



Hydro-Flow Model 2200

Fixed Insertion Vortex Flow Meter

The Hydro-Flow Model 2200 fixed insertion vortex flow meter was designed specifically for water flow measurement, containing no moving parts like traditional paddlewheel and impeller-type flow meters. Specifically designed for line sizes of 2 to 20 inches (51 to 508 mm), the Hydro-Flow Model 2200 is a fixed insertion flow meter that measures water, water/glycol mixtures, and agriculture/Reuse water.

Applications

- The Hydro-Flow Model 2200 flow meter is ideally suited for:
 - Water
 - Water/glycol mixtures
 - Agriculture/Reuse water

Benefits

- Fast and easy installation
- Rugged and maintenance-free with no moving parts
- Fits line sizes from 2 to 20" (51 to 508 mm)
- Reliable and accurate flow readings—provides $\pm 1.0\%$ of full-scale accuracy and 15:1 turndown ratio

Features

- 2-year extended warranty is the best in the industry
- Reliably processes vortex signals smaller than permitted by other technologies



Ultra Low-Flow Measurement Capability

Hydro-Flow's unique and proprietary microprocessor based piezo-resistive sensor can accurately and reliably process vortex signals that are 25 times smaller than permitted by other technologies, producing a flow meter of unequal performance and reliability.

Diverse Water Applications

The Hydro-Flow 2200 is ideal for measuring water applications, withstanding process temperatures 32-160°F (0-71°C). The Hydro-Flow 2200 contains no moving parts, so excessive mechanical loads on the flow meter (caused by continuous start-stop flow) do not affect the accuracy or mechanical reliability of the flow meter. An optional aluminum electronics enclosure can ensure performance in wet environments. Additionally, the flow meter is not affected by possible iron, salt, or other deposits found in the water flow.

Specifications

Performance	
Accuracy	Combined linearity and repeatability is $\pm 1.0\%$ of full scale.
Electrical	
Enclosure	Reinforced polycarbonate, NEMA 4X
Output Signal Options	
Pulse Output	Frequency proportional to flow rate.
	Power supply: 10 to 32 VDC with current limited by series resistance to between 5 and 20 mA.
	Maximum pulse width is 5 ms. Other pulse output settings can be configured by the factory or reconfigured in the field using Hydro-Flow Field-Pro software.
Analog Output	4 to 20 mA analog current loop. Current proportional to flow rate.
	Power Supply: 10 to 32 VDC compliance
	4 mA = zero flow; 20 mA = maximum flow.
No Output	Display only
	Power supply: 8 to 32 VDC
	4 mA maximum
Display Option	LCD display alternately shows 4-digit rate and 8-digit total flow.
Mechanical	
Type	Fixed Insertion
Measurable Fluids	Water, water/glycol mixtures, condensate
Pipe Sizes	2 to 20" (51 to 508 mm)
Fluid Temperature	32 to 160°F (0 to 71°C) all connections
Fluid Pressure	400 psi (27.5 bar) maximum for thread-o-let
	300 psi (20.7 bar) maximum for saddle connection
	150 psi (10.3 bar) maximum for tee connection
Process Temperature	32 to 160°F (0 to 71°C)
Flow Range	1' (0.3 m) per second, minimum
	15' (4.5 m) per second, maximum
Measuring Units	English = gallons
	Metric = cubic meters
	Other measuring units available upon request or measuring units can be reconfigured using Hydro-Flow's Filed-Pro, PC compatible configuration software.
Wetted Parts	
Vortex Sensor	Ultem® (plastic)
Shedder Bar	316 stainless steel
Compression Fitting	Brass
Stem	Aluminum
O-rings	EPDM
Straight Run Piping	Typical 10 diameters upstream, 5 diameters downstream
Mounting Options	Carbon steel saddle for steel or PVC pipes
	Carbon steel thread-o-let
	Brass tee fitting
	Pipe connection – 1.5" NPTF

Measurable Flow Ranges

Line Size	2" (51 mm)	3" (76 mm)	4" (102 mm)	6" (152 mm)	8" (203 mm)	10" (254 mm)
Gallons per Minute						
Minimum Flow	10.6	23.4	40.0	100.0	166.6	266.6
Maximum Flow	160	350	600	1500	2500	4000
Cubic Meters per Hour						
Minimum Flow	2.4	5.4	9.2	22.8	38.0	60.6
Maximum Flow	36.3	79.5	136.3	340.7	556.8	908.5
Pulses/Gallon¹	50	25	15	6	4	2
Pulses/Cubic Meters¹	15000	6000	5000	2000	1000	500

