System information SITRANS F C Coriolis mass flowmeters

Overview

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

Transmitter	Page	Compact	Remote	Ex-Approval	Sensor	Page
FCT030	3/174	Yes	Yes	Yes	FCS400 Standard, DN 15 ... DN 80	3/168
		Yes	Yes	Yes	FCS400 Hygienic, DN 15 ... DN 80	3/170
		Yes	Yes	Yes	FCS400 NAMUR, DN 15 ... DN 80	3/172
MASS 6000 IP67 Polyamide enclosure	3/183	No	Yes	No	FCS200, DN 10 ... DN 25	3/205
		No	Yes	No	FC300, DN 4	3/214
		No	Yes	No	MASS 2100, DI 1.5	3/210
		Yes	Yes	No	MASS 2100, DI 3 ... DI 40	3/219
		No	Yes	No	MASS MC2, DN 50...DN 150	3/230
		No	Yes	Yes	MASS MC2 Ex, DN 50...DN 150	3/230
		No	Yes	No	MASS MC2 Hygienic, DN 20 ... DN 80	3/230
MASS 6000 19"	3/188	No	Yes	No	FCS200, DN 10 ... DN 25	3/205
		No	Yes	No	FC300, DN 4	3/214
		No	Yes	No	MASS 2100, DI 1.5	3/210
		No	Yes	No	MASS 2100, DI 3 ... DI 40	3/219
		No	Yes	No	MASS MC2, DN 50...DN 150	3/230
		No	Yes	Yes	MASS MC2 Ex, DN 50...DN 150	3/230
		No	Yes	No	MASS MC2 Hygienic, DN 20 ... DN 80	3/230
MASS 6000 Ex 19"	3/188	No	Yes	Yes	FCS200, DN 10 ... DN 25	3/205
		No	Yes	Yes	FC300, DN 4	3/214
		No	Yes	Yes	MASS 2100 Ex, DI 1.5	3/210
		No	Yes	Yes	MASS 2100 Ex, DI 3 ... DI 40	3/219
		No	Yes	No	MASS MC2, DN 50...DN 150	3/230
		No	Yes	No	MASS MC2 Hygienic, DN 20 ... DN 80	3/230
MASS 6000 Ex d Stainless steel enclosure	3/195	No	Yes	Yes	FCS200, DN 10 ... DN 25	3/205
		No	Yes	Yes	FC300, DN 4	3/214
		No	Yes	Yes	MASS 2100 Ex, DI 1.5	3/210
		Yes	Yes	Yes	MASS 2100 Ex, DI 3 ... DI 40	3/219
		No	Yes	No	MASS MC2, DN 50 ... DN 150	3/230
		No	Yes	No	MASS MC2 Hygienic, DN 20 ... 80	3/230
SIFLOW FC070 Standard	3/201	No	Yes	No	all	
SIFLOW FC070 CT	3/201	No	Yes	Yes	all except MC2	
		No	Yes	No	MC2	3/230

Benefits

Greater flexibility

- Wide product program
- Uniform sensor interface enabling "plug & play" for all transmitters
- Compact or remote installation using the same transmitters and sensors

Easier commissioning

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

At commissioning the flowmeter commences measurement without any initial programming.

The factory settings matching the sensor size are stored in the SENSORPROM unit. Also customer-specified settings are downloaded to the unit.

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

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.

Application

Coriolis mass flowmeters are suitable for measuring 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. The Coriolis flowmeter is recognized for its high accuracy in 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
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, paint robots
Oil and gas	Filling of gas bottles, furnace control, CNG-dispensers, test separators, LPG
Water and waste water	Dosing of chemicals for water treatment

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

	SITRANS FC430	MASS 2100 DI 1.5	MASS 2100 DI 3 to DI 40	FC300 DN 4	MC2 DN 50 to DN 150	MC2 Hygienic DN 25 to DN 80	FCS200 DN 10 to DN 25	MASS 6000 IP67	MASS 6000 19"	MASS 6000 Ex d	SIFLOW FC070 Std/Ex CT
	7ME4600 7ME4610 7ME4620 7ME4710	7ME4100	7ME4100, 7ME4200, 7ME4210	7ME4400	7ME4300	7ME4310	7ME4500	7ME4110	7ME4110	7ME4110	7ME4120
Design											
Compact	●		●					●		●	
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									●		
Aluminium IP67	●										
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 20 (¾")						●					
DI 25 (1")			●								
DN 25 (1")	●					●	●				
DI 40 (1½")			●								
DN 40 (1½")						●					
DN 50 (2")	●				●	●					
DN 65 (2½")					●	●					
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

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	SITRANS FC430	MASS 2100 DI 1.5	MASS 2100 DI 3 to DI 40	FC300 DN 4	MC2 DN 50 to DN 150	MC2 Hygienic DN 25 to DN 80	FCS200 DN 10 to DN 25	MASS 6000 IP67	MASS 6000 19"	MASS 6000 Ex d	SIFLOW FC070 Std/Ex CT
	7ME4600 7ME4610 7ME4620 7ME4710	7ME4100	7ME4100, 7ME4200, 7ME4210	7ME4400	7ME4300	7ME4310	7ME4500	7ME4110	7ME4110	7ME4110	7ME4120
Flange											
EN 1092-1 PN 40	●		●		●						
EN 1092-1 PN 63	●										
EN 1092-1 PN 100	●		●		●[1]						
ANSI B16.5 Class 150	●		●		●						
ANSI B16.5 Class 300	●				●						
ANSI B16.5 Class 600	●		●		●[1]						
Dairy											
DIN 11851 PN 25	●		●		●[1]	●					
DIN 11851 PN 40	●		●								
DIN 11864-1	●										
DIN 11864-2A	●					●					
Clamp ISO 2852 PN 16	●		●								
ISO 2853 PN 16	●		●								
DIN 32676 Tri-Clamp PN 10/PN 16	●				●	●					
Others on request	●	●	●	●	●	●					
Pipe material											
Stainless steel AISI 316L/1.4435	●	●	●	●		●					
Stainless steel AISI 316Ti/1.4571					●						
Hastelloy C22/2.4602		●	●[5]	●			●[7]				
Hastelloy C4/2.4610					●						
With heating jacket											
Internal U - tube			●								
External electric jacket	●										
Pressure rating											
PN 40			●		●	●					
PN 100	●	●	●	●	●[2]						
PN 214							●				
PN 350							●				
High-pressure version[3]		●	●	●							
Accuracy											
Flow error ≤ 0.1 % of rate	●	●	●	●	●	●					
Flow error ≤ 0.15 % of rate					●	●					
Flow error ≤ 0.5 % of rate					●	●	●				
Density error ≤ 0.0005 g/cm³			●								
Density error ≤ 0.001 g/cm³	●	●			●	●					
Density error ≤ 0.0015 g/cm³			●[4]	●							
Cable glands											
PG 13.5									●[6]		
½" NPT	●							●			
M20	●				●	●		●		●	

● = available

1) Not available for DN 150 sensor.
2) Not available for DN 100 and DN 150 sensors.
3) See technical specifications.
4) DI 3 and DI 6
5) DI 40 is not available for Hastelloy C22/2.4602.
6) Only when mounted in enclosure.
7) Process connectors in AISI 316Ti/1.4571

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	SITRANS FC430	MASS 2100 DI 1.5	MASS 2100 DI 3 to DI 40	FC300 DN 4	MC2 DN 50 to DN 150	MC2 Hygienic DN 25 to DN 80	FCS200 DN 10 to DN 25	MASS 6000 IP67	MASS 6000 19"	MASS 6000 Ex d	SIFLOW FC070 Std/Ex CT
	7ME4600 7ME4610 7ME4620 7ME4710	7ME4100	7ME4100, 7ME4200, 7ME4210	7ME4400	7ME4300	7ME4310	7ME4500	7ME4110	7ME4110	7ME4110	7ME4120
Approvals											
Custody Transfer											
Compressed gaseous fuel measuring systems for vehicles - OIML R 139							●				●[12]
Other media than water pattern approval - OIML R 117	●	●	●	●			●	●	●	●	●[12]
Harzardous locations											
Ex II 1G, Ex ia IIC T3 (T4) ... T6 ATEX		●	●								
Ex ia IIC T3/T4 ... T6 ATEX				●							
Ex II (1)G [Ex ia] IIC ATEX									●		
Ex II 2G, Ex d e [ia/ib] IIC T6 ATEX										●	
Ex II (1)G [Ex ia] IIC Ga Ex II 3G Ex nA IIC T4 Gc ATEX											●[4][5]
Ex II 1/2 G Ex emd [ib] IIC T6 ATEX						●[9]					
Ex II 2 G Ex emd [ib] IIC T6 ATEX					●[10]	●[10]					
Ex II 1/2G Ex ia IIC T5/T4 ATEX							●				
Ex ia IIC T5/T4 IECEx							●				
Ex nA [ia] IIC T4 IECEx											●[5]
Class I, Div. 1, Gr. A, B, C, D							●				
Class I, Div. 2, Gr. A, B, C, D c-FM-us											●[11]
Class I, Div. 1, Gr. A, B, C, D c-UL-us Class I, Zone 0,Aex ia IIC T3 ... T6 Class I, Zone 0,Ex ia IIC T3 ... T6		●[1]	●[1]								
Class I, Div. 1, Gr. A, B, C, D c-UL-us				●							
Class I, Div. 2, Gr. A, B, C, D c-UL-us Class I, Zone 2, Aex nC IIC T4 Class I, Zone 2, Ex nC [nL] IIC T4								●[2]			
Class I, Div. 1 and 2, Gr. A, B, C, D Class 1, Zone 0, Aex nC [ia] IIC T4 c-UL-us									●[3]		
Ex nA [ia] IIC T4, Class I, Zone 2, Aex nA [ia] IIC T4 $_{u}CSA_{us}$											●[5]
Ordinary locations											
USL, CNL-Flowmeter c-UL-us								●[2]	●[8]		
USR, CNR-Flowmeter c-UL-us								●[2]	●[6][7]		
PED											
Fluid group 1 Category II, Module H PED Directive 97/23/EC	●		●[8]								
Module B1 + D 0/25 ... 100 bar, -80/200°C, DN 20 ...150 PED Directive 97/23/EC					●	●					

● = available

1) Sensor pressure max. 100 bar (1450 psi)
2) Only remote version
3) Install in safe area, sensor interface into Zone 0 and Div. 1 in minimum IP65 cabinet.
4) Can be placed in zone 2 if mounted in minimum IP54 cabinet.
5) Only Ex version
6) 24 V; IP20
7) 115 ... 230 V; IP20
8) 115 ... 230 V; IP65
9) Only DI 25 and DI 40
10) For sizes < DN 40 only
11) For sizes ≥ DN 50 only
12) Install in Div. 2, sensor interface into Div. 1
13) Only Ex CT version

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		SITRANS FC430	MASS 2100 DI 1.5	MASS 2100 DI 3 to DI 40	FC300 DN 4	MC2 DN 50 to DN 150	MC2 Hygienic DN 25 to DN 80	FCS200 DN 10 to DN 25	MASS 6000 IP67	MASS 6000 19"	MASS 6000 Ex d	SIFLOW FC070 Std/Ex CT
		7ME4600 7ME4610 7ME4620 7ME4710	7ME4100	7ME4100, 7ME4200, 7ME4210	7ME4400	7ME4300	7ME4310	7ME4500	7ME4110	7ME4110	7ME4110	7ME4120
CRN												
Category F OF10769.5C	CRN	●	●	●	●							
Pharma												
EHEDG	TUM	●					●					
3A		●										

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

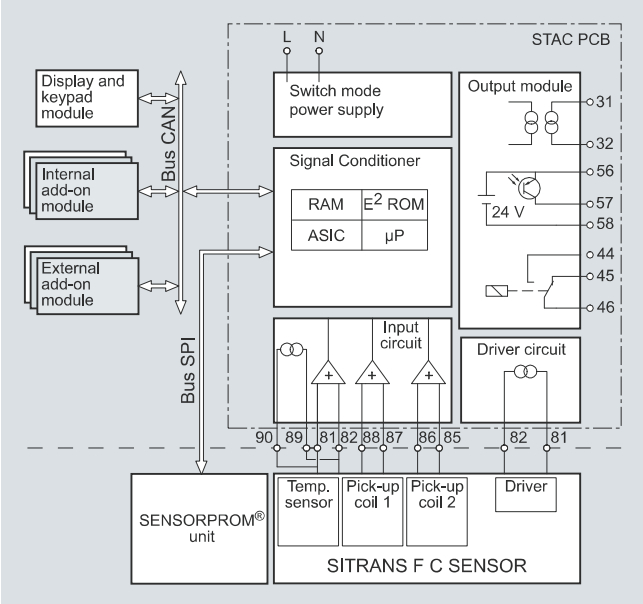
● = available

3

System information SITRANS F C Coriolis mass flowmeters

Function

The flow measuring principle is based on the Coriolis effect. The flowmeter consists of a sensor type MASS 2100/FC300 or MC2 and a transmitter MASS 6000/SIFLOW FC070.



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 via a „phase locked loop", to ensure a stable output from the 2 pick-ups in the region of 80 to 120 mV.

The temperature of the sensor is measured by a Pt1000, in a wheatstone configuration (4-wire). For MC2 the temperature is measured with a Pt100.

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 analog to digital conversion takes place in an ultra-low noise ASIC with 23 bit signal resolution. The signal transfer function is based on a patented DFT technology (Discrete Fourier Transformation). The ASIC is constructed as a state machine gate array, which enables fast signal processing and filtering.

The ASIC has a built-in noise filter, which can be used to improve the meters' 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.

For communication purposes the SITRANS F C MASS 6000 transmitters have a CAN interface with a Siemens specific protocol. This concept is known as the USM II (Universal Signal Module) concept. The idea is that extra output modules or communication modules can be connected to this bus, making it possible to configure the flowmeter for the precise task in hand. When the internal CAN bus detects the installed module, it is automatically programmed to factory settings via the SENSORPROM memory unit, and the new menu is visible in the MASS 6000 display.

SENSORPROM flow memory unit

Currently the USM platform handles all present and future communication protocols, e.g., PROFIBUS DP, PROFIBUS PA, HART, MODBUS, FOUNDATION Fieldbus H1 and DeviceNet.

Integration

Installation of MASS 2100/FC300 and MC2 sensors

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 and 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 https://pia.khe.siemens.com/index.aspx?nr=11501) can be used to calculate the pressure drop.
The following points are to be considered during installation:

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

Installation orientation

- MASS 2100/FC300 – sensors
  The optimal installation orientation is horizontal.
- MC2 – sensors
  The optimal installation orientation is vertical with the flow upwards.

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 rigid pipelines. Two 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 MC2 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.

Installation: straight run requirements

- The mass flowmeter does not require any flow conditioning 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.
  Advantageous are installations in low pipeline sections, at the bottom of a U-section in the pipeline.
- Long drop lines downstream from the flowmeter should be avoided to prevent the meter tube from draining.
- 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. The 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).
- 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. A bypass line is optimal when the process cannot be shut down. 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 Siemens flow facilities accredited according to ISO/IEC 17025 by DANAK or UKAS.

The accreditation bodies DANAK and UKAS have 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.

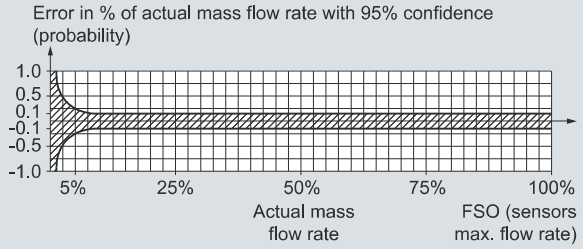
MASS 2100 sensors and MASS 6000 transmitters

	5 %		50 %		100 %	
	kg/h	(lb/h)	kg/h	(lb/h)	kg/h	(lb/h)
DI 1.5 (1/16")	1	(2.2)	32.5	(71.6)	65	(140)
DI 3 (1/8")	12	(26)	125	(275)	250	(550)
DN 4 (1/6")	17.5	(38)	175	(386)	350	(770)
DI 6 (¼")	50	(110)	500	(1 102)	1 000	(2 200)
DI 15 (½")	280	(617)	2 800	(6 173)	5 600	(12 345)
DI 25 (1")	1 250	(2 756)	12 500	(27 558)	25 000	(55 100)
DI 40 (1½")	2 600	(5 732)	26 000	(57 320)	52 000	(114 600)

- Q_{max} is found at a pressure drop of 1 bar (29 psi). With increased counterpressure Q_{max} will increase.
- For flow > 5 % of the sensors max. flow rate, the error can be read directly from the curve.
- For flow < 5 % of the sensors max. flow rate, use the formula to calculate the error.
- The error curve is plotted from the formula:

$$E = \pm\sqrt{(0.10)^2 + \left(\frac{z \times 100}{qm}\right)^2}$$

E = Error [%]
Z = Zero point error [kg/h]
qm = Mass flow [kg/h]



Reference conditions for MASS 2100 (ISO 9104 and DIN/EN 29104)	
Flow conditions	Fully developed flow profile
Temperature, medium	20 °C ± 2 °C (68 °F ± 3.6 °F)
Temperature, ambient	20 °C ± 2 °C (68 °F ± 3.6 °F)
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

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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")	DI 25 (1")	DI 40 (1½")
Number of measuring pipes		1	1	1	1	1	1	1
Mass flow								
Linearity error	% of rate	0.10	0.10	0.10	0.10	0.10	0.10	0.10
Repeatability error	% of rate	0.05	0.05	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	1.500	6.000
Density								
Density error[1]	[g/cm³]	0.0025[2]	0.001	0.0015	0.0015	0.0005	0.0005	0.0005
Repeatability error	[g/cm³]	0.0002	0.0002	0.0002	0.0002	0.0001	0.0001	0.0001
Range	[g/cm³]	0 ... 2.9	0 ... 2.9	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)	0.5 (0.9)	0.5 (0.9)
Brix								
Error	[°Brix]	0.3	0.2	0.3	0.3	0.1	0.1	0.1

1) Accuracy is only valid when sensor is density-calibrated.
2) Hastelloy C22 version

Sensor type		MC2				
Sensor size (standard version)		DN 50 (2")	DN 65 (2½")	DN 80 (3")	DN 100 (4")	DN 150 (6")
Sensor size (hygienic version)		DN 20 (¾") DN 25 (1") DN 40 (1½") DN 50 (2")	DN 65 (2½")	DN 80 (3")		
Number of measuring pipes		2	2	2	2	2
Mass flow:						
Linearity error	% of rate	0.15	0.15	0.15	0.15	0.15
Reproducibility of flowrate at rates > 5 % of Q_{max}	% of rate	0.1	0.1	0.1	0.1	0.1
Max. zero point error	[kg/h (lb/h)]	DN 20 0.6 (1.32), DN 25 0.96 (2.12), DN 40 2.85 (6.28), DN 50 5.52 (12.17)	11.34 (25.00)	14.76 (32.54)	24.96 (55.03)	330 (727.53)
Density						
Density error	(Standard) [g/cm³]	0.005	0.005	0.005	0.005	0.005
	(Extended) [g/cm³]	0.001	0.001	0.001	0.001	Not available
Range	[kg/dm³]	0.5 ... 3.5	0.5 ... 3.5	0.5 ... 3.5	0.5 ... 3.5	0.5 ... 3.5
Repeatability error	[g/l]	± 0.1	± 0.1	± 0.1	± 0.1	± 0.1
Temperature						
Error	[°C (°F)]	1.0 (1.8)	1.0 (1.8)	1.0 (1.8)	1.0 (1.8)	1.0 (1.8)
Brix[1]						
Error	[°Brix]	0.25	0.25	0.25	0.25	Not available

1) Flow and density calibration (1 kg/m³) required.

Flowmeter uncertainty/specifications

MC2 sensors and MASS 6000 transmitters

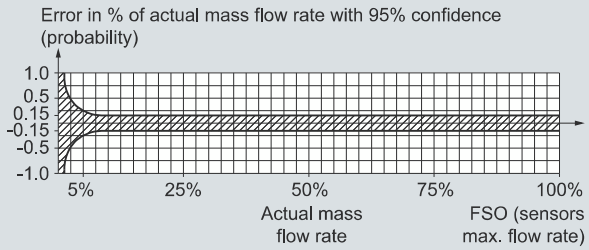
	5 %		50 %		100 %	
	kg/h	(lb/h)	kg/h	(lb/h)	kg/h	(lb/h)
DN 20 (¾")	159	(351)	1 590	(3 505)	3 180	(7 011)
DN 25 (1")	261	(575)	2 610	(5 754)	5 220	(11 508)
DN 40 (1½")	815	(1 797)	8 150	(17 968)	16 300	(35 935)
DN 50 (2")	1 680	(3 704)	16 800	(37 038)	33 600	(74 075)
DN 65 (2½")	3 320	(7 319)	33 200	(73 193)	66 400	(146 387)
DN 80 (3")	4 420	(9 744)	44 200	(97 444)	88 400	(194 888)
DN 100 (4")	7 100	(15 653)	71 000	(156 528)	142 000	(313 056)
DN 150 (6")	21 050	(46 407)	210 500	(464 073)	421 000	(928 145)

Flow capacity calculated at 1 bar pressure loss on water at 20 °C.

$$E = \pm\sqrt{(0.15)^2 + \left(\frac{z \times 100}{qm}\right)^2}$$

E = Error [%]
Z = Zero point error [kg/h]
qm = Mass flow [kg/h]

$Q_{max.}$ at 2 bar pressure loss at 1 g/cm^3



Technical specifications PROFIBUS PA/DP

General specifications	
PROFIBUS device profile	3.00 Class B
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	EN 50170 vol. 2
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 mm^2, 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	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 mm^2 (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 termination at both
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.

Flowmeter SITRANS FC430

Overview

The complete flowmeter system SITRANS FC430 can be ordered for standard, hygienic or NAMUR service. All versions can be ordered for CT service, according to OIML R 117 (Liquids other than water).

All compact variants can be validated and configured for SIL 2 or SIL 3 operation as standard. SIL 3 operation requires two flowmeters in series and monitored by a SIL-rated control system.

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

FC430 is available as standard with 4 to 20 mA analog output with HART 7.2. Additional input/output functions can be freely configured for analog, pulse, frequency, relay or status.

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

The SITRANS FC430 flowmeter system consists of a SITRANS FCS400 sensor and a SITRANS FCT030 transmitter.

Benefits

- It is narrow 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
- SensorFlash transfers setup and operating data, providing simple sensor replacement
- Short overall length; easy drop-in replacement into most existing installations

Technical specifications

Sizes	DN 15 (½") DN 25 (1") DN 50 (2") DN 80 (3")
Accuracy	± 0.10 %
Repeatability	± 0.05 %
Flow range (water @ 1 bar pressure loss)	DN 15: 3 700 kg/h (8 157 lb/h) DN 25: 11 500 kg/h (25 353 lb/h) DN 50: 52 000 kg/h (114 640 lb/h) DN 80: 136 000 kg/h (300 000 lb/h)
Architecture	Compact or remote configuration with selection of twelve languages including Chinese and Russian
Display	Full graphical display, 240 x 160 pixels
Power supply	24 ... 90 V DC, 100 ... 240 V AC
Weight	4.6 ... 50 kg
Material	
• Sensor	
- Wetted parts	316L stainless steel
- Enclosure	304 stainless steel
• Transmitter	Aluminum with corrosion-resistant coating
Enclosure rating	IP67
Pressure ratings	
• Measuring tubes	100 bar (1450 psi)
• Sensor enclosure	20 bar (DN15, DN 25) 17 bar (DN 50, DN 80)
• Sensor enclosure burst pressure	>160 bar (all sizes)
Temperature ratings	
• Process medium	-50 ... +200 °C (-58 ... +392 °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), VCO Quick-connect
• Hygienic threads	DIN 11851, DIN 11864-1, ISO 2853, SMS 1145
• Hygienic clamps	DIN 11864-2, DIN 32676, ISO 2852
Approvals	
• Hazardous area	ATEX, IECEx, cFMus, NEPSI, CSA, TISS, GOST)
• Pressure equipment	PED, CRN
• Hygienic	3A, EHEDG
• Custody transfer	SITRANS FC430 OIML R 117
• Operational safety (compact system only)	SIL 2 (Sensor) SIL 3 (Transmitter and redundant system)
NAMUR	Complying with NE132, NE41
I/O	Up to 4 channels combining analog, relay or digital outputs and binary input
Communication	HART 7.2
EMC performance	EN 61326-3-2
Mechanical load	18 to 1000 Hz random, 3.17 G rms, in all directions

Flowmeter SITRANS FC430

Selection and Ordering data		Order No.	Ord. code
SITRANS FC430 Digital coriolis flowmeter with SITRANS FCS400 Standard flow sensor with hygienic and flange/pipe thread connections and compact or remote mounting with FCT030 transmitter		7ME4613 -	
Sensor size, connection size			
DN 15, DN 10 (½", 3/8")		3F	
DN 15, DN 15 (½", ½")	◆	3G	
DN 15, DN 20 (½", ¾")	◆	3H	
DN 15, DN 25 (½", 1")	◆	3J	
DN 25, DN 15 (1", ½")		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 80, DN 65 (3", 2½")	◆	4J	
DN 80, DN 80 (3", 3")	◆	4K	
DN 80, DN 100 (3", 4")		4L	
Process connection			
EN1092-1 B1, PN 16		A0	
EN1092-1 B1, PN 40	◆	A1	
EN1092-1 B1, PN 63		A2	
EN1092-1 B1, PN 100	◆	A3	
EN1092-1 D nUT, PN 40		A5	
EN1092-1 D nUT, PN 63		A6	
EN1092-1 D nUT, PN 100		A7	
ANSI B16.5-2009, class 150	◆	D1	
ANSI B16.5-2009, class 300		D2	
ANSI B16.5-2009, class 600	◆	D3	
ISO228-1 G pipe thread	◆	E1	
ASME B1.20.1 NPT pipe thread	◆	E3	
DIN 11851 hygienic screwed	◆	F1	
DIN32676 hygienic Tri-Clamp	◆	G1	
DIN11864-1 asceptic screwed	◆	H1	
DIN11864-2 asceptic flanged		H2	
ISO 2852 hygienic clamped	◆	J1	
ISO 2853 hygienic screwed	◆	J5	
SMS 1145 hygienic screwed		K1	
12-VCO-4 quick connect		K5	
JIS B2200:2004/10K		L2	
JIS B2220:2004/20K		L4	
JIS B2220:2004/40K		L6	
Wetted parts material			
AISI 316L/W1.4435/W1.4404 (100 barg max.)	◆	1	
Calibration/Accuracy class			
0,1 % flow, 5 kg/m³ density	◆	1	
0,1 % flow, 1 kg/m³ density	◆	4	
Standard fraction calibration			
• API number		9	N0A
• Balling		9	N0B
• °Baumé light		9	N0C
• °Baumé heavy		9	N0D
• °Brix		9	N0E
• °Oeschlé		9	N0F
• °Plato		9	N0G
• Specific Gravity		9	N0H
• °Twaddell		9	N0J
• %HFCS42		9	N0K
• %HFCS55		9	N0L
• %HFCS90		9	N0M

Selection and Ordering data		Order No.	Ord. code
SITRANS FC430 Digital coriolis flowmeter with SITRANS FCS400 Standard flow sensor with hygienic and flange/pipe thread connections and compact or remote mounting with FCT030 transmitter		7ME4613 -	
Transmitter/DSL material & mounting style			
Compact, IP67, aluminum	◆	D	
Remote, IP67, aluminum, M12	◆	G	
Remote, IP67, aluminum, T/Box	◆	K	
Ex approval			
Non-Ex	◆	A	
ATEX II 2GD	◆	C	
IECEx GDb	◆	F	
FM/CSA/UL Class 1, Div 1	◆	H	
Local User Interface			
Blind	◆	1	
Graphical, 240 x 160 pxl	◆	3	

◆ Short lead time (details in PMD)

Selection and Ordering data		Order code
Further designs		
Please add "**-Z**" to Order No. and specify Order code(s).		
Cable glands		
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**
Sofware functions and CT approvals		
Standard	◆	**B11**
CT standard	◆	**B31**
I/O configuration Ch1		
Ca 4 ... 20 mA HART active SIL certified	◆	**E04**
Cp 4 ... 20 mA HART passive SIL certified	◆	**E05**
Only compact versions can be used in SIL applications.		

