



Hydro-Flow™ Model 1200 Inline Vortex Flowmeter Installation and Operation Manual



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MODEL AND SUFFIX CODES

Category	Description	Suffix Codes					
Type	Inline	1200
Line Size	1" (25mm)	...	10	...	...	...	...
	1.5" (40mm)	...	15	...	...	...	...
	2" (50mm)	...	20	...	...	...	...
	2.5" (65mm)	...	25	...	...	...	...
	3" (80mm)	...	30	...	...	...	...
Connection	Brass-NPTF	...	...	1	...	...	...
Output	Pulse	...	...	...	1	...	...
	Current, 4-20 mA	...	...	...	2	...	...
	No Output	...	...	...	3	...	...
	For Use With Solar Power Supply (Low power consumption - 2 mA)	...	...	...	4	...	...
Display	No Display	...	...	...	...	1	...
	Rate/Total Display	...	...	...	...	2	...
Measuring Units	English	...	...	...	...	...	1
	Metric	...	...	...	...	...	2

Example:

Hydro-Flow 1200-20-1-2-2-2

A 2" inline flowmeter with a brass tee fitting, 4-20 mA analog output and a rate/total display with Metric measuring units.

Notes:

1. 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/hr) and cubic meters (m³), respectively. Please specify other desired measuring units for which the flowmeter should be configured. Other units, such as acre-feet, cubic-feet, barrels and liters are available and can be set by the factory.



What is a Vortex Flowmeter?

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.

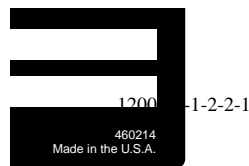
According to well proven physical laws, the shedding frequency is directly proportional to the average flow velocity. This effect can be observed in the fluttering of a flag.

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

When You Receive the Flowmeter

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

A permanent identification plate (ID) is attached to your flowmeter; verify the model is consistent with your requirements. (See Model & Suffix Code Table, p. 2.)



For example, if you ordered a 3" Hydro-Flow™ 1200 flowmeter with a brass tee fitting, 4-20 mA analog output and a Rate/Total display with English measuring units, the model number should read 1200-30-1-2-2-1, as in the above ID.

Common Sense / Meter Handling Issues

You are in receipt of a precision, world-class instrument. Even though the flowmeter is one of the most rugged in the industry, exercise reasonable care with the flowmeter.

1. When not installed, store the flowmeter with the installation manual in its shipping container.
2. Do not ram or poke objects into the meter bore or onto the sensor wing/shedder. Hydro-Flow™ is a no moving parts flowmeter. If you push hard enough to see a part move, the flowmeter is probably damaged.
3. 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.
4. The flowmeter's installation location is important for optimum performance accuracy; a quick review of Installation Guidelines, p. 4, will be helpful.

Selecting the Best Flowmeter Location

Not all plumbing is laid out with flowmetering in mind. For optimum performance, you must consider straight run requirements and the flowmeter's installation location relative to flow direction. Figures 1 and 2 illustrate useful examples of both proper and improper flowmeter installations. If you have special requirements, PLEASE consult the factory.

Flowmeter Location

Figure 1 illustrates possible flowmeter locations. The good flowmeter locations are recommended to ensure that the pipe and the flowmeter will always be filled with fluid.

