

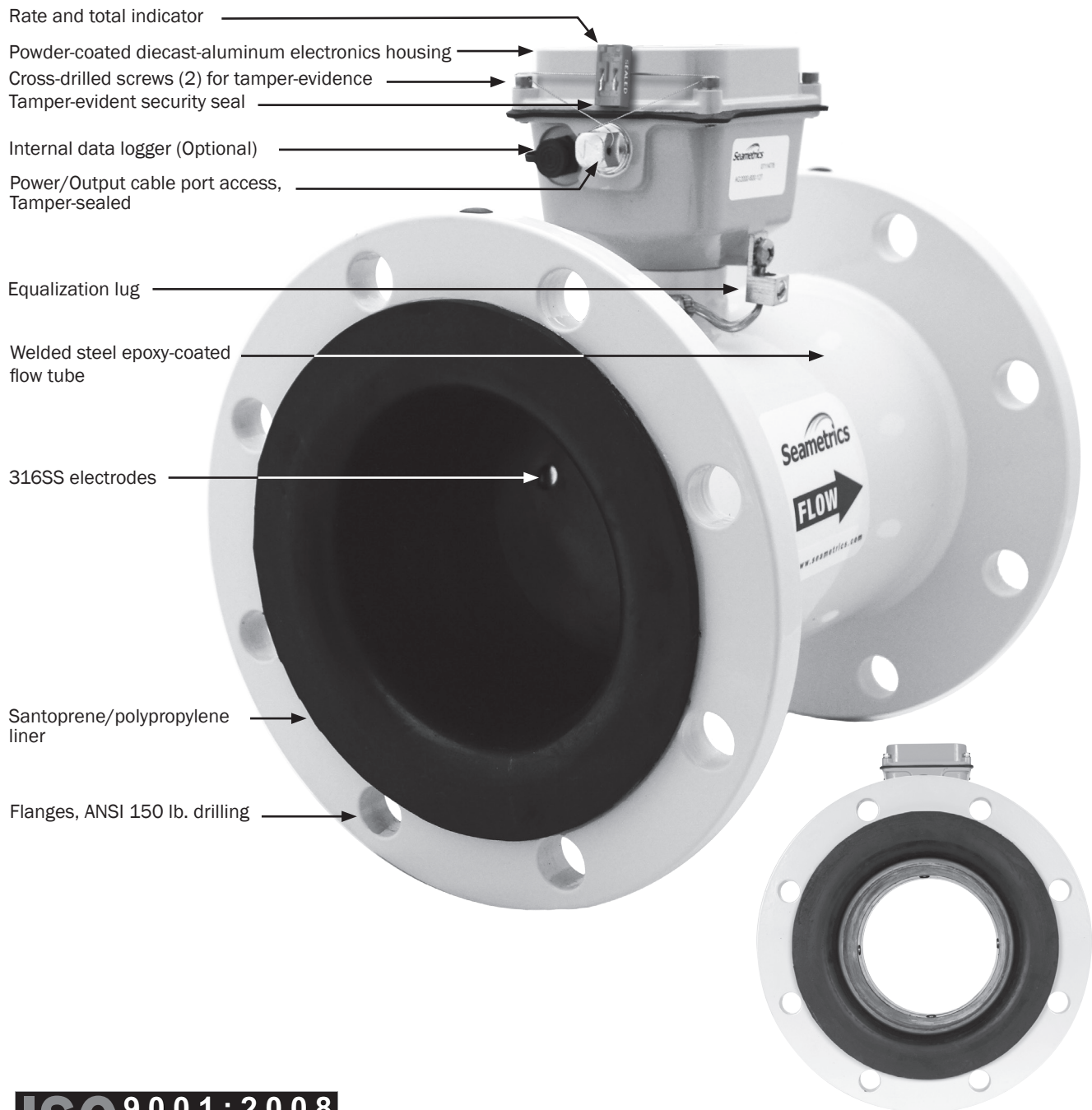
# AG2000



## IRRIGATION MAGMETER INSTRUCTIONS

AG2000 IRRIGATION MAGMETER INSTRUCTIONS

### FEATURES



**ISO 9001:2008**  
CERTIFIED COMPANY

**General Information**

Features..... Front

**Installation**

Tamper-Evident Seal ..... Page 3  
Positioning the Meter..... Page 3  
Full Pipe Recommendations..... Page 3  
Straight Pipe Recommendations ..... Page 3  
Chemigation Applications..... Page 3  
Fittings and Flanges..... Page 3  
Temperature ..... Page 3  
Calibration ..... Page 3  
Protecting the Meter ..... Page 3  
Conductivity ..... Page 3  
Flow Range ..... Page 3  
Installing the Gaskets ..... Page 4  
Tightening Flange Bolts ..... Page 4

**Equalization and Grounding**

Metal Pipe Installations ..... Page 5  
Plastic Pipe Installations ..... Page 5