Selection and Ordering data		Order code
I/O configuration Ch2, Ch3 and Ch4		
None	◆	**F00**
aSignal, None, None	◆	**F40**
aSignal, aSignal, None	◆	**F41**
aSignal, aSignal, aSignal	◆	**F42**
aSignal, aSignal, Ia	◆	**F43**
aSignal, aSignal, R	◆	**F44**
aSignal, Ia, None	◆	**F45**
aSignal, Ia, Ia	◆	**F46**
aSignal, Ia, R	◆	**F47**
aSignal, R, None	◆	**F50**
aSignal, R, R	◆	**F51**
pSignal, None, None	◆	**F60**
pSignal, pSignal, None	◆	**F61**
pSignal, pSignal, pSignal	◆	**F62**
pSignal, pSignal, Ip	◆	**F63**
pSignal, pSignal, R	◆	**F64**
pSignal, Ip, None	◆	**F65**
pSignal, Ip, Ip	◆	**F66**
pSignal, Ip, R	◆	**F67**
pSignal, R, None	◆	**F70**
pSignal, R, R	◆	**F71**
aSignal, aSignal, pSignal		**F80**
aSignal, aSignal, Ip		**F81**
aSignal, pSignal, None		**F82**
aSignal, pSignal, pSignal		**F83**
aSignal, pSignal, Ia		**F84**
aSignal, pSignal, Ip		**F85**
aSignal, pSignal, R		**F86**
aSignal, Ia, Ip		**F87**
aSignal, Ip, None		**F90**
aSignal, Ip, Ip		**F91**
aSignal, Ip, R		**F92**
pSignal, pSignal, Ia		**F93**
pSignal, Ia, None		**F94**
pSignal, Ia, Ia		**F95**
pSignal, Ia, Ip		**F96**
pSignal, Ia, R		**F97**

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 Order No. and specify Order code(s).		
Certificates		
Pressure test certificate CRN	◆	**C01**
Pressure test certificate PED	◆	**C02**
Material certificate EN 10204-3.1	◆	**C05**
Welding inspection report		**C07**
Factory certificate to EN 10204 2.1	◆	**C10**
Factory certificate to EN 10204 2.2	◆	**C11**
Cable		
None	◆	**L50**
5 m (16.4 ft), standard with M12 plugs fitted	◆	**L51**
5 m (16.4 ft), standard	◆	**L52**
10 m (32.8 ft) standard with M12 plugs fitted	◆	**L55**
10 m (32.8 ft), standard	◆	**L56**
25 m (82 ft), standard with M12 plugs fitted	◆	**L59**
25 m (82 ft), standard	◆	**L60**
50 m (164 ft), standard with M12 plugs fitted	◆	**L63**
50 m (164 ft), standard	◆	**L64**
75 m (246 ft), standard with M12 plugs fitted	◆	**L67**
75 m (246 ft), standard	◆	**L68**
150 m (492 ft), standard with M12 plugs fitted	◆	**L71**
150 m (492 ft), standard	◆	**L72**
Additional data		
Please add "**-Z**" to Order No. and specify Order code(s) and plain text.		
Tag name		
Tag name plate, stainless steel		**Y17**
Transmitter setup		
Custom transmitter setup		**Y20**
Customer specific calibration		
Customer specific calibration (5 flow x 2 points)		**Y61**
Customer specific calibration (10 flow x 1 point)		**Y62**

◆ Short lead time (details in PMD)

Operating instructions for SITRANS FC430

Description	Order No.
• English	**A5E03361511**
• German	**A5E03651143**
• Spanish	**A5E03651152**
• French	**A5E03651188**
• Italian	**A5E03651190**
• Chinese	**A5E03922773**

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

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

Flowmeter SITRANS FC430

Selection and Ordering data	Order No.	Ord. code
SITRANS FC430 Digital coriolis flowmeter ◆	7ME4623 -	
with SITRANS FCS400 Flow sensor Hygienic version with Ra < 0.8 µm, 3A approved, and compact or remote mounting with FCT030 transmitter	-	
Sensor size, connection size		
DN 15, DN 10 (½", 3/8")	3F	
DN 15, DN 15 (½", ½") ◆	3G	
DN 15, DN 20 (½", ¾")	3H	
DN 15, DN 25 (½", 1")	3J	
DN 25, DN 25 (1", 1") ◆	3L	
DN 25, DN 25 (1", 1¼")	3M	
DN 25, DN 40 (1", 1½")	3N	
DN 50, DN 40 (2", 1½")	4B	
DN 50, DN 50 (2", 2") ◆	4C	
DN 80, DN 65 (3", 2½")	4J	
DN 80, DN 80 (3", 3") ◆	4K	
Process connection		
DIN 11851 0,8 µm screwed ◆	F1	
DIN 32676 0,8 µm Tri-Clamp ◆	G1	
DIN 11864-1 0,8 µm screwed ◆	H1	
DIN 11864-2 0,8 µm flanged	H2	
ISO 2852 0,8 µm clamped ◆	J1	
ISO 2853 0,8 µm screwed ◆	J5	
Wetted parts material		
AISI 316L/W1.4435 (40 bar max.) ◆	1	
Calibration/Accuracy class		
0,1 % flow, 5 kg/m³ density ◆	1	
0,1 % flow, 1 kg/m³ density ◆	4	
Standard fraction calibration		
• API number	9	N0A
• Balling	9	N0B
• °Baumé light	9	N0C
• °Baumé heavy	9	N0D
• °Brix	9	N0E
• °Oeschlé	9	N0F
• °Plato	9	N0G
• Specific Gravity	9	N0H
• °Twaddell	9	N0J
• %HFCS42	9	N0K
• %HFCS55	9	N0L
• %HFCS90	9	N0M
Transmitter/DSL material and mounting style		
Compact, IP67, aluminum ◆	D	D
Remote, IP67, aluminum, M12 ◆	G	G
Remote, IP67, aluminum, T/Box ◆	K	K
Ex approval		
Non-Ex ◆	A	A
ATEX II 2GD ◆	C	C
IECEx GDb ◆	F	F
FM/CSA/UL Class 1, Div 1 ◆	H	H
Local User Interface		
Blind ◆	1	1
Graphical, 240 x 160 pxl ◆	3	3

◆ Short lead time (details in PMD)

Selection and Ordering data	Order code
Further designs	
Please add "**-Z**" to Order No. and specify Order code(s).	
Cable glands	
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**
Sofware functions and CT approvals	
Standard ◆	**B11**
CT standard ◆	**B31**
I/O configuration Ch1	
Ca 4 ... 20 mA HART active SIL certified ◆	**E04**
Cp 4 ... 20 mA HART passive SIL certified ◆	**E05**

Selection and Ordering data		Order code
I/O configuration Ch2, Ch3 and Ch4		
None	◆	**F00**
aSignal, None, None	◆	**F40**
aSignal, aSignal, None	◆	**F41**
aSignal, aSignal, aSignal	◆	**F42**
aSignal, aSignal, Ia	◆	**F43**
aSignal, aSignal, R	◆	**F44**
aSignal, Ia, None	◆	**F45**
aSignal, Ia, Ia	◆	**F46**
aSignal, Ia, R	◆	**F47**
aSignal, R, None	◆	**F50**
aSignal, R, R	◆	**F51**
pSignal, None, None	◆	**F60**
pSignal, pSignal, None	◆	**F61**
pSignal, pSignal, pSignal	◆	**F62**
pSignal, pSignal, Ip	◆	**F63**
pSignal, pSignal, R	◆	**F64**
pSignal, Ip, None	◆	**F65**
pSignal, Ip, Ip	◆	**F66**
pSignal, Ip, R	◆	**F67**
pSignal, R, None	◆	**F70**
pSignal, R, R	◆	**F71**
aSignal, aSignal, pSignal		**F80**
aSignal, aSignal, Ip		**F81**
aSignal, pSignal, None		**F82**
aSignal, pSignal, pSignal		**F83**
aSignal, pSignal, Ia		**F84**
aSignal, pSignal, Ip		**F85**
aSignal, pSignal, R		**F86**
aSignal, Ia, Ip		**F87**
aSignal, Ip, None		**F90**
aSignal, Ip, Ip		**F91**
aSignal, Ip, R		**F92**
pSignal, pSignal, Ia		**F93**
pSignal, Ia, None		**F94**
pSignal, Ia, Ia		**F95**
pSignal, Ia, Ip		**F96**
pSignal, Ia, R		**F97**

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 Order No. and specify Order code(s).		
Certificates		
Pressure test certificate CRN	◆	**C01**
Pressure test certificate PED	◆	**C02**
Material certificate EN 10204-3.1	◆	**C05**
Welding inspection report		**C07**
Factory certificate to EN 10204 2.1	◆	**C10**
Factory certificate to EN 10204 2.2	◆	**C11**
Cable		
None	◆	**L50**
5 m (16.4 ft), standard with M12 plugs fitted	◆	**L51**
5 m (16.4 ft), standard	◆	**L52**
10 m (32.8 ft) standard with M12 plugs fitted	◆	**L55**
10 m (32.8 ft), standard	◆	**L56**
25 m (82 ft), standard with M12 plugs fitted	◆	**L59**
25 m (82 ft), standard	◆	**L60**
50 m (164 ft), standard with M12 plugs fitted	◆	**L63**
50 m (164 ft), standard	◆	**L64**
75 m (246 ft), standard with M12 plugs fitted	◆	**L67**
75 m (246 ft), standard	◆	**L68**
150 m (492 ft), standard with M12 plugs fitted	◆	**L71**
150 m (492 ft), standard	◆	**L72**
Additional data		
Please add "**-Z**" to Order No. and specify Order code(s) and plain text.		
Tag name		
Tag name plate, stainless steel		**Y17**
Transmitter setup		
Custom transmitter setup		**Y20**
Customer specific calibration		
Customer specific calibration (5 flow x 2 points)		**Y61**
Customer specific calibration (10 flow x 1 point)		**Y62**

◆ Short lead time (details in PMD)

Operating instructions for SITRANS FC430

Description	Order No.
• English	**A5E03361511**
• German	**A5E03651143**
• Spanish	**A5E03651152**
• French	**A5E03651188**
• Italian	**A5E03651190**
• Chinese	**A5E03922773**

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

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

Flowmeter SITRANS FC430

Selection and Ordering data		Order No.	Ord. code
SITRANS FC430 Digital coriolis flowmeter	◆	7ME4713 -	
with SITRANS FCS400 NAMUR compliant flow sensor with flange/pipe thread connections and compact or remote mounting with FCT030 transmitter		-	
Sensor size, Connection size			
DN 15, DN 15 (½", ½")	◆	3G	
DN 25, DN 25 (1", 1")	◆	3L	
DN 50, DN 50 (2", 2")	◆	4C	
DN 80, DN 80 (3", 3")	◆	4K	
Process connection			
EN1092-1 B1, PN 40	◆	A1	
EN1092-1 B1, PN 100	◆	A3	
ANSI B16.5-2009, class 150	◆	D1	
ANSI B16.5-2009, class 600	◆	D3	
ISO228-1 G pipe thread	◆	E1	
ASME B1.20.1 NPT pipe thread	◆	E3	
Wetted parts material			
AISI 316L/W1.4435/W1.4404 (100 barg max.)	◆	1	
Calibration/Accuracy class			
0,1 % flow, 5 kg/m³ density	◆	1	
0,1 % flow, 1 kg/m³ density	◆	4	
Standard fraction calibration			
• API number		9	N0A
• Balling		9	N0B
• °Baumé light		9	N0C
• °Baumé heavy		9	N0D
• °Brix		9	N0E
• °Oeschlé		9	N0F
• °Plato		9	N0G
• Specific Gravity		9	N0H
• °Twaddell		9	N0J
• %HFCS42		9	N0K
• %HFCS55		9	N0L
• %HFCS90		9	N0M
Transmitter/DSL material & mounting style			
Compact, IP67, aluminum	◆	D	
Remote, IP67, aluminum, M12	◆	G	
Remote, IP67, aluminum, T/Box	◆	K	
Ex approval			
Non-Ex	◆	A	
ATEX II 2GD	◆	C	
IECEx GDb	◆	F	
FM/CSA/UL Class 1, Div 1	◆	H	
Local User Interface			
Blind	◆	1	
Graphical, 240 x 160 pxl	◆	3	

◆ Short lead time (details in PMD)

Selection and Ordering data		Order code
Further designs		
Please add "**-Z**" to Order No. and specify Order code(s).		
Cable glands		
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**
Sofware functions and CT approvals		
Standard	◆	**B11**
CT standard		**B31**
I/O configuration Ch1		
Ca 4 ... 20 mA HART active, SIL certified	◆	**E04**
Cp 4 ... 20 mA HART passive, SIL certified	◆	**E05**

Selection and Ordering data		Order code
I/O configuration Ch2, Ch3 and Ch4		
None	◆	**F00**
aSignal, None, None	◆	**F40**
aSignal, aSignal, None	◆	**F41**
aSignal, aSignal, aSignal	◆	**F42**
aSignal, aSignal, Ia	◆	**F43**
aSignal, aSignal, R	◆	**F44**
aSignal, Ia, None	◆	**F45**
aSignal, Ia, Ia	◆	**F46**
aSignal, Ia, R	◆	**F47**
aSignal, R, None	◆	**F50**
aSignal, R, R	◆	**F51**
pSignal, None, None	◆	**F60**
pSignal, pSignal, None	◆	**F61**
pSignal, pSignal, pSignal	◆	**F62**
pSignal, pSignal, Ip	◆	**F63**
pSignal, pSignal, R	◆	**F64**
pSignal, Ip, None	◆	**F65**
pSignal, Ip, Ip	◆	**F66**
pSignal, Ip, R	◆	**F67**
pSignal, R, None	◆	**F70**
pSignal, R, R	◆	**F71**
aSignal, aSignal, pSignal		**F80**
aSignal, aSignal, Ip		**F81**
aSignal, pSignal, None		**F82**
aSignal, pSignal, pSignal		**F83**
aSignal, pSignal, Ia		**F84**
aSignal, pSignal, Ip		**F85**
aSignal, pSignal, R		**F86**
aSignal, Ia, Ip		**F87**
aSignal, Ip, None		**F90**
aSignal, Ip, Ip		**F91**
aSignal, Ip, R		**F92**
pSignal, pSignal, Ia		**F93**
pSignal, Ia, None		**F94**
pSignal, Ia, Ia		**F95**
pSignal, Ia, Ip		**F96**
pSignal, Ia, R		**F97**

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 Order No. and specify Order code(s).		
Certificates		
Pressure test certificate CRN	◆	**C01**
Pressure test certificate PED	◆	**C02**
Material certificate EN 10204-3.1	◆	**C05**
Welding inspection report		**C07**
Factory certificate to EN 10204 2.1	◆	**C10**
Factory certificate to EN 10204 2.2	◆	**C11**
Cable		
None	◆	**L50**
5 m (16.4 ft), standard with M12 plugs fitted	◆	**L51**
5 m (16.4 ft), standard	◆	**L52**
10 m (32.8 ft) standard with M12 plugs fitted	◆	**L55**
10 m (32.8 ft), standard	◆	**L56**
25 m (82 ft), standard with M12 plugs fitted	◆	**L59**
25 m (82 ft), standard	◆	**L60**
50 m (164 ft), standard with M12 plugs fitted	◆	**L63**
50 m (164 ft), standard	◆	**L64**
75 m (246 ft), standard with M12 plugs fitted	◆	**L67**
75 m (246 ft), standard	◆	**L68**
150 m (492 ft), standard with M12 plugs fitted	◆	**L71**
150 m (492 ft), standard	◆	**L72**
Additional data		
Please add "**-Z**" to Order No. and specify Order code(s) and plain text.		
Tag name		
Tag name plate, stainless steel		**Y17**
Transmitter setup		
Custom transmitter setup		**Y20**
Customer specific calibration		
Customer specific calibration (5 flow x 2 points)		**Y61**
Customer specific calibration (10 flow x 1 point)		**Y62**

◆ Short lead time (details in PMD)

Operating instructions for SITRANS FC430

Description	Order No.
• English	**A5E03361511**
• German	**A5E03651143**
• Spanish	**A5E03651152**
• French	**A5E03651188**
• Italian	**A5E03651190**
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Flow sensor SITRANS FCS400

Overview

The flow measuring principle is based on the Coriolis Effect. The SITRANS FC430 flowmeter consists of a sensor type FCS400 and a transmitter FCT030. The FCS400 sensor's measuring tubes are energized by an electro-mechanical 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 and frame 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 transmitter 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.

Fraction

The sensor FCS400 can be calibrated 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.

At ordering the following fraction or standard density scales can be specified:

- API number
- Balling
- °Baumé light
- °Baumé heavy
- °Brix
- °Oeschlé
- °Plato
- Specific Gravity
- °Twaddell
- %HFCS42
- %HFCS55
- %HFCS90

Integration

The SITRANS FCS400 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 supplied with hazardous certification to Class 1 Zone 1 (ATEX, IEC Ex) or Class 1 Div. 1 (FM).

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/fc430/sizer

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 sense of the flow 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 meter is protected in a pressure-rated stainless steel enclosure with two purge ports to support a pressure guard in non-Ex applications.
- 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.

- Vibration mode separation creates a controlled measuring environment only within the CompactCurve part of the tubes. As a result the sensor has high immunity to plant vibration while avoiding large mass balancing of the meter components.
- The 15° slope of the CompactCurve shape ensures secure self-draining when the sensor axis is mounted vertically or up to 10° off vertical.
- The sensor frame is designed to conduct plant vibrations directly through the sensor body to adjacent pipeline while providing isolation of the metering section from the vibration. 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 (what goes in, comes out) 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 highest point in the liquid piping system or where vapour can collect. Install the meter low in pipeline sections 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.
- 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.

The maximum design length for the sensor cable is 200 m (656.17 ft). 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 plugs 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 FCS400 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.

Where trace heating is employed, an electric heating jacket can be ordered as an accessory. It is shaped to the sensor body and controlled from a weatherproof setpoint device.

The jacket can heat the sensor enclosure up to 200 °C (392 °F). However further insulation is also recommended for personnel protection or low loss temperature maintenance.

Calibration

To ensure accurate measurement all flowmeters must be initially calibrated. The calibration of each SITRANS FCS400 coriolis sensor is conducted at SIEMENS flow facilities accredited according to ISO/IEC 17025 by DANAK. A calibration certificate is shipped with every sensor and calibration data are stored in the SensorFlash memory unit. The accreditation body DANAK 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).

Flow sensor SITRANS FCS400

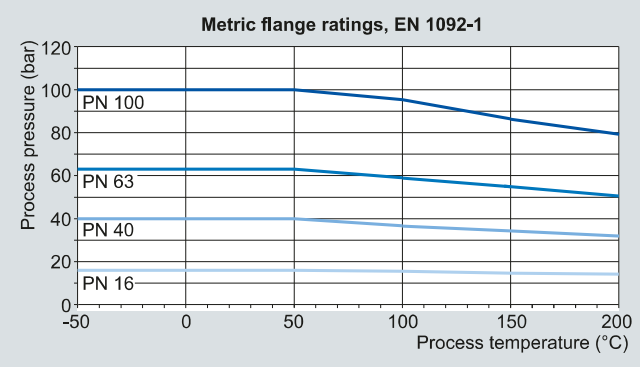
Technical specifications

Flow sensor FCS400		
Parameter	**Unit**	**Value**
Process pressure range	[barg (psi)]	0 ... 100 (0 ... 1450)
Process temperature range	[°C (°F)]	-50 ... +200 (-58 ... +392)
Ambient temperature range	[°C (°F)]	-40 ... +60 (-40 ... +140)
Transport temperature range	[°C (°F)]	-40 ... +70 (-40 ... +158)
Density range	[kg/m^3 (lb/ft^3)]	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 • Corrected volume flow (with reference density) • Fraction A:B • Fraction % A:B

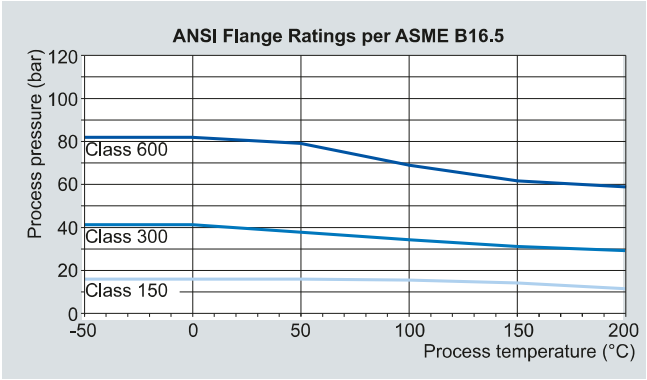
Performance specifications		Sensor			
Parameter	**Unit**	**DN 15**	**DN 25**	**DN 50**	**DN 80**
Max. zero point error	[kg/h (lb/min)]	0.2 (0.007)	2.0 (0.072)	7.5 (0.276)	9 (0.33)
Qmin	[kg/h (lb/min)]	20 (0.735)	200 (7.35)	750 (27.6)	900 (33.1)
Qnom	[kg/h (lb/min)]	3 700 (136.0)	11 500 (422.6)	52 000 (1 911)	136 000 (4 997)
Qmax	[kg/h (lb/min)]	31 900 (1 172)	88 400 (3 248)	353 500 (12 990)	904 800 (33 246)
Linearity error	[%]	± 0.1	± 0.1	± 0.1	± 0.1
Repeatability	[%]	± 0.05	± 0.05	± 0.05	± 0.05
Density error	[kg/m^3 (lb/ft^3)]	± 5 (± 0.31)	± 5 (± 0.31)	± 5 (± 0.31)	± 5 (± 0.31)
Extended density calibration	[kg/m^3 (lb/ft^3)]	± 1 (± 0.062)	± 1 (± 0.062)	± 1 (± 0.062)	± 1 (± 0.062)
Temperature error	[°C (°F)]	± 0.5 (± 0.9)	± 0.5 (± 0.9)	± 0.5 (± 0.9)	± 0.5 (± 0.9)

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 FCS400 product program.



EN1092-1 flanged sensors



ASME B16.5 flanged sensors

Sensor variants

SITRANS FCS400 sensors are available in three main variants: Standard, hygienic and NAMUR. A wide range of process connections is available for the FCS400 sensors. The available combinations of type, sensor size and connection size are shown in the tables below.

Standard sensors

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 Nut, PN 40	EN 1092-1 D Nut, PN 63	EN 1092-1 D Nut, PN 100	ANSI B16.5-2009, class 150	ANSI B16.5-2009, class 300	ANSI B16.5-2009, class 600	ISO 228-1 G pipe thread	ASME B1.20.1 NPT pipe thread	DIN 11851 Hygienic screwed	DIN 32676 Hygienic Tri-clamp	DIN 11864-1 Aseptic secrewed	DIN 11864-2 Aseptic flanged	ISO 2852 Hygienic clamped	ISO 2853 Hygienic screwed	SMS 1145 Hygineic screwed	12-VCO-4 Quick connect	JIS B2200:2004/10K	JIS B2200:2004/20K	JIS B2200:2004/40K
316 Stainless - Standard: 7ME461.-...																								
DN 15 (½")	DN 6 (¼")											o	o											
	DN 10 (3/8")													●										
	DN 15 (½")	o	●	o	●	o	o	o	●	o	●	●	●	●	●	●	o			o	●	o	o	o
	DN 20 (¾")								●	o	●				●									
	DN 25 (1")	o	●		●									●				●	●					
DN 25 (1")	DN 15 (½")																							
	DN 25 (1")	o	●	o	●	o	o	o	●	●	●	●	●	●	●	●	o	●	●	o		o	o	o
	DN 32 (1¼")													●										
	DN 40 (1½")	o	●		●				●	o	●				●			●	●					
DN 50 (2")	DN 25 (1")																							
	DN 40 (1½")	o	●	o	●	o	o	o						●		●	o	●	●	o				
	DN 50 (2")	o	●	o	●	o	o	o	●	o	●	●	●	●	●	●	o	●	●	o		o	o	o
	DN 65 (2½")																							
DN 80 (3")	DN 50 (2")																							
	DN 65 (2½")	o	●	o	●				●	o	●			●										
	DN 80 (3")	o	●	o	●	o	o	o	●	o	●			●	●	●	o	●	●	o		o	o	o
	DN 100 (4")	o	●	o	●																			

- Combinations shown ● are Mainstream products with delivery time of up to 15 days depending on the combination and production stock levels.
- Combinations shown **o** are Sidestream products with delivery from 45 to 90 days. Not all components are held in production stock for Sidestream products.

Flow sensor SITRANS FCS400

Hygienic sensor variants

The hygienic sensors all have maximum internal surface roughness < 0.8 µm and are EHEDG and 3A 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. Maximum pressure in the hygienic program is PN 40.

Sensor	Connection	DIN 11851 0.8 µm screwed	DIN 32676 0.8 µm Tri-clamp	DIN 11864-1 0.8 µm screwed	DIN 11864-2 0.8 µm flanged	ISO 2852 0.8 µm clamped	ISO 2853 0.8 µm screwed
316 SS - Hygienic: 7ME462.-...							
DN 15 (½")	DN 6 (¼")						
	DN 10 (3/8")	●					
	DN 15 (½")	●	●	●	●		
	DN 20 (¾")		●				
	DN 25 (1")	●				●	●
DN 25 (1")	DN 15 (½")						
	DN 25 (1")	●	●	●	●	●	●
	DN 32 (1¼")	●					
	DN 40 (1½")		●			●	●
DN 50 (2")	DN 25 (1")						
	DN 40 (1½")	●		●	●	●	●
	DN 50 (2")	●	●	●	●	●	●
	DN 65 (2½")						
DN 80 (3")	DN 50 (2")						
	DN 65 (2½")	●					
	DN 80 (3")	●	●	●	●	●	●
	DN 100 (4")						

- Combinations shown ● are Mainstream products with delivery time of up to 15 days depending on the combination and production stock levels.
- Combinations shown **o** are Sidestream products with delivery from 45 to 90 days. Not all components are held in production stock for Sidestream products.

NAMUR sensor variants

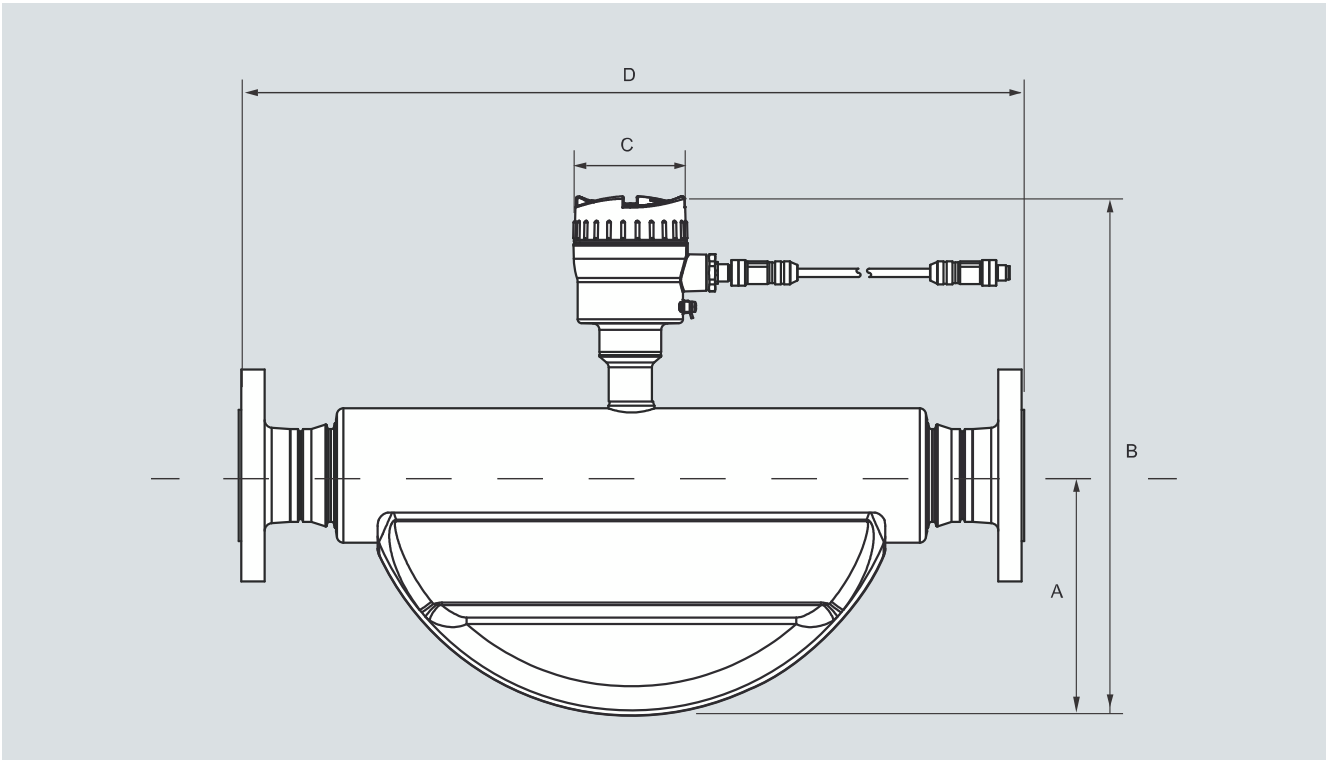
The NAMUR variants have build-in lengths according to NAMUR recommendation NE 132. The recommendations of NE 132 are stated for sensors with flanges the same size as the sensor nominal size, and for flanges to EN1092-1 PN 40 with B1 flange facing. For couplings of other standards such as ASME B16.5 Class 150, the overall length incorporates the difference in length between standard EN and ASME flanges. NAMUR variants are offered with flange and pipe thread connections according to EN, ISO oand ASME standards, as shown in the table below.

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 Nut, PN 40	EN 1092-1 D Nut, PN 63	EN 1092-1 D Nut, PN 100	ANSI B16.5-2009, class 150	ANSI B16.5-2009, class 300	ANSI B16.5-2009, class 600	ISO 228-1 G pipe thread	ASME B1.20.1 NPT pipe thread	DIN 11851 Hygienic screwed	DIN 32676 Hygienic Tri-clamp	DIN 11864-1 Aseptic secrewed	DIN 11864-2 Aseptic flanged	ISO 2852 Hygienic clamped	ISO 2853 Hygienic screwed
316 Stainless - NAMUR: 7ME471.-...																			
DN 15 (½")	DN 6 (¼")																		
	DN 10 (3/8")													o					
	DN 15 (½")	o	●	o	●	o	o	o	●	o	●	●	●	o	o	o	o		
	DN 20 (¾")								o	o	o				o				
	DN 25 (1")	o	o		o									o				o	o
DN 25 (1")	DN 15 (½")																		
	DN 25 (1")	o	●	o	●	o	o	o	●	o	●	●	●	o	o	o	o	o	o
	DN 32 (1¼")													o					
	DN 40 (1½")	o	o		o				o	o	o				o			o	o
DN 50 (2")	DN 25 (1")																		
	DN 40 (1½")	o	o	o	o	o	o	o						o		o	o	o	o
	DN 50 (2")	o	●	o	●	o	o	o	●	o	●	●	●	o	o	o	o	o	o
	DN 65 (2½")																		
DN 80 (3")	DN 50 (2")																		
	DN 65 (2½")	o	o	o	o				o	o	o			o					
	DN 80 (3")	o	●	o	●	o	o	o	●	o	●	●	●	o	o	o	o	o	o
	DN 100 (4")	o	o	o	o														

- Combinations shown ● are Mainstream products with delivery time of up to 15 days depending on the combination and production stock levels.
- Combinations shown o are Sidestream products with delivery from 45 to 90 days. Not all components are held in production stock for Sidestream products.

Flow sensor SITRANS FCS400

Dimensional drawings



Sensor		A		B		C		Weight	
[DN]	[inch]	[mm]	[inch]	[mm]	[inch]	[mm]	[inch]	[kg]	[lbs]
15	½	90	3.54	280	11.02	90	3.54	4.6	10.14
25	1	115	4.53	315	12.40	90	3.54	7.9	17.42
50	2	180	7.09	390	15.35	90	3.54	15	33.07
80	3	294	11.57	424	16.69	90	3.54	53	116.84

SITRANS FCS400, dimensions in mm (inch), weights in kg (lbs), for a EN 1092 PN 40 flanged version.

The build-in length D depends on the flange.

Overall length

The overall length (build-in length) 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.

316L stainless - Standard: 7ME461.-...

Sensor	**DN 15 (½")**					**DN 25 (1")**			**DN 50 (2")**		**DN 80 (3")**		
Connection	**DN 6 (¼")**	**DN 10 (3/8")**	**DN 15 (½")**	**DN 20 (¾")**	**DN 25 (1")**	**DN 25 (1")**	**DN 32 (1¼")**	**DN 40 (1½")**	**DN 40 (1½")**	**DN 50 (2")**	**DN 65 (2½")**	**DN 80 (3")**	**DN 100 (4")**
EN1092-1 B1, PN 16			265		265	360			610	610	915	840	840
EN1092-1 B1, PN 40			265		265	360		365	610	610	915	840	840
EN1092-1 B1, PN 63			265			360			610	610	915	915	915
EN1092-1 B1, PN 100			270		275	360			610	610	915	915	915
ANSI B16.5, class 150			270	270		360		365		620	915	875	
ANSI B16.5, class 300			270	270		360		380		620	915	875	
ANSI B16.5, class 600			270	285		360		380		620	915	875	
ISO 228-1 GH pipe thread	265		265			365				620			
ANSI B1.20.1 NPT pipe thread	265		270			365				620			
DIN 11851 Hygienic screwed		265	265		193	360	360		610	610	840	840	
DIN 32676-C Hygienic clamp			265	265		360		360		610		875	
DIN 11864-1 Aseptic screwed			265	265		360				610		875	
DIN 11864-2 Aseptic flange			265	265		360		274	620	610		875	
ISO 2852 Hygienic clamp					265	360			610	610		840	
ISO 2853 Hygienic screwed			265			360		274		610		860	

SITRANS FCS400, overall length, dimensions in mm

Sensor	**DN 15 (½")**					**DN 25 (1")**			**DN 50 (2")**		**DN 80 (3")**		
Connection	**DN 6 (¼")**	**DN 10 (3/8")**	**DN 15 (½")**	**DN 20 (¾")**	**DN 25 (1")**	**DN 25 (1")**	**DN 32 (1¼")**	**DN 40 (1½")**	**DN 40 (1½")**	**DN 50 (2")**	**DN 65 (2½")**	**DN 80 (3")**	**DN 100 (4")**
EN1092-1 B1, PN 16			10.43		10.43	14.17			24.02	24.02	36.02	33.07	33.07
EN1092-1 B1, PN 40			10.43		10.43	14.17		14.37	24.02	24.02	36.02	33.07	33.07
EN1092-1 B1, PN 63			10.43			14.17			24.02	24.02	36.02	36.02	36.02
EN1092-1 B1, PN 100			10.63		10.83	14.17			24.02	24.02	36.02	36.02	36.02
ANSI B16.5, class 150			10.63	10.63		14.17		14.37		24.41	36.02	34.45	
ANSI B16.5, class 300			10.63	10.63		14.17		14.96		24.41	36.02	34.45	
ANSI B16.5, class 600			10.63	11.22		14.17		14.96		24.41	36.02	34.45	
ISO 228-1 GH pipe thread	10.43		10.43			14.37				24.41			
ANSI B1.20.1 NPT pipe thread	10.43		10.63			14.37				24.41			
DIN 11851 Hygienic screwed		10.43	10.43		7.60	14.17	14.17		24.02	24.02	33.07	33.07	
DIN 32676-C Hygienic clamp			10.43	10.43		14.17		14.17		24.02		34.45	
DIN 11864-1 Aseptic screwed			10.43	10.43		14.17				24.02		34.45	
DIN 11864-2 Aseptic flange			10.43	10.43		14.17		10.78	24.41	24.02		34.45	
ISO 2852 Hygienic clamp					10.43	14.17			24.02	24.02		33.07	
ISO 2853 Hygienic screwed			10.43			14.17		10.78		24.02		33.86	

SITRANS FCS400, overall length, dimensions in inch

Flow sensor SITRANS FCS400

316L stainless - Hygienic 0.8 µm: 7ME462.-...

Sensor	DN 15 (½")				DN 25 (1")			DN 50 (2")		DN 80 (3")	
Connection	**DN 10 (3/8")**	**DN 15 (½")**	**DN 20 (¾")**	**DN 25 (1")**	**DN 25 (1")**	**DN 32 (1¼")**	**DN 40 (1½")**	**DN 40 (1½")**	**DN 50 (2")**	**DN 65 (2½")**	**DN 80 (3")**
DIN 11851 Hygienic screwed	265	265			360	360		610	610	840	840
DIN 32676-C Hygienic clamp		265	265		360		360		610		875
DIN 11864-1 Aseptic screwed		265			360				610		875
DIN 11864-2 Aseptic flange		265			360			620	610		875
ISO 2852 Hygienic clamp				265	360			610	610		840
ISO 2853 Hygienic screwed				265	360				610		860

SITRANS FCS400, overall length, dimensions in mm

Sensor	DN 15 (½")				DN 25 (1")			DN 50 (2")		DN 80 (3")	
Connection	**DN 10 (3/8")**	**DN 15 (½")**	**DN 20 (¾")**	**DN 25 (1")**	**DN 25 (1")**	**DN 32 (1¼")**	**DN 40 (1½")**	**DN 40 (1½")**	**DN 50 (2")**	**DN 65 (2½")**	**DN 80 (3")**
DIN 11851 Hygienic screwed	10.43	10.43		7.60	14.17	14.17		24.20	24.20	33.07	33.07
DIN 32676-C Hygienic clamp		10.43	10.43		14.17		14.17		24.20		34.45
DIN 11864-1 Aseptic screwed		10.43			14.17				24.20		34.45
DIN 11864-2 Aseptic flange		10.43			14.17			24.41	24.20		34.45
ISO 2852 Hygienic clamp				10.43	14.17			24.20	24.20		33.07
ISO 2853 Hygienic screwed				10.43	14.17				24.20		33.86

SITRANS FCS400, overall length, dimensions in inch

316L stainless - NAMUR: 7ME471.-...

