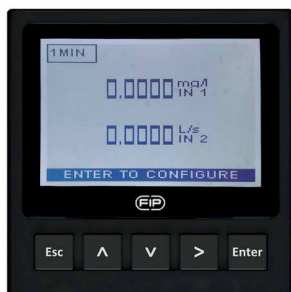


FLS M9.10

DUAL-PARAMETER ANALOG 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:

- M9.10 Dual Analog Input Monitor and Transmitter
- Instruction Manual for M9.10 Dual Analog Input Monitor and Transmitter

DESCRIPTION

The new FLS M9.10 is a powerful monitor designed to manage analog and frequency signals (or two analog signals) from every types of device which provide a 4-20mA or a frequency output. M9.10 is equipped with a wide full graphic display 4" 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. Calibration of 4-20mA input can be performed just fixing 2 points as well as 1 point or using a reference value through a new "in-line calibration". Calibration of frequency input can be performed just fixing installation features or using a reference value through a new "in-line calibration". Two independent 4-20mA outputs are available to remote measures to external devices. A proper combination of digital outputs (2 x SSR and 2 x relays) 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
M9.10	X	X	-	X	-	X	X	X

	ULF	F3.80	pH/ ORP200	pH/ ORP400	pH/ ORP600	pH/ ORP800	C150/ 200	C100/ C300	C6.30
M9.10	X	X	X	X	X	X	-	-	-

TECHNICAL DATA

General

- Associated sensors: FLS hall effect flow sensors with frequency output, FLS F6.60 flow magmeters family and every devices which generate a passive or active 4-20mA signal.
- 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
- Frequency input range (frequency): 0÷1000Hz
- Frequency accuracy (frequency): 0,5%
- Analog input range (frequency): 3,8÷21,0mA
- Analog input accuracy (frequency): 0,01mA

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 input power:
 - 18VDC @ \leq 20mA
- 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, ON-OFF mode, Timed mode, Proportional mode, Frequency mode, Pulse Out (only for frequency input), 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, ON-OFF mode, Timed mode, Proportional mode, Frequency mode, Pulse Out (only for frequency input), 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

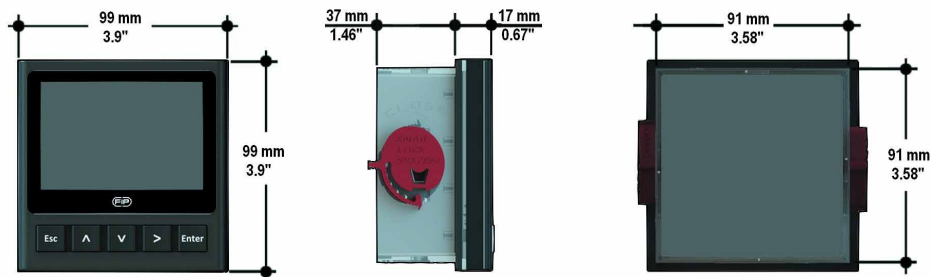
- Operating temperature: -20 to +70°C (-4 to 158°F)
- Storage temperature: -30 to +80°C (-22 to 176°F)
- Relative humidity: 0 to 95% not condensing

Standards & Approvals

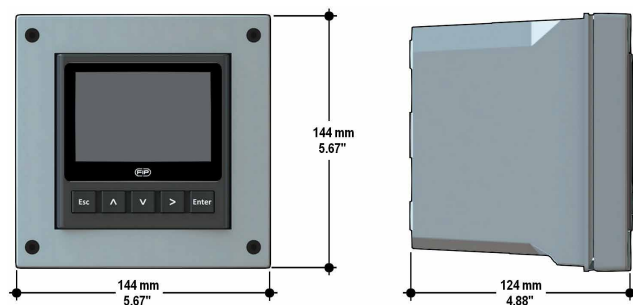
- Manufactured under ISO 9001
- Manufactured under ISO 14001
- CE
- RoHS Compliant
- EAC

