

HYDRO-FLOW MODEL 1200

Understanding Vortex Flowmeters

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

Handling Your Flowmeter

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

- When not installed, store the flowmeter 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 flowmeter 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 flowmeter electronics. The flowmeter will not work if you install it backwards.
- The flowmeter's installation location is important for optimum performance accuracy; a quick review of "Installing Your Flowmeter" on page 3 will be helpful.



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Identifying Your Flowmeter

An identification plate (ID) is attached to your flowmeter. For model code information, see “Hydro-Flow Model and Suffix Codes” below.

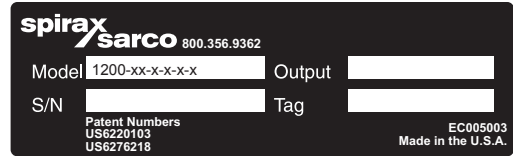


Figure 1. Flowmeter identification (ID) plate

CATEGORY	DESCRIPTION	SUFFIX CODES						
Type	Inline	1200	...	...	...	...	...	...
Line Size	1.0" (25 mm)	...	10	...	...	...	...	...
	1.5" (38 mm)	...	15	...	...	...	...	...
	2.0" (51 mm)	...	20	...	...	...	...	...
	2.5" (64 mm)	...	25	...	...	...	...	...
	3.0" (76 mm)	...	30	...	...	...	...	...
Connection	Brass - NPTF	...	...	1	...	...	...	...
	Stainless Steel	...	...	2	...	...	...	...
Output	Pulse	...	...	...	1	...	...	...
	Current, 4-20 mA	...	...	...	2	...	...	...
	No Output	...	...	...	3	...	...	...
Display	No Display	...	...	...	...	1	...	...
	Rate/Total Display	...	...	...	...	2	...	...
Measuring Units	English	...	...	...	...	...	1	...
	Metric	...	...	...	...	...	2	...
Enclosure	Polycarbonate	...	...	...	...	...	...	S
	Aluminum - 5' cable no display	...	...	...	...	...	...	AL1
	Aluminum - 10' cable no display	...	...	...	...	...	...	AL2
	Aluminum - 25' cable no display	...	...	...	...	...	...	AL3
Example		1200-	20-	1-	2-	2-	2-	S
Hydro-Flow-1200-20-1-2-2-2-S represents a 2" inline flow meter with a brass tee fitting, 4 to 20 mA analog output and a rate/total display with Metric measuring units with polycarbonate enclosure.								

Notes:

- Standard English measuring units for flow rate and totalized flow are gallons per minute (gpm) and gallons, respectively. Standard Metric measuring units for flow rate and totalized flow are cubic meters per hour (m³/h) and cubic meters (m³), respectively. Please specify other desired measuring units for which the flow meter should be configured. Other units, such as acre-feet, cubic feet, barrels, and liters are available and can be set by the factory.
- Watertight cable connector and direct burial lead wires are available. See Accessories section for more information.