Sensor	DN 15 (½")					DN 25 (1")			DN 50 (2")		DN 80 (3")		
Connection	**DN 6 (¼")**	**DN 10 (3/8")**	**DN 15 (½")**	**DN 20 (¾")**	**DN 25 (1")**	**DN 25 (1")**	**DN 32 (1¼")**	**DN 40 (1½")**	**DN 40 (1½")**	**DN 50 (2")**	**DN 65 (2½")**	**DN 80 (3")**	**DN 100 (4")**
EN1092-1 B1, PN 16			510		510	600			715	715	915	915	915
EN1092-1 B1, PN 40			510		510	600			715	715	915	915	915
EN1092-1 B1, PN 63			510			600			715	715	915	915	915
EN1092-1 B1, PN 100						600			715	715	915	915	915
EN1092-1 D, PN 16			510			600			715	715		915	
EN1092-1 D, PN 40			510			600			715	715		915	
EN1092-1 D, PN 63						600			715	715		915	
ANSI B16.5, class 150						600					915		
ANSI B16.5, class 300						600					915		
ANSI B16.5, class 600						600					915		
ISO 228-1 GH pipe thread	510		510										
ANSI B1.20.1 NPT pipe thread	510												
DIN 11851 Hygienic screwed		510	510			600	600		715	715	915	915	
DIN 32676-C Hygienic clamp			510	510		600		600		715			
DIN 11864-1 Aseptic screwed			510			600				715			
DIN 11864-2 Aseptic flange													
ISO 2852 Hygienic clamp					510	600			715	715		915	
ISO 2853 Hygienic screwed					510	600				715			

SITRANS FCS400, overall length, dimensions in mm

Sensor	DN 15 (½")					DN 25 (1")			DN 50 (2")		DN 80 (3")		
Connection	**DN 6 (¼")**	**DN 10 (3/8")**	**DN 15 (½")**	**DN 20 (¾")**	**DN 25 (1")**	**DN 25 (1")**	**DN 32 (1¼")**	**DN 40 (1½")**	**DN 40 (1½")**	**DN 50 (2")**	**DN 65 (2½")**	**DN 80 (3")**	**DN 100 (4")**
EN1091-1 B1, PN 16			20.08		20.08	23.62			28.15	28.15	36.02	36.02	36.02
EN1091-1 B1, PN 40			20.08		20.08	23.62			28.15	28.15	36.02	36.02	36.02
EN1091-1 B1, PN 63			20.08			23.62			28.15	28.15	36.02	36.02	36.02
EN1091-1 B1, PN 100						23.62			28.15	28.15	36.02	36.02	36.02
EN1092-1 D, PN 16			20.08			23.62			28.15	28.15		36.02	
EN1092-1 D, PN 40			20.08			23.62			28.15	28.15		36.02	
EN1092-1 D, PN 63						23.62			28.15	28.15		36.02	
ANSI B16.5, class 150						23.62					36.02		
ANSI B16.5, class 300						23.62					36.02		
ANSI B16.5, class 600						23.62					36.02		
ISO 228-1 GH pipe thread	20.08		20.08										
ANSI B1.20.1 NPT pipe thread	20.08												
DIN 11851 Hygienic screwed		20.08	20.08			23.62	23.62		28.15	28.15	36.02	36.02	
DIN 32676-C Hygienic clamp			20.08	20.08		23.62		23.62		28.15			
DIN 11864-1 Aseptic screwed			20.08			23.62				28.15			
DIN 11864-2 Aseptic flange													
ISO 2852 Hygienic clamp					20.08	23.62			28.15	28.15		36.02	
ISO 2853 Hygienic screwed					20.08	23.62				28.15			

SITRANS FCS400, overall length, dimensions in inch

Flow sensor SITRANS FCS400

Selection and Ordering data		Order No.	Ord. code
SITRANS FCS400 Standard Flow sensor with hygienic and flange/pipe thread connections for SITRANS FC430 Digital coriolis flowmeter Replacement sensor FCS400 ordered with or without a DSL according to service requirements. For compact or remote mounting with FCT030 transmitter		7ME4610 -	
Sensor size, connection size			
DN 15, DN 10 (½", 3/8")		3F	
DN 15, DN 15 (½", ½")	◆	3G	
DN 15, DN 20 (½", ¾")	◆	3H	
DN 15, DN 25 (½", 1")	◆	3J	
DN 25, DN 15 (1", ½")		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 80, DN 65 (3", 2½")	◆	4J	
DN 80, DN 80 (3", 3")	◆	4K	
DN 80, DN 100 (3", 4")		4L	
Process connection			
EN1092-1 B1, PN 16		A0	
EN1092-1 B1, PN 40	◆	A1	
EN1092-1 B1, PN 63		A2	
EN1092-1 B1, PN 100	◆	A3	
EN1092-1 D nUT, PN 40		A5	
EN1092-1 D nUT, PN 63		A6	
EN1092-1 D nUT, PN 100		A7	
ANSI B16.5-2009, class 150	◆	D1	
ANSI B16.5-2009, class 300		D2	
ANSI B16.5-2009, class 600	◆	D3	
ISO228-1 G pipe thread	◆	E1	
ASME B1.20.1 NPT pipe thread	◆	E3	
DIN 11851 hygienic screwed	◆	F1	
DIN32676 hygienic Tri-Clamp	◆	G1	
DIN11864-1 asceptic screwed	◆	H1	
DIN11864-2 asceptic flanged		H2	
ISO 2852 hygienic clamped	◆	J1	
ISO 2853 hygienic screwed	◆	J5	
SMS 1145 hygienic screwed		K1	
12-VCO-4 quick connect		K5	
JIS B2200:2004/10K		L2	
JIS B2220:2004/20K		L4	
JIS B2220:2004/40K		L6	
Wetted parts material			
AISI 316L/W1.4435/W1.4404 (100 barg max.)	◆	1	
Calibration/Accuracy class			
0,1 % flow, 5 kg/m³ density	◆	1	
0,1 % flow, 1 kg/m³ density	◆	4	
Standard fraction calibration			
• API number		9	N0A
• Balling		9	N0B
• °Baumé light		9	N0C
• °Baumé heavy		9	N0D
• °Brix		9	N0E
• °Oeschlé		9	N0F
• °Plato		9	N0G
• Specific Gravity		9	N0H
• °Twaddell		9	N0J
• %HFCS42		9	N0K
• %HFCS55		9	N0L
• %HFCS90		9	N0M

Selection and Ordering data		Order No.	Ord. code
SITRANS FCS400 Standard Flow sensor with hygienic and flange/pipe thread connections for SITRANS FC430 Digital coriolis flowmeter Replacement sensor FCS400 ordered with or without a DSL according to service requirements. For compact or remote mounting with FCT030 transmitter		7ME4610 -	
Transmitter/DSL material & mounting style			
None		A	
DSL, IP67, aluminum, M12		N	
DSL, IP67, aluminum, M12, T/Box		Q	
Ex approval			
Non-Ex	◆	A	
ATEX II 2GD	◆	C	
IECEx GDb	◆	F	
FM/CSA/UL Class 1, Div 1	◆	H	
Local User Interface			
None	◆	0	

◆ Short lead time (details in PMD)

Selection and Ordering data		Order code
Further designs Please add "**-Z**" to Order No. and specify Order code(s).		
Cable glands		
None	◆	**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**
Sofware functions and CT approvals		
None	◆	**B10**
I/O configuration Ch1		
None	◆	**E00**
I/O configuration Ch2, Ch3 and Ch4		
None		**F00**
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 Order No. and specify Order code(s).		
Certificates		
Pressure test certificate CRN	◆	**C01**
Pressure test certificate PED	◆	**C02**
Material certificate EN 10204-3.1	◆	**C05**
Welding inspection report		**C07**
Factory certificate to EN 10204 2.1	◆	**C10**
Factory certificate to EN 10204 2.2	◆	**C11**
Cable		
5 m (16.4 ft), standard with M12 plugs fitted	◆	**L51**
5 m (16.4 ft), standard	◆	**L52**
10 m (32.8 ft) standard with M12 plugs fitted	◆	**L55**
10 m (32.8 ft), standard	◆	**L56**
25 m (82 ft), standard with M12 plugs fitted	◆	**L59**
25 m (82 ft), standard	◆	**L60**
50 m (164 ft), standard with M12 plugs fitted	◆	**L63**
50 m (164 ft), standard	◆	**L64**
75 m (246 ft), standard with M12 plugs fitted	◆	**L67**
75 m (246 ft), standard	◆	**L68**
150 m (492 ft), standard with M12 plugs fitted	◆	**L71**
150 m (492 ft), standard	◆	**L72**
Additional data		
Please add "**-Z**" to Order No. and specify Order code(s) and plain text.		
Tag name		
Tag name plate, stainless steel		**Y17**
Customer specific calibration		
Customer specific calibration (5 flow x 2 points)		**Y61**
Customer specific calibration (10 flow x 1 point)		**Y62**

◆ Short lead time (details in PMD)

Operating instructions for SITRANS FC430

Description	Order No.
• English	**A5E03361511**
• German	**A5E03651143**
• Spanish	**A5E03651152**
• French	**A5E03651188**
• Italian	**A5E03651190**
• Chinese	**A5E03922773**

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

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

Flow sensor SITRANS FCS400

Selection and Ordering data		Order No.	Ord. code
SITRANS FCS400 Flow sensor Hygienic version with Ra < 0.8 µm. EHEDG and 3A approved for SITRANS FC430 Digital coriolis flowmeter Replacement sensor ordered with or without a DSL according to service requirements. For compact or remote mounting with FCT030 transmitter	◆	7ME4620 -	
Sensor size, connection size			
DN 15, DN 10 (½", 3/8")		3F	
DN 15, DN 15 (½", ½")	◆	3G	
DN 15, DN 20 (½", ¾")		3H	
DN 15, DN 25 (½", 1")		3J	
DN 25, DN 25 (1", 1")	◆	3L	
DN 25, DN 25 (1", 1¼")		3M	
DN 25, DN 40 (1", 1½")		3N	
DN 50, DN 40 (2", 1½")		4B	
DN 50, DN 50 (2", 2")	◆	4C	
DN 80, DN 65 (3", 2½")		4J	
DN 80, DN 80 (3", 3")	◆	4K	
Process connection			
DIN 11851 0,8 µm screwed	◆	F1	
DIN 32676 0,8 µm Tri-Clamp	◆	G1	
DIN 11864-1 0,8 µm screwed	◆	H1	
DIN 11864-2 0,8 µm flanged		H2	
ISO 2852 0,8 µm clamped	◆	J1	
ISO 2853 0,8 µm screwed	◆	J5	
Wetted parts material			
ISO228-1 G pipe thread	◆	1	
Calibration/Accuracy class			
0,1 % flow, 5 kg/m³ density	◆	1	
0,1 % flow, 1 kg/m³ density	◆	4	
Standard fraction calibration			
• API number		9	N0A
• Balling		9	N0B
• °Baumé light		9	N0C
• °Baumé heavy		9	N0D
• °Brix		9	N0E
• °Oeschlé		9	N0F
• °Plato		9	N0G
• Specific Gravity		9	N0H
• °Twaddell		9	N0J
• %HFCS42		9	N0K
• %HFCS55		9	N0L
• %HFCS90		9	N0M
Transmitter/DSL material and mounting style			
None		A	
DSL, IP67, aluminum, M12	◆	N	
DSL, IP67, aluminum, M12, T/Box	◆	Q	
Ex approval			
Non-Ex	◆	A	
ATEX II 2GD	◆	C	
IECEx GDb	◆	F	
FM/CSA/UL Class 1, Div 1	◆	H	
Local User Interface			
None	◆	0	

◆ Short lead time (details in PMD)

Selection and Ordering data		Order code
Further designs Please add "**-Z**" to Order No. and specify Order code(s).		
Cable glands		
None	◆	**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**
Sofware functions and CT approvals		
None	◆	**B10**
I/O configuration Ch1		
None	◆	**E00**
I/O configuration Ch2, Ch3 and Ch4		
None The MLFB structure for FC430 systems must be filled to **this level**, including **"-Z"** options A.., B.., E.. and F..		**F00**

Selection and Ordering data		Order code
Add-on options and accessories		
Please add "**-Z**" to Order No. and specify Order code(s).		
Certificates		
Pressure test certificate CRN	◆	**C01**
Pressure test certificate PED	◆	**C02**
Material certificate EN 10204-3.1	◆	**C05**
Welding inspection report		**C07**
Factory certificate to EN 10204 2.1	◆	**C10**
Factory certificate to EN 10204 2.2	◆	**C11**
Cable		
5 m (16.4 ft), standard with M12 plugs fitted	◆	**L51**
5 m (16.4 ft), standard	◆	**L52**
10 m (32.8 ft) standard with M12 plugs fitted	◆	**L55**
10 m (32.8 ft), standard	◆	**L56**
25 m (82 ft), standard with M12 plugs fitted	◆	**L59**
25 m (82 ft), standard	◆	**L60**
50 m (164 ft), standard with M12 plugs fitted	◆	**L63**
50 m (164 ft), standard	◆	**L64**
75 m (246 ft), standard with M12 plugs fitted	◆	**L67**
75 m (246 ft), standard	◆	**L68**
150 m (492 ft), standard with M12 plugs fitted	◆	**L71**
150 m (492 ft), standard	◆	**L72**
Additional data		
Please add "**-Z**" to Order No. and specify Order code(s) and plain text.		
Tag name		
Tag name plate, stainless steel		**Y17**
Customer specific calibration		
Customer specific calibration (5 flow x 2 points)		**Y61**
Customer specific calibration (10 flow x 1 point)		**Y62**

◆ Short lead time (details in PMD)

Operating instructions for SITRANS FC430

Description	Order No.
• English	**A5E03361511**
• German	**A5E03651143**
• Spanish	**A5E03651152**
• French	**A5E03651188**
• Italian	**A5E03651190**
• Chinese	**A5E03922773**

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Flow sensor SITRANS FCS400

Selection and Ordering data		Order No.	Ord. code
SITRANS FCS400 NAMUR compliant flow sensor with flange/pipe thread connections for SITRANS FC430 Digital coriolis flowmeter Replacement sensor ordered with or without a DSL according to service requirements. For compact or remote mounting with FCT030 transmitter	◆	7ME4710 -	
Sensor size, Connection size			
DN 15, DN 15 (½", ½")	◆	3G	
DN 25, DN 25 (1", 1")	◆	3L	
DN 50, DN 50 (2", 2")	◆	4C	
DN 80, DN 80 (3", 3")	◆	4K	
Process connection			
EN1092-1 B1, PN 40	◆	A1	
EN1092-1 B1, PN 100	◆	A3	
ANSI B16.5-2009, class 150	◆	D1	
ANSI B16.5-2009, class 600	◆	D3	
ISO228-1 G pipe thread	◆	E1	
ASME B1.20.1 NPT pipe thread	◆	E3	
Wetted parts material			
AISI 316L/W1.4435/W1.4404 (100 barg max.)	◆	1	
Calibration/Accuracy class			
0,1 % flow, 5 kg/m³ density	◆	1	
0,1 % flow, 1 kg/m³ density	◆	4	
Standard fraction calibration			
• API number		9	N0A
• Balling		9	N0B
• °Baumé light		9	N0C
• °Baumé heavy		9	N0D
• °Brix		9	N0E
• °Oeschlé		9	N0F
• °Plato		9	N0G
• Specific Gravity		9	N0H
• °Twaddell		9	N0J
• %HFCS42		9	N0K
• %HFCS55		9	N0L
• %HFCS90		9	N0M
Transmitter/DSL material & mounting style			
None		A	
DSL, IP67, aluminum, M12		N	
DSL, IP67, aluminum, M12, T/Box		Q	
Ex approval			
Non-Ex	◆	A	
ATEX II 2GD	◆	C	
IECEx GDb	◆	F	
FM/CSA/UL Class 1, Div 1	◆	H	
Local User Interface			
None	◆	0	

◆ Short lead time (details in PMD)

Selection and Ordering data		Order code
Further designs Please add "**-Z**" to Order No. and specify Order code(s).		
Cable glands		
None	◆	**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**
Sofware functions and CT approvals		
None	◆	**B10**
I/O configuration Ch1		
None	◆	**E00**
I/O configuration Ch2, Ch3 and Ch4		
None The MLFB structure for FC430 systems must be filled to **this level**, including **"-Z"** options A..., B..., E... and F...		**F00**

Selection and Ordering data		Order code
Add-on options and accessories		
Please add "**-Z**" to Order No. and specify Order code(s).		
Certificates		
Pressure test certificate CRN	◆	**C01**
Pressure test certificate PED	◆	**C02**
Material certificate EN 10204-3.1	◆	**C05**
Welding inspection report		**C07**
Factory certificate to EN 10204 2.1	◆	**C10**
Factory certificate to EN 10204 2.2	◆	**C11**
Cable		
5 m (16.4 ft), standard with M12 plugs fitted	◆	**L51**
5 m (16.4 ft), standard	◆	**L52**
10 m (32.8 ft) standard with M12 plugs fitted	◆	**L55**
10 m (32.8 ft), standard	◆	**L56**
25 m (82 ft), standard with M12 plugs fitted	◆	**L59**
25 m (82 ft), standard	◆	**L60**
50 m (164 ft), standard with M12 plugs fitted	◆	**L63**
50 m (164 ft), standard	◆	**L64**
75 m (246 ft), standard with M12 plugs fitted	◆	**L67**
75 m (246 ft), standard	◆	**L68**
150 m (492 ft), standard with M12 plugs fitted	◆	**L71**
150 m (492 ft), standard	◆	**L72**
Additional data		
Please add "**-Z**" to Order No. and specify Order code(s) and plain text.		
Tag name		
Tag name plate, stainless steel		**Y17**
Customer specific calibration		
Customer specific calibration (5 flow x 2 points)		**Y61**
Customer specific calibration (10 flow x 1 point)		**Y62**

◆ Short lead time (details in PMD)

Operating instructions for SITRANS FC430

Description	Order No.
• English	**A5E03361511**
• German	**A5E03651143**
• Spanish	**A5E03651152**
• French	**A5E03651188**
• Italian	**A5E03651190**
• Chinese	**A5E03922773**

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

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

Transmitter SITRANS FCT030

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, corrected volumeflow, density, temperature and fraction.

The FCT030 IP67 transmitter can be remote connected or compact mounted with all sensors of type FCS400, sizes DN 15 to DN 80.

Application

SITRANS FC430 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, 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 patented 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
- 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

Alarms and safety

- Advanced diagnosis and service menu enhances trouble-shooting and meter validation
- Configurable upper and lower alarms and warning limits for all process values
- Alarm handling can be selected between Siemens and NAMUR standard configurations
- Designed from the ground up and certified to integrated safety levels as:
  - SIL 3 for software
  - SIL 2 for hardware and mechanics
  - SIL 3 for a system with redundant hardware

  Unlike many systems which are certified in practice, the SITRANS FC430 system is certified in design, which is a higher qualification and more robust for secure implementation of safety systems.

Outputs and control

- Built-in dosing controller with compensation and monitoring comprising 3 built-in totalizers
- Multi-parameter outputs, individually configurable for massflow, volumeflow, corrected 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 7.2 which can be validated and setup for safety critical applications (SIL 3). The current signal can be configured for massflow, volumeflow or density.

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
- Discrete 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)
- Discrete one or two-valve dosing control
- Operational and alarm status

Relay

Relay output(s) can be user configured to:

- Discrete 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)

Signal outputs and inputs are individually ordered as active or passive.

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

Approvals and certificates

The FC430 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 FCS400 sensor of size DN 15, DN 25, DN 50 or DN 80.

FCT030 is available as standard with 1 current, HART 7.2 output and can be fitted with add-on modules for additional input/output functions.

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, 1 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 database 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.

Function

The following functions are available:

- Mass flowrate, volume flowrate, density, process temperature, fraction flow
- Up to four output/input channels selected at ordering
- Outputs can be individually configured with mass, volume, density etc.
- 3 built-in totalizers which can count positive, negative or net flows
- 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
- 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. Users can either select from a list of pre-configured fractions such as °Brix or "Ethanol in water", or order a specific fraction calibration to exactly match the process conditions. All fraction calculations fit within 0.1% of the true value.

Transmitter SITRANS FCT030

Technical specifications

Process media	• Fluid Group 1 (suitable for dangerous fluids) • Aggegate state: Paste/light slurry, liquid and gas
Number of process variables	7
Measurement of	• Mass flow • Volume flow • Density • Process media temperature • Corrected 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 ony 4 ... 20 mA)
Load	< 500 Ω per channel
Time constant	0 ... 100 s adjustable
Digital output	
Pulse	41.6 µs ... 5 s pulse duration
Frequency	0 ... 10 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	
Voltage	15 ... 30 V DC (2 ... 15 mA)
Functionality	Start/stop/hold/continue dosing, zero point adjust, 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	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	
• 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	HART 7.2
Enclosure	
Material	Aluminum
Rating	IP67/NEMA 4X to IEC 529 and DIN 40050 (1 mH_2O for 30 min.)
Mechanical load	18 ... 1000 Hz random, 3.17 g RMS, in all directions, to IEC 68-2-36
Supply voltage	
Supply	18.5 ... 300 V DC/ 85 ... 260 V AC, 50 ... 60 Hz
Fluctuation	No limit
Power consumption	7.5 W/15 VA
EMC performance	
Emission	EN/IEC 61000-6-4 (Industry)
Immunity	EN/IEC 61000-6-2 (Industry)
NAMUR	Within the value limits according to "General requirements" with error criteria A in accordance with NE 21
Environment	Within the value limits according to "General requirements" with alarm criteria A in accordance with NE 21
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
Cable	Standard industrial signal cable up to 200 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.

Approvals	
Hazardous area	• ATEX Ex II 2(1) GD Ex d e [ia] ia IIC T6 Gb • FM/CSA Class1 Div. 1 • IEC Ex II 2(1) GD Ex d e [ia] ia IIC T6 Gb
Custody transfer	• OIML R 117 type approval to a wide variety of liquids other than water • NTEP (USA) type evaluation program approval to a wide variety of liquids
Pressure equipment	• PED • CRN • Unfired pressure vessels (UK)
Hygienic applications	• EHEDG for all sensors • 3A for hygienic variant sensors • External cleanability satisfies EHEDG and 3A rules
Certificates	
Safety Integration Level (applies only to compact versions)	• 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	• C-TICK (Australia and New Zealand EMC) • NEPSI (China Ex) • TISS (Japan)

Transmitter SITRANS FCT030

Selection and Ordering data		Order No.
		7ME4603 - 0
SITRANS FCT030 Transmitter for replacement or installation extension for SITRANS FC430 Digital coriolis flowmeter		
Transmitter with HART, I/O and LUI, for compact or remote mounting, weatherproof and flameproof (where specified). Order the sensor separately.		
Material and mouting style		
Compact, IP67, aluminum	◆	2
Remote, IP67, aluminum, M12	◆	5
Remote, IP67, aluminum, T/Box	◆	8
Ex approvals		
Non-Ex	◆	A
ATEX II 2GD	◆	C
IECEx GDb	◆	F
FM/CSA/UL Class 1, Div 1	◆	H
Cable glands		
Metric, no glands	◆	A
Metric, plastic	◆	B
Metric, brass/Ni plated	◆	E
Metric, stainless steel	◆	F
NPT, no glands	◆	G
NPT, plastic	◆	H
NPT, brass/Ni plated	◆	L
NPT, stainless steel	◆	M
Power supply		
18 ... 300 V DC; 18 ... 85, 185 ... 250 V AC, 50/60 Hz	◆	0
Enclosure protection rating		
IP67/NEMA 4X	◆	4
Local User Interface		
Blind	◆	1
Graphical, 240x160 pxl	◆	3
Software functions		
Standard	◆	A
I/O configuration Ch1		
Ca 4 ... 20 mA HART active SIL certified	◆	E
Cp 4 ... 20 mA HART passive SIL certified	◆	F

◆ Short lead time (details in PMD)

Selection and Ordering data		Order code
Further designs		
Please add "**-Z**" to Order No. and specify Order code(s).		
I/O configuration Ch2, Ch3 and Ch4		
None	◆	**F00**
aSignal, None, None	◆	**F40**
aSignal, aSignal, None	◆	**F41**
aSignal, aSignal, aSignal	◆	**F42**
aSignal, aSignal, Ia	◆	**F43**
aSignal, aSignal, R	◆	**F44**
aSignal, Ia, None	◆	**F45**
aSignal, Ia, Ia	◆	**F46**
aSignal, Ia, R	◆	**F47**
aSignal, R, None	◆	**F50**
aSignal, R, R	◆	**F51**
pSignal, None, None	◆	**F60**
pSignal, pSignal, None	◆	**F61**
pSignal, pSignal, pSignal	◆	**F62**
pSignal, pSignal, Ip	◆	**F63**
pSignal, pSignal, R	◆	**F64**
pSignal, Ip, None	◆	**F65**
pSignal, Ip, Ip	◆	**F66**
pSignal, Ip, R	◆	**F67**
pSignal, R, None	◆	**F70**
pSignal, R, R	◆	**F71**
aSignal, aSignal, pSignal		**F80**
aSignal, aSignal, Ip		**F81**
aSignal, pSignal, None		**F82**
aSignal, pSignal, pSignal		**F83**
aSignal, pSignal, Ia		**F84**
aSignal, pSignal, Ip		**F85**
aSignal, pSignal, R		**F86**
aSignal, Ia, Ip		**F87**
aSignal, Ip, None		**F90**
aSignal, Ip, Ip		**F91**
aSignal, Ip, R		**F92**
pSignal, pSignal, Ia		**F93**
pSignal, Ia, None		**F94**
pSignal, Ia, Ia		**F95**
pSignal, Ia, Ip		**F96**
pSignal, Ia, R		**F97**

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 Order No. and specify Order code(s).		
Certificates		
Factory certificate to EN 10204 2.1	◆	**C10**
Factory certificate to EN 10204 2.2	◆	**C11**
Cable		
None	◆	**L50**
5 m (16.4 ft), standard with M12 plugs fitted	◆	**L51**
5 m (16.4 ft), standard	◆	**L52**
10 m (32.8 ft) standard with M12 plugs fitted	◆	**L55**
10 m (32.8 ft), standard	◆	**L56**
25 m (82 ft), standard with M12 plugs fitted	◆	**L59**
25 m (82 ft), standard	◆	**L60**
50 m (164 ft), standard with M12 plugs fitted	◆	**L63**
50 m (164 ft), standard	◆	**L64**
75 m (246 ft), standard with M12 plugs fitted	◆	**L67**
75 m (246 ft), standard	◆	**L68**
150 m (492 ft), standard with M12 plugs fitted	◆	**L71**
150 m (492 ft), standard	◆	**L72**
Additional data		
Please add "**-Z**" to Order No. and specify Order code(s) and plain text.		
Tag name		
Tag name plate, stainless steel		**Y17**
Transmitter setup		
Custom transmitter setup		**Y20**

◆ Short lead time (details in PMD)

Operating instructions for SITRANS FC430

Description	Order No.
• English	**A5E03361511**
• German	**A5E03651143**
• Spanish	**A5E03651152**
• French	**A5E03651188**
• Italian	**A5E03651190**
• Chinese	**A5E03922773**

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

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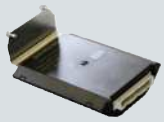
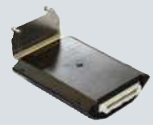
http://www.siemens.com/flowdocumentation

SITRANS FC430
Accessories/Spare parts

Spare parts - transmitter FCT030

Description	Order No.	
Display and keypad assembly with firewire connection to the transmitter module	**A5E03548971**	
Sensor interface (Compact). Front end flow calculator and process detection. SIL 3 approved	**A5E03549142**	
Sensor interface (Remote); barrier unit for high speed digital communication and Ex ib power supply to remote front end DSL module	**A5E03549098**	
Display lid in painted aluminum with Ex glass plate and o-ring seal	**A5E03549344**	
Transmitter cassette (active) with SIL approved 4 ... 20 mA output and HART 7.2	**A5E03549357**	
Transmitter cassette (passive) with SIL approved 4 ... 20 mA output and HART 7.2	**A5E03549383**	
Bag of loose spare parts; including cable strain relief components, mounting tool, seals and gasket, assorted screws and washers, hex cap nut, blind plugs, and o-rings	**A5E03549396**	
Power supply 240 V AC, 47 ... 63 Hz 24 ... 90 V DC	**A5E03549413**	
Blind lid in painted aluminum with o-ring seal	**A5E03549429**	
I/O assembly Advise Order code F00 to F97 from Selection and Ordering data	**A5E03939114**	
SensorFlash (1 GB micro SD card)	**A5E03915258**	

Description	Order No.	
Mounting bracket - FCT030; in painted aluminum for pipe or wall mounting of transmitter FCT030 remote version. Including lock ring, pressure pads and seal cap	**A5E03906091**	
M12 option for sensor housing in stainless steel. Prewired and potted to replace M12 socket in DSL housing	**A5E03906095**	
M12 option - remote - in painted aluminum. Prewired and potted replacement M12 connection for FCT030 transmitter remote version	**A5E03906104**	
Remote terminal house - M20	**A5E03906112**	
Remote terminal house - NPT - in painted aluminum for sensor cable termination at FCT030 transmitter remote version. Pre-wired and potted	**A5E03906130**	

Spare parts - sensor FCS400

Description	Order No.	
Blind lid in painted aluminum with o-ring seal	**A5E03549295**	
Sensor link insert. Front end flow calculator and process detection. SIL 3 approved	**A5E03549191**	
Sensor housing metric	**A5E03549313**	
Sensor housing NPT in painted aluminum	**A5E03906080**	
Bag of loose parts for sensor; including cable strain relief components, washer, seals, o-rings, and assorted screws	**A5E03549324**	

Accessories

Description	Order No.	
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[1]	**A5E03907429**	
Bag of glands (metric) in NiPlatedBrass[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[2]	**A5E03907467**	
Bag of glands (NPT) in NiPlatedBrass[2]	**A5E03907473**	
Standard cable (non-Ex) with M12 plugs, 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	Order No.	
Standard cable (Ex) with M12 plugs, 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**	
Service toolkit for field maintenance of transmitter and sensor components. Contains all hand tools necessary for maintenance. Other tools may be required for installation.	**A5E03722877**	
Heating Jacket, indoor use, 200 °C (392 °F) max. temperature. Complete with 5 m (16.4 ft) high temperature cable fitted. Dedicated plug connection to controller		
• DN 15 electric	**A5E03830623**	
• DN 25 electric	**A5E03830624**	
• DN 50 electric	**A5E03830625**	
• DN 80 electric	**A5E03830626**	
Heating jacket controller, IP65. Digital display for 0 ... 200 °C (32 .. 392 °F) control setpoint		
• 230 V AC	**A5E03839193**	
• 115 V AC	**A5E03839194**	

[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

SITRANS FC430
Accessories/Spare parts

Description	Dimension	Order No.
Mating parts for hygienic fittings DIN 11851 Includes: • 2 unions • 2 mating parts (for welding in) • 2 EPDM gaskets	DN 10	**FDK:085U1016**
	DN 15	**FDK:085U1017**
	DN 25	**FDK:085U1019**
	DN 32	**FDK:085U1020**
	DN 40	**FDK:085U1021**
	DN 50	**FDK:085U1022**
	DN 65	**FDK:085U1023**
Mating parts for hygienic clamp ISO 2852 Includes: • 2 clamps • 2 mating parts • 2 EPDM gaskets	25 mm	**FDK:085U1029**
	40 mm	**FDK:085U1031**
	50 mm	**FDK:085U1032**
2 EPDM gaskets with collar for mounting set DIN 11851	DN 10	**FDK:085U1006**
	DN 15	**FDK:085U1007**
	DN 25	**FDK:085U1009**
	DN 32	**FDK:085U1010**
	DN 40	**FDK:085U1011**
	DN 50	**FDK:085U1012**
	DN 65	**FDK:085U1013**

Transmitter MASS 6000 IP67 compact/remote

Overview

MASS 6000 is based on the latest developments within 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 40, and can be used in remote version for all types of MASS 2100/MC2 and FC300 sensors.

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 patented 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 5th-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 40 (1/8" to 1½") 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

Transmitter MASS 6000 IP67 compact/remote

Technical specifications

Measurement of	Mass flow [kg/s (lbs/min)], volume flow [l/s (gpm)], fraction [%], °Brix, density [kg/m^3, (lbs/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, 1 KΩ ≤ 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.
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 Grms, in all directions, to IEC 68-2-36
Supply voltage	
24 V version	
• Supply	24 V DC/AC, 50 ... 60 Hz
• Fluctuation	18 ... 30 V DC 20 ... 30 V AC
• Power consumption	10 W
230 V version	
• Supply	87 ... 253 V AC, 50 ... 60 Hz
• Power consumption	26 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/IEC 61000-6-4 (Industry)
Immunity	EN/IEC 61000-6-2 (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

Transmitter MASS 6000 IP67 compact/remote

Selection and Ordering data	Order 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**■
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	Order No.
• English	**A5E03071936**

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

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

Accessories

Description	Order 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**	

Note: The operating instructions should be ordered as a separate line on the order.

