



Badger Meter

ORION® SE

American® Residential Gas Meter Transmitter



IMPORTANT:

**This manual contains important information.
READ AND KEEP FOR REFERENCE.**

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DISCLAIMER

The user/purchaser is expected to read and understand the information provided in this manual, follow any listed Safety Precautions and Instructions and keep this manual with the equipment for future reference.

Misuse, mishandling and/or inadequate maintenance may impair performance and/or compromise safety.

QUESTIONS OR SERVICE ASSISTANCE

If you have questions regarding the product or this document contact:

Badger Meter, Inc.

P.O. Box 245036

Milwaukee, WI 53224-9536

Telephone: (414) 355-0400, (800) 876-3837

Fax: (888) 371-5982

On the Web: www.badgermeter.com

or call your local Badger Meter representative.

PRODUCT IDENTIFICATION

Record the product identification numbers from the nameplate.

Transmitter

Model Number

Serial Number

Tag Number

The ORION® SE integral transmitter and index for gas meters is designed for use with an American brand of aluminum-case residential gas meter.

SCOPE OF MANUAL

This manual contains installation instructions for the Badger® ORION® SE Integral Transmitter and Index for American Gas Meters.

Throughout the remainder of this manual, all references to "ORION" describe the "Badger® ORION® SE".

Proper performance and reliability of the ORION gas meter system depends upon installation in accordance with these instructions.

PRODUCT UNPACKING AND INSPECTION

Upon receipt of the product, perform the following unpacking and inspection procedures:

NOTE: If damage to the shipping container is evident upon receipt, request the carrier to be present when the product is unpacked.

Carefully open the shipping package, follow any instructions that may be marked on the exterior. Remove all cushioning material surrounding the product and carefully lift the product from the package.

Retain the package and all packing material for possible use in reshipment or storage.

Visually inspect the product and applicable accessories for any physical damage such as scratches, loose or broken parts, or any other sign of damage that may have occurred during shipment.

NOTE: If damage is found, request an inspection by the carrier's agent within 48 hours of delivery and file a claim with the carrier.

A claim for equipment damage in transit is the sole responsibility of the purchaser.

LICENSE REQUIREMENTS

This device complies with Part 15 of FCC Rules. Operation of this device is subject to the following conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

No FCC license is required by a utility to operate a Badger® ORION® meter reading system.

Any changes made, but not approved by Badger Meter, can void the user's authority to operate the equipment.

CAUTION!

In accordance with FCC Regulations, "Code of Federal Regulations" Title 47, Part 2, Subpart J, Section 1091, transmitters pass the requirements pertaining to RF radiation exposure. However, to avoid public exposure in excess of limits for general population (uncontrolled exposure), a 12 CM distance between the transmitter and the body of the user must be maintained during testing.

INSTALLATION TOOLS and MATERIALS

- Use magnetized screwdrivers
- 1/8" flat screwdriver
- ¼" flat screwdriver
- #1 Phillips screwdriver
- Putty knife or flat blade scraper
- Badger handheld or Optical Programming Probe and Laptop computer

Note: If battery powered driver is used, ensure torque maximums are not exceeded (usually 15 in-lb)

INSTALLATION of BADGER ORION INTEGRAL TRANSMITTER and INDEX

This manual describes installing a Badger ORION transmitter and index on an American gas meter.

AMERICAN® GAS METERS

Gas Meter Mfg.

American Meter Gas Meter Models with prefixes: AL, AC, AT, AM, AR and with suffixes: 175, 210, 225, 250, 310, 350, 425, 630

American Gas Meter and Indexes before installation of new ORION Transmitter



Figure 1: Gas Meter with Odometer Index (top right) & Dial Index (bottom right)

Index Removal From an American Gas Meter

1. Use a large screwdriver to puncture and remove tamper plugs, if present.



Figure 2: Tamper Plugs (circled)

2. Use a large screwdriver to remove and discard the four (4) mounting screws and the cover.



Figure 3: Cover Removal

3. Completely remove and discard the old gasket. Use a putty knife to clean the meter surface of all gasket remnants that might limit the effectiveness of the new gasket.



