

FCC Part 15.247
Class II Permissive Change

Frequency Hopping Spread Spectrum Transmitter

FCC ID: P2SNTGECDR900Z

FCC Rule Part: 15.247

ACS Report Number: 05-0310-15C

Manufacturer: Neptune Technology Group, Inc.
Model: E-Coder R900

Installation Guide



E-Coder) R900i™

E-Coder)R900i Installation and Maintenance Guide



E-Coder)R900/ Installation and Maintenance Guide

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FCC Notice

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 undesired operation.

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 the FCC RF radiation requirements for uncontrolled environments. To maintain compliance with these requirements, the antenna and any radiating elements should be installed to ensure that a minimum separation distance of 20cm is maintained from the general population.

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

Industry Canada

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.

E-Coder/R900i Installation and Maintenance Guide

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1 Product Description

This section provides a general description of the E-Coder)R900*i* register (subsequently referred to E-Coder)R900*i*). The E-Coder)R900*i* by Neptune is an integrated register that contains both the E-Coder and R900 technologies in one register that collects meter reading data. It then transmits the data for collection by the meter reader. A walk-by handheld, mobile unit, or fixed network receives the data and stores it to be downloaded into the utility billing system for processing.

The E-Coder)R900*i* is easily installed and operates within an RF band which does not require an operating license. The E-Coder)R900*i* meets FCC regulations part 15.247, allowing higher output power and greater range. The E-Coder)R900*i* uses frequency-hopping spread spectrum technology to avoid RF interference and enhance security. The transmitted data is updated at 15 minute intervals and is transmitted every 14 seconds. A unique 10-digit MIU ID is included in the transmission of data. This allows the meter to be read by a walk-by handheld, mobile or fixed network data collection units. The E-Coder)R900*i* is designed to offer advantages to utility organizations of all sizes:

- Increases meter reading accuracy
- Eliminates "hard to read" meters
- Protects utility liability by increasing meter reader safety
- Requires no external wiring or programming
- Provides enhanced 8-digit AMR meter reading
- Provides proactive customer service benefits (leak, tamper and backflow detection)



Figure 1 E-Coder)R900*i* Basement and Pit Versions

E-Coder)R900*i* Programming

The E-Coder)R900*i* is NOT field-programmable. At the factory, each of the following items is programmed into the MIU:

- Serial number - Each MIU is given a unique 10-digit serial number/identification number.
- Time between MIU transmissions - The time between MIU transmissions is set for approximately 14 seconds. Custom time is 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.

RF Frequency Control Algorithm

The MIU's frequency-hopping, spread-spectrum has a sequence of at least 50 different channels for transmitting data. Associated with the 50 channels are 50 frequencies that can be pre-selected in a pseudo random manner. These 50 frequencies are coded into the software.

RF Transmission Period and Randomness

The random period generation uses the same random seed created for the channel definition to generate the transmission randomness. The randomness algorithm is defined so that no two consecutive transmissions from two MIUs will interfere with one another.

2 Specifications

This section provides you with the specifications for the E-Coder)R900i.

Electrical Specifications

Power	Lithium battery
-------	-----------------

Transmitter Specifications

Transmit Period	Every 14 seconds
Transmitter Channels	50
Channel Frequency	910-920 MHz
Output Power	Meets FCC Part 15.247
FCC Verification	Part 15.247

Environmental Conditions

Operating Temperature	-22° to 149°F (-30° to 65°C)
Storage Temperature	-40° to 158°F (-40° to 70°C)
Operating Humidity	0 to 95% Condensing

Functional Specifications

Register Reading	8 digits
MIU ID	10 digits

Dimensions and Weight

Dimensions	Refer to Figure 3
Weight	1.08 lbs. (490 grams)

