



Flowmeters Series FLOMAT



FLOMAT Electromagnetic Insertion Flowmeter

Working pressure manufacturing according to
PED 97/23/CE (Lloyd's Register Certificate N° 031)

Introduction

For use in large diameter pipes or open channels as an economical solution for liquid metering.
Flow rate for liquids with electrical conductivity better than 20 $\mu\text{S}/\text{cm}$, for example.

- Water treatment
- Sewage treatment
- Acid, neutral or alkaline solutions
- Chemical and pharmaceutical products

Suitable for use at low and medium temperatures.

The body is constructed in stainless steel EN 1.4404 (SS 316L), on request available in PVDF wetted parts with electrodes in Hastelloy C, Zirconium, Titanium.

Benefits

- Readings are independent of density, temperature, viscosity and pressure
- Alternating magnetic field for metering avoids electrolysis
- Absence of obstructing elements gives low pressure loss and will allow the pass of solids
- Can be mounted in any position, provided that the pipe is always full
- Low power consumption
- Good stability with temperature and age
- No moving parts provides zero maintenance
- Can be installed with short straight pipe sections (10DN / 5DN)
- Good chemical resistance of construction materials

Metering Body Technical Data

- Pressure rating: PN16
- Liquid Temperature range:
 - PVDF Head -20°C.....+130°C
- Electrodes:
 - Standard Hastelloy C
 - Special Order Titanium, Zirconium
- Field coil current: 130 mA 6,25 / 7,5 Hz
- Liquid Conductivity: >20 $\mu\text{S} / \text{cm}$
- Accuracy: $\pm 3,5\%$

NOTE:

For temperatures above 70°C it may be necessary to separate the control unit from the metering body, depending on air temperature and ventilation of the control unit.

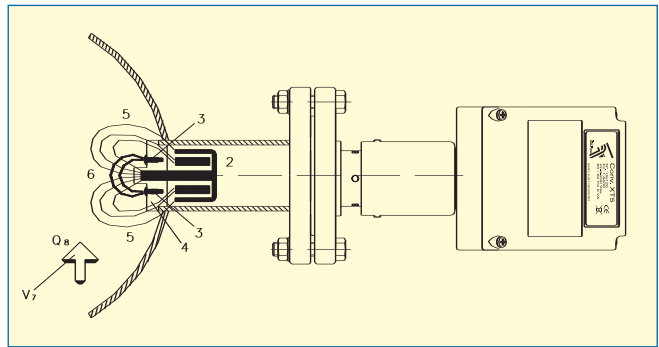


Measurement Principle

The Flomat electromagnetic insertion flowmeter consists of a sensor which generates a magnetic field in the liquid to be measured. The conductive liquids, as they flow through the magnetic field (5), generate a voltage E_6 (6) between the electrodes (3) which is proportional to the liquid velocity (V_7). The generated voltage is processed by the microprocessor electronic circuit to give outputs of mA or Hz proportional to the flow rate Q (8).

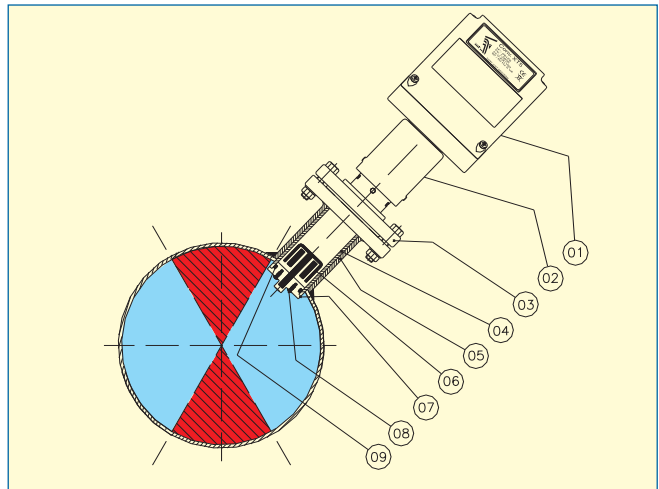
$$Q_8 = K \cdot V_7 \cdot E_6$$

(K=factor of sensor)



