

# Important Meter Replacement Notice

## Widefield Water and Sanitation District Mass Meter Change-Out Project

Widefield Water and Sanitation District is completing a district-wide meter replacement project to help maintain accurate meter readings and reliable billing for our customers. WWSD has contracted with DB Utility to assist with scheduling and completing meter change-out appointments throughout the District.

### Why is my meter being replaced?

Water meters are dependable devices, but like any equipment, some components can age over time. When a meter stops communicating properly, WWSD field staff may not be able to collect monthly consumption data electronically. If actual usage information is not available, the Utilities Billing Department may need to estimate usage for billing purposes.

Replacing aging meters helps reduce the need for estimated bills and supports more accurate monthly billing based on actual water usage.

### Meter replacement notification process

Customers selected for this phase of the project will receive a letter in the mail. The letter confirms the meter at that service address has been identified by WWSD for replacement.

Some meter replacements require an appointment. If the meter is inside the home or requires customer access, scheduling instructions will be included in the mailed notice.

If the meter is outside the home and does not require customer access, DB Utility will complete the replacement without a scheduled appointment and attempt to make contact when they arrive.

### About the new meters

The new meter equipment includes an HR-E LCD Encoder and ORION Cellular Endpoint. The new meters are designed to make water readings more accurate and reliable. They allow WWSD to receive usage information electronically, which helps reduce manual readings and makes it easier for us to spot possible meter issues sooner.

Each new meter has an easy-to-read digital display and can provide helpful information, such as water usage, flow rate, and meter status alerts. These features can help identify possible concerns like suspected leaks, reverse flow, no usage, or other meter conditions that may need attention. The equipment is built to last, with a calculated battery life of 20 years. The meter body is made from a lead-free, high-copper alloy that is strong, durable, and corrosion resistant.

### Safety, radio frequency, and privacy

We understand customers may have questions about safety, radio frequency signals, and privacy. The new meter reading equipment is designed to transmit meter reading information securely and efficiently so WWSD can collect usage data for billing and customer service purposes.

The equipment communicates in brief transmissions and is used only to send meter-related information, such as usage readings and meter status alerts. The radio frequency signals used for this type of communication are non-ionizing, meaning they do not have enough energy to damage living tissue. This information helps WWSD provide accurate billing and respond more quickly when a meter issue may need attention.

The HR-E LCD Encoder is constructed with a durable engineered polymer enclosure and polycarbonate lens. It is fully encapsulated, weatherproof, UV-resistant, and designed to protect the electronics in harsh environments, including flooded or submerged meter pit applications.

\*Please note meter replacements are not completed by customer request. Meters included in this project have been carefully selected by WWSD based on equipment age, end-of-life replacement needs, and the District's ongoing efforts to improve infrastructure and maintain reliable service for our customers.

## DESCRIPTION

ORION® Cellular water endpoints are innovative, two-way endpoints for smart water applications. The endpoints utilize existing IoT (Internet of Things) cellular infrastructure to efficiently and securely deliver meter reading data to the utility in a Network as a Service (NaaS) approach. Leveraging existing cellular infrastructure, the NaaS solution offers all the performance benefits of AMI, while eliminating network-related maintenance and technology concerns and enhancing deployment flexibility.

Cellular endpoints are members of the time-tested ORION family of products from Badger Meter, designed for maximum flexibility. Since 2002, the ORION product family has provided comprehensive Advanced Metering Analytics (AMA) for interval meter reading and data capture using both one-way and two-way communications.

## FUNCTIONALITY

**Operation:** ORION Cellular water endpoints communicate with the encoder and capture 15-minute interval read data and meter status information. The endpoints then broadcast a unique serial number, meter reading data, and applicable status indicators via the cellular network to BEACON® Software as a Service (SaaS). As an advanced data security measure, each message is securely transported to BEACON SaaS via private network only and never over the public internet. The ORION Cellular NaaS solution requires no proprietary gateways to operate, dramatically reducing infrastructure requirements compared to a traditional fixed network. This speeds installations and simplifies expansion as a system evolves.

The endpoints are designed to call in multiple times each workday and feature a configurable schedule that enables utility customers to select call-in times that best support their processes.

