FLS M9.20

BATTERY POWERED FLOW MONITOR

SAFETY INSTRUCTIONS

General Statements

- Do not install and service the product without following the Instruction Manual.
- This item is designed to be connected to other instruments which can be hazardous if used improperly. Read and follow all associated instrument manuals before using with it.
- Product installation and wiring connections should only be performed by qualified staff.
- Do not modify product construction.

Installation and Commissioning Statements

- Do not exceed maximum specifications using the instrument.
- To clean the unit, use only chemical compatible products.

PACKING LIST

Please verify that the product is complete and without any damage.
The following items must be included:

- M9.20 Battery Powered Flow Monitor
- Instruction Manual for M9.20 Battery Powered Flow Monitor
- Instruction Manual for F3.00 Flow Sensor (only for M9.20.XX Field Mount Battery Powered Flow Monitor).

DESCRIPTION

The new M9.20 is a smart battery powered flow monitor designed to convert the frequency signal of FLS sensors into a flow rate.
M9.20 is equipped by a long life lithium battery which powers the sensor also.
A wide 4" display is used to show measured values clearly.
A first procedure will grant a easy set up of main parameters. A flow rate reference can be used for a recalibration or a alignment through a intuitive "in-line calibration". A safe icon alerts when it's time to replace battery and instrument stores all main parameters automatically. A customizable string allows to tailor easily the view level.

CONNECTIONS TO INSTRUMENTS

	F3.00	F3.20	F6.30	F3.10	F3.05	F6.60	F6.61	F111
M9.20	X (only coil version)	-	-	-	-	-	-	X (only coil version)

	ULF	F3.80	pH/ ORP200	pH/ ORP400	pH/ ORP600	C150/ 200	C100/ C300	C6.30
M9.20	X (only R version)	-	-	-	-	-	-	-

TECHNICAL DATA

General

• Associated flow sensor: FLS Coil effect with frequency output and FLS Reed effect
• Materials:
- Case: ABS
- Display window: PC
- Panel & Wall gasket: silicone rubber
- Keypad: 5-button silicone rubber
• Display
- transflective technology
- Update rate: 1 second
- Enclosure: IP65 front
• Flow input Range (frequency): 0.5 to 500 Hz
• Flow input accuracy: 0,5%

Electrical

• Supply Voltage: 3.6 volt Lithium Thionylchloride Battery, size B, 8.5 AHr

• Battery life: nominal 5 years
• FLS Coil effect flow Sensor power:
- 3.6 Volts

Environmental

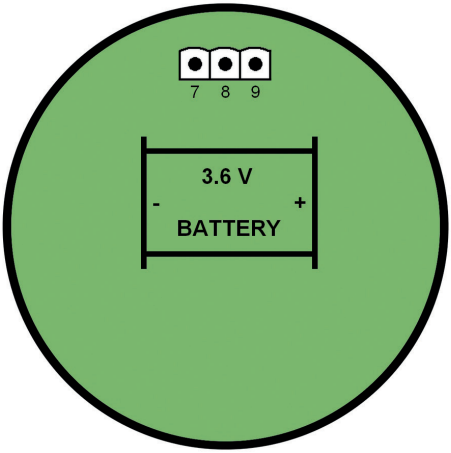
• Operating temperature: -5 to +60°C (23 to 140°F)
• Storage temperature: -10 to +80°C (14 to 176°F)
• Relative humidity: 0 to 95% not condensing

Standards & Approvals

• Manufactured under ISO 9001
• Manufactured under ISO 14001
• CE
• RoHS Compliant
• GOST R