Sensor Construction

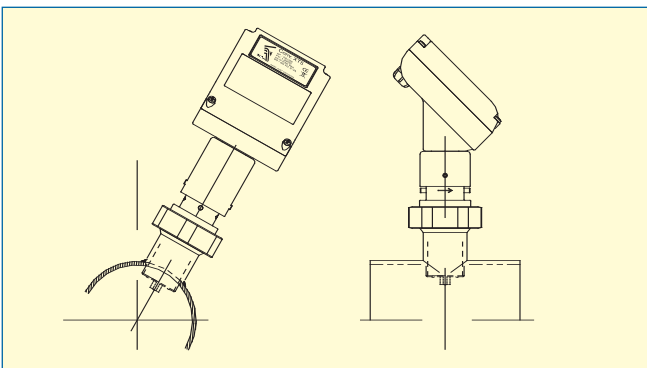
01	Electronics housing	Aluminium/Polycarbonate
02	Union	EN 1.4404 (SS 316L)
03	Flange/BSP nut	EN 1.4404 (SS 316L)
04	Body	EN 1.4404 (SS 316L)
05	Mounting Insert	EN 1.4404 (SS 316L)
06	Field Coil	—
07	Head	PVDF
08	Electrodes	Hastelloy C
09	Gasket	NBR



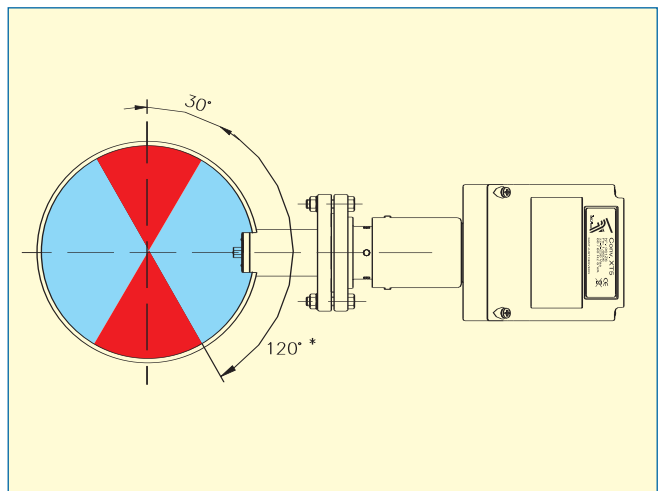
Installation

- Install with a straight section of minimum 10DN length before and 5DN after
- The pipe should always be full - install in a rising section
- Valves should be mounted after the sensor to maintain a full pipe
- Pumps should be installed before the sensor

DN40 ... DN65



DN80 ... DN2000



* Correct mounting to avoid air pockets and dirt deposits on the electrodes in blue zone.

Insert (Dimensions in mm) DN40 ... DN2000

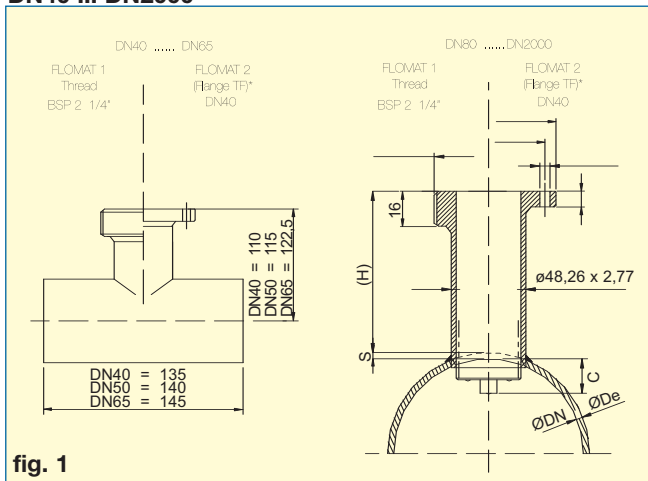


fig. 1

Dimensions in mm

DN	(H)	De*	S	C ¹
40		48,3	2,6	15
50		60,3	2,9	15
65		76,1	2,9	15
80	86	88,9	3,2	15
100	86	114,3	3,6	15
125	82	139,7	4,0	19
150	78	168,3	4,5	22
200	69	219,1	5,9	30
250	61	273,1	6,3	38
300	46	316	7,5	45
350	41	255,6	8	52
400	33	41,9	10	80
500	123,5	521	11,5	75
600	111	632	12	90
700	96	724	12	105
800	81	827	13,5	120
900	66	928	14	135
1000	51	1032	16	150
1200	180	1236	18	180
1400	150	1136	18	210
1600	120	1640	20	240
1800	90	1844	22	270
2000	60	2060	25	300

* Approximate, depending on the pressure and pipe material

¹ C is the necessary distance that the sensor (not the insert) should be inserted into the pipe (fig. 1)

