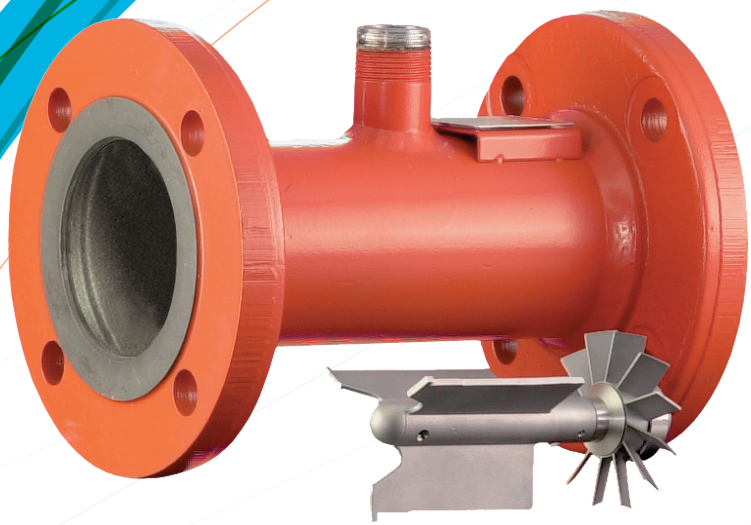
GUIDANT

# Smith Meter® Guardsman G™ and L™ Series Turbine Meters

## Installation, Operation, and Service Manual

Bulletin MN02002 Issue/Rev. 0.9 (11/25)



## Important

All information and technical specifications in this document have been carefully checked and compiled by the author; however, we cannot completely exclude the possibility of errors. Guidant Measurement is always grateful to be informed of any errors; contact us at TechnicalCommunications@GuidantMeasurement.com.

## Caution

The default or operating values used in this document and in the configuration parameters of the product described in this document are for factory testing only and should not be construed as default or operating values for your system. Each system is unique and each configuration parameter must be reviewed and programmed for that specific system application.

## Disclaimer

Guidant hereby disclaims all responsibility for damages, including but not included to consequential damages arising out of or related to the inputting of incorrect or improper program or default values entered in connection with the product described in this document.

## Technical Support

### Field Service Response Center

24/7 Technical Support/Schedule a Technician: +1 844.203.4014
System installation supervision, startup, and commissioning services are available.

## Customer Support

### Erie Customer Service

Guidant Measurement
1602 Wagner Avenue
Erie, PA 16510 USA
+1 814.898.5000
MS.ResponseCenter@GuidantMeasurement.com

### Ellerbek Customer Service

Guidant Measurement
Smith Meter GmbH
Regentstrasse 1 25474 Ellerbek, Germany
P.O. Box 1164 25470 Ellerbek, Germany
+49 4101 304-0
ResponseCenter.MS@GuidantMeasurement.com

### Guidant Knowledge Base

KB.GuidantMeasurement.com

# Contents

1 General Information ..... 1
1.1 Introduction ..... 1
1.2 Receipt of Equipment ..... 2
1.3 Pre-Installation Inspection ..... 2
2 Installation ..... 3
2.1 Mechanical Installation ..... 3
2.1.1 Back Pressure ..... 3
2.1.2 Strainer ..... 3
2.1.3 Flow Conditioning ..... 4
2.1.4 Strate Plate ..... 5
2.1.5 Meter Bypass ..... 6
2.2 Electrical Installation ..... 6
2.2.1 Electrical Installations (General) ..... 7
2.2.2 Electrical Installations (ATEX and IECEx Certifications) ..... 8
2.2.3 Electrical Installations for Brazil ..... 9
2.2.4 Installations Following North American Electrical Codes ..... 9
2.2.5 Electrical Connections ..... 9
3 Repair Guide ..... 11
3.1 Pickup Coil Removal ..... 11
3.2 Pickup Coil ..... 12
3.3 Internal Parts Removal and Disassembly Procedure ..... 12

3.4 Ball Bearing Replacement (Guardsman LB Series Only) ..... 14
3.5 Rotor Bearing Replacement (Guardsman and Guardsman LJ Series Only) 15
3.6 Internal Parts Reassembly Procedure (Guardsman and Guardsman L Series) ..... 16

4 Operation ..... 18

4.1 Typical Hook-Up ..... 18
4.2 Proving ..... 18
4.3 Maintenance ..... 19

5 Troubleshooting Guide ..... 20

6 Related Publications ..... 22

6.1 Specifications ..... 22
6.2 Parts Lists ..... 22

# 1 General Information

This manual includes the installation and service for:

- Guardsman (G) Series
- Guardsman L Ball Bearing (LB) Series
- Guardsman L Journal Bearing (LJ and LSJ) Series

> NOTE: Meters shipped after September 1991 have the catalog code (formerly termed “model code”) on the nameplate. Consult the respective specification bulletin or the factory for code descriptions.

## 1.1 Introduction

The Smith Meter Guardsman G and Guardsman L Series Turbine Meters are volumetric flow measuring transducers with a frequency output that is directly proportional to flow rate.

The turbine meter consists of a rotor which senses the linear velocity of a flow stream. The moving liquid imparts a rotation velocity to the rotor which is detected electrically by a variable reluctance-type pickup coil. As the equally-spaced, ferromagnetic rotor blades pass through the magnetic field created by the pickup coil, a sinusoidal voltage is generated. The peak-to-peak voltage of this signal is directly proportional to the rotor speed and each positive peak-to-peak voltage pulse represents an increment of volume throughput.

The output per unit volume is termed K-Factor (pulses/unit volume). For a specific meter, the K-Factor, as determined through a factory performance test, is listed on a “Turbine Meter Test Data Card” which is supplied with the meter. For maximum accuracy, the actual K-Factor must be established for a given product from on-site proving at the actual operating conditions.

## 1.2 Receipt of Equipment

When the equipment is received, the outside packing case should be checked immediately for any shipping damage. If the packing case has been damaged, the local carrier should be notified at once regarding his liability. Carefully remove the unit from its packing case and inspect for damaged or missing parts.

