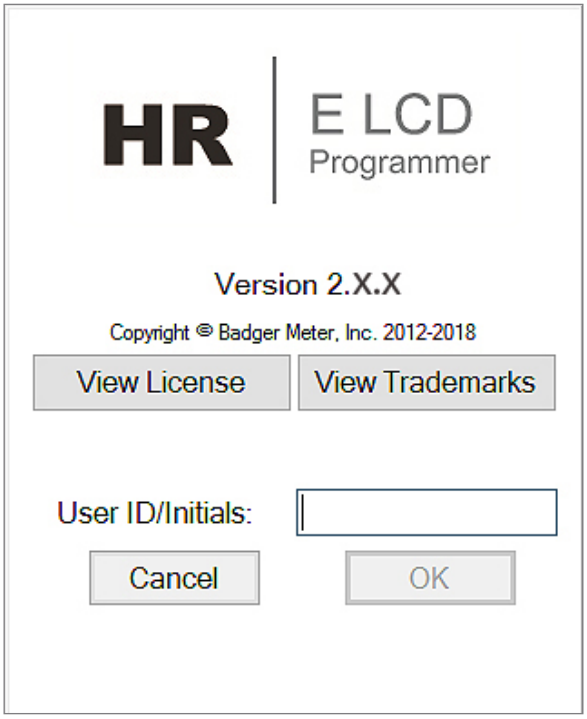
Badger Meter

High Resolution LCD Encoder Programmer

HR-E® LCD, HR-E® LCD 4-20



ENC-PM-02040-EN-03 (May 2018)

Programmer Manual

CONTENTS

Introduction 5

System Requirements 5

Parts List 5

IR Head Bracket 6

- Attaching the bracket to an encoder 6
- Removing the bracket from an encoder 6

Using the Programmer Software 7

- Performing a Read 8
  - Read Errors 8
- Encoder Types 9
- Change Current Settings 10
- Apply Current Settings 10
  - Updating Multiple Encoders 10

Programmer Parameters 11

- Serial # Field 11
- Version Field 11
- Meter Type Field 11
- Meter Model/Size Field 12
- Unit of Measure Field 12
- Billing Units Field 13
- Digits from Encoder Field 13
- Visual Reading and Encoder Output Fields 14
- Rate of Flow Units Field 14
- Rate of Flow Time Field 15
- Deactivate 6-Digit Display 15
- View Indicators 16
- Clear Reading 16
- 4-20 mA Parameters 17

Exiting the Software Application 18

Appendix

Installing the Programmer Software 20

COM Port 22

Troubleshooting 22

INTRODUCTION

This manual has instructions for programming HR-E LCD and HR-E LCD 4-20 high resolution (HR) encoders. Instructions for installing the Programmer software can be found in the *"Appendix" on page 19*.

Audience and Purpose

This manual is intended to be used by utilities for programming Badger Meter high resolution encoders.

SYSTEM REQUIREMENTS

A computer with a Windows® 7 (or newer) operating system is required for programming the HR LCD encoders.

PARTS LIST

The following parts are necessary for programming HR LCD encoders.

67660-001	Programming kit (CD)	Kit includes IR head bracket and programmer software (CD)
68468-001	Programming kit (USB)	Kit includes IR head bracket, programmer software (USB) and programming cable (USB)
67451-001	IR head bracket *(**Included** in the 67660-001, 68468-001 kits)*	
67572-009	HR-E LCD encoder programmer software (CD) *(**Included** in the 67660-001 kit)*	Available on CD
67572-012	HR-E LCD encoder programmer software (USB) *(**Included** in the 68468-001 kit)*	Available on USB flash drive
64436-042	IR programming and data profile cable *(**Required**, but **not included** in the 67660-001 kit)*	
64436-029	Serial-to-USB adapter *(Optional)*	

NOTE: Software version 2.0.x is required for programming the HR-E LCD 4-20 encoder.

IR HEAD BRACKET

To facilitate reading and programming multiple encoders, the IR head bracket is recommended. The bracket is easy to attach and remove.

Attaching the bracket to an encoder

1. Open the lid of the encoder.
2. With the bracket guide pointing to the encoder lid hinge, slide the bracket onto the encoder (*Figure 2*) so the guide fits on both sides of the hinge.

   Push gently to make sure the bracket guide is completely seated against the encoder lid hinge, and you can see the IR port through bracket opening as shown in *Figure 2*.

Figure 1: Slide bracket onto encoder

Figure 2: Bracket attached to encoder - top view

3. Place the optical head of the IR cable in the bracket, with the nubs on the back seated in the slots of the bracket. See *Figure 3*. This placement facilitates correct alignment between the IR head and the encoder IR port.

   The encoder is ready for programming.

Figure 3: Head of IR cable inserted

Removing the bracket from an encoder

When you are finished programming an encoder, remove the bracket.

Hold the encoder with one hand and pull the bracket gently with the other hand, straight off the encoder. The bracket should come off will little resistance.

USING THE PROGRAMMER SOFTWARE

Use the Programmer software to view and change the parameters that are currently programmed into the encoder, and program new parameters, if needed. You can also clear the encoder reading.

NOTE: If you need help installing the software, see the instructions *"Installing the Programmer Software" on page 20*.

1. Connect the IR programming and data profile cable (IR cable) to the serial port of the computer with the installed programming software.

   If the computer does not have a serial port, use a Serial-to-USB adapter. See the *"Parts List" on page 5.*

   NOTE: Connect the IR cable *before* you start the software to make sure the software recognizes the IR cable connection.

2. Double-click the **LCD Programmer** shortcut to start the software application.

   The License Agreement displays the first time you access the software.

Figure 4: Software shortcut

3. Read the License Agreement and click **Accept License**.

   NOTE: The License Agreement must be accepted by an authorized representative of the customer/licensee. If you select **Decline License**, the application will not start.

