

# Operating manual

## PTC-relay MSF 220 K

### Application

The PTC-resistor trip device MSF 220 K has been designed for monitoring dry-transformers. 2 PTC-circuits with different nominal-response-temperatures (NRT) can be connected to this unit for pre-alarm and alarm.

### Functions

- 2 PTC resistor circuits, 1 to 6 PTC each (max. cold resistance of circuit 1500  $\Omega$  each)
- **ALARM-1-function:** potential-free contact K1 (co) for ALARM 1. The relay releases when sensors T0/T1 reach NRT. There is a short alarm-signal of K1 when switching-on the supply-voltage. ALARM 1 also signals an interruption of power-supply.  
ALARM 1 = contacts 11-12 closed.
- **ALARM-2-function:** potential-free contact K2 (no) for ALARM 2. The relay picks up when sensors T0/T2 reach NRT.  
ALARM 2 = contacts 21-24 closed
- LEDs signal state of relays
- **TEST-button** for testing relays
- Housing for mounting on DIN-rail or wall-mount with second clamp (included)

## **Technical Data**

<u>Supply voltage/frequency Us</u>	see type plate on the device
Tolerance voltage Us	
Universal power supply	DC 20 ... 297 V
	AC 19 ... 264 V      20 ... 120 Hz
AC -versions	AC 0.9...1.1 Us      40...62 Hz
Power consumption	< 3 VA
<u>PTC-resistor connection</u>	2 x 1...6 PTC in series
Cut-out point	2,8...3,6 kΩ, typ. 3,2 kΩ
Reclosing point	1,8...2,4 kΩ, typ. 2,1 kΩ
Collective resistance of cold sensors	≤ 1.5 kΩ
Terminal voltage (sensors)	≤ 2.5 V at ≤ 250 Ω ≤ 7.5 V at ≥ 4000 Ω
Terminal current (sensor)	max. 5 mA
<u>Relay output</u>	material: AgNi 0,15 K1 = 1co potential free K2 = 1no potential free
Switching voltage max.	AC 440 V
Switching current max.	AC 8 A
Switching power max.	AC 2000 VA
Rated continuous current I <sub>th</sub>	AC 5 A
Rated operational current I <sub>e</sub>	
	AC15: I <sub>e</sub> = 2A, U <sub>e</sub> = 400 V      I <sub>e</sub> = 3 A, U <sub>e</sub> = 250 V
	DC13: I <sub>e</sub> = 2A, U <sub>e</sub> = 24 V
Mechanical contact life	3 x 10 <sup>7</sup> operations
Electrical contact life	10 <sup>5</sup> operations (at max. switching capacity)
Factor of reduction at cos = 0.4	0.6 x max. switching capacity
Prefuse for device and contacts	4 A, time-lag (gL)
<u>Testing conditions</u>	EN 60947, EN 50178
Rated insulation voltage	AC 250 V
Rated impulse voltage	4 kV
Contamination level	2
Test voltage between supply voltage, relay outputs and sensor side	2.5 kV
On period	100 %
max. ambient temperature	-20 ... +55 °C
EMC	EN 50081/EN 50082
<u>Housing:</u>	design K
Dimensions (H x W x D)	75 x 22,5 x 110 mm
Material	Polyamid PA 66, UL 94 V-2
Protection housing/contacts	IP 20
Line connection single-wired	1 x 0,5...2,5 mm <sup>2</sup> each
fine wired with end sleeves	1 x 0,14 ... 1,5 mm <sup>2</sup> each
Panel inclination	any
Mounting	snappable on 35 mm standard rail according to EN 60715 or assembly with 2 screws M 4
Weight	app. 110 g

**Subject to technical modifications**

## Installation - Putting into operation

### Mounting and connection:

- mount on 35 mm mounting rail or wall-mount with 2 x screws M4
- connect wires as per wiring scheme

**When installing the device into the switch-gear cabinet, please observe the max. admissible temperature. Care for both, sufficient clearance to other devices or sources of heat or enough forced draught.**

**Before switching on make sure that the operational voltage  $U_s$  of the type- plate and the mains voltage are the same.**

- Apply mains voltage to terminals A1 and A2 (DC A1=+, A2=)
- When device is ready for operation, relay K1 picks up (contacts 11-14 close), the green LED "ON" is alight
- Press button "TEST" with a tool, i.e. a ball-pen. Relay K1 releases (contacts 11-12 close) and relay K2 picks up (contacts 21-24 close), The red LEDs Alarm 1 and Alarm 2 are alight.



