Overview

SITRANS FUS080 is a transit time based transmitter designed for ultrasonic flow metering with any sensor in the FUS inline series SONOKIT, FUS380 and FUE380 up to DN 1200.

The ultrasonic flowmeter transmitter SITRANS FUS080 comes as battery or mains powered version. The SITRANS FUS080 is designed to measure flow water applications.

The SONOKIT retrofit flowmeter series are shown from page 3/282. The standard flowmeter series SITRANS FUS380 is described from page 3/292. The type approved flowmeter series for flow metering in energy meter custody transfer systems are named SITRANS FUE380.

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
- IrDA optical interface for local communication
- 2-path measuring principle for optimum accuracy
- Compact or remote mounting
- Measures on all district water qualities and water conductivities
- No pressure drop
- Long-term stability
- 2 galvanic isolated digital outputs for easy connection to a calculator (potential free)
- 1 analog 4 to 20 mA output
- Bidirectional measurement, with 2 totalizers and outputs
- Dynamic range Q_i (min) : Q_s (max) up to 1:400
- Compact version with triax cables for highest EMC-protection

Application

The main application for flowmeters with the transmitter SITRANS FUS080 is measurement of water flow in district heating plants, local networks, boiler stations, substations, chiller plants, irrigations plants and other general water applications.

Design

The transmitter type SITRANS FUS080 is designed with fiber-glass reinforced polyamide enclosure for remote or compact installation in normal areas. The remote versions are available with up to 30 meter distance from flowmeter to transmitter. When ordering as a compact version in the series FUS380 and FUE380 the transducer cables are pre-mounted at the sensor.

The transmitter is available in an IP67/NEMA 4X/6 enclosure and is designed for use in the flowmeters series:

- SONOKIT (1-path or 2-path)
- FUS380 (2-path)
- FUE380 (2-path)

The transmitter FUS080 is always ordered as part of a complete flowmeter system.

It can be manually ordered separately as spare part preprogrammed with the given sensor data.

Integration

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

SITRANS FUS380 has two pulsel outputs, with functions that can be individually selected.

The settings of the transmitter, e. g. flow and pulse output rate, are defined when ordering the complete flowmeter.

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.

3

Flow Measurement
SITRANS FS (ultrasonic)
Inline ultrasonic flowmeters

SITRANS FUS080/FUE080 transmitter

Technical specifications

Input	
Measurement	Flow by measuring the transit time difference of ultrasonic signals through ultrasonic transducers in the sensor pipes.
	Supporting of 1-path or 2-path sensors in sizes DN 50 … 1200 measuring on water
Measuring rate	
• Battery mode	0.5 Hz
• Mains supply	Up to 15 Hz
• Back-up mode	0.5 Hz (at mains supply drop)
Flow rate	0.02 … 9 m/s (0.065 … 29.5 ft/s), bidirectional flow metering

Output	2 pulse or status outputs (A and B), individual galvanically isolated MOS relay outputs, passive mode, max. ± 35 V AC/DC, max. 50 mA
Max. pulse frequency	100 Hz at Q_s (Q_{max})
Pulse value and length	Selectable with the ordering of the flowmeter
Output A function	Pulse: forward, reverse, forward net, reverse net (preset: forward)
Output B function	Pulse: forward, reverse, forward net, reverse net (preset: forward) or alarm indication or call-up indication (preset: alarm)
Pulse value A and B	0.1 l/p, 0.25 l/p, 0.5 l/p, 1 l/p, 2.5 l/p, 10 l/p, 25 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, 1 000 m^3/p
Pulse length (depending on Q_{max} by DN selection)	5, 10, 20, 50, 100, 200, 500 ms (standard 5 ms)
Alarm indication	Path 1 (F1), path 2 (F2) internal, failure (F3, F4), powers supply warning or low battery indication (F5), Q_{max} overflow (F6), pulse overflow (F7, F8), internal data logger warning (F9)
Analog output	Passive current output 4 ... 20 mA
	Data span pre-selectable depending on pipe size

