



Instructions Manual



Conforms with the Pressure Equipment Directive 97/23/EC.



This equipment is considered as being a pressure accessory and **NOT** a safety accessory as defined in the 97/23/EC directive, Article 1, paragraph 2.1.3.

WORKING PRINCIPLE

The Flomid electromagnetic flowmeters, are based on Faraday's induction law.

When an electrically conductive liquid flows through a magnetic field, perpendicular to the flow direction, it induces a voltage V_m , proportional to the liquid velocity.

Two electrodes in contact with the liquid and positioned perpendicular to the magnetic field, sense this voltage V_m .

$$V_m = B \cdot v_m \cdot D$$

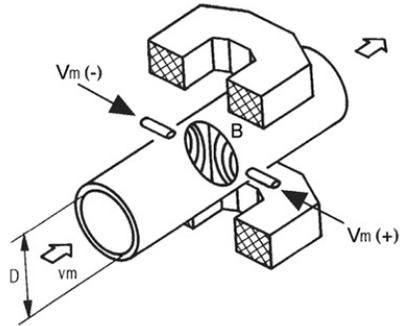
Where:

V_m = Measured voltage in the electrodes.

B = Magnetic flux density

v_m = Average liquid velocity

D = Pipe diameter.



RECEPTION

The FLOMID electromagnetic flowmeters are supplied conveniently packed for transport together with their instruction manual for installation and operation.

All the flowmeters have been verified in our calibration rigs to obtain the factor F_c for each sensor.

Disassembly

Unpack the instrument carefully, removing any remains of the packing from the inside of the sensor. Do not remove the grease from the neck that couples to the electronics housing.

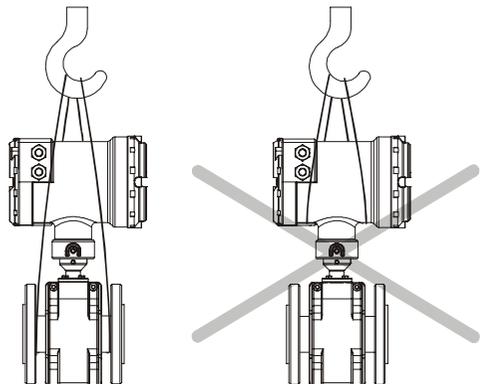
Storage temperature

Sensors linings of :	PTFE and PVDF	-20°C +60°C
	PP and EBONITE	-5°C +50°C

HANDLING

It should always be done with care and without knocks.

The large diameter sensors have rings for holding the elevation elements. If the flowmeter is held using slings, these should hold on the sensor and not on the electronics housing (see the drawing).



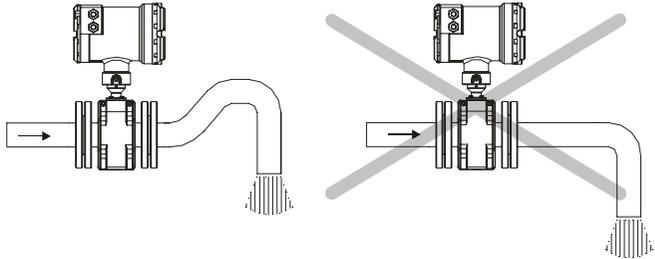
INSTALLATION

This should be made in a point that guarantees that the pipe is always completely full.

Avoid high points of the pipes where air pockets usually form, or pipes with falling flow where vacuums can form.

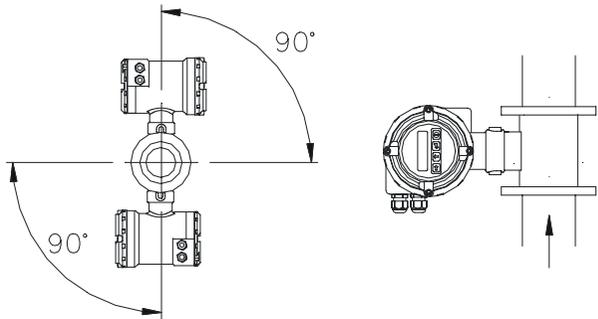
Partially full pipes can produce important reading errors.