**Activation:** ORION Cellular water endpoints are shipped in an inactive, non-transmitting state. The Badger Meter IR Communication Device can be used to activate the endpoints and verify the encoder connection. Successful endpoint function can be confirmed through a web app demonstrating that communication has been verified to both the encoder and the network.

Alternatively, the endpoints offer a Smart Activation feature. After installation, the endpoints begin broadcasting data when the encoder senses the first usage of water. No field programming or special tools are required.

**Data Storage:** The endpoints store 42 days of 15-minute data.

**Dynamic RF Messaging:** Specific configurations transmit a backup RF message to facilitate Quick Reads or help troubleshoot in the field in the rare event of a network communication outage. The endpoint begins to transmit this additional RF message when it has been unsuccessful at communicating with BEACON via the cellular network for a defined period of time.



ORION Cellular HLD endpoint (pictured)

## APPLICATION

**Configurations:** ORION Cellular water endpoints are multi-purpose endpoints that can be deployed in indoor, outdoor and pit (non-metal pit lid) applications. The electronics and battery assembly are fully encapsulated in epoxy for environmental integrity. The endpoint is available with a connector assembly for ease of installation.

**Meter Compatibility:** When attached to a Badger Meter High Resolution Encoder, the ORION Cellular water endpoint is compatible with all current Badger Meter Recordall® Disc, Turbo Series, Compound Series, Combo Series and Fire Service meters and assemblies, and with E-Series G2® Ultrasonic, E-Series® Ultrasonic, E-Series® Ultrasonic Plus, and ModMAG® electromagnetic flow meters.

**Encoder Compatibility:** The ORION Cellular water endpoint is suitable for use with a Badger Meter High Resolution Encoder as well as the following Badger Meter approved three-wire encoder registers that have a manufacture date within 10 years of the current date as long as the encoder has three wires connected to it and is programmed into the three-wire output mode for AMR/AMI: Honeywell® (Elster/ABB) ScanCoder, evoQ4 meter with Sensus® protocol module; Master Meter® Octave® Ultrasonic meter encoder output; Metron-Farnier Hawkeye; Mueller Systems 420 Solid State Register (SSR) LCD; Neptune® ProRead, E-Coder®, ARB-V®, and ProCoder; and Sensus iPerl®.

SPECIFICATIONS

|                                |                                                                                                         |
|--------------------------------|---------------------------------------------------------------------------------------------------------|
| Dimensions                     | 5.125 in. (130 mm) (H)                                                                                  |
|                                | 1.75 in. (44 mm) Diameter at top                                                                        |
|                                | 2.625 in. (W) x 2.875 in. (D) at base                                                                   |
|                                | (67 mm (W) x 73 mm (D) at base)                                                                         |
| Broadcast Network              | LTE-M cellular network (primary communication technology)                                               |
|                                | NB-IoT (secondary communication technology for certain variants)                                        |
| RF Message for Troubleshooting | Where available (see table below) frequency is FCC-regulated 902...928 MHz frequency hopping modulation |
| Operating Temperature Range    |                                                                                                         |
|                                | • Storage, Meter Reading and RF Message (for troubleshooting)                                           |
|                                | • Cellular Communications                                                                               |
| Humidity                       | 0%...100% condensing                                                                                    |
| Battery                        | One (1) lithium thionyl chloride D cell (nonreplaceable)                                                |

**Construction:** All ORION Cellular water endpoints are housed in an engineered polymer enclosure with an ORION RF board, battery and antenna. For long-term performance, the enclosure is fully potted to withstand harsh environments and to protect the electronics in flooded or submerged pit applications.

**Wire Connections:** ORION Cellular water endpoints are available with inline connectors (Twist Tight® or Nicor®) for easy installation and connection to compatible encoders/meters. The endpoints are also available with flying leads for field splice connections. Other wire connection configurations may be available upon request.

