

Relays for every application



simirel



SIEMENS

The Complete Relay Family: Every One a Winner

You're unlikely to find a more complete, more extensive family of relays on the market than SIMIREL. Function relays, relays for thermistor motor protection, switching relays and converters: SIMIREL has them all. Whatever your needs. SIMIREL simply has to be the most comprehensive range of relay products you'll come across anywhere.

This new Siemens family offers you everything you could possibly wish for between the motor feeder and the automation components: function relays for time, monitoring and temperature plus thermistor motor protection devices, all switching relays, in other words plug-in, power and interface relays, and the complete spectrum of interface converters. No matter what kind of relay you're looking for – SIMIREL has the answer.

Among SIMIREL's great advantages: all its members from A to Z couldn't be easier to operate. And you no longer need to shop around to find them. Just take a look for yourself. You'll be surprised at what awaits you.

The main advantages at a glance:

- Comprehensive range – fit for every application
- Extremely simple to operate
- Multifunctional – the relays can be flexibly used
- Graduated family – accommodates every performance need
- Always innovative – regular new additions to the spectrum of products
- Excellent value for money





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Everything switched to go –

With Siemens SIMIREL switching and function relays, everything runs smoothly. Whether in production or transport, whether monitoring motors or controlling complex plants and systems – our relays have everything under control, so that you have a handle on it all from the word go.

1 3RS10 Temperature Monitoring Relays

for PT 100/1000 , KTY 83/84 and NTC¹⁾

The 3RS10 temperature monitoring relays make a good alternative to temperature controllers in the low-end segment. They are used to monitor temperatures in solid, liquid and gaseous media. The temperature in the medium is detected by means of one of the above sensor types, evaluated by the device and checked to see if it is above, below or within a defined range (window function). The output relay is switched either on or off at the threshold value, depending on the parameter settings.

The most important applications:

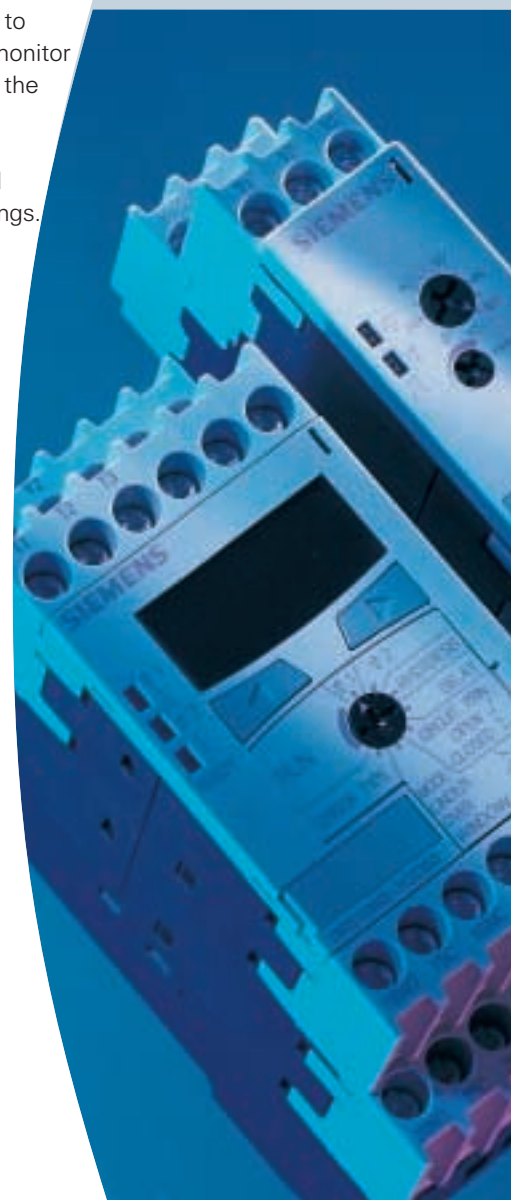
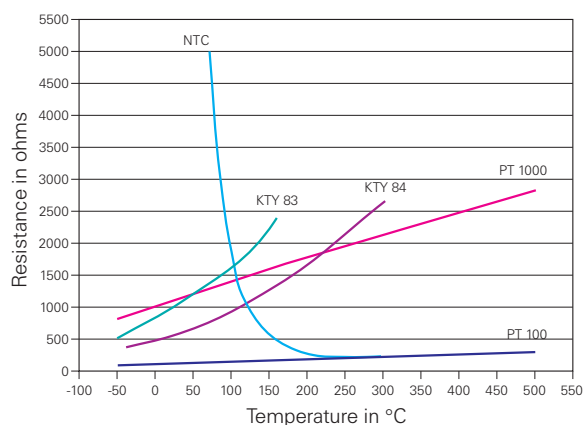
- Controlling heating, ventilation and air conditioning systems
- Monitoring limiting temperatures and signaling alarms
- Monitoring motors
- Monitoring process variables in electroplating technology, in the packaging and plastics industries etc.

Main advantages:

- Extremely simple operation with no complex menu system
- Graduated product family – fit for every application
- Low-priced compact and standard devices – quick to install and easy to operate
- High-end evaluation units with digital display – suitable for wide temperature ranges and a variety of sensor types
- Settable hysteresis
- Fast troubleshooting by detecting wire breakage and short circuit in the sensor circuit
- Wide-range voltage power supplies reduce the number of versions – only one device is required
- All versions are alternatively available with spring-loaded terminal connections
- Version for evaluating three sensors in one device, e.g. for motor protection, multiple monitoring

¹⁾NTC, Siemens Matsushita; type B 57272-4333-A1

100 °C: 1.8 k Ω ; 25 °C: 32.762 k Ω



3RS10 Temperature Monitoring Relays for PT 100/1000, KTY 83/84, NTC

1 = Screw connection
2 = Spring-loaded terminal connection

All devices with analog settings are set using a rotary knob. It is possible to set either one or two threshold values as well as a hysteresis of between 2 and 20 %. The hysteresis only applies to one of the threshold values of devices with two thresholds; there is a fixed hysteresis of 5 % for the second threshold. This product series was developed for simple applications where settings only need to be accurate to ± 5 %.

| Sensor | Description | Monitoring function | Measuring range | Contacts | Indications | Control supply voltage | Order No. (MLFB) |
|---|---|---------------------|-----------------|---------------|-------------|-------------------------|--|
| Analog settings, 1 threshold value, 22.5 mm wide | | | | | | | |
| PT 100 | 1 threshold, closed-circuit principle, without fault memory | Over-temperature | -50 to +50 °C | 1 NO +1 NC | 2 LEDs | 24 V UC 110/230 V AC | 3RS1000-□ CD00 3RS1000-□ CK00 |
| | | | 0 to +100 °C | | | 24 V UC 110/230 V AC | 3RS1000-□ CD10 3RS1000-□ CK10 |
| | | | 0 to +200 °C | | | 24 V UC 110/230 V AC | 3RS1000-□ CD20 3RS1000-□ CK20 |
| PT 100 | 1 threshold, closed-circuit principle, without fault memory | Under-temperature | -50 to +50 °C | 1 NO +1 NC | 2 LEDs | 24 V UC 110/230 V AC | 3RS1010-□ CD00 3RS1010-□ CK00 |
| | | | 0 to +100 °C | | | 24 V UC 110/230 V AC | 3RS1010-□ CD10 3RS1010-□ CK10 |
| | | | 0 to +200 °C | | | 24 V UC 110/230 V AC | 3RS1010-□ CD20 3RS1010-□ CK20 |

Analog settings, 2 threshold values, 22.5 mm wide (alarm trip)

| | | | | | | | |
|--------|--|-------------------|---------------|---------------|--------|-------------------------|--|
| PT 100 | 2 threshold values, open/closed-circuit principle selectable, without fault memory | Over-temperature | -50 to +50 °C | 1 NO +1 CO | 3 LEDs | 24 V UC 110/230 V AC | 3RS1020-□ DD00 3RS1020-□ DW00 |
| | | | 0 to +100 °C | | | 24 V UC 110/230 V AC | 3RS1020-□ DD10 3RS1020-□ DW10 |
| | | | 0 to +200 °C | | | 24 V UC 110/230 V AC | 3RS1020-□ DD20 3RS1020-□ DW20 |
| PT 100 | 2 threshold values, open/closed-circuit principle selectable, without fault memory | Under-temperature | -50 to +50 °C | 1 NO +1 CO | 3 LEDs | 24 V UC 110/230 V AC | 3RS1030-□ DD00 3RS1030-□ DW00 |
| | | | 0 to +100 °C | | | 24 V UC 110/230 V AC | 3RS1030-□ DD10 3RS1030-□ DW10 |
| | | | 0 to +200 °C | | | 24 V UC 110/230 V AC | 3RS1030-□ DD20 3RS1030-□ DW20 |

The temperature monitoring relays with digital settings are even easier to operate. The following parameters can be set:

- 2 threshold values, ϑ_1 , ϑ_2
- 1 hysteresis, applies to both thresholds
- 1 time delay, applies to both thresholds
- Open/closed-circuit principle
- Overtemperature/undertemperature/window monitoring function
- Sensor type: PT 100/1000, KTY 83/84, NTC
- No. of sensors for 3RS1041 (one type only)
- Display of the sensor status for 3RS1041

The setting accuracy is 1 °C. A separate relay with a normally open contact, which signals a broken or short-circuited sensor, is integrated for monitoring the sensor.

