

# Digiflow®

Flow Meters & Instruments



**FLOW X3**

**CHEM X3**

Insertion Paddle Wheel & Magnetic Flow Meters  
Flow & Analytical Instruments

Technical Catalogue



**CHEMLINE PLASTICS**  
SUPERIOR FLOW SOLUTIONS

PDF Published June 15, 2021

## flow sensors



Type F3.01  
Direct Mount  
Flow Sensors



Type F3.00  
Remote  
Flow Sensors



Type F3.20  
High Pressure  
Flow Sensors



Type F3.10  
Mini  
Flow Sensors



Type ULF  
Ultra Low  
Flow Sensors



Type F3.80  
Oval Gear  
Flow Sensors



Type F3.05  
No-Flow  
Switches



Type F6.30  
Blind  
Transmitters



Type F6.60M  
Electromagnetic  
Flow Transmitters



Type F6.61M  
Hot Tap  
Electromagnetic Flow  
Transmitters

## flow instruments



Type M9.00, M9.02  
Flow Monitor/Transmitters



Type M9.10, M9.03  
Flow Monitor/Transmitter



Type M9.20  
Battery Powered Flow Monitor



Type M9.50  
Batch Controller

## installation fittings

- Tees
- Bolt-On Saddles
- Metal Strap-On Saddles
- Weld-On Adaptors
- Hot-Tap Assemblies



## analytical instruments



Type M9.06  
pH/ORP Monitor



Type M9.05  
Conductivity Monitor



Type M9.07  
Dual Parameter Conductivity and  
Flow Monitor and Transmitter

# Digiflow®

a cost effective  
and complete range  
of flow monitoring  
equipment



## FLOW X3

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## CHEM X3

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# Digiflow®

## FLOW X3

a complete range of flow

## instruments

The Digiflow® FlowX3 line includes a complete range of paddle wheel flow sensors, instruments and sensor installation fittings. Also included are insertion type electromagnetic flow transmitters.

FlowX3 products provide high quality and state-of-the-art technology. All products are manufactured under ISO 9001:2000 and conform to the highest CE standards.

Chemline backs the FlowX3 line with service and support.

- Expert technical assistance
- After sales service
- Customer training
- Fast deliveries from Chemline's inventory

### ■ High Accuracy

- ± 0.75% of full scale with standard K factor
- ± 1% of reading value with field calibration

### ■ Excellent Low Flow Measurement

- Accurately measures flow velocities down to 0.15 m/s (0.5 ft./sec.)

### ■ Large Flow Velocity Range

- The 45 Hz/m/s frequency output is linearly proportional to flow rate from 0.15 to 8 m/s (0.5 to 25 ft./sec.).

### ■ Easily Installed into all Types and Sizes of Piping

- Sensor installation fittings are available in a large selection of types, materials and pipesizes up to 24" and larger.

### ■ Up-to-Date Electronics – Many Outputs

FlowX3 instruments were first introduced in 2003. The line of instruments has since expanded. A large offering of control outputs includes 4 to 20 mA, open collector (pulse) and relays. All units have backlite full graphic display.

### ■ Modular Design – 1/4 DIN Size

Only with Digiflow® FlowX3 can the same instrument be mounted in 3 different ways: directly to the flow sensor, or remotely in a panel or on a wall.



Direct Mount



Panel Mount



Wall Mount

## sensors

### ■ Designed for Corrosive Services

FlowX3 paddle wheel flow meters are of corrosion resistant solid plastic construction. They are recommended for services with up to 10% solids\*. Bearings and sensor body near the rotor are designed to be self-cleaning and small magnets in the rotor blade lessen the chance of fouling due to accumulation of magnetic particles in the process.

### ■ A Selection of Plastic or Metal Sensor Materials

The standard thermoplastic flow sensors of CPVC or PVDF are compatible with a wide range of plastic piping materials. 316L stainless steel flow sensors allow application in metal piping systems and for fluids at higher temperatures. Low flow sensors are available in PP, POM, ECTFE (Halar®) and 316L stainless steel.

### ■ Submersible Sensors Available

NEMA 6, 6P (IP68) models are available for outdoor or submersible installations.

\* Particle size not exceeding 0.5 mm cross section or length.



■ **Designed for Heavy Duty Industrial Applications**

Instruments have a NEMA 4, 4X ABS case with polycarbonate window in 1/4 DIN size, epoxy encapsulated electronics and a 5 button silicone rubber keypad.

■ **Easy Set-up**

Setting up the instrument is easy using the keypad and self-explanatory menus. Plug-in terminals make instrument connection and removal easy. Auto calibration provides automatic calculation of K factors.



**5 Button Silicone Rubber Keypad**

**Full Graphic LCD Backlit Display**

- flow rate, total flow, various outputs together
- one output status icon line
- tutorial software



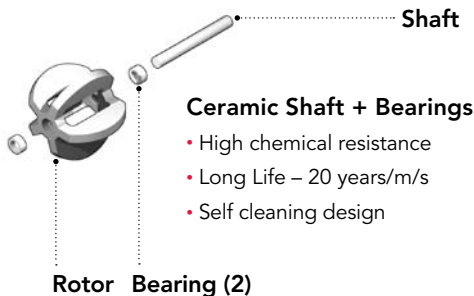
**Plug-in Removable Terminals**

- exclusive to FlowX3

**Epoxy Encapsulated Electronics**

■ **Long Service Life**

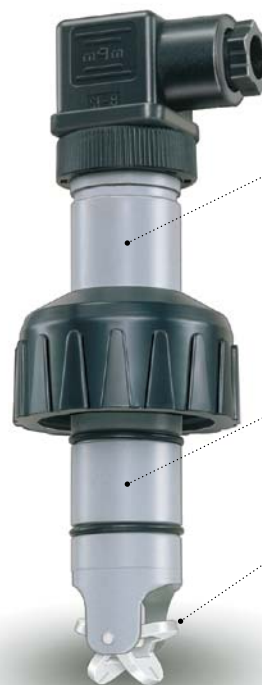
FlowX3 have a ceramic rotor shaft and bearings. On aggressive chemicals and services containing grit, FlowX3 sensors have outlasted other types with metal shafts and no bearings.



**Ceramic Shaft + Bearings**

- High chemical resistance
- Long Life – 20 years/m/s
- Self cleaning design

**Rotor Bearing (2)**



**Sensor Body**

- Available in CPVC, PVDF, 316L Stainless Steel
- 2 sensor lengths for 1/2" to 24" pipes

**Integrated Solid State Electronics**

- Encapsulated in epoxy for corrosion resistance

**5 Blade ECTFE (Halar®) Rotor**

- Open channel design avoids cavitation
- Five small magnets within rotor blades produce five pulses per revolution

### instruments



**M9.50.P1**  
**Batch Controllers**  
p.32-33



**M9.02.P1**  
**Flow Monitor & Transmitters**  
(3/4-wire)  
p.26-27



**M9.03.P1** (3/4-wire)  
**M9.10.P1** (2-wire)  
**Flow Monitor & Transmitters**  
p.28-31



**M9.00.P1**  
**Flow Monitor & Transmitter**  
(2-wire)  
p.24-25



**M9.20.P1**  
**Battery Powered Flow Monitor**  
p.34-35

### flow sensors

#### Hall Effect Sensors p.8-14

F3.01.H F3.00.H F3.00.H F3.10.H F3.20.H  
NEMA 4, 4X NEMA 6, 6P NEMA 4, 4X NEMA 4, 4X NEMA 6, 6P p.36-38



#### Electromagnetic Flow Transmitters

F6.60M



#### Hot-Tap Flow Sensors p.36-38

F6.61 Hot-Tap



**F3.00.P** **F3.00.P**  
NEMA 6, 6P NEMA 4, 4X  
For connection to PLC's with NPN or PNP inputs



**F3.10 Mini Flow Meter Tee**  
p.14  
1/2" to 1-1/2"



**F3.20 Flow Sensor Tee**  
p.12  
1-1/2" to 8"



**Hot-Tap Metal Strap-On Saddles**  
p.42  
3" to 18"



**Hot-Tap 316L Stainless Steel Weld-On Adaptors**  
p.42  
16" plus

### installation fittings



**Tees** p.39  
1/2" to 1-1/2"



**Saddles** p.39  
2" to 8"



**Metal Strap-On Saddles** p.41  
3" to 18"

Instruments and Installation Fittings may be connected

ULF.R  
Reed

ULF.H  
Hall



F3.80  
Hall

Oval Gear  
Flow Sensors



Coil Effect Sensors p.8-10

F3.01.C  
NEMA 4, 4X

F3.00.C  
NEMA 6, 6P

F3.00.C  
NEMA 4, 4X



No-Flow  
Switches p.19

F3.05



Blind  
Transmitters p.20-21

F6.30



High Pressure  
Flow Sensors

p.11-12  
For connection to PLC's  
with NPN or PNP inputs

F3.20.P  
NEMA 6, 6P



Weld-On  
Adaptors p.40  
1-1/2" to 24"



316L Stainless Steel  
Threaded Tees p.40  
3/4" to 1-1/4"



F3.20 Flow  
Sensor Tee p.12  
1-1/2" to 8"



**Modular Design Instruments**

The same instrument may be mounted in three different ways using mounting kits. p.27

M9.50.P1  
M9.03.P1



or



M9.00.P1  
M9.02.P1  
M9.20.P1

Direct Mounting  
for M9.00.P1, M9.20.P1,  
M9.10.P1



Panel Mounting  
for M9.50.P1, M9.03.P1,  
M9.10.P1



Wall Mounting  
for all monitors



for  
M9.00.P1  
M9.02.P1  
M9.20.P1



# Type F3.00/F3.01 flow sensors



The Type F3.00/F3.01 Paddle Wheel Flow Sensors are the core items in the Digiflow® FlowX3 line. A square wave output signal is generated with frequency proportional to rate of rotor rotation and flow velocity. This pulse output is normally fed to a FlowX3 flow monitor/transmitter, blind transmitter, batch controller or adjustable flow switch. It can also be fed to other brand instruments or PLC's.

Three types of sensors are available, Hall Effect which requires a 5 to 24 VDC power supply, Coil Effect which operates with less power, 3 to 5 VDC and Push-pull sensors for safe connection to any NPN or PNP inputs. Coil is required with the battery powered flow monitor. Hall Effect signals may be transmitted up to 300 meters (984 ft.) without the need for conditioning whereas Coil Effect signals may be transmitted up to 16 m (52.5 ft.) without conditioning.

- Body Materials:** CPVC, PVDF, 316L Stainless Steel
- Rotor:** ECTFE (Halar®)
- Shaft + Bearings:** Ceramic, 316L SS (only for metal sensors)
- Seals:** EPDM, Viton®
- Pipe Sizes:** 1/2" – 24" in two sensor lengths, L0 or L1  
See Installation Fittings (pages 39-42)
- Flow Ranges:** See page 45

## ■ Features

- **Ceramic Shaft and Bearings** – For longer life on services containing grit
- **Self Cleaning Design** – Lower maintenance
- **Submersible Sensors Available** – NEMA 6, 6P (IP68) models are available for outdoor or submersible installation

## ■ Connectable FlowX3 Instruments

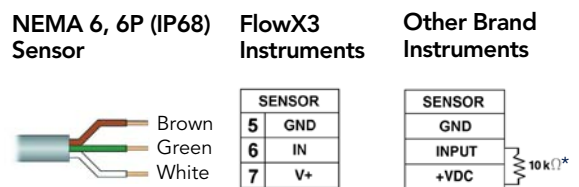
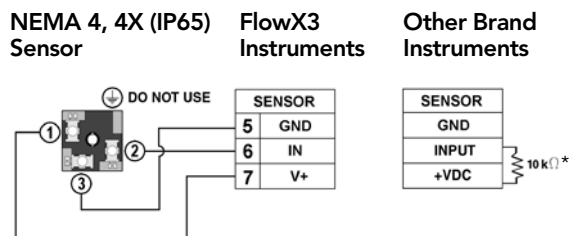
Sensor Type	Sensor No.	Instrument Mounting	FlowX3 Instruments*
Hall	F3.01.H F3.00.H	Direct, Panel or Wall	M9.00, M9.02, M9.03 M9.10, M9.50
Coil	F3.01.C F3.00.C	Direct, Panel or Wall	M9.20
Push-pull	F3.00.P	–	Connection to PLC's with NPN or PNP Inputs

\* Power supply is normally fed from FlowX3 instruments.



## ■ Wiring

### Sensor Connections to Instruments



\* 10 kΩ pull-up resistor may be required when Hall sensors are connected to other brand instruments. Resistor is not required for the F3.00.P sensors.



# Type F3.00/F3.01 flow sensors



## ■ Technical – General

<b>Output Signal:</b>	Square wave (pulse)
<b>Output Frequency:</b>	45 Hz per m/s nominal (13.7 Hz per ft./sec.)
<b>Electrical Class:</b>	NEMA 6, 6P (IP68) – F3.00 only NEMA 4, 4X (IP65) – F3.00 and F3.01
<b>Accuracy:</b>	< ± 1% of reading value after field calibration or ± 0.75% of full scale
<b>Repeatability:</b>	± 0.5% of full scale
<b>Velocity Range:</b>	0.15 to 8 m/s (0.5 to 25 ft./sec.). See page 45 for corresponding flow ranges.
<b>Viscosity Range:</b>	0.5 to 20 centistokes. Field calibration is required if outside this range, up to 40 centistokes maximum.
<b>Maximum % Solids:</b>	10% with particle size not exceeding 0.5 mm cross section or length
<b>Max. Operating Pressure/Temperature:</b>	See chart on page 43
<b>Cable (where supplied):</b>	22 AWG, 3 conductors

## ■ Technical – F3.00.H and F3.01.H Hall Sensors

<b>Supply Voltage*:</b>	5 to 24 VDC regulated
<b>Supply Current:</b>	< 30 mA @ 24 VDC
<b>Output Type:</b>	Transistor NPN open collector
<b>Output Current:</b>	10 mA max.
<b>Max. Cable Length:</b>	Max. 300 m (984 ft.) recommended without signal conditioning

## ■ Technical – F3.00.C and F3.01.C Coil Sensor

<b>Power Supply:</b>	Normally 2 x 3.6 V Lithium batteries located in the M9.20 flow monitor or 3 to 5 VDC regulated
<b>Supply Current:</b>	< 10 $\mu$ A
<b>Min. Input Impedance:</b>	100 k $\Omega$
<b>Max. Cable Length:</b>	Max. 16 m (52.5 ft.) recommended without signal conditioning

## ■ Technical – F3.00.P Push-pull Sensors

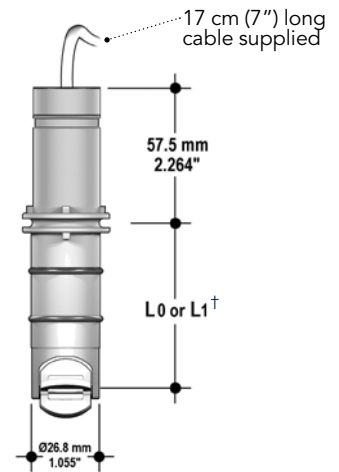
<b>Supply Voltage:</b>	12 to 24 VDC regulated
<b>Supply Current:</b>	< 30 mA @ 24 VDC
<b>Output Type:</b>	Push-pull for connection to NPN and PNP inputs
<b>Output Current:</b>	20 mA max.
<b>Max. Cable Length:</b>	Max. 300 m (984 ft.) recommended without signal conditioning

\* Supply voltage is normally fed from FlowX3 instruments

## ■ Installation

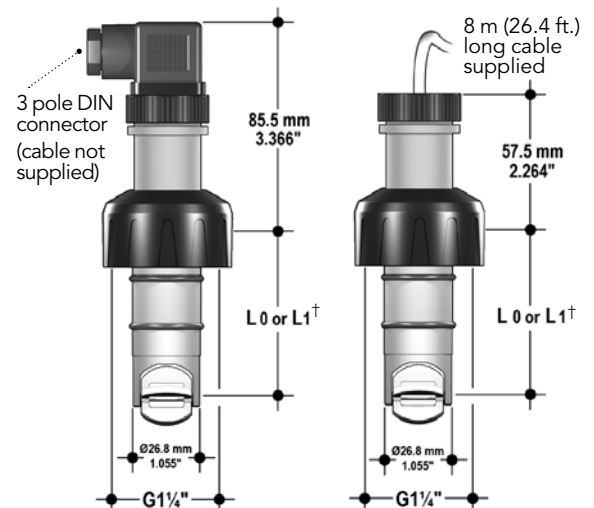
- See page 44 for guidelines on installation in piping systems
- See pages 39 to 42 for installation fittings

## F3.01 For Direct Connection to Instruments



NEMA 4, 4X (IP65)\*

## F3.00 For Remote Connection to Instruments



NEMA 4, 4X (IP65)

NEMA 6, 6P (IP68)

L0 = 68.3 mm (2.69")  
L1 = 98.5 mm (3.88")

\* F3.01 sensor is NEMA 6, 6P but when instrument is attached, unit becomes NEMA 4, 4X.

† Required sensor length (L0 or L1) depends on choice of installation fittings. See pages 39 to 42.