DIMENSIONS

PANEL MOUNTING



WALL MOUNTING



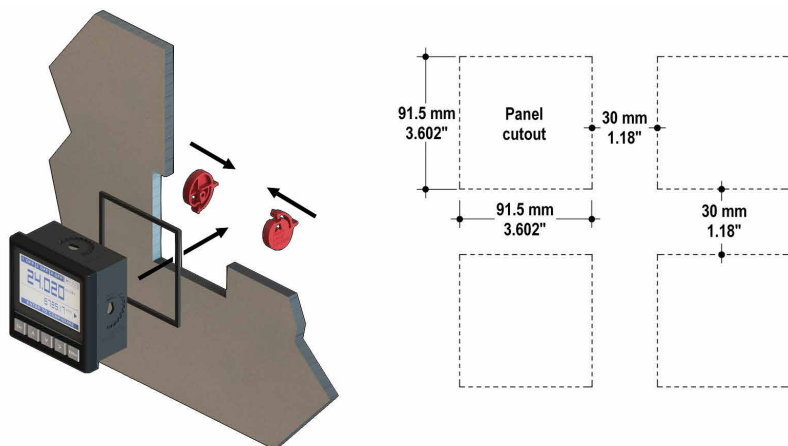
INSTALLATION

Mechanical installation

Dual Analog Input Monitor and Transmitter M9.10 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 M9.10 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.

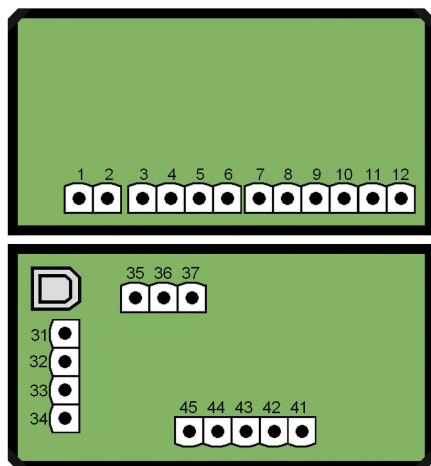
- Terminals accept 26 to 12 AWG (0.08 to 2.5 mm²)
- Strip around 10 mm (0.4") of insulation from the wire tips and tin bare ends to avoid fraying.
- Ferrules are suggested when connecting more than one wire to a single terminal.
- Remove the upper part of the terminals for an easy cabling.
- Insert wire 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.

Wall Installation

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")

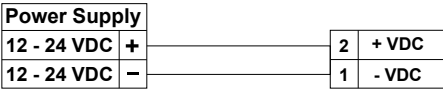
REAR TERMINAL VIEW



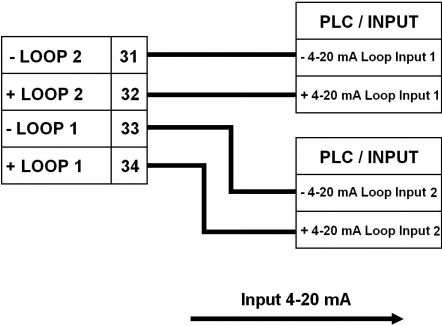
1	-VDC	Power Supply
2	+VDC	
3	NO	SSR1
4	COM	
5	NO	SSR2
6	COM	
7	NO	RELAY1
8	COM	
9	NC	RELAY2
10	NO	
11	COM	RELAY2
12	NC	
31	-LOOP2	Analog Output
32	+LOOP2	
33	-LOOP1	
34	+LOOP1	
35	+ V	FREQ. Input
36	FREQ.	
37	GND	
41	+ V IN 1	Current Input
42	IN 1	
43	+ V IN 2	
44	IN 2	
45	GND	

Refer to dedicated flow sensor manual for its wiring.

