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Operating Manual MSF220K

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from Firmware: 0-00

For more information and help about this product please scan the QR-Code or choose the following link: MSF220K

Operating manual, Quick guide, Datasheet, Connection diagram, CAD Data
Firmwareupdates, FAQ, Videos about installation and settings, Certificates

- PTC-relay for dry transformers

Table of contents

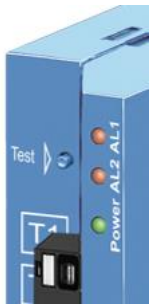
1 General Notes

Compliance with the following instructions is mandatory to ensure the functionality and safety of the product. If the following instructions given especially but not limited for general safety, transport, storage, mounting, operating conditions, commissioning and disposal / recycling are not observed, the product may not operate safely and may cause a hazard to the life and limb of users and third parties.

Deviations from the following requirements may therefore lead both to the loss of the statutory material defect liability rights and to the liability of the buyer for the product that has become unsafe due to the deviation from the specifications.

2 Display and controls

1. **LED Alarm 1**
2. **LED Alarm 2**
3. **LED Power on**
4. **Button Test**



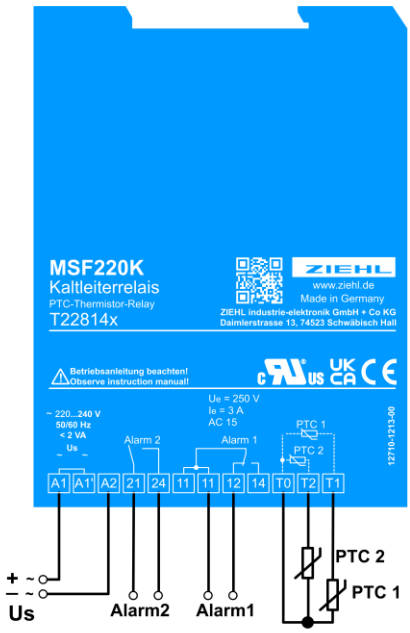
3 Application and short description

General
The PTC-relay MSF220K is especially suitable for monitoring temperatures in dry transformers.
Relay K2 (Alarm 2/Trip) is connected in operating current mode. It makes no trip signal when supply voltage is switched on. A delayed switching time relay in series is not required. Thus, the MSF220K can also be used when the supply voltage for the device is provided by the monitored transformer.
The built in test button allows easy test of the device and the connected components.
Additional terminals make it easy to bridge supply voltage to K1 and K2.

4 Overview of functions

- 2 PTC-circuits with different temperatures for monitoring
- monitoring of sensor errors (PTC circuit is monitored for break and short circuit)
- TEST-button for testing relays
- LEDs signal state of relays
- ALARM 1 in closed-circuit current mode (relay K1, 1 change-over contact) for pre alarm. Signals also error in any sensor (when activated) and interruption of supply voltage.
- ALARM 2 in operation current mode (relay K2, 1 NO contact). No signal when switching on and off the supply voltage.

5 Connecting diagram



6 Detailed description

PTC sensors with different nominal response temperatures (NRT) can be connected to MSF220K.

When everything is ok, relay K1 (Alarm 1) is picked up (11-14 closed) and relay K2 (Alarm 2, trip) is released (21-24 open). Green LED Power is on.

When nominal response temperature of PTC 1 (T1) is exceeded, relay K1 releases and red LED Alarm 1 is on.
Relay K1 picks up again, when temperature at sensor comes below switching back temperature.
When temperature of transformer continues rising and nominal response temperature of PTC 2 (T2) is exceeded, relay K2 (Alarm 2) picks up (21-24 closed) and red LED Alarm 2 is on.

Monitoring of sensors for errors (short circuit or interrupt) can be activated.

