Badger Meter

BadgerTouch®

Automated Meter Reading System Remote Module
Models HREBT and ADEBT

DESCRIPTION

Applications: The BadgerTouch® Single Remote Module coupled with the High Resolution Encoder (HRE) or Absolute Digital Encoder (ADE®) is a complete electronically encoded close-proximity automated meter reading system, specifically designed for single point remote meter installations. This system can be used with all currently available Badger Meter Recordall® Disc, Turbo, Compound, Combo, Fire Series meters and assemblies.

Communication: Communication is accomplished by using compatible reading devices programmed to read BadgerTouch or Sensus protocols, such as the VersaProbe reading wands, to interrogate the BadgerTouch remote module. The remote module responds with its serial number, water meter reading, and transmits data in approximately 2.5 seconds. In the event a tamper condition exists, the data collector will not receive a reading.

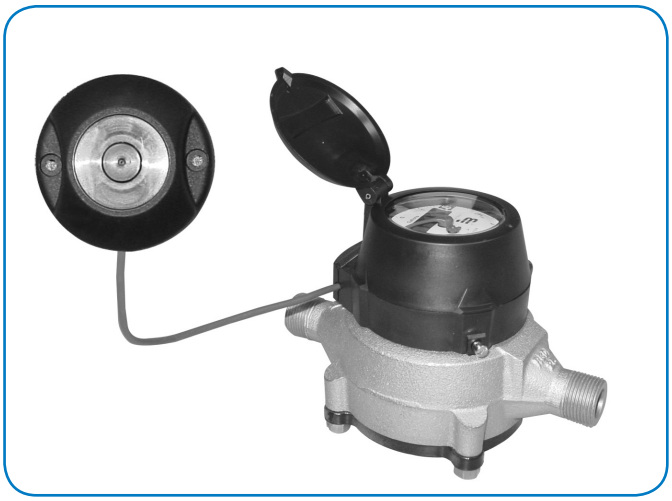
Performance: The Badger Meter BadgerTouch meter reading system offers operating performance in a variety of applications under most climatic conditions. For consistent results, interrogation equipment should be placed in direct contact with the remote read pad.

Meter Reading Validation: Further validation of the meter reading can be made automatically by the data collector based on comparison of high-low audit fields in the record. If the meter reading is not between these predetermined limits, an error message is displayed on the data collector display.

Wire Connections: The BadgerTouch Remote Module can be installed in new or existing installations where remote meter reading is required. The remote module is connected to the recommended wire that runs between the module and the HRE or ADE. A set of terminal screws on the remote module makes this connection. The HRE or ADE is provided prewired with a 3', 6', 10' 15' or 25' length of wire that is ready for connection in existing installations. Please see Figure 1 for more information on connections. To provide best results, a maximum of 75 feet of wire (Belden #9770) between the remote module and the encoder is allowed. Other wire types may also affect performance. If an additional length of wire is used in addition to that provided with the encoder, a set of gel splices must be made.

Construction: The Badger Meter BadgerTouch remote module enclosure is constructed of a high impact plastic enclosure designed for most remote locations. All internal electronic components are encapsulated to provide environmental protection. The HRE and ADE provide permanent glass/metal packaging in a plastic shroud and lid for long lasting, highly reliable encoded meter reading information collection.

License Requirements: This device complies with Part 15 of the FCC Rules. Operation of this device is subject to the following two 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. Any changes made by the user not approved by Badger Meter can void the user's authority to operate the equipment. No license is required by the utility to operate a BadgerTouch meter reading system.



SPECIFICATIONS

Operating Temperature	–5…120° F (–20…49° C)
Storage Temperature	–5…120° F (–20…49° C)
Humidity	0% to 100% Condensing
Ultraviolet	Remote enclosure is UV protected for outdoor installation.
Construction	The remote module has a high impact weather proof plastic enclosure containing encapsulated electronics and reading coil. The HRE and ADE is constructed of a permanently sealed glass and copper corrosion-resistant metal can design.
Hardware	Two terminal screws for connecting the HRE or ADE lead wire to the remote module. Noncorrosive tamper resistant TORX® seal screw mounted on the HRE or ADE shroud and remote housing (optional proprietary keyed seal screw available).
Weight	6 ounces (not including the encoder)

