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Gas Solutions

2.4ZR OpenWay® Range Extender Installation Guide

Identification

2.4ZR OpenWay Range Extender Installation Guide
1/18/2011 TDC-0832-001

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Applicable Patents

U.S. & foreign patents pending.

Compliance Statement

This device complies with Part 15 of the 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 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.

Compliance Statement

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.

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

Transportation Classification

The Federal Aviation Administration prohibits operating transmitters and receivers on all commercial aircraft. When powered, the 2.4ZR Range Extender is considered an operating transmitter and receiver and cannot be shipped by air. All product returns must be shipped by ground transportation.

Modifications and Repairs

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

Trademark Notice

Itron is a registered trademark of Itron, Inc.

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Suggestions

If you have comments or suggestions on how we may improve this documentation, send them to TechnicalCommunicationsManager@itron.com

If you have questions or comments about the software or hardware product, contact Itron Technical Support:

Contact

- Internet: www.itron.com
- E-mail: support@itron.com
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Warning Follow these procedures to avoid injury to yourself or others:

- The lithium battery may cause a fire or chemical burn if it is not disposed of properly.
- Do not recharge, disassemble, heat above 100° C (212° F), or incinerate the lithium battery.
- Keep the lithium battery away from children.



Warning Only Itron personnel should attempt repairs on Itron equipment. Attempts by unauthorized personnel to repair Itron products may void any maintenance contract with your company.



Warning Explosion Hazard. Substitution of any component may impair suitability for Class 1, Division 2.

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Before You Begin

Before you begin installation, verify you have the following equipment and tools. 2.4ZR OpenWay Range Extender installation requires the 2.4GZ OpenWay gas module's location and serial number.

