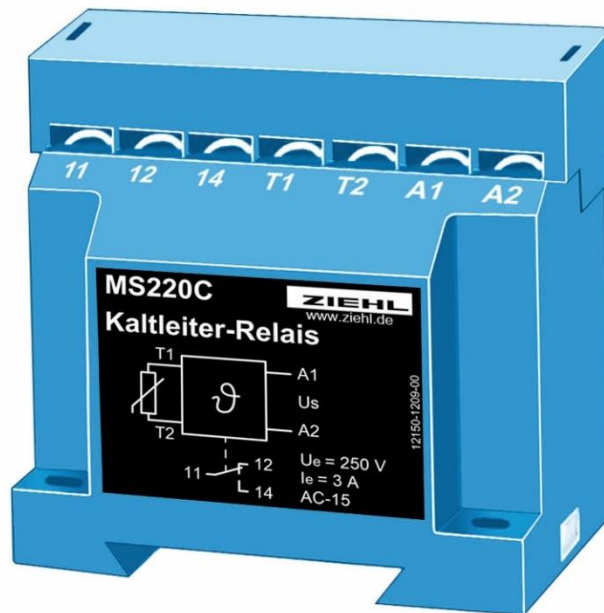


# Operating Instructions MS220C

updated: 2017-11-09 Su

**PTC-thermistor relay , TMP tripping device – Power supply AC/DC 24-240 V**

Approvals: marking see type plate on the device

## Table of contents

1	Display and control elements.....	2
2	Pre-Adjustment.....	2
3	Application and short description.....	2
4	Summary of functions.....	3
5	Connecting diagram:.....	3
6	Function diagram .....	3
7	Important notes .....	4
8	Installation .....	4
9	Commissioning.....	5
10	Trouble shooting .....	5
11	Maintenance and repair.....	5
12	Technical data .....	6
13	Form C.....	8

### 1 Display and control elements

The MS220C is a built-in device and has no display or operating elements. The status can be signalled by monitoring the normal closed contact and an external signal lamp.

### 2 Pre-Adjustment

No settings are necessary on the devices. The tripping temperature is determined solely by the response temperature of the connected PTC thermistors.

Depending on the number of PTC thermistors the following tripping temperatures and reset temperatures arise related to TNF (detector operating temperature):

	Tripping temperature	Reset temperature
1 PTC thermistor	TNF + 15 K	TNF + 5 K
3 PTC thermistors in series	TNF + 5 K	TNF – 5 K
6 PTC thermistors in series	TNF	TNF – 20 K

### 3 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.

TMP tripping device is according EN 60947-8 (VDE 0660 part 0302). PTC- thermistor sensors according DIN 44081 und 44082 (VDE 0660 part 0303) can be connected. PTC- thermistors 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, counter current operation
- under voltage and phase failure
- increased ambient temperature and hindered cooling

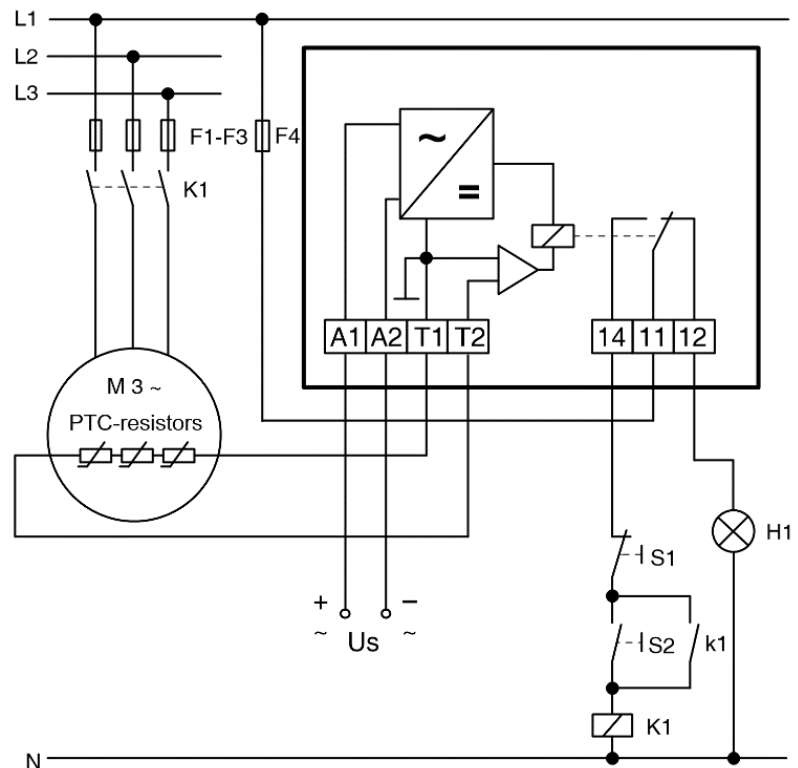
## 4 Summary of functions

- 1 PTC-resistor set with up to 6 PTC Sensors in series
- Sensors and relays are exchangeable
- Sensors with fixed nominal response temperature 60...180°C
- Suitable with thermal contacts
- Relay output with change-over contact (co), floating extern
- Snap mounting on standard rails or screw mounting

