



EP-60R Fuel Flow Electronic Sensor

Installation, Configuration and Calibration Instructions

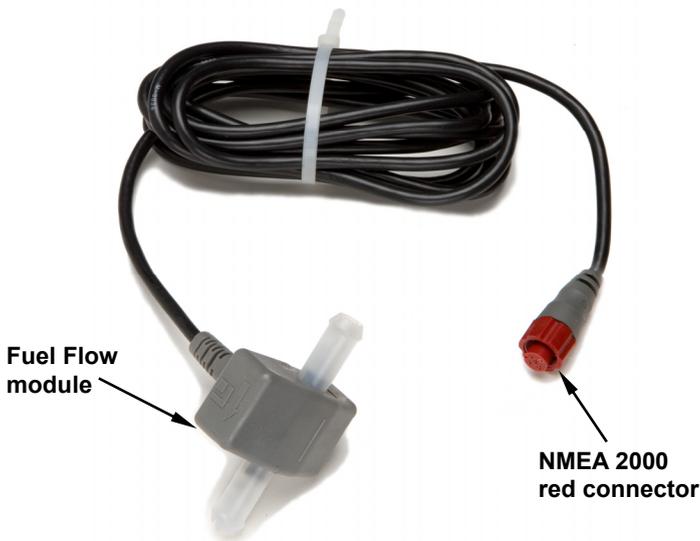
This document shows how to install an EP-60R Fuel Flow sensor and how to connect it to a NMEA 2000® network. It also provides instructions on how to configure and calibrate your fuel flow sensor with Lowrance digital gauges (LMF-200 & LMF-400) and display units.

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. You should decide where to install all components before drilling any holes in your vessel.*



The EP-60R Fuel Flow sensor.

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.

The EP-60R consists of a red cable connector and the sensor module. The sensor module contains a turbine to measure fuel flow and electronics which convert flow data to the NMEA 2000 data format. The cable length from the connector to the smart module is 10 feet (3 meters). The sensor is designed to work with gasoline only.

WARNING:

**Do not use this sensor with diesel engine fuel systems.
The EP-60R is designed only for gasoline engines.**

This sensor has been optimized to measure flow rates between 0.6 to 45 gallons (US) per hour, but it will operate at flow rates outside that range. The sensor will add 0.5 PSI of back pressure on the fuel system with a flow rate of 20 gallons per hour. At the rate of 40 gallons per hour, the back pressure will be 1 PSI.

The EP-60R Fuel Flow, like the other LowranceNet Electronic Probe (EP) sensors, is designed for use with a NMEA 2000 network. Your sensor, however, is also compatible with LowranceNet blue connector networks. It can be added to a blue connector network by using a female red to female blue adapter cable. Your sensor *MUST* be connected to a NMEA 2000 network or it *WILL NOT* function.



The NMEA 2000 female red to female Blue 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 to purchase of a LowranceNET Node Kit.



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-60R Fuel Flow, "*Setup and Installation of NMEA 2000 Networks, General Information*" part number 988-0154-173. If that document is unavailable, it can be downloaded free from the Lowrance web site.

Other supplies are not included, unless otherwise indicated. Required supplies include cable ties or other fasteners to secure the hose and cable; an inline fuel filter and any items needed to install it. Two 1" hose clamps are included with the sensor.

We assume you already have a fuel line installed. The EP-60R Fuel Flow was designed to fit a typical 3/8" SAE USCG Type A1 fuel hose. If your engine has different diameter hoses or metal fuel lines, a section of 3/8" fuel line must be installed between the sensor and the existing lines. Recommended tools are a flathead screwdriver to tighten the clamps and a knife to cut the fuel hose. If you need to route the sensor connector through a bulkhead, you will need a drill and a 3/4" drill bit.

Installation

Install one EP-60R sensor per engine. If you have multiple tanks, place the sensor after any Y or T in the line feeding the engine.

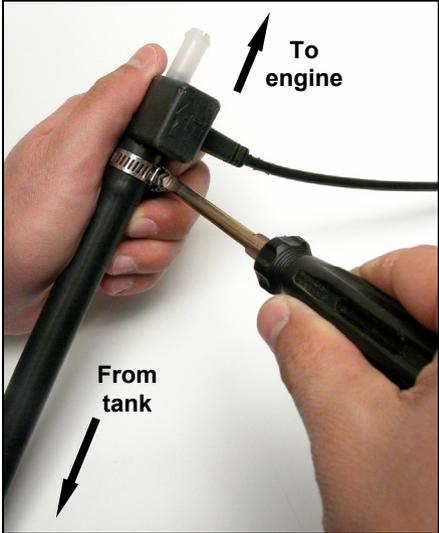
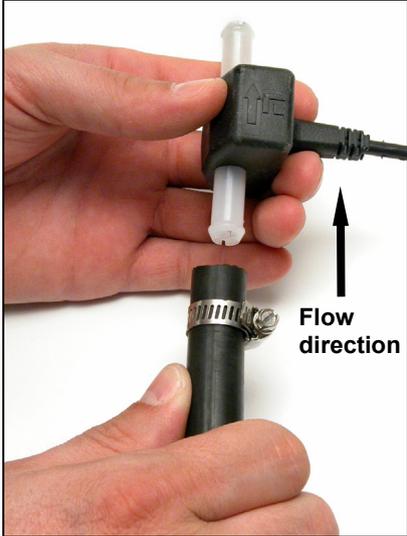
The sensor should be installed vertically, as close as possible to the fuel tank in an area where vibration is minimized. The housing has a molded-in, fuel flow direction arrow, which should be pointing up. Mount the sensor above the tank's maximum fuel level to avoid accidental fuel leakage in case the sensor becomes disconnected.

Caution:

Gasoline is extremely flammable. If possible, drain the fuel line before you start or shut any flow valves located at the tank. Keep sparks and flame away from the work area. After installation, remember to clean up any spilled fuel.

Cut the fuel hose where you intend to install the EP-60R sensor. Slide a clamp over the hose coming *from* the tank, then push the hose onto the bottom (*inlet*) hose barb.

Seat the hose flush against the sensor housing, then tighten the hose clamp. Attach the hose leading *to* the engine on the top (*outlet*) barb in the same way.



Push the fuel line onto the hose barb, then tighten the hose clamp. Orient the sensor vertically, with the flow arrow pointing up.

NOTE:

You *must* install an in-line fuel filter between the tank and the EP-60R sensor. This will prevent a malfunction caused by contaminated fuel. Debris in unfiltered fuel can clog the sensor's turbine and result in rough performance or engine shut down.

As with any fuel system, we recommend you always carry onboard a spare fuel filter and an in-line 3/8" splice barb. This allows you to remove a clogged EP-60R fuel sensor or fuel filter and restore engine operation if the fuel filter fails. We strongly recommend that you inspect your entire fuel system at regular intervals.

Secure the sensor/hose assembly so the sensor remains in a vertical position with the flow direction up. Clamp the hose on either side of the sensor to the hull or bulkhead to minimize vibration.

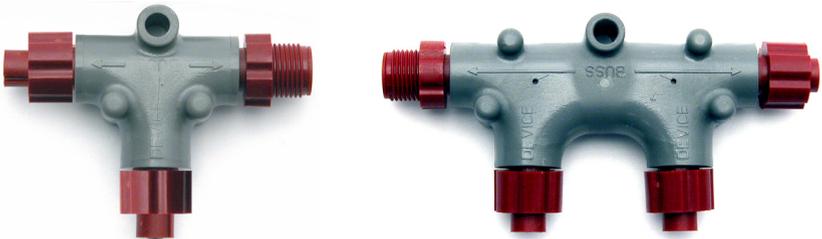
Route the sensor's cable connector to the T on the network backbone where you intend to attach it, and plug it in. The sensor is ready to use.

Connecting to a NMEA 2000 Network

A NMEA 2000 network is a communications link between two or more devices that transfer NMEA 2000 information. LowranceNET is the NMEA 2000 networking system developed by Lowrance Electronics. 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 by 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).

