FLOWMETER
MANUAL

IdroMAP

SUMMARY

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1. INSTALLATION

1.1 INSTALLATION TIPS

> **! NOTE**
>
> Please check whether the boxes are damaged or not, and whether they have been handled roughly or not. Please report the damage to the courier service and the manufacturer.
>
> Please check the packing list to make sure the batch of goods that you have received is complete.
>
> Please check the instrument nameplate, and confirm whether the delivered contents are consistent with your order. Check whether the power supply indicated on the nameplate is correct. If not correct, please contact the manufacturer.

1.2 STORAGE

1- The instrument shall be stored in a dry and clean place.
2- Avoid exposure in direct sunlight for long.
3- Instrument shall be stored in the original package.

1.3 INSTALLATION

The following items shall be considered when the pipes are designed.

- Leave enough space on the side.
- Do not make the electromagnetic flowmeter subject to violent vibration.

1- Location

1- The flow meter must be installed in a dry and ventilated place. Avoid places that could become flooded.

2- The flow meter, if installed outdoors, shall be protected from direct sunlight and from any risk of flooding.
The ambient temperature ranges from -20°C to +60°C.

3- The flow meter shall not be installed in environments containing corrosive gases. If it is to be installed in such a environment, ventilation and anti-corrosion measures must be taken.

4- The electromagnetic flowmeter shall be installed avoiding strong vibration as possible, such as violent pipe vibration.
In this case, brackets for fixing pipes on both sides of electromagnetic flowmeter shall be provided.

5- Part of the sensor of electromagnetic flowmeters with IP68 (3m under water) protection level can be placed into the water. While the electromagnetic flowmeter with IP65 protection level cannot be immersed into the water or installed outdoors.

2- Avoid interference of magnetic field

Do not install electromagnetic flowmeters near motors, transformers, or other power sources which are prone to cause electromagnetic interference, near the frequency converter or obtain power from the power distribution cabinet of the frequency converter to avoid interference.

3- The distance of the straight pipe

In order to ensure the measurement accuracy of flowmeter, it is recommended to ensure that the length of the straight pipe on the upstream of the sensor shall be at least 10 times of pipe diameters (10D), and the length of straight pipe on the downstream be at least 5 times of pipe diameters (5D).

4- Maintenance space

For the convenience of installation and maintenance, enough installation space shall be reserved around the electromagnetic flowmeter.

5- For pipes that do not allow flow disruption in the process

When installing the electromagnetic flowmeter, bypass pipes and cleaning ports shall be added. As shown in Figure 1, these devices can ensure the continuous operation of equipment system when the flowmeter is out of service.

6- Support of electromagnetic flowmeter

Do not install the electromagnetic flowmeter on a free-vibrating pipe without any support. Instead, a mounting base shall be used to secure the measuring tube. When the electromagnetic flowmeter is required to be installed underground, the pipes at both inlet and outlet ends shall be provided with support items, and a metal protection plate shall be installed above the flowmeter.

