

FLOCAT

FloCat MFE Electromagnetic Flow Meter

INSTALLATION AND WIRING MANUAL



FLOGAT MFE Electromagnetic Flowmeter



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.

- If the shipping box shows sign of damage, have the carrier unpack the flowmeter. If the meter was damaged during shipping, file a claim with the carrier, and contact your vendor as soon as possible.
- Open the shipping box, find the Packing List, and check if the items in the box match the list. If anything is missing, contact your vendor.
- Verify that the model number on the nameplate matches that on your purchase order. If it is different, do NOT proceed or install the meter, and contact your vendor as soon as possible.
- If you have any doubts about the meter you received, DO NOT proceed or install the meter. 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 to 60°C
- Relative humidity: 5 to 90%

Before Installation

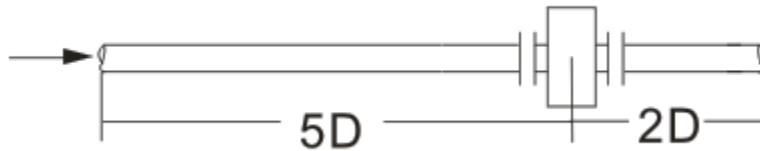
Please read following carefully before installing flowmeter:

- Be careful to not damage meter when opening the box. It is suggested you open the box at the job site. Hang the flowmeter by the installation rings.
- Do not press or damage the liner. If the lining is damaged, the flowmeter may not work properly.
- Protect the flange surface. Do not place the flange on the 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 errors.

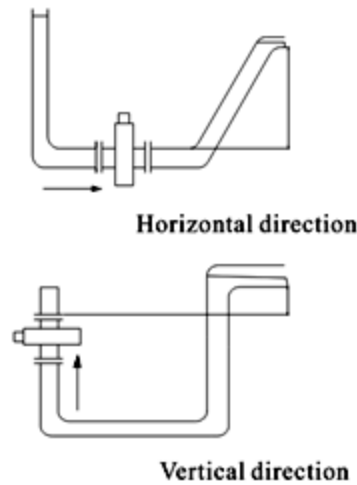
Installation of Flowmeter on Pipeline

1. Install the flowmeter in a place where there is no direct sunshine and ambient temperature is -20 to 60°C. If the meter is installed close to a heat source, protect with insulation or use a ventilation device.
 - Do NOT install the meter in an environment filled with strong corrosive air or explosive air (for non-explosion-proof type flowmeter).
 - Do NOT install the meter near an electromagnetic field, such as electromotor or transformer.

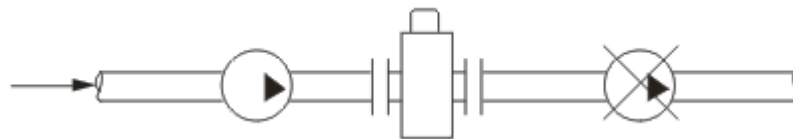
- If the meter's protection rating is IP65, do NOT install meter under water; For IP67, do NOT install under water over 1 meter; for IP68, do NOT install under water over 5 meters.
2. To ensure measurement accuracy, the upstream pipe of flowmeter must be straight for at least 5D, and the downstream must be straight for at least 2D, where D is the diameter of the pipe.



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



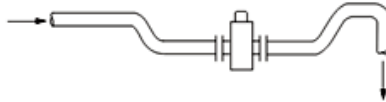
6. Pipes must be fully filled with fluid. Ensure electrodes are completely immersed into the flow liquid to achieve good measurement accuracy.
7. Do not install the flowmeter on the pumping side.



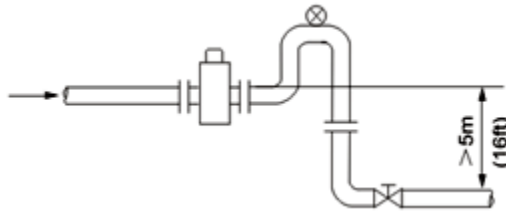
8. For long pipelines, the control valve is usually installed downstream of the flowmeter.



9. For pipes with an open end, the flowmeter should be installed at the lower section on pipeline.

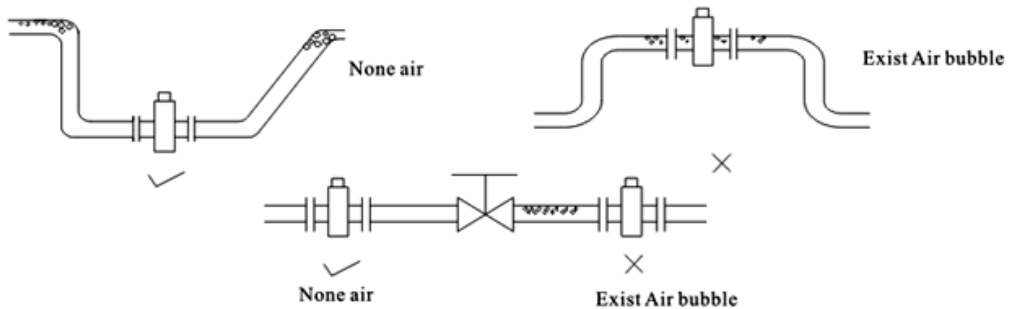


10. For pipes exceeding 5 meters vertically, air valve (vacuum) should be installed at downstream flowmeter.



11. No air bubbles in the pipeline

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



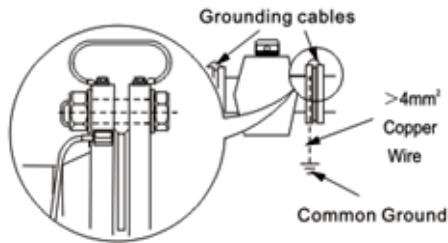
12. Liquid conductance

- Don't install the flowmeter at a 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.