Straight Run Requirements

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

Figure 1. Flowmeter Location

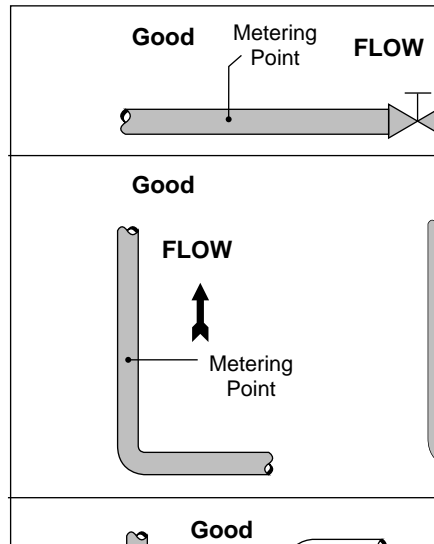
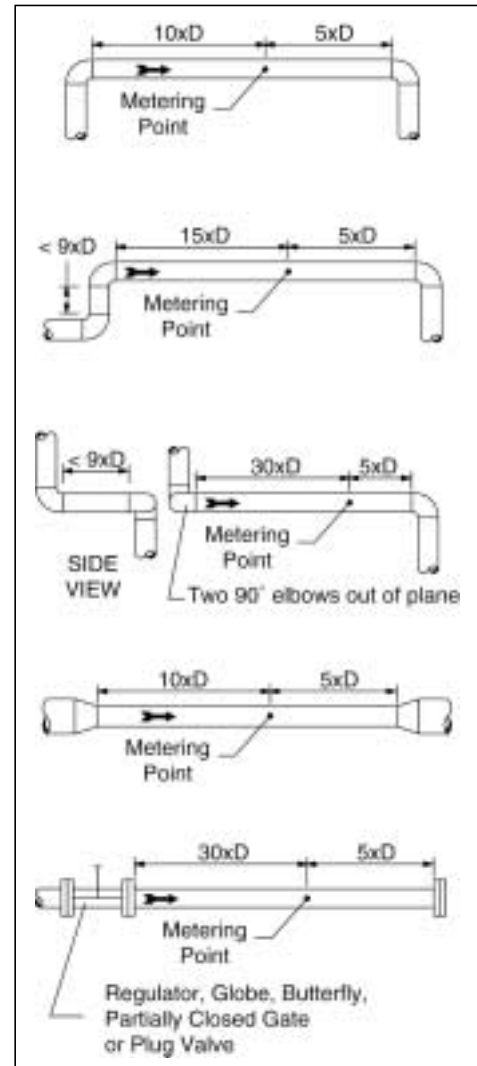
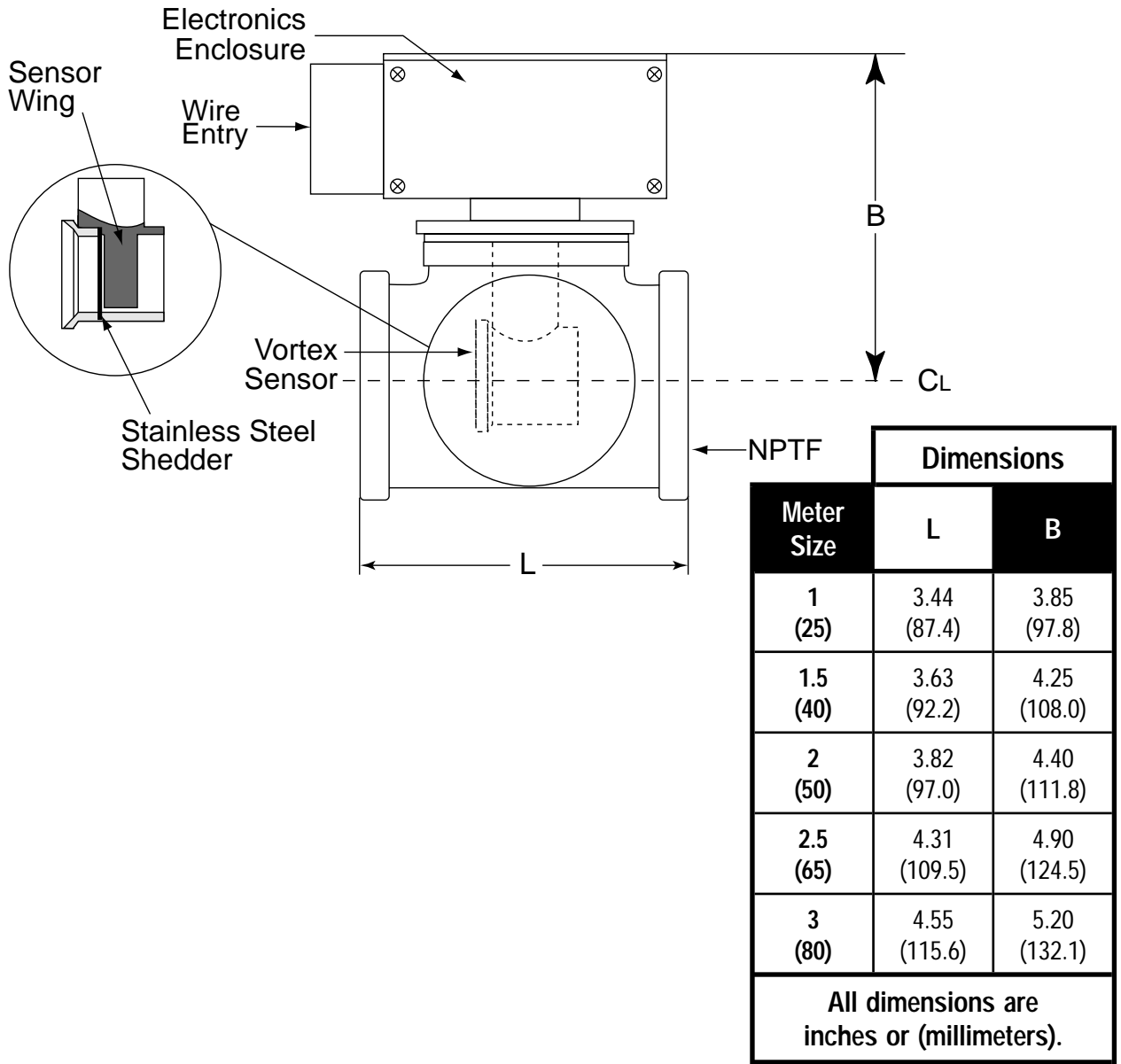