Product Data Sheet

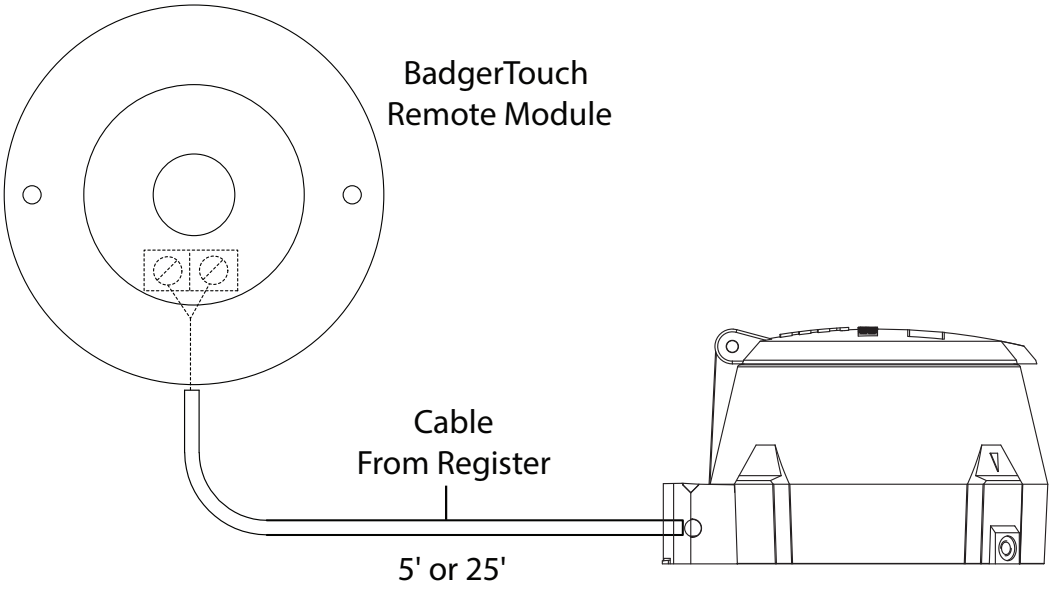


Figure 1: BadgerTouch Single Remote Configuration

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Legacy Document Number: BT-T-03-EN

Badger Meter

BadgerTouch®

Automated Meter Reading System Pit Module
Models HREBT and ADEBT

DESCRIPTION

Applications: The Badger Meter BadgerTouch® Single Pit Module factory prewired to the High Resolution Encoder (HRE) or Absolute Digital Encoder (ADE®), is a complete electronically encoded close-proximity automated meter reading system, specifically designed for single pit meter installations. This system can be used with all currently available Badger Meter Recordall® Disc, Turbo, Compound, Combo and Fire Series meters and assemblies and is designed to fit pit lid configurations up to 2 inches thick.

Communication: Communication is accomplished by using compatible reading devices programmed to read BadgerTouch or Sensus protocols, such as the VersaProbe reading wands, to interrogate the BadgerTouch pit module. The pit module responds with its serial number, water meter reading, and transmits data in approximately 2.5 seconds. In the event a tamper condition exists, the data collector will not receive a reading.

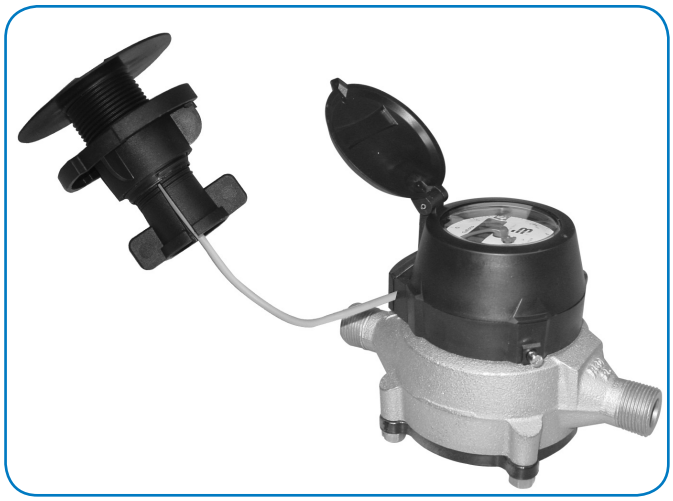
Performance: The Badger Meter BadgerTouch automated meter reading system offers superior operating performance in pit applications and is designed for totally submerged environments. The pit module allows readings under many conditions where ice, sand, or dirt may impede direct contact with the read pad. For consistent results, interrogation equipment should be placed in direct contact with the pit read pad.

Meter Reading Validation: Further validation of the meter reading can be made automatically by the data collector based on comparison of high-low audit fields in the record. If the meter reading is not between these predetermined limits, an error message is displayed on the data collector display.

Wire Connections: The BadgerTouch Single Pit Module is factory prewired to the HRE or ADE and does not require additional wiring in the field.

Construction: The Badger Meter BadgerTouch pit module is constructed from high impact plastic material that is designed for mounting directly through the pit lid. There is a plastic cover that locks the pit module in place. Inside the pit, an integral plastic locking nut is used to fit the module firmly in place next to the pit lid. All electronic components internal to the enclosure are encapsulated to provide environmental protection. The High Resolution Encoder (HRE) and Absolute Digital Encoder (ADE) provides permanent glass/metal packaging in a plastic shroud and lid for long lasting, highly reliable encoded meter reading information.

