SITRANS FUS380/FUE380/SONOCAL 3000

Overview SITRANS FUS380

The 2-track flowmeter SITRANS FUS380 comes as battery or mains powered and is designed to measure water flow in district heating plants, local networks, boiler stations, substations, chiller plants and other general water applications.

The flowmeter is approved according to heat meter standards EN 1434 class 2 and OIML R75 class 2 and metrological parameters are protected against manipulation. The type approved flowmeter is named SITRANS FUE380.

Technically the meter types SITRANS FUS380 and SITRANS FUE380 are completely identical, only difference is the calibration limit.

Benefits

- Battery powered up to 6 years
- Battery back-up option in case of mains power failure
- Fast measuring frequency 20 Hz/0.5 Hz (230 V AC/Battery)
- Easy one button straight forward display
- 2-track measuring principle for optimum accuracy
- Compact or remote mounting
- Measures on all district water qualities and water conductivities
- No pressure drop
- Long-term stability
- Galvanic isolated digital output for easy connection to a calculator (potential free)
- Dynamic range Q_{min}:Q_{max} up to 1:400
- MODBUS RTU/RS 232, RS 485

Application

The main application for SITRANS FUS380 is measurement of water flow or water flow in heat meter systems in district heating networks or chilled water.

Combined with an energy calculator and a pair of temperature sensors, SITRANS FUE380 can be used as part of an energy meter system. For this purpose Siemens offers energy calculator SITRANS FUE950.

Design

The 2-track design of SITRANS FUS380 ensures maximum accuracy under short inlet conditions. The flowmeter consists of a flow sensor pipe, 4 transducers/transducer cables and a transmitter SITRANS FUS080.

The unit is available in a compact or a remote version with up to 30 meter distance from flowmeter to transmitter. When ordering a compact version the transducer cables are pre-mounted and ready for installation.

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.

Integration

The flowmeter digital output is often used as input for an energy meter or as input for digital systems for remote reading.

SITRANS FUS380 has two digital output functions that can be individually selected, and optional MODBUS RTU communication modules.

Pulse output rate is defined when ordering.

If the flowmeter forms part of an energy meter system for custody transfer, no further approvals are needed, except eventually local approvals on the flowmeter.

Overview SONOCAL 3000

SONOCAL 3000 ultrasonic flowmeters are designed with blind display and 115 to 230 V power supply only and approved for custody transfer according to PTB, class C, OIML R75, class 4 and a number of local country approvals.

Benefits

- No pressure drop
- Reliable and accurate flow measurements
- Long-term stability with excellent performance
- Can measure on all district water independent of water quality and conductivity
- Low cost of ownership
- Matched pair calibration of complete system
- Local country approvals
- Outputs: one analog, pulse and relay

Design

The SONOCAL 3000 ultrasonic flowmeters consist of a sensor type SONO 3300 CT, transmitter SONO 3000 CT without display incl. remote mounting device and 4 pcs 10 m coaxial cables for connecting the sensor and the transmitter.
The sensor is a 2-track direct shot sensor type with flanges and integrated transducers.

The transmitter is only available in the shown IP67 (NEMA 4X/6) version.

All systems are sealed for custody transfer.

SITRANS FUS380/FUE380/SONOCAL 3000

Configuration SITRANS FUS380

Selection guide SITRANS FUS380, standard version

Flowmeter size nominal to EN 1092-1			DN 100	DN 125	DN 150	DN 200	DN 250	DN 300	DN 350	DN 400	DN 500	DN 600	DN 700	DN 800
Flow range [1]	Q_{max} (q_s)	m^3/h	240	400	560	900	1400	2100	2800	3600	5500	8000	10800	14200
	Q_{min} (q_i)	m^3/h	0.6	1.0	1.5	2.5	4.0	5.6	7.0	9.5	14.75	21.50	29.0	38.0
Dyn. range	q_i:q_s		1:400	1:400	1:373	1:360	1:350	1:375	1:400	1:379	1:373	1:372	1:372	1:373

Selection guide SITRANS FUE380, type approved version

According to EN 1434, class 2, flowmeter values

Flowmeter size nominal to EN 1092-1			DN 100	DN 125	DN 150	DN 200	DN 250	DN 300	DN 350	DN 400	DN 500	DN 600	DN 700	DN 800
Flow range [1]	Q_{max} (q_s)	m^3/h	120 or 180	200 or 280	300 or 420	500 or 700	800 or 1120	1120 or 1560	1500 or 2100	1900 or 2660	2950 or 4130	4300 or 6020	5800 or 8120	7600 or 10640
	Q_{nom} (q_p)	m^3/h	60	100	150	250	400	560	750	950	1475	2150	2900	3800
	Q_{min} (q_i)	m^3/h	0.6	1.0	1.5	2.5	4.0	5.6	7.5	9.5	14.75	21.5	29.0	38.0
Pulse value [2]		l/pulse	2.5	2.5	10	10	10	50	50	50	100	100	100	100

According to OIML R75, class 2, flowmeter values

Flowmeter size nominal to EN 1092-1			DN 100	DN 125	DN 150	DN 200	DN 250	DN 300	DN 350	DN 400	DN 500	DN 600	DN 700	DN 800
Flow range [1]	Q_{max} (qs)	m^3/h	180	280	420	700	1120	1560	2100	2660	4160	6020	8120	10640
	Q_{nom} (q_p)	m^3/h	120	200	300	500	800	1120	1500	1900	2950	4300	5800	7600
	Q_{min} (q_i)	m^3/h	1.2	2.0	3.0	5.0	8.0	11.2	15.0	19.5	29.5	43.0	58.0	76.0
Pulse value [2]		l/pulse	2.5	2.5	10	10	10	50	50	50	100	100	100	100

Dynamic range q_i:q_p: better than 1:100 according to EN 1434 and OIML R75 class 2

Low flow cut off: 0.2% of q_p (nominal)

In order to obtain best pulse output resolution in the range Q_{min} - Q_{max} of approx. 100 Hz at q_s, two or three values for every dimension can be selected at ordering.