**Power Supply**

Battery Power (Standard) ..... Page 5  
External Power (Optional) ..... Page 5  
Solar Power (Optional) ..... Page 5

**Operation**

Display Reading..... Page 6  
Optional Inputs/Outputs..... Page 6

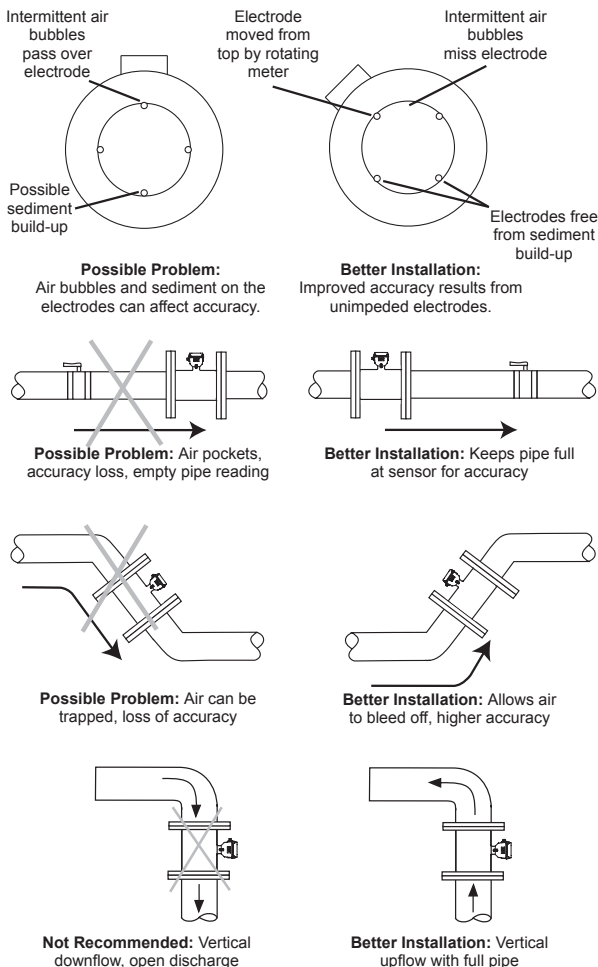
**Troubleshooting**

Problem..... Back  
Probable Cause ..... Back  
Things to Try..... Back

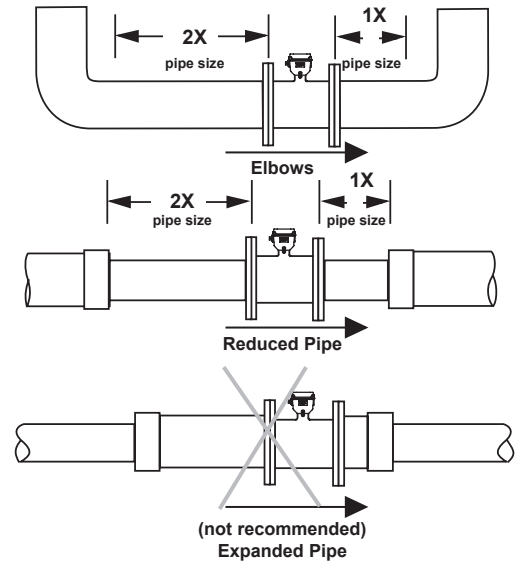
**Tamper-Evident Seal.** The battery-powered AG2000 has a seal wire to protect against unauthorized access. The seal can be broken to change units of measure, replace the battery pack, or to field-install a power/output cable (see page 6). **CAUTION:** If water usage regulation is in effect, only a person authorized by your regulatory agency should break the seal wire, and replace it when finished.

