

# Electronic temperature switch with display

## Model TSD-30

WIKA data sheet TE 67.03



for further approvals  
see page 6



### Applications

- Machine tools
- Hydraulic power packs
- Cooling and lubrication systems
- Machine building

### Special features

- Easily readable, robust display
- Intuitive and fast setup
- Easy and flexible mounting configurations



**Electronic temperature switch with display**  
**Model TSD-30**

### Description

#### Award-winning in design and functionality

The successful design and the excellent functionality of the WIKA switch family were already confirmed by winning the "iF product design award" for the model PSD-30 pressure switch.

The robust LED display has been designed using 9 mm high characters (the largest possible) and with a slight incline in order to make reading the temperature as easy as possible from a long way off. The use of a 14-segment display ensures a clear display and readability of letters.

The 3-key operation makes simple, intuitive menu navigation possible, with no need for additional assistance. The menu navigation is designed in accordance with the latest VDMA standard. The VDMA standard for fluid sensors (24574-2, part 2 temperature switches) has the aim of considerably simplifying the use of temperature switches by standardising menu navigation and display.

The control keys have been designed as large as possible and are arranged ergonomically to ensure fast and easy adjustments. Operation without any additional assistance is made easier through the tactile feedback.

#### Customised installation

The installation of the model TSD-30 temperature switch can be flexibly adapted to the individual mounting situation. Due to the almost unlimited rotation of the display and case by more than 300°, the display can be adjusted independently of the electrical connection. The display can thus always be aligned to face the operator, and the M12 x 1 connection positioned to suit the desired cable routing.

#### IO-Link

With the optional output signal in accordance with the IO-Link communication standard, the TSD-30 allows a fast integration into modern automation systems. IO-Link offers an even faster installation, parameterisation and higher functionality of the TSD-30.

## Measuring ranges

Selectable versions		
Temperature	°C	°F
Standard	-20 ... +80	-4 ... +176
Option 1 <sup>1)2)</sup>	-20 ... +120	-4 ... +248
Option 2 <sup>1)2)</sup>	0 ... +150	+32 ... +302

1) Only for process connections with compression fitting.

2) Installation instructions under "Operating conditions" must be observed.

## Display

14-segment LED, red, 4-digit, 9 mm [0.35 in] character size

Display can be rotated electronically through 180°

Update: 200 ms

## Output signal

Selectable versions	Switching output		Analogue signal
	SP1	SP2	
Option 1	PNP	-	4 ... 20 mA (3-wire)
Option 2	PNP	-	DC 0 ... 10 V (3-wire)
Option 3	PNP	PNP	-
Option 4	PNP	PNP	4 ... 20 mA (3-wire)
Option 5	PNP	PNP	DC 0 ... 10 V (3-wire)

Optionally also available with an NPN instead of a PNP switching output.

### IO-Link, revision 1.1 (option)

IO-Link is optionally available for all output signals.

With the IO-Link option, switching output SP1 is always PNP

### Switching thresholds

Switch point 1 and switch point 2 are individually adjustable

### Switching functions

Normally open, normally closed, window, hysteresis (freely adjustable)

### Switching voltage

Supply voltage - 1 V

### Switching current

- without IO-Link: max. 250 mA
- with IO-Link: SP1 max. 100 mA  
SP2 max. 250 mA

### Adjustment accuracy

≤ 0.5 % of span

### Adjustment of zero point offset

±3 % of span

### Scaling

Zero point: 0 ... 25 % of span

Full scale: 75 ... 100 % of span

### Load

Analogue signal 4 ... 20 mA: ≤ 0.5 kΩ

Analogue signal DC 0 ... 10 V: > 10 kΩ

### Service life

100 million switching cycles

## Voltage supply

### Supply voltage $U_+$

DC 15 ... 35 V

### Current consumption

Switching outputs with

- Analogue signal 4 ... 20 mA: 70 mA
- Analogue signal DC 0 ... 10 V: 45 mA
- without analogue signal: 45 mA