[1] Other flow ranges - see MLFB ordering table

[2] In connection with SITRANS FUE950 - other pulse values - see MFLB ordering table

Technical specifications SITRANS FUS380

Pipe design	2-track sensor with flanges and integrated transducers wet calibrated from factory
Nominal size welded version	DN 100, 125, 150, 200, 250, 300, 350, 400, 500, 600, 700, 800
Pressure rate	PN 16, PN 25, PN 40 EN 1092-1
Pipe material	Carbon Steel EN 1.0345 / p235 GH
Transducer design	Integrated version welded onto the pipe
Transducer material	Stainless steel AISI 316
Sensor operating conditions	
Storage	-40 … +85 °C (-40 … +185 °F)
Liquid temperature	• Remote: 2 … 200 °C (35.6 … 392 °F) • Compact: 2 … 120 °C (35.6 … 248 °F)
Degree of protection	Sensor connection IP67/NEMA 4X/6
Max. flow velocity	DN 100 … 800: • FUS380: 8 m/s (26.2 ft/s) • FUE380: 6 m/s (19.7 ft/s)

Transmitter

Display	LCD, 8 digits, additional 2 digits and symbols for status information
Push button	One push button for display information
Communication	IrDA – optical communication interface with MODBUS RTU protocol Add-on modules: • RS 232 serial interface with MODBUS RTU (Rx/Tx/GND), point to point with max. 15 m cable • RS 485 serial interface with MODBUS RTU (+/-/GND), multidrop with up to 32 devices with max. 1000 m cable MODBUS RTU protocol is an open protocol (further information available on request) Serial speed 1200, 2400, 4800, 9600, 19200, 38400 Baud

Enclosure	IP67/NEMA 4X/6 to EN 60529 and DIN 40050
Temperature ambient	0 … 60 °C (32 … 140 °F)
Temperature storage	-40 … +85 °C (-40 … +185 °F) (battery included)
Installation	Compact on sensor: max. 120 °C (248 °F), Separate: max. 30 m (98.4 ft) from transmitter
Mechanical vibration	2 g, 1 … 800 Hz sinusoidal in all directions to IEC 68-2-6
Design	Fibre-glass reinforced polyamide
Power supply	• Battery: replaceable 3.6 V LiSOCl (Lithium Thionyl Chloride) battery pack 32 Ah • Mains: 87 … 265 V AC (50 … 60 Hz)
Measuring rate	Battery mode: 0.5 Hz Mains supply: 20 Hz Back-up mode: 0.5 Hz (at mains supply drop)
Digital output	Two passive individual galvanically isolated MOS relay outputs, A and B, max. ±35 V AC/DC, 50 mA
Max pulse frequency	100 Hz
Alarm indication	Track 1 (F1), track 2 (F2), Low battery indication (F5), qs overflow (F6), pulse overflow (F7)
Cable length	Max. 30 m (98.4 ft) between transmitter and sensor
EMC	• Emission EN 61000-6-4 • Immunity EN 61000-6-2
Approvals	EN 1434 and OIML R75 Class 2 (EN version from 1. july 2002)

Type dependent settings

	FUS380	**FUE380**
Flow value	Predefined settings according to dimension	Predefined according to EN 1434 / OIML R75
Approval	No approval	Country specific
Flow rate v_f	0.02 … 8 m/s (0.065 … 26.2 ft/s)	0.02 … 6 m/s (0.065 … 19.7 ft/s)
Output A	Forward / reverse	Preset: Forward
Output B	Preset: Alarm	Preset: Alarm
Output B, function	Reverse pulse, alarm, call-up	Preset: Alarm
Pulse value A & B (depending on DN value)	0.5 l/p 1 l/p 2.5 l/p 10 l/p 50 l/p 100 l/p 250 l/p 500 l/p 1 m^3/p 2.5 m^3/p 5 m^3/p 10 m^3/p 25 m^3/p 50 m^3/p 100 m^3/p 250 m^3/p 500 m^3/p 1000 m^3/p	Preset: See scheme - previous page Preset for SITRANS FUE950 or free selectable
Pulse width	5/10/20/50/100/200/500 ms	Preset: 5 ms
Flow unit setup	Preset: m^3/h	Preset: m^3/h
Volume unit setup	Preset: m^3	Preset: m^3

SITRANS FUE380 uncertainty

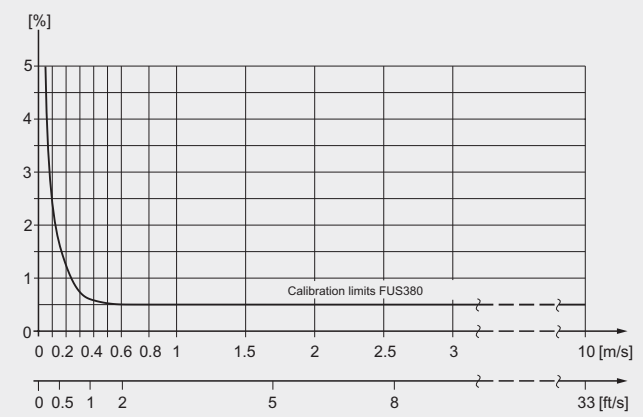
To ensure continuous accurate measurement, flowmeters must be calibrated. The calibration is conducted at SIEMENS flow facilities accredited according to ISO/IEC 17025 by DANAK or UKAS.

