Operating Manual

4 - MODULAR - ECONOMIC - FLOW -

MEFS-KT

Content

1 General Information

Read this operating manual before mounting and start-up of the flow sensor. Keep this operating manual in a place that is accessible at any time to all users. The following mounting and operating instructions have been compiled with great care, but it is not feasible to take all possible applications into concideration. If questions remain regarding a specific application, please contact the device supplier.

With special models please note specifications in the delivery note.

If the serial number becomes illegible (e. g. by mechanical damage), the retraceability of the instrument becomes impossible. The flow sensors as described in this operating manual are carefully designed and manufactured using state-of-the-art technology. Every component undergoes strict quality inspection in all stages of manufacture.

Intended Use

Use the flow sensor to transform the flow velocity into an electrical signal.

Required Knowledge

Install and start the flow sensor only if you are familar with the relevant regulations and derectives of your country and if you have the qualification required. You have to be acquainted with the rules and regulations on measurement and control technology and electric circuits, since this flow sensor is “electrical equipment” as defined by EN 50178. Depending on the operation conditions of your application you have to have the corresponding knowledge, e. g. of corrosive media.

2 Overview

Further product and safety information can be found in chapters *Signs, Abbreviations* (Chap. 3) and *Storage, Disposal* (Chap. 5), *Safety Instructions* (Chap. 7) and *Start-Up, Operation* (Chap. 9).
Read these chapters in any case.

3 Signs, Abbreviations

Warning!
Non-compliance can cause injuries to persons and/or the demolition of the device. There can be a danger to life.

Attention!
Non-compliance can cause faulty device operation or lead to property damage.

Information!
Non-compliance can influence device operation or cause unintentional device reactions.

U+: Positive supply connection
U-: Negative supply connection
SIG (+): Output signal

4 Maintenance, Accessories

The flow sensors MEFS-KT are maintenance-free.

Only the manufacturer should conduct repairs.

For necessary accessories please contact your supplier.

5 Storage, Disposal

Please remove all rest media before storing the device after operation. Rest media in dismounted pressure transmitters can be hazardous to persons, the environment and the installation. A suitable and thorough cleaning is recommended.

Disposal

Dispose instrument components and packaging materials as per the respective waste treatment and disposal regulations of the region or country to which the sensor is supplied to.

6 Function

By means of a sensor element and auxiliary energy a temperature difference is used to convert the actual flow velocity into an electrical standard signal. This electric signal changes in proportion to the flow velocity and can be further processed.

7 Safety Instructions

Select the appropriate flow sensor with regards to measurement range, type and specific measurement conditions prior to mounting and start-up of the device.

Please comply with your country-specific norms and regulations. Hazardous materials like oxygen, acetylene, inflammable or toxic media, as well as refrigerating systems, compressors etc. make it necessary to comply with relevant regulations beyond the general rules.

Non-**compliance can cause heavy injuries and damage!**

- **Open process connections only when the system is unpressurized!**
- Make sure to keep flow sensor operation inside the overload limit at all times.
- Comply with environmental and operation parameters as outlined in chapter *Technical Data* (page 12).
- Please comply with *Technical Data* (page 12) for sensor application in conjunction with corrosive media and to avoid mechanical hazards.
- Ensure that the flow sensor is only operated as per the provisions as described in this operating manual.
- Do not conduct changes at the flow sensor or interfere with the device in ways which deviate from the descriptions in this operating manual.
- If faults can not be eliminated, shut down the sensor and mark it to avoid accidental start-up.
- Rest media in dismounted flow sensors can be hazardous to persons, the environment and the installation. **Use sufficient safety measures!**
- Only the manufacturer should conduct repairs.
- Create dead voltage condition on device before removing plug or cover.

8 Before Mounting

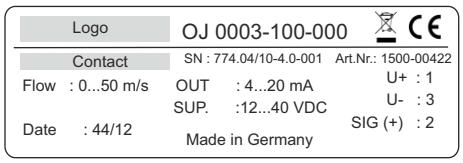
Check if a completely assembled flow sensor is supplied.

Inspect the flow sensor for possible damage during transportation. Should there be any obvious damage, inform the transport company and supplier without delay.

Keep the packaging, as it offers optimal protection during transportation.

