

Hydro-Flow Model 1200

Installation and Operation Guide



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Understanding Vortex Flow Meters

Vortex shedding flow meters measure flow by detecting the frequency at which vortices are alternately shed from a bluff body. The vortices create low and high pressure zones behind the bluff body which are detected as a force acting on the sensor wing. This force is transmitted through the sensor wing to the Hydro-Flow piezo-resistive sensor mounted inside the flow line. Hydro-Flow's unique and proprietary microprocessor-based piezo-resistive sensor can accurately and reliably process vortex signals 25 times smaller than permitted by other technologies.

According to physical laws, the shedding frequency is directly proportional to the average flow velocity. This effect can be observed in the fluttering of a flag.



Vortex flow meters are preferred for many applications requiring wide flow range, accuracy, and reliability (no moving parts).

Handling Your Flow Meter

Even though the flow meter is one of the most rugged in the industry, exercise reasonable care with the flow meter.

- *When not installed, store the flow meter with the installation manual in its shipping container.*
- *Do not ram or poke objects into the meter bore or onto the sensor wing/shedder. Hydro-Flow is a no moving parts flow meter. If you push hard enough to see a part move, the flow meter is probably damaged.*
- *Pay particular attention to the direction of flow. The flow must impact the surface of the stainless steel shedder. The direction of the flow is clearly indicated on the flow meter electronics. The flow meter will not work if you install it backwards.*
- *The flow meter's installation location is important for optimum performance accuracy; a quick review of "Installing Your Flow Meter" on page 3 will be helpful.*

Identifying Your Flow Meter

An identification plate (ID) is attached to your flow meter. For model code information, see “Hydro-Flow Model and Suffix Codes” on page 2.

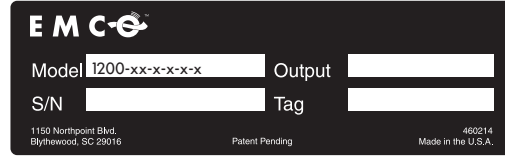


Figure 1. Flow meter identification (ID) plate

Hydro-Flow Model and Suffix Codes

Table 1. Hydro-Flow model and suffix code identification table

Category	Suffix Codes					
Type						
Inline	1200	...	...	...	...	...
Line Size						
1.0" (20 mm)	...	10	...	...	...	...
1.5" (40 mm)	...	15	...	...	...	...
2.0" (50 mm)	...	20	...	...	...	...
2.5" (65 mm)	...	25	...	...	...	...
3.0" (80 mm)	...	30	...	...	...	...
Connection						
Brass—NPTF	1	...	...	...
Stainless Steel—NPT	S	...	...	...
Output						
Pulse (Max 200 Hz)	1	...	...
Current: 4 mA to 20 mA	2	...	...
No output	3	...	...
Display						
No Display	1	...
Rate/Total Display	2	...
Measuring Units						
English	1
Metric	2
Example (1200-20-1-2-2-2):	1200-	30-	1-	2-	2-	1-AL
<i>A 3" inline flow meter with a brass tee fitting, 4 mA to 20 mA analog output, and a rate/total display with metric measuring units. To order the aluminum enclosure add AL to the end of the product string.</i>						
Example (1200-30-1-2-2-1):	1200-	30-	1-	2-	2-	1
<i>A 3" inline flow meter with a brass tee fitting, 4 mA to 20 mA analog output and a rate/total display with English measuring units</i>						

Ordering Considerations

When ordering, please specify pipe size, material, and schedule (or outside and inside diameter of pipe).

Standard English measuring units are gallons per minute (gpm) and gallons. Standard metric measuring units are cubic meters per hour (m³/hr) and cubic meters (m³).

If you require your Hydro-Flow meter to be configured for nonstandard units of measure, indicate this when ordering your unit. Other units of measurement, such as acres, cubic feet, barrels, and liters are available and can be set by the factory.

Installing Your Flow Meter

Upon receiving your Hydro-Flow equipment, verify that all materials on the packing list are present. Check for possible shipping damage and notify the freight carrier or your Hydro-Flow representative if there is any damage.

