

## DESCRIPTION

**APPLICATIONS:** The Badger® Pit ERT® system is designed for water meter pit or vault installations that are subject to flooding or submergence. The assembled system consists of a Recordall® Transmitter Register (RTR®) and the Itron® 50W-2 Pit ERT with in-line connector. The RTR is supplied with a factory-potted wire that terminates with the female half of the connector for maximum reliability. The Pit ERT is supplied with a factory potted wire assembled to the ERT and approximately 12" of wire that terminates with the male half of the connector. Once the Pit ERT is mounted through a hole in the meter lid, final field connection requires the customer to join the two halves of the connector together and lock them in place using materials from the supplied installation kit.

As an option, customers can also order the RTR with Pit ERT preprogrammed with connectors joined together and locked in place for below lid applications.

**OPERATION:** The RTR provides a digital signal from Badger Meter's patented piezoelectric solid-state switch. This signal has the characteristics of an open drain Field Effect Transistor (FET) and has no electrical contacts to stick, wear or corrode. It is fully compatible with the input circuitry of the Itron® Model 50W-2 ERT. The 50W ERT can be used in a wake-up or bubble-up (broadcast) mode.

**RESOLUTION:** Digital output from the RTR has resolution of 1/10th of the register test circle. Output resolution of the ERT may vary with meter size. The resolution table on the back of this technical brief lists output resolution for all Itron meter applications.

**MOUNTING:** The RTR uses a bayonet connection compatible with all Recordall® Disc, Turbo, Compound and Fire Series meters. A TORX® seal screw is provided to allow positioning and to secure the RTR to the meter body in a tamper resistant mode. The RTR can be removed from the meter without disrupting service or disconnecting the Pit ERT. The RTR is factory wired to the female half of the connector for ease of installation.

For best performance, the Pit ERT is mounted through the drilled hole in the lid, and attached to the lid using Itron's installation kit.

**MAGNETIC DRIVE:** Direct drive, high-strength, magnetic coupling through the meter body to the wetted magnet provides reliable and dependable register coupling.

**SEALED REGISTER:** The RTR local register consists of a six-digit straight-reading mechanical odometer totalizer, a 360° test circle with sweep hand, and a flow finder to detect leaks. The register gearing is self-lubricating, thermoplastic to minimize friction and provide long, reliable life. Permanent sealing eliminates moisture, dirt, and other contaminants.

**TAMPER-PROOF FEATURES:** Removal of the RTR from the meter can be minimized by using a tamper resistant TORX seal screw. TORX seal screws are provided as standard accessories with the RTR. Optional tamper detection seal wire screws are also available.

**CUT WIRE TAMPER INDICATION:** The 50W-2 Pit ERT has the capability to detect a tamper should it exist. Proper setup in MVRs software needed.

The Pit ERT also includes tamper proof red plugs which are attached to the ERT at installation.

**CONSTRUCTION:** The housing of the RTR is constructed of a



## SPECIFICATIONS

<b>Transmitter/Register</b>	Straight reading, permanently sealed, magnetic drive
<b>Unit of Measure</b>	U.S. Gallons, Cubic Feet, Cubic Meters, clearly identified on register face
<b>Number Wheels</b>	Six with 3/16" high numerals Namel font type
<b>Test Circle</b>	360° circle with ten major increments with ten divisions each
<b>Weight</b>	9 Ounces
<b>Humidity</b>	0% to 100% Condensing
<b>Temperature</b>	-40°C to 49°C (-40°F to 120°F)
<b>Signal Characteristics</b>	Open Drain (FET)
<b>Visual Resolution</b>	1/100th of Test Circle
<b>Electronic Resolution</b>	1/10th of Test Circle
<b>Typical Signal Duration</b>	15 ms to 75 ms @ 25°C (77°F) 8 ms to 75 ms over operating temperature range at 67 µA
<b>On State Resistance</b>	7.5 Ohms @ 25°C (77°F)
<b>Power Source</b>	External
<b>Maximum Switching</b>	30 VDC @ 1 mA @ 25°C (77°F)
<b>Battery on 50W-2 ERT</b>	3.6 V 2.75 Lithium Battery