The contacts at both relays are potential free.
Function of relays can be tested with button test.

table of function

overload:	PTC > 3650 Ω	
normal:	PTC < 1600 Ω	
∞/0:	PTC = ∞ Ω / PTC = 0 Ω	-> Sensor error

PTC-temperature sensor		alarm relays		alarm LEDs *	
PTC 1 (T0-T1)	**PTC 2 (T0-T2)**	**alarm 1**	**alarm 2**	**AL1**	**AL2**
normal	normal	off (terminal 11-14)	off	○	○
overload	normal	on (terminal 11-12)	off	●	○
overload	overload	on (terminal 11-12)	on (terminal 21-24)	●	●
Normal	overload	off (terminal 11-14)	on (terminal 21-24)	○	●

only at parameterization: “monitoring sensor error on “

∞/0 *1	normal *1	on (terminal 11-12)	off	✳	○
normal *1	∞/0 *1	on (terminal 11-12)	off	○	✳
overload *1	∞/0 *1	on (terminal 11-12)	on (terminal 21-24)	●	✳
∞/0 *1	overload *1	on (terminal 11-12)	on (terminal 21-24)	✳	●
∞/0 *1	∞/0 *1	on (terminal 11-12)	off	✳	✳

**) LED:* ○ *off* ● *on* ✳ *flash*

7 Important Information

To use the equipment flawless and safe, transport and store properly, install and start professionally and operate as directed.
Only let persons work with the equipment who are familiar with installation, start and use and who have appropriate qualification corresponding to their function. They must observe the contents of the instructions manual, the information which are written on the equipment and the relevant security instructions for the setting up and the use of electrical units.
The equipment is built according to DIN / EN and checked and leave the plant according to security in perfect condition. To keep this condition, observe the security instructions with the headline „Attention” in the instructions manual. Ignoring of the security instructions may lead to death, physical injury or damage of the equipment itself and of other apparatus and equipment.
If, in any case the information in the instructions manual is not sufficient, please contact our company or the responsible representative.
Instead of the industrial norms and regulations written in these instructions manual valid for Europe, you must observe out of their geographical scope the valid and relevant regulations of the corresponding country.

DANGER!
Hazardous voltage!
Will cause death or serious injury. Turn off and lock out all power supplying this device before Working on this device.

Attention!
Before switching on make sure that the operational voltage Us of the type- plate and the mains voltage are the same! Before switching on ensure, that the supply voltage Us written on the lateral type plate corresponds to the mains voltage!

Attention!
Observe the maximum temperature permissible when installing in switching cabinet. Make sure sufficient space to other equipment or heat sources. If the cooling becomes more difficult e.g. through close proximity of apparatus with elevated surface temperature or hindrance of the cooling air, the tolerable environmental temperature is diminishing.

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.

8 Installation

The unit can be installed as follows:

- Installation in switchgear cabinet on 35 mm mounting rail according to EN 60715
- With 2 screws M4 for installation on wall or panel

Connection according to connection plan.

9 Putting into operation

Parameterization of monitoring sensor errors (factory settings: monitoring sensor errors off)

- Power off the device
- Press button [Test] and keep pressed
- Power on the device, and keep pressed the button [Test]
  - ➢ After 5s blinks the green LED, release button [Test]
- Press Button [Test] again to switch the function
  - ➢ monitoring sensor errors on (red LEDs on)
  - ➢ monitoring sensor errors off
- Keep button [Test] pressed (2s) to save the function (the Power LED blinks fast, release button [Test])
- The MSF220K makes a reset and restarts with the set function

Checking the function of device

- Power on the device (green LED Power is on)
- The relay K1 switch on (Terminals 11-14 closed) and the red LEDs AL1 and AL2 are off

Function of button [Test] under operation

- Press button [Test] and keep pressed
- The green LED signals the status of monitoring sensor errors
  - ➢ monitoring sensor error on: LED blinks -> 2 x fast – pause - 2 x fast – pause - …)
  - ➢ monitoring sensor error off: LED blinks evenly
- after 5s: Alarm 1 becomes active (relay K1 = off, terminals 11-12 closed, red LED AL1 = on)
- after 8s: Alarm 2 becomes active (relay K2 = on, terminals 21-24 closed, red LED AL2 = on)
- release button [Test] to chancel the test function

Even if no temperature warning is monitored with alarm 1, the function of the relay K1 must be evaluated, otherwise the monitoring can fail unnoticed (missing supply- voltage, equipment failure etc.).
Connect a resistor (0,1kΩ…1,5kΩ) to sensor input PTC 1 (T0-T1), also 0Ω if monitoring sensor error = off.