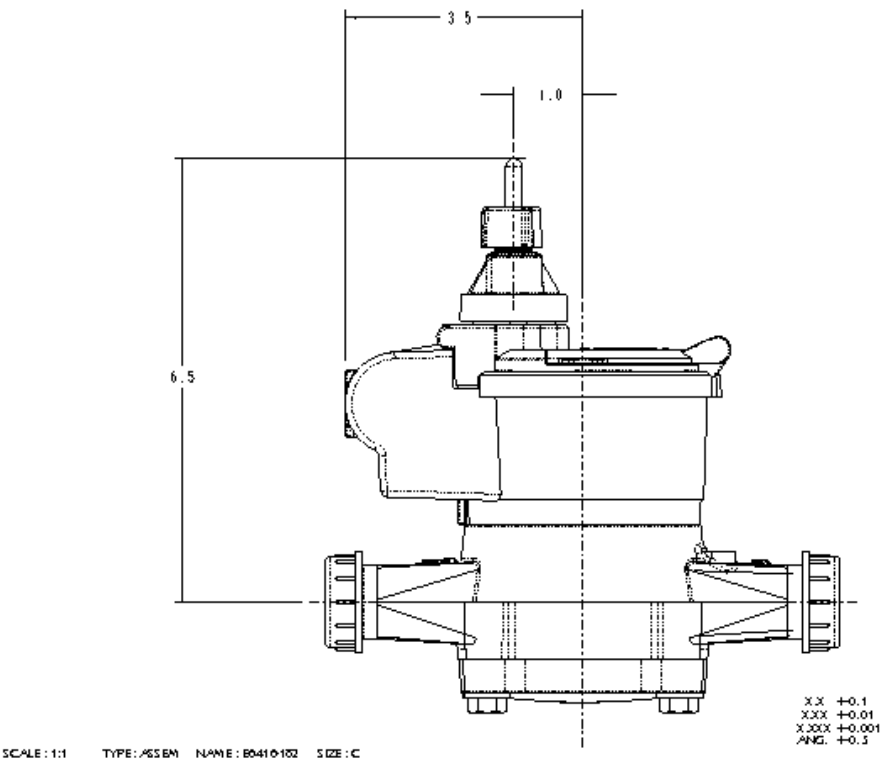


Figure 2 E-Coder)R900i Diagram

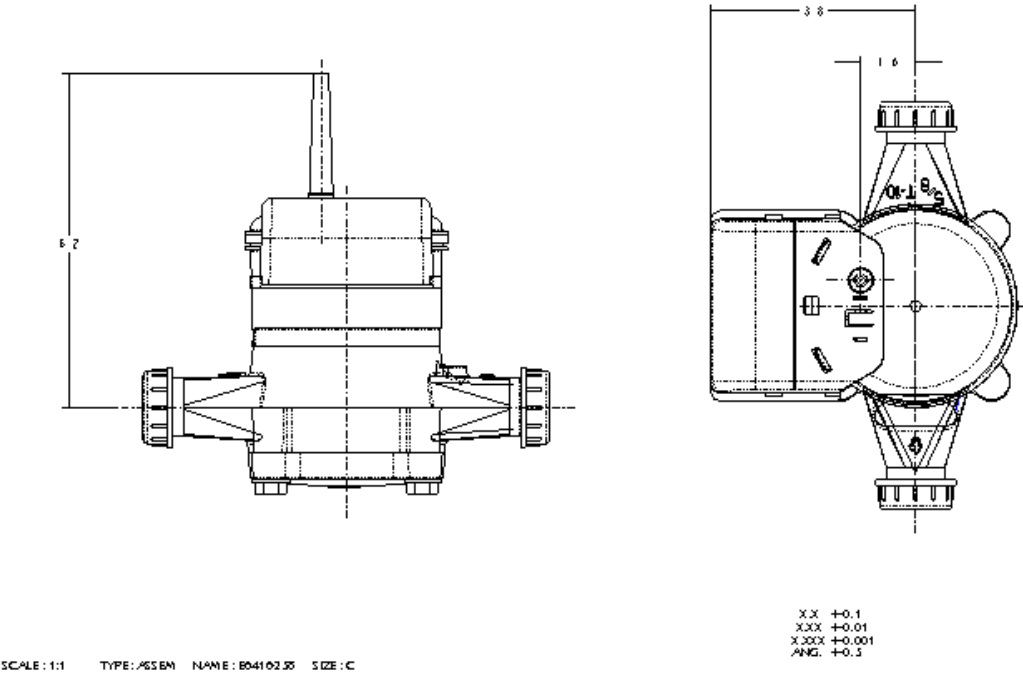


Figure 3 E-Coder)R900i Basement and Pit Version Dimensions

3 General Installation Guidelines

This section describes tools, materials, and general installation information for the E-Coder)R900i.

Tools and Materials

Tables 1 and 2 show the recommended tools and materials you may need to successfully install the E-Coder)R900i or to replace the MIU's internal battery.



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	Various installation procedures performed by the utility
Flashlight		Activating the MIU

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 MIU ID number on it, write in the ID number(s) of the MIU you are about to install. If the Site Work Order already has an MIU ID number on it, verify that it matches the ID numbers on the MIU you are about to install.