Figure 4: Gasket Removal

4. Use a small screwdriver to remove the index. Discard the two (2) screws.



Figure 5: Index Removal



Figure 6: Gas Meter with the tamper plugs, index and gasket removed

ORION Installation Components for an American Meter

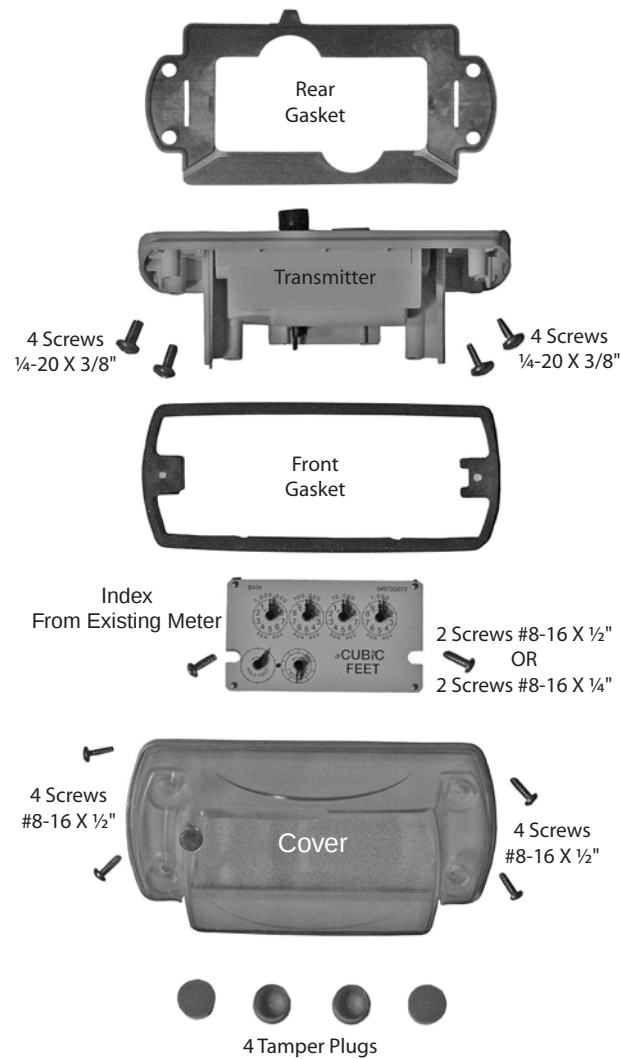


Figure 7: Installation Materials

Assemble the ORION Transmitter and Index

Transmitter gaskets attachment

The gaskets should be attached to the transmitter at the factory. If the gaskets are not attached:

1. Place the rear gasket on the back of the transmitter so that the tab is at the top of the transmitter, the drain slots are pointing down, facing towards the gas meter.

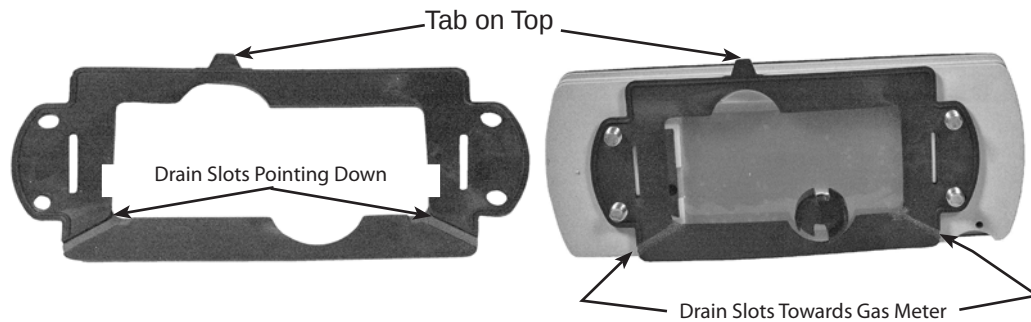


Figure 8: Rear Gasket Placement

2. Place the front gasket on the other side of the transmitter. Place the gasket so that its two holes go over the two protruding tines. Be sure the notched end goes around the guide pin on the right side of the transmitter.

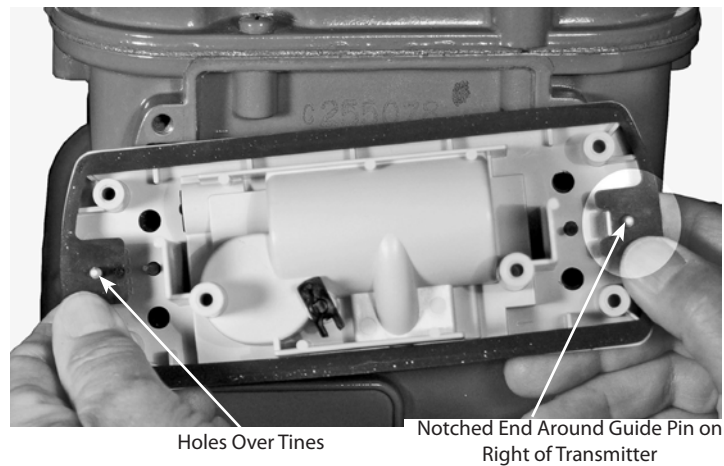


Figure 9: Front Gasket Placement

NOTE: Be certain that the stepped edge is toward the transmitter boot and seated between the transmitter sealing face and the alignment tabs.



