NEPTUNE
TECHNOLOGY GROUP

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 and continuous leak detection icon on the LCD panel

This guide helps you identify and read information displayed on the E-CODER register. It also helps you recognize the common causes of leaks and instructs what to do if you find one. This guide contains steps to determine whether a leak is fixed after repairs.

2: Product Description

The face of the E-CODER® contains reading information.

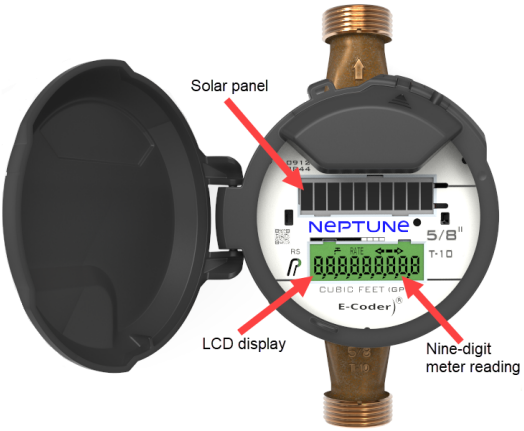


Figure 1: E-CODER® Face Plate

3: Wiring the Inside Set Version

Follow these steps to run a three-conductor cable from the E-CODER® register to the MIU.

1. Connect the three-conductor wire to the encoder register's terminals as described in the manufacturer's instructions, using the color code in step 3. The encoder terminal uses three wires: black, green, and red.

2. Remove the terminal cover with a flat-head screwdriver.

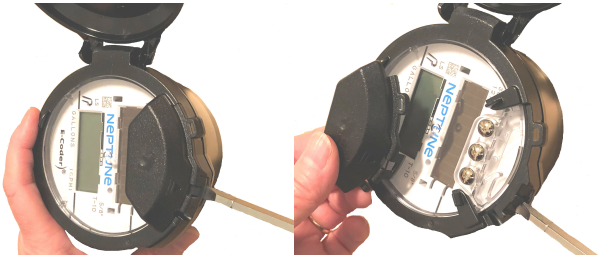


Figure 2: Removing the Terminal Cover

Figure 3: Wiring with Proper Color Wires

3. Wire the encoder register with the proper colors.
4. Test the wiring to verify the read.
5. Route the wires as shown.

Figure 4: Routing the Wire

Figure 5: Applying Compound

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

Neptune recommends Novagard 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, call Neptune's Customer Support at (800) 647-4832.

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

Figure 6: Placing the Cover on the Register

Figure 7: Snapping the Cover in Place

8. Snap the terminal cover in place by pressing on the molded arrow.
9. Proceed to "Activating the E-CODER®" on page 15.

4: Wiring the Pit Set Version

Complete the following steps to wire the pit set version. The following figure shows the components required for installation.

Figure 8: Installation Components

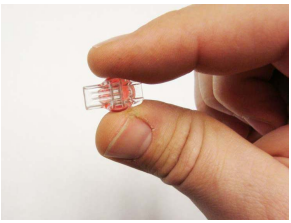


Figure 9: Scotchlok™ Connector

1. Hold the Scotchlok™ between your finger and thumb with the colored cap facing down.

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

2. Take one non-stripped black wire from the pigtail and one from the receptacle / MIU and insert the wires into the Scotchlok connector until fully seated.

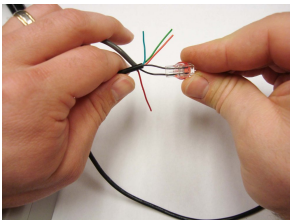


Figure 10: Seating Connector Wires

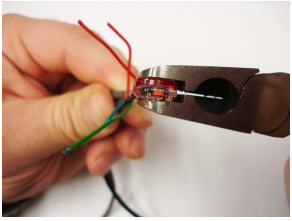
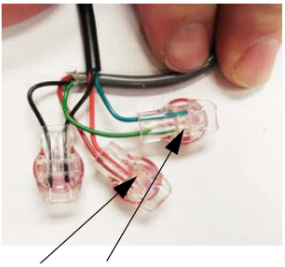


Figure 11: Crimping Tool

3. Place the connector color cap side down between the jaws of the crimping tool. For part numbers, see Table 2 on page 14.