Rated operation conditions	
Ambient conditions	
Ambient temperature	
• Operation	-10 … +60 °C (14 … 140 °F) (MID version: max. +55 °C (131 °F))
• Storage	-40 … +85 °C (-40 … +185 °F) (battery included)
Enclosure rating	IP67/NEMA 4X/6 to EN 60529 and DIN 40050
Electromagnetic compatibility	
• Emitted interference	To EN 55011/CISPR-11
• Immunity	To EN/IEC 61326-1 (Industry)
• MID approved (FUE380 series)	Environment class E2 and M1
Mechanical vibration	2 g, 1 … 800 Hz sinusoidal in all directions according to IEC 68-2-6
Weight of transmitter	Approx. 1.5 kg (3.3 lb)

Design	
Enclosure material	Fibre-glass reinforced polyamide, light gray color
Wall mounting kit	IP67/NEMA 4X/6 terminal box for the wall mounting of the transmitter, fiber-glass reinforced polyamide with stainless steel bracket, cable glands entries: 2 x 2 M20 or PG 13.5 for power supply and outputs and 2 x M20 or PG 13.5 for the sensor cables, glands (supply and outputs and double cable entries for sensor cables) are included.
Sensor cable	Coaxial cable sets for remote transmitter up to 30 m (98.4 ft) long transducer cable, 75 Ω impedance, cables sets are prepared for the connection to the sensors
	Triax cables or integral version

Display and controls	
Display	LCD, 8 digits, additional 2 digits and symbols for status information
Resolution	Totalized information can be displayed with 1, 2 or 3 decimals or automatic adjustment (default)
Display setting	Flow unit: Preset: m^3/h
	Volume unit: Preset: m^3
Push button	One push button for menu selection and display information
Communication (IrDA optical eye)	IrDA – optical communication and control interface with Modbus RTU protocol for read or write transmitter settings and data via PC and PDM tool

Power supply	
Battery	D-cell battery pack, 3.6 V LiSOCl (Lithium Thionyl Chloride, 34 Ah), replaceable, life- and working-time up to 6 years
Mains	87 … 265 V AC (50 … 60 Hz) or
	87 … 265 V AC (50 … 60 Hz) with D-cell single battery backup, 2.6 V LiSOCl (Lithium Thionyl Chloride, 17 Ah), replaceable, life time up to 8 years

Power consumption	
Mains version	Approx. 2.5 VA

◼ Technical specifications (continued)

SONOKIT, FUS380, FUE380

The flow values and settings are predefined according to dimension selection.

The transmitter settings are changeable by using the SW tool PDM (for FUE380 series some of the setting are only readable, restriction of the approval requirements).

Accuracy/Error in measurement:

(at reference conditions for FUS380 and FUE380 series, SONOKIT series will differ in the accuracy)

- Pulse output
  - ≤ ± 0.5 % of measured value at 0.5 … 10 m/s or
  - ≤ ± 0.25/V [m/s] % of measured value at flow < 0.5 m/s

