NEPTUNE
TECHNOLOGY GROUP

E-CODER® Quick Install Guide

E-CODER® QUICK INSTALL GUIDE

1 General Instructions

The E-CODER® is an electronic absolute encoder register designed for use with Neptune's Automatic Reading and Billing (ARB®) System. This register operates with Neptune's R900® and R450™ MIUs, providing advanced features such as leak, backflow, and tamper detection.

With the E-CODER register, both the homeowner and the utility can use the following features.

- Nine-digit display for visual reading
- Eight digits for billing
- Water flow indicators
- Intermittent leak detection icon on LCD panel
- Continuous leak detection icon on LCD panel

This guide can help you identify and read information displayed on the E-CODER register. It can also help you recognize the common causes of leaks and what to do if a leak is found. After the leak is repaired, this guide also contains steps to determine that the leak is no longer evident.

2 Product Description

The face of the E-CODER allows you to read various types of information available. The face of the E-CODER is shown in Figure 1.

Figure 1 E-CODER Coder Face

3 Wiring Inside Set Version

Run a three-conductor cable from the E-CODER register to the MIU. Refer to the following steps.

1 Connect the three-conductor wire to the encoder register's terminals as described in the manufacturer's instructions, using the color code in Table 1.

Table 1 Encoder Wiring

Register	Wire Color / Encoder Terminal		
Neptune E-CODER	Black/B	Green/G	Red/R

2 Remove the terminal cover with a flat-head screw driver as shown in Figure 2.

Figure 2 Removing the Terminal Cover

3 Wire the encoder register with the proper colors. See Figure 3.

4 Test the wiring to verify the read.

Figure 3 Wiring with Proper Color Wire

5 Route the wire as shown in Figure 4.

Figure 4 Routing the Wire

6 Apply Novagard G661 or Dow Corning® Compound #4 to the terminal screws and exposed bare wires. See Figure 5.

Figure 5 Applying Compound

Neptune recommends Novaguard G661 or Dow Corning Compound #4.

Novagard may cause irritation to eyes and skin. If swallowed, do not induce vomiting; dilute with one to two glasses of water or milk and seek medical attention. Please refer to:

- MSDS Novagard Silicone Compounds & Grease Inc. 5109 Hamilton Ave. Cleveland, OH 44114, 216-881-3890.
- For copies of MSDS sheets, please call Neptune's Customer Support at (800) 647-4832.

7 Place terminal cover on the register, ensuring wire is routed through strain relief. See Figure 6.

Figure 6 Placing Cover on Register

8 Snap the terminal cover in place by pressing on the molded arrow as shown in Figure 7.

Figure 7 Snapping Cover in Place

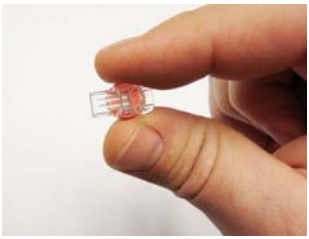
9 Proceed to “How to Activate” on page 10.

4 Wiring the Pit Set Version

Complete the steps to wire the pit set version.

Figure 8 shows the components required for installation.

Figure 8 Installation Components



1 Hold the Scotchlok between the index finger and thumb with the red cap facing down. See Figure 9.

Figure 9 Scotchlok Connector

2 Take one non-stripped black wire from the pigtail and one from the receptacle/MIU by inserting the wires into the Scotchlok connector until fully seated. See Figure 10.

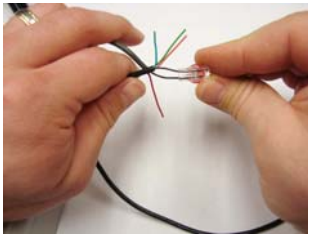


Figure 10 Seating Connector Wires

Do not strip the colored insulation from the wires or strip and twist the bare wires prior to inserting in the connector. Insert the insulated colored wires directly into the Scotchlok connector.

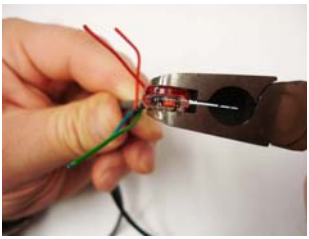


Figure 11 UR Crimping Tool

3 Place the connector red cap side down between the jaws of the UR crimping tool as shown in Figure 11. Refer to Table 3 on page 10 for part numbers.

4 Check to ensure that the wires are still fully seated in the connector before crimping the connector. Figure 12 illustrates improper connections due to wires not being fully seated.

