NEPTUNE
TECHNOLOGY GROUP

WATER | GAS | ELECTRICITY

R900® MIU Quick Install Guide

R900® MIU QUICK INSTALL GUIDE

1 General Instructions

The R900 is designed for use with multiple types of approved encoder registers: Neptune ARB® III, IV, V, ProRead™ and ECoder®, and Sensus (Invensys) ECR® II, and ECR® III*. Before installing a Meter Interface Unit (MIU), the encoder registers must be correctly wired and programmed to work with the MIU..

Notes:

- When using a ProRead encoder register (Rev. E or earlier), the ProRead register must be programmed for three-wire mode.
- If using a new ProRead register (Rev. F or later), Auto Detect
- can recognize it, and it does not need to be programmed.
- If using an existing register, make sure it has three wires hooked up and is programmed in three-wire mode.

*The ECR III register is supported when programmed with the same format used in the “6 Wheel ECR II register.”

To ensure that the ProRead register is programmed for threewire mode, use the ProRead programmer and its RF/MIU 6, 8, or 10 ID TDI format. You can accomplish this using the ProRead receptacle before removing the receptacle..

For greater detailed information and installation instructions, refer to the R900 Wall and Pit Installation and Maintenance Guide (Part #12560-001).

2 Safety & Preliminary Checks

- Verify that you are at the location specified on the Site Work Order.
- Check that the site is safe for you and your equipment.
- Notify the customer of your presence and tell the customer that you must have access to the water meter.
- Confirm and/or update the MIU ID number on the Site Work Order..

When installing meters, follow any guidelines issued by your company in addition to those given in this guide. Never perform an installation during a lightning storm or under excessively wet conditions.

3 Pit & Wall Site Selection

R900 Wall MIU

- For best results, Neptune recommends mounting the MIU on the outside of the building approximately five feet above the ground.
- Select a location which provides a direct line-of-sight to the meter reading device.
- Install the MIU in a vertical and upright position
- The preferred mounting surface for the MIU would be a flat wall, but the unit can also be mounted to a pipe.
- The selected location must be clear of all obstructions
- Avoid installing the MIU behind metal fences or walls.
- Refer to Table 1 for maximum cable lengths. The maximum cable length between the encoder register and MIU depends on the register's manufacturer and model.

R900 Pit MIU

- or best results, Neptune recommends placing the antenna through a hole in the pit lid so that the dome sits above the pit lid.
- Select a location with a direct line-of-sight to the path of the meter.
- Avoid installing the MIU behind metal fences or walls.
- Make sure there is enough room in the pit for the MIU. Because the meter position is fixed, the antenna is usually installed off-center.
- Use the attached cable that comes with the MIU. However, in some instances additional cable is required. The maximum cable length between the encoder register and MIU depends on the register's manufacturer and model. Refer to Table 1 for maxi-mum cable lengths.

Table 1 Maximum Cable Lengths

Approved Encoder Register	Maximum Cable Length	Wire Gauge
Neptune ARB® III, IV, V*	300 feet (91 meters)	22 AWG*
Neptune ProRead*/E-Coder*	500 feet (152 meters)	22 AWG
Networked Neptune ProRead/E-Coder**	250 feet (76 meters)	22 AWG

Table 1 Maximum Cable Lengths

Approved Encoder Register	Maximum Cable Length	Wire Gauge
Sensus (Invensys) ECRII®, ECRIII® ***	200 feet (61 meters)	22 AWG

* American Wire Gauge (AWG)

** Meets manufacturer's published specification for wire length between encoder and remote receptacle.
ARB, ProRead, and E-Coder are trademarks of Neptune Technology Group Inc.
ECRII and ECRIII are trademarks of Sensus (Invensys).

*** The ECR III register is supported when programmed with the same format used in the "6 Wheel ECR II register."

4 Preparing the Encoder Register

The R900 MIU is designed for use with multiple types of approved encoder registers: Neptune ARB III, IV, V, ProRead, and E-Coder, and Sensus (Invensys) ECR II and ECRIII. Before installing an MIU, the encoder registers must be correctly wired and programmed to work with the MIU.