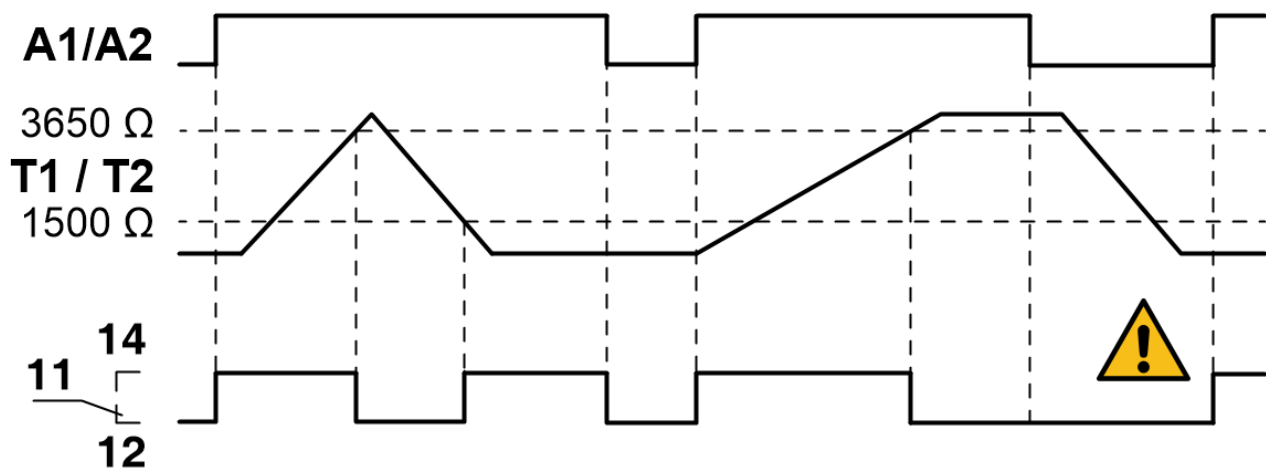
A current monitors continuously the resistance of the sensors. In cold state, the resistance is  $< 250 \Omega$  per sensor (sensor circuit  $< 1,5 \text{ k}\Omega$ ). The relay has picked up and contact 11/14 is closed. The resistance of the sensor rises rapidly at nominal response temperature NRT. The relay release at a resistance between  $3500 \Omega < R < 4000 \Omega$ . The relay switches on automatically when the temperature is cooled down.

## 5 Connecting diagram:

Us = supply voltage  
 S1 = push-button OFF  
 S2 = push-button ON  
 H1 = indicator lamp fault  
 F1-F4 = fuses  
 K1 = contactor



## 6 Function diagram



Caution! Tripping is not stored and is not non-volatile!  
 The released relay switches on automatically after a voltage dip.

## 7 Important notes



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

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 equipments are built according to EN60947 and checked and leave the plant according to security in perfect condition. To keep this condition, observe the security instructions with the headline „Attention“ written 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 this instructions manual valid for Europe, you must observe out of their geographical scope the valid and relevant regulations of the corresponding country.

## 8 Installation



**Attention!**  
**Observe safety rules and standards. Notice safety remarks!**

- The device can be mounted on 35 mm rail according EN 60715 or with screws M4 (Option)
- The devices must be installed in an enclosure of international protection class IP 5x or better.
- Housing overall width 35 mm (2 TE)
- Terminals with screw mounting M3 maximum tightening torque 0,8 Nm

**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.**

**The lines of the sensor circuit are to be routed as separate control lines. The use of lines of the supply cable or other mainstream lines is not permissible. If extreme inductive or capacitive stray effects are to be expected by parallel cables of the power installation, shielded control lines should be used.**

## 9 Commissioning



### **Attention!**

**Before switching on make sure that the operational voltage  $U_s$  of the Type plate and the mains voltage are the same!**

After the supply voltage is switched on and when the thermistors are correctly connected the relay contacts 11,14 close.

The correct function of the tripping device must be checked by resistance simulation at terminals T1 and T2. This check is also performed after changes to the installation.

Line interruption test: disconnect sensor line at terminal T1 or T2  
Temperature test: increase resistance  $0 \Omega < R < 1500 \Omega$  up to  $4000 \Omega$ .

With commissioning and after modification of the plant the sensor resistance must be checked with a suitable measuring instrument. With a resistance  $< 50 \Omega$  the sensor circuit is to be examined for short-circuit.

