NEPTUNE TECHNOLOGY GROUP

E-Coder®)R450*i*™ Installation and Maintenance Guide

E-Coder®)R450*i*™ Installation and Maintenance Guide

FCC Notice

This device complies with Part 15 of the FCC Rules. Operation is subject to the following condition: this device may not cause harmful interference.

NOTE: 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/TV technician for help."

RF Exposure Information

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

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Professional Installation

In accordance with section 15.203 of the FCC rules and regulations, the MIU must be professionally installed by trained utility meter installers.

Industry Canada

The term “IC” before the radio certification number only signifies that Industry Canada technical specifications were met.

This Class B digital apparatus meets all requirements of the Canadian Interference Causing Equipment Regulations. 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 undesired operation.

Cet appareillage numérique de la classe B répond à toutes les exigences de l'interférence canadienne causant des règlements d'équipement. L'opération est sujette aux deux conditions suivantes: (1) ce dispositif peut ne pas causer l'interférence nocive, et (2) ce dispositif doit accepter n'importe quelle interférence reçue, y compris l'interférence qui peut causer l'opération peu désirée.

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 permitted for successful communication.

This device has been designed to operate with the antennas listed below, and having a maximum gain of 0dB. Antennas not included in this list or having a gain greater than 0dB are strictly prohibited for use with this device. The required antenna impedance is 75 ohms.

R450 Wall MIU Antenna (Neptune Technology Group, Inc. model number 12795-000)

R450 Wall MIU High Gain Antenna (Neptune Technology Group, Inc. model number 12986-000)

R450 Pit MIU Lid Mount Antenna (Neptune Technology Group, Inc. model number 12796-100, 6 ft., 12796-200, 25 ft.)

E-Coder®)R450™ Installation and Maintenance Guide Literature No. IM E-Coder)R450*i* 07.15

Part No. 13252-001

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1 Product Description

This section provides a general description of the E-Coder®)R450*i*™ register (subsequently referred to as E-Coder)R450*i*). The E-Coder)R450*i* by Neptune is an integrated register that contains both the E-Coder® and R450™ technologies in one register that collects meter reading data. It then transmits the data for collection by the meter reader. A Neptune fixed network data collection system receives the data and stores it to be downloaded into the utility billing system for processing.

The E-Coder)R450*i* can be upgraded and configured. At the factory, serial numbers are programmed into the E-Coder)R450*i*. Each E-Coder)R450*i* has a unique serial number/ identification numbers. Custom serial numbers are not available.

RF Protocol Error Detection

The RF protocol is comprised of a header, data packet, and an error detection mechanism that reduces the erroneous data.

Low Battery RF Emissions

The E-Coder)R450*i* does not produce out-of-band emissions under low battery conditions.

The E-Coder)R450*i* is easy to install and requires a Federal Communications Commission (FCC) license to operate. For information on obtaining an FCC license, refer to "FCC Licensing," in the *R450™ System New Customer Guide*.

Figure 1 E-Coder)R450*i*

2 Specifications

This section provides you with the specifications for the E-Coder)R450*i*.

Specifications - E-Coder)R450*i*

Environmental Conditions

Operating temperature	-10° to 149°F (-23° to 65°C)
Storage temperature	-40° to 158°F (-40° to 70°C)
Operating humidity	0 to 100% Condensing

Functional Specifications

Register reading	3 - 9 digits
E-Coder)R450*i* ID	10 digits

Dimensions and Weight

Dimensions	Refer to Figure 2
Weight	1.57 lbs. (712.14 grams)

