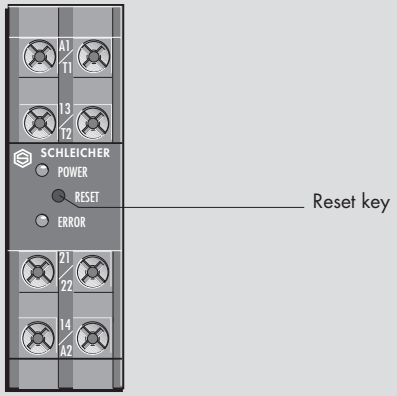
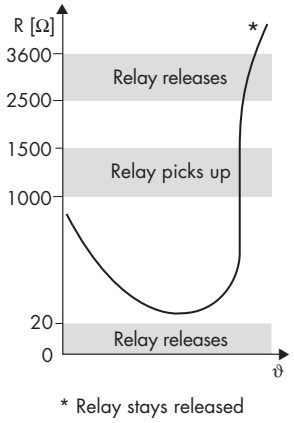
## Motor Protection Relays/Temperature Monitors For PTC Connection

**1 Monitoring Circuit for PTC-Thermistor acc. to DIN VDE 0660 Sec. 303**
**With or without Fault Memory**
**With Reset Key or Resetting through the Power Supply**
**Monitoring Rupture and Short Circuit of the Sensor Cables**
**Closed Circuit Principle**
**Number of Contacts: 1 NO, 1 NC**

### KMS 1001 KMS 1002



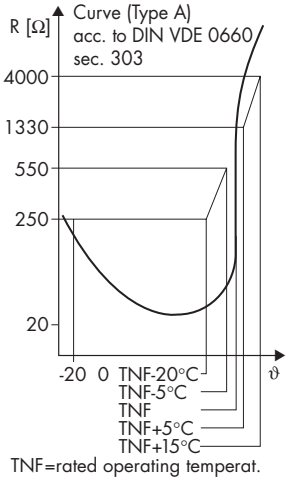

### Switching Ranges




* Relay stays released

### Resistance Curve

**PTC - Temperature Sensor**

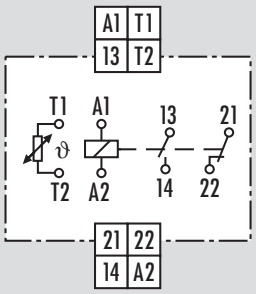



TNF=rated operating temperat.

### Connection Diagram

KS 0288/1

**KMS 1001, KMS 1002**




### For Example

- Motor protection by monitoring the temperature in the motor winding
  High winding temperature caused by:
  phase unbalance, phase fail, high-torque starting,
  high ambient temperature – insufficient cooling,
  over- or under voltage, high switching frequency
- Temperature monitoring of coolants in power transformers

### Function

**KMS 1001**

Following application of the supply voltage (A1/A2) and connection of the PTC thermistor (T1/T2) the built-in switching relay switches to the active position.
It operates according to the closed circuit principle and assures to switch back into its off-position for the following malfunctions:

- the PTC thermistor exceeds because of the increasing temperature a resistance value in the range ≥ 2500 Ω to ≤ 3600 Ω,
  (A decreasing temperature and a PTC resistance value in the range ≤ 1500 Ω to ≥ 1000 Ω causes the switching relay to be re-actuated)
- the sensor circuit falls below a resistance value ≤ 20 Ω in case of short circuit
- rupture of the cable
- power fail.

The fault is indicated by an illuminated red LED.
The fault is not stored.

**KMS 1002**

Its function corresponds to the one of the KMS 1001.
A fault memory prevents the output relay switching to its operating position following elimination of the fault.
The fault memory can be cleared by actuation of the reset key only if the fault has been eliminated.
The KMS 1002 is ready for another fault identification only if the fault memory has been cleared or the supply voltage has been switched off for a minimum of 250 ms.

### Sensor

PTC thermistor (temperature sensors) are resistances with very high positive resistance temperature coefficients. (PTC=positive temperature coefficient)
They are inserted in the air discharge side of the stator end winding of those motors which temperature diagram is known before manufacturing them.
Their rated operating temperature (TNF) depends on the motor type.
If the rated operating temperature is exceeded, the resistance value of the PTC temperature sensors increases abruptly. If the PTC is connected to a motor protection relay/temperature monitor the abrupt increase of the resistance value causes the relay to be switched.

