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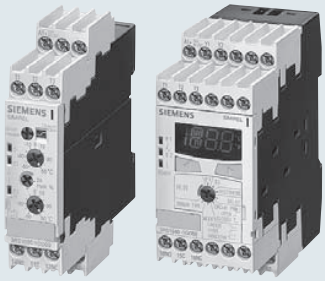
3RS10/3RS11 temperature monitoring relays



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Coupling relays and interfaces

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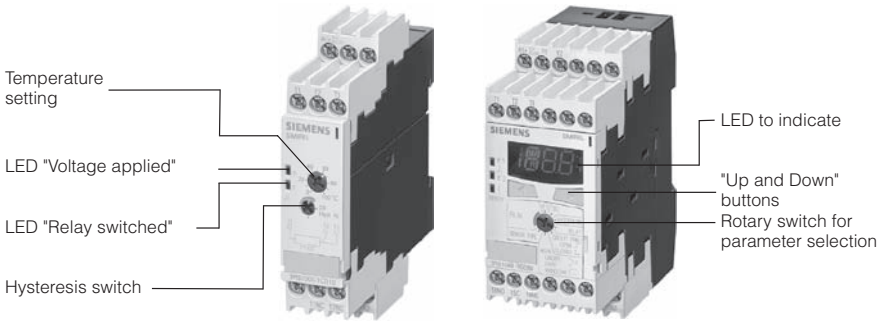
Overview

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 $\vartheta 2$ (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 signalling 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 overshot or undershot 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

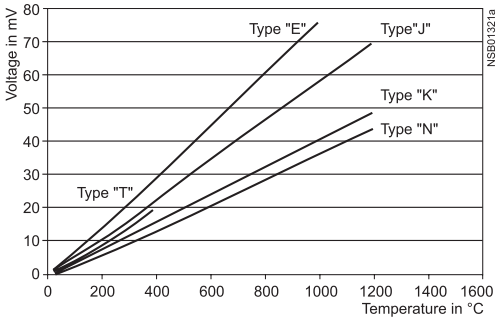
The 3RS1/3RS2 SIMIREL temperature monitoring relays can be used in almost any application in which limit temperatures must not be overshot or undershot, e.g.:

Monitoring of set limit temperatures and output of alarm messages for:

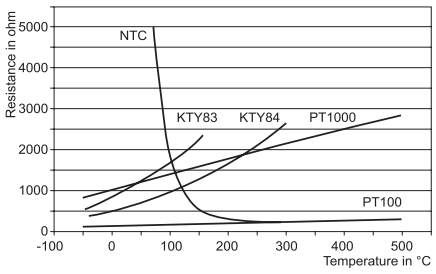
- Motor and plant protection
- Switchgear cabinet temperature monitoring
- Frost monitoring
- Temperature limits for process variables, e.g. in the packaging industry or galvanising equipment
- Control of plants and machines such as heating, air-conditioning and ventilation systems, solar collectors, 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



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**	
		0...+200 °C	24 V AC/DC	**3RS10 00-□CD20**	
			110/230 V AC	**3RS10 00-□CK20**	
	Underrange	–50...+50 °C	24 V AC/DC	**3RS10 10-1CD00**	
			110/230 V AC	**3RS10 10-1CK00**	
		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 J (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**	
Typ K (thermocouple)	Overrange	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**	
		+500...+1000 °C	24 V AC/DC	**3RS11 01-1CD40**	
			110/230 V AC	**3RS11 01-1CK40**	
Analog setting for alarm and trip (2 threshold values), 22.5 mm wide; open-circuit – closed-circuit current principle can be toggled between; no holding on supply failure function; 1 NO + 1 CO					
PT100 (resistance sensor)	Overrange	–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**	
	Underrange	–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-□DD20**	
			24–240 V AC/DC	**3RS10 30-1DW20**	
Typ J (thermocouple)	Overrange	0...+200 °C	24 V AC/DC	**3RS11 20-□DD20**	
			24–240 V AC/DC	**3RS11 20-1DW20**	
		0...+600 °C	24 V AC/DC	**3RS11 20-1DD30**	
			24–240 V AC/DC	**3RS11 20-1DW30**	
Typ K (thermocouple)	Overrange	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

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	**3RS10 40-□GD50**	
		24–240 V AC/DC	**3RS10 40-□GW50**	
	–50...+932 °F	24 V AC/DC	**3RS20 40-□GD50**	
		24–240 V AC/DC	**3RS20 40-□GW50**	
TYPE J, K, T, E, N (thermocouple)	–99...+999 °C	24 V AC/DC	**3RS11 40-□GD60**	
		24–240 V AC/DC	**3RS11 40-□GW60**	
	–99...+1830 °F	24 V AC/DC	**3RS21 40-□GD60**	
		24–240 V AC/DC	**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	**3RS10 42-□GD70**	
		24–240 V AC/DC	**3RS10 42-□GW70**	
TYPE J, K, T, E, N, R, S, B (thermocouple)	–99...+1800 °C	24 V AC/DC	**3RS11 42-□GD80**	
		24–240 V AC/DC	**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; 25 °C: 32.762 K)

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 kΩ; 25 °C: 32.762 kΩ)

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).

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 NO	SPDT +
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 for temperature 2			2 to 20 % of upper limit of scale 5 % of upper limit of scale						1 to 99 Kelvin, for both values	
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.

Configuration

Specifications

The temperature monitoring relays correspond to:

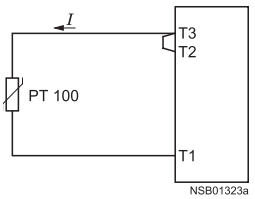
- IEC 60 721-3-3 "Environmental conditions"
- IEC 947-5-1; DIN VDE 0660 "Low-voltage switchgear and controlgear"
- EN 50 081-2 "Basic technical standard for emitted interference (industry)"
- EN 61 000-6-2 "Basic technical stand ard for interference immunity (industry)"
- DIN EN 50 042 "Terminal marking"
- 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 an 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 PT100 sensors and 20°C ambient temperature, in K

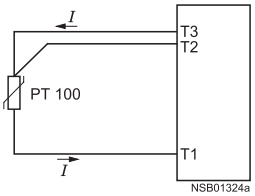
Cable length in m	Cross-section mm² 0.5	0.75	1	1.5
0	0.0	0.0	0.0	0.0
10	1.8	1.2	0.9	0.6
25	4.5	3.0	2.3	1.5
50	9.0	6.0	4.5	3.0
75	13.6	9.0	6.8	4.5
100	18.1	12.1	9.0	6.0
200	36.3	24.2	18.1	12.1
500	91.6	60.8	45.5	30.2

3-wire measurement

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

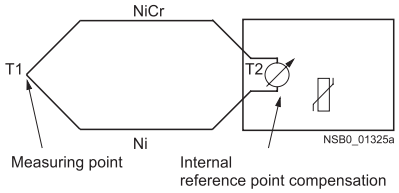
Using the additional wire, it is possible for two measuring circuits to be formed of which one is used as a reference.

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.

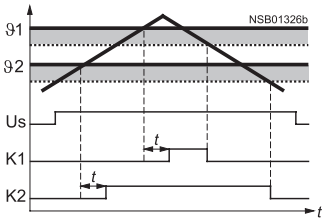
In this manner, temperature acquisition (T1) is possible without knowing the precise ambient temperature at the terminals of the evaluation unit (T2).

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.

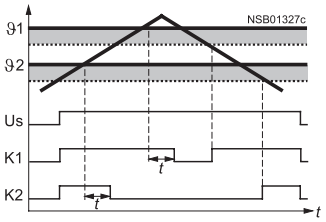
Functions

Temperature overshoot

Open-circuit principle

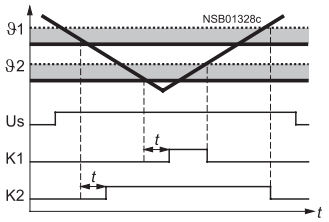


Closed-circuit principle

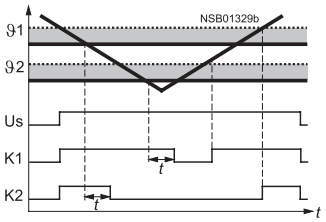


Temperature undershoot

Open-circuit principle



Closed-circuit principle



Digital evaluation units:

After the temperature has reached the set threshold value ϑ1, output relay K1 changes its switching state appropriately as soon as the set time t has elapsed (K2 responds to ϑ2 similarly).

Analog evaluation units:

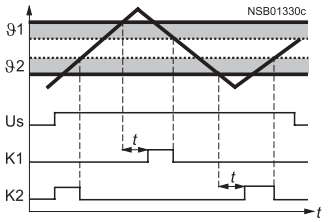
When the set threshold value is reached, output relay K1 changes its switching status. For devices with 2 threshold values, relay K2 responds to the second set threshold value.

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

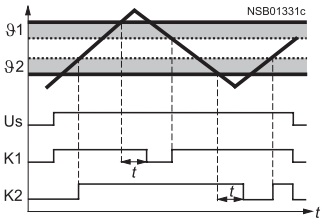
A time delay cannot be set (t = 0).

Window monitoring

Open-circuit principle



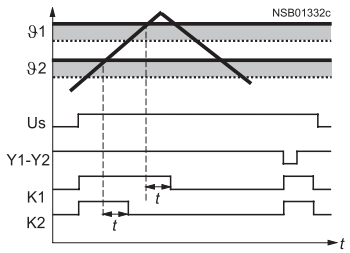
Closed-circuit principle



When the temperature has reached the upper threshold ϑ1 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 ϑ2.

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 ϑ1 and the set delay time t has elapsed, the output relay K1 changes its switching state (similarly, K2 responds to ϑ2.)

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.

Absolute limit

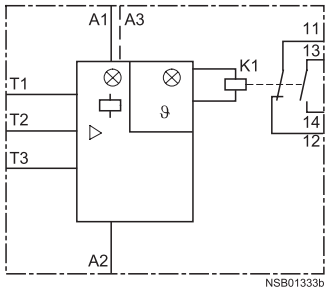
Hysteresis range

NSS00529 Hysteresis limit

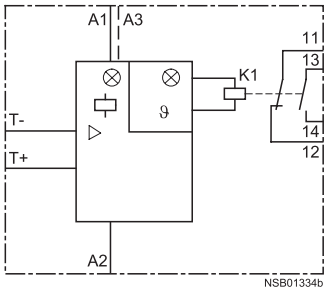
Circuit diagrams

Connection examples

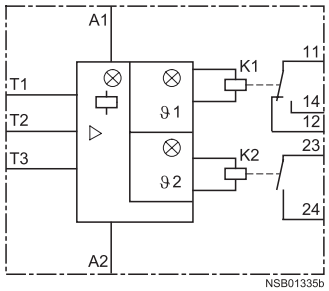
3RS10 00
3RS10 10



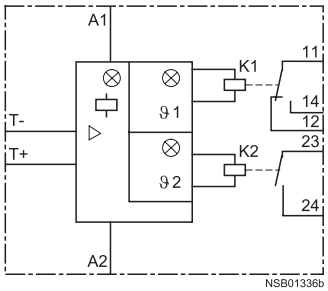
3RS11 00
3RS11 01



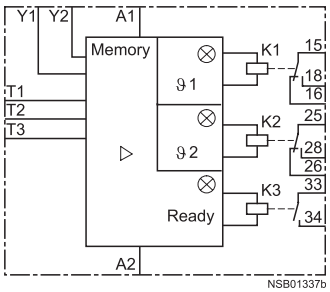
3RS10 20
3RS10 30



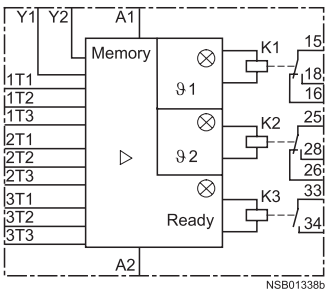
3RS11 20/3RS11 30
3RS11 21/3RS11 31



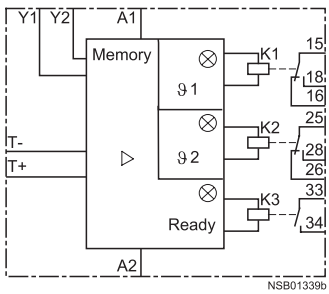
3RS10 40
3RS20 40



3RS10 41
3RS20 41



3RS11 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"
ϑ1 = LED: "Relay 1 switched"
ϑ2 = 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

ϑ1 = LED: "Relay 1 switched"
ϑ2 = 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

ϑ1 = LED: "Relay 1 switched"
ϑ2 = LED: "Relay 2 switched"
Ready = LED: "Device operating"

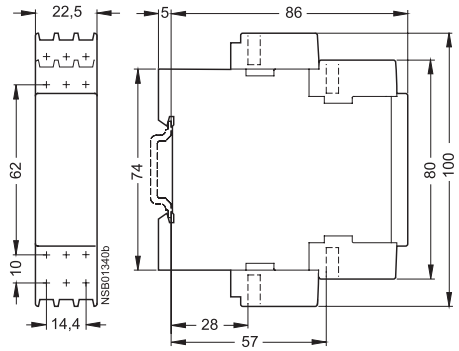
1T1 to 1T3 = Terminals for connection of resistance sensor 1
2T1 to 2T3 = Terminals for connection of resistance sensor 2
3T1 to 3T3 = Terminals for connection of resistance sensor 3
Y1/Y2 Terminals for memory jumper

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

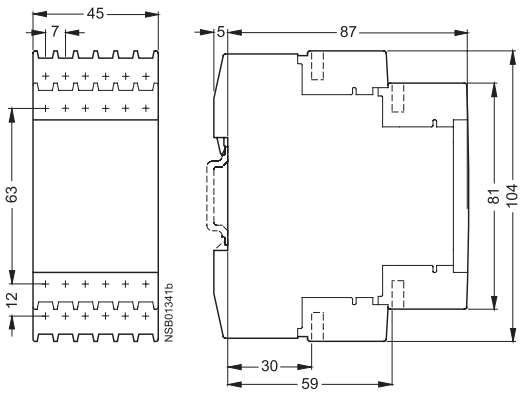
Dimension drawings

Temperature monitoring relay

3RS10/3RS11 . . with 22.5 mm enclosure



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



Overview

3RN10 00 compact tripping unit

The compact unit is equipped with a red LED (TRIPPED) to indicate tripping and a SPDT contact.

After the device has tripped, it is reset automatically after the thermistors have cooled down. The common contact of the SPDT contact is connected to the control voltage

This device is particularly suitable in circuits in which the control circuit and signalling circuit are at the same potential, e. g. in local control boxes.

3RN10 10, 10 11, 10 12 standard tripping unit

The standard units are equipped with two LEDs (READY and TRIPPED) and with 1NO and 1NC for switch-off and signalling. They are available with automatic RESET (3RN10 10), manual RESET (3RN10 11) or manual/automatic and remote RESET (3RN10 12). The 3RN10 12 unit holds on supply failure. If the control voltage fails, a previous trip will be memorised.

A remote RESET function is implemented by connecting an external pushbutton with an NO contact to terminals Y1 and Y2. If terminals Y1 and Y2 are bridged, tripping is followed by an automatic RESET.

3RN10 13 multifunction tripping unit

In the 3RN10 13 thermistor motor protection tripping units, the sensor circuit is also monitored for a short circuit. Tripping due to a short circuit is indicated by a flickering red LED. The monostable design also indicates a wire-break in the sensor circuit by flashing of the red LED. The 3RN10 13 tripping unit is equipped with manual, remote and automatic RESET functions. The TEST/RESET button can be used to manually reset the tripping unit.

A remote RESET function is implemented by connecting an external pushbutton with an NO contact to terminals Y1 and Y2. If terminals Y1 and Y2 are bridged, tripping is followed by an automatic RESET.

Response of the tripping unit to failure of the control voltage

Response at	Monostable 3RN10 00 3RN10 10 3RN10 11	Holding on supply failure Monostable 3RN10 12 3RN10 13-. . . . 0 3RN10 22 3RN10 62	Holding on supply failure Bistable 3RN10 13-. . .01
Failure of the control voltage	Device trips	Device trips	No change in switching status of the auxiliary contacts
Control voltage returns without previous tripping	Device resets	Device resets	
Control voltage returns after tripping	Device resets	Device remains tripped	

3RN10 22 tripping unit "Warning and switch-off"

Two sensor circuits can be connected to one 3RN10 22 tripping unit and act on one output relay with 1 NO for warning and 1 SPDT for switch-off. The functions "Warning" and "Switch-off" are implemented by means of temperature sensors with different rated response temperatures TNF. Activation of the sensor circuit for "Warning" is indicated by a yellow LED and for "Switch-off" by a red LED.

The sensor circuits have different reset responses:

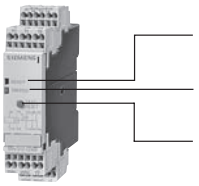
- "Warning" (terminals 2T1, T2) automatic RESET only
- "Switch-off" (terminals 1T1, T2); changeover from manual RESET to automatic RESET by bridging terminals Y1 and Y2. A remote RESET function is implemented by connecting an external pushbutton with an NO contact.

3RN10 62 tripping unit "Multiple motor protection"

Up to six sensor circuits can be connected to one 3RN10 62 tripping unit which all act on one output relay. Simultaneous protection of several motors (up to 6) is an advantage in the case of group drives (e.g. if a motor is overloaded, all motors in the group can be switched off). Apart from the red LED "TRIPPED" that indicates the switching status of the tripping unit, a LED is assigned to each sensor circuit that is lit when the associated sensor circuit trips. Sensor circuits that are not required must be short circuited.

The reset response of the 3RN10 62 tripping units can be changed from manual RESET to automatic RESET by bridging terminals Y1 and Y2.
A remote RESET function is implemented by connecting an external pushbutton with an NO contact.

3RN10 12-2C...



Application

The 3RN1 thermistor motor protection tripping units are thermal protective devices that can be used in conjunction with PTC thermistors Type A for the temperature monitoring of electrical drives, transformer windings, oils, bearings, air, etc.

Principle of operation

The 3RN1 tripping units operate according to the closed-circuit principle and therefore monitor themselves for a wire-break. A temporary voltage drop of less than 200 ms (for devices with a wide input voltage range < 100 ms) will not cause a change in status of the auxiliary contacts. The 3RN10 13 multifunction tripping unit also features short-circuit detection in the sensor circuit. The unit will trip if a short circuit arises in the sensor circuit (resistance in sensor circuit <20 Ω). The tripping units feature electrical isolation between the control circuit and sensor circuit in the case of AC and UC control supply voltages (for DC control supply voltage: no electrical isolation). For units with a TEST button, the function of the device can be checked by pressing the button for longer than 2 s.

Safe electrical isolation

All electrical circuits (outputs, control circuit, sensor and Reset circuit) of the 3RN1013-1BW10 multifunction tripping unit (wide input voltage range, monostable output relay and screw terminals) are safely isolated from each other up to a rated voltage of 300 V acc. to DIN VDE 0100 Part 410/ DIN VDE 0106/DIN VDE 0160.

Notes

⚠ For DC-activated tripping units, electrical isolation must be provided using a battery system or a safety isolating transformer to DIN VDE 0551.

⚠ When tripping units with an automatic RESET function are used in EEx e zones, the control circuit must be designed to ensure that the monitored machine cannot restart autonomously.

⚠ In the case of tripping units without short-circuit detection, the sensor circuit must be measured with a suitable measuring instrument during commissioning. For resistance < 50 Ohm, the sensor circuit must be checked for a short circuit.

⚠ When the 3RN10 00 unit (no Ready LED) and the 3RN10 13-1BW01 unit (no change in switching status for the auxiliary contacts on control voltage failure) are used to protect EEx e motors, separate monitoring of the control voltage is recommended.

Thermistor motor protection relays for PTC thermistors (type A PTCs)
All of the devices with the exception of 24 V AC/DC have electrical isolation

Version	Reset	Contacts	Control supply voltage	Order No..	List Price $
Compact evaluation units, 22.5 mm wide, monostable, closed-circuit current principle, 1 LED					
Terminal A1 is connected to the common of the changeover contact	Auto	1 CO	24 V AC/DC	**3RN1000-□AB00**	
			110 V AC	**3RN1000-□AG00**	
			230 V AC	**3RN1000-□AM00**	
Standard evaluation units, 22.5 mm wide, monostable, closed-circuit current principle, 2 LEDs					
	Auto	1 NO + 1 NC	24 V AC/DC	**3RN1010-□CB00**	
			110 V AC	**3RN1010-□CG00**	
			230 V AC	**3RN1010-□CM00**	
			24–240 V AC/DC	**3RN1010-□CW00**	
		2 CO	24 V AC/DC	**3RN1010-□BB00**	
			110 V AC	**3RN1010-□BG00**	
			230 V AC 230 V	**3RN1010-□BM00**	
		2 CO hard-gold-plated	24 V AC/DC	**3RN1010-□GB00**	
	Manual/ remote[3]	1 NO + 1 NC	24 V AC/DC	**3RN1011-□CB00**	
			110/230 V AC	**3RN1011-□CK00**	
Short-circuits are detected in the sensor circuit	Manual/ remote[3]	2 CO	24 V AC/DC	**3RN1011-□BB00**	
			110 V AC	**3RN1011-□BG00**	
			230 V AC	**3RN1011-□BM00**	
		2 CO hard-gold-plated	24 V AC/DC	**3RN1011-□GB00**	
Holding on supply failure[2]	Manual/auto/ remote	1 N + 1 NC	24 V AC/DC	**3RN1012-□CB00**	
			110/230 V AC	**3RN1012-□CK00**	
Holding on supply failure[2], short-circuits are detected in the sensor circuit	Manual/auto/ remote	2 CO	24 V AC/DC	**3RN1012-□BB00**	
			110 V AC	**3RN1012-□BG00**	
			230 V AC	**3RN1012-□BM00**	
		2 CO hard-gold-plated	24 V AC/DC	**3RN1012-□GB00**	
Holding on supply failure[2], short-circuits and wire breakage in the sensor circuit are detected and displayed, wide-range voltage with screw terminals with protective separation[1]	Manual/auto/ remote	2 CO	24 V AC/DC	**3RN1013-□BB00**	
			24–240 V AC/DC	**3RN1013-1BW10** **3RN1013-2BW00**	
		2 CO hard-gold-plated	24–240 V AC/DC	**3RN1013-1GW10** **3RN1013-2GW00**	
Evaluation units for 2 sensor circuits, alarm and trip, 22.5 mm wide, monostable, closed-circuit current principle, 3 LEDs					
Test/reset button, holding on supply failure[2]; the evaluation circuit for "alarm" uses an NO contact in the open-circuit principle	Manual/auto/ remote	1 NO + 1 NC	24–240 V AC/DC	**3RN1022-□DW00**	
Evaluation units for 6 sensor circuits, multi-motor protection, 45 mm wide, monostable, closed-circuit current principle, 8 LEDs					
Test/reset button, holding on supply failure[2]	Manual/auto/ remote	1 NO + 1 NC	24–240 V AC/DC	**3RN1062-□CW00**	
Test/reset button, holding on supply failure[2], short-circuits and wire breakage in the sensor circuit are detected and displayed, bistable version, not tripped when the control supply voltage fails	Manual/auto/ remote	2 CO	24–240 V AC/DC	**3RN1013-□BW01**	

[1] Protective separation up to 300 V according to DIN/VDE 0106
[2] Information regarding the holding on supply failure, refer to Catalog LV 1, chapter 7
[3] Reset using the reset button or by interrupting the control supply voltage

Screw Terminal 1
Spring-type Terminal 2

Accessories

Design	for type	Order No.	Weight approx. kg	Packing Packs
Push-in lugs for panel mounting				
 2 units are necessary per thermistor motor protection. 1 pack contains 10 units for 5 devices.	3RN1	**3RP 1903**	0.02	1

Technical data

General data

		Compact devices	Standard devices			Multifunct. dev.	Warning + switch-off	Multiple mot. protect.
Type		**3RN10 00**	**3RN10 10**	**3RN10 11**	**3RN10 12**	**3RN10 13**	**3RN10 22**	**3RN10 62**
Width	mm	22.5						45
No. of connectable sensor circuits		1					2	6
Response to failure of the control voltage		[1]						
Manual RESET		No		Yes				
Automatic RESET		Yes		No	Yes			
Remote RESET		No		Yes[2]	Yes			
TEST button		No		Yes				
Short-circuit detection in sensor circuit		No				Yes	No	
Indication of short-circuit and wire-break		No				Yes[3]	No	
Warning and switch-off in one unit		No					Yes	No
Weight	kg	0.120	0.133	0.145	0.145	0.145	0.145	0.260

Tripping unit

Rated insulation voltage U_i (pollution degree 3)	V	300
Permissible ambient temperature **Permissible storage temperature**	°C	– 25 to + 60 – 40 to + 80
EMC tests		EN 50 081-2; IEC 61000-6-3
Class acc. to DIN 19 251, DIN V0801		AK 3
Degree of protection acc. to DIN 40 050		IP 20
Conductor cross-section		
Terminal screws		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)
• AWG conductor connections, solid or stranded	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)
• AWG wires, solid or stranded	AWG	2 x (24 to 16)
• Corresponding opening tool		8WA2 803

Sensor circuit

Circuit burden at $R_F \leq 1.5$ kΩ	mW	≤ 5
Voltage in sensor circuit at $R_F \leq 1.5$ kΩ	V	≤ 2
Tripping temperature (specified by sensor)	°C	60 to 180
Coupling time (due to mounting of sensor)	s	approx. 5 s
Total cold resistance R_F (per sensor loop)	kΩ	≤ 1.5
Triggering value	kΩ	3.4 to 3.8
Return value	kΩ	1.5 to 1.65
Triggering tolerance	°C	± 6

1) See page 11/12.
2) Remote RESET due to interruption of the control voltage.
3) Indication of wire-break only for monostable designs (3RN10 13-. . . . 0).

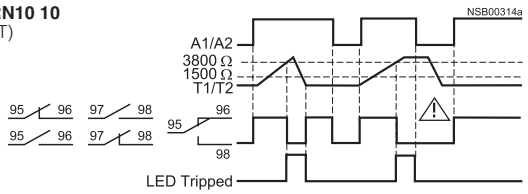
Technical data

		Compact devices	Standard devices			Multi-function devices	Warning + switch-off	Multiple motor protection
Type		**3RN10 00**	**3RN10 10**	**3RN10 11**	**3RN10 12**	**3RN10 13**	**3RN10 22**	**3RN10 62**
Control circuit								
Rated control supply voltage U_s		1)						
Operating range								
• AC		0.85 to 1.1 x U_s						
• AC/DC		0.85 to 1.1 x U_s						
• DC		0.85 to 1.2 x U_s						
Rated power								
• AC	W	< 2						
• AC/DC	W	< 2						
• DC	W	< 2						
Auxiliary circuit								
Conventional free-air thermal current I_{th}	A	5						
Rated operational current I_e								
• AC-15 240 V	A	3						
• DC-13 24 V	A	1	2			1 2)	1	2
Short-circuit protection acc. to Alpha/Lovag								
Utilisation category gL/gG	A	6						
cULus and cULus ratings, control current circuit								
Rated control voltage 50/60 Hz								
• AC	V	300						
• DC	V	300						
Switching capacity		R 300/B 300						
Safe isolation up to 300 V		–				3RN10 13–1BW10	–	

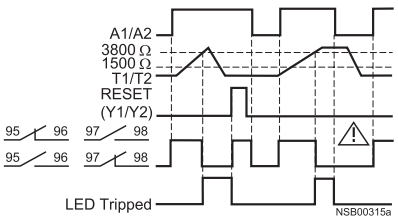
Functions

Function diagrams

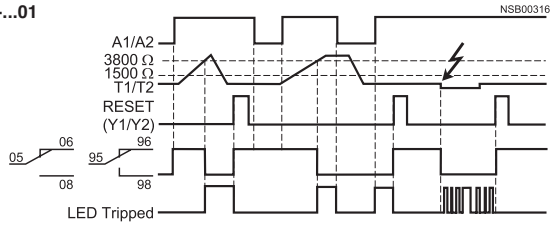
3RN10 00/3RN10 10
(AUTO RESET)



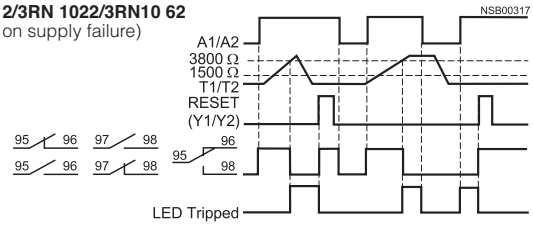
3RN10 11



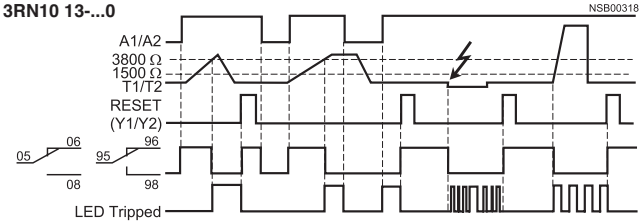
3RN10 13-...01
(bistable)



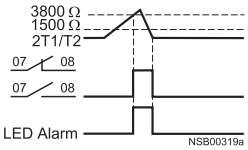
3RN10 12/3RN 1022/3RN10 62
(holding on supply failure)



3RN10 13-...0



3RN10 22 only



1) See selection and ordering data, page 11/13
2) For 3RN10 13- . BW01 (bistable output relay) 2 A.

⚠ *See notes on page 11/12.*

Configuration

PTB test report ATEX certification

The tripping units with AC and UC operation are available in conjunction with PTC thermistors acc. to DIN VDE 0660 Parts 302 and 303 and DIN 44 081/DIN 40 082 for direct temperature monitoring of explosion-protected motors of the "Increased safety" EEx e and EEx d degree of protection and are marked with the test symbol. The regulations of DIN EN 50 019, DIN VDE 0170/0171, DIN VDE 0165, the PTB test regulations DIN V 0801 Class = AK 3 and DIN 19251 apply. For tripping units with DC operation[1]), electrical isolation must be implemented by means of a battery system or a safety isolating transformer acc. to DIN VDE 0551.

When the 3RN10 13-. . .01 unit (no change in switching status for the auxiliary contacts on control voltage failure) is used to protect EEx e and EEx d motors, separate monitoring of the control voltage is recommended.

PTB File No. for 3RN1:
PTB 01 ATEX 3218

Cable routing

The measuring circuit cables must be routed as separate control cables. It is not permitted to use cores of the motor supply cable or other main supply cables. If extreme inductive or capacitive interference is expected to be generated by heavy current cables routed in parallel, shielded control cables must be used.

Maximum cable length for sensor circuit:

Cross-section	For tripping units	
	3RN10 00 3RN10 10 3RN10 11 3RN10 12 3RN10 22 3RN10 62	3RN10 13
mm^2	m	m^2)
2.5	2 x 2800	2 x 250
1.5	2 x 1500	2 x 150
0.5	2 x 500	2 x 50

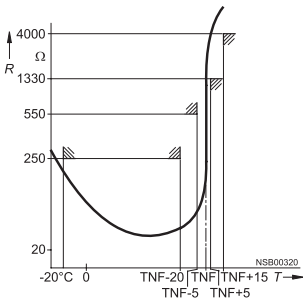
PTC temperature sensor

With the tripping units, temperature sensors with characteristics according to DIN VDE 0660 Part 303, DIN 44 081 and DIN 44 082 (e. g. EPCOS AG single and triple sensors, Type No. B 591 .. or B 593 ..) can be used.

The number of temperature sensors that can be connected in series is dependent on the total cold resistance. The total cold resistance must not exceed 1.5 kΩ.

Resistance/temperature characteristic of a PTC thermistor

with a characteristic (Type A) according to DIN VDE 0660 Part 303



Installation

The 3RN1 tripping units are suitable for snapping on to 35 mm standard mounting rails acc. to DIN EN 50 022 or for screw mounting using adapters.

Any mounting position is possible.

Specifications

The tripping units are suitable for use in any climate and safe from touch to DIN VDE 0106 Part 100.

The 3RN1 tripping units meet the requirements of the basic technical standard EN 50 081-2; IEC 61000-6-2 "Electromagnetic compatibility of I&C equipment in industrial process engineering" and DIN VDE 0660 Parts 302 and 303, IEC 60 034-11-2 Section 1 and 2 "Built-in thermal protection of rotating electrical machines, thermal detectors and tripping units" and "PTC thermistors and tripping units".

The terminal designations of the auxiliary contacts complies with EN 50 005.

Protecting the windings of three-phase transformers

To protect the windings of three-phase dry transformers with PTC thermistors in cases where the operating voltage of the thermistor motor protection tripping unit must be tapped from the mains voltage, a 3RN10 22 thermistor protection unit for warning and tripping and, for example, a 3RP25 time relay can be used. The auxiliary contactor K4 operates on the shunt release of the high-voltage circuit-breaker.

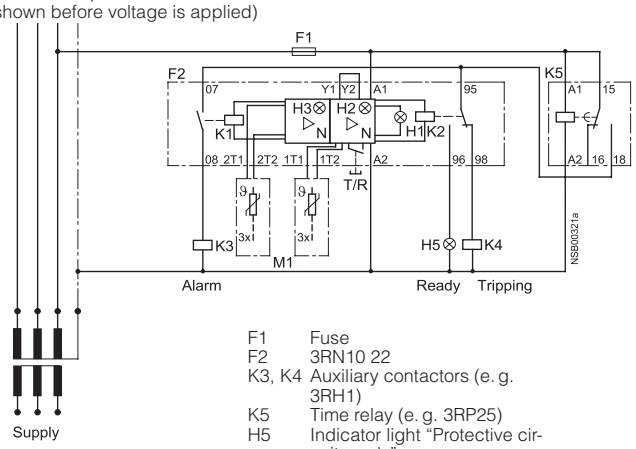
Working principle for transformer protection

When voltage is applied to the line-side of the transformer, the voltage on the secondary side rises to the final value within 1.5 s. The 3RN1 tripping unit does not trip until 0.8 x U_S, so as long as the operating voltage is applied to the closed contacts 95-98 on contactor K4, it would cause breaking of the circuit-breaker via its shunt release.

In order to prevent this, the voltage is only applied to terminals 07 and 95 once the 3RN1 tripping units have definately picked up and the auxiliary switches have switched to the "Ready" position. The K3 and K4 contactors are not controlled until the respective rated response temperature TNF of the sensor is exceeded.

The tripping unit should be switched to "Automatic RESET" (jumper must be placed between terminals Y1 and Y2). This ensures that the 3RN1 tripping unit is reset when the transformer is reconnected following tripping.
The time-delay relay is set to a delay time of ≥ 1.5 s.

Transformer protection with 3RN10 22
(shown before voltage is applied)



F1 Fuse
F2 3RN10 22
K3, K4 Auxiliary contactors (e. g. 3RH1)
K5 Time relay (e. g. 3RP25)
H5 Indicator light "Protective circuit ready"

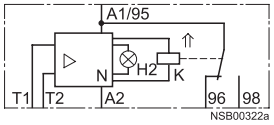
1) Electrical isolation exists with devices with a wide input voltage range of 24 to 240 V UC even in the case of DC operation.
2) Devices with short-circuit detection in the sensor circuit. Up to this maximum cable length, a short-circuit in the sensor circuit will be detected. When short-circuit detection is not required, the cable lengths shown on the left can be used.

Circuit diagrams

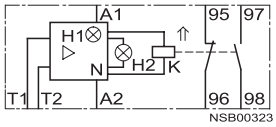
Connection diagrams

Position of the output relay "Ready, not tripped"

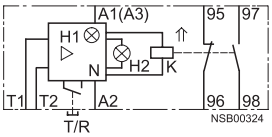
3RN10 00



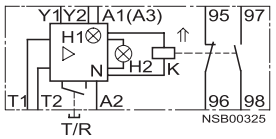
3RN10 10



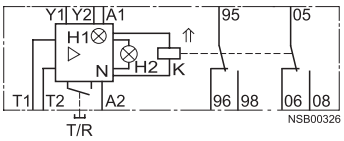
3RN10 11[1]



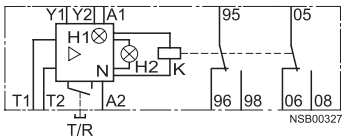
3RN10 12[1]



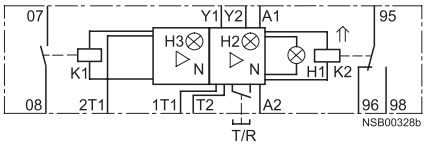
3RN10 13-. . . . 0



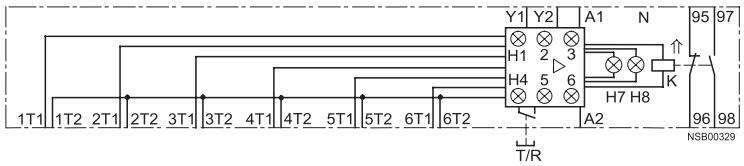
3RN10 13-. . . . 1 (bistable)



3RN10 22



3RN10 62



General equipment designations

A1, A2	Control voltage terminals
N	Amplifier
T/R	TEST/RESET button
Y1, Y2	Terminals for remote RESET (jumpered = Auto RESET)
⇑	The double-headed arrow indicates an operating state of the contact element that deviates from the standard presentation according to DIN 40 900, Part 7 (In this case: Position of the contact elements when the control voltage is applied to terminals A1 and A2)

Equipment designations for 3RN10

H1	LED "READY"
H2	LED "TRIPPED"
K	Output relay
T1, T2	Terminals of the sensor loop

Equipment designations for 3RN10 22

H1	LED "READY"
H2	LED "TRIPPED"
H3	LED "ALARM"
K1, K2	Output relay
1T1 and T2	Terminals of the sensor
2T1 and T2	loop

⚠ *Sensor circuits that are not connected must be short circuited.*

Equipment designations for 3RN10 62

H1 to H6	LEDs for tripped sensor loops
H7	LED "READY"
H8	LED "TRIPPED"
K	Output relay
1T1, 1T2	Terminals for
to	1st sensor loop
6T1, 6T2	Terminals for 6th sensor loop

⚠ *Sensor circuits that are not connected must be short circuited.*

1) For dual voltage devices AC 230 V/110 V (3RN10 11-. CK00 and 3RN10 12-. CK00):
A1 and A2: AC 230 V,
A3 and A2: AC 110 V.