When a ProRead encoder register (Rev. E or earlier) is used, the ProRead register must be programmed for three-wire mode. If two ProRead registers are connected to one MIU, the encoder register *must* be programmed in Network Mode. The ECR III register is supported when programmed with the same format used in the "6 Wheel ECR II register."

If the MIU is connected to a new ProRead encoder register, or if a three-conductor cable is already connected to a ProRead encoder register, ensure that the ProRead register is programmed for three-wire mode using the ProRead programmer and its RF/MIU 6, 8, or 10 ID TDI format. This can be accomplished through the ProRead receptacle before removing the receptacle.

5 Wiring the Encoder Register

Before wiring the encoder register, make sure the cable is long enough so that when the installation is complete, the pit lid can be removed easily without straining the cable. The ID number programmed into the register is not used. The MIU ID is the number used.

For more detailed instructions, refer to Neptune's Encoder Quick Install Guide (Part #: 12572-001).

22 American Wire Gauge (AWG) three-conductor cable must be used from the encoder register to the MIU. Refer to the following steps.

1 Connect the three-conductor wire to the encoder register's terminals per the manufacturer's instructions (see Neptune's Encoder Quick Install Guide (Part #: 12572-001), using the color code in Figure 1..

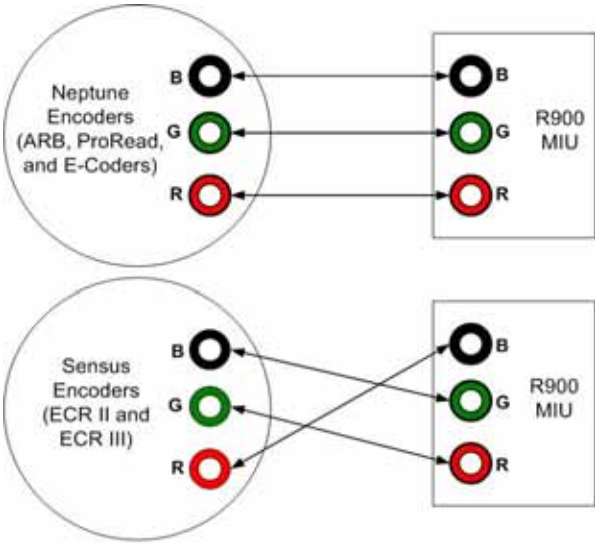


Figure 1 Color Code for Wires

*The ECR III register is supported when programmed with the same format used in the "6 Wheel ECR II register."

2 Thread the cable around the strain relief posts of the encoder.
3 Apply sealant liberally and ensure that it encapsulates the terminal screws and exposed wires.

All encoder terminal connections that are not pre-wired and potted must be covered with Novagard (G661) or Dow® Corning Compound 4.

4 Snap the cover onto the encoder register.
5 Proceed to the section specified for either Pit or Wall installation.

6 Installing the R900 Wall MIU

For greater detailed information and installation instructions, refer to the *R900 Wall and Pit Installation and Maintenance Guide* (Part #: 12560-001).

Complete the following steps to install the wall MIU.

1 Remove the main housing from the mounting adapter.

(The Hi-Lo fastener for securing the main MIU housing to the adapter plate is shipped in a separate box).

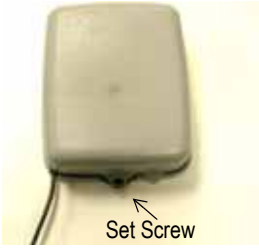
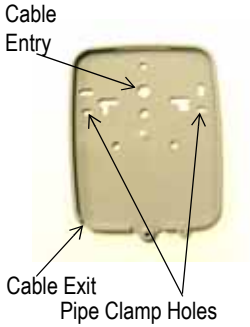


Figure 2 Wall MIU Main Housing

A variety of pre-drilled holes in the mounting adapter allows for a quick and easy installation:

- The cable enters through the bottom or rear cable entry of the mounting adaptor.
- When the MIU replaces a receptacle, use the appropriate holes to allow reuse of the receptacle's original mounting holes. (See mounting hole configuration in Figure 3 Mounting Adapter.)
- When mounting the MIU to a pipe, use the bolt hole for pipe mounting to bolt the mounting adapter to a pipe clamp.



