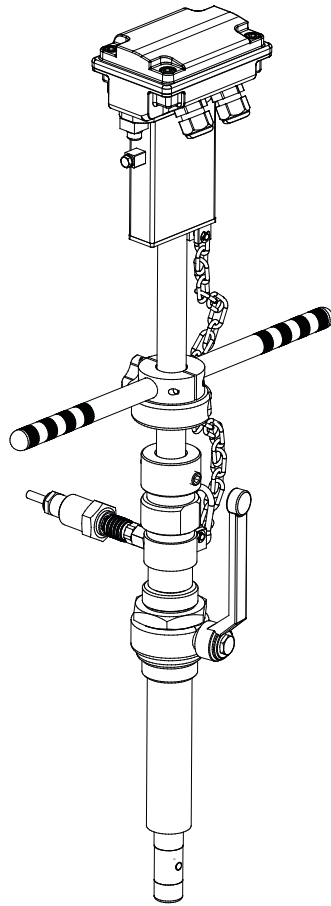


**ISOMAG**   
*The friendly magmeter*

## **DATA SHEET**



**MS 3810**

**CE**

**ISOIL**   
INDUSTRIA



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## TECHNICAL DATA

### OVERALL FEATURES

<b>Size for pipe line Ø</b>	<input type="checkbox"/> Size 0 max insertion depth 150 mm <input type="checkbox"/> Size 1 max insertion depth 300 mm <input type="checkbox"/> Size 2 max insertion depth 500 mm <input type="checkbox"/> Size 3 max insertion depth 700 mm <input type="checkbox"/> Size 4 max insertion depth 1000 mm <input type="checkbox"/> Size 5 max insertion depth 2000 mm <input type="checkbox"/> Size 9 max insertion depth 80 mm
<b>Minimum conductivity</b>	<input type="checkbox"/> 5 µS/cm (20 µS/cm for ML145/ML255)
<b>Minimum pipe diameter</b>	<input type="checkbox"/> 80 mm
<b>Humidity Range</b>	<input type="checkbox"/> 0÷100% (IP 67)
<b>Accuracy</b>	<input type="checkbox"/> See table at page 10
<b>CE Certification</b>	<input type="checkbox"/> Yes

### STANDARD FEATURES

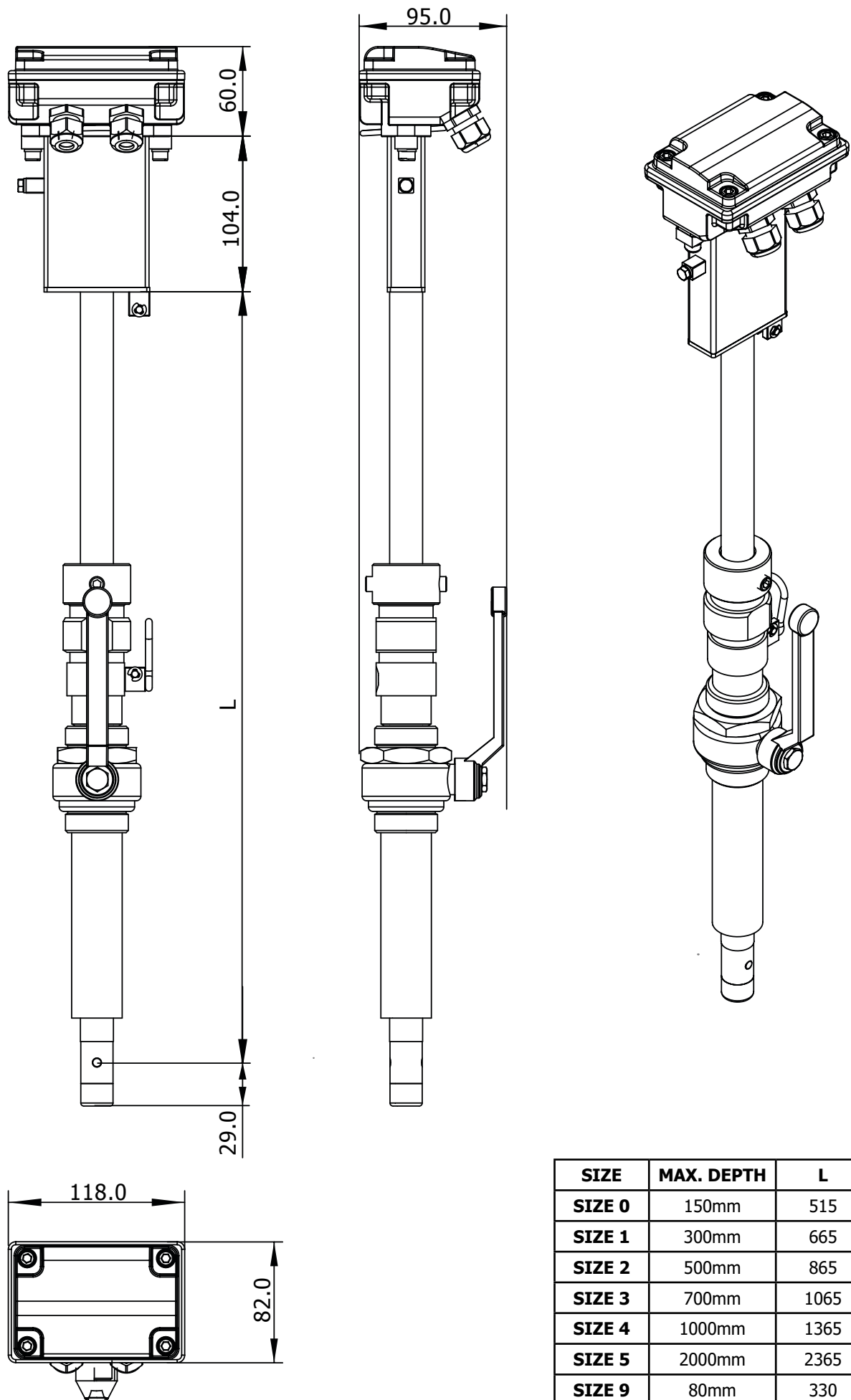
<b>Body material</b>	<input type="checkbox"/> Stainless steel AISI 316
<b>Nominal pressure</b>	<input type="checkbox"/> 2500 kPa
<b>Process connection</b>	<input type="checkbox"/> 1" Threaded
<b>Version – protection rating</b>	<input type="checkbox"/> Compact IP67
<b>Connection material</b>	<input type="checkbox"/> Stainless steel AISI 304
<b>Head material</b>	<input type="checkbox"/> PEEK
<b>Gasket material</b>	<input type="checkbox"/> FPM (O-ring)
<b>Liquid temperature</b>	<input type="checkbox"/> 0 °C to 100 °C
<b>Electrodes material</b>	<input type="checkbox"/> Hastelloy C76

