Overview

SITRANS F C Coriolis mass flowmeters are designed for measurement of a variety of liquids and gases. The meter offers accurate measurement of mass flow, volume flow, density, temperature and fraction.

Compatibility between transmitters and sensors

Transmitter	Page	Compact	Remote	Ex-Approval	Sensor	Page
FCT030	3/149	Yes	Yes	Yes	FCS300 Standard, DN 15 ... DN 150	3/160
		No	Yes	Yes	MASS 2100, DI 1.5	3/180
		Yes	Yes	Yes	MASS 2100, DI 3, DI 6, DI 15	3/187
		No	Yes	Yes	FC300, DN 4	3/183
FCT010	3/174	Yes	No	Yes	FCS300 Standard, DN 15 ... DN 150	3/160
		No	Yes	Yes	MASS 2100, DI 1.5	3/180
		Yes	Yes	Yes	MASS 2100, DI 3, DI 6, DI 15	3/187
		No	Yes	Yes	FC300, DN 4	3/183
MASS 6000 IP67 Polyamide enclosure	3/205	No	Yes	No	FCS200, DN 10 ... DN 25	3/228
		No	Yes	No	FC300, DN 4	3/183
		No	Yes	No	MASS 2100, DI 1.5	3/180
		Yes	Yes	No	MASS 2100, DI 3 ... DI 15	3/187
MASS 6000 19"	3/210	No	Yes	No	FCS200, DN 10 ... DN 25	3/228
		No	Yes	No	FC300, DN 4	3/183
		No	Yes	No	MASS 2100, DI 1.5	3/180
		No	Yes	No	MASS 2100, DI 3 ... DI 15	3/187
MASS 6000 Ex 19"	3/210	No	Yes	Yes	FCS200, DN 10 ... DN 25	3/228
		No	Yes	Yes	FC300, DN 4	3/183
		No	Yes	Yes	MASS 2100 Ex, DI 1.5	3/180
		No	Yes	Yes	MASS 2100 Ex, DI 3 ... DI 15	3/187
MASS 6000 Ex d Stainless steel enclosure	3/219	No	Yes	Yes	FCS200, DN 10 ... DN 25	3/228
		No	Yes	Yes	FC300, DN 4	3/183
		No	Yes	Yes	MASS 2100 Ex, DI 1.5	3/180
		Yes	Yes	Yes	MASS 2100 Ex, DI 3 ... DI 15	3/187
SIFLOW FC070 Standard	3/224	No	Yes	No	FCS200, DN 10 ... DN 25 FC300, DN 4 MASS 2100, DI 1.5 MASS 2100, DI 3 ... DI 15	3/228 3/183 3/180 3/187
SIFLOW FC070 Ex CT	3/224	No	Yes	Yes	FCS200, DN 10 ... DN 25 FC300, DN 4 MASS 2100, DI 1.5 MASS 2100, DI 3 ... DI 15	3/228 3/183 3/180 3/187

System information SITRANS F C Coriolis mass flowmeters

Benefits

Greater flexibility

- Wide product program
- High performance and top-end flowmeters
- Compact or remote installation using the same transmitters and sensors within their flowmeter series

Easier commissioning

All SITRANS F C Coriolis flowmeters feature a sensor related memory unit SENSORPROM or SensorFlash which stores calibration data and transmitter settings for the lifetime of the product.

At commissioning the flowmeter commences measurement without any initial programming.

Easier service

- Comprehensive self-diagnosis and service menu enhances troubleshooting and meter verification.
- Transmitter replacement requires no programming. SENSORPROM automatically updates all settings after initialization.

Room for growth

- FC330/FC310:
  Digital platform allows for any sensor in the range to be matched in compact or remote.
- MASS 2100/FC300 sensors with FCT digital platform allows all sensors from DI1,5 to DI 15 to be matched with the FCT010 and FCT030 transmitters.
  Both analog and digital connections are available.
- MASS 6000:
  Available for MASS 2100, FC200 and FC300. USM II the Universal Signal Module with "plug & play" simplicity makes it easy to access and integrate the flowmeter with almost any system and bus-protocol and it ensures the flowmeter will be easy to upgrade to future communication/bus platforms.
- SIFLOW:
  Available for MASS 2100, FC200 and FC300.
  Direct integration into SIMATIC S7-300 systems or as standalone transmitter as a flowmeter specific I/O module ensures fast and smooth startup, seamless integration, fast operation.

Application

Coriolis flowmeters are generally suitable for measuring liquids and gases. The flow measurement is independent of changes in process conditions/parameters such as temperature, density, pressure, viscosity, conductivity and flow profile.

Due to this versatility the meter is easy to install and use. The Coriolis flowmeter is recognized for its high accuracy over a wide turn-down ratio.

The main applications of the Coriolis flowmeter can be found in all industries, such as:	
Chemical and pharma	Detergents, bulk chemicals, pharmaceuticals, acids, alkalis, filling and dosing
Food and beverage	Dairy products, beer, wine, soft-drinks, °Plato/°Brix, fruit juices and pulps, bottling, CO_2 dosing, CIP-liquids
Automotive	Fuel injection nozzle and pump testing, filling of AC units, engine consumption measurement, paint robots
Oil and gas	Filling of gas bottles, furnace control, CNG-dispensers, test separators, LPG, well-head water-cut monitoring
Water and waste water	Dosing of chemicals for water treatment

Please see Product selector www.pia-selector.automation.siemens.com **on the Internet, since some constrains might be related to some of the features**

	FC330	FC310	MASS 2100 DI 1.5	MASS 2100 DI 3 to DI 15	FC300 DN 4	FCS200 DN 10 to DN 25	MASS 6000 IP67	MASS 6000 19"	MASS 6000 Ex d	SIFLOW FC070 Std/Ex CT	MASS 2100/FC300 with FCT010	MASS 2100/FC300 with FCT030
	7ME4633	7ME4631	7ME4100	7ME4100	7ME4400	7ME4500	7ME4110	7ME4110	7ME4110	7ME4120	7ME4811	7ME4813
Design												
Compact	●	●		●			●		●		●[3]	●[3]
Remote	●		●	●	●	●	●	●	●	●	●	●
Transmitter enclosure												
Polyamide, IP67/NEMA 6							●					
Noryl (SIMATIC S7-300), IP20/NEMA 2										●		
Stainless steel IP67/NEMA 6									●			
19" rack IP20/NEMA 2 aluminum								●				
Back of panel IP20 aluminum								●				
Wall mounting IP65 ABS plastic								●				
Front of panel IP65 ABS plastic								●				
Aluminum IP67 Field mounting enclosure	●	●									●	●
Aluminum IP67 Wall mounting enclosure	●											●
Communication												
HART	●						●	●	●			●
PROFIBUS PA	●						●	●	●			●
PROFIBUS DP	●						●	●				●
Modbus RTU/RS 485	●	●					●	●		●	●	●
Modbus RTU/RS 232										●		
FOUNDATION Fieldbus H1							●	●	●			
DeviceNet							●	●				
Supply voltage												
24 V DC	●	●								●	●	●
24 V AC/DC							●	●	●			
115/230 V AC	●						●	●				●
Pipe size												
DI 1.5 (1/16")			●								●	●
DI 3 (1/8")				●							●	●
DN 4 (1/6")					●						●	●
DI 6 (¼")				●							●	●
DN 10 (3/8")						●						
DI 15 (½")				●							●	●
DN 15 (½")	●	●				●						
DN 25 (1")	●	●										
DN 50 (2")	●	●										
DN 80 (3")	●	●										
DN 100 (4")	●	●										
DN 150 (6")	●	●										
Process connection norms and pressure												
Pipe thread												
NPT ANSI/ASME B.20.1; PN 100	●	●	●	●	●						●	●
NPT ANSI/ASME B.20.1; PN 350						●						
VCO						●						
ISO 228/1; PN 100	●	●	●	●	●						●	●

● = available

System information SITRANS F C Coriolis mass flowmeters

Please see Product selector www.pia-selector.automation.siemens.com **on the Internet, since some constrains might be related to some of the features**

	FC330	FC310	MASS 2100 DI 1.5	MASS 2100 DI 3 to DI 15	FC300 DN 4	FCS200 DN 10 to DN 25	MASS 6000 IP67	MASS 6000 19"	MASS 6000 Ex d	SIFLOW FC070 Std/Ex CT	MASS 2100/FC300 with FCT010	MASS 2100/FC300 with FCT030
	7ME4633	7ME4631	7ME4100	7ME4100	7ME4400	7ME4500	7ME4110	7ME4110	7ME4110	7ME4120	7ME4811	7ME4813
Flange												
EN 1092-1 PN 16	●	●										
EN 1092-1 PN 40	●	●		●							●	●
EN 1092-1 PN 100	●	●		●							●	●
ANSI B16.5 Class 150	●	●		●							●	●
ANSI B16.5 Class 300	●	●										
ANSI B16.5 Class 600	●	●		●							●	●
ANSI B16.5 Class 900[5]	●	●										
ANSI B16.5 Class 1500[5]	●	●										
JIS B2200 10K	●	●										
JIS B2200 20K	●	●										
Dairy												
DIN 11851	●	●		●							●	●
DIN 11851 PN 40				●							●	●
Clamp ISO 2852 PN 16				●							●	●
ISO 2853 PN 16				●							●	●
DIN 32676 (ISO) Clamp Row B	●	●										
SMS 1145	●	●										
Others on request	●	●	●	●	●						●	●
Pipe material												
Stainless steel AISI 316L/ 1.4435/1.4404	●	●	●	●	●						●	●
Nickel-Alloy C4	●	●										
Hastelloy C22/2.4602			●	●	●	●[4]					●	●
With heating jacket												
Internal U-tube											●	●
Pressure rating												
PN 40	●	●		●							●	●
PN 100	●	●	●	●	●						●	●
PN 160											●	●
PN 214						●					●	●
PN 350						●					●	●
High-pressure version[1]			●	●	●						●	●
Accuracy												
Flow error ≤ 0.1 % of rate[6]	●	●	●	●	●						●	●
Flow error ≤ 0.2 % of rate[6]	●	●										
Flow error ≤ 0.5 % of rate[6]						●						
Density error ≤ 0.0005 g/cm³				●							●	●
Density error ≤ 0.001 g/cm³			●								●	●
Density error ≤ 0.002 g/cm³	●	●										
Density error ≤ 0.010 g/cm³	●	●										
Density error ≤ 0.0015 g/cm³				●[2]	●							
Cable glands												
PG 13.5								●[3]				
½" NPT	●	●					●				●	●
M20	●	●					●		●		●	●

● = available

1) See technical specifications.
2) DI 3, DI 6 and DI 15
3) Only when mounted in enclosure.
4) Process connectors in AISI 316Ti/1.4571
5) Sensor pressure and temperature limited to ANSI class 600 rating
6) For reference conditions: ISO 9104 and DIN/EN 29104. Increased error can be expected for gas mass flow measurement.

Please see Product selector www.pia-selector.automation.siemens.com **on the Internet, since some constrains might be related to some of the features**

	FC330	FC310	MASS 2100 DI 1.5	MASS 2100 DI 3 to DI 15	FC300 DN 4	FCS200 DN 10 to DN 25	MASS 6000 IP67	MASS 6000 19"	MASS 6000 Ex d	SIFLOW FC070 Std/Ex CT	MASS 2100/FC300 with FCT010	MASS 2100/FC300 with FCT030
	7ME4633	7ME4631	7ME4100	7ME4100	7ME4400	7ME4500	7ME4110	7ME4110	7ME4110	7ME4120	7ME4811	7ME4813
Approvals												
Custody transfer												
NTEP	●[9]					●						
Other media than water pattern approval - OIML R 117 (DN 25 to DN 150)	●[9]											
Harzardous locations												
ATEX	●	●	●	●	●	●	●	●	●	●[3][4]	●	●
IECEx	●	●				●				●[4]	●	●
EAC Ex	●[9]	●[9]	●	●	●	●		●	●	●[3][4]		
US /CSA) Div 1	●	●									●	●
Canada (CSA) zone 1	●	●									●	●
FM						●				●		
UL			●[1]	●[1]	●						●	●
CSA										●[4]		
NEPSI	●[9]	●[9]				●						
INMETRO	●[9]	●[9]										
Ordinary locations												
UL listed (us, ca) Flowmeter c-UL-us							●[2]	●[7]				
UL recognized (us, ca) Flowmeter c-UL-us							●[2][5]	●[5][6]				
PED												
Fluid group 1 Category III, gas PED Directive 2014/68/EU	●	●										
CRN												
Category F OF10769.5C CRN	●	●	●	●[8]	●						●[8]	●[8]
F&B/Pharma												
EHEDG	●[10]	●[10]										
Marine												
SITRANS FC310: Germanischer Lloyd/ det Norske Veritas, Bureau Veritas, Lloyds of London, American Bureau of Shipping, Rina, CCS	●[9]	●[9]										

Note: Special conditions for safe use might be specified in certificates or operating instructions.

● = available

1) Sensor pressure max. 100 bar (1450 psi)
2) Only remote version
3) Can be placed in zone 2 if mounted in minimum IP54 cabinet
4) Only Ex version
5) 24 V; IP20
6) 115 ... 230 V; IP20
7) 115 ... 230 V; IP65
8) Only DI 6 is CRN
9) In preparation
10) DN 25 to DN 80

System information SITRANS F C Coriolis mass flowmeters

Function

The flow measuring principle is based on the Coriolis effect. The flowmeter consists of a system FC310 or FC330 or a combination of a sensor type MASS 2100/FC300/FCS200 and a transmitter type MASS 6000/SIFLOW FC070/FCT010 and FCT030.

The SITRANS F C sensors are energized by an electro-mechanical driver circuit which oscillates the pipe at its resonant frequency.

Two pick-ups, 1 and 2 are placed symmetrically on both sides of the driver. When liquid or gas flows through the sensor, Coriolis force will act on the measuring pipe and cause a pipe deflection which can be measured as a phase shift on pick-up 1 and 2. The phase shift is proportional to the mass flow rate.

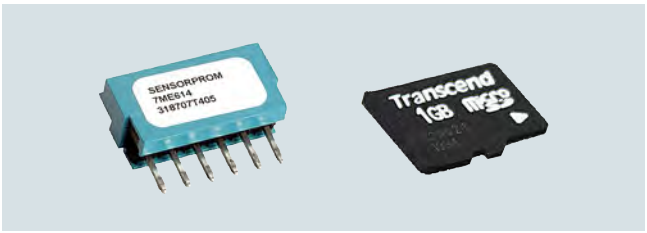
The amplitude of the driver is automatically regulated to ensure a stable output from the 2 pick-ups.

The temperature of the sensor is measured by a Pt1000.

The flow-proportional signal from the 2 pick-ups, the temperature measurement and the driver frequency are fed into the SITRANS F C transmitter for calculations of mass, volume, fraction, temperature and density.

The signal transfer function is based on a DFT technology (Discrete Fourier Transformation).

The transmitter has a built-in noise filter, which can be used to improve the meter's performance if the installation and application conditions are not ideal. Typically influence from process noise such as pump pulsations, mechanical vibrations, oscillating valves can be reduced considerably.



SENSORPROM and SensorFlash flow memory units

FC410 flow transmitters communicate via Modbus RTU and FC330 via HART/Modbus/PROFIBUS DP/ PROFIBUS PA.

Integration

Installation requirements/System design information

The SITRANS F C mass flowmeter is suitable for in- and outdoor installations. The standard instrument meets the requirements of Protection Class IP67/NEMA 6 or IP65. The flowmeter is bidirectional and can be installed in any orientation, however, the sensor is not self-emptying in all positions.
It is important to ensure that the meter tubes are always completely filled with homogeneous fluid. Otherwise measuring errors may occur.
The corrosion resistance of the fluid-wetted materials must be evaluated.
The pressure drop through the sensor is a function of the properties of the fluid and the flow rate. The **Sizing Program** (download from www.siemens.com) can be used to calculate the pressure drop.

The preferred flow direction is indicated by the arrow on the flowmeter. Flow in this direction will be indicated as positive.

Installation orientation

- FCS300 – sensors
  The optimal installation orientation is vertical with flow upwards (liquids) and up to 10° off vertical for self-draining.
- MASS 2100/FC300 – sensors
  The optimal installation orientation is horizontal.

Supports

- In order to support the weight of the flowmeter and to ensure reliable measurements when external effects exist (e.g. vibrations), the sensor should be installed in well-supported pipelines. Supports or hangers should be installed symmetrically and stress-free in close proximity to the process connections.

Shut-off devices

- To conduct a system zero adjustment, shut-off devices are required in the pipeline.
  - In horizontal installations at the outlet for FC300 and the inlet for MASS 2100.
  - In vertical installations at the inlet.
- When possible, shut-off devices should be installed both up- and downstream of the flowmeter. A bypass valve is recommended where regular zero adjustment is planned to avoid disruption of the flowing system.

Installation: straight run requirements

- The mass flowmeter does not require any flow condition or straight inlet sections. Care should be exercised to ensure that any valves, gates, sight glasses etc. do not cavitate and are not set into vibration by the flowmeter.

System design information

- The presence of gas bubbles in the fluid may result in erroneous measurements, particularly in the density measurement. Therefore the flowmeter should not be installed at the highest point in the system where bubbles are possibly largest.
- Long drop lines downstream from the flowmeter should be avoided to prevent the meter tube from draining during operation.
- The flowmeter should not come into contact with any other objects. Avoid attachments to the housing.
- When the cross-section of the connecting pipeline is larger than the sensor size, suitable standard reducers may be installed.
- If strong vibrations exist in the pipeline, they should be damped using elastic pipeline elements. The damping devices must be installed outside the supported flowmeter section and outside the section between the shut-off devices.
- Make sure that any dissolved gases, which are present in many liquids, do not outgas. The back pressure at the outlet should be at least 0.2 bar (3 psi).
- Assure that operation below the vapor pressure cannot occur when a vacuum exists in the meter tube or for fluids which boil readily.
- The sensor should not be installed in the vicinity of strong electromagnetic fields, e.g. near motors, pumps, transformers etc.
- When operating more than one meter in one or multiple interconnected pipelines, the sensors should be spaced distant from each other or the pipelines should be decoupled to prevent cross talk.

Zero adjustment

- In order to adjust the zero under operating conditions it must be possible to reduce the flow rate to „ZERO“ while the meter tube is completely filled. It is important for accurate measurements that during the zero adjustment there are no gas bubbles in the flowmeter. It is also important that the pressure and temperature in the meter tube be the same as that which exists during operation.

Technical specifications

Flowmeter uncertainty/specifications

To ensure continuous accurate measurement, flowmeters must be calibrated. The calibration is conducted at flow facilities accredited according to ISO/IEC 17025 by an acreditation body.

The accreditation body has signed the ILAC MRA agreement (International Laboratory Accreditation Corporation - Mutual Recognition Arrangement). Therefore the accreditation ensures international traceability and recognition of the test results in 39 countries worldwide, including the US (NIST traceability).

A calibration certificate is shipped with every sensor and calibration data are stored in the SENSORPROM memory unit. FC310 and FC330 meters have the calibration data written to the front end section. A backup of all calibrations and PDF copies of all certificates are stored in the SensorFlash.

FCS300 sensors: for liquids

	Q_{min} at 1% accuracy water		Q_{nom} [1]		100 % (Q_{max}) [2]	
	kg/h	(lb/min)	kg/h	(lb/min)	kg/h	(lb/min)
DN 15 (½")	70	(2.57)	4 500	(165.3)	8 000	(293.9)
DN 25 (1")	240	(8.92)	20 500	(753.2)	35 000	(1 286)
DN 50 (2")	800	(29.4)	49 000	(1 800)	90 000	(3 307)
DN 80 (3")	2 000	(73.5)	122 000	(4 483)	250 000	(9 186)
DN 100 (4")	4 000	(147)	273 000	(10 031)	520 000	(19 108)
DN 150 (6")	6 900	(253)	459 200	(16 873)	860 000	(31 600)

MASS 2100 and FC300 sensors: for liquids

	Q_{min} at 1% accuracy water		Q_{nom} [1]		100 % (Q_{max}) [2]	
	kg/h	(lb/h)	kg/h	(lb/h)	kg/h	(lb/h)
DI 1.5 (1/16")	0.1	(0.22)	15	(33)	30	(66)
DI 3 (1/8")	1.0	(2.2)	125	(275)	250	(550)
DN 4 (1/6")	1	(2.2)	175	(386)	350	(770)
DI 6 (¼")	0	(11)	500	(1 102)	1 000	(2 200)
DI 15 (½")	5	(44)	2 800	(6 173)	5 600	(12 345)

[1] Q_{nom} = Δ 1 barg @ water 20 °C

[2] Q_{max} = 10 m/sec @ water 20 °C at inlet (up to 30 m/s in the flowtubes)

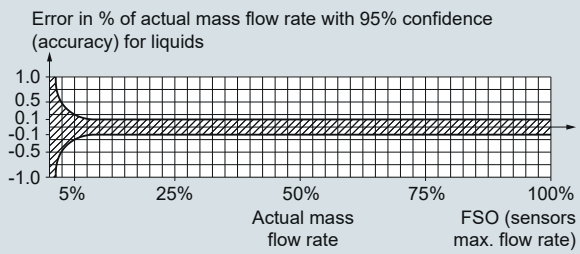
For gas applications the massflow rate is depending on the gas type. The max. flowrate is calculated with the Mach-Number to be Ma = 0.3.

- For flow > 5 % of the sensors max. flow rate, the error can be read directly from the curve below.
- For flow < 5 % of the sensors max. flow rate, use the formula to calculate the error.
- The error curve is plotted from the formula:

$$E = \pm\sqrt{(Cal.)^2 + \left(\frac{z \times 100}{qm}\right)^2}$$

E = Error [%]
Z = Zero point error [kg/h] [1]
qm = Mass flow [kg/h]
Cal. = Calibrated flow accuracy: 0.10, 0.15 or 0.20

[1] Zero point error for each sensor is shown in the tables below.



For gas applications: typical additional 0.4 % + zero point

Reference conditions for flow calibrations (ISO 9104 and DIN/EN 29104)

Flow conditions	Fully developed flow profile
Temperature, medium	25 °C (77 °F) ± 5 K
Temperature, ambient	25 °C (77 °F) +10/-5 K
Liquid pressure	2 ± 1 bar
Density	0.997 g/cm^3
Brix	40 °Brix
Supply voltage	U_n ±1 %
Warming-up time	30 min.
Cable length	5 m between transmitter and sensor

Additions in the event of deviations from reference conditions

Current output	As pulse output ± (0.1% of actual flow +0.05 % FSO)
Effect of ambient temperature	• Display/frequency/pulse output: < ± 0.003%/K act. • Current output: < ± 0.005 %/K act.
Effect of supply voltage	< 0.005 % of measuring value on 1 % alteration

System information SITRANS F C Coriolis mass flowmeters

Sensor type		FC300	MASS 2100			
Sensor size		DN 4 (1/6")	DI 1.5 (1/16")	DI 3 (1/8")	DI 6 (¼")	DI 15 (½")
Number of measuring pipes		1	1	1	1	1
Mass flow						
Linearity error[1)]	% of rate	0.10	0.10	0.10	0.10	0.10
Repeatability error	% of rate	0.05	0.05	0.05	0.05	0.05
Max. zero point error	[kg/h]	0.010	0.001	0.010	0.050	0.200
Density						
Density error[2)]	[g/cm^3]	0.0025[3)]	0.001	0.0015	0.0015	0.0005
Repeatability error	[g/cm^3]	0.0002	0.0002	0.0002	0.0002	0.0001
Range	[g/cm^3]	0 ... 2.9	0 ... 2.9	0 ... 2.9	0 ... 2.9	0 ... 2.9
Temperature						
Error	[°C (°F)]	0.5 (0.9)	0.5 (0.9)	0.5 (0.9)	0.5 (0.9)	0.5 (0.9)
Brix						
Error	[°Brix]	0.3	0.2	0.3	0.3	0.1

1) For reference conditions: ISO 9104 and DIN/EN 29104. Increased error can be expected for gas mass flow measurement (For gas measurement typically additional +0.40 % error).
2) Accuracy is only valid when sensor is density-calibrated.
3) Hastelloy C22 version.

Sensor type		FCS300					
Sensor size		DN 15 (½")	DN 25 (1")	DN 50 (2")	DN 80 (3")	DN 100 (4")	DN 150 (6")
Number of measuring pipes		2	2	2	2	2	2
Mass flow:							
Linearity error[1)]	% of rate Standard	0.1	0.1	0.1	0.1	0.1	0.1
	% of rate Medium	0.2	0.2	0.2	0.2	0.2	0.2
Repeatability of flowrate at rates > 5 % of Q_{max}	% of rate	0.05	0.05	0.05	0.05	0.1	0.1
Max. zero point error	0.1 % [kg/h (lb/min)]	0.4 (0.0147)[2)]	1.35 (0.0495)[2)]	4.5 (0.165)[2)]	20.0 (0.735)	41.6 (1.628)	68.8 (2.528)
	0.2 % [kg/h (lb/min)]	0.6 (0.0235)	2.16 (0.0792)	7.2 (0.264)	20.0 (0.735)	41.6 (1.628)	68.8 (2.528)
Density							
Density error	(Standard) [g/cm^3]	0.010	0.010	0.010	0.010	0.010	0.010
	(Extended) [g/cm^3]	0.002[3)]	0.002[3)]	0.002[3)]	0.002[3)]	0.002[3)]	0.002[3)]
Range	[kg/dm^3]	0.001 ... 5.0	0.001 ... 5.0	0.001 ... 5.0	0.001 ... 5.0	0.001 ... 5.0	0.001 ... 5.0
Repeatability error	[kg/m^3]	± 0.25	± 0.25	± 0.25	± 0.25	± 0.25	± 0.25
Temperature							
Error	[°K]	0.5	0.5	0.5	0.5	0.5	0.5

1 For reference conditions: ISO 9104 and DIN/EN 29104. Increased error can be expected for gas mass flow measurement (For gas measurement typically additional +0.4 % error).
2) In preparation: currently as for 0.2 % accuracy class
3) In preparation: 0.0005 g/cm^3

Technical specifications PROFIBUS PA/DP for FCT030

General specifications	
PROFIBUS device profile	Profile V 4.0 and compatible to V 3.x

Electrical specification DP

Physical layer specifications	
Applicable standard	IEC 61158/EN 50170
Physical Layer (Transmission technology)	RS 485
Transmission speed	≤ 12 Mbit/s
Number of stations	Up to 32 per line segment, (maximum total of 126)
Cable specification (Type A)	
Cable design	Two wire twisted pair
Shielding	CU shielding braid or shielding braid and shielding foil
Impedance	35 up to 165 Ω at frequencies from 3 ... 20 MHz
Cable capacity	< 30 pF per meter
Core diameter	> 0.34 mm², corresponds to AWG 22
Resistance	< 110 Ω per km
Signal attenuation	Max. 9 dB over total length of line section
Max. bus length	100 m at 12 Mbit/s, up to 1.2 km at 93.75 kbit/s. Extendable by repeaters

Electrical specification PA

Physical layer specifications	
Applicable standard	IEC 61158/EN 50170
Physical Layer (Transmission technology)	IEC-61158-2
Transmission speed	31.25 kbit/s
Number of stations	Up to 32 per line segment, maximum total of 126)
Max. basic current [I_B]	14 mA
Fault current [I_{FDE}]	0 mA
Bus voltage	9 ... 32 V (non Ex)
Preferred cable specification (Type A)	
Cable design	Two wire twisted pair
Conductor area (nominal)	0.8 mm² (AWG 18)
Loop resistance	44 Ω/km
Impedance	100 Ω ± 20 %
Wave attenuation at 39 kHz	3 dB/km
Capacitive asymmetry	2 nF/km
Bus termination	Passive line terminated at both ends
Max. bus length	Up to 1.9 km. Extendable by repeaters

IS (Intrinsic Safety) data	
Required sensor electronics	Compact mounted SITRANS FCT030
FISCO	Yes
Max. U_I	17.5 V
Max. I_I	380 mA
Max. P_I	5.32 V
Max. L_I	10 µH
Max. C_I	5 nF
Max. U_o	1.3 V
Max. I_o	50 µA
FISCO cable requirements	
Loop resistance R_C	15 ... 150 Ω/km
Loop inductance L_C	0.4 ... 1 mH/km
Capacitance C_C	80 ... 200 nF/km
Max. Spur length in IIC and IIB	30 m
Max. Trunk length in IIC	1 km
Max. Trunk length in IIB	5 km

PROFIBUS parameter support

The following parameters are accessible using a Class 1 Master.

Cyclic services:		
Input (Master view)	**Parameter**	**FCT030**
	Mass flow	✓
	Volume flow	✓
	Media temperature	✓
	Frame temperature	✓
	Standard volume flow	✓
	Density	✓
	Fraction A[1)]	✓
	Fraction B[1)]	✓
	Pct Fraction A[1)]	✓
	Pct Fraction B[1)]	✓
	Totalizer 1	✓
	Totalizer 2	✓
	Totalizer 3	✓
	Digital dosing control	✓
	Analog dosing control	✓
	Dosing status	✓
Output (Master view)	Control totalizer 1+2+3	✓
	Control commands as Zero point adjustment	✓

[1)] Requires a flowmeter ordered with fraction option.

Technical specifications PROFIBUS PA/DP for MASS 6000

General specifications	
PROFIBUS device profile	4 and 3
Certified	Yes, according to Profile for process control devices V3.00.
MS0 connections	1
MS1 connections	1
MS2 connections	2

Electrical specification DP

Physical layer specifications	
Applicable standard	IEC 61158/EN 50170
Physical Layer (Transmission technology)	RS 485
Transmission speed	≤ 1.5 Mbit/s
Number of stations	Up to 32 per line segment, (maximum total of 126)
Cable specification (Type A)	
Cable design	Two wire twisted pair
Shielding	CU shielding braid or shielding braid and shielding foil
Impedance	35 up to 165 Ω at frequencies from 3 ... 20 MHz
Cable capacity	< 30 pF per meter
Core diameter	> 0.34 mm², corresponds to AWG 22
Resistance	< 110 Ω per km
Signal attenuation	Max. 9 dB over total length of line section
Max. bus length	200 m at 1500 kbit/s, up to 1.2 km at 93.75 kbit/s. Extendable by repeaters

Electrical specification PA

Physical layer specifications	
Applicable standard	IEC 61158/EN 50170
Physical Layer (Transmission technology)	IEC-61158-2
Transmission speed	31.25 kbit/s
Number of stations	Up to 32 per line segment, maximum total of 126)
Max. basic current [I_B]	14 mA
Fault current [I_{FDE}]	0 mA
Bus voltage	9 ... 32 V (non Ex)
Preferred cable specification (Type A)	
Cable design	Two wire twisted pair
Conductor area (nominal)	0.8 mm² (AWG 18)
Loop resistance	44 Ω/km
Impedance	100 Ω ± 20 %
Wave attenuation at 39 kHz	3 dB/km
Capacitive asymmetry	2 nF/km
Bus termination	Passive line terminated at both ends
Max. bus length	Up to 1.9 km. Extendable by repeaters

IS (Intrinsic Safety) data	
Required sensor electronics	Compact mounted SITRANS F C MASS 6000 Ex d
FISCO	Yes
Max. U_I	17.5 V
Max. I_I	380 mA
Max. P_I	5.32 V
Max. L_I	10 µH
Max. C_I	5 nF
Max. U_o	1.3 V
Max. I_o	50 µA
FISCO cable requirements	
Loop resistance R_C	15 ... 150 Ω/km
Loop inductance L_C	0.4 ... 1 mH/km
Capacitance C_C	80 ... 200 nF/km
Max. Spur length in IIC and IIB	30 m
Max. Trunk length in IIC	1 km
Max. Trunk length in IIB	5 km

PROFIBUS parameter support

The following parameters are accessible using a MS0 relationship from a Class 1 Master.
MS0 specifies cyclic Data Exchange between a Master and a Slave.

Cyclic services:		
Input (Master view)	**Parameter**	**MASS 6000**
	Mass flow	✓
	Volume flow	✓
	Temperature	✓
	Density	✓
	Fraction A[1)]	✓
	Fraction B[1)]	✓
	Pct Fraction A[1)]	✓
	Totalizer 1	✓
	Totalizer 2[2)]	✓
	Batch progress[2)]	✓
	Batch setpoint	✓
	Batch compensation	✓
	Batch status (running ...)	✓
Output (Master view)	Set Totalizer 1+2	✓
	Set Mode Totalizer 1+2	✓
	Batch control (start, stop ...)	✓
	Batch setpoint	✓
	Batch compensation	✓

1) Requires a SENSORPROM containing valid fraction data.

2) Value returned is dependent on the BATCH function.

When ON, Batch progress is returned.

When OFF, TOTALIZER 2 is returned.

Overview

FCT030 is based on the latest developments within digital signal processing technology – engineered for high measuring performance, fast response to step changes in flow, fast dosing applications, high immunity against process noise, easy to install commission and maintain.

The FCT030 transmitter delivers true multi-parameter measurements i.e. massflow, volumeflow, standard volumeflow, density, temperature and fraction.

The FCT030 IP67 transmitter can be remote connected or compact mounted with all sensors of type FCS300, sizes DN 15 to DN 150, MASS 2100 DI 1.5, DI 3, DI 6, DI 15 and FC300 DN 4.

Fraction

The transmitter FCT030 can be set up at works to measure and report various fraction concentrations of two-part mixtures or solutions. Where a discrete relationship exists between concentration and density at particular temperatures a calculation is performed and the percentage concentration by volume or mass of Part A or Part B (100 % minus Part A) is measured. For solutions and some mixtures the total mass, or dry weight, is also available.

In some industries, a selection of standard density scales has been adopted to represent the density or relative density of the process fluid.

If "Standard fractions" option is chosen at ordering, the following fraction or standard density scales can be selected in the setup menu:

- API number
- Balling
- °Baumé light
- °Baumé heavy
- °Brix
- °Oeschlé°
- Plato
- Specific Gravity
- °Twaddell
- %HFCS42
- %HFCS55
- %HFCS90
- Ethanol-Water 0 % to 20 %
- Ethanol-Water 15 % to 35 %
- Ethanol-Water 30 % to 55 %
- Ethanol-Water 50 % to 100 %

Application

SITRANS FCT030 mass flowmeters are suitable for applications within the entire process industry where there is a demand for accurate flow measurement. The meter is capable of measuring both liquid and gas flow.

Coriolis flowmeters can be applied in all industries, such as:

- Chemical & Pharma: detergents, bulk chemicals, acids, alkalis, paint mixing systems, solvents and resins, pharmaceuticals, blood products, vaccines, insulin production
- Food & Beverage: dairy products, beer, wine, soft drinks, °Brix/°Plato, fruit juices and pulps, bottling, CO_2 dosing, CIP/SIP-liquids, mixture recipe control
- Automotive: fuel injection nozzle & pump testing, filling of AC units, engine consumption
- Oil & Gas: filling of gas bottles, furnace control, test separators
- Hydrocarbon processing: oil refining, derivatives manufacturing, polymerisation
- Water & Waste Water: dosing of chemicals for water treatment

The multiple outputs and bus communication mean that all of the process information can be read either instantaneously (10 ms update) or periodically as plant operation requires.

Benefits

Flow calculation and measurement

- Dedicated mass flow calculation with DSP technology
- Fast dosing and flow step response with maximum 10 ms response time.
- 100 Hz update rate to all outputs
- Maximum data age from pickup to output is 20 ms (two update cycles)
- Independent low flow cut-off settings for mass and volume flowrates
- Automatic zero-point adjustment on command from discrete input or host system
- Empty pipe monitoring

Operation and display

- User-configurable operation display
  - Full graphical display 240 x 160 pixels 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
  - Keypad can be used for controlling dosing as start/stop/hold/reset
- SensorFlash technology stores production specific system documentation and provides removable memory of all flowmeter setups and functions
  - Calibration certificates
  - Pressure and material test certificates (as ordered)
  - Non-volatile memory backup of operational data
  - Transfer of user configuration to other flowmeters
  - Alarm history log
  - Parameter change log
  - Logging of min and max process values
  - Data logging of process values and parameter (Version 4.0)

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
- Alarm handling can be selected between Siemens and NAMUR standard configurations
- FCT030 is in preparation to be certified for integrated safety in accordance with IEC 61508 and IEC 61511 as a compact FC330.
  - SIL 2 (single-channel operation) in preparation
  - SIL 3 (dual-channel operation) in preparation

Outputs and control

- Built-in dosing controller with compensation and monitoring comprising 3 built-in totalizers
- Multi-parameter outputs, individually configurable for mass-flow, volumeflow, standard volumeflow, density, temperature or fraction flow such as °Brix or °Plato

Up to four I/O channels are configured as follows:

Channel 1

Channel 1 is 4 to 20 mA analog output with HART 7.5, PROFIBUS PA, PROFIBUS DP and Modbus RS485 RTU. The current signal can be configured for massflow, volumeflow or density, standard volume flow, medium temperature, Fraction A and B and Fraction A% and B%.

Channel 2

Channel 2 is a signal output which can be freely configured for any process variable.

- Analog current (0/4 to 20 mA)
- 3 stage analog valve dosing control
- Frequency or pulse
- Digital one or two-valve dosing control in combination with channel 3 or 4
- Operational and alarm status

Channels 3 and 4

Channels 3 and 4 can be ordered with signal (freely configured for any process variable) or relay outputs, or signal input.

Signal

Signal output can be user configured to:

- Analog current (0/4 to 20 mA)
- 3 stage analog valve dosing control
- Frequency or pulse
- Redundant frequency or pulse (linked to Channel 2)
- Digital one or two-valve dosing control
- Operational and alarm status

Relay

Relay output(s) can be user configured to:

- Digital one or two-valve dosing control
- Operation status including flow direction
- Alarm status

Signal input

Signal input can be user-configured for

- Dosing control
- Totalizer reset functions
- Force or freeze output(s)
- Inititate automatic zero point adjustment

Signal outputs and inputs for non hazardous areas can be changed for active or passive operations by dip switch.

For hazardous areas Signal outputs and inputs can't be changed by dip switch, and has to selected individually by ordering.

During service and maintenance all outputs can be forced to a preset value for simulation, verification or calibration purposes.

Approvals and certificates

The FCT030 coriolis flowmeter program was designed from the ground up to comply with or exceed the requirements of international standards and regulations.

Design

The transmitter SITRANS FCT030 is designed in an IP67/NEMA 4X aluminum enclosure with corrosion resistant coating. It can be remote connected or compact mounted with an sensor

- FCS300 DN 15, DN 25, DN 50, DN 80, DN 100 and DN 150,
- MASS 2100 DI1.5, DI 3, DI 6, DI 15 and
- FC300 DN 4.

FCT030 is available with current output HART 7.5, Modbus RS485 RTU, PROFIBUS DP or PROFIBUS PA as standard on Channel 1.

The transmitter has a modular design with discrete, replaceable electronic modules and connection boards to maintain separation between functions and facilitate field service. All modules are fully traceable and their provenance is included in the transmitter setup.

SensorFlash

SensorFlash is a standard, 4 GByte micro SD card with the ability to be updated by PC. It is supplied with each sensor with the complete set of certification documents including calibration report. Material, pressure test, factory conformance certificates are optional at ordering.

The Siemens SensorFlash memory unit offers the following features and benefits:

- Automatically program any similar transmitter in seconds to the operation standard
- Transmitter replacement in less than 5 minutes
- True "plug & play" provided by integrated cross-checking data consistency and HW/SW version verification
- Permanent memory of operational and functional information from the moment that the flowmeter is switched on
- New firmware updates can be downloaded from the SIEMENS internet portal for Product Support and placed onto SensorFlash (unmounted from the transmitter and inserted into a PC's SD card slot). The firmware is then inserted into the existing flowmeter and the complete system upgraded.
- Storing of alarm history log
- Storing of parameter change log
- Storing of process peak values log

Datalogging on SensorFlash

The following functions are available:

- Logging of process values
- Logging of parameter settings
- Selectable logging interval

Function

The following functions are available:

- Mass flowrate, volume flowrate, density, process temperature, frame temperature, fraction flow
- Up to four output/input channels selected at ordering
- Outputs can be individually configured with mass, volume, density etc.
- Three built-in totalizers which can count forward, backward or forward and backward
- Low flow cut-off, adjustable
- Density cut-off or empty pipe cut-off, adjustable
- Flow direction adjustable
- Alarm system consisting of alarm-log, alarm pending menu
- Internal data logger is updated each 10 minutes with operational data such as system health, totalizer values, all configurations and data needed for custody transfer requirements to OIML R 117 and NTEP
- Display of operating time with real-time clock. Daylight saving time is not implemented
- Uni/bidirectional flow measurement
- Flowrate outputs are freely configurable between maximum negative and maximum positive flows according to the sensor capacity
- Limit switches programmable for flow, density, temperature or fraction process values. Limit points can be graded as warning and alarm for values both above and below nominal process conditions
- Process noise filter for optimization of measurement performance under non-ideal application conditions. 5-stage pumping filter compensates for flow fluctuations caused by e.g. single acting piston pumps
- Full dosing controller with 5 user-configurable recipes
- Automatic zero adjustment menu, with zero point evaluation display
- Full service menu for effective and straight forward application and meter troubleshooting
- Precise temperature measurement ensures optimum accuracy on massflow, density and fraction flow.
- Fraction flow computation is based on a 5th-order algorithm matching known applications.
- Audit trail information, stores parameters changes with time stamp information
- Simulation of process values, status information and alarms
- Aerated flow filtering system, for advanced filtering of fluids with gas or air bubbles
- Datalogging of process values and parameter changes on SensorFlash

Transmitter SITRANS FCT030

Technical specifications

Process media	• Fluid Group 1 (suitable for dangerous fluids) • Aggregate state: Paste/light slurry, liquid and gas
Number of process variables	7
Measurement of	• Mass flow • Volume flow • Density • Process media temperature • Standard volume flow • Reference density • Fraction A flow • Fraction B flow • Fraction A % • Fraction B %
Current output	
Current	0 ... 20 mA or 4 ... 20 mA (Channel 1 only 4 ... 20 mA)
Load	< 500 Ω per channel
Time constant	0 ... 100 s adjustable
Digital output[1]	
Pulse	41.6 µs ... 5 s pulse duration
Frequency	0 ... 12.5 kHz, 50 % duty cycle, 120 % overscale provision
Time constant	0 ... 100 s adjustable
Active	0 ... 24 V DC, 110 mA, short-circuit-protected
Passive	3 ... 30 V DC, max. 110 mA
Relay	
Type	Change-over voltage-free relay contact
Load	30 V AC/100 mA
Functions	Alarm level, alarm number, limit, flow direction
Digital input[1]	
Voltage	15 ... 30 V DC (2 ... 15 mA)
Functionality	Start/stop/hold/continue dosing, reset totalizer 1 and 2, force output, freeze output
Galvanic isolation	All inputs and outputs are galvanically isolated, isolation voltage 500 V.
Cut-off	
Low-flow	0 ... 9.9 % of maximum flow
Limit function	Mass flow, volume flow, fraction, density, sensor temperature
Totalizer	Three eight-digit counters for forward, net or reverse flow
Display	• Background illumination with alphanumerical text, 3 × 20 characters to indicate flow rate, totalized values, settings and faults. • Time constant as current output 1 • Reverse flow indicated by negative sign
Zero point adjustment	Via keypad or remote via digital input

Ambient temperature	
Operation	
• Transmitter	-40 ... +60 °C (-40 ... +140 °F), (humidity max. 95 %)
• Display	-20 ... +60 °C (-4 ... +140 °F)
Storage	
• Transmitter	-40 ... +70 °C (-40 ... +158 °F) (Humidity max. 95 %)
• Display	-20 ... +70 °C (-4 ... +158 °F)
Communication Ch1	HART 7.5 PROFIBUS PA PROFIBUS DP Modbus RS485 RTU
Enclosure	
Material	Aluminum
Rating	IP67/NEMA 4X to IEC 529 and DIN 40050 (1 mH_2O for 30 min.)
Mechanical load	18 ... 400 Hz random, 3.17 g RMS, in all directions
Supply voltage	
Supply	20 ... 27 V DC ± 10%; 100 ... 240 V AC ± 10 %, 47 ... 63 Hz
Fluctuation	No limit
Power consumption	7.5 W/15 VA
EMC performance	
Emission	EN 55011/CISPR-11 (Class A)
Immunity	EN/IEC 61236-1 (Industry)
NAMUR	Within the value limits according to "General requirements" with error criteria A in accordance with NE 21
Environment	
Environmental conditions acc. to IEC/EN/UL 61010-1	• Altitude up to 2000 m • Pollution degree 2
Maintenance	The flowmeter has a built-in error log/pending menu which should be inspected on a regular basis.
Cable glands	Cable gland are available in Nylon, Nickel plated brass or stainless steel (316L/W1.4404) in the following dimensions: • M20 • ½" NPT
Digital cable connection	Standard industrial signal cable up to 75 m long with 2 x screened pairs or 4-wire overall screen can be laid between the sensor and transmitter. Siemens offers cables in a selection of pre-cut lengths and prepared for either gland or plug connection.
Analog cable connection (MASS 2100/FC300)	Standard industrial cable up to 15 m distance between sensor and transmitter. PVC insulated 5 x 2 x Ø 0.34 mm, twisted and screened in pairs, temperature range -20 ... +105 °C Siemens offers cables in a selection of precut lengths and with two M20 connectors mounted.