- Repeatability ≤ 0.25 % of measured value at 0.5 … 10 m/s

- Reference conditions
  - Process temperature and ambient temperature:
    25 °C ± 5 °C (77 °F ± 9 F)
  - Transmitter Warming-up time 30 min.
  - Installation conditions of the sensor: Upstream section
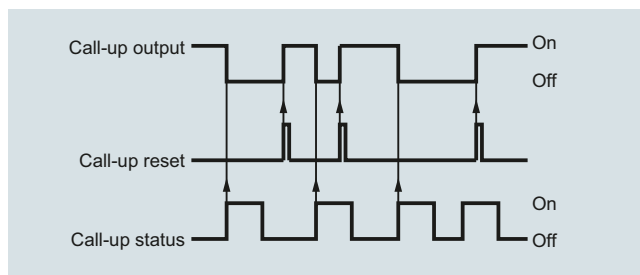   > 10 x DN and downstream section > 5 DN
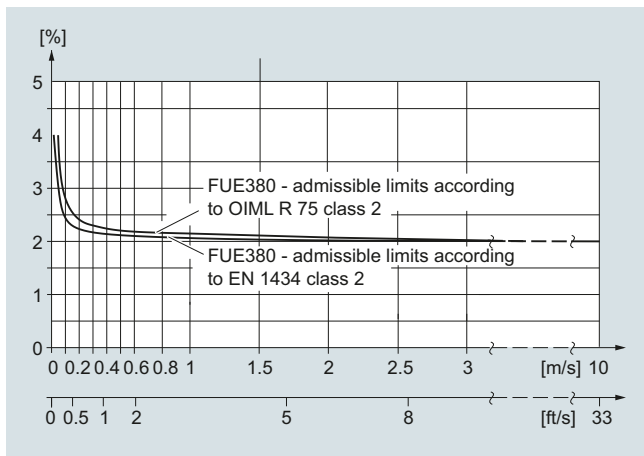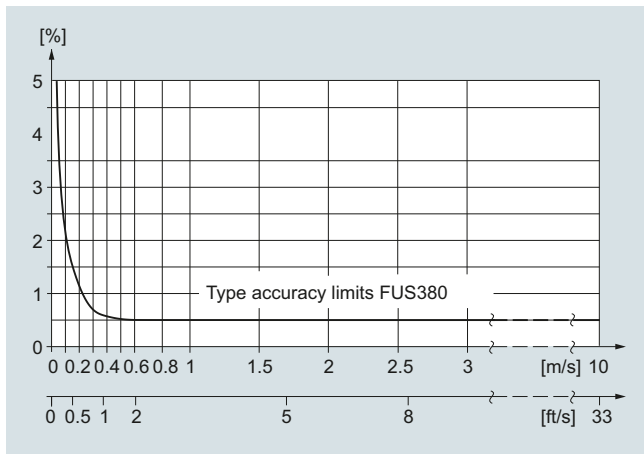
Output configuration

PW = 5, 10, 20, 50, 100, 200 and 500 ms
PR = pulse rate
PF = pulse frequency
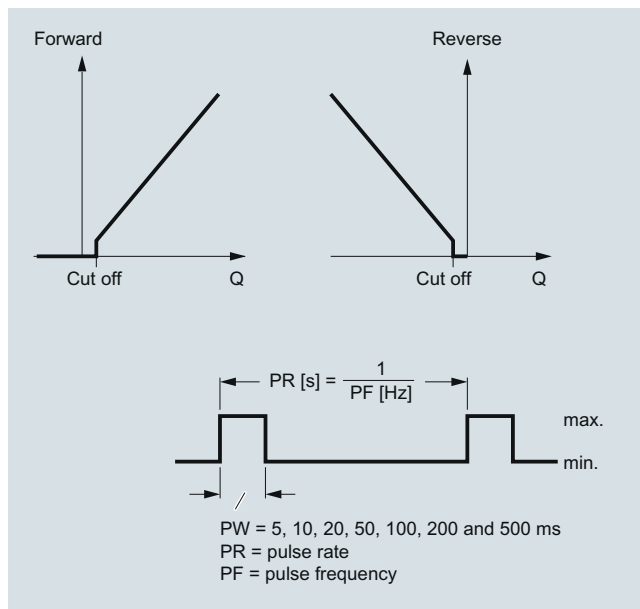
Pulse volume: output A/B configured as volume per pulse, calculated on forward/reverse or net forward/reverse flow. The volume per pulse is free scaleable (via PDM software).
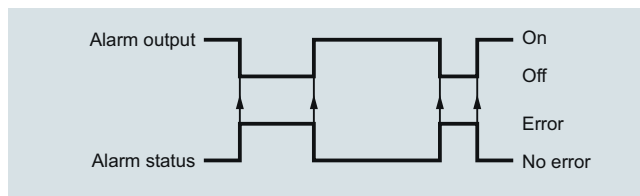
Pulse output B can be used as stated above or as alarm or call-up function.