IO-Link option causes a deviating current consumption

### Total current consumption

- without IO-Link: max. 600 mA including switching current
- with IO-Link: max. 450 mA including switching current

## Accuracy specifications

### Analogue signal

≤ ±0.5 % of span + temperature sensor error

### Switching output

≤ ±0.8 % of span + temperature sensor error

### Display

≤ ±(0.8 % of span + temperature sensor error) ±1 digit

### Temperature sensor error

For °C: ±(0.15 K + 0.002 | t |)

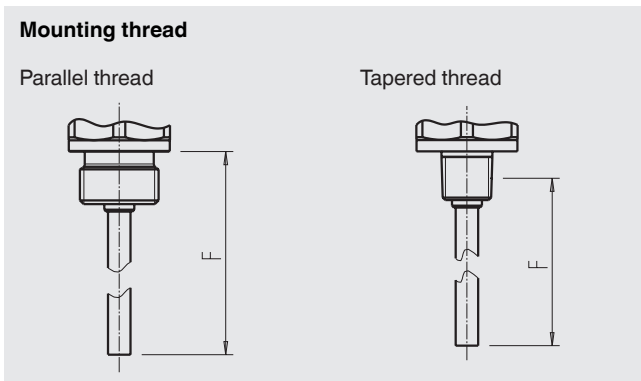
For °F: ± [1.8\*(0.15 + 0.002 (t - 32) / 1.8)]

| t | is the numerical value of the temperature without consideration of the sign.

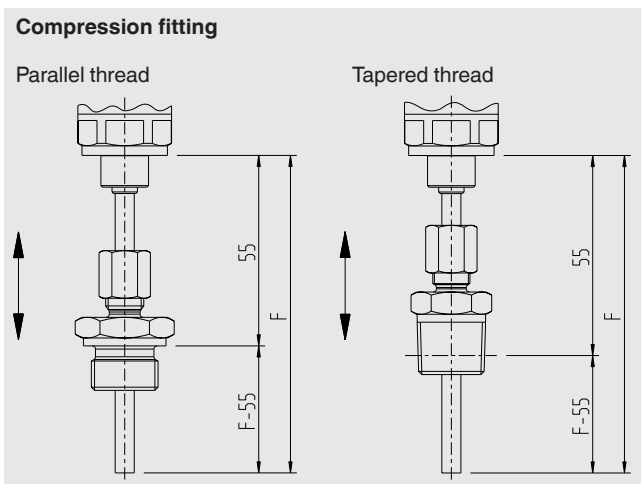
The actually achievable accuracy is significantly determined by the mounting situation (immersion depth, probe length, operating conditions). This is especially the case for large temperature gradients between the environment and the medium.

## Probe

### Probe length (F)



F		25	50	100	150	200	250	300	350
mm		25	50	100	150	200	250	300	350
in		0.98	1.97	3.94	5.91	7.87	9.84	11.81	13.8



F		100	150	200	250	300	350
mm		100	150	200	250	300	350
in		3.94	5.91	7.87	9.84	11.81	13.8

### Response time

T05 < 5 s (per DIN EN 60751)

T09 < 10 s (per DIN EN 60751)

### Static operating pressure

max. 150 bar [2,175 psi]

When using a compression fitting:

max. 50 bar [max. 725 psi]

## Operating conditions

### Permissible temperature ranges

Medium: see measuring ranges

Ambient: -20 ... +80 °C [-4 ... +176 °F] <sup>1)</sup>

Storage: -20 ... +80 °C [-4 ... +176 °F]

<sup>1)</sup> At medium temperatures above 80 °C [176 °F] the permissible ambient temperature is limited to -20 ... +40 °C [-4 ... +104 °F]. In this case, the process connection has to be designed with a compression fitting.

At high medium or ambient temperatures, ensure by suitable measures that the instrument case temperature does not exceed 80 °C [176 °F] in continuous operation (the temperature is measured at the hexagon of the process connection).