The accreditation bodies DANAK and UKAS have signed the ILAC MRA agreement (International Laboratory Accreditation Corporation - Mutual Recognition Arrangement). Therefore the accreditation ensures international traceability and recognition of the test results in 39 countries world wide, including the US (NIST traceability).

A calibration certificate is shipped with every SITRANS FUS380/FUE380.

Accuracy SITRANS FUS380:

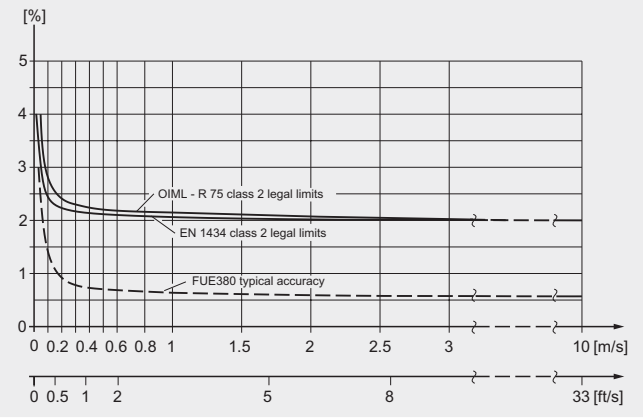
Standard calibration: Better than 0.5% of rate, 0.5 m/s < v < 8 m/s
v < 0.5 m/s, 0.5 + 0.25/v [%]



Typical accuracy SITRANS FUE380:

0.5 + 0.02 q_p/q [%]
q_p according to EN 1434/OIML requirements.

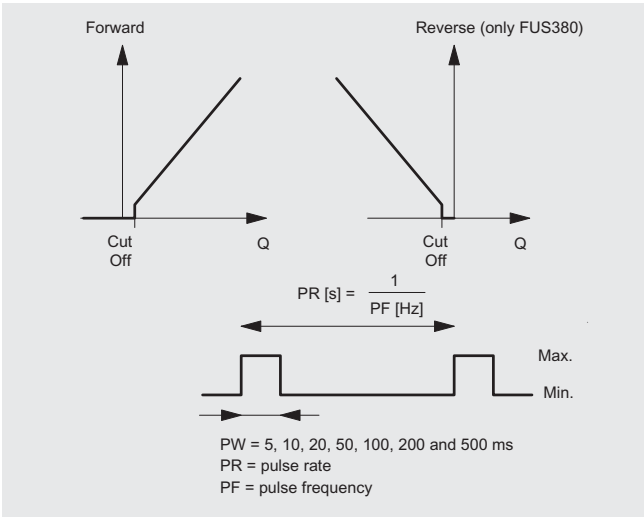
Example: DN 100, q_p = 60 m^3/h at q = 1.2 m^3/h:
Accuracy = typical 1.5 %



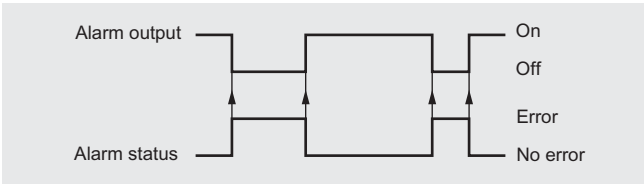
SITRANS FUE380 fulfils the requirements
$E_f = \pm(2 + 0.02\ q_p/q_i)$ max. ± 5%, according to EN 1434 and OIML R75, class 2 revised 1. July 2002

SITRANS FUS380/FUE380/SONOCAL 3000

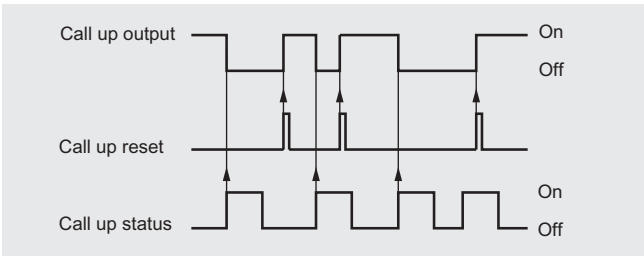
Output configuration SITRANS FUS380/FUE380



Pulse volume: output A/B configured as volume per pulse, calculated on forward/reverse or net forward/reverse flow. The volume per pulse is free scaleable (FUS380 only).



Pulse output B can be used as stated above or as alarm or call up function



Call up: the call up output is active until manually reset by use of PDM program. The callup function is activated when an alarm is activated.

Technical specifications SONOCAL 3000

SONO 3300 CT flow sensor

Accuracy	
Error in measurement at reference conditions; % of measured value	
Dynamic range	
• 1:20	Pulse output ≤ ± 0.5%
• 1:50	Pulse output ≤ ± 3%
Repeatability	≤ ± 0.25%
Maximum flow velocity	10 m/s (32 ft/s)
Nominal size	DN 50, 65, 80, 900, 1000, 1200 (2“, 2,5", 3", 36", 40", 48")
Liquid temperature	-10 … +200 °C (14 … 392 °F) depending on approval
Ambient temperature	-10 … +160 °C (14 … 320 °F) depending on approval
Enclosure	IP67 (NEMA 4X/6)
Process connections	
PN designated, EN 1092-1, type 11, B	• PN 16 (DN 50, 65, 80, 900, 1000, 1200 (2”, 2,5", 3", 36", 40", 48"))
	• PN 25 (DN 900, DN 1000 (36”, 40”))
	• PN 40 (DN 50, 65, 80 (2” ... 3”))
Transducers	Integrated version welded into the pipe
Materials	
Pipe	• DN 50 ... DN 80 (2” ... 3”): Steel GS-16 Mn5, mat. No. 1.1131
	• DN 900 ... DN 1200 (36” ... 48”): Steel EN 1.0345
Flange	• DN 50, 65, 80, 900, 1000, 1200 (2”, 2,5", 3", 36", 40", 48"): Steel EN 1.0025-S235JRG2
Tranducers	Stainless steel AISI 316 or similar
Certificates and approvals	
Material certificates	The sensor is supplied with a Siemens Certificate of Conformity
Custody transfer	PTB class C, OIML R75 class 4, many other local approvals

The sensors are approved according to EU Directive 97/23/EC dated 29 May 1997 regarding fluid in group 1, classified in category III. Design EN 13480.

