



Welcome to the Lund family! On behalf of everyone at Lund Boat Company, thank you for purchasing the best boat on the water, designed by fishermen for fishermen. We are confident your new Lund will deliver the ultimate fishing experience you expect for many years to come. Our passion for fishing is designed into each Lund boat we build. It is this dedication to our sport that makes Lund the choice of serious anglers all across North America. With your purchase, you have joined this band of knowledgeable, accomplished anglers. Your new Lund boat is a wise investment that will allow you to enjoy more days on the water, and is your number one tool to better fishing. And, with proper care and maintenance, it will return to you the highest resale value in the boating industry.

We hope this manual will aid you in your enjoyment of our product and give you some guidance in the care, maintenance and operation of your Lund boat. This manual cannot cover every aspect of boat ownership and operation, nor is it intended to. For additional information, please consult your Lund dealer. Local boating organizations can also provide valuable information or direction as to where to find additional information. If, for any reason, your dealer is unable to answer your questions regarding your new Lund boat, please contact us for assistance.

We encourage you to practice safe boating at all times, and respect the environment and our resources so that all of us and our children may enjoy them for years to come.

Thank you again for choosing the best, a Lund boat, and Good Fishing!



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# GENERAL INFORMATION 1

## ABOUT THIS MANUAL

More and more people are joining the ranks of boat owners who find enjoyment in the leisure activity of boating and fishing. For this reason, this manual is written for the first-time boat owner or operator. Even if you are an experienced boater, you will still find valuable information regarding the safe operation and maintenance of your boat, motor and trailer.

**For your own safety and the safety of others, take the time to read this entire manual before you take the boat out for the first time.** Use it as a guide to familiarize yourself with its systems and components. The information in this manual will help you with the operation and maintenance. The suppliers of more complex components, such as engines, pumps, and electronics, supply their own manuals. They are included in your Owner's Packet. The suppliers of these products maintain their own manufacturers' warranties and service facilities. One of the first orders of business should be to fill out each warranty card and mail it back to the manufacturer to register your ownership.

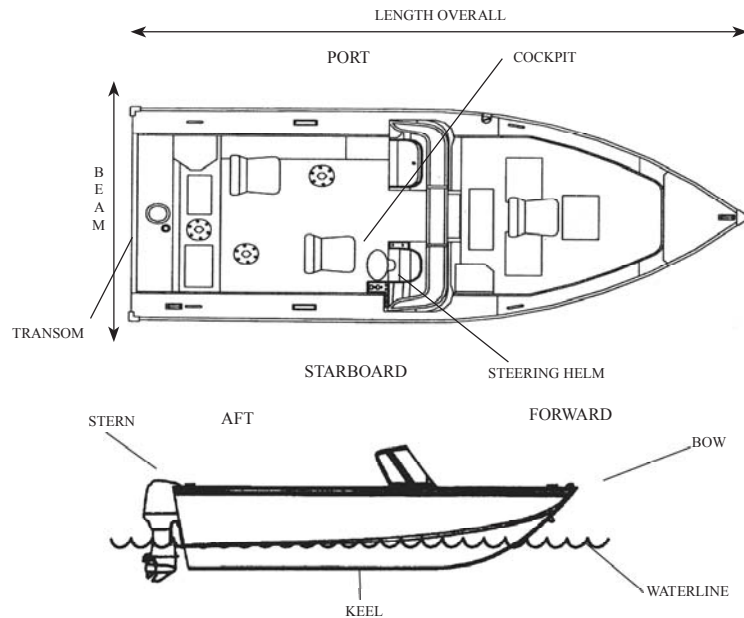
Make sure you read and understand the safety, emergency, and operating procedures in this manual and pass this information along to your family and passengers. Pay close attention to safety warnings. Remember that along with the freedom and fun of boating and fishing comes the responsibility for the safety of your passengers, other boaters, and the environment which we all share.

This manual is part of your boat's equipment. Always keep it on board. If you transfer ownership of the boat to someone else, give this manual to the new owner. In some cases, this manual provides general information; more specific information is available in the original equipment manufacturer (OEM) manuals. This owner's manual does not supersede or change any of the original manufacturers' specifications, operation or maintenance instructions. If the information in this manual conflicts with that in the OEM manuals, the OEM manuals take precedence.

**Note:** This manual may include information about systems and equipment not provided on your boat. Check with your dealer if you have any questions.

## YOU AND YOUR NEW BOAT

If you are new to boating, you may not be familiar with some common boating terms. Figure 1-1 lists some of these terms and identifies their meaning in relation to a typical boat.



**FIGURE 1-1 TERMINOLOGY**

**MANUFACTURER'S CERTIFICATION**



As a boat manufacturer, Lund builds their products to guidelines established under the Federal Boat Safety Act of 1971. The Act is promulgated by the United States Coast Guard who has authority to enforce these laws on boat manufacturers that sell products in the United States. Lund ensures that all of its products comply with these laws.

The National Marine Manufacturers Association (NMMA) provides Lund with a third party certification. The NMMA is an organization that represents the marine industry and assists manufacturers, boat dealers, marinas, repair yards and component suppliers in areas of legislation, environmental concerns, marine business growth and state and federal government agency interaction. The third party certification that Lund participates in, uses the well known Standards and Recommended Practices of the American Boat and Yacht Council (ABYC).

