Routing Node ERT® Gateway Mesh Installation Guide

Routing Node ERT® Gateway Mesh Installation Guide Rev0

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1 Important Safety and Compliance Information

This section provides important information for your safety and product compliance.

USA, FCC Part 15 Compliance

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference, and
2. This device must accept any interference received, including interference that may cause undesirable operation.

This equipment complies with radiation exposure limits set forth for an uncontrolled environment. The antenna(s) used must be installed to provide a separation distance of at least 20 centimeters (7.9 inches) from all persons and must not be collocated or operating in conjunction with any other antenna or transmitter.

USA, FCC Class B-Part 15

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio or TV technician for help.

Canada, ISED Compliance

Compliance Statement Canada

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

Under Innovation, Science and Economic Development Canada (ISED) regulations, this radio transmitter may only operate using an antenna of a type and maximum (or lesser) gain approved for the transmitter by Industry Canada. To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that necessary for successful communication.

Déclaration de Conformité

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, (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Conformément à la réglementation d'Industrie Canada, le présent émetteur radio peut fonctionner avec une antenne d'un type et d'un gain maximal (ou inférieur) approuvé pour l'émetteur par Industrie Canada. Dans le but de réduire les risques de brouillage radioélectrique à l'intention des autres utilisateurs, il faut choisir le type d'antenne et son gain de sorte que la puissance isotrope rayonnée équivalente (p.i.r.e.) ne dépasse pas l'intensité nécessaire à l'établissement d'une communication satisfaisante.

RF Exposure (FCC/ISED)

This equipment complies with radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20 cm between the radiator and your body. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

Cet équipement est conforme aux limites d'exposition aux radiations dans un environnement non contrôlé. Cet équipement do it être installé et utilisé à distance minimum de 20 cm entre le radiateur et votre corps. Cet émetteur ne doit pas être co-localisées ou opérant en conjonction avec tout autre antenne ou transmetteur.

Modifications and Repairs

Caution: To ensure FCC and ISED compliance, and system performance, this device and antennas shall not be changed or modified without the express approval of Itron. Any unauthorized modifications or operation beyond or in conflict with these instructions for use could void the user's authority to operate the equipment.

Danger! This device contains no user serviceable parts. Attempts to repair this device by unauthorized personnel may subject the person to shock hazard if removal of protected covers is attempted. Unauthorized repair will void the warranty and/or maintenance contract with your company.

Electromagnetic Compatibility

Caution: Use only approved accessories with this equipment. All cables must be high quality, shielded, and correctly terminated. Unapproved modifications or operation beyond or in conflict with these use instructions may void the authorities authorization to operate the equipment.

Professional Installation

The ERT Gateway is intended for professional installation by the integrator. The OEM integrator is still responsible for the FCC and ISED compliance requirements of the end product, which includes integration with the antennas.

2 Getting Started: Routing Node-ERT Gateway Mesh

The Routing Node-ERT Gateway Mesh provides a unified means of reading Itron R300/R400 electric meters over an IPv6 network.

The ERT Gateway Mesh communicates directly with the Connected Grid Router (CGR). The gateway utilizes RF links with optimized modulation rates. The CGR then transmits the data to the OpenWay Operations Center (a part of the head-end system) over the utility's backhaul communication solution. The ERT Gateway's flexible design provides installation options for a variety of wall-mounted or pole-mounted locations. This flexibility provides optimal communication effectiveness and range and minimizes installation costs.

Important! Installation must be completed by professional installers to ensure trouble-free operation of the Itron OpenWay system. Follow these product installation instructions to ensure proper operation of your Routing Node ERT Gateway Mesh.

Important! Use the ERT Gateway shipping packaging to transport the ERT Gateway. The shipping materials protect the ERT Gateway from damage.

ERT Gateway Mesh Related Documents

The listed documents provide additional information for ordering and working with the Routing Node ERT Gateway Mesh.

