

**Recordall®  
Compound Series  
Meter**

**Sizes 2", 3", 4", and 6"**

**Installation &  
Operation Manual**



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**BadgerMeter, Inc.**

**RCS-IOM-1**

P/N 53407-005 Rev. 1

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## PREFACE

### SCOPE OF MANUAL

This manual contains information concerning the installation, operation and maintenance of Badger® Recordall® Compound Series meters with magnetic drive. To ensure efficient operation of the meters, the instructions in this manual should be thoroughly read and understood. Retain the manual in a location where it is readily available for reference.

### CHANGES IN MANUAL

Changes or additions to the original edition of this manual will be covered by a "CHANGE NOTICE" supplied as an addendum to the manual. The "CHANGE NOTICE" will explain any differences between meters as received and those described in the manual.

## SECTION I - GENERAL INFORMATION

### 1-1. DESCRIPTION

Recordall Compound Series meters utilize the proven features of the Recordall disc meter in combination with the Recordall Turbo Series meter within a single meter housing. The compound meters are available in 2", 3", 4" and 6" sizes.

A spring loaded valve assembly is used to control flow through each of the two measuring elements to ensure maximum accuracy and performance.

For technical specifications and operating principle; please see Technical Briefs (RCS-T-2, RCS-T-3, RCS-T-4, and RCS-T-6) on the Compound Series Meters. A pictorial description of the meter's components can be found in the illustrated parts list RCS-P-1. Also, included is a part number and part description for each identified component.

The basic components of the compound meter consist of a housing, Turbo Series Head Assembly and Cover Assembly

with disc chamber assembly. The Turbo Head Assembly includes a Recordall Register for High Flow totalization and complete turbo head components (cage, rotor, etc.) The Cover Assembly includes a Recordall Register for Low Flow totalization and a chamber assembly complete.

The output of both measuring elements, the disc and turbo, is transmitted to each Recordall Register respectively by means of ceramic magnets. The register is permanently sealed in a controlled environment relative to humidity and cleanliness, thus assuring longevity of performance.

### 1-2. ACCESSORIES

Options available include RTR® Registers for use with Summator/Converter or Summator/Splitter products which interface with remote 570 Registers and MRT products respectively. Strainers are also available for all sizes.

## SECTION II - INSTALLATION

### 2-1. UNPACKING AND INSPECTION

To avoid damage in transit, Badger Recordall Compound Series meters are shipped to the customer in special shipping containers. Upon receipt of shipment, be sure to follow these unpacking and inspection procedures:

#### NOTE

If damage to a shipping container is evident upon receipt of a meter, request that a representative of the carrier be present when the meter is unpacked.

a. Carefully open the shipping container, following any instructions that may be marked on the container. Remove all cushioning material surrounding the meter and carefully lift the meter from the container. Keep the container and all packing material for possible use in reshipment or storage.

b. Visually inspect the meter and applicable accessory devices for any signs of damage such as scratches, loose or broken parts or other physical damage that may have occurred during shipment.

#### NOTE

If damage is found, request an inspection by carrier's agent

within 48 hours of delivery. Then file a claim with the carrier. A claim for equipment damaged in transit is the responsibility of the customer.

### 2-2. INSTALLATION

Procedures for installing Badger Recordall Compound Series meters are essentially the same for all meter sizes. Any special instructions required for the installation or connection of accessory devices such as AMR technologies or strainers will be provided as supplements to this manual. Figure 1 outlines a recommended meter installation.

A. PRELIMINARY CONSIDERATIONS. Before proceeding any further with the installation, first read the instructions in the paragraphs immediately following to become familiar with the requirements and procedures involved.

#### NOTE

Badger Recordall Compound Series meters are designed for operation in HORIZONTAL piping arrangements.

1. Be sure that the meter flow range and size of the meter coincide with the intended service and demand for water.

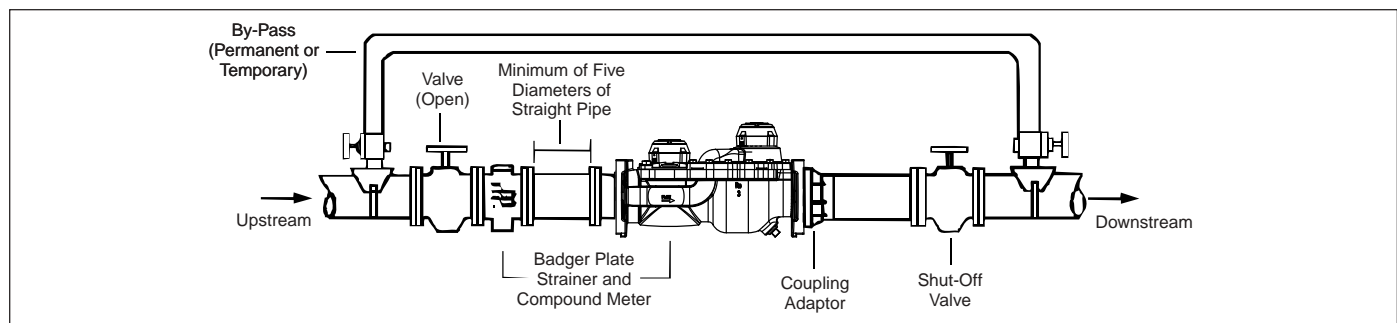


Figure 1. Recommended Meter Installation

**CAUTION**

The life of the compound meter will be curtailed if operated at flow rates higher than specified.

2. The meters are designed for use in cold water service (up to 120°F or 27°C) within the applicable flow requirements for compound meters. For use with water at higher temperatures, consult your Badger Meter representative or nearest Badger® regional sales office.