Digital settings, 2 threshold values, 45 mm wide

| Sensor | Description | Monitoring function | Measuring range | Contacts | Indications | Control supply voltage | Order No. (MLFB) |
|-----------------------------|--------------------------------------|--|-----------------|------------------------|--------------------------|------------------------|-----------------------|
| PT 100/1000, KTY 83/84, NTC | 1 sensor memory/without memory | selectable (over/under-temperature/window) | -50 to +500 °C | 1 CO +1 CO +1 NO | 3 LEDs + digital display | 24 V UC | 3RS1040-□ GD50 |
| | | | | | | 24-240 V UC | 3RS1040-□ GW50 |
| | 1 to 3 sensors memory/without memory | | | | | 24-240 V UC | 3RS1041-□ GW50 |

Accessories: Interchangeable labels for digital device covers

| | | |
|-------------|---------|-------------------|
| 1 sensor | German | 3RS1901-1A |
| | English | 3RS1901-1C |
| 1-3 sensors | German | 3RS1901-1B |
| | English | 3RS1901-1D |

2 3RS11 Temperature Monitoring Relays

for Thermocouple Types J, K, T, E, and N

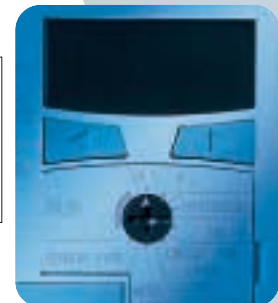
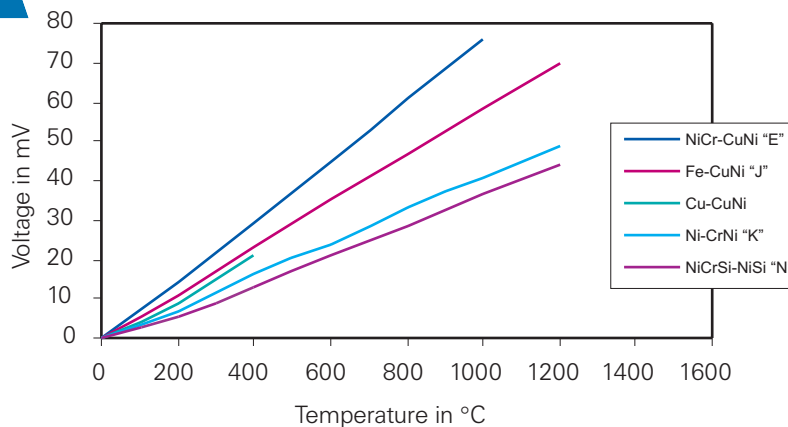
The 3RS11 temperature monitoring relays make a good alternative to temperature controllers in the low-end segment. They are used to monitor temperatures in solid, liquid and gaseous media. The temperature is detected in the medium by means of one of the above sensor types, evaluated by the device and checked to see if it is above, below or within a defined range (window function). The output relay is switched either on or off at the threshold value, depending on the parameter settings.

The most important applications:

- Controlling heating, ventilation and air conditioning systems
- Monitoring limiting temperatures and signaling alarms
- Monitoring motors
- Monitoring process variables in electroplating technology and in the packaging and plastics industries

Main advantages:

- Internal compensation
- Extremely simple operation with no complex menu system
- Graduated product family – fit for every application
- Low-priced compact and standard devices – quick to install and easy to operate
- High-end evaluation units with digital display – suitable for wide temperature ranges and a variety of sensor types
- Settable hysteresis
- Fast troubleshooting by detecting wire breakage in the sensor circuit
- Wide-range voltage power supplies reduce the number of versions – only one device is required
- All versions are alternatively available with spring-loaded terminal connections



3RS11 temperature monitoring relays for thermocouples

1 = Screw connection
2 = Spring-loaded terminal connection

All devices with analog settings are set using a rotary knob. It is possible to set either one or two threshold values as well as a hysteresis of between 2 and 20 %. The hysteresis only applies to one of the threshold values of devices with two thresholds; there is a fixed hysteresis of 5 % for the second threshold. This product series was developed for simple applications where settings only need to be accurate to ± 5 %.

| Sensor | Description | Monitoring function | Measuring range | Contacts | Indications | Control supply voltage | Order No. (MLFB) |
|---|---|---------------------|------------------|---------------|-------------|---|---|
| Analog settings, 1 threshold value, 22.5 mm wide | | | | | | | |
| Type J | 1 threshold value, closed-circuit principle, without fault memory | Over-temperature | 0 to +200 °C | 1 NO +1 NC | 2 LEDs | 24 V UC 110/230 V AC 24 V UC 110/230 V AC | 3RS1100-□ CD20 |
| | | | 0 to +600 °C | | | | 3RS1100-□ CK20 3RS1100-□ CD30 3RS1100-□ CK30 |
| Type K | 1 threshold value, closed-circuit principle, without fault memory | Over-temperature | 0 to +200 °C | 1 NO +1 NC | 2 LEDs | 24 V UC 110/230 V AC 24 V UC 110/230 V AC 24 V UC 110/230 V AC | 3RS1101-□ CD20 |
| | | | 0 to +600 °C | | | | 3RS1101-□ CK20 3RS1101-□ CD30 3RS1101-□ CK30 |
| | | | +500 to +1000 °C | | | | 3RS1101-□ CD40 3RS1101-□ CK40 |
| Type J | 1 threshold value, closed-circuit principle, without fault memory | Under-temperature | 0 to +200 °C | 1 NO +1 NC | 2 LEDs | 24 V UC 110/230 V AC 24 V UC 110/230 V AC | 3RS1110-□ CD20 |
| | | | 0 to +600 °C | | | | 3RS1110-□ CK20 3RS1110-□ CD30 3RS1110-□ CK30 |
| Type K | 1 threshold value, closed-circuit principle, without fault memory | Under-temperature | 0 to +200 °C | 1 NO +1 NC | 2 LEDs | 24 V UC 110/230 V AC 24 V UC 110/230 V AC 24 V UC 110/230 V AC | 3RS1111-□ CD20 |
| | | | 0 to +600 °C | | | | 3RS1111-□ CK20 3RS1111-□ CD30 3RS1111-□ CK30 |
| | | | +500 to +1000 °C | | | | 3RS1111-□ CD40 3RS1111-□ CK40 |

Analog settings, 2 threshold values, 22.5 mm wide (alarm and trip)

| | | | | | | | |
|--------|---|-------------------|------------------|---------------|--------|--|---|
| Type J | 2 threshold values, open/closed circuit, selectable, without fault memory | Over-temperature | 0 to +200 °C | 1 NO +1 CO | 3 LEDs | 24 V UC 24–240 V UC 24 V UC 24–240 V UC | 3RS1120-□ DD20 |
| | | | 0 to +600 °C | | | | 3RS1120-□ DW20 3RS1120-□ DD30 3RS1120-□ DW30 |
| Type K | 2 threshold values, open/closed circuit, selectable, without fault memory | Over-temperature | 0 to +200 °C | 1 NO +1 CO | 3 LEDs | 24 V UC 24–240 V UC 24 V UC 24–240 V UC 24 V UC 24–240 V UC | 3RS1121-□ DD20 |
| | | | 0 to +600 °C | | | | 3RS1121-□ DW20 3RS1121-□ DD30 3RS1121-□ DW30 |
| | | | +500 to +1000 °C | | | | 3RS1121-□ DD40 3RS1121-□ DW40 |
| Type J | 2 threshold values, open/closed circuit, selectable, without fault memory | Under-temperature | 0 to +200 °C | 1 NO +1 CO | 3 LEDs | 24 V UC 24–240 V UC 24 V UC 24–240 V UC | 3RS1130-□ DD20 |
| | | | 0 to +600 °C | | | | 3RS1130-□ DW20 3RS1130-□ DD30 3RS1130-□ DW30 |
| Type K | 2 threshold values, open/closed circuit, selectable, without fault memory | Under-temperature | 0 to +200 °C | 1 NO +1 CO | 3 LEDs | 24 V UC 24–240 V UC 24 V UC 24–240 V UC 24 V UC 24–240 V UC | 3RS1131-□ DD20 |
| | | | 0 to +600 °C | | | | 3RS1131-□ DW20 3RS1131-□ DD30 3RS1131-□ DW30 |
| | | | +500 to +1000 °C | | | | 3RS1131-□ DD40 3RS1131-□ DW40 |

The temperature monitoring relays with digital settings are even easier to operate.

The following parameters can be set:

- 2 threshold values, ϑ_1 , ϑ_2
- 1 hysteresis, applies to both threshold values
- 1 time delay, applies to both threshold values
- Overtemperature/undertemperature/window monitoring function
- Sensor type: J, K, T, E, N
- Open/closed-circuit principle

The setting accuracy is 1 °C. A separate relay with a normally open contact, which signals a broken or short-circuited sensor, is integrated for monitoring the sensors.

Digital settings, 2 threshold values, 45 mm wide

| Sensor | Description | Monitoring function | Measuring range | Contacts | Indicators | Control supply voltage | Order No. (MLFB) |
|--------------------|--------------------------------|--|-----------------|-------------------|--------------------------|------------------------|-----------------------|
| Type J, K, T, E, N | 1 sensor memory/without memory | Selectable (overtemp./undertemp./window) | –99 to +999 °C | 1 CO+1 CO 1 NO | 3 LEDs + digital display | 24 V UC | 3RS1140-□ GD60 |
| | | | | | | 24–240 V UC | 3RS1140-□ GW60 |

Accessories: Interchangeable labels for digital device covers

| | | |
|----------|-------------------|--|
| 1 sensor | German English | 3RS1901-1A 3RS1901-1C |
|----------|-------------------|--|

3 3RN1 Thermistor Motor Protection

3RN1 thermistor motor protection relays provide decisive advantages where current-dependent protection using either a circuit-breaker or an overload relay is not the ideal monitoring quantity: In specific cases, often caused by external defects, overheating can occur without this being able to be detected by the thermal image in the circuit-breaker/overload relay. Examples include:

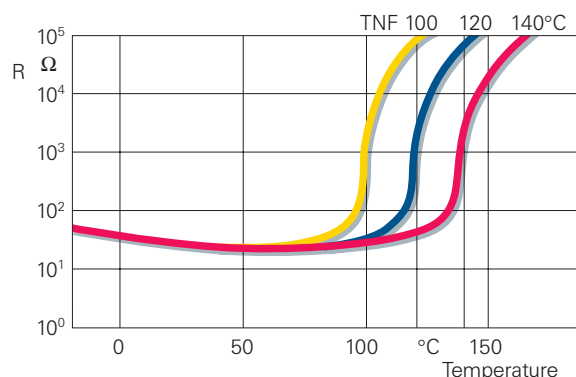
- Heavy-duty starting (e.g. centrifuges)
- Operation with AC drive converters/inverters
- Frequent switching
- Restricted cooling, e.g. as a result of high dirt accumulation (for example in the paper and textile industries, cement plants)
- Braking operations

Additional application possibilities:

- “Alarm and shutdown” function by using two sensor circuits with different response temperatures – this means that it is possible to respond before shutting down (for example, switching-in additional cooling, reducing the load etc.)
- Multi-motor protection using only one device, e.g. for conveyor lines – for several motors which must be shut down together.

Main advantages:

- The motor winding temperature is directly measured
- Only one device is used for all motor outputs
- The device/terminal labeling is according to DIN EN 50005 for “normal” switching relays and for overload protective devices
- Relay with hard-gold-plated contacts for use under difficult conditions
- Wire breakage and short circuits in the sensor circuit are displayed using an LED
- All versions are alternatively equipped with screw connection or spring-loaded terminal connection
- For special cases: Version with protective separation up to 300 V according to DIN/VDE 0106 and version with bistable relay



The resistance of a thermistor, which are used for motor protection, changes abruptly when its limit temperature is reached. This means that the motor manufacturer defines the correct shutdown temperature by setting the appropriate sensor.