### Approvals

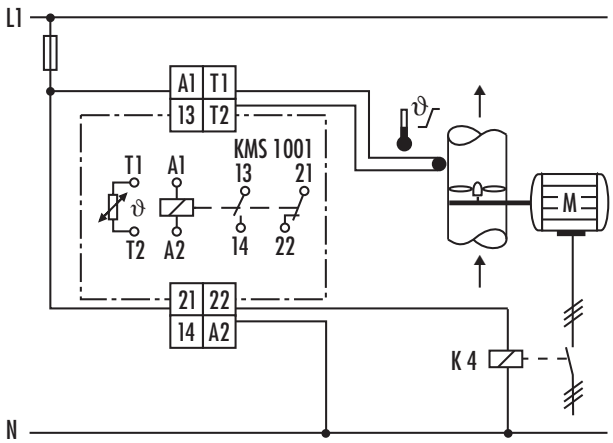
3

# KMS 1001 KMS 1002

## Application Diagram

A 1034

**Monitoring of the Outlet Air Temperature**

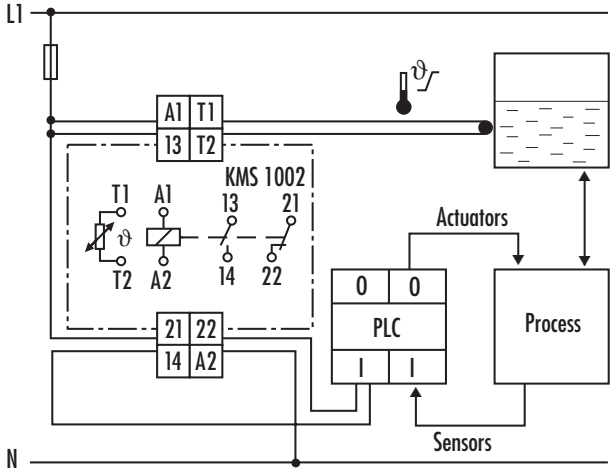



If the outlet air temperature exceeds the rated operating temperature, the KMS 1001 switches into the off-position.
A ventilating motor is started via K4.

## Application Diagram

A 1035

**Temperature Monitoring of Liquids**




If the rated operating temperature (TNF) is exceeded, the relay switches into the off-position.
The disturbance signal functions as input signal for the PLC to control the process.

