maddalena
METERING EXPERTISE

FUE380 ultrasonic flow meter

Benefits

- Battery-powered up to 6 years
- 115/230 V mains-powered with back-up battery option in case of mains power failure
- Fast measuring frequency 15 Hz/0.5 Hz (230 V AC/Battery)
- Easy one-button straight forward display
- 2-path measuring principle for optimum accuracy
- Compact or remote mounting
- Used on industrial plants
- No pressure drops
- Long-term stability
- 2 galvanically isolated digital outputs for easy connection to a calculator (potential-free)
- Analog output 4 to 20 mA
- Bidirectional measurement, with 2 totalizers and outputs
- Dynamic range Qi:Qp up to 1:50/100 or max. range Qi:Qs up to 1:400

The 2-path flowmeter SITRANS FUE380 comes as battery or mains-powered and is designed to measure water flow in district heating plants, local networks, boiler stations, substations, chiller plants (including glycol mixes without type approval) and other general water applications. The flowmeter FUE380 is approved according to energy meter standards EN 1434 class 2, OIML R 75 class 2 and MID MI-004 class 2. Metrological parameters are protected against manipulation.

Application

The main application for SITRANS FUE380 is measurement of water flow or water flow in energy meter systems for custody transfer in district heating networks or chilled water (including glycol mixes without type approval). Combined with an energy calculator and a pair of temperature sensors, SITRANS FUE380 can be used as part of an energy meter system.

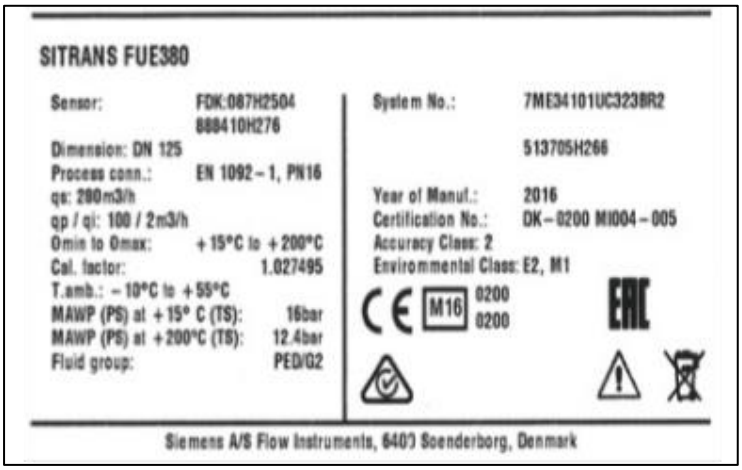
Design

The 2-path design of SITRANS FUE380 ensures maximum accuracy under short inlet conditions. The approved flowmeter consists of a flow sensor pipe, 4 transducers/transducer cables and a transmitter SITRANS FUE080. The unit is available in a compact or a remote version. Both versions are pre-mounted with short coax-cables. Remote transmitter up to a distance of 30 m by one Sensor link cable (SSL). Compact mounting is only possible up to 120 °C (248 °F). The sensor must be isolated to protect transmitter from heat. The transmitter is available in an IP67/NEMA 4X/6 enclosure.

FUE380 MI-004 approval

The SITRANS FUE380 program is type-approved according to international energy meter standard EN 1434. On 1 November 2006 the MI-004 energy meter directive became effective providing that all energy meters with a MI-004 verification label can be sold across the EU borders. The FUE380 are MI-004 verified and labeled products according to Directive 2014/32/EU of the European Parliament and Council of 26 February, 2014 on measuring instruments, Annex VI Thermal Energy Meters (MI-004), in sizes from DN 50 to DN 1200. The MID certification is obtained as module B + module D approvals according to the above-mentioned directive. Module B: MI-004 Type MID approval according to EN 1434: 2007 (approved for media water) Module D: Quality insurance MID approval of production. The MID system label with the approval information is placed on the side of the transmitter and on the sensor. An example of the product label is shown below:

FUE380 transmitter label



FUE380 sensor label

Integration

The flowmeter digital output is often used as input for an energy meter or as input for digital systems for remote reading. SITRANS FUE380 has two digital output functions that can be individually selected. Pulse output rate is defined when ordering. To get optimal benefit the pulse value must be selected as low as possible. If the flowmeter forms part of an energy meter system for custody transfer, no further approvals are needed, except possible local approvals on the flowmeter.