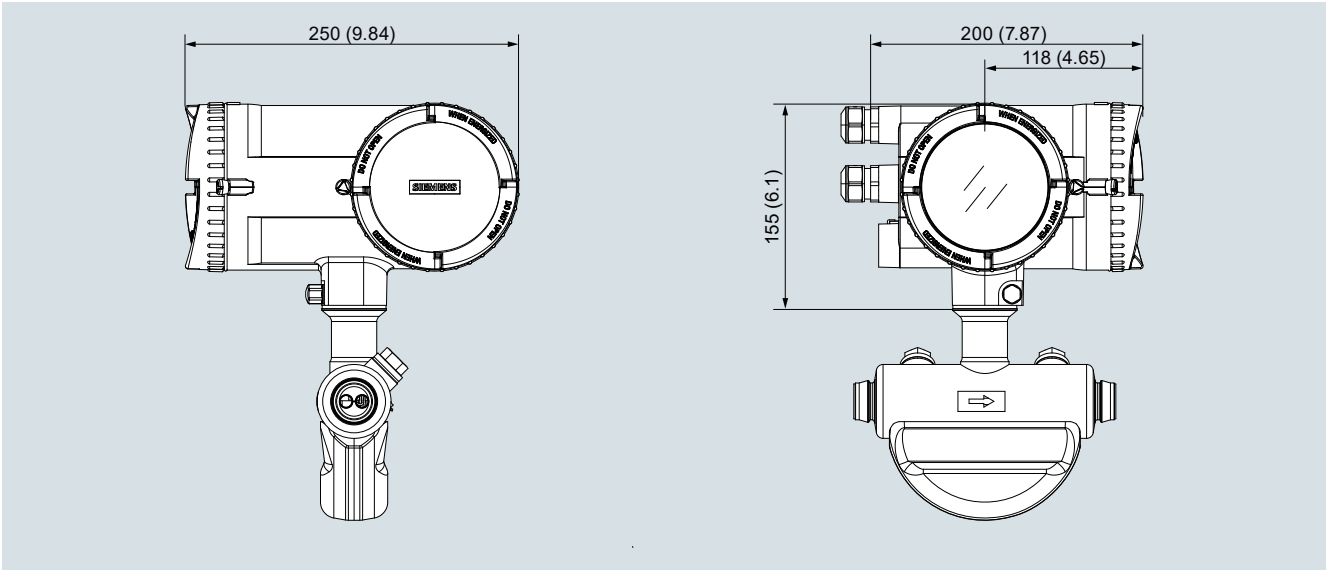
[1] With 300 Ω internal impedance. For coil switching use the passive output option.

Approvals	
Hazardous area	• ATEX, IECEx, cCSAus (Class 1 Div 1), EAC Ex, cCSAus Zone 1, NEPSI, INMETRO (depending on version and configuration) - Zone 1: Ex d e ia [ia Ga] IIC T6 Gb
Custody transfer (in preparation)	• OIML R 117 type approval to a wide variety of liquids other than water • NTEP for US and Canada
Pressure equipment	• PED • CRN
Hygienic applications	• EHEDG for hygienic variant sensors (DN 25 ... DN 80) • External cleanability satisfies EHEDG

Certificates	
Safety Integration Level (in preparation)	• SIL 3 for software • SIL 2 for hardware • SIL 3 for redundant hardware systems
CE mark	• Pressure equipment • Low voltage directive • WEEE • RoHS
Regional certifications (depending on configuration)	• C-TICK (Australia and New Zealand EMC) • EAC (Belarus, Armenia, Kazakhstan, Russia) • KCC (South Korea)

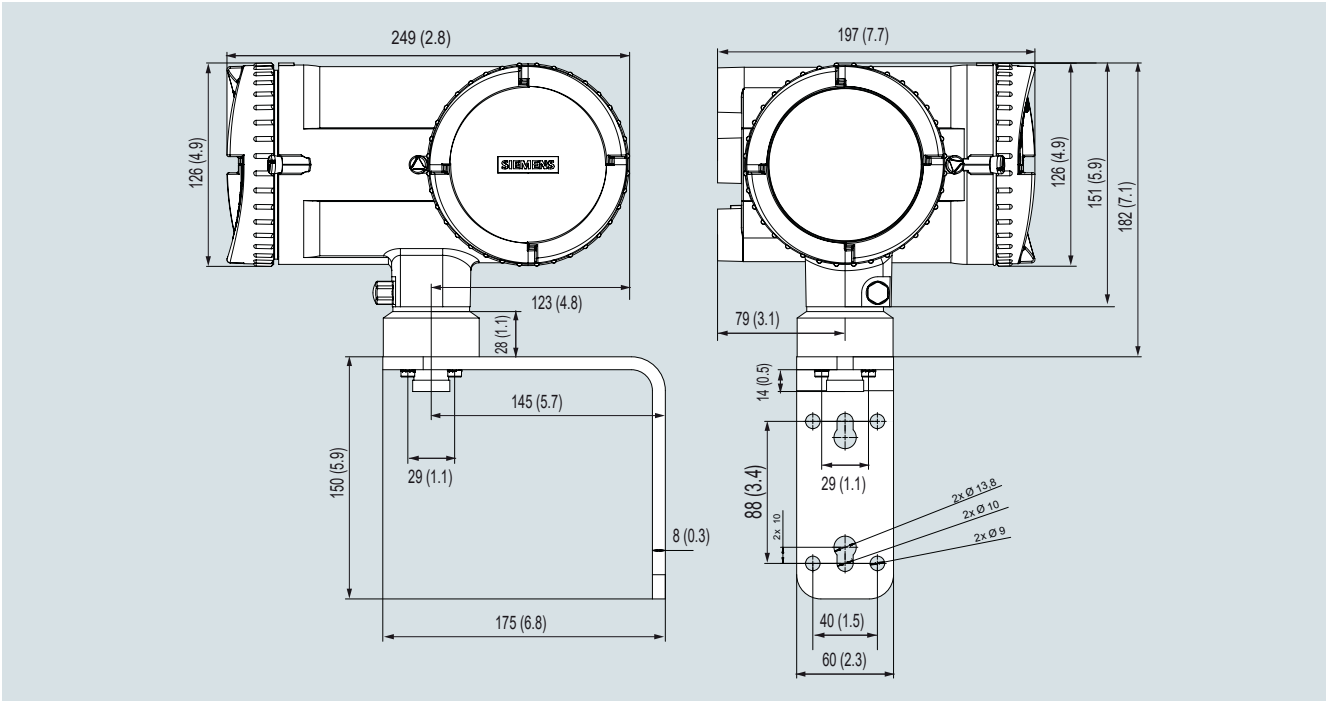
3

Dimensional drawings

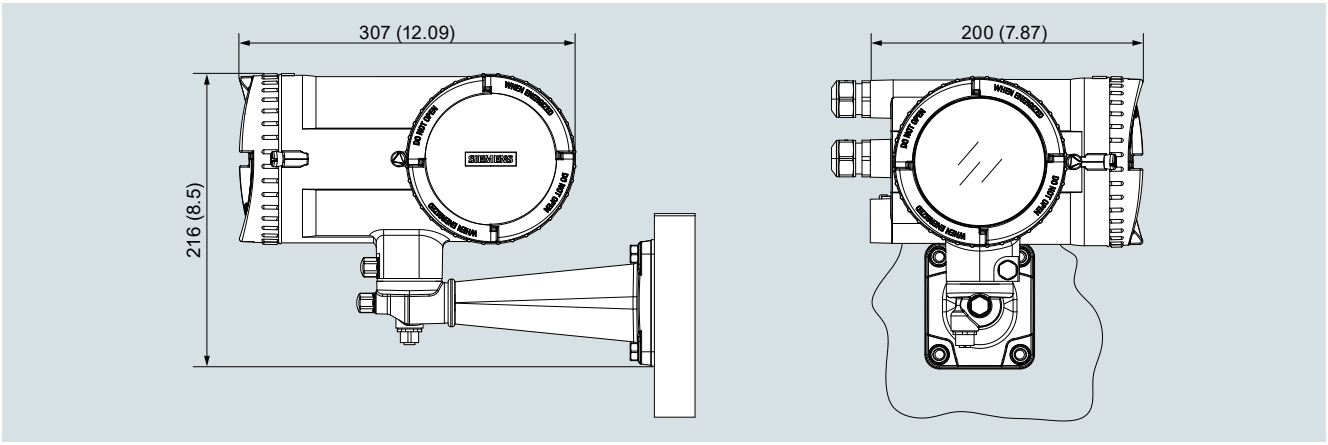


SITRANS FCT030, compact version, dimensions in mm (inch)

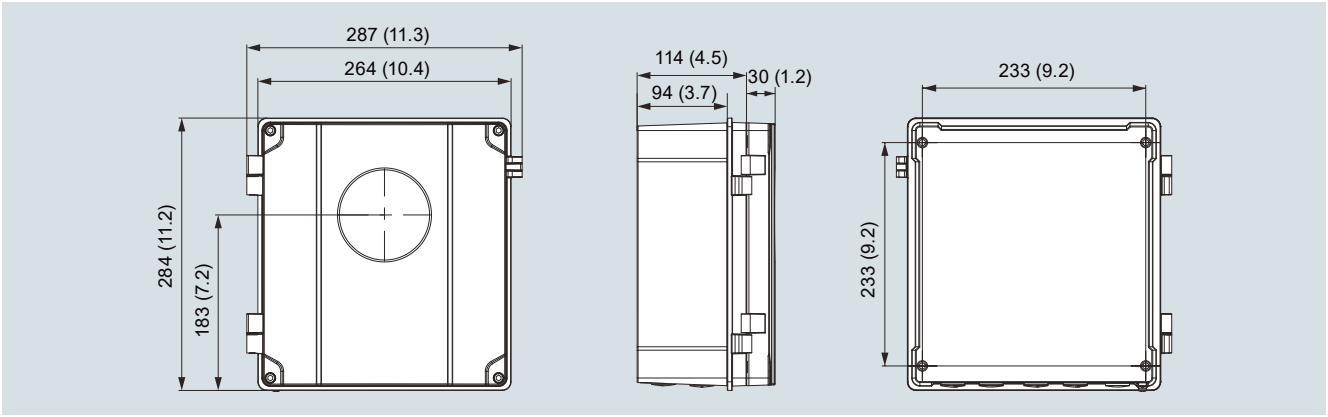
Transmitter SITRANS FCT030



SITRANS FCT030, field mount version for low flow MASS2100/FC300 sensors with analog cable and M20 plug connection, dimensions in mm (inch)



SITRANS FCT030, field mount version for sensors with digital cable and M12 plug connection, dimensions in mm (inch)



SITRANS FCT030, wall mount version, dimensions in mm (inch)

Accessories

Description	Article No.	
CT connector Tamper cover for CT locking. Fits over the M12 connector at both sensor and transmitter ends of the remote system cable (2 pcs.)	**A5E31478498**	
Bag of glands (metric) in black plastic[1]	**A5E03907414**	
Bag of glands, (metric) in gray plastic Ex e/i[1]	**A5E03907424**	
Bag of glands (metric) in AISI 316 SS Ex e/i[1]	**A5E03907429**	
Bag of glands (metric) in Ni-plated brass Ex e/i[1]	**A5E03907430**	
Bag of glands (NPT) in black plastic[2]	**A5E03907435**	
Bag of glands (NPT) in gray plastic Ex e/i[2]	**A5E03907451**	
Bag of glands (NPT) in AISI 316 SS Ex e/i[2]	**A5E03907467**	
Bag of glands (NPT) in Ni-plated brass Ex e/i[2]	**A5E03907473**	
Standard cable (non-Ex) with M12 connectors, PO insulation and PUR sleeve, gray, -40 ... +80 °C (-40 ... +176 °F)		
• 5 m (16.4 ft)	**A5E03914805**	
• 10 m (32.8 ft)	**A5E03914850**	
• 25 m (82 ft)	**A5E03914853**	
• 50 m (164 ft)	**A5E03914859**	
• 75 m (246 ft)	**A5E03914861**	
• 150 m (492 ft)	**A5E03914874**	
Standard cable (non-Ex) for termination, PO insulation and PUR sleeve, gray, -40 ... +80 °C (-40 ... +176 °F)		
• 5 m (16.4 ft)	**A5E03914833**	
• 10 m (32.8 ft)	**A5E03914849**	
• 25 m (82 ft)	**A5E03914854**	
• 50 m (164 ft)	**A5E03914856**	
• 75 m (246 ft)	**A5E03914864**	
• 150 m (492 ft)	**A5E03914873**	

Description	Article No.	
Standard cable (Ex) with M12 connectors, PO insulation and PUR sleeve, blue, -40 ... +80 °C (-40 ... +176 °F)		
• 5 m	**A5E03914929**	
• 10 m	**A5E03914962**	
• 25 m	**A5E03914995**	
• 50 m	**A5E03915004**	
• 75 m	**A5E03915074**	
• 150 m	**A5E03915088**	
Standard cable (Ex) for termination, PO insulation and PUR sleeve, blue, -40 ... +80 °C (-40 ... +176 °F)		
• 5 m	**A5E03914945**	
• 10 m	**A5E03914973**	
• 25 m	**A5E03914984**	
• 50 m	**A5E03915015**	
• 75 m	**A5E03915057**	
• 150 m	**A5E03915100**	
Analog signal cable For analog cable connection between MASS 2100/ FC300 sensor and FCT010/030 transmitters. 5 x 2 x Ø 0.34 mm screened and twisted in pairs. Blue PVC insulation and sleeve. With two M20 connectors, female/female. -20 ... 105 °C (-4 ... +221 °F), Ex		
• 1 m	**A5E42815465**	
• 2 m	**A5E42521862**	
• 5 m	**A5E42522447**	
• 10 m	**A5E42523233**	
• 15 m	**A5E42523347**	

[1] 2 pcs M20; 1 pce M25 with single and dual cable inserts

[2] 2 pcs ½" NPT; 1 pce ½" NPT with single and dual cable inserts

3

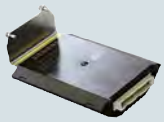
Spare parts - sensor FCS400/FCS300

Description	Article No.	
Blind lid in painted aluminum with silicone o-ring seal	**A5E03549295**	
Sensor housing • metric • NPT	 **A5E03549313** **A5E03906080**	
Bag of loose parts for sensor; including cable strain relief components, washer, seals, silicone o-rings, and assorted screws	**A5E03549324**	
M12 option for sensor housing in stainless steel. Pre-wired and potted to replace M12 socket in DSL housing	**A5E03906095**	

Spare parts - Transmitter FCT030 Field mount enclosure (all FW versions)

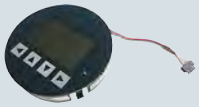
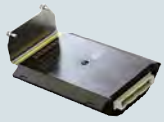
Description	Article No.	
Display lid in painted aluminum with Ex glass plate and silicone o-ring seal Ex and Non-Ex	**A5E03549344**	
Blind lid in painted aluminum with silicone o-ring seal	**A5E03549429**	
Bag of loose spare parts; including cable strain relief components, mounting tool, seals and gasket, assorted screws and washers, hex cap nut, blind connectors, and silicone o-rings	**A5E03549396**	
Mounting bracket - FCT030 field mount; in painted aluminum for pipe or wall mounting of transmitter FCT030 remote version. Including lock ring, pressure pads and seal cap	**A5E03906091**	
M12 option - remote - in painted aluminum. Pre-wired and potted replacement M12 connection for FCT030 field mount transmitter remote version	**A5E03906104**	
Remote terminal house painted aluminum for sensor cable termination at FCT030 transmitter remote version. Pre-wired and potted • M20 • NPT	 **A5E03906112** **A5E03906130**	

Spare parts - Transmitter FCT030 (FW 3.1)

Description	Article No.	
Display and keypad assembly for field mount enclosure, with Siemens logo. For HW 2 and FW 3.1 version	**A5E03548971**	
Sensor cassette (Compact) (HW version 2, FW 3.1.X)	**A5E03549142**	
Sensor cassette (Remote) (HW version 2, FW 3.1.X)	**A5E03549098**	
Frontend cassette Spare part frontend cassette for remote version of FC430 and cassette for FC410 For firmware V 2.x	**A5E03549191**	
Power supply for field mount enclosure 100 ... 240 V AC, 47 ... 63 Hz 24 ... 90 V DC (HW version 2 and FW 3.1.x)	**A5E03549413**	
Transmitter cassette (active) 4 ... 20 mA output and HART 7.2 (HW version 2 and FW 3.1.x)	**A5E03549357**	
Transmitter cassette (passive), 4 ... 20 mA output and HART 7.2 (HW version 2 and FW 3.1.x)	**A5E03549383**	
I/O assembly Advise Order code F00 and F40 to F97 Selection and Ordering data[1)]	**A5E03939114**	
SensorFlash (micro SD card 1G)	**A5E03915258**	

1) The I/O configuration must be stated in the "Remark" field. The I/O configuration is found in the F option of the ordering code. e.g. code “F40” for ordering Ch2 Active Current/Freq/Pulse, Ch3 Active Current/Freq/Pulse, Ch4 Active Input

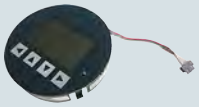
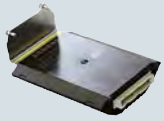
Spare parts FCT030 - Fieldmount enclosure (FW 4.0)

Description	Article No.	
Display and keypad assembly		
• From firmware 4.0, with Siemens logo	**A5E37705139**	
• From firmware 4.0, neutral version - no company logo	**A5E39844362**	
Power supply for field mount enclosure FCT030 V 4.0 Fieldmount 100 ... 240 V AC, 47 ... 63 Hz 19.2 ... 28.8 V DC	**A5E38264471**	
Sensor cassette (compact) for systems without DSL and for systems with analog sensor connection, HW version 3, FW version 4.0	**A5E41526318**	
Sensor cassette (remote) Ex barrier module ditial sensor connection (HW version 3, FW version 4.0)	**A5E03549098**	
Sensor cassette (remote) for systems with DSL, HW version 3, FW version 4.0	**A5E03549098**	
Frontend cassette Spare part frontend DSL for remote version . For firmware V 4.0	**A5E41526286**	
SensorFlash (micro SD card 4G)	**A5E38288507**	
Transmitter cassette for firmware 4.0		
• Ch1 E02: I/O and comm (active/passive) 4 ... 20 mA output and HART 7.5, Non-Ex	**A5E38013040**	
• Ch1 E06: I/O and comm (active) 4 ... 20 mA output and HART 7.5, Ex	**A5E38012278**	
• Ch1 E07: I/O and comm (passive) 4 ... 20 mA output and HART 7.5, Ex	**A5E38013025**	
• Ch1 E10: Communication PROFIBUS PA, Non-Ex & Ex	**A5E41216315**	
• Ch1 E11: Communication PROFIBUS DP, Non-Ex	**A5E41216042**	
• Ch1: Communication Modbus RTU 485, Ex	**A5E38013054**	
• Ch1: Communication Modbus RTU 485, Non-Ex	**A5E38013069**	

Description	Article No.	
I/O Cassette for firmware 4.0		
• Ch2: Current/Frequ./Pulse, Ch3: None, Ch4: None F01, Non-Ex	**A5E38006256**	
• Ch2: Current/Frequ./Pulse, Ch3: Current/Frequ./Pulse, Ch4: None, F02, Non-Ex	**A5E38006558**	
• Ch2: Current/Frequ./Pulse, Ch3: Current/Frequ./Pulse, Ch4: Current/Frequ./Pulse F03, Non-Ex	**A5E38006598**	
• Ch2: Current/Frequ./Pulse, Ch3: Current/Frequ./Pulse, Ch4: Relay, F04, Non-Ex	**A5E38006896**	
• Ch2: Current/Frequ./Pulse, Ch3: Relay, Ch4: Relay, F05, Non-Ex	**A5E380006900**	
• Ch2: Current/Frequ./Pulse, Ch3: Relay, Ch4: None, F06, Non-Ex	**A5E38011432**	
• Ch2: Current/Frequ./Pulse, Ch3: None, Ch4: None, F11, Ex-passive	**A5E38011478**	
• Ch2: Current/Frequ./Pulse, Ch3: Current/Frequ./Pulse, Ch4: None, F12, Ex-passive	**A5E38011509**	
• Ch2: Current/Frequ./Pulse, Ch3: Current/Frequ./Pulse, Ch4: Current/Frequ./Pulse, F13, Ex-passive	**A5E38011541**	
• Ch2: Current/Frequ./Pulse, Ch3: Current/Frequ./Pulse, Ch4: Relay, F14, Ex-passive	**A5E38011600**	
• Ch2: Current/Frequ./Pulse, Ch3: Relay, Ch4: Relay, F15, Ex-passive	**A5E38011618**	
• Ch2: Current/Frequ./Pulse, Ch3: Relay, Ch4: None, F16, Ex-passive	**A5E38011908**	
• Ch2: Current/Frequ./Pulse, Ch3: None, Ch4: None, F21, Ex-active	**A5E38012039**	
• Ch2: Current/Frequ./Pulse, Ch3: Current/Frequ./Pulse, Ch4: None, F22, Ex-active	**A5E38012056**	
• Ch2: Current/Frequ./Pulse, Ch3: Current/Frequ./Pulse, Ch4: Current/Frequ./Pulse, F23, Ex-active	**A5E38012121**	
• Ch2: Current/Frequ./Pulse, Ch3: Relay, Ch4: Relay, F24, Ex-active	**A5E38019235**	
• Ch2: Current/Frequ./Pulse, Ch3: Current/Frequ./Pulse, Ch4: Relay, F25, Ex-active	**A5E38019263**	
• Ch2: Current/Frequ./Pulse, Ch3: Relay, Ch4: None, F26, Ex-active	**A5E38019378**	

Description	Article No.	
Adapter cable for FCS400 sensor with new transmitter DSL/FCT010/FCT030 Version 4.0	**TBD**	
Remote adapter for wall bracket M20 cable connection		
• Ex	**A5E42404417**	
• Non-Ex	**A5E42846478**	
Wall bracket for FCT030 for M20 analog cable connector	**A5E42404426**	
Wall bracket for FCT010 for M20 analog cable connector	**A5E42404447**	
Compact adapter for DSL/FCT030 For upgrade from MASS 2100 DI3, DI6, DI15 with MASS 6000 compact to DSL/FCT030		
• Ex	**A5E42846758**	
• Non-Ex	**A5E42846760**	
Compact adapter for DSL/FCT030 FCS300 and FCS400 (DN 100 and DN 150 sensor) adapter for compact mount DSL, FCT010 or FCT030 Ex and Non-Ex	**TBD**	

Spare parts - FCT030 Wall mount enclosure

Description	Article No.	
Display and keypad assembly		
• For wall mount enclosure, Siemens logo	**A5E37697615**	
• For wall mount enclosure, neutral version	**A5E39844261**	
Power supply for wall mount 100 ... 240 V AC, 47 ... 63 Hz 19.2 ... 28.8 V DC	**A5E38263021**	
Sensor cassette for FCT030 wall mounting enclosure	**TBD**	
Foam insert set for wall mount with connectors	**A5E38287828**	
Wall mount enclosure front blind, Siemens version	**A5E38287882**	
Wall mount enclosure front blind, Neutral version - no company logo	**A5E38287965**	
Wall mount enclosure front with glass	**A5E38288007**	
Wall mount enclosure bracket for pipe mounting	**A5E38288020**	
Wall bracket panel mounting	**A5E38288032**	
Bag of loose spare parts for wall mount including cable strain relief components, mounting tool, seals and gasket, assorted screws and washers, hex cap nut, blind connectors and O-rings	**A5E38288072**	
Metall kit PSU cover back pane for wall mount enclosure	**A5E38415145**	

Description	Article No.	
Power input cover plate for wall mount enclosure	**A5E38415205**	

Flow sensor SITRANS FCS300

Overview

The flow measuring principle is based on the Coriolis Effect. The FCS300 sensor's measuring tubes are energized by an electromechanical driver circuit which oscillates them at their resonance frequency.

Two pick-ups are placed symmetrically upstream and downstream of the central driver. When a process fluid passes through the sensor, the Coriolis Effect will act on the vibrating tubes and cause deflection which can be measured as a phase shift between pick-ups 1 and 2. The phase shift is proportional to the mass flow rate.

The amplitude of the driver is automatically regulated to ensure a stable output from both of the pickups.

The temperatures of the sensor tubes are measured with high precision to provide compensation for changes with temperature in the measuring properties.

The sensor signals are analyzed for flow, density and fluid temperature in the sensor front end. The digital signal is controlled to conform to high Safety Integrated Level (SIL) and sent digitally to the transmitter via standard cable. The FCT030 further calculates total mass and volume, fraction, dosing control and many other functions.

The front-end module has a process noise filter, which can be used to improve the meter's performance when installation and application conditions are not ideal. Typical interferences from process conditions such as pump pulsations, mechanical vibrations, oscillating valves can be reduced considerably.

Integration

The SITRANS FCS300 Massflow sensor is suitable for both indoor and outdoor installation and meets the requirements of Protection Class IP67/NEMA 4X. Optionally the sensor can be ordered with hazardous certification to Zone 1 (ATEX, IECEx, cCSAus, EAC Ex, NEPSI, INMETRO).

The flowmeter is bidirectional and can be installed in any orientation. The sensor is self-draining in many positions, with vertical mounting preferred.

It is important to ensure that the sensor tubes are always completely filled with homogeneous fluid; otherwise measuring errors may occur. Suitable fluids are clean liquids, pastes, light slurries or gases. Condensing vapours, aerated liquids or slush are not recommended.

The materials in contact with the process medium must be evaluated for corrosion and erosion resistances for long sensor life.

The pressure drop through the sensor is a function of the properties of the fluid and the flow rate. A pressure loss and accuracy calculator can be found on the Siemens Internet site www.siemens.com

The preferred flow direction is indicated by an arrow on the sensor. Flow in the direction of the arrow will be measured as positive. The flow direction can be adjusted at the transmitter to compensate for reverse installation.

Installation orientation

The optimal installation orientation is vertical with the flow upwards. This ensures that suspended solids or bubbles are completely pushed through the sensor. A drain valve below the sensor will allow the pipe and sensor to drain completely.

Supports

In order to support the weight of the flowmeter and to ensure reliable measurements when external effects exist (e.g. plant vibrations), the sensor should be installed in rigidly supported pipelines.

Supports or hangers should be installed symmetrically and stress-free in close proximity to both of the process connections.

Shut-off devices

To conduct a system zero adjustment, secure shut-off devices are required in the pipeline.

Where possible, shut-off devices should be installed both upstream and downstream of the flowmeter.

System design

- The sensor design consists of process connections, inlet and outlet manifolds mounted in a stiff frame and two parallel tubes equally sharing the process medium flow.
- The sensing tubes are curved in the CompactCurve shape which gives high sensitivity and low pressure loss. The CompactCurve shape was selected to ensure that the smallest flows are measured with optimal signal to noise ratio.
- Careful mounting of the pipeline with regard to minimizing vibration at the meter will ensure a secure measurement environment.

Installation guidelines

- The mass flowmeter does not require any flow conditioning or straight inlet pipe sections. Care should be exercised however to ensure that any upstream valves, gates, sight glasses etc. do not cavitate and are not set into vibration by the flow.
- It is always preferred to place the flowmeter upstream of any control valve or other pipeline component which may cause flashing, cavitation or vibrations.
- The presence of gas bubbles in the fluid may result in erroneous measurements, particularly in the density measurement. Therefore the flowmeter should not be installed at the lowest pressure point in the liquid piping system or where vapour can collect. Install the meter in pipeline sections with high pressure to maintain system pressure and compress any bubbles.
- Drop lines downstream from the flow sensor should be avoided to prevent the meter tube from draining during flowing conditions. A back-pressure device or orifice is recommended to ensure that flow does not separate within the flow sensor but the metering section remains at positive pressure at all times while there is flow.
- The flowmeter should not come into contact with any other objects. Avoid making attachments to the housing except for the pressure guard components (if required).
- When the connecting pipeline is larger than the sensor size, suitable standard reducers may be installed. A selection of oversize and undersize connections can be ordered - refer to the sizes tables below.

- The flow sensor may be supported at the junction between process connection and the manifold, but should not be used to support adjacent piping. Ensure that the piping is also supported on both sides so that connection stresses are neutral.
- If strong vibrations exist in the pipeline, they should be damped using elastic pipeline elements. The damping devices must be installed outside the supported flowmeter section. Direct connection of flexible elements to the sensor should be avoided.
- Make sure that any dissolved gases, which are present in many liquids, do not outgas. The back pressure at the outlet should be at least 0.2 bar (3 psi) above the vapour pressure of the process fluid.
- Assure that operation below the vapour pressure cannot occur particularly for fluids with low latent heat of vaporisation.
- The sensor should not be installed in the vicinity of strong electromagnetic fields, e.g. near motors, pumps, variable frequency drives, transformers etc.
- When operating meters on a common mounting base the sensors should be mounted and spaced separate from each other to avoid cross-talk and other vibration interferences.
- When operating meters in interconnected pipelines the pipes should be decoupled to prevent cross talk.

Remote system cabling

The system is designed so that standard instrumentation cable with four cores and overall screen or two screened pairs can be used, or cable sets can be ordered with the flowmeter. The cable can be ordered in various set lengths and terminated in the field.

Be aware of maximum sensor length cable depending on product selection, currently 75 m. Data transmission speed and process variable update rates may be affected by the cable characteristics. For best results, choose a cable with the following electrical characteristics:

Property	Unit	Value
Resistance	[Ω/km]	59
Characteristic impedance	[Ω]	100 @ 1 MHz
Insulation resistance	[MΩ/km]	200
Maximum voltage	[V]	300

The flowmeter system applies maximum 15 V DC in operation and is certified intrinsically safe. The complete system is insulation tested to 1500 V in production.

Cabling solutions which can be ordered with the flowmeter are as follows:

1. High performance plugged cable using M12 connectors into prepared sockets
2. Cable glands for either metric or NPT threaded terminal housings.
3. Plain cable in set lengths to be passed through flexible and rigid conduit (not supplied) for metric or NPT threaded terminal housings

Cable for items 1, 2 and 3 are available either gray for standard applications or light blue for Ex applications to identify the circuit as intrinsically safe.

Insulation and heating

For applications where pipeline insulation is required for personnel protection or process temperature maintenance, the SITRANS FCS300 flow sensor may also be insulated. The form and material of insulation is not prescribed and entirely depends on the practices at the application location or plant.

Insulation must not be crowded around the sensor pedestal but shaped at a 45° cone to allow the pedestal to radiate excess heat and maintain a suitable working temperature within the front-end housing.

Calibration

To ensure accurate measurement all flowmeters must be initially calibrated. The calibration of each SITRANS FCS300 coriolis sensor is conducted at an accredited according to ISO/IEC 17025 flow calibration facility. A calibration certificate for every sensor is stored on the SensorFlash SD card. The accreditation body has signed the ILAC MRA agreement (International Laboratory Accreditation Corporation - Mutual Recognition Arrangement). Therefore the accreditation ensures international traceability and recognition of the test results in 39 countries worldwide, including the US (NIST traceability).

3

Technical specifications

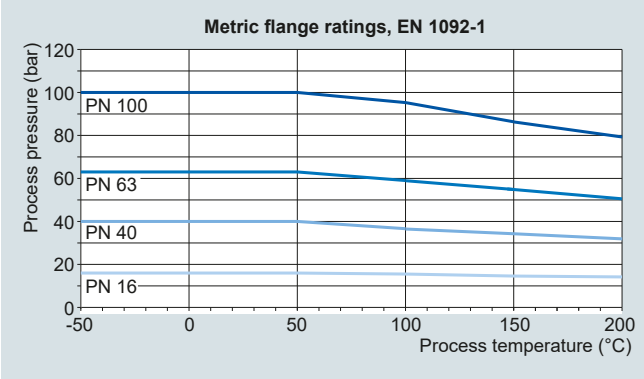
Flow sensor FCS300		
Parameter	**Unit**	**Value**
Process pressure range	[barg (psi)]	The maximum permissible operating pressure is determined by the respective process connection and the temperature of the medium. 316L: 0 ... 100 (0 ... 1450) Nickel-alloy C4 (2.4610)[3]: 0 ... 100 (0 ... 1450)
Process temperature range	[°C (°F)]	-50 ... +205 (-58 ... +400)
Ambient temperature range	[°C (°F)]	-40 ... +70 (-40 ... +158)
Transport temperature range	[°C (°F)]	-40 ... +70 (-40 ... +158)
Density range	[kg/m³ (lb/ft³)]	1 ... 5000 (0.062 ... 312.2)
Process media	Fluid group	1 (suitable for dangerous fluids)
	Form	Light slurry, liquid and non-condensing gas
No. of process values		
• Primary process values		• Mass flow • Density • Process medium temperature
• Derieved process values		• Volume flow • Standard volume flow (with reference density) • Fraction A:B • Fraction % A:B

Performance specifications		**Sensor**					
Parameter	**Unit**	**DN 15**	**DN 25**	**DN 50**	**DN 80**	**DN 100**	**DN 150**
Max. zero point error	0.2 % [kg/h (lb/min)]	0.6 (0.0235)	2.16 (0.0792)	7.2 (0.264)	20 (0.735)	41.6 (1.628)	68.8 (2.528)
	0.1 % [kg/h (lb/min)]	0.4 (0.0147)[4]	1.35 (0.0025)[4]	4.5 (0.165)[4]	20 (0.735)	41.6 (1.628)	68.8 (2.528)
Qmin (1 % error)	[kg/h (lb/min)]	70 (2.57)	240 (8.92)	800 (29.4)	2 000 (73.5)	4 000 (146.9)	6 900 (253.5)
Qnom (1 bar pressure)	[kg/h (lb/min)]	4 500 (163.3)	20 500 (753.2)	49 000 (1 800)	122 000 (4 483)	273 000 (10 031)	459 200 (16 873)
Qmax[2]	[kg/h (lb/min)]	8 000 (293.9.2)	35 000 (1 286)	90 000 (3 307)	250 000 (9 186)	520 000 (19 107)	860 000 (31 600)
Linearity error mass flow							
• for liquids[1]	[%] standard	± 0.1	± 0.1	± 0.1	± 0.1	± 0.1	± 0.1
	[%] medium	± 0.2	± 0.2	± 0.2	± 0.2	± 0.2	± 0.2
• for gases (additional)	[%]	± 0.40	± 0.40	± 0.40	± 0.40	± 0.40	± 0.40
Repeatability mass flow	[%]	± 0.05	± 0.05	± 0.05	± 0.05	± 0.05	± 0.05
Density accuracy standard calibration	[kg/m³ (lb/ft³)]	± 10 (± 0.62)	± 10 (± 0.62)	± 10 (± 0.62)	± 10 (± 0.62)	± 10 (± 0.62)	± 10 (± 0.62)
Density accuracy extended calibration	[kg/m³ (lb/ft³)]	± 2 (± 0.124)[5]	± 2 (± 0.124)[5]	± 2 (± 0.124)[5]	± 2 (± 0.124)[5]	± 2 (± 0.124)[5]	± 2 (± 0.124)[5]
Temperature error	[°K]	± 0.5	± 0.5	± 0.5	± 0.5	± 0.5	± 0.5

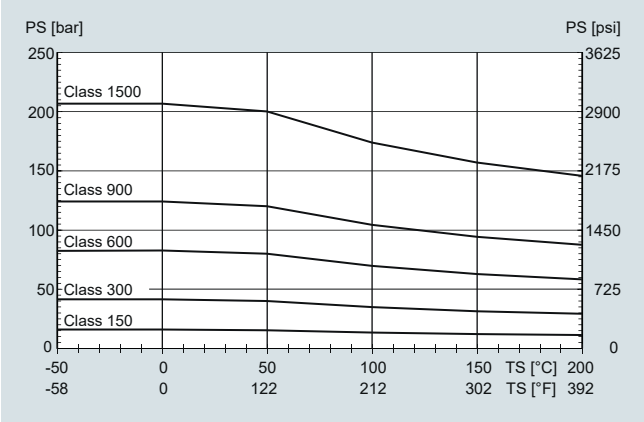
1) For reference conditions: ISO 9104 and DIN/EN 29104. Increased error can be expected for gas mass flow measurement (For gas measurement typically + 0.40 % error).
2) For gas applications the max. flowrate is calculated at Mach-Number = 03.
3) Hastelloy C is a registered trademark of Haynes International. C4 nickel alloys are equivalent to Hastelloy C4 .
4) In preparation: currently as for 0.2 % accuracy class.
5) In preparation: 0.5 kg/m³.

Pressure/temperature curves

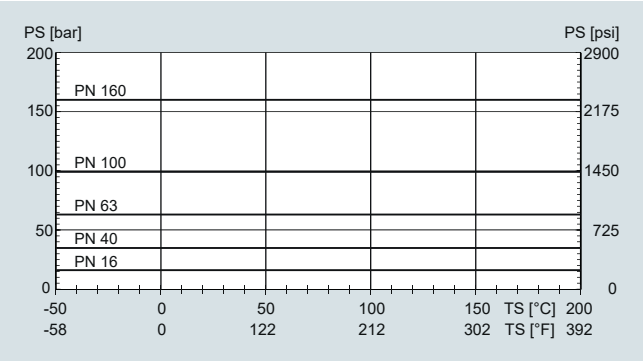
With two major exceptions, the pressure rating of the flow sensors is independent of the process medium temperature. Design rules for flange connections in both the EN1092-1 and ASME B16.5 standards dictate pressure derating with increasing temperature. The charts below show the effect of process medium temperature on the pressure ratings for the flanges within the FCS300 product program.



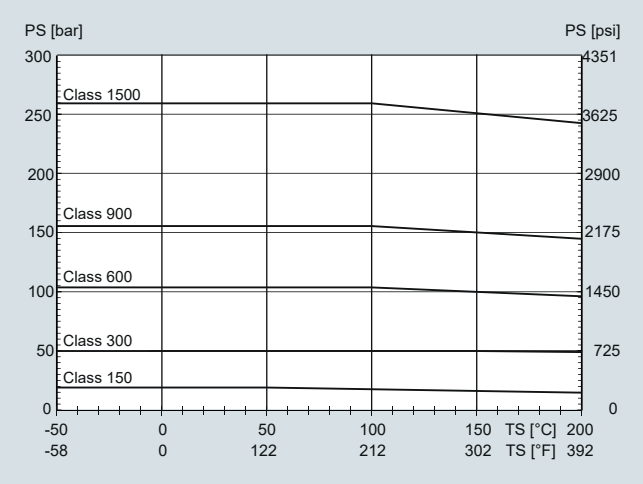
EN1092-1 flanged sensors in AISI 316L



Stainless steel ASME flange 1.4571/1.4404 (AISI 316Ti/316L) up to DN200 (8")



Nickel alloy DIN flange C4 (2.4610) or nickel alloy C22 (2.4602) up to DN200 (8")



Nickel alloy ASME flange C4 (2.4610) or nickel alloy C22 (2.4602) up to DN200 (8")

Sanitary connection

Design	Nominal diameter	PS_{max}		TS_{max}		TS_{min}	
		[bar]	[psi]	[°C]	[°F]	[°C]	[°F]
Pipe fitting DIN 11851	DN 15 ... 40 (½ ... 1½")	40	580	140	284	-40	-40
	DN 50 ... 100 (2 ... 4")	25	363	140	284	-40	-40
Pipe fitting SMS 1145	DN 25 ... 80 (1 ... 3")	6	87	140	284	-40	-40
Clamp DIN 32676	DN 15 ... 50 (½ ... 2")	16	232	120	248	-40	-40
	DN 65 ... 100 (2½ ... 4")	10	145	120	248	-40	-40

Flow sensor SITRANS FCS300

Sensor variants

SITRANS FCS300 sensors are available in a wide range of process connections. The available combinations of type, sensor size and connection size are shown in the tables below.

Standard variants

Sensor	Connection	EN 1092-1 B1, PN 16	EN 1092-1 B1, PN 40	EN 1092-1 B1, PN 63	EN 1092-1 B1, PN 100	EN 1092-1 D, PN 40	ANSI B16.5-2009, class 150	ANSI B16.5-2009, class 300	ANSI B16.5-2009, class 600	ANSI B16.5-2009, class 900	ANSI B16.5-2009, class 1500	ISO 228-1 G pipe thread	ASME B1.20.1 NPT pipe thread	DIN 11851 Hygienic screwed	DIN 32676 (ISO) Clamp Row B	SMS 1145 Hygienic screwed	JIS B2200:2004/10K	JIS B2200:2004/20K	EN 1092-1 PN 16, NAMUR length	EN 1092-1 PN 40, NAMUR length
Standard: 7ME463.-...																				
DN 15 (½")	DN 10 ($^3/_8$")		●									●		●	●		●	●		
	DN 15 (½")		●	●	●	●	●	●	●	●[1]	●[1]	●	●	●	●		●	●		●
	DN 20 (¾")		●				●							●	●		●	●		
DN 25 (1")	DN 20 (¾")		●				●							●	●		●	●		
	DN 25 (1")		●	●	●	●	●	●	●	●[1]	●[1]			●	●	●	●	●		●
	DN 40 (1½")		●	●	●		●	●	●					●	●	●	●	●		
DN 50 (2")	DN 40 (1½")		●	●	●		●	●	●	●	●			●	●	●	●	●		
	DN 50 (2")		●	●	●	●	●	●	●	●[1]	●[1]			●	●	●	●	●		●
	DN 65 (2½")		●				●		●	●[1]	●[1]			●	●	●	●	●		
DN 80 (3")	DN 65 (2½")	●	●	●	●		●	●	●	●[1]	●[1]			●	●	●	●	●		
	DN 80 (3")	●	●	●	●	●	●	●	●	●[1]	●[1]			●	●	●	●	●		●
	DN 100 (4")	●	●	●	●		●	●	●	●[1]	●[1]			●	●		●	●		
DN 100 (4")	DN 80 (3")	●	●	●	●		●		●	●[1]	●[1]						●	●		
	DN 100 (4")	●	●	●	●		●	●	●	●[1]	●[1]						●	●	●	
	DN 150 (6")	●	●	●	●		●	●	●	●[1]	●[1]						●	●		
DN 150 (6")	DN 100 (4")	●	●	●	●		●		●	●[1]	●[1]							●		
	DN 150 (6")	●	●	●	●		●	●	●	●[1]	●[1]							●	●	
	DN 200 (8")	●	●	●	●		●	●	●	●[1]	●[1]							●		

[1] Apply class 600 p and t ratings for class 900 and class 1500 flanges.

Hygienic sensor variants

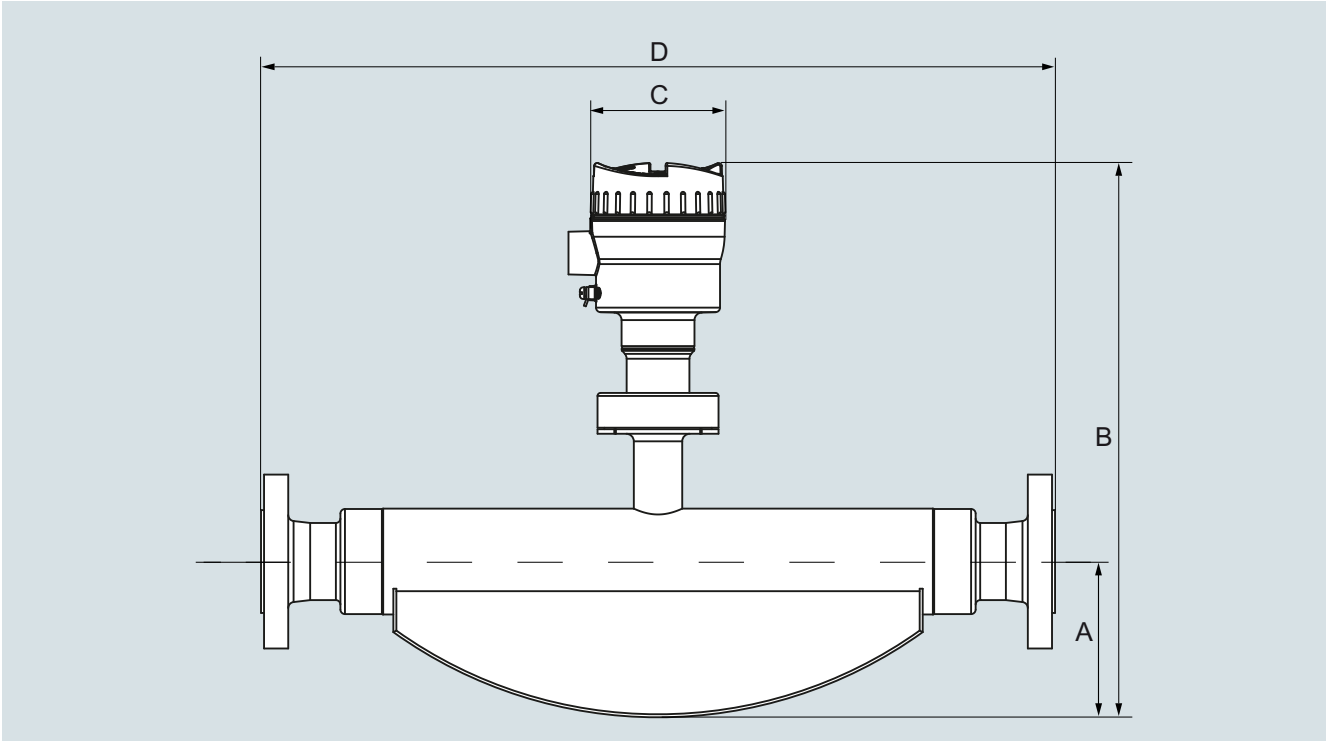
The hygienic sensors will have to be ordered with stainless steel tubes 316L/1.4435/1.4404 (polished) and are EHEDG approved. Hygienic sensors are offered with process connection conforming to various international quick-connect clamps or threaded connectors. Pressure ratings are according to the relevant standard and the sensor size.

NAMUR sensor variants

The NAMUR variants have built-in lengths according to NAMUR recommendation NE 132. The recommendations of NE 132 are stated for sensors with flanges the same size as the sensor nominal size, and for flanges to EN1092-1 PN 40 with B1 flange facing. For DN 100 and DN 150 flanges to PN 16.

Dimensional drawings

Sensor dimensions



Sensor		A		B		C		Weight	
[DN]	[inch]	[mm]	[inch]	[mm]	[inch]	[mm]	[inch]	[kg]	[lb]
15	½	80	3.15	358	14.09	90	3.54	4.6	10.1
25	1	103	4.06	398	15.67	90	3.54	7.9	17.4
50	2	126	4.96	435	17.13	90	3.54	25.7	56.7
80	3	181	7.13	525	20.67	90	3.54	66.5	147
100	4	262	10.31	622	24.49	90	3.54	128	282
150	6	317	12.48	714	28.11	90	3.54	207	456

SITRANS FCS300, dimensions in mm (inch), weights in kg (lb), for a EN 1092 PN 40 flanged version.