Thermistor motor protection relay for PTC thermistors (type A PTCs)

All devices with the exception of 24 V AC/DC have electr. isolation

1 = Srew connection
2 = Spring-loaded terminal connection

| Version | Reset | Switching contacts | Control supply voltage | Order No. (MRPD) | |
|---|---|---------------------------------|--|--|--|
| 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 changeover contact | 24 V AC/DC 110 V AC 230 V AC | 3RN1000-□ AB00 3RN1000-□ AG00 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 110 V AC 230 V AC 24–240 V AC/DC | 3RN1010-□ CB00 3RN1010-□ CG00 3RN1010-□ CM00 3RN1010-□ CW00 | |
| | | 2 changeover contacts | 24 V AC/DC 110 V AC 230 V AC | 3RN1010-□ BB00 3RN1010-□ BG00 3RN1010-□ BM00 | |
| | | 2 W hard-gold-plated | 24 V AC/DC | 3RN1010-□ GB00 | |
| | Manual/ Remote ³⁾ | 1 NO + 1 NC | 24 V AC/DC 110/230 V AC | 3RN1011-□ CB00 3RN1011-□ CK00 | |
| | Short-circuit detection in the sensor circuit | Manual/ Remote ³⁾ | 2 W | 24 V AC/DC 110 V AC 230 V AC | 3RN1011-□ BB00 3RN1011-□ BG00 3RN1011-□ BM00 |
| | | | 2 W hard-gold-plated | 24 V AC/DC | 3RN1011-□ GB00 |
| Fault memory ²⁾ | Manual/Auto/ Remote | 1 NO + 1 NC | 24 V AC/DC 110/230 V AC | 3RN1012-□ CB00 3RN1012-□ CK00 | |
| Fault memory ²⁾ , short-circuit detection in the sensor circuit | Manual/Auto/ Remote | 2 changeover contacts | 24 V AC/DC 110 V AC 230 V AC | 3RN1012-□ BB00 3RN1012-□ BG00 3RN1012-□ BM00 | |
| | | 2 W hard-gold-plated | 24 V AC/DC | 3RN1012-□ GB00 | |
| Fault memory ²⁾ , short-circuit and broken wires in the sensor circuit are detected and displayed, wide-range voltage with screw connection with protective separation ¹⁾ | Manual/Auto/ Remote | 2 changeover contacts | 24 V AC/DC 24–240 V AC/DC | 3RN1013-□ BB00 3RN1013-□ BW10 | |
| | | 2 W hard-gold-plated | 24–240 V AC/DC | 3RN1013-□ GW10 | |
| Evaluation units for 2 sensor circuits, alarm and shutdown, 22.5 mm wide, monostable, closed-circuit current principle, 3 LEDs | | | | | |
| Test/reset key, fault memory ²⁾ , the evaluation circuit for “Alarm” uses an NO contact in the open-circuit principle | Manual/Auto/ Remote | 1 NO + 1 changeover contact | 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 key, fault memory ²⁾ | Manual/Auto/ Remote | 1 NO + 1 NC | 24–240 V AC/DC | 3RN1062-□ CW00 | |
| Bistable evaluation unit, 22.5 mm wide | | | | | |
| Test/reset key, fault memory ²⁾ , short circuit and broken wires in the sensor circuit are detected and displayed, bistable version, not tripped when the control supply voltage fails | Manual/Auto/ Remote | 2 changeover contacts | 24–240 V AC/DC | 3RN1013-□ BW01 | |

¹⁾ Protective separation up to 300 V according to DIN/VDE 0106

²⁾ Information regarding the fault memory, refer to Catalog NS K 10/2001 Page 7/11

³⁾ Reset using the RESET key or by interrupting the control supply voltage

4 3RP1 Time Relays

3RP1 electronic time relays are used for all time-delayed switching operations in starting, protection and control circuits.

They are the **ideal timer modules** for industrial cabinet, switchgear and control manufacturers on account of their sophisticated, well-proven design and their space-saving, compact type of construction.

The most important applications:

ON delay:

- Suppressing noise pulses
- Staggered motor starting to prevent the power system from being overloaded etc.

OFF delay:

- Providing a run-on function after the control voltage has been removed (e.g. for fans)
- Emergency shutdown or bringing a plant or system into a defined condition after the supply voltage fails

Star-delta:

- Changing motors over from star to delta – with a dead interval of
- 50 ms on reversing to prevent short-circuiting between phases

Main advantages:

- All versions are alternatively available with spring-loaded terminal connections
- Sets of labels to identify the selected function of the multi-function time relays
- Transparent product family – fit for every application with just seven basic devices
- Multi-function time relays with wide-range voltage – significant logistical advantages
- Excellent value for money
- Positively driven, hard gold-plated relay contacts (e.g. for safety circuits up to category 2 in accordance with DIN EN 954-1 and/or in combination with electronic controls)
- Sealable cover – to protect the parameter settings



1 = Srew connection
2 = Spring-loaded terminal connection

3RP20 electronic time relays

| Function | Contacts | Time range | Control supply voltage | Order No. (MLFB) |
|-------------|----------------------------|--------------|------------------------|--|
| 8 functions | 1 CO (changeover contacts) | 0.05 s–100 h | 24 V UC/100–127 V AC | 3RP2005- <input type="checkbox"/> AQ30 |
| 8 functions | 1 CO | 0.05 s–100 h | 24 V UC/200–240 V AC | 3RP2005- <input type="checkbox"/> AP30 |
| ON delay | 1 CO | 0.05 s–100 h | 24 V UC/100–127 V AC | 3RP2025- <input type="checkbox"/> AQ30 |
| ON delay | 1 CO | 0.05 s–100 h | 24 V UC/200–240 V AC | 3RP2025- <input type="checkbox"/> AP30 |
| 16 fuctions | 2 CO | 0.05 s–100 h | 24–240 V UC | 3RP2005- <input type="checkbox"/> BW30 |

3RP15 electronic time relays

| | | | | |
|-------------------------------------|-----------------------------|---------------------------|----------------------|---|
| 8 functions | 1 CO | 0.05 s–100 h | 12 V DC | 3RP1505- <input type="checkbox"/> AA40 |
| 8 functions | 1 CO | 0.05 s–100 h | 24 V UC/100–127 V AC | 3RP1505- <input type="checkbox"/> AQ30 |
| 8 functions | 1 CO | 0.05 s–100 h | 24 V UC/200–240 V AC | 3RP1505- <input type="checkbox"/> AP30 |
| 8 functions | 1 CO | 0.05 s–100 h | 24–240 V UC | 3RP1505- <input type="checkbox"/> AW30 |
| 8 functions | 2 CO | 0.05 s–100 h | 24–240 V UC | 3RP1505- <input type="checkbox"/> RW30¹⁾ |
| 16 functions | 2 CO | 0.05 s–100 h | 24 V UC/100–127 V AC | 3RP1505- <input type="checkbox"/> BQ30 |
| 16 functions | 2 CO | 0.05 s–100 h | 24 V UC/200–240 V AC | 3RP1505- <input type="checkbox"/> BP30 |
| 16 functions | 2 CO | 0.05 s–100 h | 24–240 V UC | 3RP1505- <input type="checkbox"/> BW30 |
| 16 functions | 2 CO | 0.05 s–100 h | 400–440 V AC | 3RP1505- <input type="checkbox"/> 1 BT20²⁾ |
| ON delay | 1 CO | 0.5–10 s | 24 V UC/100–127 V AC | 3RP1511- <input type="checkbox"/> AQ30 |
| ON delay | 1 CO | 0.5–10 s | 24 V UC/200–240 V AC | 3RP1511- <input type="checkbox"/> AP30 |
| ON delay | 1 CO | 1.5–30 s | 24 V UC/100–127 V AC | 3RP1512- <input type="checkbox"/> AQ30 |
| ON delay | 1 CO | 1.5–30 s | 24 V UC/200–240 V AC | 3RP1512- <input type="checkbox"/> AP30 |
| ON delay | 1 CO | 5–100 s | 24 V UC/100–127 V AC | 3RP1513- <input type="checkbox"/> AQ30 |
| ON delay | 1 CO | 5–100 s | 24 V UC/200–240 V AC | 3RP1513- <input type="checkbox"/> AP30 |
| ON delay | 1 CO | 0.05 s–100 h | 24 V UC/100–127 V AC | 3RP1525- <input type="checkbox"/> AQ30 |
| ON delay | 1 CO | 0.05 s–100 h | 24 V UC/200–240 V AC | 3RP1525- <input type="checkbox"/> AP30 |
| ON delay | 2 CO | 0.05 s–100 h | 42–48/60 V UC | 3RP1525- <input type="checkbox"/> BR30 |
| ON delay | 2 CO | 0.05 s–100 h | 24 V UC/100–127 V AC | 3RP1525- <input type="checkbox"/> BQ30 |
| ON delay | 2 CO | 0.05 s–100 h | 24 V UC/200–240 V AC | 3RP1525- <input type="checkbox"/> BP30 |
| ON delay | 2 CO | 0.05 s–100 h | 24–240 V UC | 3RP1525- <input type="checkbox"/> BW30 |
| ON delay, 2-wire | 1 NO contact, semiconductor | 0.05–240 s | 24–66 V UC | 3RP1527- <input type="checkbox"/> EC30 |
| ON delay, 2-wire | 1 NO contact, semiconductor | 0.05–240 s | 90–240 V UC | 3RP1527- <input type="checkbox"/> EM30 |
| OFF delay with auxiliary voltage | 1 CO | 0.5–10 s | 24 V UC/100–127 V AC | 3RP1531- <input type="checkbox"/> AQ30 |
| OFF delay with auxiliary voltage | 1 CO | 0.5–10 s | 24 V UC/200–240 V AC | 3AP1531- <input type="checkbox"/> AP30 |
| OFF delay with auxiliary voltage | 1 CO | 1.5–30 s | 24 V UC/100–127 V AC | 3RP1532- <input type="checkbox"/> AQ30 |
| OFF delay with auxiliary voltage | 1 CO | 1.5–30 s | 24 V UC/200–240 V AC | 3RP1532- <input type="checkbox"/> AP30 |
| OFF delay with auxiliary voltage | 1 CO | 5–100 s | 24 V UC/100–127 V AC | 3RP1533- <input type="checkbox"/> AQ30 |
| OFF delay with auxiliary voltage | 1 CO | 5–100 s | 24 V UC/200–240 V AC | 3RP1533- <input type="checkbox"/> AP30 |
| OFF delay without auxiliary voltage | 1 CO | 0.05–100 s | 24 V UC | 3RP1540- <input type="checkbox"/> AB30 |
| OFF delay without auxiliary voltage | 1 CO | 0.05–100 s | 100–127 V UC | 3RP1540- <input type="checkbox"/> AJ30 |
| OFF delay without auxiliary voltage | 1 CO | 0.05–100 s | 200–240 V UC | 3RP1540- <input type="checkbox"/> AN30 |
| OFF delay without auxiliary voltage | 2 CO | 0.05–100 s | 24 V UC | 3RP1540- <input type="checkbox"/> BB30 |
| OFF delay without auxiliary voltage | 2 CO | 0.05–100 s | 100–127 V UC | 3RP1540- <input type="checkbox"/> BJ30 |
| OFF delay without auxiliary voltage | 2 CO | 0.05–100 s | 200–240 V UC | 3RP1540- <input type="checkbox"/> BN30 |
| Clock-pulse generator | 1 CO | 0.05 s–100 h | 42–48 V UC/60 V AC | 3RP1555- <input type="checkbox"/> AR30 |
| Clock-pulse generator | 1 CO | 0.05 s–100 h | 24 V UC/100–127 V AC | 3RP1555- <input type="checkbox"/> AQ30 |
| Clock-pulse generator | 1 CO | 0.05 s–100 h | 24 V UC/200–240 V AC | 3RP1555- <input type="checkbox"/> AP30 |
| Star-delta with run-on function | 3 x 1 NO contact | 1–20 s, 30–600 s (run-on) | 24 V UC/100–127 V AC | 3RP1560- <input type="checkbox"/> SQ30 |
| Star-delta with run-on function | 3 x 1 NO contact | 1–20 s, 30–600 s (run-on) | 24 V UC/200–240 V AC | 3RP1560- <input type="checkbox"/> SP30 |
| Star-delta | 1 NO contact + 1 NO contact | 1–20 s | 24 V UC/100–127 V AC | 3RP1574- <input type="checkbox"/> NQ30 |
| Star-delta | 1 NO contact + 1 NO contact | 1–20 s | 24 V UC/200–240 V AC | 3RP1574- <input type="checkbox"/> NP30 |
| Star-delta | 1 NO contact + 1 NO contact | 3–60 s | 24 V UC/100–127 V AC | 3RP1576- <input type="checkbox"/> NQ30 |
| Star-delta | 1 NO contact + 1 NO contact | 3–60 s | 24 V UC/200–240 V AC | 3RP1576- <input type="checkbox"/> NP30 |

