

Flow Measurement

SITRANS FC (Coriolis)

Sensors and Flowmeter systems / SITRANS FC MASS 2100 and FC300 DN 4 / MASS 2100 / FC300 DN 4 with FCT030

Overview



Sensors MASS 2100 and FC300 DN 4 with FCT010 / FCT030 transmitters

The SITRANS MASS 2100 and FC300 DN 4 system consists of a SITRANS sensor and a SITRANS FCT030 transmitter.

The flowmeter comes in a compact and remote design depending for all MASS 2100 DI 3 to DI 15.

MASS 2100 DI 1.5 and FC300 DN4 are only available with analogue connection of the FCT030 transmitter.

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

FCT030 is available with current output HART 7.5, Modbus RS 485 RTU, PROFIBUS DP or PROFIBUS PA as standard on Channel 1. Additional functions can be freely configured for analog, pulse, frequency, relay or status output or binary input.

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

Benefits

- High accuracy better than 0.1 % of mass flow rate
- Large dynamic turn-down ratio better than 500:1
- Densitometer performance available through density accuracy (depending upon sensor size) ranging from 0.0005 to 0.0015 g/cm³ with a typical repeatability better than 0.0001 to 0.0002 g/cm³
- 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
- 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.)
- Full bore design provides lower pressure loss due to same internal diameter throughout the entire sensor
- 4-wire Pt1000 temperature measurement ensures optimum accuracy on mass flow, density and fraction flow
- Multi-plug electrical connector enables true “plug & play”
- 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

Selection and ordering data

SITRANS FC sensors MASS 2100/FC300 with FCT030 transmitter	Article No. 7ME4813-	Order code
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Sensor type and connector size		
MASS 2100 DI 1.5, 1/4"	1	G
MASS 2100 DI 3, 1/4"	3	A
MASS 2100 DI 3, 1/4" Heated w. DIN	3	B
MASS 2100 DI 3, 1/4" Heated w. ANSI	3	C
FC300 DN 4, 1/4"	4	A
MASS 2100 DI 6, 1/4"	6	A
MASS 2100 DI 6, 1/4" Heated w. EN	6	B
MASS 2100 DI 6, 1/4" Heated w. ANSI	6	C
MASS 2100 DI 6, DN 10	6	D
MASS 2100 DI 6, DN 10 Heated w. EN	6	E
MASS 2100 DI 6, DN 10 Heated w. ANSI	6	F
MASS 2100 DI 6, DN 15 (1/2")	6	G
MASS 2100 DI 6, DN 15 (1/2") Heated w. EN	6	H
MASS 2100 DI 6, DN 15 (1/2") Heated w. ANSI	6	J
MASS 2100 DI 6, DN 20 (3/4")	6	K
MASS 2100 DI 6, DN 20 (3/4") Heated w. EN	6	L
MASS 2100 DI 6, DN 20 (3/4") Heated w. ANSI	6	M
MASS 2100 DI 6, DN 25 (1")	6	N
MASS 2100 DI 6, DN 25 (1") Heated w. EN	6	P
MASS 2100 DI 6, DN 25 (1") Heated w. ANSI	6	Q
MASS 2100 DI 15, DN 15 (1/2")	7	A
MASS 2100 DI 15, DN 15 (1/2") Heated w. EN	7	B
MASS 2100 DI 15, DN 15 (1/2") Heated w. ANSI	7	C
MASS 2100 DI 15, DN 20 (3/4")	7	D
MASS 2100 DI 15, DN 20 (3/4") Heated w. EN	7	E
MASS 2100 DI 15, DN 20 (3/4") Heated w. ANSI	7	F
MASS 2100 DI 15, DN 25 (1")	7	G
MASS 2100 DI 15, DN 25 (1") Heated w. EN	7	H
MASS 2100 DI 15, DN 25 (1") Heated w. ANSI	7	J
Process connection/Pressure		
No connections (spare part transmitter)	A	0
EN 1092-1 B1, PN 40	A	1
EN 1092-1 B1, PN 100	A	3
ASME B16.5, RF, Class 150	D	1
ASME B16.5, RF, Class 600	D	3
DIN 11851 crewed connection	F	1
ISO 2852 hygienic clamped	J	1
ISO 2853 hygienic screwed	J	5
ISO 228-1 pipe thread, PN 100	C	1
ISO 228-1 pipe thread, PN 130	C	2
ISO 228-1 pipe thread, PN 200	C	3
ISO 228-1 pipe thread, PN 230	C	4
ISO 228-1 pipe thread, PN 265	C	5
ISO 228-1 pipe thread, PN 350	C	6
ISO 228-1 pipe thread, PN 365	C	7
ISO 228-1 pipe thread, PN 410	C	8
NPT ASME B 1.20.1 pipe thread, PN 100	N	1
NPT ASME B 1.20.1 pipe thread, PN 130	N	2
NPT ASME B 1.20.1 pipe thread, PN 200	N	3
NPT ASME B 1.20.1 pipe thread, PN 230	N	4
NPT ASME B 1.20.1 pipe thread, PN 265	N	5
NPT ASME B 1.20.1 pipe thread, PN 350	N	6
NPT ASME B 1.20.1 pipe thread, PN 365	N	7
NPT ASME B 1.20.1 pipe thread, PN 410	N	8