4 Activating and Reading the E-Coder)R900i

How to Activate LCD Using the Light Sensor

The light sensor is recessed under the small round hole near the center of the dial face. The hole is marked with a light bulb graphic (see figure). The light sensor activates the LCD display for several minutes when the unit is exposed to a light source. For example, a unit mounted in the basement would turn on the LCD for several minutes after the room light is turned on. A unit mounted in an outside pit would turn on the LCD for several minutes after 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 light sensor.



Figure 4 Activating the LCD

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 2 Icons and Displays



Solar Cell, located at the top of the E-Coder, supplies the power for the register. It is activated by light.



Light Sensor, recessed under the small hole near the center of the face-plate of the E-Coder)R900i, 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 gallons or cubic feet.

- Last **three** digits Testing units used for meter testing.
- Fifth & Sixth** reading digits Reading units.
- First **four** digits Typical billing digits.

Common Causes of Leaks

If the leak indicator is flashing or continuously on, the E-Coder)R900i 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 3 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 watching for two minutes.
- 2 Determine the following conditions:
 - If the arrow is Flashing, then water is running very slowly.
 - If the arrow is continuous 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 leak indicator shows a possible leak:

Table 4 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 pipe leaking. |

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.
- 2 Check the  leak icon.
- 3 If the leak is OFF, then a leak is no longer indicated.

If Intermittent Leak is Repaired

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

- 1 Check the  leak icon after at least 24 hours.
- 2 If the leak has been correctly repaired, the leak icon changes from **Continuous ON** to **Flashing**.

Software

A software update is required for EZRoute or RouteMAPS to interpret the advanced feature data communicated from the Neptune E-Coder)R900i.

5 Installing the Basement Version

This section describes storage and unpacking instructions, preliminary tests, tools, materials, site selection, and basement installation of the E-Coder)R900*i* version MIU.

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. Keep in mind that the E-Coder)R900*i* MIU basement version has an internal battery. Storage for more than one year may affect product life. Be sure to use a first-in first-out inventory control system. See “Environmental Conditions” on page 3. The unit should not be transmitting until the box is opened and the unit is exposed to a light source.

Unpacking

As with all precision electronic instruments, the E-Coder)R900*i* MIU should be handled carefully; however, no additional special handling is required.

After unpacking the MIU, inspect it for damage. If the MIU appears to be damaged or proves to be defective upon installation, notify your Neptune Sales Representative. If one or more items requires reshipment, use the original cardboard box and packing material.



Figure 5 E-Coder)R900*i* Basement Installation

Tools and Materials

Tables 1 and 2 on page 5 shows the recommended tools and materials you need to successfully install the E-Coder)R900*i* or replace the MIU's internal battery.



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 3.

Follow these guidelines when selecting a location to install the E-Coder)R900*i*:

- "The E-Coder)R900*i* must be installed in a vertical and upright position
- "The selected location should be clear of all obstructions
- "Avoid installing the MIU behind metal fences or walls
- "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)R900*i*. Never perform an installation during a lightning storm or under excessively wet conditions.

Installing the E-Coder)R900*i* Basement Version MIU

The following are steps for installation of the E-Coder)R900*i* basement version MIU.

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 service line, connecting inlet and outlet service lines on either side of 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 E-Coder)R900*i* meter laying length and two couple gas-kets. The pipe ends must be sufficiently aligned so that the coupling and E-Coder)R900*i* meter threads can engage without binding or cross-threading.

- 3 Before installing the E-Coder)R900i meter, remove the thread protectors and spud caps. Be sure that no debris enters the meter during installation.
- 4 Place the coupling gaskets inside the coupling nuts and set the E-Coder)R900i meter in the line. The E-Coder)R900i 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 Slowly open the E-Coder)R900i 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 E-Coder)R900i meter is operating correctly.
- 7 Turn off the faucet and check the E-Coder)R900i meter installation for leaks.
- 8 To activate the LCD and begin the MIU transmissions, use a small flashlight to activate the light sensor. The light sensor is recessed under a small hole near the center of the faceplate.



The small hole is denoted on the faceplate by a flashlight symbol.

- 9 Test the installation as described in “Testing the E-Coder)R900i Basement Installation” on page 13.

