

## Flow Measurement

### SITRANS F US Inline

#### Transmitter SITRANS FUS080/FUE080

#### 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 3/286. The standard flowmeter series SITRANS FUS380 is described from page 3/297. The type approved flowmeter series for flow metering in energy meter custody transfer systems are named SITRANS FUE380 - see page 3/303.

#### 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 pre-programmed 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 pulse outputs, with functions that can be individually selected.

The settings of the transmitter, eg. 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.

#### 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	
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 <sup>3</sup> /p, 2.5 m <sup>3</sup> /p, 5 m <sup>3</sup> /p, 10 m <sup>3</sup> /p, 25 m <sup>3</sup> /p, 50 m <sup>3</sup> /p, 100 m <sup>3</sup> /p, 250 m <sup>3</sup> /p, 500 m <sup>3</sup> /p, 1 000 m <sup>3</sup> /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 for 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<sup>3</sup>/h  
Volume unit: Preset: m<sup>3</sup>

#### 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

### SONOKIT, FUS380, FUE380

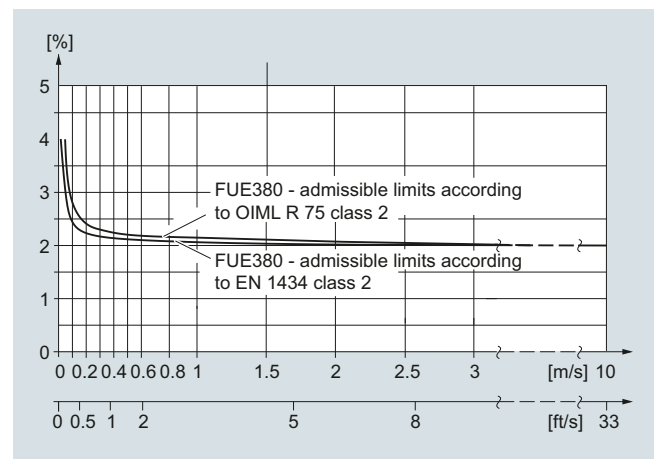
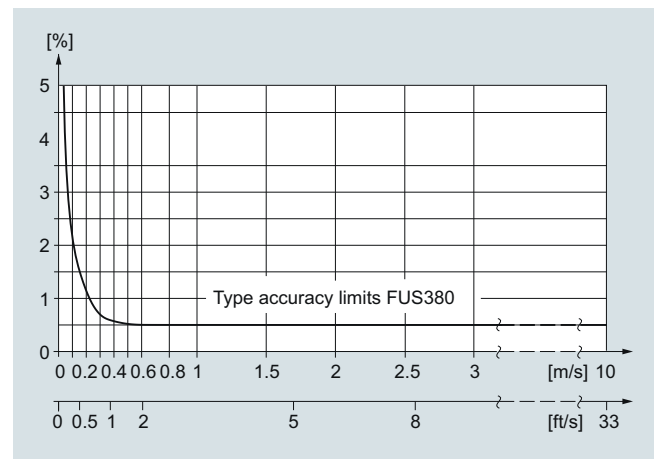
The flow values and settings are predefined according to dimension selection.

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
  - $\leq \pm 0.5$  % of measured value at 0.5 ... 10 m/s or
  - $\leq \pm 0.25/V$  [m/s] % of measured value at flow < 0.5 m/s
- Repeatability  $\leq 0.25$  % of measured value at 0.5 ... 10 m/s
- Reference conditions
  - Process temperature and ambient temperature: 25 °C  $\pm$  5 °C (77 °F  $\pm$  9 °F)
  - Transmitter warming-up time 30 min.
  - Installation conditions of the sensor: Upstream section > 10 x DN and downstream section > 5 DN

