



FloCat Flange-type Electromagnetic Flow Meter

Installation and Wiring Manual

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Inspection upon Receipt

Every electromagnetic flowmeter passed strict calibration testing and inspection before leaving factory. Please follow the guidelines below when receiving your order.



- (1) If shipping box shows sign of damage, have the carrier present and unpack the flowmeter. If the meter was damaged during shipping, file a claim with the carrier, and contact your vendor as soon as possible.
- (2) Open the shipping box, find the *Packing List* sheet, and check if the items in the box match the list sheet. If anything is missing, contact your vendor.
- (3) Read the model number on the nameplate, and verify if it is same as described in your purchase order. If it is different, do NOT proceed or install the meter, and contact your vendor as soon as possible.
- (4) If you have any doubt on the received meter, do NOT proceed or install the meter, and contact your vendor as soon as possible.

Storage



- If you need to store flowmeter for an extended period after receipt,
- Keep flowmeter in the original box.
- Do not put flowmeter under the rain.
- Do not put flowmeter in place with continuous vibration.
- Do not open junction box on sensor and transmitter in order to avoid moisture.
- Ambient temperature: $-20^{\circ}\text{C} \sim 60^{\circ}\text{C}$
- Relative humidity: 5%~90%

Before Installation

Please read following carefully before installing flowmeter:

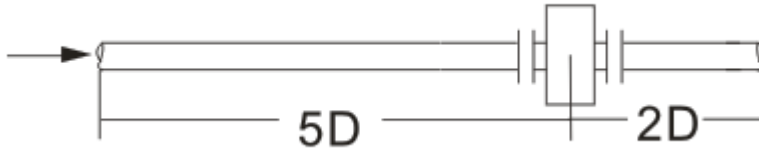
- Be careful to not damage meter when opening the box. It is suggested to open the box after products at job site. Hang flowmeter by installation rings..
- Do not press or damage the surface of lining. If lining is damaged, flowmeter may not work properly.
- Protect flange surface. Do not place flange on ground without any protection.
- Do not open wire connection box before wiring.
- Preparing pipeline: dross usually exists inside new pipeline (for example welding dross). It is important to remove dross before installing flowmeter to avoid damage to lining and causing measuring error.

Installation of Flowmeter on Pipeline

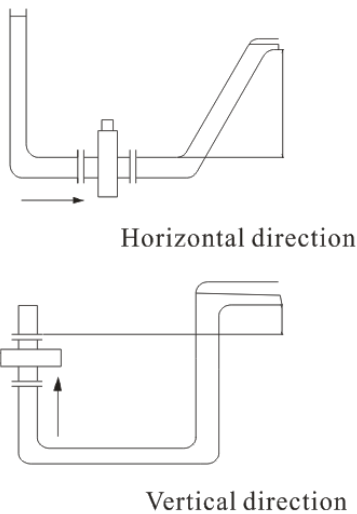
- (1) Install flowmeter in a place where there is no direct sunshine and ambient temperature is $-20 \sim +60^{\circ}\text{C}$. If meter is installed close to heat source, use heat insulation in between or use ventilation device.
Do NOT install meter in an environment filled full of strong corrosive air and explosive air (for non-explosion-proof type flowmeter).
Do NOT install meter near an electromagnetic field, such as electromotor and transformer.

If protection rating is IP65, do NOT install meter under water; For IP67, do NOT install under water over 1 meter; for IP68, do NOT install under water over 5 meters.

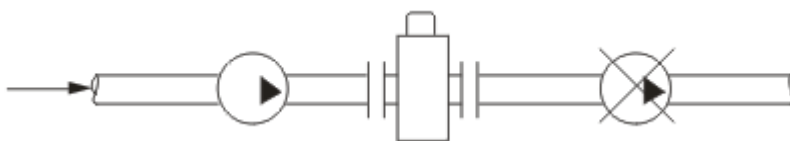
- (2) To ensure measurement accuracy, the upstream pipe of flowmeter must be straight for at least $5D$, and the downstream must be straight for at least $2D$, where D is the diameter of the pipe.



- (3) Do not install flowmeter on vibrating pipe. Pipe should be fixed with an installation foundation. For underground installation, supporters are required at the two ends of the pipeline.
- (4) Flow direction: flowmeter can self-check forward/reverse flow, and the flow arrow on sensor indicates forward flow direction. User should ensure the flow arrow same as the actual flow direction when installing the meter.
- (5) Installation orientation: sensor can be installed horizontally or vertically.



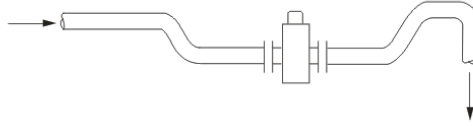
- (6) Pipe must be fully filled with fluid. Ensure electrodes completely immerse into flow liquid to achieve good measurement accuracy.
- (7) Do not install flowmeter on pumping side.



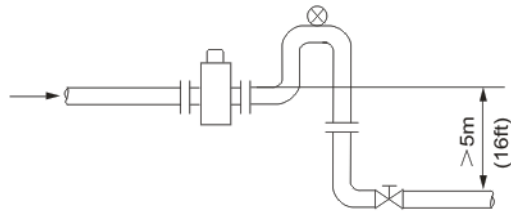
- (8) For long pipeline, control valve is usually installed at downstream of flowmeter.



(9) For pipe with opening end, flowmeter should be installed at the lower section on pipeline.