3. If solid material is present in the water to be metered, a strainer must be installed in the service piping upstream of the meter. The strainer, in addition to protecting the meter from debris in the line, minimizes the effect of velocity profile distortions or turbulence caused by changes in pipe direction or valving resulting in more accurate registration. Contact your Badger representative for information on Recordall® Plate Strainers.

4. Avoid locating the meter in close quarters. Allow sufficient space to permit access for meter reading, testing, and maintenance.

5. Because of the need to test large meters periodically to verify their performance, it is recommended that a bypass system be incorporated into the piping arrangement. This will also provide a means of performing periodic cleanout and routine maintenance without interrupting service to the customer. A test plug is incorporated in the meter housing and can be used for field accuracy testing.

6. The Recordall Compound Series meter is accuracy and pressure tested prior to shipment, therefore no field adjustments are required. As turbine performance is directly related to the flow conditions of the water stream entering the meter, upstream fittings and piping changes can adversely affect flow registration. To insure valid registration and proper performance, the following factors should be considered for installation:

a. When installing the meter with a Badger Plate Strainer, a minimum of five (5) pipe diameters of straight, unobstructed pipe is required upstream of the meter. (A minimum of ten (10) pipe diameters of straight unobstructed pipe is required upstream of a meter installed without a plate strainer. The deletion of a strainer, however, is not recommended.) This allows for dampening of velocity profile distortions caused by elbows, pumps, dirt traps, etc., prior to the meter. Where spiral flows are created by three dimensional elbows or rotary pumps, additional distance to dampen the effect is beneficial. If a basket or Y-type strainer is utilized, it should be placed five (5) to ten (10) pipe diameters prior to the meter to dampen velocity profile distortions created by this design.

b. Do not install check valves or pressure reducing devices upstream of the meter.

c. Valves immediately upstream of the meter should only be fully-open gate valves. Butterfly valves are acceptable if they are five (5) pipe diameters or more upstream from the meter. Downstream, fully open gate or butterfly valves can be used.

d. Unweighted check valves should not be located closer than three (3) pipe diameters downstream of the meter.

e. Externally weighted check valves and pressure reducing devices should not be located closer than five (5) pipe diameters of the meter.

f. When installing a compound meter and plate strainer of a size smaller than the pipe installation, to reduce the effect of jetting caused by the increase in flow velocity, a minimum of five (5) pipe diameters of pipe equal in size to the meter, is required upstream of the meter. Additional length is required if a sharp contraction or an eccentric reducer, rather than a concentric, tapered reducer is used.

**B. INSTALLING THE METER.** Overall dimensions and laying lengths of each meter size are shown in bulletin RCS-T-2, RCS-T-3, RCS-T-4, and RCS-T-6. After reviewing the applicable dimensional requirements, choose an appropriate instal-

lation point in the piping and proceed as follows:

1. Measure precisely the overall length of the meter with gaskets attached to the inlet and outlet flange connections.
2. Provide proper gap length in service piping.
3. Install meter in the pipeline so that the flow arrow on the meter housing points in the same direction as water flow.
4. With meter and gaskets in place, tighten flange connection bolts.
5. To relieve possible strain on the piping, it is recommended that a meter support be used under the meter housing where appropriate.

**Adapter Spacers:**

The 2" and 4" Compound Series Meters are supplied in 15 1/4" and 20" lay lengths respectively. If you have an existing compound meter with a lay length of 17" (2" size) or 24" (4" size), a Flange Adapter Kit is available for each to accommodate the difference. We recommend the Flange Adapter be mounted to the outlet side of the meter. See illustrations/photos below:



2" Adapter



2" Adapter with a 2" Elliptical Meter



2" Adapter with a 2" Round Meter



4" Adapter



4" Adapter with a 4" Meter

	<u>Part Number</u>
2" Elliptical Flange Adapter Kit .....	64186-001
2" Round Flange Adapter Kit .....	64186-002
4" Flange Adapter Kit .....	64186-003

## CAUTION

Compound meters must operate in a completely filled line at all times. The downstream piping must always be arranged to provide sufficient back pressure to maintain a full line at the meter. By eliminating air in the line, as well as sudden flow surges, inaccurate registration and damage to the turbine mechanism can be avoided.

### 2-3. REMOTE REGISTER OPTION

RTR® registers supplied with the Recordall® compound can be connected to a remote register when the remote register is purchased as an option. This also requires a Summator/Converter unit for interface between the RTRs and remote register. The installation guidelines outlined in bulletin ROM-I-3 should be followed when installing the Model 570 remote register.

Before proceeding with installation, be sure that the Model 570 register corresponds to the meter size and unit of measure.

### 2-4. PERFORMANCE CHECKS

Any valves or devices controlling the flow of water through a compound meter must always be opened and closed SLOWLY

to prevent shock loads that may damage the meter's rotor assembly.

Complete the following checks to ensure that a compound meter is properly installed and operational:

- Slowly open upstream valve to apply water pressure to the meter and check to see if there are any leaks. Tighten flange bolts as required.
- Perform a functional test of the meter. Slowly open valve on downstream side of the meter to evacuate any air that may have been trapped in the service line. When air has been eliminated, increase demand flow rate by further opening of downstream valve or valves. Observe register for correct direction of flow. Continue to open the demand side valve(s) to a flow rate sufficient to open the valve assembly in the meter — a procedure which will start water flowing through the turbo high-side rotor. The high flow pointer will now move in the proper direction. Now open all applicable service valves.
- Adjust rate of flow by throttling with the downstream valve so the flow does not exceed the maximum continuous duty specification. The rate of flow can be quickly checked by timing the quantity registered through the meter in one minute.

## SECTION III - REGISTRATION

### 3.1 READING THE RECORDALL REGISTERS:

To determine total reading for meter, the totals for both the low flow and the high flow must be added together.

