IO-Link

General data

Application

The use of SIRIUS monitoring relays for IO-Link is particularly recommended for machines and plants in which these relays, in addition to their monitoring function, are to be connected to the automation level for the rapid, simple and fault-free provision of the current measured values and/or for remote parameterization.

The monitoring relays can either relieve the controller of monitoring tasks or, as a second monitoring entity in parallel to and independent of the controller, increase the reliability in the process or in the system. In addition, the elimination of AI and IO modules allows the width of the controller to be reduced despite significantly expanded functionality.

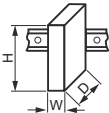



Technical specifications

More information

Technical specifications, see
<https://support.industry.siemens.com/cs/ww/en/ps/16368/td>

Manual and internal circuit diagrams, see
<https://support.industry.siemens.com/cs/ww/en/view/54375430>

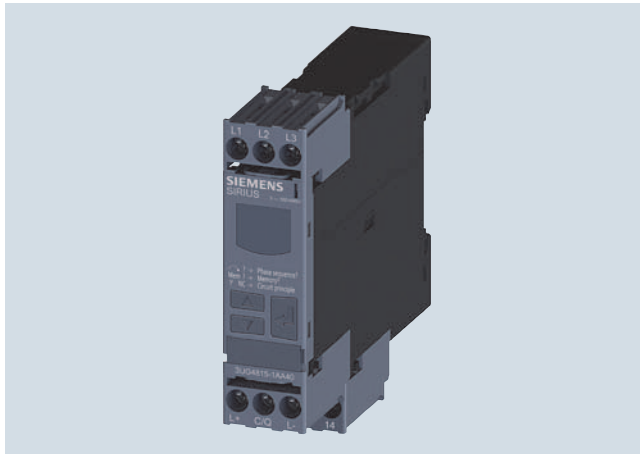
FAQs, see <https://support.industry.siemens.com/cs/ww/en/ps/16368/faq>

Type	3UG48		
General technical specifications			
Dimensions (W x H x D)			
• For 3 terminal blocks			
- Screw terminals		mm	22.5 x 92 x 91
- Spring-type terminals		mm	22.5 x 94 x 91
• For 4 terminal blocks			
- Screw terminals		mm	22.5 x 103 x 91
- Spring-type terminals	mm	22.5 x 103 x 91	
Permissible ambient temperature			
• During operation	°C	-25 ... +60	
Connection type			Screw terminals
• Terminal screw		M3 (for standard screwdriver, size 2 and Pozidriv 2)	
• Solid	mm ²	1 x (0.5 ... 4), 2 x (0.5 ... 2.5)	
• Finely stranded with end sleeve	mm ²	1 x (0.5 ... 2.5), 2 x (0.5 ... 1.5)	
• AWG cables, solid or stranded	AWG	2 x (20 ... 14)	
• Tightening torque	Nm	0.8 ... 1.2	
Connection type		 	Spring-type terminals
• Solid	mm ²	2 x (0.25 ... 1.5)	
• Finely stranded, with end sleeve acc. to DIN 46228	mm ²	2 x (0.25 ... 1.5)	
• Finely stranded	mm ²	2 x (0.25 ... 1.5)	
• AWG cables, solid or stranded	AWG	2 x (24 ... 16)	

3UG48 Monitoring Relays for Stand-Alone Installation for IO-Link

Line monitoring

Overview



SIRIUS 3UG4815 monitoring relay

Solid-state line monitoring relays provide maximum protection for mobile machines, plants and hoisting equipment or for unstable networks. Network and voltage faults can thus be detected early and rectified before far greater damage ensues.

The line monitoring relays with IO-Link monitor phase sequence, phase failure (with or without N conductor monitoring), phase asymmetry and undervoltage and/or overvoltage.

Phase asymmetry is evaluated as the difference between the greatest and the smallest phase voltage relative to the greatest phase voltage. Undervoltage or overvoltage exist if the set limit values for at least one phase voltage are overshoot or undershot. The rms value of the voltage is measured.

Benefits

- Can be used in any network from 160 to 630 V AC worldwide thanks to wide voltage range
- Variably adjustable to overshoot, undershoot or range monitoring
- Freely configurable delay times and RESET response
- Width 22.5 mm
- Display and transmission of actual value and network fault type to controller
- All versions with removable terminals
- All versions with screw or spring-type terminals

Application

The relays are used above all for mobile equipment, e.g. air conditioning compressors, refrigerating containers, building site compressors and cranes.

Function	Application
Phase sequence	<ul style="list-style-type: none"> • Direction of rotation of the drive
Phase failure	<ul style="list-style-type: none"> • A fuse has tripped • Failure of the control supply voltage • Broken cable
Phase asymmetry	<ul style="list-style-type: none"> • Overheating of the motor due to asymmetrical voltage • Detection of asymmetrically loaded networks
Undervoltage	<ul style="list-style-type: none"> • Increased current on a motor with corresponding overheating • Unintentional resetting of a device • Network collapse, particularly with battery power
Overvoltage	<ul style="list-style-type: none"> • Protection of a plant against destruction due to overvoltage

3UG48 Monitoring Relays for Stand-Alone Installation for IO-Link

Line monitoring

Technical specifications

3UG4815/3UG4816 monitoring relays

The 3UG4815 and 3UG4816 line monitoring relays have a wide voltage range input and are supplied with power through IO-Link or from an external 24 V DC source.

The device is equipped with a display and is parameterized using three buttons. The 3UG4815 monitoring relay monitors three-phase networks with regard to phase sequence, phase failure, phase asymmetry, undervoltage and overvoltage. The 3UG4816 monitoring relay monitors the neutral conductor as well. The hysteresis is adjustable from 1 to 20 V.

The device has two separately adjustable delay times for overvoltage and undervoltage and for line stabilization. If the direction of rotation is incorrect or a phase fails, the device switches off immediately. Thanks to a special measuring method, a phase failure is reliably detected in spite of the wide voltage range from and potentially high feedback through the load.

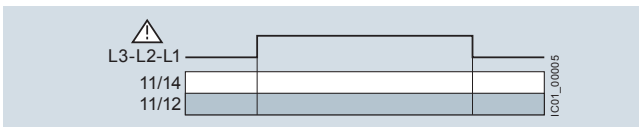
The 3UG4815 and 3UG4816 monitoring relays can be operated on the basis of either the open-circuit or closed-circuit principle and with Manual or Auto RESET.

If Manual RESET is selected in the menu (Memory = Yes), the switching relay remains in its current switching state and the current measured value and the symbol for undershooting and overshooting continues to flash, even when the measured variable reaches a permissible value again. This stored fault status can be reset by simultaneously pressing the UP▲ and DOWN▼ keys for 2.5 s.

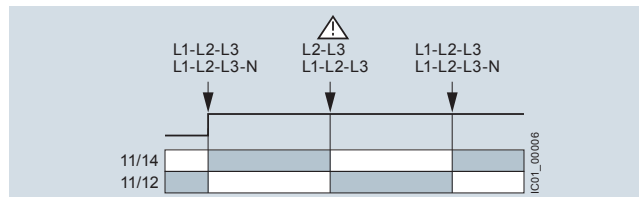
With Manual RESET through IO-Link it is possible in addition to set whether error signals are to be deleted when the control supply voltage is switched off and on (as remote RESET) or whether the signals are to be permanently saved even in a voltage failure, with confirmation possible only through local RESET or via IO-Link.

With the closed-circuit principle selected

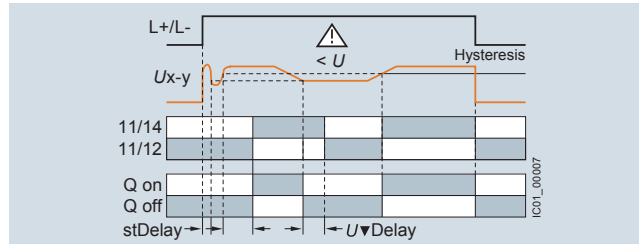
Wrong phase sequence



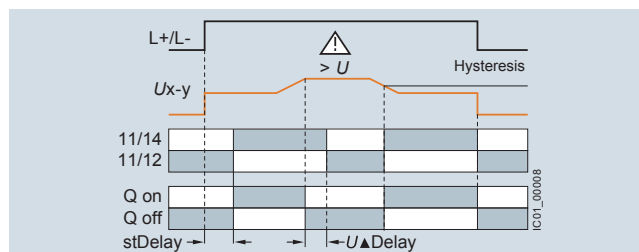
Phase failure



Undervoltage



Overvoltage



Type	3UG4815, 3UG4816	
General technical specifications		
Rated insulation voltage U_i Pollution degree 2 Overvoltage category III acc. to VDE 0110	V	690
Rated impulse withstand voltage U_{imp}	kV	6
Control circuit		
Load capacity of the output relay		
• Thermal current I_{th}	A	5
Rated operational current I_e at		
• AC-15/24 ... 400 V	A	3
• DC-13 at		
- 24 V	A	1
- 125 V	A	0.2
- 250 V	A	0.1
Minimum contact load at 17 V DC	mA	5
Electrical endurance AC-15	Million operating cycles	0.1
Mechanical endurance	Million operating cycles	10

3UG48 Monitoring Relays for Stand-Alone Installation for IO-Link

Line monitoring

Selection and ordering data

- Adjustable via IO-Link and locally, with illuminated LCD
- Power supply with 24 V DC via IO-Link or external auxiliary voltage
- Auto or Manual RESET
- Open- or closed-circuit principle
- 1 CO contact, 1 semiconductor output (in SIO mode)

PU (UNIT, SET, M) = 1
 PKG* = 1 UNIT
 PG = 41H



3UG4815-1AA40





3UG4816-1AA40



3UG4815-2AA40



3UG4816-2AA40

Adjust-able hys-teresis	Under-voltage detection	Over-voltage detection	Stabilization time adjust-able stDEL	Tripping delay time adjustable Del	Version of auxiliary contacts	Measurable line voltage ¹⁾	SD	Screw terminals		SD	Spring-type terminals	
V s s V AC d							Article No.	Price per PU	d	Article No.	Price per PU	
Monitoring of phase sequence, phase failure, phase asymmetry, overvoltage and undervoltage												
1 ... 20	✓	✓	0.1 ... 999.9	0.1 ... 999.9	1 CO + 1 Q ²⁾	160 ... 690	2	3UG4815-1AA40	2	3UG4815-2AA40		
Monitoring of phase sequence, phase and N conductor failure, phase asymmetry, overvoltage and undervoltage												
1 ... 20	✓	✓	0.1 ... 999.9	0.1 ... 999.9	1 CO + 1 Q ²⁾	90 ... 400 to N	2	3UG4816-1AA40	2	3UG4816-2AA40		

✓ Function supported

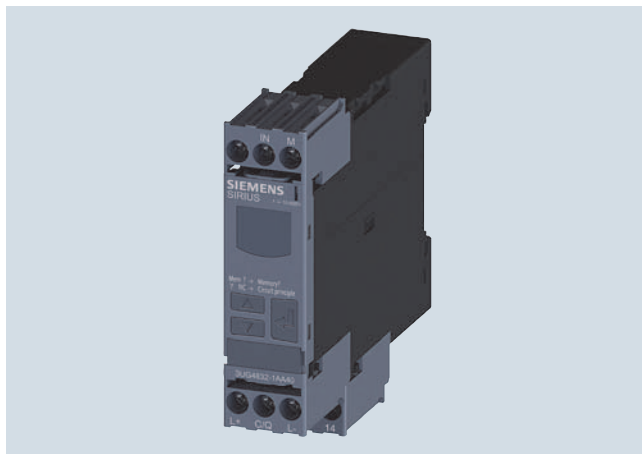
¹⁾ Absolute limit values.²⁾ In SIO mode.

For accessories, see page 10/134.

3UG48 Monitoring Relays for Stand-Alone Installation for IO-Link

Voltage monitoring

Overview



SIRIUS 3UG4832 monitoring relays

The relays monitor single-phase AC voltages (rms value) and DC voltages against the set limit value for overshoot and undershoot.

Benefits

- Variably adjustable to overshoot, undershoot or range monitoring
- Freely configurable delay times and RESET response
- Width 22.5 mm
- Display and transmission of actual value and status messages to controller
- All versions with removable terminals
- All versions with screw or spring-type terminals

Application

- Protection of a plant against destruction due to overvoltage
- Switch-on of a plant at a defined voltage and higher
- Protection from undervoltage due to overloaded control supply voltages, particularly with battery power

Technical specifications

3UG4832 monitoring relays

The 3UG4832 voltage monitoring relays are supplied with power through IO-Link or with an external auxiliary voltage of 24 V DC and perform overshoot, undershoot or range monitoring of the voltage depending on parameterization. The devices are equipped with a display and are parameterized by means of three buttons or through IO-Link.

The measuring range extends from 10 to 600 V AC/DC. The limit values for overshoot or undershoot can be freely configured within this range. If one of these limit values is reached, the output relay responds according to the set principle of operation as soon as the delay time has elapsed. This tripping delay time $U\blacktriangle$ Del/ $U\blacktriangledown$ Del can be set from 0 to 999.9 s, as can the ON-delay time onDel. The hysteresis is adjustable from 0.1 to 300 V.

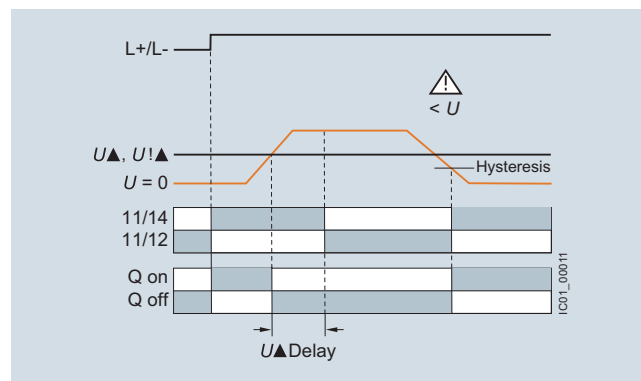
The device can be operated on the basis of either the open-circuit or closed-circuit principle and with Manual or Auto RESET. One output changeover contact is available as a signaling contact, and a semiconductor output is available in addition in SIO mode.

If Manual RESET is selected in the menu (Memory = Yes), the switching relay remains in its current switching state and the current measured value and the symbol for undershooting and overshooting continues to flash, even when the measured variable reaches a permissible value again. This stored fault status can be reset by simultaneously pressing the UP \blacktriangle and DOWN \blacktriangledown keys for 2.5 s.

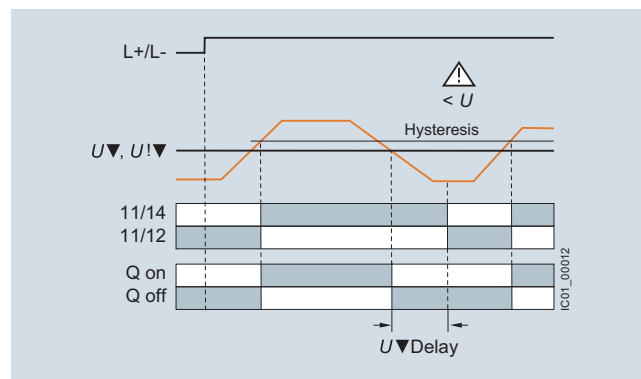
With Manual RESET through IO-Link it is possible in addition to set whether error signals are to be deleted when the control supply voltage is switched off and on (as remote RESET) or whether the signals are to be permanently saved even in a voltage failure, with confirmation possible only through local RESET or via IO-Link.

With the closed-circuit principle selected

Overvoltage



Undervoltage

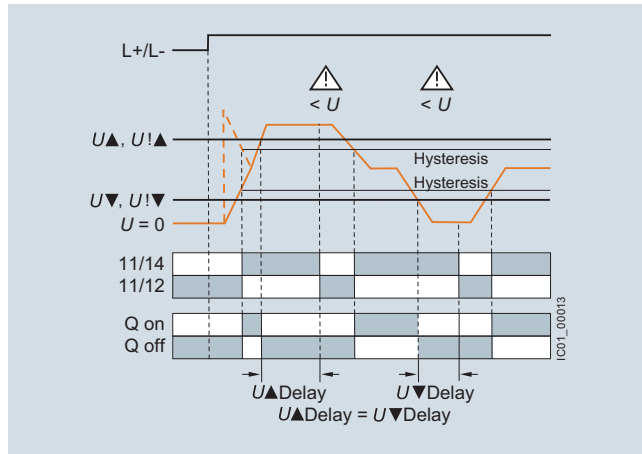


3UG48 Monitoring Relays for Stand-Alone Installation for IO-Link

Voltage monitoring

With the closed-circuit principle selected

Range monitoring



Type	3UG4832	
General technical specifications		
Rated insulation voltage U_i Pollution degree 2 Overvoltage category III acc. to VDE 0110	V	690
Rated impulse withstand voltage U_{imp}	kV	6
Measuring circuit		
Permissible measuring range single-phase AC/DC voltage	V	10 ... 690
Measuring frequency	Hz	40 ... 500
Setting range single-phase voltage	V	10 ... 600
Control circuit		
Load capacity of the output relay		
• Thermal current I_{th}	A	5
Rated operational current I_e at		
• AC-15/24 ... 400 V	A	3
• DC-13 at		
- 24 V	A	1
- 125 V	A	0.2
- 250 V	A	0.1
Minimum contact load at 17 V DC	mA	5

3UG48 Monitoring Relays for Stand-Alone Installation for IO-Link

Voltage monitoring

Selection and ordering data

- Adjustable via IO-Link and locally, with illuminated LCD
- Power supply with 24 V DC via IO-Link or external auxiliary voltage
- Auto or Manual RESET
- Open- or closed-circuit principle
- 1 CO contact, 1 semiconductor output (in SIO mode)



PU (UNIT, SET, M) = 1
 PKG* = 1 UNIT
 PG = 41H



3UG4832-1AA40



3UG4832-2AA40

Measuring range	Adjustable hysteresis	ON-delay time adjustable onDel	Tripping delay time separately adjustable $U\blacktriangle\text{Del}/U\nabla\text{Del}$	SD	Screw terminals 	SD	Spring-type terminals 	
V AC/DC	V	s	s	d	Article No.	Price per PU	Article No.	Price per PU
Monitoring of voltage for overshoot or undershoot								
10 ... 600	0.1 ... 300	0 ... 999.9	0 ... 999.9	2	3UG4832-1AA40	2	3UG4832-2AA40	

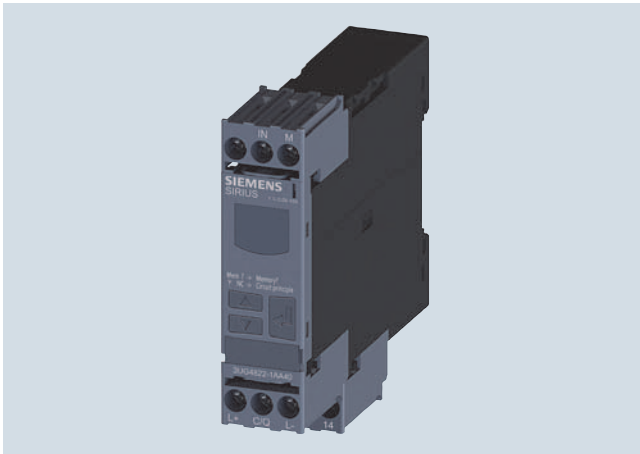
For accessories, [see page 10/134](#).

For accessories, [see page 11/106](#).

3UG48 Monitoring Relays for Stand-Alone Installation for IO-Link

Current monitoring

Overview



SIRIUS 3UG4822 monitoring relays

The relays monitor single-phase AC (rms value) and DC currents against the set limit value for overshoot and undershoot.

Benefits

- Variably adjustable to overshoot, undershoot or range monitoring
- Freely configurable delay times and RESET response
- Width 22.5 mm
- Display and transmission of actual value and status messages to controller
- All versions with removable terminals
- All versions with screw or spring-type terminals

Application

- Overcurrent and undercurrent monitoring
- Monitoring the functionality of electrical loads
- Monitoring for broken conductors

Technical specifications

3UG4822 monitoring relays

The 3UG4822 current monitoring relays are supplied with power through IO-Link or with an external voltage of 24 V DC and perform overshoot, undershoot or range monitoring of the current depending on the parameterization. The devices are equipped with a display and are parameterized using three buttons.

The measuring range extends from 0.05 to 10 A. For larger AC currents the measuring range can be extended by using commercially available current transformers. Using the adjustable transformer factor, the display of the measured primary currents up to 750 A instead of the secondary currents (max. 1 A or 5 A) is possible.

The rms value of the current is measured. The limit values for overshoot or undershoot can be freely configured within this range. If one of these limit values is reached, the output relay responds according to the set principle of operation as soon as the delay time $I\Delta\text{Del}/I\nabla\text{Del}$ has elapsed. This time and the ON-delay time onDel are adjustable from 0 to 999.9 s.

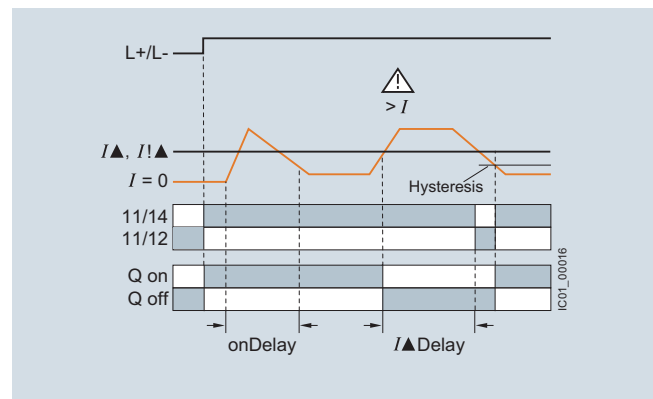
The hysteresis is adjustable from 0.01 to 5 A. The device can be operated with Manual or Auto RESET and on the basis of either the open-circuit or closed-circuit principle. You can decide here whether the output relay is to respond when the supply voltage $U_s = \text{ON}$ is applied, or not until the lower measuring range limit of the measuring current ($I > 50 \text{ mA}$) is reached. One output changeover contact is available as a signaling contact, and a semiconductor output is available in addition in SIO mode.

If Manual RESET is selected in the menu (Memory = Yes), the switching relay remains in its current switching state and the current measured value and the symbol for undershooting and overshooting continues to flash, even when the measured variable reaches a permissible value again. This stored fault status can be reset by simultaneously pressing the UP▲ and DOWN▼ keys for 2.5 s.