Add-on module

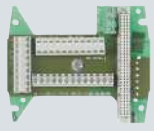
Description	Order No.	
HART (Ex-i)	**FDK:085U0226**	
PROFIBUS PA Profile 3 (Ex-i)	**FDK:085U0236**	
PROFIBUS DP Profile 3	**FDK:085U0237**	
MODBUS RTU RS 485	**FDK:085U0234**	
FOUNDATION Fieldbus H1 (Ex-i)	**A5E02054250**	
DeviceNet	**FDK:085U0229**	

Operating instructions for SITRANS F add-on modules

Description	Order No.
HART	
• English	**A5E03089708**
PROFIBUS PA/DP	
• English	**A5E00726137**
• German	**A5E01026429**
MODBUS	
• English	**A5E00753974**
• German	**A5E03089262**
• Spanish	**A5E03089278**
• French	**A5E03089265**
FOUNDATION Fieldbus	
• English	**A5E02318728**
• German	**A5E02488856**
• Spanish	**A5E02512177**
• French	**A5E02512169**
DeviceNet	
• English	**A5E03089720**

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

Spare parts for compact or remote IP67 version

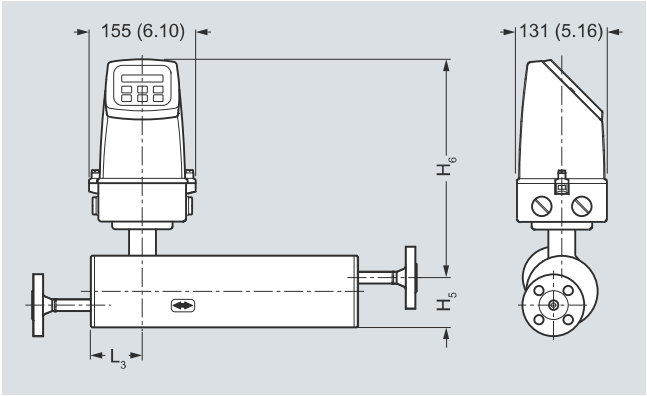
Description	Order No.	
MASS 6000 transmitter IP67/NEMA 6 Fibre glass reinforced polyamide and without connection board 1 current output 1 frq./pulse output 1 relay output		
• 115/230 V AC, 50/60 Hz	**7ME4110-1AA10-1AA0**	
• 24 V AC/DC	**7ME4110-1AA20-1AA0**	
Wall mounting unit for IP67/NEMA 6 version 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	Order 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**	

Dimensional drawings

Compact

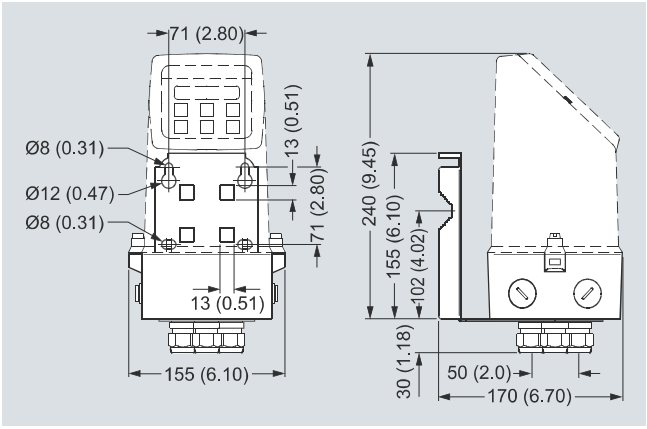


Dimensions in mm (inch)

MASS 2100

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)
25 (1)	75 (2.95)	173 (6.81)	330 (13.00)	503 (19.80)
40 (1½)	75 (2.95)	227 (8.94)	330 (13.00)	557 (21.93)

Transmitter wall mounted



Dimensions in mm (inch)

Schematics

Electrical connection

Grounding

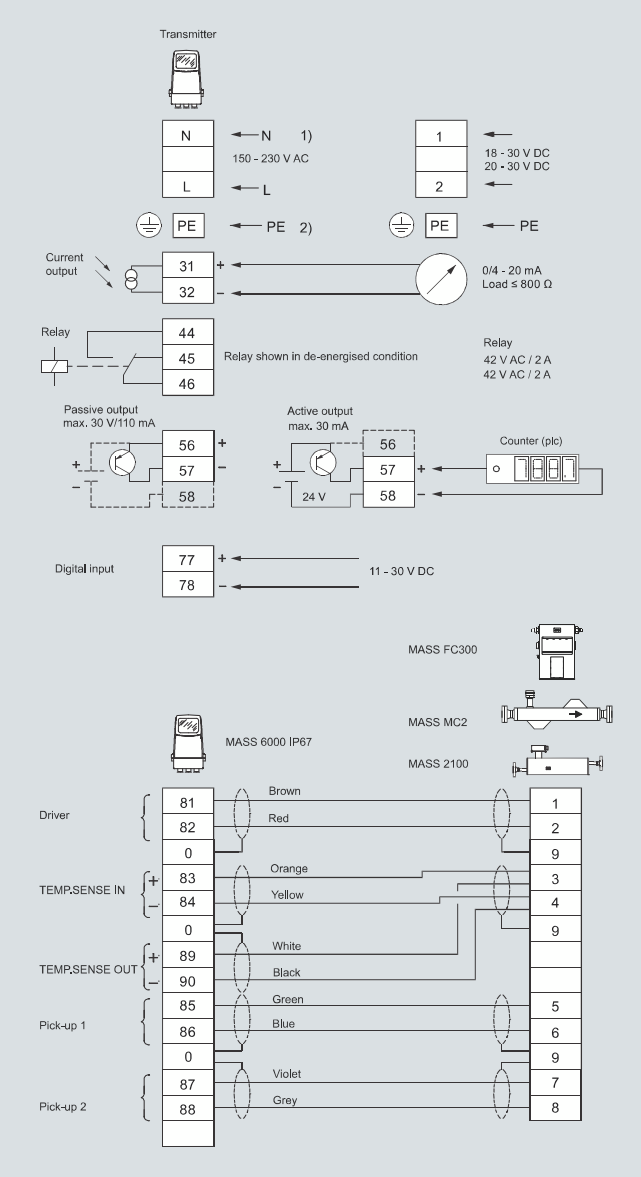
PE must be connected due to safety class 1 power supply.

Mechanical counters

When mounting a mechanical counter to terminals 57 and 58 (active output), a 1000 µF 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 the latest developments within 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/MC2/FC300 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 patented 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 5th-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 ATEX and UL approval
- 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 IP65

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

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

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 (lbs/min)], volume flow [l/s (gpm)], fraction [%], °Brix, density [kg/m^3 (lbs/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, 1 KΩ ≤ 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.
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, 3.17G rms, in all directions, to IEC 68-2-36
Supply voltage	• 87 ... 253 V AC +10 % ... -10 %, 50 ... 60 Hz • 18 ... 30 V DC or 20 ... 30 V AC
Power consumption	
230 V AC	9 VA max.
24 V DC	6 W I_N = 250 mA, I_{ST} = 2 A (30 ms)
EMC performance	
Emission	EN/IEC 61000-6-4 (Industry)
Immunity	EN/IEC 61000-6-2 (Industry)
Ex approval	[Ex ia] IIC, DEMKO 03 ATEX 135251X
Maintenance	The flowmeter has a built-in error log/pending menu which should be inspected on a regular basis.
Fuse	T 400 mA, T 250 V (IEC 127), not replaceable by operator
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

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

Selection and Ordering data	Order No.
SITRANS F C MASS 6000 transmitter	7ME4110-
Transmitter for rack and wall mounting, incl. connection board	2 ■■■■ - ■■ A0
Enclosure	
19 inch insert IP20 (rack)	C
19 inch insert in IP65 (wall mounting)	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
ATEX	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

Attention (Ex applications)!

MC2 Ex version sensors must only be connected to MASS 6000 standard. The MASS 6000 connection board must be replaced by a connection board approved FDK:083H4294 or FDK:083H4295 (see connection boards/PCB for MASS 6000 and MC2 sensors).

Operating instructions for SITRANS F C MASS 6000 19“

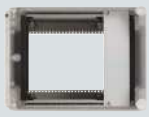
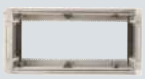
Description	Order No.
• English	**A5E02944875**

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

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

Accessories

Enclosure

Description	Order 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	Order No.	
Cable glands, screwed entries type PG 13.5 in nickel-plated brass, 2 pcs.	**FDK:083G3140**	
Cable glands, screwed entries type PG 13.5 in polyamide (100 °C (212 °F)) black, 2 pcs.	**FDK:083G0228**	

Add-on module

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

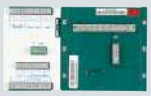
Description	Order No.	
HART (Ex-i)	**FDK:085U0226**	
PROFIBUS PA Profile 3 (Ex-i)	**FDK:085U0236**	
PROFIBUS DP Profile 3	**FDK:085U0237**	
MODBUS RTU RS 485	**FDK:085U0234**	
FOUNDATION Fieldbus H1 (Ex-i)	**A5E02054250**	
DeviceNet	**FDK:085U0229**	

Operating instructions for SITRANS F add-on modules

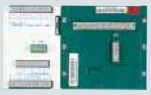
Description	Order No.
HART	
• English	**A5E03089708**
PROFIBUS PA/DP	
• English	**A5E00726137**
• German	**A5E01026429**
MODBUS	
• English	**A5E00753974**
• German	**A5E03089262**
• Spanish	**A5E03089278**
• French	**A5E03089265**
FOUNDATION Fieldbus	
• English	**A5E02318728**
• German	**A5E02488856**
• Spanish	**A5E02512177**
• French	**A5E02512169**
DeviceNet	
• English	**A5E03089720**

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

Connection boards/PCB for MASS 6000 and MASS 2100 sensors

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

Spare parts 19” versions

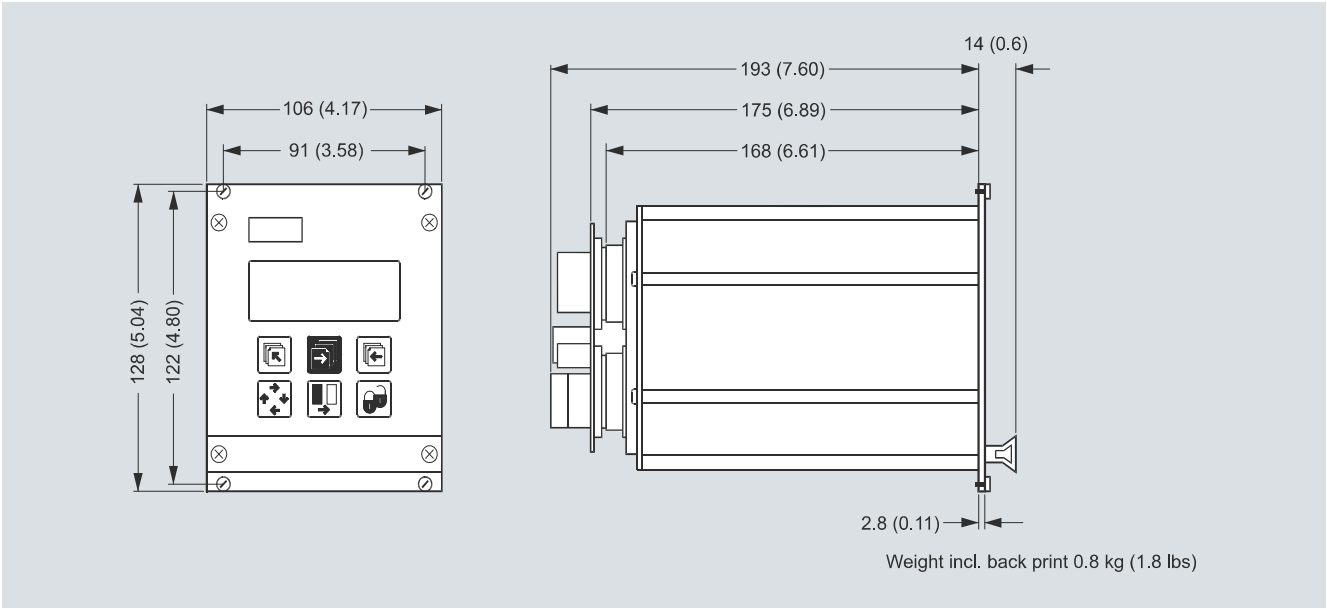
Enclosure (without PCB, connection board)

Description	Order 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 for replacement	**FDK:085U1039**	

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

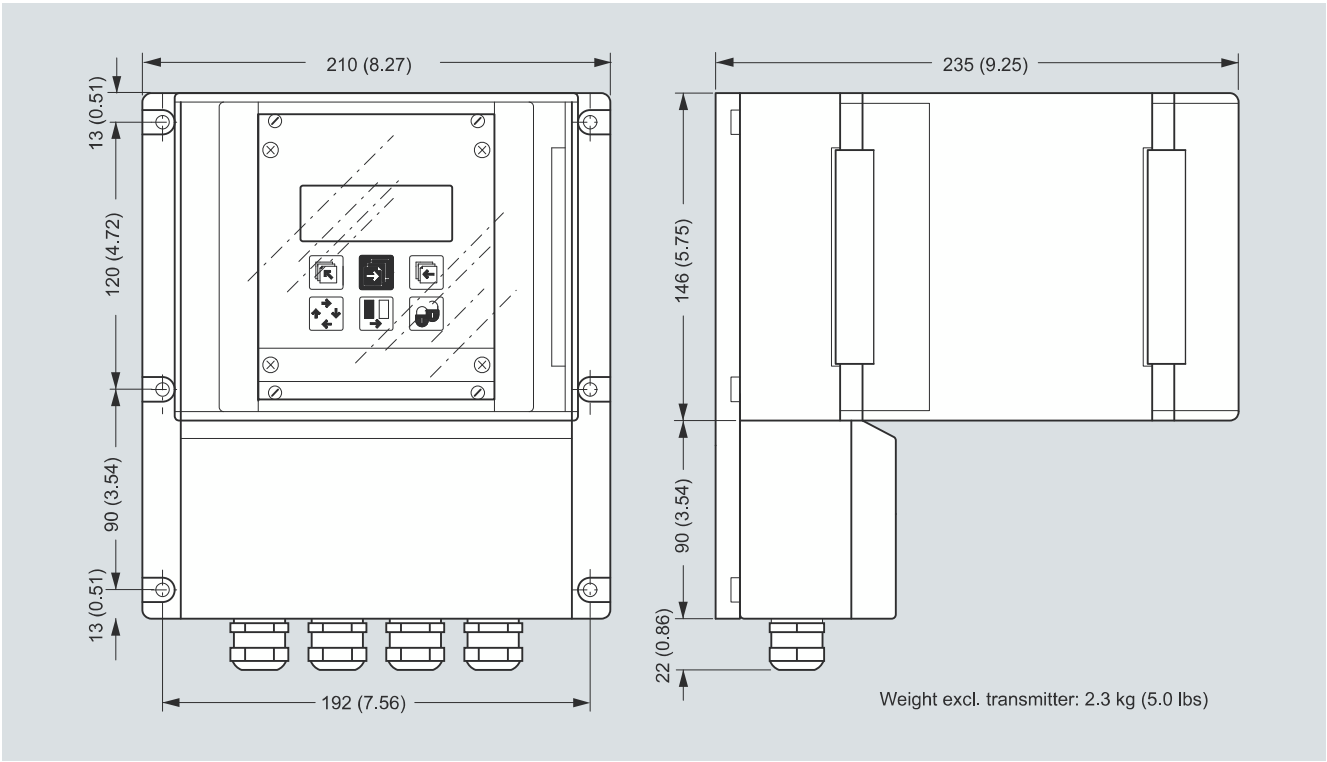
Dimensional drawings

Transmitter 19" insert



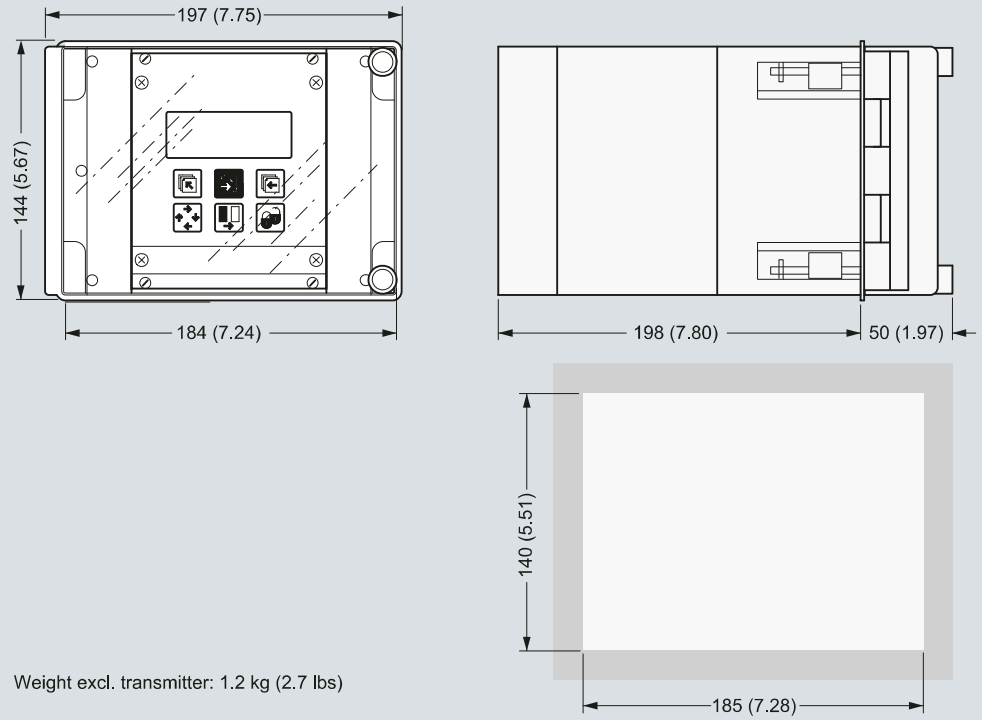
Dimensions in mm (inch)

Transmitter 19" wall mounting



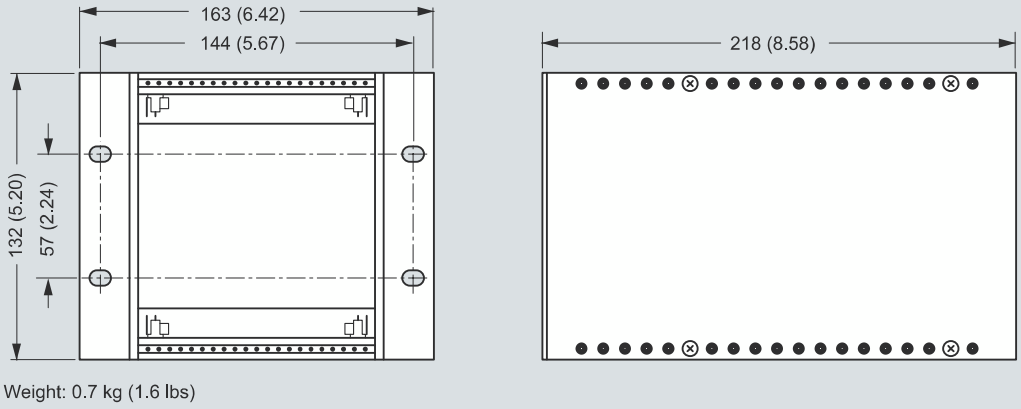
Dimensions in mm (inch)

Transmitter 19“ front of panel



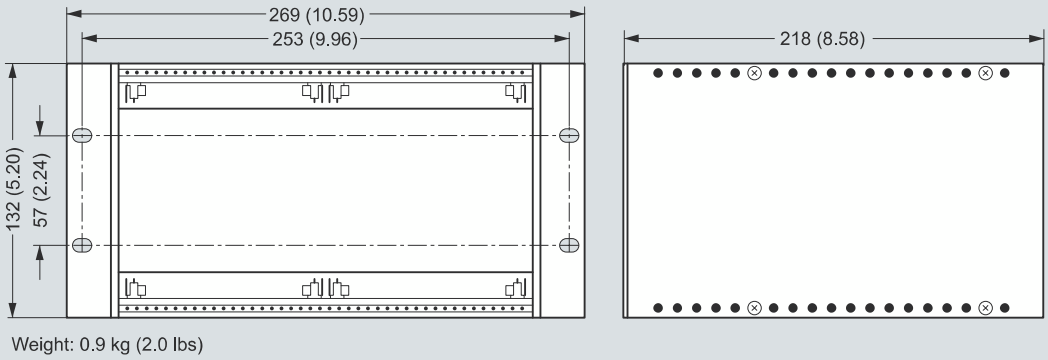
Dimensions in mm (inch)

Transmitter back of panel



Dimensions in mm (inch)

Transmitter back of panel, 42 TE



Dimensions in mm (inch)

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

Schematics

Electrical connection

Grounding

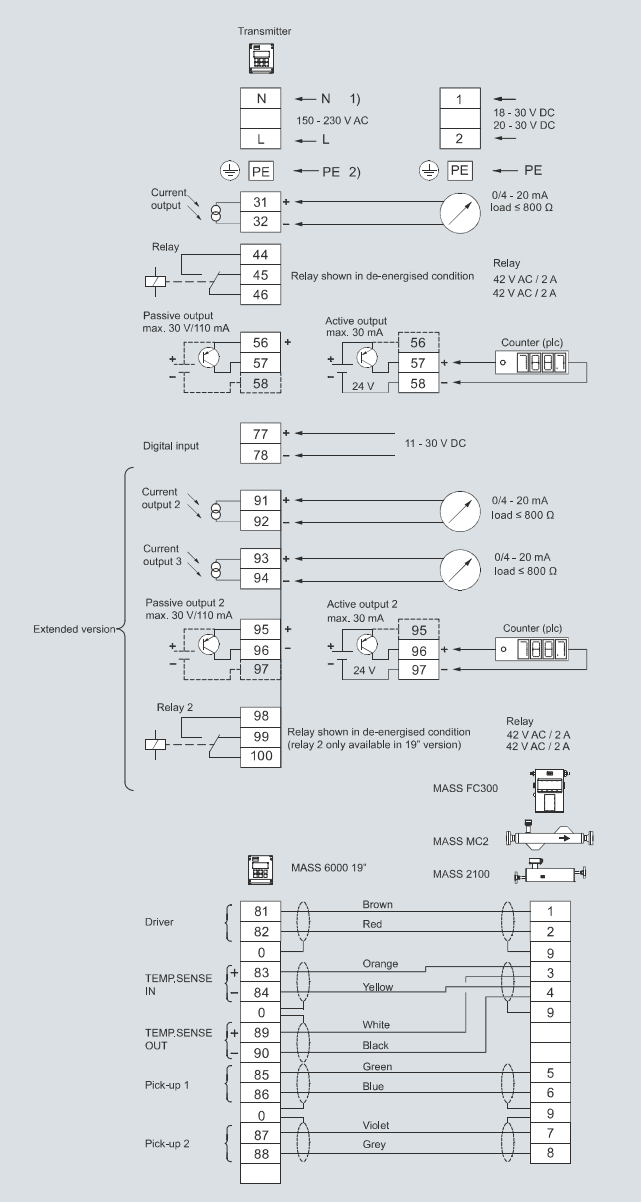
PE must be connected due to safety class 1 power supply.

Mechanical counters

When mounting a mechanical counter to terminals 57 and 58 (active output), a 1000 µF 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.



Transmitter MASS 6000 Ex d compact/remote

Overview

MASS 6000 is based on the latest developments within 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 40, 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
- ATEX-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 patented 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"
- 4-wire Pt1000 temperature measurement ensures optimum accuracy on mass flow, density and fraction flow
- Fraction flow computation based on a 5th-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 40, 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 ATEX approved together with all MASS 2100 sensors, but can **not** be used together with MC2 Ex versions

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 (lbs/min)], volume flow [l/s (gpm)], fraction [%], °Brix, density [kg/m^3 (lbs/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.
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 AAISI 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, to IEC 68-2-36, Curve E

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 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.
EMC performance	
Emission	EN/IEC 61000-6-4 (Industry)
Immunity	EN/IEC 61000-6-2 (Industry)
NAMUR	Within the value limits according to "Allgemeine Anforderung" with error criteria A in accordance with NE 21
Ex approval	Ex de [ia/ib] IIC T6, DEMKO 03 ATEX 135253X
Temperature class:	Process liquid temperature:
• T6	• T < 85 °C (185 °F)
• T5	• 85 °C < T < 100 °C (185 °F < T < 212 °F)
• T4	• 100 °C < T < 135 °C (212 °F < T < 275 °F)
• T3	• 135 °C < T < 180 °C (275 °F < T < 356 °F)

Selection and Ordering data	Order No.
SITRANS F C MASS 6000 transmitter Transmitter Ex d for remote mounting inclusive of wall mounting kit	7ME4110 - 2 ■■■■ - ■■ A ■
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	
ATEX	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	Order No.
• English	**A5E02944883**

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

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

Note:
Only communication modules with Ex approvals are allowed.

Transmitter MASS 6000 Ex d compact/remote

Selection and Ordering data

Accessories

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

Description	Order 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	Order No.
HART	
• English	**A5E03089708**
PROFIBUS PA/DP	
• English	**A5E00726137**
• German	**A5E01026429**
FOUNDATION Fieldbus	
• English	**A5E02318728**
• German	**A5E02488856**
• Spanish	**A5E02512177**
• French	**A5E02512169**

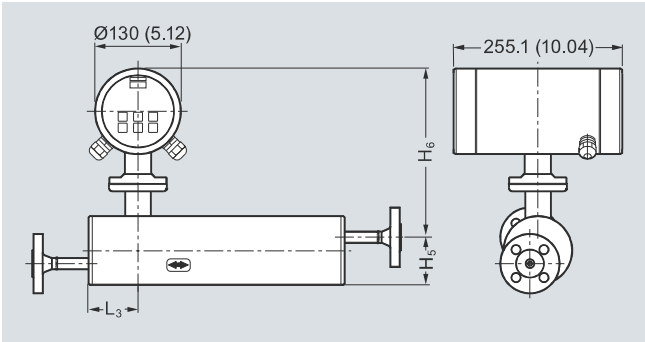
This device is shipped with a Quick Start guide and a CD containing further SITRANS F C literature.

Spare parts for MASS 6000 Ex d

Description	Order No.	
Wall mounting kit for remote Ex d inclusive of sensor cable of		
• 5 m	**FDK:083H0231**	
• 10 m	**FDK:083H0232**	
• 25 m	**FDK:083H0233**	
Transmitter insert (PCBA)	**FDK:083H3061**	
Front lid in stainless steel including plastic lens	**FDK:085U2373**	
Screws and washers between pedestal and sensor (4 pcs.), seal (1 pc.)	**FDK:085U2374**	
Display and keypad	**FDK:083H0235**	

Dimensional drawings

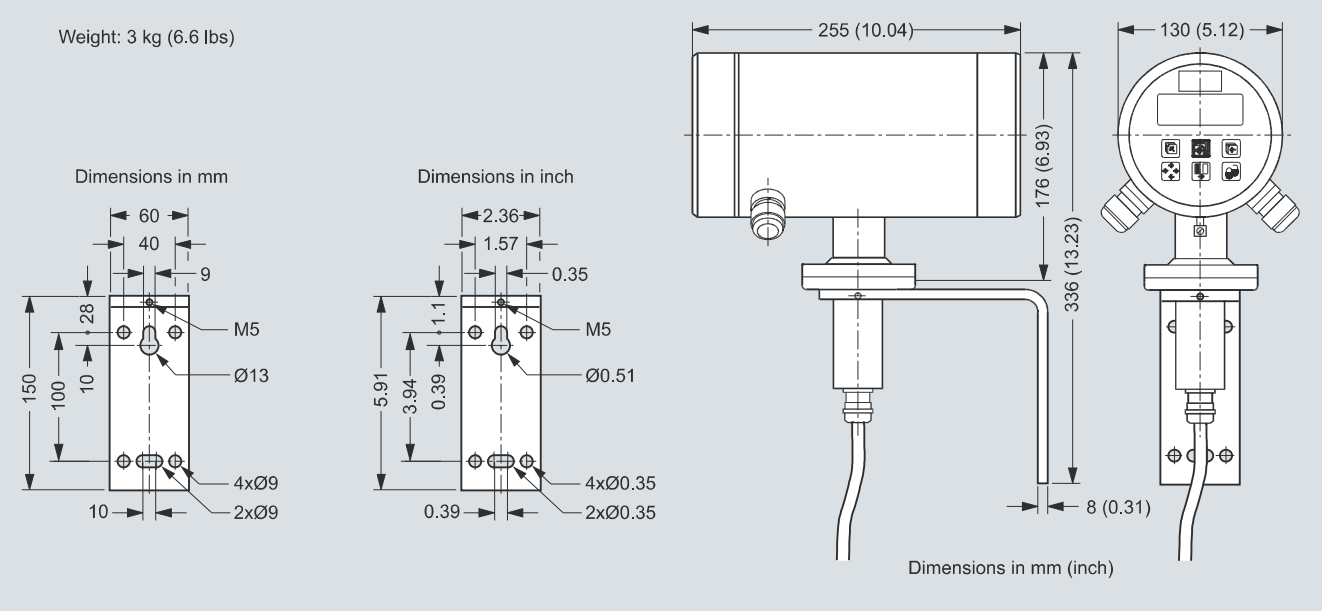
MASS 6000 Ex d compact version



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)

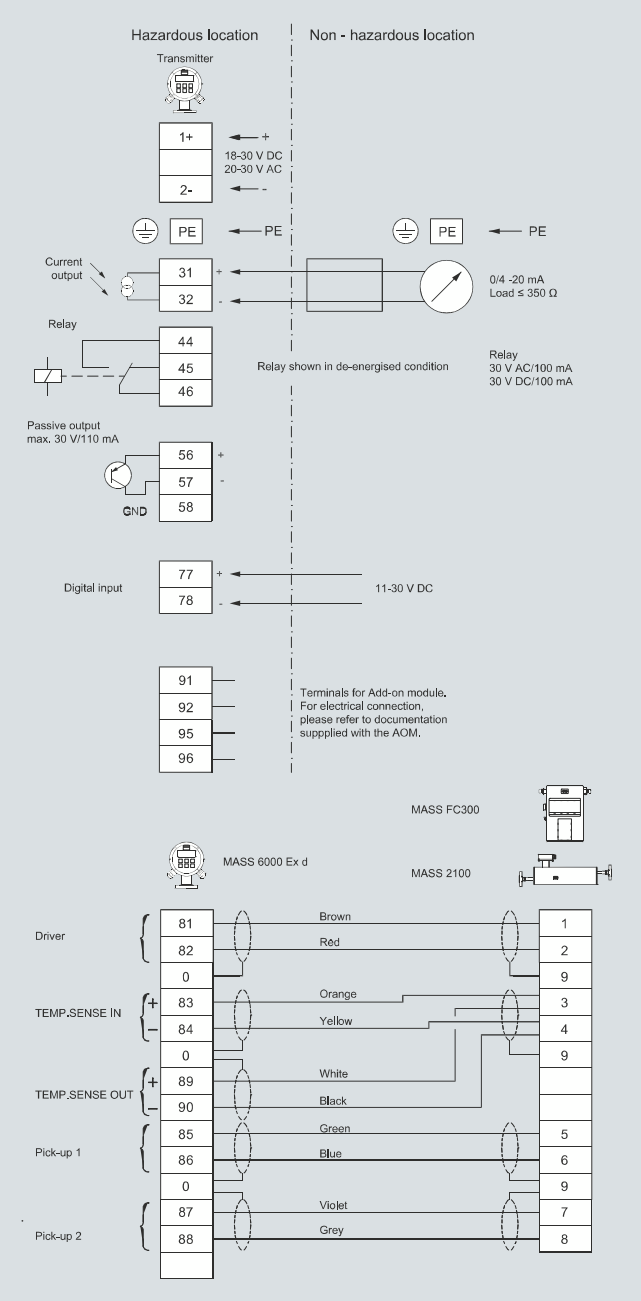
MASS 6000 Ex d remote version



Transmitter MASS 6000 Ex d compact/remote

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, MC2, 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 patented 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 5th-order algorithm matching all applications
- SIFLOW FC070 Ex CT is Custody transfer approved, according to OIML R 139 (Compressed gaseous fuel measuring systems for vehicles), when using the redundant digital output or the encrypted ActiveX component for SIMATIC touch panels.
- 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, MASS 2100 and MC2 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/batch output
- 1 phase shifted 90°/180°/ two stage digital output
- 1 digital input
- Low flow cut-off
- Empty pipe detection
- Noise filter settings for different applications
- Simulation
- Two-stage batch controller
- Automatic zero point adjustment with zero point evaluation feed back
- Limit functionality
- Comprehensive status and error reporting

