

SILVER SERIES INSTALLATION INSTRUCTIONS

This is important information. Read it carefully before beginning work.

- 1) Inspect the meter for damage that may have occurred during shipping. If container is damaged report this to the freight carrier immediately.
- 2) Make sure your pressure, temperature, fluid and other requirements are compatible with the meter.
- 3) Select a suitable location for installation to prevent excess stress on the meter which may result from:
 - a) Misaligned pipe.
 - b) The weight of related plumbing.
 - c) "Water Hammer" which is most likely to occur when flow is suddenly stopped as with quick closing solenoid operated valves. (If necessary a surge chamber should be installed. This will also be useful in pressure start-up situations.)
 - d) Thermal expansion of liquid in a stagnated or valve isolated system.
 - e) It is recommended to install valving which will allow the meter to be drained. Meter should be drained when not in use or prior to maintenance.
 - f) Instantaneous pressurization which will stress the meter and could result in tube failure.

Note: In closed thermal transfer or cooling systems install the meter in the cool side of the line to minimize meter expansion and contraction and possible fluid leaks at the threaded connections.

- 4) Handle the meter carefully during installation.
 - a) Use an appropriate amount of Teflon tape on external pipe threads before making connections. Do not use paste or stick type thread sealing products.
 - b) Overtightening of PVDF connections may result in fitting damage.
- 5) Install the meter vertically with the inlet port at the bottom.
- 6) Connections: Fittings are fully rotatable by loosening fitting retainer screws during installation. Make sure fitting retainer screws are tightened after adjustment of fitting.
- 7) Meters with stainless steel fittings will support several feet of pipe as long as significant vibration or stress resulting from misaligned pipe are not factors.
- 8) Meters with plastic fittings must be installed so that fittings are not made to support any part of the associated plumbing. In addition, meter frame should be fastened to bulkhead, panel or column.
- 9) Meters used in gas service should have suitable valves plumbed in at the inlet and outlet of the meter. These valves should be no more than 1 1/2 pipe diameters from the meter ports. The valve at the outlet should be used to create back pressure as required to prevent float bounce. It should be set initially and then left alone. The inlet valve should be used for throttling purposes. Depending on the installation, valves may not be essential, but they are most useful in many installations. Remember: To get a correct reading of flow in gas service it is necessary to know the pressure right at the outlet of the meter (before the valve).

MAINTENANCE

To minimize downtime, Silver Series metering tubes were designed to be removed without uninstalling flowmeter from piping system. Meter should be drained prior to maintenance.

Removal of glass tube: Remove the 4 shield screws with a 3/16" hex wrench and detach the shield from the frame. Loosen the scale plate screws and remove the scale plate. Loosen the tube retainer screws and pull the tube retainer forward. Rotate the glass tube to loosen the o-ring seal. Carefully push the glass tube up until its bottom clears the inlet fitting. Angle the bottom of the glass tube forward keeping a finger under the tube to prevent the internals from falling out. Remove the tube by pulling the glass tube down and away from the frame. Use caution. Pulling glass tube at an extreme angle, or by excessive force will cause tube to break. Do not allow float to fall. Float damage may result in meter inaccuracy.

Cleaning: Components can be cleaned with a mild soap solution. This will be an effective cleaner of rust stains. A bottle brush may be helpful in cleaning the inside of the glass tube. Caution must be used so that materials of construction are not damaged by cleaning solutions. Hard water deposits can be removed with a 5% acetic acid solution (vinegar). Before the meter is reassembled, inspect all parts for damage.

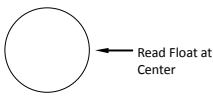
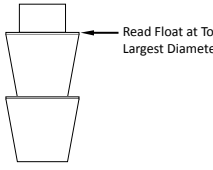
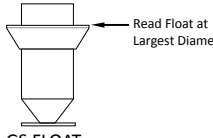
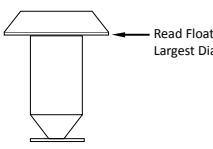
Re-installation of glass tube: Inspect all parts for damage prior to re-assembly. Replacement of o-rings during meter maintenance is recommended. O-rings should be generously lubricated using a silicone based o-ring lubricant. Insert the float and float stops into the glass tube. Make sure the orientation of the float is correct prior to installing. Carefully slide glass tube assembly onto top fitting at a slight angle and align with bottom fitting. Be careful that the internals do not fall out during this process. Gently pull glass tube down onto bottom fitting. Secure the tube by pushing the tube retainer between the glass tube and the upper fitting and tightening the screws. Replace the scale plate making sure the reference line on the scale is aligned with the reference line on the glass tube. Re-install the front shield.

