



EP-90R Pressure Electronic Sensor

Installation and Configuration Instructions

This document shows how to install an EP-90R Pressure sensor and how to connect it to a NMEA 2000® network. It also provides instructions on how to configure your pressure sensor with Lowrance digital gauges (LMF-200 & LMF-400) and display units.

NMEA 2000 is the communication bus standard developed by the National Marine Electronics Association (NMEA) for use in boats. Lowrance has introduced a line of products that can communicate over a NMEA 2000 network (LowranceNet).

All Lowrance NMEA 2000 capable devices are either NMEA 2000 certified or certification is pending.

CAUTION:

*Installing LowranceNET NMEA 2000 devices is **significantly different** from installing earlier Lowrance components without NMEA 2000 features. You should read all of the installation instructions before proceeding. Decide where you want to install all components before drilling any holes in your vessel.*

Some sonar or GPS display units may require a software upgrade to display NMEA 2000 data correctly. For free software upgrades or additional information on the LowranceNet NMEA 2000® network system, visit our web site, www.lowrance.com.



EP-90R Pressure Sensor.

The EP-90R consists of a red cable connector and the EP-90R housing with standard size hose barb attachment.

The EP-90R Water Pressure sensor, like the other LowranceNet Electronic Probe (EP) sensors, is designed for use with a NMEA 2000 DeviceNet Network. Your sensor, however, is also compatible with LowranceNet blue connector networks. It can be added to a blue connector network by using a red female to blue female adapter cable. Your sensor *MUST* be connected to a NMEA 2000 network or it *WILL NOT* function.



The NMEA 2000 red female to blue female adapter cable allows users to add red connector devices to a blue connector network.

Tools and Supplies

Your EP sensor packs with a T connector needed to attach it to a LowranceNET NMEA 2000 network. If this is the first sensor you are connecting, you may also need a one-time purchase of a LowranceNET Node Kit.

The following tools and supplies are NOT included. Required tools include: a utility knife. For some installations, a Phillips screwdriver will be needed. Supplies include: zip/cable tie.



LowranceNET Node Kit for a NMEA 2000 network. Includes a 2-foot extension cable, T connector and two 120-ohm terminators.

For complete instructions on setting up a new NMEA 2000 network or expanding an existing one, see the other document packed with your EP-90R, "*Setup and Installation of NMEA 2000 Networks, General Information*" part number 988-0154-173. If that document is not available, it can be downloaded free from the Lowrance web site.

Installation

The EP-90R Pressure sensor can provide pressure data for the following categories: Atmospheric Pressure, Engine Boost Pressure, Engine Oil Pressure, Engine Water Pressure, Fuel Pressure, Transmission Oil Pressure and Pitot Speed.

WARNING:

The maximum pressure for an EP-90R Pressure sensor is 100 PSI (689 kPa). If that pressure level is exceeded you not only risk damaging the EP-90R, but could also suffer bodily injury.

Pitot Tube (Water Speed)

We recommend installing the EP-90R near the boat's original speedometer.

NOTE:

If your engine does not have a speedometer hose, you will have to purchase a pitot tube kit to use the EP-90R Pressure sensor. For pitot tube installation instructions, refer to your pitot tube installation manual.

The following steps cover the *recommended* installation of the EP-90R. You will attach the EP-90R to a pitot tube hose in the same manner.

1. Remove the pressure hose from the boat's speedometer.
2. Clip off the end of the pressure hose that was connected to the speedometer. This will help ensure the pressure hose will fit snugly on the EP-90R hose barb attachment. **The hose-barb attachment requires a 1.4" (6.35 mm) hose.**



1/4 " hose barb attachment

3. Slide the pressure hose onto the EP-90R hose barb attachment. If it does not fit snugly, secure it with a zip tie at the base of the hose barb attachment.

4. Now you are ready to remove the speedometer. Refer to the speedometer’s installation manual for removal instructions.

5. The EP-90R is ready to be connected to NMEA 2000 network. If the NMEA 2000 network backbone is in another part of the boat, the EP-90R can be linked to the display unit at the console — if one is present — or either of the LMF digital gauges by using the T connector that was included in the packaging. If the network backbone is near the console, connect the EP-90R red male connector to a T connector in the desired location on the network backbone. The EP-90R is ready for use.

The rest of this document contains detailed information on connecting to a NMEA 2000 network.

Installing the EP-90R to measure other data:

Follow this installation to monitor the following data: Atmospheric Pressure, Engine Boost Pressure, Engine Oil Pressure, Engine Water Pressure, Fuel Pressure and Transmission Oil Pressure.

NOTE:

Make sure the pressure hose has enough slack to be attached to the pressure sensor when the EP-90R is connected to the NMEA 2000 backbone.

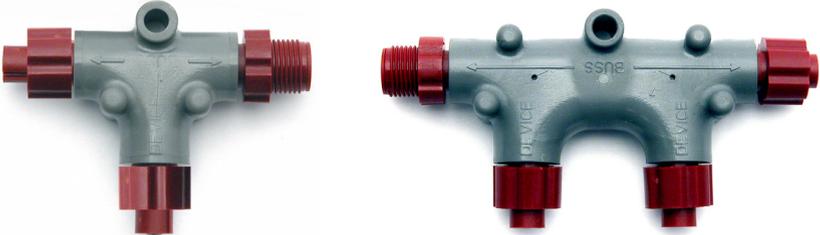
1. Slide the (Atmospheric, Engine Boost, Engine Oil, Engine Water, Fuel or Transmission Oil) pressure hose onto the EP-90R hose barb attachment. Attach a zip tie or hose clamp at the base of the hose barb attachment.

2. The EP-90R is ready to be connected to NMEA 2000 network. If the NMEA 2000 network backbone is in another part of the boat, the EP-90R can be linked to the display unit at the console — if one is present — or either of the LMF digital gauges by using the T connector that was included in the packaging. If the network backbone is near the console, connect the EP-90R red female connector to a T connector in the desired location on the network backbone.

Connecting to a NMEA 2000 Network

A NMEA 2000 network is a communications link between two or more devices that transfer NMEA 2000 information. A NMEA 2000 network functions like the phone wiring in a house. If, for example, you pick up a phone in the living room you will be able to hear the conversation someone is having on a phone in the bedroom.

In similar fashion, a NMEA 2000 network allows multiple display units to receive data from a GPS antenna or multiple sonar units to receive messages sent from a temperature sensor. A NMEA 2000 network gives you the flexibility to view information like, engine diagnostics and fuel level data on digital gauges or display units located anywhere on your boat.