# Type F3.00/F3.01 flow sensors



## ■ Item Numbers

Hall Effect Sensors – For Connection to M9.00, M9.02, M9.10 and M9.50 FlowX3 Instruments  
for Direct Mounting to Instruments

Electrical Class	O-Ring	Sensor Length†	Body Material		
			CPVC	PVDF	316L SS
NEMA 4, 4X (IP65)	EPDM	L0	F3.01.H.01	F3.01.H.05	F3.01.H.09
	Viton®	L0	F3.01.H.02	F3.01.H.06	F3.01.H.10
	EPDM	L1	F3.01.H.03	F3.01.H.07	F3.01.H.11
	Viton®	L1	F3.01.H.04	F3.01.H.08	F3.01.H.12

for Connection to Panel or Wall Mount Instruments

Electrical Class	O-Ring	Sensor Length†	Body Material		
			CPVC	PVDF	316L SS
NEMA 6, 6P (IP68)	EPDM	L0	F3.00.H.01	F3.00.H.05	F3.00.H.09
	Viton®	L0	F3.00.H.02	F3.00.H.06	F3.00.H.10
	EPDM	L1	F3.00.H.03	F3.00.H.07	F3.00.H.11
	Viton®	L1	F3.00.H.04	F3.00.H.08	F3.00.H.12
NEMA 4, 4X (IP65)	EPDM	L0	F3.00.H.13	F3.00.H.17	F3.00.H.21
	Viton®	L0	F3.00.H.14	F3.00.H.18	F3.00.H.22
	EPDM	L1	F3.00.H.15	F3.00.H.19	F3.00.H.23
	Viton®	L1	F3.00.H.16	F3.00.H.20	F3.00.H.24

Coil Effect Sensors – For Connection to M9.20 FlowX3 Instrument  
for Direct Mounting to Instruments

Electrical Class	O-Ring	Sensor Length†	Body Material		
			CPVC	PVDF	316L SS
NEMA 4, 4X (IP65)	EPDM	L0	F3.01.C.01	F3.01.C.05	F3.01.C.09
	Viton®	L0	F3.01.C.02	F3.01.C.06	F3.01.C.10
	EPDM	L1	F3.01.C.03	F3.01.C.07	F3.01.C.11
	Viton®	L1	F3.01.C.04	F3.01.C.08	F3.01.C.12

for Connection to Panel or Wall Mount Instruments

Electrical Class	O-Ring	Sensor Length†	Body Material		
			CPVC	PVDF	316L SS
NEMA 6, 6P (IP68)	EPDM	L0	F3.00.C.01	F3.00.C.05	F3.00.C.09
	Viton®	L0	F3.00.C.02	F3.00.C.06	F3.00.C.10
	EPDM	L1	F3.00.C.03	F3.00.C.07	F3.00.C.11
	Viton®	L1	F3.00.C.04	F3.00.C.08	F3.00.C.12
NEMA 4, 4X (IP65)	EPDM	L0	F3.00.C.13	F3.00.C.17	F3.00.C.21
	Viton®	L0	F3.00.C.14	F3.00.C.18	F3.00.C.22
	EPDM	L1	F3.00.C.15	F3.00.C.19	F3.00.C.23
	Viton®	L1	F3.00.C.16	F3.00.C.20	F3.00.C.24

Push-pull Sensors – For Connection to PCL's with NPN or PNP inputs

Electrical Class	O-Ring	Sensor Length†	Body Material		
			CPVC	PVDF	316L SS
NEMA 6, 6P (IP68)	EPDM	L0	F3.00.P.01	F3.00.P.05	F3.00.P.09
	Viton®	L0	F3.00.P.02	F3.00.P.06	F3.00.P.10
	EPDM	L1	F3.00.P.03	F3.00.P.07	F3.00.P.11
	Viton®	L1	F3.00.P.04	F3.00.P.08	F3.00.P.12
NEMA 4, 4X (IP65)	EPDM	L0	F3.00.P.13	F3.00.P.17	F3.00.P.21
	Viton®	L0	F3.00.P.14	F3.00.P.18	F3.00.P.22
	EPDM	L1	F3.00.P.15	F3.00.P.19	F3.00.P.23
	Viton®	L1	F3.00.P.16	F3.00.P.20	F3.00.P.24

# Type F3.20 high pressure flow sensors



The Type F3.20 Paddle Wheel Flow Sensors are the core items in the Digiflow® FlowX3 line. A square wave output signal is generated with frequency proportional to rate of rotor rotation and flow velocity. This pulse output is normally fed to a FlowX3 flow monitor/transmitter or batch controller. It can also be fed to other brand instruments or PLC's.

Two types of sensors are available, Hall Effect and Push-pull sensors for safe connection to any NPN or PNP inputs. Hall Effect signals may be transmitted up to 300 meters (984 ft.) without the need for conditioning.

- .....
- Body Materials:** 316L Stainless Steel
- .....
- Rotor:** ECTFE (Halar®)
- .....
- Shaft + Bearings:** 316L Stainless Steel
- .....
- Seals:** Graphite Flat Gasket
- .....
- Pipe Sizes:** 1-1/2" – 8"  
See Installation Fittings (page 12)
- .....
- Flow Ranges:** See page 45
- .....

## ■ Features

- **High Pressure and Temperature Rating** – 1600 psi at 120°C (248°F)
- **Submersible Sensors** – NEMA 6, 6P (IP68)
- **Low and Easy to Perform Maintenance**

## ■ Connectable FlowX3 Instruments

Sensor Type	Sensor No.	Instrument Mounting	FlowX3 Instruments*
Hall	F3.20.H.01	Panel or Wall	M9.00, M9.02, M9.03 M9.10, M9.50
Push-pull	F3.20.P.01	–	Connection to PLC's with NPN or PNP Inputs

\* Power supply is normally fed from FlowX3 instruments.



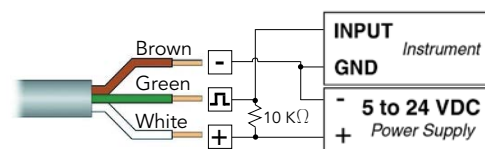
## ■ Wiring

### Sensor Connections to Instruments

#### F3.20.H IP68 Sensor Connection to FlowX3 Instruments

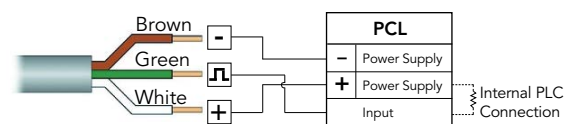


#### F3.20.H IP68 Sensor Connection to Other Brand Instruments

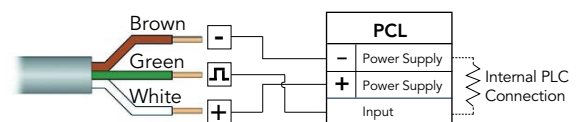


2 KΩ to 10KΩ pull-up resistor may be required.

#### F3.20.P IP68 Sensor to PLC with NPN Input



#### F3.20.P IP68 Sensor to PLC with PNP Input



# Type F3.20

## high pressure flow sensors

**Digiflow**  
**FLOW X3**

### F3.20 For Remote Connection to Instruments

#### ■ Technical – General

<b>Output Signal:</b>	Square wave (pulse)
<b>Output Frequency:</b>	45 Hz per m/s nominal (13.7 Hz per ft./sec.)
<b>Electrical Class:</b>	NEMA 6, 6P (IP68)
<b>Accuracy:</b>	< ± 1% of reading value after field calibration or ± 0.75% of full scale
<b>Repeatability:</b>	± 0.5% of full scale
<b>Velocity Range:</b>	0.15 to 8 m/s (0.5 to 25 ft./sec.). See page 45 for corresponding flow ranges.
<b>Viscosity Range:</b>	0.5 to 20 centistokes. Field calibration is required if outside this range, up to 40 centistokes maximum.
<b>Solids:</b>	Recommended for clean liquids
<b>Max. Operating Pressure/Temperature:</b>	1600 psi at 120°C (248°F)
<b>Cable:</b>	8 m, 22 AWG, 3 conductors

#### ■ Technical – F3.20.H.01 Hall Sensor

<b>Supply Voltage*:</b>	5 to 24 VDC regulated
<b>Supply Current:</b>	< 30 mA @ 24 VDC
<b>Output Type:</b>	Transistor NPN open collector
<b>Output Current:</b>	10 mA max.
<b>Max. Cable Length:</b>	Max. 300 m (984 ft.) recommended without signal conditioning

\* Supply voltage is normally fed from FlowX3 instruments.

#### ■ Technical – F3.20.P.01 Push-pull Sensor

<b>Supply Voltage:</b>	12 to 24 VDC regulated
<b>Supply Current:</b>	< 30 mA @ 24 VDC
<b>Output Type:</b>	Push-pull for connection to NPN and PNP inputs
<b>Output Current:</b>	20 mA max.
<b>Max. Cable Length:</b>	Max. 300 m (984 ft.) recommended without signal conditioning

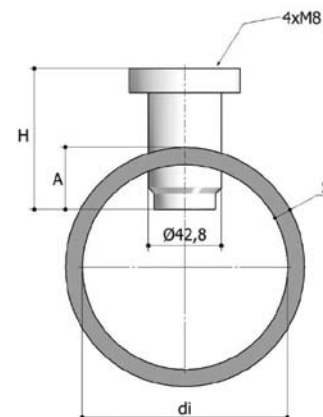
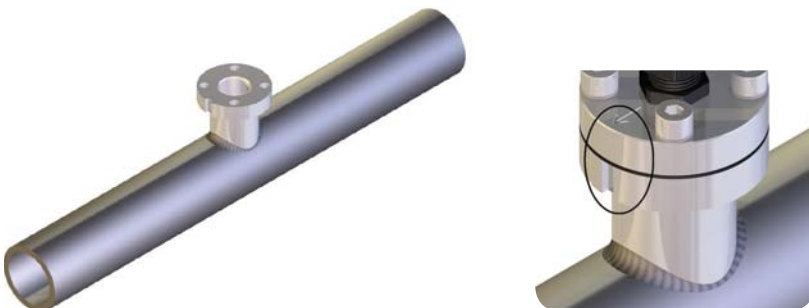


#### ■ Installation Fitting



**316L SS Weld-on Adaptor**  
– for 1-1/2" to 8" pipe

#### ■ Installation Fitting on Pipe



# Type F3.10 mini flow sensors



The Type F3.10 Mini Flow Sensor features compact size and low cost. It can measure flow from 0.25 to 4 m/s producing a highly repeatable frequency output signal. Rugged construction and proven Hall Effect sensor technology provides exceptional performance with little or no maintenance. A 4-blade paddle wheel without bearings generates a square wave output signal with a frequency of 15 Hz per m/s (4.6 Hz per ft./sec.).

**Body Materials:** ABS, PVDF

**Rotor:** ABS, PVDF

**Shaft:** 316L SS

**Seals:** EPDM, Viton®

**Pipe Sizes:** 1/2"– 1-1/4"

**Flow Ranges:** 0.25 to 4 m/s (0.8 to 12.5 ft.sec.)  
Monodirectional flow

## ■ Features

- **Low Cost** – Ideal for water treatment equipment
- **Compact Design**
- **Submersible Rating** – NEMA 6, 6P (IP68) enclosure rating allows for outdoor or submersible applications
- **Connects to the Full Range of FlowX3 Instruments**  
All models of the Flow Monitor/Transmitters and Batch Controller may be connected remotely, either panel or wall mounted.

## ■ Connectable FlowX3 Instruments

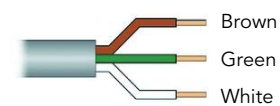
Sensor Type	Sensor No.	Instrument Mounting	FlowX3 Instruments*
Hall	F3.10.H	Panel or Wall	M9.00, M9.02, M9.03 M9.10, M9.50

\* Power supply is normally fed from FlowX3 instruments.



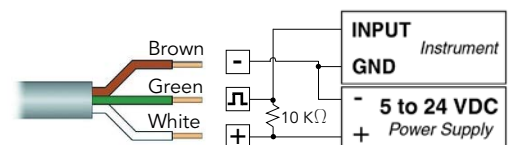
## ■ Wiring

### F3.10 Sensor Connection to FlowX3 Instruments



SENSOR	
5	GND
6	IN
7	V+

### F3.10 Sensor Connection to Other Brand Instruments



2 KΩ to 10KΩ pull-up resistor may be required.

# Type F3.10 mini flow sensors



## ■ Technical – General

<b>Output Signal:</b>	Square wave (pulse)
<b>Output Frequency:</b>	15 Hz per m/s nominal (4.6 Hz per ft./sec.)
<b>Output Type:</b>	NPN open collector
<b>Output Current:</b>	10 mA max.
<b>Pulses per Litre:</b>	See page 45
<b>Electrical Class:</b>	NEMA 6, 6P (IP68)
<b>Accuracy:</b>	< ± 2% of reading value after field calibration or ± 1.0% of full scale
<b>Repeatability:</b>	± 0.5% of full scale
<b>Viscosity Range:</b>	1 to 10 centistokes
<b>Applications:</b>	Clean non-corrosive services only, no solids recommended
<b>Working Temperature:</b>	-10 to 80°C (14 to 176°F)
<b>Working Pressure:</b>	5 bar (70 psi) max. @ 25°C (77°F)
<b>Cable:</b>	22 AWG, 3 conductors, 2 m (6.6 ft.) length supplied standard
<b>Max. Cable Length:</b>	Max. 300 m (990 ft.) recommended without signal conditioning
<b>Supply Voltage*:</b>	5 to 24 VDC regulated
<b>Supply Current:</b>	< 30 mA @ 24 VDC

\* Supply voltage is normally fed from FlowX3 instruments.



## Installation Fitting for mini flow sensors



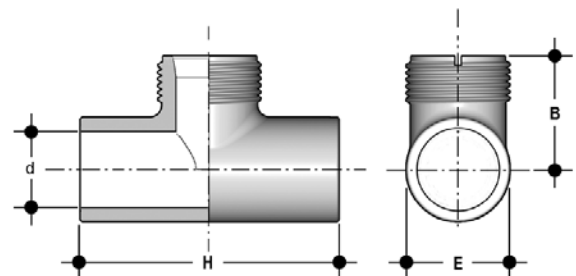
## Tees

**Sizes:** 1/2" to 1-1/4"

**Maximum Pressure:**  
70 psi @ 25°C (77°F)

### DIMENSIONS INCHES

Pipe Size	B	d	E	H	PVC / EPDM / Socket	
					Item No.	K-Factor
1/2"	1.10	0.84	1.12	2.20	TEA005S-310	113.61
3/4"	1.18	1.05	1.30	2.60	TEA007S-310	61.06
1"	1.28	1.32	1.61	3.11	TEA010S-310	35.56
1-1/4"	1.50	1.66	1.96	3.78	TEA012S-310	20.44
1-1/2"	1.67	1.96	2.38	4.56	TEA015S-310-M	11.78



# Type ULF ultra low flow sensors



The Type ULF Ultra Low Flow Sensors are available in two flow ranges. They contain a transducer and a four blade paddle wheel rotor with a permanent magnet inside each blade. A square wave output signal is generated with frequency proportional to rate of rotor rotation and flow velocity. This pulse output is normally fed to a FlowX3 flow monitor/transmitter, blind transmitter, batch controller or adjustable flow switch. It can also be fed to other brand instruments or PLC's.

Two types of sensors are available, Hall Effect which requires a 5 to 24 VDC power supply and Reed Effect which have a volt-free contact. Reed Effect is required with the battery powered flow monitor. Hall Effect signals may be transmitted up to 300 meters (984 ft.) without the need for conditioning whereas Reed Effect signals may be transmitted up to 16 m (52.5 ft.) without conditioning.

	Polyoxymethylene (POM) Version	ECTFE Version
<b>Sensor Body:</b>	POM	ECTFE (Halar®)
<b>Rotor:</b>	POM	ECTFE (Halar®)
<b>Shaft:</b>	Corepoint®†	Sapphire
<b>Bearings:</b>	–	Sapphire
<b>O-Ring:</b>	Viton®	Viton® or Kalrez®
<b>Connections:</b>	Inline 1/4" BSP male threaded	

## Flow Ranges:

ULF01 Model: 1.5 to 100 l/h (0.0066 to 0.44 gpm)

ULF03 Model: 6 to 250 l/h (0.0264 to 1.10 gpm)

## ■ Features

- **Connects to the Full Range of FlowX3 Instruments**  
All models of the Flow Monitor/Transmitters and Batch Controller may be connected remotely, either panel or wall mounted.

† Corepoint® is a steel alloy.

## ■ Connectable FlowX3 Instruments

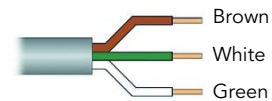
Instrument Mounting	Sensor No.	Sensor Type	FlowX3 Instruments*
Panel or Wall	ULF.H	Hall	M9.02, M9.03, M9.10, M9.50
Panel or Wall	ULF.R	Reed	M9.00, M9.20

\* Power supply is normally fed from FlowX3 instruments.



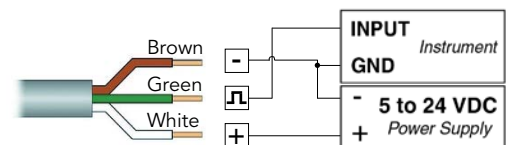
## ■ Wiring

### ULF.H Sensor Connection to FlowX3 Instruments

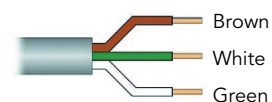


SENSOR	
5	GND
6	IN
7	V+

### ULF.H Sensor Connection to Other Brand Instruments



### ULF.R Sensor Connection to FlowX3 and Other Brand Instruments



INPUT Instrument	
-	GND
+	5 to 24 VDC Power Supply
Not Connected	

# Type ULF

## ultra low flow sensors



### ■ Technical – General

<b>Output Signal:</b>	Square wave (pulse)
<b>Pulses per Litre:</b>	See page 45
<b>Electrical Class:</b>	NEMA 4, 4X (IP65)
<b>Accuracy:</b>	< ± 2% of reading value after field calibration or ± 1.0% of full scale
<b>Repeatability:</b>	± 0.5% of full scale
<b>Viscosity Range:</b>	1 to 10 centistokes
<b>Maximum % Solids:</b>	Clean services only, no solids recommended
<b>Working Temperature:</b>	-10 to 80°C (14 to 176°F)
<b>Working Pressure:</b>	5 bar (70 psi) max. @ 22°C (72°F)
<b>Cable:</b>	22 AWG, 3 conductors

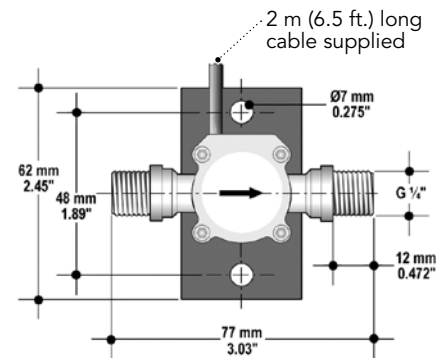
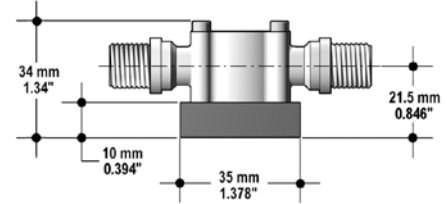
### ■ Technical – ULF.H (Hall Effect) Sensor

<b>Supply Voltage*:</b>	5 to 24 VDC regulated
<b>Supply Current:</b>	< 15 mA @ 24 VDC
<b>Max. Cable Length:</b>	Max. 300 m (984 ft.) recommended without signal conditioning

### ■ Technical – ULF.R (Reed Effect) Sensor

<b>Output Type:</b>	Volt free Reed contact
<b>Max. Cable Length:</b>	Max. 16 m (52.8 ft.) recommended without signal conditioning

\* Supply voltage is normally fed from FlowX3 instruments.



**Connections:**  
1/4" BSP male thread

### ■ Installation Guidelines

- The sensor can be installed in any position, horizontally or vertically, although horizontal is preferred. A non horizontal installation may cause a greater error in the lower flow measurement range.
- Install the sensor with the arrow pointing in the flow direction.
- Maximize the distance between sensor and pump. Do not install the sensor immediately downstream of valves, elbows or any obstacles. 15 cm (6") of straight pipe is suggested before and after the sensor.

### ■ Item Numbers

Electrical Class	Materials		Flow Rate		Item No.	
	Body	O-Ring	l/hr	USGPM	Hall	Reed
NEMA 4, 4X (IP65)	POM	Viton®	1.5 – 100	0.0066 – 0.44	ULF01.H.0	ULF01.R.0
			6.0 – 250	0.0264 – 1.10	ULF03.H.0	ULF03.R.0
	ECTFE	Viton®	1.5 – 100	0.0066 – 0.44	ULF01.H.2	ULF01.R.2
			6.0 – 250	0.0264 – 1.10	ULF03.H.2	ULF03.R.2
		Kalrez®	1.5 – 100	0.0066 – 0.44	ULF01.H.3	ULF01.R.3
			6.0 – 250	0.0264 – 1.10	ULF03.H.3	ULF03.R.3



# Type F3.80 oval gear flow sensors



The Type F3.80 Oval Gear Flow Sensors are positive displacement flow meters suitable for high viscosity fluids up to 1,000 cP. Accuracy and repeatability is high.

