

### Operating instructions for

## Motor temperature protection FIMO TA 03



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## 1. Switching of the temperature sensors

In the motor, there are several temperature sensors or temperature switches (KTY, PTC, Klixon). The following circuit diagram shows the arrangement of these sensors in the motor.

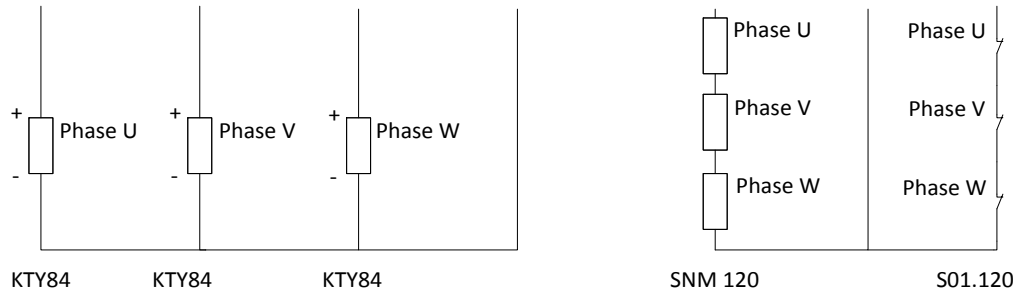


Figure 1 Circuit diagram of temperature sensors

## 2. Function

In order to monitor the temperature in a torque motor, temperature sensors are analysed. These are located directly in the motor windings. Depending on the type of construction, 1 to 3 temperature sensors can be used for temperature monitoring. Due to the linear characteristic curve which extends over a wide temperature range, KTY84-130 temperature sensors are used. The temperature sensor has no effect on the control of the TA device – the contact is only galvanically separated (see 4.2). The analogue output (0 – 10V) is scaled to a temperature range of 0 – 200°C. All 3 sensors are analysed for the thermal monitoring of the motor. Based on the highest temperature of the motor phases, a single KTY signal is generated. In this way, all 3 motor phases can be monitored at the same time with a single signal. The FIMO TA 03 can thus be used with motors having at least one KTY temperature sensor. All 3 inputs of the FIMO TA 03 have to be connected (wire break control). A 600 Ohm Resistor has to be connected to the inputs without a KTY connected. If no temperature sensor is connected, an error signal is sent.

### 3. Display

The status LED on the front side reports on the individual operating modes of the FIMO TA 03.

#### 3.1 Operational mode 1 (green LED)

- Normal mode
- The temperature in the motor is below 100°C

#### 3.2 Operational mode 2 (orange LED)

- Alarm mode
- The temperature threshold of the advance warning has been reached (see Section 4.2)
- If a temperature falls below 90°C, the LED switches again to green (Operational mode 1)
- Output warning (alarm) is set (make contact)

#### 3.3 Operational mode 3 (red LED)

- Error mode
- The maximum motor temperature is higher than the set switch-off temperature
- One or more KTY inputs are short circuited or non-functional
- As soon as the motor temperature falls below 90°C, the operational mode 1 is switched on (green LED)
- Output error (Error) is set (make contact)

