MFS

High stability inline flow meter with compact, easy access transmitter

Application

- Measuring principle characterised by a wide flow rate range enabled by direct mass flow measurement.
- Measurement of utility and process gases as well as gas mixtures in small pipe sizes.

Device features

- Inline version from DN15 to DN100 (½” ÷ 4”).
- High measuring performance.
- Drift-free sensor.
- Compact housing.
- Backlit display with touch control and WLAN access.
- Remote display available.

Advantages

- Convenient and flexible programming.
- High level of process control - premium measurement accuracy and repeatability.
- Reliable monitoring.
- Easy maintenance - removable sensor.
- Full access to process and diagnostic information – numerous, freely combinable I/Os and fieldbuses.

Display views

UNIGAS® CIB UNIGAS

MFS

High stability inline flow meter with transmitter and display

Measuring principle

The measuring principle is based on a state-of-the-art thermal mass flow sensor with Pt resistance thermometers made from platinum and protected by micrometric ceramic and glass films that ensure negligible drift over time. The films also provide high protection against chemicals and oxidation. A temperature sensor monitors the actual process temperature while a heated resistance thermometer is kept at a constant differential temperature (compared to the measured process temperature) by controlling the electrical dissipated by the heating element. The greater the mass flow rate passing over the heated resistance thermometer, the greater the cooling effect and therefore the stronger the current required to maintain a constant differential temperature. This means that the current measured is an indicator of the mass flow rate of the fluid. This system is referred to V-CTA or “Volt - Constant temperature anemometer”.

Linearity

Signal linearity is processed by a linearisation control board designed exclusively for the installed mass sensor. This control is set by the manufacturer to linearise the output signal and to compensate for any errors due to changes in the measured fluid temperature. A second linearisation can be performed using the on-board display.

Reference operating conditions

Error limits according to ISO 11631
Dry air at 0 ÷ +50 °C (+32 ÷ +122 °F) at 0 ÷ 1 bar (0 ÷ 14.5 psi)
Accuracy based on ISO 17025 accredited calibration systems

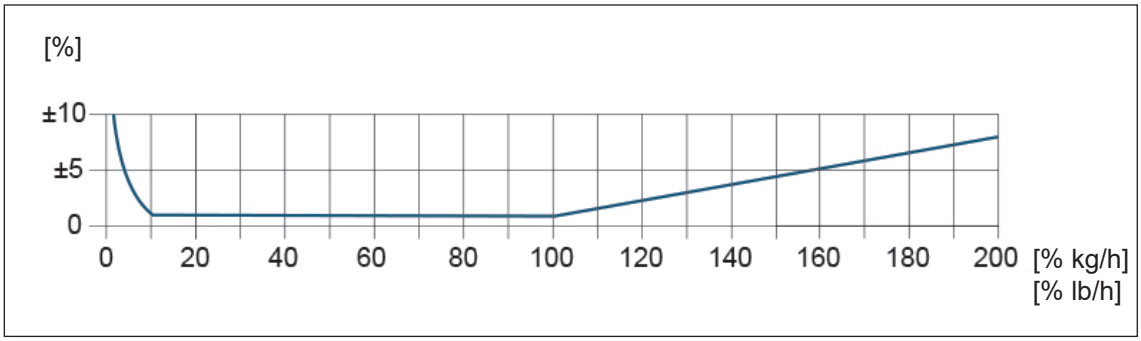
Available models

Model	List price	DN	Inner diameter (mm)	Natural gas Flow at 15 °C 1013 mbar (Sm^3/h)		Natural gas Flow at 15 °C 1013 mbar (kg/h)	
				Min	Max	Min	Max
MFS-80	*on request*	65	38	5	106	3.9	78.3
MFS-100			38	7	132	4.9	97.9
MFS-150			44	11	212	7.8	156.7
MFS-200			44	16	318	11.7	235.0
MFS-300			50	21	423	15.7	313.3
MFS-400			50	26	529	19.6	391.7
MFS-450			50	32	635	23.5	470.0
MFS-550	*on request*	100	68	37	741	27.4	548.3
MFS-700			80	48	953	35.2	705.0
MFS-800			80	53	1059	39.2	783.3
MFS-1000			80	74	1482	54.8	1096.6

Technical specifications

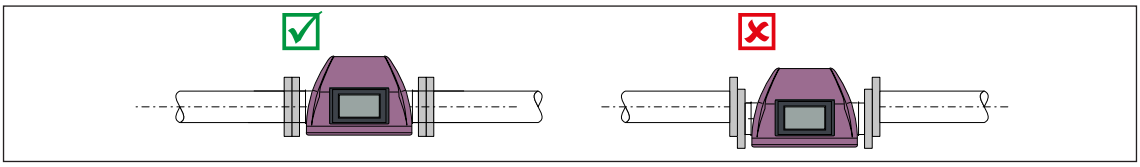
Supply voltage	230 V AC
Display	4.3” TFT Resistive
Protection	IP 54
Communication	Modbus RTU- RS485
	Ethernet
	4-20 mA
	Pulse
	PWM 0-5 kHz
Displayable measures	Sm^3/h / kW / kcal/h / kg/h selectable from display
	°C / °F / K selectable from display
	bar / mbar / Pa selectable from display
Totalizer	Sm^3 / kWh / kcal / kg selectable from display
24 V digital alarms	Instantaneous flow rate below minimum threshold
	Instantaneous flow rate above maximum threshold
	Totalizer maximum threshold exceeded
Precision	± 3 %
Error	see graph
Accuracy	± 1.0 % of instantaneous measured value
Repeatability	± 0.25 % of instantaneous value
Response time	< 1 s
Fluid temperature	0 ÷ 60 °C
Max pressure	1 bar
Max relative humidity	Up to 90 %

