

# E-Coder<sup>®</sup>)R900*i*<sup>™</sup> Installation and Maintenance Guide







E-Coder<sup>®</sup>)R900*i*<sup>™</sup> 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.

#### **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<sup>®</sup>)R900*i*<sup>™</sup> Installation and Maintenance Guide

Literature No. IM E-Coder)R900*i* 10.15 Part No. 12560-002 Neptune Technology Group Inc. 1600 Alabama Highway 229 Tallassee, AL 36078 Tel: (800) 633-8754 Fax: (334) 283-7293

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# **1** Product Description

This section provides a general description of the E-Coder<sup>®</sup>)R900*i*<sup>TM</sup> register. The E-Coder)R900*i* by Neptune is an integrated register that contains both the E-Coder<sup>®</sup> and R900<sup>®</sup> technologies in one register that collects meter reading data. It then transmits the data for collection by the meter reader. A Neptune walk-by, mobile, or R900 Gateway fixed network data collection system 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 transmits a mobile message that includes the meter reading data and the unique 10-digit E-Coder)R900*i* ID every 14 seconds. This allows the meter to be read by a handheld unit (HHU) or mobile data collections unit. The E-Coder)R900*i* also transmits a high power fixed network message every seven and one-half minutes on an interleaved basis to an R900 Gateway.

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)R900i

# E-Coder)R900i 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.
- Meter size and change gear information.

# **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 (FHSS) has a sequence of at least 50 different channels for transmitting data. Associated with the 50 channels are 50 frequencies that are pre-selected in a pseudorandom 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 interfere with one another.

# **Inside and Pit Versions**

The E-Coder)R900*i* comes in a pit version with a roll sealed metal body and the inside version comes in a laser sealed plastic body.

# 2 Specifications

Electrical Specifications	6	
	Power	Lithium battery
Transmitter Specifications		
	Transmit Period	<ul> <li>Every 14 seconds - standard mobile message.</li> <li>Every seven and one-half minutes - standard, high power, fixed network message.</li> </ul>
	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 100% Condensing (pit only)
Functional Specifications		
	Register Reading	8 digits (AMR) 9 digits (Visual)
	MIU ID	10 digits
Dimensions and Weight		
	Dimensions	Refer to Figure 2 and Figure 3.
	Weight	Inside - 1.39 lbs. (630.5 grams) Pit - 1.62 lbs. (734.8) grams)

This section provides you with the specifications for the E-Coder)R900*i*.

# E-Coder)R900*i* Dimensions

The following diagrams show both the inside and pit dimensions for the E-Coder)R900*i*.



Figure 2 E-Coder)R900*i* Inside Dimensions



Figure 3 E-Coder)R900*i* Antenna Dimensions

# **3** General Installation Guidelines

This section describes tools, materials, and general installation information for the E-Coder)R900*i*.

### **Tools and Materials**

Table 1 shows the recommended tools you need to successfully install the E-Coder)R900*i*.



It is possible that some items do not apply to your specific installation, or the list does not contain all required tools or materials.

Item	Description/ Recommendation	Use
Tool Kit	Contains standard tools including: • Screwdrivers • Hammer • Pliers • Wrench	Perform various installation procedures. Wrench used in connecting TTL antenna to F-connector.
Flashlight		Activate the LCD.

#### Table 1 Recommended Tools

# **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 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)R900*i*

# How to Activate LCD Using the Solar Panel

The E-Coder)R900*i* has a solar panel to power the LCD display. See Figure 4.



Figure 4 Solar Panel for E-Coder)R900i

The solar panel activates the LCD display when the unit is exposed to a light source. If the LCD does not reactivate as expected, try shining a flashlight on the light sensor. See Figure 5.



Figure 5 Activating E-Coder)R900i

# 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

	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 50 of the 96 15- minute intervals during the previous 24-hour period.		
	Continuous ON	Continuous leak indicated. Water used during all 96 15-minute intervals during the previous 24-hour period.		
0 2	Nine-digit LCD displays th	e meter reading in billing units of		



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

- 1 First four digits Typical billing digits.
- 2 Last three digits Testing units used for meter testing
- 3 Fifth and sixth reading digits Reading units

# **Common Causes of Leaks**

If the leak indicator is flashing or continuously on, the E-Coder)R900*i* is indicating that a possible leak can 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.

