

## OVERVIEW

For outdoor deployments, Badger Meter recommends installing standard ORION<sup>®</sup> Cellular endpoints through non-metallic pit lids. If metal lids must be used, ORION Cellular HLEX, HLHX (AT&T) and HLFX (Verizon) endpoints may be installed **through** the lid to improve cellular signal and endpoint performance ([Figure 1](#)).

The unique form factor of the endpoint accommodates a larger Antenna, the electronics to support that Antenna, and a D-cell Battery Pack.

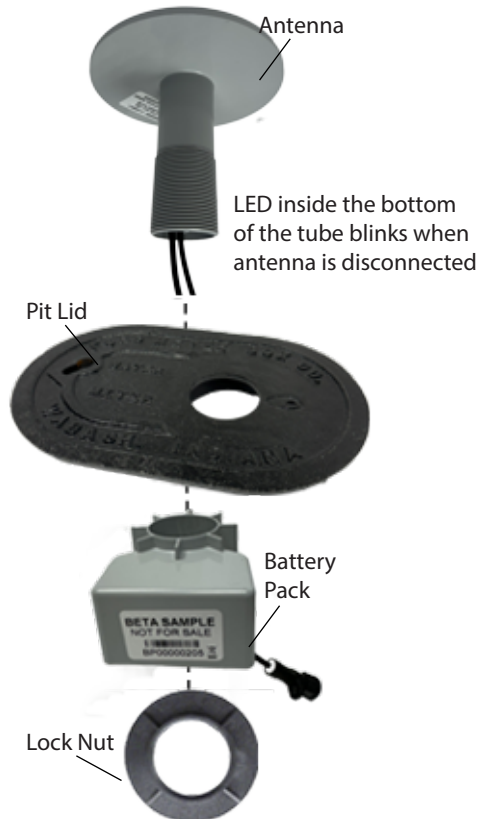


Figure 1: Pit assembly exploded view

The ORION Cellular HLEX/HLFX/HLHX units are designed for use with metal pit lids with thickness of 0.15...1.7 inches (3.8...43.2 mm) and a standard opening diameter of 1-7/8 inches (48 mm).

Avoid installations in high traffic areas and lids with uneven surfaces.

## WIRING METHODS

The ORION Cellular HLEX/HLFX/HLHX endpoints have the Antenna and Battery Pack in separate units. The Antenna has two connectors:

- 1. Register/Meter Connection:** A standard wiring option that connects to the register/meter, available in select lengths of Twist Tight<sup>®</sup>, Nicor, Itron-equivalent or Pigtail.
- 2. Battery Pack Connection:** A unique 3-socket, black cable version of the Badger Meter Twist Tight connector ([Figure 2](#)) that can only pair with the three-pin Battery Pack cable.



Figure 2: 3-socket Twist Tight connector with black cable

## INSTALLATION

To install an ORION Cellular HLEX/HLFX/HLHX endpoint through a metal pit lid, see the assembly in [Figure 1](#) and follow these steps.

ORION Cellular HLEX/HLFX/HLHX endpoints are shipped from the factory with the Antenna connected to the Battery Pack and Lock Nut secure. For easiest pit assembly, place the endpoint upside down on the floor/ground so it is resting on the Antenna head.



Figure 3: ORION Cellular HLEX/HLFX/HLHX endpoint out-of-box

## IMPORTANT

Do NOT use tools to loosen/tighten connector ends or Lock Nut. Hand loosen/tighten only.

1. To begin, disconnect the Antenna from the Battery Pack: Twist the rotating collar of each connector counterclockwise to loosen and disconnect.

**NOTE:** The LED (see [Figure 1](#)) inside the bottom of the Antenna tube blinks red every 10 seconds when disconnected.

2. Rotate the Lock Nut counterclockwise by hand to remove it from the endpoint assembly.
3. Lift off/remove the Battery Pack. The Antenna tube should now be fully visible ([Figure 4](#)).
4. From **above** the pit lid, insert the Antenna tube through the pit lid opening ([Figure 5](#)).



Figure 4: Antenna tube



Figure 5: Antenna tube through pit lid

5. From **under** the pit lid, reinstall the Battery Pack to its previous position on the endpoint Antenna tube. Rotate the Battery Pack, if necessary, so it sits flush on the underside of the pit lid ([Figure 6](#)).

**NOTE:** The underside of metal lids may have ridges, brackets or other obstructions. The Battery Pack is not threaded, allowing for easy rotation and accommodating tight fits.

6. Reinstall the Lock Nut to its previous position. Hand tighten the Lock Nut clockwise onto the Antenna tube threads (large diameter touching the Battery Pack) until the Battery Pack is snug to the underside of the lid. **Do not overtighten.**



Figure 6: Rotate Battery Pack to fit under pit lid

## CAUTION

**BEFORE JOINING THE CONNECTOR ENDS, MAKE SURE ALL SURFACES ARE CLEAN, DRY AND FREE OF ANY DEBRIS OR DIRT. THIS STEP IS ESSENTIAL TO MAKE SURE THE CONNECTOR REMAINS WATER TIGHT AND SUBMERSIBLE.**

7. Align the connector tabs on the black battery cables and push the connector ends together until the Battery-side connector is fully seated into the Antenna-side connector.
8. On the Battery-side connector, twist the rotating collar clockwise until the ends are tightly connected. The LED on the bottom of the Antenna tube blinks red four (4) times upon initial connection. **The connection is not yet secure!** When tightly connected, the tabs at the top of the connectors should remain aligned and the pink O-ring on the Antenna-side connector should NOT be visible. **Connection is now secure.**
9. Your assembly should now look like [Figure 8](#).