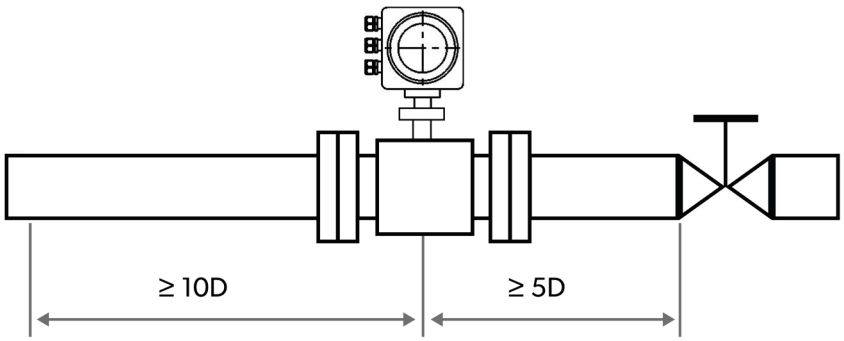


Figure 1

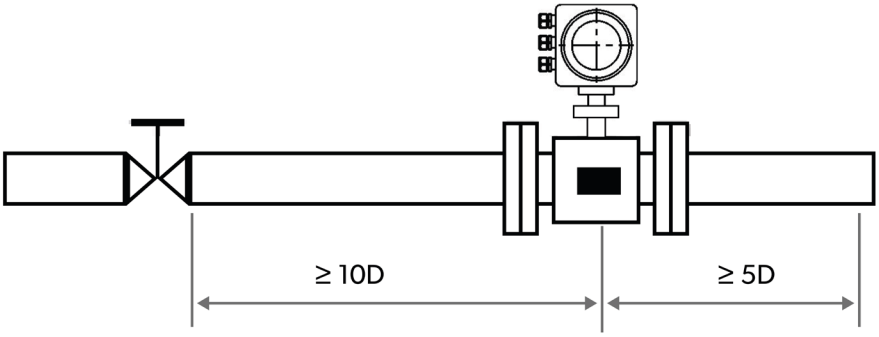


Figure 2

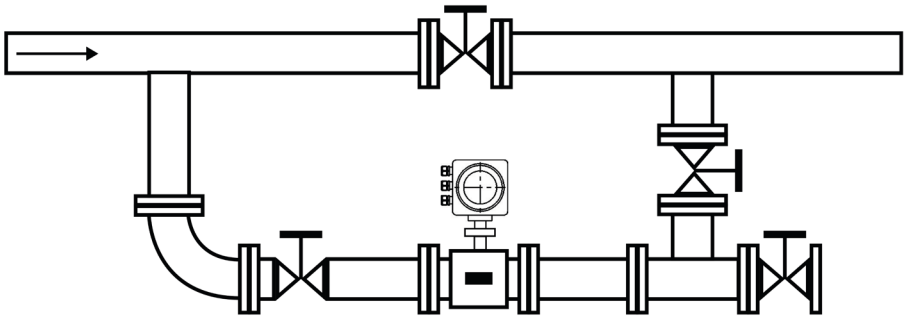


Figure 3

1.4 INSTALLATION CONDITION

1- Flow direction

The flowmeter can be set to automatically detect the positive and negative flow direction. The flow direction arrow on the sensor casing indicates the positive flow direction specified by the manufacturer. Generally, when installing the meter, the user shall make the flow arrow consistent with the on-site process flow.

Figure 4 shows the preferred location for installing the electromagnetic flowmeter.

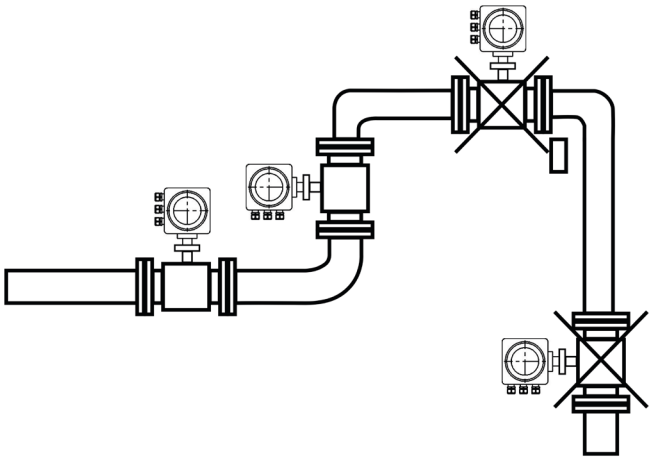


Figure 4

The pipe is routed to the highest point (Bubble accumulation in the measuring tube is likely to cause produce measurement errors!) Make sure the pipeline is always full.

2- Installation direction of electromagnetic flowmeter and sensor electrodes

The sensor allows horizontal and vertical installation. When it's installed horizontally, the electrode shall be horizontally placed such that bubbles will not be adsorbed near the electode in case that the medium is contained with bubbles or precipitates. Otherwise, this would cause converter signals opened and zero drift due to the fact that deposits are not covered by the electrode.