FLOMAT 1RS (Remote electronics)

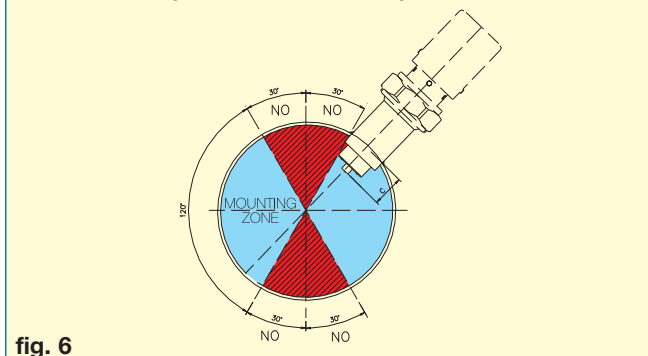


fig. 6

Mounting

FLOMAT 1

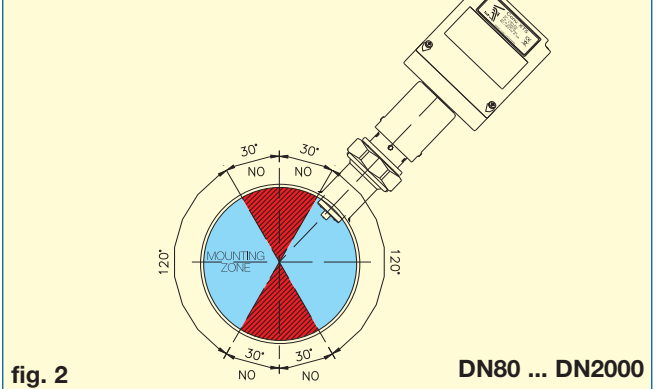


fig. 2

DN80 ... DN2000

FLOMAT 2

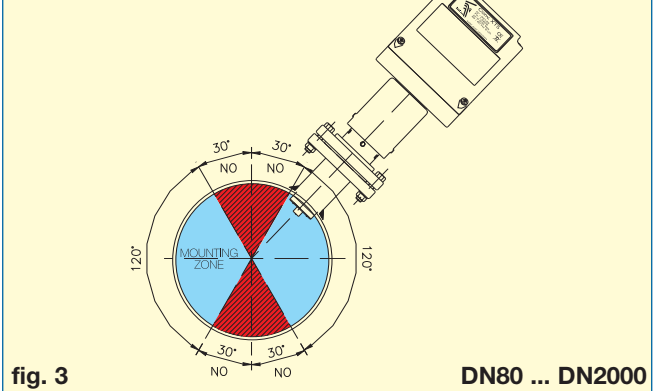


fig. 3

DN80 ... DN2000

FLOMAT 204 mounted with ring

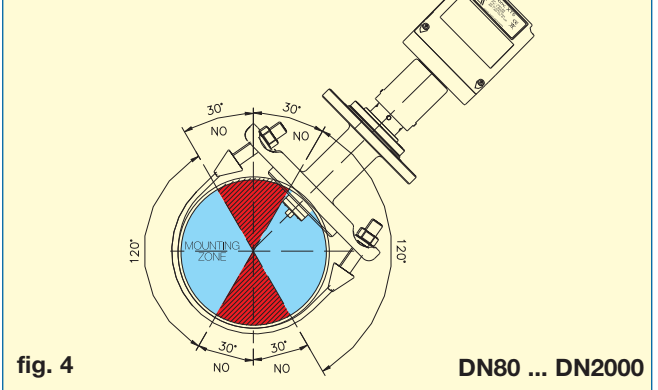


fig. 4

DN80 ... DN2000

FLOMAT 103 mounted with body ring for PVC/PE

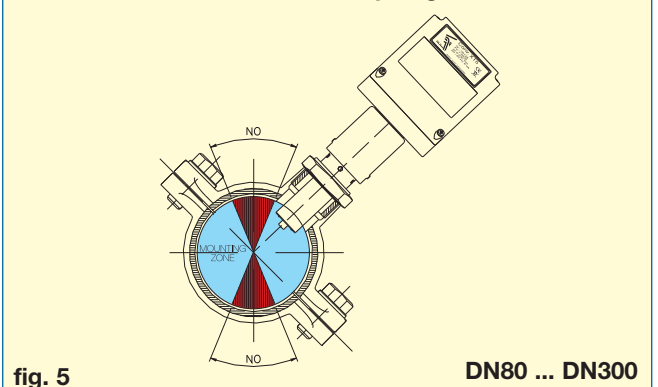
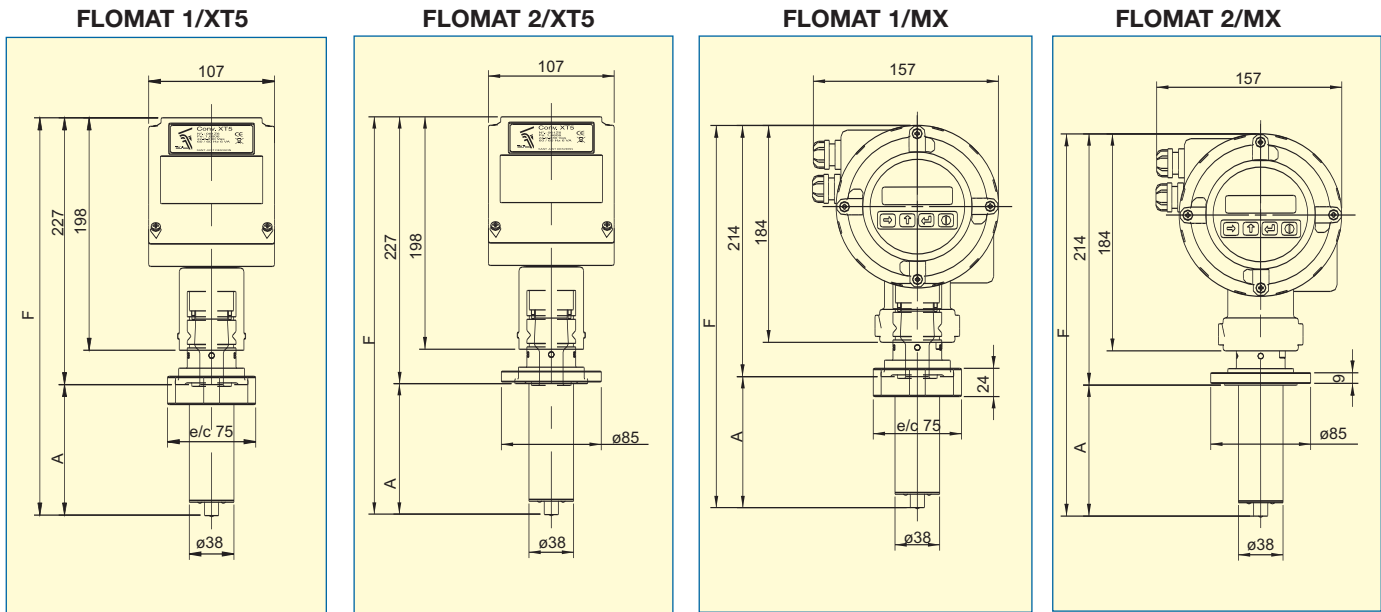


fig. 5

DN80 ... DN300

Dimensions

Sensor with Compact Electronics