Ensure the pressure connection thread and the connection contacts will stay undamaged.

9.1 Product Label (Example)

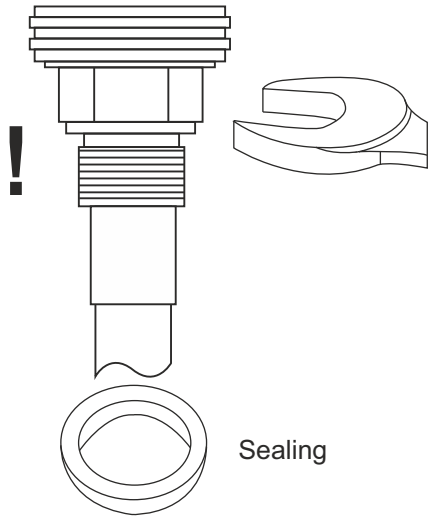


OJ... : Product code
Flow : Sensor input
U+ : Supply +
U- : Supply -
SIG (+) : Output signal

Art.Nr.: Part number
SN : Serial number
Date : Date of QC
OUT : Current signal
SUP. : Range of voltage

9.2 Mounting Process Connection

Tools: wrench (flats 27), screw driver



A sealing element is necessary for mounting, exceptions are instruments with self-sealing threads (e. g. NPT thread).

When mounting the instrument, ensure the sealing surfaces at sensor and measurement point are clean and undamaged.

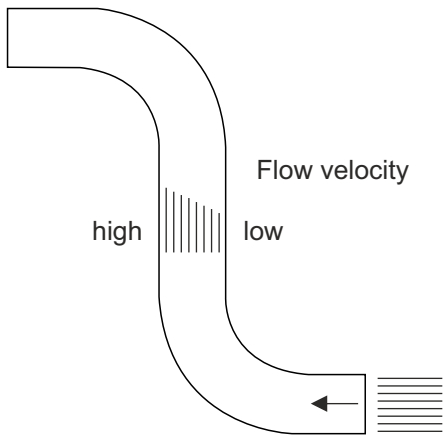
When screwing in, only use suitable tools and only screw in via wrench flats. Please comply with the specified torque. The right torque is dependent on process connection dimensions and the type of seal used (form/material). Do not use the casing as a working surface for screwing in.

Don not tilt the threads when screwing in.

Please comply with specifications for female threads and welding sockets!

