Instructions manual

Series FLOMID

Sensor FLOMID-FX
Converter MX4

The art of measuring

R-MI-FIMX4 Rev.: 2 English version

PREFACE

Thank you for choosing a product from Tecfluid S.A.

This instruction manual allows the installation, configuration, programming and maintenance. It is recommended to read it before using the equipment.

WARNINGS

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- Tecfluid S.A. reserve the right to make changes as deemed necessary at any time and without notice, in order to improve the quality and safety, with no obligation to update this manual.
- Make sure this manual goes to the end user.
- Keep this manual in a place where you can find it when you need it.
- In case of loss, ask for a new manual or download it directly from our website www.tecfluid.com Downloads section.
- Any deviation from the procedures described in this instruction manual, may cause user safety risks, damage of the unit or cause errors in the equipment performance.
- Do not modify the equipment without permission. Tecfluid S.A. are not responsible for any problems caused by a change not allowed. If you need to modify the equipment for any reason, please contact us in advance.

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FLOMID-FX SENSOR

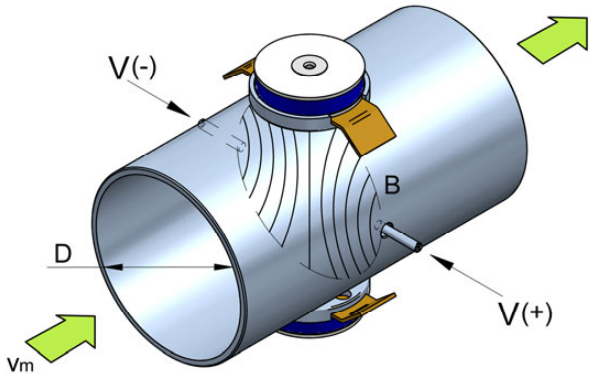
MX4 CONVERTER

1 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 Vm proportional to the liquid velocity.

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



$$V = B \cdot v_m \cdot D$$

Where:

V = Measured voltage in the electrodes
B = Magnetic field
v_m = Average liquid velocity
D = Pipe diameter

2 RECEPTION

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

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

2.1 Unpacking

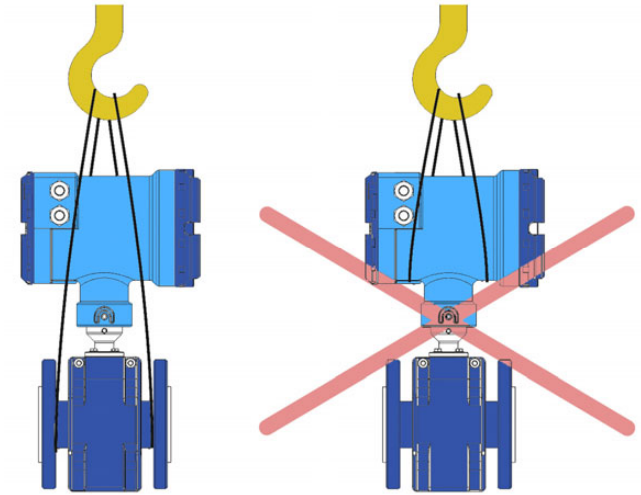
Unpack the instrument carefully, removing any remains of the packing from the inside of the sensor. Do not remove the grease from the neck that couples to the electronics housing.

2.2 Storage temperatures

Sensors linings of :	PTFE and PVDF	-20ºC ..... +60ºC
	PP and EBONITE	-5ºC ..... +50ºC

3 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 drawing).



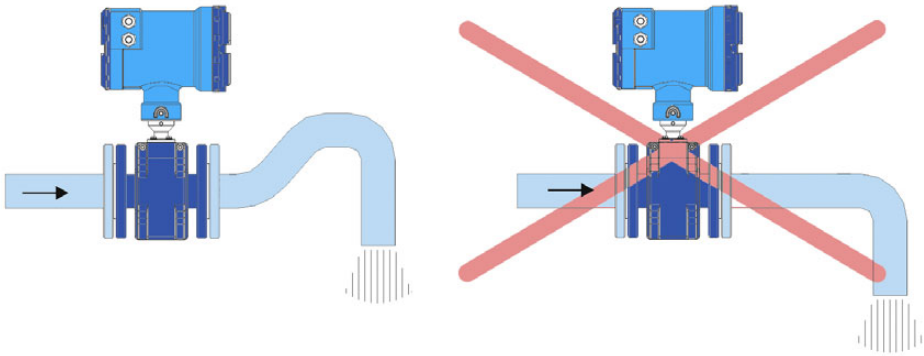
4 INSTALLATION

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.

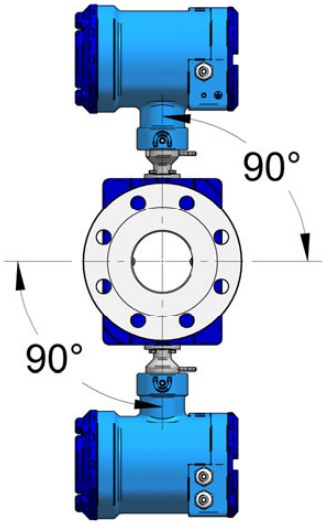
Partially full pipes can produce important reading errors.

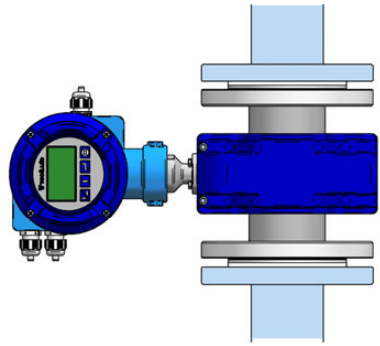
Flow rate measurement with open discharge makes it necessary to install the flowmeter in a pipe section with a siphon which avoids stagnation of air in the sensor.



4.1 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.



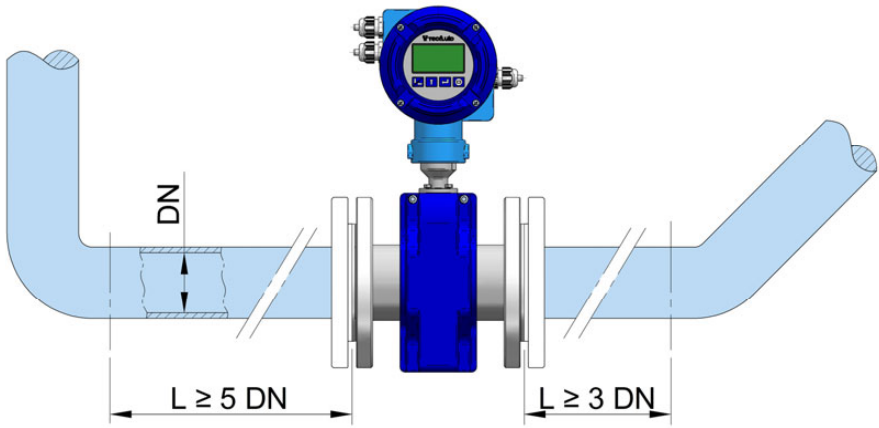


4.2 Straight pipe sections

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

Upstream	5 DN
Downstream	3 DN

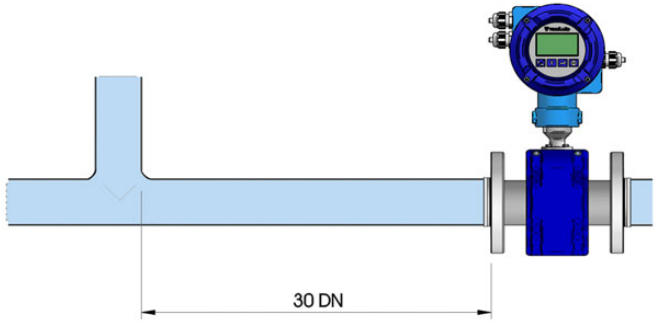
In installations with turbulent flow it may be necessary to increase these distances.



4.2.1 Mixtures

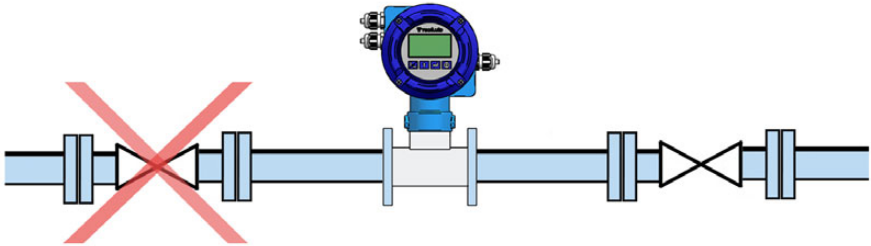
If liquids of different conductivities are mixed it is necessary to install the sensor a minimum of 30 DN from the point of mixture in order to obtain a uniform conductivity of the liquid and stabilize the readings.

If this distance is shorter, readings may be unstable.



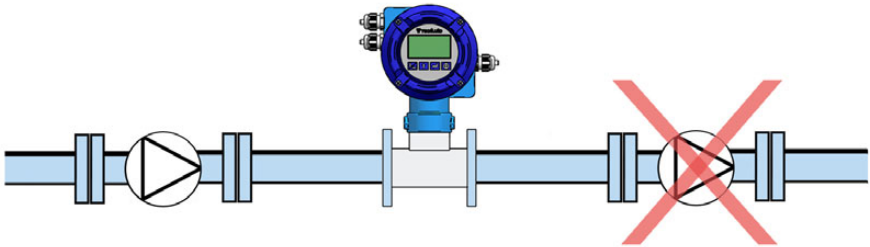
4.3 Valves

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



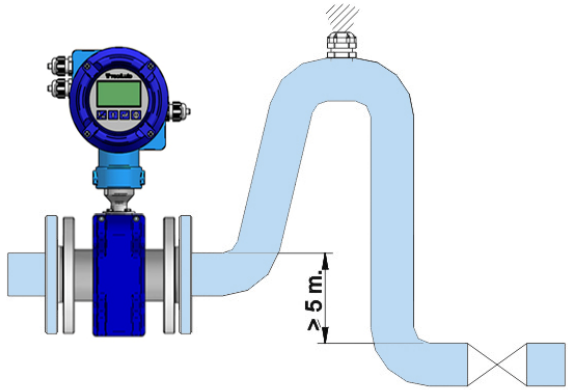
4.4 Pumps

Pumps should be mounted upstream from the sensor to avoid the suction of the pump (vacuum) that could damage the sensor liner.



4.5 Aeration

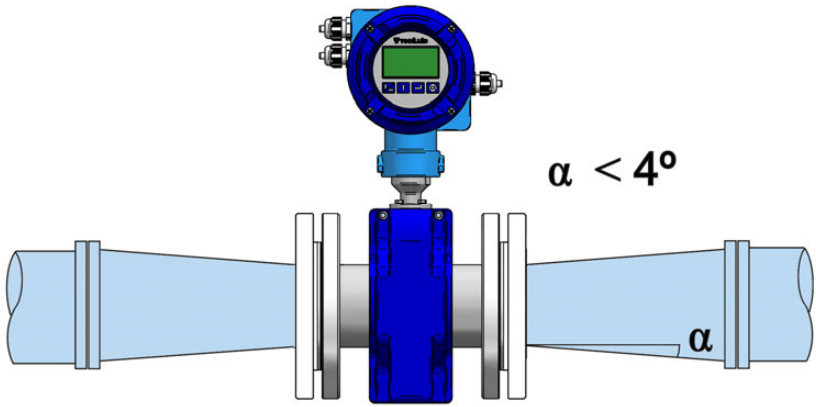
If there is a point where the difference in level is higher than 5 m an air inlet valve should be installed after the sensor to avoid a vacuum effect that could damage the sensor liner.



4.6 Reduction of DN

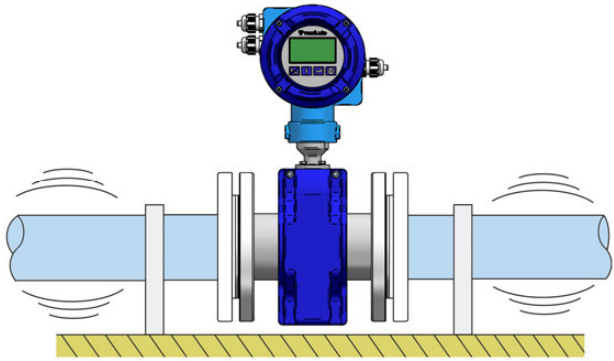
In installations where, due to reasons of the flow rate to be measured, a sensor of a smaller DN than the pipe DN must be mounted, the reduction must be done with an angle smaller than 4º to avoid turbulences that can give false readings.

If the angle cannot be so small, straight pipe sections indicated in point 4.2 must be kept.



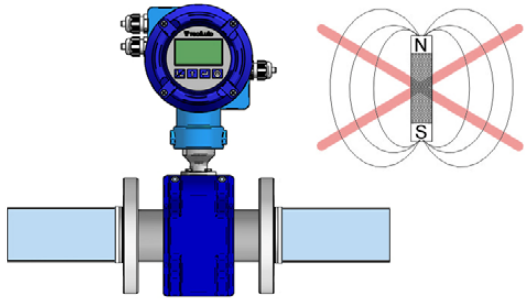
4.7 Vibrations

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.



4.8 Magnetic fields

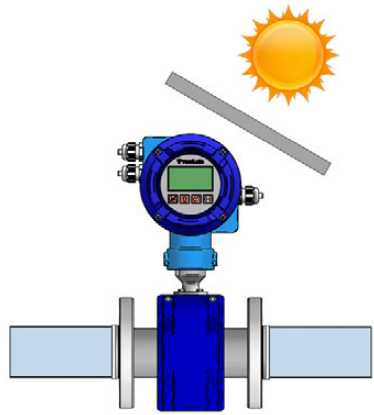
Strong magnetic fields close to the sensor should be avoided.



4.9 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.

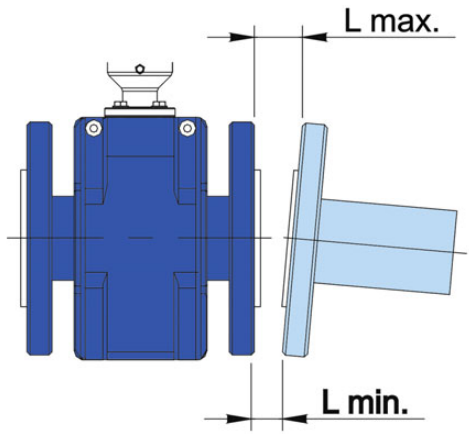
The maximum liquid temperatures are shown on page 53.



5 MOUNTING

5.1 Parallelism

The maximum parallelism error must be less than 0.5 mm (Lmax—Lmin ≤ 0.5 mm).

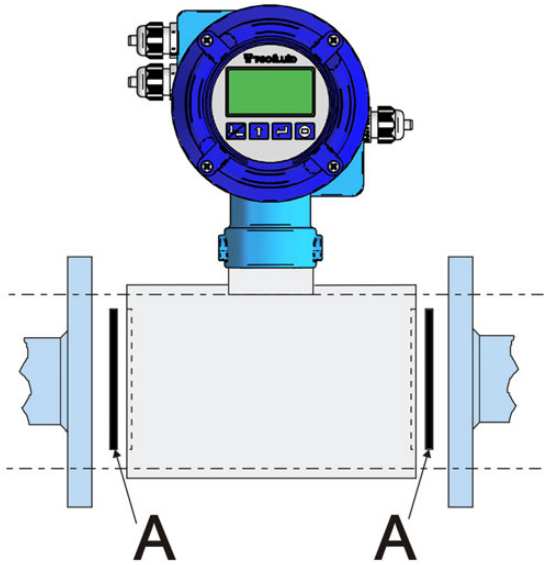


5.2 Gasket position

In the wafer mounted sensors, in order to avoid leakage of the liquid into the sensor, it is necessary to ensure that the rubber gasket (A) of the figure is well centered, so that it presses directly on the plastic liner.

The standard gasket material supplied is NBR. Other materials can be supplied on demand.

The sensors with connections different to wafer are supplied without gaskets..



5.3 Sensor earth connection

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

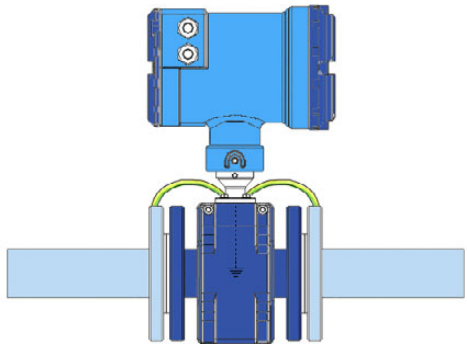
The earth cables should assure a good electrical contact. To obtain this, they should be well screwed down and with a good contact on both sides of the sensor. It is important to eliminate paint or coverings that act as insulation of the connection.

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.

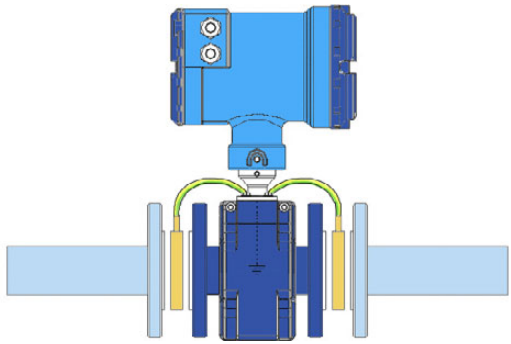
In the case that there are high voltage differences between different earth points, this will cause currents that may give problems in the readings (empty pipe indication). In these cases, do not connect the functional earth to the protective earth of the mains.

