



finder[®]
SWITCH TO THE FUTURE

Monitoring relays 10 A

71
SERIES



Industrial motors



Industrial refrigerators



Elevators and lifts



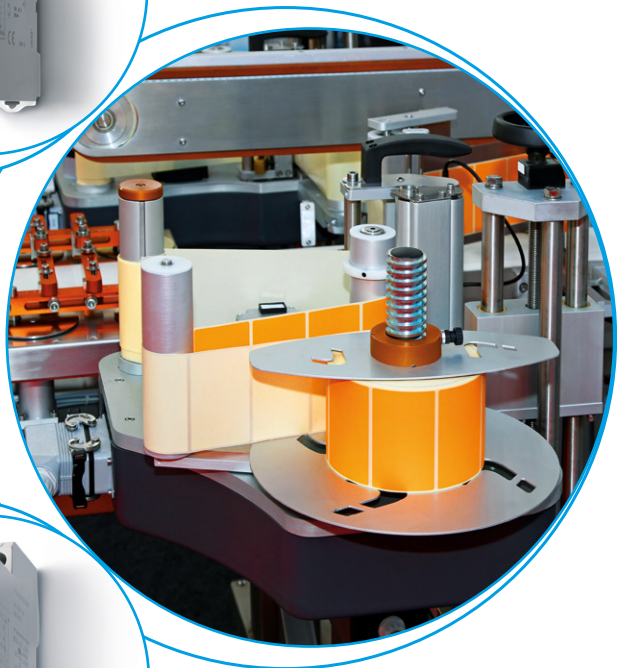
Textile machines



Labelling machines



Carousel warehouses



Universal voltage or current detecting and monitoring relay

71.41.8.230.1021 - Voltage monitoring

71.51.8.230.1021 - Current monitoring

- Zero voltage memory according to EN 60204-7-5
- Programmable for DC or AC detection level:
 - range detecting: upper and lower value
 - upper set point minus hysteresis range (5...50)% for switch on
 - lower set point plus hysteresis range (5...50)% for switch on
- Fault memory
- Electrical isolation between measuring and supply circuits
- Immune to supply interruptions of < 200 ms
- Wide detecting range:
 - voltage: DC (15...700)V, AC (15...480)V
- 35 mm rail (EN 60715) mounting

Screw Terminal



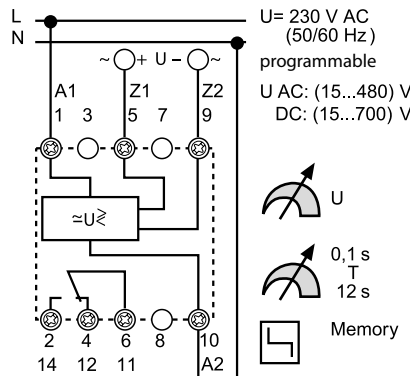
For outline drawing see page 7

71.41.8.230.1021



- Programmable universal voltage monitoring relay

- AC/DC voltage detection - adjustable
- AC (50/60 Hz) (15...480)V
- DC (15...700)V
- Switch-on hysteresis (5...50)%
- Switch-off delay (0.1...12)s

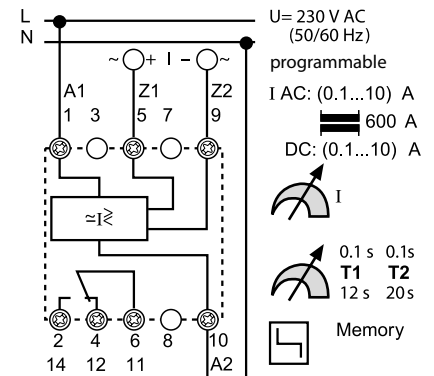


71.51.8.230.1021



- Programmable universal current monitoring relay
- Usable with current transformer 50/5, 100/5, 150/5, 250/5, 300/5, 400/5 or 600/5

- AC/DC current detection - adjustable
- AC(50/60 Hz) (0.1...10)A with current transformer to 600 A
- DC (0.1...10)A
- Switch-on hysteresis (5...50)%
- Switch-off delay (0.1...12)s
- Start delay (0.1...20)s