WIRING CONNECTIONS

Rear Terminal View



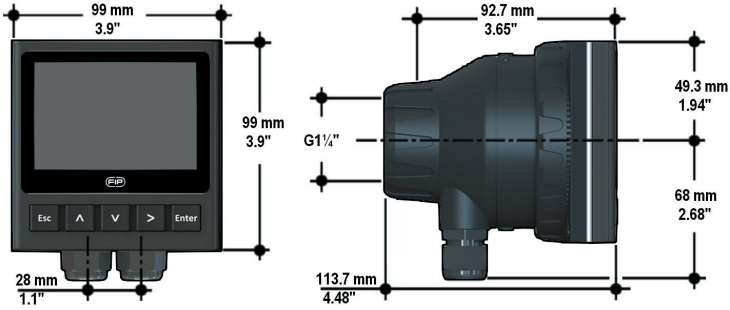
9	V+
8	FREQ IN
7	GND

Flow Sensor

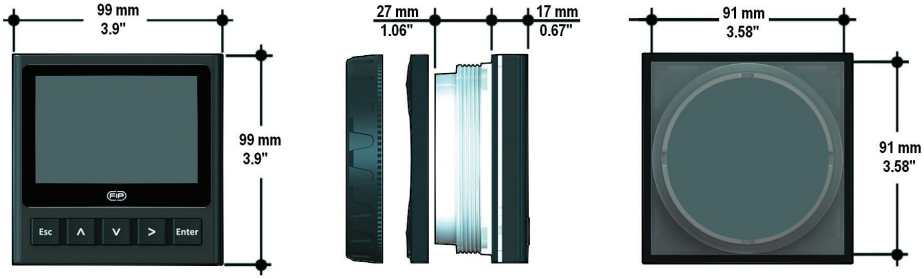
Refer to dedicated sensor manual for its wiring.

DIMENSIONS

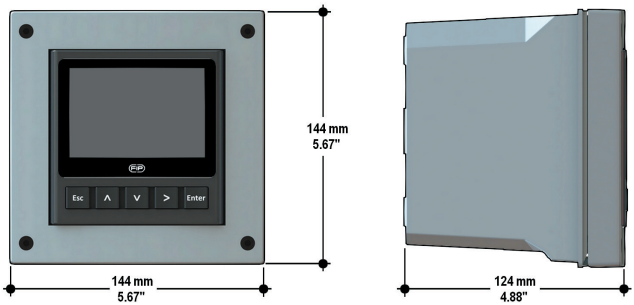
COMPACT MOUNTING



PANEL MOUNTING



WALL MOUNTING

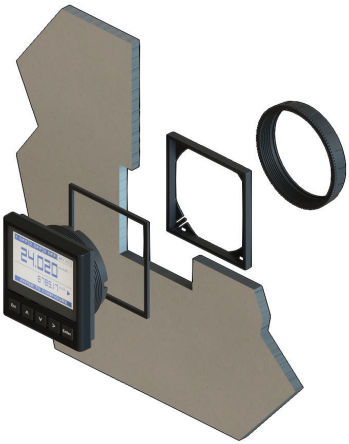


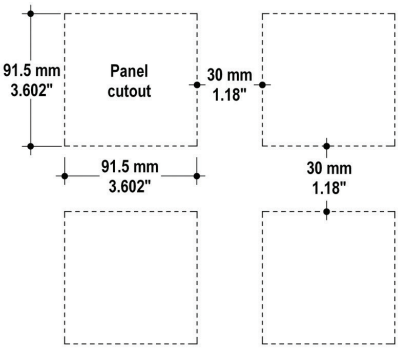
INSTALLATION

Mechanical installation

The flow monitor & transmitter is available just in one packaging for compact field version, panel or wall installation. The compact field version is mounted on top of the sensor using the compact mounting kit (F6.KC1), the panel version is installed using the panel mounting kit (M9.LN1), while the wall mounting version is got fixing the panel mounting version on the wall mounting kit (M9.KWX). The mounting kits can be ordered directly connected to the monitor or separately and then simply installed on it.

Panel installation

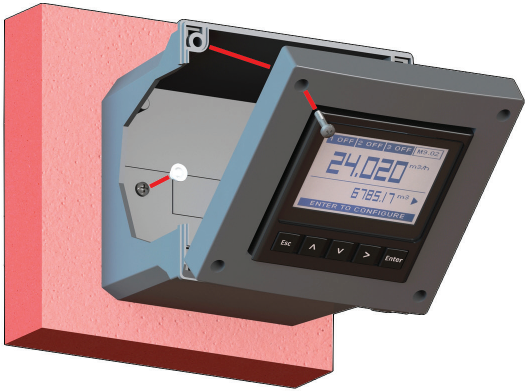


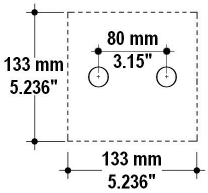


Fix instrument on the panel tightening by hand plastic nut (M9.LN1).