**In case of failure of supply voltage , the monitored unit is not protected any more. The operator must ensure, that a failure is detected, e.g. by monitoring Alarm 1 (K1) or by testing the unit regularly.**

Even if no temperature warning is monitored with alarm 1, the function of the relay K1 should be evaluated, otherwise the monitoring can fail unnoticed (missing supply- voltage, equipment failure etc.).When no sensor is connected to T0/T1, the sensor entrance must be bridged.

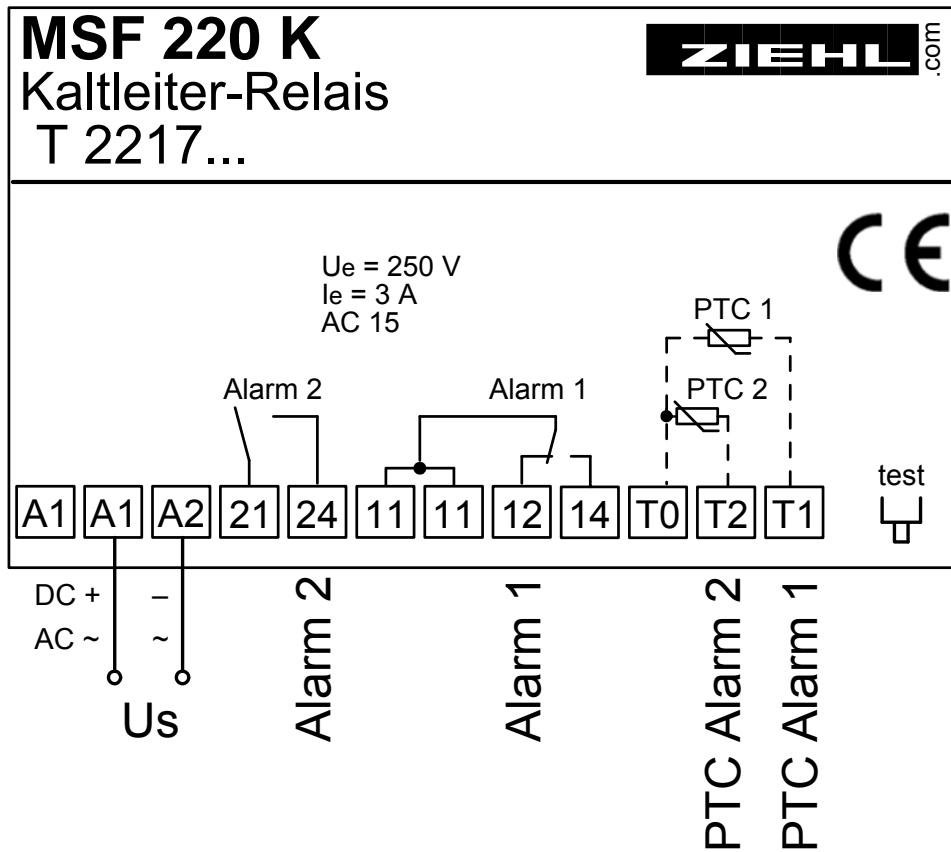
### Trouble-shooting and remedies

- LED "ON" is not alight:  
Make sure that supply voltage is connected correctly (+/-) to terminals A1/A2 and is the same as on the type plate
- K1 doesn't pick up, red LED Alarm 1 is alight:  
Make sure, that the PTCs are connected to terminals T0/T1 and that the resistance of the PTCs is  $< 1,5 \text{ k}\Omega$
- K2 picks up, red LED Alarm 2 is alight:  
Make sure, that the PTCs are connected to terminals T0/T2 and that the resistance of the PTCs is  $< 1,5 \text{ k}\Omega$

**Attention! Check PTC's only with measuring voltages of  $< 2.5 \text{ V}$ .**

- In case of any other malfunctions, replace device and send it in together with a description of the occurred malfunction.

## Wiring Scheme:



## Design K