There are two types of LowranceNet red connectors: the single T connector (left) and the double T connector (right).

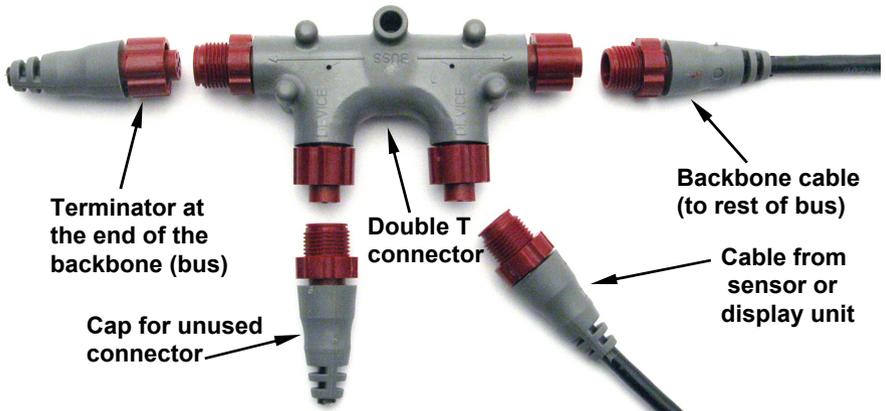
Network Backbone and Network Nodes

A network bus backbone consists of network cabling, terminators and T connectors. Network nodes are made by fitting T-shaped connectors into the backbone (using the sockets on the sides) and attaching any network device to the bottom of the T.

Staying with the previous phone wiring example, T connectors on the backbone are the equivalent of phone jacks spread throughout a house. To pick up a phone and be able to hear a conversation from another phone in the house, both phones have to be connected to the main phone line. In similar fashion, only sensors and display units plugged into the NMEA network can share information.

The network backbone is like the phone wiring that runs throughout a home. It connects the network nodes, allowing them to communicate across the network. Connections found in the middle of the bus could have T connectors or backbone network cable plugged into one or both sides.

Connections at the end of a network will have the backbone cable plugged into one side and a terminator plugged into the other.



NMEA 2000 network node located at the end of a NMEA 2000 backbone.

NOTE:

If you have a double T Connector on your network that is not attached to a device, you must cap the unused connector with a NMEA 2000 cap. This will protect the pin connectors from corrosion. The NMEA 2000 cap looks like a terminator, but has "Cap" stamped into the connector housing.

If you want to add another node to a working network, add another T connector. T connectors may be purchased from LEI. If you are adding a Lowrance or LEI NMEA 2000 sensor, it will come with its own T connector.

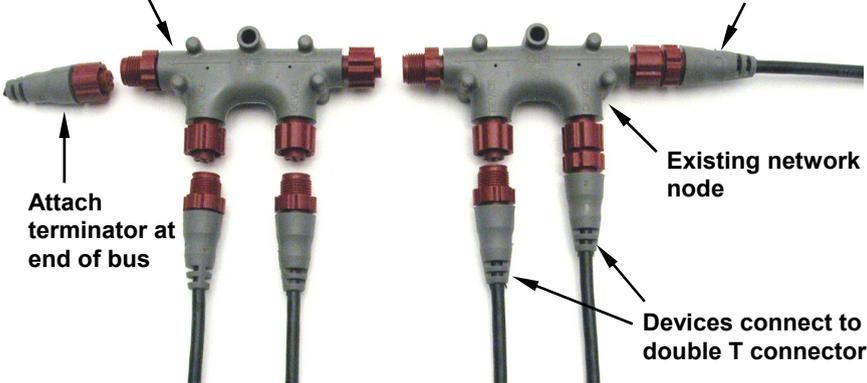
Adding a Network Node

You can add a node to any existing connection, anywhere along the network backbone. This connection could be between a T connector and a terminator, between two T connectors, between a T connector and a backbone extension cable or between two extension cables. Wherever you want to add the new node, separate the sockets of the existing connection and install the T connector between them.

If you want to add a node at the end of the backbone (network bus) remove the terminator from the last connector. Install the new T connector and attach the terminator to the side of the connector.

Use T-connector or double T connector to add device to bus (maintaining linear architecture)

Backbone cable to rest of bus



Attach terminator at end of bus

Existing network node

Devices connect to double T connector

In this example, a new device is added to the NMEA 2000 bus by installing a T connector between a T connector and a terminator at the end of the backbone (network bus).

Additional Network Information

For more information on creating or expanding a network refer to the NMEA 2000 network setup booklet, part number 988-0154-173, which came packed with this document.

Notes

LMF-200: EP-90R

Pressure Configuration

This section covers how to use EP-90R Pressure Sensor with the LMF-200 Multi-function gauge.

NOTE:

You will notice the LMF-200 does not have an Exit key. Menus will time out after a preset amount of time (3, 5, 10 or 15 seconds). The default setting is 5 seconds. Refer to your LMF-200 instruction manual for more information on the Timeout feature.



LMF-200 Multi-function Digital Gauge.

Boat Setup

If this is the first time you have turned on your LMF-200, you will have to complete Boat Setup before you will be able to configure your pressure sensor.

To execute Boat Setup:

1. With Boat Setup highlighted on the screen, press **MENU**. The Boat Setup menu will appear, allowing you to select an engine-tank configuration that matches the number of engines and fuel tanks on your vessel. Boat Setup options include: 1 En/1 Tk, 1 En/2 Tk, 2 En/1 Tk, 2 En/2 Tk, 3 En/1 Tk and 3 En/3 Tk.
2. Select the configuration option that matches number of engines and tanks on your vessel and press **MENU**.
3. Select the tank you want to set up and press **MENU**, which will open the Tank Size window.

4. Use the **UP** and **DOWN** keys to input the number of gallons the tank will hold and press **MENU**. Repeat steps 3 and 4 for each additional tank. After all tanks have been set up, you will be directed to the main display.

Boat Setup Reset

If you want to access the Setup screen (Boat Setup) after an engine-tank configuration has been chosen you will have to reset the configuration to default settings.

To reset engine tank configuration:

1. Press **MENU**, highlight **SYSTEM SETUP** and press **MENU**.
2. Choose **ENG/TANK** and press **MENU** twice. The following message will appear: *Hit menu to reset Eng/Tnk.*
3. Press **MENU**. The Setup screen will appear with Boat Setup highlighted.