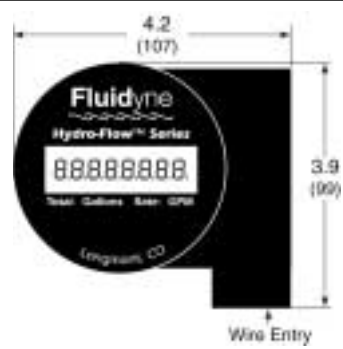
Figure 2. Straight Run Requirements



Mechanical Drawing: Model 1200



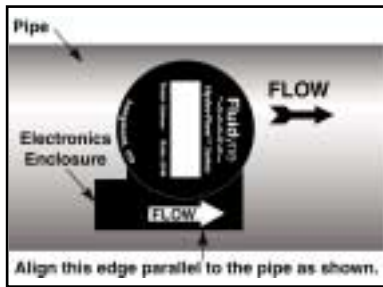
Dimensional Drawing: Condulet (shown with display)



Dimensions in inches (mm)

Mechanical Installation

Figure 3. Flow Direction and Alignment



Mechanical Installation

Install the Hydro-Flow™ Model 1200 with a brass tee fitting using standard thread sealing procedures. When installing the flowmeter, be sure the flow direction indicator arrow is pointing in the direction of flow. (See *Figure 3*.)

CAUTION

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

Electrical Installation

TABLE 1. CURRENT LIMITING RESISTOR FOR PULSE OUTPUT

Supply Voltage (DC)	Current Limiting Resistor Values (ohms)	
	Min	Max
10	400	400
12	480	800
14	560	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

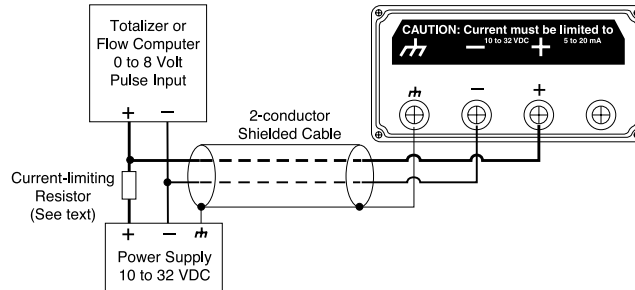
CAUTION

The pulse output of the Hydro-Flow™ flowmeter functions by momentarily shorting the + terminal to the – terminal. If the flowmeter is connected directly to a DC power source without the series resistor, both the flowmeter and the power source may be damaged. The wiring polarity must be observed for proper operation of the flowmeter. If the flowmeter is wired backwards to the current-limited power source, the flowmeter will not be damaged but it will not function properly.