4. Check to ensure that the wires are still fully seated in the connector before crimping the connector.



Red and green wires not 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 1 on page 9for the wiring configuration to connect Neptune® MIUs or competitor MIUs to the E-CODER®.

Table 1: Color Code for Wires

MIU Wire Color / Encoder Terminal	MIU Type
Black / B Green / G Red / R	• R900® • 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 you connect all three colored wires, read the encoder register to ensure proper connections, and that the receptacle / MIU is functioning properly.

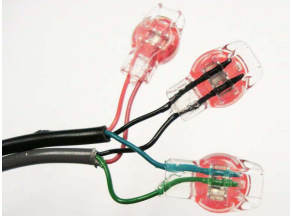


Figure 13: Three Color Wires Connected

Figure 14: Splice Tube

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

9. Separate the gray wires, and place them into the slots on each side of the splice tube.

Figure 15: Gray Wires in Slot

Figure 16: Cover in Place

10. Snap the cover closed to finish the installation.

11. Proceed to "Activating the E-CODER®" on page 15.

5: Installing Networked Receptacle / Dual Port MIUs

Enhanced R900® v4 MIUs are not dual port capable. These instructions apply only 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. Program them separately before 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

Complete the following steps using the Neptune field programmer to select the ProRead Program tab for programming.

1. Select **RF Compound HI** format.
2. Select 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 as shown in this figure.

Figure 17: HI Register

Programming the LO Register

Use the Neptune field programmer to select the ProRead Program tab for programming.

Figure 18: LO Register

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.

6: Wiring Networked Registers

Complete the following steps to wire the 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.

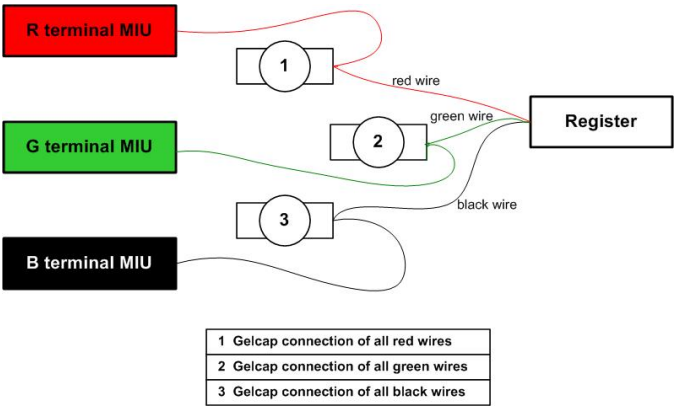


Figure 19: Interconnection of Like Terminals

Remove any bare or non-insulated wire. Insert only insulated wire into the splice connector.

Observe proper polarity as shown in the above figure, when wiring the registers so that all terminals are interconnected with wires of the same color: red, black, or green.

2. Proceed with "Activating the E-CODER®" on page 15.

7: Crimping Tool Manufacturers

To apply the Scotchlok™ connectors, you need a proper crimping tool. The following table shows a list of various manufacturers and model numbers.

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

Table 2: Crimping Tools

Manufacturer	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

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: Activating the E-CODER®

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 you can power on the LCD, but there is insufficient light to read the ASCII, the LCD displays LO Light.

Figure 20: LCD Displays LO Light

Verify the following LCD displays the :

- All-Segment test
- Version number
- Flow rate

The display alternates between the reading and the flow rate.

9: Reading the E-CODER®

It is important to become familiar with the information available from the meter. Table 3 on page 16 lists various icons and displays along with a description.

