

FLS M9.03

DUAL PARAMETER FLOW MONITOR & TRANSMITTER



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

- Remove power to the instrument before wiring input and output connections.
- 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:

- M9.03 Dual Parameter Flow Monitor & Transmitter
- Instruction Manual for M9.03 Dual Parameter Flow Monitor & Transmitter.

DESCRIPTION

The new FLS M9.03 is a powerful dual flow monitor designed to convert the frequency signals of FLS flow sensors into flow rates. M9.03 is equipped with a 4" wide full graphic display which shows measured values clearly and a lot of other useful information. Moreover, due to a multicolor display plus a powerful backlight, measurement status can be determined easily from afar also. A tutorial software guarantees a mistake-proof and fast set up of every parameters. Calibrations can be performed just fixing installation features or using a reference value through a new "in-line calibration". Two 4-20mA output are available to remote each flow rate to an external device. A proper combination of digital outputs allows customized setups for any process to be controlled.

CONNECTIONS TO INSTRUMENTS

	F3.00	F3.20	F6.30	F3.10	F3.05	F6.60	F6.61	F111
M9.03	x	x	-	X	-	X	X	X

	ULF	F3.80	pH/ ORP200	pH/ ORP400	pH/ ORP800	C150/ 200	C100/ C300	C6.30
M9.03	X	X	-	-	-	-	-	-

TECHNICAL DATA

General

- Associated sensors: 2 X FLS hall effect flow sensors with frequency output or FLS F6.60 flow magmeter family
- Materials:
 - case: ABS
 - display window: PC
 - panel & wall gasket: silicone rubber
 - keypad: 5-button 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
- Flow input range (frequency): 0÷1500Hz
- Flow input accuracy (frequency): 0,5%

Electrical

- Supply Voltage: 12 to 24 VDC \pm 10% regulated
- Maximum current consumption: 300 mA
- FLS hall effect flow Sensor power:
 - 5 VDC @ < 20 mA
 - optically isolated from current loop
 - short circuit protected
- 2 x Current output:
 - 4-20 mA, isolated, fully adjustable and reversible
 - max loop impedance: 800 Ω @ 24 VDC - 250 Ω @ 12 VDC
- 2 x Solid State Relay output:
 - user selectable as MIN alarm, MAX alarm, Pulse Out, Window IN Alarm, Window OUT Alarm, Off
 - optically isolated, 50 mA MAX sink, 24 VDC MAX pull-up voltage
 - max pulse/min: 300
 - hysteresis: user selectable
- 2 x Relay output:
 - user selectable as MIN alarm, MAX alarm, Pulse Out, Window IN Alarm, Window OUT Alarm, Off
 - mechanical SPDT contact
 - expected mechanical life (min. operations): 10^7
 - expected electrical life (min. operations): 10^5 N.O./ N.C. switching capacity 5A/240VAC
 - max pulse/min: 60
 - hysteresis: User selectable

Environmental

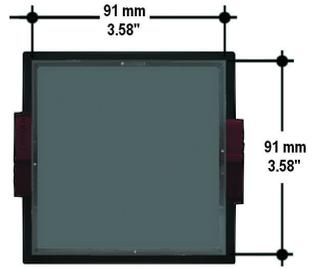
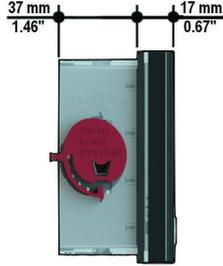
- Operating temperature: -20 to +70°C (-4 to 158°F)
- Storage temperature: -30 to +80°C (-22 to 176°F)
- Relative humidity: 0 to 95% not condensing

