

# PTC-Resistor-Relays

## General

ZIEHL PTC resistor relays and ZIEHL PTC resistors according to DIN 44 081 and DIN 44 082 are a reliable protection from thermal overloading. Together they result in a fast and effective protective system for i.e. engines and transformers. ZIEHL PTC relays offer the following advantages:

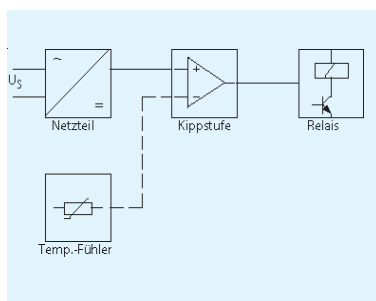
- Sensors and relays can be used in many combination

- fixed response temperatures of the sensors of 60... 180 °C
- reliable monitoring of sensor line sensors
- 1 - 6 PTC resistor connectable
- monitoring of normally closed contacts possible
- housings for the fast assembly standard rail or with screws M4
- protection against accidental contact according to VBG 4, VDE 106 part of 100

ZIEHL PTC resistor relays are routine tested and meet the following standards for PTC resistor relays: VDE 0660, VDE 0160, IEC 337-1, CENELEC hp 420 i

Type	housing	connectable PTC-resistors	potential-free relay contacts	reclosing-lock	approvals/remarks
MS220K	K	1...6	1 CO, 2 CO	-	Low-Cost-Version
MSR220K	K	1...6	1 CO, 2 CO	x	Low-Cost-Version
MS220KA	K	1...6	1 CO, 2 CO	-	Short-circuit monitoring, ATEX-Approval
MSR220KA	K	1...6	1 CO, 2 CO	x	Short-circuit monitoring, ATEX-Approval
MS220VA	V2	1...6	1 CO	-	Short-circuit monitoring, ATEX-Approval
MSR220VA	V2	1...6	1 CO	x	Short-circuit monitoring, ATEX-Approval
MS220Vi	V4	1...6	2 CO	-	intrinsic safe sensor-circuit, Ex II (1) GD (Ex ia) II C (Ex ia D)
MSR220Vi	V4	1...6	2 CO	x	intrinsic safe sensor-circuit, Ex II (1) GD (Ex ia) II C (Ex ia D)
MS220C	C	1...6	1 CO	-	compact device, GL-Zulassung
MS220K2	K	2 x 1...6	2 x 1 CO	-	2 separate channels
MSR220K2	K	2 x 1...6	2 x 1 CO	x	2 separate channels, reclosing-lock
MSR220K6	K	6 x 1...6	1 CO	x	6 channels, common output
MSR820V	V4	8 x 1...6	2 CO	x	8 channels, common output, LED-display for responding sensor-circuit
MSM220K	K	1...6	1 CO	x	reclosing lock power fail proof, test button
MS40ZT	S12	1...6	1 CO	-	pulse input for monitoring movement of elevators
MSF220K	K	2 x 1...6	1 CO, 1 NO	-	2 separate channels, test-button, monitoring of dry transformers
MSF220SE	S12	2 x 1...6	2x1 CO	-	2 separate channels, timing-relay, monitoring of dry transformers
MSF220V	V4	3 x 1...6	2x1 CO, 1 NO	-	3 separate channels, fan-control, monitoring of dry transformers
MSF220VL	V4	4 x 1...6	4 x 1 CO	-	4 separate channels, fan-control, core monitoring of dry transformers
MSR220SEL	S24	4 x 1...6	3x1 CO, 1 NO	x	4 separate channels, timing-relay, fan-control, monitoring of dry transformers
TS1000	V8	3 x 1...6	3x1 CO, 6x1 NO	-	protection of dry transformers with integrated monitoring of fan-motors
MS-Tester	K	-	-	-	device for testing PTC-relays

## Function



The electronics monitors the sensor-circuit with a continuous current. In the cold state the resistance is  $<250 \Omega$  per sensor and the relay signals o.k. The resistance of the sensors rise rapidly when reaching nominal response temperature (NRT). The relay switches at values

between  $1650 \Omega$ ...  $4000 \Omega$ . The relay switches back at values  $\leq 1650 \Omega$ .

PTC-relays type MS switch back automatically. PTC-relays type MSR store the switching until a RESET (integrated reset-button, external reset with contact at terminal or switch-off of power-supply). PTC-relays type MSM have a power-fail proof reclosing lock.

## Application

PTC-relays in combination with PTC-resistors also effectively monitor the temperatures of

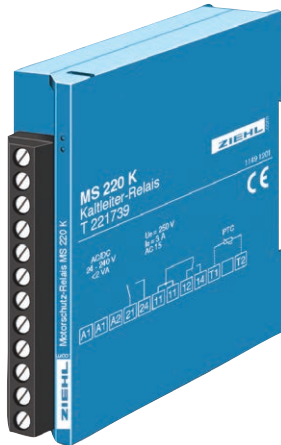
- bearings in equipment and machinery
- coolants, i.e. in transformers
- airflows and gases
- oil and other liquid media

PTC-resistor sensors are suitable for the installation into windings of electrical machines. They protect against to high temperatures in case of: blocking rotors, hard start, countercurrent operation, undervoltage and phase failure, with increased ambient temperature and hindered cooling.

# PTC-Resistor-Relay Type MS(R)220K

## Single PTC-Circuit

### MS220K



The MS220K is a particularly economical standard design in a 22,5 mm wide housing with vertically arranged terminals. Each terminal remains accessible even if all others are already occupied.

- 1 PTC resistor set 1... 6 PTC resistors
- output relay with 1 or 2 change-over (co) contacts
- 2 LEDs for ON and ALARM
- K-type housing, vertically arranged terminals, 22,5 mm wide

- assembly on 35 mm DIN rail or with 2 screws M4 (option)
- UL Recognized Component
- Option:
  - other supply-voltages

Order-numbers: 1 CO                    2 COs  
 AC 220-240 V    **T221745**                    **T221765**  
 AC/DC 24 V     **T221741**                    **T221761**  
                          1 CO / 1 NO  
 AC/DC 24-240 V **T221739**  
 (without cURus)



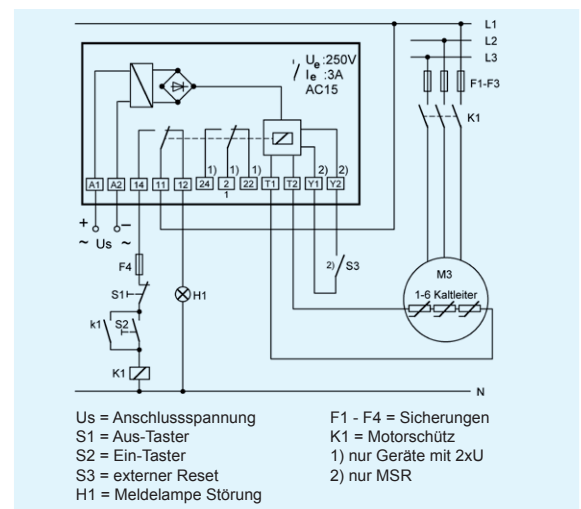
### MSR220K



Same execution as MS220K, additionally with electronic reclosing lock. A switching is stored until a RESET.

