

FM130

Sensor

Data Sheet



Benefits

- Compact and lightweight
- Easy installation and maintenance
- Cost-effective
- Low pressure drop

Typical Applications

- Water / Waste water
- Chemical
- Mining
- Agriculture

Measuring Range: DN25 – DN400 16 bar (232psi), 40 bar (580psi)

Temperature Range: -20°C – 110°C (-4°F – 230°F)

Accuracy: Up to 0.4%

CE

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Technical Data

Overall Features	
Nominal diameter	DN25 (1") ÷ DN400 (16")
Minimum conductivity	5µS/cm
Humidity Range	0÷100% (IP 67)
Accuracy	See relevant converter data sheet
CE Certification	Yes

Standard Features	
Body Material	Carbon steel painted
Nominal Pressure	<ul style="list-style-type: none"> 16 bar (232 psi) : all with PP and Ebonite lining 40 bar (580 psi) : PTFE lining up to DN150 (6")
Process Connection	Wafer Type
Version - Protection Rating	Compact IP67
Body Material	Carbon Steel
Lining Material	<ul style="list-style-type: none"> Polypropylene (max PN 16 or 232 psi) Ebonite - DN 200 (8") – DN 400 (16") PTFE - DN 25 (1") – DN 150 (6")
Gasket Material (ONLY for lining in polypropylene)	FPM
Liquid Temperature	0°C – 60°C (32°F – 140°F) with PP lining -5°C – 80°C (23°F – 176°F) with Ebonite lining -20°C – 100°C (-4°F – 212°F) with PTFE lining in compact version
Vacuum Resistance	0.2 bar abs (2.9 psi abs) at 100°C (212°F), PP 60°C (140°F), Ebonite 80°C (176°F)
Electrodes Material	<ul style="list-style-type: none"> AISI 316 (1.4404) Hastelloy C Platinum-rhodium Titanium Tantalum

Optional Features (For more details, see 'How to Order' on last page)	
Body Material	Stainless steel AISI 304 or 316
Gasket Material (ONLY for lining in polypropylene)	EPDM
Liquid Temperature	-20°C – 110°C (-4°F – 230°F) with PTFE lining in separate version
Lining Material	On request
Electrodes Material	On request
Version - Protection Rating	<ul style="list-style-type: none"> Separate version (max 20m) – IP 68 Separate version (max 500 m), with preamplifier – IP 67 Separate version (max 500 m), with preamplifier – IP 68

Notes for PED Directive for Sensor

Here below the tables of products subject to Directive Pressure Equipment Device 2014/68/UE (PED)

The tables show which category of PED is applicable according to the water operating temperature (TAB A T <110 ° C
TAB B T > 110 ° C), sensor's DN and its nominal pressure.

TABELLA CORRELAZIONE DN/PN E APPLICABILITA' DIRETTIVA PED

SOLO PER MS2500-MS1000 AND E PRESSIONE MASSIMA
SOLO PER MISURATORI CON RIVESTIMENTO IN PTFE
SOLO PER MS2500 FLANGE UNI EN1092 MATERIALE P245GH O
ASTM MATERIALE A105

SOLO MISURATORI PER ACQUA CON T. > 110°C

DN	PN - Nominal Pressure			
	B	C	D	E
25	USE PN 40			40
32	USE PN 40			40
40	USE PN 40			40
50	USE PN 16	16	USE PN 40	40
65		16		40
80		16		40
100		16		40
125		16		40
150		16		40
200	10	16	25	40
250	10	16	25	40
300	10	16	25	40
350	10	16	25	40
400	10	16	25	40
450	10	16	25	40
500	10	16	25	40

CONDIZIONI DA SODDISFARE PER T. > 110°C:
TENSIONE DI VAPORE > 1,5 ATA

CAT I
$32 > DN \leq DN100 + PS * DN > 1000 \leq 3500$
CAT II
$100 > DN \leq 250 + PS * DN > 3500 \leq 5000$
CAT III
$DN > 250 + PS * DN > 5000$

LEGENDA:

[Blue]	= OUT OF PED
[Green]	= CAT. I
[Yellow]	= CAT. II
[Red]	= CAT. III
[Light Blue]	= USE DIFF. PN

