

FLOW SENSORS MANUAL

- English
- 中文简体
- 中文繁體

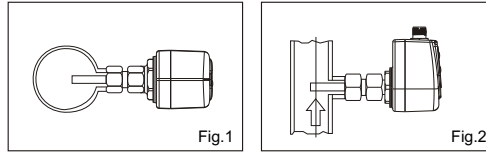


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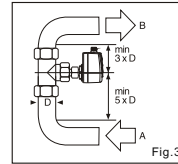


Installation

- It is suggested to install the sensor laterally in the horizontal pipe. (Fig.1)
 - In case of installing it on the bottom, the pipe should be cleaned from sediments.
 - You should pay attention to the capacity of the pipe and to the medium itself.
- In the vertical pipe, sensor should be installed where medium streams upwards. (Fig.2)

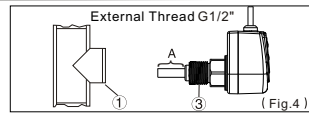


- To avoid damage, minimum distance to curves, valves and cross sections should be considered (Fig.3):
 - Entrance (A)
 - Exit (B)
 - Diameter of the pipeline (D)



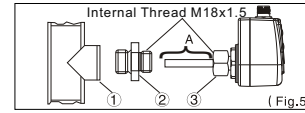
Installation

External Thread G1/2"



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Internal Thread M18x1.5

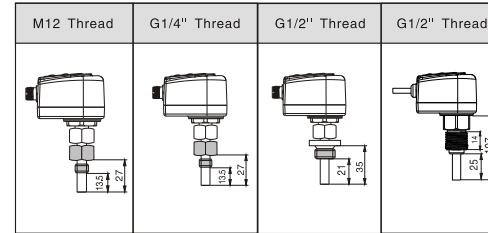


- To screw the nut smoothly, please add lubricant to nut and threads. (Fig.4 & Fig.5)

Notice: It is disallowed to add lubricant on the probe (A).
- Screw a suitable adapter (2) to the joint (1). (Fig.4 & Fig.5)
- Insert the sensor to the adapter and then screw the nut (3) (The max. screwing torque: 50Nm). (Fig.4 & Fig.5)

The depth of insertion: The minimum depth inserting to the pipeline is 12mm. To insure the correct depth, the user can use the adapter (Accessory: optional order).
Notice: The probe of sensor is not allowed to contact the wall of the pipe.

Mounting

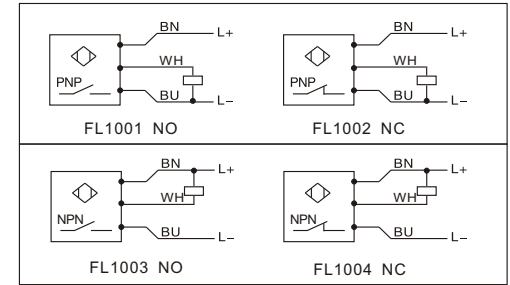


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System connection

- Definition of three wires and the colors
 - BN (brown): L+ Power positive
 - BU (blue): L- Power negative
 - WH (white): NO/NC overload output

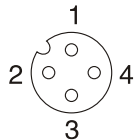
Connection



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Pinout & Connection

- Pinout (The following figure)
- Pinout definition



- PIN1: L+ Positive pole (BN)
- PIN2: P Programming wire (WH)
- PIN3: L- Negative pole (BU)
- PIN4: PNP/NPN output (BK)

Connection

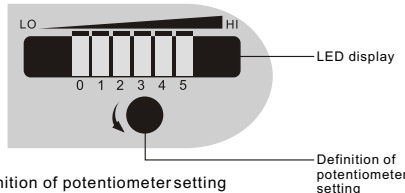
PNP		
	NO setting via menu, please see page 9 for specific operation.	NC setting via menu, please see page 9 for specific operation.
NPN		
	NO setting via menu, please see page 9 for specific operation.	NC setting via menu, please see page 9 for specific operation.
Programming wire (for remote adjustment) Core color: 1=BN (Brown) 2=WH (White) 3=BU (Blue) 4=BK (Black)		

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Menu setting and the status of indication light

