

# SITRANS F flowmeters

## SITRANS F C



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### MASSFLO MASS 2100 DI 1.5

#### Overview



MASS 2100 DI 1.5 are suitable for low flow measurement applications for all kind of liquids and gases.

The sensor offers superior performance in terms of flow accuracy, turn-down range 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 flow.

#### Benefits

- High accuracy better than 0.1% of mass flow rate
- Large dynamic turn down range 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<sup>3</sup> with a repeatability better than 0,0002 g/cm<sup>3</sup>
- One tube without internal welds, reductions or flow splitters offers optimal hygiene, safety and CIP cleanability for food & beverage and pharmaceutical applications
- Markets biggest wall thickness, ensuring optimal lifetime 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 & SENSORPROM enables true plug & play. Installation and commissioning in less than 10 min.
- Intrinsically safe Ex-design ia IIC as standard
- Sensor pipe available in high quality AISI 316L stainless steel 1.4435 or Hastelloy C 22 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 & beverage or pharmaceutical industry, accurate recipe control means everything. The MASS 2100 DI 1.5 has demonstrated superior 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:**

<b>Chemical industry</b>	Liquid and gas measurement within Miniplant and R&D, dosing of additives and catalysts
<b>Cosmetic industry</b>	Dosing of essence & fragrances
<b>Pharmaceutical industry</b>	High speed dosing and coating of pills, filling of ampuls/injectors
<b>Food&amp;beverage</b>	Dosing of flavourings, colours and additives, density measurement, in-line Measurement of liquid or gaseous CO <sub>2</sub>
<b>Automotive</b>	Fuel injection nozzle & pump testing, filling of AC.units, engine consumption, paint robots, ABS test-beds

#### Design

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

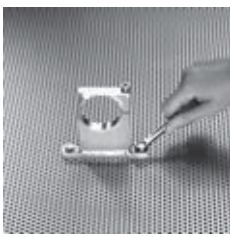
The sensor is available in 2 materials configurations, AISI 316L or Hastelloy C22 with 1/4" NPT or 1/4" ISO process connections.

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

The sensor can be delivered in 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.





Mount the clamp



Fit the meter in the clamp and tighten

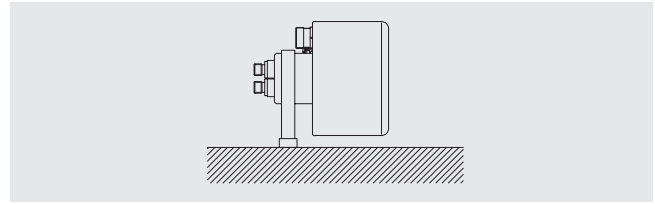


Connect the pre-wired multi-plug connector



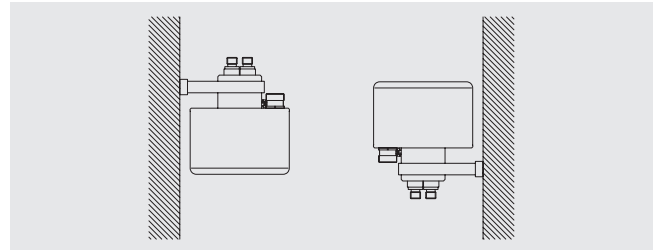
Fit backplate to converter and measurement can commence

#### Horizontal



Liquid and gas application

#### Vertical



Liquid application (left), gas application (right)

#### Technical specifications

<b>Versions</b>	DI 1.5 (1/16")
<b>Inside pipe diameter</b> (sensor consists of one continuous pipe)	1.5 mm (0.06")
<b>Pipe wall thickness</b>	0.25 mm (0.010")
<b>Mass flow measuring range</b>	0 ... 65 kg/h (0 ... 17.2 USgpm)
<b>Density</b>	0 ... 2.9 g/cm <sup>3</sup> (0 ... 0.10 lb/inch <sup>3</sup> )
<b>Fraction e.g.</b>	0 ... 100 °Brix
<b>Temperature</b>	
Standard	-50 ... +125 °C (-58 ... +257 °F)
High temperature version	-50 ... +180 °C (-58 ... +356 °F)
<b>Liquid pressure measuring pipe <sup>1)</sup></b>	
Stainless steel	<ul style="list-style-type: none"> <li>• 20 °C (68 °F): 230 bar (3336 psi)</li> <li>• 180 °C (356 °F): 200 bar (2900 psi)</li> <li>• 350 °C (662 °F): 350 bar (5076 psi)</li> </ul>
Hastelloy C-22	<ul style="list-style-type: none"> <li>• 20 °C (68 °F): 365 bar (5294 psi)</li> <li>• 180 °C (356 °F): 330 bar (4786 psi)</li> <li>• 350 °C (662 °F): 550 bar (7977 psi)</li> </ul>
<b>Materials</b>	
Measuring pipe	1.4435 (AISI 316 L) (stainless steel)
Thread connection	2.4602 (Hastelloy C-22)
<b>Enclosure and enclosure material</b>	IP66/NEMA 4 and 1.4404 (AISI 316 L) (stainless steel)
<b>Enclosure, burst pressure</b>	70 bar (1015 psi)
<b>Thread</b>	
• ISO 228/1, PN 100	G1/4"
• ANSI/ASME B1.20.1, PN 100	1/4" NPT
<b>Cable connection</b>	
	Multiple plug connection to sensor 2 x 0.35 mm <sup>2</sup> twisted and screened in pairs, ext. Ø 12 mm
<b>Ex-version</b>	
	EEx [ia] IIC T3-T6, DEMKO 03 ATEX 135252X
<b>Weight approx.</b>	2.6 kg (5.73 lb)