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 Flowmeter

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 Flowmeter Location

For optimum performance, you must consider straight run

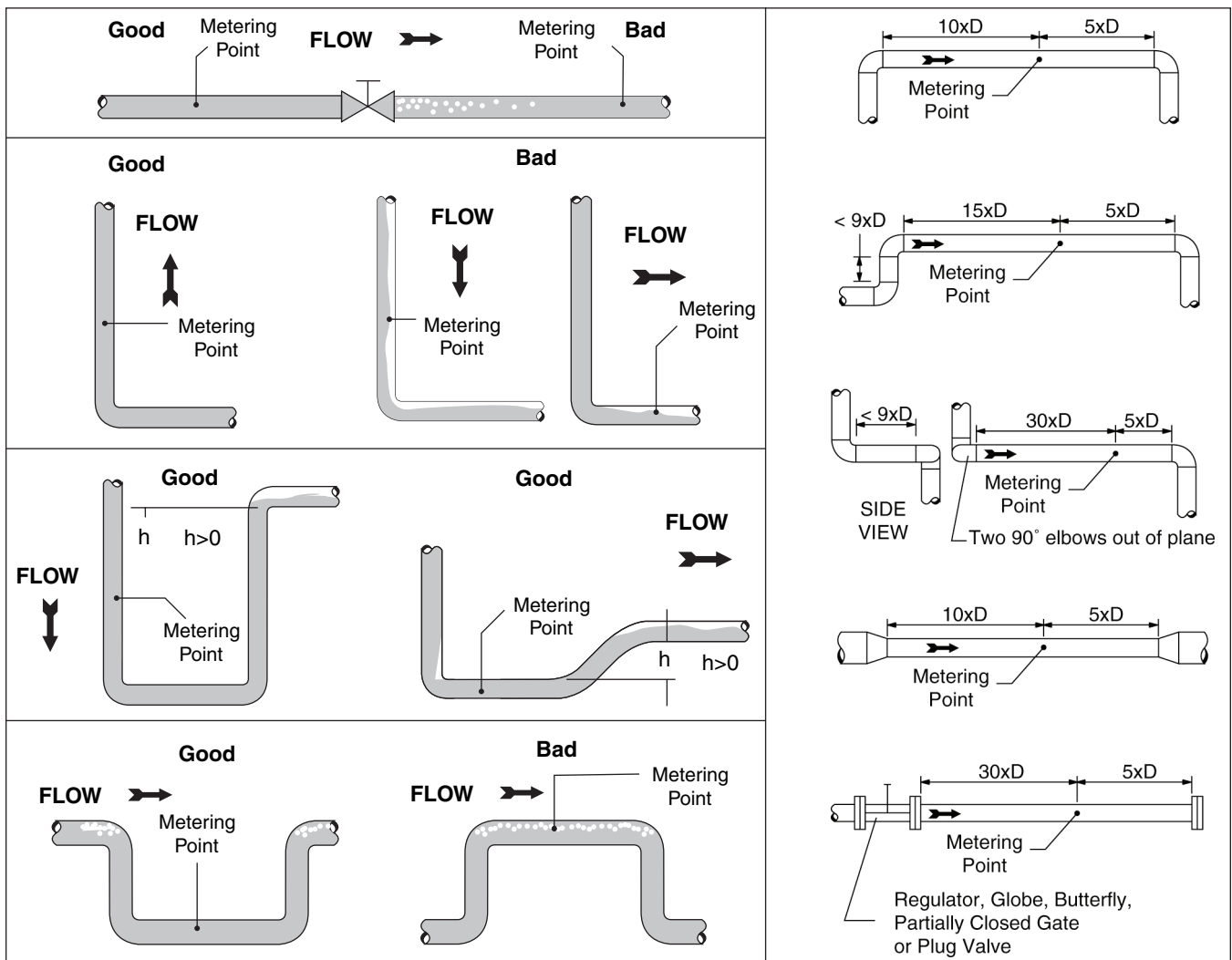
requirements and flow meter installation location relative to flow direction. Figure 2 on page 3 illustrates possible flow meter locations. The good flow meter locations are recommended to ensure that the pipe and the flow meter will always be filled with fluid.

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. Flowmeter 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 PTFE tape. Do not allow excess sealant or tape to enter the flow meter and partially block flow.