- Determine the low flow total by reading the register identified as Low Flow. Read only the moveable number wheels.
- From the High Flow register, read both the number wheels and the sweep hand. Read the number wheels first. Read only the moveable number wheels. Note the position of the sweep hand, round the number down to the nearest increment. Add the reading from the number wheel and the sweep hand together.
- To determine the complete total flow, add the low flow total and the high flow total together.

### 3.2 PROGRAMMING THE REGISTERS WITH AN MRT SYSTEM:

- When installing an MRT device to an existing compound meter, the device may be programmed to begin reading at the same total as on the meter.
  - For ITRON® products, the device is programmed to hold six digits, so program in the nearest six digits. The ITRON unit also requires the quantity of number wheels to be programmed in.
  - For ORION® and TRACE® AMR modules, a seven digit totalized reading can be programmed into the AMR device. Note to obtain a totalized reading, the high and low flow RTR number wheel values must be added together. See the ORION Programming Software IOM and the TRACE hand held IOM for more details on programming.

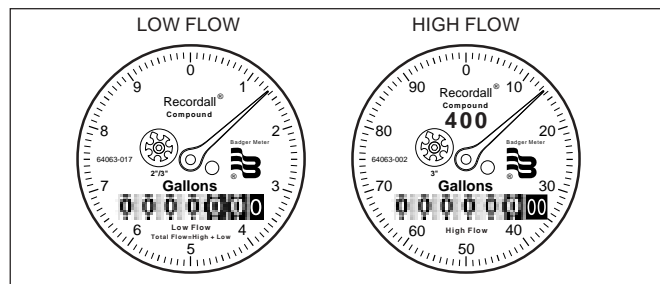


Figure 2.

For utilities opting to read the high and low flow separately, each RTR must be connected to a separate AMR module. When programming, each reading should be programmed according to the seven digit reading (six movable wheels and the sweep hand) on the RTR.

*Note: The ITRON Read 1 Pro reads seven digits for every reading, since the MRT device can only be programmed to six digits, the Read 1 Pro automatically rounds the last digit to zero. This error will not occur when reading the meter for billing purposes, only when being checked for accuracy.*

## SECTION IV - MAINTENANCE

### 4-1. GENERAL

This section is limited to information pertaining to the general maintenance of Badger® Recordall Compound Series meters. An exploded view and a parts list for the complete meter are provided as a supplement to the manual (see RCS-P-1).

### 4-2. MAINTENANCE EQUIPMENT

The tools and equipment recommended for use in servicing

and maintaining of Recordall Compound Series meters consist of the usual complement of hand tools used by plumbers and mechanics.

### 4-3. PREVENTATIVE MAINTENANCE

The purpose of preventative maintenance is to ensure efficient operation and long life by detecting and correcting any defect that might damage the meter or cause it to fail. Preventative

maintenance consists of periodic inspection, accuracy testing, and cleaning procedures.

a. PERIODIC INSPECTION

1. Visually inspect the meter for missing hardware, loose screws, broken or scratched register lens or any other signs of wear or deterioration.
2. Verify that the meter is operating at the proper flow rate and pressure. A loss in pressure, coupled with a decrease in flow rate, may indicate that the screen in the upstream pipeline or the meter itself is clogged with foreign material and needs cleaning.

b. CLEANING

1. Clean all dirt, grease, moisture or other foreign material from the exterior of the meter. After cleaning, rinse thoroughly with water.
2. In the event that system pressure has been reduced and the upstream filter or meter is clogged, the foreign material must be flushed out. To flush the screen, open the cleanout plug and purge the foreign material with fresh water from the service line. If cleaning the screen does not restore system pressure, the compound meter also should be flushed by purging with fresh service water through the cleanout plugs located on the housing.

c. ACCURACY TESTING

The Recordall® Compound Series meter can be tested for accuracy with a test meter or a test tank of known volume. A test plug is provided on the meter. The Low Flow register is for recording the amount of water passing through the disc, or low flow side of the meter. The High Flow register is for recording the amount of water passing through the turbo, or high flow side of the meter.

When testing at flow rates below the meter's cross-over point, only the low flow test hand will move. Record the initial reading (low flow odometer and low flow test circle). To determine the amount of water that has passed through the meter during test, take the new reading from the low flow test circle. If more than one revolution of the test circle, take a new reading from both the low flow odometer and the low flow test circle. The difference between the initial and final reading is then compared to that recorded by the test meter or test tank.

When testing flow rates at or above the meter's crossover point (listed above) the high flow and low flow register test hands will move. This is because both sides of the meter, disc and turbo, operate simultaneously at these flow rates. The disc side of the meter operates at all flow rates to keep the chamber free of debris that might enter the meter. Record the initial readings (high flow odometer and high flow test circle, low flow odometer and low flow test circle). If less than one revolution of the high flow test circle, record both the new high flow and low flow test circle readings. The amount of flow recorded by the high flow and low flow test circles during test must be added together to determine the **total** flow through the meter. Compare this to that recorded by the test meter or test tank.

If more than one revolution of the high flow test circle occurs, take new readings from the low flow odometer, high flow and low flow test circles and add all complete high flow test circle revolutions to this. Once again, the amount of flow recorded by the high flow and low flow test circles must be added together and combined to determine the **total** flow through the meter. This is then compared to that recorded by the test meter or test tank.

A simplified alternative to recording the initial and final odometer readings on the high flow and low flow odometers, is to record the number of **complete** revolutions of the test hand on the high flow and/or low flow test circles during test. This is then added to the difference between the initial and final position of the test hands on the test circles to determine the total **flow** through the meter.