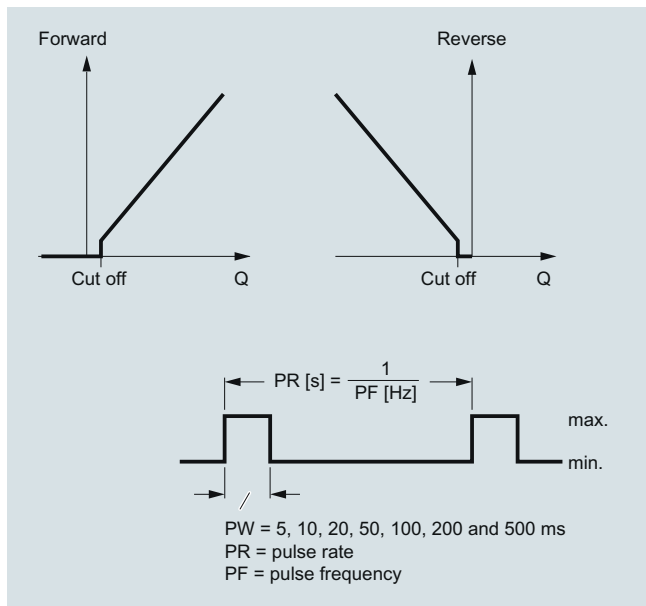


# Flow Measurement

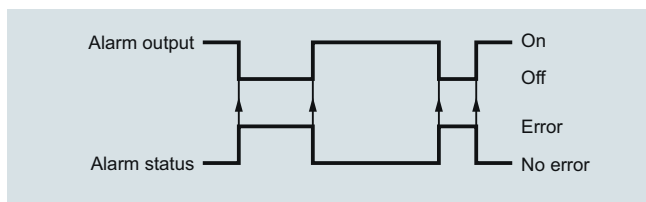
## SITRANS F US Inline

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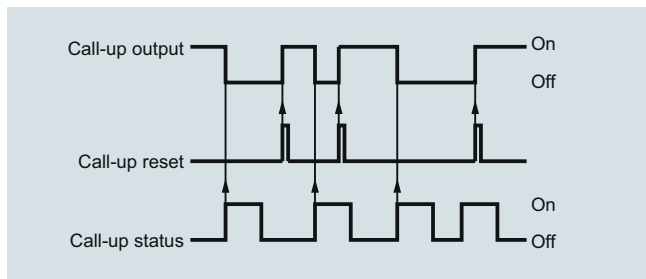
#### Output configuration



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).

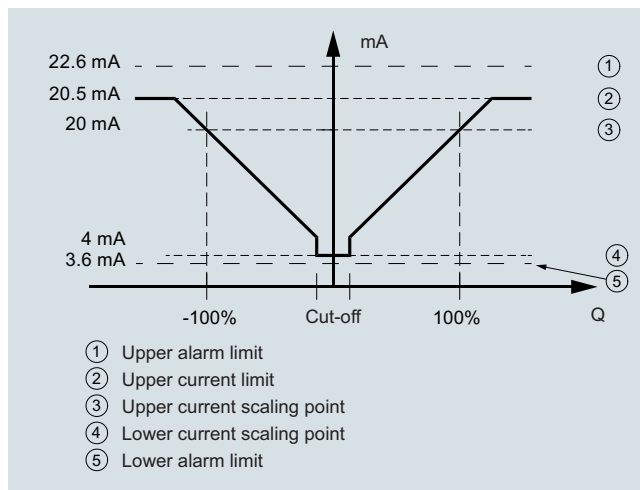


Pulse output B can be used as stated above or as alarm or call-up function.

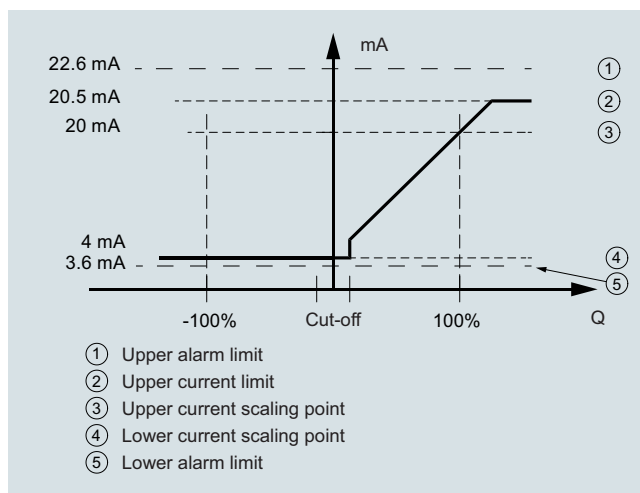


Call-up: the call-up output is active until manually reset by use of PDM tool. The call-up function is activated when an alarm is activated.

