

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



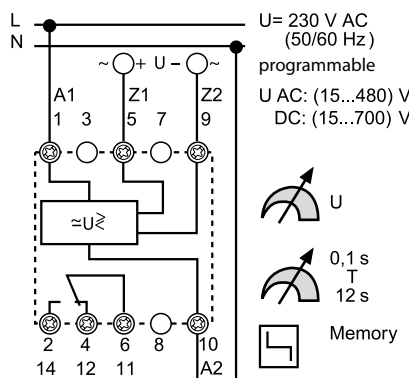
For outline drawing see page 7

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

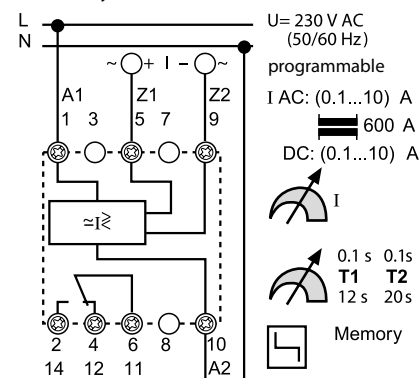


71.51.8.230.1021



- 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)



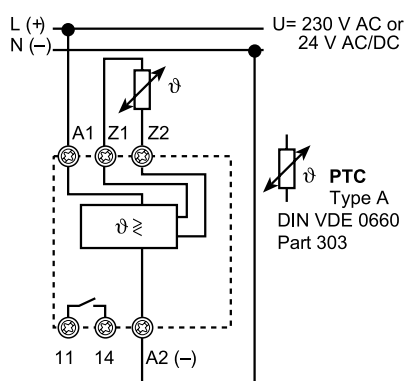
Thermistor temperature sensing relays for industrial applications
71.91 - 1 Pole, without fault memory
71.92 - 2 Pole, with fault memory

