

Thermal flow sensor ETDF-25

For limit and continuous flow rate sensing of liquid media and for monitoring of their temperature

- These sensors are intended for installation in pipes, in which the actual flow rate and temperature occurs
- Flow rate measurement is shown in a bar graph by five green LED diodes and in the same graduation it is possible to select the limit for output switching (unswitching)
- Optical indication of the flow rate and temperature status via two LEDs
- Settings by magnetic pen
- Stainless steel case

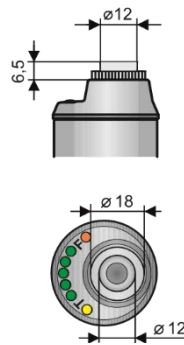


Thermal flow sensor – ETDF-25 is a compact measuring device intended for industrial use for flow rate sensing of liquid media and for monitoring of their temperature when installed in a pipe. The sensor may be installed in plastic or metal pipes. Suitable for monitoring filling, cooling or lubricating media and their temperatures. Flow rate is indicated by means of a bar graph (5 green LEDs). Output (flow rate and temperature) switching indicator by means of LED (orange and yellow).

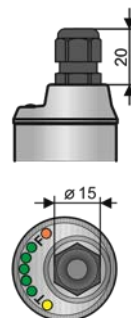
Simple configuration using a magnetic pen. Sensor is made in a stainless steel design. Quick and simple installation thanks to simple construction.

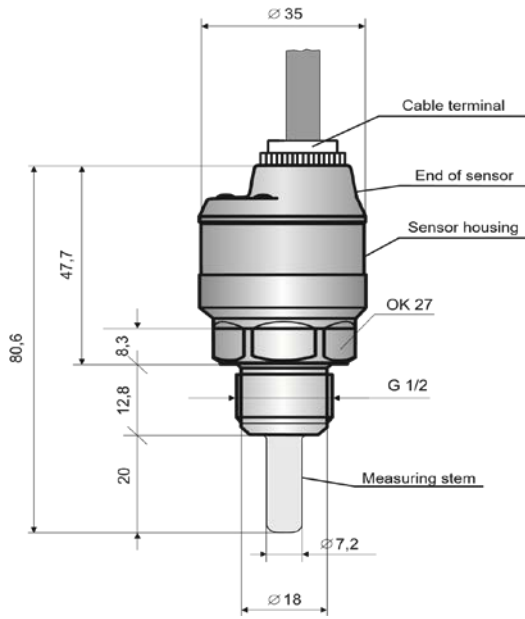
Dimensional drawings

Variant "A" with short stainless steel terminal

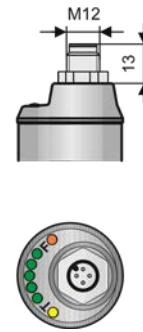


Variant "B" with plastic threaded terminal





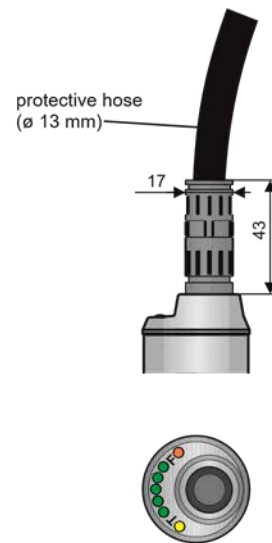
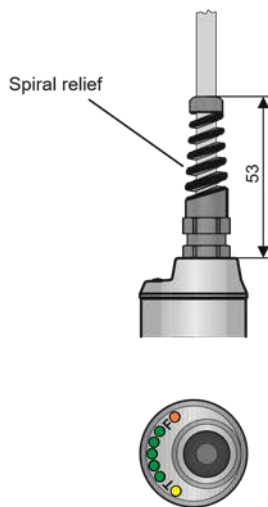
Variant "C" with connector M12



TFS-25-dat-1.1

Variant "V" with plastic terminal with spiral relief – in case of increased mechanical strain on the cable

Variant "V" with plastic terminal with spiral relief – in case of increased mechanical strain on the cable.