### OPTIONAL FEATURES

**(CHECK FOR MORE DETAILS 'HOW TO ORDER' ON LAST PAGE)**

<b>Size for pipe line Ø</b>	<input type="checkbox"/> Other on request
<b>Body material</b>	<input type="checkbox"/> Others on request
<b>Process connection</b>	<input type="checkbox"/> Others on request
<b>Electrodes material</b>	<input type="checkbox"/> Others on request
<b>Version – protection rating</b>	<input type="checkbox"/> Separate version (max 20m) – IP 68 <input type="checkbox"/> Separate version (max 500 m), with preamplifier – IP 67 (OPT. IP 68)
<b>Accessories</b>	<input type="checkbox"/> Pressure sensor

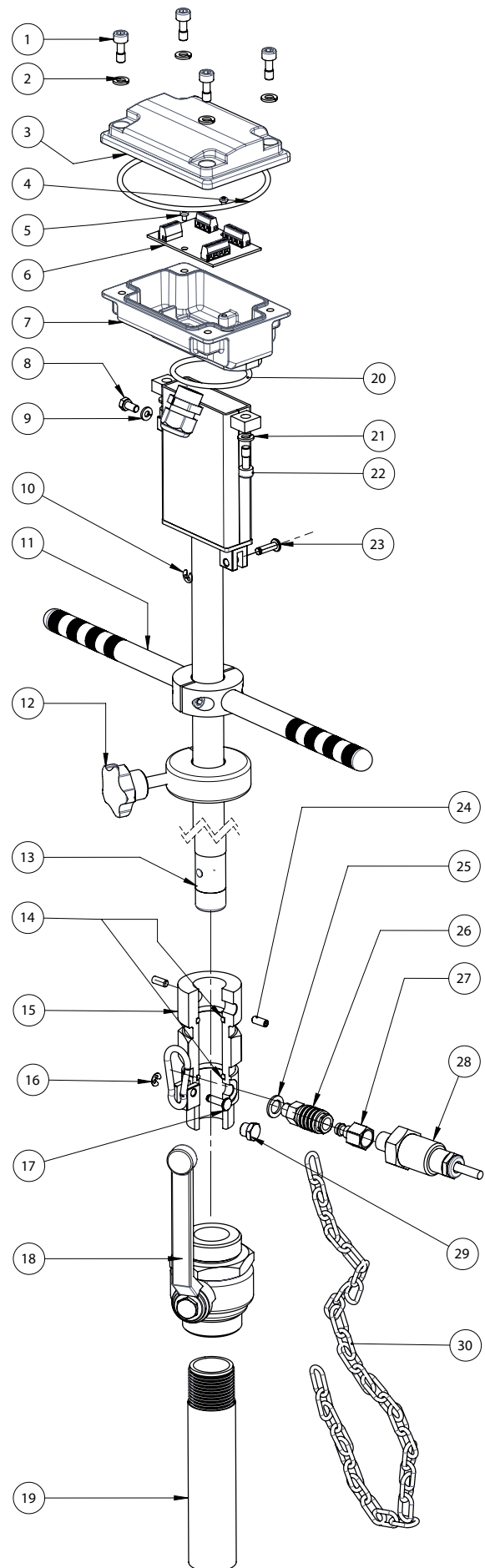
OVERALL DIMENSIONS



SIZE	MAX. DEPTH	L
SIZE 0	150mm	515
SIZE 1	300mm	665
SIZE 2	500mm	865
SIZE 3	700mm	1065
SIZE 4	1000mm	1365
SIZE 5	2000mm	2365
SIZE 9	80mm	330

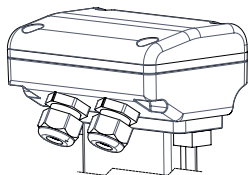
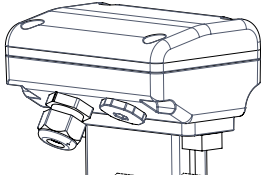
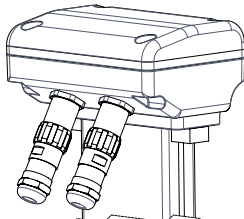
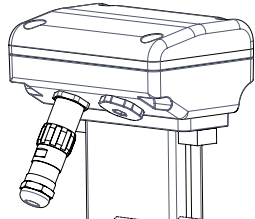
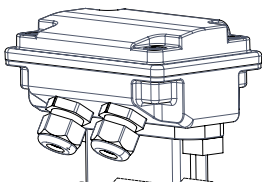
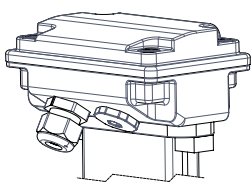
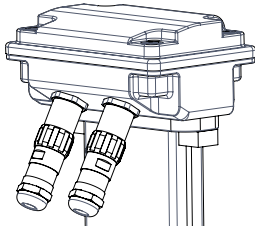
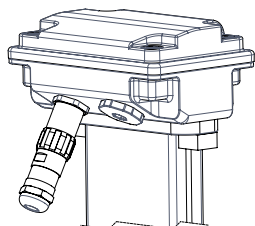
MS3810 LAYOUT