The built-in length D depends on the flange.

Flow sensor SITRANS FCS300

Overall length

The overall length (built-in length (D)) of each sensor depends on the connection standard and the pressure rating. The tables below summarize the dimensions available at the time of publishing. Please contact Siemens for further information about our desired process connection specification.

Sensor in AISI 316L: 7ME463.-...

Sensor AISI 316L	**DN 15 (½")**				**DN 25 (1")**			**DN 50 (2")**		
Connection	**DN 6 (¼")**	**DN 10 (3/8")**	**DN 15 (½")**	**DN 20 (¾")**	**DN 20 (¾")**	**DN 25 (1")**	**DN 40 (1½")**	**DN 40 (1½")**	**DN 50 (2")**	**DN 65 (2½")**
EN 1092-1 B1, PN 16										
EN 1092-1 B1, PN 40		385	385	421	576	525	576	763	715	763
EN 1092-1 B1, PN 63			403			564	572	745	745	
EN 1092-1 B1, PN 100									745	
EN 1092-10-D, PN 40										
ANSI B16.5, class 150			435	421	575	575	576	763	715	756
ANSI B16.5, class 300			421			576	576	756	763	
ANSI B16.5, class 600									773	
ANSI B16.5, class 900						576		780	790	800
ANSI B16.5, class 1500									790	
ISO 228-1 GH pipe thread	450		490							
ANSI B1.20.1 NPT pipe thread			450							
DIN 11851 Hygienic screwed		413			590			763	740	
DIN 32676 (ISO 2852) Row B Hygienic clamp		413			590			763	740	
SMS 1145 Hygienic screwed						590		763	740	
JIS B2200/10K		385	385	421	576	525	576	763	715	763
EN 1092-1 PN 40, NAMUR length			510			600			715	

Sensor	**DN 80 (3")**			**DN 100 (4")**			**DN 150 (6")**		
Connection	**DN 65 (2½")**	**DN 80 (3")**	**DN 100 (4")**	**DN 80 (3")**	**DN 100 (4")**	**DN 150 (6")**	**DN 100 (4")**	**DN 150 (6")**	**DN 200 (8")**
EN 1092-1 B1, PN 16		870	875	1222	1122	1300	1569	1421	
EN 1092-1 B1, PN 40	910				1144		1599	1461	1637
EN 1092-1 B1, PN 63		910	1060	1234	1304				
EN 1092-1 B1, PN 100			1080		1334				
ANSI B16.5, class 150		880	880	1244	1144	1330	1630	1485	1650
ANSI B16.5, class 300	920	895	1075		1324		1650	1505	1670
ANSI B16.5, class 600		920	1100		1354		1675	1555	
ANSI B16.5, class 900	965	1100	1130	1470	1380		1705	1605	
ANSI B16.5, class 1500		1300	1150	1500	1400		1725	1665	
DIN 11851 Hygienic screwed	990	940							
DIN 32676 (ISO 2852) Row B Hygienic clamp	950	910							
SMS 1145 Hygienic screwed		990	940						
JIS B2200/10K		870	1060	1275	1150	1300			1585
EN 1092-1 PN 40, NAMUR length		915			1400			1700	

SITRANS FCS300, overall length (D), dimensions in mm

Sensor	DN 15 (½")				DN 25 (1")			DN 50 (2")		
Connection	**DN 6 (¼")**	**DN 10 (3/8")**	**DN 15 (½")**	**DN 20 (¾")**	**DN 20 (¾")**	**DN 25 (1")**	**DN 40 (1½")**	**DN 40 (1½")**	**DN 50 (2")**	**DN 65 (2½")**
EN 1092-1 B1, PN 16										
EN 1092-1 B1, PN 40		15.2	15.2	16.6	22.7	20.7	22.7	30.0	28.15	30.0
EN 1092-1 B1, PN 63			15.9			22.2	22.5	29.33	29.33	
EN 1092-1 B1, PN 100									29.33	
ANSI B16.5, class 150			17.13	16.6	22.6	22.6	22.7	30.0	28.15	29.76
ANSI B16.5, class 300			16.6			22.7	22.7	29.76	30.0	
ANSI B16.5, class 600									30.43	
ANSI B16.5, class 900						22.7		30.71	31.1	31.5
ANSI B16.5, class 1500										
ISO 228-1 GH pipe thread	17.72		19.29							
ANSI B1.20.1 NPT pipe thread			17.72							
DIN 11851 Hygienic screwed		16.3			23.2			30.0	29.1	
DIN 32676 (ISO 2852) Row B Hygienic clamp		16.3				23.2		30.0	29.1	
JIS B2200/10K		15.2	15.2	16.6	22.7	20.7	22.7	30.0	28.15	30.0
JIS B2200/20K										
EN 1092-1 PN 40, NAMUR length			20.08			23.62			28.15	

Sensor	DN 80 (3")			DN 100 (4")			DN 150 (6")		
Connection	**DN 65 (2½")**	**DN 80 (3")**	**DN 100 (4")**	**DN 80 (3")**	**DN 100 (4")**	**DN 150 (6")**	**DN 100 (4")**	**DN 150 (6")**	**DN 200 (8")**
EN 1092-1 B1, PN 16		34.25	34.45	48.11	44.17	51.18	61.77	55.94	
EN 1092-1 B1, PN 40	35.83				45.04		62.95	57.52	64.45
EN 1092-1 B1, PN 63		35.83	41.73		51.34				
EN 1092-1 B1, PN 100			45.52		52.52				
ANSI B16.5, class 150		34.65	34.65	48.98	45.04	52.36	64.17	58.46	64.96
ANSI B16.5, class 300	36.22	35.24	42.32		52.13		64.96	59.25	65.75
ANSI B16.5, class 600		36.22	43.31		52.31		65.94	61.22	
ANSI B16.5, class 900	37.99	43.31	44.49	57.87	54.33		67.13	63.19	
ANSI B16.5, class 1500		51.18	45.28	59.05	55.12		67.91	65.55	
DIN 11851 Hygienic screwed	39.0	37.0							
DIN 32676 (ISO 2852) Row B Hygienic clamp	37.2	35.83							
JIS B2200/10K	35.83	34.25	41.73	50.20	45.28	51.18			62.4
JIS B2200/20K									
EN 1092-1 PN 40, NAMUR length		36.02			55.12			66.93	

SITRANS FCS300, overall length (D), dimensions in inch

Flow sensor SITRANS FCS300

Sensor in Nickel-Alloy C4: 7ME463.-...

Sensor Nickel-Alloy C4	DN 15 (½")			DN 25 (1")			DN 50 (2")		
Connection	**DN 10 (3/8")**	**DN 15 (½")**	**DN 20 (¾")**	**DN 20 (¾")**	**DN 25 (1")**	**DN 40 (1½")**	**DN 40 (1½")**	**DN 50 (2")**	**DN 65 (2½")**
EN 1092-1 B1, PN 40	449	442	428	646	614	576	814	764	819
EN 1092-1 B1, PN 63	449	442	428	646	614	576	814	764	819
EN 1092-1 B1, PN 100	449	442	428	646	614	576	814	764	819
ANSI B16.5, class 150		442	428	646	614	576	814	764	819
ANSI B16.5, class 300		442	428	646	614	576	814	764	819
ANSI B16.5, class 600		442	428	646	614	576	814	764	819
JIS B2200/10K	449	442	428	646	614	576	814	764	819

Sensor	DN 80 (3")			DN 100 (4")			DN 150 (6")		
Connection	**DN 65 (2½")**	**DN 80 (3")**	**DN 100 (4")**	**DN 80 (3")**	**DN 100 (4")**	**DN 150 (6")**	**DN 100 (4")**	**DN 150 (6")**	**DN 200 (8")**
EN 1092-1 B1, PN 16			971	1357	1280	1261	1592	1502	
EN 1092-1 B1, PN 40	1021	971	971	1357	1280	1261	1592	1502	
EN 1092-1 B1, PN 63	1021		971	1357	1280	1261	1632	1542	
EN 1092-1 B1, PN 100	1021	971	971	1357	1280	1261	1632	1542	
ANSI B16.5, class 150	1021	971	971	1357	1280	1261	1592	1502	
ANSI B16.5, class 300	1021	971	971	1357	1280	1261	1632	1542	
ANSI B16.5, class 600	1021	971	971	1357	1280	1261	1632	1542	
JIS B2200/10K	1021	971	971	1357	1280	1261	1592	1502	

SITRANS FCS300, overall length (D), dimensions in mm

Sensor	DN 15 (½")			DN 25 (1")			DN 50 (2")		
Connection	**DN 10 (3/8")**	**DN 15 (½")**	**DN 20 (¾")**	**DN 20 (¾")**	**DN 25 (1")**	**DN 40 (1½")**	**DN 40 (1½")**	**DN 50 (2")**	**DN 65 (2½")**
EN 1092-1 B1, PN 40	17.7	17.4	16.9	25.4	24.2	22.7	32.0	30.1	32.2
EN 1092-1 B1, PN 63	17.7	17.4	16.9	25.4	24.2	22.7	32.0	30.1	32.2
EN 1092-1 B1, PN 100	17.7	17.4	16.9	25.4	24.2	22.7	32.0	30.1	32.2
ANSI B16.5, class 150		17.4	16.9	22.6	22.6	22.7	32.0	30.1	31.2
ANSI B16.5, class 300		17.4	16.9	25.4	24.2	22.7	32.0	30.1	31.2
ANSI B16.5, class 600		17.4	16.9	25.4	24.2	22.7	32.0	30.1	31.2
JIS B2200/10K	17.7	17.4	16.9	25.4	24.2	22.7	32.0	30.1	32.2

Sensor	DN 80 (3")			DN 100 (4")			DN 150 (6")		
Connection	**DN 65 (2½")**	**DN 80 (3")**	**DN 100 (4")**	**DN 80 (3")**	**DN 100 (4")**	**DN 150 (6")**	**DN 100 (4")**	**DN 150 (6")**	**DN 200 (8")**
EN 1092-1 B1, PN 16			38.2	53.4	50.4	49.6	62.7	59.1	
EN 1092-1 B1, PN 40	40.2	38.2	38.2	53.4	50.4	49.6	62.7	59.1	
EN 1092-1 B1, PN 63	40.2		38.2	53.4	50.4	49.6	64.3	59.1	
EN 1092-1 B1, PN 100	40.2	38.2	38.2	53.4	50.4	49.6	64.3	59.1	
ANSI B16.5, class 150	40.2	38.2	38.2	53.4	50.4	49.6	62.7	59.1	
ANSI B16.5, class 300	40.2	38.2	38.2	53.4	50.4	49.6	64.3	59.1	
ANSI B16.5, class 600	40.2	38.2	38.2	53.4	50.4	49.6	64.3	59.1	
JIS B2200/10K	35.83	34.25	41.73	53.4	50.4	49.6	62.7	59.1	

SITRANS FCS300, overall length (D), dimensions in inch

Overview

The complete flowmeter system SITRANS FC330 can be ordered for standard, hygienic or NAMUR service.

The flowmeter is based on the latest developments within digital signal processing technology – engineered for high measuring performance:

- Fast response to rapid changes in flow
- Fast dosing applications
- High immunity against process noise
- High turndown ratio of flowrates
- Suitable for liquid and gas service
- Easy to install, commission and maintain

FC330 is available with current output HART 7.5, Modbus RS485 RTU, PROFIBUS PD or PROFIBUS PA as standard on Channel 1. Additional functions can be freely configured for analog, pulse, frequency, relay or status output or binary input.

The transmitter comes with a user-configurable graphical display and SensorFlash, a micro SD card for configuration backup, firmware update and data storage.

The SITRANS FC330 flowmeter system consists of a SITRANS FCS300 sensor and a SITRANS FCT030 transmitter.

Benefits

- It is compact and light, fitting neatly into dense piping arrangements
- Easy maintenance because modules can be exchanged rapidly
- Effective separation of measurement from plant vibration
- Highly secure operation in safety critical applications
- Non-volatile memory of all setup and operation data
- Reliable measurements due to high signal to noise ratio
- Secure, digital transfer of measurement data from the sensor
- Short overall length; easy drop-in replacement into most existing installations

3

Technical specifications

Sizes	DN 15 (½") DN 25 (1") DN 50 (2") DN 80 (3") DN 100 (4") DN 150 (6")
Accuracy	± 0.10 % or 0.20 % for liquids additional ±0.40 for gases
Repeatability	± 0.05 %
Flow range (liquids) (water @ 1 bar pressure loss) (Q_{nom})	
• DN 15	4 500 kg/h (163.3 lb/min)
• DN 25	20 500 kg/h (753.2 lb/min))
• DN 50	49 000 kg/h (1 800 lb/min)
• DN 80	122 000 kg/h (4 483 lb/min)
• DN 100	273 000 kg (10 031 lb/min)
• DN 150	459 200 kg/h (16 873 lb/min)
Architecture	Compact or remote configuration
Display	Full graphical display, 240 x 160 pixels with selection of 6 languages
Power supply	20 ... 27 V DC ± 10%; 100 ... 240 V AC ± 10 %, 47 ... 63 Hz ± 10%
Weight	4.6 ... 212 kg
Material	
• Sensor	
- Wetted parts	316L stainless steel or Nickel Alloy C4
- Enclosure	304 stainless steel
• Transmitter	Aluminum with corrosion-resistant coating
Enclosure rating	IP67
Pressure ratings	
• Measuring tubes	
- 316L	100 bar (1450 psi)
- Nickel Alloy C4 (DN 15 ... 50)	100 bar (1450 psi)
• Sensor enclosure	No pressure containment
Temperature ratings	
• Process medium	-50 ... +205 °C (-58 ... +400 °F)
• Ambient	-40 ... +60 °C (-40 ... +140 °F)[1]
• Display	-20 ... +60 °C (-4 ... +140 °F)

Process connections	
• Flanges	EN 1092-1 B1, EN 1092-1 D, ANSI/ASME B16.5, JIS B 2220
• Pipe threads	ASME B1.20 (NPT), ISO228-1 G (BSPP)
• Hygienic threads	DIN 11851, SMS 1145
• Hygienic clamps	DIN 32676 Row B
Approvals	
• Hazardous area	ATEX, IECEx, EAC Ex, CSA, cCSAus (NEPSI, INMETRO, EAC in preparation)
• Pressure equipment	PED, CRN
• Hygienic	EHEDG (DN 25 ... DN 80)
• Custody transfer	OIML R 117, NTEP (in preparation)
• Operational safety (compact system only NAMUR 7ME471)	SIL 2 Single (in preparation) SIL 3 Redundant system (in preparation)
NAMUR	NAMUR-compliant (e.g. NE 21, NE 41, NE 107 and NE 132)
I/O	Up to 4 channels combining analog, relay or digital outputs and binary input
Communication	HART PROFIBUS PA PROFIBUS DP Modbus RTU (RS 485)
EMC performance	
Emission	EN 55011/CISPR-11 (Class A)
Immunity	EN/IEC 61326-1 (Industry)
Mechanical load	18 to 400 Hz random The flow meter will mechanically tolerate 3.17 g RMS in all directions. Flow accuracy cannot be guaranteed under all conditions.

[1] If operating outdoors, avoid direct sunlight, paritcularly in warm climatic regions.

Selection and Ordering data	Article No.	Order code
SITRANS FC330 Digital coriolis flowmeter with SITRANS FCS300 standard flow sensor compact or remote mounting with FCT030 transmitter	**7ME4633 -**	**-**
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Sensor size, connector size		
DN 15, DN 10 (½", 3/8")	**3F**	
DN 15, DN 15 (½", ½")	**3G**	
DN 15, DN 20 (½", ¾")	**3H**	
DN 25, DN 20 (1", ¾")	**3K**	
DN 25, DN 25 (1", 1")	**3L**	
DN 25, DN 40 (1", 1½")	**3N**	
DN 50, DN 40 (2", 1½")	**4B**	
DN 50, DN 50 (2", 2")	**4C**	
DN 50, DN 65 (2", 2½")	**4D**	
DN 80, DN 65 (3", 2½")	**4J**	
DN 80, DN 80 (3", 3")	**4K**	
DN 80, DN 100 (3", 4")	**4L**	
DN 100, DN 80 (4", 3")	**5M**	
DN 100, DN 100 (4", 4")	**5N**	
DN 100, DN 150 (4", 6")	**5Q**	
DN 150, DN 100 (6", 4")	**6D**	
DN 150, DN 150 (6", 6")	**6F**	
DN 150, DN 200 (6", 8")	**6H**	
Process connection		
EN 1092-1 B1, PN 16	**A0**	
EN 1092-1 B1, PN 40	**A1**	
EN 1092-1 B1, PN 63	**A2**	
EN 1092-1 B1, PN 100	**A3**	
EN 1092-1 D, PN 40	**A5**	
ASME B16.5 RF, class 150	**D1**	
ASME B16.5 RF, class 300	**D2**	
ASME B16.5 RF, class 600	**D3**	
ASME B16.5 RF, class 900 (p- and t-rating as class 600)	**D4**	
ASME B16.5 RF, class 1500 (p- and t-rating as class 600)	**D5**	
ISO 228-1G	**E1**	
ASME B1.20.1 NPT	**E3**	
DIN 11851 hygienic screwed	**F1**	
DIN 32676 (ISO) clamp row B	**G1**	
SMS 1145 hygienic screwed	**K1**	
JIS B2200/10K	**L2**	
JIS B2200/20K	**L4**	
EN 1092-1, PN 16, NAMUR length	**N1**	
EN 1092-1, PN 40, NAMUR length	**N2**	
Wetted parts material		
AISI 316L/1.4435/1.4404	**1**	
AISI 316L/1.4435/1.4404 (polished)	**2**	
Nickel-alloy C4	**3**	
Calibration/Accuracy class		
0.2 % flow, 10 kg/m³ density	**0**	
0.1 % flow, 2 kg/m³ density	**1**	
Standard fraction	**8**	
Customer selected fraction	**9**	**N0Y**

Flowmeter SITRANS FC330

Selection and Ordering data	Article No.	Order code
SITRANS FC330 Digital coriolis flowmeter with SITRANS FCS300 standard flow sensor compact or remote mounting with FCT030 transmitter	**7ME4633 -**	
Mounting style, transmitter housing and material		
None (replacement sensor)		**A**
Compact, IP67 fieldmount, aluminum		**D**
Remote, IP67 fieldmount, aluminum, M12		**G**
Remote, IP67 fieldmount, aluminum, T/Box		**K**
Remote, IP67, wall mount, aluminium		**U**
Ex approval (depending on variant)		
Non-Ex		**A**
ATEX		**C**
IECEx		**F**
US (cCSAus), Div 1		**L**
Canada (cCSAus), zone 1		**M**
NEPSI (in preparation)		**N**
INMETRO (in preparation)		**P**
KCs (in preparation)		**Q**
EAC (in preparation)		**U**
Local User Interface		
None (replacement sensor, DSL only)		**0**
Blind		**1**
Graphical, 240 x 160 pxl		**3**

Selection and Ordering data	Order code
Further designs	
Please add "**-Z**" to Article No. and specify Order code(s).	
Cable glands	
None (replacement sensor)	**A00**
Metric, no glands	**A01**
Metric, Nylon, limited to -20 °C/-4 °F	**A02**
Metric, brass/Ni plated	**A05**
Metric, stainless steel	**A06**
NPT, no glands	**A11**
NPT, Nylon, limited to -20 °C/-4 °F	**A12**
NPT, brass/Ni plated	**A15**
NPT, stainless steel	**A16**
Metric thread with M12 socket fitted	**A20**
Sofware functions and CT approvals	
None (replacement sensor)	**B10**
Standard	**B11**
CT OIML R 117 (in preparation)	**B31**
CT NTEP (in preparation)	**B52**
I/O configuration Ch1	
No output channel	**E00**
4 ... 20 mA HART Active/Passive (non-Ex)	**E02**
Ca 4 ... 20 mA HART active (Ex)	**E06**
Ca 4 ... 20 mA HART passive (Ex)	**E07**
PROFIBUS PA	**E10**
PROFIBUS DP (non-Ex)	**E11**
Modbus RTU RS 485	**E14**

Selection and Ordering data	Order code
I/O configuration Ch2, Ch3 and Ch4	
None	**F00**
• Non Ex: Sig I/O, None, None	**F01**
• Non Ex: Sig I/O, Sig I/O, None	**F02**
• Non Ex: Sig I/O, Sig I/O, Sig I/O	**F03**
• Non Ex: Sig I/O, Sig I/O, R	**F04**
• Non Ex: Sig I/O, R, R	**F05**
• Non Ex: Sig I/O, R, None	**F06**
• Ex: pSig I/O, None, None	**F11**
• Ex: pSig I/O, pSig I/O, None	**F12**
• Ex: pSig I/O, pSig I/O, pSig I/O	**F13**
• Ex: pSig I/O, pSig I/O, R	**F14**
• Ex: pSig I/O, R, R	**F15**
• Ex: pSig I/O, R, None	**F16**
• Ex: aSig I/O, None, None	**F21**
• Ex: aSig I/O, aSig I/O, None	**F22**
• Ex: aSig I/O, aSig I/O, aSig I/O	**F23**
• Ex: aSig I/O, aSig I/O, R	**F24**
• Ex: aSig I/O, R, R	**F25**
• Ex: aSig I/O, R, None	**F26**

Notes on I/O configurations:
a or p suffix: The I/O module is selected at ordering with either active or passive function.
Signal: The output can be selected for Current (0 or 4 to 20 mA), frequency or pulse function in the menu.
I: Discrete status input to the flowmeter. Functions are selected in the menu including 'Freeze output', 'Reset totalizer'.
R: Relay output for discrete status reporting. Function is selected in the menu, including 'Error', 'High flow warning'.
The MLFB structure for FC430 systems must be filled to **this level**, including **"-Z"** options A.., B.., E.. and F..

Selection and Ordering data	Order code
Add-on options and accessories	
Please add "**-Z**" to Article No. and specify Order code(s).	
Certificates	
Factory certificate to EN 10204 -2.2	**C01**
Material certificate EN 10204-3.1 with inspection	**C02**
Material certificate EN 10204-3.2 with inspection	**C03**
NACE MR0175/EN 10204-3.1	**C04**
Material certificate EN 10204-2.1	**C05**
Material certificate EN 10204-3.1 with test	**C06**
Material certificate EN 10204-3.1 with PMI	**C07**
Pressure test acc. AD2000	**C08**
Test package (Pressure, NDT, WPS, WPQS)	**C09**
Inspection certificate to EN 10204 3.1/NDE	**C10**
Certificate acc. EN 10204 2.1	**C11**
Material certificate to EN 10204 3.1 with PMI	**C12**
Customer selected calibration	
DN 15 ... 50: Multi-point (5 flows x 1 pass)	**D60**
DN 15 ... 50: Multi-point (10 flows x 1 pass)	**D61**
DN 80: Multi-point (5 flows x 1 pass)	**D62**
DN 80: Multi-point (10 flows x 1 pass)	**D63**
DN 100: Multi-point (5 flows x 1 pass)	**D64**
DN 100: Multi-point (10 flows x 1 pass)	**D65**
DN 150: Multi-point (5 flows x 1 pass)	**D66**
DN 150: Multi-point (8 flows x 1 pass)	**D67**
Cable	
None	**L50**
5 m (16.4 ft), standard with M12 connectors fitted	**L51**
5 m (16.4 ft), standard	**L52**
10 m (32.8 ft) standard with M12 connectors fitted	**L55**
10 m (32.8 ft), standard, without plugs	**L56**
25 m (82 ft), standard with M12 connectors fitted	**L59**
25 m (82 ft), standard, without plugs	**L60**
50 m (164 ft), standard with M12 connectors fitted	**L63**
50 m (164 ft), standard, without plugs	**L64**
75 m (246 ft), standard with M12 connectors fitted	**L67**
75 m (246 ft), standard, without plugs	**L68**
Sensor options	
FCS300 Marine approval	**S22**
SD-Card accessibility via USB (not allowed in USA by Patent)	
Mass storage enabled	**S30**
Region-specific approvals and certificates	
South Korea (KCC)	**W28**
Additional data	
Please add "**-Z**" to Article No. and specify Order code(s) and plain text.	
Tag name	
Tag name plate, stainless steel	**Y17**

Operating instructions for SITRANS FC330

Description	Article No.
English	
• for firmware V 4.0 and onwards	**A5E44030648**
German	
• for firmware V 4.0 and onwards	**TBD**

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

Flowmeter SITRANS FC310

Overview

The compact flowmeter SITRANS FC310 can be ordered for industrial, hygienic or NAMUR service.

Intended for integration into OEM skids, machines or pre-assembled plant systems, the flowmeter is based on the latest developments within digital signal processing technology - engineered for high measuring performance:

- Fast response to rapid changes in flow
- Fast dosing applications with control in host system
- High immunity against process noise
- High turndown ratio of flowrates
- Suitable for liquid and gas service
- Easy to install, commission and maintain

With all global marine approvals the FC310 is ideal for integration in ship fuel efficiency and environmental measurement systems as well as bunkering solutions.

The FCT010 transmitter delivers true multi-parameter measurements i.e. massflow, density, temperature

FC410 is available with Modbus RTU (RS 485) multi-drop serial communication.

The flowmeter is supplied with SensorFlash, a micro SD card containing all relevant certificates.

The SITRANS FC310 flowmeter system consists of a SITRANS FCS300 sensor and a SITRANS FCT010 transmitter always compact mounted.

Benefits

- It is compact and light, fitting neatly into dense piping arrangements
- Effective separation of measurement from plant vibration
- Reliable measurements due to high signal to noise ratio
- Short overall length; easy drop-in replacement into most existing installations
- Direct connection to host with high-speed Modbus simplifies machine or skid construction and set-up.
- Modbus RS485 RTU allows simple and easy integration with all Modbus masters with fast update rate of process values

Technical specifications

Sizes	DN 15 (½") DN 25 (1") DN 50 (2") DN 80 (3") DN 100 (4") DN 150 (6")
Accuracy	± 0.10 % or ±0.20 % Addional ±0.40 % for gases
Repeatability	± 0.05 %
Flow range (water @ 1 bar pressure loss)	
• DN 15	4 500 kg/h (163.3 lb/min)
• DN 25	20 500 kg/h (753.2 lb/min))
• DN 50	49 000 kg/h (1 800 lb/min)
• DN 80	122 000 kg/h (4 483 lb/min)
• DN 100	273 000 kg (10 031 lb/min)
• DN 150	459 200 kg/h (16 873 lb/min)
Power supply	24 V DC ± 20 %; 110 mA
Weight	4.6 ... 207 kg
Material	
• Sensor	
- Measuring tubes	316L stainless steel or Nickel Alloy C4
- Enclosure	304 stainless steel
• Transmitter	Aluminum with corrosion-resistant coating
Enclosure rating	IP67
Pressure ratings	
• Measuring tubes	
- 316L	100 bar (1450 psi)
- Nickel-Alloy C4	100 bar (1450 psi)
• Sensor enclosure	No pressure containment
Temperature ratings	
• Process medium	-50 ... +205 °C (-58 ... +400 °F)
• Ambient	-40 ... +60 °C (-40 ... +140 °F)

Process connections	
• Flanges	EN 1092-1 B1, EN 1092-1 D, ANSI/ASME B16.5, JIS B 2220
• Pipe threads	ASME B1.20 (NPT), ISO228-1 G (BSPP)
• Hygienic threads	DIN 11851, SMS 1145
• Hygienic clamps	DIN 32676 row B
Approvals	
• Hazardous area	ATEX, IECEx, EAC Ex, cCSAus (NEPSI, INMETRO, EAC in preparation)
• Pressure equipment	PED, CRN
• Hygienic	EHEDG (DN 25 ... 80)
• Marine (in preparation)	Germanischer Lloyd/det Norske Veritas, Bureau Veritas, Lloyds of London, American Bureau of Shipping, RINA (Italy)
NAMUR	NAMUR-compliant (e.g. NE 21, NE 41 and NE 132)
Communication	Modbus RS 485 RTU
EMC performance	
Emission	EN 55011/CISPR-11 (Class B)
Immunity	EN/IEC 61326-1 (Industry)
Mechanical load	18 to 400 Hz random The flow meter will mechanically tolerate 3.17 g RMS in all directions. Flow accuracy cannot be guaranteed under all conditions.

Flowmeter SITRANS FC310

Selection and Ordering data	Article No.	Order code
SITRANS FC310 Digital coriolis flowmeter with SITRANS FCS300 standard flow sensor with hygienic and flange/pipe thread connections and compact mounting with FCT010 transmitter	**7ME4631 -**	**- ■■■ ■■■**
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Sensor size, connector size		
DN 15, DN 10 (½", 3/8")	**3F**	
DN 15, DN 15 (½", ½")	**3G**	
DN 15, DN 20 (½", ¾")	**3H**	
DN 25, DN 20 (1", ¾")	**3K**	
DN 25, DN 25 (1", 1")	**3L**	
DN 25, DN 40 (1", 1½")	**3N**	
DN 50, DN 40 (2", 1½")	**4B**	
DN 50, DN 50 (2", 2")	**4C**	
DN 50, DN 65 (2", 2½")	**4D**	
DN 80, DN 65 (3", 2½")	**4J**	
DN 80, DN 80 (3", 3")	**4K**	
DN 80, DN 100 (3", 4")	**4L**	
DN 100, DN 80 (4", 3")	**5M**	
DN 100, DN 100 (4", 4")	**5N**	
DN 100, DN 150 (4", 6")	**5Q**	
DN 150, DN 100 (6", 4")	**6D**	
DN 150, DN 150 (6", 6")	**6F**	
DN 150, DN 200 (6", 8")	**6H**	
Process connection		
EN 1092-1 B1, PN 16	**A0**	
EN 1092-1 B1, PN 40	**A1**	
EN 1092-1 B1, PN 63	**A2**	
EN 1092-1 B1, PN 100	**A3**	
EN 1092-1 D, PN 40	**A5**	
ASME B16.5 RF, class 150	**D1**	
ASME B16.5 RF, class 300	**D2**	
ASME B16.5 RF, class 600	**D3**	
ASME B16.5 RF, class 900 (p- and t-rating as class 600)	**D4**	
ANSI B16.5-2009, class 1500 (p- and t-rating as class 600)	**D5**	
ISO 228-1G	**E1**	
ASME B1.20.1 NPT	**E3**	
DIN 11851 hygienic screwed	**F1**	
DIN 32676 (ISO) hygienic clamp row B	**G1**	
SMS 1145 hygienic screwed	**K1**	
JIS B2200/10K	**L2**	
JIS B2200/20K	**L4**	
EN 1092-1, PN 16, NAMUR length	**N1**	
EN 1092-1, PN 40, NAMUR length	**N2**	
Wetted parts material		
AISI 316L/1.4435/1.4404	**1**	
AISI 316L/1.4435/1.4404 (polished)	**2**	
Nickel-Alloy C4	**3**	
Calibration/Accuracy class		
0.2 % flow, 10 kg/m³ density	**0**	
0.1 % flow, 2 kg/m³ density	**1**	
Mounting style, transmitter housing and material		
Compact, IP67, aluminum	**D**	
Ex approval		
Non-Ex	**A**	
ATEX II 2G	**C**	
IECEx Gb	**F**	
US (cCSAus), Div 1	**L**	
Canada (cCSAus), class I, zone 1	**M**	
NEPSI (in preparation)	**N**	
INMETRO (in preparation)	**P**	
KCs (in preparation)	**Q**	
EAC (in preparation)	**U**	
Local User Interface		
Blind	**1**	

Selection and Ordering data	Order code
Further designs	
Please add "**-Z**" to Article No. and specify Order code(s).	
Cable glands	
None (replacement sensor)	**A00**
Metric, no glands	**A01**
Metric, plastic	**A02**
Metric, brass/Ni plated	**A05**
Metric, stainless steel	**A06**
NPT, no glands	**A11**
NPT, plastic	**A12**
NPT, brass/Ni plated	**A15**
NPT, stainless steel	**A16**
Metric thread with M12 socket fitted	**A20**
Sofware functions and CT approvals	
Standard	**B11**
I/O configuration Ch1	
Modbus RTU RS 485	**E14**
I/O configuration Ch2, Ch3 and Ch4	
None	**F00**

Selection and Ordering data	Order code
Add-on options and accessories	
Please add "**-Z**" to Article No. and specify Order code(s).	
Certificates	
Factory certificate to EN 10204 -2.2	**C01**
Material certificate EN 10204-3.1 with inspection	**C02**
Material certificate EN 10204-3.2 with inspection	**C03**
NACE MR0175/EN 10204-3.1	**C04**
Material certificate EN 10204-2.1	**C05**
Material certificate EN 10204-3.1 with test	**C06**
Material certificate EN 10204-3.1 with PMI	**C07**
Pressure test acc. AD2000	**C08**
Test package (Pressure, NDT, WPS, WPQS)	**C09**
Inspection certificate to EN 10204 3.1/NDE	**C10**
Certificate acc. EN 10204 2.1	**C11**
Material certificate to EN 10204 3.1 with PMI	**C12**
Customer selected calibration	
DN 15 ... 50, multi-point, 5 flows x 1 pass	**D60**
DN 15 ... 50, multi-point, 10 flows x 1 pass	**D61**
DN 80, multi-point, 5 flows x 1 pass	**D62**
DN 80, multi-point, 10 flows x 1 pass	**D63**
DN 100, multi-point, 5 flows x 1 pass	**D64**
DN 100, multi-point, 10 flows x 1 pass	**D65**
DN 150, multi-point, 5 flows x 1 pass	**D66**
DN 150, multi-point, 8 flows x 1 pass	**D67**
Cable (M12 versions of cable have a connector on both ends)	
None	**L50**
5 m (16.4 ft), standard with M12 connectors fitted	**L51**
5 m (16.4 ft), standard, without plugs	**L52**
10 m (32.8 ft) standard with M12 connectors fitted	**L55**
10 m (32.8 ft), standard, without plugs	**L56**
25 m (82 ft), standard with M12 connectors fitted	**L59**
25 m (82 ft), standard, without plugs	**L60**
50 m (164 ft), standard with M12 connectors fitted	**L63**
50 m (164 ft), standard, without plugs	**L64**
75 m (246 ft), standard with M12 connectors fitted	**L67**
75 m (246 ft), standard, without plugs	**L68**
Sensor options	
FCS300 Marine approval	**S22**
Additional data	
Please add "**-Z**" to Article No. and specify Order code(s) and plain text.	
Tag name	
Tag name plate, stainless steel	**Y17**

Operating instructions for SITRANS FC310

Description	Article No.
English	
• for firmware V 4.0 and onwards	**A5E39789214**
German	
• for firmware V 4.0 and onwards	**TBD**

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

Flowmeter SITRANS FC410 and FC430 for OEM customers

Overview

The complete flowmeter system SITRANS FC consist of a new FCS400 sensor in sizes DN 15 to DN50 mm and a FCT030 multichannel/multifunctional in compact or remote versions, or a single Modbus-channel FCT010 transmitter in compact version. The flowmeter is based on the latest developments within digital signal processing technology – engineered for high measuring performance:

- Fast response to rapid changes in flow
- Fast dosing applications
- High immunity against process noise
- High turndown ratio of flowrates
- Suitable for liquid and gas service
- Easy to install, commission and maintain
- Aerated flow filtering system, for advanced filtering of fluids with gas or air bubbles
- Build in Data logger for all process variables and status messages (FCT030)
- Build in Batch functionality (FCT030)

The SITRANS FC430 is available with current output HART 7.5, Modbus RS485 RTU, PROFIBUS PD or PROFIBUS PA as standard on Channel 1. Additional I/O functions can be freely configured for analog, pulse, frequency, relay or status output, or binary input.

The transmitter comes with a user configurable graphical display and SensorFlash, a micro SD card for configuration backup, firmware update and data storage.

The SITRANS FC410 is available with a Modbus RTD output transferring all process values to a any PLC or DCS system like SIMATIC S7-1200; S7-1500 or PCS7. True multi-parameter measurements i.e. massflow, density, temperature.

The SITRANS FC410 is available with MODBUS RTU (RS 485) multi-drop serial communication.

Benefits

- It is truely compact and light, fitting neatly into dense piping arrangements
- Easy maintenance because modules can be exchanged rapidly
- Effective separation of measurement from plant vibration
- Highly secure operation in safety critical applications
- Non-volatile memory of all setup and operation data
- Reliable measurements due to high signal to noise ratio
- Secure, digital transfer of measurement data from the sensor
- Shortest overall length; easy drop-in replacement into most existing installations

Application

SITRANS FCS400 mass flowmeters are especially suitable for applications for machinebuilder, skid manufacturer and OEM's in general for the process industry where there is a demand for accurate flow measurement. The meter is capable of measuring both liquid and gas flow.

Coriolis flowmeters can be applied in all industries, such as:

- Chemical: detergents, bulk chemicals, acids, alkalis, paint mixing systems, solvents and resins, fertilizer, technical gases
- Oil & Gas Processing Up- Mid- Down stream: Well-head monitoring ,oil separators, refineries control, furnace control
- Hydrocarbon processing: oil refining, derivatives manufacturing, polymerization
- Power industry processing
- Marine Application : Fuel management & consumption; bunkering solutions ; Boiler control
- Food & Beverage: dairy products, beer, wine, Alcohol / spirit, soft drinks, °Brix/°Plato, fruit juices and pulps, bottling, CO_2 dosing, CIP/SIP-liquids, mixture recipe control

The multiple outputs and bus communication mean that all of the process information can be read either instantaneously (10 ms update) or periodically as plant operation requires.

Technical specifications

Flowmeter	SITRANS FC430	SITRANS FC410
		
Sizes	DN 15 (½") DN 25 (1") DN 50 (2")	
Accuracy		
• Massflow	± 0.10 % for liquids additional ± 0.25 for gases	
• Density	± 5 kg/m^3 or 0.5 kg/m^3	
Repeatability		
• Massflow	± 0.05 %	
Flow range (liquids) Q_{nom} (water @ 1 bar pressure loss) (Q_{max} approx. 2 x Q_{nom})		
• DN 15 (½")	3 700 kg/h (8 200 lb/h)	
• DN 25 (1")	11 500 kg/h (25 300 lb/h)	
• DN 50 (2")	52 000 kg/h (115 000 lb/h)	
Installation	Compact or remote	Compact
Display	Full graphical display, 240 x 160 pixels with selection of 6 languages	No display
Totalizer	Three eight-digit counters for forward, net or reverse flow	One Totalizer
Process values	Mass, volume, corrected volume, temperature, density, fraction e.g. Brix, Plato % Alc., concentration	Mass, volume, temperature, density
Power supply	20 ... 27 V DC ± 10%; 100 ... 240 V AC ± 10 %, 47 ... 63 Hz ± 10%	24 V DC ± 20%; 110 mA

Flowmeter	SITRANS FC330	SITRANS FC310
Materials		
• Sensor		
- Wetted parts	316L stainless steel	
- Enclosure	304 stainless steel	
• Transmitter	Aluminum with corrosion-resistant coating	
Enclosure rating	IP67	
Pressure ratings		
• Measuring tubes		
- 316L	100 bar (1450 psi)	
• Sensor enclosure	20 bar (DN 15, DN 25) 17 bar (DN 50) Burst pressure >100 bar	
Temperature ratings		
• Process medium		
- DN 15 ... DN 50	-50 ... +200 °C (-58 ... +392 °F)	
• Ambient	-40 ... +60 °C (-40 ... +140 °F)	
• Display	-20 ... +60 °C -4 ... +140 °F)	-
Process connections		
• Flanges	EN 1092-1 B1, EN 1092-1 D, ANSI/ASME B16.5, JIS B 2220, DIN 11864-2	
• Pipe threads	ASME B1.20 (NPT), ISO228-1 G, VCO Quick-connect	
• Hygienic threads	DIN 11851, DIN 11864-1A, ISO 2853, SMS 1145	
• Hygienic clamps	DDIN 11864-3A, DIN 32676, ISO 2852	
Approvals		
• Hazardous area	ATEX, IECEx, cCSA us	
• Pressure equipment	PED, CRN	
NAMUR	NAMUR-compliant (e.g. NE 21, NE 41, NE 107 and NE 132)	
I/O	Up to 4 channels combining analog, relay or digital outputs and binary input	-
Communication	HART PROFIBUS PA PROFIBUS DP Modbus RTU (RS 485)	Modbus RTU (RS 485)

Selection and Ordering data (please contact Siemens sales office)

	Article No.	
SITRANS FC430 Digital coriolis flowmeter with SITRANS FCS400 sensor compact or remote mounting with FCT030 transmitter	7ME4613 - ■■■■■ - ■■■■	
SITRANS FC410 Digital coriolis flowmeter with SITRANS FCS400 sensor compact mounting FCT010 transmitter	7ME4611 - ■■■■■ - ■■■■	

SITRANS F C sensor MASS 2100 DI 1,5 with SITRANS FCT010, FCT030 and SIFLOW FC070 transmitter

Overview

MASS 2100 DI 1.5 is suitable for low flow measurement applications of a variety of liquids and gases.

The sensor offers superior performance in terms of flow accuracy, turn-down ratio and density accuracy. The ease of installation through a "plug & play" mechanical and electrical interface ensures optimum performance and operation.

The sensor delivers true multi-parameter measurements i.e.: Mass flow, volume flow, density, temperature and fraction.

Benefits

- High accuracy better than 0.1 % of mass flow rate
- Large dynamic turn-down ratio better than 500:1, from 30 kg/h to below 100 g/h
- Densitometer performance available through a density accuracy better than 0.001 g/cm^3 with a repeatability better than 0.0002 g/cm^3.
- Single continuous tube design, with no internal welds, reductions or flow splitters offers optimal hygiene, safety and CIP cleanability for food and beverage and pharmaceutical applications.
- Market's biggest wall thickness, ensuring optimal life-time and corrosion resistance and high-pressure durability
- Balanced pipe design with little mechanical energy-loss, ensures optimal performance and stability under non-ideal and unstable process conditions (pressure, temperature, density-changes etc.).
- 4-wire Pt1000 temperature measurement ensures optimum accuracy on mass flow, density and fraction flow
- Multi-plug electrical connector and SENSORPROM enables true "plug & play". Installation and commissioning in less than 10 minutes
- Intrinsically safe Ex ia design as standard
- Sensor pipe available in high-quality stainless steel AISI 316L/ 1.4435 or Hastelloy C22/2.4602 offering optimum corrosion resistance
- Dual-drive pick-up and driver construction facilitate ultra low-weight pipe construction giving the markets' smallest and most stable zero point.
- Rugged and space-saving sensor design in stainless steel matching all environments
- High-pressure program as standard
- The sensor calibration factor is also valid for gas measurement.

Application

In many industries such as the food and beverage or pharamceutical industry, accurate recipe control means everything. The MASS 2100 DI 1.5 has demonstrated superiour performance in numerous applications and field trails relating to accuracy and turn-down ratio. It is today the preferred meter for research and development and mini-plant applications for liquid or gas measurement, where measuring small quantities is important.

The main applications for the MASS 2100 DI 1.5 sensor can be found in:	
Chemical industry	Liquid and gas measurement within Miniplant and R & D, dosing of additives and catalysts
Cosmetic industry	Dosing of essence and fragrances
Pharmaceutical industry	High-speed dosing and coating of pills, filling of ampuls/injectors
Food and beverage industry	Dosing of flavourings, colours and additives, density measurement, inline measurement of liquid or gaseous CO_2
Automotive industry	Fuel injection nozzle and pump testing, filling of AC units, engine consumption, paint robots, ABS test-beds

Design

The MASS 2100 sensor consists of a single bent tube in a double omega pipe configuration, welded directly to the process connectors at each end.

The sensor is available in 2 material configurations, AISI 316L/ 1.4404 or Hastelloy C22/2.4602 with ¼" NPT or ¼" ISO process connections.

The enclosure is made in stainless steel AISI 316L/1.4404 with a grade of encapsulation of IP65/NEMA 4.

The sensor is available in either a standard version with a maximum liquid temperature of 125 °C (257 °F) or a high-temperature version, with raised electrical connector for 180 °C (356 °F).

The sensor can be installed in horizontal or vertical position. The enclosed single quick release clamp fitting which, along with its compact design and single multi-plug electrical connector, will keep installation costs and time to a minimum as shown below.

SITRANS F C sensor MASS 2100 DI 1,5 with SITRANS FCT010, FCT030 and SIFLOW FC070 transmitter

Function

The measuring principle is based on the Coriolis effect. See "System information SITRANS F C Coriolis mass flowmeters".

Integration

The sensor can be connected to FCT010, FCT030, SIFLOW and MASS 6000 (non CE) transmitters for remote installation only.

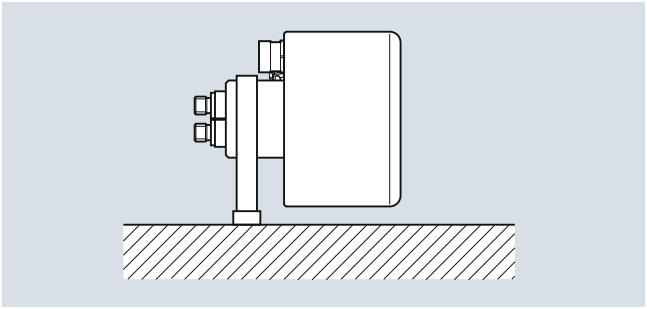
All sensors are delivered with a Sensor Flash or SENSORPROM containing all information about calibration data, identity and factory pre-programming of transmitter settings

Installation guidelines MASS 2100 DI 1.5 (1/16")

Installation of MASS 2100 sensor

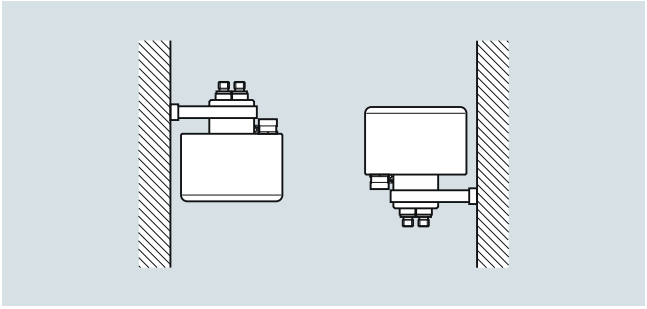
- The optimal installation is horizontal.
  If vertical mounting is necessary, upward flow is recommended to facilitate the removal of air bubbles. To remove the air from the sensor the flow speed in the sensor must be at least 1 m/s.
  If there are solid particles in the liquid, especially in connection with low flow, it is recommended that the sensor be mounted horizontally with inlet flange uppermost so that particles are more easily flushed out. To ensure that the sensor does not become partially empty, there must be sufficient counter-pressure on the unit min. 0.2 bar (2.9 psi).
- Mount the sensor on a vibration-free wall or steel frame.
- Locate the sensor low in the system in order to avoid an underpressure in the sensor separating air/gas in the liquid.
- Ensure that the sensor is not emptied of liquid (during normal operation) otherwise incorrect measurement will occur.