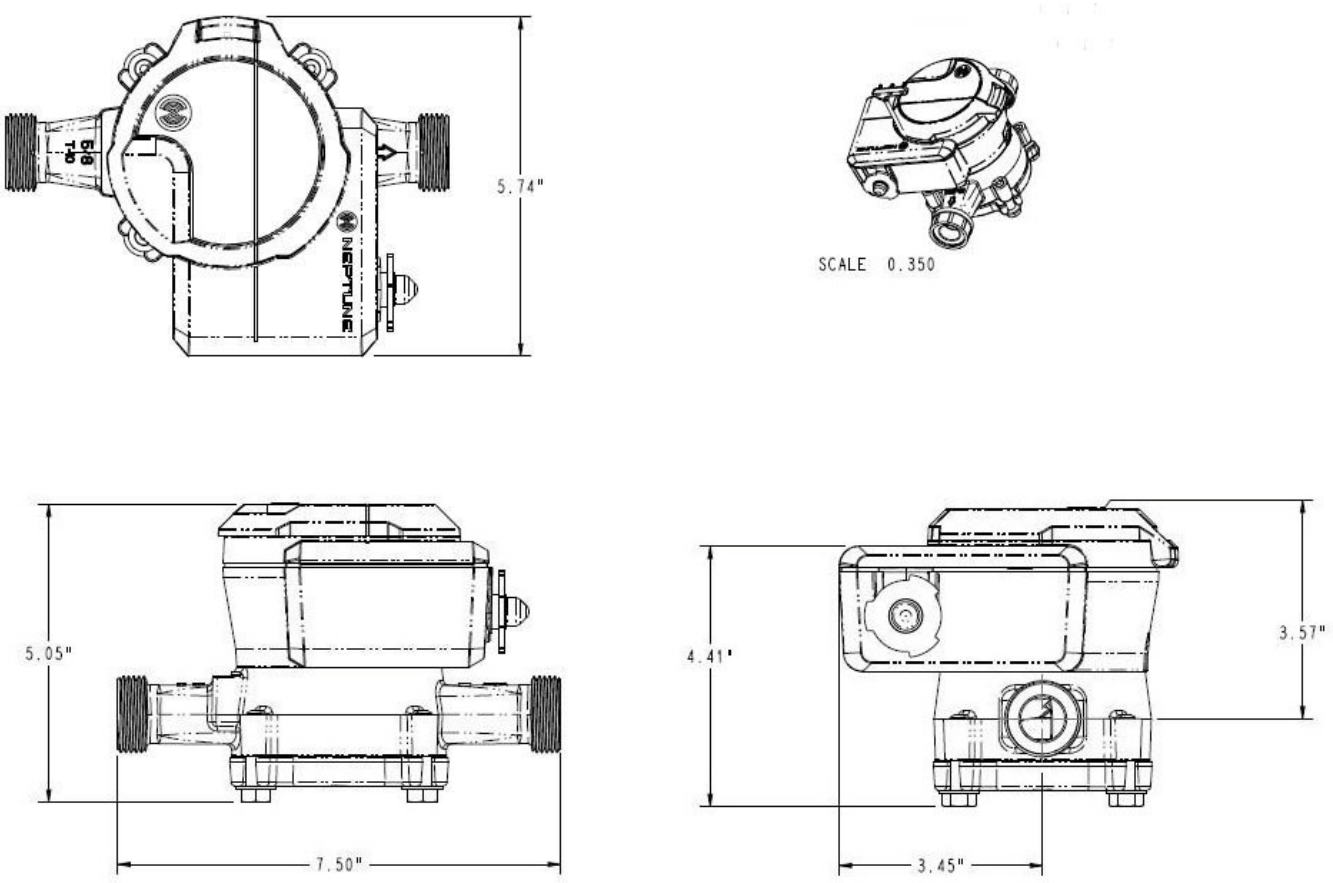


Figure 2 E-Coder)R450*i* Dimensions

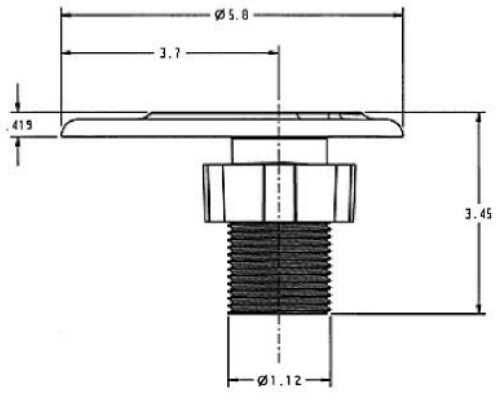


Figure 3 Pit E-Coder)R450*i* Dimensions

3 General Installation Guidelines

This section describes tools, materials, and general installation information for the E-Coder)R450*i*.

