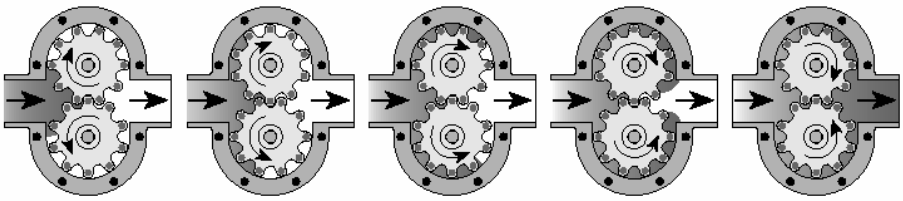
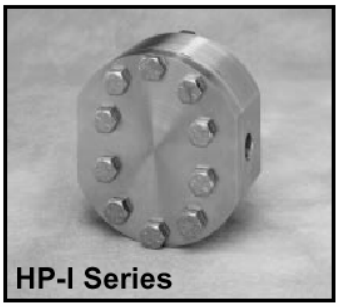
OPERATOR'S MANUAL 362-974

362-974 DIRECT DRIVE FLOW MONITOR

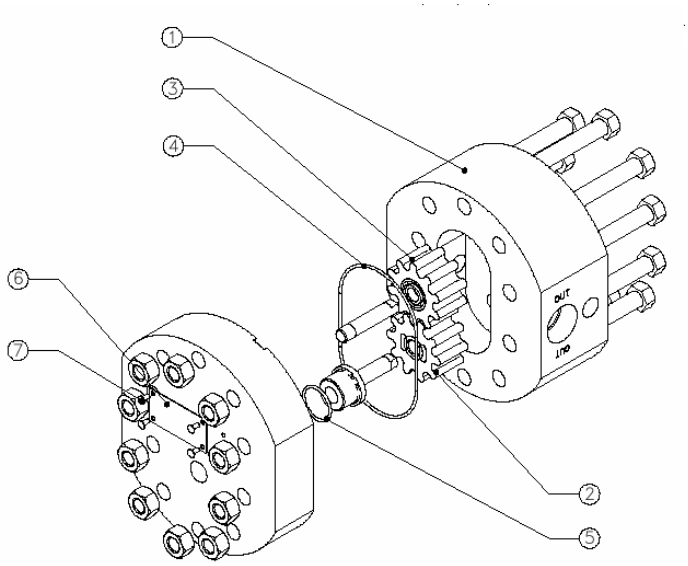
IMPORTANT: WHEN REPAIRING TURN OFF THE MAIN DISCONNECT AND BLEED THE WATER PRESSURE BEFORE, OPERATING, OR SERVICING THIS EQUIPMENT

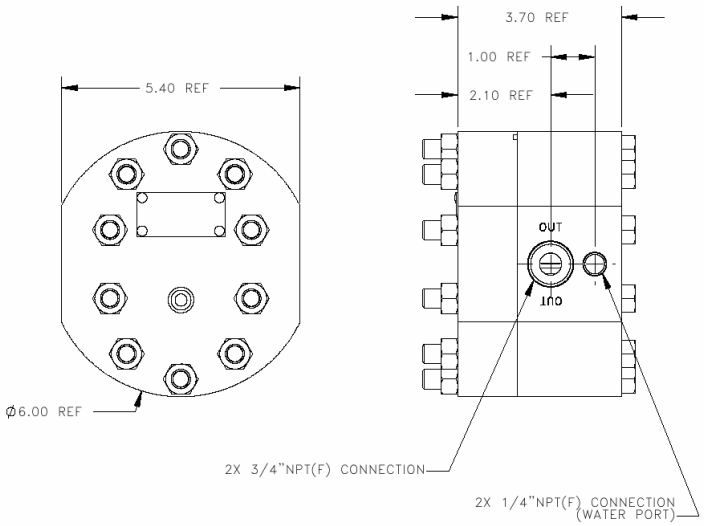
Principle of Operation





Flowdata flowmeters use two rotating impellers which are driven by the flowing liquid. Magnets imbedded in the impellers activate a non-intrusive sensor which generates a pulsed output signal. Each pulse represents a known volume of liquid that is captured between the lobes of the impellers. A "K-Factor" converts the pulses into engineering units for remote data collection and digital display.