   The Splash (sign-in) screen displays (*Figure 6*). The screen includes the software version, access to the license and trademarks information, and the User ID/Initials field.

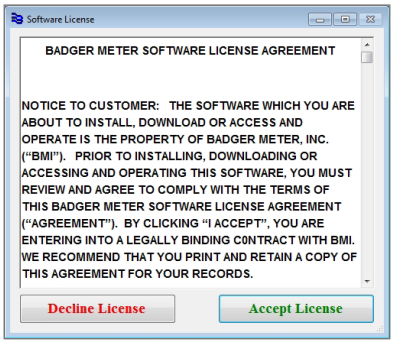


Figure 5: Software license agreement

4. Enter your initials in the *UserID/Initials* field. A user ID of 3…7 characters is required to activate the **OK** button.

   Then click **OK**.

   NOTE: Your sign-in initials are used in the product log file to record any changes you make to the LCD encoder.

   The software *Programmer* screen opens.

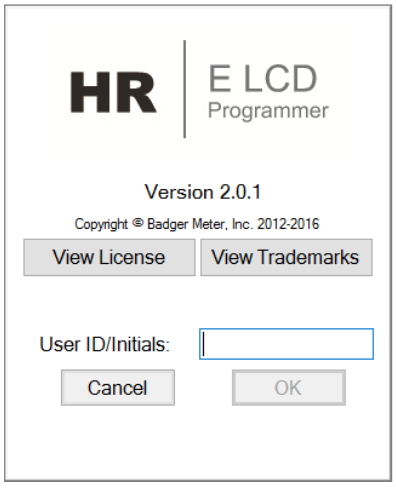


Figure 6: Splash screen

5. When the *Programmer* screen opens, select the correct COM port for the IR cable using the **IR Port** drop-down menu.

   NOTE: If the correct COM port is not selected, the software will be unable to read the encoder. For help with the COM port, see *"COM Port" on page 22*.

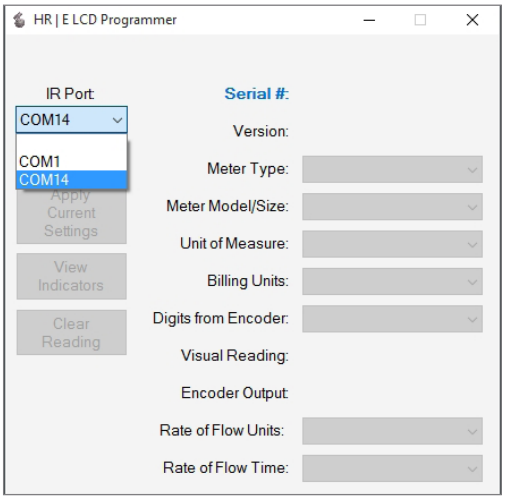


Figure 7: Select the COM port

Performing a Read

Make sure the IR head is aligned with the IR port of the encoder. Then click the **Read** button.

If the correct COM port is selected and a good response is received, the software determines the encoder type and populates the *Programmer* screen data fields as shown in *Figure 8*. For more information, see *"Encoder Types" on page 9*.

If the encoder is programmed the way you want, disconnect it from the IR bracket. If not, see *"Change Current Settings" on page 10*.

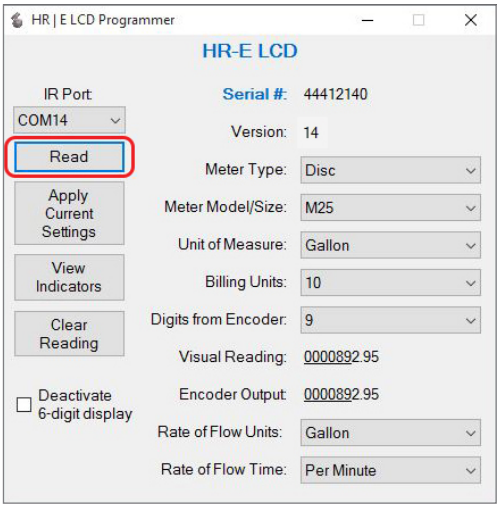


Figure 8: Encoder Read

Read Errors

If *no* COM port is selected, the error message in *Figure 9* displays. Click **OK**, select the COM port, and click **Read** again.

Figure 9: No COM port selected

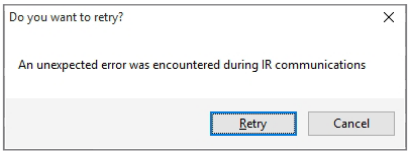


Figure 10: Wrong COM port selected

If the *wrong* COM port is selected, the error message in *Figure 10* displays. Click **Cancel**, select the correct COM port, and click **Read** again.

Encoder Types

When you read the device with the IR cable, the software automatically detects the encoder type. The device type and serial number display at the top of the screen. Software parameters that display on the screen vary depending on the device type. Examples of completed *Programmer* screens for all three device types are displayed here.