2 Study Figure 3 Mounting Adapter and the location requirements, then decide how to install the MIU and mount adapter with set screw positioned at bottom.

Figure 3 Mounting Adapter

3 Connect each individual colored wires from the Wall MIU with the appropriate colored wire from the approved encoder per the encoder wiring (see Table 2 on page 4). Repeat this step for each colored wire

4 For rear cable entry, store excess wire and Scotchloks in the hollow cavity in the back of the MIU using the strain relief guides as shown in Figure 4 Back of MIU.

Figure 4 Back of MIU

5 For bottom cable exit, store Scotchloks in the hollow cavity in the back of the MIU and guide the remaining wire through the cable exit notch at the bottom right side of the MIU as shown in Figure 5 Cable Exit Notch

Figure 5 Cable Exit Notch

- Connection from the MIU to the approved encoder should be made using 22AWG three-conductor wire.
- Neptune requires that you use either type UR or UY Scotchlok™ gel caps to connect the pigtail from the MIU to the register wire. (Refer to Neptune's *Encoder Quick Install Guide* (Part #: 12572-001) for proper Scotchlok techniques.

When using the Scotchlok gelcaps,

- Pair the wires according to the color chart in Figure 1 on page 4.
- Slide the ends of the pair of colored wires into the gel caps as far as they can go. Do not strip individual colored wires.
- Then, firmly squeeze the gel cap with the appropriate crimping tool (Eclipse Tools Part #: 100-008 or Neptune Part #: 5500-158). One gel cap is used for each colored wire pair (See Figure 6 Gel Cap Connections.)

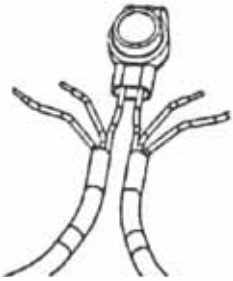


Figure 6 Gel Cap Connections

Figure 7 MIU Back Plate

6 Slide the tongue on the top of the MIU, into the groove on the top of the MIU Mounting Adapter. (See Figure 3 Mounting Adapter.)

7 Secure the MIU to the Mounting Adapter using the Hi-Lo Fastener provided. (See Figure 8 Hi-Lo Fastener.)

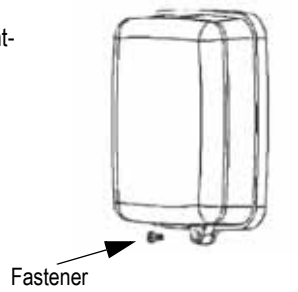


Figure 8 Hi-Lo Fastener

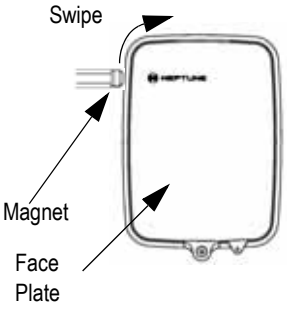


Figure 9 Activation Magnet

8 Position the magnet against the left side of the MIU directly in line with the Neptune logo, as shown, and swipe it bringing it from the side and around the corner to the top to activate the MIU. (See Figure 9 Activation Magnet Activation Magnet.)

9 Test the installation as described in the “Testing the R900 MIU Installation” on page 15.

7 Completing the R900 Wall MIU Installation

1 Install a seal wire or seal clip through the seal holes, if desired.

2 Read the MIU one more time before leaving the site to ensure MIU is transmitting.

3 Make sure the appropriate ID# on the MIU has been assigned to the meter setting.

- For single register applications, use the bold-faced ID#.
- For two register configuration, assign the (HI S/N) to one register and the (LO S/N) to the second register.

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

8 Installing the R900 Pit MIU

- For greater detailed information and installation instructions refer to the *R900 Wall and Pit Installation and Maintenance Guide* (Part # 12560-001).
- Before wiring the encoder register, make sure the cable is long enough so that when the installation is complete, the pit lid (with MIU attached) can be removed easily without straining the cable

1 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. Make sure the smooth side at top of threads on nut is facing upward. (See Figure 10 Pit Antenna Cable and Housing.)