1) Positively driven, hard gold-plated relay contacts
2) This device is only available with a srew connection

5 7PV Time Relays

**for Front Panel Mounting
with Analog or Digital Settings**

7PV electronic time relays have been optimized as built-in devices for operator panels. In terms of their functions, rated voltage and time ranges, they represent the ideal solution no matter what the application. The 48 x 48 mm size is designed to fit into 45 x 45 mm panel cutouts.

Five relay versions are sufficient to cover a wide spectrum of applications, because all the devices are supplied with selectable time ranges from 0.1 s to 10 h or from 0.01 s to 9999 h.

From 24 V UC to 240 V AC in the multi-function time relays – either analog settings with a large rotary knob or digital settings with an LCD display. All the versions combine with an 11-pole socket, either for surface mounting (DIN rail) or with a connection on the back. The relays are easy to install or replace anywhere within the ambient temperature range from -20 to +60 °C.

Main advantages:

- All products in the series are 48 x 48 mm in size
- Analog settings from ON delay to multi-function
- Multi-function relays with digital settings plus LCD display
- Selectable time ranges from 0.5 s to 10 h or from 0.01 s to 9999 h
- All settings are possible on the front
- Easy to replace thanks to the separation of components, sockets and relays



| Built-in time relays with analog settings | | Built-in time relays with digital settings | | |
|---|---------------------------|---|------------------------|----------------------|
| ON delay Multi-function (4 functions) <ul style="list-style-type: none">– ON delay– OFF delay with auxiliary voltage– Pulse-shaping– Making pulse contact | | Multi-function (6 functions): <ul style="list-style-type: none">– ON delay– OFF delay with auxiliary voltage– Blinking, pulse-starting– Blinking, interval-starting– Making pulse contact– Pulse shaping | | |
| 2 CO or 1 CO with time delay +1 instantaneous CO LED 0.1 s–10 h, six possible settings 24 V UC/AC 110 V 24 V UC/220–240 V AC | | 1 changeover contact LCD display 0.01 s–9999 h, eleven possible settings 24 V UC/110–240 V AC | | |
| 7PV3 solid-state time relays | | | | |
| Function | Contacts | Time range | Control supply voltage | Order No. (MLFB) |
| 6 functions | 1 CO | 0.01 s–9999 h | 24 V UC/110–240 V AC | 7PV3348-2AX34 |
| 7PV4 solid-state time relays, analog settings | | | | |
| Function | Contacts | Time range | Control supply voltage | Order No. (MLFB) |
| 4 functions | 1 CO (changeover contact) | 0.1 s–10 h | 24 V UC/110 V AC | 7PV4348-1AG30 |
| 4 functions | 1 CO | 0.1 s–10 h | 24 V UC/220–240 V AC | 7PV4348-1AP30 |
| ON delay | 2 CO | 0.1 s–10 h | 24 V UC/110 V AC | 7PV4148-1BG30 |
| ON delay | 2 CO | 0.1 s–10 h | 24 V UC/220–240 V AC | 7PV4148-1BP30 |
| Applications | | | | |
| Design | | Order No. | | |
| 11-pole socket with connection on back 11-pole socket for DIN rail and surface mounting | | 7PX9921 LZX:MT78750 | | |

6 3UG3 Monitoring Relays for Electrical Signals

Phase and voltage monitoring (single- and three-phase)

3UG3 monitoring relays for phase and voltage measure various parameters in the main and auxiliary circuits of plants and systems. The main purpose of these devices is to detect faults or symptoms of wear in good time and to respond to them before considerably greater damage is caused.

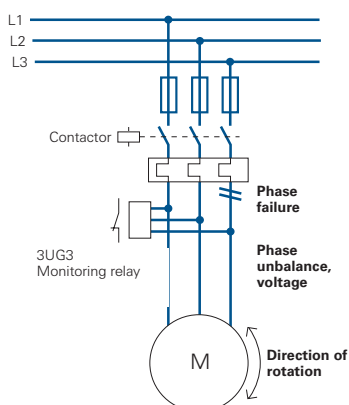
Applications:

The range of applications is shown in the table below. This table indicates which system states can be detected with the help of which monitoring parameters.

| Measured quantity | Possible system status |
|-----------------------|--|
| Phase sequence | • Direction of rotation of the drive |
| Phase failure | • Fuse tripped • Control supply voltage failure • Single-phase operation of a motor which consequently overheats |
| Phase unbalance | • Motor overheated as a result of asymmetrical voltages • Asymmetrically loaded power systems detected • Phase failure detected despite regenerative feedback |
| Undervoltage | • Increased current in a motor which consequently overheats • Device reset accidentally • Collapse of a power system, especially if the equipment is battery-supplied • Threshold switch for 0 to 10 V analog signals |
| Overvoltage | • Destruction of the plant or system as a result of overvoltages • Plant or system switched on with excessive voltage • Threshold switch for 0 to 10 V analog signals |
| Insulation monitoring | • Monitors the insulation resistance between ungrounded networks and earthed conductors (IT networks) |

Main advantages:

- No separate auxiliary voltages required by any of the three-phase devices
- Underrange or overrange selectable
- Single-phase voltage monitoring with or without auxiliary voltage
- Single-phase voltage monitoring also using a "window" technique



Three-phase phase and voltage monitoring

| Phase failure | Phase sequence | Phase unbalance | Symmetrical undervoltage | Symmetrical overvoltage | N-conductor monitoring | Hysteresis | Time delay | Contacts | Width | Control supply voltage | Order No. (MLFB) |
|---------------|----------------|----------------------|--------------------------|-------------------------|------------------------|------------|------------|----------------|---------|--|--|
| Yes | Yes | – | – | – | – | – | – | 2 CO | 22.5 mm | 3 x 230–460 V AC | 3UG3511-1BQ50 |
| Yes | Yes | 20 % fixed | 20 % fixed | – | – | typ. 5 % | 0.2–10 s | 2 CO | 45 mm | 3 x 180–260 V AC 3 x 320–460 V AC 3 x 380–550 V AC 3 x 460–660 V AC | 3UG3013-1BL60 3UG3013-1BP60 3UG3013-1BR60 3UG3013-1BS60 |
| Yes | Yes | 5–20 % | – | – | – | 10 % | 0.5–10 s | 1 CO | 45 mm | 3 x 230 V AC 3 x 400 V AC | 3UG3012-1AL50 3UG3012-1AP50 |
| Yes | No | 85–98 % 102–115 % | 85–98 % | 102–115 % | – Yes | 3 % | 0.1–10 s | 1 CO + 1 CO | 45 mm | 3 x 400 V AC 3 x 400 V AC | 3UG3041-1BP50 3UG3042-1BP50 |

Single-phase voltage monitoring

| Measuring range | Overvoltage/undervoltage | Auto reset/fault memory | Contacts | Time delay | Hysteresis | Auxiliary voltage | Electrical isolation | Order No. (MLFB) |
|----------------------------------|------------------------------------|-------------------------|----------|------------|------------|--|-------------------------|--|
| AC/DC 0.2–60 V | Selectable | Selectable | 1 CO | 0.1–3 s | 5–50 % | 230 V AC 120 V AC 24 V AC 24 V DC | Yes Yes Yes No | 3UG3531-1AL20 3UG3531-1AG20 3UG3531-1AC20 3UG3531-1AC40 |
| AC/DC 15–600 V | Selectable | Selectable | 1 CO | 0.1–3 s | 5–50 % | 230 V AC 120 V AC 24 V AC 24 V DC | Yes Yes Yes No | 3UG3532-1AL20 3UG3532-1AG20 3UG3532-1AC20 3UG3532-1AC40 |
| AC/DC 15–150 V AC/DC 50–275 V | Selectable | Selectable | 1 CO | 0.1–3 s | 5–50 % | – – | – – | 3UG3534-1AC50 3UG3534-1AM50 |
| AC/DC 15–150 V AC/DC 50–275 V | Window (upper and lower threshold) | Auto reset | 1 CO | 0.1–3 s | 5 % fixed | – – | – – | 3UG3535-1AC50 3UG3535-1AM50 |

Insulation monitoring for IT networks

| Network | Measuring range | Autoreset/fault memory | Contacts | Auxiliary voltage | Order No. (MLFB) |
|---------|-------------------|------------------------|----------|-----------------------------|--|
| AC | 1–110 k Ω | selectable | 1 CO | 115/230 V AC 24–240 V AC | 3UG3081-1AK20 3UG3081-1AW30 |
| DC | 10–110 k Ω | selectable | 1 CO | 24–240 V AC | 3UG3082-1AW30 |

6 3UG3 Monitoring Relays for Electrical Signals

Single-phase current and $\cos \varphi$ monitoring

3UG3 monitoring relays for current and $\cos \varphi$ are used above all to monitor motor loads and the functionality of electrical loads. The main purpose of these devices is to detect faults or symptoms of wear in good time and to respond to them before considerably greater damage is caused.