3- Pipes should always be filled with liquids.

Pipes shall be arranged to ensure that the electromagnetic flowmeter measuring tube is always filled with liquids.

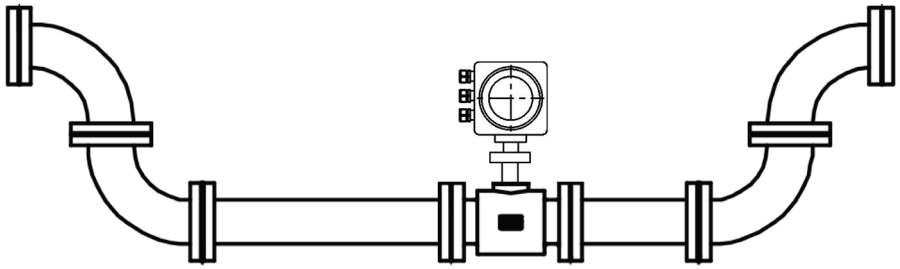


Figure 5

In case of liquids or suspensions containing solid particles, it is recommended to install electromagnetic flowmeters vertically. For one thing, the phase separation of measured medium can be prevented; for another, the sensor lining is worn evenly. In addition, impurities will not precipitate at the bottom of the measuring tube. It shall be guaranteed that liquids flow from bottom to top to ensure that the sensor measuring tube is always filled with medium.

4- The electromagnetic flowmeter cannot be installed on the suction side of the pump.

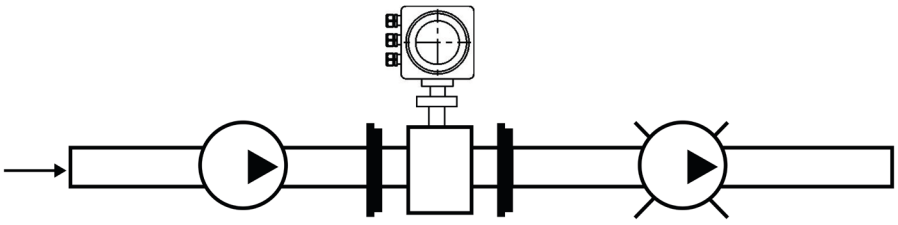


Figure 6

5- For long pipelines, control valves are generally installed on the downstream of the electromagnetic flowmeter.

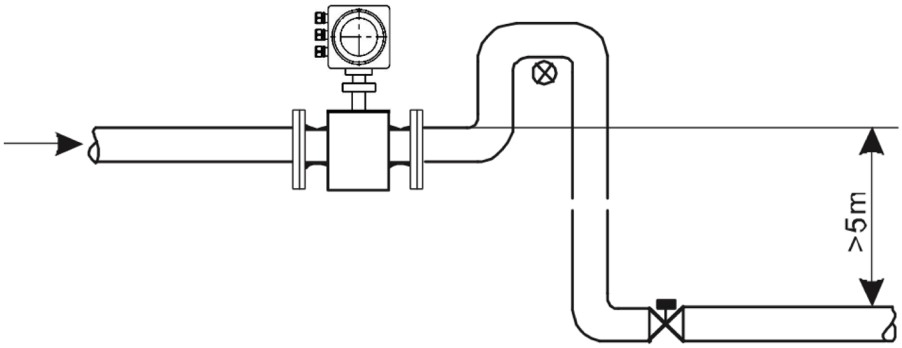


Figure 7

6- For pipes with open discharges, the electromagnetic flowmeter shall be installed at the bottom section (lower part of pipe).