Before installing your flow meter, verify that the model is consistent with your requirements. See “Hydro-Flow Model and Suffix Codes” on page 2 for identification information.

Selecting the Best Flow Meter Location

For optimum performance, you must consider straight run requirements and flow meter installation location relative to flow direction. Figure 2 on page 3 illustrates possible flow meter locations. The good flow meter locations are recommended to ensure that the pipe and the flow meter will always be filled with fluid.

Straight Run Requirements

The straight run of the pipe must have the same nominal diameter (D) as the flow meter body. Figure 2 illustrates the minimum requirements for straight run piping.

Note: Consult the factory if you have special requirements.

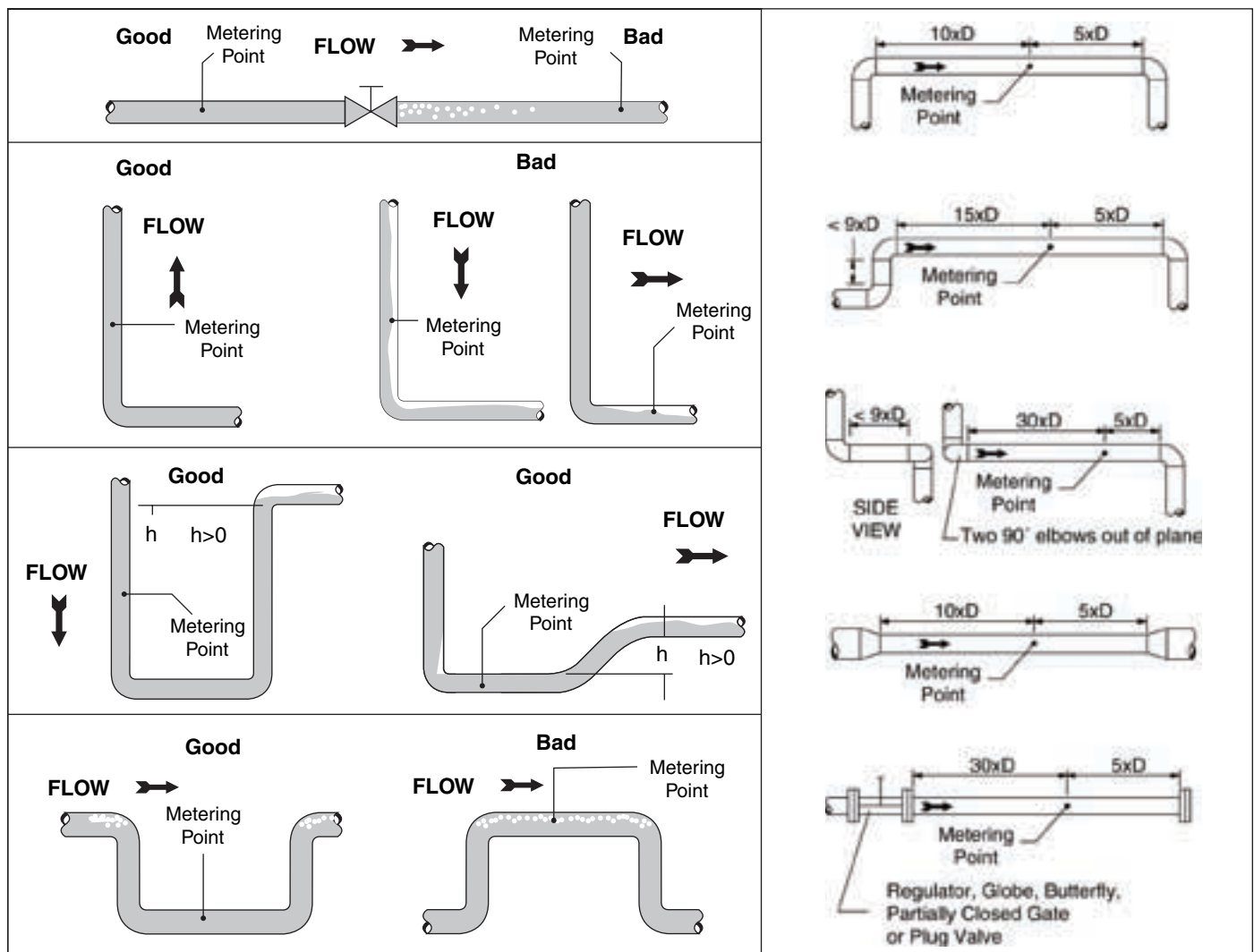


Figure 2. Flow meter location illustrations and straight run requirements