Call-up: the call-up output is active until manually reset by use of PDM tool. The call-up function is activated when an alarm is activated.
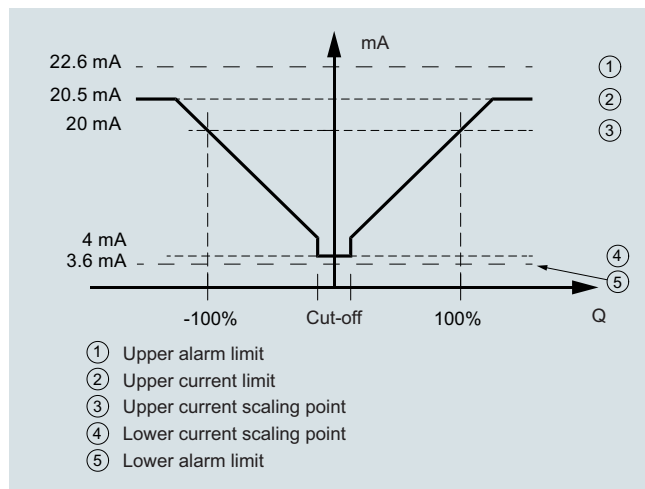
Flow Measurement
SITRANS FS (ultrasonic)
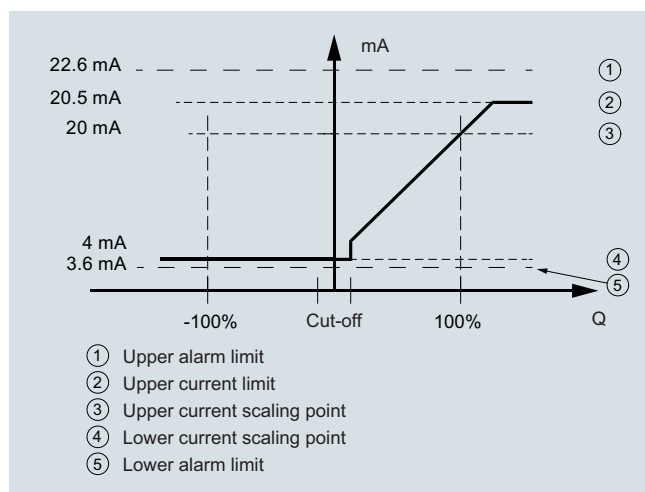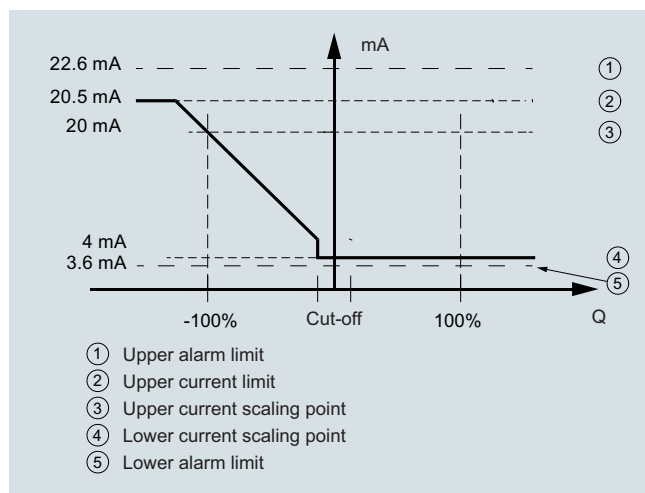Inline ultrasonic flowmeters

▪ Technical specifications (continued)

Current output

① Upper alarm limit
② Upper current limit
③ Upper current scaling point
④ Lower current scaling point
⑤ Lower alarm limit

Bidirectional flow

① Upper alarm limit
② Upper current limit
③ Upper current scaling point
④ Lower current scaling point
⑤ Lower alarm limit

Positive flow

① Upper alarm limit
② Upper current limit
③ Upper current scaling point
④ Lower current scaling point
⑤ Lower alarm limit

Negative flow

Sensor coaxial cable for SONOKIT series with FUS080

Coaxial cable	
Standard coaxial cable (75 Ω)	
Outside diameter	Ø 5.8 mm
Length	15, 30 m (49.2, 98.4 ft) between sensor and transmitter
Material (outside jacket)	Black PE
Ambient temperature	-10 … +70 °C (14 … 158 °F)

SSL cable for FUS380 /FUE380 series

Special SSL cable	
Special SSL	SSL cable to connect sensor electronics with transmitter electronic
Outside diameter	7.1 mm (0.28 inch) with RJ45 connector on both ends
Length	Direct connection (internal) for remote distance 5 m, 10 m, 20 m or 30 m
Material outside	Polyurethan (PUR) black glossy finish
Ambient temperature	-40 … +85 °C (-40 … +185 °F)
	High flexible, halogen free, UV resistance

■ Selection and ordering data

Transmitter FUS080 operating instructions, accessories and spare parts

Operating instructions

Description	Article No.
for use with SONOKIT • English	**A5E03059912**
integrated in FUS/FUE380 • English • German	**A5E00730100** **A5E00740611**