Standards & Approvals

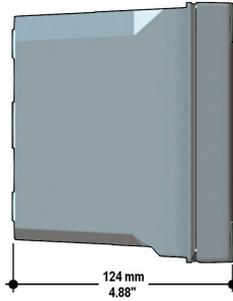
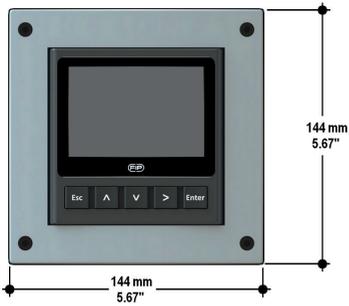
- Manufactured under ISO 9001
- Manufactured under ISO 14001
- CE
- RoHS Compliant
- EAC

DIMENSIONS

PANEL MOUNTING



WALL MOUNTING

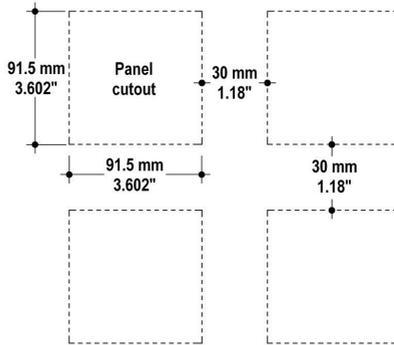
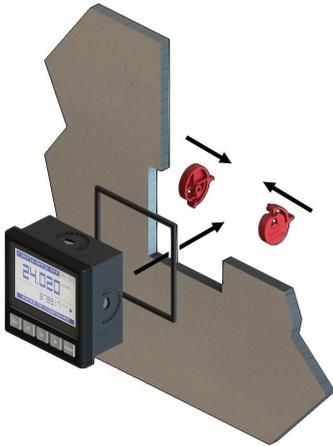


INSTALLATION

Mechanical installation

The M9.03 Dual-Parameter Flow Monitor & Transmitter is available just in one packaging for panel or wall installation. The panel version is installed using the panel mounting kit (M9.SN1), 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.

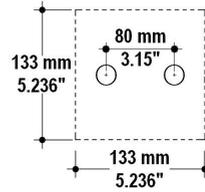
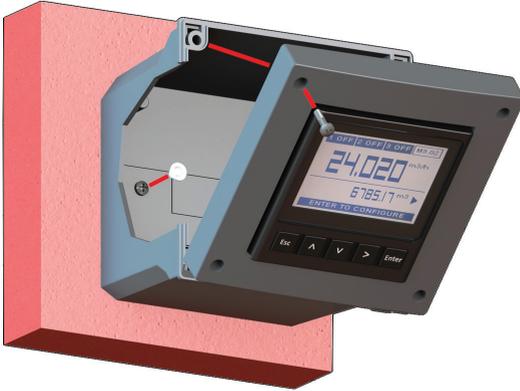
Panel installation



Fix instrument on the panel rotating by hand the fixing snails (M9.SN1).

Wall installation

Use the panel mounting kit (M9.SN1) to fix the M9.03 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.

WIRING



General recommendation

Always ensure the power supply is switched off before working on the device. Make wiring connections according to wiring diagrams.

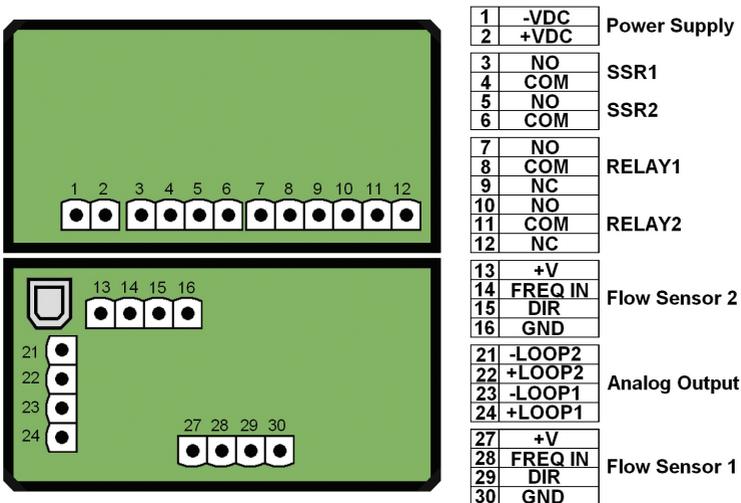
- Terminals accept 26 to 12 AWG (0.08 to 2.5 mm²)
- Strip around 10 mm (0.4") of insulation from the wire tips and tin bare ends to avoid fraying.
- Ferrules are suggested when connecting more than one wire to a single terminal.
- Remove the upper part of the terminals for an easy cabling.
- Insert wire tip or ferrule completely into the terminal and fix with the screw until finger tight.
- Do not route the sensor, DC power, or 4-20mA cables in conduit containing AC power wiring. Electrical noise may interfere with sensor signal.
- 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.