Coaxial cable

The first 0.5 m (19.7 inch) of the coaxial cable	
Diameter	5.3 mm (0.21”)
Length	0.5 m (19.7”)
Material	PTFE
Ambient temperature	-200 … +200 °C (-328 ... +392 F)
Coaxial cable > 0.5 m (19.7 inch)	
Diameter	5.8 mm (0.23”)
Length	9.5 m (30.4 ft) Total max. length 10 m (32 ft)
Material	PE
Ambient temperature	-40 … +70 °C (-40 ... +158 °F)

SONO 3000 CT transmitter without display

Output	
Analog output	Individually galvanically isolated, isolation voltage 500 V
• Measurement of	Volume flow
• Current	4 ... 20 mA
• Load	< 800 Ω
• Time constant	5 s
Pulse output	Individually galvanically isolated, isolation voltage 500 V
• Measurement of	Volume flow
• Pulse width	5 ms
Pulse values	1-2.5-100 l/pulse depending on size, see selection guide
Output mode	
• Passive	5 ... 30 V/max. 200 mA
Relay output	
• Time constant/hysteresis	5 s/0.5% F.S.O.
• Change-over relay	Error indication
• Load	42 V, 0.5 A
Cut-off: low flow	0.8% F.S.O.

Rated operation conditions	
Ambient temperature	
• IP67 (NEMA 4X/6) version	
- Storage	-40 ... +85 °C (-40 ... +185 °F)
Mechanical vibrations	2 g, 1 .. 800 Hz sinusoidal in all directions to IEC 68-2-6
Degree of protection (enclosure)	IP67 (NEMA 4X/6) to EN 60529 and DIN 40050
Design	
Enclosure material	Fibre glass reinforced polyamide
Dimensional drawings and weight	See dimensional drawings
Power supply	
Supply voltage and power consumption	115 … 230 V +10%/-15%, 50 ... 60 Hz, 10 ... 20 VA
Certificates and approvals	
EMC	Emission EN 61000-6-4 Immunity EN 61000-6-2
Low voltage	Acoording to EN 61010-1
Approvals	
IP67 (NEMA 4X/6) version	PTB, class C, OIML R75, class 4

Selection guide SITRANS F US SONOCAL series 3000 flow part (DN 50, 65, 80, 900, 1000, 1200) with standard settings

Flowmeter size nominal to EN 1092-1			**DN 50**	**DN 65**	**DN 80**	**DN 900**	**DN 1000**	**DN 1200**
Flow range	Q_{max} (Qs)	m^3/h	45	72	120	6000	6000	7200
	Q_n (Qp)	m^3/h	36	60	100	5000	5000	6000
	Q_{min}	m^3/h	0.31	0.44	0.7	112	112	162
Flowrate at 20 mA	Q_{20mA}	m^3/h	36	60	100	5000	5000	6000
Pulse output		l/pulse	1	1	2.5	100	100	100

SITRANS FUS380/FUE380/SONOCAL 3000

Selection and Ordering data	Order-No.	Order code
Flowmeter SITRANS FUS380 (standard)	7ME3400 -	
Flowmeter SITRANS FUE380 (type approved)	7ME3410 -	
Flowmeter SITRANS F US SONOCAL 3000	7ME3320 -	

SITRANS FUS380 (standard) 7ME3400

Diameter	Qp [m³/h]	Qs [m³/h]	
DN 100 / 4"	60	60	1 N
DN 100 / 4"	60	180	1 Q
DN 100 / 4"	120	240	1 R
DN 125 / 5"	100	100	1 S
DN 125 / 5"	100	280	1 U
DN 125 / 5"	200	400	1 V
DN 150 / 6"	150	150	2 A
DN 150 / 6"	150	420	2 C
DN 150 / 6"	300	560	2 D
DN 200 / 8"	250	250	2 E
DN 200 / 8"	250	700	2 G
DN 200 / 8"	500	900	2 H
DN 250 / 10"	400	400	2 J
DN 250 / 10"	400	1120	2 L
DN 250 / 10"	800	1400	2 M
DN 300 / 12"	560	560	2 N
DN 300 / 12"	560	1560	2 Q
DN 300 / 12"	1120	2100	2 R
DN 350 / 14"	750	750	2 S
DN 350 / 14"	750	2100	2 U
DN 350 / 14"	1500	2800	2 V
DN 400 / 16"	950	950	3 A
DN 400 / 16"	950	2660	3 C
DN 400 / 16"	1900	3600	3 D
DN 500 / 20"	1475	1475	3 J
DN 500 / 20"	1475	4130	3 L
DN 500 / 20"	2950	5500	3 M
DN 600 / 24"	2150	2150	3 S
DN 600 / 24"	2150	6020	3 U
DN 600 / 24"	4300	8000	3 V
DN 700 / 28"	2900	2900	4 E
DN 700 / 28"	2900	8120	4 G
DN 700 / 28"	5800	10800	4 H
DN 800 / 32"	3800	3800	4 N
DN 800 / 32"	3800	10640	4 Q
DN 800 / 32"	7600	14200	4 R