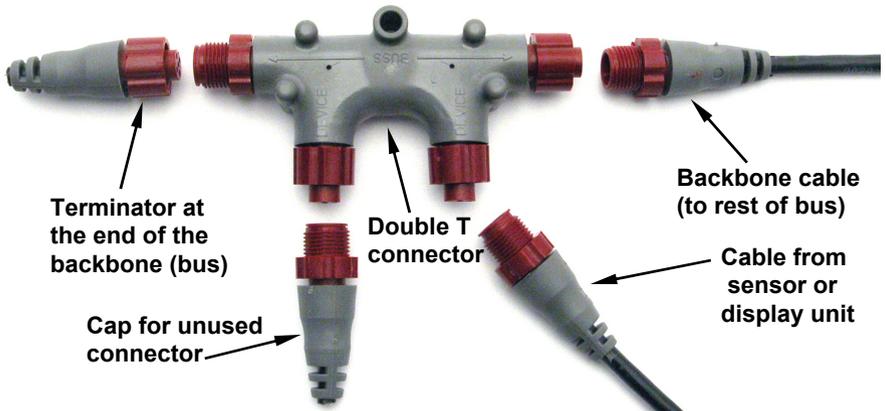
Network Backbone and Network Nodes

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, as shown in the following figure.



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.

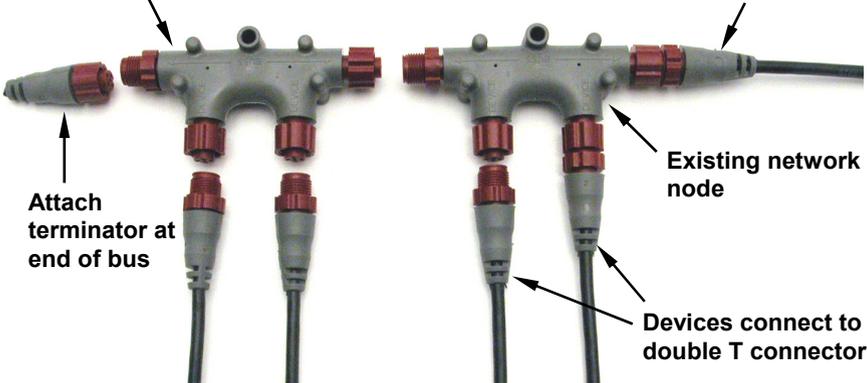
All T connectors on your network probably will be connected to a device. If you want to add another node to a working network, add another T connector. T connectors may be purchased from LEI (ordering information appears on the back page of this booklet). If you are adding a Lowrance or LEI NMEA 2000 sensor, it will come with a 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, like the figure above. 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-60R

Configuration & Calibration

This section covers how to use the EP-60R Fuel Flow with a 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 or calibrate your fuel flow. If you have already completed Boat Setup, skip ahead to the segment covering EP-60R Fuel Flow Configuration.

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 to match 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 correct configuration option and press **MENU**. If you selected a configuration with more than one tank, the Tank Size menu will appear. (If you selected a single tank configuration you will be taken directly to the Tank Size window, where you can input the size of the tank.)

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.

Fuel Remaining Source (FRem Src)

The Fuel Remaining source function allows you to select the device used to measure the amount of fuel remaining in the tank. It will be set to fluid level by default.

To set Fuel Remaining Source to Fuel Flow (Eng/FFlow):

1. Press **MENU**, use the **UP** and **DOWN** keys to select **SYSTEM SETUP** and press **MENU**. Select **FUEL MNGR** and press **MENU**.
2. Highlight **FREM SRC** and press **MENU**. That will open the FRem Src menu, which has two options: Eng/FFlow and Fuel level.
3. Select **ENG/FFLOW** and press **MENU**. You can now view fuel remaining data from the EP-60R.

EP-60R Fuel Flow Configuration

The LMF-200 can support up to three engines with one fuel flow sensor for each engine. Each fuel flow has an internal menu with the following options: Unset Engine, Change Engine (multiple engines only), Fuel Warning, Reset and Reset Calibration.

To configure a fuel flow:

1. Press **MENU**, use the **UP** and **DOWN** keys to select **SYSTEM SETUP** and press **MENU**.
2. Highlight **B. DEVICES** and press **MENU**. After a few moments, the Bus Devices list will appear.

3. Select **UNCFG FF** and press **MENU**. The following message will appear: *Hit Menu to Cfg Flow Sns.* Press **MENU** and the Configuration options menu will appear.

NOTE:

If your unit is set to a single-engine configuration, the Configuration Options menu will not appear when you are configuring a fuel flow. The fuel flow will automatically be configured as Eng FFlow.

4. Select the desired option and press **MENU**. You will be directed to the Bus Devices list. Configure remaining fuel flows by following the steps above.

To unconfigure a fuel flow:

You will use the Unset Engine command when you want to unconfigure a fuel flow.

To unset engine:

1. Press **MENU**, use the **UP** and **DOWN** keys to select **SYSTEM SETUP** and press **MENU**.
2. Highlight **B. DEVICES** and press **MENU**. After a few moments, the Bus Devices list will appear.
3. Select the fuel flow you want to unconfigure and press **MENU**.
4. Highlight **UNSET ENGINE** and press **MENU** which will launch the following message: *Hit Menu to Unset Dev Name.*
5. Press **MENU** and you will be taken back to the Bus Devices list. The newly unconfigured fuel flow will be displayed as **UNCFG FF**.

To reconfigure a fuel flow:

You will use the Change Engine command to reconfigure a Fuel Flow. Change Engine, however, will only appear on your LMF-200 menu if you have more than one engine. If you want to reconfigure a fuel flow, but all the fuel flows on your vessel are configured, you first will have to unconfigure a fuel flow to free up its configuration name.

If all three fuel flows are configured, which means there is no name configuration available, follow the first set of instructions. If the desired configuration name is available, follow the second set of instructions.

Change Engine (Active only with multiple-engine setting)

The Change Engine command allows you to change the configuration name of a fuel flow. The steps below show how to switch the configuration name of a fuel flow from Port to Starboard.

If all fuel flows configured (Configuration name unavailable):

1. Press **MENU**, use the **UP** and **DOWN** keys to select **SYSTEM SETUP** and press **MENU**.

2. Highlight **B. DEVICES** and press **MENU**. The Bus Devices list will appear.

3. Select the Port FFlow and press **MENU**.

4. Highlight **UNSET ENGINE** and press **MENU**. The following message will appear: *Hit Menu to Unset Dev Name*.

5. Press **MENU** and you will be taken back to the Bus Devices menu, where fuel flow (formerly Port FFlow) now will be displayed as UnCfg FFlow.

Remember: If the fuel flow you just unconfigured is not shown on the Bus Devices the list, you will have to refresh the list. Let the Bus Devices list time out then access it again.

6. Highlight **STBD FFLOW** and press **MENU**. Select **CHANGE ENGINE** and press **MENU**, which will open the Select Engine menu with up to three options: Port, Cen, Stbd.

7. Highlight **PORT** and press **MENU**.

8. You will be taken back to the Bus Devices list, where the fuel flow you selected (formerly Stbd FFlow) will now be shown as Port FFlow. If the newly configured fuel flow is not shown, refresh the Bus Devices list.

9. Now, select **UNCFG FFLOW** and press **MENU**. The following message will appear: *Hit Menu to Cfg Flow Sns*.

10. Press **MENU**, which will open the Select Engine menu. Highlight Starboard and press **MENU**. You will be directed to the Bus Devices list where the fuel flow now will be displayed as Stbd FFlow. If the newly configured fuel flow is not shown, refresh the Bus Devices list.

If configuration name available:

1. Press **MENU**, use the **UP** and **DOWN** keys to select **SYSTEM SETUP** and press **MENU**.

2. Highlight **B. DEVICES** and press **MENU**. After a few moments, the Bus Devices list will appear.

3. Highlight **PORT FFLOW** and press **MENU**. Select **CHANGE ENGINE** and press **MENU**, which will open the Select Engine menu with up to three options: Port, Cen, Stbd.

4. Highlight **STARBOARD** and press **MENU**.

5. You will be taken back to the Bus Devices list, where the fuel flow you selected (formerly Port FFlow) will be listed as Stbd FFlow. If the newly configured fuel flow is not shown, refresh the Bus Devices list.

Reset

The Reset command in the Fuel Flow level menu will clear the sensor's configuration and calibration settings.

