

# Operating Manual MS220K and MSR220K

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## - PTC-Resistor-Relay



## Table of contents

1	Application and Short description .....	3
2	Wiring scheme .....	3
3	Display and Operating Elements .....	4
4	Functional overview .....	4
5	Detailed description .....	4
6	Action Chart .....	5
7	Important Notes/ Putting into operation .....	5
8	Assembly .....	6
9	Trouble – shooting and remedies .....	6
10	Technical data .....	7
11	Design K .....	8

# 1 Application and Short description

ZIEHL PTC-resistor 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-resistor relays are designed for PTC-sensors according to DIN 44081 and DIN 44082. Therefore sensor and relays are exchangeable. PTC-resistor 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 an effectively and reliable protection in case of

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

## Approvals:



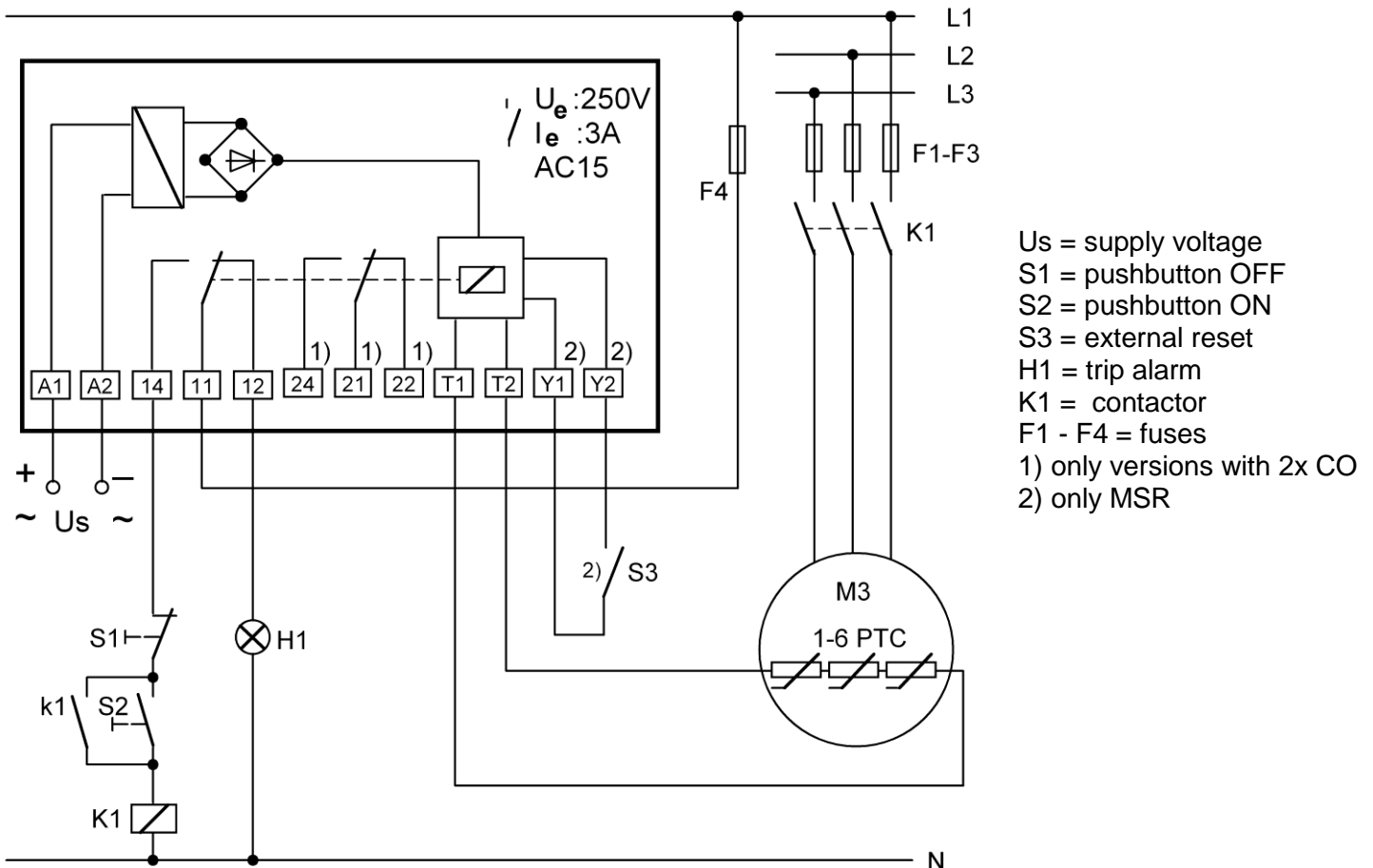
without electronic reclosing lock

