



DESCRIPTION

Applications: The ORION Smart Endpoint (SE) is a full functioning two-way water endpoint for use in either mobile or fixed network mode of operation. Once installed, ORION SE endpoints operate in mobile mode and will automatically transition to fixed network mode of operation, once ORION gateways and ReadCenter Software are deployed. ORION SE endpoints may also transition back to mobile mode at any time via two way command or will automatically transition back to a backup mobile mode of operation if the network is disrupted for a period of time.

ORION ME: The ORION Migratable Endpoint (ME) is a full functioning two-way water endpoint for mobile applications with the capability of migrating to fixed network mode to support future utility growth. In addition to providing the current and snapped midnight reading, the ORION ME endpoint's two way functionality allows users to capture data profile information wirelessly, without having to access the endpoint during the normal reading process.

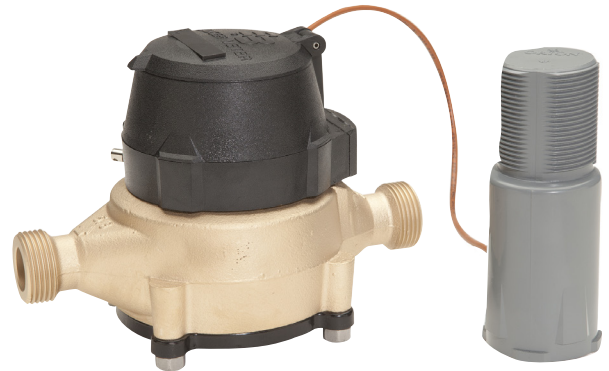
ORION CE: The ORION Classic Endpoint (CE) is a one-way endpoint designed for mobile meter reading. ORION CE endpoints support data profile and may be transitioned to fixed network application through approved electric connectivity partner solutions, or with strategic deployment of ORION gateway 4.0 and 2.0 receivers.

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

Meter Compatibility: When attached to the Badger Meter Recordall® Transmitter Register (RTR®) or Badger Meter Absolute Digital Encoder (ADE®), the ORION endpoint is compatible with all current Badger Meter Recordall Disc, Turbo, Compound, and Fire Series meters and assemblies, E-Series™ ultra-sonic and M-Series® mag meters

Encoder Compatibility: The ORION endpoint is suitable for use with all RTR registers, ADE encoders and the following Badger Meter approved three-wire encoders: Hersey®, Elster-AMCO®, Neptune®, Sensus®, Master Meter® and Metron-Farnier.

Data Profiling: The ORION endpoint (optional for CE) stores hourly data profile metering information within its nonvolatile memory.



FUNCTIONALITY

Operation: The ORION endpoint continuously monitors the encoder circuit. At predetermined intervals, the endpoint broadcasts the totalized reading value along with other metering data to the network gateway transceivers (SE/ME), gateway receivers (CE) or mobile collection devices (SE/ME/CE).

Activation: The ORION endpoints are shipped in an inactive, non-transmitting state. The endpoint offers a Smart Activation feature. After the endpoint is installed, it begins broadcasting data when the encoder senses the first usage of water. No field programming or special tools are required to activate the endpoint.

Broadcast Mode (SE/ME): ORION SE and ME endpoints can be ordered to broadcast in a fixed network or mobile reading mode to meet the deployment needs of the utility. After installation, using the endpoint's two-way communication and "smart mode" intelligence, endpoints designated for use in fixed network deployment automatically detect network gateway transceivers in the area, which signal the endpoints to broadcast in fixed network mode.

Broadcast Mode (CE): The ORION CE endpoint broadcasts in a mobile mode only.

Output Message: When in mobile mode, SE and ME endpoints broadcast the current, as well as, daily clocked meter reading every six seconds. CE endpoints broadcast the current meter reading every four seconds. The endpoint also sends the following data with each RF message: unique endpoint ID serial number, potential leak indication, reverse flow indication (encoder only), encoder error (encoder only), low battery indicator (SE and ME only) and wire tamper indication. Through the use of a synchronized embedded real-time clock, the ORION SE endpoints store and automatically send top-of-the hour meter reads three times per day in fixed network mode.