NOTE:

After using the Reset command, you will have to re-enter your engine-tank configuration. It, however, will not affect the configuration or calibration of other devices on the network.

To reset fuel flow settings:

1. Press **MENU**, use the **UP** and **DOWN** keys to select **SYSTEM SETUP** and press **MENU**.
2. Highlight **B. DEVICES** and press **MENU**. After a few moments, the Bus Devices list will appear.
3. Select the desired fuel flow and press **MENU**. Highlight **RESET**, press **MENU** and the following message will appear: *Hit Menu to Rst Values*.
4. Press **MENU** to reset fuel flow values to default settings.

EP-60R Fuel Flow Calibration

The factory calibration settings for the EP-60R Fuel Flow should be within 3 percent, so calibration will not be necessary in most cases.

NOTE:

Make sure the fuel flow has been set as the Fuel Remaining Source; otherwise, you will not be able to calibrate the fuel flow.

Fuel Flow Accuracy

To check fuel flow accuracy, you must add the Fuel Manager page to the page screen rotation and then customize it with Fuel Used data.

To add Fuel Manager page to the display:

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. Select **ADD PAGE** and press **MENU**.
3. Highlight **FUEL MANAGER** (Fuel Mngr) and press **MENU**. You will be taken back to the main display.

NOTE:

Make sure the Fuel Remaining Source has been set to Fuel Flow.

To customize Fuel Manager page:

1. With the Fuel Manager page displayed on the main display, press **MENU**, select **CUSTOMIZE** and press **MENU**.
2. Highlight **USD** (Fuel Used) and press **MENU**. If your unit is configured for more than one tank, the Select Tank menu will appear. (If your engine-tank configuration is set for one tank, you will be directed to the main display.)
3. Select the desired option and press **MENU**. You will be directed to the main display.

To check fuel flow accuracy:

1. Make sure your Fuel Remaining Source has been set to Fuel Flow then fill up the fuel tank connected to the EP-60R Fuel Flow you want to calibrate. Press **MENU**, use the **UP** and **DOWN** keys to select **SYSTEM SETUP** and press **MENU**.
2. Highlight **FUEL MNGR** and press **MENU**. Select **REFILL T.** and press **MENU**. If your unit is configured for more than one tank, the Select Tank menu will open. Select the tank you refilled and press **MENU**. (If your unit is configured for one tank, you will be taken directly to the Recalibration menu.)
3. The Recalibration (ReCal?) menu will appear with two options: Yes and No. Select **No** and press **MENU**. The following message will appear: *Hit Menu if Tank filled up.*
4. Press **MENU**, which will direct you to the main display.
5. Take your boat out, but use only ONE engine — the engine connected to the fuel flow. Burn at least 5 gallons of fuel, then fill up the tank again, noting how much fuel was added to the tank. Check the Fuel Management page for the fuel used figure calculated by the EP-60R Fuel Flow.
6. Compare the amount of fuel you added when you filled up the tank with the EP-60R Fuel Used figure. If the difference between these two numbers is greater than 3 percent, you need to calibrate the unit.

To calibrate a fuel flow:

7. Press **MENU**, use the **UP** and **DOWN** keys to select **SYSTEM SETUP** and press **MENU**.
8. Highlight **FUEL MNGR** and press **MENU**. Select **REFILL T.** and press **MENU**. If your unit is configured for more than one tank, the Select Tank menu will open. Select the tank you refilled and press **MENU**. (If your unit is configured for one tank, you will be taken directly to the Recalibration menu.)

9. The Recalibration (The Recal?) menu will appear with two options: Yes and No. Select **Yes** and press **MENU**.

NOTE:

If you do not have the fuel remaining source set to Eng/FFlow, the recalibration message will not appear.

10. The Filled Quantity window will appear. Use the **UP** and **DOWN** keys to input the amount of fuel you added to the tank and press **MENU**.

11. Repeat these steps for each fuel flow you want to calibrate.

Reset Calibration

The Reset Calibration command allows you to reset a fuel flow calibration back to factory defaults.

To Reset Calibration:

1. Press **MENU**, use the **UP** and **DOWN** keys to select **SYSTEM SETUP** and press **MENU**.
2. Highlight **B. DEVICES** and press **MENU**. Select the fuel flow you want to reset and press **MENU**.
3. Select **RST CAL** from the fuel flow menu and press **MENU**. The following message will appear: *Hit Menu to Rst the Cal.*
4. Press **MENU** to set calibration back to factory default settings. To recalibrate the fuel flow, refer to the fuel flow calibration instructions in this section.

Refill Tank (Refill T)

Since the EP-60R is not connected to the tank, its fuel information is not automatically updated when the tank is filled up. You must use the Refill Tank command to ensure the fuel information in the EP-60R stays consistent with the amount of fuel actually in the tank.

To refill tank:

1. Press **MENU**, use the **UP** and **DOWN** keys to select **SYSTEM SETUP** and press **MENU**. Highlight **FUEL MNGR** and press **MENU**.
2. Select **REFILL T** and press **MENU**. If your unit is configured for more than one tank, the Select Tank menu will appear with up to three options. (If you are using a single tank configuration, you will not see the Select Tank menu.)
3. Select the desired tank and press **MENU**. The following message will appear: *Hit Menu if Tank filled up.* Press **MENU** and you will be taken you back to the main display.

Partial Fill (Part Fill)

Since the EP-60R is not connected to the tank, its fuel information is not automatically updated when fuel is added to the tank. When you

add fuel to a tank without completely filling it up, you must use the Partial Fill command. This will ensure the fuel information in the EP-60R stays consistent with the amount of fuel actually in the tank.

To use Partial Fill:

1. Press **MENU**, use the **UP** and **DOWN** keys to select **SYSTEM SETUP** and press **MENU**. Highlight **FUEL MNGR** and press **MENU**.
2. Highlight **PART FILL** and press **MENU**. The Select Tank menu will appear with up to three options. (If you have one tank, you will be taken directly to the Fuel Quantity window.) Select the desired engine and press **MENU**.

NOTE:

When using the Partial Fill command, you will only be able to input an amount of fuel less or equal to the fuel used figure. The unit will not allow you to input a fuel amount greater than the fuel used figure.

3. The Fuel Quantity window will appear. Use the **UP** and **DOWN** keys to enter the amount of fuel you added to the tank and press **MENU**. You will be taken back to the main display.

Economy Speed Source (Eco spd)

The Economy Speed Source menu allows you to choose the speed source (Water Speed, Pitot Speed or Ground Speed) the LMF-200 will use to calculate Fuel Economy. Ground Speed (GPS) is the default speed source for Fuel Economy.

To change Economy Speed Source:

1. Press **MENU**, use the **UP** and **DOWN** keys to select **SYSTEM SETUP** and press **MENU**. Select **FUEL MNGR** and press **MENU**.
2. Highlight **ECO SPD** and press **MENU**, which will open the Eco spd menu. The menu has three options: Water Spd (Water Speed), Pitot Speed and Gnd Spd (Ground Speed). A NMEA 2000 GPS module measures ground speed, while a paddlewheel, like the EP-70R Speed Sensor measures water speed.
3. Select the desired speed source and press **MENU**, which will take you back to the main display.

Reset Trip Fuel Used (Rst trip f)

The LMF-200 uses fuel flow data to keep a running total of fuel used for a trip. By using the Reset Trip command, you can reset to zero the running total of fuel used on a trip.

To Reset Trip Fuel (Rst trip f)

1. Press **MENU**, use the **UP** and **DOWN** keys to select **SYSTEM SETUP** and press **MENU**. Highlight **FUEL MNGR** and press **MENU**.
2. Select **RST TRIP F** (Reset Trip Fuel) and press **MENU**. The Select Engine menu will appear with up to four options. Select the desired engine or All Engines and press **MENU**. (If you are using a single-engine configuration you will not see the Select Engine menu.)
3. The following message will appear: *Hit Menu to Rst Trip F*. Press **MENU**, which will reset the trip fuel used to zero.

Reset Seasonal Fuel (Rst Seas)

The LMF-200 uses fuel flow data to keep a running total of fuel used for a season. By using the Reset Seasonal command, you can reset to zero the running total of fuel used for a season.