Wall installation

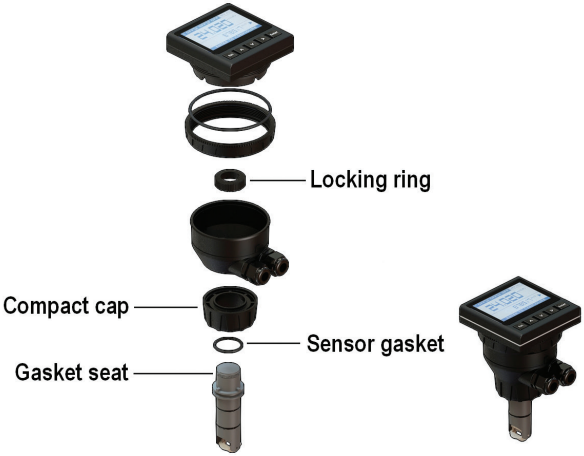
Use the panel mounting kit (M9.LN1) to fix the M9.20 on the dedicated frontal cutout of the wall mounting kit (M9.KWX).





Tighten front screws of box and waterproof connectors of cables, internally mount caps on screw sites to get a IP65 watertight installation.

Compact installation



The compact mounting kit (F6.KC1) includes the compact plastic adapter with gasket for IP65 watertight installation, sensor gasket, the compact cap and the locking ring.

- Lubricate the sensor gasket with silicone lubricant and mount it on the proper seat.
- Add the compact cap to the sensor and insert the sensor into the plastic adapter making sure the alignment tabs are seated in the fitting notches.
- Lock the sensor to the adapter: screw completely the locking ring.
- Tighten plastic nut to fix monitor on plastic adapter.

WIRING

General recommendation

Make wiring connections according to wiring diagrams.
- Terminals accept 26 to 12 AWG (0.08 to 2.5 mm2)
- Strip around 10 mm (0.4”) of insulation from the wire tips and tin bare ends to avoid fraying.
- Ferrules are suggested when connecting more than one wire to a single terminal.
- Remove the upper part of the terminals for an easy cabling.
- Insert wire tip or ferrule completely into the terminal and fix with the screw until finger tight.
- Routing the sensor cable in grounded metal conduit can help prevent electrical noise and mechanical damage.
- Seal the cable entry points to prevent moisture damage.

Compact or Wall Installation

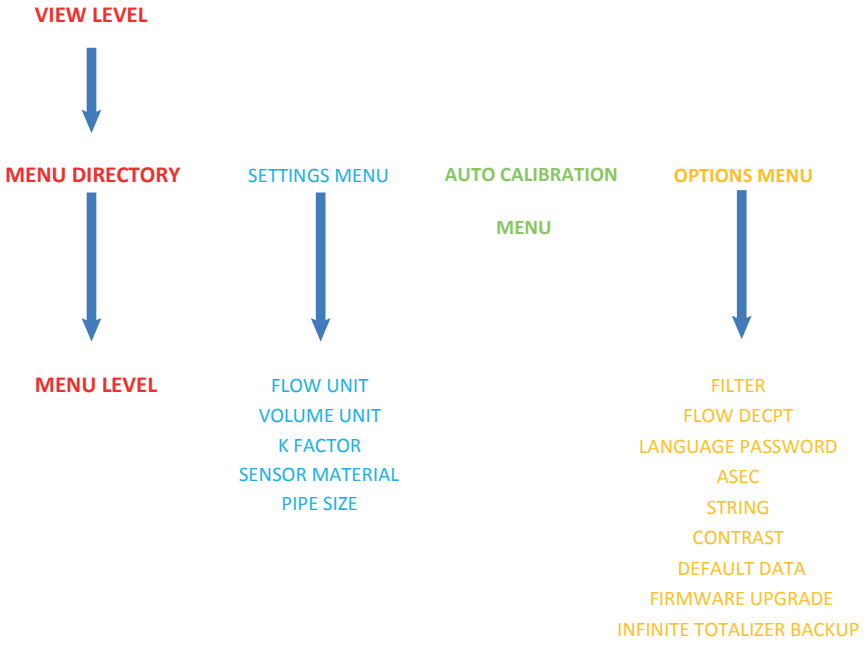
Pull the electrical cables through liquid tight connectors.
Use electrical cables with the proper external diameter for the liquid tight connector.
PG11/PG9: external diameter between 2-7 mm (0.079-0.276”)