Figure 10 Pit Antenna Cable and Housing

2 Place the flat black rubber washer on MIU around the male coax connection. (See Figure 11 Coax Connection.)

3 Apply a coating of Novaguard around the base of the “F” connector and on the flat rubber washer.

4 Connect the coaxial cable connector to the “F” connector on the transmitter housing. This connection should be hand-tight. (See Figure 11.)

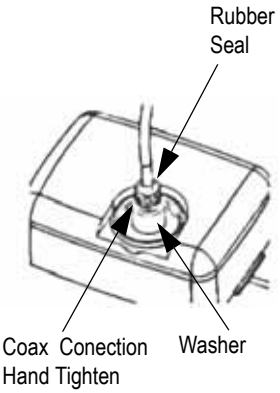
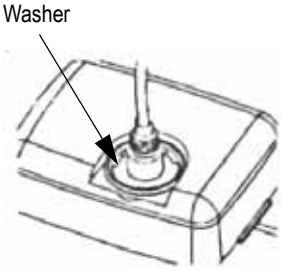
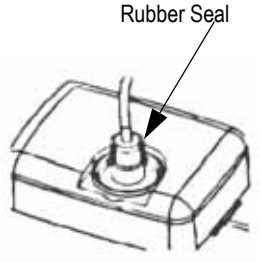


Figure 11 Coax Connection



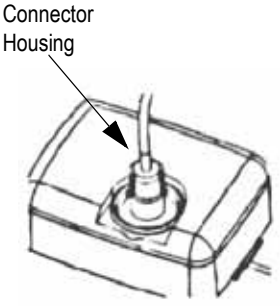
5 Make sure the washer is properly seated. Connect the plastic connector housing to the 3-lobed black plastic latch-plate. (See Figure 12 Latch Plate.)

Figure 12 Latch Plate



6 Slide the black conical-shaped gasket down the cable until it engages the connector housing. (See Figure 13 Rubber Seal.)

Figure 13 Rubber Seal



7 Tighten the connector nut onto the threaded portion of the connector housing. This connection should be hand-tight. Do not use pliers. (See Figure 14 Connector Housing.)

Figure 14 Connector Housing

8 For flooded pit or deep vault installations:

- Use the included cable tie to hang the MIU from the antenna tube. (See Figure 15 Cable Tie.)

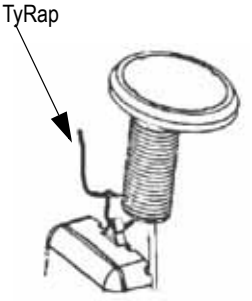


Figure 15 Cable Tie

Or,

For shallow residential pits:

:

- Position MIU in the base of meter box as shown for the shallow residential pit settings. (See Figure 16 Pit Installation.)

Figure 16 Pit Installation

Be careful not to lodge the MIU between the meter box and any components inside the box.

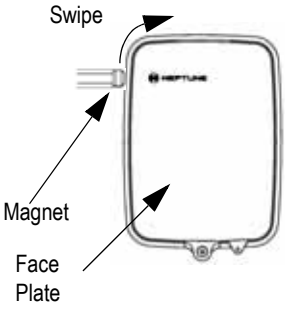


Figure 17 Activation Magnet

9 Position the magnet against the left side of the MIU directly in line with the Neptune logo, as shown, and swipe it bringing it from the side and around the corner to the top to activate the MIU. (See Figure 17 Activation Magnet.)

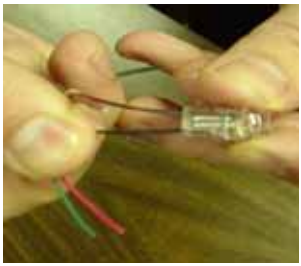
9 PIT MIU Installation - Retrofit Applications Only

1 Complete steps 1 through 9 outlined in “Installing the R900 Pit MIU” on page 9 to install the MIU through the lid.

2 Use 3M Scotchlok Type UR connector to connect the MIU wires to the encoder wires.

3 Hold the Scotchlok connector between index finger and thumb with the red cap facing down. (See Figure 18.).

Figure 18 Scotchlok Connector



4 Take a non-stripped black wire from the pigtail and a non-stripped black wire from receptacle/MIU and insert wires into the Scotchlok connector until fully seated in connector. (See Figure 19.)