Lund Boats participates extensively in the American Boat and Yacht Council which is a nonprofit organization that develops and publishes voluntary standards and recommended practices for boat and equipment design, construction of your Lund boat.

Finally, Lund sells their products world wide and as such must conform to the various rules and regulations required by other countries. Most notably, are the ISO standards in Europe which require the application of the Common European (CE) mark. This mark, much like the NMMA certification here in the US, gives you the boat owner



specific information concerning your craft.

## SERVICE

If you have a problem with your new boat as a result of workmanship or materials, we want to correct it and get it back in service as quickly as possible. Contact the Lund Boats dealer from whom you purchased the boat. An authorized dealer must process all warranty repairs. If the dealer fails to remedy the cause of the problem, contact us within 30 days. **It is your responsibility to deliver the boat to the dealer for repair.**

Information about service, replacement parts, or additional equipment is available from your dealer or Lund Boats. You can get in touch with us directly at:

Lund Boat Company  
P.O. Box 248  
New York Mills, MN 56567  
(218) 385-2235

LUND BOATS CANADA  
98 PTH 52 West  
Steinbach, MB R5G 1Y1  
Canada  
(204) 346-2628

## RESPONSIBILITIES

### Boat Owner/Operator

You should inspect the boat at the time of delivery to verify that all systems and components are operating safely and acceptably. We recommend that you refer to the engine warranty certificate for initial inspection and service requirements. Be sure to review the pre-delivery checklist for the boat and engine with your dealer when you take delivery.

Your dealer will also record all important information about your boat and its major components on the **Boat Data Sheet**. (You will find the Boat Data Sheet at the end of this chapter.) After all the data has been entered, make a photocopy and store at home or another safe place.

You are responsible for following proper procedures during the break-in period. Check with your dealer if you have any questions. You should also schedule the 20-hour checkup with your dealer. At the 20-hour checkup, your dealer should perform an engine check according to recommended procedures as stated by the engine manufacturer in the engine owner's manual.

The operator is also responsible for complying with the following procedures and operational requirements:

- Registering the boat with the appropriate jurisdiction.
- Safety training of passengers and crew.
- Ensuring the boat's continued safe operation through proper maintenance and repair.
- Obtaining adequate insurance coverage.
- Following safe operating practices at all times.
- Learning the Rules of the Road.
- Developing an understanding of boat systems.
- Operating and maintaining all equipment in compliance with the manufacturer's instructions.
- Avoiding the use of drugs and alcohol.
- Complying with environmental regulations.

Along with boating comes the responsibility of complying with environmental regulations. Please think about the future of our waterways, oceans, and marine life while you're out enjoying them – and take all necessary measures to help protect our natural habitats. Keeping our waterways and marine habitats free from debris, and showing consideration for the creatures who thrive in these environments are some ways you can help assure the pleasure of boating for years to come.

## **AQUATIC INVASIVE SPECIES (AIS)**

Aquatic Invasive Species (AIS) are plants and animals that occur in waters in which they are not native and whose introduction causes or is likely to cause economic or environmental damage, or harm to human health. AIS almost always have a negative impact on the waterway, its native species, and recreational and commercial activities on the waterway.

As responsible boaters and citizens, each boat owner should do their part to prevent the spread of these aquatic hitchhikers. In many cases, it is also required by law. Check local regulations for any waterway where you will boat.

After each boating trip, follow these three simple steps before you leave the water access to stop the spread of AIS: Clean, Drain and Dry. This is the boaters' way to help protect the environment from the damage that AIS can cause.



## **STOP AQUATIC HITCHHIKERS!**

Be A Good Steward. Clean. Drain. Dry.

### **Clean**

Inspect and remove all aquatic plants, animals, mud, and debris from the boat, engine, trailer, anchor, and any watersports equipment. Rinse, scrub or wash, as appropriate, away from storm drains, ditches or waterways. Rinse watercraft, trailer and equipment with hot water, when possible. Flush motor according to owner's manual.

### **Drain**

Completely drain all water from the boat and its compartments, including but not limited to the bilge, wells, lockers, ballast tanks or bags, bait containers, engines and outdrives.

### **Dry**

Allow the boat to completely dry before visiting any other bodies of water.

### **Dealer**

Your dealer will inspect your boat when you take delivery to make sure it is in flawless condition and that all components are working properly. Your dealer will discuss the terms of all warranties and emphasize the importance of registering each warranty with the manufacturer. He will also explain the proper procedures for obtaining warranty service. If requested, he will instruct you in the operation of the boat and its systems and components.

## **ADDITIONAL INFORMATION**

### **Maintenance and Repair**

Proper maintenance and repair are critical to your continued enjoyment of and the safe use of your boat. Your dealer is always ready to help you. There are areas that you, the owner, cannot service because of today's complex technology. Your dealer has access to factory trained specialists, when they are needed, for such equipment as engines and trailers. You can handle basic servicing such as checking engine oil levels and inspecting the condition of hoses, sea cocks, bilge pumps, and electrical connections, but all other maintenance and repair should be performed by properly trained and qualified technicians.

