

OBSOLETE

Electronic flow switch With display, for liquid media Model FSD-3

WIKA data sheet FL 80.01



Applications

- Control of cooling lubricant systems
- Monitoring of cooling circuits
- Control of filter units
- Dry run protection in pumps

Special features

- Reliable flow monitoring of liquid media
- Switching and analogue outputs for flow, temperature and diagnostics
- Easily parameterisable via the local display
- Free from wear, without any moving parts in the medium



Electronic flow switch, model FSD-3

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 pressure switch model PSD-30.

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 flow as easy as possible from greater distances.

The 3-key operation makes simple, intuitive menu navigation possible, with no need for additional assistance. The menu navigation conforms to the VDMA standard.

Free from wear

The FSD-3 operates on the basis of the calorimetric measuring principle. This guarantees a wear-free flow measurement without any moving parts in the medium.

Flow monitoring of liquid media

The FSD-3 enables the reliable and process-safe monitoring of the flow of liquid media. When the flow is above or below the set value, the switching output activates the downstream regulator or control. Damage and production losses through degradation of pumps, tools and spindles can thus be avoided.

Temperature monitoring

The medium temperature can be monitored by means of a temperature output, without the need for equipping another measuring location.

Diagnostic function

The optional diagnostic function reliably outputs a warning when a sensor defect is detected. The switching output can be used to trigger a downstream safety function.

Measuring ranges

Flow

Water: 5 ... 150 cm/s

Oil: 3 ... 300 cm/s

The in-factory adjustment is carried out with the medium water. It is recommended to carry out the adjustment, relative to the minimum/maximum flows of the system, via the menu.

Temperature (option)

-20 ... +85 °C (-4 ... +185 °F)

Display

14-segment LED, red, 4-digit, 9 mm (0.35 in) character size
Display can be turned electronically by 180°

Output signals

Switching output	
Standard	PNP
Option	NPN

Analogue signal (option)

4 ... 20 mA

Circuit

	Switching output		Analogue signal
	SP1	SP2	
Option 1	Flow	-	-
Option 2	Flow	-	Flow
Option 3	Flow	Temperature	-
Option 4	Flow	-	Temperature
Option 5	Flow	Diagnostics ¹⁾	-
Option 6	Temperature	-	Flow
Option 7	Diagnostics ¹⁾	-	Flow

1) Switching signal on sensor defect

Scaling temperature (option)

Zero point: -20 ... +5 °C (-4 ... +41 °F)

End value: 60 ... 85 °C (140 ... 185 °F)

Switching thresholds

Switch point 1 and switch point 2 are individually adjustable

Switching functions

Normally open, normally closed, window, hysteresis

Freely adjustable

Switching voltage

Power supply - 1 V

Switching current

max. 250 mA

Switch-on drift

10 s

Settling time

Flow (0 ... 100 %, 100 ... 0 %): 6 s

Flow (50 ... 100 %, 100 ... 50 %): 4 s

Temperature t_{90} : 4 sTemperature t_{63} : 2 s

Load

Analogue signal 4 ... 20 mA: $\leq 0.5 \text{ k}\Omega$

Service life

100 million switching cycles

Voltage supply

Power supply

DC 15 ... 35 V

Current consumption

- Switching outputs with analogue signal: 175 mA
- Switching outputs without analogue signal: 150 mA

Total current consumption

max. 650 mA including switching current

Accuracy specifications

Non-repeatability

Flow (5 ... 100 cm/s): ≤ 2 cm/s

Temperature: ≤ 0.5 K

Accuracy at reference conditions

Flow (5 ... ≤ 100 cm/s): $\leq \pm 5$ % of end value of measuring range

Flow (> 100 ... 175 cm/s): $\leq \pm 10$ % of end value of measuring range

Temperature: $\leq \pm 1,5$ K

Including non-linearity, hysteresis, zero offset and end value deviation (corresponds to measuring deviation per IEC 61298-2).

The accuracy of the flow sensor is dependent on the thermal conductivity and the contamination of the probe.

The flow switch serves for reliable monitoring of the flow losses and of dry running. Also with analogue signal it should only be used as a trend indicator, in order to monitor process changes, such as filter blocking.

Temperature error at -20 ... +85 °C (-4 ... +185 °F)

Flow: $\leq \pm 0.4$ cm/s per K

Reference conditions

Temperature: 15 ... 25 °C (59 ... 77 °F)

Atmospheric pressure: 860 ... 1,060 mbar (12.47 ... 15.38 psi)

Humidity: 45 ... 75 % r. h.