Inside is a transducer and two oval gears oriented at 90 degrees to each other with embedded permanent magnets. A square wave output signal is generated with frequency proportional to rate of rotor rotation and flow velocity. This pulse output is normally fed to a FlowX3 flow monitor/transmitter or batch controller. It can also be fed to other brand instruments or PLC's.

	PP Version	ECTFE Version	SS Version
<b>Sensor Body:</b>	PP	ECTFE	316L SS
<b>Oval Gears:</b>	ECTFE	ECTFE	ECTFE
<b>Shaft:</b>	Zirconium	Zirconium	316L SS
<b>O-Ring:</b>	Viton®	Viton®	Viton®

**Connections:** Inline 1/4" BSP female threaded

### Flow Ranges:

F3.81.H Model: 10 to 100 l/h (0.044 to 0.44 gpm)

F3.82.H Model: 25 to 150 l/h (0.11 to 0.66 gpm)

### ■ Features

- High Accuracy and Repeatability
- Excellent choice for low flows of high viscosity fluids
- Suitable for pulsating flows

### ■ Connectable FlowX3 Instruments

Instrument Mounting	FlowX3 Instruments*
Panel or Wall	M9.02, M9.03, M9.10, M9.50

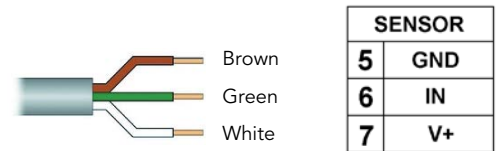
\* Supply voltage is normally fed from FlowX3 instruments.

Special versions with 4 to 20 mA output or alarm output available on request.

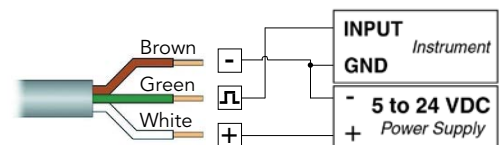


### ■ Wiring

#### F3.80 Sensor Connection to FlowX3 Instruments



#### F3.80 Sensor Connection to Other Brand Instruments



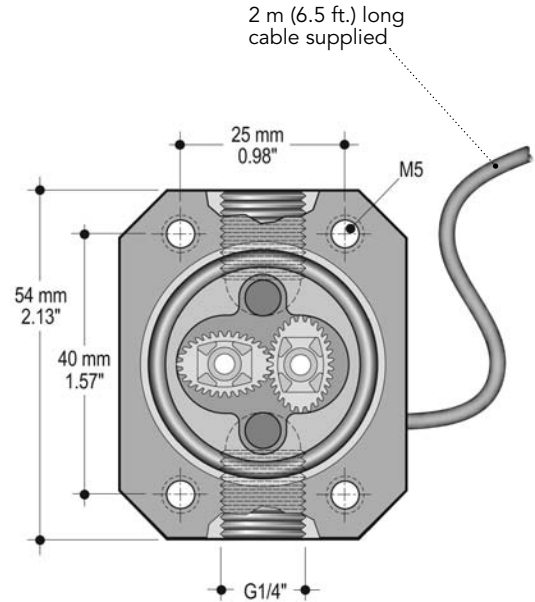
# Type F3.80 oval gear flow sensors



## ■ Technical

<b>Supply Voltage*:</b>	5 to 24 VDC regulated
<b>Supply Current:</b>	< 15 mA @ 24 VDC
<b>Output Signal:</b>	Square wave (pulse)
<b>Electrical Class:</b>	NEMA 4, 4X (IP65)
<b>Accuracy:</b>	± 1% of reading value
<b>Repeatability:</b>	< ± 0.3% of reading value
<b>Max. Fluid Viscosity:</b>	1,000 centipoise
<b>Maximum % Solids:</b>	Clean services only, no solids recommended
<b>Working Temperature:</b>	-10 to 60°C (14 to 140°F)
<b>Maximum Working Pressure:</b>	
PP Body:	6 bar (87 psi) @ 25°C (77°F) 3 bar (43 psi) @ 60°C (140°F)
ECTFE Body:	8 bar (116 psi) @ 25°C (77°F) 5 bar (72 psi) @ 60°C (140°F)
SS Body:	8 bar (116 psi) @ 60°C (140°F)
<b>Cable:</b>	22 AWG, 3 conductors
<b>Max. Cable Length:</b>	Max. 300 m (984 ft.) recommended without signal conditioning

\* Supply voltage is normally fed from FlowX3 instruments.



## ■ Installation Guidelines

- The sensor can be installed in any position, horizontally or vertically, although horizontal is preferred. A non horizontal installation may cause a greater error in the lower flow measurement range.
- Install the sensor with the arrow pointing in the flow direction.
- Maximize the distance between sensor and pump. Do not install the sensor immediately downstream of valves, elbows or any obstacles. 15 cm (6") of straight pipe is suggested before and after the sensor.

## ■ Item Numbers

Electrical Class	Materials			Flow Rate		Item No.
	Body	Gears	O-Ring	l/hr	USGPM	
NEMA 4, 4X (IP65)	PP	ECTFE	Viton®	10 – 100	0.044 – 0.44	F3.81.H.01
				25 – 150	0.11 – 0.66	F3.82.H.01
	ECTFE	ECTFE	Viton®	10 – 100	0.044 – 0.44	F3.81.H.02
				25 – 150	0.11 – 0.66	F3.82.H.02
	316L SS	ECTFE	Viton®	10 – 100	0.044 – 0.44	F3.81.H.03
				25 – 150	0.11 – 0.66	F3.82.H.03

# Type F3.05 no-flow switches

The Type F3.05 No-Flow Switches offer reliable pump protection. They open an electrical circuit when flow velocity decreases below 0.15 m/s (0.5 ft./sec.) and are not adjustable. The unique Halar® paddle wheel design is not available from other manufacturers.

**Body Materials:** CPVC, PVDF, 316L Stainless Steel

**Rotor:** ECTFE (Halar®)

**Shaft + Bearings:** Ceramic

**Seals:** EPDM, Viton®

**Pipe Sizes:** 1/2"– 24" in two sensor lengths, L0 or L1  
See Installation Fittings (pages 39-42)

**Velocity Trip Point:**

0.15 m/s (0.5 ft./sec.) not adjustable. The normally open contact closes after a delay of 2 seconds.

**Visual Flow** Bicolour LED

**Indication:** Red = No Flow, Green = Flow

**Relay Output:** Mechanical SPST contact,  
No Flow = open contact  
1A @ 24 VDC, 0.5A @ 125 VAC,  
0.1A @ 230 VAC

■ **Features**

- **Reliable Pump Protection** – Typical applications are to protect a pump from running dry or pumping against a closed valve in the main pipe.
- **Visual Flow Indication** – Red/green bicolour LED

■ **Technical**

**Supply Voltage:** 12 to 24 VDC, regulated

**Current Consumption:** < 50 mA

**Electrical Class:** NEMA 4, 4X (IP65) 4-pole DIN 43650

**Maximum % Solids:** 10% with particle size not exceeding 0.5 mm cross section or length

**Max. Operating**

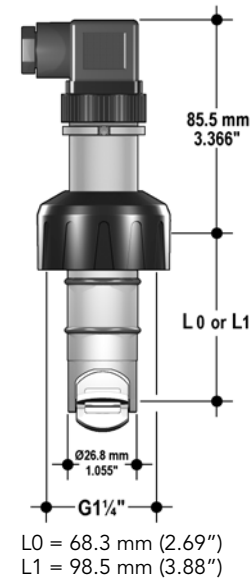
**Pressure/Temperature:** See chart on page 43

■ **Installation Guidelines**

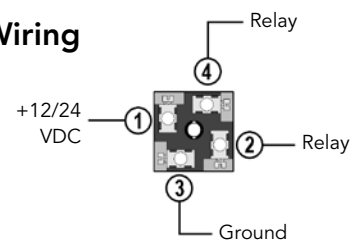
- See page 44 for preferred installation positions. No minimum length of straight pipe is required.

**Type F3.05**

Electrical Class	O-Ring	Sensor Length	Item No.		
			CPVC	PVDF	316L SS
NEMA 4, 4X (IP65)	EPDM	L0	F3.05.H.01	F3.05.H.05	F3.05.H.09
	Viton®	L0	F3.05.H.02	F3.05.H.06	F3.05.H.10
	EPDM	L1	F3.05.H.03	F3.05.H.07	F3.05.H.11
	Viton®	L1	F3.05.H.04	F3.05.H.08	F3.05.H.12



■ **Wiring**



# Type F6.30 <sup>new</sup>

## blind transmitters & switches

The Type F6.30 is a 3-wire flow transmitter with a 4 to 20 mA analog output and a Solid State Relay output. For applications not requiring visual flow indication, it is an economical alternative to an M9.00 instrument/sensor direct mount assembly.

### ■ Type F6.30

**Body Materials:** CPVC, PVDF, 316L Stainless Steel

**Rotor:** ECTFE (Halar®)

**Shaft:** Ceramic (Al2O3)/316SS (only for metal sensors)

**Bearings:** Ceramic (Al2O3)

**Seals:** EPDM, Viton®

**Pipe Sizes:** 1/2"– 24" in two sensor lengths, L0 or L1  
See Installation Fittings (pages 39-42)

**Flow Ranges:** 0.15 to 8 m/s (0.5 to 25 ft./sec.)

### ■ Features

- **Large Selection of Sensor Materials** – Including stainless steel
- **Corrosion Resistant PVC Electronics Housing**
- **Ceramic Shaft and Bearings** – Provide long life on services containing grit
- **Self Cleaning Design** – Lower maintenance



F6.30



### ■ Applications

- **Industrial water and wastewater treatment**
- **Cooling water systems**
- **Swimming pools**
- **Flow control and monitoring**
- **Water treatment**
- **Water regeneration plant**
- **Processing and manufacturing industry**
- **Water distribution**

### Type F6.30

Electrical Class	O-Ring	Sensor Length	Item No.		
			CPVC	PVDF	316L SS
NEMA 4, 4X (IP65)	EPDM	L0	F6.30.H.01	F6.30.H.05	F6.30.H.09
	Viton®	L0	F6.30.H.02	F6.30.H.06	F6.30.H.10
	EPDM	L1	F6.30.H.03	F6.30.H.07	F6.30.H.11
	Viton®	L1	F6.30.H.04	F6.30.H.08	F6.30.H.12

# Type F6.30

## blind transmitters & switches



### General

**Accuracy:**  $\pm 0.75\%$  of full scale or  $1\%$  of reading value with field calibration

**Minimum Reynolds Number Required:** 4500

**Enclosure:** NEMA 4/4X (IP65)

### Electrical

**Power Supply:** 12 to 24 VDC  $\pm 10\%$  regulated (reverse polarity and short circuit protected)

**Maximum Current:** Consumption 150 mA

**Protective Earth**  $< 10\Omega$

**1x Current Output** 4 to 20 mA, isolated  
 Max. Loop impedance  $800\Omega@24\text{ VDC} - 250\Omega@12\text{ VDC}$

**1x Solid State Relay Output:** User selectable as MIN alarm. MAX alarm, Volumetric, Pulse Out, Window alarm, Off  
 Optically isolated, 50 mA MAX sink, 24 VDC MAX pull-up voltage  
 Max pulse/min: 300  
 Hysteresis: use selectable

### Environmental

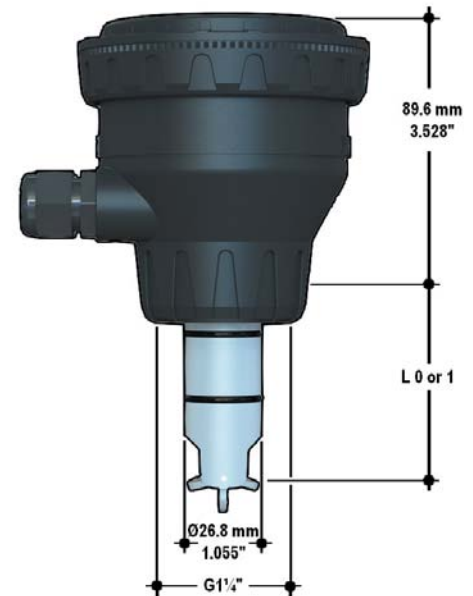
**Storage Temperature:**  $-30$  to  $80^\circ\text{C}$  ( $-22$  to  $176^\circ\text{F}$ )

**Ambient Temperature:**  $-20$  to  $70^\circ\text{C}$  ( $-4$  to  $158^\circ\text{F}$ )

### Standards + Approvals

- CE
- RoHS Compliant
- GOST R

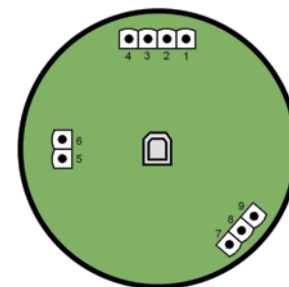
### F6.30 Paddle Wheel Flow Transmitter



L0 = 68.3 mm (2.69")  
 L1 = 98.5 mm (3.88")

### Wiring – Rear Terminal View

(See Instruction Manual for detailed wiring information)



1	+VDC
2	+LOOP
3	-LOOP
4	-VDC

Power Supply

5	NO
6	COM

SSR

7	GND
8	HALL
9	+V

Flow Sensor

**Full Graphic LCD Display**

- Flow rate and total flow indication
- Third line shows output status icons
- Backlit display



**5 Button Silicone Rubber Keypad**

1/4 DIN size

The same instrument may be mounted three different ways using mounting kits

**Direct Mounting to Flow Sensor**



**Flow Monitor**

M9.00.P1  
M9.02.P1  
M9.20.P1



**Direct Mounting Kit**

F6.KC1



**Flow Sensor (Hall or Coil Effect)**

F3.01

=



**Direct Mounted Flow Instrument**

**Panel Mounting**



**Flow Monitor**

M9.00.P1  
M9.02.P1  
M9.20.P1

**with Panel Fixing Threaded Ring**

=



**Panel Mounted Flow Monitor**

or



**Flow Monitor Batch Controller**

M9.10.P1, M9.03.P1  
M9.50.P1

**with Panel Fixing Snails Panel Mounted Flow Monitor or Batch Controller**



**Wall Mounting**



**Flow Monitor**

M9.00.P1  
M9.02.P1  
M9.20.P1

or



**Flow Monitor**

M9.10.P1, M9.03.P1

**Batch Controller**

M9.05.P1

+



**Wall Mounting Kit**

M9.KW1  
M9.KW2

=



**Wall Mount Flow Instrument**

**Direct Mount** package consists of a flow instrument, flow sensor and direct mounting kit.

The **F6.KC1** kit includes an ABS enclosure with EPDM gasket for NEMA 4, 4X watertight installation, a cap and locking ring for connecting the sensor to the enclosure, plus four screws to attach the instrument.

**Panel Mount** instrument consists of a flow instrument and the panel mounting kit (included with the standard monitor).

**Wall Mount** instrument consists of a flow instrument and the wall mounting kit.

The **M9.KW1** kit includes an ABS wall mounting plastic box with UV resistant Polycarbonate front, IP65 (Nema 4, 4X) rating.

The **M9.KW2** includes an ABS wall mounting plastic box with UV resistant Polycarbonate front, IP65 (Nema 4, 4X) rating, with 110/230VAC to 24 VDC power supply included.

## Technical – M9.00, .02, .03, .10, .20 and .50 Instruments

### Display:

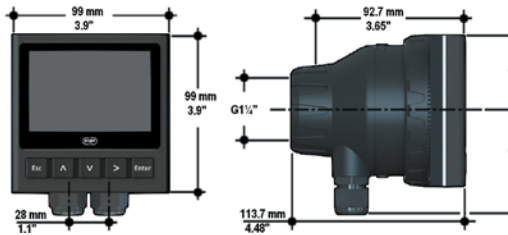
- 3 Line LCD: 2 x 12 alphanumeric characters and 1 icon line
- Update rate: 1 sec.
- Contrast: User adjustable with 5 levels

### Enclosure:

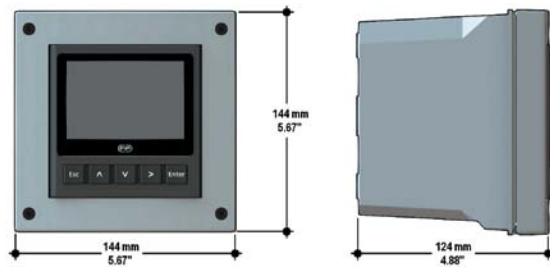
- NEMA 4, 4X (IP65) front
- 1/4 DIN size
- Clear polycarbonate plastic

## Dimensions – Instruments with Mountings

### ■ Direct Mount

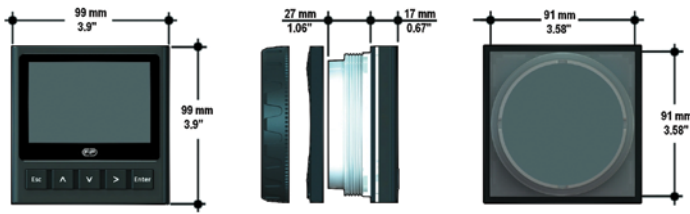


### ■ Wall Mount

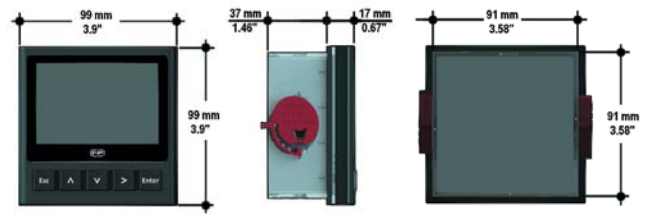


### ■ Panel Mount

#### With Mounting Ring Assembly



#### With Mounting Snails



The monitor fits into a standard 1/4 DIN (96 mm x 96 mm or 3.78" x 3.78") panel cutout.

# Type M9.00 <sup>new</sup>

## 2-wire flow monitor/transmitter

Type M9.00 2-wire Flow Monitor/Transmitter is designed to process the pulse signals from all FlowX3 Hall Effect flow sensors. All units have one 4 to 20 mA and one Solid State Relay output. They have backlit displays. The instrument supplies voltage to the flow sensors. The same instrument may be mounted in three different ways: directly to the flow sensor or remotely either panel or wall mount. Standard configuration is panel mount.