The remaining steps follow the standard ORION Cellular endpoint installation process, summarized below. Full detail and troubleshooting tips are available in the ORION Water Endpoints Installation Manual (ORI-UM-00025-EN).

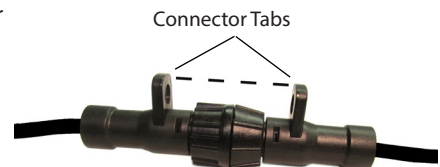


Figure 7: Secure connection



Figure 8: View from under pit lid

10. Connect the remaining Antenna cable to the encoder/meter. Both cables should now be connected (Figure 9).
11. (Optional) While all ORION endpoints offer a Smart Activation feature, infrared (IR) activation tools are available for use if immediate activation is desired. These tools allow customers to verify that the endpoint is on, properly connected to the meter, and properly connected to BEACON® via cellular. Align IR tool head with the IR communication port located under the Antenna tube.



Figure 9: Meter connected

12. (Optional) BEACON users can check the activation status of ORION Cellular HLEX endpoints with the ORION Endpoint Status tool, available at <https://orionstatus.beaconama.net>. Several minutes after installation, the browser-based tool displays ORION Cellular endpoints assigned to the user's BEACON portfolio.
- Installation and activation are complete.



Figure 10: ORION Cellular HLEX/HLFX/HLHX from top of pit lid

WHAT’S NEW IN BEACON

On BEACON's At-A-Glance page, ORION Cellular HLEX, HLFX and HLHX appear under “Cell Endpoint Name.” Standard call-in cadence, interval data, and exception flags\* mirror your existing cellular endpoint portfolio.

IMPORTANT

*\*With a new installation process, some steps may be missed. The most critical new step is **Step #8**, connecting the Antenna to the Battery Pack. If this is missed, the Antenna lasts up to 10 days on its own, but functionality is limited (see Figure 12) until the Battery Pack connection is correctly made. **External Battery Disconnected** will appear in BEACON as a new exception flag.*

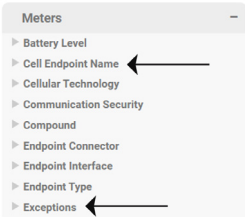


Figure 11: Exceptions

	Install	Day 2	Day 3	Day 4	Day 5	Day 6-10	Day 10+
BEACON Exception Flag	"External Battery Disconnected"						
Interrogate Meter	X	X	X	X	X	X	
Automatic Call Schedule (retries applicable when call is unsuccessful)	Immediate call, 2 retries		1 call, 2 retries		1 call, 2 retries		
Mobile Backup							
Visual LED (bottom of antenna tube)	Red blink every 10 seconds. Upon proper battery connection, device will blink red four (4) times in a row. Ensure connection is fully tightened.						
Feedback when connection is restored	Visual LED blinks x4, immediate call to BEACON	Visual LED blinks x4, immediate call to BEACON	Visual LED blinks x4, immediate call to BEACON	Visual LED blinks x4	Visual LED blinks x4	Visual LED blinks x4	Visual LED blinks x4
PCU Operating Status	"Low Power Operating Mode"						

Figure 12: Battery Pack connection

## ADDITIONAL RESOURCES

For alternative endpoint installation methods and more information, refer to these documents, available at [www.badgermeter.com](http://www.badgermeter.com).

- [ORION Water Endpoints Installation Manual](#)
- [IR Communication Device Quick Reference Guide](#)
- [Product Configuration Utility for ORION Endpoints](#)

## LICENSE REQUIREMENTS

ORION Cellular HLEX/HLFX/HLHX endpoints comply with Part 15, Part 22, Part 24, and Part 27 of FCC Rules. Operation is subject to the following conditions: (1) These devices may not cause harmful interference, and (2) these devices must accept any interference received, including interference that may cause undesired operation of the device.

In accordance with FCC Regulations, "Code of Federal Regulations" Title 47, Part 2, Subpart J, Section 1091, transmitters pass the requirements pertaining to radiation exposure. However, to avoid public exposure in excess of limits for general population (uncontrolled exposure), a 20 centimeter distance between the transmitter and the body of the user must be maintained during operation.

No FCC license is required by a utility to operate an ORION meter reading system.

This device complies with Industry Canada license-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

The device shall be used in such a manner that the potential for human contact during 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 device and your body. This device and its antenna(s) must not be co-located or operating in conjunction with any other antenna or transmitter.

Le dispositif doit être utilisé de manière à minimiser le potentiel de fonctionnement normal par contact humain. Cet équipement est conforme aux limites d'exposition au rayonnement RSS-102. Cet équipement doit être installé et utilisé avec une distance minimale de 20 cm entre le dispositif et votre corps. Cet appareil et son (ses) antenne (s) ne doivent pas être co-localisés ou utilisés conjointement avec une autre antenne ou un autre émetteur.