Retrofit Meter Installation:

- 10 Use a punch/screwdriver and hammer to punch out the tamper proof seal pin on the existing register head.
- 11 Remove the existing register by twisting counter-clockwise
- 12 Install the new E-Coder)R900i register head onto the meter body in the desired orientation by twisting clockwise.
- 13 Test the installation as described in “Testing the E-Coder)R900i Basement Installation” on page 13.
- 14 Snap the new tamper-proof seal pin to secure the register to the meter body.

Testing the E-Coder)R900i Basement Installation

After the MIU has been installed, follow these steps to verify that the MIU is working properly.

- 1 Power up the handheld unit (HHU) test device to start the testing program provided.



To avoid RF signal saturation of the HHU, position the receiver at least 2 to 3 feet from the MIU. In a densely saturated area, removing the antenna from the handheld can assist with readings.

- 2 When the E-Coder)R900i is installed correctly, its MIU ID# and a meter-reading appears on the HHU's display within one minute. Verify that this is the correct meter reading by comparing it to the meter's dial.



A register reading of 8 digits will be returned.

- 3 If a meter reading does not appear on the HHU's display or the meter reading in the HHU's display is not the same as the reading on the meter's dial:
 - Reactivate the MIU by using a flashlight to activate the photo sensor light.
 - Verify the battery is connected.
 - Test the installation again (repeat steps 1 and 2).



The light sensor is located under a small recess near the center of the dial plate. This recess is denoted by a flashlight symbol on the dial plate.

Completing the E-Coder)R900i Basement Installation

- 1 Read the MIU one more time before leaving the site to ensure MIU is transmitting.
- 2 Make sure the appropriate ID# on the MIU has been assigned to the meter setting.



All tags are provided to aid in the elimination of transcription errors.

Testing the R900 MIU Installation

After the MIU has been installed and wired, follow these steps to verify that the MIU is working properly.

- 1 Power up the handheld unit (HHU) test device to start the testing program provided.



To avoid RF signal saturation of the HHU, position the receiver at least 2 to 3 feet from the MIU. In a densely saturated area, removing the antenna from the handheld can assist with readings.

- 2 When the MIU is installed correctly, its MIU ID# and a meter-reading appears on the HHU's display within one minute. Verify that this is the correct meter reading by comparing it to the meter's dial.



All registers return 6 digits, except for E-Coders which return 8 digits.*

- 3 If a meter reading does not appear on the HHU's display or the meter reading in the HHU's display is not the same as the reading on the meter's dial:
 - Reactivate the MIU using the magnet.
 - Verify all electrical connections.
 - Test the installation again (repeat steps 1 and 2).

* E-Coders return 8 digits when connected to a second generation R900 or later MIU.

- 4 If using a ProRead Encoder Register (Rev E or earlier):
 - Ensure the unit is programmed in three-wire mode.
 - Verify all electrical connections.
 - Reactivate the MIU using the magnet



If a problem still exists, contact your Neptune representative.

Checklist

Before leaving the installation site, be sure to:

Table 5 Checklist Before Leaving Site

- ☒ Record MIU ID for each register.
- ☒ Verify that you have followed all requirements of this Quick Install 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.

6 Installing the Pit Version

This section describes storage and unpacking instructions, preliminary tests, tools, materials, site selection, and pit installation of the E-Coder)R900*i* version MIU.

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. Keep in mind that the E-Coder)R900*i* pit version has an internal battery. Storage for more than one year may affect product life. Be sure to use a first-in first-out inventory control system. See “Environmental Conditions” on page 3. The unit should not be transmitting until the box is opened and the unit is exposed to a light source.

Unpacking

As with all precision electronic instruments, the E-Coder)R900*i* MIU should be handled carefully; however, no additional special handling is required.

After unpacking the MIU, inspect it for damage. If the MIU appears to be damaged or proves to be defective upon installation, notify your Neptune Sales Representative. If one or more items requires reshipment, use the original cardboard box and packing material.



Figure 6 E-Coder)R900*i* Pit Installation

Tools and Materials

Tables 1 and 2 on page 5 shows the recommended tools and materials you need to successfully install the E-Coder)R900*i* or replace the MIU's internal battery.



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 3.

Follow these guidelines when selecting a location to install the E-Coder)R900*i*:

- "The E-Coder)R900*i* must be installed in a vertical and upright position
- "The selected location should be clear of all obstructions
- "Avoid installing the MIU behind metal fences or walls
- "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)R900*i*. Never perform an installation during a lightning storm or under excessively wet conditions.

Installing the E-Coder)R900*i* Pit Version MIU

The following are steps for installation of the E-Coder)R900*i* pit version MIU.