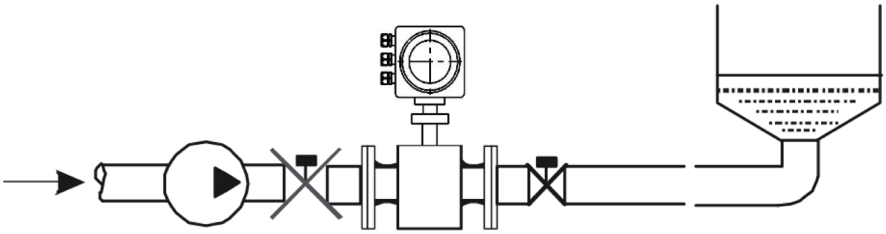


Figure 8

7- For places where fall head of pipes is over 5m, the air valve shall be installed on the downstream of the electromagnetic flowmeter.

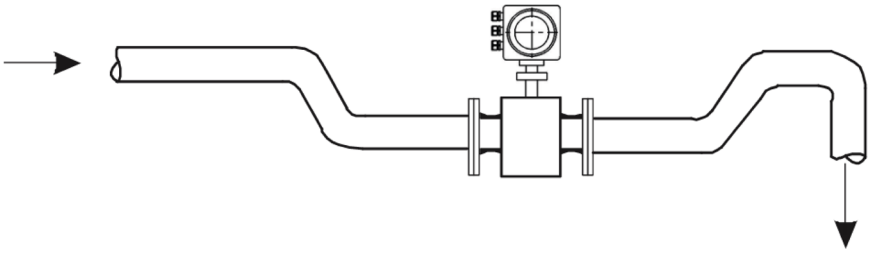


Figure 9

8- Measurement errors caused by the ingress of foreign gas and damage to the lining caused by vacuum should be avoided.

9- No bubbles shall be observed in the pipes.

Pipes shall be designed to prevent the air bubbles in the fluids from accumulating the measurement pipe of a sensor. If a valve exists near the flowmeter, try to mount the flowmeter on the valve's upstream side for preventing a decrease of pressure inside the pipe possibly, consequently avoiding the possibility of air bubbles ensure that no gas can be separated from the liquid.

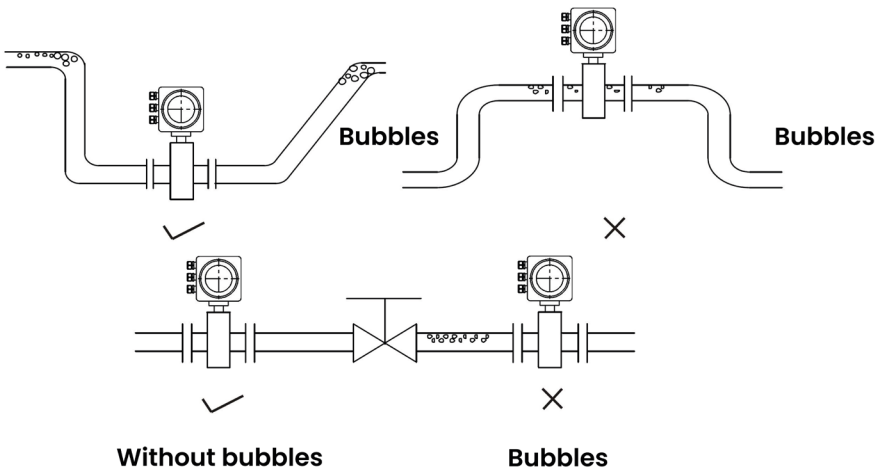


Figure 10

10- Liquid conductivity

It's not allowed to install the electromagnetic flowmeter at a place where the liquid conductivity is extremely uneven. Injection of chemicals from the upstream of the meter can easily result in uneven liquid conductivity, which can cause serious interference to the meter flow indication. In this case, it is recommended to inject chemicals from the downstream of the meter; if chemicals must be injected from the upstream of the meter, it must be ensured that the straight pipe section on the upstream at least has 30 times of pipe diameters to ensure adequate mixing of liquids.

11- Grounding

As the voltage of induced signal of electromagnetic flowmeter is small, it's more prone to be affected by noises or other electromagnetic signals. This is why the electromagnetic flowmeter needs to be grounded in many occasions.
This functions to form an internal space for shielding external interference through the grounding of flowmeter casing, thereby improving measurement accuracy.