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Selection and ordering data (continued)

	Article No. 7ME4813-	Order code
SITRANS FC sensors MASS 2100/FC300 with FCT030 transmitter		
Tube material (wetted) and max. operational temperature		
AISI 316L/EN 1.4435, max. 115 °C	1	
AISI 316L/EN 1.4435, max. 125 °C	2	
AISI 316L/EN 1.4435, max. 180 °C	3	
Hastelloy C22/UNS N06022/EN 2.4602, max. 115 °C	5	
Hastelloy C22/UNS N06022/EN 2.4602, max. 125 °C	6	
Hastelloy C22/UNS N06022/EN 2.4602, max. 180 °C	7	
Calibration		
Mass flow calibration 2 flow × 2 points	1	
Mass flow calibration 2 flow × 2 points + density calibration	4	
Standard fraction (selectable by menu) incl density calibration	8	
Individual fraction (on demand)	9	N 0 Y
Mounting style, transmitter housing and material		
Compact mounted, IP67, Aluminium transmitter housing (DI 3, DI 6 and DI 15)	D	
Remote field mounted, IP67, Aluminium housing, M12 socket for digital cable connection (DI 3, DI 6 and DI 15 only)	G	
Remote field mount, IP67, Aluminium housing, terminal box for digital cable connection (DI 3, DI 6 and DI 15)	K	
Wall mount aluminium transmitter housing, M12 socket for digital cable connection (DI 3, DI 6 and DI 15)	U	
Remote field mount, IP67, Aluminium transmitter housing, analog cable connection with M20 connectors	Z	P 0 D
Remote wall mount, IP67, aluminum transmitter housing, analog cable connection with M20 connectors	Z	P 0 E
Ex approvals		
Non-Ex		A
ATEX Zone 1 / 21		C
IECEx Zone 1 / 21 (in preparation)		F
USA (FM, CSA, UL), Zone 1/Div 1		H
Canada (CSA, UL), Zone 1/Div 1		M
EAC Zone 1 / 21		U
Local User Interface		
Blind		1
Graphical, 240 × 160 pixels, glass lid		3

	Order code
Further designs	
Please add "-Z" to Article No. and specify Order code(s).	
Cable glands	
None (mechanical sensor)	A00
Metric, no glands	A01
Metric, plastic	A02
Metric, brass/Ni plated	A05
Metric, stainless steel	A06
NPT, no glands	A11
NPT, plastic	A12
NPT, brass/Ni plated	A15
NPT, stainless steel	A16
Integral M12 socket	A20
SW functions & CT approvals	
Standard	B11
I/O configuration Ch1	
None (replacement sensor)	E00
4 ... 20 mA, HART, active/passive output (non-Ex)	E02
4 ... 20 mA, HART, active Ex	E06
4 ... 20 mA, HART, passive Ex	E07
PROFIBUS PA	E10
PROFIBUS DP	E11
Modbus RTU RS 485 (none-Ex)	E14