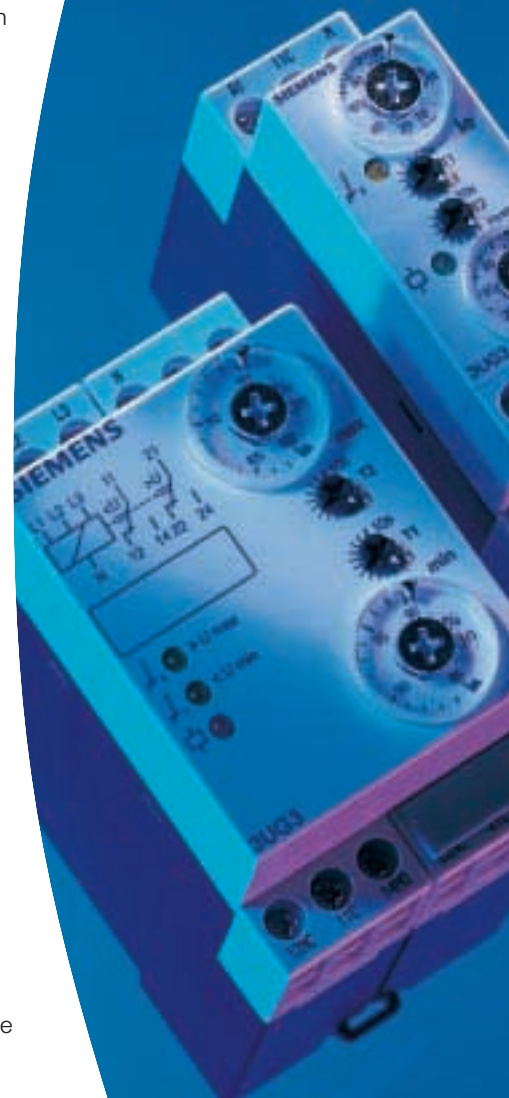
Applications:

The range of applications is shown in the table below. This table indicates which system states can be detected with the help of which monitoring parameters.

| | |
|---------------------------|---|
| Current monitoring | <ul style="list-style-type: none"> • Overload monitoring • Underload monitoring close to the rated torque • Functional monitoring for electrical loads • Wire breakage monitoring • Energy management (phase current monitoring) • Threshold switch for 0/4 to 20 mA analog signals |
| $\cos \varphi$ monitoring | <ul style="list-style-type: none"> • No-load monitoring • Underload monitoring at the low end of the power range • Overload monitoring (for low monitor outputs) • Very simple $\cos \varphi$ monitoring in power systems for controlling reactive-power compensation equipment |

Main advantages:

- Only two versions with three measuring ranges per device (20/100/500 mA and 1/5/10 A)
- Underrange/overrange and with/without fault memory selectable
- Settable starting bypass and time delay for underrange/overrange
- 22.5-mm-wide housing (current monitoring)



Single-phase current monitoring

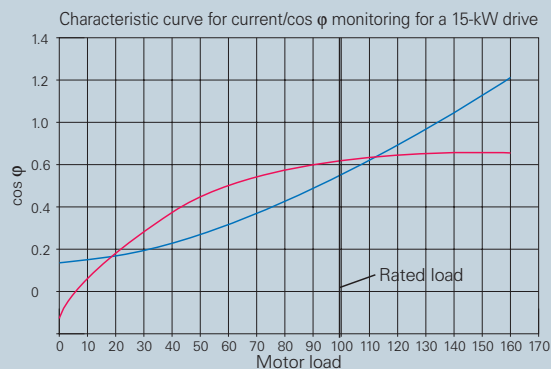
| Measuring range | Overcurrent/undercurrent | Auto reset/fault memory | Contacts | Starting bypass | Time delay | Hysteresis | Control supply voltage | Electrical isolation | Order No. (MLFB) |
|--|--------------------------|-------------------------|----------|-----------------|------------|------------|--|-------------------------|--|
| 2 mA–0.5 A AC/DC in three measuring ranges IN1: 2–20 mA IN2: 10–100 mA IN3: 50–500 mA | Selectable | Selectable | 1 CO | 1–20 s | 0.1–3 s | 5–50 % | 230 V AC 120 V AC 24 V AC 24 V DC | Yes Yes Yes No | 3UG3521-1AL20 3UG3521-1AG20 3UG3521-1AC20 3UG3521-1AC40 |
| 0.1–10 A AC/DC in three measuring ranges IN1: 0.1–1 A IN2: 0.5–5 A IN3: 1–10 A | Selectable | Selectable | 1 CO | 1–20 s | 0.1–3 s | 5–50 % | 230 V AC 120 V AC 24 V AC 24 V DC | Yes Yes Yes No | 3UG3522-1AL20 3UG3522-1AG20 3UG3522-1AC20 3UG3522-1AC40 |

cos ϕ monitoring

| Measuring range | Max. continuous current | Overcurrent/undercurrent | Contacts | Starting bypass | Time delay | Hysteresis fixed | Voltage | Order No. (MLFB) |
|-----------------|-------------------------|-------------------------------------|---------------|-----------------|------------|--|--|--|
| 0.1–0.99 | 14 A | Window (upper and lower thresholds) | 1 CO +1 CO | 0.5–20 s | 0.3–3 s | 10 % at $\cos \phi \geq 0.4$ 10–30 % at $\cos \phi < 0.4$ | 3 x 230 V AC 3 x 400 V AC 3 x 480 V AC 3 x 575 V AC | 3UG3014-1BL60 3UG3014-1BP60 3UG3014-1BR60 3UG3014-1BS60 |

(Current transformers can be used for higher currents. A selection is provided in Part 13 of our NSK Catalog.)

Measuring signal frequency: The 3UG352... monitoring relays can measure frequencies from 40 to 500 Hz and DC with the specified accuracy. For other frequencies, the setting must be changed accordingly.



7 3UG3 Monitoring Relays

for Liquid Level and Speed

3UG3 monitoring relays for non-electrical signals are used to monitor the levels of conductive liquids and speeds.

Applications:

The range of applications is shown in the table below. This table indicates which system states can be detected with the help of which monitoring parameters.

| | |
|--|--|
| Level monitoring for conductive liquids | <ul style="list-style-type: none"> • Single-point and two-point level monitoring • Overflow protection • Dry-running protection • Leakage monitoring |
| Speed monitoring (one pulse per revolution is generated by a sensor) | <ul style="list-style-type: none"> • Slip or breakage of a belt drive • Zero-speed monitoring (not suitable for protecting persons) • Completeness monitoring for interlocking covers |

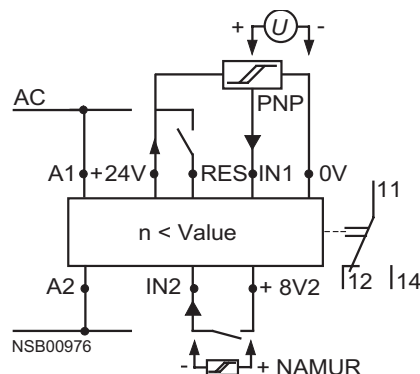
Main advantages for liquid-level monitoring:

- 2- and 3-pole wire electrode, extremely simple mounting for installation from above
- Bar-type electrode for lateral installation – for greater filling heights and minimum space requirement
- Sensitivity settable from 5 to 100 kOhms
- 22.5 mm wide housing

Main advantages for speed monitoring:

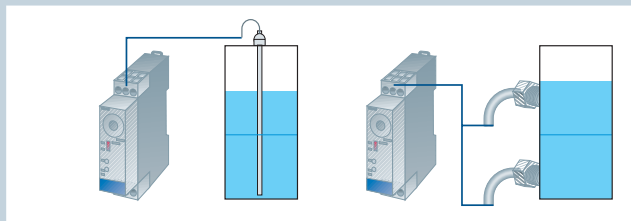
- Selectable measuring ranges
- Two- or three-wire sensors can be connected
- Sensors with mechanical switching output or solid-state output can be connected
- Integrated auxiliary voltage for sensor

Speed monitoring:



Applications:

Single-point and two-point liquid-level monitoring, overflow protection



This method can be used for many different liquids and substances, providing the resistance is $< 100 \text{ k}\Omega$

| Product | k Ω | | |
|-----------------|------------|--------------------|-----|
| Buttermilk | 1 | Untreated water | 5 |
| Fruit juice | 1 | Waste water | 5 |
| Vegetable juice | 1 | Starch solution | 5 |
| Milk | 1 | Oil | 10 |
| Soup | 2.2 | Condensation water | 18 |
| Beer | 2.2 | Lather | 18 |
| Coffee | 2.2 | Jam/marmalade | 45 |
| Ink | 2.2 | Jellies | 45 |
| Saltwater | 2.2 | Sugar solution | 90 |
| Wine | 2.2 | Whisky | 220 |
| | | Distilled Water | 450 |

Monitoring relays for two-point level monitoring of conductive liquids

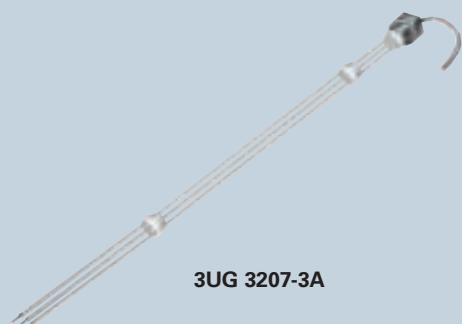
| Sensitivity | Contacts | Width | Control supply voltage | Order No. (MLFB) |
|-------------|----------|---------|---------------------------------|--|
| 5–100 kOhms | 1 CO | 22.5 mm | 230 V AC 120 V AC 24 V AC | 3UG3501-1AL20 3UG3501-1AG20 3UG3501-1AC20 |