#### 3.4 Operational mode 4 (LED does not light up)

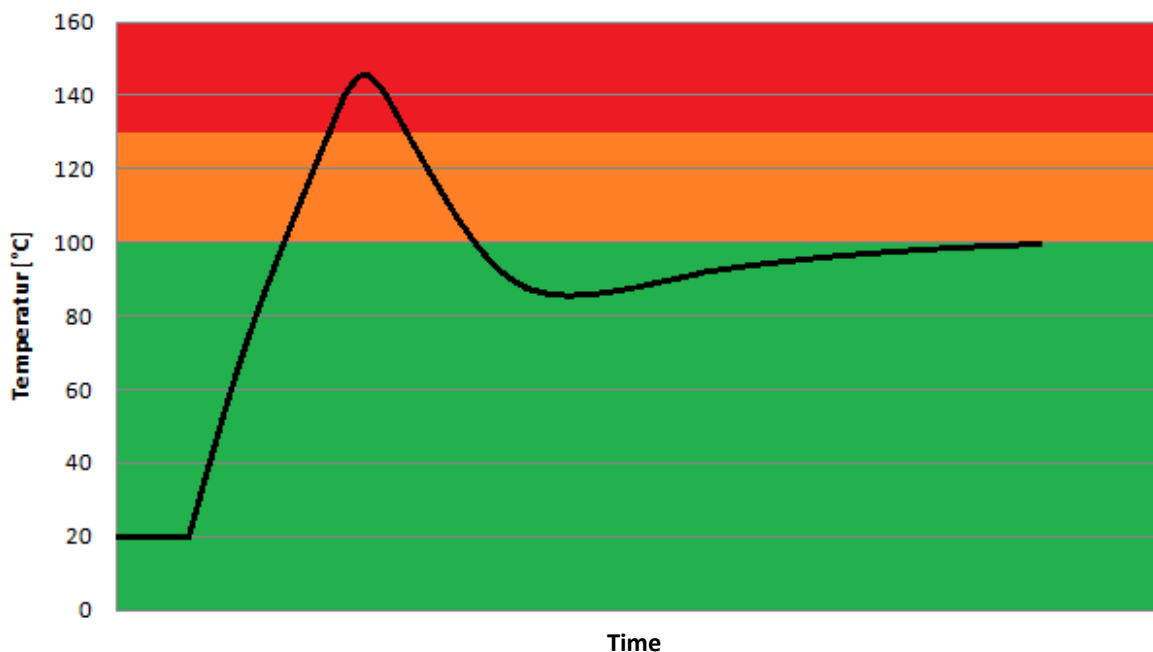
- FIMO TA 03 is out of order (possible disruption of power supply)
- A serious error has occurred
- The temperature increases exceeds the set maximum (see Section 4.2)
- If the power supply is not disrupted and the LED light is red, then please send the FIMO TA03 back to us

## 4. Specification

### 4.1 General parameters

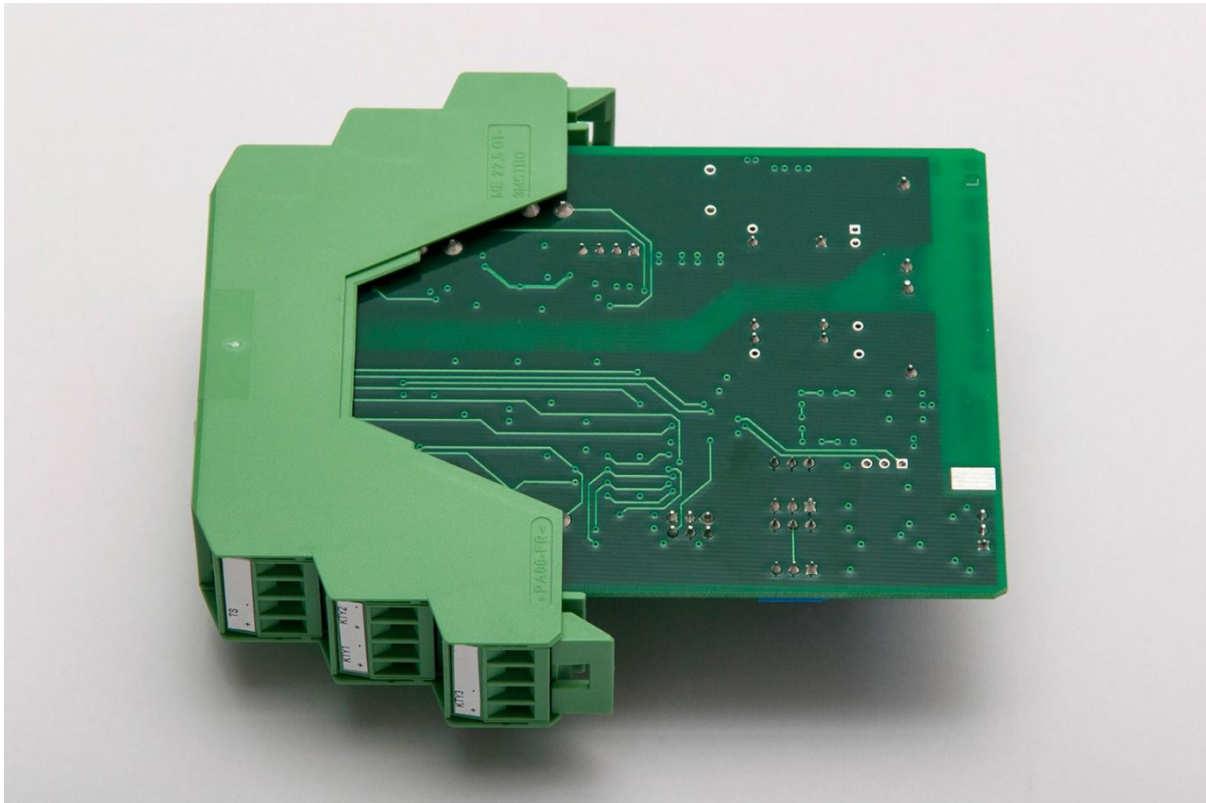
FIMO SPECIFICATION			
	Min.	Typical	Max.
Supply voltage	+18V DC	+24v DC	+30V DC
Supply current at +24V DC	-	-	100mA
Measuring current KTY output	0.5mA	1mA	5mA
Resistance accuracy KTY output at 1mA (0 - 150°C)	-	-	±2%
Relay output resistance			25Ω
Measuring current KTY input	-	1mA	-
Alarm threshold (adjustable) <sup>1</sup>	97°C	100°C	103°C
Error threshold (adjustable) <sup>1</sup>	126°C	130°C	134°C
Reset after error	87°C	90°C	93°C
Conformity	EN50178 (Overvoltage category 3 degree of contamination 2)		