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")

REAR TERMINAL VIEW



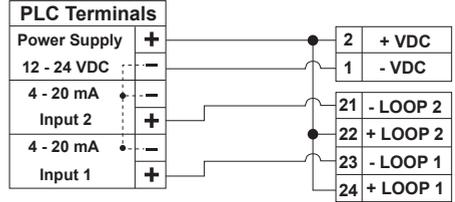
Refer to dedicated sensor manual for its wiring.

POWER/LOOP WIRING DIAGRAM

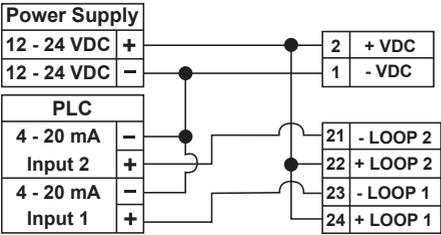
Stand-alone application,
no current loop used



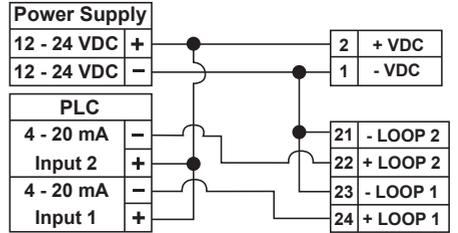
Connection to a PLC with built-in
power supply



Connection to a PLC/Instrument with a separate power supply



or



USB PORT

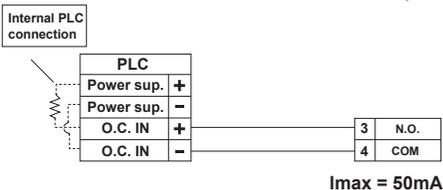
A USB port (type B) is available on the M9.03 PCB.

The USB connection allows the updating of device software.

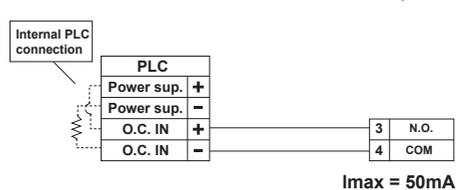
To update the software you need: USB cable (M9.KUSB), the interface software "FLS Calibration System" and the new updating software for M9.03 which are both downloadable from www.flsnet.it freely on product page.

SOLID-STATE RELAY WIRING DIAGRAM (FOR SSR1 AND SSR2)

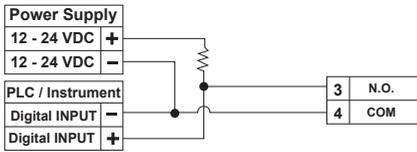
Connection to a PLC with NPN input



Connection to a PLC with PNP input

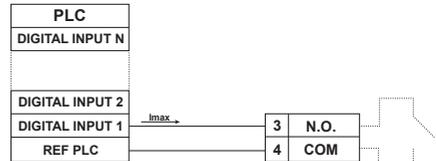


Connection to a PLC / Instrument digital input with separate Power Supply



$I_{max} = 50\text{mA}$

Connection to a PLC / Instrument digital input for Voltage Free Contacts (REED)