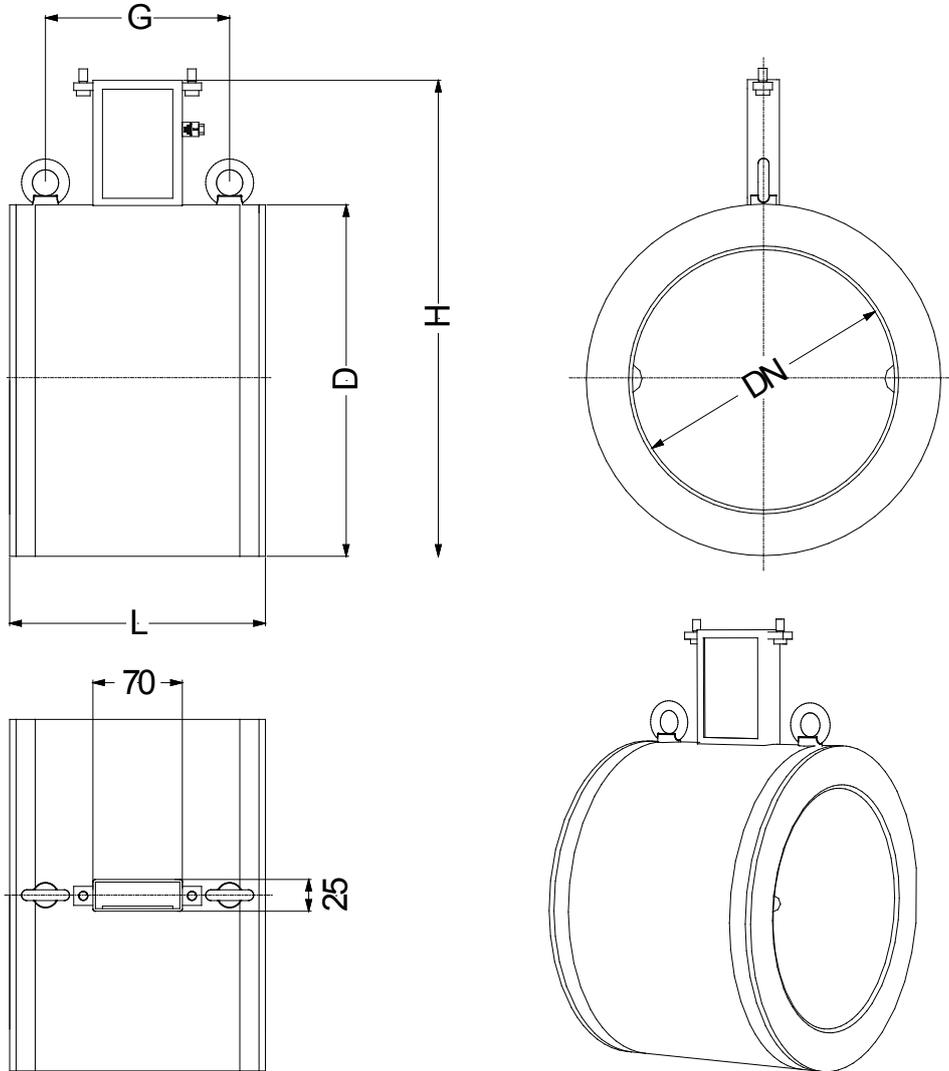
TABELLA CORRELAZIONE DN/PN E APPLICABILITA' DIRETTIVA PED

SOLO MISURATORI PER ACQUA CON T. < 110°C

DN	PN - Nominal Pressure			
	B	C	D	E
25	USE PN 40			40
32	USE PN 40			40
40	USE PN 40			40
50	USE PN 16	USE PN 40	USE PN 40	40
65				40
80				40
100				40
125				40
150				40
200	10	16	25	40
250	10	16	25	40
300	10	16	25	40
350	10	16	25	40
400	10	16	25	40
450	10	16	25	40
500	10	16	25	40
600	10	16	25	40
700	10	16	25	40
800	10	16	25	40
1000	10	16	25	40
1200	10	16	25	40
1300	10	16	25	40
1400	10	16	25	40
1500	10	16	25	40
1600	10	16	25	40
1700	10	16	25	40
1800	10	16	25	40
2000	10	16	25	40
2400	10	16	25	40

For products that falls in category I, is valid the declaration of conformity available on the following page; the products in Category II and III are supplied with a specific declaration of conformity for each instrument

