USER 'S MANUAL

F820 Series

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INSTRUCTION

◎ INSTRUCTION FOR USAGE OF FLOWMETER

1. GENERAL

For the correct usage of the Flowmeter, Installation, Maintenance, Repai and Inspection shall be done at the site. No matter how excellent in the design and best parts applied in the Flowmeter, not only the flowmeter is bad in its performance but also the whole system is low in the creditability and safety without good consideration on the Process, and well organized work control and maintenance plan.

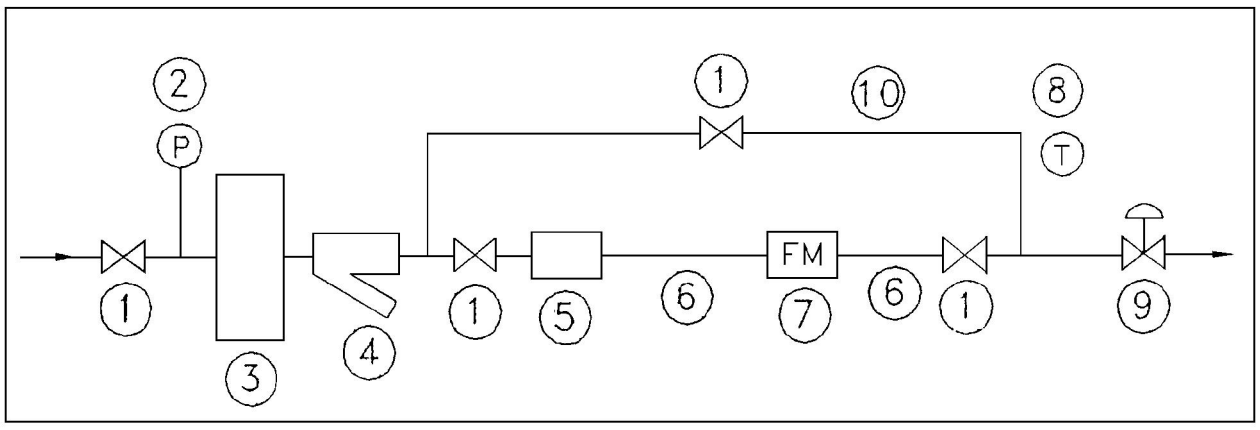
Hence, due to the Carelessness in installation and maintenance of the Flowmeter in the Process can cause the bad performance or malfunction of the whole system, the correct installation and proper maintenance program shall be set up as a part of the Process and executed by the plan.

2. INSTALLATION

(1) FLOWMETER DIAGRAM

It is designed the basic piping diagram to maximize the performance of the flowmeter, and it is called "Flowmeter Diagram"

As shown on Fig.1-1, each entity has own role and is required for the accurate measurement of the flow rate. But, the actual "Flowmeter Diagram"can be differed by the principle of the applied flowmeter and the fluid flow to be measured, then please refer this manual carefully to make the proper diagram. Also simple explanations for each entity are added.



(FIG. 1-1) Sample of " Flowmeter Diagram"

① Stop Valve ② Pressure Gauge ③ Separator ④ Strainer(filter)
⑤ Flow Conditioner ⑥ Straight Pipe Line ⑦ Flowmeter ⑧ Thermometer
⑨ Flow Control V/V ⑩ By-pass Line

(2) INSTALLATION CONDITION

For the accurate and consistent measurement, it is recommended to install the flowmeter with cautions as the below.

① AMBIENT TEMPERATURE

▷ Install the Flowmeter at the place where the temperature keep in constant or change in small.

▷ The allowable temperature in the installed place shall be complied to the Specification of the Flowmeter.

② ATMOSPHERE

▷ Avoid the place existing the corrosive gas.

▷ Don't let the water flow into the conduit or stay in.

③ Install at the place without or minimized the shock and vibration.

④ Keep enough space for the maintenance and repair.

⑤ Avoid the place existing Electromagnetic Interference.

⑥ Avoid in the piping occurred the cavitation effect.

⑦ Must keep the required straight line length by the type of the flowmeter.

(3) INSTALLATION

It shall be installed by the instruction specified and flushed the flowmeter prior to the installation.

① Confirm the flow direction with the indication on the flowmeter.

② Use the correct size of the tightening bolts with the Pipe.

③ Install the seal such as gasket to prevent from leaking.

④ Tighten the bolts with the constant force and the diagonal directional sequence.

⑤ Follow the specified earthing method in electrical works.
(refer to the attached wiring diagram)

(4) MAINTENANCE AND CHECK

Generally the maintenance program can be classified by two types; Precautionary program and Post program.