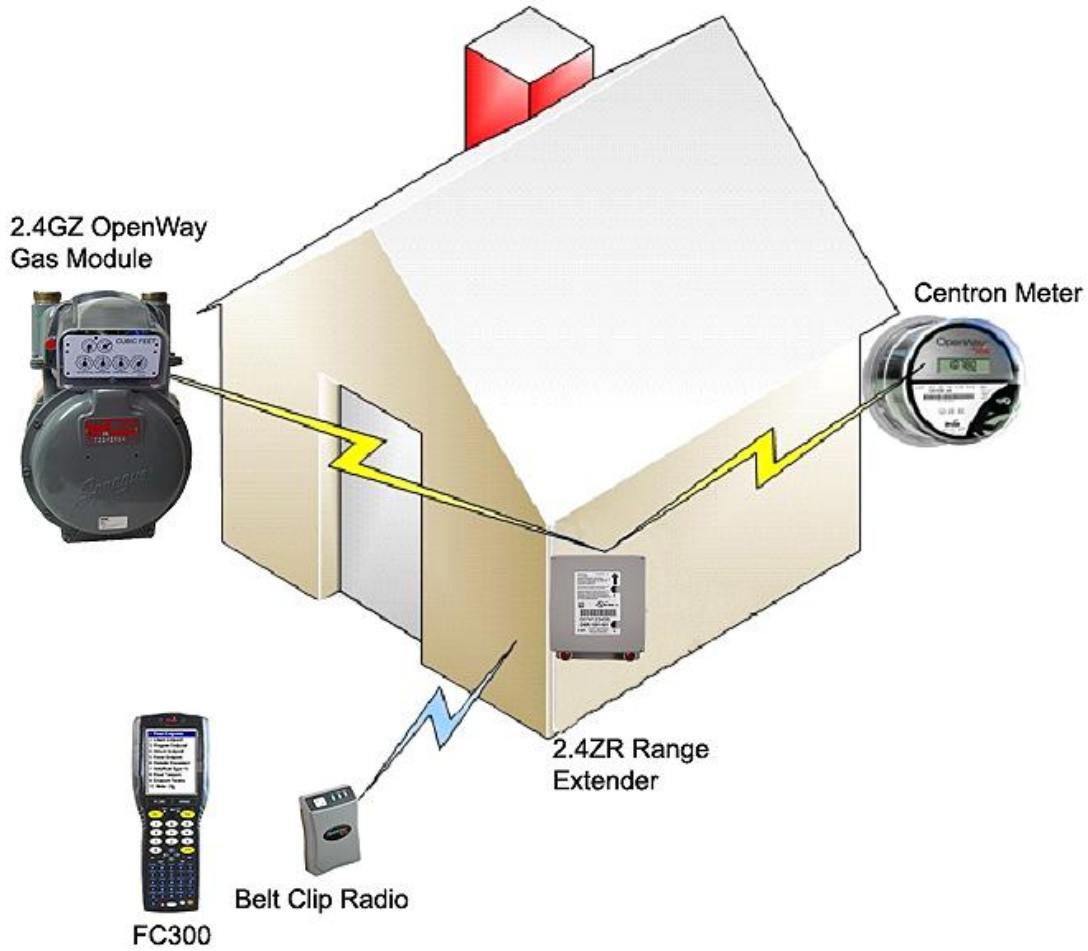
Materials Available From Itron

- 2.4ZR OpenWay Range Extender (OWR-1001-001)
- Itron magnet (MSE-0159-003)
- Itron programming device
 - FC300 with SRead (or a laptop computer) with Endpoint-Link or Endpoint Link Pro version 5.5 or higher or Field Deployment Manager (FDM) software version 1.1 or higher
 - or
 - FC200 (with Bluetooth-enabled) handheld computer loaded with Endpoint-Link or Endpoint-Link Pro software or Field Deployment Manager (FDM) software version 1.1 or higher
 - and
 - OpenWay Belt-clip Radio with Endpoint-Link or EndPoint-Link Pro software or Field Deployment Manager (FDM) software version 1.1 or higher.
- OpenWay Belt Clip Radio (AMI-0100-201)
- *2.4GZ OpenWay Gas Module Installation Guide - Direct Mount* (TDC-0816-xxx)
- *2.4GZ OpenWay Gas Module Installation Guide - Remote Mount* (TDC-0838-xxx)

Equipment Provided by You

- Screwdriver
- 1/8-inch drill bit and drill

Configure the 2.4ZR OpenWay Range Extender with the same Itron tools used to program the 2.4GZ OpenWay Gas Module. Successful mitigation and installation create a reliable signal path between the OpenWay gas module and the CENTRON meter.



Specifications

The 2.4ZR OpenWay Range Extender is designed for outdoor installation and operation. The functional and operational specifications are listed below.

Functional Specifications	Description
Power source	Lithium battery pack
Tamper detection	Magnetic tamper
FCC compliance	Part 15 certified
Intrinsic safety	UL Class 1, Division 2, Groups C and D
Product identification	Numeric, bar-code, and serial number
Construction materials	Polycarbonate, encapsulated electronics

Operational Specifications	Description
Operating temperatures	-40° to 158° F (-40° to +70° C)
Operating humidity	Up to 95% relative humidity
Frequency band	2.4 05 to 2.475 GHz ISM (industrial, scientific, and medical) band
Modulation	Direct Sequence Spread Spectrum
Data integrity	Verified in every data message

Compatibility	Description
Electric meters	OpenWay CENTRON Hardware versions 1.5, 2.0, and 3.0 System release firmware version SR2 SP5 and later
Gas modules	2.4GZ OpenWay Gas Module (direct mount or remote) Model OWG-5002-xxx with ZigBee Smart Energy Model OWG-5001-xxx with Itron Private Profile

Related Documents

Document Title	Document Part Number*
<i>2.4GZ OpenWay Gas Module Installation Guide – Direct Mount</i>	TDC-0816
<i>2.4GZ OpenWay Gas Module Installation Guide - Remote Mount</i>	TDC-0838
<i>Endpoint-Link Pro Field Service Representative's Guide</i>	TDC-0735
<i>Endpoint-Link Endpoint Programming Guide</i>	TDC-0744
<i>Field Deployment Manager Endpoint Tools Mobile Application Guide</i>	TDC-0934
<i>Field Deployment Manager Field Representative's Guide</i>	TDC-0936
<i>OpenWay Belt Clip Radio User Guide</i>	TDC-0791

*The last three digits of Itron user guides indicate the document's revision. The revision is subject to change without notice.