Mechanical Installation

Install the Hydro-Flow model 1200 with a brass tee fitting using standard thread sealing procedures. When installing the flow meter, ensure the flow direction indicator arrow is pointing in the direction of flow (see Figure 5).

CAUTION: Exercise care when installing with sealant and/or NPT tape. Do not allow excess sealant or tape to enter the flow meter and partially block flow.

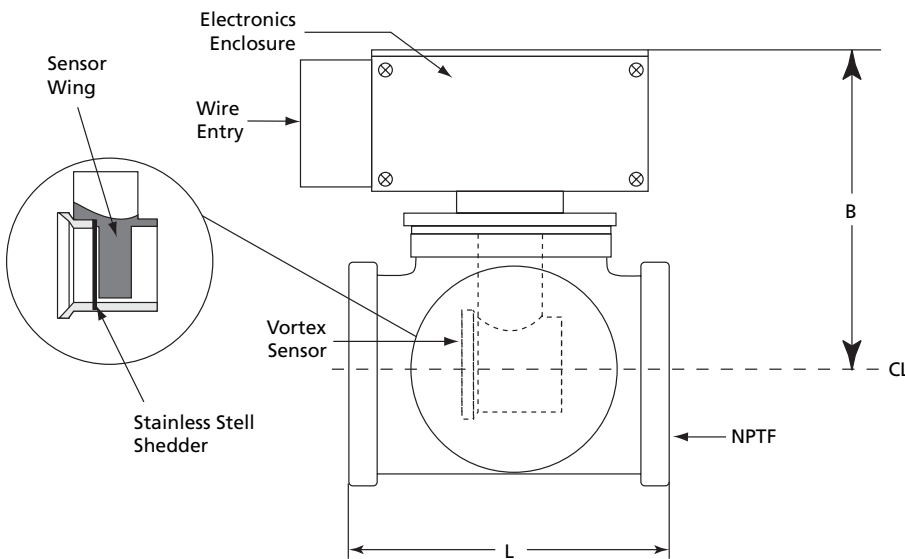


Figure 3. Hydro-Flow model 1200 mechanical drawing

	Dimensions	
Meter Size	L	B
1" (25 mm)	3.44 (87.4)	3.85 (97.8)
1.5" (40 mm)	3.63 (92.2)	4.25 (108.0)
2" (50 mm)	3.82 (97.0)	4.40 (111.8)
2.5" (65 mm)	4.31 (109.5)	4.90 (124.5)
3" (80 mm)	4.55 (115.6)	5.20 (132.1)

Dimensions in inches (and millimeters)
 Aluminum enclosure L is equal to the standard enclosure, For aluminum enclosure dimension B, add 0.358" to standard dimension B.