License Requirements: This device complies with Part 15 of the FCC Rules. Operation of this device is subject to the following two 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. Any changes made by the user not approved by Badger Meter can void the user's authority to operate the equipment. No license is required by the utility to operate a BadgerTouch meter reading system.



SPECIFICATIONS

Operating Temperature	–5…120° F (–20…49° C)
Storage Temperature	–5…120° F (–20…49° C)
Humidity	0% to 100% Condensing
Construction	High impact plastic pit lid nut, adjustment nut, and encapsulated read coil within the plastic pit module. The HRE and ADE are constructed of a permanently sealed glass and copper non-corrosive metal can design.
Hardware	Non-corrosive tamper resistant TORX® seal screw mounted on the HRE or ADE shroud (optional proprietary keyed seal screw available).
Weight	15 ounces (module and encoder)

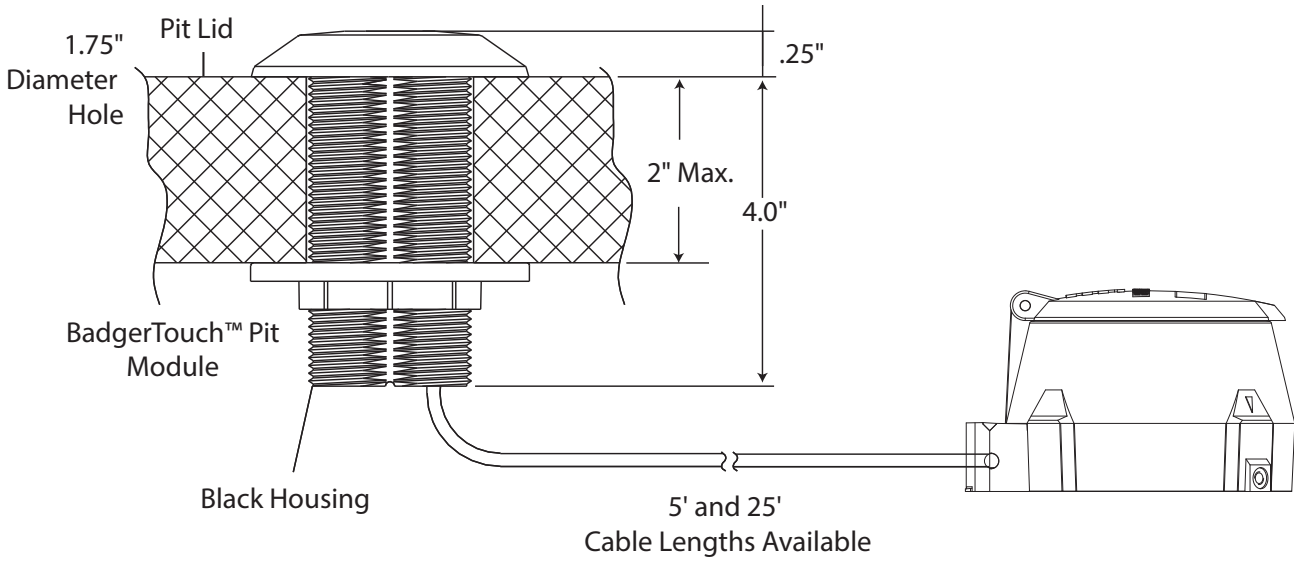


Figure 1: BadgerTouch Single Pit Prewired Configuration

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Legacy Document Number: BT-T-04-EN

Badger Meter

BadgerTouch®

Automated Meter Reading System Remote Module
Models HREBT and ADEBT

TOOLS AND MATERIAL

Required Tools

62658-000 Torx® Screw Driver (10 and 15 bits)

Suggested Tools

- Electric drill
- 3/16" carbide tip masonry drills
- Common and Phillips Screwdrivers T-25 Wire Stapler and Staples
- Touch reading device for installation verification

Required Material

63705-003 BadgerTouch Installation Kit for Remote

Applications, including:

- (2) 55211-231 Screw, Phillips Head
- (2) 62359-001 Screw Anchor 10-12 (1/4" drill bit required)
- (2) 34776-001 Cable Tie

Optional Material

56088 GE RTV-162 Adhesive Sealant

IDENTIFICATION

BadgerTouch Remote Modules are supplied as standalone modules for field connection to High Resolution Encoder (HRE) or Absolute Digital Encoder (ADE®) for all Recordall® Disc, Turbo, Compound, Combo, and Fire Series meters and assemblies. Each HRE or ADE is clearly identified on the face of the dial with an assembly number, unit of measure and meter model number The BadgerTouch Remote Module does not contain an identification number. The HRE or ADE register contains a unique identification number. The number is shown on the underside of the register cover. Interrogation of the HRE or ADE will display the ID number and the meter reading.