If damage has occurred during shipment or parts are missing, a written report should be submitted to the Customer Service Department, Guidant, P.O. Box 10428, Erie, Pennsylvania 16514-0428.

Prior to installation, the unit should be stored in its original packing case and protected from adverse weather conditions and abuse.

## 1.3 Pre-Installation Inspection

Visually inspect the meter and meter nameplate to insure the proper size, model number, flange rating, and flow range.

> NOTE: The direction of flow (described by an arrow) in which the unit was calibrated and should be installed.

The Guardsman G and Guardsman L Series Turbine Meters are precise measuring instruments and should be treated as such. Install carefully.

# 2 Installation

## 2.1 Mechanical Installation

> WARNING: Meters shipped after September 1991 have the catalog code (formerly termed “model code”) on the nameplate. Consult the respective specification bulletin or the factory for code descriptions.

It is recommended that turbine meters be installed in the section of piping where the pressure is highest, downstream from pumps and upstream from valves, see Section Figure 1: Typical Guardsman Series Turbine Meter Installation (Horizontal Only). When it is expected that flow will be intermittent, the turbine meter should not be mounted at or near a low point in the piping. Solids or water which settle in a low point can freeze or damage the metering element.

The piping arrangements herein described are intended to be general recommendations and, therefore, may require modification top fit your specific applications.

### 2.1.1 Back Pressure

A positive back pressure is required to prevent cavitation and inaccurate output.

Recommended back pressure = 2 x pressure drop + 1.25 x absolute vapor pressure.

Example: 3-Inch turbine meter, flow rate 600 gallons per minute (GPM), vapor pressure 10 pound-force per square inch absolute (psia)

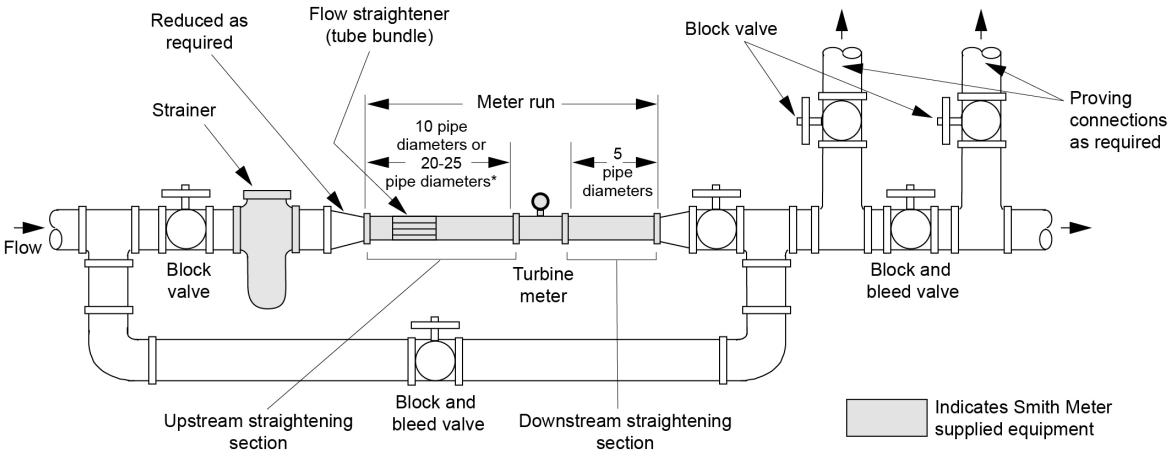
Back pressure = 2 x 3 + 1.25 x 10 = 18.5 pounds per square inch gauge (psig)

### 2.1.2 Strainer

A strainer should be installed to protect the flow meter and extend service life. For most installations, a 20- or 40-mesh screen is suitable.

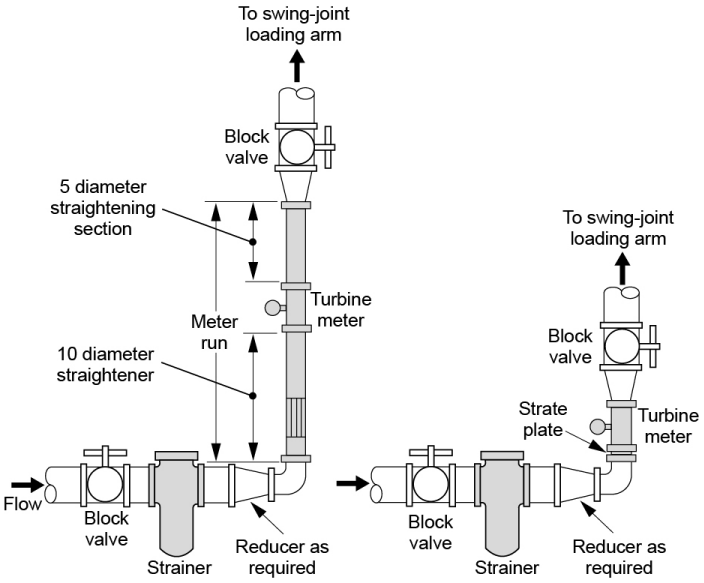
> **WARNING:** Thermal expansion of liquid in this equipment can cause high pressure damage. A thermal pressure relief valve may be necessary in the system.

Figure 1: Typical Guardsman Series Turbine Meter Installation (Horizontal Only)




**10 pipe diameters with tube bundle or 20-25 pipe diameters without tube bundle.*

Figure 2: Typical Guardsman L Series Turbine Meter Installation (Vertical or Horizontal, Conventional, and Strate Plate Flow Conditioners)




## 2.1.3 Flow Conditioning

The standard rule of 20 to 25 pipe diameters upstream of the meter (where a flow straightener is not used) and 5 pipe diameters downstream of the meter may be

adequate for some installations. However, variables of viscosity, pipe size, and upstream configuration (fittings) should be considered. Therefore, reference should be made to the API Manual of Petroleum Measurement Standards, Chapter 5, Section 3 – Turbine Meters.