	Material
Case:	ABS
Window Display:	Polycarbonate
Panel & Wall Gasket:	Silicone Rubber
Keypad:	5-Button Silicone Rubber
Display:	Transflective technology Backlight (not available with 4 to 20 mA output)

### ■ Backlit Display

Flow Rate	– 5 digits
Resettable Total	– 10 digits
Non-Resettable Total	– 10 digits

### ■ Output Signals

Item No.	4 – 20 mA*	Wiring	Solid State Relay <sup>†</sup>
M9.00	1	2-Wire	1

<sup>†</sup> User selectable as MIN alarm, MAX alarm, Pulse Out Off

\* Not available with backlight on

### ■ Connectable FlowX3 Sensors

FlowX3 F3.0 Hall Effect Flow Sensors with frequency output or ULF Reed Sensors

**Digiflow**  
**FLOW X3**

M9.00.P1



Direct



Panel  
(standard)



Wall

### ■ Features

- **Easy Set-up** – Setting up the instrument is easy using the keypad and self-explanatory menus
- **Plug-In Removable Terminals** – Makes instrument connection and removal easy
- **4" Transflective Display** – can show two parameters at one time or flow rate and a customizable line field
- **Backlight** – not available with 4 to 10 mA output
- **Installation flexibility**
- **Solid State Relay** – for programmable alarms
- **Multilanguage menu**

### ■ Technical

#### Supply Voltage:

- 12 to 24 VDC ± 10% regulated
- 110/230 VAC with M9.KW2 Wall Mount Kit

#### Sensor Input (Frequency):

- Sensor Power: 5 VDC @ < 20 mA
- Range: 0.5 to 1,500 Hz
- Optically isolated from current loop
- Short circuit protected

#### Enclosure:

- NEMA 4, 4X (IP65)
- 1/4 DIN Size



# Type M9.00

## 2-wire flow monitor/transmitter

### Output Specifications

#### M9.00 – 2-Wire:

**4 to 20 mA Output:** Isolated, fully adjustable and reversible

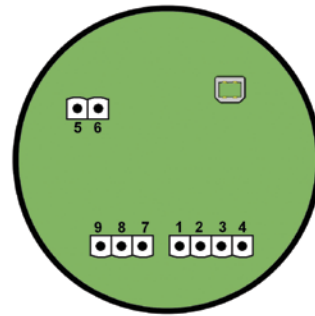
- Maximum Loop Impedance: 800Ω @ 24 VDC, 250Ω @ 12 VDC

**Solid State Relay (S.S.R.) Output:**

- User selectable as MIN alarm, MAX alarm, Pulse Out or Off
- Optically isolated, 50 mA maximum sink, 24 VDC maximum pull-up voltage
- Maximum pulses per minute: 300
- Hysteresis: Adjustable

### Wiring – Rear Terminal View

(See Instruction Manual for detailed wiring information)



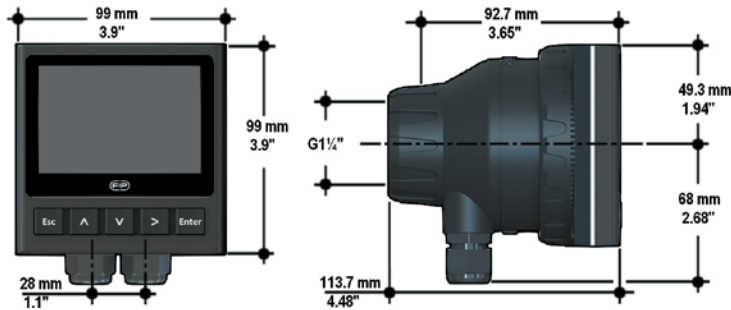
1	+ VDC
2	+ LOOP
3	- LOOP
4	- VDC

SENSOR	
7	GND
8	IN
9	V+

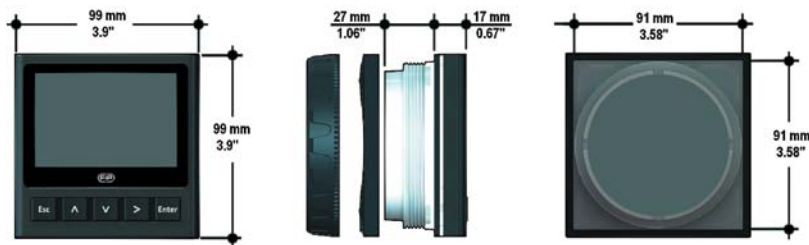
SSR	
5	NO
6	COM

### Mounting Options

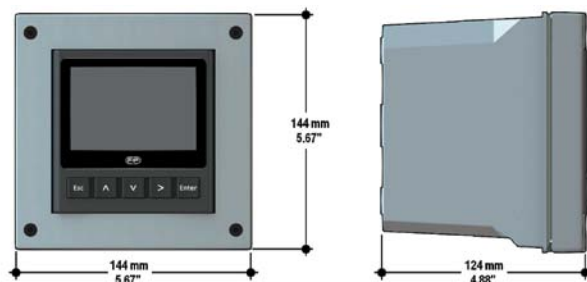
#### Compact



#### Panel



#### Wall



# Type M9.02 <sup>new</sup> flow monitor/ transmitter

Type M9.02 Flow Monitor/Transmitter is designed to process the pulse signals from all FlowX3 Hall Effect flow sensors. All units have a number of control outputs including 4 to 20mA, Solid State and SPDT relays. They have full graphic backlit displays. The instrument supplies voltage to the flow sensors. The same instrument may be mounted in three different ways: directly to the flow sensor or remotely either panel or wall mount. Standard configuration is panel mount.

	Material
<b>Case:</b>	ABS
<b>Window Display:</b>	Polycarbonate
<b>Panel &amp; Wall Gasket:</b>	Silicone Rubber
<b>Keypad:</b>	5-Button Silicone Rubber
<b>Display:</b>	Liquid Crystal Full Graphic Display White backlit during standard conditions Red backlit in case a set alarm is activated Green backlit in case an external device control is activated

## ■ Backlit Display

Flow Rate	- 5 digits
Resettable Total	- 10 digits
Non-Resettable Total	- 10 digits

## ■ Output Signals

Item No.	4 – 20 mA	Wiring	Solid State Relay <sup>†</sup>	Relay (SPDT)*
M9.02	1	3/4-Wire	2	1

<sup>†</sup> User selectable as MIN alarm, MAX alarm, Pulse Out, Window or Off.

\* User selectable as MIN alarm, MAX alarm, Pulse Out, Window or Off.

## ■ Connectable FlowX3 Sensors

FlowX3 Hall Effect Flow Sensors with frequency output or FLS F6.60 Flow Magmeters

**Digiflow**  
**FLOW X3**

M9.02.P1



Direct



Panel  
(standard)



Wall

## ■ Features

- **Easy Set-up** – Setting up the instrument is easy using the keypad and self-explanatory menus
- **Plug-In Removable Terminals** – Makes instrument connection and removal easy
- **4" Full Graphic Display** – can show up to 3 parameters at one time or a single one in full screen
- **Multicolor backlight**
- **Installation flexibility**
- **Mechanical relay** – for external device control
- **Solid State Relays** – for programmable alarms
- **Multilanguage menu**

## ■ Technical

### Supply Voltage:

- 12 to 24 VDC ± 10% regulated
- 110/230 VAC with M9.KW2 Wall Mount Kit

### Sensor Input (Frequency):

- Sensor Power: 5 VDC @ < 20 mA
- Range: 0.5 to 1,500 Hz
- Optically isolated from current loop
- Short circuit protected

### Enclosure:

- NEMA 4, 4X (IP65)
- 1/4 DIN Size

# Type M9.02

## flow monitor/ transmitter

### Output Specifications

#### M9.02 – 3/4-Wire:

**4 to 20 mA Output:** Isolated, fully adjustable and reversible

- Maximum Loop Impedance: 800Ω @ 24 VDC, 250Ω @ 12 VDC

**Two Solid State Relay (S.S.R.) Outputs with LED display:**

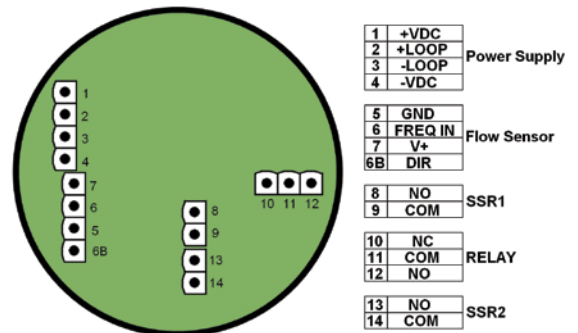
- User selectable as MIN alarm, MAX alarm, Pulse Out, Window or Off
- Optically isolated, 50 mA maximum sink, 24 VDC maximum pull-up voltage
- Maximum pulses per minute: 300
- Hysteresis: Adjustable

**One Relay Output:**

- User selectable MIN alarm, MAX alarm, Pulse Out, Window or Off
- Mechanical SPDT contact
- Expected mechanical life (minimum operations): 10<sup>7</sup>
- Expected electrical life (minimum operations): 10<sup>5</sup> N.O./N.C. switching capacity 5A/240 VAC
- Maximum pulses per minute: 60
- Hysteresis: User selectable

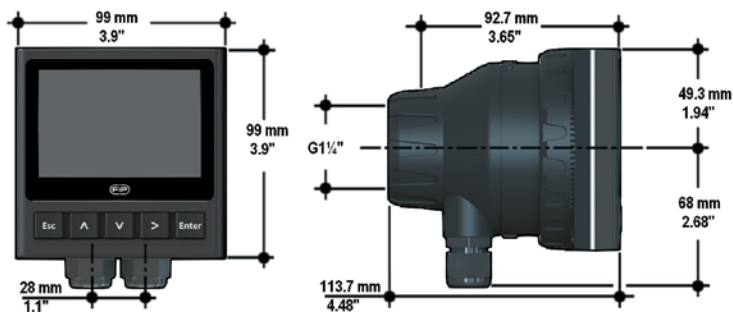
### Wiring – Rear Terminal View

(See Instruction Manual for detailed wiring information)

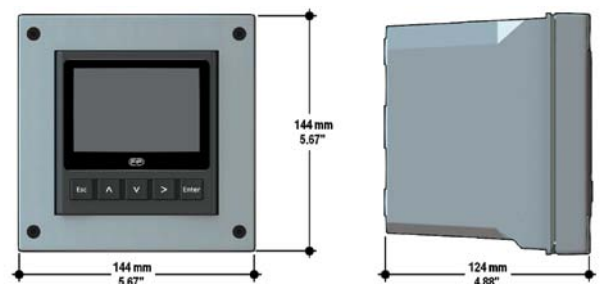


### Mounting Options

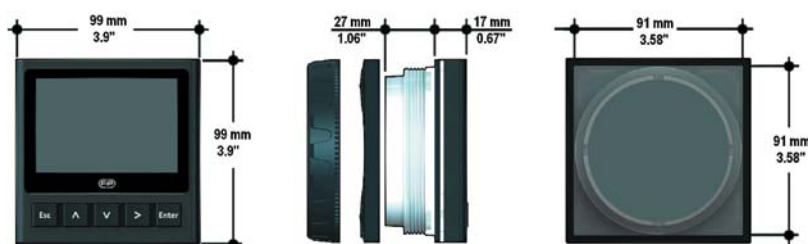
#### Compact



#### Wall



#### Panel



# Type M9.03 <sup>new</sup> dual input flow monitor/transmitter

Type M9.03 Flow Monitor/Transmitter is designed to process the pulse signals from 2 FlowX3 Hall Effect flow sensors and magmeters. They feature 2 of each control outputs: 4 to 20mA, Solid State and SPDT relays. They have full graphic backlit displays. The instrument supplies voltage to the flow sensors. The same instrument may be mounted either panel or wall mount. Standard configuration is panel mount.

	Material
<b>Case:</b>	ABS
<b>Window Display:</b>	Polycarbonate
<b>Panel &amp; Wall Gasket:</b>	Silicone Rubber
<b>Keypad:</b>	5-Button Silicone Rubber
<b>Display:</b>	Liquid Crystal Full Graphic Display White backlit during standard conditions Red backlit in case a set alarm is activated Green backlit in case an external device control is activated

## ■ Backlit Display

Flow Rate	– 5 digits
Resettable Total	– 10 digits
Non-Resettable Total	– 10 digits

## ■ Output Signals

Item No.	4 – 20 mA	Wiring	Solid State Relay <sup>†</sup>	Relay (SPDT)*
M9.03	2	3/4-Wire	2	2

<sup>†</sup> User selectable as MIN alarm, MAX alarm, Pulse Out, Window or Off.

\* User selectable as MIN alarm, MAX alarm, Pulse Out, Window or Off.

## ■ Connectable FlowX3 Sensors

FlowX3 Hall Effect Flow Sensors with frequency output or FLS F6.60 Flow Magmeters

**Digiflow**  
**FLOW X3**

M9.03.P1



**Panel**  
(standard)



**Wall**

## ■ Features

- **Easy Set-up** – Setting up the instrument is easy using the keypad and self-explanatory menus
- **Plug-In Removable Terminals** – Makes instrument connection and removal easy
- **4" Full Graphic Display** – can show up to 3 parameters at one time or a single one in full screen
- **Multicolor backlight**
- **Installation flexibility**
- **Mechanical relay** – for external device control
- **Solid State Relays** – for programmable alarms
- **Multilanguage menu**

## ■ Technical

### Supply Voltage:

- 12 to 24 VDC ± 10% regulated
- 110/230 VAC with M9.KW2 Wall Mount Kit

### Sensor Input (Frequency):

- Sensor Power: 5 VDC @ < 20 mA
- Range: 0.5 to 1,500 Hz
- Optically isolated from current loop
- Short circuit protected

### Enclosure:

- NEMA 4, 4X (IP65)
- 1/4 DIN Size

# Type M9.03

## dual input flow monitor/transmitter

### Output Specifications

#### M9.03 – 3/4-Wire:

**2 x 4 to 20 mA Output:** Isolated, fully adjustable and reversible

- Maximum Loop Impedance: 800Ω @ 24 VDC, 250Ω @ 12 VDC

#### 2 x Two Solid State Relay (S.S.R.) Outputs with LED display:

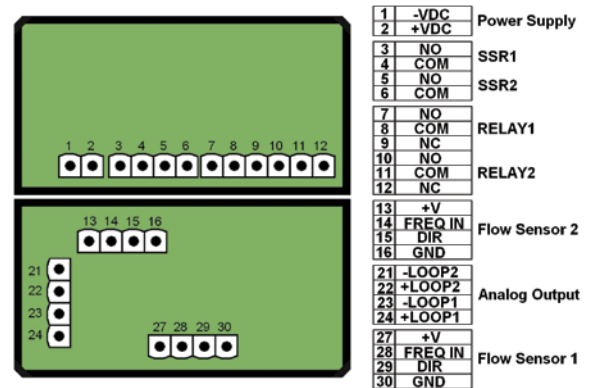
- User selectable as MIN alarm, MAX alarm, Pulse Out, Window or Off
- Optically isolated, 50 mA maximum sink, 24 VDC maximum pull-up voltage
- Maximum pulses per minute: 300
- Hysteresis: Adjustable

#### 2 x Relay Output:

- User selectable MIN alarm, MAX alarm, Pulse Out, Window or Off
- Mechanical SPDT contact
- Expected mechanical life (minimum operations): 10<sup>7</sup>
- Expected electrical life (minimum operations): 10<sup>5</sup> N.O./N.C. switching capacity 5A/240 VAC
- Maximum pulses per minute: 60
- Hysteresis: User selectable

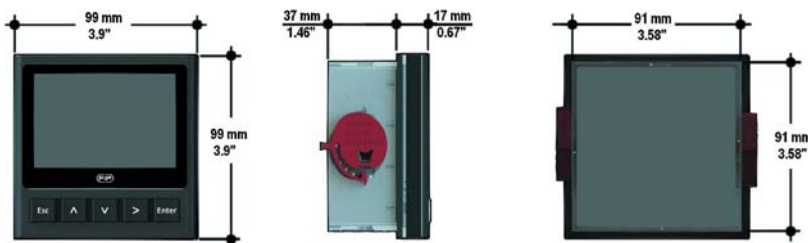
### Wiring – Rear Terminal View

(See Instruction Manual for detailed wiring information)

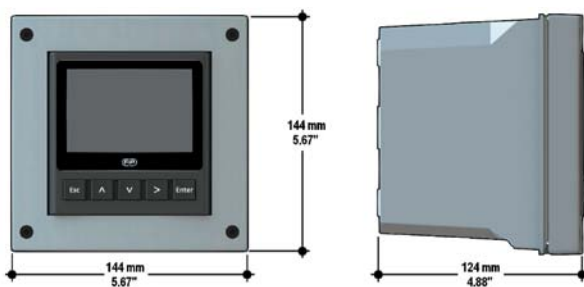


### Mounting Options

#### Panel



#### Wall



# Type M9.10 <sup>new</sup> flow monitor/ transmitter

Type M9.10 Flow Monitor/Transmitter is designed to process two signals from flow sensors and magmeters (one analogue and one frequency). All units have a number of control outputs including 4 to 20mA, Solid State and SPDT relays. They have full graphic backlit displays. The instrument supplies voltage to the flow sensors. The same instrument may be mounted either panel or wall mount.

	Material
<b>Case:</b>	ABS
<b>Window Display:</b>	Polycarbonate
<b>Panel &amp; Wall Gasket:</b>	Silicone Rubber
<b>Keypad:</b>	5-Button Silicone Rubber
<b>Display:</b>	Liquid Crystal Full Graphic Display White backlit during standard conditions Red backlit in case a set alarm is activated Green backlit in case an external device control is activated

## ■ Backlit Display

Flow Rate	- 5 digits
Resettable Total	- 10 digits
Non-Resettable Total	- 10 digits

## ■ Output Signals

Item No.	4 – 20 mA	Wiring	Solid State Relay <sup>†</sup>	Relay (SPDT)*
M9.10	2	2-Wire	2	2

<sup>†</sup> User selectable as MIN alarm, MAX alarm, Pulse Out, Window or Off.

\* User selectable as MIN alarm, MAX alarm, Pulse Out, Window or Off.