1.5 MECHANICAL INSTALLATION

1.6.1- Installation of flowmeter pipeline

1- Prior to installation, the pipeline shall be calibrated to ensure that the diameter of the meter has good coaxiality with the user's pipeline. For sensors with a nominal diameter of no more than 50mm, the protrusion of its axis shall not exceed 1.5mm; for sensors with a nominal diameter of no less than 350mm, it shall not exceed 4mm.

2- In general, foreign particles (such as welding slag) may exist in newly installed pipelines. Before the flowmeter is installed, wash away the debris. It not only prevents the lining from being damaged but also measurement error caused by foreign particles which pass through the measuring tube during measurement.

1.6.2- Precautions

1- Operating introduction:
Take care to avoid damage to the meter when you are unpacking. It is suggested not to unpack the box before transporting it to installation site to avoid damage of meter. It's prohibited to use a stick or rope to lead through the measuring tube of sensor. Instead, follow the correct lifting as shown in the figure below.

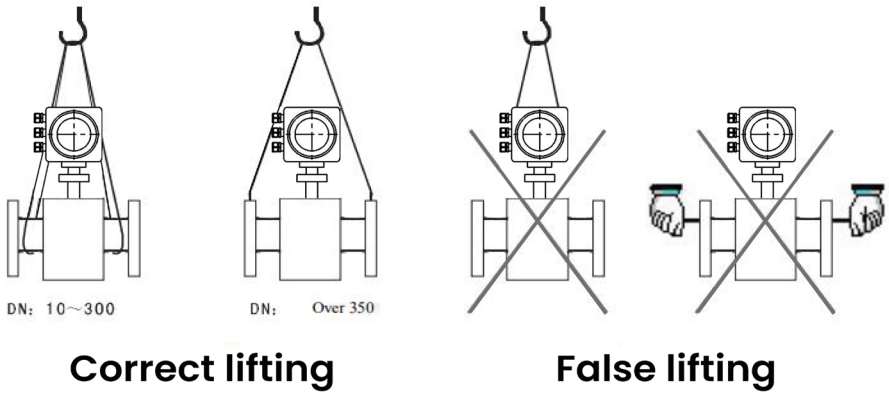


Figure 11

2- Avoid vibration
Avoid heavy falling or pressing, especially the flange surface which cannot be stressed (otherwise, the lining may be damage to disable operation of the meter).

3- Protection of flange surface
After unpacking, pay attention to protect the flange. Do not place it on the unpadded floor or other uneven boards.

4- Terminal box
It's not allowed to seal terminal box cover before electrical wiring. After the wiring is completed, please apply the special sealant provided by our company to on the terminal box as soon as possible. The cover terminal box and tighten the screws to ensure the tightness. If the protection level of the electromagnetic flowmeter is IP68 at type selection, it has been subject to water-proof sealing.

5- No operation for long duration
After the instrument is installed, it shall be avoided that the meter is not checked for long duration. If yes, please take following measures:

A. Check the tightness of the covers and the wiring terminals to ensure that no moisture and water enters into the meter .

B. Conduct regular inspection. Check against the measures mentioned above and the terminal box for at least once a year. In the event of water entry into the meter (eg, after heavy rain, etc.), the meter shall be inspected immediately.

1.6.3- Installation of flowmeter

1- Installation direction
The flow direction of the measured fluid shall be consistent with flow direction mark indicated on the flowmeter.

2- Seal gaskets installed between flanges shall have good corrosion resistance and shall not protrude into the interior of the pipe.

3- When welding or flame cutting is performed adjacent to sensor pipe, isolation measures shall be taken to prevent the lining from being deformed due to heart.

4- If it is installed in a well or immersed in water, apply sealant on the terminal box of the sensor after the system is intalled and debugged. (If the protection level of the electromagnetic flowmeter is IP68 at type selection, it has been subject to water-proof sealing.)