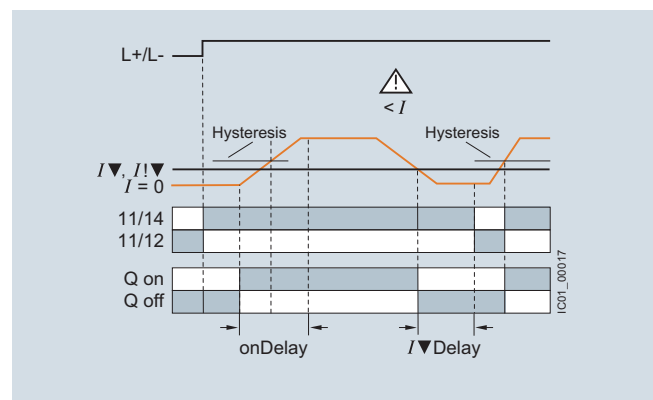
With Manual RESET through IO-Link it is possible in addition to set whether error signals are to be deleted when the control supply voltage is switched off and on (as remote RESET) or whether the signals are to be permanently saved even in a voltage failure, with confirmation possible only through local RESET or via IO-Link.

With the closed-circuit principle selected upon application of the control supply voltage

Current overshoot



Current undershoot

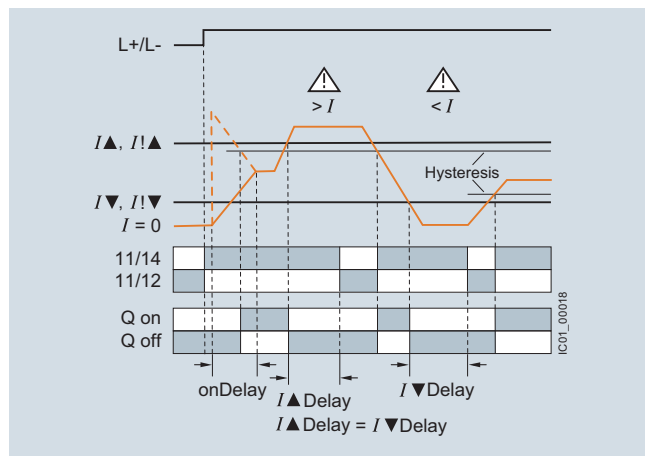


3UG48 Monitoring Relays for Stand-Alone Installation for IO-Link

Current monitoring

With the closed-circuit principle selected
upon application of the control supply voltage

Range monitoring



Type		3UG4822
General technical specifications		
Rated insulation voltage U_i	V	690
Pollution degree 2 Overvoltage category III acc. to VDE 0110		
Rated impulse withstand voltage U_{imp}	kV	6
Measuring circuit		
Measuring range for single-phase AC/DC current	A	0.05 ... 15
Measuring frequency	Hz	40 ... 500
Setting range for single-phase current	A	0.05 ... 10
Load supply voltage	V	Max. 300 (with protective separation) Max. 500 (with simple separation)
Control circuit		
Load capacity of the output relay		
• Thermal current I_{th}	A	5
Rated operational current I_e at		
• AC-15/24 ... 400 V	A	3
• DC-13 at		
- 24 V	A	1
- 125 V	A	0.2
- 250 V	A	0.1
Minimum contact load at 17 V DC	mA	5

3UG48 Monitoring Relays for Stand-Alone Installation for IO-Link

Current monitoring

Selection and ordering data

- Adjustable via IO-Link and locally, with illuminated LCD
- Power supply with 24 V DC via IO-Link or external auxiliary voltage
- Adjustable converter factor to display the measured primary current when an external current transformer is used
- Auto or Manual RESET
- Open- or closed-circuit principle
- 1 CO contact, 1 semiconductor output (in SIO mode)

PU (UNIT, SET, M) = 1
 PKG* = 1 UNIT
 PG = 41H



3UG4822-1AA40



3UG4822-2AA40

Measuring range	Adjustable hysteresis	ON-delay time adjustable onDel	Tripping delay time separately adjustable /▲Del/▼Del	SD	Screw terminals	SD	Spring-type terminals
A AC/DC	A	s	s	d	Article No.	Price per PU	Article No.
Monitoring of current for overshooting and undershooting							
0.05 ... 10	0.01 ... 5	0.1 ... 999.9	0.1 ... 999.9	2	3UG4822-1AA40	2	3UG4822-2AA40

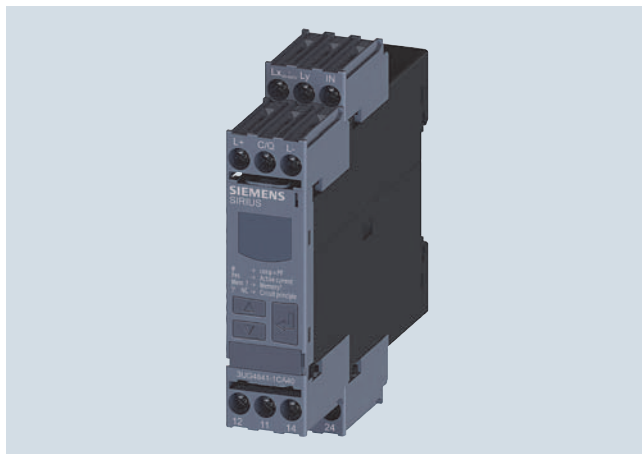
For accessories, [see page 11/106](#).

For AC currents $I > 10$ A it is possible to use commercially available current transformers, e.g. the Siemens 4NC current transformer, as accessories, [see Catalog LV 10](#).

3UG48 Monitoring Relays for Stand-Alone Installation for IO-Link

Power factor and active current monitoring

Overview



SIRIUS 3UG4841 monitoring relay

The 3UG4841 power factor and active current monitoring devices enable the load monitoring of motors.

Whereas power factor (p.f.) monitoring is used above all for monitoring no-load operation, the active current monitoring option can be used to observe and evaluate the load factor over the entire torque range.

Benefits

- Monitoring of even small single-phase motors with a no-load supply current below 0.5 A
- Simple determination of threshold values by the direct collection of measured variables on motor loading
- Range monitoring and active current measurement enable detection of cable breaks between control cabinets and motors, as well as phase failures
- Power factor and/or I_{res} (active current) can be selected as the measurement principle
- Width 22.5 mm
- Display and transmission of actual value and status messages to controller
- All versions with removable terminals
- All versions with screw or spring-type terminals

Application

- No-load monitoring and load shedding, such as in the event of a V-belt tear
- Underload monitoring in the low-end performance range, e.g. in the event of pump no-load operation
- Monitoring of overload, e.g. due to a dirty filter system
- Power factor monitoring in networks for control of compensation equipment
- Broken cable between control cabinet and motor

Technical specifications

3UG4841 monitoring relays

The 3UG4841 monitoring relays are supplied with power through IO-Link or with an external auxiliary voltage of 24 V DC and are used for performing overshoot, undershoot or range monitoring of the power factor and/or the resulting active current, depending on parameterization. The load to be monitored is connected upstream of the IN terminal. The load current flows through the terminals IN and Ly/N. The setting range for the power factor is 0 to 0.99 and for the active current I_{res} it is 0.2 to 10 A. If the control supply voltage is switched on and no load current flows, the display will show $I < 0.2$ and a symbol for overrange, under-range or range monitoring. If the motor is now switched on and the current exceeds 0.2 A, the set ON-delay time $onDel$ begins. During this time, if the set limit values are undershot or exceeded, this does not lead to a relay reaction of the changeover contact. If the operational flowing active current and/or the p.f. value falls below or exceeds the respective set threshold value, the tripping delay time begins. When this time has expired, the relay changes its switch position. The relevant measured variables for overshooting and undershooting in the display flash. If monitoring for active current undershoot is switched off ($I_{res} \blacktriangledown = OFF$), and if the load current undershoots the lower measuring range threshold (0.2 A), the CO contacts remain unchanged. If a threshold value is set for the monitoring of active current undershooting, then undershooting of the measuring range threshold (0.2 A) will result in a response of the CO contacts.

The relay operates either according to the open-circuit or closed-circuit principle.

If the device is set to Auto RESET (Memory = No), depending on the set principle of operation, the switching relay returns to its initial state and the flashing ends when the hysteresis threshold is reached.

If Manual RESET is selected in the menu (Memory = Yes), the switching relay remains in its current switching state and the current measured value and the symbol for undershooting and overshooting continues to flash, even when the measured variable reaches a permissible value again. This stored fault status can be reset by simultaneously pressing the UP▲ and DOWN▼ keys for 2.5 s.

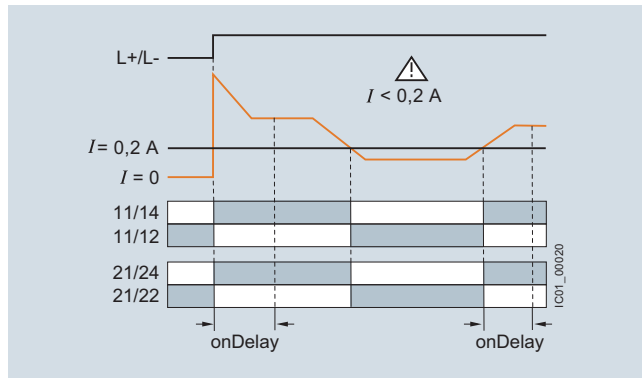
With Manual RESET through IO-Link it is possible in addition to set whether error signals are to be deleted when the control supply voltage is switched off and on (as remote RESET) or whether the signals are to be permanently saved even in a voltage failure, with confirmation possible only through local RESET or via IO-Link.

3UG48 Monitoring Relays for Stand-Alone Installation for IO-Link

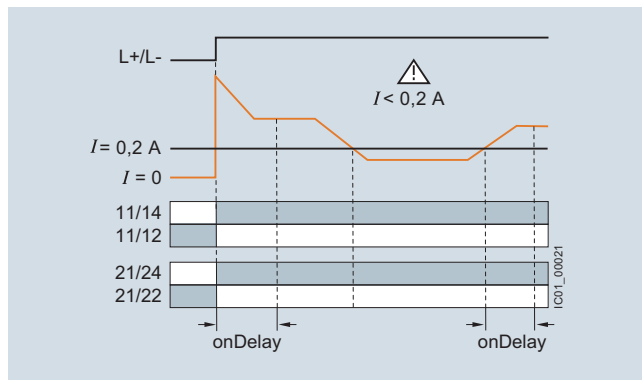
Power factor and active current monitoring

With the closed-circuit principle selected

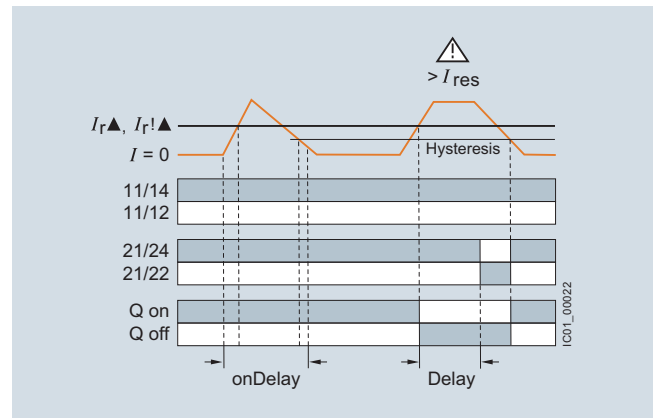
Response in the event of undershooting the measuring range limit with activated monitoring of I_{res} ▼



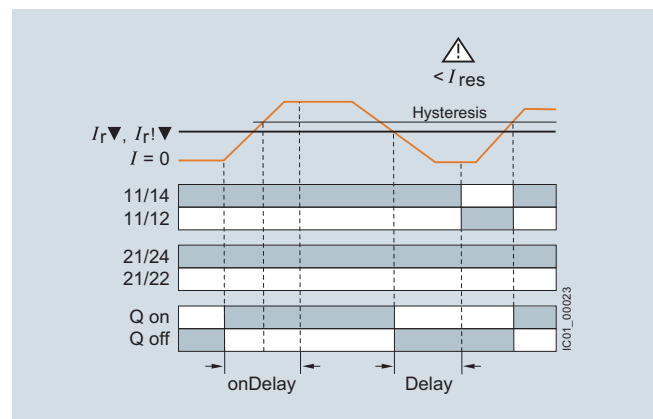
Response in the event of undershooting the measuring range limit with deactivated monitoring of active current undershooting



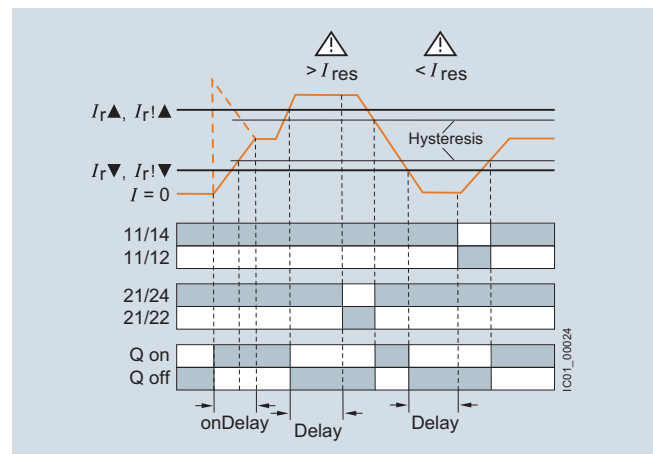
Overshooting of active current



Undershooting of active current



Range monitoring of active current

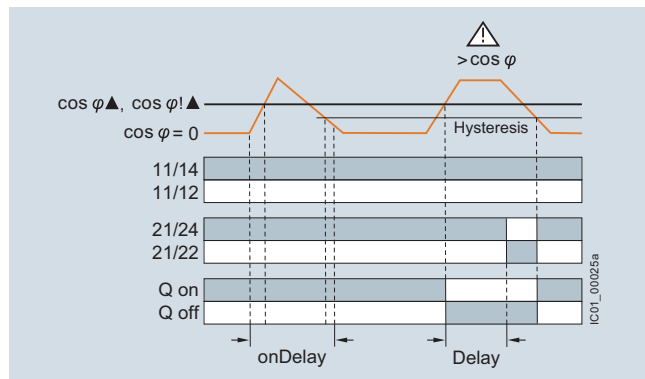


3UG48 Monitoring Relays for Stand-Alone Installation for IO-Link

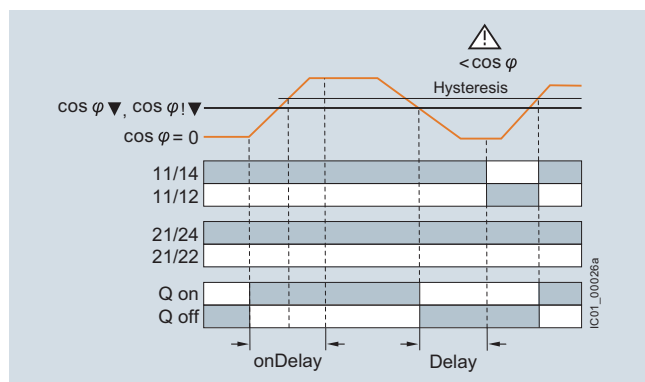
Power factor and active current monitoring

With the closed-circuit principle selected

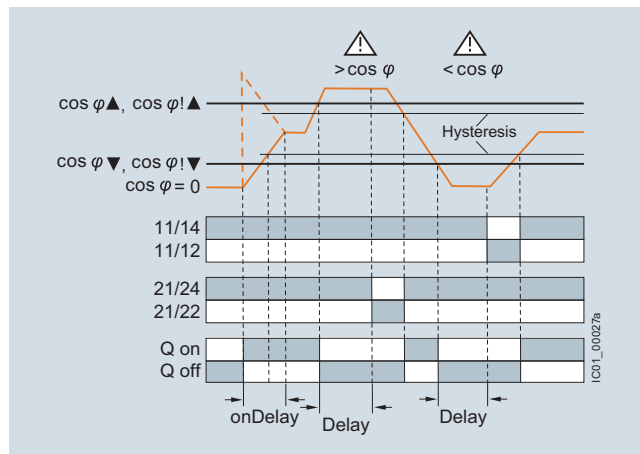
Overshooting of power factor



Undershooting of power factor



Range monitoring of power factor



Type	3UG4841	
General technical specifications		
Rated insulation voltage U_i Pollution degree 2 Overvoltage category III according to IEC 60664-1	V	690
Rated impulse withstand voltage U_{imp}	kV	6
Control circuit		
Number of CO contacts for auxiliary contacts		2
Load capacity of the output relay		
• Thermal current I_{th}	A	5
Rated operational current I_e at		
• AC-15/24 ... 400 V	A	3
• DC-13 at		
- 24 V	A	1
- 125 V	A	0.2
- 250 V	A	0.1
Minimum contact load at 17 V DC	mA	5

3UG48 Monitoring Relays for Stand-Alone Installation for IO-Link

Power factor and active current monitoring

Selection and ordering data

- For monitoring the power factor and the active current I_{res} (p.f. $\times I$)
- Suitable for single- and three-phase currents
- Adjustable via IO-Link and locally, with illuminated LCD
- Power supply with 24 V DC via IO-Link or external auxiliary voltage
- Overshoot, undershoot or range monitoring adjustable
- Upper and lower limit values can be adjusted separately
- Permanent display of actual value and tripping state
- 1 CO contact each for undershoot and overshoot, 1 semiconductor output (in SIO mode)




PU (UNIT, SET, M) = 1
 PKG* = 1 UNIT
 PG = 41H



3UG4841-1CA40



3UG4841-2CA40

Measuring range		Voltage range of the measuring voltage ¹⁾	Hysteresis		ON-delay time adjustable onDel	Tripping delay time separately adjustable	SD	Screw terminals	SD	Spring-type terminals		
For power factor	For active current I_{res}	50/60 Hz AC	Adjustable for power factor	Adjustable for active current I_{res}		$U \blacktriangle Del / U \blacktriangledown Del, \varphi \blacktriangle Del / \varphi \blacktriangledown Del$						
P.f.	A	V	P.f.	A	s	s	d	Article No.	Price per PU	d	Article No.	Price per PU
Monitoring of power factor and active current for overshooting or undershooting												
0.1 ... 0.99	0.2 ... 10	90 ... 690	0.1 ... 0.2	0.1 ... 3	0 ... 999.9	0 ... 999.9	2	3UG4841-1CA40	2		3UG4841-2CA40	

¹⁾ Absolute limit values.

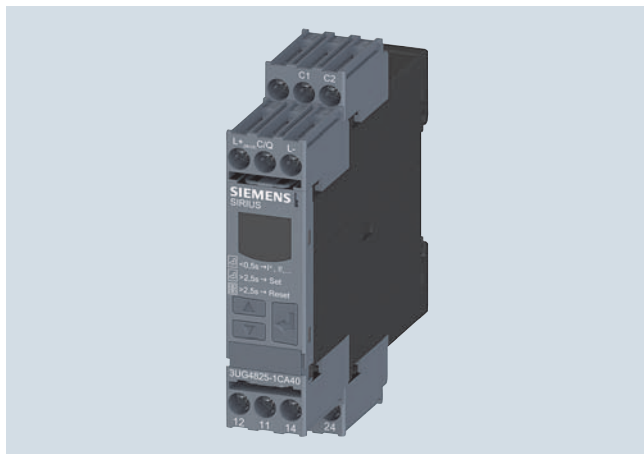
For accessories, [see page 11/106](#).

For AC active currents $I_{res} > 10$ A it is possible to use commercially available current transformers, e.g. Siemens 4NC current transformers, as accessories, [see Catalog LV 10](#).

3UG48 Monitoring Relays for Stand-Alone Installation for IO-Link

Residual-current monitoring relays

Overview



SIRIUS 3UG4825 monitoring relay

The 3UG4825 residual-current monitoring relays are used in conjunction with the 3UL23 residual-current transformers for monitoring plants in which higher residual currents are increasingly expected due to ambient conditions. Monitoring encompasses pure AC residual currents or AC residual currents with a pulsating DC fault current component (transformer type A in accordance with DIN VDE 0100-530/IEC TR 60755).

Technical specifications

3UG4825 monitoring relays

The main conductor, and any neutral conductor to which a load is connected, are routed through the opening of the annular ring core of a residual-current transformer. A secondary winding is placed around this annular strip-wound core to which the monitoring relay is connected.

If operation of a plant is fault-free, the sum of the inflowing and outward currents equals zero. No current is then induced in the secondary winding of the residual-current transformer.

However, if an insulation fault occurs downstream of the residual current operated circuit breaker, the sum of the inflowing currents is greater than that of the outward currents. The differential current – the residual current – induces a secondary current in the secondary winding of the transformer. This current is evaluated in the monitoring relay and is used on the one hand to display the actual residual current and on the other, to switch the relay if the set warning or tripping threshold is overshoot.

If the measured residual current exceeds the set warning value, the associated changeover contact instantly changes the switching state and an indication appears on the display.

If the measured residual current exceeds the set tripping value, the set delay time begins and the associated relay symbol flashes. On expiry of this time, the associated changeover contact changes the switching state.

ON-delay time for motor start

To be able to start a drive when a residual current is detected, the output relays switch to the OK state for an adjustable ON-delay time depending on the selected open-circuit principle or closed-circuit principle.

The changeover contacts do not react if the set threshold values are overshoot during this period.

Benefits

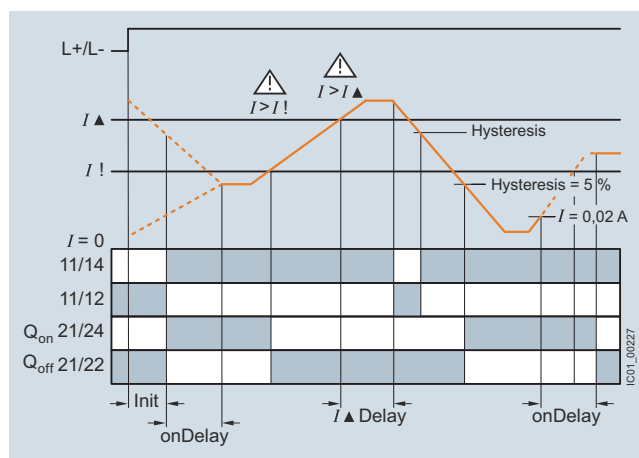
- High measuring accuracy of $\pm 7.5\%$
- Permanent self-monitoring
- Parameterization of the devices locally or via IO-Link possible
- Variable threshold values for warning and disconnection
- Freely configurable delay times and RESET response
- Display and transmission of actual value and status messages to controller
- High level of flexibility and space saving through installation of the transformer inside or outside the control cabinet
- Width 22.5 mm
- All versions with removable terminals
- All versions with screw or spring-type terminals

Application

Monitoring of plants in which residual currents can occur, e.g. due to dust deposits or moisture, porous cables and leads, or capacitive residual currents.

With the closed-circuit principle selected

Residual current monitoring with Auto RESET (Memory = no)



If the device is set to Auto RESET, the relay switches back to the OK state for the tripping value once the value falls below the set hysteresis threshold and the display stops flashing.