To reset seasonal fuel:

1. Press **MENU**, use the **UP** and **DOWN** keys to select **SYSTEM SETUP** and press **MENU**. Highlight **FUEL MNGR** and press **MENU**.
2. Choose **RST SEAS** and press **MENU**. If you have more than one engine, the Select Engine menu will appear with up to four options.
3. Select the desired engine or All Engines and press **MENU**. The following message will appear: *Hit Menu to Rst USD:S*.
3. Press **MENU**, which will take you back to the main display.

Fuel Warning

The Fuel Warning feature allows you to set a Low level or High level alarm for each fuel tank. A pop-up window will appear and an alarm will sound if the amount of fuel rises above (High Level) or falls below (Low level) the selected percentage of tank capacity.

To set a fuel warning:

1. Press **MENU**, select **SYSTEM SETUP** and press **MENU**.
2. Highlight **BUS DEVICES** and press **MENU** to display the Bus Devices list. Select the desired Fuel Flow (FFlow) and press **MENU**. The Configuration Options menu will appear.
3. Select **FUEL WARNING** (Fuel Wrng) and press **MENU**.
4. The Select Level menu will appear with two options: High Level and Low Level.
5. Select the desired level and press **MENU**. The Level Percentage window will appear. It will be set to Off by default.

6. Use the **UP** and **DOWN** keys to input the desired percentage of tank capacity and press **MENU**. Let the menus time out to return to the main display.

NOTE:

To turn off a fuel warning, repeat Steps 1-4, then select **OFF** from the Level Percentage window mentioned in Step 5. Press **MENU**. Repeat these steps for each warning you want to turn off. Let the menus time out and you will be directed to the main display.

Engine Warnings (Alarms)

The Engine Warnings feature allows you to set an alarm for one or more engines, which will alert you to several engine issues including overheating and low oil pressure.

To set Engine Warnings:

1. Press **MENU**, use the **UP** and **DOWN** keys to select **SYSTEM SETUP** and press **MENU**.
2. Highlight **ENGINE WARNINGS** and press **MENU**. The Engine Warnings menu will appear with up to five options, including Off and All Engines. The default setting is All Engines. (If you have a single-engine configuration, the only options on the Engine Warning menu will be On and Off.)

NOTE:

If you choose All Engines, the alarm will be shown for each alarm engine alarm. If a single engine is selected, the gauge will only show warnings from the selected engine. (To turn off all engine warnings, highlight **OFF** and press **MENU**. If you turn off engine alarms, no alarms will be shown for any of the engines.)

3. Highlight the desired option and press **MENU**. You will be taken back to the main display.

Displaying data from fuel flow

You can display fuel flow data on the 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 page screen 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 the

Autoscroll feature if you want the pages to automatically scroll across the screen. Refer to your LMF -200 manual for more 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 Single Digital, Dual Digital or the Fuel Manager page 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 Single Digital, Dual Digital and Fuel Manager pages with fuel flow data, which includes Fuel Rate (fuel flow), Fuel Used, Fuel Range, Trip Fuel Used and Seasonal Fuel Used.

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 **FUEL FLOW (FUL: F)**, **FUEL USED (USD)**, **FUEL RANGE (RNG)**, **TRIP FUEL USED (USD: Tp)** or **SEASONAL FUEL USED (USD: Se)** and press **MENU**. A menu will appear, allowing you to display data from a single engine or show data from all engines on the vessel. *(If you select **FUEL RANGE (RNG)** or if your unit is configured for one engine, you will be taken back to the main display.)*
4. Select the desired engine or, to display data from all engines, highlight Vessel and press **MENU**. 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 **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 **FUEL FLOW (FUL: F)**, **FUEL USED (USD)**, **FUEL RANGE (RNG)**, **TRIP FUEL USED (USD: Tp)** or **SEASONAL FUEL USED (USD: Se)** and press **MENU**. A

menu will appear, allowing you to display data from a single engine or show data from all engines. *(If you select **FUEL RANGE (RNG)** or if your unit is configured for one engine, you will be taken back to the main display.)*

5. Select the desired engine or, to display data from all engines, highlight Vessel and press **MENU**. You will be taken back to the main display, where the data you selected will be shown. Repeat these steps to customize the other data position.

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 **FUEL FLOW (FUL: F)**, **FUEL USED (USD)**, **FUEL RANGE (RNG)**, **TRIP FUEL USED (USD: Tp)** or **SEASONAL FUEL USED (USD: Se)** and press **MENU**. A menu will appear, allowing you to display data from a single engine or show data from all engines. *(If you select **FUEL RANGE (RNG)** or if your unit is configured for one engine, you will be taken back to the main display.)*

4. Select the desired engine or, to display data from all engines, highlight Vessel and press **MENU**. You will be taken back to the main display, where the data you selected will be shown.

Reset

The Reset command will reset EP-60R Fuel Flow values to default settings.

NOTE:

After using the Reset command has been executed, you will have to re-enter your engine-tank configuration. The Reset command will not affect the configuration or calibration of other devices on the network.

To use reset command:

1. Press **MENU**, select **SYSTEM SETUP** and press **MENU**.

2. Highlight **BUS DEVICES**, select the desired fuel flow and press **MENU**. The Configuration Options menu will appear.

3. Select **RESET** and press **MENU**. The following message will appear: *Hit Menu to Rst Values.*

4. Press **MENU**, then let the menus time out to return to the main display.

LMF-400: EP-60R

Configuration & Calibration

This section covers how to use the EP-60R Fuel Flow with a 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 or calibrate your fuel flow. If you have already completed Boat Setup, skip ahead to the segment covering EP-60R Fuel Flow Configuration.

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. (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 size of the tank and press **ENTER**. 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.

Fuel Remaining Source

The Fuel Remaining source function allows you to select the device used to measure the amount of fuel remaining in the tank. It must be set to Fuel Flow (Eng /FFlow) to work properly with the EP-60R. The Fuel Remaining Source will be set to fluid level by default.

To change Fuel Remaining Source to fuel flow:

1. Press **MENU**, use the **UP** and **DOWN** keys to select **SYSTEM SETUP** and press **ENTER**.
2. Highlight **FUEL SETUP** and press **ENTER**.
3. Select **FUEL REM SRC** (Fuel Remaining Source) and press **ENTER**.
4. Highlight **ENG/FFLOW** (Fuel Flow) and press **ENTER**. You are ready to configure your fuel flow sensor.

EP-60R Fuel Flow Configuration

You can have up to three fuel flow sensors installed on your vessel, one for each engine supported by the LMF-400. When accessing a fuel flow, its menu will appear with the following options: Change Engine (for two or more engines only), Fuel Warning, Unset Engine, Reset Values and Reset Calibration.

NOTE:

If, after configuring, unconfiguring or reconfiguring a fuel flow, it is not shown on the Bus Devices list, you will have to refresh the list.

To do this, press **MENU**, select **SYSTEM SETUP** and press **ENTER**.

Highlight **BUS DEVICES** and press **ENTER**.

To configure a fuel flow:

When you configure a fuel flow, you are linking the fuel flow's location/engine on the boat to its matching configuration name in the LMF-400.

1. Press **MENU**, use the **UP** and **DOWN** keys to select **SYSTEM SETUP** and press **ENTER**.
2. Highlight **BUS DEVICES** and press **ENTER**. The Bus Devices list will appear.



Bus Devices highlighted in the System Setup menu (left). Searching Bus Devices window (center) with Bus Devices list (right).

3. Select **UNCFG F FLOW** and press **ENTER**. The following message will appear: *Press Enter to Configure Fuel Flow Snsr.*
4. Press **ENTER**. If your unit is configured for more than one tank, the Select Engine menu will appear. (If your unit is set to a single-tank configuration, the Select Engine menu will not appear. The fuel flow will automatically be given the configuration name Eng FFlow.)
5. Select the desired engine and press **ENTER**. You will be directed to the Bus Devices list. Press **EXIT** repeatedly to return to the main display.

To unconfigure a fuel flow:

You will use the Unset Engine command to unconfigure a fuel flow.

To unset engine:

1. Press **MENU**, use the **UP** and **DOWN** keys to select **SYSTEM SETUP** and press **ENTER**.
2. Highlight **BUS DEVICES** and press **ENTER** to open the Bus Devices list.
3. Select the desired fuel flow and press **ENTER**. The Fuel Flow menu will appear. Select **UNSET ENGINE** and press **ENTER**. The following message will appear: *Press Enter to UnConfig Device Name.*
4. Press **ENTER** and you will be directed back to the Bus Devices list, where the fuel flow you unconfigured will be shown as UnCfg F Flow.