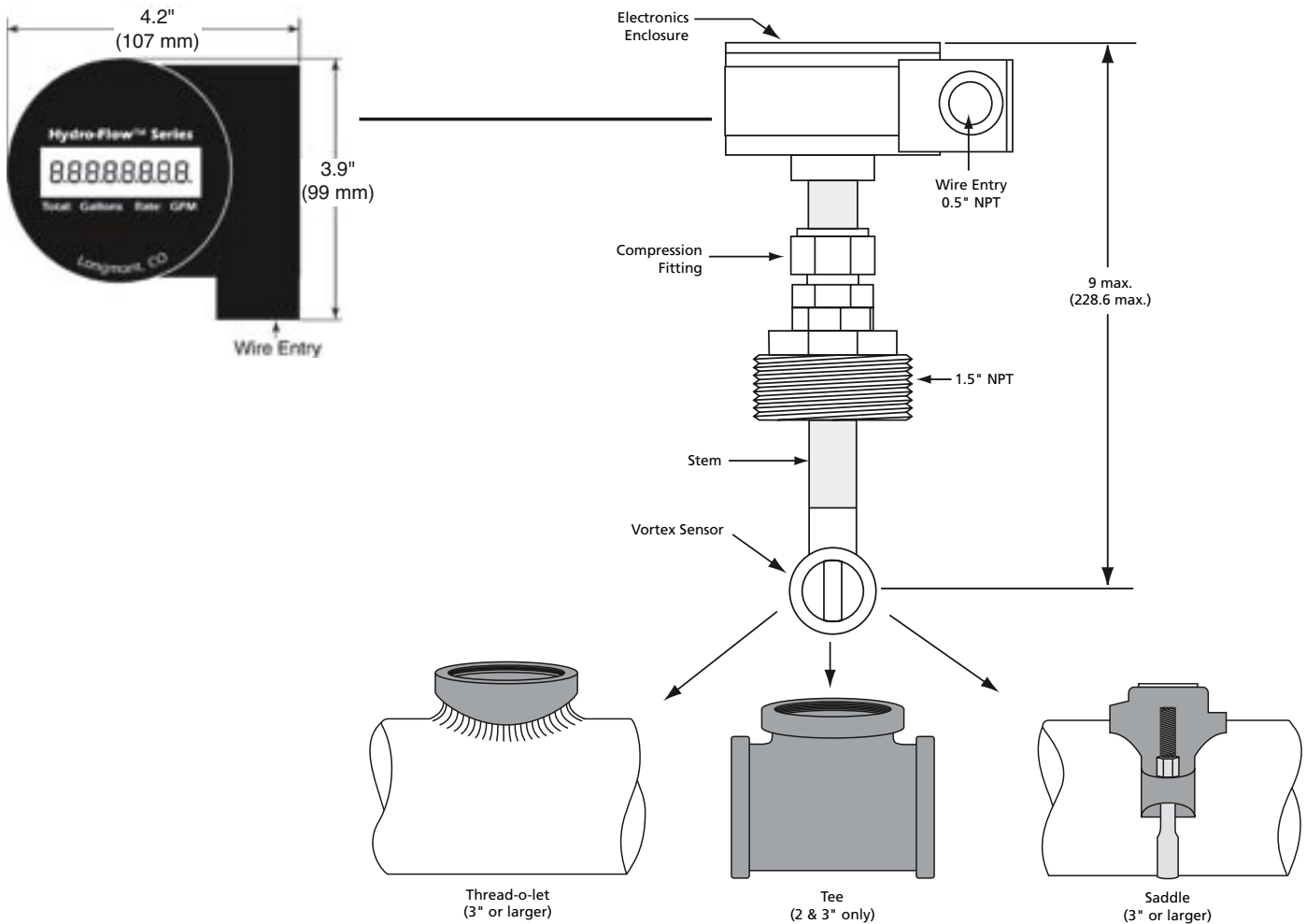
Line Size	12" (305 mm)	14" (356 mm)	16" (406 mm)	18" (457 mm)	20" (508 mm)
Gallons Per Minute					
Minimum Flow	368	418	568	734	934
Maximum Flow	5500	6250	8500	11000	14000
Cubic Meters per Hour					
Minimum Flow	83.4	94.8	128.8	166.6	212
Maximum Flow	1249.2	1419.5	1930.6	2498.4	3179.7
Pulses/Gallon¹	2	1	1	1	0.5
Pulses/Cubic Meters¹	500	500	200	200	200

¹ When flow meter is configured for pulse output.

Hardware Installation

The Hydro-Flow model 2200 is a fixed insertion flow meter with a 1-1/2" NPT mounting thread. The pipe must be depressurized prior to flow meter installation and/or removal. Three standard accessory mounting fittings are recommended for flow meter installation.