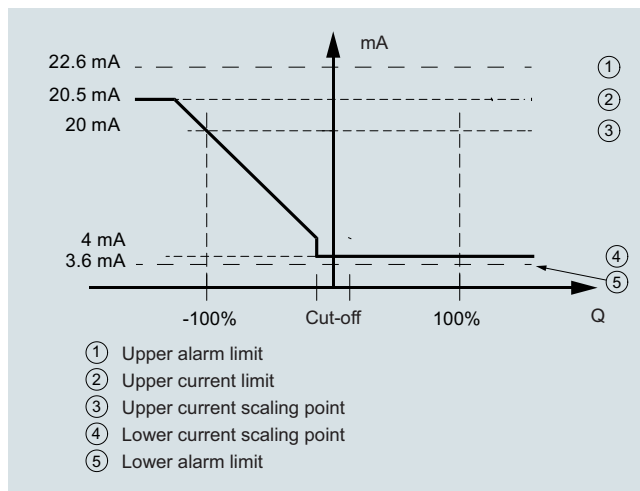
#### Current output



#### Bidirectional flow



#### Positive flow



#### 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)


**Sensor coaxial cable for FUS380/FUE380 series**
**Coaxial cable**
**High temperature coaxial cable (75 Ω)**

	With special designed glands for connection in the sensor/transducer
Outside diameter	Ø 5.13 mm (first 0.3 m (0.98 ft) part to the transducer), Ø 5.8 mm (for remaining cable to the transmitter – black holt melt junction part between (Ø 16 mm, length 70 mm)
Length	Up to 30 m (98.4 ft) between sensor and transmitter
Material (outside jacket)	Brown PTFE (0.3 m (9.84 ft) part) and black PE (for remaining cable)
Ambient temperature	-200 ... +200 °C (-328 ... +392 °F) (brown PTFE transducer part) and -10 ... +70 °C (14 ... 158 °F) (black PE for remaining transmitter cable part)



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#### Transmitter FUS080 operating instructions, accessories and spare parts

##### Operating instructions


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

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

##### Accessories

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


##### Process Device Manager SIMATIC PDM

SIMATIC PDM	See page 8/13, chapter "Communication and Software"	
Details about the SIMATIC PDM tool can be found on page 8/5, chapter "Communication and Software"		

##### 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	<b>A5E02729700</b>	
FUS080 transmitter 3.6 V battery (battery included) as spare part transmitter for FUS380 flowmeter series <sup>1)</sup> . Transmitter Article No. 7ME3450-0AA20-2AA0	<b>A5E02729035</b>	
FUS080 transmitter 230 V mains as spare part transmitter for FUS380 flowmeter series. Transmitter Article No. 7ME3450-0AA30-2AA0	<b>A5E02699309</b>	
FUS080 transmitter 230 V mains with backup-battery as spare part transmitter for FUS380 flowmeter series. Transmitter Article No. 7ME3450-0AA40-2AA0	<b>A5E02729610</b>	

When ordering: Inform on flowmeter Article No. and flowmeter serial no. (e.g. 7ME3400-xxxx-xxx-Z, XX.... and xxxxxHxxx)


##### 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	<b>A5E02734600</b>	
FUE080 transmitter 3.6 V battery (battery included) as spare part transmitter for FUE380 flowmeter series <sup>1)</sup> . Transmitter Article No. 7ME3450-0AA20-2AB0	<b>A5E02734568</b>	
FUE080 transmitter 230 V mains as spare part transmitter for FUE380 flowmeter series. Transmitter Article No. 7ME3450-0AA30-2AB0	<b>A5E02734539</b>	
FUE080 transmitter 230 V mains with backup-battery as spare part transmitter for FUE380 flowmeter series. Transmitter Article No. 7ME3450-0AA40-2AB0	<b>A5E02734585</b>	

When ordering: Inform on flowmeter Article No. and flowmeter serial no. (e.g. 7ME3410-xxxx-xxx-Z, XX.... and xxxxxHxxx)












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

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

When ordering: Inform on flowmeter Article No. and flowmeter serial no. (e.g. 7ME3220-xxxx-xxx-Z, XX.... and xxxxxHxxx)

<sup>1)</sup> 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.