**Positioning the Meter.** These meters can be installed horizontally, vertically, and in any radial position. If sludge accumulation is possible, vertical or horizontal placement with the register at a 45° angle is recommended. **Using a check valve on the upstream side of the meter, and/or an air vent (vacuum relief valve) in the same, unobstructed run of pipe as the meter, is required in any installation where the meter may be exposed to suction when the system is not in normal operation. Suction can cause damage to the liner. Liner damage caused by suction, without the use of a check valve and/or air vent, may void the warranty.**

**Full Pipe Recommendations.** All magmeters require a method for determining that the pipe is empty, to prevent false reading. This meter is designed to go to zero reading if one or more electrodes is exposed. For highest accuracy, install the meter so that the pipe will be full when there is flow. If air bubbles may be present in the pipe, rotate the meter by one flange hole to position the control housing at a 45° angle. See mounting diagrams below.



**Straight Pipe Recommendations.** See the diagrams below for manufacturers' recommendations. **Local regulations may vary, confirm before installing to assure compliance.**



**Note:** See Technical Bulletin 'Piping Configurations for AG2000 Magmeters' at [www.seametrics.com](http://www.seametrics.com) for additional configuration information.

**Chemigation Applications.** Magmeters in chemigation applications must be placed either upstream of the chemical injection line, or far enough downstream for complete mixing to occur before the solution reaches the meter. Proper placement prevents spikes and drops in readings that result when fluids of different conductivity pass through the meter. (For more information, refer to the technical bulletin on the Seametrics website Downloads page.)

**Fittings and Flanges.** The AG2000 flanges have standard ANSI 150 lb. drilling, and should match up with any other ANSI 150 lb. flange. **IMPORTANT:** Piping protruding beyond welded-on flange faces may damage meter sealing surfaces.

**Temperature.** These flow sensors are recommended for operating temperatures of 10° to 130° F (-12° to 54° C) and non-operating temperatures of -40° to 158° F (-40° to 70° C).


**Calibration.** The AG2000 is factory calibrated and cannot be recalibrated in the field.

**Protecting the Meter.** A weather guard is recommended (Seametrics part #31388) for environmental protection.

**Conductivity.** The AG2000 requires media with >20 microSiemens/cm of conductivity.

**FLOW RANGE**

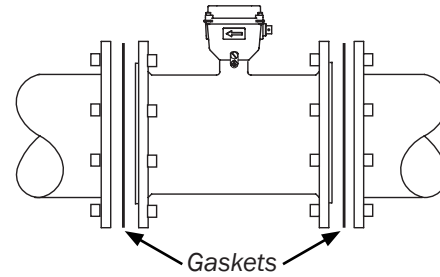
	Minimum	Maximum
3"	7.5 gal/min (0.47 liter/sec)	700 gal/min (44 liter/sec)
4"	12 gal/min (0.75 liter/sec)	1000 gal/min (63 liter/sec)
6"	32 gal/min (2 liter/sec)	2400 gal/min (151 liter/sec)
8"	60 gal/min (4 liter/sec)	4400 gal/min (278 liter/sec)
10"	95 gal/min (6 liter/sec)	7000 gal/min (442 liter/sec)
12"	130 gal/min (8 liter/sec)	10,000 gal/min (631 liter/sec)



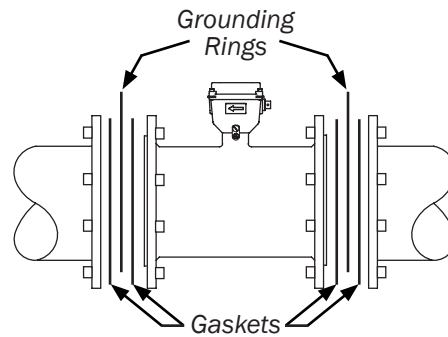
**GASKETS**  
Gaskets are required at all junctions.