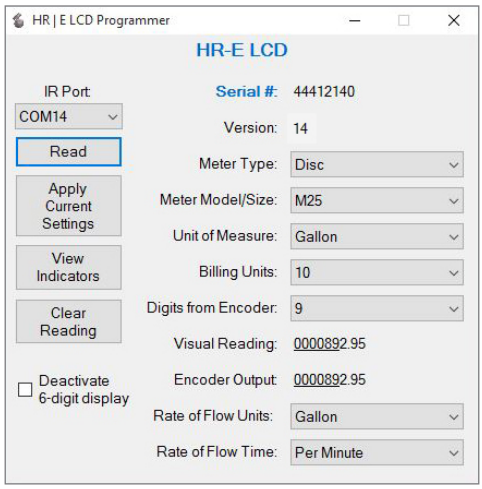


Figure 11: HR-E LCD screen

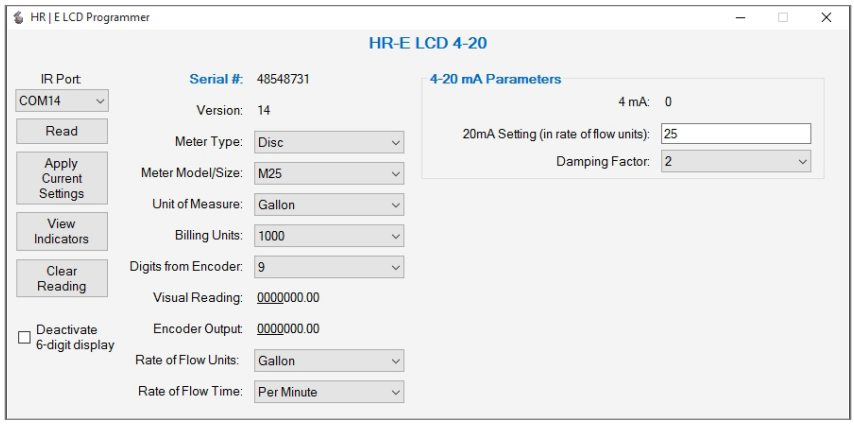


Figure 12: HR-E LCD 4-20 screen

NOTE: The HR-E LCD encoder is used for the examples throughout this manual, unless otherwise indicated.

Change Current Settings

To change the encoder settings and set a new default value for any of the data fields, follow this procedure.

1. Click the drop-down menu to the right of the field to display a list of values.
2. Click the value you want to set as the default for that field.

NOTE: The field label changes to **bold** text, indicating a new, unprogrammed value is selected. See *Figure 13*.

NOTE: You must set the default value for the *Meter Type* field before you set the *Meter Model / Size*. The *Unit of Measure* value does *not* have to be the same as the *Rate of Flow Units*. (Even in a cubic foot meter, the flow rate can be gallons per minute.)

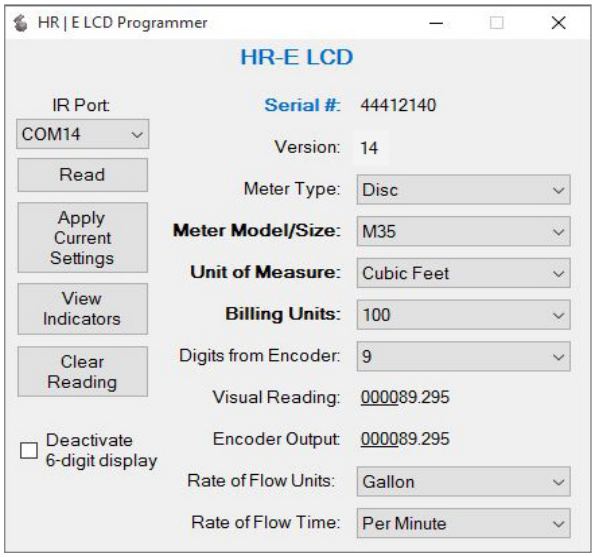


Figure 13: Unprogrammed values

Apply Current Settings

If you make a change on the Programmer screen, you must apply the change to the encoder.

With the IR head aligned, click **Apply Current Settings** to program the new values to the encoder.

The new values display on the *Programmer* screen and the field labels are no longer bold. The encoder also goes into storage mode. In storage mode, the encoder displays the *meter type, digit resolution from the encoder* and *unit of measure*. This is an example of an encoder display of a Model 25 Disc Meter with a 9-digit output, measuring in gallons:

Figure 14: Meter type, digit resolution from the encoder and unit of measure

Updating Multiple Encoders

If you have multiple encoders to program with the same settings, attach the IR head bracket with the IR cable to each encoder, one at a time, and click **Apply Current Settings** to program each encoder with the same settings.

PROGRAMMER PARAMETERS

The Programmer fields are described in this section. The description applies to all encoder types unless otherwise indicated.

Serial # Field

The *Serial #* (number) field (*Figure 15*) is a read-only field that displays the encoder factory-assigned serial number. You cannot change this number.

Version Field

The *Version* field (*Figure 15*) is a read-only field that displays the encoder version. You cannot change the value in this field.

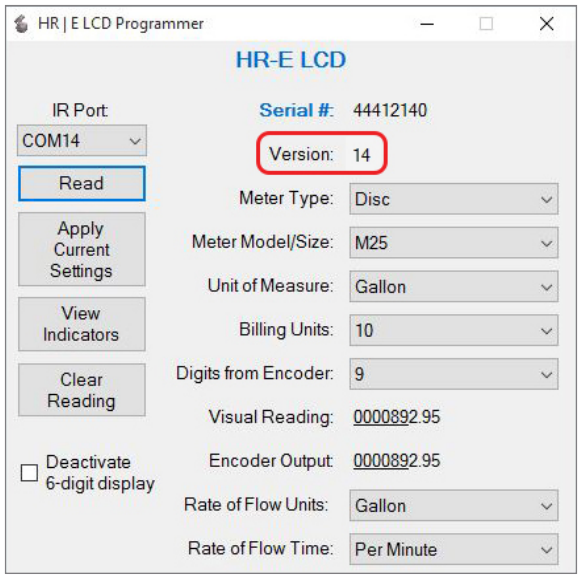


Figure 15: Serial and Version number

Meter Type Field

The *Meter Type* field (*Figure 16*) displays the type of meter to which the encoder can connect.

Click the drop-down menu to the right of the data field to select the Meter Type. Available options are Disc, CSM (Compound), and TSM (Turbo).