Horizontal



Liquid and gas application

Vertical



Liquid application (left), gas application (right)

Technical specifications

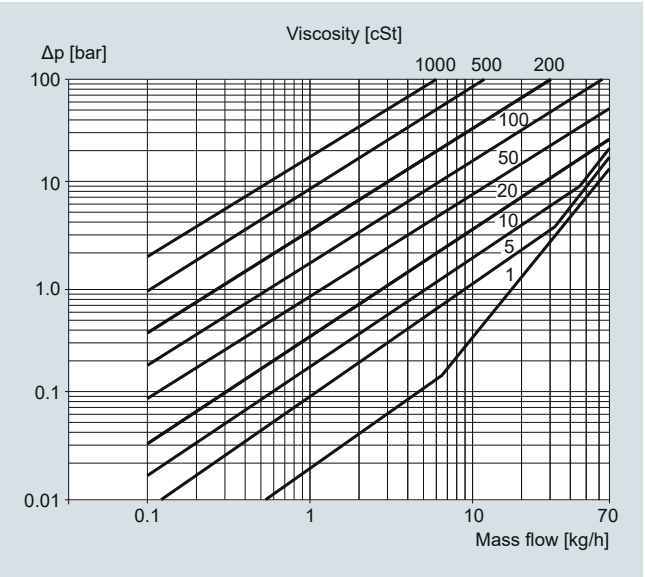
Inside pipe diameter (sensor consists of one continuous pipe)	1.5 mm (0.06")
Pipe wall thickness	0.25 mm (0.010")
Mass flow measuring range	0 ... 30 kg/h (0 ... 66 lb/h)
Density	0 ... 2.9 g/cm^3 (0 ... 0.10 lb/inch^3)
Fraction e.g.	0 ... 100 °Brix
Media temperature	
Standard	-50 ... +125 °C (-58 ... +257 °F)
High-temperature version	-50 ... +180 °C (-58 ... +356 °F)
Ambient temperature	-20 ... +50 °C (-4 ... +122 °F)
Liquid pressure measuring pipe[1]	
Stainless steel	230 bar (3336 psi) at 20 °C (68 °F)
Hastelloy C22/2.4602	365 bar (5294 psi) at 20 °C (68 °F)
Materials	
Measuring pipe and connection	Stainless steel AISI 316L/1.4435 Hastelloy C22/2.4602
Enclosure and enclosure material[2]	IP65 and stainless steel AISI316L/1.4404
Connection thread	
ISO 228/1	G¼" male
ANSI/ASME B1.20.1	¼" NPT male
Cable connection	Multiple plug connection to sensor 5 x 2 x 0.35 mm^2 twisted and screened in pairs, ext. Ø 12 mm
Ex-version	II 1G Eex ia IIC T3-T6, DEMKO 03 ATEX 135252X c-UL-us Ex ia IIC T3-T6 EAC Ex TC RU C– DE.MIO62.B.02013 0Ex ia IIC T3…T6 Gb UL WYMG.E232147
Weight approx.	2.6 kg (5.73 lb)

[1] According to DIN 2413, DIN 17457

[2] Housing is not rated for pressure containment.

For accuracy specifications see "System information SITRANS F C".

Pressure drop

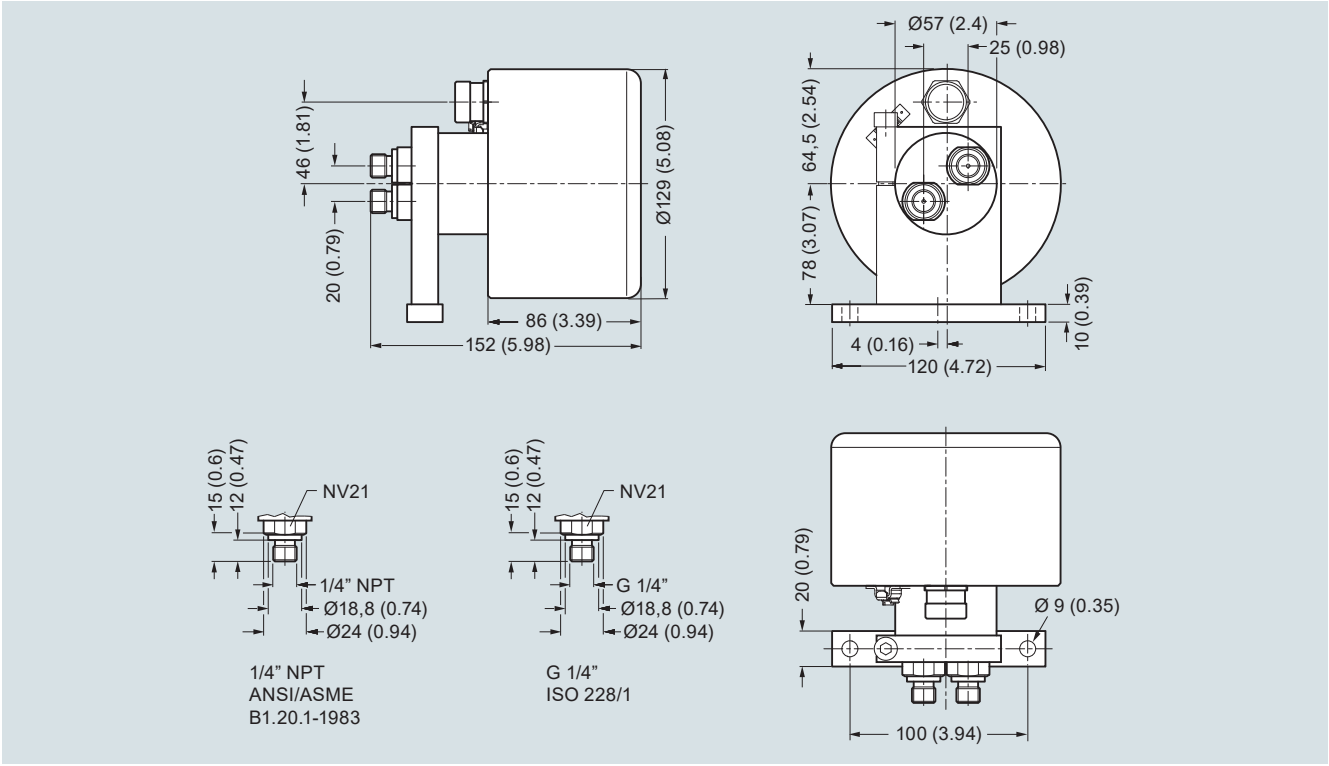


MASS 2100 DI 1.5 (1/16"), pressure drop for density = 1000 kg/m^3

SITRANS F C sensor MASS 2100 DI 1,5 with SITRANS FCT010, FCT030 and SIFLOW FC070 transmitter

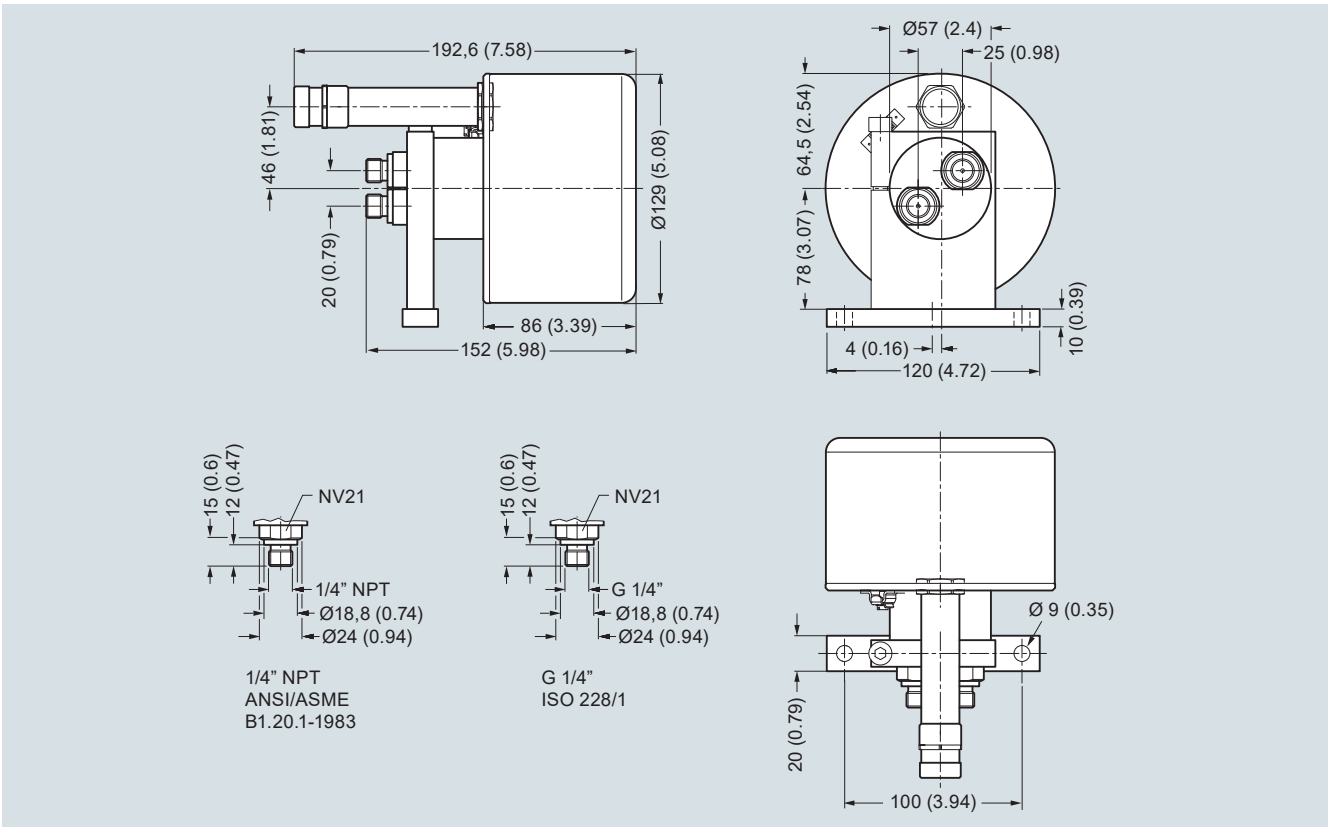
Dimensional drawings

MASS 2100 DI 1.5 (1/16“)



Dimensions in mm (inch)

MASS 2100 DI 1.5 High-temperature version to 180 °C (356 °F)



Dimensions in mm (inch)

SITRANS F C sensor FC300 DN 4 with SITRANS FCT010, FCT030 and SIFLOW FC070 transmitter

Overview

SITRANS FC300 is a compact Coriolis mass sensor suitable for flow measurement of a variety of liquids and gases.

The sensor offers superior performance in terms of flow accuracy, turn-down ratio and density accuracy. The ease of installation through a „plug & play“ interface ensures optimum performance and operation.

A new designed encapsulation in stainless steel with a surprisingly low weight of only 3.5 kg (7.7 lb), ensures a rigid and robust sensor performance for a wide range of applications.

Benefits

- High accuracy better than 0.1 % of mass flow rate
- Large dynamic turn-down ratio better than 500:1
- Densitometer performance available through a density accuracy as follows:
  - For 316L/1.4404 version better than 0.007 g/cm^3 (0.00025 lb/inch^3) with repeatability better than 0.0002 g/cm^3 (0.0000072 lb/inch^3)
  - For C22/2.4602 version better than 0.0025 g/cm^3 (0.000090 lb/inch^3) with repeatability better than 0.0002 g/cm^3 (0.0000072 lb/inch^3)
- One tube without internal welds, reductions or flow splitters offers optimal hygiene, safety and CIP cleanability for food and beverage and pharmaceutical applications
- Larger wall thickness, ensures optimal life-time and corrosion resistance and high-pressure durability
- Balanced pipe design with little mechanical energy loss, ensures optimal performance and stability under non-ideal and unstable process conditions (pressure, temperature, density-changes etc.).
- 4-wire Pt1000 temperature measurement ensures optimum accuracy on mass flow, density and fraction flow
- Multi-plug electrical connector and SENSORPROM enable true „plug & play“. Installation and commissioning in less than 10 minutes.
- Intrinsically safe Ex design ia IIC as standard
- Sensor pipe available in high-quality stainless steel AISI 316L/1.4435 or Hastelloy C22/2.4602 offering optimum corrosion resistance.
- Rugged and space-saving sensor design in stainless steel matching all applications.
- High-pressure program as standard
- The sensor calibration factor is also valid for gas measurement.

Application

The industry today has an increasing demand for mass flowmeters with a reduced physical size without loss of performance. The meters must be suitable for installation in traditional process industry environment as well as OEM equipment for instance within automotive or appliance industry. Independent of industry application the meter must deliver accurate and reliable measurements. The new and versatile design of the FC300 offers this flexibility.

The main applications for the SITRANS FC300 DN 4 can be found in:	
Chemical industry	Liquid and gas measurement in normal as well as corrosive environments
Cosmetic industry	Dosing of essence and fragrances
Pharmaceutical industry	High-speed dosing and coating of pills, filling of ampuls/injectors
Food and beverage industry	Filling, dosing of flavorings, colors and additives, inline density measurement Measurement and dosing of liquid or gaseous CO_2
Automotive industry	Fuel injection nozzle and pump testing, filling of AC units, engine consumption, paint robots, ABS test-beds

Design

The FC300 sensor consists of a single tube bent in double omega pipe geometry, welded directly to the process connectors at each end. The sensor is available in 2 material configurations, AISI 316L/1.4404 or Hastelloy C22/2.4602 with ¼”-NPT or G¼”-ISO process connections.

The enclosure is made of stainless steel AISI 316L/1.4409 with a grade of encapsulation of IP67/NEMA 4. The enclosure has a very robust design and with an overall size of 130 x 200 x 60 mm (5.12“ x 7.87“ x 2.36“) the sensor is very compact and requires only little installation space.

The sensor can be delivered in a standard version with a maximum liquid temperature of 115 °C (239 °F) or a high-temperature version, with raised electrical connector for 180 °C (356 °F).

The sensor can be installed in horizontal or vertical position. The sensor can be mounted directly on any given plane surface or if desired with the enclosed quick release clamp fitting which, along with its compact design and multi-plug electrical connector, will keep installation costs and time to a minimum.

Function

The measuring principle is based on the Coriolis effect. See “System information SITRANS F C Coriolis mass flowmeters”.

Integration

The sensor can be connected to all FCT010, FCT030, SIFLOW and MASS 6000 (non CE) transmitters for remote installation only.

All sensors are delivered with a Sensor Flash or SENSORPROM containing all information about calibration data, identity and factory pre-programming of transmitter settings.

SITRANS F C sensor FC300 DN 4 with SITRANS FCT010, FCT030 and SIFLOW FC070 transmitter

Installation guidelines for SITRANS FC300 sensor

Horizontal installation as shown in figure A is recommended with gas or liquid applications.

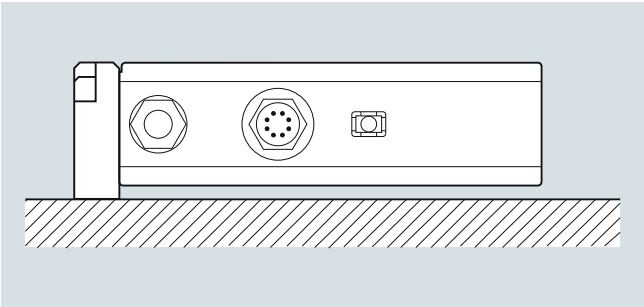
This installation is also recommended when the flow velocity is low (< 1 m/s) or the liquid contains solid particles or air bubbles.

Vertical installation as shown in figure B can be used for liquid or gas applications.

For liquid applications upwards flow is recommended to facilitate the removal of air bubbles and to avoid partly emptying of the sensor.
For gas applications we recommend to place the flow inlet on the sensor high and the outlet low to remove impurities and oil films.

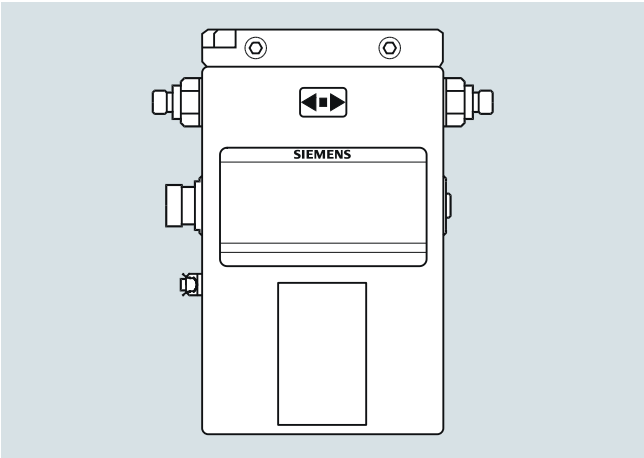
- To ensure that the sensor does not become partly empty, there must be a sufficient counter-pressure on the unit min. 0.2 bar (2.9 psi).
- Mount the sensor on a vibration-free and plane wall or steel frame.
- Locate the sensor low in the system in order to avoid underpressure in the sensor separating air/gas in the liquid.
- Ensure that the sensor is not emptied of liquid (during normal operation) otherwise incorrect measurement will occur.

Horizontal mounting (recommended) (fig. A)



Liquid or gas (low to high flow)

Vertical mounting (fig. B)



Liquid or gas (medium to high flow)

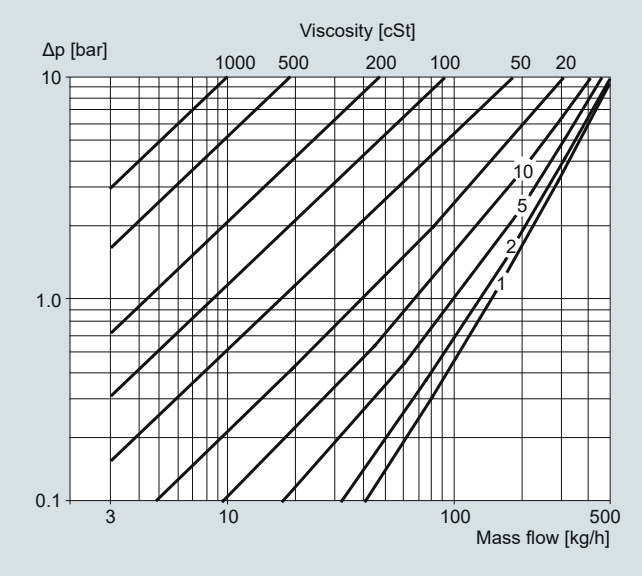
Technical specifications

Sensor size	DN 4 (1/6“)
Mass flow	
Measuring range	0 ... 350 kg/h (0 ... 772 lb/h)
Accuracy, mass flow	0.1 % of rate
Repeatability	0.05 % of rate
Max. zero point error	0.010 kg/h (0.022 lb/h)
Density	
Density range	0 ... 2.9 g/cm^3 (0 ... 0.105 lb/inch^3)
Density error	
• Stainless steel	0.007 g/cm^3 (0.00025 lb/inch^3)
• Hastelloy C22/2.4602	0.0025 g/cm^3 (0.00009 lb/inch^3)
Repeatability error	0.0002 g/cm^3 (0.0000072 lb/inch^3)
Media temperature	
Standard	-40 ... +115 °C (-40 ... +239 °F)
High-temperature version	-40 ... +180 °C (-40 ... +356 °F)
Temperature error	0.5 °C (0.9 °F)
Ambient temperature	-20 ... +50 °C (-4 ... +122 °F)
Brix	
Measuring range	0 ... 100 °Brix
Brix error	0.3 °Brix
Inside pipe diameter	
Stainless steel version	3.5 mm (0.14“)
Hastelloy version	3.0 mm (0.12“)
Pipe wall thickness	
Stainless steel version	0.25 mm (0.0098“)
Hastelloy version	0.5 mm (0.0196“)
Liquid pressure measuring pipe[1)]	
Stainless steel	130 bar (1885 psi) at 20 °C (68 °F)
Hastelloy C22/2.4602	410 bar (5945 psi) at 20 °C (68 °F)
Materials	Stainless steel AISI 316L/1.4435
Measuring pipe and connection	Hastelloy C22/2.4602
Enclosure[2)]	
Material	Stainless steel AISI 316L/1.4404
Enclosure grade	IP67/NEMA4
Connection thread	
ISO 228/1	G¼” male
ANSI/ASME B1.20.1	¼” NPT male
Ex approval	Ex ia IIC T3-T6 05ATEX138072X EAC Ex TC RU C–DE.MIO62.B.02013 0Ex ia IIC T3…T6 Gb c-UL-us Class 1 Div. 1, Gr. A, B, C, D
Weight	3.5 kg (7.7 lb)
Dimensions	135 x 205 x 58 mm (5.31“ x 8.07“ x 2.28“)

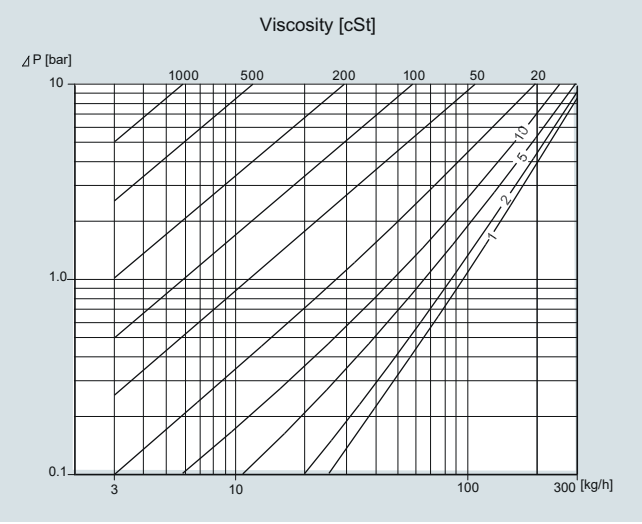
1) According to DIN 2413, DIN 17457
2) Housing is not rated for pressure containment.

Characteristic curves

Pressure drop



Stainless steel 316L/1.4404

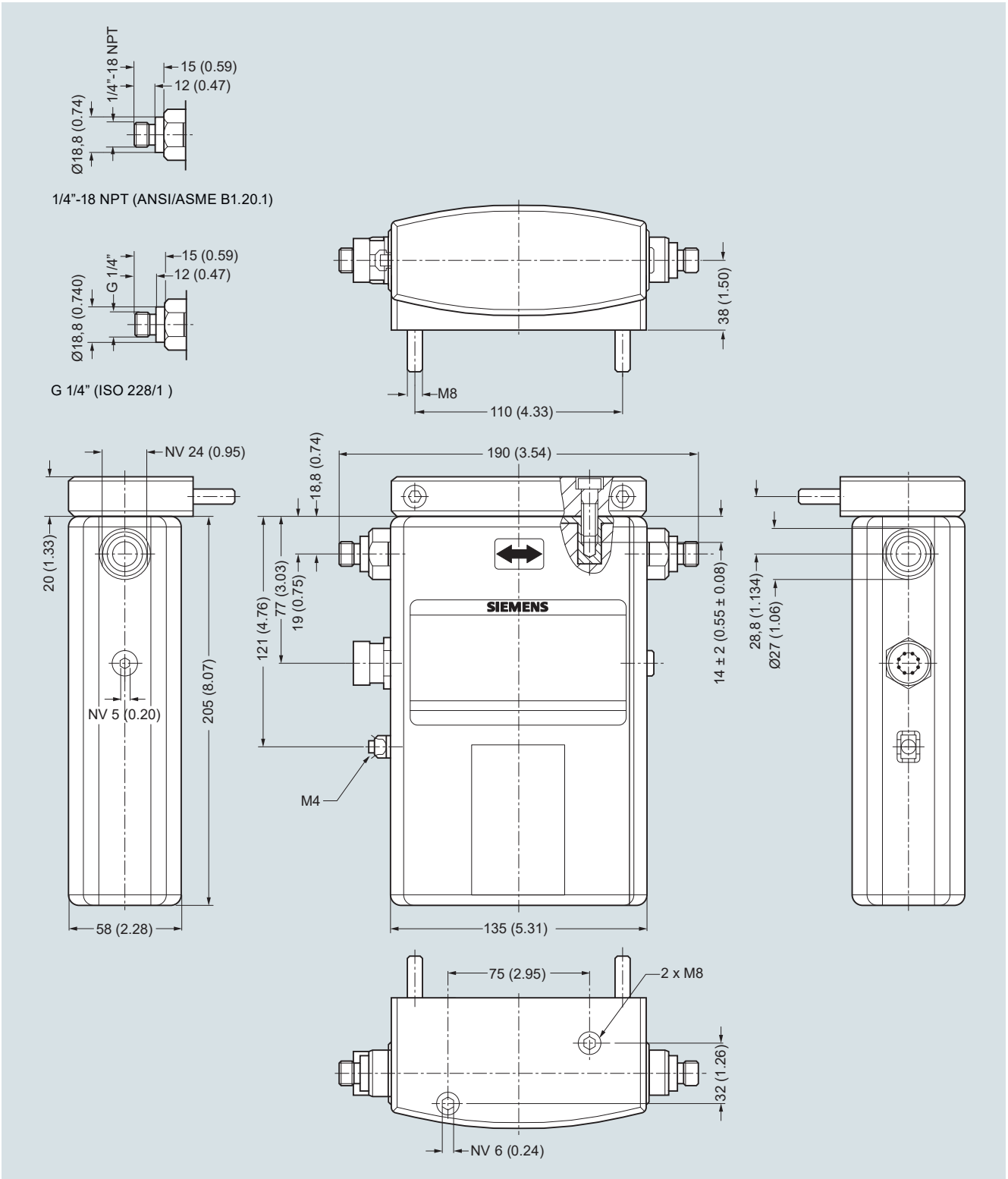


Hastelloy C22/2.4602

3

Dimensional drawings

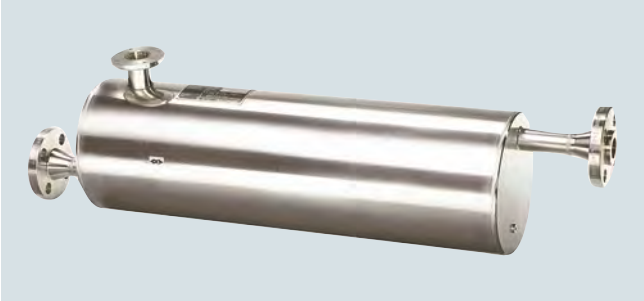
SITRANS FC300 DN 4



SITRANS FC300, dimensions in mm (inch)

SITRANS F C sensor MASS 2100 DI 3, DI 6 and DI 15 with SITRANS FCT010, FCT030 and SIFLOW FC070 transmitter

Overview



MASS 2100 DI 3 to DI 15 is suitable for accurate mass flow measurement of a variety of liquids and gases.

The sensor offers superior performance in terms of flow accuracy, turn-down ratio and density accuracy. The ease of installation through a "plug & play" mechanical and electrical interface ensures optimum performance and operation.

The sensor delivers true multi-parameter measurements i.e.: Mass flow, volume flow, density, temperature and fraction.

Benefits

- High accuracy better than 0.1 % of mass flow rate
- Large dynamic turn-down ratio better than 500:1
- Densitometer performance available through density accuracy (depending upon sensor size) ranging from 0.0005 to 0.0015 g/cm^3 with a typical repeatability better than 0.0001 to 0.0002 g/cm^3
- Single continuous tube design, with no internal welds, reductions or flow splitters offers optimal hygiene, safety and CIP cleanability for food and beverage and pharmaceutical applications
- Markets' thickest sensor walls ensure optimal life-time and corrosion resistance and high-pressure durability
- Full bore design provides lower pressure loss due to same internal diameter throughout the entire sensor
- Balanced pipe design with little mechanical energy loss, ensures optimal performance and stability under non-ideal and unstable process conditions (pressure, temperature, density changes etc.)
- 4-wire Pt1000 temperature measurement ensures optimum accuracy on mass flow, density and fraction flow
- Multi-plug electrical connector and Sensor Flash/ SENSORPROM enables true "plug & play". Installation and commissioning in less than 10 minutes
- Intrinsically safe Ex design ia IIC as standard, making service in hazardous area possible without having to demount the sensor if a compact Ex d transmitter needs service
- Sensor pipe available in high-quality stainless steel AISI 316L/1.4435 or Hastelloy C22/2.4602 offering optimum corrosion resistance
- Centre-block design decouples process noise from the environment such as vibrations, pulsations, pressure shocks etc. making installation flexible and versatile
- Rugged and space-saving sensor design in stainless steel matching all environments
- High-pressure program as standard
- The sensor calibration factor is also valid for gas measurement
- Uniform sensor interface matching all transmitter versions at the same time whether it is compact IP67/NEMA 6, compact Ex d or remote installation, one sensor fits all

Application

Coriolis mass flowmeters are suitable for measuring all liquids and gases. The measurement is independent of changes in process conditions/parameters such as temperature, density, pressure, viscosity, conductivity and flow profile.

Due to this versatility the meter is easy to install and the Coriolis flowmeter is recognized for its high accuracy in a wide turn-down ratio which is a paramount in many applications.

The main applications of the Coriolis flowmeter can be found in all industries, such as:	
Chemical and pharma	Detergents, bulk chemicals, pharmaceuticals, acids, alkalis
Food and beverage	Dairy products, beer, wine, soft-drinks, Brix/Plato, fruit juices and pulps, bottling, CO_2 dosing, CIP-liquids
Automotive	Fuel injection nozzle and pump testing, filling of AC units, engine consumption, paint robots
Oil and gas	Filling of gas bottles, furnace control, test separators, LPG
Water and waste water	Dosing of chemicals for water treatment

The wide varity of combinations and versions from the modular system means that ideal adaptation is possible to each measuring task.

Design

The MASS 2100 sensor consists of a single bent tube in a double bent pipe configuration, welded directly to the process connectors at each end.
The centre-block is brazed onto the sensor pipes from the outside acting as a mechanical low pass filter.

The sensor is available in 2 material configurations, AISI 316L/1.4404 or Hastelloy C22/2.4602 with a wide variety of process connections.

The enclosure is made in stainless steel AISI 316L/1.4404 with a grade of encapsulation of IP67.

The sensor is as standard Ex ia approved, intrinsically safe.

The sensor can be installed in horizontal or vertical position. In horizontal position the sensor is self draining.

Heating: All the sensors MASS 2100, DI 3 to DI 15, can optionally be equipped with a heating coil to avoid solidification of sensitive fluids during down-time or period between discontinuing processes. This feature gives the user an alternative to the costly electrical heating normally used, as it gives the freedom to choose either hot water, superheated steam or hot oil, to maintain a constant temperature inside the sensor.

SITRANS F C sensor MASS 2100 DI 3, DI 6 and DI 15 with SITRANS FCT010, FCT030 and SIFLOW FC070 transmitter

Function

The measuring principle is based on the Coriolis effect. See "System information SITRANS F C Coriolis mass flowmeters".

Integration

The sensor can be connected to FCT010, FCT030 and MASS 6000 (none CE) transmitters for compact and remote installation as well as SIFLOW FC070 standard and Ex type transmitters.

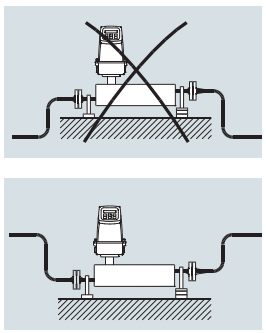
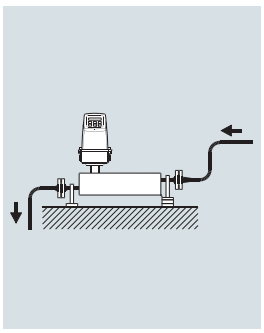
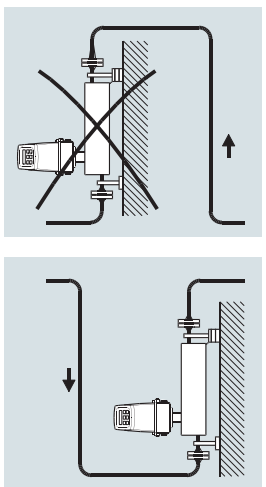
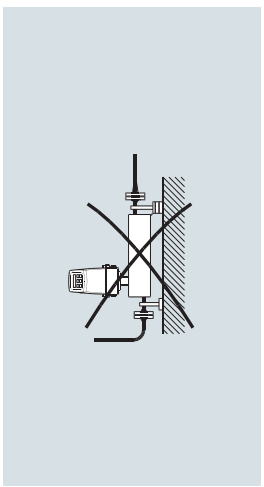
All sensors are delivered with a Sensor Flash or SENSORPROM containing all information about calibration data, identity and factory pre-programming of transmitter settings.

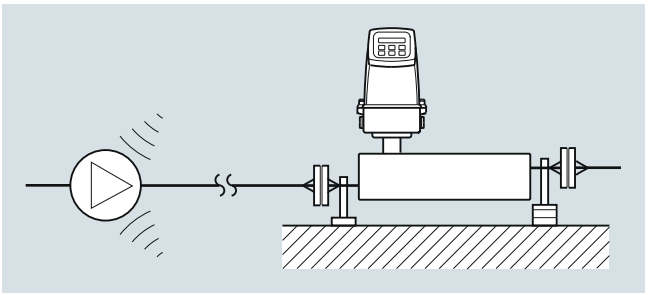
Installation guidelines MASS 2100 DI 3 ... DI 15 (1/8" ... ½")

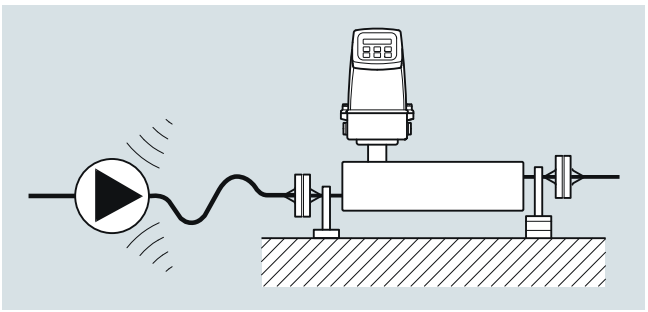
Installation of sensor

In order to perform according to given specifications for flow and density accuracy, the sensor must be installed using rigid mounting brackets as shown in the installation examples.

If the liquid is volatile or contains solid particles, vertical mounting is not recommended.

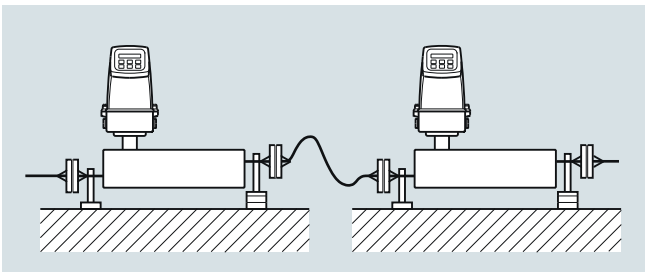
	Liquid	Gas
Horizontal		
Vertical		





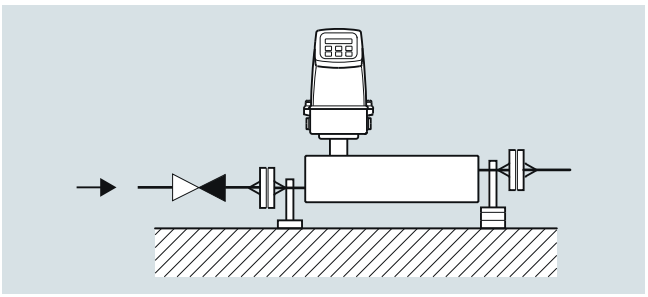
Vibration

Always locate the flowmeter as far away as possible from components that generate mechanical vibration in the piping.



Cross talk

Cross talk between sensors mounted close to each other may disturb the measurement. To avoid cross talk never mount more than one meter on each frame and mount flexible hose connections between the sensors as shown.



Zero point adjustment

To facilitiate zero point adjustment a shut-off valve should always be mounted in connection with the sensor as a proper zero point setting is essential for a good accuarcy.

SITRANS F C sensor MASS 2100 DI 3, DI 6 and DI 15 with SITRANS FCT010, FCT030 and SIFLOW FC070 transmitter

Technical specifications

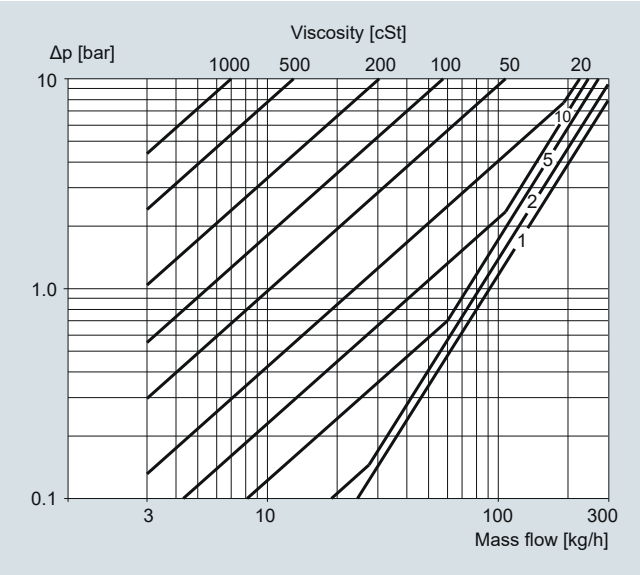
Versions (mm (inch))		**DI 3 (1/8)**	**DI 6 (¼)**	**DI 15 (5/8)**
Inside pipe diameter (sensor consists of one continuous pipe)	mm (inch)	3.0 (0.12)	6.0 (0.24)	14.0 (0.55)
Pipe wall thickness	mm (inch)	0.5 (0.02)	1.0 (0.04)	1.0 (0.04)
Mass flow measuring range (liquids)	kg/h (lb/h)	0 ... 250 (0 ... 550)	0 ... 1000 (0 ... 2200)	0 ... 5600 (0 ... 12345)
Density	g/cm^3 (lb/inch^3)	0 ... 2.9 (0 ... 0.10)		
Fraction e.g.	°Brix	0 ... 70 (applicable temperature range: 10 ... 99 °C (50 ... 210.2 °F))		
Temperature				
Media temperature	°C (°F)	-50 ... +180 °C (-58 ... +356 °F)		
Ambient temperature	°C (°F)	-20 ... +50 °C (-4 ... +122 °F)		
Liquid pressure measuring pipe[1]				
Stainless steel	bar (psi)	230 (3336)	265 (3844)	130 (1885)
Hastelloy C22/2.4602	bar (psi)	350 (5076)	410 (5946)	200 (2900)
Materials				
Measuring pipe, flange and thread connection		Stainless steel AISI 316L/1.4435 Hastelloy C22/2.4602		
Enclosure and enclosure material		IP67 (NEMA 4) and stainless steel AISI 316L/1.4404, **The housing is not rated for pressure containment**		
Process connections[2]				
Flange				
EN 1092-1, PN 40			DN 10	DN 15
ANSI B16.5, Class 150			½"	½"
ANSI B16.5, Class 600 (Class 300)			½"	½"
Dairy screwed connection (PN 16/25/40)[3]				
DIN 11851			DN 10	DN 15
ISO 2853/BS 4825 part 4 (SS3351)			25 mm	25 mm
Dairy clamp connection (PN 16)[3]				
ISO 2852/BS 4825 part 3 (SMS3016)			25 mm	25 mm
Thread				
ISO 228/1, PN 100		G¼" female	G¼" male	G½" male
ANSI/ASME B1.20.1, PN 100		¼" NPT female	¼" NPT male	½" NPT male
Cable connection		Multiple plug connection to sensor 5 x 2 x 0.35 mm^2 twisted and screened in pairs, ext. Ø 12 mm		
Ex-version				
ATEX, EAC Ex, c-UL-us		Zone 0: Ex ia IIC T3...T6 Ga		
UL (c-UL-us)		Class I, Div. 1: Grp. A, B, C, D		
Weight approx.	kg (lb)	4 (8.8)	8 (17.6)	12 (26.5)

1) Max. at 20 °C (68 °F), DIN 2413, DIN 17457
2) Other connections to order, see "Selection and Ordering data"
3) Material, AISI 316/1.4401 or corresponding

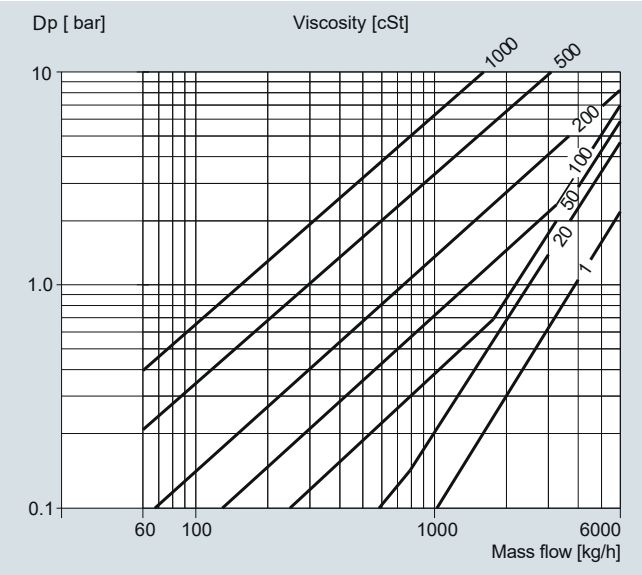
For accuracy specification see "System information SITRANS F C".