USB PORT

A USB port is available on the M9.20 PCB.
The USB connection allows the updating of device software.
To do updating it is necessary to have: USB cable (M9.KUSB); the interface software "FLS Calibration System” and the new updating software for M9.20 which are both freely downloadable from FLS website (www.flsnet.it) on product profile.

OPERATIONAL OVERVIEW

The M9.20 flow monitor and transmitter features a trasflective display and a five-button keypad for system set-up, calibration and operation.



EDIT LEVEL

PUSH BUTTON

to modify an item

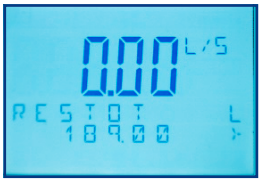
to scroll right

to return to the upper Menu without saving

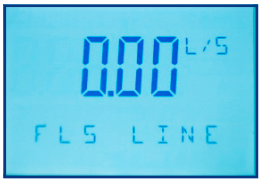
to save new settings

VIEW LEVEL

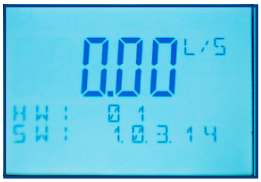
Flow Rate and **Permanent Totalizer** values



Flow rate and **Resettable Totalizer** values.
Press the **RIGHT** arrow key to reset.
If locked, you will need to enter the **Password** first.
Lock or Unlock the **Totalizer reset** in **Option Menu**.

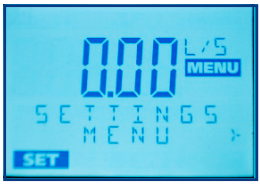


Flow rate and **Custom string**.



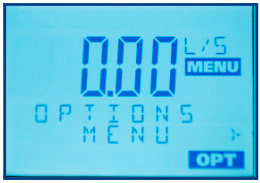
Flow rate and **Hardware Release** and **Software Release**.

MENU DIRECTORY



The **M9.20 basic settings** are selected in this menu.

The **M9.20 auto-calibration** is selected in this menu.



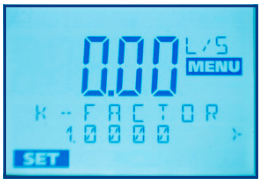
The **M9.20 options** are selected in this menu.

MENU LEVEL

SETTINGS MENU

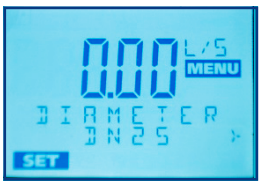
Set the **Engineering Unit** for the **Instant Flow Rate**.
All the options available are displayed on the LCD.

Set the **Engineering Unit** for the **Total Flow Rate**.
All the options available are displayed on the LCD.



Set the **K-Factor** for the proper conversion of the **frequency** of the flow sensor into a **flow rate**. The **K-factor** is correlated to: **Sensor Model and Actual Internal Diameter** (Pipe Size, Pipe Material, Pipe Standard). Refer to **Flow Sensor Instruction Manual** for the correct value. **K factor range: 000.01 to 99999** (the K-Factor cannot be set to 0)

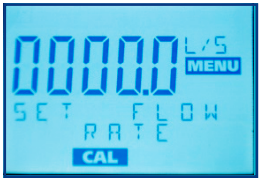
The choice of **Sensor Material** allows **ASEC to improve instrument performances**.
You can choose among: **CPVC**, **PVDF** or **METAL** (for Brass and Stainless Steel).
Warning: the **ASEC function** set **OFF** makes **Material Options** unavailable.