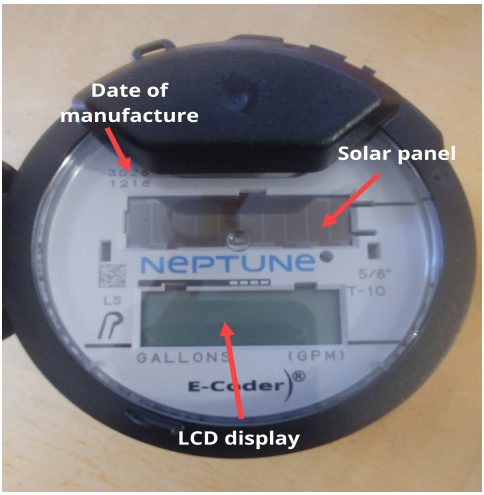


Figure 21: E-CODER® Displays

Table 3: Icons and Displays

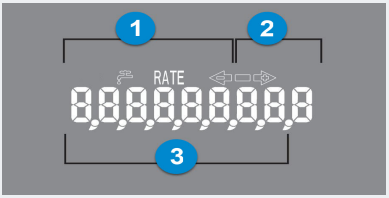
Icon	Description	
	Flow / Leak Indicator shows the direction of flow through the meter:	
	ON	Water in use
	OFF	Water not in use
	Flashing	Water is running slowly / low flow indicator
	+	Forward flow
	-	Reverse flow

Table 3: Icons and Displays (continued)

Icon	Description	
	Leak indicator displays a possible leak:	
	OFF	No leak
	Flashing	Intermittent leak indicated. Water used during at least 50 of the last 96 15-minute interval data updates within the past 24 hours.
	Continuous ON	Continuous leak indicated. Water used during all 96 15-minute interval data updates within the past 24 hours.
	RATE – Rate of Flow. Average flow rate is displayed every 12 seconds on the LCD display.	

The following table shows the LCD display and what the icons and numbers mean.

Table 4: LCD Display

LCD Display	Description
Nine-digit LCD displays the meter reading in billing units (U.S. gallons left to right):	 • (1) E-CODER Basic Reading / Customary– 6-digit remote reading • (2) Customary sweep hand digits • (3) E-CoderPLUS Reading – 8-digit remote reading

If the leak indicator is Flashing or Continuously ON, it indicates a possible leak. The following table contains some common causes of potential leaks.

Table 5: Causes of Leaks

Possible Cause of Leak	Intermittent Leak	Continuous Leak
Outside faucet, garden hose, or sprinkler system leaking	✔	✔
Toilet valve not sealed properly	✔	✔
Toilet running		✔

Table 5: Causes of Leaks (continued)

Possible Cause of Leak	Intermittent Leak	Continuous Leak
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		✔
Yard watered for more than eight hours	✔	✔
Continuous pet water device in use		✔
Water-cooled air conditioner or heat pump	✔	✔
Swimming pool filled		✔
Other continuous use of water for 24 hours		✔

10: How to Tell if Water is in Use

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

1. Watch the flow indicator for two minutes.
2. Determine which of the following conditions exists. If the arrow is:
   - Flashing, then water is running very slowly.
   - Continuously on, then water is running.
   - Not flashing, then water is not running.

What To Do In Case of a Leak

The following checklist can be helpful if the E-CODER® leak indicator shows a possible leak.

Table 6: 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 a 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.

If an 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 changes from Flashing to OFF.
2. Refer to the following tables which describe the standard functions of the E-CODER flags.

Table 7: E-CODER® Flags

Flag	Description
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

Table 7: E-CODER® Flags (continued)

Flag	Description
Flashing leak icon	Eighth digit incremented in 50 of the 96 15-minute interval data updates within the past 24 hours
Solid leak icon	Eighth digit incremented in all of the 96 15-minute interval data updates within the past 24 hours
Leak Status Flag (Resets After 35 Days)	
Based on total amount of 15-minute periods recorded in the previous 24 hours	
Leak icon off	Eighth digit incremented in less than 50 of the past 96 15-minute interval data updates
Consecutive Days with Zero Consumption Flag (Resets After 35 Days)	
Number of days the “leak status” was at a minimum value	

11: Contact Information

Within the United States, Neptune Customer Support is available Monday through Friday, 7:00 A.M. to 5:00 P.M. Central Standard Time, by telephone or email.

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** 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 Email

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

Notes

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