Contact specification

| | | | |
|---|-----------|--------------------|--------------------|
| Contact configuration | | 1 CO (SPDT) | 1 CO (SPDT) |
| Rated current/Maximum peak current | A | 10/15 | 10/15 |
| Rated voltage/Maximum switching voltage | V AC | 250/400 | 250/400 |
| Rated load AC1 | VA | 2500 | 2500 |
| Rated load AC15 (230 V AC) | VA | 500 | 500 |
| Single phase motor rating (230 V AC) | kW | 0.5 | 0.5 |
| Breaking capacity DC1: 30/110/220 V | A | 10/0.3/0.12 | 10/0.3/0.12 |
| Minimum switching load | mW (V/mA) | 300 (5/5) | 300 (5/5) |
| Standard contact material | | AgSnO ₂ | AgSnO ₂ |

Supply specification

| | | | |
|-----------------------------------|-----------------|-----------------------------|-----------------------------|
| Nominal voltage (U _N) | V AC (50/60 Hz) | 230 | 230 |
| | V DC | — | — |
| Rated power AC/DC | VA (50 Hz)/W | 4/— | 4/— |
| Operating range | AC | (0.85...1.15)U _N | (0.85...1.15)U _N |
| | DC | — | — |

Technical data

| | | | |
|--|-----------------|------------------------------|--|
| Electrical life at rated load AC1 | cycles | 100 · 10 ³ | 100 · 10 ³ |
| Detection levels | AC(50/60 Hz)/DC | (15...480)V/(15...700)V | (0.1...10)A at transducer to 600 A/(0.1...10)A |
| Switch-off/reaction/Start delay | | (0.1...12)s/< 0.35 s/< 0.5 s | (0.1...12)s/< 0.35 s/(0.1...20)s |
| Switch-on level of the detecting level | % | 5...50 | 5...50 |
| Fault memory - programmable | | Yes | Yes |
| Electrical isolation: Supply to Measuring circuits | | Yes | Yes |
| Ambient temperature range | °C | -20...+55 | -20...+55 |
| Protection category | | IP 20 | IP 20 |

Approvals (according to type)



Thermistor temperature sensing relays for industrial applications
71.91 - 1 Pole, without fault memory
71.92 - 2 Pole, with fault memory

- Overload protection according EN 60204-7-3
- Positive safety logic - make contact opens if the measured value is outside of the acceptable range
- Industry standard module
- LED status indication
- 35 mm rail (EN 60715) mounting

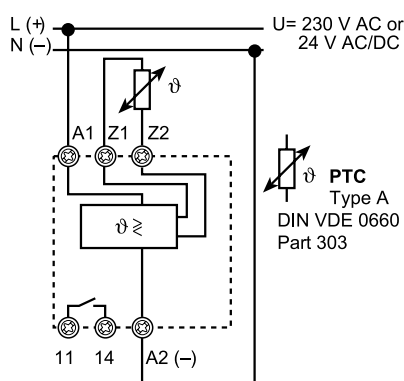
Screw Terminal



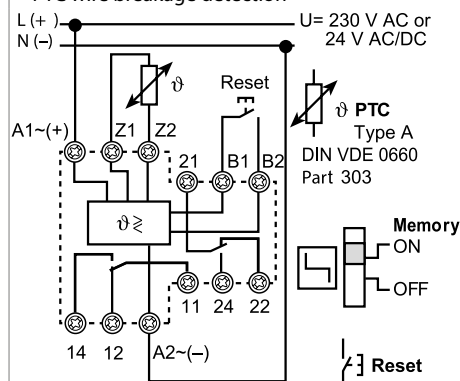
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71.91.x.xxx.0300


- Thermistor relay
- 1 Pole normally open contact
- 24 V AC/DC, or 230 V AC supply
- Temperature detection with PTC
- PTC short circuit detection
- PTC wire breakage detection


71.92.x.xxx.0001


- Thermistor relay with fault memory
- 2 Pole changeover contacts
- 24 V AC/DC, or 230 V AC supply
- Temperature detection with PTC
- Fault memory - switch selectable
- Reset by Reset button or supply interruption
- PTC short circuit detection
- PTC wire breakage detection