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 service line, connecting inlet and outlet service lines on either side of 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 E-Coder)R900*i* meter laying length and two couple gas-kets. The pipe ends must be sufficiently aligned so that the coupling and E-Coder)R900*i* meter threads can engage without binding or cross-threading.

- 3 Before installing the E-Coder)R900*i* meter, remove the thread protectors and spud caps. Be sure that no debris enters the meter during installation.
- 4 Place the coupling gaskets inside the coupling nuts and set the E-Coder)R900*i* meter in the line. The E-Coder)R900*i* 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 Slowly open the E-Coder)R900*i* 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 E-Coder)R900*i* meter is operating correctly.
- 7 Turn off the faucet and check the E-Coder)R900*i* meter installation for leaks.
- 8 To activate the LCD and begin the MIU transmissions, use a small flashlight to activate the light sensor. The light sensor is recessed under a small hole near the center of the faceplate.



The small hole is denoted on the faceplate by a flashlight symbol.

- 9 Test the installation as described in “Testing the E-Coder)R900*i* Basement Installation” on page 13.

Retrofit Meter Installation:

- 10 Use a punch/screwdriver and hammer to punch out the tamper proof seal pin on the existing register head.
- 11 Remove the existing register by twisting counter-clockwise
- 12 Install the new E-Coder)R900*i* register head onto the meter body in the desired orientation by twisting clockwise.
- 13 Test the installation as described in “Testing the E-Coder)R900*i* Basement Installation” on page 13.
- 14 Snap the new tamper-proof seal pin to secure the register to the meter body.

Testing the E-Coder)R900i Pit Installation

After the MIU has been installed, follow these steps to verify that the MIU is working properly.

- 1 Power up the handheld unit (HHU) test device to start the testing program provided.



To avoid RF signal saturation of the HHU, position the receiver at least 2 to 3 feet from the MIU. In a densely saturated area, removing the antenna from the handheld can assist with readings.

- 2 When the E-Coder)R900i is installed correctly, its MIU ID# and a meter-reading appears on the HHU's display within one minute. Verify that this is the correct meter reading by comparing it to the meter's dial.



A register reading of 8 digits will be returned.

- 3 If a meter reading does not appear on the HHU's display or the meter reading in the HHU's display is not the same as the reading on the meter's dial:
 - Reactivate the MIU by using a flashlight to activate the photo sensor light.
 - Verify the battery is connected.
 - Test the installation again (repeat steps 1 and 2).



The light sensor is located under a small recess near the center of the dial plate. This recess is denoted by a flashlight symbol on the dial plate.

Completing the E-Coder)R900i Pit Installation

- 1 Read the MIU one more time before leaving the site to ensure MIU is transmitting.
- 2 Make sure the appropriate ID# on the MIU has been assigned to the meter setting.



All tags are provided to aid in the elimination of transcription errors.

7 Maintenance and Troubleshooting

This section takes you through maintenance and troubleshooting procedures for the E-Coder)R900*i*. The first topic will guide you through the steps necessary to replace the battery that is in the main housing.

In addition, this section will guide you through some troubleshooting procedures for both a six-wheel and a four-wheel encoder.

Replacing the MIUBattery (E-Coder)R900*i* Basement Version)

Removing the Battery Assembly:



Figure 7 Screwdriver in Tamper Nail

- 1 Remove the tamper nail by using a small flat-blade screwdriver and hammer. The blade of the screwdriver needs to be 1/8" to 3/16" wide.
- 2 Place the end of the screwdriver in the center of the tamper nail as shown in Figure 7.



Figure 8 Sliding Battery over Antenna

- 3 Use the hammer to drive the screwdriver through the head of the tamper nail. The head of the tamper nail will shear off and the body of the tamper nail will fall out underneath the battery.
- 4 Pull up on the battery housing to unsnap the battery
- 5 Slide the battery pack up over the antenna shaft.
- 6 Snap in the new battery by sliding it down over the antenna (see Figure 8). Press down on the battery housing until you hear the snaps engage



Figure 9 Pushing in New Tamper Nail

- 7 Push in a new tamper nail (see Figure 9) until it snaps in place. Use of a hammer or other device may be necessary to force the tamper nail into position.
- 8 Reactivate the E-Coder)R900*i* as described in Step 3 on page 13. For help on how to position and activate the MIU found in Step 8 on page 12.