Technical specification

Basic technical data		
Working areas (EN 60079-10-1)		no explosive hazard area
Supply voltage		12 ... 34 V DC
Power consumption	for power voltage 12 V DC	max. 100 mA DC max.
	15 V DC	80 mA DC max. 70 mA
	18 V DC	DC max. 60 mA DC
	24 V DC	

Output	flow rate temperatures	PNP PNP
Maximum switching current		300 mA
Maximum residual voltage in ON state		1.5 V
Temperature output - switching points		15°C; 30°C; 45°C; 60°C; 75°C;
Flow rate range		1 to 150 cm/s (for water)
Temperature gradient		< 250 K/min
Isolating capacity (housing - inputs) / dielectric strength		4 nF / 350 V AC
Protection		IP67 (design C) IP68 (design A, B, V, H)
Ambient working temperature range (ta)		-20 ... +80°C

Basic technical data

Cable	PVC 4x 0.5 mm ²
Heat up time after start	10s
Response time	2 to 15s ^{*1)}
Pressure strength	10 MPa (100 bar) over full temperature range
Weight of sensor (without cable)	150 g

*1) Depending on the flow rate and setting of the sensor.

Used materials

part of the sensor	type	standard material
Housing	all	stainless steel W.Nr. 1.4404 (AISI 316L)
End of sensor	all	stainless steel W.Nr. 1.4301 (AISI 304)
Cable terminal	ETDF-25 _ _ _ _ - A- L _ _ ETDF-25 _ _ _ _ - B- L _ _ ETDF-25 _ _ _ _ - V- L _ _ ETDF-25 _ _ _ _ - H- L _ _	stainless steel W.Nr. 1.4571 / NBR plastic PA / NBR plastic PA / NBR plastic PA / NBR
Connector M12	ETDF-25 _ _ _ _ - C- L _ _	nickel-plated brass /

Process connection

name	dimensions	marking
pipe thread	G 1/2"	G 1/2

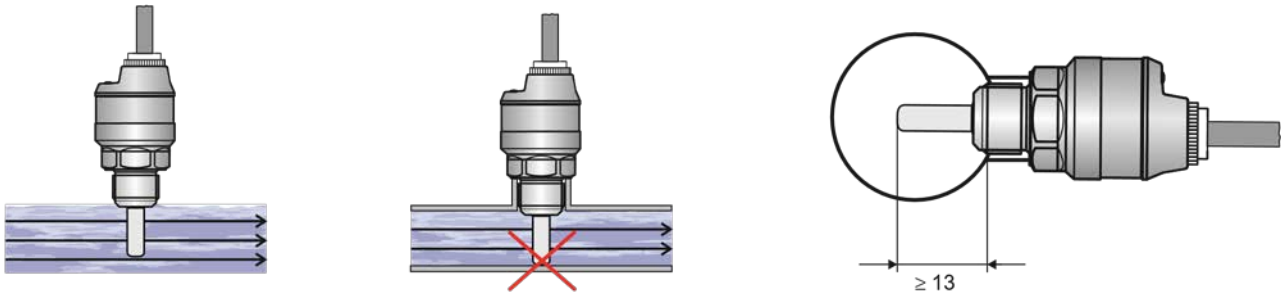
Electrical connection

A sensor with PNP type of outputs can be loaded only by resistive or inductive loads. The positive pole of the supply voltage (+U) is connected to the brown wire BN or pin connector no.1, the negative pole (0 V) is connected to the blue wire BU or pin connector no.3. Flow rate load on the black wire BK or pin connector no.4 and temperature load on the white wire WH or pin connector no.2. The capacitive loads and low resistance loads (e.g. bulb) are evaluated by the sensor as a short circuit.

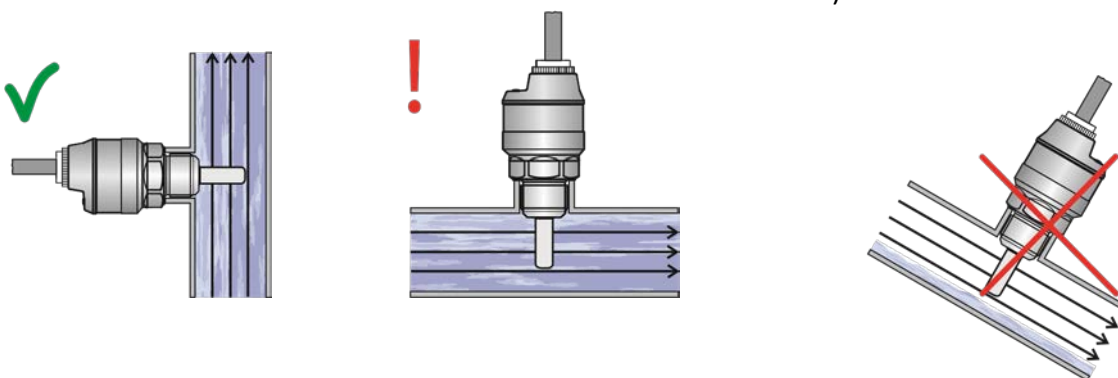
Wiring diagrams are provided in the figures below.