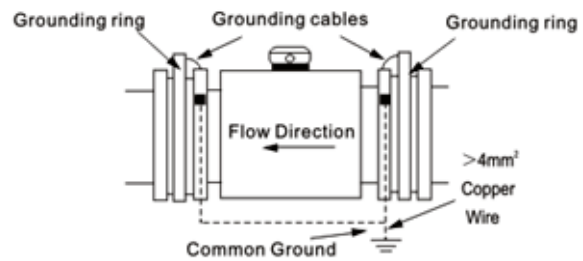
13. Ground Connections for Sensor

★ 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.

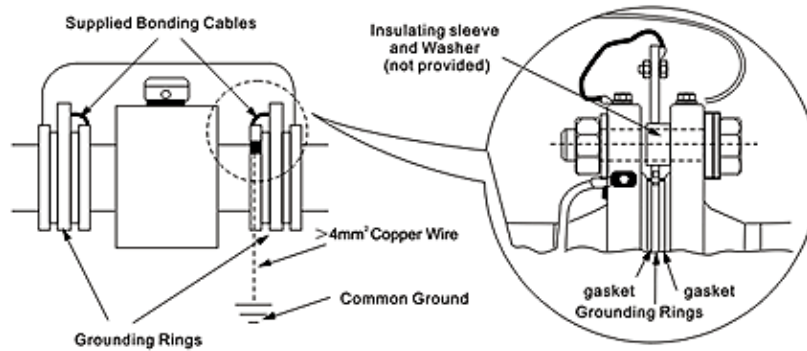
The following diagrams show the grounding connection methods for sensor in the different conditions:



A. Metal pipe grounding



B. Plastic pipe grounding



C. Pipeline with cathode protection

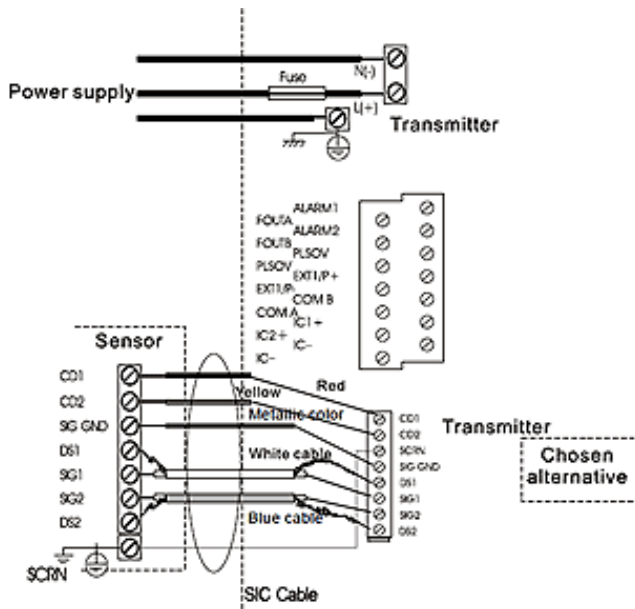
14. Ground Connections for Transmitter

- 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.)

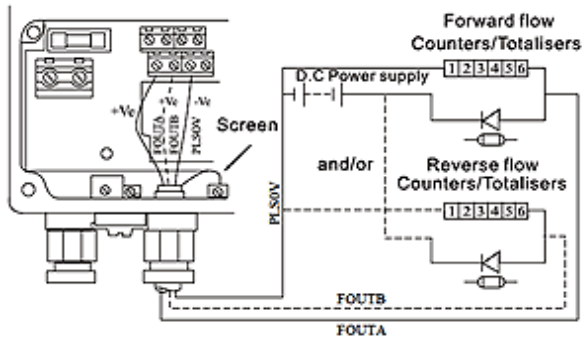
- Working temperature: -25 to ~70°C
- Cable's specification and colors are as shown below
- The diameter of cable is 11.5±0.5mm.



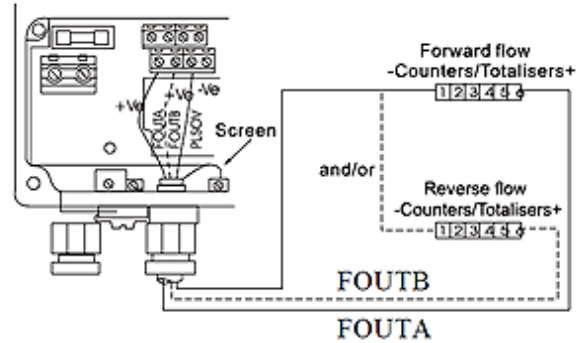
★Note★

- (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 outdoors under rain.
- (3) When wiring is completed, screws must be securely tightened on the transmitter junction box in order to maintain good seal.
- (4) Do not add other power supply to the 4-20mA output.
- (5) Voltage fluctuation must be lower than +/-10%.
- (6) External fuse: rated current 20A.

A. Frequency Outputs:

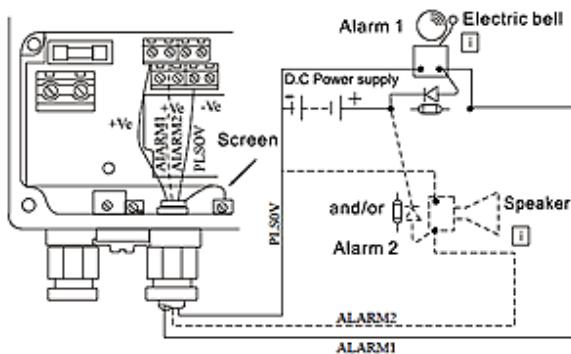


Electromagnetic counter connection

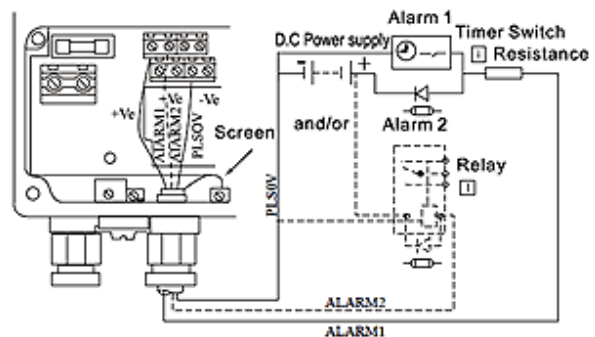


Telemetry, electronic counters etc.