For outline drawing see page 7

Contact specification

| Contact configuration | | 1 NO (SPST-NO) | 2 CO (DPDT) |
|--------------------------------------|-----------|--------------------|--------------------|
| Rated current/Maximum peak current | A | 10/15 | 10/15 |
| Rated voltage/ | | | |
| Maximum switching voltage | V AC | 250/400 | 250/400 |
| Rated load AC1 | VA | 2500 | 2500 |
| Rated load AC15 (230 V AC) | VA | 500 | 500 |
| Single phase motor rating (230 V AC) | kW | 0.5 | 0.5 |
| Breaking capacity DC1: 30/110/220 V | A | 10/0.3/0.12 | 10/0.3/0.12 |
| Minimum switching load | mW (V/mA) | 300 (5/5) | 300 (5/5) |
| Standard contact material | | AgSnO ₂ | AgSnO ₂ |

Supply specification

| | | | |
|-----------------------------------|-----------------|-----------------------------|-----------------------------|
| Nominal voltage (U _N) | V AC (50/60 Hz) | 230 | 230 |
| | V AC/DC | 24 | 24 |
| Rated power AC/DC | VA (50 Hz)/W | 1/0.5 | 1/0.5 |
| Operating range | AC | (0.85...1.15)U _N | (0.85...1.15)U _N |
| | DC | — | — |

Technical data

| | | | |
|--|-----------------|----------------------------|----------------------------|
| Electrical life at rated load AC1 | cycles | 100 · 10 ³ | 100 · 10 ³ |
| PTC detecting: Short circuit/Temperature OK | | < 20 Ω / > 20 Ω ... < 3 kΩ | < 20 Ω / > 20 Ω ... < 3 kΩ |
| | Reset/PTC break | < 1.3 kΩ / > 3 kΩ | < 1.3 kΩ / > 3 kΩ |
| Delay time/activation time | | — / < 0.5 s | — / < 0.5 s |
| Fault memory - switch selectable | | — | Yes |
| Electrical isolation: Supply to Measuring circuits | | Yes | Yes |
| Ambient temperature range | °C | -20...+55 | -20...+55 |
| Protection category | | IP 20 | IP 20 |

Approvals (according to type)


Ordering information

Example: Universal voltage monitoring relay with LCD display for AC/DC voltage detection, 1 CO (SPDT) contact rated 10 A 250 V, supply voltage 230 V, programmable delay time and fault memory.

7 1 . 4 1 . 8 . 2 3 0 . 1 0 2 1

Series

Type

- 4 = AC/DC universal- Voltage detection
- 5 = AC/DC universal- Current detection
- 9 = Thermistor relay (temperature monitoring with PTC thermistor)

No. of poles

- 1 = 1 CO (SPDT) types 71.41, 51
- 1 = 1 NO (SPST-NO) type 71.91
- 2 = 2 CO (DPDT) type 71.92

Supply version

- 0 = AC(50/60 Hz)/DC
- 8 = AC (50/60 Hz)

Supply voltage

- 024 = 24 V AC/DC
- 230 = 230 V
- 400 = 400 V

Additional functions

- 0 = Basic function
- 1 = Adjustable detection value

Special versions

- 0 = No fault memory
- 1 = Fault memory

Options

- 0 = No delay time
- 2 = Adjustable delay times

Contact circuit

- 0 = CO (nPDT)
- 3 = NO (nPST-NO)