Flow sensor TFS-35 with a type A, B, V or H cable terminal, is connected to the assessment units permanently by a connection cable, see. Dimensional drawings.

The TFS-35 flow sensor with connection method type C (see Dimensional drawings) is connected to the assessment units by means of a connector socket with a pressed-in cable, or by means of a detachable connector socket without a cable (e.g. ELWIKA), see accessories. In this case the cable is connected to the inside pins of the socket according to the figure below. The recommended diameter of this cable when using ELWIKA connectors is 4 to 6 mm (the recommended wire cross-sectional area is 0.5 to 0.75 mm²).



The recommended installation location is in the rising parts of the pipe system. The sensor is installed on a horizontal pipe from above when the pipe is completely flooded. Installation is not recommended in parts of the pipe system that may become aerated (highest parts of the pipe system, horizontal areas with open ends).

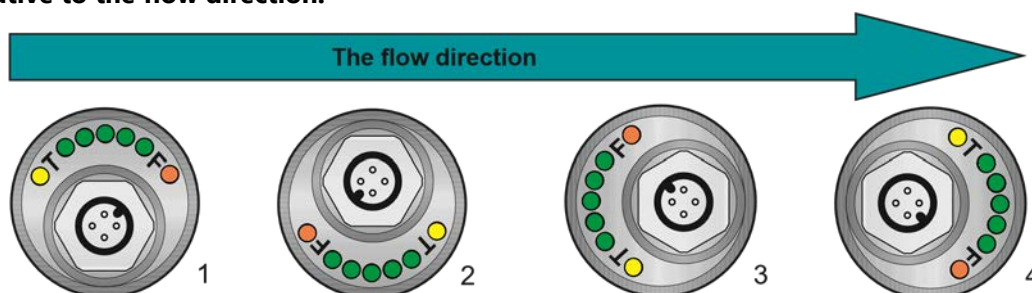


When measuring very low flow rates in water pipe systems, where there is a risk of dirt accumulating on the stem of the sensor, it is recommended to install it from the side of the pipe.

Disruptive elements cause the media to swirl, which reduces measuring accuracy. For this reason, the sensor installation location is selected so that there are calming direct pipe segments before and after the sensor. A direct segment of length 5...10 DN is recommended before the sensor and a direct segment of length 3...5 DN behind it. Disruptive elements are understood to mean bends, elbows, valves, reductions, other sensors, etc.

The sensor is screwed into a threaded sleeve in the pipe. For tightening, a 27 mm open end wrench must be used. The tightening torque must be selected respecting the used seal and the working overpressure in the pipe system.

Positions relative to the flow direction:




The sensitivity of the sensor depends on its position relative to the flow direction. Optimal positions are no. 1 and no. 2. In these positions, the signal from the sensor is not dependent on the flow direction and sensitivity corresponds to factory settings. The lighting up of individual LED diodes on the bar graph is practically linear relative to the flow rate.

In position 3, the sensor is more sensitive to small flow rates, the ability to differentiate large flow rates is limited.

In position no. 4, the sensor is able to detect larger flow rates well, the sensitivity to small flow rates is limited.

Electrical connection

 **Electrical connection can only be made in a voltage-free state!**

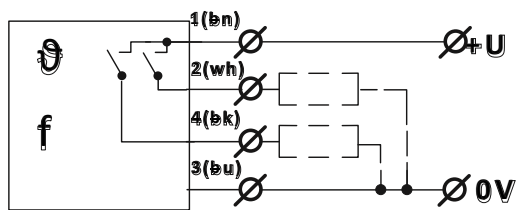
A sensor with PNP type of outputs can be loaded only by resistive or inductive loads. The positive pole of the supply voltage (+U) is connected to the brown wire *BN* or *pin connector no.1*, the negative pole (0 V) is connected to the blue wire *BU* or *pin connector no.3*. Flow rate load on the black wire *BK* or *pin connector no.4* and temperature load on the white wire *WH* or *pin connector no.2*.