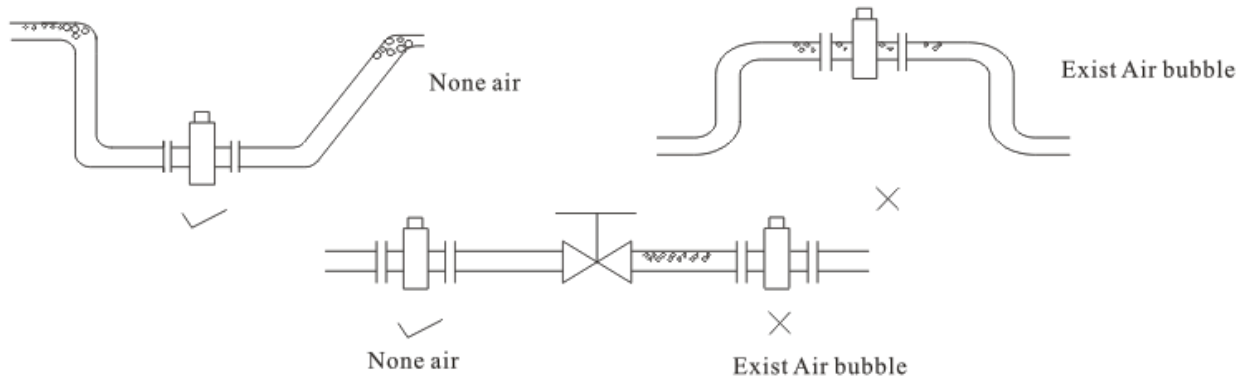
(10) For pipe exceeds 5 meters vertically, air valve (vacuum) should be installed at downstream flowmeter.



(11) No air bubble in pipeline

Flowmeter should be installed on the upstream before the valve. Due to the action of valve, the pressure inside the pipeline may decrease and cause air bubbles.

Flowmeter should be installed on the lower section of pipeline to prevent air bubbles.



(12) Liquid conductance

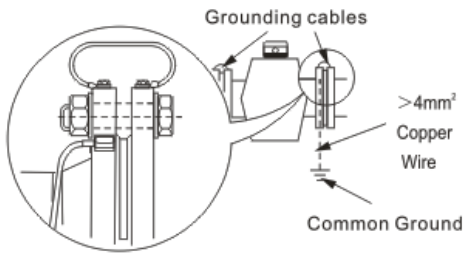
Don't install flowmeter at the place where conductance fluctuates.

Filling chemical liquid on the upstream from flowmeter will easily cause liquid conductance to vary irregularly, which may result in false reading on flowmeter. It's suggested to fill chemical liquid on the down-stream. If filling chemical liquid on the upstream cannot be avoided, ensure that the length of the straight pipe before flowmeter is at least 5 times of the upstream section, so that liquid can be adequately mixed on the upstream.

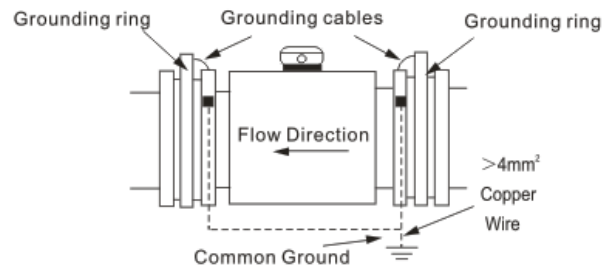
(13) Ground Connections for Sensor

★Notice: Since inductive signal generated from flow is very faint, it is very important to have a good earth connection, in order to avoid interference.

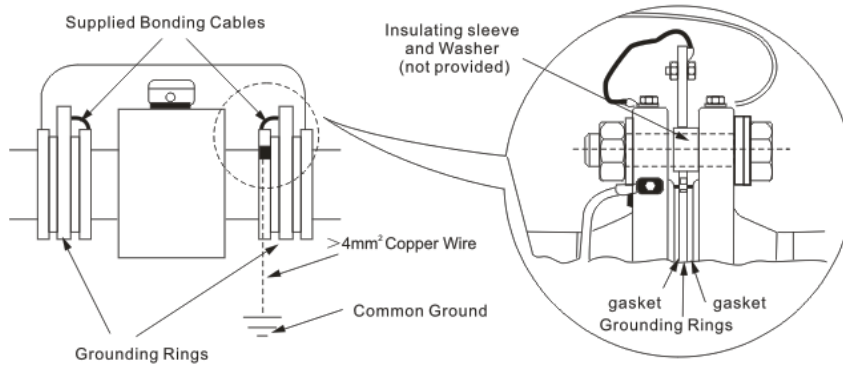
The following diagrams show the grounding connection methods for sensor in the different conditions:



A. Metal pipe grounding



B. Plastic pipe grounding



C. Pipeline with cathode protection

(14) Ground Connections for Transmitter

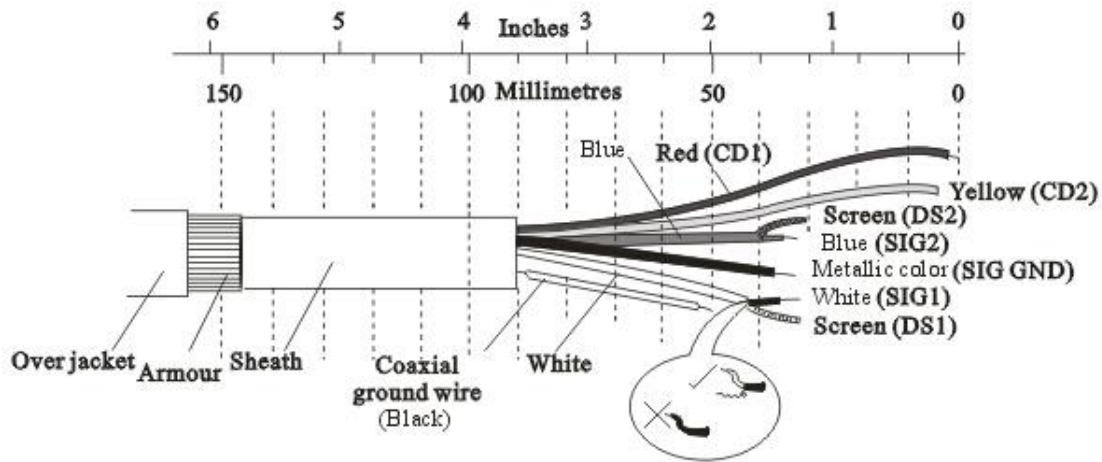
Just connect the housing of transmitter to earth with copper wire.

Wiring

1. Cable

Cable is for remote version of flowmeter only. No cable wiring is needed for integral version.

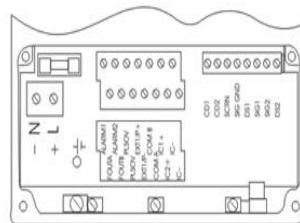
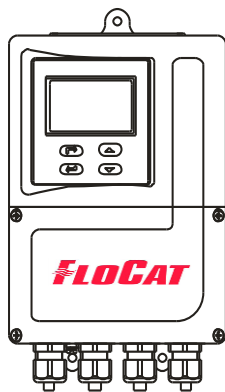
- Working temperature: $-25^{\circ}\text{C} \sim 70^{\circ}\text{C}$
- Cable's specification and colors are as shown below:
- The diameter of cable is $11.5 \pm 0.5\text{mm}$.



2. Wiring in Regular (non-explosion proof) Transmitter

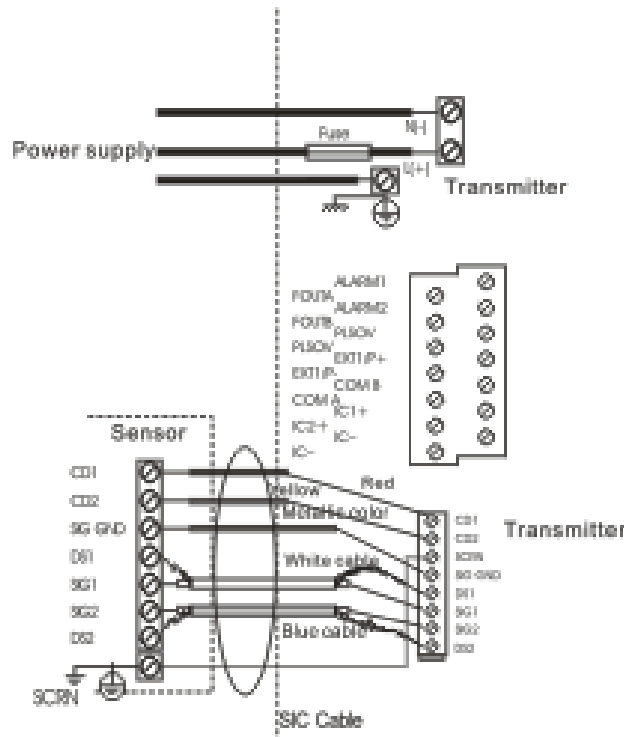
Note: The junction box on sensor has been filled with the sealing glue in the factory. So user normally does not need to wire cable on sensor.

Open the cover of transmitter junction box, the connecting terminals is shown below.



For integral version, the connections between sensor and transmitter are completed by the manufacturer. For remote version, the connections can be done by the manufacturer as well, if user requests.

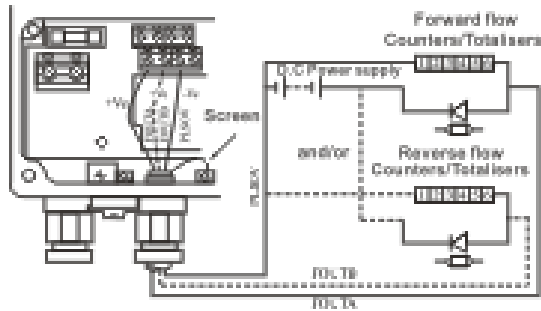
Refer to the following diagrams for wiring in transmitter junction box. Diagram A ~ E are the connections for outputs.



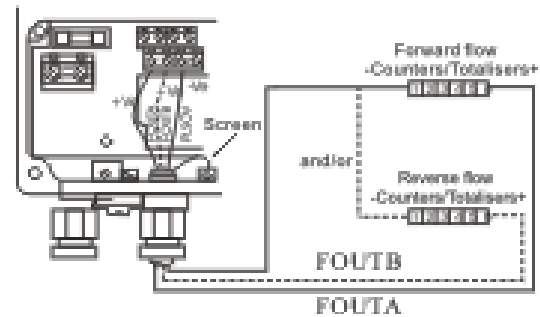
★Note

- (1) Connections between sensor and transmitter must be correct and in good contact, free from short circuit and open circuit.
- (2) Do not connect wires outdoor under rain.
- (3) Do not add other power supply to the 4~20mA output.