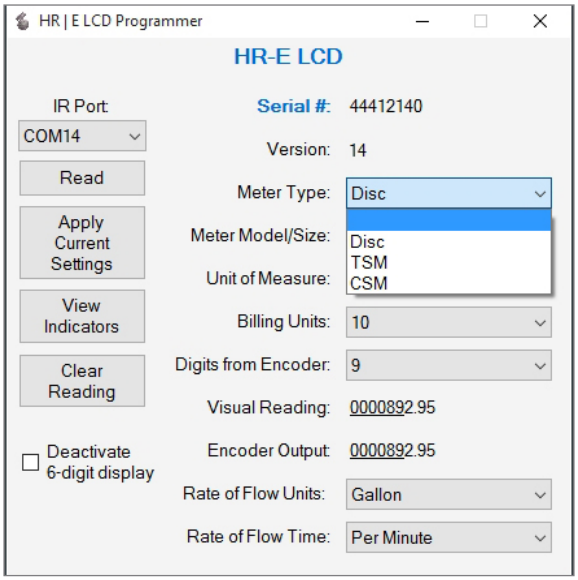


Figure 16: Meter Types

Meter Model/Size Field

The *Meter Model/Size* field (*Figure 17*) auto-populates based on the *Meter Type* selected.

Click the drop-down menu to the right of the data field to select a Meter Model. Meter Sizes corresponding to the Meter Models in the drop-down menu are shown in the table below *Figure 17*.

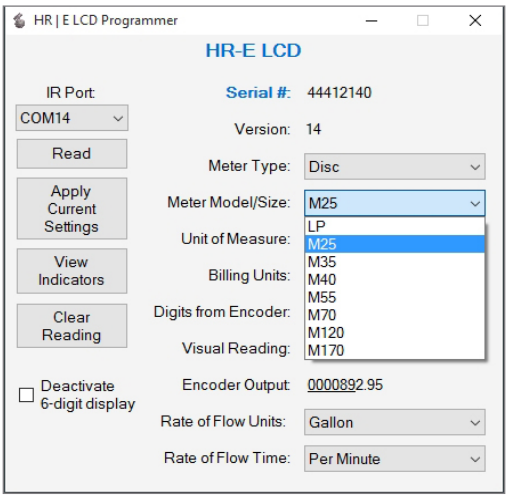


Figure 17: Meter Model and Size

For Recordall® Combination Fire Service meters and assemblies, refer to the **Disc** and **TSM** columns of the table.

Disc (inches)	Model	CSM (inches)	Model	TSM (inches)	Model
5/8, 5/8 x 3/4	LP	2	High Side	1-1/2	T160
5/8, 5/8 x 3/4	M25	2	Low Side	2	T200
3/4	M35	3	High Side	3	T450
1	M40	3	Low Side	4	T1000
1	M55	4	High Side	6	T2000
1	M70	4	Low Side	8	T3500
1-1/2	M120	6	High Side	10	T5500
2	M170	6	Low Side	12	T6200
				16	T6600
				20	T10000

Unit of Measure Field

The *Unit of Measure* field (*Figure 18*) displays the unit selected to measure the flow.

Click the drop-down menu to the right of the data field to select a Unit of Measure. The options are gallon, cubic meter, liters, cubic feet and imperial gallon.

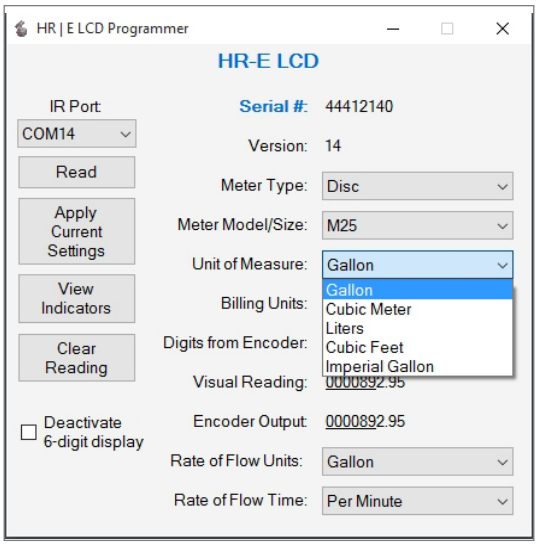


Figure 18: Unit of Measure

Billing Units Field

The *Billing Units* field (*Figure 19*) displays the default units for which the customer is billed, and is indicated by dashed lines above and below the totalizer reading. The default is based on the Unit of Measure selected:

Unit of Measure	Default Billing Unit
Gallons, liters, imperial gallons	1000
Cubic feet	100
Cubic meters	1

Click the drop-down menu to the right of the data field to select a *Billing Units* value. If you do not want the dashed lines to display, select "**0**" (zero) as the *Billing Units* value.

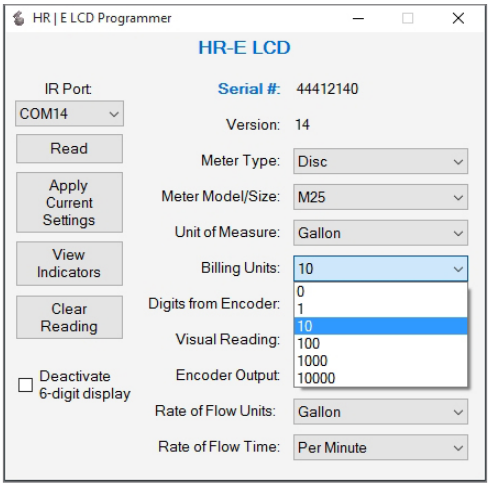


Figure 19: Billing Units

Digits from Encoder Field

The *Digits from Encoder* field (*Figure 20*) displays the number of digits the encoder is programmed to send to the endpoint. These options include 4, 5, 6, 7*, 8* and 9 digits. Readings reported from an encoder programmed to 4, 5, 6, 7 and 8 digits are the left-most significant digits. Changing this value affects the *Encoder Output* field.