To reconfigure a fuel flow:

You will use the Change Engine command to reconfigure a Fuel Flow. Change Engine, however, will only appear on the LMF-400 menu if a multiple engine setting was chosen during Boat Setup. If all the fuel flows on your vessel are configured, you will have to unconfigure a fuel

flow to free up its configuration name. *If all three fuel flows are configured, which means there is no configuration name available, follow the first set of instructions. If the desired configuration name is available, follow the second set of instructions.*

Change Engine (active only with multiple-engine setting)

The steps below show how to switch the configuration name of a fuel flow from Port engine to Starboard engine.

If all fuel flows configured (Configuration name unavailable):

1. Press **MENU**, use the **UP** and **DOWN** keys to select **SYSTEM SETUP** and press **ENTER**.
2. Highlight **BUS DEVICES** and press **ENTER**. The Bus Devices list will appear.
3. Select the Port fuel flow and press **ENTER**. Highlight **UNSET ENGINE** and press **ENTER**. The following message will appear: *Press Enter to UnCfg Device Name.*
4. Press **ENTER**. You will be taken back to the Bus Devices list, where the Port fuel flow will now be displayed as UnCfg FFlow.
5. Select the Starboard fuel flow and press **ENTER**.
6. Highlight **CHANGE ENGINE** and press **ENTER**. The Select Engine menu will appear.
7. Select **PORT** and press **ENTER**. You will be taken back to the Bus Devices list.
8. Highlight UnCfg FFlow and press **ENTER**. The following message will appear: *Press Enter to Configure Fuel Flow Sns.*
9. Press **ENTER**, which will open the Select Engine menu. Choose Starboard and press **ENTER**. You will be taken back to the Bus Devices list where both fuel flows will be shown with their new configuration names.

If desired configuration name available:

1. Press **MENU**, use the **UP** and **DOWN** keys to select **SYSTEM SETUP** and press **ENTER**.
2. Highlight **BUS DEVICES** and press **ENTER**. The Bus Devices list will appear.
3. Select the fuel flow you want to reconfigure and press **ENTER**. Highlight **CHANGE ENGINE** and press **ENTER**. The Select Engine menu will appear.
4. Choose the desired configuration name and press **ENTER**. You will be taken back to the Bus Devices list, where the fuel flow you reconfigured will be displayed with its new configuration name.

EP-60R Fuel Flow Calibration

The factory calibration settings for the EP-60R Fuel Flow should be within 3 percent, so calibration will not be necessary in most cases.

NOTE:

The Fuel Remaining Source must be set to fuel flow for the unit to correctly display fuel level information. Follow the instructions below to ensure fuel flow (Eng/FFlow) has been selected as the Fuel Remaining Source. It is set to fluid level by default.

Fuel Flow Accuracy

To check fuel flow accuracy, add the Fuel Manager page to the page screen rotation and then customize it with Fuel Used data.

To add the Fuel Manager 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 the Fuel Manager page and press **ENTER**. The following message will appear: *Press Enter to add Fuel Manager.*
4. Press **ENTER**, which will take you back to the main display, where the page you chose will be shown on the screen.

To customize the Fuel Manager page:

1. With the Fuel Manager page on the display, Press **MENU**, select **CUSTOMIZE** and press **ENTER**. The data menu will appear with three options: Top Data, Center Data and Bottom Data — each representing one of the three data boxes on the Fuel Manager page.
2. Select the desired data location and press **ENTER**. Highlight **FUEL USED** and press **ENTER**. If your unit is configured for more than one tank the Select Tank menu will appear.

NOTE:

If your unit is configured for a single-tank, the Select Tank menu will not appear. Press **EXIT** repeatedly to return to the main display where Fuel Used data will be displayed on the Fuel Manager page.

3. Highlight the desired tank option and press **ENTER**. Press **EXIT** twice to return to the main display where Fuel Used data will be displayed on the Fuel Manager page.

To check fuel flow accuracy:

1. Make sure the Fuel Remaining Source has been set to Fuel Flow then fill up the tank connected to the fuel flow you want to calibrate.

2. Press **MENU**, use the **UP** and **DOWN** keys to select **SYSTEM SETUP** and press **ENTER**.
3. Highlight **FUEL SETUP** and press **ENTER**.
4. Select **REFILL TANK** and press **ENTER**. If your unit is configured for more than one tank, the Select Tank menu will open.
5. Select the tank you refilled and press **ENTER**. A Recalibration window (ReCalibrate?) will appear with two options: Yes and No. Select **No** and press **ENTER**. The following message will appear: *Press Enter after refilling the fuel tank.* Press **ENTER**.
6. Take your boat out, but run only **ONE** engine — the engine connected to the fuel flow. Burn at least 5 gallons of fuel, then fill up the tank again, noting how much fuel was added to the tank. Check the Fuel Manager page for the fuel used figure calculated by the LMF-400.
7. Compare the amount of fuel added when you filled up the tank with the LMF-400 Fuel Used figure. If the difference between these two numbers is greater than 3 percent, you need to calibrate the unit.

To calibrate a fuel flow:

8. Press **MENU**, use the **UP** and **DOWN** keys to select **SYSTEM SETUP** and press **ENTER**.
9. Highlight **FUEL SETUP** and press **ENTER**.
10. Select **REFILL TANK** and press **ENTER**. If your unit is configured for more than one tank, the Select Tank menu will open. Select the tank you refilled and press **ENTER**.
11. The Recalibration menu will appear with two options: Yes and No. Select **Yes** and press **ENTER**.
12. The Filled Fuel Quantity window will appear. Use the **UP** and **DOWN** keys to input the amount of fuel you added to the tank and press **ENTER**.
13. Repeat these steps for each fuel flow you want to calibrate.

NOTE:

It is a good idea to periodically check the calibration of a fuel flow.

Reset Calibration

The Reset Calibration command allows you to set fuel flow calibration to factory defaults.

To reset calibration:

1. Press **MENU**, use the **UP** and **DOWN** keys to select **SYSTEM SETUP** and press **ENTER**.

2. Highlight **BUS DEVICES** and press **ENTER**. Highlight the fuel flow you want to reset and press **ENTER**.
3. Select **RESET CAL** from the fuel flow menu and press **ENTER**. The following message will appear: *Press Enter to reset the Calibration.*
4. Press **ENTER** to set calibration back to default settings. To recalibrate the fuel flow, follow the fuel flow calibration steps in this section.

Refill Tank

Since the EP-60R is not connected to the tank, its fuel information is not automatically updated when the tank is filled up. You must use the Refill Tank command to ensure the fuel information in the EP-60R stays consistent with the amount of fuel actually in the tank.

To refill tank:

1. Press **MENU**, use the **UP** and **DOWN** keys to select **SYSTEM SETUP** and press **ENTER**.
2. Highlight **FUEL SETUP** and press **ENTER**.
3. Select **REFILL TANK** and press **ENTER**. The select Tank menu will appear with up to three options. Select the tank you refilled and press **ENTER**. (If you have one tank, you will be taken directly to the recalibration window mentioned in step 4.)
4. A recalibration window will appear with two options: Yes and No. Select **No** and press **ENTER**. The following message will appear: *Press Enter after refilling the fuel tank.*
5. Press **ENTER**. You will be directed back to the main display.

Partial Fill

Since the EP-60R is not connected to the tank, its fuel information is not automatically updated when fuel is added to the tank. When you add fuel to a tank without completely filling it up, you must use the Partial Fill command. This will ensure the fuel information in the EP-60R stays consistent with the amount of fuel actually in the tank.

To use Partial Fill:

1. Press **MENU**, use the **UP** and **DOWN** keys to select **SYSTEM SETUP** and press **ENTER**. Highlight **FUEL SETUP** and press **ENTER**.
2. Select **PARTIAL FILL** and press **ENTER**. The Select Tank menu will appear with up to three options. (If you have one tank, you will be taken directly to the Adding Fuel window.)
3. Select the desired tank and press **ENTER**. The Adding Fuel window will appear.