- electronic reclosing lock (disconnectable)
- integrated RESET-button
- link for external RESET
- automatic RESET at voltage recovery
- LEDs for power ON (green) and alarm (red) in reset-button
- UL Recognized Component
- Option:
  - othersupply-voltages

Order-numbers: 2 COs  
 AC 220-240 V    **T221775**  
 AC/DC 24 V     **T221771**



### Technical Data

Rated supply voltage Us

AC 220 - 240 V,  $\pm 10\%$ , 50/60 Hz,  $\leq 2$  VA  
 AC/DC 24 V, AC  $\pm 10\%$  DC 21-30 V  $< 2$  VA,  
 without potential separation  
 AC/DC 24-240 V, AC 14-264 V, DC 20-297 V  $< 2$  VA  
 1... 6 PTC according to DIN 44 081 or 44 082  
 $< 4000 \Omega$   
 1 or 2 change-over contacts (co)  
 type 2 (see "general technical informations")  
 see "general technical informations"  
 $-20...+55^\circ\text{C}$

connectable PTC resistors

switching point

output relay

type of contact

test conditions

rated ambient temperature

range

dimensions (h x w x d) attachment

protection housing / terminals weight

design K: 75 x 22.5 x 110 [ mm ]  
 on 35 mm DIN rail according to DIN EN 50 022  
 or with screws M4 (option)  
 IP 30 / IP 20  
 approx. 150 g

# PTC-Resistor-Relay Type MS(R)220KA

## Single PTC-Circuit, ATEX-Approval according to Directive 94/9/EC

### MS220KA



PTC-relay for the application as a protection device against inadmissible heating up at electrical equipment in areas with explosive gases (zones 1 and 2) and areas with combustible dust (21 and 22), e.g. for direct temperature-monitoring of explosion-proof motors EEx e and EEx d.

Vertically arranged terminals. Each terminal remains accessible even if all others are already occupied.

- ATEX-approval according to directive 94/9/EC
- SIL 1 according to IEC 61508
- PL c according to ISO 13849

- 1 PTC-resistor (thermistor) set, each 1...6 PTC-sensors
- short-circuit monitoring of sensor-circuit
- output-relay with 1 or 2 change-over contacts (co)
- 2 LEDs for ON and ALARM
- K-kousing, vertically arranged terminals housing 22.5 mm wide
- assembly on DIN-rail or with 2 screws M4 (option)
- UL Recognized Component
- Option:
  - other supply-voltages

Order-numbers: 1 change-over 2 change-over  
 AC 220-240 V **T222445** **T222455**  
 AC/DC 24 V **T222451**



II (2) G [Ex e] [Ex d] [Ex px]  
 II (2) D [Ex t] [Ex p]



### MSR220KA



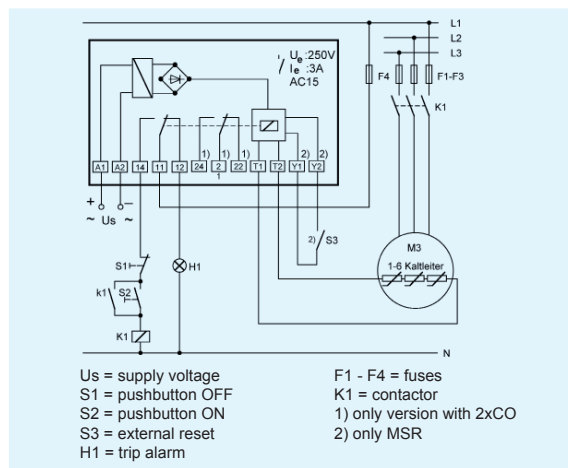
Same execution as MS220KA, additionally with electronic reclosing lock. An alarm is stored until a reset is made.

- ATEX-approval according to directive 94/9/EC
- SIL 1 according to IEC 61508
- PL c according to ISO 13849
- electronic reclosing lock (disconnectable)
- integrated RESET-button
- link for external reset
- automatic reset at voltage recovery
- LEDs for power-on (green) and alarm (red) in reset-button
- UL Recognized Component
- Option:
  - other supply-voltages

Order-numbers: 1 change-over 2 change-over  
 AC 220-240 V **T222465** **T222475**  
 AC/DC 24 V **T222471**  
 AC 110-120 V **T222473**  
 AC 380-415 V (without cURus) **T222476**



II (2) G [Ex e] [Ex d] [Ex px]  
 II (2) D [Ex t] [Ex p]



### Technical Data

Rated supply-voltage  $U_s$

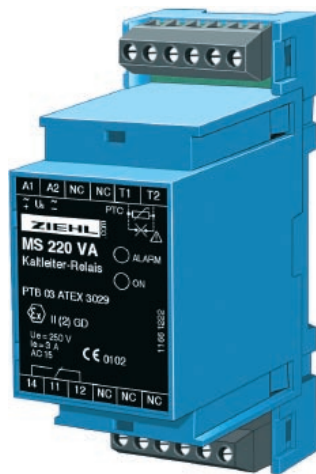
connectable PTC-resistors  
 switching point  
 output relay  
 type of contact  
 test conditions  
 rated ambient temperature  
 dimensions (h x w x d)  
 attachment  
 protection housing/terminals  
 weight

AC 220 - 240 V  $\pm 10\%$  50/60 Hz  $\leq 2$  VA  
 AC/DC 24 V, AC  $\pm 10\%$  DC 21- 30 V  $< 2$  VA, without potential separation  
 1...6 in series according to DIN 44081 or 44082  $< 4000 \Omega$   
 1 or 2 change-over contacts (co)  
 type 2 (see "general technical informations")  
 see "general technical informations"  
 -20...+55 °C  
 design K: 75 x 22,5 x 110 [mm]  
 on 35 mm DIN-rail or with 2 screws M4 (option)  
 IP 30 / IP 20  
 app. 150 g

# PTC-Resistor-Relay Type MS(R)220VA

## Single PTC-Circuit, ATEX-Approval according to Directive 94/9/EC

### MS220VA



PTC-relay for the application as a protection device against inadmissible heating up at electrical equipment in areas with explosive gases (zones 1 and 2) and areas with combustible dust (21 and 22), e.g. for direct temperature-monitoring of explosion-proof motors EEx e and EEx d.

This compact version is especially suitable for mounting in fuse-boxes or power-distribution panels.

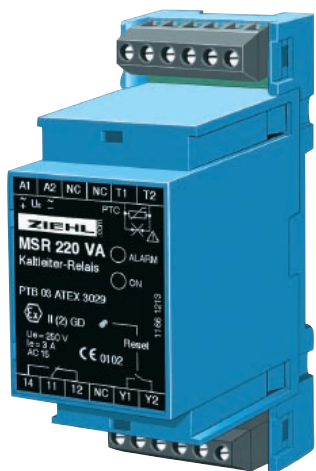
- ATEX-approval according to directive 94/9/EC
- 1 PTC-resistor (thermistor) set, each 1...6 PTC-sensors

- short-circuit monitoring of sensor-circuit
- output-relay with 1 change-over contact (co)
- 2 LEDs for ON and ALARM
- housing for mounting in fuse-boxes mounting height 55 mm, 35 mm wide
- assembly on DIN-rail or with 2 screws M4
- Option:
  - other supply-voltages

Order-number:  
AC 220-240 V **T222115**

**Ex II (2) GD**

### MSR220VA

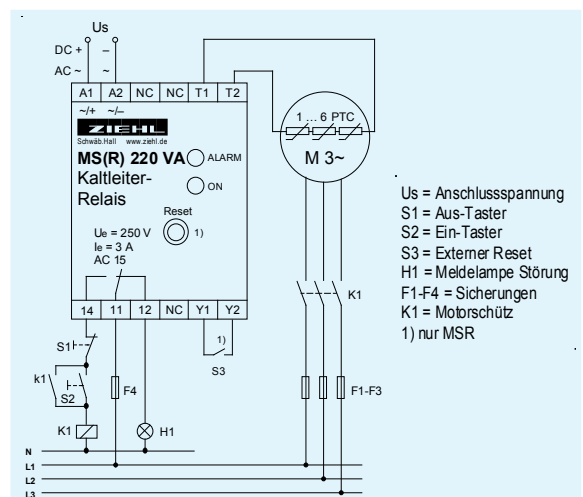


Same execution as MS220VA, additionally with electronic reclosing lock. An alarm is stored until a reset is made.