B. Alarm Output Connections:

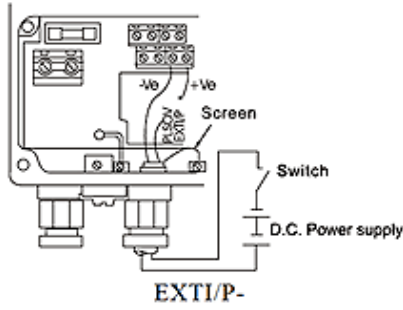


Alarms (1)

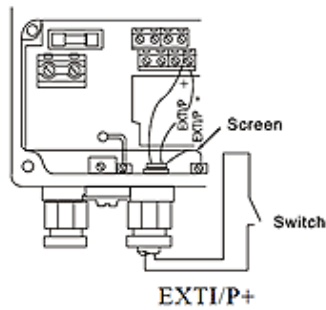


Alarm (2)

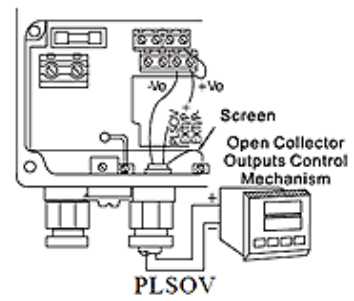
C. Contact Input Connections:



EXTI/P-
Volt-free contact

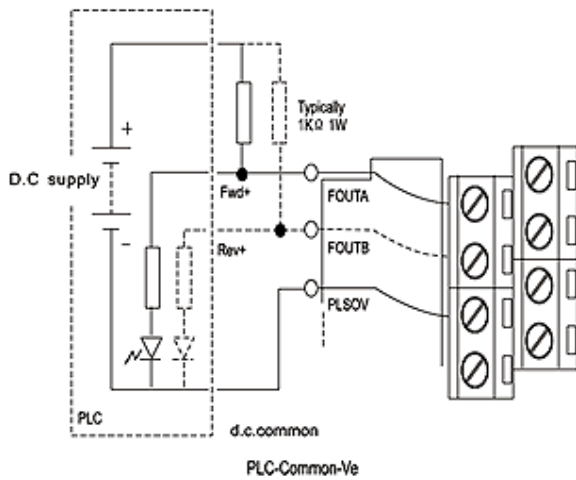


EXTI/P+
Voltage or Logic Signal

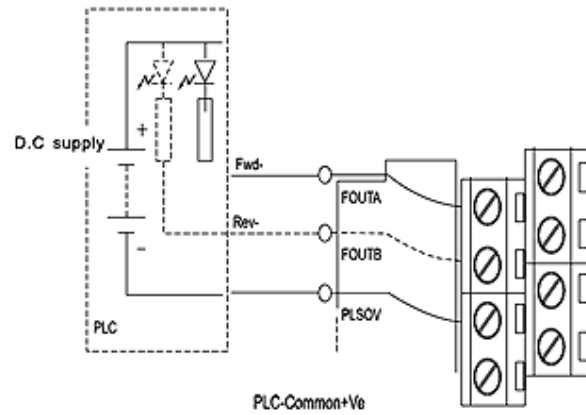


PLSOV
Open Collector
(or Grounded Contact)

D. PLC Interface

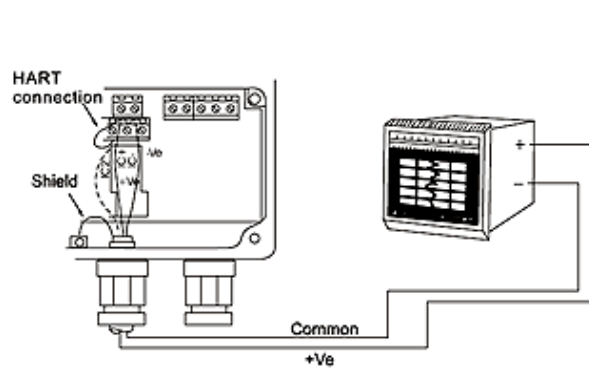


PLC Common - Ve

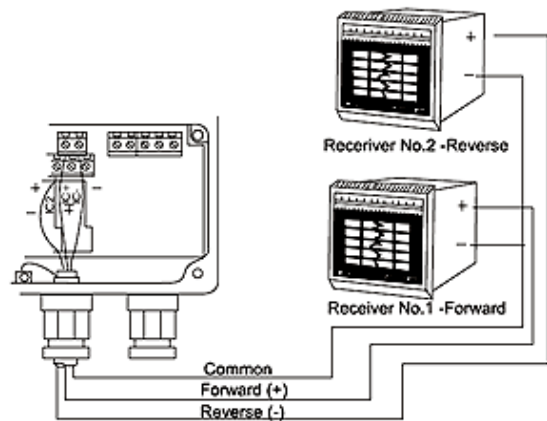


PLC Common + Ve

E. Current Output Connections

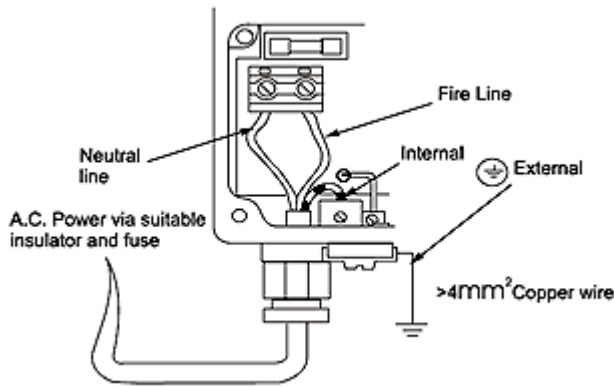


Current Output Connections (Standard)