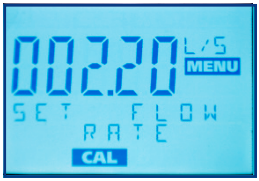


The choice of **Pipe Size** allows **ASEC to improve instrument performances.**
You can choose standard sizes from **DN15** to **DN300**. For pipes bigger than DN300 choose DN300.
Warning: the **ASEC function** set **OFF** makes **Size Options** unavailable.

MENU LEVEL

AUTO CALIBRATION MENU





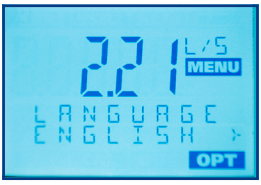
Set the **Reference Flow Rate.**
Press **Enter** and the instrument will calculate the **New k-factor** in according with application features (**Custom k-factor**).
Warning: The flow has to be stable, otherwise the monitor will abort the calculation.

MENU LEVEL

OPTION MENU

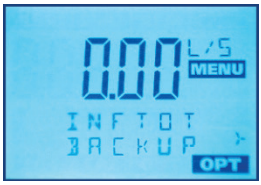
Select the **Filter Level** to dampen fluctuations in measurement.
OFF: no damping effect, near instantaneous response.

Set the **Decimal Point Position** to get the best resolution for the application.
Select one of the following options:
X.XXXX ; XX.XXX ; XXX.XX ; XXXX.X ; XXXXX.



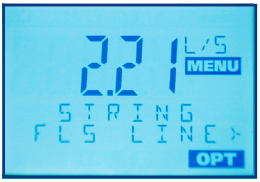
Set the **Language** among following options:
English – Italiano – Deutsch- Francais - Espanol

Set **ON** the **ResTot PWD to protect** access to **Menu Directory Level** and to avoid undesired **reset** of Resettable Totalizer.
NOTE: the **Password** is **right** arrow, **up** arrow, **right** arrow and **enter**. The **Password Combination** can't be modified. If the **Password** is **not correct** on the display will appear the notice: "**Password wrong**".



Set the backup of infinite totalizer for storing its value.
NOTE: the backup is automatically done when **LOW BATTERY** icon appears.

ASEC (Automatic Systematic Error Compensation) improves **instrument performances**. **ASEC** function works basing on: **Sensor Body Material** and **Pipe Size**. When **ASEC** is set **OFF**, **Sensor Body Material** and **Pipe Size** options are unavailable in **Calibration Menu**. **WARNING: ASEC** is designed to work **ONLY** in conjunction with F3.00 sensor. Don't activate this function when monitor manage a other sensor.



Set **a string** of **10 characters/digits.**

Adjust the **LCD contrast** for view improving.

Use **to return back** to the **factory data**

Use to update the Instrument Software with a New Firmware Release following this procedure:
-Download the interface software "FLS Calibration System" and the updated software on www.flsnet.it.
- Launch the software "FLS Calibration System" on the laptop.
- Confirm the "Firmware Upgrade" procedure with Right Arrow and then with Enter on M9.20.
- Connect M9.20 to the laptop by the USB cable.
NOTE: At the end of the procedure swicth off the instrument and then switch on again to refresh M9.20 software.

TROUBLESHOOTING

MAX FREQ ERROR > Input frequency is too high

OVERFLOW ERROR > Flow rate is in OVERFLOW: it exceeds the maximum display capability. Solution can be to change the flow rate engineering units.

SET MORE THAN ZERO > The K-FACTOR and the FLOW RATE during the auto calculation procedure can't be set 0.

LOW BATTERY ICON > Battery has to be replaced as soon as possible. Monitor continues to work properly for a maximum of 4 months (in according with enviromental conditions).

ORDERING DATA

Part No.	Description / Name	Power supply	Wire power Technology	Sensor Input	Output
M9.20.P1	Panel mount Battery Powered Flow Monitor	Battery Powered	-	Flow (Frequency)	-
M9.20.W1	Panel mount Battery Powered Flow Monitor	Battery Powered	-	Flow (Frequency)	-

