OPERATION & MAINTENANCE MANUAL

FLOW SWITCH FLOW METER

HCKB Series

Rev.1

Always The Best Solution

HITROL CO., LTD.

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1. INSTRUCTION

1 GENERAL

For the correct usage of the Flowmeter, Installation, Maintenance, Repairing 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.

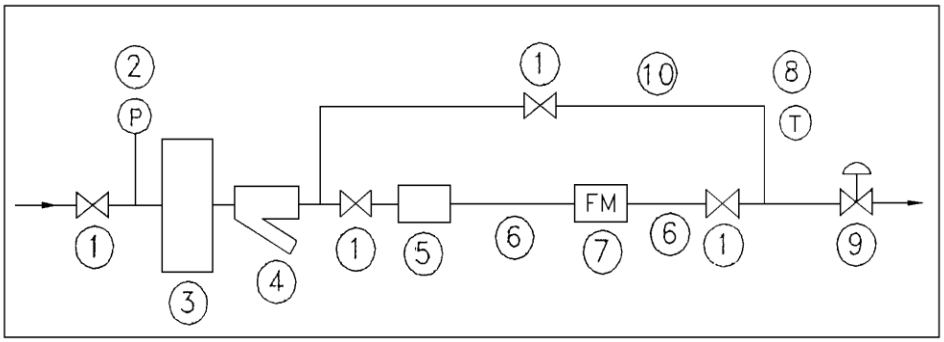
Hence, due to the Carelessness in installation and maintenance of the Flowmeter in the Process can cause the bad performance or malfunction of the whole system, the correct installation and proper maintenance program shall be set up as a part of the Process and executed by the plan.

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.

2. MODEL : HCKB Series

1. Summary

When flow of liquid comes by difference pressure from pipe line inside, it can be measured a flow-rate by moving a flapper.

Simple design and treatment used for medium or large flow rate.

2. Principle

HCKB has the application under favor of come by difference pressure from flapper and spring tension.

3. Description

(1) Size : 15A - 200A

(2) Pressure(Max) : 10Kgf/㎠ g(water)

(3) Temp : 120℃

(4) Accuracy : F . S ±5%

(5) SWITCH SPECIFICATION :

① Switching power (MAX) : 10 VA

② Switching current(MAX) : 0.5 Amp

③ Switching voltage : 100VDC : 75 VAC

④ Contact Form : 1-SPDT

⑤ Sensor : Reed Switch

4. Feature

(1) It can be a simplicity read inside of pipeline.

(2) It is a Simple design and be convenient to handle with.

(3) A small sized instrument can be measured from small to large flow rate.

(4) Easy for installation.

(5) Easy for maintenance.

5. Installation and maintenance

(1) It should be installed a correct flow direction shown on an arrow mark of the body.
(A flow direction shall be installed an arrow mark on the body)

(2) It must be used the proper straight line for flow meter as below.
(IN LET = 3D ~ 20D , OUT LET = 3D ~ 5D)

(3) For repairing and cleaning purpose, it is strongly recommended to install a by-pass function on a pipe system additionally.

(4) It needs to install a strainer for dregs and sludge.

6. Troubleshooting

※ Prior to install the flowmeter, Flushing the piping line shall be done.
It is possible to install the strainer.

Q. An incorrect indication

A1. Check if the flow of fluid is normal.

A2. In case of gas, check out the working pressure with standard pressure
< Working pressure is posterior to installation flow meter >

A3. Check if there is any dregs or sludge of the inside flow meter

A4. Clean up the strainer

Q . When the needle does not move

A1. (1) Open the cover.
(2) Check if there is any dreg or sludge of the inside flow meter
(3) Check if the magnet is detached from needle.