Maximum measurement error



Installation instructions

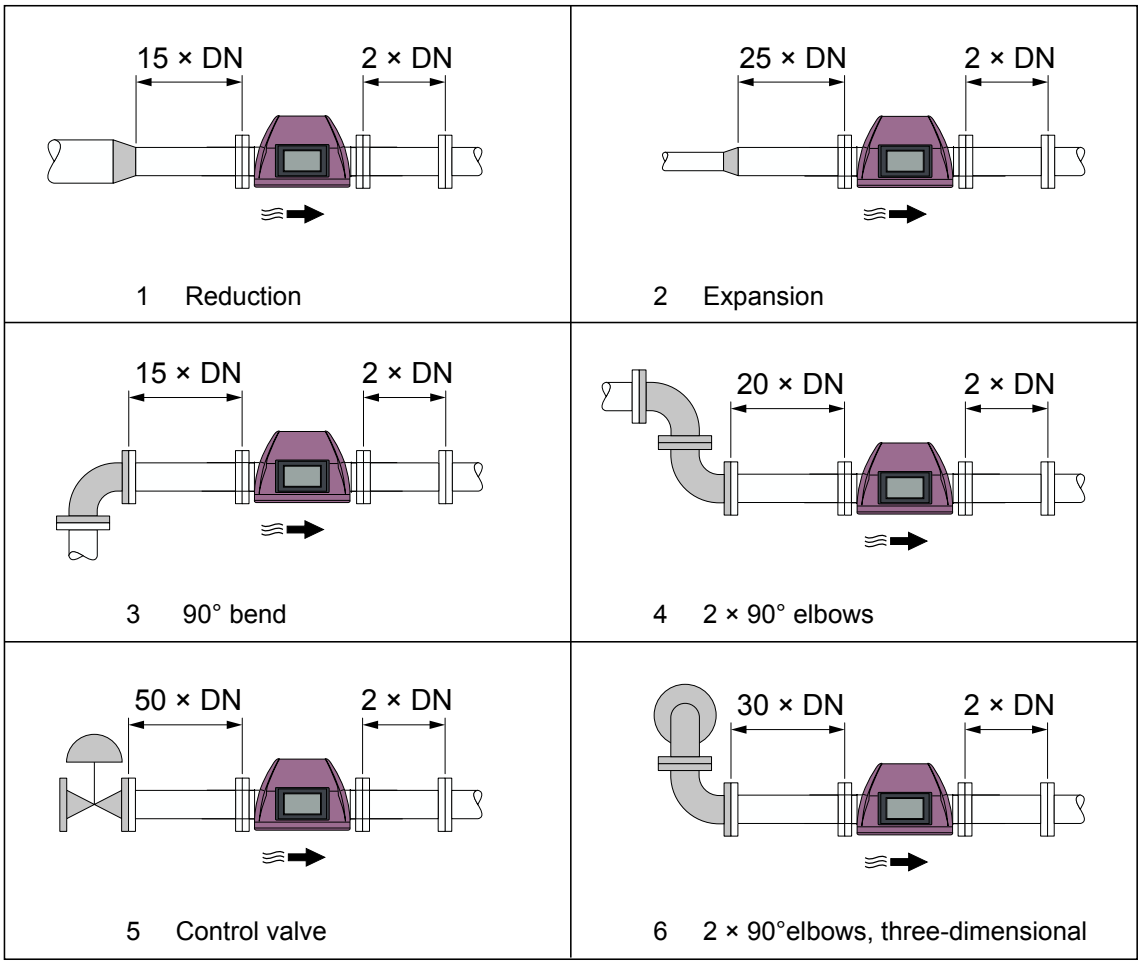
Install the measuring device in a parallel pane free of external mechanical stress.



Straight inlet and outlet runs

A fully developed flow profile is a prerequisite for the optimal measurement of thermal mass flow. For maximum measurement performance, maintain at least the following straight stretches on entry and exit.

- In the case of bidirectional sensors, keep to the recommended inlet run measurement also in the opposite direction.
- In the presence of several flow disturbances, use flow rectifiers.
- Use flow rectifiers if it is not possible to comply with the instructions for straight inlet runs.
- In the case of control valves, the influence of interference depends on the type of valve and the degree of opening. The recommended inlet run for control valves is 50 × DN.
- In the presence of very light gases (helium, hydrogen), the recommended inlet run must be doubled.



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