Selection and ordering data (continued)

	Order code
I/O configuration Ch2 (O), Ch3 (I/O) and Ch4 (I/O)	
None	F00
Non Ex: Sig O, None, None. Active/passive menu selected	F01
Non Ex: Sig O, Sig I/O, None. Active/passive menu selected	F02
Non Ex: Sig O, Sig I/O, Sig I/O. Active/passive menu selected	F03
Non Ex: Sig O, Sig I/O, R. Active/passive menu selected	F04
Non Ex: Sig O, R, R. Active/passive menu selected	F05
Non Ex: Sig O, R, None. Active/passive menu selected	F06
Ex: pSig O, None, None	F11
Ex: pSig O, pSig I/O, None	F12
Ex: pSig O, pSig I/O, pSig I/O	F13
Ex: pSig O, pSig I/O, R	F14
Ex: pSig O, R, R	F15
Ex: pSig O, R, None	F16
Ex: aSig O, None, None	F21
Ex: aSig O, aSig I/O, None	F22
Ex: aSig O, aSig I/O, aSig I/O	F23
Ex: aSig O, aSig I/O, R	F24
Ex: aSig O, R, R	F25
Ex: aSig O, R, None	F26
Certificates	
Press test certificate CRN	C01
Press test certificate PED	C02
Material certificate EN 10204-3.1	C12
Welding inspection report	C13
Factory certificate according to EN 10204 2.2	C14
Factory certificate according to EN 10204 2.1	C15
Cleaning for oil and grease/ASTM-A380	C50
Sensor data storage	
Sensor with SensorFlash for FCT	S20
Sensor with SensorProm for MASS 6000 (in preparation)	S21
SD-Card accessibility via USB (not allowed in USA by Patent)	
Mass storage enabled	S30
Digital cable sensor-transmitter	
None	L50
5 m (16.4 ft), sensor cable, 4 wire, with 2 pcs M12 plugs mounted	L51
5 m (16.4 ft), sensor cable, 4 wire, without plugs for terminal connection	L52
10 m (32.8 ft) sensor cable, 4 wire, with 2 pcs M12 plugs mounted	L55
10 m (32.8 ft), sensor cable, 4 wire, without plugs for terminal connection	L56
25 m (82 ft), sensor cable, 4 wire, with 2 pcs M12 plugs mounted	L59
25 m (82 ft), sensor cable, 4 wire, without plugs for terminal connection	L60
50 m (164 ft), sensor cable, 4 wire, with 2 pcs M12 plugs mounted	L63

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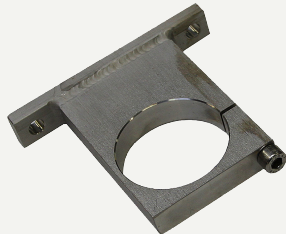
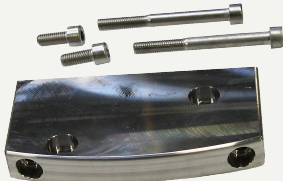
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Selection and ordering data (continued)

