



**Badger Meter**

# HR-E<sup>®</sup> LCD Encoder

## 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<sup>®</sup> Disc, Turbo Series, Compound Series, Combo Series and Fire Service meters and assemblies. The HR-E LCD provides connectivity with Badger Meter ORION<sup>®</sup> and GALAXY<sup>®</sup> 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") high
<b>Weight</b>	11 ounces
<b>Humidity</b>	0...100% condensing
<b>Temperature</b>	Storage: -40...60° C (-40...140° F) Max. ambient for 1 hr: 72° C (150° F) 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 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 (patent pending) 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 30 seconds.
- 6-digit consumption (segmented leak detector in this mode) displays for 20 seconds.
- Rate of flow displays for 5 seconds.
- Meter model displays for 5 seconds.

**DIMENSIONAL DRAWINGS**

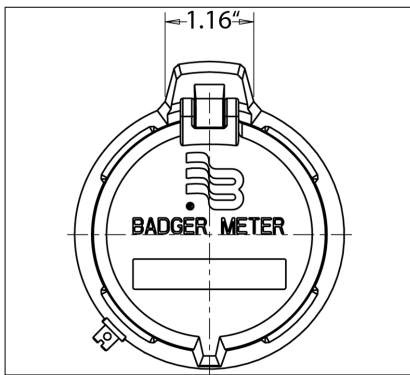


Figure 1: Top view

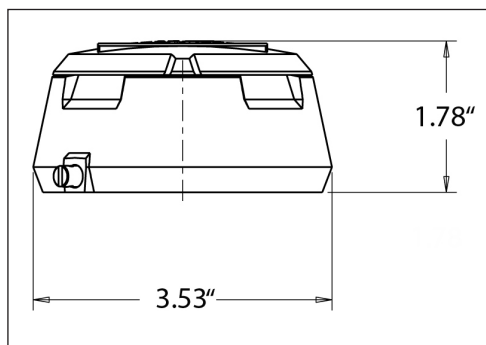


Figure 2: Front view

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**MEASUREMENT RESOLUTION**

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

Recordall Disc Series	Size	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	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	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.

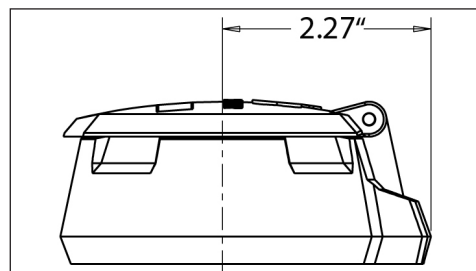


Figure 3: Left side view