All literature is available to download for free, in a range of languages, at
http://www.siemens.com/processinstrumentation/documentation

Accessories

Description	Article No.	
Sun lid for FUS080 transmitter (frame and lid)	**A5E02328485**	
Brace (holder) for optical IrDA eye	**A5E00695277**	
IrDA infrared interface adapter with USB for data acquisition with 1.2 m (3.9 ft) cable	**FDK:087L4163**	

Process Device Manager SIMATIC PDM

SIMATIC PDM For more details about SIMATIC PDF please go to chapter 8 "Digitalization and Communication".	**See the Selection and Ordering data on chapter 8 "Digitalization and Communication"**	

Spare parts

A spare part transmitter can be ordered for a specific system. In the description of the following spare part transmitters the related transmitter Article No. found on the device silver front label is noted.

Spare part transmitter for FUS380 systems (7ME3400)

Description	Article No.	
FUS080 transmitter 3.6 V battery (no battery included, to be ordered separate) as spare part transmitter for FUS380 flowmeter series. Transmitter Article No. 7ME3450-0AA10-2AA0	**A5E02729700**	
FUS080 transmitter 3.6 V battery (battery included) as spare part transmitter for FUS380 flowmeter series [1]. Transmitter Article No. 7ME3450-0AA10-2AA0	**A5E02729035**	
FUS080 transmitter 230 V mains as spare part transmitter for FUS380 flowmeter series. Transmitter Article No. 7ME3450-0AA10-2AA0	**A5E02699309**	
FUS080 transmitter 230 V mains with backup-battery as spare part transmitter for FUS380 flowmeter series. Transmitter Article No. 7ME3450-0AA40-2AA0	**A5E02729610**	

When ordering: Inform on flowmeter order no. and flowmeter serial no. (e.g. 7ME3400-xxxxx-xxxx-Z, XX.... and xxxxxxHxxx)

Spare part transmitter for FUE380 approved systems (7ME3410)

(only with MID approval marks, no MID verification – only a complete flowmeter can be MID-verified, i.e. sensor together with the transmitter)

Description	Article No.	
FUE080 transmitter 3.6 V battery (no battery included, to be ordered separate) as spare part transmitter for FUE380 flowmeter series. Transmitter Article No.7ME3450-0AA10-2AB0.	**A5E02734600**	
FUE080 transmitter 3.6 V battery (battery included) as spare part transmitter for FUE380 flowmeter series [1]. Transmitter Article No. 7ME3450-0AA20-2AB0	**A5E02734568**	
FUE080 transmitter 230 V mains as spare part transmitter for FUE380 flowmeter series. Transmitter Article No. 7ME3450-0AA30-2AB0	**A5E02734539**	
FUE080 transmitter 230 V mains with backup-battery as spare part transmitter for FUE380 flowmeter series. Transmitter Article No. 7ME3450-0AA40-2AB0	**A5E02734585**	

When ordering: Inform on flowmeter order no. and flowmeter serial no. (e.g. 7ME3410-xxxxx-xxxx-Z, XX.... and xxxxxxHxxx)

Spare part transmitter for SONOKIT systems (7ME3210/7ME3220)

Description	Article No.	
FUS080 transmitter 3.6 V battery (no battery included, to be ordered separate) as spare part transmitter for SONOKIT flowmeters. Transmitter Article No. 7ME3450-0AA10-2AA0	**A5E03048726**	
FUS080 transmitter 3.6 V battery (no battery included) as spare part transmitter for SONOKIT flowmeters [1]. Transmitter Article No. 7ME3450-0AA20-2AA0	**A5E03048714**	
FUS080 transmitter 230 V mains as spare part transmitter for SONOKIT flowmeters. Transmitter Article No. 7ME3450-0AA30-2AA0	**A5E03048701**	
FUS080 transmitter 230 V mains with backup-battery as spare part transmitter for SONOKIT flowmeters. Transmitter Article No. 7ME3450-0AA40-2AA0	**A5E03048719**	

When ordering: Inform on flowmeter order no. and flowmeter serial no. (e.g. 7ME3220-xxxxx-xxxx-Z, XX.... and xxxxxxHxxx)

[1] 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.