**Installing the Gaskets.**

1. Select a suitable full-face gasket.
  - Only use flat compressible gaskets (either pliable or hard fiber will work).
  - Use a material compatible with the fluid you will be using.
  - Thickness should be 1/8" - 1/4" (3 - 6 mm), depending on the flatness of the pipe flange surface.
  - Inner diameter must be larger than opening in flow meter.
2. Be sure all mating surfaces are smooth and free of debris.
3. Install gaskets on each end of meter as shown in diagrams at right.



Installation without grounding rings

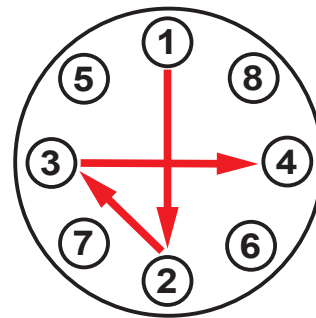


Installation with grounding rings

**Tightening Flange Bolts.**

NOTE: Mating pipe flanges must be ANSI 150# full face (FF) and/or raised face (RF).


1. Tighten flange bolts in an alternating pattern.
  - a. Tighten left flange bolt-1 to 20% recommended torque.
  - b. Tighten right flange bolt-1 to 20% of recommended torque.
  - c. Repeat steps a and b for each bolt in an alternating order, such as shown at right, tightening to 40%, then 60%, then 80%, and then 100%.
2. Test for leaks.
3. If needed, tighten further in 10% increments until leaking stops. **DO NOT over-tighten. Over-tightening can cause serious damage to the flow meter.**
4. Recheck after 24 hours, adjusting if needed.



Suggested tightening sequence.

**SUGGESTED FLANGE BOLT TORQUE**

Pipe Size	Santoprene Liner	
	ft-lb	Nm
3"	25	34
4"	20	27
6"	42	57
8"	65	88
10"	73	99
12"	97	132



**CAUTION!**  
Improper tightening sequence can cause serious damage to the flow meter.

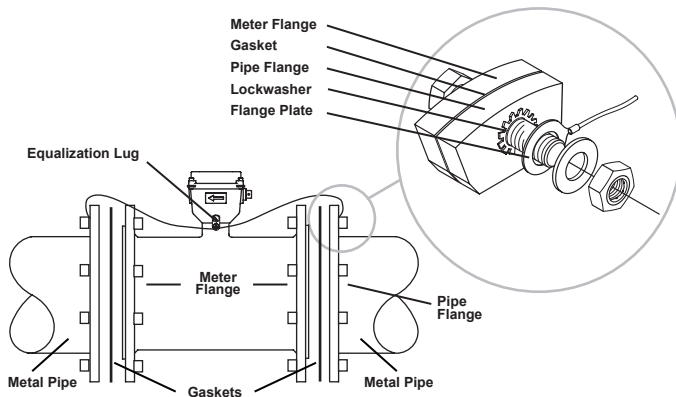
- Do not tighten one side at a time.
- Do not tighten each bolt completely at one time.



**WARNING: ELECTRICAL SHOCK HAZARD**

When the AG2000 is installed in a plastic piping system, or when externally powered, it is very important to ground the meter to avoid electrical shock hazard. Failure to do so can result in electrocution.