Tools and Materials

Tables 1 and 2 show the recommended tools and materials you may need to successfully install the E-Coder)R450*i*.

Some items may not apply to your specific installation or the list may not contain all required tools or materials.

Table 1 Recommended Tools

Item	Description/ Recommendation	Use
Tool Kit	Contains standard tools including: • Screwdrivers • Hammer • Pliers • 7/16 wrench	Various installation procedures performed by the utility For the F-connector
Flashlight		Activate the LCD
Magnet	6 lb. force Part No: 12287-001	Activating the E-Coder)R450*i*
Installation tool	Smartphone or cellular phone	To receive emails

Table 2 Recommended Materials

Item	Description/Recommendation	Use
Moisture protection compound	Novaguard sealant Part No: 96018-072	Connecting the pit antenna to the E-Coder)R450*i*
Site work order	Documentation provided by your utility	Receiving and recording information about the work site

Safety and Preliminary Checks

Observe the following safety and preliminary checks before and during each installation:

- Verify that you are at the location specified on the Site Work Order.
- Verify that the site is safe for you and your equipment.
- Notify the customer of your presence, and tell the customer that you will need access to the water meter.
- If the Site Work Order does not have an E-Coder)R450*i* ID number on it, write in the ID number(s) of the E-Coder)R450*i* you are about to install. If the Site Work Order already has an E-Coder)R450*i* ID number on it, verify that it matches the ID numbers on the E-Coder)R450*i* you are about to install.

4 Activating and Reading the E-Coder)R450*i*

How to Activate LCD Using the Solar Panel

The solar panel is located in the center of the faceplate of the E-Coder)R450*i*, and it supplies the power for the LCD panel. It is light-activated. See Figure 4.

Figure 4 Solar Panel for E-Coder)R450*i*

The solar panel activates the LCD display when the unit is exposed to a light source. For example, a unit mounted in an inside location would turn on the LCD when the room light is turned on. A unit mounted in an outside pit would turn on the LCD when the pit lid is opened exposing the unit to daylight. If the LCD is currently off, the LCD may be reactivated by covering the dial plate with your hand for about two seconds. In bright sunlight, it may be necessary to close the cover or the pit lid momentarily. If the LCD does not reactivate as expected, try shining a flashlight on the solar panel.

Figure 5 Activating E-Coder)R450*i*

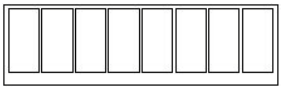
If the LCD is able to power on, but there is insufficient light to read the ASIC, the LCD displays **LO LIGHT**. See Figure 6 on page 7.

Figure 6 LCD Displaying Lo Light

How to Read

It is important to become familiar with the information available from the meter. To identify this information the following icons and displays are helpful.

Table 3 Icons and Displays



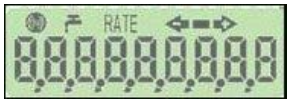
Solar panel, located in the center of the faceplate of the E-Coder)R450*i*, supplies the power for the LCD panel (light-activated).

Flow/Leak Indicator shows the direction of flow through the meter:

ON	Water in use
OFF	Water not in use.
Flashing	Water is running slowly/low flow indication.