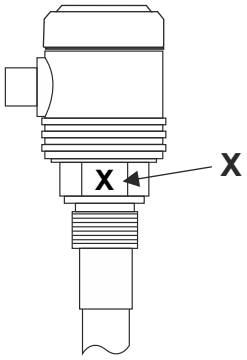
9.3 Notes for Mounting and Installation

9.3.1 Fitting position when considering different flow velocities



9.3 Notes for Mounting and Installation

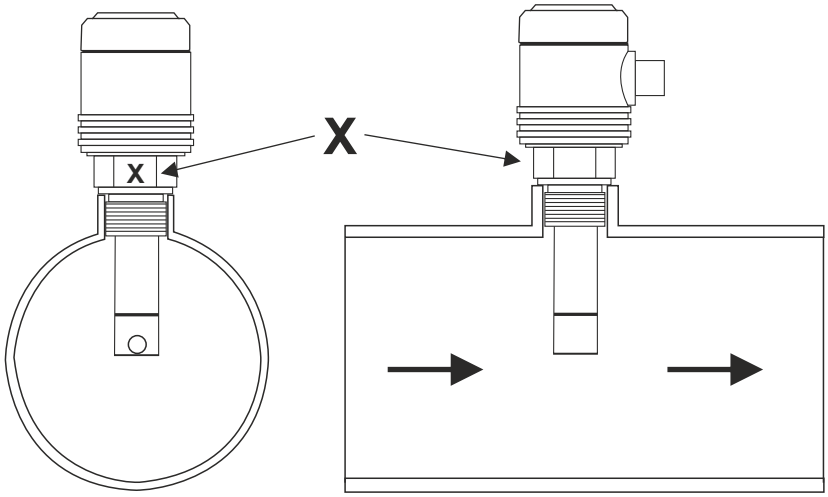
9.3.2 Mark for Sensor Fitting Position



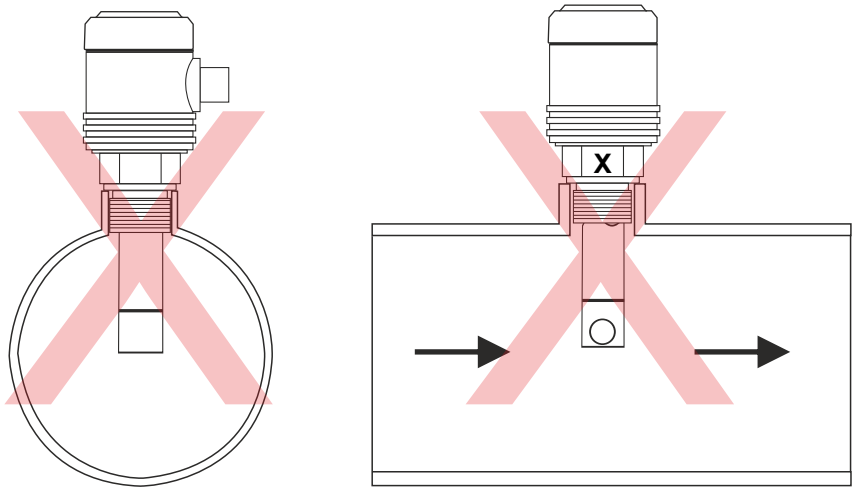
Every process connection has a mark for the sensor fitting position.

For optimal performance, the mark should point against flow direction.

9.3.3 Fitting Position for Sensor and Flow Direction



When mounting the sensor it is important that the fitting position mark points against the flow direction.

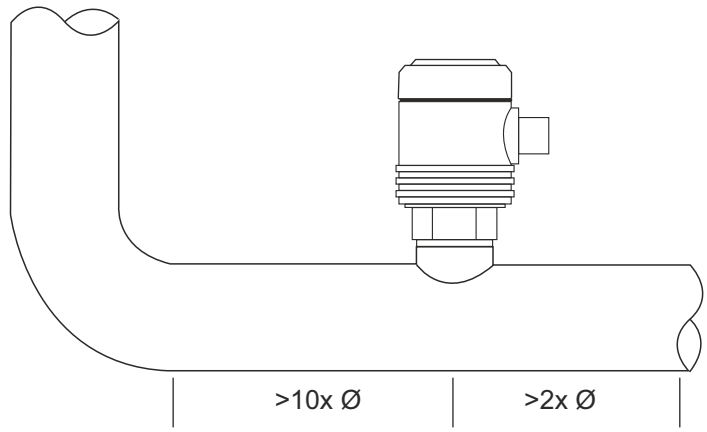


Do not mount the device as shown left, or the performance of the device will be greatly reduced.

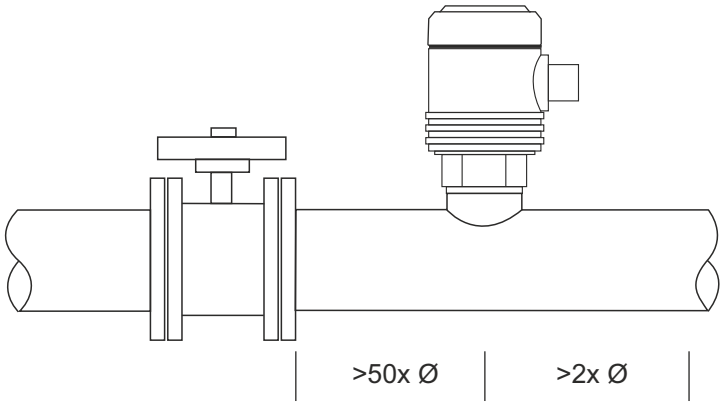
9.3 Notes for Mounting and Installation

9.3.4 Select a Suitable Installation Site

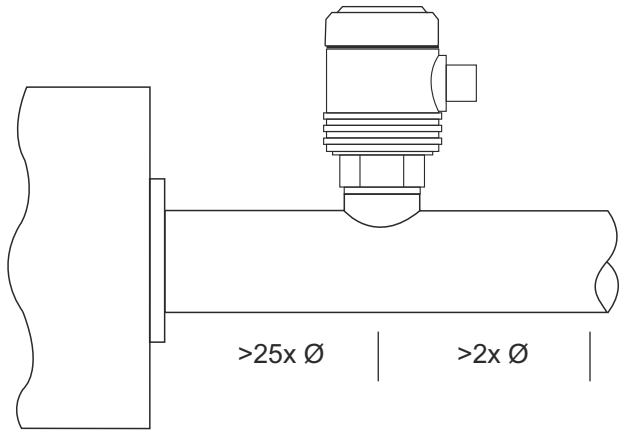
Avoid mounting in areas of extreme flow turbulence. All downstream dimensions are only provided as a guideline and whenever possible, larger spacing should be considered.