#### Spare part transmitter for FUS880 retrofitting systems (7ME3440)

Description	Article No.		Description	Article No.	
<p><b>Sparepart FUS080 transmitter 3.6 V, incl. 3.6V dual batterie pack, USA version</b></p> <p>Transmitter Article No.: 7ME3450-0AA20-1CA0; Label, 0: Siemens FUS080 transmitter; Version, 0: Without connection box; Enclosure, A: IP67/NEMA 4X/6; Code A: Standard; Supply Voltage, 2: 3.6V DC battery; Ex. Approval, 0: no Ex approval; Display, 1: With display and unit label; Region version, C: USA: AcFt,CFS; Application, A: Standard FUS080 (for SITRANS Retrofit - 7ME344); Code, 0: Standard</p>	<b>A5E03412669</b>		<p>Internal battery pack, one set of 2 D-cell (3.6 V 34 Ah)<sup>1)</sup></p> <ul style="list-style-type: none"> <li>1 pc. pack</li> <li>24 pcs. pack</li> </ul>	<b>A5E02679676</b> <b>A5E02896941</b>	
			Single battery back-up to main supply (17 Ah) <sup>1)</sup>	<b>A5E02679923</b>	
			Battery cover for transmitter FUS080	<b>A5E00694468</b>	
			PG 13.5 cable gland set for FUS080 power and output connection, black PA plastic, 2 pcs.	<b>FDK:083G0228</b>	
			PG 13.5 cable gland set (two cable entries) for FUS080 sensor connection, black PA plastic, 2 pcs.	<b>A5E00694500</b>	
<p><b>FUS080 transmitter for FUS880 retrofit systems, USA version,</b></p> <p>incl. wall-mounting kit, 2 transducers and 2 pcs. 60 ft (20 m) of cables.</p> <p>Label, 0: Siemens FUS080 transmitter; Diameter, 0A: None; Wall Thickness, A: None; Pipe Material, 0: No Pipe; Track configuration, 1: 1-Track; Region version, 2: USA: AcFt,CFS; Transmitter, D: FUS080,IP67, Battery, Remote, unit label; Template, A: None; Transducer coax cable, 4: 20 m with gland</p>	<b>7ME3440-0AA01-2DA4</b>		<ul style="list-style-type: none"> <li>cables Ø 6 ... 12 mm (0.24" ... 0.47")</li> <li>-40 ... +100 °C (-40 ... +212 °F)</li> </ul>		
			SITRANS FUS/FUE380 wall mounting kit for remote transmitter mounting, including connection plate (DN 50 ... DN 1200/2" ... 48")	<b>A5E00694509</b>	
			SITRANS FUS/FUE380 terminal box for compact transmitter mounting, including connection plate, (bronze sensors only, DN 50 ... DN 80/2" ... 3")	<b>A5E01208138</b>	
			SITRANS FUS/FUE380 terminal box for compact transmitter mounting, including connection plate, (steel sensors only, DN 100 ... DN 1200/4" ... 48")	<b>A5E00694660</b>	
			FUS080 display and keypad with Siemens logo	<b>A5E00873496</b>	
			FUS080 display and keypad neutral (without logo)	<b>A5E33147123</b>	


<sup>1)</sup> 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.

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#### Transmitter SITRANS FUS080/FUE080