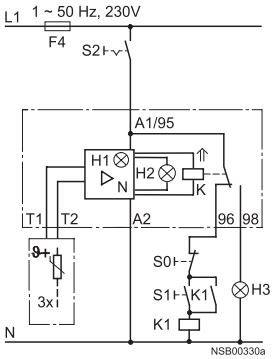
Circuit diagrams

Connection examples

3RN10 00 tripping unit

Switching off a three-phase motor via a contactor, pushbutton control

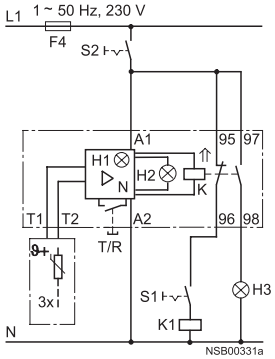
- The contact elements are shown for voltage applied to terminals A1 and A2 of the tripping unit



3RN10 11 tripping unit

Switching off a three-phase motor via a contactor, maintained-contact control

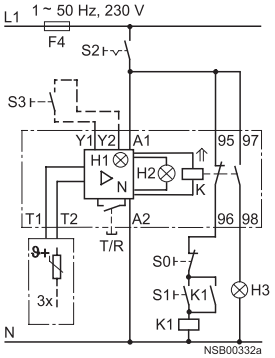
- The contact elements are shown for voltage applied to terminals A1 and A2 of the tripping unit



3RN10 12 tripping unit

Switching off a three-phase motor via a contactor, pushbutton control

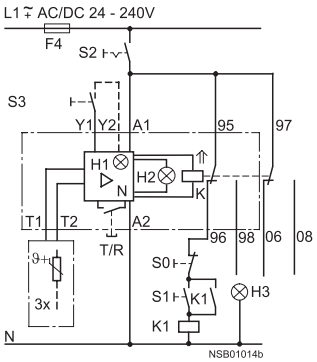
- The contact elements are shown for voltage applied to terminals A1 and A2 of the tripping unit



3RN10 13-. . . . 0 tripping unit

Switching off a three-phase motor via a contactor, pushbutton control

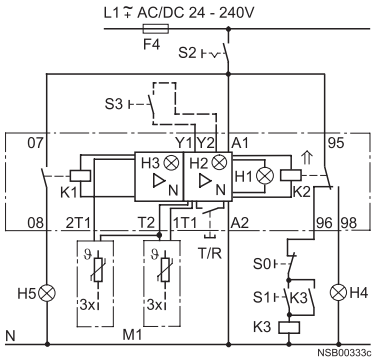
- The contact elements are shown for voltage applied to terminals A1 and A2 of the tripping unit



3RN10 22 tripping unit (warning + switch-off)

Switching off a three-phase motor via a contactor, warning via output relay, pushbutton control

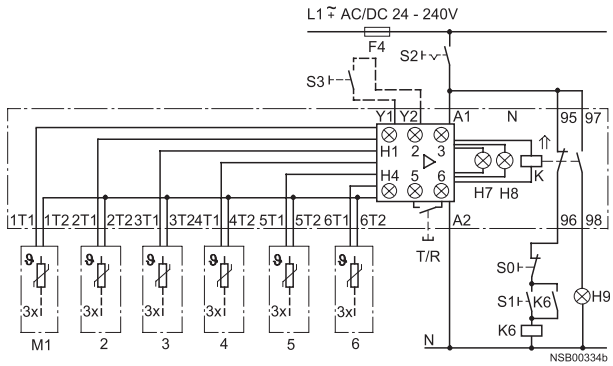
- The contact elements are shown for voltage applied to terminals A1 and A2 of the tripping unit



3RN10 62 tripping unit (multiple motor protection)

Switching off 6 three-phase motors via contactors, pushbutton control

- The contact elements are shown for voltage applied to terminals A1 and A2 of the tripping unit



General equipment designations

A1, A2	Control voltage terminals[1])
F4	Back-up fuse
N	Amplifier
S0	OFF pushbutton
S1	ON pushbutton
S2	Main switch
S3	Remote RESET button
T/R	TEST/RESET button
Y1, Y2	Terminals for remote RESET (jumpered = Auto RESET)
⇑	The double-headed arrow indicates an operating state of the contact element that deviates from the standard presentation according to DIN 40 900, Part 7 (In this case: Position of the contact elements when the control voltage is applied to terminals A1 and A2)

Equipment designations for 3RN10

H1	LED "READY"
H2	LED "TRIPPED"
H3	Signalling light
K	Output relay
K1	Contactor
1T, T2	Terminals of the sensor loop

Equipment designations for 3RN10 22

H1	LED "READY"
H2	LED "TRIPPED"
H3	LED "ALARM"
H4	Signalling light
H5	Signalling light "ALARM"
K1, K2	Output relay
K3	Contactor
1T1 and T2	Terminals of the sensor
2T1 and T2	loop

⚠ *Sensor circuits that are not connected must be short circuited.*

Equipment designations for 3RN10 62

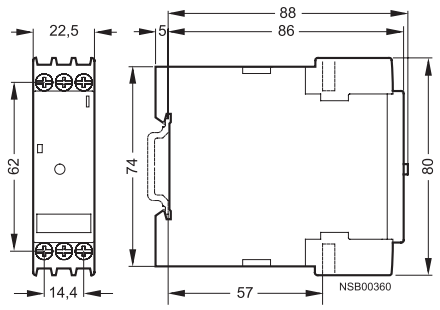
H1 to H6	LEDs for tripped sensor loops
H7	LED "READY"
H8	LED "TRIPPED"
H9	Signalling light
K	Output relay
K6	Contactor
1T1, 1T2 to 6T1, 6T2	Terminals for 1st sensor loop ... Terminals for 6th sensor loop

⚠ *Sensor circuits that are not connected must be short circuited.*

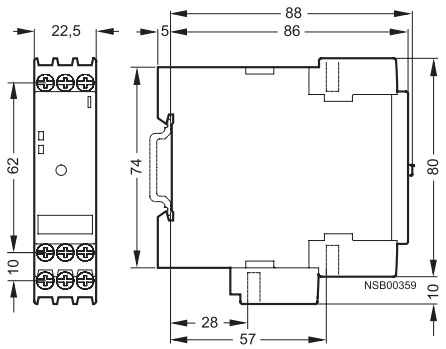
1) For dual voltage devices AC 230 V/110 V (3RN10 11-. CK00 and 3RN10 12-. CK00): A1 and A2: AC 230 V, A3 and A2: AC 110 V.

Dimension drawings

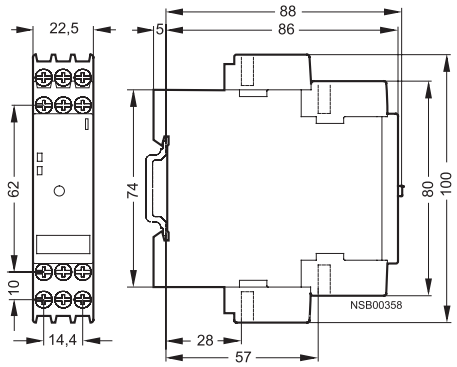
3RN10 00



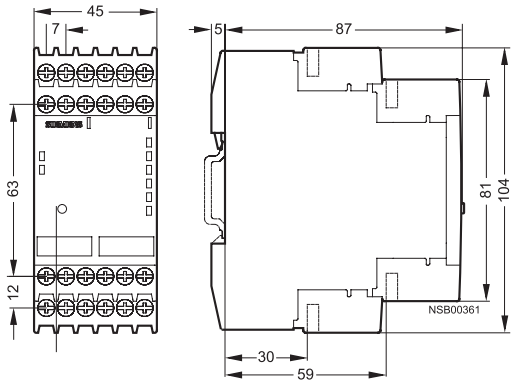
3RN10 10



3RN10 11, 3RN10 12, 3RN10 13, 3RN10 22



3RN10 62



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

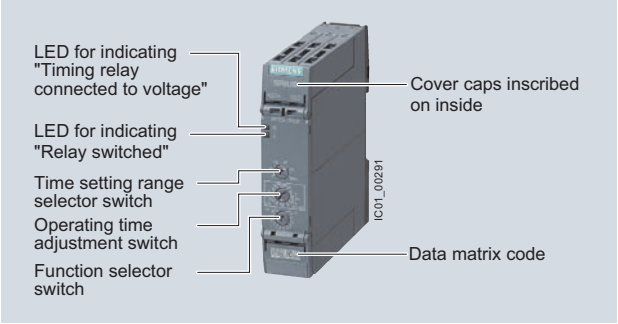
Wye-delta timing relay

- 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

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 2021 "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.

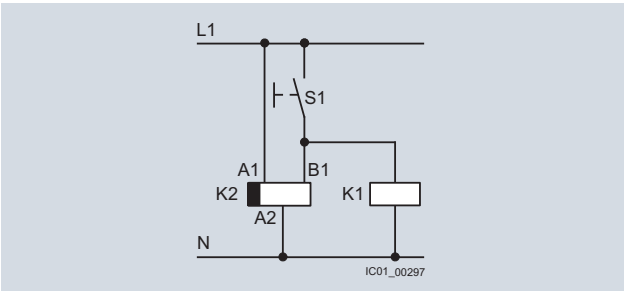
With a set of foil labels the timing relay can be legibly marked with the functions which can be selected on the timing relay. This is supplied together with the multifunctional timing relay.

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

Functions, see the overview of functions on page 11/22.

Note:

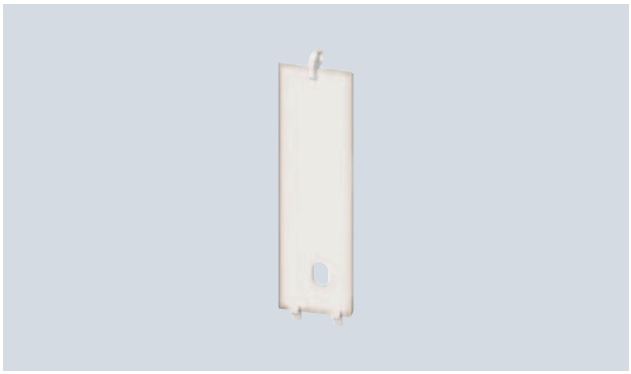
The activation of loads parallel to the start input is permissible when using AC/DC control voltage (see diagram).



Diagram

Accessories

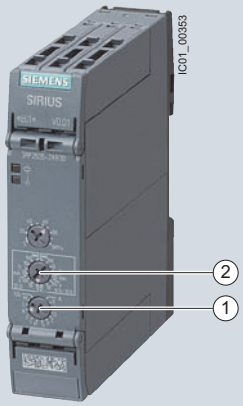
Push-in lugs for wall mounting



Sealable cover 17.5 mm

Sealable cover 22.5 mm

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.

Article No. scheme

Digit of the Article No.	1st - 5th	6th	7th		8th	9th	10th	11th	12th
	□□□□□	□	□	–	□	□	□	□	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

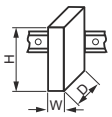
Timing relays are used in control, starting, and protective circuits for all switching operations involving time delays. They guarantee a high level of functionality and a high repeat accuracy of timer settings.

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.

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

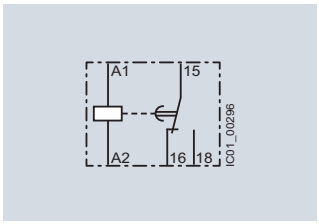


Type		3RP25..-.AB30, 3RP25..-.AW30, 3RP25..-.BB30, 3RP25..-.BW30, 3RP25..-.NW30, 3RP25..-.SW30	3RP25..-.BT20, 3RP25..-.NM20	3RP25..-.CW30	3RP25..-.EW30	3RP25..-.RW30
Insulation voltage For overvoltage category III According to IEC 60664 For pollution degree 3, rated value	V AC	300	500	300	--	300
Ambient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

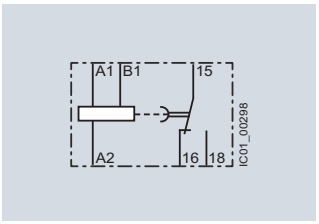
Type		3RP25
Connection type		**Screw terminals**
• Design of thread of connection screw		M3
• Solid	mm^2	1 x (0.5 ... 4.0)/2 x (0.5 ... 2.5)
• Finely stranded with end sleeve	mm^2	1 x (0.5 ... 4)/2 x (0.5 ... 1.5)
• Solid for AWG cables	AWG	1 x (20 ... 12), 2 x (20 ... 14)
• Stranded for AWG cables	AWG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

Internal circuit diagrams 3RP25

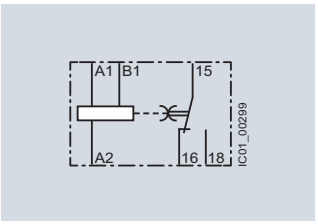
Multifunction 3RP2505-.A, 13 functions, 1 CO



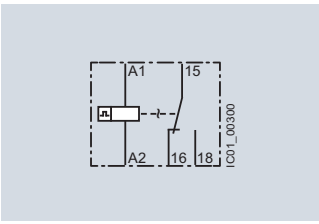
3RP2505-.A (A)
ON-delay



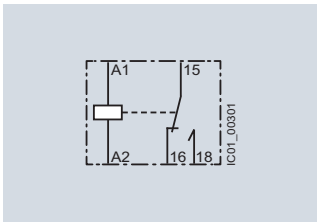
3RP2505-.A (B)
OFF-delay with control signal



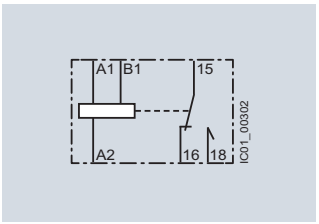
3RP2505-.A (C)
ON-delay/OFF-delay with control signal



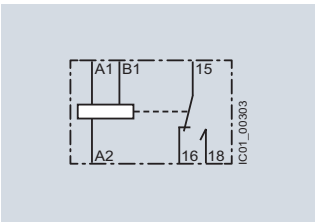
3RP2505-.A (D)
Flashing, symmetrical, starting with interval



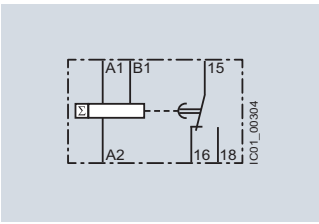
3RP2505-.A (E)
Passing make contact, interval relay



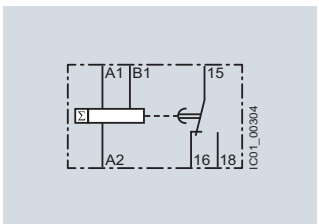
3RP2505-.A (F)
Retriggerable interval relay with deactivated control signal (passing break contact with control signal)



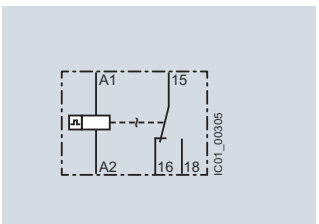
3RP2505-.A (G)
Passing make contact with control signal, not retriggerable (pulse-forming with control signal)



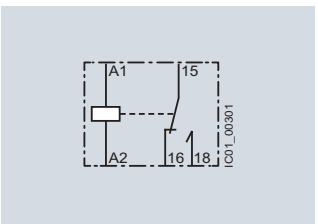
3RP2505-.A (H)
Additive ON-delay, instantaneous OFF with control signal



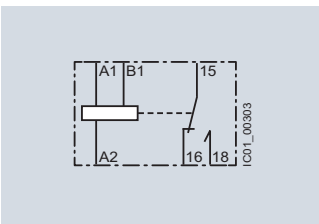
3RP2505-.A (I)
Additive ON-delay with control signal



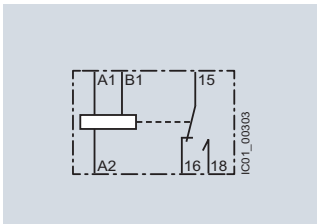
3RP2505-.A (J)
Flashing, symmetrical, starting with pulse



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

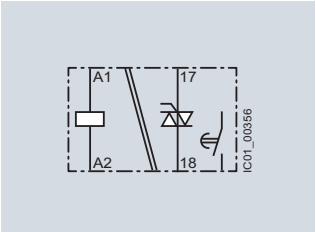


3RP2505-.A (L)
Pulse-delayed with control signal (fixed pulse (at 1 s) and settable pulse delay)

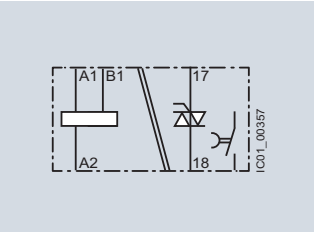


3RP2505-.A (M)
Retriggerable interval relay with activated control signal (watchdog)

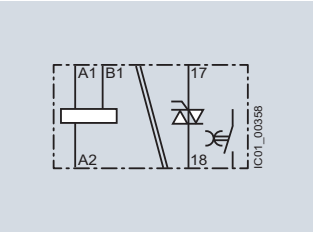
Multifunction 3RP2505-.C, 13 functions, 1 NO (semiconductor)



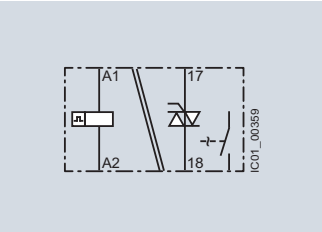
3RP2505-.C (A)
ON-delay



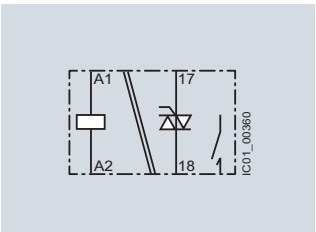
3RP2505-.C (B)
OFF-delay with control signal



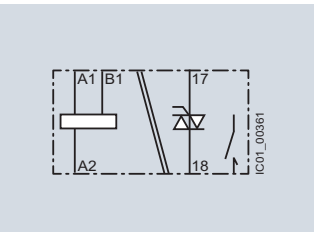
3RP2505-.C (C)
ON-delay/OFF-delay with control signal



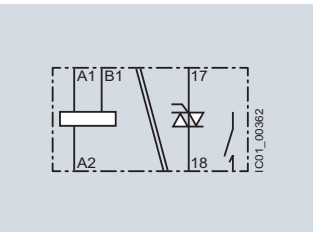
3RP2505-.C (D)
Flashing, symmetrical, starting with interval



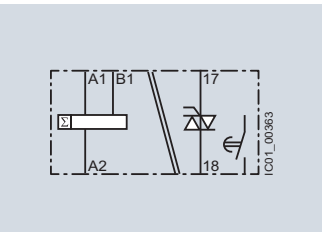
3RP2505-.C (E)
Passing make contact, interval relay



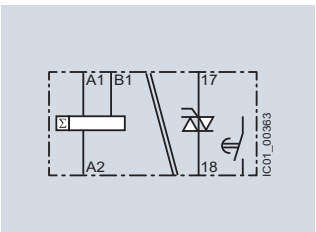
3RP2505-.C (F)
Retriggerable interval relay with deactivated control signal (passing break contact with control signal)



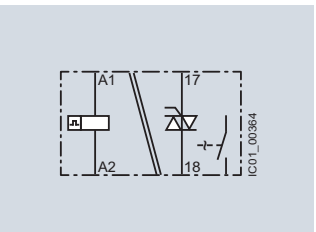
3RP2505-.C (G)
Passing make contact with control signal, not retriggerable (pulse-forming with control signal)



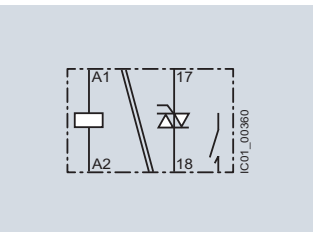
3RP2505-.C (H)
Additive ON-delay, instantaneous OFF with control signal



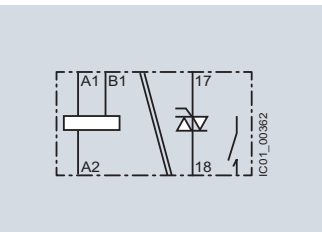
3RP2505-.C (I)
Additive ON-delay with control signal



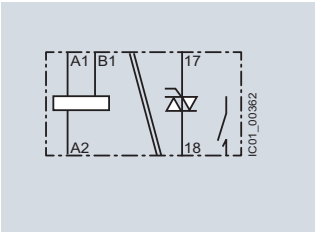
3RP2505-.C (J)
Flashing, symmetrical, starting with pulse



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

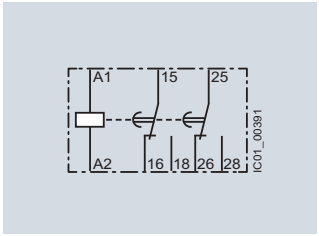


3RP2505-.C (L)
Pulse-delayed with control signal (fixed pulse (at 1 s) and settable pulse delay)

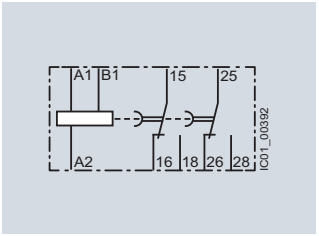


3RP2505-.C (M)
Retriggerable interval relay with activated control signal (watchdog)

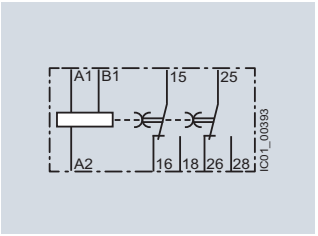
Multifunction 3RP2505-.B, 27 functions, 2 CO switched in parallel with delay/
multifunction 3RP2505-.R, 13 functions, 2 CO positively driven, and switched in parallel with delay (see also note below)



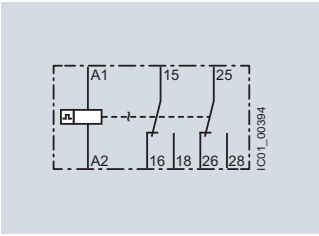
3RP2505-.B (A)
ON-delay



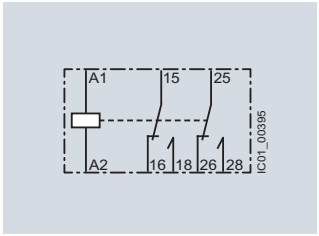
3RP2505-.B (B)
OFF-delay with control signal



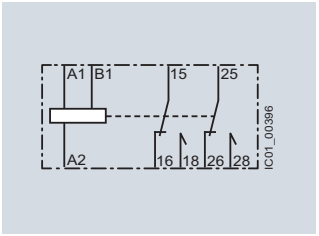
3RP2505-.B (C)
ON-delay/OFF-delay
with control signal



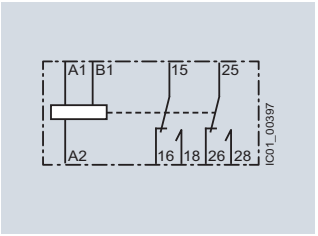
3RP2505-.B (D)
Flashing, symmetrical,
starting with interval



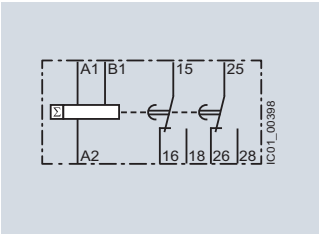
3RP2505-.B (E)
Passing make contact, interval relay



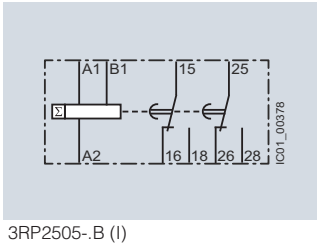
3RP2505-.B (F)
Retriggerable interval relay with
deactivated control signal (passing
break contact with control signal)



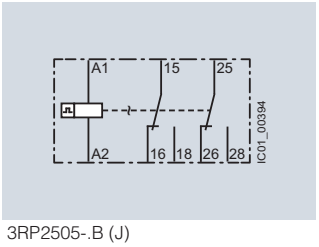
3RP2505-.B (G)
Passing make contact with
control signal, not retriggerable
(pulse-forming with control signal)



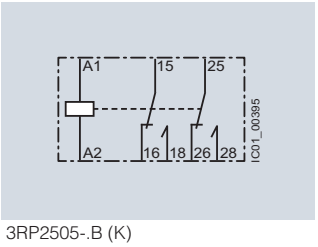
3RP2505-.B (H)
Additive ON-delay, instantaneous OFF
with control signal



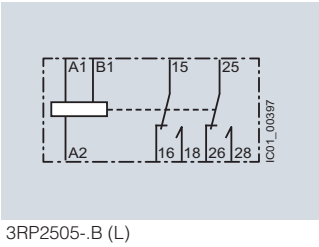
3RP2505-.B (I)
Additive ON-delay with control signal



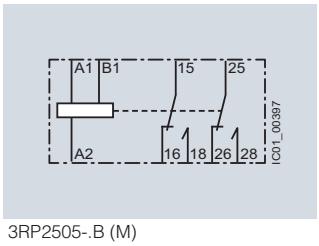
3RP2505-.B (J)
Flashing, symmetrical,
starting with pulse



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



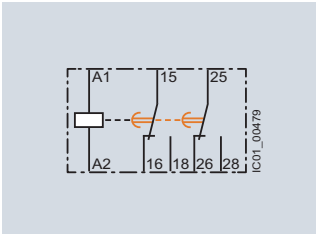
3RP2505-.B (L)
Pulse-delayed with control signal (fixed
pulse (at 1 s) and settable pulse delay)



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

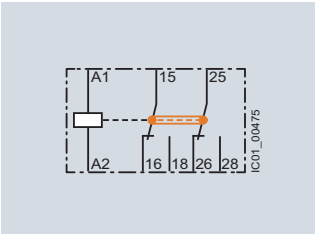
Note:

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.



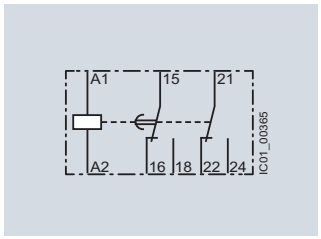
3RP2505-.B (A)

ON-delay

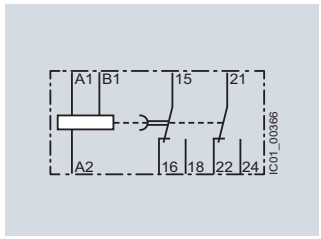


3RP2505-.R (A)
with positively driven contacts
ON-delay

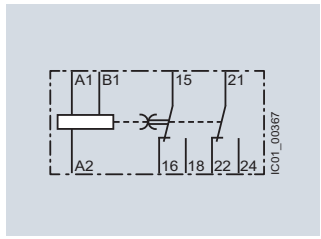
Multifunction 3RP2505-.B, 27 functions, 1 CO delayed + 1 CO instantaneous (continued)



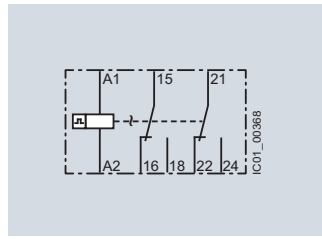
3RP2505-.B (A)
ON-delay and instantaneous contact



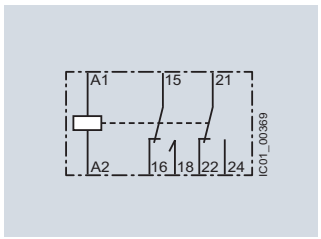
3RP2505-.B (B)
OFF-delay with control signal and instantaneous contact



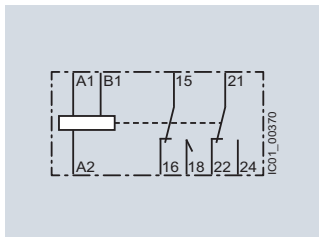
3RP2505-.B (C)
ON-delay/OFF-delay with control signal and instantaneous contact



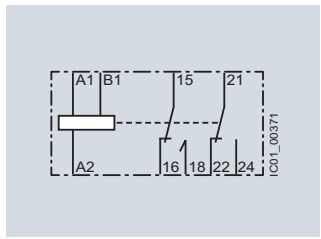
3RP2505-.B (D)
Flashing, symmetrical, starting with interval and instantaneous contact



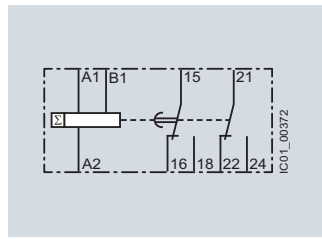
3RP2505-.B (E)
Passing make contact, interval relay and instantaneous contact



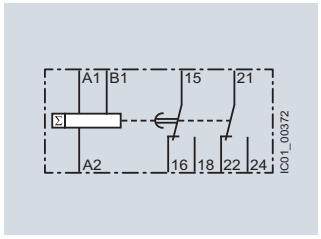
3RP2505-.B (F)
Retriggerable interval relay with deactivated control signal (passing break contact with control signal) and instantaneous contact



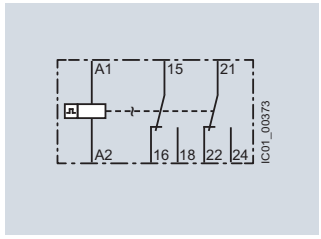
3RP2505-.B (G)
Passing make contact with control signal, not retriggerable (pulse-forming with control signal) and instantaneous contact



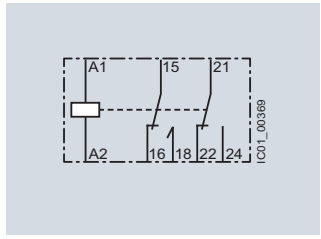
3RP2505-.B (H)
Additive ON-delay, instantaneous OFF with control signal and instantaneous contact



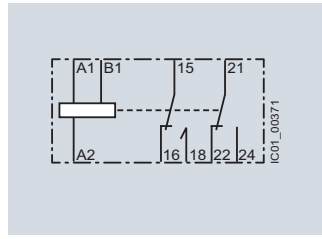
3RP2505-.B (I)
Additive ON-delay with control signal and instantaneous contact



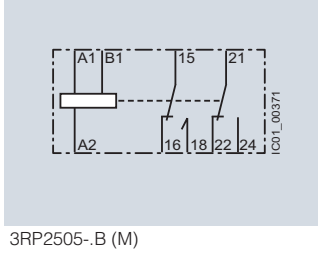
3RP2505-.B (J)
Flashing, symmetrical, starting with pulse and instantaneous contact



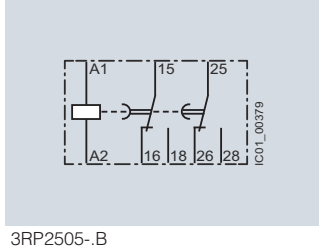
3RP2505-.B (K)
Pulse-delayed (fixed pulse (at 1 s) and settable pulse delay) and instantaneous contact



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

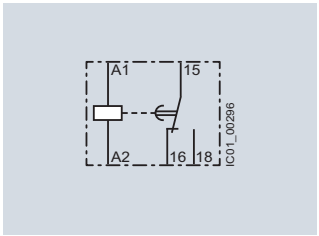


3RP2505-.B (M)
Retriggerable interval relay with activated control signal and instantaneous contact (watchdog)

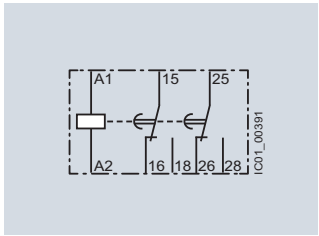


3RP2505-.B
Wye-delta function

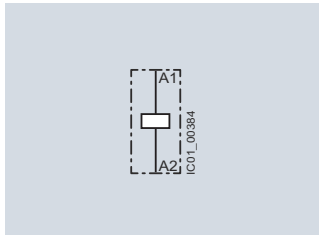
Monofunctions 3RP251. up to 3RP257.[1)]



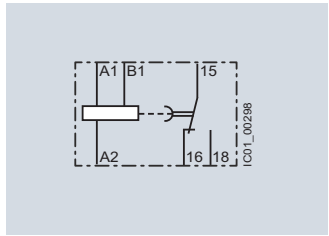
3RP251., 3RP2525-.A
ON-delay



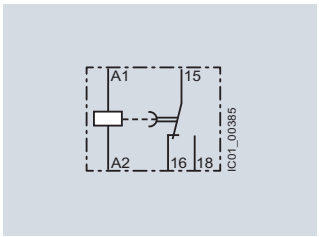
3RP2525-.B
ON-delay



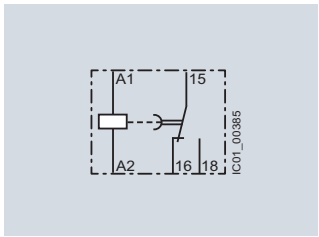
3RP2527
ON-delay, two-wire design



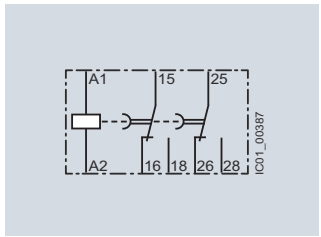
3RP2535
OFF-delay with control signal



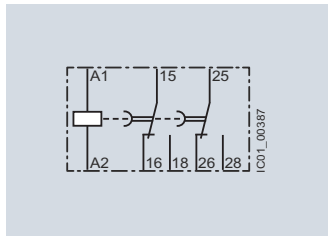
3RP2540-.A (N)[1)]
OFF-delay



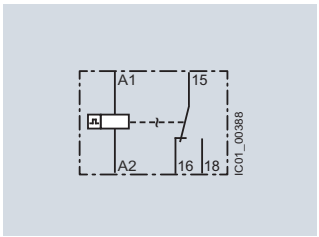
3RP2540-.A (O)[1)]
Positive passing make contact



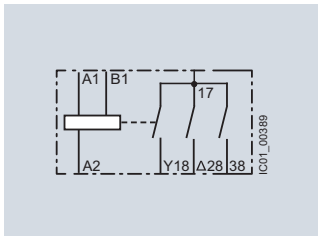
3RP2540-.B (N)[1)]
OFF-delay



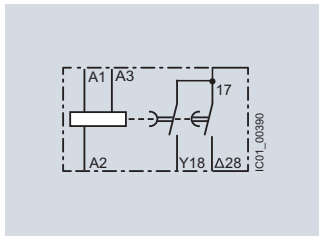
3RP2540-.B (O)[1)]
Positive passing make contact



3RP2555
Flashing, asymmetrical, starting with interval (clock-pulse relay)



3RP2560
Wye-delta function with overtravel function (idling)

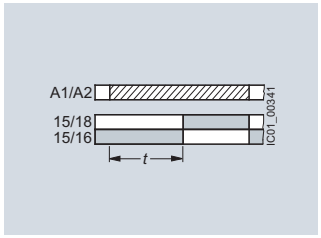


3RP257.
Wye-delta function

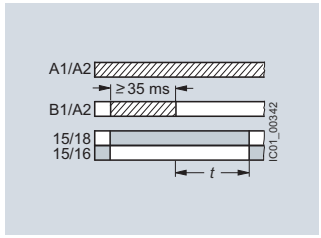
[1)] 3RP2540 has a double function:
Function N = OFF-delay
Function O = Positive passing make contact.

