Lowrance lms 525c df fishfinder gps manual

I'm not robot!

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NOTICE! The storage and operation temperature range for your unit is from -20 degrees to +167 degrees Fahrenheit (-28 degrees to +75 degrees Celsius). Extended storage or operation in temperatures higher or lower than specified will damage the liquid crystal display in your unit. This type of damage is not covered by the warranty. For more information, contact the factory's Customer Service Department; phone numbers are listed on the last page of the manual. WARNING! A CAREFUL NAVIGATOR NEVER RELIES ON ONLY ONE METHOD TO OBTAIN POSITION INFORMATION. CAUTION When showing navigation data to a position (waypoint), a GPS unit will show the shortest, most direct path to the waypoint. It provides navigation data to the waypoint regardless of obstructions. Therefore, the prudent navigator will not only take advantage of all available navigation tools when traveling to a waypoint, but will also visually check to make sure a clear, safe path to the waypoint is always available. WARNING! When a GPS unit is used in a vehicle, the vehicle operator is solely responsible for operating the vehicle in a safe manner. Vehicle operators must maintain full surveillance of all pertinent driving, boating or flying conditions at all times. An accident or collision resulting in damage to property, personal injury or death could occur if the operator of a GPSequipped vehicle fails to pay full attention to travel conditions and vehicle operation while the vehicle is in motion. vii Section 1: Read Me First! How this manual can get you out on the road, fast! Welcome to the exciting world of digital sonar and GPS! We know you're anxious to begin navigating and finding fish, but we have a favor to ask. Before you grab the unit and begin installing it, please give us a moment or two to explain how our manual can help you get the best performance from your compact, wide-screen, combination fish finder and mapping GPS receiver. First, we want to thank you for buying a Lowrance sonar/GPS unit. Whether you're a first time user or a professional fisherman, you'll discover that your unit is easy to use, yet capable of handling demanding navigation and sonar tasks. When you team your unit with our custom mapping software MapCreate™, you have an incredible combination. You won't find another combination GPS and sonar unit with this much power and this many features for this price! Our goal for this book is to get you on the water fast, with a minimum of fuss. Like you, we'd rather spend more time boating or fishing and less time reading the manual! So, we designed our book so that you don't have to read the whole thing from front to back for the information you want. At the start (or end) of each segment, we'll tell you what content is coming up next. If it's a concept you're already familiar with, we'll show you how and where to skip ahead for the next important topic. We've also made it easy to look up any tips you may need from time to time. Here's how: The manual is organized into 10 sections. This first section is an introduction to the LMS-520c and LMS-525cDF, sonar and GPS. It tells you the basics you need to know before you can make the unit look around and tell you where you are, or look below the surface to find some fish. Section 2 will help you install your unit, the transducer and the GPS antenna module. We'll show you how to get the MultiMedia Card (MMC) correctly installed inside the unit. We'll also tell you about some of the available accessories. Section 3 covers Basic Sonar Operation. It will show you how easy it is to run your sonar, right out of the box. This section features a one-page Sonar Quick Reference. (If you've already jumped ahead and figured out how to install the unit yourself, and you just can't wait any longer, turn to the Quick Reference on page 55 and head for the water!) After you've gained some experience with your sonar, you'll want to check out Section 4, which discusses more advanced Sonar Options and Other Features. When you come to a sonar menu command on your unit’s screen, you can look it up in the manual by skimming over the table of contents, just flipping through Section 3 or scanning the sonar options in Section 4. If you're having difficulty with your sonar, you can find an answer to the most common problems in Section 5, Sonar Troubleshooting. The manual switches from sonar to navigation in Section 6, which introduces you to Basic GPS Operations. This section features a onepage GPS Quick Reference on page 121. Section 6 contains short, easy-to-scan GPS lessons that follow one another in chronological order. They're all you'll need to know to find your way on the water quickly. After you've learned the basics (or if you already have some GPS experience), you may want to try out some of the unit’s many advanced navigation features. That brings us to Section 7, Advanced GPS Operations. This section contains the rest of your unit’s GPS command functions, organized in alphabetical order. When you come to a GPS menu command on the screen, you can look it up in the manual by skimming over the table of contents, just flipping through Section 6 or scanning through the command portion of Section 7. Your unit is ready to use right out of the box, but you can fine tune and customize it's operation with dozens of options. Since sonar is the unit's key feature, we put the main sonar options in Section 4. Some options, such as screen brightness settings, affect both sonar and GPS operations. We describe how to use those common options along with GPS options in Section 8, System Setup and GPS Setup Options. Section 8 is organized in alphabetical order. In Section 9, we go into more detail on one of the unit’s most remarkable GPS capabilities — Searching. We'll introduce a search example in the Basic GPS Operation section, but there are so many map items you can search for, we had to give this function it's own section in the manual! For example, did you know your unit can look up business phone numbers, functioning as a virtual Yellow Pages? We’ll show you how in Section 9. Finally, in Section 10, we offer Supplemental Material, including a list of the GPS datums used, warranties and customer service information. Specifications: LMS-520c and LMS-525cDF General Display: ... 5.0" (12.7 cm) diagonal high contrast color Film SuperTwist LCD; programmable to viewing preference. Resolution: ... 480 pixel x 480 pixel resolution; 230,400 to- tal pixels. Backlighting: ... Incandescent backlit screen with multiple lighting levels; backlit keypad. Input power: ... 10 to 15 volts DC. Case size: ... 5.4" H x 6.9" W x 3.4" D (13.8 x 17.6 x 8.6 cm); sealed and waterproof; suitable for salt-water use. MMC slots:... One with waterproof door (SD card compati- ble). Recording:... GPS uses MMC & SD cards for recording trip details and displaying charts or custom maps. Sonar uses them to record and save sonar chart logs. Back-up memory:... Built-in memory stores sonar records and GPS data for decades. User settings are stored when unit is turned off. Languages: ... 10; menu languages selectable by user. Sonar Frequency: ... LMS-525cDF: 50/200 kHz. LMS-520c: 200 kHz. Transducers: ... A dual-frequency Skimmer® transducer with built-in temperature sensor is packed with the LMS-525cDF. It has 35°/12° cone angles. A single-frequency Skimmer transducer with built-in temperature sensor is packed with the LMS-520c. It has a 20° cone angle. Transduc- ers operate at speeds up to 70 mph (61 kts). Transmitter:... 