NOTE:

When using the Partial Fill command, you will only be able to input into the gauge, an amount of fuel less or equal to the fuel used figure. The unit will not allow you to enter a fuel amount greater than the fuel used figure.

4. Use the **UP** and **DOWN** keys to input the amount of fuel added to the tank and press **ENTER**. You will be taken back to the main display.

Economy Speed Source

The Economy Speed menu allows you to choose what speed source (Water Speed, Pitot Speed or Ground Speed) the LMF-400 will use to calculate Fuel Economy. Ground Speed (GPS) is the default speed source.

To change Economy Speed source:

1. Press **MENU**, use the **UP** and **DOWN** keys to select **SYSTEM SETUP** and press **ENTER**. Select **FUEL SETUP** and press **ENTER**.
2. Highlight **ECO SPEED SRC** and press **ENTER** to open the Economy Speed menu. The menu has three options: Water Speed (Paddlewheel), Pitot Speed and Ground Speed (GPS).
3. Select the desired speed source and press **ENTER**. You will be taken back to the main display.

Reset Trip Fuel

The LMF-400 keeps a running total of fuel used for a trip. By using the Reset Trip command, you can reset to zero the running total of fuel used on a trip.

To reset trip fuel:

1. Press **MENU**, use the **UP** and **DOWN** keys to select **SYSTEM SETUP** and press **ENTER**. Select **FUEL SETUP** and press **ENTER**.
2. Highlight **RST TRIP FUEL** and press **ENTER**. The Select Engine menu will appear with up to four options. (If you have one tank, the *Press Enter to reset Trip Fuel (Step 3)* message will appear.)
3. Select the desired engine or All Engines and press **ENTER**. The following message will appear: *Press Enter to reset Trip Fuel*.
4. Press **ENTER**, which will reset the trip fuel to zero and take you back to the main display.

Reset Seasonal

The LMF-400 keeps a running total of fuel used for a season. By using the Reset Seasonal command, you can reset to zero the running total of fuel used for a season.

To reset seasonal fuel:

1. Press **MENU**, select **SYSTEM SETUP** and press **ENTER**.
2. Highlight **FUEL SETUP** and press **ENTER**.
3. Select **RESET SEASONAL** and press **ENTER**. The Select Engine menu will appear with up to four options. (If you have one engine, the reset seasonal fuel message (Step 4) will appear.)
4. Select the desired engine or All Engines and press **ENTER**. The following message will appear: *Press Enter to reset Seasonal Fuel*.
5. Press **ENTER** to reset seasonal fuel. You will be taken back to the main display.

Fuel Warning

The Fuel Warning feature allows you to set a Low level or High level alarm for each fuel tank. A pop-up window will appear and an alarm will sound if the amount of fuel rises above (High Level) or falls below (Low level) the selected percentage of tank capacity.

To set a fuel warning:

1. Press **MENU**, highlight **SYSTEM SETUP** and press **ENTER**.
2. Select **BUS DEVICES** and press **ENTER**. Highlight **FUEL FLOW** and press **ENTER**. The Fuel Flow menu will appear. Select **FUEL WARNING** (Fuel Wrng) and press **ENTER**.
3. The Select Level menu will appear with two options: High Level and Low Level.
4. Highlight **LOW LEVEL** or **HIGH LEVEL** and press **ENTER**. The Set Percentage window will appear. It will be set to Off by default.
5. Use the **UP** and **DOWN** keys to input the desired percentage of tank capacity that will trigger the alarm. If the amount of fuel falls below the percentage you choose, the alarm will go off.
6. Press **ENTER** and you will be taken back to the Bus Devices list. Press **EXIT** repeatedly to return to the main display.

NOTE:

To turn off a fuel warning, repeat Steps 1-3, then select **OFF** from the Level Percentage window mentioned in Step 4. Press **ENTER**. Repeat these steps for each warning you want to turn off. Press **EXIT** repeatedly to return to the main display.

Engine Warnings (Alarms)

The Engine Warnings feature allows you to set an alarm for one or more engines, which will alert you to several engine issues including overheating and low oil pressure.

To set an Engine Warning (Alarm):

1. Press **MENU**, use the **UP** and **DOWN** keys to highlight **SYSTEM SETUP**, and press **ENTER**.
2. Highlight **ENGINE WARNINGS** and press **ENTER**. The Engine Warnings menu will appear with up to five options, including Off and All Engines. The default setting is All Engines. (If you have a single-engine configuration, the only options on the Engine Warning menu will be On and Off.)
3. Choose the desired option and press **ENTER**. You will be taken back to the main display.

Displaying data from a fuel flow

You can display fuel flow data on the 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 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 and how it will be displayed on select pages. You can customize the Single Digital, Dual Digital and Fuel Manager pages with fuel flow data, which includes Fuel Rate (fuel flow), Fuel Used, Fuel Range, Trip Fuel Used and Seasonal Fuel Used.

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 Fuel Flow, Fuel Range, Fuel Used, Trip Fuel Used or Seasonal Fuel and press **ENTER**. A menu will appear, allowing you to display data from a single engine or from all engines. *(If you select **FUEL RANGE** or if your unit is configured for one engine, you will be directed back to the main display.)*
4. Select the desired engine or, to display data from all engines, highlight Vessel 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**.
4. Select **FUEL FLOW**, **FUEL RANGE**, **FUEL USED**, **TRIP FUEL USED** or **SEASONAL FUEL** and press **ENTER**. A menu will appear, allowing you to display data from a single engine or from all engines. *(If you select **FUEL RANGE (RNG)** or if your unit is configured for one engine, you will be taken back to the Position menu.)*
5. Select the desired engine or, to display data from all engines, highlight Vessel and press **ENTER**. You will be taken back to the Position menu. To display data in the other data box, repeat Steps 3-5.
6. Press **EXIT** twice 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**.
4. Select **FUEL FLOW**, **FUEL RANGE**, **FUEL USED**, **TRIP FUEL USED** or **SEASONAL FUEL USED** and press **ENTER**. A menu will appear, allowing you to display

data from a single engine or from all engines on the vessel. *(If you select **FUEL RANGE** or if your unit is configured for one engine, you will be taken back to the Position menu.)*

5. Select the desired engine or, to display data from all engines, highlight Vessel and press **ENTER**. You will be taken back to the Position menu. To display data in another data box, repeat Steps 3-5.
6. Press **EXIT** twice 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**.
4. Select **FUEL FLOW**, **FUEL RANGE**, **FUEL USED**, **TRIP FUEL USED** or **SEASONAL FUEL USED** and press **ENTER**. A menu will appear, allowing you to display data from a single engine or from all engines on the vessel. *(If you select **FUEL RANGE** or if your unit is configured for one engine, you will be taken back to the Position menu.)*
5. Select the desired engine or, to display data from all engines, highlight Vessel and press **ENTER**. You will be taken back to the Position menu. To display data in another data box, repeat Steps 3-5.
6. Press **EXIT** twice to return to the main display.

Reset Values

By accessing Reset Values from the Fuel Flow menu, you will be able to reset configuration and calibration settings for a particular fuel flow.

NOTE:

After using the Reset Values command, you will have to re-enter your engine-tank configuration. It, however, will not affect the configuration or calibration of other devices on the network.

To reset values:

1. Press **MENU**, use the **UP** and **DOWN** keys to select **SYSTEM SETUP** and press **ENTER**.
2. Highlight **BUS DEVICES** and press **ENTER**. Select the fuel flow you want to reset and press **ENTER**.
3. Choose **RESET VALUES** from the fuel flow menu and press **ENTER**. The following message will appear: *Press Enter to Reset Device Values.*
4. Press **ENTER** and you will be taken back to the Bus Devices list.

Display Unit: EP-60R

Configuration & Calibration

All NMEA 2000 capable Lowrance sonar and sonar/GPS combo display units can be used to configure and calibrate your EP-60R Fuel Flow sensor on a NMEA 2000 network.



The LMS-525cDF is one of many Lowrance display units that may be used to configure an EP-60R Fuel Flow sensor.