**MS220K**

with electronic reclosing lock

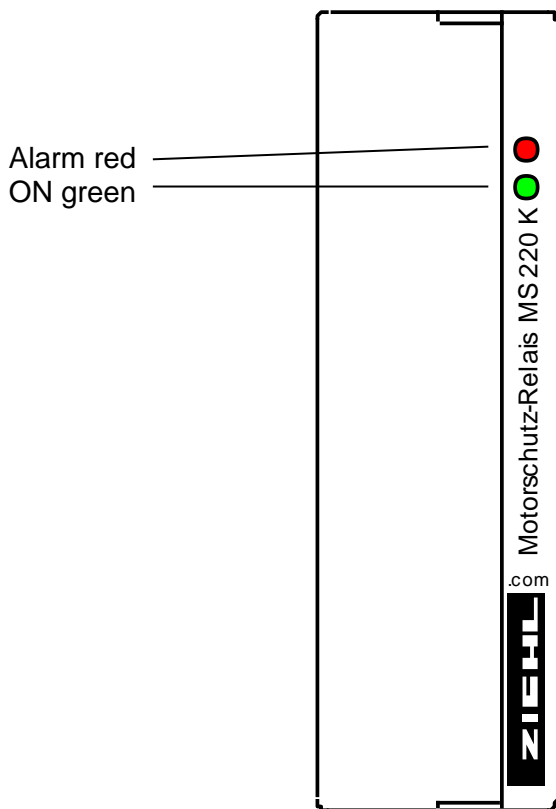
**MSR220K**

## 2 Wiring scheme



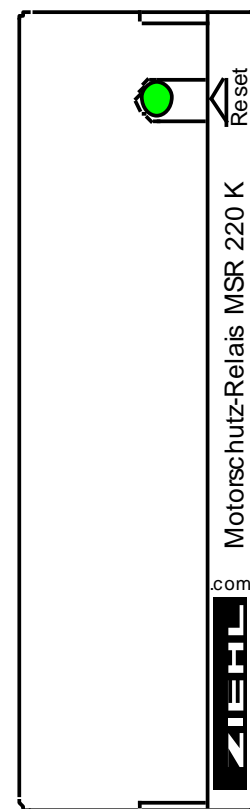
### 3 Display and Operating Elements

#### MS220K



#### MSR220K

Reset-Button  
ON = green  
Alarm = red



### 4 Functional overview

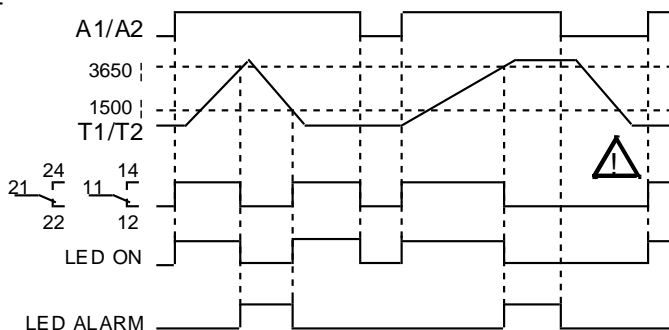
- 1 PTC-resistor set with up to 6 PTC-sensors (250Ω) in series
- output relay with 1 or 2 change-over contact (co)
- operating status display with LED
- K-Housing, vertical terminal order
- width 22.7 mm
- snap mounting on 35 mm standard DIN rail or screw mounting

### 5 Detailed description

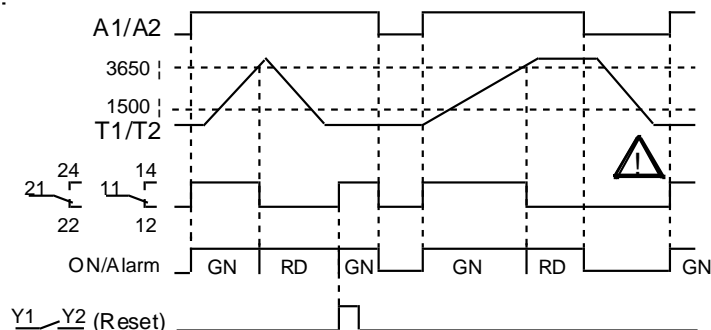
A current monitors continuously the resistance of the sensors. In cold state, the resistance is  $<250 \Omega$  per sensor (sensor circuit  $< 1,5 \text{ k}\Omega$ ). The relay has picked up and contacts 11/14 (21/24) are closed(LED/Button=GN). The resistance of the sensor rises rapidly at nominal response 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.