Part No.	Description / Name	Power supply	Wire power Technology	Sensor Input	Output	Lenght	Main Wetted Materials
M9.20.01	Field mount Battery Powered Flow Monitor	Battery Powered	-	Flow (Frequency)	-	L0	PVCC/ EPDM
M9.20.02	Field mount Battery Powered Flow Monitor	Battery Powered	-	Flow (Frequency)	-	L0	PVCC/ FPM
M9.20.03	Field mount Battery Powered Flow Monitor	Battery Powered	-	Flow (Frequency)	-	L1	PVCC/ EPDM
M9.20.04	Field mount Battery Powered Flow Monitor	Battery Powered	-	Flow (Frequency)	-	L1	PVCC/ FPM
M9.20.05	Field mount Battery Powered Flow Monitor	Battery Powered	-	Flow (Frequency)	-	L0	PVDF/ EPDM
M9.20.06	Field mount Battery Powered Flow Monitor	Battery Powered	-	Flow (Frequency)	-	L0	PVDF/ FPM
M9.20.07	Field mount Battery Powered Flow Monitor	Battery Powered	-	Flow (Frequency)	-	L1	PVDF/ EPDM
M9.20.08	Field mount Battery Powered Flow Monitor	Battery Powered	-	Flow (Frequency)	-	L1	PVDF/ FPM

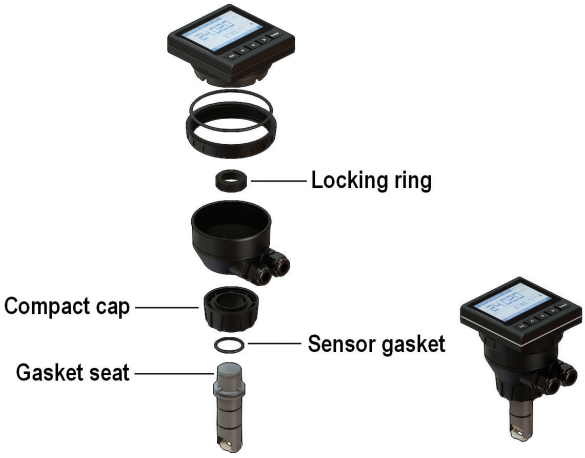
M9.20.09	Field mount Battery Powered Flow Monitor	Battery Powered	-	Flow (Frequency)	-	L0	SS316L/ EPDM
M9.20.10	Field mount Battery Powered Flow Monitor	Battery Powered	-	Flow (Frequency)	-	L0	SS316L/ FPM
M9.20.11	Field mount Battery Powered Flow Monitor	Battery Powered	-	Flow (Frequency)	-	L1	SS316L/ EPDM
M9.20.12	Field mount Battery Powered Flow Monitor	Battery Powered	-	Flow (Frequency)	-	L1	SS316L/ FPM
M9.20.13	Field mount Battery Powered Flow Monitor	Battery Powered	-	Flow (Frequency)	-	L0	BRASS/ EPDM
M9.20.14	Field mount Battery Powered Flow Monitor	Battery Powered	-	Flow (Frequency)	-	L0	BRASS/ FPM
M9.20.15	Field mount Battery Powered Flow Monitor	Battery Powered	-	Flow (Frequency)	-	L1	BRASS/ EPDM
M9.20.16	Field mount Battery Powered Flow Monitor	Battery Powered	-	Flow (Frequency)	-	L1	BRASS/ FPM

ACCESSORIES

Part No.	Name	Description
F6.KC1	Compact mounting kit	Plastic adapter with compact cap and locking nut (for M9.02, M9.00 and M9.20)
M9.KW1	Wall mounting kit	144x144mm plastic box for wall installation of all panel mount monitors
M9.KUSB	USB cable for device interfacing	USB cable dedicated to FLS products, 1,5 meter long

SPARE PARTS

Part No.	Name	Description
M9.SP4.1	PG 11	PG 11 complete cable gland (2 o-rings and cap)
M9.LN1	Locking nut	Plastic locking nut for M9.02, M9.00 and M9.20
M9.SP7	Replacement battery	3,6 V Lithium Thionyl Chloride battery



NOTE

NOTE

NOTE

NOTE

FIP - Formatura Iniezione Polimeri S.p.A.

Loc. Pian di Parata
16015 Casella
Genova - Italy
Tel. +39 010 96211
Fax +39 010 9621209
www.flsnet.it

IMM920E 07-2015