SITRANS FUE380 (type approved) 7ME3410

Diameter	Qp [m³/h]	Qs [m³/h]	
DN 100 / 4"	60[1]	120	1 P
DN 100 / 4"	60[1]	180	1 Q
DN 100 / 4"	120[2]	180	1 R
DN 125 / 5"	100[1]	200	1 T
DN 125 / 5"	100[1]	280	1 U
DN 125 / 5"	200[2]	280	1 V
DN 150 / 6"	150[1]	300	2 B
DN 150 / 6"	150[1]	420	2 C
DN 150 / 6"	300[2]	420	2 D
DN 200 / 8"	250[1]	500	2 F
DN 200 / 8"	250[1]	700	2 G
DN 200 / 8"	500[2]	700	2 H
DN 250 / 10"	400[1]	800	2 K
DN 250 / 10"	400[1]	1120	2 L
DN 250 / 10"	800[2]	1120	2 M
DN 300 / 12"	560[1]	1120	2 P
DN 300 / 12"	560[1]	1560	2 Q
DN 300 / 12"	1120[2]	1560	2 R
DN 350 / 14"	750[1]	1500	2 T
DN 350 / 14"	750[1]	2100	2 U
DN 350 / 14"	1500[2]	2100	2 V
DN 400 / 16"	950[1]	1900	3 B
DN 400 / 16"	950[1]	2660	3 C
DN 400 / 16"	1900[2]	2660	3 D
DN 500 / 20"	1475[1]	2950	3 K
DN 500 / 20"	1475[1]	4130	3 L
DN 500 / 20"	2950[2]	4130	3 M
DN 600 / 24"	2150[1]	4300	3 T
DN 600 / 24"	2150[1]	6020	3 U
DN 600 / 24"	4300[2]	6020	3 V
DN 700 / 28"	2900[1]	5800	4 F
DN 700 / 28"	2900[1]	8120	4 G
DN 700 / 28"	5800[2]	8120	4 H
DN 800 / 32"	3800[1]	7600	4 P
DN 800 / 32"	3800[1]	10640	4 Q
DN 800 / 32"	7600[2]	10640	4 R

SITRANS F US SONOCAL 3000 7ME3320

Diameter	Qp [m³/h]	Qs [m³/h]	
Cast steel, mat. no. 1.1131/GS-16Mn5			
DN 50	36	45	1 C
DN 65	60	72	1 G
DN 80	100	120	1 L
Carbon steel, mat. no. 1.0345/P235GH			
DN 900	5000	6000	5 C
DN 1000	5000	6000	5 L
DN 1200	6000	7200	5 U

Flange norm and pressure rating	
No pipe (only FUS080)	A
EN 1092-1	
PN 16 (DN 50 ... 1200)	C
PN 25 (DN 200 ... 1000)	D
PN 40 (DN 50 ... 250)	E

Compact / remote connection	
Compact version, max. 120 °C (248 °F) FUS380/FUE380 only	0
Remote version, SONOCAL 3000 with 10 m (32.8 ft) cable	1
Remote version, max. 200 °C (392 °F)	
5 m (16.4 ft)	2
10 m (32.8 ft)	3
20 m (65.6 ft)	4
30 m (98.4 ft)	5

SITRANS FUS380/FUE380/SONOCAL 3000

Selection and Ordering data	Order-No.	Order code
Flowmeter SITRANS FUS380 (standard)	7ME3400-	
Flowmeter SITRANS FUE380 (type approved)	7ME3410-	
Flowmeter SITRANS F US SONOCAL 3000	7ME3320-	
Approvals / pulse output		
Without approval (neutral) Selectable pulse output (SONOCAL 3000 standard)	0	
Only FUE380 and SONOCAL 3000		
With approval marks Selectable pulse output (SONOCAL 3000 standard)	1	
With approval marks and seal Selectable pulse output (SONOCAL 3000 standard)	2	
Without approval (neutral) (FUE380 only) Preset pulse output for FUE950 energy meter	3	
With approval marks (FUE380 only) Preset pulse output for FUE950 energy meter	4	
With approval marks and seal (FUE380 only) Preset pulse output for FUE950 energy meter	5	
Pulse value for SITRANS FUE950		
1 l/pulse (SONOCAL 3000 DN 50...DN 65)	2	
2.5 l/pulse (SONOCAL 3000 DN 80) (DN 100, DN 125 SITRANS FUE380)	3	
10 l/pulse (DN 150 ... DN 250 SITRANS FUE380)	4	
50 l/pulse (DN 300 ... DN 400 SITRANS FUE380)	5	
100 l/pulse (SONOCAL DN 900...1200) (DN 500 ... DN 800 SITRANS FUE380)	6	
Pulse value FUS380/FUE380		
250 l/pulse	7	
1 m^3/pulse	8	
0.5 l/pulse	9	N0B
5 l/pulse	9	N0C
25 l/pulse	9	N0D
500 l/pulse	9	N0E
2.5 m^3/pulse	9	N0F
5 m^3/pulse	9	N0G
10 m^3/pulse	9	N0H
25 m^3/pulse	9	N0J
50 m^3/pulse	9	N0K
100 m^3/pulse	9	N0L
250 m^3/pulse	9	N0M
500 m^3/pulse	9	N0N
1000 m^3/pulse	9	N0P
Transmitter Blind SONO 3000 CT		
IP67/NEMA4X/6, 115 ... 230 V AC SONOCAL 3000	A	
Transmitter SITRANS FUS080/FUE080		
IP67/NEMA 4X/6 115 ... 230 V AC	B	
IP67/NEMA 4X/6 (3.6 V battery supply)	D	
IP67/NEMA 4X/6 115 ... 230 V AC, including 3.6 V battery back up	E	
IP67/NEMA 4X/6 3.6 V battery version (no battery included)[3]	G	
Country / approval type [4]		
No approval mark	A	
Only FUE380		
Denmark, EN 1434/OIML R75	E	
Russia, EN 1434/OIML R75	M	

