

Overview



SITRANS FUS060 transmitter

SITRANS FUS060 is a transit time based transmitter designed for ultrasonic flowmetering for any pipe in the SONO series up to DN 4000. SITRANS FUS060 is engineered for high performance and suitable for 1-, 2- and 4-tracks flowmeters.

Benefits

- Superior signal resolution for optimum turn down ratio
- Simple menu-based local operation with two-line display and four optical input elements, for unlimited use in potentially explosive atmospheres
- Self-monitoring and diagnosis
- Operate up to 4-tracks
- ATEX II 2G EEx de IIC T6 (HART version only)
- ATEX II 2G EEx d [ia] IIC T6
- Remote transmitter up to 15 m away
- 1 analog output (4 to 20 mA) with HART-protocol, 1 digital frequency or pulse output, 1 relay output for limit, alarms, flow direction
- PROFIBUS PA Profile 2 add-on module, 1 digital frequency or pulse output

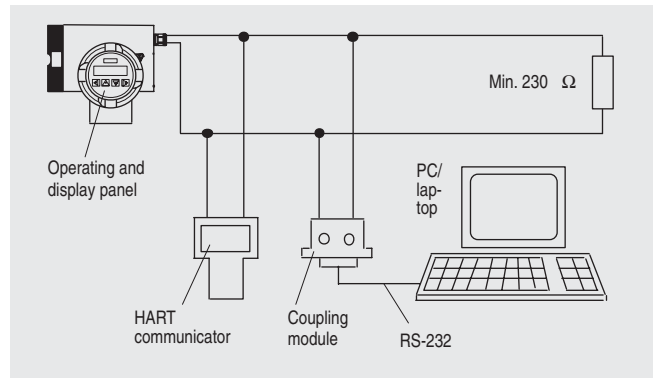
Design

The transmitter is designed for remote installation in non-hazardous or hazardous areas.

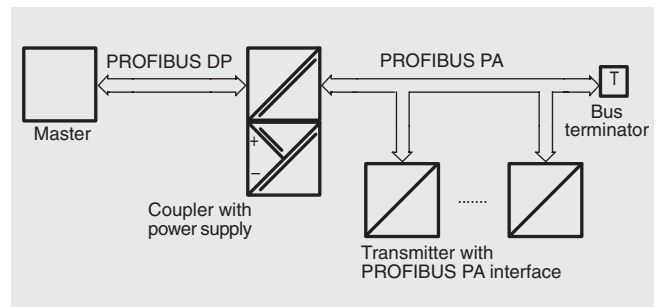
Displays and keypad

Operation of the SITRANS FUS060 transmitter can be carried out using:

- Keypad and display unit
- HART communicator
- PC/laptop and SIMATIC PDM software via HART communication
- PC/laptop and SIMATIC PDM software using PROFIBUS PA communication



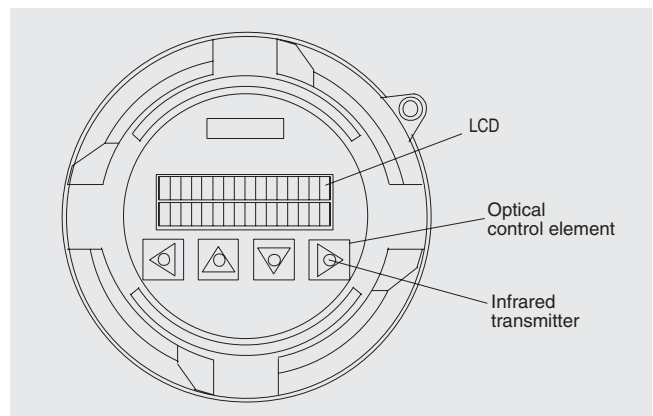
HART communication



PROFIBUS PA communication

Function

The operating and display panel permits simple operation without supplementary equipment. It is not necessary to open the housing. All changes to a setting can therefore also be carried out in the potentially explosive atmosphere.