Figure 3. Model 1200 Hydro-Flow mechanical drawing

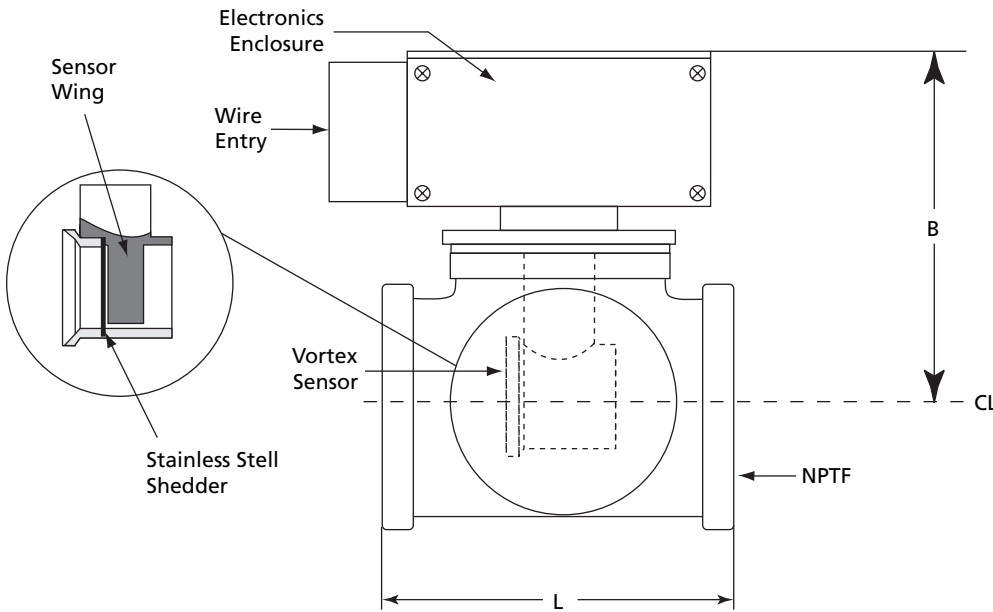


Figure 4. Condulet dimensions

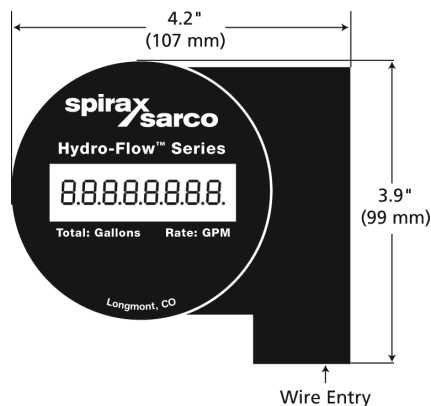
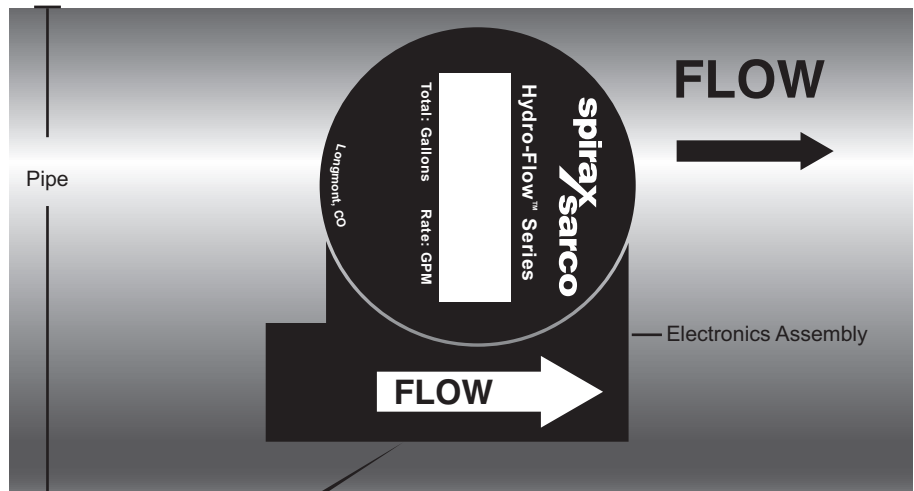


Figure 5. Flow direction and alignment



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.

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.

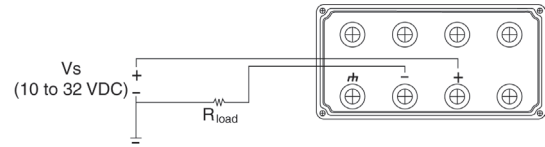
Table 2. Current limiting resistor for pulse output

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 Flowmeter 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)

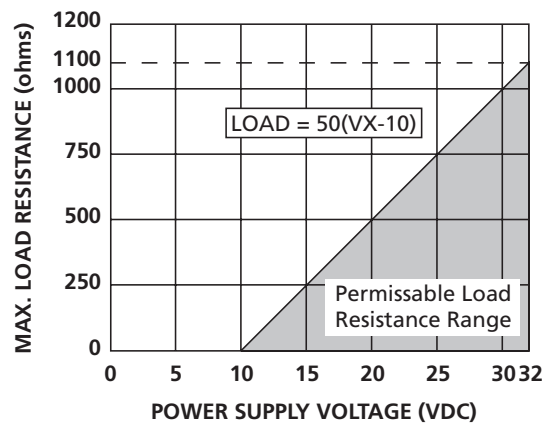


Cabling (4 mA to 20 mA Output or No Output)

The flowmeter 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, NEMA 4X
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°F to 160°F (0°C to 71°C)
Fluid Pressure	150 psi (10.3 bar) maximum
Ambient Temperature	-20°F to 140°F (-29°C to 60°C)
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>

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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