Document	Itron part number
Routing Node-ERT Gateway Ordering Guide	PUB-1306-001
OpenWay Collection Manager Installation and Configuration Guide	TDC-1675-XXX
OpenWay® Operations Center Performance Manager Integration Guide Integration Guide	TDC-1718-XXX

> **Note:** The -XXX refers to the revision level of the document. The revision level is subject to change without notice.

Installation Location Information

The ERT Gateway is designed for the listed installation locations:

- Wood, concrete, or metal utility pole
- Wall (indoor or outdoor)
- Pipe or mast (between 2 and 3.5" in diameter)
- Roof

  > **Note:** Roof installation requires a 3rd-party, non-penetrating mounting kit (for example, Tessco #461587)

- Other vertical structures

> **Note:** To achieve optimal RF performance the ERT Gateway Mesh should be mounted at the height recommended by Itron's Global Network Design Center (GNDC).

Integrated mounting and coupling brackets secure the device in high winds and under heavy ice loads. Consult a professional engineer with concerns about your ERT Gateway Mesh mounting location.

The ERT Gateway Mesh consists of several components in a single, weatherproof device. Electrical components are encased in a plastic enclosure that provides optimum safety for the installer.

Warning! In accordance with FCC rules, unapproved modifications or operation beyond or in conflict with these use instructions could void the user's authority to operate the equipment. Only authorized Itron personnel may open the ERT Gateway. Unauthorized access or modifications to the ERT Gateway will void the warranty.

ERT Gateway Mesh Components

The ERT Gateway Mesh has three antennas. Two of the antennas are mounted directly on the gateway housing:

- WAN antenna for communication to and from the CGR
- ERT antenna for communications from the electric meter

The third antenna is the internal Wi-Fi antenna.

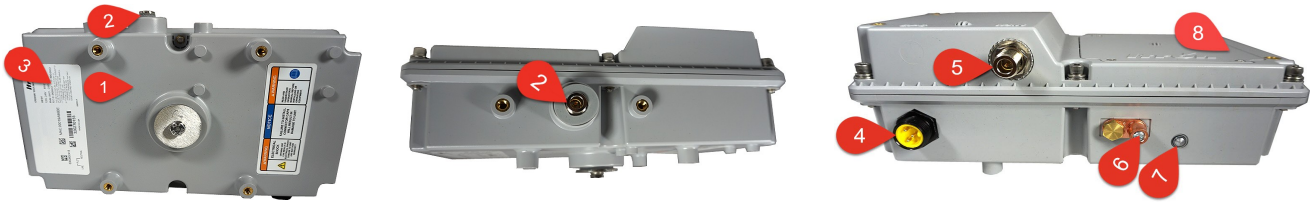
Since the ERT Gateway can be installed in outdoor environments, each component of the gateway is weather-tight and able to withstand wind speeds in excess of 100 miles per hour.

Note: Review the *ERT Gateway Ordering Guide* (PUB-1306-001) for specific part numbers and component options to determine the ERT Gateway configuration.

ERT Gateway Mesh Housing

The ERT Gateway Mesh housing contains the electronic components, radio boards and backup battery. The radio antennas are included with the gateway and are directly mounted to the housing.

> **Caution:** Only authorized Itron personnel may open this device. Unauthorized access or modifications to this product voids the warranty. Per FCC rules, unapproved modifications or operation beyond or in conflict with the installation instructions in this guide could void the user's authority to operate the equipment.