For correct testing procedures, and test volumes based upon meter flow rates, please refer to AWWA M-6 Manual. Starting the test when the register test circle hands are on zero and operating the meters through complete revolution(s) of the test circles are desirable operating procedures to follow.

**⚠ CAUTION**

The test hands operate independently of one another. For example, during meter operation at flows below crossover, the low flow test hand will revolve while the high flow test hand is stationary, allowing higher readings on the low flow odometer only.

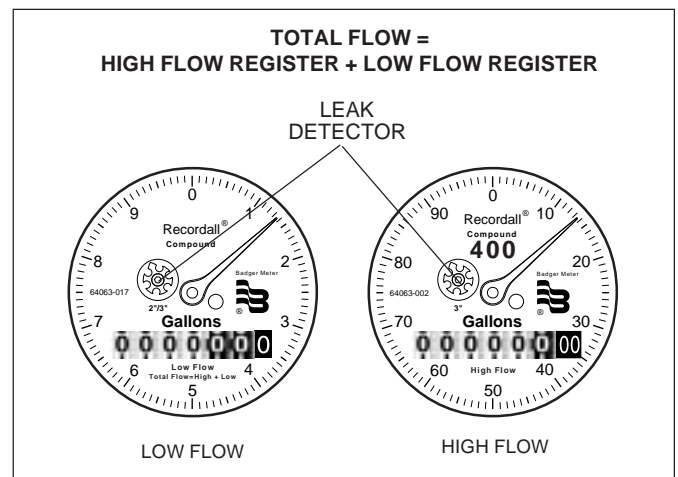
**SECTION V - SERVICING**

**5-1. GENERAL**

When the performance of a compound meter indicates a need for servicing, refer to the following instructions pertaining to removal, inspection and installation of service parts and assemblies. Also refer to the illustrated repair parts list (RCS-P-1) for part numbers of replaceable components and correct ordering information. If satisfactory repair cannot be made, contact Badger Meter, Inc.

**5-2. LOCAL REGISTER AND RTR REMOVAL**

The High Flow and Low Flow registers are easily removable to facilitate in-line service. Remove the register lid and shroud by removing the seal screw. The shroud is removed by rotating the register assembly counter clockwise until it stops. This provides clearance so it can be lifted off the measuring element assembly. To reinstall the register, follow the above procedure in reverse order.



**Figure 3. Compound Meter Register**

### 5-3. REMOVAL OF HIGH FLOW TURBO METER HEAD

A typical installation would be equipped with drain and piping valves. To inspect or replace components of the High Flow Turbo head assembly, close the upstream and downstream valves. However, if the installation does not have a drain valve, proceed as follows to relieve pressure:(Figure 4)

#### ⚠ WARNING

Upstream and downstream valves must be closed before attempting to remove meter head from housing. Failure to do so can lead to head being "ejected" from housing, causing personal injury and/or property damage!

- Loosen each of the head bolts about one and one-half turns. Do not completely remove the bolts.
- If the O-ring between the Turbo meter head and the housing is secure and not leaking, pry the measuring element assembly loose by inserting a screwdriver blade where the head and housing join together.

#### ⚠ CAUTION

Be sure that any water coming out of the meter head does not spray onto electrical equipment to create a shock hazard.

- Allow the meter to drain and relieve internal pressure.
- When pressure is relieved, remove the head bolts. Lift the Turbo measuring element assembly from the housing.

#### NOTE

A dummy cover plate is available to close the Turbo Head Assembly opening in the line and continue service while the Turbo measuring element assembly is being inspected or serviced. (See illustrated repair parts list RCS-P-1.)