FEATURES

|                              |                               |
|------------------------------|-------------------------------|
| Smart City Ready             | Future-proof technology       |
| Communication Type           | Two-way                       |
| Application Type             | Control/Monitor               |
| Endpoint Communication       | Configurable call-in schedule |
| Reading Interval Type        | 15-minute                     |
| Encoder Compatibility        | Absolute                      |
| Fixed Network Reading        | ✓                             |
| Cut-Wire Indication          | ✓                             |
| Encoder Error                | ✓                             |
| Low Battery Indication       | ✓                             |
| Remote Clock Synchronization | ✓                             |
| Firmware Upgrades            | ✓                             |

CONFIGURATIONS

| Endpoint           | Notes                                           |
|--------------------|-------------------------------------------------|
| ORION Cellular C   | Includes RF and IR messages for troubleshooting |
| ORION Cellular HLD | Includes RF and IR messages for troubleshooting |
| ORION Cellular HLG | Includes RF and IR messages for troubleshooting |

ORION® Cellular endpoints are IoT Network Certified for Smart Connected Infrastructure™ by CTIA, an association representing the U.S. wireless communications industry and companies throughout the mobile ecosystem. The certification signifies that the endpoints meet global 4G and 5G, 3GPP, NIST, and CTIA certification standards for cybersecurity and network performance, and are suitable to support critical infrastructure operations.



- License Requirements:**

ORION Cellular water endpoints comply with Part 15, Part 22, Part 24, and Part 27 of the FCC Rules. No license is required by the utility to operate an ORION meter reading system. This device complies with Industry Canada license-exempt RSS standard(s). The device shall be used in such a manner that the potential for human contact in normal operation is minimized. This equipment complies with RSS-102 radiation exposure limits. This equipment should be installed and operated with a minimum distance of 20 cm between the radiator and your body. This device and its antenna(s) must not be co-located or operating in conjunction with any other antenna or transmitter.
- Transportation:**

**WARNING:** The operation of transmitters and receivers on airlines is strictly prohibited by the Federal Aviation Administration. As such, the shipping of radios and endpoints via air is prohibited. Please follow all Badger Meter return and/or shipping procedures to prevent exposure to liability.
- Warning:**

To reduce the possibility of electrical fire and shock hazards, never connect the cable from the endpoint to any electrical supply source. The endpoint cable provides SELV low voltage limited energy power to the load and should only be connected to passive elements of a water meter register.
- Caution:**

Endpoint batteries are *not* replaceable. Users should make no attempt to replace the batteries. Changes or modifications to the equipment that are not expressly approved by Badger Meter could void the user's authority to operate the equipment.

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## DESCRIPTION

**Applications:** The High Resolution encoder (HR-E LCD) is a fully electronic, solid-state encoder with no moving parts. It is designed for use with all current Badger Meter Recordall® Disc, Turbo Series, Compound Series, Combo Series and Fire Service meters and assemblies. The HR-E LCD provides connectivity with Badger Meter ORION® and GALAXY® AMR/AMI endpoints and other AMR/AMI technology solutions approved by Badger Meter.

**NOTE:** For more detailed information, refer to the document *HR-E LCD Encoder User Manual*, available at [www.badgermeter.com](http://www.badgermeter.com).

**Field Programmable:** The HR-E LCD encoder comes standard as factory programmed to customer specifications, with the option for field programming the unit of measure, meter type, meter model, digit resolution from the encoder, billing units, and rate-of-flow time and units. Programming is performed through the IR port via a computer.

**Electronic Resolution:** Standard encoded output from the HR-E LCD is nine digits.

**Status Indicators:** Status indicators are sent as part of the encoder extended message to AMR/AMI systems such as ORION Cellular, Fixed Network and Migratable endpoints that are capable of receiving an extended message. The details can also be read through an IR interface.

**Mounting:** Icons on the HR-E LCD encoder face indicate encoder status and alarm conditions. The fully potted encoder assembly has a bayonet mount compatible with all Recordall Disc, Turbo Series, Compound Series, Combo Series and Fire Series meters and assemblies. The bayonet mount positions the encoder in any of four orientations for visual reading convenience. The HR-E LCD encoder can be removed from the meter without disrupting water service.

**Magnetic Drive Communication:** The HR-E LCD encoder detects movement of the wet side meter magnet with magnetic sensors to provide reliable and dependable encoded communication.