We suggest you develop a routine maintenance plan for the engine and trolling motor to assure that they remain in first-rate condition and continue to operate properly. Follow the maintenance and service schedule recommended by the manufacturer. Cleaning the hull and deck regularly will keep your boat looking like new.

### **Boating Education**

It is highly recommended that the boat operator and a standby operator enroll in a boating safety course. Such organizations as the U.S. Power Squadron, United States Coast Guard Auxiliary, and the American Red Cross sponsor educational programs. Chapter 3 has general information about such courses. See your Lund Boats dealer about special courses available in your area.

There are many good boating publications that have helpful information. Pamphlets prepared by the Coast Guard explain “Rules of the Road,” signal lights, buoys, safety, international and inland regulations, and other information beyond the scope of this manual. Check Chapter 3 for a partial listing. You can contact the local U.S. Coast Guard Unit at [www.uscg.mil](http://www.uscg.mil). Contact the Canadian Coast Guard at [www.ccg-gcc.gc.ca](http://www.ccg-gcc.gc.ca). Your dealer will also have information about your area and what other boaters are doing, such as club memberships and other activities.

## **BOATING LAWS AND REGULATIONS**

The Coast Guard is the authority of the waterways; it is there to help the boating public. Boating regulations are also enforced by local authorities. You are subject to marine traffic laws and “Rules of the Road” for both federal, state and provincial waterways. You must stop if signaled to do so by enforcement officers, and permit them to board if asked.

Some localities have specific local trailer specifications and legal limits on speed and noise. It is your responsibility to be aware of these laws and to ensure that your boat and trailer comply. Check with your dealer and consult with the local Marine Patrol or local Coast Guard office about any local requirements.

### **Registration**

Register your boat in the state or province in which it is principally used. In a few jurisdictions, the Coast Guard retains registration authority. Registration numbers and validation stickers must be displayed on the boat according to regulations, and the registration certificate must be carried on board when the boat is in use. Your dealer will either supply registration forms or tell you where they may be obtained.

**Insurance**

In most states, the boat owner is legally responsible for damages or injuries he or she causes, even if someone else is operating the boat at the time of the accident.

Common sense dictates that you carry adequate personal liability and property damage insurance, just as you would on an automobile. You should also protect your investment by insuring the boat against physical damage or theft.

**Accident Reporting**

After an accident, the operator of the boat is responsible for filing a report with the appropriate authorities. Reports are generally necessary for accidents involving loss of life, injury, or in some cases when the damage amount exceeds a specific limit. Ask your insurance agent for more information. If you are involved in an accident, check with your local authorities for reporting requirements.

If you see a distress signal, you must assume it is a real emergency and render assistance immediately. The person in charge of a boat is obligated by law to provide assistance to any individual in danger at sea. However, you should not put your crew or passengers in a dangerous situation which exceeds your capabilities or those of your boat. In the United States the 1971 Boating Safety Act grants protection to a "Good Samaritan" boater offering good faith assistance, and absolves a boater from any civil liability arising from assistance given.

**Discharge of Oil**

Regulations prohibit the discharge of oil or oily waste into or upon navigable waters, if such discharge causes a film or sheen upon, or a discoloration of, the surface of the water or causes sludge or an emulsion beneath the surface of the water. Violators are subject to a monetary penalties as allowed by law.



**Disposal of Plastics & Other Garbage**

Plastic refuse dumped in the water can kill fish and marine wildlife and can foul boat propellers and cooling water intakes. Other forms of waterborne garbage can litter our beaches and make people sick. Regulations prohibit the dumping of plastic refuse or other garbage mixed with plastic into the water anywhere, and restrict the dumping of other forms of garbage within specified distances from shore.

**HAZARD COMMUNICATION LABELS**

Some or all of the hazard communication labels shown on the following pages can be found in various locations on your boat or trailer. (Labels are not necessarily to size or scale.) The appropriate labels are determined by the standard and optional equipment actually installed upon delivery. Check with your dealer to find out what labels your boat or trailer should have. If any label is missing, ask your dealer for a replacement.

**⚠ WARNING**


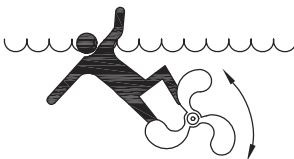



Gasoline vapors are explosive!  
 Avoid serious injury or death from fire or explosion, resulting from leaking fuel.  
 Inspect system for leaks at least once a year.

---

The use of fuels containing ethanol higher than 10% (E-10) can damage your engine or fuel system and will void the warranty. Never use (E-85).

**⚠ WARNING**

Rotating propeller can cause serious injury or death  
 Never approach or use ladder when motor is running.