Click the drop-down menu to the right of the data field to select a different encoder output resolution.

* The 7- and 8-digit options apply to encoders with version 14 or later.

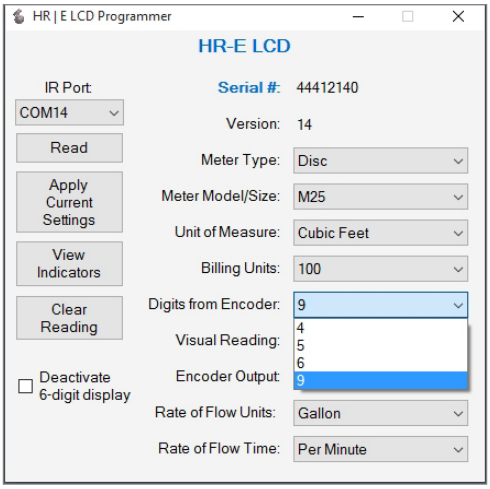


Figure 20: Encoder digits

IMPORTANT

Be very careful with the Digits from Encoder feature! Changes will affect the reading resolution sent to the endpoint and in your reading data management system.

Visual Reading and Encoder Output Fields

The *Visual Reading** field is a read-only field that displays the current meter reading as a real number. The number of decimal places is determined by the units and meter size. You cannot change this number.

The *Encoder Output** field is a read-only field that displays the reading resolution sent from the encoder. Changing the *Digits from Encoder* field affects the *Encoder Output* field. See *Figure 21* for an example of both fields.

*For TSM (Turbo) 12…20 inch meters, the value shown in the *Visual Reading* field and *Encoder Output* field may not display correctly. The programming value, however, is calculated correctly and will display correctly on the encoder.

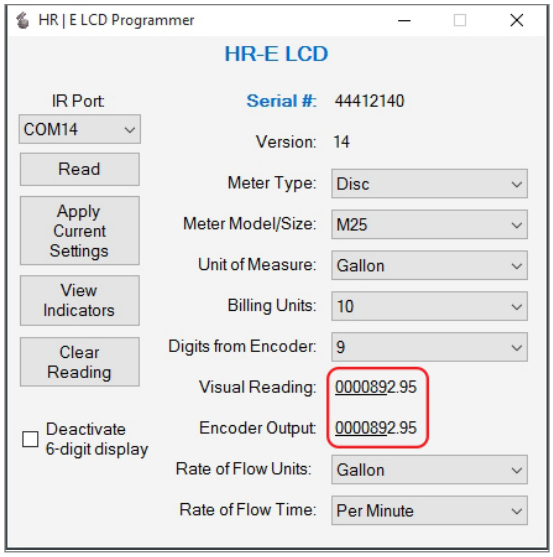


Figure 21: Visual Reading and Encoder Output

Rate of Flow Units Field

The *Rate of Flow Units* field displays the unit by which the rate of flow is measured. The factory-programmed default is *Gallon*.

Click the drop-down menu to the right of the data field to select a Rate of Flow Units. The options are gallon, cubic meter, liters, cubic feet and imperial gallon as shown in *Figure 22*.

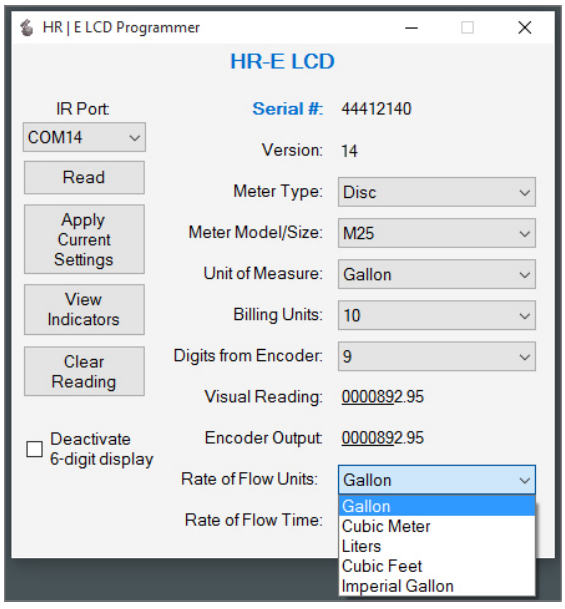


Figure 22: Rate of Flow Units

Rate of Flow Time Field

The *Rate of Flow Time* field displays the time unit set for the rate of flow. The factory-programmed default is *Per Minute*.

Click the drop-down menu to the right of the data field to select a Rate of Flow Time. The options are seconds, minutes or hours as shown in *Figure 23*.

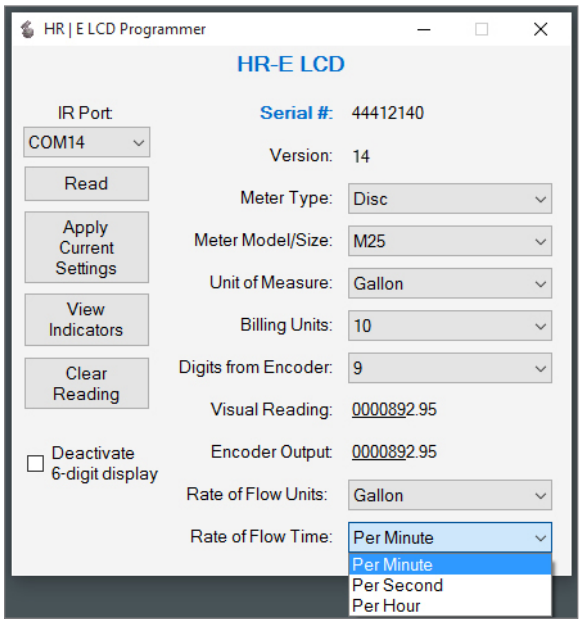


Figure 23: Rate of Flow Time

Deactivate 6-Digit Display

The *Deactivate 6-digit display* field can be used to remove the 6-digit consumption display from the encoder automatic display. See the *High Resolution LCD Encoders User Manual*, available at *www.badgermeter.com*, for additional information.