Overall Dimensions



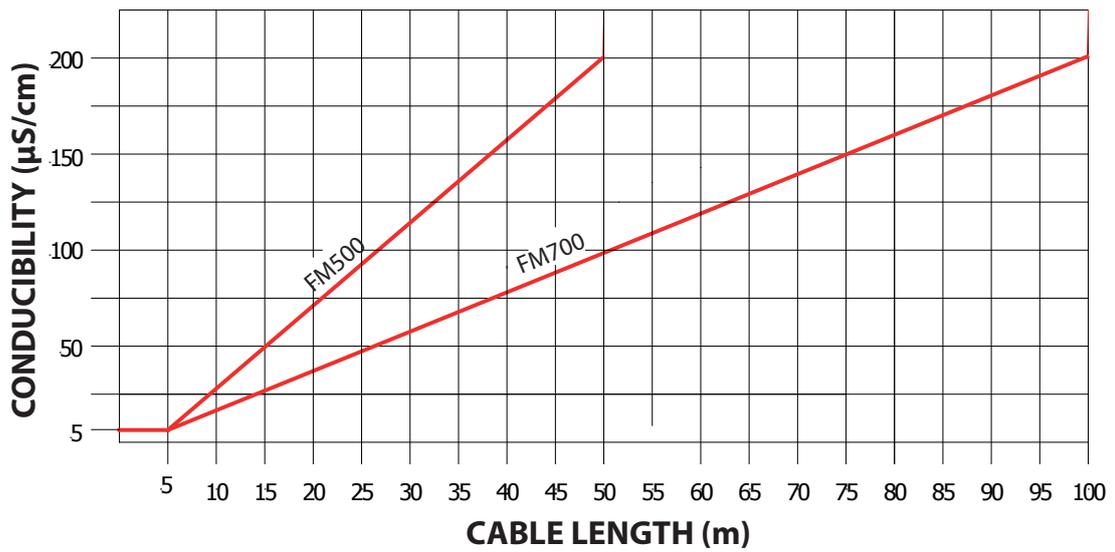
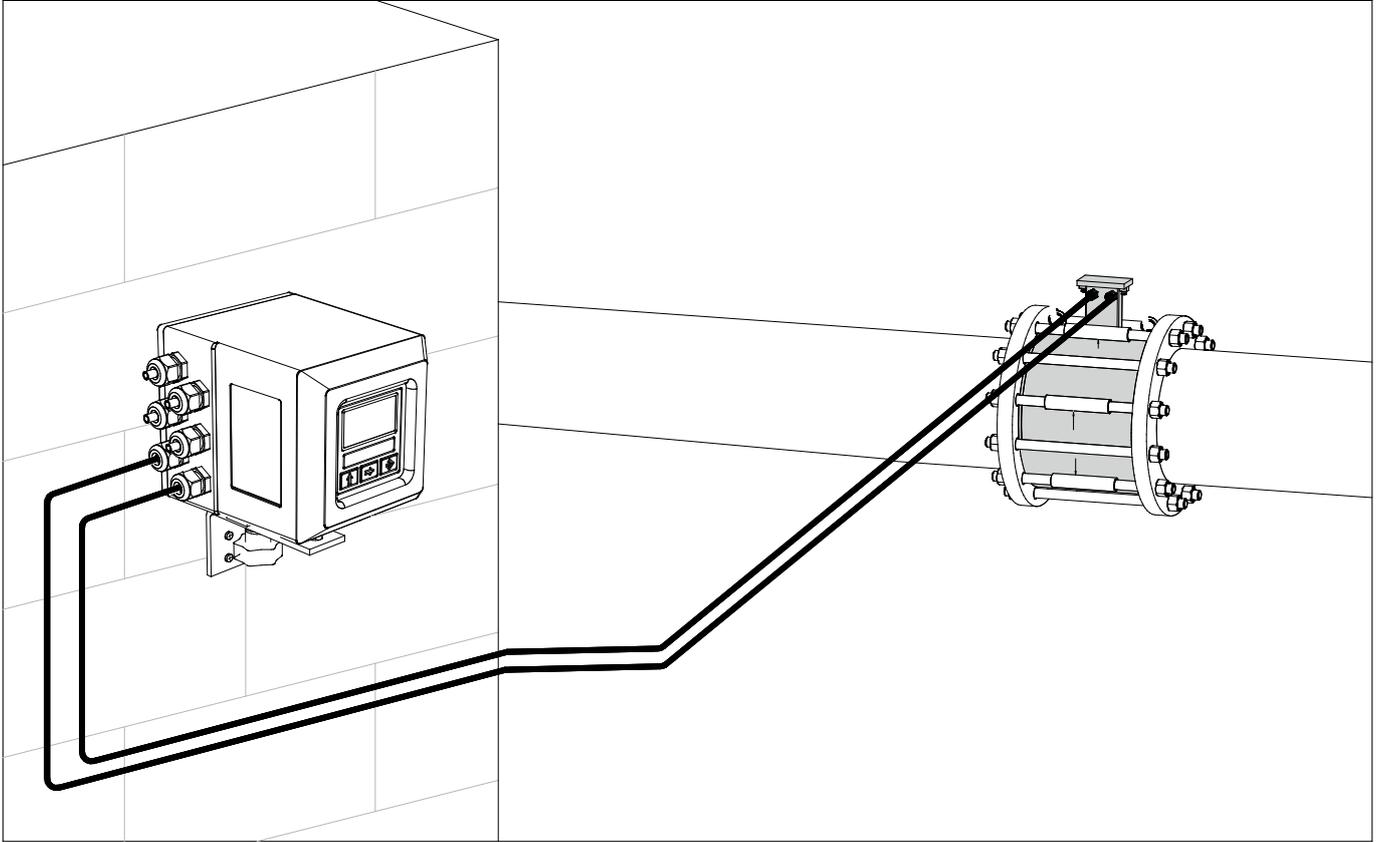
mm (inches)	DN													
	25 (1")	32 (1" 1/4)	40 (1" 1/2)	50 (2")	65 (2" 1/2)	80 (3")	100 (4")	125 (5")	150 (6")	200 (8")	250 (10")	300 (12")	350 (14")	400 (16")
L	+0	+0	+0	+0	+0	+0	+0	+0	+0	+0	+0	+0	+0	+0
	-3 (-0.12)	-3 (-0.12)	-3 (-0.12)	-3 (-0.12)	-3 (-0.12)	-3 (-0.12)	-3 (-0.12)	-3 (-0.12)	-3 (-0.12)	-3 (-0.12)	-5 (-0.20)	-5 (-0.20)	-5 (-0.20)	-5 (-0.20)
H	100 (3.94)	100 (3.94)	100 (3.94)	100 (3.94)	150 (5.90)	150 (5.90)	150 (5.90)	180 (7.09)	180 (7.09)	200 (7.87)	250 (9.84)	300 (11.81)	350 (13.78)	400 (15.75)
	147 (5.79)	153 (6.02)	161 (6.34)	177 (6.97)	199 (7.83)	209 (8.23)	239 (9.40)	263 (10.35)	291 (11.46)	362 (14.25)	417 (16.42)	467 (18.39)	527 (20.75)	579 (22.80)
D	62 (2.20)	67 (2.44)	78 (2.76)	92 (3.39)	108 (4.25)	118 (4.65)	148 (5.83)	172 (6.77)	200 (7.87)	271 (10.67)	326 (12.83)	376 (14.80)	436 (17.17)	488 (19.21)
G	-	-	-	-	-	-	-	-	-	144 (5.67)	194 (7.64)	244 (9.60)	294 (11.57)	344 (13.54)
Weight kg (lbs)	1.2 (2.64)	1.6 (3.52)	1.8 (3.96)	2 (4.4)	3.6 (7.92)	3.8 (8.36)	5 (11)	7.8 (17.16)	8.2 (18)	18.2 (40)	24 (53)	27 (59)	32 (70)	39 (86)
Flanges available	PTFE-EBONITE: PN10, PN16, PN25, PN40, ANSI150, ANSI,300							PP: PN10, PN16, ANSI150			PTFE-EBONITE: PN10, PN16, ANSI150			