Figure 10: Gasket Placement (continued)

Place four (4) screws into the transmitter

1. Place the four (4) ¼-20 X 3/8" screws through the transmitter and rear gasket from the front.

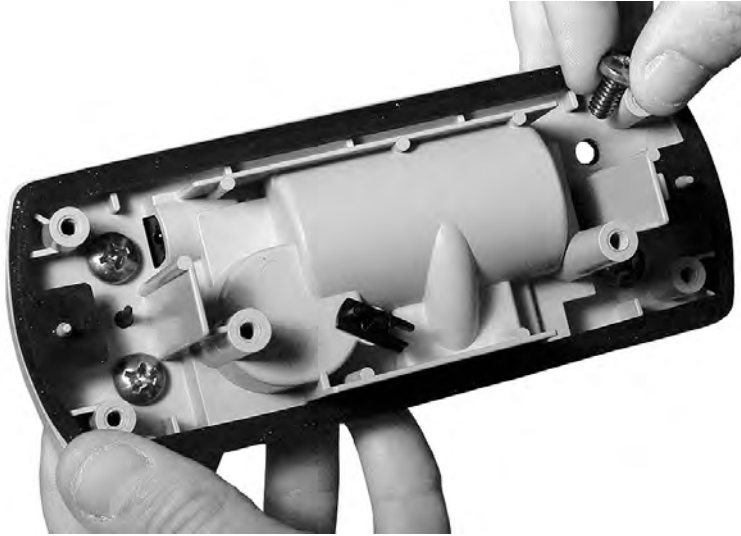


Figure 11: Screw Placement

2. The screws are temporarily held in place by the rear gasket.

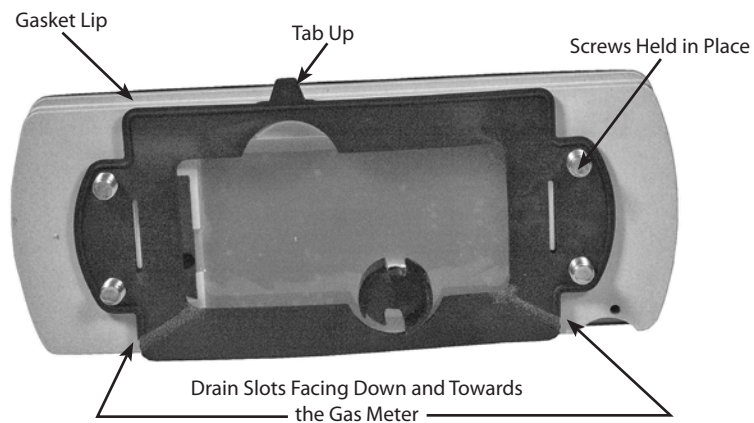


Figure 12: Screws held in place

Index Installation

NOTE: There are two (2) index capacities, ONE FOOT and TWO FEET; and two index mounting styles, slots and holes.

Place screws in slotted index

1. Place two (2) #8 X 1/2" self-tapping screws between the top metal dial and the lower plastic frame and into the holes on each side of the index.

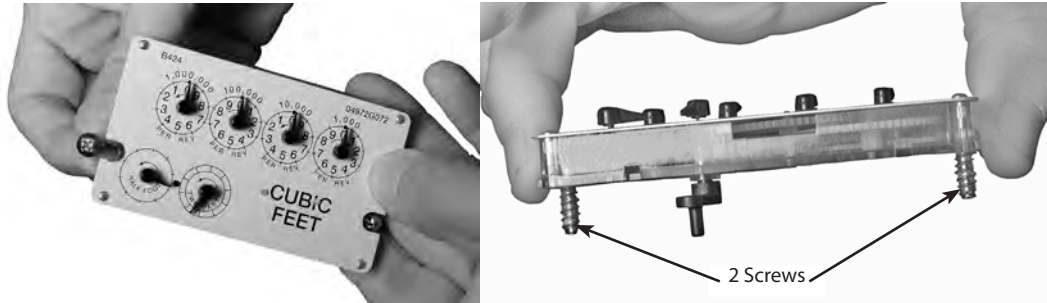


Figure 13: Screw Placement in Index

Place screws in index with holes

1. Place two (2) #8 X 1/4" self-tapping screws between the dial and lower plate and into the holes on each side of the meter.

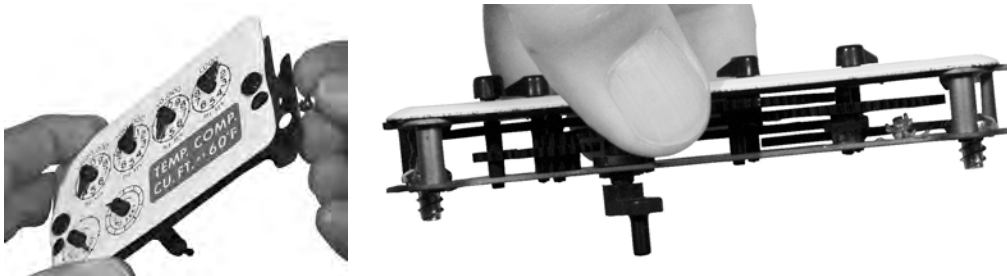


Figure 14: Screw Placement in Index (continued)

Drive pawl engagement and installation of index

1. Use care when handling the Badger® ORION® transmitter and index to insure the transmitter rear drive pawl and the mating drive pawls are not subjected to any physical abuse. Abuse may cause the spindles to become bent, misaligned, or otherwise inoperative.