2.4ZR OpenWay Range Extender Configuration and Installation

An Itron handheld computer, OpenWay Belt Clip Radio, programming software, and programming magnet are required to configure the 2.4ZR OpenWay Range Extender.

Configuration and Installation Checklist

Step	Procedure	
1	Configuring the 2.4ZR OpenWay Range Extender on page 7	<input type="checkbox"/>
2	Selecting a Mounting Location on page 10	<input type="checkbox"/>
3	Linking to a CENTRON Meter on page 11	<input type="checkbox"/>
4	Linking to a 2.4GZ OpenWay Gas Module on page 12	<input type="checkbox"/>
5	Installing the 2.4ZR OpenWay Range Extender on page 14	<input type="checkbox"/>

Required Configuration Tools

- Blue-tooth enabled Itron FC200 or FC300 handheld or laptop computer loaded with Endpoint-Link or Field Deployment Manager (FDM) software
- OpenWay Belt Clip Radio (AMI-0100-201)
- Itron magnet (MSE-0159-003)

2.4ZR OpenWay Range Extender Configuration Overview

Itron's handheld FC200 or FC300 and an Itron programming magnet are used to configure and audit the 2.4ZR OpenWay Range Extender. The programming magnet is briefly held over the range extender's bar code (swiped) to cause the range extender to search for the handheld device.



The magnet swipe's effect is dependent on the range extender's current operating mode. If the magnet swipe occurs during programming/audit operations with the handheld, the magnet swipe is ignored. If the magnet swipe occurs during the installation window for gas modules, the range extender closes the installation window and gives a visual indication the range extender is installing gas modules. If the range extender is swiped at any other time, the range extender first searches for a handheld computer. If the range extender does not find a handheld, it will:

1. If the range extender was not previously joined to an electric meter, the range extender will start the process to join an electric meter.
- or*
2. If the range extender was joined to an electric meter, the range extender re-establishes the connection and opens an installation window for gas modules.

Configuring the 2.4ZR OpenWay Range Extender

Note Perform each procedure in the order listed in the [Configuration and Installation Checklist](#) on page 5.

The range extender and the gas module must have the same network configuration settings. You may configure the range extender before deployment in the field. Configuration must be completed before the final field installation.

Configure the range extender communications parameters with a Bluetooth-enabled FC200 or FC300 handheld computer (or a laptop computer) loaded with Endpoint-Link or Endpoint-Link Pro or FDM software, the OpenWay Belt Clip Radio, and the same configuration files used to program the 2.4GZ OpenWay Gas Module during module installation. See the *Endpoint-Link Endpoint Programming Guide* (TDC-0744) or *Field Deployment Manager Endpoint Tools Mobile Application Guide* (TDC-0934) for more complete programming information. An Itron magnet is also required to initiate communication between the range extender and other devices.



FC300 Handheld Computer

FC200 Handheld Computer

OpenWay Belt Clip Radio

Itron Magnet

To configure the 2.4ZR OpenWay Range Extender

1. Position and hold the Itron magnet over the label barcode on the range extender for approximately five seconds. Remove the magnet.



2. Watch the blink pattern of both LEDs to verify the range extender is searching for the configuration devices. The range extender should now be exchanging data with the handheld computer running Endpoint-Link or FDM software. Magnet swipes while the range extender is in field configuration mode are ignored.

LED	Number of Blinks	Description
Both	3	The range extender is scanning for available networks.
Both	5	Join to handheld network is complete.

When the 2.4ZR OpenWay Range Extender successfully joins a handheld network, it scans for a communication from the handheld. If no communication is heard within 30 seconds, the range extender leaves the handheld network.

3. Using the handheld loaded with Endpoint-Link or FDM, verify successful range extender configuration.

Important If the 2.4GZ OpenWay gas module is not programmed, it must be programmed at this time. Refer to the *2.4GZ OpenWay Gas Module Installation Guide - Direct Mount* (TDC-0816) or *2.4GZ OpenWay Gas Module Installation Guide- Remote Mount* (TDC-0838) for complete instructions.

Reconfiguring or Reading an Installed 2.4ZR OpenWay Range Extender

Users can swipe a previously installed range extender to reconfigure the range extender or to read its configuration. When an installed range extender is swiped, the range extender first searches for a handheld. The following table describes the range extender's LED blink pattern during Handheld mode.