DN	Qs (m3/h)	Qmax (m3/h)	Qp (m3/h)	Qi (m3/h) OIML R 75/MID	Cut-off (m3/h)	Cut-off (% of Qmax)	Typical pulse value
100	180	189	60	1,20	0,600	0,32	2,5
125	280	294	200	2,00	1,000	0,34	2,5
150	420	441	300	3,00	1,500	0,34	10
200	700	735	500	5,00	2,500	0,34	10
250	1120	1176	800	8,00	4,000	0,34	10
300	1560	1638	1120	11,20	5,600	0,34	50
350	2100	2205	1500	15,00	7,500	0,34	50
400	2660	2793	1900	19,00	9,500	0,34	50
500	4130	4336,5	2950	29,50	14,75	0,34	100
600	6020	6321	4300	43,00	21,50	0,34	100
700	8120	8526	5800	58,00	29,00	0,34	100
800	10640	11172	7600	76,00	38,00	0,34	100
900	14000	14700	10000	100,00	50,00	0,34	100
1000	16800	17640	12000	120,00	60,00	0,34	100
1200	25200	26460	18000	180,00	90,00	0,34	100

TECHNICAL DATA

Pipe design	2-path sensor with flanges and inline transducers wet-calibrated from factory
Nominal size welded version	DN 100, 125, 150, 200, 250, 300, 350, 400, 500, 600, 700, 800, 900, 1000, 1200
Pressure rate	PN 16, PN 25, PN 40 EN 1092-1 flanges: • type 01 (B): DN 100 to DN 125 • type 11 (B): DN 150 to DN 1200
Pipe material	• DN 100 ... DN 1200: Carbon Steel EN 1.0345/P235 GH, painted in light-gray. • DN 100 ... DN 1200: Inline version and welded onto the pipe
Sensor operating conditions	
Ambient temperature	Operation -10 … +60 °C (14 ... 140 °F) (MID version: -10 … +55 °C (14 ... 131 °F)) • Storage -40 … +85 °C (-40 ... +185 °F) Measured media Heating water, according to VDI-2035 (pH 8.2 - 10.5), industrial VdTÜV information sheet 1466 and AGFW information sheet FW 510
Media/surface temperature	• DN 100 ... DN 1200 Remote: 2 … 200 °C (35.6 … 392 °F) MID: min. +15 °C/+59 °F • DN 100 ... DN 1200 Compact: 2 … 120 °C (35.6 … 248 °F) MID: min. +15 °C/+59 °F Degree of protection Sensor connection IP67/NEMA 4X/6
Electromagnetic compatibility	• Emitted interference To EN 55011/CISPR-11 • Noise immunity To EN/IEC 61326-1 (Industry) • MID Environment class E2 and M1 Max. flow velocity at Qs DN 100 … DN 1200: 9 m/s (29.5 ft/s)

Transmitter	The transmitter related to this system is the SITRANS FUE080. Technical specifications to the FUE080 see page 3/253 ff.
Sensor cable	Transducer cable length Pre-mounted with short coax- cables Sensor link cable length (SSL) 5, 10, 20, 30 m (16.4, 32.8, 65.6, 98.4 ft)
Certificates and approvals	
Conformity certificate (CE)	The devices are supplied as standard with a Certificate of Conformity
Material certificate	Material certificate according EN 10204-3.1 is optionally available
Calibration report	A standard calibration report is shipped with every flowmeter. Extended accredited ISO/IEC 17025 calibration certificates optionally available
Approvals	• Approval standards: EN 1434 and OIML R 75 Class 2 • Type approval: MID, MI-004, class 2 approval and certification (according to EN 1434) • CPA/CMC (China)

The sensors are approved according to EU directive 2014/68/EU dated 27 June 2014 regarding fluid group 1, classified in category III. Design according to EN 13480 (PED Directive).