Selection and Ordering data	Order-No.	Order code
Flowmeter SITRANS FUS380 (standard)	7ME3400-	
Flowmeter SITRANS FUE380 (type approved)	7ME3410-	
Flowmeter SITRANS F US SONOCAL 3000	7ME3320-	
Country/ Approval-type SONOCAL 3000 only		
Austria / OE01 C 050	B	
Croatia / HR Q-1-1002	C	
Czech Republic / TCM 142/97-2741	D	
Denmark / TS 27.01 076 (OIML R75)	E	
Finland	F	
Germany / 2216 9802 (PTB)	G	
Hungary /Th-8290/4/2004	H	
Latvia	J	
Poland / ZT 597/2003	K	
Romania / RO 176/98	L	
Russia / 16373/1 (OIML R75)	M	
Switzerland / ZW 138	N	
Ukraine	P	
Yugoslavia / Q-2-17	Q	
China	Z	Q0C
Slovak Republic	Z	Q0L
Pulse width setup		
5 ms (always for SONOCAL 3000)	0	
5 ms (standard for SITRANS FUE950)	2	
10 ms	3	
20 ms	4	
50 ms	5	
100 ms	6	
200 ms	7	
500 ms	8	

1) EN 1434 flow values
2) OIML R75 flow values
3) Lithium batteries are subject to special transportation regulations according to United Nations "Regulation of Dangerous Goods, UN 3090 and UN 3091". Special transport documentation is required to observe these regulations. This may influence both transport time and costs.
4) Other countries in progress

Please also see www.siemens.com/SITRANSFordering for practical examples of ordering.

SITRANS FUS380/FUE380/SONOCAL 3000

Selection and Ordering data	Order code
Additional information	
Please add „-Z“ to Order No. and specify Order code(s) and plain text.	
Verification FUE380	
Verification certificate 2 x 3 points. Max. flow 50 ... 250 m^3/h depending on dimension	**D10** [1]
Verification certificate 2 x 3 points. Max flow 250 ... 1300 m^3/h depending on dimension	**D11** [1]
Verification certificate 2 x 3 points. Max flow 1400 ... 4200 m^3/h depending on dimension	**D12** [1]
Accredited Siemens calibration FUS380/FUE380	
Accredited Siemens ISO/IEC 17025 calibration. Max. flow 50 ... 250 m^3/h, depending on dimension	**D20**
Accredited Siemens ISO/IEC 17025 calibration Max. flow 250 ... 1300 m^3/h depending on dimension	**D21**
Accredited Siemens ISO/IEC 17025 calibration Max. flow 1400 ... 4200 m^3/h depending on dimension	**D22**
Verification SONOCAL 3000	
Verification certificate: 2 x 3 points, DN 50 ... DN 80 (Max. flow 36 ... 180 m^3/h depending on dimension)	**D10**
Verification certificate: 2 x 3 points, DN 900 ... DN 1200 (Max. flow 4300 m^3/h)	**D12**
Accredited Siemens calibration SONOCAL 3000	
Accredited Siemens ISO/IEC 17025 calibration DN 50 ... DN 80, (Max. flow 36 ... 180 m^3/h dep. on dim.)	**D20**
Accredited Siemens ISO/IEC 17025 calibration DN 900 ... DN 1200, (Max. flow 4300 m^3/h)	**D22**
Accredited third party calibration SONOCAL 3000	
Accredited third party calibration SONOCAL 3000	**D30**
Accredited - Third party ISO/IEC 17025 calibration DN 50 ... DN 80, (Max. flow 36 ... 180 m^3/h dep. on dim.)	
Accredited - Third party ISO/IEC 17025 calibration DN 900 ... DN 1200, (Max. flow 7000 m^3/h)	**D32**
Material certificate	
EN 10204-3.1.B	**F10**
Tag name plate	
Stainless steel tag with 12 mm characters, max. 15 characters (add plain text)	**Y17**
Self-adhesive plastic tag with 8 mm characters, max. 15 characters (add plain text)	**Y18**

[1] Only selectable in SITRANS FUE380

MLFB Ordering example

Customer requires a flowmeter for custody transfer:

- DN 250, PN 25, compact version (media temperature max. 120 °C), battery version.
- Type approved according to EN 1434, verified and sealed.
- Pulse output for energymeter SITRANS FUE950.

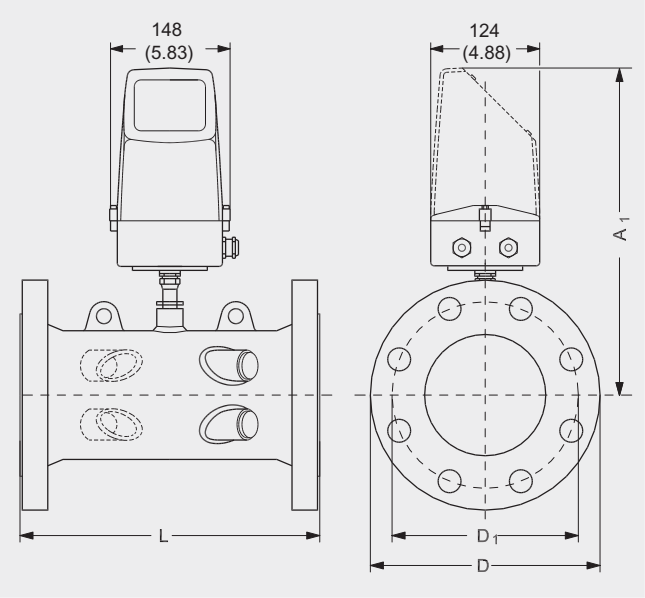
Ordering:

FUE380: **7ME3410-2KD05-4DE2**

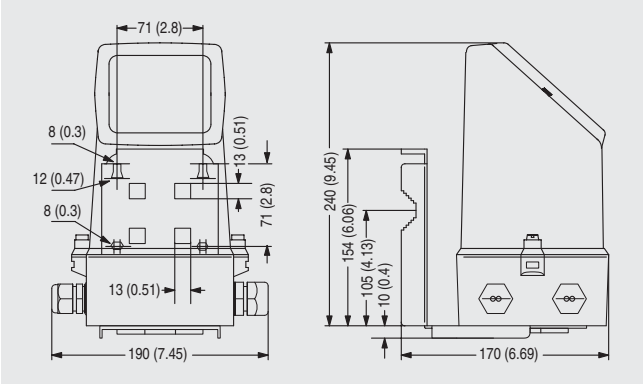
Example of appropriate energy meter:

Energy meter type: **FUE950-03110-0R1CB-10300-DK2-00012**

Dimensional drawings



Transmitter IP67/NEMA 4X/6, wall mounting



Pipe Dimensions

Size	PN 16		PN 25		PN 40					
	L	Weight	L	Weight	L	Weight	A1	D	D_1	Lift hug
DN	mm	kg	mm	kg	mm	kg	mm	mm	mm	
100	350+0-2	20	-	-	350+0-3	16.5	361	220	180	No
125	350+0-2	23	-	-	350+0-3	53	374	250	210	No
150	500+0-3	26	-	-	500+0-3	32	388	285	240	Yes
200	500+0-3	38	500+0-3	47	500+0-3	55	414	340	295	Yes
250	600+0-3	60	600+0-3	76	600+0-3	91	440	405	355	Yes
300	500+0-3	66	500+0-3	81	-	-	466	460	410	Yes
350	550+0-3	94	550+0-3	121	-	-	-	-	-	-
400	550+0-3	124	550+0-3	153	-	-	507	580	525	Yes
500	625+0-3	190	625+0-3	244	-	-	558	715	650	Yes
600	750+0-3	303	750+0-3	365	-	-	609	840	770	Yes
700	875+0-3	361	875+0-3	552	-	-	660	910	840	Yes
800	1000+0-3	494	1000+0-3	770	-	-	710	1025	950	Yes

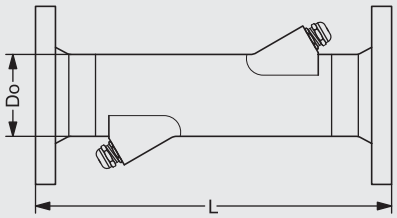
Weight electronics 1.5 kg (3.3 lb)

Size	PN 16		PN 25		PN 40					
	L	Weight	L	Weight	L	Weight	A1	D	D_1	Lift hug
inch	inch	lb	inch	lb	inch	lb	inch	inch	inch	
4	13.77+0-0.08	44	-	-	13.77+0-0.12	36	14.21	8.66	7.09	No
5	13.77+0-0.08	50	-	-	13.77+0-0.12	117	14.72	9.84	8.27	No
6	19.68+0-0.12	57	-	-	19.68+0-0.12	71	15.28	11.22	9.45	Yes
8	19.68+0-0.12	84	19.68+0-0.12	104	19.68+0-0.12	121	16.30	13.39	11.61	Yes
10	23.62+0-0.12	132	23.62+0-0.12	168	23.62+0-0.12	201	17.32	15.94	13.98	Yes
12	19.68+0-0.12	146	19.68+0-0.12	179	-	-	18.35	18.11	16.14	Yes
14	21.65+0-0.12	207	21.65+0-0.12	267	-	-	-	-	-	-
16	21.65+0-0.12	273	21.65+0-0.12	337	-	-	19.96	22.83	20.67	Yes
20	24.61+0-3	419	24.61+0-3	538	-	-	21.97	28.15	25.59	Yes
24	29.53+0-0.12	668	29.53+0-0.12	805	-	-	23.98	33.07	30.31	Yes
28	34.45+0-0.12	796	34.45+0-0.12	1217	-	-	25.98	35.83	33.07	Yes
32	39.37+0-0.12	1089	39.37+0-0.12	1698	-	-	27.95	40.35	37.40	Yes