### Air humidity

45 ... 75 % r. h.

### Vibration resistance

Probe length  $F \leq 150$  mm [5.91 in]:

6 g (IEC 60068-2-6, under resonance)

Probe length  $F \geq 250$  mm [9.84 in]:

2 g (IEC 60068-2-6, under resonance)

### Shock resistance

50 g (IEC 60068-2-27, mechanical)

### Ingress protection per IEC/EN 60529

IP65 and IP67

The stated ingress protection only applies when plugged in using mating connectors that have the appropriate ingress protection.

### Mounting position

as required

## Reference conditions

Temperature:	15 ... 25 °C [59 ... 77 °F]
Atmospheric pressure:	950 ... 1,050 mbar [13.78 ... 15.23 psi]
Air humidity:	45 ... 75 % r. h.
Nominal position:	Process connection lower mount
Supply voltage:	DC 24 V
Load:	see "Output signal"

## Materials

### Wetted parts

Probe:	Stainless steel 1.4571
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### Non-wetted parts

Case:	Stainless steel
Keyboard:	TPE-E
Display window:	PC
Display head:	PC + ABS blend

## Process connections

Selectable versions	
Standard	Thread
DIN EN ISO 1179-2 (parallel thread)	G ¼ A
	G ½ A
DIN 3852-A (parallel thread)	G ¼ A with compression fitting
	G ½ A with compression fitting
ANSI / ASME B1.20.1 (tapered thread)	¼ NPT
	¼ NPT with compression fitting
	½ NPT
	½ NPT with compression fitting

## Sealings

Selectable versions		
Connection per	Sealing material	
DIN EN ISO 1179-2 (parallel thread)	Standard	NBR
	Option	FPM/FKM
DIN 3852-A (parallel thread)	Standard	Copper

## Electrical connections

### Connections

- Circular connector M12 x 1 (4-pin)
- Circular connector M12 x 1 (5-pin) <sup>1)</sup>

1) Only for version with two switching outputs and additional analogue signal

### Electrical safety

Short-circuit resistance:	S <sub>+</sub> / SP1 / SP2 vs. U <sub>-</sub>
Reverse polarity protection:	U <sub>+</sub> vs. U <sub>-</sub>
Insulation voltage:	DC 500 V
Overvoltage protection:	DC 40 V

### Connection diagrams

#### Circular connector M12 x 1 (4-pin)

	U <sub>+</sub>	1
	U <sub>-</sub>	3
	S <sub>+</sub>	2
	SP1 / C	4
	SP2	2

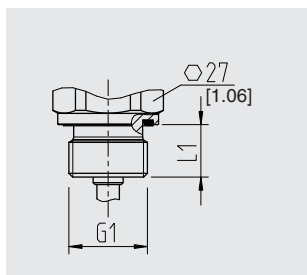
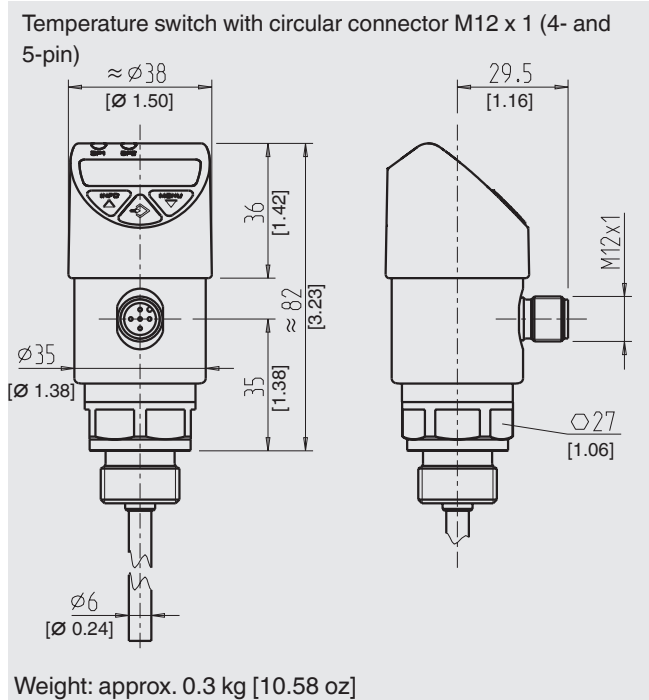
#### Circular connector M12 x 1 (5-pin)