The capacitive loads and low resistance loads (e.g. bulb) are evaluated by the sensor as a short circuit.

Wiring diagrams are provided in the figures below.

Flowmeter TFS-25 with a type A, B, V or H cable terminal, is connected to the assessment units permanently by a connection cable, see. Dimensional drawings.

The TFS-25 flow meter with connection method type C (see Dimensional drawings) is connected to the assessment units by means of a connector socket with a pressed-in cable, or by means of a detachable connector socket without a cable (e.g. ELWIKA), see accessories. In this case the cable is connected to the inside pins of the socket according to the figure below. The recommended diameter of this cable when using ELWIKA connectors is 4 to 6 mm (the recommended wire cross-sectional area is 0.5 to 0.75 mm²).



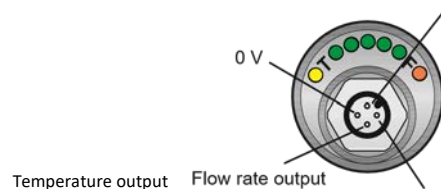
+U
Connection of flow meter TFS-25

Cable wire colours:

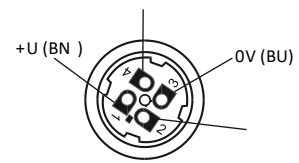
BN – brown

BK – black

BU – blue



Flow rate output (BK)



WH – white

Temperature output (WH)

Inside view of the connector socket (variant "C")

Settings

Settings are performed by placing the magnetic pen on to the sensitive spot marked **BAR GRAPH** "T" or "F" located between the LEDs. In this way, the minimum and maximum flow rate, flow rate switching point, temperature switching point, switching modes (O, C) are

TEMPERATURE OUTPUT (green LED) FLOW OUTPUT

(yellow LED) (orange LED)

rate, flow rate switching point, temperature switching point, switching modes (O, C) are

10 – bare cylindrical

(+ cable length) G1/2 – pipe thread G 1/2"

Correct specification examples

TFS–25N-10-G1/2–PFPT–A-L20 cable 2 m

(N) configuration for normal areas; **(10)** non-insulated cylindrical, **(G1/2)** process connection with thread G1/2", **(PFPT)** PNP type flow rate and temperature sensing terminals, **(A)** stainless steel cable terminal, **(L20)** length of stem 20mm. cable 2 m)

TFS–25N-10-G1/2–PFPT–C-L20

(N) configuration for normal areas; **(10)** non-insulated cylindrical, **(G1/2)** process connection with thread G1/2", **(PFPT)** PNP type flow rate and temperature sensing terminals, **(C)** M12 connector), **(L20)** length of stem 20mm.

TFS–25N-10-G1/2–PFPT–B-L20 cable 12 m

(N) configuration for normal areas; **(10)** non-insulated cylindrical, **(G1/2)** process connection with thread G1/2", **(PFPT)** PNP type flow rate and temperature sensing terminals, **(A)** plastic cable terminal, **(L20)** length of stem 20mm. cable 12 m)

Accessories

optional – for a surcharge (see catalogue sheet of accessories)

- cable (over the standard 2m length)
- connector socket (type ELWIKa or ELKA)
- standard steel or stainless steel welding flange
- protective hose (for type of cable terminal H)
- stainless steel fixing nut
- various types of seals (PTFE, Al, etc.)

Protection, safety and compatibility

The flow meter TFS–25 is equipped with protection against voltage polarity reversal, protection against current overload and protection against short term overvoltage.

Protection against dangerous contact is provided by low safety voltage according to 33 2000-4-41.

Electromagnetic compatibility is provided by conformity with standards EN 55011 / B, EN 61326-1, EN 61000-4-2

(8 kV). -4-3 (10 V/m). -4-4 (2 kV). -4-5 (1 kV) and -4-6 (10 V

Packaging, shipping and storage

The TFS-25 device is supplied packaged in a cardboard box that protects it against mechanical damage.

When handling and during transport, it is necessary to prevent impacts and falls.

The TFS-25 electrical device must be stored in dry enclosed areas with humidity up to 85%, free of aggressive vapours at temperatures between -10°C and 50°C, and must be protected against the effects of weather.