In Precautionary program, it is included in the Internal Check List for the precaution of the malfunction and defect, which is being kept in record, and Occasional Check-out of the cleanness and tightness. Post Program is designed for the reactive of the flowmeter after the malfunction occurred and is included in the understands of the problem, the investigation of the cause,

resolutions and prevention in future. It will be explained in detail at the provisions for the principle of the flowmeter, maintenance and checking method for each type of the flowmeter.

① SEPARATOR

This is the device to reduce the error on reading due to the air or steam included in the fluid flow. It shall be applied in the system using the mass flowmeter.

② STRAINER (FILTER)

This is the device to prevent the damage by collecting the dust, chips, sand or other foreign substances in the fluid flow.

③ FLOW CONDITIONER

The is the device installed at the upstream of the flowmeter in order to minimize the effects on the flowmeter characteristics by removing or reducing the vortex, turbulence and axial flow.

④ STRAIGHT PIPING LINE

It is the straight part of the piping line between the upstream and downstream of the flowmeter for the accuracy of the measurement. This part is required to make the flow stable, and a priority factor to be considered in the design of the piping line.

[The required length of the Straight Piping Line]

Type	Electro Mag. Meter	Ultra Sonic Meter	Vortex Meter	P/D Meter	Turbine Meter	Differ. Press. Meter	Variable Area Meter	Mass Meter
Upstream	5D	10D	15D	N/A	20D	20D	N/A	N/A
Downstream	2D	5D	5D	N/A	5D	5D	5D	N/A

⑤ BY-PASS LINE

It is recommended to design the Piping Line that the maintenance, repair, inspect and calibration of the flowmeter can be done without stopping of the PROCESS.

⑥ FLOW CONTROL VALVE

If the flow control V/V was placed in upstream of the flowmeter, it could be interfered to the flow and the correct measurement could not expected. Hence, it is recommended to install the flow control V/V in downstream, or keep the enough distance from the flowmeter to prevent from effecting on the flow, if installed in upstream.

◈ MODEL: F820 Series ◈

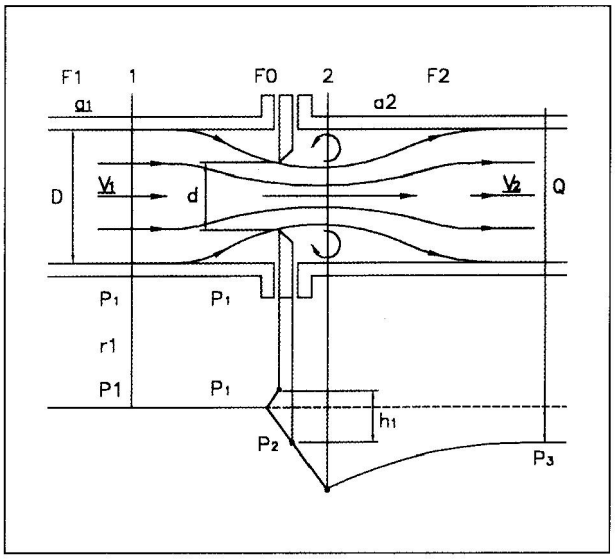
1. GENERAL

The flow rate can be obtained by measuring the Pressure difference of the flow through the orifice located in the Piping Line. This type of Flowmeter has some advantages such as simple structure, easy to handle and wide application from small to large flow.

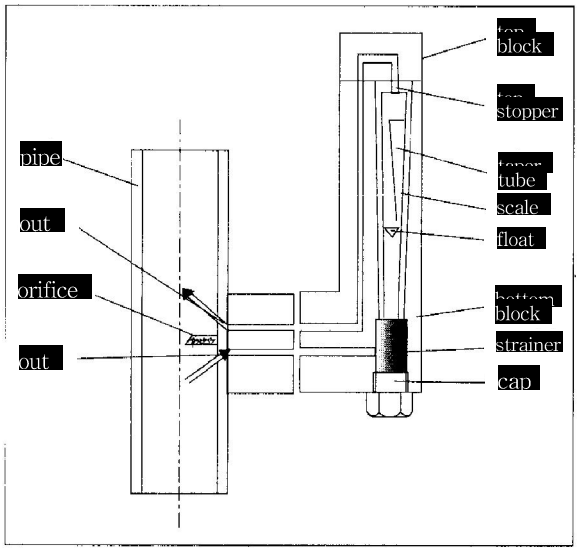
2. PRINCIPLE

The orifice located in the flow line (see Fig.2) causes the velocity of the flowing fluid to change. According to Bernoulli's equation, the difference in pressure between two measurement point is the result of the change in the flow velocity, and the volume of flow rate through the cross-sectional area is proportioned to the pressure difference. Hence, this Flowmeter can be said as a type of Variable Area Flowmeter, which the flow rate is obtained from the pressure difference, and the Indicator indicate the flow rate by using Float Type Variable Area Flowmeter.