NOTE: When attaching an index to a Badger ORION transmitter, make sure the index mounts securely to the transmitter. The front and rear drive pawls must mate without causing any binding or potential for disengagement.

2. Align the two (2) screws in the transmitter holes.

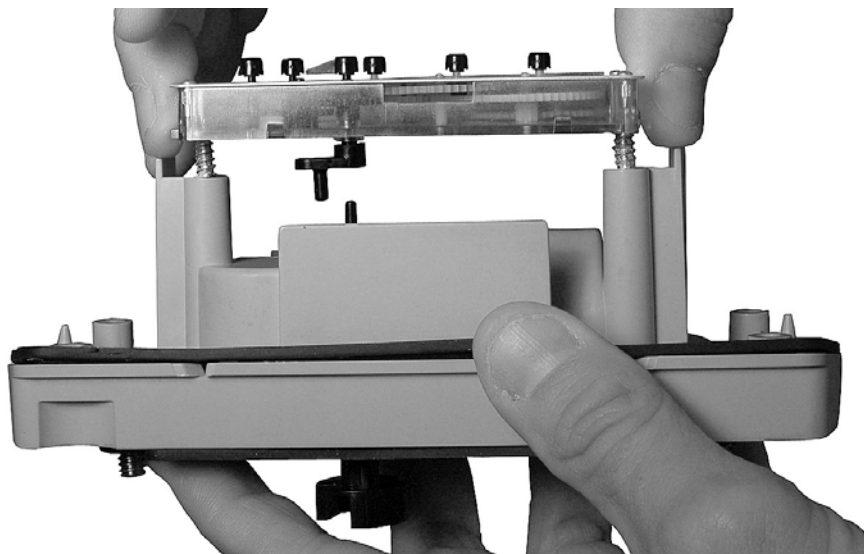


Figure 15: Screw Alignment

On a TWO FEET dial, engage the index drive pawl into the half round connection in the transmitter.

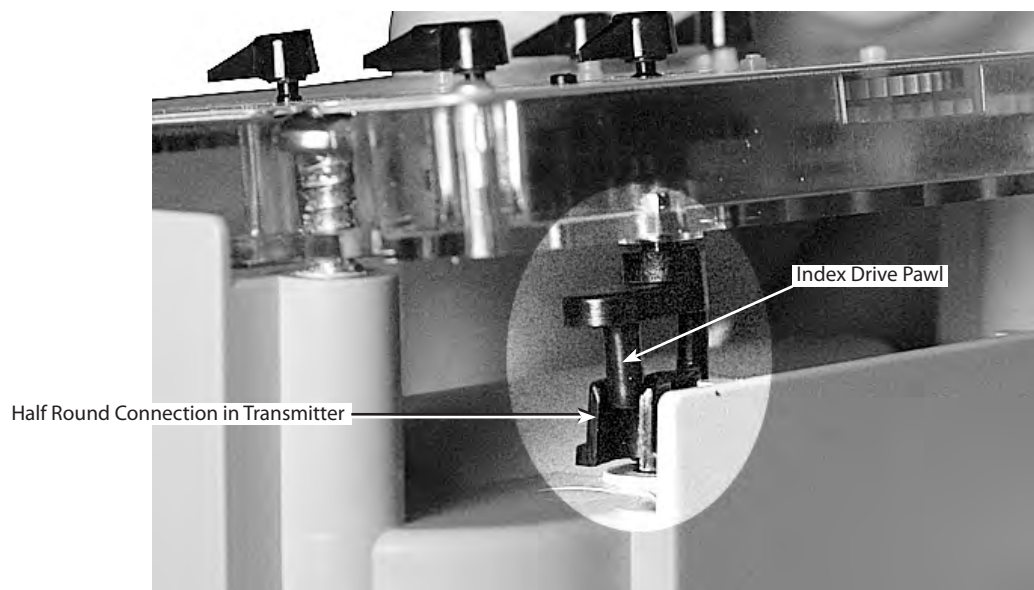


Figure 16: Two-foot Dial

For a ONE FOOT dial, place the index pawl hole into the pawl sticking out of the transmitter.

