Flow Rate Monitoring – RFO Type

4.5 to 24 VDC Pulsed Output

GEMS Sensors popularized the RotorFlow's paddlewheel design by combining high visibility rotors with solid-state electronics that are packaged into compact, panel mounting housings. They provide accurate flow rate output with integral visual confirmation...all with an unprecedented price/performance ratio. RFO Types feature a VDC pulsed output.

Typical Applications

- Water Purification/Dispensing Systems
- Chemical Metering Equipment
- Lasers and Welders
- Water Injection Systems
- Semiconductor Processing Equipment
- Chillers and Heat Exchangers

Specifications

Wetted Materials	
Body	Brass, 316 Stainless Steel or Polypropylene (Hydrolytically Stable, Glass Reinforced)
Rotor Pin	Ceramic
Rotor	PPS Composite, Black
Lens	Polysulfone[1]
O-Ring	Viton® (Alloy Bodies); Buna N (Polypropylene Body)
Low Flow Adaptor	Glass Reinforced Polypropylene
Operating Pressure, Maximum	Optional SS Face Plate 500 PSI
Brass or Stainless Steel Body	200 PSIG (13.8 bar) @ 70°F (21°C), 100 PSI (6.9 bar) Max. @ 212°F (100°C)[1]
Polypropylene Body	100 PSIG (6.9 bar) @ 70°F (21°C), 40 PSI (2.8 bar) Max. @ 180°F (82°C)
Operating Temperature,	
Brass or Stainless Steel Body	-20°F to 212°F (-29°C to 100°C)
Polypropylene Body	-20°F to 180°F (-29°C to 82°C)
Electronics	150°F (65°C) Ambient
Viscosity, Maximum	200 SSU
Input Power	4.5 VDC to 24 VDC
Output Signal	4.5 VDC to 24 VDC Pulse. (Sourcing) Pulse Rate Dependent on Flow Rate, Port Size and Range.
Current Consumption	8 mA, No Load
Current Source Output, Max.	70 mA
Frequency Output Range	15 Hz (Low Flow) to 225 Hz (High Flow)
Accuracy	See Table Below
Electrical Termination	22 AWG PVC-Jacketed, 24″ Cable. Color Coded: Red = +VDC; Black = Ground; White = Signal Output

Notes:
1. For higher pressure/temperature ratings, stainless face plates are available. Consult factory.

How To Order

For standard configurations, specify Part Number based on desired body material and port size.

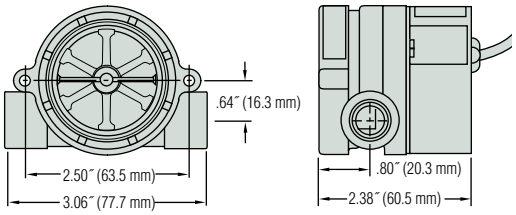
Body Material	Port Size NPT	Flow Range – GPM		Part Number
		Low Range* (Accuracy)	Standard Range (Accuracy)	
Polypropylene	.25″	0.1 to 1.0 (±7.0%)	0.5 to 5.0 (±7.0%)	**155421** ⚡
	.50″	1.5 to 12.0 (±7.0%)	4.0 to 20.0 (±15.0%)	**155481** ⚡
Brass	.25″	0.1 to 1.0 (±7.0%)	0.5 to 5.0 (±7.0%)	**156261** ⚡
	.50″	1.5 to 12.0 (±7.0%)	4.0 to 20.0 (±15.0%)	**156262** ⚡
	.75″	—	5.0 to 30.0 (±15.0%)	**194761** ⚡
	1.00″	—	8.0 to 60.0 (±15.0%)	**194762** ⚡
Stainless Steel	9/16″-18**	0.1 to 1.0 (±7.0%)	0.5 to 5.0 (±7.0%)	**165071**
	.50″	1.5 to 12.0 (±7.0%)	4.0 to 20.0 (±15.0%)	**165075** ⚡
	.75″	—	5.0 to 30.0 (±15.0%)	**194763**
	1.00″	—	8.0 to 60.0 (±15.0%)	**194764** ⚡

⚡ – Stock Items.