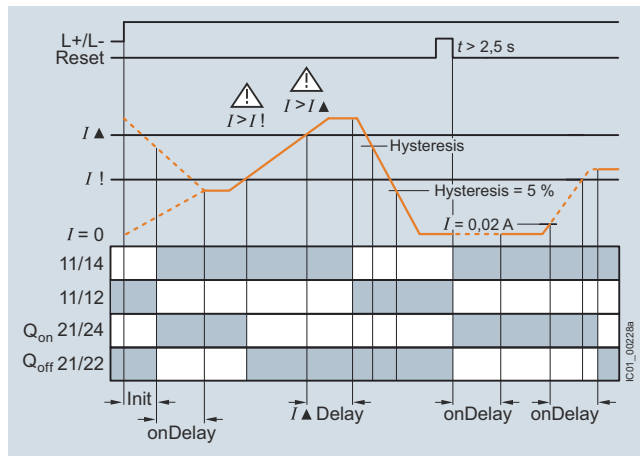
The associated relay changes its switching state if the value falls below the fixed hysteresis value of 5% of the warning value.

Any overshoots are therefore not stored.

3UG48 Monitoring Relays for Stand-Alone Installation for IO-Link

Residual-current monitoring relays

Residual current monitoring with Manual RESET (Memory = yes)



If Manual RESET is selected in the menu, the output relays remain in their current switching state and the current measured value and the symbol for overshooting continues to flash, even when the measured residual current returns to a permissible value. This stored fault status can be reset by simultaneously pressing the UP▲ and DOWN▼ keys for > 2 seconds, or by switching the supply voltage off and back on again.

Note:

The neutral conductor must not be grounded downstream of the summation current transformer as this may impair the function of the residual-current monitoring device.

Type	3UG4825-1CA40, 3UG4825-2CA40	
General data		
Insulation voltage for overvoltage category III to IEC 60664 for pollution degree 3 rated value	V	300
Impulse withstand voltage, rated value U_{imp}	kV	4
Control circuit		
Number of CO contacts for auxiliary contacts		2
Thermal current of the non-solid-state contact blocks, maximum	A	5
Current carrying capacity of the output relay		
• At AC-15 at 250 V at 50/60 Hz	A	3
• At DC-13		
- At 24 V	A	1
- At 125 V	A	0.2
- At 250 V	A	0.1
Operational current at 17 V, minimum	mA	5

3UG48 Monitoring Relays for Stand-Alone Installation for IO-Link

Residual-current monitoring relays

Selection and ordering data

- For monitoring residual currents from 0.03 to 40 A, from 16 to 400 Hz
- For 3UL23 residual-current transformers with feed-through opening from 35 to 210 mm
- Permanent self-monitoring
- Certified in accordance with IEC 60947, functionality corresponds to IEC 62020
- Digitally adjustable, with illuminated LCD
- Permanent display of actual value and tripping state
- Separately adjustable limit value and warning threshold
- 1 changeover contact each for warning threshold and tripping threshold

PU (UNIT, SET, M) = 1
PS* = 1 unit
PG = 41H



3UG4825-1CA40



3UG4825-2CA40

Measurable current	Adjustable response value current	Switching hysteresis	Adjustable ON-delay time	Control supply voltage At DC rated value	SD	Screw terminals	SD	Spring-type terminals
A	A	%	s	V	d	Article No.	Price per PU	Article No.
0.01 ... 43	0.03 ... 40	0 ... 50	0 ... 999.9	24	2	3UG4825-1CA40		3UG4825-2CA40

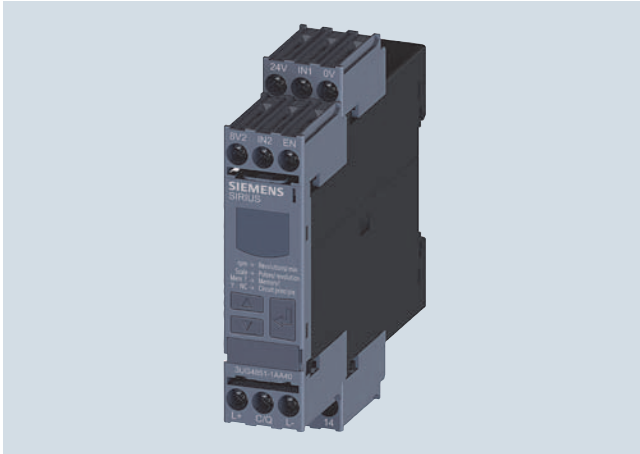
For accessories, [see page 11/106](#).

For 3UL23 residual-current transformers and accessories for 3UL23, [see page 11/68](#).

3UG48 Monitoring Relays for Stand-Alone Installation for IO-Link

Speed monitoring

Overview



SIRIUS 3UG4851 monitoring relay

3UG4851 monitoring relays are used in combination with a sensor to monitor drives for overspeed and/or underspeed.

Furthermore, the monitoring relays are ideal for all functions where a continuous pulse signal needs to be monitored (e.g. belt travel monitoring, completeness monitoring, passing monitoring, clock-time monitoring).

Benefits

- Variably adjustable to overshoot, undershoot or range monitoring
- Freely configurable delay times and RESET response
- Display and transmission of actual value and fault type to controller
- Use of up to 10 sensors per rotation for extremely slowly rotating motors
- 2- or 3-wire sensors and sensors with a mechanical switching output or semiconductor output can be connected
- Auxiliary voltage for sensor integrated
- All versions with removable terminals
- All versions with screw or spring-type terminals

Application

- Slip or tear of a belt drive
- Overload monitoring
- Transport monitoring for completeness

Technical specifications

3UG4851 monitoring relays

The speed monitoring relay operates according to the principle of period duration measurement.

In the monitoring relay, the time between two successive rising edges of the pulse encoder is measured and compared to the minimum and/or maximum permissible period duration calculated from the set limit values for the speed.

Thus, the period duration measurement recognizes any deviation in speed after just two pulses, even at very low speeds or in the case of extended pulse gaps.

By using up to ten pulse encoders evenly distributed around the circumference, it is possible to shorten the period duration, and in turn the response time. By taking into account the number of sensors in the monitoring relay, the speed continues to be indicated in rpm.

ON-delay time for motor start

To be able to start a motor drive, and depending on whether the open-circuit or closed-circuit principle is selected, the output relay switches to the GO state during the ON-delay time, even if the speed is still below the set value.

The ON-delay time is started by either switching on the auxiliary voltage or, if the auxiliary voltage is already applied, by actuating the respective NC contact (e.g. auxiliary contact).

Speed monitoring with Auto RESET (Memory = no)

If the device is set to Auto RESET, the output relay switches to the GO state, once the adjustable hysteresis threshold is reached in the range of 1 to 99.9 rpm and the flashing stops. Any overshoots or undershoots are therefore not stored.

Speed monitoring with Manual RESET (Memory = yes)

If Manual RESET is selected in the menu, the output relay remains in its current switching state and the current measured value and the symbol for overshooting/undershooting continue to flash, even when the speed returns to a permissible value. This stored fault status can be reset by simultaneously pressing the UP▲ and DOWN▼ keys for > 2.5 s or by connecting the RESET device terminal to 24 V DC.

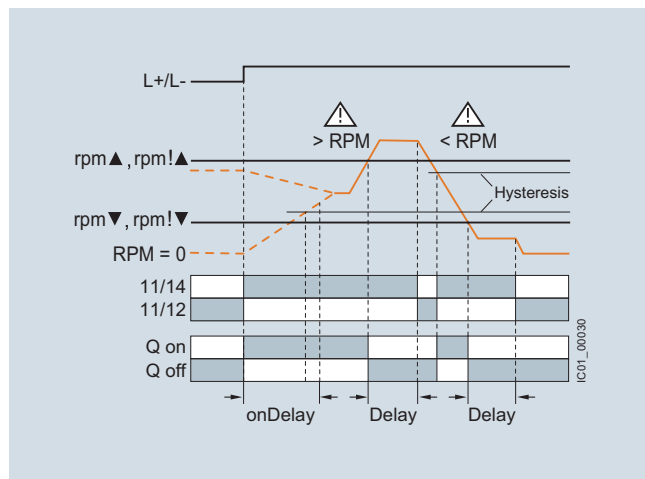
With Manual RESET through IO-Link it is possible in addition to set whether error signals are to be deleted when the control supply voltage is switched off and on (as remote RESET) or whether the signals are to be permanently saved even in a voltage failure, with confirmation possible only through local RESET or via IO-Link.

3UG48 Monitoring Relays for Stand-Alone Installation for IO-Link

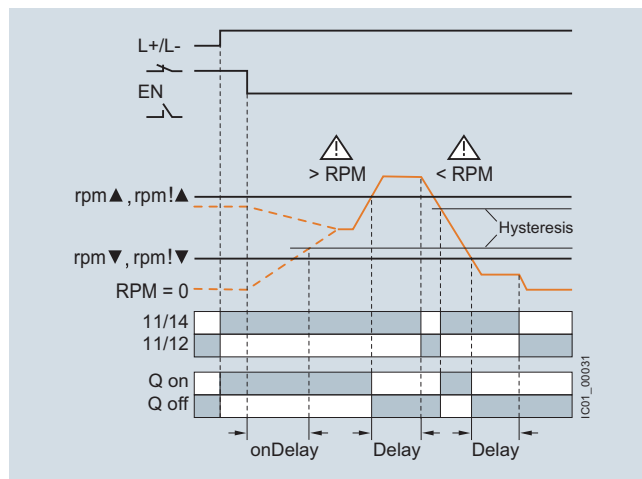
Speed monitoring

With the closed-circuit principle selected

Range monitoring without enable input



Range monitoring with enable input



Type	3UG4851	
General technical specifications		
Rated insulation voltage U_i Pollution degree 2 Overvoltage category III acc. to VDE 0110	V	300
Rated impulse withstand voltage U_{imp}	kV	4
Measuring circuit		
Sensor supply • For 3-wire sensor (24 V/0 V) • For 2-wire NAMUR sensor (8V2)	mA mA	Max. 50 Max. 8.2
Signal input • IN1 • IN2	kΩ kΩ	16, 3-wire sensor, pnp operation 1, floating contact, 2-wire NAMUR sensor
Voltage level • For level 1 at IN1 • For level 0 at IN1	V V	4.5 ... 30 0 ... 1
Current level • For level 1 at IN2 • For level 0 at IN2	mA mA	> 2.1 < 1.2
Minimum pulse duration of signal	ms	5
Minimum interval between 2 pulses	ms	5
Control circuit		
Number of CO contacts for auxiliary contacts		1
Load capacity of the output relay Thermal current I_{th}	A	5
Rated operational current I_e at • AC-15/24 ... 250 V • DC-13 at - 24 V - 125 V - 250 V	A A A A	3 1 0.2 0.1
Minimum contact load at 17 V DC	mA	5

3UG48 Monitoring Relays for Stand-Alone Installation for IO-Link

Speed monitoring

Selection and ordering data

- For speed monitoring in revolutions per minute (rpm)
- Two- or three-wire sensor with mechanical or electronic switching output can be connected
- Two-wire NAMUR sensor can be connected
- Sensor supply 24 V DC/50 mA integrated
- Input frequency 0.1 to 2 200 pulses per minute (0.0017 to 36.7 Hz)
- With or without enable signal for the drive to be monitored
- Adjustable via IO-Link and locally, with illuminated LCD
- Power supply with 24 V DC via IO-Link or external auxiliary voltage
- Overshoot, undershoot or range monitoring adjustable
- Number of pulses per revolution can be adjusted
- Upper and lower limit values can be adjusted separately
- Auto, manual or remote RESET options after tripping
- Permanent display of actual value and tripping state
- 1 CO contact, 1 semiconductor output (in SIO mode)

PU (UNIT, SET, M) = 1
 PKG* = 1 UNIT
 PG = 41H



3UG4851-1AA40



3UG4851-2AA40

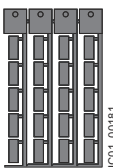
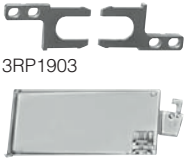


Measuring range	Adjustable hysteresis	ON-delay time adjustable onDel	Tripping delay time separately adjustable rpm▲Del/rpm▼Del	Pulses per revolution	SD	Screw terminals	SD	Spring-type terminals
rpm	rpm	s	s		d	Article No. Price per PU	d	Article No. Price per PU
Speed monitoring for overshooting and undershooting								
0.1 ... 2 200	OFF 1 ... 99.9	0 ... 999.9	0 ... 999.9	1 ... 10	2	3UG4851-1AA40	2	3UG4851-2AA40

For accessories, see page 11/106.

3UG48 Monitoring Relays for Stand-Alone Installation for IO-Link

Accessories

Selection and ordering data

	Use	Version	SD	Article No.	Price per PU	PU (UNIT, SET, M)	PS*
Blank labels							
 3RT2900-1SB20	For 3UG48	Unit labeling plates For SIRIUS devices 20 mm x 7 mm, titanium gray	20	3RT2900-1SB20		100	340 units
	For 3UG48	Adhesive labels for SIRIUS devices					
		• 19 mm x 6 mm, pastel turquoise	15	3RT1900-1SB60		100	3 060 units
		• 19 mm x 6 mm, zinc yellow	15	3RT1900-1SD60		100	3 060 units
Push-in lugs and covers							
 3RP1903 3RP1902	For 3UG48	Push-in lugs For screw fixing, 2 units are required for each device	5	3RP1903		1	10 units
	For 3UG48	Sealable covers For securing against unauthorized adjustment of setting knobs	5	3RP1902		1	5 units
Tools for opening spring-type terminals							
 3RA2908-1A	For auxiliary circuit connections	Screwdrivers For all SIRIUS devices with spring-type terminals 3.0 mm x 0.5 mm, length approx. 200 mm, titanium gray/black, partially insulated	2	3RA2908-1A		1	1 unit
				Spring-type terminals 			

Overview



SIRIUS 3RQ3 coupling relays

SIRIUS 3RQ3 coupling relays in narrow design are used for coupling control signals from and to a controller, and they are available in different versions:

- Coupling relays with relay output (not plug-in)
- Coupling relays with plug-in relays
- Coupling relays with semiconductor output (not plug-in)

Coupling relays with relay output**AC and DC operation**

IEC 60947-5-1, EN 60947-5-1

The input and output coupling relays differ with regard to the positioning of the terminals and the LEDs.

Coupling relays with plug-in relays**AC and DC operation**

IEC 60947-1

The coupling relays are plug-in, so the relay can be replaced quickly at the end of its service life without detaching the wiring.

Coupling relays with semiconductor output**AC and DC operation**

IEC 60947-1, EN 60664-1 and EN 50005;
coupling relays with semiconductor output: EN 60747-5;
programmable controllers: IEC 61131-2

The input and output coupling relays differ with regard to the positioning of the terminals and the LEDs.

The coupling relays with semiconductor output have extremely high contact reliability, so they are especially suitable for electronic systems.

For test purposes, versions are available with manual-0-automatic switches.

Spring-type terminal with push-in functionality

Push-in connections are a form of spring-type terminals allowing fast wiring without tools for rigid conductors or conductors equipped with end sleeves.

As with other spring-type terminals, a screwdriver (with 3.0 x 0.5 mm blade) is required to disconnect the conductor. The same tool can also be used to wire finely-stranded conductors with no end finishing.

The advantages of the push-in terminals are found, as with all spring-type terminals, in speed of assembly and disassembly and vibration-proof connection. There is no need for the checking and tightening required with screw terminals.

Note:

For the conversion tool e.g. from 3TX7 to 3RQ3, see www.siemens.com/sirius/conversion-tool.

Article No. scheme

Digit of the Article No.	1st - 4th	5th	6th	7th	8th	9th	10th	11th	12th
	□□□□	□	□	□	–	□	□	□	□
Coupling relays in the new 6.2 mm enclosure	3RQ3								
Function		□							
Design and type of output			□						
Switching current at the output				□					
Connection methods					□				
Contacts						□			
Rated control supply voltage							□		
Max. switchable voltage at the output								□	
Contact variant									□
Example	3RQ3	1	1	8	–	1	A	M	0 0

Note:

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

For your orders, please use the article numbers quoted in the catalog in the Selection and ordering data.

Coupling Relays – Narrow Design

3RQ3

Benefits**General**

- All versions with screw terminals or spring-type terminals (push-in technology)
- TOP wiring for spring-type terminals (push-in) for quick and reliable wiring.
- Reduced space requirement in the control cabinet thanks to a consistent width of 6.2 mm
- Reduced inventory due to fewer variants
- Clearly visible functional state of the coupling relay by green LED
- Integrated reverse polarity protection and EMC arc-suppression diode
- Standardized accessories across the entire 3RQ3 series
- Universal bridging option using connecting combs for all terminals
- Galvanic isolation plate for isolating different voltages for neighboring units
- Clip-on labels available as set for individual labeling

Coupling relays with relay output

- Permanently soldered relay for enhanced contact reliability
- Device variants with hard gold-plated contacts, hence high contact reliability at low currents

Coupling relays with plug-in relays

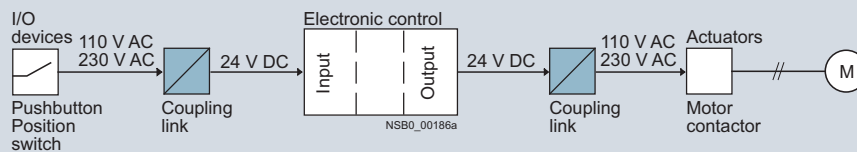
- Fast replacement of the relays with existing wiring
- Tested complete units → lower assembly time
- Individual relays available as spare parts
- Device variants with hard gold-plated contacts, hence high contact reliability at low currents

Coupling relays with semiconductor output

- Long service life since there is no mechanical wear
- High switching frequency thanks to short make-break times
- Vibration-resistant
- No contact bounce
- Extremely high contact reliability
- Noise-free switching
- Low control power required
- Switching of DC and capacitive loads

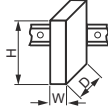


Application

- Electrical separation between the input and output circuit
- Adjustment of different signal levels
- Signal amplification



Application example motor controller

Technical specifications

Type			3RQ3018-.AB0., 3RQ3018-.AE00, 3RQ3018-.AF00, 3RQ3038-.AB0., 3RQ3038-.AE0., 3RQ3038-.AF0., 3RQ3052-.SM50, 3RQ3053-.SG30	3RQ3018- 2A.08-0AA0	3RQ3050-.SM50, 3RQ3052-.SM30, 3RQ3052-.SM40, 3RQ3055-.SM30, 3RQ3070-.SB30	3RQ3065- .SM30	3RQ3070- .SG30	3RQ3118-.AB0., 3RQ3118-.AE0., 3RQ3118-.AF0., 3RQ3118-.AM0.
General data								
Dimensions (W x H x D)		mm	6.2 x 93 x 72.5			6.2 x 93 x 75	6.2 x 93 x 72.5	6.2 x 93 x 76
Insulation voltage for overvoltage category III to IEC 60664 for pollution degree 3 rated value	V	300	50			--	300	
Max. permissible voltage for protective separation between control circuit and auxiliary circuit	V	300	50			--	300	
Permissible ambient temperature								
• During operation	°C	-25 ... +60	-40 ... +70	-25 ... +60				
• During storage	°C	-40 ... +85						
IP degree of protection		IP20						
Version of the fuse link required for short-circuit protection of the auxiliary switch		Fuse gG: 4 A						
Conductor cross-sections								
Main and auxiliary conductors (1 or 2 conductors connectable)		 Screw terminals						
• Solid	mm²	1x (0.25 ... 2.5)						
• Finely stranded with end sleeve	mm²	1x (0.25 ... 1.5)						
• AWG cables	AWG	1x (20 ... 14)						
Main and auxiliary conductors (1 or 2 conductors connectable)		 Spring-type terminals						
• Solid	mm²	1x (0.25 ... 2.5)						
• Finely stranded without end sleeve	mm²	1x (0.25 ... 2.5)						
• Finely stranded with end sleeve	mm²	1x (0.25 ... 1.5)						
• AWG cables	AWG	1x (20 ... 14)						

Coupling Relays – Narrow Design

3RQ3

Type	3RQ3018-.AB00, 3RQ3018-.AE00, 3RQ3018-.AF00, 3RQ3018-2A.08- 0AA0, 3RQ3038-.AB00, 3RQ3038-.AE00, 3RQ3038-.AF00, 3RQ3118-.AB00, 3RQ3118-.AE00, 3RQ3118-.AF00, 3RQ3118-.AM00	3RQ3018-.AB01, 3RQ3038-.AB01, 3RQ3038-.AE01, 3RQ3038-.AF01, 3RQ3118-.AB01, 3RQ3118-.AE01, 3RQ3118-.AF01, 3RQ3118-.AM01	3RQ3050- .SM50	3RQ3052-.SM30, 3RQ3053-.SG30, 3RQ3055-.SM30, 3RQ3065-.SM30	3RQ3052- .SM40	3RQ3052- .SM50	3RQ3070- .S30
Load side							
Operational current of the auxiliary contacts							
• At AC-15							
- At 24 V	A	3	--				
- At 250 V	A	3	--				
• At DC-13							
- At 24 V	A	1	--				
- At 125 V	A	0.2	--				
- At 250 V	A	0.1	--				
Contact reliability of the auxiliary contacts (one incorrect switching operation per 100 million)		17 V, 1 mA	5 V, 1 mA	--			
Switching voltage of the semiconductor output							
• At AC	V	--				19.2 ... 264	--
• At DC	V	--	20 ... 60	10 ... 30	20 ... 60	--	10 ... 30
Current carrying capacity of the semiconductor output, minimal							
• At AC	A	--				0.05	--
• At DC	A	--	0.01	0.5		--	0.01
Mechanical endurance, typical		Operating cycles	10 000 000	--			
Electrical endurance, typical							
• At AC-15 at 230 V	Operating cycles	100 000	--				

Coupling relays with relay output

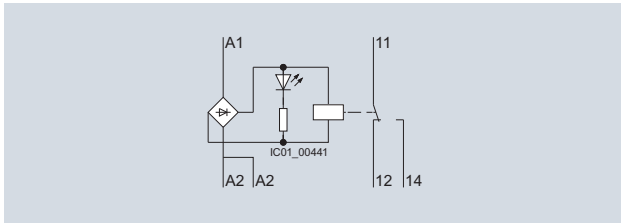
Type	3RQ3018-.AB0., 3RQ3038-.AB0.	3RQ3018-.AE00, 3RQ3038-.AE0.	3RQ3018-.AF00, 3RQ3038-.AF0.	3RQ3018-2AM08- 0AA0	3RQ3018-2AN08- 0AA0
Operating range factor of the control supply voltage, rated value					
• At AC, at 50 Hz	0.8 ... 1.25	0.8 ... 1.1	--		
• At DC	0.8 ... 1.25	0.8 ... 1.1	0.7 ... 1.25		
Active power input		W	0.3	0.7	1
Thermal current		A	6	0.3	0.6