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

## 10 Trouble shooting

Relay does not pick up. Please check:

- The supply voltage  $U_s$  at terminals A1 - A2
- The PTC sensors at terminals T1 - T2
- The resistance of a PTC set must be within  $0 \Omega < R < 1500 \Omega$ . The terminal voltage T1 - T2 is to be measured  $< 2 \text{ V}$  with connected PTC's.

Relay does not release. Please check:

- With no PTC sensor connected the TMP trip relay must release.
- The voltage at terminals T1-T2 must be app.  $13 \text{ V}$ .

In case of any other malfunction replace the device. Please add a description of the failure and send it back for repair.

## 11 Maintenance and repair

The devices are maintenance-free. Only the manufacturer may accomplish repairs. We recommend testing within the regular maintenance intervals of the plant, where the device is used.

## 12 Technical data

<b>Power supply (A1, A2)</b>	
Rated supply voltage $U_s$	DC 24 – 240 V      AC 24 – 240 V    50/60 Hz
Tolerance $U_s$	DC 20,4...264 V    AC 20,4...264 V    45...65 Hz
Power consumption	< 1 W                      < 2 VA
On-period	100%
Buffer time in case of power failure	max. 200 ms
<b>Input (T1, T2)</b>	
	PTC-Thermistors acc. DIN 44081 and DIN 44082
Number of PTC Thermistors	Set with 1...6 PTC's in series
System operating temperature TFS	60 °C ... 180 °C
Tolerance TFS	±6 °C
Collective resistance cold thermistor	≤1.65 kΩ
Terminal voltage (PTC thermistor)	≤ 2 V at $R \leq 1.65 \text{ k}\Omega$ : ≤ 3,6 V at $R \leq 3.65 \text{ k}\Omega$ ≥ 13 V at $R = \infty$
Terminal current (PTC thermistor)	< 1.3 mA
Power consumption	≤ 5 mW
Line capacity max.	0.2 μF
Temperature monitor cut-out-point	3,3 kΩ ... 3,65 kΩ ... 3,85 kΩ
Temperature monitor reclosing point	1,65 kΩ ... 1,7kΩ ... 1,85 kΩ
<b>Relay output (11,12,14)</b>	
	EN 60947-5-1
Contacts	1 change-over contact (co)
Rated operational voltage $U_e$	250 V
Switching voltage max.	AC 300 V
Switching current.max.	5 A
Making current < 20 ms	30 A
Min. operational current at 12 V	10 mA
Derating $T_a$	up to +55°C              up to +70°C
Conventional free air thermal current $I_{th}$	5 A                              3 A
Switching power AC-1 max.	1250 VA                      750 VA
Switching power DC-1 max.	120 W at 24 V              72 W at 24 V
Rated operational current ( $I_e$ )	AC-15 $I_e = 3 \text{ A}$ $U_e = 250 \text{ V}$ DC-13 $I_e = 2 \text{ A}$ $U_e = 24 \text{ V}$ DC-13 $I_e = 0,2 \text{ A}$ $U_e = 240 \text{ V}$
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
Mechanical contact life	$3 \times 10^7$ operations
Electrical contact life AC-1	$3 \times 10^5$ operations at 240 V/ 3 A
Recommended fuse NO	4 A time-lag or miniature circuit-breaker MCB B4
Recommended fuse NC	3,15 A time-lag
<b>Electrical Safety – Testing conditions</b>	
	EN 60 947-1
Rated insulation voltage $U_i$	300V
Rated impulse voltage	4000 V
Overvoltage category	III
Contamination level	3
Test Voltage Input/output	2000 V 50 Hz
EMC - Immunity	EN 61000-6-2
EMC - Emission	EN 61000-6-3

## Ambient conditions

Rated ambient temperature range	-30 °C ... +70 °C
Storage (1K4 EN60721-3-1)	-25 °C... +55 °C
Transportation (2K3 EN 60721-3-2)	-25 °C... +70 °C
Alltitude	≤ 2000 m NHN
Mounting position	any
Climatic conditions (3K3 EN60721-3-3)	5-85% rel. F., no condensation
Vibration resistance EN 60068-2-6	2 ... 13,2 Hz ± 1 mm 13,2 ... 100 Hz ± 0,7 g

## Housing

## Form C

Dimensions (H x W x D) mm	72 x 33 x 60
Material	PA66
Flammability class	UL 94 V-2
Protection class housing/terminals EN 60529	IP 40/IP20
Mounting EN 60715	35 mm standard rail according or with screws M4
Weight	app. 80 g
Screw - Terminals	M 3,5
Tightening torque	0.8 Nm (7 lb.in)
Line connection solid wire	2 x 0,5...2,5 mm <sup>2</sup> (AWG 20...14)
Stranded wire with insulated ferrules	2 x 0,34 ... 1,5 mm <sup>2</sup> (AWG 20...16)
Insulation strip length min.	8 mm

**Subject to technical modifications**

You'll find this and other user manuals in the internet under  
[www.ziehl.com](http://www.ziehl.com)

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

# 13 Form C

Dimension in mm