Flow Measurement
SITRANS FS (ultrasonic)
Inline ultrasonic flowmeters

SITRANS FUS080/FUE080 transmitter

■ **Selection and ordering data** (continued)

Spare part transmitter for FUS880 retrofitting systems (7ME3440)

Description	Article No.	
Internal battery pack, one set of 2 D-cell (3.6 V 34 Ah)[1] • 1 pc. pack • 24 pcs. pack	A5E02679676 A5E02896941	
Single battery back-up to main supply (17 Ah)[1]	A5E02679923	
Battery cover for transmitter FUS080	A5E00694468	
FUS080 display and keypad with Siemens logo	A5E00873496	
FUS080 display and keypad neutral (without logo)	A5E33147123	
Wall mounting unit for IP67/NEMA 4X/6 version, wall bracket, terminal box in polyamide (SSL version) • 3 x M20 cable glands (power and 2xoutput) (cable glands are supplied on the connection cable)	A5E34365669	
Connection electronics for transmitters with remote cable connection	A5E34365721	
Connection electronics for sensors with remote cable connection	A5E34365744	
Terminal box for direct pipe mounting made of polyamide with blank plugs (8 pcs) without lid and no pcba, with pedistal mounting. (Pre mounted) • 3 x M20 cable glands (1 pcs power and 2 x output) + 3 x cable glands M20 with pipe mounting adapter	A5E34365775	
Lid for terminal box	FDK:085U1003	

Description	Article No.	
Cabel gland M20 for FUS080/FUE080, plastic black, cable diameter: 5 ... 13mm, -20 ... 100°C	A5E02246304	
Cable gland M20 set (two cable entries) for FUS/E080 sensor connection, PA-black, 2 pcs. • -40 ... +100 °C (-40 ... +212 °F)	A5E43762073	
Current output module for FUS/E080 passive 4-20 mA add on output module	A5E33961666	

[1] 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.

Downloads for DEVICE description FUE380
http://support.automation.siemens.com/WW/view/en/17320235

Sensor cables for FUS380/FUE380 flowmeters

Description	Article No.
Compact connection cable for direct mounting of the transmitter on the pipe	A5E34365172
FUS080/FUE080 remote cable (connector and cable with 2 x M20 cable glands)	
• 5 m	A5E34365162
• 10 m	A5E34365154
• 20 m	A5E34365151
• 30 m	A5E34364386

Sensor cables for SONOKIT flowmeter with FUS080

| Description	Article No.	
15 m (49.2 ft) cable set (2 pcs.) remote mounting with SONOKIT flowmeters	A5E02478541	
30 m (98.4 ft) cable set (2 pcs.) remote mounting with SONOKIT flowmeters	A5E02478551	

Sensor cables for FUS880 retrofitting system (7ME3440)

Description	Article No.	
Coaxial cable with transducer connection for use in SONO 3300 sensors; with 0.3 m brown PTFE high temperature transducer part, max. 200 °C (392 °F) and black PVC for the remaining transmitter part, max. 70 °C (158 °F); cable impedance 75 W.W. • 1 × 10 m (32.8 ft) • 1 × 20 m (65.6 ft) • 1 × 30 m (98.4 ft)	 FDK:085L2400 FDK:085L2401 FDK:085L2402	
Transducer spare part set of two transducers with gaskets for STRANS FUS880 retrofitting systems	FDK:087H3007	

