

Fixed Network Repeater

Installation Guide

D R A F T

Identification

Fixed Network Repeater Installation Guide
TDC-0613-000 10/04

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Compliance Statement

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.

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

- This device may not cause harmful interference.
- This device must accept any interference that may cause undesirable operation.

This device complies with Part 15.247 of the FCC rules governing spread spectrum devices. The device operates in the 900 MHz unlicensed band at a maximum peak power level of 1 watt with a transmission duration that will not exceed 50 milliseconds.

This device must be permanently mounted such that it retains a distance of 20 centimeters (7.9 inches) from all persons in order to comply with FCC RF exposure levels.

Modification and Repairs

To ensure FCC compliance and system performance, this device, antenna and coaxial assembly shall not be changed or modified without the expressed approval of Itron. Any modification may void the user's authority to operate the equipment.



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

Meter Installation/Removal

In the event of malfunction, all repairs should be performed by Itron. It is the responsibility of users requiring service to report the need for service to Itron.



WARNING! The installation of this device may subject the installer to hazardous conditions, including the possibility of electrical shock. Trained professionals should install this device. This instruction manual should be considered supplemental and used in addition to and in accordance with your company's meter installation and removal procedures and all related safety regulations.

Customer Service

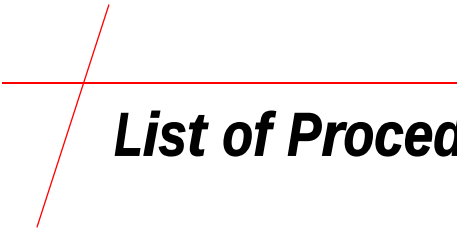
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Before You Begin

Overview

This document describes the installation and configuration of Fixed Network repeaters. This document describes the different types of repeaters, installation kits and accessories, the installation process, and how to configure repeaters if needed in the field using the Repeater Programmer.

Audience

This document is intended for utility field personnel and others associated with the installation and maintenance of a Fixed Network repeater. Installers should have previous training and experience in the following:

- Installation and maintenance of electric meters
- Electrical wiring and related skills
- All utility-specific OSHA regulations and procedures

How This Document is Organized

This document is organized as the following.

Chapter	Description
<i>List of Procedures</i>	Provides an alphabetical list of all procedures contained in this document.
<i>Chapter 1. Getting Started</i>	Describes what a repeater is, the types of repeaters, specifications, and the contents of installation kits.
<i>Chapter 2. Repeater Installation</i>	Provides step-by-step instructions for installing pole-mount or sleeve-mount repeaters.
<i>Chapter 3. Repeater Configuration</i>	Provides an overview and step-by-step instructions for using the repeater programmer and QuickTerminal configuration application to configure repeaters in the field.

Documentation Conventions

This document uses the following conventions.

Convention	Example
Keypresses are in bold .	Press Enter when complete.
Menu paths are in bold .	From the Start menu, choose File > Save As . (This example instructs the user to choose File from the Start menu; then choose Save As from the File menu.)

Convention	Example
Computer commands to be typed by the user are in Courier New font.	At the C: prompt, type <code>cd itron/bin</code>
File names are in Courier New font.	The data is uploaded to the <code>upload.dat</code> file
Hypertext links are blue.	See Contents on page iii for the complete table of contents.
The last line in a table is defined by a thick gray line.	Note the thick gray line below this row. If the table continues on another page, the column headings are repeated on each page.

CAUTION This type of note warns the user that failure to heed the information in the note could result in loss of data. Be sure to carefully read a CAUTION note and heed the advice/instructions.



WARNING! This type of note is used to warn of potential physical harm to the user or hardware. It is critical that you pay strict attention to WARNING notes, read the information carefully, and heed the advice/instructions.

Chapter 1

Getting Started

What is a Repeater?

Overview

The repeater is a network component that collects data from nearby ERT endpoints and forwards data to the Cell Control Unit (CCU), Itron's network collector. A repeater expands the footprint of a CCU by forwarding data between endpoints and CCU collectors. The repeater forwards both standard consumption messages (SCM) and interval data messages (IDM).

The CCU, in turn, communicates the data to the Fixed Network Collection Engine. The CCU opens communication sessions at regular intervals, listening for data from the network repeaters. The CCU processes returned data according to the default or custom parameters configured at the Collection Engine for each meter. Repeaters communicate with ERT endpoints and the CCU in the 900 MHz radio band.

Repeater Identification

Each repeater has a unique identification number stored in its internal flash memory. The ID number is used for remote unit communications, setting the timing for acknowledgements, setting the index into the transmit, receiving hop tables at power up, setting the random sequences in the transmit hop table, and other functions. A repeater does not track other repeaters within its communication range.

Repeater Configuration

A repeater is configured at the factory prior to shipment. In certain cases, you may use the Repeater Programmer to edit the configuration of a repeater to optimize communication or to troubleshoot network problems. See [Chapter 3, Repeater Configuration on page 15](#) for more information.