- ATEX-approval according to directive 94/9/EC
- electronic reclosing lock (disconnectable)
- integrated RESET-button
- link for external reset
- automatic reset at voltage recovery
- Option:
  - other supply-voltages

Order-numbers:  
AC 220-240 V **T222135**  
AC/DC 24 V **T222131**

**Ex II (2) GD**



### Technical Data

Rated supply-voltage  $U_s$

connectable PTC-resistors  
switching point  
output relay  
type of contact  
test conditions  
rated ambient temperature  
dimensions (h x w x d)  
attachment  
protection housing/terminals  
weight

AC 220 - 240 V  $\pm 10\%$  50/60 Hz  $\leq 2$  VA  
AC/DC 24 V, AC  $\pm 10\%$  DC 21- 30 V  $< 2$  VA, without potential separation  
1...6 in series according to DIN 44081 or 44082  
 $< 4000 \Omega$   
1 change-over contact (co)  
type 2 (see "general technical informations")  
see "general technical informations"  
-20...+55 °C  
design V2: 90 x 35 x 58 [mm]  
on 35 mm DIN-rail or with 2 screws M4  
IP 30 / IP 20  
app.. 120 g

# PTC-Resistor-Relay Type MS(R)220Vi

Atex-Approval according to Directive 94/9/EC

## MS220Vi



PTC-relay for the application as a protection device against inadmissible heating up at electrical equipment in areas with explosive gases (zones 0, 1 and 2) and in areas with combustible dust (zones 20, 21 and 22), e.g. for direct monitoring in explosion-protected areas where intrinsic safety class "i" is afforded.

PTC-Sensors (Thermistors) of intrinsic safety class "i" can be connected directly. The sensors may be placed in the potentially explosive atmosphere, e.g. for mechanical explosion-protection at bearings. The relay itself may not be installed in the potentially explosive atmospheres.

- ATEX-approval according to directive 94/9/EG
- Safety Integrity Level SIL 1
- 1 PTC-resistor set (thermistors), each 1...6 PTC
- Short-circuit monitoring of sensor-circuit
- Output-relay with 2 change-over contacts
- LEDs for ON and ALARM
- Housing for mounting in switchgear-cabinet, 70 mm wide, mounting height 55 mm
- Assembly on DIN-rail 35 mm or screws M4
- Option:  
other supply-voltages

Order-number:

AC 220-240 V      **T222185**

**Ex** II (1) GD [Ex ia] II C [Ex ia D]

## MSR220Vi



Same execution as MS220Vi, additionally with electronic reclosing lock. An alarm is stored until a reset is made.

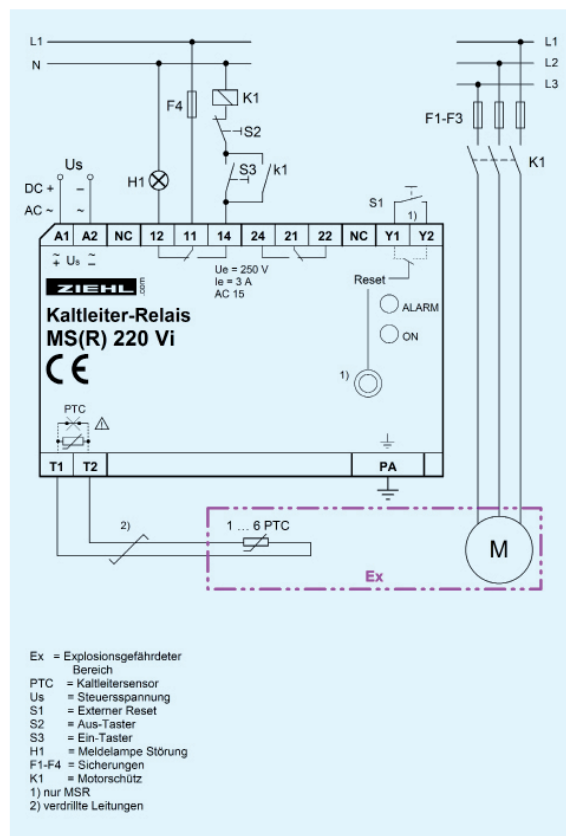
- ATEX-approval according to directive 94/9/EG
- Electronic reclosing lock (disconnectable)
- Integrated RESET-button
- Link for external reset
- Automatic reset at voltage recovery
- Option:  
other supply-voltages

Order-numbers:

AC 220-240 V      **T222195**

AC/DC 24 V      **T222191**

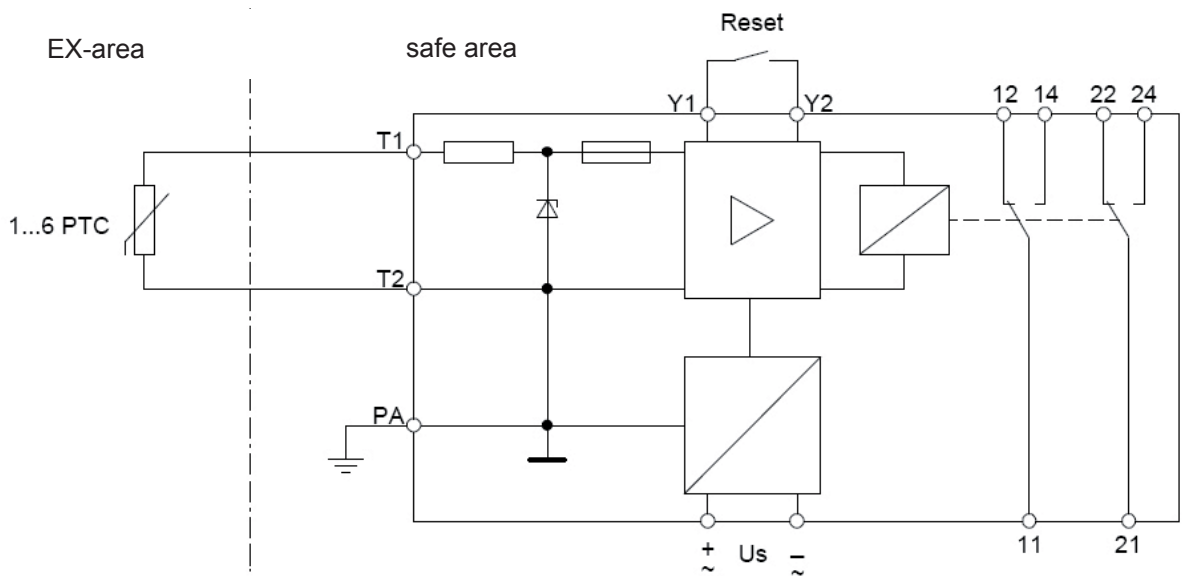
**Ex** II (1) GD [Ex ia] II C [Ex ia D]



Technical Data

Rated supply-voltage $U_s$	AC 220 - 240 V $\pm$ 10 % 50/60 Hz $\leq$ 2 VA AC/DC 24 V, AC $\pm$ 10 % DC 21- 30 V < 2 VA, without potential separation
Connectable PTC-resistors Switching point	1...6 in series according to DIN 44081 or 44082 < 4000 $\Omega$
Output relay Type of contact	2 change-over contacts (co) type 2, see "general technical informations"
Test conditions Rated ambient temp. range	see "general technical informations" -20...+60 °C
Dimensions (H x W x D) Attachment Protection housing/terminals Weight	Design V4: 90 x 70 x 58 mm, mounting height 55 mm on 35 mm rail according to EN 60 715 or screws M4 IP 30 / IP 20 app. 180 g

1



# PTC-Resistor-Relay Type MS220C

## Single PTC-Circuit

### MS220C



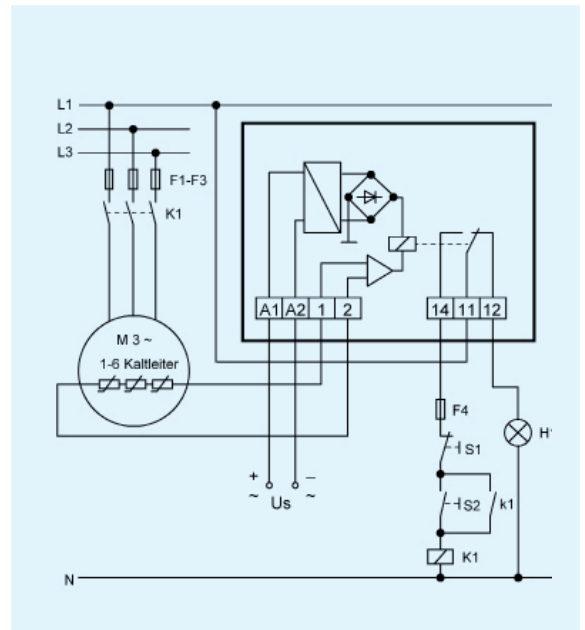
This compact device is the smallest version of all our PTC-resistor relays:

- terminals outside
- protection terminals IP 20
- Relays 1 change-over contact (co)
- GL-approval for version AC 220 - 240 V

Order-numbers:

without GL-approval:  
 AC/DC 24 V **T221830**  
 AC/DC 24 - 240 V **T221821**

with GL-approval:  
 AC 220 - 240 V **T221804**



### Technical Data

Rated supply voltage  $U_s$

AC 220-240 V  $\pm 10\%$ , 50/60 Hz, 2 VA  
 AC/DC 24 V, AC  $+10/-15\%$ , DC  $+25/-20\%$ ,  
 $< 1\text{ W}$ ,  $< 2\text{ VA}$ , without potential separation  
 AC/DC 24-240 V, AC 20-264 V, DC 20-297 V,  
 $< 1\text{ W}$ ,  $< 4\text{ VA}$

connectable PTC resistors  
 switching point

1... 6 PTC according to DIN 44 081 or 44 082  
 $< 4000\ \Omega$

output relay  
 type of contact

1 change-over contact (co)  
 type 2 (see "general technical informations")

test conditions  
 rated ambient temperature  
 range

see "general technical informations"  
 $-20\dots+55\text{ }^\circ\text{C}$

dimensions (h x w x d) attach-  
 ment

design C: 72 x 33 x 60 [ mm ]  
 on 35 mm of DIN rail according to EN 60 715  
 or with screws M4

protection housing / terminals  
 weight

IP 30 / IP 20  
 approx. 120 g

# PTC-Resistor-Relay Type MS(R)220K2

## 2 PTC-Circuits

### MS220K2



The MS220K2 monitors 2 PTC-resistor sets at the same time. If a temperature rise occurs in one set, the appropriate output relay releases.

With this relay, 2 PTC-sets can be independently monitored on only 22.5 mm space

- 2 PTC-resistor sets, each 1... 6 PTC resistors
- output relays 2 x 1 change-over contact (co)
- LEDs for operation and alarm

Order numbers:

AC/DC 24 V  
**AC 115 V**  
 AC 230 V

**T221923**  
**T221922**  
**T221925**



### MSR220K2



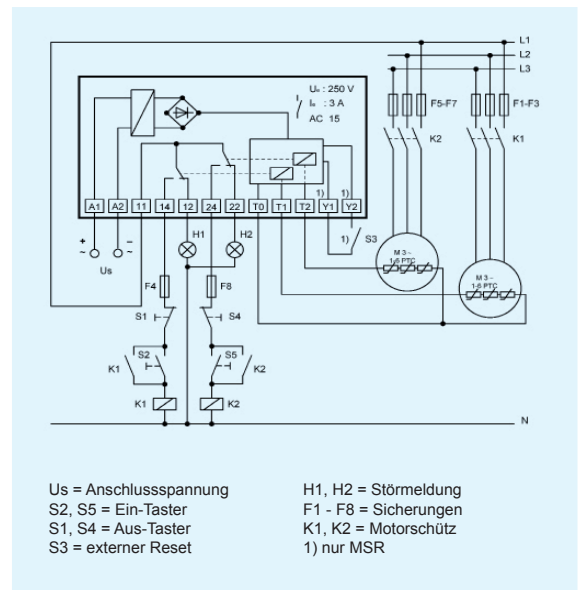
Same execution as MS220K 2, additionally with electronic reclosing lock:

- electronic reclosing lock (disconnectible)
- integrated RESET-button
- link for external RESET
- automatic RESET at voltage recovery

Order numbers:

AC/DC 24 V  
**AC 115 V**  
 AC 230 V

**T221943**  
**T221942**  
**T221945**



### Technical Data

Rated supply voltage Us

AC 230 V,  $\pm 10\%$ , 50/60 Hz,  $\leq 2$  VA  
 AC/DC 24 V, AC  $\pm 10\%$ , DC 21-30 V,  $< 2$  VA,  
 without potential separation  
 2 x 1... 6 PTC according to DIN 44 081 or 44 082  
 $< 4000 \Omega$   
 2 x 1 change-over contact (co)  
 type 2 (see "general technical informations")  
 see "general technical informations"  
 $-20...+55 \text{ }^\circ\text{C}$

connectable PTC resistors  
 switching point  
 output relays  
 type of contact  
 test conditions  
 rated ambient temperature  
 range

dimensions (h x w x d) attach-  
 ment

design K: 75 x 22.5 x 110 [ mm ]  
 on 35 mm DIN rail according to DIN EN 50 022  
 or with screws M4 (option)  
 IP 30 / IP 20  
 approx. 145 g

protection housing / terminals  
 weight



# PTC-Resistor-Relay Type MSR220K6

## 6 PTC-Circuits

### MSR220K6



The MSR220K6 monitors up to 6 PTC-resistor sets with up to 6 PTCs each at the same time. If a temperature rise occurs in one set, the output relay releases and LEDs show the overheated sensor.

Switching-off is stored until a Reset. Thus enables to find the overheated sensor even when it has cooled down.

With the MSR220K6 only 4 mm space is needed per monitored PTC-circuit.

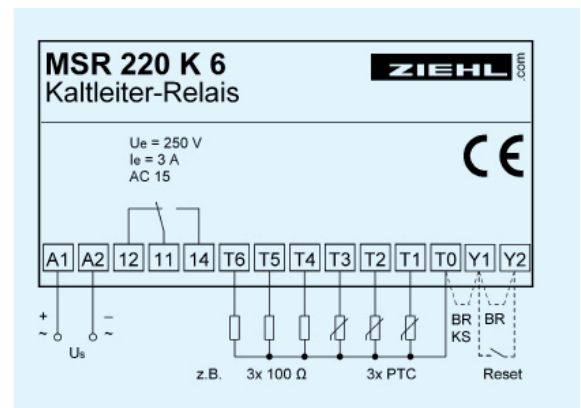
It is especially suitable for monitoring drives with multiple motors, like cranes or robots. Instead of the PTC-sensors also contacts (normally closed) can be connected.

- 6 PTC-resistor sets, each 1...6 PTC
- Monitoring of short-circuit of sensor
- Output relay 1 x change-over contact
- Electronic reclosing lock (disconnectable with bridge)
- Input for external RESET
- Automatic RESET at voltage recovery
- LED for power on (green)
- 6 LEDs for display of overheated sensor
- Universal supply voltage AC/DC 24-240 V

Order-number:

AC/DC 24-240 V

T221958



### Technical Data

Rated supply voltage  $U_s$

AC/DC 24-240 V, AC 19-264 V, DC 20-297 V, <2 VA

connectable PTC resistors  
switching point

6 x 1... 6 PTC according to DIN 44081 or 44082  
<4000Ω

output relay  
type of contact

change-over contact (co)  
type 2 (see "general technical informations")

test conditions  
rated ambient temperature-  
range

see "general technical informations")  
-20... +55 °C

dimensions (h x w x d) attach-  
ment

design K: 75 x 22,5 x 110 [ mm ]  
on 35 mm DIN rail according to DIN EN 50 022  
or with screws M4

protection housing / terminals  
weight

IP 30 / IP 20  
approx. 145 g

# PTC-Resistor-Relay Type MSR820V

## 8 PTC-Circuits

### MSR820V



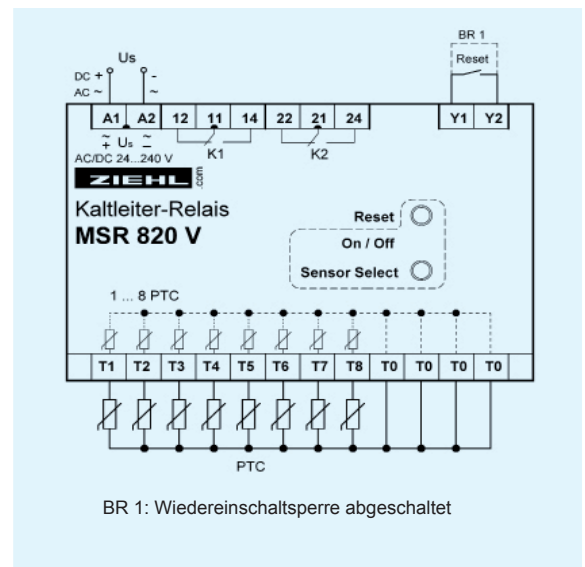
The MSR820V monitors up to 8 PTC-resistor-circuits at the same time. A common relay signals an alarm or an error in a sensor-circuit.