Table 3 Possible Leak
-----------------------

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.
- 2 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)R900*i* 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 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.
- 2 Check the  $\bigwedge^{\frown}$  leak icon.

If the leak indicator changes from continuous ON to flashing, then a continuous 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  $\int_{0}^{\infty}$  leak icon after at least 24 hours.
- 2 If the leak has been correctly repaired, the leak icon changes from flashing to OFF.

Software

A software update is required for the N\_SIGHT<sup>™</sup> host software to interpret the enhanced data communicated feature from the Neptune E-Coder)R900*i*.

# 5 Installing the E-Coder)R900i

This section describes storage and unpacking instructions, preliminary tests, tools, materials, site selection, and inside installation of the E-Coder)R900*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)R900*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)R900*i*, inspect it for damage. If the E-Coder)R900*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 6 E-Coder)R900*i* Installation

### **Tools Needed**

Site Selection

Table 1 on page 5 shows the recommended tools you need to successfully install the E-Coder)R900*i*.



It is possible that some items do not apply to your specific installation, or the list does not contain all required tools or materials.

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..



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)R900i

**New Meter Installation** 

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

- 1 Flush the service line 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 and begin the transmissions, open the LCD cover to let the sunlight shine on the display. If this is in a basement, you can use a small flashlight over the solar panel.



The solar panel is located in the center of the faceplate.

- 1 Use a punch/screwdriver and hammer to punch out the tamper proof seal pin on the existing register head.
- 2 Remove the existing register by twisting counter-clockwise.
- 3 Install the new E-Coder)R900*i* register head onto the meter body in the desired orientation by twisting clockwise.
- 4 Activate the E-Coder)R900*i* as described in "Activating and Reading the E-Coder)R900*i*" on page 6.
- 5 Snap the new tamper-proof seal pin to secure the register to the meter body.

#### **Retrofit Meter Installation**

# Connecting the Optional E-Coder)R900*i* Through-the-Lid Antenna



E-Coder)R900*i* is equipped with a standard internal antenna that works well for most mobile meter reading applications. However, for fixed network applications, Neptune recommends use of the optional, external through-the-lid antenna which can also be used to improve mobile performance.



When ordering an external antenna for the R900*i* units, Neptune recommends at least a 6 foot cable to allow for easy removal of the pit lid when necessary.



Figure 7 E-Coder)R900*i* Antenna

### Before Connecting the Antenna



1

Remove the pit lid from the pit box.

The existing pit lid requires a  $1\frac{3}{4}$ -inch diameter hole to be drilled or cut into the lid or the pit lid needs to be replaced with 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  $\frac{1}{4}$  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.

# Installing the Antenna



Figure 8 Inserting Antenna into the Pit Lid



Figure 9 Locking Nut on Antenna



Figure 10 Securing the Locking Nut

1 Insert the antenna cable and housing through the 1<sup>3</sup>/<sub>4</sub>-inch hole in the meter pit lid. See Figure 8.

2 Thread the locking nut onto the antenna (smooth end towards lid). See Figure 9.

3 Hand tighten the nut securely to the lid. See Figure 10.



Figure 11 Installation Complete

### Attaching Antenna to MIU



1

Figure 12 Removing the Dust Cover



Figure 13 Placing Washer on MIU

Figure 11 shows a completed installation of the antenna.

Remove the dust cover from the "F" connector. See Figure 12.

- 2 Place the flat black rubber washer on the MIU around the male coax connection. See Figure 13.
- 3 Apply a coating of Novaguard around the base of the "F" connector and on the flat black rubber washer.



Figure 14 Connecting the Coaxial Cable



Figure 15 Connecting the Plastic Connector

4 Using a torque wrench, connect the coaxial cable connector to the "F" connector on the MIU/register housing, tightening it to 15 inchpounds. See Figure 14.

5 Make sure the washer is properly seated. Connect the plastic connector housing to the 3-lobed black plastic latch plate. See Figure 15.