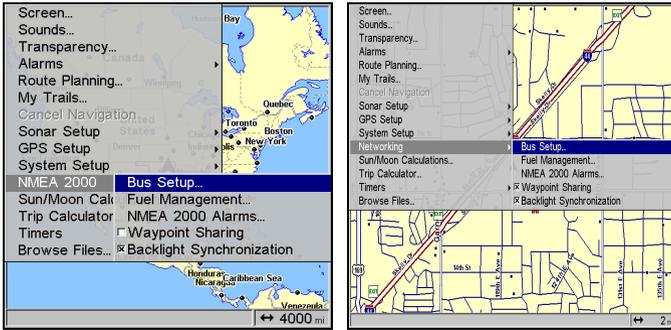
NOTE:

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

Bus Setup

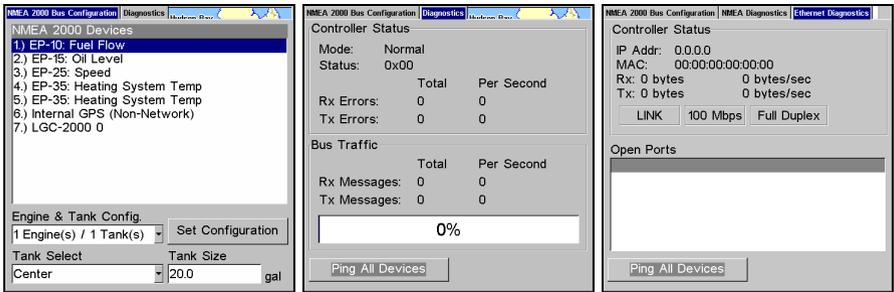
Selecting Bus Setup from the NMEA 2000 or Networking menu will open the Bus Configuration menu, giving you access to the Engine-Tank Configuration menu and the NMEA 2000 Devices list.

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. The network devices list is located in the top half of the Bus Configuration menu.



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

The Engine-Tank Configuration and Tank Select menus as well as the Tank Size dialog box are located on the bottom half of the Bus Configuration menu. The Set Configuration button — positioned next to the engine-tank configuration menu — allows you to finalize a selected configuration.



Bus Configuration menu (left). NMEA Diagnostics page (center). Ethernet Diagnostics (right).

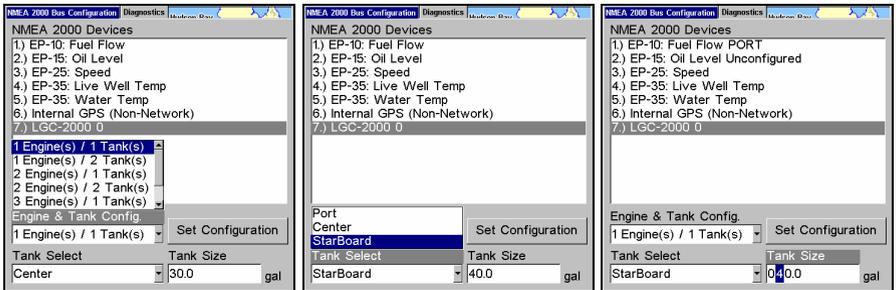
The NMEA Diagnostics page displays information about the performance of the network bus, keeping you updated on bus status, mode, errors and bus traffic. The Ethernet Diagnostics page keeps you updated on the performance of an Ethernet connection (if applicable) supplying information ranging from IP Address to upload and download rates (bytes per second). To refresh either Diagnostics page, highlight the **PING ALL DEVICES** button at the bottom of the page and press **ENT**.

Engine & Tank Configuration

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

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**.



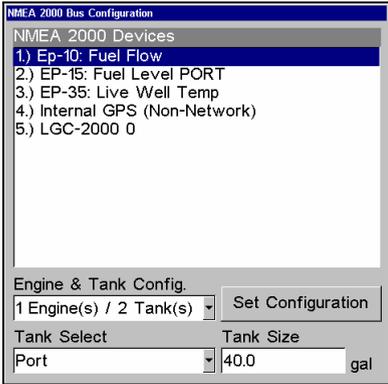
1 Engine/1Tank highlighted on Engine and Tank Configuration menu (left). Starboard highlighted on Tank Select menu (center). Tank Size set to 40 gallons (right).

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, press the **SET CONFIGURATION** button. 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.

NMEA 2000 Devices List

Devices connected to your NMEA 2000 network will be listed on the NMEA 2000 Devices list, located at the top of the Bus Configuration

menu. To configure or calibrate most devices, you will select it on the NMEA 2000 Devices list and press **ENTER**. This will open its Device Configuration menu.



Bus Configuration menu with five items displayed on the NMEA 2000 Devices list. Engine-Tank Configuration and Tank Select menus are at the bottom of the screen.

Device Configuration Menu

When a device is selected from the network devices list on the Bus Configuration menu, its Device Configuration menu will appear. Device configuration menus vary among devices. Available functions on device configuration menus allow you to change device names, tank sizes, fluid types and provide access to the Advanced Options menu. We will cover configuration and calibration later in this section.

Device Information and Device Data

The Device information panel, located to the left of the Device Configuration menu, displays information on the selected device that includes, software version, model, address, serial number, instance and current status.

Device Data is shown in the Device Data window at the bottom of the device configuration menu. The information displayed in the Device Data window will vary among devices. If, for example, you are viewing the device configuration menu for an EP-65R Fluid Level, the device data window will include tank size and the amount of fuel left in the tank.

The Device Data for an EP-60R Fuel Flow includes Fuel Rate (amount of fuel burned per hour), Fuel Used, Trip Fuel Used and Seasonal Fuel Used.

EP-60R Fuel Flow Configuration

When configuring your fuel flow, you will open its Device Configuration menu where you can access the Location and Advanced Options menu. You can also change your fuel flow's device name.

Device Name

You can change how your fuel flow 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-60R 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 fuel flow 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 fuel flow 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.

Location

The Location menu allows you to select a configuration name that matches the location of the engine connected to your fuel flow sensor.

To change fuel flow 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 fuel flow you want to configure and press **ENTER**. The Device Configuration menu will appear.
4. Select **LOCATION** and press **ENTER**, which will open the Location menu.

NOTE:

If you want to unconfigure your fuel flow, select **UNKNOWN** from the Location menu.

5. Highlight the desired location 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 get back to the main display.

Unconfiguring an EP-60R Fuel Flow

You can unconfigure a fuel flow by manually resetting its Location to default settings (Unknown) via the Location menu or you can use the Restore Defaults command.

To reset the fuel flow's device name, refer to the previous segment covering Device Name. The Device Name also may be reset by using the Restore Defaults command.

NOTE:

If you execute the Restore Defaults command, you will have to re-enter your engine-tank configuration settings. The Restore Defaults command is covered at the end of this section.



Fuel Management highlighted on Networking menu (left). Fuel Management menu (right).

Fuel Management Menu

The Fuel Management menu gives you access to the following options: Tank Location, Fuel Added, Add Fuel, Fill Tank, Engine Select, Reset Calibration, Reset Trip and Reset Seasonal. The menu is divided into two parts: Tank Operations and Engine Operations. You will calibrate your fuel flow from Tank Operations section of the Fuel Management menu. Engine Operations are located in the lower half of the menu.

Tank Operations

The top half of the Fuel Management menu covers Tank Operations, which include Tank Location, Fuel Added, Add Fuel and Fill Tank.

Adding Fuel to Tank

Tank Location, Fuel Added and Add Fuel commands work together to keep NMEA 2000 fuel data consistent with the actual amount of fuel added to the fuel tank(s).

1. Press **MENU** twice, select **NMEA 2000** or **NETWORKING** and press **ENTER**.
2. A menu will appear with five options: Bus Setup, Fuel Management, NMEA 2000 Alarms, Waypoint Sharing and Backlight Synchronization. Select **FUEL MANAGEMENT** and press **ENTER**.
3. Highlight **TANK LOCATION** and press **ENTER**. The Tank Location menu will appear.
4. Select the tank you added fuel to and press **ENTER**.
5. Follow the steps below that apply to your tank.

If you filled up the tank:

A. Press the **FILL TANK** button and press **ENTER**. The following message will appear: *Are you sure you wish to Fill Tank?* Press **ENTER**. Another message will appear: *Do you wish to re-calibrate the device?* Highlight **No** and press **ENTER**.

