

# Flow Measurement

## SITRANS F US Inline

### Transmitter FUS080/FUE080

#### Overview



SITRANS FUS080 is a transit time based transmitter designed for ultrasonic flowmetering 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 4/243. The standard flowmeter series SITRANS FUS380 is described from page 4/254. The type approved flowmeter series for flowmetering in energy meter custody transfer systems are named SITRANS FUE380 - see page 4/259.

#### 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-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
- 2 galvanic isolated digital outputs for easy connection to a calculator (potential free)
- Bidirectional measurement, with 2 totalizers and outputs
- Dynamic range  $Q_i$  (min) :  $Q_s$  (max) up to 1:400
- Modbus RTU/RS232, RS485 communication modules

#### 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 fiberglass 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- or 2-track)
- FUS380 (2-track)
- FUE380 (2-track)

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 pulse outputs, with functions that can be individually selected, and optional Modbus RTU communication modules.

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-track or 2-track sensors in sizes DN 50 ... 1200.
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
Outputs	
	2 pulse or status outputs (A and B), individual galvanically isolated MOS relay outputs, passive mode, max. $\pm 35$ 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	Pulse: forward, reverse, forward net, reverse net (preset: forward)
Output B	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	Track 1 (F1), track 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)

# Flow Measurement

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#### Rated operation conditions

##### Ambient conditions

Ambient temperature

- Operation -5 ... +60 °C (23 ... 140 °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 61000-6-4
- Immunity To EN 61000-6-2
- 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

#### 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, 32 Ah), replaceable, life- and working-time up to 8 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, 12.5 Ah), replaceable, life time up to 8 years

#### Power consumption

Mains version

Approx. 2.5 VA

Add-on modules

- RS232 serial interface with Modbus RTU (Rx/Tx/GND), point to point with max. 15 m cable
- RS485 serial interface with Modbus RTU (+/-/GND), multidrop with up to 32 devices with max. 1 000 m cable
- Modbus RTU protocol is an open protocol (further information available on request)
- Serial speed 1 200, 2 400, 4 800, 9 600, 19 200, 38 400 Baud

#### SONOKIT, FUS380, FUE380

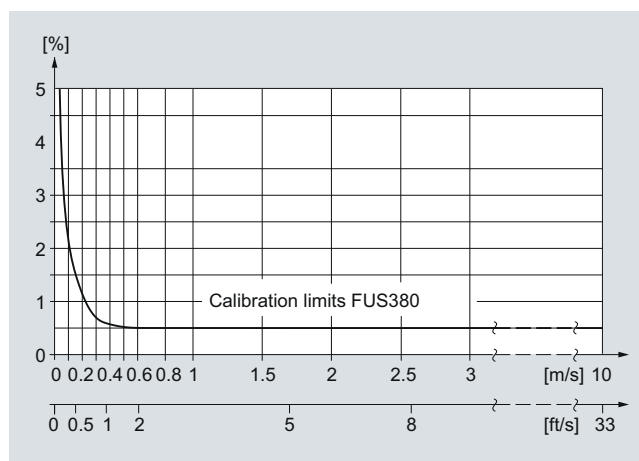
Flow value setting predefined settings according to dimension selection.

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 FUS380 series, SONOKIT series will differ in the accuracy)

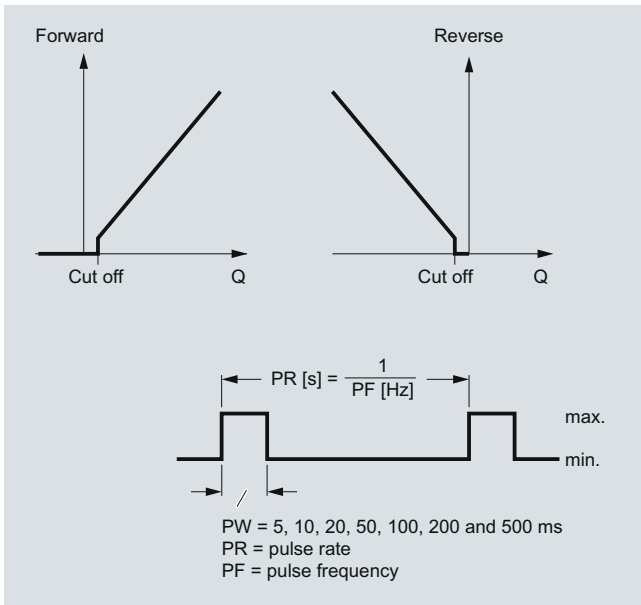
- Pulse output
  - $\leq \pm 0.5\%$  of measured value at 0.5 ... 10 m/s or
  - $\leq \pm 0.25/V$  [m/s] % of measured value at flow < 0.5 m/s
- Repeatability  $\leq 0.25\%$  of measured value at 0.5 ... 10 m/s
- Reference conditions
  - Process temperature and ambient temperature: 25 °C  $\pm$  5 °C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