3RP25 function diagrams

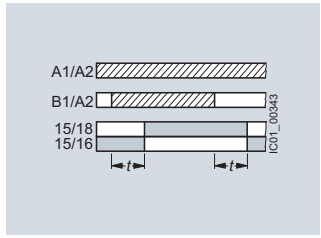
Multifunction 3RP2505-.A, 1 CO, 13 functions and 3RP2505-.C, 1 NO (semiconductor), 13 functions



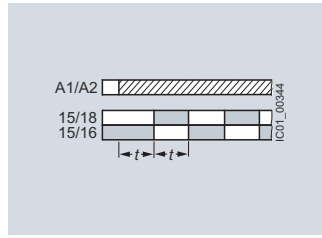
A
ON-delay



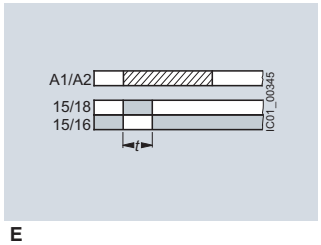
B
OFF-delay with control signal



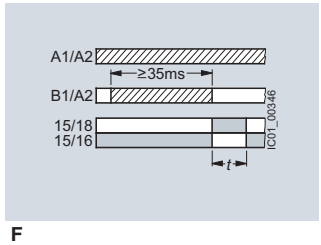
C
ON-delay/OFF-delay with control signal



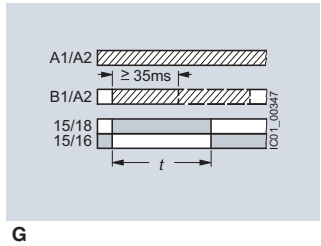
D
Flashing, symmetrical, starting with interval



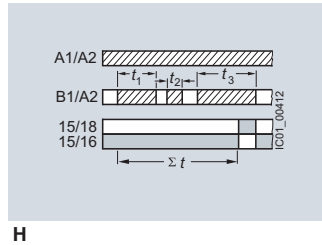
E
Passing make contact, interval relay



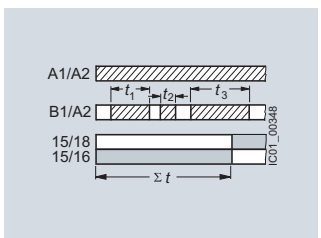
F
Retriggerable interval relay with deactivated control signal (passing break contact with control signal)



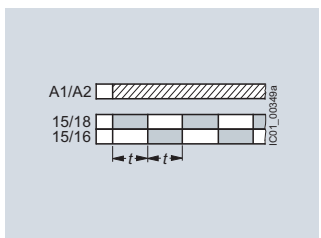
G
Passing make contact with control signal, not retriggerable (pulse-forming with control signal)



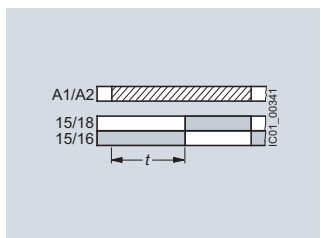
H
Additive ON-delay, instantaneous OFF with control signal



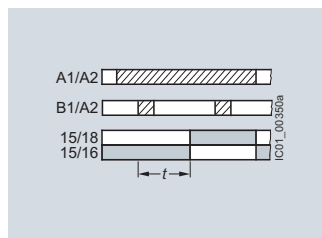
I
Additive ON-delay,with control signal



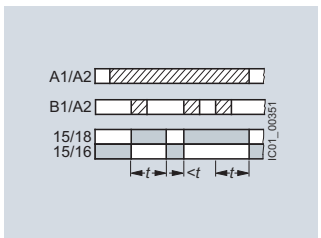
J
Flashing, symmetrical, starting with pulse



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)

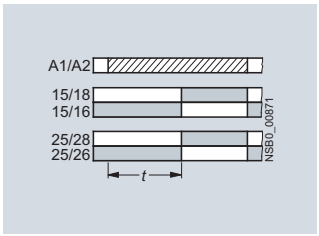


M
Retriggerable interval relay with activated control signal (watchdog)

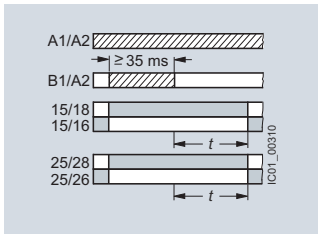
Legend

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

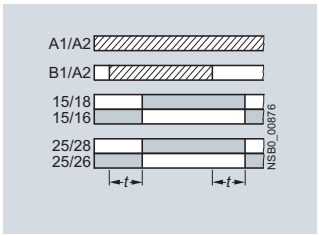
Multifunction 3RP2505-.B, 13 functions, 2 CO positively driven and switched in parallel with delay



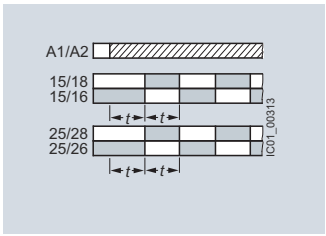
A
ON-delay



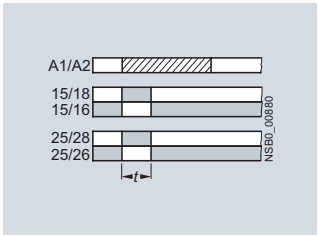
B
OFF-delay with control signal



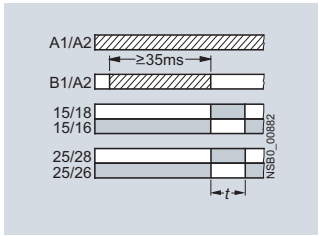
C
ON-delay/OFF-delay with control signal



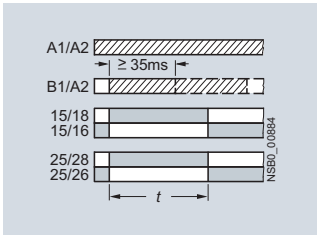
D
Flashing, symmetrical, starting with interval



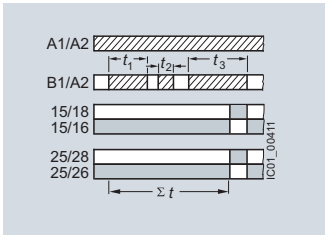
E
Passing make contact, interval relay



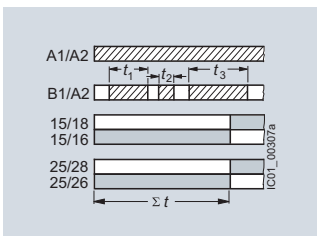
F
Retriggerable interval relay with deactivated control signal (passing break contact with control signal)



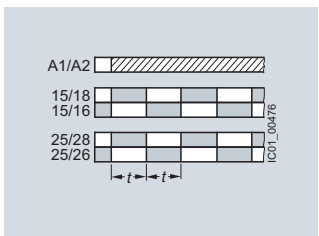
G
Passing make contact with control signal, not retriggerable (pulse-forming with control signal)



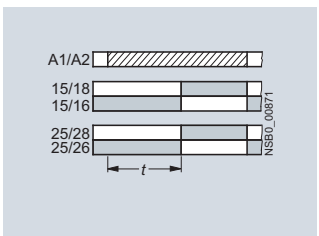
H
Additive ON-delay, instantaneous OFF with control signal



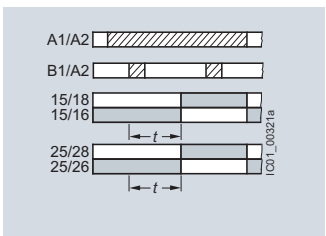
I
Additive ON-delay with control signal



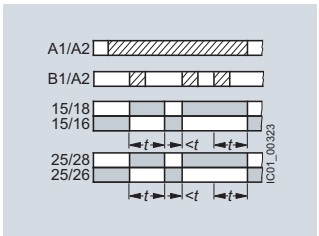
J
Flashing, symmetrical, starting with pulse



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)

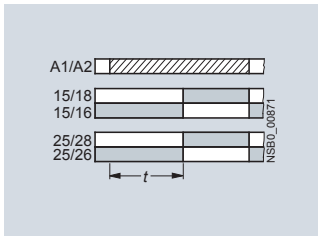
Legend

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

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

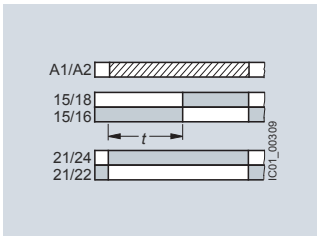
A

2 CO switched in parallel



ON-delay

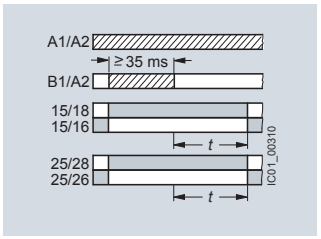
1 CO delayed + 1 CO instantaneous



ON-delay and instantaneous contact

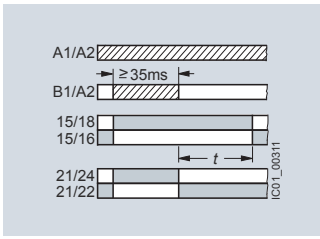
B

2 CO switched in parallel



OFF-delay with control signal

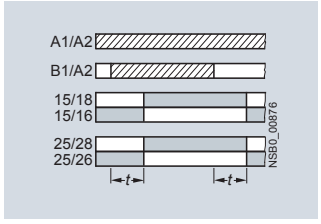
1 CO delayed + 1 CO instantaneous



OFF-delay with control signal and instantaneous contact

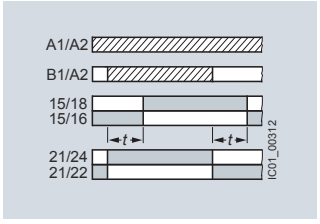
C

2 CO switched in parallel



ON-delay/OFF-delay with control signal

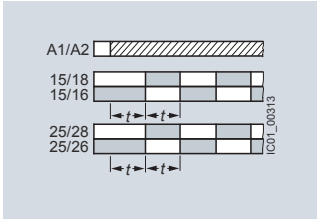
1 CO delayed + 1 CO instantaneous



ON-delay/OFF-delay with control signal and instantaneous contact

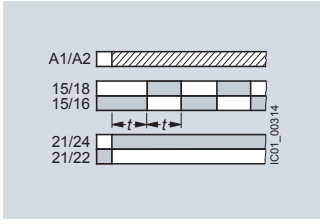
D

2 CO switched in parallel



Flashing, symmetrical, starting with interval

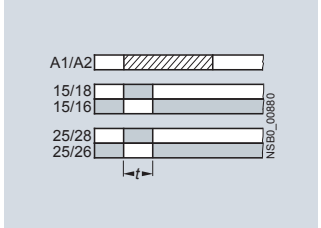
1 CO delayed + 1 CO instantaneous



Flashing, symmetrical, starting with interval and instantaneous contact

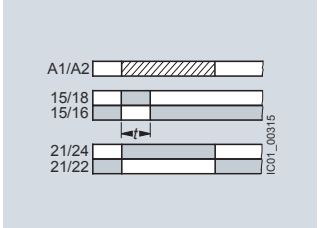
E

2 CO switched in parallel



Passing make contact, interval relay

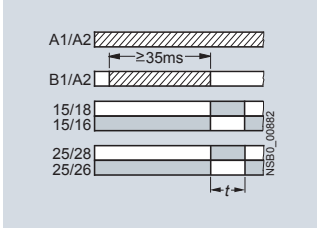
1 CO delayed + 1 CO instantaneous



Passing make contact, interval relay and instantaneous contact

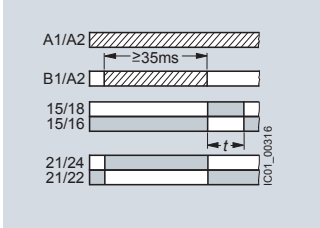
F

2 CO switched in parallel



Retriggerable interval relay with deactivated control signal (passing break contact with control signal)

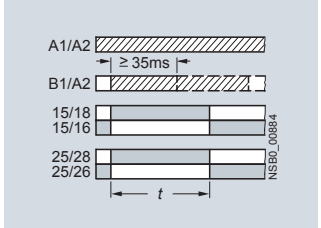
1 CO delayed + 1 CO instantaneous



Retriggerable interval relay with deactivated control signal (passing break contact with control signal) and instantaneous contact

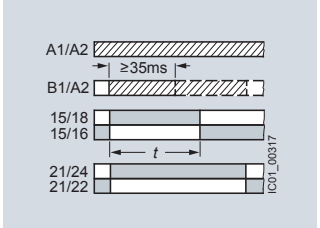
G

2 CO switched in parallel



Passing make contact with control signal, not retriggerable (pulse-forming with control signal)

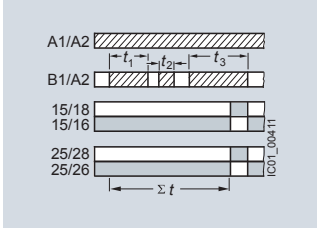
1 CO delayed + 1 CO instantaneous



Passing make contact with control signal, not retriggerable (pulse-forming with control signal) and instantaneous contact

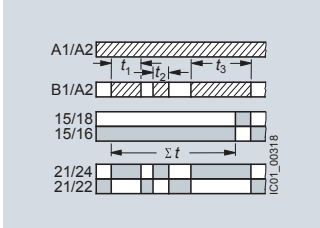
H

2 CO switched in parallel



Additive ON-delay, instantaneous OFF with control signal

1 CO delayed + 1 CO instantaneous



Additive ON-delay, instantaneous OFF with control signal and instantaneous contact

Legend

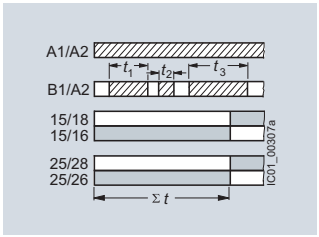
A ... M Identification letters

- Timing relay energized
- Contact closed
- Contact open

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

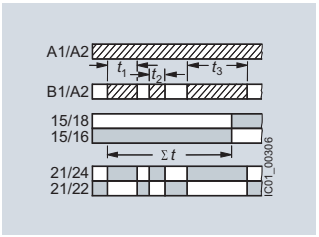
I

2 CO switched in parallel



Additive ON-delay with control signal

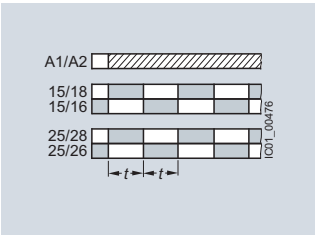
1 CO delayed +
1 CO instantaneous



Additive ON-delay with control signal and instantaneous contact

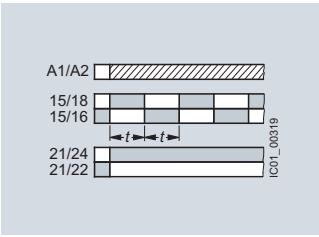
J

2 CO switched in parallel



Flashing, symmetrical, starting with pulse

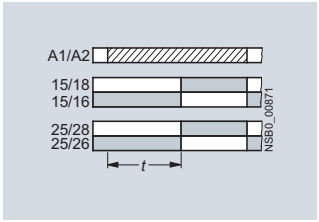
1 CO delayed +
1 CO instantaneous



Flashing, symmetrical, starting with pulse and instantaneous contact

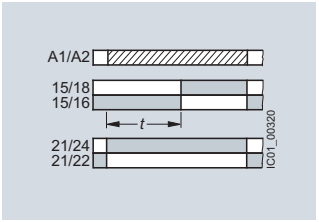
K

2 CO switched in parallel



Pulse-delayed (fixed pulse at 1 s and settable pulse delay)

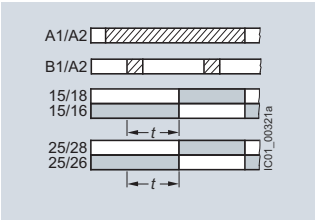
1 CO delayed +
1 CO instantaneous



Pulse-delayed (fixed pulse at 1 s and settable pulse delay) and instantaneous contact

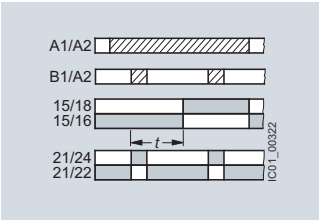
L

2 CO switched in parallel



Pulse-delayed with control signal (fixed pulse at 1 s and settable pulse delay)

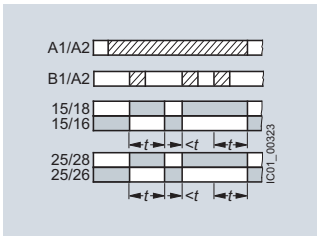
1 CO delayed +
1 CO instantaneous



Pulse-delayed with control signal (fixed pulse at 1 s and settable pulse delay) and instantaneous contact

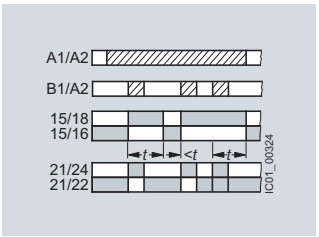
M

2 CO switched in parallel



Retriggerable interval relay with activated control signal (watchdog)

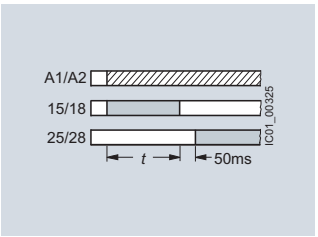
1 CO delayed +
1 CO instantaneous



Retriggerable interval relay with activated control signal and instantaneous contact (watchdog)

Y/Δ

2 CO switched in parallel or 1 CO delayed +
1 CO instantaneous



Wye-delta function

Legend

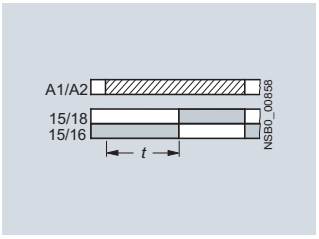
A ... M Identification letters

Timing relay energized

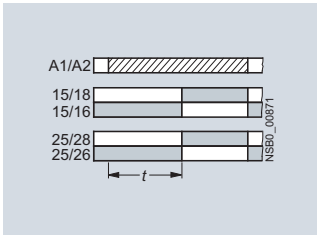
Contact closed

Contact open

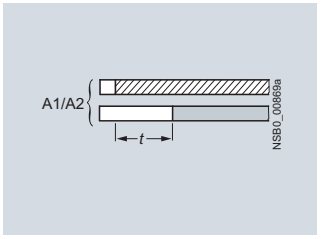
Monofunctions 3RP251. up to 3RP257.[1)]



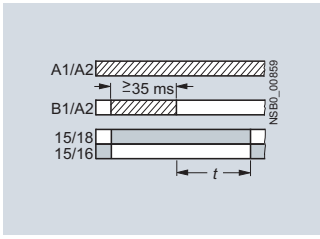
3RP251.-.AW30, 1 CO, ON-delay



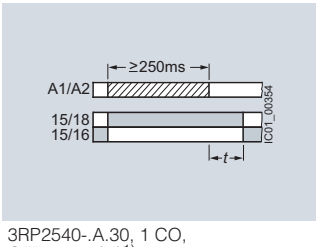
3RP2525-..W30, 2 CO, ON-delay



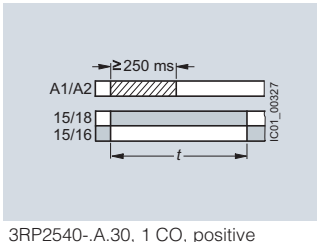
3RP2527-.EW30, 1 NO (semiconductor), ON-delay



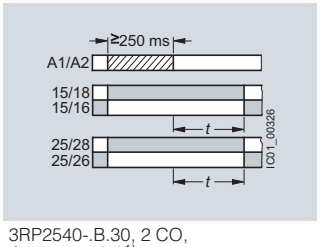
3RP2535-.AW30, 1 CO, OFF-delay with control signal



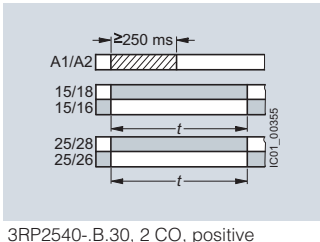
3RP2540-.A.30, 1 CO, OFF-delay (N)[1)]



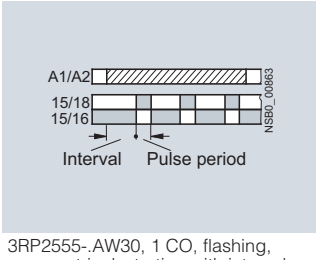
3RP2540-.A.30, 1 CO, positive passing make contact (O)[1)]



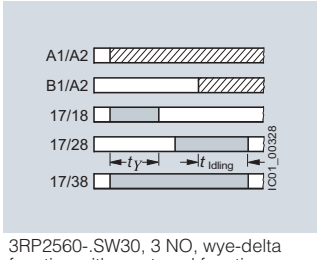
3RP2540-.B.30, 2 CO, OFF-delay (N)[1)]



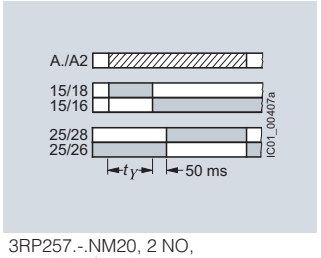
3RP2540-.B.30, 2 CO, positive passing make contact (O)[1)]



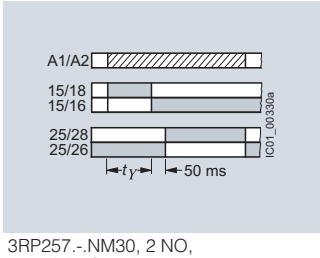
3RP2555-.AW30, 1 CO, flashing, asymmetrical, starting with interval (clock-pulse relay)



3RP2560-.SW30, 3 NO, wye-delta function with overtravel function (idling)



3RP257.-.NM20, 2 NO, wye-delta function



3RP257.-.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.

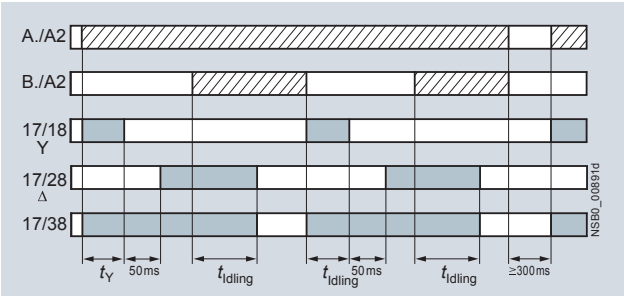
Possibilities of operation of the 3RP2560-.SW30 timing relay

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 Y/Δ 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:

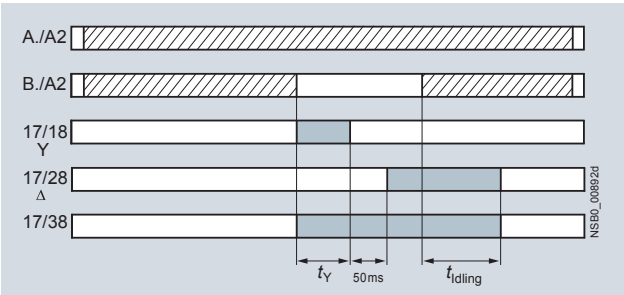
Observe response time (dead time) of 400 ms on energizing control supply voltage until contacts 17/18 and 17/16 close.



Operation 1

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

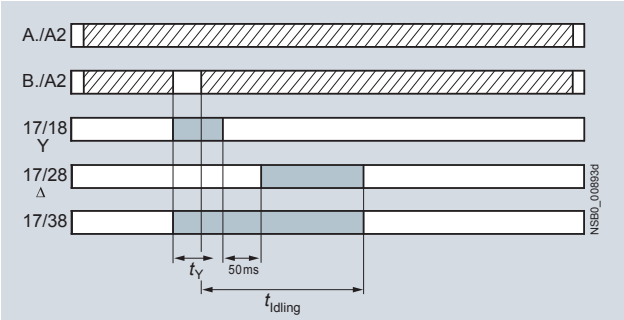
If the control signal B./A2 is already present when the control supply voltage A./A2 is applied, **no** timing is started. The timing is only started when the control signal B./A2 is switched off.



Operation 2

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

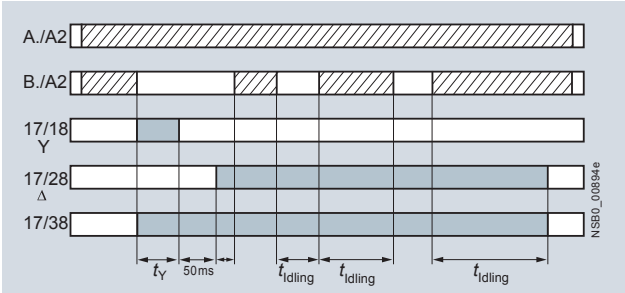
If the control signal B./A2 is applied again during the star time, the idling time starts and the timing is terminated normally.



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 Y/Δ 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).

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

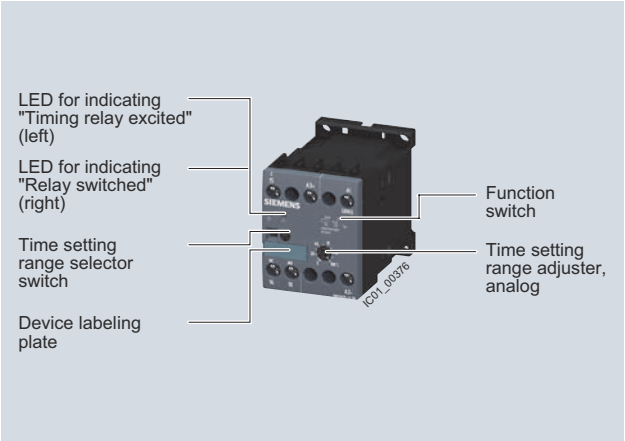
[3] With 3RP2574-.NM20 and 3RP2576-.NM20 , connection of 200 ... 240 V AC, 50/60 Hz control voltage is also possible.

For accessories, see page 11/37.

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**		**Screw terminals**				
	• 2-pole, screw terminals 1 x 4 mm²	A	**3ZY1122-1BA00**		1	6 units	41L
 3ZY1122-2BA00			**Spring-type terminals (push-in)**				
	• 2-pole, push-in terminals 1 x 4 mm²	A	**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

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"

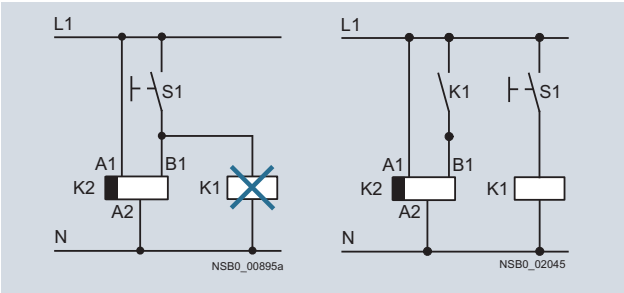
Multifunction

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 11/43.

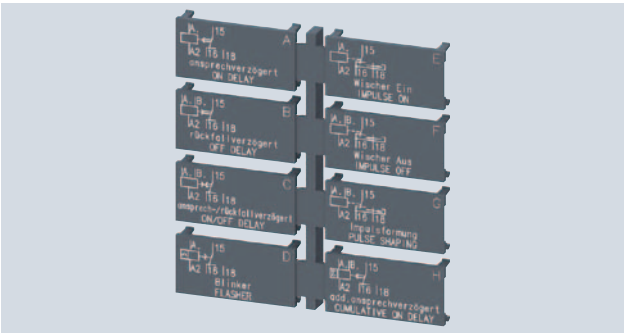
Note:

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**	**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.

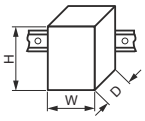
Benefits

- 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

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.

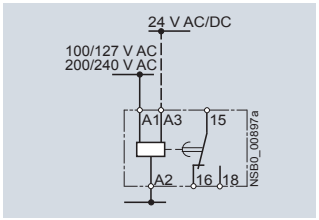
Technical specifications

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		°C	-25 ... +60
• During storage		°C	-40 ... +85
Operating range at excitation[1]			0.85 ... 1.1 x U_s at AC; 0.8 ... 1.25 x U_s at DC; 0.95 ... 1.05 times the rated frequency
Mechanical endurance		Operating cycles	10 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	2 x (0.5 ... 1.5)[2], 2 x (0.75 ... 2.5)[2]
• Finely stranded with end sleeve		mm^2	2 x (0.5 ... 1.5)[2], 2 x (0.75 ... 2.5)[2]
• Stranded		AWG	2 x (0.5 ... 1.5)[2], 2 x (0.75 ... 2.5)[2]
• AWG cables		AWG	2 x (18 ... 14)
• Tightening torque		Nm	0.8 ... 1.2
Connection type			**Spring-type terminals**
• Solid		mm^2	2 x (0.25 ... 2.5)
• Finely stranded with end sleeve		mm^2	2 x (0.25 ... 1.5)
• Finely stranded without end sleeve		mm^2	2 x (0.25 ... 2.5)
• AWG cables, solid or stranded		AWG	2 x (24 ... 14)
• Max. external diameter of the conductor insulation		mm	3.6

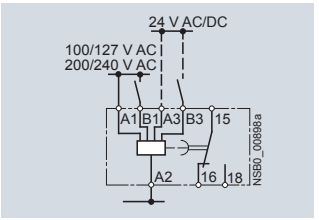
1) If nothing else is stated.

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

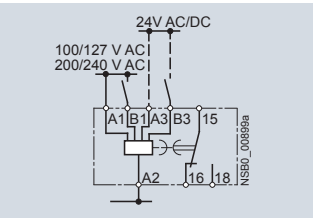
3RP20 internal circuit diagrams



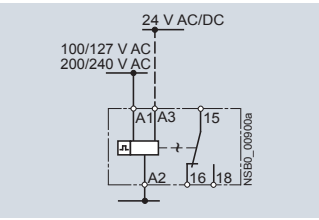
3RP2005, 3RP2025
ON-delay



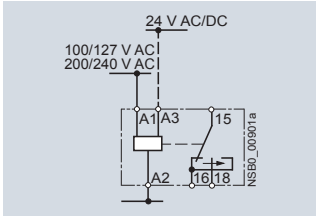
3RP2005
OFF-delay
with control signal



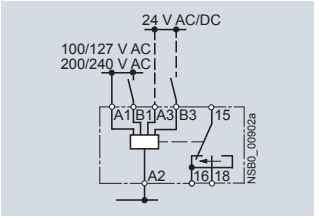
3RP2005
ON-delay and OFF-delay
with control signal



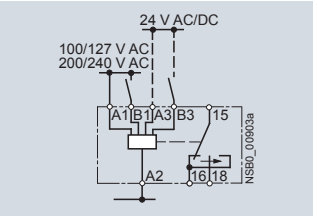
3RP2005
Flashing, starting with interval



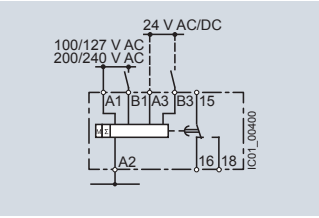
3RP2005
Passing make contact



3RP2005
Passing break contact
with control signal



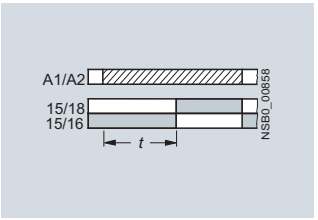
3RP2005
Pulse-forming
with control signal



3RP2005
Additive ON-delay
with control signal

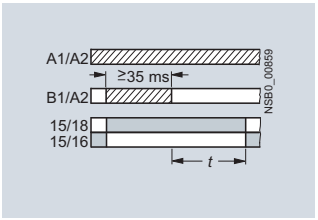
3RP20 function diagrams and 3RP2901 label set

1 CO contact



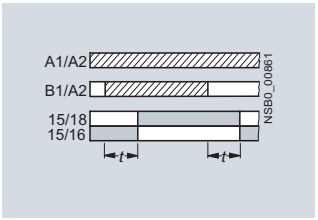
A

3RP2005-.A, 3RP2025
ON-delay



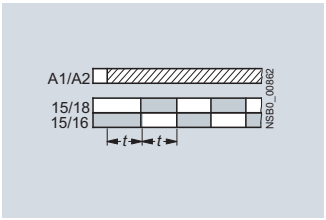
B[1)]

3RP2005-.A
OFF-delay with control signal



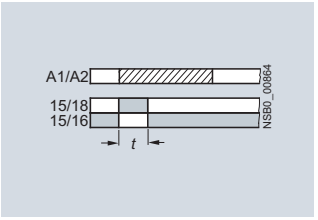
C[1)]

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



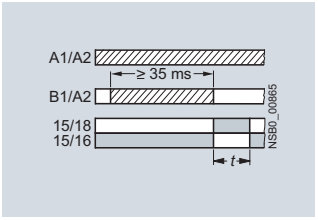
D

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



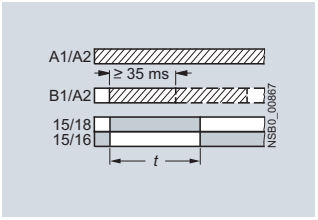
E

3RP2005-.A
Passing make contact



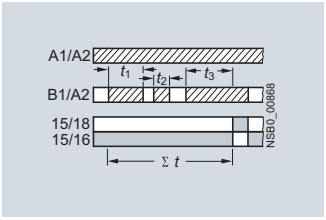
F[1)]

3RP2005-.A
Passing break contact
with control signal



G[1)]

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



H[1)]

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

Legend

A ... H Identification letters for 3RP2005

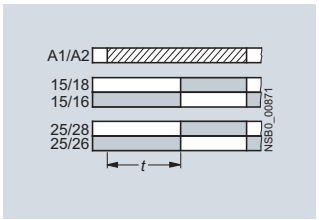
Timing relay energized

Contact closed

Contact open

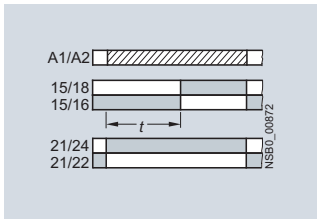
[1)] Note on function with start contact: A new control signal at terminal B, after the operating time has started, resets the operating time to zero (retriggerable). This does not apply to G, G● and H●, which are not retriggerable.

2 CO contacts



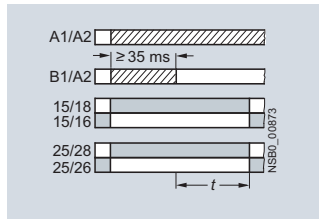
A

3RP2005-.B
ON-delay



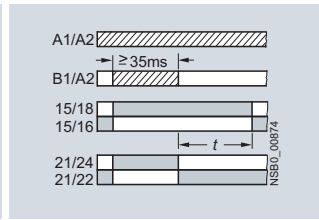
A●

3RP2005-.B
ON-delay and instantaneous contact



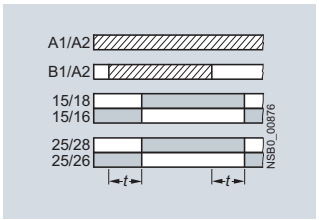
B[1)]

3RP2005-.B
OFF-delay with control signal



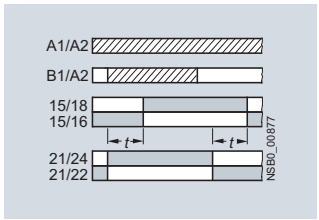
B●[1)]

3RP2005-.B
OFF-delay with control signal and instantaneous contact



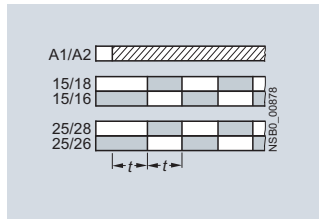
C[1)]

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



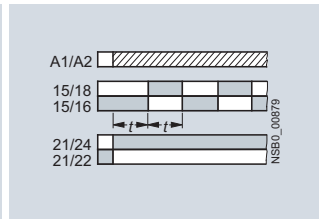
C●[1)]

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



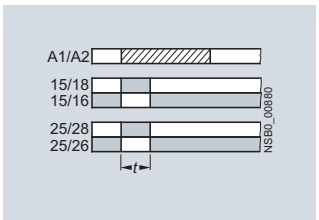
D

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



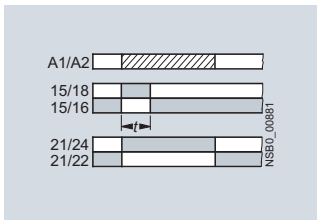
D●

3RP2005-.B
Flashing, starting with interval (pulse/interval 1:1) and instantaneous contact



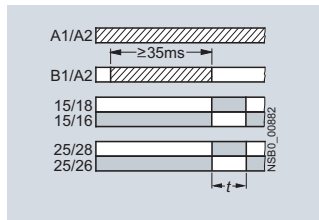
E

3RP2005-.B
Passing make contact



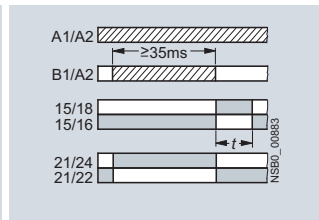
E●

3RP2005-.B
Passing make contact and instantaneous contact



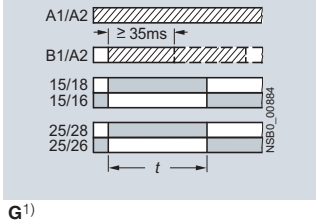
F[1)]

3RP2005-.B
Passing break contact with control signal



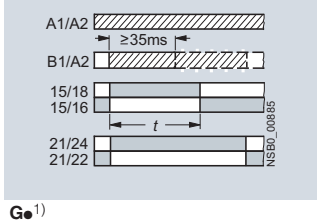
F●[1)]

3RP2005-.B
Passing break contact with control signal and instantaneous contact



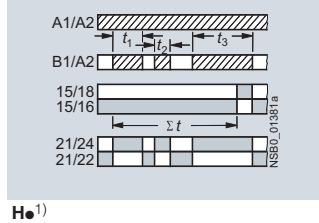
G[1)]

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



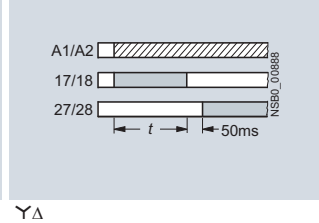
G●[1)]

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.