Sensor Versions/Junition Box

	1	2	3	4
A PAINTED ALUMINIUM				
B AISI 304				

PRICE LIST OPTIONS	JUNCTION BOX TYPE (surface finish)
A	Without junction box, converter connected on the connections box
B	A-1 A-2 only for ML110
G	A-4
F	A-3
N	A-2 with preamplifer
Q	A-4 with preamplifer
U	B-1 (raw) B-2 only for ML110 (raw)
S	B-4 (raw)
T	B-3 (raw)
P	B-2 with preamplifer (raw)
R	B-4 with preamplifer (raw)
K	B-1 (polished) B-2 only for ML110 (polished)
Y	B-4 (polished)
W	B-3 (polished)
V	B-2 with preamplifer (polished)
J	B-4 with preamplifer (polished)

Seperate Version

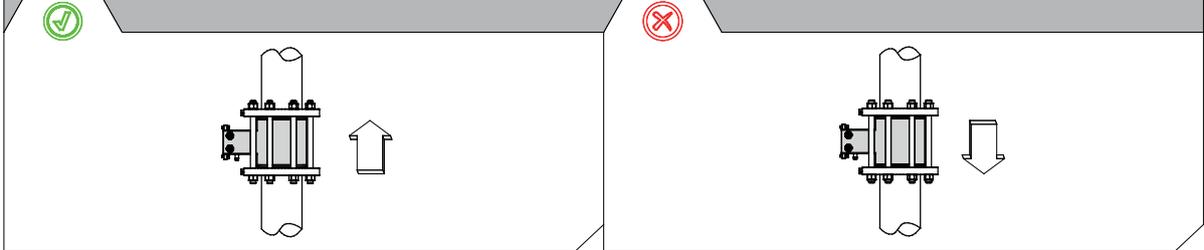


Note:

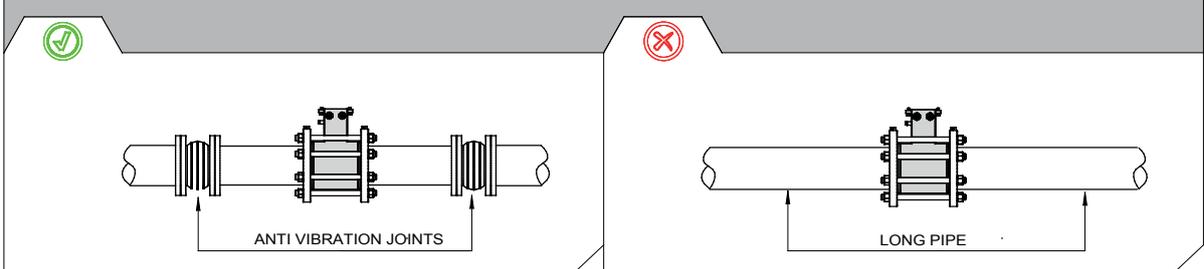
- It is recommended to install the connection cables away from, or protect against sources of electromagnetic noise.
- The minimum conductivity of the liquid medium to ensure correct functionality of the empty pipe detection is 20 µS/cm

Installation Recommendations

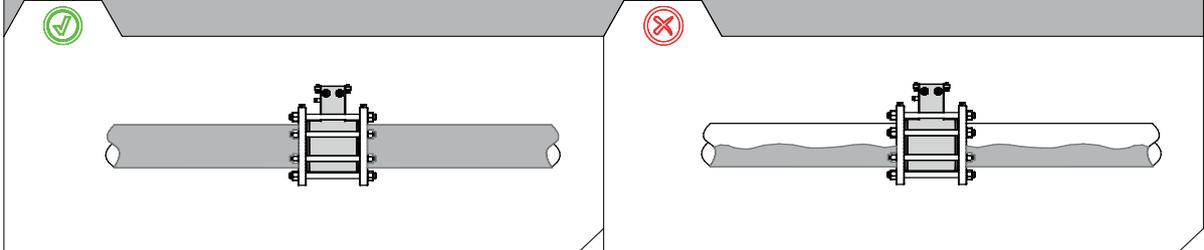
In vertical installations an ascending flow is preferable. For vertical installations with descending flow direction contact the manufacturer



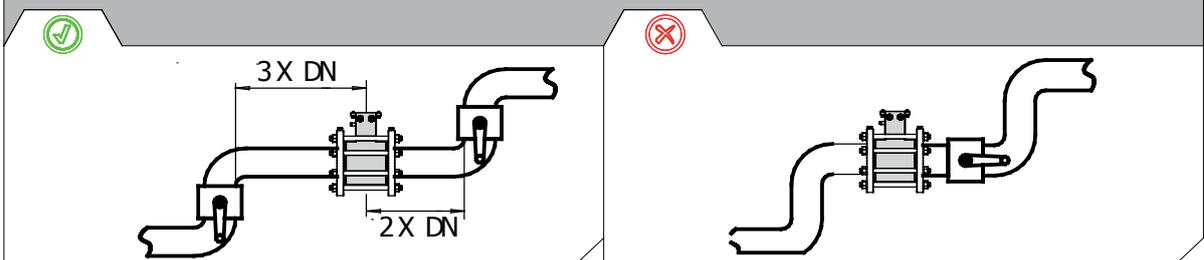
For installations in long pipe lines, please use anti vibration joints



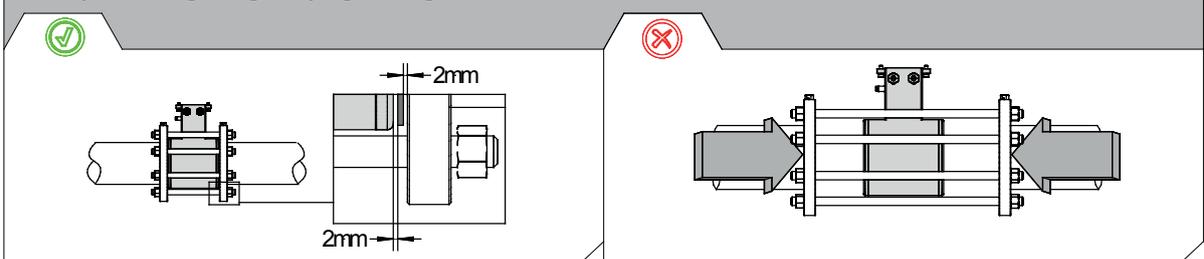
Avoid a partially empty pipe, during operation the pipe must be either completely full of liquid or completely empty