Operating and display panel

The individual functions and parameters are selected using a hierarchical, multi-language input menu and four optical input elements. The parameters can be specifically selected and modified using codes, e.g.:

SITRANS F flowmeters

SITRANS F US

SITRANS FUS060 transmitter

- Operating parameters such as measuring range, physical dimensions, device information
- Limits for flow, ultrasonic velocity or ultrasonic amplitude
- Noise suppression using damping, error stages and hysteresis
- Display parameters (freely-configurable display)
- Display in volume or mass dimensions
- Density as constant input value for conversion of volume into mass dimensions
- Forward/backward measurement
- Flow direction
- Diagnostics functions and control values
- Functions of the PROFIBUS PA output: flow, net quantity (volume or mass), speed of sound, ultrasonic amplitude, forward quantity (volume or mass), backward quantity (volume or mass)
- Functions of the analog output: flow, ultrasonic velocity or ultrasonic amplitude
- Functions of digital output 1: pulse output, frequency output or device status
- Functions of digital output 2: limit, flow direction or device status
- Simulation of output signal via analog output, digital output 1 and digital output 2

The HART protocol is implemented via the analog output (current output). Using this communication facility, the device can be parameterized with a PC/laptop and SIMATIC PDM software in addition to local operation.

In the SITRANS F version with PROFIBUS PA, the analog output is replaced by the digital PROFIBUS PA output. The device can then be parameterized via PROFIBUS communication and with SIMATIC PDM in addition to local operation.

Technical specifications

Input

Nominal diameters and measuring ranges	2-track DN 50 ... DN 4000
Max. cable length	15 m (49.2 ft) (screened cable)

Output

Analog output • Signal range • Upper limit • Signal on alarm • Load	4 ... 20 mA 20 ... 22.5 mA, adjustable 3.6 mA, 22 mA, or 24 mA Max. 600 Ω ; $\geq 230 \Omega$ for HART communication
• Only PROFIBUS PA version:	Analog output omitted, is replaced by digital PROFIBUS PA interface

Digital output 1

• Active or passive signal, can be configured with positive or negative logic • For explosion protection II 2G EEx dem [ib] • Only PROFIBUS PA version: • Output function, configurable	Active: DC 24 V, ≤ 24 mA, $R_i = 300 \Omega$ Passive: open collector, DC 30 V, ≤ 200 mA Passive: open collector DC 30 V, ≤ 100 mA Only passive signals for digital output 1 Pulse output • Adjustable pulse significance $\leq 5,000$ pulses/s • Adjustable pulse width ≥ 0.1 ms Frequency response • f_{END} selectable up to 10 kHz
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Digital output 2

• Relay, NC or NO contact	Switching capacity max. 5 W Max. DC 50 V, max. DC 200 mA Self-resetting fuse, $R_i = 9 \Omega$
• For explosion protection II 2G EEx d [ib]	Max. DC 30 V, max DC 100 mA, AC 50 mA (cf. EC-Type Examination certificate)
• Output function, configurable	Limit for Flow, speed of sound or ultrasonic amplitude Flow direction Device status
• Only PROFIBUS PA version:	Digital output 2 omitted

Communication via analog output 4 ... 20 mA

• PC/laptop or HART communicator with SITRANS F flowmeter	
- Load with connection of coupling module	230 ... 500 Ω
- Load with connection of HART communicator	230 ... 600 Ω
- Cable	2-wire screened ≤ 3 km (≤ 1.86 miles) Multi-core screened ≤ 1.5 km (≤ 0.93 miles)
- Protocol	HART, version 5.1

Communication via PROFIBUS PA interface

	Layers 1 + 2 according to PROFIBUS PA Communication system according to IEC 1158-2 Layer 7 (protocol layer) according to PROFIBUS DP, EN 50170 standard
• Power supply	Separate supply, four-wire device Permissible bus voltage 9 ... 32 V See certificates and approvals
• Current consumption from bus	10 mA; ≤ 15 mA in event of error with electronic current limiting

Electrical isolation

	Outputs electrically isolated from power supply and from one another
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Accuracy

Error in measurement (at reference conditions)

• Pulse output	$V < 0.5$ m/s: $\pm 0.25\%$
• Analog output	As pulse output plus $\pm 0.1\%$ of measured value, $\pm 20 \mu\text{A}$
• Repeatability	$\leq \pm 0.05\%$ of measured value

Reference conditions

• Process temperature	$25^\circ\text{C} \pm 5^\circ\text{C}$ ($77^\circ\text{F} \pm 9^\circ\text{F}$)
• Ambient temperature	$25^\circ\text{C} \pm 5^\circ\text{C}$ ($77^\circ\text{F} \pm 9^\circ\text{F}$)
• Warming-up time	30 min.