Coupling relays with plug-in relays

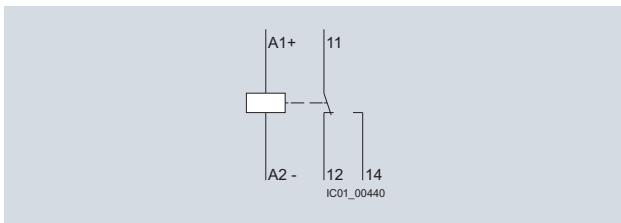
Type	3RQ3118-.AB0.	3RQ3118-.AE0.	3RQ3118-.AF0.	3RQ3118-.AM0.
Operating range factor of the control supply voltage, rated value				
• At AC, at 50 Hz	0.8 ... 1.25	0.8 ... 1.1	--	
• At DC	0.8 ... 1.25	0.8 ... 1.1	0.8 ... 1.25	
Active power input		W	0.3	0.7
Thermal current		A	6	0.3

Coupling relays with semiconductor output

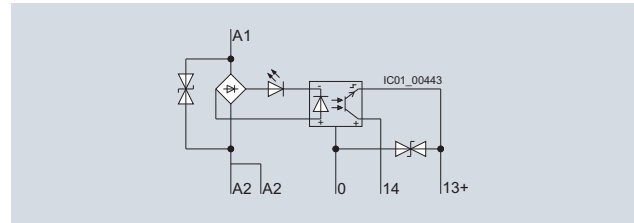
Type	3RQ3050- .SM50	3RQ3052-.SM30, 3RQ3052-.SM40	3RQ3052- .SM50	3RQ3053- .SG30	3RQ3055-.SM30, 3RQ3065-.SM30	3RQ3070- .SB30	3RQ3070- .SG30
Operating range factor of the control supply voltage, rated value							
• At AC, at 50 Hz	--			0.8 ... 1.1	--		0.8 ... 1.1
• At DC	0.8 ... 1.25			0.8 ... 1.1	0.8 ... 1.25		0.8 ... 1.1
Active power input		W	0.3	0.25	0.3	0.7	
Thermal current		A	0.5	2	3	5	0.5

Circuit diagramsCoupling relays with relay output (not plug-in)

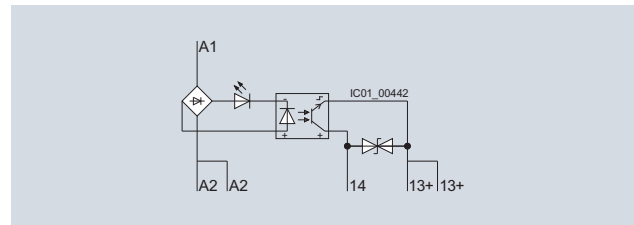
3RQ30.8

Coupling relays with plug-in relays

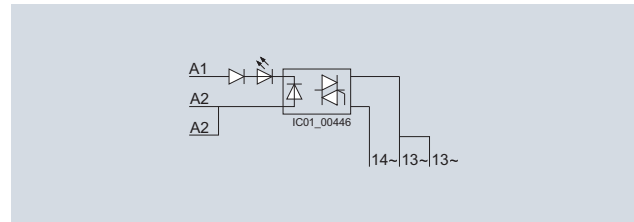
3RQ3118

Coupling relays with semiconductor output (not plug-in)

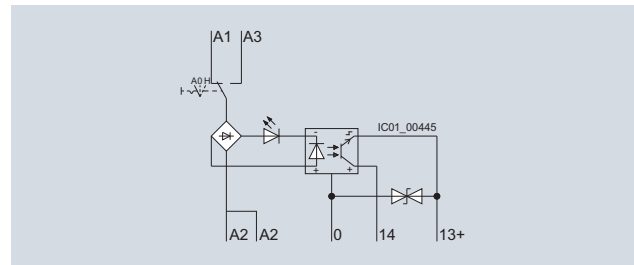
3RQ305.-.S.30



3RQ305.-.SM.0, 3RQ3070.-.S.30



3RQ3052-.SM50



3RQ3065.-.SM30

Coupling Relays – Narrow Design

3RQ3 with relay output

Selection and ordering data



PU (UNIT, SET, M)= 1
 PS* = 5 units
 PG = 41H



3RQ30.8-1



3RQ30.8-2

Control supply voltage rated value	Number of CO contacts for auxiliary contacts	Contacts hard gold-plated	DT	Screw terminals		DT	Spring-type terminals (push-in)	
				Article No.	Price per PU		Article No.	Price per PU

V

Coupling relays with relay output

Output coupling links

24 AC/DC	1	--	A	3RQ3018-1AB00	A	3RQ3018-2AB00
		✓	A	3RQ3018-1AB01	A	3RQ3018-2AB01
115 AC/DC	1	--	A	3RQ3018-1AE00	A	3RQ3018-2AE00
230 AC/DC	1	--	A	3RQ3018-1AF00	A	3RQ3018-2AF00
24 DC	1	--	--		A	3RQ3018-2AM08-0AA0
110 DC	1	--	--		A	3RQ3018-2AN08-0AA0

Input coupling links

24 AC/DC	1	--	A	3RQ3038-1AB00	A	3RQ3038-2AB00
		✓	A	3RQ3038-1AB01	A	3RQ3038-2AB01
115 AC/DC	1	--	A	3RQ3038-1AE00	A	3RQ3038-2AE00
		✓	A	3RQ3038-1AE01	A	3RQ3038-2AE01
230 AC/DC	1	--	A	3RQ3038-1AF00	A	3RQ3038-2AF00
		✓	A	3RQ3038-1AF01	A	3RQ3038-2AF01

✓ Available

-- Not available

Coupling Relays – Narrow Design

3RQ3 with plug-in relays

Selection and ordering data



PU (UNIT, SET, M) = 1
 PS* = 5 units
 PG = 41H



3RQ3118-1



3RQ3118-2

Control supply voltage rated value	Number of CO contacts for auxiliary contacts	Contacts hard gold-plated	DT	Screw terminals		DT	Spring-type terminals (push-in)	
V				Article No.	Price per PU		Article No.	Price per PU

Coupling relays with plug-in relays

Output coupling links

24 AC/DC	1	--	A	3RQ3118-1AB00	A	3RQ3118-2AB00
		✓	A	3RQ3118-1AB01	A	3RQ3118-2AB01
115 AC/DC	1	--	A	3RQ3118-1AE00	A	3RQ3118-2AE00
		✓	A	3RQ3118-1AE01	A	3RQ3118-2AE01
230 AC/DC	1	--	A	3RQ3118-1AF00	A	3RQ3118-2AF00
		✓	A	3RQ3118-1AF01	A	3RQ3118-2AF01
24 DC	1	--	A	3RQ3118-1AM00	A	3RQ3118-2AM00
		✓	A	3RQ3118-1AM01	A	3RQ3118-2AM01

✓ Available
 -- Not available

Coupling Relays – Narrow Design

3RQ3 with semiconductor output

Selection and ordering data

PU (UNIT, SET, M)= 1
 PS* = 5 units
 PG = 41H



3RQ3050-1SM50



3RQ3050-2SM50

Control supply voltage rated value		Current carrying capacity of the semiconductor output			Manual-0-automatic switch	DT	Screw terminals		DT	Spring-type terminals (push-in)	
		Resistive load	At DC-13	At AC-15							
			At 24 V	At 60 V	At 240 V	At 50/60 Hz					
V	A	A	A	A			Article No.	Price per PU		Article No.	Price per PU

Coupling relays with semiconductor output

Output coupling links

24 DC	0.5	0.5	0.5	--	--	A	3RQ3050-1SM50	A	3RQ3050-2SM50
	2	2	--	--	--	A	3RQ3052-1SM30	A	3RQ3052-2SM30
		2	2	--	--	A	3RQ3052-1SM40	A	3RQ3052-2SM40
	2	--	--	2	--	A	3RQ3052-1SM50	A	3RQ3052-2SM50
	5	5	--	--	--	A	3RQ3055-1SM30	A	3RQ3055-2SM30
					✓	A	3RQ3065-1SM30	A	3RQ3065-2SM30
110 ... 230 AC/DC	3	3	--	--	--	A	3RQ3053-1SG30	A	3RQ3053-2SG30

Input coupling links

24 DC	0.5	5	--	--	--	A	3RQ3070-1SB30	A	3RQ3070-2SB30
110 ... 230 AC/DC	0.5	0.5	--	--	--	A	3RQ3070-1SG30	A	3RQ3070-2SG30





✓ Available

-- Not available

Coupling Relays – Narrow Design

3RQ3 accessories

Selection and ordering data

Version	DT	Article No.	Price per PU	PU (UNIT, SET, M)	PS*	PG
Galvanic isolation plates						
 3RQ3900-0A	Galvanic isolation plates For electrical separation of different potentials when devices of different types are installed side by side					
	A	3RQ3900-0A				
Connecting combs						
 3RQ3901-0B	Connecting combs For linking the same potentials, current carrying capacity for infeed max. 6 A					
		• 2-pole				
	A	3RQ3901-0A		1	10 units	41H
	A	3RQ3901-0B		1	10 units	41H
	A	3RQ3901-0C		1	10 units	41H
	A	3RQ3901-0D		1	10 units	41H
Clip-on labels						
	Clip-on labels For terminal marking and equipment labeling, white					
		• 5 x 5 mm				
	A	3RQ3902-0A		100	2 000 units	41H
	A	3RQ3902-0B		100	1 200 units	41H
Tools for opening spring-type terminals						
 3RA2908-1A	Spring-type terminals 					
	A	3RA2908-1A		1	1 unit	41B
Screwdrivers For all SIRIUS devices with spring-type terminals, 3.0 mm x 0.5 mm, length approx. 200 mm; titanium gray/black, partially insulated						

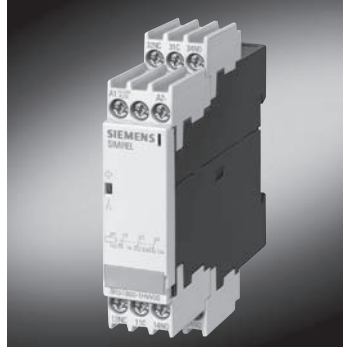
Interface Relays in a Rugged Industrial Enclosure

3RS18 relay interfaces

11

RELAYS, INTERFACES
& CONVERTERS

The new 3RS18 interface relays set new standards: They have a wide-range voltage extending from 24 V AC DC to 240 V. This makes them absolutely unique in the interface market. All of these devices are accommodated in a well-proven, rugged 22.5 mm wide enclosure. Relays with 1, 2 and 3 changeover contacts are available in both screw and Cage Clamp terminal versions. Not only this, also in combination and wide-range voltage with hard-gold-plated contacts for an especially high contact reliability – even at low current levels. Thanks to the well-proven, rugged enclosure, you can enjoy the benefits of user-friendly connection systems, including Cage Clamp terminals – just the same as delete our time relays. 2 conductors can be connected at each terminal point.

**Your advantages:**

- New, worldwide: One device for all voltages
- Lower costs due to fewer versions
- User-friendly wiring
- Especially high contact reliability even at low currents

Applications:

- Everywhere that contacts which are electronics-compatible are required and where devices with wide-range voltage are used
- Thanks to the hard-gold-plated contacts, predestined for PLC I/O

3RS18 interface relays in a rugged, industrial enclosure 22.5 mm wide			
Rated control supply voltage V_s	Contact versions	Order No.	List Price \$
50 60 Hz			
Wide-range voltage 24–240 V AC/DC	2 CO	3RS18 00-□ BW00	
	3 CO	3RS18 00-□ HW00	
	3 CO hard-gold-plated	3RS18 00-□ HW01	
Combination voltage 24 V AC/DC and 110–120 V AC	1 CO	3RS18 00-□ AQ00	
	2 CO	3RS18 00-□ BQ00	
	3 CO	3RS18 00-□ HQ00	
24 V AC/DC and 220–240 V AC	3 CO hard-gold-plated	3RS18 00-□ HQ01	
	1 CO	3RS18 00-□ AP00	
	2 CO	3RS18 00-□ BP00	
	3 CO	3RS18 00-□ HP00	
	3 CO hard-gold-plated	3RS18 00-□ HP01	

Screw Terminal 1

Spring-type Terminal 2

Signal Converters

3RS70

Overview



SIRIUS 3RS70 signal converters

Signal converters perform the coupling function for analog signals on both the input side and the output side. They are indispensable when processing analog values with electronic controls. Under harsh industrial conditions in particular, it is often necessary to transmit analog signals over long distances. Electrical separation is then needed as a result of the different power supplies. The resistance of the wiring causes potential differences and losses which must be prevented.

Electromagnetic disturbance and overvoltages can affect the signals on the input side in particular or even destroy the analog modules. All terminals of the 3RS70 signal converters are safe up to a voltage of 30 V DC and protected against switching poles. Short-circuit protection is an especially important function for the outputs.

The devices are EMC-tested according to

- IEC 61000-6-4 (basic standard for emitted interference)
- IEC 61000-6-2 (basic standard for interference immunity)

The analog signals comply with

- IEC 60381-1/2.

Note:

For the conversion tool e.g. from 3RS17 to 3RS70, see www.siemens.com/sirius/conversion-tool.

Article No. scheme

Digit of the Article No.	1 st - 5 th	6 th	7 th		8 th	9 th	10 th	11 th	12 th
	□□□□□	□	□	-	□	□	□	0	0
Signal converters	3RS70								
Type of input signal		□	□						
Connection methods					□				
Type of output signal						□			
Version of the supply voltage							□		
Example	3RS70	0	0	-	1	A	E	0	0

Note:

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

For your orders, please use the article numbers quoted in the catalog in the Selection and ordering data.

Benefits

- Narrow width
- Easy-to-set universal converters
- Converters with frequency output
- All ranges are fully calibrated
- Universal family of devices – the perfect solution for every application
- Integrated manual/automatic switch with a setpoint generator
- Outputs are short-circuit-proof
- Up to 30 V – protected against damage caused by wiring errors

Application

Signal converters are used in analog signal processing for

- Electrical separation
- Conversion of normalized and non-normalized signals
- Amplification and impedance adaptation
- Conversion to a frequency for processing by a digital input
- Overvoltage and EMC protection
- Short-circuit protection of the outputs

Signal Converters

3RS70

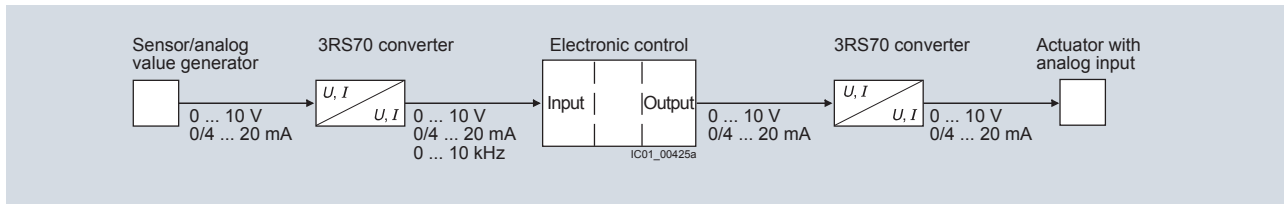
3RS7025 manual/automatic converter

For special applications in which analog signals have to be simulated, or during plant commissioning when the actual process value is not yet available, the 3RS7025 devices feature an adjustable potentiometer for manual setpoint selection and a manual/automatic switch.

The potentiometer for the 3RS7025 devices is used to simulate analog output signals when the changeover switch is set to "Manual" and the control supply voltage is applied, without the

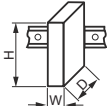


need for an analog input signal. The scale ranges from 0 ... 100 %.

Example: When it is set for an output of 4 ... 20 mA, the left stop on the potentiometer represents an output current of 4 mA and the right stop represents an output current of 20 mA. In the "Auto" switch position, the output signal follows the input signal proportionally regardless of the potentiometer setting.

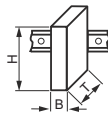




3RS70 interface converters, application example: analog signal processing

Technical specifications**Single-range converters, active/passive**

Type		3RS7000-.AE00	3RS7000-.CE00, 3RS7000-.DE00	3RS7002-.AE00, 3RS7003-.AE00	3RS7002-.CE00, 3RS7002-.DE00, 3RS7003-.CE00, 3RS7003-.DE00	3RS7020-.ET00
General data						
Dimensions (W x H x D)	 mm	6.2 × 93 × 73				6.2 × 93 × 71
Ambient temperature						
• During operation	°C	-25 ... +60				
• During storage	°C	-40 ... +85				
Relative humidity during operation	%	10 ... 90				
Insulation voltage	V	50				
For overvoltage category III To IEC 60664 for pollution degree 3 Rated value						
Active power input	W	0.29				--
Degree of protection		IP20				
Conductor cross-sections						
		 Screw terminals				
• Solid	mm²	1x (0.25 ... 2.5)				
• Finely stranded with end sleeve	mm²	1x (0.25 ... 1.5)				
• AWG cables, solid	AWG	1x (20 ... 14)				
		 Spring-type terminals				
• Solid	mm²	1x (0.25 ... 2.5)				
• Finely stranded without end sleeve	mm²	1x (0.25 ... 2.5)				
• Finely stranded with end sleeve	mm²	1x (0.25 ... 1.5)				
• AWG cables, solid	AWG	1x (20 ... 14)				
Inputs						
Input voltage						
• Max.	V	30				
• Typical	V	24				
Input impedance						
• Of current input	Ω	--				100
• Of voltage input	kΩ	330				--
Outputs						
Load						
• Maximum at current output	Ω	500				1000
• Maximum at voltage output	kΩ	2	--	2	--	
Relative measuring accuracy	%	0.1				
Overvoltage strength	V	30				
Maximum at current output						
Short-circuit proof		Yes				

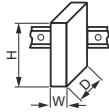


Multi-range converters, active

Type	3RS7005-.FE00		3RS7005-.KE00		3RS7005-.FW00		3RS7005-.KW00		3RS7025-.FE00, 3RS7025-.FW00			
General data												
Dimensions (W x H x D)				mm	6.2 × 93 × 73			17.5 × 93 × 73			17.5 × 93 × 75	
Ambient temperature												
• During operation			°C	-25 ... +60								
• During storage			°C	-40 ... +85								
Relative humidity during operation			%	10 ... 90								
Insulation voltage			V	50			300					
For overvoltage category III To IEC 60664 for pollution degree 3 Rated value												
Active power input			W	0.29			0.5		0.34	0.5		
Degree of protection			IP20									
Conductor cross-sections												
			 Screw terminals									
• Solid			mm²	1x (0.25 ... 2.5)								
• Finely stranded with end sleeve			mm²	1x (0.25 ... 1.5)								
• AWG cables, solid			AWG	1x (20 ... 14)								
			 Spring-type terminals									
• Solid			mm²	1x (0.25 ... 2.5)								
• Finely stranded without end sleeve			mm²	1x (0.25 ... 2.5)								
• Finely stranded with end sleeve			mm²	1x (0.25 ... 1.5)								
• AWG cables, solid			AWG	1x (20 ... 14)								
Inputs												
Input voltage												
• Max.			V	30								
• Typical			V	24								
Input impedance												
• Of current input			Ω	100								
• Of voltage input			kW	330								
Outputs												
Load												
• Maximum at voltage output			kΩ	2	--	2	--	2				
• Maximum at current output			Ω	500	--	500	--	500				
Relative measuring accuracy			%	0.1								
Overvoltage strength			V	30								
Maximum at current output												
Short-circuit proof			Yes									

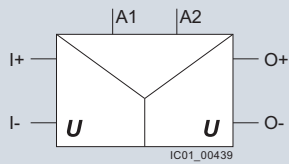
Signal Converters

3RS70

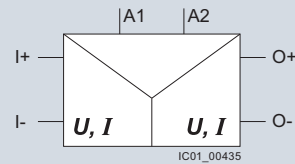
Universal converters, active

Type	3RS7006-F.00	
General data		
Dimensions (W x H x D)	 mm	17.5 × 93 × 73
Ambient temperature		
• During operation	°C	-25 ... +60
• During storage	°C	-40 ... +85
Relative humidity during operation	%	10 ... 90
Insulation voltage	V	300
For overvoltage category III To IEC 60664 for pollution degree 3 Rated value		
Active power input	W	0.5
Degree of protection	IP20	
Conductor cross-sections		
• Solid • Finely stranded with end sleeve • AWG cables, solid	mm ²	 Screw terminals
	mm ²	1x (0.25 ... 2.5)
	AWG	1x (0.25 ... 1.5) 1x (20 ... 14)
• Solid • Finely stranded without end sleeve • Finely stranded with end sleeve • AWG cables, solid	mm ²	 Spring-type terminals
	mm ²	1x (0.25 ... 2.5)
	mm ²	1x (0.25 ... 2.5)
	mm ²	1x (0.25 ... 1.5)
	AWG	1x (20 ... 14)
Inputs		
Input voltage		
• Max.	V	30
• Typical	V	24
Input impedance		
• Of current input	Ω	100
• Of voltage input	kΩ	330
Outputs		
Load		
• Maximum at voltage output	kΩ	2
• Maximum at current output	Ω	500
Relative measuring accuracy	%	0.1
Overvoltage strength	V	30
Maximum at current output		
Short-circuit proof	Yes	

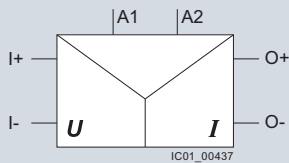
Circuit diagrams



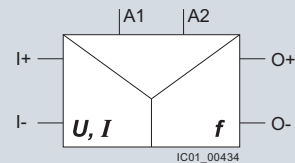
3RS7000-.AE00



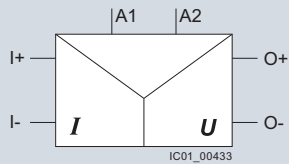
3RS7005-.FE00, 3RS7005-.FW00, 3RS7006-.FE00, 3RS7006-.FW00