LED	Number of Blinks	Description
Both	3	The range extender is scanning for available networks.
Both	5	Join to handheld network is complete.

At the end of Handheld mode, the range extender returns to the previous network (by default if the range extender is left in Normal mode). The range extender prepares for joining gas modules. The current gas module list is preserved. If a network is not found, the range extender enters Sleep Mode.

If the range extender is placed into Sleep mode by the handheld, the range extender will return to the previous network and send a leave notification. The range extender removes any gas modules from its child table and enters Sleep mode.

Selecting a Mounting Location

Note Perform each procedure in the order listed in the [Configuration and Installation Checklist](#) on page 5.

Follow these general guidelines to ensure successful results when selecting a mounting location for the range extender.

Important Mounting is only temporary at this time because you may need to move the range extender to a different location during [Linking to a CENTRON Meter](#) on page 11 and [Linking to a 2.4GZ OpenWay Gas Module](#) on page 12. Do not drill holes or use a method that damages surfaces until the final location is verified.

- If you can mount the range extender within sight of the meter and the gas module, the location is most likely adequate.
- Select a location for the range extender where physical barriers and obstructions (for example, buildings, bushes, vehicle parking) between the electric meter and the gas module are minimal. If possible, choose a range extender location above any obstructions.
- Determine the best range extender mounting position based on available mounting surfaces.
- Consult and follow your company's guidelines for installing equipment. Request permission from property owners before permanently installing the range extender on private property.



Caution You must mount the 2.4ZR OpenWay Range Extender with the label arrow pointing up.



Linking to a CENTRON Meter



Important Prior to linking the range extender to a CENTRON meter:

- Remember mounting is temporary at this time because the range extender may be moved.
- Range extender joining to a handheld has the highest priority. If a handheld is present, the range extender will join to that handheld.
- The Itron 2.4ZR OpenWay Range Extender is not required to register to a specific CENTRON meter. The range extender may join any CENTRON meter.
- The range extender searches for CENTRON meters and attempts to join the meter with the best signal quality. The meter with the best signal quality should typically be the CENTRON meter on the same premise as the 2.4GZ OpenWay Gas Module but it could be a different meter depending on the relative locations of all nearby meters.

To initiate and verify the radio link to the CENTRON meter

1. To activate the radio joining process, hold the Itron magnet over the barcode on range extender label for approximately five seconds. Remove the magnet. The range extender and magnet label arrows must be pointing up.



2. The range extender first searches for a handheld network. This leads to an initial three blinks. If there is no handheld, the range extender blinks three more times while it searches for the CENTRON network. If it successfully joins the CENTRON network, it blinks five times. The blink sequence is three - three - five.

LED	Number of blinks	Description
Both	3	The range extender is scanning for available networks.
Both	5	Join to a network (CENTRON) is complete.

3. Watch the *E* LED to verify the connection signal quality between the range extender and the CENTRON meter. The range extender blinks the signal strength every thirty seconds.

To maintain a reliable connection, the radio link between the range extender and the CENTRON meter must have sufficient signal quality. After the establishing a connection, the range extender indicates the relative signal quality by the number of *E* LED blinks.

LED	Number of Blinks	Definition	Action
E	1	Poor signal quality.	Move the range extender to a more suitable location (see Selecting a Mounting Location on page 10) and return to step 2 of this procedure.
E	2-5	Acceptable signal quality.	No action is required. Three to five blinks are the best signal quality; two blinks are acceptable.

4. Perform the procedure [Linking to a 2.4GZ OpenWay Gas Module](#) on page 12.

Linking to a 2.4GZ OpenWay Gas Module



Important Perform each procedure in the order listed in the [Configuration and Installation Checklist](#) on page 5.

The radio link from the range extender to the CENTRON meter must be established before you establish a link to the gas module.

You have a limited time period to complete the radio link setup and verification between the range extender and the gas module. The time available depends on the time setting configured in the range extender's install window parameter. The install window parameter default setting is 10 minutes.