Install the sensor away from bends and hydraulic accessories



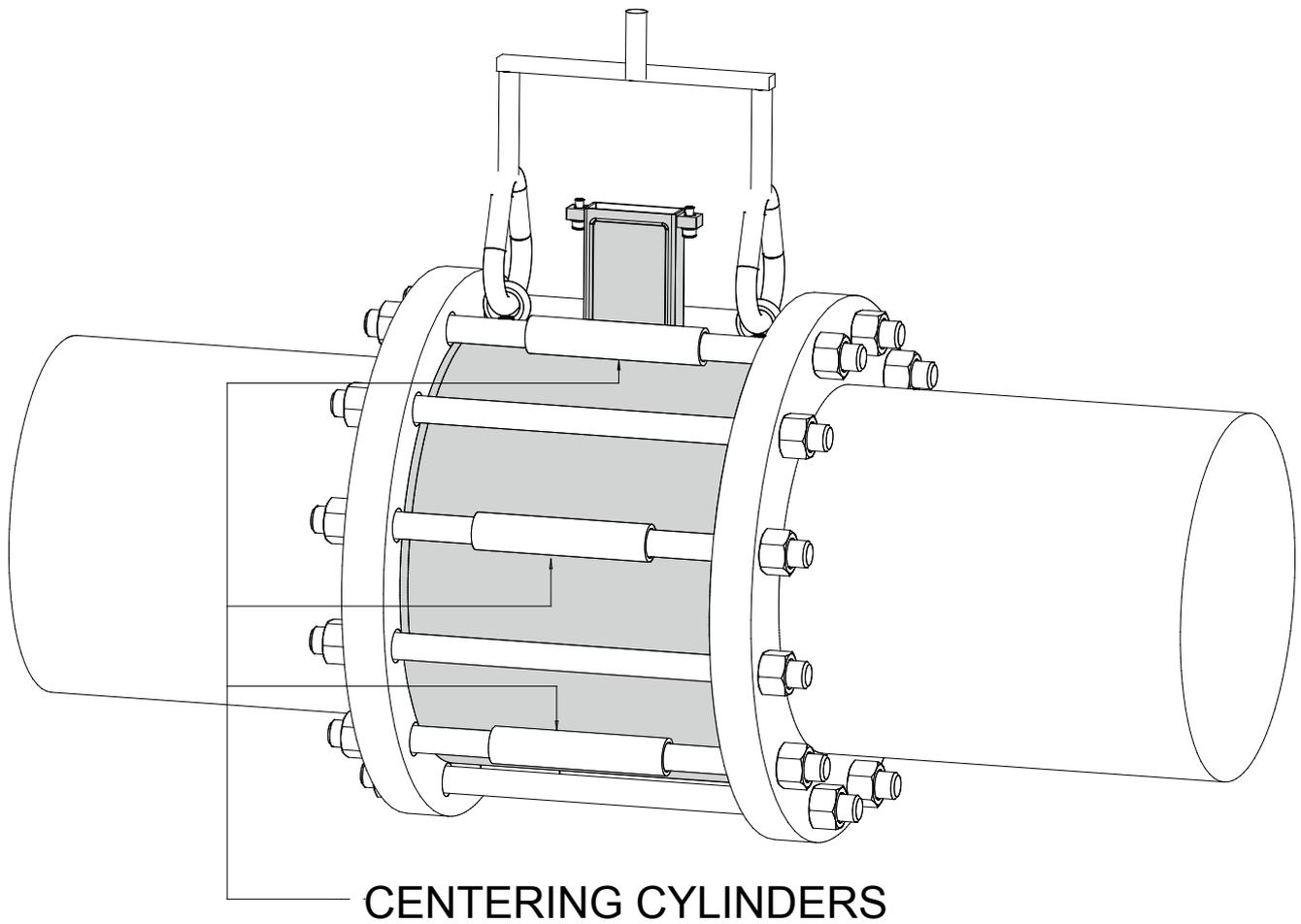
Avoid positioning flanges by tightening the nuts.



Recommended Installation Procedure

Sensors weighing more than 20Kg are equipped of appropriate eyebolts to lift the sensor according to the drawing above.