## 2.1.4 Strate Plate

When a strate plate is supplied with a meter, it is matched marked at the factory. When installing the strate plate, the arrows on the housing and the strate plate should be aligned.

For cases where the strate plate is not matched marked (field retrofits), the strate plate should be installed so that holes forming a straight line are aligned with the number 1 boss.

> NOTE: The strate plate has a cutout on the bottom of the plate to align with the number 1 pick-up boss.

Figure 3: Strate Plate for the Guardsman LJ (Vertical and Horizontal) Turbine Meter

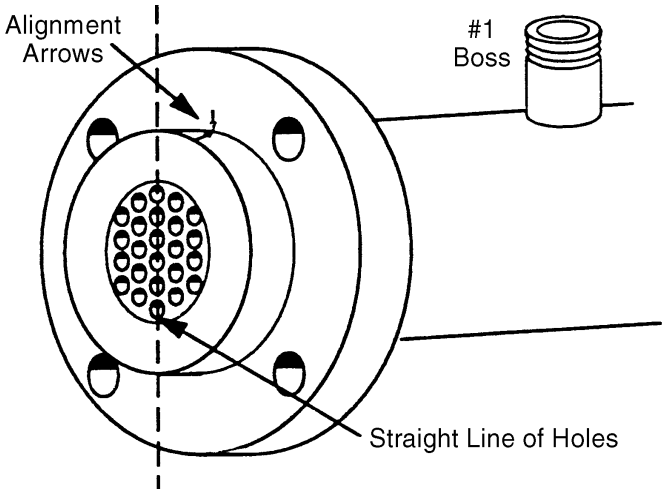
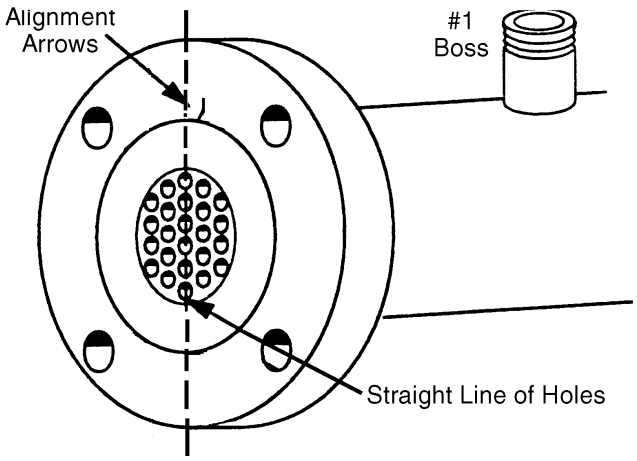


Figure 4: Strate Plate for the Guardsman LSJ (Vertical and Horizontal) Turbine Meter




NOTE: For meters manufactured prior to October, 2002 the strate plate has two mounting screws on the outer diameter of the plate. For meters manufactured after October, 2002 the strate plate has one mounting screw located in the middle of the strate plate.

### 2.1.5 Meter Bypass

Where possible, such as in a new system, it is advisable to include a valved bypass around the metering section. This allows inspection of the meter without stopping the system flow. The bypass connections, however, should not be placed within the “meter run”, see Section Figure 1: Typical Guardsman Series Turbine Meter Installation (Horizontal Only).

## 2.2 Electrical Installation

Turbine meters are supplied with a signal pickup coil mounted in an explosion-proof housing attached to the meter. Where the transmission distance from the meter to an electronic readout is less than 2,000 feet (ft) (609.6 meters (m)), no special amplification is required if Smith electronic readout is less than 2,000 feet (609.6 m), no special amplification is required if Smith electronic instruments having "Common Mode Rejection" are employed. The signal input, direct from the pickup coil, enters the readout device through a common mode noise rejection

circuit. The circuit is sensitive to low-level meter signals, but highly insensitive to unwanted noise interference.

In cases where the signal transmission distance is greater than 2,000 feet (609.6 m) and Smith Meter instruments are being used, or if the receiving instruments accept only pulse inputs, then a preamplifier (Model PA-6) is recommended.

The PA-6 Preamplifier is designed to fit in the standard explosion-proof coil housing as shown in Figure 5: One Coil, No Premplifier on page 10Figure 6: One Coil and One PA-6 Preamplifier on page 10, Figure 7: Two Coils, No Preamplifier on page 10, and Figure 8: Two Coils and Two PA-6 Preamplifiers on page 10. When using the Turbine Meter Preamplifier, Model PA-6, refer to the PA-6 Preamplifier Specifications (SS02012).

| Recommended Signal Transmission Cable | | |
|---|---|---|
| Distance | Wire Size | Type Cable (or Equal) |
| Up to 2,000 ft (610 m) | #20 AWG | 2 Conductor–Belden 8762<br>3 Conductor–Belden 8772<br>4 Conductor–Alpha 2414 |
| Up to 3,000 ft (915 m) | #18 AWG | 2 Conductor–Belden 8760<br>3 Conductor–Belden 8770<br>4 Conductor–Alpha 2424 |
| Up to 5,000 ft (1,525 m) | #16 AWG | 2 Conductor–Belden 8719<br>3 Conductor–Belden 8618<br>4 Conductor–Alpha 3248 |

NOTE: For distances greater than 5,000 ft, a trial run should be made employing the best available engineering techniques.

CAUTION: All cable shields must be terminated only at the instruments.

## 2.2.1 Electrical Installations (General)

The maximum ambient temperature for the GP Junction box with PA-x amplifier and or UPCC/ID-2000 instrument is 70 °C; if the process temperature of the turbine meter is expected to exceed this value then the enclosures shall be remotely mounted to guarantee the 70 °C ambient is not exceeded.

NOTE: Electrical installations should only be performed by qualified technicians/electricians that are trained in the techniques that apply to hazardous locations electrical equipment.

CAUTION: To prevent ignition of hazardous atmospheres, disconnect from supply circuit before opening, keep enclosure tightly closed when circuits are in operation.