POWER WIRING DIAGRAM

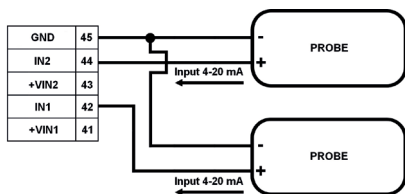


LOOP WIRING DIAGRAM

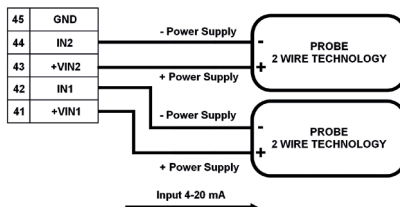


INPUT WIRING DIAGRAM

Active loop devices



Passive loop devices

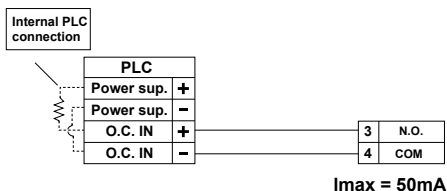


USB PORT

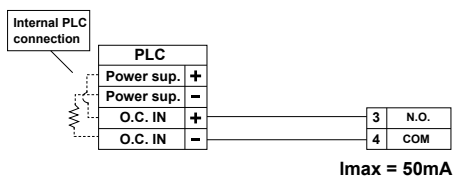
A USB port (type B) is available on the M9.10 PCB. The USB connection allows the updating of device software. To update the software you need: USB cable (M9.KUSB), the interface software "FLS Calibration System" and the new updating software for M9.10 which are both downloadable from www.flisnet.it freely on product page.

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

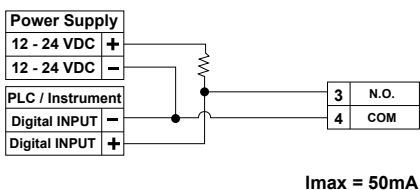
Connection to a PLC with NPN input



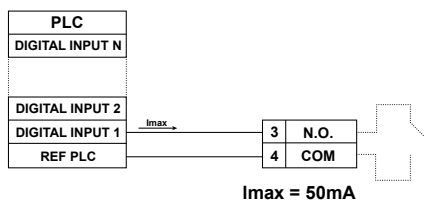
Connection to a PLC with PNP input



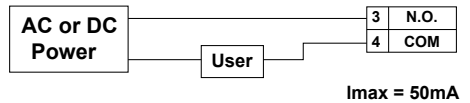
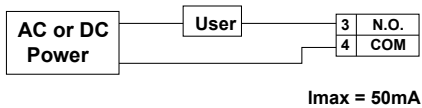
Connection to a PLC / Instrument digital input with separate Power Supply



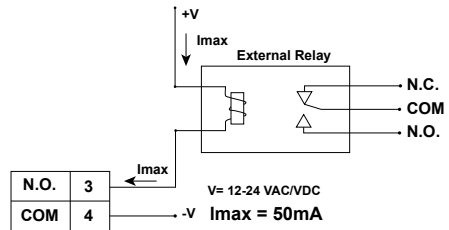
Connection to a PLC / Instrument digital input for Voltage Free Contacts (REED)



Connection to an User

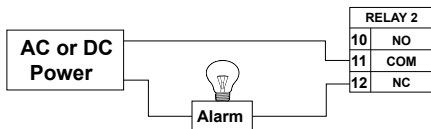


The alarm is off during normal operation and goes ON according to Relay setting.
If $I_{max} > 50 \text{ mA}$ use external Relay

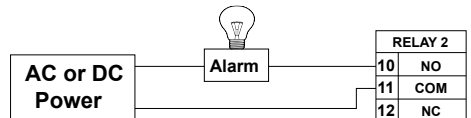


RELAY WIRING DIAGRAM (FOR RELAY 1 & RELAY 2)