##### Sensor cables for FUS380/FUE380 flowmeters

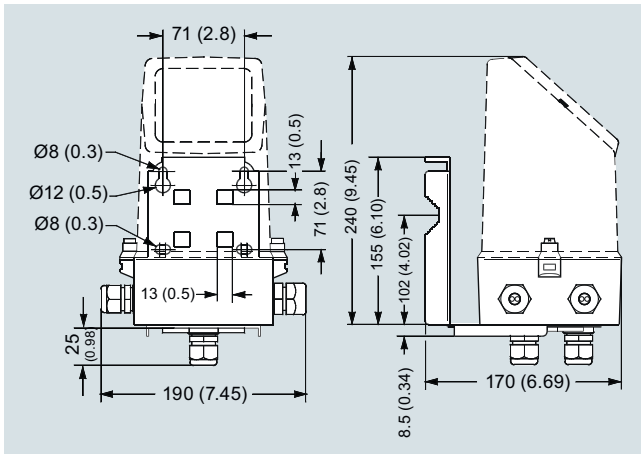
Description	Article No.	
<b>DN 50 to 80 flowmeters</b>		
Coaxial cable for FUS080; with 0.3 m brown PTFE high temp. transducer part, max. 200 °C (392 °F) and black PVC for remaining transmitter part, max. 70 °C (158 °F); impedance 75 Ω		
5 m (16.4 ft) cable set (4 pcs.) for DN 50 ... DN 80 (2" ... 3") remote mounting	<b>A5E01208092</b>	
10 m (32.8 ft) cable set (4 pcs.) for DN 50 ... DN 80 (2" ... 3") remote mounting	<b>A5E01208114</b>	
20 m (65.6 ft) cable set (4 pcs.) for DN 50 ... DN 80 (2" ... 3") remote mounting	<b>A5E01208117</b>	
30 m (98.4 ft) cable set (4 pcs.) for DN 50 ... DN 80 (2" ... 3") remote mounting	<b>A5E01208121</b>	
0.5 m (1.64 ft) cable set (4 pcs.) for DN 50 ... DN 80 (2" ... 3") for compact version of FUS380/FUE380	<b>A5E01208126</b>	
<b>DN 100 to 1200 flowmeters</b>		
Coaxial cable for FUS080; with 0.3 m brown PTFE high temp. transducer part, max. 200 °C (392 °F) and black PVC for remaining transmitter part, max. 70 °C (158 °F); impedance 75 Ω		
5 m (16.4 ft) cable set (4 pcs.) for DN 100 ... DN 1200 (4" ... 48") remote mounting	<b>A5E00695476</b>	
10 m (32.8 ft) cable set (4 pcs.) for DN 100 ... DN 1200 (4" ... 48") remote mounting	<b>A5E00695479</b>	
20 m (65.6 ft) cable set (4 pcs.) for DN 100 ... DN 1200 (4" ... 48") remote mounting	<b>A5E00695480</b>	
30 m (98.4 ft) cable set (4 pcs.) for DN 100 ... DN 1200 (4" ... 48") remote mounting	<b>A5E00695483</b>	
1 m (3.28 ft) cable set (4 pcs.) for DN 100 ... DN 1200 (4" ... 48") for compact version of FUS380/FUE380	<b>A5E00695486</b>	

##### Sensor cables for SONOKIT flowmeter with FUS080

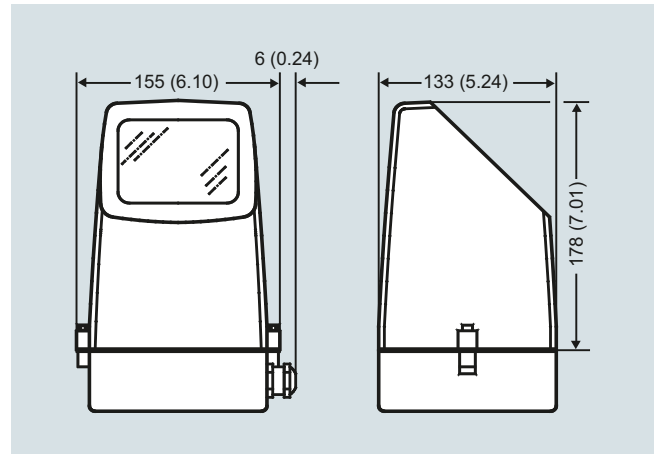
Description	Article No.	
15 m (49.2 ft) cable set (2 pcs.) remote mounting with SONOKIT flowmeters	<b>A5E02478541</b>	
30 m (98.4 ft) cable set (2 pcs.) remote mounting with SONOKIT flowmeters	<b>A5E02478751</b>	

##### Sensor cables for FUS880 retrofitting systems (7ME3440)

Description	Article No.	
<b>Coaxial cable with transducer connection</b>		
for use in FUS880 and 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 Ω		
• 1 x 10 m (32.8 ft)	<b>FDK:085L2400</b>	
• 1 x 20 m (65.6 ft)	<b>FDK:085L2401</b>	
• 1 x 30 m (98.4 ft)	<b>FDK:085L2402</b>	
<b>Transducer spare part set of two transducers with gaskets for STRANS FUS880 retrofitting systems</b>	<b>FDK:087H3007</b>	