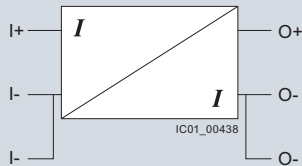
3RS7000-.CE00, 3RS7000-.DE00



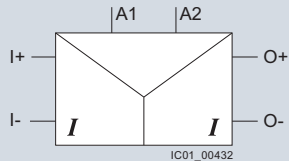
3RS7005-.KE00, 3RS7005-.KW00



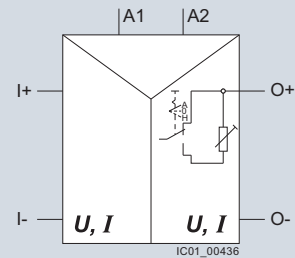
3RS7002-.AE00, 3RS7003-.AE00



3RS7020-.ET00



3RS7002-.CE00, 3RS7002-.DE00, 3RS7003-.CE00, 3RS7003-.DE00



3RS7025-.FE00, 3RS7025-.FW00

Signal Converters

3RS70

Selection and ordering data

PU (UNIT, SET, M) = 1
 PS* = 1 unit
 PG = 41 H



3RS7000-1AE00







3RS7000-2AE00

Signal type		Supply voltage	Width	DT	Screw terminals		DT	Spring-type terminals		
At the input	At the output				Article No.	Price per PU		Article No.	Price per PU	
					mm					
Single-range converters, passive, 2-way separation										
4 ... 20 mA	4 ... 20 mA	--	6.2	A	3RS7020-1ET00	A	3RS7020-2ET00			
Single-range converters, active, 3-way separation										
0 ... 10 V	0 ... 10 V	24 V AC/DC	6.2	A	3RS7000-1AE00	A	3RS7000-2AE00			
0 ... 20 mA	0 ... 10 V	24 V AC/DC	6.2	A	3RS7002-1AE00	A	3RS7002-2AE00			
4 ... 20 mA	0 ... 10 V	24 V AC/DC	6.2	A	3RS7003-1AE00	A	3RS7003-2AE00			
0 ... 10 V	0 ... 20 mA	24 V AC/DC	6.2	A	3RS7000-1CE00	A	3RS7000-2CE00			
0 ... 20 mA	0 ... 20 mA	24 V AC/DC	6.2	A	3RS7002-1CE00	A	3RS7002-2CE00			
4 ... 20 mA	0 ... 20 mA	24 V AC/DC	6.2	A	3RS7003-1CE00	A	3RS7003-2CE00			
0 ... 10 V	4 ... 20 mA	24 V AC/DC	6.2	A	3RS7000-1DE00	A	3RS7000-2DE00			
0 ... 20 mA	4 ... 20 mA	24 V AC/DC	6.2	A	3RS7002-1DE00	A	3RS7002-2DE00			
4 ... 20 mA	4 ... 20 mA	24 V AC/DC	6.2	A	3RS7003-1DE00	A	3RS7003-2DE00			
Switchable multi-range converters, active										
0 ... 10 V, 0 ... 20 mA, 4 ... 20 mA	0 ... 10 V,	24 V AC/DC	6.2	A	3RS7005-1FE00	A	3RS7005-2FE00			
	0 ... 20 mA,	24 ... 240 V AC/DC	17.5	A	3RS7005-1FW00	A	3RS7005-2FW00			
	4 ... 20 mA									
	0 ... 50 Hz	24 V AC/DC	6.2	A	3RS7005-1KE00	A	3RS7005-2KE00			
	0 ... 100 Hz	24 ... 240 V AC/DC	17.5	A	3RS7005-1KW00	A	3RS7005-2KW00			
	0 ... 1 kHz									
	0 ... 10 kHz									
Switchable multi-range converters, active, with manual/automatic switch and setting potentiometer as manual analog signal transmitter										
0 ... 10 V,	0 ... 10 V,	24 V AC/DC	17.5	A	3RS7025-1FE00	A	3RS7025-2FE00			
0 ... 20 mA,	0 ... 20 mA,	24 ... 240 V AC/DC	17.5	A	3RS7025-1FW00	A	3RS7025-2FW00			
4 ... 20 mA	4 ... 20 mA									
Switchable universal converters, active, with 16 input ranges and 3 output ranges										
0 ... 60 mV,	0 ... 10 V,	24 V AC/DC	17.5	A	3RS7006-1FE00	A	3RS7006-2FE00			
0 ... 100 mV,	0 ... 20 mA,	24 ... 240 V AC/DC	17.5	A	3RS7006-1FW00	A	3RS7006-2FW00			
0 ... 300 mV,	4 ... 20 mA									
0 ... 500 mV,										
0 ... 1 V,										
0 ... 2 V,										
0 ... 5 V,										
0 ... 10 V,										
0 ... 20 V,										
2 ... 10 V,										
0 ... 5 mA,										
0 ... 10 mA,										
0 ... 20 mA,										
4 ... 20 mA,										
-5 ... +5 mA,										
-20 ... +20 mA										

3RS70

Accessories

Version	DT	Article No.	Price per PU	PU (UNIT, SET, M)	PS*	PG
Galvanic isolation plates						
 3RQ3900-0A		Galvanic isolation plates For electrical separation of different potentials when devices of different types are installed side by side	A	3RQ3900-0A	1	10 units 41H
Connecting combs						
 3RQ3901-0B		Connecting combs For linking the same potentials, current carrying capacity for infeed max. 6 A				
		• 2-pole	A	3RQ3901-0A	1	10 units 41H
		• 4-pole	A	3RQ3901-0B	1	10 units 41H
		• 8-pole	A	3RQ3901-0C	1	10 units 41H
		• 16-pole	A	3RQ3901-0D	1	10 units 41H
Clip-on labels						
		Clip-on labels For terminal marking and equipment labeling, white				
		• 5 x 5 mm	A	3RQ3902-0A	100	2 000 units 41H
Tools for opening spring-type terminals						
 3RA2908-1A		Screwdrivers For all SIRIUS devices with spring-type terminals; 3.0 mm x 0.5 mm; length approx. 200 mm, titanium gray/black, partially insulated	A	Spring-type terminals  3RA2908-1A	1	1 unit 41B

Signal Converters

3RS70

More information

Active signal converters

Active signal converters provide maximum flexibility for the application by the use of an external supply voltage. Configuration with active signal converters is extremely easy because input and output resistances and voltage drops are compensated by the auxiliary supply. They support electrical separation as well as conversion from one signal type to another or reinforcement. The load of the measured value transmitter is negligible.

Passive signal converters

Passive signal converters do not require an external supply voltage. This advantage can only be used by current signals that are converted 1:1. Reinforcement or conversion is not possible. The converters are used for complete electrical separation of current signals and to protect the inputs and outputs. Passive signal converters do not operate reaction-free, i.e. any load on the output produces an equal load on the input signal. When the passive converter is to be used, the output power of the sensor and the input resistance of the analog input must be analyzed.

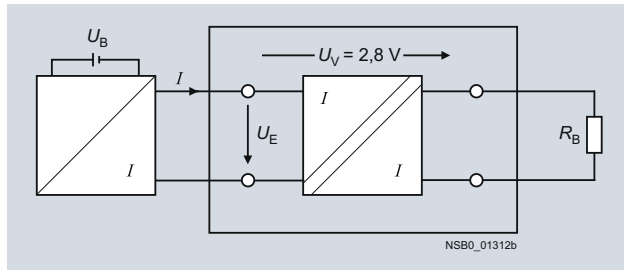
Calculation guide for passive converters

Important: Please note the following when using passive signal converters:

The current-driving voltage of the measuring transducer U_E must be sufficient to drive the maximum current of 20 mA over the passive separators with a voltage loss of $U_V = 2.8$ V and the load R_B .

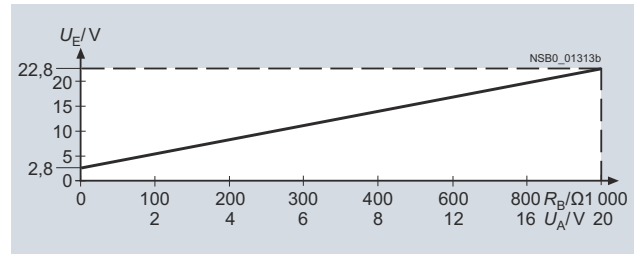
This means that:

$$U_B \geq U_E = 2.8 \text{ V} + 20 \text{ mA} \times R_B$$



Distribution of the voltages in the case of passive signal converters

The following figure shows the input voltage U_E as a function of the load R_B taking into account the voltage loss U_V . If the load is known, the y-axis shows the minimum voltage that has to be supplied by the current source in order to drive the maximum current of 20 mA over the passive signal converter and load.



Input voltage depending on the load at $I_a = 20$ mA

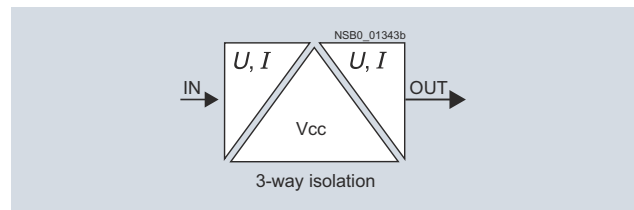
Load rating of the outputs

A maximum output load is specified for current signals. This resistance value specifies how large the input resistance of the next device connected in series can be as a result of the power of the converter.

For voltage signals, the maximum current that can be drawn from the output is the decisive factor.

3-way separation

For the 3-way separation, each circuit is electrically separated from the other circuits, i.e. input, output, and control supply voltage do not have equipotential bonding.



3-way separation

Coupling Relays and Interfaces

3TG10 power relays

Overview

Version

The 3TG10 contactors with 4 main contacts are available with screw-type terminals or with 6.3 mm to 0.8 mm tab connectors. The designs with screw-type terminals are suitable for use in any climate and safe from touch to DIN VDE 0106 Part 100.

The 3TG10 contactors have a compact design. Their overall width is 36 mm.

Application

They are suitable for use in household appliances as well as for distribution boards in offices and residential buildings, owing to their hum-free construction. They can further be used in all areas where there is only a limited amount of space available, e.g. in air conditioners, heating systems, pumps and fans - basically in all simple electrical controls.

AC and DC operation

EN 60 947-4-1
(VDE 0660 Part 102).

Surge suppression


The 3TG10 contactors are fitted with an integrated protective circuit for damping opening surges.

Overload and short-circuit protection

The 3UA7 overload relay can be used for overload protection (see NS E catalogue, available in German). This applies both for contactor mounting and for mounting as a single unit.


The data for short-circuit protection of the contactors without using an overload relay are provided in the technical data.

Selection and ordering data

Ratings Utilization category			Main contacts	Rated control supply voltage U_s	Order No.	List Price \$	Weight approx.	Pack
AC-1 maximum resistive load	Horsepower ratings of three-phase loads at 50 Hz 400 V	AC-3 maximum inductive current	Design 					
A	kW	A	NO NC					
							kg	Units

With screw connections, 4-pin
for screwing and snapping onto 35 mm standard mounting rail · hum-free

• AC operation


	3TG10 ...0	20	5	8.4	4	–	230 V, 45–450 Hz 110 V, 45–450 Hz 24 V, 45–450 Hz	3TG10 10-0AL2 3TG10 10-0AG2 3TG10 10-0AC2	0.15	10
					3	1	230 V, 45–450 Hz 110 V, 45–450 Hz 24 V, 45–450 Hz	3TG10 01-0AL2 3TG10 01-0AG2 3TG10 01-0AC2	0.15	10

• DC operation

	20	5	8.4	4	–	DC 24 V	3TG10 10-0BB4 3TG10 01-0BB4	0.15	10
				3	1	DC 24 V			

With tab connectors 6.3 x 0.8 mm, 4-pin
for screwing and snapping onto 35 mm standard mounting rail · hum-free

• AC operation

	3TG10 ...-1	16	5	8.4	4	–	230 V, 45–450 Hz 110 V, 45–450 Hz 24 V, 45–450 Hz	3TG10 10-1AL2 3TG10 10-1AG2 3TG10 10-1AC2	0.14	10
					3	1	230 V, 45–450 Hz 110 V, 45–450 Hz 24 V, 45–450 Hz	3TG10 01-1AL2 3TG10 01-1AG2 3TG10 01-1AC2	0.14	10

• DC operation

	16	5	8.4	4	–	DC 24 V	3TG10 10-1BB4 3TG10 01-1BB4	0.14	10
				3	1	DC 24 V			

1) The links for paralleling can be reduced by one pole. The rated operational currents are valid for each pole. The links for paralleling are insulated.

Coupling Relays and Interfaces

3TG10 power relays

Technical data

General data

Mechanical endurance	operating cycles		3 mill.
Electrical endurance at I_e	operating cycles	AC-1 AC-3	0.1 million 0.4 million
Rated insulation voltage U_i (pollution degree 3)		V	400
Rated impulse withstand voltage U_{imp}		kV	4
Safe isolation acc. to DIN VDE 0106 Part 101 and A1 (draft 2/89) between coil and contacts		V	up to 300
Permissible ambient temperature	in operation ¹⁾ when stored	°C °C	-25 ... +55 -50 ... +80
Degree of protection acc. to IEC 60 947-1 and IEC 60 529 (VDE 0470 Part 1)			IP 00, coil system IP 20
Power consumption of the coils (with coil in cold state and $1.0 \times U_s$)			
AC operation 45 – 450 Hz		VA	4.4
p.f.			0.9 (hum-free)
DC operation		W	4
Coil voltage tolerance			0.85 to $1.1 \times U_s$
Operating times (break-time = opening time + arcing time)			AC operation DC operation
	Closing	closing time opening time	NO ms NC ms
	Opening	opening time closing time	NO ms NC ms
	Arcing time		ms
Shock resistance			
rectangular pulse	AC and DC operation	g/ms	5.1/5 and 3.5/10
sine pulse	AC and DC operation	g/ms	7.9/5 and 5.2/10
Operating frequency z in operating cycles per hour			
Rated operation	No-load op. frequency	1/h	10000
	for AC-1	1/h	1000
	for AC-2	1/h	500
	for AC-3	1/h	1000

Short-circuit protection

Fuse links			
Utilisation category gL/gG	NH DIAZED NEOZED	Type 3NA Type 5SB Type 5SE	
acc. to IEC 60 947-4-1 (DIN VDE 0660 Part 102)	Type of coordination "1" Type of coordination "2"	A A	25 10
Miniature circuit-breaker	C-characteristic	A	10

Load ratings with AC

AC-1 utilisation category, switching resistive load

Rated operational current I_e at 55 °C to 400 V ¹⁾			
with screw connection	A	20	
with tab connector	A	16	
Ratings U_e of three-phase loads p.f. = 1	V	400	230/220
with screw connection	kW	13	7.5
with tab connector	kW	10	6.0
Minimum conductor cross-section with $I_{e \text{ load}}$	mm ²	2.5	

1) If the three main conducting paths are loaded with 20 A and $I > 10$ A for the fourth conducting

path; the permissible ambient temperature is 40 °C.

Technical data

Load ratings with AC

AC-2 and AC-3 utilisation categories

Rated operational currents I_e up to 400 V

A

8.4

Ratings of motors with slipring or squirrel-cage rotor at 50 Hz and 60 Hz and at 400 V

kW

4

AC-5a utilisation category (permissible supply impedance: $\geq 0.5 \Omega$)

Switching gas discharge lamps

per main conducting path at 50 Hz 230 V

Uncorrected

Lead-lag

Rating per lamp

W

18

36

58

18

36

58

Rated operational current per lamp

A

0.37

0.43

0.67

2 x 0.11

2 x 0.21

2 x 0.32

Number of lamps

unit

43

37

24

2 x 81

2 x 42

2 x 28

Switching gas discharge lamps with correction, electronic ballast

per main conducting path at 50 Hz 230 V

Parallel correction

Electr. ballast, 1 lamp

Electr. ballast, 2 lamps

Rating per lamp

W

18

36

58

18

36

58

Capacitor

 μF

4.5

4.5

7

6.8

6.8

10

10

10

22

Rated operational current per lamp

A

0.11

0.21

0.32

0.10

0.18

0.27

0.18

0.35

0.52

Number of lamps

unit

15

15

10

39

39

26

2 x 26

2 x 26

2 x 1

AC-5b utilisation category, switching incandescent lamps

per main conducting path at 50 Hz 230 V

kW

1.6

Load ratings with DC

DC-1 utilisation category, switching resistive load ($\frac{L}{R} \leq 1 \text{ ms}$)Rated operational current I_e

Conducting paths connected in series

1

2

3

4

up to 24 V A

16

16

18

20

60 V A

6

16

18

20

110 V A

2

6

16

20

220 V/240 V A

0.8

1.6

6

20

DC-3 and DC-5 utilisation categories, shunt and series motors

 $(\frac{L}{R} \leq 15 \text{ ms})$ Rated operational current I_e

Conducting paths connected in series

1

2

3

4

up to 24 V A

10

16

16

18

60 V A

0.5

5

16

16

110 V A

0.15

0.35

10

10

220 V/240 V A

–

–

1.75

2

Conductor cross-sections for designs

with screw connections

Screw connection

Finely stranded with end sleeve (DIN 46 228, style A/D/C)

mm²

M3

Solid

mm²

2 x (0.75 to 2.5)

mm²

2 x (1 to 2.5)

mm²

1 x 4

with tab connectors

Finely stranded

6.3 to 1

mm²

0.5 to 1

When using push-on contact acc. to DIN 46 245/46 247

6.3 to 2.5

mm²

1 to 2.5

Ⓢ and Ⓢ ratings (screw connection)

Rated insulation voltage

AC

V

600

Conventional thermal current

Free air and enclosed

A

20

Maximum horsepower ratings

(Ⓢ and Ⓢ-approved values)

Ratings of three-phase motors

at 60 Hz

at 115 V

hp

1/2

200 V

hp

1

230 V

hp

1 1/2

460 V/575 V

hp

–

600 V

hp

–

3-phase

–

3

3

5

5

Coupling Relays and Interfaces

3TG10 power relays

Accessories

For contactor	Design	Order No.	List Price \$	Weight approx.	Pack
	Max. rated operational currents $I_n/AC-1$ (at 55 °C) of contactors				
Type	A	mm ²	PG 101	kg	Units

Links for paralleling (star jumpers)

• 3-pole without terminal ¹⁾²⁾

3TG10	16 Star jumpers can be reduced by one pole	—	3RT1 916-4BA31	0.004	1
-------	---	---	-----------------------	-------	---

• 3-pole with terminal ¹⁾³⁾

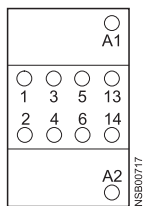
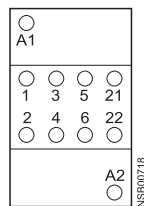
3TG10	40	25	3RT1 916-4BB31	0.013	1
-------	----	----	-----------------------	-------	---

• 4-pole with terminal ¹⁾⁴⁾

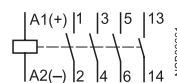
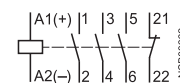
3TG10	50	25	3RT1 916-4BB41	0.02	1
-------	----	----	-----------------------	------	---

Circuit diagrams

Position of terminals

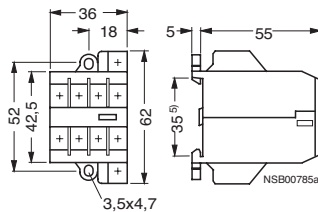
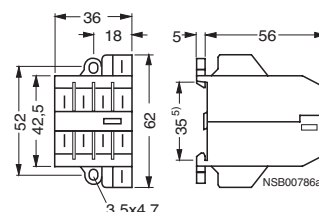
3TG10 10
1 NO3TG10 01
1 NC

Internal circuit diagram

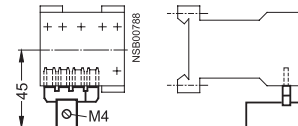
3TG10 10
1 NO
Ident. 10E3TG10 01
1 NC
01E

Dimension drawings

AC and DC operation

3TG10 ...-0..
with screw connections3TG10 ...-1..
with tab connectors

Accessories for 3TG10

3RT19 16-4BB41 links for paralleling,
4-pole, with terminal

The links for paralleling can be reduced by one pole.

1) The links for paralleling can be reduced by one pole. The rated operational currents are valid for each pole. The links for paralleling are insulated.

2) Replacement type for 3TX44 90-2C.

3) Replacement type for 3TX44 90-2A.

4) Replacement type for 3TX44 90-2B.

5) Can be snapped onto 35 mm standard mounting rails.

Coupling Relays and Interfaces

3TX71 plug-in relays

Selection and ordering data

Siemens offers a wide range of plug-in relays to meet your industrial needs. Basic style relays are the most economical and are equipped with a mechanical flag indicator only. Premium style relays are full featured with LED and mechanical flag indication, push to test button and typically a latching hold down door which provides a method of activating the contacts without applying power to the coil. This feature is very handy during commissioning and troubleshooting. Premium Bifurcated style relays are ideal for low minimum holding current requirements on the contacts. Typical minimum holding current for bifurcated contacts is 3mA instead of 100mA.

Relays are divided up by the following functions for selection:

- Base style
- Contact Arrangement
- Contact Rating
- Coil Voltage
- Optional Features (Basic, Premium and Premium Bifurcated)



Square Base (Narrow)

Contacts	Contact Rating (A)	Coil Voltage	Basic Relay	Premium Relay	Uses Socket 3TX7144-	Uses Clip 3TX7144-	Socket Access Set	Panel Mount Adaptor 3TX7144-	DIN Rail Mount Adaptor 3TX7144-
SPDT	15	12VDC	3TX7110-5BB03C	3TX7110-5JB03	4E7	1L7	B	3L5	3L4
		24 VDC	3TX7110-5BC03C	3TX7110-5JC03	4E7	1L7	B	3L5	3L4
		24 VAC	3TX7110-5BC13C	3TX7110-5JC13	4E7	1L7	B	3L5	3L4
		120 VAC	3TX7110-5BF13C	3TX7110-5JF13	4E7	1L7	B	3L5	3L4
		240 VAC	—	3TX7110-5JG13	4E7	1L7	B	3L5	3L4



Square Base (Standard)

Contacts	Contact Rating (A)	Coil Voltage	Basic Relay	Premium Relay	Uses Socket 3TX7144-	Uses Clip 3TX7144-	Socket Access Set	Panel Mount Adaptor 3TX7144-	DIN Rail Mount Adaptor 3TX7144-
DPDT	12	24 VDC	3TX7111-3DC03C	3TX7111-3LC03	4E5	1L6	B	3L7	3L6
		24 VAC	3TX7111-3DC13C	3TX7111-3LC13	4E5	1L6	B	3L7	3L6
		120 VAC	3TX7111-3DF13C	3TX7111-3LF13	4E5	1L6	B	3L7	3L6
DPDT	15	12 VDC	3TX7114-5DB03C	3TX7114-5LB03	4E6	1L6	B	3L7	3L6
		24VDC	3TX7114-5DC03C	3TX7114-5LC03	4E6	1L6	B	3L7	3L6
		24VAC	3TX7114-5DC13C	3TX7114-5LC13	4E6	1L6	B	3L7	3L6
		120 VAC	3TX7114-5DF13C	3TX7114-5LF13	4E6	1L6	B	3L7	3L6
		240 VAC	—	3TX7114-5LH13	4E6	1L6	B	3L7	3L6
DPDT	10	12 VDC	3TX7115-5DB03C	—	4E4	1L12	A	—	—
		24VDC	3TX7115-5DC03C	3TX7115-5LC03	4E4	1L12	A	—	—
		24VAC	3TX7115-5DC13C	3TX7115-5LC13	4E4	1L12	A	—	—
		120 VAC	3TX7115-5DF13C	3TX7115-5LF13	4E4	1L12	A	—	—

Option	Basic	Premium
Mechanical Flag	✓	✓
Push To Test		✓
Lock Down Door		✓
LED		✓

Note: See page 11/131 for socket accessories.