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 M9.10 Dual Analog Input 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 (PROPORTIONAL FREQUENCY, PROPORTIONAL PULSE, TIMED MODE, ON-OFF MODE)

MENU DIRECTORY

Settings



Calibration



Outputs



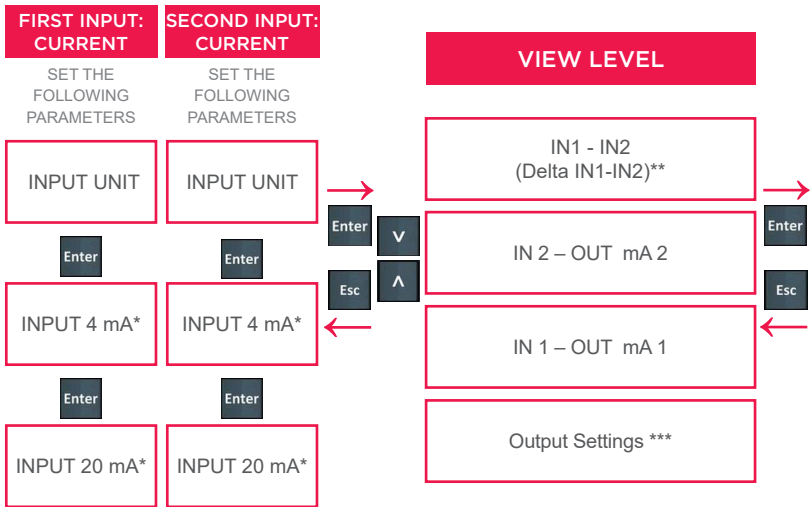
Options




View data



Adjust input mA



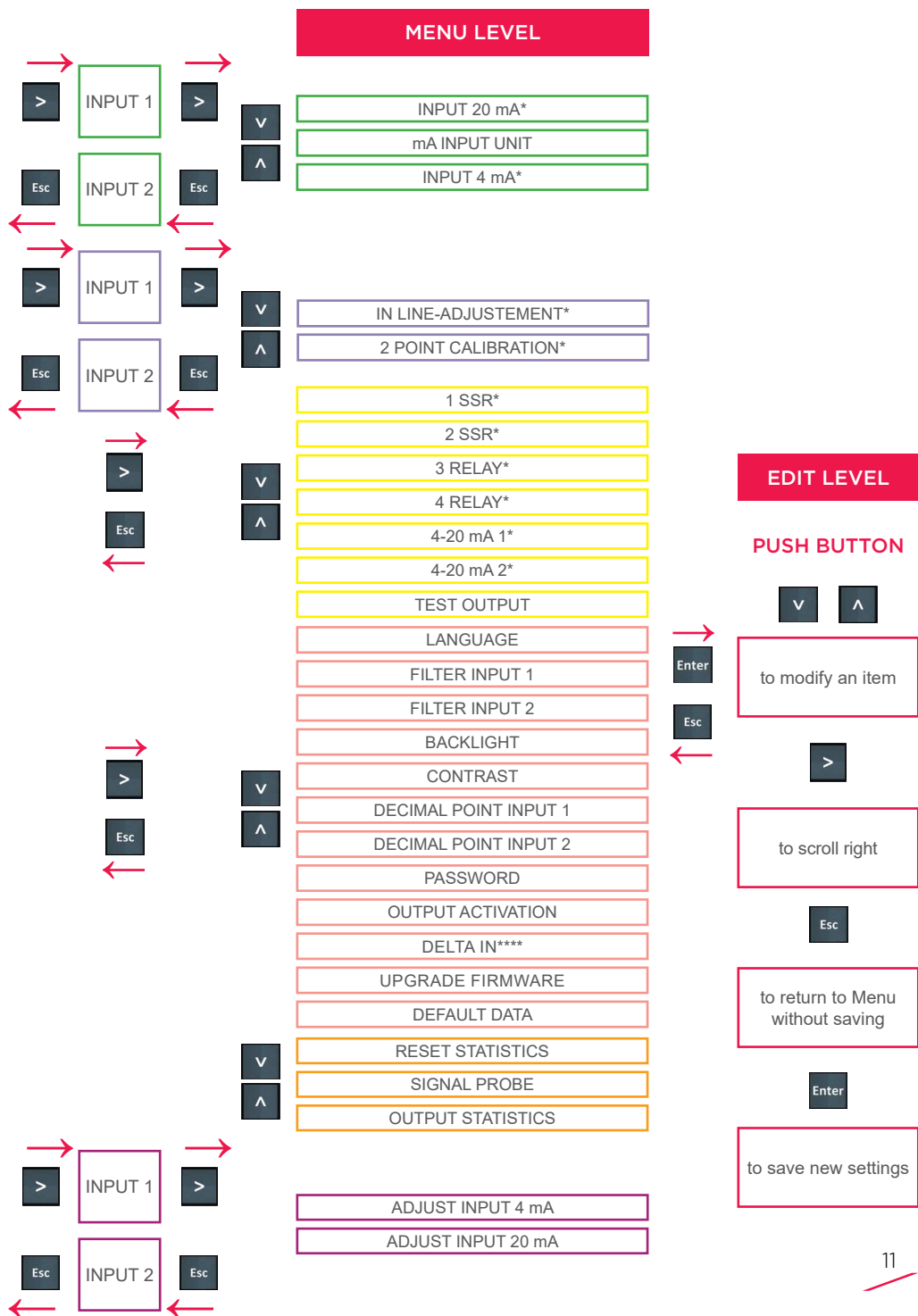
* For negative values firstly set the corresponding positive value and then move the position indicator beyond the last position on the right using  to get the minus sign (not available for flow measurement)