1) According to DIN 2413, DIN 17457

For accuracy specifications see "System information MASSFLO".

#### Function

The measuring principle is based on coriolis force of movement, see "System information MASSFLO coriolis mass flow meters".

#### Integration

The sensor can be connected to all MASS 6000 transmitters for remote installation only.

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

#### Installation guidelines MASS 2100 DI 1.5

##### Installation of MASS 2100 sensor

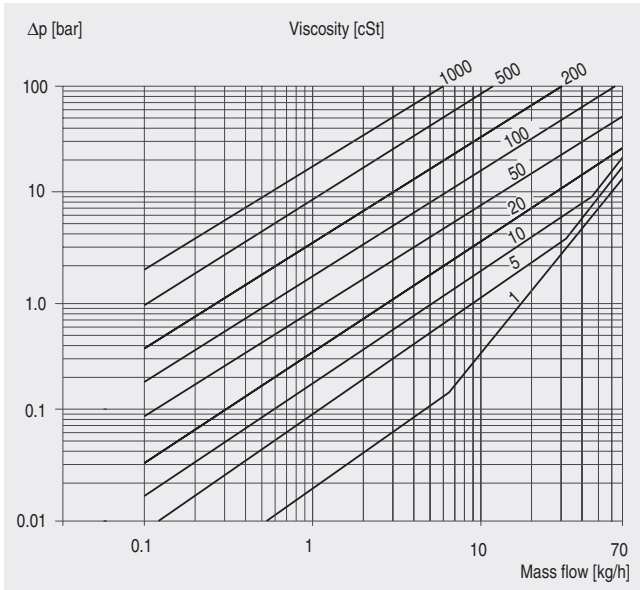
- The optimal installation is horizontal. If vertical mounting is necessary, upward flow is recommended to facilitate the removal of air bubbles. To remove the air out of the sensor the flow speed in the sensor must be at least 1 m/s. If there are solid particles in the liquid, and especially in connection 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 counterpressure on the unit min. 0.1 ... 0.2 bar.
- Mount the sensor on a vibration-free wall or steel frame.
- Locate the sensor low in the system in order to avoid an 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.

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### MASSFLO MASS 2100 DI 1.5