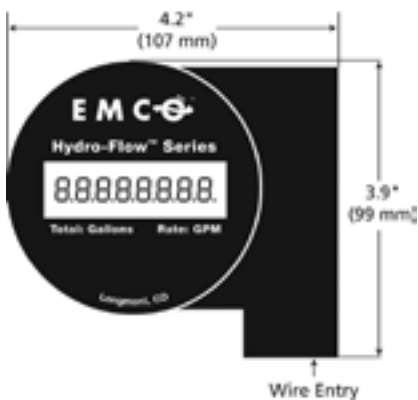


Figure 4. Condulet dimensions

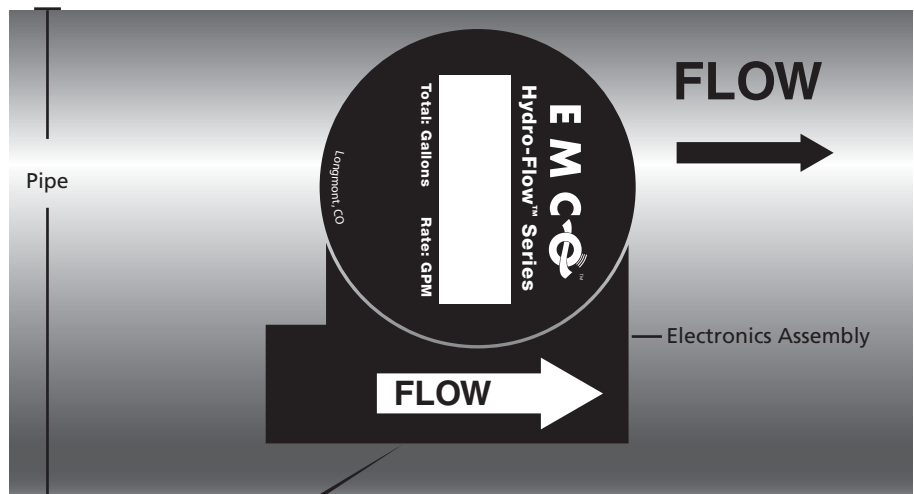
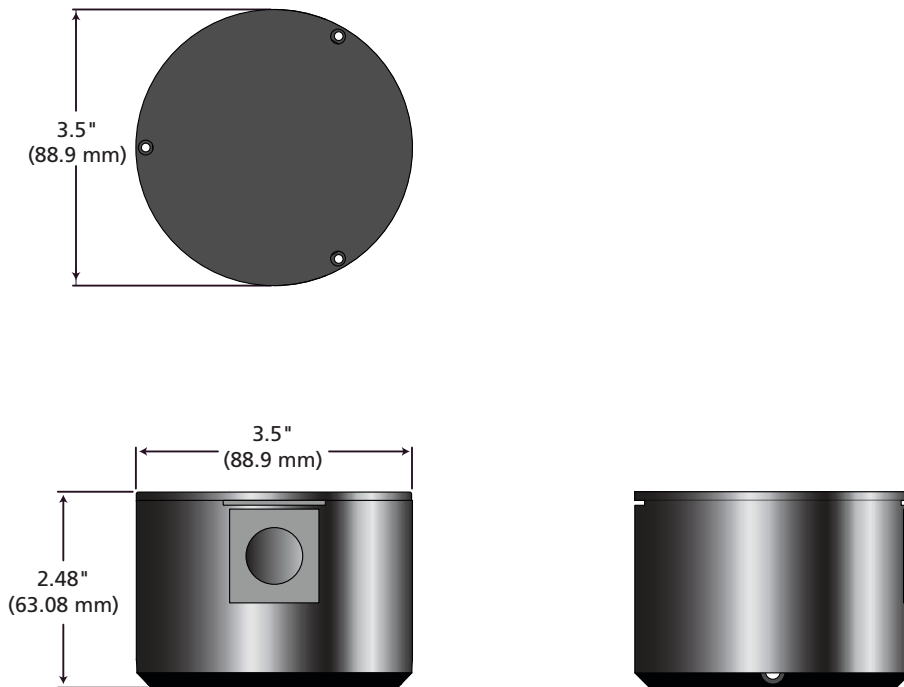


Figure 5. Flow direction and alignment

Dimensions for the Aluminum Enclosure - AL



Class I, Division 2, Groups A, B, C, and D or non-hazardous locations only

Field Wiring:

Use copper wire with 60C or 60/75C wire insulation. Terminal tightening torque of 7.0 lb/in (.070 Nm).

Connectors: 

CAUTION: Warning - Explosion hazard

- Do not disconnect equipment while the circuit is live or unless the area is known to be free of ignitable concentrations.

Warning: Explosion hazard- substitution of any component may impair suitability for Class I Division 2.

Making Electrical Connections

The pulse output of the Hydro-Flow flow meter functions by momentarily shorting the (+) terminal to the (-) terminal.