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 counter flanges.



b) In the case of metallic pipes with internal lining or plastic pipes, connect the earth cables to the earthing disks, supplied on request.

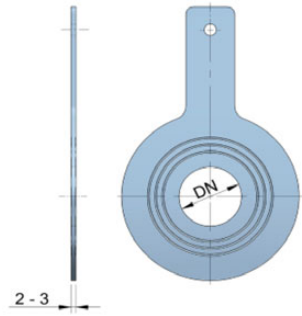


The earthing disks are necessary when the installation is with plastic pipes or metallic pipes with an internal insulating lining (PTFE, PVDF, PP, EBONITE etc.).

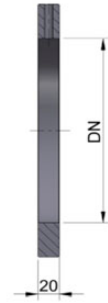
Earthing disks are supplied in two versions:

Metallic, disk in stainless steel EN 1.4404 (AISI 316L), for liquids compatible with this material.

Plastic, with an electrode to make the contact with the liquid. The materials (plastic and metal) depend on the working liquid.



Metallic



Plastic

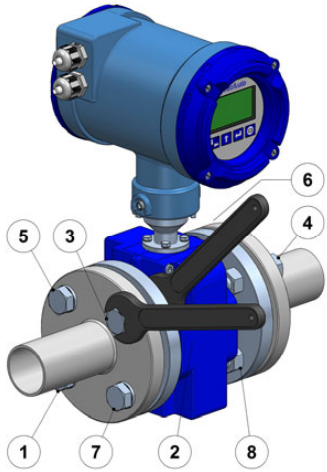
Dimensions in mm

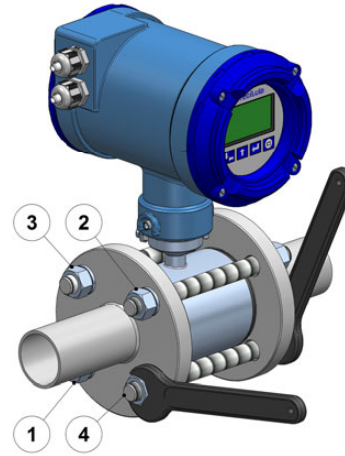
5.4 Tightening torque

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 wafer mounting (Flomid-0FX) and also to flange mounting sensors (FLOMID-2FX) 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.

6 MAINTENANCE

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

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

MX4 CONVERTER

1 INTRODUCTION

The MX4 converter unit can be used with the different FLOMID and FLOMAT series of electromagnetic flow sensors. The electronic circuit is based on the most advanced technology in digital signal processing, in order to obtain accurate and reliable measurements.

The device provides the following features:

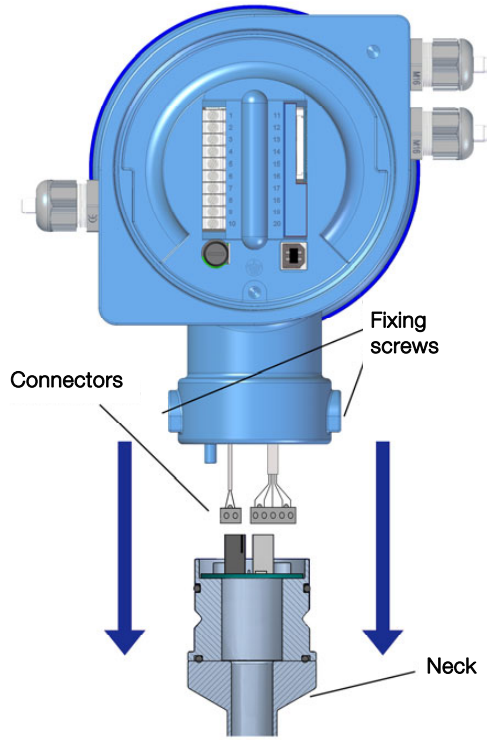
- Coil excitation by means of pulsed signal to obtain a negligible zero offset.
- Pulse and current output proportional to the flow rate and user programmable.
- Relay outputs user programmable as flow rate alarm or status.
- Local and remote mounting.
- Easy exchange with other sensors.
- Graphic display with intuitive menus.
- Adjustable front cover in order to make display reading easier, depending on installation.

2 INSTALLATION

2.1 Sensor connection

2.1.1 Compact converter

The converter provides two cables to be connected to the sensor. Once connected, slide the converter along the sensor neck until the stop. Tight the two fixing screws.



2.1.2 Remote converter

One of the ends of the cable has a header and two wires, to connect them to the sensor. The connection is as explained in point 2.1.1.

The other end has to be connected to the converter, and has five wires. The cable must be passed through the cable gland and the connection for each wire is explained in chapter 3.

2.2 Electrical connection

For the electrical installation, the MX4 converter has two terminal strips. To help in the wiring of the equipment, the description of the terminals is marked on a label in the rear cover of the device.

For the electrical installation it is recommended to use multiple conductor cables with individual cable sections in the order of 0.25 to 0.5 mm^2 in order to make it easier to connect. It is better to maintain the cables with mains voltage (power supply) separated from the cables with low level signals (4-20 mA, etc.).

Before starting the installation, check that the cable glands are the right size for the cables to be used. This will guarantee the instrument will stay watertight. The cable glands used are for cables with outside diameters between 3.5 mm and 10 mm

To connect the cables, peel the outside insulation to free the inner cables. It is recommended to put a terminal at the ends of the wires to avoid loose ends. Pass the cables through the cable glands and screw down in the corresponding positions of the terminal strip. Once the wiring is finished make sure that the cables are well gripped by the cable glands to maintain the degree of protection.

Incorrect installation of the cable gland or inadequate cable placement can cause irreparable damage to the converter.

IMPORTANT NOTE: In order to comply with the electrical safety requirements as per EN-61010-1 (IEC 1010-1), the installation of the equipment must take into account the following:

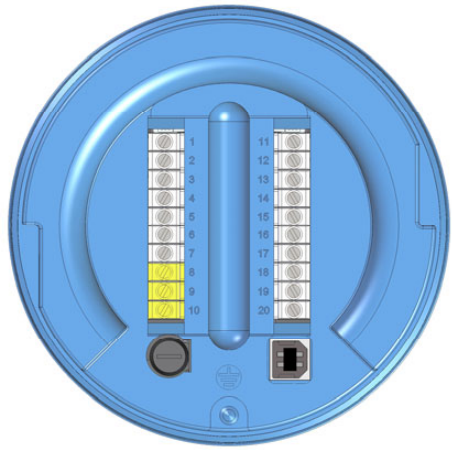
- A mains switch must be provided to disconnect the equipment. This switch must be marked as the disconnecting device for the equipment and be within easy reach of the operator.
- The mains supply must have an earth line.
- The housing must not be opened when the instrument has mains supply connected.

IMPORTANT NOTE: To ensure smooth operation of the equipment, it is recommended to make the connection paying attention to the following points:

- For the output signals, use shielded cable when possible.
- Keep the cables away from strong sources of noise.

2.2.1 Power supply wiring

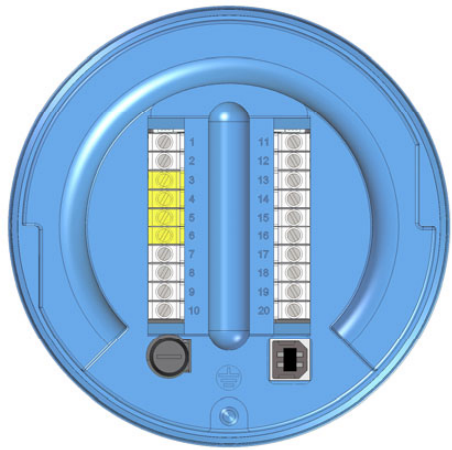
Before starting the installation of the equipment, check that the supply voltage available is the same as marked on the label of the converter.



Terminal	Power supply AC	Power supply DC
8	Earth	NC
9	Neutral	-
10	Phase	+

It is very important to connect the mains earth to the instruments with AC power supply due to the presence of a mains filter inside the converter that uses this connection.

2.2.2 Relay output wiring

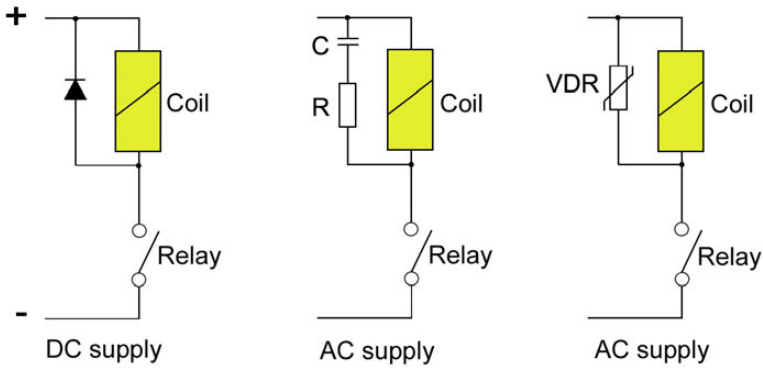


Terminal	Description	Relay
6	Normally Open	Relay 1
5	Common	Relay 1
4	Normally Open	Relay 2
3	Common	Relay 2

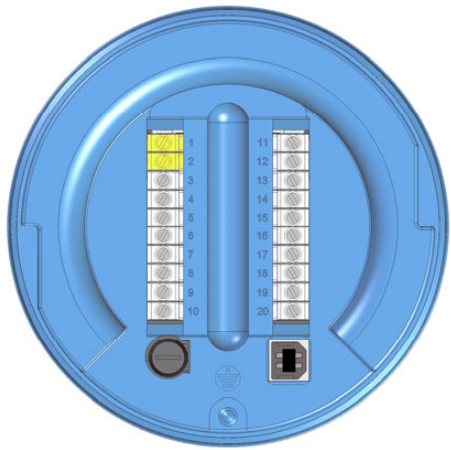
The relay outputs provide relays with potential free contacts (see characteristics in page 53).

The status of the relay contacts corresponds to the relay at rest.

The relay contacts are not protected in any way, and therefore they must be installed externally as required in the application, taking into account the limitations of the characteristics of such contacts. In the case of having inductive loads, and to extend the working life of the relay contacts, it is recommended to use overvoltage protection (VDR for AC and diodes for DC loads). In all cases a fuse or some kind of protection against short circuits, should always be provided according to the needs of the intended load.



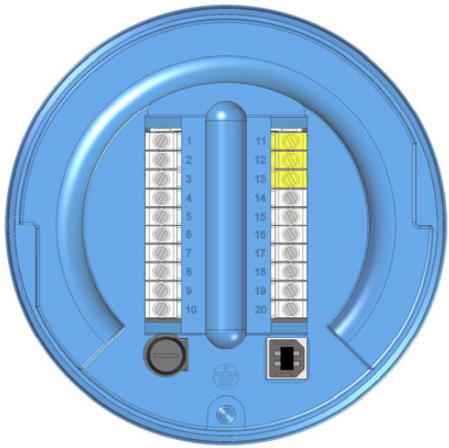
2.2.3 Remote reset input wiring



Terminal	
1	Contact
2	Contact

These terminals correspond to an input that resets the value of the totalizer. A potential free normally open push button can be connected. The push button contact must be a good quality snap action switch to guarantee correct working at low voltages and reduce contact bounce effects.

2.2.4 Analog output wiring

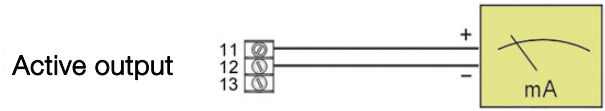


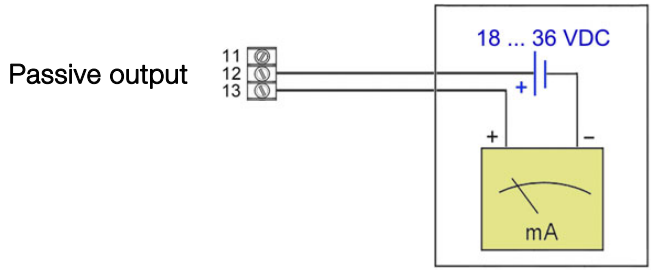
Terminal	
11	mA (positive, active output)
12	mA
13	mA (negative, passive output)

The analog output is galvanically isolated. It can be either active (which means that the receiving device must be passive) or passive (which means that the receiver must supply the power for the current loop). It is recommended to use a receptor with an input resistance of less than 700 Ω to guarantee correct operation.

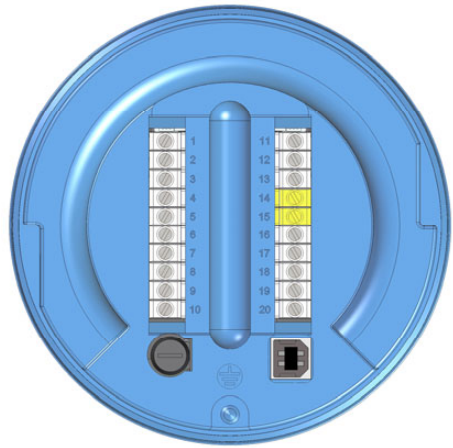
The configuration of the analog output mode (active or passive) is done by means of the connection to the terminal strip. For active mode, terminals 11 and 12 are connected. For passive mode, terminals 12 and 13 are connected.

NOTE: The analog output has protection against reversed polarity. Due to another protection against over voltages, if a loop supply voltage of more than 32 V is connected the converter may be damaged.





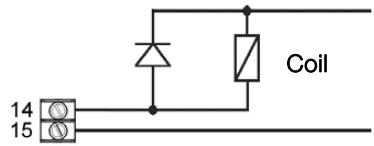
2.2.5 Pulse output wiring



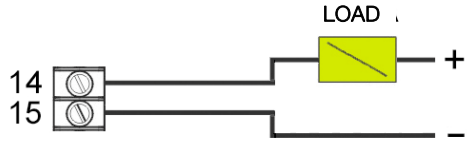
Terminal	
14	Collector
15	Emitter

The pulse output is opto-isolated. The terminals are the collector and emitter of a NPN bipolar transistor.

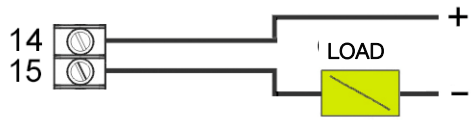
In the case of using inductive loads, in order to protect the output transistor, the use of free wheeling diodes is required.



Example. Connection with the load at the collector



Example. Connection with the load at the emitter



3 REMOTE SENSOR

When an installation requires that the electromagnetic sensor is separated from the control unit, the union between these two elements must be made by means of an interconnection cable.

These cables are supplied by Tecfluid S.A., already prepared for their direct connection to the sensor and the converter.

Important: The interconnection cable between the sensor and the converter must always be a single piece, without any kind of joint.

In the event of having to repair a broken cable at one of its ends, it should be cut at the breakage point and reworked for the connection at that point.

3.1 Preparing the cable

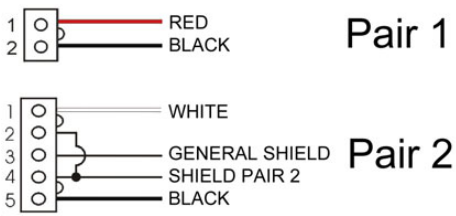
The ends of the cable should be prepared as shown in the drawing on next page. Special care should be taken to avoid possible short circuits between the shields. The point at which the shields are cut refers to the aluminium shields.

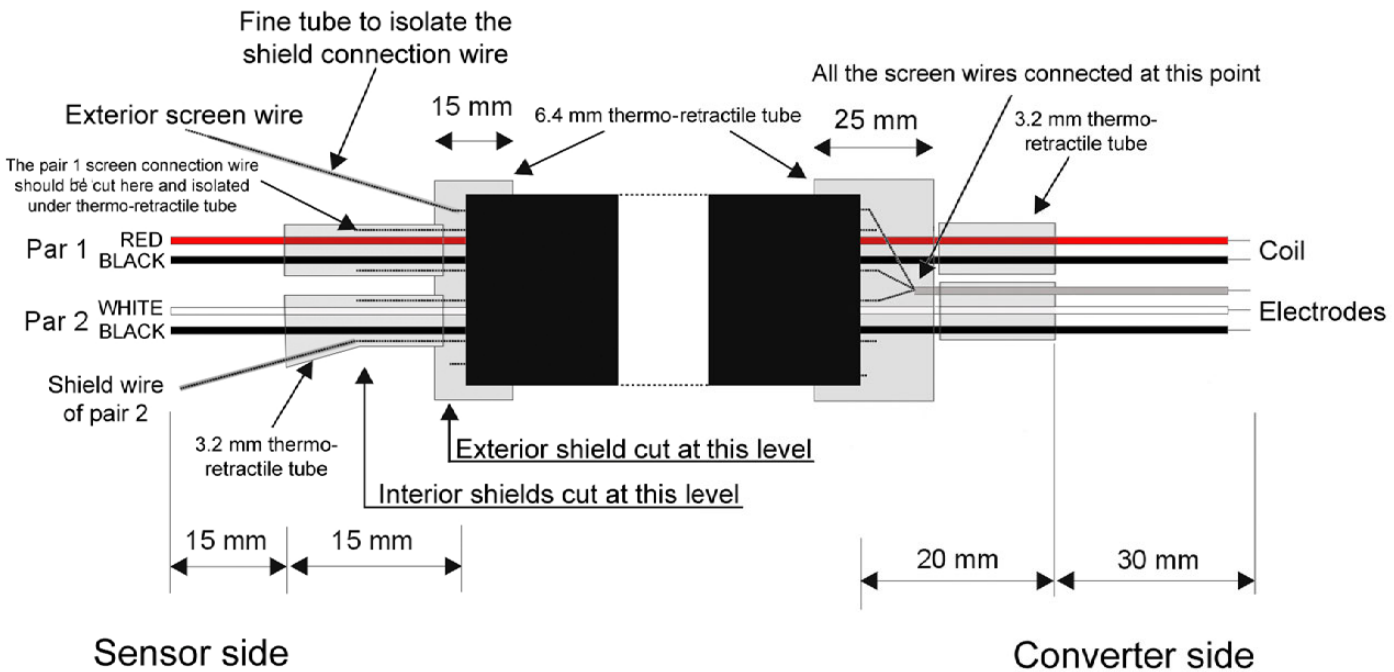
Electronics side

At the electronic unit's end, the ends of the cables should be striped at about 5 mm and then tined. Pair 1 (Red & Black) is for the excitation coils and Pair 2 (White & Black) is for the electrodes.