Current Output Connections (Dual Current Option)

F. Power Supply Connections



A.C. Power Supply Connections (AC 220V)

★Note★

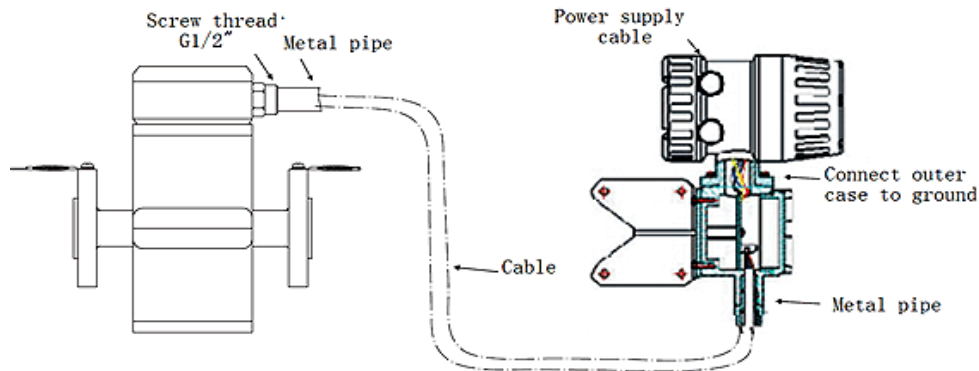
Fuse Parameters:

- Nominal Voltage: 250v
- Nominal Current: 0.5A
- Size: 20 x 5mm
(Length x Diameter)

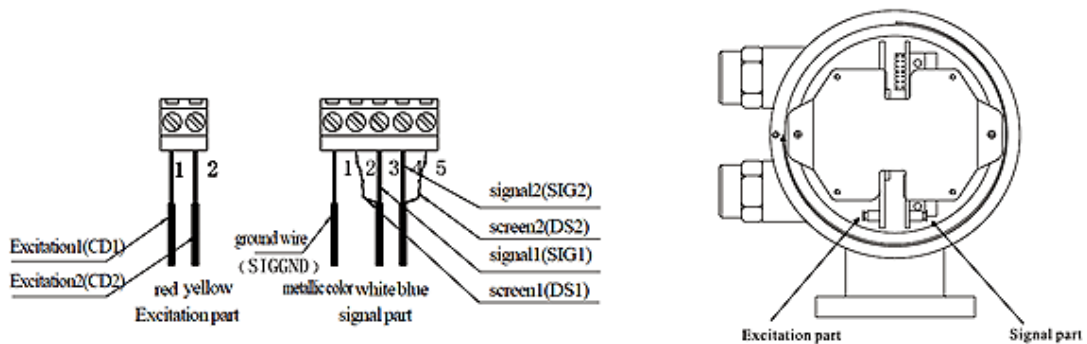
Wiring in Explosion Proof Transmitter

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

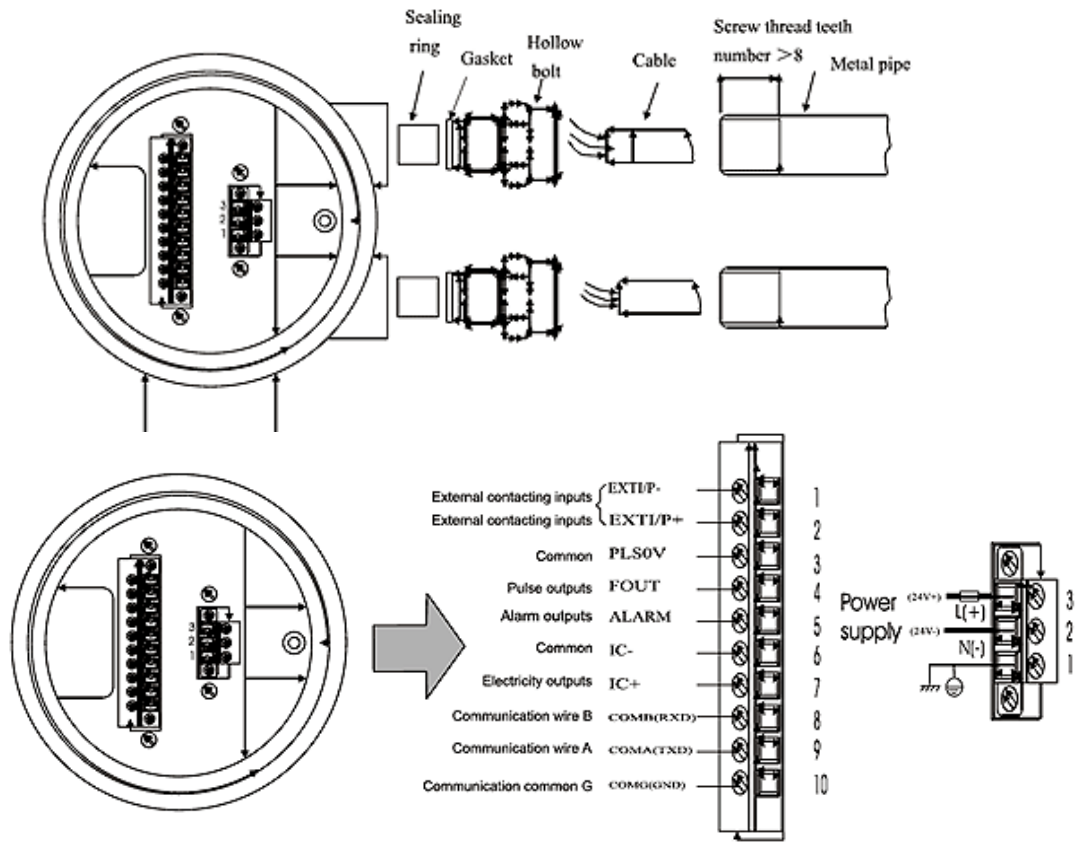
For integral mounting, the connections between sensor and transmitter are completed by the manufacturer. For remote mounting, the connections can be done by the manufacturer as well, if user requests. Use the cable supplied by the factory.