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 50/60 Hz AC V	Rated control supply voltage U_s DC V	DT	Screw terminals Article No.	Screw terminals Price per PU	DT	Spring-type terminals Article No.	Spring-type terminals 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 3RP2505 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 11/43.									
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 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	▶ ▶	**3RP2005-1AQ30** **3RP2005-1AP30**		A ▶	**3RP2005-2AQ30** **3RP2005-2AP30**	
With LED and 2 CO contacts, 16 functions		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 11/43.

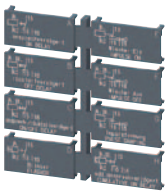
1) Units with protective separation.

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.

Accessories

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

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:

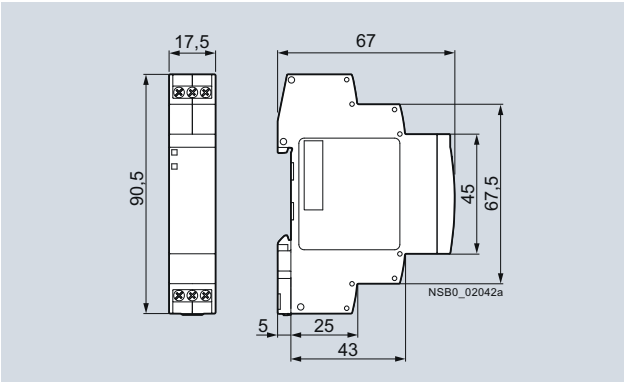
- IEC 60721-3-3 "Classification of environmental conditions"
- IEC 61812-1 "Time relays for industrial and residential use"
- IEC 61000-6-2 and EN 61000-6-4 "Electromagnetic compatibility"
- IEC 60947-5-1 "Low-voltage switchgear and controlgear – Electromechanical control circuit devices"
- DIN 43880 "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

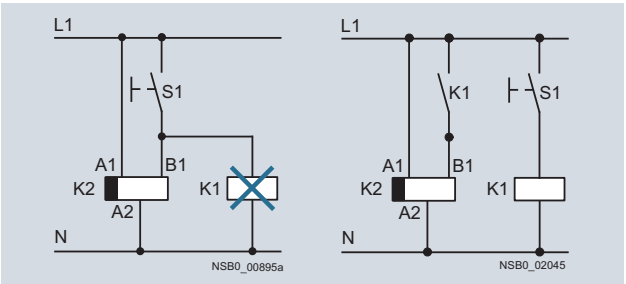
All timing relays are suitable for snap-on mounting onto TH 35 standard mounting rails according to IEC 60715. The enclosure complies with DIN 43880, 1 MW.



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.	1st - 5th	6th	7th		8th	9th	10th	11th	12th
	□□□□□	□	□	–	□	□	□	□	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.

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

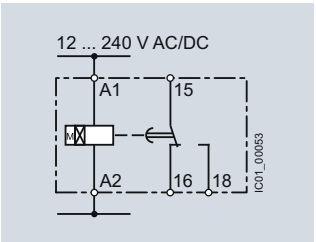
Timing relays are used in control, starting and protective circuits for all switching operations involving time delays, e.g. in non-residential buildings, airports, industrial buildings etc.

Technical specifications

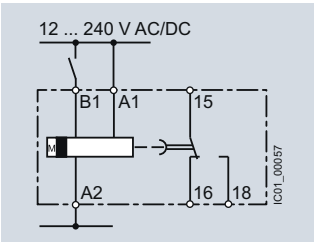
Type			7PV15
Rated insulation voltage Pollution degree 2, overvoltage category III		V AC	300
Permissible ambient temperature			
• During operation		°C	-25 ... +55
• During storage		°C	-40 ... +70
Operating range at excitation[1]			0.85 ... 1.1 x U_s at V AC/DC, 50/60 Hz 0.8 ... 1.25 x U_s 24 V DC 0.95 ... 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.

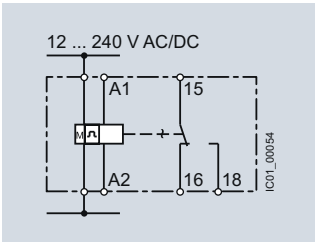
7PV15 internal circuit diagrams



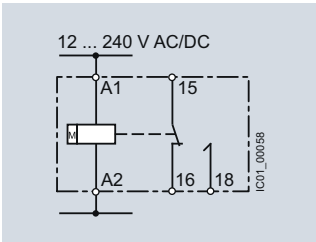
7PV1508-1AW30
ON-delay



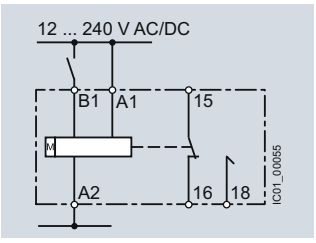
7PV1508-1AW30
OFF-delay



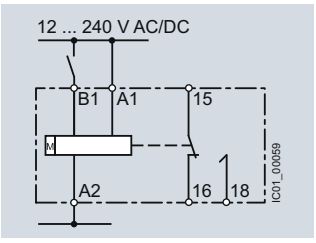
7PV1508-1AW30
Flashing, starting with interval



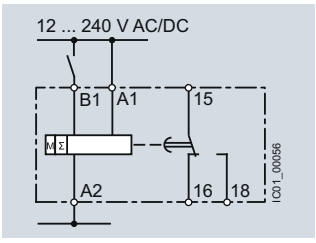
7PV1508-1AW30
Passing make contact



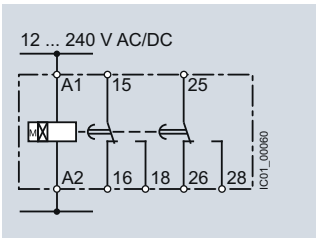
7PV1508-1AW30
Passing break contact
with control signal



7PV1508-1AW30
Pulse-forming
with control signal

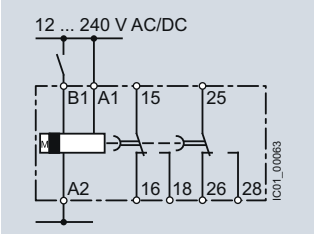


7PV1508-1AW30
Additive ON-delay,
with control signal

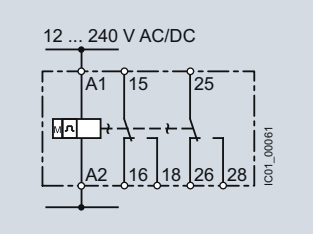


7PV1508-1BW30
ON-delay

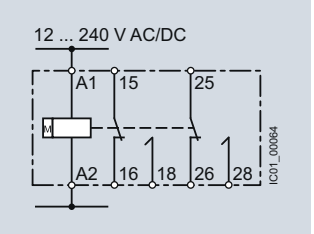
7PV15 internal circuit diagrams (continued)



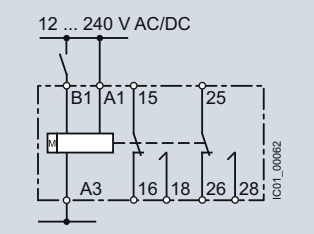
7PV1508-1BW30
OFF-delay
with control signal



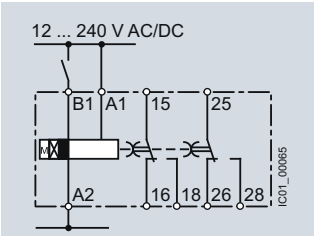
7PV1508-1BW30
Flashing,
starting with interval



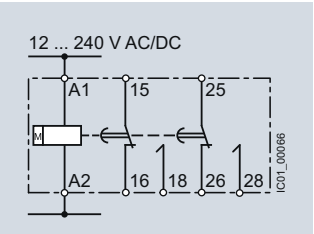
7PV1508-1BW30
Passing make contact



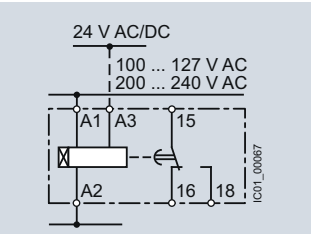
7PV1508-1BW30
Pulse-forming
with control signal



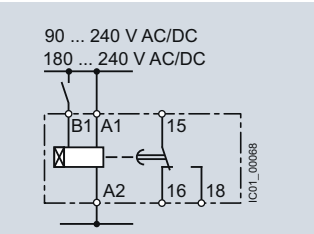
7PV1508-1BW30
ON and OFF-delay



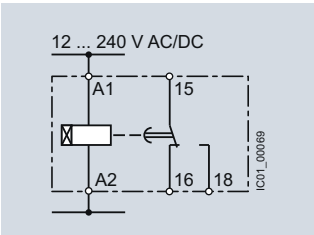
7PV1508-1BW30
Fixed pulse after ON-delay



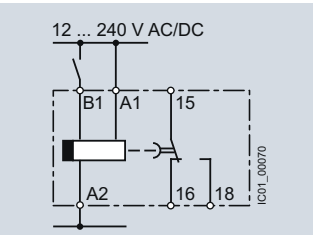
7PV151.-1AQ30, 7PV151.-1AP30
ON-delay



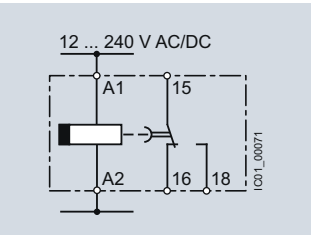
7PV1518-1AJ30, 7PV1518-1AN30
ON-delay



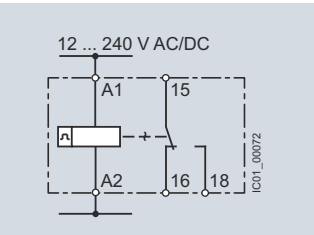
7PV1518-1AW30
ON-delay



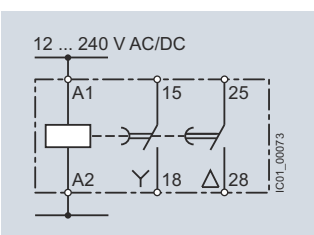
7PV1538-1AW30
OFF-delay
with control signal



7PV1540-1AW30
OFF-delay
without control signal



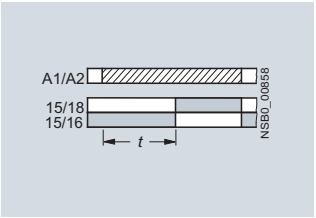
7PV1558-1AW30
Clock-pulse relay



7PV1578-1BW30
Wye-delta

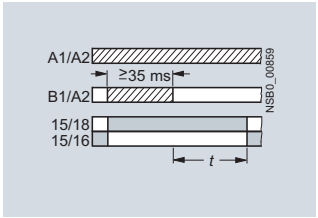
7PV15 function diagrams

1 CO contact



A

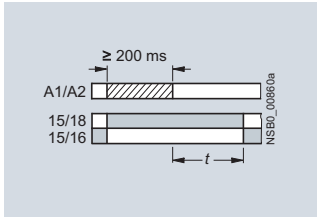
7PV1508-1A, 7PV1511, 7PV1512, 7PV1513, 7PV1518
ON-delay



B[1)]

7PV1508-1A, 7PV1538

OFF-delay with control signal



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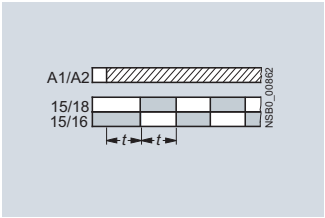
7PV1540

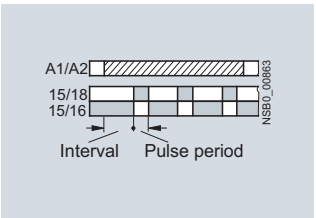
OFF-delay without control signal



C

7PV1508-1A

Flashing, starting with interval (pulse/interval 1:1)



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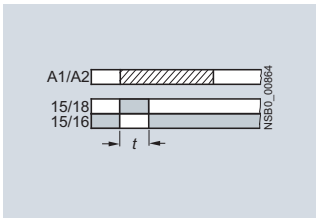
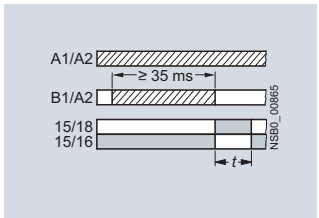
7PV1558
Clock-pulse, starting with interval (dead period, pulse time, and time setting ranges each separately adjustable)



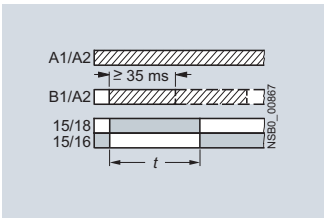
D

7PV1508-1A
Passing make contact



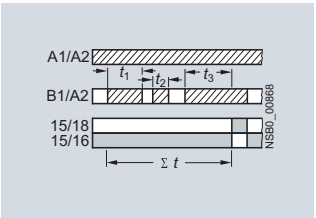
E[1]

7PV1508-1A
Passing break contact with control signal



F[1)]

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



G[1)]

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

Legend

A ... G Identification letters for 7PV1508

Timing relay energized

Contact closed

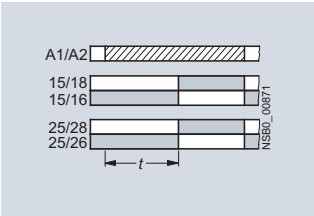
Contact open

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.

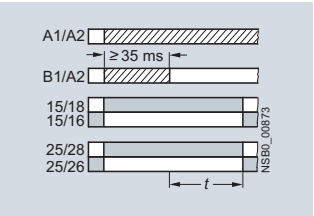
Note:

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.

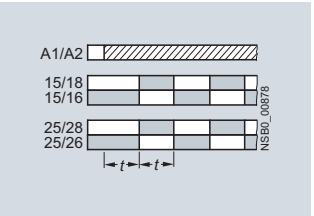
2 CO contacts



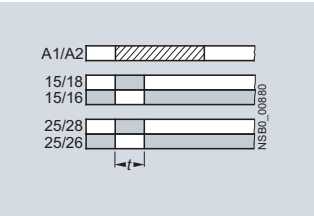
A
7PV1508-1B
ON-delay



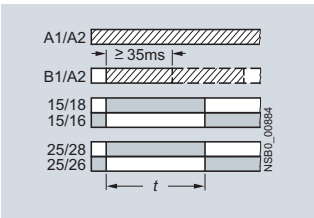
B[1)]
7PV1508-1B
OFF-delay with control signal



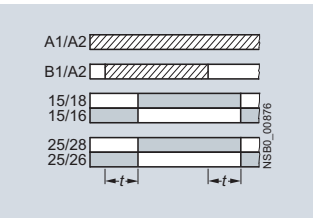
C
7PV1508-1B
Flashing, starting with interval (pulse/interval 1:1)



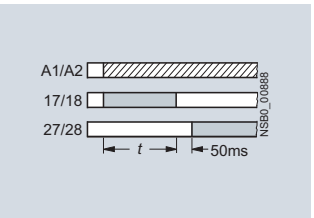
D
7PV1508-1B
Passing make contact



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

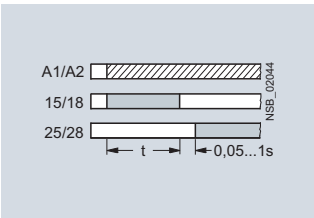


H[1)]
7PV1508-1B
ON-delay and OFF-delay with control signal



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

2 NO contacts



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7PV1578
Wye-delta function[2)]

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.

7PV15 timing relays in enclosure, 17.5 mm

Selection and ordering data


7PV1508-1AW30


7PV1512-1AP30


7PV1518-1AW30


7PV1538-1AW30


7PV1540-1AW30


7PV1558-1AW30

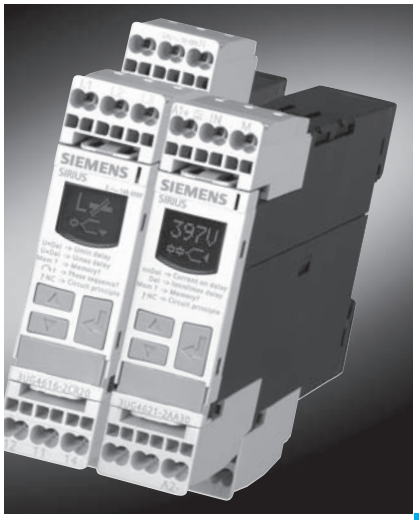

7PV1578-1BW30

Version	Time setting range *t* adjustable by rotary switch to	Rated control supply voltage U_s 50/60 Hz AC V	Rated control supply voltage U_s DC V	DT	Screw terminals Article No.	Price per PU	PU (UNIT, SET, M)	PS*	PG
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 30 s ... 10 min 3 min ... 1 h 30 min ... 10 h 5 ... 100 h	12 ... 240	12 ... 240	►	**7PV1508-1AW30**		1	1 unit	41H
With LED and 2 CO contacts, 7 functions		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 0.5 ... 10 s 5 ... 100 s 30 s ... 10 min 3 min ... 1 h 30 min ... 10 h 5 ... 100 h	12 ... 240	12 ... 240	►	**7PV1518-1AW30**		1	1 unit	41H
		90 ... 127	90 ... 127	►	**7PV1518-1AJ30**		1	1 unit	41H
		180 ... 240	180 ... 240	►	**7PV1518-1AN30**		1	1 unit	41H
7PV1538 timing relays, OFF-delay, with control signal, 7 time setting range									
With LED and 1 CO contact	0.05 ... 1 s 0.5 ... 10 s 5 ... 100 s 30 s ... 10 min 3 min ... 1 h 30 min ... 10 h 5 ... 100 h	12 ... 240	12 ... 240	►	**7PV1538-1AW30**		1	1 unit	41H
7PV1540 timing relays, OFF-delay, without control signal, 7 time setting ranges									
With LED and 1 CO contact	0.05 ... 1 s 0.15 ... 3s 0.3 ... 6 s 0.5 ... 10 s 1.5 ... 30 s 3 ... 60 s 5 ... 100 s	12 ... 240	12 ... 240	►	**7PV1540-1AW30**		1	1 unit	41H
7PV1558 timing relays, clock-pulse relay, 7 time setting ranges									
With LED and 1 CO contact	0.05 ... 1 s 0.5 ... 10 s 5 ... 100 s 30 s ... 10 min 3 min ... 1 h 30 min ... 10 h 5 ... 100 h	12 ... 240	12 ... 240	►	**7PV1558-1AW30**		1	1 unit	41H
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 0.5 ... 10 s 5 ... 100 s 30 s ... 10 min 3 min ... 1 h 30 min ... 10 h 5 ... 100 h	12 ... 240	12 ... 240	►	**7PV1578-1BW30**		1	1 unit	41H

3UG Monitoring Relays

For line, single-phase voltage and insulation monitoring

The new 3UG4 line monitoring relays permit a maximum degree of protection to be achieved for machines, plants and systems. This means that line and voltage faults can be detected early on and the appropriate response is initiated before far more significant subsequent damage can occur.



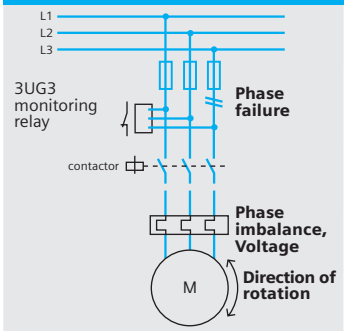
Your advantages:

- Thanks to the wide voltage range, it can be used on all line supplies around the world – from 160 V to 690 V – without an auxiliary voltage
- Can be variably set to above range, below range or window monitoring
- Freely parameterizable delay times and reset behavior
- Reduced width for all versions for line and voltage monitoring
- For the digital versions, the actual value and fault type are permanently displayed
- Automatic direction of rotation correction by differentiating between line faults and incorrect phase sequence
- All versions have removable terminals
- All versions have either screw terminals or alternatively innovative Cage Clamp terminals

Applications:

The applications are listed in the following table. These tables indicate the various plant system conditions that can be detected using the monitoring parameters.

Configuration of a 3-phase monitoring function



Measured quantity	Possible plant or system fault
Phase sequence	• Direction of rotation of the drive
Phase failure	• A fuse has blown • Control supply voltage has failed • Single-phase operation of a motor with the corresponding overheating
Phase dissymmetry	• Motor overheating as a result of non-symmetrical voltages or phase failure • Line supplies with non-symmetrical load are detected • A phase failure is detected in spite of regenerative feedback
Undervoltage	• Motor draws an increased current and in turn overheats • A device is undesirably reset • Line supply dips, especially when supplied from a battery • Threshold value switch for analog signals 0 to 10 V
Overvoltage	• A plant is protected against destruction due to supply overvoltages • A plant or system switches-in above a certain voltage • Threshold value switch for analog signals 0 to 10 V
Insulation monitoring	• The insulation resistance for non-grounded plants and systems is monitored

3UG Monitoring Relays

For line, single-phase voltage and insulation monitoring

3UG4 Monitoring relays for the line supply and three-phase voltages

Phase sequence	Phase failure	Phase imbalance	Hysteresis	Under-voltage	Over-voltage	N-conductor monitoring	Delay time	Contacts	Line supply voltage	Order No.	List Price $
22.5 mm wide 3UG4514 to 3UG3518 can be digitally set, with fault memory and with LCD display											
Yes	–	–	–	–	–	–	–	1 CO	160–260	**3UG4511-□AN20**	
									320–500	**3UG4511-□AP20**	
									420–690	**3UG4511-□AQ20**	
								2 CO	160–260	**3UG4511-□BN20**	
									320–500	**3UG4511-□BP20**	
									420–690	**3UG4511-□BQ20**	
Yes	Yes	10%	–	–	–	–	–	1 CO	160–690	**3UG4512-□AR20**	
								2 CO	160–690	**3UG4512-□BR20**	
Yes	Yes	20%	5%	160–690 V	–	–	Off delay 0–20 s	2 CO	160–690	**3UG4513-□BR20**	
Selectable	Yes	0–20%	1–20 V	160–690 V	–	–	On and off delay 0–20 s	2 CO	160–690	**3UG4614-□BR20**	
Selectable	Yes	Using threshold values	1–20 V	160–690 V	160–690 V	–	0–20 s for V_{min} and V_{max}	1CO for V_{min} and V_{max}	160–690	**3UG4615-□CR20**	
Selectable	Yes	Using threshold values	1–20 V	160–690 V	160–690 V (90–400 w.r.t. N)	Yes	0–20 s for V_{min} and V_{max}	1 CO for V_{min} and V_{max}	160–690 (90–400 w.r.t. N)	**3UG4616-□CR20**	
Autom. correction	Yes	0–20%	1–20 V	160–690 V	160–690 V	–	Off delay 0–20 s	1 CO for line faults and 1 W for phase sequence	160–690	**3UG4617-□CR20**	
Autom. correction	Yes	0–20%	1–20 V	160–690 V	160–690 V (90–400 w.r.t. N)	Yes	Off delay 0–20 s	1 CO for line faults and 1 W for phase sequence	160–690 (90–400 w.r.t. N)	**3UG4618-□CR20**	

Screw Terminal 1
Spring-type Terminal 2

Return voltage due to coupling between the individual phases

Loads connected to the three-phase line supply – such as motor windings, lamps, transformers – result in a coupling between the individual phases.

As a result of this coupling, there is always a return voltage at the equipment terminal of the phase that has failed.

Single-phase voltage monitoring

Measuring range	Hysteresis	Contacts	Delay time	Auxiliary voltage	Order No.	List Price $
22.5 mm wide, all of the devices can be digitally set and have an LCD display, a fault memory that can be switched-in, simultaneous monitoring for overvoltage and undervoltage over the complete measuring range						
17–275 V AC DC	0.1–150 V	1 CO	0–20 s	Selfsupplied	**3UG4633-□AL30**	
0.1–60 V AC DC	0.1–30 V	1 CO	0–20 s	24 V AC DC	**3UG4631-□AA30**	
				24–240 V AC DC	**3UG4631-□AW30**	
10–600 V AC DC	0.1–300 V	1 CO	0–20 s	24 V AC DC	**3UG4632-□AA30**	
				24–240 V AC DC	**3UG4632-□AW30**	

Screw Terminal 1
Spring-type Terminal 2

Technical specifications

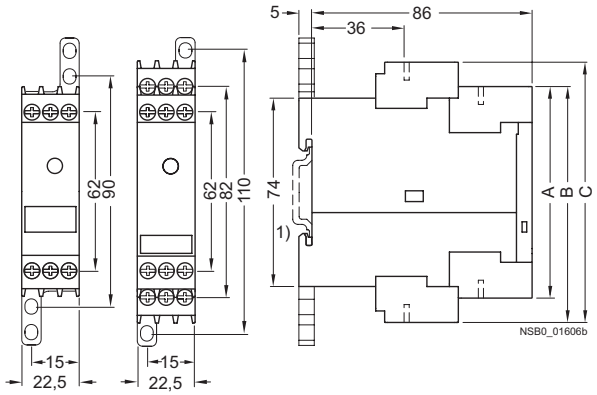
Type		3UG45 11-..N20	3UG45 11-..P20	3UG45 11-..Q20	3UG45 12	3UG45 13	3UG46 14	3UG46 15 3UG46 17	3UG46 16 3UG46 18
General data									
Rated control supply voltage U_s [1]	V	160 … 260	320 … 500	420 … 690	160 … 690				90 … 400
Rated frequency	Hz	50/60							
Rated power, typical									
• At AC 230 V	W/VA	2/4	--	--	2/2.5				
• At AC 400 V	W/VA	--	2/8	--	2/3.5				
• At AC 460 V	W/VA	--	--	2/8	2/4				
Width	mm	22.5							
RESET		Auto-RESET					Automatic/manual		
Principle of operation		Closed-circuit					Closed-circuit, open-circuit (3UG46 17/3UG46 18: closed-circuit)		
Availability time after application of U_s	ms	200			1.000				
Response time once a switching threshold is reached	ms	Max. 450							
Unbalance	%	--			10	20	0; 5 ... 20	3UG46 15/3UG46 16: Through threshold values 3UG46 17/3UG46 18: 0; 5 ... 20	
Adjustable tripping delay time	s	--				0.1 ... 20			
Adjustable ON-delay time	s	--					0.1 … 20	--	
Mains buffering time, minimum	ms	10			30				
Rated insulation voltage U_i Degree of pollution 3 Overvoltage category III acc. to EN 60664-1	V	690							
Rated impulse withstand voltage	kV	6							
Permissible ambient temperature									
• During operation	°C	-25 … +60							
• During storage	°C	-40 … +85							
EMC tests [2]		IEC 60947-/IEC 61000-6-2/IEC 61000-6-4							
Degree of protection									
• Enclosure		IP40							
• Terminals		IP20							
Vibration resistance acc. to IEC 60068-2-6		1 ... 6 Hz: 15 mm; 6 ... 500 Hz: 2 *g*							
Shock resistance acc. to IEC 60068-2-27		12 shocks (half-sine 15 *g*/11 ms)							
Connection type		**Screw terminals**							
• Terminal screw		M 3 (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 sleeves 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)							
Measuring circuit									
Measuring range AC 50/60 Hz rms value	V	160 ... 260	320 ... 500	420 ... 690	160 ... 690				
Setting range	V					200...690	160...690		90...400
Measuring accuracy	%	--				±5			
Repeat accuracy At constant parameters	%	--				±1			
Setting accuracy		--				±10 % referred to setting	±1 V		
Accuracy of digital display		--					±1 digit		
Deviations for temperature fluctuations	%/°C	--				±0.1			
Hysteresis for voltage	V	--				5 % from setting	1 ... 20 V		
Hysteresis for unbalance	%	--					(setting - 2)	3UG46 17/3UG46 18: (setting - 2)	
Deviation for frequency fluctuation	%	--				±1			

[1] Absolute limit values.

[2] Important: This is a Class A product. In the household environment this device may cause radio interference. In this case the user must introduce suitable measures.

		3UG45 11-..N20	3UG45 11-..P20	3UG45 11-..Q20	3UG45 12	3UG45 13	3UG46 14	3UG46 15 3UG46 17	3UG46 16 3UG46 18
Control circuit									
Load capacity of the output relay									
• Conventional thermal current I_{th}	A	5							
Rated operational current I_e 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							
Output relay with DIAZED fuse gL/gG operational class	A	4							
Electrical endurance AC-15	Million operating cycles	0.1							
Mechanical endurance	Million operating cycles	10							

Dimensional drawings

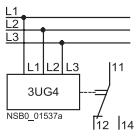


Type	3UG45 11-.A 3UG45 12-.A	3UG45 11-.B 3UG45 12-.B 3UG45 13 3UG46 14 3UG46 15 3UG46 17	3UG46 16 3UG46 18
	A	B	C
Removable terminal			
Screw-type terminal	83	92	102
Spring-loaded terminal	84	94	103

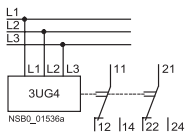
1) For standard mounting rail according to EN 60715.

Schematics

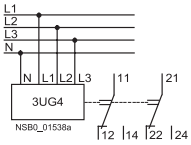
3UG45 11-.A
3UG45 12-.A



3UG45 11-.B
3UG45 12-.B
3UG45 13
3UG46 14
3UG46 15
3UG46 17



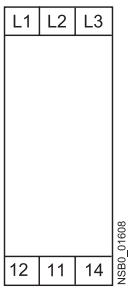
3UG46 16
3UG46 18



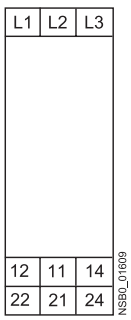
Note: It is not necessary to protect the measuring circuit for device protection. The protective device for line protection depends on the cross-section used.

Position of the terminals

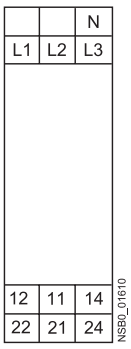
3UG45 11-.A
3UG45 12-.A



3UG45 11-.B
3UG45 12-.B
3UG45 13
3UG46 14
3UG46 15
3UG46 17



3UG46 16
3UG46 18



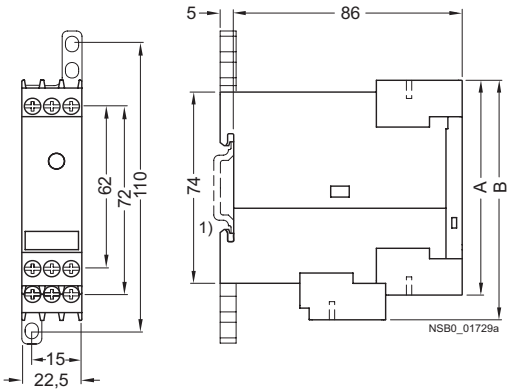
Technical specifications

		3UG46 31-.AA	3UG46 31-.AW	3UG46 32-.AA	3UG46 32-.AW	3UG46 33
General data						
Rated control supply voltage U_s	V	24 AC/DC	24...240 AC/DC	24 AC/DC	24...240 AC/DC	17 ... 275[1] AC/DC
Rated frequency for AC	Hz	50/60				40 ... 500
Operating range	V	20.4 ... 27.6	20.4 ... 264	20.4 ... 27.6	20.4 ... 264	17...275
Rated power in W/VA	VA	2/4				
Width	mm	22.5				
RESET		Automatic/manual				
Availability time after application of U_s	ms	1000				
Response time once a switching threshold is reached	ms	Max. 450				
Adjustable tripping delay time	s	0.1 … 20				
Adjustable ON-delay time	s	--				0.1 ... 20
Mains buffering time, minimum	ms	10				
Rated insulation voltage U_i Degree of pollution 3 Overvoltage category III acc. to EN 60664-1	V	690				
Rated impulse withstand voltage U_{imp}	kV	6				
Protective separation acc. to EN 60947-1, Annex N	V	300				
Permissible ambient temperature • During operation • During storage	 °C °C	 -25 … +60 -40 … +85				
EMC tests[2]		IEC 60947-1/IEC 61000-6-2/IEC 61000-6-4				
Degree of protection • Enclosure • Terminals		 IP40 IP20				
Vibration resistance acc. to IEC 60068-2-6		1 ... 6 Hz: 15 mm; 6 ... 500 Hz: 2 *g*				
Shock resistance acc. to IEC 60068-2-27		12 shocks (half-sine 15 *g*/11 ms)				
Connection type		**Screw terminals**				
• Terminal screw • Solid • Finely stranded with end sleeve • AWG cables, solid or stranded • Tightening torque	 mm^2 mm^2 AWG Nm	M 3 (standard screwdriver, size 2 and Pozidriv 2) 1 x (0.5 ... 4)/2 x (0.5 ... 2.5) 1 x (0.5 ... 2.5)/2 x (0.5 ... 1.5) 2 x (20 ... 14) 0.8 … 1.2				
Connection type		**Spring-type terminals**				
• Solid • Finely stranded, with end sleeves acc. to DIN 46228 • Finely stranded • AWG cables, solid or stranded	mm^2 mm^2 mm^2 AWG	2 x (0.25 ... 1.5) 2 x (0.25 ... 1.5) 2 x (0.25 ... 1.5) 2 x (24 ... 16)				
Measuring circuit						
Permissible measuring range single-phase AC/DC voltage	V	0.1 … 68		10 … 650		17 … 275
Setting range single-phase voltage	V	0.1 ... 60		10 ... 600		17 ... 275
Measuring frequency	Hz	40 ... 500				40 ... 500
Measuring accuracy	%	5				
Repeat accuracy at constant parameters	%	1				
Accuracy of digital display		±1 digit				
Deviations for temperature fluctuations	%/°C	±0.1				
Hysteresis for single-phase voltage	V	0.1 ... 30		0.1 ... 300		0.1 ... 150
Control circuit						
Load capacity of the output relay • Conventional 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				
Output relay with DIAZED fuse gL/gG operational class	A	4				
Electrical endurance AC15	Million operating cycles	0.1				
Endurance with contactor relay	Million operating cycles	10				

[1] Absolute limit values.

[2] Important: This is a Class A product. In the household environment this device may cause radio interference. In this case the user must introduce suitable measures.

Dimensional drawings

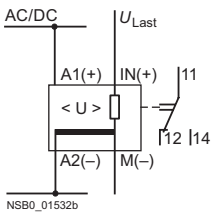


Type	3UG46 31 3UG46 32 3UG46 33	
	A	B
Removable terminal		
Screw-type terminal	83	92
Spring-loaded terminal	84	94

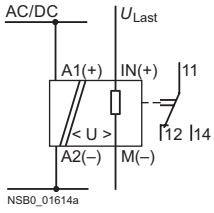
1) For standard mounting rail according to EN 60715.

Schematics

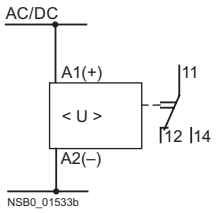
3UG46 31-.AA30
3UG46 32-.AA30



3UG46 31-.AW30
3UG46 32-.AW30



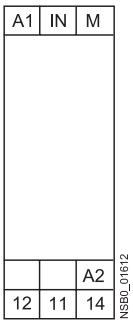
3UG46 33



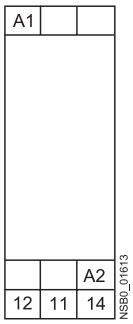
Note: It is not necessary to protect the measuring circuit for device protection. The protective device for line protection depends on the cross-section used.

Position of the terminals

3UG46 31
3UG46 32



3UG46 33



3UG Monitoring Relays

For single-phase current and cos φ 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

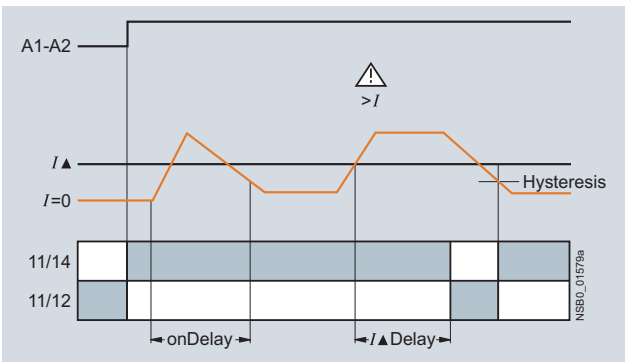
The 3UG4621 or 3UG4622 current monitoring relay is supplied with an auxiliary voltage of 24 V AC/DC or 24 to 240 V AC/DC and performs overshoot, undershoot or range monitoring of the current depending on parameterization. The device is equipped with a display and is parameterized using three buttons.

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.