Sensor side

Pass the sensor side end through the cable gland of the sensor connector and then connect the cables of this end to the IDC connectors as shown in the following drawing. (the union between terminals 2 and 4 in Pair 2 must be taken into account).




Fine tube to isolate the shield connection wire
Exterior screen wire
15 mm
6.4 mm thermo-retractile tube
25 mm
All the screen wires connected at this point
3.2 mm thermo-retractile tube
The pair 1 screen connection wire should be cut here and isolated under thermo-retractile tube
Par 1
RED
BLACK
Par 2
WHITE
BLACK
Coil
Electrodes
Shield wire of pair 2
3.2 mm thermo-retractile tube
Exterior shield cut at this level
Interior shields cut at this level
15 mm
15 mm
20 mm
30 mm
Sensor side
Converter side

3.2 Cable installation

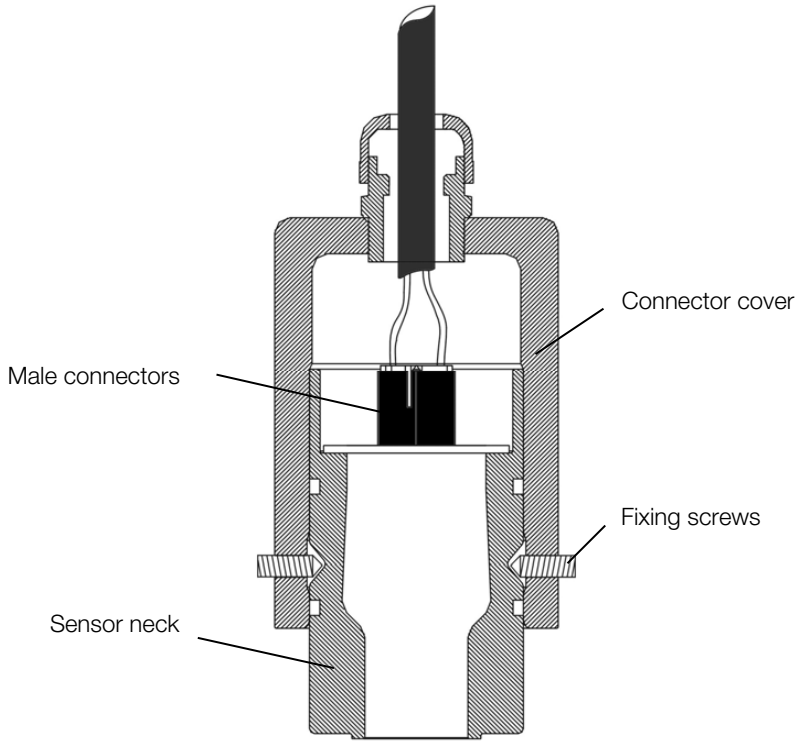
The following points must be taken into account:

- The cable should be installed in a conduit or should be securely fixed, given that movements of the cable can induce reading errors.
- The cable should be placed as far as possible from sources of electrical noise such as switching gear and electrical machines.
- The maximum length of the connection cable depends on the fluid conductivity. For liquids with a conductivity higher than 500 µS/cm cable length can be up to 150 m.

3.3 Cable connection to sensor

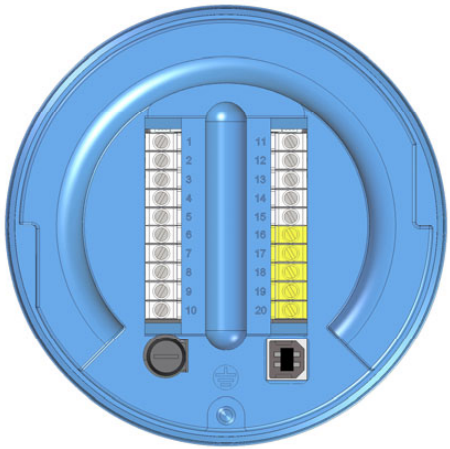
For the sensor connection, first loosen the cable gland to allow the cable to slide in it.

- Make sure that the two fixing screws of the cover do not protrude inside the cover (this avoids damaging the O-ring of the sensor neck).
- Apply a few vaseline on the sensor neck to aid inserting in the cover, specially on the O-rings.
- Connect the two cable connectors in their corresponding male connectors on the sensor, mating the bumps in the guide of the male connectors.



- Slide the cover on the sensor neck until it meets its stop.
- Tighten the two fixing screws to anchor the cover.
- Tighten the cable gland to guarantee water tightness.

3.4 Cable connection to converter



Terminal	
16	Top coil (red cable)
17	Bottom coil (black cable)
18	Rear electrode (white cable)
19	Ground (shield)
20	Front electrode (black cable)

So that the flow direction shown in the instrument matches the actual direction, please take into account the cables colour scheme according to the figure on page 21.

3.5 Cable specifications

Model: CERVITRONIC PAR-POS Code 04754502

Construction

Conductor:	Annealed electrolytic copper, tinned
As Norm:	UNE 21064
Isolator:	Polyolefin (PE - Solid)
Composition:	By pars
Par shield:	Tape Al/Pet + Drain Cu Sn
Cover :	100 % Physical
All over shield:	Tape Al/Pet + Drain Cu Sn
Cover:	100 % Physical
Exterior cover:	PVC
Colour:	Black

Electrical characteristics

Working Voltage:	250 V
Testing Voltage:	1000 V
Electrical resistance:	≤ 52,2 Ω/km
Capacity: C* / C**	90-170 pF/m

C* capacity between conductors

C** capacity between one conductor and the rest connected to the shields

Physical characteristics

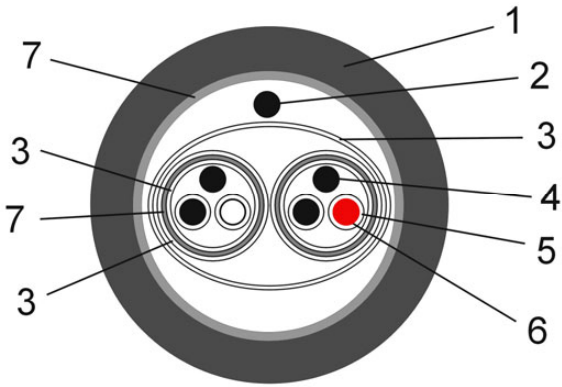
External diameter:	6.6 mm
Bending radius:	66 mm
Working temperature:	-5ºC ... +70ºC

Fire risk: Does not propagate flame as per Norm IEC 60332-1 and EN 50265

Section:	0.34 mm2
Weight:	51 kg/km

Cable section

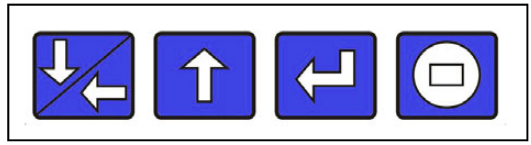
1	PVC cover
2	External shield wire
3	Insulating film
4	Pair 1/2 shield wire
5	PVC insulation
6	Pair 1/2 conductor



4 CONVERTER INTERFACE

The MX4 converter has a graphic LCD and a keyboard with 4 push buttons.

The keyboard has four numeric keys to introduce the values of installation and programming. Two of these keys are used also as cursors.

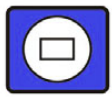


The following figure shows the functionality of the converter keys.

(Down / Left) To switch between flow rate, totalizer and fluid velocity screens.
To change to the digit on the left.
Into the menu, to scroll down.

(Up) To switch between flow rate, totalizer and fluid velocity screens. To increase the digit.
Into the menu, to scroll up.

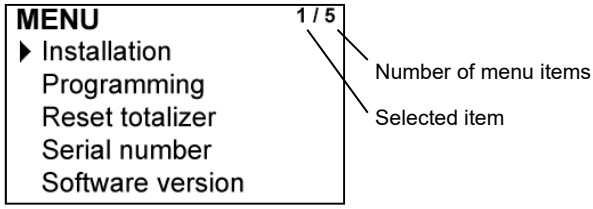
(Enter) To validate the data.
To enter into installation and programming modes of the converter.
To exit from an informative text.



(Escape) To return to the previous menu.
To exit from a screen without validating data.

5 MAIN MENU

To access the main menu of the converter, press the key (Enter). The following screen appears:



The "Installation" option allows the basic configuration of the instrument, as explained in Chapter 6 of this manual.

The "Programming" option allows to program all parameters of the converter, as explained in Chapter 7 of this manual.

From the "Reset totalizer" option, the user can return the totalizer to zero. When exiting the menu, the totalizer will begin to accumulate again.

Note: The “Reset totalizer” operation requires the program password input (see point 5.1).

The options "Software Version" and "Serial Number" are informative and are discussed in Chapters 8 and 9 of this manual.

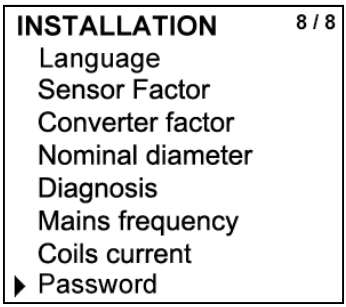
5.1 Passwords to access the menus

The password for the installation menu may be different from the password for the program menu.

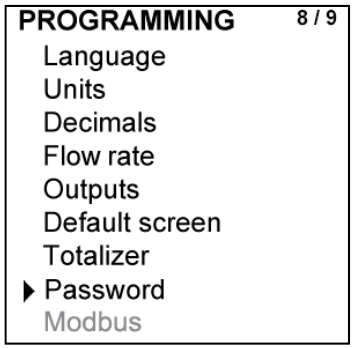
By default, the equipment is factory configured with the password disabled.

If you want to change any of these passwords, you must enter the corresponding menu and once inside, access the submenu "Password".

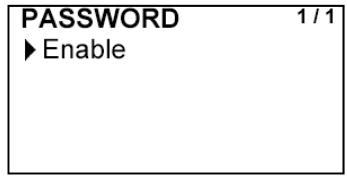
To change the access password of the installation menu, select "Installation" on the main menu and then "Password".



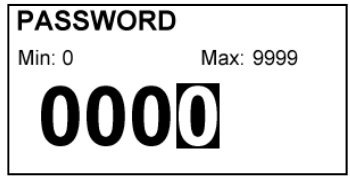
To change the access password of the programming menu, select "Programming" in the main menu and then "Password".



When the "Password" option is selected, a screen that indicates the password status for this menu appears.

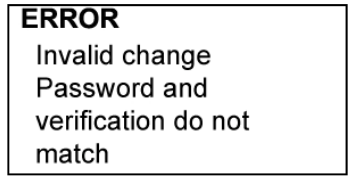


Selecting “Enable”, the screen to enter the new password appears.

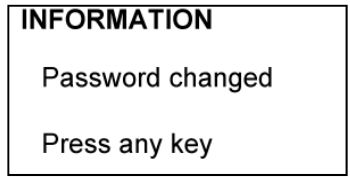


Once entered, the new password is asked again to avoid possible inadvertent error.

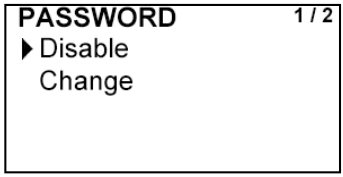
If the re-entered password does not match the first one, the following error message appears and the process should be carried out again.



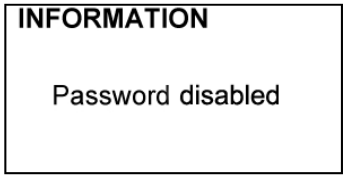
If both passwords match, the following information message is displayed:



If the password needs to be changed or disabled, the procedure is the same. Once entered the "Password" menu, the following screen appears:



If “Change” is selected, the equipment will ask for a password again. If “Disable” is selected, the following message will appear:



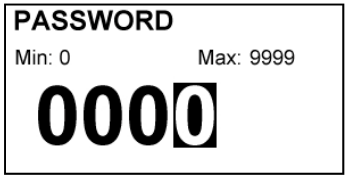
6 INSTALLATION PARAMETERS

Power on the electronic converter with the voltage indicated on the label.

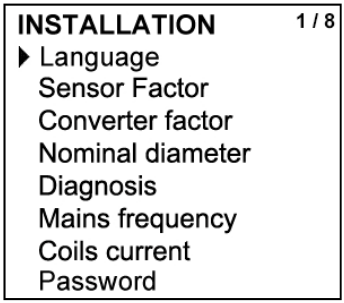
Press the (Enter) key in order to enter the main menu.

With the keys (Down / Left) and (Up), select “Installation”, and then validate with the key (Enter).

In order to access to the Installation menu, a password must be entered. When accessing the first time, the default password is 0123. For more details about the password, see paragraph 5.1, page 27.

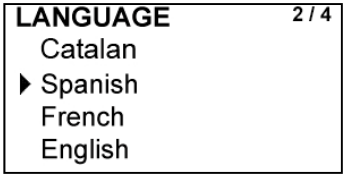


Once the password is entered, and after pressing the key (Enter), the first screen allows to choose between the different options of the installation menu.



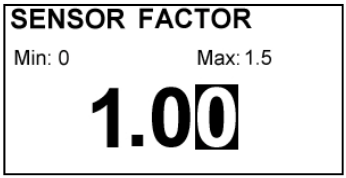
6.1 Language

You can choose the language in which all the menus will be displayed.



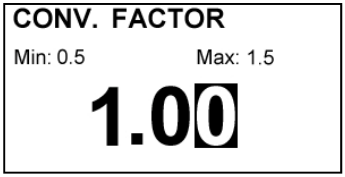
6.2 Sensor factor

In this screen the sensor factor is shown. It should coincide with the **Fc** parameter on the sensor label.



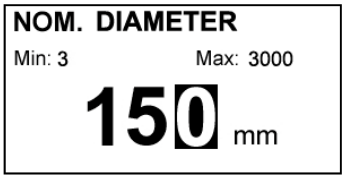
6.3 Converter factor

The electronic converter factor is shown. It should coincide with the **Fe** parameter on the converter label.



6.4 Nominal diameter

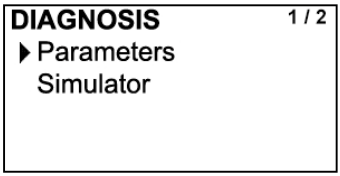
The value of the nominal diameter is always the internal diameter of the sensor.



6.5 Diagnosis

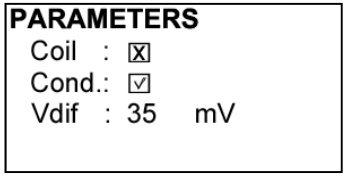
When the flowmeter is not working properly, it can be useful to test some parts of the instrument in order to locate the problem.

In this section a list with two possible options appears.



6.5.1 Parameters

This screen allows the diagnosis of the coil current, the differential voltage on the sensor electrodes, and the conductivity of the liquid.



In the first row, a possible damage of the sensor coils can be detected. If there is a symbol V on this row, it means that the coils do not have any damage. If the symbol is X it means that the coils are damaged. In this case, please contact us.

The second row shows if the conductivity of the liquid is high enough for the instrument to perform the measurement process.

The conductivity of the liquid should always be higher than 20 µS / cm .

The third row shows the differential voltage value on the electrodes (Vdif).

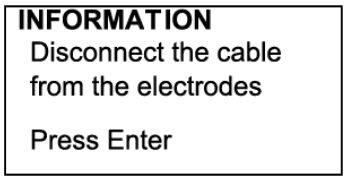
This voltage appears in some cases where chemical reactions are created on the surface of the electrodes.

While this value does not exceed 500 mV the flowmeter can work properly. If the value is higher, there is no guarantee that the flow reading is correct. In this case, please contact us.