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



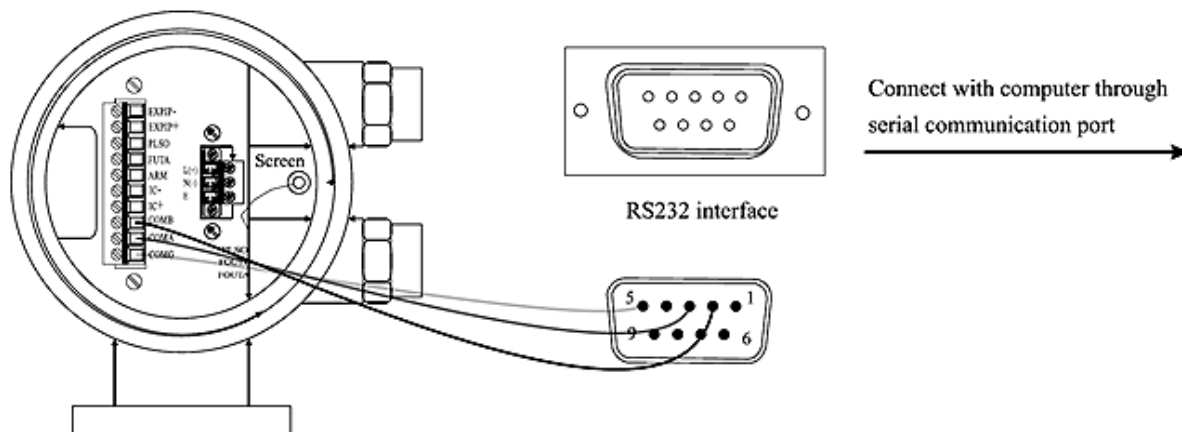
The following diagrams show the connections in the upper junction box:



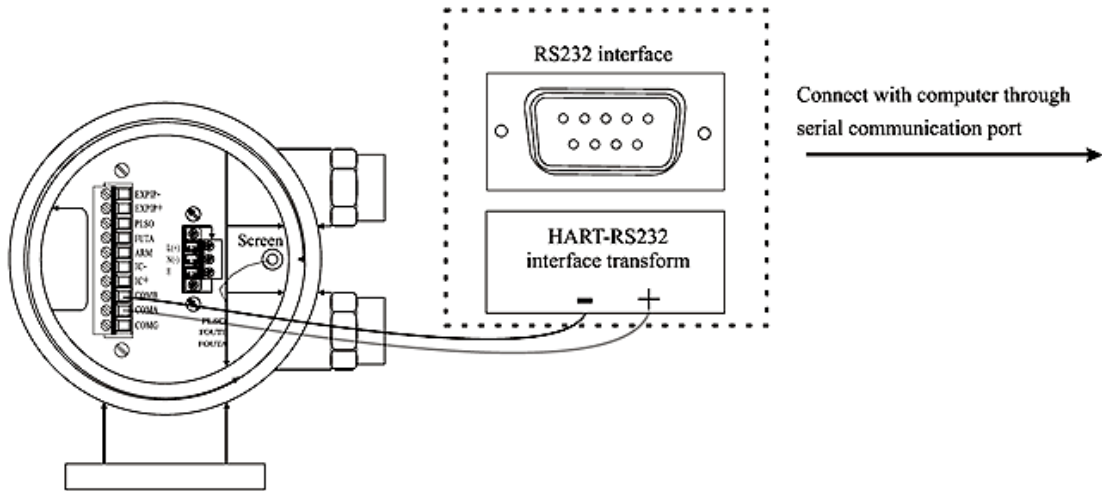
★Notice: Please disconnect the power supply when wiring.