Figure 1: Identification – Touch Module

INSTALLATION

Unpacking

Carefully remove the BadgerTouch Remote Module (Figure 1) from the shipping carton. Locate the corresponding HRE or ADE for proper coordination during installation. Retain the contents of the installation kit for use in making connections to the HRE or ADE transmission line.

Location

To ensure proper operation of the BadgerTouch on-site meter reading system, the BadgerTouch Pit Module should be mounted through a predrilled hole in the pit lid. Minimum hole diameter required is 1-3/4". The Pit Module contains electronic circuitry that is totally encapsulated to enhance reliable performance in most locations, under most conditions.

Remote Module Installation

The remote module contains two screw terminals that require connection to the red and black lead wires of the HRE or ADE cable. The BadgerTouch system is not polarity sensitive.

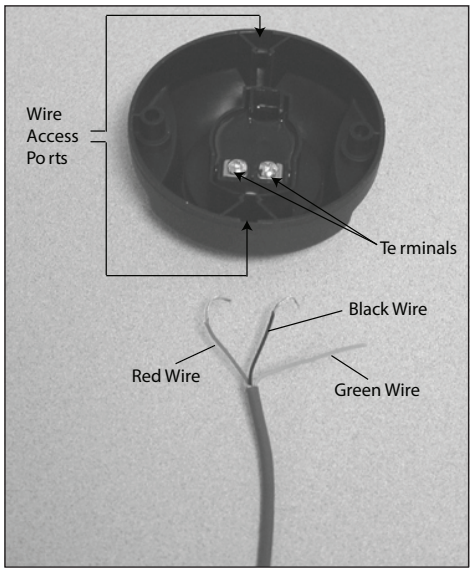

Figure 2: Remote Module Connection

Locate the position of the two mounting holes on the outside of the building by using the remote module as a template. The Remote Module should be located in an easily accessible location but should be within 75 feet maximum wire distance to the water meter and the encoder using Belden 9770 wire. Additional wire length and other wire types may affect performance.

Drill a 3/16" wire entry hole at a suitable location in the building wall. Cut the protective gel cap off the end of the HRE or ADE cable. Feed the HRE or ADE cable from the water meter through the wall. Then cut the cable to proper length, making sure you have sufficient wire to make the connection to the Remote Module.

Wire access to the Remote Module may be from the rear, or through a bottom or top access port. When utilizing rear access, allow approximately 8" of extra cable behind the Remote Module to facilitate making the wiring connections. If using the bottom or top access port, the thin plastic area of the outer shroud needs to be snapped off to expose the wire access port. Use a small wire cutting pliers to snap the plastic.

Strip-back about 1 inch of the outer insulation of the HRE or ADE cable, being careful not to nick the inner conductors. Strip about 3/4" of insulation from the red and black wires; the green wire is not used and can be cut off.

The two cable ties act as strain relief, as shown in Figure 3, to eliminate the possibility of breaking the wire connection at the terminals if the wire is accidentally pulled. Place the two plastic cable ties on the outer insulation of the field wire. Tighten securely and remove the excess cable tie with the wire cutting pliers.

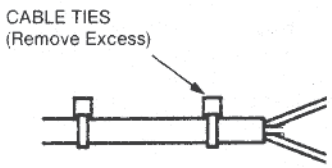

Figure 3: Strain Relief Detail

Tightly wrap one bare wire around one of the terminal screws in a clockwise direction. (Note: you can place either wire on either terminal since the device is not polarity sensitive). The terminal screw should then be tightened to firmly grip the wire between the screw head and terminal. Repeat this procedure with the other wire and the other terminal screw. Excess bare wire ends should be cut off.

If the Remote Module is to be installed in a wet or humid environment, the terminals and exposed wires must be coated with an approved electrical insulating compound, such as GE RTV-162 Adhesive Sealant Dow Corning® 4 Electrical Insulating Compound or Novagard® G661. These compounds protect the terminals and wires against corrosion which otherwise might affect the performance and reliability of the BadgerTouch system.

Fasten the Remote Module to the structure using the mounting hardware that is provided. The module must be securely mounted to a rigid surface; avoid mounting on loose siding or any type, as this may lead to wire breakage. Fasten the field wiring to the building structure and/or existing piping to assure a secure installation. Use standard fasteners or cable ties. If staples are used, be careful not to nick or cut into the outer insulation of the field wiring.