3,000 watts peak-to-peak/375 watts RMS. Sonar sounding LMS-525cDF: 2,500 feet/762 meters. depth capability:... LMS-520c: 1,000 feet/305 meters. (Actual capability depends on transducer configuration and installation, bottom com- position and water conditions. All sonar units typically read deeper in fresh water than in salt water.) Depth display: ... Continuous display. Graph recording:... Up to 1 GB on one MMC (or SD) card Audible alarms:... Deep/shallow/fish/zone. Automatic ranging: ... Yes, with instant screen updates. Auto bottom track: ... Yes Zoom bottom track:... Yes. Split-screen zoom: ... Yes. Surface water temp: ... Yes, built into transducer. Speed/distance log: ... Yes, with optional speed sensor (sensor in- cluded with LMS-525cDF.) GPS Receiver/antenna:... External; LGC-2000 12 parallel channel NMEA 2000-ready GPS/WAAS re- ceiver/antenna. Background map: ... Built-in custom, detailed Lowrance map. Contains: enhanced detail of continental U.S. and Hawaii. Includes more than 60,000 nav aids and 10,000 wrecks/obstructions in coastal and Great Lakes waters. Metro ar- eas, selected major streets/highways and in- terstate exit services details included. Custom mapping:... MapCreate™ software optional; optional plug and play LEI FreedomMaps™ offer the same high-detail without the computer work of MapCreate. Other plug and play mapping options include IMS™ Fishing Hot Spots®, LEI NauticPaths™ charts and Navionics® charts. Mapping memory: ... Up to 1 GB on one MMC (or SD) card. Position updates:... Every second. Position points:... 1,000 waypoints; 1,000 event marker icons. Audible alarms:... Arrival/off-course/anchor. Graphic symbols for waypoints or event 63. marker icons:... Routes: ... 100; up to 100 waypoints per route. Plot Trails:... 10 savable; up to 9,999 points per trail. Zoom range: ... 39 ranges; 0.02 to 4,000 miles. NOTE: The above memory capacities refer only the unit’s on-board memory. The amount of GPS or sonar data you can record and save for recall later is only limited by the number of MMC cards you have. How Lowrance Sonar Works Sonar has been around since the 1940s, so if you already know how it works, skip down to read about the relatively new technology of GPS. But, if you've never owned a sonar fish finder, this segment will tell you the under water basics. Sonar is an abbreviation for SOund NAvigation and Ranging, a technology developed during World War II for tracking enemy submarines. (Lowrance developed the world's first transistorized sportfishing sonar in 1957.) A sonar consists of a transmitter, transducer, receiver and display. In simple terms, here's how it finds the bottom, or the fish: The transmitter emits an electrical impulse, which the transducer converts into a sound wave and sends into the water. (The sound frequency can't be heard by humans or fish.) The sound wave strikes an object (fish, structure, bottom) and bounces back to the transducer, which converts the sound back into an electrical signal. The receiver amplifies this return signal, or echo, and sends it to the display, where an image of the object appears on the scrolling sonar chart. The sonar's microprocessor calculates the time lapse between the transmitted signal and echo return to determine the distance to the object. The whole process repeats itself several times each second. Your unit can record a log of the sonar signals that scroll across the screen and save them to the MMC memory card. (These recordings are also called sonar charts or sonar graphs.) You can replay this sonar log in the unit using the Sonar Simulator function, or play it back on a personal computer using our free Sonar Viewer. The viewer is available for download from the Lowrance web site, www.lowrance.com. You can save several different sonar log files, erase 'em and record new ones, over and over again. The size of your sonar recordings is only limited by the free space available on your MMC. How Lowrance GPS Works You'll navigate faster and easier if you understand how your unit scans the sky to tell you where you are on the earth — and, where you're going. First, think of your unit as a small but powerful computer. (But don't worry — we made the unit easy to use, so you don't need to be a computer expert to find your way!) It includes a keypad and a screen with menus so you can tell it what to do. The screen also lets the unit show your location on a moving map, as well as point the way to your destination. This gimbal-mounted unit uses an external antenna/receiver module, which makes the whole system work something like your car radio. But instead of your favorite dance tunes, this receiver tunes in to a couple of dozen GPS satellites circling the earth. (It will also listen in to the WAAS satellites in orbit, but more about that in the upcoming segment introducing you to GPS and WAAS.) Your unit listens to signals from as many satellites as it can "see" above the horizon, eliminates the weakest signals, then computes its location in relation to those satellites. Once the unit figures its latitude and longitude, it plots that position on the moving map shown on the screen. The whole process takes place several times a second! The performance doesn't stop there. Stored in the permanent memory of each unit is a basic background map of the entire world. We lock it in here at the factory — you can't change or erase this map. The background map is suitable for many navigation chores, but for maximum accuracy and much more detail, you need our optional mapmaking software, MapCreate™. Some unit features — such as searching for businesses and addresses — won't work without a custom MapCreate map. There is so much detail in our background map (and even more in MapCreate) that we'll describe their contents and differences in Section 6, Basic GPS Operations, on page 105. Another portion of the unit’s onboard memory is devoted to recording GPS navigation information, which includes waypoints, event marker icons, trails and routes. This lets you look back the way you came. Think of this data storage like the hard drive memory in a computer or a tape in a cassette tape recorder. You can save several different GPS data files, erase 'em and record new ones, over and over again. These GPS Data Files (file format *.usr) can be shared between, not only the LMS-520c and LMS-525cDF, but other Lowrance GPS units and even personal computers. Your unit has one more thing in common with a personal computer. Just as computers have a floppy disk drive for storing and exchanging files, the unit has a slot for an MMC (MultiMedia Card) or SDC (Secure Digital card) flash memory card. These solid-state memory devices are about the size of a postage stamp, but can hold data ranging from 8 MB to 1 GB. (Compare that to a floppy disk's 1.44 MB capacity!) Your unit uses all that MMC space for two key GPS purposes. (The MMC is also used to record sonar logs.) First, you can backup your onboard GPS Data Files by copying them to the MMC. Since the MMC is removable (like a floppy disk or a cassette tape), you can store these GPS Data Files on a personal computer equipped with an MMC card reader. (Or store them on a pocketful of MMCs, if you don't have a computer.) Our MapCreate mapping software can save, edit or create its own GPS Data Files, which can be copied to the MMC and then loaded from the MMC into unit’s memory. (NOTE: No matter where they come from, GPS Data Files must be loaded from the MMC into memory before your unit can use them.) The other key GPS use for MMCs is storage of special high-detail, custom maps, which you can produce on your computer with our MapCreate software. These MapCreate custom maps contain much greater detail than the basic background map. These Custom Map Files (file format *.lcm) not