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

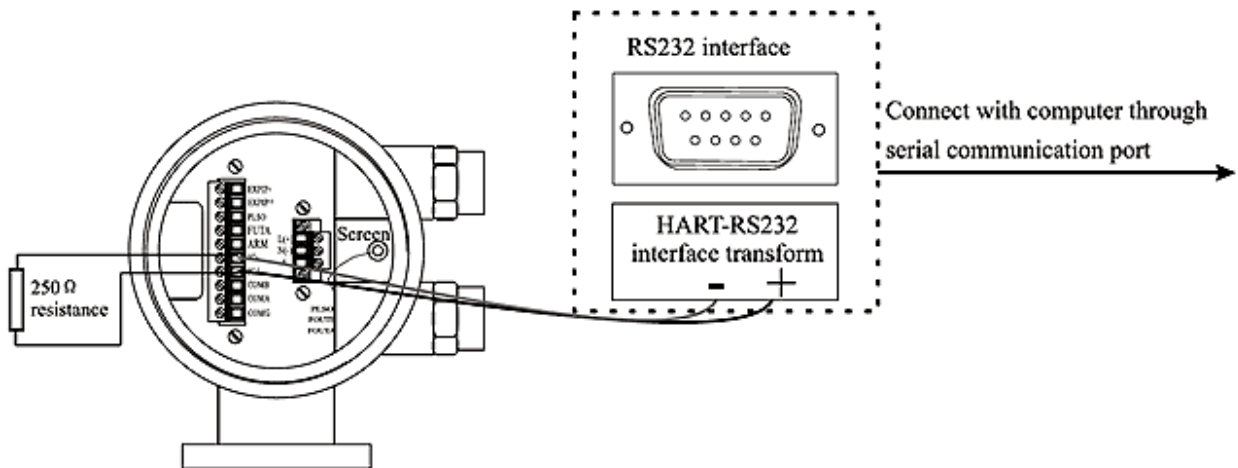
A. RS232 Connections



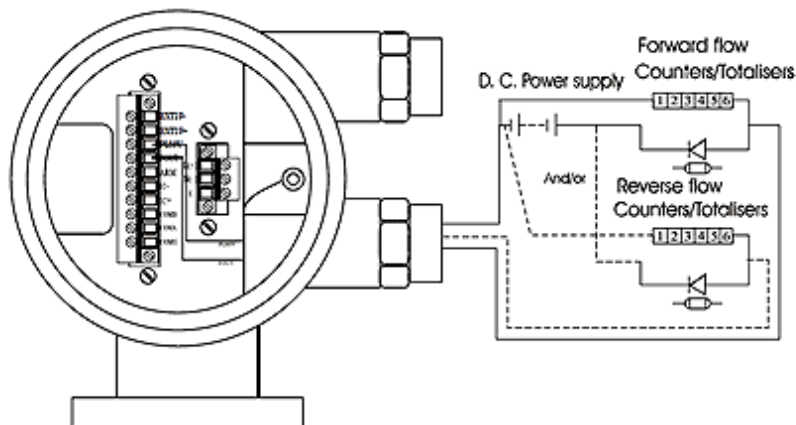
B. RS485 Connections



C. HART Connections



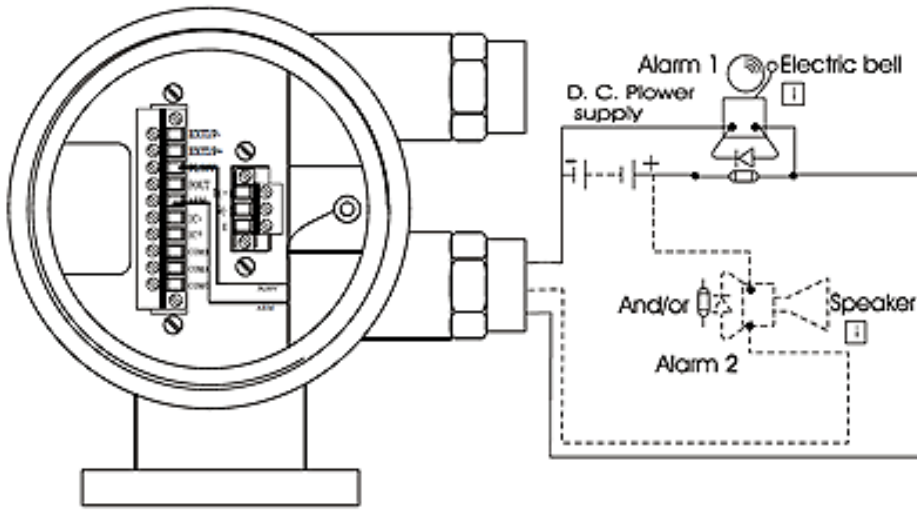
D. Frequency Outputs Connections



Elect

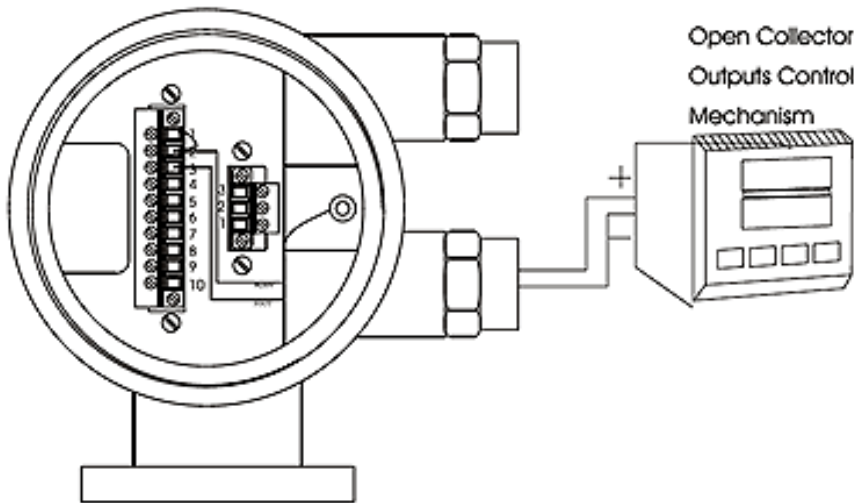
magnetic Counters

E. Alarm Output Connections

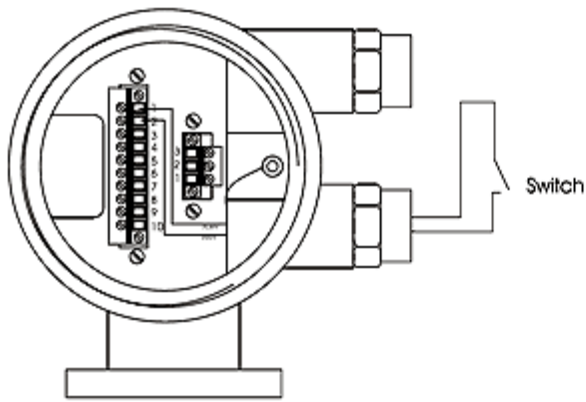


Telemetry, Electronic Counters, Etc

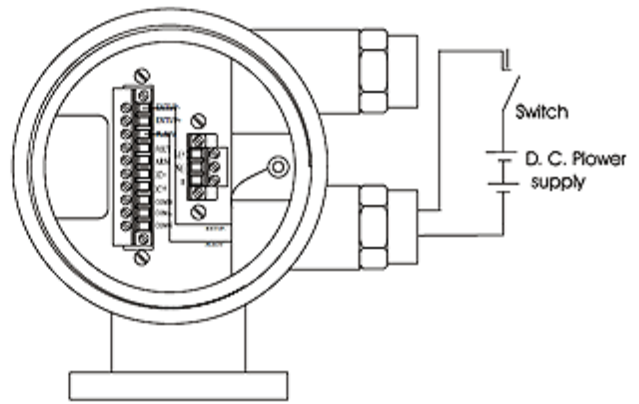
F. Contact Input Connections



Open Collector (or Grounded Contact)