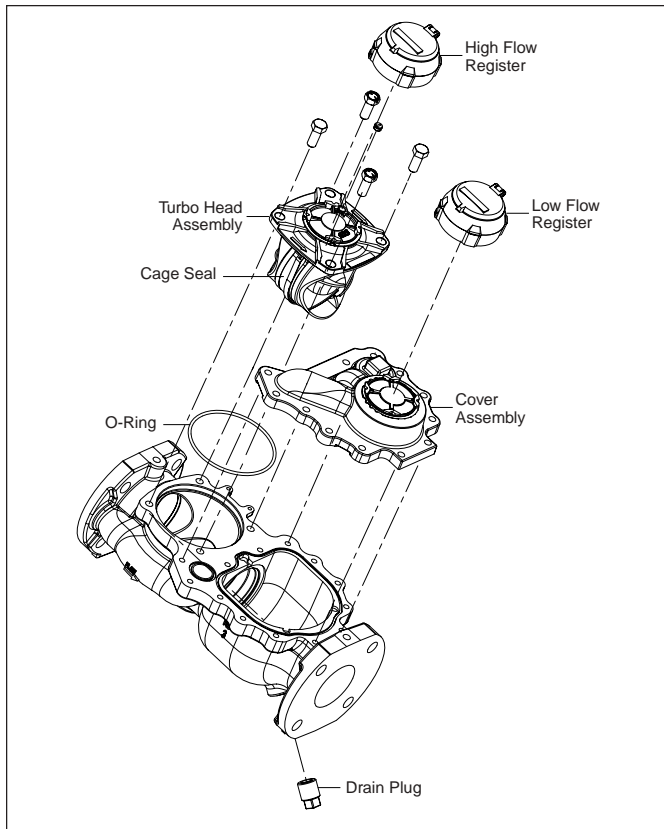
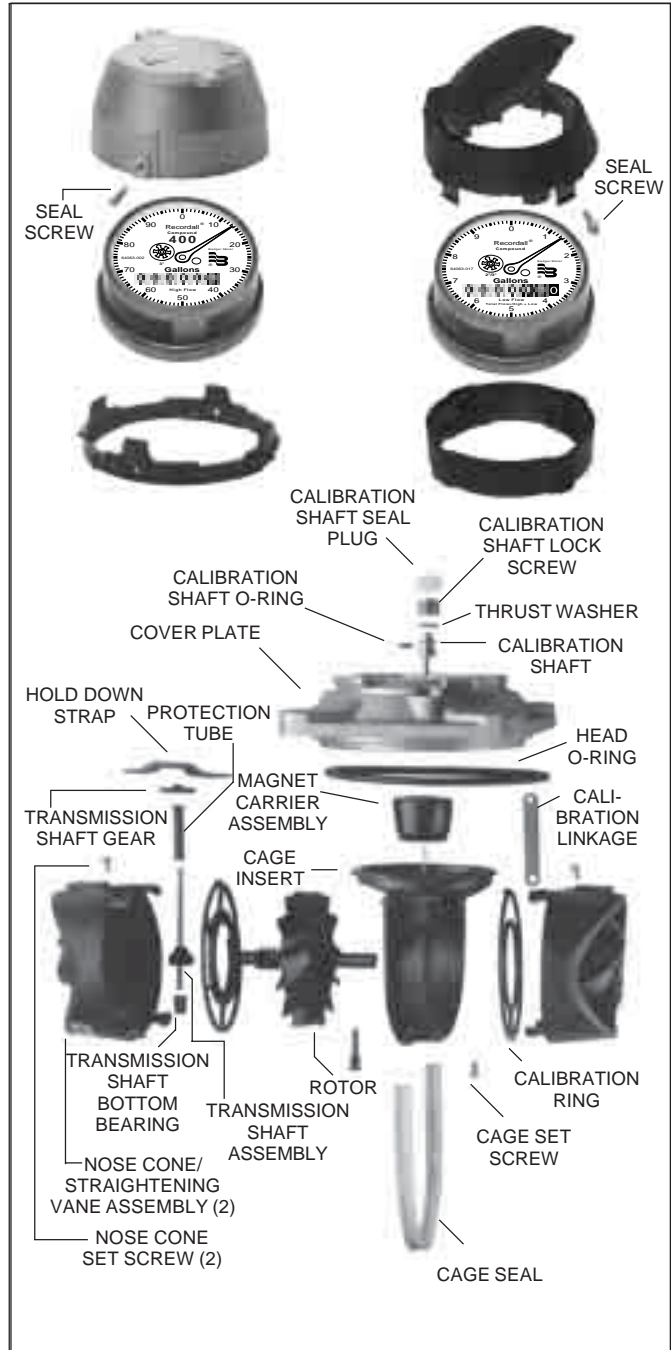


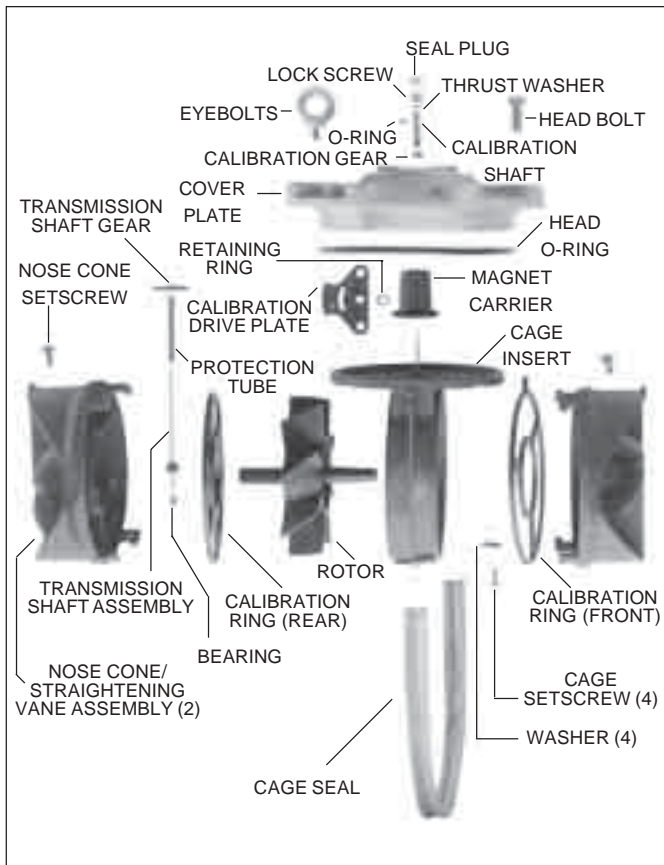
Figure 4. Removal of High Flow Meter Head from Housing



Figure 5. Chamber and Disc Assembly



Register and High Flow Turbo Measuring Element Assembly, 2" - 4"



**Register and High Flow Turbo Measuring Element Assembly - 6"**

### 5-3.1. TURBO MEASURING ELEMENT ASSEMBLY

Remove the O-ring and cage seal. Check for damage and clean or replace prior to reassembly.

To remove measuring element from cover, remove calibration shaft seal plug and lock screw. Place cover register side down on table or flat surface. Lightly tap or press calibration shaft from wet side out of bore in cover (2" - 4" only). Care should be taken not to strike or bend the calibration linkage.

The measuring element insert can be removed from the cover plate for service or replacement by removing the cage set screw (quantity 4 for 6" size.) Holding the cover plate in one hand, rotate the thermoplastic element counter clockwise until the bayonette-like tabs are aligned with open areas of the cover plate (2" - 4" only). Remove element from cover plate.

### 5-3.2. STRAIGHTENING VANES/NOSE CONE

The straightening vanes are an integral part of the upstream and downstream nose cone assemblies. To gain access, the measuring element must be removed from cover as outlined in Section 5-3.1 above.