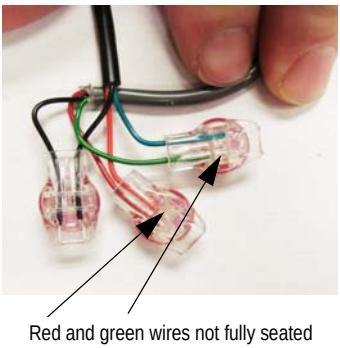


Figure 12 Improper Connections

5 Squeeze the connector firmly with the proper crimping tool until you hear a pop and gel oozes out the end of the connector.

6 Repeat steps one through five for each color wire. See Table 2 for the wiring configuration to connect Neptune MIUs or competitive MIUs to the E-CODER.

Table 2 Color Codes for Wires

MIU Wire Color / Encoder Terminal	MIU Type
Black/B Green/G Red/R	R900
Black/B Green/G Red/R	R450
Black/G Green/R Red/B	Sensus
Black/B White/G Red/R	Itron
Black/G White/R Red/B	Aclara
Black/G Green/B Red/R	Elster
Black/G Green/R Red/B	Badger

7 After all three color wires have been connected, read the encoder register to ensure proper connections, and the receptacle/MIU is functioning properly. See Figure 13.

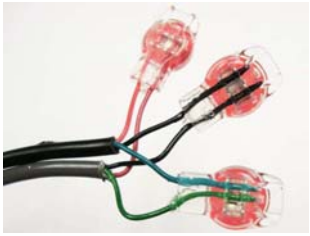


Figure 13 Three Color Wires Connected

Figure 14 Splice Tube

8 Take all three connected Scotchloks and push into the splice tube until fully covered by the silicone grease. See Figure 14.

9 Separate the gray wires, and place in the slots on each side of the splice tube as shown in Figure 15.

Figure 15 Gray Wires in Slot

Figure 16 Cover in Place

10 Snap the cover closed to finish the installation as shown in Figure 16.

11 Proceed to “How to Activate” on page 10.

5 Installation Instructions for Networked Receptacle/Dual Port MIUs

Enhanced R900 v4 MIUs are not Dual Port capable. These instructions only apply to v3 MIUs.

The Dual Port R900 and R450 MIUs work only with Neptune ProRead™ or E-CODER registers. Each register must be programmed in “RF Network” mode prior to installation.

- E-CODER registers cannot be programmed while connected together in a network. Each register must be programmed separately prior to making the network connection.
- The designations HI and LO are Neptune's designations for the high (HI) flow or turbine side of the compound, and the low (LO) flow or disc side of the compound.
- The settings can also be used to designate the *primary* (HI) and *secondary* (LO) meters in a dual set application

Programming the HI Register

To complete the following steps, use the Neptune field programmer to select the ProRead Program tab for programming.

1 Select RF Compound HI format.
2 Match the Connectivity 2W.
3 Match the Dial Code 65.
4 Type the appropriate register ID.
5 Program the register.
6 Read or query the register to confirm correct programming. See Figure 17.

Figure 17 HI Register

Programming the LO Register

To complete the following steps, use the Neptune field programmer to select the ProRead Program tab for programming.

1 Select RF Compound LO format.
2 Match the Connectivity 2W.
3 Match the Dial Code 65.
4 Type the appropriate register ID.
5 Program the register.
6 Read or query the register to confirm correct programming. See Figure 18.

Figure 18 LO Register

6 Wiring Networked Registers

Complete the steps to wire networked registers.

1 Connect each color wire with the appropriate color wire from the pigtail and both registers, until all three colors have been successfully connected. See Figure 19.

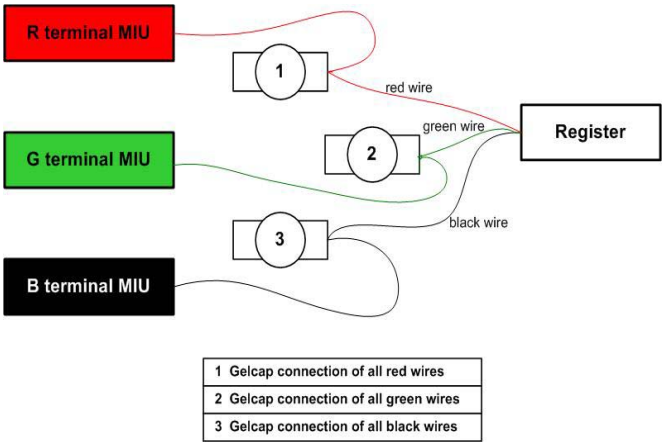


Figure 19 Interconnection of Like Terminals

- Remove any bare or non-insulated wire. Make sure that you only insert insulated wire into the splice connector.
- Observe proper polarity when wiring the registers, so that all terminals are interconnected with wires of the same color: red, black, or green. Refer to Figure 19.