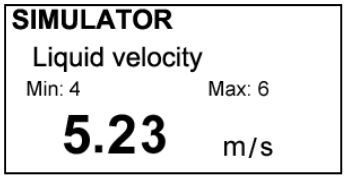
6.5.2 Simulator

With this diagnosis an electronic fault in the measuring circuit can be checked.

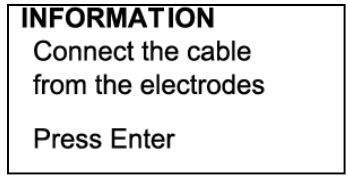
Before checking, disconnect the electrodes from the converter. To do this, if the converter is compact mounted, remove the electrodes IDC connector shown in the figure on page 15 (5-pin cable). If the converter is remote mounted, remove the electrodes wires (terminals 18, 19 and 20) of the terminal strip on the back (page 24).



Pressing Enter a screen indicating a simulated speed of the liquid is shown. If the circuit is working properly the displayed value will be between 4 and 6 m/s.



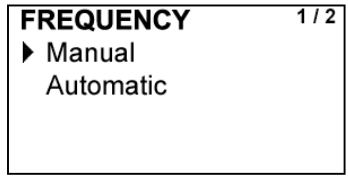
To come back to the main menu, connect the electrodes cable again and press Escape key.



Press again the Escape key until the working screen.

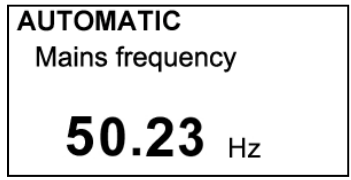
6.5.3 Mains frequency

If the power supply of the converter is AC, the following screen will appear:

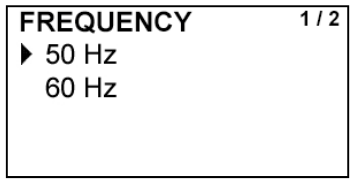


Normally "Automatic" should be selected. In this case, the instrument automatically detects the frequency of the mains and thus uses the most appropriate coil excitation to eliminate noise from the mains.

The detected frequency can be shown in the screen that appears when you select the automatic mode.



If manual mode is selected, the mains frequency can be chosen between the two most prevalent in all countries, 50 and 60 Hz



If the power supply of the converter is DC, this screen appears directly.

6.5.4 Coil current

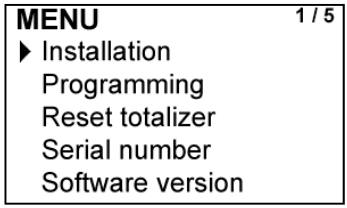
In normal situations it is not necessary to change the coil current selected in the equipment by default.

NOTE: So that this change is effective, several jumpers inside the instrument need to be changed. In case that a different coil current must be used, please contact us.

7 CONVERTER PROGRAMMING

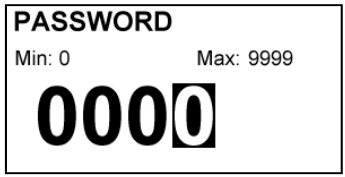
By programming the converter the visualization and the outputs of the instrument can be configured.

Turn on the converter and press (Enter) to enter the main menu. The following screen appears:

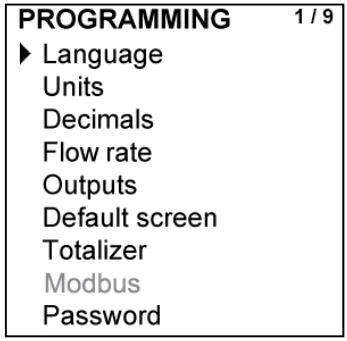


With the keys (Down / Left) and (Up), select Programming, and then validate with the key (Enter).

If the converter has the password option enabled, a password must be entered. For more details about the password,, see section 5.1 on page 27.

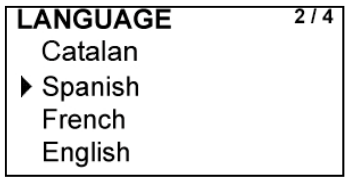


Once the password is entered, the first screen allows to choose between the different programming options.



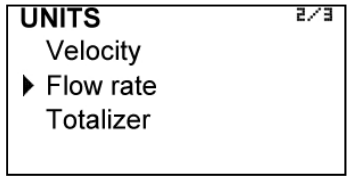
7.1 Language

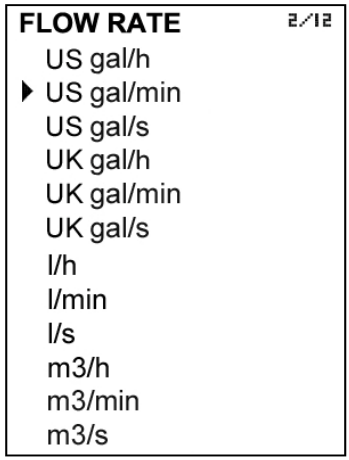
The language in which all the menus will be displayed can be chosen.

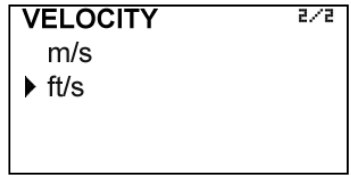


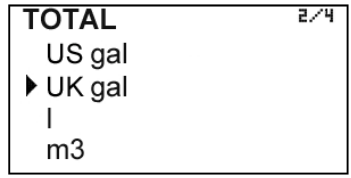
7.2 Units

In this screen the units for the liquid velocity, the flow rate and the totalizer can be chosen independently.



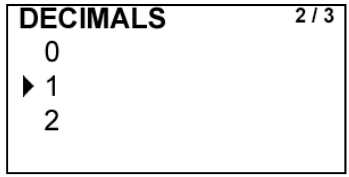






7.3 Flow rate decimals

In this screen the number of decimals for the flow rate indication can be selected.



To select the number of decimals it must be taken into account that the instrument has 5 digits for flow rate indication. If two decimals have been selected, these will be seen whilst the flow rate is not higher than 999.99. Above this value the indication will automatically change to one decimal, and when the flow rate is higher than 9999.9 the indication will be done without decimals.

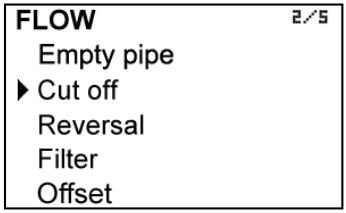
If one decimal is selected, the flow rate indication will have a maximum of one decimal until 9999.9. Above this value the indication will be done without decimals.

If indication without decimals is selected, the flow rate will always be shown without decimals.

For the selection of the flow rate units and the number of decimals it must be taken into account that an indication with an excess of decimals may give the sensation of instability of the reading. As a general rule it can be considered that the reading should not have more than a total of 5 digits (integer + decimals).

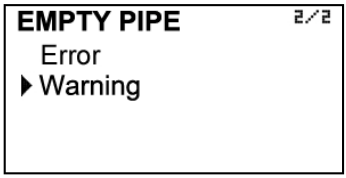
7.4 Flow rate

This screen displays a submenu to modify different aspects related to flow reading, such as empty pipe detection, cut off, reversal flow, filtering and offset.

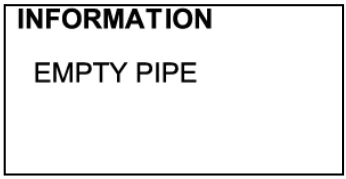


7.4.1 Empty pipe

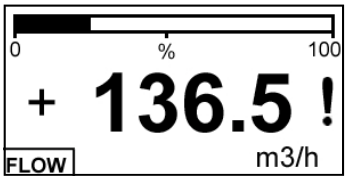
Detection can be programmed in two different ways.



In the event that “Error” is selected, when the converter detects empty pipe, it will display the following error message instead of readings.



If “Warning” is selected, in the event of detection of empty pipe, the converter will keep working normally and the symbol “!” will appear next to the measured value, indicating that the reading is not reliable.

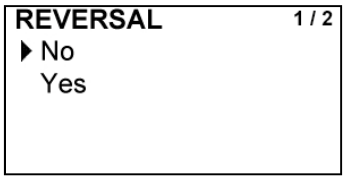


7.4.2 Cut off

A cut off flow rate can be programmed, that means, the flow rate below which the flow rate indication will be zero. This can avoid reading errors in the lower zone of the scale. The maximum allowed value for the cut off is the equivalent to a liquid velocity of 1 m/s.

7.4.3 Reversal flow rate

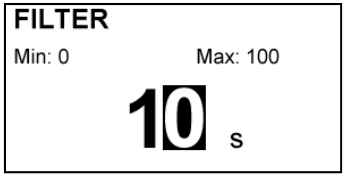
The MX4 is a bi-directional converter. The flow rate changes its sign automatically when the flow is reversed. If after the converter has been installed it is necessary to reverse the flow rate sign, in this screen it can be done by selecting the option “REVERSAL– Yes”.



7.4.4 Damping

The MX4 converter has an adaptive filter (damping) to provide stable flow rate and analog output readings in the presence of continuous flow rate fluctuations.

The configuration of this filter can be very useful in the cases where the flow rate readings have some instability (due to air bubbles, suspended solids, etc.



Only the flow rate indication of the display and the analog output are affected by the filter. The relay output and the totalizer act according to the instant flow rate. Selecting a filter with a longer or shorter integration time will provide more or less stable readings and will also affect the response time to small variations of flow rate.

The integration time is selected in seconds, with a minimum value of 0 and a maximum value of 40 seconds. For example, with an integration time of 15 seconds, the display will indicate the flow rate reading of the average flow rate over the last 15 seconds from the last update of the display. This does not mean that the display is refreshing its data every 15 seconds. The display shows a new value several times per second, indicating an average of the flow rate values of the last 15 seconds.

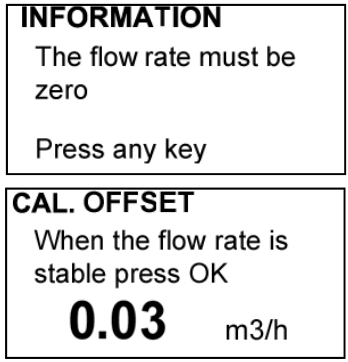
When there is a sudden variation of the flow rate then the filter should react as fast as possible to give a correct reading of the new value. For this, the filter controls the deviation of the instant flow rate with respect to a reference for each reading. If this deviation exceeds the 10%, the filter will stop acting, indicating the instant value, and will start again the filtering process.

7.4.5 Offset

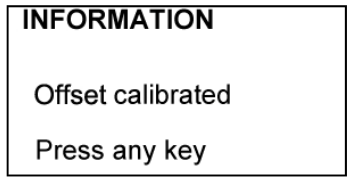
In order to obtain a perfect linearization of the instrument, it is recommended to make an adjustment of the zero offset each time an installation is performed.

The flow rate must be zero, that is, the liquid inside the pipe where the flowmeter is installed should be completely stopped. Furthermore, a completely full pipe is necessary in order to make an effective adjustment.

When the option “Offset” is selected, the following screen is shown:



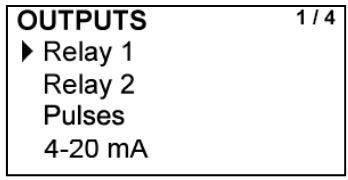
When the flow rate is stable, press the key (Enter) and the instrument will save the value.



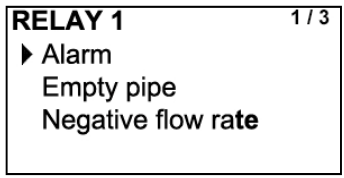
7.5 Outputs

This screen allows to program the four outputs of the instrument: Relay 1, Relay 2, pulses and analog output (4-20 mA).

7.5.1 Relay 1 and relay 2

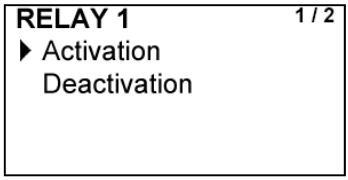


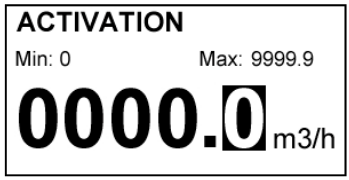
By selecting one of the two relay outputs, next screen appears with the options which allow to assign the relay to a function.



7.5.1.1 Alarm

If “Alarm” is selected, we have access to program the flow rate at which the relays will change its status and to the level of hysteresis. By level of hysteresis we understand the difference between activation and deactivation of the output. To avoid that an alarm output is continuously moving from activate to deactivate status, we must program the points of connection and disconnection.





Example

If the activation point is programmed to 100 m^3/h and the deactivation point is programmed to 90 m^3/h, when the flow rate is zero the output will be deactivated. When the flow rate reaches a value of 100 m^3/h the output will be activated until the flow rate falls below 90 m^3/h.

If we program an activation point of 90 m^3/h and a deactivation point of 100 m^3/h, when the flow rate is zero the output will be activated. When the flow rate reaches a value of 100 m^3/h the output will be deactivated until the flow rate falls below 90 m^3/h.

7.5.1.2 Empty pipe

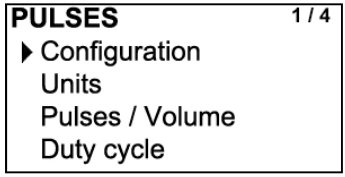
In this case, the relay will change its status when the flowmeter detects empty pipe.

7.5.1.3 Negative flow

The relay will change its status when the flow rate changes its sign.

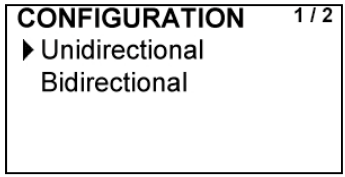
7.5.2 Pulse output

This output allows to connect the converter to a PLC or remote totalizer. The number of pulses per unit of volume can be programmed. The following parameters can be selected.



7.5.2.1 Pulse output configuration

It allows to choose between unidirectional and bidirectional.

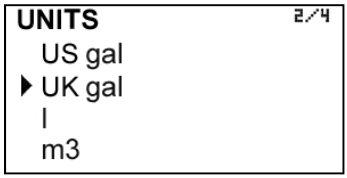


If “Unidirectional” is chosen, the output will give pulses proportional to flow rate when the flow rate is positive, and will not give them when the flow rate is negative.

If “Bidirectional” is chosen, the output will give pulses proportional to flow rate in both flow directions.

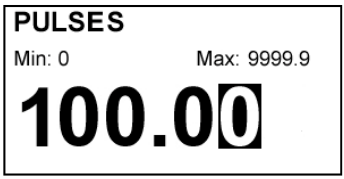
7.5.2.2 Units

First volume units for which we want to get a number of pulses are selected.



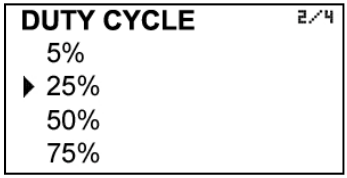
7.5.2.3 Pulses

Then the pulses per unit of volume that we will obtain at the output are selected.



7.5.2.4 Duty Cycle

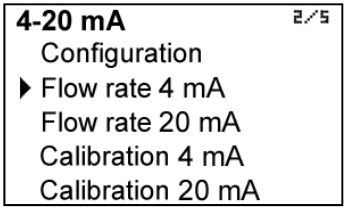
With the duty cycle width or percentage of time the pulse will be active during each cycle can be determined.



Active pulse is when the NPN transistor at the output (see 2.2.5) is ON.

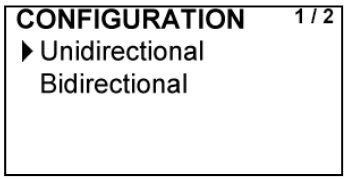
7.5.3 Analog output

The flow rate corresponding to 4 mA and 20 mA can be programmed and the calibration for these two values can be made as well.



7.5.3.1 4-20 mA output configuration

It allows to choose between unidirectional and bidirectional.

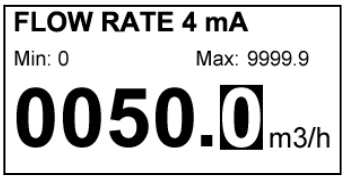


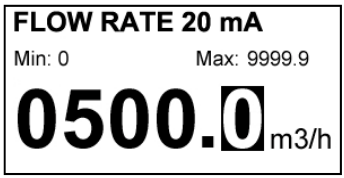
If “Unidirectional” is chosen, the analog output will have a value proportional to the flow rate when positive, and it will provide always 4 mA when negative.

If “Bidirectional” is chosen, the analog output will have a value proportional to the flow rate for both positive and negative values.

7.5.3.2 Programming of the 4-20 mA output

Flow rate values equivalent to each current are entered directly.



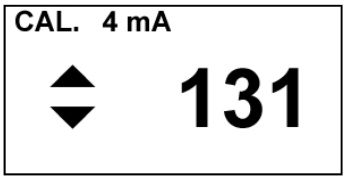


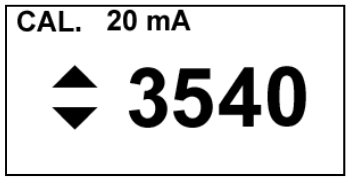
Programming a flow rate value for 20 mA higher than the one for 4 mA, the loop current changes from 4 to 20 mA as the flow increases.

Otherwise, programming a flow rate value for 20 mA lower than the one for 4 mA, the current loop will change from 20 to 4 mA as the flow increases.