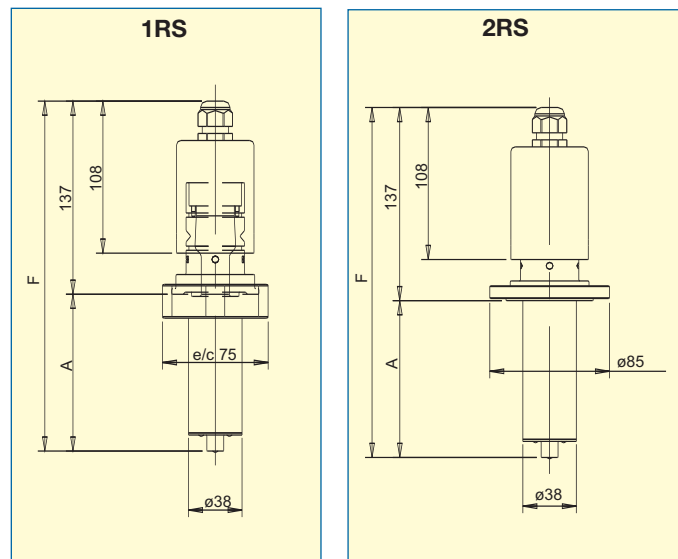


Dimensions in mm

DN	A Sensor Length	F ¹ Compact Senso with XT5 / MX	Sensor 1RS or 2RS
40	105	332/151	242
50			
65			
80			
100			
125	210	437/124	347
150			
200			
250			
300			
350			
400			
500	360	587/574	497
600			
700			
800			
900			
1000			
1200			
1400			
1600			
1800			
2000			

¹ F is the minimum dimension necessary to remove

Sensor with Remote Electronic



Metering body selection

The diagram shows the relation between the liquid speed and the flow rate for different body sizes.