Designator	Component	Description
1	ERT Gateway	The ERT Gateway processes data received through the antennas and relays it to the OpenWay Operations Center (OWOC). Only authorized Itron personnel may open this product housing.
2	ERT antenna	A 915MHz antenna that receives messages from the 100 series ERT modules in the network. The connection for this antenna is type N female.
3	ERT Gateway label	The label displays the identification number, model number, and other associated gateway information.
4	Power connector	The power connector supplies power to the ERT Gateway. A three-pin cable connects the ERT Gateway to the AC mains power supply.
5	WAN antenna	A 900MHz antenna that provides a connection to the MESH network. The connection for this antenna is a

		type N female.
6	Ground lug	The ground lug is optional on the ERT Gateway and is provided for utilities that require a separate earth ground. **Note:** When the ERT Gateway Mesh is powered with the light pole/photo sensor adapter, there is no ground connection. Use the ground lug in the this configuration.
7	LED status indicator	The status indicator displays the current operational status of the ERT Gateway. The LED indicator is located on the bottom of the housing. ■ Unpowered (off) ■ Initializing (green blink) ■ Running (green) ■ Error (amber) The LED is configurable for the following display modes: ■ None (no light) ■ Error only ■ Normal
8	Battery compartment	Backup battery cover

ERT Gateway Antennas

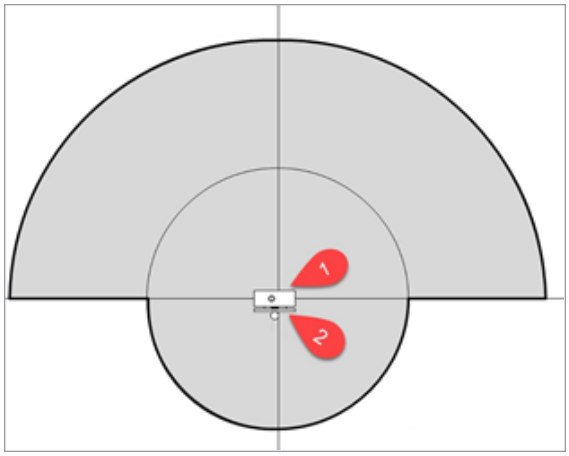
The ERT Gateway utilizes three antennas.

- **ERT antenna**: The ERT antenna is a custom designed, 5.5dBi antenna that mounts directly to the top of the ERT Gateway Mesh housing.

- **WAN antenna**: The WAN antenna is a custom designed 2.6dBi antenna that mounts directly to the bottom of the ERT Gateway Mesh housing to support the customer's backhaul data requirements.

> **Caution:** This equipment has been designed and approved per FCC and ISED rules to operate with these antennas. To reduce potential radio interference to other users, the antenna type and its gain were chosen so that the equivalent isotropically radiated power (e.i.r.p.) is not more than that permitted for successful communication. Antennas not included in this list and approved by Itron are strictly prohibited for use with this device. Installing the Routing Node ERT Gateway with an unapproved antenna will void the product warranty and can void the user's authority to operate this equipment.

- **Internal Wi-Fi antenna**: The Wi-Fi antenna is used for local access to the device. The effective range is approximately 100 feet from the front (1) of the ERT Gateway Mesh and approximately 50 feet to the rear (2) of the device. The shown coverage area assumes the device is mounted at a height of 25 feet with a clear line-of-sight path between the ERT Gateway Mesh and the programming device.



3 Planning an ERT Gateway Installation

This chapter describes ERT Gateway installation preparation and planning.

Installation Profiles

The ERT Gateway may be installed in a variety of configurations and locations (for more information, see **Installation location information** on page 3). Itron identified the following profiles for ERT Gateway installations.

Location	Location description
Utility pole	The ERT Gateway is installed on a utility pole.
Light pole/street light	The ERT Gateway is installed on either a light pole or the davit arm of the street light.
Pipe or mast	The ERT Gateway is secured/installed to a pipe or fence railing (from 2 to 3.5 inches in diameter).

Siting the ERT Gateway

ERT Gateways can be installed in the field on a variety of surfaces. Examples of siting surfaces include:

- wooden or metal walls
- metal pipes
- fence railings
- utility poles

In determining the ERT Gateway placement, observe the following primary considerations. Best practices are to site the ERT Gateway:

- For optimum RF reception.
- In a location where there is a power connection.
- On a structure or in a location that can physically support the weight of the ERT Gateway (and its mounting hardware).