**⚠ WARNING**

**CARBON MONOXIDE CAN ACCUMULATE IN THIS AREA. TO AVOID CO POISONING, DO NOT OCCUPY THIS AREA WHEN ENGINE(S) IS RUNNING.**

**CAUTION**



DO NOT TRIM ENGINE WITH A SEAT INSTALLED AT THIS LOCATION

**CAUTION**



ENGINE CANNOT BE FULLY TRIMMED WHEN SKI PYLON IS INSTALLED

**⚠ WARNING**

**AVOID SERIOUS OR FATAL INJURY. DO NOT OCCUPY SEAT WHEN SPEED EXCEEDS 5 MPH.**


**⚠ WARNING/AVERTISSEMENT**

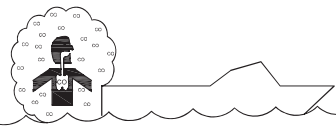
Avoid serious injury or death from fire or explosion resulting from leaking fuel. Inspect system for leaks at least once a year.  
*Les fuites d'essence sont explosives et inflammables. Pour éviter des blessures graves ou la mort, vérifiez le système d'essence pour détecter des fuites au moins une fois par année.*

 **WARNING**



**Do not occupy this seating position above trolling speed while using a pedestal longer than 6-1/2 inches.**

 **DANGER**





Carbon monoxide (CO) can cause brain damage or death or death

Engine and generator exhaust contains odorless and colorless carbon monoxide gas.

Carbon monoxide will be around the back of the boat when engines or generators are running

Move to fresh air, if you feel nausea, headache, dizziness, or drowsiness.

 **WARNING**




Carbon monoxide (CO) can cause brain damage or death


Engine and generator exhaust contains odorless and colorless carbon monoxide gas.

Signs of carbon monoxide poisoning include nausea, headache, dizziness, drowsiness and lack of consciousness.

Get fresh air if anyone shows signs of carbon monoxide poisoning

See Owner's Manual for information regarding carbon monoxide poisoning.

 **WARNING**



**Rotating propeller can cause serious injury or death. Shut off motor when near persons in water.**

## HOW TO READ YOUR HULL I.D. PLATE

### HOW TO READ YOUR HULL IDENTIFICATION NUMBER (HIN)

The HIN should be included in any inquiries or when ordering parts. The U.S.C.G. requires that your HIN be permanently affixed on the upper starboard portion of the transom.



“H” stands for August. . . as “A” thru “L” stands for January to December, for the year of manufacture.

### BOAT AND TRAILER DATA

Owner \_\_\_\_\_

Date Purchased \_\_\_\_\_

Address \_\_\_\_\_

Dealer \_\_\_\_\_

Phone \_\_\_\_\_

Address \_\_\_\_\_

Boat Model \_\_\_\_\_

**Hull Identification Number** \_\_\_\_\_

Motor \_\_\_\_\_

**Serial Number** \_\_\_\_\_

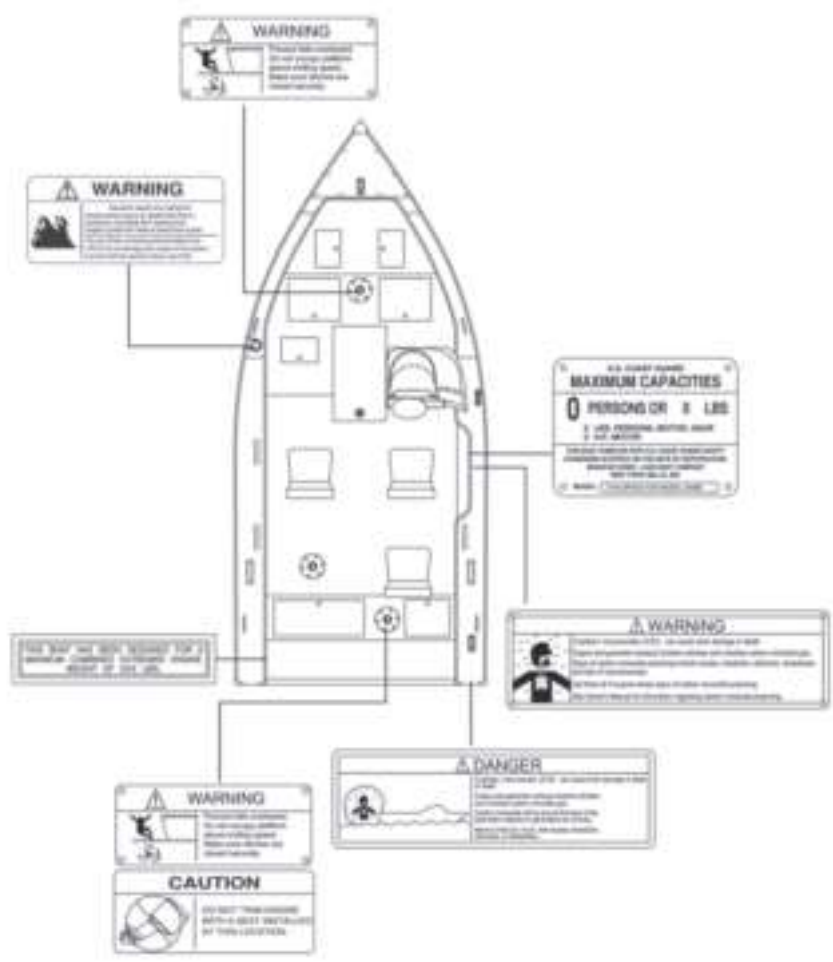
Trailer \_\_\_\_\_

**Serial Number** \_\_\_\_\_

Other \_\_\_\_\_

\_\_\_\_\_







## SAFE BOATING CHECKLIST

Boating safety and the safety of your passengers is YOUR responsibility.

