



EP-70R Speed Electronic Speed Sensor Installation Instructions

This document shows how to install an EP-70R speed sensor and how to connect it to a NMEA 2000® network.

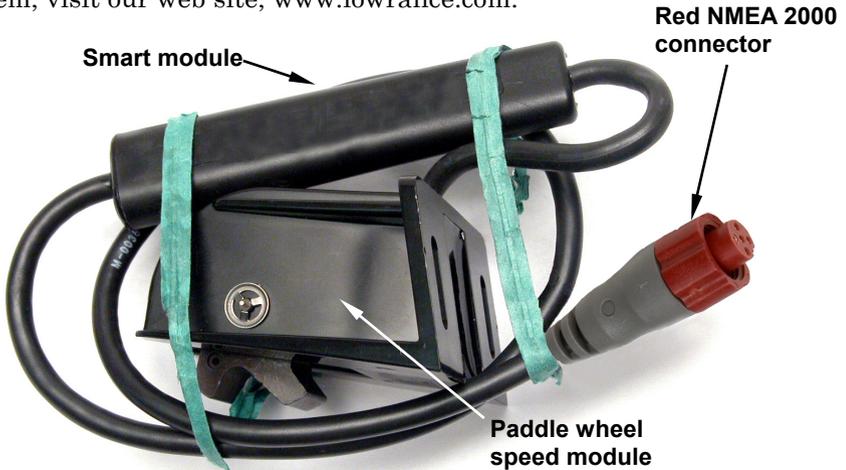
NMEA 2000 is the communication bus standard developed by the National Marine Electronics Association (NMEA) for use in boats. Lowrance has introduced a line of products that can communicate over a NMEA 2000 network (LowranceNet).

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.



The EP-70R speed sensor.

The EP-70R consists of the paddle wheel sensor module, a red cable connector and the smart module, which converts analog speed data to the NMEA 2000 data format. The cable length from the connector to the smart module is 16 1/2 inches (42 cm) and from the smart module to the speed module is 10 feet (3 meters).

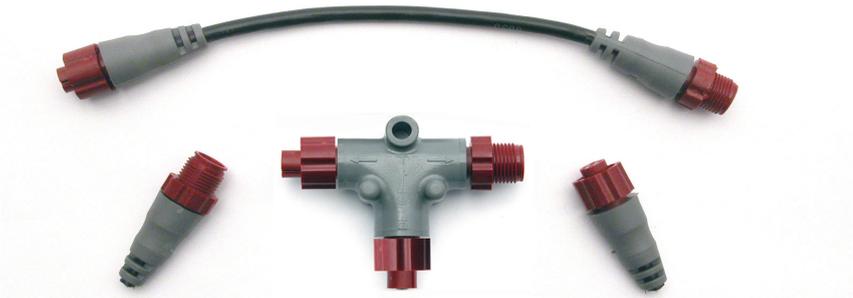
The EP-70R speed sensor, like the other LowranceNet Electronic Probe (EP) sensors, is designed for use with a NMEA 2000 network. Your sensor, however, is also compatible with LowranceNet blue connector networks. It can be added to a blue connector network by using a red female-to-blue female adapter 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 NMEA 2000 LowranceNet network. If you are connecting to an existing LowranceNET network, those are all the electronic components you need. If this is the first sensor you are connecting, you will need to purchase 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.

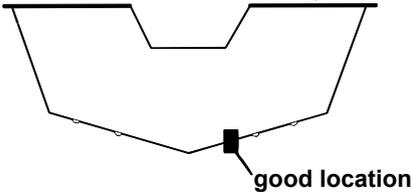
For complete instructions on setting up a new NMEA 2000 network or expanding an existing one, see the NMEA 2000 document packed with your EP-70R, "*Setup and Installation of NMEA 2000 Networks, General Information*," part number 988-0154-173. If that document is missing, it can be downloaded free from the Lowrance web site.

Recommended tools for this job include: drill, 7/8" (22 mm) drill bit, 1/8" (3 mm) drill bit for pilot holes, screwdriver. Required supplies for this job include: four #8 stainless steel wood screws (3/4" long), *high quality, marine grade* above- or below-waterline caulking compound.

Other supplies are not included, unless otherwise indicated. If you want to feed the speed module cable through a transom or bulkhead, use a 3/4" (19 mm) bit. A screwdriver is needed for mounting the speed sensor.