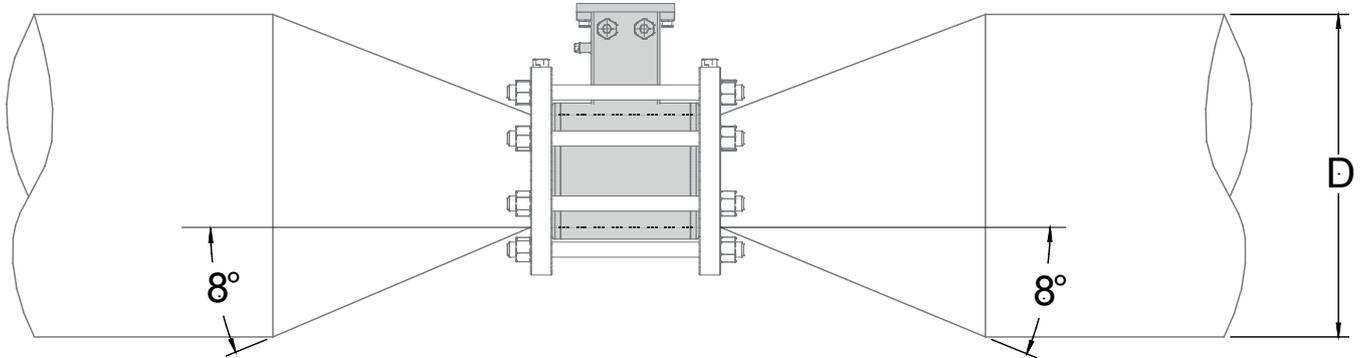
The eyebolts support **ONLY** the weight of the meter.



Sensor Grounding

METALLIC PIPE	
INSULATED PIPE	
	<p>If the sensor has to be installed in a pipe made of an insulating material, the following are necessary:</p> <p>Inserting two metallic rings between the sensor flanges and the pipe line counter flanges or: Using a sensor with the additional grounding electrode</p>
PIPE WITH CATHODIC PROTECTION	
	<p>If the sensor has to be installed in the pipe with cathodic protection, the following are necessary:</p> <p>using insulating bushes to isolate the bolts</p> <p>Metallic grounding rings should be provided to ground the liquid using insulating gasket between the rings</p>

Pressure Loss Calculation (Cones 8° Angles)



$$\Delta p = \left[0.10 + 0.20 \left(\left(\frac{d}{D} \right)^{-2} - 1 \right)^2 \left(\frac{d}{D} \right)^4 \right] \left(\rho \frac{u^2}{2} \right)$$

Were:

- Dp = Pressure loss in [Pa]
- r = Fluid density [kg/m³] typical value r = 1000 [kg/m³]
- d = sensor diameter [m]
- D = pipe diameter (greater than sensor diameter) [m]
- u = Mean flow velocity in sensor diameter [m/s]

Calculation examples Δp [mbar]								
$\frac{d}{D}$ \ u	1 [m/s]	2 [m/s]	3 [m/s]	4 [m/s]	5 [m/s]	6 [m/s]	7 [m/s]	8 [m/s]
0.5	1.1	4.3	9.6	17	26.6	38.3	52.1	68
0.6	0.9	3.6	8.2	14.6	22.7	32.7	44.6	58.2
0.7	0.8	3	6.8	12.2	19	27.4	37.2	48.6
0.8	0.6	2.5	5.7	10.1	15.7	22.7	30.9	40.3
0.9	0.5	2.1	4.8	8.6	13.4	19.3	26.3	34.3

Notes:

- $\rho = 1000$ [kg/m³] as goodness approximation of water density in common use.
- Inner diameter of sensor is used for d, express in meters.
- Indeed pressure loss equation is dimensionally correct in [Pa]. The equation results in table are show in [mbar].