Measuring probes

| Description | Cable connection | No. of poles | | |
|--|--|-------------------------|--|--|
| Wire electrode, 500 mm long, with Teflon isolation, max. operating temperature 90 °C, max. operating pressure 10 bar | 3 x 0.5 mm ² , 2 m 2 x 0.5 mm ² , 2 m | Three-pole Two-pole | | 3UG3207-3A 3UG3207-2A |
| Bar electrode for lateral installation, max. operating temperature 90 °C, max. operating pressure 10 bar | 3 x 0.5 mm ² , 2 m 2 x 0.5 mm ² , 2 m | Two-pole Single-pole | | 3UG3207-2B 3UG3207-1B |
| Rugged design, max. operating temperature 90 °C, max. operating pressure 10 bar | 2 x 0.5 mm ² , 2 m | Single-pole | | 3UG3207-1C |

Monitoring relay for underspeed

| Measuring range | Starting bypass | Width | Voltage | Electrical isolation | |
|--|-----------------|-------|--|-------------------------|--|
| Impulse/min 0.1–600 (10–0.0017 Hz) | 0.3–30 s | 45 mm | 230 V AC 120 V AC 24 V AC 24 V DC | Yes Yes Yes No | 3UG3051-1AL20 3UG3051-1AG20 3UG3051-1AC20 3UG3051-1AC40 |



3UG 3207-3A



3UG 3207-2B



3UG 3207-1C

8 3RS17 Interface Converters

Standard Signal and Universal Converters

Interface converters are used mainly to isolate and convert analog signals. Sensors/actuators and controls generally have different power supply units and therefore require electrical isolation in the signal circuit. This is either integrated in the control or ensured by means of interface converters.

It is necessary to convert one signal to another, for instance, if a voltage signal needs to be transmitted over a long distance as a current signal or if the output of a sensor and the input of a control are not mutually compatible.

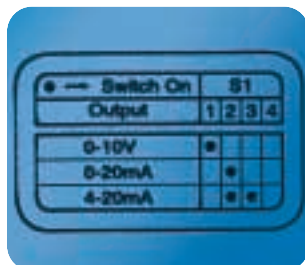
Another application is facilitated by the frequency outputs. The input signal is converted into a proportional frequency. Analog signals can thus be processed with digital inputs. This is important if the control does not allow an analog input to be installed or if all its analog inputs are already assigned, such as when devices are retrofitted.

Applications:

- Electrical isolation of analog signals
- Conversion of analog signals
- Conversion of analog signals to a frequency
- Conversion of non-standard signals to standard signals
- Overvoltage protection from analog inputs

Main advantages:

- Slimline design
- Universal converters simple to set
- Converters have a frequency output
- All ranges fully calibrated
- Complete family – the ideal solution for every situation
- Integrated Hand – Automatic switch with adjustable set point



Single interface converters

1 = Screw connection
2 = Spring-loaded terminal connection

| Input | Output | Width | M-A switch | Control supply voltage | Electrical isolation | Order No. (MLFB) |
|---------------|---------------|---------|------------|------------------------|----------------------|-----------------------|
| 0...10 V | 0...10 V | 6.2 mm | No | 24 V UC | 2-way | 3RS1700-1 AD00 |
| 0...10 V | 0...20 mA | 6.2 mm | No | 24 V UC | 2-way | 3RS1700-1 CD00 |
| 0...10 V | 4...20 mA | 6.2 mm | No | 24 V UC | 2-way | 3RS1700-1 DD00 |
| 0...20 mA | 0...10 V | 6.2 mm | No | 24 V UC | 2-way | 3RS1702-1 AD00 |
| 0...20 mA | 0...20 mA | 6.2 mm | No | 24 V UC | 2-way | 3RS1702-1 CD00 |
| 0...20 mA | 4...20 mA | 6.2 mm | No | 24 V UC | 2-way | 3RS1702-1 DD00 |
| 4...20 mA | 0...10 V | 6.2 mm | No | 24 V UC | 2-way | 3RS1703-1 AD00 |
| 4...20 mA | 0...20 mA | 6.2 mm | No | 24 V UC | 2-way | 3RS1703-1 CD00 |
| 4...20 mA | 4...20 mA | 6.2 mm | No | 24 V UC | 2-way | 3RS1703-1 DD00 |
| 0...20 mA | 0...20 mA | 6.2 mm | No | Passive converter | 2-way | 3RS1720-1 ET00 |
| 0...20 mA | 0...20 mA | 12.5 mm | No | Passive converter | 2-way | 3RS1721-1 ET00 |
| 2 x 0...20 mA | 2 x 0...20 mA | 12.5 mm | No | Passive converter | 2-way | 3RS1722-1 ET00 |

Selectable standard interfaces

| Input | Output | Width | M-A switch | Control supply voltage | Electrical isolation | Order No. (MLFB) |
|---------------------------------------|--|---------|------------|------------------------|----------------------|-----------------------|
| 0...10 V 0/4...20 mA selectable | 0...10 V 0/4...20 mA selectable | 6.2 mm | No | 24 V UC | 2-way | 3RS1705-1 FD00 |
| | | 17.5 mm | No | 24–240 V UC | 3-way | 3RS1705-1 FW00 |
| 0...10 V 0/4...20 mA selectable | 0...10 V 0/4...20 mA selectable | 17.5 mm | Yes | 24 V UC | 2-way | 3RS1725-1 FD00 |
| | | 17.5 mm | Yes | 24–240 V UC | 3-way | 3RS1725-1 FW00 |
| 0...10 V 0/4...20 mA selectable | 0...50 Hz 0...100 Hz 0...1 kHz 0...10 kHz selectable | 6.2 mm | No | 24 V UC | 2-way | 3RS1705-1 KD00 |
| | | 17.5 mm | No | 24–240 V UC | 3-way | 3RS1705-1 KW00 |

Universal converters

| Input | Output | Width | M-A switch | Control supply voltage | Electrical isolation | Order No. (MLFB) |
|--|---------------------------------------|---------|------------|-----------------------------------|-------------------------|---|
| 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 mA ± 20 mA | 0...10 V 0/4...20 mA selectable | 17.5 mm | No | 24 V UC 24 V UC 24–240 V UC | 2-way 3-way 3-way | 3RS1706-1 FD00 3RS1706-1 FE00 3RS1706-1 FW00 |

9 3TX70 Interface Relays

Two basic versions of the 3TX70 interface relays are available. The first of these is the 3TX7004/05 series in a 6.2-mm slimline housing. This series allows interface relays to be fitted into a smaller width inside the cabinet. Secondly, the 3TX7002/03 series permits mounting in small cabinets with reduced tier spacing between the DIN rails as well as a reduced depth. Both series are offered with an extensive range of input and output interfaces.

Applications:

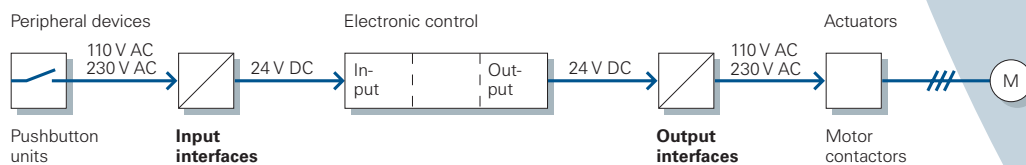
- Electrical isolation
- Voltage conversion, e.g. from 24 V DC to 230 V AC
- Signal amplification
- Contact multiplication
- Relay controls in general
- Overvoltage and EMV protection from PLC's

Main advantages:

- Coil voltage tolerance from 0.7 to 1.25 U_n with 24 V DC up to 60 °C
- Integrated protection circuit at the input
- Extremely reliable owing to soldered-in relays
- Connection comb for jumpering equal potentials
- Various relay complements available
- Manual-0-automatic switch for easier startup
- Multichannel devices



Applications:



3TX7004/05 – the narrow space-saver – output interface with relay output

4 = Screw connection
5 = Spring-loaded terminal connection

| Contacts | Control supply voltage | Width | Hard gold-plating | M-0-A switch | Order No. (MLFB) |
|----------|------------------------|---------|-------------------|--------------|--|
| 1 CO | 24 V UC | 6.2 mm | – Yes | – – | 3TX7004-1LB00 3TX7005-1LB02 |
| | | 12.5 mm | – – | – Yes | 3TX7004-1BB00 3TX7005-1BB10 |
| | 230 V UC | 6.2 mm | – | – | 3TX7004-1LF00 3TX7005-1BF05 ¹⁾ |
| | | 12.5 mm | – | – | |
| | 10–40 V UC | 6.2 mm | – | – | 3TX7004-1LH00 |
| 1 NO | 24 V UC | 6.2 mm | – | – | 3TX7004-1MB00 3TX7005-1AB10 |
| | | 12.5 mm | – | Yes | |
| | 230 V UC | 6.2 mm | – | – | 3TX7004-1MF00 |
| 2 NO | 24 V UC | 12.5 mm | – | – | 3TX7004-1CB00 |
| 3 NO | 24 V UC | 17.5 mm | – | – | 3TX7004-1HB00 |
| 2 CO | 24 V UC | 22.5 mm | – | – | 3TX7004-1GB00 |

Input interface with relay output

| | | | | | |
|------|----------|--------|-----|---|---------------|
| 1 NO | 230 V UC | 6.2 mm | Yes | – | 3TX7004-2MF02 |
| | 110 V UC | 6.2 mm | Yes | – | 3TX7004-2ME02 |
| | 24 V UC | 6.2 mm | Yes | – | 3TX7004-2MB02 |

3TX7002/03 – for low tier heights – output interface with relay output

2 = Screw connection
3 = Spring-loaded terminal connection

| Output | Control supply voltage | Width | Hard gold-plated | | |
|--------|------------------------|---------|------------------|--|---------------|
| 1 NO | 24 V UC | 11.5 mm | – | | 3TX7002-1AB00 |
| | | 11.5 mm | Yes | | 3TX7002-1AB02 |
| 1 CO | 24 V UC 230 V UC | 17.5 mm | – | | 3TX7002-1BB00 |
| | | 17.5 mm | – | | 3TX7002-1BF00 |
| 2 NO | 24 V UC | 22.5 mm | – | | 3TX7002-1CB00 |
| 2 CO | 24 V UC | 22.5 mm | Yes | | 3TX7002-1FB02 |

Input interface with relay output

| | | | | | |
|------|----------|---------|-----|--|-----------------------------|
| 1 NO | 230 V UC | 11.5 mm | – | | 3TX7002-2AF00 |
| | 230 V UC | 11.5 mm | – | | 3TX7002-2AF05 ¹⁾ |
| | 110 V UC | 11.5 mm | – | | 3TX7002-2AE00 |
| | 24 V UC | 11.5 mm | – | | 3TX7002-2AB00 |
| 1 CO | 230 V UC | 17.5 mm | Yes | | 3TX7002-2BF02 |

Accessories

Cable with 24 terminals for 3TX70*
Connection comb with 24 terminals for 3TX 7004 with 6.2-mm width

3TX7004-8BA00
3TX7004-8AA00

¹⁾ For longer cables up to 350 m.