only may be shared between the LMS-520c and 525cDF, but also with other Lowrance GPS and sonar/GPS units as well as personal computers. (For example, the exact same MMC, custom map files and GPS data files can be used interchangeably between your gimbal-mounted unit and the hand-held iFINDER™ GPS receiver.) Your unit automatically reads Custom Map Files directly from the MMC or SDC. To use a custom map, all you need to do is slide an MMC containing a map into the unit. Introduction to GPS and WAAS Well, now you know the basics of how your unit does its work. You might be ready to jump ahead to Section 2, Installation & Accessories, on page 13, so you can mount your unit and plug in the power. Or you might want to see how our text formatting makes the manual tutorials easy to skim. If that's the case, move on to "How to Use This Manual" on page 10. But, if you want to understand the current state of satellite navigation, look over this segment describing how GPS and its new companion WAAS work together to get you where you're going. The Global Positioning System (GPS) was launched July 17, 1995 by the United States Department of Defense. It was designed as a 24- hour-a-day, 365-days-a-year, all weather global navigation system for the armed forces of the U.S. and its allies. Civilian use was also available at first, but it was less accurate because the military scrambled the signal somewhat, using a process called Selective Availability (SA.) GPS proved so useful for civilian navigation that the federal government discontinued SA on May 2, 2000, after the military developed other methods to deny GPS service to enemy forces. Reliable accuracy for civilian users jumped from 100 meters (330 feet) under SA to the present level of 10 to 20 meters (about 30 to 60 feet.) Twenty-four satellites orbit 10,900 nautical miles above the Earth, passing overhead twice daily. A series of ground stations (with precisely surveyed locations) controls the satellites and monitors their exact locations in the sky. Each satellite broadcasts a low-power signal that identifies the satellite and its position above the earth. Three of these satellites are spares, unused until needed. The rest virtually guarantee that at least four satellites are in view nearly anywhere on Earth at all times. A minimum of three satellites are required to determine a 2D fix. The system requires signal reception from three satellites in order to determine a position. This is called a 2D fix. It takes four satellites to determine both position and elevation (your height above sea level — also called altitude.) This is called a 3D fix. Remember, the unit must have a clear view of the satellites in order to receive their signals. Unlike radio or television signals, GPS works at very high frequencies. These signals can be easily blocked by trees, buildings, an automobile roof, even your body. Like most GPS receivers, the unit doesn’t have a compass or any other navigation aid built inside. It relies solely on the signals from the satellites to calculate a position. Speed, direction of travel, and distance are all calculated from position information. Therefore, in order it to determine direction of travel, you must be moving and the faster, the better. This is not to say that it won’t work at walking or trolling speeds — it will. There will simply be more "wandering" of the data shown on the display. GPS alone is plenty accurate for route navigation, but the U.S. Federal Aviation Administration has special aircraft navigation needs that go beyond basic GPS. So, the FAA has developed a program to boost GPS performance with its Wide Area Augmentation System, or WAAS. The FAA commissioned the system on July 11, 2003. WAAS is designed to increase GPS accuracy to within 7.6 meters vertically and horizontally, but it consistently delivers accuracies within 1-2 meters horizontal and 2-3 meters vertical, according to the FAA. It does this by broadcasting correction signals on GPS frequencies. Your unit automatically receives both GPS and WAAS signals. However, there are some fringe areas of the U.S., including parts of Alaska that do not yet receive robust WAAS coverage. Continued WAAS development is planned to extend WAAS coverage in the years to come. WAAS boosts the accuracy of land GPS navigation, but the system is designed for aircraft. The satellites are in a fixed orbit around the Equator, so they appear very low in the sky to someone on the ground in North America. Aircraft and vessels on open water can get consistently good WAAS reception, but terrain, foliage or even large man-made structures can sometimes block the WAAS signal from ground receivers. You'll find that using your GPS receiver is both easy and amazingly accurate. It’s easily the most accurate method of electronic navigation available to the general public today. Remember, however, that this receiver is only a tool. Always have another method of navigation available, such as a map or chart and a compass. Also remember that this unit will always show navigation information in the shortest line from your present position to a waypoint, regardless of terrain! It only calculates position, it can’t know what’s between you and your destination, for example. It’s up to you to safely navigate around obstacles, no matter how you’re using this product. How to use this manual: typographical conventions Many instructions are listed as numbered steps. The keypad and arrow "keystrokes" appear as boldface type. So, if you're in a real hurry (or just need a reminder), you can skim the instructions and pick out what menu command to use by finding the boldface command text. The following paragraphs explain how to interpret the text formatting for those commands and other instructions: Arrow Keys The arrow keys control the movement of dotted cross-hair lines on your mapping screen called the cursor. The arrow keys also control a horizontal line depth cursor on the sonar screen. The arrow keys help you move around the menus so you can execute different commands. They are represented by symbols like these, which denote the down arrow key, the up arrow, the left arrow and the right arrow: ↓ ↑ ← →. Keyboard The other keys perform a variety of functions. When the text refers to a key to press, the key is shown in bold, sans serif type. For example, the "Enter/Icons" key is shown as ENT and the "Menu" key is shown as MENU. Menu Commands A menu command or a menu option will appear in small capital letters, in a bold sans serif type like this: ROUTE PLANNING. These indicate that you are to select this command or option from a menu or take an action of some kind with the menu item. Text that you may need to enter or file names you need to select are show in italic type, such as trail name. Instructions = Menu Sequences Most functions you perform with your unit are described as a sequence of key strokes and selecting menu commands. We've written them in a condensed manner for quick and easy reading. For example, instructions for navigating a trail would look like this: 1.From the Map Page, press MENU|MENU|↓ to MY TRAILS|ENT. 2.Press ↓ to Trail 1|ENT|→|↓ to NAVIGATE|ENT. 3.You are asked to wait while it converts the trail into a route. 4.The wait message disappears and the unit begins showing navigation information along the trail. Translated into complete English, step 1 above would mean: "Start on the Map Page. Press the Menu key twice. Next, repeatedly press (or press and hold) the down arrow key to scroll down the menu and select (highlight) the My Trails menu command. Finally, press the Enter key." Step 2 would mean: "Press the down arrow key repeatedly to scroll to the trail named Trail 1, and press Enter. Next, press the right arrow key and then the down arrow key to highlight the Navigate command, then press Enter." Section 2: Installation Preparations You can install the sonar and GPS systems in some other order if you prefer, but we recommend this installation sequence: Caution: You should read over this entire installation section before drilling any holes in your vehicle or vessel! 