A. Frequency outputs

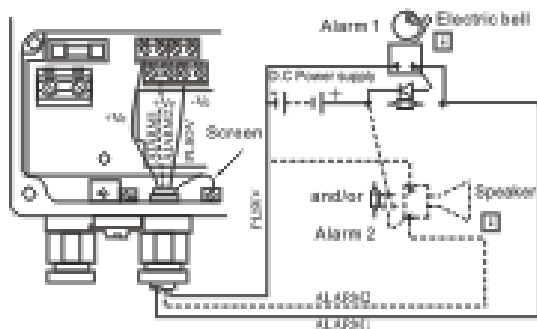


Electromagnetic counter connection

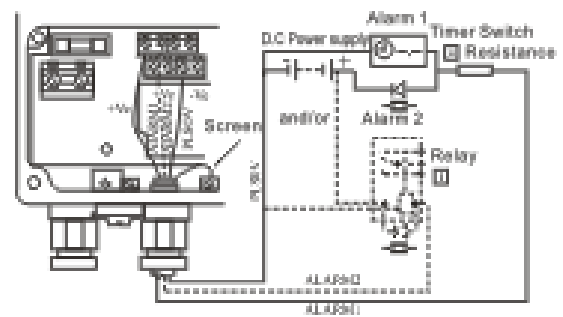


Telemetry, electronic counters etc.

B. Alarm output connections

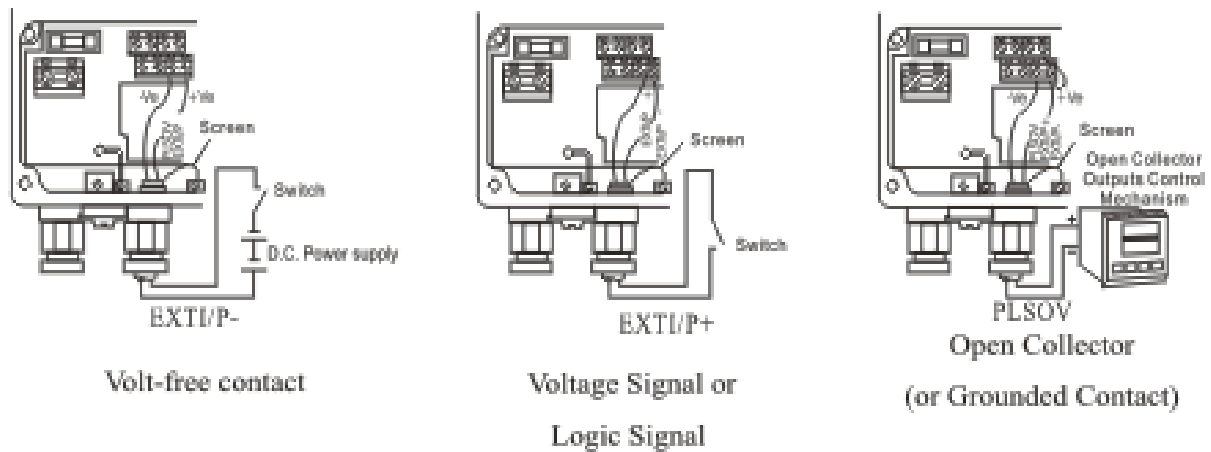


Alarms (1)

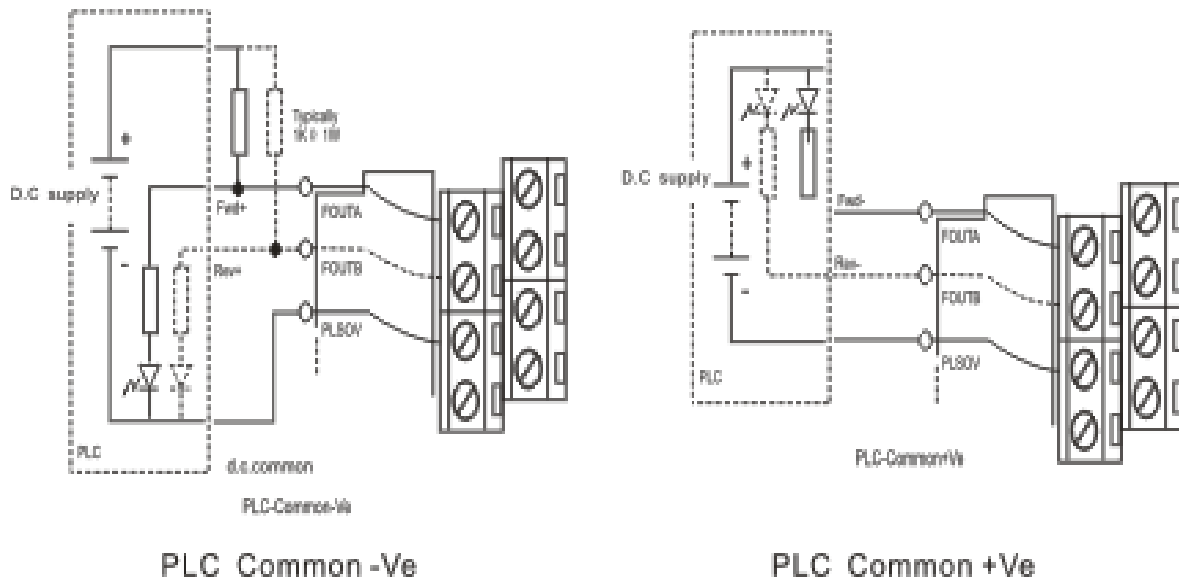


Alarms (2)