SITRANS F C sensor MASS 2100 DI 3, DI 6 and DI 15 with SITRANS FCT010, FCT030 and SIFLOW FC070 transmitter

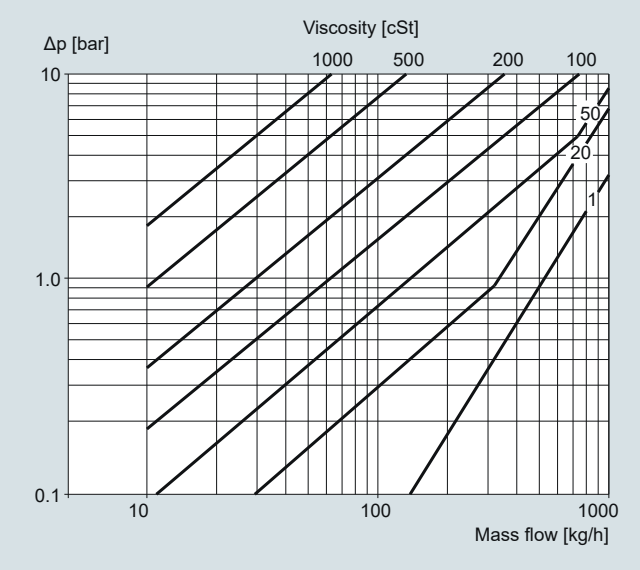
Pressure drop



MASS 2100 DI 3 (1/8"), pressure drop for density = 1000 kg/m^3



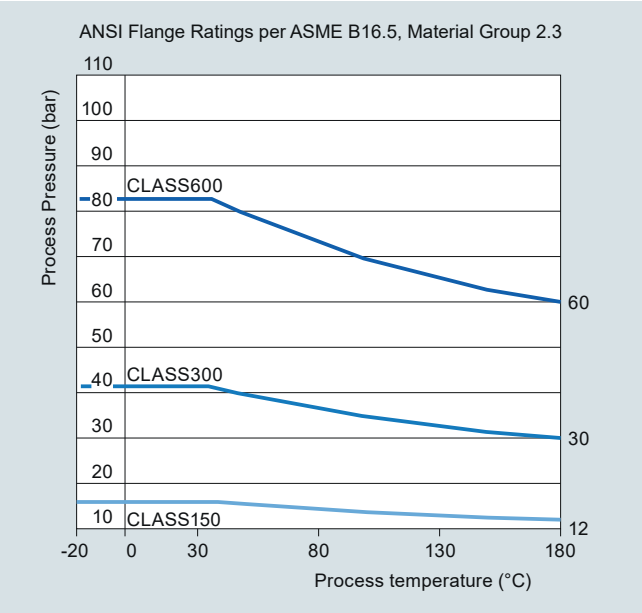
MASS 2100 DI 15 (½"), pressure drop for density = 1000 kg/m^3



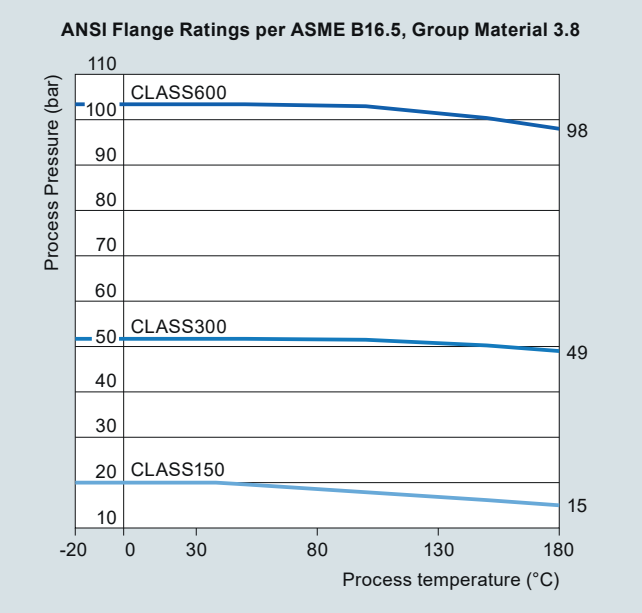
MASS 2100 DI 6 (¼"), pressure drop for density = 1000 kg/m^3

SITRANS F C sensor MASS 2100 DI 3, DI 6 and DI 15 with SITRANS FCT010, FCT030 and SIFLOW FC070 transmitter

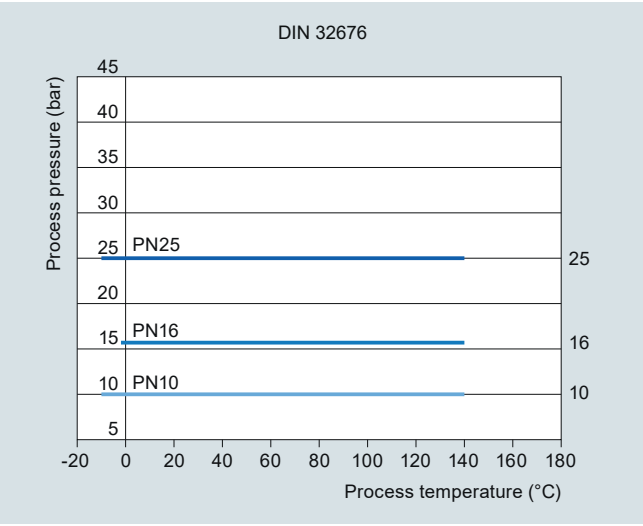
Pressure/temperature curves



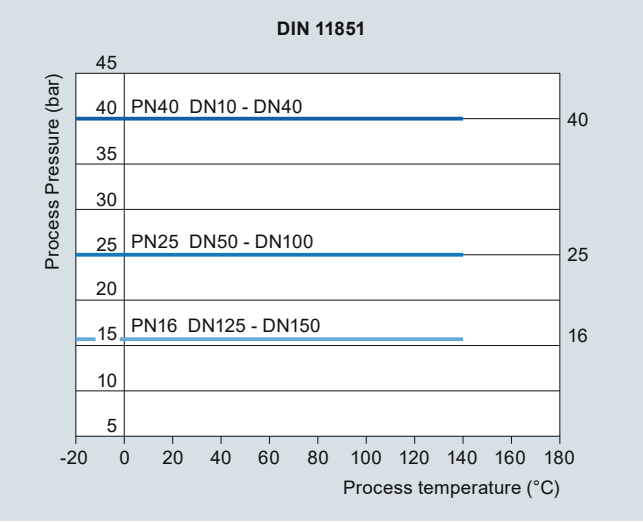
ASME flanges B16.5 stainless steel



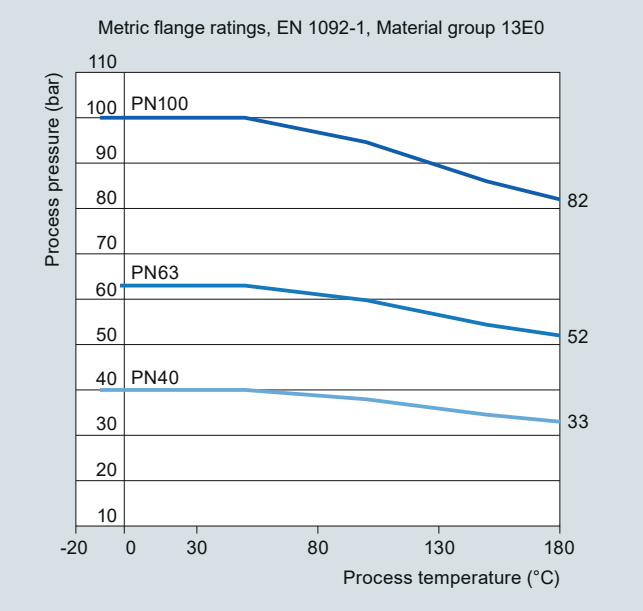
ASME flanges B16.5 Hastelloy C22/2.4602



DIN 32676 flanges stainless steel (PN 10 ... PN 25)

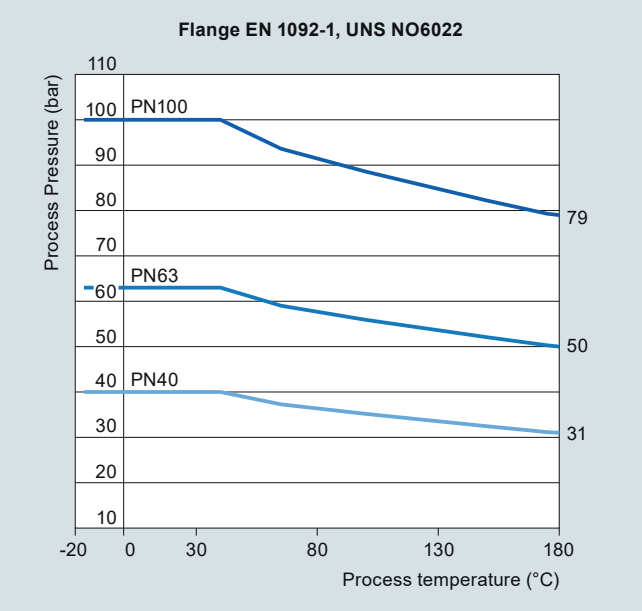


DIN 11581 flanges stainless steel (PN 25 ... PN 40)

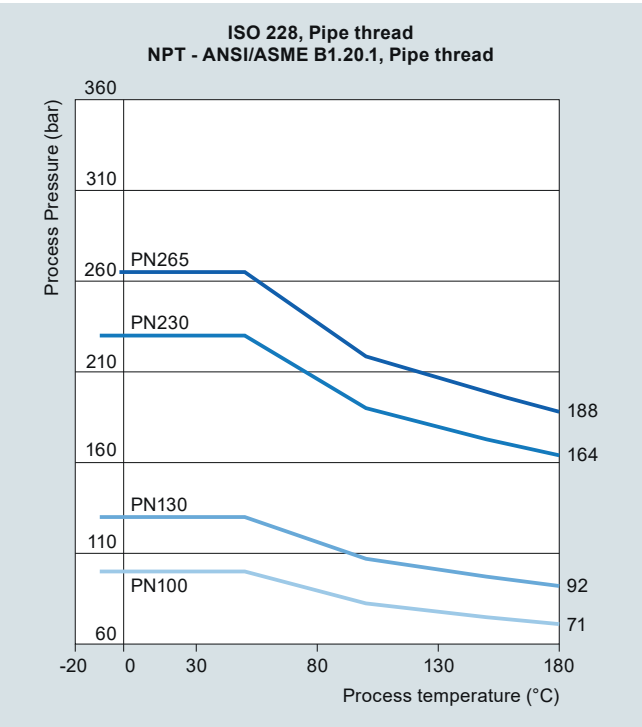


EN 1092 flanges stainless steel (PN 40 ... PN 100)

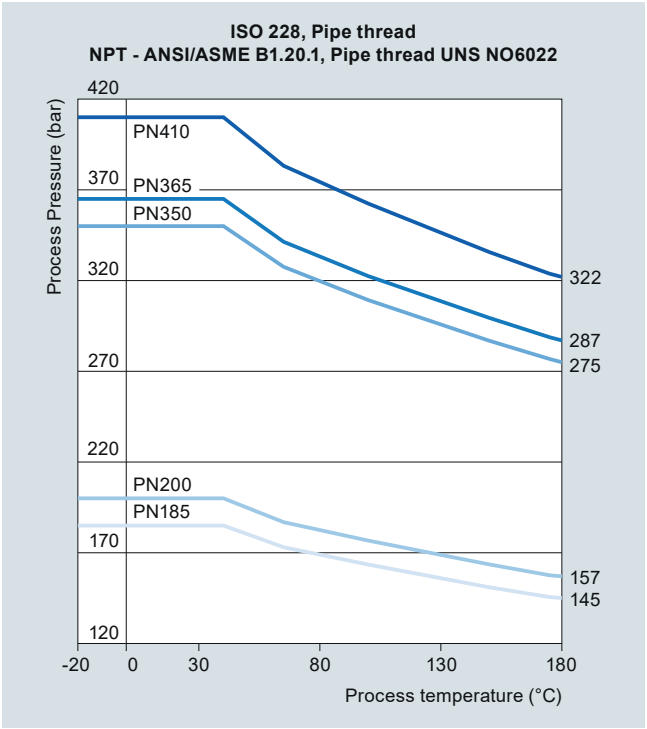
SITRANS F C sensor MASS 2100 DI 3, DI 6 and DI 15 with SITRANS FCT010, FCT030 and SIFLOW FC070 transmitter



EN 1092 flanges Hastelloy C22/2.4602 (PN 40 ... PN 100)



ISO 228 and NPT pipe thread stainless steel (PN 100 ... PN 265)

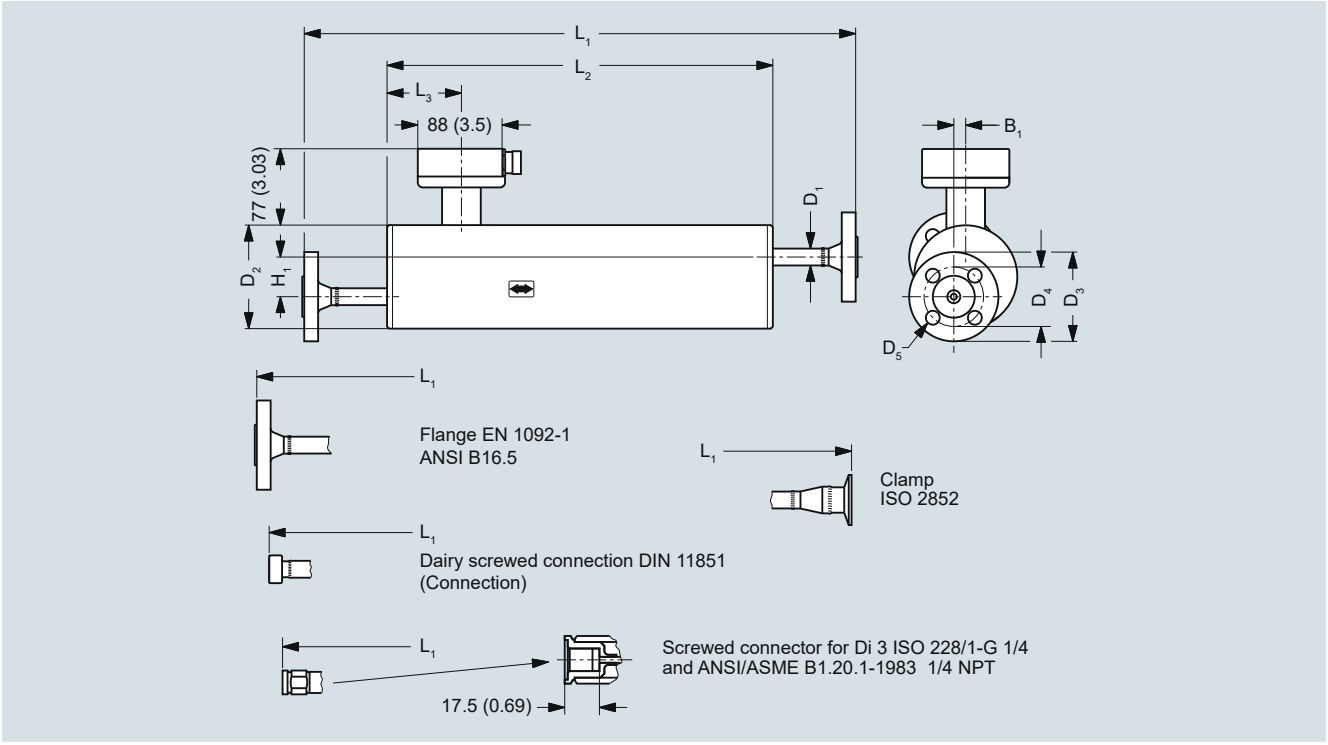


ISO 218 and NPT pipe thread stainless steel (PN 185 ... PN 410)

For further information on the PED standard and requirements, see page 10/15.

Dimensional drawings

MASS 2100 sensor for analog cable connection



Dimension in mm (inch)

For not listed variants please contact product support

Sensor size	Connections			L1 mm	L2 mm	L3 mm	H1 mm	B1 mm	D1 mm	D2 mm	D3 mm	D4 mm	D5 mm
DI (inch)	Type	Pressure rating	Size										
DI 3	Pipe thread ISO 228/1 - G¼	PN 100	¼"	400	280	75.5	60	0	21.3	104	-	-	-
(1/8)	Pipe thread ANSI/ASME B 1.20.1 - ¼" NPT	PN 100	¼"	400	280	75.5	60	0	21.3	104	-	-	-
DI 6	Flange EN 1092-1	PN 100	DN 10	580	390	62.0	40	12	17.0	104	100	70.0	14.0
(¼)	Flange EN 1092-1	PN 40	DN 10	560	390	62.0	40	12	17.0	104	90.0	60.0	14.0
	Flange ANSI B16.5	Class 150	½"	624	390	62.0	40	12	17.0	104	88.9	60.5	15.7
	Flange ANSI B16.5	Class 600	½"	608	390	62.0	40	12	17.0	104	95.3	66.5	15.7
	Screwed connection DIN 11851	PN 40	DN 10	532	390	62.0	40	12	17.0	104	-	-	-
	Clamp ISO 2852	PN 16	25 mm	570	390	62.0	40	12	17.0	104	-	-	-
DI 15	Flange EN 1092-1	PN 100	DN 15	634	444	75.5	44	20	21.3	129	105	75.0	14.0
(½)	Flange EN 1092-1	PN 40	DN 15	620	444	75.5	44	20	21.3	129	95.0	65.0	14.0
	Flange ANSI B16.5	Class 150	½"	639	444	75.5	44	20	21.3	129	88.9	60.5	15.7
	Flange ANSI B16.5	Class 600	½"	660	444	75.5	44	20	21.3	129	95.3	66.5	15.7
	Screwed connection DIN 11851	PN 40	DN 15	586	444	75.5	44	20	21.3	129	-	-	-
	Clamp ISO 2852	PN 16	25 mm	624	444	75.5	44	20	21.3	129	-	-	-

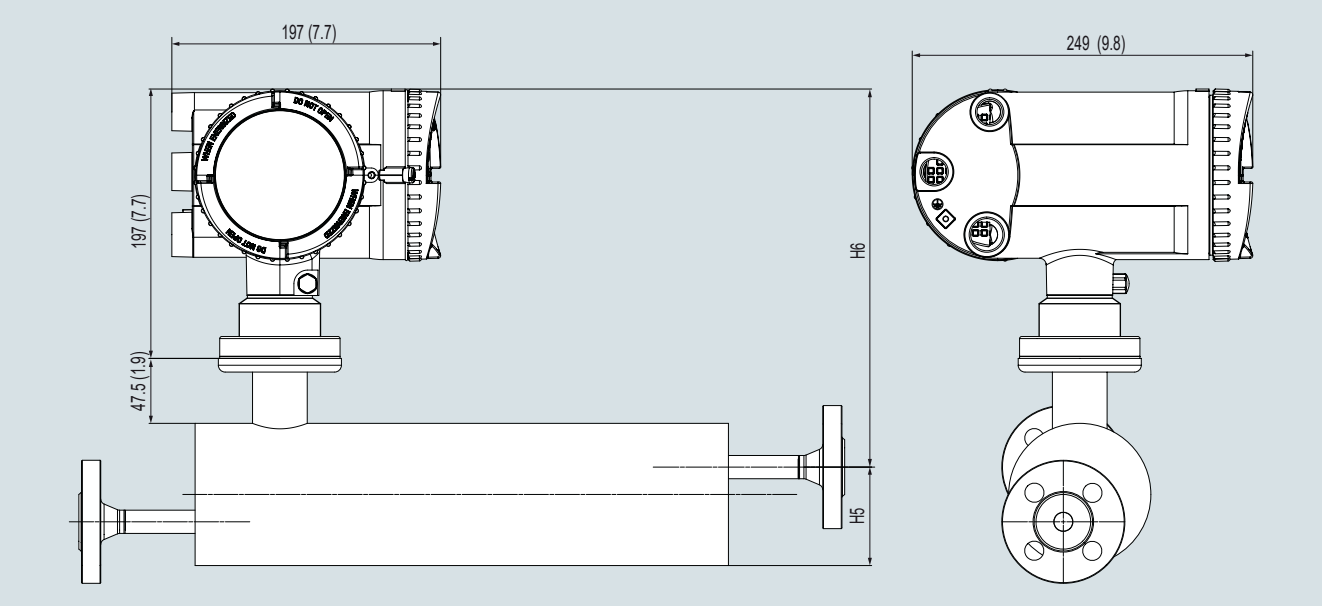
SITRANS F C sensor MASS 2100 DI 3, DI 6 and DI 15 with SITRANS FCT010, FCT030 and SIFLOW FC070 transmitter

For not listed variants please contact product support.

Sensor size	Connections			L1	L2	L3	H1	B1	D1	D2	D3	D4	D5
				inch	inch	inch	inch	inch	inch	inch	inch	inch	inch
DI (inch)	Type	Pressure rating	Size										
DI 3	Pipe thread ISO 228/1 - G¼	PN 100	¼"	15.75	11.02	2.97	2.36	0	0.84	4.09	-	-	-
(1/8)	Pipe thread ANSI/ASME B 1.20.1 - ¼" NPT	PN 100	¼"	15.75	11.02	2.97	2.36	0	0.84	4.09	-	-	-
DI 6	Flange EN 1092-1	PN 100	DN 10	22.83	15.35	2.44	1.57	0.47	0.67	4.09	3.94	2.76	0.55
(¼)	Flange EN 1092-1	PN 40	DN 10	22.05	15.35	2.44	1.57	0.47	0.67	4.09	3.54	2.36	0.55
	Flange ANSI B16.5	Class 150	½"	24.57	15.35	2.44	1.57	0.47	0.67	4.09	3.5	2.38	0.62
	Flange ANSI B16.5	Class 600	½"	23.94	15.35	2.44	1.57	0.47	0.67	4.09	3.75	2.62	0.62
	Screwed connection DIN 11851	PN 40	DN 10	20.94	15.35	2.44	1.57	0.47	0.67	4.09	-	-	-
	Clamp ISO 2852	PN 16	25 mm	22.44	15.35	2.44	1.57	0.47	0.67	4.09	-	-	-
DI 15	Flange EN 1092-1	PN 100	DN 15	24.96	17.48	2.97	1.73	0.79	0.84	5.08	2.95	4.13	0.55
(½)	Flange EN 1092-1	PN 40	DN 15	24.41	17.48	2.97	1.73	0.79	0.84	5.08	3.74	2.56	0.55
	Flange ANSI B16.5	Class 150	½"	25.16	17.48	2.97	1.73	0.79	0.84	5.08	3.5	2.38	0.62
	Flange ANSI B16.5	Class 600	½"	25.98	17.48	2.97	1.73	0.79	0.84	5.08	3.75	2.62	0.62
	Screwed connection DIN 11851	PN 40	DN 15	23.07	17.48	2.97	1.73	0.79	0.84	5.08	-	-	-
	Clamp ISO 2852	PN 16	25 mm	24.57	17.48	2.97	1.73	0.79	0.84	5.08	-	-	-

SITRANS F C sensor MASS 2100 DI 3, DI 6 and DI 15 with SITRANS FCT010, FCT030 and SIFLOW FC070 transmitter

Compact with FCT030

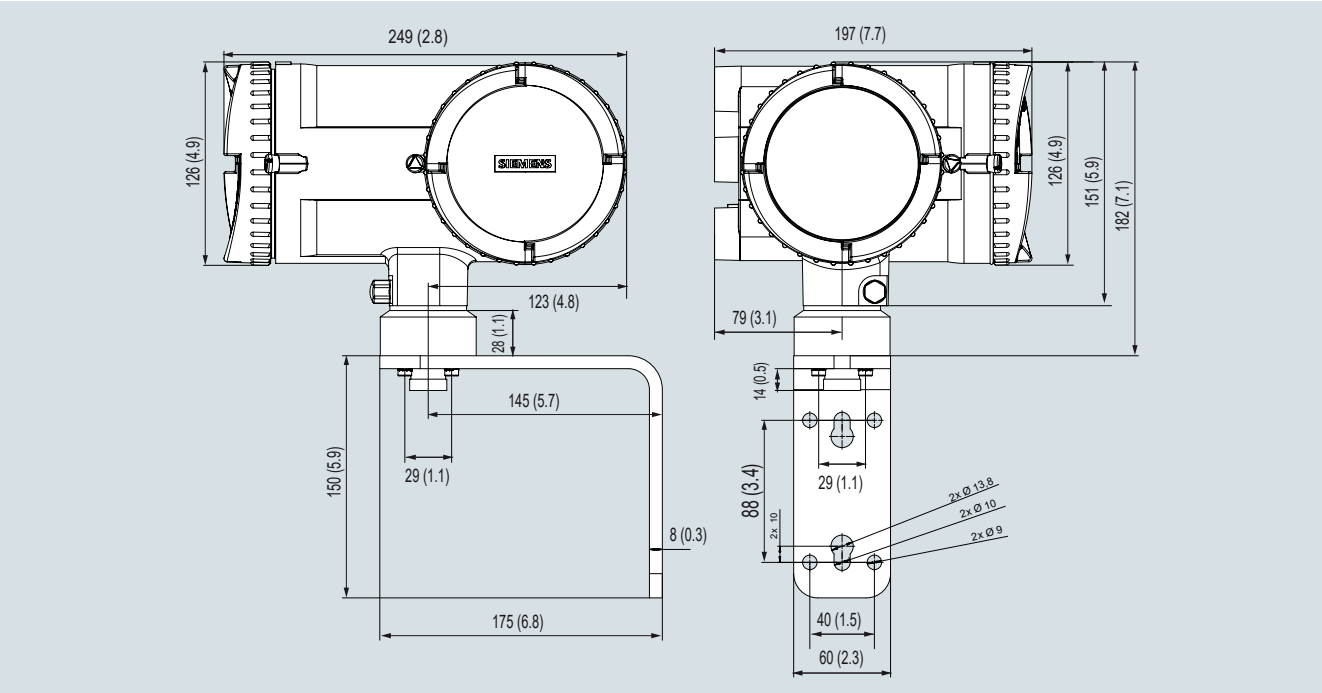


Dimensions in mm (inch)

MASS 2100 with FCT030 transmitter compact

Sensor size [DI (inch)]	L_3 [mm (inch)]	H_5 [mm (inch)]	H_6 [mm (inch)]	$H_5 + H_6$ [mm (inch)]
3 (1/8)	75.5 (2.97)	82 (3.23)	267 (10.51)	349 (13.74)
6 (¼)	62 (2.44)	72 (2.83)	277 (10.91)	349 (13.74)
15 (½)	75.5 (2.97)	86.5 (3.41)	287 (11.3)	373.5 (14.71)

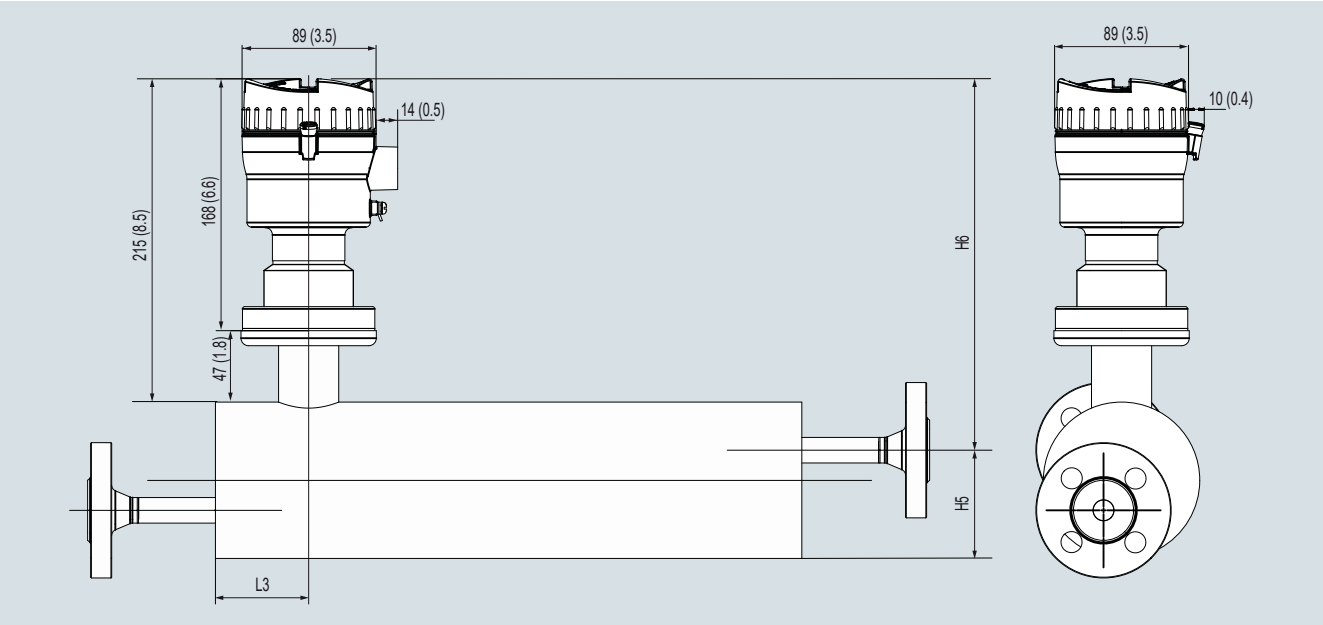
Transmitter FCT030 remote field mount for M20 analog cable connection



Dimensions in mm (inch)

SITRANS F C sensor MASS 2100 DI 3, DI 6 and DI 15 with SITRANS FCT010, FCT030 and SIFLOW FC070 transmitter

Compact with FCT010

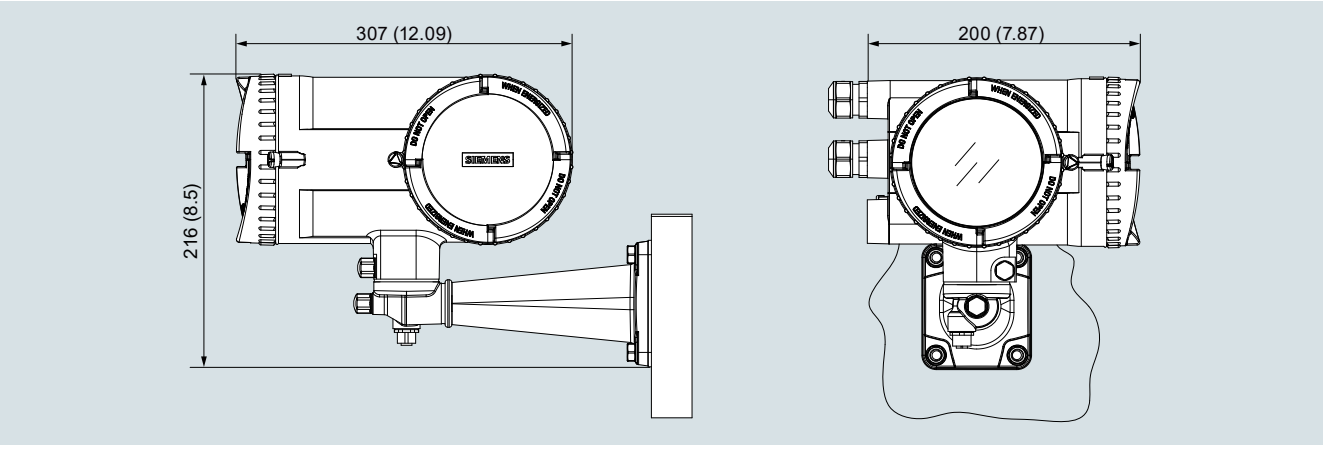


Dimensions in mm (inch)

MASS 2100 with FCT010 transmitter compact

Sensor size [DI (inch)]	L_3 [mm (inch)]	H_5 [mm (inch)]	H_6 [mm (inch)]	$H_5 + H_6$ [mm (inch)]
3 (1/8)	75.5 (2.97)	82 (3.23)	237 (9.33)	319 (12.56)
6 (¼)	62 (2.44)	72 (2.83)	247 (9.72)	319 (12.56)
15 (½)	75.5 (2.97)	86.5 (3.41)	257 (10.11)	343.5 (13.52)

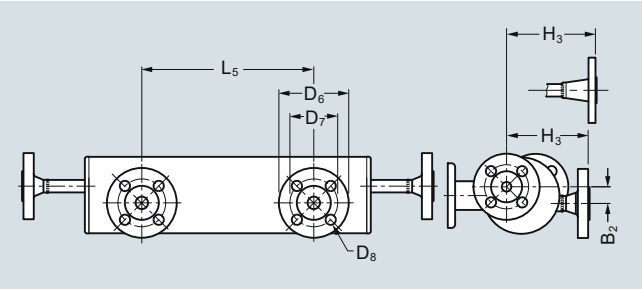
Transmitter FCT030 remote field mount for M12 digital cable connection



Dimensions in mm (inch)

SITRANS F C sensor MASS 2100 DI 3, DI 6 and DI 15 with SITRANS FCT010, FCT030 and SIFLOW FC070 transmitter

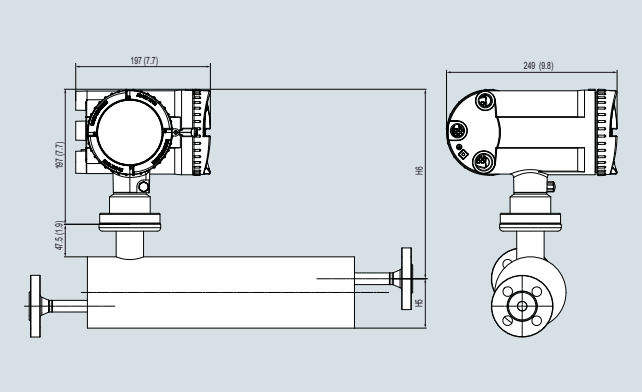
MASS 2100 sensor with “heating jacket”



Dimensions in mm (inch)

Sensor size	Connec-tions heated			L5	H3	B2	D6	D7	D8
DI (inch)	Type	Pressure rating	Size	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)
DI 3 (1/8)	EN 1092-1	PN 40	DN 15	234 (9.21)	122 (4.8)	22 (0.87)	95 (3.74)	65.0 (2.56)	14.0 (0.55)
	ANSI B16.5	Class 150	½"	234 (9.21)	131.6 (5.18)	22 (0.87)	88.9 (3.5)	60.5 (2.38)	15.7 (0.62)
DI 6 (¼)	EN 1092-1	PN 40	DN 15	234 (9.21)	112 (4.41)	22.7 (0.89)	95 (3.74)	65.0 (2.56)	14.0 (0.55)
	ANSI B16.5	Class 150	½"	234 (9.21)	121.6 (4.79)	22.7 (0.89)	88.9 (3.5)	60.5 (2.38)	15.7 (0.62)
DI 15 (½)	EN 1092-1	PN 40	DN 15	234 (9.21)	126.5 (4.98)	31.5 (1.24)	95 (3.74)	65.0 (2.56)	14.0 (0.55)
	ANSI B16.5	Class150	½"	234 (9.21)	136.1 (5.36)	31.5 (1.24)	88.9 (3.5)	60.5 (2.38)	15.7 (0.62)

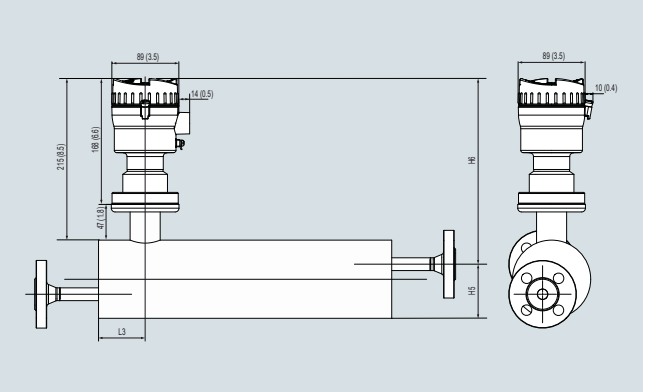
MASS 2100 and FCT030 compact version



MASS 2100 and FCT030 compact version, dimensions in mm (inch)

Sensor size [DI (inch)]	L_3 [mm (inch)]	H_5 [mm (inch)]	H_6 [mm (inch)]	$H_5 + H_6$ [mm (inch)]
3 (1/8)	75.5 (2.97)	82 (3.23)	267 (10.51)	349 (13.74)
6 (¼)	62 (2.44)	72 (2.83)	277 (10.91)	349 (13.74)
15 (½)	75.5 (2.97)	86.5 (3.41)	287 (11.30)	373.5 (14.70)

MASS 2100 and FCT010 compact version

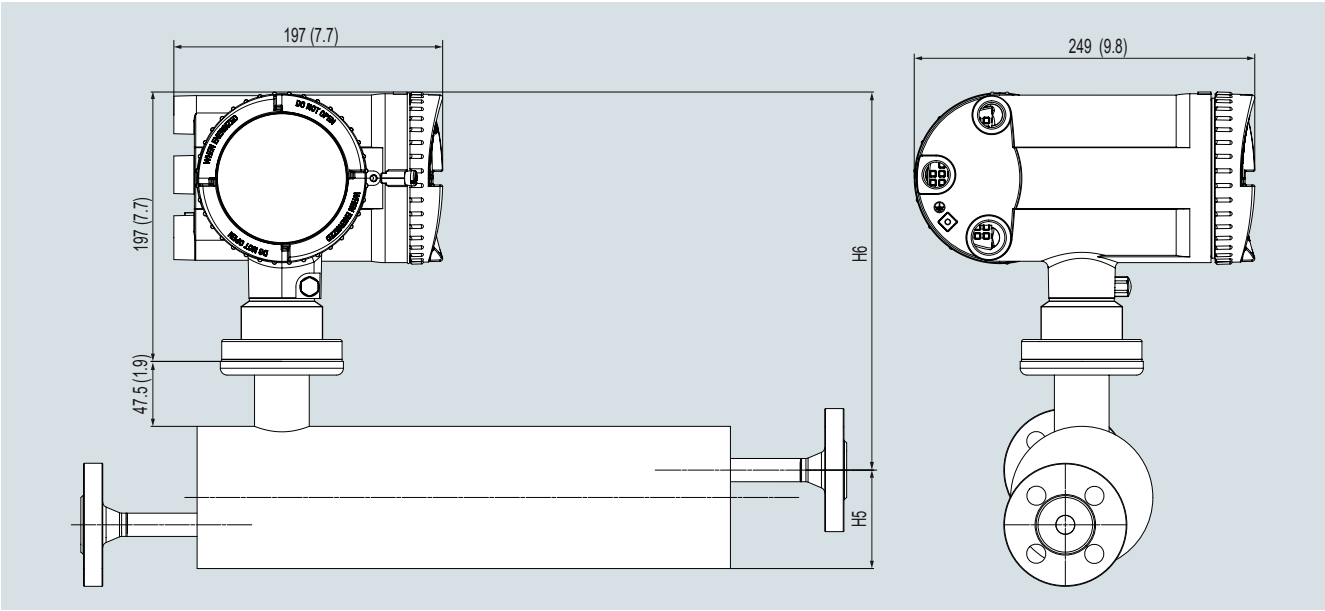


MASS 2100 and FCT010 compact version, dimensions in mm (inch)

Sensor size [DI (inch)]	L_3 [mm (inch)]	H_5 [mm (inch)]	H_6 [mm (inch)]	$H_5 + H_6$ [mm (inch)]
3 (1/8)	75 (2.95)	82 (3.23)	237 (9.33)	319 (12.56)
6 (¼)	62 (2.44)	72 (2.83)	247 (9.72)	319 (12.56)
15 (½)	75 (2.95)	87 (3.43)	257 (10.11)	343.5 (13.52)

SITRANS F C sensor MASS 2100 DI 3, DI 6 and DI 15 with SITRANS FCT010, FCT030 and SIFLOW FC070 transmitter

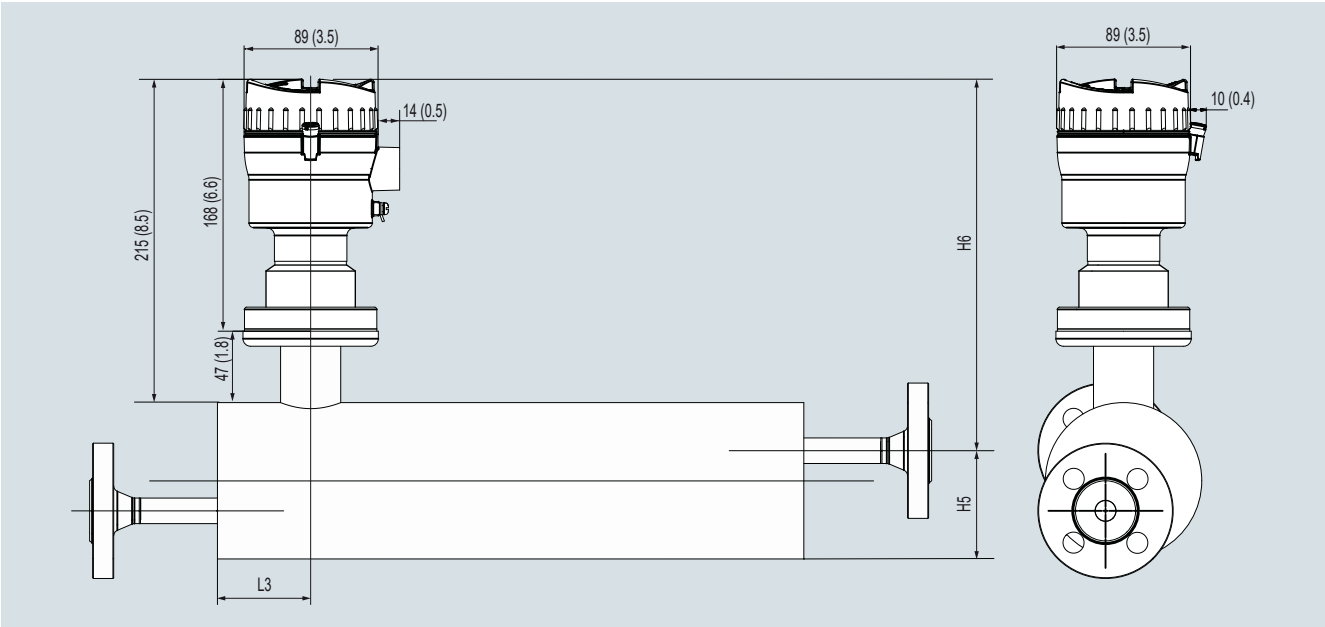
MASS 2100 and FCT030 compact version



MASS 2100 and FCT030 compact version, dimensions in mm (inch)

Sensor size [DI (inch)]	L_3 [mm (inch)]	H_5 [mm (inch)]	H_6 [mm (inch)]	$H_5 + H_6$ [mm (inch)]
3 (1/8)	75.5 (2.97)	82 (3.23)	267 (10.51)	349 (13.74)
6 (¼)	62 (2.44)	72 (2.83)	277 (10.91)	349 (13.74)
15 (½)	75.5 (2.97)	86.5 (3.41)	287 (11.30)	373.5 (14.70)

MASS 2100 and FCT010 compact version



MASS 2100 and FCT010 compact version, dimensions in mm (inch)

Sensor size [DI (inch)]	L_3 [mm (inch)]	H_5 [mm (inch)]	H_6 [mm (inch)]	$H_5 + H_6$ [mm (inch)]
3 (1/8)	75 (2.95)	82 (3.23)	237 (9.33)	319 (12.56)
6 (¼)	62 (2.44)	72 (2.83)	247 (9.72)	319 (12.56)
15 (½)	75 (2.95)	87 (3.43)	257 (10.11)	343.5 (13.52)

SITRANS F C sensors MASS 2100/FC300 with FCT010, FCT030 and SIFLOW FC070 transmitters (Low flow program)

Selection and Ordering data	Article No.	Ord. code
SITRANS F C sensors MASS 2100/FC300 with FCT010 transmitter	7ME4811 -	
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Sensor type and connector size		
MASS 2100 DI 1.5, 1/4"	1 G	
MASS 2100 DI 3, 1/4"	3 A	
MASS 2100 DI 3, 1/4" Heated w. DIN	3 B	
MASS 2100 DI 3,1/4" Heated w. ANSI	3 C	
FC300 DN 4, 1/4"	4 A	
MASS 2100 DI 6, 1/4"	6 A	
MASS 2100 DI 6,1/4" Heated w. EN	6 B	
MASS 2100 DI 6, 1/4" Heated w. ANSI	6 C	
MASS 2100 DI 6, DN 10	6 D	
MASS 2100 DI 6, DN 10 Heated w. EN	6 E	
MASS 2100 DI 6, DN 10 Heated w. ANSI	6 F	
MASS 2100 DI 6, DN 15 (½")	6 G	
MASS 2100 DI 6, DN 15 (½") Heated w. EN	6 H	
MASS 2100 DI 6, DN 15 (½") Heated w. ANSI	6 J	
MASS 2100 DI 6, DN 20 (¾")	6 K	
MASS 2100 DI 6, DN 20 (¾") Heated w. EN	6 L	
MASS 2100 DI 6, DN 20 (¾") Heated w. ANSI	6 M	
MASS 2100 DI 6, DN 25 (1")	6 N	
MASS 2100 DI 6, DN 25 (1") Heated w. EN	6 P	
MASS 2100 DI 6, DN 25 (1") Heated w. ANSI	6 Q	
MASS 2100 DI 15, DN 15 (½")	7 A	
MASS 2100 DI 15, DN 15 (½") Heated w. EN	7 B	
MASS 2100 DI 15, DN 15 (½") Heated w. ANSI	7 C	
MASS 2100 DI 15, DN 20 (¾")	7 D	
MASS 2100 DI 15, DN 20 (¾") Heated w. EN	7 E	
MASS 2100 DI 15, DN 20 (¾") Heated w. ANSI	7 F	
MASS 2100 DI 15, DN 25 (1")	7 G	
MASS 2100 DI 15, DN 25 (1") Heated w. EN	7 H	
MASS 2100 DI 15, DN 25 (1") Heated w. ANSI	7 J	
Process connection/Pressure		
No connections (spare part transmitter)	A 0	
EN1092-1 B1, PN40	A 1	
EN1092-1 B1, PN100	A 3	
ASME B16.5, RF, Class 150	D 1	
ASME B16.5, RF, Class 600	D 3	
DIN 11851 Screwed connection	F 1	
ISO2852 Hyg. Clamped	J 1	
ISO2853 Hyg. Screwed	J 5	
ISO 228-1 Pipe thread, PN 100	C 1	
ISO 228-1 Pipe thread, PN 130	C 2	
ISO 228-1 Pipe thread, PN 200	C 3	
ISO 228-1 Pipe thread, PN 230	C 4	
ISO 228-1 Pipe thread, PN 265	C 5	
ISO 228-1 Pipe thread, PN 350	C 6	
ISO 228-1 Pipe thread, PN 365	C 7	
ISO 228-1 Pipe thread, PN 410	C 8	
NPT ASME B 1.20.1 Pipe thread, PN 100	N 1	
NPT ASME B 1.20.1 Pipe thread, PN 130	N 2	
NPT ASME B 1.20.1 Pipe thread, PN 200	N 3	
NPT ASME B 1.20.1 Pipe thread, PN 230	N 4	
NPT ASME B 1.20.1 Pipe thread, PN 265	N 5	
NPT ASME B 1.20.1 Pipe thread, PN 350	N 6	
NPT ASME B 1.20.1 Pipe thread, PN 365	N 7	
NPT ASME B 1.20.1 Pipe thread, PN 410	N 8	

Selection and Ordering data	Article No.	Ord. code
SITRANS F C sensors MASS 2100/FC300 with FCT010 transmitter	7ME4811 -	
Tube material (wetted) and max. operational temperature		
AISI 316L/EN 1.4435, Max 115 °C	1	
AISI 316L/EN 1.4435, Max 125 °C	2	
AISI 316L/EN 1.4435, Max 180 °C	3	
Hastelloy C22/UNS N06022/EN 2.4602, Max. 115 °C	5	
Hastelloy C22/UNS N06022/EN 2.4602, Max. 125 °C	6	
Hastelloy C22/UNS N06022/EN 2.4602, Max. 180 °C	7	
Calibration		
Mass flow calibration	1	
Mass flow calibration and density calibration	4	
Mounting style, Transmitter Housing and Material		
Compact mounted, IP67, Aluminium transmitter housing (DI 3, DI 6 and DI 15 only)	D	
Remote mounted, IP67, Aluminium transmitter housing, analog cable connection with M20 connectors	Z	P 0 D
Ex approvals		
Non-Ex	A	
ATEX Zone 1	C	
IECEx Zone 1	F	
USA (FM, CSA, UL), Zone 1/Div1	H	
Canada (CSA, UL), Zone 1/Div1	M	
Local User Interface		
Blind	1	

SITRANS F C sensors MASS 2100/FC300 with FCT010, FCT030 and SIFLOW FC070 transmitters (Low flow program)