A part of the range extender's preparation to allow gas modules to join involves the range extender's query to the CENTRON meter to verify the meter has space for a gas module. If the CENTRON has additional space, the range extender waits for a gas module to join. If the CENTRON does not have additional space:

- The range extender shuts off the receiver.
- The range extender's *G* LED displays the signal strength of the range extender to gas module's path.
- While indicating the signal strength to the gas module, the range extender's *E* LED displays a rapid blink state (200ms on/off).

At the end of the installation time period, the range extender turns off the LED rapid blink state. The range extender enters Normal mode with currently joined gas modules.

To set up and verify the radio link to the gas module

1. Go to the gas meter with the 2.4GZ OpenWay gas module and use the Itron magnet to activate the gas module's radio joining process. Refer to the *2.4GZ OpenWay Gas Module Installation Guide - Direct Mount* or *2.4GZ OpenWay Gas Module Installation Guide - Remote Mount* for complete instructions.
2. After you establish a connection between the gas module and the range extender, return to the range extender and verify the signal quality. The connection status with the last joined gas module is indicated by the blink pattern of the *G* LED. The *G* LED repeats a blink pattern every thirty seconds for the duration of the installation time period.

LED	Number of blinks	Definition	Action
G	1	Poor signal quality.	Move the range extender to a more suitable location (see Selecting a Mounting Location on page 10) and repeat Linking to a CENTRON Meter on page 11.
G	2-5	Acceptable signal quality.	No action is required. If the signal quality is two blinks or better, an acceptable radio link is established between the range extender (at its temporary mounting location) and both the CENTRON meter and the gas module.

Installing the 2.4ZR OpenWay Range Extender

- Note** Perform each procedure in the order listed in the [Configuration and Installation Checklist](#) on page 5.

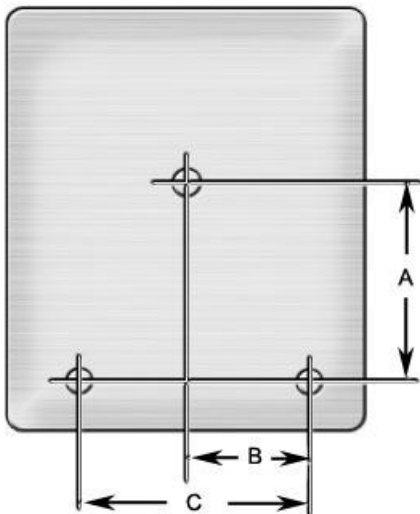
The 2.4ZR OpenWay Range Extender includes three mounting screws and two tamper seals. To permanently mount the range extender, perform the following procedure.

To mount the 2.4ZR OpenWay Range Extender

- If the permanent mounting location is significantly different from the location first attempted, perform the procedures [Linking to a CENTRON Meter](#) on page 11 and [Linking to a 2.4GZ OpenWay Gas Module](#) on page 12 again to verify the radio links are satisfactory for the permanent mounting location.

Note For easier installation, you may drill three pilot holes in the mounting surface (use the 1/8-inch drill bit to accommodate the range extender mounting screws, see the Drilling Template). Carefully select a mounting location free from electrical wires. The mounting location must have the proper clearance to accommodate the #10 x 1-1/2-inch mounting screws so nothing is damaged by the drill or mounting screws.

When drilling pilot holes to mount the 2.4ZR OpenWay Range Extender, the two bottom screw holes must be on a horizontal line. If the range extender will mount on a sheet metal surface, use the mounting screws included. Use a comparable wood screw to mount the range extender on a vertical wood surface.



2.4ZR OpenWay Range Extender Drilling Template

- A. 3-inches
- B. 1-11/16-inches
- C. 3-3/8-inches

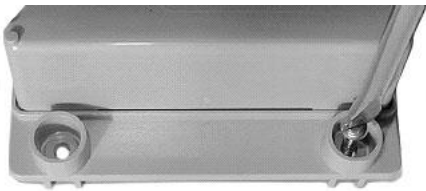
2. Turn a mounting screw for the range extender mounting lug part way into the mounting surface.



3. Place the 2.4ZR mounting lug recess (at the top of the range extender's backplate) just under the screw head. Slide the range extender upward until the screw head fits completely inside the mounting lug recess. Several adjustments may be necessary to properly position the screw.