1 SSR , 3 RELAY, 4-20 mA 1 can be assigned to the first input.
2 SSR, 4 RELAY, 4-20 mA 2 can be assigned to the second input.

** Delta visualization can be activated in Options Menü.

***  for more info about Outputs

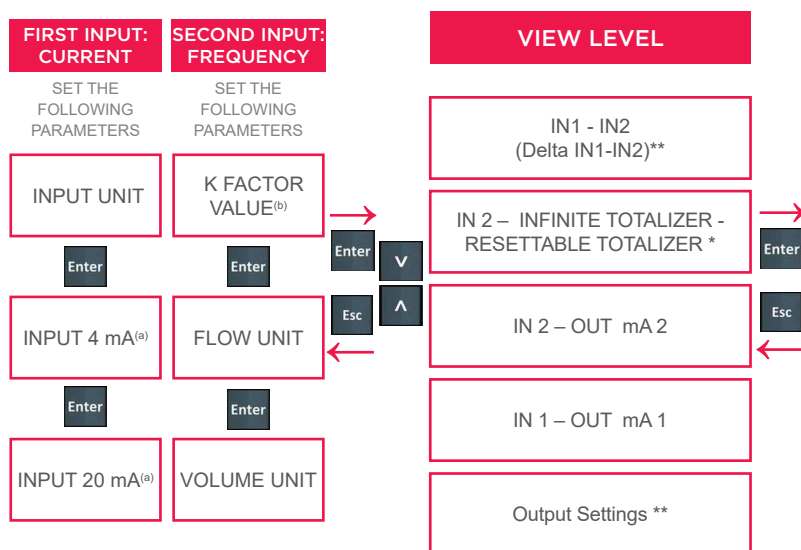
**** Use the same Engineering Unit on both INPUTS



OPERATIONAL OVERVIEW

MENU DIRECTORY

The M9.10 Dual Analog Input 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(PROPORTIONAL FREQUENCY, PROPORTIONAL PULSE, ON-OFF MODE, TIMED MODE).



Settings



Calibration



Outputs



Options



View data



Adjust input mA

* Resettable totalizers can be reset using on view level (only with frequency input).