Type-dependent settings

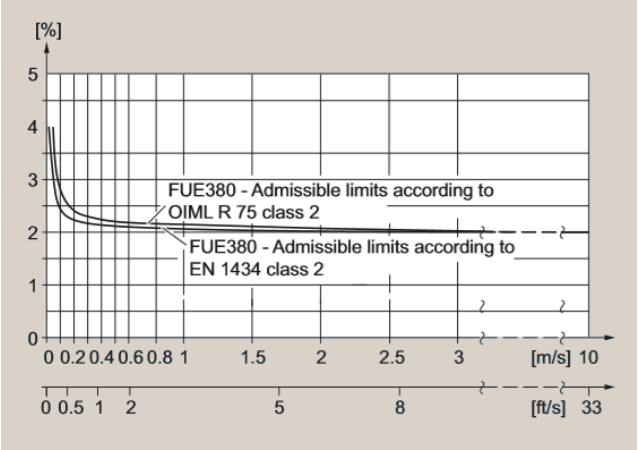
Flow value: Predefined according to EN 1434/ OIML R 75/MID
Approval: Country specific
Flow rate vf: 0.02 … 9 m/s (0.065 … 29.5 ft/s)
Output A: Preset: Forward pulses
Output B: Preset: Alarm
Pulse value A & B: Preset: See scheme - previous page
Pulse width: Preset: 5 ms
Flow unit setup: Preset: m3/h
Volume unit setup: Preset: m3

Flowmeter Calibration and traceability

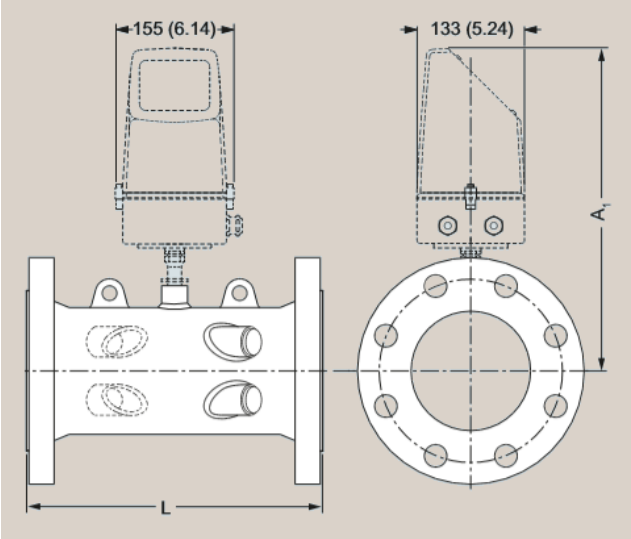
To ensure continuous accurate measurement, flowmeters must be calibrated. The calibration is conducted at Siemens flow facilities with traceable instruments referring directly to the physical unit of measurement according to the International System of Units (SI). Therefore, the calibration certificate ensures recognition of the test results worldwide, including the US (NIST traceability). Siemens offers accredited calibrations assured to ISO 17025 in the flow range from 0.0001 m³/h to 10 000 m³/h. Siemens Flow Instruments accredited laboratories are recognized by ILAC MRA (International Laboratory Accreditation Corporation - Mutual Recognition Arrangement) ensuring international traceability and recognition of the test results worldwide. A standard calibration certificate with Qn as selected flow is shipped with each SITRANS FUE380. This production calibration protocol consists of 2 x 3 points at Qi, 10 % Qp and Qp (max. 4 200 m3/h).

Typical accuracy

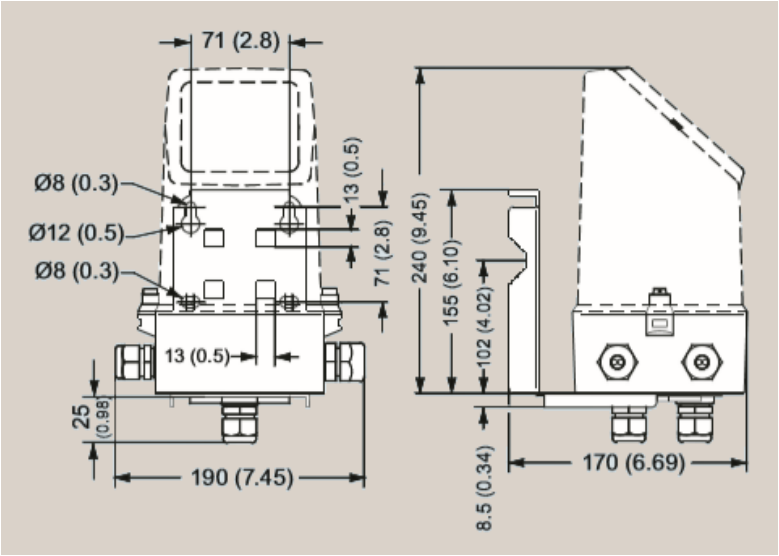
SITRANS FUE380: ± (0.5 + 0.02 Qp/Q) [%] Qp according to EN 1434/OIML requirements. Example: DN 100, Qp = 60 m3/h at Q = 1.2 m3/h: Accuracy at 1.2 m3/h = typical 1.5 %