- 6 Slide the black conical-shaped gasket down the cable until it engages the connector housing. See Figure 16.
- 7 Tighten the connector nut onto the threaded portion of the connector housing. This connection should be hand-tight. Do not use pliers.

Figure 16 Sliding the Gasket

### Upgrading the E-Coder)R900*i* Antenna

To upgrade the E-Coder)R900*i* antenna, remove the existing or damaged antenna, and follow instructions provided in the previous sections.

# 6 Data Logging Extraction

# **About Data Logging**



The E-Coder)R900*i* is capable of storing interval data for data logging and retrieving this data through RF activation. The E-Coder)R900*i* is activated using the Trimble Nomad and R900<sup>®</sup> Belt Clip Transceiver (BCT) and is explained in more detail in the following section.

The E-Coder)R900*i* stores consumption in hourly intervals for a rolling total of 96 days. This is equal to 2,304 hourly intervals of consumption. The data logging data can be extracted through radio frequency (RF) activation. The RF activation allows the utility workers to visit the location and extract the data without physically interacting with the meter itself. This limits exposure by the worker to animals, or dangerous situations. The extraction process, once started, only takes about 30 seconds. The activation is done through the HHU connected to the R900 BCT via Bluetooth. The activation signal is sent by the R900 BCT to the E-Coder)R900*i* which in turn sends the data intervals to the R900 BCT and are saved in the HHU.

#### Accessing Data Logging

Complete the following steps for data logging.

1 From the host software home screen on the HHU, click MENU. See Figure 17.



Figure 17 HHU Home Screen



Figure 18 N\_SIGHT R900 Menu Screen



Figure 19 Data Logger Option

2 From the HHU Menu screen, click **UTILS** (option 4). See Figure 18.

3 Click DATA LOGGER (option 9). See Figure 19.

N_SIGHT R900	#‡ <b>4</b> € 4:17 ok
USER AUTHE	NTICATION
READER ID:	
PASSWORD:	
LOGIN	CANCEL
	3

Figure 20 Reader ID Input

### Initializing the Data Logger



Figure 21 HHU Time Confirmation

4 Type your reader ID and password (if applicable) for the host software. Click **LOGIN.** See Figure 20.

1 Verify the time is correct, and click **YES**. See Figure 21.



The HHU must be synchronized prior to data logging in order to set the clock



Figure 22 Initialize RF Device



Figure 23 Enter MIU ID

2 The Initialize Device screen appears if you are not connected or you are not in range of your Belt Clip. Click **INITIALIZE**. See Figure 22.

3 Select **RF** and type the MIU ID. See Figure 23.



You can type the MIU ID with the number pad keys or expand the on-screen keyboard.

😤 N_SIGHT R900 🛛 🚑 📢 3:43 ok											
LD'	DATA LOG										
•	(E)	THO	D	: k	JI	R		۲	RF		
•	NIU ID: 1234567890										
CAPTURE											
VIEW CAPTURED CLOSE											
c <i>i</i>	۷) (P1	E E I	K Sei	D				(	CLO	SE	
C/ 123	(V) (P) ()		# <u>?EI</u>	)  }	7	8	9	#	CL0	SE =	•
123	۷) ۱۹۱ ۱		∦ ₹EI { <	)  }  >	7	8	9	# +	CL0 %	SE = *	•
С/ 123 ^ н	۲ ۹۱ ۱۹۱		# <u>{</u> { \ \	<b>□</b> >	7 4 1	8 5 2	9 6 3	( # + ↓	% -	SE = *	• / -
С/ 122 ^ н \$	¥] ▲P1 ↓ ↓ ↓	[E] [U] ]	∦ ₹EI < <	)  >     +	7 4 1 (	8 5 2 0	9 6 3 )	( # + ↓ Tab	CL0	= * ⊷	• / •

Figure 24 Capture Button

N_SIGHT R900 🛛 👫 📢 11:16 ok
UNIT OF MEASURE:
■ 10 10 10 10 10 10 10 10 10 10 10 10 10
METER SIZE:
-
CLEAR OK CANCEL

Figure 25 Meter Size Selection

4 After you type the MIU ID, click **CAPTURE**. See Figure 24.

5 A prompt appears for you to provide meter size and unit of measure. Type this information now and click **OK**. See Figure 25.