Flow Sensor via Potentiometers

Control panel



Definition of potentiometer setting

SP setting: Rotate in anticlockwise direction, LED increase
 Rotate in clockwise direction, LED decrease

Display function (Operation mode)

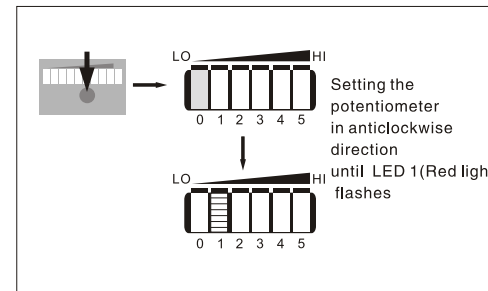
	Overflow flow (LED 0 flashes)
	SP setting (LED 1 display)
	Current flow in display range (LED bargreen)
	Over the flow range (LED full display)
	LED = Red
	LED = Green

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Function and parameter setting

SP setting

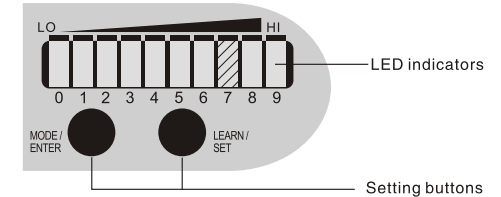
Setting the flow to needed value, it is ready to operate after 8 seconds once the power is on. It is allowed that the medium flow through the system with max. flow rate. Measuring current flow and setting the value as SP setting value.



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Flow Sensor via Pushbuttons

Controls and visual indication



Button definition

MODE / ENTER: Selection / Confirmation
 Learn/Set: Adjust to the maximum / minimum flow rate; value setting (Keep pressing button to scroll the display; Press button once to increase the value stepwise.)

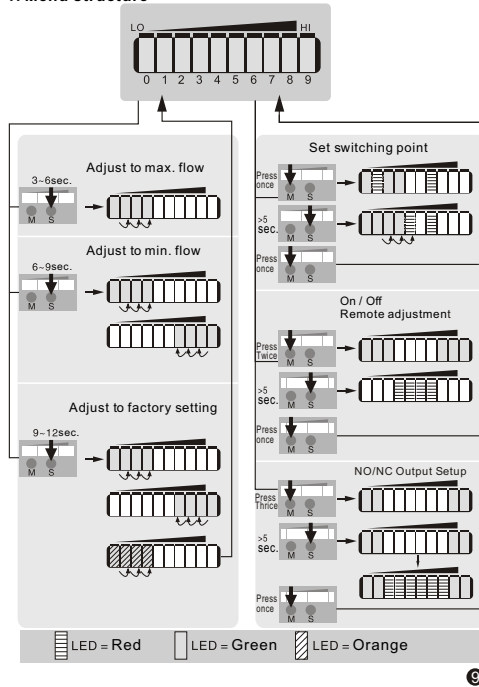
Display (Operation)

	In the display range (LED bar Green)
	Over the flow range (LED 9 Flash)
	Flow rate is too low (LED 0 Flash)
Switching point display (SP) : LED Orange: Flow > SP; LED Red: Flow < SP	

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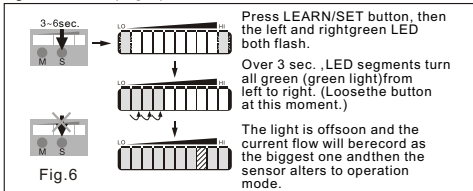
Parameter Setting

1. Menu structure

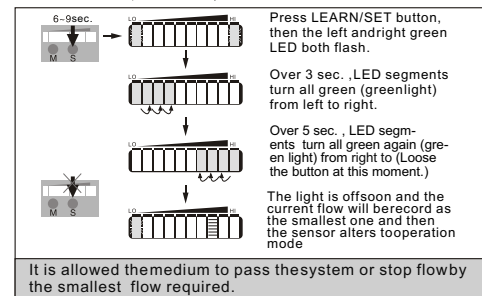


2. Sensing range setting

Adjust to the biggest flow (HI-Teach) Connect up the power. The sensor is ready to run after 8 sec., and then requires the highest rate of flow in the tube in order to run the learn-process successfully. The sensor detects the flow and sets it as the highest value. (Fig.6)



Adjust to the smallest flow / flow stop. The sensor detects the current flow and sets the value as the smallest display value of LED. In the normal operation, the first green LED (LED 0) flashes when the flow smaller than this value. (or when the flow stops) when the flow smaller than this value (or when the flow stops).
Notice: LO-Teach operation is only allowed to be done after HI-Teach.