** Delta visualization can be activated in Option Menü.

*** for more info about Outputs

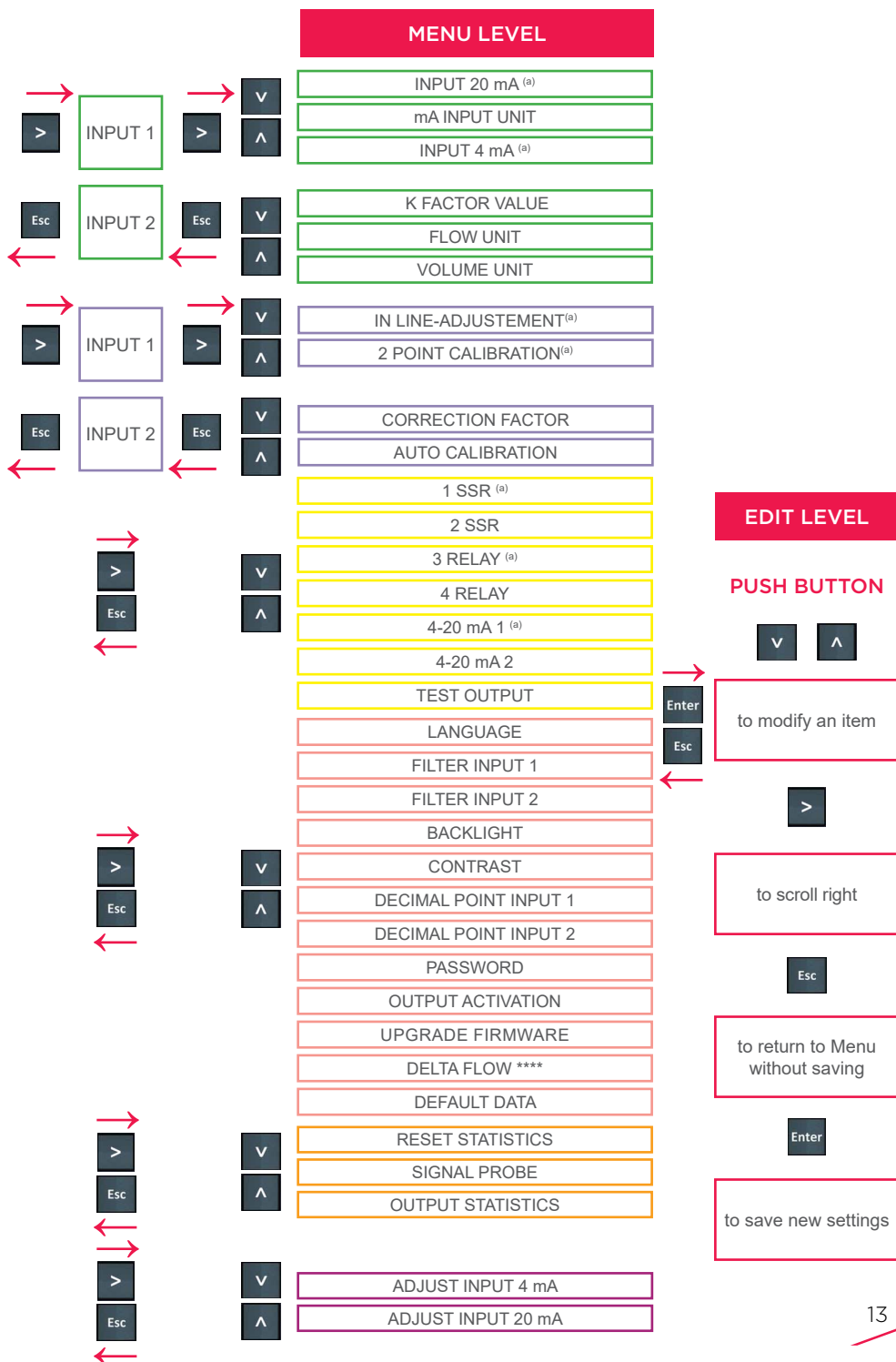
(a) For negative values firstly set the corresponding positive value and then move the position indicator beyond the last position on the right using to get the minus sign (not available for flow measurement)