7.5.3.3 Current calibration for 4 and 20 mA

The MX4 converter is delivered with the current output already calibrated. If you want to correct a derive of the 4 or 20 mA current values because they do not coincide with the ammeter used, it can be done by pressing the keys (Down / Left) and (Up) to increase or decrease the current respectively in each case. The values shown on the screen are reference levels. When one of this data is confirmed, the MX4 will take the current value shown on the ammeter as a reference.

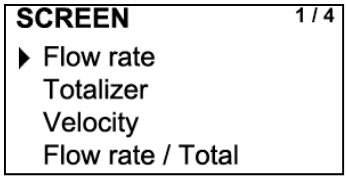




Before making a current calibration, be sure that the ammeter used for that is showing the real measure.

7.6 Working screen

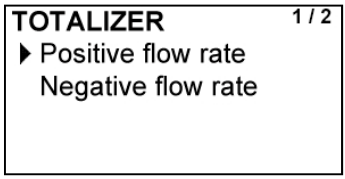
Flow rate, totalizer, liquid velocity or flow rate and totalizer screens can be programmed as a default. Thus, the converter presents this screen when a power failure occurs or when returning from the installation or programming menu.



7.7 Totalizer

In this screen you can configure the totalizer operation mode depending on the flow direction. Thus, the value indicated by the totalizer will always be true regardless of the application where the flowmeter is installed.

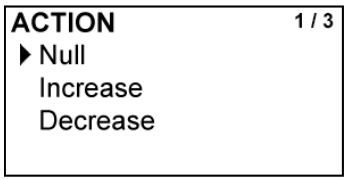
The first screen after selecting “Totalizer” is the following:



In this screen you can choose the flow direction for which you want to configure the action that the totalizer will do.

Positive flow is defined as the one that appears unsigned on the default screen, and negative flow the one that appears with a — sign on the default screen.

Once the flow rate direction is chosen, a screen with the different actions is shown:



If "Null" is selected, the totalizer remains unchanged. If "Increase" is selected, the totalizer will add the amount of fluid passing through the flowmeter, and if you select "Decrease", the totalizer will subtract that amount.

Examples:

a) Installation in which for a time the product flows through the pipe and after that a cleaning process in reverse direction is performed. The programming will be:

Positive flow rate action: Increase
Negative flow rate action: Null

b) Installation in which for a time the product flows through the pipe to a tank, and after that a quantity of the product comes back in the opposite direction. The programming will be:

Positive flow rate action: Increase

Negative flow rate action: Decrease

The totalizer will indicate the volume of product that there is in the tank.

c) Installation in which for a time a first product flows through the pipe, and after that a second product flows in the opposite direction. The programming will be:

Positive flow rate action: Increase

Negative flow rate action: Increase

The totalizer will indicate the volume corresponding to the sum of both products.

Note: To reset the totalizer, go to chapter 5 (page 27).

7.8 Modbus

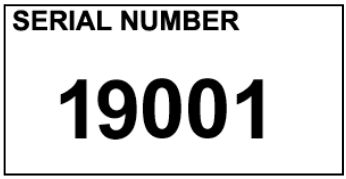
This option is only implemented in some devices.

It allows to configure the needed parameters to establish a Modbus RTU communication with the instrument.

Detailed information on this point could be found in the R-IT-MX4COM instructions manual, that can be downloaded from the Tecfluid S.A. website.

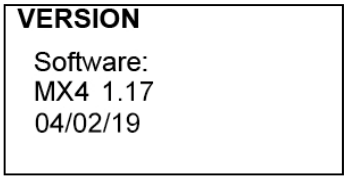
8 SERIAL NUMBER

In this section the converter serial number is shown.



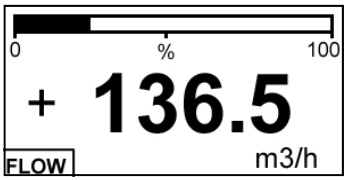
9 SOFTWARE VERSION

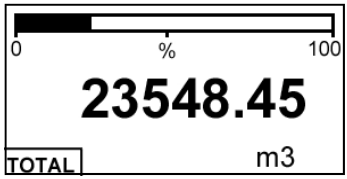
From the main menu, if “Software version” is selected, the screen will show this data and the corresponding date.

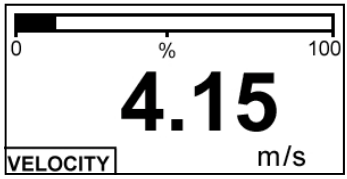


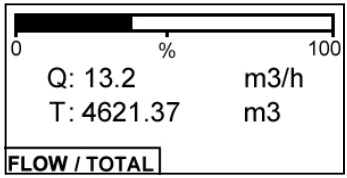
10 WORKING SCREEN

When exiting the menu, the display shows the default screen. To scroll between the three operating screens, press the key (Down / Left) or (Up).



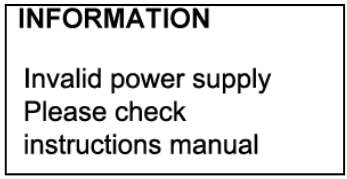






11 STARTING CURRENT

It may happen that the chosen power supply can not provide the required current for the equipment to operate properly. In this case an information message will appear indicating this situation.



12 MAINTENANCE

No special maintenance is required.

For cleaning, a humid cloth can be used, and if necessary with a little neutral soap. Solvents or other aggressive liquids which could damage the housing material should not be used.

12.1 Fuse

In the event that the fuse blows, this should be replaced with a slow blow “T” fuse, size Ø5 x 20 mm and value 250 mA.

13 ASSOCIATED SOFTWARE WINSMETER MX4

Most of the steps in the preceding paragraphs can be done by means of the device associated software Winsmeter MX4, which allows working in a more comfortable and intuitive way.

Such software can be downloaded from the “Downloads” section of the Tecfluid S.A. website www.tecfluid.com/downloads

13.1 USB cable connection and drivers installation

Extract the files from the winsmeterMX4.zip to a new system folder.

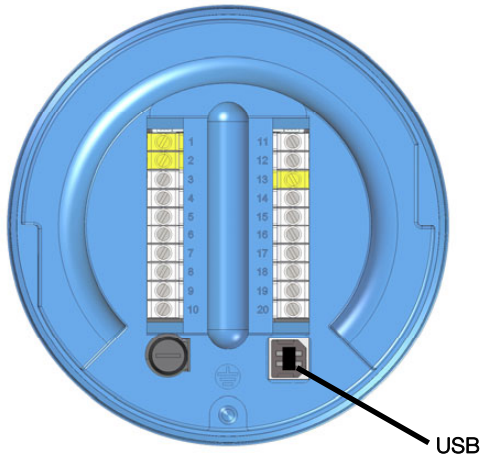
Execute the Setup.exe file and follow the steps for the installation.

In order to connect the converter to a computer an USB cable is required. This cable is type A at one end and type B at the other, and it is readily available on the market.

The ends of the cables can be seen in the picture.

The first step to do the connection is to open the rear cover of the electronic converter.

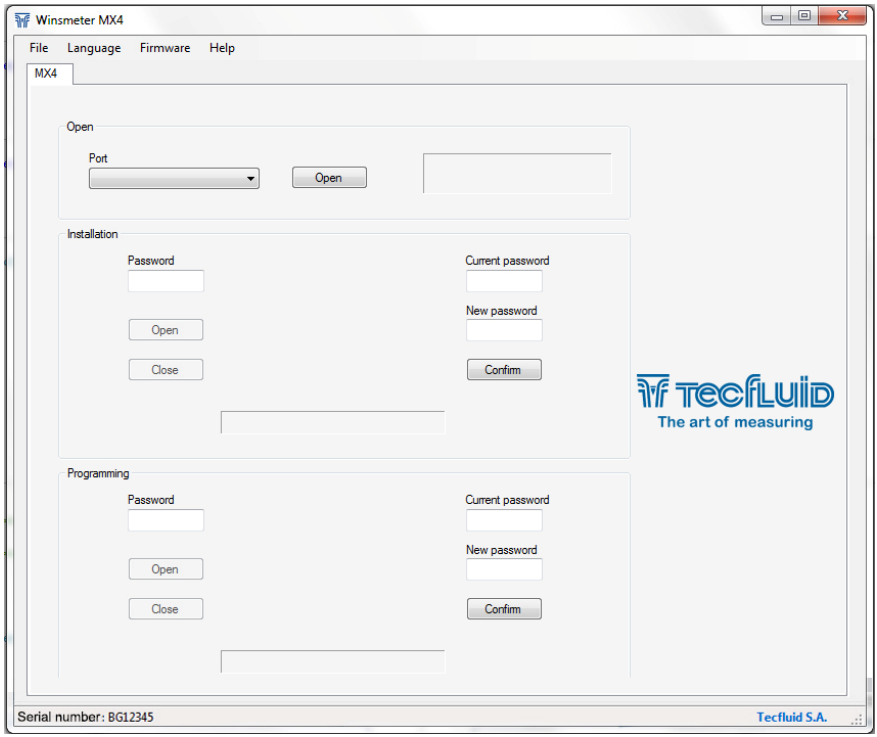
The USB connector is located below the right terminal strip.



Connect the USB cable at one end to the converter and at the other to the computer where the software is installed.

Power on the electronic converter.

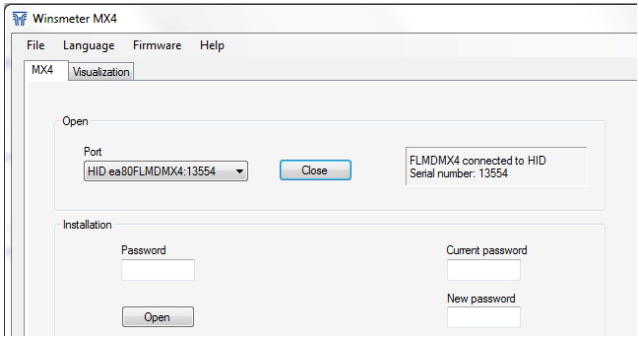
Execute the program WinsmeterMX4 following the sequence Start – Programs – Tecfluid S.A. - WinsmeterMX4.



13.2 Port connection

In the "Port" section, choose the appropriate port for the converter. This will appear with the name of the port followed by MX4 and its serial number. Then click "Open".

Once the port is open, the button "Open" in the "Installation" and “Programming” sections activates.

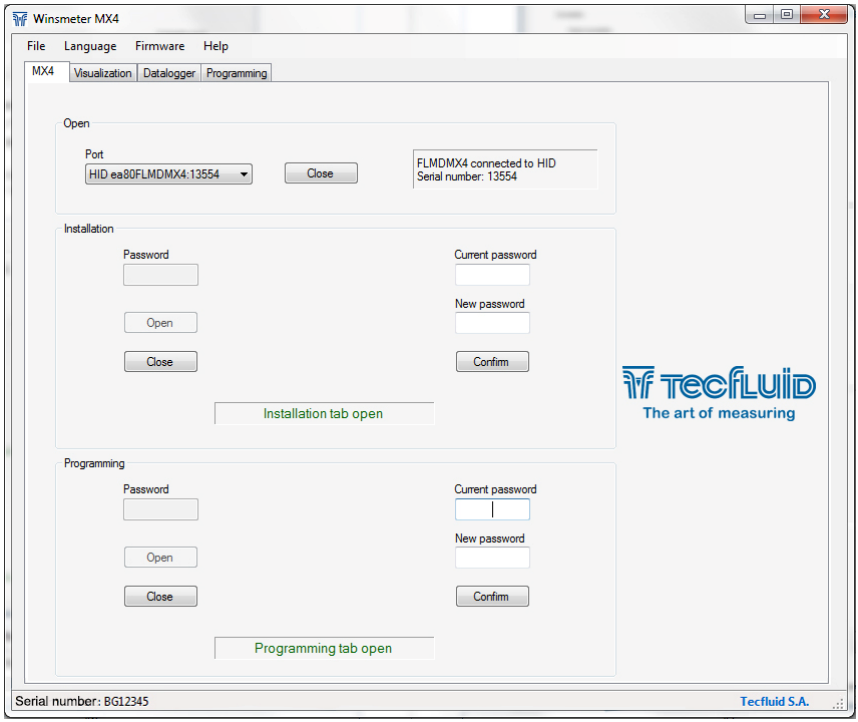


13.3 Access to installation and programming

In order to change the data contained in the "Install" tab, you must enter a password.

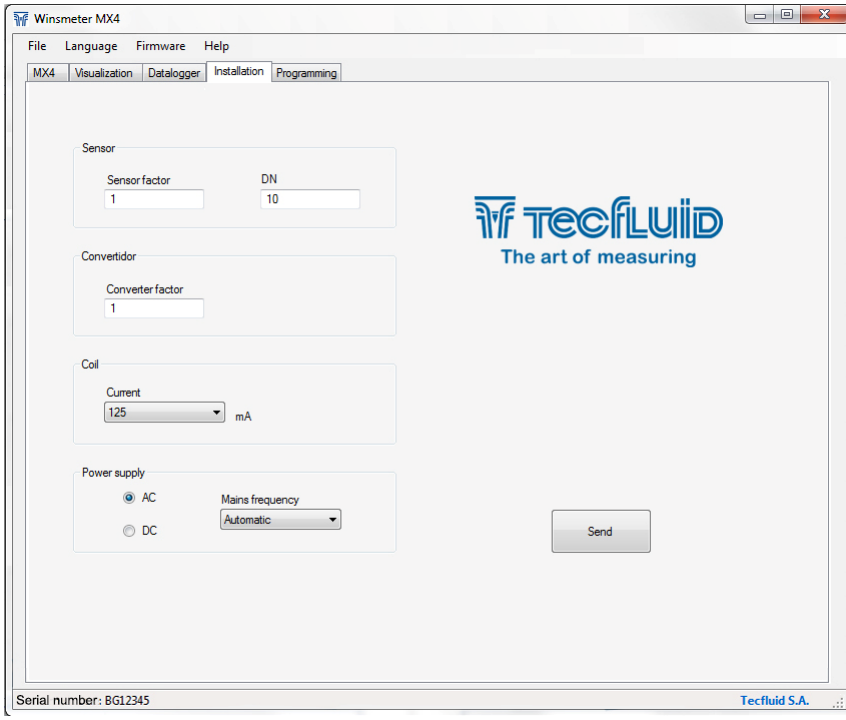
The default password is **install**, and it can be changed using the boxes on the right of the "Installation" section.

Likewise, to change the data contained in the "Programming" tab it is necessary to enter the password which by default is **program**. This can be changed using the boxes on the right of the "Programming" section.



Once the password is written, press "Enter" or "Open", and the installation or programming tab will open. At the bottom of each section the text "Installation tab open" or "Programming tab open" will be displayed.

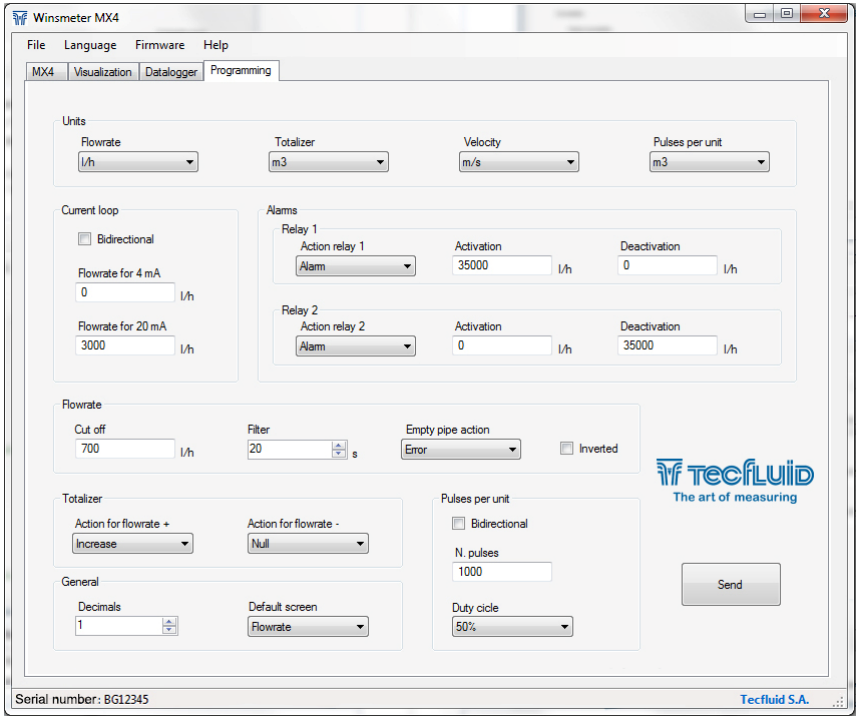
To enter the Installation window, just click the corresponding tab.



In the installation window the parameters that adapts the converter to a sensor and to a certain installation can be configured.

To transfer data to the MX4 converter, press the “Send” button. The message "Saving program" will appear for two seconds in the converter screen. The installation data will be stored in the memory of the converter.