EP-90R Pressure Configuration

Your EP-90R Pressure Sensor can be configured to measure the following data types: Pitot Speed (PTT:S), Water Pressure (WTR:P), Engine Oil Pressure (Eng:O:P), Fuel Pressure (FUL:P), Boost Pressure (BST:P), Transmission Oil Pressure (Trn:O:P) and Atmospheric Pressure (ATM:P).

To configure the EP-90R:

1. Press **MENU**, select **SYSTEM SETUP** and press **MENU**.
2. Highlight **BUS DEVICES** and press **MENU**. Select an unconfigured pressure sensor (**UNCFG PRES**) and press **MENU**. The following message will appear: *Hit Menu to Cfg Pres Snsr.*
3. Press **MENU**, then select **PTT:S** (Pitot Speed), **WTR:P** (Engine Water Pressure), **ENG:O:P** (Engine Oil Pressure), **FUL:P** (Fuel Pressure), **BST:P** (Boost Pressure), **TRN:O:P** (Transmission Oil Pressure) or **ATM:P** (Atmospheric Pressure) and press **MENU**. The Select Engine menu will appear with up to three options. (If your unit is set to a single-tank configuration, or if you chose Pitot Speed or Atmospheric Pressure, you will be directed to the Bus Devices list.)
4. Select the desired tank and press **MENU**. You will be taken back to the Bus Devices list.

To unconfigure the EP-90R:

1. Press **MENU**, select **SYSTEM SETUP** and press **MENU**.
2. Highlight **BUS DEVICES** and press **MENU**. Select a configured pressure sensor and press **MENU**.
3. The pressure sensor menu will appear. Highlight **UNCONFIG** and press **MENU**. The following message will appear: *Hit Menu to Unset Dev Name*.
4. Press **MENU**. You will be taken back to the Bus Devices list.

To reconfigure the EP-90R:

1. Press **MENU**, select **SYSTEM SETUP** and press **MENU**.
2. Highlight **BUS DEVICES** and press **MENU**. Select a configured pressure sensor and press **MENU**.
3. The pressure sensor menu will appear. Highlight **RECONFIG** and press **MENU**.
4. Select **PTT:S** (Pitot Speed), **WTR:P** (Engine Water Pressure), **ENG:O:P** (Engine Oil Pressure), **FUL:P** (Fuel Pressure), **BST:P** (Boost Pressure), **TRN:O:P** (Transmission Oil Pressure) or **ATM:P** (Atmospheric Pressure) and press **MENU**. The Select Engine menu will appear with up to three options. (If your unit is set to a single-tank configuration, or if you chose Pitot Speed or Atmospheric Pressure, you will be directed to the Bus Devices list.)
4. Select the desired engine and press **MENU**. You will be taken back to the Bus Devices list.

Displaying Pressure Sensor Data

You can display pressure data on the Gauge, Single Digital, Dual Digital and Fuel Manager pages.

Page Screen Rotation

The Page Screen Rotation consists of multiple pages that have been set for display. Once pages have been added to the rotation, they can be set to scroll across the screen automatically or manually. Press the **UP** and **DOWN** keys to manually scroll pages across the screen. Pressing the **UP** key moves the scroll in one direction. Pushing the **DOWN** key moves the scroll in the other direction. You can use Autoscroll if you want the pages to automatically scroll across the screen. Refer to your LMF -200 manual for information about Autoscroll.

Adding a page:

1. Press **MENU**, use the **UP** and **DOWN** keys to select **PAGES** and press **MENU**, which will open the Pages menu with the following options: Add Page, Rem Page, Autoscroll and Set Pop-up.
2. Highlight **ADD PAGE** and press **MENU**.
3. Select Gauge, Single Digital or Dual Digital and press **MENU**. You will be taken back to the main display, where the page you selected will be shown.

Customizing Pages

The customizing pages feature allows you to choose what data will be displayed and where it will be displayed on select pages. You can customize the Gauge, Single Digital and Dual Digital pages with pressure sensor data: Pitot Speed (PTT:S), Water Pressure (WTR:P), Engine Oil Pressure (Eng:O:P), Fuel Pressure (FUL:P), Boost Pressure (BST:P), Transmission Oil Pressure (Trn:O:P) and Atmospheric Pressure (ATM:P).

To customize Gauge page:

1. After the Gauge page has been added to the page screen rotation, use the **UP** and **DOWN** keys to display it on the screen.
2. Press **MENU**, select **CUSTOMIZE** and press **MENU**.
3. Highlight **PTT:S** (Pitot Speed), **WTR:P** (Engine Water Pressure), **ENG:O:P** (Engine Oil Pressure), **FUL:P** (Fuel Pressure), **BST:P** (Boost Pressure), **TRN:O:P** (Transmission Oil Pressure) or **ATM:P** (Atmospheric Pressure) and press **MENU**. If your unit is configured for multiple tanks, the Select Engine menu will appear with up to three options. (If you are using a single-tank configuration, or if you chose Pitot Speed or Atmospheric Pressure, you will be directed to the main display.)
4. Highlight the desired tank and press **MENU**. You will be taken back to the main display.

To customize Single Digital page:

1. After the Single Digital page has been added to the page screen rotation, use the **UP** and **DOWN** keys to display it on the screen.
2. Press **MENU**, select **CUSTOMIZE** and press **MENU**.
3. Highlight **PTT:S** (Pitot Speed), **WTR:P** (Engine Water Pressure), **ENG:O:P** (Engine Oil Pressure), **FUL:P** (Fuel Pressure), **BST:P** (Boost Pressure), **TRN:O:P** (Transmission Oil Pressure) or **ATM:P** (Atmospheric Pressure) and press **MENU**. The Select Engine menu will appear with

up to three options. (If your unit is configured for one engine, or if you chose Pitot Speed or Atmospheric Pressure, you will be directed back to the main display.)

4. Select the desired engine and press **MENU**. You will be taken back to the main display.

To customize Dual Digital page:

1. After the Dual Digital page has been added to the page screen rotation, use the **UP** and **DOWN** keys to display it on the screen.

2. Press **MENU**, select **CUSTOMIZE** and press **MENU**. The Position menu will appear with two options: Top Data and Bottom Data.