## ■ Connectable FlowX3 Sensors

FlowX3 Hall Effect Flow Sensors, flow magmeters and any devices which generate frequency or 4 to 20 mA output

**Digiflow**  
**FLOW X3**

M9.10.P1



**Panel**  
(standard)



**Wall**

## ■ Features

- **Tutorial Software**
- **Easy Set-up** – Setting up the instrument is easy using the keypad and self-explanatory menus
- **Plug-In Removable Terminals** – Makes instrument connection and removal easy
- **4" Full Graphic Display** – shows measured parameters and various other information
- **Multicolor backlight**
- **Installation flexibility**
- **Easy in-line or 2 point calibration**
- **Mechanical relays and Solid State Relays** – allows customized set ups for any process control
- **Multilanguage menu**

## ■ Technical

### Supply Voltage:

- 12 to 24 VDC ± 10% regulated
- 110/230 VAC with M9.KW2 Wall Mount Kit

### Sensor Input (Frequency):

- Sensor Power: 3.8 to 5 VDC @ < 30 mA
- Range: 0.5 to 1,000 Hz
- Optically isolated from current loop
- Short circuit protected

### Enclosure:

- NEMA 4, 4X (IP65)
- 1/4 DIN Size

# Type M9.10

## flow monitor/ transmitter

### Output Specifications

#### M9.10 – 2-Wire:

**4 to 20 mA Output:** Isolated, fully adjustable and reversible

- Maximum Loop Impedance: 800Ω @ 24 VDC, 250Ω @ 12 VDC

#### Two Solid State Relay (S.S.R.) Outputs with LED display:

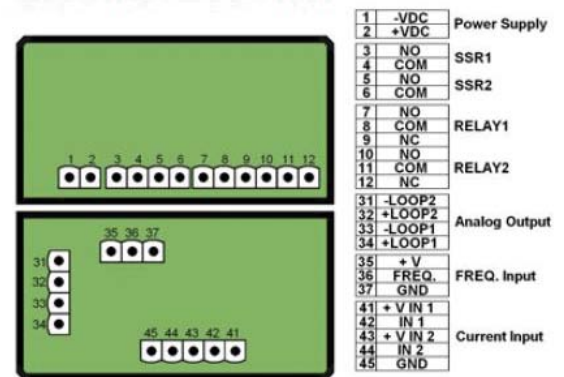
- User selectable as MIN alarm, MAX alarm, Pulse Out, Frequency / Out, Window or Off
- Optically isolated, 50 mA maximum sink, 24 VDC maximum pull-up voltage
- Maximum pulses per minute: 300
- Hysteresis: Adjustable

#### Two Relay Outputs:

- User selectable MIN alarm, MAX alarm, Pulse Out, Window or Off
- Mechanical SPDT contact
- Expected mechanical life (minimum operations): 10<sup>7</sup>
- Expected electrical life (minimum operations): 10<sup>5</sup> N.O./N.C. switching capacity 5A/240 VAC
- Maximum pulses per minute: 60
- Hysteresis: User selectable

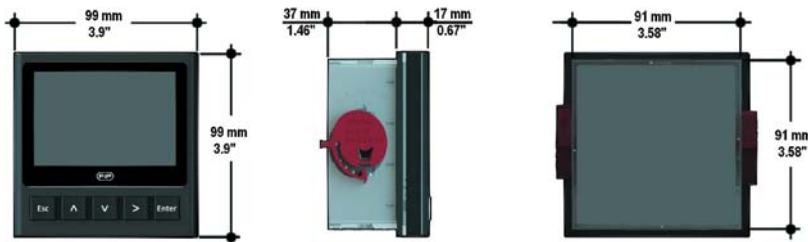
### Wiring – Rear Terminal View

(See Instruction Manual for detailed wiring information)

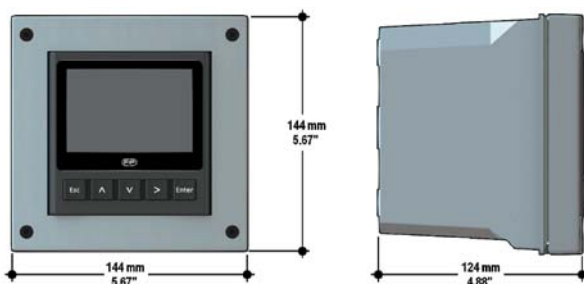


### Mounting Options

#### Panel



#### Wall



# Type M9.50 <sup>new</sup> batch controller



## M9.50.P1

The Type M9.50 Batch Controller is designed for accurate and reliable batching or blending of liquids. It accepts a pulse input from all FlowX3 Hall Effect flow sensors and magmeters.

The instrument offers complex control capability. It is easy to calibrate and operate using self explanatory menus. A Simple and Advanced mode are available which allow the choice of quick calibration and basic outputs or a more customized and detailed control set-up. Four separate control outputs (two SPDT relays, two Solid State Relays) allow the operator to set-up for accurate batch operation. State-of-the-art electronic design ensures performance and reliability.

Flow sensor supply voltage is provided by the controller. The same instrument may either be panel or wall mounted. Standard configuration is panel mount.



## ■ Features

- **Modular Design** – The same instrument may be mounted in two different ways using mounting kits. See page 22.



**Panel**  
(Standard)

**Wall**

- External Start, Stop and Resume
- Two-Stage Shutdown Control
- Permanent and Resettable Totalizer
- Auto-Calibration
- Auto Systematic Error Compensation (ASEC) – For increased linearity and accuracy
- Manual Overrun Compensation
- Overrun Alarm
- Missing Signal Alarm
- Count-up or Count-down Batch Indication
- Output Simulation for System Testing
- Password Protection
- Stores up to 10 batches
- Multicolour backlit visualization

	Material
<b>Case:</b>	ABS
<b>Window Display:</b>	Polycarbonate
<b>Panel &amp; Wall Gasket:</b>	Silicone Rubber
<b>Keypad:</b>	5-Button Silicone Rubber
<b>Display:</b>	Liquid Crystal Full Graphic Display White backlit during standard conditions Red backlit in case a set alarm is activated Green backlit in case an external device control is activated

## ■ Backlit Display

Batch in Progress	– 5 digits
Flow Rate	– 5 digits
Resettable Total	– 10 digits
Non-Resettable Total	– 10 digits

## ■ Output Signals

Item No.	Wiring	Solid State Relay Output	Relay (SPDT)	No. of Batches
M9.50	3/4-Wire	2	2	10

**1xSPDT Relay:** Batch in Progress indication

**1xSPDT Relay and 2xSSR Relay:** User selectable Two-Stage Shutdown, Overrun Alarm or Missing Signal Alarm

## ■ Connectable FlowX3 Sensors

Instrument Mounting	Sensor
Panel or Wall	F3.00.H, F3.20.H, F3.10, F3.80 ULF.H, F6.60M.S, F6.61M.S



# Type M9.50 batch controller



## ■ Technical

### Supply Voltage:

- 12 to 24 VDC  $\pm$  10% regulated
- 110/230 VAC with M9.KW2 Wall Mount Kit

### Sensor Input (Frequency):

- Sensor Power: 3.8 to 5 VDC @ < 30 mA
- Range: 0.5 to 1,500 Hz
- Optically isolated from current loop
- Short circuit protected

### Enclosure:

- NEMA 4, 4X (IP65) front
- 1/4 DIN Size

### Operating Temperature:

- $-20$  to  $70^{\circ}\text{C}$  ( $-4$  to  $158^{\circ}\text{F}$ )

### Storage Temperature:

- $-30$  to  $80^{\circ}\text{C}$  ( $-22$  to  $176^{\circ}\text{F}$ )

For dimensions and more technical specifications, see page 23

## ■ Output Specifications

### Two Solid State Relays:

- User selectable Two-Stage Shutdown, Overrun Alarm or Missing Signal Alarm
- Optically isolated, 50 mA maximum sink, 24 VDC maximum pull-up voltage
- Maximum pulses per minute: 300

### Two Relay Outputs with LED display:

- **OUT1** – Batch: Batch in progress indication
- **OUT2** – User selectable Two-Stage Shutdown, Overrun Alarm or Missing Signal Alarm
- Mechanical SPDT contact
- Expected Mechanical Life (minimum operations):  $10^7$
- Expected Electrical Life (minimum operations):  $10^5$  NO/NC switching capacity 5A @ 240 VAC
- Maximum pulses per minute: 60
- Hysteresis: Adjustable

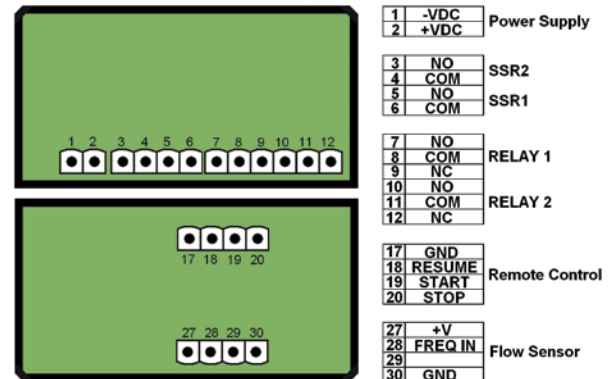
### Additional Functions:

- External Start, Stop and Resume

## ■ Wiring

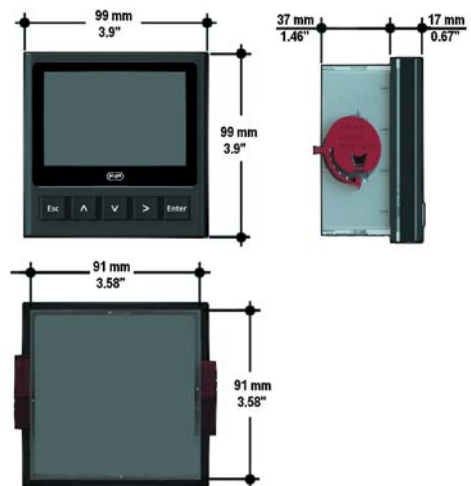
### REAR TERMINAL VIEW

(See Instruction Manual for detailed wiring information)

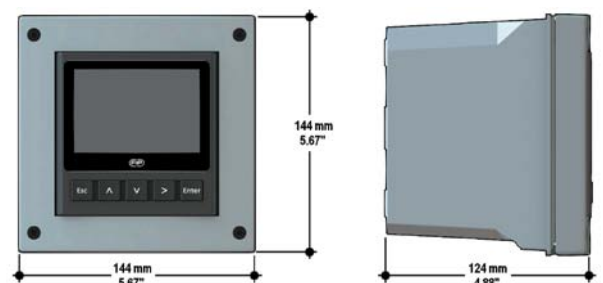


## ■ Mounting Options

### Panel



### Wall



# Type M9.20 <sup>new</sup> battery powered flow monitor

The Type M9.20 Battery Powered Flow Monitor is designed to process the pulse signals from all FlowX3 Coil Effect and ULF Reed Effect flow sensors. The long life Lithium AA battery make this unit ideal for remote locations or for use as a portable meter. The 4" transreflective display shows flow rate and total flow or customizable string. The instrument supplies voltage to the flow sensor.

	Material
Case:	ABS
Window Display:	Polycarbonate
Panel & Wall Gasket:	Silicone Rubber
Keypad:	5-Button Silicone Rubber
Display:	Liquid Crystal Full Graphic Backlit Display

## ■ Display

Flow Rate	- 5 digits
Resettable Total	- 10 digits
Non-Resettable Total	- 10 digits

## ■ Connectable FlowX3 Sensors

Instrument Mounting	Sensor No.
Direct	F3.01.C
Panel or Wall	F3.00.C, ULF.R

**Digiflow**  
**FLOW X3**

M9.20.P1



Direct



Panel  
(standard)



Wall

## ■ Features

- **Battery Operated**  
By a 3.6V Lithium Thionylchloride battery size C ER26500  
Five year estimated battery life  
Battery status indicator  
Battery can be exchanged without loss of calibration data
- **Ideal for Remote Locations** – Or for use as a portable flow meter
- **Easy and intuitive setup**
- **Multilanguage menu**
- **Customizable 10 digit string for the view level**
- **Auto-Calibration** – Automatic calculation using a reference flow
- **Modular Design** – The same instrument may be mounted in three different ways using mounting kits

# Type M9.20 battery powered flow monitor

## ■ Technical

### Sensor Input (Frequency):

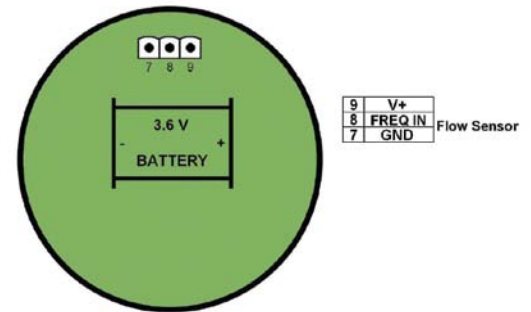
- Sensor Power: 3.6 Volt
- Range: 0.5 to 500 Hz
- Flow Input Accuracy: 0.5%

### Enclosure:

- NEMA 4, 4X (IP65) front
- 1/4 DIN Size
- Update Rate: 1 sec
- Operating Temperature: -5 to 70°C (23 to 140°F)
- Storage Temperature: -10 to 80°C (143 to 176°F)

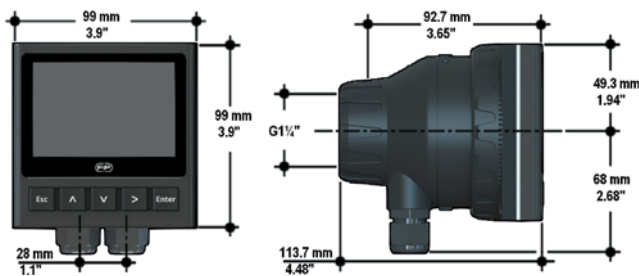
## ■ Rear Terminal View

(See Instruction Manual for detailed wiring information)

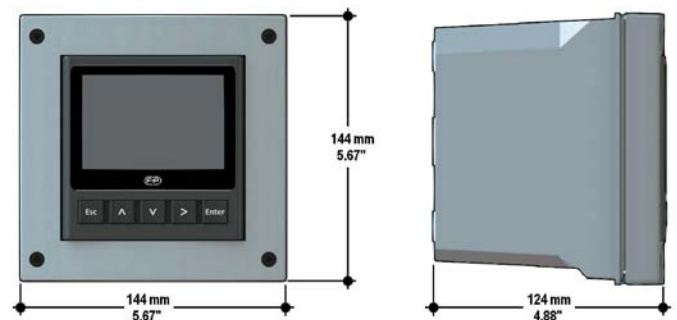


## ■ Mounting Options

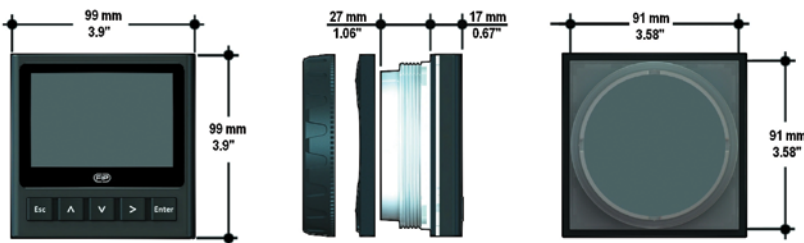
### Direct



### Wall



### Panel



new

# Type F6.60M/F6.63M & F6.61M

## electromagnetic flow transmitters

Types F6.60M/F6.63M and F6.61M are insertion type blind transmitters with a 4 to 20 mA analog output signal and a Solid State Relay, selectable as MIN / MAX alarm, Volumetric/ Pulse Output, Window alarm. These units will handle solids and higher viscosity fluids and are not affected by ferrous particles which can foul the magnetic rotors of the paddle wheel type. The Type F6.60M is the standard installation version and F6.61M is the Hot-Tap version. Hot-Tap function allows sensor insertion and removal while the pipe is pressurized. The units may be connected to FlowX3 instruments.

USB to Digital Configuration allows users to set and calibrate the sensor on the PC/Laptop, and log the data to a file.

	Standard	Sea Water Applications	High Temperature Applications
<b>Body Materials:</b>	316L SS, PVDF	CuNi Alloy, PVDF	316L SS, PEEK†
<b>Electrodes:</b>	316L SS	CuNi Alloy	316L SS
<b>Seals:</b>	EPDM, Viton®	EPDM, Viton®	Viton®
<b>Pipe Sizes:</b>	F6.60M/F6.63M: 1/2" to 24" (consult Chemline for larger pipe sizes) F6.61M: 2" to 36"		

**Installation Fittings:** See pages 41-42

† PEEK = Polyether Ether Ketone

### Unique Features

	F6.60M	F6.63M	F6.61M Hot-Tap Version
<b>Velocity Measurement Range</b>	0.05 to 8 m/s (0.15 to 25 ft/sec.)	0.15 to 8 m/s (0.45 to 25 ft/sec.)	0.05 to 8 (0.15 to 25 ft/sec.)
<b>Directional Flow Measurement</b>	F6.60M/F6.61M: Bidirectional or Monodirectional Software Selectable F6.63M: Monodirectional		

### Installation Fittings

Tees:	1/2" to 1-1/2" PVC, PP, PVDF	-
Bolton-On Saddles:	2" to 12"	-
Strap-On Saddles:	3" to 18"	3" to 18"
Weld-On Adaptors:	1-1/2" to 24"	16" to 24"

### Connectable FlowX3 Instruments

Instrument Mounting	FlowX3 Instruments
Panel or Wall	M9.02, M9.03, M9.10, M9.50



F6.60M/F6.63M



F6.61M Hot-Tap Version



### Common Features

- **Low maintenance** – No moving parts, no wear
- **Will handle slurries and high viscosity conductive and homogeneous fluids**
- **Easier to install and remove** compared to full port magmeters
- **Less costly** than full port magmeters
- **For both plastic and metal pipes**

# Type F6.60M/F6.63M & F6.61M

## electromagnetic flow transmitters

### ■ Technical

**Power Supply:** 12 to 24 VDC  $\pm$  10% regulated (reverse polarity and short circuit protected)

**Maximum Current Consumption:** 250 mA

**Protective Earth:**  $<10\Omega$

**Current Output:** 4 to 20 mA, isolated,  
Maximum loop impedance  $800\Omega$  @ 24 VDC,  
 $250\Omega$  @ 12 VDC, Positive or negative flow  
indication

### Solid State

**Relay Output:** User selectable as MIN alarm, MAX alarm,  
Volumetric, Pulse Out, Window alarm, Off  
Optically isolated, 50 mA MAX sink, 24 VDC  
Max pull-up voltage, max. pulse/min: 300  
Hysteresis: User selectable

### Open Collector

**Output (Frequency):** Type: Open Collector NPN  
Frequency: 0 to 800 Hz  
Max. Pull-up Voltage: 24 VDC  
Max. Current: 50 mA, current limited

### Open Collector

**Output (Direction):** Type: Open Collector NPN  
Max. Pull-up Voltage: 24 VDC  
Max. Current: 50 mA, current limited  
Flow Direction:  
0 VDC arrow-wise  
+ VDC anti arrow-wise

**Enclosure:** NEMA 4, 4X (IP65), PC and PVC materials

**Accuracy/Linearity:** 1% of measured value + flow rate value  
at +0.01m/s (0.03 ft/sec.)

**Repeatability:** 0.5% of measured value

**Full Scale Setting:** 8 m/sec. (25 ft/sec)

**Liquid:** Conductive and homogeneous liquids  
or slurries

**Conductivity of Fluids:** Minimum  $20\ \mu\text{S}$  (microSiemens)

**Ambient Temperature:** 0 to  $60^\circ\text{C}$  (32 to  $140^\circ\text{F}$ )

**Working Temperature:** PVDF bottom (standard + sea water) versions:  
 $-10$  to  $60^\circ\text{C}$  (14 to  $140^\circ\text{F}$ )  
PEEK High Temperature Version:  
 $-10$  to  $150^\circ\text{C}$  (14 to  $302^\circ\text{F}$ )

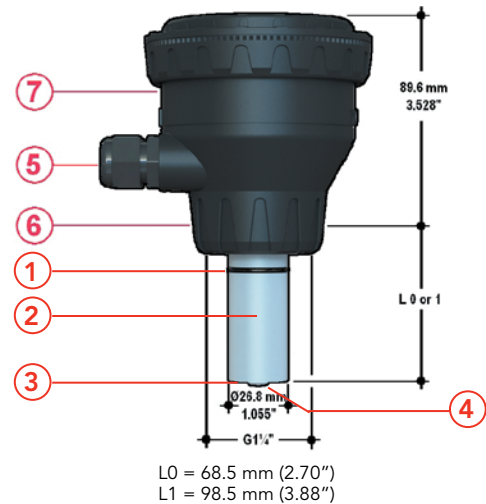
**Maximum Pressure:** 232 psi at  $77^\circ\text{F}$ , 16 bar at  $25^\circ\text{C}$   
124 psi at  $140^\circ\text{F}$ , 8.6 bar at  $60^\circ\text{C}$