Click the box to the left of the field to select it. When the box is checked, the display automatically toggles between the 9-digit consumption display, the rate of flow and the meter model.

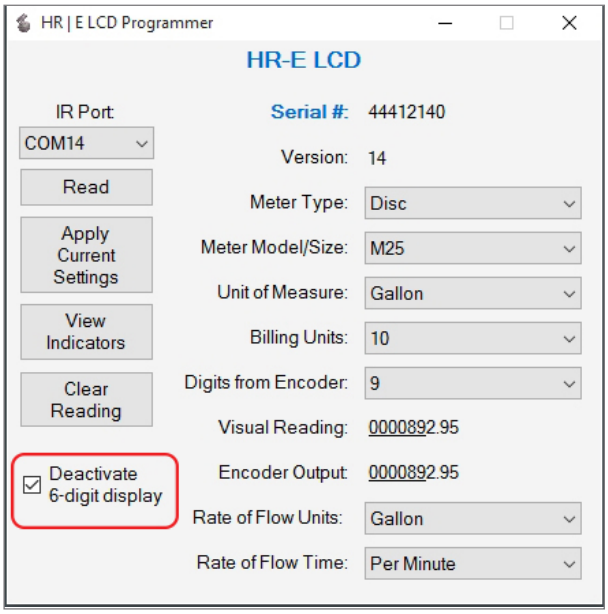


Figure 24: Deactivate 6-digit display

View Indicators

The **View Indicators** button (*Figure 25*) displays the current status indicators for the selected meter.

Status indicator options are Encoder Removal, 30 Day No Usage, Suspected Leak, Programmed, End of Battery Life, Reverse Flow, Magnetic Tamper and Temperature Limit Exceeded. See the *High Resolution LCD Encoders User Manual*, available at *www.badgermeter.com*, for descriptions of these indicators.

1. With the IR head aligned, click **View Indicators**. The Status Indicators pop-up window displays (*Figure 26*).
2. To clear the indicators, click **Clear Indicators** in the pop-up window.

   NOTE: The **Clear Indicators** button does NOT clear the *Programmed* indicator.
3. Click **Close** to exit the window.

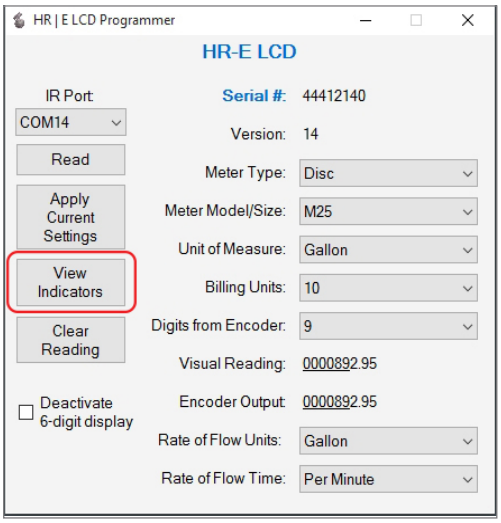


Figure 25: View Indicators

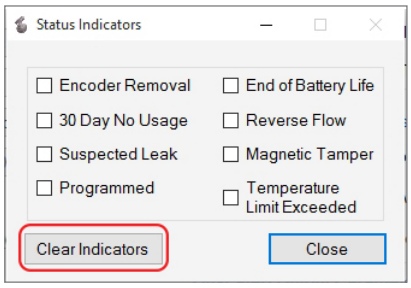


Figure 26: Status Indicators

Clear Reading

The **Clear Reading** button (*Figure 27*) deletes ALL readings for the selected meter.

IMPORTANT

*Be very careful with the **Clear Reading** feature! If you select this option, a pop-up message displays (Figure 28), asking for a password to confirm the deletion. Contact Badger Meter Technical Support for the password.*

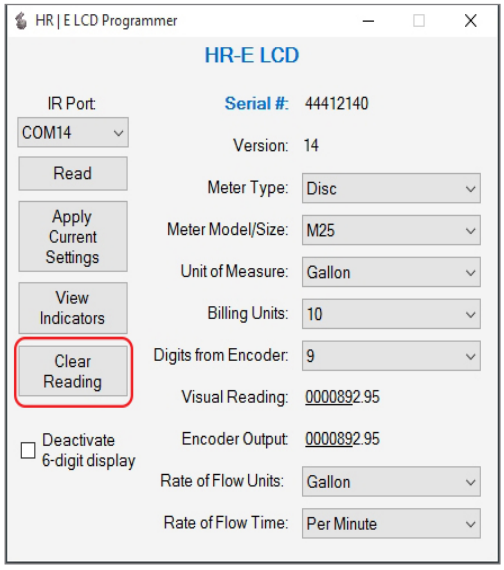


Figure 27: Clear all readings

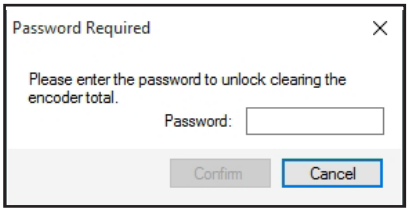


Figure 28: Password required

4-20 mA Parameters

NOTE: These parameters apply to the HR-E LCD 4-20 encoder.