1.Determine the approximate location for the sonar/GPS unit, so you can plan how and where to route the cables for the antenna, transducer and power. This will help you make sure you have enough cable length for the desired configuration. 2.Determine the approximate location for the transducer and its cable route. 3.Determine the approximate location for the GPS antenna module and its cable route. 4.Determine the location of your battery or other power connection, along with the power cable route. 5.Install the transducer and route the transducer cable to the sonar/GPS unit. 6.Install the GPS antenna and route the antenna cable to the sonar/GPS unit. 7.Install the power cable and route it to the sonar/GPS unit. 8.Mount the sonar/GPS unit to the bracket. Transducer Installation These instructions will help you install your Skimmer® transducer on a transom, on a trolling motor or inside a hull. These instructions cover both singleand dual-frequency Skimmer transducers. Please read all instructions before proceeding with any installation. The smaller single-frequency Skimmers typically use a one-piece, stainless steel mounting bracket. The larger dual-frequency Skimmers typically use a two-piece, plastic mounting bracket. The trolling motor mount uses a one-piece plastic bracket with an adjustable strap. These are all "kick-up" mounting brackets. They help prevent damage if the transducer strikes an object while the boat is moving. If the transducer does "kick-up," the bracket can easily be pushed back into place without tools. Read these instructions carefully before attempting the installation. Determine which of the mounting positions is right for your boat. Remember, the transducer installation is the most critical part of a sonar installation. NOTE: The following installation types also call for these recommended tools and required supplies that you must provide (supplies listed here are not included): Single-frequency transom installations Tools include: two adjustable wrenches, drill, #29 (0.136") drill bit, flathead screwdriver. Supplies: high quality, marine grade aboveor belowwaterline sealant/adhesive compound. Dual-frequency transom installations Tools: two adjustable wrenches, drill, #20 (0.161") drill bit, flat-head screwdriver. Supplies: four, 1" long, #12 stainless steel slotted wood screws, high quality, marine grade aboveor below-waterline sealant/adhesive compound. Single-frequency trolling motor installations Tools: two adjustable wrenches, flat-head screwdriver. Supplies: plastic cable ties. Shoot-through hull installations Tools: these will vary depending on your hull's composition. Consult your boat dealer or manufacturer. Other tools are a wooden craft stick or similar tool for stirring and applying epoxy, and a paper plate or piece of cardboard to mix the epoxy on. Supplies: rubbing alcohol, 100 grit sandpaper, specially formulated epoxy adhesive available from LEI (see ordering information on the inside back cover). A sandwich hull also requires polyester resin. Selecting a Transducer Location 1.The location must be in the water at all times, at all operating speeds. 2.The transducer must be placed in a location that has a smooth flow of water at all times. If the transducer is not placed in a smooth flow of water, interference caused by bubbles and turbulence will show on the sonar's display in the form of random lines or dots whenever the boat is moving. NOTE: Some aluminum boats with strakes or ribs on the outside of the hull create large amounts of turbulence at high speed. These boats typically have large outboard motors capable of propelling the boat at speeds faster than 35 mph. Typically, a good transom location on aluminum boats is between the ribs closest to the engine. 3.The transducer should be installed with its face pointing straight down, if possible. For shoot-thru applications: Many popular fishing boat hulls have a flat keel pad that offers a good mounting surface. On vee hulls, try to place the transducer where the deadrise is 10° or less. Deadrise less than 10° Pad Strakes Left, vee pad hull; right, vee hull. A pod style transducer is shown here, but the principle is the same for Skimmers inside a hull. 4.If the transducer is mounted on the transom, make sure it doesn't interfere with the trailer or hauling of the boat. Also, don't mount it closer than approximately one foot from the engine's lower unit. This will prevent cavitation (bubble) interference with propeller operation. 5.If possible, route the transducer cable away from other wiring on the boat. Electrical noise from engine wiring, bilge pumps and aerators can be displayed on the sonar's screen. Use caution when routing the transducer cable around these wires. CAUTION: Clamp the transducer cable to transom near the transducer. This will help prevent the transducer from entering the boat if it is knocked off at high speed. Good location Poor location Good location Good location Poor angle Good and poor transducer locations. How low should you go? For most situations, you should install your Skimmer transducer so that its centerline is level with the bottom of the boat hull. This will usually give you the best combination of smooth water flow and protection from bangs and bumps. Transom Transducer centerline Hull bottom Align transducer centerline with hull bottom. However, there are times when you may need to adjust the transducer slightly higher or lower. (The slots in the mounting brackets allow you to loosen the screws and slide the transducer up or down.) If you frequently lose bottom signal lock while running at high speed, the transducer may be coming out of the water as you cross waves or wakes. Move the transducer a little lower to help prevent this. If you cruise or fish around lots of structure and cover, your transducer may be frequently kicking up from object strikes. If you wish, you may move the transducer a little higher for more protection. There are two extremes you should avoid. Never let the edge of the mounting bracket extend below the bottom of the hull. Never let the bottom – the face – of the transducer rise above the bottom of the hull. Shoot-thru-hull vs. Transom Mounting In a shoot-thru-hull installation, the transducer is bonded to the inside of the hull with epoxy. The sonar "ping" signal actually passes through the hull and into the water. This differs from a bolt-thru-hull installation (often called simply "thru-hull"). In that case, a hole is cut in the hull and a specially designed transducer is mounted through the hull with a threaded shaft and nut. This puts the transducer in direct contact with the water. Typically, shoot-thru-hull installations give excellent high speed operation and good to excellent depth capability. There is no possibility of transducer damage from floating objects, as there is with a transommounted transducer. A transducer mounted inside the hull can't be knocked off when docking or loading on a trailer. However, the shoot-thru-hull installation does have its drawbacks. First, some loss of sensitivity does occur, even on the best hulls. This varies from hull to hull, even from different installations on the same hull. This is caused by differences in hull lay-up and construction. Second, the transducer angle cannot