**Ground Protection:** Low impedance ground required – below  $10\Omega$

**Standards + Approvals:** Manufactured under ISO 9001 (Quality),  
ISO 14001 (Environmental), CE

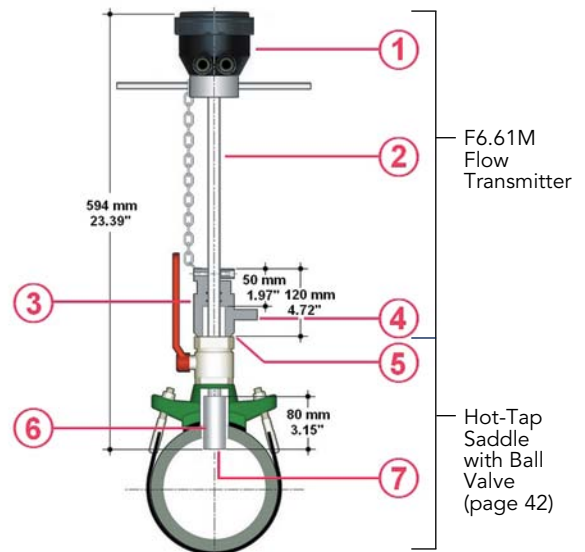
### ■ Dimensions

#### F6.60M/F6.63M



- 1 O-ring (EPDM or FKM)
- 2 Sensor body (316LSS or CuNi)
- 3 Isolation Plate (PVDF or PEEK)
- 4 Electrodes (316LSS or CuNi)
- 5 Cable gland
- 6 ABS cap for installation into fittings
- 7 Electronic box

#### F6.61M

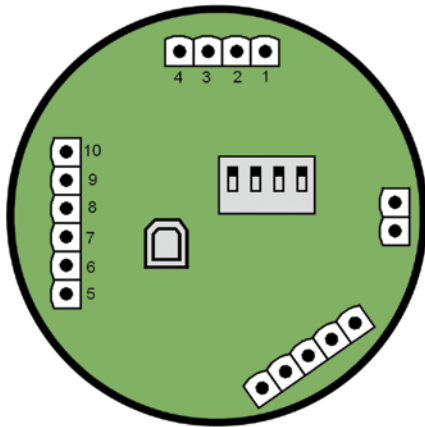


- 1 Magmeter electronic device
- 2 Sliding Rod
- 3 AISI 304 SS joint for sensor installation
- 4 Pressure intake
- 5 Process connection 1-1/4" NPT
- 6 AISI 304 SS adjustable sensor body
- 7 AISI 316L SS electrodes and PVDF bottom

# Type F6.60M/F6.63M & F6.61M electromagnetic flow transmitters



## ■ Rear Terminal View



1	+VDC
2	+LOOP
3	-LOOP
4	-VDC

Power supply

10	-FREQ
9	+FREQ
8	-DIR
7	+DIR
6	COM
5	NO

Digital Output

## ■ Principle of Operation

Two magnetic coils in the body of the instrument generate a magnetic field perpendicular to the flow direction. The magnetic field  $B$  and the flow velocity  $V$  induce a voltage  $E$  between the two electrodes. The voltage  $E$  is directly proportional to the flow velocity  $V$ :

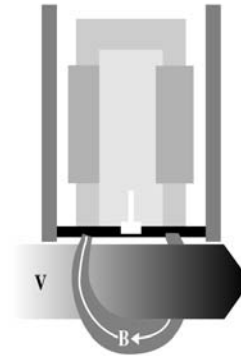
$$E = K \times B \times V$$

$K$  = instrument constant

$B$  = intensity of magnetic field

$V$  = flow velocity of fluid

The voltage across the electrode terminals is transmitted to an integral converter and converted into an output signal of 4 to 20 mA or frequency output signal.



# Installation Fittings for F3.0 sensors & magmeters

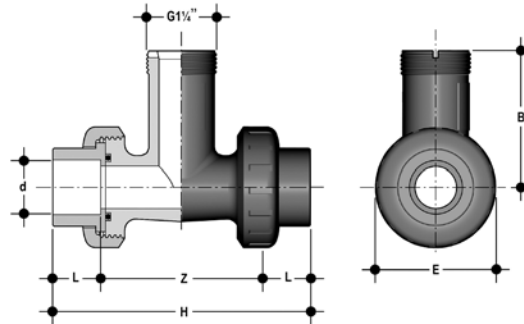
## Tees

**Sizes:** 1/2" to 1-1/2"

**Maximum Pressure:**

150 psi @ 20°C (70°F).

See page 43 for working pressures at higher temperatures.



### DIMENSIONS INCHES

Pipe Size	Sensor Length	B	d	E	PVC / EPDM / Socket				PP / EPDM / Threaded				PVDF / Viton® / Socket			
					Item No.	H	Z	L	Item No.	H	Z	L	Item No.	H	Z	L
1/2"	L0	2.87	0.85	2.09	TEA005ES	4.92	3.15	0.89	TEB005ET	4.45	3.05	0.70	TEK005VS	4.37	3.23	0.57
3/4"	L0	3.15	1.06	2.44	TEA007ES	5.51	3.50	1.00	TEB007ET	4.96	3.54	0.71	TEK007VS	4.74	3.48	0.63
1"	L0	3.19	1.33	2.80	TEA010ES	6.04	3.78	1.13	TEB010ET	5.49	3.71	0.89	TEK010VS	5.26	3.82	0.71
1-1/4"	L0	3.31	1.67	3.31	TEA012ES	7.34	4.80	1.26	TEB012ET	6.69	4.84	0.93	TEK012VS	6.36	4.74	0.81
1-1/2"	L0	3.25	1.91	3.86	TEA015ES	8.15	5.39	1.38	TEB015ET	7.83	5.59	1.12	TEK015VS	7.62	5.77	0.93

PVC ends are ANSI socket. PP tees are female NPT and PVDF tees have DIN socket ends. Other ends available are socket, threaded or flanged in all materials, butt fusion ends (B) for PP and PVDF, and CPVC socket ends for installing PP tees in CPVC pipes. Standard elastomer seals are EPDM or Viton®. Other materials are available.

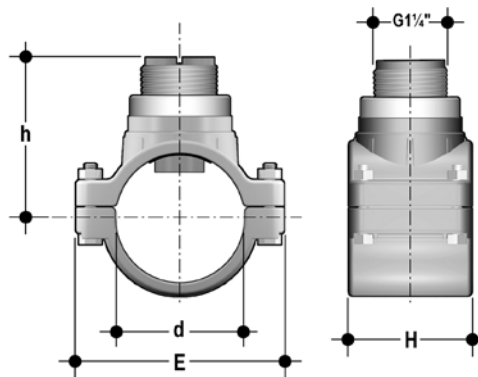
## Bolt-On Saddles

**Sizes:** 2" to 8"

**Maximum Pressure:**

150 psi @ 20°C (70°F).

Use the insert material for determination of working pressures at higher temperatures. See page 43.



### DIMENSIONS INCHES

Size	Sensor Length	Materials		Materials		d	E	h	H	Hole Diameter in Pipe
		Saddle / Insert / Seal	Item No.	Saddle / Insert / Seal	Item No.					
2"	L0	PVC / CPVC / EPDM†	SAAC020E	PVC / PVDF / Viton®	SACK020V	2.375	4.57	3.3	4.13	1-3/8"
2-1/2"	L0	PVC / CPVC / EPDM†	SAAC025E	PVC / PVDF / Viton®	SACK025V	2.875	5.28	3.4	4.13	1-3/8"
3"	L0	PVC / CPVC / EPDM†	SAAC030E	PVC / PVDF / Viton®	SACK030V	3.500	5.98	3.6	4.13	1-9/16"
4"	L0	PVC / CPVC / EPDM†	SAAC040E	PVC / PVDF / Viton®	SACK040V	4.500	6.93	4.0	4.13	1-9/16"
6"	L1	PVC / CPVC / EPDM†	SAAC060E	PVC / PVDF / Viton®	SACK060V	6.625	9.37	5.9	4.72	1-9/16"
8"	L1	PVC / CPVC / EPDM†	SAAC080E	PVC / PVDF / Viton®	SACK080V	8.625	13.11	6.6	4.92	1-9/16"

Bolts, nuts and washers are carbon steel.

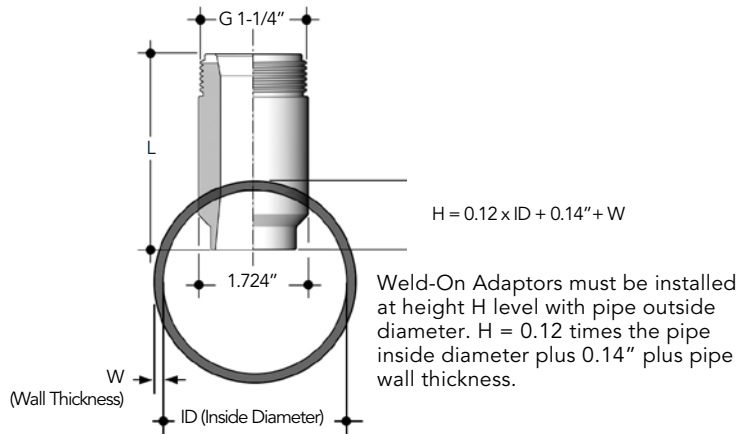
† Viton® seals are also available.

# Installation Fittings for F3.0 sensors & magmeters



## Weld-On Adaptors

**Pipe Sizes:** 1-1/2" to 24"  
**Body Materials:** 316 Stainless Steel  
**Maximum Pressure:** 365 psi with metal sensor. See page 43.

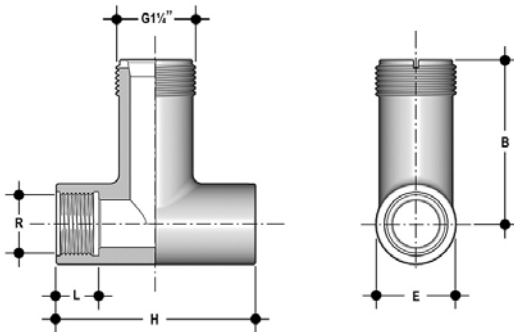


### DIMENSIONS INCHES

Pipe Size	Sensor Length	Item No.	L	D
1-1/2" to 8"	L0	WOSS-L0	2.70	1.724
10" to 24"	L1	WOSS-L1	3.88	1.724

## 316 Stainless Steel Threaded Tees

**Sizes:** 3/4" to 1-1/4" NPT female thread.  
**Maximum Pressure:** 365 psi with metal sensor. See page 43.



### DIMENSIONS INCHES

Pipe Size	Sensor Length	Item No.	d	H	L	B	E
3/4"	L0	TES007T-NPT	3/4"	3.74	0.79	3.20	1.65
1"	L0	TES010T-NPT	1"	4.13	0.88	3.20	1.65
1-1/4"	L0	TES012T-NPT	1-1/4"	4.72	0.81	3.30	2.12



# Installation Fittings for F3.0 sensors & magmeters



**Sensor  
Installation Kit  
(included)**

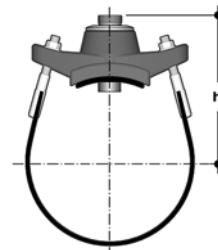


## Metal Strap-On Saddles

- Pipe Sizes:** 3" to 18"
- Body Materials:** Cast Iron/Stainless Steel
- Insert Materials:** PVC
- Nut + Washer Material:** Carbon Steel
- Seals:** EPDM
- Maximum Pressure:** 150 psi @ 20°C (70°F). See page 43.

### DIMENSIONS

Pipe Size	Sensor Length	Item No.	OD (mm)		OD (inches)		h (inches)	Drilling Hole
			Min.	Max.	Min.	Max.		
3"	L0	MSS030E	88	104	3.5	4.1	4.64	1-5/8"
4"	L0	MSS040E	112	126	4.4	5.0	4.92	1-5/8"
5"	L0	MSS050E	140	154	5.5	6.1	5.15	1-5/8"
6"	L0	MSS060E	168	184	6.6	7.2	5.63	1-5/8"
8"	L1	MSS080E	218	234	8.6	9.2	7.56	1-5/8"
10"	L1	MSS100E	272	286	10.7	11.3	8.26	1-5/8"
12"	L1	MSS120E	322	344	12.7	13.5	9.01	1-5/8"
14"	L1	MSS140E	356	384	14.0	15.1	9.72	1-5/8"
16"	L1	MSS160E	425	458	16.7	18.0	11.22	1-5/8"
18"	L1	MSS180E	475	516	18.7	20.3	11.97	1-5/8"



**MSS Saddle with  
F3.00 IP68 sensor  
(recommended instal-  
lation)**

## Plugs for Installation Fittings

Plugs are used to cap off tees or saddles (see pages 39) after a sensor is removed for relocation, repair or pipeline maintenance.

**Materials:** PVC, CPVC, PP, PVDF

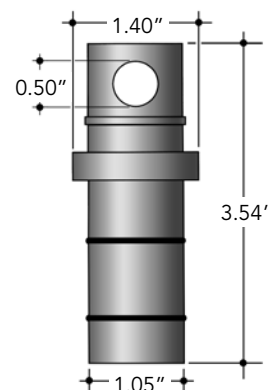
**Seals:** EPDM, Viton®

**Maximum Pressure:**

150 psi @ 20°C (70°F). See page 43 for working pressures at higher temperatures.

### MATERIALS

Item No.	Body Material	O-Ring
PLUGAE	PVC	EPDM
PLUGAV	PVC	Viton®
PLUGCE	CPVC	EPDM
PLUGCV	CPVC	Viton®
PLUGBE	PP	EPDM
PLUGBV	PP	Viton®
PLUGKV	PVDF	Viton®



# Installation Fittings for F6.61M magmeters



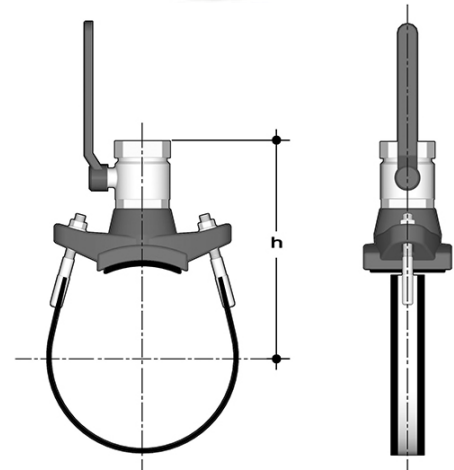
## Hot-Tap Metal Strap-on Saddles

Includes 2" brass ball valve with BSP female threaded ends to connect directly to the F6.61M Hot Tap flow sensor. See pages 36 to 38.

- Pipe Sizes:** 3" to 18"
- Body Materials:** Cast Iron/Stainless Steel
- Seals:** EPDM
- Nut Materials:** Carbon Steel
- Maximum Pressure:** 150 psi
- Maximum Temperature:** 80°C (176°F), same as the sensor

### DIMENSIONS

Pipe Size	Item No.	OD (mm)		OD (inches)		h (inches)
		Min.	Max.	Min.	Max.	
3"	MSS030E-HT	88	104	3.5	4.1	7.28
4"	MSS040E-HT	112	126	4.4	5.0	7.83
5"	MSS050E-HT	140	154	5.5	6.1	8.62
6"	MSS060E-HT	168	184	6.6	7.2	9.13
8"	MSS080E-HT	218	234	8.6	9.2	10.31
10"	MSS100E-HT	272	286	10.7	11.3	11.22
12"	MSS120E-HT	322	344	12.7	13.5	12.32
14"	MSS140E-HT	356	384	14.0	15.1	13.30
16"	MSS160E-HT	425	458	16.7	18.0	14.01
18"	MSS180E-HT	475	516	18.7	20.3	15.35

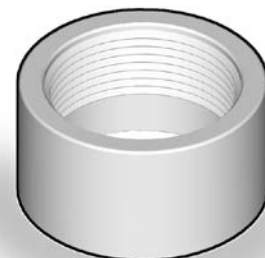
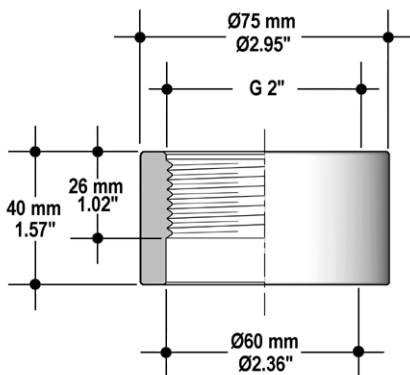


## Hot-Tap 316L Stainless Steel Weld-On Adaptors

2" ball valve is not included but is required. Consult Chemline.

### DIMENSIONS INCHES

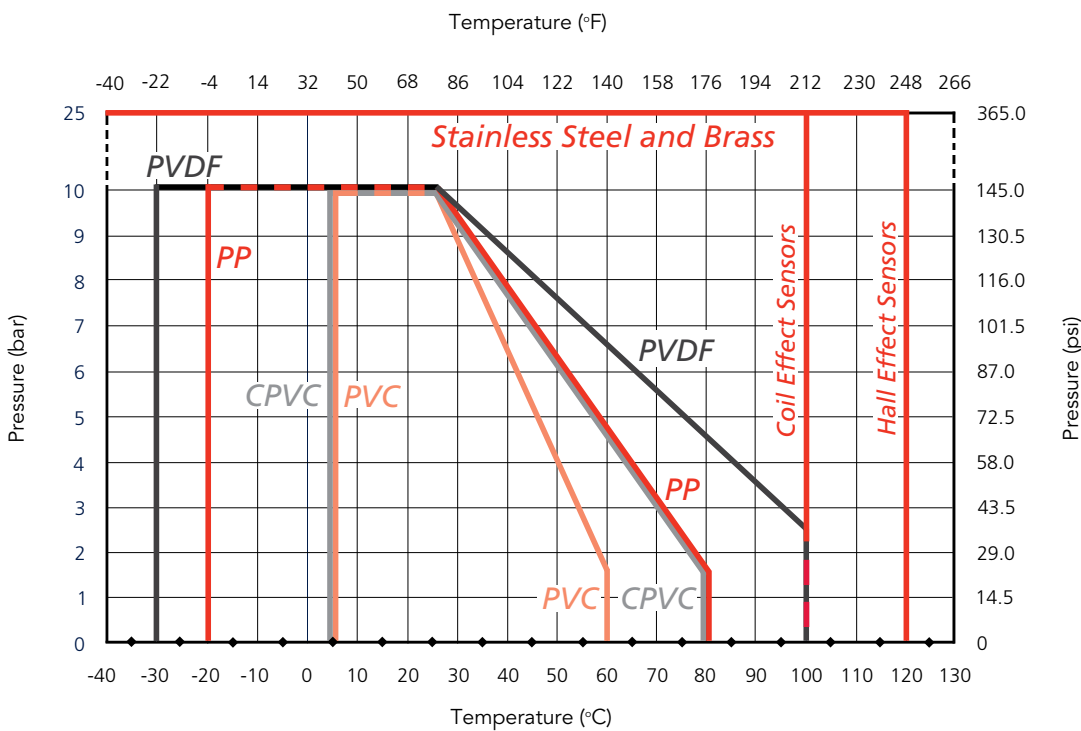
Pipe Size Min.	Item No.	OD Min.	Connection Size (BSP)
16"	WOSS-HT	15.75	2.00"



# Working Pressure vs. Temperature

## For Paddle Wheel Flow Sensors and Installation Fittings

To determine maximum recommended pressure at a given temperature check maximum pressure ratings of the sensor as well as installation fittings selected. The lower pressure rating applies.