POS.	DESCRIPTION
1	SCREW 6X16
2	GROWER Ø6
3	JUNCTIONS BOX COVER
4	O-RING 4400
5	SCREW M4x6
6	PCB FOR SEPARATE VERSION (NORMAL OR PREAMPLIFIER)
7	JUNCTIONS BOX MAIN HOUSING
8	SCREW M5x10
9	GROWER Ø5
10	SEGGER 4X9 (RING 4 7434-75)
11	HANDLE PUSH
12	FIXING KNOB
13	SENSOR MS3810
14	O-RING 4087
15	CYLINDER LINER
16	SEGGER 4X9 (RING 4 7434-75)
17	PIN FOR INSERT
18	BALL VALVE
19	WELDED PIPE 1"
20	O-RING 155
21	GROWER Ø6
22	SCREW 6X16 WORKED
23	PIN FOR INSERT
24	GRUB SCREW M10X12
25	WASHER
26	QUICK FEMALE
27	QUICK MALE
28	PRESSURE SENSOR
29	CUP PRESSURE HOLE
30	SAFETY CHAIN



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## SENSOR VERSIONS / JUNCTIONS BOX

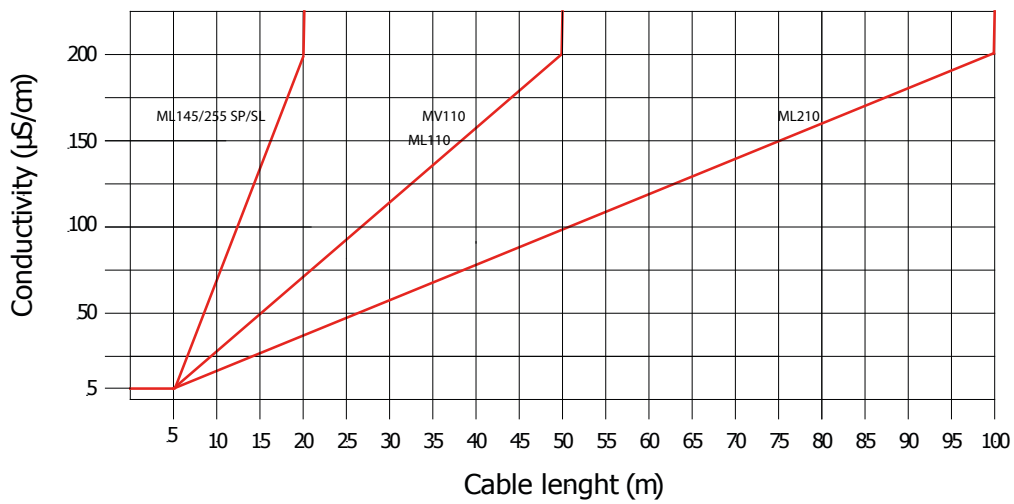
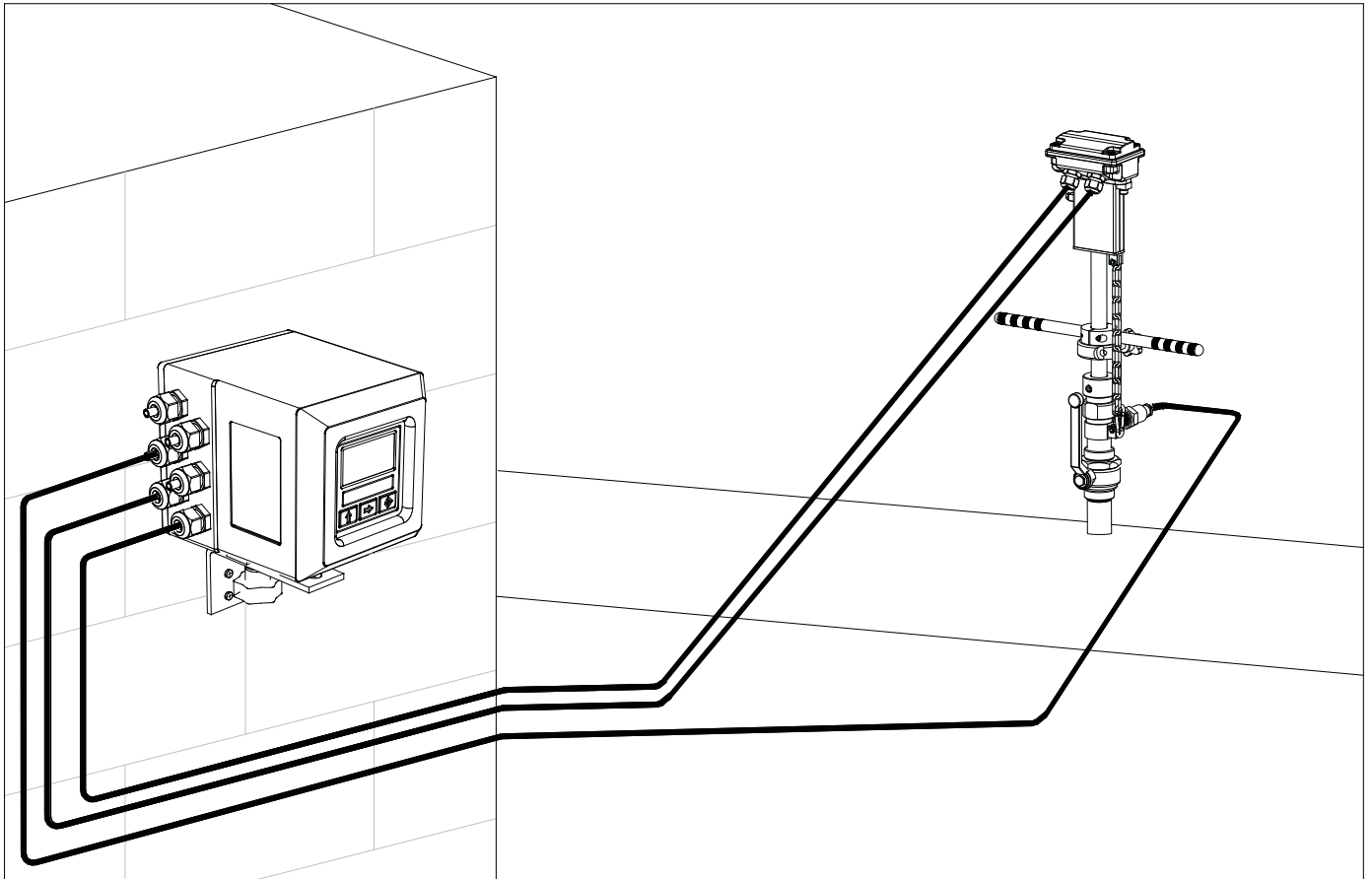
	1	2	3	4
<b>A</b> PAINTED ALUMINIUM				
<b>B</b> AISI 304				