Caution: Always get permission to install the ERT Gateway at the selected site prior to installation. If you have questions or need help, contact Itron Support.

Installation Location Information

The ERT Gateway is designed for the listed installation locations:

- Wood, concrete, or metal utility pole
- Wall (indoor or outdoor)
- Pipe or mast (between 2 and 3.5" in diameter)
- Roof

  > **Note:** Roof installation requires a 3rd-party, non-penetrating mounting kit (for example, Tessco #461587)

- Other vertical structures

> **Note:** To achieve optimal RF performance the ERT Gateway Mesh should be mounted at the height recommended by Itron's Global Network Design Center (GNDC).

Integrated mounting and coupling brackets secure the device in high winds and under heavy ice loads. Consult a professional engineer with concerns about your ERT Gateway Mesh mounting location.

The ERT Gateway Mesh consists of several components in a single, weatherproof device. Electrical components are encased in a plastic enclosure that provides optimum safety for the installer.

Warning! In accordance with FCC rules, unapproved modifications or operation beyond or in conflict with these use instructions could void the user's authority to operate the equipment. Only authorized Itron personnel may open the ERT Gateway. Unauthorized access or modifications to the ERT Gateway will void the warranty.

Propagation Study for the ERT Gateway Installation Site

Prior to the ERT Gateway field installation, contact Itron. Itron performs a propagation study to:

- evaluate the quantity and types of network endpoints.
- assess the environmental and geographical considerations for the ERT Gateway installation.
- optimize the ERT Gateway placement within the network to get the best possible reception.
- assess the physical and structural implications of the selected mounting surface.

The propagation study provides the information to determine the exact ERT Gateway installation location and the best mounting surface. This iterative process may be repeated as the final installation parameters are determined.

AC Power Requirements

The ERT Gateway Mesh requires an 85-264 VAC source defined as a 10 Amp or 15 Amp branch circuit that must be protected by a certified branch circuit breaker.

Warning! Do not connect the ERT Gateway to a circuit protected by a GFCI breaker.

The wiring must be sized in accordance with the National Electrical Code, ANSI/NFPA 70 and, where applicable, the Canadian Electrical Code, Part I, CSA C22.1 or the prevailing local code.

Mounting Hardware Requirements

Mounting hardware requirements are based on the installation location and your system configuration. The installer must supply the following mounting hardware to properly attach the ERT Gateway to the mounting surface.

Caution: Each installation is unique. You must ensure the mounting hardware securely supports the ERT Gateway. The ERT Gateway without the mounting hardware weighs 8 pounds. Itron recommends you consult a qualified engineer to verify load requirements and safety issues. Installers must comply with local codes when the ERT Gateway is installed.

Profile	Mounting surface	Suggested hardware/sizing
Utility pole	Wood or steel pole	High-strength stainless steel straps
Light pole	Steel light pole	High-strength stainless steel straps
Pipe	2.5" to 3.5" galvanized steel pipe	Two pipe mount brackets for pipes up to 3.5" in diameter. Pipe mount brackets are available from Itron (part number FAB-0192-001). Two brackets are required for each ERT Gateway.

4 Installing the ERT Gateway

This chapter provides the Itron-approved instructions to install an ERT Gateway in the field. The ERT Gateway can be installed in a variety of locations. This installation profile uses AC mains power.

> **Note:** Before the ERT Gateway installation, ensure that the selected location will support the weight of the gateway and its mounting hardware. Engage a registered engineer to conduct a structural analysis of the installation location prior to the installation. Itron is not responsible for improper installation or for installation at a site that cannot adequately support the ERT Gateway.

