Ultrasonic flow transmitter SITRANS FST020

Overview

The SITRANS FST020 is the basic device for simple and cost-effective clamp-on applications. As a single-path device, it is suitable for flow measurement on liquids that do not require temperature or viscosity consideration and where highest accuracies are not required.

Historically, the FST020 comes from the clamp-on family of analog FUS1010 transmitters. Since the revision in 2017, the updated transmitter is now part of a digital platform based on the latest developments within Digital Signal Processing (DSP) technology - engineered for high measuring performance, fast response to step changes in flow, high immunity against process noise and simplicity in installation, commissioning and maintenance.

The FST020 transmitter delivers standard parameter measurements i.e. volume flow, flow speed or sound velocity by analog outputs and Modbus communication.

Process values
- Volume flow
- Flow velocity
- Sound velocity
- Totalizer 1, 2 and 3

Benefits

Flow calculation and measurement
- Dedicated volume flow calculation with DSP technology
- 100 Hz update rate for all primary process values
- Maximum data age from sensor to output is 20 ms
- Independent low flow cut-off settings for volume flow and velocity
- Zero-point adjustment on command from discrete input or host system

Operation and display
- User-configurable operation display
  - Fully graphical display 240 x 160 pixel display with up to 6 programmable views
  - Self-explaining alarm handling/log in clear text
  - Help text for all parameters appears automatically in the configuration menu
- SensorFlash technology stores production specific system documentation and provides removable memory of all flowmeter setups and functions
  - Calibration certificates (with ordered calibration)
  - Non-volatile memory backup of operational data
  - Transfer of user configuration to other flowmeters
  - 4GB SD card for storage and data logging
  - Audit trail of all parameter changes
  - Alarm logging

Alarms and safety
- Advanced diagnosis and service menu enhances trouble-shooting and meter validation
- Configurable upper and lower alarm and warning limits for all process values

Outputs and control
- Monitoring comprised of 3 individually configurable totalizers
- Single parameter outputs that can be assigned individually to any of the following parameters:
  - Volume flow
  - Flow velocity
  - Sound velocity
  - Flow direction

Channel 1 is 4 to 20 mA analog output. The current signal can be configured for passive volume flow.

Relay output(s) can be user configured to Alarm status or warning.

Modbus RTU RS 485 comes as standard.

Signal input

The signal input can be user-configured for:
- Totalizer reset functions
- Forcing outputs or freezing process values
- Initiating automatic zero point adjustment

Approvals and certificates

The SITRANS FST020 transmitter was designed to comply with or exceed the requirements of international standards and regulations.

Design

- Field clamp-on (non-intrusive)
- Single path, for only one pair of sensors on one pipe
- IP65 (NEMA 4X) wall mount housing, constructed of polycarbonate
- Available AC or DC power, 100 to 240 V AC, 11.5 to 28.5 V DC

Function

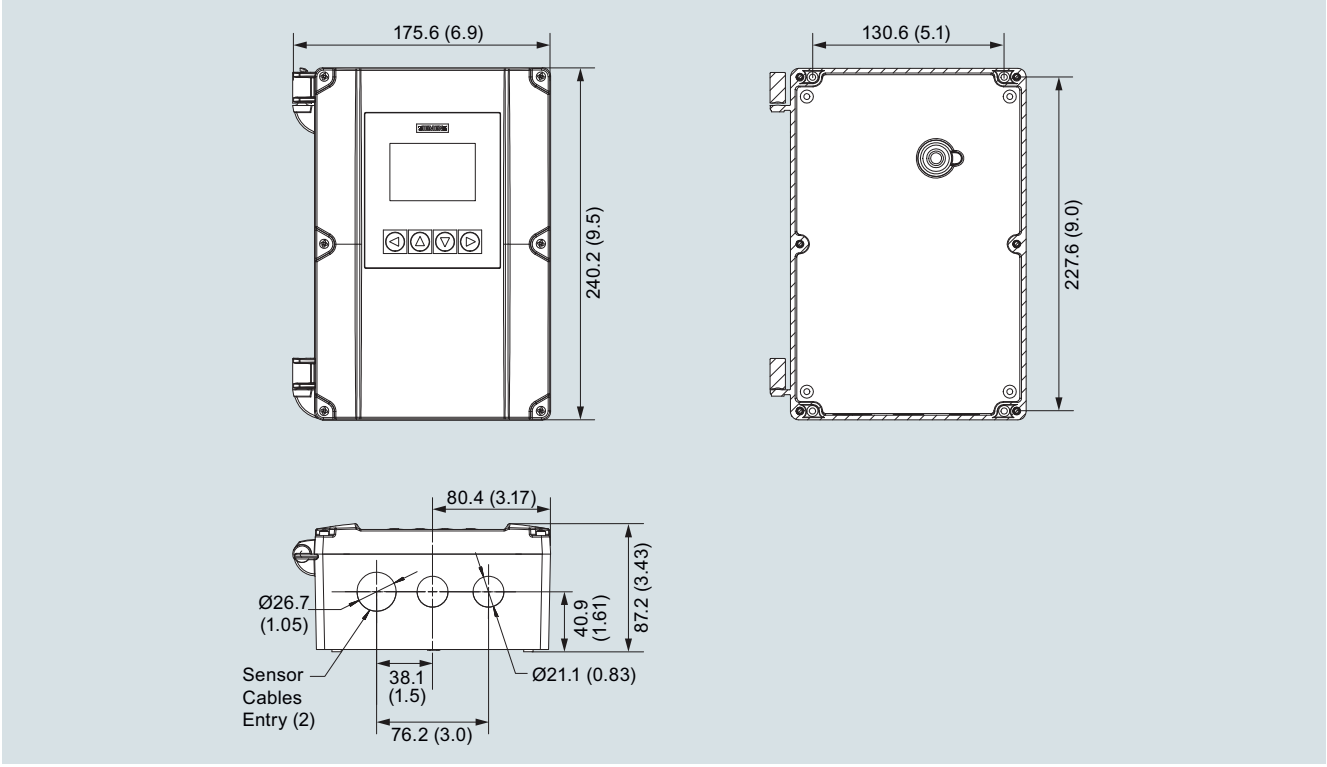
- 240 x 160 pixel graphical display with 4 key navigation and backlight
- 6 user programmable views for individual process and diagnostic information
- Modbus RTU communication
- 100 Hz update rate for all primary process values
- Independent low flow cut-off settings for volume and flow velocity
- Fully compatible with Siemens PDM version 8.2 service pack 1 or higher
- Bidirectional flow operation
- Menus available in English and German