See Badger Technical Brief RTR-T-05 for RTR® specifications.



tempered glass lens top and a copper alloy metal bottom. Internal construction materials are thermoplastic for long-life and high reliability. The integrity of the adhesive seal joining the glass top to the metal base provide unmatched protection in water meter applications. A corrosion and tamper resistant TORX seal screw is provided to secure the RTR to the meter. The shroud assembly is polycarbonate.

The housing of the Pit ERT is constructed of aluminum and the dome is constructed of a polycarbonate material.

**TEMPERATURE:** The operating range of the RTR Pit ERT is -40°C to 49°C (-40°F to 120°F). The water meter should not be subjected to temperatures below freezing.

**MOISTURE:** The RTR is permanently sealed and designed for submerged meter pit applications. The RTR Pit ERT system is also designed for flooded or submerged meter pit locations. **To ensure long-term performance and reliability, it is critical that proper procedures are followed for field installation of the connector that joins the RTR to the Pit ERT assembly.**

**WIRE CONNECTIONS:** The RTR can be factory prewired with pre-sized wire harness of either 5 or 25 feet to the Itron Model 50W-2 Pit ERT.

**ELECTRONICS:** The piezoelectric switch circuit board is completely sealed against moisture inside the unit and sealed to ensure protection from humidity. The Itron Model 50W-2 ERT is designed to protect against the effects of humidity.

**ELECTRICAL:** The electronic circuitry of the RTR and ERT is designed to provide immunity to electrical surges and transients per IEC801-2, IEC801-4 Severity Level 4.

**OPERATING CHARACTERISTICS:** The RTR has an output equal to 1/10th of the meter test circle with the characteristics of an open drain FET. The on-state condition is a solid-state switch closure. Off-state condition is an open circuit. Powered by an external source, the RTR has a maximum rating of 30 VDC at 1 mA (25°C).

**PATENT:** The Badger RTR Pit ERT application is covered by US patent number 5,298,894.

**TRANSPORTATION WARNING:** The Federal Aviation Administration prohibits operating transmitters and receivers on all commercial aircraft. **When powered, the Itron Model 50W-2 ERT is considered an operating transmitter and receiver and cannot be shipped by air.**

**MEASUREMENT RESOLUTION:** The minimum electronic resolution of the RTR is noted to the right. To verify the correct resolution for your application, contact Badger Meter Customer Service.

**METER COMPATIBILITY:** Badger Meter's Recordall® Disc, Turbo, Compound, and Fire Series meters.

RECORDALL Model	Size	Gallons	Resolution Cubic Feet (Ft³)	Resolution Cubic Meters (m³)
M25	5/8"	1	0.1	0.01
M25	3/4"	1	0.1	0.01
M35	3/4"	1	0.1	0.01
M70	1"	1	0.1	0.01
M120	1 1/2"	10	1	0.1
M170	2"	10	1	0.1

RECORDALL Turbo Series (Size)	Gallons	Resolution Cubic Feet (Ft³)	Resolution Cubic Meters (m³)
2"	100	10	0.1
3"	100	10	0.1
4"	100	10	0.1
6"	100	10	1
8"	100	10	1
10"	100	10	
12"	1000	100	
16"	1000	100	
20"	1000	100	

RECORDALL Compound Series	Resolution Gallons	Resolution Cubic Feet (Ft³)	Resolution Cubic Meters (m³)
2"	100	10	0.1
3"	100	10	0.1
4"	100	10	0.1
6"	100	10	1

Resolution stated as summed total with (2) RTRs, Summator/Splitter and a single AMR module. Please see the Turbo Series and Disc Series sections for individual high and low side resolution.

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