Removal of upstream nose cone provides access to rotor, calibration ring and transmission assembly. To remove nose cone, unscrew the upstream nose cone setscrew. For 2" - 4", slide calibration linkage into cage insert stop. Take hold of the nose cone/straightening vanes and turn clockwise, thereby disengaging the calibration linkage from the tab on the calibration ring and unlocking bayonettes of nose cones from cage (see Figure 7). If tab of calibration ring has not disengaged linkage, rotate ring carefully by pushing struts at interior of element (between straightening vanes and rotor). Pull the nose cone assembly out from the measuring element insert.

For 6", remove transmission gear by lifting off shaft, noting alignment of "D" shaped bore with flat on shaft (required to align for assembly). Next remove retaining ring that holds down calibration drive plate, located under magnet carrier magnet (see Figure 8). Remove drive plate. Rotate calibration ring until pin clears slot of cage. Take hold of the nose cone/straightening vanes and turn clockwise. Pull the nose cone assembly out from the measuring element insert. Remove rotor assembly.

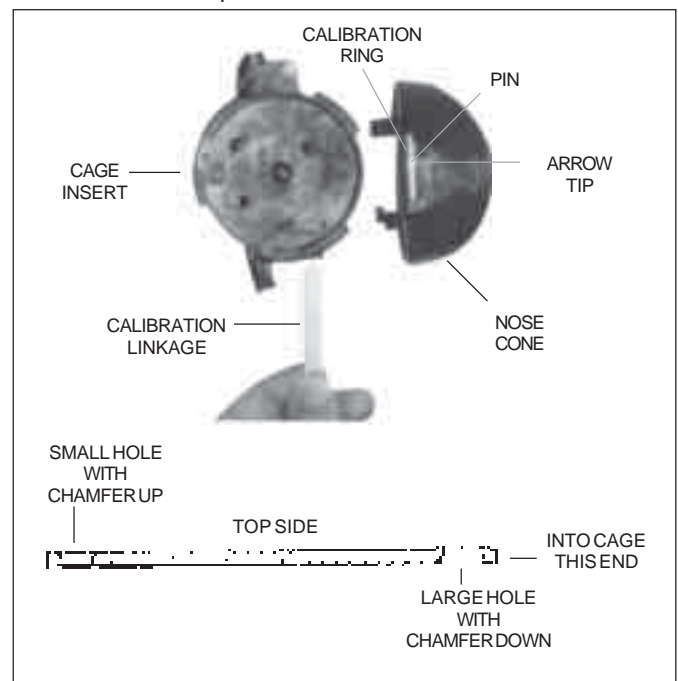
Rear nose cone removal requires transmission shaft removal. First, remove strap over gear (2" - 4" only). Gear is removed from shaft by simply lifting off. Note shaft has a flat that matches with "D" shaped bore in gear (required to align for assembly). Remove nose cone set screw. Remove protection tube by carefully pressing (with flat surface of blade screwdriver) on bottom of tube located inside rear nose cone. Press to release detent lock, approximately 1/4" vertical travel, then lift tube out from top of cage insert. Lift transmission shaft assembly up and out of bottom bearing, then slide shaft downward and diagonally out (towards you) to remove from nose cone/cage assembly. Finally, holding cage firmly with one hand, rotate nose cone clockwise with other hand, then carefully lift off cage. Reinstallation is reverse of removal.

Refer to Section 5-3.5 of this manual to correctly reassemble components.

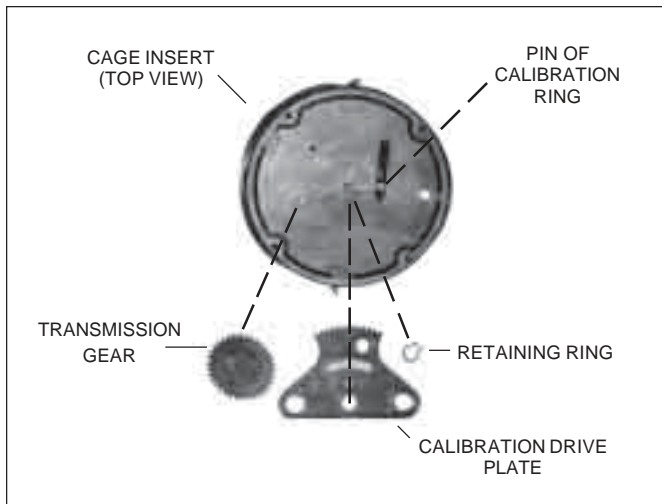
### 5-3.3. CALIBRATION MECHANISM

To disassemble the calibration ring assembly, the following procedures are required. Remove the calibration shaft seal plug and unscrew the calibration shaft lock screw from the cover plate. Remove the calibration shaft thrust washer and calibration shaft. The calibration shaft can be pressed out of the cover plate from below. The calibration shaft O-ring may be removed if a leak exists at this point in the disassembly of the meter. If replaced, the O-ring should be coated slightly with a silicon grease before insertion. Clean all parts as required.

To gain access to the calibration ring, the straightening vane/nose cone must be removed. See Section 5-3.2 to remove. To remove calibration ring from nose cone assembly, align the ring slots with bayonettes of nose cone assembly located on inner ring of calibration ring. To remove, carefully lift the calibration ring from the nose cone assembly. Reinstallation is the reverse of this procedure.



**Figure 7. Calibration Ring/Linkage Assembly, 2" - 4"**



**Figure 8. Calibration Ring/Linkage Assembly, 6"**

**NOTE**

When reassembling, the pin on the perimeter of the calibration ring must be aligned with the arrow tip located on the nose cone assembly (see Figure 7). For 2"-4" sizes, the calibration linkage is to be installed into cage with larger hole to engage calibration ring tab, and side of chamfered edge of hole towards nose cone assembly (see Figure 7). With calibration linkage fully inserted to cage stop, install nose cone onto cage and rotate counter-clockwise. This rotation engages pin of ring to calibration linkage. The hole of the calibration linkage has to be aligned onto the calibration shaft, engaging it fully so that the calibration ring cannot vibrate during operation. The calibration shaft lock screw should also be tightened securely to hold the calibration ring in its desired position.