3. Select the desired data position and press **MENU**.

4. Highlight **PTT:S** (Pitot Speed), **WTR:P** (Engine Water Pressure), **ENG:O:P** (Engine Oil Pressure), **FUL:P** (Fuel Pressure), **BST:P** (Boost Pressure), **TRN:O:P** (Transmission Oil Pressure) or **ATM:P** (Atmospheric Pressure) and press **MENU**. The Select Engine menu will appear with up to three options. (If your unit is configured for one engine, or if you chose Pitot Speed or Atmospheric Pressure, you will be directed back to the main display.)

5. Select the desired engine and press **MENU**. You will be taken back to the main display.

To customize Fuel Manager page:

1. After the Fuel Manager page has been added to the page screen rotation, use the **UP** and **DOWN** keys to display it on the screen.

2. Press **MENU**, select **CUSTOMIZE** and press **MENU**.

3. Highlight **PTT:S** (Pitot Speed) and press **MENU**. You will be taken back to the main display.

Pressure Range (Gauge Page only)

From the analog page, you can set pressure ranges for Boost, Oil, Fuel and Transmission Oil Pressure.

To set pressure range:

1. From the Gauge page, press **MENU** and select **SYSTEM SETUP**.

2. Highlight **PRES RNGS** (Pressure Ranges), which will open the Select Pressure menu with the following options: **FUL:P** (Fuel Pressure), **BST:P** (Boost Pressure), **WTR:P** (Engine Water Pressure), **Eng:O:P** (Engine Oil Pressure) and **Trn:O:P** (Transmission Oil Pressure).

3. Select the desired option and press **MENU**. The Pressure Range menu will appear with the following options: 0-30 psi, 0-60 psi, 0-80 psi and 0-100 psi.

4. Select the desired PSI range and press **MENU**.

Warning Threshold

When you set a Warning Threshold for a pressure sensor, a pop-up window will appear and an alarm will sound when pressure exceeds a preset pressure level of your choosing.

NOTE:

Warning Thresholds may be set to monitor Boost Pressure, Engine Water Pressure, Oil Pressure, Fuel Pressure and Transmission Oil Pressure.

To set a warning threshold:

1. Press **MENU**, select **SYSTEM SETUP** and press **MENU**.
2. Highlight **BUS DEVICES** and press **MENU**.
3. Select the desired pressure sensor and press **MENU**. Highlight **WRNING TRHLD** and press **MENU**.
4. Use the **UP** and **DOWN** keys to select the desired PSI level. Depress the **DOWN** key to turn off a warning threshold. The threshold will be set to Off by default.
5. When the threshold is set to the desired level, press **MENU**.

Reset

The reset command switches pressure sensor settings (alarms and configuration) to default values.

To reset EP-90R values:

1. Press **MENU**, select **SYSTEM SETUP** and press **MENU**.
2. Highlight **BUS DEVICES** and press **MENU**. Select a configured pressure sensor and press **MENU**.
3. The pressure sensor menu will appear. Highlight **RESET** and press **MENU**. The following message will appear: *Press Menu to Rst Values*. You will be taken back to the Bus Devices list where the sensor will be shown as PTT:S (Pitot Speed).

LMF-400: EP-90R

Pressure Configuration

This section covers how to use your EP-90R Pressure Sensor with the LMF-400 Multi-function gauge.



LMF-400 Multi-function Digital gauge.

Boat Setup

If this is the first time you have turned on your LMF-400, you will have to complete Boat Setup before you will be able to configure your water pressure sensor.

To execute Boat Setup:

1. With Boat Setup highlighted on the screen, press **ENTER**. A menu will appear, allowing you to choose the number of engines and fuel tanks on your vessel. The Boat Setup menu options are: 1 Eng/1 Tank, 1 Eng/2 Tank, 2 Eng/1 Tank, 2 Eng/2 Tanks, 3 Eng/1 Tank or 3 Eng/3 Tanks.
2. Use the **UP** and **DOWN** keys to select the engine-tank configuration that applies to your vessel and press **ENTER**. After setting the engine/tank configuration, the Tank Size menu will appear with up to three options (Port Tank, Center Tank and Starboard Tank), depending on the engine tank configuration you chose. (If you selected one tank during Boat Setup, you will be taken directly to the Setting Tank Size Window in Step 4.)
3. Select the desired tank and press **ENTER**, which will open the Setting Tank Size window.
4. Use the **UP** and **DOWN** keys to input the number of gallons the tank will hold and press **ENTER**. Press **EXIT** and repeat steps 3 and 4 for each of the remaining tanks.

5. After all tanks on your vessel have been set up, press **EXIT** repeatedly to return to the main display.

Boat Setup Reset

If you want to access the Setup screen (Boat Setup) after an engine-tank configuration has been chosen you will have to reset the configuration to default settings.

To reset engine-tank configuration:

1. Press **MENU**, highlight **SYSTEM SETUP** and press **ENTER**.
2. Choose **ENG/TANK CFG** and press **ENTER** twice. The following message will appear: *Press ENTER to reset Eng/Tnk Cfg.*
3. Press **MENU**. The Setup Menu will appear with Boat Setup highlighted.

EP-90R Pressure Configuration

Your EP-90R Pressure Sensor can be configured to monitor the following data: Pitot Tube, Engine Boost Pressure, Engine Oil Pressure, Engine Water Pressure, Fuel Pressure, Transmission Oil Pressure and Atmospheric Pressure.

To configure the EP-90R:

1. Press **MENU**, select **SYSTEM SETUP** and press **ENTER**.
2. Highlight **BUS DEVICES** and press **ENTER**. Select an unconfigured pressure sensor and press **ENTER**. The following message will appear: *Press Enter to Configure Pressure Snsr.*
3. Select **PITOT SPEED**, **ENG BST PRESS**, **ENG OIL PRESS**, **ENG WTR PRESS**, **FUEL PRESSURE**, **TRNS OIL PRESS** or **ATM PRESSURE** and press **ENTER**.
4. The Select Engine menu will appear with up to three options. (If your unit is set to a single-engine configuration, or if you chose Pitot Tube or Atmospheric Pressure, you will be taken back to the Bus Devices list.)
5. Select the desired engine and press **ENTER**. You will be directed to the Bus Devices list.

To unconfigure the EP-90R:

1. Press **MENU**, select **SYSTEM SETUP** and press **ENTER**.
2. Highlight **BUS DEVICES** and press **ENTER**. Select a configured pressure sensor and press **ENTER**.
3. Highlight **UNCONFIGURE** and press **ENTER**. The following message will appear: *Press Enter to Unconfig Device Name.*

4. Press **ENTER**. You will be taken back to the Bus Devices list. Press **EXIT** repeatedly to return to the main display.