### Tamper-resistant Features:

Unauthorized removal of the HR-E LCD encoder is inhibited by a tamper-resistant Torx® seal screw. Torx seal screws are provided as standard accessories. Optional proprietary tamper-proof screws are also available.

Magnetic sensors detect and report an attempted encoder removal. In addition, the HR-E LCD encoder is resistant to magnetic tampering. The encoder detects an attempted tamper—as well as encoder removal—and sends a tamper alarm in either situation. Approved endpoints capable of receiving the alarms, such as ORION Cellular, Fixed Network and Migratable endpoints, can then report the tamper condition to the meter reading software.



## SPECIFICATIONS

|                          |                                                                                                                                                                                                                           |
|--------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Encoder type</b>      | Straight reading, permanently sealed, electronic LCD absolute encoder with field-programmable option                                                                                                                      |
| <b>Encoder display</b>   | Status indicators, unit of measure, billing units, automatic toggle between 9-digit and 6-digit consumption (segmented leak detector in this mode), rate of flow, meter model                                             |
| <b>Unit of measure</b>   | U.S. gallons, Imperial gallons, cubic feet, cubic meters, and liters clearly identified on register face                                                                                                                  |
| <b>Flow rate</b>         | Seconds, minutes, and hours                                                                                                                                                                                               |
| <b>Numerals</b>          | 7 mm (0.28 in.) high                                                                                                                                                                                                      |
| <b>Weight</b>            | 11 ounces                                                                                                                                                                                                                 |
| <b>Humidity</b>          | 0...100% condensing                                                                                                                                                                                                       |
| <b>Temperature</b>       | Storage: – 40...60° C (– 40...140° F)<br>Max. ambient for 1 hr: 70° C (158° F)<br>Electronics & Display: – 10...60° C (14...140° F)                                                                                       |
| <b>Status indicators</b> | Electronic and visual icons for: meter functioning correctly, meter alarm (indicates temperature limits exceeded, magnetic tamper or encoder removal), reverse flow, suspected leak, 30-day no usage, end of battery life |
| <b>Signal output</b>     | Industry standard ASCII format                                                                                                                                                                                            |
| <b>Signal type</b>       | Three-wire synchronous for AMR/AMI solutions<br>Red = clock/power; Black = ground; Green = data                                                                                                                           |
| <b>Battery</b>           | Lithium thionyl chloride AA cell, fully encapsulated within encoder housing                                                                                                                                               |
| <b>Battery Life</b>      | 20 years (calculated)                                                                                                                                                                                                     |

**Construction:** The housing of the HR-E LCD encoder is constructed of an engineered polymer enclosure and a polycarbonate lens. For long-term performance, the enclosure is fully encapsulated, weatherproof, and UV-resistant to withstand harsh environments and to protect the electronics in flooded or submerged pit applications. An epoxy potting (patented design - 8,482,908) comprises the encoder bottom. Due to this unique sealing, the HR-E LCD exceeds all applicable requirements of AWWA Standard C706 and C707.

**Wire Connections:** The HR-E LCD encoder is available with an in-line connector for easy connection and installation to AMR/AMI endpoints. It is also available with a flying lead for a field splice connection, or fully prewired to an AMR/AMI endpoint.

**Operating Characteristics:** The HR-E LCD encoder is shipped in storage mode so a meter status alarm is not triggered. In storage mode, the meter model screen is displayed. Upon sensing two revolutions of the meter magnet, the encoder goes into normal operation mode. The display then automatically toggles between these four modes:

- 9-digit consumption displays for 45 seconds.
- 6-digit consumption (segmented leak detector in this mode) displays for 5 seconds.
- Rate of flow displays for 5 seconds.
- Meter model displays for 5 seconds.