### Temperature Ranges

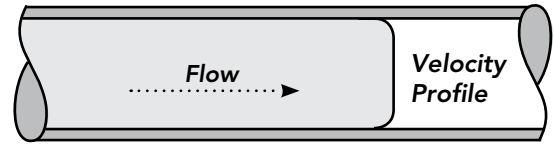
Material	Temperature Range
PVC: Polyvinyl Chloride	5 to 60°C (41 to 140°F)
CPVC: Chlorinated Polyvinyl Chloride	5 to 80°C (41 to 176°F)
PP: Polypropylene	-20 to 80°C (-4 to 176°F)
PVDF: Polyvinylidene Fluoride	-30 to 100°C (-22 to 212°F)
316L SS and Brass:	Allowable temperature range is limited by the sensor's electronics Hall Sensors: -30 to 120°C (-22 to 248°F) Coil Sensors: -30 to 100°C (-22 to 212°F)

# Installation Guidelines

Digiflow® FlowX3 flow meters measure liquids only. No air bubbles should be present and the pipe must always be full. The sensors will not work properly in laminar or transitional flow applications. Minimum Reynolds number required is 4500.

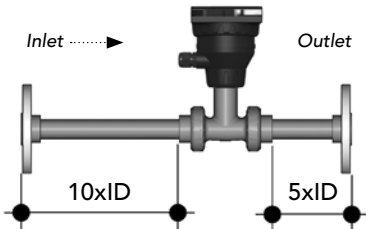
For accurate flow measurement there must be a developed turbulent velocity profile at the sensor location. This requires a straight run pipe with a minimum number of pipe diameters distance upstream and downstream of the flow sensor. These distances depend on the type of piping element (i.e. valves, elbows, reducers etc.) causing the disturbance.

To ensure maximum accuracy, the following guidelines should be observed when installing.

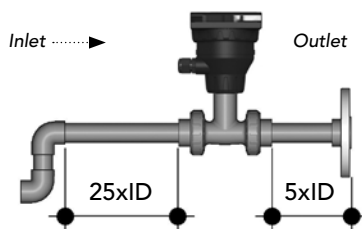


**Developed Turbulent Flow**

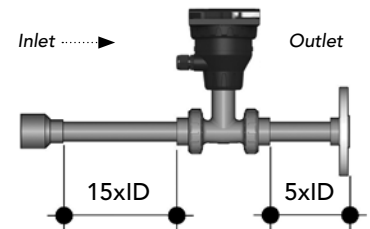
### Socket Flange



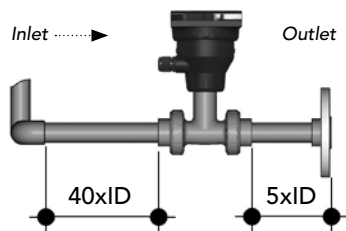
### 2 x 90° Elbow



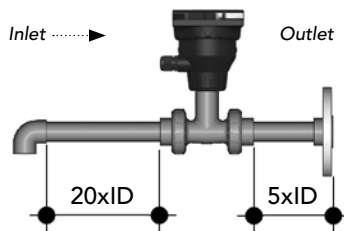
### Reducer



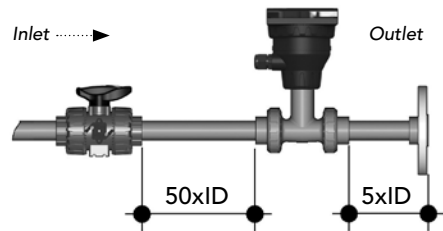
### 2 x 90° Elbow – 3 Dimensional



### 90° Elbow

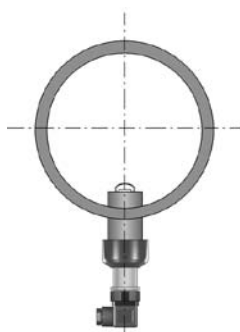


### Valve



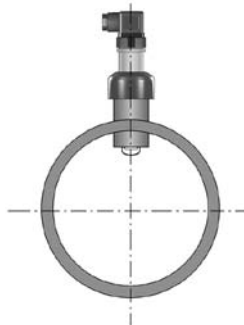
## ■ Installation Positions

**Figure 1**



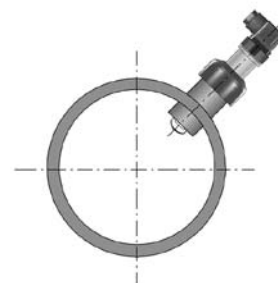
OK if no sediments are present

**Figure 2**



OK if no air bubbles are present

**Figure 3**



Preferred installation if sediments\* or air bubbles may be present

\* Maximum % Solids: 10% with particle size not exceeding 0.5 mm cross section or length.

# Calibration Factors for F3.0/6.30 flow sensors



## Calibration (K) Factors + Flow Ranges

Calibration (K) factors are the numbers that must be programmed into the instruments. They convert the pulse output from the sensor (**pulses per litre**) to instrument readings and depend on the inside diameter of the pipe and specific fitting.

Flow range is the minimum and maximum which may be measured within stated accuracy. This corresponds to the flow velocity range of 0.15 to 8 m/s (0.5 to 25 ft./sec.).

### K Factors for Tee Fittings

Fitting Size	K Factors				Flow Range – m <sup>3</sup> /h		Flow Range – USGPM	
	PVC	PP	PVDF	316L SS	Minimum	Maximum	Minimum	Maximum
1/2"	235.45	212.17	225.06	–	0.09	5.1	0.42	22.4
3/4"	142.46	135.32	139.38	157.06	0.17	9.0	0.75	39.8
1"	91.53	89.36	94.66	92.84	0.26	14.1	1.17	62.2
1-1/4"	51.57	48.94	51.37	51.52	0.43	23.2	1.91	102.0
1-1/2"	42.89	42.10	43.07	–	0.68	36.2	2.99	159.3

### K Factors for Plastic Saddles installed on PVC Pipe

Fitting Size	Schedule 40				Schedule 80			
	ID	K Factor	Flow Range		ID	K Factor	Flow Range	
			m <sup>3</sup> /h	USGPM			m <sup>3</sup> /h	USGPM
2"	2.047	25.97	1.15 – 61	5 – 270	1.913	29.74	1.0 – 53	4.4 – 235
2-1/2"	2.445	17.76	1.6 – 87	7 – 380	2.290	20.25	1.4 – 77	6.3 – 340
3"	3.042	10.92	2.5 – 135	11 – 590	2.864	12.36	2.2 – 120	9.9 – 530
4"	3.998	5.79	4.4 – 233	19 – 1,030	3.786	6.47	3.9 – 209	17.3 – 920
5"	5.016	3.61	6.9 – 367	30 – 1,600	4.768	4.00	6.2 – 332	27.4 – 1,460
6"	6.031	2.39	9.9 – 531	44 – 2,340	5.709	2.68	8.9 – 476	39.3 – 2,090
8"	7.941	1.30	17.2 – 920	76 – 4,050	7.565	1.46	15.7 – 835	68.9 – 3,680

### K Factors for Metal Clamp Saddles and Weld-On Adaptors on CS or Stainless Steel Pipe

Pipe Size	Schedule 40		Schedule 80	
	ID	K Factor	ID	K Factor
2"	2.047	21.93	1.913	25.11
2-1/2"	2.445	15.26	2.290	17.40
3"	3.042	10.30	2.864	11.62
4"	3.998	5.06	3.786	5.64
5"	5.016	3.19	4.768	3.53
6"	6.031	2.13	5.709	2.38
8"	7.941	1.21	7.565	1.33
10"	9.976	0.73	9.493	0.81
12"	11.888	0.51	11.294	0.57
14"	13.072	0.48	12.412	0.53
16"	14.936	0.36	14.224	0.39
18"	16.809	0.27	16.014	0.29
20"	18.743	0.22	17.814	0.24
24"	22.544	0.15	21.418	0.17

### Installation Weld-On Adaptor for Metal Pipe

For Weld-On Adaptors on metal pipe, where the pipe inside diameter (ID<sub>1</sub>) is different from the values shown in the chart to the left, use the following correction equation to calculate the new K factor (K<sub>1</sub>).

$$K_1 = K \left( \frac{ID}{ID_1} \right)^2$$

ID, K – Values from the chart to the left

ID<sub>1</sub> – Inside diameter of pipe (different from sch 40 or sch 80)

K<sub>1</sub> – New K factor to be inputted into instruments

## ULF Sensors

Ends	Flow Range		ULFH Hall Effect Pulses per Litre (K Factor)	ULFR Reed Effect Pulses per Litre (K Factor)	Min. Flow without Field Calibration		Min. Flow with Field Calibration	
	l/h	USGPM			l/h	USGPM	l/h	USGPM
1/4"	1.5–100	0.0066–0.44	8,431	2,108	8	0.035	1.5	0.0066
1/4"	6–250	0.0264–1.10	3,394	848	15	0.066	6.0	0.0264

# Calibration Factors for electromagnetic flow transmitters



## Calibration (K) Factors + Flow Ranges

Calibration (K) factors are the numbers that must be programmed into the instruments. They convert the pulse output from the sensor (**pulses per litre**) to instrument readings and depend on the inside diameter of the pipe and specific fitting.

F3.60M.S and F9.60M magmeters are factory calibrated for 5 m/s velocity. F.S. is the Flow Rate value (l/s and USGPM) at 5 m/s.

### K Factors for Tee Fittings

Fitting Size	PVC			PP			PVDF			316L SS		
	K	l/s	USGPM	K	F.S. l/s	USGPM	K	F.S. l/s	USGPM	K	F.S. l/s	USGPM
1/2"	462.04	1.08	17.12	510.01	0.98	15.53	510.01	0.98	15.53	-	-	-
3/4"	272.89	1.83	29.00	294.29	1.56	24.73	294.29	1.70	26.94	308.21	1.62	25.68
1"	157.86	3.17	50.24	178.60	2.59	41.05	178.60	2.80	44.38	177.84	2.81	44.54
1-1/4"	101.60	4.92	77.98	105.74	4.02	63.72	105.74	4.73	74.97	88.85	5.63	89.24
1-1/2"	63.72	7.85	124.42	67.60	6.31	100.01	67.60	7.40	117.29	-	-	-

### K Factors for Plastic Saddles installed on PVC Pipe

Fitting Size	Schedule 40				Schedule 80			
	ID	K Factor	F.S. l/s	F.S. USGPM	ID	K Factor	F.S. l/s	F.S. USGPM
2"	2.047	47.10	10.6	168.2	1.913	53.93	9.3	146.9
2-1/2"	2.445	33.05	15.1	240.0	2.290	37.67	13.3	210.3
3"	3.042	21.33	23.4	371.5	2.864	24.06	20.8	329.4
4"	3.998	16.00	40.5	641.7	3.786	17.84	36.3	575.5
5"	5.016	12.44	63.7	1,010.1	4.768	13.77	57.6	912.7
6"	6.031	5.43	92.1	1,460.3	5.709	6.06	82.6	1,308.8
8"	7.941	3.13	159.7	2,531.7	7.565	3.45	145.0	2,298.3

### K Factors for Metal Clamp Saddles and Weld-On Adaptors on CS or Stainless Steel Pipe

Pipe Size	Schedule 80			
	ID	K Factor	F.S. l/s	USGPM
1-1/2"	1.500	53.74	9.30	147.41
2"	1.913	43.60	11.47	181.80
2-1/2"	2.290	26.22	19.07	302.26
3"	2.864	19.02	26.29	416.70
4"	3.786	11.28	44.32	702.48
5"	4.768	7.43	67.30	1,066.73
6"	5.709	5.10	98.13	1,555.39
8"	7.565	3.00	166.92	2,645.74
10"	9.493	1.91	261.85	4,150.41
12"	11.294	1.35	369.82	5,861.77
14"	12.412	1.12	447.32	7,088.74
16"	14.224	0.83	600.96	9,525.41
18"	16.014	0.62	801.28	12,700.55
20"	17.814	0.52	961.54	15,240.72
24"	21.418	0.36	1,373.63	21,772.48

### Installation Weld-On Adaptor for Metal Pipe

For Weld-On Adaptors on metal pipe, where the pipe inside diameter (ID<sub>1</sub>) is different from the values shown in the chart to the left, use the following correction equation to calculate the new K factor (K<sub>1</sub>).

$$K_1 = K \left( \frac{ID}{ID_1} \right)^2$$

- ID, K – Values from the chart to the left
- ID<sub>1</sub> – Inside diameter of pipe (different from sch 40 or sch 80)
- K<sub>1</sub> – New K factor to be inputted into instruments

# selection questionnaire



fluid: \_\_\_\_\_ (notes 1, 2)

concentration: \_\_\_\_\_ % (note 2)

temperature: \_\_\_\_\_ °C (notes 2, 3)

pressure: \_\_\_\_\_ psi (note 3)

viscosity: \_\_\_\_\_ cSt (note 4)

maximum solids: \_\_\_\_\_ % (note 5)

particle size: \_\_\_\_\_ mm dia. (note 5)

ferrous particles in fluid?:  yes  no (note 6)

electromagnetic flow meters only: (note 7)

conductivity of fluid greater than 20 microSiemens?:  yes  no

maximum/minimum measured flow rate:  
\_\_\_\_\_ / \_\_\_\_\_ units: \_\_\_\_\_

pipe size: \_\_\_\_\_ pipe material: \_\_\_\_\_

sensor body:  CPVC  316L SS  
 PVDF

sensor o-rings:  EPDM  Viton®  
 other \_\_\_\_\_

installation fittings:  tee  saddle  
 weld-on adaptor

power supply available: \_\_\_\_\_

output signal: \_\_\_\_\_

digital display:  not required  
 direct mount  
 panel mount  
 wall mount

distance of straight pipe upstream/downstream  
of flow sensor: \_\_\_\_\_ / \_\_\_\_\_ (note 8)

type of piping element upstream/downstream of  
flow sensor (i.e. valve, elbow, reducer, etc.):  
\_\_\_\_\_ / \_\_\_\_\_ (note 8)

maximum distance from flow sensor to remote  
instrument: \_\_\_\_\_ (note 9)

## Reference Notes

1. Digiflow® FlowX3 flow meters measure liquids only. No air bubbles should be present and the pipe must always be full.
2. Check chemical resistance of the fluid to verify if wetted parts are acceptable.
3. Check that the service is within the pressure/temperature rating of installation fitting.
4. Viscosity range is 0.5 to 20 cSt (centistokes). Factor calibration is required if outside this range, up to 40 cSt maximum. Maximum viscosity for Oval Gear flow sensor is 1,000 cP. Insertion electromagnetic flow transmitters have no viscosity limitations. See **Units of Viscosity** below.
5. Maximum percentage solids content for paddle wheel sensors is 10%, with particles not to exceed 0.5 mm in length or diameter (0% solids for ULF flow sensors). The insertion type electromagnetic flow transmitters can handle homogeneous solids easily. Particle size is not an issue.
6. Paddle wheel flow meters cannot be used on services containing ferrous particles i.e., those which will be attracted to the magnetic rotor blades. The insertion type electromagnetic flow transmitters is only sensitive to metallic particles if they are magnetic.
7. Electromagnetic flow transmitters require liquid to have minimum conductivity at 20 microSiemens.
8. For accurate flow measurement there must be a developed turbulent velocity profile at the sensor location. This requires a straight run pipe with a minimum number of pipe diameters distance upstream and downstream of the flow sensor. These distances depend on the type of piping element (i.e. valves, elbows, reducers etc.) causing the disturbance. See page 45.
9. Hall Effect signals may be transmitted up to 300 meters (984 ft.) without the need for conditioning whereas Coil or Reed Effect signals may be transmitted up to 16 m (52.5 ft.) without conditioning. Coil Effect sensors are normally used with the battery powered flow monitor.

## Units of Viscosity

$$\text{Absolute Viscosity } (\mu\text{L}): 1 \text{ poise (P)} = 1 \frac{\text{dyne}}{\text{cm}^2} = 1 \frac{\text{gm}}{\text{cm} \cdot \text{sec.}}$$

$$1 \text{ centipoise (cP)} = 0.01 \text{ poise}$$

Viscosity of water at 20°C is 1.002 cP

$$\text{Kinematic Viscosity } (\nu) = \frac{\text{Absolute Viscosity}}{\text{Density of Fluid}}$$

$$1 \text{ stoke (St)} = 1 \frac{\text{m}^2}{\text{sec.}}$$

$$1 \text{ centistoke (cSt)} = 0.01 \text{ stoke}$$

Viscosity is temperature dependent. Liquid viscosities drop with increased temperature.

# Digiflow FlowX3 Sample Case



This fully functional display case can be used for promotion and training as well as troubleshooting and simulation. Item substitutions can be made based on your products of interest.

## ■ Components

- Kinetics waterproof, high impact ABS case with custom foam insert and 110 VAC power supply
- F6.30.01 – CPVC Paddle wheel Blind Flow Transmitter/Adjustable Flow Switch, with 4-20 mA output and SSR Relay, with USB key and connection cable for calibration with the free software. The F6.60M.09 Insertion 316SS/PVDF Magmeter can be chosen to replace the paddle wheel flow transmitter.
- M9.02.P1 – Flow Monitor and 3-wire Transmitter, features a 4" full graphic multicolored backlit display, plug-in terminals, 5 buttons keypad and self-explanatory menus for easy calibration. The M9.02 Monitor and F3.01 Hall Sensor can be replaced with any other Digiflow flow or analytical monitor and sensor.
- F6.KC1 – Local mounting kit for M9.02
- F3.01.H.01 – CPVC Hall Effect Paddle Wheel Flow Sensor
- TEA007ES – 3/4" PVC Installation Tee fitting for sensors
- WOSS-L0 – 316L SS Weld-on adaptor
- USB Key – with downloadable software
- Chemline Screwdriver





# Type M9.06 <sup>new</sup> pH/ORP monitor



The Type M9.06 pH/ORP monitor and controller is designed for a wide range of applications and to work with different kinds of pH and ORP electrodes.

Automatic buffer recognition allows an easy and mistake-proof pH and ORP electrode calibration. A complete choice of input/output options, together with manual and automatic temperature compensation and easy-to-use tutorial software, guarantee customized set-ups for any process to be controlled.