Assembly Solutions
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Installation and Orientation

Flowmeter

Environment

Flowdata flowmeters will operate in normal environmental conditions. The temperature must be kept within the specified operating range for the sensor and electronics (refer to the spec sheets and technical manuals that came with the electronics). For meters constructed of 300 Series stainless steel, note that the rated pressure must be reduced as the temperature increases, as shown in the following chart.

300 Series Stainless Steel Body Rating						
TEMP (°F)	PRESSURE (PSIG), Published Rating & Rating at Temperature					
	250	**1000**	**1500**	**3000**	**6000**	**10000**
100	250	1000	1500	3000	6000	10000
200	215	862	1293	2585	5170	8617
300	194	777	1165	2330	4660	7767
400	178	713	1069	2138	4277	7128
500	168	665	997	1994	3989	6648
600	157	628	942	1883	3766	6277

Note that temperature is only one of the many parameters that affect pressure rating. Contact Flowdata for information on special high temperature designs. Vibrations do not affect the meter performance, however a jam nut may be required to keep the sensor in place.

Orientation

The mounting position does not significantly affect the flowmeter. However, the **normal** mounting configuration is in the vertical position with the inlet and outlet in the horizontal plane. If the inlet and outlet are oriented vertically, make certain that back pressure on the outlet side is maintained. The meter may be mounted with vertical flow up, however a vertical flow downward installation is NOT recommended.

Inlet and Outlet

Model DC01I, DC02I, DC01E, DC02E, DC01F, DC02F, HP01I, HP02I, AP01I, AP02I: These meters are bidirectional and have no specific inlet or outlet.

Model DC05I thru DC40I, DC05F thru DC40F, DC05E thru DC40E, HP05I thru HP20I, AP05I thru AP20I: These meters MUST be installed correctly with regards to the inlet and outlet. They are NOT interchangeable. The words "IN" and "OUT" are stamped on the meters to identify the inlet and outlet. If bidirectional flowmeters are required, they may be ordered.

Mounting

Pipe hangers attached around the fittings of the flowmeter or on the adjacent piping will usually be adequate at holding the flowmeter in place (Refer to the Weight specifications in Disassembly/Reassembly).

For the AP-I Series, pipe hangers attached to the adjacent piping will usually be adequate at holding the flowmeter in place. **Do not attach pipe hangers or supports to plastic flanges that are part of the flowmeter.** The AP15I and AP20I have mounting holes in their bases if needed.

For the AP-I Series, it is not recommended to install flowmeters with NPT pipe connections in metal piping of any kind. Stresses of misalignment in the piping will be relieved on the plastic flowmeter body. This can cause irreversible damage to the flowmeter body. Flowmeters with split-ring flanges will allow for a small degree of misalignment, though they are still susceptible to damage. Persons plumbing in the plastic flowmeters should be aware of this potential problem.

Instrumentation

Sensors

A Flowdata sensor must be used with each Flowdata flowmeter. Several types of sensors are available to handle a variety of applications. The sensor must be screwed **COMPLETELY** into the mounting hole of the flowmeter in order to operate properly. **FINGER TIGHTEN ONLY; the sensor and flowmeter can be damaged by over-tightening**. See specifications and wiring information provided. *SENSORS MUST BE INSTALLED IN HP SERIES BEFORE SYSTEM PRESSURE IS APPLIED.*

Flow Controllers and Accessories

Flow Controllers, Signal Conditioners, Transmitters, Intrinsic Safety Barriers, and other accessories are available from Flowdata. Refer to the manuals that came with these devices for proper wiring and installation.

Trouble-Shooting

Most flowmeter operation problems can be solved by carefully reviewing this manual. Some specific problems are listed below. Review all of the possible causes and solutions since some difficulties are caused by a combination of problems and may require multiple solutions. **Operating your flowmeter with liquids or conditions other than those specified can reduce its accuracy, can damage the flowmeter, and may void your Flowdata warranty.** Consult your sales representative **BEFORE** changing operating conditions.