2 Proceed to “How to Activate” on page 10.

7 Crimping Tool Manufacturers

To apply the Scotchlok connectors, Neptune requires the use of a proper crimping tool. Table 3 on page 10 shows a list of various manufacturers and model numbers.

Table 3 Proper Crimping Tools

Manufacturer	Manufacturer's Model Number
3M	E-9R (10:1)* E-9BM (10:1) E-9C/CW (7:1) E-9E (4:1) E-9Y (3:1)
Eclipse Tools	100-008

* To reduce fatigue, use a tool within each splicing group with the highest mechanical advantage indicated within the parentheses ().

Use of normal pliers or channel locks is highly discouraged because they do not apply even pressure and can result in an improper connection.

8 How to Activate

To read the E-CODER you must first activate it.

Complete the following steps to activate the E-CODER.

1 Expose the E-CODER to sunlight or activate with a flashlight for five seconds.

If the LCD is able to power on, but there is insufficient light to read the ASIC, the LCD displays LO LIGHT. See Figure 20.

Figure 20 LCD Displaying LO Light

2 Verify that the following LCD displays appear.

- The All-Segment test appears for two seconds.
- The version number appears for two seconds.
- The event index value appears for 20 seconds.
- The flow rate appears for four seconds.
- The display alternates between the reading and the flow rate every 12 seconds.

9 How to Read

It is important to become familiar with the information available from the meter. Figure 21 lists various icons and displays along with a description of each.

	**FLOW INDICATOR** Shows the direction of flow through the meter: **ON** Water in use. **OFF** Water not in use. **Flashing** Water is running slowly. **(-)** Reverse flow. **(+)** Forward flow.
	**LEAK INDICATOR** Displays a possible leak: **OFF** No leak indicated. **Flashing** Intermittent leak indicates that water has been used for at least 50 of the 96 15-minute intervals during the previous 24-hour period. **On Continuously** Indicates water use for all 96 15-minute intervals during the previous 24-hour period.
RATE	**RATE OF FLOW** Average flow rate is displayed every twelve (12) seconds on LCD display.
	**LCD DISPLAY** Nine-digit LCD displays the meter reading in billing units of measure: U.S. gallons, cubic feet, Imperial gallons, or cubic metres. 1 E-Coder Basic Reading/Customary 6-digit remote reading 2 Customary sweep hand digits 3 E-CoderPLUS Reading (8-digit remote reading)

Figure 21 Icons and Displays

10 Common Causes of Leaks

If the leak indicator is Flashing or Continuously ON, the E-CODER 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		✔

Table 4 Possible Leaks

Possible Cause of Leak	Intermittent Leak	Continuous Leak
Water-cooled air conditioner or heat pump	✔	✔
Filling a swimming pool		✔
Any continuous use of water for 24 hours		✔

11 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 which of the following conditions exists.

- If the arrow is Flashing, then water is running very slowly.
- If the arrow is Continuously ON, water is running.
- If the arrow is not Flashing, water is not running.

12 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 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 pipe leaking.

13 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.
If the leak indicator changes from Continuously ON to Flashing, then a continuous leak is no longer indicated.

14 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.
If the leak has been correctly repaired, the leak icon changes from Flashing to OFF.

2 Refer to the following tables which describe the standard functions of the E-CODER flags.

Table 6 E-CODER Flags

Backflow Flag (Resets After 35 Days)	
Based on reverse movement of the eighth digit, the eighth digit is variable based on the meter size.	
No backflow event	Eighth digit reversed less than one digit
Minor backflow event	Eighth digit reversed more than one digit up to 100 times the eighth digit
Major backflow event	Eighth digit reversed greater than 100 times the eighth digit
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	Eighth digit incremented less than 50 of the 96 15-minute intervals

Backflow Flag (Resets After 35 Days)	
Flashing leak icon	Eighth digit incremented in 50 of the 96 15-minute intervals
Solid leak icon	Eighth 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	

15 Contact Information

Within the United States, Neptune Customer Support is available Monday through Friday, 7:00 AM to 5:00 PM Central Standard Time, by telephone, email, 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 number.
3 Enter the six-digit PIN number and press #.
4 Select one of the following options.
   - Press 2 for Technical Support.
   - Press 3 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 customer support specialist to contact you.

By Email

To contact Neptune Customer Support by email, send your message to hhsupp@neptunetg.com.

Notes

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