The accessories provide a simple means of jumpering equal potentials.

10 3TX70 Interface Modules

with Semiconductor Output

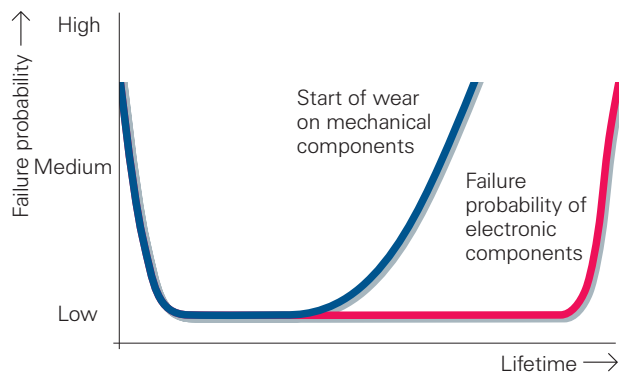
3TX70 interface modules are available either with conventional relays or in a semiconductor version. Compared to interface relays, semiconductor-type interface modules offer a few significant advantages: the electronic components are extremely reliable and long-lasting (refer to the diagram below). The input interface combines the best of both worlds: improved technical features and a lower price. When considering output interfaces, the question of "relay or semiconductor" needs to be taken into account as well as the making/breaking capacity and the number of switching cycles. If a relay has to be replaced just once during the complete lifetime of a machine, then a semiconductor interface will already have paid for itself.

Applications:

- Switching DC loads
- Switching capacitive loads
- Large number of switching cycles

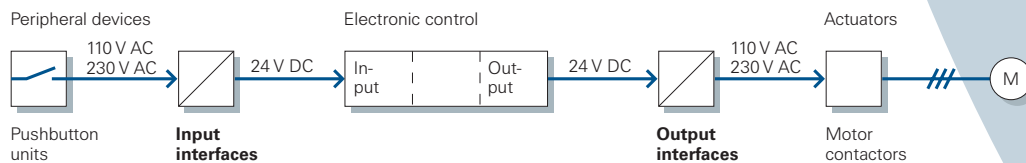
Main advantages of semiconductor interfaces:

- Input interface with semiconductor output – lower price and increased reliability
- Graduated series of output interfaces with semiconductors
- Extremely long electrical life
- Extremely good contact stability
- High DC making/breaking capacity



Graph comparing different failure mechanisms for electronic and mechanical components

Applications:



3TX 7004/05 – the narrow space-saver – output interface with semiconductor output, 1 NO contact

4 = Screw connection
5 = Spring-loaded terminal connection

| Control supply voltage | Width | Max. switching current | Switching voltage | Min. load current | Short-time loading capacity | M-0-A switch | Order No. (MLFB) |
|------------------------|---------|------------------------|-------------------|-------------------|-----------------------------|--------------|----------------------|
| 24 V DC | 6.2 mm | 0.5 A | ≤ 48 V DC | – | 1.5 A/20 ms | – | 3TX700□-3AB04 |
| | | 0.75 A | ≤ 200 V DC | – | 3 A/2 ms | – | 3TX700□-3PB41 |
| | | 1.5 A | ≤ 30 V DC | – | Short-circuit-proof | – | 3TX700□-3PB54 |
| | 12.5 mm | 5 A | ≤ 30 V DC | 0.5 A | Short-circuit-proof | – | 3TX700□-3AC04 |
| | 12.5 mm | 5 A | ≤ 30 V DC | 0.5 A | Short-circuit-proof | Yes | 3TX700□-3AC14 |
| | 6.2 mm | 0.5 A | 24–250 V AC | 0.01 A | 0.8 A/3 ms | – | 3TX700□-3RB43 |
| 110–230 V AC | 12.5 mm | 2 A | 24–250 V AC | 0.05 A | 100 A/20 ms | – | 3TX700□-3AC03 |
| | 6.2 mm | 3 A | ≤ 30 V DC | – | Short-circuit-proof | – | 3TX700□-3PG74 |

Input interface with semiconductor output, 1 NO contact

| | | | | | | | |
|--------------|--------|-------|-----------|---|-------------|---|----------------------|
| 110–230 V AC | 6.2 mm | 0.1 A | ≤ 30 V DC | – | 0.2 A/3 ms | – | 3TX700□-4PG24 |
| 24 V DC | | 0.1 A | ≤ 30 V DC | – | 0.2 A/3 ms | – | 3TX700□-4PB24 |
| 24 V DC | | 0.5 A | ≤ 48 V DC | – | 1.5 A/20 ms | – | 3TX700□-4AB04 |

3TX7002 – for low tier heights – output interface with semiconductor output, 1 NO contact

| Control supply voltage | Width | Max. switching current | Switching voltage | Min. load current | Short-time loading capacity | M-0-A switch | Order No. (MLFB) |
|------------------------|---------|------------------------|-------------------|-------------------|-----------------------------|--------------|----------------------|
| 24 V DC | 12.5 mm | 1.8 A | 48–264 V AC | 0.06 A | 20 A/20 ms | | 3TX7002-3AB00 |
| 24 V DC | 11.5 mm | 1.5 A | ≤ 60 V DC | – | 4 A/0.2 ms | | 3TX7002-3AB01 |

Input interface with semiconductor output, 1 NO contact

| | | | | | | | |
|--------------|---------|-------|-----------|---|-----------|--|----------------------|
| 110–230 V AC | 12.5 mm | 0.1 A | ≤ 60 V DC | – | 1 A/20 ms | | 3TX7002-4AG00 |
| 24 V UC | 12.5 mm | 0.1 A | ≤ 30 V DC | – | 1 A/20 ms | | 3TX7002-4AB00 |

Accessories

Cable with 24 terminals for 3TX70*
Connection comb with 24 terminals for 6.2-mm width
End plate for 3TX7004/5-...AB04

3TX7004-8BA00
3TX7004-8AA00
3TX7004-8CE00



The accessories provide a simple means of jumpering equal potentials.

11 LZX Plug-In Relays

Applications:

- Interface relay for electronic controls to couple inputs and outputs together
- Multiplying contacts
- Switching small loads
- Measured-value changeover switch

Main advantages:

- Tested AC 15 and DC 13 making/breaking capacity
- LZX:RT/LZX:RY can also be supplied as a complete module
- Extensive range of accessories
- Coil voltages: 24 V DC, 24 V AC, 115 V AC, 230 V AC

The family is available in 4 versions:

LZX:RT

1 or 2 changeover contacts
AC 1: 16/8 A
15.5 mm wide



LZX:RY

1 changeover contact
AC 1: 8 A
15.5 mm wide

LZX:PT

2, 3 or 4 changeover contacts
AC 1: 12/10/6 A
27 mm wide



LZX:MT

3 changeover contacts
AC 1: 10 A
38 mm wide



| Making/breaking capacity | 15, 230 V AC | 13, 24 V DC |
|-----------------------------------|--------------|-------------|
| LZX:RT 1 CO (changeover contacts) | 6 A | 2 A |
| LZX:RT 2 CO | 3 A | 2 A |
| LZX:PT 2 CO | 5 A | 5 A |
| LZX:PT 3 CO | 5 A | 5 A |
| LZX:PT 4 CO | 4 A | 5 A |
| LZX:MT 3 CO | 5 A | 2 A |

Product overview**LZX:RY and LZX:RT – the narrow space-saver for high performance and low power consumption****Complete modules (socket, relay, retaining/eject bar, LED module and label)**

| Control supply voltage | Contacts | LED | Free-wheeling diode | Logical isolation | Hard gold-plating | Order No. (MLFB) |
|------------------------|----------------------------|-----|---------------------|-------------------|-------------------|---------------------|
| 24 V DC | 1 CO (changeover contacts) | Yes | Yes | Yes | No | LZX:RY1A4L24 |
| 24 V DC | 1 CO | Yes | Yes | No | No | LZX:RT3A4L24 |
| 24 V DC | 2 CO | Yes | Yes | No | No | LZX:RT4A4L24 |
| 230 V AC | 1 CO | Yes | No | No | No | LZX:RT3A4T30 |
| 230 V AC | 2 CO | Yes | No | No | No | LZX:RT4A4T30 |

Individual modules for self-assembly: relays

| | | | | | | |
|----------|------|----|----|---|-----|---------------------|
| 24 V DC | 1 CO | No | No | – | No | LZX:RT314024 |
| 24 V DC | 2 CO | No | No | – | No | LZX:RT424024 |
| 24 V AC | 1 CO | No | No | – | No | LZX:RT314524 |
| 24 V AC | 2 CO | No | No | – | No | LZX:RT424524 |
| 115 V AC | 1 CO | No | No | – | No | LZX:RT314615 |
| 115 V AC | 2 CO | No | No | – | No | LZX:RT424615 |
| 230 V AC | 1 CO | No | No | – | No | LZX:RT314730 |
| 230 V AC | 1 CO | No | No | – | No | LZX:RT424730 |
| 24 V DC | 1 CO | No | No | – | Yes | LZX:RT315024 |
| 24 V AC | 1 CO | No | No | – | Yes | LZX:RT315524 |
| 230 V AC | 1 CO | No | No | – | Yes | LZX:RT315730 |

Accessories for LZX:RT, designed for 1 or 2 changeover contacts

| Description | Logical isolation | Order No. (MLFB) |
|------------------------------|-------------------|--|
| Socket for DIN rail mounting | No Yes | LZX:RT78625 LZX:RT78626 |
| Retaining/eject bar | – | LZX:RT16016 |
| Label | – | LZX:RY16040 |