$I_{max} = 50\text{mA}$

Connection to an User

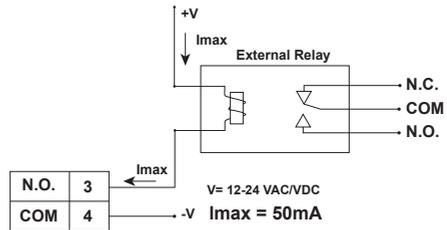


$I_{max} = 50\text{mA}$



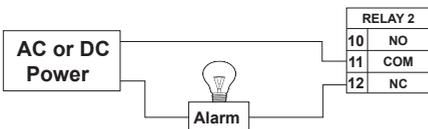
$I_{max} = 50\text{mA}$

The alarm is off during normal operation and goes ON according to Relay setting.
If $I_{max} > 50\text{ mA}$ use external Relay

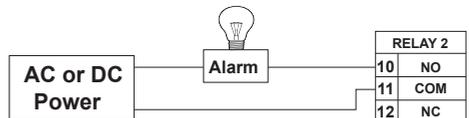


RELAY WIRING DIAGRAM (FOR RELAY 1 & RELAY 2)

The alarm is OFF during normal operation and goes ON according to Relay settings

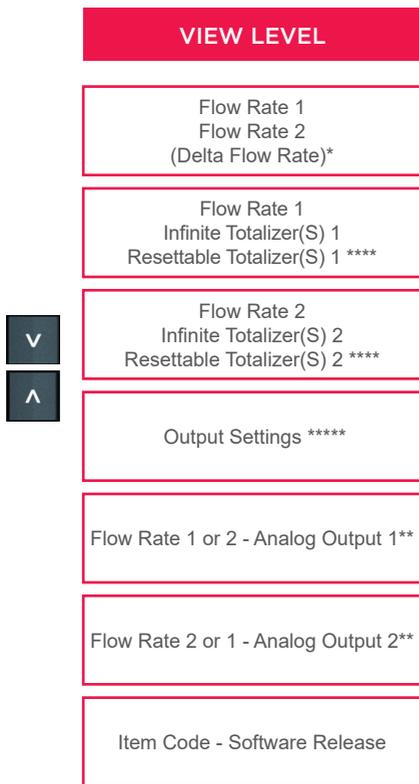


The alarm is ON during normal operation and goes OFF according to Relay settings



OPERATIONAL OVERVIEW

The M9.03 Dual Parameter Flow Monitor and Transmitter features a full graphic display and a five-button keypad for system set-up, calibration and operation. Full graphic display has a white backlight during standard conditions, a red backlight in case a set alarm is activated (MAX, MIN, WINDOW IN, WINDOW OUT MODE: always with priority), a green backlight in case a external device control is activated (PULSE MODE).



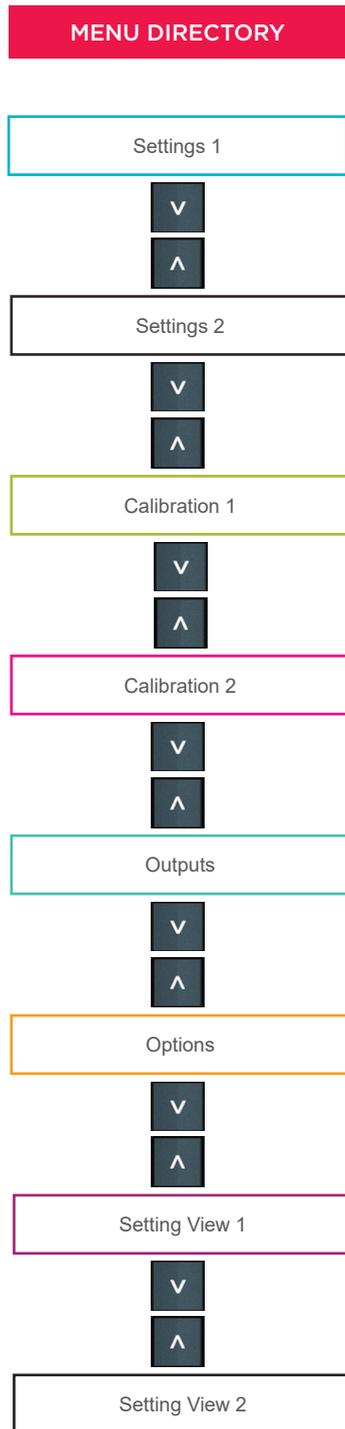
* Delta visualization can be activated in Options Menü.