■ **Dimensional drawings**

FUS080 transmitter IP67/NEMA 4X/6, wall mounting and compact mounting
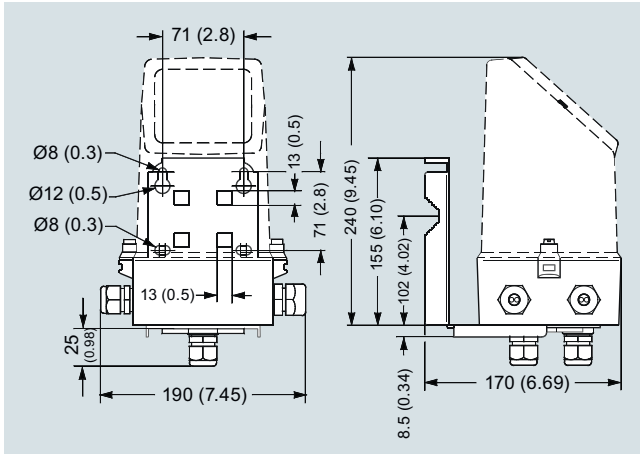
Transmitter wall mounted, dimensions in mm (inch)
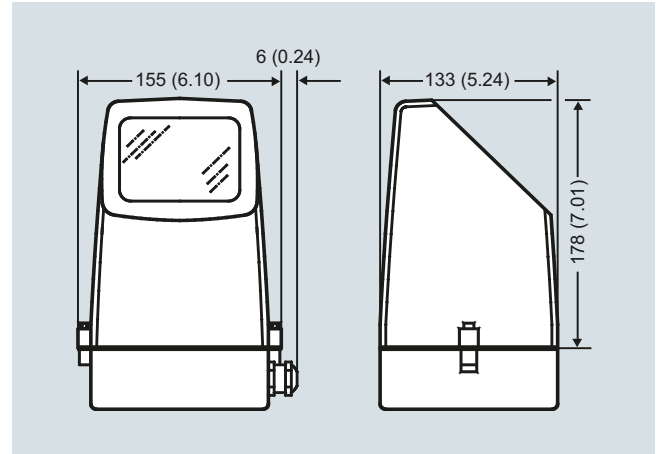
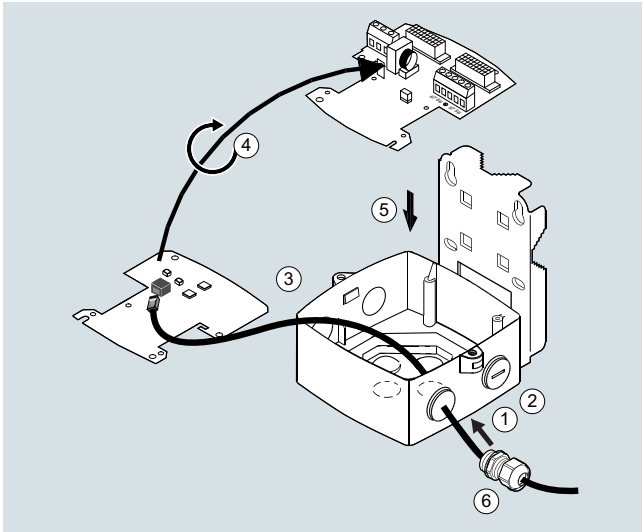Transmitter compact mounted, dimensions in mm (inch)

3

Flow Measurement
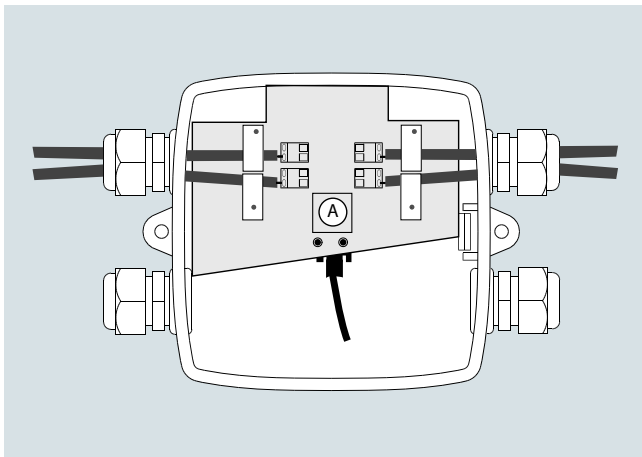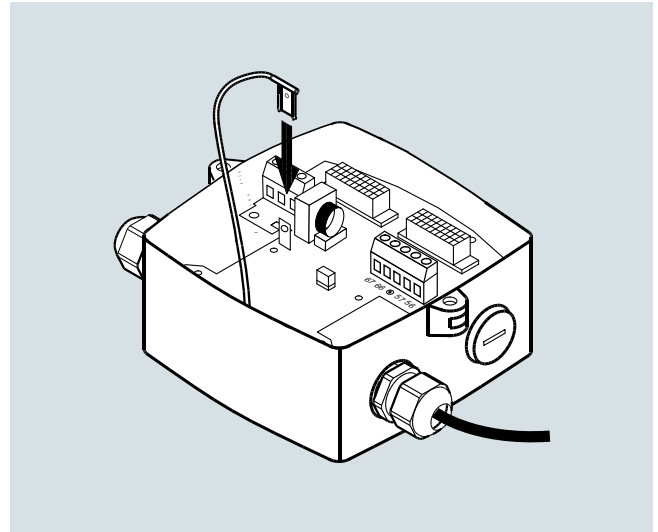SITRANS FS (ultrasonic)
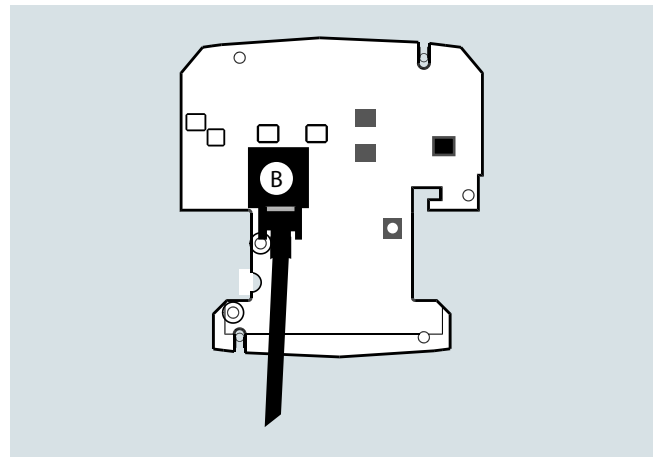Inline ultrasonic flowmeters