be adjusted for the best fish arches on your sonar display. (This is not an issue for flasher-style sonars.) Lack of angle adjustment can be particularly troublesome on hulls that sit with the bow high when at rest or at slow trolling speeds. Third, a transducer CAN NOT shoot through wood and metal hulls. Those hulls require either a transom mount or a thru-hull installation. Fourth, if your Skimmer transducer has a built in temp sensor, it will only show the temperature of the bilge, not the water surface temp. Follow the testing procedures listed in the shoot-thru-hull installation section at the end of this lesson to determine if you can satisfactorily shoot through the hull. Transom Transducer Assembly And Mounting The best way to install these transducers is to loosely assemble all of the parts first, place the transducer's bracket against the transom and see if you can move the transducer so that it's parallel with the ground. The following instructions sometimes vary depending on the mounting bracket that came with your transducer. Single-frequency Skimmers come with a one-piece stainless steel bracket, while dual-frequency Skimmers come with a two-piece plastic mounting bracket. Use the set of instructions that fits your model. 1.Assembling the bracket. A. One-piece bracket: Press the two small plastic ratchets into the sides of the metal bracket as shown in the following illustration. Notice there are letters molded into each ratchet. Place each ratchet into the bracket with the letter "A" aligned with the dot stamped into the metal bracket. This position sets the transducer's coarse angle adjustment for a 14° transom. Most outboard and stern-drive transoms have a 14° angle. Dot Align plastic ratchets in bracket. B. Two-piece bracket: Locate the four plastic ratchets in the transducer's hardware package. Press two ratchets into the sides of the plastic bracket and two on either side of the transducer as shown in the following illustrations. Notice there are letters molded into each ratchet. Place the ratchets into the bracket with the letter "A" aligned with the alignment mark molded into the bracket. Place the ratchets onto the transducer with the letter "A" aligned with the 12 o'clock position on the transducer stem. These positions set the transducer's coarse angle adjustment for a 14° transom. Most outboard and stern-drive transoms have a 14° angle. Alignment letters Alignment positions Transducer Transducer bracket Insert and align ratchets. Transducer Transducer bracket Add ratchets to bracket and transducer. 2.Aligning the transducer on the transom. A. One-piece bracket: Slide the transducer between the two ratchets. Temporarily slide the bolt though the transducer assembly and hold it against the transom. Looking at the transducer from the side, check to see if it will adjust so that its face is parallel to the ground. If it does, then the "A" position is correct for your hull. If the transducer's face isn't parallel with the ground, remove the transducer and ratchets from the bracket. Place the ratchets into the holes in the bracket with the letter "B" aligned with the dot stamped in the bracket. Reassemble the transducer and bracket and place them against the transom. Again, check to see if you can move the transducer so it's parallel with the ground. If you can, then go to step 3A. If it doesn't, repeat step 2A, but use a different alignment letter until you can place the transducer on the transom correctly. Ratchets Insert bolt and check transducer position on transom. B. Two-piece bracket: Assemble the transducer and bracket as shown in the following figure. Temporarily slide the bolt though the transducer assembly but don't tighten the nut at this time. Hold the assembled transducer and bracket against the transom. Looking at the transducer from the side, check to see if it will adjust so that its face is parallel to the ground. If it does, then the "A" positions are correct for your hull. If the transducer's face isn't parallel with the ground, remove and disassemble the transducer and ratchets. Place the ratchets into the bracket holes with the letter "B" aligned with the bracket alignment mark. Place them on the transducer aligned with the 12 o'clock position on the transducer stem. Reassemble the transducer and bracket and place them against the transom. Again, check to see if you can move the transducer so it's parallel with the ground. If you can, then go to step 3B. If it doesn't, repeat step 2B, but use a different alignment letter until you can place the transducer on the transom correctly. Bolt Lock washer Nut Flat washer Flat washer Assemble transducer and bracket. 3.Assembling the transducer. A. One-piece bracket: Once you determine the correct position for the ratchets, assemble the transducer as shown in the following fig- ure. Don't tighten the lock nut at this time. Metal Nut washer Rubber Metal washer washers Bolt Assemble transducer and bracket. B. Two-piece bracket: Once you determine the correct position for the ratchets, assemble the transducer as shown in the figure in step 2B. Don't tighten the lock nut at this time. 4.Drilling mounting holes. Hold the transducer and bracket assembly against the transom. The transducer should be roughly parallel to the ground. The transducer's centerline should be in line with the bottom of the hull. Don't let the bracket extend below the hull! Mark the center of each slot for the mounting screw pilot holes. You will drill one hole in the center of each slot. Drill the holes. For the one-piece bracket, use the #29 bit (for the #10 screws). For the two-piece bracket, use the #20 bit (for the #12 screws). 20 Transom Transom Position transducer mount on transom and mark mounting holes. Side view shown, left, and seen from above at right. 5.Attaching transducer to transom. A. One-piece bracket: Remove the transducer from the bracket and re-assemble it with the cable passing through the bracket over the bolt as shown in the following figures. For single-frequency Skimmer, route cable over bolt and through bracket. Side view shown, left, and seen from above at right. Both bracket types: Attach the transducer to the transom. Slide the transducer up or down until it's aligned properly with the bottom of the hull as shown in the preceding and following figures. Tighten the bracket's mounting screws, sealing them with the sealant. Adjust the transducer so that it's parallel to the ground and tighten the nut until it touches the outer washer, then add 1/4 turn. Don't over tighten the lock nut! If you do, the transducer won't "kick-up" if it strikes an object in the water. 21 Bottom of hull Flat-bottom hull Deep-"vee" hull Align transducer centerline with hull bottom and attach transducer to transom. Rear view of dual-frequency Skimmer shown. 6.Route the transducer cable through or over the transom to the sonar unit. Make sure to leave some slack in the cable at the transducer. If possible, route the transducer cable away from other wiring on the boat. Electrical noise from the engine's wiring, bilge pumps, VHF radio wires and cables, and aerators can be picked up by the sonar. Use caution when routing the transducer cable around these wires. WARNING: Clamp the transducer cable to the transom close to the transducer. This can prevent the transducer from entering the boat if it is knocked off at high speed. If you need to drill a hole in the transom to pass the connector through, the required hole size be 1". 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 hole with the same marine grade aboveor below-waterline sealant used for the mounting screws. 