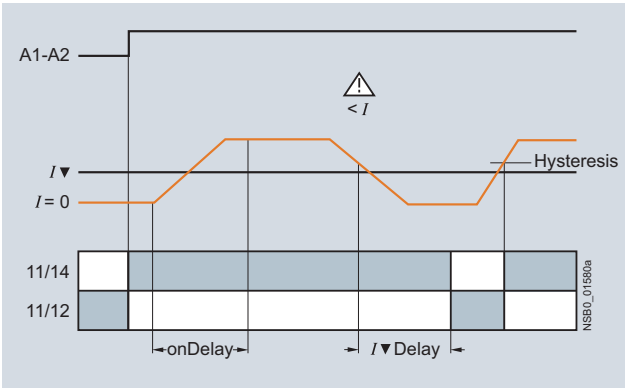
The hysteresis is adjustable from 0.1 to 250 mA or 0.01 to 5 A. The device can be operated with manual or Auto RESET and on the basis of either the open-circuit or closed-circuit principle. Following options are available: Response of the output relay when the control supply voltage U_s = ON is applied or not until the lower measuring range limit of the measuring current (I > 3 mA/50 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

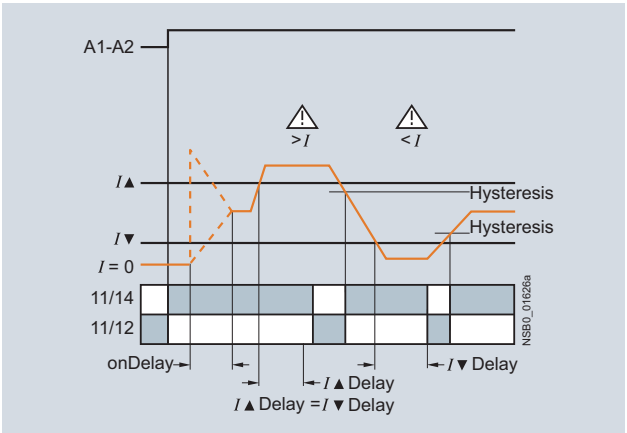
Current overshoot



Current undershoot



Range monitoring

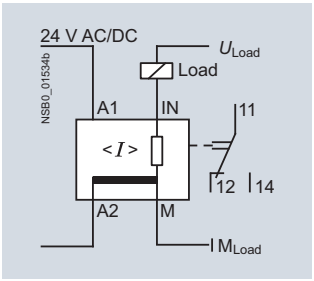


Type		3UG4621-.AA	3UG4621-.AW	3UG4622-.AA	3UG4622-.AW
General data					
Rated insulation voltage U_i Pollution degree 3; overvoltage category III according to VDE 0110	V	690			
Rated impulse withstand voltage U_{imp}	kV	6			
Measuring circuit					
Measuring range single-phase AC/DC current	A	0.003 … 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 • Conventional 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.

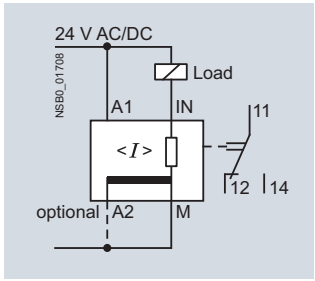
2) With simple separation.

Circuit diagrams



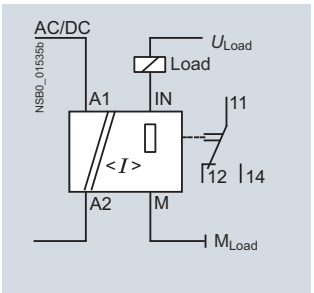
3UG4621-.AA30,
3UG4622-.AA30

Operation with separate control circuit and load circuit



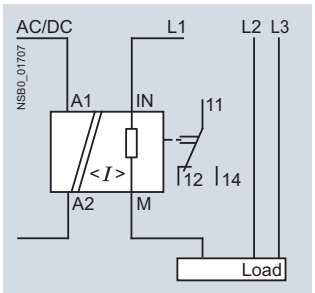
3UG4621-.AA30,
3UG4622-.AA30

Operation with joint control circuit and load circuit



3UG4621-.AW30,
3UG4622-.AW30

Single-phase operation

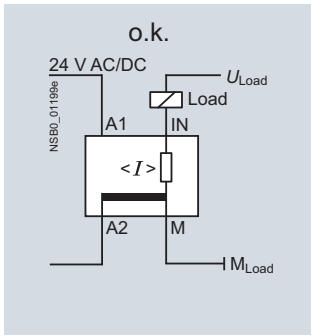


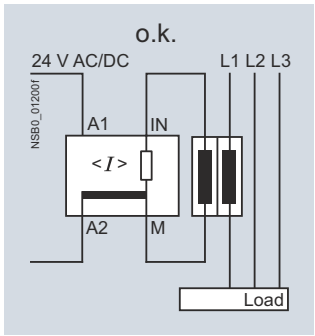
3UG4621-.AW30,
3UG4622-.AW30

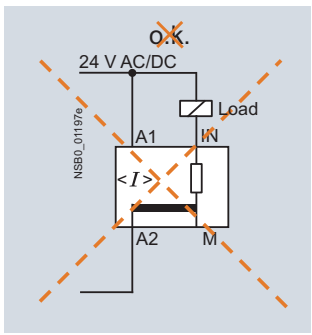
Three-phase operation

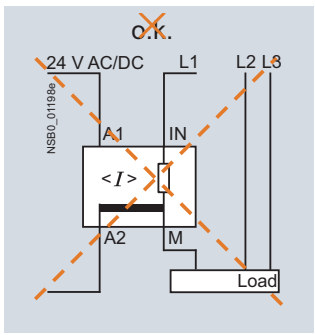
Connection diagrams for 24 V AC/DC (only 3UG462.-.AA30)

From the following circuit diagrams it is clear that loads in measuring circuits have to be in the current flow upstream from the monitoring relay. Otherwise, the monitoring relay could be destroyed and the short-circuit current could cause damage to the plant.









Configuring note:

A2 and M are electrically connected internally.

For applications in which the load to be monitored and the monitoring relay are supplied from the same power supply, there is no need for connection A2.

The load current must always flow through M or the monitoring relay may be destroyed.

3UG4 Monitoring relays – single-phase current monitoring

Measuring range	Hysteresis	Contacts	On delay bypass time	Tripping delay	Auxiliary voltage	Order No.	List Price $
22.5 mm wide, all of the devices can be digitally set and have an LCD display, a fault memory that can be switched-in, simultaneous monitoring for overcurrent and undercurrent over the complete measuring range							
3.0 mA AC/DC up to 500 mA AC/DC	0.1 mA–250 mA	1 CO	0.1–20 s	0.1–20 s	24 V AC/DC	**3UG4621-□AA30**	
					24–240 V AC/DC	**3UG4621-□AW30**	
0.05 A AC/DC up to 10 A AC/DC	0.01 A–5 A	1 CO	0.1–20 s	0.1–20 s	24 V AC/DC	**3UG4622-□AA30**	
					24–240 V AC/DC	**3UG4622-□AW30**	

Screw Terminal 1
Spring-type Terminal 2

Power factor and active current monitoring

Measuring range for power factor	Measuring range for active current I_{res}	Power factor hysteresis	Active current hysteresis	On delay	Tripping delay	Rated control supply voltage V_s [1]	Order No.	List Price $
22.5 mm wide, all of the devices can be digitally set and have an LCD display, a fault memory that can be switched-in, simultaneous power factor and active current monitoring over the entire measuring range								
0.1–0.99 (cos φ)	0.2–10.0 A	0.1(cos φ)	0.1–2.0 A	0–99 s	0.1–20.0 s	90–690 V AC	**3UG4641-□CS20**	

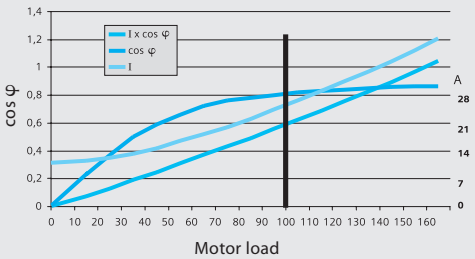
[1] Absolute limits.

Screw Terminal 1
Spring-type Terminal 2

Monitoring parameter	Plant system states
Current monitoring	• Overload monitoring • Underload monitoring close to the rated torque • Monitoring the functionality of electric loads • Wire breakage monitoring • Energy management (phase current monitoring) • Threshold value switch for analog signals up to 20 mA
Power factor and active current monitoring	• No-load monitoring • Underload monitoring in the lower power range • Extremely simple power factor monitoring of line supplies to control compensation equipment • Energy management • Interrupted cable between the cabinet and the motor

Current and cos φ as a function of the motor load

Rule of thumb:
cos φ changes significantly below the rated load; the current increases overproportionally above the rated load.



The active current I_{res} indicates a linear correlation between the motor load and the measured value over the entire measuring range.

Technical specifications

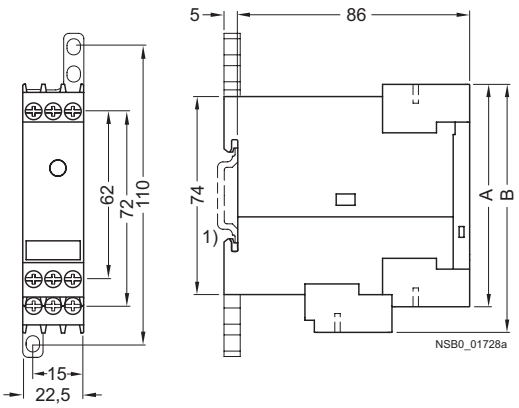
		3UG46 21-.AA	3UG46 21-.AW	3UG46 22-.AA	3UG46 22-.AW
General data					
Rated control supply voltage U_s	V	24	24 … 240	24	24 … 240
Rated frequency	Hz	50/60			
Operating range	V	20.4 ... 26.4	20.4 ... 264	20.4 ... 26.4	20.4 ... 264
Rated power	W/VA	2/4			
Width	mm	22.5			
RESET		Automatic/manual			
Availability time after application of U_s	ms	1000			
Response time once a switching threshold is reached	ms	Max. 450			
Adjustable tripping delay time/ON-delay time	s	0.1 … 20			
Mains buffering time, minimum	ms	10			
Rated insulation voltage U_i Degree of pollution 3; overvoltage category III acc. to EN 60664-1	V	690			
Rated impulse withstand voltage U_{imp}	kV	6			
Protective separation acc. to EN 60947-1, Annex N	V	300			
Permissible ambient temperature					
• During operation	°C	-25 … +60			
• During storage	°C	-40 … +85			
EMC tests[1]		IEC 60947-1/IEC 61000-6-2/IEC 61000-6-4			
Degree of protection					
• Enclosure		IP40			
• Terminals		IP20			
Vibration resistance acc. to IEC 60068-2-6		1 ... 6 Hz: 15 mm; 6 ... 500 Hz: 2 *g*			
Shock resistance acc. to IEC 60068-2-27		12 shocks (half-sine 15 *g*/11 ms)			
Connection type		**Screw terminals**			
• Terminal screw		M 3 (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 sleeves 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)			
Measuring circuit					
Measuring range for single-phase AC/DC current	A	0.003 … 0.6		0.05 … 15	
Setting range for single-phase current	A	0.003 ... 0.5		0.05 ... 10	
Load supply voltage	V	24	Max. 300[2] Max. 500[3]	24	Max. 300[2] Max. 500[3]
Measuring accuracy	%	5			
Repeat accuracy at constant parameters	%	1			
Accuracy of digital display		±1 digit			
Deviations for temperature fluctuations	%/°C	±0.1			
Hysteresis for single-phase current		0.1 ... 250 mA		0.01 ... 5 A	
Permissible overcurrent, continuous	A	0.6		15	
Permissible overcurrent, < 1 s	A	5		50	
Protection against destruction, DIAZED gL/gG	A	2		16	
Measuring circuit internal resistance, shunt	mΩ	500		5	
Control circuit					
Load capacity of the output relay					
• Conventional thermal current I_{th}	A	5			
Rated operational current I_e 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			
Output relay with DIAZED fuse gL/gG	A	4			
Electrical endurance AC15 (million operating cycles)		0.1			
Endurance with contactor relay (million operating cycles)		10			

[1] Important: This is a Class A product. In the household environment this device may cause radio interference. In this case the user must introduce suitable measures.

[2] With protective separation.

[3] With simple separation.

Dimensional drawings



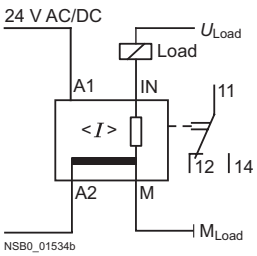
Type	3UG46 21 3UG46 22 A	B
Removable terminal		
Screw-type terminal	83	92
Spring-loaded terminal	84	94

1) For standard mounting rail according to EN 60715.

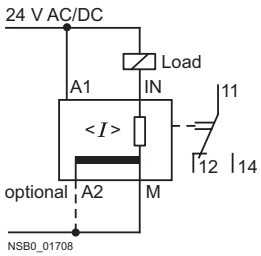
Schematics

3UG46 21-.AA30
3UG46 22-.AA30

Operation with separate control circuit and load circuit

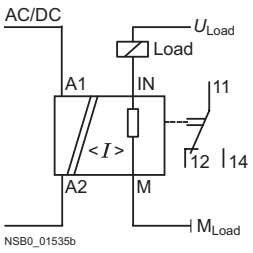


Operation with joint control circuit and load circuit

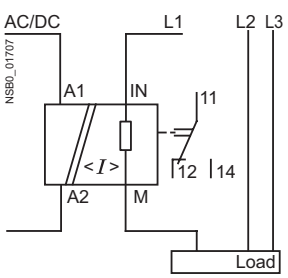


3UG46 21-.AW30
3UG46 22-.AW30

Single-phase operation

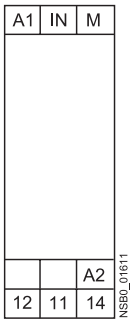


3-phase operation



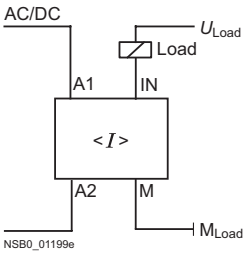
Position of the terminals

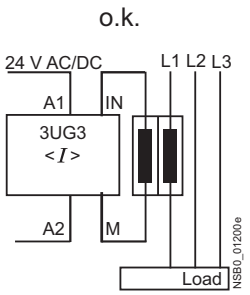
3UG46 21
3UG46 22

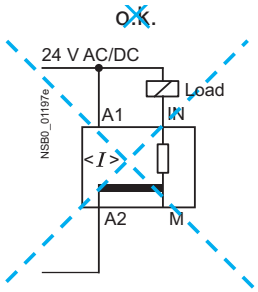


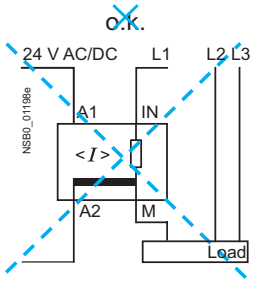
Wiring diagram for 24 V AC/DC (only 3UG46 2.-.AA30)

From the following circuit diagrams it is clear that loads in measuring circuits have to be in the current flow upstream from the monitoring relay. Otherwise, the monitoring relay could be destroyed and the short-circuit current could cause damage to the plant.









Configuring note:

A2 and M are electrically connected internally!

For applications in which the load to be monitored and the monitoring relay are supplied from the same power supply, there is no need for connection A2!

The load current must always flow through M or the monitoring relay may be destroyed!

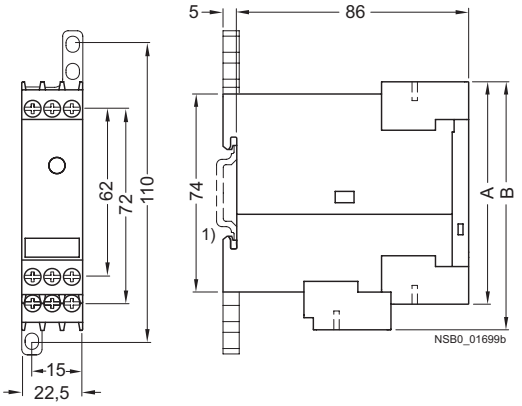
Technical specifications

Type		3UG46 41
General data		
Rated control supply voltage U_s	V	90 … 690
Rated frequency	Hz	50/60
Rated power, typical		
• At 200 V AC	VA	2.0
• At 400 V AC	VA	2.7
• At 460 V AC	VA	3.1
Width	mm	22.5
RESET		Automatic/manual
Principle of operation		Closed-circuit principle, open-circuit principle
Availability time after application of U_s	ms	1000
Response time once a switching threshold is reached	ms	Max. 450
Adjustable tripping delay time	s	0.1 ... 20
Adjustable ON-delay time	s	0 ... 99
Mains buffering time, minimum	ms	10
Rated insulation voltage U_i Degree of pollution 3 Overvoltage category III acc. to EN 60664-1	V	690
Rated impulse withstand voltage	kV	6
Permissible ambient temperature		
• During operation	°C	-25 … +60
• During storage	°C	-40 … +85
EMC tests[1]		IEC 60947-1/IEC 61000-6-2/IEC 61000-6-4
Degree of protection		
• Enclosure		IP40
• Terminals		IP20
Vibration resistance acc. to IEC 60068-2-6		1 ... 6 Hz: 15 mm; 6 ... 500 Hz: 2 *g*
Shock resistance acc. to IEC 60068-2-27		12 shocks (half-sine 15 *g*/11 ms)
Connection type		**Screw terminals**
• Terminal screw		M 3 (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 sleeves 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)
Measuring circuit		
Measurable active current I_{res}	A	0.2 ... 10
Max. permissible load current	A	10
Peak current < 1 s	A	50
Adjustable response value **Phase displacement angle**		0.1 ... 0.99
DIAZED protection, gL/gG operational class	A	16
Measuring accuracy	%	10
Repeat accuracy at constant parameters	%	1
Accuracy of digital display		± 1 digit
Deviations for temperature fluctuations	%/°C	±0.1
Hysteresis Phase angle		0.10
Hysteresis Active current monitoring	A	0.1 ... 2.0

[1] Important: This is a Class A product. In the household environment this device may cause radio interference. In this case the user must introduce suitable measures.

Type		3UG46 41
Control circuit		
Number of CO contacts for auxiliary contacts		2
Load capacity of the output relay • Conventional 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
Output relay with DIAZED fuse gL/gG operational class	A	4
Electrical endurance AC-15	Million operating cycles	0.1
Mechanical endurance	Million operating cycles	10

Dimensional drawings

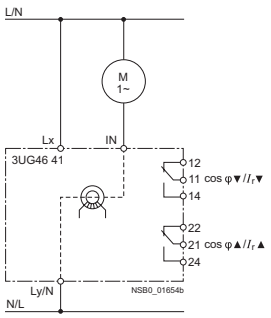


Type	3UG46 41	
	A	B
Removable terminal		
Screw-type terminal	83	92
Spring-loaded terminal	84	94

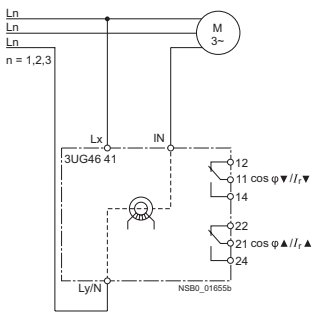
1) For standard mounting rail according to EN 60715.

Schematics

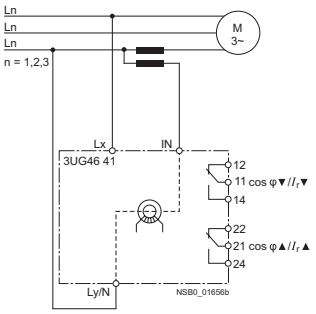
Single-phase motors



3-phase motors



3-phase motors with transformers for currents > 10 A

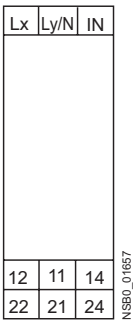


Legend

cos φ: p. f.

Position of the terminals

3UG46 41



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).

Benefits

- Worldwide use thanks to wide voltage range from 24 to 240 V AC/DC
- High measuring accuracy ± 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.

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 – 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 overshot.

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.

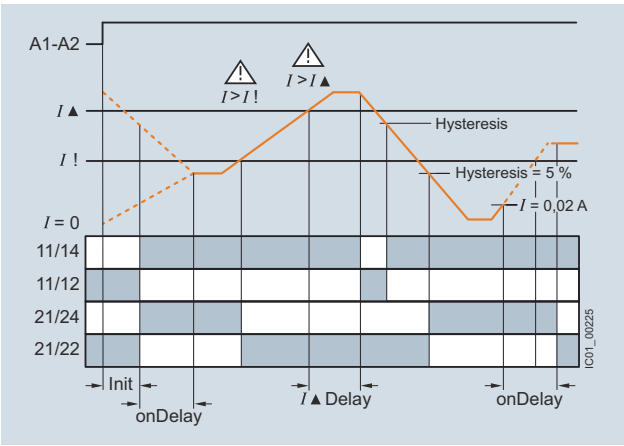
ON-delay time for motor start

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 overshot during this period.

With the closed-circuit principle selected

Residual current monitoring with Auto RESET (Memory = no)

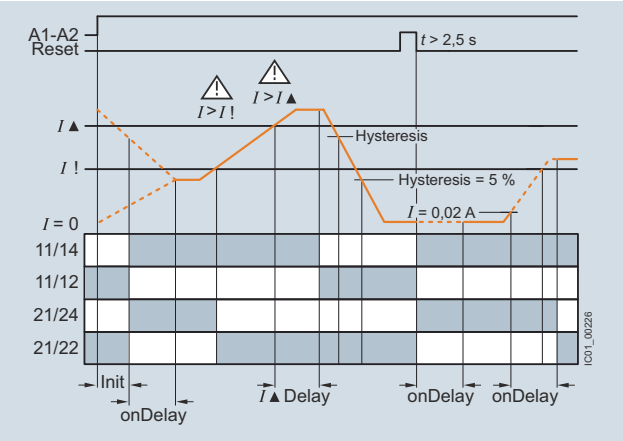


If the device is set to Auto RESET, the relay switches back to the OK state for the tripping value once the value falls below the set hysteresis threshold and the display stops flashing.

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.

Residual current monitoring with Manual RESET (Memory = yes)



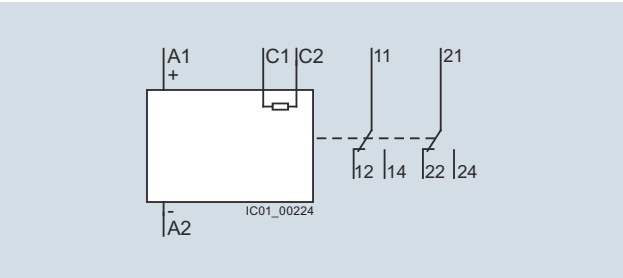
If Manual RESET is selected in the menu, the output relays remain in their current switching state and the current measured value and the symbol for overshooting continues to flash, even when the measured residual current returns to a permissible value. This stored fault status can be reset by pressing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

Circuit diagram



3UG4625

Note:

It is not necessary to protect the measuring circuit for device protection. The protective device for line protection depends on the cross-section used.

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

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

3UL23 residual-current transformers, see page 11/66.

Overview

SIRIUS 3UL23 residual-current transformer

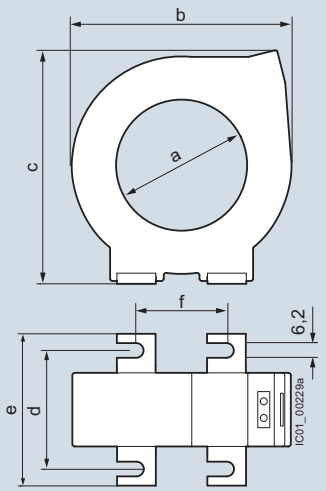
The 3UL23 residual-current transformers detect residual currents in machines and plants. They are suitable for pure AC residual currents or AC residual currents with a pulsating DC fault current component (transformer type A in accordance with DIN VDE 0100-530/IEC TR 60755).

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.

Technical specifications

Dimensional drawing



Type	a	b	c	d	e	f
3UL2302-1A	35	70	75,5	50	64	--
3UL2303-1A	55	92	98	50	64	38
3UL2304-1A	80	124,5	130	50	64	60
3UL2305-1A	110	163	169	50	64	84,5
3UL2306-1A	140	201	207,5	50	64	110
3UL2307-1A	210	300	286	46	62	161

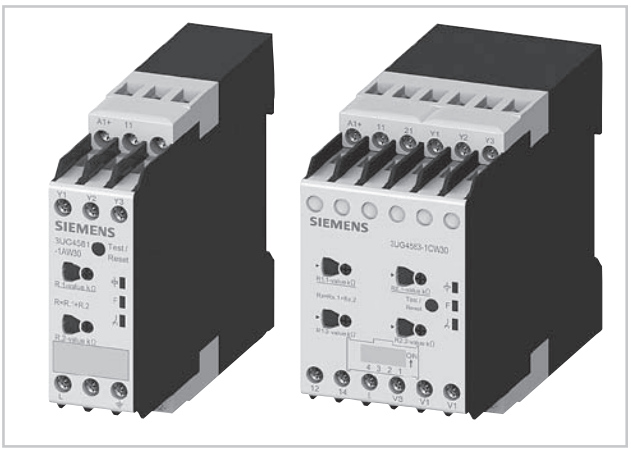
Selection and ordering data

Diameter of the bushing opening	Connectable cross-section of the connecting terminal	DT	Screw terminals		PU (UNIT, SET, M)	PS*
			Article No.	Price per PU		
mm	mm^2					
Residual-current transformer (essential accessory for 3UG4625, 3UG4825 or SIMOCODE 3UF)						
35	2.5	A	**3UL2302-1A**		1	1 unit
55	2.5	A	**3UL2303-1A**		1	1 unit
80	2.5	A	**3UL2304-1A**		1	1 unit
110	2.5	A	**3UL2305-1A**		1	1 unit
140	2.5	A	**3UL2306-1A**		1	1 unit
210	4	A	**3UL2307-1A**		1	1 unit

Accessories

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

Overview



SIRIUS 3UG45 8. insulation monitor

Isolation 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 supplies 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 series

- 3UG45 81 insulation monitoring relays for ungrounded AC networks
- 3UG45 82, 3UG45 83 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 1000 V DC by means of a voltage reducer module
- For AC mains: Frequency range 15 ... 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 pushbutton 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

Technical specifications

General data

Type	3UG45 81-1AW30	3UG45 82-1AW30	3UG45 83-1AW30
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	✓	--	✓
• 0 ... 690 V AC	--	--	✓ 1)
• 0 ... 300 V DC	--	✓	--
• 0 ... 600 V DC	--	--	✓
• 0 ... 1000 V DC	--	--	✓ 1)
Max. leakage capacitance of the system			
• 10µ F	✓	✓	--
• 20µ F	--	--	✓
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			
• 13.5 ... 440 Hz	--	--	✓
• 45 ... 65 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			
3UG30 81-1AK20 110 ... 130/220 ... 240 V AC/DC	3 x 230/400 V AC	✓	--	--
3UG30 81-1AW30 24 ... 240 V AC/DC	3 x 230/400 V AC	✓	--	--
3UG30 82-1AW30 24 ... 240 V AC/DC	24 ... 240 V DC	--	✓	--

✓ Available

-- Not available

1) With voltage reducer module.

Overview

SIRIUS 3UG45 81 insulation monitor

The 3UG45 81 insulation monitoring relays are used to monitor insulation resistance in accordance with 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.

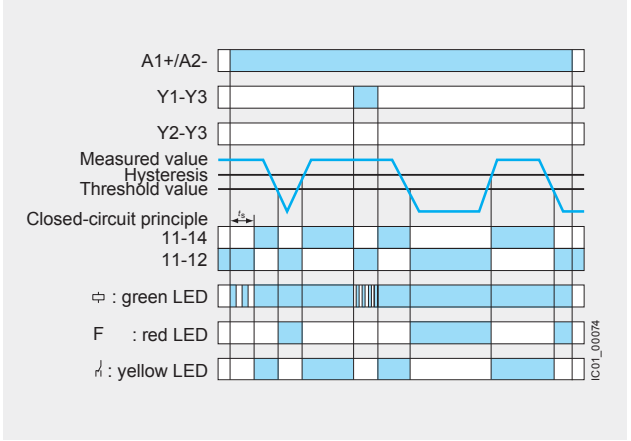
In the case of 3UG45 81 a higher-level DC measuring signal is used. The higher-level DC measuring signal and the resulting current are used to determine the value of the insulation resistance of the network which is to be measured.

Technical specifications

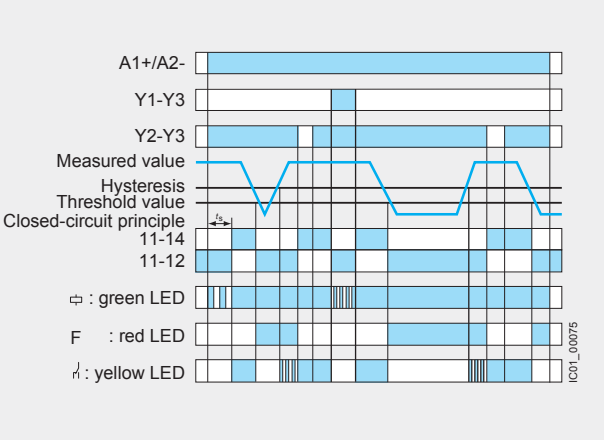
3UG45 81 monitoring relays

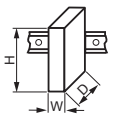
With the closed-circuit principle selected

Insulation resistance monitoring without fault storage, with auto RESET

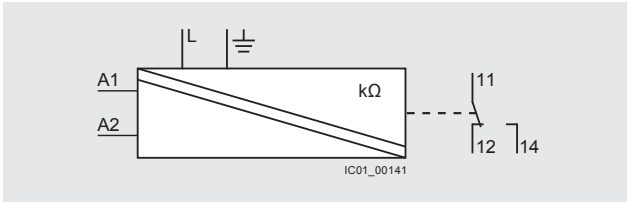


Insulation resistance monitoring with fault storage and manual RESET



Type		3UG45 81
Dimensions (W x H x D) 	mm	22.5 x 100 x 100
Connection type		**Screw terminals**
• 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	kV	6
Rated control supply voltage	V	24 ... 240 AC/DC
Rated frequency	Hz	15 ... 400
Measuring circuit		
Rated system 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 • Conventional thermal current I_{th}	A	4
Rated operational current I_e at • AC-15/24 ... 400 V • DC-13/24 V	A A	3 2
Minimum contact load at 24 V DC	mA	10

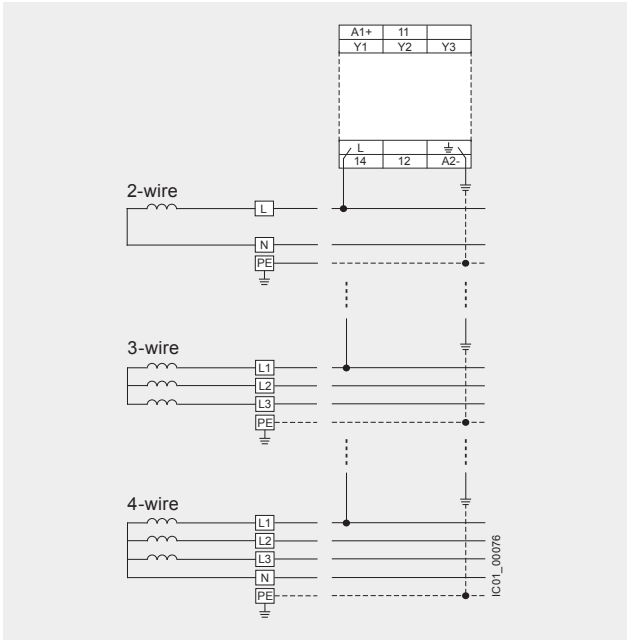
Circuit diagram



3UG45 81

Note:
It is not necessary to protect the measuring circuit for device protection. The protective device for line protection depends on the cross-section used.

Connection diagrams for networks up to 400 V AC

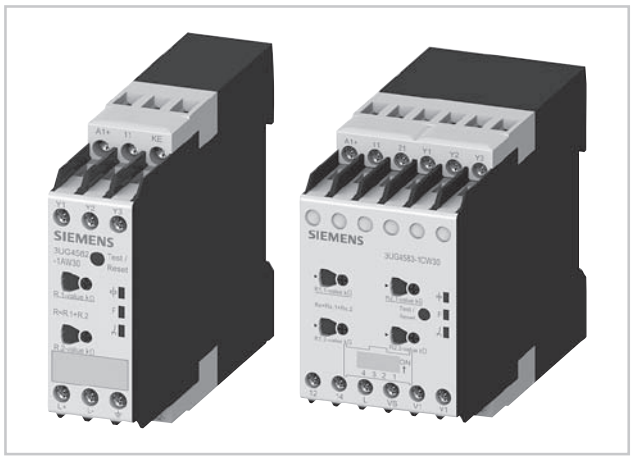


Selection and ordering data

- Auto or manual RESET
- Closed-circuit principle
- 1 CO contact
- Fault memory adjustable using control input (S2-S3)
- Reset by means of pushbutton on front or using control input (S2-S3)
- Test by means of pushbutton on front or using control input (S1-S3)

	Rated system voltage U_n	Measuring range U_e	Rated control supply voltage U_s	System leakage capacitance	DT	**Screw terminals**	PU (UNIT, SET, M)	PS*	PG
						Order No. Price per PU			
	V AC	kΩ	V	µF					
Insulation monitors for ungrounded AC networks									
 3UG45 81-1AW30	0 ... 400	1 ... 110	24 ... 240 AC/DC	max. 10	B	**3UG45 81-1AW30**	1	1 unit	41H

Overview



SIRIUS 3UG45 82 and 3UG45 83 insulation monitors

The 3UG45 82 and 3UG45 83 insulation monitoring relays are used to monitor insulation resistance in ungrounded IT AC or DC networks in accordance with 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.

3UG49 83 voltage reducer modules

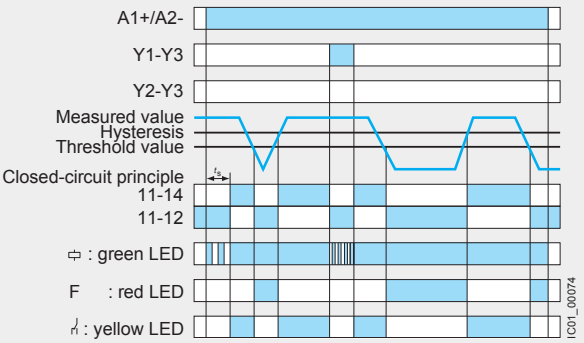
The 3UG49 83 passive voltage reducer module can be used to allow the 3UG45 83 insulation monitoring relay to be used for insulation monitoring of IT networks with rated voltages of up to 690 V AC and 1000 V DC.