The inputs can be enabled or disabled during operation. The MSR820V can also be used as a fault annunciator for collective reports

- 1-8 PTC-circuits, each 1...6 PTC in series (max. cold-resistance 1500Ω/circuit)
- Easy activating/deactivating of PTC-circuits (display with LEDs)
- 2 potential-free relay-outputs, display of switching state with LEDs
- Display of state of PTC-circuits with 2 LEDs per circuit
- Electronic reclosing-lock (disconnectible with bridge Y1-Y2)
- monitoring of contacts for collective fault-reports

- Programmable functions:
  - Monitoring of short-circuit of PTCs (off / on)
  - External Reset as normally closed (nc) or open (no) contact (Y1, Y2)
  - Power-fail-safe reclosing lock (off / on)
  - Function of relay
    - K1 and K2 closed-current mode
    - K1 and K2 operating-current mode
    - K1 closed- and K2 operating-current-mode
- Universal supply-voltage AC/DC 24 – 240 V
- Mounting on DIN-rail 35mm EN 60715 or wall-mount (Option)
- Mounting height 55 mm

Order-number: **T221709**



### Technical Data

Rated supply-voltage $U_s$	AC/DC 24-240 V 0/50/60 Hz + 25/-20 %, <1W, <3VA DC 20,4 - 297 V AC 20 - 264 V
Connectable PTC-resistors Switching Point	8 x 1...6 pieces according to DIN 44081/82 3,3 kΩ...4 kΩ typical 3,65 kΩ
Output Relay Type of contact	2 x 1 change-over contact (CO) AgSnO <sub>2</sub>
Testing Conditions Rated ambient Temperature range	see "general technical informations" -20...+55 °C
Dimensions H x W x D Attachment	Design V4: 90 x 70 x 58 mm, mounting height 55 mm on rail NS 35 mm according to EN 60 715 or with screws M4 (option)
Protection Housing / Terminals Weight	IP 30 / IP 20 app. 180 g

# PTC-Resistor-Relay Type MSM220K

## Lock Power-Fail Proof

MSM220K



The reclosing-lock of the PTC-resistor relay MSM220K is power-fail proof. Thus a tripping is being stored also over a loss of voltage.

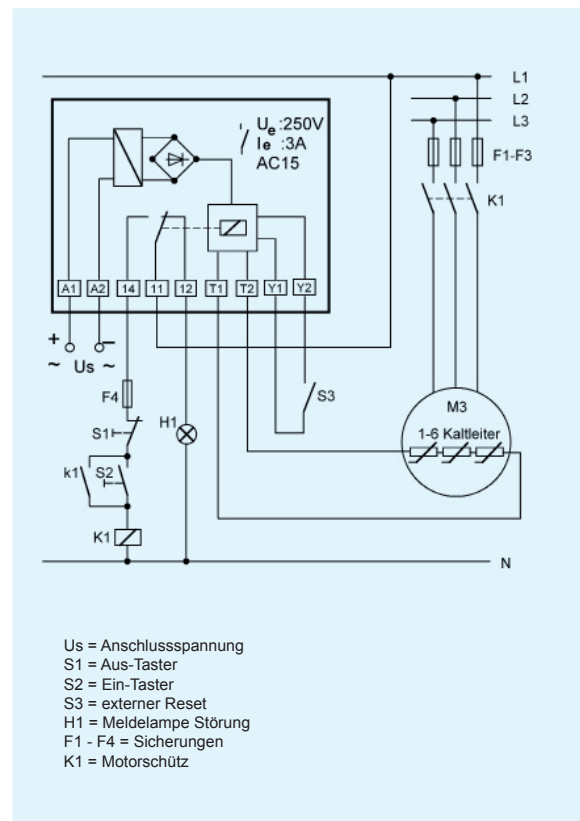
The integrated TEST-button enables a simple test of the device and the connected system.

- 1 PTC resistor set 1... 6 PTC resistors
- output relay with 1 change-over contact (co)
- power-fail proof reclosing lock (disconnectible)
- integrated RESET-button
- link for external RESET
- integrated TEST-button
- LEDs for operation and alarm
- K-type housing, vertically arranged terminals, 22,5 mm wide
- assembly on 35 mm DIN rail or with 2 screws M4 (option)

Order number:

AC 230/ 240 V

**T221947**



## Technical Data

Control voltage  $U_s$

AC 230 - 240 V  $\pm$  10 % 50/60 Hz, 2 VA

connectable PTC resistors  
 switching point  
 output relay  
 type of contact  
 test conditions  
 rated ambient temperature range  
 dimensions (h x w x d)  
 attachment

1... 6 PTC according to DIN 44 081 or 44 082  
 $< 4000 \Omega$   
 1 change-over contact (co)  
 type 2 (see "general technical informations")  
 see "general technical informations"  
 $-20... +55 \text{ }^\circ\text{C}$

protection housing / terminals  
 weight

design K: 75 x 22.5 x 110 [ mm ]  
 on 35 mm DIN rail according to DIN EN 50 022  
 or with screws M4 (option)  
 IP 30 / IP 20  
 approx. 145 g

# PTC-Resistor-Relay Type MS40ZT

## for Elevators

### MS40ZT



The PTC-resistor relay MS40ZT monitors particularly engines at elevator cars and lifts.

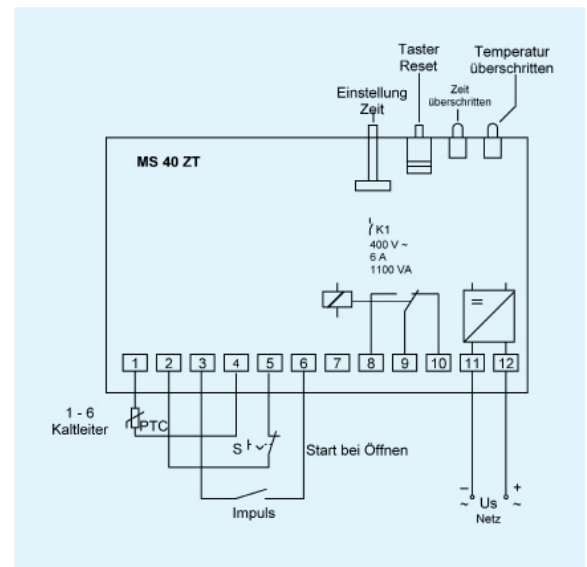
A pulse input monitors the movement of the elevator car as long as the motor is switched on.

- watchdog timing adjustable 5 - 50 s.
- temperature monitoring with PTC-resistor
- integrated RESET-button
- LED for temperatur alarm
- LED for watchdog alarm

At elevator systems the temperature of the motor and the travelling motion have to be monitored. With the car at rest and contact between terminals 2 and 5 closed, the integrated relay picks up (terminals 8, 9 connected). The time monitoring starts with the opening of the contact between terminals 2 and 5. Then the pulse input between terminals 3 and 6 must continuously open and close during travelling motion. When the pulse stops or the nominal

response temperature of the PTC-resistor is exceeded, the relay releases. Each disconnection is locked. A restart by pressing the RESET-button is only possible with closed contact between terminals 2 and 5 and low-resistive sensor.