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

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SEPARATE VERSION

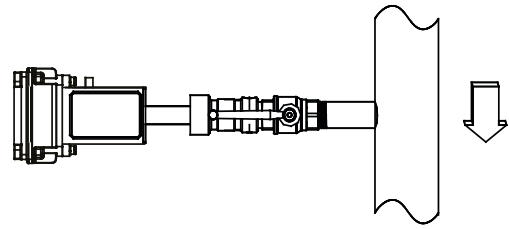
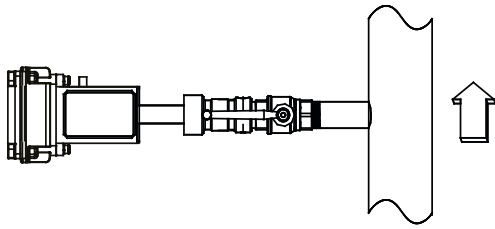


Notes:

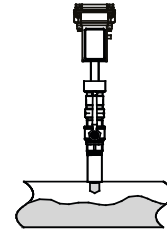
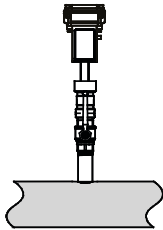
- It is recommended to install the connection cables away from, or protect against sources of electromagnetic noise.
- The minimum conductivity of the liquid medium to ensure correct functionality of the empty pipe detection is 20  $\mu\text{S/cm}$

## INSTALLATION RECOMMENDATIONS

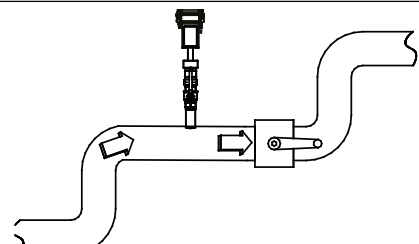
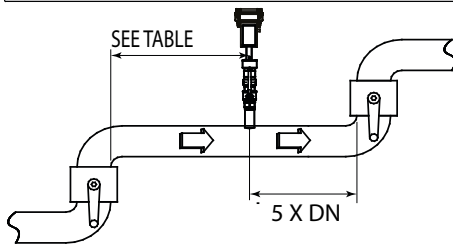
In vertical installations an ascending flow is preferable. For vertical installations with descending flow direction contact the manufacturer



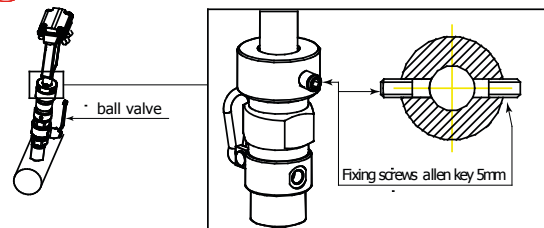
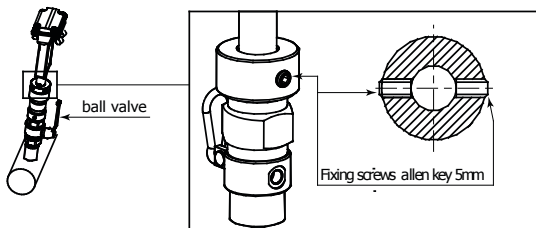
Avoid a partially empty pipe, during operation the pipe must be either completely full of liquid or completely empty



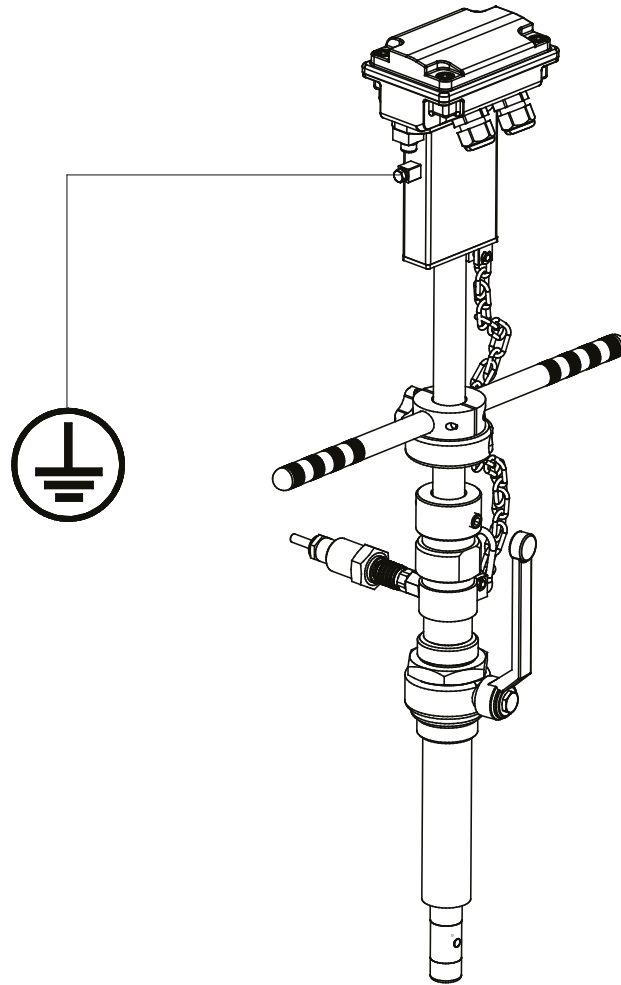
Install the sensor away from bends and hydraulic accessories