4. Install the two bottom mounting screws. Fasten screws in an alternating fashion until fully tightened to secure the range extender firmly in position.



Caution Do not over-tighten the range extender mounting screws. Over-tightening the mounting screws may damage the range extender's polycarbonate case.

To install tamper seals

1. Place a tamper seal (included with the range extender) over each range extender mounting screw.



2. Push the tamper seals into place with a 1/4-inch nut driver or similar blunt tool.



Note A tamper seal is fully seated when the top of the tamper seal is approximately 1/16-inch below the top of the screw recess.

3. Record the range extender location according to your company asset management requirements.

Troubleshooting

If communication stops or you cannot establish communication between the range extender and the CENTRON meter or the gas module, try one or all of the following solutions.

- Use a handheld computer loaded with Endpoint-Link or FDM software to check the configuration settings of the gas module and the range extender. These settings should match.
- Repeat the steps in [Configuring the 2.4ZR Range Extender](#) on page 7.
- Repeat the steps in [Linking to a CENTRON Meter](#) on page 11 and [Linking to a 2.4GZ OpenWay Gas Module](#) on page 12.

Important The order you perform the magnet swipes when setting up RF paths is critical. The path between the range extender and the electric meter must be established first. The gas module must have a magnet swipe during the install window, to establish its connection to the range extender.

- If communication continues to fail, contact Itron to replace the 2.4ZR OpenWay Range Extender.

Magnet Swipe Outcomes

A magnet swipe causes one of four possible outcomes:

1. If the range extender is swiped with the programming magnet while it is in Sleep mode and a handheld computer is not present:
 - Both range extender LEDs blink three times to indicate the range extender is searching for a handheld network.
 - If a handheld network is discovered, the range extender follows the CENTRON meter's join sequence.
 - If the range extender does not successfully join a CENTRON network, the range extender enters Sleep mode.
 - If the range extender joins with a CENTRON meter but a 2.4GZ gas module does not join through the range extender, the range extender enters Sleep mode.
2. If the range extender is swiped with the programming magnet while in Sleep mode and in the presence of a handheld:
 - Both range extender LEDs blink three times to indicate the range extender is scanning for active networks.
 - If a handheld network is found, the range extender attempts to join the network.
 - After the range extender joins the handheld network, both LEDs blink five times.
 - At the end of the range extender's Handheld mode, the range extender may be immediately placed into Sleep mode by the handheld, or the range extender will enter the discover network process (join CENTRON meter sequence) by default. If a network is not discovered, the range extender enters Sleep mode. If the range extender does not successfully join a , the range extender enters Sleep mode. If the range extender joins with a CENTRON meter but a 2.4GZ gas module does not join through the range extender, the range extender enters Sleep mode.

3. If the range extender is in Normal mode and is swiped with the programming magnet in the presence of a handheld:
 - Both range extender LEDs blink three times to indicate the range extender is scanning for active networks.
 - If the handheld network is found, the range extender attempts to join the network.
 - After the range extender joins the handheld network, both range extender LEDs blink five times.

At the end of Handheld mode, there are two options:

1. Using the handheld, the user can configure the range extender for Sleep mode. The range extender joins the previous network and sends a leave indicator. The range extender will then remove any children currently joined and enter Sleep mode.

Note The process of removing children currently joined to the range extender does not involve any communication with the gas modules. The gas modules must be removed from the network individually.

2. The range extender is allowed to re-join the previous network and prepares to allow 2.4GZ gas modules to join. After re-establishing the network connection and while the range extender waits for potential joining gas modules, the *E* LED blinks signal strength. The range extender's window for allowing gas modules to join is ten minutes.
4. If the range extender is in Normal Operation and the programming magnet is swiped with no available handheld devices in range, the range extender executes the following sequence:
 - Both range extender LEDs blink three times to indicate the range extender is scanning for a handheld network.
 - If the range extender does not discover an active handheld device, the range extender re-establishes the previous network connection.
 - The *E* LED blinks to reflect the current signal strength.
 - The range extender prepares to allow gas modules to join and sets the timeout for 10 minutes. The 10-minute timeout allows another gas module to join after the initial installation of at least one gas module is complete.

Magnet Swipe Flowchart