Directly behind bends or after extensions/reductions



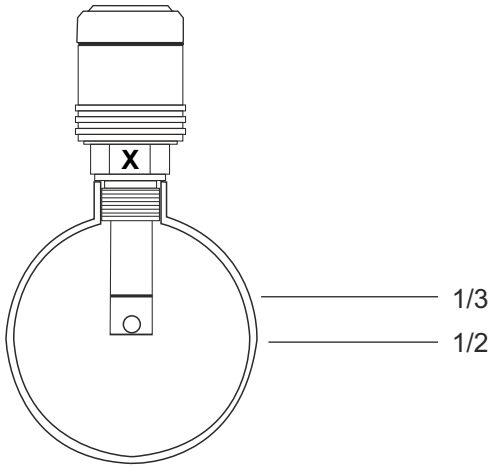
Directly downstream of insulation and control valves.



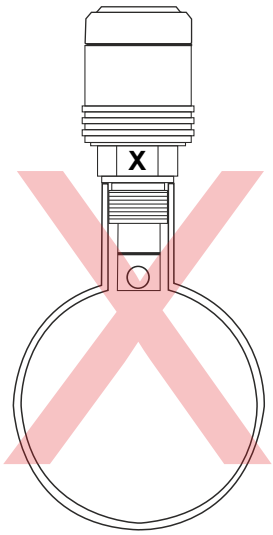
Directly after pumps, fans and compressors.

9.3 Notes for Mounting and Installation

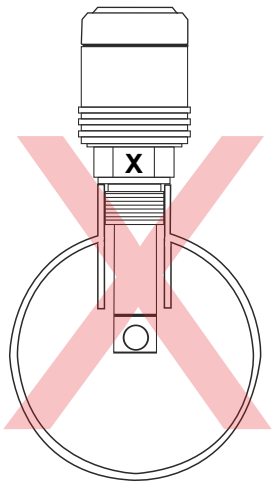
9.3.5 Sensor Insertion Depth



For optimum measuring performance the active area should be positioned anywhere between 1/3 and 1/2 of the internal pipe diameter.



The screwed socket is too long, the sensor element does not extend deep enough into the pipe.



The screwed socket extends too far into the pipe. This causes an additional pressure drop.

9.4 Electrical Connection

Ground the device via process connection.

The specified protection class only applies in plugged condition with a socket connector with corresponding protection class .

Select a suitable cable diameter for the cable bushing of your plug. Check that the cable gland of the mounted plug is fitted correctly. Check that the seals are present and undamaged. Tighten the threaded connection and check that seals are fitted correctly. Otherwise, the protection class can not be guaranteed.

When using cable outlets, make sure no moisture can seep in at the end of the cable.

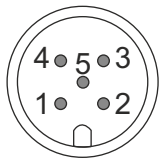
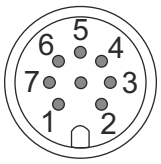
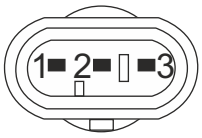
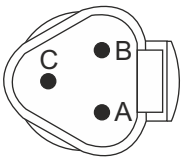
Cables have to be laid in a way which avoids forces or torque to affect the device.

