



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/cm³ with a repeatability better than 0.0001 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
- 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 AISI 316L stainless steel mat. no 1.4435 or Hastelloy C22 mat. no 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 4X, 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, BRUX/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, CNG-dispensers, test separators, LPG
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.

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 or Hastelloy C22 with a wide variety of process connections.

The enclosure is made in stainless steel AISI 316L mat. no 1.4404 with a grade of encapsulation of IP66/NEMA 4.

The sensor is as standard EEx 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.

Distributor Slovakia: Mahrlo www.marweb.sk

MAHRLO s.r.o.
Ľudmily Podjavorinskej 535/11
916 01 Stará Turá

mob.: +421 908 170 313
tel.: +421 32 776 03 62
fax: +421 32 776 21 56

web: www.marweb.sk
e-mail: slecka@mahrlo.sk
e-shop: www.marweb.sk



SITRANS F C Flow Measurement

Flow sensor MASS 2100 DI 3 to DI 40

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/cm ³ (lb/inch ³)	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 pipe¹⁾						
Stainless steel	bar (psi)	230 (3336)	265 (3844)	130 (1885)	110 (1595)	105 (1523)
Hastelloy C22	bar (psi)	350 (5076)	410 (5946)	200 (2900)	185 (2683)	not available
Materials						
Measuring pipe, flange and thread connection		Mat. no 1.4435 (AISI 316L) (Stainless steel) Mat. no 2.4602 (Hastelloy C22) not available				
Enclosure and enclosure material						
IP65 (NEMA 4) and mat. no 1.4404 (AISI 316L) (Stainless steel), housing is not rated for pressure containment						
Process connections²⁾						
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 mm ² twisted and screened in pairs, ext. Ø 12 mm						
Ex-version						
EEx 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, mat. no. 1.4401 or corresponding

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

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MAHRLO s.r.o.
L'udmily Podjavorinskej 535/11
916 01 Stará Turá

mob.: +421 908 170 313
tel.: +421 32 776 03 62
fax: +421 32 776 21 56

web: www.marweb.sk
e-mail: slecka@mahrlo.sk
e-shop: www.marweb.sk



SITRANS F C Flow Measurement

Flow sensor MASS 2100 DI 3 to DI 40

Selection and Ordering data	Order No.	Order code	Selection and Ordering data	Order No.	Order code
SITRANS F C sensors			SITRANS F C sensors		
MASS 2100 without heating jacket	7ME4100-		MASS 2100 without heating jacket	7ME4100-	
MASS 2100 heated, DN 15 connection	7ME4200-		MASS 2100 heated, DN 15 connection	7ME4200-	
MASS 2100 heated, ½ inch, ANSI B16.5 connection	7ME4210-		MASS 2100 heated, ½ inch, ANSI B16.5 connection	7ME4210-	
Diameter			Dairy screwed connection DIN 11851		
Stainless steel mat. no. 1.4435/316L DI 3 (PN 100/PN 230)	1C		DN 10 (PN 40)	40	
DI 6	1D		DN 15 (PN 40)	41	
DI 15	1E		DN 25 (PN 40)	42	
DI 25	1F		DN 32 (PN 40)	43	
DI 40	1G		DN 40 (PN 25)	44	
Mat. no. 2.4602/Hastelloy C22 DI 3 (PN 100/PN 350)	2C		DN 50 (PN 25)	45	
DI 6	2D		DN 65 (PN 25)	46	
DI 15	2E		Dairy clamp connection ISO 2852 (DIN 32676)		
DI 25	2F		Cone down the sensor in order to obtain self-drainage with connectors ISO 2852		
Pressure			25 mm (PN 16)	50	
PN 16 (DI 6, DI 15, DI 25 and DI 40)	A		38 mm (PN 16)	51	
PN 25 (DI 6, DI 15, DI 25 and DI 40)	B		51 mm (PN 16)	52	
PN 40 (DI 6, DI 15, DI 25 and DI 40)	C		Dairy screwed connection ISO 2853		
PN 100 (DI 3, DI 6, DI 15, DI 25 and DI 40)	D		25 mm (PN 16)	60	
PN 105 (DI 40, 2", 316L)	E		38 mm (PN 16)	61	
PN 110 (DI 25, 1", 316L)	F		51 mm (PN 16)	62	
PN 130 (DI 15, ½", 316L)	G		Configuration/calibration type		
PN 185 (DI 25, 1", Hastelloy C22)	J		Standard	1	
PN 200 (DI 15, ½", Hastelloy C22)	K		Density	2	
PN 230 (DI 3, ¼", 316L)	L		BRIX/PLATO	3	
PN 265 (DI 6, ¼", 316L)	M		Fraction (specification required)	9	NOY
PN 350 (DI 3, ¼", Hastelloy C22)	N		Transmitter compact mounted on sensor		
PN 410 (DI 6, ¼", Hastelloy C22)	Q		No transmitter, sensor and adapter only	A	
Class 150 (DI 6, DI 15, DI 25 and DI 40)	R		MASS 6000, Ex d, stainless steel enclosure, 1 current, 1 freq./pulse and 1 relay output, 24 V AC/DC with EEx de [ia/ib] T3 -T6 Ex-approval	B	
Class 600 (DI 6, DI 15, DI 25 and DI 40)	S		MASS 6000, IP67, Polyamide enclosure, cable glands M20, 1 current, 1 freq./pulse and 1 relay output, 24 V AC/DC	C	
Process connection/flange			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	
Pipe thread			MASS 6000, IP67, Polyamide enclosure, cable glands ½" NPT, 1 current, 1 freq./pulse and 1 relay output, 24 V AC/DC	E	
G ¼"	10		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	
¼" NPT	11		Cable		
G ½"	12		No cable	A	
½" NPT	13		5 m (16.4 ft) cable	B	
G 1	14		10 m (32.8 ft) cable	C	
1" NPT	15		25 m (82 ft) cable	D	
G 2"	16		50 m (164 ft) cable	E	
2" NPT	17		75 m (246 ft) cable	F	
Flange EN1092-1 Form B			150 m (492 ft) cable	G	
DN 10 (PN 40/PN 100)	20		Calibration/verification		
DN 15 (PN 40/PN 100)	21		Standard calibration 3 flow x 2 points	1	
DN 25 (PN 40/PN 100)	22		Stand. calibration matched pair 3 flow x 2 points	2	
DN 40 (PN 40/PN 100)	23		Accredited calibration matched pair 5 flow x 2 points (DANAK)	3	
DN 50 (PN 40/PN 100)	24		Extended calibration customer-specified select Y60, Y61, Y62 or Y63 (see additional information)	8	
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				