** Both Analog Outputs can be set for remoting the same Flow Rate.

*** In case Bi-directional measurement is activated, Delta Flow indication cannot be shown.

**** Resettable totalizers can be reset using  on view level

*****  for more info about Outputs



MENU LEVEL

Settings 1

Installation Data	▼	Volume Unit
Flow Unit	▲	

Settings 2

Installation Data	▼	Volume Unit
Flow Unit	▲	

Calibration 1

Correction Factor	▼	Signal Intensity BLE
Auto Calibration	▲	

Calibration 2

Correction Factor	▼	Signal Intensity BLE
Auto Calibration	▲	

Outputs

1 SSR	▼	Output Test
2 SSR	▲	4-20mA
3 RELAY		

Options

Language		Bi-Directional***
Filter		Default Data
Backlight	▼	Custom Calibration1
Flow Rate Decimal Point	▲	Custom Calibration2
Password		Contrast
Delta Flow ***		Outputs Activation
Asec		Upgrade Firmware

Setting View 1

Sensor Type	▼	Pipe Diameter
Pipe Parameter	▲	Internal Diameter
Standard Pipe		K-Factor

Setting View 2

Sensor Type	▼	Internal Diameter
Pipe Parameter	▲	K-Factor
Pipe Diameter		



Enter

Esc



Enter

Esc



EDIT LEVEL

PUSH BUTTON



to modify an item



to scroll right



to return to Menu without saving



to save new settings



OUTPUT MODE

The M9.03 Dual Parameter Flow Monitor and Transmitter features 2 solid state relays and 2 mechanical relays in addition to 2 analog outputs 4-20mA.

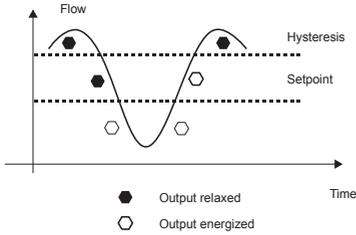
PROCEDURE FOR OUTPUTS SETTING

- go to the “Options” menu
- enter into the “Outputs activation” sub menu
- enable output(s)
- go to the “Outputs” menu
- set the operating mode for each enabled output

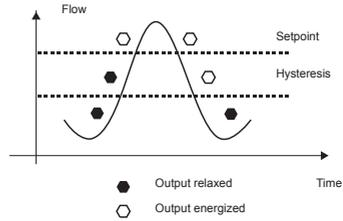
Monitor without digital output activated	In case a digital output is enabled, a icon will appear	In case a digital output is set, icon reports the operating mode	In case set digital output is activated, the icon will turn to black (display turns green in case output is set to manage an external device, red to indicate a activated output as alarm)

Digital outputs can be set in the following way:

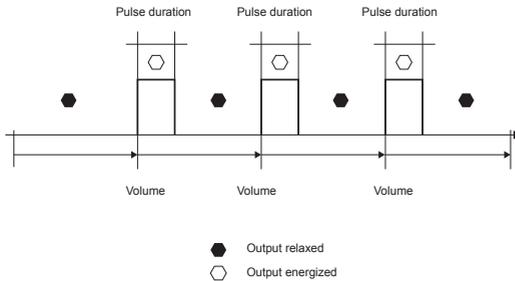
MIN MODE (icon reports MIN)