## ■ Multicoloured Backlit Display

4" full graphic  
Update Rate – 1 second  
Contrast – User adjustable with 5 levels



## ■ Output Signals

Item No.	Power Supply	Electrode Input	4–20 mA Output	SPDT Relay Output	SSR Relay Output
M9.06.P1	24 VAC/DC	pH or ORP, Temperature	2	ON-OFF, Prop. pulse, Time Pulse, Off	Same as SPDT
M9.06.W1	24 VAC/DC	pH or ORP, Temperature	2	ON-OFF, Prop. pulse, Time Pulse, Off	Same as SPDT
M9.06.W2	110/230 VAC	pH or ORP, Temperature	2	ON-OFF, Prop. pulse, Time Pulse, Off	Same as SPDT



Panel  
(Standard)



Wall

## ■ Configurations

Instrument Mounting	Monitor
Panel	M9.06.P1
Wall	M9.06.W1, M9.06.W2

## ■ Connections to ChemX3 Electrodes

### Electrodes

pH Electrodes All pH sensors

ORP Electrodes All ORP sensors

## ■ Features

- Configurable for either pH or ORP
- Automatic evaluation of electrode performance
- Automatic recognition of calibration buffer
- Automatic or manual temperature compensation
- Backlit full colour display
- Two programmable relays for external device control
- Programmeable alarms
- Easy to use software
- Removeable terminals
- Output simulator
- Temperature Sensors selectable PT100, PT1000

# Type M9.06 pH/ORP monitor



## Technical

### Supply Voltage:

- 24 VAC/VDC  $\pm$  20% regulated
- 110/230 VAC with M9.KW2 Wall Mount version

### Enclosure:

- ABS case with Polycarbonate display
- NEMA 4, 4X (IP65) front
- 1/4 DIN Size
- Silicone rubber keypad
- Panel and Wall Gasket: silicone rubber

### Operating Temperature:

- $-20$  to  $70^{\circ}\text{C}$  ( $-4$  to  $158^{\circ}\text{F}$ )

### 4 to 20 mA Output:

- Isolated, fully adjustable and reversible
- Rated Maximum:  $800\Omega$  @ 24 VDC -  $250\Omega$  @ 12 VDC

### 2 SPDT Relay Outputs:

- User selectable as ON-OFF, Proportional frequency, Proportional output, Proportional Pulse, Timed Pulse, Off
- Rated max.  $5\text{A}$ @  $250$  VAC resistive load
- Hysteresis: User selectable

### 2 SSR Outputs:

- User selectable as ON-OFF, Proportional frequency output, Proportional Pulse, Timed Pulse, Off
- Optically isolated,  $50$  mA MAX sink,  $24$  VDC MAX pull-up voltage
- Max pulse/min:  $300$
- Hysteresis: User selectable

### Sensor Input:

#### Electrical:

- Input Voltage for hold function:  $15/30$  VAC/DC optically isolated
- Protection Fuse:  $150$  mA (Regenerate)

#### pH Monitor:

- Sensor input range:  $-2/16$  pH
- Accuracy:  $\pm 0.01$  pH

#### Redox Monitor:

- Sensor input range  $\pm 2000$  mV
- Accuracy:  $1$  mV

#### Temperature Input Range:

- $-50$  to  $150^{\circ}\text{C}$  ( $-58$  to  $302^{\circ}\text{F}$ ) (with PT100 or PT1000)

#### Temperature Resolution:

- $0.1^{\circ}\text{C}/^{\circ}\text{F}$  (PT1000);  $0.5^{\circ}\text{C}/^{\circ}\text{F}$  (PT100)

#### Operating Temperature:

- $-20$  to  $70^{\circ}\text{C}$  ( $-4$  to  $158^{\circ}\text{F}$ )

#### Storage Temperature:

- $-30$  to  $80^{\circ}\text{C}$  ( $-22$  to  $176^{\circ}\text{F}$ )

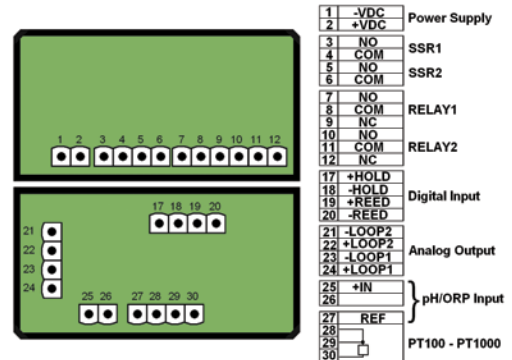
#### Relative Humidity:

- $0$  to  $95\%$  non condensing

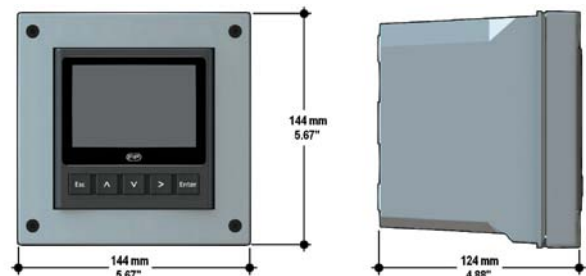
## Wiring – Rear Terminal View

(See Instruction Manual for detailed wiring information)

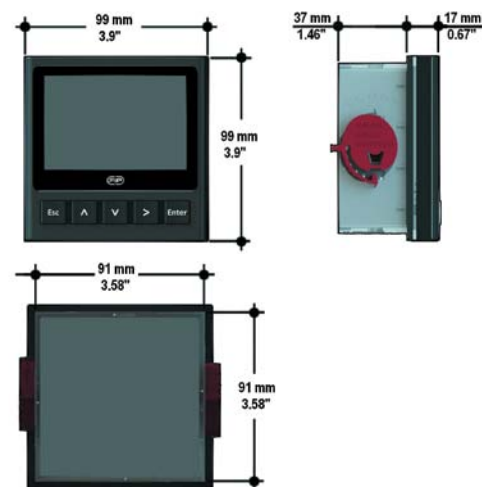
### M9.06



## Wall Mount Dimensions



## Panel Mount Dimensions



The monitor fits into a standard 1/4 DIN (96 mm x 96 mm or 3.78" x 3.78") panel cutout.

## Standards + Approvals:

- Manufactured under ISO 9001 (Quality)
- Manufactured under ISO 14000 (Environmental Management)
- CE
- RoHS compliant, GOST R

# Type M9.05 <sup>new</sup> conductivity monitor



The Type M9.05 Conductivity monitor/transmitter is designed to satisfy a broad range of application requirements. A complete choice of input/output options, together with manual or automatic temperature compensation, guarantees customized setups for any process to be controlled.

The M9.05 can be easily configured via user friendly software and can show also temperature value on the display (for TC sensor version).

## ■ Backlit Display

Full graphic backlit display version – 3 colours  
Update Rate – 1 second  
Contrast – User adjustable

## ■ Output Signals

Item No.	Power Supply	Electrode Input	4–20 mA Output	SPDT Relay Output	SSR Relay Output
M9.05.P1	24 VAC/DC	Conductivity, Temperature	2	2 ON-OFF, Prop. Frequency, Prop. Pulse, Timed Pulse, Off	Same as SPDT
M9.05.W1	24 VAC/DC	Conductivity, Temperature	2	2 ON-OFF, Prop. Frequency, Prop. Pulse, Timed Pulse, Off	Same as SPDT
M9.05.W2	110/230 VAC	Conductivity, Temperature	2	2 ON-OFF, Prop. Frequency, Prop. Pulse, Timed Pulse, Off	Same as SPDT

## ■ Configurations

Instrument Mounting	Monitor
Panel	M9.05.P1
Wall	M9.05.W1, M9.05.W2

## ■ Connections to ChemX3 Sensors

### Conductivity Sensors

Sensors Conductivity sensors



Panel  
(Standard)



Wall

## ■ Features

- Temperature value on the display
- Range from 0.05  $\mu$ S to 0.2 S
- Auto range
- Backlit alphanumeric LCD
- Programmable relays for external device control
- Easy to use software
- Removeable terminals
- Temperature Sensors selectable PT100, PT1000

# Type M9.05 conductivity monitor



## Technical

### Supply Voltage:

- 24 VAC/VDC  $\pm$  20% regulated
- 110/230 VAC with M9.KW2 Wall Mount version

### Enclosure:

- ABS case with Polycarbonate display
- NEMA 4, 4X (IP65) front
- 1/4 DIN Size
- Silicone rubber keypad
- Panel, Wall Gasket: silicone rubber

### Operating Temperature:

- $-20$  to  $70^{\circ}\text{C}$  ( $-4$  to  $158^{\circ}\text{F}$ )

### 4 to 20 mA Output:

- Isolated, fully adjustable and reversible
- Maximum Loop Impedance:  $800\Omega$  @ 24 VDC -  $250\Omega$  @ 12 VDC

### 2 Solid State Outputs:

- User selectable as ON-OFF, Proportional frequency output, Proportional Pulse, Timed Pulse, Off
- Optically isolated, 50 mA MAX sink, 24 VDC MAX pull-up voltage
- Max pulse/min: 300
- Hysteresis: User selectable

### Two Relay Outputs:

- User selectable ON-OFF, Proportional Frequency, Proportional Pulse, Timed Pulse, Off
- Mechanical SPDT contacts
- Rated maximum: 5A/24 VAC @ 250 VAC resistive load
- Hysteresis: User selectable

### Sensor Input:

#### Electrical:

- Input Voltage for hold function: 15/30 VAC/DC optically isolated
- Protection Fuse: 150 mA (Regenerate)

#### Conductivity:

- Sensor input range: 0.055 to 200000  $\mu\text{S}$

#### Accuracy:

- $\pm 2.0\%$  of reading value

#### Temperature Input Range:

- $-50$  to  $150^{\circ}\text{C}$  ( $-58$  to  $302^{\circ}\text{F}$ ) (with PT100 or PT1000)

#### Temperature Accuracy:

- $\pm 1^{\circ}\text{C}$  ( $1.8^{\circ}\text{F}$ )

#### Temperature Resolution:

- $0.1^{\circ}\text{C}/^{\circ}\text{F}$  (PT1000);  $0.5^{\circ}\text{C}/^{\circ}\text{F}$  (PT100)

#### Operating Temperature:

- $-20$  to  $70^{\circ}\text{C}$  ( $-4$  to  $158^{\circ}\text{F}$ )

#### Storage Temperature:

- $-30$  to  $80^{\circ}\text{C}$  ( $-22$  to  $176^{\circ}\text{F}$ )

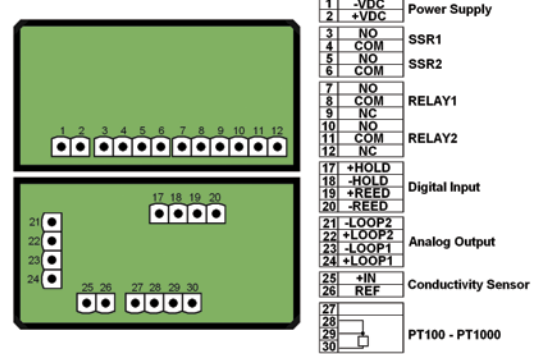
#### Relative Humidity:

- 0 to 95% non condensing

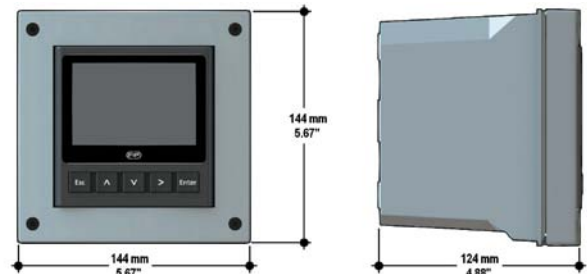
## Wiring – Rear Terminal View

(See Instruction Manual for detailed wiring information)

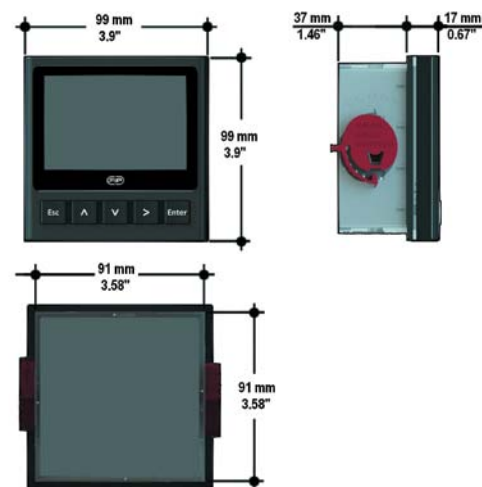
### M9.05



## Wall Mount Dimensions



## Panel Mount Dimensions



The monitor fits into a standard 1/4 DIN (96 mm x 96 mm or 3.78" x 3.78") panel cutout.

## Standards + Approvals:

- Manufactured under ISO 9001 (Quality)
- Manufactured under ISO 14000 (Environmental Management)
- CE
- RoHS compliant, GOST R

# Type M9.07 <sup>new</sup> dual-parameter conductivity and flow monitor & transmitter

The new M9.07 is a dual monitor and transmitter which combines conductivity and flow measurement. It features a 4" wide full graphic display and a tutorial software for easy calibration and set up. The display has a white backlight during standard conditions, a green backlight in case an external device control is activated and a red backlight in case an alarm is activated

All units have a number of control outputs including 4 to 20mA, Solid State and SPDT relays. The instrument can be used with Hall effect sensors and magmeters, and any conductivity sensors with a range of 0.055 to 200000 µS. The same instrument may be mounted either panel or wall mount. Standard configuration is panel mount. M9.07 has a number of optional displays, including flow, resettable and nonresettable totalizers, conductivity, temperature and analogue outputs for both sensors.

## ■ Display

Batch in Progress	- 5 digits
Flow Rate	- 5 digits
Resettable Total	- 10 digits
Non-Resettable Total	- 10 digits

## ■ Output Signals

Item No.	4 – 20 mA	Solid State Relay Output	SPDT Relay
M9.07	2	2	2

2x4 – 20 mA: user selectable as valve control, batch completion flow rate

## ■ Connectable FlowX3 Sensors

Instrument Mounting	Sensor
Panel or Wall	F3.00.H, F3.20.H, F3.10, F3.80 ULF.H, F6.60M.S, F6.61M.S



## ■ Features

- **Modular Design** – The same instrument may be mounted in two different ways using mounting kits. See page 22.



**Panel**  
(Standard)

**Wall**

- Wide full graphic display
- Multi colour backlit
- Help on board
- Simultaneous measurement of conductivity, temperature and flow
- Fast, intuitive and mistake-proof calibration software
- Mechanical Relays for external device control
- Solid State Relays for programmable alarms
- Multi language menus

# Type M9.07

## dual-parameter conductivity and flow monitor & transmitter



### Technical

#### General:

- Associated sensors: conductivity/temperature sensors & Digiflow® FlowX3 hall effect flow sensors or Digiflow® FlowX3 F6.60 Flow Sensor Magmeters

#### Enclosure:

- ABS case with Polycarbonate display
- NEMA 4, 4X (IP65) front
- 1/4 DIN Size
- Silicone rubber keypad
- Panel, Wall Gasket: silicone rubber

#### Display:

- LC full graphic display
- Backlight version: 3-colours
- Backlight activation: User adjustable with 5 levels of timing
- Update rate: 1 second
- Enclosure: IP65 front

#### Temperature Input Range:

- -50 to 150°C (-58 to 302°F) (with PT100-PT1000)
- Temperature measurement resolution: 0.1°C/°F (Pt1000); 0.5°C/°F (Pt100)
- Flow Input Range (frequency): 0-1500Hz
- Flow Input Accuracy (frequency): 0.5%

#### 4 to 20 mA Output:

- Isolated, fully adjustable and reversible
- Maximum Loop Impedance: 800Ω @ 24 VDC - 250Ω @ 12 VDC

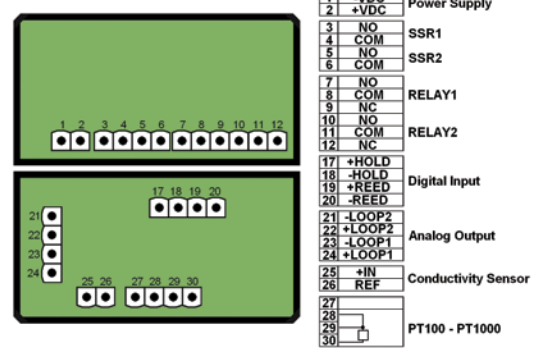
#### 2 Solid State Outputs:

- (Flow) user selectable as MIN alarm, MAX alarm, Pulse Out, Window alarm, Off
- (Conductivity) user selectable as ON-OFF, Proportional frequency output, Timed Pulse, Off
- Optically isolated, 50 mA MAX sink, 24 VDC MAX pull-up voltage
- Max pulse/min: 300
- Hysteresis: User selectable

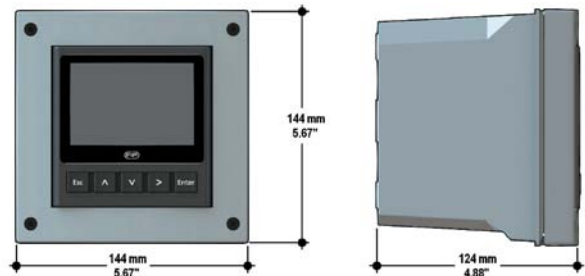
### Wiring – Rear Terminal View

(See Instruction Manual for detailed wiring information)

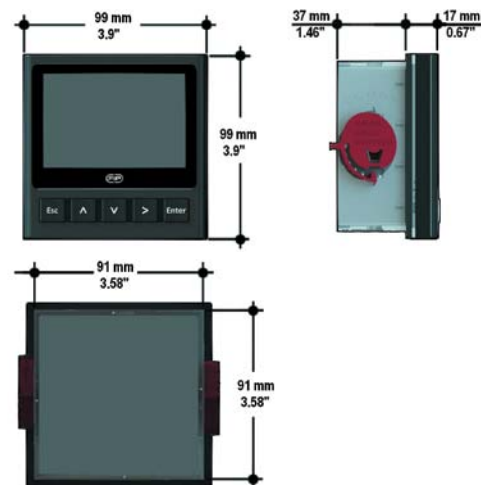
#### M9.07



### Wall Mount Dimensions



### Panel Mount Dimensions



The monitor fits into a standard 1/4 DIN (96 mm x 96 mm or 3.78" x 3.78") panel cutout.

# Type M9.07

## dual-parameter conductivity and flow monitor & transmitter

### ■ Technical

#### 2 Relay Outputs:

- (Flow) user selectable as MIN alarm, MAX alarm, Pulse Out, Window alarm, Off
- (Conductivity) user selectable as ON-OFF, Proportional frequency output, Timed Pulse, Off
- Mechanical SPDT contact - expected mechanical life (min. operations): 107
- Expected electrical life (min. operations): 105 N.O./ N.C. switching capacity 5A/240VAC
- Max pulse/min: 60
- Hysteresis: User selectable

#### Electrical:

##### Supply Voltage:

- 12 to 24 VDC  $\pm$  10% regulated
- FLS Hall effect flow sensor power: 5 VDC @ <20 mA
- Optically isolated from current loop, short circuit protected
- Protection Fuse: 150 mA (Regenerate)

##### Conductivity:

- Sensor input range: 0.055 to 200000  $\mu$ S
- Conductivity measurement accuracy:  $\pm$  2.0 % of reading value

##### Temperature Input Range:

- -50 to 150°C (-58 to 302°F) (with PT100 or PT1000)

##### Temperature Resolution:

- 0.1°C/°F (PT1000); 0.5°C/°F (PT100)

##### Operating Temperature:

- -20 to 70°C (-4 to 158°F)

##### Storage Temperature:

- -30 to 80°C (-22 to 176°F)

##### Relative Humidity:

- 0 to 95% non condensing

##### Standards + Approvals:

- Manufactured under ISO 9001 (Quality)
- Manufactured under ISO 14000 (Environmental Management)
- CE
- RoHS compliant, GOST R

# Digiflow® FLOW X3

a cost effective  
and complete range  
of flow monitoring  
equipment



## The Heart of the System

Five-blade ECTFE (Halar®)  
rotors with ceramic shaft  
and bearings



A square wave (pulse)  
output signal from the  
sensor is proportional  
to the flow velocity.

This is fed to a  
FlowX3 flow monitor/  
transmitter.



## Digital Output

Pulse output from  
flow sensor provides  
for high accuracy  
at low flows

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