Medium: Water

Nominal position: Process connection M18 x 1.5 downwards
Inner diameter of pipe 26 mm
Upstream/Downstream pipe 1 m/0.5 m
Marking towards the inflow side twist of $\pm 5^\circ$

Power supply: DC 24 V

Load: 100 Ω

Operating conditions

Permissible temperature ranges

Medium: -20 ... +85 °C (-4 ... +185 °F)

Ambient: -20 ... +80 °C (-4 ... +176 °F)

Storage: -20 ... +80 °C (-4 ... +176 °F)

Humidity

45 ... 75 % r. h.

Max. operating pressure

40 bar (580 psi)

30 bar (435 psi) with process connection M18 x 1.5

Vibration resistance

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

Shock resistance

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

Ingress protection

IP65 and IP67

The stated ingress protection (per EN/IEC 60529) only applies when plugged in using mating connectors that have the appropriate ingress protection.

Materials

Wetted parts

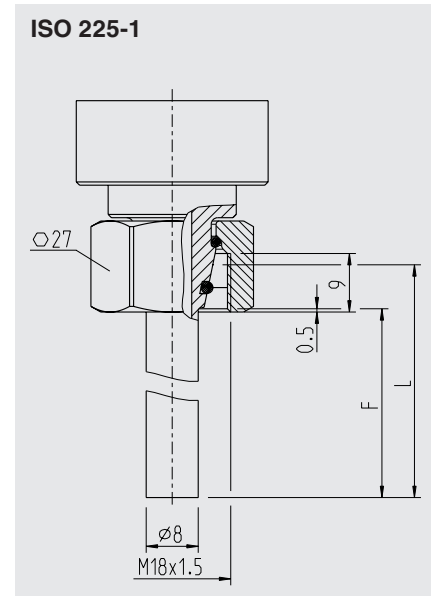
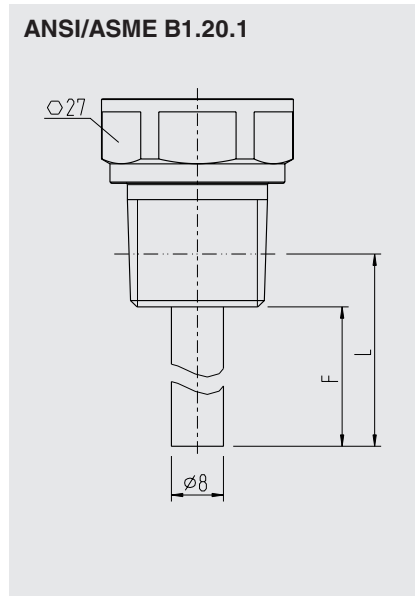
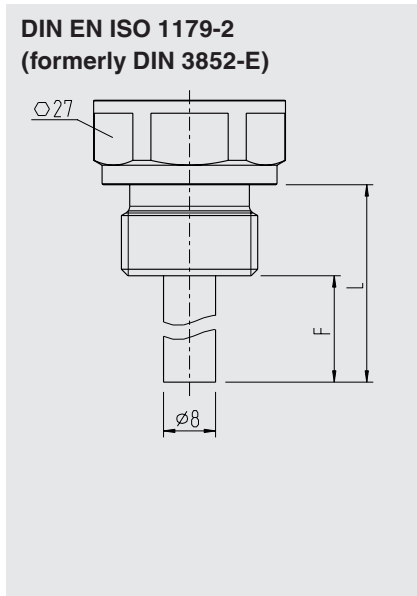
Process connection, probe: Stainless steel 316Ti
 Sealing: See table under "Process connections"

Non-wetted parts

Case: Stainless steel 304
 Keyboard: TPE-E
 Display window: PC
 Display head: PC+ABS blend

Process connections

	Standard	Thread	Probe length F	Insertion length L
Option 1	ISO 225-1	M18 x 1.5	45 mm (1.77 in)	52 mm (2.05 in)
Option 2	DIN EN ISO 1179-2 (formerly DIN 3852-E)	G ¼ A	16 mm (0.63 in)	28 mm (1.10 in)
Option 3	DIN EN ISO 1179-2 (formerly DIN 3852-E)	G ½ A	16 mm (0.63 in)	30 mm (1.18 in)
Option 4	DIN EN ISO 1179-2 (formerly DIN 3852-E)	G ½ A	35 mm (1.38 in)	49 mm (1.93 in)
Option 5	DIN EN ISO 1179-2 (formerly DIN 3852-E)	G ½ A	65 mm (2.65 in)	79 mm (3.11 in)
Option 6	DIN EN ISO 1179-2 (formerly DIN 3852-E)	G ½ A	105 mm (4.13 in)	119 mm (4.69 in)
Option 7	ANSI/ASME B1.20.1	¼ NPT	16 mm (0.63 in)	22 mm (0.87 in)
Option 8	ANSI/ASME B1.20.1	½ NPT	30 mm (1.18 in)	38 mm (1.50 in)