Leak indicator displays a possible leak:

OFF	No leak indicated.
Flashing	Intermittent leak indicated. Water used during at least 1/2 of the 15-minute intervals in the last 24 hours (96 15-minute intervals in a 24-hour period).
Continuous ON	Continuous leak indicated. Water used during all 15-minute intervals in the last 24 hours.



Nine-digit LCD displays the meter reading in billing units of measure. The number is shown in odometer style, reading left to right.

The LCD can display commas or decimals, depending on the configuration of each register, to show digits in the "tens" position, "ones" position, "tenths" position, and so forth. For example, some registers will display 1,234,567.89. Others could display 123,456.789, 12,345,678.9 or 1,234,567,89 depending on the need of the meter/register combination. (Zeros are not shown on the screen.)

Common Causes of Leaks

If the leak indicator is flashing or continuously on, the E-Coder)R450*i* is indicating that a possible leak may exist. Leaks can result from various circumstances. To better help you identify a possible leak, the following table contains some common causes of leak problems that can occur.

Table 4 Possible Leaks

Possible Cause of Leak	Intermittent Leak	Continuous Leak
Outside faucet, garden or sprinkler system leaking	✔	✔
Toilet valve not sealed properly	✔	✔
Toilet running		✔
Faucet in kitchen or bathrooms leaking	✔	✔
Ice maker leaking		✔
Soaker hose in use		✔
Leak between the water meter and the house		✔
Washing machine leaking	✔	✔
Dishwasher leaking	✔	✔
Hot water heater leaking		✔
Watering yard for more than eight hours	✔	✔
Continuous pet feeder		✔
Water-cooled air conditioner or heat pump	✔	✔
Filling a swimming pool		✔
Any continuous use of water for 24 hours		✔

How to Tell if Water is in Use

To determine if water is in use, complete the following steps:

1 Check the  flow indicator by closely watching it for two minutes.

1 Determine the following conditions:

- If the arrow is flashing, then water is running very slowly.
- If the arrow is continuously ON, water is running.
- If the arrow does not flash, water is not running.

What to Do if There is a Leak

The following checklist can be helpful if the E-Coder)R450*i* leak indicator shows a possible leak.

Table 5 Checklist for Leaks

☑	Check all faucets for possible leaks.
☑	Check all toilets and toilet valves.
☑	Check the ice maker and water dispenser.
☑	Check the yard and surrounding grounds for a wet spot or indication of a leaking pipe.

If Continuous Leak is Repaired

If a continuous leak is found and repaired, complete the following steps:

1 Use no water for at least 15 minutes.

1 Check the  leak icon.

If the leak indicator is continuous ON to flashing, then a leak is no longer indicated.

If Intermittent Leak is Repaired

If an intermittent leak is found and repaired, complete the following steps:

Check the  leak icon after at least 24 hours.

If the leak has been correctly repaired, the leak icon changes from flashing to OFF.

Software

A software update is required for N_SIGHT™ R450 to interpret the advanced feature data communicated from the Neptune E-Coder)R450*i*.

5 Installing the E-Coder)R450*i*

This section describes storage and unpacking instructions, preliminary tests, tools, materials, site selection, and inside installation of theE-Coder)R450*i*.

Prior to Installation

Storage

Upon receipt, inspect shipping containers for damage, and inspect the contents of any damaged cartons prior to storage.

Once the inspection is complete, store the cartons in a clean, dry environment. The unit should be in sleep mode until it is exposed to light.

Unpacking

As with all precision electronic instruments, the E-Coder)R450*i* should be handled carefully; however, no additional special handling is required. When shipped, the assembly is lying on its side. You should lift the assembly out of the box by the meter main case.

After unpacking the E-Coder)R450*i*, inspect it for damage. If the E-Coder)R450*i* appears to be damaged or proves to be defective upon installation, notify your Neptune Territory Manager or Distributor. If one or more items requires reshipment, use the original cardboard box and packing material.