WARNING: Enclosure may contain batteries and or capacitors, to prevent ignition of hazardous atmospheres, do not open unless area is known to be non-hazardous.

## 2.2.2 Electrical Installations (ATEX and IECEx Certifications)

All electrical installations shall be in accordance with EN/IEC 60079-14 “Explosive atmospheres – Part 14: Electrical installations design, selection and erection.”

Cable entry must be in accordance to EN/IEC 60079-1 section 13. For systems utilizing cable glands the gland and or thread adapter must be Ex db certified. The cable end must be securely installed and depending on the cable type be properly protected from mechanical damage. Conduit Entry must be in accordance to EN/IEC 60079-1 section 13. For systems utilizing conduit, an Ex db certified sealing device must be used immediately at the entrance of the enclosure.

Any unused entry must be suitably blocked with an Ex db certified plug.

The maximum ambient temperature for the GP Junction box with PA-x amplifier and or other certified instruments is 70 °C; if the process temperature of the turbine meter exceeds this value, then the enclosures shall be remotely mounted to guarantee the 70 °C ambient is not exceeded.

If the temperature at entry fittings exceeds 70 °C, the connecting cables used must be of the temperature-resistant type.

The field connecting wire or cable must be installed into an enclosure which complies with the requirements of an accepted type protection according to IEC/EN 60079-0, section 1, if the connection takes place in an area with potentially explosive atmosphere.

The device must be included into the local equipotential bonding.

Repairs on flameproof joints may only be performed in accordance with the manufactures design specifications. Repair on the basis of the values in table 1 and 2 of EN/IEC 60079-1 is not accepted.

## 2.2.3 Electrical Installations for Brazil

- UL BR 25.1036X (meter); must be manufactured in the Erie, Pennsylvania, USA, plant

Ex d IIC (T3-T6) Gb Tamb = -40 °C to +70 °C, IP66

- UL BR 25.1042X (GP junction box); must be manufactured in the Erie, Pennsylvania, USA, plant

Ex d IIC (T4-T6) Gb Tamb = -40 °C to +70 °C, IP66

## 2.2.4 Installations Following North American Electrical Codes

All electrical installations shall be in accordance with appropriate electrical codes or with the rules provided by the regulatory authority having jurisdiction.

- USA: NEC code, NFPA 70 Articles 500 – 515 as appropriate
- Canada: CEC Code, CSA 22.1 as appropriate

## 2.2.5 Electrical Connections

Due to the variety of electronic totalizers used with turbine meters, only general information is provided in this manual. The installation manual for a particular totalizer should be consulted.

Refer to the following figures for suggested wiring for pickup coil and preamplifier.

When installing conduit, a union should be installed for ease of meter removal for servicing.

Figure 5: One Coil, No Premplifier

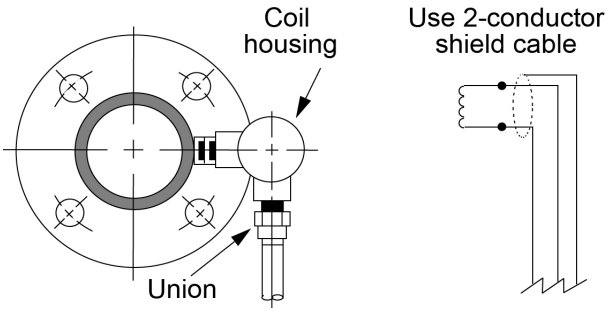



Figure 6: One Coil and One PA-6 Preamplifier

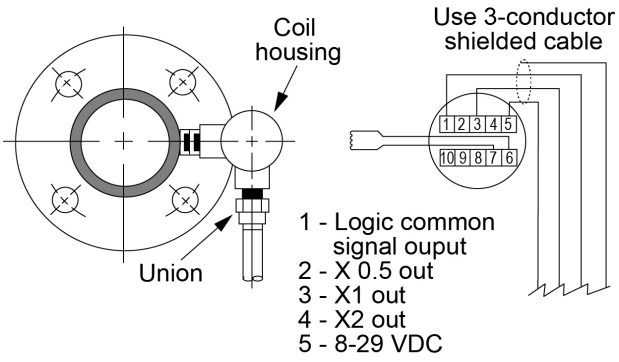



Figure 7: Two Coils, No Preamplifier

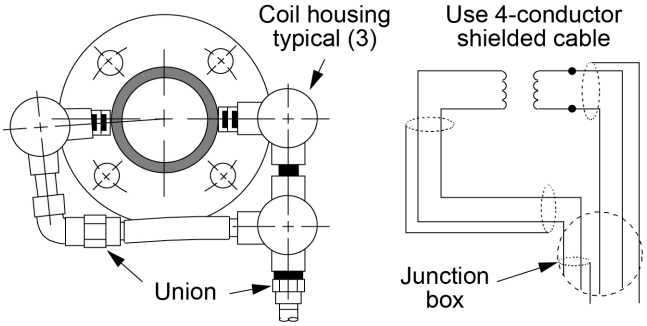
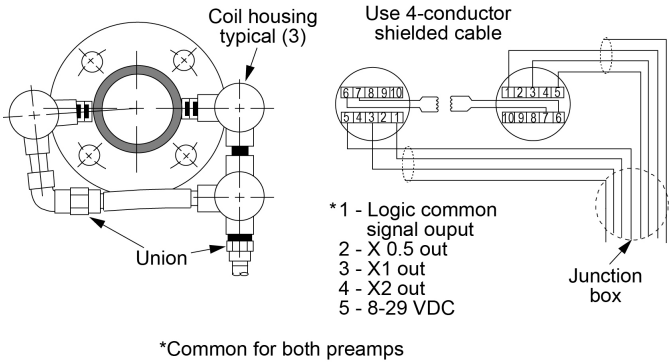