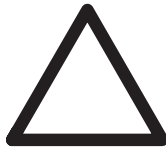
- Observe the instructions on all safety labels. They are there to assure that you have a safe and enjoyable outing.
- Never operate a boat while under the influence of drugs or alcohol. It is a Federal offense. Allow only qualified drivers to operate your boat.
- At least one passenger should be able to operate the boat in case the operator is unexpectedly unable to do so.
- Don't overload the boat. Heavy seas reduce capacity. A weight capacity plate is not an excuse for failure to use common sense or rational judgment.
- Always use the lanyard stop switch when operating the boat and ensure that all passengers are familiar with its use.
- Regularly inspect the boat, the hull, engine, safety equipment, and all other boating gear and keep them in safe operating condition.
- Be sure you have the minimum required safety equipment and any additional gear needed for your cruise.
- Check that all lifesaving equipment, including fire extinguisher, is in safe operating condition and in easily accessible locations. Show all passengers where this equipment is, and make sure they know how to use it.
- Be very careful while fueling. Know the capacity of the fuel tank. Avoid fueling at night except under well-lit conditions. Gas spills are unnoticeable in the dark. Extinguish all open flames when fueling.
- Each time you fill up, be sure the engine compartment is free of gasoline vapors, and inspect fuel lines for leaks and hose deterioration.
- Keep enough fuel on board for the planned trip. Allow for changes due to adverse weather or other delays. Use 1/3 of the fuel to reach your destination, use 1/3 to return, and keep 1/3 in reserve.
- Keep an eye on the weather. Check local weather broadcasts before departure. Be alert to changing conditions. The skipper should personally take the helm during storms.
- Always keep accurate up-to-date charts of the boating area on board. Before getting underway, check water conditions in the planned boating area.
- Before departure, file a Float Plan with a responsible person ashore.

- Always operate your boat with consideration, courtesy, and common sense.

**YOU** are responsible for your own safety, as well as the safety of your passengers and your fellow boaters. You should fully understand and become familiar with the operating procedures and safety precautions in this manual and the other information in the Owner's Packet before you launch the boat. Before leaving on a cruise, whether for an hour or several days, go through the Safety Checklist on page 2-1. Always operate your boat with consideration, courtesy, and common sense.

## HAZARD STATEMENTS

As you read your Owner's Manual, please note the hazard warnings which alert you to safety precautions related to unsafe conditions or operating procedures. We have included these warnings because we are concerned about your safety and the safety of your passengers.



The safety alert symbol is recognized around the world. In this manual, it means read this information carefully! Be sure you understand the consequences of a hazard and how to avoid them. *Failure to follow the recommendations in a hazard communication statement may result in property damage, personal injury, or death.*

People often refer to a hazard statement as a warning in a general sense. This manual uses three kinds of "warnings" depending on the likely effect of a hazard (minor injury, severe injury, death).

### CAUTION

The safety symbol and this signal word indicate a potentially hazardous situation which, if not avoided, may result in minor or moderate personal injury or property damage. It may also be used to alert against unsafe practices.

### WARNING

The safety symbol and this signal word indicate a potentially hazardous situation which, if not avoided, COULD result in severe injury, death or substantial property damage.

### DANGER

The safety symbol and this signal word indicate an imminently hazardous situation, which, if not avoided, WILL result in severe personal injury or death.

*The warnings in this manual do not and cannot address every conceivable situation. Always use common sense! If a procedure, method, tool, or part is not specifically recommended, you must satisfy yourself that it is safe for you and others and that your boat will not be damaged or made unsafe as a result of your decision.*

## ADVISORY STATEMENTS

Advisory statements alert you to conditions that affect equipment operation, maintenance, and servicing practices.

An **IMPORTANT** statement indicates a procedure intended to prevent damage to equipment or associated components.

A **Note** statement is a general advisory statement relating to equipment operation and maintenance procedures.

## SAFETY EQUIPMENT

As the owner of the boat, you are responsible for assuring that all required safety equipment is aboard. You should also consider supplying additional equipment as needed for your safety and that of your passengers. Check state and local regulations for information about required safety equipment.

### Required Safety Equipment

While most required safety equipment has been provided on your boat, it is your responsibility to properly equip your boat. Check with your dealer or with boating authorities to determine equipment needed.

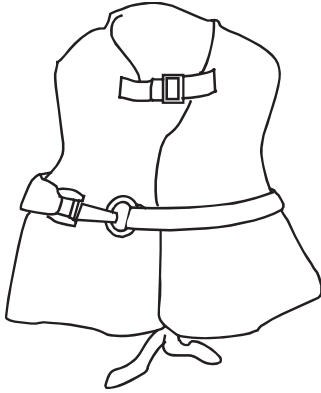
### Personal Flotation Devices (PFDs)

Federal regulations require that you have at least one Coast Guard approved personal flotation device (PFD) for each person in a recreational boat. You may not use your boat unless all PFDs are in serviceable condition, readily accessible, legibly marked with the Coast Guard approval number, and of an appropriate size (within the weight range and chest size marked on the PFD) for each person on board.

A PFD provides buoyancy to help keep your head above the water and to help you remain in a satisfactory position while in the water. Body weight and age should be considered when selecting a PFD. The buoyancy provided by the PFD should support your weight in water. The size of the PFD should be appropriate for the wearer. Body weight or chest size are common methods used to size PFDs. It is your responsibility to ensure that you have the proper number and types of PFDs on board and that your passengers know where they are and how to use them.

