

## DESCRIPTION AND APPLICATION

TFA temperature switches are designed as two-state controllers (ON / OFF control) that compare set temperature with momentary temperature and switch galvanically separated relay contacts when the set temperature is reached. The required temperature is setting in the device according to the customer requirement and cannot be changed later. The switches consist of a plastic connection head, inside which power supply and control printed circuit boards are placed. The head is made of LEXAN 500R material and the temperature switches meet the IP 65 ingress protection requirements according to the EN 60 529 standard.

Regarding sens. element location and switch app. the following versions are available:

**TFA 220 A** – For temperature measurement in the switch ambient. The sensing element is placed in the metal stem of the length 60 mm.

**TFA 220 K** – Sensing element in the metal stem for temperature measurement in air-conditioning shafts or tubing. It is delivered with a plastic holder. Optionally a stainless steel thermowell or a metal holder can be delivered as accessory.,

**TFA 220 C** – Sensing element in a 40 mm long TG 8 case is run out by the 1 m long cable (other cable or case lengths and other types of sensors can be ordered).

**TFA 220 P** – Contact type for attaching on tubing; sensing element in a metal measuring case which is placed in protection case made of SILIKON and SILAMID materials. It is delivered with the fastening strap (the length of 40 cm) and closure device.



Maximal operating temperature of TFA 220 A switches is 70 °C, for TFA 220 P it is 110 °C. For operating TFA 220 K in temperature higher than 120 °C, a variant with an extended measuring stem (60 mm) and a metal centric holder is provided. The switches are designed for operating in a chemically non-aggressive environment.

## SPECIFICATIONS

### BASIC DATA

Type of sensing element	Ni 1000/5000
Power supply	230 V / 50 Hz
Maximum switched voltage	250 V AC / 6 A
Set point adjustment failure	± 0,5 °C
Standard hysteresis	2 °C
Connection of the switch	according to the wiring diagram
Recommended wire cross section	0,35 to 1,5 mm <sup>2</sup>
Material of the connection head	LEXAN 500R
Connection head dimensions	62 x 62 x 55 mm
Connection head ambient temperature	-25 to 70 °C
Ingress protection	IP 65 according to EN 60 529
Grommet type	M 16 x 1,5
Mass	depending on design, min. 0,2 kg

### SUPPLEMENTARY DATA TO PARTICULAR TYPES

#### TFA 220 A

Standard length of the stem L1	60 mm
Diameter of the stem	6 + 0,2 mm
Material of the stem	stainless steel EN X5CrNi18-10 (DIN 1.4301)
Switch installation	on the wall, by means of a metal holder
Maximum range of measured temperature	-25 to 70 °C

#### TFA 220 K

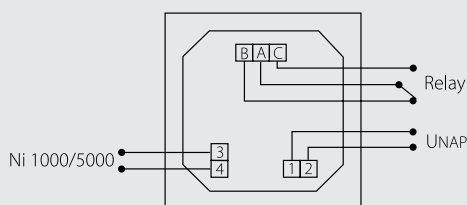
Standard length of the stem L1	70, 120, 180, 240 mm
Diameter of the stem	6 + 0,2 mm
Material of the stem	stainless steel EN X5CrNi18-10 (DIN 1.4301)
Switch installation	by means of a plastic or stainless steel holder or a stainless steel thermowell
Maximum range of measured temperature	-25 to 200 °C (using an elongated stem above 120 °C)

**TFA 220 C**

Standard type of sensor	TG8 – 40, kabel 1 m
Diameter of the case	5,7 ± 0,1 mm
Material of the case	stainless steel EN X5CrNi18-10 (DIN 1.4301)
Lead-in cable	shielded silicone 2 x 0,34 mm <sup>2</sup>
Sensor ingress protection	IP 67 according to EN 60 529
Switch installation	on the wall, by means of a metal holder
Maximum range of measured temperature	-30 to 200 °C

**TFA 220 P**

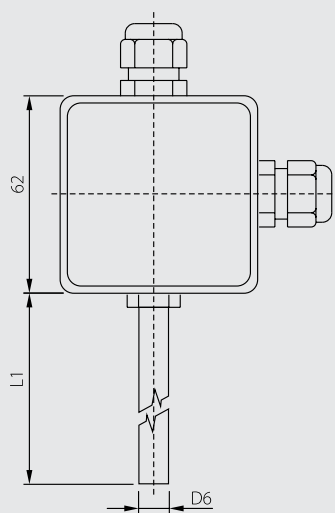
Material of the measuring case	brass
Material of the protection case	SILIKON and SILAMID
Switch installation	by means of fastening band
Standard length of the band	40 cm
Minimum diameter of tubing	20 mm

**WIRING DIAGRAM**

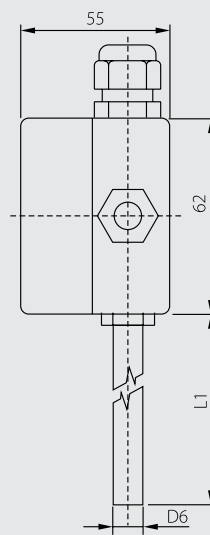
The terminal board for sensing element connection is installed for the TFA 220 C version only. The version is delivered without any sensing element or with another type than the TG8 - 40.