- 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

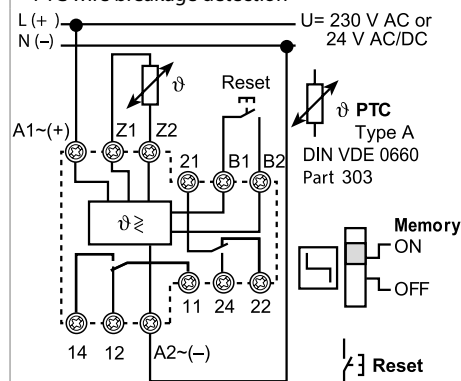
Screw Terminal


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	—	—

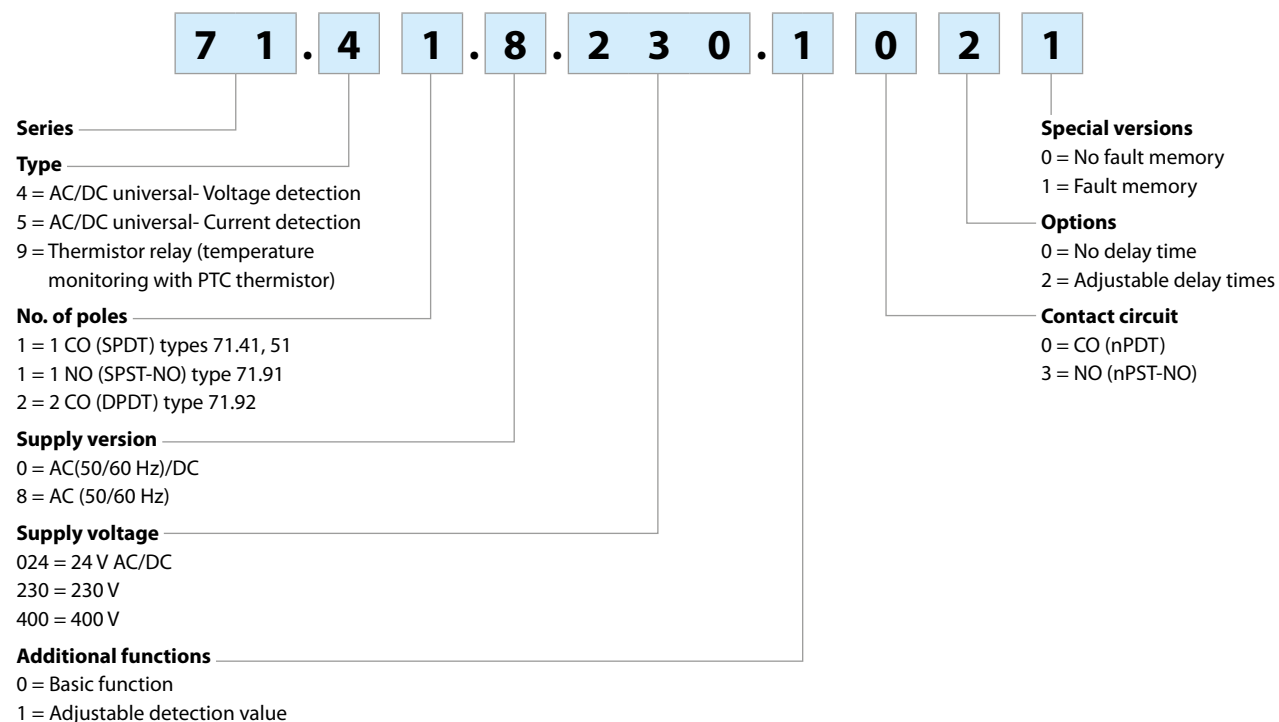
Technical data

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.



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

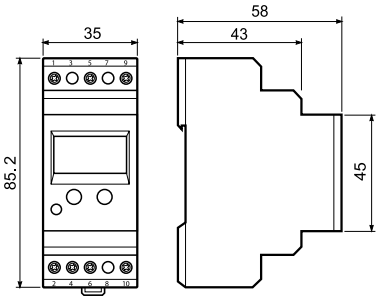
Type of test		Reference Standard	
Electrostatic discharge	contact discharge	EN 610004-2	8 kV
	air discharge	EN 610004-2	8 kV
Radio-frequency electromagnetic field (80...1000)MHz		EN 610004-3	3 V/m
Fast transients (burst) (5-50 ns, 5 kHz) on (A1, A2, B1, B2) and (Z1, Z2)		EN 610004-4	2 kV
Surges (1.2/50 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

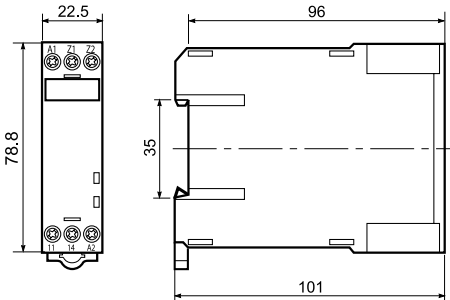
Voltage and current values at terminals Z1 Z2	Type 71.91, 71.92	PTC temperature measurement	V / mA	24 V/2.4
Maximum length of wiring to the Supply terminals/ Measuring terminals	Type 71.41	Voltage measurement	m	150/50
	Type 71.51	Current measurement	m	150/50
(Wiring capacitance no greater than 10 nF/100 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

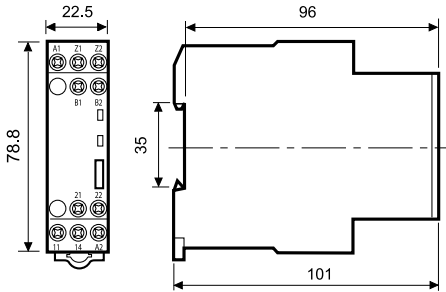
Types 71.41/51
Screw Terminal



Type 71.91
Screw Terminal



Type 71.92
Screw Terminal



E

Explanation of relay marking and LED/LCD display

























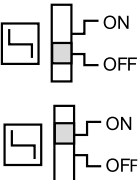






Monitoring relay without LCD-display

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 11-14 (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 UpLo.</p> <p>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 broken 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) UpLo = 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