If Additional Wire Length is Required

The HRE and ADE is supplied with a pre-determined length of wire. Should an additional length of wire be required, it is important to follow the instructions that are supplied with the HRE or ADE regarding splicing. Use Belden 9770 wire. Before proceeding with the installation, be certain that the appropriate field splice kit and gel splice crimping tool are available to assure proper installation and that electrical connections are secure and weather resistant.

TESTING

After all connections have been made from the remote module to the remote cable and from the remote cable to the HRE or ADE, the testing of the complete BadgerTouch remote system can begin. To perform the test, a compatible reading device capable of reading Badger HRE, ADE or Sensus protocol can be used. The reading unit should be placed on the remote module and the meter reading collected. This should correspond to the reading on the meter odometer stack.

LICENSE REQUIREMENTS

The device complies with Part 15 of the FCC Rules. Operation of this device is subject to the following two 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. Any changes made by the user not approved by Badger Meter can void the user's authority to operate the equipment. No license is required by the utility to operate a BadgerTouch Meter Reading System.

This device complies with Industry Canada licence-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

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Legacy Document Number: BT-I-03-EN P/N 64764-005

BadgerTouch®

Automated Meter Reading System Pit Module
Models HREBT and ADEBT

REQUIRED TOOLS

62658-000 Torx® Screw Driver (10 bit)

IDENTIFICATION

Badger Meter BadgerTouch Pit Modules are available in a single module configuration for easy adaptation to the complete Badger Recordall® Disc, Turbo, Compound, Combo and Fire Series meters and. The single pit design offers a factory prewired BadgerTouch module to the High Resolution Encoder (HRE) Absolute Digital Encoder (ADE®).

Each HRE or ADE is clearly identified on the face of the dial with an assembly number, unit of measure and meter model number. The BadgerTouch Pit Module does not contain an identification number. The HRE or ADE encoder contains a unique identification number. The number is shown on the underside of the register cover. Interrogation of the HRE or ADE will display the ID number and the meter reading.

INSTALLATION

Unpacking

Carefully remove the prewired BadgerTouch Pit Module and encoder(s) from the shipping carton and inspect the assembly for any damage. Retain the contents of the installation kit for use in securing the Pit Module to the pit lid cover.

Location

To ensure proper operation of the BadgerTouch on-site meter reading system, the BadgerTouch Pit Module should be mounted through a predrilled hole in the pit lid. Minimum hole diameter required is 1-3/4". The Pit Module contains electronic circuitry that is totally encapsulated to enhance reliable performance in most locations, under most conditions.

Pit Module Installation

The BadgerTouch Pit Module (see Figure 1) is shipped prewired to the encoder for single pit configurations. Due to the factory prewired shipment, there is no splicing required. To prepare for the Pit Module installation, first disassemble the two locking nuts of the Pit Module and remove the coil assembly. From the top of the pit lid, insert the "mushroom" pit module holder through the pit lid. Tighten the pit module locking nut so that the module holder fits snugly against the pit lid. Then insert the coil assembly, which is connected to the HRE or ADE lead wire, into the Pit Module holder, and then tighten its locking nut so that the coil assembly is fully seated in the top of the holder. Excess wire should be coiled up inside the pit and cable tied to avoid any damage.

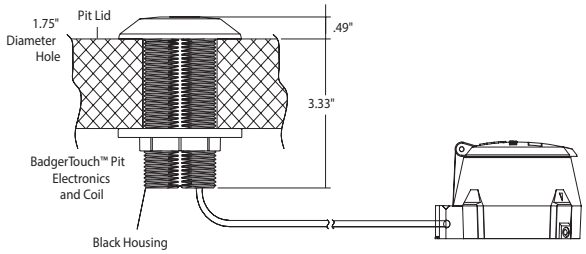

Figure 1: Identification – BadgerTouch Pit Module

HRE or ADE Installation

Install the encoder on the water meter and secure it with the seal screw provided.

TESTING

Once the BadgerTouch Pit Module is secured through the pit lid and the encoder has been mounted on the water meter, the BadgerTouch system is ready for operation. No specific testing is required at the meter location regarding proper connections. Interrogation of each module will ensure that proper coordination of meters, modules, and account have occurred. A VersaProbe or other equivalent reading device should be used for interrogation of the installed BadgerTouch modules.

LICENSE REQUIREMENTS

This device complies with Part 15 of the FCC Rules. Operation of this device is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interfer- ence received, including interference that may cause undesired operation. Any changes made by the user not approved by Badger Meter can void the user's authority to operate the equipment. No license is required by the utility to operate a BadgerTouch meter reading system.