CAUTION: If the flow meter is connected directly to a DC power source without the series resistor, both the flow meter and the power source may be damaged.

The wiring polarity must be observed for proper operation of the flow meter. If the flow meter is wired backwards to the current-limited power source, the flow meter will not be damaged but it will not function properly.

Use appropriate ½" NPT conduit or wire connector for installation. For installations in damp or wet environments use the appropriate ½" NPT water tight connector.

Pulse Output Electrical Installation

The Hydro-Flow pulse output flow meter may be used with a 10 VDC to 32 VDC power supply and series current limiting resistor. The voltage at the flow meter terminals is internally limited to 8.0 ± 1.0 VDC under noflow conditions, dropping to less than 1.0 V for the 2.5 to 5 millisecond duration of the output pulse. Figure 6 illustrates a typical installation.

Note: The totalizer or flow computer input must be rated for an 8-volt pulse input.

Cabling (Pulse Output)

The cable may be up to 2000 feet of #20 AWG or larger shielded two-conductor cable. The shield lead from the meter may be connected to an earth ground, such as a copper cold water pipe. The shield improves noise immunity and provides a return path for electrical surges. Its use is optional in installations in which transients and noise are not a problem.

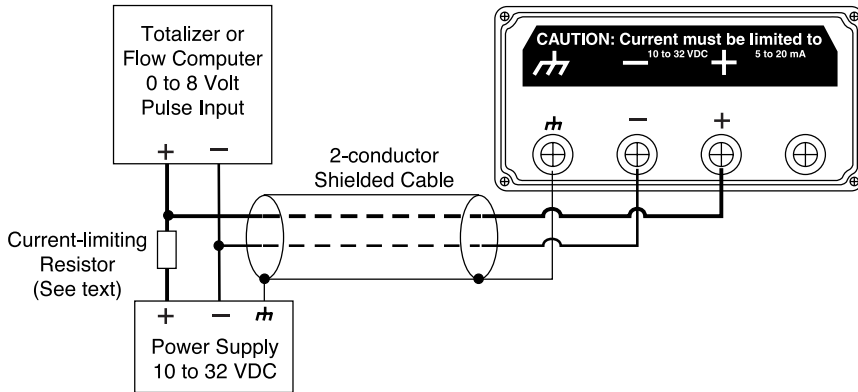


Figure 6. Wiring diagram (pulse output)

Current Limiting Resistor (Pulse Output)

The current limiting resistor is required to limit the normal operating current in the flow meter to a value between 5 mA and 20 mA (with a meter voltage of 8 volts and less than 25 mA). The value of the resistor is determined by the power supply voltage, the operating meter current, and the cable resistance.

Table 2 lists standard ½ watt 5% resistor values which will work in most installations. For power supply voltages between those in the table, use the lower value of resistor.

Table 2. Current limiting resistor for pulse output

Supply Voltage (DC)	Current Limiting Resistor Values (Ω)	
	Minimum	Maximum
10	400	400
12	480	800
14	260	1200
16	640	1600
18	720	2000
20	800	2400
22	880	2800
24	960	3200
26	1040	3600
28	1120	4000
30	1200	4400
32	1280	4800

4 mA to 20 mA Current Output or No Output (Display Only) Electrical Installation

The Hydro-Flow flow meter may be configured to output a 4 mA to 20 mA analog signal proportional to flow rate.

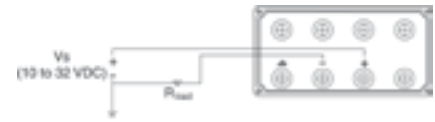


Figure 7. Wiring diagram (4 mA to 20 mA current loop)

Cabling (4 mA to 20 mA Output or No Output)

The flow meter may be connected with up to 2000 feet of #22 AWG or larger cable. Shielded cable may be necessary in some environments to reduce electrical noise; if used, the shield should be connected at one end only to an earth ground point, such as a copper cold water pipe.