Figure 19 Seating Connector Wires

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

5 Place the connector red cap side down between the jaws of the UR crimping tool as shown in Figure 20. Refer to Table 2 on page 4 for a list of the manufacturers and part numbers.

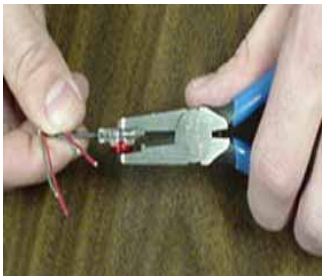
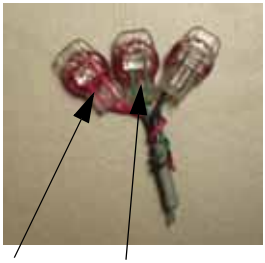


Figure 20 UR Crimping Tool



6 Check to ensure that the wires are still fully seated in the connector before crimping the connector. Figure 21 illustrates improper connections due to wires not fully seated.

Figure 21 Improper Connections

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

8 Repeat steps 2 through 6 for each color wire. (See Figure 23.)

9 Once all three color wires have been connected, read the encoder register to ensure proper connections and the receptacle/ MIU is functioning properly. (See Figure 22.)

Figure 22 Three Color Wires Connected

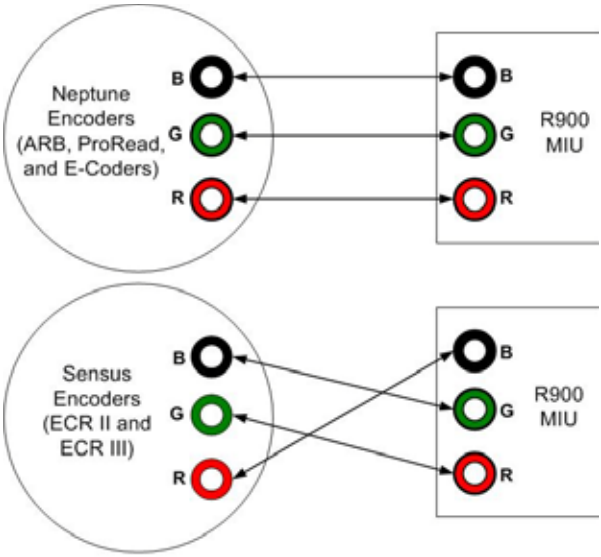


Figure 23 Color Code for Wires

Connecting the Splice Tube

To complete the installation of the Scotchloks, complete the following steps to install the Connector King Splice Tube.

Figure 24 Splice Tube

10 Take all 3 connected Scotchlok's and push into the splice tube until fully encapsulated by the silicone grease. (See Figure Figure 24.)

11 Separate eachgray wire and place in the slots on each side as shown in Figure 25.

Figure 25 Gray Wires in Slots

12 Snap cover closed to finish the installation as shown in Figure 26.

Figure 26 Cover in Place

10 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.

Note: 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.

11 Checklist

Before leaving the installation site, be sure to:

- ☑ Record the 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.

12 Contact Information

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

To contact Customer Support by phone, call 1-800-645-1892. If all Support Technicians are helping other customers, your call will be routed to the Customer Support voice mail system. Please leave your name, the name of your company, and your telephone number. Your call will be returned during business hours in the order it was received.

To contact Customer 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 Customer Support by E-mail, send your letter to the following address: hhsupp@neptunetg.com.

Notes

NEPTUNE
TECHNOLOGY GROUP

Take Control.

neptunetg.com

Neptune Technology Group Inc.
1600 Alabama Highway 229
Tallassee, AL 36078
USA
Tel: (800) 633-8754
Fax: (334) 283-7299

Neptune Technology Group (Canada) Ltd.
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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