Installation

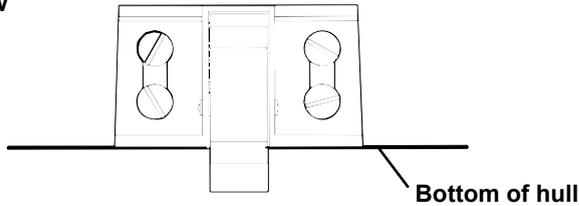
To install the speed sensor, first find a location on the boat's transom where the water flow is smoothest. Don't mount the sensor behind strakes or ribs. These will disturb the water flow to the speed sensor. Make sure the sensor will remain in the water when the boat is on plane. Also make sure the location doesn't interfere with the boat's trailer. Typically, the sensor is mounted about one foot to the side of the transom's centerline.



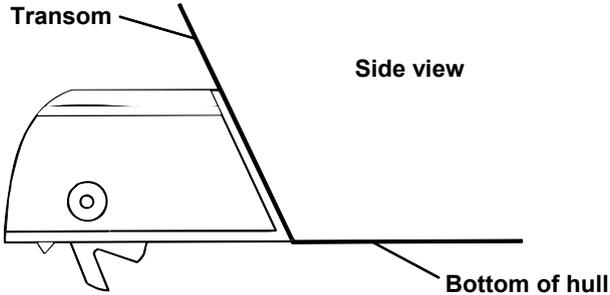
Transom showing mounting location.

Once you've determined the proper location for the unit, place the sensor on the transom. The bottom of the bracket should be flush with the hull's bottom. Using the sensor as a template, mark the hull for the screws' pilot holes. Drill four 1/8" holes, (3 mm) one in each end of the slots. Mount the sensor to the hull using #8 stainless steel wood screws (not included). Use a high quality, marine grade above- or below-waterline sealant to seal the screws. Make sure the sensor is flush with the bottom of the hull and tighten the screws.

Rear view



Speed sensor rear view.



Speed sensor side view.

If the base of the transom has a radius, fill the gap between the transom and the sensor with sealant. This will help ensure a smooth water flow.

Route the sensor's cable through or over the transom to the LowranceNET. If you need to drill a hole in the transom to pass the connector through, the required hole size is 7/8".

Caution:

If you drill a hole in the transom for the cable, make sure it is located above the waterline. After installation, be sure to seal the cable hole with the same marine grade above-or below-waterline sealant used for the screws.

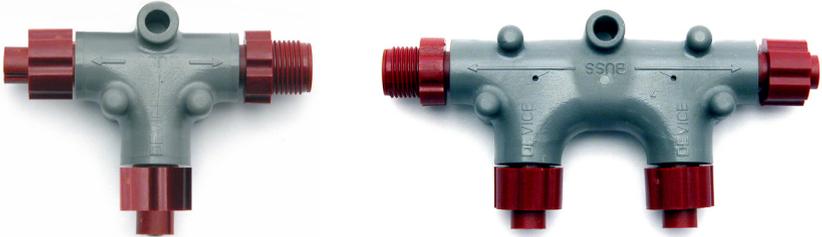
The EP-70R is now ready for use. Connect the sensor's red cable connector to a T connector on the network backbone and plug it in.

If you have any questions concerning the installation of the EP-70R, please contact your local boat dealer.

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).

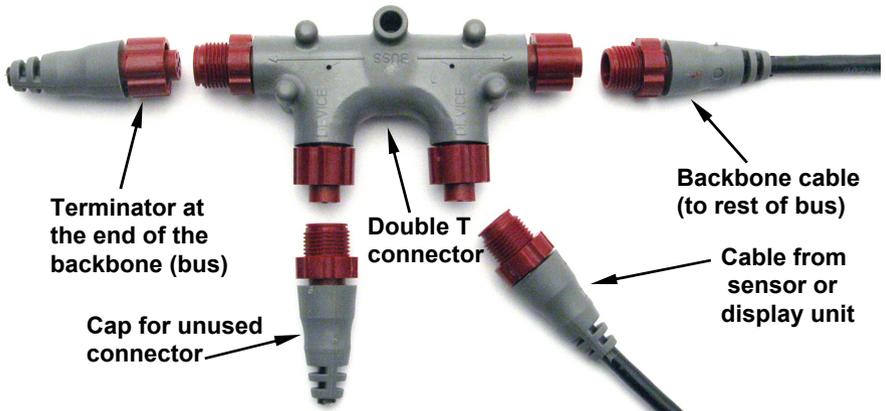
Network Backbone and Network Nodes

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:

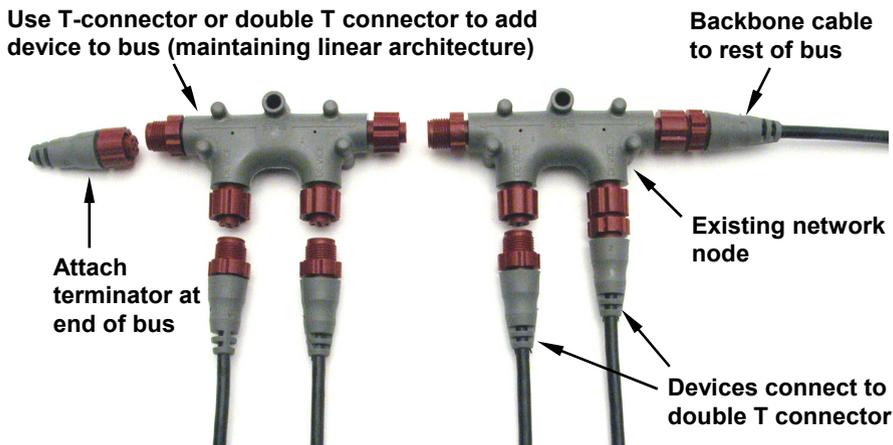
If you have a double T Connector on your network that is not attached to a device, you must cap the unused connector with a NMEA 2000 cap. This will protect the pin connectors from corrosion. The NMEA 2000 cap looks like a terminator, but has "Cap" stamped into the connector housing.

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.



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.

Configuration

The EP-70R Speed Sensor is not a configurable device. When selected from a display unit, LMF-200 or LMF-400 device list, a message will appear telling you if the sensor is working properly.

Displaying EP-70R Data

You can display EP-70R Speed Sensor data on the LMF-200 and LMF-400 multi-function gauges and on NMEA 2000 compatible sonar and GPS display units.

LMF-200

Speed sensor data can be shown 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 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. 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. Select **ADD PAGE** and press **MENU**.

3. Select (Gauge, Single Digital, Dual Digital or 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 how it will be displayed on select pages. You can customize the Gauge, Single Digital, Dual Digital and Fuel Manager pages to display EP-70R Speed Sensor data.

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 **WATER SPEED** and press **MENU**.

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 **WATER SPEED** and press **MENU**.

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 **WATER SPEED** and press **MENU**.

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 **WATER SPEED** and press **MENU**.

LMF-400

Speed sensor data can be shown 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 page) 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 selected pages. You can customize the Single Analog, Dual Analog, Quad Analog, Single Digital, Dual Digital, Quad Digital and Fuel Manager pages with speed 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 **WATER SPEED** and press **ENTER**.

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 **WATER SPEED** and press **ENTER**.
6. You will be directed to the Position menu. Repeat steps 4-5 to customize the other position or press **EXIT** twice 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 **WATER SPEED** and press **ENTER**.
6. You will be directed to the Position menu. Repeat steps 4-5 to customize the other positions or press **EXIT** twice 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 **WATER SPEED** and press **ENTER**.

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 **WATER SPEED** and press **ENTER**.
5. 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 **WATER SPEED** and press **ENTER**.
5. 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 **WATER SPEED** and press **ENTER**.

5. 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.

Display Unit

The Overlay Data function will be used to show speed sensor data on your display unit.

To add speed sensor as overlay data:

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 **EP-70R: SPEED** and press **ENTER**.
5. The following checkboxes will appear: Water Distance and Water Speed. Highlight the desired data and press **ENTER**, which will place a checkmark in its enabled box. It now will be shown as overlay data on your display unit's screen.
6. Repeat step 5 to display the other data category, or press **EXIT** repeatedly to return to the main display.

Device Name

You can change how your speed 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-70R 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 input a Device Name:

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 speed sensor and press **ENTER**. The Device Configuration menu will appear with the Device Name dialog box highlighted.

4. Press **ENTER**. Use the arrow keys to input the desired name for the speed sensor and 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**, to open the Bus Configuration menu. A list of network devices will be at the top of the page.

3. Select the desired speed sensor 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.

Restore Defaults

Located on the Advanced Options menu, the Restore Defaults command allows you to reset an EP-70R Speed Sensor's settings to factory defaults.

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 EP-70R Speed 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

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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