**DIMENSIONAL DRAFT**

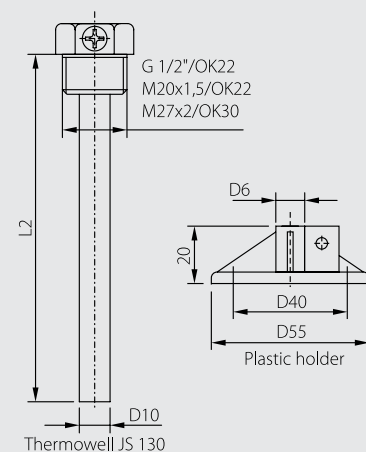
TFA 220 K – front view



TFA 220 K – lateral view



Accessories

**SENSOR INSTALLATION AND SERVICING**

Before connecting the power lead-in cable and the cable for the relay output signal, screw off the switch's lower segment to lift it off slightly. The relevant lead-in cables are pushed through the loosened grommets and connected to the terminals in accordance with the wiring diagram. The recommended wire cross section is 0,35 to 1,5 mm<sup>2</sup>. A shielded cable has to be used when laying the lead-in cable in the vicinity of high voltage conductors or those supplying equipment generating interfering electromagnetic field (e.g. inductance type equipment). To secure a hermetic condition, the grommets have to be tightened and the switch's lower segment has to be replaced. A component part of the TFA 220 A and the TFA 220 C switches is a metal clip making it possible to fasten the switch on plane surfaces by means of two screws. In case a stainless steel thermowell or a centric holder are used in the TFA 220 K version, these accessories are first to be placed in locations where the temperature should be measured, then the switch has to be inserted into the holder, or, as the case may be, as far as to the thermowell's bottom, and then secured with the screw. The openings designed to install a plastic or a stainless steel holder are to be drilled according to the attached template, on which the opening diameters are depicted, too. The TFA 220 P switch version is intended to be fixed on tubings by means of the fastening band and a special closing device. After installing and connecting the sensor to the appropriate evaluating electrical equipment the switch is ready to use. The switch does not require any special attendance or maintenance.

## OPERATION DESCRIPTION

Suppose the switching temperature set point is 20 °C. When the measured temperature value is above the set point, then the output relay's A and B terminals are closed. When the measured temperature value goes down below 18 °C, then the output relay's A and C terminals are closed. The difference of 2 °C is determined by the switch hysteresis.

## CUSTOMER SPECIFIC MODIFICATIONS

REGARDING TO SENSORS MANUFACTURED IN A STANDARD VERSION THE FOLLOWING PARAMETERS CAN BE MODIFIED:

- supply voltage 24V AC or 24V DC
- changing the range of temperatures to be switched
- adding a clip for fixing the device on a DIN console instead of the metal holder for fixing the device on the wall
- for the TFA 220 A and TFA 220 K versions changing the stem length; for the TFA 220 C changing the case and cable lengths
- customer specified stem or case design
- functioning of the differential switch can be modified

## HOW TO ORDER

TFA temperature switches		5	1	A	0	C	C	C	0	0	E	E	E	E	F	F
Type	TS - A			0												
	TS - K			1												
	TS - C			2												
	TS - P			3												
Temperature range	15 °C				0	1	5									
	120 °C				1	2	0									
	-10 °C				-	1	0									
for type A, K		Stem length in mm						0	0	6	0					
for type C		with sensor TG 8 - 40						G	8	4	0					
		without TG8-40, with terminal box						0	0	0	0					
for type P		Length of the fastening band						0	4	0	0					
								for type C		Cable length in m				0	1	
								for type A, K, P						0	0	
Thermowell – Stainless steel, JS 130		9	0	0	1	B	B	0	1	0	0	E	E	E	E	
Thread	G 1/2"					0	1									
	M 20 x 1,5					0	3									
Thermowell length L2	50 mm							0	0	5	0					
	100 mm							0	1	0	0					
	160 mm							0	1	6	0					
	220 mm							0	2	2	0					
Central holder – Stainless steel, K 120		9	0	0	0	0	0	0	1	0	0	0	0	0	0	

WHEN ORDERING GOODS, THE FOLLOWING DATA ARE REQUIRED:

Required data	Example	Required data	Example
Product type	TFA 220 A (C, P)	Product type	TFA 220 K
Temperature range	15 °C	Temperature range	70 °C
		Stem length	120 mm
		Thermowell (length, thread)	Thermowell JS 130 (100 mm, thread G 1/2")

## DELIVERY

The switches are packed in pasteboard boxes by 1 piece.

Each delivery contains, if not agreed with the customer otherwise, the following components:

- centric plastic holder for the TFA 220 K type
- fastening band (band length 40 cm) and the closing device for the TFA 220 P type
- TG8 - 40 sensor type (or other) with 1 m of cable for the TFA 220 C type

In addition, the following may be provided together with the product:

- accessory: stainless steel thermowell, JS 130; stainless steel centric holder, K 120
- calibration sheet
- the EU Declaration of Conformity.