### Initiating RF Activated Data Logging

N_SIGHT R900	<b>‡</b> ‡ <b>4</b> € 11:17 ok
PRESS THE START BUT ACTIVATE METER NUMB	TON TO RF Er 1540002104.
START	CLOSE

Figure 26 Start Button



Figure 27 Listening for Data

1 Click **START** to initiate RF activated data logging. See Figure 26.

The R900 BCT activates the E-Coder)R900*i* and listens for the data logger to start transmitting. See Figure 27.

2	N_SIGHT R900	#	€ 3:45	ok
ID: Hea	1540001456 RD:100%	17	31/14	•
ENI	] TIME	READING	CONSUMP	<b>TI</b> ▲
01, 01, 01, 01, 01,	(31/2014 15:37 (31/2014 14:37 (31/2014 13:37 (31/2014 12:37 (31/2014 12:37	12.2 12.2 12.2 12.2 12.2 12.2	0.0 0.0 0.0	•
CAP	TURING: D1/22/	2014	STO	

Figure 28 Receiving Data

<b>∷ </b>
2 / 12/ 14 🗸 🗸
READING CONSUMPTA
3
3
3
3
2
GRAPH CLOSE

Figure 29 Graph Button

The screen displays the data received. See Figure 28.

- 2 After the data logging process is completed, choose the meter size (see Step 5 on page 22).
- 3 Click **GRAPH** (see Figure 29) to display the data in a graph. Examples of graphs are shown in Figure 30 on page 25.

The HHU processes and saves the data. After closing the data logging screen, the unit performs a backup.

### Sample Data Logging Graphs

The following are two examples of the graphs that can be produced with data logging.





Figure 30 Examples of Data Logging Graphs

Color Code	Description		
1 red	Intermittent Leak		
2 red	Continuous Leak		
1 gray	Minor Backflow		
2 gray	Major Backflow		
Blue bars	No Flags		
Red bars	Leak		
Gray bars *	Backflow		
* If the Backflow flag and the Leak flag appear at the same time, Backflow (Gray bars) has precedence over Leak,.			

#### Table 5 Data Logging Graph Legend

# **Off Cycle Data Extraction**



Figure 31 HHU Home Screen



Figure 32 HHU Menu

Off cycle reads are 96 days of daily reads. This allows the utilities to retrieve move-out reads or monitor vacant usage to prevent theft.

To navigate to the off cycle function, complete the following steps.

1 From the host software home screen on the HHU, click **MENU**. See Figure 31.

2 From the HHU menu screen, click **UTILS** (option 4). See Figure 32.



Figure 33 Off Cycle Option

**Belt Clip Transceiver** 

3 Click **OFF CYCLE** (option 4). See Figure 33

- 4 Type the read ID and/or the password.
- 5 Click LOGIN.
- 6 Confirm date and time are correct.
- 7 Click YES.

To pair the belt clip transceiver (BCT), complete the following steps.

- 1 Change date if you have a specific day to target.
- 2 Click INITALIZE to pair with R900 BCT.
- 3 Type the MIU ID.
- 4 Click CAPTURE.

The reads come in just like the data logger reads. The data logger has 96 days of hourly reads and off cycle has 96 days of daily reads.

# 7 Maintenance and Troubleshooting

This section takes you through maintenance and troubleshooting procedures for the E-Coder)R900*i*.

# **Six and Four Wheel Encoders**

#### **Six-Wheel Encoder Normal Operation**

If the odometer reads 123456, the display should show 1 2 3 4 5 5 0 0.



Note that the sixth digit displayed is a five if the last digit on the odometer is five through nine. The sixth digit is zero if the last digit on the odometer is zero through four. The E-Coder)R900*i* adds and additional two zeros on the end to provide an eight digit reading to the host software.

### **Four-Wheel Encoder Normal Operation**

If the odometer reads 123456, the display should show 1 2 3 4 0 0 0 0.