(b) K factor is value of pulses/liter (available on technical manual of connected FLS sensor)

1 SSR , 3 RELAY, 4-20 mA 1 can be assigned to the first input.

2 SSR, 4 RELAY, 4-20 mA 2 can be assigned to the second input.

**** Use the same Engineering Unit on both INPUTS




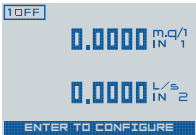
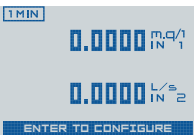

OUTPUT MODE

The M9.10 Dual Analog monitor and transmitter features 2 solid state relays and 2 mechanical relay in addition to an 2 analog output 4-20mA.

- 1 SSR , 3 RELAY, 4-20 mA 1 can be assigned to the first input.
- 2 SSR, 4 RELAY, 4-20 mA 2 can be assigned to the second input.

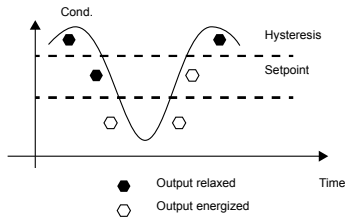
PROCEDURE FOR OUTPUTS SETTING

- 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

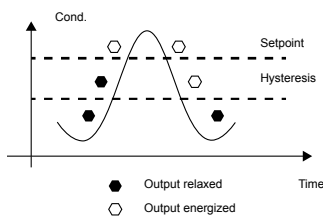
			
Monitor without digital output activated	In case a digital output is enabled, a icon will appear	In case a digital output is set, icon reports the operating mode	In case set digital output is activated, the icon will turn to black

Digital outputs can be set in the following way:

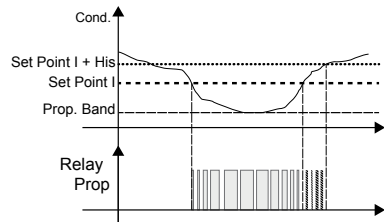
ON-OFF MODE (icon reports O-F) LOW LEVEL



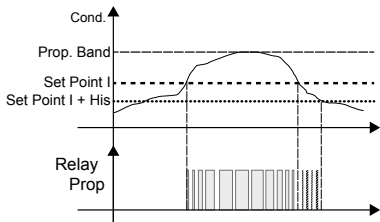
ON-OFF MODE (icon reports O-F) HIGH LEVEL



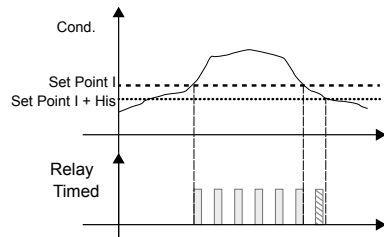
PROPORTIONAL MODE (icon reports PRP) LOW LEVEL



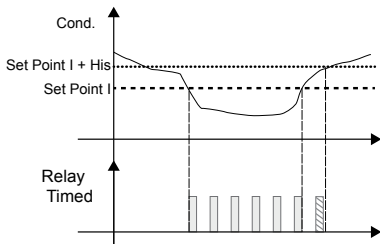
PROPORTIONAL MODE (icon reports PRP) HIGH LEVEL



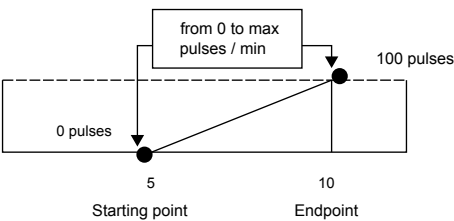
TIMED MODE (icon reports TMD) HIGH LEVEL