Dimensional drawings



Transmitter IP67/NEMA 4X/6, wall mounting



Dimensions in mm (inch)

Sensor dimensions for FUS380 and FUE380

Size	PN 16		PN 25		PN 40			
	L	Weight	L	Weight	L	Weight	A_1	Lift hug
DN	mm	kg	mm	kg	mm	kg	mm	
100	350 +0/-2	15	-	-	350 +0/-2	18	372	No
125	350 +0/-2	18	-	-	350 +0/-2	24	385	No
150	500 +0/-3	28	-	-	500 +0/-3	34	399	No
200	500 +0/-3	38	500 +0/-3	47	500 +0/-3	55	425	Yes
250	600 +0/-3	60	600 +0/-3	76	600 +0/-3	91	452	Yes
300	500 +0/-3	66	500 +0/-3	81	-	-	478	Yes
350	550 +0/-3	94	550 +0/-3	121	-	-	495	Yes
400	600 +0/-3	124	600 +0/-3	153	-	-	520	Yes
500	625 +0/-3	194	625 +0/-3	231	-	-	570	Yes
600	750 +0/-3	303	750 +0/-3	365	-	-	622	Yes
700	875 +0/-3	361	875 +0/-3	553	-	-	673	Yes
800	1000 +0/-3	494	1000 +0/-3	770	-	-	724	Yes
900	1230 +0/-6	535	1300 +0/-6	835	-	-	775	Yes
1000	1300 +0/-6	594	1370 +0/-6	1000	-	-	826	Yes
1200	1360 +0/-6	732	-	-	-	-	928	Yes

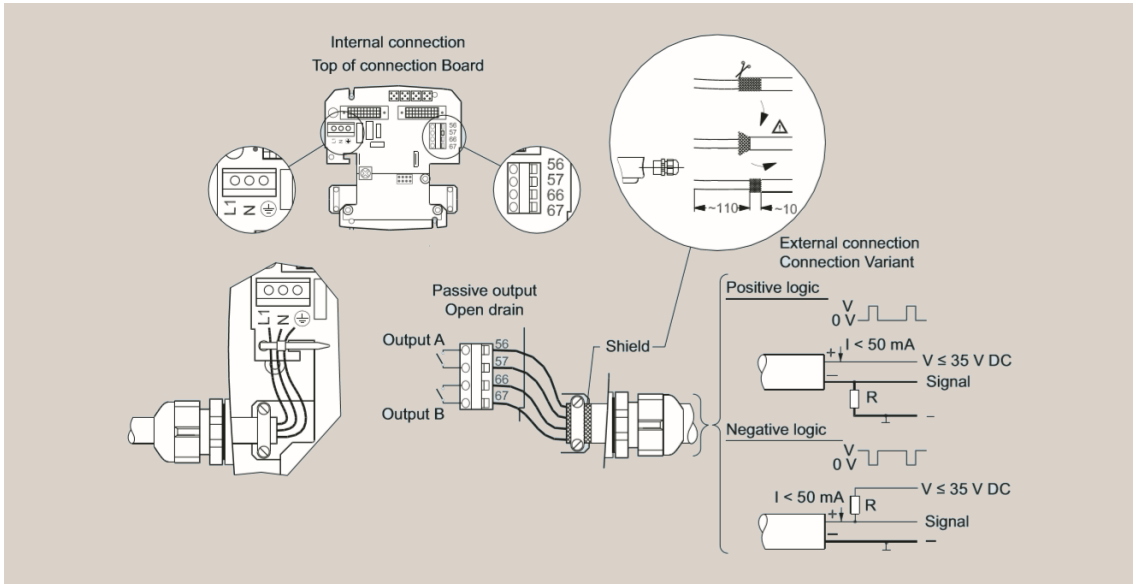
Notes:

• *Weight for transmitter/electronics 1.5 kg (compact version) or approximately 3 kg (remote version including 10 m cable set)*

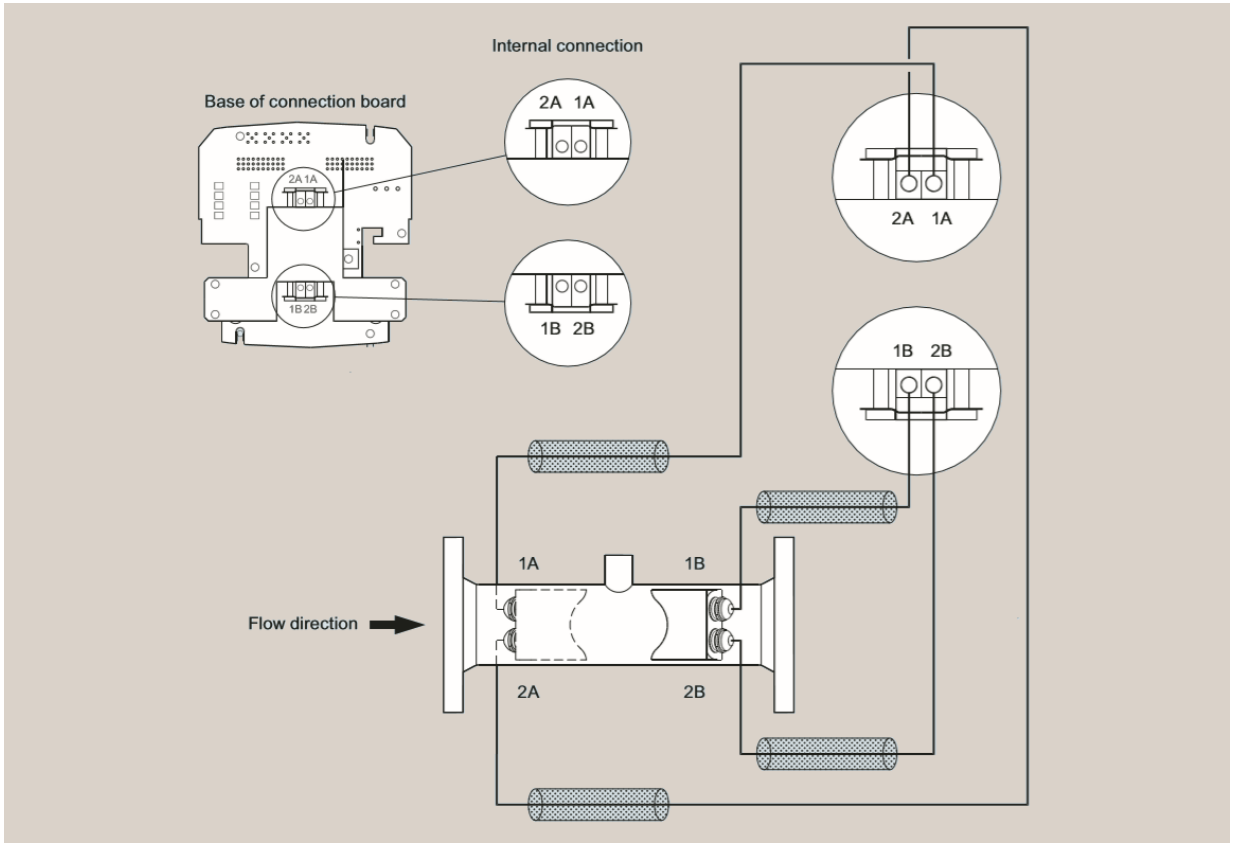
• *All weights are approximate*

• *For flange values - see norm EN 1092-1*

Schematics



Electrical connection of transmitter SITRANS FUS/FUE380



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