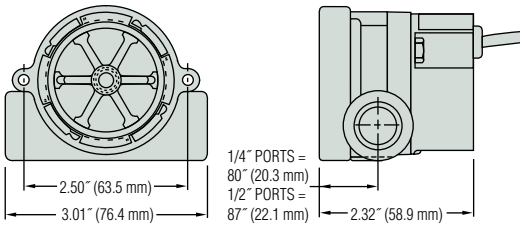
CE c UL us File No. E45168 RoHS

Dimensions

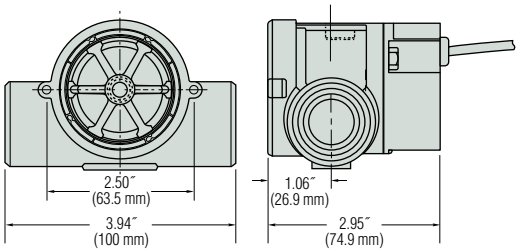
Polypropylene Bodies



Brass and Stainless Steel Bodies - .25″ and .50″ Ports



Brass Bodies – .75″ and 1.00″ NPT Ports



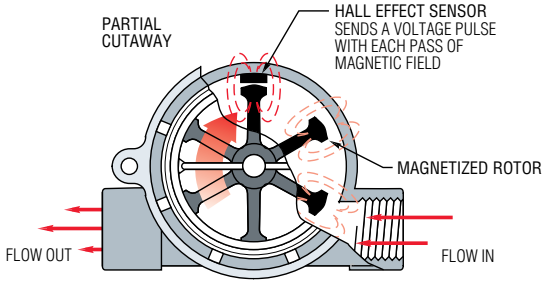
High Resolution Black Rotor

PPS composite. Each of the six rotor arms is magnetized. A PTFE loaded bushing ensures long life.

Note: Improved accuracy can be achieved by calibrating the individual RFO unit.

*With use of Low Flow Adapter supplied. See Page F-8 for more information.
**Straight thread with O-ring seal.

Operating Principle



1. As liquid passes through the RotorFlow body, the magnetic rotor spins at a rate proportional to flow. This causes a series of magnetic fields (the rotor vanes) to excite the Hall Effect sensor, producing a series of voltage pulses.

2. The output pulses (RFO) are at the same voltage level as the input (4.5 - 24 VDC) with a frequency proportional to the flow rate. The output signal can be utilized by digital rate meters totalizers or other electronic controllers. RFA Type analog sensors condition the output signal to 0-10 VDC.

3. RotorFlow Indicators may be mounted with flow entering either port. Performance is optimized by positioning ports at the top of the unit, in a horizontal plane.

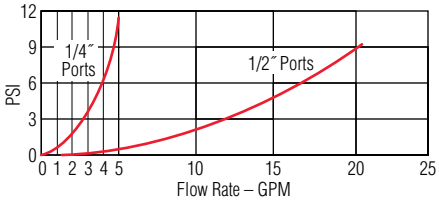
Frequency vs. Flow Rate-Typical

	Output Frequency – Hz					
	RFO Model – Based on Port Size					
Flow Rate (GPM)	**.25″**	**.25″ with Adapter***	**.50″**	**.50″ with Adapter***	**.75″**	**1″**
0.10		13				
0.25		41				
0.50	15	90				
0.75		137				
1.0	34	186				
1.5	54			17		
2.0	73			25.9		
2.5	90			34		
3.0	110			43		
3.5	128					
4.0	148		34	60		
4.5	168					
5.0	185		44.8	76.7	24	
6.0			55	94		
7.0			65.9	111		
8.0			76	129		22
9.0			87.5	147		
10			99	165	61	30
11			110	185		
12			122	204		
13			135			
14			147			
15			158		93	43
16			170			
17			183			
18			195			
19			207			
20			220		128	60
25					163	74
30					196	91
35						107
40						123
45						137
50						153
55						170
60						185

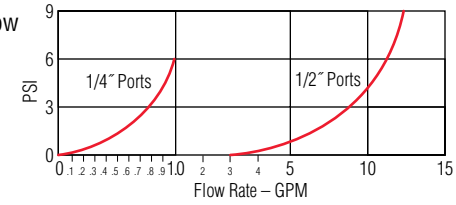
*Low Flow Adapter

Pressure Drop-Typical

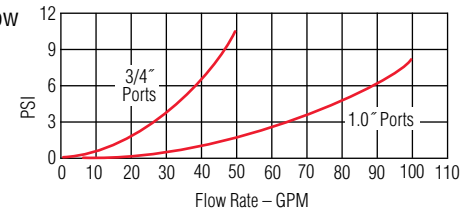
Standard Flow Range Units



Low Flow Range Units



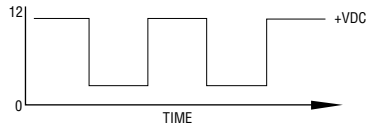
High Flow Units



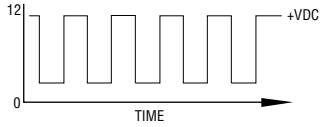
Signal Output

Output signal for RFO Types is an on/off pulse of the DC voltage supplied to the unit, it is compatible with all digital logic families. Input voltage range is 4.5 to 24 VDC. Frequency of the output pulse is proportional to the flow rate and ranges from approximately 15 Hz at low flow to 225 Hz at high flow.

Example:
Low Flow



High Flow



Note: Consult factory for flow rate/frequency curves.