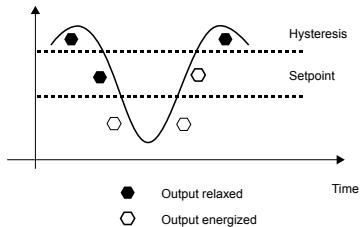
TIMED MODE (icon reports TMD) LOW LEVEL



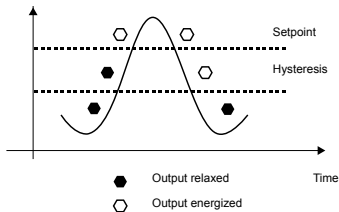
FREQUENCY MODE (icon reports FRQ)



MIN MODE (icon reports MIN)

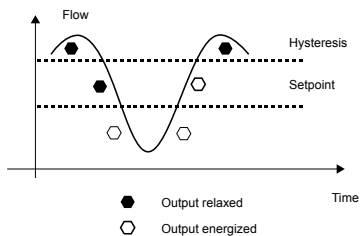


MAX MODE (icon reports MAX)

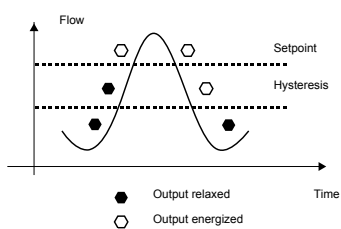


In case frequency input is activated, digital outputs (2 SSR, 4 RELAY) can be set in following way:

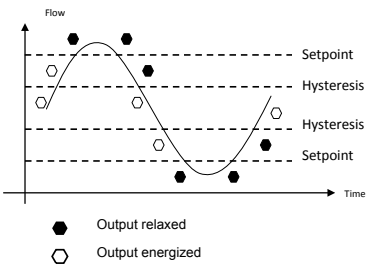
MIN MODE (icon reports MIN)



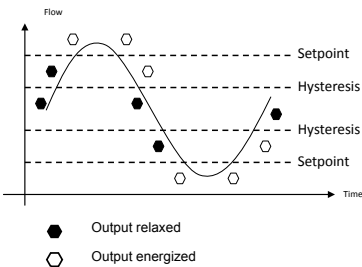
MAX MODE (icon reports MAX)



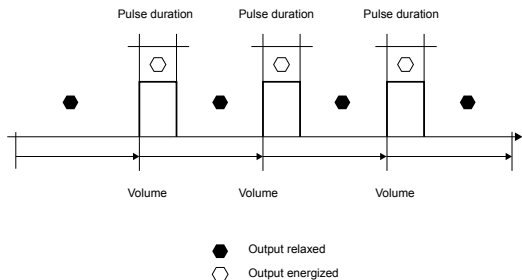
WINDOW IN MODE (icon reports WIN)



WINDOW OUT MODE (icon reports WOT)



PULSE MODE (icon reports PLS)



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 M9.10 to the laptop by the USB cable
- Select the item 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 M9.10 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 M9.10 to the laptop by the USB cable
- Select the item 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 M9.10 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
M9.10.P1	Panel mount Dual Parameter Analog monitor & transmitter	12 - 24 VDC	3/4 wire	2 * 4-20mA	2*(4-20mA), 2*(S.S.R.), 2*(mech. relay)
M9.10.W1	Wall mount Dual-Parameter Analog monitor & transmitter	12 - 24 VDC	3/4 wire	2 * 4-20mA	2*(4-20mA), 2*(S.S.R.), 2*(mech. relay)
M9.10.W2	Wall mount Dual-Parameter Analog monitor & transmitter	110 - 230 VAC	3/4 wire	2 * 4-20mA	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

NOTE



FIP - Formatura Iniezione Polimeri S.p.A.

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Genova - Italy
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Fax +39 010 9621209
www.flsnet.it