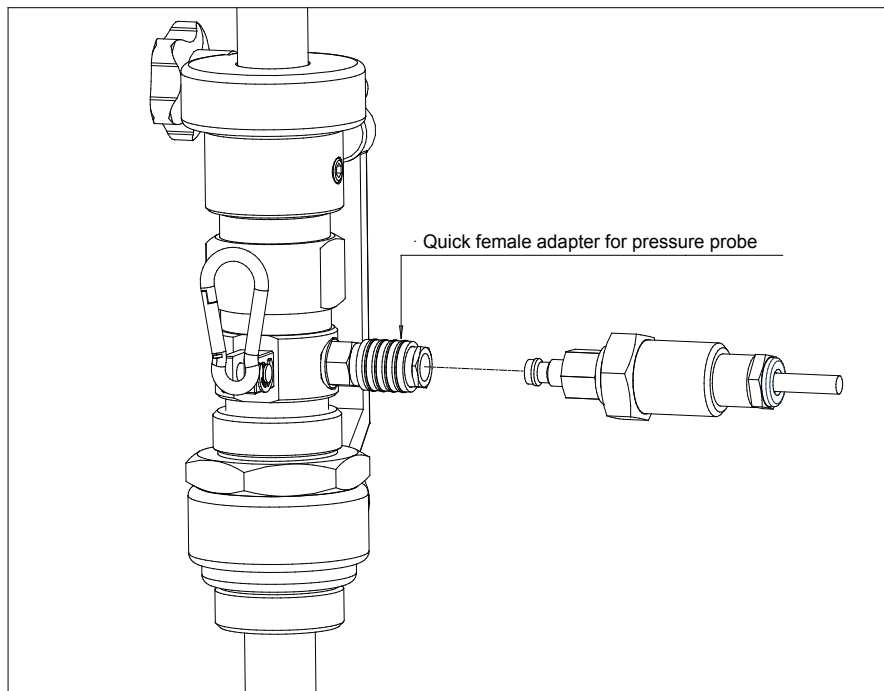
Tighten the two fixing screws before opening the ball valve



**SENSOR GROUNDING**



**MS3810 PRESSURE SENSOR INSTALLATION**



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## MAXIMUM ALLOWED SPEED

**WARNING!** The insertion and extraction operations of the insertion instruments are operations that can be dangerous when working with the pressure tube.

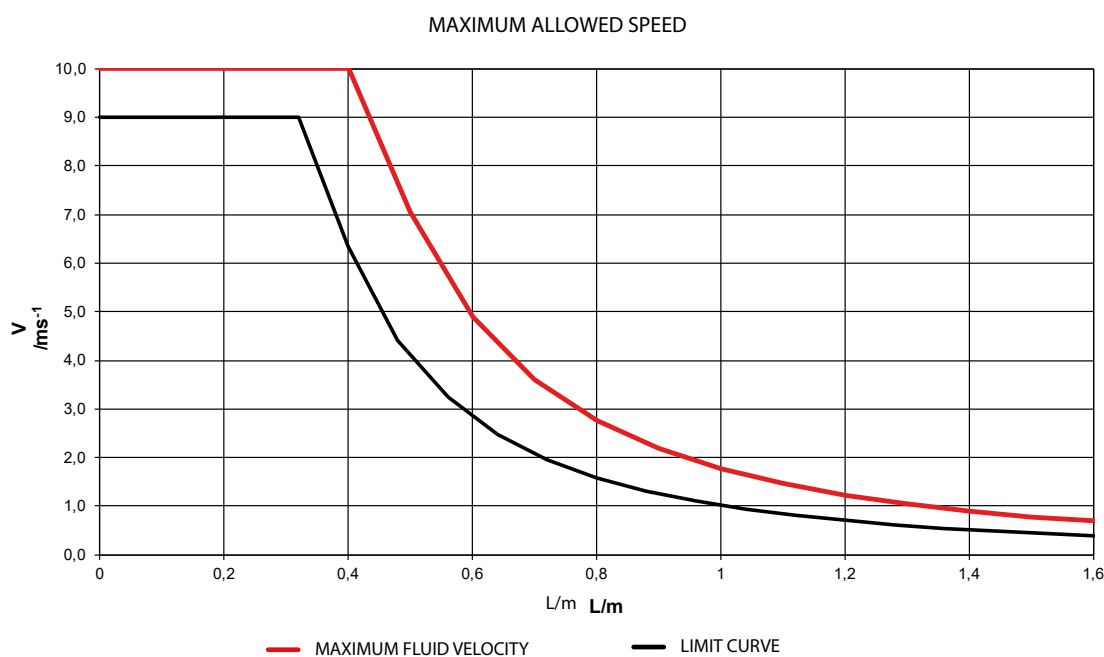
The pressure inside the tube apply a significant force on the probe that can be ejected violently, creating dangerous situations for the operators. However, the protection chain provided by the instrument does not allow it to completely escape from the cylinder linear.

It is recommended to perform the insertion or extraction operations of the insertion instrument in safe conditions, if possible with not in pressure pipe or at least reduced pressure pipe.