Technical specifications

Rangeability	
Flow range	±12 m/s (±40 ft/s), depending on pipe size higher or lower
Flow direction	bi-directional
Flow sensitivity	0.001 m/s (0.003 ft/s) flow rate independent
Digital inputs	
Totalizer Hold	Optically isolated diode Activated On: Input voltage: 2 ... 10 V DC
Totalizer Reset	Optically isolated diode Activated On: Input voltage: 2 ... 10 V DC
Output Channel 1	
Current	4 ... 20 mA (isolated) Externally powered 10 ... 30 V DC
Relay	30 V DC, 3 V AC max.
Pulse rate	Optically isolated transistor 10 mA, 30 V DC max.
	Pulse: 41.6 ms ... 5 s pulse duration
	Frequency: 0 ... 12.5 kHz (50 % duty cylce)

Accuracy	For velocities above 0.3 m/s (1 ft/s), ±1.0 % of flow
Repeatability	± 0.25 % (according to ISO 11631)
Zero Drift	0.1 % of rate; < ±0.001 m/s (±0.003 ft/s)
Data refresh rate	100 Hz
Transmitter conditions	
Operating temperature	-10 … +50 °C (14 … 122 °F)
Storage temperature	-20 … +60 °C (-4 … +140 °F)
Degree of protection	IP65, NEMA 4X
Design	
Weight	1.4 kg (3.0 lb)
Dimensions (W x H x D)	176 x 240 x 87 mm (6.9 x 9.5 x 3.4 inch)
Enclosure material	Polycarbonate
Power supply	100 ... 240 V AC @ 20 VA or 11.5 ... 28.5 V DC @ 10 W
Certificates and approvals	
Unclassified locations	
• General Safety	UL, ULc, CE

Dimensional drawings



SITRANS FST020 IP65 (NEMA 4X), wall mount enclosure, dimensions in mm (inch)