Flow rate measurement with open discharge makes it necessary to install the flowmeter in a pipe section with a siphon which avoids stagnation of air in the sensor.



Sensor position

The most adequate position is with the electrodes in a horizontal plane. In this way, deposits of particles on the electrodes are avoided.

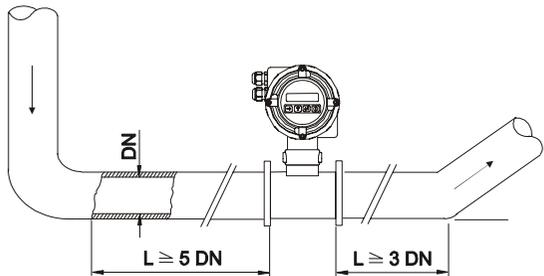


Straight pipe sections

Are necessary before and after the sensor. The minimum distances are the following:

- Upstream : 5 DN
- Downstream : 3 DN

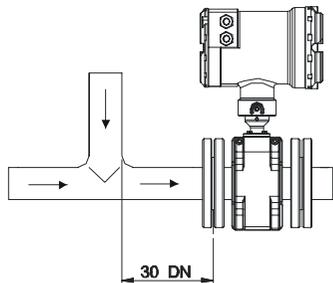
In installations with turbulent flow it may be necessary to increase these distances.



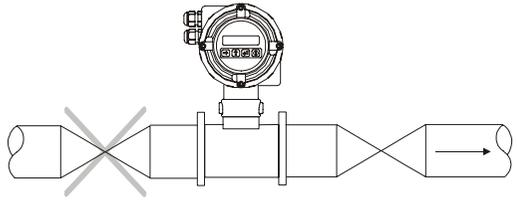
Mixtures

If liquids of different conductivities are mixed it is necessary to install the sensor a minimum of 30 DN from the point of mixture in order to obtain a uniform conductivity of the liquid and stabilize the readings.

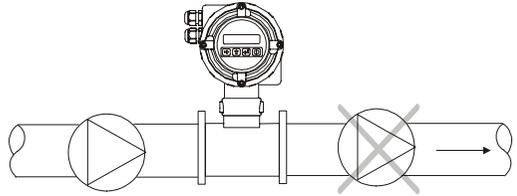
If this distance is less, the readings may be unstable.



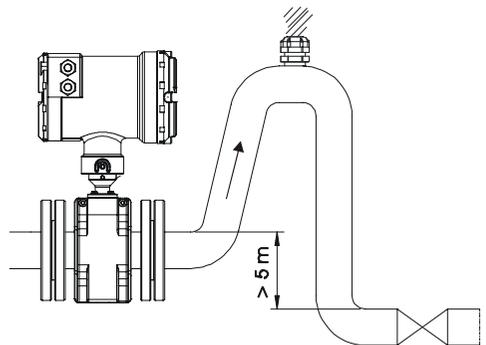
Control valves or stop cocks should always be installed downstream from the sensor to assure that the pipe is always full of liquid.



Pumps should be mounted upstream from the sensor to avoid the suction part of the pump (vacuum) that could damage the sensor liner (see the table on page 8).



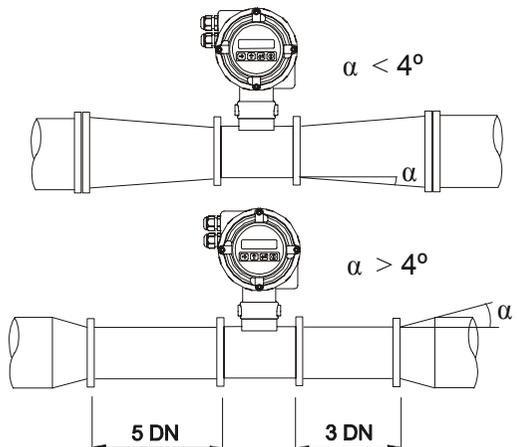
If there is a point where the difference in level is greater than 5 m an air inlet valve should be installed after the sensor to avoid a vacuum effect that could damage the sensor liner (see the table on page 8).