Selection guide

| Type | 71.41.8.230.1021 | 71.51.8.230.1021 | 71.91.0.024.0300 | 71.91.8.230.0300 | 71.92.0.024.0001 | 71.92.8.230.0001 |
|--|------------------|------------------|------------------|------------------|------------------|------------------|
| Supply system type | Single phase | Single phase | Single phase | Single phase | Single phase | Single phase |
| Functions | | | | | | |
| Undervoltage/Overvoltage | AC or DC | — | — | — | — | — |
| Window mode (Undervoltage and Overvoltage) | AC or DC | — | — | — | — | — |
| Phase loss | — | — | — | — | — | — |
| Phase rotation | — | — | — | — | — | — |
| Asimmetry | — | — | — | — | — | — |
| Neutral loss | — | — | — | — | — | — |
| Overcurrent/Undercurrent | — | AC or DC | — | — | — | — |
| Window mode (Undercurrent and Overcurrent) | — | AC or DC | — | — | — | — |
| Thermistor relay (PTC) | — | — | • | • | • | • |
| Delay Times | | | | | | |
| Fixed | — | — | • | • | • | • |
| Adjustable | • | • | — | — | — | — |
| Supply voltage | | | | | | |
| 24 V AC/DC | — | — | • | — | • | — |
| 230 V AC | • | • | — | • | — | • |
| 400 V AC | — | — | — | — | — | — |
| Module width | | | | | | |
| 35 mm wide | • | • | — | — | — | — |
| 22.5 mm wide | — | — | • | • | • | • |
| 17.5 mm wide | — | — | — | — | — | — |
| Other data | | | | | | |
| Fault memory | • | • | — | — | • | • |
| Contact configuration | 1 CO | 1 CO | 1 NO | 1 NO | 2 CO | 2 CO |

See selection guide for 70 series functions

Technical data

Insulation


| | | | |
|------------------------------------|---------------------------------|----|-----|
| Insulation according to EN 61810-1 | insulation rated voltage | V | 250 |
| | rated impulse withstand voltage | kV | 4 |
| | pollution degree | | 3 |
| | over-voltage category | | III |

| | | |
|---|----------------|------|
| Dielectric strength (A1, A2, B1, B2), and contact terminals (11, 12, 14) and terminals (Z1, Z2) | V AC | 2500 |
| | kV (1.2/50 µs) | 6 |
| Dielectric strength at open contact | V AC | 1000 |

EMC specifications

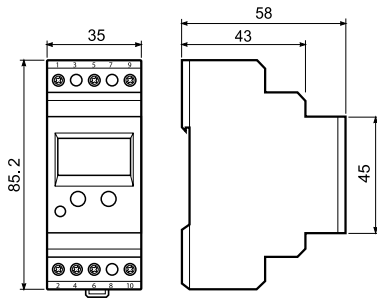
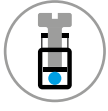
| Type of test | | Reference Standard | |
|---|-------------------|--------------------|---------|
| Electrostatic discharge | contact discharge | EN 610004-2 | 8 kV |
| | air discharge | EN 610004-2 | 8 kV |
| Radio-frequency electromagnetic field (80...1000)MHz | | EN 610004-3 | 3 V/m |
| Fast transients (burst) (5-50 ns, 5 kHz) on (A1, A2, B1, B2) and (Z1, Z2) | | EN 610004-4 | 2 kV |
| Surges (1.2/50 µs) on (A1, A2, B1, B2) and (Z1, Z2) | common mode | EN 610004-5 | 4 kV |
| | differential mode | EN 610004-5 | 4 kV |
| Radio-frequency common mode (0.15 ÷ 80 MHz) to A1 - A2 | | EN 610004-6 | 10 V |
| Radiated and conducted emission | | EN 55022 | class B |