The extraction operations can be dangerous as well as for the risk connected to the ejection forces of the probe, also due to the possible leakage of liquid from the piping caused by incorrect operation or defect in the shut-off valve. The following are the indicative values of expulsion force at different pressure values:

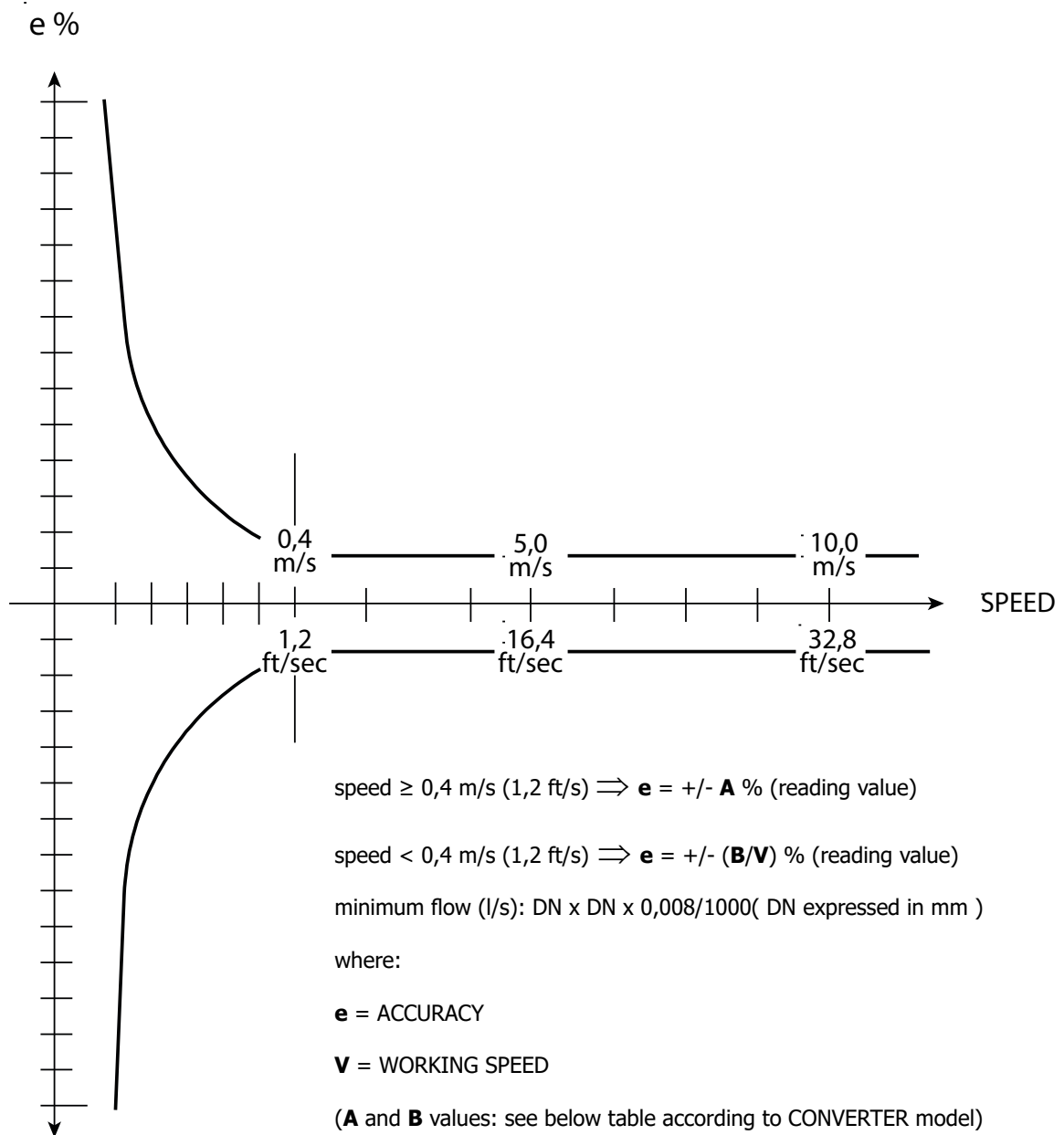
INTERNAL PRESSURE PIPE [bar]	EXPULSION FORCE [kg]
6	30
10	50
16	80
25	125

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INSERTION DEPTH	MAXIMUM FLUID VELOCITY
L	V
m	ms-1
0.10	10.0
0.20	10.0
0.30	10.0
0.40	10.0
0.50	7.06
0.60	4.91
0.70	3.60
0.80	2.76
0.90	2.18
1.00	1.77
1.10	1.46
1.20	1.23
1.30	1.04
1.40	0.90
1.50	0.78
1.60	0.69