Installation Overview

This ERT Gateway installation profile describes installation mounting the gateway to a 2- inch vertical pipe. The ERT Gateway power source is a 110V AC mains supply. Installation tasks include:

1. Attaching the 915MHz ERT antenna.
2. Attaching the 915MHz WAN antenna.
3. Installing the battery
4. Attaching the ERT Gateway to the mounting surface.
5. Connecting the power cable.

   Do not move or transport the ERT Gateway without first disconnecting the power. Use the ERT Gateway shipping packaging to transport the device to protect the equipment.
6. Supplying power.

Installing the Battery

1. Remove the battery cover by loosening the four screws securing it.

   These are captive screws and do not need to be fully removed from the battery cover.

2. Plug in the four pin battery wiring harness. The harness should snap into place, providing a secure connection.

3. Slide the battery into the battery compartment.

4. Replace the battery compartment cover, and torque the screws to 6 inch-pounds.

Attaching the ERT Antenna

Warning! Install only the provided ERT antenna.

1. Remove the antenna from the shipping package.

2. Verify that the foam seal is seated in the N-connector cavity on the top of the ERT Gateway.

3. Thread the antenna onto the top of the ERT Gateway. Do not over-tighten.

Important! Do not over-tighten or cross-thread the ERT antenna.

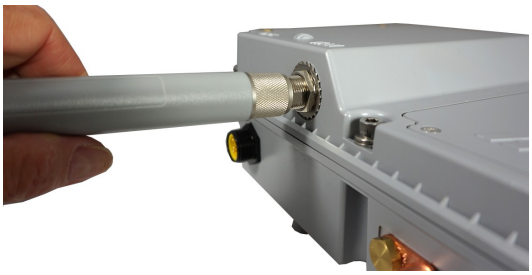
Attaching the WAN Antenna

Warning! Install only the provided WAN antenna.

1. Remove the WAN antenna from the shipping box.

2. Thread the WAN antenna onto the N-connector (labeled WAN) on the bottom of the ERT Gateway.

Important! Do not over-tighten or cross-thread the WAN antenna.



Mounting the ERT Gateway

The ERT Gateway can attach to a variety of locations. The following sections provide mounting instructions for:

- Pipe mount
- Pole mount
- Davit arm mount

Mounting Hardware

The mounting hardware for the ERT Gateway can be adapted to mount the gateway in many different locations.

For pole or pipe mount profiles, the required mounting hardware includes:

- the mounting plate
- two mounting brackets
- four bolts
- the set screw
- (optional) metal bands (not provide by Itron)

> **Note:** If the vertical pipe or pole exceeds 6.75" in diameter, you may use metal bands instead of the mounting brackets to secure the mounting plate to the pipe or pole. Two 1.5" long slots are on the mounting plate to accommodate the metal bands.

For wall mount profiles, the required mounting hardware includes:

- two metal mounting brackets
- four mounting bolts
- four mounting nuts
- four lock washers

Table 1 Mounting Hardware

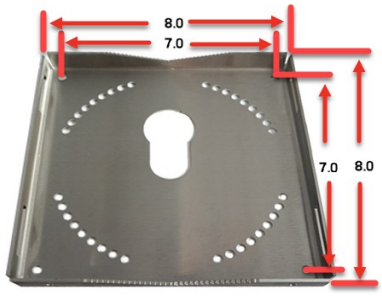
Component	Image	Description
Mounting plate		Mounting plate dimensions 

Table 1 Mounting Hardware (continued)

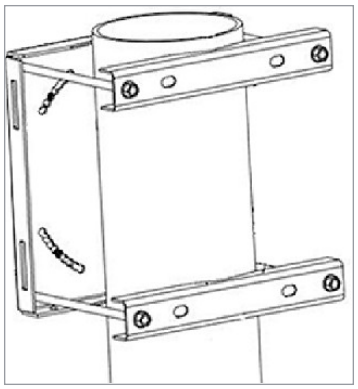
Mounting brackets		Brackets for wall mounting
		Brackets for pipe or pole mounting (bracket dimensions are shown) 
Mounting bolts		
Miscellaneous		Mounting nuts, bolts, washers, split washers, and anti-seize lubricant

The integrated mounting support on the back of the ERT Gateway housing slides into the slot in the center of the mounting bracket. A set screw locks the ERT Gateway to the mounting bracket. The housing orientation can be adjusted ± 16 degrees horizontal to compensate for different angles.