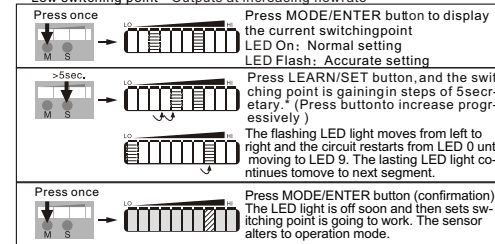


It is allowed the medium to pass the system or stop flow by the smallest flow required.

3. Configure switching point

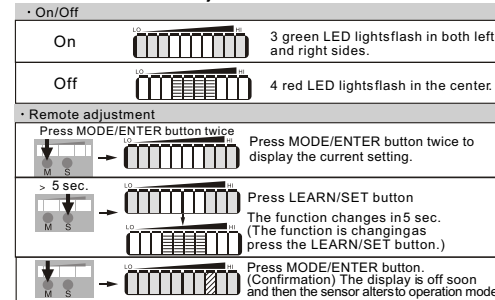
Switching point (LED7), which efforts outputresponse time, is setby factory setting.

- High switching point = Outputs at decreasing flowrate
- Low switching point = Outputs at increasing flowrate



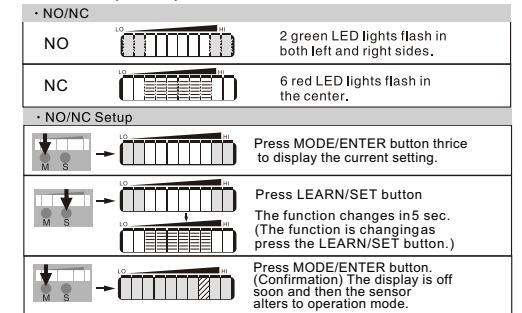
* Decrease switching point: Move the flashing LED light to the biggest setting value and then the circuit will restart from the smallest setting value.
** Beyond: If the flashing LED light moves over the biggest setting value, the circuit will restart from the smallest setting value.

4. Start/Non-start remote adjustment

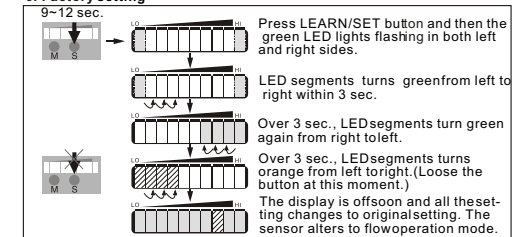


After activating this function, connect PIN2 and L+ to run remote adjustment.

5. NO/NC Output Setup



6. Factory setting



7. Remote adjustment

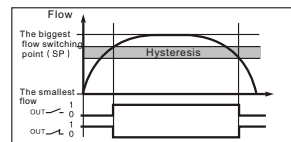
Adjust to biggest flow (HI-Teach): connected to power, the sensor is ready to run after 8 seconds and then requires the highest rate of flow in the tube in order to run the learning-process successfully. After that the sensor detects the flow and sets it as the highest value. Adjust wire (RED) to power L+, both left and right LED start flashing for 2-3 sec. LED segments turn all green (green light) from left to right. Loose the button during this procedure, the light is off soon and the current rate of flow will be recorded as the biggest one and then this sensor alters to operation mode.
Adjust to smallest flow / flow stop (LO-Teach): The sensor detects the current flow and sets the value as the smallest display value of LED. In the normal operation, the first green LED (LED 0) flashes when the flow smaller than this value. (or when the flow stops) After connect remote adjust wire (RED) to power L+, both left and right LED start flashing for 2-3 sec. LED segments turn all green (green light) from left to right and then turn green again from left to right in 5-6sec. Loose the button during this procedure, the light is offsoon and the current rate of flow will be record as the smallest one and then this sensor alters to operation mode.