### Temperature switching threshold



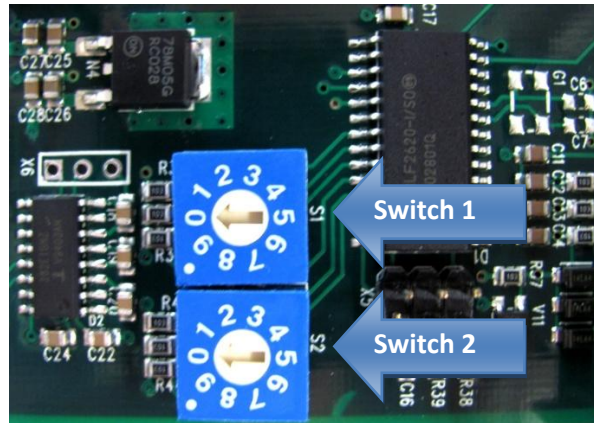
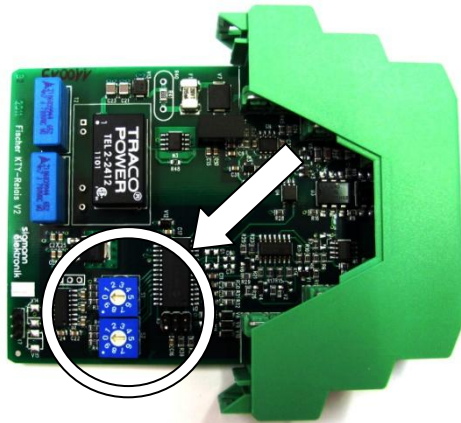
## 4.2 Galvanic separation

By using a galvanic separation on the circuit board, the control or PLC is protected against a voltage breakdown in the possible case of an error and is not damaged.