Other data

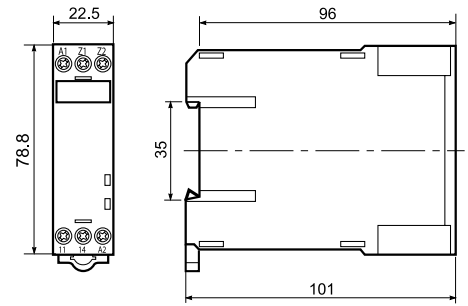
| | | | | |
|---|---------------------------------|---|-----------------|---------------|
| Voltage and current values at terminals Z1 Z2 | Type 71.91, 71.92 | PTC temperature measurement | V / mA | 24 V/2.4 |
| Maximum length of wiring to the Supply terminals/ Measuring terminals | Type 71.41 | Voltage measurement | m | 150/50 |
| | Type 71.51 | Current measurement | m | 150/50 |
| (Wiring capacitance no greater than 10 nF/100 m) | Type 71.91, 71.92 | PTC temperature measurement | m | 50/50 |
| Measuring principle | Type 71.41, 71.51, 71.91, 71.92 | The measured value is the arithmetical average of 500 individual measurements taken over a 100 ms period. Interruptions less than < 200 ms are ignored. | | |
| Safety logic | Type 71.41, 71.51, 71.91, 71.92 | Positive safety logic - When the value being monitored lies within the acceptable area, the make contact is closed. | | |
| Reaction time (following the application of the supply voltage) | Type 71.41, 71.51, 71.91, 71.92 | ≤ 0.5 s | | |
| Power lost to the environment | without contact load | W | 4 | |
| | with rated current | W | 5 | |
| Permitted storage temperature range | | °C | -40...+85 | |
| Protection category | | | IP 20 | |
|  Screw torque | | Nm | 0.8 | |
| Max. wire size | | | solid cable | standed cable |
| | | mm ² | 0.5...(2 x 2.5) | (2 x 1.5) |
| | | AWG | 20...(2 x 14) | (2 x 16) |

Outline drawings

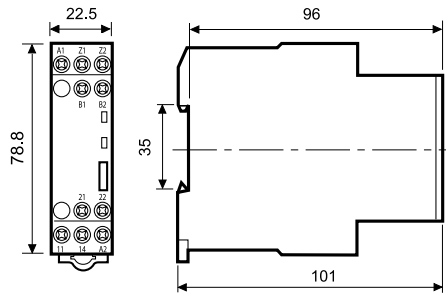
Types 71.41/51
Screw Terminal



Type 71.91
Screw Terminal



Type 71.92
Screw Terminal



Explanation of relay marking and LED/LCD display

Monitoring relay without LCD-display

| | |
|------------|---|
| ON | LED green steady light: supply voltage is on and measuring system is active. |
| DEF | Default: the detected value is outside of the acceptable range. LED red flashing: delay time is running, see the function diagram. LED red steady light: output relay is off, contact 11-14 (6-2) is open. |
| MEMORY ON | Fault memory switched on: the state of the output relay after the occurrence of a fault –contact 11-14 (6-2) open– will be maintained, monitored value returns to within acceptable limits. Fault reset is made by power down or by operating of the “RESET” (71.92.x.xxx.0001). |
| MEMORY OFF | Fault memory turned off: the state of the output contacts will only remain in the “fault” condition –contact 11-41 (6-2) open– while the monitored value is outside of the acceptable limits. When the monitored value returns within the acceptable limits the contact will revert to the energised state. Monitored equipment will start again automatically. |