If your problem is beyond the scope of this manual, or if you need assistance of any kind, contact your sales representative or Flowdata at **1-800-833-2448**. When calling for technical assistance, please have the following information available so we may better assist you:

- Flowmeter model number and serial number (See nameplate)
- Date of flowmeter purchase and installation
- Current fluid application
- Flow controls used

WARNING: Before disassembling the flowmeter, depressurize any of the lines connected to the meter. A small amount of fluid will remain in the flowmeter and will leak out when it is opened. Take any precautions necessary to deal with this fluid. Failure to heed this warning may result in serious bodily injury.

Sympton	Possible Cause	Solution
Flow is restricted.	Impellers are jammed.	Debris may be caught in the impellers. If so, open the flowmeter and remove it. Also, make sure that an appropriately sized filter is located upstream from the flowmeter. Temperature changes or chemical incompatibility may also cause the impellers to jam. If you suspect this, call Flowdata.
	Pressure drop across flowmeter is too high.	Call sales representative or Flowdata for assistance. Flowmeter size may need to be increased. Pump pressure may be increased as long as the pressure rating of the meter is not exceeded and the pressure drop is less than 100 psi.
	Too much torque on bolts.	Refer to the Torque Tables on the preceding pages. Depressurize meter and take precautions to deal with leaks. Reduce torque until impellers spin freely.
Fluid flowing but there is no output signal.	Bent impeller shafts.	Consult Flowdata for replacement part(s).
	Instrumentation is improperly set up.	First, confirm that all wiring is properly connected. Then, review the technical manual(s) supplied with the instrumentation for trouble shooting procedures.
	Sensor is not screwed into the flowmeter properly.	Unscrew the sensor and make sure that the sensor hole is clear of any dirt and debris. Screw the sensor back in. **FINGER TIGHTEN ONLY**; over tightening can damage the sensor and/or the flowmeter.
	Sensor is malfunctioning.	Install spare sensor, if available. Call your sales representative or Flowdata. Improper wiring, jolts, or extreme temperatures can damage the sensor.
	Impellers installed backwards.	Confirm that the impellers are oriented properly. The magnets imbedded in the impellers must be facing the sensor side of the flowmeter.
	Flow rate is too low.	Increase flow rate or check to see if the fluid application has changed. If the application has changed, consult your sales representative or Flowdata.
	No back pressure.	Verify that there is at least 5psi back pressure on the flowmeter. See Flowmeter Orientation.
Flowmeter is giving inaccurate readings.	Instrumentation is improperly set up.	Review the technical manual(s) supplied with the instrumentation to verify setup. Confirm that instrumentation is using K-Factor stamped on nameplate of flowmeter.
	K-Factor is not correct.	$\frac{\text{Indicated Flow}}{\text{Actual Flow}}$ x K-Factor = New K-Factor. Default K-factor = 0.089 If error is consistent, use this formula to calculate new/corrected K-Factor.
	Sensor wire is receiving interference.	Interference can be caused by electrical devices placed too close to the sensor wire or by not properly grounding the shield on the sensor cable or sensor shield wire.
	Impellers are dragging.	Too much torque may be on bolts (refer to *Flow is restricted*). Temperature changes or chemical incompatibility may also cause the impellers to drag. If you suspect this, call Flowdata.
Flow rate is not steady through the flowmeter.	Flowmeter outlet is not pressurized.	Pressurize the downstream side of the flowmeter or lengthen the amount of piping between the flowmeter and the pipe outlet.
	Reciprocating pump, or pump producing an unsteady flow.	Lengthen the amount of pipe between the flowmeter and the pump, move the flowmeter to a different location in the system, add mechanical dampeners between the pump and flowmeter, incorporate the Flowdata Electronic Dampening System, or change the pump type.
	The flow rate is too low.	Change controller window time to a higher number or reduce the significant figures being displayed on the controller (for Flowdata flow controls).