## DIMENSIONAL DRAWINGS

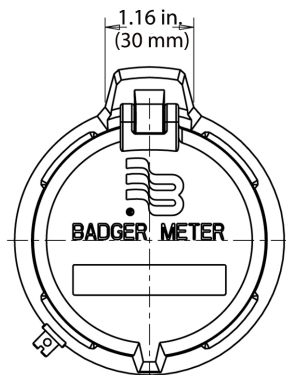


Figure 1: Top view

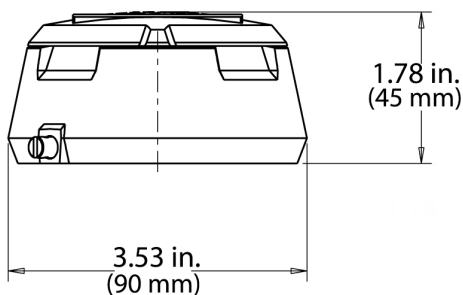


Figure 2: Front view

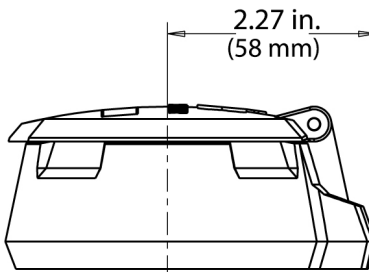


Figure 3: Left side view

## MEASUREMENT RESOLUTION

The electronic encoder output resolution of the HR-E LCD is as noted below.

| Recordall Disc Series | Size (in.)     | 9-dial encoder output (gal) | 9-dial encoder output (ft³) | 9-dial encoder output (m³) |
|-----------------------|----------------|-----------------------------|-----------------------------|----------------------------|
| LP                    | 5/8, 5/8 x 3/4 | 0.01                        | 0.001                       | 0.0001                     |
| M25                   | 5/8, 5/8 x 3/4 | 0.01                        | 0.001                       | 0.0001                     |
| M35                   | 3/4            | 0.01                        | 0.001                       | 0.0001                     |
| M40                   | 1              | 0.01                        | 0.001                       | 0.0001                     |
| M55                   | 1              | 0.01                        | 0.001                       | 0.0001                     |
| M70                   | 1              | 0.01                        | 0.001                       | 0.0001                     |
| M120                  | 1-1/2          | 0.1                         | 0.01                        | 0.001                      |
| M170                  | 2              | 0.1                         | 0.01                        | 0.001                      |

| Recordall Turbo Series | Size (in.) | 9-dial encoder output (gal) | 9-dial encoder output (ft³) | 9-dial encoder output (m³) |
|------------------------|------------|-----------------------------|-----------------------------|----------------------------|
| T160                   | 1-1/2      | 0.1                         | 0.01                        | 0.001                      |
| T200                   | 2          | 0.1                         | 0.01                        | 0.001                      |
| T450                   | 3          | 0.1                         | 0.01                        | 0.001                      |
| T1000                  | 4          | 0.1                         | 0.01                        | 0.001                      |
| T2000                  | 6          | 1                           | 0.1                         | 0.01                       |
| T3500                  | 8          | 1                           | 0.1                         | 0.01                       |
| T5500                  | 10         | 1                           | 0.1                         | 0.01                       |
| T6200                  | 12         | 10                          | 1                           | 0.01                       |
| T6600                  | 16         | 10                          | 1                           | 0.01                       |
| T10000                 | 20         | 10                          | 1                           | 0.01                       |

| Recordall Compound Series | Size (in.) | 9-dial encoder output (gal) | 9-dial encoder output (ft³) | 9-dial encoder output (m³) |
|---------------------------|------------|-----------------------------|-----------------------------|----------------------------|
| High Side T200            | 2          | 0.1                         | 0.01                        | 0.001                      |
| Low Side M25              | 2          | 0.01                        | 0.001                       | 0.0001                     |
| High Side T450            | 3          | 0.1                         | 0.01                        | 0.001                      |
| Low Side M25              | 3          | 0.01                        | 0.001                       | 0.0001                     |
| High Side T1000           | 4          | 0.1                         | 0.01                        | 0.001                      |
| Low side M35              | 4          | 0.01                        | 0.001                       | 0.0001                     |
| High Side T2000           | 6          | 1                           | 0.1                         | 0.01                       |
| Low Side M35              | 6          | 0.01                        | 0.001                       | 0.0001                     |
| High Side T3500           | 8          | 1                           | 0.1                         | 0.01                       |
| Low side M120             | 8          | 0.1                         | 0.01                        | 0.001                      |

**NOTE:** For Fire Service Meters and Assemblies, please refer to appropriate Disc and TSM information provided above.

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