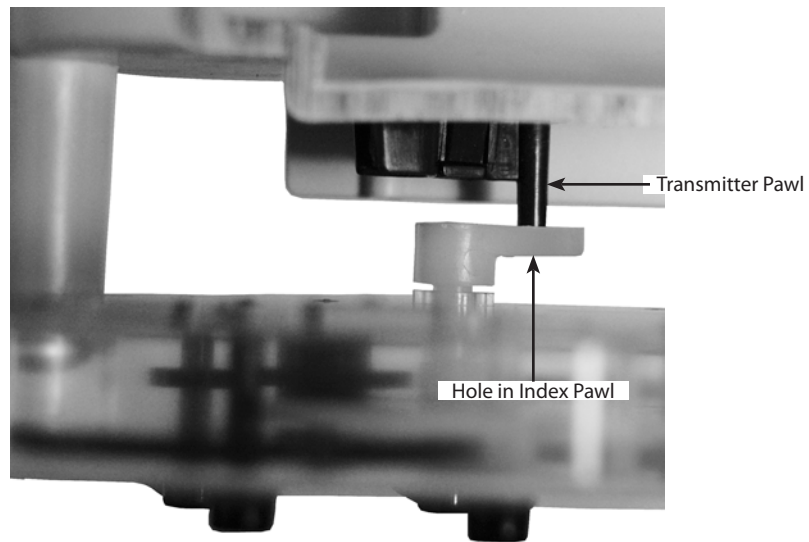


Figure 17: Two-foot Dial

3. Tighten the two (2) screws (6 inch-lbs max).

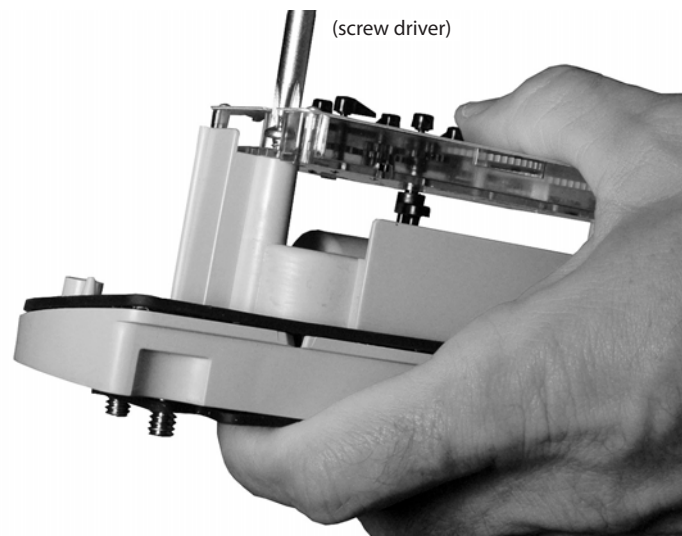


Figure 18: Tighten Screws

4. Test the drive pawl connection by turning the shaft on the rear of the transmitter several times. If dragging or friction is felt, reposition the index to eliminate any drag. The dials should turn smoothly.

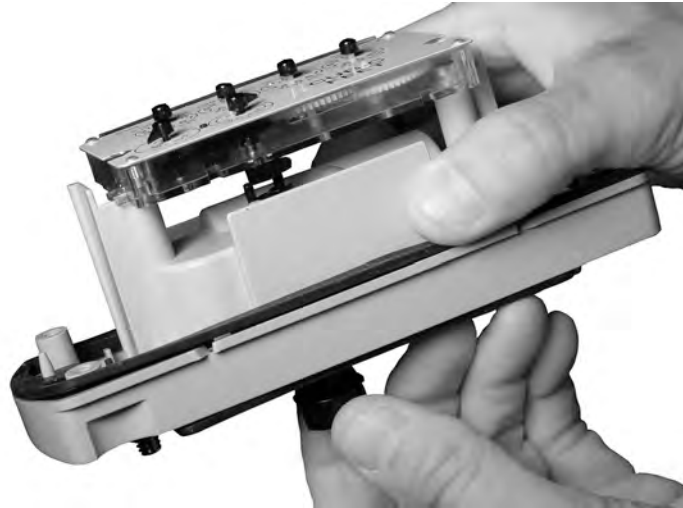


Figure 19: Test Pawl Connection

Final Assembly

Place the Transmitter and Index on an American® Gas Meter

1. Verify that the rear gasket does not interfere with the transmitter drive shaft.
2. Verify that the gasket fits around the semi-circular cut out guide.

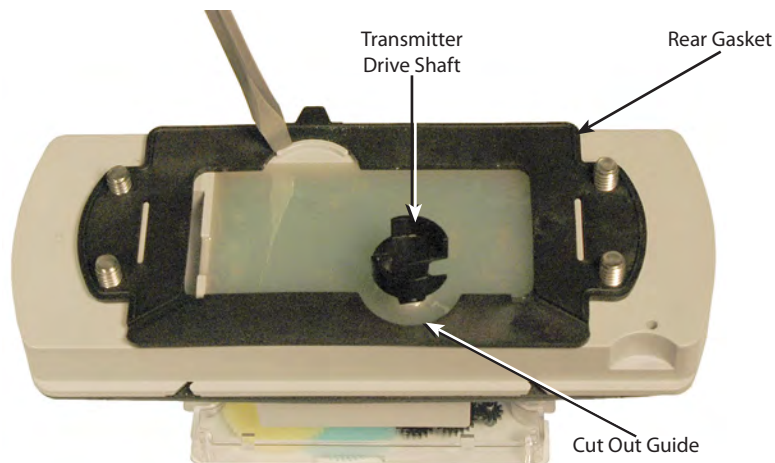


Figure 20: Gasket Verification

Placing a two feet dial

1. Align the rear transmitter drive pawl and the gas meter pawl. Place the four (4) 1/4-20 X 3/8" transmitter screws against the holes in the gas meter.