Figure 7 E-Coder)R450*i* Installation

Tools Needed

Table 1 on page 4 shows the recommended tools you need to successfully install the E-Coder)R450*i*.

Some items may not apply to your specific installation or the list may not contain all required tools or materials.

Site Selection

Installation and operation in moderate temperatures increase reliability and product life. See “Environmental Conditions” on page 2.

Follow these guidelines when selecting a location to install the E-Coder)R450*i*:

- The E-Coder)R450*i* must be installed in a vertical and upright position.
- The selected location should be clear of all obstructions.
- Some items may not apply to your specific installation, or the list may not contain all required tools or materials.

Always follow your company's safety practices and installation guidelines when installing an E-Coder)R450*i*. Never perform an installation during a lightning storm or under excessively wet conditions.

Installing the E-Coder)R450*i*

The following are steps for installation of the E-Coder)R450*i*.

New Meter Installation

1 The service line must be flushed prior to meter installation in order to remove debris in the line.

2 Place an electrical grounding strap on the service line, connecting the inlet and outlet service lines on either side of the meter setting.

Suitable inlet and outlet meter valves and couplings/setters must be installed if they are not already present. Appropriate space must be allowed in the line for the meter laying length and two coupling gaskets. The pipe ends must be sufficiently aligned so that the coupling and meter threads can engage without binding or cross-threading.

3 Before installing the meter, remove the thread protectors and spud caps. Be sure that no debris enters the meter during installation.

Use caution; the meter threads are sharp.

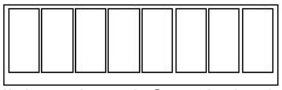
4 Place the coupling gaskets inside the coupling nuts and set the meter in the line. The meter should be in the horizontal position with the register dial facing upward. The direction of flow marked on the meter must agree with the direction of water flow.

5 Start the coupling nuts by hand then use a wrench and tighten sufficiently to prevent leakage. Be careful not to cross-thread the connections.

6 Open the meter outlet valve slowly. Open a down stream faucet and run enough water to dissipate entrained air and flush the line. While the faucet is open, check to see if the meter is operating correctly.

7 Turn off the faucet and check the meter installation for leaks.

8 To activate the LCD, use a small flashlight to activate the solar panel. The solar panel is located in the center of the faceplate.

The solar panel  is located in the center of the faceplate and is light-activated. See “Activating the E-Coder)R450*i*” on page 15.

9 Connect the antenna as described in “Connecting the E-Coder)R450*i* Antenna” on page 13.

Retrofit Meter Installation

1 Use a punch/screwdriver and hammer to punch out the tamper proof seal pin on the existing register head.

1 Remove the existing register by twisting counter-clockwise.

2 Install the new E-Coder)R450*i* register head onto the meter body in the desired orientation by twisting clockwise.

3 Activate the E-Coder)R450*i* as described in “Activating the E-Coder)R450*i*” on page 15.

4 Test the E-Coder)R450*i* as described in “Activating and Testing the E-Coder)R450*i*” on page 15.

5 Snap the new tamper proof seal pin to secure the register to the meter body.

Connecting the E-Coder)R450*i* Antenna

1 Remove the pit lid from the pit box.

The existing pit lid will require a 1¾-inch diameter hole to be drilled or cut into the lid or the pit lid will have to be replaced w/ a lid that contains a hole.

Figure 8 Feeding Antenna Cable

2 Remove the through-the-lid antenna components from the plastic bag.

3 Feed the antenna cable and housing through the 1¾-inch hole in the meter pit lid. Slip the large plastic nut over the antenna cable and thread it onto the antenna assembly to secure it to the pit lid.