The *4-20 mA Parameters* field (*Figure 29*) displays the parameters of the encoder analog control signal. The 4-20 mA output signal is directly proportional to the meter rate of flow. For default measurement resolution values, see the Measurement Resolution charts in the *High Resolution LCD Encoder User Manual*, available at *www.badgermeter.com*.

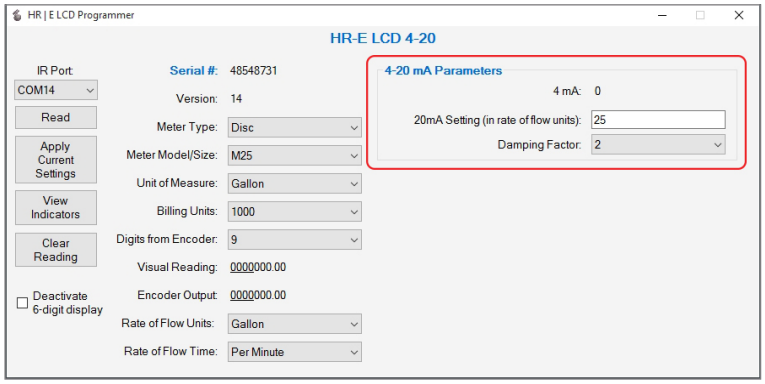


Figure 29: 4-20 mA Parameters

- The *4 mA* field is always set to zero (0). The register produces a 4 mA signal at zero flow.
- The *20 mA Setting* field displays the flow rate setting. Set this parameter to the flow rate at which the output should generate to maximum signal. In most cases, this is the maximum flow rate of the meter.
- The *Damping Factor* is the value used to stabilize the analog output signal.

EXITING THE SOFTWARE APPLICATION

To exit and close the software application, click the **X** in the top right corner of the software screen as shown in *Figure 30*.

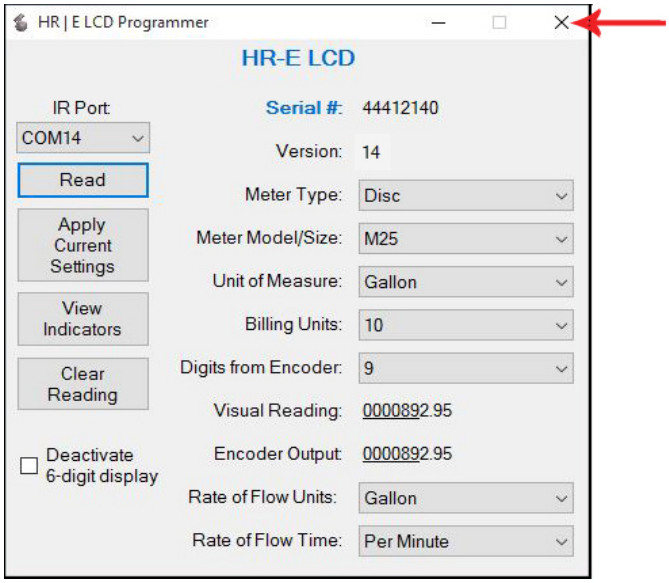


*Figure 30: Click the **X** to exit software*

APPENDIX

INSTALLING THE PROGRAMMER SOFTWARE

Follow these steps for installing the software.

1. Double-click the **setup.exe** file to begin installation. The *Welcome* screen displays.

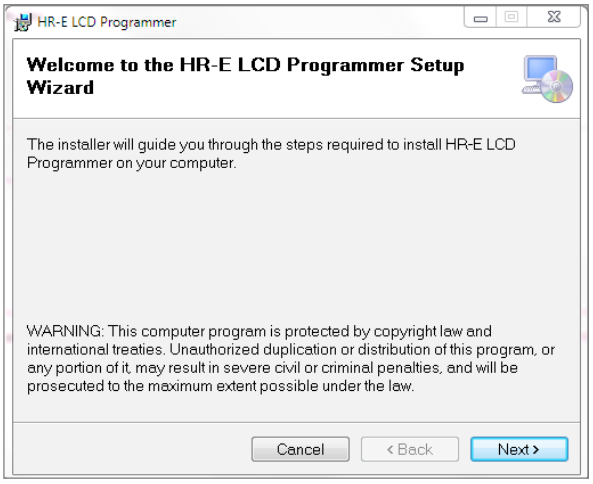


Figure 31: Software Installer Wizard Welcome screen

2. Click **Next**. The *Select Installation Folder* screen displays.

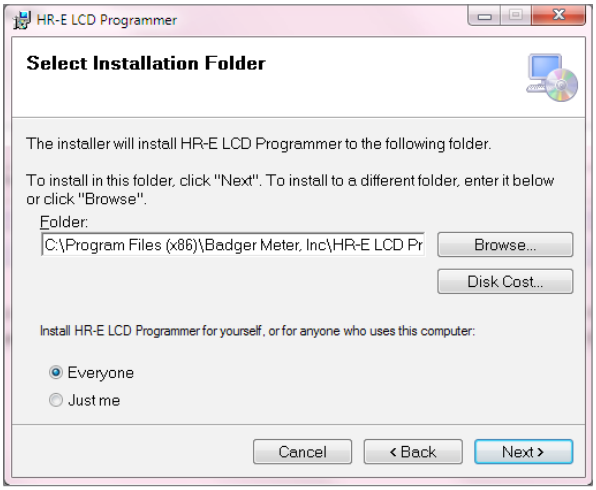


Figure 32: Software files location

3. Click **Next** to choose *Program Files*, the default location folder, or click **Browse** to choose another location. The confirmation screen displays.