Coupling Relays and Interfaces

3TX71 plug-in relays

Selection and ordering data



Square Base (Standard)

Contacts	Contact Rating (A)	Coil Voltage	Basic Relay	Premium Relay	Premium Bifurcated	Uses Socket 3TX7144-	Uses Clip 3TX7144-	Socket Access Set	Panel Mount Adaptor 3TX7144-	DIN Rail Mount Adaptor 3TX7144-
3PDT	15	24VDC	3TX7116-5FC03C	3TX7116-5NC03	—	4E8	1L9	A	1M3	1M4
		24VAC	3TX7116-5FC13C	3TX7116-5NC13	—	4E8	1L9	A	1M3	1M4
		120 VAC	3TX7116-5FF13C	3TX7116-5NF13	—	4E8	1L9	A	1M3	1M4
3PDT	10	24VDC	—	3TX7115-5NC03	—	4E4	1L12	A	—	—
		120 VAC	3TX7115-5FF13C	3TX7115-5NF13	—	4E4	1L12	A	—	—
4PDT	6A for Basic and Premium and 3A for Bifurcated	24VDC	3TX7111-3HC03C	3TX7111-3PC03	3TX7111-5PC03B	4E5	1L6	B	3L7	3L6
		24VAC	3TX7111-3HC13C	3TX7111-3PC13	—	4E5	1L6	B	3L7	3L6
		120 VAC	3TX7111-3HF13C	3TX7111-3PF13	3TX7111-5PF13B	4E5	1L6	B	3L7	3L6
		240 VAC	—	3TX7111-3PG13	—	4E5	1L6	B	3L7	3L6
4PDT	15	24VDC	3TX7117-5HC03C	3TX7117-5PC03	—	4E9	1L10	A	1M5	1M6
		24VAC	3TX7117-5HC13C	3TX7117-5PC13	—	4E9	1L10	A	1M5	1M6
		120 VAC	3TX7117-5HF13C	3TX7117-5PF13	—	4E9	1L10	A	1M5	1M6

Option	Basic	Premium	Premium Bifurcated
Mechanical Flag	✓	✓	✓
Push To Test		✓	✓
Lock Down Door		✓	✓
LED		✓	✓

Note: See page 11/131 for socket accessories.

Coupling Relays and Interfaces

3TX71 plug-in relays

Selection and ordering data



Standard Octal Base

Contacts	Contact Rating (A)	Coil Voltage	Basic Relay	Premium Relay	Uses Socket 3TX7144-	Uses Clip 3TX7144-	Socket Access Set
DPDT	10	12 VDC	3TX7112-1DB03C	3TX7112-1LB03	4E2	1L14	A
		24VDC	3TX7112-1DC03C	3TX7112-1LC03	4E2	1L14	A
		24VAC	3TX7112-1DC13C	3TX7112-1LC13	4E2	1L14	A
		120 VAC	3TX7112-1DF13C	3TX7112-1LF13	4E2	1L14	A
		240 VAC	3TX7112-1DG13C	3TX7112-1LG13	4E2	1L14	A
3PDT	10	24VDC	3TX7112-1FC03C	3TX7112-1NC03	4E3	1L14	A
		24VAC	3TX7112-1FC13C	3TX7112-1NC13	4E3	1L14	A
		120 VAC	3TX7112-1FF13C	3TX7112-1NF13	4E3	1L14	A
		240 VAC	—	3TX7112-1NG13	4E3	1L14	A



Hermetically Sealed

Contacts	Contact Rating (A)	Coil Voltage	Basic Relay	Uses Socket 3TX7144-	Uses Clip 3TX7144-	Socket Access Set
DPDT	12	24 VDC	3TX7127-5HC00	4E2	1L12	A
4PDT	3	24VDC	3TX7127-3HC00	4E5	1L11	B
		24VAC	3TX7127-3HC10	4E5	1L11	B
		120 VAC	3TX7127-3HF10	4E5	1L11	B
4PDT	5	12 VDC	3TX7127-3HB03	4E5	1L11	B
		24VDC	3TX7127-3HC03	4E5	1L11	B
		120 VAC	3TX7127-3HF13	4E5	1L11	B

Socket Accessories

Access. Series	MOV	MOV	R/C	R/C	Diode
	24VAC/DC	120VAC/DC	6-24VAC/DC	110-240VAC/DC	6-250VDC
A	3TX7144-H1	3TX7144-H20	3TX7144-H4	3TX7144-H5	3TX7144-H6
B	3TX7144-H9	3TX7144-H17	—	—	3TX7144-H12

Note: See socket accessories above.

Coupling Relays and Interfaces

3TX71 plug-in relays

Selection and ordering data

Open Power Relays

Contacts	Contact Rating (A)	Coil Voltage	Basic Relay	Metal Cover 7144-
SPST NO-DM	40	24VAC	3TX7130-0AC13	1M0
SPST NO-DM		120 VAC	3TX7130-0AF13	1M0
SPST NO-DM		240 VAC	3TX7130-0AH13	1M0
SPST NC-DM	40	120 VAC	3TX7130-0QF13	1M0
SPDT		24 VAC	3TX7130-0BC13	1M0
SPDT		120 VAC	3TX7130-0BF13	1M0
SPDT		240 VAC	3TX7130-0BH13	1M0
SPDT		277 VAC	3TX7130-0BS13	1M0
DPDT	40	24 VAC	3TX7130-0DC13	1M0
		120 VAC	3TX7130-0DF13	1M0
		240 VAC	3TX7130-0DH13	1M0
		277 VAC	3TX7130-0DS13	1M0
		12 VDC	3TX7130-0DB03	1M0
		24 VDC	3TX7130-0DC03	1M0
		48 VDC	3TX7130-0DD03	1M0
DPST NO	40	110 VDC	3TX7130-0DF03	1M0
		24 VAC	3TX7130-0CC13	1M0
		120 VAC	3TX7130-0CF13	1M0
		240 VAC	3TX7130-0CH13	1M0
		12 VDC	3TX7130-0CB03	1M0
		24 VDC	3TX7130-0CC03	1M0
DPDT (Mag Blowout)	40	48 VDC	3TX7130-0CD03	1M0
		120 VAC	3TX7130-0RF13	1M0
		12 VDC	3TX7130-0RB03	1M0
		24 VDC	3TX7130-0RC03	1M0
		48 VDC	3TX7130-0RD03	1M0
		110 VDC	3TX7130-0RF03	1M0



Enclosed Power Relays

Contacts	Contact Rating (A)	Coil Voltage	Basic Relay
DPST-NO	30	24VAC	3TX7131-4CC13
		120 VAC	3TX7131-4CF13
		230 VAC	3TX7131-4CH13
DPDT	30 NO/ 3 NC	12 VDC	3TX7131-4DB03
		24 VDC	3TX7131-4DC03
		24VAC	3TX7131-4DC13
		120 VAC	3TX7131-4DF13
		230 VAC	3TX7131-4DH13



Note: See page 11/131 for socket accessories.

Coupling Relays and Interfaces

3TX71 plug-in relays

General specifications

Contact Characteristics		Units	3TX7109	3TX7110	3TX7111	3TX7111	3TX7111	3TX7111	3TX7111
Number and Type of Contacts			SPDT	SPDT	SPDT	DPDT	DPDT	4PDT	4PDT
Contact Material			Silver Alloy	Silver Alloy	Silver Alloy	Silver Alloy	Silver Alloy	Silver Alloy	Silver Alloy
Thermal (Carrying) Current		A	20	15	3 (Bifurcated)	12	3 (Bifurcated)	6	3 (Bifurcated)
Maximum Switching Voltage		V	300	300	300	300	300	300	300
Switching Current at Voltage		Resistive	16A @240V	15A @240V	3A @240V	—	3A @240V	6A @240V	3A @240V
		Resistive	16A @120V	15A @120V	—	12A @120V	3A @120V	6A @120V	3A @120V
		Resistive	16A @ 28	15A @ 28	—	12A @ 28	3A @ 30	6A @ 28	3A @ 30
		HP	1/2 @ 120VAC	1/2 @ 120VAC	—	1/3 @ 120VAC	1/16 @ 120VAC	1/3 @ 120VAC	1/16 @ 120VAC
		HP	1 @ 240VAC	1 @ 240VAC	—	—	—	1 @ 240VAC	—
Pilot Duty			B300	B300	—	B300	—	B300	—
Minimum Switching Requirement		mA	100 @ 5VDC (.5W)	100 @ 5VDC (.5W)	3 @ 17VDC (.4W)	100 @ 5VDC (.5W)	3 @ 17VDC (.4W)	100 @ 5VDC (.5W)	3 @ 17VDC (.4W)
Coil Characteristics									
Voltage Range	AC	V	6...240	6...240	6...240	6...240	6...240	6...240	6...240
	DC	V	6...125	6...125	6...125	6...125	6...125	6...125	6...125
Operating Range	AC	%	85 to 110	85 to 110	85 to 110	85 to 110	85 to 110	85 to 110	85 to 110
	DC	%	80 to 110	80 to 110	80 to 110	80 to 110	80 to 110	80 to 110	80 to 110
Average Consumption	AC	VA	1.2	0.9	0.9	1.2	1.2	1.2	1.2
	DC	W	0.9	0.7	0.7	0.9	0.9	0.9	0.9
Drop-out Voltage Threshold	AC	%	15	15	15	15	15	15	15
	DC	%	10	10	10	10	10	10	10
Performance Characteristics									
Electrical Life (UL508)	Operations @ Rated Current	(Resistive)	100,000	100,000	100,000	200,000	200,000	200,000	200,000
Mechanical Life	Unpowered		10,000,000	10,000,000	10,000,000	10,000,000	10,000,000	10,000,000	10,000,000
Operating Time (response time)		ms	20	20	20	20	20	20	20
Dielectric Strength	Between Coil and Contact	V(rms)	2500	2500	2500	2500	2500	2500	2500
	Between Poles	V(rms)	1500	1500	1500	1500	1500	1500	1500
	Between Contacts	V(rms)	1500	1500	1500	1500	1500	1500	1500
Environment									
Product Certifications	Standard Version		UL,RoHS	UL,RoHS	UL,RoHS	UL,RoHS	UL,RoHS	UL,RoHS	UL,RoHS
Ambient Air Temperature around the Device	Storage	°C	-40...+85	-40...+85	-40...+85	-40...+85	-40...+85	-40...+85	-40...+85
	Operational	°C	-40...+55	-40...+55	-40...+55	-40...+55	-40...+55	-40...+55	-40...+55
Vibration Resistance	Operational	g-n	3, 10 - 55 Hz	3, 10 - 55 Hz	3, 10 - 55 Hz	3, 10 - 55 Hz	3, 10 - 55 Hz	3, 10 - 55 Hz	3, 10 - 55 Hz
Shock Resistance		g-n	10	10	10	10	10	10	10
Degree of Protection			IP40	IP40	IP40	IP40	IP40	IP40	IP40
Weight		grams	36	29	29	36	36	36	36

Contact Characteristics		Units	3TX7112		3TX7114	3TX7115		3TX7116	3TX7117
Number and Type of Contacts			DPDT	3PDT	DPDT	DPDT	3PDT	3PDT	4PDT
Contact Material			Silver Alloy	Silver Alloy	Silver Alloy	Silver Alloy	Silver Alloy	Silver Alloy	Silver Alloy
Thermal (Carrying) Current		A	10	10	15	10	10	15	15
Maximum Switching Voltage		V	300	300	300	300	300	300	300
Switching Current at Voltage		Resistive	10A @240V	10A @240V	12A @277V	10A @277V	10A @277V	12A @277V	12A @277V
		Resistive	10A @120V	10A @120V	15A @120V	10A @120V	10A @120V	15A @120V	15A @120V
		Resistive	10A @ 28	10A @ 28	12A @ 28	10A @ 28	10A @ 28	12A @ 28	12A @ 28
		HP	1/3 @ 120VAC	1/3 @ 120VAC	1/2 @ 120VAC	1/3 @ 120VAC	1/3 @ 120VAC	1/2 @ 120VAC	1/2 @ 120VAC
		HP	1/2 @ 240VAC	1/2 @ 240VAC	1 @ 240VAC	1/2 @ 240VAC	1/2 @ 240VAC	3/4 @ 240VAC	3/4 @ 240VAC
		Pilot Duty	B300	B300	B300	B300	B300	B300	B300
Minimum Switching Requirement		mA	100 @ 5VDC (.5W)	100 @ 5VDC (.5W)	100 @ 5VDC (.5W)	100 @ 5VDC (.5W)	100 @ 5VDC (.5W)	100 @ 5VDC (.5W)	100 @ 5VDC (.5W)
Coil Characteristics									
Voltage Range	AC	V	6...240	6...240	6...240	6...240	6...240	6...240	6...240
	DC	V	6...125	6...125	6...125	6...125	6...125	6...125	6...125
Operating Range	AC	%	85 to 110	85 to 110	85 to 110	85 to 110	85 to 110	85 to 110	85 to 110
	DC	%	80 to 110	80 to 110	80 to 110	80 to 110	80 to 110	80 to 110	80 to 110
Average Consumption	AC	VA	1.2	1.2	1.2	1.2	1.2	1.5	1.5
	DC	W	0.9	0.9	0.9	0.9	0.9	1.4	1.5
Drop-out Voltage Threshold	AC	%	15	15	15	15	15	15	15
	DC	%	10	10	10	10	10	10	10
Performance Characteristics									
Electrical Life (UL508)	Operations @ Rated Current	(Resistive)	200,000	200,000	100,000	100,000	100,000	200,000	200,000
Mechanical Life	Unpowered		10,000,000	10,000,000	10,000,000	10,000,000	10,000,000	10,000,000	10,000,000
Operating Time (response time)		ms	20	20	20	20	20	20	20
Dielectric Strength	Between Coil and Contact	V(rms)	2500	2500	2500	2500	2500	2500	2500
	Between Poles	V(rms)	1500	1500	1500	1500	1500	2500	2500
	Between Contacts	V(rms)	1500	1500	1500	1500	1500	1500	2500
Environment									
Product Certifications	Standard Version		UL,RoHS	UL,RoHS	UL,RoHS	UL,RoHS	UL,RoHS	UL,RoHS	UL,RoHS
Ambient Air Temperature around the Device	Storage	°C	-40...+85	-40...+85	-40...+85	-40...+85	-40...+85	-40...+85	-40...+85
	Operational	°C	-40...+55	-40...+55	-40...+55	-40...+55	-40...+55	-40...+55	-40...+55
Vibration Resistance	Operational	g-n	3, 10 - 55 Hz	3, 10 - 55 Hz	3, 10 - 55 Hz	3, 10 - 55 Hz	3, 10 - 55 Hz	3, 10 - 55 Hz	3, 10 - 55 Hz
Shock Resistance		g-n	10	10	10	10	10	10	10
Degree of Protection			IP40	IP40	IP40	IP40	IP40	IP40	IP40
Weight		grams	89	89	36	88	88	60	60

Coupling Relays and Interfaces

3TX71 plug-in relays

General specifications

Contact Characteristics		Units	3TX7119	3TX7127		3TX7130	
Number and Type of Contacts			DPDT	DPDT	4PDT	4PDT	All
Contact Material			Silver Alloy	Silver Alloy	Fine Silver	Silver Alloy	Silver Alloy
Thermal (Carrying) Current		A	20	12	3	5	40
Maximum Switching Voltage		V	600	300	300	300	600
Switching Current at Voltage		Resistive	20A @300V	12A @240V	3A @240V	12A @240V	40A @277V
		Resistive	—	12A @120V	3A @120V	—	—
		Resistive	20A @ 28	12A @ 28	3A @ 30	—	40A @ 28
		HP	1/3 @ 120VAC	1/3 @ 120VAC	1/16 @ 120VAC	—	—
		HP	1/2 @ 600VAC	1/2 @ 240VAC	1/10 @ 240VAC	—	—
		Pilot Duty	B600	B300	—	—	—
Minimum Switching Requirement		mA	100 @ 5VDC (.5W)	100 @ 5VDC (.5W)	10 @ 5VDC (.5W)	100 @ 5VDC (.5W)	1000 @ 12VAC/DC
Coil Characteristics							
Voltage Range	AC	V	6...240	6...240	6...240	6...240	6...600
	DC	V	6...125	6...125	6...125	6...125	6...600
Operating Range	AC	%	85 to 110	85 to 110	85 to 110	85 to 110	85 to 110
	DC	%	80 to 110	80 to 110	80 to 110	80 to 110	80 to 110
Average Consumption	AC	VA	2.75	1.2	1.2	1.2	10
	DC	W	2	0.9	0.9	0.9	4
Drop-out Voltage Threshold	AC	%	15	15	15	15	10
	DC	%	10	10	10	10	10
Performance Characteristics							
Electrical Life (UL508)	Operations @ Rated Current	(Resistive)	100,000	100,000	100,000	100,000	100,000
Mechanical Life	Unpowered		10,000,000	10,000,000	10,000,000	10,000,000	1,000,000
Operating Time (response time)		ms	20	20	20	20	30
Dielectric Strength	Between Coil and Contact	V(rms)	2000	1,500	1240	1240	2200
	Between Poles	V(rms)	2000	1,500	1240	1240	2200
	Between Contacts	V(rms)	1500	1500	500	500	1500
Environment							
Product Certifications	Standard Version		UL	UL,RoHS	UL,RoHS	UL,RoHS	UL
Ambient Air Temperature around the Device	Storage	°C	-40...+85	-40...+85	-40...+85	-40...+85	-40...+85
	Operational	°C	-40...+55	-40...+55	-40...+70	-40...+70	-40...+70
Vibration Resistance	Operational	g-n	3, 10 - 55 Hz	3, 10 - 55 Hz	3, 10 - 55 Hz	3, 10 - 55 Hz	3, 10 - 55 Hz
Shock Resistance		g-n	10	10	10	10	—
Degree of Protection			IP40	IP67	IP67	IP67	Open
Weight		grams	88	130	45	45	227 to 312

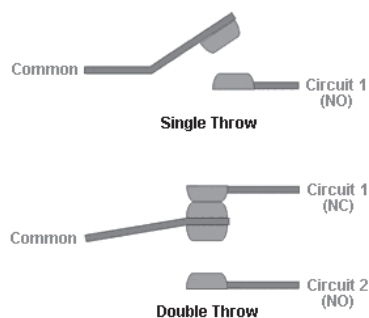
Contact Characteristics		Units	3TX7131		3TX7132		3TX7136	3TX7137
Number and Type of Contacts			DPST-NO	DPDT	DPDT	SPDT	SPDT	DPDT
Contact Material			Silver Alloy	Silver Alloy	Silver Alloy	Silver Alloy	Silver Alloy	Silver Alloy
Thermal (Carrying) Current		A	30	30 DPDT-NO	3 DPDT-NC	30 SPDT-NO	3 DPDT-NC	12
Maximum Switching Voltage		V	600	300	300	300	300	300
Switching Current at Voltage		Resistive	20A @300V	30A @277V	3A @277V	30A @277V	3A @277V	12A @240V
		Resistive	—	—	—	—	—	16A @120V
		Resistive	20A @ 28	20A @ 28	3A @ 28	10A @ 28	3A @ 28	12A @ 28
		HP	1/3 @ 120VAC	1 @ 120VAC	—	1 @ 120VAC	—	1/2 @ 120VAC
		HP	1/2 @ 600VAC	3 @ 240VAC	—	2 @ 240VAC	—	1/3 @ 240VAC
		Pilot Duty	—	—	—	—	B300	B300
Minimum Switching Requirement		mA	500 @ 12VAC/DC	500 @ 12VAC/DC	500 @ 12VAC/DC	1000 @ 12VAC/5VDC	500 @ 12VAC/DC	100 @ 5VDC (.5W)
Coil Characteristics								
Voltage Range	AC	V	12...240	12...240	12...240	12...277	12...277	12...120
	DC	V	6...110	6...110	6...110	5...110	5...110	12...110
Operating Range	AC	%	85 to 120	85 to 120	85 to 120	85 to 120	85 to 120	85 to 110
	DC	%	75 to 120	75 to 120	75 to 120	75 to 120	75 to 120	80 to 110
Average Consumption	AC	VA	4	4	4	2.8	2.8	1.8
	DC	W	1.7	1.7	1.7	1	1	1.4
Drop-out Voltage Threshold	AC	%	10	10	10	10	10	15
	DC	%	10	10	10	10	10	10
Performance Characteristics								
Electrical Life (UL508)	Operations @ Rated Current	(Resistive)	100,000	100,000	100,000	100,000	100,000	100,000
Mechanical Life	Unpowered		5,000,000	5,000,000	5,000,000	10,000,000	10,000,000	5,000,000
Operating Time (response time)		ms	15	15	15	15	15	35
Dielectric Strength	Between Coil and Contact	V(rms)	4000	4000	4000	2500	2500	1500
	Between Poles	V(rms)	2000	2000	2000	1500	1500	500
	Between Contacts	V(rms)	1500	1500	1500	1500	1500	1500
Environment								
Product Certifications	Standard Version		UL	UL	UL	UL	UL	UL
Ambient Air Temperature around the Device	Storage	°C	-40...+85	-40...+85	-40...+85	-40...+85	-40...+85	-40...+85
	Operational	°C	-40...+55	-40...+55	-40...+55	-40...+55	-40...+55	-40...+70
Vibration Resistance	Operational	g-n	3, 10 - 55 Hz	3, 10 - 55 Hz	3, 10 - 55 Hz	3, 10 - 55 Hz	3, 10 - 55 Hz	3, 10 - 55 Hz
Shock Resistance		g-n	10	10	10	10	10	10
Degree of Protection			—	—	—	—	—	IP40
Weight		grams	86	86	86	33	33	110

Coupling Relays and Interfaces

3TX71 plug-in relays

Overview

Contact arrangement - throws

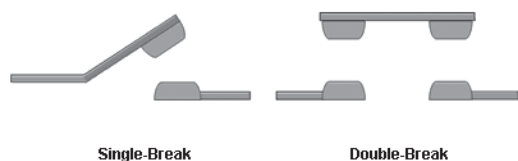


Throw is the number of different closed contact positions per pole. In other words a throw describes the total number of different circuits each pole controls.