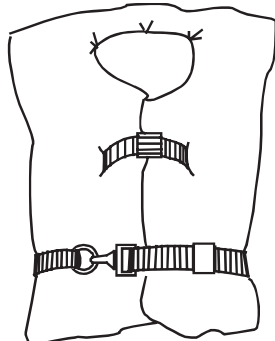
*PFD TYPES*

Five types of PFDs have been approved by the U.S. Coast Guard.



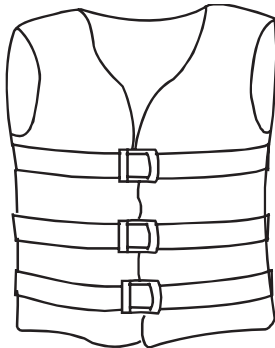
PFD Type I, Wearable (Figure 2-1) has the greatest required buoyancy. Its design allows for turning most unconscious persons in the water from face down position to a vertical or slightly backward, face-up position. It can greatly increase the chances of survival. Type I is most effective for all waters, especially offshore when rescue may be delayed. It is also the most effective in rough waters.

**FIGURE 2-1 TYPE I, WEARABLE**



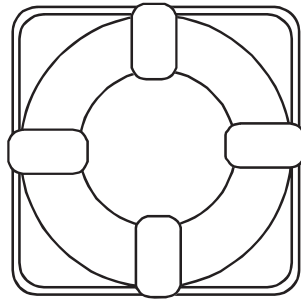
PFD Type II, Wearable (Figure 2-2) turns its wearer in the same way as Type I, but not as effectively. The Type II does not turn as many persons under the same conditions as a Type I. You may prefer to use this PFD where there is a probability of quick rescue such as in areas where other people are commonly involved in water activities.

**FIGURE 2-2 TYPE II, WEARABLE**



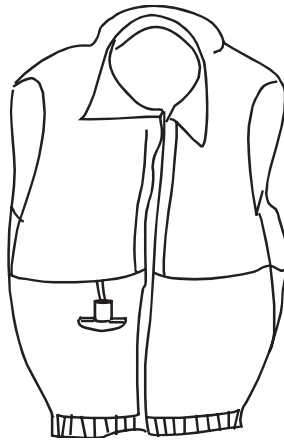
PFD Type III, Wearable (Figure 2-3) allows wearers to place themselves in a vertical or slightly backward position. It does not turn the wearer. It maintains the wearer in a vertical or slightly backward position and has no tendency to turn the wearer face down. It has the same buoyancy as a Type II PFD and may be appropriate in areas where other people are commonly involved in water activities.

**FIGURE 2-3 TYPE III, WEARABLE**



PFD Type IV, Throwable (Figure 2-4) is required in addition to the PFDs previously discussed. The most common Type IV PFD is a buoyant cushion or ring buoy. It is designed to be thrown to a person in the water, grasped and held by the user until he or she is rescued. A Type IV PFD should always be in serviceable condition and immediately available for use. Grasping this PFD may be difficult if the rescue is delayed or if the user is overcome by hypothermia (loss of body heat).

**FIGURE 2-4 TYPE IV, THROWABLE**



PFD Type V, Wearable (Figure 2-5) must be worn. When inflated, it provides buoyancy equivalent to Type I, II or III PFDs. When it is deflated, however, it may not support some people.

**FIGURE 2-5 TYPE V, WEARABLE**

#### *PFD POINTERS*

The purpose of a PFD is to help save your life. If you want it to support you when you are in the water, it needs to fit, float, and be in good condition.

- Try the PFD on and adjust it until it fits comfortably in and out of the water. Mark your PFD if you are the only wearer.
- To make sure the PFD works, wear it in the water. This will show you how it works and give you confidence when you use it.
- Teach children how to put a PFD on and allow them to try it in the water. That way, they know what the PFD is for and how it works. They will feel more comfortable with it if they suddenly find themselves in the water.
- If the PFD is wet, allow it to dry thoroughly before storing it. Do not dry it in front of a radiator or heater. Store it in a well-ventilated area.

- Keep PFDs away from sharp objects which can tear the fabric or puncture the flotation pads.
- For their own safety and the safety of others, all non-swimmers, poor swimmers, and children should wear PFD's at all times, whether the boat is stationary or moving.
- Check the PFD frequently to make sure that it is not torn, that flotation pads have no leaks, and that all seams and joints are securely sewn.
- If a PFD contains kapok, the kapok fibers may become waterlogged and lose their buoyancy after the vinyl inserts are punctured. If the kapok becomes hard or if it is soaked with water, replace it. It may not work when you need it.

### **Hypothermia**

Hypothermia, the loss of body heat to the water, is a significant cause of deaths in boating accidents. After an individual has succumbed to hypothermia, he or she will lose consciousness and then drown.

PFD's can increase survival time because of the insulation they provide. Naturally, the warmer the water, the less insulation one will require. When operating in cold water (below 40°F) consideration should be given to using a coat or jacket style PFD as they cover more of the body than the vest style PFD's.