Sealings

	Process connection	
	DIN EN ISO 1179-2 (formerly DIN 3852-E)	ISO 225-1
Standard	NBR	FPM/FKM
Option 1	FPM/FKM	-
Option 2	without	-

Electrical connection

Connection

Circular connector M12 x 1 (4-pin)

Electrical safety

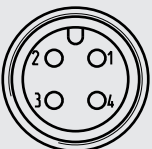
Short-circuit resistance: S+ / SP1 / SP2 vs. U-

Reverse polarity protection: U+ vs. U-

Insulation voltage: DC 500 V

Overvoltage protection: DC 40 V



Connection diagram

Circular connector M12 x 1 (4-pin)		
	U+	1
	U-	3
	S+	2
	SP1	4
	SP2	2

Legend:

- U+ Positive power supply terminal
- U- Negative power supply terminal
- SP1 Switching output 1
- SP2 Switching output 2
- S+ Analogue output

Approvals

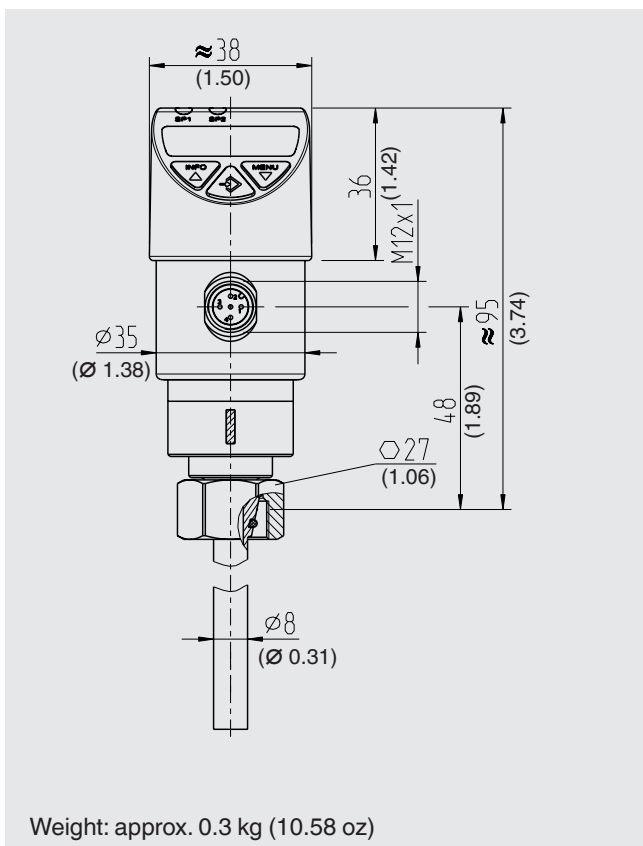
Logo	Description	Country
	EU declaration of conformity <ul style="list-style-type: none"> ■ EMC directive EN 61326 emission (group 1, class B) and interference immunity (industrial application) ■ RoHS directive 	European union
	UL Safety (e.g. electr. safety, overpressure, ...)	USA and Canada

Manufacturer's information and certificates

Logo	Description
-	China RoHS directive

Approvals and certificates, see website

Dimensions in mm (in)

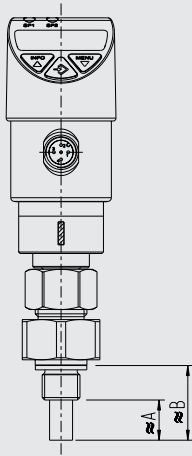


Accessories and spare parts

Sealings		
	Description	Order number
	NBR profile sealing G ¼ A DIN EN ISO 1179-2 (formerly DIN 3852-E)	1537857
	FPM/FKM profile sealing G ¼ A DIN EN ISO 1179-2 (formerly DIN 3852-E)	1576534
	NBR profile sealing G ½ A DIN EN ISO 1179-2 (formerly DIN 3852-E)	1039067
	FPM/FKM profile sealing G ½ A DIN EN ISO 1179-2 (formerly DIN 3852-E)	1039075

Circular connector M12 x 1 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
	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

FSD-3 with adapter



Legend:

- A Maximum probe immersion depth
- B Distance sealing face to probe tip

Adapter					
	Description	Recommended for pipe \varnothing	B	A	Order number
	From M18 x 1.5 to G ¼	22 ... 50 mm (0.86 ... 0.97 in)	28 mm (1.10 in)	16 mm (0.63 in)	14242761
	From M18 x 1.5 to G ½ long	25 ... 60 mm (0.98 ... 2.36 in)	31 mm (1.22 in)	17 mm (0.67 in)	14242759
	From M18 x 1.5 to G ½ short	32 ... 100 mm (1.26 ... 3.93 in)	36 mm (1.41 in)	22 mm (0.86 in)	14242760

Ordering information

Model / Output signal / Probe length / Process connection / Sealing / Accessories

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