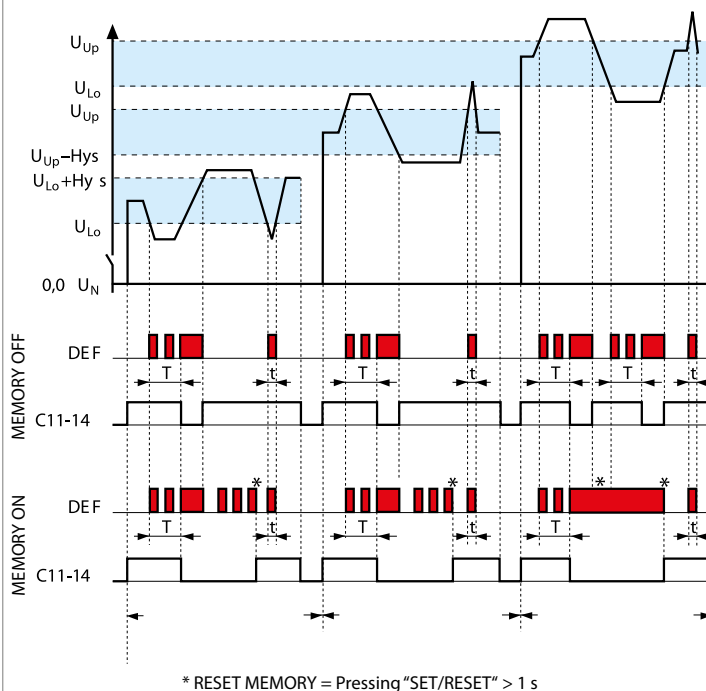
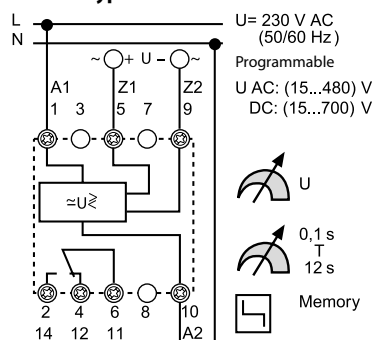
LED/LCD status announcement/advice

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 		 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

Type 71.41.8.230.1021



Switch off

U_{L0} – 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_{L0} 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_{L0} or U_{Up} – modes

When passing the hysteresis value.

U_{L0} U_{Up} – mode

When passing the U_{L0} or U_{Up} value.

RESET MEMORY

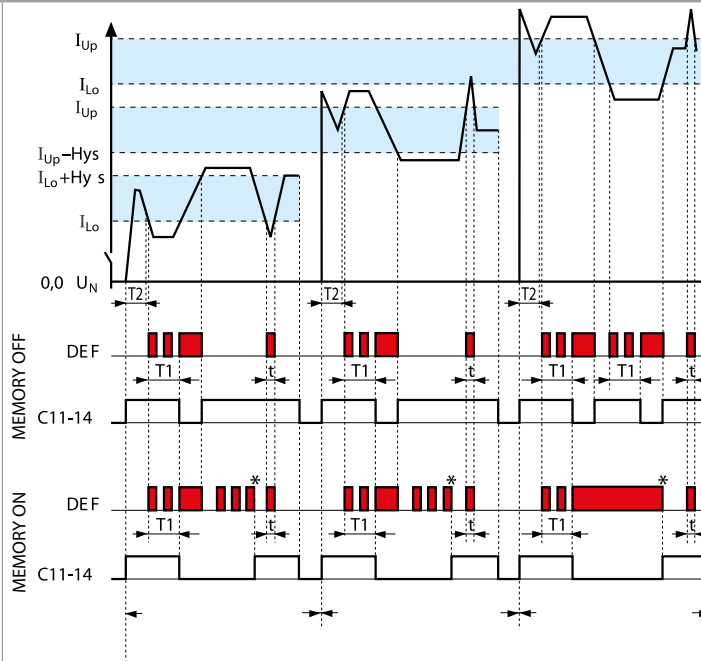
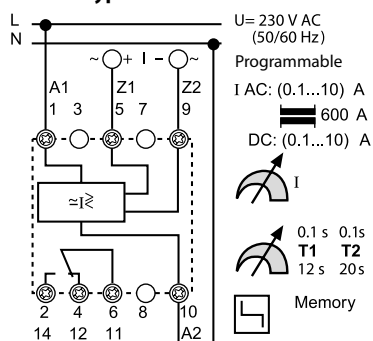
Pressing "SET/RESET" > 1 sec.

C = output contact

Normally open 11-14 (6-2) closed.

Functions

Type 71.51.8.230.1021



* RESET MEMORY = Pressing "SET/RESET" > 1 s

Switch off

I_{Lo} – mode
If the monitored value is less than the lower-limit and, time T₁ has expired.

I_{Up} – mode

If the monitored value is higher than the upper limit, and time T₁ has expired.

I_{Lo} I_{Up} – mode

If the monitored value of voltage is outside of the upper or lower limits, and time T₁ has expired.

Inrush current < T₂ is ignored

Current dips < T₁ do not result in output relay switching off.

Switch on

I_{Lo} or I_{Up} – modes
When passing the hysteresis value.