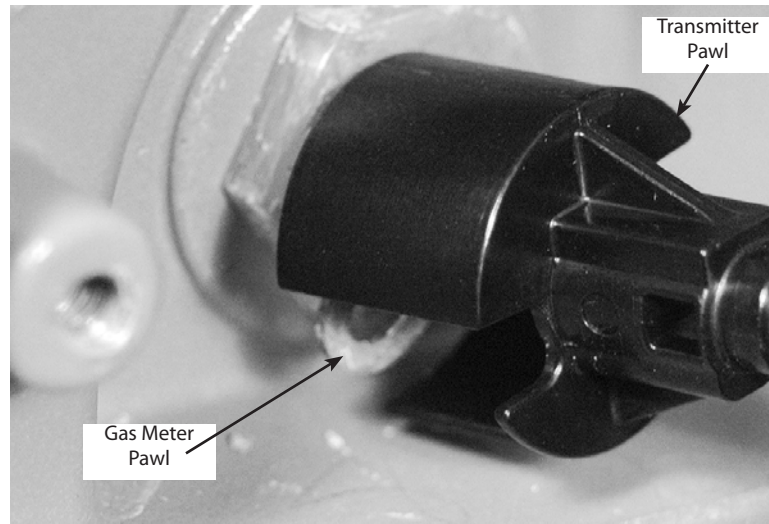


Figure 21: Two-foot Dial Placement

Placing a one foot index

1. Place the transmitter against the gas meter.
2. Place the transmitter drive pawl so it is around the gas meter pawl.

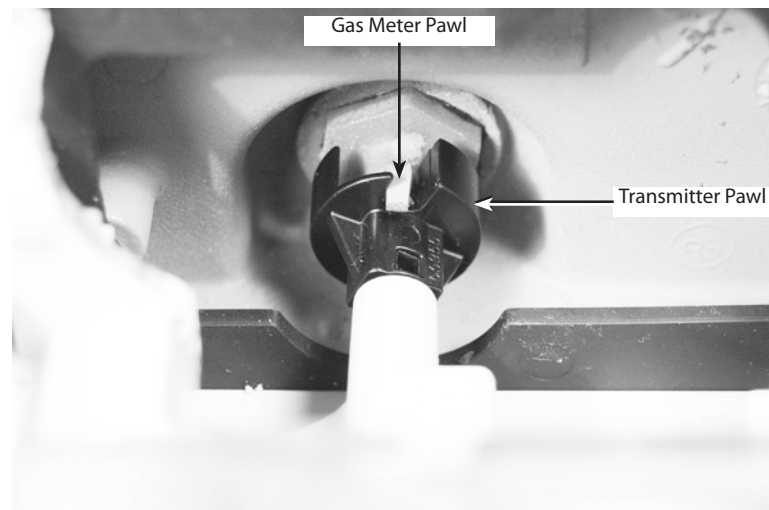


Figure 22: One-foot Index Placement

3. Tighten the four (4) Transmitter screws (20 in-lbs max).

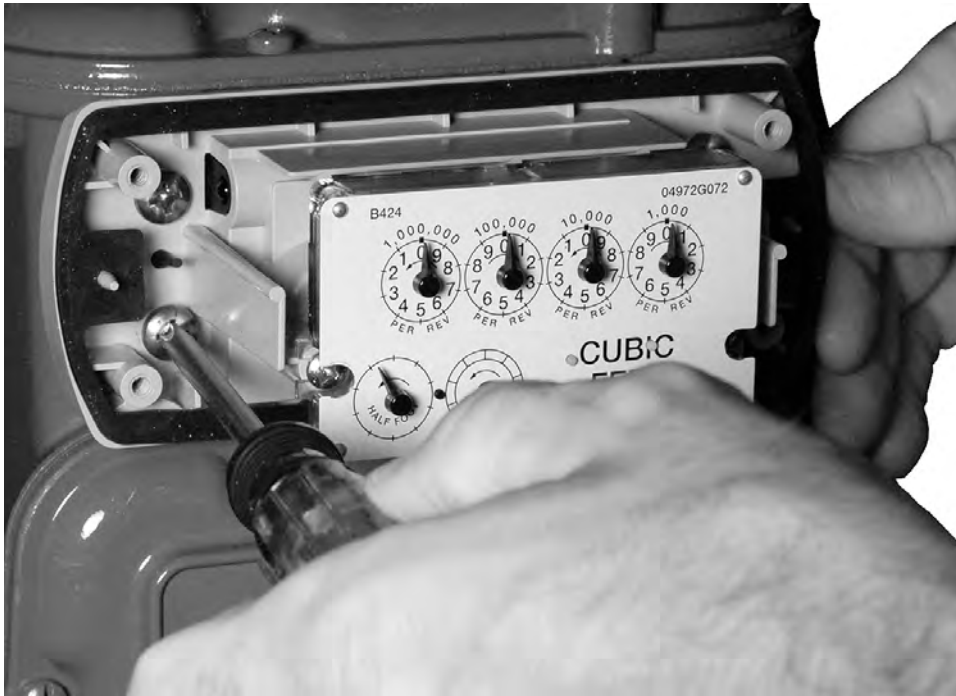


Figure 23: Tighten Transmitter Screws