This device complies with Industry Canada licence-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

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Legacy Document Number: BT-I-04-EN P/N 64764-006

Badger Meter

HR | E High Resolution Encoder

DESCRIPTION

Applications: The High Resolution Encoder (HRE) is designed for use with all current Recordall® Disc, Turbo, Compound, Combo and Fire Series meters and assemblies. The HRE provides connectivity with Badger Meter ORION®, GALAXY AMR/AMI endpoints, BadgerTouch® modules.and other AMR/AMI technology solutions approved by Badger Meter.

Electronic Resolution: Digital output from the HRE includes the option of four, five, six, seven or eight dial resolution. Refer to tables on the next page for details.

Mounting: The HRE in its shroud assembly uses a bayonet mount compatible with all Recordall Disc, Turbo, Compound and Fire Series meters and Assemblies. The bayonet mount allows positioning of the register in any of four orientations for visual reading convenience. The HRE can be removed from the meter without disrupting water service.

Magnetic Drive: A direct-drive, high-strength magnetic coupling through the meter body to the wetted magnet provides reliable and dependable register coupling.

Local Indication: The HRE face features an eight-digit mechanical odometer wheel stack and a flow finder with a calibrated test circle.

Tamper-Resistant Features: Unauthorized removal of the register or encoder is inhibited by the option of a tamper detection seal wire screw, resistant TORX® tamper-resistant seal screw, or the proprietary tamper-resistant keyed seal screw. Each can be installed at the meter site or at the factory.

Construction: The housing of the HRE is constructed of a strengthened glass lens top and a corrosion-resistant metal bottom. Internal construction materials are thermoplastic for long life and high reliability. The encoder gearing is self-lubricating thermoplastic to minimize friction and provide long, reliable life. The shroud assembly is thermoplastic.

Temperature: The operating range of the HRE is – 40…140° F (– 40…60° C). The water meter should not be subjected to temperatures below freezing.

Sealing: The HRE achieves true water resistance due to the adhesive technology used to seal the glass dome to the corrosion resistant metal bottom. Leak rates less than 10-6 cc/sec, as tested by a helium mass spectrometer, are comparable to a true hermetic seal. Due to this unique sealing process, the HRE exceeds all applicable requirements of AWWA Standard C707 regarding moisture intrusion.

Wire Connections: The HRE is provided as either a factory-wired assembly to an AMR/AMI endpoint or touch module or as an encoder with pre-sized wire harness available for connection in the field. Standardized wire lengths are 3, 10, 25 and 75 feet. The Badger Meter 308 in-line connector is an optional feature that allows connectivity to an AMR/AMI endpoint without the need for a field splice kit.

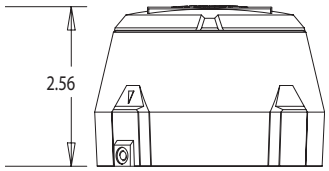
SPECIFICATIONS

Encoder Type	Straight reading, permanently sealed, magnetic drive
Unit of Measure	U.S. Gallons, Cubic Feet, Cubic Meters, clearly identified on encoder face
Number Wheels	Eight with 5/32-inch high numerals
Test Circle	360° circle with ten major increments with ten divisions each
Weight	10 Ounces
Humidity	0% to 100% condensing when equipped with potted lead wire, 0% to 95% non-condensing with screw-terminal wire connections
Temperature	– 40…140° F (– 40…60° C)
Signal Output	Industry Standard ASCII Format
Visual Resolution	1/100th of Test Circle
Electronic Resolution	4, 5, 6, 7 or 8 -dial resolution
Signal Type	3-wire synchronous for AMR/AMI solutions 2-wire asynchronous for Touch solutions
Power Source	External

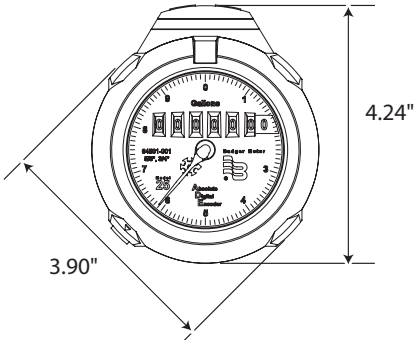
Electrical: The electronic circuitry is designed to provide immunity to electrical surges and transients per IEC1000-4-2, IEC1000-4-4. Operation of the HRE is dependent on the wire length limitations of connected AMR/AMI equipment.

Operating Characteristics: The digital reading obtained by an AMR/AMI device is sensed directly from the position of the endcoder's odometer using internal LED light paths to determine the exact position of each number wheel. This technology eliminates electromechanical contacts that could wear out, and provides greater long-term performance.