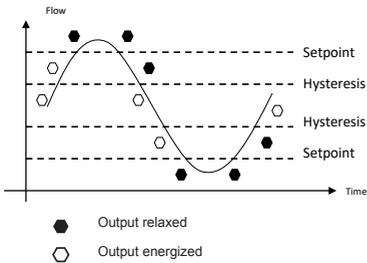
MAX MODE (icon reports MAX)



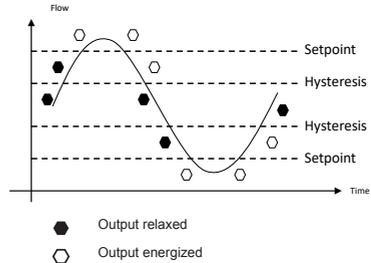
PULSE MODE (icon reports PLS)



WINDOW IN MODE (icon reports WIN)



WINDOW OUT MODE (icon reports WOT)



In case bidirectional function is activated, ICONS reports also a reference to the flow direction: + for main direction, - for opposite direction.

OUTPUT FOR F3.00.W

In case of combination with F3.00.W, LOW BATTERY status and NO SIGNAL condition can be removed by two different digital outputs or by one for both indications.

SOFTWARE UPDATING

In order to update the Instrument Software with a New Firmware Release follow the suggested procedures

TO UPDATE INSTALLED UNITS

- Download the interface software "FLS Calibration System" and the Updated Software on www.flsnet.it
- Launch the software "FLS Calibration System" on the laptop
- Select OPTION and then UPGRADE FIRMWARE
- Confirm the "Firmware Upgrade" procedure by ENTER
- Connect M9.03 to the laptop by the USB cable
- Select the item (M9.03) which appears on NAVIGATION area on the "FLS Calibration System" software
- Confirm FW UPGRADE and select the Updated Software

NOTE: At the end of the procedure restart the instruments in order to refresh M9.03 software (It takes 90 seconds to refresh the SW. Please do not interrupt the restarting process).

TO UPDATE NEW UNITS

- Download the interface software "FLS Calibration System" and the updated software on www.flsnet.it
- Launch the software "FLS Calibration System" on the laptop
- Push together ENTER and ESC powering the monitor
- Connect M9.03 to the laptop by the USB cable
- Select the item (M9.03) which appears on the NAVIGATION area on the software "FLS Calibration System"
- Confirm FW UPGRADE and select the Updated Software

NOTE: At the end of the procedure restart the instruments in order to refresh M9.03 software (It takes 90 seconds to refresh the SW. Please do not interrupt the restarting process).

ORDERING DATA

Part No.	Description /Name	Power supply	Wire power Technology	Sensor Input	Output
M9.03.P1	Panel mount Dual Parameter Flow Monitor and Transmitter	12 - 24 VDC	3/4 wire	2* Flow (Frequency)	2*(4-20mA), 2*(S.S.R.), 2*(mech. relay)
M9.03.W1	Wall mount Flow Monitor Dual Parameter Flow Monitor and Transmitter	12 - 24 VDC	3/4 wire	2* Flow (Frequency)	2*(4-20mA), 2*(S.S.R.), 2*(mech. relay)
M9.03.W2	Wall mount Flow Monitor Dual Parameter Flow Monitor and Transmitter	110 - 230 VAC	3/4 wire	2* Flow (Frequency)	2*(4-20mA), 2*(S.S.R.), 2*(mech. relay)

ACCESSORIES

Part No.	Name	Description
M9.KW1	Wall mounting kit	144x144mm plastic box for wall installation of all panel mount monitors
M9.KW2	Wall mounting kit with power supply	144x144mm plastic box and 110/230VAC to 24 VDC power supply 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.SN1	Fixing snails	2 fixing snails for panel installation of FLS monitors



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