Monitoring relay with LCD-display

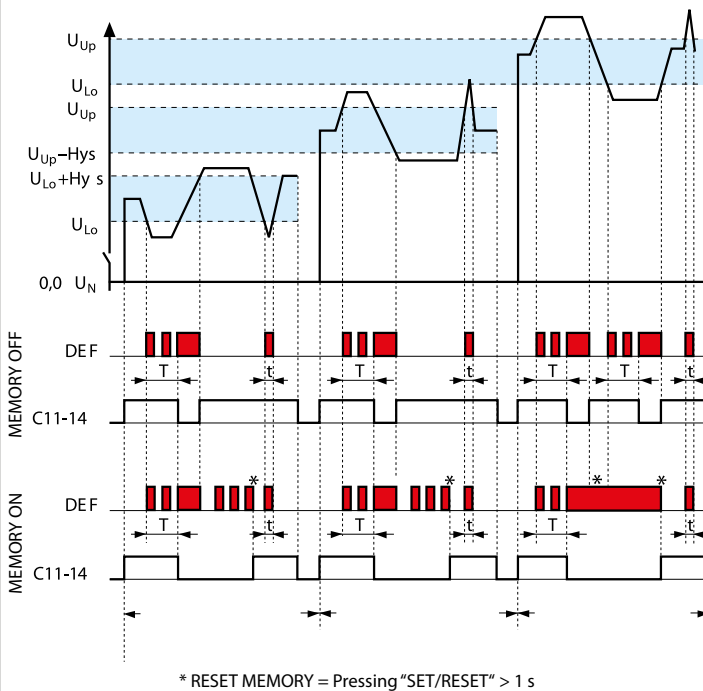
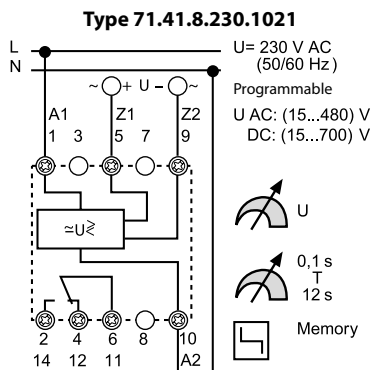
| | | | |
|------------------------------|--|--|---|
| SET/RESET | Relay 71.41 and 71.51. Sets and resets the programmable values - see operating in the packing. | | |
| SELECT | Relay 71.41 and 71.51. Selects the desired parameter for programming - see operating instructions. | | |
| DEF | Default, LED red steady or flashing. | | |
| PROG Modus | <p>Enter the programming mode by simultaneously pressing the buttons “SET/RESET” and “SELECT” for 3 seconds. The word “prog” is shown for 1 second. “SELECT” allows the choice of “AC” or “DC”, and is confirmed with “SET/RESET”. Successively pressing the button “SELECT” brings up the choices of Up, or Up_{Lo}. The appropriate choice is made by pressing the “SET/RESET” button.</p> <p>The next step will program the appropriate values and the selection of the fault memory function (which is selected with a “YES” or “NO”). If all programming steps are completed the display will read “end”.</p> | | |
| Short programmin instruction | After repeatedly pressing the “SET/RESET” button the measured value will be displayed, or “0” appears if nothing is connected to Z1 and Z2 (5 and 9). If the programming is brocken off before “end” is shown in the display the previous program will remain unchanged after an interruption of the supply voltage. | | |
| Program query | Pushing the “SELECT” button for at least 1 second, enters the “program inquiry mode”. The programmed mode and the values are shown on the repeated pressing of the “SELECT” button. | | |
| Flashing M (memory) | Fault memory has had effect (fault acknowledgement and reset is made by a 1 second press of the “SET/RESET” button). | | |
| LCD-display | V = volt A = amp Up = upper limit (with hysteresis in down direction) Lo = lower limit (with hysteresis in up direction) Up _{Lo} = upper and lower limit - range detecting | Level = value Hys = hysteresis M = memory (fault) Yes = yes - with memory no = no - without memory | t ₁ = T ₁ - time during which short-time fluctuations are not taken into account t ₂ = T ₂ - (monitoring relay 71.51) the time during which inrush currents are not taken into account |

LED/LCD status announcement/advise

| Type | Starting mode | Normal operation | Abnormal mode | | Reset |
|--------------------------------|---|---|--|---|--|
| 71.41.8.230.1021 Memory OFF | | Measured value displayed Normal operation Set point is OK 11-14 is closed | Measured value displayed Time T runs, Set point is not OK 11-14 is closed | Measured value displayed After expiry of T Set point is not OK 11-14 is open Will close, if set point is OK | |
| 71.41.8.230.1021 Memory ON | | Measured value displayed Normal operation Set point is OK 11-14 is closed | Measured value displayed Time T runs, Set point is not OK 11-14 is closed | M in the display flashes Measured value displayed After expiry of T Set point is not OK 11-14 is open Will not close at RESET | M in the display - static Measured value displayed After expiry of T Set point is not OK 11-14 is open Will close at RESET |
| 71.51.8.230.1021 Memory OFF | Measured value displayed Time T2 runs, Set point immaterial 11-14 is closed | Measured value displayed Normal operation Set point is OK 11-14 is closed | Measured value displayed Time T runs, Set point is not OK 11-14 is closed | Measured value displayed After expiry of T Set point is not OK 11-14 is open Will close, if set point is OK | |
| 71.51.8.230.1021 Memory ON | Measured value displayed Time T2 runs, Set point immaterial 11-14 is closed | Measured value displayed Normal operation Set point is OK 11-14 is closed | Measured value displayed Time T runs, Set point is not OK 11-14 is closed | M in the display flashes Measured value displayed After expiry of T Set point is not OK 11-14 is open Will not close at RESET | M in the display - static Measured value displayed After expiry of T Set point is not OK 11-14 is open Will close at RESET |
| 71.91.x.xxx.0300 | | Normal operation Set point is OK 11-14 is closed | Temperature to high or PTC line break or PTC short circuit 11-14 is open Will close, if set point is OK | | |
| 71.92.x.xxx.0001 Memory OFF | | Normal operation Set point is OK 11-14 is closed | Temperature to high or PTC line break or PTC short circuit 11-14 is open Will close, if set point is OK | | |
| 71.92.x.xxx.0001 Memory ON | ON OFF ON OFF | Normal operation Set point is OK 11-14 is closed | Temperature to high or PTC line break or PTC short circuit 11-14 is open | | Temperature is OK 11-14 is open Will close at RESET |