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

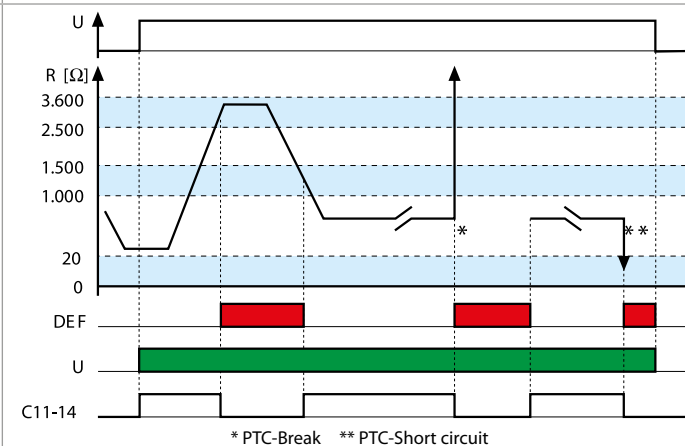
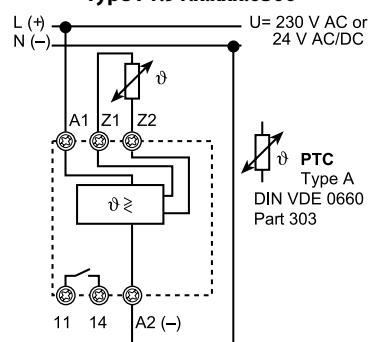
RESET MEMORY

Pushing "SET/RESET" > 1 sec.

C = output contact

Normally open 11-14 (6-2) closed.

Type 71.91.x.xxx.0300



* PTC-Break ** PTC-Short circuit

Switch off

– Thermistor line break
– Over temperature R_{PTC} > (2.5...3.6)kΩ
– Thermistor line short circuit (R_{PTC} < 20 Ω)
– Loss of supply

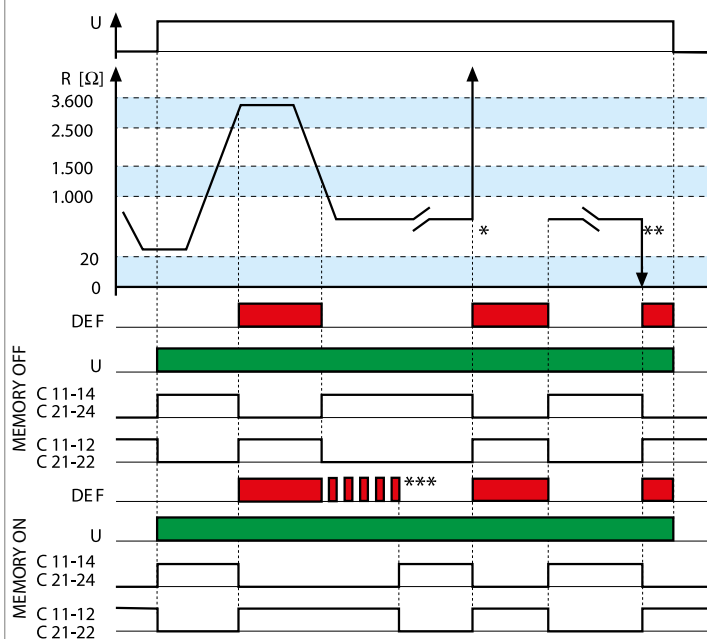
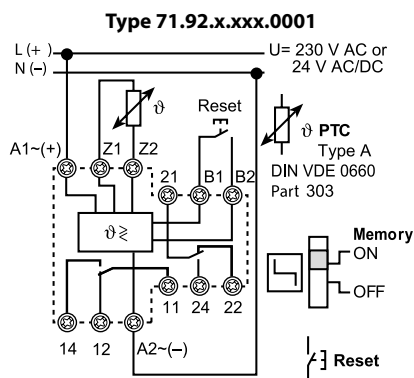
Switch on

Temperature within limits
R_{PTC} > (1.0...1.5)kΩ on power-up.
(1...1.5)kΩ on cooling.

C = output contact

Normally open 11-14 Closed when temperature within limits.

Functions



* PTC-Break ** PTC-Short circuit

*** RESET MEMORY = Operate the RESET key, or interrupt the supply.

Switch off

- Thermistor line break
- Over temperature
 $R_{PTC} > (2.5 \dots 3.6) \text{ k}\Omega$,
- Thermistor line short circuit ($R_{PTC} < 20 \Omega$)
- Loss of supply

Switch on

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