To reconfigure the EP-90R:

1. Press **MENU**, select **SYSTEM SETUP** and press **ENTER**.
2. Highlight **BUS DEVICES** and press **ENTER**. Select a configured pressure sensor and press **ENTER**.
3. Highlight **RECONFIGURE** and press **ENTER**.
4. Select the **PITOT SPEED**, **ENG BST PRESS**, **ENG OIL PRESS**, **ENG WTR PRESS**, **FUEL PRESSURE**, **TRNS OIL PRESS** or **ATM PRESSURE** and press **ENTER**. The Select Engine menu will appear with up to three options. (If you are using a single-engine configuration you will be taken back to the Bus Devices list.)
5. Select the desired tank and press **ENTER**. You will be taken back to the Bus Devices list. Press **EXIT** repeatedly to return to the main display.

Displaying Pressure Sensor Data

You can display pressure sensor data on the Single Analog, Dual Analog, Quad Analog, Single Digital, Dual Digital, Quad Digital and Fuel Manager pages.

Page Screen Rotation

The Page Screen Rotation consists of multiple pages that have been set up for display. Once pages have been added to the page screen rotation, they can be set to scroll across the screen automatically or manually. Use the **ENTER** and **EXIT** keys to manually scroll pages across the screen. Pressing the **ENTER** key moves the scroll in one direction. Pushing the **EXIT** key moves the scroll in the other direction. You will use the Page Scrolling if you want pages to automatically scroll across the screen. Refer to your LMF-400 manual for more information about Page Scrolling.

To add a page to the display:

1. Press **MENU**, use the **UP** and **DOWN** keys to select **PAGES** and press **ENTER**. A menu will pop up with four options: Add Page, Remove Page, Page Scrolling and Pop-Ups Setup.
2. Select **ADD PAGE** and press **ENTER**.
3. Highlight Single Analog, Dual Analog, Quad Analog, Single Digital, Dual Digital, Quad Digital or Fuel Manager and press **ENTER**. The following message will appear: *Press Enter to add the selected page.*
4. Press **ENTER**, which will take you back to the main display, where the page you selected will be shown on the screen.

Customizing Pages

The customizing pages feature allows you to choose what data will be displayed on selected pages. You can use the Single Analog, Dual Analog, Quad Analog, Single Digital, Dual Digital, Quad Digital pages and Fuel Manager pages to display pressure sensor data.

To customize Single Analog page:

1. Make sure the Single Analog page has been added to the page screen rotation.
2. Use the **ENTER** and **EXIT** keys to scroll the Single Analog page onto the main display.
3. Press **MENU**, use the **UP** and **DOWN** keys to select **CUSTOMIZE** and press **ENTER**. The data menu will appear.
4. Select **PITOT SPEED, ENG BST PRESS, ENG OIL PRESS, ENG WTR PRESS, FUEL PRESSURE, TRNS OIL PRESS** or **ATM PRESSURE** and press **ENTER**. The Select Engine menu will appear with up to three options. (If your unit is set to a single-engine configuration, or if you chose Pitot Speed or ATM Pressure, you will be taken back to the Bus Devices list.)
5. Select the desired engine and press **ENTER**. You will be taken back to the Bus Devices list. Press **EXIT** repeatedly to return to the main display.

To customize Dual Analog page:

1. Make sure the Dual Analog page has been added to the page screen rotation.
2. Use the **ENTER** and **EXIT** keys to scroll the Dual Analog page onto the main display.
3. Press **MENU**, use the **UP** and **DOWN** keys to select **CUSTOMIZE** and press **ENTER**. The Position menu will appear with two options: Top Gauge and Bottom Gauge.
4. Select the desired position and press **ENTER**. The data menu will appear.
5. Highlight **PITOT SPEED, ENG BST PRESS, ENG OIL PRESS, ENG WTR PRESS, FUEL PRESSURE, TRNS OIL PRESS** or **ATM PRESSURE** and press **ENTER**. The Select Engine menu will appear with up to three options. (If your unit is set to a single-engine configuration, or if you chose Pitot Speed or ATM Pressure, you will be taken back to the Position menu.)
6. Select the desired engine and press **ENTER**. You will be directed to the Position menu.
7. Repeat steps 4-6 to customize the other position or press **EXIT** repeatedly to return to the main display.

To customize Quad Analog page:

1. Make sure the Quad Analog page has been added to the page screen rotation.
2. Use the **ENTER** and **EXIT** keys to scroll the Quad Analog page onto the main display.
3. Press **MENU**, select **CUSTOMIZE** and press **ENTER**. The Position menu will appear with four options: Top Left, Top Right, Bottom Left and Bottom Right.
4. Select the desired position and press **ENTER**. The data menu will appear.
5. Highlight **PITOT SPEED**, **ENG BST PRESS**, **ENG OIL PRESS**, **ENG WTR PRESS**, **FUEL PRESSURE**, **TRNS OIL PRESS** or **ATM PRESSURE** and press **ENTER**. The Select Engine menu will appear with up to three options. (If your unit is set to a single-engine configuration, or if you chose Pitot Speed or ATM Pressure, you will be taken back to the Position menu.)
6. Select the desired engine and press **ENTER**. You will be directed to the Position menu.
7. Repeat steps 4-6 to customize the other positions or press **EXIT** repeatedly to return to the main display.

To customize Single Digital page:

1. After the Single Digital page has been added to the page screen rotation, use the **ENTER** and **EXIT** keys to display it on the main screen.
2. Press **MENU**, use the **UP** and **DOWN** keys to select **CUSTOMIZE** and press **ENTER**. The data menu will appear.
3. Highlight **PITOT SPEED**, **ENG BST PRESS**, **ENG OIL PRESS**, **ENG WTR PRESS**, **FUEL PRESSURE**, **TRNS OIL PRESS** or **ATM PRESSURE** and press **ENTER**. The Select Engine menu will appear with up to three options. (If your unit is set to a single-engine configuration, or if you chose Pitot Speed or ATM Pressure, you will be taken back to the main display.)
4. Select the desired engine and press **ENTER**. You will be taken back to the main display, where the data you selected will be shown.

To customize Dual Digital page:

1. After the Dual Digital page has been added to the page screen rotation, use the **ENTER** and **EXIT** keys to display it on the main screen.
2. Press **MENU**, use the **UP** and **DOWN** keys to select **CUSTOMIZE** and press **ENTER**. The Position menu will appear with two options: Top Data and Bottom Data.
3. Highlight the desired data position and press **ENTER**.