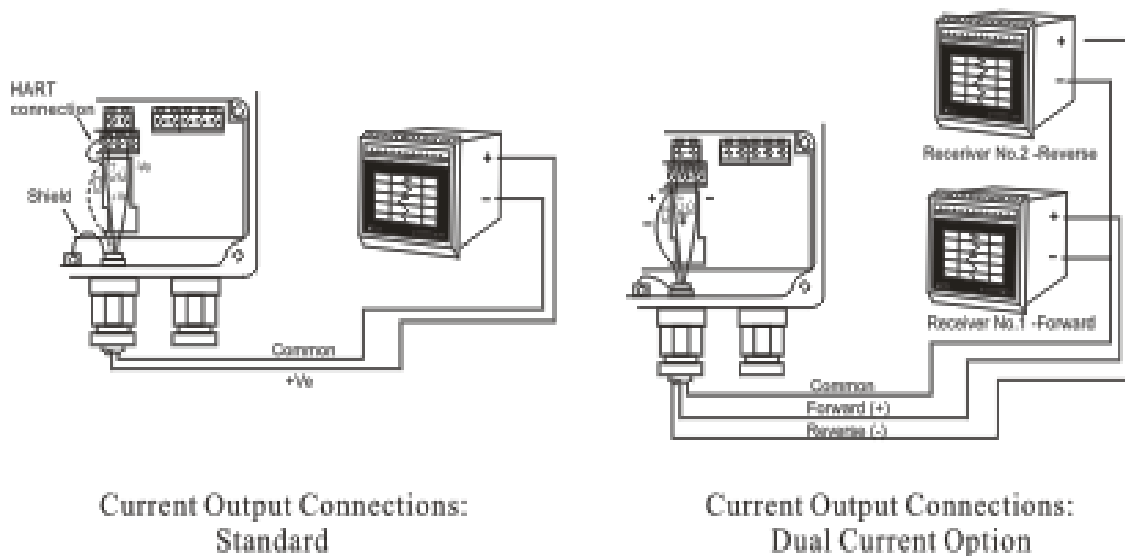
C. Contact input connections



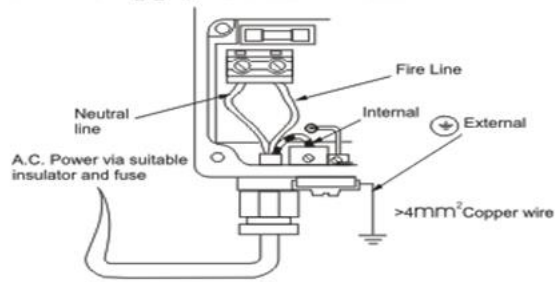
D. PLC Interface



E. Current Output Connections



F. Power Supply Connections

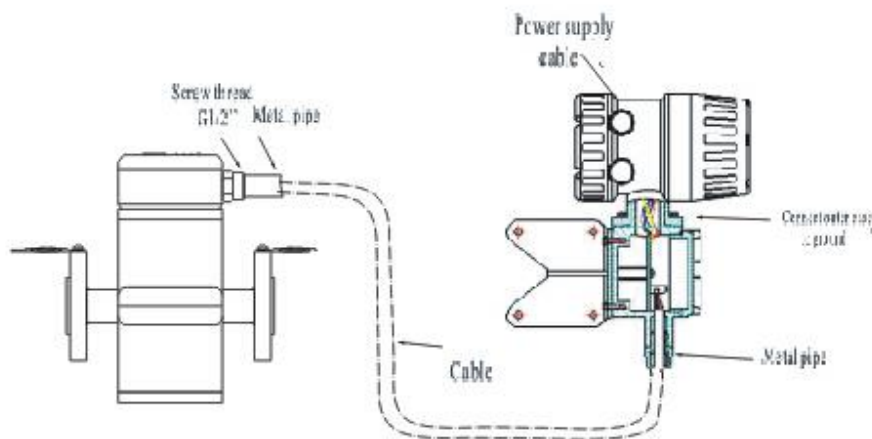


A.C. Power Supply Connections (AC220V)

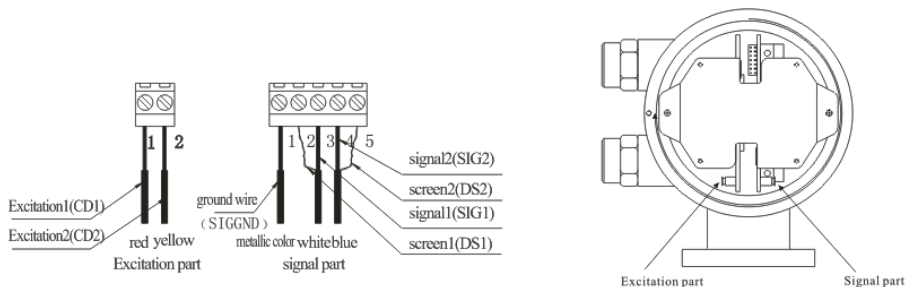
3. Wiring in Explosion Proof Transmitter

Note: The junction box on sensor has been filled with the sealing glue in the factory. So user normally does not need to wire cable on sensor.