Reduction of the DN

In installations where, for reasons of the flow rate to be measured, a sensor of a smaller DN than the pipe DN must be mounted, the reduction must be done with an angle smaller than 4° to avoid turbulences that can give false readings.

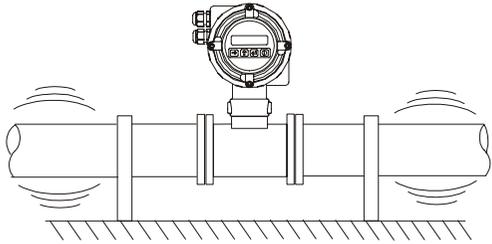
If the reduction angle is greater then the straight pipe sections indicated on the previous page must be respected.



Vibrations

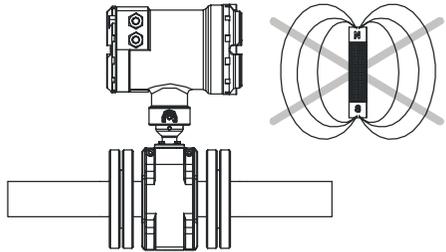
Vibrations of the pipes should be avoided by anchoring the pipe before and after the sensor.

The vibration level should be less than 2.2 g in the range of 20 -150 Hz according to IEC 068-2-34.



Magnetic fields

Strong magnetic fields close to the sensor should be avoided.

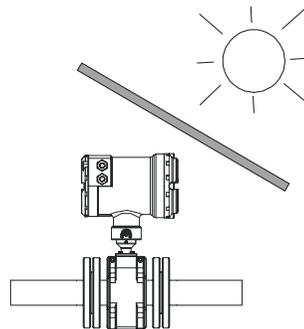


Temperature

In open air installations it is recommended to install a protection to avoid direct sun light on the flowmeter.

With thermally insulated pipes DO NOT insulate the sensor. High temperatures can damage it.

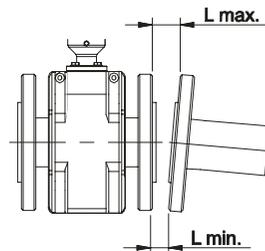
The maximum liquid temperatures are shown on page 8.



MOUNTING

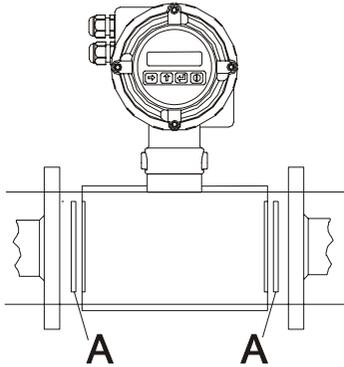
Parallelism

The maximum parallelism error must be less than 0.5 mm ($L_{max} - L_{min} \leq 0,5 \text{ mm}$).



Gasket position

For the sandwich mounting sensors, to avoid leakage into the inside of the sensor one must make sure that the rubber gasket (A) (drawing on the following page) is fitted into the stainless steel ring so that it will be pressed directly on the plastic liner. If the rubber gasket seals against the stainless steel ring then the liquid pressure will force liquid into the interior of the sensor causing irreparable damage.