#### Pressure drop

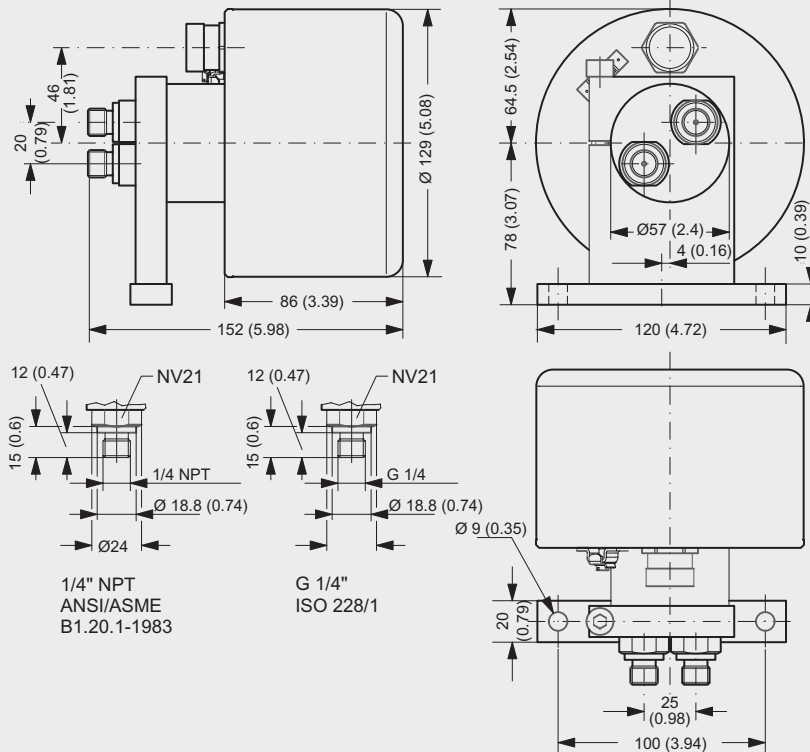


MASSFLO MASS 2100 DI 1.5 (1/16"), pressure drop for viscosity 1cST

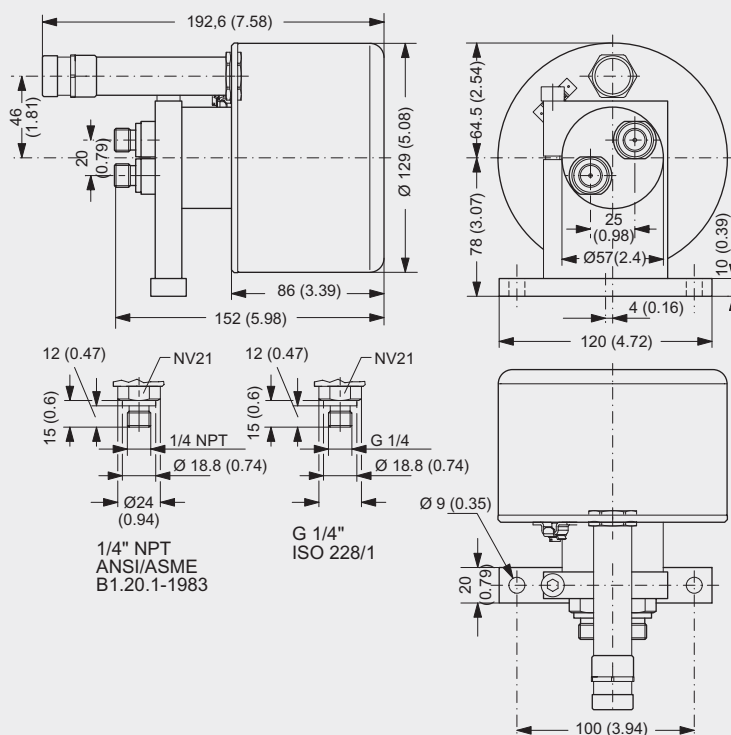
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#### Dimensional drawings

#### MASS 2100 DI 1.5



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



# SITRANS F flowmeters

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### MASSFLO MASS 2100 DI 1.5

#### Selection and Ordering data

Selection and Ordering data	Order-No.	Order code
<b>SITRANS F C Flowsensors</b>		
<b>MASSFLO 2100 DI 1.5 sensor</b>	7 ME 4 1 0 0 -	
<b>Diameter</b>		
Stainless steel 1.4435/316L		
DI 1,5, max. 125 °C (257 °F)	1 A	
DI 1,5, max. 180 °C (356 °F)	1 B	
2.4602/Hastelloy C22		
DI 1,5, max. 125 °C (257 °F)	2 A	
DI 1,5, max. 180 °C (356 °F)	2 B	
<b>Pressure</b>		
PN 100	D	
PN 230 (316L)	L	
PN 365 (C-22)	P	
<b>Process connection/flange</b>		
<b>Pipe thread</b>		
G 1/4"	1 0	
1/4" NPT	1 1	
<b>Configuration</b>		
Standard		1
Density		2
Brix/Plato		3
Fraction (specification required)		9
<b>Cable</b>		
No cable		A
5 m cable		B
10 m cable		C
25 m cable		D
50 m cable		E
75 m cable		F
150 m cable		G
<b>Calibration</b>		
Standard Calibration		1
Standard Calibration matched pair		2
Accredited Calibration (DANAK)		3

#### Additional information

Additional information	Order code
Please add "-Z" to Order No. and specify Order code(s) and plain text.	
Pressure testing certificate	C11
Material certificate	C12
Welding certificate	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 (5x2)	Y60
Customer specified calibration, no matched pair (5x2)	Y61
Customer specified, matched pair (10x1)	Y62
Customer specified calibration, no matched pair (10x1)	Y63
Special version	Y99

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