The metering body diameter should be chosen to obtain a maximum normal working liquid velocity of about 3-4 m/s.

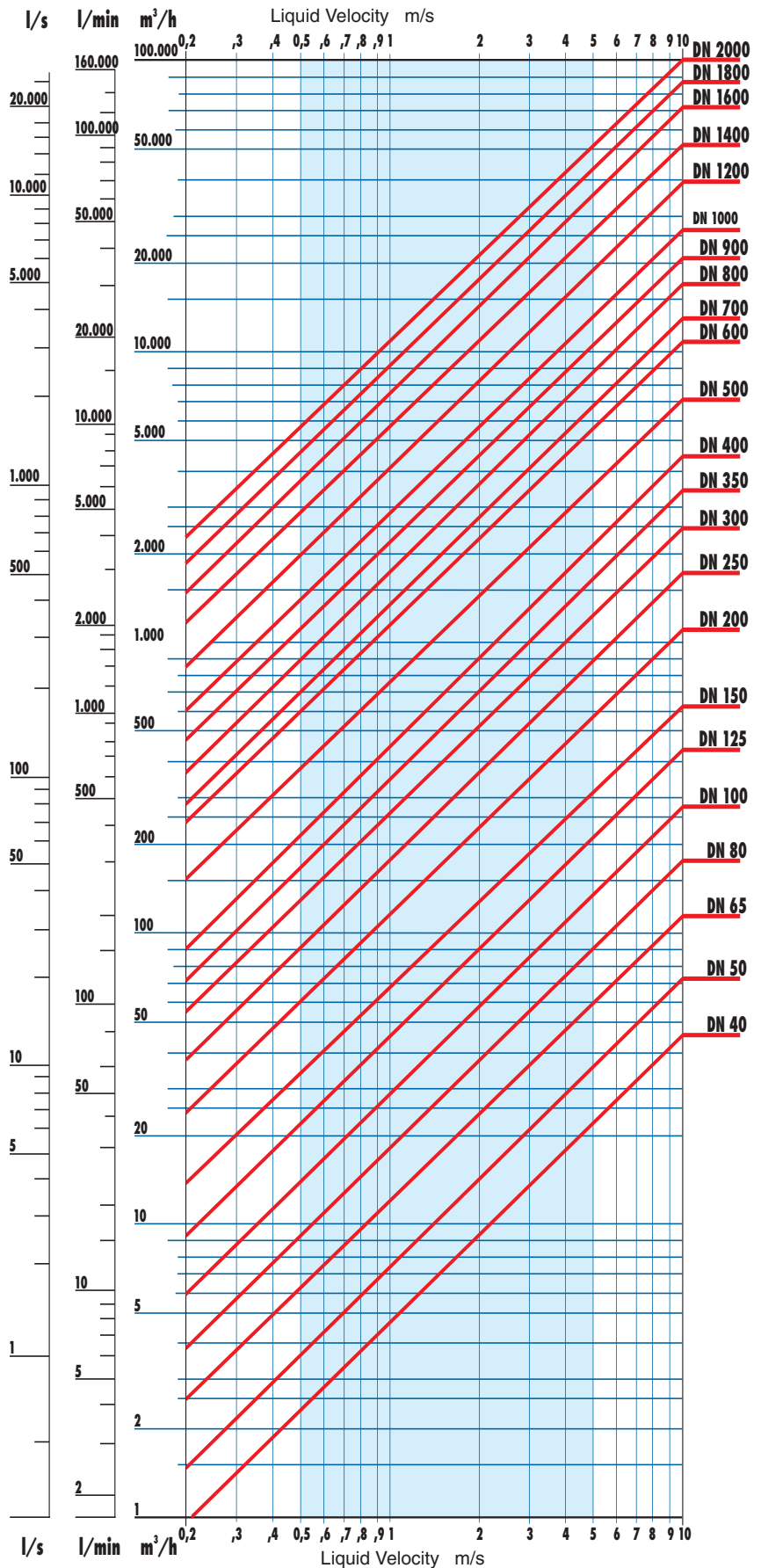
The minimum working liquid velocity should not be below 0.5 m/s.