**ACCURACY TABLE**



A	B (speed m/s)	B (speed ft/s)
2	0,8	0,24

**Reference conditions:**

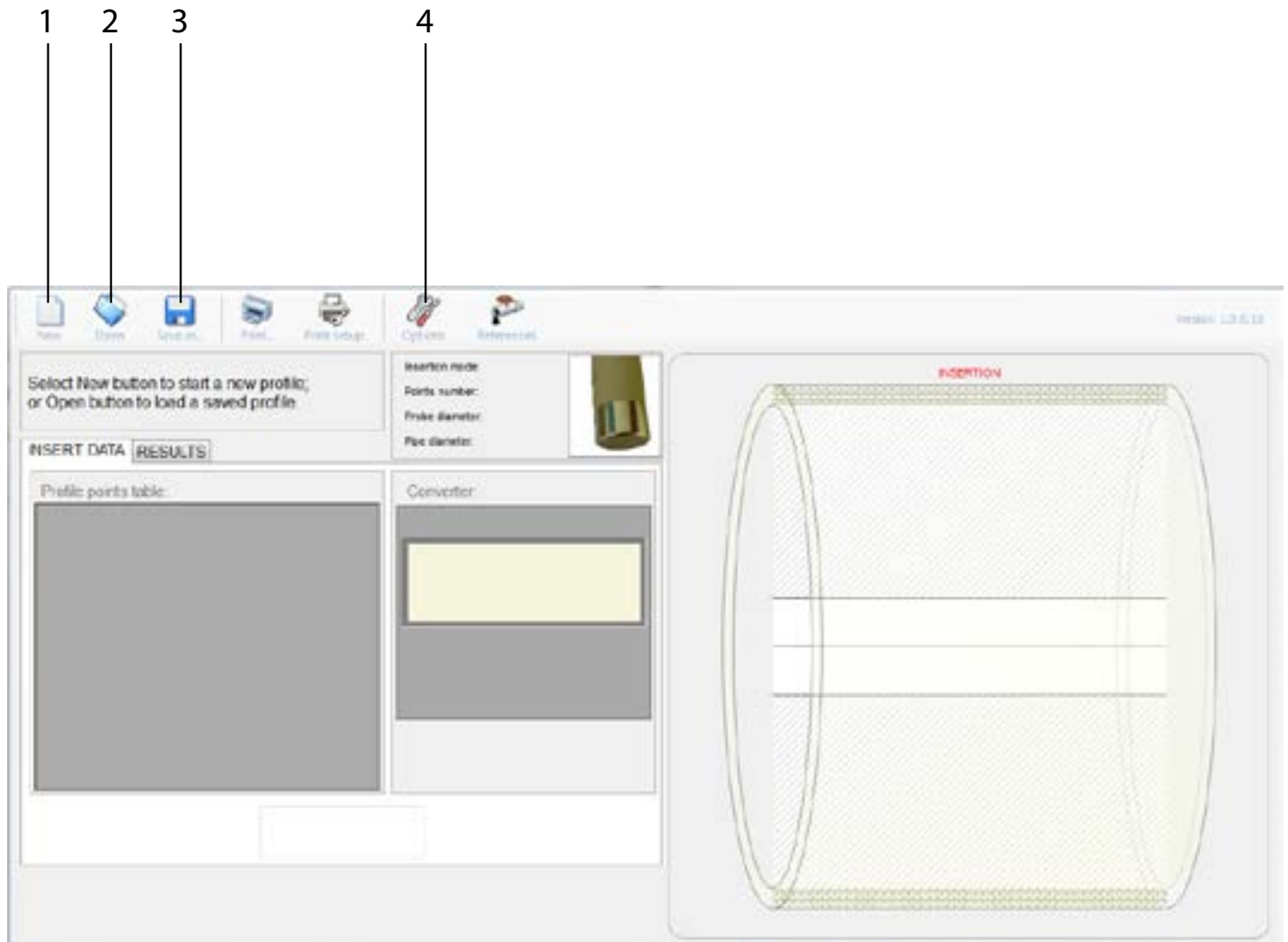
- Constant flow rate during the test
- Pressure: >30 kPa
- Flow condition : fully developed flow profile
- Zero stability +/- 0,005 %
- ID accuracy: mean value better than 1%, IDmin/IDmax>0,98

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## ISOFLOW PROFILER

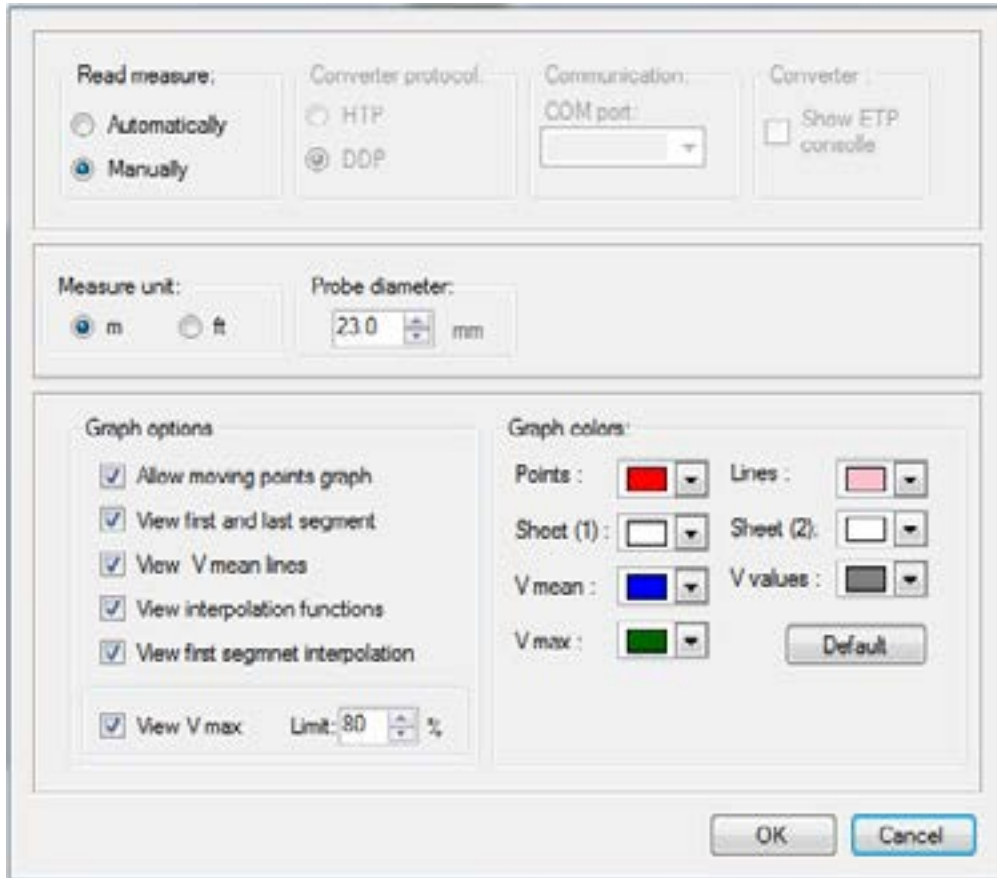
Flow Profiler is an application designated to calculate the value of the correction coefficients  $K_i$  and  $K_p$  when the flow profile is not fully developed. This is achieved by measuring the flow velocity at different insertion depths along pipe diameter.

### Main page



At program start-up appears the above window appears in addition to the normal print functions is possible:

- Load a profile previously saved by Profiler program from a text file (rif. 1)
- Open the form to insert a new profile (rif. 2)



By the button "Options" is possible to insert the basic parameters used in the calculations including:

- Diameter of the pipe in which the sensor probe is inserted
- Diameter of the sensor probe (this is usually 23 mm)
- Number of points in which the flow velocity is measured
- Type of point spacing that is correlated to the probe insertion depth at which measures are taken

Possible choices for the point spacing parameter are:

- Automatic: the point spacing will be automatically calculated by the program
- Manual: the insertion depth of every point will be inserted by the user.