5. Highlight **PITOT SPEED, ENG BST PRESS, ENG OIL PRESS, ENG WTR PRESS, FUEL PRESSURE, TRNS OIL PRESS** or **ATM PRESSURE** and press **ENTER**. The Select Engine menu will appear with up to three options. (If your unit is set to a single-engine configuration, or if you chose Pitot Speed or ATM Pressure, you will be taken back to the Position menu.)

6. Select the desired engine and press **ENTER**. You will be directed to the Position menu.

7. Repeat steps 4-6 to customize the other position or press **EXIT** repeatedly to return to the main display.

To customize Quad Digital page:

1. After the Quad Digital page has been added to the page screen rotation, use the **ENTER** and **EXIT** keys to display it on the main screen.

2. Press **MENU**, use the **UP** and **DOWN** keys to select **CUSTOMIZE** and press **ENTER**. The Position menu will appear with four options: Data Box 1, Data Box 2, Data Box 3 and Data Box 4.

3. Highlight the desired data position and press **ENTER**.

5. Highlight **PITOT SPEED, ENG BST PRESS, ENG OIL PRESS, ENG WTR PRESS, FUEL PRESSURE, TRNS OIL PRESS** or **ATM PRESSURE** and press **ENTER**. The Select Engine menu will appear with up to three options. (If your unit is set to a single-engine configuration, or if you chose Pitot Speed or ATM Pressure, you will be taken back to the Position menu.)

6. Select the desired engine and press **ENTER**. You will be directed to the Position menu.

7. Repeat steps 4-6 to customize the other positions or press **EXIT** repeatedly to return to the main display.

To customize Fuel Manager page:

1. After the Fuel Manager page has been added to the page screen rotation, use the **ENTER** and **EXIT** keys to display it on the main screen.

2. Press **MENU**, use the **UP** and **DOWN** keys to select **CUSTOMIZE** and press **ENTER**. The Position menu will appear with three options: Top Data, Center Data and Bottom Data.

3. Highlight the desired data position and press **ENTER**.

5. Highlight **PITOT SPEED** and press **ENTER**.

6. Select the desired engine and press **ENTER**. You will be directed to the Position menu.

7. Repeat steps 4-6 to customize the other positions or press **EXIT** repeatedly to return to the main display.

Pressure Range (Analog Pages only)

From the Single, Dual and Quad Analog pages, you can set pressure ranges for Boost, Oil, Fuel and Transmission Oil Pressure.

To set pressure range:

1. From an analog page, press **MENU**, select **SYSTEM SETUP** and press **ENTER**.
2. Highlight **PRESS RANGES** (Pressure Ranges) and press **ENTER**. The Select Pressure menu with the following options: Eng Water Pressure, Eng Oil Pressure, Fuel Pressure, Eng Bst Press (Engine Boost Pressure) and Trns Oil Press (Transmission Oil Pressure).
3. Select the desired option and press **ENTER**. The Pressure Range menu will appear with the following options: 0-15 psi, 0-30 psi, 0-60 psi, 0-80 psi and 0-100 psi.
4. Select the desired PSI range and press **ENTER**.

Warning Threshold

When you set a Warning Threshold for a pressure sensor, a pop-up window will appear and an alarm will sound when pressure exceeds a preset pressure level of your choosing.

NOTE:

Warning Thresholds may be set to monitor Boost Pressure, Engine Water Pressure, Oil Pressure, Fuel Pressure and Transmission Oil Pressure.

To set a warning threshold:

1. Press **MENU**, select **SYSTEM SETUP** and press **ENTER**.
2. Highlight **BUS DEVICES** and press **ENTER**.
3. Select the desired pressure sensor and press **ENTER**.
4. Highlight **WRNG THRESHLD** and press **ENTER**.
5. Use the **UP** and Down **KEYS** to input the desired PSI level for the threshold. Press **ENTER**. You will be taken back to the Bus Devices list.
6. Press **EXIT** repeatedly to return to the main display.

Reset Values

The Reset Values command switches pressure sensor settings (Alarms and Configuration) to default values.

To reset pressure sensor values:

1. Press **MENU**, select **SYSTEM SETUP** and press **ENTER**.
2. Highlight **BUS DEVICES** and press **ENTER**.
3. Select the desired pressure sensor and press **ENTER**.
4. Highlight **RESET VALUES** and press **ENTER**. The following message will appear: *Press Enter to Reset Values*.
5. You will be taken back to the Bus Devices list. Press **EXIT** repeatedly to return to the main display.

Display Unit: EP-90R

Pressure Configuration

This section will show you how to use an EP-90R Pressure Sensor with a display unit.



The LMS-525cDF is one of many Lowrance display units that may be used with the EP-90R Pressure Sensor.

NOTE:

Your unit may have a NMEA 2000 menu or a Networking menu, depending on the software version installed in your unit. Both menus allow you to perform the same NMEA 2000-related functions.

Bus Setup

Selecting Bus Setup from the NMEA 2000 or Networking menu will open the Bus Configuration menu, giving you access to the Engine-Tank Configuration menu and the NMEA 2000 Devices list. The list, located in the top half of the Bus Configuration menu, shows all devices connected to the network. The Engine-Tank Configuration menu is located in the bottom half of the Bus Configuration menu.

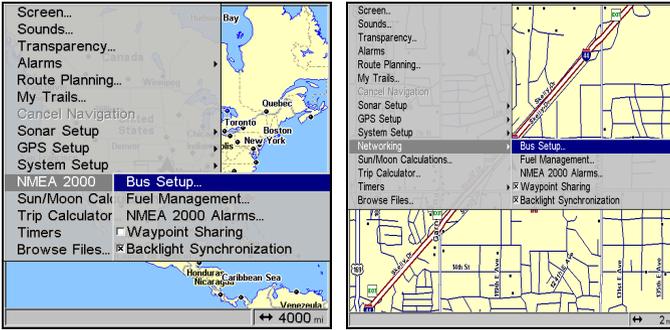
NOTE:

Some of the menus shown in this section may differ slightly from the menus in your display unit, but your unit will perform the same functions in a similar manner.

Engine & Tank Configuration

The Engine-Tank configuration menu is located below the NMEA 2000 Devices list, but will only be accessible if engine- or fuel-related devices are on the network.