7.Make a test run to determine the results. If the bottom is lost at high speed, or if noise appears on the display, try sliding the transducer bracket down. This puts the transducer deeper into the water, hopefully below the turbulence causing the noise. Don't allow the transducer bracket to go below the bottom of the hull! Trolling Motor Bracket Installation (single-frequency only) 1.Attach the optional TMB-S bracket to the transducer as shown in the following figure, using the hardware supplied with the transducer. (Note: The internal tooth washer is supplied with the TMB-S.) TMB-S bracket Internal tooth washer Flat washer Attach motor mounting bracket to transducer. 2.Slide the adjustable strap supplied with the TMB-S through the slot in the transducer bracket and wrap it around the trolling motor. Position the transducer to aim straight down when the motor is in the water. Tighten the strap securely. 3.Route the transducer cable alongside the trolling motor shaft. Use plastic ties (not included) to attach the transducer cable to the trolling motor shaft. Make sure there is enough slack in the cable for the motor to turn freely. Route the cable to the sonar unit and the transducer is ready for use. Transducer mounted on trolling motor, side view. Transducer Orientation and Fish Arches If you do not get good fish arches on your display, it could be because the transducer is not parallel with the ground when the boat is at rest in the water or at slow trolling speeds. Partial fish arches Transducer aimed Transducer aimed too far back Transducer aimed too far forward Full fish arch Proper transducer angle Transducer angles and their effects on fish arches. If the arch slopes up – but not back down – then the front of the transducer is too high and needs to be lowered. If only the back half of the arch is printed, then the nose of the transducer is angled too far down and needs to be raised. NOTE: Periodically wash the transducer's face with soap and water to remove any oil film. Oil and dirt on the face will reduce the sensitivity or may even prevent operation. Shoot-Thru-Hull Preparation Hulls with Flotation Materials The transducer installation inside a fiberglass hull must be in an area that does not have air bubbles in the resin or separated fiberglass layers. The sonar signal must pass through solid fiberglass. A successful transducer installation can be made on hulls with flotation materials (such as plywood, balsa wood or foam) between layers of fiberglass if the material is removed from the chosen area. See the following figure. WARNING: Do not remove any material from your inner hull unless you know the hull's composition. Careless grinding or cutting on your hull can result in damage that could sink your boat. Contact your boat dealer or manufacturer to confirm your hull specifications. Fill with Fill with resin Flotation material Inner hull Epoxy to hull first Outer hull Epoxy the transducer to a solid portion of the hull. For example, some (but not all) manufacturers use a layer of fiberglass, then a core of balsa wood, finishing with an outer layer of fiberglass. Removing the inner layer of fiberglass and the balsa wood core exposes the outer layer of fiberglass. The transducer can then be epoxied directly to the outer layer of fiberglass. After the epoxy cures for 24 hours, fill the remaining space with polyester resin. When the job is finished, the hull is watertight and structurally sound. Remember, the sonar signal must pass through solid fiberglass. Any air bubbles in the fiberglass or the epoxy will reduce or eliminate the sonar signals. Testing Determines Best Location Ideally, the shoot-thru transducer should be installed as close to the transom as possible, close to the centerline. This will give you the best performance during high speed maneuvers. Transducer location Transducer location (high speed) (trolling speed) Shoot-thru-hull transducer locations for high speed or trolling speed operation. To choose the proper location for shoot-thru-hull mounting, follow these testing procedures: (You may need a helper to complete these steps.) 1.Anchor the boat in about 30 feet of water. Add a little water to the sump of the boat. Plug the transducer into the sonar unit, turn it on, then hold the transducer over the side of the boat in the water. Adjust the sensitivity and range controls until a second bottom echo is seen on the display. (You'll need to turn off Auto Sensitivity, Auto Depth Range and ASP™. Try a range setting that is two to three times the water depth. The harder (more rocky) the bottom, the easier it will be to get a second bottom signal.) Don't touch the controls once they've been set. True bottom Second bottom Manual range setting Example of a second bottom signal. Unit is in 30 feet of water, with range set at 80 feet and sensitivity set at 87 percent. 2.Next, take the transducer out of the water and place it in the water in the sump of the boat, face down. (The transducer face is shown in the figure on the following page.) Notice how the signal strength decreases. The second bottom signal will probably disappear and the bottom signal intensity will likely decrease. 3.Now move the transducer around to find the best location with the strongest possible bottom signal. If you find a spot with an acceptable bottom signal, mark the location and move on to step 4. If you can't get an acceptable bottom signal, try turning up the sensitivity by three or five keystrokes and then move the transducer around once more. If you find a spot that works, mark it and move on to step 4. If you have to turn up sensitivity by more than five keystrokes to get a good signal, the transducer should be mounted on the outside of the hull. This is especially true if you have to turn sensitivity all the way up to get a decent bottom signal. 4.Most people can get good results by following steps 1 through 3, so this step is optional. If you want to make an extra effort to be absolutely sure that your selected location will work under all conditions, make a test run with the boat on plane and observe the bottom signal. You'll need to figure some way to prop the transducer into position while you make your test run. (A brick or two might be sufficient to hold it in place.) 5.When you're satisfied with a location, mark it and proceed with the installation. Shoot-thru-hull Installation If you are installing the transducer on a hull with floatation material sandwiched within the hull, refer to the text "Hulls With Flotation Materials" beginning on page 24. 1.Make sure the area is clean, dry and free of oil or grease, then sand both the inside surface of the hull and the face of the transducer with 100 grit sandpaper. The sanded hull area should be about 1-1/2 times the diameter of the transducer. The surface of the hull must be flat so the entire transducer face is in contact with the hull prior to bonding. After sanding, clean the hull and transducer with rubbing alcohol to remove any sanding debris. Spread epoxy here Sand this surface (unit's face) Orient the Skimmer with the nose facing the bow of the boat. To bow Epoxy transducer to hull. WARNING: Use only the epoxy available from LEI. It has been formulated to work with these installation procedures. Other epoxy types may be too thin or may not cure to the right consistency for optimum transducer performance. 