For the program to operate correctly it is necessary to insert at least one point on the pipe axis and to insert the same number of points above and below the center line. The points must be inserted in the insertion depth order.

## HOW TO ORDER

MS 3810		
0	<b>Suitable for piping diameter</b>	
	0	maximum insertion depth 150 mm
	1	maximum insertion depth 300 mm
	2	maximum insertion depth 500 mm
	3	maximum insertion depth 700 mm
	4	maximum insertion depth 1000 mm
	5	maximum insertion depth 2000 mm
	9	maximum insertion depth 80 mm
<b>Sensor and electrodes material / lining</b>		
A	A	Sensor material AISI316, head in PEEK, electrodes in Hastelloy C276, gasket in FPM
	Z	Sensor material: to be specified
<b>Accessory for mounting in pressurised pipe line</b>		
2	1	Mounting in pipe without pressure (by the use of the own handles) ; connection 1" UNI 338 ( GAS)
	2	Accessory kit, suitable for mounting in pressurised line, composed by: 1" hose-coupling (to welding on the pipe) and 1" ball valve (Bronze material) ( SEE THE ACCESSORIES FOR PUSHING ACCOMPLICE ) ; all connections 1" UNI 338 ( GAS)
	3	Mounting in pipe without pressure (by the use of the own handles) ; connection 1" NPT
	4	Accessory kit, suitable for mounting in pressurised line, composed by: 1" hose-coupling (to welding on the pipe) and 1" ball valve (Bronze material) ( SEE THE ACCESSORIES FOR PUSHING ACCOMPLICE ) ; all connections 1" NPT
	6	( ONLY FOR ML 255 ) Accessory kit, suitable for mounting in pressurised line, composed by: 1" hose-coupling (to welding on the pipe ) and 1" ball valve (Bronze material) 1" Uni 338 (GAS)+ QUICK CONNECTIONS 1/8"
	7	( ONLY FOR ML 255 ) Accessory kit, suitable for mounting in pressurised line, composed by: 1" hose-coupling (to welding on the pipe ) and 1" ball valve (Bronze material) 1" NPT+ QUICK CONNECTIONS 1/8"
	8	( ONLY FOR ML 255 ) Accessory kit, suitable for mounting in pressurised line, composed by: 1" Uni 338 (GAS) sleeve connection + QUICK CONNECTIONS 1/8" for pressure sensor
	9	Special connection: to be specified
	<b>Suitable for Pipe Size</b>	
A	A	> 150 mm
	B	< 150 mm
<b>Number and electrodes material</b>		
0	0	Standard ( $V > 0,5 \text{ m/s} = 2\%$ ; $V < 0,5 \text{ m/s} = 1/V_{\text{measured}}$ ) ; V = fluid velocity
	1	Special
<b>Number and electrodes material</b>		
	A	Compact version , IP67 protection rate
	B	Separate version, Painted Aluminum JB, protection rate IP68, standing immersion with 1,5 m of head water - (DEFINE THE CABLE LENGHT - ADD THE COST )
	G	Separate version, Painted Aluminum JB, N° 1 connectors IP 68 suitable for fast cable connections - (DEFINE THE CABLE LENGHT - ADD THE COST)
	F	Separate version, Painted Aluminum JB, N° 2 connectors IP 68 suitable for fast cable connections - (DEFINE THE CABLE LENGHT - ADD THE COST)
	N	Separate version, Painted Aluminum JB , PREAMPLIFIRE*, protection rate IP67 - (DEFINE THE CABLE LENGHT MAX 500 m-ADD THE COST)
	Q	Separate version, Painted Aluminum JB, PREAMPLIFIRE*, N° 1 connectors IP 68 suitable for fast cable connection - (DEFINE THE CABLE LENGHT MAX 500 m-ADD THE COST)



<b>A</b>	<b>U</b>	Separate version, AISI 304 JB RAW, protection rate IP68, standing immersion with 1,5 m of head water - (DEFINE THE CABLE LENGHT - ADD THE COST )
	<b>S</b>	Separate version, AISI 304 JB RAW, with N° 1 connectors IP 68 suitable for fast cable connections - (DEFINE THE CABLE LENGHT - ADD THE COST )
	<b>T</b>	Separate version, AISI 304 JB RAW, N° 2 connectors IP 68 suitable for fast cable connections - (DEFINE THE CABLE LENGHT - ADD THE COST )
	<b>P</b>	Separate version, AISI 304 JB RAW, PREAMPLIFIRE*, protection rate IP67 - (DEFINE THE CABLE LENGHT MAX 500 m-ADD THE COST )
	<b>R</b>	Separate version, AISI 304 JB RAW, PREAMPLIFIRE* N° 1 connectors IP 68 suitable for fast cable connections to - (DEFINE THE CABLE LENGHT MAX 500 m-ADD THE COST )
	<b>K</b>	Separate version, AISI 304 JB POLISCHED, protection rate IP68, standing immersion with 1,5 m of head water - (DEFINE THE CABLE LENGHT - ADD THE COST )
	<b>Y</b>	Separate version, AISI 304 JB POLISCHED, with N° 1 connectors IP 68 suitable for fast cable connections - (DEFINE THE CABLE LENGHT - ADD THE COST )
	<b>W</b>	Separate version, AISI 304 JB POLISCHED, N° 2 connectors IP 68 suitable for fast cable connections - (DEFINE THE CABLE LENGHT - ADD THE COST )
	<b>V</b>	Separate version, AISI 304 JB POLISCHED, PREAMPLIFIRE*, protection rate IP67 - (DEFINE THE CABLE LENGHT MAX 500 m-ADD THE COST )
	<b>J</b>	Separate version, AISI 304 JB POLISCHED, PREAMPLIFIRE* N° 1 connectors IP 68 suitable for fast cable connections to - (DEFINE THE CABLE LENGHT MAX 500 m-ADD THE COST )

MS3810-0A1A0A (Example of Complete code for order)

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If you want to find the complete list of our distributors access at the following link:  
[http://www.isoil.com/u\\_vendita.asp](http://www.isoil.com/u_vendita.asp)



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