ZIEHL industrie – elektronik GmbH + Co KG
Daimlerstr.13, 74523 Schwäbisch Hall, Germany
+ 49 791 504-0, info@ziehl.de, www.ziehl.de

Operating Manual MSR220K

updated: 2024-06-26 / dr

For more information and help about this product please scan the QR-Code or choose the following link: MSR220K.

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

- PTC-Thermistor-Relay



Table of contents

1 General Notes 2
2 Display and controls 2
3 Application and short description 2
4 Overview of functions 3
5 Connecting diagram 3
5.1 [*2] automatic reset 3
6 Function Chart 4
7 Important Information 4
8 Installation 5
9 Error search 5
10 Technical data 6
11 Housing Type K 8
12 Disposal 8

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

Reset-Button
↪ Alarm red
↪ Power green



3 Application and short description

ZIEHL PTC-thermistor relays protect motors, transformers, machines and equipment against thermal overload. With ZIEHL PTC Sensors MINIKA ® applied they offer best solutions for nominal response temperatures 60°C…180°C.

ZIEHL PTC-thermistor relays are designed for PTC-sensors according to DIN 44081 and DIN 44082. Therefor sensor and relays are exchangeable. PTC-thermistor sensors are suitable for the installation into windings of electrical machines, bearings and transformers as well as to monitor the temperature of liquid media, airflow and gases.
Used in conjunction, they provide a effectively and reliable protection in case of

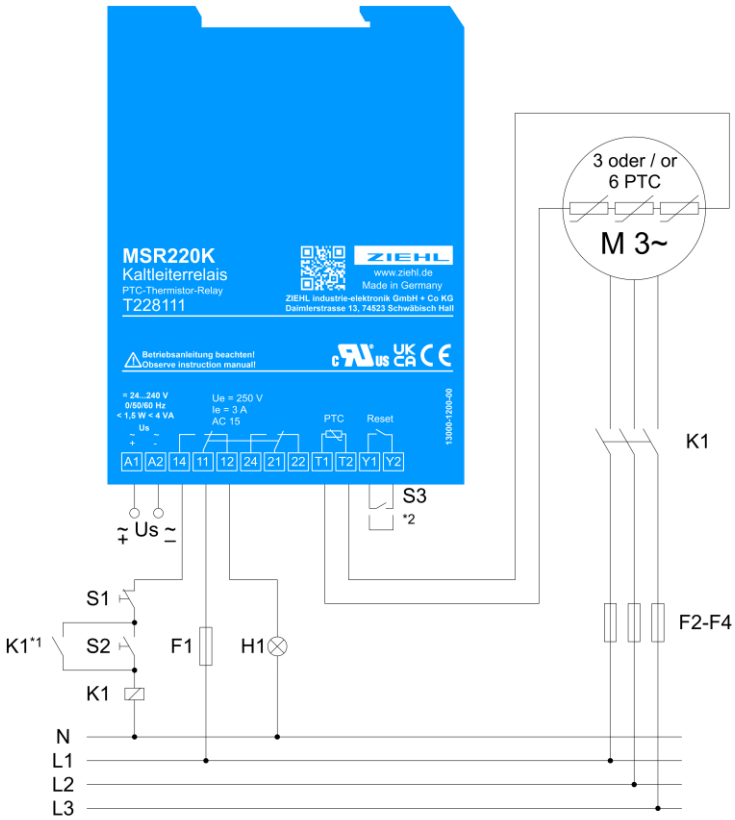
- blocking rotors, heavy starts, counter current operation
- undervoltage and phase failure
- increased ambient temperature and hindered cooling

4 Overview of functions

- 1 PTC-resistor set with up to 6 PTC-sensors (250Ω) in series
- output relay with 2x 1 change-over contact (co)
- operating status display with LED

A current monitor continuously the resistance of the sensors. In cold state, the resistance is <250 Ω per sensor (sensor circuit < 1,5 kΩ). The relay has picked up and contacts 11/14 (21/24) are closed (LED/Button=GN). The resistance of the sensor rises rapidly at nominal response temperature NRT. The relay releases at a resistance of 3…4 kΩ and contacts 11/12 (21/22) close (LED/Button=RED). MS types switch on automatically when the temperature has decreased approx. 5 °C. MSR types with electronic reclosing lock switch on again when the temperature has decreased approx. 5 °C and RESET is made (push built-in button or external RESET with terminals Y1/Y2 closed) or by return of supply voltage. With bridged terminals Y1, Y2, the reclosing lock function is disabled and a device type MSR works like a device type MS.