How to Order

CODE EXAMPLE	CODE/DESCRIPTION	
Nominal Diameter / Lining / Liquid temperature / Measuring range		
T100	P25	DN25 / P.P. Lining / Max. Temp.: 0°... +60°C / Measuring range: 0 ... 17,6mc/h
	T25	DN25 / PTFE Lining / Max. Temp.: -20°... +110°C / Measuring range: 0 ... 17,6mc/h
	P32	DN32 / P.P. Lining / Max. Temp.: 0°... +60°C / Measuring range: 0 ... 28,8mc/h
	T32	DN32 / PTFE Lining / Max. Temp.: -20°... +110°C / Measuring range: 0 ... 28,8mc/h
	P40	DN40 / P.P. Lining / Max. Temp.: 0°... +60°C / Measuring range: 0 ... 45,2mc/h
	T40	DN40 / PTFE Lining / Max. Temp.: -20°... +110°C / Measuring range: 0 ... 45,2mc/h
	P50	DN50 / P.P. Lining / Max. Temp.: 0°... +60°C / Measuring range: 0 ... 70,6mc/h
	T50	DN50 / PTFE Lining / Max. Temp.: -20°... +110°C / Measuring range: 0 ... 70,6mc/h
	P65	DN65 / P.P. Lining / Max. Temp.: 0°... +60°C / Measuring range: 0 ... 118mc/h
	T65	DN65 / PTFE Lining / Max. Temp.: -20°... +110°C / Measuring range: 0 ... 118mc/h
	P80	DN80 / P.P. Lining / Max. Temp.: 0°... +60°C / Measuring range: 0 ... 180mc/h
	T80	DN80 / PTFE Lining / Max. Temp.: -20°... +110°C / Measuring range: 0 ... 180mc/h
	P100	DN100 / P.P. Lining / Max. Temp.: 0°... +60°C / Measuring range: 0 ... 282mc/h
	T100	DN100 / PTFE Lining / Max. Temp.: -20°... +110°C / Measuring range: 0 ... 282mc/h
	P125	DN125 / P.P. Lining / Max. Temp.: 0°... +60°C / Measuring range: 0 ... 440mc/h
	T125	DN125 / PTFE Lining / Max. Temp.: -20°... +110°C / Measuring range: 0 ... 440mc/h
	P150	DN150 / P.P. Lining / Max. Temp.: 0°... +60°C / Measuring range: 0 ... 636mc/h
	T150	DN150 / PTFE Lining / Max. Temp.: -20°... +110°C / Measuring range: 0 ... 636mc/h
	E200	DN200 / Ebonite (Hard Rubber) Lining / Max. Temp.: -5°... +80°C / Measuring range: 0 ... 1130mc/h
	E250	DN250 / Ebonite (Hard Rubber) Lining / Max. Temp.: -5°... +80°C / Measuring range: 0 ... 1766mc/h
E300	DN300 / Ebonite (Hard Rubber) Lining / Max. Temp.: -5°... +80°C / Measuring range: 0 ... 2544mc/h	
E350	DN350 / Ebonite (Hard Rubber) Lining / Max. Temp.: -5°... +80°C / Measuring range: 0 ... 3462mc/h	
E400	DN400 / Ebonite (Hard Rubber) Lining / Max. Temp.: -5°... +80°C / Measuring range: 0 ... 4522mc/h	
Gasket material (internal tightness - only PP lining)		
0	0	No O-Ring (ONLY FOR PTFE/EBONITE LINING)
	1	O-Ring : FKM
	2	O-Ring : EPDM
	9	Gasket material: to be specified
Body material		
A	A	Body in Carbon Steel painted
	B	Body in Stainless Steel (AISI304)
	C	Body in Stainless Steel (AISI316)
	Z	Body material: other

How to Order

Number and electrodes material		
2	2	n. 3 (2 measure + 1 for ground) electrodes in AISI316 (1.4404)
	4	n. 3 (2 measure + 1 for ground) electrodes in Hastelloy C
	5	n. 3 (2 measure + 1 for ground) electrodes in Titanium
	6	n. 3 (2 measure + 1 for ground) electrodes in Tantalum; not available with Polypropilene
	7	n. 3 (2 measure + 1 for ground) electrodes in Platinum; not available with Polypropilene
	0	Electrode material: to be specified
Version / Protection rate		
A	A	Compact execution, IP67 protection rate
	B	Separate version - Material JB: Alluminium - IP68 - for Cable C014 + C015/16
	F	Separate version - Material JB: Alluminium - IP68 - n.2 MIL connectors for Cable C015/016-CC/CS + CB
	N	Separate version - Material JB: Alluminium - IP67 - with Preamp for Cable C014 + C015/16
	L	Separate version - Material JB: Alluminium - IP68 - with Preamp - n.2 MIL connectors for Cable C015/016-CC/CS + CB
	U	Separate version - Material JB: 304 RAW - IP68 for Cable C014 + C015/16
	T	Separate version - Material JB: 304 RAW - IP68 - n.2 MIL connectors for Cable C015/016-CC/CS + CB
	P	Separate version - Material JB: 304 RAW - IP67 - with Preamp for Cable C014 + C015/16
	M	Separate version - Material JB: 304 RAW - IP68 - with Preamp - n.2 MIL connectors for Cable C015/016-CC/CS + CB
	K	Separate version - Material JB: 304 Polished - IP68 for Cable C014 + C015/16
	W	Separate version - Material JB: 304 Polished - IP68 - n.2 MIL connectors for Cable C015/016-CC/CS + CB
	V	Separate version - Material JB: 304 Polished - IP67 - with Preamp for Cable C014 + C015/16
J	Separate version - Material JB: 304 Polished - IP68 - with Preamp - n.2 MIL connectors for Cable C015/016-CC/CS + CB	

Example of
complete to order



FM130-T100-0A2A