Figure 8: Two Coils and Two PA-6 Preamplifiers




*Common for both preamps

# 3 Repair Guide

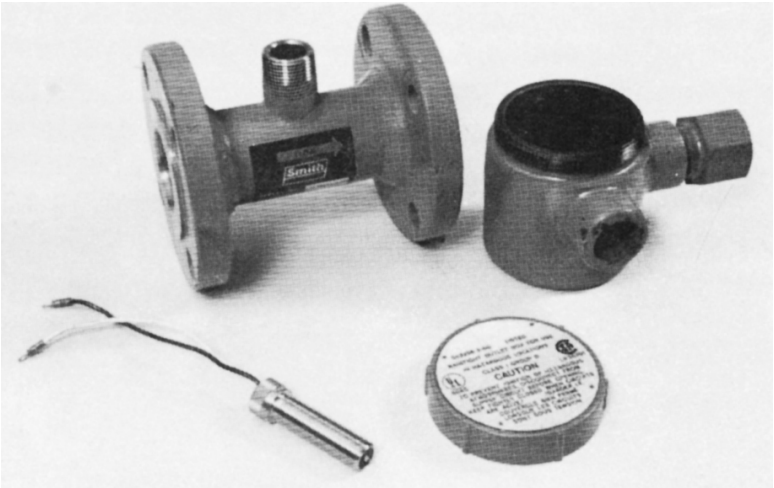
The Smith Meter Turbine Meter is field-serviceable. However, being a precision instrument, this manual must be followed to ensure that proper repair procedures are used.

## 3.1 Pickup Coil Removal

> CAUTION: Disconnect all electrical power.

Unscrew the cover from the conduit box and disconnect all cable leads. Easier access to the pickup coil occurs when the conduit box is completely removed. When using the turbine meter Preamplifier Model PA-6, refer to “Turbine Meter Preamplifier Installation Guide.”

Figure 9: Pickup Coil Removal



Unscrew the pickup coil and lift it out, see Figure 9: Pickup Coil Removal above.

Use an ohmmeter to check the resistance of the coil (1,200 ohms). Also check the resistance between one lead of the coil and the metal coil housing. This resistance should be greater than 20 kiloohms. If not, replace the pickup coil.

# 3.2 Pickup Coil

- Inductance: 400 megahertz (mH), maximum at 1 kilohertz (kHz)
- Direct current (DC) coil resistance: 1,200 ohms
- Temperature range: -40 to 225 °F (-73 to 107 °C)

Should it be suspected that the preamplifier is not functioning properly, remove it from the conduit box. Its output should be checked in accordance with the output signal shown under specifications in the “Turbine Meter Preamplifier Installation Guide.”

# 3.3 Internal Parts Removal and Disassembly Procedure

Use a screwdriver to pry the end of the stator retainer ring up and out, see Figure 10: Retainer Ring Removal below. Once the end of the retainer ring is clear of its slot, pull it until the entire ring is clear of the turbine meter housing.

Some Guardsman and Guardsman L Series Meters have a slotted stator fin with an Allen head set screw. The set screw must be loosened before the internal parts assembly can be removed. Remove the internal parts assembly.

Remove the internal parts assembly.

Figure 10: Retainer Ring Removal

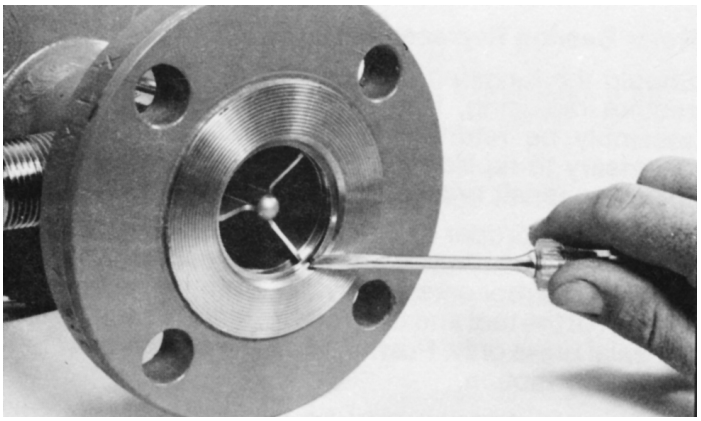


Figure 11: Guardsman L and LB (1-1/2" and 2") Turbine Meter Internals

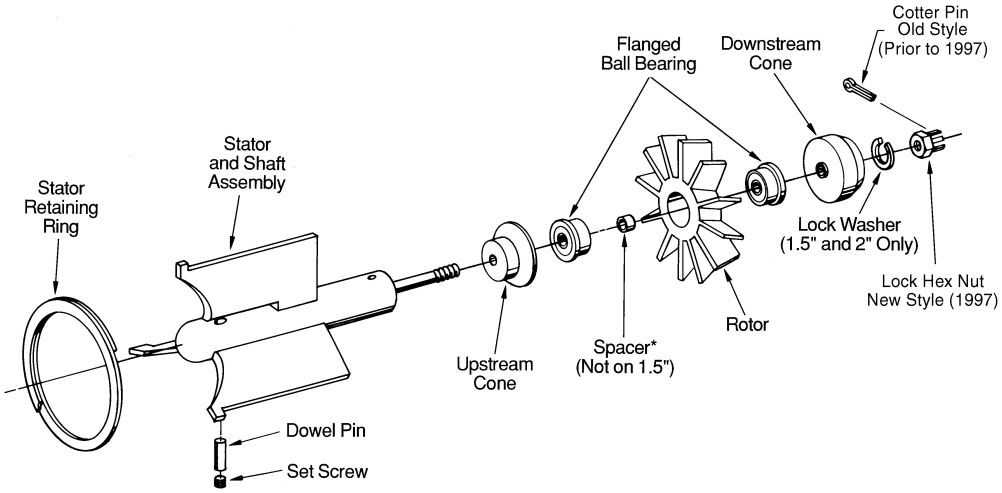



Figure 12: Guardsman and Guardsman J Series (2", 3" and 4") Turbine Meter Internals