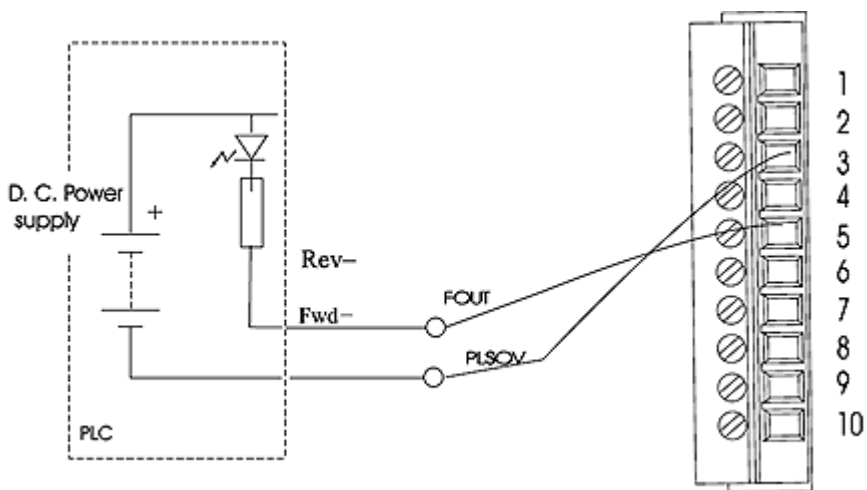
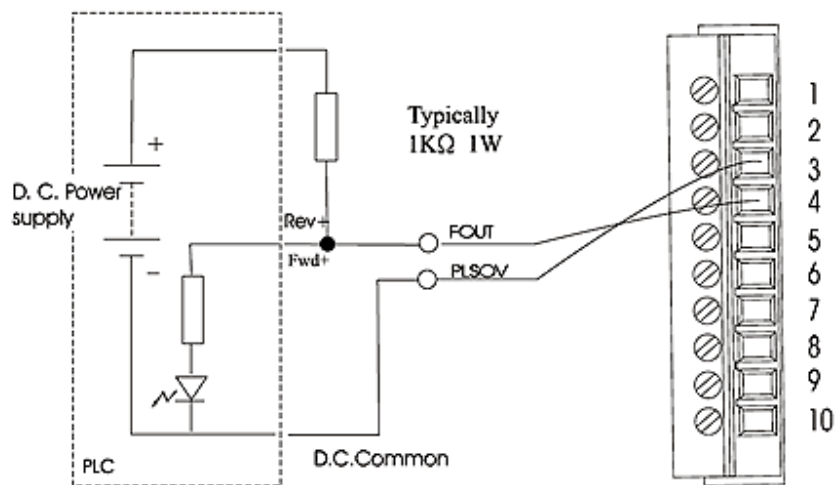