If you did not fill up the tank:

B. Highlight **FUEL ADDED** and press **ENTER** to access the **FUEL ADDED** dialog box. Use \uparrow \downarrow , \leftarrow \rightarrow to input the amount of fuel added to the tank and press **ENTER**. Select the **ADD FUEL** button and press **ENTER**. The following message will appear: *Are you sure you wish to Add Fuel?* Highlight **Yes** and press **ENTER**.

6. Press **EXIT** repeatedly to get back to the main display.

EP-60R Fuel Flow Calibration

The default calibration for the EP-60R Fuel Flow is adequate in most cases, but if Fuel Used readings are off by more than 3 percent, calibration is recommended.

Fuel Flow Accuracy

To check fuel flow accuracy you must overlay Fuel Used data on your display to be able to check the accuracy of fuel information coming from the fuel flow.

To overlay Fuel Used data on your screen:

1. Press **MENU**, select **OVERLAY DATA** and press **ENTER**.
2. If you currently have any overlay data on your screen, it will be listed here. Select (**ENTER TO ADD**) and press **ENTER**.
3. Highlight **NMEA 2000** or **NETWORKING** and press **ENTER**, which will open the NMEA 2000 Devices list.
4. Select **EP-60R FUEL FLOW** and press **ENTER** and a list of data options will appear.
5. Highlight **FUEL USED** and press **ENTER**.
6. Press **EXIT** twice to return to the page display, where Fuel Used data will be displayed on the screen.

To check fuel flow accuracy:

1. After selecting Fuel Used as overlay data, fill up your tank and press **MENU** twice. Select **NMEA 2000** or **NETWORKING** and press **ENTER**.
2. Highlight **FUEL MANAGEMENT** and press **ENTER**. Select **TANK LOCATION** and press **ENTER**.
3. Select the tank location and press **ENTER**.

4. Highlight **FILL TANK** and press **ENTER**. The following confirmation message will appear: *Are you sure you wish to Fill Tank?*

NOTE:

You must use the unit's Fill Tank command when filling your fuel tank to keep the fuel flow updated with correct information on the amount of fuel in the tank.

5. Select **Yes** and press **ENTER**. The following confirmation message will appear: *Do you wish to re-calibrate the device?*

6. Highlight **No** and press **ENTER**.

7. Take your vessel out on the water and burn at least five gallons of fuel. **Be sure you run only ONE engine — the engine connected to your fuel flow.**

8. Fill up your tank again, noting how much fuel you added to the tank. Compare that number to the Fuel Used figure displayed on your display unit's screen.

If the amount of fuel you added to the tank and the fuel used figure are off by more than 3 percent, we recommend the fuel flow be calibrated.

To calibrate a fuel flow:

9. Fill up your tank. Press **MENU** twice, select **NMEA 2000** or **NETWORKING** and press **ENTER**.

10. Highlight **FUEL MANAGEMENT** and press **ENTER**. Highlight **TANK LOCATION** and press **ENTER**.

11. Select the desired tank location and press **ENTER**.

12. Highlight **FILL TANK** and press **ENTER**. The following message will appear: *Are you sure you wish to Fill Tank?* Select **Yes** and press **ENTER**.

13. The following message will appear: *Do you wish to re-calibrate the device?* Select **Yes** and press **ENTER**.

14. Repeat these steps for each EP-60R Fuel Flow you want to calibrate.

Engine Operations

The lower half of the Fuel Management menu covers Engine Operations, which include: Engine Select, Reset Calibration, Reset Trip and Reset Seasonal.

Engine Select

Engine Select allows you to choose the desired engine when resetting calibration, resetting trip fuel and resetting seasonal fuel.

To Reset Calibration:

Choosing the Reset Calibration command will switch fuel flow calibration settings back to factory defaults.

1. Press **MENU** twice, select **NMEA 2000** or **NETWORKING** and press **ENTER**.
2. Highlight **FUEL MANAGEMENT** and press **ENTER**.
3. Highlight to **ENGINE SELECT** and press **ENTER**. Select the desired engine and press **ENTER**.
4. Highlight **RESET CALIBRATION** and press **ENTER**. The following confirmation message will appear: *Are you sure you wish to Reset Calibration?* Select **Yes** and press **ENTER**. Calibration settings for the selected fuel have been returned to factory defaults.

To Reset Trip:

The Reset Trip function allows you to reset to zero the running total of fuel used on a particular trip.

1. Press **MENU** twice, select **NMEA 2000** or **NETWORKING** and press **ENTER**.
2. Highlight **FUEL MANAGEMENT** and press **ENTER**. The Fuel Management menu will appear.
3. To reset trip fuel used for a particular engine, highlight **ENGINE SELECT** and press **ENTER**. Select the desired engine or All Engines and press **ENTER**.
4. Highlight **RESET TRIP** and press **ENTER**. The following confirmation message will appear: *Are you sure you wish to Reset Trip?*
5. Highlight **Yes** and press **ENTER**. The Trip Fuel Used figure has been reset to zero.

To Reset Seasonal:

Your unit can track fuel usage not only for trips, but also for entire seasons. The reset seasonal command allows you to reset to zero the running total of fuel used during a season.

1. Press **MENU** twice, select **NMEA 2000** or **NETWORKING** and press **ENTER**.
2. Highlight **FUEL MANAGEMENT** and press **ENTER**.
3. To reset seasonal trip fuel used for a particular engine, highlight **ENGINE SELECT** and press **ENTER**. Select the desired engine or All Engines and press **ENTER**.
4. Highlight **RESET SEASONAL** and press **ENTER**. The following confirmation message will appear: *Are you sure you wish to Reset Seasonal?*
5. Highlight **Yes** and press **ENTER**. The Seasonal Fuel Used figure has been reset to zero.

Displaying data from fuel flow

The Overlay Data function will be used to show EP-60R Fuel Flow data on your unit's main display.

To add overlay data from the EP-60R:

1. Press **MENU**, highlight **OVERLAY DATA** and press **ENTER**.
2. Select (**PRESS ENT TO ADD...**) and press **ENTER**.
3. Highlight **NMEA 2000** and press **ENTER**. A list of devices on the network will appear.
4. Select the desired fuel flow and press **ENTER**. Fuel Rate, Fuel Used, Trip Fuel Used and Seasonal Fuel Used categories will appear.
5. Highlight the data you want to display and press **ENTER**, which will place a checkmark in its enabled box. It now will be shown as overlay data on your unit's main display.
6. Repeat step 5 to display another data category, or press **EXIT** repeatedly to return to the main display.

NMEA 2000 Alarms

The NMEA 2000 Alarms menu allows you to set Full and Empty fuel alarms for a number of NMEA 2000 devices. The alarms may be set to a percentage (0-100%) of tank capacity.

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 fuel flow and press **ENTER**.
4. Highlight the **ENABLED** box next to the desired alarm (Full Alarm or Empty Alarm) 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 alarm percentage, highlight **PERCENT** and press **ENT**.
6. Use the arrow keys to input the desired percentage 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.

Restore Defaults

The Restore Defaults command allows you to reset EP-60R Fuel Flow settings to factory defaults.

NOTE:

After using the Restore Defaults command, you will have to re-enter your engine-tank configuration. It, however, will not affect the configuration or calibration of other devices on the network.

To use the Restore Defaults command:

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 fuel flow 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.

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.**

Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitations or exclusions may not apply to you.

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...

...in the USA:

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

Lowrance Electronics and Eagle Electronics may find it necessary to change or end their shipping policies, regulations and special offers at any time. They reserve the right to do so without notice.

...in Canada:

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

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

LEI Extras™, Inc. is the accessory source for sonar and GPS products manufactured by Lowrance Electronics and Eagle Electronics. To order Lowrance or Eagle accessories, please contact:

1) Your local marine dealer or consumer electronics store. To locate a Lowrance dealer, visit the web site, www.lowrance.com, and look for the Dealer Locator. To locate an Eagle dealer, visit the web site, www.eaglesonar.com, and look for the Dealer Locator. Or, consult your telephone directory for listings.

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.

3) Canadian customers: Lowrance/Eagle Canada, 919 Matheson Blvd. E. Mississauga, Ontario L4W2R7 or fax 905-629-3118.

Call toll free in Canada, 800-661-3983, or dial 905 629-1614 (not toll free), 8 a.m. to 5 p.m. Eastern Standard Time, M-F.



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