10 Error search

- LED Power is off
  - ⇒ Make sure that supply voltage is connected correctly (+/-) to terminals A1/A2 and correspond with the voltage on type plate

- Alarm 1 / Alarm 2 always active (LED AL1 / AL2 is on)
  - ⇒ Make sure, that the PTCs are correct connected and the voltage at the terminals is < DC 0,8 V. The resistance of the PTCs in cold state should be < 1,5 kΩ.
  - ⇒ Check PTC's only with measuring voltages of < 2.5 V.

- LED Power blinks and Alarm 1 is active (button Test is not pushed, not at parameterization)
  - ⇒ internal device error, switch it off and on. If the error persists please replace device. Send in together with a description of the occurred malfunction.

- Alarm 1 constantly active (K1 off, 11-12 on) and at least one alarm LED blinks:
  - ⇒ monitoring sensor error active, check sensors for short circuit and interruption
  - ⇒ monitoring sensor error in PTC 1 (AL1 blinks) and/or sensor error in PTC 2 (AL2 blinks)

Functional tests (according to function table):
• with Test button (test function)
• with potentiometers on PTC 1 (T0-T1) and PTC 2 (T0-T2)
• When sensor error monitoring is switched off: with jumpers/interruptions on PTC1 and PTC 2

11 Technical data

Power supply (A1, A2)	
Rated supply voltage Us	see type plate on device
Model Us = AC/DC 24...240 V	DC 20,4 … 297 V / AC 20 … 264 V
Frequency	AC 40…500 Hz, from AC 80 V: 10…500 Hz
Power consumption	< 1 W < 3 VA
Model Us = AC 220...240 V	AC 0,9 Us -1,1 Us 40 ... 62 Hz
Power consumption	< 2 W < 2 VA
Relay output	EN 60947-5-1
Contacts	1 change-over contact , 1 NO contact
Switching voltage	max. AC 300 V; DC 300 V
Minimum voltage / current	12 V / 10 mA
Switching current Ith	max. 5 A
Current per terminal	max. 5 A
Switching power (ohm resistive load)	max. 1250 VA max. 120 W at DC 24 V
rated operating current Ie rated operational voltage Ue	AC-15 Ie = 3 A Ue = 250 V DC-13 Ie = 2 A Ue = 24 V DC-13 Ie = 0,2 A Ue = 240 V
UL electrical ratings	250 V ac, 3 A, general use 240 V ac, 1/4 hp, 2.9 FLA 120 V ac, 1/10 hp, 3.0 FLA C 300
PTC thermistor input (T0-T1, T0-T2)	acc. DIN 44081 / DIN 44082
Number	2 x 1…6 PTC thermistor in series
Rated response temperature TFS	60 °C … 180 °C
Response tolerance	±6 °C
Temperature monitor cut-out-point	3,3 kΩ…3,65 kΩ…3,85 kΩ
Temperature monitor reclosing point	1,5 kΩ…1,6 kΩ …1,65 kΩ
Collective resistance cold thermistor	≤ 1,5 kΩ
Terminal voltage (PTC thermistor)	≤ 2,2 V at R ≤ 3,65 kΩ ≤ 5 V at R = ∞
Terminal current (PTC thermistor)	≤ 1 mA
Power consumption	≤ 1,5 mW
Short circuit monitor	On: approx. 20 Ω Off: approx. 40 Ω
Interruption monitor	On: approx. 20 kΩ, only if temperature monitor cut-out-point has not previously exceeded, Off: approx. 1,6 kΩ
Test conditions	EN 60947-8
Rated impulse voltage	4000 V
Overvoltage category	III
Pollution degree	2
Rated insulation voltage Ui	300 V
Transformer	EN 61558-2-6 (VDE 0551)
On-period	100 %
EMC immunity (industry)	EN 61000-6-2
EMC emission	EN 61000-6-3

Reliability – failure rate	EN 61709/ SN29500		
Ambient conditions	Local operation in dry rooms		
Operation time 24/7/365	8760 h/y		
Failure rate (FIT) Tu = Tref (component not in operation)	Tu = 40 °C 601 FIT 100 (190) years	Tu = 60°C 1214 FIT 94 years	Tu = 80°C 2789 FIT 41 years