Mounting the ERT Gateway on a Pipe

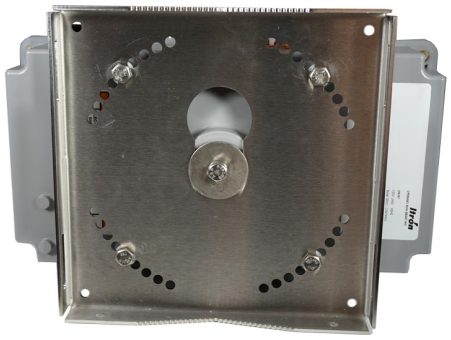
In these instructions, the mounting plate is attached to the vertical pipe with the mounting brackets. The ERT Gateway housing is secured to the mounting plate.

1. Use the two mounting brackets and four bolts to attach the mounting plate to the pipe.



2. Place the gateway on the mounting plate with the antenna in an upright position. Insert the mounting plate disc into the mounting plate's disc opening.

3. Secure the ERT Gateway to the mounting plate using the four set screws.

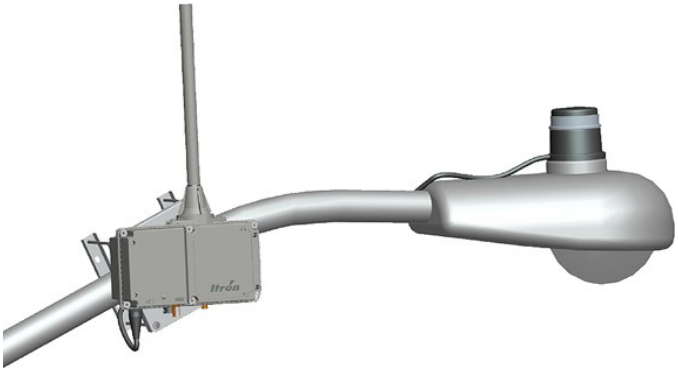


Mounting the ERT Gateway on a Pole

1. Follow the pipe mounting procedure for securing the mounting plate to the ERT Gateway (see **Mounting the ERT Gateway on a Pipe)**. Ensure the ERT Gateway ERT antenna is in an upright position.
2. Attach the ERT Gateway/mounting bracket assembly to the pole using the mounting brackets or the optional metal straps.

Mounting the ERT Gateway on a Davit Arm

These instructions describe a typical utility or street light pole installation. The ERT Gateway is mounted on a davit or street light arm.

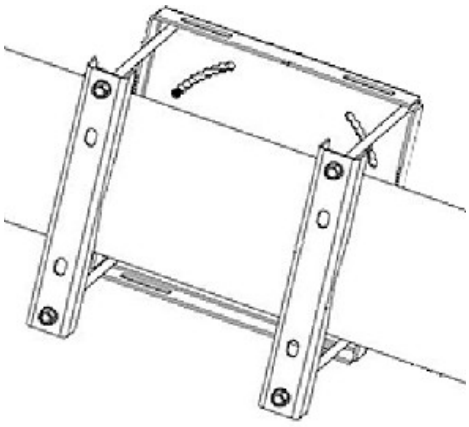


Power is supplied on a davit or street light arm installation using a photocell adapter cable. The cable plugs into the photocell sensor of the street light. If the ERT Gateway is mounted on a davit

arm without a street light, the power cable must be connected according to the local electrical codes.

Important! If a photocell adapter cable supplies power to the ERT Gateway, the gateway must be grounded through the grounding lug on the bottom of the housing.