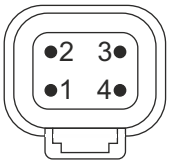
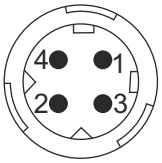
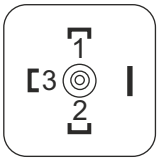
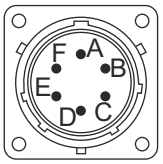
9.5 Pin Assignment

Connection	Supply		Out	Programming
	U+	U-	+	
M12, 5-pole	1	3	2	5
M12, 8-pole	1	3	6	
Super Seal, 3-pole*	1	3	2	
Deutsch DT04, 3-pole*	A	B	C	4
Deutsch DT04, 4-pole	1	3	2	4
Bayonet DIN, 4-pole	1	2	3	GND
Valve (L-plug), 4-pole	1	2	3	
Cable, 4-pole	yellow	white	green	
Cable, 6-pole	yellow	white	pink	
MIL, 6-pole	A	C	F	

* When using 3-pole connectors, changing the measuring range is impossible after sensor assembly.

View: Plug pins of male connector

M12, 5-pole	M12, 8-pole	Super Seal, 3-pole	Deutsch DT04, 3-pole	
				

Deutsch DT04, 4-pole	Bayonet DIN, 4-pole	Valve (L-plug), 4-pole	MIL, 6-pole	Cable, 4-, 6-pole
				LIYCY 4 or 6x0,25 mm² grey

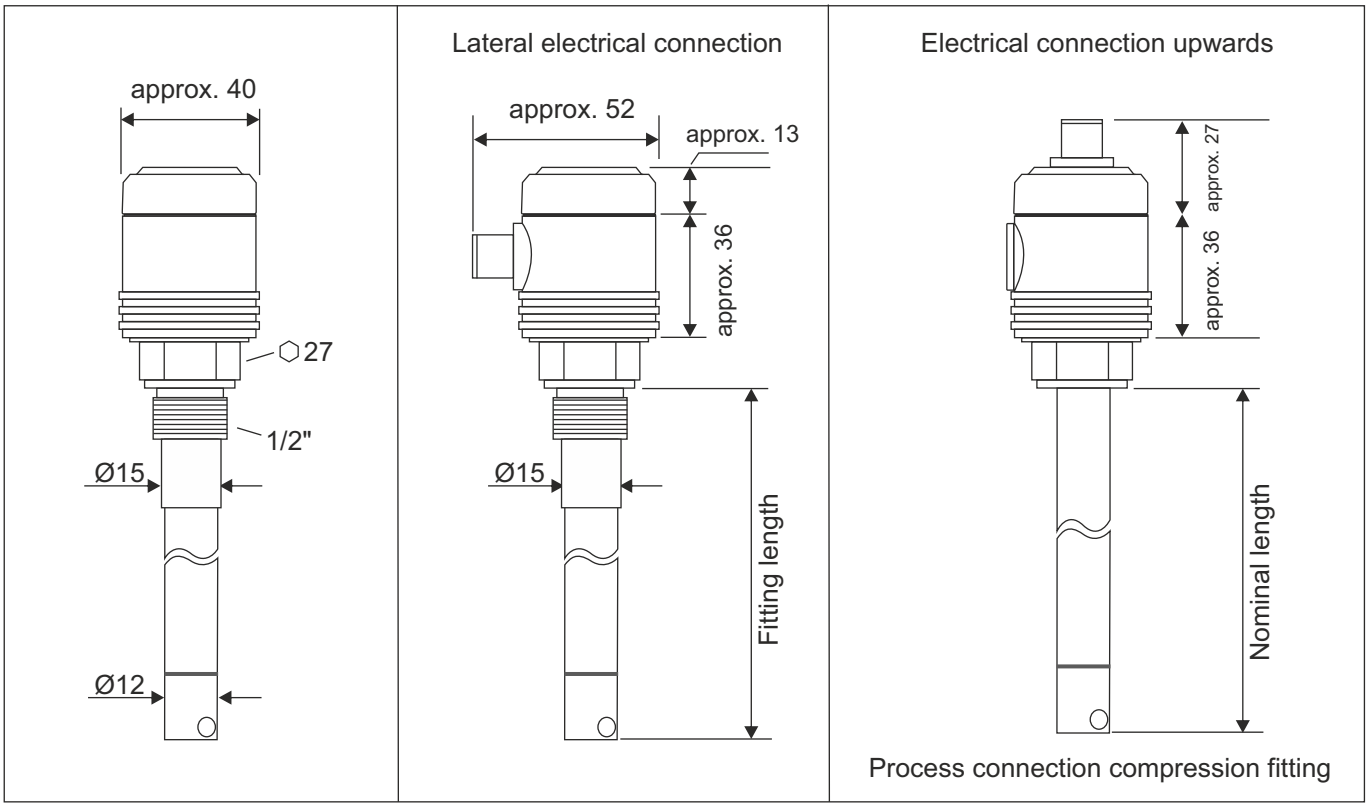
9.6 Function Test

The output signal must be proportional to the flow velocity. If not, this might point to sensor damage. In that case refer to chapter *Fault Recovery* (page 11).