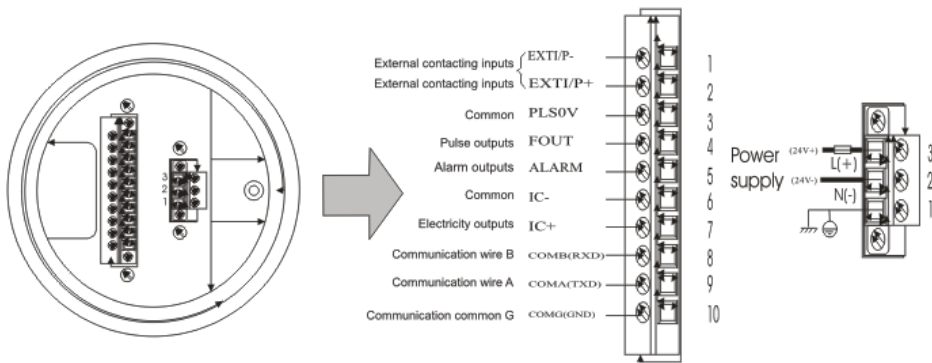
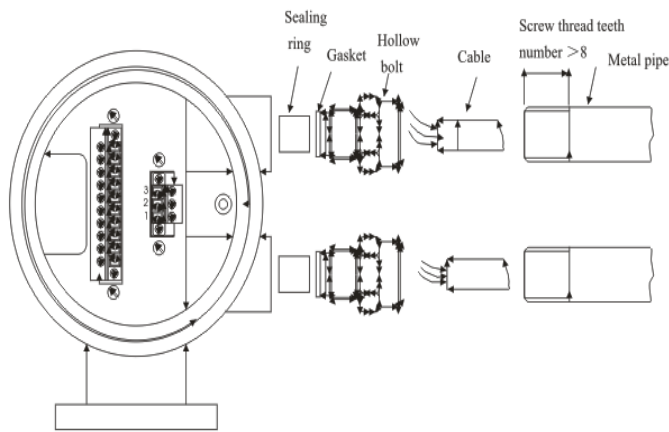
For integral version, the connections between sensor and transmitter are completed by the manufacturer. For remote version, the connections can be done by the manufacturer as well, if user requests. Use the cable supplied by the factory.



For remote explosion proof transmitter, there are two junction boxes. The upper one is for outputs, and the lower one is for cable connection to sensor. The connection terminals in the lower junction box are shown as below:



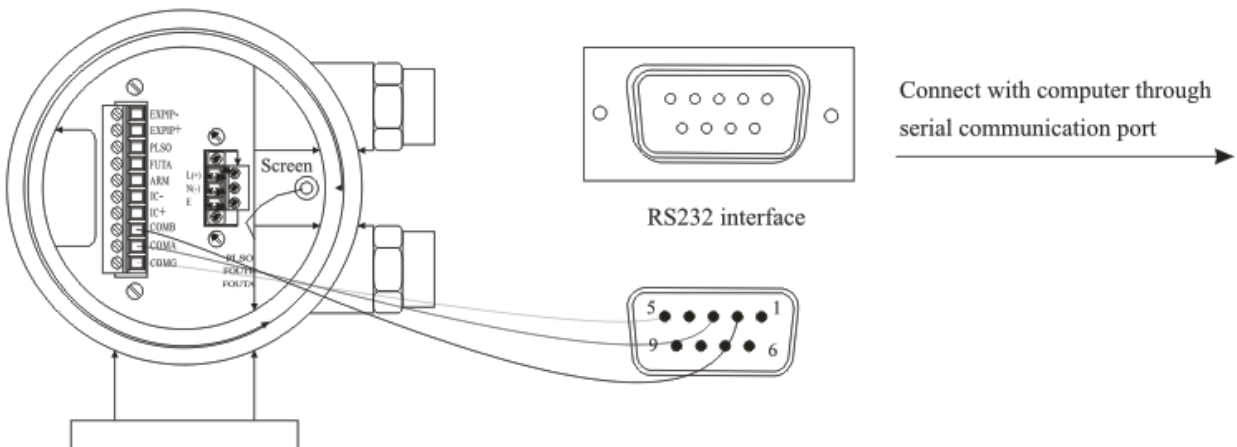
The following diagrams show the connections in the upper junction box:



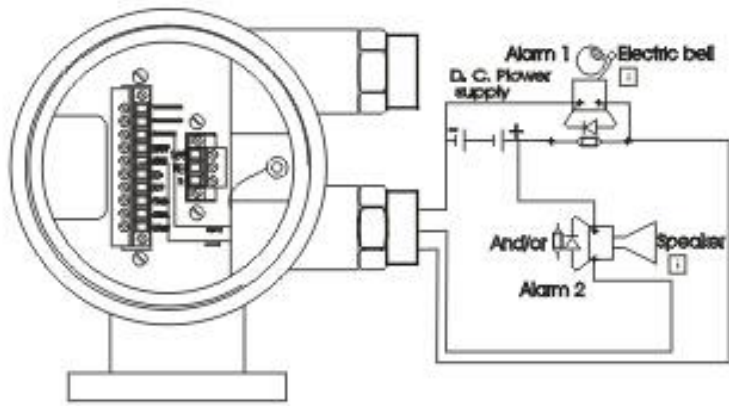
★Notice: Please disconnect the power supply when wiring.

The following diagrams show the output connections in the upper junction box:

A. RS232 connections

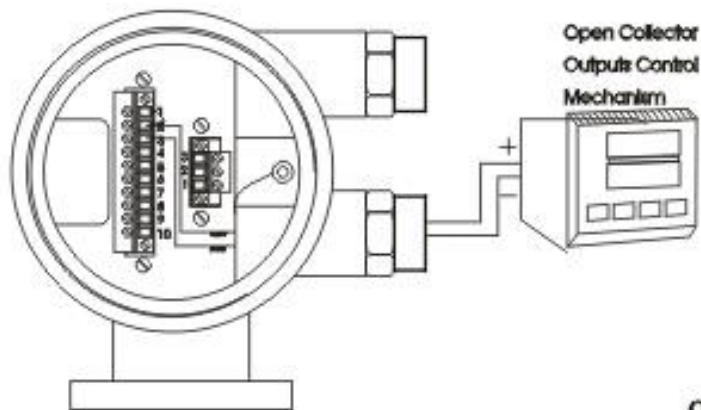


E. Alarm output outputs connetions

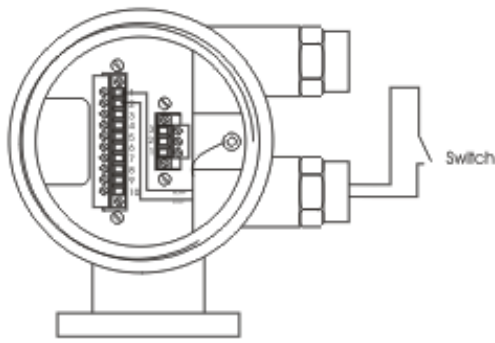


Telemetry, electronic counters etc.

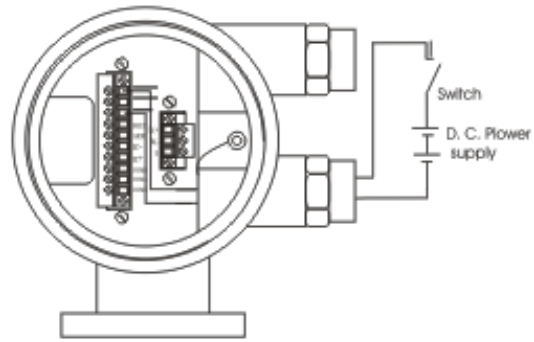
F. Contact input connections



Open Collector (or Grounded Contact)

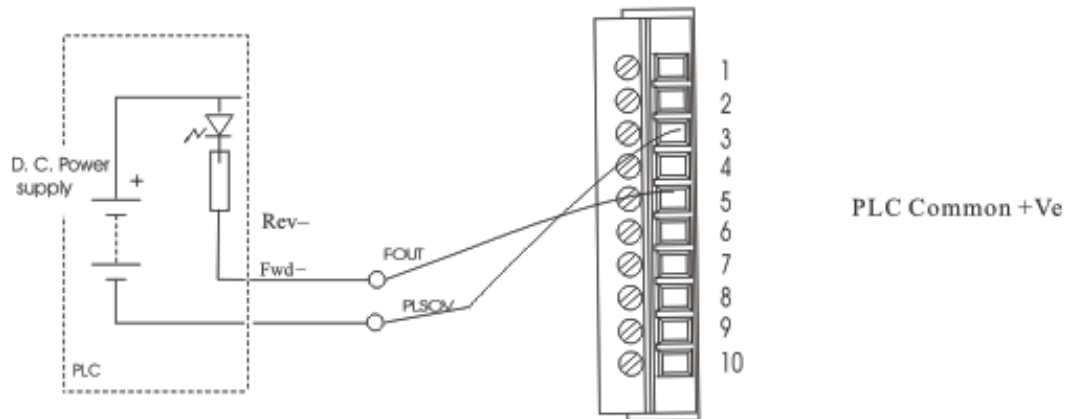
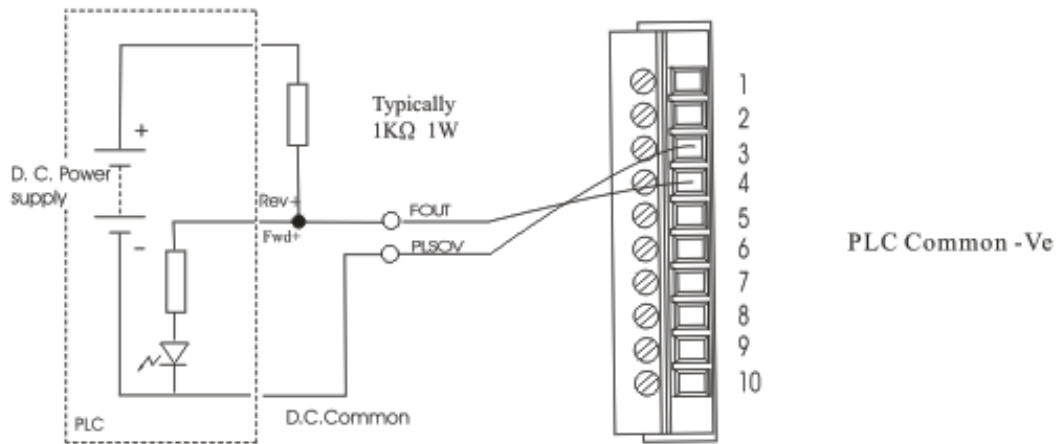