When choosing an engine-tank configuration you will use the Tank Select menu, Tank Size dialog box and Set Configuration button.

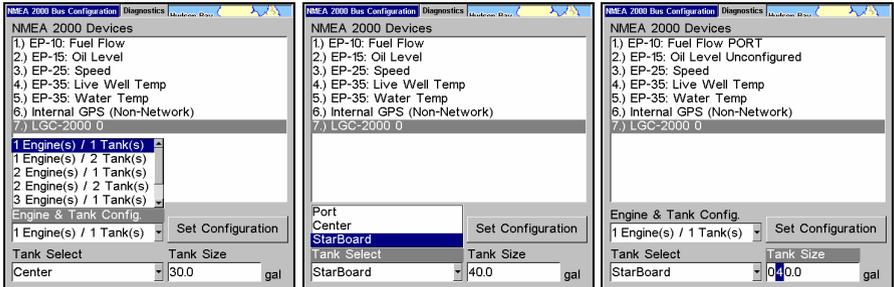


Bus Setup highlighted on the NMEA 2000 menu (left). Bus Setup selected on Networking menu (right).

Setting Engine-Tank Configuration:

1. Press **MENU** twice, highlight **NMEA 2000** or **NETWORKING** and press **ENTER**.
2. The NMEA 2000 menu will appear with five options: Bus Setup, Fuel Management, NMEA 2000 Alarms, Waypoint Sharing and Backlight Synchronization. Choose **BUS SETUP** and press **ENTER**.
3. Select **ENGINE & TANK CONFIG** and press **ENTER**, which will open the Engine & Tank Configuration menu with the following configuration options: 1 Engine/1 Tank, 1 Engine/2 Tanks, 2 Engines/1 Tank, 2 Engines/2 Tanks, 3 Engines/1 Tank, 3 Engine/3 Tanks and Unconfigured Bus.
4. Choose the configuration that matches the number of engines and tanks on your vessel and press **ENTER**.
5. Highlight **TANK SELECT** and press **ENTER**, which will open the Tank Select menu.
6. Select the tank you want to set up and press **ENTER**. Highlight the Tank Size dialog box and press **ENTER**.
7. Input the capacity (gallons) of the tank you chose from the Tank Select menu and press **ENTER**.
8. Repeat Steps 5-7 for each remaining tank.

9. When all tanks have been configured, highlight the **SET CONFIGURATION** button and press **ENTER**. The following confirmation message will appear: *Are you sure you wish to change the bus configuration?* Choose **YES** and press **ENTER**, Press **EXIT** to return to the main display.



1 Engine/1Tank highlighted on Engine and Tank Configuration menu (left). Starboard highlighted on Tank Select menu (center). Tank Size set to 40 gallons (right).

9. When all tanks have been configured, highlight the **SET CONFIGURATION** button and press **ENTER**. The following confirmation message will appear: *Are you sure you wish to change the bus configuration?* Choose **YES** and press **ENTER**, Press **EXIT** to return to the main display.

EP-90R Pressure Sensor Configuration

The Location and Pressure Type menus will be used when configuring you EP-90R. You can also change the sensor's Device Name.

Device Name

You can change how your pressure sensor will be displayed on your unit's NMEA 2000 Devices list by inputting a customized device name in the Device Name dialog box.

NOTE:

Changing the Device Name only will affect the way the EP-90R is shown on your display unit. The customized device name will not be seen by other devices or display units on the NMEA 2000 network.

To change Device Name:

1. Press **MENU** twice, select **NMEA 2000** or **NETWORKING** and press **ENTER**.
2. Highlight **BUS SETUP** and press **ENTER**. Select the desired pressure sensor from the Bus Devices list and press **ENTER**.
3. Device Name will be highlighted. Press **ENTER** to access the Device Name dialog box.

4. Use the **UP** and **DOWN** keys to change the Device Name. When you have finished inputting the desired Device Name, press **ENTER**. Press **EXIT** repeatedly to return to the main display.

To reset device name to default setting:

1. Press **MENU** twice, select **NMEA 2000** or **NETWORKING** and press **ENTER**. A menu will appear with five options: Bus Setup, Fuel Management, NMEA 2000 Alarms, Waypoint Sharing and Backlight Synchronization.

2. Highlight **Bus SETUP** and press **ENTER**, which will open the Bus Configuration menu. A list of network devices will be at the top of the page.

3. Select the pressure sensor with the device name you want to reset and press **ENTER**. The Device Configuration menu will appear with the Device Name dialog box highlighted.

4. Press **ENTER**. Depress the left arrow key until the device name disappears. Press **ENTER**, then press **EXIT** to return to the NMEA 2000 menu.

5. Highlight the device and press **ENTER**. The Device Configuration menu will open. The device name will be reset to its default setting. Press **EXIT** repeatedly to return to the main display.

To select Location:

1. Press **MENU** twice, select **NMEA 2000** or **NETWORKING** and press **ENTER**. A menu will appear with five options: Bus Setup, Fuel Management, NMEA 2000 Alarms, Waypoint Sharing and Backlight Synchronization.

2. Highlight **Bus SETUP** and press **ENTER**, which will open the Bus Configuration menu. A list of network devices will be at the top of the page.

3. Select the desired pressure sensor and press **ENTER**. The Device Configuration menu will appear.

4. Highlight **LOCATION** and press **ENTER**.

5. Select the desired location or the default (Unknown) and press **ENTER**. The following message will appear: Are you sure you wish to change this device's configuration?

6. Select **Yes** and press **ENTER**. Press **EXIT** repeatedly to return to the main display.

To select Pressure Type:

1. Press **MENU** twice, select **NMEA 2000** or **NETWORKING** and press **ENTER**. A menu will appear with five options: Bus Setup, Fuel Management, NMEA 2000 Alarms, Waypoint Sharing and Backlight Synchronization.
2. Highlight **BUS SETUP** and press **ENTER**, which will open the Bus Configuration menu. A list of network devices will be at the top of the page.
3. Select the desired pressure sensor and press **ENTER**. The Device Configuration menu will appear.
4. Highlight **PRESSURE TYPE** and press **ENTER**. The following configuration options will appear: Pitot Speed, Boost, Oil, Water, Fuel, Transmission Oil, Atmospheric and the default setting, Unknown.
5. Highlight the desired Pressure Type and press **ENTER**. The following confirmation message will appear: *Are you sure you wish to change this device's configuration?*
6. Highlight **Yes** and press **ENTER**. Press **EXIT** repeatedly to return to the main display.