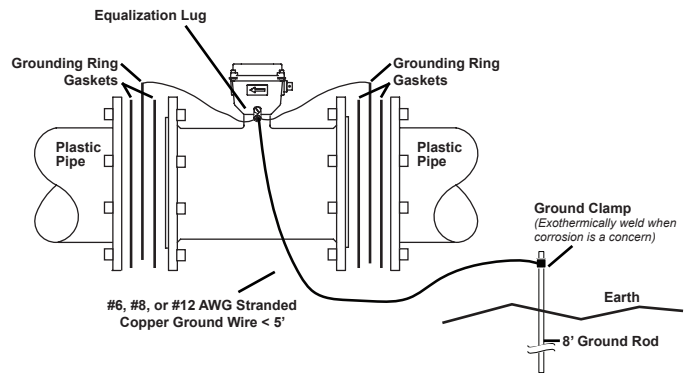
**Metal Pipe Installations.** To equalize the electrical potential of the fluid, the AG2000 meter, and the surrounding pipe, secure the flange plates (factory-installed on the equalization wire) to both pipe flanges at one of the bolt holes, as shown below. Be sure the lock washer fits between the pipe flange and the flange plate. For the best electrical bonding, remove rust and paint to expose clean, bare metal where the equalization flange plate lock washer contacts the pipe flange. Connection must be inspected periodically for corrosion to maintain the necessary low resistance connection.



**Plastic Pipe Installations.** When the AG2000 is installed in a plastic piping system, grounding rings are recommended, especially in the presence of electrical interference sources such as VFD pump drives. As shown in the diagram below, the equalization wires should then be connected to the grounding ring tabs instead of the flange bolts as in metal piping installations. Where lightning is a threat, or in severe electrical environments, an optional connection to a nearby equipment ground or ground rod may be advisable.

**Grounding Ring Part Numbers:**

3" = n/a	8" = 100878
4" = 100876	10" = 100879
6" = 100877	12" = 103288



**POWER SUPPLY**

**Battery Power (standard).** The AG2000 is powered by a non-rechargeable battery pack with standard battery life of 2.5 years; 5 years with extended battery life (EBL) option. Actual lifespan will vary from application to application, depending on the duty cycle (the High Frequency option, if selected, will shorten battery life).

“Low Batt” will display when it is time to replace the battery (see illustration at right). Replacement instructions come with the custom battery pack available from your dealer or Seametrics.

**NOTE:** Memory will not be lost during a battery change.

**External Power (optional).** When external power is used, the batteries serve as backup in case of power failure, keeping the meter reading out during an outage. The display reads “P” to indicate that external power is in use (see illustration on next page).

When the display is reading numbers/letters but neither the “Low Batt” or “P” symbol is displayed, the meter is functioning normally under battery power (see illustration at right). When the display is completely blank, the meter is not powered.

**Solar Power (optional).** In most areas of the US, a 12-volt, 5 watt solar power unit (panel, charge controller and battery) should suffice to operate the meter. In this case, the internal batteries will serve as backup and battery life will be conserved.

**Display Reading.** There are two lines to the display, the bottom line for flow rate and the top line for accumulated total. Measurement units are pre-ordered and factory-set and can be changed in the field only by an authorized individual.