2.The epoxy consists of the epoxy itself and a hardener. Remove the two compounds from the package and place them on the paper plate. Thoroughly stir the two compounds together until the mixture has a uniform color and consistency. Do not mix too fast or bubbles will form in the epoxy. After mixing, you have 20 minutes to complete the installation before the epoxy becomes unworkable. Spread a thin layer of epoxy (about 1/16" or 1.5 mm thick) on the face of the transducer as shown in the previous figure. Make sure there are no air pockets in the epoxy layer! Then, apply the remaining epoxy to the sanded area on the hull. 3.Press the transducer into the epoxy, twisting and turning it to force any air bubbles out from under the transducer face. Stop pressing when you bottom out on the hull. When you're finished, the face of the transducer should be parallel with the hull, with a minimum amount of epoxy between the hull and transducer. 4.Apply a weight, such as a brick, to hold the transducer in place while the epoxy cures. Be careful not to bump the transducer while the epoxy is wet. Leave the weight in place for a minimum of three hours. Allow the epoxy to cure for 24 hours before moving the boat. 5.After the epoxy has cured, route the cable to the sonar unit and it's ready to use. Speed/Temperature Sensors Optional Speed Sensor Installation All the units in this series can display speed and distance traveled, but only the LMS-525cDF comes packed with a speed sensor. If you wish to purchase an optional additional sensor for your unit, refer to the accessory ordering information inside the back cover of this manual. The following instructions describe how to install the speed sensor. Recommended tools for this job include: drill, 7/8" drill bit, 1/8" 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 aboveor below-waterline sealant. 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. 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, 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 aboveor below-waterline sealant to seal the screws. Make sure the sensor is flush with the bottom of the hull and tighten the screws. Goodlocation Stern view showing good location for mounting sensor on transom. Transom Bottom of hull Bottom of hull Speed sensor mounting configuration: side view (left) and rear view (right.) If the base of the transom has a radius, fill the gap between the transom and the sensor with the sealant. This will help ensure a smooth water flow. Route the sensor's cable through or over the transom to the sonar unit. 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 hole with the same marine grade aboveor below-waterline sealant used for the screws. The sensor is now ready for use. Connect the sensor to the sonar socket on the back of your unit and connect the transducer to the speed sensor's socket. If you have any questions concerning the installation of the sensor, please contact your local boat dealer. Power Connections Your unit comes with a power/data cable that splits into three branches, each with several exposed wires. The thicker three-wire cable (white, red and black) is the power supply for your display unit. This cable has no label. The thinner branch with three wires (red, black and shield) is the power cable for a NMEA 2000 network. It is labeled "NMEA 2000 POWER." The branch with four wires (blue, yellow, orange, and shield) is a data cable, labeled "RS-232 COMM." It supports a serial communication port. This allows your unit to exchange NMEA 0183 data with another device, such as an autopilot, DSC marine radio or computer. Display unit power wires: white, red and black To unit NMEA 2000 power wires: red, black and shield Data cable wires: blue, yellow, orange, and shield The Power/Data cable for this unit. NOTE: There are two basic power connection options, which are shown in the following two diagrams. Read the following instructions carefully to determine which power connection applies to your unit. Depending on your configuration, you may not use all of these wires. Caution: All of the wires in the power/data cable have bare ends for easier installation. The bare ends on any unused wires could cause an electrical short if left exposed. To prevent this, you should cover the individual wire ends – either by capping them with wire nuts, wrapping them with electrical tape or both. (You should cut off the bare wire before taping off the ends.) Powering Your Display Unit The display unit works from a 12-volt DC battery system. Attach the display power cable (with provided 3-amp fuse) to an accessory switch or power bus. If this results in electrical interference, connect direct to a battery but install an in-line switch on the cable. Caution: We strongly recommend that you shut off the power supply to the power cable when the unit is not in use, especially in saltwater environments. When the unit is turned off but still connected to a power supply, electrolysis can occur in the power cable plug. This may result in corrosion of the plug body along with the electrical contacts in the cable and the unit's power socket. Risk of electrolysis corrosion is even greater when the cable is unplugged from the unit, but still connected to a power source. We recommend you connect the power cable to the auxiliary power switch included in most boat designs. If that results in electrical interference, or if such a switch is not available, we recommend connecting direct to the battery and installing an in-line switch. This will let you shut off power to the power cable when the unit is not in use. When you are not using the unit, you should always shut off power to the power cable, especially when the power cable is disconnected from the unit. WARNING: This product must be independently fused with the enclosed 3-amp fuse (or equivalent), even if you connect to a fused accessory or power bus. If a malfunction happens inside the unit, extensive damage can occur if the enclosed fuse is not used. As with all electrical devices, this unit could be damaged to a point that it is unrepairable and could even cause harm to the user when not properly fused. Failure to use a 3-amp fuse will void your warranty. If possible, keep the power cable away from other boat wiring, especially the engine's wires. This will provide the best isolation from electrical noise. If the cable is not long enough, splice #18 gauge wire onto it. The display power cable has three wires, white, red and black. Red is the positive (+) lead, black is negative (–) or ground. The white wire is unused by your unit and should be capped. Make sure to attach the in-line fuse holder to the red lead as close to the power source as possible. For example, if you have to extend the power cable to the power bus or battery, attach one end of the fuse holder directly to the power bus or battery. This will protect both the unit and the power cable in the event of a short. This unit has reverse polarity protection. No damage will occur if the power wires are reversed. However, the unit will not work until the wires are attached correctly. Power Diagram A To unit Mandatory network power-off 3-amp fuse switch NMEA 2000 Power Cable Shield Black Display Unit 3-amp fuse Red Power Cable Recommended Black display unit White power-off switch (unused) 12 volt DC power source Data Cable Use this method if you are powering the display unit and a GPS module or the display unit and a NMEA 2000 network. (Fuses may be different from those shown.). The network and any NMEA 2000 devices, including the GPS module, will not operate unless the NMEA 2000 Power Cable is connected to power. The NMEA 2000 power cable must be connected to power even if your only NMEA 2000 device is the GPS module and it is connected to the display unit's Network socket. (However, never connect multiple power sources to a NMEA 2000 network. If you have a network that is already powered, see diagram B on page 33.) Power Diagram B To unit Red wire with White wire Display Unit (unused) 3-amp fuse Power Cable All unused Data Black