Replacing the MIUBattery (E-Coder)R900*i* Pit Version)



Figure 10 Screwdriver in Seal Pin

- 1 Remove the tamper seal pin by using a hammer and a screw driver or a spring loaded punch to drive out the seal pin located in the tab at the bottom of the battery pack and register.
- 2 Place the end of the screw driver or punch in the center of the seal pin as shown in figure Figure 7.



Figure 11 Removing Battery from Hinges

- 3 Use the hammer or punch to drive out the seal pin. The head of the seal pin will shear off and the body of the seal pin will be underneath the register.
- 4 Pull up on the battery housing to remove the battery from hinges located on the register as shown in Figure 11.



Figure 12 Cutting the Battery Wires

- 5 As close to the battery housing as possible, cut the battery wires one at a time. See Figure 12.



Figure 13 Using Scotchlok to Splice Wires

- 6 Use Scotchlok to splice the wires from the new battery casing to the wires that were connected to the old battery casing. See Figure 13.
- 7 Place the scotchloks in the small compartments on each side of the register hinges.
- 8 Attach new battery pack to hinges and swing down into position. Be careful not to pinch any wires during this procedure.
- 9 Push in new register seal pin until it snaps.

Upgrading the R900 Antenna

- 1 Remove the pit lid from the pit box.



The existing pit lid will require a 1 3/4" 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.

- 2 Unscrew the connector nut from the top of the connector housing on the existing whip antenna.
- 3 Remove the connector housing by turning it counter-clockwise 1/4 turn to remove.
- 4 Remove the flat black rubber washer from the base of "F" connector.
- 5 Unscrew the whip antenna from the "F" connector.
- 6 Remove the through the lid antenna components from the plastic bag.
- 7 Feed the antenna cable and housing through the 1 3/4" 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.
- 8 Make sure the smooth side at top of threads on nut is facing upward. (See Figure 14.)



Figure 14 Feeding Antenna Cable



Figure 15 Placing Washer on MIU

- 9 Place the flat black rubber washer on the MIU around the male coax connection (See Figure 15.)
- 10 Apply a coating of Novaguard around the base of the "F" connector and on the flat black rubber washer.



Figure 16 Connecting the Coaxial Cable

- 11 Connect the coaxial cable connector to the "F" connector on the MIU/register housing. This connection should be hand-tight. (See Figure 16.)



Figure 17 Connecting the Plastic Connector

- 12 Make sure the washer is properly seated. Connect the plastic connector housing to the 3-lobed black plastic latch plate (See Figure 17).
- 13 Slide the black conical-shaped gasket down the cable until it engages the connector housing. (See Figure 17.)
- 14 Tighten the connector nut onto the threaded portion of the connector housing. This connection should be hand-tight. Do not use pliers. (See Figure 16.)

Contact Information

Within the United States, Neptune support is available Monday through Friday, 8:00 AM to 7:00 PM Eastern Standard Time, by telephone or fax.

To contact technical support by phone, call 1-800-645-1892. If all support technicians are helping other customers, your call is routed to the Neptune Support voice mail system. Please leave your name, the name of your company, your company's Personal Identification Number (PIN), and your telephone number. Calls are returned within business hours in the order they are received.

To contact technical support by fax, send a description of your problem to 1-334-283-7497. Please include on the fax cover sheet the best time of day for a support technician to contact you.

To contact technical support by E-mail, send your letter to the following address:

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 washer	The washer used to seal cable connector housing to pit MIU.
main housing	The main body of the MIU that attaches to the mounting adapter.
main housing fastener screw	The set screw (Hi-Lo fastener) that holds the main housing to the mounting adapter.
maximum cable length	The length set by the manufacturer for the wire between the encoder and the remote receptacle. The specifications for this length are based on a solid 3 conductor wire.
MIU	Meter Interface Unit.
mounting adapter	The back plate of the MIU that is attached to the wall.
register read time	The default time is once an hour for ProRead and 15 minute interval for E-Coder (ARB VII). Custom time is not available.
seal wire	Wire inserted into the seal holes, adjacent to the main housing fastener screw. This seal must be broken to remove the main housing from the mounting adapter.
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.
strain relief posts	Posts located on the encoder register and the back of the main MIU housing.

terminal screw cover	The plastic cover on the encoder register that protects the terminal screws and exposed wires.
terminal screws	The screws on the encoder register face that are used to connect and anchor the three (3) conductor wire to the register.
transmission time	The time between MIU transmissions. The default is approximately fourteen (14) seconds. Custom time is not available.

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