ROOTS Meters Series B3
Meter Models 8C175-56M175
Refer to IOM-B3 for Complete Instructions

WARNING
Read and follow ALL installation instructions shipped with this meter. Failure to properly install this equipment could result in escaping gas, and cause property damage, serious injury or death.
RECEIVING, HANDLING AND STORAGE

ROOTS® rotary positive displacement gas meters are precision measurement instruments. Although of very rugged construction, reasonable care should be given during handling and storage.

At time of delivery

1. Check the packing list to account for all items received.
2. Inspect each item for damage.
3. Record any visible damage or shortages on the delivery record
   • File a claim with the carrier.
   • Notify your ROOTS® meter supplier immediately.

IMPORTANT NOTES

• Do not accept any shipment with evidence of mishandling in transit without making an immediate inspection for damage and checking each meter for free rotation of the impellers. Refer to “Meter Installation” procedures. All new meters should be checked for free rotation soon after arrival since damage to internal working parts can exist without obvious external evidence.
• Should any serious problems be encountered during installation or initial operation of the meter, notify your ROOTS® meter supplier immediately.
• Do not attempt repairs or adjustments, as doing so is a basis for voiding all claims for warranty.
• If the meter is not tested or installed soon after receipt, store in a dry location in the original shipping container for added protection. Make sure the box remains horizontal with the arrow pointing up. Leave the protective caps installed in the meter flanges. The caps will provide reasonable protection against atmospheric moisture.
• Do not add oil to the two meter end cover oil reservoirs until after the meter has been installed in a permanent installation and is ready for service. The Series 3 (Life-Lubed) Accessory Unit does not require lubrication.
• When reporting a suspected problem, please provide the following information:
  • Your sales Order Number and/or Dresser Order Number.
  • Meter Model, Serial Number and Bill of Material Number.
  • Accessory Unit Bill of Material Number and Serial Number, if applicable
  • Description of problem.
  • Application information such as gas type, pressure, temperature, and flow characteristics.

Our Product Services Department offers professional services for all ROOTS® products. Authorization for return is required for all ROOTS® products shipped to the Factory for repair, calibrations, warranty, exchange or credit. To obtain authorization for return of ROOTS® products purchased from a Dresser Distributor or Representative please contact the Distributor or Representative from whom the product was purchased. Refer to our Return Material Authorization procedure. All returns should be packaged in an original-type shipping container.
Use and Limitations

The ROOTS® meter is a positive displacement, rotary type gas meter designed for continuously measuring and indicating the accurate measurement of gas flow in a pipeline.

ROOTS® meters are suitable for handling most types of clean, dry, common gases at either constant or varying flow rates. The meter is not suitable for handling liquids. Measurement accuracy and life expectancy can be impeded by excessive deposits of dirt or other types of foreign material present in the gas stream. A filter or stainer may be used for added protection of the meter and other downstream equipment.

Meters of standard construction are not directly suitable for handling acetylene, biogas or sewage gas. Specially constructed meters made of materials directly compatible with these and other gases are available. Please contact your ROOTS® meter supplier for details and to request publication S:SSM.

METER INSTALLATION

Piping configurations

Line mounted ROOTS® meters may be installed in either a Top Inlet (vertical) or a Side Inlet (horizontal) configuration. The preferred or recommended installation is top inlet in a vertical pipeline with gas flow downward.

Proper torque is required to effectively seal the piping/meter flanges while lowering the stress of the meter. Some full-face gaskets, such as Phenolic insulating gaskets, with little or no laminated Neoprene backings may be more difficult to seal.

A Phenolic gasket with an imbedded sealing O-ring is recommended for applications requiring a full-face gasket. Dresser offers the ROOTS® gasket strainer and Linebacker® insulating gasket for these applications.