	U <sub>+</sub>	1
	U <sub>-</sub>	3
	S <sub>+</sub>	5
	SP1 / C	4
	SP2	2

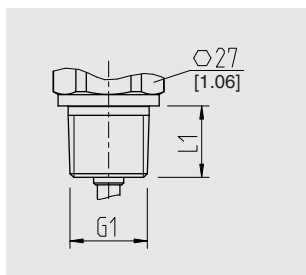
### Legend:

U <sub>+</sub>	Positive supply voltage
U <sub>-</sub>	Reference potential
SP1	Switching output 1
SP2	Switching output 2
C	Communication with IO-Link
S <sub>+</sub>	Analogue output

## Dimensions in mm [in]

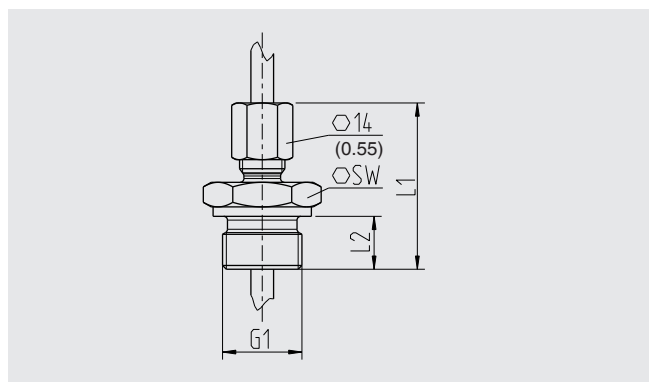


G1	L1
G ¼ A	12 [0.47]
G ½ A	14 [0.55]

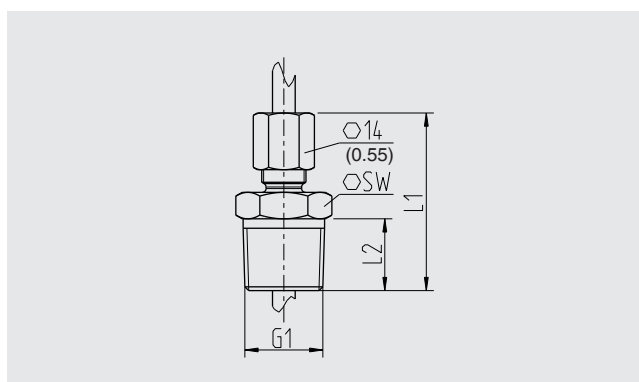


G1	L1
¼ NPT	13 [0.51]
½ NPT	19 [0.75]

## Compression fittings









G1	L1	L2	SW
G ¼ A	40 [1.57]	12 [0.47]	19 [0.75]
G ½ A	44 [1.73]	14 [0.55]	27 [1.06]




G1	L1	L2	SW
¼ NPT	41 [1.61]	15.1 [0.59]	17 [0.67]
½ NPT	41 [1.61]	19.7 [0.78]	22 [0.87]

For probe lengths, see page 3.