E

Functions



Switch off
U_{Lo} – mode
 If the monitored value is less than the lower-limit and, time T has expired.

U_{Up} – mode
 If the monitored value is higher than the upper limit, and time T has expired.

U_{Lo}U_{Up} – mode
 If the monitored value of voltage is outside of the upper or lower voltage limits, and time T has expired.

Voltage dips < T do not result in output relay switching off.

Switch on
U_{Lo} or U_{Up} – modes
 When passing the hysteresis value.

U_{Lo}U_{Up} – mode
 When passing the U_{Lo} or U_{Up} value.

RESET MEMORY
 Pressing “SET/RESET” > 1 sec.

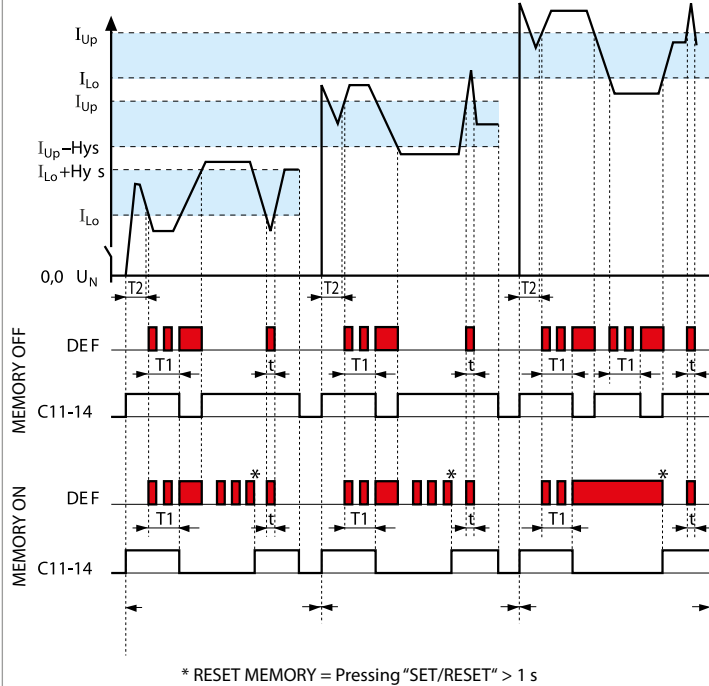
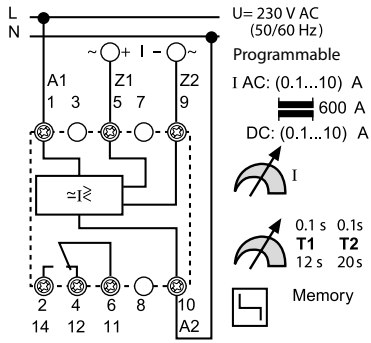
C = output contact
 Normally open 11-14 (6-2) closed.