An additional recommendation is to install the meter in a side loop with a bypass adjacent to the main line. Piping should be solid and properly aligned. Eliminate piping strains on the meter body. The installation of tees upstream and downstream of the meter provide a means for transfer proving a meter still mounted in the pipeline.
Meter Pressure Rating

The maximum working pressure of a rotary meter is limited by case design. Refer to the meter nameplate for the maximum allowable operating pressure (MAOP). A meter should not be installed where line pressure can exceed the meter MAOP.

Placing Meter In Line

IMPORTANT: Remove the plastic protective caps from both meter flanges prior to meter installation

1. Before installing a meter:
   - Make sure the upstream piping is clean by using extreme caution and following recommended company procedures when venting to atmosphere
   - Insure the impellers turn freely and no objects or contaminants are in the measuring chamber. Depending upon meter condition, it may be necessary to flush the meter with an approved solvent. After flushing, drain all solvent from both end covers. Make sure the measuring chamber is clean and dry and the impellers turn freely. Refer to IOM:B3.

2. Meter Orientation:
   - Connect meter inlet to the gas supply side of the line, insuring the gas flow will be in the same direction as the arrow on the meter body nameplate (i.e. arrow pointing downward for Top Inlet).
   - In a correct installation, both meter oil level gauges are parallel to the ground.

3. Install the meter without piping strain to prevent a binding of the impellers. Use pipe supports as required. Level all 8C-56M line mount Series B3 meters to within 1/16” per running foot (5mm/m), side-to-side and front-to-back.

4. Tighten flange bolts evenly in a cross-pattern. The maximum torque on a lubricated 5/8-11 cap screw is approximately 55 foot-pounds, and approximately 60 ft.lb. for non-lubricated cap screws.

5. DANGER: The meter must NOT be under pressure for the procedure. After the meter is installed, remove the socket head plug in the timing gear and cover using an Allen wrench. Depending on meter type, insert an Allen driver into the socket head gear clamp and slowly turn the impellers, checking for free rotation. If binding is present, do not attempt to disengage the impellers. Remove the meter from the set and clear all obstructions or piping strain prior to reinstallation. Replace the plug after verifying free impeller rotation.

6. There are oil reservoirs in the ROOTS® meter Series B basic body. Oil is shipped with each new meter in a quantity sufficient to fill the reservoirs in either a Top Inlet or a Side Inlet configuration.
   a. Remove the pipe plugs in the meter end covers. Slowly add oil to each cover reservoir until the oil level is to the center of the oil gauge (sight glass). **DO NOT OVERFILL.**
   b. **IMPORTANT: DO NOT add oil to the permanently lubricated Series 3 accessory unit.** **DO NOT drill and tap the Lexan® cover.**
Meter Start-Up

Slowly pressurize the meter in accordance with the following recommendations:

**IMPORTANT:** Do not exceed 5 psig/second (35 kPa/second) maximum when pressurizing. Rapid pressurization can cause an over-speed condition which may damage the meter. Resulting damage is not covered by warranty.

a. Open the bypass and outlet (downstream of meter) gas valves.
b. Partially open the meter inlet gas valve until the meter starts operating at low speed. Throttling of the bypass valve may be necessary to initiate gas flow through the meter. Verify gas is flowing through the meter by watching for movement of the black-and-white RPM wheel on the accessory unit. If movement is present, go to step c. If the RPM dial is not turning, verify gas is being delivered to the meter. If gas is flowing to the meter inlet and the RPM wheel is not moving, go to step e.

c. Let the meter operate at low speed for several minutes. Listen closely for unusual scraping or knocking sounds.
d. If operation is satisfactory, go directly to step f.
e. If unusual sounds are present or the accessory unit’s RPM wheel is not turning, place the meter in bypass. Slowly depressurize and vent all pressure from the meter set before checking for piping misalignment, piping strain, torsion, or other related problems. Once the problem has been resolved, repeat the start-up procedure beginning with step a.