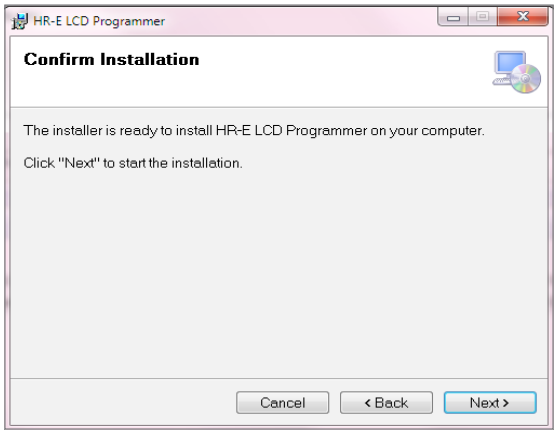


Figure 33: Ready to install

4. Click **Next** to start installation. A progress bar displays briefly. Then the *Installation Complete* screen displays.

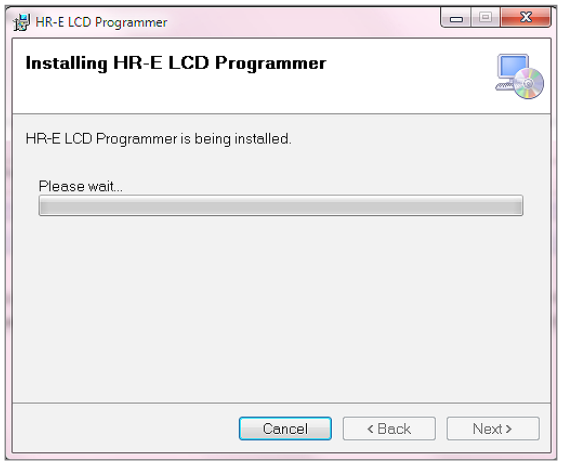


Figure 34: Progress bar shows installation in progress

5. At the *Installation Complete* screen, click **Close** to exit the installer. The Programmer shortcut displays on the computer desktop.

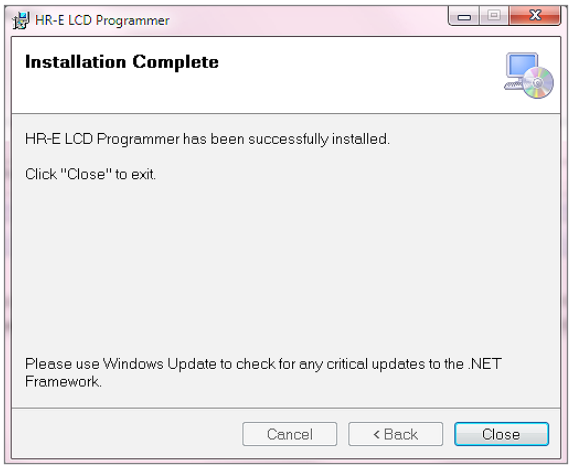


Figure 35: Installation complete

COM PORT

The Programmer software communicates with the encoder through the encoder IR port using the IR programming and data profile cable (IR cable). You must identify the correct communication (COM) port for the IR cable to make sure the software can communicate with the encoder. Follow these steps to identify the correct COM port for the IR cable connected to the computer.

1. Connect the IR cable to the serial port of the computer. If the computer does not have a serial port, use a serial-to-USB adapter.

   Follow these instructions to identify the COM port:

   - Select the Microsoft **Start** button.
   - Right-click on **Computer***.
   - Select **Manage**.
   - Select **Device Manager** from the menu on the left.
   - In the Device Manager window, click the arrow next to **Ports (COM & LPT)** to expand the selection.
   - Find the COM port for the IR cable. The example (*Figure 36*) shows **COM 7** for the IR cable connected with a USB to serial adapter, "Prolific USB-to-Serial Comm Port."

2. Write down the COM port number for use with the Programmer software.

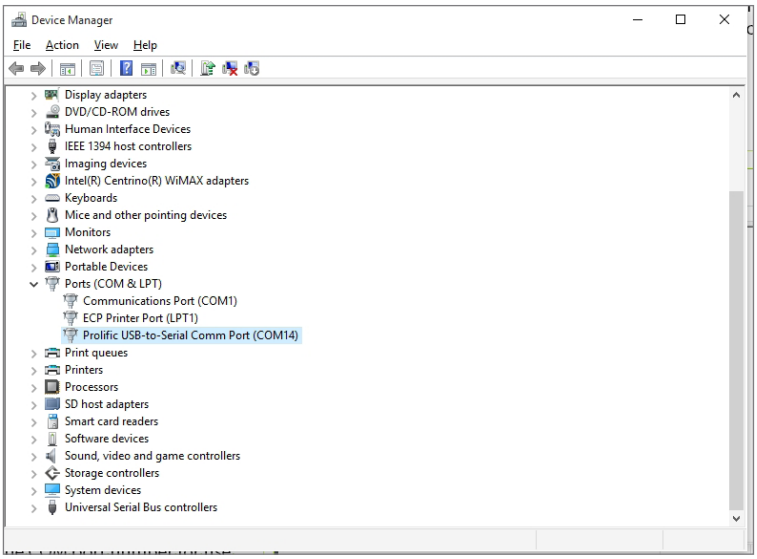


Figure 36: COM port in Device Manager window

* If you have Windows 8 or 10, type "Device Manager" in the **Search** field to open the Device Manager screen.

TROUBLESHOOTING

Issue	Probable Cause	Solution
Programmer screen is blank after a Read.	COM port not specified.	Select the correct COM port from the IR Port drop-down menu.
	Bad connection.	Check for damaged or broken wires.
Error message displayed after clicking an option on the programmer screen.	IR head not aligned with the device.	Align the head of the IR cable with the IR port on the device and try again.
Encoder alarm	While in regular operational mode, the device is tilted or removed from the meter.	Align the head of the IR cable with the IR port on the device. Keep the device still.

Also see *"Read Errors" on page 8*.

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