Repeater Types

Itron offers two types of repeaters: pole-mount and sleeve-mount. The type of repeater you install will depend on your site characteristics and network needs.

Repeater Specifications

The following table lists the physical specifications for the pole-mount repeater.

Pole-Mount Repeater Specification	Description
Power Source	Single-phase 240V or 120V AC
Operating and Storage Temperature	-40 to +75 C
Storage Temperature	-40 to +85 C
Operating humidity	5 to 95% non-condensing relative humidity

Pole-Mount Repeater Specification	Description
Product identification	Numeric and bar coded repeater module serial number
ANSI Compliance	C12.1 standards
Receive/Transmit Frequency Range	908-924 MHz
Data Integrity	Verified in every data message

The following table lists specifications for the sleeve-mount repeater.

Sleeve-Mount Repeater Specification	Description
Power Source	Single-phase 240V or 120V AC
Operating and Storage Temperature	-40 to +75 C
Storage Temperature	-40 to +85 C
Operating humidity	5 to 95% non-condensing relative humidity
Product identification	Numeric and bar coded repeater module serial number
ANSI Compliance	C12.1 standards
Receive/Transmit Frequency Range	908-924 MHz
Data Integrity	Verified in every data message
Meter Form Factor	2S 240V 3-wire Class 200 1S 120V 2-wire Class 100
Meter Sleeve Mount	J4S, J5S

Planning for Repeater Installations

Installation Types

A repeater may be installed in the field directly on a meter using a meter sleeve or on a utility pole. The type of installation affects the radio performance of the repeater. A pole mounted repeater will have a greater radio coverage area than a sleeve mounted repeater. Select an installation type based on the following criteria:

- Availability of utility poles
- Costs related to utility pole installation and future maintenance visits.
- Construction materials surrounding the selected meter installation site.

Unpacking the Repeater

Overview

When you remove a repeater from its shipping carton, verify that no damage has occurred during shipment. Return the repeater to its shipping packaging for transport to the field. Transporting the repeater without protective packaging may result in damage.

Pole-Mount Repeater

- Pole-mount repeater
- Antenna
- Antenna gasket
- Hex bolts (4)
- Washers (4)
- Lock washers (4)
- Photoelectric cell power adapter

Sleeve-Mount Repeater

- Sleeve-mount repeater
- Antenna cover and tension band
- Meter sealing ring



Chapter 2

Repeater Installation

Getting Started

Overview Your repeater installation process will depend on the type of repeater (pole-mount or sleeve-mount) and the installation location.

Installing on a Street Light

Overview A pole-mount repeater mounts on a streetlight davit at least 6 inches behind the lamp, which allows for clearance to change the light bulb in the lamp.

The mounting kit for the repeater will depend on the angle of the davit. If the angle of the davit is less than 15 degrees, the standard bracket kit should be used. If the angle is greater than 15 degrees, use the adjustable bracket kit.

Required Hardware and Tools A pole-mount repeater installation requires the following tools and hardware:

- Mounting Kit (streetlight)
- 7/16-inch nut driver, wrench, or ratchet-wrench
- Inch-pound torque wrench with 7/16-inch socket
- 1-inch wrench
- Tie wraps (not supplied with mounting kit)

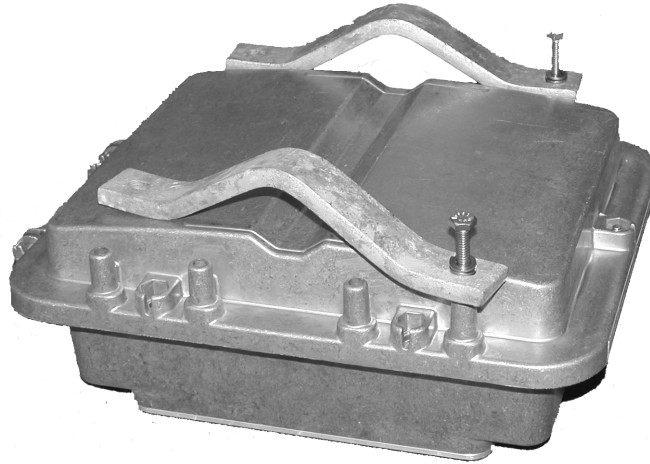
Earth Grounding Depending on the local requirements for your utility company, you may need to ground each repeater to earth ground. If you need to earth ground a repeater, ground the case through one of the mounting screws that attach the repeater to the pole using a grounding cable in accordance with local utility company guidelines. The grounding cable is not supplied by Itron.

Wind Load Prior to installing a repeater on a light pole, ensure that the weight and estimated project area (EPA) of the repeater does not exceed the wind load and total weight load of the light pole. The manufacturer of the light pole should provide wind load and weight rating specifications.