Order number:  
AC 220 - 240 V **T221120**



### Technical Data

Rated supply voltage  $U_s$   
connectable PTC resistors  
switching point  
output relay  
type of contact  
test conditions  
rated ambient temperature  
range  
dimensions (h x w x d) attachment

protection housing / terminals  
weight

AC 220 - 240 V  $\pm 10\%$ , 50/60 Hz, 3VA  
1... 6 PTC according to DIN 44 081 or 44 082  
< 4000  $\Omega$   
1 change-over contact (co)  
type 2 (see "general technical informations")  
see "general technical informations"  
-20... +55  $^{\circ}\text{C}$

design S 12: 82 x 42 x 121 [ mm ]  
on 35 mm DIN rail according to DIN EN 50 022  
or with screws M4  
IP 30 / IP 20  
approx. 280 g

# PTC-resistor relay type MSF220K

## for Dry-Transformers, 2 PTC-Circuits

### MSF220K



Low Cost execution for the monitoring of dry transformers.

Alarm 1 with relay in closed-circuit current mode for preliminary warning, releases at over-temperature at PTC-set 1 and serves at the same time as functional monitoring.

Alarm 2 in operating current mode. Thus no wiping signal occurs when switching on the supply voltage on.

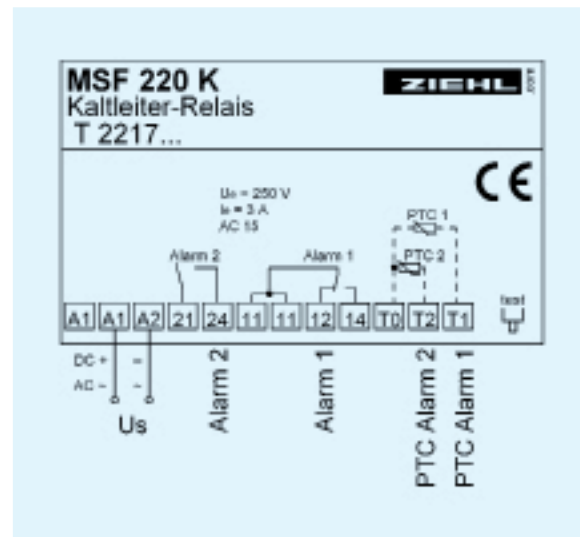
Additional terminals enable comfortable wiring from supply voltage to relays K1 and/or K2.

- 2-PTC resistor sets
- 2 output relays 1 change-over contact (co) / 1 normally open contact (no)
- TEST-button, for alarm 1 and 2 power on green LED
- red LEDs for alarm 1 and 2
- K-type housing, vertically arranged terminals, 22,5 mm wide  
for attachment on DIN rail 35 mm or with 2 screws M4

Order numbers:

AC 230 - 240 V  
AC/DC 24 - 240 V

**T221716**  
**T221715**



### Technical Data

Rated supply voltage  $U_s$

AC 220 - 240 V  $\pm 10\%$ , 50/60 Hz,  $\leq 2$  VA  
AC/DC 24-240 V, AC 19 - 264 V, DC 20 - 297 V  $< 2$ VA  
2 x 1... 6 PTC according to DIN 44081 or 44082  
 $< 4000 \Omega$

connectable PTC resistors  
switching point  
output relays

1 change-over contact (co), 1 normally-open contact (no)

type of contact  
test conditions  
rated ambient temperature range  
dimensions (h x w x d) attachment

type 2 (see "general technical informations")  
see "general technical informations"  
 $-20 \dots +55 \text{ }^\circ\text{C}$

protection housing / terminals  
weight

design K: 75 x 22.5 x 110 [ mm ]  
on 35 mm DIN rail according to DIN EN 50 022  
or with screws M4

IP 30 / IP 20  
approx. 110 g

# PTC-Resistor-Relay Type MSF220SE

## for Dry-Transformers, 2 PTC-Circuits

### MSF220SE



The MSF220SE is a 2-channel PTC resistorrelay. It is used favourably wherever an alarm has to be suppressed for a short period when applying the supply voltage.

- 2 PTC resistor sets
- 2 output-relays with change-over contacts (co)
- integrated timing-relay K3 to suppress an alarm-impulse when switching on supply voltage
- ALARM 1, i.e. for preliminary alarm
- ALARM 2, i.e. for switching off
- power on green LED
- ALARM 1 yellow LED
- ALARM 2 red LED
- Test-button for testing of relays K1/K2
- time-delayed signal (2-4s) of K3 available at terminal 1 for external use

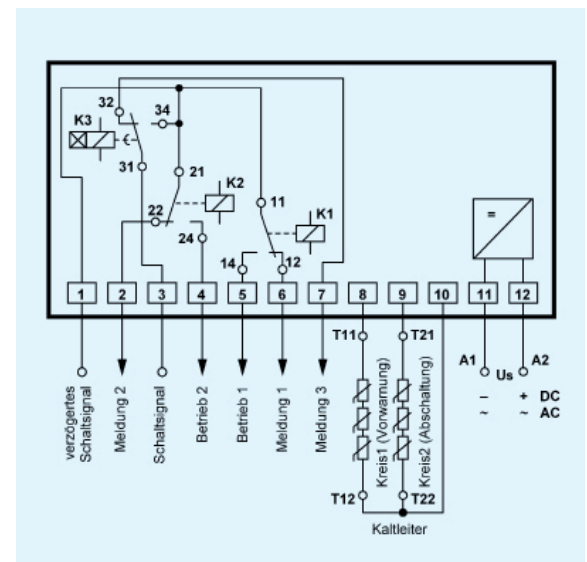
Thanks to the delayed switching-on of relay K3, the MSF 220 SE is especially suitable in applications, where an auxiliary voltage is not available and the secondary

voltage of the monitored transformer is being used as supply voltage.

As a consequence of this feature, there will be no alarm case of failure of supply voltage. We recommend therefore the monitoring of the function of K3 at terminals 1 or 7.

Order numbers:

AC/DC 90 - 240 V **T221697**  
AC/DC 24 - 240 V **T221696**



### Technical Data

Rated supply voltage  $U_s$

connectable PTC resistors

switching point

output relays

type of contact

test conditions

rated ambient temperature

range

dimensions (h x w x d) attachment

protection housing / terminals weight

AC/DC 90-240 V, AC 80-264 V, DC 80-297 V, < 2 VA  
AC/DC 24-240 V, AC 20-264 V, DC 21-297 V, < 2 VA  
2 x 1... 6 PTC according to DIN 44 081 or 44 082  
< 4000  $\Omega$

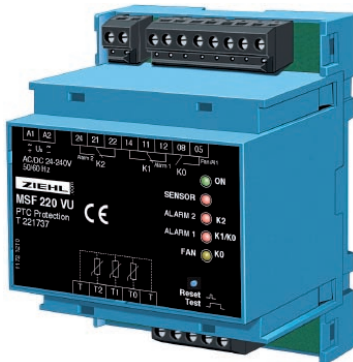
2 x 1 change-over contacts (co)  
type 2 (see "general technical informations")  
see "general technical informations"  
-20... +55 °C

design S 12: 82 x 42 x 121 [ mm ]  
on 35 mm DIN rail according to DIN EN 50 022  
or with screws M4  
IP 40 / IP 20  
approx. 290 g

# PTC-Resistor-Relay Type MSF220V/VU

## for Dry-Transformers, 3 PTC-Circuits

MSF220V/  
MSF220VU



The MSF220V is particularly suitable for the temperature monitoring at dry transformers.

3 PTC-circuits with different nominal response temperatures (NRT) can be connected to this unit, one for controlling an fan (forced cooling) and two for alarms.