## 6 Action Chart

### MS220K



### MSR220K



## 7 Important Notes/ Putting into operation



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



**Attention!**  
Trip relays with supply voltage DC/AC 24 V are intended to use at power supplies according EN 61558. Wiring connection must be protected.



**Attention!**  
Trip relays type MSR220K 2 with electronic reclosing lock switch on automatically by return of the supply voltage. To prevent automatically 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 terminal plan The relay contacts must be fused externally to prevent welding of the contacts.

## 8 Assembly

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 Trouble – shooting and remedies

Relay does not pick up. Please check

- The supply voltage  $U_s$  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  $0 \Omega < R < 1500 \Omega$ . The terminal voltage T1-T2 is to be measured  $< 2,5 \text{ V}$  with connected PTC  $< 1500 \Omega$ .

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

- With relay type MSR please push the Reset button. The relay can pick up at resistance  $R < 1,65 \text{ k}\Omega$ . 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. Please check

- 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

### Power supply

Rated supply voltage $U_s$	AC 110-120 V, AC 220-240 V (see lateral type plate) AC/DC 24 V (no potential separation)
Tolerance voltage $U_s$	AC 0,9 $U_s$ ... 1,1 $U_s$ DC 21 ... 30 V
Frequency (AC)	50 / 60 Hz
Tolerance frequency	45 - 62 Hz
Power consumption	<2 VA

### PTC-resistor connection

Number	PTC-sensor according to DIN 44081/82 set with 1 ... 6 PTC's in series
Cut-out-point	3,3 k $\Omega$ ...3,65 k $\Omega$ ...3,85 k $\Omega$
Reclosing point	1,7 k $\Omega$ ...1,8 k $\Omega$ ... 1,95 k $\Omega$
response tolerance of system	$\pm 6$ °C
Collective resistance cold sensors	$\leq 1,65$ k $\Omega$
Terminal voltage (sensors)	$\leq 2,5$ V at $R \leq 3,65$ k $\Omega$ , $\leq 9$ V at $R = \infty$
Terminal current (sensors)	<1 mA
Power consumption	<2 mW

### Relay output

Contacts	EN 60947-5/IEC 947-5 1 or 2 change-over contact (co)
Switching voltage	max. AC 415 V
Switching current	max. 6 A
Switching power AC $\cos = 1$	max. 2000 VA max. 120 W at DC 24 V
Rated operational current $I_e$	3 A AC15 250 V ; 2 A DC13 24 V
Recommended fuse	3,15 A gl (slow)
Mechanical contact life	$3 \times 10^7$ operations
Electrical contact life	$1 \times 10^5$ operations at 240 V / 6 A $1 \times 10^6$ operations at 240 V / 2 A
Factor of reduction at $\cos=0,3$	0,5
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

### Testing conditions

Rated impulse voltage	EN 60 947 4000 V
Overvoltage category	III
Contamination level	3 2
Rated insulation voltage $U_i$	250 V 415 V
Transformer	EN 61558-2-6 (VDE 0551)
On-period	100 %
Rated ambient temperature range	-20 ... +55 °C EN 60068-2-2 Dry Heat
EMC - Immunity	EN 61000-6-2
EMC - Emission	EN 61000-6-3
Vibration resistance EN 60068-2-6	2...25 Hz $\pm 1,6$ mm 25 ... 150 Hz 5g

**Housing:**

Dimensions (H x W x D)

Line connection

Protection housing EN 60529

Protection terminals EN 60529

Panel inclination

Attachment

Optional: screws

Weight

design "K"

75 x 22,5 x 110 mm

1 x 0,5...2.5 mm<sup>2</sup> each

IP 40

IP 20

any

on 35 mm standard rail according to EN 60715

M4, only with extra bar

(not enclosed)

approx. 150 g

Subject to technical modifications

## 11 Design K

dimensions in mm