After the calibration mechanism is serviced or replaced, be sure to check the accuracy and calibration in accordance with the instructions in section 3-4 of the Turbo Series Meter manual.

**5-3.4. MAGNET CARRIER/TOP GEAR SET**

Remove the magnet carrier from the measuring element insert by lifting it off the stainless steel pin. Check the condition of the magnet and gear on the magnet carrier for damage or wear. If significant wear or damage is present, replace the magnet carrier.

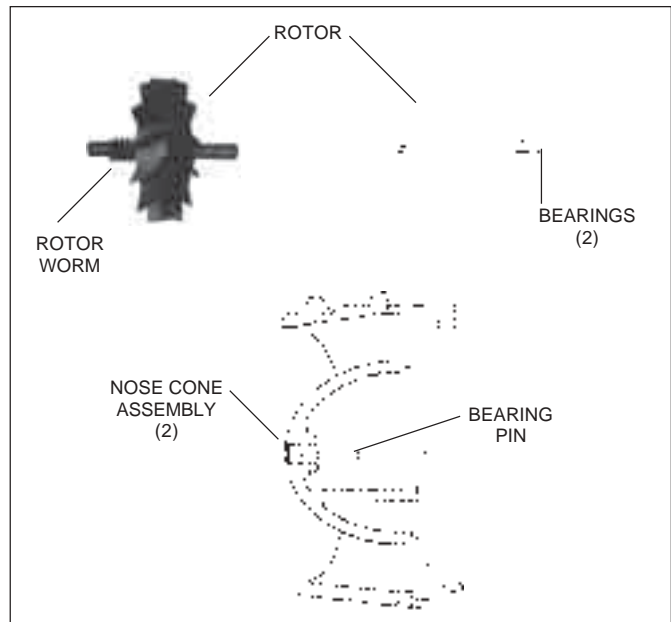
Remove the hold down strap. Check the condition of the transmission shaft gear for damage or wear. If significant wear or damage is present, replace the gear. Remove gear by lifting off the shaft.

**5-3.5. ROTOR AND BEARINGS**

The rotor can be inspected by removing the nose cone assembly from the measuring element insert as outlined in section 5-3.2 of this manual.

Check the rotor worm and blades for signs of damage and wear. Also inspect the bearing bushings in the front and rear shaft. If damage or wear has occurred, replace the part (see Figure 9).

The rotor bearing pins in the straightening vane and nose cone assembly should be inspected for signs of damage and wear (see Figure 9). The spherical end of the bearing pin must not show any drag lines and/or wear.



**Figure 9. Rotor and Nose Cone Assembly (2" - 6" Turbo Head Assemblies)**

**NOTE**

Only highly-polished bearing pin ends insure a minimum of friction and optimal meter performance. Bearing pins are an integral part of the straightening vane and nose cone assembly. Wear or damage would require the replacement of this component.

To reassemble, the rear nose cone must be installed to cage. See section 5-3.2. Now place the rotor assembly with worm gear side leading through the cage, place on the rear rotor bearing pin, while tipping the assembly back so that the opening is up. See section 5-3.3 to insure calibration rings are properly assembled with nose cone assembly. Insert the front nose cone assembly partially onto the cage insert, engaging the bearing pin with the front bearing of the rotor. Tilt the measuring element insert assembly forward and back to see that the rotor now engages the bearing pins on the straightening vane/nose cones and is free to rotate and slide fore and aft.

**CAUTION**

Be careful not to force the nose cone assembly into the cage insert. Be sure that rotor engages both front and rear rotor bearing pins prior to pressing the nose cone assembly fully into the cage insert.

Press the nose cone assembly fully into the cage insert and turn it counter clockwise catching the calibration linkage in the slot. Check to see that the rotor spins freely. If not, remove the nose cone assembly and repeat the procedure. Install and tighten nose cone assembly setscrew.

Holding the cover plate in one hand, align the thermoplastic cage bayonette-like tabs with the slots in the cover plate (2" - 4" only). Rotate the element clockwise until the cage set screw hole is aligned. Install the cage set screws (quantity 1 for 2" - 4", quantity 4 for 6") and tighten.

**5-3.6. REINSTALLING HEAD ASSEMBLY**

Badger® recommends that a new O-ring be used after each teardown and reassembly. To provide a tight seal, make sure the surfaces of the housing and meter head are clean and free of any old O-ring material. Be careful not to force the

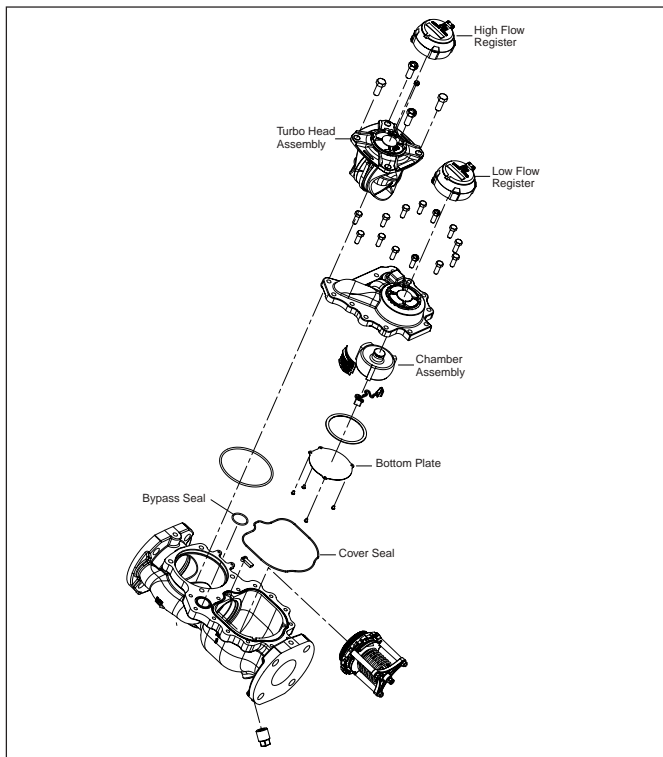
measuring element insert into the meter housing. If you experience any binding, do not force the element into the housing. Remove the element from the housing and properly reinsert the unit.