## Order Example

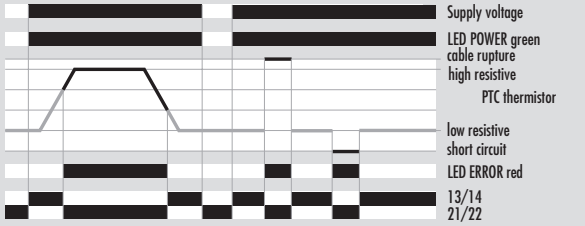
**KMS 1002** 230 V AC

Type — Rated Voltage

## Function Diagram

FD 0088 W1

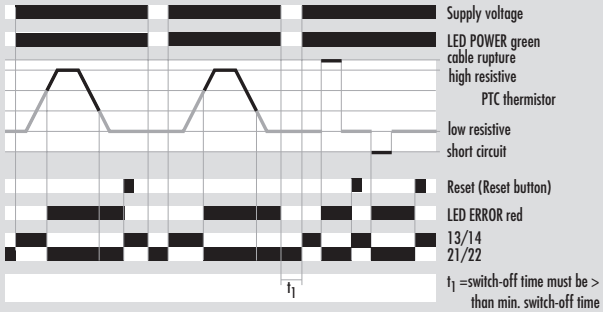
**KMS 1001**




## Function Diagram

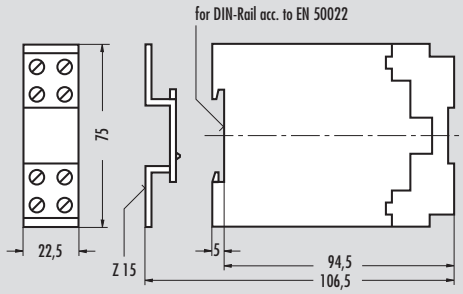
FD 0089 W1

**KMS 1002**



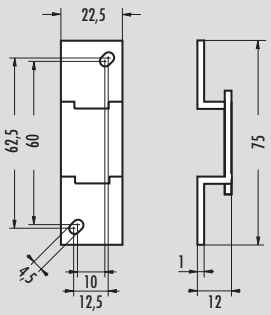

## Dimension Diagram

K 1-12




## Accessory

Adaptor Z 15



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## TECHNICAL DATA

| | | KMS 1001 | KMS 1002 |
|---|---|---|---|
| **FUNCTION** According to DIN VDE 0435 Sec.303:09.84 | | Motor Protection Relay ,Temperature Monitor for PTC Thermistor Connection acc. to DIN VDE 0660 S303:2.87 Closed Circuit Principle | Motor Protection Relay ,Temperature Monitor for PTC Thermistor Connection acc. to DIN VDE 0660 S303:2.87 Fault Memory, Reset Key, Reset through Supply Voltage Closed Circuit Principle |
| Function Display | | 1 LED green, 1 LED red | 1 LED green, 1 LED red |
| Function Diagram | | FD 0088 W1 | FD 0089 W1 |
| **POWER SUPPLY** | | | |
| Rated Voltage $U_N$ | V AC | **24 \| 42 \| 110 \| 127 \| 230** | **24 \| 42 \| 110 \| 127 \| 230** |
| Rated Consumption at 50 Hz and $U_N$ (AC) | VA | 2 \| 2 \| 2 \| 2 \| 2 | 2 \| 2 \| 2 \| 2 \| 2 |
| Rated Frequency | Hz | 50 to 60 | 50 to 60 |
| Operating Voltage Range | | 0,8 to 1,1 x $U_N$ | 0,8 to 1,1 x $U_N$ |
| **MEASURING CIRCUIT** | | | |
| Electrically Isolated | | yes | yes |
| Relay Releases | Ω | ≥ 2500 to ≤ 3600 with increasing sensor temperature | ≥ 2500 to ≤ 3600 with increasing sensor temperature |
| Relay Picks-up | Ω | ≤ 1500 to ≥ 1000 with falling sensor temperature | ≤ 1500 to ≥ 1000 with falling sensor temperature |
| Relay Releases | Ω | ≤ 20 with short circuit at the sensor line | ≤ 20 with short circuit at the sensor line |
| Sum of Cold Resistance of the Sensor | Ω | ≤ 1500 | ≤ 1500 |
| Voltage in Case of Rupture of the Sensor Cable | V DC | 10 | 10 |
| Current in Case of Short Circuit of the Sensor Cable | mA | 2,5 | 2,5 |
| Minimum Switch-Off Time | ms | – | – |
| **OUTPUT CIRCUIT** | | | |
| Contact Equipment | | 1 N. Closed, 1 N. Open | 1 N. Closed,1 N. Open |
| Contact Material | | Ag Cd O | Ag Cd O |
| Switching Voltage $U_n$ | V AC/DC | 230/115 | 230/115 |
| Maximum Rated Current $I_n$ per Contact | A | ≤ 5 | ≤ 5 |
| Application Category acc. to EN 60947–5–1:1991 | | AC–15: $U_e$ 230 V AC, $I_e$ 3 A<br>DC–13: $U_e$ 24 V DC, $I_e$ 2 A | AC–15: $U_e$ 230 V AC, $I_e$ 3 A<br>DC–13: $U_e$ 24 V DC, $I_e$ 2 A |
| Short-Circuit Protection,Max. Fuse Element Class gG | A | 6 | 6 |
| Permissible Switching Frequency | Switching Cycle/h | 3600 | 3600 |
| Mechanical Lifetime | Switching Cycles | $20 \times 10^6$ | $20 \times 10^6$ |
| Response Time | ms | < 20 | < 20 |
| Release Time | ms | < 20 | < 20 |
| **GENERAL DATA** | | | |
| Creepage and Clearance Distances Between Circuits | | | |
| According to DIN VDE 0110-1:04.97: Rated Withstand Voltage | kV | 4 | 4 |
| Over-Voltage Category | | III | III |
| Contamination Level | | 3 Outside,2 Inside | 3 Outside,2 Inside |
| Design Voltage | V | 250 | 250 |
| Test Voltage $U_{eff}$ 50 Hz acc. to DIN VDE 0110-1, Table A.1 | kV | 2,2 | 2,2 |
| Protection Class Housing/Terminals acc. to DIN VDE 0470 Sec. 1:11.92 | | IP 30/IP 20 | IP 30/IP 20 |
| Radiated Noise | | EN 50081–1:03.93, –2:03.94 | EN 50081–1:03.93, –2:03.94 |
| Noise Immunity | | EN 50082–2:1995 | EN 50082–2:1995 |
| Ambient Temperature, Working Range | °C | -20 to + 60 | -20 to + 60 |
| Dimension Diagram | | K 1 - 12 | K 1 - 12 |
| Connection Diagram | | KS 0288/1 | KS 0288/1 |
| Weight | kg | 0,17 | 0,17 |
| Approvals | | CSA | CSA |
| Accessories | | Adaptor Z 15 | Adaptor Z 15 |
| **GENERAL TECHNICAL SPECIFICATIONS** | | Page i.11 | Page i.11 |