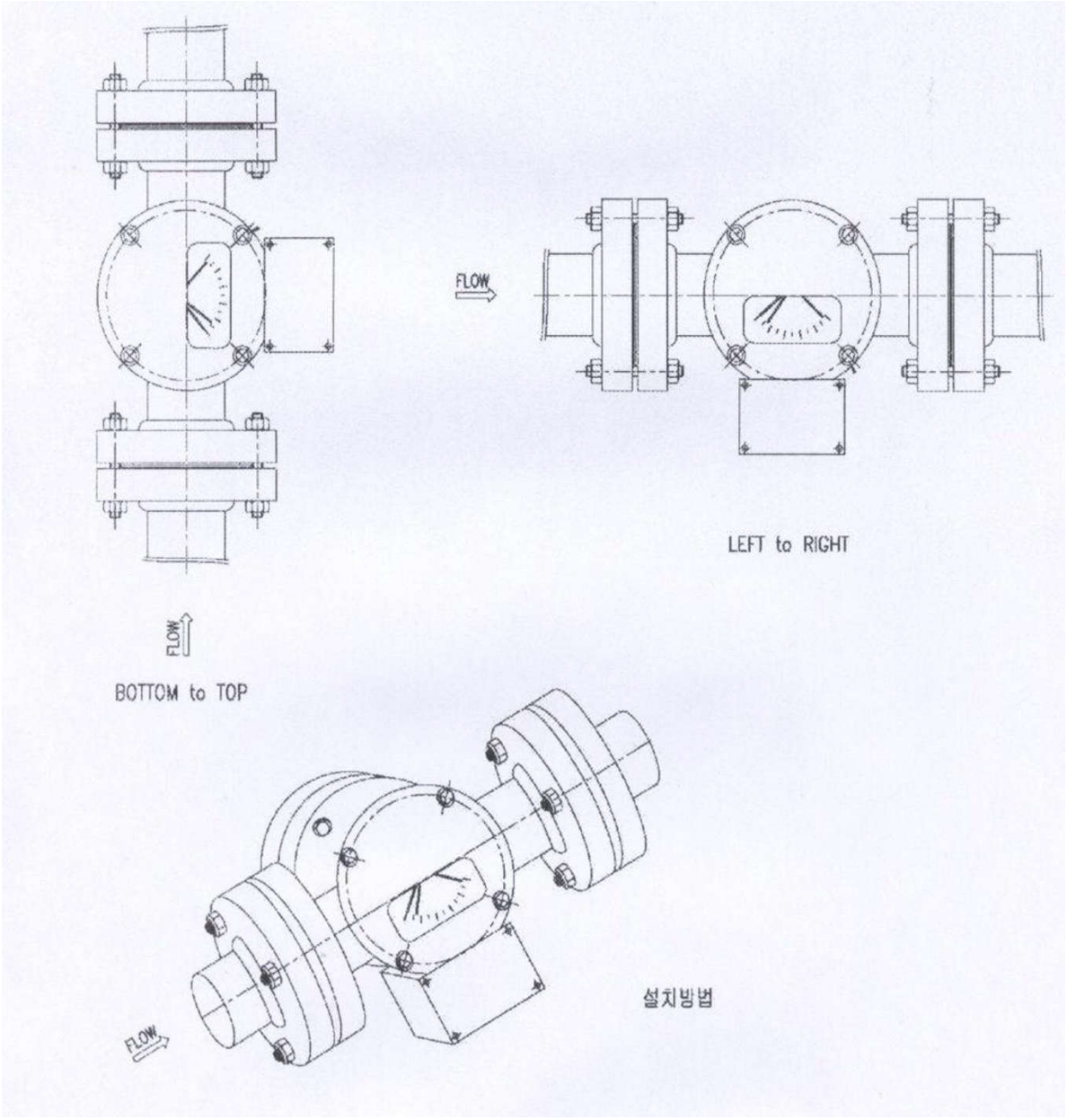
Q. When the Alarm does not operate

A1. Check the installed wires with the wiring diagram.

A2. Open the cover and confirm if the Reed switch is fixed in the correction position of needle.

A3. Check if the magnet is detached from needle.

7. Installation



8. Wiring Diagram(HCKB Series)

(1) CABLE LINE

N,C	COM	N,O
PURPLE	YELLOW	GRAY

(2) WIRING METHOD

- In “LOW” state, connect NC and COM to make
- In “HIGH” state, connect NO and COM to make .