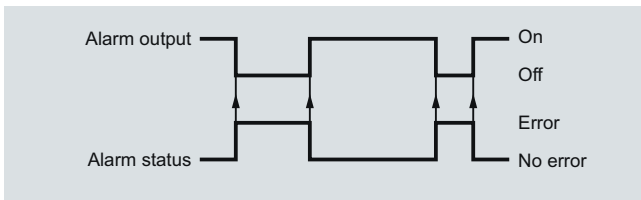
# Flow Measurement SITRANS F US Inline

## Transmitter FUS080/FUE080

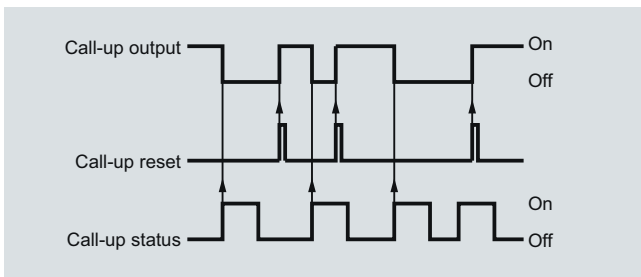
### Output configuration



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.

### 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/FUE 380 series

#### Coaxial cable

##### High temperature coaxial cable (75 Ω)

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)



# Flow Measurement

## SITRANS F US Inline

### Transmitter FUS080/FUE080

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


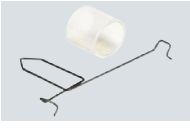



##### Operating instructions

Description	Order No.
for use with SONOKIT	
• English	<b>A5E03059912</b>
integrated in FUS/FUE380	
• English	<b>A5E00730100</b>
• German	<b>A5E00740611</b>
• Spanish	<b>A5E00754188</b>
• French	<b>A5E00754173</b>

This device is shipped with a Quick Start guide and a CD containing further SITRANS F US literature.

All literature is also available for free at:  
<http://www.siemens.com/flowdocumentation>

##### Accessories

Description	Order 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>	
RS232 add-on module, point to point communication interface with Modbus RTU protocol	<b>A5E03405537</b>	
RS485 add-on module, multi-drop communication interface with Modbus RTU protocol	<b>A5E03405534</b>	

##### Process Device Manager SIMATIC PDM

###### SIMATIC PDM Single Point V6.0

For operation and parameterization of one field device, communication using PROFIBUS DP/PA or HART modem, incl. 1 TAG


**Cannot** be expanded by further functions or TAG option/power-pack 5 languages (German, English, French, Spanish, Italian) executes with Windows 2000 Professional or Windows XP Professional

**6ES7658-3HX06-0YA5**



##### Spare parts


###### Spare part transmitter for FUS380 systems (7ME3400)

Description	Order No.	
FUS080 transmitter 3.6V battery (no battery included, to be ordered separate) as spare part transmitter for FUS380 flowmeter series	<b>A5E02729700</b>	
FUS080 transmitter 3.6V battery (battery included) as spare part transmitter for FUS380 flowmeter series	<b>A5E02729035</b>	
FUS080 transmitter 230V mains as spare part transmitter for FUS380 flowmeter series	<b>A5E02699309</b>	
FUS080 transmitter 230V mains with backup-battery as spare part transmitter for FUS380 flowmeter series	<b>A5E02729610</b>	

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


###### Spare part transmitter for FUE380 approved systems (7ME3410)

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

Description	Order No.	
FUE080 transmitter 3.6V battery (no battery included, to be ordered separate) as spare part transmitter for FUE380 flowmeter series	<b>A5E02734600</b>	
FUE080 transmitter 3.6V battery (battery included) as spare part transmitter for FUE380 flowmeter series	<b>A5E02734568</b>	
FUE080 transmitter 230V mains as spare part transmitter for FUE380 flowmeter series	<b>A5E02734539</b>	
FUE080 transmitter 230V mains with backup-battery as spare part transmitter for FUE380 flowmeter series	<b>A5E02734585</b>	

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

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



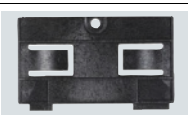




Description	Order No.	
FUS080 transmitter 3.6V battery (no battery included, to be ordered separate) as spare part transmitter for SONOKIT flowmeters	<b>A5E03048726</b>	
FUS080 transmitter 3.6V battery (battery included) as spare part transmitter for SONOKIT flowmeters	<b>A5E03048714</b>	
FUS080 transmitter 230V mains as spare part transmitter for SONOKIT flowmeters	<b>A5E03048701</b>	
FUS080 transmitter 230V mains with backup-battery as spare part transmitter for SONOKIT flowmeters	<b>A5E03048719</b>	

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

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### Transmitter FUS080/FUE080

Description	Order No.	
Dual battery pack (6 year life-time) 33 Ah <sup>1)</sup> • 1 pc. pack • 24 pcs. pack	<b>A5E02679676</b> <b>A5E02896941</b>	
Single battery back-up to main supply 13.5 Ah <sup>1)</sup>	<b>A5E02679923</b>	
Battery cover for transmitter FUS080	<b>A5E00694468</b>	
PG 13.5 set (2 pcs.) for main cable/pulse cable	<b>FDK:083G0228</b>	
PG 13.5 set (2 pcs.) for dual coaxial cable (6 mm)	<b>A5E00694500</b>	
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	<b>A5E0405537</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.