## Approvals



Logo	Description	Country
	<b>EU declaration of conformity</b> ■ EMC directive, EN 61326 emission (group 1, class B) and immunity (industrial application) ■ RoHS directive	European Union
	<b>UL</b> Safety (e.g. electr. safety, overpressure, ...)	USA
	<b>EAC</b> EMC directive	Eurasian Economic Community
	<b>GOST</b> Metrology, measurement technology	Russia
	<b>KazInMetr</b> Metrology, measurement technology	Kazakhstan
-	<b>MTSCHS</b> Permission for commissioning	Kazakhstan
	<b>UkrSEPRO</b> Metrology, measurement technology	Ukraine
-	<b>CRN</b> Safety (e.g. electr. safety, overpressure ...)	Canada

## Accessories and spare parts

Compression fittings		
	Description	Order number
	G ¼ A per DIN 3852-A, stainless steel	11160136
	G ½ A per DIN 3852-A, stainless steel	3221555
	¼ NPT, stainless steel	3232905
	½ NPT, stainless steel	14043934

When using compression fittings, a limited static operating pressure of max. 50 bar (max. 725 psi) applies.

Sealings		
	Description	Order number
	NBR profile sealing G ¼ A DIN EN ISO 1179-2	1537857
	FPM/FKM profile sealing G ¼ A DIN EN ISO 1179-2	1576534
	NBR profile sealing G ½ A DIN EN ISO 1179-2	1039067
	FPM/FKM profile sealing G ½ A DIN EN ISO 1179-2	1039075

Connectors with moulded cable				
	Description	Temperature range	Cable diameter	Order number
	Straight version, cut to length, 4-pin, 2 m [6.6 ft] PUR cable, UL listed, IP67	-20 ... +80 °C [-4 ... +176 °F]	4.5 mm [0.18 in]	14086880
	Straight version, cut to length, 4-pin, 5 m [16.4 ft] PUR cable, UL listed, IP67	-20 ... +80 °C [-4 ... +176 °F]	4.5 mm [0.18 in]	14086883
	Straight version, cut to length, 4-pin, 10 m [32.8 ft] PUR cable, UL listed, IP67	-20 ... +80 °C [-4 ... +176 °F]	4.5 mm [0.18 in]	14086884
	Straight version, cut to length, 5-pin, 2 m [6.6 ft] PUR cable, UL listed, IP67	-20 ... +80 °C [-4 ... +176 °F]	5.5 mm [0.22 in]	14086886
	Straight version, cut to length, 5-pin, 5 m [16.4 ft] PUR cable, UL listed, IP67	-20 ... +80 °C [-4 ... +176 °F]	5.5 mm [0.22 in]	14086887
	Straight version, cut to length, 5-pin, 10 m [32.8 ft] PUR cable, UL listed, IP67	-20 ... +80 °C [-4 ... +176 °F]	5.5 mm [0.22 in]	14086888
	Angled version, cut to length, 4-pin, 2 m [6.6 ft] PUR cable, UL listed, IP67	-20 ... +80 °C [-4 ... +176 °F]	4.5 mm [0.18 in]	14086889
	Angled version, cut to length, 4-pin, 5 m [16.4 ft] PUR cable, UL listed, IP67	-20 ... +80 °C [-4 ... +176 °F]	4.5 mm [0.18 in]	14086891
	Angled version, cut to length, 4-pin, 10 m [32.8 ft] PUR cable, UL listed, IP67	-20 ... +80 °C [-4 ... +176 °F]	4.5 mm [0.18 in]	14086892
	Angled version, cut to length, 5-pin, 2 m [6.6 ft] PUR cable, UL listed, IP67	-20 ... +80 °C [-4 ... +176 °F]	5.5 mm [0.22 in]	14086893
	Angled version, cut to length, 5-pin, 5 m [16.4 ft] PUR cable, UL listed, IP67	-20 ... +80 °C [-4 ... +176 °F]	5.5 mm [0.22 in]	14086894
	Angled version, cut to length, 5-pin, 10 m [32.8 ft] PUR cable, UL listed, IP67	-20 ... +80 °C [-4 ... +176 °F]	5.5 mm [0.22 in]	14086896

### Ordering information

Model / Measuring range / Output signal / Probe length / Process connection / Sealing / Accessories and spare parts