5 Connecting diagram



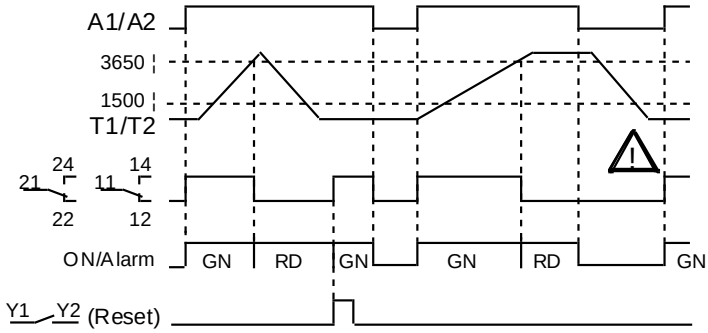
PTC	PTC thermistor
Us	Supply voltage
S1	Off switch
S2	Pusch button on
S3	Remote Reset
H1	Indicator lamp fault
F1-F4	Fuses
K1	Contactor
*1	external interlock
*2	MS-function

5.1 [*2] automatic reset

With bridged terminals Y1, Y2, the reclosing lock function is disabled and a device type MSR works like a device type MS.

MS types switch on automatically when the temperature has decreased approx.

6 Function Chart



7 Important Information

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! Universal power supply
The unit is equipped with a universal power supply, that is suitable for DC- and AC-voltages. Before connecting the unit to the current, make sure that the allowed scope of voltage of the control voltage Us, written on the lateral type of plate, corresponds to the supply voltage of the unit.

Attention!
Trip relays type MSR220K with electronic reclosing lock switch on automatically by return of the supply voltage. To automatically prevent start-up the applicant must install additional components or monitor the power supply lines.

Attention!
To safeguard the safety function of the device, connect the outputs directly in the control circuit of the equipment according to terminal plan. The relay contacts must be fused externally to prevent welding of the contacts.

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 instruction's 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 VDE/EN/IEC and checked and leave the plant according to security in perfect condition. If, in any case the information in the instruction's manual is not sufficient, please contact our company or the responsible representative.
In order to maintain this status, you must observe the safety regulations entitled "caution" in this operating manual. Failures to follow the safety regulations can result in death, personal injury or property damage to the device itself and to other devices and facilities.
To maintain this condition, you must observe the safety instructions in this instruction manual titled "Important Information". Failure to follow the safety instructions may result in death, personal injury, or property damage to the equipment itself and other equipment and facilities.
Instead of the industrial norms and regulations written in this instruction manual valid for Europe, you must observe out of their geographical scope the valid and relevant regulations of the corresponding country.

8 Installation

The applicant must observe safety rules and standards.
The trip relays must be installed within rooms of international protection class IP 54 or better.

The device can be mounted:

- on 35 mm standard rail EN 60715
- with screws of type M4 for wall fastening



When installing the device into the switchgear cabinet, please observe the max. admissible temperature. Care for both, sufficient clearance to other devices or sources of heat or enough forced draught. If cooling is made more difficult, e.g. close devices with increased surface temperature or by handicap of airflow cooling, the permissible ambient temperature has to be reduced.

9 Error search

Relay does not pick up. Please check

- The supply voltage Us at terminals A1-A2. With ready for use equipment type MS the green LED shines; with type MSR the inserted RESET button shines green.
- The PTC's at terminals T1-T2. In the case of disturbance the red LED shines, with type MSR the inserted RESET button shines red.
- The resistance of a PTC circuit must be at 0 Ω < R < 1500 Ω. The terminal voltage T1-T2 is to be measured < 2,5 V with connected PTC <1500 Ω.



Attention!
Check PTC's only with measuring voltages of < 2.5 V.

- With relay type MSR please push the Reset button. The relay can pick up at resistance R <1,65 kΩ. LED (or RESET button) changes from red to green. Alternatively reset can be done with closing an external contact at terminals Y1-Y2 or with power recovery.

Relay does not release.

- With no PTC sensor connected the PTC Trip Relay must release. The voltage at terminals T1-T2 must be approx. 8 V.

In case of any other malfunctions, replace device. Please add a description of the occurred malfunction when sending back for repair.