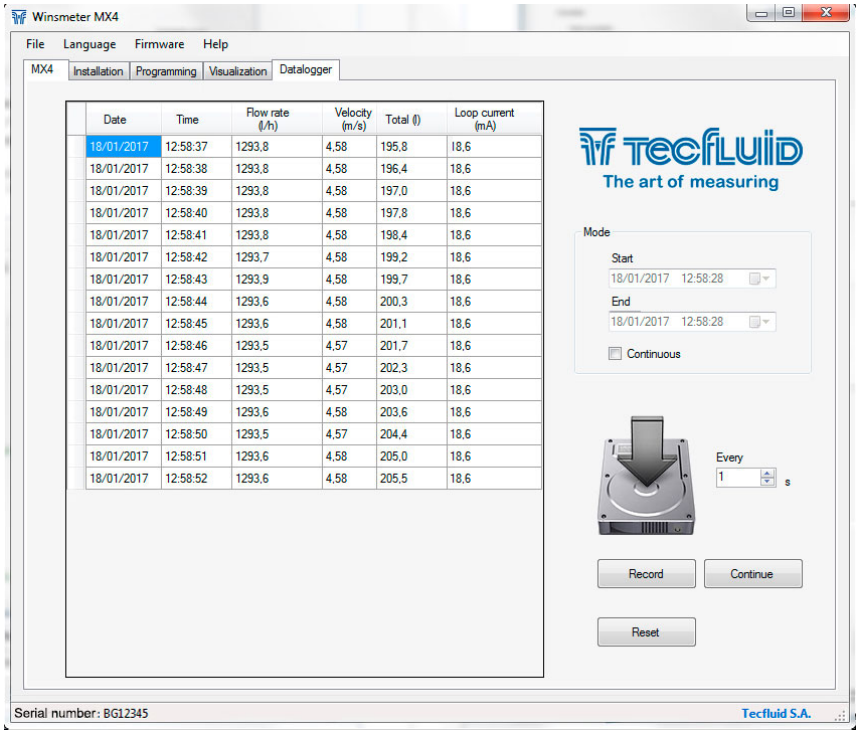
Likewise, to enter into the programming window, just click the corresponding tab.



Changing the parameters of this screen, (see previous page) you can program the different functions of the equipment.

As in the previous paragraph, to program this data to the MX4 converter, press the “Send” button. The message "Saving program" will appear for two seconds in the converter screen. The programming data will be stored into the memory of the converter.

13.4 Datalogger

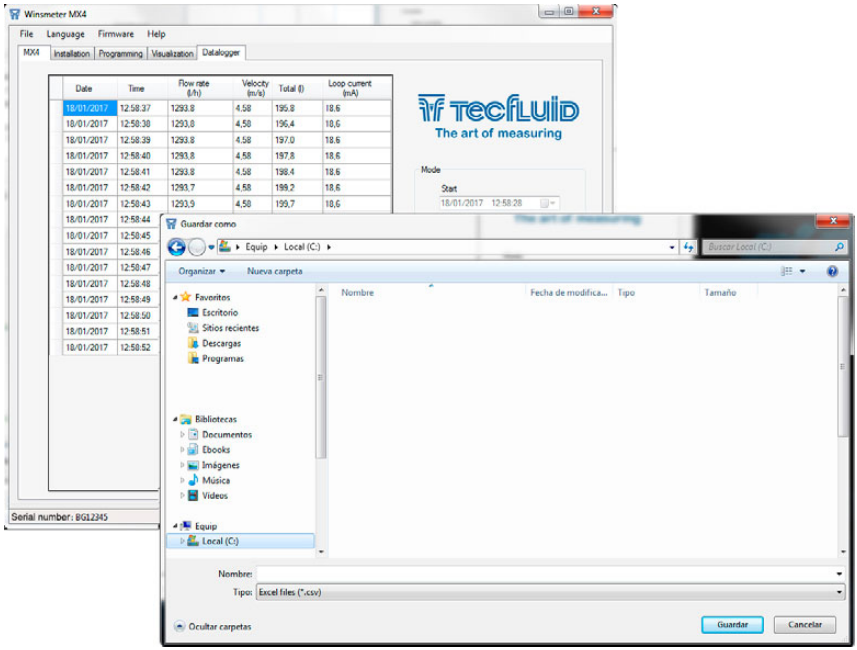


In this window the process of the different variables of the equipment can be registered in a file.

The time between samples, as well as the start and end time of the record can be selected.

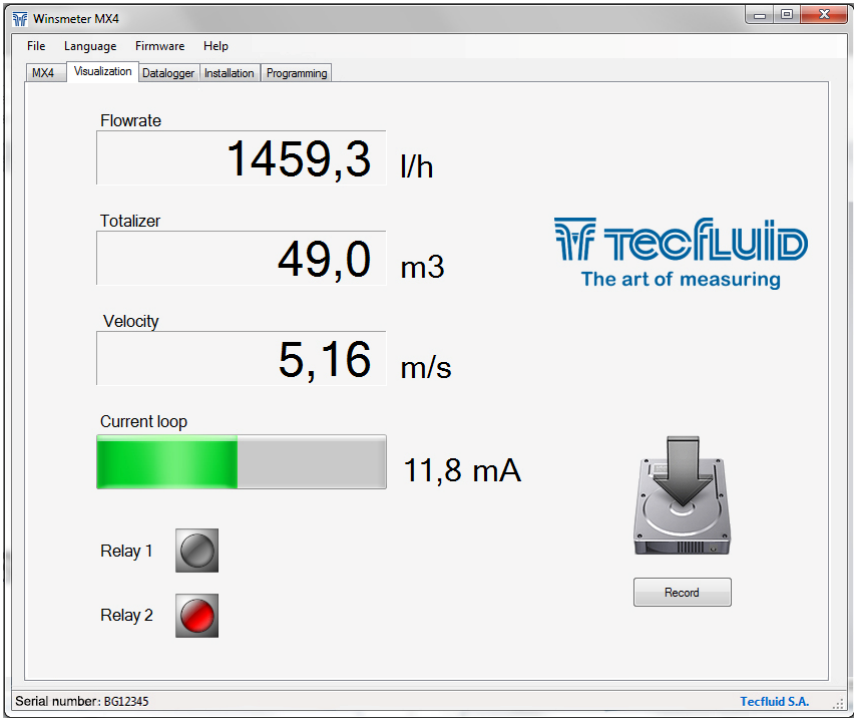
When the "Register" button is pressed, the screen that allows to name the file and select its location appears.

The created file has CSV format, which can be viewed directly with a spreadsheet.



13.5 Visualization

When the communication with the computer port is established (see section 12.2), the tab "Visualization" opens. This tab lets you view real-time flow rate, totalizer and velocity values, as well as the current value of the analog output and the status of the relay outputs.



It is an intuitive tool to verify that the instrument has been installed and programmed correctly.

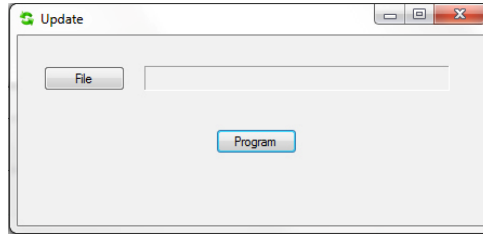
By means of the "Record" button, you can store data in different computer files, which can then be processed by other software.

13.6 Firmware updates

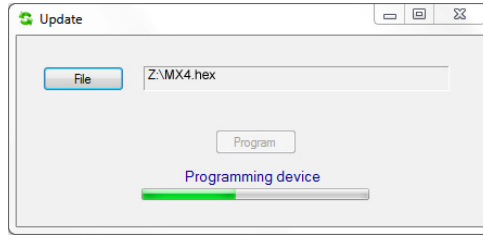
New firmware updates can be published in the website. These updates contain improvements or bug fixes that make the equipment operates at best conditions.

The updates can be downloaded from the “Downloads” section of the Tecfluid S.A. website www.tecfluid.com/downloads

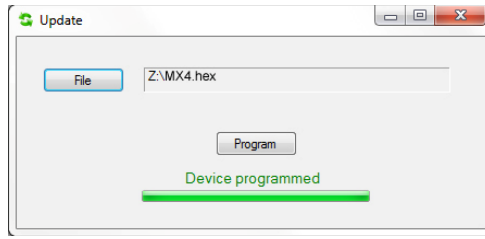
To update the equipment, go to menu “Firmware” - “Update”, and a screen with the button “File” will appear. Pressing this button system can be accessed. The downloaded file has to be searched there.



Once the file is selected, press the “Program” button. A message “Programming device” will appear.



The process takes about 90 seconds, after which the message “Device programmed” will appear.



From this moment, the converter MX4 already has the new version of Firmware.

14 TECHNICAL CHARACTERISTICS

Accuracy

±0.5% reading value for v > 0.4 m/s

$\frac{\pm 0.2}{v\ (m/s)}$ % reading value for v < 0.4 m/s

Repeatability

± 0.1% reading value

Velocity range

0.2 ...10 m/s

Temperature

Process temperature:

PP: -10ºC … +80ºC
PTFE, PVDF: -20ºC … +120ºC
Ebonite: -20ºC … +90ºC

Ambient temperature range: -20ºC ... +60ºC

Minimum conductivity

20 µS/cm

Power supply

90 ... 265 VAC 50, 60 Hz	Power consumption: ≤ 5 VA
12 ... 48 VDC	Power consumption: ≤ 5 W

Analog output

4-20 mA. Active or passive. galvanically isolated from the power supply.

Pulse output

Optoisolated. NPN bipolar transistor. Vmax: 30 VDC. Imax: 30 mA.
Maximum frequency : 5000 Hz
Minimum frequency : 0.01 Hz

Relay outputs

2 relay with potential free contacts.

Contact characteristics:

Maximum voltage : 250 VAC
Maximum current : 8 A
Maximum power : 500 VA

Totalizer

N. of digits:	8 (2 decimals)**
Digit size:	8 mm
Reset:	by means of keyboard

Flow rate indication

Nº of digits:	5 (up to 2 decimals configurable)**
Digit size:	11 mm

** When the available digits are full and the integers overflow a decimal is automatically lost.

Liquid velocity indication

Nº of digits:	5 (2 decimals)
Digit size:	11 mm

General characteristics

Sensor materials:

Exterior: FLOMID-0FX: EN 1.4404 (AISI 316L)
FLOMID-2FX, 4FX (DN ≤ 80): Coated aluminium, optional EN 1.4404 (AISI 316L)
FLOMID-2FX, 4FX (DN > 80): Coated steel, optional EN 1.4404 (AISI 316L)
FLOMID-1FX, 3FX, 5FX, 7FX: Stainless Steel

Liner: FLOMID-0FX: PP, PVDF
FLOMID-2FX, 4FX: PTFE, Ebonite
FLOMID-1FX, 3FX, 5FX, 7FX: PTFE

Electrodes: Hastelloy C22 (UNS-06022), stainless steel, titanium, zirconium, tantalum

MX4 converter material: Coated aluminium

Ingress protection:

FLOMID-0FX: IP65
FLOMID-1FX, 2FX, 3FX, 4FX: 5FX, 6FX, 7FX, 9FX: IP68 10m H_2O
MX4 converter: IP67

Maximum cable length (remote version) : 150 m

Communication protocols (optional)

Modbus RTU
HART

Detailed information on these protocols can be found in the R-IT-MX4COM instructions

manual, that can be downloaded from Tecfluid S.A. website.

15 SAFETY INSTRUCTIONS

The series FLOMID flowmeters are in conformity with all essential requirements of all EC directives applicable to them:

2014/68/EU	Pressure equipment directive (PED)
2014/30/EU	Electromagnetic compatibility directive (EMC)
2012/19/EU	Waste electric and electronic equipment (WEEE).
2011/65/EU	Restriction of the use of certain hazardous substances in electrical and electronic equipment (ROHS).

The declarations UE of conformity can be downloaded from the section “Download” of the Tecfluid S.A. website. www.tecfluid.com

15.1 Pressure equipment directive

Tecfluid S.A. have subjected the series FLOMID of flowmeters to a conformity assessment method for the pressure equipment directive, specifically according to module H (full quality assurance).

Conformity with the directive is reflected by the CE marking in each pressure equipment and by the written declaration of conformity. The CE marking is accompanied by the identification number of the notified body involved at the production control phase.

The marking of the equipment takes into account the fluid type, the group of fluid and the category, for example: G1 CATI

G	Gases and vapours
1	Group of liquids 1
CATI	Category I

Devices that, due to their size, are not subject to conformity assessment, are considered outside the scope of the directive and therefore they have not the CE mark according to pressure directive. These devices are subject to applicable sound engineering practice (SEP).

This equipment is considered as being a pressure accessory and **NOT** a safety accessory as defined in the 2014/68/EU directive, Article 2, paragraph 4.

15.2 Certificate of conformity TR CU (EAC marking)

Tecfluid S.A. have subjected the series FLOMID of flowmeters to a certification procedure according to the technical regulations of the Customs Union of the Eurasian Economic Union (EEU).

This Certificate is an official document confirming the quality of production with the standards on the territory of the Customs Union, particularly regarding safety requirements

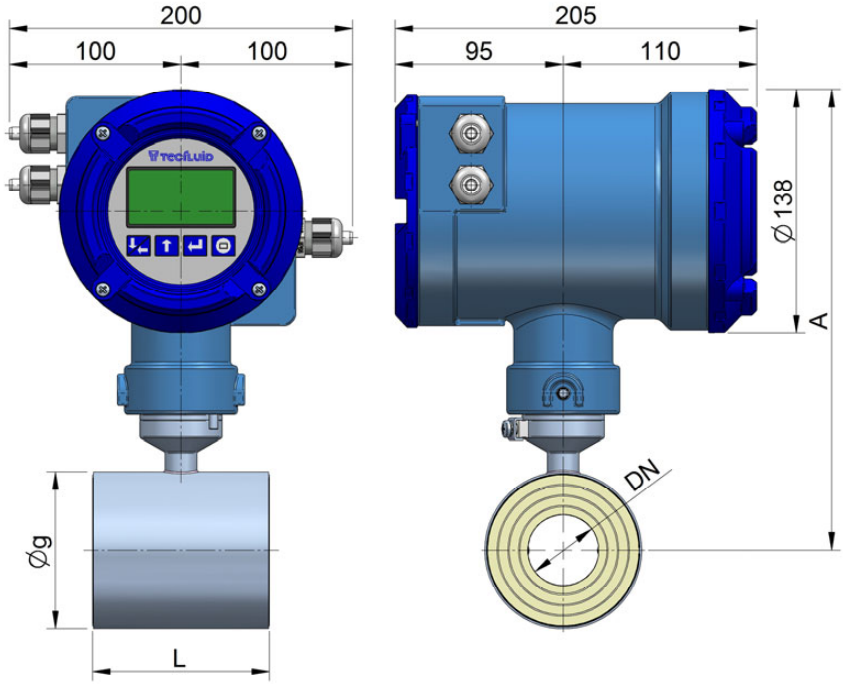
FLOMID-0FX (EN 1092-1 wafer mounted)

DN	PN	g	L	A	h	Weight (kg)
3		48	65	240	152	3,7
6		48	65	240	152	3,7
10		48	65	240	152	3,7
15		54	65	243	155	3,8
20		63	65	248	160	4,0
25	16	73	80	252	165	4,1
32		84	80	258	171	4,2
40		89	100	261	173	4,4
50		108	100	270	183	4,7
65		129	120	281	193	5,4
80		141	120	287	199	5,7
100		154	165	293	206	6,5
125	10	192	165	310	222	10,4
150		218	165	323	235	11,8

FLOMID-0FX (ANSI B16.5 wafer mounted)

NPS	Class	g	L	A	h	Weight (kg)
⅛"		48	65	240	152	3,7
⅜"		48	65	240	152	3,7
½"		48	65	240	152	3,7
¾"		54	65	243	155	3,8
1"		63	65	248	160	4,0
1¼"		73	80	252	165	4,1
1½"	150#	84	80	258	171	4,2
2"		89	100	261	173	4,4
2½"		108	100	270	183	4,7
3"		129	120	281	193	5,4
4"		154	165	293	206	6,5
5"		192	165	310	222	10,4
6"		218	165	323	235	11,8