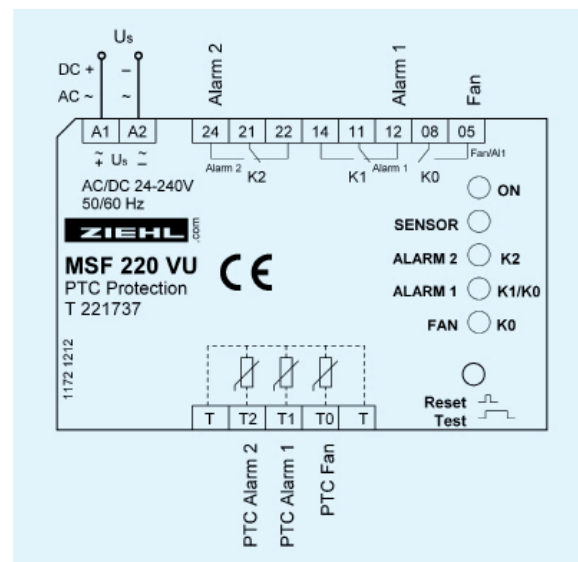
Each PTC-circuit is monitored for break and short circuit. This reduces the probability of false alarms.

- 3 PTC-circuits
- MSF220VU for universal supply voltage AC/DC 24-240 V
- intelligent control of fan (relay K0, 1 normally-open contact)
- ALARM 1 in closed-circuit current mode (relay K1, 1 change-over contact) for pre-alarm. Signals also error in any sensor and interruption of supply voltage.
- ALARM 2 in operation current mode (relay K2, 1 change-over contact). No signal when switching on and off the supply voltage.
- all output relays potentially separated from each other.
- monitoring of sensor lines
- TEST-button (stop possible before ALARM 2)
- simple testing with disconnectable monitoring of break and

- short-circuit (for 10 minutes)
- LEDs for ON, sensor error, Fan, ALARM 1 and ALARM 2
- plug-in terminals
- housing for mounting on DIN-rail or wall-mount
- mounting height 55 mm
- 
- 

Order numbers:

MSF220V	AC 230/240 V	<b>T221738</b>
MSF220VU	AC/DC 24-240 V	<b>T221737</b>



### Technical Data

Rated supply voltage  $U_s$

connectable PTC resistors  
switching point  
output relays  
type of contact  
test conditions  
rated ambient temperature  
range  
dimensions (h x w x d) attach-  
ment

protection housing / terminals  
weight

AC 220 - 240 V  $\pm 10\%$ , 50/60 Hz,  $\leq 3$  VA

AC/DC 24 - 240 V  $\pm 15\%$ ,  $< 3$  VA

3 x 1... 6 PTC according to DIN 44 081 or 44 082  
 $< 4000 \Omega$

2 x 1 change-over contacts, 1 normally-open contact  
type 2 (see "general technical informations")  
see "general technical informations"  
-20... +55 °C

design V 4: 90 x 70 x 58 [ mm ]

on 35 mm DIN rail according to DIN EN 50 022  
or with screws M4

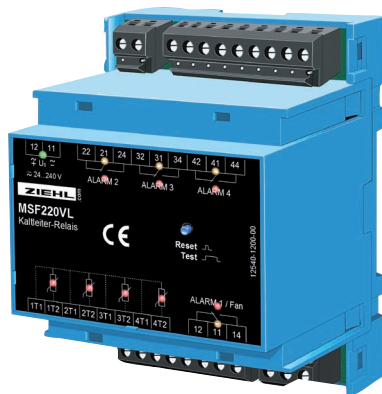
IP 30 / IP 20

approx. 320 g

# PTC-Resistor-Relay Type MSF220VL

## für Dry-Transformers, Fan, Warning, Trip Winding and Trip Core

### MSF220VL



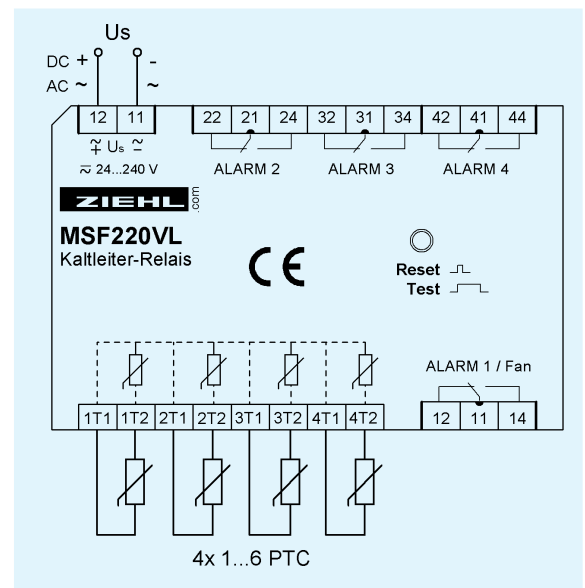
The MSF220VL is particularly suitable for monitoring of temperatures at dry transformers, when also the temperature of the core shall be measured. An intelligent control prolongs automatically the runtime of a cooling-fan, depending on the load of the transformer. Each PTC-circuit is monitored for break and short circuit. This reduces probability of false alarms. Relays in operating-current mode prevent from a trip-signal when switching on supply voltage.

The device can be adapted to different applications with 4 programs:

- 1.) Fan-control - alarm - trip (winding) - trip (core)
- 2.) Alarm - trip (winding) - trip (core) - alarm (fault)
- 3.) Fan-control - alarm - trip (winding) - alarm (fault)
- 4.) Fan-control with hysteresis T1/T2 - alarm - trip (winding)

- 4 inputs for PTC
- Intelligent control of fan
- Automatic fan-test 1x / week
- Monitoring of sensors
- Test-button
- Simple testing with disconnectable monitoring of break and short circuit (for 10 minutes)
- LEDs for alarms, states of relays and sensors
- Housing for mounion on DIN-Rail or wall-mount
- (option)
- Mounting height 55 mm
- Universal supply voltage AC/DC 24-240 V

Order-number T221674



### Technical Data

Rated supply voltage  $U_s$

AC/DC 24 - 240 V  $\pm$  15 %, < 3 VA

connectable PTC resistors

4 x 1... 6 PTC according to DIN 44 081 or 44 082

switching point

< 4000  $\Omega$

output relays

4 x 1 change-over contacts

type of contact

type 2 (see "general technical informations")

test conditions

see "general technical informations"

rated ambient temperature

-20... +55  $^{\circ}$ C

range

dimensions (h x w x d) attach-

design V 4: 90 x 70 x 58 [ mm ]

ment

on 35 mm DIN rail according to DIN EN 50 022

or with screws M4

protection housing / terminals

IP 30 / IP 20

weight

approx. 250 g



# PTC-resistor relay type MSR220SEL

## for Dry-Transformers, 4 PTC-Circuits

### MSR220SEL



The MSR220SEL is a PTC-resistor relay for the monitoring of up to 4 PTC resistor sets. It is used favourably, where the simultaneous monitoring of 2 ALARMS and the controlling offforced cooling are required. It is suitable also for the application in systems, in which an error message must be suppressed in the moment of switching on supply voltage, e.g. because supply voltage is supplied by the monitored transformer.

The MSR220SEL is especially suitable for the monitoring of cast resin dry-type transformers. The switching points of the integrated ventilator control are determined by the nominal response temperatures (NRT) of the connected PTC resistor sets. This and the insertable automatic delay for the fan enable a better utilization of the transformer.

The monitoring of the sensors on short-circuit and break as well as the simultaneous digital and analog evaluation of the sensor for ALARM 3 minimize false alarms.