Ultrasonic flow transmitter SITRANS FST020, wall mount housing - Ordering data

Selection and Ordering data				Article No.	Ord. code
Transmitter SITRANS FST020 (Basic), IP65 (NEMA 4X)				↗ 7ME3570- ■■■ 40-0■■	■■■
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.					
Number of ultrasonic paths					
Single path				1	
Flowmeter functions and I/O configurations					
With display, keypad, 1x 4 ... 20 mA, 1x relay, 1x pulse/frequency, 2x digital input, Modbus RTU				J	
Power supply					
100 ... 240 V AC				A	
11.5 ... 28.5 V DC				B	
Sensor FSS200[1]					
When ordering a flow system, sensors always come automatically with suitable mounting equipment. Smaller sensor sizes A & B come with mounting tracks, while sensor sizes C, D & E are supplied with frames and spacer bars. Straps provided are for the indicated maximum OD listed below.Strap kits are available to accommodate larger pipes (refer to spare part list). Refer to "Sensor Selection Charts" to find the most suitable sensors for specific pipe sizes and wall thicknesses.					
No sensor				A	
For the following Universal sensors, temperature range is -40 ... +121 °C (-40 ... +250 °F), FSS200 Universal: select according to outer pipe diameter					
FSS 200 Universal	A2	12.7 ... 50 mm (0.5 ... 2")	Track mount and straps provided up to 75 mm (3")	B	
FSS 200 Universal	B3	19 ... 127 mm (0.75 ... 5")	Track mount and straps provided up to 125 mm (5")	C	
FSS 200 Universal	C3	51 ... 305 mm (2 ... 12")	Mounting frame, straps and spacer bar provided up to 330 mm (13")	D	
FSS 200 Universal	D3	203 ... 610 mm (8 ... 24")	Mounting frame and straps and spacer bar provided up to 600 mm (24")	E	
FSS 200 Universal	E2	304 ... 9144 mm (12 ... 360")	Mounting frame and straps and spacer bar provided up to 1200 mm (48")	F	
For the following High Precision sensors T1, temperature range is -40 ... +120 °C (-40 ... +248 °F), FSS200 High Precision: select according to pipe wall thickness					
FSS200 HP	A1H	0.6 ... 1.0 mm (0.025 ... 0.4")	Track mount and straps provided up to 75 mm (3")	G	
FSS200 HP	A2H	1.0 ... 1.5 mm (0.04 ... 0.06")	Track mount and straps provided up to 75 mm (3")	H	
FSS200 HP	A3H	1.5 ... 2.0 mm (0.06 ... 0.08")	Track mount and straps provided up to 75 mm (3")	J	
FSS200 HP	B1H	2.0 ... 3.0 mm (0.08 ... 0.12")	Track mount and straps provided up to 125 mm (5")	K	
FSS200 HP	B2H	3.0 ... 4.1 mm (0.12 ... 0.16")	Track mount and straps provided up to 125 mm (5")	L	
FSS200 HP	C1H	4.1 ... 5.8 mm (0.16 ... 0.23")	Mounting frame, straps and spacer bar provided up to 600 mm (24")	M	
FSS200 HP	C2H	5.8 ... 8.1 mm (0.23 ... 0.32")	Mounting frame, straps and spacer bar provided up to 600 mm (24")	N	
FSS200 HP	D1H	8.1 ... 11.2 mm (0.32 ... 0.44")	Mounting frame, straps and spacer bar provided up to 1200 mm (48")[1]	P	
FSS200 HP	D2H	11.2 ... 15.7 mm (0.44 ... 0.62")	Mounting frame, straps and spacer bar provided up to 1200 mm (48")[1]	Q	
FSS200 HP	D4H	15.7 ... 31.8 mm (0.62 ... 1.25")	Mounting frame, straps and spacer bar provided up to 1200 mm (48")[1]	R	
For the following High Temperature sensors, temperature range is -40 ... +230 °C (-40 ... +446 °F), FSS200 High Temperature: select according to outer diameter					
FSS200 HT	Size 2	30 ... 200 mm (1 ... 8")	Mounting track and straps provided up to 250 mm (10")	Z	P1A
FSS200 HT	Size 3	150 ... 610 mm (6 ... 24")	Mounting track and straps provided up to 650 mm (26")	Z	P2A
FSS200 HT	Size 4	400 ... 1200 mm (16 ... 48")	Mounting track and straps provided bar provided up to 1250 mm (50")	Z	P3A

Selection and Ordering data	Article No.	Ord. code
Transmitter SITRANS FST020 (Basic), IP65 (NEMA 4X)	**7ME3570 - ■■■ 40 - 0 ■■■**	
Sensor cable (pair - terminated)		
No sensor cable	**A**	
Sensor cable, HDPE jacket, submersible, length • 5 m (16.4 ft) • 10 m (32.8 ft) • 20 m (65.6 ft)	**P** **Q** **R**	
Approvals		
UL, ULc, CE	**1**	

[1] Supplied spacer bar supports pipes up to 1050 mm (42"). For pipes larger than 1050 mm (42") purchase also, spare part 7ME3960-0MS40 (1012BN-4)

[2] Made of stainless steel construction.

Selection and Ordering data	Order code
Further designs Please add "**-Z**" to Article No. and specify Order code(s).	
Cable termination kit for customer supplied sensor cable pair	
Sensor cable termination for standard and plenum cable	**T01**
Mass storage	
Enable mass storage function or SD-card (not available for USA)	**S30**
Tag and name plates	
Tag plate, transmitter and sensor	**Y19**

MLFB example

Application example

A basic clamp-on meter is required for a DN 150 - 168.3 x 4.5 mm (6“ schedule 40) carbon steel wastewater line. Meter electronics are to be located in an instrumentation shed with available AC power. 10 m (32 ft) of sensor cable is needed to reach pipe location.

MLFB Article No.: **7ME3570-1JA40-0MQ1**

Selection and Ordering data	Article No.	Ord. code
SITRANS FST020 (Basic) IP65 (NEMA 4X)	**7ME3570 - ■■■ 40 - 0 ■■■**	
Single channel	**1**	
Standard I/O option	**J**	
100 ... 240 V AC power option	**A**	
Sensor FSS200 HP C1H	**M**	
Sensor cable: HDPE jacket, submersible, length 10 m (32 ft)	**Q**	
UL, ULc, CE	**1**	