Dairy MLFB example

MASS 2100

Sensor size DI 15,
mat. no. 1.4435/316L

PN 40

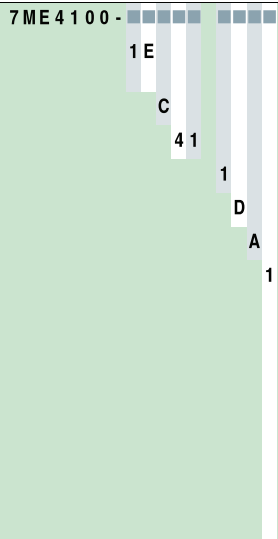
DN 15 connector

Standard configuration/calibration

MASS 6000 IP67 compact mounted

No cable

Standard calibration, 3 flow x 2 points



Selection and Ordering data

Accessories

Description	Dimension	Order No.
Mating parts for hygienic fittings DIN 11851	DN 10	FDK-085U1016
	DN 15	FDK-085U1017
Includes:	DN 25	FDK-085U1019
• 2 unions	DN 32	FDK-085U1020
• 2 mating parts (for welding in)	DN 40	FDK-085U1021
• 2 EPDM gaskets	DN 50	FDK-085U1022
	DN 65	FDK-085U1023
Mating parts for hygienic clamp ISO 2852	25 mm	FDK-085U1029
	40 mm	FDK-085U1031
Includes:	50 mm	FDK-085U1032
• 2 clamps		
• 2 mating parts		
• 2 EPDM gaskets		

Gaskets for MASS 2100

Description	Dimension	Order No.
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

Spare parts

Description	Length	Order No.
Cable with multiple plug	5 m (16.4 ft)	FDK-083H3015
Standard blue cable between MASS 6000 and MASS 2100.	10 m (32.8 ft)	FDK-083H3016
5 x 2 x 0.34 mm ² twisted and scree- ned in pairs.	25 m (82 ft)	FDK-083H3017
Temperature range -20 °C ... +110 °C (-4 °F ... +230 °F)	50 m (164 ft)	FDK-083H3018
	75 m (246 ft)	FDK-083H3054
	150 m (492 ft)	FDK-083H3055
Adapter for MASS 2100		FDK-083L8889
Multiple plug for cable mounting		FDK-083H5056
2 kB SENSORPROM unit (Sensor Serial No. and Order No. must be specified by ordering)		FDK-083H4410

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 DI 3 sensor only: 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 3 to DI 40

Description	Order No.
Operating instructions for SITRANS F C MASS 2100 DI 3 to DI 40	
• English	A5E02896535
• German	A5E03073519
• Spanish	A5E03073549
• French	A5E03073539

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Ludmily Podjavorinskej 535/11
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mob.: +421 908 170 313
tel.: +421 32 776 03 62
fax: +421 32 776 21 56

web: www.marweb.sk
e-mail: slecka@mahrlo.sk
e-shop: www.marweb.sk