Battery: ORION endpoints are powered by Lithium Thionyl Chloride battery technology. The battery assembly is not replaceable and has a calculated life of twenty years, based on normal broadcast intervals at an ambient temperature of 21°C.

Temperature: The operating range of the endpoint and encoder is -40°C to +60°C (-40°F to +140°F) based on storage and meter reading, not including RF performance. The water meter should not be subjected to temperatures below freezing.

Range: Transmission reception depends on a number of factors, including the location of the network gateway transceiver or receiver. Other factors include topographical features, a building's construction materials and obstacles such as buildings, trees, vegetation and fences. Temporary conditions, such as a vehicle parked near the endpoint or heavy rain or snow, could also affect reception. These factors need to be considered when installing or designing a fixed network system layout and communicating with the endpoint using a handheld or mobile reading system. For a more in-depth discussion, please see Badger Meter RF Propagation Whitepaper MRT-WP-1.

EXCEPTION INDICATORS

Tamper Indication: The ORION endpoint sends a tamper indication flag to the fixed network or mobile reading device when a tamper condition (cut wire) is sensed. A tamper condition is defined as either a short or open circuit in the endpoint's three-wire system.

Leak Detection: The endpoint reports detection of a possible leak when a one-hour (RTR®) or two-hour (ADE® or three-wire encoder) window of no usage is not found within a 24-hour time period. The system automatically resets as soon as an appropriate window of no usage is found.

Reverse Flow / Back Flow Alert: ORION endpoints can detect, store and broadcast a backflow condition when wired to a Badger Meter ADE or approved three-wire absolute encoder.

Encoder Error: The ORION endpoint sets an encoder error status flag if the endpoint's attempt to read the encoder results in a meter reading that is not valid or contains a non-numeric value. The alarm is cleared when a valid encoder reading is obtained. This alarm is also stored as part of the interval data.

Low Battery Indication: ORION SE and ME endpoints are designed with a low-battery alarm indicator and broadcast a low battery warning when the endpoint is nearing the end of its useful life.

SPECIFICATIONS

	FIXED NETWORK MODE (SE/ME)	MOBILE MODE (SE/ME)	MOBILE MODE (CE)
Dimensions	5.125" (W) 1.75" (W) at top 2.125" (W) at bottom	5.125" (W) 1.75" (W) at top 2.125" (W) at bottom	5.125" (W) 1.75" (W) at top 2.125" (W) at bottom
Transmission Interval	Every eight hours	Every 6 seconds	Every 4 seconds
Interval Data	Time-synchronized to top-of-the-hour interval meter readings (hourly standard)	Time-synchronized to top-of-the-hour interval meter readings (current and midnight reads standard)	Endpoint capable of storing 21,000 hourly data reads
Broadcast Frequency MHz Band	FCC Regulated 902-928 MHz Frequency Hopping Modulation	FCC Regulated 902-928 MHz Frequency Hopping Modulation	FCC Regulated 902-928 MHz Frequency Hopping Modulation
Operating Temperature Range - Storage and Meter Reading	-40°C to +60°C (-40°F to 140°F)	-40°C to +60°C (-40°F to 140°F)	-40°C to +60°C (-40°F to 140°F)
Humidity	0% to 100% condensing	0% to 100% condensing	0% to 100% condensing
Battery	Lithium Thionyl Chloride C Cell	Lithium Thionyl Chloride C Cell	(2) Lithium Thionyl Chloride AA Cell
Battery Life	20 years (calculated)	20 years (calculated)	20 years (calculated)
Lead Length Prewired	3, 10, 25 & 75 feet	3, 10, 25 & 75 feet	3, 10, 25 & 75 feet
Lead Length Badger Meter 308 Connector	6 & 25 feet	6 & 25 feet	6 & 25 feet

License Requirements: ORION endpoints comply with Part 15 of the FCC Rules. No license is required by the utility to operate an ORION meter reading system.

Transportation: The Federal Aviation Administration prohibits operating transmitters and receivers on all commercial aircraft. The ORION endpoint is considered an operating transmitter and cannot be shipped by air.

Caution: 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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