10 Technical data

Rated supply voltage Us	AC/DC 24-240 V 0/50/60 Hz
Tolerance (voltage)	AC/ DC 20,4…297 V
Tolerance (frequency)	0/40…70 Hz
Power consumption	< 1,5 W / < 4 VA
PTC-resistor connection:	PTC-sensor according to DIN 44081/82
Number	set with 1 ... 6 PTC´s in series
Cut-out-point	3,3 kΩ…3,65 kΩ…3,85 kΩ
Reclosing point	1,7 kΩ…1,8 kΩ …1,95 kΩ
response tolerance of system	±6 °C
Collective resistance cold sensors	≤ 1,65 kΩ
Terminal voltage (sensors)	≤ 2,5 V at R ≤ 3,65 kΩ, ≤ 9 V at R = ∞
Terminal current (sensors)	≤ 1 mA
Power consumption	≤ 2 mW
Reset input (Y1, Y2)	Potential free contact (no)
Current	1 mA
Voltage	< 30 VDC
Testing conditions:	EN 60 947
Rated impulse voltage	4000 V
Overvoltage category	III
Contamination level	2
Rated insulation voltage Ui	320 V
Transformer	EN 61558-2-6 (VDE 0551)
On-period	100 %
Rated ambient temperature range	-20 °C ... +55 °C EN 60068-2 Dry Heat
EMC - Immunity	EN 61000-6-2
EMV - Emission	EN 61000-6-3
Vibration resistance EN 60068-2-6	2…25 Hz ±1,6 mm, 25 ... 150 Hz 5g
Relay output:	EN 60947-5/IEC 947-5
Contacts	2x 1 change-over contact (co)
Switching voltage	max. AC 300 V; DC 300 V
Switch-on current (NO)	AC 15 A 4s 10% ED
min. voltage / current	12 V 10 mA
conventional thermal current Ith	max. 5 A
Switching power max. AC cos φ = 1	1500 VA 300 V * 5 A
Switching power max. DC (ohm)	0.3 A 300 V; 0.4 A 120 V; 0.8 A 60 V; 8 A 30 V
Contact life electrical	cos φ = 1 -> 5 x 10^5 operating cycles 250 V / 2 A
Contact life mechanical	3 x 10^7 operating cycles
Recommended fuse (NO)	4 A time-lag or miniature circuit-breaker MCB B4
Recommended fuse (NC)	3,15 A time-lag
Utilization category Rated operational current	AC-15 Ie = 3 A Ue = 250 V
Rated operational current	DC-13 Ie = 2 A Ue = 24 V
Rated operational voltage	DC-13 Ie = 0.4 A Ue = 120 V; DC-13 Ie = 0.2 A Ue = 240 V
UL electrical ratings	250 Vac, 3 A, general use C300

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 431 FIT 100 (264) years	Tu = 60°C 865 FIT 100 (133) years	Tu = 80°C 1901 FIT 60 years

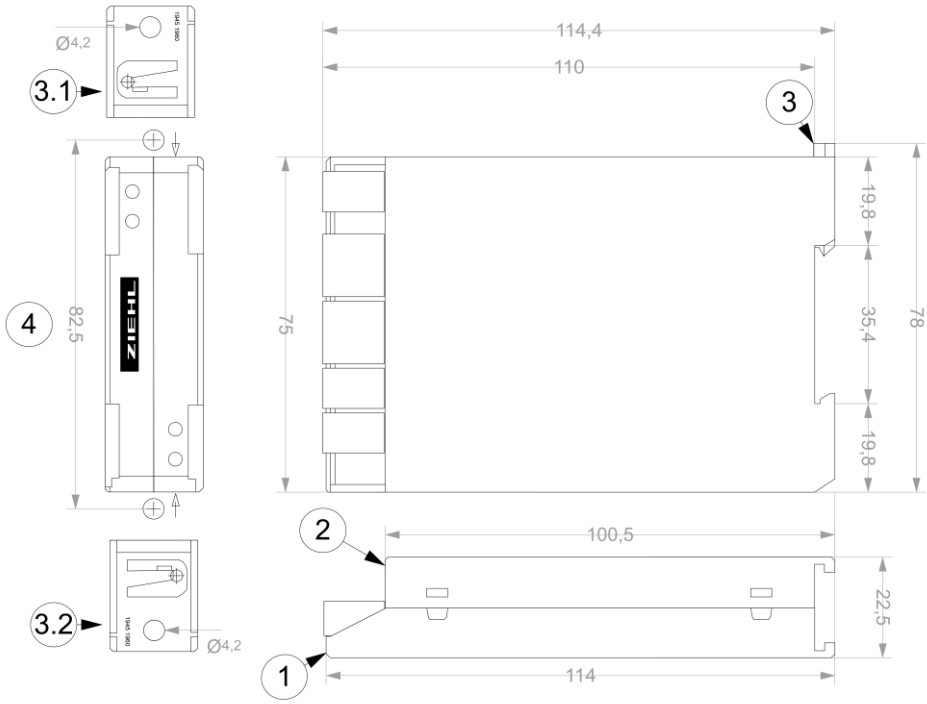
Contact termination	Push-In spring-type terminal
Protection class terminals	IP20
Actuation type	Push-Button
Number of levels	1
Solid conductor	1 x 0,14 mm^2 … 1,5 mm^2 / AWG 28 … 16
Fine-stranded conductor	1 x 0,14 mm^2 … 1,5 mm^2 / AWG 26 … 14
Fine-stranded with insulated ferrule	1 x 0,25 mm^2 … 0,75 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	app. 95 g

Subject to technical changes

11 Housing Type K

Dimensions in mm



1 Bottom
2 Top
3 Bolt
4 Holes for screw mounting

12 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.