Load Resistances (4 mA to 20 mA Output)

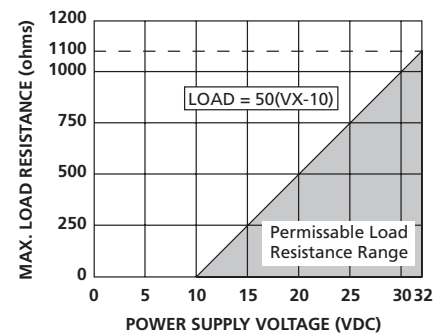


Figure 8. Maximum load resistance (4 mA to 20 mA output)

Electrical Specifications

Table 3. Electrical specifications

Enclosure	Reinforced Polycarbonate, NEMA6
Output Signal Options	<ul style="list-style-type: none"> Pulse output: frequency proportional to flow rate. Power supply: 10 VDC to 32 VDC power supply with current limited by series resistance to between 5 mA and 20 mA. Maximum pulse width is 5 ms. See Table 5 on page 8 for standard output scaling. Other pulse output settings can be configured by the factory or reconfigured in the field using Hydro-Flow Field-Pro software. Analog output: 4 mA to 20 mA analog current loop, current proportional to flow rate. Power supply: 10 VDC to 32 VDC compliance. 4 mA = zero flow; 20 mA = maximum flow listed in Table 5 on page 8. Other 20 mA settings can be configured by the factory or reconfigured in the field using Hydro-Flow Field-Pro software. No output: display only. Power supply: 8 VDC to 32 VDC, 4 mA maximum
Display Option	LCD display alternately shows 4-digit rate and 8-digit total flow.

Mechanical Specifications

Table 4. Mechanical specifications

Type	Full bore, inline
Measurable Fluids	Water; water/ glycol mixtures; conden
Pipe Sizes	1", 1.5", 2", 2.5 ", and 3" (25 mm to 80 mm)
Fluid Temperature	32 oF to 160 oF (0 oC to 71 oC)
Fluid Pressure	150 psi (10.3 bar) maximum
Ambient Temperature	-20 oF to 140 oF (-29 oC to 60 oC)
Flow Range	<ul style="list-style-type: none"> Minimum: 1.0 foot per second (0.3 m per second) Maximum: 15 feet per second (4.5 m per second)
Measuring Units	<ul style="list-style-type: none"> English: gallons Metric: cubic meters <p><i>Note: Other measuring units available upon request or measuring units can be reconfigured using Hydro-Flow Field-Pro software.</i></p>
Accuracy (combined linearity and repeatability)	±0.5% of full scale
Wetted parts	<ul style="list-style-type: none"> Vortex sensor: Ultem® (plastic) Shedder bar: 316 stainless steel Flow meter body: brass Stem: brass O-rings: EPDM
PipeConnection	• NPT female
Straight Run Piping	Typical 10 diameters upstream, 5 diameters downstream. <i>Note: For more information, see "Straight Run Requirements" on page 3.</i>

Meter has UL approval for - AL Telemarketing Equipment for use in hazardous locations class I, div. 2, groups A, B, C and D

- UL 508
- ANSI/ISA 12.12.01, 2000
- CAN/CSA C22.2 No. 213-M1987

Hydro-Flow Model 1200 Flow Ranges

Table 5. Model 1200 flow ranges

Line Size Inches (mm)	1.0" (25 mm)	1.5" (40 mm)	2" (50 mm)	2.5" (65 mm)	3" (80 mm)
Minimum flow(gpm)	2.6	5.4	10.6	14.0	23.4
Maximum flow	40	80	160	210	350
Minimum flow (m3/h)	0.60	1.22	2.42	3.18	5.30
Maximum flow	9.1	18.2	36.3	47.7	79.5
Pulses per gallon ^{Note 1}	250	100	50	50	25
Pulses per cubic meter ^{Note 1}	75000	25000	15000	15000	6000

Note 1 When flow meter is configured for pulse output

Safety Information

Safe operation of this product can be guaranteed only if it is properly installed, commissioned, used and maintained by qualified personnel in compliance with the operating instructions. General installation and safety instructions for pipeline and plant construction, as well as the proper use of tools and safety equipment, must also be complied with.



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