Transmitter SIFLOW FC070

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. baudrate: 115 200 baud • Max. line length: 15 m at 115 200 baud • Signal level: according to EIA-RS 232C
MODBUS RS 485	• Max. baudrate: 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)
Approvals Ex	
SIFLOW FC070 Standard	CE, C-UL, ATEX II 3G Ex nA IIC
SIFLOW FC070 Ex CT	CE, C-UL, UL Haz.Loc., FM Class I, Div. 2 Groups A, B, C, D ATEX II (1)G [Ex ia] IIC Ga / II 3G Ex nA IIC T4 Gc and IEC Ex Ex nA [ia] IIC T4
Approvals Custody transfer	
SIFLOW FC070 Ex CT	PTB Germany approval no.: 5.4.11/11.22 OIML R 139 - Compressed gaseous fuel measuring systems for vehicles
Electromagnetic compatibility	Requirements of EMC law; Noise immunity according to IEC 61000-6-2, tested according to: IEC 61000-4-2, 61000-4-3, IEC 61000-4-4, IEC 61000-4-5, IEC 61000-4-6 Emitted interference according to EN 50081-2, tested according to EN 55011, class A, group 1
NAMUR	Within the limits according to "Allgemeine Anforderung" with error criteria A in accordance with NE21
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	Order No.
SIFLOW FC070 flow transmitter Remember to order 40 pin front plug connector.	**7ME4120-2DH20-0EA0**
40 pin front plug with screw contacts	**6ES7392-1AM00-0AA0**
40 pin plug 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 plug with screw contacts	**6ES7392-1AJ00-0AA0**

Operating instructions for SITRANS F C SIFLOW FC070

Description	Order No.
SIFLOW FC070 system manual	
• English	**A5E00924779**
• German	**A5E00924776**
SIFLOW FC070 with S7	
• English	**A5E02254228**
• German	**A5E02665536**
• French	**A5E02591639**
SIFLOW FC070 with PCS7	
• English	**A5E03694109**

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

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

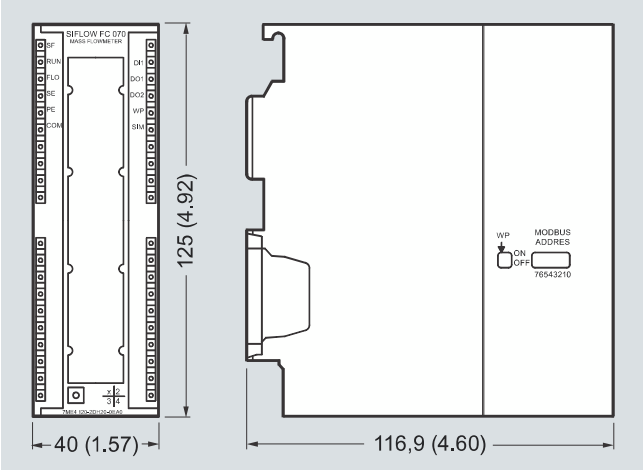
Accessories

Description	Order 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")	**6ES7 390-1AB60-0AA0**	
• 482 mm (18.9")	**6ES7 390-1AE80-0AA0**	
• 530 mm (20.8")	**6ES7 390-1AF30-0AA0**	
• 830 mm (32.7")	**6ES7 390-1AJ30-0AA0**	
• 2000 mm (78.7")	**6ES7 390-1BC00-0AA0**	
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**	

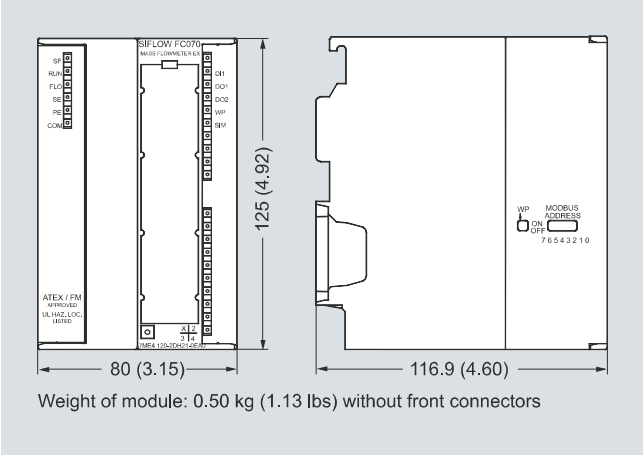
Transmitter SIFLOW FC070

ActiveX component, enables encrypted sensor process values to be communicated between SIFLOW FC070 Ex CT and SIMATIC touch panels

Dimensional drawings



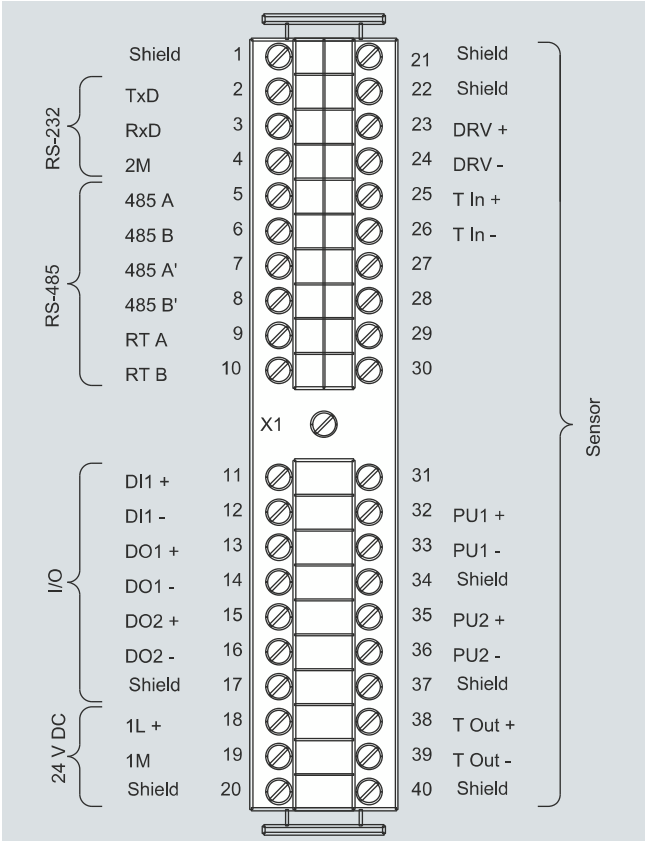
SIFLOW FC070, dimensions in mm (inch)



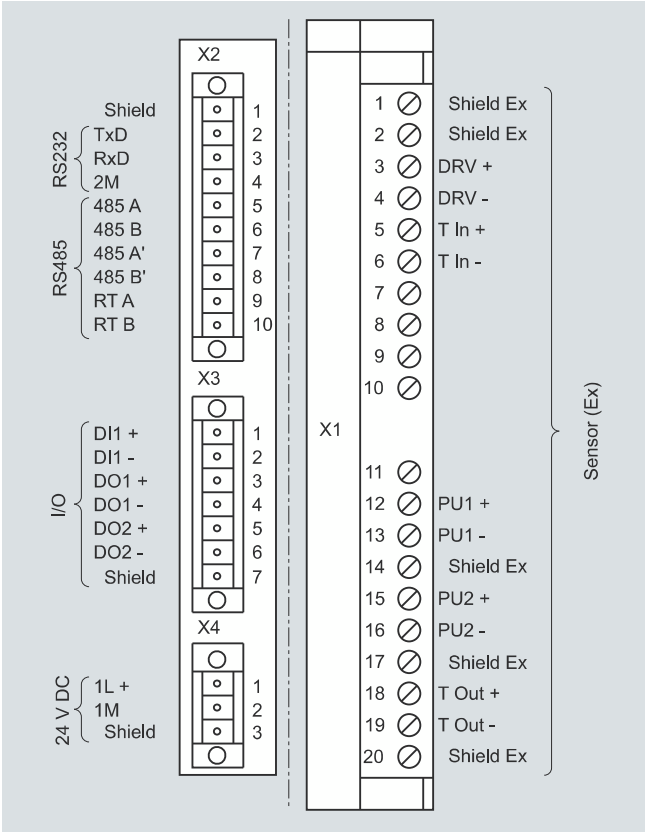
Weight of module: 0.50 kg (1.13 lbs) without front connectors

SIFLOW FC070 Ex CT, dimensions in mm (inch)

Schematics



SIFLOW FC070, electrical connection



SIFLOW FC070 Ex CT, electrical connection

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 OIML R 139 (Compressed gaseous fuel measuring systems for vehicles). For custody transfer applications SIFLOW FC070 Ex CT must be used.
- Self-draining in both horizontal and 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 wetted parts of SITRANS FCS200 are available in Hastelloy C22, while the enclosure is made of stainless steel AISI 304/ 1.4301 with a grade of encapsulation of IP67.

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

Function

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

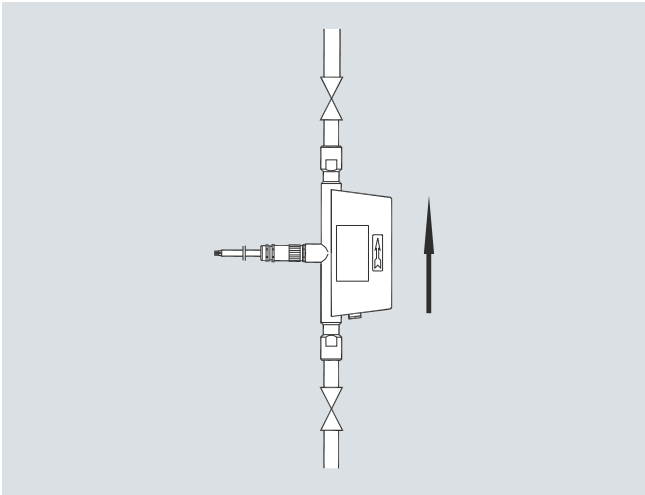
Integration

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.

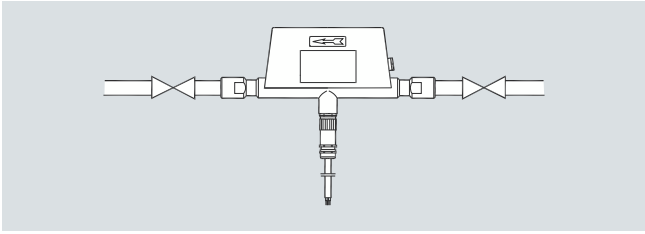
The sensor is shipped with a SENSORPROM memory unit containing all information about calibration data, device identity and factory pre-programming of transmitter settings.

Installation guidelines

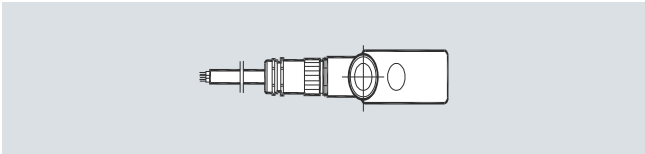
Siemens Flow Instruments recommends installing the sensor in one of the following ways:



Vertical orientation with an upwards flow



Horizontal installation, tubes up



Horizontal installation, tubes sideways

3

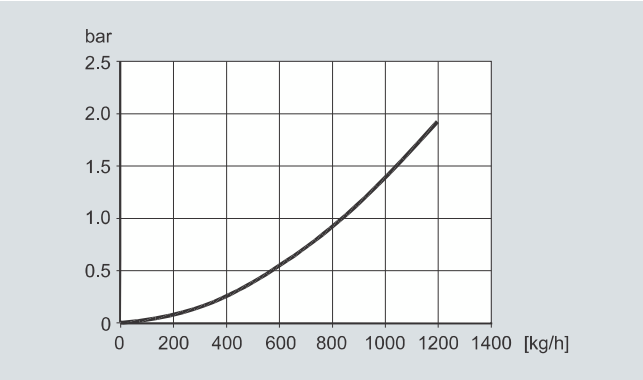
Flow sensor SITRANS FCS200

Technical specifications

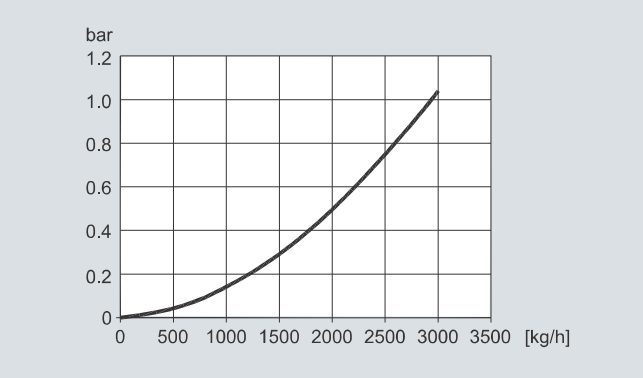
Sensor size	DN 10	DN 15	DN 25
Mass Flow			
Accuracy [% of rate]		± 0.5	
Repeatability [% of rate]		± 0.25	
Max. zero point error [kg/h (lbs/h)]	0.25 (0.55)	1.2 (2.65)	3.0 (6.6)
Measuring range [kg/min (lbs/min)]	0 … 42 (0 … 92.6)	0 … 200 (0 … 440.9)	0 … 500 (0 … 1102.3)
Process temperature	-40 ... +125 °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
Ex approval			
• ATEX	II 1/2 G Ex ia IIC T5/T4		
• IECEx	Ex ia IIC T5/T4		
• FM	Class I, Div 1, Groups A, B, C and D		
Weight approx.	2.8 kg (6.2 lb)	6.0 kg (13.2 lb)	11 kg (24.2 lb)
Approvals Custody transfer			
DN 10/DN 15	PTB Germany approval nr: 5.4.11/11.22 OIML R 139 - Compressed gaseous fuel measuring systems for vehicles		

Characteristic curves

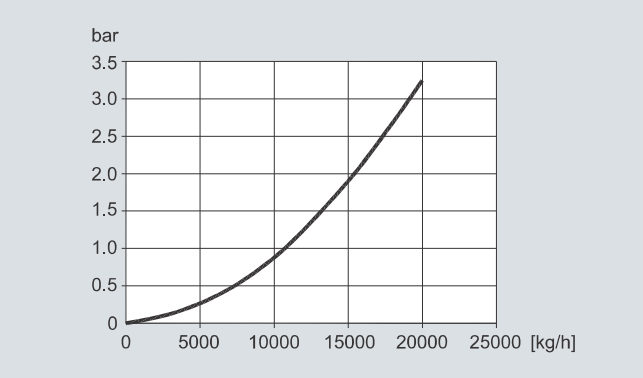
DN 10



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).

Selection and Ordering data	Order No.
SITRANS F C Flow sensors	
SITRANS FCS200 sensor, without heating jacket	7ME4500 - ■■■■■ - ■■■■
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	
Standard	1
Transmitter	
None	A
Cable	
No cable	A
Calibration	
Standard calibration	1

Selection and Ordering data	Order code
Additional information	
Please add "**-Z**" to Order No. and specify Order code(s) and plain text.	
Pressure testing certificate PED: 97/23/EC	**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		Order No.
Cable with multiple plug	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

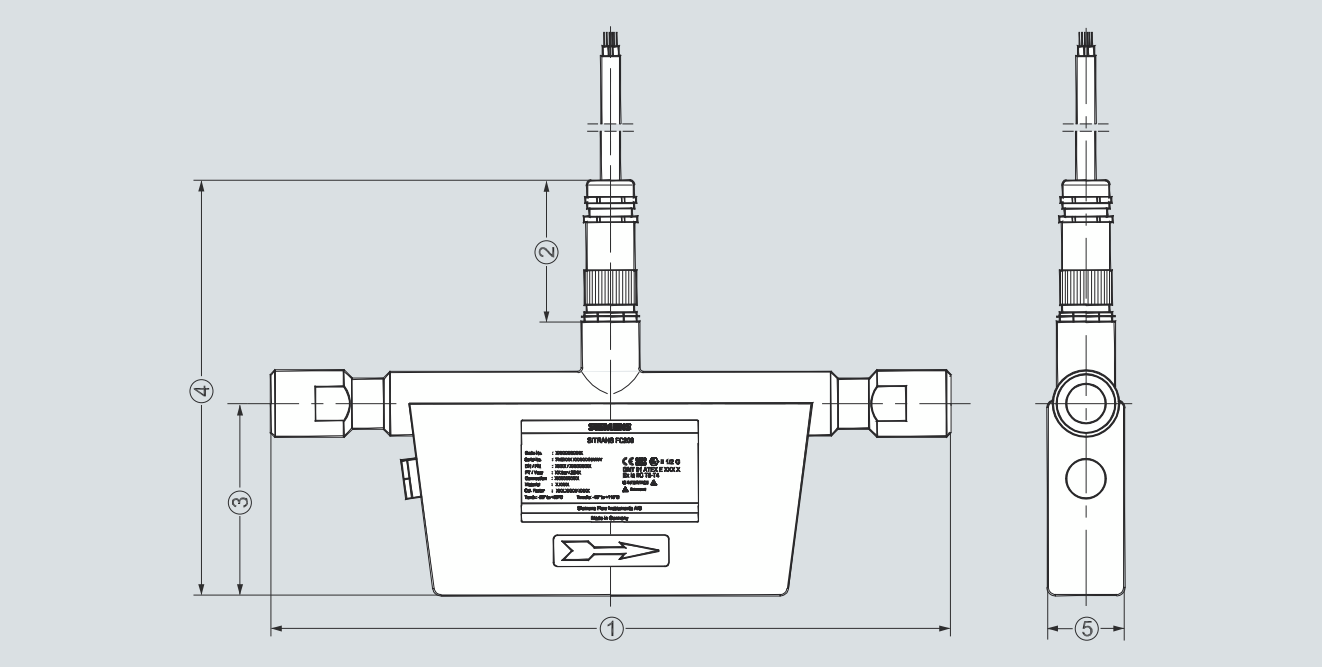
Description	Order No.
• English	**A5E02508199**
• German	**A5E03082574**
• Spanish	**A5E03082587**
• French	**A5E03082581**
• Italian	**A5E03504933**

Spare parts

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

Dimensional drawings

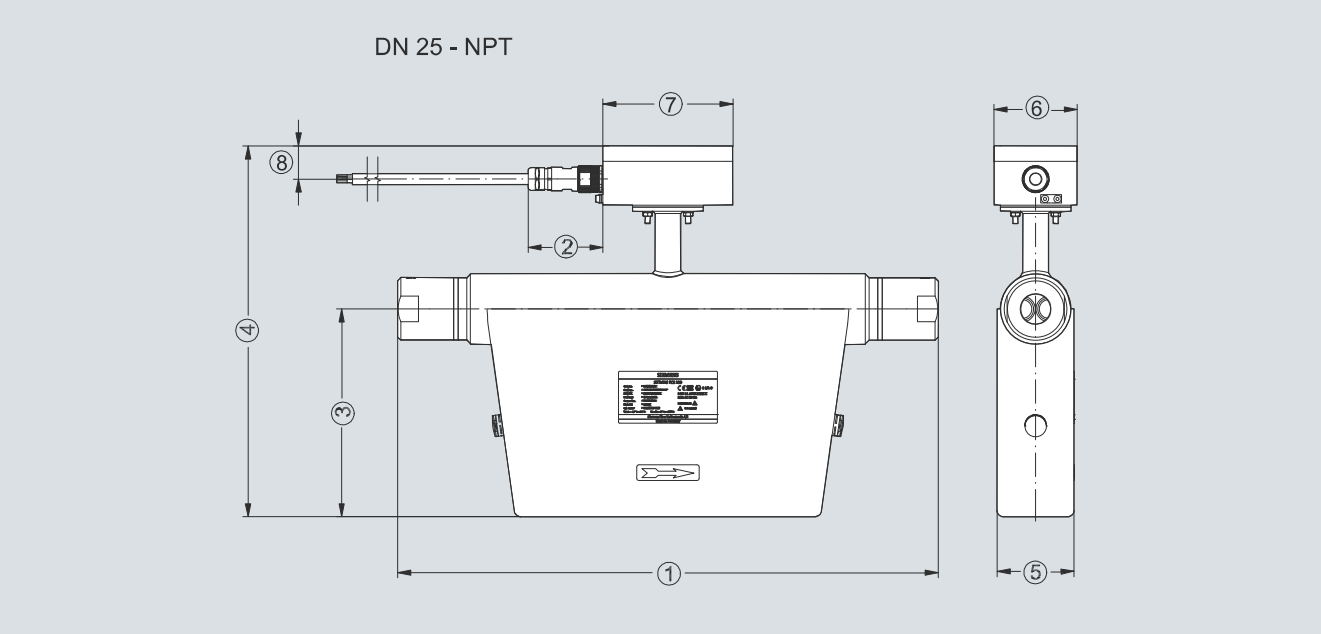
SITRANS FCS200, DN 10 ... DN 15

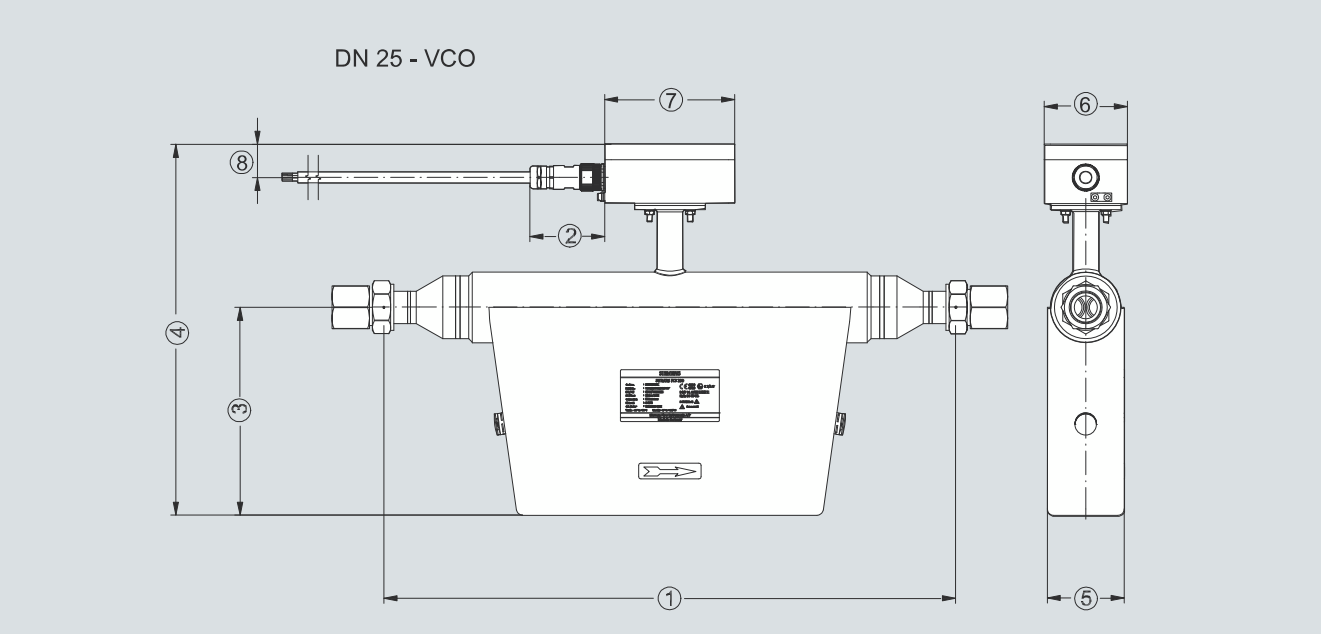


SITRANS FCS200, DN 10 ... DN 15, dimensions in mm (inch)

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)

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)

Flow sensor MASS 2100 DI 1.5

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 65 kg/h to a few 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.

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 MASS 6000 transmitters for remote installation only.

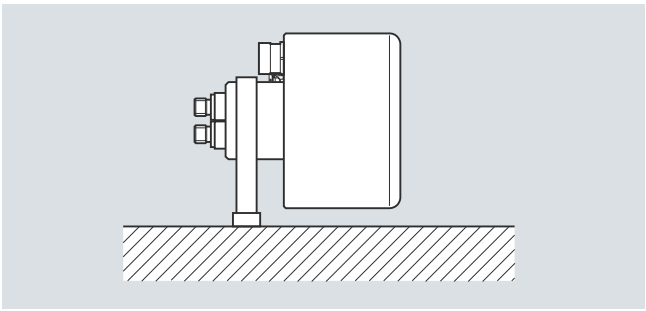
All sensors are delivered with a SENSORPROM containing all information about calibration data, identity and factory pre-programming of transmitter settings

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

Installation of MASS 2100 sensor

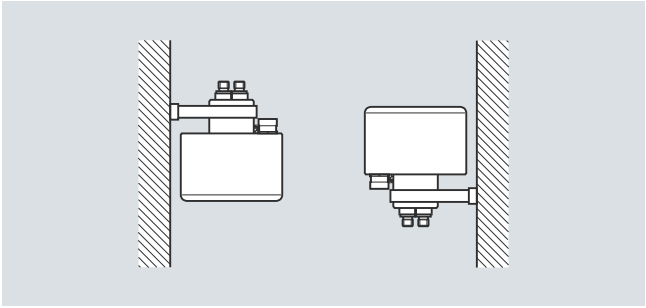
- The optimal installation is horizontal.
  If vertical mounting is necessary, upward flow is recommended to facilitate the removal of air bubbles. To remove the air from the sensor the flow speed in the sensor must be at least 1 m/s.
  If there are solid particles in the liquid, especially in connection 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. 0.1 to 0.2 bar (1.45 to 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

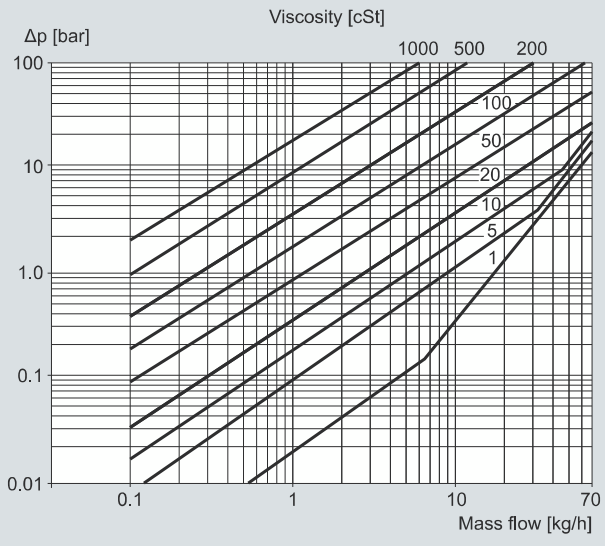
Inside pipe diameter (sensor consists of one continuous pipe)	1.5 mm (0.06")
Pipe wall thickness	0.25 mm (0.010")
Mass flow measuring range	0 ... 65 kg/h (0 ... 143 lb/h)
Density	0 ... 2.9 g/cm^3 (0 ... 0.10 lb/inch^3)
Fraction e.g.	0 ... 100 °Brix
Temperature	
Standard	-50 ... +125 °C (-58 ... +257 °F)
High-temperature version	-50 ... +180 °C (-58 ... +356 °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	Ex ia IIC T3-T6, DEMKO 03 ATEX 135252X
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

Flow sensor MASS 2100 DI 1.5

Selection and Ordering data	Order No.	Order code
SITRANS F C Flow sensors	7ME4100 -	
MASS 2100 DI 1.5 (1/16“) sensor	■■■■ -	■■■
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 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 de [ia/ib] T3 -T6 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 (DANAK)	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 Order No. and specify Order code(s) and plain text.	
Pressure testing certificate PED: 97/23/EC	**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	Order No.
• English	**A5E03089952**

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

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

Accessories

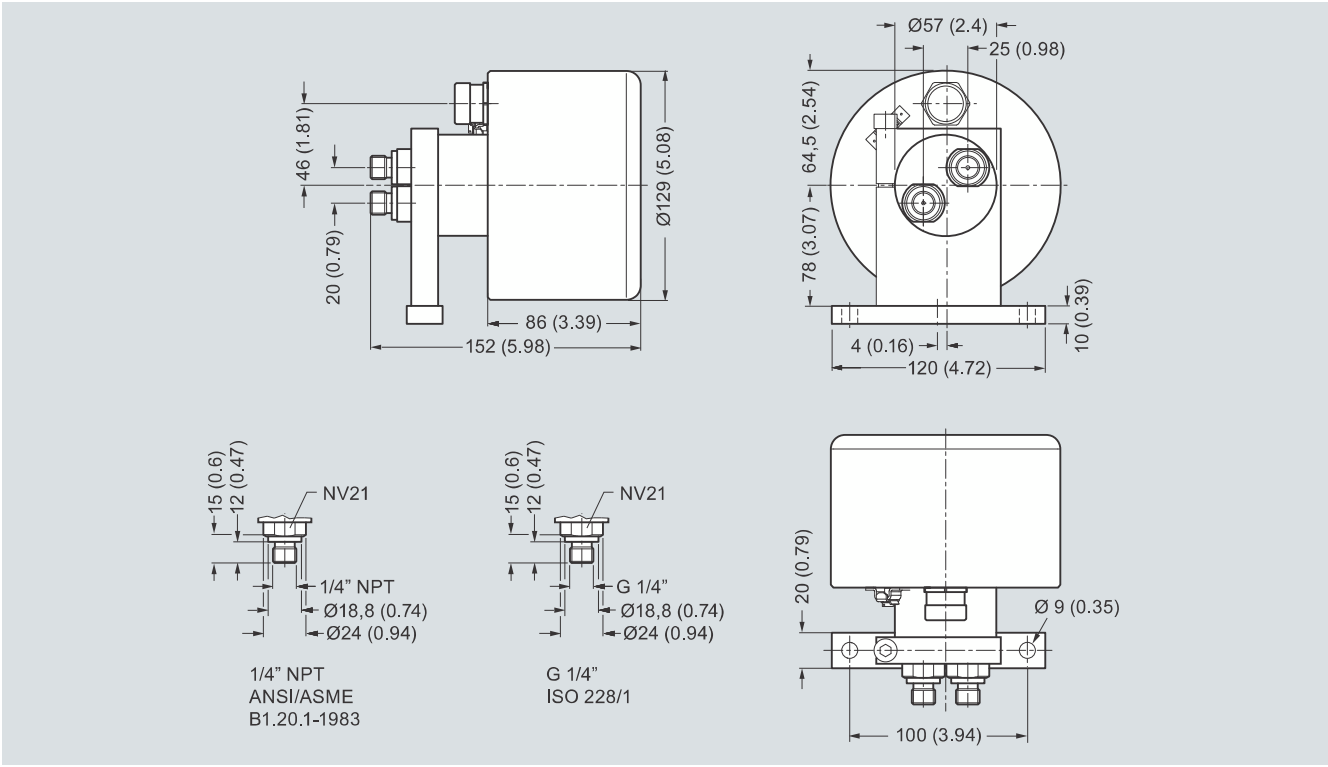
Description	Order No.	
Cable with multiple plug Standard blue cable between MASS 6000 and MASS 2100, 5 x 2 x 0.34 mm² twisted and screened in pairs. Temperature range -20 °C ... +110 °C (-4 °F ... +230 °F)		
• 5 m (16.4 ft)	**FDK:083H3015**	
• 10 m (32.8 ft)	**FDK:083H3016**	
• 25 m (82 ft)	**FDK:083H3017**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

Spare parts

Description	Order No.	
Multiple plug for cable mounting	**FDK:083H5056**	
2 kB SENSORPROM unit (Sensor Serial No. and Order No. must be specified by ordering)	**FDK:083H4410**	
Bracket	**A5E02590427**	
Demo suitcase including MASS 6000, FC300 (DN 4), and HART module	**A5E00789737**	

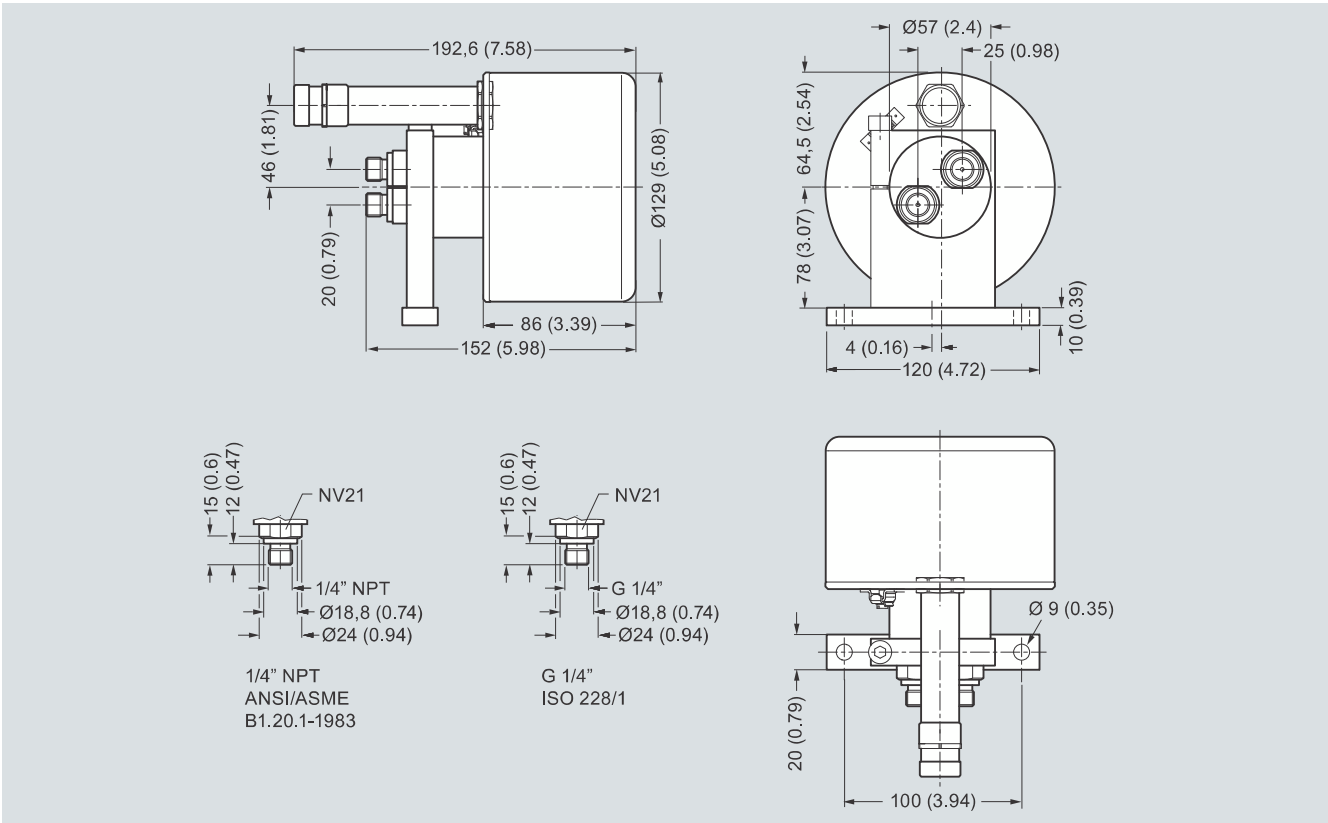
Dimensional drawings

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)

Flow sensor SITRANS FC300

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 better than 0.001 g/cm^3 (0.000036 lb/inch^3) with a 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 MASS 6000 transmitters for remote installation only.