wire or NMEA 2000 power wires Recommended should be 12 volt DC capped with power off switch wire nuts and power source electrical tape to prevent shorts. Data Cable NMEA 2000 Power Cable Use this method if you are only powering your display unit and are not powering a NMEA 2000 network or any NMEA 2000 accessory device, including a GPS module. (Fuse may be different from that shown.) The method in diagram B is also used when your display unit is connected to a NMEA 2000 network that is already connected to power. (Never connect multiple power sources to a NMEA 2000 network.) Powering a NMEA 2000 Network Bus A NMEA 2000 bus must be connected to a power source to operate. NMEA 2000 devices, including GPS modules, draw their power from the network bus. If you have a pre-existing NMEA 2000 network installation, it may already be connected to another power source. If you are not sure about a network's power status, consult the boat manufacturer or dealer. If your NMEA 2000 bus is already powered, you can ignore the NMEA 2000 Power cable and use the method shown in Power Diagram B above. Never attach two power sources to a single NMEA 2000 bus. If you do need to power your NMEA 2000 bus, attach the NMEA 2000 Power cable to an accessory switch as indicated in power diagram A on page 32. The NMEA 2000 Power cable's red wire should be attached (with provided 3-amp fuse) to the positive (+) terminal. The NMEA 2000 Power cable's black and shield wires should both be attached to the negative (–) terminal. WARNING: The NMEA 2000 network bus is always on and constantly drawing power. You must connect NMEA power to a switched power source so you can turn off the network when not in use. Failure to connect to and use a power switch will drain your boat battery, which could stop your boat's operation. GPS Antenna/Receiver Module The LMS-520c and LMS-525cDF packages include the LGC-3000 GPS module. This device contains the unit's external antenna and receiver for GPS and WAAS signals. The antenna/receiver module comes with a 15-foot extension cable. This module can be mounted on a flat surface or pole, or an optional magnet is available for temporary mounting on any ferrous surface. You need to select an antenna installation location that has a clear, unobstructed view of the sky. After the module is installed, connect it to the unit. The LGC-3000 can communicate with your GPS unit either directly (using the supplied extension cable) or through a NMEA 2000 network. LGC-3000 Module, bottom view (left) and top view (right). NOTE See the module’s instruction sheet, publication part number 988- 0154-651, for complete installation instructions. To use the module in an automobile, you may achieve good results by simply placing the external antenna on the top of the dash, at the base of the windshield. A piece of the rubber non-skid shelf liner material available in recreational vehicle supply stores will help hold the antenna in place. This may not work well if you have a cab-over design pickup truck camper or motor home. If dashboard reception is poor, simply relocate the antenna module elsewhere on the vehicle for a clearer view of the sky. Connecting to a NMEA 2000 Network A network bus is an installed and operational network cable (backbone) running the length of your boat, already connected to a power supply and properly terminated. Such a bus provides network connection nodes at various locations around your boat. The NMEA 2000 network is similar to the telephone wiring in a house. If you pick up a phone in your living room, you can hear someone talking into the phone in the bedroom. Lowrance and LEI provide all the cables you will need to create a NMEA 2000 network. Lowrance provides T connectors and extension cables so you can add devices along the backbone wherever you want. Once you have a working network, every sensor added will come with its own T connector for easy expansion. The simplest NMEA 2000 network is a GPS or sonar/GPS display unit with the LGC-3000, one double-T connector, two 120 ohm terminators and any extension cables needed to connect them. The diagram below details how to set up that type of network. Network port on display unit Double T Connector Extension cable 120-ohm terminator 120-ohm terminator Extension cable LGC-3000 LGC-3000 and display unit as an expandable NMEA 2000 network. The diagram has a double T connector with two 120-ohm terminators — one at each end of the connector. It is easy to expand this network by removing a terminator from one end of the double T connector, then inserting a new T connector or extension cable between the double T connector and terminator (See the NMEA 200 network general information document that came with your unit for more information). NMEA 0183 Wiring (Data cable) To exchange NMEA 0183 data, this unit has one NMEA 0183 version 2.0 communication port. Com port one (Com-1) can be used to receive NMEA format GPS data. The com port can also transmit NMEA format GPS data to another device. The four wires for the com port are combined with the Power Supply cable and NMEA 2000 Power cable to form the power/data cable (shown earlier). Com-1 uses the yellow wire to transmit, the orange wire to receive and the shield wire for signal ground. Your unit does not use the blue wire. Orange (Receive) NMEA Transmit To Other Com-1 Shield (Ground) Ground GPS Receiver To unit Com-1 wiring to receive NMEA position information from some other GPS receiver. Yellow (Transmit) NMEA Receive Com-1 To Other Shield (Ground) Ground To unit Device Com-1 wiring to transmit NMEA position information to another NMEA-compatible device. LMS-525CDF (rear view) Power/Data Network socket socket SP-BL optional speed sensor Sonar socket Ethernet socket (future enhancement) Double T connector 120 ohm 120 ohm terminator terminator Data cable Display unit power cable Extension cables NMEA 2000 Power cable Transducer LGC-3000 LMS-520c and LMS-525cDF cable connections. Mounting the Unit: Bracket, In-Dash or Portable You can install your unit on the dash with the gimbal bracket. It can also be installed in the dash or mounted on a portable power supply. If you use the supplied bracket, you may be interested in the optional R-A-M® bracket mounting system. This converts the unit's gimbal bracket to a swivel mount, which can be used on the dash or overhead mounting positions. Optional R-A-M mounting system. Bracket Installation Mount the unit in any convenient location, provided there is clearance behind it when it's tilted for the best viewing angle. You should also make sure there is enough room behind it to attach the power, transducer and GPS antenna/receiver module cables. Holes in the bracket's base allow wood screw or through-bolt mounting. You may need to place a piece of plywood on the back side of thin fiberglass panels to reinforce the panel and secure the mounting hardware. Front Install the gimbal bracket. Orient the bracket so the arms slope toward the front of your unit. Drill a 1-inch (25.4 mm) hole in the dash for the power, transducer and antenna cables. The best location for this hole is immediately under the gimbal bracket location. This way, the bracket can be installed so that it covers the hole, holds the cables in position and results in a neat installation. Some customers, however, prefer to mount the bracket to the side of the cable hole — it's a matter of personal preference. 173.9 [6.85] 137.9 [5.43] Millimeter [Inch] 72.9 [2.87] 23.4 [0.92] 157.9 [6.22] 56.9 [2.24] Front view (left) and side view (right) showing dimensions of the LMS520c and LMS-525cDF sonar/GPS units mounted on gimbal bracket.

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