### 4.3 Selectable functions

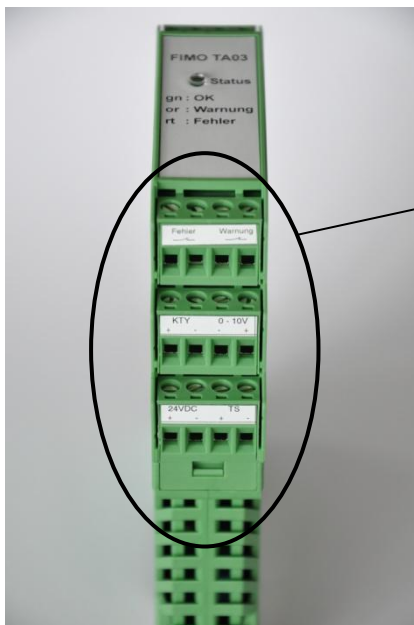
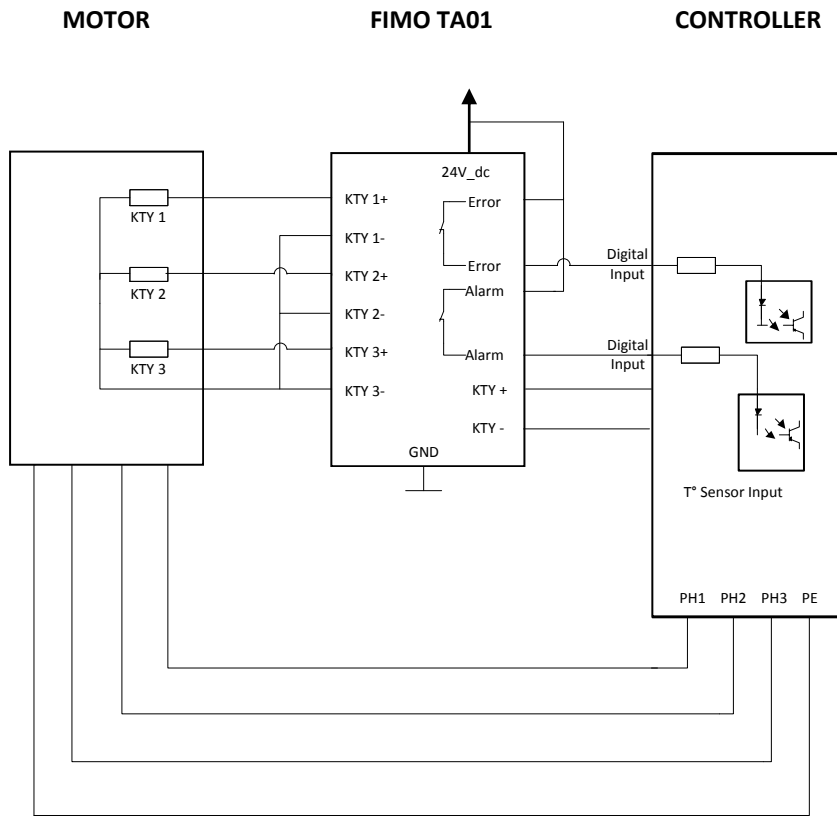
The FIMO TA 03 is in the position of sending an error message if the temperature increase per time unit exceeds a pre-set maximum. It is possible to choose between three operating modes. These can be selected via two rotary switches on the board of the FIMO TA 03.



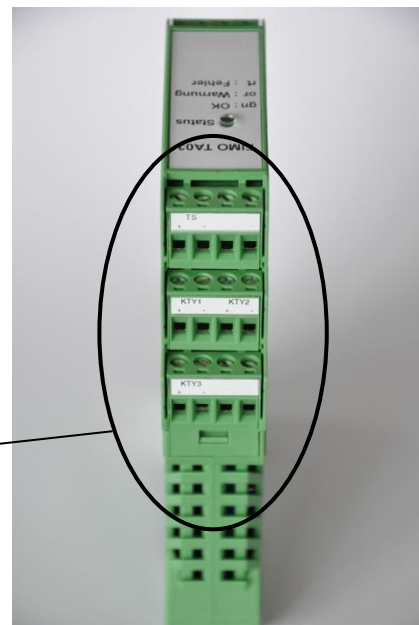
Rotary switch 1:	Switch off temperature	Advance warning
Position 0	110°C ±3%	105°C ±3%
Position 1	120°C ±3%	115°C ±3%
Position 2	130°C ±3%	125°C ±3%
Position 3	110°C ±3%	100°C ±3%
Position 4	120°C ±3%	110°C ±3%
Position 5	130°C ±3%	120°C ±3%
Position 6	N.C.	
Position 7	N.C.	