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

Installation guidelines for SITRANS FC300 sensor

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

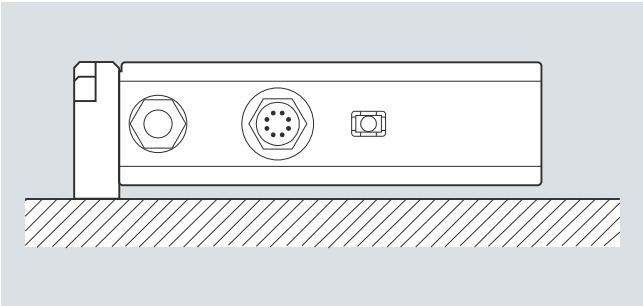
This installation is also recommended when the flow velocity is low (< 1 m/s) or the liquid contains solid particles or air bubbles.

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.

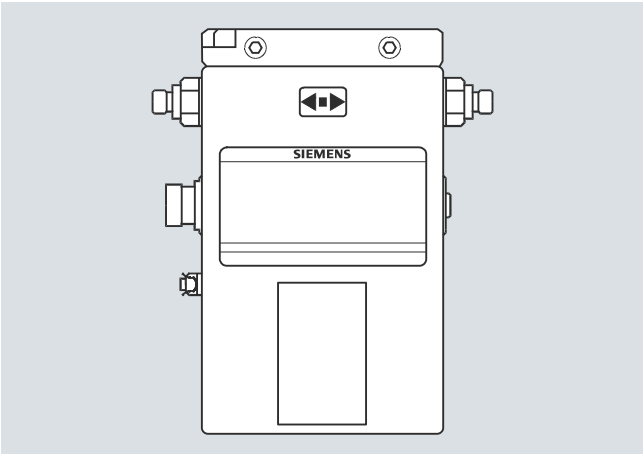
- To ensure that the sensor does not become partly empty, there must be a sufficient counter-pressure on the unit min. 0.1 to 0.2 bar (1.5 to 2.9 psi).
- Mount the sensor on a vibration-free and plane wall or steel frame.
- Locate the sensor low in the system in order to avoid under-pressure in the sensor 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)
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)
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 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.

Flow sensor SITRANS FC300

Selection and Ordering data	Order No.	Order code
SITRANS F C Flow sensors	7ME4400 -	
SITRANS FC300 DN 4 (1/6“) sensor	■■■■ - ■■■■	■■■
Pipe material and temperature		
Stainless steel AISI 316L/1.4435		
115 °C (239 °F)	1G	
180 °C (356 °F)	1H	
Hastelloy C22/2.4602		
115 °C (239 °F)	2G	
180 °C (356 °F)	2H	
Pressure		
PN 100	D	
PN 130 (316L)	G	
PN 410 (C22)	Q	
Process connection		
Pipe thread		
G ¼“ male	10	
¼“ NPT male	11	
Configuration		
Standard	1	
Density[1]	2	
BRIX/PLATO	3	
Fraction (specification required)	9	N0Y
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 de [ia/ib] T3 -T6 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 (DANAK)	3	
Extended calibration customer-specified select Y60, Y61, Y62 or Y63 (see additional information)	8	

[1] Density calibration on request. Contact Siemens for details.

Selection and Ordering data	Order code
Additional information Please add “**-Z**“ to Order No. and specify Order code(s) and plain text.	
Pressure testing certificate PED: 97/23/EC	**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	Order No.
• English	**A5E00698213**
• German	**A5E00728101**
• Spanish	**A5E00746629**
• French	**A5E00746625**

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

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

Accessories

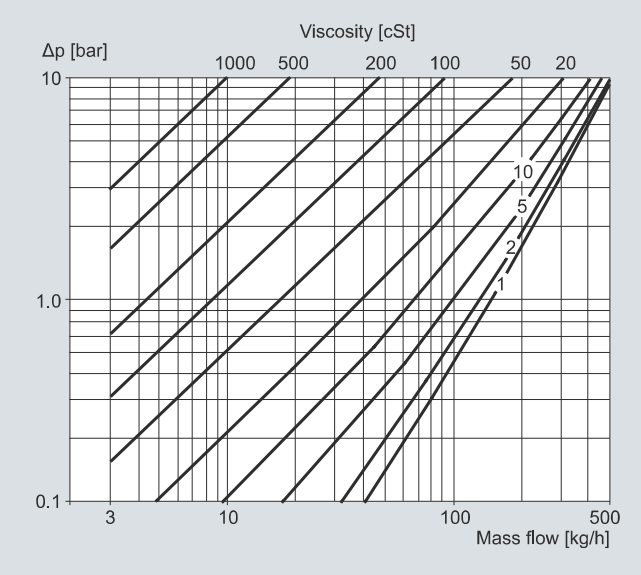
Description	Order No.	
Cable with multiple plug Standard blue cable between MASS 6000 and MASS 2100, 5 x 2 x 0.34 mm² twisted and screened in pairs. Temperature range -20 °C ... +110 °C (-4 °F ... +230 °F)		
• 5 m (16.4 ft)	**FDK:083H3015**	
• 10 m (32.8 ft)	**FDK:083H3016**	
• 25 m (82 ft)	**FDK:083H3017**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

Spare parts

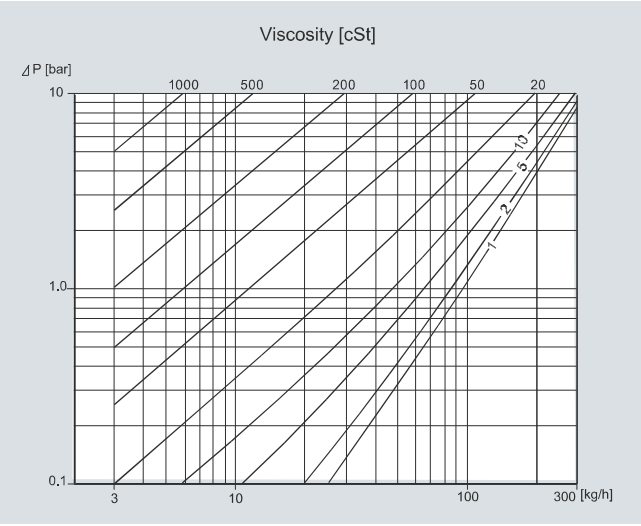
Description	Order No.	
Multiple plug for cable mounting	**FDK:083H5056**	
2 kB SENSORPROM unit (Sensor Serial No. and Order No. must be specified by ordering)	**FDK:083H4410**	
Mounting bracket in AISI 304	**A5E02590439**	
Demo suitcase including MASS 6000, FC300 (DN 4), and HART module	**A5E00789737**	

Characteristic curves

Pressure drop



Stainless steel 316L/1.4404

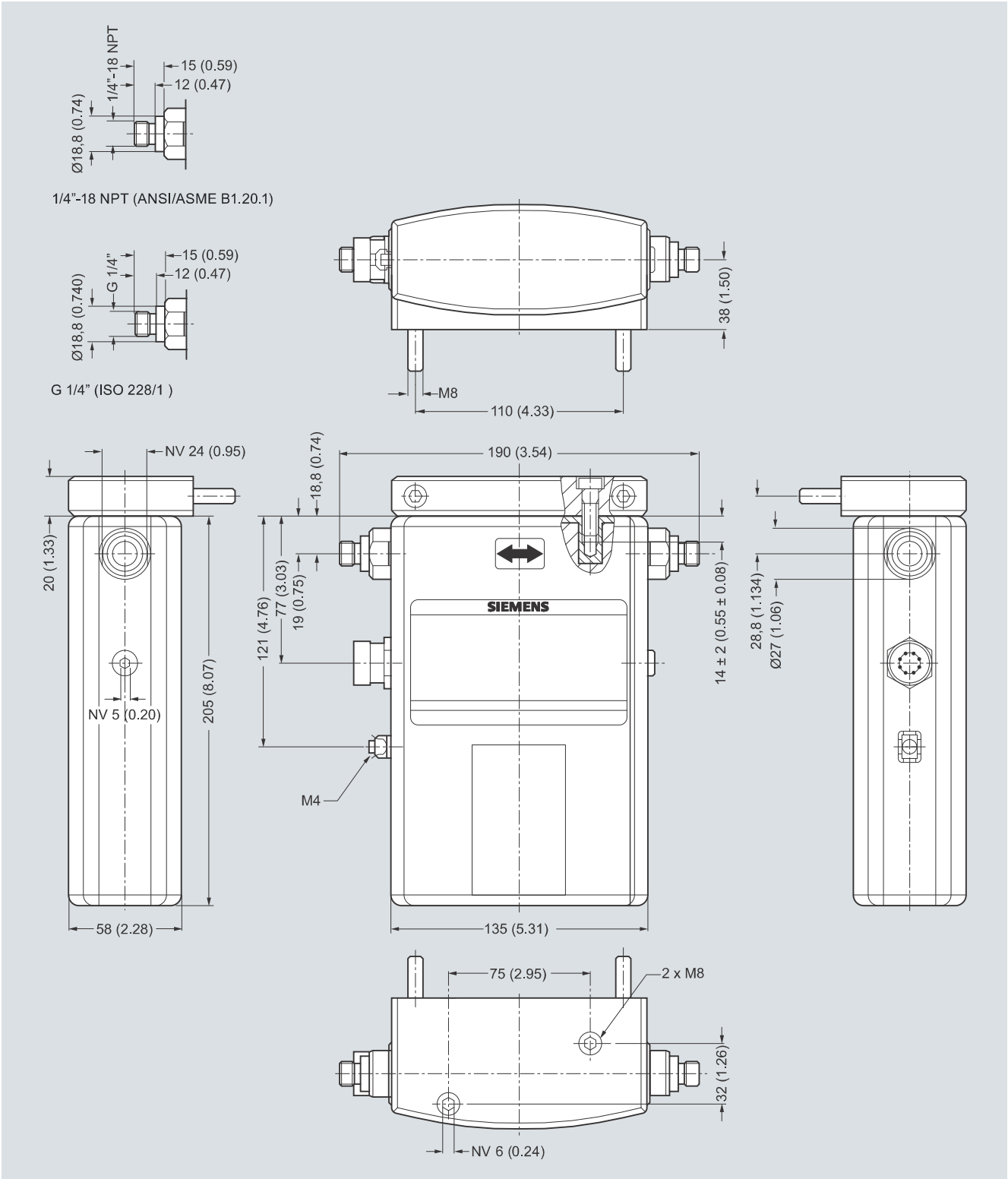


Hastelloy C22/2.4602

3

Dimensional drawings

SITRANS FC300 DN 4



SITRANS FC300, dimensions in mm (inch)

Overview

MASS 2100 DI 3 to DI 40 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 a density accuracy better than 0.0005 g/cm^3 with a repeatability better than 0.0001 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' biggest wall thickness, ensuring 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 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 316/1.4404 with a grade of encapsulation of IP65.

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 Jacket: All the sensors MASS 2100, DI 3 to DI 40, 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.

Flow sensor MASS 2100 DI 3 to DI 40

Function

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

Integration

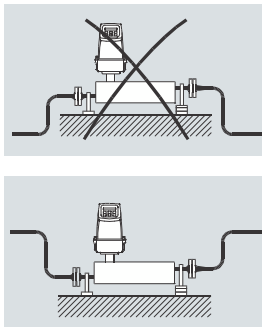
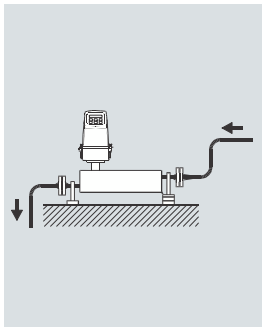
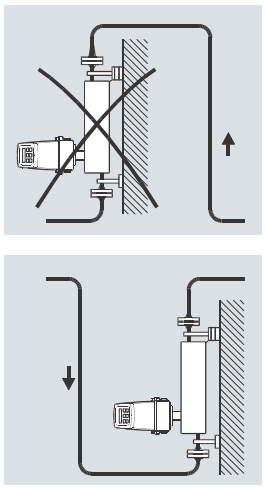
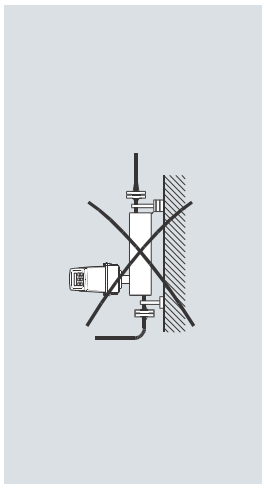
The sensor can be connected to all MASS 6000 transmitters for compact as well as remote installation.

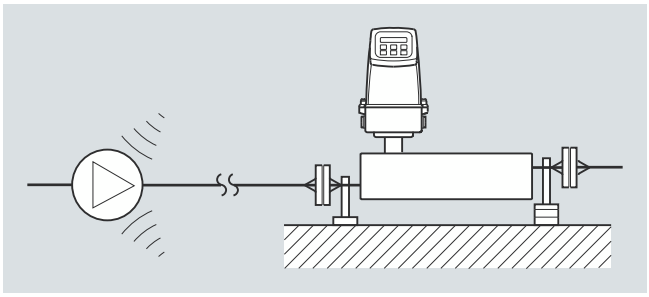
All sensors are delivered with a SENSORPROM containing all information about calibration data, identity and factory pre-programming of transmitter settings.

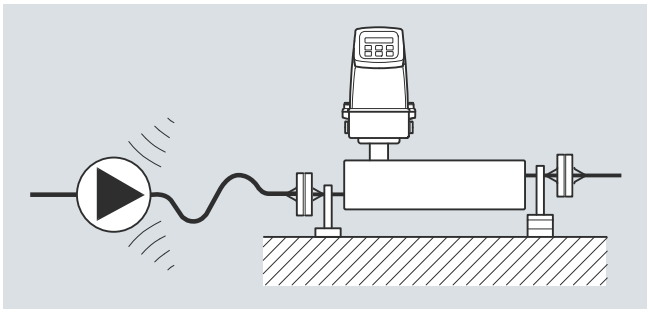
Installation guidelines MASS 2100 DI 3 ... DI 40 (1/8" ... 1½")

Installation of sensor

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

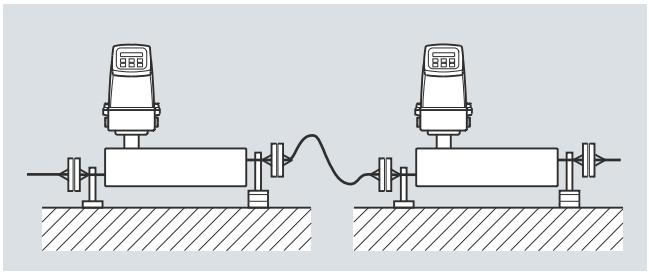
	Liquid	Gas
Horizontal		
Vertical		





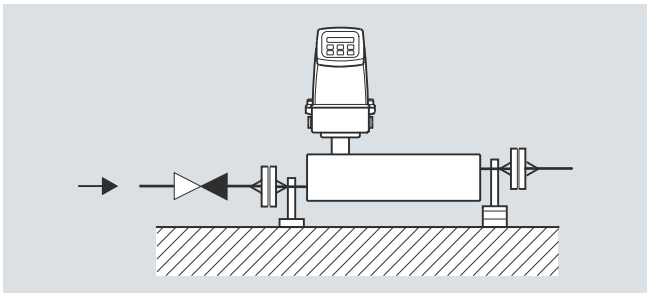
Vibration

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.

Technical specifications

Versions (mm (inch))		DI 3 (1/8)	DI 6 (¼)	DI 15 (5/8)	DI 25 (1)	DI 40 (1½)
Inside pipe diameter (sensor consists of one continuous pipe)	mm (inch)	3.0 (0.12)	6.0 (0.24)	14.0 (0.55)	29.7 (1.17)	43.1 (1.70)
Pipe wall thickness	mm (inch)	0.5 (0.02)	1.0 (0.04)	1.0 (0.04)	2.0 (0.08)	2.6 (0.10)
Mass flow measuring range	kg/h (lb/h)	0 ... 250 (0 ... 550)	0 ... 1000 (0 ... 2200)	0 ... 5600 (0 ... 12345)	0 ... 25000 (0 ... 55100)	0 ... 52000 (0 ... 114600)
Density	g/cm³ (lb/inch³)	0 ... 2.9 (0 ... 0.10)				
Fraction e.g.	°Brix	0 ... 100				
Temperature						
Standard	°C (°F)	-50 ... +180 °C (-58 ... +356 °F)				
Liquid pressure measuring pipe[1]						
Stainless steel	bar (psi)	230 (3336)	265 (3844)	130 (1885)	110 (1595)	105 (1523)
Hastelloy C22/2.4602	bar (psi)	350 (5076)	410 (5946)	200 (2900)	185 (2683)	not available
Materials						
Measuring pipe, flange and thread connection		Stainless steel AISI 316L/1.4435				
		Hastelloy C22/2.4602				not available
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	DN 25	DN 40
ANSI B16.5, Class 150			½"	½"	1"	1½"
ANSI B16.5, Class 600 (Class 300)			½"	½"	1"	1½"
Dairy screwed connection (PN 16/25/40)[3]						
DIN 11851			DN 10	DN 15	DN 32	DN 40
ISO 2853/BS 4825 part 4 (SS3351)			25 mm	25 mm	38 mm	51 mm
Dairy clamp connection (PN 16)[3]						
ISO 2852/BS 4825 part 3 (SMS3016)			25 mm	25 mm	38 mm	51 mm
Thread						
ISO 228/1, PN 100		G¼" female	G¼" male	G½" male	G1" male	G2" male
ANSI/ASME B1.20.1, PN 100		¼" NPT female	¼" NPT male	½" NPT male	1" NPT male	2" NPT male
Cable connection		Multiple plug connection to sensor 5 x 2 x 0.35 mm² twisted and screened in pairs, ext. Ø 12 mm				
Ex-version		Ex ia IIC T3-T6, DEMKO 03 ATEX 135252X				
Weight approx.	kg (lb)	4 (8.8)	8 (17.6)	12 (26.5)	48 (105.8)	70 (154.5)

1) Max. at 20 °C (68 °F), DIN 2413, DIN 17457

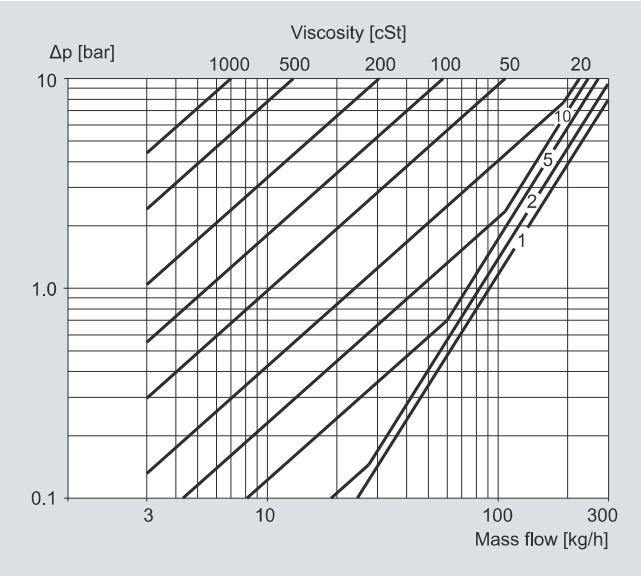
2) Other connections to order, see "Selection and Ordering data"

3) Material, AISI 316/1.4401 or corresponding

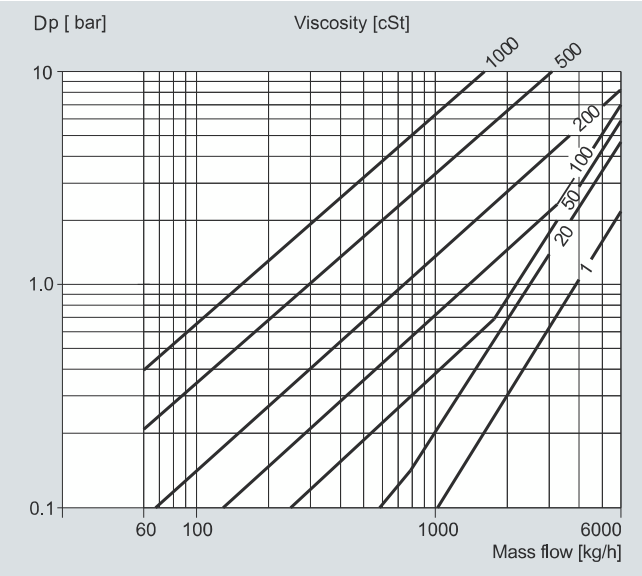
For accuracy specification see "System information SITRANS F C".

Flow sensor MASS 2100 DI 3 to DI 40

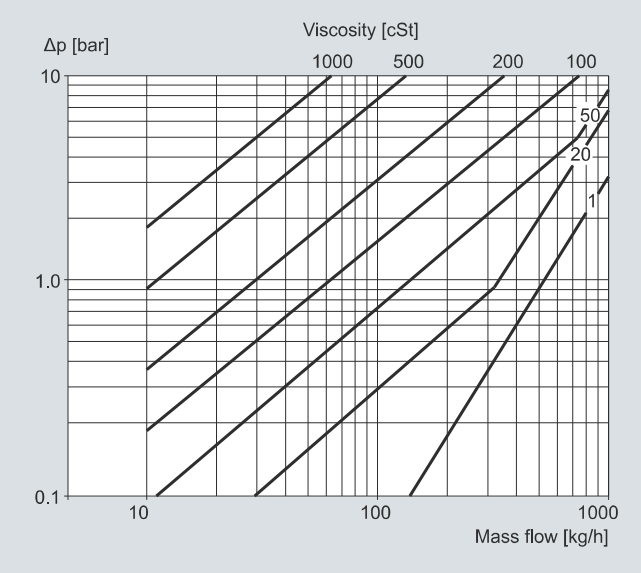
Pressure drop



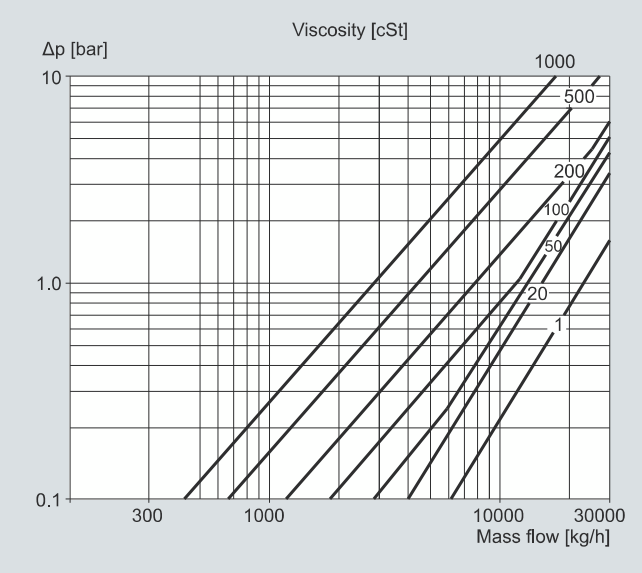
MASS 2100 DI 3 (1/8"), pressure drop for density = 1000 kg/m^3



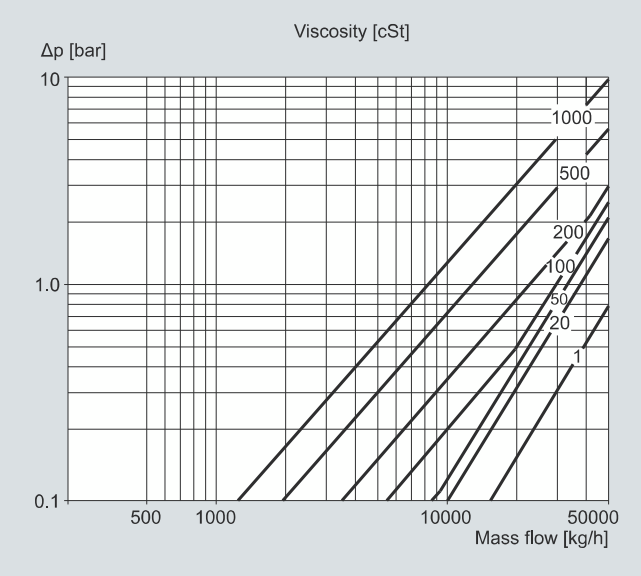
MASS 2100 DI 15 (½"), pressure drop for density = 1000 kg/m^3



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

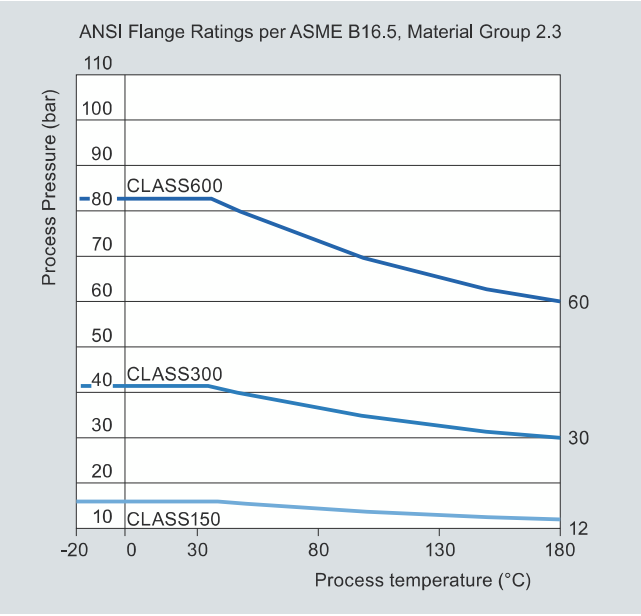


MASS 2100 DI 25 (1"), pressure drop for density = 1000 kg/m^3

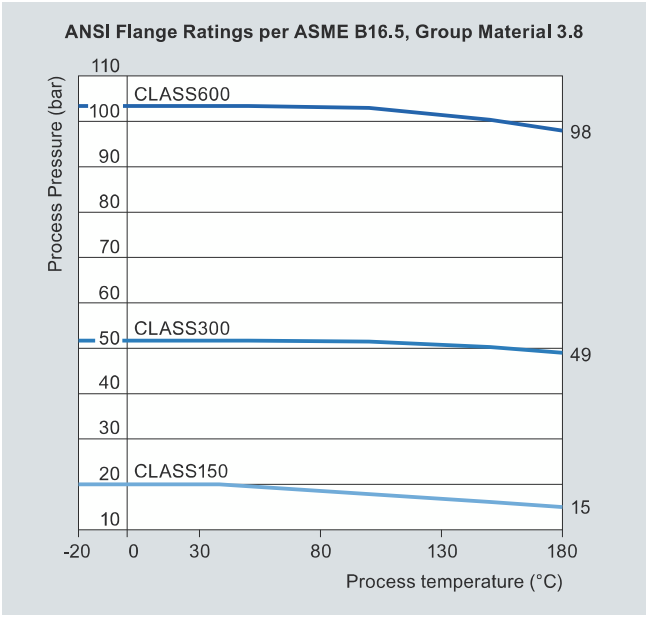


MASS 2100 DI 40 (1½"), pressure drop for density = 1000 kg/m^3

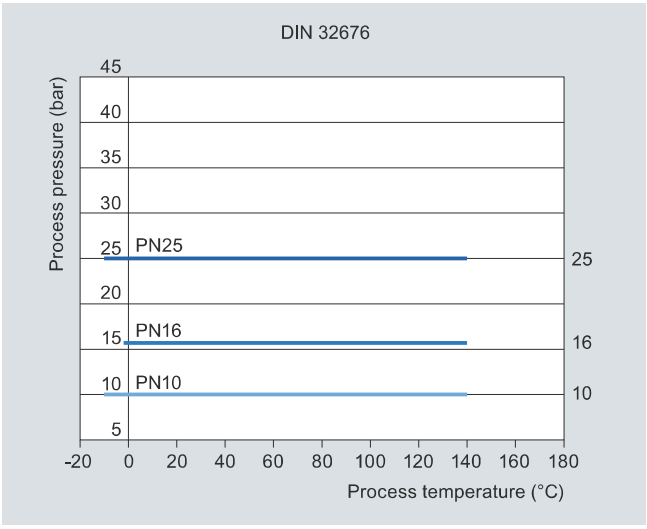
Pressure/temperature curves



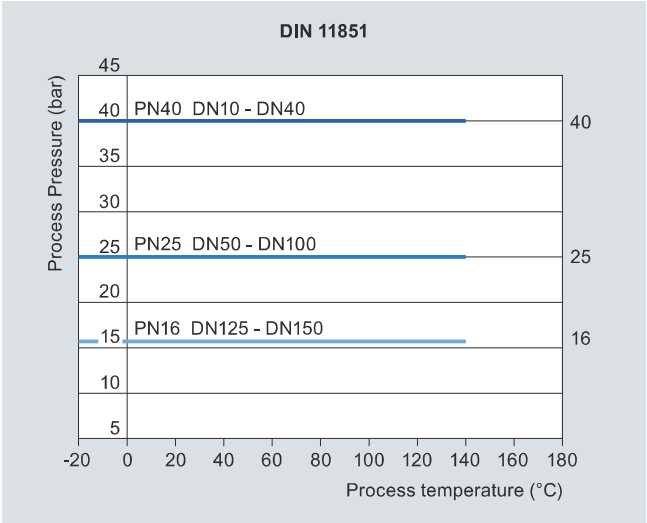
ASME flanges B16.5 stainless steel



ASME flanges B16.5 Hastelloy C22/2.4602

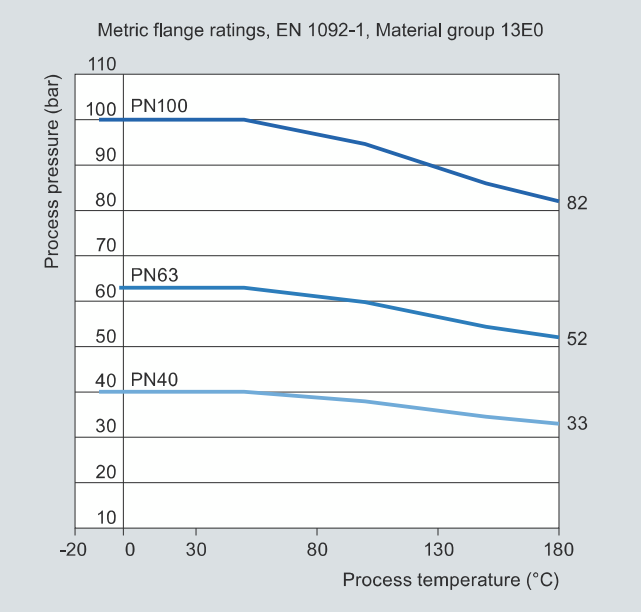


DIN 32676 flanges stainless steel (PN 10 ... PN 25)

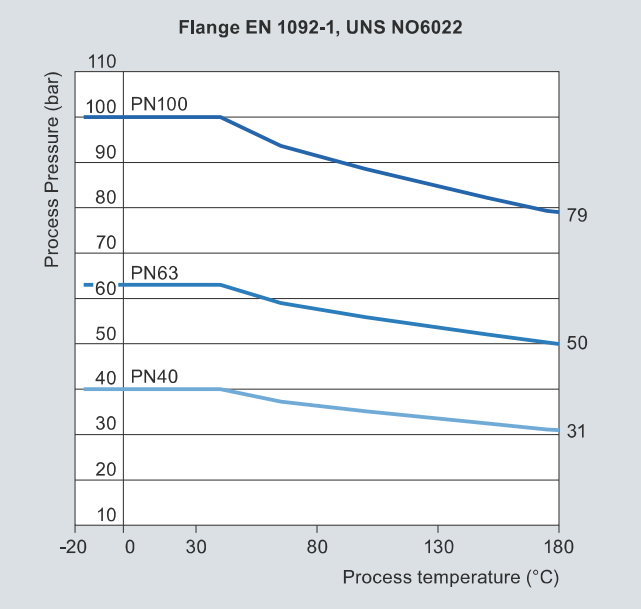


DIN 11581 flanges stainless steel (PN 25 ... PN 40)

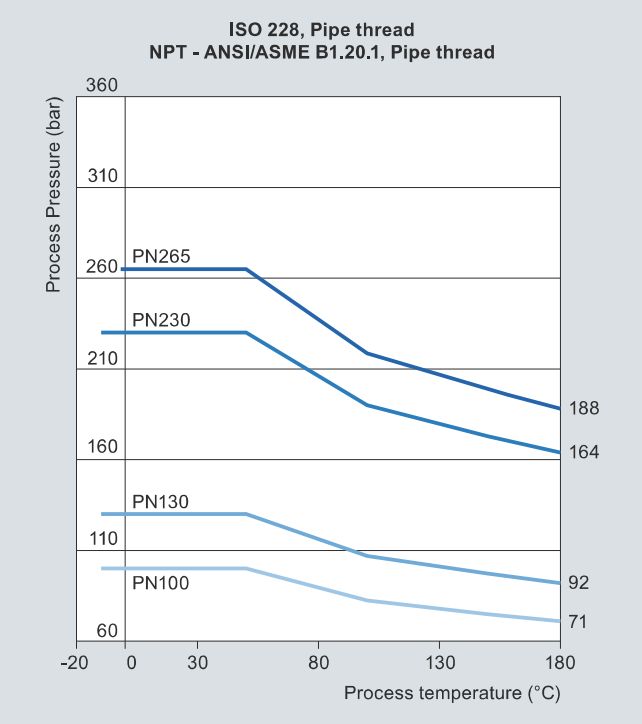
Flow sensor MASS 2100 DI 3 to DI 40



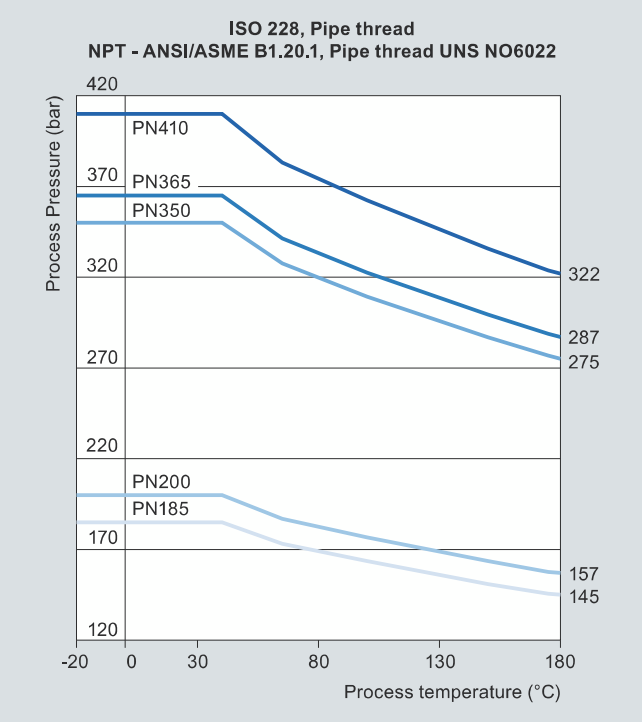
EN 1092 flanges stainless steel (PN 40 ... PN 100)



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 9/14.