1. Use the two mounting brackets and four bolts to attach the mounting plate to the davit arm.



2. Insert the mounting disc into the mounting plate disc opening.

3. Using the set screws, secure the gateway to the mounting plate with the antenna in an upright position.

Connecting the Ground Wire (If Required)

Connect the cable ground wire to the grounding lug on the ERT Gateway.

> **Note:** Due to variable requirements for ground cable length, ground cables are not provided by Itron.

Attach the grounding wire to earth ground. Follow local codes if earth ground is not provided through the AC power cable.

Connecting the ERT Gateway Power

The final step of the ERT Gateway installation is to provide power. A three-pin (AC) cable is required.

> **Warning!** Securely mount the ERT Gateway before the dedicated AC mains power source is connected. The ERT Gateway must be grounded by the ground wire in the three-wire AC mains cable or through the grounding lug on the bottom of the gateway. For installations connected to the photocell adapter, use the grounding lug to ground the gateway.

Connecting the Power Cable

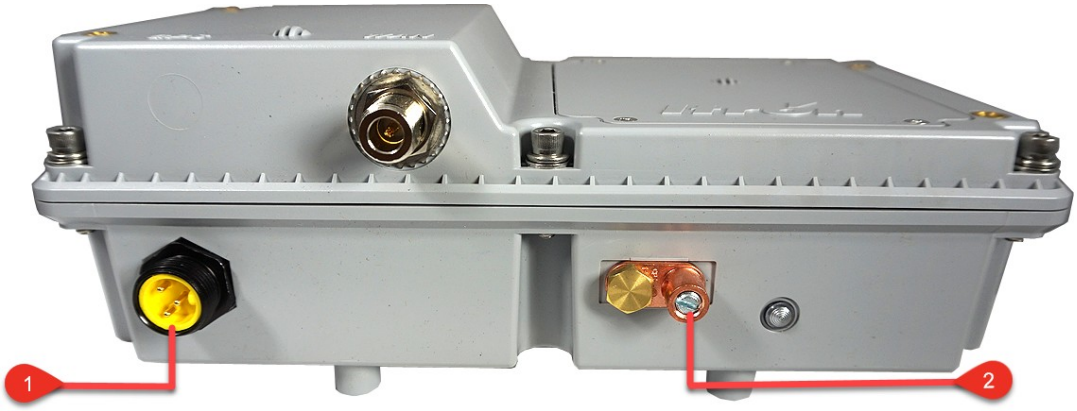
1. Plug the power cable into the power connector on the bottom of the ERT Gateway.

   > **Note:** The connector is keyed so the cable connects in the proper orientation.

2. Secure the cable by tightening the retaining nut on the cable.

ERT Gateway Wiring Diagram

Power source and grounding connection are shown in the following illustration.



Connection	Description
1	AC power source
2	Ground

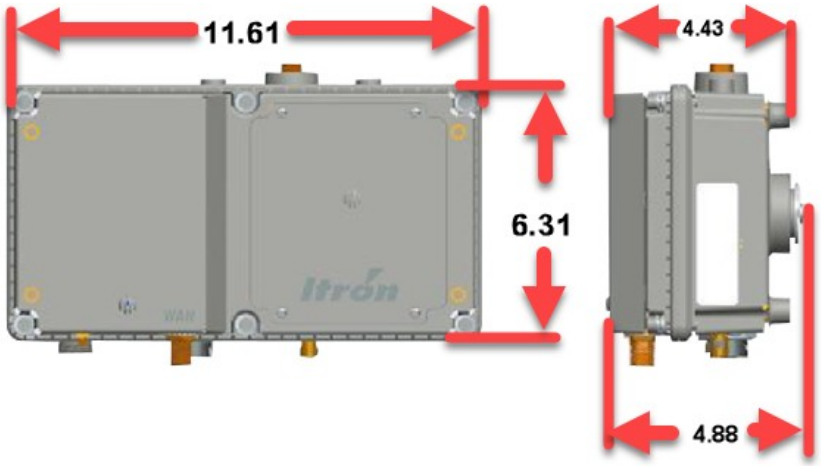
Appendix: ERT Gateway Specifications

This section provides Routing Node ERT Gateway product specifications.