**DANGER:** Slowly depressurize and vent all pressure from the meter set before working on meter.

f. Gradually open the inlet valve until full line flow is passing through the meter and the inlet valve is fully open.
g. Slowly close the bypass valve.
h. Follow your company authorized procedure or common practice to leak test the meter and all connections. Soapy water, Snoop® and gas analyzers are commonly used for this procedure.
INSPECTION AND MAINTENANCE

Lubrication

Meters installed and maintained in accordance with factory recommendations can be expected to operate dependably for many years. Proper oil level and cleanliness have the greatest effect on meter life expectancy. The two oil reservoirs in the meter end covers should be visually inspected for proper mid-gauge oil levels once a month until a practical interval is determined. Add oil as necessary.

Use only the instrument grade oils approved for service by the manufacturer. (i.e. ROOTS® meter oil).

No scheduled lubrication maintenance is required.

Meter oil change frequency will depend upon the cleanliness of the gas being measured. Change oil when the color darkens or when the level increases, indicating an accumulation of moisture. Under favorable conditions, these periods may be from 3 to 5 years, or longer.

**CAUTION: THE METER END COVER IS PRESSURIZED.**

Bleed off the line pressure before removing the oil fill or drain plug from the meter.

The permanently lubricated Series 3 Accessory Units is sealed-off from the meter body and is not pressurized.

**DO NOT add oil to the Series 3 Accessory Unit.**
Since the meter is supported entirely by the gas pipe line, movement of the piping due to settling of the ground or other causes can impede meter operation and accuracy. Refer to “INSTALLATION” procedures. Make sure the meter remains level within 1/16” per foot (5mm/m) in any direction, side to side, front to back.

**INSTALLATION DIFFERENTIAL TESTING**

A change in the meter’s internal resistance can affect rotary meter accuracy. Any significant increase on the meter’s internal resistance to flow will increase the pressure drop between the inlet and outlet of the meter, thus increasing the differential. Therefore, the meter differential pressure appears as a prime indicator of meter condition.

**Establishing Base Line Curves** - developing an original differential or baseline curve is recommended at the time of meter initial installation. At least (3) test points are required at gas flow rates from 25% to 100% of meter capacity. Plot the points on a graph and then connect the points to form a curve. This provides baseline data for comparison to later tests.

### TROUBLE SHOOTING CHECKLIST

<table>
<thead>
<tr>
<th>Trouble</th>
<th>Item</th>
<th>Possible Cause</th>
<th>Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Flow Registered</td>
<td>1</td>
<td>Obstruction in piping or meter.</td>
<td>Check pipe and valves to assure an open flow path. Check for impeller rotation. Refer to Step #5 “Placing meter in line.”</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>Index or RPM wheel does not turn.</td>
<td>No gas flow. Open valve or remove obstruction per item 1.</td>
</tr>
<tr>
<td>High Differential</td>
<td>3</td>
<td>Build-up of deposits in measuring chamber.</td>
<td>Flush meter.</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>Worn bearings or gears.</td>
<td>Replace or Return to Dresser’s Product Service Department.</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>High oil level or heavy oil.</td>
<td>Check oil level and cleanliness.</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>Impellers rubbing cylinder or headplates, or meter out of time.</td>
<td>Rotate impellers manually to check for binding or rubbing. Remove obstructions and/or time the meter. Check the meter level.</td>
</tr>
<tr>
<td>Vibration/Noise</td>
<td>7</td>
<td>Piping misalignment or strain.</td>
<td>Remove piping strain, Level meter.</td>
</tr>
<tr>
<td></td>
<td>8</td>
<td>Impellers rubbing casing.</td>
<td>See items #7 &amp; #9.</td>
</tr>
<tr>
<td></td>
<td>9</td>
<td>Contaminants in measuring chamber.</td>
<td>See item #6.</td>
</tr>
</tbody>
</table>
WARNING

Read and follow ALL installation instructions shipped with this meter. Failure to properly install this equipment could result in escaping gas, and cause property damage, serious injury or death.