5- When the flowmeter is intalled on the field, use bolts to connect the flange on the sensor to that on the pipe. Bolts, nuts and their threads for securing meters shall be complete and free of damage and well lubricated. Use them with suitable flat washers and spring washer. A torque wrench shall be used to tighten the bolts according to the flange size and torque. Regularly tighten the bolts during daily use to prevent looseness of the bolts.

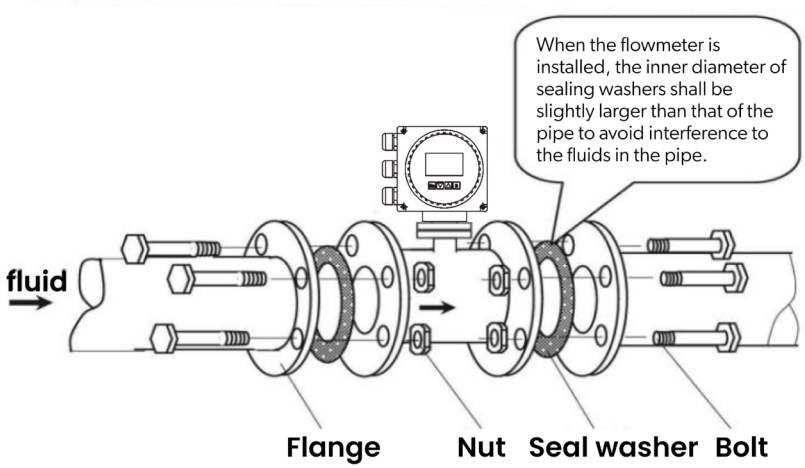
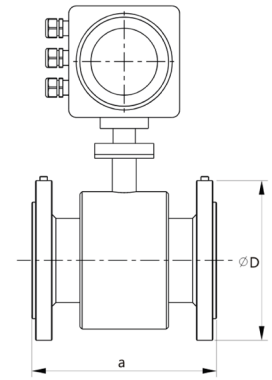
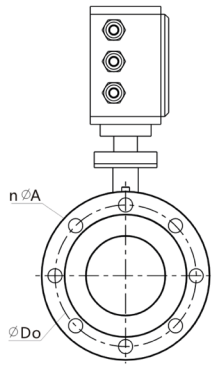


Figure 12

1.6 DIMENSIONS FOR FLOWMETER





DN	a	D	Do	n*A	Pressure resistance
10	200	90	60	4*14	1.6 Mpa
15	200	95	65	4*14	
20	200	105	75	4*14	
25	200	115	85	4*14	
32	200	135	100	4*18	
40	200	145	110	4*18	
50	200	160	125	4*18	
65	200	180	145	4*18	
80	200	195	160	8*18	
100	250	215	180	8*18	
125	250	245	210	8*18	
150	300	280	240	8*23	
200	350	335	295	12*23	
250	450	405	355	12*25	
300	500	440	400	12*23	1 Mpa