Refer to Fig.1 for the variation of Pressure Difference.

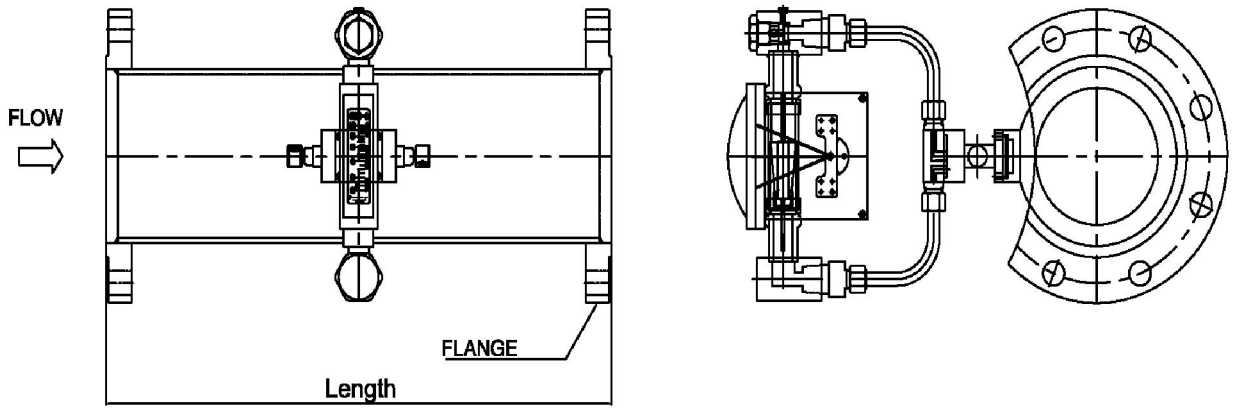


(Fig.1) Flow and Pressure Distribution around the Orifice in Piping Line



(Fig.2) Principle of Measurement

3. OVERVIEW & INSTALLATION



4. STANDARD FEATURE

(1) DIAMETER : 10A - 500A

(2) TEST PRESSURE : Max 10Kgf/㎠G(Standard)

(3) MAX. OPERATING TEMP : 100℃(Option : 200℃)

(4) ACCURACY : Full Scale ±3% (With Alarm : ±5% of Full Scale)

5. CHARACTERISTICS

(1) Simple and clear reading the instant flow in piping.

(2) Simple structure and easy installation.

(3) Compact size and available for the large flow measurement.

(4) Easy dismount from the piping line.

(5) No restriction of the flow direction.

(6) Without any obstructions of the flow, it can be possible to disassemble the indicator and clean it. (By-pass Valve-2-ways)

(7) Easy to maintenance.

6. Installation and Maintenance

(1) Install the flowmeter in matching the Measuring Part with the direction of flow. (complied with the direction of arrow marked on the Orifice)

(2) Clean up the Indicator periodically (including Strainer) - once in every three months.

(3) Connect the Measuring Part in Straight Piping Line.
(IN Let = 3D ~ 20D Length, OUT Let = 3D ~ 5D Length)

(4) For the repair or cleaning of the Indicator, add the BY Pass function.

7. Troubleshooting

※ Prior to install the Flowmeter, Flushing the Piping Line shall be done.
The Strainer is recommended to install in the front of Flowmeter.

Q. Incorrect Buoyant of Rota in Gauge.

A1. Check the Flow first.

A2. In measuring the gas, check the operating pressure with the Flowmeter Operating Pressure.
< Flowmeter Operating Pressure is called the pressure on the back of the Flowmeter>

A3. Check a clogginess factor inside of Body & Indicator to cause the Pressure Loss.

A4 Dismount the Strainer and Clean it carefully.

A5 Check the Limit Stopper of Flowmeter.
(Open the Upper CAP, and check a clogginess factor of hole on the Upper Limit Stopper in the tube of it.)

Q. Leak between the Indicator and Connection to BODY.

A1. Check the omission of the seal (O-RING) between the Indicator and Connection.

A2. Tighten down the Indicator tight bolts (M5*15mm).

Q. Impossible to read the Flow rate

A1. Open the Upper CAP and disassemble the taper tube.
Clean the inside of the taper tube with soft cloths or brush.
Put it back with caution not to omit the Upper and the Lower O-rings, CAP and ROTA in the reverse sequency of disassembling.

Q. Leak in the BODY Part

A. Tighten down the connecting bolts.

A. Check the omission of packing materials.

8. Various Installation Method