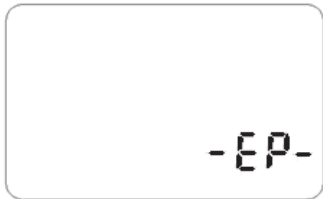
**Low Battery Indicator**



**No Power**



**External Power Indicator**



**Empty Pipe**



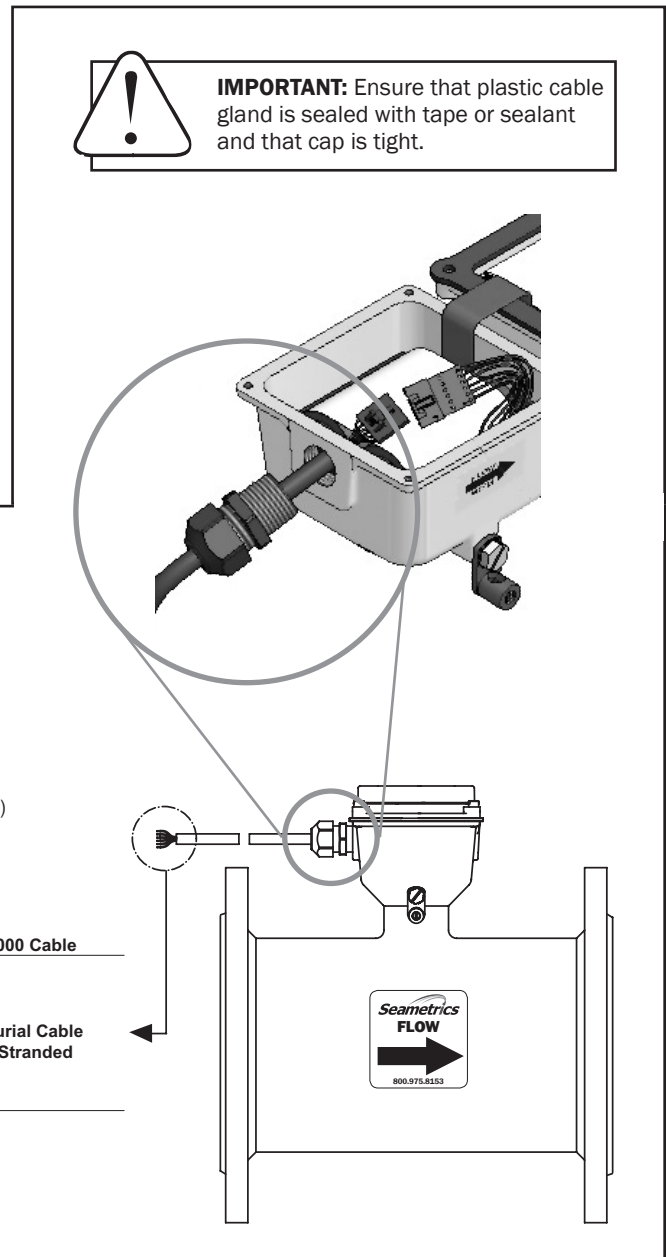
**Battery Power**



**Meter Installed Backwards**

**Optional Input and Outputs.** An optional cable, factory-installed or field-installed by an authorized individual, provides power input, pulse output\* for remote reading (4-20 mA conversion, telemetry and data logging functions). See diagram below. Detailed wiring diagrams provided with cable. \*See *High Frequency Output Technical Bulletin* for available pulse rates.

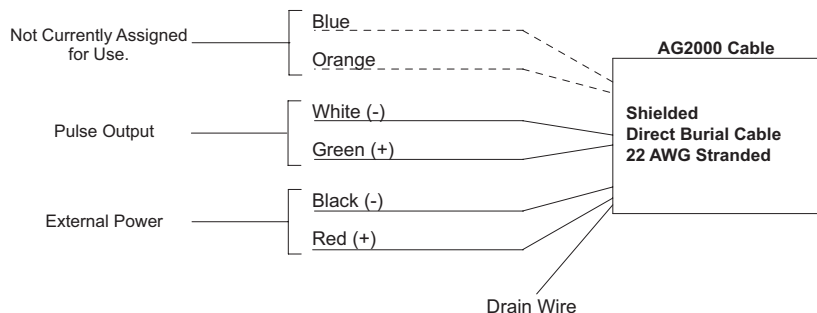
**For data logger setup and operation, refer to FlowInspector Manual**



**Optional Input/Output Cable - Factory or Field Installed**

**WARNING:** Using an unregulated power supply >18 Vdc may damage the meter due to AC line input voltage fluctuation.

- Orange and Blue:** Serial Output (Technician Use Only)
- Green (+) and White (-):** Pulse Output, 30 Vdc max, 10 mA max
- Red (+) and Black (-):** External Power, 8-32 Vdc at 30 mA max (See **WARNING**)
- Drain:** Connect to earth ground





Problem	Probable Cause	Try...
Blank display	Dead battery	Replace battery pack
Flow rate steadily reads zero when there is flow	Flow is below cutoff (very low) There is air in the meter	Reading will resume when flow increases Reposition meter for full pipe
Display reads [ - ]	Meter is installed backward	Note flow direction arrow, reverse meter
Flow rate intermittently drops when there is flow	There is air in the meter	Reposition meter for full pipe or rotate to avoid bubbles
Jumpy reading	Improperly equalized Pulsing flow Rapidly changing conductivity (chemigation applications)	Check for proper equalization Use external power source (allows more flow averaging) Install chemigation line downstream of meter (or enough upstream for thorough mixing of fluids before meter)