A recommended working liquid velocity is between 1 and 3 m/s.

When the liquid has solids in suspension, it is better to work between 3 and 5 m/s to avoid sedimentation in the pipe and metering body.



Flow rate table



Electronic Control Units

Different models of electronic control units are available to comply with the options of flow indication, maximum/minimum flow rate controls, analog outputs, pulse outputs. All are compatible with the different Flomat sensor models.

For compact mounting directly on the sensor

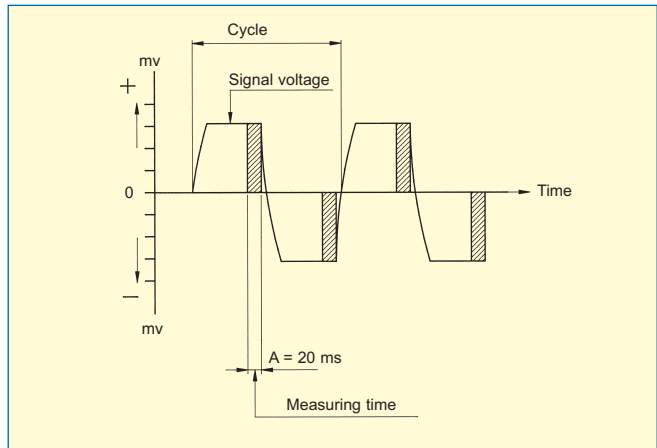
- Series MX, with local indication, signal, mA and pulse outputs

For wall and pipe bracket mounting

- Series MX (Local Indication) - M* ... T*
- Series MX / M* and MX / T*

*M = wall mounting

*T = pipe mounting



Electronic Technical Data

Series MX (Compact) and Series MX-M, MX-T (Separated)

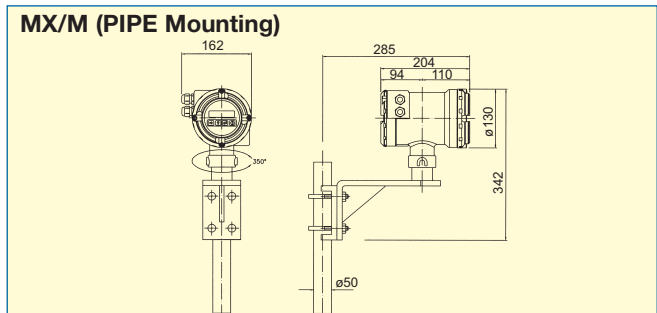
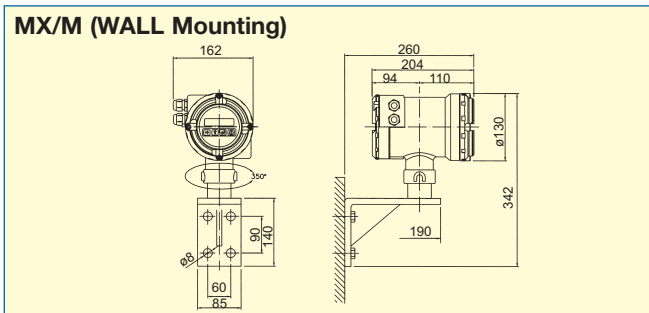
- Painted coated injected aluminium housing.
IP 67 degree of protection
- Programming via front tactile pushbuttons
- Totalising and partial volume counters
- Programmable batching volume with remote input for starting
- Magnetic field: 6.25 Hz square wave for 50 Hz mains
7.5 Hz square wave for 60 Hz mains
- Mains supply: 12 V, 24 V, 110 V, 120 V, 220 V,
240 V ac, $\pm 10\%$, 50 or 60 Hz
24 Vdc
(others on demand)
- Power consumption: <10 VA
- Min. Flowrate cut off: Programmable
- Measuring range: 0...10 m/s
- Display: 16 character x 2 lines LCD
6 languages to be selected.
Program for auto-edition of other languages
- Flowrate indication: User programmable measuring units
- Analog output: 4...20 mA programmable
- Programmable pulse output mode:
Flowrate x Pulses/unit
volume < 2 pulses/s
- Programmable frequency output mode:
10..1000 Hz

- Logic outputs: Two programmable outputs for flowrate alarms, empty pipe detection, flow direction or batching
- Adaptive flowrate filter: Integration time programmable
0.1 ... 25.5 seconds
Filter reset window programmable
- Linearity: 0.1%
- Zero drift: 0.05%
- Temperature drift: 0.015% / °C
- Working ambient temperature range: -10 ... +60 °C