Downloads for DEVICE description FUE380  
<http://support.automation.siemens.com/WW/view/en/23036121/133100>

### Sensor cables for FUS380/FUE380 flowmeters

Description	Order No.	
<b>DN 50 to 80 flowmeters</b>		
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>	
1 m (3.28 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>		
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	Order No.	
15 m (49.2 ft) cable set (2 pcs.) remote mounting with SONOKIT flowmeters	<b>A5E02478541<sup>F)</sup></b>	
30 m (65.6 ft) cable set (2 pcs.) remote mounting with SONOKIT flowmeters	<b>A5E02478751<sup>F)</sup></b>	

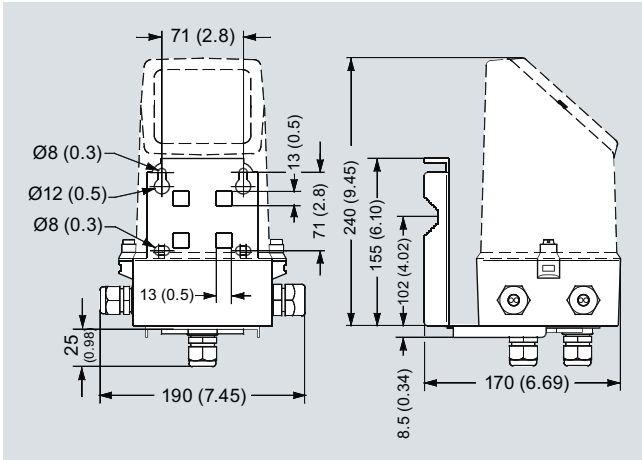
F) Subject to export regulations AL: 91999, ECCN: N.

# Flow Measurement SITRANS F US Inline

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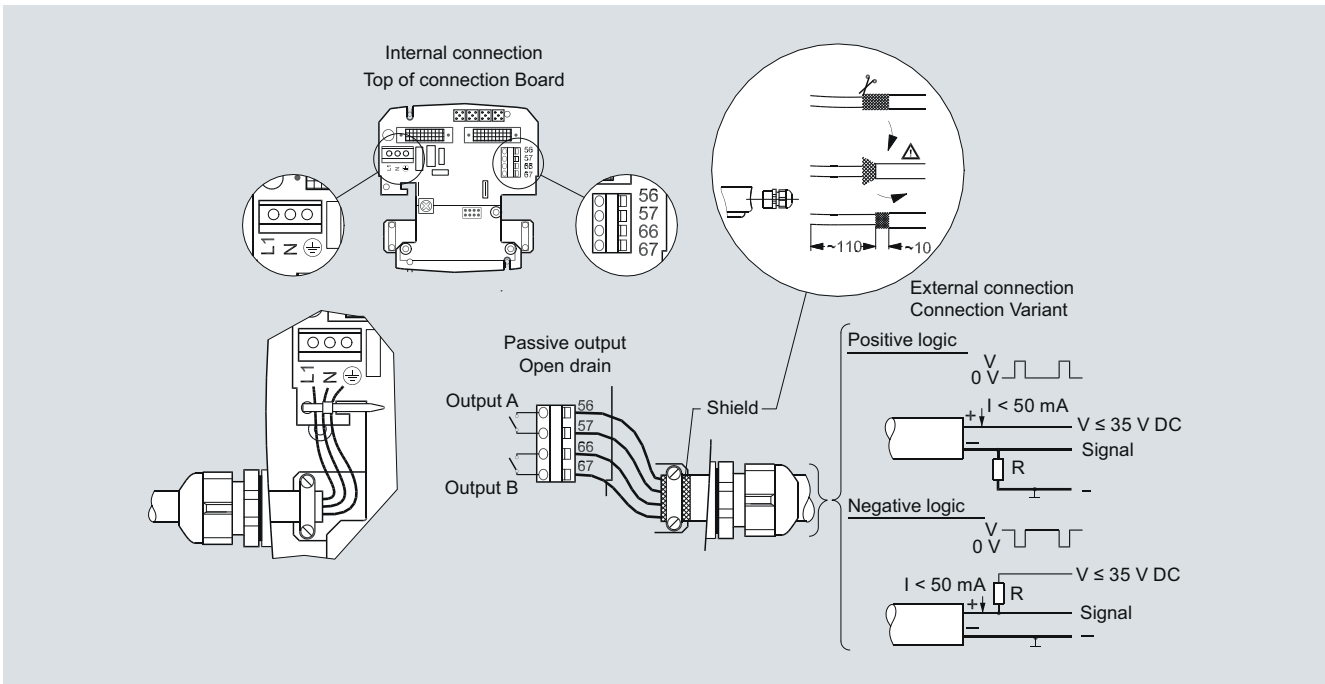
### Dimensional drawings

**FUS080 transmitter IP67/NEMA 4X/6, wall mounting**



Dimensions in mm (inch)

### Schematics



Electrical connection of SITRANS FUS080

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