The E-Coder)R900*i* adds an additional four zeros on the end to provide an eight digit reading to the host software.

### Troubleshooting

This section provides examples of possible reading values and what they indicate.

|--|

Reading Value	Definition	Troubleshooting
	Failure to retrieve reading	<ul> <li>Because this usually indicates a cut wire, check the connection between the register and MIU.</li> <li>If using a non-autodetect ProRead register, verify that it has been programmed for three wire mode.</li> </ul>
????????	Indicates an ambiguous, bad read, replaces and HHHHHHH	

Reading Value	Definition	Troubleshooting
MMMMMMM	Indicates out of range reading (>999999999), diagnostic code from the MIU	<ul> <li>Indicates that no meter reading history is available.</li> <li>Swipe the MIU with a magnet to force the MIU to read the register.</li> </ul>
υυυυυυυ	Indicates undefined out of range reading, corrupt valve	

# Table 6 Examples of Reading Values

# 8 Contact Information

Contact Information			
	Within North America, Neptune Customer Support is available Monday through Friday, 7:00 AM to 5:00 PM Eastern Standard Time by telephone, e-mail, or fax.		
By Phone			
	To contact Neptune Customer Support by phone, complete the following steps.		
	1 Call (800) 647-4832.		
	2 Select one of the following options:		
	• Press 1 if you have a Technical Support Personal Identification Number (PIN).		
	• Press 2 if you do not have a Technical Support PIN.		
	3 Enter the six digit PIN number and press #.		
	4 Select one of the following options.		
	Press 2 for Technical Support.		
	• Press <b>3</b> for maintenance contracts or renewals.		
	• Press 4 for Return Material Authorization (RMA) for Canadian Accounts.		
	You are directed to the appropriate team of Customer Support Specialists. The specialists are dedicated to you until the issue is resolved to your satisfaction. When you call, be prepared to give the following information.		
	• Your name and utility or company name.		
	• A description of what occurred and what you were doing at the time.		
	• A description of any actions taken to correct the issue.		
By Fax			
	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 Specialist to contact you.		
By Email			
	To contact Customer Support by email, send your email message to hhsupp@neptunetg.com.		

# Appendix A: E-Coder)R900*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 the E-Coder)R900*i*.

Table 7 our Digit Resolution by meter Size			
Register Size	8th Digit Resolution - Least Significant Digit		
Residential	1/10 Gallon or		
(5/8" - 1" T-10)	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	10 Gallons or		
(6" - 12" HPT, HPPII and TRU/FLO)	1 Cubic feet		
Large Commercial and Industrial	100 Gallons or		
(16" - 20" HPT)	10 Cubic feet		

Table 7 8th Digit Resolution by Meter Size

#### Table 8 E-Coder)R900*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

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 50-95 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 (Resets After 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 washer	The washer used to seal cable connector housing to pit MIU.
Liquid Crystal Display (LCD)	The component where the meter reading and value-added icons are displayed.
MIU	Meter Interface Unit.
register read time	The default time is 15 minutes for all registers. Custom time is not available.
seal pin	The small black plastic nail used to secure the E-Coder)R900 <i>i</i> to the meter.
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.
transmission time	The time between MIU transmissions. The default is approxi- mately fourteen (14) seconds. Custom time is not available.

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 Neptune Technology Group Inc.
 Neptune Technology Group (Canada) Ltd.

 1600 Alabama Highway 229
 7275 West Credit Avenue

 Tallassee, Al. 36078
 Mississauga, Optaria

Tallassee, AL 36078 USA Tel: (800) 633-8754 Fax: (334) 283-7293

#### 7275 West Credit Avenue Mississauga, Ontario L5N 5M9 Canada Tel: (905) 858-4211 Fax: (905) 858-0428

Neptune Technology Group Inc.

Ejército Nacional No. 418 Piso 12, Desp. 1201-1202 Col. Chapultepec Morales Delegación Miguel Hidalgo 11570 México, Distrito Federal Tel: (525) 55203 5294 / (525) 55203 5708 Fax: (525) 55203 6503



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