Volt-free contact

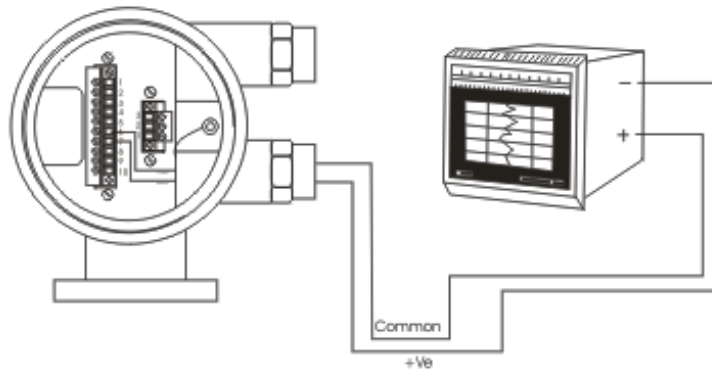


Voltage Signal or logic signal

G. PLC interface

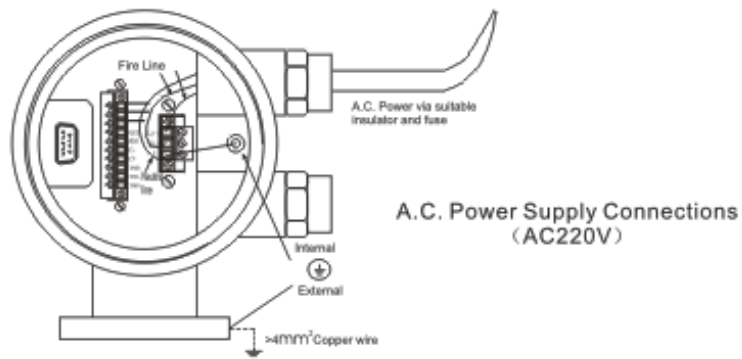


H. Current output connections



Current Output Connections: Standard

I. Power Supply connections

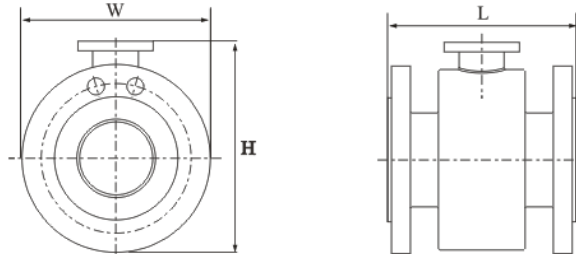


A.C. Power Supply Connections (AC220V)

Spec Sheet

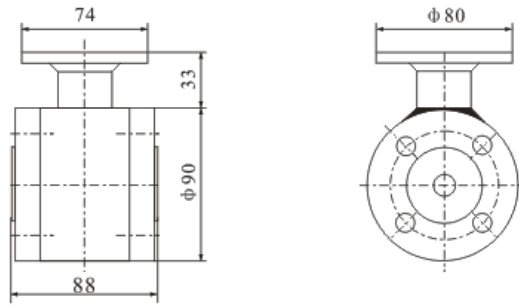
1. Dimensions and Weight of Sensor (Flange-type)

- Common Sizes:



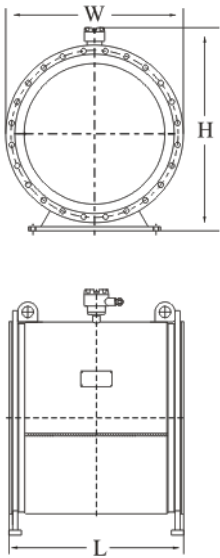
Nominal size (mm) (inch)		Dimension(mm)			Approx weight (kg)			
		L	W	H	145psi	232psi	363psi	580psi
10		134	90	123	3.5	3.5	3.5	3.5
15		134	95	126	4	4	4	4
20	3/4	200	128	137	4	4	4	4.5
25	1	200	128	147	5	5	5	5.5
32	1 1/4	200	128	155	7	7	7	8
40	1 1/2	200	128	165	7.5	7.5	8	8.5
50	2	200	165	187	9	9	9.5	10
65	2 1/2	200	185	202	11	11	12	14
80	3	200	200	223	14	14	15	19
100	4	250	220	249	19	19	20	24
125	5	250	250	278	24	24	25	30
150	6	300	285	303	32	32	35	42
200	8	350	340	358	41	41	46	56.5
250	10	450	405	418	68	68	73	85
300	12	500	460	468	89	89	97	113
350	14	550	562	560	97	97	124	---
400	16	600	596	614	122	122	157	---
450	18	600	640	656	161	161	200	---
500	20	600	715	715	180	180	243	---
600	24	600	810	810	241	241	285	---

- Small sizes:



Nominal size (mm)	Dimension(mm)			Approx weight(kg)			
	L	W	H	145psi	232psi	363psi	580psi
2.5	88	90	123	3	3	3	3
5	88	90	123	3	3	3	3

- Large Sizes:



Nominal size (mm) (inch)		L	W	H	Approx weight (kg)
700	28	700	895	995	420
800	32	800	1015	1115	541
900	36	900	1115	1215	668
1000	40	1000	1230	1350	858
1200	48	1200	1405	1505	990
1400	56	1400	1630	1730	1362
1600	64	1600	1830	1930	1754
1800	72	1800	2045	2145	1890
2000	80	2000	2266	2365	2105
2200	88	2200	2475	2364	3210
2400	96	2400	2685	2564	3910

2. Technical Specifications

Flange: ANSI 150. Carbon (Stainless also available)

Sizes: DN15 ~ 600mm (24"). Smaller and larger sizes also available

Sensor Housing Material: Carbon steel

Pressure rating: 145 psi, 232psi, 363psi, 580psi

Accuracy: $\pm 0.75\%$

Sensor Lining: Chloroprene rubber, PTFE, PFA, FEP

Minimum Conductivity: 5 $\mu\text{S}/\text{cm}$

Flow velocity range: ~ 20m/s (suggest 0.5m/s at minimal for best accuracy)

Electrode Material: 316L stainless, Hastelloy C, Ti, Ta, Pt-Ir Alloy

Ambient Temperature: -25 to 60°C (-13 to 140°F)

Liquid Temperature: -25 to 140°C (-13 to 284°F) depending on lining

Communications: Standard: 4-20mA and Pulse. Optional: HART, RS485, Profibus PA

Power: 100-230v AC, 11-40v DC

Protection: IP65, IP67

Cable Entry: M20x1.5