Warning

- Please open the process connections only when unpressurized.
- Attention: Please comply with the operating parameters as per chapter *Technical Data* (page 12).
- Please ensure the flow sensor is always operating within the load limit.
- Surfaces of instrument components may heat up during operation. Please exercise caution before touching the device.

10 Dimensions (in mm)



11 Fault Recovery

Warning

- Open connections only after the system is unpressurized.
- Take precautions regarding rest media in removed flow sensors. Rest media can endanger personnel, environment and installation.
- If the flow sensor is damaged or becomes unsafe for operation, remove it from service and mark it to prevent accidental start-up.
- Only the manufacturer should conduct repairs.

- Do not use any pointed or hard objects for cleaning to prevent damage to the sensor element.
- Verify in advance if pressure is being applied (valves / ball valve etc. open) and if the correct voltage supply and wiring type has been chosen.

Failure	Possible Cause	Procedure
No output signal	Cable break	Check passage
	No/incorrect voltage supply or surge voltage	Adjust voltage supply as per this operating manual
No/false output signal	Wiring error	Check pin assignment (see product label / operating manual)
Output signal unchanged after change in flow	Sensor element damaged	Replace device, if failure repeats, consult the manufacturer
Signal span dropping off / too small	Sensor element is damaged by e. g. impacts, abrasive / corrosive media, sensor corrosion	Replace device, if failure repeats inform the manufacturer
	Sensor not aligned in flow direction	Align sensor in direction of flow as per marking
Signal span fluctuates / is inaccurate	Electromagnetic interference source in the vicinity, e. g. converter	Shield sensor, shield cables, remove interference source
	Turbulences / cross flows caused by wrong mounting location	Mount the flow sensor on a suitable location
	Flow sensor not grounded	Ground flow sensor
	Violent fluctuations of process media	Damping, consult the supplier

Note: In case of unjustified reclamation an additional charge is possible.

Ensure the sensor is working properly after every system change. In case the fault persists, send the instrument in for repair or replacement.

Returns: Purge / clean dismounted instruments before returning them in order to protect personnel and the environment from any hazards caused by rest media.

12 Technical Data

Input			
Flow:	10 m/s / 20 m/s / 30 m/s Reference conditions: 20 °C, 1013 hPa		
Medium:	Air, non-corrosive gases		
Measuring principle:	Calorimetric		
Output			
Current signal:	4...20 mA		
Load:	500 Ω maximum		
Performance			
Sensor unit:	Measurement uncertainty:	±5% of final value, dependent on construction (within range 10...100%)	
	Reference section:	10x diameter for inflow and outflow	
	Repeating accuracy:	±2	
	Reaction time:	approx. 2 s	
	Dependence on temperature:	±0,01% / 1K	
	Transient response:	linear to flow velocity	
Supply			
Voltage:	24 VDC, ±10%		
Environmental Conditions			
Temperature:	Operating range:	0...+60 °C	
	Storage:	-20...+80 °C	
	Medium:	-20...+70 °C	
Condensation:	uncritical		
Mechanics			
Dimensions:	see page 10		
Process connection:	without / 1/2” / 3/4” / 1” / 1,5" / 1/2NPT		
Fitting, Nominal length:	80...400 mm		
System pressure:	10 bar with screwed connection		
Electrical connection:	see page 9		
Material:	Sensor:	Process connection:	stainless steel
		Sensor tube:	stainless steel
		Sensor element:	Al_2O_3 with glassivation
		Sensor retainer:	FKM
		Potting:	epoxy resin
	Body:	all parts:	PBT GF30
Weight:	approx. 170 g (1/2”, 100 mm, M12)		
Fitting position:	any		
Protection class:	Sensor:	IP67	
	Electronics:	at least degree IP65 (when electrical connection is plugged)	