	Order code
50 m (164 ft), sensor cable, 4 wire, without plugs for terminal connection	L64
75 m (246 ft), sensor cable, 4 wire, with 2 pcs M12 plugs mounted	L67
75 m (246 ft), sensor cable, 4 wire, without plugs for terminal connection	L68
Analog cable sensor-transmitter	
1 m cable, analog, with 2 × M20 connectors	L85
2 m cable, analog with 2 × M20 connectors	L86
5 m cable, analog with 2 × M20 connectors	L87
10 m cable, analog with 2 × M20 connectors	L88
15 m cable, analog with 2 × M20 connectors	L89
Additional data	
Please add "-Z" to Article No. and specify Order code(s) and plain text.	
Tag name	
Tag name plate, stainless steel	Y17
Extended calibration	
Multi-point high, (5 flows × 2 passes), 10 ... 100 % of Q_{nom}	Y61
Multi-point high, (10 flows × 1 pass), 10 ... 100 % of Q_{nom}	Y63

Accessories for MASS 2100 and FC300 DN 4 with FCT030 transmitter

Description	Article No.	
Mounting bracket for flow sensor MASS 2100 DI 1.5	A5E02590427	
Mounting bracket for FC300 DN 4 in AISI 304	A5E02590439	

Technical specifications

Sensors MASS 2100 / FC300 DN 4 with FCT030 transmitter	
Sizes	MASS 2100 DI 1.5 (1/16") MASS 2100 DI 3 (1/8") MASS 2100 DI 6 (1/4") MASS 2100 DI 15 (1/2") FC300 DN 4 (1/6")
Accuracy	± 0.10 % for liquids additional ±0.40 for gases
Repeatability	± 0.05 %
Flow range Q norm (liquids) (water @ 1 bar pressure loss) (Q _{nom})	
• DI 1.5	19 kg/h (42 lb/h)
• DI 3	90 kg/h (198 lb/h)
• DI 6	500 kg/h (1 102 lb/h)
• DI 15	3 800 kg/h (8 370 lb/h)
• DN 4	140 kg/h (308 lb/h)
Architecture	Compact: DI 3, DI 6, DI 15 Remote digital: DI 3, DI 6, DI 15 Remote analogue: DI 1.5, DI 3, DI 6, DI 15, DN 4
Display	Full graphical display, 240 × 160 pixels with selection of 6 languages
Power supply	20 ... 90 V DC ± 10 %; 100 ... 240 V AC ± 10 %, 47 ... 63 Hz ± 10 %
Material	
• Sensor	
- Wetted parts	316L stainless steel or Hastelloy C 22
- Enclosure	316L stainless steel
• Transmitter	Aluminum with corrosion-resistant coating Class C4
Enclosure rating	IP67 ¹⁾
Pressure ratings	
• Measuring tubes	
- 316L	Up to 265 bar (3 844 psi), depending on size and process connection
- Nickel Alloy C4	Up to 410 bar (5 945 psi), depending on size and process connection
• Sensor enclosure	No pressure containment
Temperature ratings	
• Process medium	-50 ... +180 °C (-58 ... +356 °F)
• Ambient	-20 ... +50 °C (-4 ... +122 °F) ¹⁾
Process connections (depending on size and pressure rating)	
• Flanges	EN 1092-1 B1, ANSI/ASME B16.5
• Pipe threads	ASME B1.20 (NPT), ISO 228
• Hygienic threads	DIN 11851, ISO 2853/BS 4825 part 4 (SS3016)
• Hygienic clamps	ISO Clamp 2852
Approvals	
• Hazardous area	ATEX, IECEx, EAC Ex, CSA, cCSAus, EAC
• Pressure equipment	PED
NAMUR	NAMUR-compliant (e.g. NE 21, NE 41, NE 107 and NE 132)
I/O	Up to 4 channels combining analog, relay or digital outputs and binary input
Communication	HART PROFIBUS PA PROFIBUS DP Modbus RTU (RS 485)
EMC performance	
• Emission	EN 55011/CISPR-11 (Class A)
• Immunity	EN/IEC 61326-1 (Industry)
Mechanical load	18 ... 1 000 Hz random The flowmeter will mechanically tolerate 3.17 g RMS in all directions. Flow accuracy cannot be guaranteed under all conditions.

Technical specifications (continued)

¹⁾ If operating outdoors, avoid direct sunlight, particularly in warm climatic regions.