(All dimensions in mm)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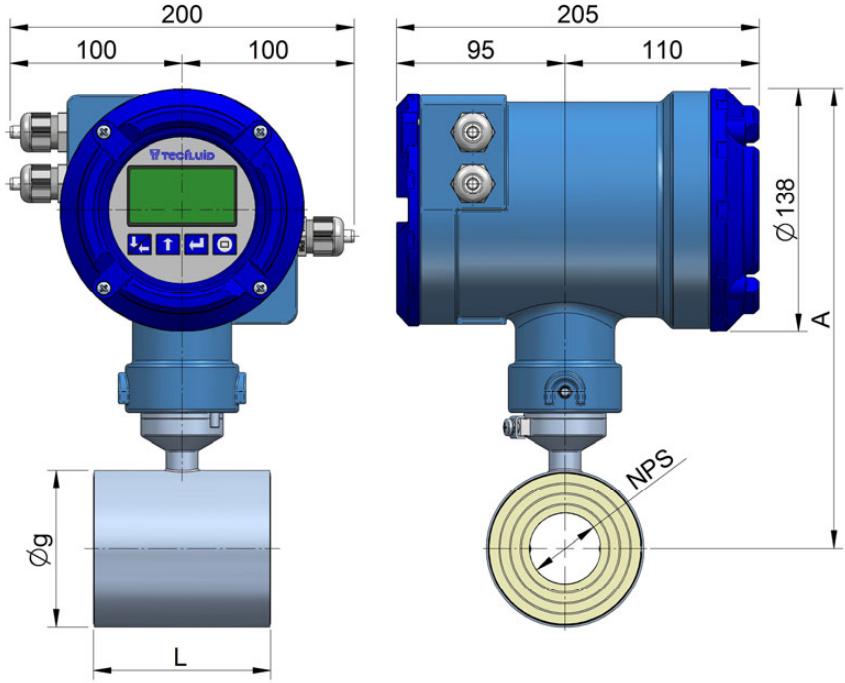
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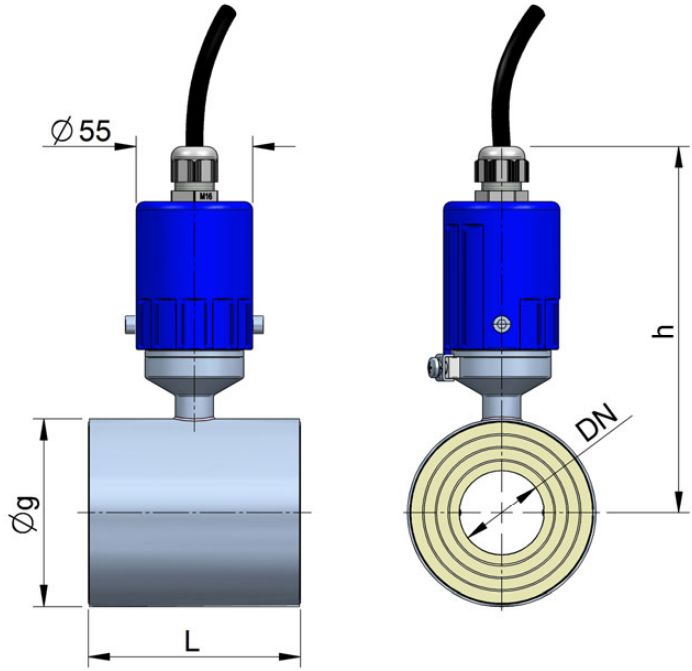
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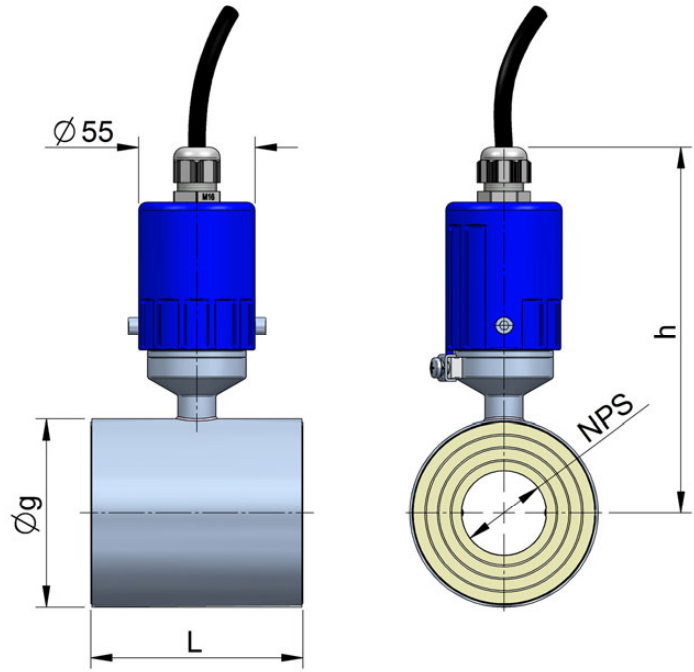
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L
h
NPS

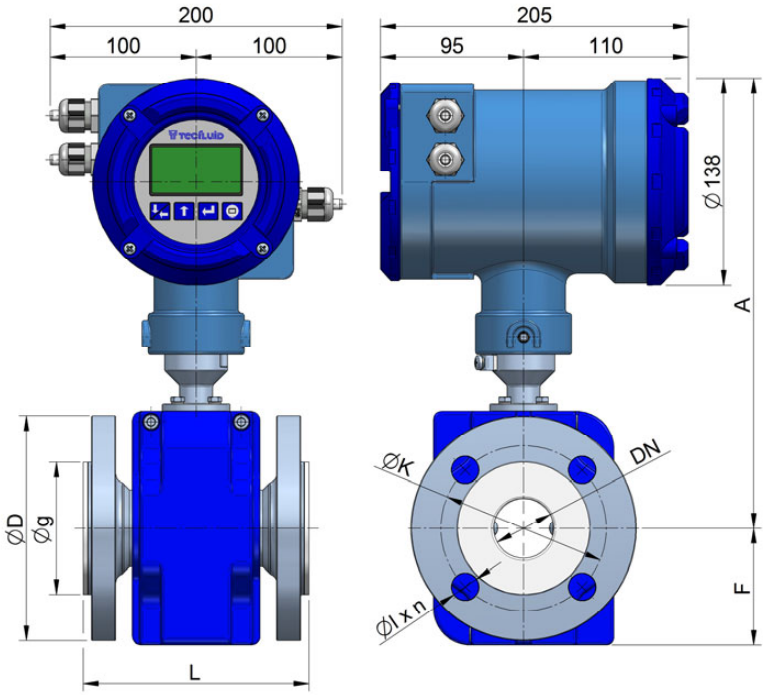
FLOMID-2FX (EN 1092-1 flanges)

DN	PN	D	K	l x n	g	L	A	h	F	Weight (kg)
10	16	90	60	14 x 4	40	150	292	206	71	6,0
15		95	65	14 x 4	45	150	292	206	71	6,0
20		105	75	14 x 4	58	150	292	206	71	6,5
25		115	85	14 x 4	68	150	292	206	71	7,0
32		140	100	18 x 4	78	160	300	213	78	8,5
40		150	110	18 x 4	88	160	300	213	78	9,0
50		165	125	18 x 4	102	200	326	240	105	10,5
65		185	145	18 x 8	122	200	326	240	105	12,0
80		200	160	18 x 8	138	200	326	240	105	14,0
100		220	180	18 x 8	158	250	320	232	110	18,0
125		250	210	18 x 8	188	250	332	245	125	20,0
150		285	240	22 x 8	212	300	347	260	143	23,0
200	10	340	295	22 x 8	268	350	376	289	170	34,0
250		395	350	22 x 12	320	400	404	317	198	48,0
300		445	400	22 x 12	370	500	421	334	223	56,0
350		505	460	22 x 16	430	500	454	367	253	65,0
400		565	515	26 x 16	482	600	471	384	283	79,0
450		615	565	26 x 20	532	600	526	439	309	88,0
500		670	620	26 x 20	585	600	551	464	335	101,0

FLOMID-4FX (ASME B16.5 flanges)

NPS	Class	D	K	l x n	g	L	A	h	F	Weight (kg)
½"	150#	90	60.3	5/8" x 4	34.9	150	292	206	71	6,0
¾"		100	69.9	5/8" x 4	42.9	150	292	206	71	6,5
1"		110	79.4	5/8" x 4	50.8	150	292	206	71	7,0
1¼"		115	88.9	5/8" x 4	63.5	160	300	213	78	8,5
1½"		125	98.4	5/8" x 4	73.0	160	300	213	78	9,0
2"		150	120.7	¾" x 4	92.1	200	326	240	105	10,5
2½"		180	139.7	¾" x 4	104.8	200	326	240	105	12,0
3"		190	152.4	¾" x 4	127.0	200	326	240	105	14,0
4"		230	190.5	¾" x 8	157.2	250	320	232	115	18,0
5"		255	215.9	7/8" x 8	185.7	250	332	245	128	20,0
6"		280	241.3	7/8" x 8	215.9	300	347	260	140	23,0
8"		345	298.5	7/8" x 8	269.9	350	376	289	173	34,0
10"		405	362.0	1" x 12	323.8	400	404	317	203	48,0
12"		485	431.8	1" x 12	381.0	500	421	334	243	56,0
14"		535	476.3	1 1/8" x 12	412.7	500	454	367	268	65,0
16"		595	539.8	1 1/8" x 16	469.9	600	471	384	298	79,0
18"		635	577.9	1 1/8" x 16	533.4	600	526	439	318	88,0
20"		700	635.0	1 1/8" x 20	584.2	600	551	464	350	101,0

All dimensions in mm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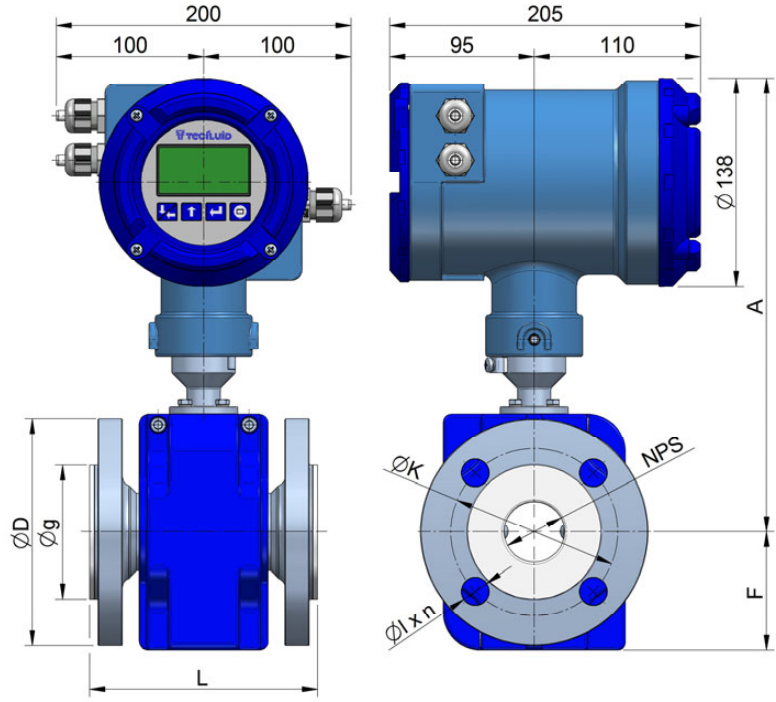
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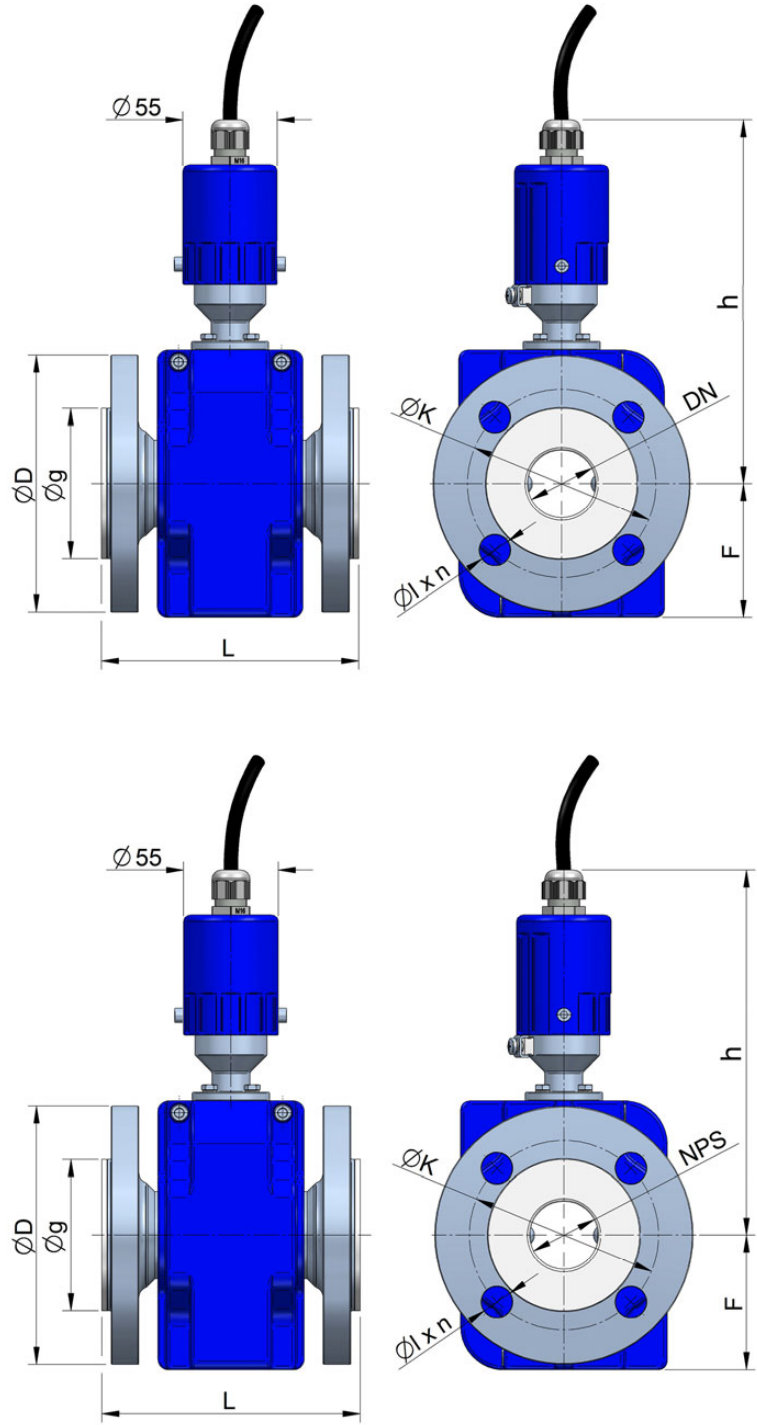
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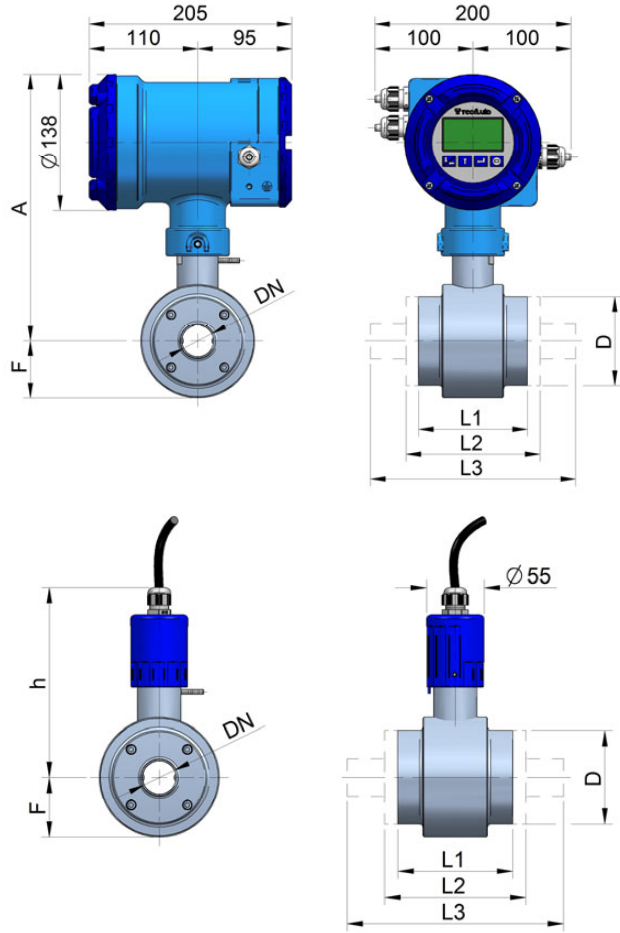
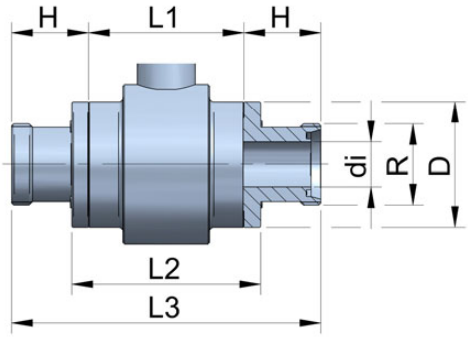
Sanitary connection FLOMID sensor, common dimensions

DN	L1	L2	D	A	h	F
10	104	120	60	260	172	48
15	104	120	65	260	172	48
20	104	120	70	262	174	50
25	110	134	80	262	174	50
32	110	134	90	270	182	58
40	130	154	100	270	182	58
50	130	154	115	279	191	66
65	160	186	145	292	204	79
80	160	186	160	300	212	86
100	204	234	180	316	228	102



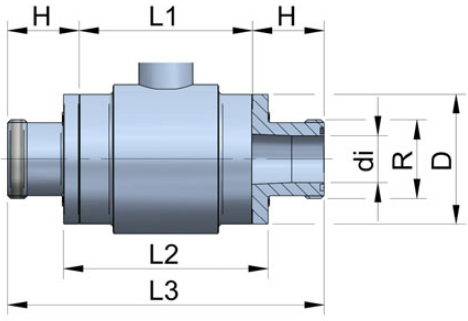
FLOMID-1FX (DIN 11851)

DN	di	R	D	L1	L2	L3	H
10	10	Rd 28 x 1/8"	60	104	120	200	48
15	16	Rd 34 x 1/8"	65	104	120	200	48
20	20	Rd 44 x 1/6"	70	104	120	200	48
25	26	Rd 52 x 1/6"	80	110	134	220	55
32	32	Rd 58 x 1/6"	90	110	134	220	55
40	38	Rd 65 x 1/6"	100	130	154	240	55
50	50	Rd 78 x 1/6"	115	130	154	240	55
65	66	Rd 95 x 1/6"	145	160	186	280	60
80	81	Rd 110 x 1/4"	160	160	186	280	60
100	100	Rd 130 x 1/4"	180	204	234	330	63