Some points to remember about hypothermia protection:

1. While afloat in the water, do not attempt to swim unless it is to reach a nearby craft, fellow survivor, or a floating object on which you can lean or climb. Unnecessary swimming increases the rate of body heat loss. In cold water drownproof methods that require putting your head in the water are not recommended. Keep your head out of the water. This will greatly lessen heat loss and increase your survival time.
2. Keep a positive attitude about your survival and rescue. This will improve your chances of extending your survival time until rescue. Your will-to-live does make a difference!
3. If there is more than one person in the water, huddling is recommended while waiting to be rescued. This action tends to reduce the rate of heat loss and thus increase the survival time.
4. Always wear your PFD. It won't help you fight off the effects of hypothermia if you don't have it on when you go into the water.

### **Fire Extinguishers**

As the owner of the boat, you are responsible for supplying a fire extinguisher approved by the U.S. Coast Guard.



All Class 1 powerboats (16 to less than 26 feet) are required to carry one (1) B-I type hand portable fire extinguisher unless the boat is equipped with a fixed fire extinguishing system in the engine compartment.

Hand-held portable fire extinguishers should be mounted in readily accessible locations away from the engine compartment. All persons aboard should know the location and proper operation of the fire extinguisher(s).

### WARNING

**Fire!** In case of fire, do not open engine compartment. Turn off engine. Using portable CO2 fire extinguisher, continuously discharge entire contents at base of fire.

**Note:** Don't test fire extinguishers by squirting small amounts of the extinguishing compound. The extinguisher might not work when you really need it!

#### Visual Distress Signal Devices

Visual distress signal devices approved by the U.S. Coast Guard are required on all recreational boats operating on coastal waters and on boats owned in the United States when they are operating on the high seas. Coastal waters include territorial seas and those waters directly connected to the Great Lakes and the territorial seas up to a point where the waters are less than two miles (3.2 km) wide. Visual distress signal equipment may be of the pyrotechnic or non-pyrotechnic type. Regulations prohibit display of visual distress signals on the water under any circumstances except when assistance is required to prevent immediate or potential danger to persons on board a vessel.

The equipment must be approved by the U.S. Coast Guard, be in serviceable condition, and be stowed in a readily accessible location. Equipment having a date for serviceable life must be within the specified usage date shown. *Careful selection and proper stowage of visual distress equipment is very important if young children are aboard.*

Day Use Only	Night Use Only	Day and Night Use
Three orange smoke signals (one hand held and two floating) or one orange flag with black square and disk	One S-O-S electric distress light	Three flares of the hand held, meteor or parachute type

### Sound Signalling Devices

**Note:** No single signaling device is appropriate for all purposes. Consider keeping various types of equipment on board.

Boats less than 26 feet (7.9 m) in length are required to carry a hand, mouth, or power operated horn or whistle. It must produce a blast of two-second duration and audible at a distance of at least one-half (1/2) mile.

Following are standard whistle signals:

- |                       |                           |
|-----------------------|---------------------------|
| • One Prolonged Blast | Warning signal            |
| • One Short Blast     | Pass on my port side      |
| • Two Short Blasts    | Pass on my starboard side |
| • Three Short Blasts  | Engines in reverse        |
| • Five or More Blasts | Danger signal             |

### Navigation Lights

Navigation lights are intended to keep other vessels informed of your presence and course. If you are out on the water between sunset and sunrise, you are required to display appropriate navigation lights.

## ADDITIONAL RECOMMENDED EQUIPMENT

It is recommended that you acquire additional equipment for safe, enjoyable cruising. This list, which is not all-inclusive, includes items you should consider acquiring.

### *BASIC GEAR*

Flashlight	Mooring lines	Compass
Oar or paddle	Distress signals	First aid kit
Dock fenders	VHF radio	EPIRB
Boat hook	Extra warm clothing	Charts
Suntan lotion	Tow line	
Second anchor and line	Dewatering device (pump or bailer)	
Emergency supply of drinking water and food		

### *TOOLS*

Spark plug wrench	Hammer	Screwdrivers
knife	Pliers	Electrician's tape
Adjustable wrench	Lubricating oil	Prop wrench
Duct tape		

*SPARE PARTS*

Extra bulbs	Spare propeller	Extra fuses
Extra drain plug	Spark plugs	Spare wire
Extra prop nut/washer		

**CARBON MONOXIDE AND BOATING**

Carbon monoxide is a colorless, odorless gas by-product of the burning of carbon based fuels like gasoline. In high concentrations, CO can be fatal within minutes. The effects of CO in lower concentrations are cumulative and can be just as lethal over long periods of time. Symptoms of carbon monoxide poisoning include: itchy and watering eyes, flushed appearance, throbbing temples, inability to think coherently, ringing in the ears, tightness across the chest, headaches, drowsiness, nausea, dizziness, fatigue, vomiting, collapse and convulsions. **CARBON MONOXIDE POISONING IS OFTENTIMES CONFUSED WITH SEASICKNESS.**

Outboard motors exhaust carbon monoxide and other gases typically through the hub or the propeller. To avoid exposure to carbon monoxide, do not stand or swim near the motor when the engine is idling.