* RESET MEMORY = Pressing “SET/RESET” > 1 s

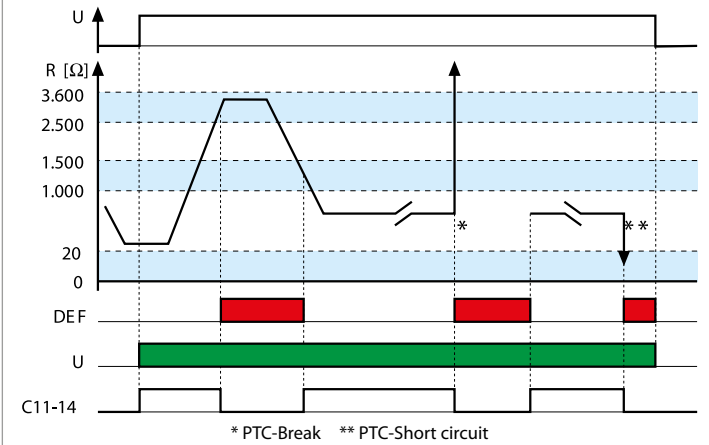
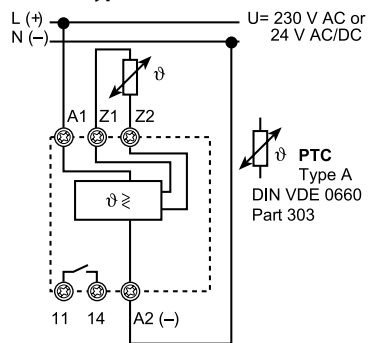
E

Functions

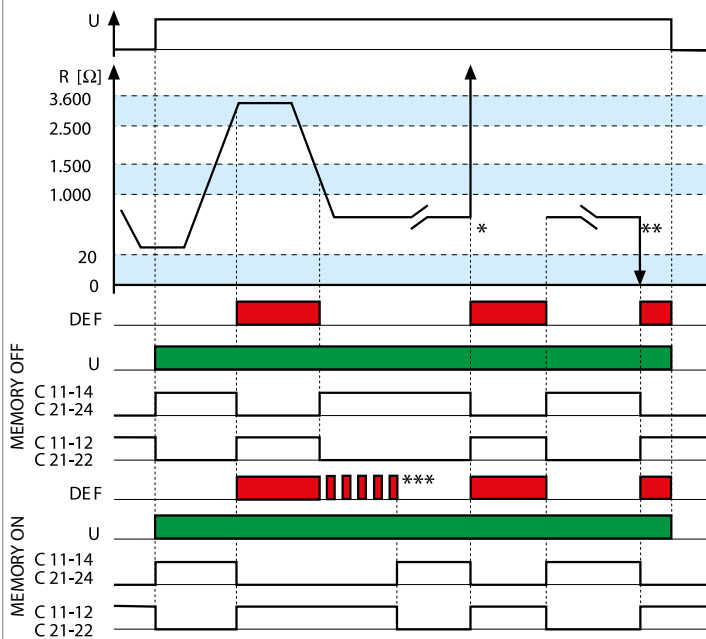
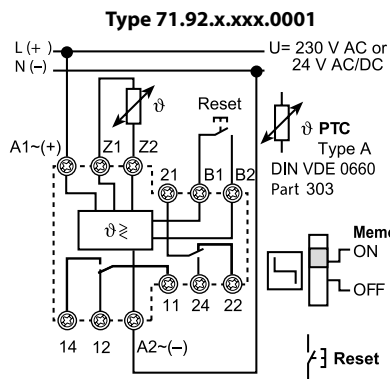
Type 71.51.8.230.1021



Type 71.91.x.xxx.0300



Functions



* PTC-Break ** PTC-Short circuit
*** RESET MEMORY = Operate the RESET key, or interrupt the supply.

Switch off

- Thermistor line break
- Over temperature
- Thermistor line short circuit ($R_{PTC} < 20 \Omega$)
- Loss of supply

Switch on

Temperature within limits ($20 \Omega \dots 2.5 k\Omega$) on power-up.
 $R_{PTC} > (1 \dots 1.5)k\Omega$ on cooling.

Select MEMORY OFF

If monitored value is expected to cross the resetting threshold.

Select MEMORY ON

If monitored value is expected to remain within limits.

RESET MEMORY

Operate the RESET key, or interrupt the supply.

C = output contact

Normally open 11-14 (21-24)
Closed when temperature within limits.

Normally closed 11-22 (21-22)
Closed when temperature outside limits/Power off.

E