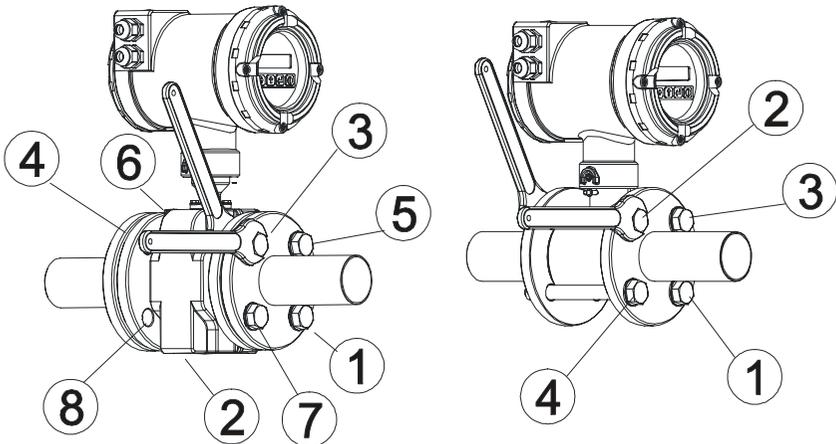
Tightening torque

The tightening torque for the flange bolts should not exceed 32 Nm for working pressures of 16 bar maximum.

This tightening torque should be applied to sandwich mounting (Flomid 0FX) and also to DIN, ANSI, JIS etc. flange mounting sensors for the same working pressure of 16 bar.

The maximum tightening torque varies in function of the nominal pressure (PN) of the sensor.

The tightening of the bolts should be uniform, following the sequence shown in the drawings and depending on the number of flange bolts.



SENSOR EARTH CONNECTION (only for sandwich and flange mounting sensors)

To obtain correct operation the sensor should have its functional earth connected to a point that is in direct contact with the liquid to be metered.

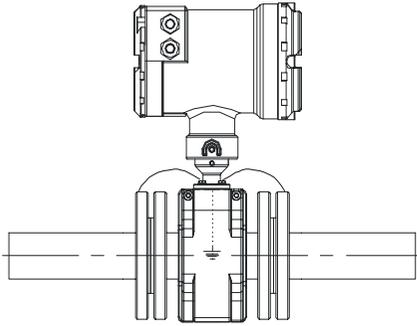
The earth cables should assure a good electrical contact. To obtain this, they should be well screwed down and with a good contact on both sides of the sensor. It is important to eliminate paint or coverings that act as insulation of the connection.

The functional earth connection should be used exclusively for the sensor given that parasitic signals caused by other electrical equipment connected to this earth can cause malfunction of the sensor.

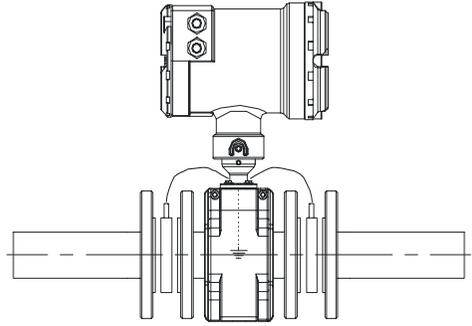
In the case that there are high voltage differences between different earth points, this will cause currents that may give problems in the readings (empty pipe indication). In these cases, do not connect the functional earth to the protective earth of the mains.

The connection of the functional earth should be made as follows:

- A) In the case of metallic pipes without internal lining connect the earth cables to the counterflanges.
- B) In the case of metallic pipes with internal lining or plastic pipes, connect the earth cables to the earth disks, supplied on demand.



METALLIC PIPES
Without internal lining



METALLIC PIPES
With internal lining
or PLASTIC PIPES

EARTH DISKS

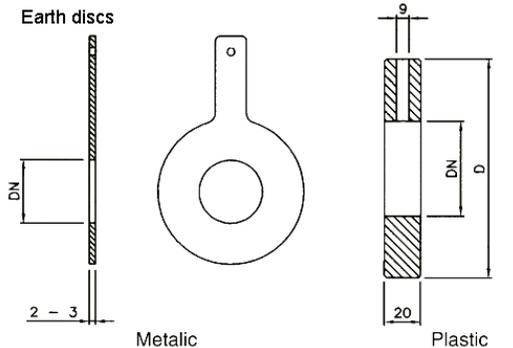
The earth disks are necessary when the installation is with plastic pipes or metallic pipes with an internal insulating lining (PTFE, PVDF, PP EBNITE etc.).