Technical specifications

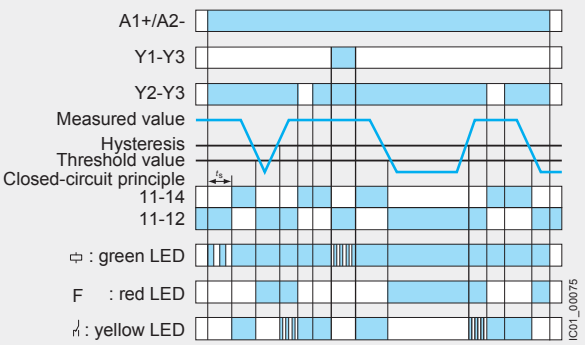
3UG45 82 monitoring relays

With the closed-circuit principle selected

Insulation resistance monitoring without fault storage, with auto RESET



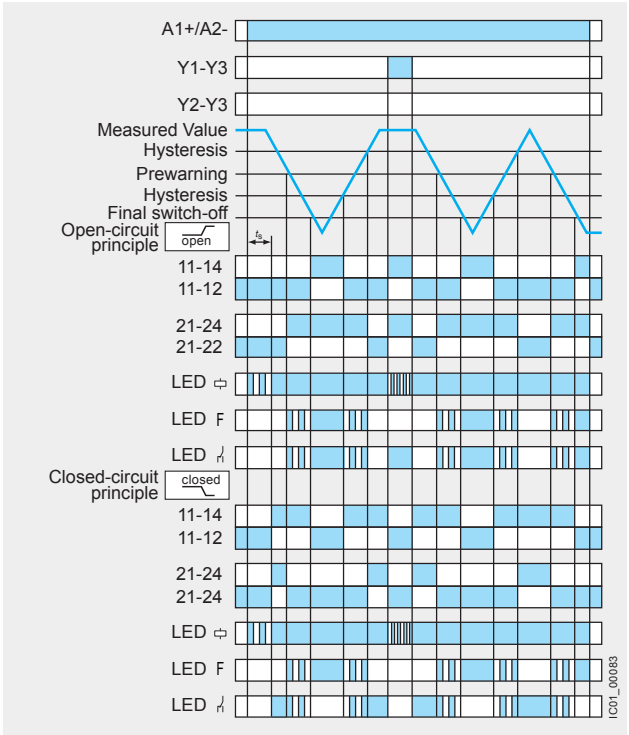
Insulation resistance monitoring with fault storage and manual RESET



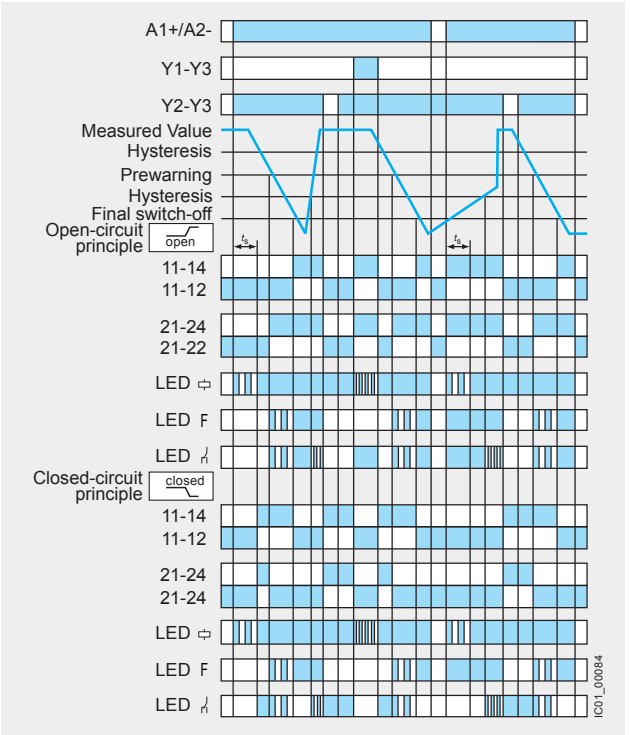
3UG45 83 monitoring relays

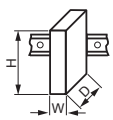
With the closed-circuit principle selected

Insulation resistance monitoring without fault storage, with auto RESET

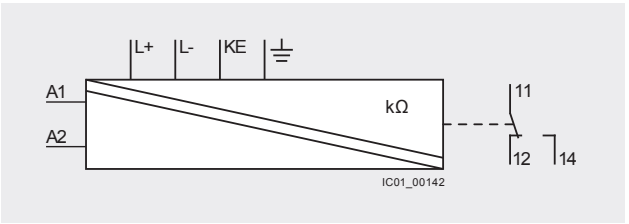


Insulation resistance monitoring with fault storage and manual RESET

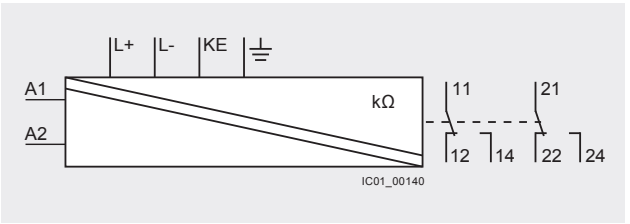


Type			3UG45 82	3UG45 83
Dimensions (W x H x D)		mm	22.5 x 100 x 100	45 x 100 x 100
Connection type			Screw terminals	
• Solid		mm^2	2 x (0.5 ... 4)	
• Finely stranded with end sleeve		mm^2	2 x (0.75 ... 2.5)	
• AWG cables, solid or stranded		AWG	2 x (20 ... 14)	
General data				
Rated insulation voltage 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		kV	6	
Rated control supply voltage		V	24 ... 240 AC/DC	
Rated frequency		Hz	15 ... 400	
Measuring circuit				
Rated system voltage of the network being monitored		V	0 ... 250 AC, 0 ... 300 DC	0 ... 300 AC, 0 ... 690 AC with 3UG49 83 0 ... 600 DC, 0 ... 1000 DC with 3UG49 83
Rated frequency of the network being monitored		Hz	DC or 15 ... 400	
Setting range for insulation resistance		kΩ	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 • Conventional thermal current I_{th}		A	4	
Rated operational current I_e at • AC-15/24 ... 400 V • DC-13/24 V		A A	3 2	
Minimum contact load at 24 V DC		mA	10	

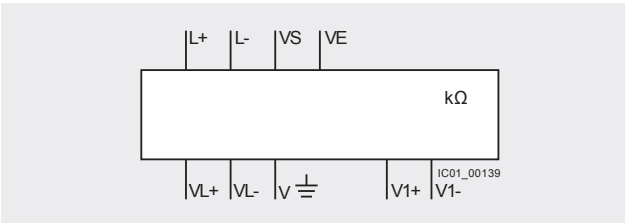
Circuit diagrams



3UG45 82



3UG45 83



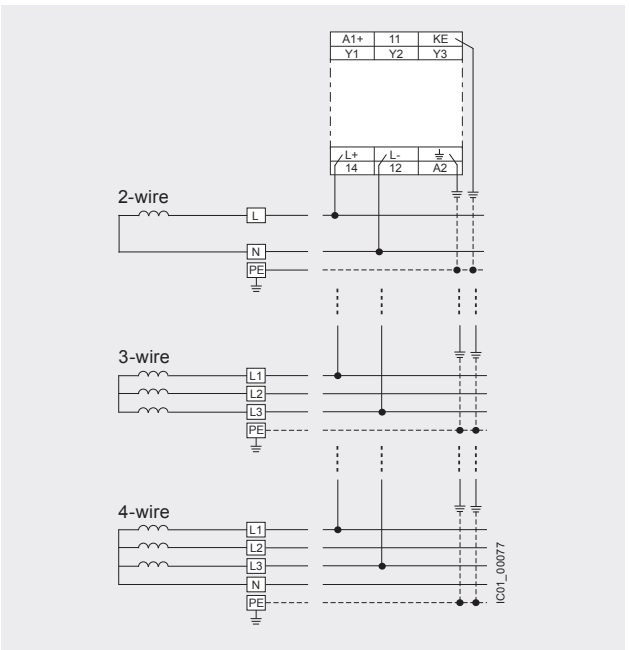
3UG49 83

Note:
It is not necessary to protect the measuring circuit for device protection. The protective device for line protection depends on the cross-section used.

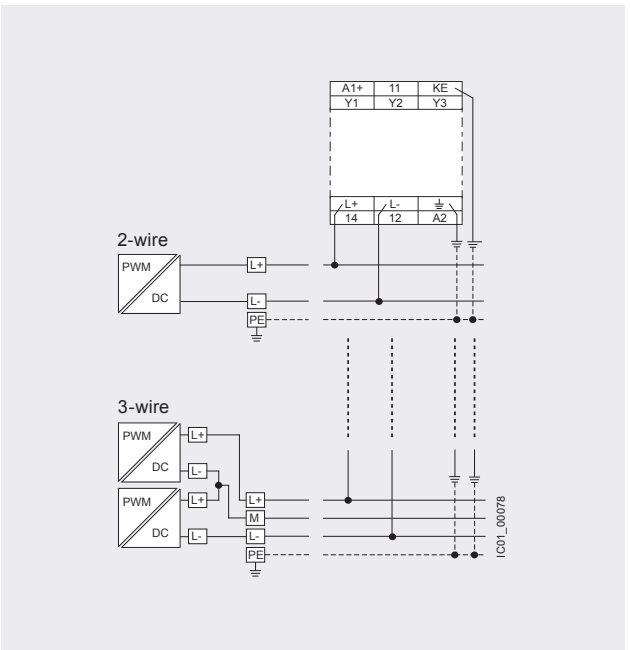
Connection diagrams

3UG45 82

AC network, 2-wire, 3-wire or 4-wire



DC network, 2-wire or 3-wire

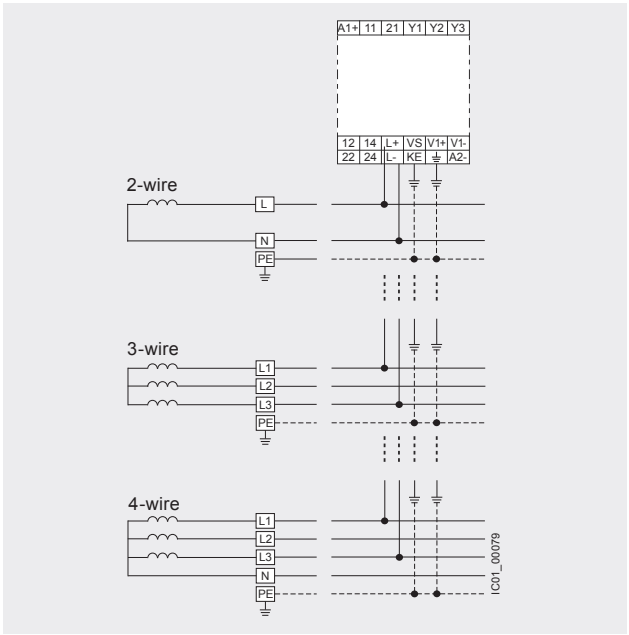


Note:

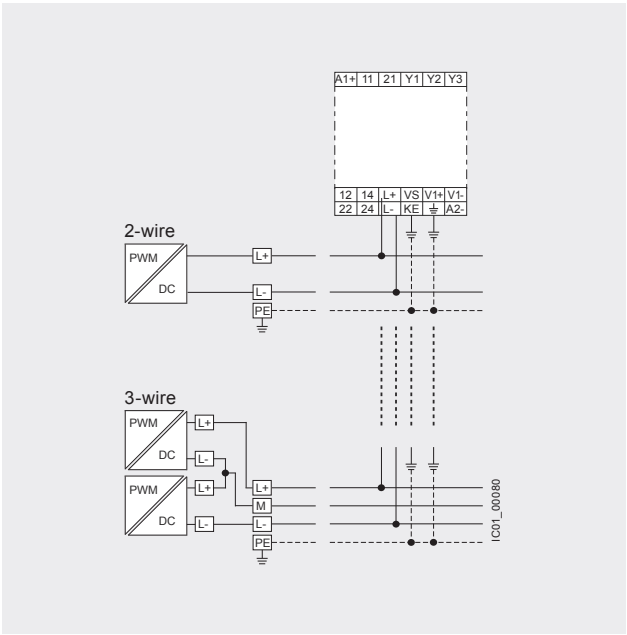
L+ and L- can be connected to any wire, but each to a different wire. $U_n \leq$ 250 V AC or 300 V DC.

3UG45 83

AC network, 2-wire, 3-wire or 4-wire



DC network, 2-wire or 3-wire

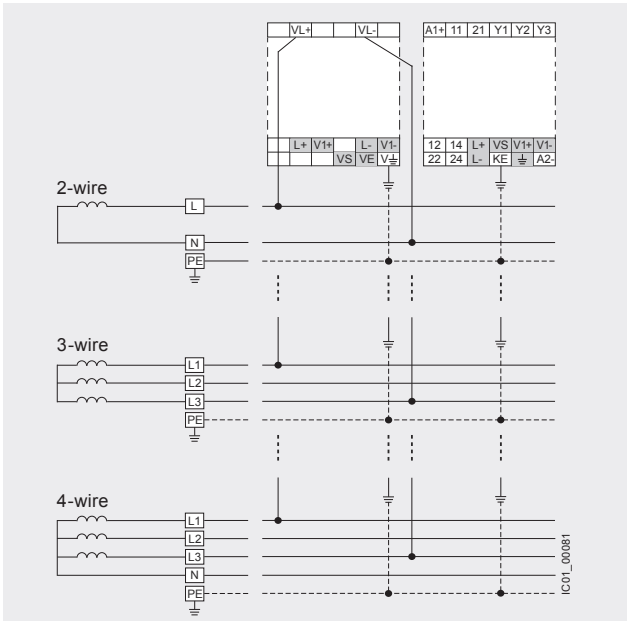


Note:

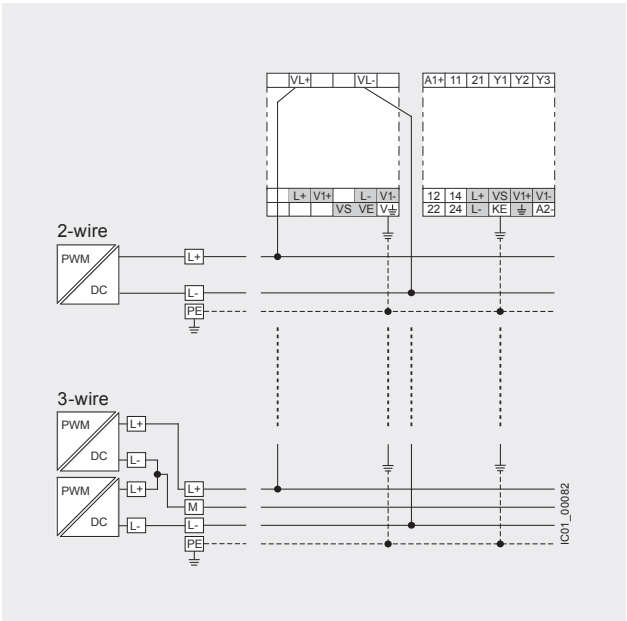
L+ and L- can be connected to any wire, but each to a different wire. $U_n \leq 400$ V AC or 600 V DC.
Use a voltage reducer module to monitor systems with higher voltages.

3UG49 83 voltage reducer modules

AC network, 2-wire, 3-wire or 4-wire



DC network, 2-wire or 3-wire



Note:

L+ and L- can be connected to any wire, but each to a different wire. $U_n \leq 400$ V AC or 600 V DC.
Use a voltage reducer module to monitor systems with higher voltages.

Selection and ordering data

- Auto or manual RESET
- 3UG45 82: Open-circuit principle
  3UG45 83: Open-circuit or closed-circuit principle, adjustable
- 1 or 2 CO contacts
- Fault memory adjustable using control input (S2-S3)
- Reset by means of pushbutton on front or using control input (S2-S3)
- Test by means of pushbutton on front or using control input (S1-S3)
- 3UG45 83: Non-volatile fault storage can be configured
- 3UG45 83: 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:

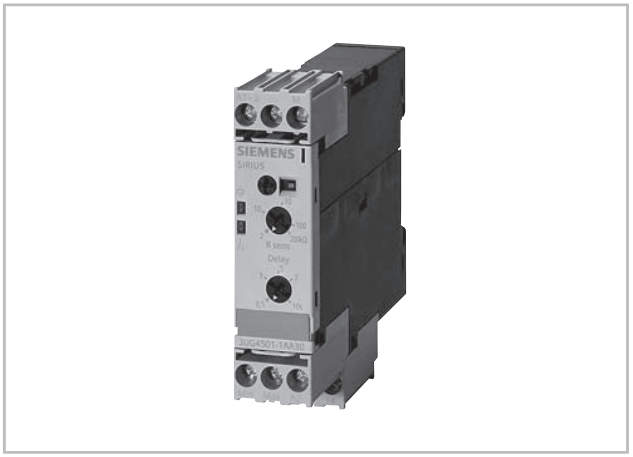
With the 3UG49 83-1A coupling unit, connection to networks with a voltage of up to 690 V AC and 1000 V DC is possible, see below.

	Rated system voltage U_n	System leakage capacitance	Output relay	Measuring range U_e	Broken wire detection in the measuring range	DT	Screw terminals ⊕ Order No.	Price per PU	PU (UNIT, SET, M)	PS*	PG
	V	µF		kΩ							
SIRIUS 3UG45 82 insulation monitors											
 3UG45 82-1AW30	0 ... 250 AC	max. 10	1 CO	1 ... 110	✓	B	**3UG45 82-1AW30**		1	1 unit	41H
SIRIUS 3UG45 83 insulation monitors											
 3UG45 83-1AW30	0 ... 400 AC, 0 ... 600 DC [1]	max. 20	2 CO or 1 CO + 1 CO, adjustable	1 ... 110, 2 ... 200 for 2nd limit value, adjustable	✓ adjustable	B	**3UG45 83-1CW30**		1	1 unit	41H
	3UG45 83 voltage reducer modules										
 3UG49 83-1A	For extending the mains voltage range to max. 690 V AC and 1000 V DC					B	**3UG49 83-1A**		1	1 unit	41H

✓ Available

[1] With 3UG49 83-1A voltage reducer module suitable also for the insulation monitoring of IT networks up to 690 V AC and 1000 V DC.

Overview



The 3UG45 01 level monitoring relay is used together with 2- or 3-pole sensors to monitor the levels of conductive liquids.

Application

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

Selection and ordering data

- Level monitoring relay for conductive liquids
- Control principle: inlet or outlet control per rotary switch
- Single-point and two-point control possible
- Analog adjustable sensitivity (specific resistance of the liquid)
- Analog adjustable tripping delay time
- 1 yellow LED for indicating the relay state
- 1 green LED for indicating the applied control supply voltage
- 1 CO contact
- All terminals are removable
- Width 22.5 mm

Sensitivity	Tripping delay time	Rated control supply voltage U_s	**Screw terminals**		PU (UNIT, SET, M)	PS*	Weight per PU approx.
kΩ	s	V AC/DC	Order No.	List Price $ per PU			kg
2 ... 200	0.5 ... 10	24[1)] 24 ... 240	**3UG45 01-1AA30** **3UG45 01-1AW30**		1 1	1 unit 1 unit	0.110 0.120

Sensitivity	Tripping delay time	Rated control supply voltage U_s	**Spring-type terminals**		PU (UNIT, SET, M)	PS*	Weight per PU approx.
kΩ	s	V AC/DC	Order No.	List Price $ per PU			kg
2 ... 200	0.5 ... 10	24[1)] 24 ... 240	**3UG45 01-2AA30** **3UG45 01-2AW30**		1 1	1 unit 1 unit	0.110 0.120

For level monitoring sensors see page 11/78

[1)] The rated control supply voltage and the measuring circuit are not electrically isolated.

Selection and ordering data

	Version	Assignment Cable	Assignment Electrode	Application	Order No.	List Price $ per PU	PU (UNIT, SET, M)	PS*	Weight per PU approx. kg
Level monitoring sensors (essential accessory)									
 3UG32 07-3A	**Three-pole wire electrodes** 500 mm long, with Teflon insulation (PTFE), screw-in gland width A/F 22, 3/8 inch thread, PVC connecting cable, 3 x 0.5 mm², 2 m long, max. operating temperature 90 °C, max. operating pressure 10 bar	Brown White Green	Center electrode Not assignable	The 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. Applications: For 2-point liquid level control in an insulating tank. One electrode each for the min. and max. value and a common reference electrode.	**3UG32 07-3A**		1	1 unit	0.254
 3UG32 07-2A	**Two-pole wire electrodes** 500 mm long, with Teflon insulation (PTFE), screw-in gland width A/F 22, 3/8 inch thread, PVC connecting cable, 3 x 0.5 mm², 2 m long, max. operating temperature 90 °C, max. operating pressure 10 bar	Brown White	Not assignable	For installation see 3UG32 07-3A Application: 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.	**3UG32 07-2A**		1	1 unit	0.230
 3UG32 07-2B	**Two-pole bow electrodes** with Teflon insulation (PTFE), screw-in gland width A/F 22, 3/8 inch thread, PVC connecting cable, 3 x 0.5 mm², 2 m long, max. operating temperature 90 °C, max. operating pressure 10 bar	Brown White Green	Gland Not assignable	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.	**3UG32 07-2B**		1	1 unit	0.128
 3UG32 07-1B	**Single-pole bow electrodes for lateral fitting** with Teflon insulation (PTFE), screw-in gland width A/F 22, 3/8 inch thread, PVC connecting cable, 3 x 0.5 mm², 2 m long, max. operating temperature 90 °C, max. operating pressure 10 bar	Brown White	Gland Electrode	As a max. value electrode for lateral fitting or for alarm indication in conductive tanks or pipes.	**3UG32 07-1B**		1	1 unit	0.122
 3UG32 07-1C	**Single-pole rod electrodes for lateral fitting** with Teflon insulation (PTFE), screw-in gland width A/F 22, 3/8 inch thread, PVC connecting cable, 3 x 0.5 mm², 2 m long, max. operating temperature 90 °C, max. operating pressure 10 bar	Brown White	Gland Electrode	For high flow velocities or for intensively sparkling fluids.	**3UG32 07-1C**		1	1 unit	0.144

Technical specifications

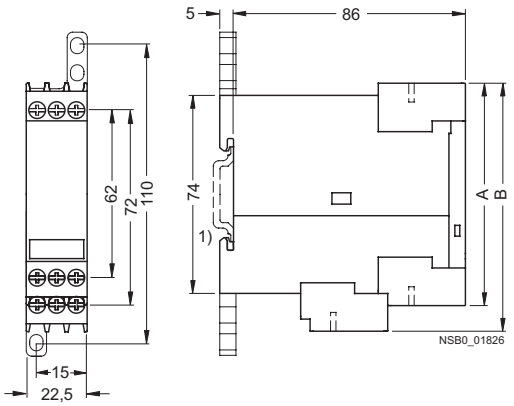
Type		3UG45 01-1AA30, 3UG45 01-2AA30	3UG45 01-1AW30, 3UG45 01-2AW30
General data			
Rated control supply voltage U_s	V AC/DC	24	24 … 240
Rated frequency	Hz	50/60	
Operating range	V	20.4 ... 26.4	20.4 ... 264
Rated power, max.			
• At 24 V AC	VA	2	2
• At 240 V AC	VA	--	4
Width	mm	22.5	
Availability time after application of U_s	ms	500	
Response time once a switching threshold is reached	ms	Max. 300	
Adjustable delay time	s	0.5 ... 10	
Inlet or outlet monitoring function		UNDER/OVER selector switch at the front	
Mains buffering time, minimum	ms	200	
Rated insulation voltage U_i Degree of pollution 3, Overvoltage category III acc. to EN 60664-1	V	300	
Rated impulse withstand voltage	kV	4	
Permissible ambient temperature			
• During operation	°C	-25 … +60	
• During storage	°C	-40 … +80	
EMC tests[1]		IEC 60947-1/IEC 61000-6-2/IEC 61000-6-4	
Degree of protection			
• Enclosure (acc. to EN 60529)		IP40	
• Terminals		IP20	
Vibration resistance acc. to IEC 60068-2-6		1 ... 6 Hz: 15 mm; 6 ... 500 Hz: 2 *g*	
Shock resistance acc. to IEC 60068-2-27		12 shocks (half-sine 15 g/11 ms)	
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 sleeves 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)	
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 capacity of sensor cable[2]	nF	Max. 10	
Adjustable sensitivity			
• Resistance	kΩ	2 ... 200	
Measuring accuracy	%	±20	
Repeat accuracy at constant parameters	%	±1	
Deviations for temperature fluctuations	%/°C	±1	
Control circuit			
Number of CO contacts for auxiliary contacts		1	
Load capacity of the output relay Conventional thermal current I_{th}	A	5	
Rated operational current I_e 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	
Output relay with DIAZED fuse gL/gG operational class	A	4	
Electrical endurance AC-15	Million operating cycles	0.1	
Mechanical endurance	Million operating cycles	10	

[1] Important: This is a Class A product. In the household environment this device may cause radio interference. In this case the user must introduce suitable measures.

[2] 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.

Dimensional drawings

3UG45 01

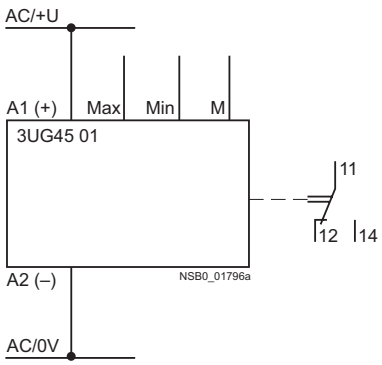


Type	3UG45 01	
	A	B
Removable terminals		
Screw terminals	83	92
Spring-loaded terminals	84	94

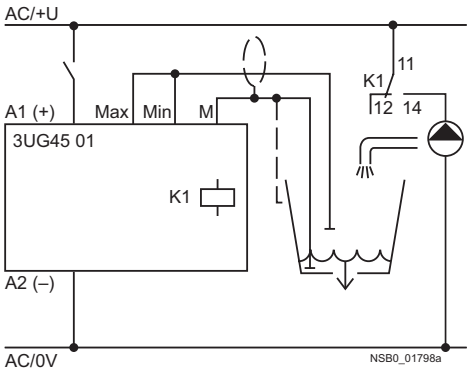
1) For standard mounting rail according to EN 60715.

Schematics

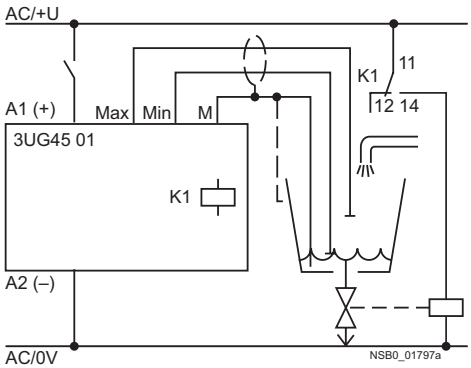
3UG45 01



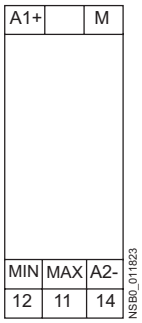
Single-point control with inlet monitoring



Two-point control with outlet monitoring



Position of the terminals

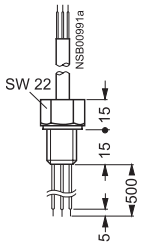


Technical specifications

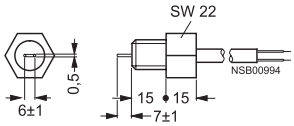
Type			3UG32 07-3A three-pole	3UG32 07-2A two-pole	3UG32 07-2B two-pole	3UG32 07-1B single-pole	3UG32 07-1C single-pole
Length		mm	500	500	--	--	--
Insulation	Teflon insulation (PTFE)		Yes	Yes	Yes	--	Yes
Installation			Vertical	Vertical	Lateral	Lateral	Lateral
Screw-in gland width A/F			22				
Thread		inch	R 3/8				
Connecting cable		mm^2	3 x 0.5, 2 m long				
Operating temperature		°C	90				
Operating pressure		bar	10				
Assignment							
Cable/Electrode	• Cable brown		Center electrode	Not assignable	Gland	Gland	Gland
	• Cable white		Not assignable	Not assignable	Not assignable	Electrode	Electrode
	• Cable green		Not assignable	--	Not assignable	--	--

Dimensional drawings

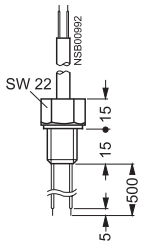
3UG32 07-3A
three-pole wire electrode



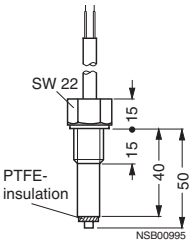
3UG32 07-1B
single-pole bow electrode



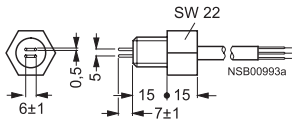
3UG32 07-2A
two-pole wire electrode



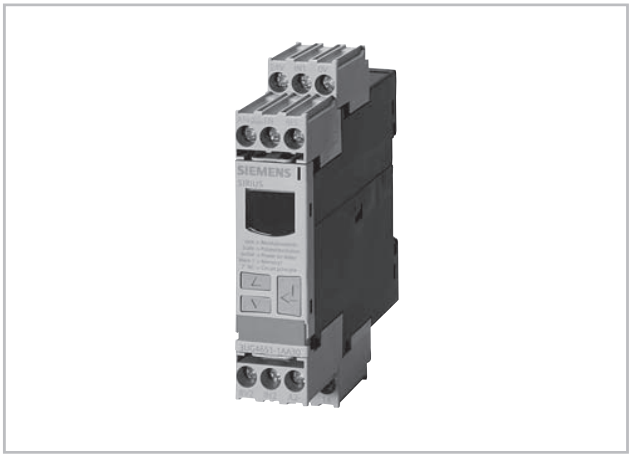
3UG32 07-1C
single-pole electrode, rugged version



3UG32 07-2B
two-pole bow electrode



Overview



The 3UG46 51 monitoring relay is used together with a sensor to monitor drives for overspeed and/or underspeed.

Furthermore, this 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).

Application

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

Selection and ordering data

- Relay for speed monitoring in min $^{-1}$ (rpm)
- Two- or three-wire sensor with mechanical or electronic switching output can be connected
- Two-wire NAMUR sensor can be connected
- Integrated sensor supply 24 V DC/50 mA
- Input frequency 0.1 ... 2200 pulses min $^{-1}$ (0.0017 ... 36.7 Hz)
- With or without enable signal for the drive to be monitored
- Digital adjustable, with illuminated LCD
- Overshoot, undershoot or range monitoring
- 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
- All terminals are removable
- Width 22.5 mm

Measuring range	Hysteresis	ON-delay time	Tripping delay time	Pulses per revolution	Rated control supply voltage U_s AC/DC	**Screw terminals**		PU (UNIT, SET, M)	PS*	Weight per PU approx.
rpm	rpm	s	s		V	Order No.	List Price $ per PU			kg
0.1 ... 2200	OFF, 0.1 ... 99.9	0 ... 900	0.1 ... 99.9	1 ... 10	24[1)] 24 ... 240	**3UG46 51-1AA30** **3UG46 51-1AW30**		1 1	1 unit 1 unit	0.120 0.130

Measuring range	Hysteresis	ON-delay time	Tripping delay time	Pulses per revolution	Rated control supply voltage U_s AC/DC	**Spring-type terminals**		PU (UNIT, SET, M)	PS*	Weight per PU approx.
rpm	rpm	s	s		V	Order No.	Lisat Price $ per PU			kg
0.1 ... 2200	OFF, 0.1 ... 99.9	0 ... 900	0.1 ... 99.9	1 ... 10	24[1)] 24 ... 240	**3UG46 51-2AA30** **3UG46 51-2AW30**		1 1	1 unit 1 unit	0.120 0.130

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

Technical specifications

Type		3UG46 51-1AA30, 3UG46 51-2AA30	3UG46 51-1AW30, 3UG46 51-2AW30
General data			
Rated control supply voltage U_s	V AC/DC	24	24 … 240
Rated frequency	Hz	50/60	
Operating range	V	20.4 ... 26.4	20.4 ... 264
Rated power, max.			
• At 24 V AC	VA	2.5	4
• At 240 V AC	VA	--	9
Width	mm	22.5	
RESET		Automatic/manual	
Availability time after application of U_s	ms	500	
Response time once a switching threshold is reached	ms	Max. 300	
Adjustable tripping delay time	s	0.1 ... 99.9	
Adjustable ON-delay time	s	1 ... 900	
Principle of operation		Closed-circuit principle, open-circuit principle	
NC/NO contact behavior		Adjustable	
Mains buffering time, minimum	ms	10	
Rated insulation voltage U_i Degree of pollution 3, Overvoltage category III acc. to EN 60664-1	V	300	
Rated impulse withstand voltage	kV	4	
Permissible ambient temperature			
• During operation	°C	-25 … +60[1]	
• During storage	°C	-40 … +80	
EMC tests[2]		IEC 60947-1, IEC 61000-6-2, IEC 61000-6-4	
Degree of protection			
• Enclosure (acc. to EN 60529)		IP40	
• Terminals		IP20	
Vibration resistance acc. to IEC 60068-2-6		1 ... 6 Hz: 15 mm; 6 ... 500 Hz: 2 *g*	
Shock resistance acc. to IEC 60068-2-27		12 shocks (half-sine 15 *g*/11 ms)	
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 sleeves 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)	
Measuring circuit			
Sensor supply			
• For three-wire sensor (24 V/0 V)	mA	Max. 50	
• For 2-wire NAMUR sensor (8V2)	mA	Max. 8.2	
Signal input			
• IN1	kΩ	16, three-wire sensor, pnp operation	
• IN2	kΩ	1, floating contact, 2-wire NAMUR sensor	
Voltage level			
• For level 1 at IN1	V	4.5 ... 30	
• For level 0 at IN1	V	0 ... 1	
Current level			
• For level 1 at IN2	mA	> 2.1	
• For level 0 at IN2	mA	< 1.2	
Minimum pulse duration of signal	ms	5	
Minimum interval between 2 pulses	ms	5	
Adjustable response value rpm	rpm	0.1 ... 2200	
Hysteresis	rpm	OFF and 0.1 ... 99.9	
Scale		1 ... 10	
Measuring accuracy	%	±10	
Repeat accuracy at constant parameters	%	±1	
Accuracy of digital display		±1 digit	

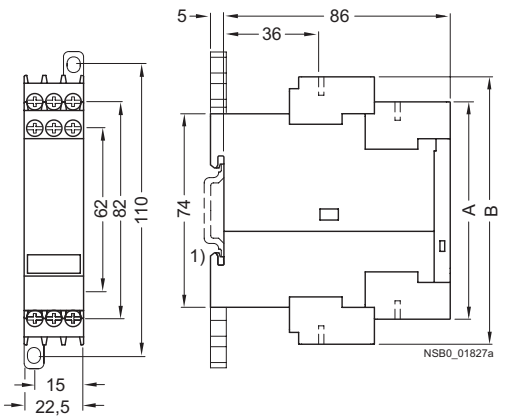
1) At a distance of > 1 cm to adjacent devices; if butt-mounted: +50 °C.

2) Important: This is a Class A product. In the household environment this device may cause radio interference. In this case the user must introduce suitable measures.

Type		3UG46 51-1AA30, 3UG46 51-2AA30	3UG46 51-1AW30, 3UG46 51-2AW30
Control circuit			
Number of CO contacts for auxiliary contacts		1	
Load capacity of the output relay Conventional thermal current I_{th}	A	5	
Rated operational current I_e at			
• AC-15/24 ... 400 V AC/DC	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	
Output relay with DIAZED fuse gL/gG operational class	A	4	
Electrical endurance AC-15	Million operating cycles	0.1	
Mechanical endurance	Million operating cycles	10	

Dimensional drawings

3UG46 51

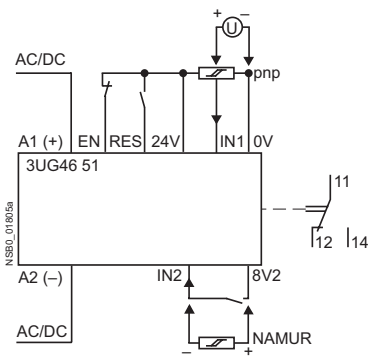


Type	3UG46 51 A	B
Removable terminal		
Screw-type terminal	83	102
Spring-loaded terminal	84	103

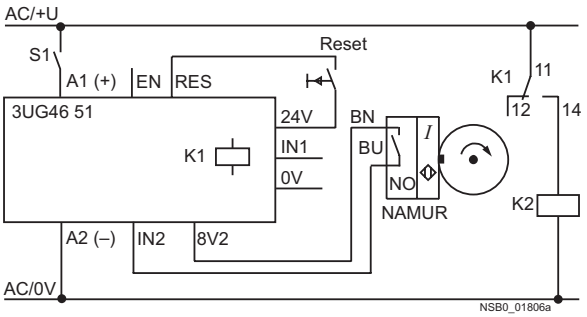
1) For standard mounting rail according to EN 60715.