**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)



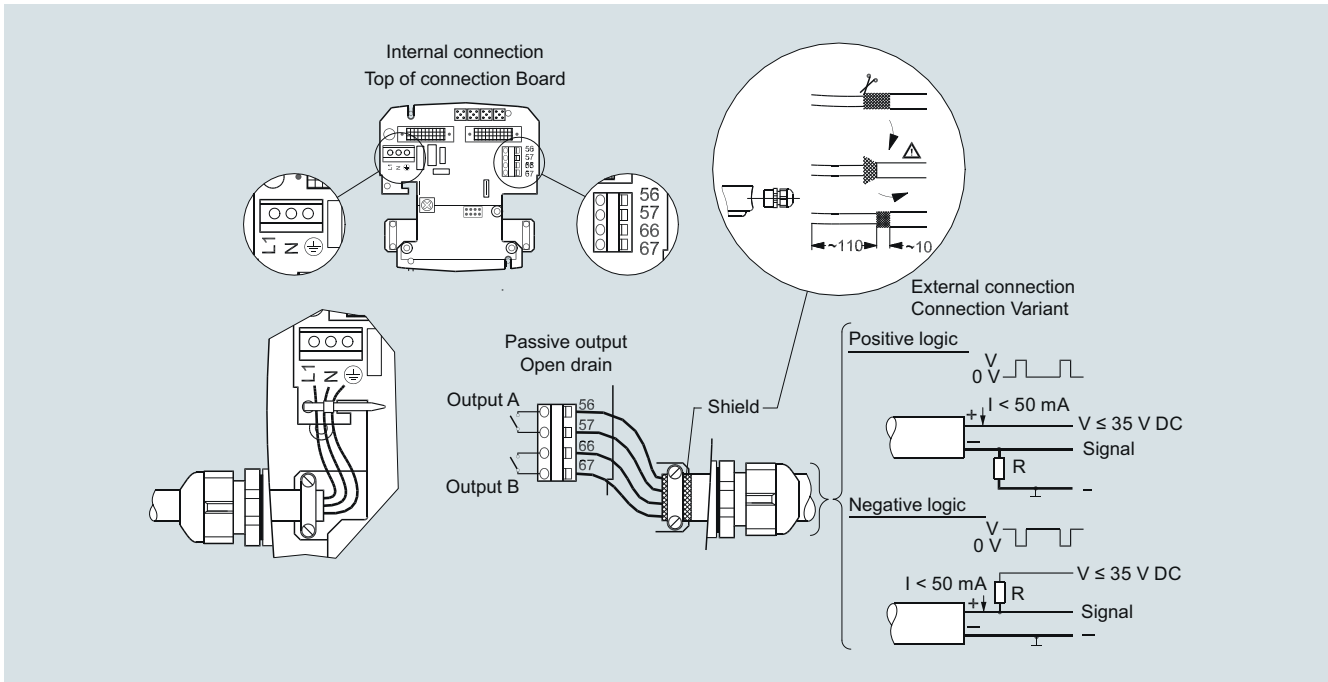
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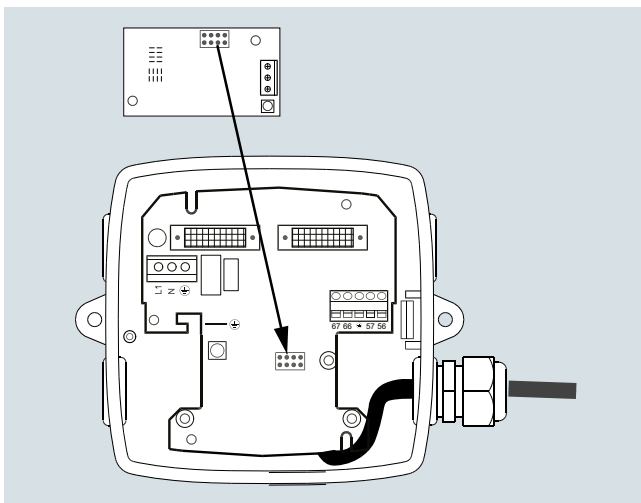
### Transmitter SITRANS FUS080/FUE080

#### Schematics

3



Electrical connection of SITRANS FUS080



Analog module SITRANS FUS080