Volt-free contact

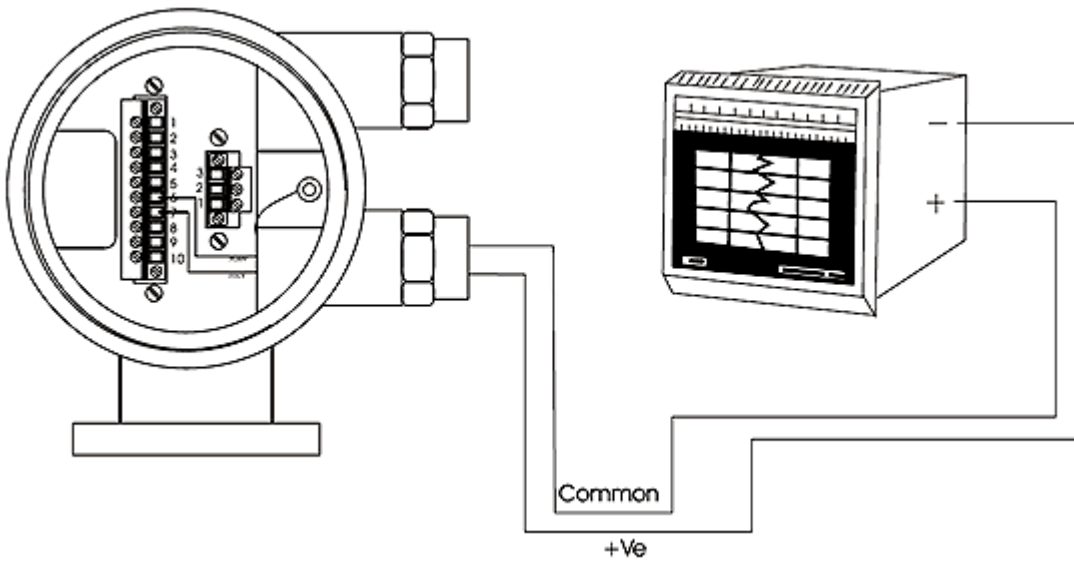


Voltage Signal or Logic Signal

G. PLC Interface

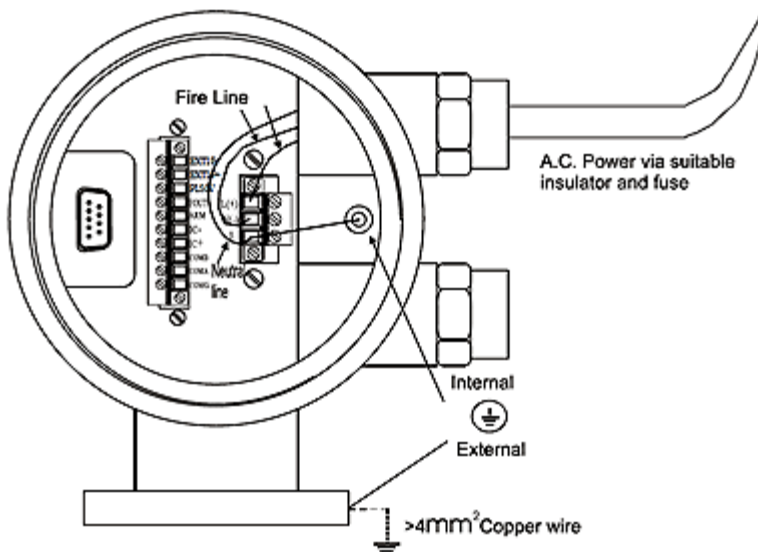


H. Current Output Connections



Stand and Current Output Connections

I. Power Supply Connections

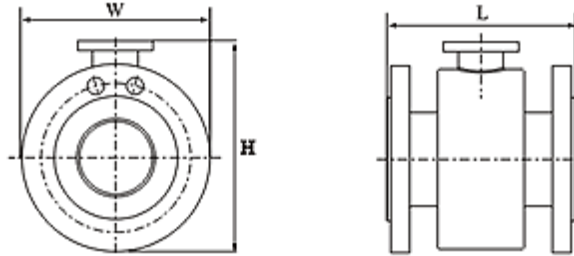


A.C. Power Supply Connections (AC 220V)

Spec Sheet

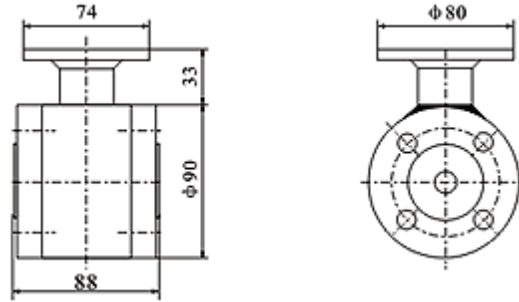
1. Dimensions and Weight of Sensor (Flange-type)

Common Sizes:



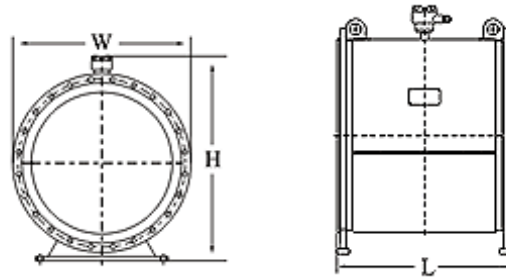
Nominal size (inch) (mm)		Dimension (inch)			Weight (lbs) 150# ANSI	Flow Range (gpm)
		L	W	H		
	10	5.3 3.5	4.8		Contact us	Contact us
	15	5.3 3.7	5.0		Contact us	Contact us
3/4	20	7.9 5.0	5.4		Contact us	Contact us
1	25	7.9 5.0	5.8		Contact us	Contact us
1 1/4	32	7.9 5.0	6.1		Contact us	Contact us
1 1/2	40	7.9 5.0	6.5		Contact us	Contact us
2	50	7.9 6.5	7.4		Contact us	Contact us
2 1/2	65	7.9 7.3	8.0		Contact us	Contact us
3	80	7.9 7.9	8.8		Contact us	Contact us
4	100	9.8 8	.7 9	.8	Contact us	Contact us
5 1	25	9.8	9.8	10.9	Contact us	Contact us
6	150	11.8 11	.2 11	.9	Contact us	Contact us
8	200	13.8 1	3.4 1	4.1	Contact us	Contact us
10	250	17.7 15.	9 16.	5	Contact us	Contact us
12	300	19.7 18.	1 18.	4	Contact us	Contact us
14	350	21.7 22.	1 22.	0	Contact us	Contact us
16	400	23.6 23.	5 24.	2	Contact us	Contact us
18	450	23.6 25.	2 25.	8	Contact us	Contact us
20	500	23.6 28.	1 28.	1	Contact us	Contact us
24	600	23.6 31.	9 31.	9	Contact us	Contact us

Small sizes:



Nominal size (mm)	Dimension(mm)			Weight (lbs) 150# ANSI	Flow Range (gpm)
	L	W	H		
2.5 3.5		3.6	4.8	Contact us	Contact us
5 3	.5	3.6	4.8	Contact us	Contact us

Large Sizes:



Nominal size (inch) (mm)	Dimension (inch)			Weight (lbs) 150# ANSI	Flow Range (gpm)
	L	W	H		
28 70 0	28	35.2	39.2	Contact us	Contact us
32 80 0	32	40.0	43.9	Contact us	Contact us
36 90 0	36	43.9	47.8	Contact us	Contact us
40 10 00	40	48.4	53.1	Contact us	Contact us
48 12 00	48	55.3	59.3	Contact us	Contact us
56 14 00	56	64.2	68.1	Contact us	Contact us
64 16 00	64	72.0	76.0	Contact us	Contact us
72 18 00	72	80.5	84.5	Contact us	Contact us
80 20 00	80	89.2	93.1	Contact us	Contact us
88 22 00	88	97.4	93.1	Contact us	Contact us
96 24 00	96	105.7	100.9	Contact us	Contact us

3. 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: 290psi

Accuracy: $\pm 0.2\%$ (~DN300); $\pm 0.5\%$

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: NPT ½, M20x1.5