Selection and Ordering data	Order No.	Order code
SITRANS F C sensors		
MASS 2100 without heating jacket	7ME4100-	
MASS 2100 heated, DN 15 connection	7ME4200-	
MASS 2100 heated, ½ inch, ANSI B16.5 connection	7ME4210-	
	☐☐☐☐☐-☐☐☐☐	☐☐☐
Diameter		
Stainless steel AISI 316L/1.4435		
DI 3 (PN 100/PN 230)	1C	
DI 6	1D	
DI 15	1E	
DI 25	1F	
DI 40	1G	
Hastelloy C22/2.4602		
DI 3 (PN 100/PN 350)	2C	
DI 6	2D	
DI 15	2E	
DI 25	2F	
Pressure		
PN 16 (DI 6, DI 15, DI 25 and DI 40)	A	
PN 25 (DI 6, DI 15, DI 25 and DI 40)	B	
PN 40 (DI 6, DI 15, DI 25 and DI 40)	C	
PN 100 (DI 3, DI 6, DI 15, DI 25 and DI 40)	D	
PN 105 (DI 40, 2", AISI 316L/1.4404)	E	
PN 110 (DI 25, 1", AISI 316L/1.4404)	F	
PN 130 (DI 15, ½", AISI 316L/1.4404)	G	
PN 185 (DI 25, 1", Hastelloy C22/2.4602)	J	
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, DI 25 and DI 40)	R	
Class 600 (DI 6, DI 15, DI 25 and DI 40)	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	
DN 40 (PN 40/PN 100)	23	
DN 50 (PN 40/PN 100)	24	
Flange ASME/ANSI B 16.5		
½" (class 150/class 600)	30	
¾" (class 150/class 600)	31	
1" (class 150/class 600)	32	
1 ½" (class 150/class 600)	33	
2" (class 150/class 600)	34	

Selection and Ordering data	Order No.	Order code
SITRANS F C sensors		
MASS 2100 without heating jacket	7ME4100-	
MASS 2100 heated, DN 15 connection	7ME4200-	
MASS 2100 heated, ½ inch, ANSI B16.5 connection	7ME4210-	
	☐☐☐☐☐-☐☐☐☐	☐☐☐
Dairy screwed connection DIN 11851		
DN 10 (PN 40)	40	
DN 15 (PN 40)	41	
DN 25 (PN 40)	42	
DN 32 (PN 40)	43	
DN 40 (PN 25)	44	
DN 50 (PN 25)	45	
DN 65 (PN 25)	46	
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	N0Y
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 de [ia/ib] T3 -T6 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	
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/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 (DANAK to ISO 17025)	3	
Extended calibration customer-specified select Y60, Y61, Y62 or Y63 (see additional information)	8	

Flow sensor MASS 2100 DI 3 to DI 40

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

Selection and Ordering data	Order code
Addtional information Please add "**-Z**" to Order No. and specify Order code(s) and plain text.	
Pressure testing certificate PED: 97/23/EC	**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	Order No.
• English	**A5E02896535**
• German	**A5E03073519**
• Spanish	**A5E03073549**
• French	**A5E03073539**

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

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

Selection and Ordering data

Accessories

Description	Dimension	Order No.
Mating parts for hygienic fittings DIN 11851 Includes: • 2 unions • 2 mating parts (for welding in) • 2 EPDM gaskets	DN 10	**FDK:085U1016**
	DN 15	**FDK:085U1017**
	DN 25	**FDK:085U1019**
	DN 32	**FDK:085U1020**
	DN 40	**FDK:085U1021**
	DN 50	**FDK:085U1022**
	DN 65	**FDK:085U1023**
Mating parts for hygienic clamp ISO 2852 Includes: • 2 clamps • 2 mating parts • 2 EPDM gaskets	25 mm	**FDK:085U1029**
	40 mm	**FDK:085U1031**
	50 mm	**FDK:085U1032**
2 EPDM gaskets with collar for mounting set DIN 11851	DN 10	**FDK:085U1006**
	DN 15	**FDK:085U1007**
	DN 25	**FDK:085U1009**
	DN 32	**FDK:085U1010**
	DN 40	**FDK:085U1011**
	DN 50	**FDK:085U1012**
	DN 65	**FDK:085U1013**

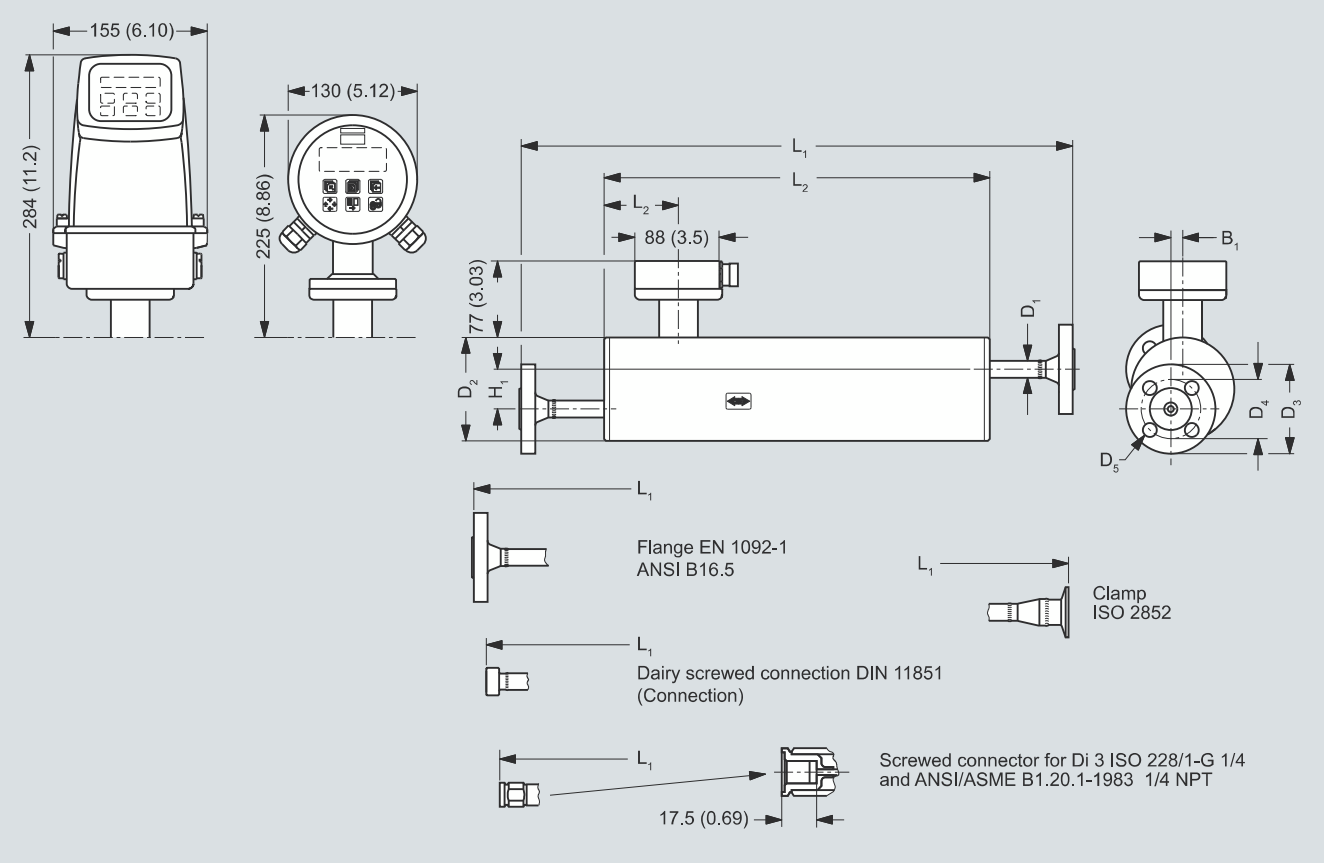
Description	Length	Order No.
Cable with multiple plug Standard blue cable between MASS 6000 and MASS 2100, 5 x 2 x 0.34 mm² twisted and screened in pairs. Temperature range -20 °C ... +110 °C (-4 °F ... +230 °F)		
	5 m (16.4 ft)	**FDK:083H3015**
	10 m (32.8 ft)	**FDK:083H3016**
	25 m (82 ft)	**FDK:083H3017**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

Spare parts

Description	Order No.
Adapter for MASS 2100	**FDK:083L8889**
Multiple plug for cable mounting	**FDK:083H5056**
2 kB SENSORPROM unit, including programming (Sensor Serial No. and Order No. must be specified by ordering)	 **FDK:083H4410**

Dimensional drawings

MASS 2100 sensor



Dimension in mm (inch)

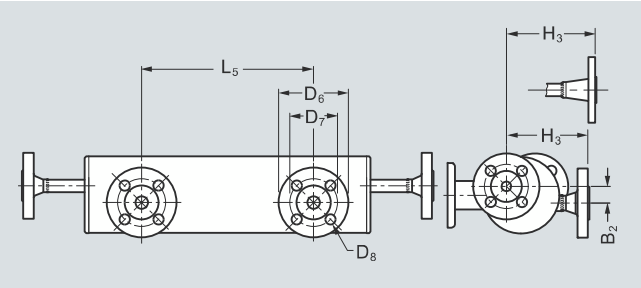
Sensor size	Connections			L1 mm	L2 mm	L3 mm	H1 mm	B1 mm	D1 mm	D2 mm	D3 mm	D4 mm	D5 mm
DI (inch)	Type	Pressure rating	Size										
DI 3	Pipe thread ISO 228/1 - G¼	PN 100	¼"	400	280	75.5	60	0	21.3	104	-	-	-
(1/8)	Pipe thread ANSI/ASME B 1.20.1 - ¼" NPT	PN 100	¼"	400	280	75.5	60	0	21.3	104	-	-	-
DI 6	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	-	-	-
DI 25	Flange EN 1092-1	PN 100	DN 25	970	700	75.5	126	25	33.7	219	140.0	100.0	18.0
(1)	Flange EN 1092-1	PN 40	DN 25	934	700	75.5	126	25	33.7	219	115.0	85.0	14.0
	Flange ANSI B16.5	Class 150	1"	967	700	75.5	126	25	33.7	219	108.0	79.2	15.7
	Flange ANSI B16.5	Class 600	1"	992	700	75.5	126	25	33.7	219	124.0	88.9	19.1
	Screwed connection DIN 11851	PN 40	DN 32	922	700	75.5	126	25	33.7	219	-	-	-
	Clamp ISO 2852	PN 16	38 mm	940	700	75.5	126	25	33.7	219	-	-	-
DI 40	Flange EN 1092-1	PN 100	DN 40	1100	850	75.5	180	0	48.3	273	170.0	125.0	22.0
(1½)	Flange EN 1092-1	PN 40	DN 40	1063	850	75.5	180	0	48.3	273	150.0	110.0	18.0
	Flange ANSI B16.5	Class 150	1½"	1100	850	75.5	180	0	48.3	273	127.0	98.6	15.7
	Flange ANSI B16.5	Class 600	1½"	1128	850	75.5	180	0	48.3	273	155.4	114.3	22.4
	Screwed connection DIN 11851	PN 25	DN 50	1090	850	75.5	180	0	48.3	273	-	-	-
	Clamp ISO 2852	PN 25	51 mm	1062	850	75.5	180	0	48.3	273	-	-	-

Flow sensor MASS 2100 DI 3 to DI 40

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	-	-	-
DI 25	Flange EN 1092-1	PN 100	DN 25	38.19	27.56	2.97	4.96	0.98	1.33	8.62	3.94	5.51	0.71
(1)	Flange EN 1092-1	PN 40	DN 25	36.77	27.56	2.97	4.96	0.98	1.33	8.62	4.53	3.35	0.55
	Flange ANSI B16.5	Class 150	1"	38.07	27.56	2.97	4.96	0.98	1.33	8.62	4.25	3.12	0.62
	Flange ANSI B16.5	Class 600	1"	39.06	27.56	2.97	4.96	0.98	1.33	8.62	4.88	3.50	0.75
	Screwed connection DIN 11851	PN 40	DN 32	36.30	27.56	2.97	4.96	0.98	1.33	8.62	-	-	-
	Clamp ISO 2852	PN 16	38 mm	37.01	27.56	2.97	4.96	0.98	1.33	8.62	-	-	-
DI 40	Flange EN 1092-1	PN 100	DN 40	43.31	33.46	2.97	7.09	0	1.9	10.75	4.92	6.69	0.87
(1½)	Flange EN 1092-1	PN 40	DN 40	41.85	33.46	2.97	7.09	0	1.9	10.75	5.91	4.33	0.71
	Flange ANSI B16.5	Class 150	1½"	43.31	33.46	2.97	7.09	0	1.9	10.75	5	3.88	0.62
	Flange ANSI B16.5	Class 600	1½"	44.41	33.46	2.97	7.09	0	1.9	10.75	6.12	4.50	0.88
	Screwed connection DIN 11851	PN 25	DN 50	42.91	33.46	2.97	7.09	0	1.9	10.75	-	-	-
	Clamp ISO 2852	PN 25	51 mm	41.81	33.46	2.97	7.09	0	1.9	10.75	-	-	-

For not listed variants please contact product support.

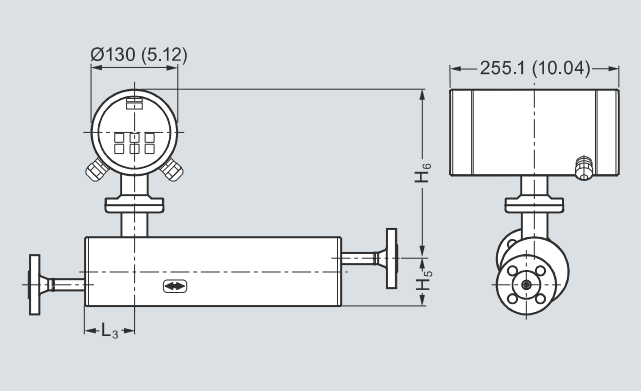
MASS 2100 sensor with “heating jacket”



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)
DI 25 (1)	EN 1092-1	PN 40	DN 15	420 (16.54)	213.6 (8.41)	60 (2.36)	95 (3.74)	65.0 (2.56)	14.0 (0.55)
	ANSI B16.5	Class 150	½"	420 (16.54)	223.2 (8.79)	60 (2.36)	88.9 (3.5)	60.5 (2.38)	15.7 (0.62)
DI 40 (1½)	EN 1092-1	PN 40	DN 15	500 (19.68)	267.5 (10.53)	43 (1.69)	95 (3.74)	65.0 (2.56)	14.0 (0.55)
	ANSI B16.5	Class 150	½"	500 (19.68)	277.1 (10.91)	43 (1.69)	88.9 (3.5)	60.5 (2.38)	15.7 (0.62)

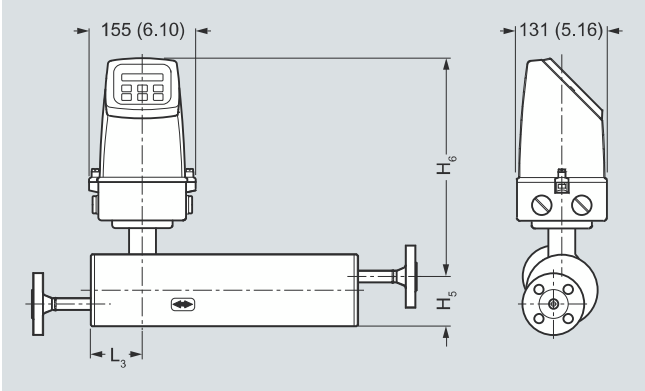
MASS 2100 and MASS 6000 Ex d compact version



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)
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 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)
25 (1)	75 (2.95)	173 (6.81)	330 (13.00)	503 (19.80)
40 (1½)	75 (2.95)	227 (8.94)	330 (13.00)	557 (21.93)

Flow sensor MC2

Overview

SITRANS F C MC2 is available as a:

- Standard version (DN 50 to DN 150 (2" to 6"))
- Hygienic EHEDG-certified version (DN 20 to DN 80 (¾" to 3"))

The MC2 sensor 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 and delivers true multi-parameter measurements i.e.: mass flow, volume flow, density, temperature and fraction flow.

The very compact sensor construction makes installation and commissioning of even the largest sizes very straight forward and easy.

Benefits

- High accuracy better than 0.15 % of mass flow rate
- Large dynamic turn-down ratio
- Densitometer performance available through density accuracy better than 0.001 g/cm^3
- Space-saving split-flow sensor design facilitating low pressure loss
- Parallel S-tube design and optimal oriented inductive sensors enhances accuracy and turn-down ratio.
- Self-draining in both horizontal and vertical position
- Rigid enclosure design reduces the influence from pipeline vibration and thermal stress
- 4-wire Pt100 temperature measurement ensures optimum accuracy on mass flow, density and fraction flow
- SENSORPROM enables true "plug & play" - installed and commissioned in less than 10 minutes.
- Safe Ex design Ex em [ib] IIC
- Sensor pipe available in high-quality stainless steel AISI 316L/1.4571 or Hastelloy C4/2.4610 offering optimum corrosion resistance.
- The sensor calibration is also valid for gas measurement.
- CIP cleanability for food and beverage and pharmaceutical applications

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 turndown ratio which is 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, plato/brix, fruit juices and pulps, bottling, CO_2 dosing, CIP-liquids
Oil and gas	Gas measurement, furnace control, test separators, LPG, oil bunkering
Water and waste water	Dosing of chemicals for water treatment

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

The MC2 sensor is also available in a hygienic version which is EHEDG-approved. This is of particular interest for the food and beverage and pharmaceutical markets were the EHEDG approval is often requested for optimum hygienic and process safety.

Design

The MC2 sensor consists of 2 parallel measuring pipes, welded directly onto a flow-splitter at each end to eliminate a direct coupling to the process connectors and significantly reduce effects from external vibrations.

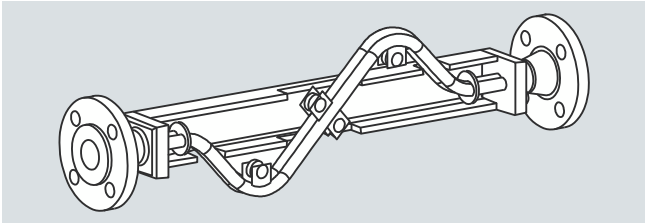
The flow-splitters are welded onto a rigid sensor housing which acts as a mechanical low-pass filter.

The sensor is available in 2 material configurations, AISI 316L/ 1.4436 or Hastelloy C4/2.4610 with a wide variety of process connections.

The enclosure is made of stainless steel AISI 304/1.4301 with an encapsulation grade of IP67/NEMA 4.

The sensor is Ex-approved Ex em [ib] IIC.

It can be installed in horizontal or vertical position, and is self-draining in both positions.



The MC2 sensor is based on a different Ex concept than MASS 6000. Therefore the MC2 sensor can only be connected to MASS 6000 IP67, MASS 6000 19" or SIFLOW FC070 standard versions, which have to be remote mounted in the safe area. MASS 6000 Ex d and SIFLOW FC070 Ex CT can **not** be used with MC2 sensors.

Hazardous area
Zone 1 + 2

Safe area

Function

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

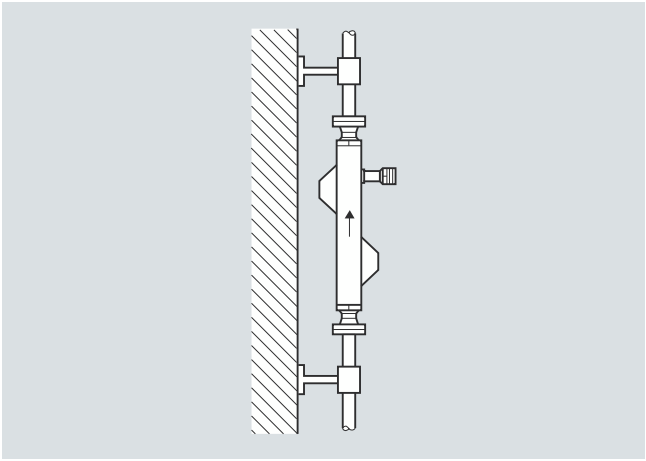
Integration

Installation guidelines MC2 DN 50 ... DN 150

Installation of sensor

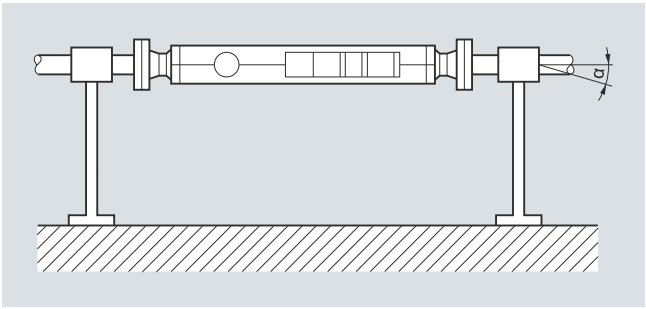
The optimal installation orientation is a vertical installation with an upward flow as shown in the following figure. This has the advantage that any solids contained in the fluid will settle downward and gas bubbles will move upward out of the meter tube when the flow rate is zero. Additionally, it is easy to drain the meter tube. Deposits can thereby be avoided.

Vertical orientation:

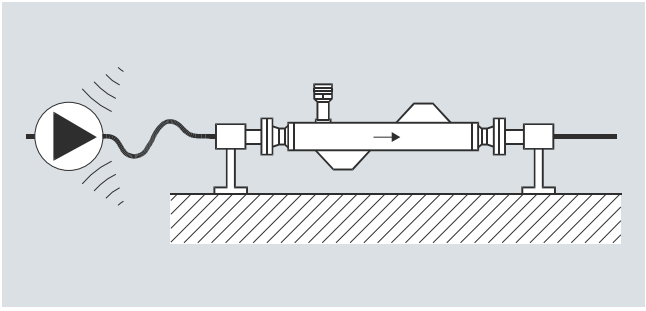


Vertical installation self-draining (upward flow)

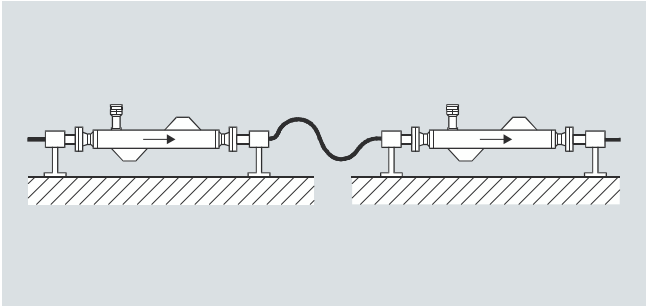
Horizontal orientation, self-draining



Avoid vibrations

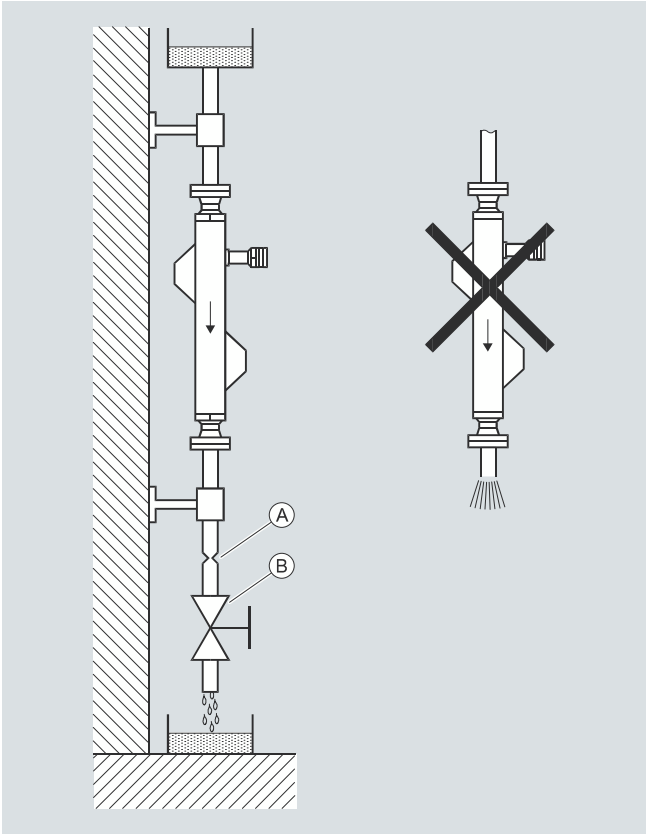


Avoid cross talk



Installation in a drop line

Mount with reduction (A) or orifice (B) to prevent partially draining (min. back pressure: 0.2 bar).



Installation in a drop line

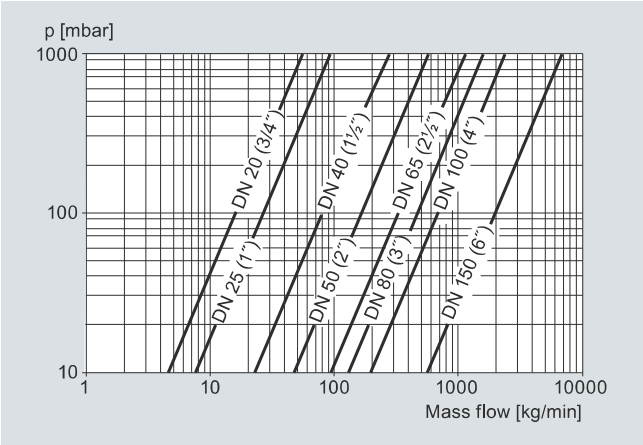
Flow sensor MC2

Technical specifications

Versions (mm (inch))		20 (¾)	25 (1)	40 (1½)	50 (2)	65 (2½)	80 (3)	100 (4)	150 (6)
Inside pipe diameter	**mm (inch)**	8.0 (0.31)	10.0 (0.39)	16.0 (0.63)	22.0 (0.87)	29.0 (1.14)	34.0 (1.34)	43.1 (1.69)	76.1 (2.99)
Pipe wall thickness	**mm (inch)**	1.0 (0.04)	1.0 (0.04)	1.0 (0.04)	1.5 (0.06)	1.5 (0.06)	2.0 (0.08)	2.6 (0.10)	3.2 (0.13)
Mass flow measuring range at pressure drop of 2 bar (29 psi) at 1 g/cm³ (0.036 lb/inch³)	**kg/h (lb/h)**	4 610 (10 163)	7 560 (16 667)	23 560 (51 941)	48 500 (106 924)	95 500 (210 541)	127 000 (279 987)	203 500 (448 640)	602 000 (1 327 181)
Density	**g/cm³ (lb/inch³)**	0.5 ... 3.5 (0.18 ... 0.126)							
Fraction e.g. Brix	**°Brix**	0 ... 100							Not possible
Temperature									
Standard-version		-50 ... +200 °C (-58 ... +392 °F)							
Ex-version		-50 ... +200 °C (-58 ... +392 °F)							
Liquid pressure measuring pipe		20	25	40					
Stainless steel (DIN 2413, 20 °C (68 °F))	**bar (psi)**	100 (1450)	100 (1450)	100 (1450)	100 (1450)	100 (1450)	100 (1450)	40 (580)	40 (580)
Materials									
Measuring pipe		Stainless steel AISI 316Ti/1.4571 or Hastelloy C4/2.4610							
Flange		Stainless steel AISI 316Ti/1.4571 or Hastelloy C4/2.4610							
Enclosure		IP67							
Enclosure material/ connection box		AISI 304 (1.4301)/aluminum, max. pressure 40 bar (580 psi)							
Process connections		See dimensional drawings							
Electrical connections		Screw terminals, M 20							
Cable		5 x 2 x 0.35 mm² twisted and screened in pairs, ext. Ø 12 mm							
Cable length		10, 25, 75 or 150 m (32.8, 82, 246 or 492 ft.)							
Ex-version									
ATEX 1443X		≤ DN 40: II 1/2 Ex em [ib] IIC T2-T6 ≥ DN 50: II 2G Ex em [ib] IIC T2-T6							
Weight approx.	**kg (lb)**	13 (28)	14 (31)	18 (40)	34 (75)	47 (104)	58 (128)	91 (201)	261 (573)

For accuracy specifications see „System information Coriolis mass flowmeters“.