Weight electronics 1.5 kg (3.3 lb) - Means not available

SITRANS FUS380/FUE380/SONOCAL 3000

SONO 3300 CT sensor flow part



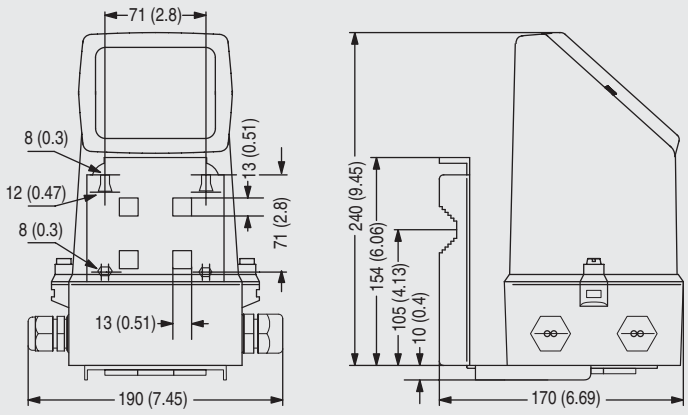
Size	Build-in length L between the flanges			Do Outside diameter	Pipe wall thickness for[1]		
DN	PN 16 [mm]	PN 25 [mm]	PN 40 [mm]	[mm]	PN 16 [mm]	PN 25 [mm]	PN 40 [mm]
50	465 ±3	475 ±3	475 ±3	66.6	7.0	7.0	7.0
65	460 ±3	475 ±3	475 ±3	78.0	7.0	7.0	7.0
80	380 ±3	400 ±3	400 ±3	92.0	7.0	7.0	7.0
900	1230 ±6	1300 ±6	-	914.0	8.8	13.3	-
1000	1300 ±6	1370 ±6	-	1016.0	9.7	14.3	-
1200	1360 ±6	-	-	1220.0	11.3	-	-

[1] The stated wall thickness for DN 200 ... DN 1200 are minimum values according to the EC Directive on the Pressure Equipment 97/23/EC.

Weight of SONO 3300 CT sensor

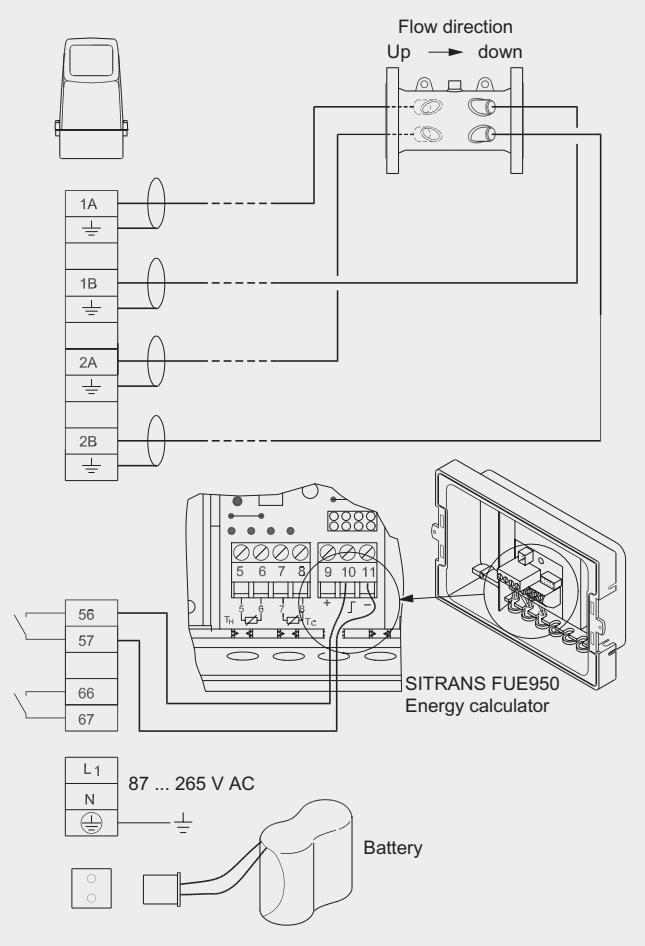
Size		Weight					
		PN 16		PN 25		PN 40	
DN	inch	kg	lbs	kg	lbs	kg	lbs
50	2	13	28.6	14	30.8	14	30.8
65	2½	15	33	16	35.3	16	35.3
80	3	18	39.7	19	42	19	42
900	36	475	1047	835	1841	-	-
1000	40	594	1309	1078	2377	-	-
1200	48	732	1614	-	-	-	-

SONO 3000 CT transmitter, IP67 (NEMA 4X/6), wall mounting



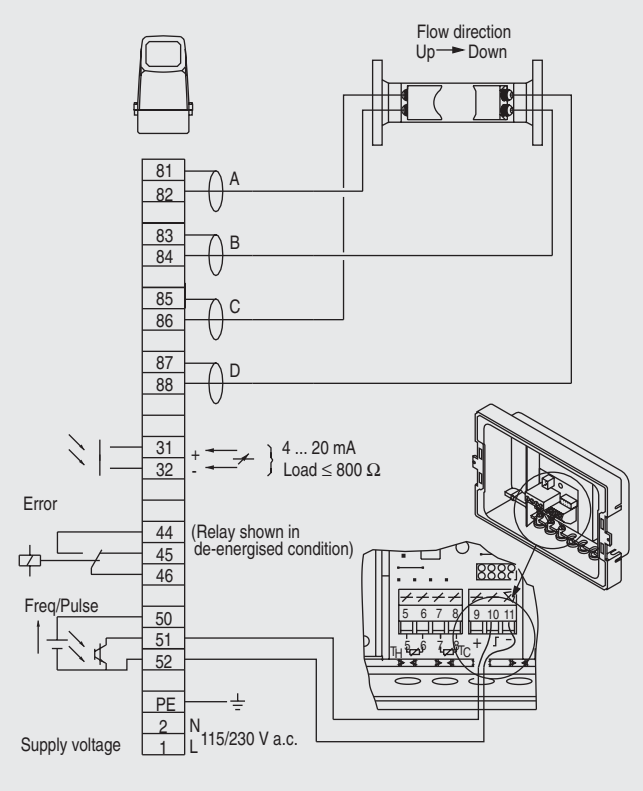
Add approximately 30 mm (1.18 inch) on each side for cabling, approx. 2 kg (4.4 lb).

Schematics SITRANS FUS380



The scheme shows the transducer cable connections between transmitter terminals and respective transducer and the electrical connection of the energy calculator SITRANS FUE950.

Schematics SONOCAL 3000



Electrical connections