4 Make sure the smooth side at top of threads on nut is facing upward. See Figure 8.

Figure 9 Removing the Dust Cover

5 Remove the dust cover from the "F" connector. See Figure 9.

Figure 10 Placing Washer on E-Coder)R450*i*

6 Place the flat black rubber washer on the E-Coder)R450*i* around the male coax connection. See Figure 10.

7 Apply a coating of Novaguard around the base of the "F" connector and on the flat black rubber washer.

Figure 11 Connecting the Coaxial Cable

8 Using a torque wrench, connect the coaxial cable connector to the "F" connector on the E-Coder)R450*i* register housing, tightening it to 15 in-lb. See Figure 11.

Figure 12 Connecting the Plastic Connector

9 Make sure the washer is properly seated. Connect the plastic connector housing to the 3-lobed black plastic latch plate. See Figure 12.

Figure 13 Tightening the Connector Nut

10 Slide the black conical-shaped gasket down the cable until it engages the connector housing.

11 Tighten the connector nut onto the threaded portion of the connector housing. This connection should be hand-tight. Do not use pliers. See Figure 13.

6 Activating and Testing the E-Coder)R450*i*

Activating the E-Coder)R450*i*

Complete the following steps to activate and test the E-Coder)R450*i*.

1 Position the magnet over the magnetic area on E-Coder)R450*i*, as shown in Figure 14. Start at the bottom of the register box and bring the magnet up towards the top.

During the 30 seconds before the configuration transmission, the E-Coder)R450*i* acquires the strongest R450 Data Collector (R450 DC) for that location.

Figure 14 Magnet Activation of the E-Coder)R450*i*

2 The E-Coder)R450*i* will transmit its configuration packet to the collector approximately 30 seconds following the magnet swipe.

3 The E-Coder)R450*i* will send the register reading to the collector approximately 15 seconds following the configuration packet.

4 When the collector receives the configuration packet, the host sends an email or Short Message Service (SMS) confirmation to the installer to allow for verification of proper installation and E-Coder)R450*i* location. The following is an example of the email text.

Example of E-Coder)R450i Config Email

```
Subject: 1224/G/-89/US 29/MIU Config

MIU RSSI..............Pass[-93]
Collector RSSI.........Pass[-89]
Register..............Valid Read
Collector.............US 29
Signal/Noise..........37
Noise.................126
MIU ID................110001224
================================
```

The subject line of the email provides a quick summary of the detailed information which is included. Table 6 on page 16 provides a breakdown of the highlights of the email.

Table 6 Config Email Subject Line Breakdown

Value	Description
1224	Last 4 digits of MIIU ID
G	Valid read. There are three types of reads: • G = Valid read • B = Bad Read • N = No register
-89	R450 DC Received Signal Strength Indicator (RSSI)
US 29	Data Collector Name

RSSI Values and R450 System Capabilities

Signal Strength (RSSI values) is a key indicator of the R450 System health as well as the communication capabilities of the E-Coder)R450*i* to and from the R450 DC.

These values are associated with the *Uplink,* the ability of the R450 DC to hear reading information from the E-Coder)R450*i*, and *Downlink,* the ability of the E-Coder)R450*i* to hear instructions from the R450 DC.

The E-Coder)R450*i* Config Email provides feedback on the RSSI values between the E-Coder)R450*i* and the collector following MIU activation. Depending on the RSSI values recorded, the System indicates the following values.

- Pass
- Marginal
- Fail

It is important to note that RSSI values in the Pass range are required for both the Uplink and the Downlink to ensure full, two-way capabilities of the E-Coder)R450*i* as part of the R450 System. See Table 7, which follows, and Table 8 on page 17.

Table 7 Collector RSSI Uplink

RSSI Description	RSSI Values	Result in Performance
Pass	RSSI >= -105	Reliable daily readings and profile data
Marginal	-115 <+ RSSI < -105	Occasionally missed daily readings and profile data
Fail	RSSI < -115	Very poor readings performance

Table 8 E-Coder)R450*i* RSSI Downlink

RSSI Description	RSSI Values	Result in Performance
Pass	RSSI >= -95	Full capability
Marginal	-105 <= RSSI < -95	Occasional two-way capability - not reliable
Fail	RSSI < -105	E-Coder)R450*i* not capable of two-way communications

Other Sample Configuration Emails

RSSI Validation Test Failed

If an E-Coder)R450*i* fails the validation test for RSSI during the installation process, an installer will receive an email or SMS showing a *Marginal* or *Failed* RSSI value. In the following example email, note the **Failed** downlink value [-107] as well as the **Marginal** uplink value [-107].