SITRANS FUS080/FUE080 transmitter
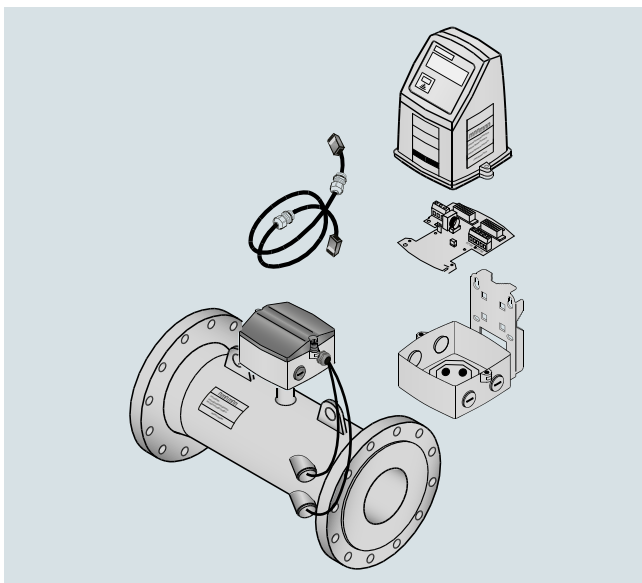
Circuit diagrams

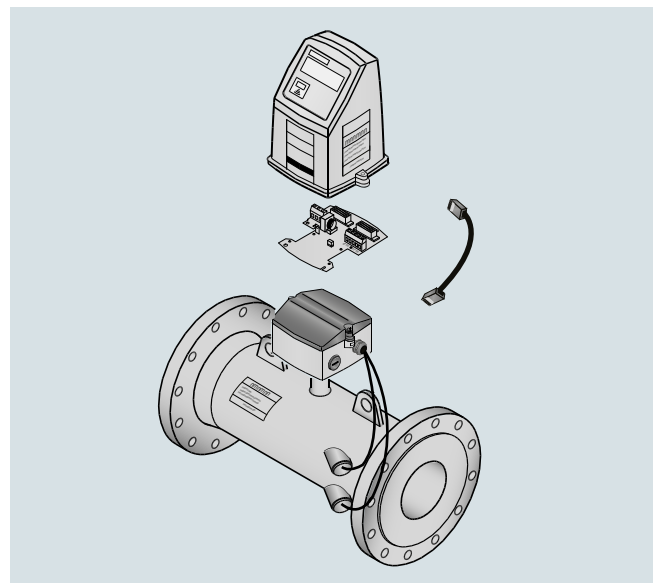Electrical connection of SITRANS FUS080

Sensor junction box

Electrical connection of transmitter

Separate transmitter

Compact transmitter