Dimensions and Weight

The ERT Gateway weight is listed in pounds. The dimensions are shown in inches.

Component	Weight
ERT Gateway	8.0 lbs (with antennas)
Pole mounting kit	3 lbs
Wall mounting kit	2 lbs



Antenna Specifications

Caution: This section provides the specifications for the 915MHz ERT and WAN antennas. The ERT Gateway is designed to operate with specific antennas. Antennas not expressly approved by Itron are strictly prohibited for use with the ERT Gateway and will be out of FCC and ISED compliance. Below are the two approved antennas. The required antenna impedance is 50 ohms.

Specification	915 MHz ERT Antenna	915 MHz WAN Antenna
Itron part number*	MSE-0453-001	MSE-0452-001
Frequency range	902-928 MHz	902-928 MHz
Maximum gain	5.5 dBi	2.6 dBi
Horizontal beamwidth	Omnidirectional	Omnidirectional
Impedance	50 ohms	50 ohms
Termination	Type N male	Type N male
Overall length	18.8 in	8 in
Radome diameter	1 in OD	1 in OD

* See the *Routing Node Ordering Guide* (PUB-1306-001) for a description of antennas or contact your Itron representative.

To reduce potential radio interference to other users, select an antenna type with gain such that the equivalent isotropically radiated power (e.i.r.p.) is not more than that permitted for successful communication.

ISED Canada Conformity

This radio transmitter has been approved by Innovation, Science and Economic Development (ISED) to operate with the antenna types listed previously with the maximum permissible gain and required antenna impedance for each antenna type indicated. Antenna types not included in this list, having a gain greater than the maximum gain indicated for that type, are strictly prohibited for use with this device.

Le présent émetteur radio a été approuvé par Innovation, Science and Economic Development (ISED) pour fonctionner avec les types d'antenne énumérés ci-dessus et ayant un gain admissible maximal et l'impédance requise pour chaque type d'antenne. Les types d'antenne non inclus dans cette liste, ou dont le gain est supérieur au gain maximal indiqué, sont strictement interdits pour l'exploitation de l'émetteur.

Environmental Specifications

The ERT Gateway meets the listed environmental specifications.

Specification	Value
Operating temperature	-40°C to 60°C
Storage temperature	-40°C to 85°C
Humidity	0 to 90% non-condensing

AC Mains Power

The AC mains wiring to the ERT Gateway Mesh utilizes a three-conductor cable. Terminate the cable with either a NEMA L5-15 (125V, 15A), NEMA L6-15 (250V, 15A) locking plug, or by directly splicing to the secondary power to meet electrical codes. Power wiring on the Itron-supplied power cable follows conventional color coding for AC wiring: green (ground), white (neutral), and black (hot).

The ERT Gateway Mesh must be powered by a 85-265 VAC source defined as a maximum 15-amp branch circuit.

Warning! Verify the 85-264 VAC power source before connecting power to the ERT Gateway Mesh. Securely mount the ERT Gateway Mesh before connecting the dedicated AC mains power source. The ERT Gateway Mesh must be grounded using either the ground wire in the three-conductor cable or the grounding lug on the bottom of the ERT Gateway Mesh unit. For installations that use the photocell adapter, the grounding lug must be used to ground the ERT Gateway Mesh.

ERT Gateway Power Operating Range

The ERT Gateway meets the listed power operating ranges.

Specification	Value
Voltage (AC)	85 VAC to 264 VAC
Frequency	47 to 63 Hz
Average power	5 watts