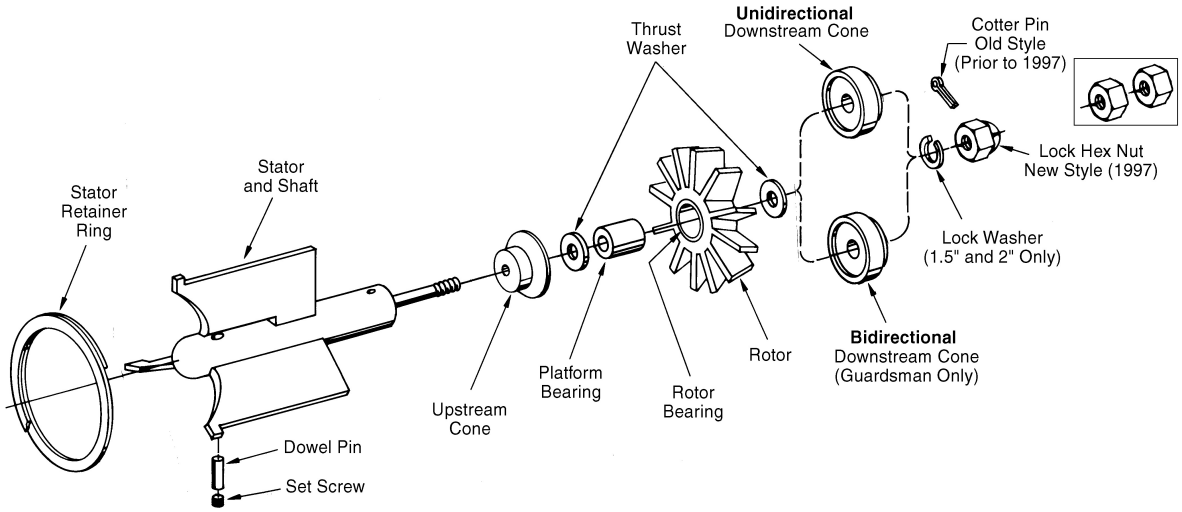
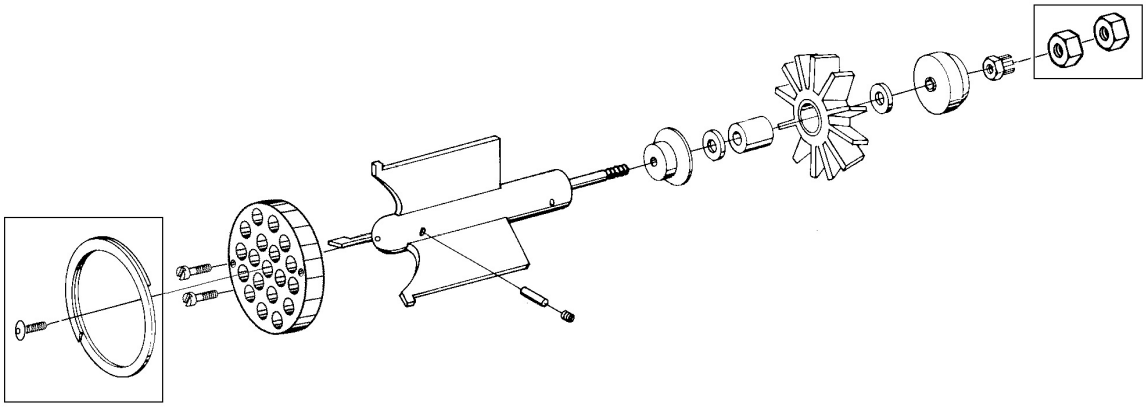



Figure 13: Guardsman LSJ Series Horizontal and Vertical (3" and 4") Turbine Meter Internals



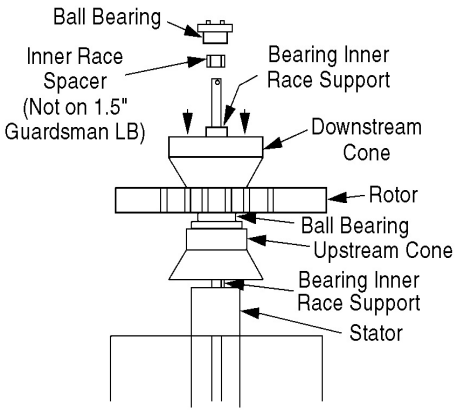
Remove the cotter pin and castle nut (old style) or the lock hex nut (new style) from the downstream end of the shaft. The remaining components, see will be free to slide off the shaft.

## 3.4 Ball Bearing Replacement (Guardsman LB Series Only)

For Guardsman LB Series Turbine Meters, flanged ball bearings are used. To replace the ball bearings as they become worn, the following procedure should be followed:

1. Slide the downstream cone onto the shaft with the bearing inner race support first, see Figure 14: Ball Bearing Replacement on the next page.
2. Next slide the ball bearing, flanged-side first, onto the shaft. Center the upstream-side of the rotor (marked “IN”) on the bearing. Use the downstream cone to guide the rotor onto the bearing as shown (push evenly across the cone).
3. Remove the downstream cone from the shaft and place the inner race spacer on the shaft followed by the ball bearing with the flanged-side last. As was done for the upstream bearing, use the downstream cone to guide the bearing into the rotor hub.
4. Carefully remove the rotor and bearings from the shaft and place the upstream cone in the proper orientation.
5. Next install the rotor onto the shaft with the “IN” side first. Install the downstream cone and the lock hex nut or castle nut (old style). Torque the nut to the value given in Table 1: Retaining Nut Torque Values on page 16. If meter is old style (prior to 1997), install the cotter pin to ensure the nut does not loosen (1.5" and 2" Guardsman L Meters do not have cotter keys).