Schematics

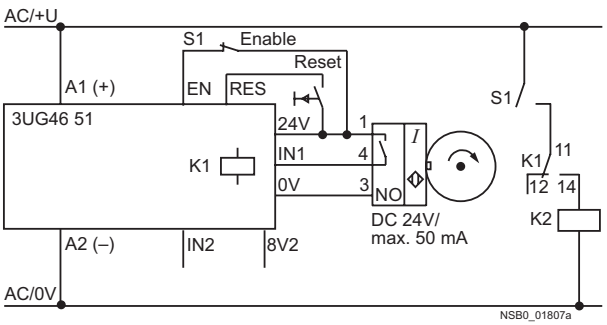
3UG46 51



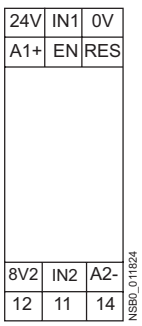
Circuit example without enable input



Circuit example with enable input



Position of the terminals



Coupling Relays – Narrow Design

3RQ3

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

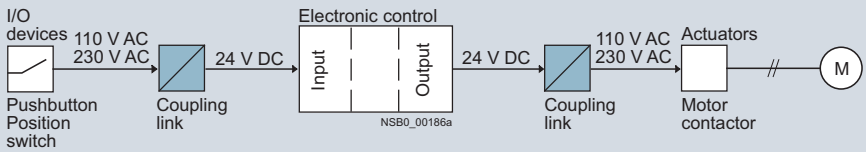
- Fast replacement of the relays with existing wiring
- Tested complete units → lower assembly time
- Individual relays available as spare parts
- Device variants with hard gold-plated contacts, hence high contact reliability at low currents

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

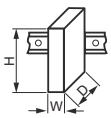
Application

- 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	mm^2	1x (0.25 ... 2.5)					
• Finely stranded with end sleeve	mm^2	1x (0.25 ... 1.5)					
• AWG cables	AWG	1x (20 ... 14)					
Main and auxiliary conductors (1 or 2 conductors connectable)		**Spring-type terminals**					
• Solid	mm^2	1x (0.25 ... 2.5)					
• Finely stranded without end sleeve	mm^2	1x (0.25 ... 2.5)					
• Finely stranded with end sleeve	mm^2	1x (0.25 ... 1.5)					
• AWG cables	AWG	1x (20 ... 14)					

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-.S.30
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	0.3	0.6
Thermal current	A	6				

Coupling relays with plug-in relays

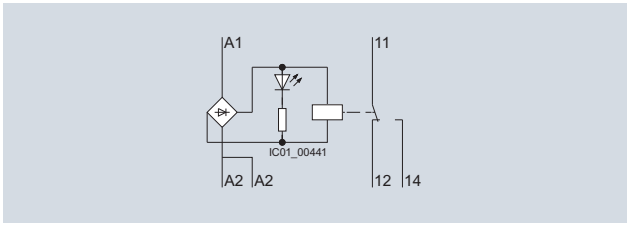
Type		3RQ3118-.AB0.	3RQ3118-.AE0.	3RQ3118-.AF0.	3RQ3118-.AM0.
Operating range factor of the control supply voltage, rated value					
• At AC, at 50 Hz		0.8 ... 1.25	0.8 ... 1.1		--
• At DC		0.8 ... 1.25	0.8 ... 1.1		0.8 ... 1.25
Active power input	W	0.3	0.7	1	0.3
Thermal current	A	6			

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	

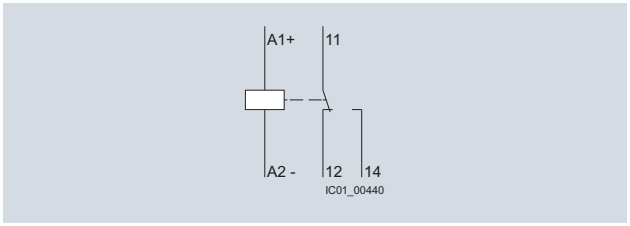
Circuit diagrams

Coupling relays with relay output (not plug-in)



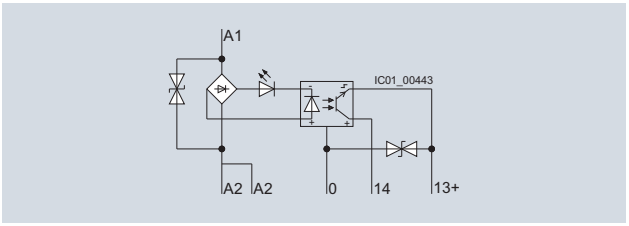
3RQ30.8

Coupling relays with plug-in relays

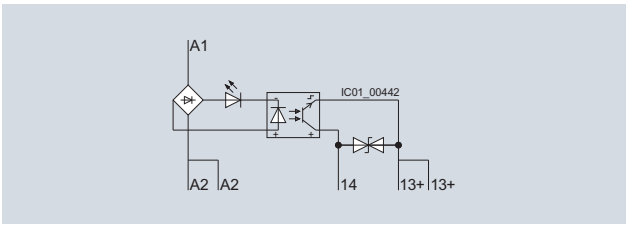


3RQ3118

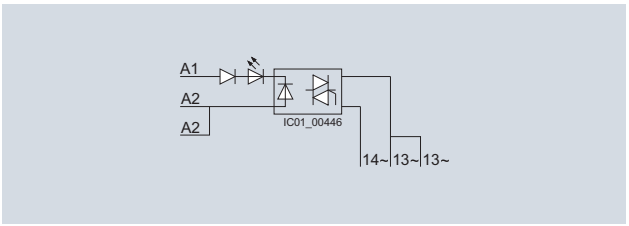
Coupling relays with semiconductor output (not plug-in)



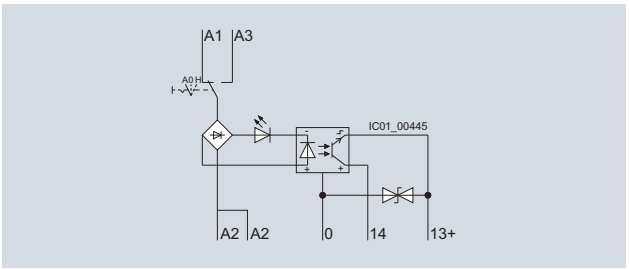
3RQ305.-.S.30



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



3RQ3052-.SM50



3RQ3065-.SM30

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)
V				Article No. / Price per PU		Article No. / Price per PU
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)
				Article No. / Price per PU		Article No. / Price per PU
V						
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

Selection and ordering data

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


3RQ3050-1SM50


3RQ3050-2SM50

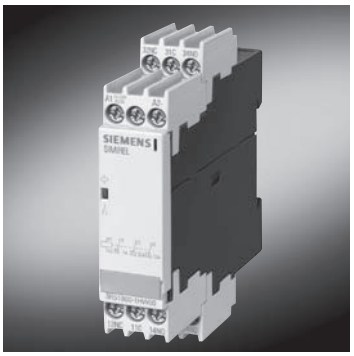
Control supply voltage rated value	Current carrying capacity of the semiconductor output				Manual-0-automatic switch	DT	Screw terminals	DT	Spring-type terminals (push-in)
	Resistive load	At DC-13		At AC-15					
		At 24 V	At 60 V	At 240 V At 50/60 Hz					
							Article No. Price per PU		Article No.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

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
	• 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
	• 6 x 12 mm	A	**3RQ3902-0B**		100	1 200 units	41H
Tools for opening spring-type terminals							
			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	**3RA2908-1A**		1	1 unit	41B

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 50 60 Hz	Contact versions	Order No.	List Price $
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**	
	3 CO hard-gold-plated	**3RS18 00-☐HQ01**	
24 V AC/DC and 220–240 V AC	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

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.	1st - 5th □□□□□	6th □	7th □	–	8th □	9th □	10th □	11th 0	12th 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

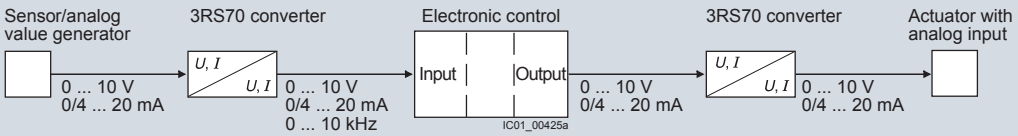
- Electrical separation
- Conversion of normalized and non-normalized signals
- Amplification and impedance adaptation
- Conversion to a frequency for processing by a digital input
- Overvoltage and EMC protection
- Short-circuit protection of the outputs

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 %.

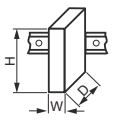
Example: When it is set for an output of 4 ... 20 mA, the left stop on the potentiometer represents an output current of 4 mA and the right stop represents an output current of 20 mA. In the "Auto" switch position, the output signal follows the input signal proportionally regardless of the potentiometer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



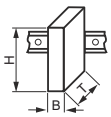
3RS70 interface converters, application example: analog signal processing

Technical specifications

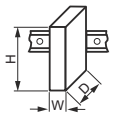
Single-range converters, active/passive

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 For overvoltage category III To IEC 60664 for pollution degree 3 Rated value	V	50				
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 Maximum at current output	V	30				
Short-circuit proof		Yes				

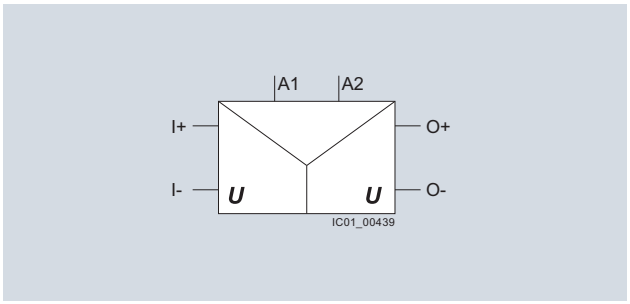
Multi-range converters, active

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 For overvoltage category III To IEC 60664 for pollution degree 3 Rated value		V	50		300		
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 Maximum at current output		V	30				
Short-circuit proof			Yes				

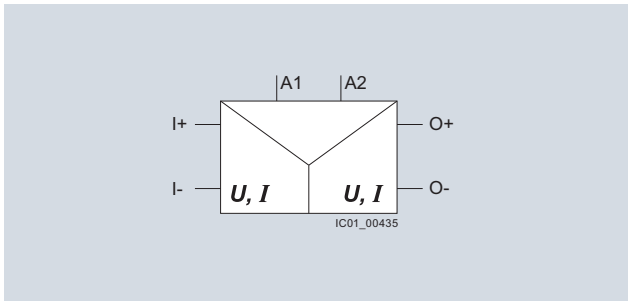
Universal converters, active

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 For overvoltage category III To IEC 60664 for pollution degree 3 Rated value	V	300
Active power input	W	0.5
Degree of protection		IP20
Conductor cross-sections		
		Screw terminals
• Solid	mm^2	1x (0.25 ... 2.5)
• Finely stranded with end sleeve	mm^2	1x (0.25 ... 1.5)
• AWG cables, solid	AWG	1x (20 ... 14)
		Spring-type terminals
• Solid	mm^2	1x (0.25 ... 2.5)
• Finely stranded without end sleeve	mm^2	1x (0.25 ... 2.5)
• Finely stranded with end sleeve	mm^2	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 voltage output	kΩ	2
• Maximum at current output	Ω	500
Relative measuring accuracy	%	0.1
Overvoltage strength Maximum at current output	V	30
Short-circuit proof		Yes

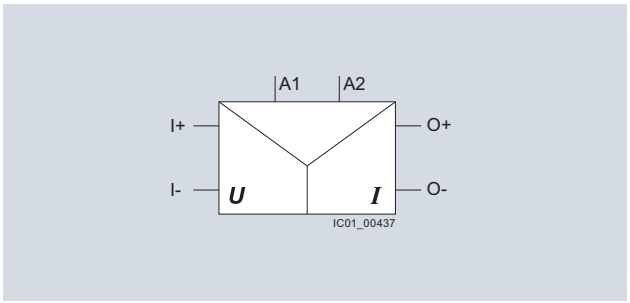
Circuit diagrams



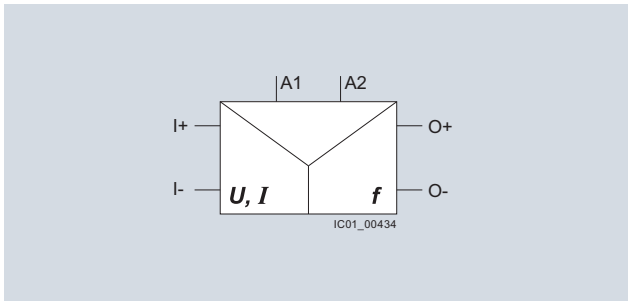
3RS7000-.AE00



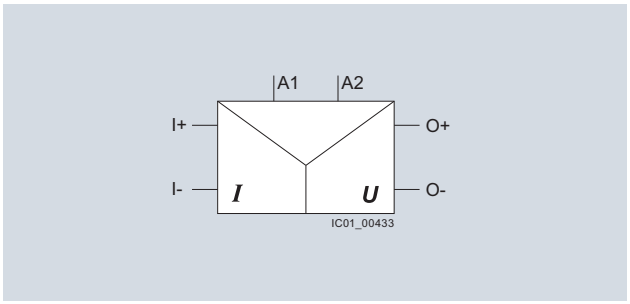
3RS7005-.FE00, 3RS7005-.FW00, 3RS7006-.FE00. 3RS7006-.FW00



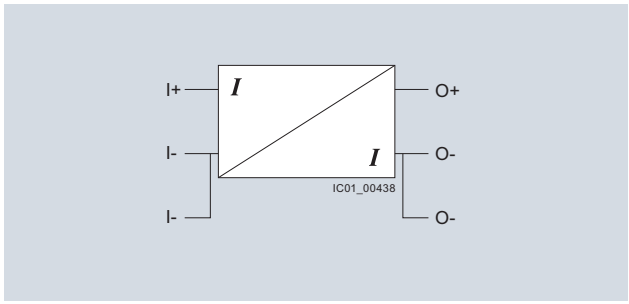
3RS7000-.CE00, 3RS7000-.DE00



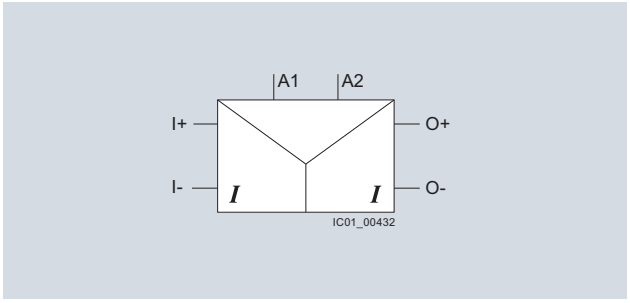
3RS7005-.KE00, 3RS7005-.KW00



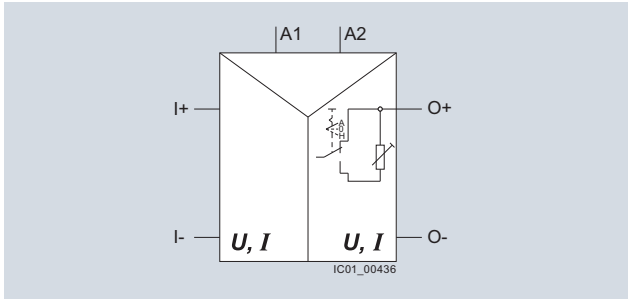
3RS7002-.AE00, 3RS7003-.AE00



3RS7020-.ET00



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



3RS7025-.FE00., 3RS7025-.FW00

Selection and ordering data

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

3RS7000-1AE00

3RS7000-2AE00

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

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							
			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	**3RA2908-1A**		1	1 unit	41B

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.

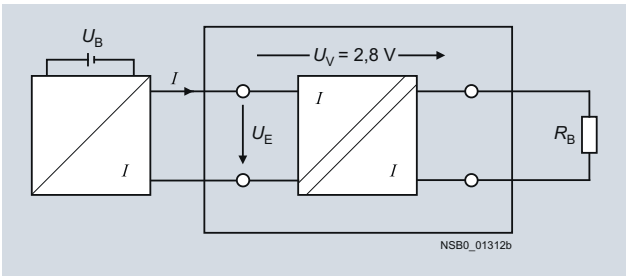
Calculation guide for passive converters

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.

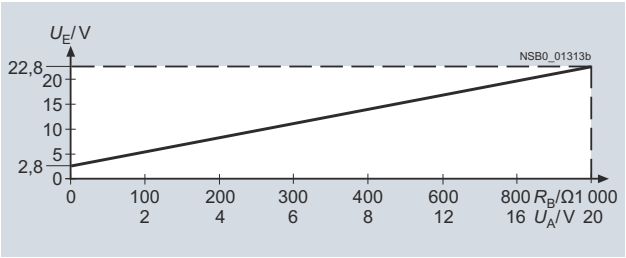
This means that:

$U_B \geq U_E$ = 2.8 V + 20 mA x 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

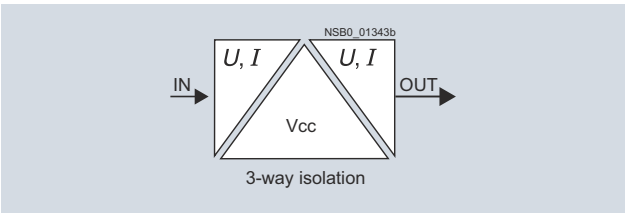
Load rating of the outputs

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 3	– 1	DC 24 V DC 24 V	**3TG10 10-0BB4** **3TG10 01-0BB4**		0.15	10
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 3	– 1	DC 24 V DC 24 V	**3TG10 10-1BB4** **3TG10 01-1BB4**		0.14	10

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.

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 x 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 x U_s	
Operating times (break-time = opening time + arcing time)				AC operation	DC operation
	Closing	closing time opening time	NO NC	ms ms	10 ... 50 5 ... 45	11 ... 50 5 ... 45
	Opening	opening time closing time	NO NC	ms ms	20 ... 30 20 ... 30	19 ... 35 21 ... 39
	Arcing time			ms	10 to 15	
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	Type 3NA		
	DIAZED	Type 5SB		
	NEOZED	Type 5SE		
acc. to IEC 60 947-4-1 (DIN VDE 0660 Part 102)	Type of coordination "1"		A	25
	Type of coordination "2"		A	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 $I_{e\ load}$	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: ≥ 0.5 Ω)
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	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 x26	2 x 26	2 x1

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 ($\frac{L}{R}$ ≤ 1 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 ($\frac{L}{R}$ ≤ 15 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			M3
Finely stranded with end sleeve (DIN 46 228, style A/D/C)		mm²	2 x (0.75 to 2.5)
Solid		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

cULus and CSA ratings (screw connection)

Rated insulation voltage	AC	V	600
Conventional thermal current	Free air and enclosed	A	20

Maximum horsepower ratings
(cULus and CSA-approved values)
Ratings of three-phase motors at 60 Hz

		1-phase	3-phase
at 115 V	hp	1/2	–
200 V	hp	1	3
230 V	hp	1 1/2	3
460 V/575 V	hp	–	5
600 V	hp	–	5

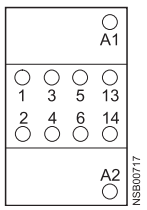
Accessories

For contactor	Design		Order No.	List Price $	Weight approx.	Pack
	Max. rated operational currents I_e/AC-1 (at 55 °C) of contactors	Max. conductor cross-sections				
Type	A	mm²	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

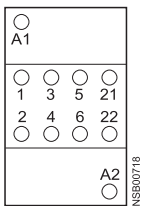
Circuit diagrams

Position of terminals

3TG10 10
1 NO

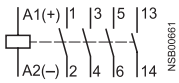


3TG10 01
1 NC

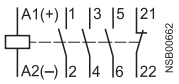


Internal circuit diagram

3TG10 10
1 NO
Ident. 10E



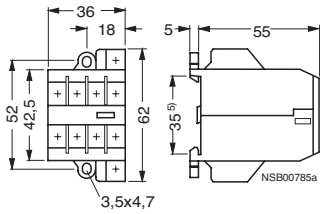
3TG10 01
1 NC
01E



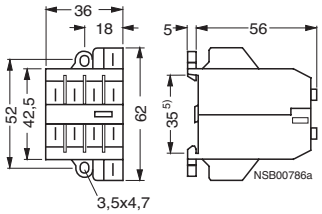
Dimension drawings

AC and DC operation

3TG10 ..-0..
with screw connections

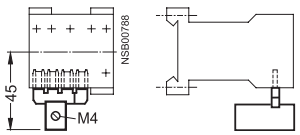


3TG10 ..-1..
with tab connectors



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.

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 comissioning 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 11/109 for socket accessories.

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

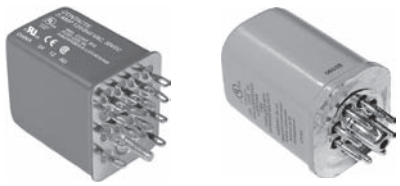
Option	Basic	Premium	Premium Bifurcated
Mechanical Flag	√	√	√
Push To Test		√	√
Lock Down Door		√	√
LED		√	√

Note: See page 11/109 for socket accessories.

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.

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
		110 VDC	3TX7130-0DF03	1M0
DPST NO	40	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
		48 VDC	3TX7130-0CD03	1M0
DPDT (Mag Blowout)	40	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 11/109 for socket accessories.

General specifications

Contact Characteristics		Units	3TX7109	3TX7110		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
Dialectric 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	Storage	°C	-40…+85	-40…+85	-40…+85	-40…+85	-40…+85	-40…+85	-40…+85
around the Device	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
Dialectric 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	Storage	°C	-40…+85	-40…+85	-40…+85	-40…+85	-40…+85	-40…+85	-40…+85
around the Device	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

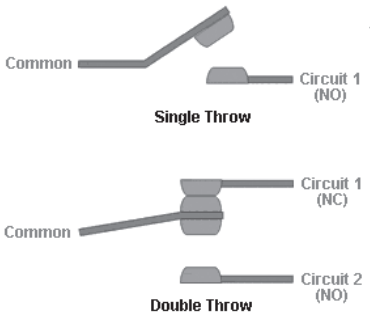
General specifications

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
Dialectric 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	Storage	°C	-40…+85	-40…+85	-40…+85	-40…+85	-40…+85
around the Device	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	DPDT
Contact Material			Silver Alloy	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	16
Maximum Switching Voltage		V	600	300	300	300	300	300	300
Switching Current at Voltage		Resistive	20A @300V	30A @277V	3A @277V	30A @277V	3A @277V	12A @240V	16A @277V
		Resistive	—	—	—	—	—	—	16A @120V
		Resistive	20A @ 28	20A @ 28	3A @ 28	10A @ 28	3A @ 28	12A @ 28	16A @ 28
		HP	1/3 @ 120VAC	1 @ 120VAC	—	1 @ 120VAC	—	1/2 @ 120VAC	1/2 @ 120VAC
		HP	1/2 @ 600VAC	3 @ 240VAC	—	2 @ 240VAC	—	1/3 @ 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)	100 @ 5VDC (.5W)
Coil Characteristics									
Voltage Range	AC	V	12…240	12…240	12…240	12…277	12…277	12…120	6…240
	DC	V	6…110	6…110	6…110	5…110	5…110	12…110	6…125
Operating Range	AC	%	85 to 120	85 to 120	85 to 120	85 to 120	85 to 120	85 to 110	85 to 110
	DC	%	75 to 120	75 to 120	75 to 120	75 to 120	75 to 120	80 to 110	80 to 110
Average Consumption	AC	VA	4	4	4	2.8	2.8	1.8	3
	DC	W	1.7	1.7	1.7	1	1	1.8	1.4
Drop-out Voltage Threshold	AC	%	10	10	10	10	10	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	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	10,000,000	5,000,000
Operating Time (response time)		ms	15	15	15	15	15	35	20
Dialectric Strength	Between Coil and Contact	V(rms)	4000	4000	4000	2500	2500	1500	1500
	Between Poles	V(rms)	2000	2000	2000	1500	1500	500	1500
	Between Contacts	V(rms)	1500	1500	1500	1500	1500	1500	1500
Environment									
Product Certifications	Standard Version		UL	UL	UL	UL	UL	UL	UL
Ambient Air Temperature	Storage	°C	-40…+85	-40…+85	-40…+85	-40…+85	-40…+85	-40…+85	-40…+85
around the Device	Operational	°C	-40…+55	-40…+55	-40…+55	-40…+55	-40…+55	-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	3, 10 - 55 Hz	3, 10 - 55 Hz
Shock Resistance		g-n	10	10	10	10	10	10	10
Degree of Protection			—	—	—	—	—	IP40	IP40
Weight		grams	86	86	86	33	33	110	87

Overview

Contact arrangement - throws

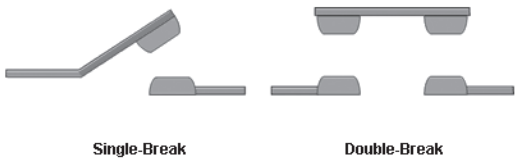


Throw is the number of different closed contact positions per pole. In other words a throw describes the total number of different circuits each pole controls.

The following abbreviations are used to indicate contact configurations:

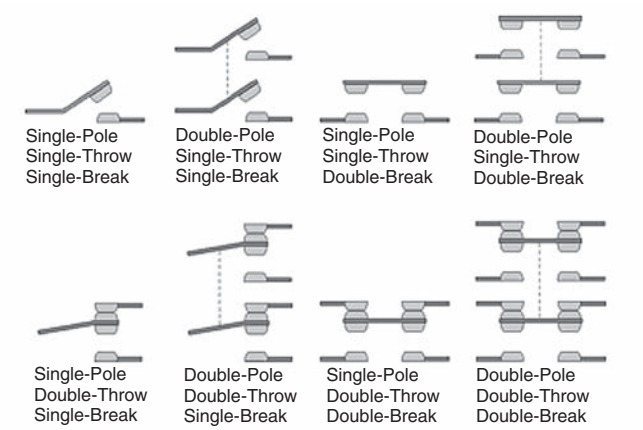
SPST Single-pole, single-throw
SPDT Single-pole, double-throw
DPST Double-pole, single-throw
DPDT Double-pole, double-throw

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.

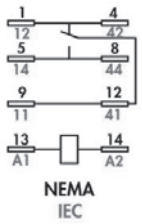
Contact arrangements overview



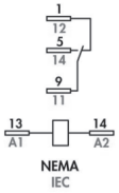
This illustration shows various contact arrangement types.

Circuit diagrams

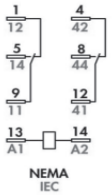
3TX7109 (SPDT)



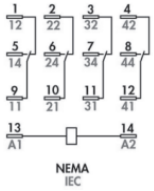
3TX7110
SPDT



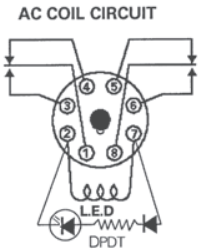
3TX7111
DPDT

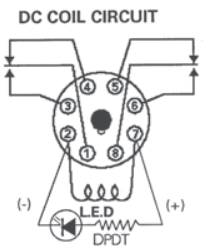


3TX7111
4PDT

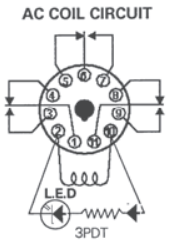


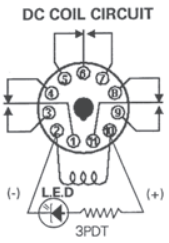
3TX7112
DPDT



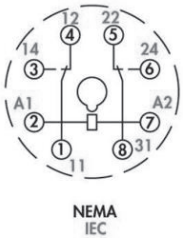


3TX7112
3PDT

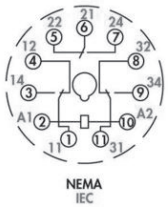




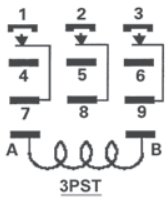
3TX7112-1L, -1D
DPDT

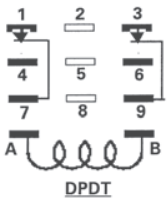


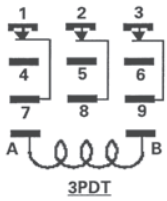
3TX7112-1N, -1F
3PDT



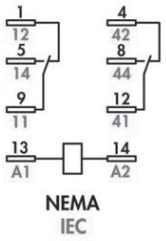
3TX7113
DPDT, 3PST, 3PDT



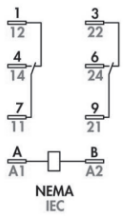




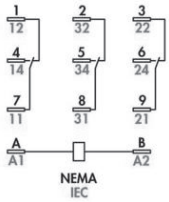
3TX7114
DPDT



3TX7115
DPDT

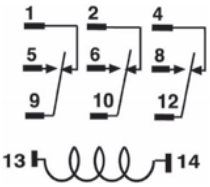


3TX7115
3PDT

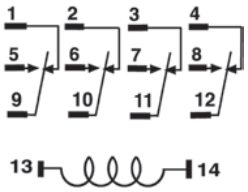


Circuit diagrams

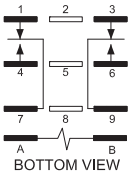
3TX7116
3PDT



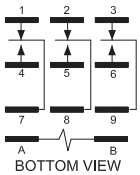
3TX7117
4PDT



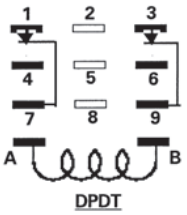
3TX7119 (DPDT)

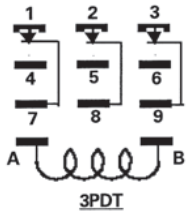


3TX7119 (3PDT)



3TX7121
DPDT, 3PDT





3TX7125
DPDT

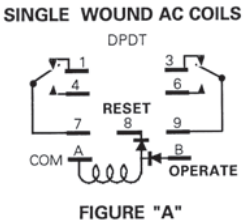


FIGURE "A"

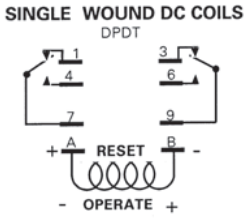
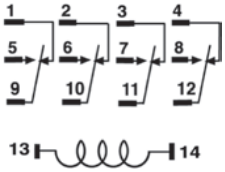
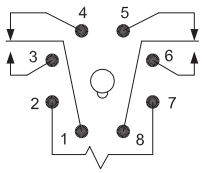


FIGURE "B"

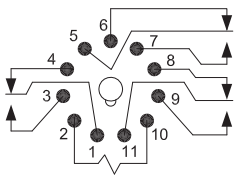
3TX7126/ 3TX7127
4PDT



3TX7127 (DPDT)

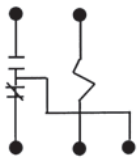


3TX7127 (3PDT)

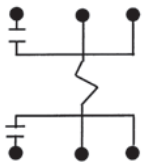


3TX7130
SPST-NO

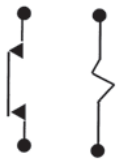
3TX7130
SPDT



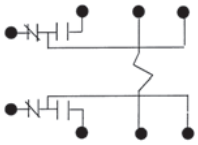
3TX7130
DPST-NO



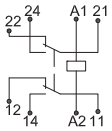
3TX7130
SPST-NC



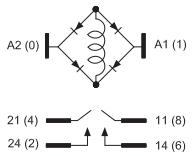
3TX7130
DPDT



3TX7130 (DPDT)

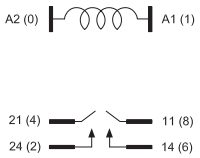


3TX7131 (DPST-NO) (AC)

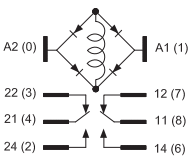


Circuit diagrams

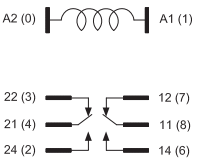
3TX7131 (DPST-NO) (DC)



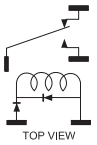
3TX7131 (DPDT) (AC)



3TX7131 (DPDT) (DC)



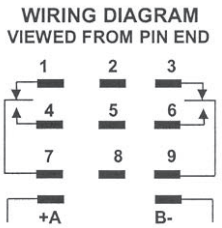
3TX7132 (SPDT) (AC)



3TX7132 (SPDT) (DC)

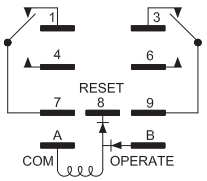
3TX7136

DPDT

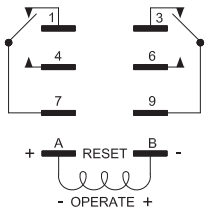


INPUT SIGNAL

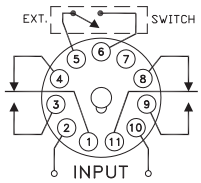
3TX7137 (DPDT) (AC)



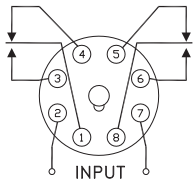
3TX7137 (DPDT) (DC)



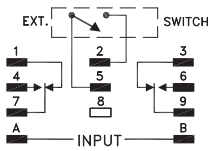
OFD-DFOB (DPDT)



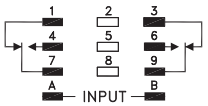
OND-DFOB (DPDT)



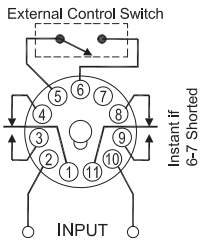
OFD-DFSB (DPDT)



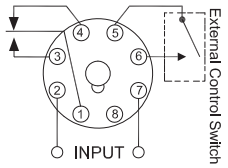
OND-DFSB (DPDT)



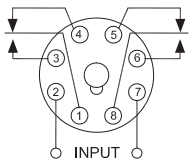
OFD-DFPR-00 (DPDT)



OND-DFPR-01 (SPDT)

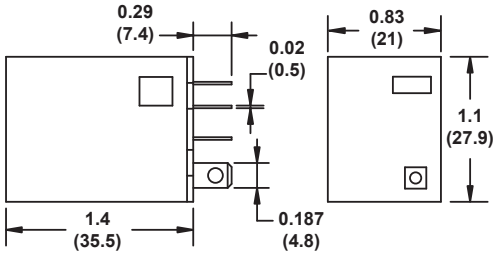


OND-DFPR-02 (DPDT)

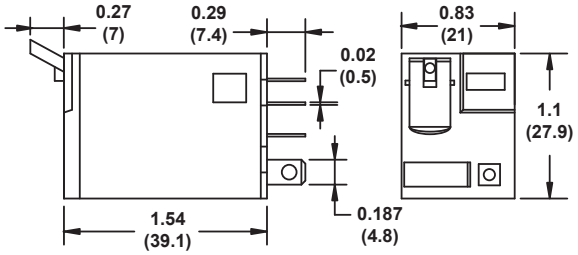


Dimension drawings

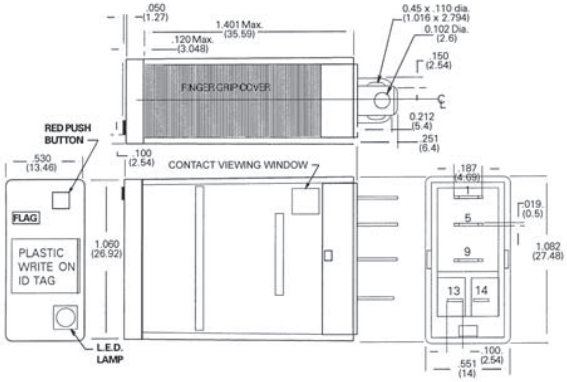
3TX7109 (SPDT) (clear cover)



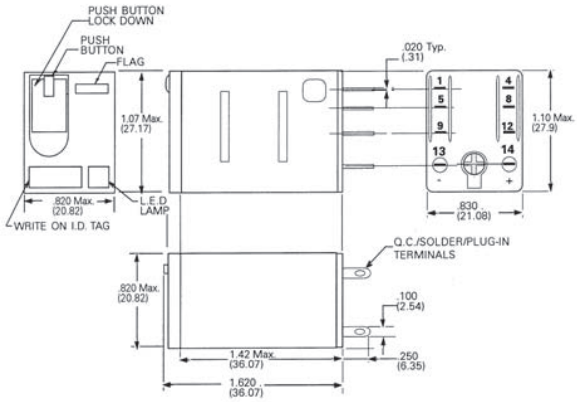
3TX7109 (SPDT) (full feature)



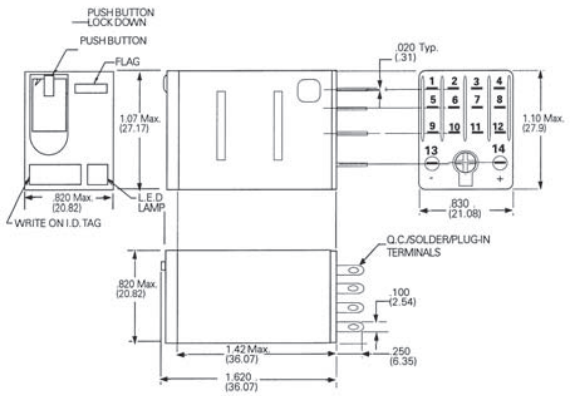
3TX7110 SPDT



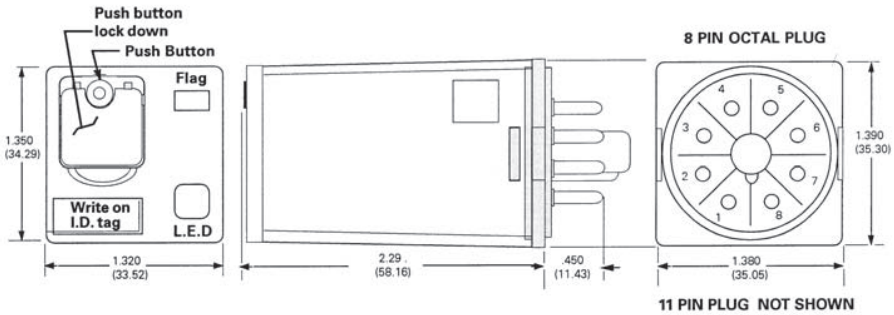
3TX7111 DPDT



3TX7111 4PDT

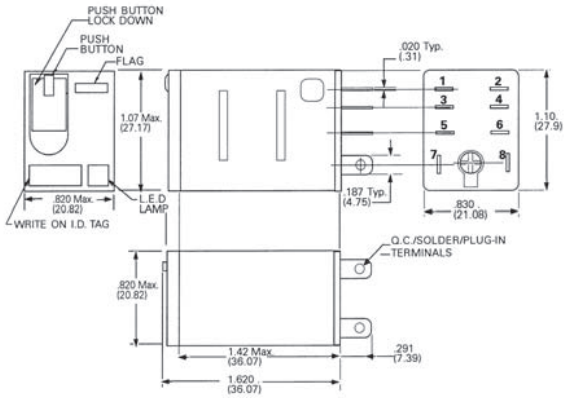


3TX7112 DPDT

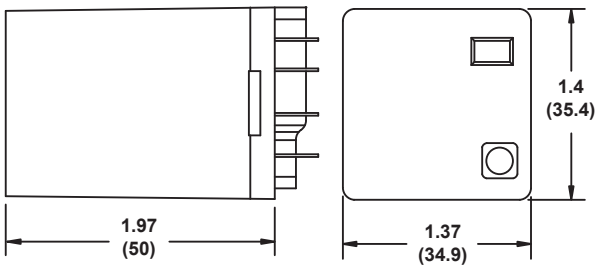


Dimension drawings

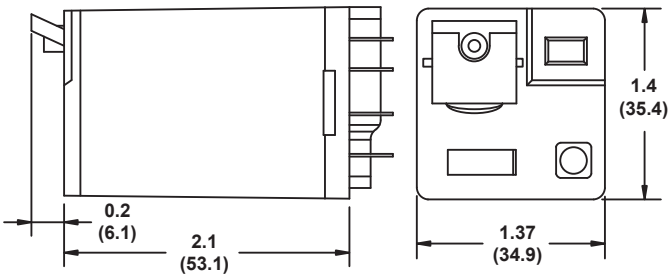
3TX7114 DPDT



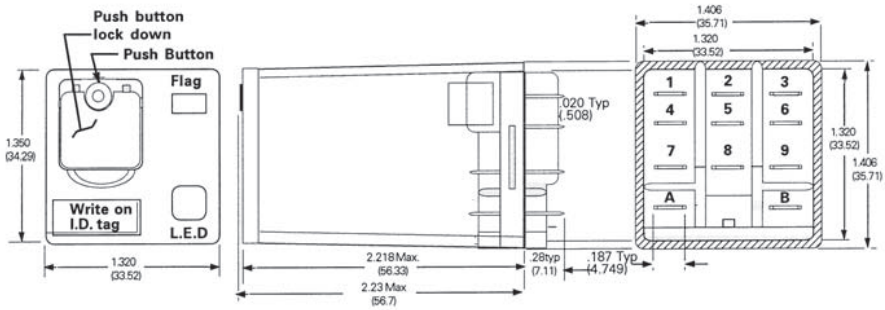
3TX7115 (DPDT) (clear cover)