Selection and Ordering data	Order code
Futher designs	
Please add "**-Z**" to Article No. and specify Order code(s).	
Cable glands	
None (mechanical sensor)	**A00**
Metric, no glands	**A01**
Metric, plastic	**A02**
Metric, brass/Ni plated	**A05**
Metric, stainless steel	**A06**
NPT, no glands	**A11**
NPT, plastic	**A12**
NPT, brass/Ni plated	**A15**
NPT, stainless steel	**A16**
Integral M12 socket	**A20**
SW functions & CT approvals	
Standard	**B11**
I/O configuration Ch1	
Modbus RTU RS 485	**E14**
I/O configuration Ch2, Ch3 and Ch4	
None	**F00**
Certificates	
Press test certificate CRN	**C01**
Press test certificate PED	**C02**
Material certificate EN 10204-3.1	**C12**
Welding inspection report	**C13**
Factory certificate according to EN 10204 2.2	**C14**
Factory certificate according to EN 10204 2.1	**C15**
Cleaning for oil and grease/ASTM-A380	**C50**
Cleaned according to PWIS	**C51**
Sensor data storage	
Sensor with SensorFlash for FCT	**S20**
Sensor with SensorProm for MASS 6000	**S21**
Cable sensor-transmitter	
None	**L50**
5 m, standard, M12 connectors	**L51**
5 m, standard, without connectors	**L52**
10 m, standard, M12 connectors	**L55**
10 m, standard, without connectors	**L56**
25 m, standard, M12 connectors	**L59**
25 m, standard, without connectors	**L60**
50 m, standard, M12 connectors	**L63**
50 m, standard, without connectors	**L64**
75 m, standard, M12 connectors	**L67**
75 m, standard, without connectors	**L68**
2 m cable, analog, with two M20 connectors	**L85**
5 m cable, analog, with two M20 connectors	**L86**
10 m cable, analog, with two M20 connectors	**L87**
15 m cable, analog, with two M20 connectors	**L88**

Selection and Ordering data	Order code
Additional data	
Please add "**-Z**" to Article No. and specify Order code(s) and plain text.	
Tag name	
Tag name plate, stainless steel	**Y17**
Extended calibration	
Multi-point high, (5 flows x 2 passes), 10 ... 100 % of Q_{nom}	**Y61**
Multi-point high, (10 flows x 1 pass), 10 ... 100 % of Q_{nom}	**Y63**

SITRANS F C sensors MASS 2100/FC300 with FCT010, FCT030 and SIFLOW FC070 transmitters (Low flow program)

Selection and Ordering data	Article No.	Ord. code
SITRANS F C sensors MASS 2100/FC300 with FCT030 transmitter	7ME4813 -	
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Sensor type and connector size		
MASS 2100 DI 1.5, 1/4"	1G	
MASS 2100 DI 3, 1/4"	3A	
MASS 2100 DI 3, 1/4" Heated w. DIN	3B	
MASS 2100 DI 3,1/4" Heated w. ANSI	3C	
FC300 DN 4, 1/4"	4A	
MASS 2100 DI 6, 1/4"	6A	
MASS 2100 DI 6,1/4" Heated w. EN	6B	
MASS 2100 DI 6, 1/4" Heated w. ANSI	6C	
MASS 2100 DI 6, DN 10	6D	
MASS 2100 DI 6, DN 10 Heated w. EN	6E	
MASS 2100 DI 6, DN 10 Heated w. ANSI	6F	
MASS 2100 DI 6, DN 15 (½")	6G	
MASS 2100 DI 6, DN 15 (½") Heated w. EN	6H	
MASS 2100 DI 6, DN 15 (½") Heated w. ANSI	6J	
MASS 2100 DI 6, DN 20 (¾")	6K	
MASS 2100 DI 6, DN 20 (¾") Heated w. EN	6L	
MASS 2100 DI 6, DN 20 (¾") Heated w. ANSI	6M	
MASS 2100 DI 6, DN 25 (1")	6N	
MASS 2100 DI 6, DN 25 (1") Heated w. EN	6P	
MASS 2100 DI 6, DN 25 (1") Heated w. ANSI	6Q	
MASS 2100 DI 15, DN 15 (½")	7A	
MASS 2100 DI 15, DN 15 (½") Heated w. EN	7B	
MASS 2100 DI 15, DN 15 (½") Heated w. ANSI	7C	
MASS 2100 DI 15, DN 20 (¾")	7D	
MASS 2100 DI 15, DN 20 (¾") Heated w. EN	7E	
MASS 2100 DI 15, DN 20 (¾") Heated w. ANSI	7F	
MASS 2100 DI 15, DN 25 (1")	7G	
MASS 2100 DI 15, DN 25 (1") Heated w. EN	7H	
MASS 2100 DI 15, DN 25 (1") Heated w. ANSI	7J	
Process connection/Pressure		
No connections (spare part transmitter)	A0	
EN1092-1 B1, PN40	A1	
EN1092-1 B1, PN100	A3	
ASME B16.5, RF, Class 150	D1	
ASME B16.5, RF, Class 600	D3	
DIN 11851 Screwed connection	F1	
ISO2852 Hyg. Clamped	J1	
ISO2853 Hyg. Screwed	J5	
ISO 228-1 Pipe thread, PN 100	C1	
ISO 228-1 Pipe thread, PN 130	C2	
ISO 228-1 Pipe thread, PN 200	C3	
ISO 228-1 Pipe thread, PN 230	C4	
ISO 228-1 Pipe thread, PN 265	C5	
ISO 228-1 Pipe thread, PN 350	C6	
ISO 228-1 Pipe thread, PN 365	C7	
ISO 228-1 Pipe thread, PN 410	C8	
NPT ASME B 1.20.1 Pipe thread, PN 100	N1	
NPT ASME B 1.20.1 Pipe thread, PN 130	N2	
NPT ASME B 1.20.1 Pipe thread, PN 200	N3	
NPT ASME B 1.20.1 Pipe thread, PN 230	N4	
NPT ASME B 1.20.1 Pipe thread, PN 265	N5	
NPT ASME B 1.20.1 Pipe thread, PN 350	N6	
NPT ASME B 1.20.1 Pipe thread, PN 365	N7	
NPT ASME B 1.20.1 Pipe thread, PN 410	N8	

Selection and Ordering data	Article No.	Ord. code
SITRANS F C sensors MASS 2100/FC300 with FCT030 transmitter	7ME4813 -	
Tube material (wetted) and max. operational temperature		
AISI 316L/EN 1.4435, Max 115 °C	1	
AISI 316L/EN 1.4435, Max 125 °C	2	
AISI 316L/EN 1.4435, Max 180 °C	3	
Hastelloy C22/UNS N06022/EN 2.4602, Max. 115 °C	5	
Hastelloy C22/UNS N06022/EN 2.4602, Max. 125 °C	6	
Hastelloy C22/UNS N06022/EN 2.4602, Max. 180 °C	7	
Calibration		
Mass flow calibration	1	
Mass flow calibration and density calibration	4	
Standard fraction	8	
Mounting style, Transmitter Housing and Material		
Compact mounted, IP67, Aluminium transmitter housing (DI 3, DI 6 and DI 15 only)	D	
Remote field mounted, IP67, Aluminium housing, M12 socket for digital cable connection (DI 3, DI6 and DI 15 only)	G	
Remote field mount, IP67, Aluminium housing, terminal box for digital cable connection (DI 3, DI6 and DI 15 only)	K	
Wall mount aluminum transmitter housing, M12 socket for digital cable connection (DI 3, DI 6 and DI 15 only)	U	
Remote field mount, IP67, Aluminium transmitter housing, analog cable connection with M20 connectors	Z	P0D
Remote wall mount, IP67, aluminum transmitter housing, analog cable connection with M20 connectors	Z	P0E
Ex approvals		
Non-Ex	A	
ATEX Zone 1	C	
IECEx Zone 1	F	
USA (FM, CSA, UL), Zone 1/Div1	H	
Canada (CSA, UL), Zone 1/Div1	M	
Local User Interface		
Blind	1	
Graphical, 240 x 160 pixels, glass lid	3	

SITRANS F C sensors MASS 2100/FC300 with FCT010, FCT030 and SIFLOW FC070 transmitters (Low flow program)

Selection and Ordering data	Order code
Futher designs	
Please add "**-Z**" to Article No. and specify Order code(s).	
Cable glands	
None (mechanical sensor)	**A00**
Metric, no glands	**A01**
Metric, plastic	**A02**
Metric, brass/Ni plated	**A05**
Metric, stainless steel	**A06**
NPT, no glands	**A11**
NPT, plastic	**A12**
NPT, brass/Ni plated	**A15**
NPT, stainless steel	**A16**
Integral M12 socket	**A20**
SW functions & CT approvals	
Standard	**B11**
I/O configuration Ch1	
None (replacement sensor)	**E00**
4 ... 20 mA, HART, active/passive output (non-Ex)	**E02**
4 ... 20 mA, HART, active Ex	**E06**
4 ... 20 mA, HART, passive Ex	**E07**
PROFIBUS PA (non-Ex)	**E10**
PROFIBUS DP	**E11**
Modbus RTU RS 485	**E14**
I/O configuration Ch2, Ch3 and Ch4	
None	**F00**
Non Ex: Sig I/O, none, none	**F01**
Non Ex: Sig I/O, Sig I/O, none	**F02**
Non Ex: Sig I/O, Sig I/O, Sig I/O	**F03**
Non Ex: Sig I/O, Sig I/O, R	**F04**
Non Ex: Sig I/O, R, R	**F05**
Non Ex: Sig I/O, R, none	**F06**
Ex: pSig I/O, none, none	**F11**
Ex: pSig I/O, pSig I/O, none	**F12**
Ex: pSig I/O, pSig I/O, pSig I/O	**F13**
Ex: pSig I/O, pSig I/O, R	**F14**
Ex: pSig I/O, R, R	**F15**
Ex: pSig I/O, R, none	**F16**
Ex: aSig I/O, none, none	**F21**
Ex: aSig I/O, aSig I/O, none	**F22**
Ex: aSig I/O, aSig I/O, aSig I/O	**F23**
Ex: aSig I/O, aSig I/O, R	**F24**
Ex: aSig I/O, R, R	**F25**
Ex: aSig I/O, R, none	**F26**
Certificates	
Press test certificate CRN	**C01**
Press test certificate PED	**C02**
Material certificate EN 10204-3.1	**C12**
Welding inspection report	**C13**
Factory certificate according to EN 10204 2.2	**C14**
Factory certificate according to EN 10204 2.1	**C15**
Cleaning for oil and grease/ASTM-A380	**C50**
Cleaned according to PWIS	**C51**

Selection and Ordering data	Order code
Sensor data storage	
Sensor with SensorFlash for FCT	**S20**
Sensor with SensorProm for MASS 6000	**S21**
SD-Card accessibility via USB (not allowed in USA by Patent)	
Mass storage enabled	**S30**
Cable sensor-transmitter	
None	**L50**
5 m, standard, M12 connectors	**L51**
5 m, standard, without connectors	**L52**
10 m, standard, M12 connectors	**L55**
10 m, standard, without connectors	**L56**
25 m, standard, M12 connectors	**L59**
25 m, standard, without connectors	**L60**
50 m, standard, M12 connectors	**L63**
50 m, standard, without connectors	**L64**
75 m, standard, M12 connectors	**L67**
75 m, standard, without connectors	**L68**
2 m cable, analog with two M20 connectors	**L85**
5 m cable, analog with two M20 connectors	**L86**
10 m cable, analog with two M20 connectors	**L87**
15 m cable, analog with twoM20 connectors	**L88**
Additional data	
Please add "**-Z**" to Article No. and specify Order code(s) and plain text.	
Tag name	
Tag name plate, stainless steel	**Y17**
Extended calibration	
Multi-point high, (5 flows x 2 passes), 10 ... 100 % of Q_{nom}	**Y61**
Multi-point high, (10 flows x 1 pass), 10 ... 100 % of Q_{nom}	**Y63**

SITRANS F C sensors MASS 2100/FC300 with FCT010, FCT030 and SIFLOW FC070 transmitters (Low flow program)

Selection and Ordering data	Article No.	Ord. code
SITRANS F C sensors MASS 2100/FC300 with SIFLOW FC070 transmitter	7ME4818 -	
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Sensor type and connector size		
MASS 2100 DI 1.5, 1/4"	1G	
MASS 2100 DI 3, 1/4"	3A	
MASS 2100 DI 3, 1/4" Heated w. DIN	3B	
MASS 2100 DI 3,1/4" Heated w. ANSI	3C	
FC300 DN 4, 1/4"	4A	
MASS 2100 DI 6, 1/4"	6A	
MASS 2100 DI 6,1/4" Heated w. EN	6B	
MASS 2100 DI 6, 1/4" Heated w. ANSI	6C	
MASS 2100 DI 6, DN 10	6D	
MASS 2100 DI 6, DN 10 Heated w. EN	6E	
MASS 2100 DI 6, DN 10 Heated w. ANSI	6F	
MASS 2100 DI 6, DN 15 (½")	6G	
MASS 2100 DI 6, DN 15 (½") Heated w. EN	6H	
MASS 2100 DI 6, DN 15 (½") Heated w. ANSI	6J	
MASS 2100 DI 6, DN 20 (¾")	6K	
MASS 2100 DI 6, DN 20 (¾") Heated w. EN	6L	
MASS 2100 DI 6, DN 20 (¾") Heated w. ANSI	6M	
MASS 2100 DI 6, DN 25 (1")	6N	
MASS 2100 DI 6, DN 25 (1") Heated w. EN	6P	
MASS 2100 DI 6, DN 25 (1") Heated w. ANSI	6Q	
MASS 2100 DI 15, DN 15 (½")	7A	
MASS 2100 DI 15, DN 15 (½") Heated w. EN	7B	
MASS 2100 DI 15, DN 15 (½") Heated w. ANSI	7C	
MASS 2100 DI 15, DN 20 (¾")	7D	
MASS 2100 DI 15, DN 20 (¾") Heated w. EN	7E	
MASS 2100 DI 15, DN 20 (¾") Heated w. ANSI	7F	
MASS 2100 DI 15, DN 25 (1")	7G	
MASS 2100 DI 15, DN 25 (1") Heated w. EN	7H	
MASS 2100 DI 15, DN 25 (1") Heated w. ANSI	7J	
Process connection/Pressure		
No connections (spare part transmitter)	A0	
EN1092-1 B1, PN40	A1	
EN1092-1 B1, PN100	A3	
ASME B16.5, RF, Class 150	D1	
ASME B16.5, RF, Class 600	D3	
DIN 11851 Screwed connection	F1	
ISO2852 Hyg. Clamped	J1	
ISO2853 Hyg. Screwed	J5	
ISO 228-1 Pipe thread, PN 100	C1	
ISO 228-1 Pipe thread, PN 130	C2	
ISO 228-1 Pipe thread, PN 200	C3	
ISO 228-1 Pipe thread, PN 230	C4	
ISO 228-1 Pipe thread, PN 265	C5	
ISO 228-1 Pipe thread, PN 350	C6	
ISO 228-1 Pipe thread, PN 365	C7	
ISO 228-1 Pipe thread, PN 410	C8	
NPT ASME B 1.20.1 Pipe thread, PN 100	N1	
NPT ASME B 1.20.1 Pipe thread, PN 130	N2	
NPT ASME B 1.20.1 Pipe thread, PN 200	N3	
NPT ASME B 1.20.1 Pipe thread, PN 230	N4	
NPT ASME B 1.20.1 Pipe thread, PN 265	N5	
NPT ASME B 1.20.1 Pipe thread, PN 350	N6	
NPT ASME B 1.20.1 Pipe thread, PN 365	N7	
NPT ASME B 1.20.1 Pipe thread, PN 410	N8	

Selection and Ordering data	Article No.	Ord. code
SITRANS F C sensors MASS 2100/FC300 with SIFLOW FC070 transmitter	7ME4818 -	
Tube material (wetted) and max. operational temperature		
AISI 316L/EN 1.4435, Max 115 °C	1	
AISI 316L/EN 1.4435, Max 125 °C	2	
AISI 316L/EN 1.4435, Max 180 °C	3	
Hastelloy C22/UNS N06022/EN 2.4602, Max. 115 °C	5	
Hastelloy C22/UNS N06022/EN 2.4602, Max. 125 °C	6	
Hastelloy C22/UNS N06022/EN 2.4602, Max. 180 °C	7	
Calibration		
Mass flow calibration	1	
Mass flow calibration and density calibration	4	
Standard fraction calibration	8	
Mounting style, Transmitter Housing and Material		
SIFLOW FC070 Standad DIN rail	W	
Ex approvals		
Non-Ex	A	
ATEX Zone 1	C	
IECEx Zone 1	F	
USA (FM, CSA, UL), Zone 1/Div1	H	
Canada (CSA, UL), Zone 1/Div1	M	
Local User Interface		
Blind	1	

SITRANS F C sensors MASS 2100/FC300 with FCT010, FCT030 and SIFLOW FC070 transmitters (Low flow program)

Selection and Ordering data	Order code
Futher designs	
Please add "**-Z**" to Article No. and specify Order code(s).	
SW functions & CT approvals	
Standard	**B11**
Certificates	
Press test certificate CRN	**C01**
Press test certificate PED	**C02**
Material certificate EN 10204-3.1	**C12**
Welding inspection report	**C13**
Factory certificate according to EN 10204 2.2	**C14**
Factory certificate according to EN 10204 2.1	**C15**
Cleaning for oil and grease/ASTM-A380	**C50**
Cleaned according to PWIS	**C51**
Sensor data storage	
Sensor with SensorFlash for FCT	**S20**
Sensor with SensorProm for MASS 6000 and SIFLOW FC070	**S21**
Cable sensor-transmitter	
None	**L50**
5 m cable for SIFLOW FC070	**L79**
10 m cable for SIFLOW FC070	**L80**
25 m cable for SIFLOW FC070	**L81**
50 m cable for SIFLOW FC070	**L82**
75 m cable for SIFLOW FC070	**L83**
150 m cable for SIFLOW FC070	**L84**
Additional data	
Please add "**-Z**" to Article No. and specify Order code(s) and plain text.	
Tag name	
Tag name plate, stainless steel	**Y17**
Extended calibration	
Multi-point high, (5 flows x 2 passes), 10 ... 100 % of Q_{nom}	**Y61**
Multi-point high, (10 flows x 1 pass), 10 ... 100 % of Q_{nom}	**Y63**

Overview

MASS 6000 is based on digital signal processing technology – engineered for high performance, fast flow step response, fast batching applications, high immunity against process noise, easy to install, commission and maintain.

The MASS 6000 transmitter delivers true multiparameter measurements i.e. mass flow, volume flow, density, temperature and fraction.

The MASS 6000 IP67 transmitter can be compact mounted on all sensors of type MASS 2100 DI 3 to DI 15, and can be used in remote version for all types of MASS 2100 and FC300 sensors.

Note

Due to RoHs directives active from July 22nd 2017, MASS 6000 transmitters of any model and variants are not for sale within EU, EU candidate countries, Norway, Switzerland, Iceland, Croatia, and Turkey.

Replacement products: 7ME461.-..., 7ME462.-..., 7ME471.-... and 7ME481.-...

Repair parts for MASS 6000 (all models and variants) are available. See spare part list.

Benefits

- Dedicated mass flow chip with the latest ASIC technology
- Fast batching and flow step response with an update rate of true 30 Hz
- Superior noise immunity due to a DFT (Discrete Fourier Transformation) algorithm.
- Front end resolution better than 0.35 ns improves zero point stability and enhances dynamic turn-down ratio on flow and density accuracy.
- Advanced diagnosis and service menu enhances trouble-shooting and meter verification.
- Built-in batch controller with compensation and monitoring comprising 2 built-in totalizers
- Multi-parameter outputs, individual configurable for mass flow, volume flow, density, temperature or fraction flow such as Brix or Plato
- Digital input for batch control, remote zero adjust or forced output mode
- All outputs can be forced to preset value for simulation, verification or calibration purposes.
- User-configurable operation menu with password protection
  - 3 lines, 20 characters display in 11 languages
  - Self-explaining error handling/log in text format
  - Keypad can be used for controlling batch as start/stop/hold/reset
- SENSORPROM technology automatically configures transmitter at start-up providing:
  - Factory pre-programming with calibration data, pipe size, sensor type, output settings
  - Any values or settings changed by users are stored automatically
  - Automatically re-programming any new transmitter without loss of accuracy
  - Transmitter replacement in less than 5 minutes.
  - True "plug & play"
- 4-wire Pt1000 temperature measurement ensures optimum accuracy on mass flow, density and fraction flow.
- Fraction flow computation based on a 3rd-order algorithm matching all applications.
- USM II platform enables fitting of add-on bus modules without loss of functionality.
  - All modules can be fitted through true "plug & play"
  - Module and transmitter are automatically configured through the SENSORPROM.
- Installation of the transmitter to the sensor is simple "plug & play" via the sensor pedestal.

Application

SITRANS F C mass flowmeters are suitable for all applications within the entire process industry, where there is a demand for accurate flow measurement. The meter is capable of measuring both liquid and gas flow.

The main applications for the MASS 6000 IP67 transmitter can be found in:

- Food and beverage industries
- Pharmaceutical industries
- Automotive industry
- Oil and gas industry
- Power generation and utility industry
- Water and waste water industry

Design

The transmitter is designed in an IP67/NEMA 6 compact polyamide enclosure which can be compact mounted on the MASS 2100 sensor range DI 3 to DI 15 (1/8" to ½") and remote mounted for the entire sensor series.

The MASS 6000 IP67 is available as standard with 1 current, 1 frequency/pulse and 1 relay output and can be fitted with add-on modules for bus communication.

Function

The following functions are available:

- Mass flow rate, volume flow rate, density, temperature, fraction flow
- 1 current output, 1 frequency/pulse output, 1 relay output, 1 digital input
- All outputs can be individually configured with mass, volume, density etc.
- 2 built-in totalizers which can count positive, negative or net
- Low flow cut-off
- Density cut-off or empty pipe cut-off, adjustable
- Flow direction adjustable
- Error system consisting of error-log, error pending menu
- Display of operating time
- Uni/bidirectional flow measurement
- Limit switches with 1 or 2 limits, programmable for flow, density or temperature
- Noise filter setting for optimization of measurement performance under non-ideal application conditions
- Full batch controller
- Automatic zero adjustment menu, with zero point evaluation feed back
- Full service menu for effective and straight forward application and meter troubleshooting

3

Technical specifications

Measurement of	Mass flow [kg/s (lb/min)], volume flow [l/s (gpm)], fraction [%], °Brix, density [kg/m^3, (lb/ft^3)], temperature [°C (°F)]
Current output	
Current	0 ... 20 mA or 4 ... 20 mA
Load	< 800 Ω
Time constant	0 ... 99.9 s adjustable
Digital output	
Frequency	0 ... 10 kHz, 50 % duty cycle
Time constant	0 ... 99.9 s adjustable
Active	24 V DC, 30 mA, 1 KΩ ≤ R_{load} ≤ 10 KΩ, short-circuit-protected
Passive	3 ... 30 V DC, max. 110 mA, 250 Ω ≤ R_{load} ≤ 10 KΩ
Relay	
Type	Change-over relay
Load	42 V/2 A peak
Functions	Error level, error number, limit, flow direction
Digital input	11 ... 30 V DC (R_i = 13.6 kΩ)
Functionality	Start/hold/continue batch, zero point adjust, reset totalizer 1/2, force output, freeze output
Galvanic isolation	All inputs and outputs are galvanically isolated. Isolation voltage: • 500 V to supply • 50 V between outputs
Cut-off	
Low-flow	0 ... 9.9 % of maximum flow
Limit function	Mass flow, volume flow, fraction, density, sensor temperature
Totalizer	Two eight-digit counters for forward, net or reverse flow
Display	• Background illumination with alphanumerical text, 3 × 20 characters to indicate flow rate, totalized values, settings and faults. Time constant as current output 1 • Reverse flow indicated by negative sign
Zero point adjustment	Via keypad or remote via digital input
Ambient temperature	
Operation	-20 ... +50 °C (-4 ... +122 °F), max. rel. humidity 80 % at 31 °C (87.8 °F) decreasing to 50 % at 40 °C (104 °F) according to IEC/EN/UL 61010-1
Storage	-40 ... +70 °C (-40 ... +158 °F) (Humidity max. 95 %)
Communication	Add-on modules: HART, PROFIBUS PA and DP, Modbus RTU RS 485, DeviceNet, FOUNDATION Fieldbus H1

Enclosure	
Material	Fibre glass reinforced polyamide
Rating	IP67/NEMA 6
Mechanical load	18 ... 1000 Hz random, 3.17 g RMS, in all directions
Supply voltage	
24 V version	
• Supply	18 ... 30 V DC 20 ... 30 V AC
230 V version	
• Supply	87 ... 253 V AC, 50 ... 60 Hz
Power consumption	
24 V DC	6 W
24 V AC	10 VA
230 V AC	9 VA
Fuse	
230 V version	T 400 mA, T 250 V (IEC 127) - not replaceable by operator
24 V version	T 1 A, T 250 V (IEC 127) - not replaceable by operator
EMC performance	
Emission	EN 55011/CISPR-11 (Class A)
Immunity	EN/IEC 61326-1 (Industry)
NAMUR	Within the value limits according to "General requirements" with error criteria A in accordance with NE 21
Environment	
Environmental conditions acc. to IEC/EN/UL 61010-1:	• Altitude up to 2000 m • POLLUTION DEGREE 2
Maintenance	The flowmeter has a built-in error log/pending menu which should be inspected on a regular basis.
Cable glands	Two types of cable gland are available in polyamide in the following dimensions: M20 or ½" NPT

Note

Due to RoHs directives active from July 22nd 2017, MASS 6000 transmitters of any model and variants are not for sale within EU, EU candidate countries, Norway, Switzerland, Iceland, Croatia, and Turkey.

Replacement products: 7ME461.-..., 7ME462.-..., 7ME471.-... and 7ME481.-...

Repair parts for MASS 6000 (all models and variants) are available. See spare part list.

Selection and Ordering data	Article No.
SITRANS F C MASS 6000 transmitter Transmitter for wall mounting with wall mounting bracket, fibre glass reinforced polyamide (1 current output, 1 frq./pulse output, 1 relay output and connection board/PCB)	7ME4110- ■AA■0-■■A■
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
Version	
Remote IP67/NEMA 6 enclosure	2
Supply voltage	
115/230 V AC, 50 ... 60 Hz	1
24 V AC/DC	2
Display/Keypad	
with display	1
Serial communication	
No communication	A
HART	B
PROFIBUS PA Profile 3	F
PROFIBUS DP Profile 3	G
Modbus RTU RS 485	E
DeviceNet	H
FOUNDATION Fieldbus H1	J
Cable glands	
M20	1
½" NPT	2

Operating instructions for SITRANS F C MASS 6000 IP67

Description	Article No.
• English	**A5E03071936**

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

Accessories

Description	Article No.	
Cable glands, screwed entries type in polyamide (100 °C (212 °F)) black, 2 pcs.		
• M20	**A5E00822490**	
• ½" NPT	**A5E00822501**	
Sun lid for MASS 6000 transmitter (Frame and lid)	**A5E02328485**	

Add-on module

Description	Article No.	
HART[1]	**FDK:085U0226**	
PROFIBUS PA Profile 3[1]	**FDK:085U0236**	
PROFIBUS DP Profile 3	**FDK:085U0237**	
Modbus RTU RS 485	**FDK:085U0234**	
FOUNDATION Fieldbus H1[1]	**A5E02054250**	
DeviceNet	**FDK:085U0229**	

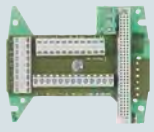
[1] Modules are rated Ex i when used with MASS 6000 Ex d.

Operating instructions for SITRANS F add-on modules

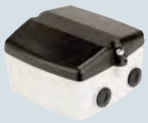
Description	Article No.
HART	
• English	**A5E03089708**
PROFIBUS PA/DP	
• English	**A5E00726137**
• German	**A5E01026429**
Modbus	
• English	**A5E00753974**
• German	**A5E03089262**
FOUNDATION Fieldbus	
• English	**A5E02318728**
• German	**A5E02488856**
DeviceNet	
• English	**A5E03089720**

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

Spare parts for compact or remote IP67 version

Description	Article No.	
MASS 6000 transmitter IP67/NEMA 6 Fibre glass reinforced polyamide and without connection board 1 current output 1 frq./pulse output 1 relay output		
• 115/230 V AC, 50/60 Hz	**7ME4110-1AA10-1AA0**	
• 24 V AC/DC	**7ME4110-1AA20-1AA0**	
Wall mounting unit for IP67/NEMA 6 version with wall bracket, without connection board but with		
• 4 x M20 cable glands	**FDK:085U1018**	
• 4 x ½" NPT cable glands	**A5E01164211**	
Connection board/PCB Supply voltage: 115/230 V/24 V AC/DC	**FDK:083H4260**	

Transmitter MASS 6000 IP67 compact/remote

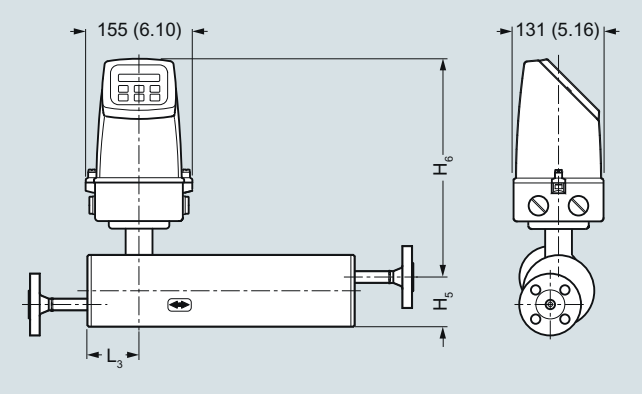
Description	Article No.	
Terminal box kit with • M20 cable glands • ½" NPT cable glands Change from remote to safe area compact mounting of MASS 6000 IP67/NEMA 6 with MASS 2100. The kit consists of a terminal box in polyamide incl. connection board, cable and connector between PCB and sensor pedestal, PCB, seal and screws (4 pcs.) for mounting on sensor. Not approved for hazardous locations	 **A5E00832338** **A5E00832342**	
Terminal box, in polyamide, inclusive lid • M20 cable glands • ½" NPT cable glands Not approved for hazardous locations	 **FDK:085U1050** **FDK:085U1052**	
Terminal box – **lid** in polyamide	**FDK:085U1003**	
Display and keypad • Siemens Front	**FDK:085U1039**	

Add-on spare parts required due to RoHs directives and EoL for EU and EU related countries

Description	Article No.	
MASS 6000 IP67 **Spare part PCB main**		
• 230 V	**A5E41718138**	
• 24 V	**A5E41718346**	
MASS 6000 19"/IP20 **Spare part PCB main**		
• 1 current output 230 V	**A5E43226138**	
• 3 current outputs 230 V	**A5E43226145**	
• 1 current output 24V	**A5E43226154**	
• 3 current outputs 24 V	**A5E43226168**	
MASS 6000 19"/IP20 Ex **Spare part PCB main**		
• 1 current output 230 V	**A5E43226277**	
• 3 current outputs 230 V	**A5E43226342**	
• 1 current output 24V	**A5E43226441**	
• 3 current outputs 24 V	**A5E43226455**	
MASS 6000 Ex d, **Spare part PCB** Stainless steel, without module	**FDK:083H3061**	
MASS 6000 Ex d, **Spare part barriere** Stainless steel	**A5E41718720**	
MASS 6000 19"/IP20, **Barriere PCB, Ex**	**A5E41718669**	
MASS 6000 Ex d, **Connection board** Stainless steel	**A5E41718522**	
MASS 6000 IP20, **Front plate** Without display	**A5E41718695**	
MASS 6000 IP20, **Front plate, Ex** Without display	**A5E41718706**	

Dimensional drawings

Compact with MASS 6000 IP67

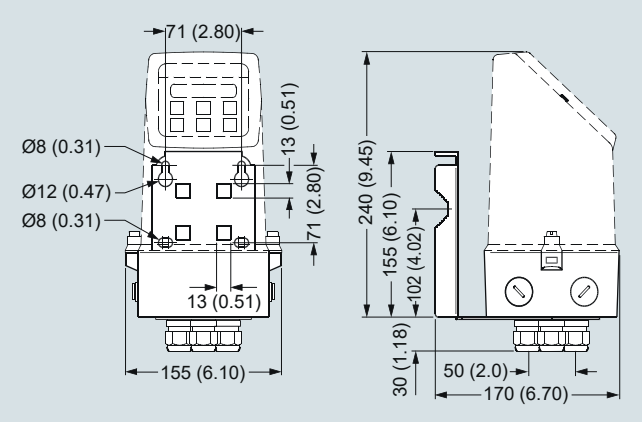


Dimensions in mm (inch)

MASS 2100 with MASS 6000 IP67 compact

Sensor size [DI (inch)]	L_3 [mm (inch)]	H_5 [mm (inch)]	H_6 [mm (inch)]	$H_5 + H_6$ [mm (inch)]
3 (1/8)	75 (2.95)	82 (3.23)	306 (12.04)	388 (15.28)
6 (¼)	62 (2.44)	72 (2.83)	316 (12.44)	388 (15.28)
15 (½)	75 (2.95)	87 (3.43)	326 (12.83)	413 (16.26)

Transmitter MASS 6000 IP67 wall mounted



Dimensions in mm (inch)

Schematics

Electrical connection

Grounding

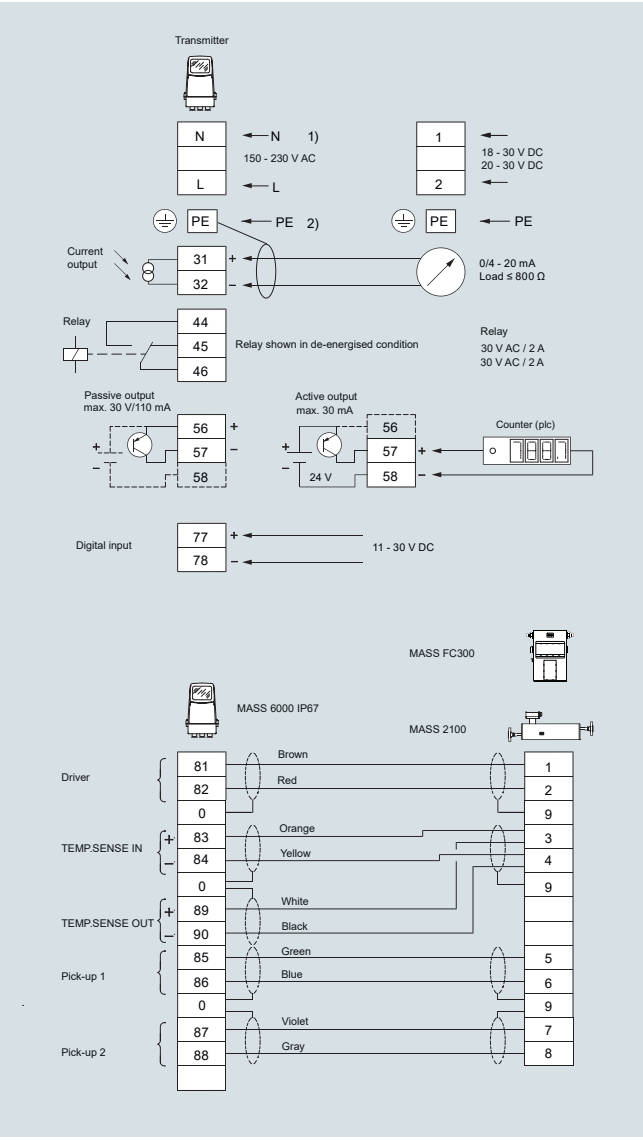
PE must be connected due to safety class 1 power supply.

Mechanical counters

When mounting a mechanical counter to terminals 57 and 58 (active output), a 1000 µF min. 35 V electrolytic capacitor must be connected to the terminals 56 and 58. Capacitor + is connected to terminal 56 and capacitor - to terminal 58.

Output cables

If long cables are used in a noisy environment, it is recommended to use shielded cables.



Transmitter MASS 6000 for 19" insert/19" wall mounting

Overview

MASS 6000 is based on digital signal processing technology – engineered for high performance, fast flow step response, fast batching applications, high immunity against process noise, easy to install, commission and maintain.
The MASS 6000 transmitter delivers true multi parameter measurements i.e.: Mass flow, volume flow, density, temperature and fraction.

The MASS 6000 19" transmitter can be connected to all sensors of types MASS 2100/FC300/FCS200 and are available in different versions depending of number of output facilities, Ex protection and grade of enclosure.

Benefits

- Dedicated mass flow chip with the latest ASIC technology
- Fast batching and flow step response with an update rate of true 30 Hz
- Superior noise immunity due to a DFT (Discrete Fourier Transformation) algorithm.
- Front end resolution better than 0.35 ns improves zero point stability and enhances dynamic turn-down ratio on flow and density accuracy.
- Advanced diagnosis and service menu enhances trouble-shooting and meter verification.
- Built-in batch controller with compensation and monitoring comprising 2 built-in totalizers
- Multi-parameter outputs, individual configurable for mass flow, volume flow, density, temperature or fraction flow such as Brix or Plato
- Many output capacities, up to 3 current, 2 frequency/pulse and 2 relay outputs (excludes the possibility of an add-on module)
- Digital input for batch-control, remote zero adjust or forced output mode
- All outputs can be forced to preset value for simulation, verification or calibration purposes.
- User-configurable operation menu with password protection
  - 3 lines, 20 characters display in 11 languages
  - Self-explaining error handling/log in text format
  - Keypad can be used for controlling batch as start/stop/hold/reset
- SENSORPROM technology automatically configures transmitter at start-up providing:
  - Factory pre-programming with calibration data, pipe size, sensor type, output settings
  - Any values or settings changed by users are stored automatically
  - Automatically re-programming any new transmitter without loss of accuracy
  - Transmitter replacement in less than 5 minutes. True "plug & play"
- 4-wire Pt1000 temperature measurement ensures optimum accuracy on mass flow, density and fraction flow
- Fraction flow computation based on a 3rd-order algorithm matching all applications
- USM II platform enables fitting of add-on bus modules without loss of functionality.
  - All modules can be fitted as true "plug & play"
  - Module and transmitter automatically configured through the SENSORPROM.
- Transmitter available with Ex approvals
- All electrical connections are easily accessible on the large back plane PCB

Application

SITRANS F C Coriolis mass flowmeters are suitable for all applications within the entire process industry, where there is a demand for accurate flow measurement. The meter can measure both liquids and gases.

The main applications for the MASS 6000 19" transmitter can be found in:

- Chemical and pharmaceutical industries
- Food and beverage industries
- Automotive industry
- Oil and gas industry
- Power generation and utility industry
- Water and waste water industry

Design

The transmitter is designed as a 19" insert as base to be used in:

- 19" rack system
- Panel mounting IP65
- Back of panel mounting IP20
- Wall mounting IP66

The MASS 6000 19" is available as standard or as Ex-approved transmitter which is to be mounted in the safe area.

Note

Due to RoHs directives active from July 22nd 2017, MASS 6000 transmitters of any model and variants are not for sale within EU, EU candidate countries, Norway, Switzerland, Iceland, Croatia, and Turkey.

Replacement products: 7ME461.-..., 7ME462.-..., 7ME471.-... and 7ME481.-...

Repair parts for MASS 6000 (all models and variants) are available. See spare part list.

Function

The following functions are available:

- Mass flow rate, volume flow rate, density, temperature, fraction flow
- 2 output versions available as standard:
  - 1 current output, 1 frequency/pulse output, 1 relay output, 1 digital input
  - 3 current outputs, 2 frequency/pulse outputs, 2 relay outputs, 1 digital input
- All outputs can be individually configured with mass, volume, density etc.
- 2 built-in totalizers which can count positive, negative or net
- Low flow cut-off
- Density cut-off or empty pipe cut-off, adjustable
- Flow direction
- Error system consisting of error-log, error pending menu
- Operating time
- Uni/bidirectional flow measurement
- Limit switches with 1 or 2 limits, programmable for flow, density or temperature
- Noise filter setting for optimization of measurement performance under non-ideal application conditions
- Full batch controller
- Automatic zero adjustment menu, with zero point evaluation feed-back
- Full service menu for effective and straight forward application and meter troubleshooting

Technical specifications

Measurement of	Mass flow [kg/s (lb/min)], volume flow [l/s (gpm)], fraction [%], °Brix, density [kg/m^3 (lb/ft^3)], temperature [°C (°F)]
Current output	
Current	0 ... 20 mA or 4 ... 20 mA
Load	< 800 Ω
Time constant	0 ... 99.9 s adjustable
Digital output	
Frequency	0 ... 10 kHz, 50 % duty cycle
Time constant	0 ... 30 s adjustable
Active	24 V DC, 30 mA, 1 KΩ ≤ R_{load} ≤ 10 KΩ, short-circuit-protected
Passive	3 ... 30 V DC, max. 110 mA, 250 Ω ≤ R_{load} ≤ 10 KΩ
Relay	
Type	Change-over relay
Load	42 V/2 A peak
Functions	Error level, error number, limit, direction
Digital input	11 ... 30 V DC
Functionality	Start/hold/continue batch, zero point adjust, reset totalizer 1/2, force output, freeze output
Galvanic isolation	All inputs and outputs are galvanically isolated. Isolation voltage: • 500 V to supply • 50 V between outputs
Cut-off	
Low-flow	0 ... 9.9 % of maximum flow
Limit function	Mass flow, volume flow, fraction, density, sensor temperature
Totalizer	Two eight-digit counters for forward, net or reverse flow
Display	• Background illumination with alphanumerical text, 3 × 20 characters to indicate flow rate, totalized values, settings and faults • Reverse flow indicated by negative sign
Zero point adjustment	Via keypad or remote via digital input
Ambient temperature	
Operation	-20 ... +50 °C (-4 ... +122 °F)
Storage	-40 ... +70 °C (-40 ... +158 °F) (Humidity max. 95 %)
Communication	Add-on modules: HART, PROFIBUS PA and DP, Modbus RTU RS 485, DeviceNet, FOUNDATION Fieldbus H1
Enclosure 19"	
Material	Aluminum/steel (DIN 41494)
Rating	IP20
Mechanical load	18 ... 1000 Hz random, 3.17 g RMS, in all directions
Supply voltage	
24 V version	
• Supply	24 V DC/AC, 50 ... 60 Hz
• Fluctuation	18 ... 30 V DC 20 ... 30 V AC
• Power consumption	6 W I_N = 250 mA, I_{ST} = 2 A (30 ms)
230 V version	
• Supply	87 ... 253 V AC, 50 ... 60 Hz
• Power consumption	9 VA
Fuse	
230 V version	T 400 mA, T 250 V (IEC 127) - not replaceable by operator
24 V version	T 1 A, T 250 V (IEC 127) - not replaceable by operator
EMC performance	
Emission	EN 55011/CISPR-11 (Class A)
Immunity	EN/IEC 61236-1 (Industry)
Ex approval	ATEX, EAC Ex: [Ex ia] IIC
Maintenance	The flowmeter has a built-in error log/pending menu which should be inspected on a regular basis.
Cable	• Max. 300 m • C: max. 300 [pF/m]; L_C/R_C: max. 100 [µH/Ω] • The total cable capacity must be max. 200 nF.
Cable glands	The cable gland is available in polyamide, in dimension: PG 13.5

Note

Due to RoHs directives active from July 22nd 2017, MASS 6000 transmitters of any model and variants are not for sale within EU, EU candidate countries, Norway, Switzerland, Iceland, Croatia, and Turkey.

Replacement products: 7ME461.-..., 7ME462.-..., 7ME471.-... and 7ME481.-...

Repair parts for MASS 6000 (all models and variants) are available. See spare part list.

Transmitter MASS 6000 for 19" insert/19" wall mounting

Selection and Ordering data	Article No.
SITRANS F C MASS 6000 transmitter	7ME4110-
Transmitter for rack and wall mounting, incl. connection board	2 ■■■■ - ■■ A0
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
Enclosure	
19 inch insert IP20 (rack mount, purchase rack separately)	C
19 inch insert in IP65 (wall mount, enclosure included)	E
Output configuration	
1 current, 1 frequency, 1 relay	A
3 current, 2 frequency, 2 relay	C
Supply voltage	
115/230 V AC, 50/60 Hz	1
24 V AC/DC	2
Ex Approvals	
Standard (No Ex-approval)	0
With Ex approval	1
Display/Keypad	
With display	1
Serial communication (Only possible to connect to MASS 6000 version with 1 current output)	
No communication	A
HART	B
PROFIBUS PA Profile 3	F
PROFIBUS DP Profile 3	G
Modbus RTU RS 485	E
DeviceNet	H
FOUNDATION Fieldbus H1	J

Operating instructions for SITRANS F C MASS 6000 19"

Description	Article No.
• English	**A5E02944875**

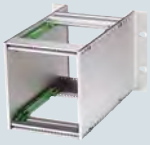
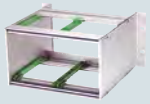
All literature is available to download for free, in a range of languages, at www.siemens.com/processinstrumentation/documentation

Accessories

Enclosure (without PCB, connection board)

Description	Article No.	
IP66/NEMA 4X, wall mounting enclosure for 19" inserts • 21 TE	**FDK:083F5037**	

Enclosure

Description	Article No.	
Panel mounting enclosure for 19" insert (21 TE); IP65/NEMA 2 enclosure in ABS plastic for front panel mounting	**FDK:083F5030**	
Panel mounting enclosure for 19" insert (42 TE); IP65/NEMA 2 enclosure in ABS plastic for front panel mounting	**FDK:083F5031**	
Back of panel mounting enclosure for 19" insert (21 TE); IP20/NEMA 1 enclosure in aluminum	**FDK:083F5032**	
Back of panel mounting enclosure for 19" insert (42 TE); IP20/NEMA 1 enclosure in aluminum	**FDK:083F5033**	
Front cover (7TE) for panel mounting enclosure	**FDK:083F4525**	

Cable glands

Description	Article No.	
Cable gland, screwed entry, type M20, in polyamide (100 °C (212 °F)) black, 2 pcs.	**A5E00822490**	

Add-on module

Note:
Only possible to connect to MASS 6000 versions with 1 current output.