NOTE:

You can unconfigure your EP-90R by setting the Location and Pressure Type to Unknown. You also can use the Restore Defaults command.

Restore Defaults

The Restore Defaults command will reset your pressure sensor to default settings.

To restore default settings:

1. Press **MENU** twice, select **NMEA 2000** or **NETWORKING** and press **ENTER**. A menu will appear with five options: Bus Setup, Fuel Management, NMEA 2000 Alarms, Waypoint Sharing and Backlight Synchronization.
2. Highlight **BUS SETUP** and press **ENTER**, which will open the Bus Configuration menu. A list of network devices will be at the top of the page.
3. Select the desired pressure sensor and press **ENTER**. The Device Configuration menu will appear.
4. Highlight **ADVANCED OPTIONS** and press **ENTER**.
5. Select **RESTORE DEFAULTS** and press **ENTER**. The following message will appear: *Are you sure you wish to change this device's configuration?*

6. Highlight **Yes** and press **ENTER**. Press **EXIT** repeatedly to return to the main display.

NMEA 2000 Alarms

When you set a NMEA 2000 Alarm for a pressure sensor, a pop-up window will appear and an alarm will sound when pressure exceeds or falls below a preset PSI level of your choosing.

To turn on/off NMEA 2000 Alarm:

1. Press **MENU** twice, select **NMEA 2000** or **NETWORKING** and press **ENTER**.
2. Highlight **NMEA 2000 ALARMS** and press **ENTER**.
3. Highlight **FLUID LEVEL DEVICE** and press **ENTER**. Select the desired pressure sensor and press **ENTER**.
4. Highlight the **ENABLED** box next to the desired alarm (High Pressure or Low Pressure) and press **ENTER** to turn on the alarm. When the alarm is on an "X" will be placed in the Enabled Box.
5. To set the PSI level for an alarm, press **→** to highlight **VALUE** and press **ENT**.
6. Use the arrow keys to input the desired PSI and press **ENTER**. Repeat Steps 3-4 to set the other alarm.
7. Highlight **SET CONFIGURATION** and press **ENTER** to finalize alarm settings. Press **EXIT** repeatedly to get back to the main display.

NOTE:

To turn off (uncheck) an alarm, select its **ENABLED BOX** and press **ENTER**. Highlight the **SET CONFIGURATION** button and press **ENTER**.

Alarm Status Tab

The Alarm Status tab is the second tab at the top of the NMEA 2000 Alarms page. When an alarm has been set for a device, the alarm and its current status will be shown on the Alarm Status window.

To view Alarm Status:

1. Press **MENU** twice, select **NMEA 2000** or **NETWORKING** and press **ENTER**.
2. Select **NMEA 2000 ALARMS** and press **ENTER**.
3. Highlight the Alarm Status tab.
4. Press **EXIT** repeatedly to return to the main display.

Notes

Notes

LOWRANCE ELECTRONICS FULL ONE-YEAR WARRANTY

"We," "our," or "us" refers to LOWRANCE ELECTRONICS, INC., the manufacturer of this product. "You" or "your" refers to the first person who purchases this product as a consumer item for personal, family or household use.

We warrant this product against defects or malfunctions in materials and workmanship, and against failure to conform to this product's written specifications, all for one (1) year from the date of original purchase by you. **WE MAKE NO OTHER EXPRESS WARRANTY OR REPRESENTATION OF ANY KIND WHATSOEVER CONCERNING THIS PRODUCT.** Your remedies under this warranty will be available so long as you can show in a reasonable manner that any defect or malfunction in materials or workmanship, or any non-conformity with the product's written specifications, occurred within one year from the date of your original purchase, which must be substantiated by a dated sales receipt or sales slip. Any such defect, malfunction, or non-conformity which occurs within one year from your original purchase date will either be repaired without charge or be replaced with a new product identical or reasonably equivalent to this product, at our option, within a reasonable time after our receipt of the product. If such defect, malfunction, or non-conformity remains after a reasonable number of attempts to repair by us, you may elect to obtain without charge a replacement of the product or a refund for the product. **THIS REPAIR, OR REPLACEMENT OR REFUND (AS JUST DESCRIBED) IS THE EXCLUSIVE REMEDY AVAILABLE TO YOU AGAINST US FOR ANY DEFECT, MALFUNCTION, OR NON-CONFORMITY CONCERNING THE PRODUCT OR FOR ANY LOSS OR DAMAGE RESULTING FROM ANY OTHER CAUSE WHATSOEVER. WE WILL NOT UNDER ANY CIRCUMSTANCES BE LIABLE TO ANYONE FOR ANY SPECIAL, CONSEQUENTIAL, INCIDENTAL, OR OTHER INDIRECT DAMAGE OF ANY KIND.**

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This warranty does NOT apply in the following circumstances: (1) when the product has been serviced or repaired by anyone other than us; (2) when the product has been connected, installed, combined, altered, adjusted, or handled in a manner other than according to the instructions furnished with the product; (3) when any serial number has been effaced, altered, or removed; or (4) when any defect, problem, loss, or damage has resulted from any accident, misuse, negligence, or carelessness, or from any failure to provide reasonable and necessary maintenance in accordance with the instructions of the owner's manual for the product.

We reserve the right to make changes or improvements in our products from time to time without incurring the obligation to install such improvements or changes on equipment or items previously manufactured.

This warranty gives you specific legal rights and you may also have other rights which may vary from state to state.

REMINDER: You must retain the sales slip or sales receipt proving the date of your original purchase in case warranty service is ever required.

**LOWRANCE ELECTRONICS
12000 E. SKELLY DRIVE, TULSA, OK 74128
(800) 324-1356**

How to Obtain Service...

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Contact the Factory Customer Service Department. Call toll-free:

For Lowrance: 800-324-1356. For Eagle: 800-324-1354

8 a.m. to 5 p.m. Central Standard Time, M-F

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800-661-3983

905-629-1614 (not toll-free)

8 a.m. to 5 p.m. Eastern Standard Time, M-F

...outside Canada and the USA:

Contact the dealer in the country where you purchased your unit. To locate a dealer near you, see the instructions in paragraph number 1 below.

Accessory Ordering Information

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2) U.S. customers: LEI Extras Inc., PO Box 129, Catoosa, OK 74015-0129
Call toll free in the U.S., 800-324-0045, 8 a.m. to 5 p.m. Central Standard Time, M-F, or visit our web site www.lei-extras.com.

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