The following abbreviations are used to indicate contact configurations:

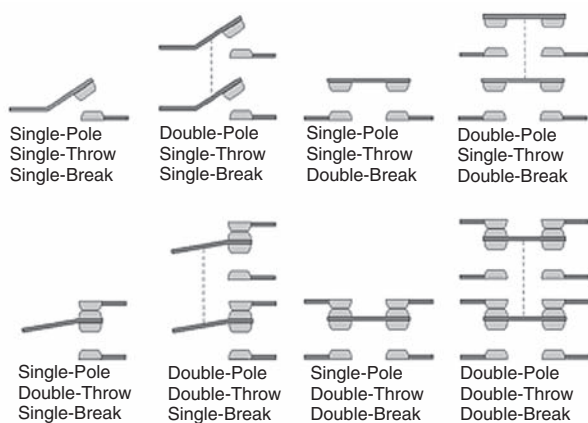
SPST Single-pole, single-throw
SPDT Single-pole, double-throw
DPST Double-pole, single-throw
DPDT Double-pole, double-throw

Contact arrangement - break



Break is the number of separate contacts the switch uses to open or close an individual circuits. If the relay breaks the circuit in one place, then it is a single break relay. If the relay breaks the circuit in two places, then it is a double break relay.

Contact arrangements overview



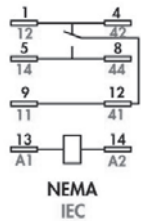
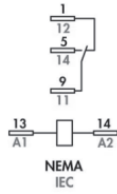
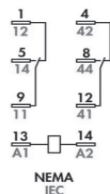
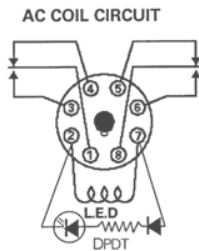
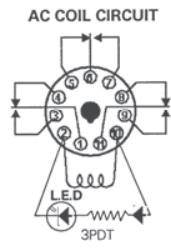
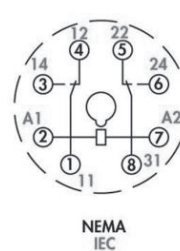
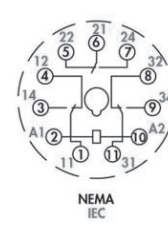
This illustration shows various contact arrangement types.

Coupling Relays and Interfaces

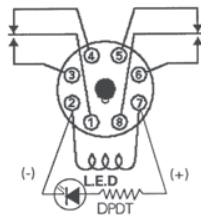
3TX71 plug-in relays

Circuit diagrams

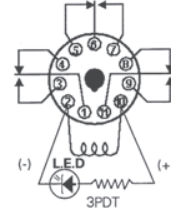
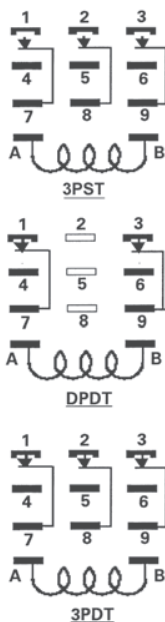
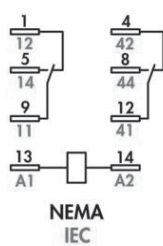
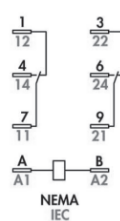
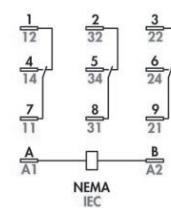
3TX7109 (SPDT)

3TX7110
SPDT3TX7111
DPDT3TX7111
4PDT3TX7112
DPDT3TX7112
3PDT3TX7112-1L, -1D
DPDT3TX7112-1N, -1F
3PDT

DC COIL CIRCUIT



DC COIL CIRCUIT

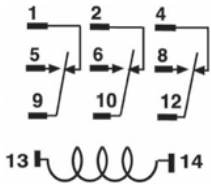
3TX7113
DPDT, 3PST, 3PDT3TX7114
DPDT3TX7115
DPDT3TX7115
3PDT

3TX71 plug-in

Circuit diagrams

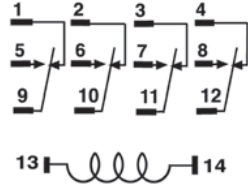
3TX7116

3PDT

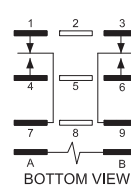


3TX7117

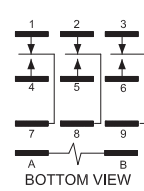
4PDT



3TX7119 (DPDT)

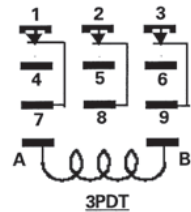
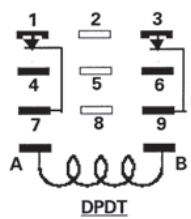


3TX7119 (3PDT)



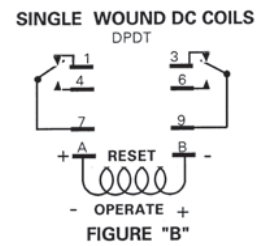
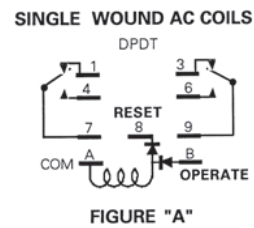
3TX7121

DPDT, 3PDT



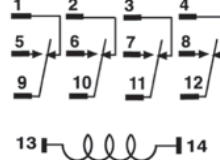
3TX7125

DPDT

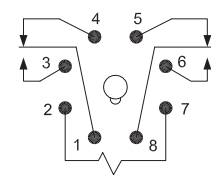


3TX7126/ 3TX7127

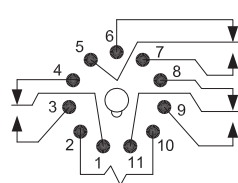
4PDT



3TX7127 (DPDT)



3TX7127 (3PDT)



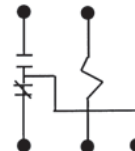
3TX7130

SPST-NO



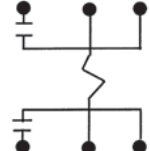
3TX7130

SPDT



3TX7130

DPST-NO



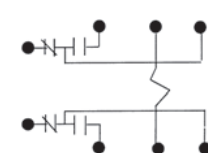
3TX7130

SPST-NC

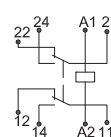


3TX7130

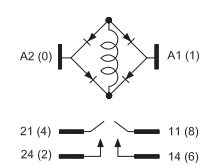
DPDT



3TX7130 (DPDT)



3TX7131 (DPST-NO) (AC)

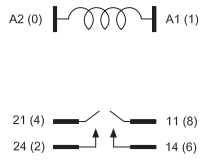


Coupling Relays and Interfaces

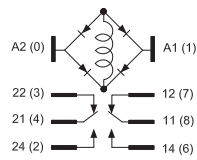
3TX71 plug-in relays

Circuit diagrams

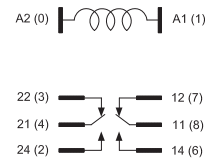
3TX7131 (DPST-NO) (DC)



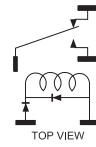
3TX7131 (DPDT) (AC)



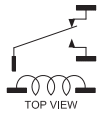
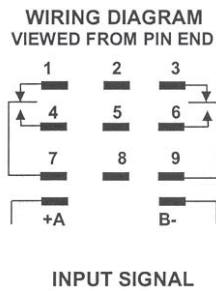
3TX7131 (DPDT) (DC)



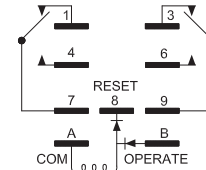
3TX7132 (SPDT) (AC)



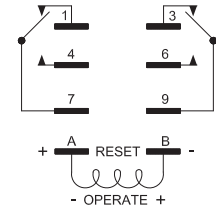
3TX7132 (SPDT) (DC)

3TX7136
DPDT

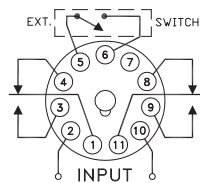
3TX7137 (DPDT) (AC)



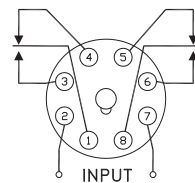
3TX7137 (DPDT) (DC)



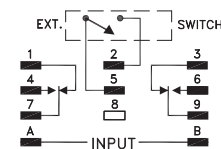
OFD-DFOB (DPDT)



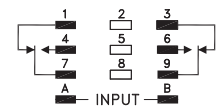
OND-DFOB (DPDT)



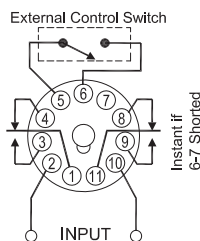
OFD-DFSB (DPDT)



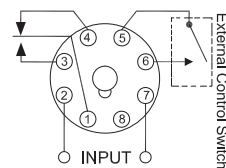
OND-DFSB (DPDT)



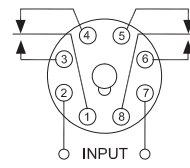
OFD-DFPR-00 (DPDT)



OND-DFPR-01 (SPDT)

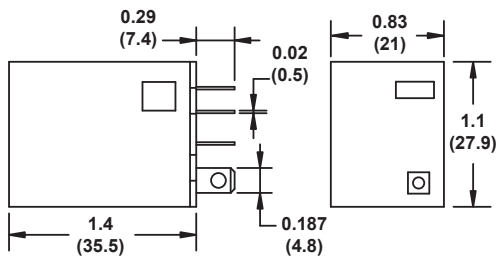


OND-DFPR-02 (DPDT)

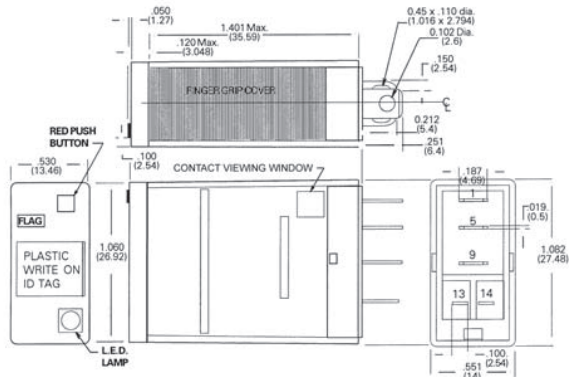


3TX71 plug-in relays

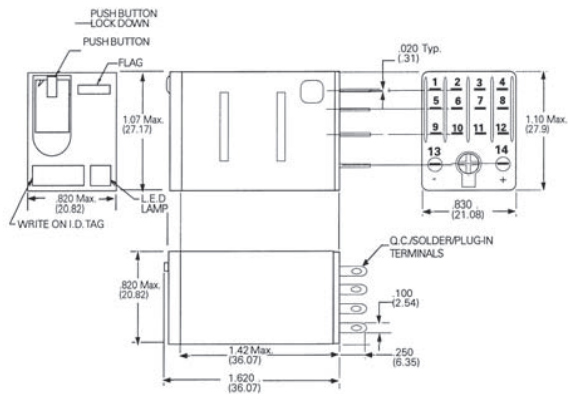
3TX7109 (SPDT) (clear cover)



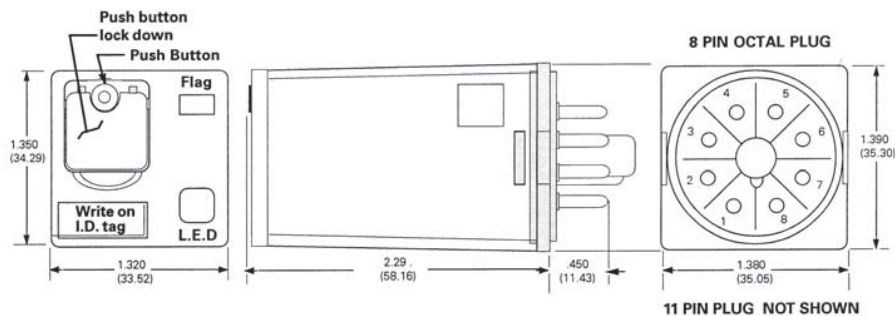
3TX7110 SPDT



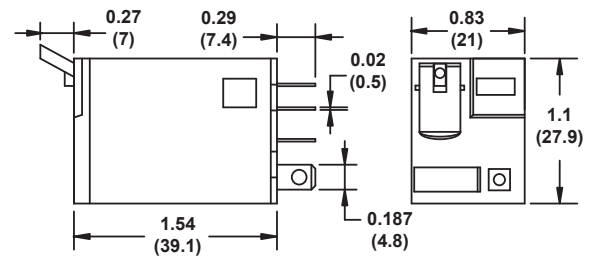
3TX7111 4PDT



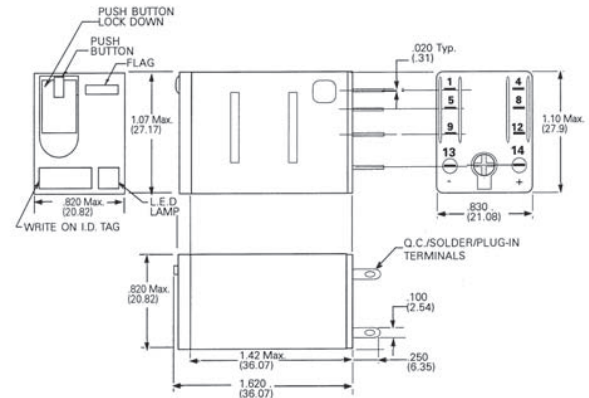
3TX7112 DPDT



3TX7109 (SPDT) (full feature)



3TX7111 DPDT

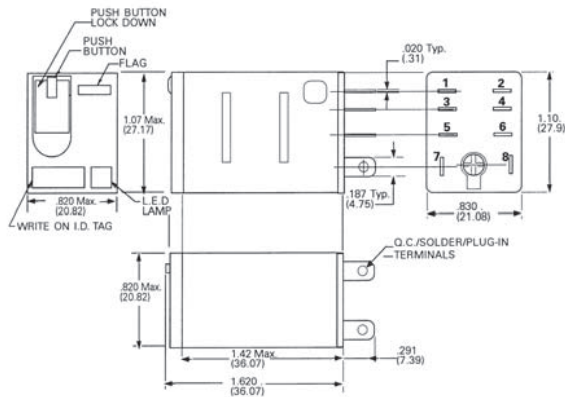


Coupling Relays and Interfaces

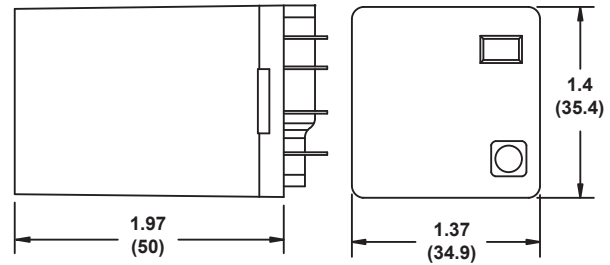
3TX71 plug-in relays

Dimension drawings

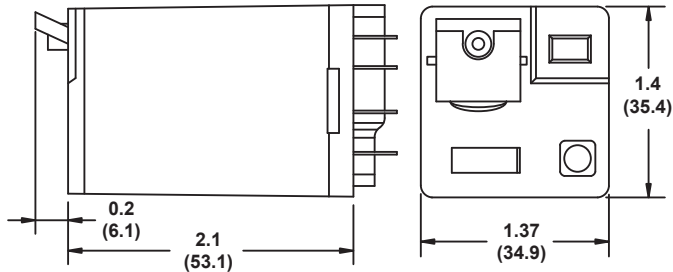
3TX7114 DPDT



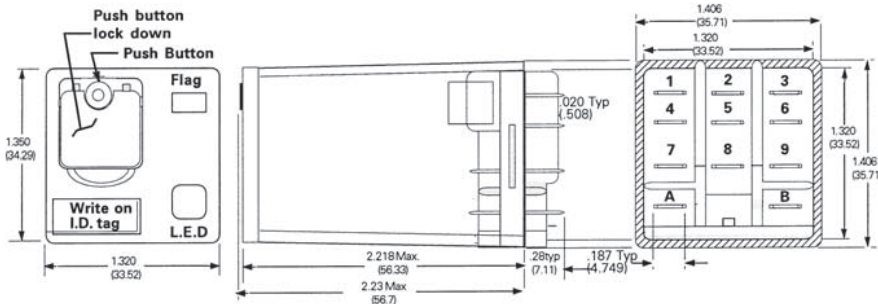
3TX7115 (DPDT) (clear cover)



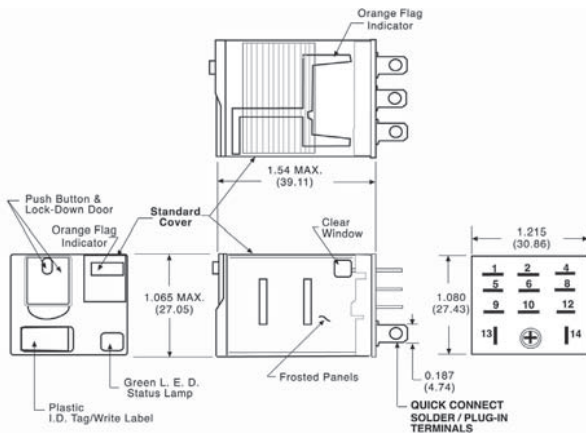
3TX7115 (DPDT) (full feature)



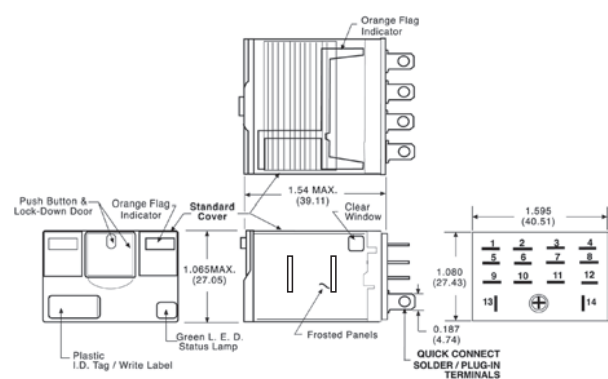
3TX7115 3PDT



3TX7116 3PDT



3TX7117 4PDT

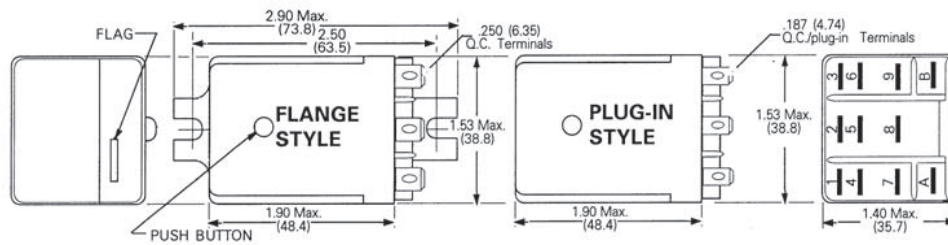


Coupling Relays and Interfaces

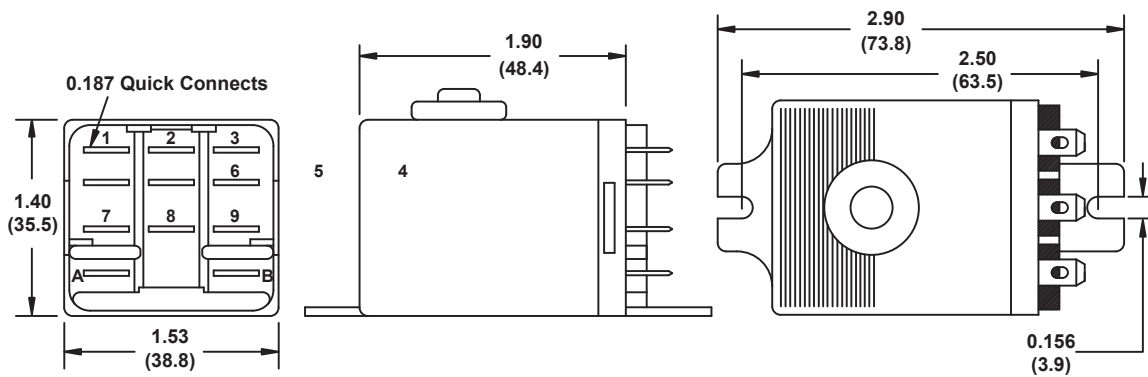
3TX71 plug-in relays

Dimension drawings

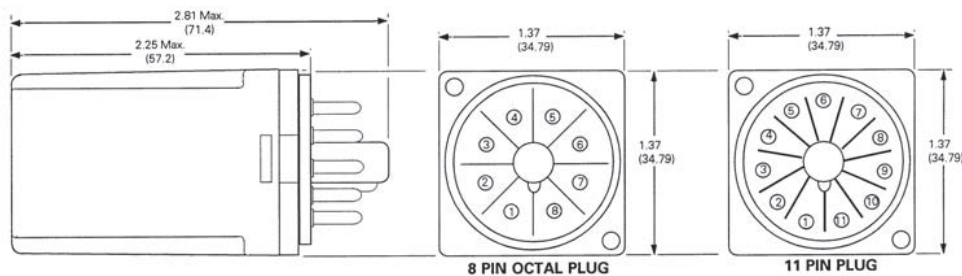
3TX7119 DPDT



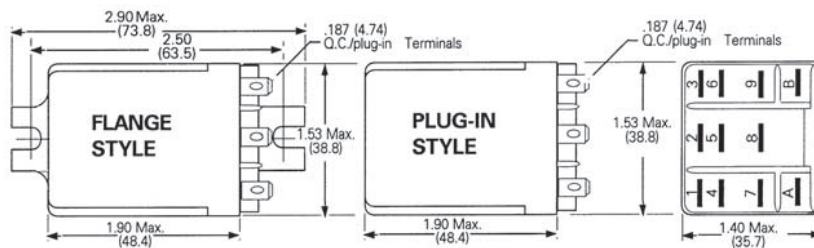
3TX7119 (3PDT)