**NOTE**

Head bolts should be tightened similar to that on car tire. First insert the bolts and snug-fit each. Then using a crisscross pattern, tighten the bolts down. Following this pattern, the meter head will not turn allowing the rotor to remain perpendicular to the flow and eliminating any potential flow distortion. Head bolts should be tightened to 10-11 ft. lbs. for 2" size, and 35-40 ft. lbs. for 3" - 6" sizes.

**5-4. REMOVAL OF LOW FLOW SIDE**

Follow same removal steps for cover as listed above in removal of High Flow Turbo Head Assembly.



**Figure 10.**

**5-4.1. SERVICING CHAMBER AND DISC**

Remove the screws holding the bottom plate on Cover Assembly. The chamber and disc assembly will now be exposed in the meter head and can be removed by taking out the chamber retaining strap. The chamber assembly can be replaced or serviced by cleaning with a detergent and soft brush, followed by rinsing in clear water.

Inspect the chamber and parts (Figure 6) for visible signs of wear. The thrust roller and dovetail insert should be replaced if worn. Replace the chamber if wear is evident on disc spindle where it contacts the crossbar magnet drive or the balls or if the disc plate is worn by foreign material. Before replacing the chamber in the meter head, make certain that the area surrounding the magnet in the meter head is clean.

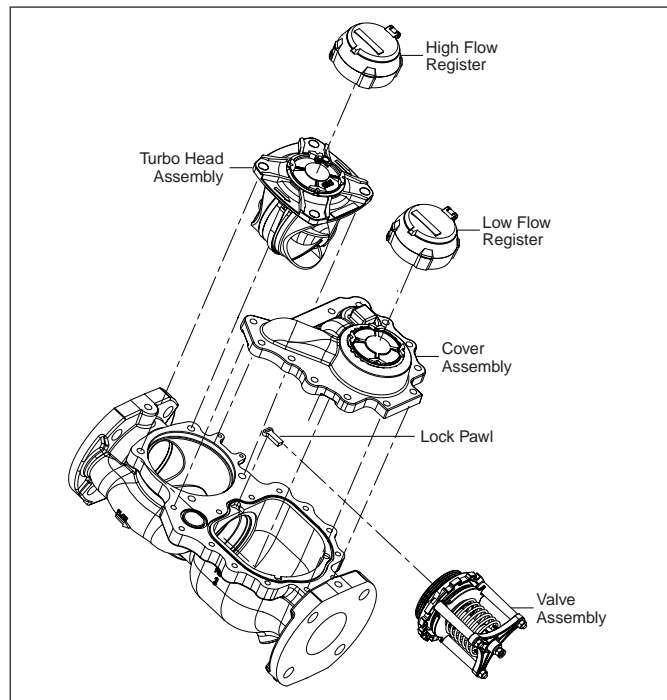
**5-5 VALVE ASSEMBLY**

After removal of Cover Assembly as described above, the Valve Assembly is now exposed for service. Remove lock pawl

(Figure 11). Now, turn the Valve Assembly counter-clockwise to unthread from housing. When complete, simply lift out of housing. If any portion of the assembly requires replacement, we recommend complete replacement of the Valve Assembly. Simply drop in the new assembly, thread in place clockwise and drop lock pawl back in position to lock assembly.

**NOTE**

The 4" and 6" assemblies cannot be disassembled and must be completely replaced. Complete replacement of 2" and 3" is also recommended as noted, but the seal can be replaced if required with a special tool. Please contact Badger Meter for further detail if desired.



**Figure 11.**

**5-6. REINSTALLING COVER ASSEMBLY**

Badger® recommends that a new "O"-ring be used after each teardown and reassembly of the Cover Assembly. To assure a tight seal, make sure "O"-ring is positioned correctly on housing and Cover Assembly are clean and free of dirt or residual traces of old "O"-ring material. If necessary, use silicone grease to help retain "O" ring and to serve as a lubricant in reassembly to housing.

Cover bolts should be tightened in a criss-cross pattern similar to Turbo head bolts. Torque 2" and 3" cover assembly bolts to 16-18 ft. lbs, and bolts for 4" and 6" cover assembly to 35-40 ft. lbs.

**ORDERING INFORMATION**

Order replaceable parts through your local Badger Meter sales representative. When placing an order, please provide the following information:

- a. Size of each compound meter being ordered.
- b. Registration units, i.e., U.S. gallons, cubic feet, etc.
- c. Complete description of the assembly or parts required.
- d. Part number of the item as shown in the repair parts list (RCS-P-1).
- e. Quantity of parts required.
- f. Purchase order number, plus exact return and billing address.







Please see our website at  
[www.badgermeter.com](http://www.badgermeter.com)  
for specific contacts.

Due to continuous research, product improvements and enhancements, Badger Meter reserves the right to change product or system specifications without notice, except to the extent an outstanding bid obligation exists.



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