LZX:PT – small but powerful individual components for self-assembly: relays

| Control supply voltage | Contacts | LED | Free-wheeling diode | Hard gold-plating | Test bar | Order No. (MLFB) |
|------------------------|----------|-----|---------------------|-------------------|----------|---------------------|
| 24 V DC | 2 CO | No | No | No | Yes | LZX:PT270024 |
| 24 V DC | 3 CO | No | No | No | Yes | LZX:PT370024 |
| 24 V DC | 4 CO | No | No | No | Yes | LZX:PT570024 |
| 24 V DC | 4 CO | No | No | Yes | Yes | LZX:PT580024 |
| 24 V DC | 4 CO | No | No | No | No | LZX:PT520024 |
| 24 V AC | 2 CO | No | No | No | Yes | LZX:PT270524 |
| 24 V AC | 3 CO | No | No | No | Yes | LZX:PT370524 |
| 24 V AC | 4 CO | No | No | No | Yes | LZX:PT570524 |
| 24 V AC | 4 CO | No | No | No | No | LZX:PT520524 |
| 115 V AC | 2 CO | No | No | No | Yes | LZX:PT270615 |
| 115 V AC | 3 CO | No | No | No | Yes | LZX:PT370615 |
| 115 V AC | 4 CO | No | No | No | Yes | LZX:PT570615 |
| 230 V AC | 2 CO | No | No | No | Yes | LZX:PT270730 |
| 230 V AC | 3 CO | No | No | No | Yes | LZX:PT370730 |
| 230 V AC | 4 CO | No | No | No | Yes | LZX:PT570730 |
| 230 V AC | 4 CO | No | No | Yes | Yes | LZX:PT580730 |
| 230 V AC | 4 CO | No | No | No | No | LZX:PT520730 |

Accessories for LZX:PT

| Description | Designed for | Order No. (MLFB) |
|------------------------------|----------------------|--|
| Socket for DIN rail mounting | 2 CO 3 CO 4 CO | LZX:PT78702 LZX:PT78703 LZX:PT78704 |
| Retaining/eject bar | 2/3/4 CO | LZX:PT16016 |
| Label | | LZX:PT16040 |

Accessories for LZX:RT and LZX:PT

| Description | Control supply voltage | Free-wheeling diode | Order No. (MLFB) |
|---------------------|------------------------------------|---------------------|---|
| LED module, red | 24 V DC 24 V UC 110–230 V AC | Yes No No | LZX:RPML0024 LZX:RPML0524 LZX:RPML0730 |
| LED module, green | 24 V DC 110–230 V AC | Yes No | LZX:RPMG0024 LZX:RPMG0730 |
| Free-wheeling diode | 24 V DC | Yes | LZX:RPMT00A0 |
| RC element | 24–48 V AC 110–230 V AC | No No | LZX:RPMU0548 LZX:RPMU0730 |

LZX:MT – for high voltages and currents, individual components for self-assembly: relays

| Control supply voltage | Contacts | LED | Free-wheeling diode | Order No. (MLFB) |
|------------------------|----------|-----|---------------------|---------------------|
| 24 V DC | 3 CO | No | No | LZX:MT321024 |
| 24 V DC | 3 CO | Yes | No | LZX:MT323024 |
| 24 V AC | 3 CO | No | No | LZX:MT326024 |
| 24 V AC | 3 CO | Yes | No | LZX:MT328024 |
| 115 V AC | 3 CO | No | No | LZX:MT326115 |
| 115 V AC | 3 CO | Yes | No | LZX:MT328115 |
| 230 V AC | 3 CO | No | No | LZX:MT326230 |
| 230 V AC | 3 CO | Yes | No | LZX:MT328230 |

Accessories for LZX:MT

| Description | Order No. (MLFB) |
|---------------------------------------|--------------------|
| Socket for DIN rail mounting, 11-pole | LZX:MT78750 |
| Retaining bar | LZX:MT28800 |

12 3TG10 Power Relays and SITOP Power

3TG10 power relays come through with flying colors wherever low-noise relays or contactors and a low price are required. The power relays are suitable for basic controls, and especially for use in large-series equipment and control systems. They are ideal for applications which only need an auxiliary contact and not an overload relay – yet at the same time demand a higher making/breaking capacity, additional switching voltage and a longer lifetime.

Applications:

- Domestic appliances and installations
- Hoisting systems: small elevators, elevating platforms
- Building services: Hum-free INSTA systems

Main advantages:

- Can be mounted in any position, hum-free
- Safe isolation
- Can be screwed or inserted
- Integrated auxiliary contact
- AC-3 power: 4 kW/400 V
- Operating current I_e /AC-1: 20 A/400 V
- Inrush current per phase: 90 A
- Integrated overvoltage damping
- Slimline housing – just 36 mm
- Increased making/breaking capacity when switching contacts are connected in parallel

6EP1 wide-voltage range power supply units

The 6EP1 primary switched-mode, wide-voltage power supply units in a 22.5-mm slimline housing have been specially developed as ballast for standard products in all applications where “unusual” supply voltages and/or wide operating ranges have to be catered for. These devices have wide input voltage ranges and a 24 V DC output. They are hence able to operate with practically any supply voltage that is used for standard products. This cuts out the costs for special designs and reduces the time necessary for engineering.

Applications:

- Voltage ballast for all voltage ranges
- Voltage ballast for wide operating ranges

Main advantages:

- Just 22.5 mm wide
- Wide input voltage range
- Lightweight
- High efficiency

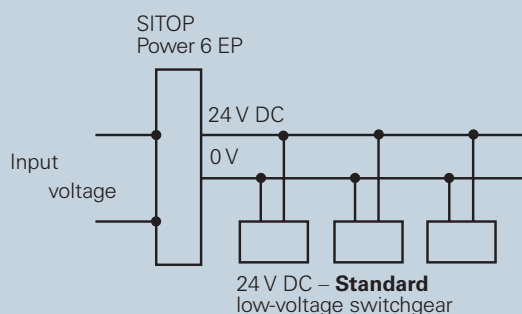


Product overview

| AC-1 operating current I_e at 400 V (A) | AC-1 power of three-phase loads at 50 Hz 400 V (kW) | AC-2 and AC-3 operating current I_e at 400 V (A) | AC-2 and AC-3 three-phase loads at 50 Hz 400 V (kW) | Connection type | Contacts NO NC | Control supply voltage | Order No. (MLFB) |
|---|--|---|--|---------------------|-------------------|--|--|
| 20 | 13 | 8.4 | 4 | Screw connection | 4 – | 230 V AC 110 V AC 24 V AC 24 V DC | 3TG1010-0AL2 3TG1010-0AG2 3TG1010-0AC2 3TG1010-0BB4 |
| 20 | 13 | 8.4 | 4 | Screw connection | 3 1 | 230 V AC 110 V AC 24 V AC 24 V DC | 3TG1001-0AL2 3TG1001-0AG2 3TG1001-0AC2 3TG1001-0BB4 |
| 16 | 10 | 8.4 | 4 | Flat connector | 4 – | 230 V AC 110 V AC 24 V AC 24 V DC | 3TG1010-1AL2 3TG1010-1AG2 3TG1010-1AC2 3TG1010-1BB4 |
| 16 | 10 | 8.4 | 4 | Flat connector | 3 1 | 230 V AC 110 V AC 24 V AC 24 V DC | 3TG1001-1AL2 3TG1001-1AG2 3TG1001-1AC2 3TG1001-1BB4 |

Wide-voltage range power supply units

| Input voltage | Output voltage | Max. output current | short-circuit-proof and overload protected | Order No. (MLFB) |
|----------------------------|----------------|---------------------|--|----------------------|
| 93–264 V AC | 24 V DC | 0.5 A | Yes | 6EP1331-2BA10 |
| 30–264 V DC 30–186 V AC | 24 V DC | 0.375 A | Yes | 6EP1731-2BA00 |



Engineering Information

Temperature monitoring relays 3RS10/11

- Three-wire connections are envisaged for resistance sensors (PT100 etc.). Two-wire connections can be achieved by inserting a jumper between T2 and T3.
- The connecting cables of thermocouples can only be extended using an equalizing conductor.
- Either an open-circuit principle or a closed-circuit principle can be selected.

3RN1 thermistor motor protection

| Response of the tripping unit to a control voltage failure | | | |
|--|-----------------------------------|---|--|
| Response to | Protected against voltage failure | | |
| | Monostable | Monostable | Bistable |
| | 3RN10 00 3RN10 10 3RN10 11 | 3RN10 12 3RN10 13-...0 3RN10 22 3RN10 62 | 3RN10 13-...01 |
| Control voltage failure | Device trips | Device trips | No change in control state of auxiliary contacts |
| Control voltage restored <u>without</u> tripping | Device resets | Device resets | |
| Control voltage restored after tripping | Device remains tripped | Device remains tripped | |

3RP1 time relays

- The pulse and the interval can be set separately for the "clock pulse" function, in contrast with the "blinking" function where the pulse/interval ratio is always 1:1.
- 3RP15 time relay: 15 selectable time ranges, so that the "infinite" time range is integrated for test functions.
- "Time addition" function for multi-function time relays: by activating the starting contact (not protected against voltage failure).

3UG3 monitoring relays

- Voltage recovered from motors:

If a phase fails while the motor is running, the open phase in the motor acts like a generator. If a voltage which the relay is unable to distinguish from the normal voltage is recovered from this phase, a phase open-circuit with the motor running may well remain undetected. This effect does not occur with motors that are just starting.

3UG3 monitoring relays detect recovered voltages as follows:

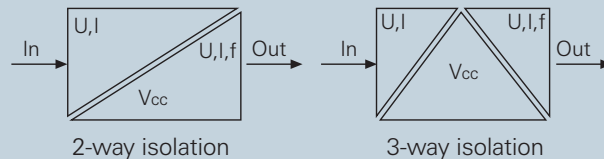
3UG3511 Not detected

3UG3013 Up to 70% of recovered voltages detected

3UG3012 Up to 95% of recovered voltages detected

Interface converters

- Passive converters obtain their required power from the analog signal and do not need a separate power supply.
- With 2-way isolation, the input is electrically isolated from the output and from the supply voltage, while the output and the supply have common potential. With 3-way isolation, all three circuits are isolated from one another (refer to the diagram below).



3TX70 interface relays / LZX plug-in relays

- When capacitances are switched, relay contacts can weld in the μm range – we recommend the use of semiconductors here.
- At rated control supply voltages of 110 V AC or 230 V AC, the maximum permissible cable length should be taken into account when selecting the interfaces. The special 3TX700-...05 type can be used for longer cables.
- The test lever of LZX:PT relays does not latch. If the test lever is pressed further until a 90° movement occurs, two small lugs will break off and the lever can then be set so that it latches.
- LZX relays are designed for AC voltages of 50 Hz; for 60-Hz operation, the lower response value must be increased by 10% and the power loss is reduced slightly.

3TG10 power relays

- If the three main circuits have a 20-A load, the fourth circuit must have $I > 10 \text{ A}$; the maximum permissible ambient temperature is 40 °C.

Siemens AG

Automation and Drives

Low Voltage Controls and Distribution Division

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