Description	Article No.	
HART (Ex-i)	**FDK:085U0226**	
PROFIBUS PA Profile 3 (Ex-i)	**FDK:085U0236**	
PROFIBUS DP Profile 3	**FDK:085U0237**	
Modbus RTU RS 485	**FDK:085U0234**	
FOUNDATION Fieldbus H1 (Ex-i)	**A5E02054250**	
DeviceNet	**FDK:085U0229**	

Operating instructions for SITRANS F add-on modules

Description	Article No.
HART	
• English	**A5E03089708**
PROFIBUS PA/DP	
• English	**A5E00726137**
• German	**A5E01026429**
Modbus	
• English	**A5E00753974**
• German	**A5E03089262**
FOUNDATION Fieldbus	
• English	**A5E02318728**
• German	**A5E02488856**
DeviceNet	
• English	**A5E03089720**

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

Connection boards/PCB for MASS 6000 and MASS 2100 sensors

Description	Version	Article No.	
Connection board MASS 6000 for 19“ IP20 rack mounting version	24 V 115/230 V	**FDK:083H4272**	
Connection board MASS 6000 Ex [ia] IIC for 19“ IP20 rack mounting version	24 V 115/230 V	**FDK:083H4273**	
Connection board MASS 6000 for 19“ wall mounting version, for enclosure FDK:083F5037/FDK:083F5038	24 V 115/230 V	**FDK:083H4274**	
Connection board MASS 6000 Ex [ia] IIC for 19“ wall mounting version, for enclosure FDK:083F5037/FDK:083F5038	24 V 115/230 V	**FDK:083H4275**	

Connection boards/PCB for MASS 6000 and MC2 sensors

Description	Version	Article No.	
Connection board MASS 6000 for 19“ IP20 rack mounting version	24 V 115/230 V	**FDK:083H4272**	
Connection board MASS 6000 for Ex application[1] and 19“ IP20 rack mounting version (connection board MASS 6000 to MC2 sensors Ex-approved)	24 V 115/230 V	**FDK:083H4294**	
Connection board MASS 6000 for 19“ wall mounting version, for enclosure FDK:083F5037/FDK:083F5038	24 V 115/230 V	**FDK:083H4274**	
Connection board MASS 6000 for Ex application[1] and 19“ wall mounting version (connection board MASS 6000 to MC2 sensors Ex-approved), for enclosure FDK:083F5037/FDK:083F5038	24 V 115/230 V	**FDK:083H4295**	

[1] Attention (Ex application): MC2 Ex version sensors must only be connected to connection board FDK:083H4294 or FDK:083H4295.

Description	Article No.	
Wall mounting enclosure in ABS plastic IP65 with connection board/PCB for Ex application connected to MC2 Ex sensors	**FDK:083H4296**	

Transmitter MASS 6000 for 19" insert/19" wall mounting

Spare parts 19" versions

Enclosure (without PCB, connection board)

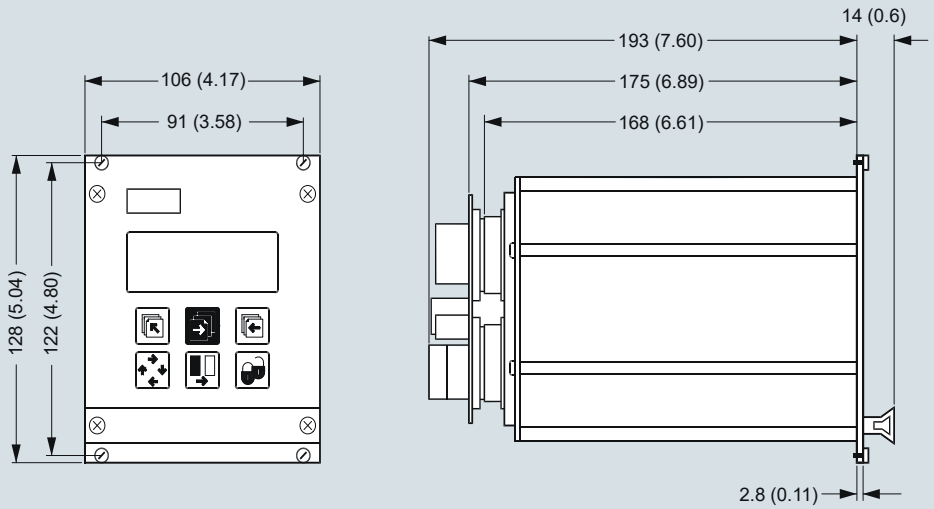
Description	Article No.	
IP66/NEMA 4X, wall mounting enclosure for 19" inserts (without back plates). Use with PCB A5E02559813 or A5E02559814		
• 21 TE	**FDK:083F5037**	
• 42 TE	**FDK:083F5038**	
Display unit for 19" versions Order the Display and Keypad accessory from MASS 6000 IP67 compact/remote (FDK:085U1039) and use the display part only for replacement	**FDK:085U1039**	

Add-on spare parts required due to RoHs directives and EoL for EU and EU related countries

Description	Article No.	
MASS 6000 IP67 **Spare part PCB main**		
• 230 V	**A5E41718138**	
• 24 V	**A5E41718346**	
MASS 6000 19"/IP20 **Spare part PCB main**		
• 1 current output 230 V	**A5E43226138**	
• 3 current outputs 230 V	**A5E43226145**	
• 1 current output 24V	**A5E43226154**	
• 3 current outputs 24 V	**A5E43226168**	
MASS 6000 19"/IP20 Ex **Spare part PCB main**		
• 1 current output 230 V	**A5E43226277**	
• 3 current outputs 230 V	**A5E43226342**	
• 1 current output 24V	**A5E43226441**	
• 3 current outputs 24 V	**A5E43226455**	
MASS 6000 Ex d, **Spare part PCB** Stainless steel, without module	**FDK:083H3061**	
MASS 6000 Ex d, **Spare part barriere** Stainless steel	**A5E41718720**	
MASS 6000 19"/IP20, **Barriere PCB, Ex**	**A5E41718669**	
MASS 6000 Ex d, **Connection board** Stainless steel	**A5E41718522**	
MASS 6000 IP20, **Front plate** Without display	**A5E41718695**	
MASS 6000 IP20, **Front plate, Ex** Without display	**A5E41718706**	

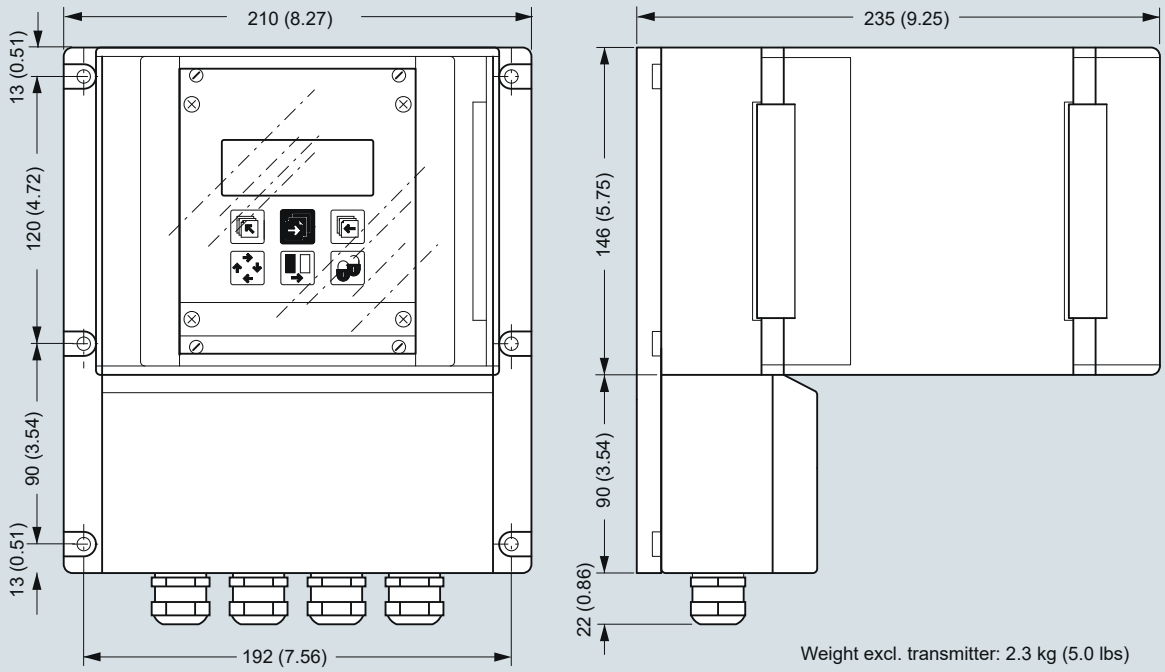
Dimensional drawings

Transmitter 19" insert



Dimensions in mm (inch)

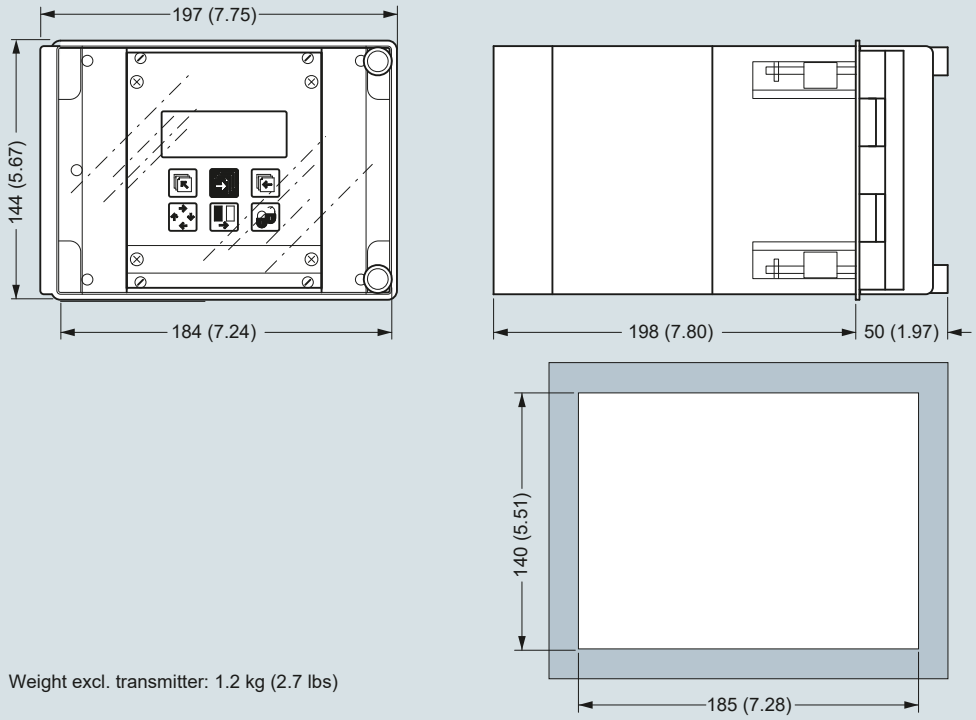
Transmitter 19" wall mounting



Dimensions in mm (inch)

Transmitter MASS 6000 for 19" insert/19" wall mounting

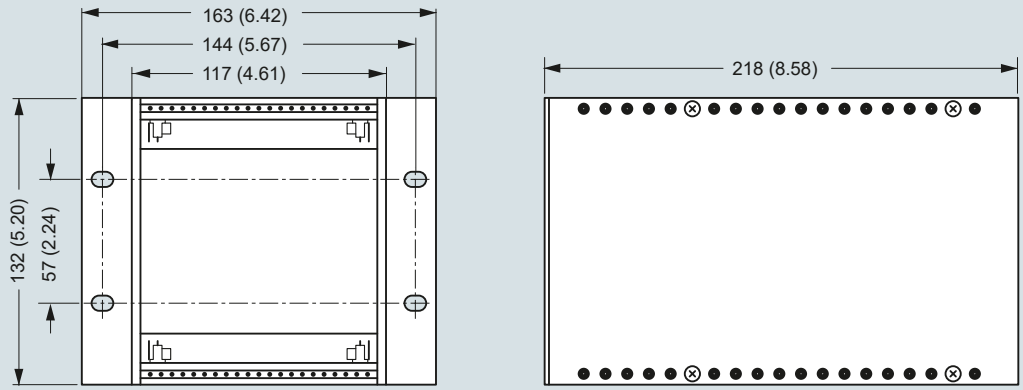
Transmitter 19“ front of panel



Weight excl. transmitter: 1.2 kg (2.7 lbs)

Dimensions in mm (inch)

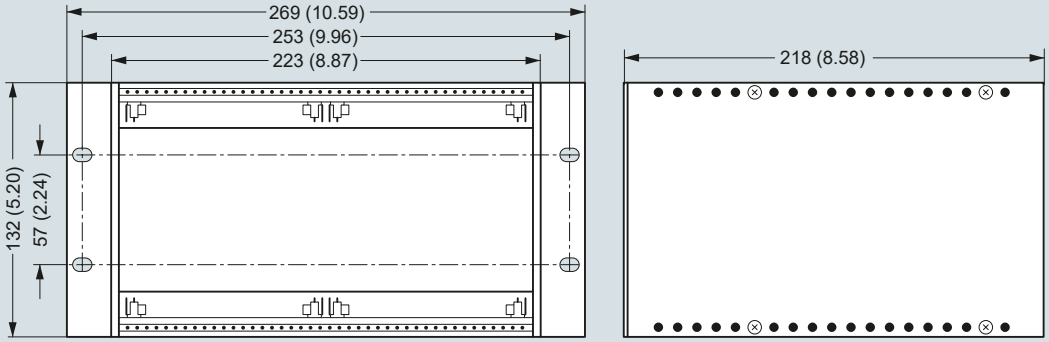
Transmitter, back of panel IP20/NEMA 1, 21 TE



Weight: 0.7 kg (1.6 lbs)

Dimensions in mm (inch)

Transmitter, back of panel IP20/NEMA 1, 42 TE



Weight: 0.9 kg (2.0 lbs)

Dimensions in mm (inch)

3

Schematics

Electrical connection

Grounding

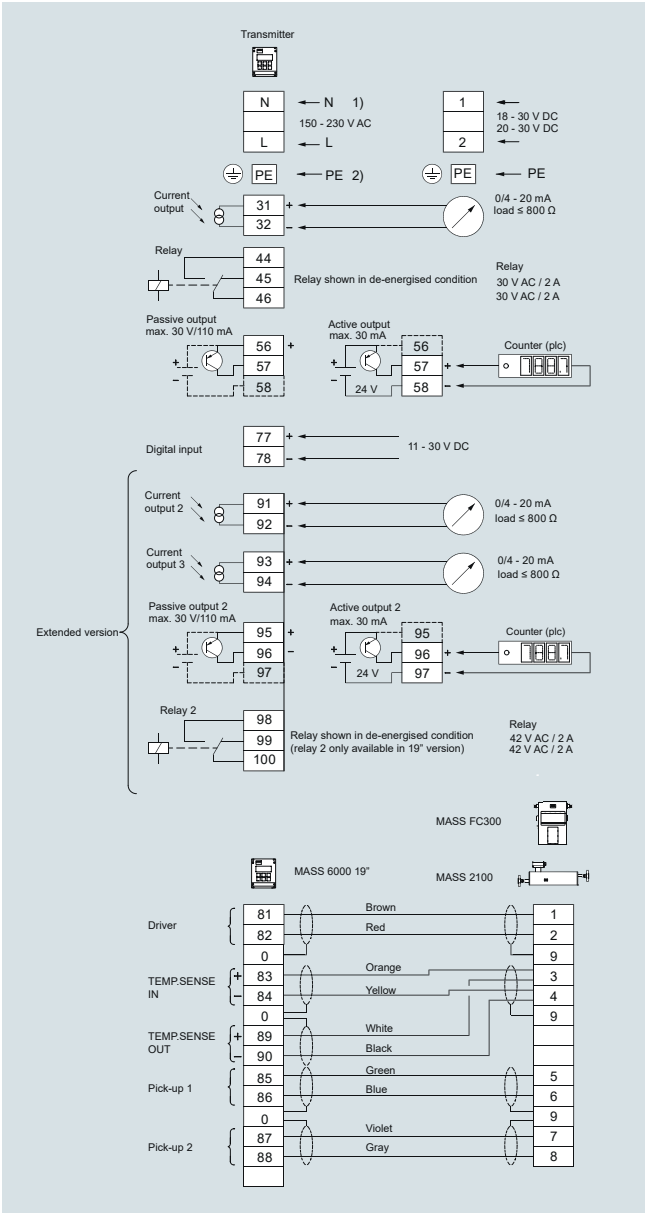
PE must be connected due to safety class 1 power supply.

Mechanical counters

When mounting a mechanical counter to terminals 57 and 58 (active output), a 1000 µF min. 35 V electrolytic capacitor must be connected to the terminals 56 and 58. Capacitor + is connected to terminal 56 and capacitor - to terminal 58.

Output cables

If long cables are used in noisy environment, it is recommended to use shielded cables.



Overview

MASS 6000 is based on digital signal processing technology – engineered for high performance, fast flow step response, fast batching applications, high immunity against process noise, easy to install, commission and maintain.

The MASS 6000 transmitter delivers true multiparameter measurements i.e.: Mass flow, volume flow, density, temperature and fraction flow.

The MASS 6000 Ex d transmitter is manufactured in stainless steel (AISI 316L/1.4404) and able to withstand harsh installation conditions in hazardous applications within the process and chemical industry. The conservative choice of material guarantees the user a low cost of ownership and a long trouble-free lifetime.
The Ex d can be compact mounted on all sensors of type MASS 2100 DI 3 to DI 15, and can be used in remote version for all types of MASS 2100.

Benefits

- Fully stainless steel flameproof Ex d enclosure, ensuring optimum cost of ownership
- Intrinsically safe keypad and display directly programmable in hazardous area
- Ex-approved transmitter which can be mounted in hazardous area Zone 1 or Zone 2.
- Sensor and transmitter interface intrinsically safe Ex ia IIC
- Exchange of transmitter directly in hazardous area without shut-down of process pipe line due to ia IIC sensor/transmitter interface.
- Dedicated mass flow chip with the latest ASIC technology
- Fast batching and flow step response with an update rate of true 30 Hz
- Superior noise immunity due to a DFT (Discrete Fourier Transformation) algorithm
- Front end resolution better than 0.35 ns improves zero point stability and enhances dynamic turn-down ratio on flow and density accuracy.
- Advanced diagnosis and service menu enhances trouble-shooting and meter verification.
- Built-in batch controller with compensation and monitoring comprising 2 built-in totalizers
- Multi-parameter outputs, individual configurable for mass flow, volume flow, density, temperature or fraction flow such as Brix or Plato
- 1 current output, 1 frequency/pulse and 1 relay as standard output
- Current output can be selected as passive or active output
- Digital input for batch-control, remote zero adjust or forced output mode
- All outputs can be forced to preset value for simulation, verification or calibration purposes.
- User-configurable operation menu with password protection
  - 3 lines, 20 characters display in 11 languages
  - Self-explaining error handling/log in text format
  - Keypad can be used for controlling batch as start/stop/hold/reset
- SENSORPROM technology automatically configures transmitter at start-up providing:
  - Factory pre-programming with calibration data, pipe size, sensor type, output settings
  - Any values or settings changed by users are stored automatically
  - Automatically re-programming any new transmitter without loss of accuracy
  - Transmitter replacement in less than 5 minutes. True "plug & play"
- Fraction flow computation based on a 3rd-order algorithm matching all applications
- USM II platform enables fitting of add-on bus modules without loss of functionality:
  - All modules can be fitted as true "plug & play"
  - Module and transmitter automatically configured through the SENSORPROM
- Installation of the transmitter to the sensor is simple "plug & play" via the sensor pedestal.

Application

SITRANS F C mass flowmeters are suitable for all applications within the entire process industry where there is a demand for accurate flow measurement in hazardous area. The meter can measure both liquids and gases.

The main applications for the MASS 6000 Ex d transmitter can be found in:

- Chemical process industry
- Pharmaceutical industries
- Automotive industry
- Oil and gas industry
- Power generation and utility industry

Design

The transmitter is designed in an Ex d compact stainless steel enclosure which can be compact mounted on the MASS 2100 sensor range DI 3 to DI 15, and remote mounted for the entire sensor series.

The MASS 6000 Ex d is available as standard with 1 current, 1 frequency/pulse and 1 relay output and can be fitted with add-on modules for bus communication.

- Flameproof „d“ enclosure
- Enclosure stainless steel, IP67/NEMA 6 as compact and IP65 as remote
- Supply voltage 24 V AC/DC
- MASS 6000 Ex d is Ex-approved together with all MASS 2100 sensors, but can **not** be used together with MC2 Ex versions

Note

Due to RoHs directives active from July 22nd 2017, MASS 6000 transmitters of any model and variants are not for sale within EU, EU candidate countries, Norway, Switzerland, Iceland, Croatia, and Turkey.

Replacement products: 7ME461.-..., 7ME462.-..., 7ME471.-... and 7ME481.-...

Repair parts for MASS 6000 (all models and variants) are available. See spare part list.

Transmitter MASS 6000 Ex d compact/remote

Function

The following functions are available:

- Mass flow rate, volume flow rate, density, temperature, fraction flow
- 1 current output, 1 frequency/pulse output, 1 relay output, 1 digital input
- All outputs can be individually configured with mass, volume, density etc.
- 2 built-in totalizers which can count positive, negative or net
- Low flow cut-off
- Density cut-off or empty pipe cut-off, adjustable
- Flow direction
- Error system consisting of error-log, error pending menu
- Operating time
- Uni/bidirectional flow measurement
- Limit switches with 1 or 2 limits, programmable for flow, density or temperature
- Noise filter setting for optimization of measurement performance under non-ideal application conditions
- Full batch controller
- Automatic zero adjustment menu, with zero point evaluation feed back
- Full service menu for effective and straight forward application and meter troubleshooting

Technical specifications

Measurement of	Mass flow [kg/s (lb/min)], volume flow [l/s (gpm)], fraction [%], °Brix, density [kg/m^3 (lb/ft^3)], temperature [°C (°F)]
Current output	Classified Ex ia, selectable as active or passive outputs. Default setting is active mode.
Current	0 ... 20 mA or 4 ... 20 mA
Load	< 350 Ω
Time constant	0 ... 99.9 s adjustable
Current characteristics	
Active mode	U_o = 24 V, I_o = 82 mA, P_o = 0.5 W, C_o = 125 nF, L_o = 2.5 mH
Passive mode (max input from external barrier)	U_i = 30 V, I_i = 100 mA, P_i = 0.75 W, C_i = 52 nF, L_i = 100 µH
Digital output	
Frequency	0 ... 10 kHz, 50 % duty cycle
Time constant	0.1 ... 30 s adjustable
Passive	6 ... 30 V DC, max. 110 mA, 1 KΩ ≤ R_{load} ≤ 10 kΩ
Output characteristics	
Active mode	Not available
Passive mode (max input from external barrier)	U_i = 30 V, I_i = 100 mA, P_i = 0.75 W, C_i = 52 nF, L_i = 100 µH
Relay	
Type	Change-over relay
Load	30 V/100 mA
Functionality	Error level, error number, limit, direction
Output characteristics	U_i = 30 V, I_i = 100 mA, P_i = 0.75 W, C_i = 0 nF, L_i = 0 mH
Digital input	11 ... 30 V DC (R_i = 13.6 kΩ)
Functionality	Start/hold/continue batch, zero point adjust, reset totalizer 1/2, force output, freeze output
Output characteristics	U_i = 30 V, I_i = 3.45 mA, P_i = 0.10 W, C_i = 0 nF, L_i = 0 mH
Galvanic isolation	All inputs and outputs are galvanically isolated. Isolation voltage: • 500 V to supply • 50 V between outputs
Cut-off	
Low-flow	0 ... 9.9 % of maximum flow
Empty pipe	Detection of empty sensor
Density	0 ... 2.9 g/cm^3
Totalizer	Two eight-digit counters for forward, net or reverse flow
Display	• Background illumination with alphanumerical text, 3 × 20 characters to indicate flow rate, totalized values, settings and faults. Time constant as current output • Reverse flow indicated by negative sign
Zero point adjustment	Via keypad or remote via digital input
Ambient temperature	
Operation	-20 ... +50 °C (-4 ... +122 °F)
Storage	-40 ... +70 °C (-40 ... +158 °F) (Humidity max. 95 %)
Communication	Add-on modules: HART, PROFIBUS PA, FOUNDATION Fieldbus H1
HART	
Active mode	U_o = 6.88 V, I_o = 330 mA, P_o = 0.57 W, C_o = 20 nF, L_o = 100 µH
Passive mode (max input from external barrier)	U_i = 10 V, I_i = 200 mA, P_i = 0.5 W, C_i = 0 nF, L_i = 0 µH
PROFIBUS PA	
Active mode	Not available
Passive mode	U_i = 17.5 V, I_i = 380 mA, P_i = 5.32 W, C_i = 5 nF, L_i = 10 µH
FOUNDATION Fieldbus H1	
Active mode	Not available
Passive mode	U_i = 17.5 V, I_i = 380 mA
Enclosure	
Material	Stainless steel AISI 316/1.4435
Rating	• Compact mounted on sensor: IP67/NEMA 4X • Remote mounted: IP65
Load	18 ... 1000 Hz random, 1.14 g RMS, in all directions

Supply voltage	
24 V AC	
• Range	20 ... 30 V AC
• Power consumption	6 VA I_N = 250 mA, I_{ST} = 2 A (30 ms)
• Power supply	The power supply shall be from a safety isolating transformer. Maximal cable core is 1.5 mm^2
24 V DC	
• Range	18 ... 30 V DC
• Power consumption	6 W I_N = 250 mA, I_{ST} = 2 A (30 ms)
• Power supply	The power supply shall be from a safety isolating transformer. Maximal cable core is 1.5 mm^2.
EMC performance	
Emission	EN 55011/CISPR-11 (Class A)
Immunity	EN/IEC 61326-1 (Industry)
NAMUR	Within the value limits according to "Allgemeine Anforderung" with error criteria A in accordance with NE 21
Ex approval	ATEX, EAC Ex: Ex d e ib [ia Ga] IIC T4 Gb

Note

Due to RoHs directives active from July 22nd 2017, MASS 6000 transmitters of any model and variants are not for sale within EU, EU candidate countries, Norway, Switzerland, Iceland, Croatia, and Turkey.

Replacement products: 7ME461.-..., 7ME462.-..., 7ME471.-... and 7ME481.-...

Repair parts for MASS 6000 (all models and variants) are available. See spare part list.

Selection and Ordering data	Article No.
SITRANS F C MASS 6000 transmitter Transmitter Ex d for remote mounting inclusive of wall mounting kit	**7ME4110-** 2 ■■■■ - ■■ A ■
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
Enclosure	
Ex d SS with 5 m (16.5 ft) cable	G
Ex d SS with 10 m (32.8 ft) cable	H
Ex d SS with 25 m (82.0 ft) cable	J
Output configuration	
1 current, 1 frequency, 1 relay	A
Supply voltage	
24V AC/DC	2
Ex approvals	
Ex	1
Display/Keypad	
With display	1
Serial communication	
No communication	A
HART	B
PROFIBUS PA Profile 3	F
FOUNDATION Fieldbus H1	J
Cable gland	
M20	1

Operating instructions for SITRANS F C MASS 6000 Ex d

Description	Article No.
• English	**A5E02944883**

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

Note:
Only communication modules with Ex approvals are allowed.

3

Selection and Ordering data

Accessories

Add-on module for remote and compact MASS 6000 Ex d

Description	Article No.	
HART (Ex-i)	**FDK:085U0226**	
PROFIBUS PA Profile 3 (Ex-i)	**FDK:085U0236**	
FOUNDATION Fieldbus H1 (Ex-i)	**A5E02054250**	

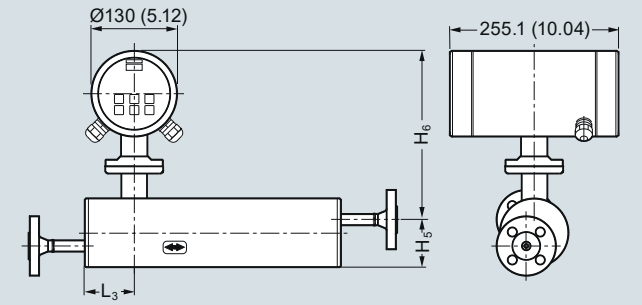
Operating instructions for SITRANS F add-on modules

Description	Article No.
HART	
• English	**A5E03089708**
PROFIBUS PA/DP	
• English	**A5E00726137**
• German	**A5E01026429**
FOUNDATION Fieldbus	
• English	**A5E02318728**
• German	**A5E02488856**

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

Dimensional drawings

MASS 6000 Ex d compact version



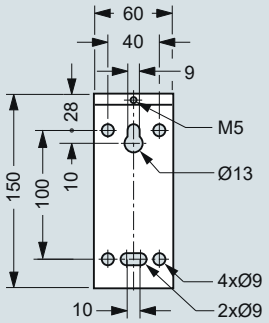
DImensions in mm (inch)

Sensor size [DI (inch)]	L_3 [mm (inch)]	H_5 [mm (inch)]	H_6 [mm (inch)]	$H_5 + H_6$ [mm (inch)]
3 (1/8)	75 (2.95)	82 (3.23)	247 (9.72)	329 (12.95)
6 (¼)	62 (2.44)	72 (2.83)	257 (10.12)	329 (12.95)
15 (½)	75 (2.95)	87 (3.43)	267 (10.51)	354 (13.94)
25 (1)	75 (2.95)	173 (6.81)	271 (10.67)	444 (17.48)
40 (1½)	75 (2.95)	227 (8.94)	271 (10.67)	498 (19.61)

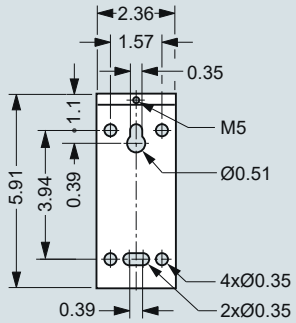
MASS 6000 Ex d remote version

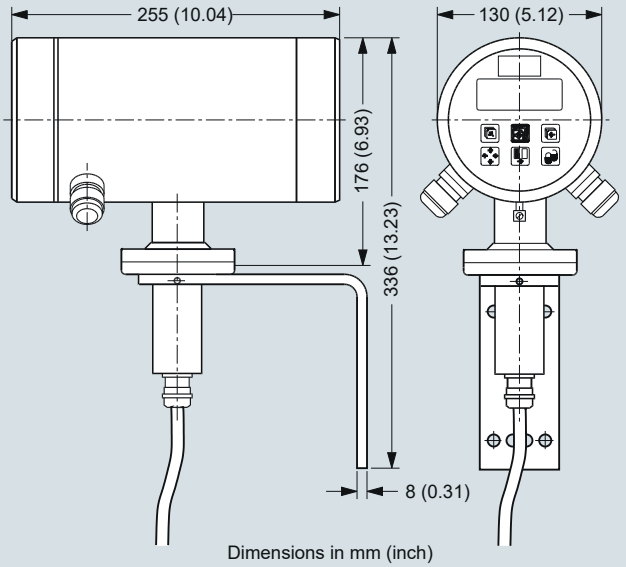
Weight: 3 kg (6.6 lbs)

Dimensions in mm



Dimensions in inch

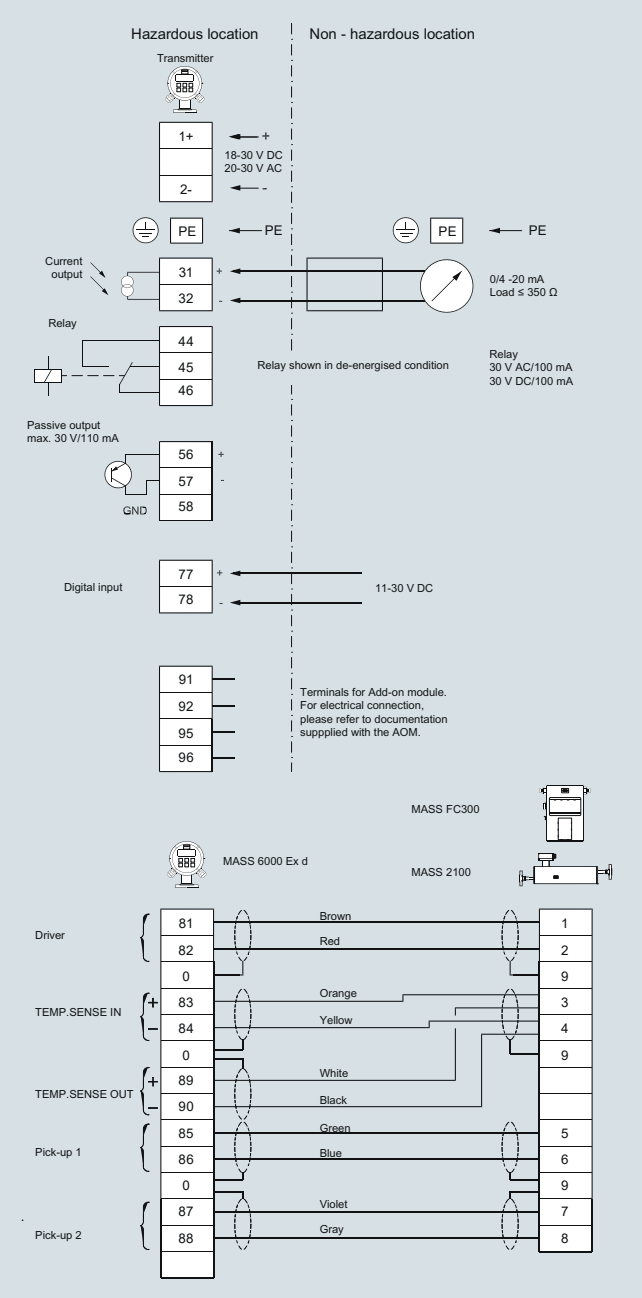




Dimensions in mm (inch)

Schematics

Electrical connection compact or remote



Transmitter SIFLOW FC070

Overview

SIFLOW FC070 is based on the latest developments within the digital processing technology – engineered for high performance, fast flow step response, immunity against process generated noise, easy to install, commission and maintain.

SIFLOW FC070 is available in two versions:

- SIFLOW FC070 Standard
- SIFLOW FC070 Ex CT

The SIFLOW FC070 transmitter delivers true multi-parameter measurements i.e. mass flow, volume flow, density, temperature and fraction.

SIFLOW FC070 is designed for integration in a variety of automation systems, i.e.:

- Central mounted in S7-300, C7
- Decentralized in ET 200M for use with S7-300 and S7-400 as PROFIBUS DP/PROFINET masters
- Decentralized in ET 200M for use with any automation system using standardized PROFIBUS DP/PROFINET masters
- Stand-alone via a Modbus RTU master, i.e. SIMATIC PDM

The SIFLOW FC070 transmitter can be connected to all sensors of types MASS 2100, FCS200 and FC300.

Benefits

- Easy integration in SIMATIC S7 and PCS 7
- Support of SIMATIC PDM configuration tool via Modbus
- Dedicated mass flow chip with high-performance ASIC technology
- True 30 Hz update rate securing fast batching and step response
- Superior noise immunity due to a DFT (Discrete Fourier Transformation) algorithm
- Front end resolution better than 0.35 ns improves zero point stability and enhances dynamic turn-down ratio on flow and density accuracy.
- Advanced diagnostics enhancing troubleshooting and meter verification
- Built-in batch controller with two-stage control and compensation
- Digital outputs for direct batch control, frequency/pulse
- Modbus RTU RS 232/RS 485 interface for connection to SIMATIC PDM or any other Modbus master
- Digital input for batch control, zero adjust
- Extensive simulation options for measurement values, I/O and errors easy communication/fault-finding
- Multiple LED's for easy indication of flow, error and I/O state
- SENSORPROM technology automatically configures the transmitter during start-up providing:
  - Factory pre-programming with calibration data, pipe size, sensor type and I/O settings
  - Any values or settings changed by the user is stored automatically
  - Automatically re-programming of a new transmitter, without loss of settings and accuracy
  - Transmitter replacement in less than 30 seconds
- Four-wire Pt1000 measurement ensuring optimum accuracy mass flow, density and fraction flow
- Fraction flow computation based on a 3rd-order algorithm matching all applications
- SIFLOW FC070 Ex CT can be used for custody transfer approved application. (Compressed gaseous fuel measuring systems for vehicles), when using the redundant digital output or the encrypted ActiveX component for SIMATIC touch panels. The approval will hav eto be done locally at the customer.
- Free of charge ActiveX component for SIMATIC touch panels, enables encrypted sensor process values to be communicated between SIFLOW FC070 Ex CT and SIMATIC touch panels

Application

SIFLOW FC070 mass flowmeters are suitable for all applications within the entire process industry, where there is a demand for accurate flow measurement. The meters are suitable for measuring on liquid and gas.

The main applications for the SIFLOW FC070 transmitter can be found in the following industries:

- Food and beverage
- Pharmaceutical
- Automotive
- Oil and gas
- Power generation and utility
- Water and waste water

Design

SIFLOW FC070 is designed in an IP20 SIMATIC S7-300 enclosure and for use in central and de-central cabinets where sensors: FCS200, FC300 and MASS 2100 are remotely mounted.

Function

The following key functionalities are available:

- Mass flow rate, volume flow rate, density, temperature and fraction flow
- Two built-in totalizers which can freely be set for counting mass, volume or fraction
- 1 frequency/pulse output
- 1 phase shifted 90°/180° frequency/pulse output
- Two-stage batch controller
- 1 digital input
- Low flow cut-off
- Empty pipe detection
- Noise filter settings for different applications
- Simulation
- Automatic zero point adjustment with zero point evaluation feed back
- Configurable upper and lower alarm and warning limits for all process values
- Comprehensive status and error reporting

Technical specifications

Measurement of	Mass flow, volume flow, density, sensor temperature, fraction A flow, fraction B flow, fraction A in %
Measurement functions	
• Totalizer 1	Totalization of mass flow, volume-flow, fraction A, fraction B
• Totalizer 2	Totalization of mass flow, volume-flow, fraction A, fraction B
• Single and 2-stage batch function	Batching function with the use of one or two outputs for dosing in high and low speed
• 4 programmable limits	4 programmable high/low limits for mass flow, volume flow, density, sensor temperature, fraction A flow, fraction B flow, fraction A in %. Limits will generate an alarm if reached.
Digital input	
Functions	Start batch, stop batch, start/stop batch, hold/continue batch, reset totalizer 1, reset totalizer 2, reset totalizer 1 and 2, zero adjust, force frequency output, freeze frequency output
High signal	• Nominal voltage: 24 V DC • Lower limit: 15 V DC • Upper limit: 30 V DC • Current: 2 ... 15 mA
Low signal	• Nominal voltage: 0 V DC • Lower limit: -3 V DC • Upper limit: 5 V DC • Current: -15 ... +15 mA
Input	Approx. 10 kΩ
Switching	Max. 100 Hz.
Digital output 1 and 2	
Functions	• Output 1: Pulse, frequency, redundancy pulse, redundancy frequency 2-stage batch, batch • Output 2: Redundancy pulse, redundancy frequency, 2-stage batch
Voltage supply	3 ... 30 V DC (passive output)
Switching current	Max. 30 mA at 30 V DC
Voltage drop	≤ 3 V DC at max. current
Leakage current	≤ 0.4 mA at max. voltage 30 V DC
Load resistance	1 ... 10 kΩ
Switching frequency	0 ... 12 kHz 50 % duty cycle
Functions	Pulse, frequency, redundancy pulse, redundancy frequency 2-stage batch, batch
Communication	
Modbus RS 232C	• Max. baud rate: 115 200 baud • Max. line length: 15 m at 115 200 baud • Signal level: according to EIA-RS 232C
Modbus RS 485	• Max. baud rate: 115 200 baud • Max. line length: 1200 m at 115 200 baud • Signal level: according to EIA-RS 485 • Bus termination: Integrated. Can be enabled by inserting wire jumpers.
Galvanic isolation	All inputs, outputs and communication interfaces are galvanically isolated. Isolation voltage: 500 V

Power	
Supply	24 V DC nominal
Tolerance	20.4 V DC ... 28.8 V DC
Consumption	Max. 7.2 W
Fuse	T1 A/125 V, not replaceable by operator
Environment	
Ambient temperature	• Storage -40 ... +70 °C (-40 ... +158 °F)
Operation conditions	Horizontally mounted rail. For SIFLOW FC070 Std.: 0 … 60 °C (32 ... 140 °F) For SIFLOW FC070 Ex CT: -40 ... +60 °C (-40 ... +140 °F) Vertically mounted rail For SIFLOW FC070 Std.: 0 … 45 °C (32 ... 113 °F) For SIFLOW FC070 Ex CT: -40 ... +45 °C (-40 ... +113 °F)
Altitude	• Operation: -1000 ... 2000 m (pressure 795 ... 1080 hPa)
Enclosure	
Material	Noryl, color: anthracite
Rating	IP20/NEMA 2 according to IEC 60529
Mechanical load	According to SIMATIC standards (S7-300 devices)
Ex approvals	
SIFLOW FC070 Standard	ATEX: II 3G Ex nA II T4
SIFLOW FC070 Ex CT	• ATEX, IECEx, EAC Ex, FM, CSA, INMETRO - Zone 2: Ex nA [ia] IIC T4 • FM - Class I, Div. 2: Grp. A, B, C, D (interface to Class I+II+III, Div. 1)
Custody transfer approvals	
SIFLOW FC070 Ex CT	Compressed gaseous fuel measuring systems for vehicles NTEP for USA and Canada, approval no: 97-111A3
EMC performance	
Emission	EN 55011/CISPR-11
Immunity	EN/IEC 61326-1
Certification	
CE mark	Low voltage directive RoHS
NAMUR	Within the limits according to "General recommendations" with error criteria A in accordance with NE 21
Programming tools	
SIMATIC S7	Configuration through backplane P-BUS, PLC program and WinCC flexible
SIMATIC PCS7	Configuration trough backplane P-BUS and PLC/WinCC faceplates, certified driver
SIMATIC PDM	Through Modbus port RS 232C and RS 485, certified driver

Selection and Ordering data

Description	Article No.
SIFLOW FC070 flow transmitter Remember to order 40 pin front plug connector.	**7ME4120-2DH20-0EA0**
40 pin front connector with screw contacts	**6ES7392-1AM00-0AA0**
40 pin connector with spring contacts	**6ES7392-1BM01-0AA0**
SIFLOW FC070 Ex CT flow transmitter Remember to order 20 pin front plug connector.	**7ME4120-2DH21-0EA0**
20 pin plug with spring contacts	**6ES7392-1BJ00-0AA0**
20 pin front connector with screw contacts	**6ES7392-1AJ00-0AA0**

Operating instructions for SITRANS F C SIFLOW FC070

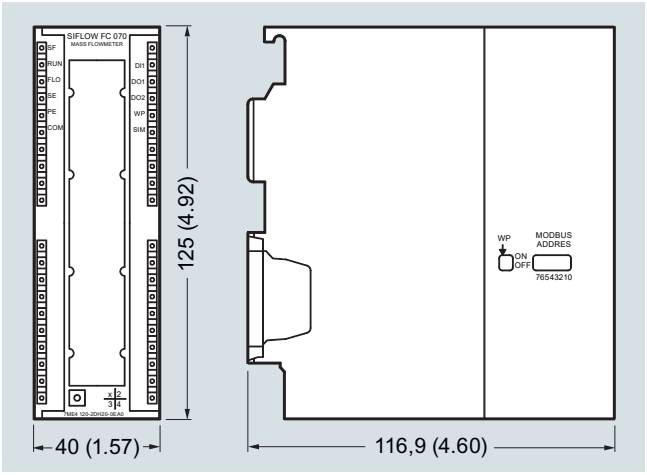
Description	Article No.
SIFLOW FC070 system manual	
• English	**A5E00924779**
• German	**A5E00924776**
SIFLOW FC070 with S7	
• English	**A5E02254228**
• German	**A5E02665536**
SIFLOW FC070 with PCS7	
• English	**A5E03694109**

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

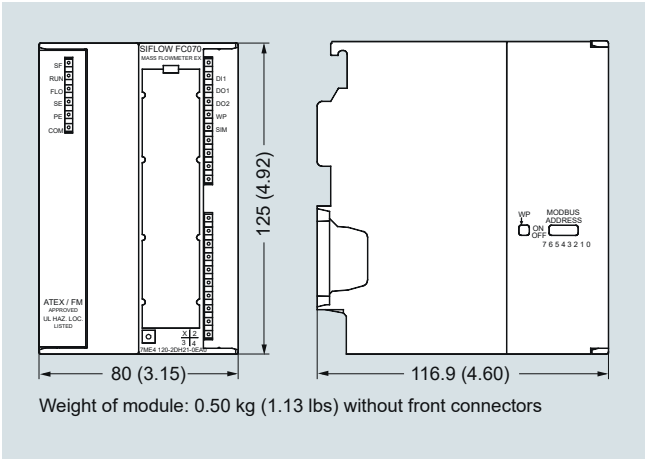
Accessories

Description	Article No.	
Cable with multiplug for connecting MASS 2100, FCS200 and FC300 sensors, 5 x 2 x 0.34 mm² twisted and screened in pairs. Temperature range -20 ... +110°C (-4 ... +230 °F)		
• 5 m (16.4 ft)	**FDK:083H3015**	
• 10 m (32.8 ft)	**FDK:083H3016**	
• 25 m (82 ft)	**FDK:083H3017**	
• 50 m (164 ft)	**FDK:083H3018**	
• 75 m (246 ft)	**FDK:083H3054**	
• 150 m (492 ft)	**FDK:083H3055**	
Cable without multiplug for connecting MC2 sensors, 5 x 2 x 0.34 mm² twisted and screened in pairs. Temperature range -20 ... +110°C (-4 ... +230 °F)		
• 10 m (32.8 ft)	**FDK:083H3001**	
• 25 m (82 ft)	**FDK:083H3002**	
• 75 m (246 ft)	**FDK:083H3003**	
• 150 m (492 ft)	**FDK:083H3004**	
SIMATIC S7-300 rail The mechanical mounting rack of the SIMATIC S7-300		
• 160 mm (6.3")	**6ES7390-1AB60-0AA0**	
• 482 mm (18.9")	**6ES7390-1AE80-0AA0**	
• 530 mm (20.8")	**6ES7390-1AF30-0AA0**	
• 830 mm (32.7")	**6ES7390-1AJ30-0AA0**	
• 2000 mm (78.7")	**6ES7390-1BC00-0AA0**	
SIFLOW FC070 Demo suitcase with MASS 2100 DI 1.5 sensor and SIMATIC HMI TP 177B touch panel	**A5E01075465**	
SIMATIC S7-300, stabilized power supply PS307 Input: 120/230 V AC Output: 24 V DC/2 A	**6ES7307-1BA01-0AA0**	

Dimensional drawings



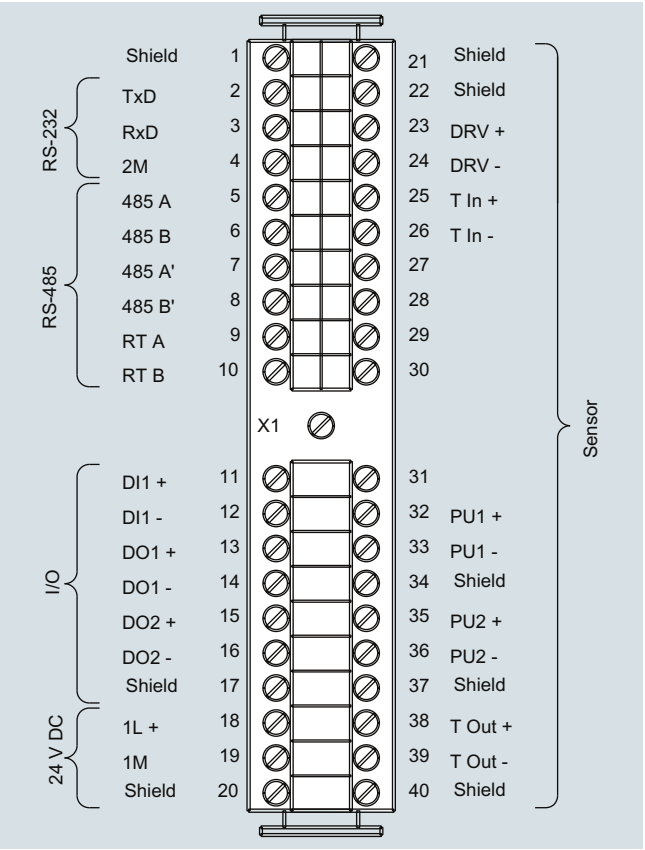
SIFLOW FC070, dimensions in mm (inch)



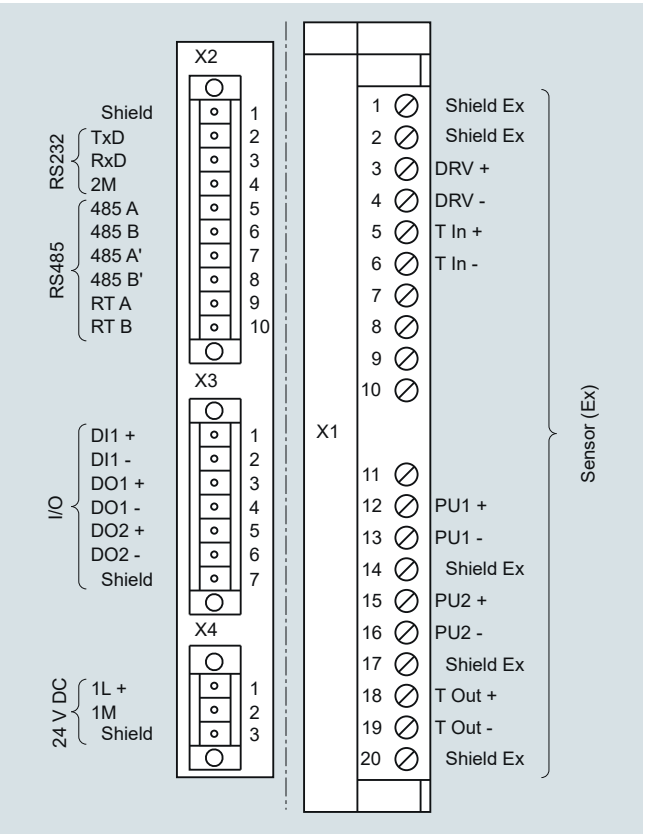
Weight of module: 0.50 kg (1.13 lbs) without front connectors

SIFLOW FC070 Ex CT, dimensions in mm (inch)

Schematics



SIFLOW FC070, electrical connection



SIFLOW FC070 Ex CT, electrical connection

Flow sensor SITRANS FCS200

Overview

SITRANS FCS200 (DN10, DN 15 and DN 25) is a Coriolis sensor specialized for accurate mass flow measurement of gases.