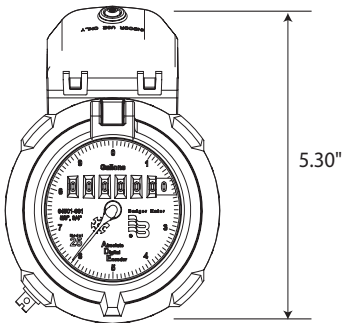
DIMENSIONAL DRAWINGS



Side view



With wire lead



With terminal screws

Top view

MEASUREMENT RESOLUTION

The minimum electronic resolution of the ADE is as noted below (6 Dial Reading). To verify the correct resolution for your application, contact Badger Meter Customer Service.

Recordall Disc Series	Size	8-Dial Resolution (gal)	8-Dial Resolution (ft^3)	8-Dial Resolution (m^3)
M25/MLP	5/8"	0.1	0.01	0.001
M25/MLP	3/4"	0.1	0.01	0.001
M35	3/4"	0.1	0.01	0.001
M40	1"	0.1	0.01	0.001
M55	1"	0.1	0.01	0.001
M70	1"	0.1	0.01	0.001
M120	1-1/2"	1	0.1	0.01
M170	2"	1	0.1	0.01

Fire Service Series	8-Dial Resolution (gal)	8-Dial Resolution (ft^3)	8-Dial Resolution (m^3)
3"	1	0.1	0.01
4"	1	0.1	0.01
6"	10	1	0.1
8"	10	1	0.1
10"	10	1	0.1

Recordall Turbo Series	Size	8-Dial Resolution (gal)	8-Dial Resolution (ft^3)	8-Dial Resolution (m^3)
T160	1-1/2"	1	0.1	0.01
T200	2"	1	0.1	0.01
T450	3"	1	0.1	0.01
T1000	4"	1	0.1	0.01
T2000	6"	10	1	0.1
T3500	8"	10	1	0.1
T5500	10"	10	1	0.1
T6200	12"	1000	10	0.1
T6600	16"	1000	10	1
T10000	20"	1000	1000	1

Recordall Compound Series	Size	8-Dial Resolution (gal)	8-Dial Resolution (ft^3)	8-Dial Resolution (m^3)
High Side T200	2"	1	0.1	0.01
Low Side M25	2"	0.1	0.01	0.001
High Side T450	3"	1	0.1	0.01
Low Side M25	3"	0.1	0.01	0.001
High Side T1000	4"	1	0.1	0.01
Low side M35	4"	0.1	0.01	0.001
High Side T2000	6"	10	1	0.1
Low Side M35	6"	0.1	0.01	0.001

Resolution stated as individual high and low readings.

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Badger Meter | HR | E High Resolution Encoder

IDENTIFICATION

The Badger Meter High Resolution Encoder (HRE) is available in two versions:

- With a potted three-wire flying lead
- With three terminal screws

The HRE with glass lens is available factory pre-wired to Badger Meter AMR/AMI products, or may be spliced to other devices following the instructions below. This version is permanently sealed to eliminate the intrusion of moisture, dirt, or other contaminants, and is suitable for installation in all environments, including meter pits subject to continuous submergence.

The HRE with terminal screws features the same permanent sealing of the register's internal elements, but does not provide a moisture resistant enclosure. Therefore it is suitable for indoor installation in a dry environment only, and is marked as such on the terminal screw cover.

Available for all Recordall® Disc, Turbo, Compound, Combo and Fire Service Meters and Assemblies, each HRE is clearly identified on the face of the dial with an assembly number, unit of measure, and meter model.

REQUIRED MATERIAL

62084-001 Field Splice Kit Contents:

- (3) 59761-001 Gel-Connectors
- (2) 34776-001 Cable Ties
- (1) 62085-001 Splice Enclosure

SUGGESTED TOOLS

- Screw Driver
- 59983-001 Gel-Splice Crimping Tool (Flying lead versions only)
- 59989-001 Coax Stripper
- 59991-001 Wire Cutting Pliers
- 59993-001 Wire Stripper
- TORX® Driver

Before proceeding with installation, be certain that the meter type and size correspond, and that the proper HRE configuration has been supplied for the application.

⚠CAUTION

THE HRE SHOULD ONLY BE CONNEC TED TO A BADGER METER APPROVED PRODUCT. CONNECTION TO AN UNAPPROVED PRODUCT WILL VOID THE HRE WARRANTY.

CONNECTING THE HRE

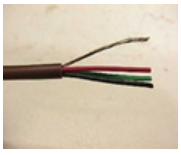
Your HRE will have a factory installed three-conductor cable (brown) for connection to an AMR module.

If the wire is cut or broken and requires a field splice after initial installa- tion, connect like color wires to maintain proper installation.

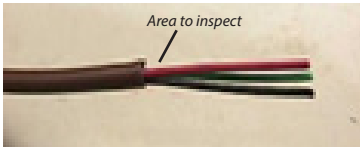
To connect to an AMR module, strip approximately 1-1/2" of outer insulation sheath from the HRE and AMR module cables using the 59989-001 Coax Stripping Tool. Use caution in removing the outer sheath so that the inner signal wire insulation is not damaged.