This email is sent if the configuration has failed.

```
Subject: 0042/G/-107/ Collector One/MIU
Config

MIU <- Coll.............. Failed[-107]
Coll <- MIU.............. Marginal[-107]
Register................. Valid Read
Collector................ Collector One
Signal/Noise............. 23
Noise.................... 130
MIU id................... 110500042
================================
```

Register Test Failed

If an E-Coder)R450*i* fails the error-check test on the register read during the installation process, an installer receives the email below. This indicates that there is a problem with the wiring to the register.

```
Subject: 1776/B/-117/Collector Four/MIU
Config

MIU <- Coll.............. Failed[-109]
Coll <- MIU.............. Failed[-117]
Register................. Register Connectiv-
ity Problem
Collector................ Collector Four
Signal/Noise............. 13
Noise.................... 130
MIU id................... 110181776
================================
```

Completing the Activation

Do one of the following:

- If a valid register connection and acceptable RSSI values are reported, then proceed to “Completing the E-Coder)R450*i* Installation” on page 19.
- If the E-Coder)R450*i* does not report acceptable RSSI values, check the antenna.
- If the register connection is returned as invalid, then proceed to “Checklist” on page 19.

7 Completing the E-Coder)R450*i* Installation

Checklist

Before leaving the installation site, be sure to do the following.

- ☑ Record the E-Coder)R450*i* ID for each register.
- ☑ Verify that you have followed all requirements of this Installation and Maintenance Guide.
- ☑ Verify that you have recorded all required information.
- ☑ Clean up any installation debris.
- ☑ Verify that the requirements of the Site Work Order have been completed.
- ☑ Inform the customer that you have completed your work. If you were unable to finish, inform the customer when you will be back to complete the project.

8 Troubleshooting

Troubleshooting Low RSSI: Tips and Techniques for New Installations

Received Signal Strength Indicator (RSSI) is a measurement of the power present in a received radio signal. Neptune uses this measurement during the installation process to determine if a collector is strongly receiving for an E-Coder)R450*i*. The following table lists the values that Neptune considers acceptable, marginal, or failed.

Table 9 E-Coder)R450*i* RSSI Downlink

RSSI Description	RSSI Values	Result in Performance
Pass	RSSI >= -95	Full capability
Marginal	-105 <= RSSI < -95	Occasional two-way capability - not reliable
Fail	RSSI < -105	E-Coder)R450*i* not capable of two-way communications

Table 10 Collector RSSI Uplink

RSSI Description	RSSI Values	Result in Performance
Pass	RSSI >= -105	Reliable daily readings and profile data
Marginal	-115 <+ RSSI < -105	Occasionally missed daily readings and profile data
Fail	RSSI < -115	Very poor readings performance

During the installation process, the installer receives an email with the RSSI value to determine if the location of the E-Coder)R450*i* is acceptable or not. If the RSSI value is either at the upper limit of the marginal range or is a failed RSSI, the installer should try these tips and techniques.

E-Coder)R450*i* Pit Installation

- Reorient the pit antenna.
- Check the antenna connection to the E-Coder)R450*i*.

Troubleshooting Low RSSI: Tips and Techniques for Existing Installations

Refer to the following sections to troubleshoot low RSSI for existing installations.

E-Coder)R450*i* Pit Installations

- Check the RSSI values and reorient the pit antenna.
- Check the antenna connection to the E-Coder)R450*i*.
- Replace the pit antenna.
- Replace the E-Coder)R450*i*, if necessary.