4. Move the TWO FEET or ONE FOOT dial back and forth to verify pawl connections.

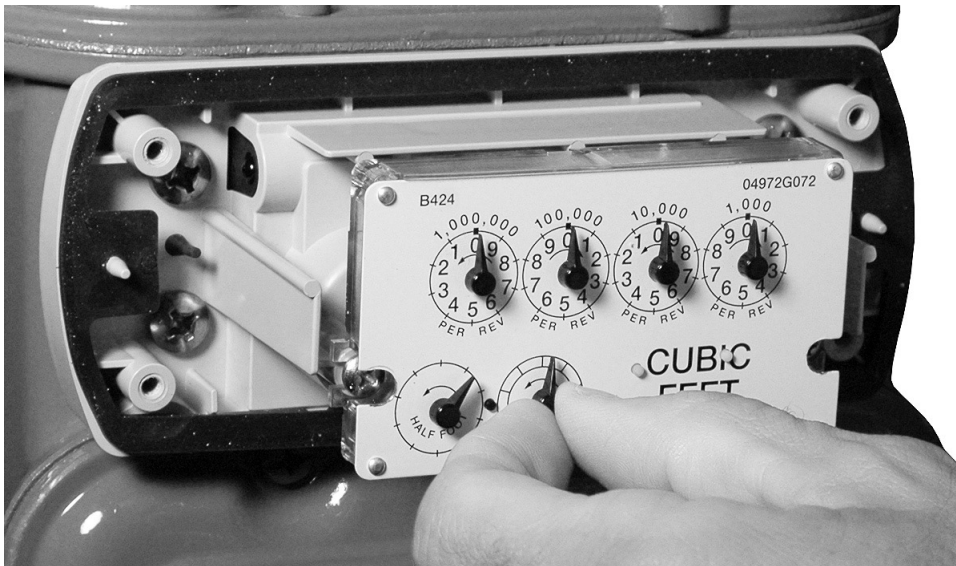


Figure 24: Verify Pawl Connections

Place the Cover Over the Transmitter and Index

1. Verify the front gasket is set properly.

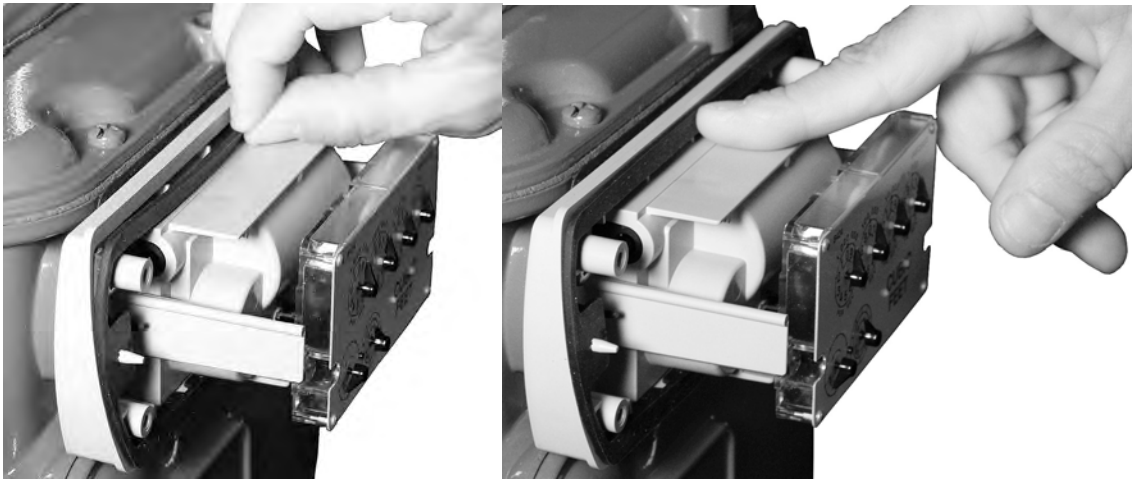


Figure 25: Gasket Seating Verification

2. Place the cover on the gas meter and tighten it with the four (4) remaining screws (15 in-lbs max).



Figure 26: Secure Cover

The transmitter unit is now ready for programming.