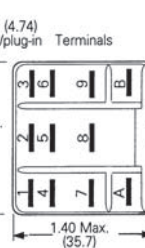
3TX7120



3TX7121/3TX7122



3TX7123

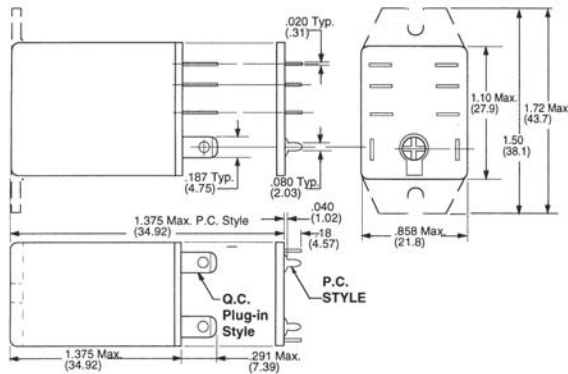


Coupling Relays and Interfaces

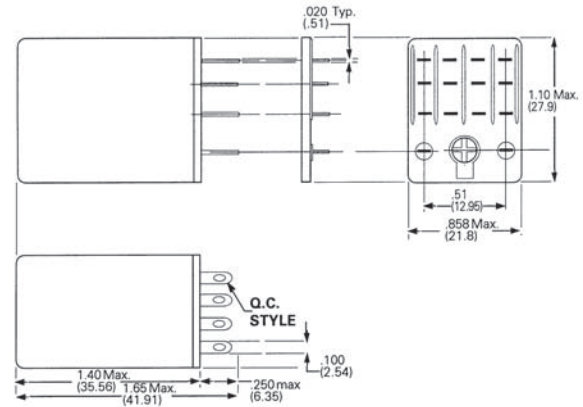
3TX71 plug-in relays

Dimension drawings

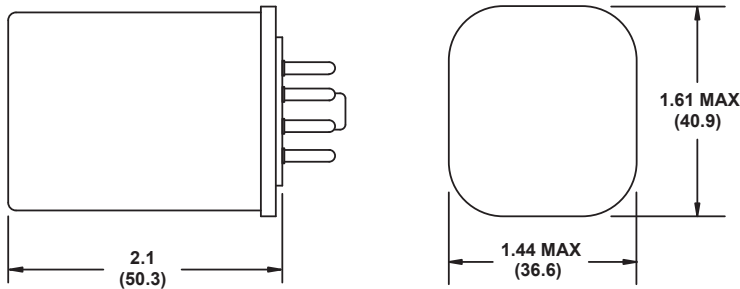
3TX7123



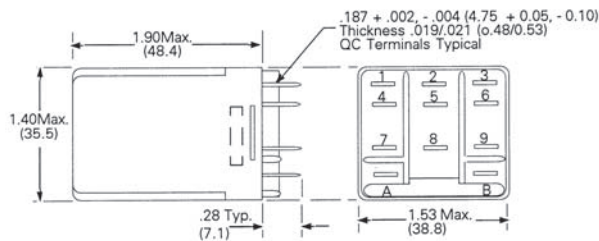
3TX7126



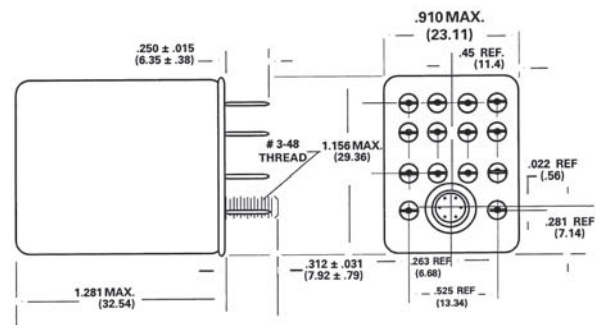
3TX7127 (DPDT)



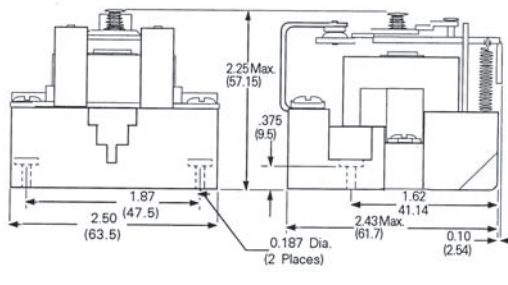
3TX7127 3PDT



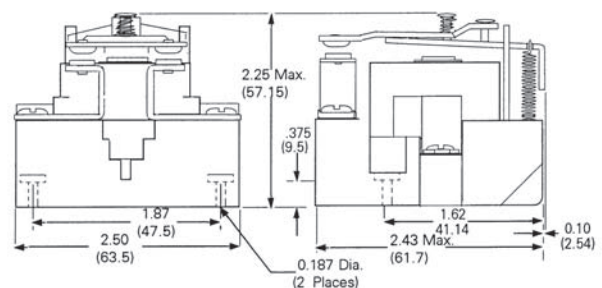
3TX7127 4PDT



3TX7130 SPST NC



3TX7130 SPST NO

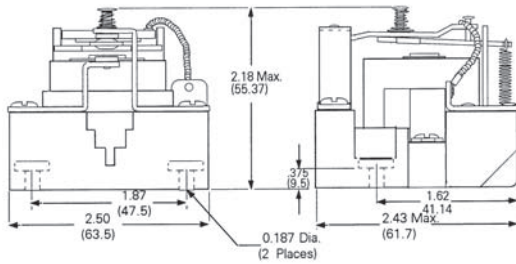


Coupling Relays and Interfaces

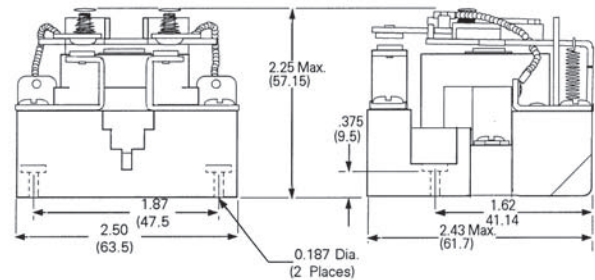
3TX71 plug-in relays

Dimension drawings

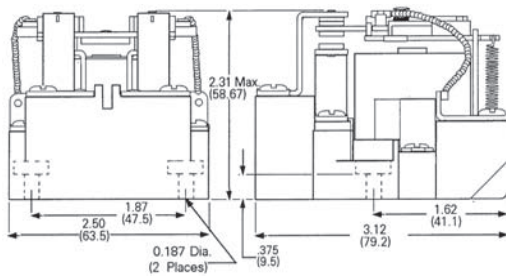
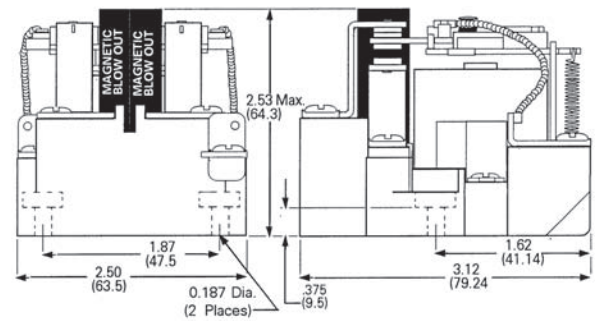
3TX7130 SPDT



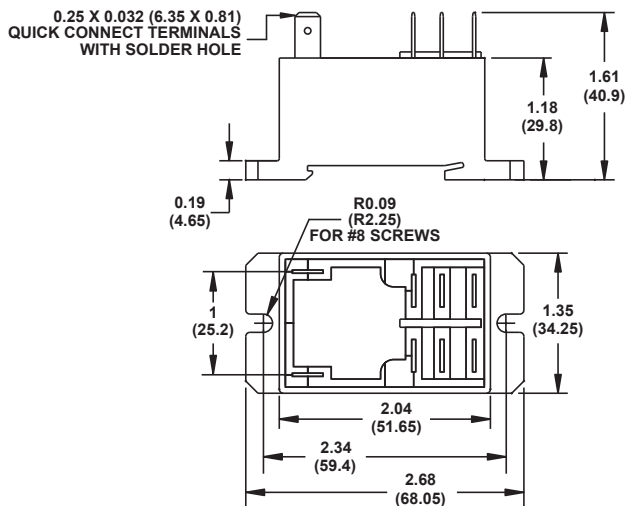
3TX7130 DPST NO



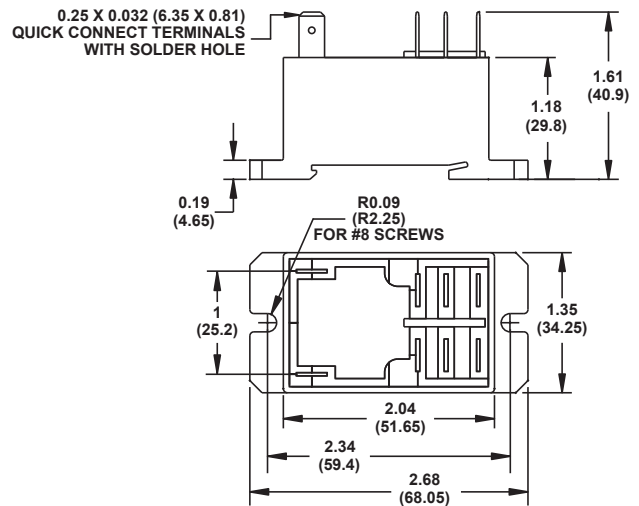
3TX7130 DPDT

3TX7130 DPDT with magnetic
blowout

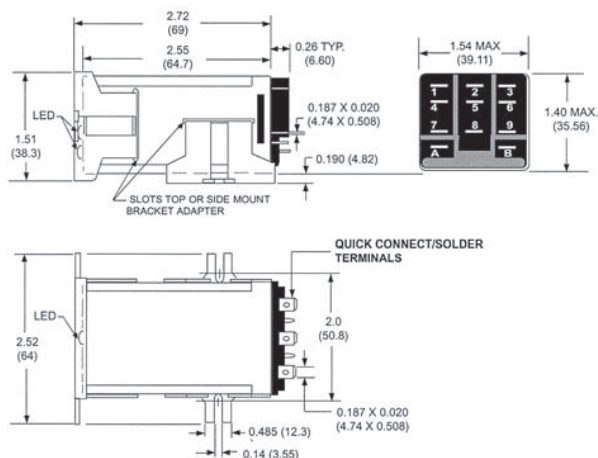
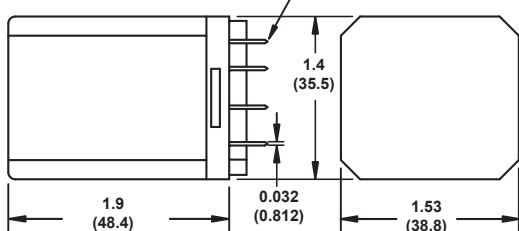
3TX7131 (DPST-NO)



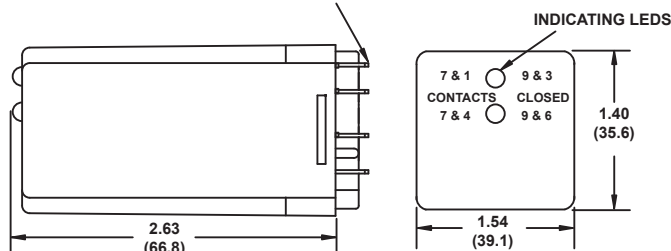
3TX7131 (DPDT)



3TX7136

0.1875 QUICK
CONNECTS

0.187 QUICK CONNECTS

[illegible]

Dimension drawings

Technical drawing of a terminal block showing top and side views with dimensions and callouts.

Top View Dimensions:

- Overall width: 2-3/16 MAX (69.88)
- Overall height: 2-1/16 (51.81)
- Distance from left edge to first terminal center: 100 (2.54) Typ (2)
- Distance between terminal centers: 150 (3.81) Typ (2)
- Distance from last terminal center to right edge: 100 (2.54) Typ (2)
- Terminal width: .060 (1.53) Typ (2)
- Terminal height: .040 (1.01) Typ (2)
- Distance from left edge to center of slot: 125 (3.18) Typ (2)
- Slot width: .040 (1.01) Typ (2)
- Slot height: .040 (1.01) Typ (2)
- Distance from slot center to right edge: 100 (2.54) Typ (2)
- Distance from left edge to center of slot: 125 (3.18) Typ (2)
- Slot width: .040 (1.01) Typ (2)
- Slot height: .040 (1.01) Typ (2)
- Distance from slot center to right edge: 100 (2.54) Typ (2)

Side View Dimensions:

- Overall height: 2-1/16 (51.81)
- Distance from top edge to terminal center: 100 (2.54) Typ (2)
- Terminal height: .060 (1.53) Typ (2)
- Terminal width: .040 (1.01) Typ (2)
- Distance from terminal center to right edge: 100 (2.54) Typ (2)
- Distance from top edge to center of slot: 125 (3.18) Typ (2)
- Slot width: .040 (1.01) Typ (2)
- Slot height: .040 (1.01) Typ (2)
- Distance from slot center to right edge: 100 (2.54) Typ (2)

Callouts:

- Rectangular Slot for relay hold down clip (SEE NOTE 8)
- RED
- RED
- RAISED MOLDED IN TERMINAL NUMBERS (14)
- COMBINATION SLOTTED PHILIPS HEAD SCREWS SEE NOTE 3

[illegible][illegible]

Technical drawings of the 1000 Series Power Supply Unit, showing top, side, and front views with dimensions in millimeters (mm).

Top View: Shows the overall dimensions of the unit. The width is 167.5mm (6.6 inches) and the height is 132.5mm (5.2 inches). The unit features a central circular fan area and several mounting holes.

Side View: Shows the unit's profile. The height is 132.5mm (5.2 inches). The input voltage range is 100-240VAC (100-240V) and the output voltage is 5.0VDC (5.0V).

Front View: Shows the unit's front panel. The width is 167.5mm (6.6 inches) and the height is 132.5mm (5.2 inches). The front panel includes a power switch, a power indicator LED, and a power jack. The unit is labeled with "1000 Series", "1000W", "100-240VAC", "5.0VDC", and "1000W".

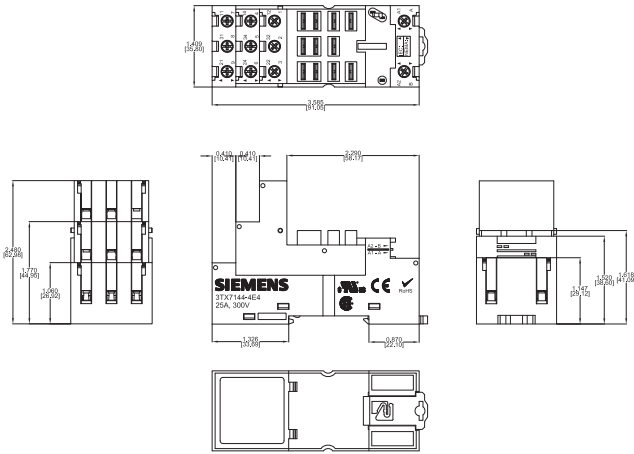
Technical drawings of the Siemens 1FA 100V 400W power supply unit. The drawings include a top view, a front view, and a side view. The top view shows a rectangular unit with a central circular feature and several mounting holes. The front view shows the unit's profile with a label indicating "SIEMENS 1FA 100V 400W" and "UL 100V 400W". The side view shows the unit's depth and mounting flange. Dimensions are provided in inches and millimeters.

Coupling Relays and Interfaces

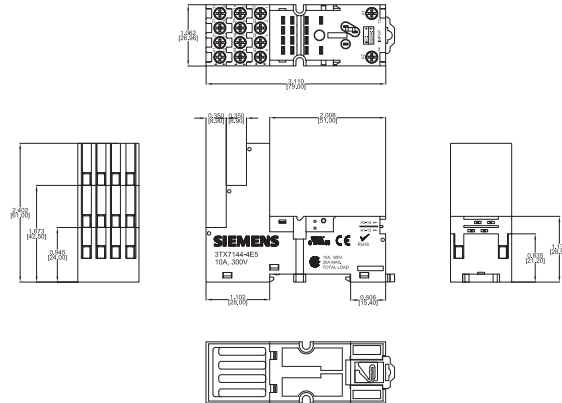
3TX71 plug-in relays

Dimension drawings

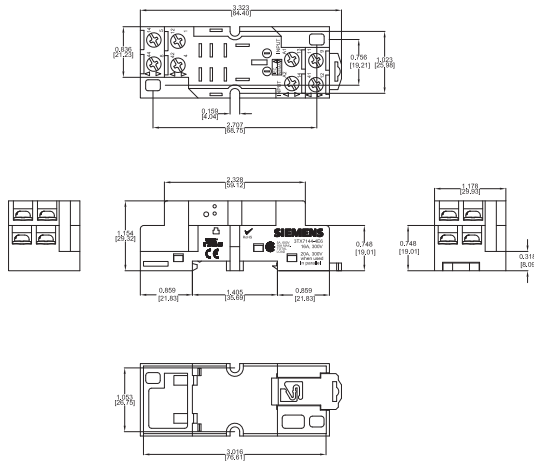
3TX7144-4E4



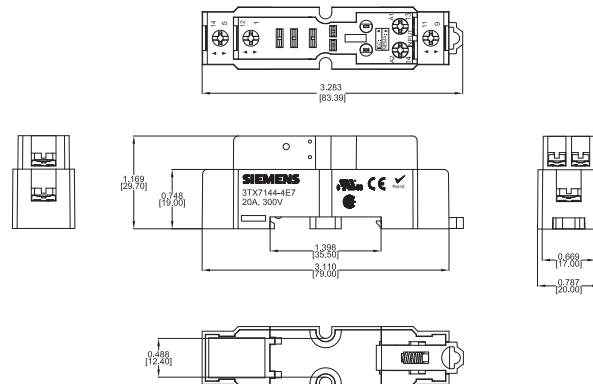
3TX7144-4E5



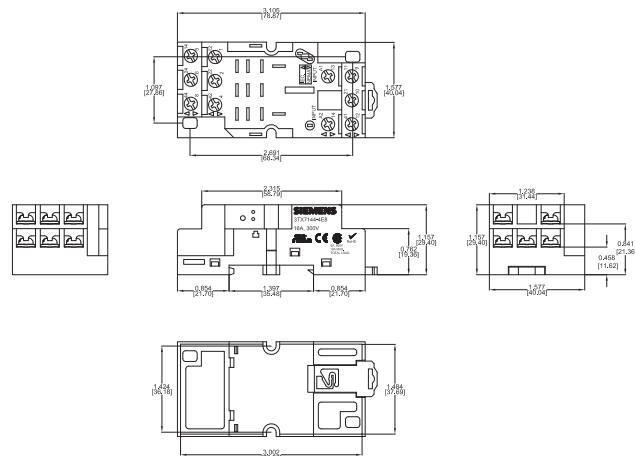
3TX7144-4E6



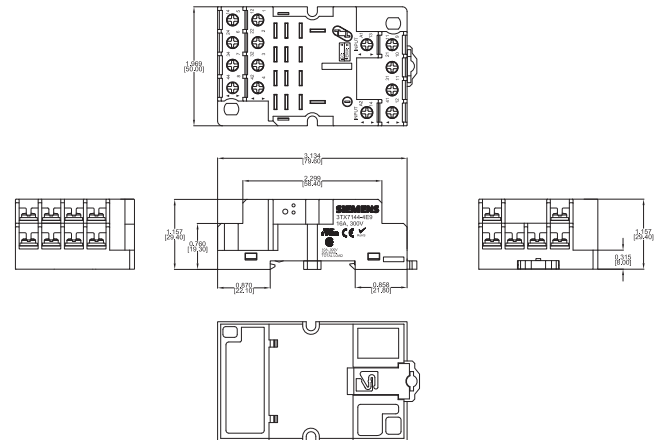
3TX7144-4E7



3TX7144-4E8

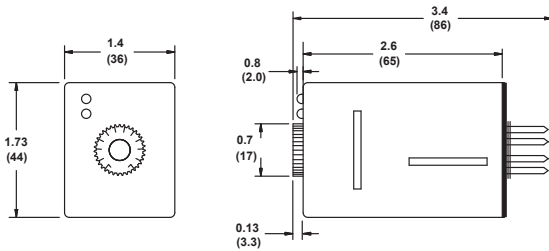


3TX7144-4E9

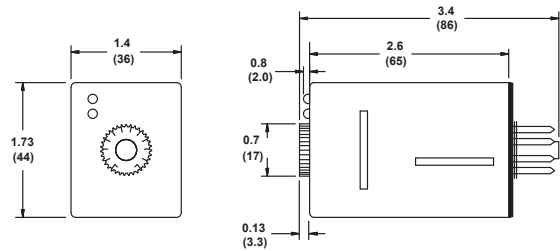


Dimension drawings

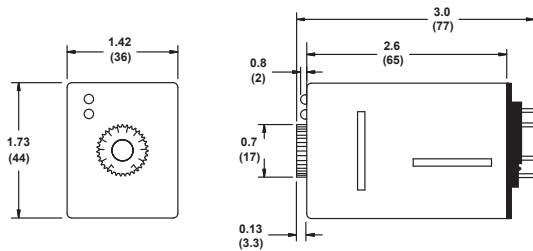
OFD-DFOB (DPDT)



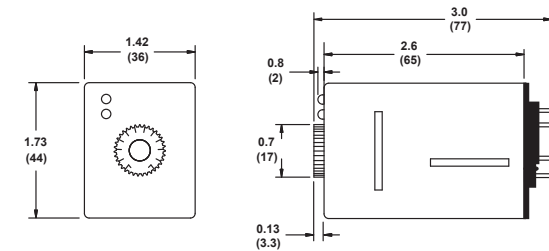
OND-DFOB (DPDT)



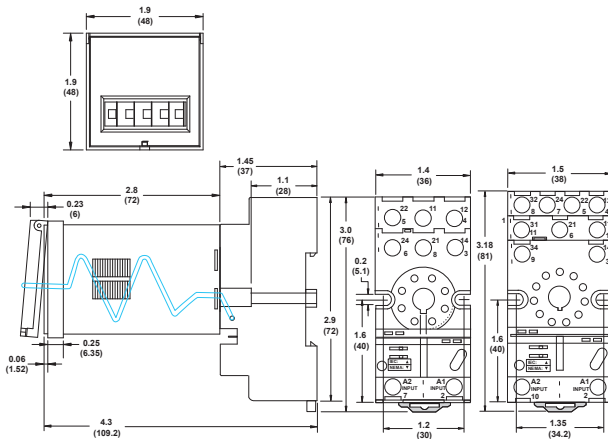
OFD-DFSB (DPDT)



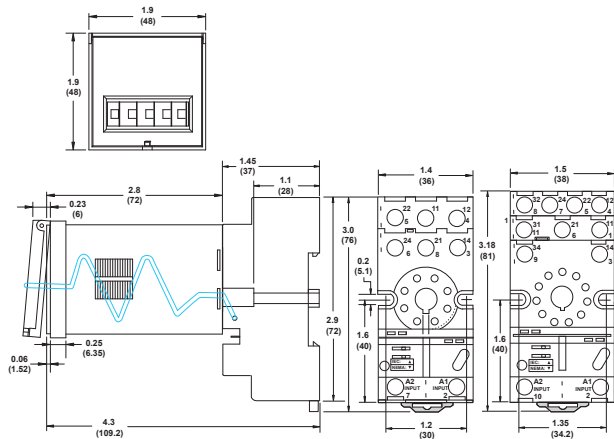
OND-DFSB (DPDT)



OFD-DFPR-00 (DPDT)



OND-DFPR-01 (SPDT)



OND-DFPR-02 (DPDT)