CAUTION:

- Silver Series meters have O-ring seals. Use with incompatible fluids may cause O-rings to swell which may cause glass tubes to fail.
- Plastic fittings are not suitable for gas applications.
- Extra caution must be exercised when meters are used in high pressure gas cylinder applications. Pressure regulators should be installed at the cylinder and at the inlet of the meter.
- Serious property damage and great personal injury could occur as the result of a meter misused or used in an unsuitable application.

WARNING:

Pressure and temperature ratings are based on a study of the engineering data for particular materials used in construction and on the design of individual models. This information is supplemented by destructive test results. Meters with stainless enclosures must never be operated without shields securely in place. Meters exposed to difficult environments such as those created by certain chemicals, excessive vibration or other stress inducing factors could fail at or below the suggested maximums. Never operate meters above pressure and temperature maximums. It is strongly recommended that all meter installations utilize an appropriate pressure relief valve and/or rupture disc. The pressure settings and locations of these devices should be such that meters cannot be overpressurized. Meter failure could result in damage to equipment and serious personal injury. Always use suitable safety gear, including OSHA approved eye protection when working around meters in service. We are happy to pass along chemical compatibility information that has been published by the manufactures of raw materials used in our products; however, this information should not be construed as a recommendation made by King Instrument Company, Inc. for a specific application.

9000 Series Float Discription Table
 <p>Read Float at Center</p> <p>SPHERICAL FLOAT Lowest meter capacity or medium capacity with low viscosity fluids.</p>
 <p>Read Float at Top Largest Diameter</p> <p>L J FLOAT Maximum flowmeter capacity with limited viscosity immunity.</p>
 <p>Read Float at Largest Diameter</p> <p>GS FLOAT High flow capacity with some immunity to viscous fluids.</p>
 <p>Read Float at Largest Diameter</p> <p>GV FLOAT Highest immunity to viscous fluids with medium meter capacity.</p>

METERS FOR GAS SERVICE

Meters used in gas service may be susceptible to float bounce. (This is especially true in low density gas applications.) To reduce the possibility of float bounce, valves should be installed at both ends of the meter. Make sure there is minimum piping between the valve and the meter body. During start up (with both valves closed) open the inlet 1/2 turn, then slowly open the outlet two turns. Return to the inlet and open another two turns. Now adjust a combination of the valves to achieve desired flow. Make sure to open the valves slowly. If the float begins to bounce, close the valves immediately and begin procedure again. Both the inlet and outlet valves should be opened to the minimum required setting to achieve the desired flow. Follow this procedure during each start up. A pressure gage installed between the outlet of the meter and the downstream piping will show the pressure in the meter and will allow the exact flow to be calculated by deriving a multiplier (X) using the formula shown below. (multiply the indicated flow by the value of "X" to obtain the actual flow at the corrected pressure.) $X = \text{square root of } ([14.7 + \text{operating pressure}] / 14.7)$

Meters are not specifically recommended for service other than water or air.
The user must determine meter suitability for use with other fluids.

FLOWMETER LIMITED WARRANTY

Meters are warranted against defects in materials and workmanship to the original user for a period of thirteen (13) months from the date of factory shipment, provided the meter is installed, operated and maintained in accordance with the Company's instructions and recommendations. This warranty does not apply if the failure is caused or contributed to by any of the following: improper handling, improper storage, improper installation, abuse, unsuitable application of the product, lack of reasonable and necessary maintenance, use exceeding suggested pressure and temperature maximums, improper packaging for return, or repairs made or attempted to be made by other than the Company.

THE COMPANY MAKES NO WARRANTY AS TO THE FITNESS OF ITS PRODUCTS FOR SPECIFIC APPLICATIONS.

This warranty is valid for the original end-user only and does not apply to products that have been damaged or modified. This warranty is nontransferable and is limited to replacement or repair. The liability of the Company arising out of its supply of the products, or their use, shall not in any case exceed the cost of correcting defects in the products as above set forth.

THIS WARRANTY IS A LIMITED WARRANTY AND SHALL BE IN LIEU OF ANY OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO ANY IMPLIED WARRANTY OR MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. THERE ARE NO OTHER WARRANTIES WHICH EXIST BEYOND THE DESCRIPTION OR FACE HEREOF. IN NO EVENT SHALL THE COMPANY BE LIABLE FOR LOSS OF PROFITS, INDIRECT, CONSEQUENTIAL OR INCIDENTAL DAMAGES.

Products should be returned, prepaid, to the Company with proof of purchase.