Program the Transmitter

Badger® uses a handheld system to process and display screens.



Figure 27: Handheld Devices

Please reference the document ORI-IOM-40, Badger-Radix Installation Tool User Manual or ORI-IOM-52, Trimble Ranger Installation & Operation Manual.

Two programing procedures

There are two procedures to program the transmitter and index. One procedure involves reading the transmitter IR port with the Radix handheld programmer/data collector. The other procedure involves reading the transmitter with an IR Read Head attached to either a Radix or Trimble Ranger.

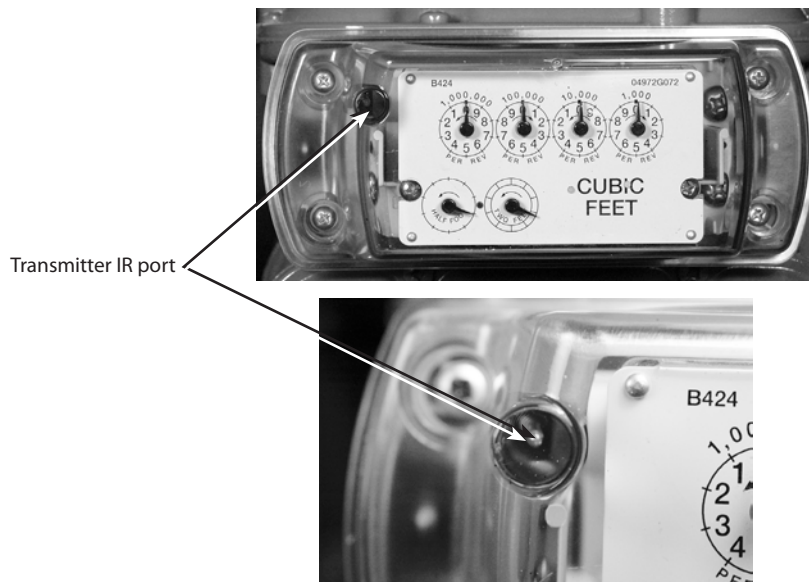


Figure 28: IR Port

First procedure

One procedure is to place the Radix Handheld IR port directly in line with the transmitter IR port.



Figure 29: Align IR Ports

Second procedure

Another procedure is to use an external IR cable with the Radix or Trimble Ranger handheld.



Figure 30: Align with IR Cable

Tamper Plugs

After programming of the transmitter is complete and for security purposes, insert the four (4) red tamper plugs (supplied) in the screw holes and push them in.



Figure 31: Tamper Plugs

Installation of ORION components for the AMERICAN® Residential Gas Meter with dial or odometer index is now complete.

APPENDIX

Programming the ORION Gas Transmitter Using the Handheld Quick-Read/Programming Function

1. Turn on the Trimble Ranger Data Collector, (if the unit is off). Navigate to the Badger Field Application folder and tap the ReadCenter® – Quick Read program.
2. Enter your user ID. Note: This is not a password and can be any 3-5 characters. Most use their initials.
3. To access the Programming feature tap <IR Programming> or press <I>.
4. Connect your IR cable to the bottom of the Trimble.
5. Align the infrared data port with the Badger ORION transmitter's infrared LED.
6. Tap <Read> or press <ENTER>. The Status window will display "Please Wait." Hold the Badger Trimble Ranger steady until you hear a single beep. After the beep, a screen will be displayed indicating Drive Circles available. Select the proper style of transmitter, unit of measurement, number of dials and resolution, and direction of rotation of the drive dial, by tapping on the appropriate selections.. Then, select the Drive Circle that corresponds with the chosen information and matches the index that is installed on the transmitter. Tap <Select> or press <Enter>.

Note: If the message "Wakeup ORION failed" appears it means that the IR cable was not properly aligned to the IR port on the ORION unit. Tap <OK> or press <ENTER> and repeat step 6.

7. To change the reading, tap in the <Index> box. You will see a blinking cursor. Tap to the right of the number and press the <Delete> key to erase the old number. Then type in the new reading. You do not have to worry about entering sub counts, only the moveable wheels.
8. Realign the infrared cable with the Badger ORION transmitter's LED.
9. Tap <Program> or press <P>. The Status will display "Please Wait." Hold the Trimble Ranger steady until you hear a single beep.
10. Verify everything was programmed correctly by tapping <Listen> or pressing <L>. This will automatically take you to the RF S/N tab. Ensure that the read taken over the radio is what was programmed into the ORION Transmitter.
11. Tap <Exit> to exit the Programming software when you are finished.