8. Lock/Unlock

This sensor can be locked electrically to avoid the parameters set from accident. The buttons are under lock while the units restart.
Lock: This sensor owns automatic button lock function. When there is no button pressed within 2 minutes, the units locks automatically. When the units locks, it is in running mode and gives signals as usual.
Unlock: Press two buttons simultaneously and keep it pressed for 10sec. The user can adjust relevant parameters by the buttons, while the 2 green LEDs in the center flash.

9. Hysteresis

When the flow increases and reaches the corresponding switching point (SPx), it outputs.
When the flow decreases again and reaches the "SPx-hysteresis"
Hysteresis is 2-4 cm/s when it is adjusted to high flow value between 0-60cm/s. (suitable for water)
The hysteresis increase as the flow gains when it is adjusted to high flow value which is over 100 cm/s. The normal output response time is 2 sec. and it is affected by the setting of LO-Teach and switching point.
Low setting of LO-Teach or of switch point, the faster time to switch on the sensor.
High setting of LO-Teach or switching point, the faster time to switch off the sensor.



Technical parameters

Flow Sensor via Potentiometers

Application	Liquid and gas
Operation voltage [V]	10-36 DC
Output function	PNP/NPN, NO/NC
Max. overload current [mA]	400
Reverse Polarity protection	Yes
Overload protection	Yes
Short-circuit protection	Yes
Voltage Drop [V]	<3.5
Current consumption [mA]	<40
Max. temperature drift [K/min]	300
Pressure resistance [bar]	300
Liquid temperature [°C]	-25...80
Liquid setting range [cm/s]	3...300
Measuring range of Max. sensitivity [cm/s]	3...60
Liquid SP setting [cm/s]	via potentiometer (Factory setting is 15)
Gas temperature [°C]	-25...80
Gas setting range [cm/s]	200...3000
Measuring range of Max. sensitivity [cm/s]	200...800
Gas SP setting [cm/s]	via potentiometer (Factory setting is 150)
Startup time [s]	< 8

Output response time [s]	<2
Protection classification	IP67
Shock resistance [g]	50
Vibration resistance [g]	20
Housing material	PBT+30%GF
Probe material	stainless steel S316L
Cable connection	PVC cable; 3 x 0.34mm ²
Length of connection cable [m]	2

Flow Sensor via Pushbuttons

Operating Voltage [V]	20...36 DC
Max. current loading [mA]	400
Short-circuit protection	YES
Reverse polarity protection	YES
Overload protection	YES
Voltage drop [V]	<2.5
Current consumption [mA]	< 80
Temperature gradient of medium [K/min]	300
Pressure rating [bar]	300
Electric design	DC PNP/NPN
Output	NO/NC
Accuracy	± 10% (Standard under the normal temp. 25°C of water.)
Housing material	PBT+30%GF
Probe material	Stainless steel S316L
Connection	M12 Socket

Liquid medium	Temperature [°C]	-25...80
	Setting range [cm/s]	3...300
	Max. sensing range [cm/s]	3...60
	Temperature [°C]	-25...80
Gas medium	Setting range [cm/s]	200...3000
	Max. sensing range [cm/s]	200...800
	Switching point adjustment	Buttons
	Power-on delay time [s]	< 8
Operating environment	Output response time [s]	< 2
	Protection classification	IP67(IEC 60529) / (UL50)
	Temperature [°C]	-25...80
	Humidity	15...85%
	Resistance to shock [g]	50 (DIN / IEC 68-2-27, 11 ms)
	Resistance to vibration [g]	20 (DIN / IEC 68-2-6, 55-2000 Hz)
	Temperature [°C]	-25...80
	Humidity	15...95%
Storage	Display LED	3 colours LED x 10
	Certification	CE; RoHS

Notice:



It must be installed by technical engineer. It must be follow domestic and international instructions about electrical equipment. Power must be cut before connecting the equipment.



Please confirm flow sensor via potentiometers or via pushbuttons and install the products according to the instructions.