Pulse Output Electrical Installation

The Hydro-Flow™ pulse output flowmeter may be used with a 10 to 32 volt DC power supply and series current limiting resistor. The voltage at the flowmeter terminals is internally limited to 8.0 ±1.0 volts DC under no-flow conditions, dropping to less than 1.0 volt for the 2.5 to 5 millisecond duration of the output pulse. Figure 4 below illustrates a typical installation. *Note: The totalizer or flow computer input must be rated for an 8-volt pulse input.*

Figure 4. Wiring Diagram - Pulse Output



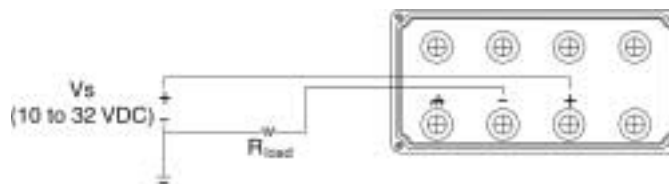
The cable may be up to 2000 feet of #20 AWG or larger shielded two-conductor cable. The shield lead from the meter may be connected to an earth ground, such as a copper cold water pipe. The shield improves noise immunity and provides a return path for electrical surges. Its use is optional in installations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

The current limiting resistor is required to limit the normal operating current in the flowmeter to a value between 5 and 20 mA with a meter voltage of 8 volts, and less than 25 mA with the meter terminals short-circuited. The value of the resistor is determined from the power supply voltage, the operating meter current and the cable resistance. Table 1 lists standard 1/2 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.

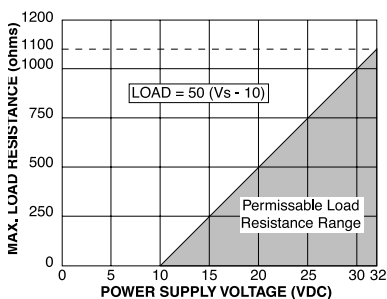
4-20 mA Current Output or No Output (Display Only) Electrical Installation

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.

Figure 5. Wiring Diagram - 4-20 mA Current Loop



Graph 1. Maximum Load Resistance for 4-20 mA Output



Technical Data

Mechanical Specifications

Type

Full Bore, Inline

Measurable Fluids

Water; Water-Glycol Mixtures; Condensate

Pipe Sizes

1", 1 1/2", 2", 2 1/2", 3" (25 - 80mm)

Fluid Temperature

32° to 212° F (0° to 100° C)

Fluid Pressure

150 psi maximum

Ambient Temperature

-20° to 140° F (-29° to 60° C)

Flow Range

0.5 feet, or 0.15 meters, per second minimum

15 feet, or 4.5 meters, per second maximum

Measuring Units

English.....Gallons

Metric.....Cubic Meters

Other measuring units available upon request or measuring units can be reconfigured using Fluidyne's Field-Pro™, PC compatible configuration software.

Accuracy (Combined Linearity and Repeatability)

±0.5% of full scale

Wetted Parts

Vortex SensorUltem® (Plastic)

Shedder Bar316 Stainless Steel

Flowmeter BodyBrass

StemBrass

O-ringsEPDM

Pipe Connection

NPT female

Straight Run Piping

Typical 10 diameters upstream, 5 diameters downstream. (See Figure 2, p.4.)

Electrical Specifications

Enclosure

Reinforced Polycarbonate, NEMA 6

European CE Mark

Approved

Output Signal Options

Pulse OutputFrequency proportional to flow rate. Power

Supply: 10-32 VDC power supply with current limited by series resistance to between 5 and 20 mA. Maximum pulse width is 5 ms. See Table 2 for standard output scaling.

Other pulse output setting can be configured by the factory or reconfigured in the field using Fluidyne's Field-Pro™.

Analog Output4-20 mA analog current loop, current pro-

portional to flow rate. Power Supply: 10-32 VDC compliance. 4 mA = zero flow; 20 mA = maximum flow listed in Table 2. Other 20 mA setting can be configured by the factory or reconfigured in the field using Fluidyne's Field-Pro™.

No Output.....Display only. Power Supply: 8-32 VDC, 4 mA maximum.

Display Option

LCD display alternately shows 4-digit rate and 8-digit total flow.

TABLE 2. MINIMUM AND MAXIMUM FLOW RANGES

Line Size in. (mm)	1 (25)	1.5 (40)	2 (50)	2.5 (65)	3 (80)
Min. Flow Max. Flow (gpm)	1.3 (40)	2.7 (80)	5.3 (160)	7.0 (210)	11.7 (350)
Min. Flow Max. Flow (m³/h)	0.30 (9.1)	0.61 (18.2)	1.21 (36.3)	1.59 (47.7)	2.65 (79.5)
Pulses/gal¹⁾	250	100	50	50	25
Pulses/m³ ¹⁾	75,000	25,000	15,000	15,000	6,000

1. When flowmeter is configured for pulse output.