Pressure drop



Selection and Ordering data	Order No. Order code
SITRANS F C flow sensors MC2	7ME4300-
Nominal diameter	
Stainless steel AISI 316Ti/1.4571	
DN 50	1A
DN 65	1B
DN 80	1C
DN 100	1D
DN 150	1E
Hastelloy C4/2.4610	
DN 50	2A
DN 65	2B
DN 80	2C
DN 100	2D
DN 150	2E
Nominal pressure	
PN 40	A
PN 100	B
Class 150	C
Class 300	D
Class 600	E
Clamps/screwed-connections	F
Process connections	
Flange EN 1092-1	
DN 50 (PN 40/PN 100)	20
DN 65 (PN 40/PN 100)	21
DN 80 (PN 40/PN 100)	22
DN 100 (PN 40)	23
DN 150 (PN 40)	24
Flange ASME/ANSI	
2" (class 150/300/600)	30
2 ½" (class 150/300/600)	31
3" (class 150/300/600)	32
4" (class 150/300)	33
6" (class 150/300)	34
Dairy screwed connection to DIN 11851	
DN 50 (PN 25)	40
DN 65 (PN 25)	41
DN 80 (PN 25)	42
DN 100 (PN 25)	43
Dairy clamp connection DIN 32676 Tri-clamp	
50 mm clamp (PN 16)	50
66 mm clamp (PN 10)	51
81 mm clamp (PN 10)	52
100 mm clamp (PN 10)	53
Aseptic nut flange DIN 11864-2 form A for pipes dimensioned by DIN 11866	
DN 40 (1½")	60
DN 50 (2")	61
DN 65 (2½")	62
DN 80 (3")	63
DN 100 (4")	64
Configuration	
Flow and density (5 kg/m³ [0.31 lb/ft³])	1
Flow, Brix/Plato and density (1 kg/m³ [0.06 lb/ft³])[1]	2
Density (1 kg/m³ [0.06 lb/ft³])[1]	5
Fraction (specified by customer) and density (1 kg/m³ [0.06 lb/ft³])[1]	9
	N0Y

Selection and Ordering data	Order No. Order code
SITRANS F C flow sensors MC2	7ME4300-
Ex-approval	
Standard, without explosion protection	A
With explosion protection: Ex, ATEX	B
Cable	
No cable (see accessories)	A
Calibration	
Standard	1
Matched pair	2
Extended calibration customer-specified select Y60, Y61, Y62 or Y63 (see additional information)	8

[1] Extended density and fraction not possible with DN 150.

Dairy MLFB example	Order No.
MC2 sensor	7ME4300- -
Sensor size DN 80. AISI 316Ti/1.4571	1C
Nominal pressure: Clamps	F
DIN 11851, DN 80, PN 25	42
	
Configuration/calibration type: flow and density (5 kg/m³ [0.31 lb/ft³])	1
Without Ex appproval	A
No cable	A
Standard calibration	1

Selection and Ordering data	Order code
Additional information Please add "**-Z**" to Order No. and specify Order code(s) and plain text.	
Pressure testing certificate PED: 97/23/EC	**C11**
Material certificate EN 10204-3.1	**C12**
Welding certificate NDT X-ray: EN 25817/B	**C13**
Factory certificate according to EN 10204 2.2	**C14**
Factory certificate according to EN 10204 2.1	**C15**
Material certificate according to NACE	**C16**
Tag name plate, stainless steel	**Y17**
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**
Special version	**Y99**

Operating instructions for SITRANS F C MC2

Description	Order No.
• English	**A5E02154544**
• German	**A5E02407329**
• Spanish	**A5E02384868**
• French	**A5E02384945**

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

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

Flow sensor MC2

Accessories

Description	Order No.
Cables from MC2 sensor to MASS 6000 transmitter	
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**

Spare parts

Description	Order No.
2 kB SENSORPROM unit (Sensor Serial No. and Order No. must be specified at ordering)	**FDK:083H4410**
Connection board/PCB	**A5E03004110**

3

Selection and Ordering data	Order No. Order code
SITRANS F C flow sensors	
MC2 for Hygienic applications only	**7ME4310-** ☐☐☐☐-☐☐☐
Nominal diameter	
AISI 316L/1.4435	
DN 20	**1A**
DN 25	**1B**
DN 40	**1C**
DN 50	**1D**
DN 65	**1E**
DN 80	**1F**
Nominal pressure 40 bar, PN 25	
Clamps/screwed-connections	**F**
Pressure and Process connections	
Dairy screwed connection to DIN 11851	
DN 20, PN 25	**40**
DN 25, PN 25	**41**
DN 40, PN 25	**42**
DN 50, PN 25	**43**
DN 65, PN 25	**44**
DN 80, PN 25	**45**
Dairy clamp connectors for DIN 32676 Tri-clamp	
20 mm clamp	**47**
26 mm clamp	**48**
38 mm clamp	**54**
50 mm clamp	**50**
66 mm clamp	**51**
81 mm clamp	**52**
Aseptic connectors DIN 11864-2 Form A for DIN tubes	
DN 20	**58**
DN 25	**57**
DN 40	**60**
DN 50	**61**
DN 65	**62**
DN 80	**63**
Configuration	
Flow and density (5 kg/m³)	**1**
Flow, BRIX/PLATO and density (1 kg/m³)[1]	**2**
Density (1 kg/m³)[1]	**5**
Flow, fraction (customer-specified application from the net)	**9** **NOY**
Ex-approval	
Standard, without explosion protection	**A**
With explosion protection: Ex, FM Class I, Div 2	**D**

Selection and Ordering data	Order No. Order code
SITRANS F C flow sensors	
MC2 for Hygienic applications only	**7ME4310-** ☐☐☐☐-☐☐☐
Cable	
No cable (see accessories)	**A**
Calibration	
Standard	**1**
Matched pair	**2**

[1] Extended density and fraction not possible with DN 150.

Selection and Ordering data	Order code
Additional information	
Please add "**-Z**" to Order No. and specify Order code(s) and plain text.	
Pressure testing certificate PED: 97/23/EC	**C11**
Material certificate EN 10204-3.1	**C12**
Welding certificate NDT X-ray: EN 25817/B	**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**
Special version	**Y99**

Accessories

Description	Order No.
Cables from MC2 sensor to MASS 6000 transmitter	
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**

Spare parts

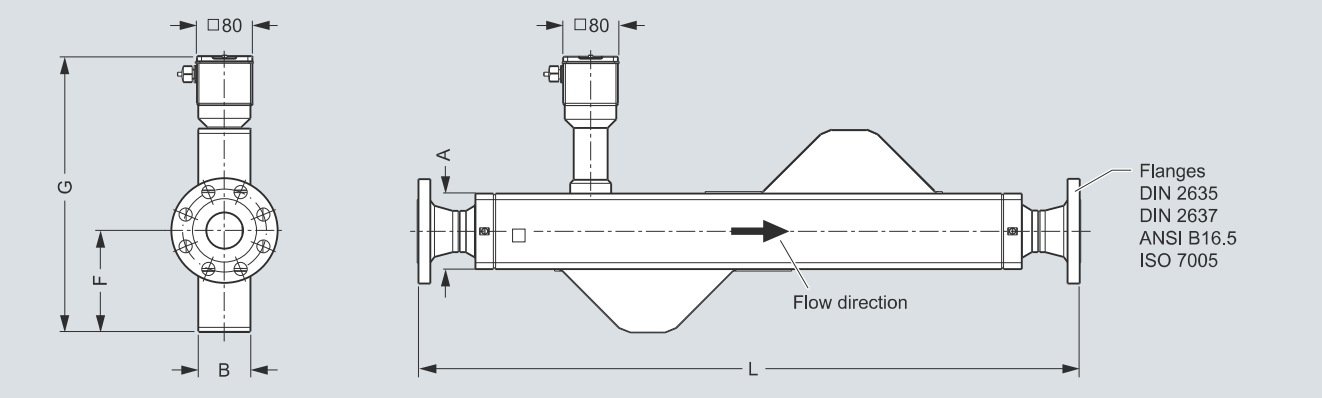
Description	Order No.
2 kB SENSORPROM unit (Sensor Serial No. and Order No. must be specified by ordering)	**FDK:083H4410**

Dairy MLFB example	Order No.
MC2 sensor	7ME4310- ■■■■■■- ■■■■
Sensor size DN 40 AISI 316L/1.4435	1C
Nominal pressure: Clamp DIN 11851, DN 40, PN 25	F 42
	
Configuration/calibration type: flow and density (5 kg/m^3 [0.31 lb/ft^3])	1
Without Ex appproval	A
No cable	A
Standard calibration	1

Flow sensor MC2

Dimensional drawings

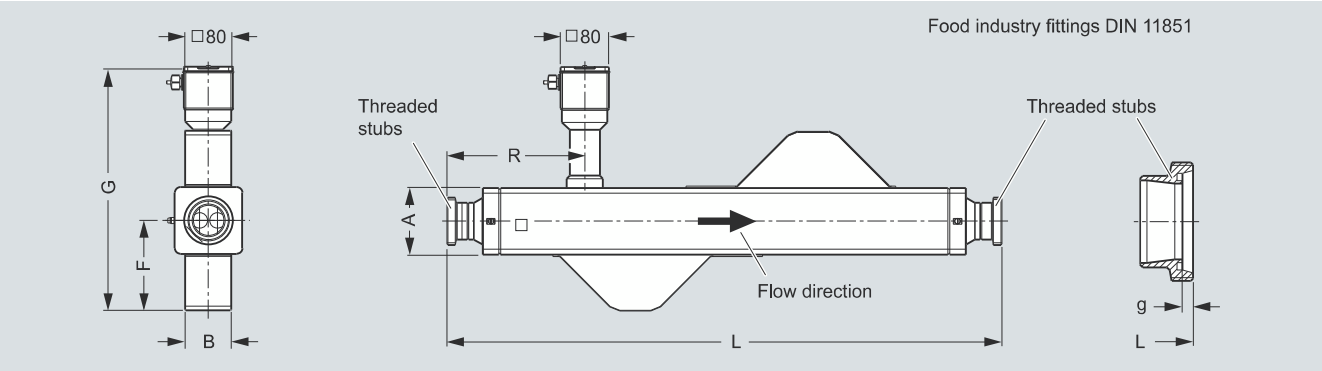
Remote design, flanged construction, DIN/ANSI



Meter size		Process connection size		L [mm (inch)]						G[1] [mm (inch)]	F [mm (inch)]	B [mm (inch)]	A [mm (inch)]	Weight [kg (lb)]
inch	DN	inch	DN	DIN 11864-2 form A	DIN 2635 PN 40	DIN 2637 PN 100	ANSI CL 150	ANSI CL 300	ANSI CL 600					
2	50	2	50	918 (36.14)	940 (37.01)	979 (38.54)	970 (38.19)	980 (38.58)	1001 (39.41)	403 (15.87)	148 (5.83)	80 (3.15)	110 (4.33)	34 (75)
		2½	65	1081 (42.56)	1100 (43.31)	1148 (45.20)	1218 (47.95)	1228 (48.35)	1248 (49.13)					38 (84)
2½	65	2	50	1197 (47.13)	1220 (48.03)	1259 (49.57)	1250 (49.21)	1260 (49.61)	1281 (50.43)	429 (16.89)	164 (6.64)	97 (3.82)	130 (5.12)	43 (95)
		2½	65	1081 (42.56)	1100 (43.31)	1148 (45.20)	1218 (47.95)	1228 (48.35)	1249 (49.17)					47 (104)
		3	80	1200 (47.24)	1220 (48.03)	1260 (49.61)	1240 (48.82)	1260 (49.61)	1282 (50.47)					50 (110)
3	80	2½	65	1310 (51.57)	1330 (52.36)	1378 (54.25)	1365 (53.74)	1375 (54.13)	1396 (54.96)	456 (17.95)	186 (7.32)	108 (4.25)	140 (5.51)	56 (123)
		3	80	1200 (47.24)	1220 (48.03)	1260 (49.61)	1240 (48.82)	1260 (49.61)	1282 (50.47)					58 (128)
		4	100	1463 (57.60)	1480 (58.27)	1530 (60.24)	1500 (59.06)	1520 (59.84)	1568 (61.73)					69 (152)
4	100	3	80	1618 (63.70)	1640 (64.57)	1680 (66.14)	1660 (65.35)	1680 (66.14)	1702 (67.01)	500 (19.69)	215 (8.46)	131 (5.16)	170 (6.69)	84 (185)
		4	100	1463 (57.60)	1480 (58.27)	1530 (60.24)	1500 (59.06)	1520 (59.84)	1568 (61.73)					91 (201)
		6	150	N/A	1778 (69.92)	N/A	1806 (71.10)	1826 (71.89)	N/A					120 (265)
6	150	6	150	N/A	2040 (80.31)	N/A	2070 (81.50)	2090 (82.28)	N/A	613 (24.13)	285 (11.22)	190 (7.84)	260 (9.84)	260 (573)

[1] For Ex add 54 mm

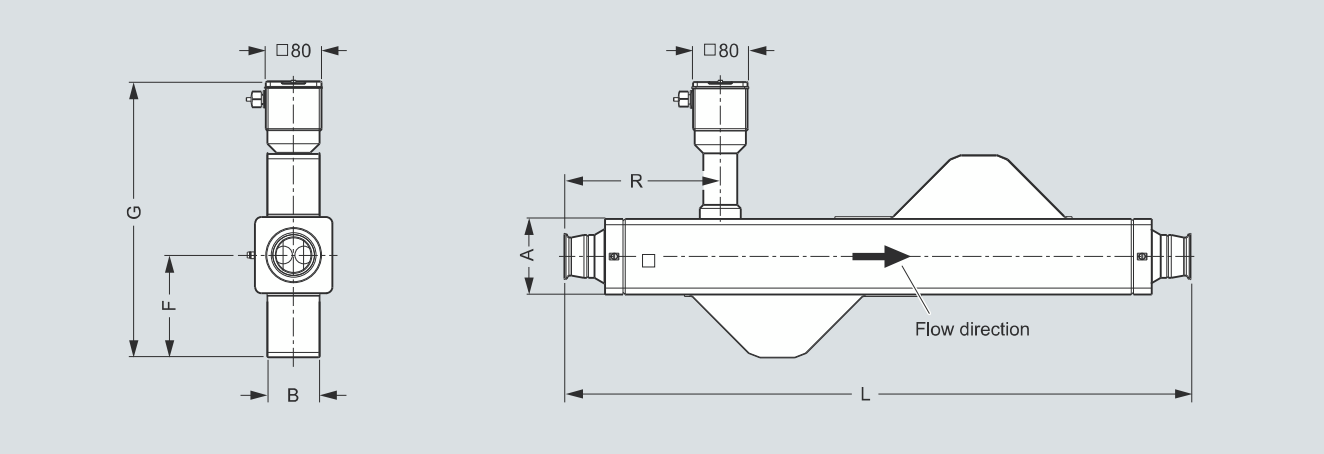
Remote design, food industry fittings, DIN 11851



Meter size		Process connection size			L [mm (inch)]	g [mm (inch)]	G[1] [mm (inch)]	F [mm (inch)]	B [mm (inch)]	A [mm (inch)]	R [mm (inch)]	Weight [kg (lb)]
inch	DN	inch	DN									
2	50	2	50	Rd 78 x 1/6	918 (36.14)	7 (0.28)	403 (15.87)	148 (5.83)	80 (3.15)	110 (4.33)	177 (6.97)	30 (66)
		2½	65	Rd 95 x 1/6	1081 (42.56)	8 (0.31)					254 (10.00)	34 (75)
2½	65	2	50	Rd 78 x 1/6	1197 (47.13)	7 (0.28)	429 (16.89)	164 (6.46)	97 (3.82)	130 (5.12)	291 (11.46)	40 (88)
		2½	65	Rd 95 x 1/6	1081 (42.56)	8 (0.31)					227 (10.91)	44 (97)
		3	80	Rd 110 x 1/6	1200 (47.24)	8 (0.31)					281 (11.06)	47 (104)
3	80	2½	65	Rd 95 x 1/6	1310 (51.57)	8 (0.31)	456 (17.95)	186 (7.32)	108 (4.25)	140 (5.51)	319 (12.56)	54 (119)
		3	80	Rd 110 x 1/6	1200 (47.24)	8 (0.31)					258 (10.16)	56 (123)
		4	100	Rd 110 x 1/6	1463 (57.60)	10 (0.39)					381 (15.00)	60 (132)
4	100	3	80	Rd 110 x 1/6	1618 (63.70)	8 (0.31)	500 (19.69)	215 (8.46)	131 (5.16)	170 (6.69)	401 (15.79)	82 (180)
		4	100	Rd 130 x ¼	1463 (57.60)	10 (0.39)					314 (12.36)	86 (190)

[1] For Ex add 54 mm

Remote design, Tri-clamp DIN 32676 (ISO 2852)



Dimensions in mm (inch)

Meter size		Process connection size		L [mm (inch)] ± 3	G[1)] [mm (inch)]	F [mm (inch)]	B [mm (inch)]	A [mm (inch)]	R [mm (inch)]	Weight [kg (lb)]
inch	DN	inch	DN							
2	50	2	50	913 (35.94)	403 (15.87)	148 (5.83)	80 (3.15)	110 (4.33)	225 (8.86)	26 (57)
		2½	65	1073 (42.24)					305 (12.01)	27 (60)
2½	65	2	50	1192 (46.93)	429 (16.89)	164 (6.64)	97 (3.82)	130 (5.12)	335 (13.19)	36 (79)
		2½	65	1073 (42.24)					275 (10.83)	37 (82)
		3	80	1180 (46.46)					328 (12.91)	38 (84)
3	80	2½	65	1302 (51.26)	456 (17.95)	186 (7.32)	108 (4.25)	140 (5.51)	378 (14.88)	45 (99)
		3	80	1180 (46.46)					296 (11.65)	44 (97)
		4	100	1448 (57.01)					430 (16.93)	46 (101)
4	100	3	80	1598 (62.91)	500 (19.69)	215 (8.46)	131 (5.16)	170 (6.69)	440 (17.32)	71 (157)
		4	100	1448 (57.01)					365 (14.37)	69 (152)

1) For Ex add 54 mm

Flow sensor MC2

Process Connections

- Flanges DIN/ASME
- Tri-Clamp DIN 32676
  - DN 15 to DN 50: Series 3
  - DN 65 to DN 100: Series 1
- Food Industry fittings DIN 11851

The max. allowable operating pressure is a function of the process connection type, the fluid temperature, the bolts and the gaskets.

Pressure Rating

- PN 16, PN 40, PN 100 (to DN 80 (3"))
  Class 150, Class 300, Class 600 (to DN 80 (3"))

Housing as secondary containment

- Max. 40 bar

Pressure Equipment Directive 97/23/EG

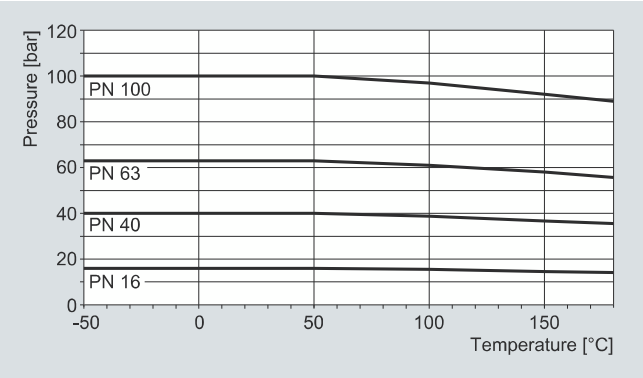
- Conformity evaluation category III, fluid group 1, gas, diagramme 6

Corrosion resistance of measuring pipe material to measuring medium has to be considered.

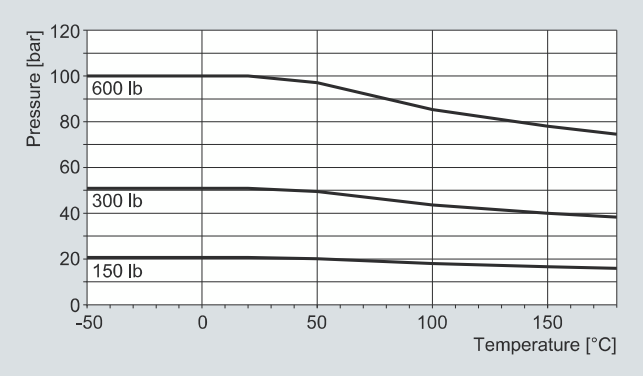
Material strength for process connections

Process connection	Size		$PS_{max.}$ at 20 °C (68 °F)	$TS_{max.}$	$TS_{min.}$
	DN	inch	bar (psi g)	°C (°F)	°C (°F)
Thread acc. DIN 11851	15 ... 40	½ ... 1½	40 (580)	140 (284)	-40 (-40)
	50 ... 100	2 ... 4	25 (363)	140 (284)	-40 (-40)
Tri-Clamp acc. DIN 32676	15 ... 50	½ ... 2	16 (232)	120 (248)	-40 (-40)
	65 ... 100	2½ ... 4	10 (145)	120 (248)	-40 (-40)

Pressure/temperature curves



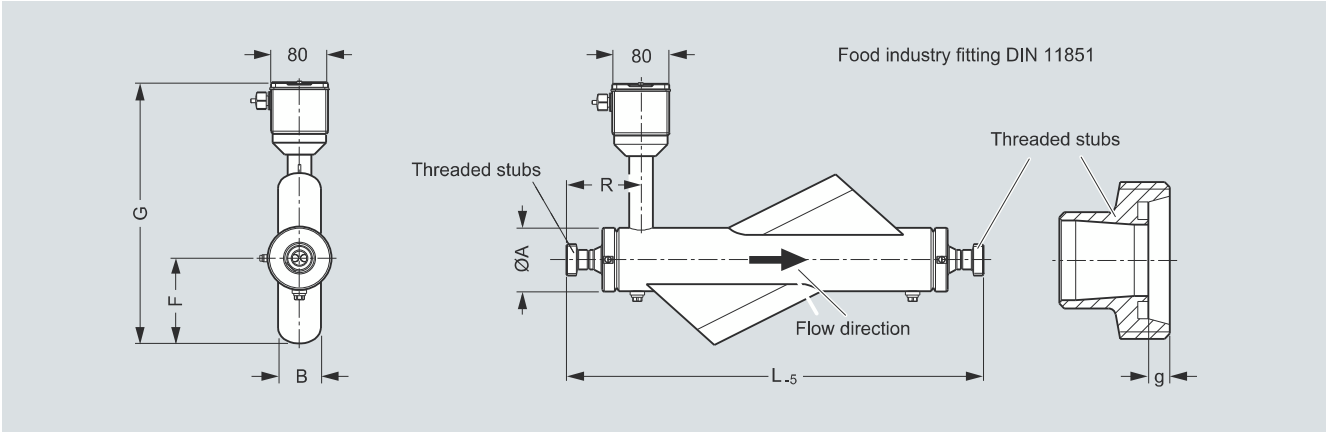
DIN-Flanges stainless steel AISI 316Ti/1.4571 to DN 100 (4")



ASME-Flanges stainless steel AISI 326Ti/1.4571 to DN 100 (4")

For further information on the PED standard and requirements, see page 9/14.

Remote Design, Food Industry Fitting, DIN 11851

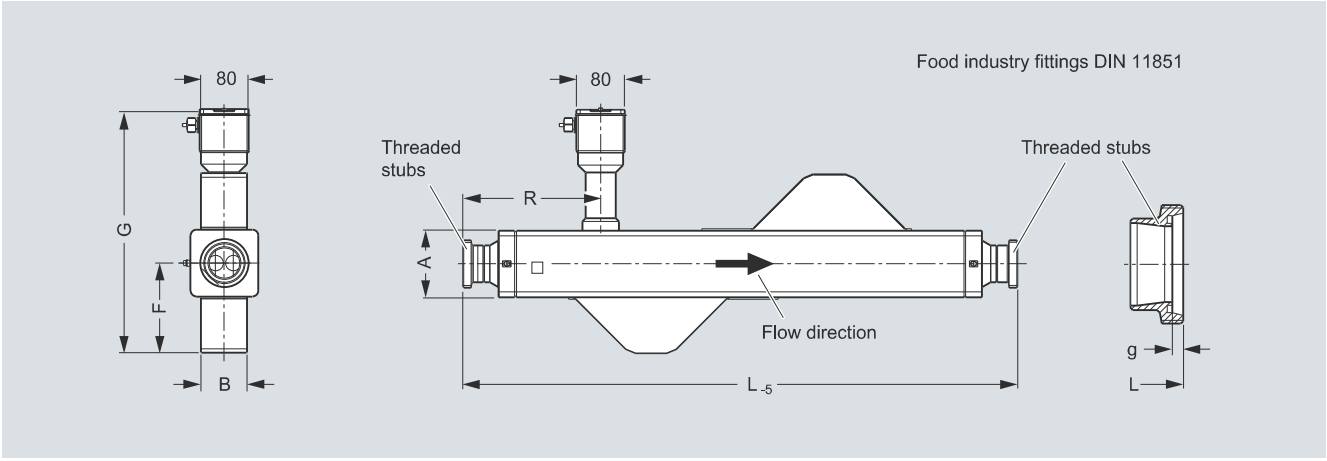


DN (Size)		Process connections			L_{-5}	g	G	F	B	∅A	R	Weight
DN	inch	DN	inch		mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	kg (lb)
20	¾	15	½	Rd34 x 1/8	672 (26.46)	4 (0.16)	358 (14.94)	127 (5.00)	66 (2.60)	89 (3.50)	152 (5.98)	13 (29)
		20	¾	Rd44 x 1/6	583 (22.95)	6 (0.24)					102 (4.02)	
		25	1	Rd52 x 1/6	683 (26.89)	7 (0.28)					152 (5.98)	
25	1	20	¾	Rd44 x 1/6	743 (29.25)	6 (0.24)	358 (14.94)	127 (5.00)	66 (2.60)	89 (3.50)	162 (6.38)	14 (31)
		25	1	Rd52 x 1/6	643 (25.31)	7 (0.28)					112 (4.11)	
		40	1½	Rd65 x 1/6	786 (30.94)	7 (0.28)					185 (7.28)	

If this connection is supplied with an EHEDG-certified device, the device nominal sizes must correspond with the connection nominal sizes!

Flow sensor MC2

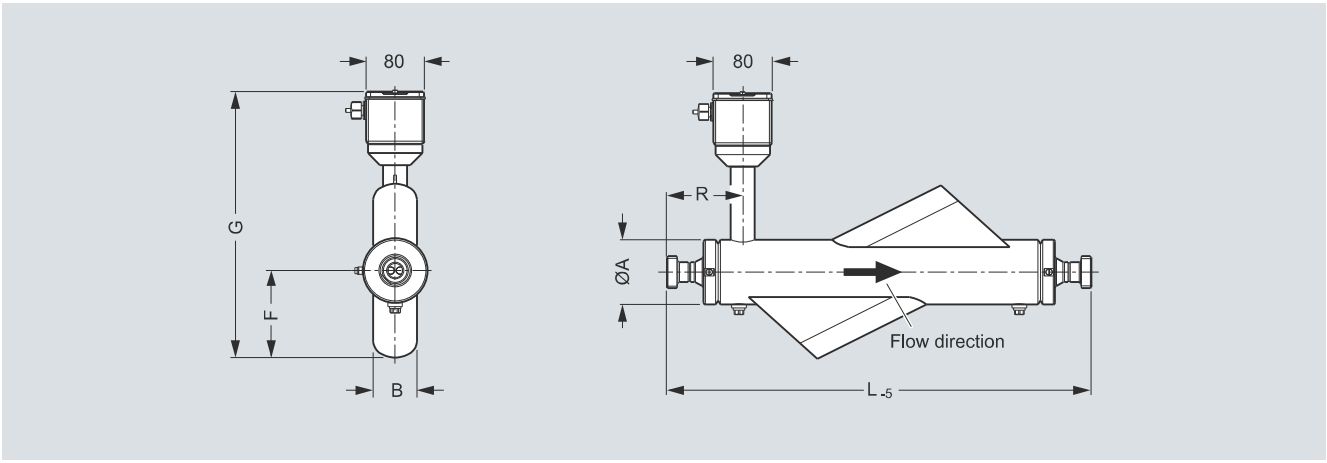
Remote Design, Food Industry Fitting, DIN 11851



DN (Size)		Process connections			L_{-5}	g	G	F	B	∅A	R	Weight
DN	inch	DN	inch		mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	kg (lb)
40	1½	25	1	Rd52 x 1/6	864 (34.02)	7 (0.28)	374 (14.72)	129 (5.08)	64 (2.52)	90 (3.54)	218 (8.58)	16 (35)
		40	1½	Rd65 x 1/6	761 (29.96)	7 (0.28)					164 (6.46)	18 (40)
		50	2	Rd78 x 1/6	918 (36.14)	7 (0.28)					241 (9.49)	19 (42)
50	2	40	1½	Rd65 x 1/6	1025 (40.35)	7 (0.28)	403 (15.87)	148 (5.83)	80 (3.15)	110 (4.33)	233 (9.17)	28 (62)
		50	2	Rd78 x 1/6	918 (36.14)	7 (0.28)					177 (6.97)	30 (66)
		65	2½	Rd95 x 1/6	1081 (42.56)	8 (0.31)					254 (10.00)	34 (75)
65	2½	50	2	Rd78 x 1/6	1197 (47.13)	7 (0.28)	429 (16.89)	164 (6.46)	97 (3.82)	130 (5.12)	291 (11.46)	40 (88)
		65	2½	Rd95 x 1/6	1081 (42.56)	8 (0.31)					227 (8.94)	44 (97)
		80	3	Rd110 x 1/4	1200 (47.24)	8 (0.31)					281 (11.06)	47 (104)
80	3	65	2½	Rd95 x 1/6	1310 (51.57)	8 (0.31)	456 (17.95)	186 (7.32)	108 (4.25)	140 (5.51)	319 (12.56)	54 (119)
		80	3	Rd110 x 1/4	1200 (47.24)	8 (0.31)					258 (10.16)	56 (123)
		100	4	Rd130 x 1/4	1463 (57.60)	10 (0.39)					381 (15.00)	60 (132)

If this connection is supplied with an EHEDG-certified device, the device nominal sizes must correspond with the connection nominal sizes!

Remote Design, Tri-Clamp DIN 32676

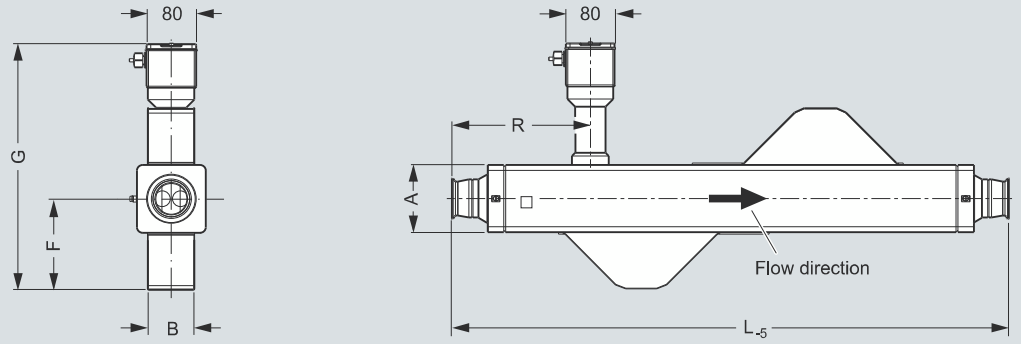


DN (Size)		Process connections			L_{-5}	G	F	B	∅A	R	Weight
DN	inch	DN	inch		mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	kg (lb)
20	¾	15	½	DIN 32676	656 (25.83)	358 (14.09)	127 (5.00)	66 (2.60)	89 (3.50)	140 (5.51)	12 (26)
		20	¾		561 (22.09)					92 (3.62)	
		25	1		661 (26.02)					142 (5.59)	
25	1	20	¾	DIN 32676	721 (28.39)	358 (14.09)	127 (5.00)	66 (2.60)	89 (3.50)	152 (5.98)	13 (29)
		25	1		621 (24.45)					102 (4.02)	
		40	1½		773 (30.43)					180 (7.09)	

If this connection is supplied with an EHEDG-certified device, the device nominal sizes must correspond with the connection nominal sizes!

Flow sensor MC2

Remote Design, Tri-Clamp DIN 32676



DN (Size)		Process connections		L_{-5}	G	F	B	∅A	R	Weight
DN	inch	DN	inch	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	kg (lb)
40	1½	25	1	842 (33.15)	374 (14.72)	129 (5.08)	64 (2.52)	90 (3.54)	242 (9.53)	17 (37)
		40	1½	748 (29.45)					195 (7.68)	17 (37)
		50	2	913 (35.94)					278 (10.94)	18 (40)
50	2	40	1½	1012 (39.84)	403 (15.87)	148 (5.83)	80 (3.15)	110 (4.33)	275 (10.83)	27 (60)
		50	2	913 (35.94)					225 (8.86)	26 (57)
		65	2½	1073 (42.24)					305 (12.01)	27 (60)
65	2½	50	2	1192 (46.93)	429 (16.89)	164 (6.46)	97 (3.82)	130 (5.12)	335 (13.19)	36 (79)
		65	2½	1073 (42.24)					275 (10.83)	37 (82)
		80	3	1180 (46.46)					328 (12.91)	38 (84)
80	3	65	2½	1302 (51.26)	456 (17.95)	186 (7.32)	108 (4.25)	140 (5.51)	378 (14.88)	45 (99)
		80	3	1180 (46.46)					296 (11.65)	44 (97)
		100	4	1448 (57.01)					430 (16.93)	46 (101)

If this connection is supplied with an EHEDG-certified device, the device nominal sizes must correspond with the connection nominal sizes!