Rotary switch 2:	Temperature pilot control
Position 0	off
Position 1	10K/s
Position 2	15K/s
Position 3	20K/s
Position 4	25K/s
Position 5	N.C.
Position 6	N.C.
Position 7	N.C.

### 5. Block diagram



Outputs



Inputs



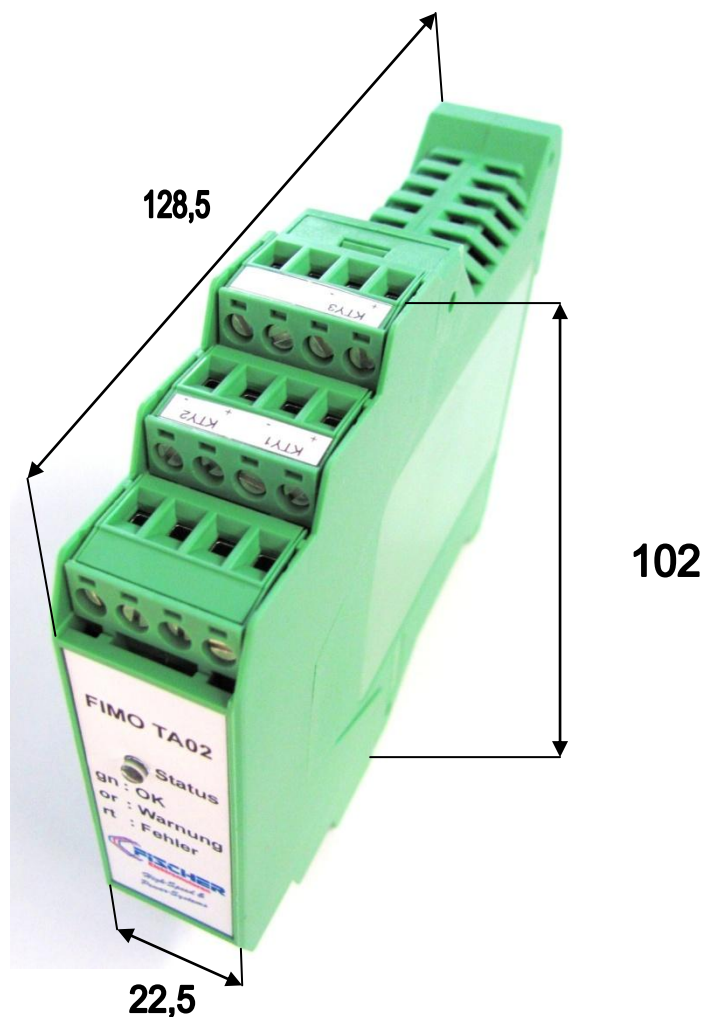
## 6. Operating conditions

The FIMO TA 03 has been designed for use in the following environment:

- non-aggressive, clean environment (degree of contamination 3)
- Humidity: 10 - 85%
- Height: < 2000m
- Temperature : 0 - 50°C
- Mains: Overvoltage category 3

The FIMO TA 03 is not suitable for use in an environment with an increased safety risk (e.g. nuclear plants, air traffic, among other things).

## 7. Dimensions



## 8. Commissioning

In order to guarantee safe operation of the FIMO TA 03, please carry out the following steps:

1.)

- Make sure that the motor is switched off (motor temperature = ambient air temperature)
- Switch on FIMO TA 03
  - LED green: FIMO TA 03 is correctly connected
  - LED red: FIMO TA 03 is not connected or at least 1 KTY temperature sensor is damaged or not correctly connected
  - LED does not light up: FIMO TA 03 is not connected to the mains or is damaged

2.)

- Check the digital inputs “Error” and “Alarm” (both relays must be closed)
- If applicable, check KTY sensors

3.)

- Switch on motor, low power
- Separate from a KTY sensor connection → LED must switch to red
- → Motor must switch off

If this test is successful, the FIMO TA 03 can be used for temperature monitoring.