Rated operation conditions

Ambient conditions

Ambient temperature

- For transmitter
 - -20 ... +65 °C (-4 ... +149 °F) with process temp. ≤ 60 °C (≤ 140 °F)
 - -20 ... +55 °C (-4 ... +131 °F) with process temp. > 60 °C (> 140 °F)
- For operating panel
 - 0 ... 50 °C (32 ... 122 °F)
- In potentially explosive atmospheres
 - Observe temperature classes
- Storage temperature
 - 25 ... +80 °C (-13 ... +176 °F)
- Degree of protection
 - IP65
- Electromagnetic compatibility
 - For use in industrial environments
- Emitted interference
 - To EN 61000-6-4
- Noise immunity
 - To EN 61000-6-2 and NAMUR

Medium conditions

- Process temperature
 - 20 ... +180 °C (-4 ... +356 °F)
- Gases/solids
 - Influence accuracy of measurement

Design

Transmitter

- Separate version
 - Transmitter is connected to metering tube via 15 m (49.2 ft) long specially screened cable
- Housing material
 - Die-cast aluminum
- Electrical connection
 - Cable inlet: 2x M20 or 2x 1/2" NPT

Displays and controls

- Display
 - LCD, two lines with 16 characters each
- Multi-display:
 - 2 freely-selectable values are displayed simultaneously in two lines
- Operation
 - Flow, quantity, flow velocity, speed of sound, ultrasonic amplitude, current, frequency
 - 4 optical control elements
 - Hierarchical menu prompting with codes

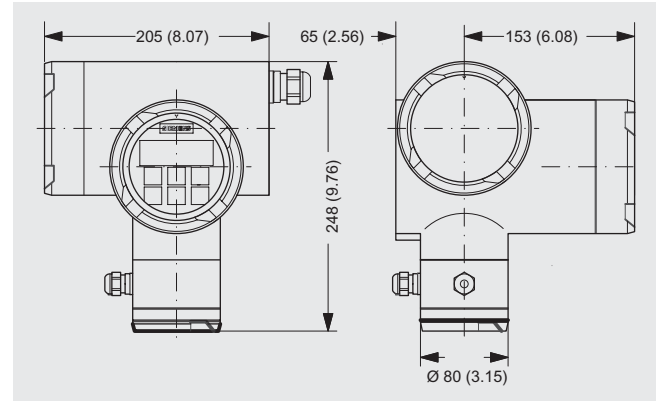
Power supply

- Supply voltage
 - AC 120 ... 230 V ± 15% (50/60 Hz) or DC 19 ... 30 V/ AC 20.4 ... 26.4 V
- Power failure
 - No effect for at least 1 period (> 20 ms)
- Power consumption
 - Approx. 8 VA / 6 W

Certificates and approvals

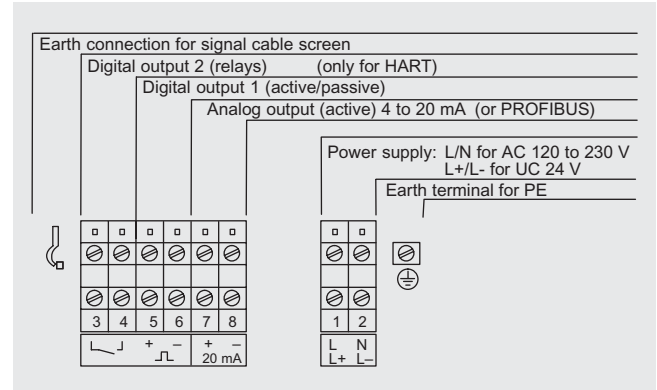
- Explosion protection
 - ATEX version w. HART
 - II 2G EEx de IIC T6
 - ATEX version w. PROFIBUS PA
 - II 2G EEx d [ia] IIC T6

Dimensional drawings



SITRANS FUS060, dimensions in mm (inch)

Schematics



SITRANS FUS060