![Badger Meter logo]

ORION® Water Endpoints

Fixed Network (SE) Endpoint

DESCRIPTION

ORION Fixed Network (SE) endpoints ("endpoint(s)") are designed to operate in either mobile priority or fixed network priority mode of operation. Mobile priority mode supports two-way mobile communication and one-way fixed network communication. Fixed network priority mode supports two-way mobile and two-way fixed network communications. Both modes of operation allow utilities to use either mobile or fixed network technology to collect reading data from the endpoint at any time.

When initially installed, the endpoints begin transmitting in mobile priority mode. Once gateways are deployed, utilities may begin to immediately collect fixed network readings from either operating mode, and with appropriate licensing, may transition endpoints to fixed network priority mode without having to visit the account.

FUNCTIONALITY

Operation: The endpoint continuously monitors the encoder circuit. At predetermined intervals, the endpoint broadcasts the totalized reading value, along with other meter data, to the network gateway transceivers or mobile collection devices.

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

Broadcast Mode: Once activated, the endpoints begin transmitting in mobile priority mode. Utilities deploying a fixed network system may leave the endpoint in mobile priority mode of operation and collect data at any time, using either two-way mobile collection or through the deployment of gateway transceivers. In mobile priority mode, the endpoint will send a mobile reading once every six seconds and a fixed network data message once an hour. Utilities licensed to deploy a two-way fixed network system may transition the endpoints to fixed network priority mode of operation using the endpoints two-way communication feature via the gateway transceiver. Endpoints in fixed network priority mode continue to send a mobile message once every ten seconds for reading and troubleshooting purposes.

Data Profiling: The endpoints store up to 90 days of hourly historical interval meter data within nonvolatile memory.

Output Message: Each hour, the endpoint stores a reading at the top of the hour. The endpoint broadcasts its unique serial number, reading(s) and status indicators in either fixed network priority mode or mobile priority mode depending on the system configuration. When gateway transceivers are deployed, each fixed network message in mobile priority mode includes the most current top-of-the-hour reading plus the previous 11 top-of-the-hour reads. In fixed network priority mode, the endpoint broadcasts up to the last 24 top-of-the-hour reads for gateway transceiver data collection.

Endpoints also support collection of a current endpoint reading, status indicators and snapped daily read (midnight UTC) for mobile (walk-by or drive-by) data collection. Using the two-way endpoint feature, historical interval data and other endpoint information can be captured from the endpoint during the mobile reading process.

APPLICATION

Configurations: Available in integral, remote or endpoint-only configurations, the endpoint can be deployed in indoor, outdoor and pit applications. The endpoint electronics and battery assembly are fully encapsulated in epoxy for environmental integrity.

Meter Compatibility: When attached to a Badger Meter encoder, the 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® Ultrasonic and M-Series® Electromagnetic Flow meters.

Encoder Compatibility: The endpoint is suitable for use with all Badger Meter encoders as well as the following Badger Meter approved three-wire encoder registers that have a manufacture date of 2000 or newer, are programmed into the AMR/AMI three-wire output mode and have three-wires connected: Elster C700 Digital, InVISION and ScanCoder® encoders and evoQ4 meter (encoder output); Hersey® Translator; Master Meter® Octave® Ultrasonic meter encoder output; Metron-Farnier Hawkeye; Mueller Systems 420 Solid State Register (SSR) LCD; Neptune® ProRead, E-Coder® and ARB-V®; and Sensus® Electronic Register encoder (ECR) and ICE.

Product Data Sheet

SPECIFICATIONS

Dimensions	5.125 in. (H); 1.75 in. (W) at top; 2.125 in. (W) at bottom
Broadcast Frequency MHz Band	FCC regulated 902…928 MHz frequency hopping modulation
Operating Temperature Range **Storage and Meter Reading**	–40…60° C (–40…140° F) based on storage and meter reading. RF output may be reduced by extremely low temperatures. The water meter should not be subjected to temperatures below freezing.
Humidity	0…100% condensing
Battery	One (1) lithium thionyl chloride C cell (nonreplaceable)
Battery Life	20 years (calculated)

Construction: All 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.

Wire Connections: ORION Fixed Network endpoints are available with in-line 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.

Range: Transmission reception depends on a number of factors, including the location of the network gateway transceiver. 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, see the white paper, *Understanding RF Propagation of AMR/AMI Systems*, available at *www.badgermeter.com*.

FEATURES

Communication Type	Two-Way
Application Type	Control/Monitor
Reading Interval Type	Hourly
Encoder Compatibility	Absolute/Incremental
Fixed Network Reading	√
Mobile Reading in Fixed Network Mode	√
Premise Leak Detection	√
Cut-Wire Indication	√
Reverse Flow Indication (Absolute Encoder)	√
No Usage Indication	√
Encoder Error (Absolute Encoder)	√
Low Battery Indication	√
Remote Programming	√
Remote Clock Synchronization	√
Firmware Upgrades	√

License Requirements: ORION Fixed Network 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.

Making Water Visible®

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