The sensor offers superior performance in terms of flow accuracy and turn down ratio. The ultra compact sensor design makes installation, replacement and commissioning very straight forward and easy.

Benefits

- High accuracy gas measurement
- Approved for use in hazardous area
- DN 10 and DN 15 is custody transfer approved, according to NTEP (Compressed gaseous fuel measuring systems for vehicles). For custody transfer applications SIFLOW FC070 Ex CT must be used.
- Self-draining in vertical orientation
- Pt1000 temperature measurement for optimum accuracy
- SENSORPROM enabling true "plug & play"
- Rigid enclosure design reducing influence from pipeline vibration and thermal stress
- High-pressure measurement up to 350 bar (5076 psi)
- Ultra compact sensor design with space-saving split flow

Application

SITRANS FCS200 is designed for measurement of gases and is suitable for use in the oil and gas industry:

- Filling of gas bottles
- CNG dispensers
- Metering of general gas applications

Design

SITRANS FCS200 is available in DN 10, DN 15 and DN 25.

The sensor consists of 2 parallel measuring pipes, welded directly onto a flow splitter at each end of the sensor to eliminate a direct coupling to the process connectors and significantly reduce effects from external vibrations. The flow-splitters are welded directly onto a rigid sensor housing which acts as a mechanical low pass filter.

The SITRANS FCS200 DN 10 and DN 15 wetted parts material is Hastelloy C22, and the DN 25 wetted parts material is AISI 316Ti/1.4571. The enclosure is made of stainless steel AISI 316L/1.4404 with a grade of encapsulation of IP67.

The two black rupture discs are designed to protect the enclosure from overpressure.

Function

The flow measuring principle is based on the Coriolis effect. See "System information SITRANS F C".

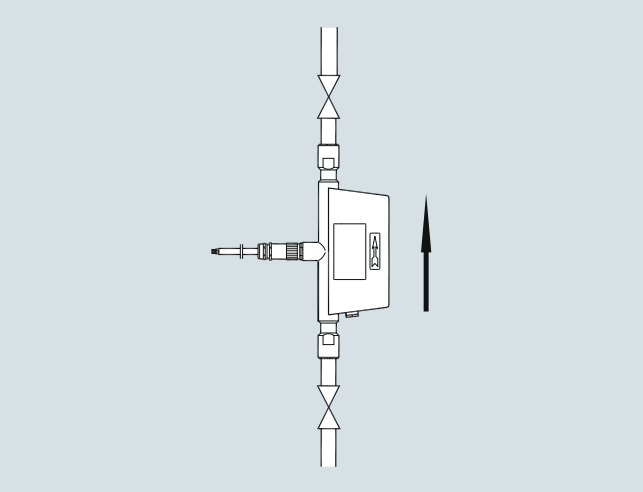
Integration

The complete flowmeter consists of the sensor (SITRANS FCS200) and a transmitter SITRANS F C MASS 6000 or SIFLOW FC070. All communication options are available for MASS 6000.

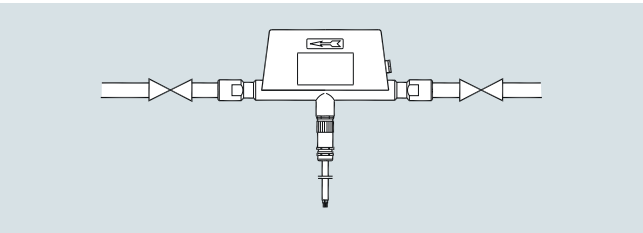
The sensor is shipped with a SENSORPROM memory unit containing all information about calibration data, device identity and factory pre-programming of transmitter settings.

Installation guidelines

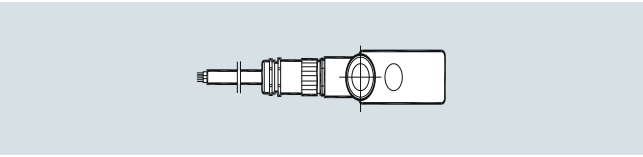
Siemens Flow Instruments recommends installing the sensor in one of the following ways:



Vertical orientation with an upwards flow



Horizontal installation, tubes up



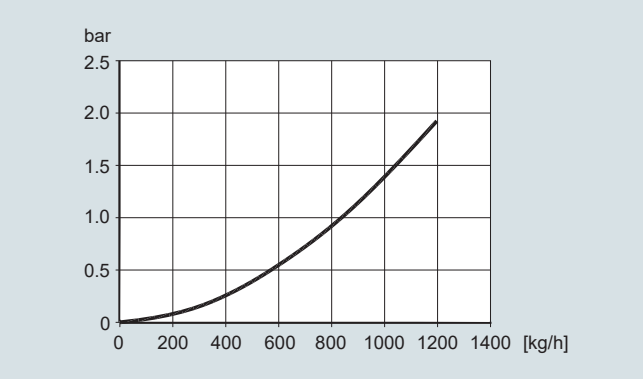
Horizontal installation, tubes sideways

Technical specifications

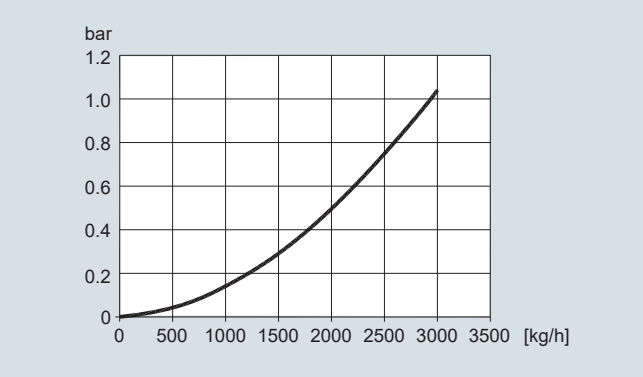
Sensor size	DN 10	DN 15	DN 25
Mass Flow			
Accuracy [% of rate]		± 0.5	
Repeatability [% of rate]		± 0.25	
Max. zero point error [kg/h (lb/h)]	0.25 (0.55)	1.2 (2.65)	3.0 (6.6)
Measuring range [kg/min (lb/min)]	0 … 42 (0 … 92.6)	0 … 200 (0 … 440.9)	0 … 500 (0 … 1102.3)
Process temperature	-40 ... +125 °C (-40 ... +257 °F)		
Ambient temperature	-40 ... +60 °C (-40 ... +140 °F)		
Temperature error	0.5 °C (0.9 °F)		
Pressure [bar (psi)]	350 (5076)	350 (5076)	214 (3104)
Enclosure grade	IP66/IP67 (EN 60529)		
Material			
Measuring pipe	Hastelloy C22/2.4602	Hastelloy C22/2.4602	Stainless steel AISI 316L/1.4571
Splitter	Hastelloy C22/2.4602	Stainless steel AISI 316L/1.4571	Stainless steel AISI 316L/1.4571
Enclosure and connection (flanges)	Stainless steel		
Connection thread	¼" NPT ½" NPT ½" VCO	½" NPT ¾" NPT 1" NPT ¾" VCO	1" NPT 1½" NPT 1" VCO
Weight approx.	2.8 kg (6.2 lb)	6.0 kg (13.2 lb)	11 kg (24.2 lb)
Ex approvals			
ATEX	II 1/2 G Ex ia IIC T5/T4 Ga/Gb		
IECEx	Ex ia IIC T5/T4 Ga/Gb		
EAC Ex	0Ex ia IIC T4/T5 Gb		
FM	Class I, Div 1, Groups A, B, C and D		
Custody transfer approvals			
DN 10/DN 15	Compressed gaseous fuel measuring systems for vehicles NTEP for USA and Canada, approval no: 97-111A3		

Characteristic curves

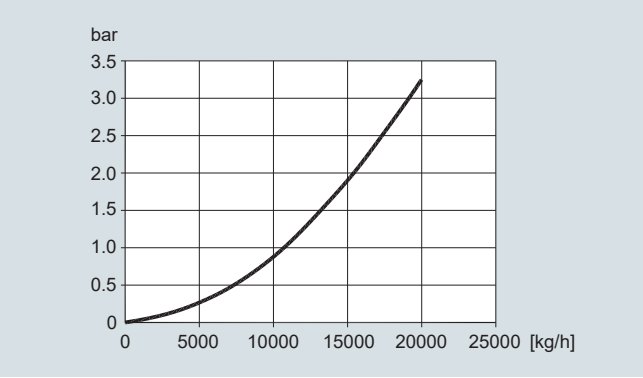
DN 10



DN 15



DN 25



The pressure drop as a function of capacity for CNG with a pressure of 200 bar (2900 psi) and an ambient temperature of 20 °C (68 °F).

Flowsensor SITRANS FCS200

Selection and Ordering data	Article No.
SITRANS F C Flow sensors	
SITRANS FCS200 sensor, without heating jacket	7ME4500 - ■■■■■ - ■■■■
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
Sensor size and material	
DN 10, Hastelloy C22/2.4602	2D
DN 15, Hastelloy C22/2.4602	2E
DN 25, Stainless steel AISI 316Ti/1.4571	1F
Pressure	
PN 214 (DN 25)	K
PN 350 (DN 10 and DN 15)	N
Process connection/flange	
½"/VCO	71
¾"/VCO	72
1"/VCO	73
¼"/NPT pipe thread	81
½"/NPT pipe thread	82
¾"/NPT pipe thread	83
1"/NPT pipe thread	84
1½"/NPT pipe thread	85
Configuration	
PTB custody transfer approval	1
NTEP custody transfer approval	2
Transmitter	
None	A
Cable	
No cable	A
Calibration	
Standard calibration	1
Extended calibration	8

Selection and Ordering data	Order code
Additional information	
Please add "**-Z**" to Article No. and specify Order code(s) and plain text.	
Pressure testing certificate PED: 2014/68/EU	**C11**
Material certificate EN 10204-3.1	**C12**
NDT-Penetrant inspection report ISO 3452	**C13**
Factory certificate according to EN 10204 2.2	**C14**
Factory certificate according to EN 10204 2.1	**C15**
Tag name plate, stainless steel	**Y17**

Accessories

Description		Article No.
Cable with multiple connector	5 m (16.4 ft)	**FDK:083H3015**
Standard blue cable between SIFLOW FC070/MASS 6000 and FCS200, 5 x 2 x 0.34 mm^2 twisted and screened in pairs. Temperature range -20 °C ... +110 °C (-4 °F ... +230 °F)	10 m (32.8 ft)	**FDK:083H3016**
	25 m (82 ft)	**FDK:083H3017**
	50 m (164 ft)	**FDK:083H3018**
	75 m (246 ft)	**FDK:083H3054**
	150 m (492 ft)	**FDK:083H3055**

Operating instructions for SITRANS FCS200

Description	Article No.
• English	**A5E02508199**
• German	**A5E03082574**

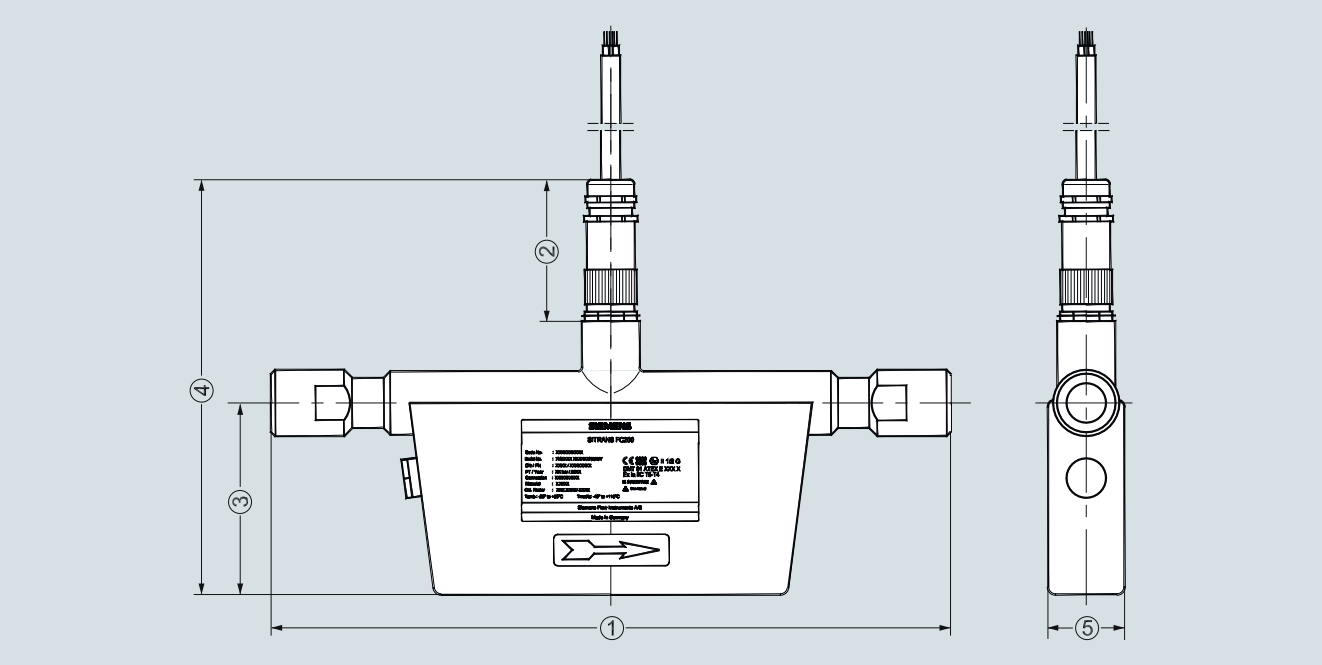
All literature is available to download for free, in a range of languages, at www.siemens.com/processinstrumentation/documentation

Spare parts

Description	Article No.
Multiple connector for cable mounting	**FDK:083H5056**
2 kB SENSORPROM unit (Sensor Serial No. and Article No. must be specified by ordering)	**FDK:083H4410**

Dimensional drawings

SITRANS FCS200, DN 10 ... DN 15

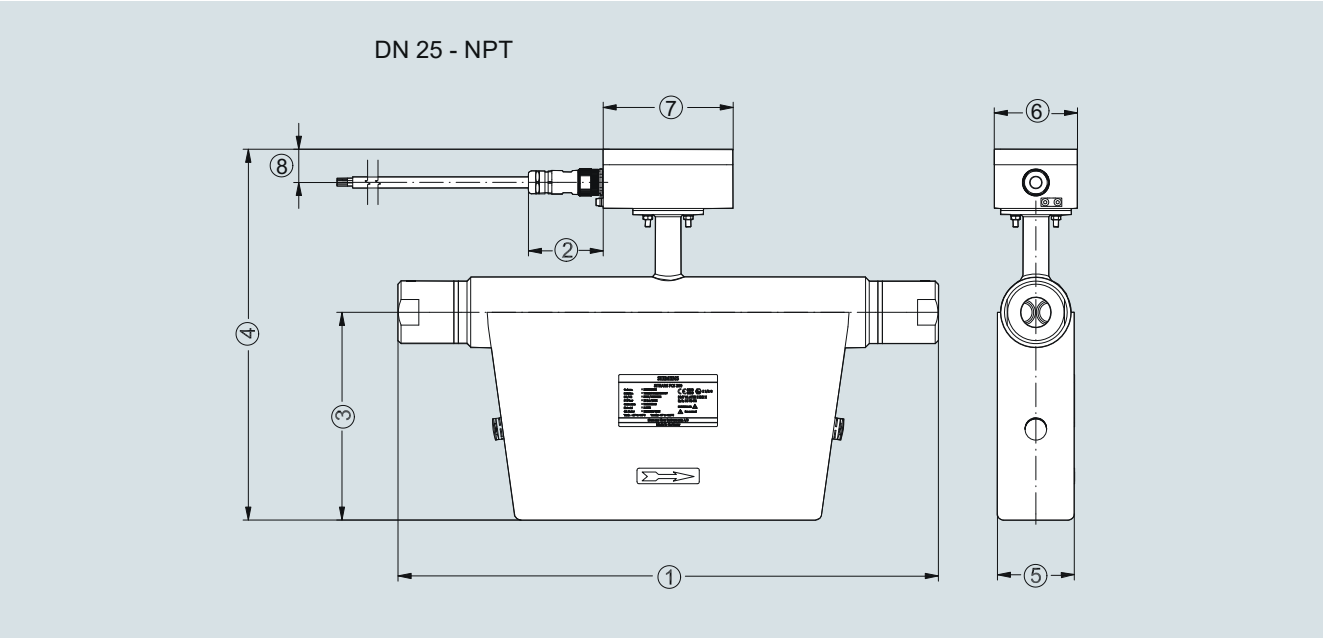


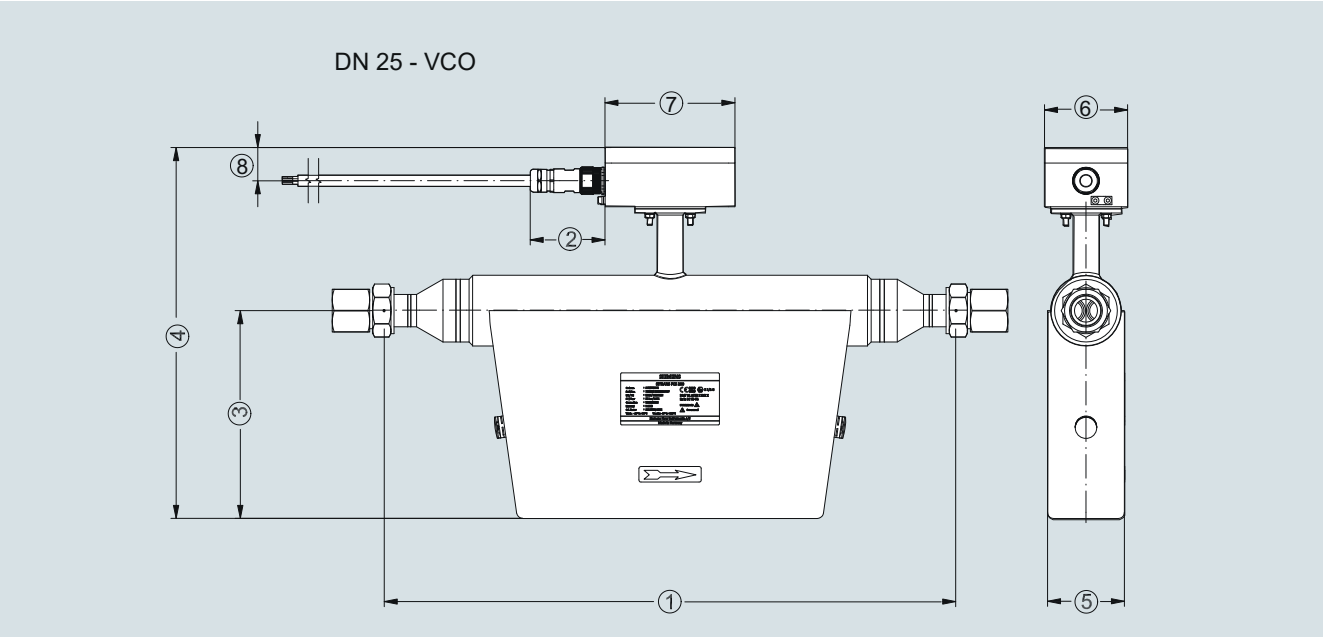
SITRANS FCS200, DN 10 ... DN 15, dimensions in mm (inch)

Position	DN 10 with NPT connectors mm (inch)	DN 10 with VCO connectors mm (inch)	DN 15 mm (inch)
(1)	350 (13.78)	330 (12.99)	450 (17.72)
(2)	72 (2.84)	72 (2.84)	72 (2.84)
(3)	100 (3.94)	100 (3.94)	148 (5.83)
(4)	204 (8.03)	204 (8.03)	253 (9.96)
(5)	40 (1.57)	40 (1.57)	48 (1.89)

Flowsensor SITRANS FCS200

SITRANS FCS200, DN 25





SITRANS FCS200, DN 25, dimensions in mm (inch)

Position	DN 25 with NPT connection mm (inch)	DN 25 with VCO connection mm (inch)
(1)	520 (20.47)	550 (21.65)
(2)	72 (2.84)	72 (2.84)
(3)	200 (7.87)	200 (7.87)
(4)	357 (14.77)	357 (14.77)
(5)	74 (2.91)	74 (2.91)
(6)	80 (3.15)	80 (3.15)
(7)	125 (4.92)	125 (4.92)
(8)	32 (1.26)	32 (1.26)

SITRANS F C sensor MASS 2100 DI 1,5 with SITRANS MASS 6000 and SIFLOW FC070 transmitter

Note: Technical specification see page 3/180 to 3/182.

Selection and Ordering data	Article No.	Ord. code
SITRANS F C Flow sensors	7ME4100 -	
MASS 2100 DI 1.5 (1/16“) sensor	■■■■■ - ■■■	■■■
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Diameter		
Stainless steel AISI 316L/1.4435		
DI 1.5, max. 125 °C (257 °F)	1A	
DI 1.5, max. 180 °C (356 °F)	1B	
Hastelloy C22/2.4602		
DI 1.5, max. 125 °C (257 °F)	2A	
DI 1.5, max. 180 °C (356 °F)	2B	
Pressure		
PN 100	D	
PN 230 (AISI 316L/1.4404)	L	
PN 365 (C22/2.4602)	P	
Process connection/flange		
Pipe thread		
G ¼“ male	10	
¼“ NPT male	11	
Configuration		
Standard		1
Density		2
Brix/Plato		3
Fraction (specification required)		9 N0Y
Transmitter		
No transmitter, sensor and adapter only		A
MASS 6000, Ex d, stainless steel enclosure, 1 current, 1 freq./pulse and 1 relay output, 24 V AC/DC with Ex d e ib [ia Ga] IIC T4 Gb Ex-approval.		B
MASS 6000, IP67, Polyamide enclosure, cable glands M20, 1 current, 1 freq./pulse and 1 relay output, 24 V AC/DC.		C
MASS 6000, IP67, Polyamide enclosure, cable glands M20, 1 current, 1 freq./pulse and 1 relay output, 115/230 V AC 50/60 Hz		D
MASS 6000, IP67, Polyamide enclosure, cable glands ½" NPT, 1 current, 1 freq./pulse and 1 relay output, 24 V AC/DC		E
MASS 6000, IP67, Polyamide enclosure, cable glands ½" NPT, 1 current, 1 freq./pulse and 1 relay output, 115/230 V AC 50/60 Hz, ½" NPT		F
Cable		
No cable		A
5 m (16.4 ft) cable		B
10 m (32.8 ft) cable		C
25 m (82 ft) cable		D
50 m (164 ft) cable		E
75 m (246 ft) cable		F
150 m (492 ft) cable		G
Calibration		
Standard calibration 3 flow x 2 points		1
Standard calibration matched pair 3 flow x 2 points		2
Accredited calibration matched pair 5 flow x 2 points		3
Extended calibration customer-specified select Y60, Y61, Y62 or Y63 (see additional information)		8

Selection and Ordering data	Order code
Additional information	
Please add “**-Z**“ to Article No. and specify Order code(s) and plain text.	
Pressure testing certificate PED: 2014/68/EU	**C11**
Material certificate EN 10204-3.1	**C12**
Welding certificate NDT-Penetrant: ISO 3452	**C13**
Factory certificate according to EN 10204 2.2	**C14**
Factory certificate according to EN 10204 2.1	**C15**
Tag name plate, stainless steel	**Y17**
Tag name plate, plastic	**Y18**
Customer-specific transmitter setup	**Y20**
Customer-specified, matched pair (5 x 2)	**Y60**
Customer-specified calibration (5 x 2)	**Y61**
Customer-specified, matched pair (10 x 1)	**Y62**
Customer-specified calibration (10 x 1)	**Y63**
Cleaned for oil and grease	**Y80**
Special version	**Y99**

Operating instructions for SITRANS F C MASS 2100 DI 1.5

Description	Article No.
• English	**A5E03089952**

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

Accessories

Description	Article No.	
Cable with multiple connector Standard blue cable between MASS 6000 and MASS 2100, 5 x 2 x 0.34 mm² twisted and screened in pairs. Temperature range -20 °C ... +110 °C (-4 °F ... +230 °F)		
• 5 m (16.4 ft)	**FDK:083H3015**	
• 10 m (32.8 ft)	**FDK:083H3016**	
• 25 m (82 ft)	**FDK:083H3017**	
• 50 m (164 ft)	**FDK:083H3018**	
• 75 m (246 ft)	**FDK:083H3054**	
• 150 m (492 ft)	**FDK:083H3055**	

Spare parts

Description	Article No.	
Multiple connector for cable mounting	**FDK:083H5056**	
2 kB SENSORPROM unit (Sensor Serial No. and Article No. must be specified by ordering)	**FDK:083H4410**	
Bracket Mounting bracket for flow sensor MASS 2100 DI 1.5	**A5E02590427**	

SITRANS F C sensor FC300 DN 4 with SITRANS MASS 6000 and SIFLOW FC070 transmitter

Note: Technical specification see page 3/183 to 3/186.

Selection and Ordering data	Article No.	Order code
SITRANS F C Flow sensors	7ME4400 -	
SITRANS FC300 DN 4 (1/6“) sensor	▪▪▪▪▪ - ▪▪▪▪	▪▪▪
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Pipe material and temperature		
Stainless steel AISI 316L/1.4435		
115 °C (239 °F)	1 G	
180 °C (356 °F)	1 H	
Hastelloy C22/2.4602		
115 °C (239 °F)	2 G	
180 °C (356 °F)	2 H	
Pressure		
PN 100	D	
PN 130 (316L/C22)	G	
PN 410 (C22)	Q	
Process connection		
Pipe thread		
G ¼“ male	1 0	
¼“ NPT male	1 1	
Configuration		
Standard	1	
Density	2	
Brix/Plato	3	
Fraction (specification required)	9	N 0 Y
Transmitter		
No transmitter, sensor and adapter only	A	
MASS 6000, Ex d, stainless steel enclosure, 1 current, 1 freq./pulse and 1 relay output, 24 V AC/DC with Ex d e ib [ia Ga] IIC T4 Gb Ex-approval	B	
MASS 6000, IP67, Polyamide enclosure, cable glands M20, 1 current, 1 freq./pulse and 1 relay output, 24 V AC/DC	C	
MASS 6000, IP67, Polyamide enclosure, cable glands M20, 1 current, 1 freq./pulse and 1 relay output, 115/230 V AC 50/60 Hz	D	
MASS 6000, IP67, Polyamide enclosure, cable glands ½" NPT, 1 current, 1 freq./pulse and 1 relay output, 24 V AC/DC	E	
MASS 6000, IP67, Polyamide enclosure, cable glands ½" NPT, 1 current, 1 freq./pulse and 1 relay output, 115/230 V AC 50/60 Hz, ½" NPT	F	
Cable		
No cable	A	
Cable with one M20 connector and one end for terminal connect		
• 5 m (16.4 ft)	B	
• 10 m (32.8 ft)	C	
• 25 m (82 ft)	D	
• 50 m (164 ft)	E	
• 75 m (246 ft)	F	
• 150 m (492 ft)	G	
Calibration		
Standard calibration 3 flow x 2 points	1	
Standard calibration matched pair 3 flow x 2 points	2	
Accredited calibration matched pair 5 flow x 2 points	3	
Extended calibration customer-specified select Y60, Y61, Y62 or Y63 (see additional information)	8	

Selection and Ordering data	Order code
Additional information Please add “**-Z**“ to Article No. and specify Order code(s) and plain text.	
Pressure testing certificate PED: 2014/68/EU	**C11**
Material certificate EN 10204-3.1	**C12**
Welding certificate NDT-Penetrant: ISO 3452	**C13**
Factory certificate according to EN 10204 2.2	**C14**
Factory certificate according to EN 10204 2.1	**C15**
Tag name plate, stainless steel	**Y17**
Tag name plate, plastic	**Y18**
Customer-specific transmitter setup	**Y20**
Customer-specified, matched pair (5 x 2)	**Y60**
Customer-specified calibration (5 x 2)	**Y61**
Customer-specified, matched pair (10 x 1)	**Y62**
Customer-specified calibration (10 x 1)	**Y63**
Cleaned for oil and grease	**Y80**
Special version	**Y99**

Operating instructions for SITRANS F C FC300

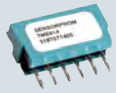
Description	Article No.
• English	**A5E00698213**
• German	**A5E00728101**

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

Accessories

Description	Article No.	
Cable with M20 connector Standard blue cable between MASS 6000 and MASS 2100, 5 x 2 x 0.34 mm² twisted and screened in pairs. Cable mounted with one M20 connector and one end for terminal connections. Temperature range: -20 ... +110 °C (-4 ... +230 °F)		
• 5 m (16.4 ft)	**FDK:083H3015**	
• 10 m (32.8 ft)	**FDK:083H3016**	
• 25 m (82 ft)	**FDK:083H3017**	
• 50 m (164 ft)	**FDK:083H3018**	
• 75 m (246 ft)	**FDK:083H3054**	
• 150 m (492 ft)	**FDK:083H3055**	

Spare parts

Description	Article No.	
Multiple connector for cable mounting	**FDK:083H5056**	
2 kB SENSORPROM unit (Sensor Serial No. and Article No. must be specified by ordering)	**FDK:083H4410**	
Mounting bracket FC300, AISI 304	**A5E02590439**	

SITRANS F C sensor MASS 2100 DI 3, DI 6 and DI 15 with SITRANS MASS 6000 and SIFLOW FC070 transmitter

Note: Technical specification see page 3/187 to 3/198.

Selection and Ordering data	Article No.	Ord. code
SITRANS F C sensors		
MASS 2100 without heating jacket	7ME4100-	
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Diameter		
Stainless steel AISI 316L/1.4435		
DI 3 (PN 100/PN 230)	1C	
DI 6	1D	
DI 15	1E	
Hastelloy C22/2.4602		
DI 3 (PN 100/PN 350)	2C	
DI 6	2D	
DI 15	2E	
Pressure		
PN 16 (DI 6, DI 15)	A	
PN 25 (DI 6, DI 15)	B	
PN 40 (DI 6, DI 15)	C	
PN 100 (DI 3, DI 6, DI 15)	D	
PN 130 (DI 15, ½", AISI 316L/1.4404)	G	
PN 200 (DI 15, ½", Hastelloy C22/2.4602)	K	
PN 230 (DI 3, ¼", AISI 316L/1.4404)	L	
PN 265 (DI 6, ¼", AISI 316L/1.4404)	M	
PN 350 (DI 3, ¼", Hastelloy C22/2.4602)	N	
PN 410 (DI 6, ¼", Hastelloy C22/2.4602)	Q	
Class 150 (DI 6, DI 15)	R	
Class 600 (DI 6, DI 15)	S	
Process connection/flange		
Pipe thread		
G ¼"	10	
¼" NPT	11	
G ½"	12	
½" NPT	13	
G 1	14	
1" NPT	15	
G 2"	16	
2" NPT	17	
Flange EN1092-1 Form B		
DN 10 (PN 40/PN 100)	20	
DN 15 (PN 40/PN 100)	21	
DN 25 (PN 40/PN 100)	22	
Flange ASME/ANSI B 16.5		
½" (class 150/class 600)	30	

Selection and Ordering data	Article No.	Ord. code
SITRANS F C sensors		
MASS 2100 without heating jacket	7ME4100-	
Dairy screwed connection DIN 11851		
DN 10 (PN 40)	40	
DN 15 (PN 40)	41	
DN 25 (PN 40)	42	
Dairy clamp connection ISO 2852 (DIN 32676) Cone down the sensor in order to obtain self-drainage with connectors ISO 2852		
25 mm (PN 16)	50	
38 mm (PN 16)	51	
51 mm (PN 16)	52	
Dairy screwed connection ISO 2853		
25 mm (PN 16)	60	
38 mm (PN 16)	61	
51 mm (PN 16)	62	
Configuration/calibration type		
Standard	1	
Density	2	
Brix/Plato	3	
Fraction (specification required)	9	NOY
Transmitter compact mounted on sensor		
No transmitter, sensor and adapter only	A	
MASS 6000, Ex d, stainless steel enclosure, 1 current, 1 freq./pulse and 1 relay output, 24 V AC/DC with Ex d e ib [ia Ga] IIC T4 Gb Ex-approval	B	
MASS 6000, IP67, Polyamide enclosure, cable glands M20, 1 current, 1 freq./pulse and 1 relay output, 24 V AC/DC	C	
MASS 6000, IP67, Polyamide enclosure, cable glands M20, 1 current, 1 freq./pulse and 1 relay output, 115/230 V AC 50/60 Hz	D	
MASS 6000, IP67, Polyamide enclosure, cable glands ½" NPT, 1 current, 1 freq./pulse and 1 relay output, 24 V AC/DC	E	
MASS 6000, IP67, Polyamide enclosure, cable glands ½" NPT, 1 current, 1 freq./pulse and 1 relay output, 115/230 V AC 50/60 Hz	F	
Cable		
No cable	A	
Cable with one M20 connector and one end for terminal connect	B	
• 5 m (16.4 ft)	B	
• 10 m (32.8 ft)	C	
• 25 m (82 ft)	D	
• 50 m (164 ft)	E	
• 75 m (246 ft)	F	
• 150 m (492 ft)	G	
Calibration/verification		
Standard calibration 3 flow x 2 points	1	
Stand. calibration matched pair 3 flow x 2 points	2	
Accredited calibration matched pair 5 flow x 2 points (ISO 17025)	3	
Extended calibration customer-specified select Y60, Y61, Y62 or Y63 (see additional information)	8	

SITRANS F C sensor MASS 2100 DI 3, DI 6 and DI 15 with SITRANS MASS 6000 and SIFLOW FC070 transmitter

Dairy MLFB example

MASS 2100

Sensor size DI 15, AISI 316L/1.4435	7ME4100- 1E
PN 40	C
DN 15 connector	41
Standard configuration/calibration	1
MASS 6000 IP67 compact mounted	D
No cable	A
Standard calibration, 3 flow x 2 points	1

Selection and Ordering data — Order code

Addtional information

Please add "**-Z**" to Article No. and specify Order code(s) and plain text.

Pressure testing certificate PED: 2014/68/EU	**C11**
Material certificate EN 10204-3.1	**C12**
NDT- X-ray inspection report: EN 1435 DI3 sensor only: NDT-Penetrant inspection report ISO 3452.	**C13**
Factory certificate according to EN 10204 2.2	**C14**
Factory certificate according to EN 10204 2.1	**C15**
Tag name plate, stainless steel	**Y17**
Tag name plate, plastic	**Y18**
Customer-specific transmitter setup	**Y20**
Customer-specified, matched pair (5 x 2)	**Y60**
Customer-specified calibration (5 x 2)	**Y61**
Customer-specified, matched pair (10 x 1)	**Y62**
Customer-specified calibration (10 x 1)	**Y63**
Cleaned for oil and grease	**Y80**
Special version	**Y99**

Operating instructions for SITRANS F C MASS 2100 DI 3 to DI 40

Description	Article No.
• English	**A5E02896535**
• German	**A5E03073519**

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

Selection and Ordering data

Accessories

Description	Dimension	Article No.
Mating parts for hygienic fittings DIN 11851 (AISI 316L) Includes: • 2 unions • 2 mating parts (for welding in) • 2 EPDM gaskets		
	DN 10	**FDK:085U1016**
	DN 15	**FDK:085U1017**
	DN 25	**FDK:085U1019**
Mating parts for hygienic clamp ISO 2852 (AISI 316L) Includes: • 2 clamps • 2 mating parts • 2 EPDM gaskets		
	25 mm	**FDK:085U1029**
2 EPDM gaskets with collar for mounting set DIN 11851		
	DN 10	**FDK:085U1006**
	DN 15	**FDK:085U1007**
	DN 25	**FDK:085U1009**

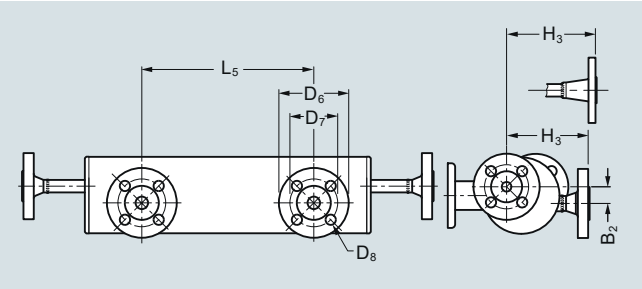
Description	Length	Article No.
Cable with M20 connector Standard blue cable between MASS 6000 and MASS 2100, 5 x 2 x 0.34 mm² twisted and screened in pairs. Cable mounted with one M20 connector and one end for terminal connections. Temperature range -20 ... +110 °C (-4 ... +230 °F)		
	5 m (16.4 ft)	**FDK:083H3015**
	10 m (32.8 ft)	**FDK:083H3016**
	25 m (82 ft)	**FDK:083H3017**
	50 m (164 ft)	**FDK:083H3018**
	75 m (246 ft)	**FDK:083H3054**
	150 m (492 ft)	**FDK:083H3055**

Spare parts

Description	Article No.
Adapter for MASS 2100 M20 electrical adapter for MASS 2100 DI 3, 6, 15, 25 and 40	**FDK:083L8889** 
M20 connector for cable mounting	**FDK:083H5056** 
2 kB SENSORPROM unit, including programming (Sensor Serial No. and Article No. must be specified by ordering)	**FDK:083H4410** 

SITRANS F C sensor MASS 2100 DI 3, DI 6 and DI 15 with SITRANS MASS 6000 and SIFLOW FC070 transmitter

MASS 2100 sensor with “heating jacket”

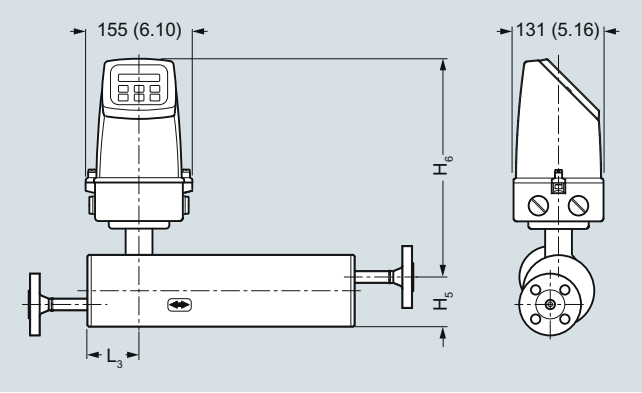


Dimensions in mm 199

(inch)

Sensor size	Connec-tions heated			L5	H3	B2	D6	D7	D8
DI (inch)	**Type**	**Pressure rating**	**Size**	**mm (inch)**	**mm (inch)**	**mm (inch)**	**mm (inch)**	**mm (inch)**	**mm (inch)**
DI 3 (1/8)	EN 1092-1	PN 40	DN 15	234 (9.21)	122 (4.8)	22 (0.87)	95 (3.74)	65.0 (2.56)	14.0 (0.55)
	ANSI B16.5	Class 150	½"	234 (9.21)	131.6 (5.18)	22 (0.87)	88.9 (3.5)	60.5 (2.38)	15.7 (0.62)
DI 6 (¼)	EN 1092-1	PN 40	DN 15	234 (9.21)	112 (4.41)	22.7 (0.89)	95 (3.74)	65.0 (2.56)	14.0 (0.55)
	ANSI B16.5	Class 150	½"	234 (9.21)	121.6 (4.79)	22.7 (0.89)	88.9 (3.5)	60.5 (2.38)	15.7 (0.62)
DI 15 (½)	EN 1092-1	PN 40	DN 15	234 (9.21)	126.5 (4.98)	31.5 (1.24)	95 (3.74)	65.0 (2.56)	14.0 (0.55)
	ANSI B16.5	Class150	½"	234 (9.21)	136.1 (5.36)	31.5 (1.24)	88.9 (3.5)	60.5 (2.38)	15.7 (0.62)

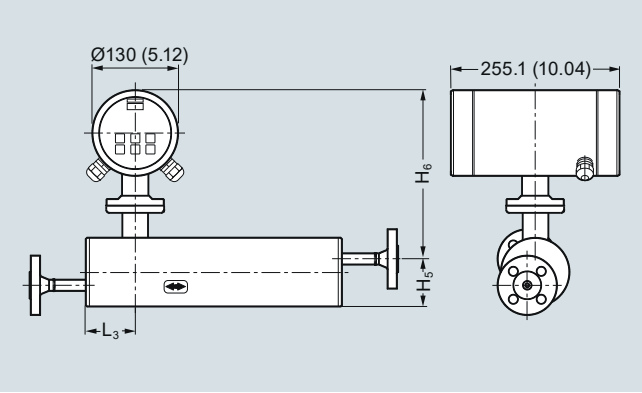
MASS 2100 and MASS 6000 IP67 compact version



MASS 2100 and MASS 6000 IP67 compact version, dimensions in mm (inch)

Sensor size [DI (inch)]	L_3 [mm (inch)]	H_5 [mm (inch)]	H_6 [mm (inch)]	$H_5 + H_6$ [mm (inch)]
3 (1/8)	75 (2.95)	82 (3.23)	306 (12.04)	388 (15.28)
6 (¼)	62 (2.44)	72 (2.83)	316 (12.44)	388 (15.28)
15 (½)	75 (2.95)	87 (3.43)	326 (12.83)	413 (16.26)

MASS 2100 and MASS 6000 Ex d compact version



MASS 2100 and MASS 6000 Ex d compact version, dimensions in mm (inch)

Sensor size [DI (inch)]	L_3 [mm (inch)]	H_5 [mm (inch)]	H_6 [mm (inch)]	$H_5 + H_6$ [mm (inch)]
3 (1/8)	75 (2.95)	82 (3.23)	247 (9.72)	329 (12.95)
6 (¼)	62 (2.44)	72 (2.83)	257 (10.12)	329 (12.95)
15 (½)	75 (2.95)	87 (3.43)	267 (10.51)	354 (13.94)