Installation conditions	
Fitting position	any
Rated ambient temperature range	-20 °C ... +55 °C
Storage temperature	-20 °C ... +70 °C
Temperature for wiring (admissible)	-5 °C …+70 °C
Altitude	up to 2000 m
Climatic conditions	5-85% rel. F., no condensation
Vibration resistance EN 60068-2-6	2…13,2 Hz ±1 mm 13,2...100 Hz 0,7g

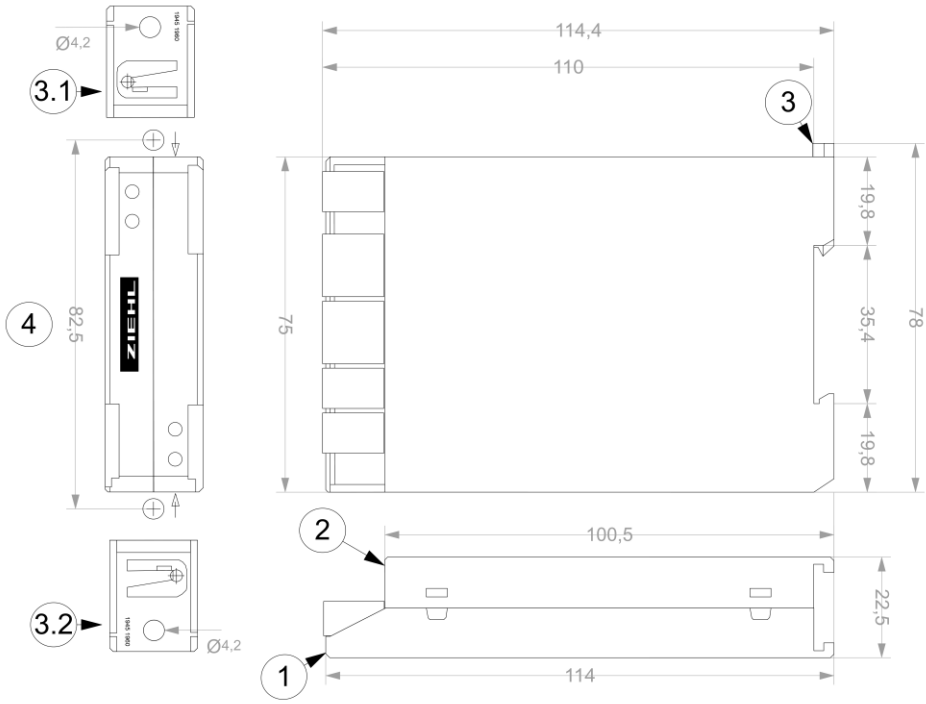
Contact termination	Push-In spring-type terminal
Protection class terminals	IP20
Actuation type	Push-Button
Number of levels	1
Solid conductor	1 x 0,14 mm^2 … 1,5 mm^2 / AWG 28 … 16
Fine-stranded conductor	1 x 0,14 mm^2 … 1,5 mm^2 / AWG 26 … 14
Fine-stranded with insulated ferrule	1 x 0,25 mm^2 … 0,75 mm^2
Fine-stranded with uninsulated ferrule	1 x 0,25 mm^2 … 1,5 mm^2
Strip length	8 … 9 mm / 0.31 … 0.35 inches

Housing	Type K
Dimensions (W x H x D)	22,5 x 75 x 115 mm
Width	1 M
Protection class housing	IP40
IK-Code	IK06 (1 J impact energy)
Mounting	Snap mounting on 35 mm standard rail EN60715 or M4 screws (additional bar not included)
Mounting position	any
Weight Model AC 220...240 V	approx. 140 g
AC/DC 24...240 V	approx. 110 g

Subject to technical modifications

12 Housing Type K

Dimensions in mm



1 Bottom
2 Top
3 Bolt
4 Holes for screw mounting

13 Disposal

Disposal should be carried out properly and in an environmentally friendly manner in accordance with legal provisions.
ZIEHL is registered with the EAR Foundation under WEEE no .: DE 49 698 543.