1.7 CONVERTER DIMENSIONS

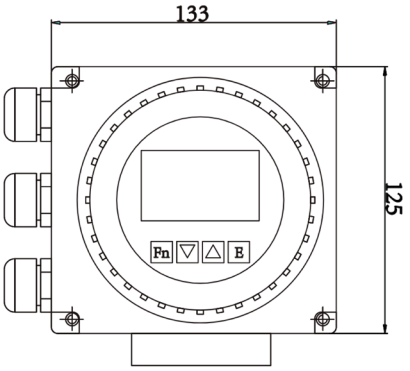


Figure 13 - Compact type

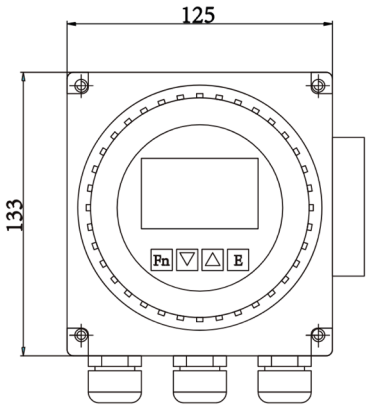


Figure 14 - Remote type

2. OPERATION

2.1 DEFINITION OF LCD AND KEYBOARD

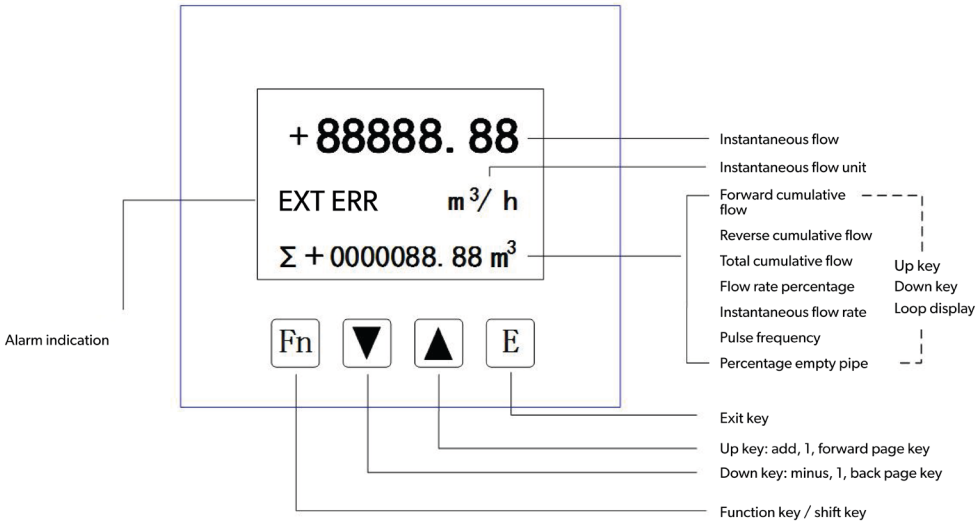


Figure 15

After the instrument is powered on, it enters the automatic measurement state, realizes various measurement functions and displays the corresponding measurement data. By operating the four panel keys, the instrument parameters can be set and displayed.

2.2 KEY FUNCTIONS

The instrument has four keys, which are up key, down key, function key/ shift key and exit key.

Up key: add 1 to number at the cursor, and cycle to select the content displayed on the upper line of the screen.

Down key: the number at the cursor is reduced by 1, and the content displayed in the lower part of the screen is cyclically selected.

Function key/shift key: in the parameter editing interface, the cursor moves to the right. In the non-parameter editing interface, enter the lower submenu, and in the measurement interface, enter the main menu.

Exit key: in the parameter editing interface, choose to save the parameter or exit directly (there must be addition and subtraction or shift operation, otherwise it will return to the upper-level submenu directly). In the non-parameter editing interface, return to the upper submenu;
When editign parameters, use the function key/shift key to perform the shift operation, use the up and down keys to perform addition and subtraction operations, and use the exit key to select whether to save the parameter or exit directly without saving.

2.3 LOOP DISPLAY

Press the up and down keys to display the following parameters:

- Forward cumulative flow
- Reverse cumulative flow
- Total cumulative flow
- Flow rate percentage
- Instantaneous flow rate
- Pulse frequency
- Percentage empty pipe

3. CONNECTIONS

3.1 CAN BUS

The Flowmeter is supplied with a Deutsch M/F DT04-4P-C015 F/ M 4 position connector.

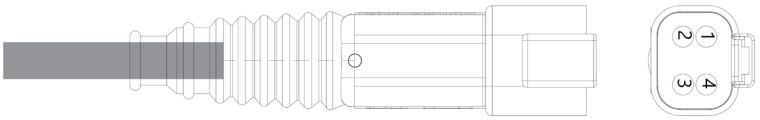


Figure 16

Pole	Colour	Section	Function
1	RED	1	CAN BUS PWR
2	YELLOW	0.50	CAN_H
3	BLACK	1	GND CAN
4	GREEN	0.50	CAN_L

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