Figure 14: Ball Bearing Replacement

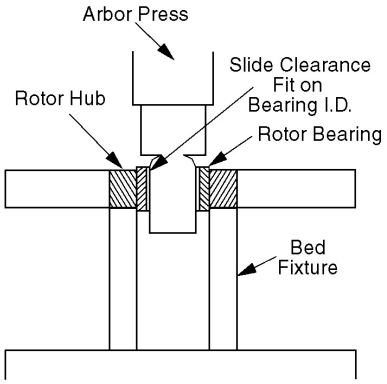



# 3.5 Rotor Bearing Replacement (Guardsman and Guardsman LJ Series Only)

Should the tungsten carbide bearing in the rotor ever require replacing, it is recommended that the rotor assembly be returned to the factory. If it becomes necessary to replace the rotor bearing in the field, the following repair procedure should be followed:

1. With the proper tool and fixture (see Figure 13), the old rotor bearing may be forced out of the rotor hub with an arbor press. Care must be taken in the selection of the tool and fixture to ensure a “straight line” or axial press only. Push the bearing out with a smooth, steady motion.
2. The new bearing may be installed with the same equipment used to remove the old bearing. Press the chamfered end of the bearing into the hub first. Center the hub bore before pressing. The bearing material has been selected for its hardness and wear characteristics, but may be chipped or broken if mistreated. Press the bearing into the rotor hub to achieve equal protrusion from both faces.
3. Clean bearing surfaces and lubricate with light machine oil. Guide the rotor onto the platform bearing and check for freedom of rotation.

Figure 15: Tungsten Carbide Rotor Bearing Removal




# 3.6 Internal Parts Reassembly Procedure (Guardsman and Guardsman L Series)

Reassembly is accomplished by reversing the order of the disassembly steps. The retaining nut should be properly tightened and where used (3" and 4"), secured with the cotter pin (old style). See Table 1: Retaining Nut Torque Values below for proper torque values.

Table 1: Retaining Nut Torque Values

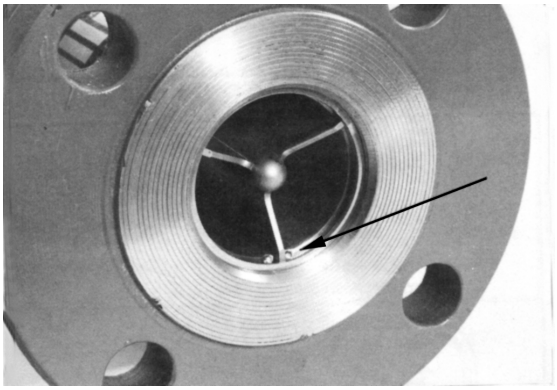
| Meter Size | Meter Series | Thread Size | Torque Required (Lubricated) |
|---|---|---|---|
| 1.5" | Guardsman | 2-56 UNC-2 | 29-33 in-oz |
| 1.5" | Guardsman L | 2-56 UNC-2 | 29-33 in-oz |
| 2" | Guardsman | 6-32 UNC-2 | 7-9 in-lb |
| 2" | Guardsman L | 6-32 UNC-2 | 70-79 in-oz |
| 3", 4" | Guardsman | 10-32 UNF-2 | 24-28 in-lb |
| 3", 4" | Guardsman L | 10-32 UNF-2 | 24-28 in-lb |

NOTE: These torque values will be approximated by tightening the nut an additional 1/4 turn (60 to 70 degrees) after all the parts have been put together “snug” tight.

To be sure that the stator shaft nut is locked securely in place on 0.75" and 1" models, apply Loctite “Thread Locker” 242 adhesive/sealant. Application must be

made to clean parts: Loctite primer is optional. Use extra care to prevent Loctite from entering moving parts, such as journal and rotor bearings. Allow the parts to set undisturbed for twenty minutes to allow full curing of the Loctite.

Figure 16: Stator Rotational Stops



After reassembly, the meter internal parts assembly can be inserted in the upstream-side of the turbine meter housing. Make certain that the slotted stator fin is inserted between the two rotational stops, see Figure 16: Stator Rotational Stops above. This will prevent any rotational movement of the stator during product flow.

For meters with slotted stator fins, after inserting the internal parts assembly, the set screw is adjusted so that there is no free play.

If the meter is equipped with a strate plate reinsert the strate plate with screws. Loctite "Thread Locker" 242 should be used to prevent loosening.

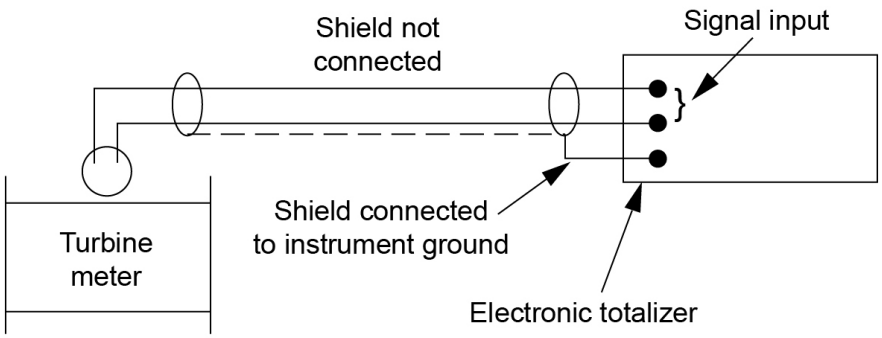
Reinsert the stator retainer ring into the slot provided at the upstream end of the meter housing. Make certain the retainer ring is seated correctly. Any protruding edge may alter the product flow profile, which can affect meter performance.

# 4 Operation

## 4.1 Typical Hook-Up

The signal leads are connected to the meter coil at one end and the appropriate readout device at the other, see Figure 17: Turbine Meter Shielding below. The shielding is connected to the instrument ground only, not at the meter and not to any earth ground. Because neither signal lead is grounded there is no polarity and, hence, either signal lead may be connected to either coil terminal.

Figure 17: Turbine Meter Shielding




## 4.2 Proving

Once the meter has been installed into the line, it should be proved. This is normally accomplished using a displacement type prover of certified volume.

Recommended procedures are covered in the API Manual of Petroleum Measurement Standards, Chapters 4 and 12. It is very important that the proving be done under conditions (flow rate, pressure, temperature, and liquid characteristics) that are as close to those of normal operation as possible.