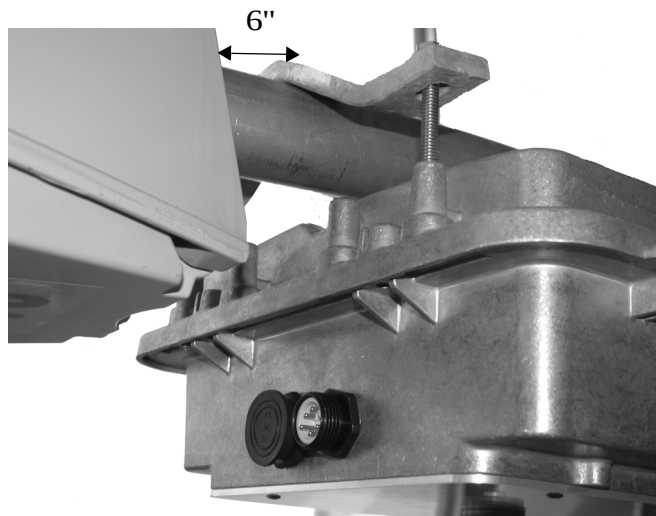
Installing on a Davit Using Standard Brackets

To install a repeater on a street light davit, do the following steps.

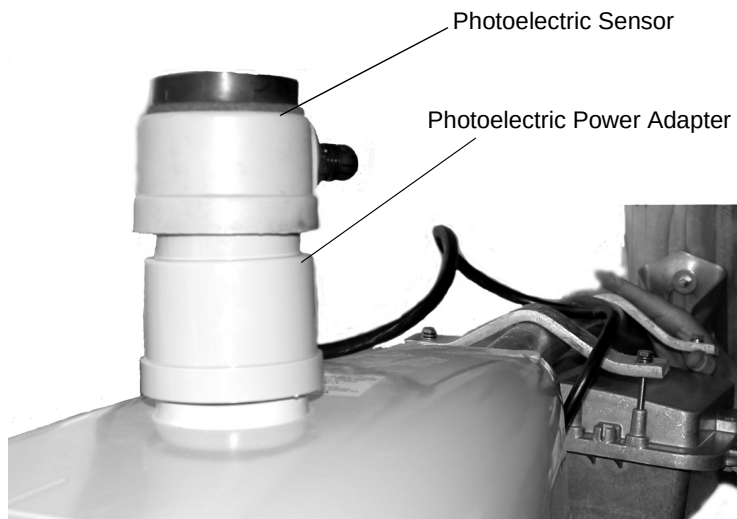
Step	Action
1	Partially bolt one end of each bracket onto the repeater, using the lock washer and flat washer. Leave the bolts loose so that the bracket can swing. When you are ready to install the repeater in the final position, you will swing each bracket across the top of the davit and secure it.



- | | |
|---|--|
| 2 | Place the antenna gasket over the antenna mount. |
| 3 | Position the repeater beneath the davit, making sure that the repeater: <ul style="list-style-type: none">• Connectors face the street lamp• Power cable can easily extend between the power connector at the repeater and the photoelectric sensor• Is placed is at least a 6 inches from the light fixture• Mounting brackets are straight along the sides of the repeater lid• Lid groove aligns with the davit• Hangs straight down |



Step	Action
4	Swing the unsecured ends of the brackets over the davit and partially bolt them, then torque the bolts to 40-inch pounds in a cross pattern. IMPORTANT The four hex bolts must be torqued as specified to achieve the clamping force needed to withstand 100 M.P.H. wind. If the bolts are under-torqued, the necessary clamping force may not be obtained. If the bolts are over-torqued, the brackets may become overstressed and clamping force may be reduced.
5	Install the photoelectric power adapter using the following steps: - Connect photoelectric power adapter to the 5-pin power connector on the repeater. - Note the current orientation of the sensor window (usually it faces north), so that you can restore it to that orientation when you are done. - Remove the photoelectric sensor. - Insert the repeater photoelectric power adapter into the socket and turn to lock it in place. - Re-insert the photoelectric sensor into the socket on the top of the power adapter. - Adjust the adapter to face the photosensor window to its original orientation by pulling up on the adapter housing and swiveling the housing. - Use tie-wraps, as necessary, to secure the cable away from the repeater housing.



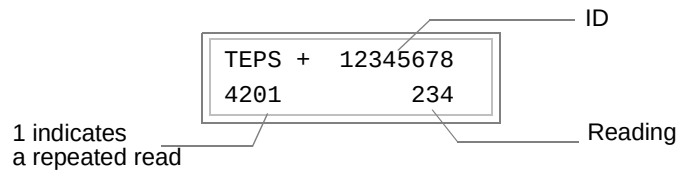
Step Action

- 6 Attach the antenna on the bottom of the repeater, tightening with a wrench until the antenna makes contact.

TIP To test whether the antenna makes contact, try to wiggle the antenna. If it seems loose, continue tightening.



- 7 To verify a successful repeater installation, power on the Sentry 850 handheld.
- 8 On the handheld, press **Receive**. If the repeater is correctly installed, the repeated ERT readings will display on the handheld as illustrated below.



NOTE The Sentry 850 reads all endpoints and repeaters within its communication range and data may display rapidly. If needed, use the Up and Down buttons to review entries for the repeated readings.