Replacement Parts

Table 11 lists the available replacement parts for the E-Coder)R450*i*.

Table 11 Available Replacement Parts

Part Name	Part Number
Dow Corning #4 compound (5.3oz tube)	96018-064
GE Novaguard (4cc Packet)	96018-072
Magnet	12287-001
Antenna assembly	12926-000
Black rubber washer	8340-054
Lockwire screw	8460-015
Seal pin	9106-001
Lid, register	13199-003

Contact Information

Within North America, Neptune Customer Support is available Monday through Friday, 8:00 AM to 7:00 PM Eastern Standard Time, by telephone or fax.

To contact Neptune Customer Support by phone, call (800) 647-4832. If all Customer Support Representatives are helping other customers, your call will be routed to the Neptune Customer Support voice mail system. Please leave your name, the name of your company, and your telephone number. Your call will be returned within business hours in the order it was received.

To contact Neptune Customer Support by fax, send a description of your problem to (334) 283-7497. Please include on the fax cover sheet the best time of day for a support technician to contact you. To contact Customer Support by E-mail, send your letter to hhsupp@neptunetg.com.

Appendix A: E-Coder)R450*i* Flags

Description of Flags

Two tables in this appendix describe the volume represented by the 8th digit by meter size and the flags used the by E-Coder)R450*i*.

Table 12 8th Digit Resolution by Meter Size

Register Size	8th Digit Resolution - Least Significant Digit
Residential (5/8" - 1" T-10)	1/10 Gallon or 1/100 Cubic feet
Light Commercial and Industrial (1-1/2" and 2" T-10; 1-1/2" - 4" HPT)	1 Gallon or 1/10 Cubic feet
Large Commercial and Industrial (6" - 12" HPT, HP PIII and TRU/FLO)	10 Gallons or 1 Cubic feet
Large Commercial and Industrial (16" - 20" HPT)	100 Gallons or 10 Cubic feet

Table 13 E-Coder)R450*i*Flags

Backflow Flag (Resets After 35 Days)	
Based on reverse movement of the 8th digit. 8th digit is variable based on the meter size.	
No backflow event	8th digit reversed less than 1 digit
Minor backflow event	8th digit reversed more than 1 digit up to 100 times the 8th digit
Major backflow event	8th digit reversed greater than 100 times the 8th digit

continued on next page

Table 7 E-Coder)R450*i* Flags (continued)

Leak Status Flag (Resets After 35 Days)	
Based on total amount of 15-minute periods recorded in the previous 24-hour period.	
Leak icon off	8th digit incremented less than 50 of the 96 15-minute intervals
Flashing leak icon	8th digit incremented in at least 50 of the 96 15-minute intervals
Solid leak icon	8th digit incremented in all of the 96 15-minute intervals

Consecutive Days with Zero Consumption Flag (Out of Rolling 35 Days)
Number of days the “leak status” was at a minimum value

Glossary

antenna (pit)	The MIU antenna used for pit installations.
conical-shaped gasket	The cone-shaped rubber gasket on antenna cable used to seal cable at top of connector housing.
connector housing	The black plastic 1/4-turn connector used to waterproof antenna cable connection to pit MIU.
connector nut	The black plastic nut used to depress conical-shaped gasket and seal antenna cable at the top of connector housing.
flat rubber washer	The washer used to seal antenna cable connector housing to pit E-Coder)R450*i*.
Liquid Crystal Display (LCD)	The component where the meter reading and value-added icons are displayed.
MIU	Meter Interface Unit.
serial number	A unique identification number given to each MIU at the factory. The default value is the last programmed plus one. Custom serial numbers are not available.
solar panel	The component located in the center of the faceplate of the E-Coder)R450*i*, and it supplies the power for the LCD panel. The solar panel activates the LCD display when the unit is exposed to a light source.

Notes:

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TAKE CONTROL

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