Verify that there are no leaks (internal or external) and that all liquid going into the prover has passed through the meter.

If, during the proving, suitable repeatability of runs is not obtained and the prover is functioning properly, verify that the pickup coil is tightly in place and that there is

no electrical “noise” on the pulse circuit. If proper repeatability continues, check for adequate back pressure as described in Section 2.

It may be necessary to remove the meter and inspect it for damage to the rotor, thrust bearings, or platform bearing.

## 4.3 Maintenance

Maintenance is normally required when proving shows a dramatic shift in the K-Factor or suitable repeatability cannot be obtained.

In some cases, the internals may have to be cleaned of buildup or deposits. Always check that the ports on the stator fins are free and clean of any debris. When draining the turbine meter installation for inspection, the line should be opened downstream of the meter so that fine debris that may be attached to the leading edges of the blades remains affixed. Draining from upstream creates a backflow that may remove this debris.

> NOTE: When a meter is removed from the line, particularly if it has been disassembled and reassembled, it should be recalibrated for optimum accuracy.

> NOTE: These products have been designed for petroleum applications, where corrosion/erosion is normally minimum. The design has adequate material allowance for typical petroleum applications. Consult the factory for other applications or for the actual material allowances.

# 5 Troubleshooting Guide

For maximum accuracy, the meter must be recalibrated after each repair.

| Problem | Probable Cause | Corrective Action |
|---|---|---|
| Over delivery (or under registration) | Dirty or fouled bearings | Clean |
| | Corrosion, erosion | Minor: Reprove meter Extreme: Replace damaged parts |
| | Bent blades | Replace rotor |
| | Missing rotor blade. | Replace rotor |
| Under delivery (or over registration) | Deposits (wax, for example) | Clean |
| | Clogging of tube bundles | Remove and clean |
| | Bent blades | Replace rotor |
| | Cavitation | Higher back-pressure |
| | Entrained air or gas | Eliminate source or add air eliminator |
| | Noise or transmission line | Add or check shielded cable<br>Eliminate source<br>Check that shield is grounded at instrument end only<br>Decrease sensitivity on instrument front end<br>Add suppression circuit to preamplifier |
| Non-Repeatability | Dirty bearings | Clean |
| | Missing blade | Replace rotor |
| | Electrical noise interference | See “Under delivery” |

| Problem | Probable Cause | Corrective Action |
|---|---|---|
| Meter Factor Shift | Refer to Probable Cause of Over delivery, Under delivery | Refer to action to be taken for over delivery and under delivery |
| Output Without Flow | Noise | See “Under delivery” |
| | Line vibration transmission through pickup coil | Eliminate source of vibration<br><br>With pickup coil only, desensitize coil by inserting a non-ferrous spacer(s) (0.030" increments) in pickup coil boss. With preamp, refer to preamplifier bulletin to desensitize. |

# 6 Related Publications

## 6.1 Specifications

- 1.5- to 4-Inch Guardsman Series (G) Models Turbine Meters (SS02002)
- 1.5- to 4-Inch Guardsman Series (L) Models Turbine Meters (SS02003)

## 6.2 Parts Lists

- 1-Inch Guardsman (G) Series (PO02001)—No Longer Available
- 1-Inch Guardsman (GL) Series Model K2C1 (PO02029)—No Longer Available
- 1.5-Inch Guardsman L (GL) Series (PO02006)
- 2-Inch Guardsman (G) Series (PO02002)
- 3-Inch Guardsman (G) Series (PO02003)
- 3-Inch Low Flow Guardsman (G) Series (PO02004)
- 3-Inch Guardsman (LB) Series (PO02007)
- 3-Inch Guardsman LJ-H Series Model K2ED; LJ-V Series, Model K2PD (PO02008)
- 3-Inch Guardsman LSJ-H Series, Models K2FD, K2GD; LSJ-V Series, Models K2RD, K2SD (PO02011)
- 4-Inch Guardsman (G) Series (PO02005)
- 4-Inch Guardsman (LB) Series (PO02009)
- 4-Inch Guardsman LJ-H Series, Model K2EE; LJ-V Series, Model K2PE (PO02010)
- 4-Inch Guardsman LSJ-H Series, Models K2FE, K2GE; LSJ-V Series, Models K2RE, K2SE (PO02012)

## Notice

All procedures, data, information, drawings, specifications or other material, whether accompanying this document or separately supplied in furtherance of this document, contain confidential and proprietary information which (i) is the property of Guidant Measurement (Guidant) and its subsidiaries, (ii) is disclosed by Guidant only in confidence, and (iii) except as Guidant may otherwise permit in writing, is to be used, disclosed or copied only to the extent necessary for the evaluation and use thereof by the recipient.

The foregoing shall not apply to any such material to the extent that the contents (i) are now or subsequently become available to the public without payment, (ii) were previously known to the recipient, or (iii) subsequently become otherwise known to the recipient without restriction.

This document is based on information available at the time of its publication. While efforts have been made to be accurate, the information contained herein does not purport to cover all details or variations in hardware and software, nor to provide for every possible contingency in connection with installation, operation and maintenance.

Guidant makes no representation or warranty, either expressed or implied, with respect to, and assumes no responsibility for, the accuracy, completeness, or sufficiency of the information contained herein. No warranties of merchantability or fitness for a particular purpose shall apply.

Smith Meter is a registered trademark. The Guidant logo is a trademark.

This document takes precedence over and supercedes in their entirety all previous versions or revisions.

MN02002 Issue/Rev. 0.9 (11/25)

© 2025 Guidant Corporation
All rights reserved.

GuidantMeasurement.com

Corporate Headquarters
5825 North Sam Parkway West
Suite 120
Houston, TX 77086 USA

USA
1602 Wagner Avenue
Erie, PA 16510 USA
+1 814.898.5000

Germany
Regentstrasse 1
25474 Ellerbek, Germany
+49 4101 304.0