MX Compact

Remote Version Mounting (Electronics)



Series XT5, Electronic Control Units

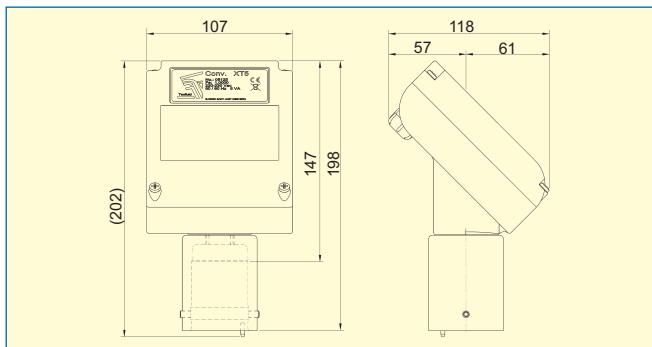
Technical Features

- Power supply: 230, 240, 115, 24 Vac 50/60 Hz
24 VDC
- Power consumption: ≤ 5 VA
- Analog output: 4-20 mA. Active or passive
- Pulse output:
- **Opto isolated V max.: 30 Vdc. I max: 30 mA**
Maximum frequency in "P/U" mode: 6,25 Hz
Maximum frequency in "Hz" mode: 10000 Hz
Maximum frequency in "Hz" mode: 0,04 Hz
- **Optional. V max: 240 Vac / 350 Vdc. I max: 100 mA**
Maximum frequency in "P/U" mode: 6,25 Hz
Maximum frequency in "Hz" mode: 75 Hz
- Totaliser: N° of digits: 7 (2 decimal points)**
Digit size: 8 mm
Button reset
- Flow indicator: N° of digits 4 (up to 2 decimal point Configuration)**
Digit size 5 mm

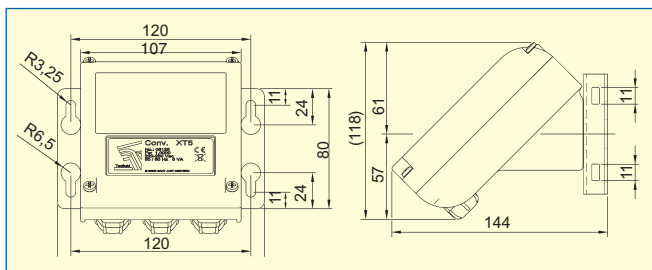
** When 4 digit counter reaches 10000, 1 decimal point is automatically eliminated.
When 5 digit counter reaches 10000, the other decimal point is eliminated.

In accordance with Directive 73/23/CEE Low voltage
In accordance with Directive 89/336/CEE electromagnetic compatibility

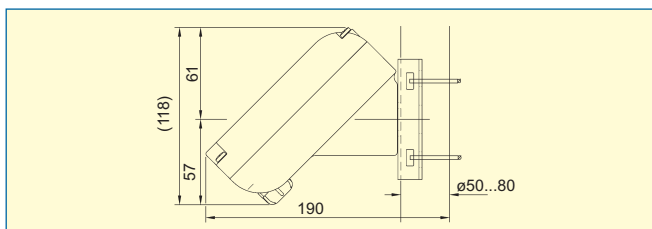
XT5 (Compact model)



XT5/M (Wall Mounting)



XT5/M (Pipe Mounting)



General Features

- Protection level: IP67
- Ambient temperature range: 0 ... +60°C

Electrical Features referring to analog loop and Communications

- Reception Impedance: $R_x > 8,5$ M Ω $C_x < 200$ pF
- Models: XT5 compact model
XT5/M...T Wall or Pipe mounted
XT5H compact model with HART communication
XT5HM Wall or Pipe mounted with HART communication

HART Communication

The XT5H converter has a MODEM for HART communication. You will find all the features regarding HART communication in the corresponding document "Field Device Specification"



Summary of main communication features

- Manufacturer, Model and revision **Tecfluid S.A., XT5 converter, Rev.0**
- Type of apparatus Transmitter
- HART protocol revision 6.0
- Device description available No
- Number and type of sensors 1, exterior
- Number and type of actuators 0
- Number and type of auxiliary host signals 1, 4 - 20 mA
- Number of Device variables 2
- Number of Dynamic variables 1
- Dynamic Mappable variables No
- Number of Common practice commands 13
- Number of Device specific commands 8
- Additional Device Status Bits 17
- Alternative function Modes? No
- Bursts Mode? No
- Write Protection? Yes

XT5 Compact



XT5 Wall & Pipe





FLOMAT-TAP

The FLOMAT-TAP Series is an useful complement for the Flomat sensors in some type of installations.