Strip the outer sheath

If the outer foil shield remained after removing the insulation sheath, unwind the outer foil shield on the cable ends and cut it off even with the outer sheath. Then cut the uninsulated shield drain wire even with the outer sheath. Inspect the inner signal wire insulation to insure it was not damaged; any slice in the insulation of the signal wires could result in a short between conductors resulting in a **tamper** condition on the AMR product.

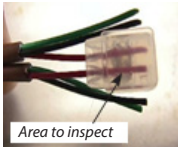


Sheath and outer foil removed

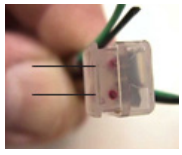


Drain wire cut off

Insert the like color conductors from each cable end into the Gel-Connector. Inspect that the conductors are through the crimp bar and all the way to the end of the Gel-Connector.

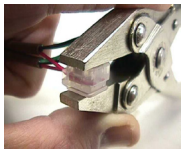


Wires to end of gel connector

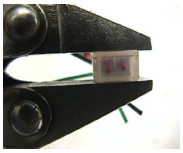


Wires should be visible through the end

Crimp the Gel-Connector using the Crimping Tool making sure the plunger is fully seated so there is no visual gap between the cap'on the plunger and the shell of the Gel-Connector.

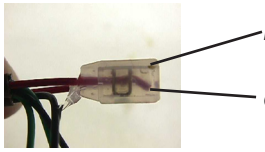


Gel connector in the crimping tool



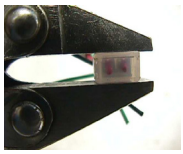
Proper crimp—plunger fully seated

Inspect the Gel-Connector to insure that the conductors did not back out during crimping and that the Gel-Connector plunger is fully seated.



Conductors are still all the way through to the end of the Gel-Connector and the plunger is fully seated.

Repeat this procedure for the remaining like color conductors.



If the wire is cut or broken and requires a field splice after initial installation, connect like colors to maintain proper installation.

PIT INSTALLATIONS

Insert the entire splice assembly into the filled splice tube P/N 62085-001 as indicated in the figure below. Close the cover with leads exiting alternate sides as indicated in Figure 2.

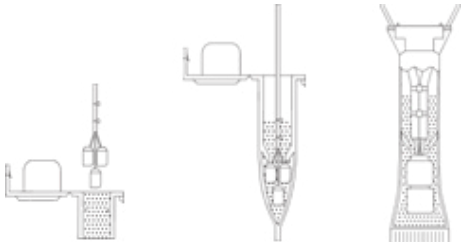


Figure 2: Splice enclosure assembly

HRE WITH TERMINAL SCREWS

NOTE: The HRE with optional terminal screws is suitable for indoor installation only.

The terminal screws are identified by the letters "R", "B", and "G" (standing for Red, Black, and Green) molded into the screw cavity.

Strip approximately 1-1/2" of outer insulation sheath using the 59989-001 coax stripping tool. Use caution in removing the outer sheath so that the inner wire insulation is not damaged.

Unwind the outer foil shield from the cable and cut it off even with the outer sheath using the wire cutting pliers. Cut the uninsulated shield drain wire even with the outer sheath.

Strip approximately 1/2" of insulation from the inner wires using the 59993-001 wire stripper. Use a screwdriver to loosen the terminal screws sufficiently to allow the bare wire ends to fit below the screw heads. Bend the bare wire ends into hook shapes that will closely fit around the shafts of the terminal screws, and hold the hooks around the screw shafts while tightening the screws with the screwdriver. Do not overtighten screws. The hooks should be oriented with the openings to the right, so that tightening the screws (by turning to the right) will tend to draw the wire closer to the screw.

Place plastic cable tie P/N 34776-001 approximately 1/4" from end of outer insulation sheath. Tighten securely for strain relief. Remove excess cable tie. Ensure that the cable exits the terminal screw cavity via the opening on the right side of the cavity wall and that cable tie resides on interior of terminal cover. Place the cover over the terminal screw cavity and secure by tightening the Torx screw.

TESTING

After connections are complete, test the entire installation including the HRE, wiring, and remote or pit module for proper operation in accordance with the instructions supplied with the module.

Install the HRE on the water meter and secure it using the Torx screw provided.

LICENSE REQUIREMENTS

This device complies with Part 15 of the FCC Rules. Operation of this device is subject to the following two 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. Any changes made by the user not approved by Badger Meter can void the user's authority to operate the equipment. No license is required by the utility to operate an HRE meter reading system.

This device complies with Industry Canada licence-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

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