- **Thread-o-let:** *The thread-o-let is recommended for permanent installation requiring minimal service and is good for high-pressure (up to 400 psi) applications.*
- **Tee Fitting:** *The tee fitting is installed only for 2" and 3" pipe sizes. Installation requires no special machining, hole cutting or welding. Pressure is limited to 150 psi*
- **Saddle Clamp:** *The saddle clamp is recommended when welding is not feasible. Saddles can be used for steel and PVC pipe. Pressure is limited to 300 psi.*



Model 2200 Hydro-Flow mechanical drawing with conduit detail

Making Electrical Connections

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

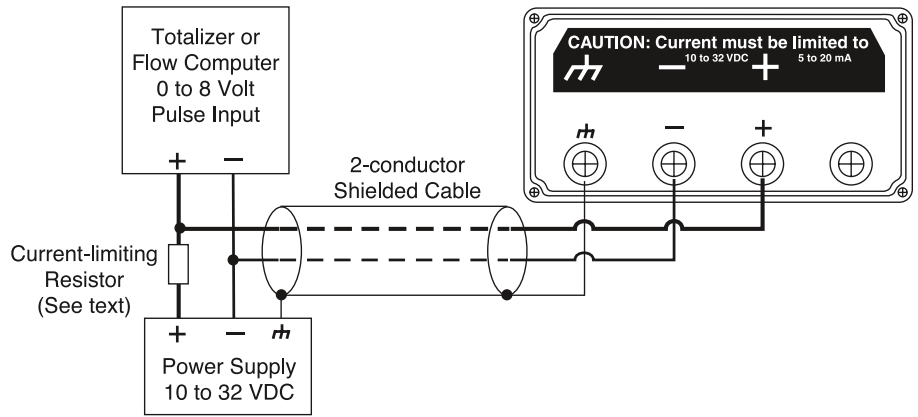
Pulse Output Electrical Installation

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 volt for the 2.5 to 5 millisecond duration of the output pulse.

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 electrical transients and noise are not a problem.



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 1 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.

Caution: 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.

Supply Voltage (DC)	Current Limiting Resistor Values (Ω)	
	Minimum	Maximum
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

Table 1. Current limiting resistor for pulse output

Category	Suffix Codes					
Type						
Fixed Insertion	2200					
Line Size						
2" (51 mm) through 20" (508 mm)		02 to 20				
Mounting						
Thread-o-let (3" and larger)			1			
Saddle for Steel Pipe (3" and larger)			2			
Saddle for PVC Pipe (3" and larger)			3			
Tee (2" and 3" only)			4			
None (retrofit)			5			
Output						
Pulse				1		
Current: 4 to 20 mA				2		
No Output				3		
Display						
No Display					1	
Rate/Total Display					2	
Measuring Units						
English						1
Metric						2
Example	2200-	08-	3-	1-	2-	1
Hydro-Flow 2200-08-3-1-2-1 represents an 8" fixed insertion flow meter with saddle mounting for PVC pipe, pulse output and a rate/total display with English measuring units.						

- 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/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.
- 2 Watertight cable connector and direct burial lead wires are available. See Accessories section for more information.
- 3 Please specify pipe size, material, and schedule (or outside and inside diameter of pipe).
- 4 To order the Aluminum electronics enclosure put AL on the end of the product string.

Aluminum Electronics Enclosure Advantages and Uses:

- *Solid Enclosure—NEMA 6P environmental protection (prolonged submersion)*
- *Field Serviceable*
- *Data relayed to the flow processor, no need to access the meter*
- *Designed to withstand wet environments, direct burial, and heavy industrial installations*
- *Proven accurate in hard-use environments*
- *Fluid Temperature 32 to 160°F (0 to 71°C)*
- *Accuracy $\pm 1\%$ of full scale*
- *Line size 2 to 20" (50 to 500mm)*
- *Compatible with Thread-o-let mounting*
- *Staight run requirements equal to reinforced polycarbonate enclosure*

Accessories

Description	Part Number
BTU-121 BTU/Energy Measurement System for Chilled and Hot Water	Contact rep or factory
Field-Pro Configuration Program: Software	011110
Communicator Hardware	011113
Hydro-Flow Relay Output Module	011121
AC to DC Converter/Power Supplies	011138
Water-Tight Cable Connector and 18" Direct Burial Cable	011142



EMCO Flow Systems is a division of Spirax Sarco, Inc. • 1150 Northpoint Blvd. • Blythewood, SC 29016

For information on EMCO industrial flow products, contact:

EMCO Flow Systems • 2150 Miller Drive • Longmont, CO 80501
T: 800.356.9362 or 303.682.7060 • F: 303.682.7069 • sales@emcoflow.com • www.emcoflow.com