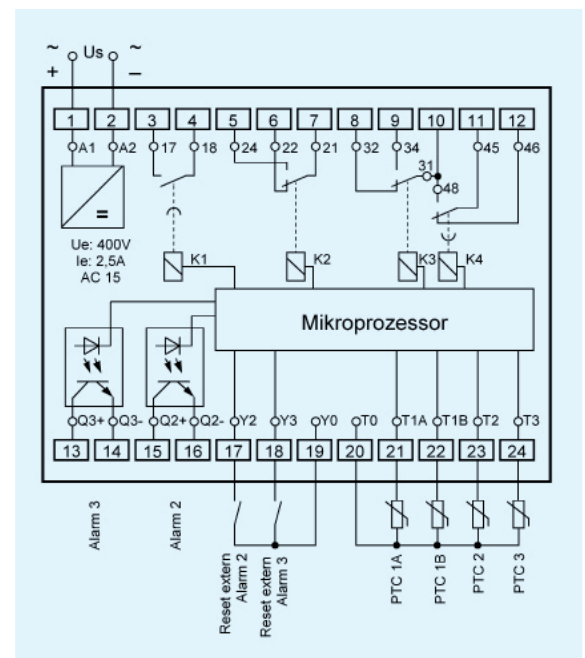
Test-buttons simplify the check of the device and the connected equipment.

- 2 PTC-resistor sets for ventilation control (ALARM 1), e.g. ON at 90 °C, OFF at 80 °C,
- optional operation with only one PTC resistor set
- delay ventilation 20 min. insertable

- automatic test of fan 1x/week
- TEST-buttons for ALARM 1 and ALARM 2 (3 seconds at the same time pressed for ALARM 3)
- ALARM 2, e.g. for preliminary warning
- ALARM 3 analog and digital evaluation, minimizing risk for false alarms
- electronic reclosing-lock for ALARM 2 and 3 (disconnectible), RESET-button integrated
- integrated time delay relay for suppressing of error signals when switching on and off
- open collector outputs (max. DC 60 V/40 mA) for ALARM 2 and 3 for message to a PLC
- sensor monitoring for short-circuit and line break, release of ALARM 2 in case of error
- LED displays for ON, ALARM 1, 2 and 3 and sensor error
- Universal Power Supply AC/DC 24-240 V

Order numbers:  
AC/DC 24-240 V

**T221672**



### Technical Data

Rated supply voltage  $U_s$   
connectable PTC resistors  
switching point  
output relays  
type of contact  
test conditions  
rated ambient temperature range  
dimensions (h x w x d) attachment

protection housing / terminals  
weight

AC/DC 24 - 240 V  $\pm 15\%$ ,  $\leq 3$  VA  
4 x 1...6 PTC according to DIN 44 081 or 44 082  
< 4000  $\Omega$   
3 x 1 change-over contact, 1 normally-open contact  
type 2 (see "general technical informations")  
see "general technical informations"  
-20...+55 °C

design S24: 82 x 120 x 121 [mm]  
on 35 mm DIN rail according to DIN EN 50 022  
or with screws M4  
IP 30 / IP 20  
approx. 500 g

# Transformer-Protection Trafosafe TS1000

## with integrated monitoring of Fans

### Trafosafe TS1000



The Trafosafe TS1000 is applied at transformers with forced cooling.

It monitors the temperature of the transformer with 3 sensor-circuits (PTC-thermistors), controls the forced cooling depending on the load of the transformer, reports exceeding of alarm-temperature and switches off the transformer (trip) when increasing of the temperature continues.

Up to 6 fans can be controlled and monitored directly with the TS1000. Contactors and motor protection switches are not necessary any more.

At Pt 100-monitored transformers the TS1000 can be used to control only the fans.

Temperature-Monitoring:

- 1 PTC-circuit for controlling the cooling (1T1/1T2) = input for starting fan when using as fan-control only.
- 2 x 1 PTC-circuit for alarm 1 (2T1/2T2) and alarm 2/trip (3T1/3T2), monitored for short-circuit and interruption Alarm 1 (K2) in closed-circuit current mode = monitoring of function
- Alarm 2/trip (K3) in open-circuit current mode = no signal/tripping when switching on the device
- Test-/Reset-button for testing the function

Fan-Control and Monitoring of Fan:

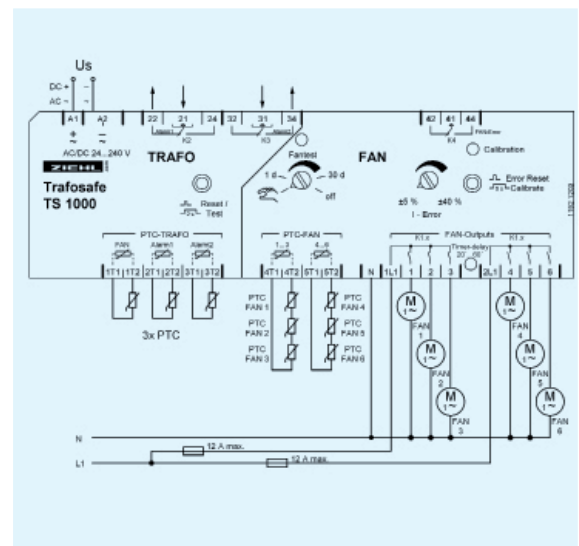
- direct connection of up to 6 fans
- automatic exceeding of the on-time of the fans at high load of the transformer
- Monitoring of failure fan (over-/undercurrent)
- Self-calibration of the monitored values of the currents to the fans
- Switching-point for current-failure adjustable  $\pm 5-40\%$
- automatic test of fans 1-30 days, disconnectable
- Relay for reporting fan-failure
- Clear displays with LEDs

General:

- Universal-power-supply AC/DC 24-240 V
- compact housing for cabinet-mount, 140 mm wide, mounting height 55 mm
- Attachment on 35 mm rail or with 3 screws M4

Order-number

**T221660**



### Technical Data

Supply voltage  $U_s$   
Steuerspannung 1L1, 2L1-N

Connectable PTC-circuits  
Switching point

Output relays K2, K3, K4  
Type of contact

Output relays 1-6  
Rated current of fans

Test conditions  
Rated ambient temp. range  
Dimensions (h x w x d)  
Attachment  
Protection housing / terminals  
Weight

AC/DC 24 - 240 V  $\pm 15\%$  0/50/60 Hz <3W <5 VA  
AC 90 - 240 V  $\pm 10\%$  50/60 Hz (<1 VA no load)

5 x 1...6 pcs according to DIN 44081 or 44082  
< 4000  $\Omega$

3 x 1 change-over contact (co)  
type 3 (see "general technical informations")

6 x 1 normally-open contact (no)  
max. 4 A

see "general technical informations"  
-20...+55 °C  
housing V8: 90x140x8 [mm], mounting height 55 mm  
on DIN-rail 35 mm or 3 screws M4  
IP 30 / IP 20  
app. 420 g

# MS-Tester

## for PTC-Relays Type MS

### MS-Tester



Simple PTC-relays can be easily tested by interrupting the sensor-line.

At PTC-relays with monitoring the sensor for short-circuit and break this is not possible.

With the ZIEHL MS-Tester these relays can also be tested easily for correct function.

#### Test:

- Turn off supply-voltage of the tested relay
- disconnect output-side if necessary
- connect MS-Tester (T/0, T/1 and/or T/2) to the sensor-inputs
- switch on PTC-relay
- increase resistance slowly by turning the potentiometer until the according alarm switches
- reduce resistance until the relay in the MS switches back or the LED signals ready for switching back
- If necessary, the accurate switching-points can be evaluated by measuring the resistances between the terminals T/0, T/1 and T/2 after disconnecting the MS. The values are typically 3000  $\Omega$  to 4000  $\Omega$  for tripping and >1500  $\Omega$  for switching back.
- Test break of sensor with button (only relays with monitoring of sensor-break)
- Test short-circuit of sensor with button (only relays with monitoring of sensor-short-circuit))
- **ATTENTION:** At MSF 220 V(U) short-circuit or break of any sensor or fast rising of resistance will lead to a report of an error = alarm 1.
- **TIP:** Cold PTC have a resistance of 20 ... 250  $\Omega$ , typically 50 ... 120  $\Omega$  per sensor.

The connection-cable (included) is cabled for the connection to a ZIEHL MSF220V(U), but other PTC-relays can be tested with the MS-Tester also.

Order-number: T221734