FLOMID-3FX (SMS 1145)

DN	di	R	D	L1	L2	L3	H
25	22.5	Rd 40 x 1/6"	80	110	134	220	55
32	29.5	Rd 48 x 1/6"	90	110	134	220	55
40	35.5	Rd 60 x 1/6"	100	130	154	240	55
50	48.5	Rd 70 x 1/6"	115	130	154	240	55
65	60.5	Rd 85 x 1/6"	145	160	186	280	60
80	72.0	Rd 98 x 1/6"	160	160	186	280	60



FLOMID-5IFX (CLAMP ISO 2852)

DN	OD*	di	C	D	L1	L2	L3	H
10	12.0	10.0	34.0	60	104	120	200	48
10	12.7	10.7	34.0	60	104	120	200	48
15	17.2	15.2	34.0	65	104	120	200	48
20	21.3	19.3	34.0	70	104	120	200	48
25	25.0	22.6	50.5	80	110	134	220	55
32	33.7	31.3	50.5	90	110	134	220	55
40	38.6	35.6	50.5	100	130	154	240	55
50	51.0	48.6	64.0	115	130	154	240	55
65	63.5	60.3	77.5	145	160	186	280	60
80	76.1	72.9	91.0	160	160	186	280	60
100	101.6	97.6	119.0	180	204	234	330	63

* OD = pipe outside Ø according to ISO 2037

FLOMID-5DFX (CLAMP DIN 32676)

DN	OD*	di	C	D	L1	L2	L3	H
10	13	10	34.0	60	104	120	200	48
15	19	16	34.0	65	104	120	200	48
20	23	20	34.0	70	104	120	200	48
25	29	26	50.5	80	110	134	220	55
32	35	32	50.5	90	110	134	220	55
40	41	38	50.5	100	130	154	240	55
50	53	50	64.0	115	130	154	240	55
65	70	66	91.0	145	160	186	280	60
80	85	81	106.0	160	160	186	280	60
100	104	100	119.0	180	204	234	330	63

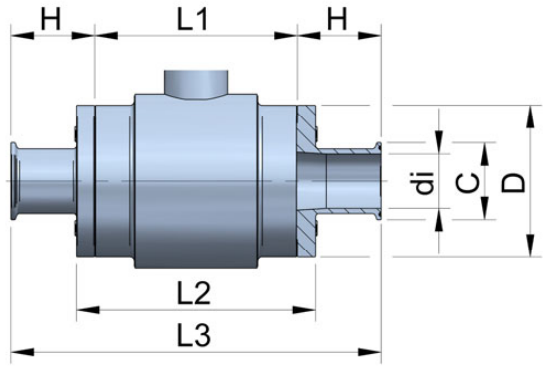
* OD = pipe outside Ø according to DIN 11850 (Series 2)

(All dimensions in mm)

FLOMID-5TFX (TRI-CLAMP®)

DN	Coup	OD*	di	C	D	L1	L2	L3	H
10	½"	12.7	9.4	25.0	60	104	120	200	48
15	¾"	19.0	15.7	25.0	65	104	120	200	48
25	1"	25.4	22.1	50.4	80	110	134	220	55
40	1½"	38.1	34.8	50.4	100	130	154	240	55
50	2"	50.8	47.5	63.9	115	130	154	240	55
65	2½"	63.5	60.2	77.4	145	160	186	280	60
80	3"	76.2	72.9	90.9	160	160	186	280	60
100	4"	101.6	97.4	118.9	180	204	234	330	63

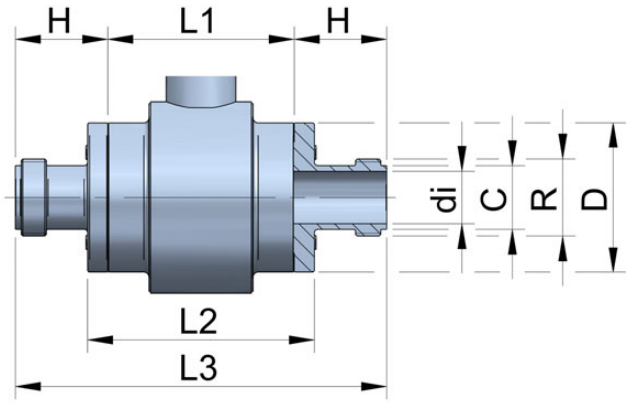
* OD = pipe outside Ø according to ASME BPE DT-1
® trademark of Tri-Clover Inc.



(All dimensions in mm)

FLOMID-7FX (ISO 2853)

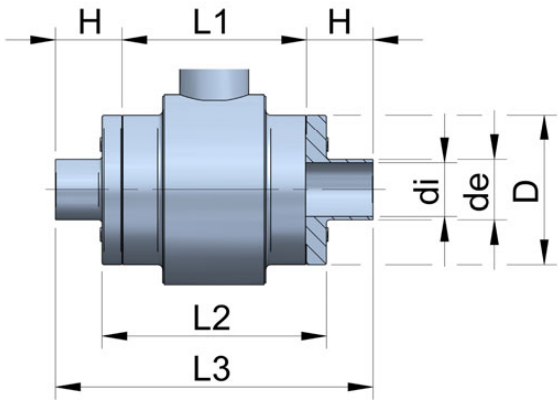
DN	di	R	C	D	L1	L2	L3	H
10	10.0	Tr 22.89 x 1/8"	15.0	60	104	120	200	48
15	15.2	Tr 29.26 x 1/8"	21.2	65	104	120	200	48
20	19.3	Tr 33.53 x 1/8"	25.4	70	104	120	200	48
25	22.6	Tr 37.13 x 1/8"	29.0	80	110	134	220	55
32	31.3	Tr 45.97 x 1/8"	38.0	90	110	134	220	55
40	35.6	Tr 50.65 x 1/8"	42.5	100	130	154	240	55
50	48.6	Tr 64.16 x 1/8"	56.0	115	130	154	240	55
65	60.3	Tr 77.67 x 1/8"	69.7	145	160	186	280	60
80	72.9	Tr 91.19 x 1/8"	82.3	160	160	186	280	60
100	97.6	Tr 118.21 x 1/8"	108.5	180	204	234	330	63



(All dimensions in mm)

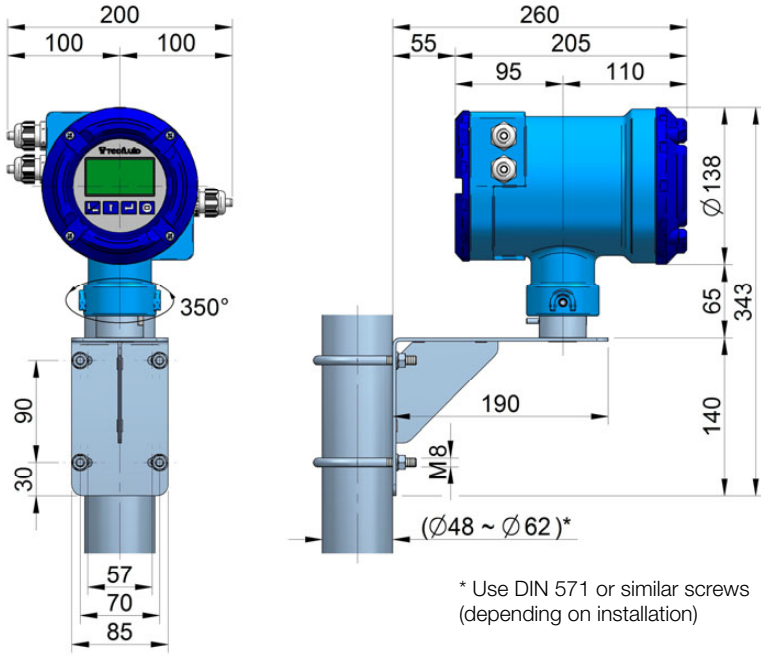
FLOMID-9WDFX (DIN 11850 weld-on connections)

DN	de	di	D	L1	L2	L3	H
10	13	10	60	104	120	180	38
15	19	16	65	104	120	180	38
20	23	20	70	104	120	180	38
25	29	26	80	110	134	190	40
32	35	32	90	110	134	190	40
40	41	38	100	130	154	210	40
50	53	50	115	130	154	210	40
65	70	66	145	160	186	250	45
80	85	81	160	160	186	250	45
100	104	100	180	204	234	300	48



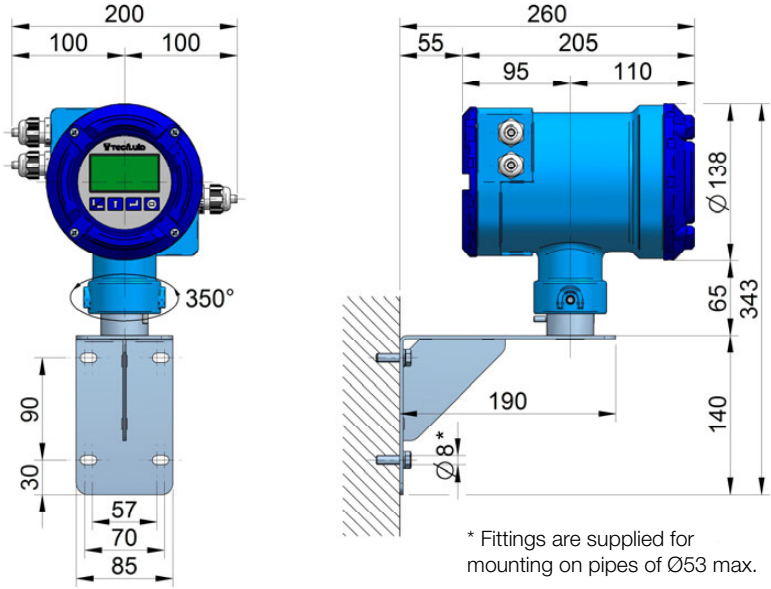
(All dimensions in mm)

MX4 REMOTE CONVERTER (wall mounting)



* Use DIN 571 or similar screws (depending on installation)

MX4 REMOTE CONVERTER (pipe mounting)

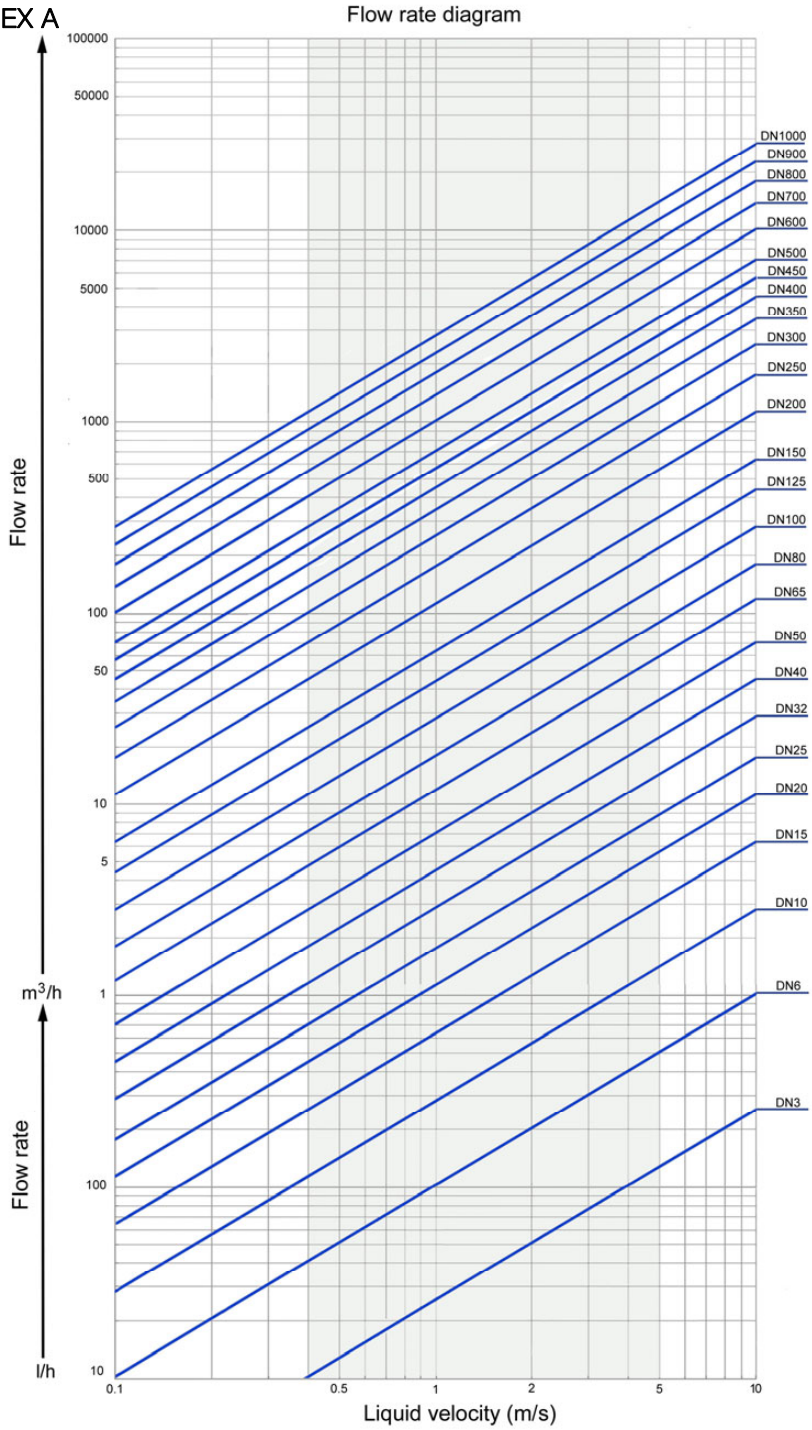


* Fittings are supplied for mounting on pipes of Ø53 max.

17 TROUBLESHOOTING

Problem	Probable cause	Solution
The screen shows empty pipe	Pipe is empty	Make sure that the pipe is completely full, for example, installing the flowmeter in a vertical pipe with upwards flow
	The functional earth is not connected	Connect the functional ground of the flowmeter to a metallic point of the installation in contact with the liquid
	Isolation of the electrodes	Clean the sensor electrodes
	Electrode cable disconnected	Connect the cable between the sensor and the electronic converter
	Liquid with very low conductivity	The flowmeter is not adequate for the application
The flow rate is unstable	Dirt on the electrodes	Clean the sensor electrodes
	The product contains air or non-conductive particles in suspension	Verify that the flowmeter is adequate for this application
The flow rate displayed is 0	Coil cable disconnected	Connect the cable between the sensor and the electronic converter
	The flow rate is smaller than programmed as CUT OFF	Decrease the value of the cut off (see page 35)
The instrument displays a value when there is not flow	The sensor is damaged due to electrodes corrosion	Electrode material not adequate for the liquid
	The functional earth is not connected and the empty pipe option is OFF	Connect the functional ground of the flowmeter to a metallic point of the installation in contact with the liquid
The displayed flow rate is higher than expected	The electrodes are immersed but the pipe is not completely full	Make sure that the pipe is completely full, for example, installing the flowmeter in a vertical pipe with upwards flow.
Display is blank	Blown fuse	Change the fuse
The analog output gives always 4 mA or 20 mA	Current output range not properly programmed	Program the range properly (see page 39)
The analog output gives always 0 mA	Cable disconnected	Check the cable connection
The invalid current message appears	Insufficient current from the power supply	Change the power supply

ANNEX A


Flow rate diagram
Flow rate
m³/h
Flow rate
l/h
100000
50000
10000
5000
1000
500
100
50
10
5
1
100
10
DN1000
DN900
DN800
DN700
DN600
DN500
DN450
DN400
DN350
DN300
DN250
DN200
DN150
DN125
DN100
DN80
DN65
DN50
DN40
DN32
DN25
DN20
DN15
DN10
DN6
DN3
0.1
0.5
1
2
5
10
Liquid velocity (m/s)

WARRANTY

Tecfluid S.A. guarantee all the products for a period of 24 months from their sale, against all faulty materials, manufacturing or performance. This warranty does not cover failures which might be imputed to misuse, use in an application different to that specified in the order, the result of service or modification carried out by personnel not authorized by Tecfluid S.A., wrong handling or accident.

This warranty is limited to cover the replacement or repair of the defective parts which have not damaged due to misuse, being excluded all responsibility due to any other damage or the effects of wear caused by the normal use of the devices.

Any consignment of devices for repair must observe a procedure which can be consulted in the website www.tecfluid.com, “After-Sales” section.

All materials sent to our factory must be correctly packaged, clean and completely exempt of any liquid, grease or toxic substances.

The devices sent for repair must enclose the corresponding form, which can be filled in via website from the same “After-Sales” section.

Warranty for repaired or replaced components applies 6 months from repair or replacement date. Anyway, the warranty period will last at least until the initial supply warranty period is over.

TRANSPORTATION

All consignments from the Buyer to the Seller´s installations for their credit, repair or replacement must always be done at freight cost paid unless previous agreement.

The Seller will not accept any responsibility for possible damages caused on the devices during transportation.

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