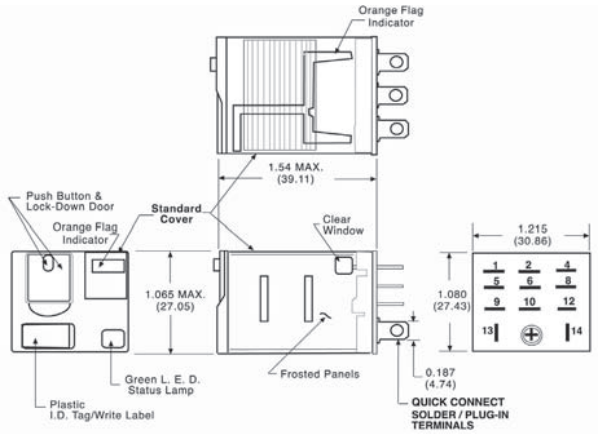
3TX7115 (DPDT) (full feature)



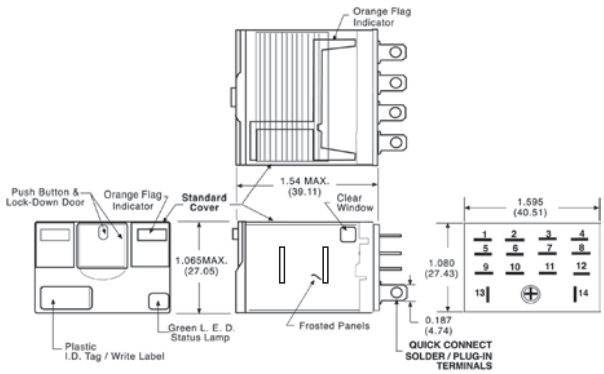
3TX7115 3PDT



3TX7116 3PDT

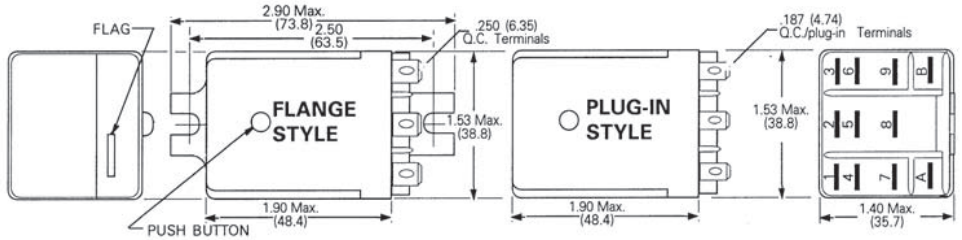


3TX7117 4PDT

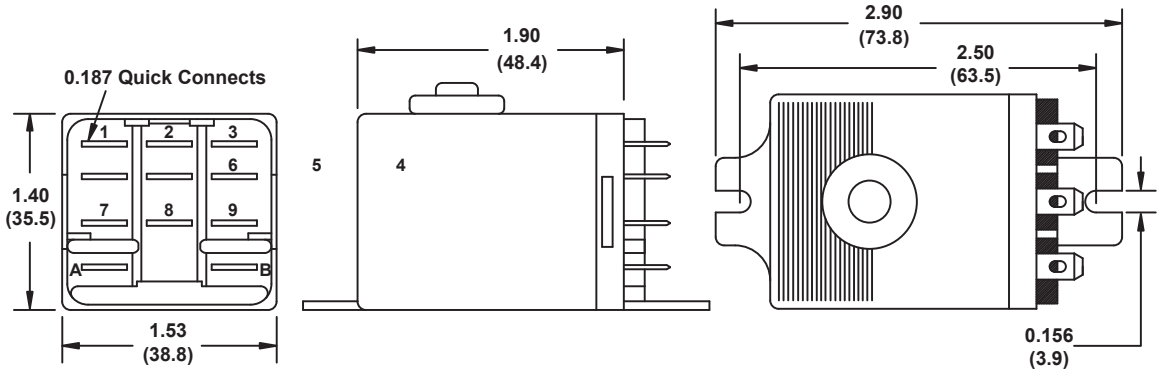


Dimension drawings

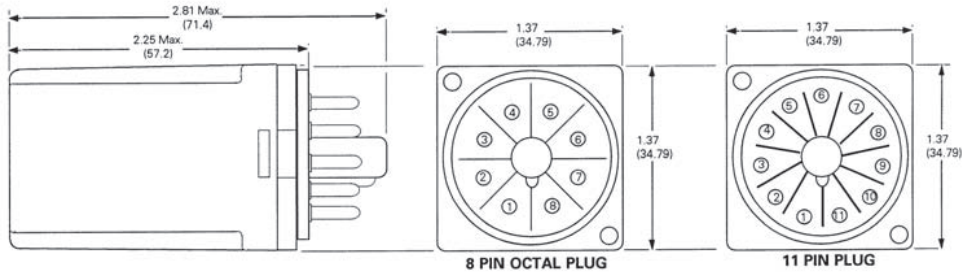
3TX7119 DPDT



3TX7119 (3PDT)

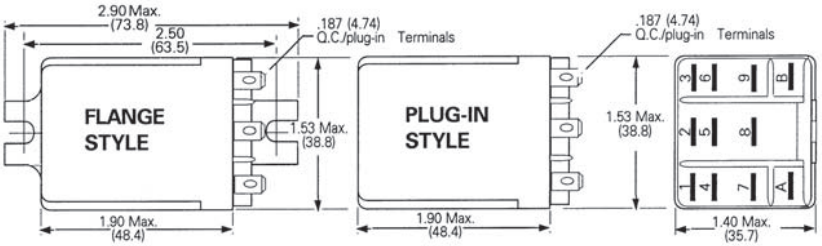


3TX7120



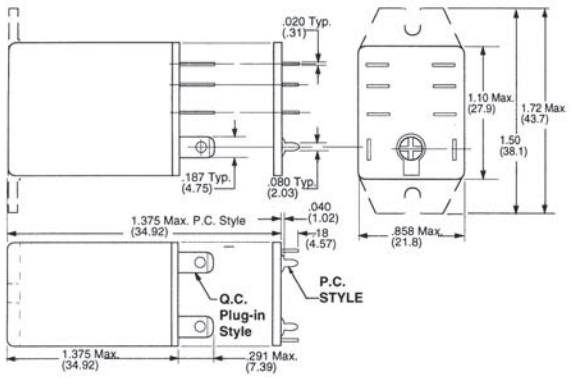
3TX7121/3TX7122

3TX7123

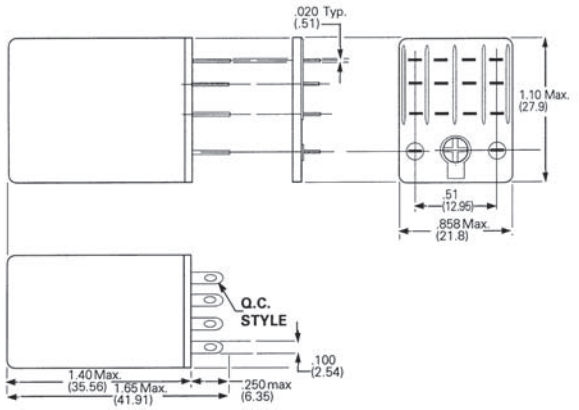


Dimension drawings

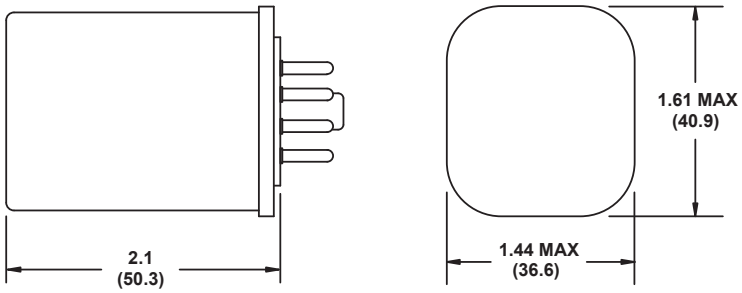
3TX7123



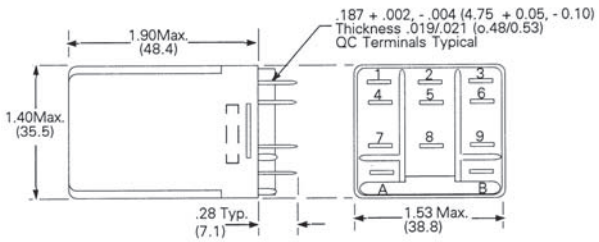
3TX7126



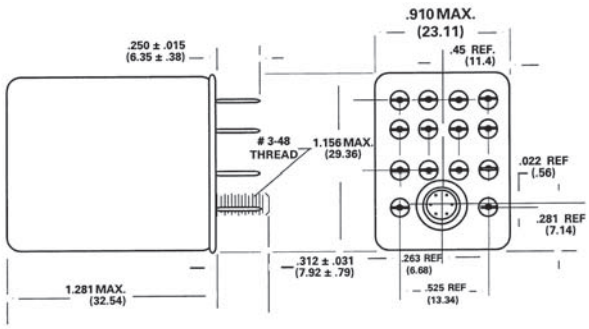
3TX7127 (DPDT)



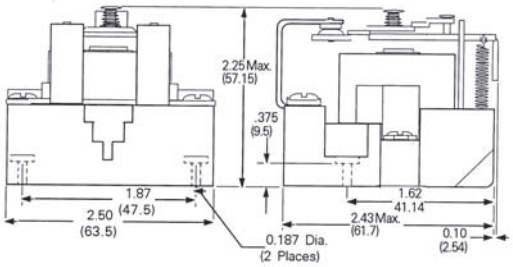
3TX7127 3PDT



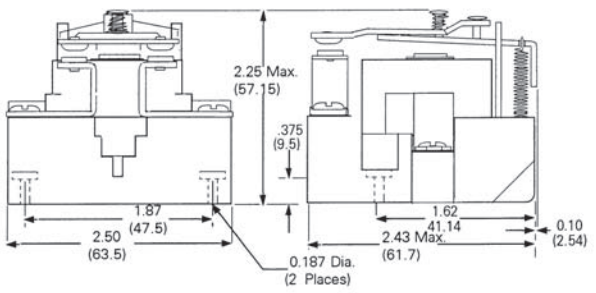
3TX7127 4PDT



3TX7130 SPST NC

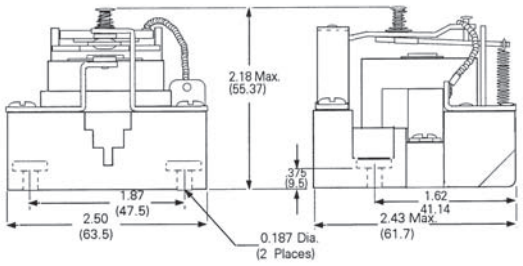


3TX7130 SPST NO

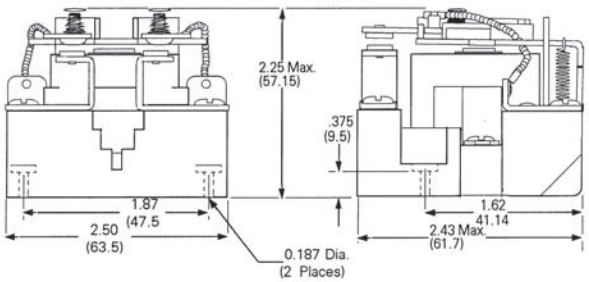


Dimension drawings

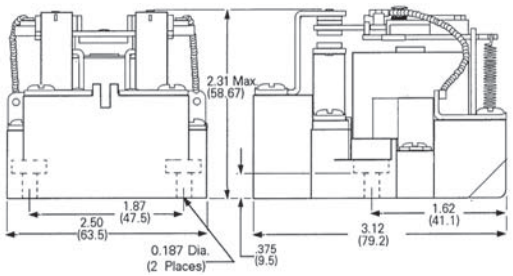
3TX7130 SPDT



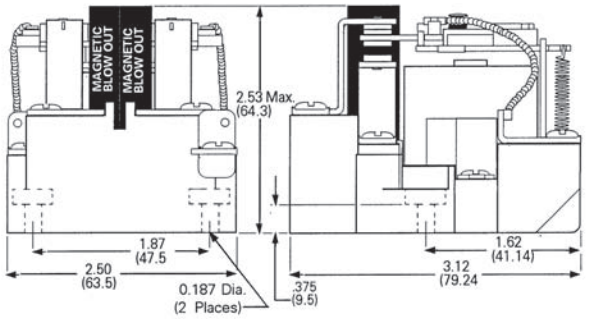
3TX7130 DPST NO



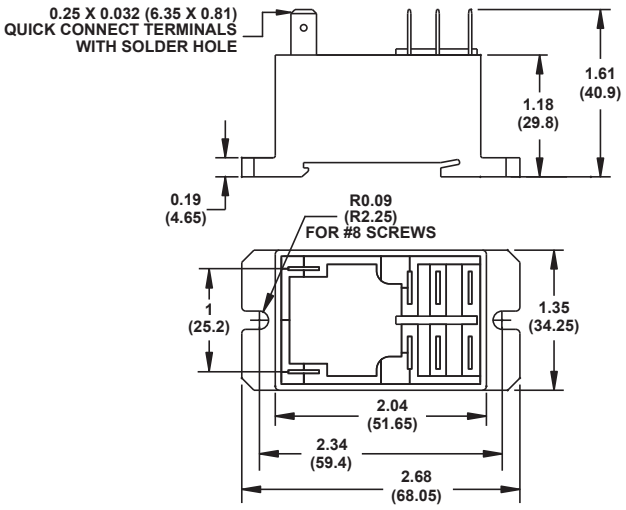
3TX7130 DPDT



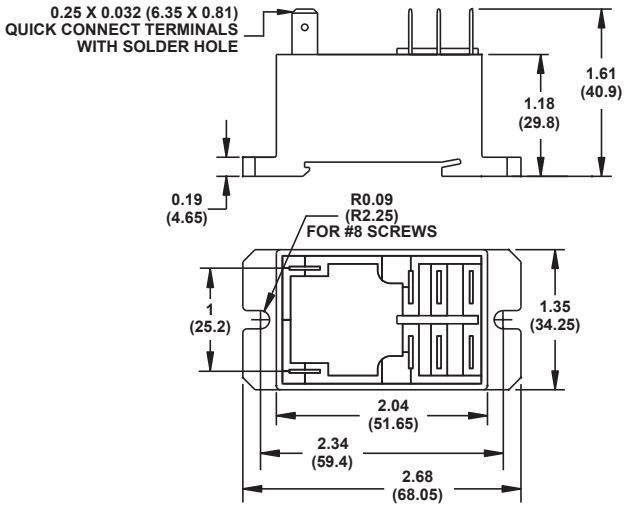
3TX7130 DPDT with magnetic blowout



3TX7131 (DPST-NO)

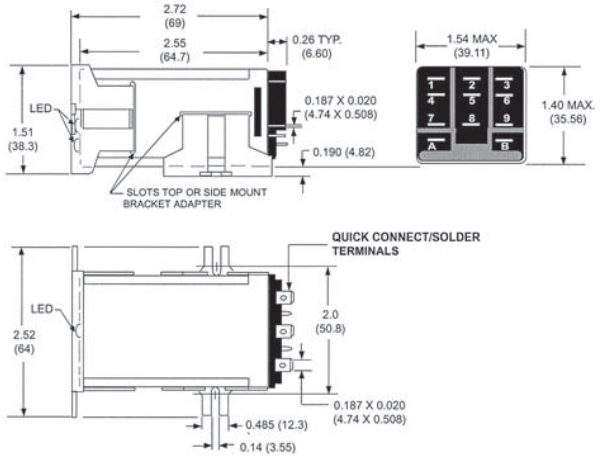


3TX7131 (DPDT)

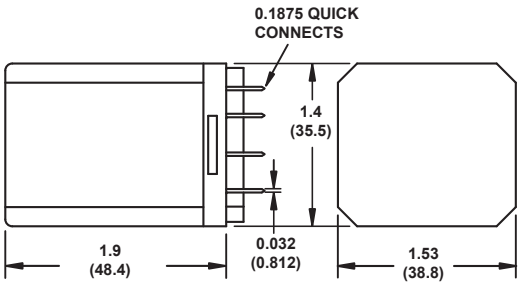


Dimension drawings

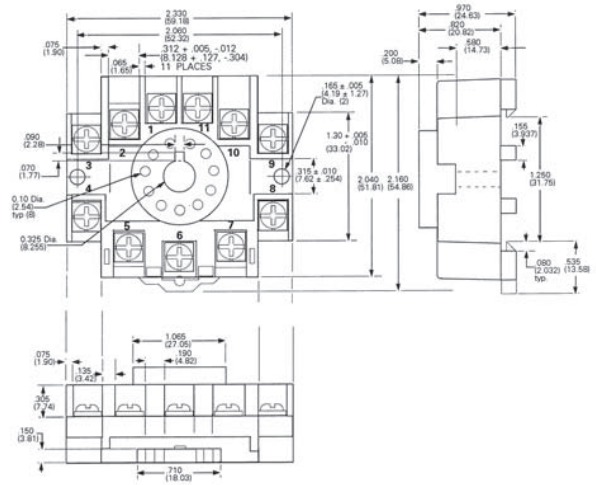
3TX7136



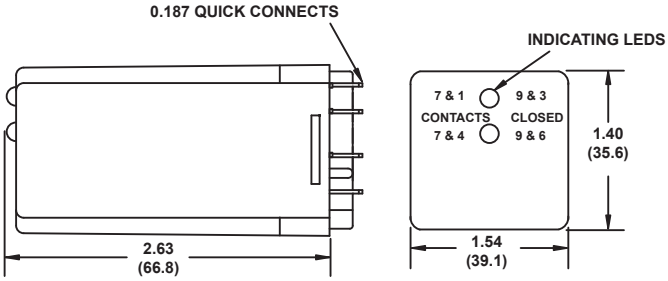
3TX7137 (DPDT)



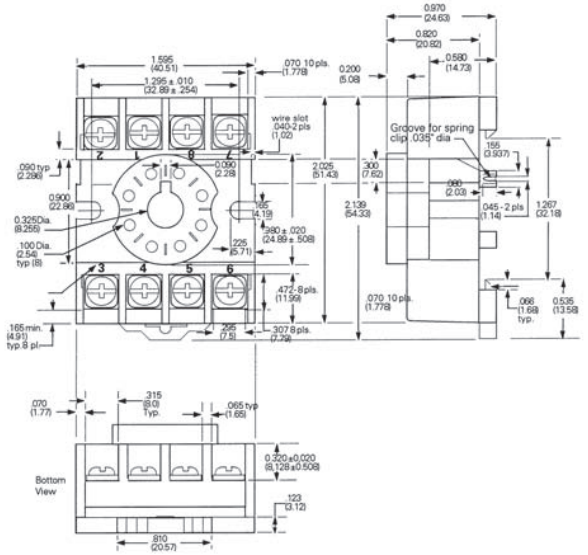
3TX7144-1E3



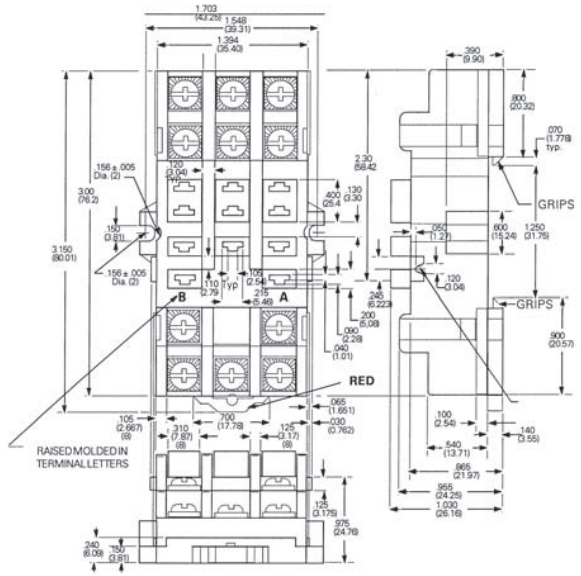
3TX7136 (DPDT Alternating)



3TX7144-1E2

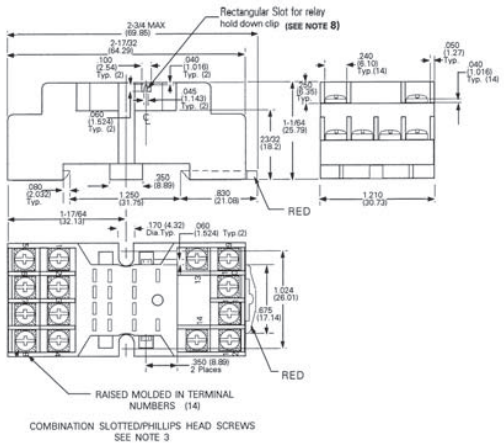


3TX7144-1E4

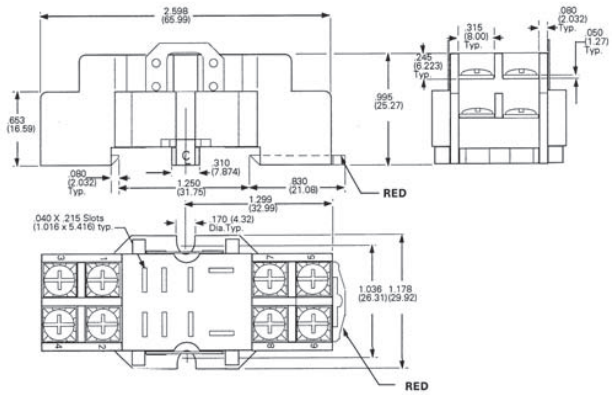


Dimension drawings

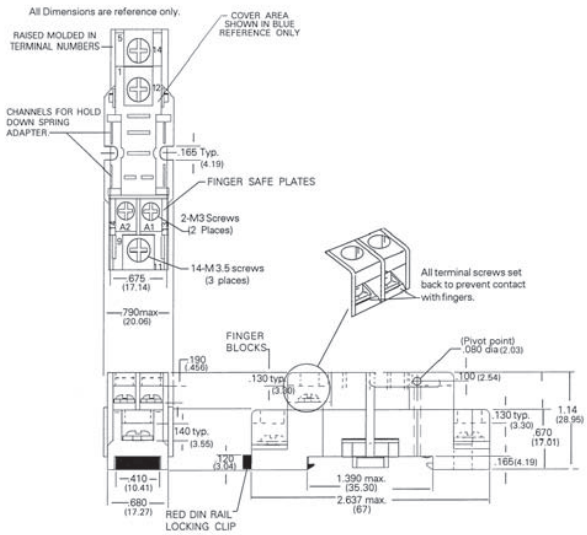
3TX7144-1E5



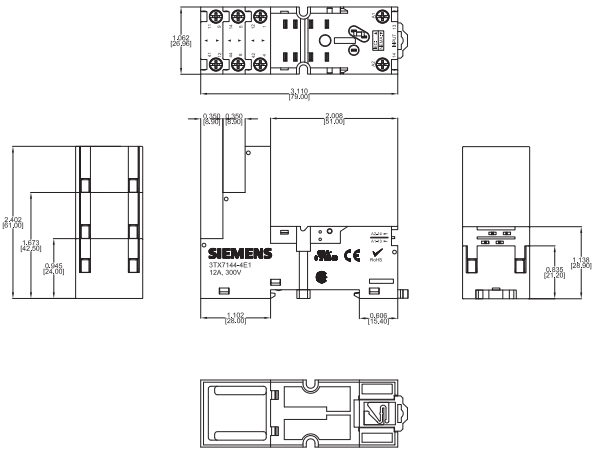
3TX7144-1E6



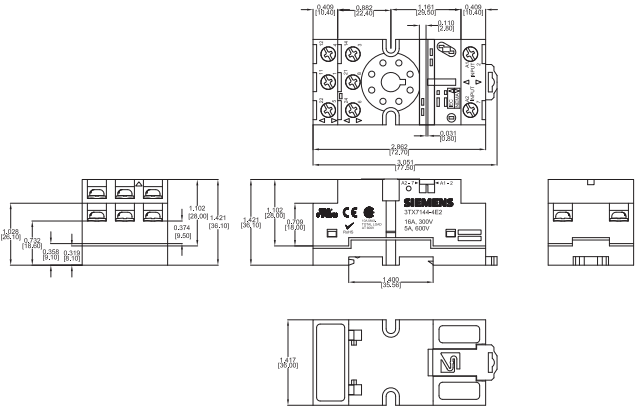
3TX7144-1E7



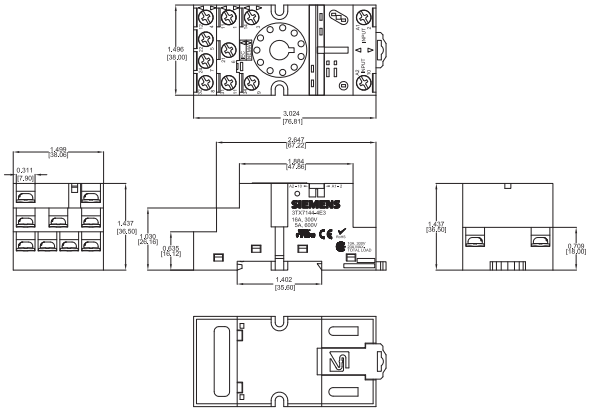
3TX7144-4E1



3TX7144-4E2

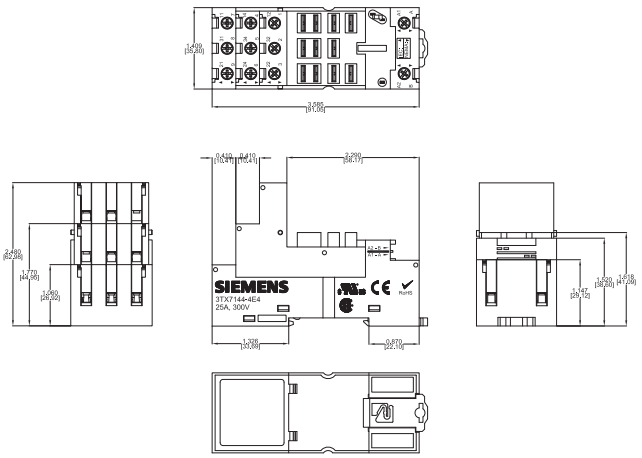


3TX7144-4E3

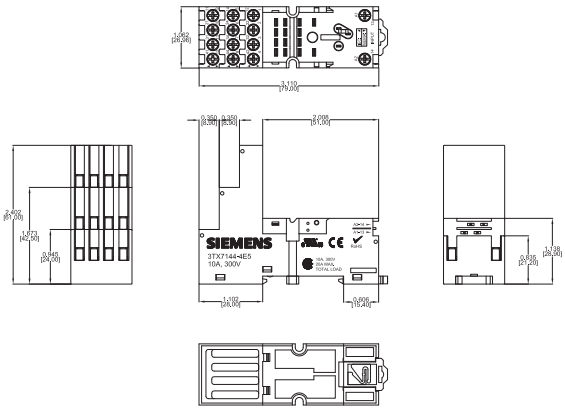


Dimension drawings

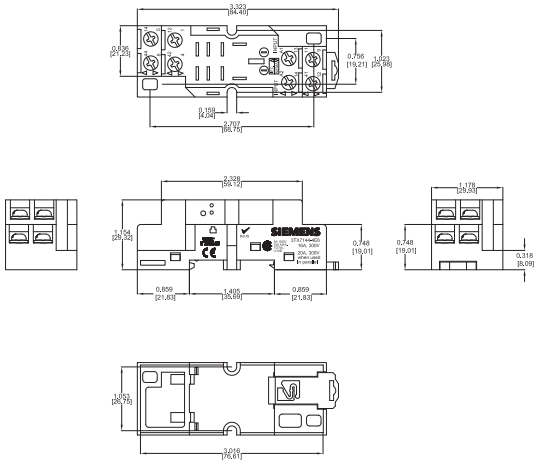
3TX7144-4E4



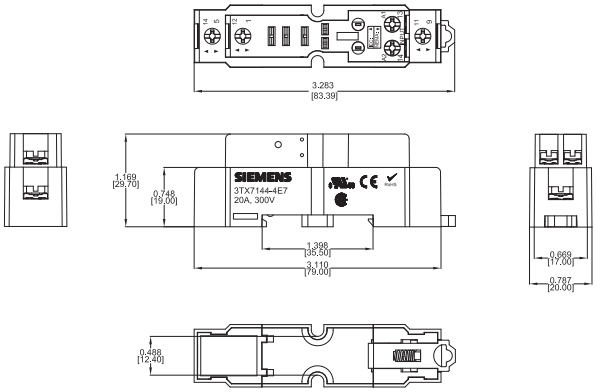
3TX7144-4E5



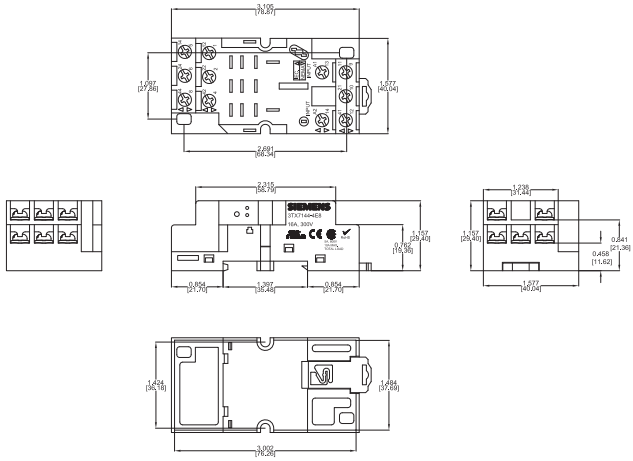
3TX7144-4E6



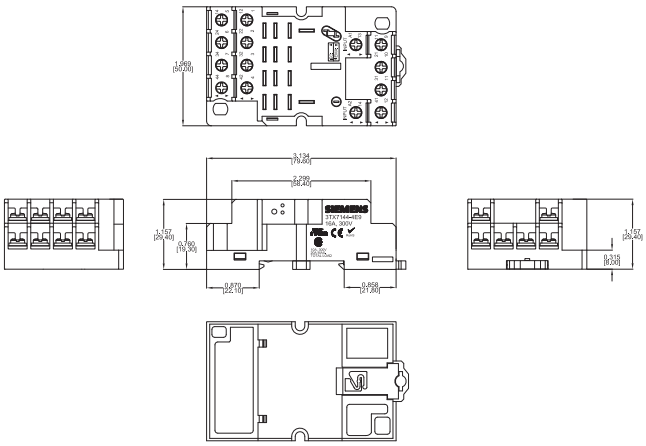
3TX7144-4E7



3TX7144-4E8

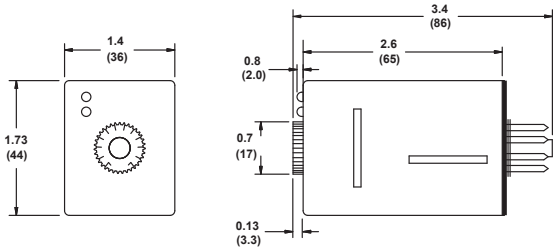


3TX7144-4E9

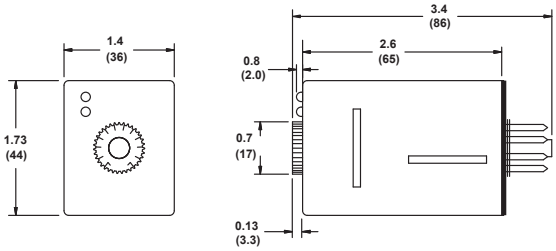


Dimension drawings

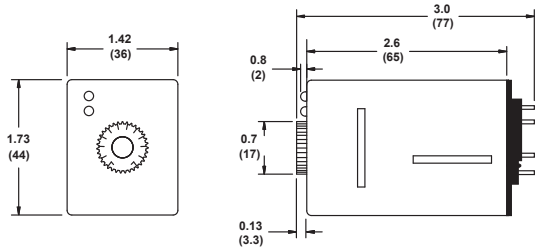
OFD-DFOB (DPDT)



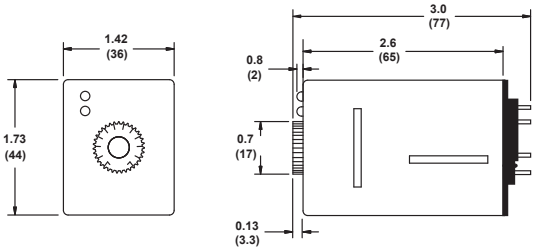
OND-DFOB (DPDT)



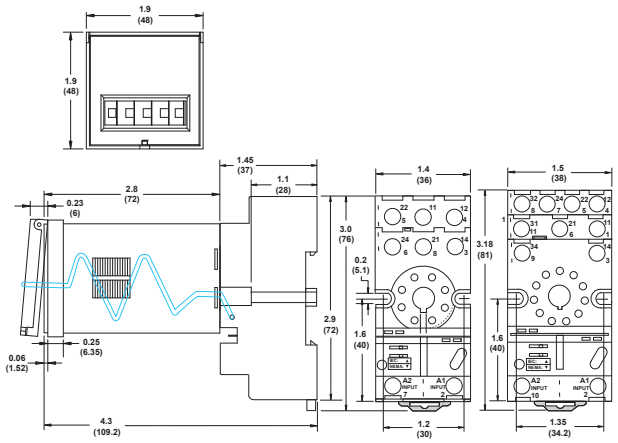
OFD-DFSB (DPDT)



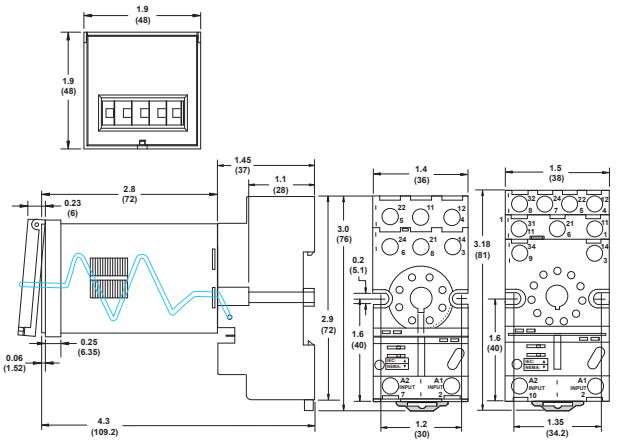
OND-DFSB (DPDT)



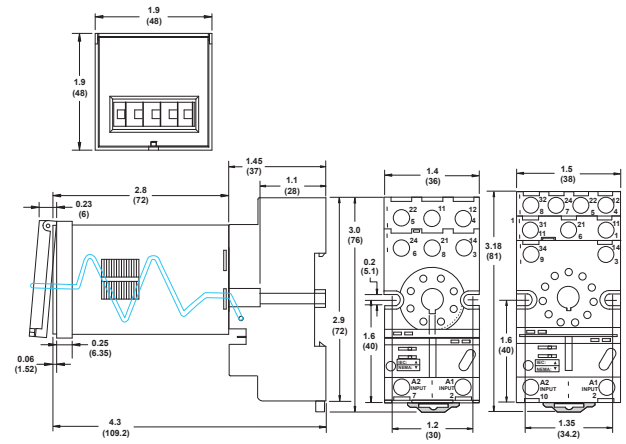
OFD-DFPR-00 (DPDT)



OND-DFPR-01 (SPDT)



OND-DFPR-02 (DPDT)



Notes