The key features of the product are:

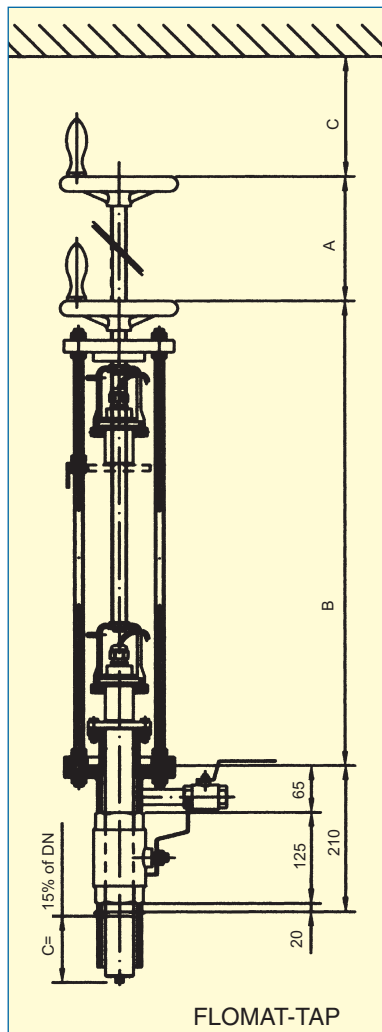
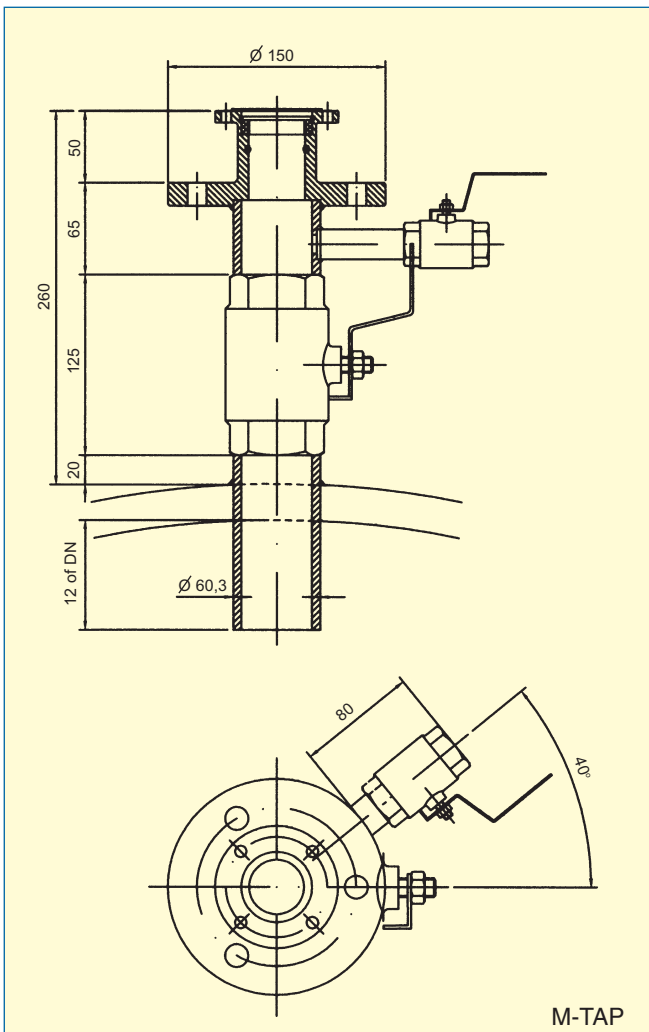
- Flomat sensors can be inserted or removed under pressure (pipe full of liquid).
- Designed for obtaining flow measurement in different points of a distribution network with one only Flomat sensor.
- Maintenance of Flomat sensors without interruption of the flow.

NOTE: the M-TAP accesory must be installed to the main pipe as an insert pipe as an adaptor and it is a part of the complete system FLOMAT-TAP.

Minimum lenght for dismounting

Lenght in mm

DN max.	A	B	C	Total
600	385	720	140	1245
1200	480	830	140	1450
2000	588	960	140	1688



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