The earth disks are supplied in two versions:

METALLIC, in the form of a disk in stainless steel EN 1.4404 (AISI316L), for liquids compatible with this material.

PLASTIC, that have an electrode to make the contact with the liquid. The materials (plastic and metal) depend on the product to be metered.

The electrodes can be EN 1.4404, Hastelloy C, Titanium, Zirconium, etc..



MAINTENANCE

It is recommended to clean the electrodes in installations where incrustations or appreciable sedimentations can occur.

Cleaning can be done using liquid detergents and medium hard brushes.

TEMPERATURE, PRESSURE and VACUUM LIMITS

DN	PTFE				PTFE / PVDF				PP				EBONITE			
	Flomid 2, 4				Flomid 0, 1, 3, 5, 7				Flomid 0				Flomid 2, 4			
	PN		Vacuum ⁽¹⁾		PN		Vacuum ⁽¹⁾		PN		Vacuum ⁽¹⁾		PN		Vacuum ⁽¹⁾	
	DIN2501 (bar)	ANSI B16.5 (lbs)	mbar	psi	DIN2501 (bar)	ANSI B16.5 (lbs)	mbar	psi	DIN2501 (bar)	ANSI B16.5 (lbs)	mbar	psi	DIN2501 (bar)	ANSI B16.5 (lbs)	mbar	psi
3			0	0												
6																
10	16 > 40	150 > 300	▽	▽	16	150 > 300	60 ▽	0,9 ▽	16	150 > 300	100 ▽	1,5 ▽				
15																
20			0	0												
25			80	1,2												
32	16 > 40	150 > 300	▽	▽	16	150 > 300	100 ▽	1,5 ▽	16	150 > 300	180 ▽	2,7 ▽	16 > 40	150 > 300	▽	▽
40																
50			500	7,5			600	9			700	10,5			200	3
65	16 > 40	150 > 300	150	2,2	16	150 > 300	150	2,2	16	150 > 300	200	3	16 > 40	150 > 300	120	1,8
80			650	9,7			700	10,5			800	12			250	3,7
100			250	3,7			300	4,5			380	5,7			280	4,2
125	16	150	750	11,2	10	150 > 300	800	12	10	150 > 300	900	13,5	16	150	▽	▽
	▽		450	6,7			480	7,2			650	9,7	▽			
			▽	▽			▽	▽			▽	▽				
150	40		800	12			900	13,5			1000	15	40		400	6
200			450	6,7											250	3,75
			▽	▽												
			900	13,5											▽	▽
250	10	150	500	7,5									10	150		
	▽		▽	▽									▽		450	6,7
300			1000	15											500	7,5
350			750	11,2											▽	▽
400	40		▽	▽									40		600	9
500			1000	15												
T ^o Máx	-20...+120°C				-20...+120°C				-10...+80°C				-20...+90°C			
Punta ⁽²⁾	130°C				130°C				—				—			

(1) En mbar absolute 40°C and 80°C reference Temperature
(2) maximum 30°

WARRANTY

Tecfluid S.A. GUARANTEES ALL ITS PRODUCTS FOR A PERIOD OF 24 MONTHS, after consignment, against all defects in materials and workmanship.

This warranty does not cover failures which can be imputed to misuse, use in an application different to that specified in the order, the result of service or modification by un-authorized persons, bad handling or accident.

This warranty is limited to cover the repair or replacement defective parts which have not been damaged by misuse.

This warranty is limited to the repair of the equipment and all further and eventually following damages are not covered by this warranty.

Any consignment of equipment to our factory or distributor must be previously authorised. The consignment should be done with the equipment well packed, clean of any liquids, grease or hazardous materials. Tecfluid S.A. will not accept any responsibility for damage done during transport.

Together with the equipment, a note should be enclosed indicating the failure observed, the name, address and telephone number of the sender.

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