Outboard powered open boats present a lower risk of exposure to dangerous levels of carbon monoxide from their own motors because natural ventilation dissipates the majority of the engine exhaust. However, engine or generator exhaust from other boats docked or anchored nearby can emit poisonous carbon monoxide gas and endanger people in the vicinity. Be alert for exhaust from other boats alongside your boat, and monitor people around you for symptoms of carbon monoxide poisoning. If you suspect carbon monoxide poisoning, evacuate the area and move the victim to fresh air. Get medical help immediately.

**Carbon Monoxide Accumulation**

If the boat has a boarding platform or swim ladder see warning label on page 1.8. Following are examples of possible situations where carbon monoxide may accumulate within your boat while docked, anchored, or underway. Become familiar with these examples and their precautions to prevent DANGEROUS accidents.

**⚠ WARNING**

**Exhaust Fumes!** Generator or hull exhaust from other vessels while either docked or anchored can emit poisonous carbon monoxide gas and cause excessive accumulation within cabin and cockpit areas. See Figure 2-6. Be alert for generator exhaust from other vessels alongside.

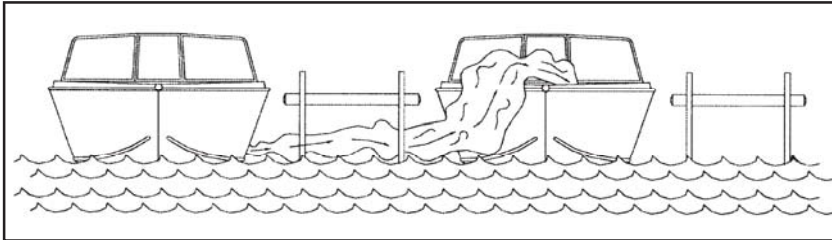


FIGURE 2-6 VESSEL ALONGSIDE

### ⚠ WARNING

#### Backdrafting!

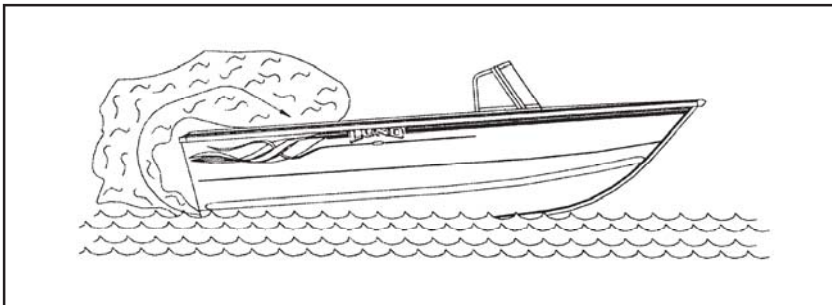


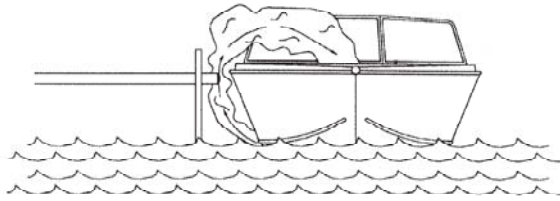
FIGURE 2-7 WHILE UNDERWAY (BACKDRAFTING)

While underway, CO concentrations can increase by backdrafting or “the station wagon effect.” Backdrafting is caused by factors such as relative wind direction, speed, or the bow being too high. To prevent this, open canvas whenever possible to provide positive airflow through the hull, or increase boat speed to increase ventilation.

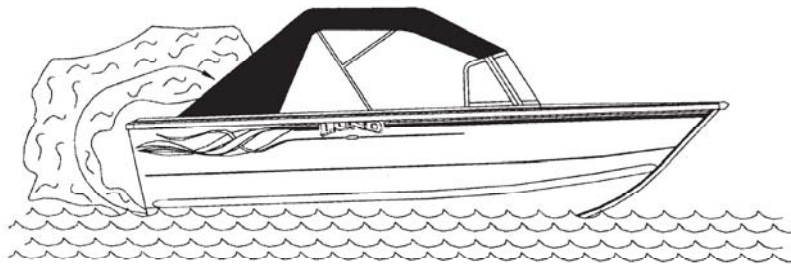
### ⚠ WARNING

**Exhaust Fumes!** Hull exhaust from your boat can cause excessive accumulation of poisonous carbon monoxide gas within cockpit area when using protective weather coverings while underway (Figure 2-7) or while stationary. Provide adequate ventilation when the canvas top, side curtains, and/or back curtains are in their closed protective positions.

Boat houses, seawalls, and other boats in close proximity or confined areas can contribute to increased CO levels. *Operators must be aware that operation, mooring, and anchoring in an area with other boats puts them in jeopardy of CO accumulation from other sources. Likewise, a boat operator must be aware of how exhaust from his/her boat will affect others.* Operation of the engines while moored may cause CO accumulation in your boat and those around you.



**FIGURE 2-8 CONFINED AREAS**



**FIGURE 2-8 WITH CANVAS IN PLACE**

Installing rear canvas while underway increases the chance of CO accumulation in your boat. Be sure to provide adequate ventilation. If the windshield has vents, open them before getting underway to increase positive air flow and decrease the chances of CO accumulation.

Even with the best boat design and construction, CO may still accumulate in enclosed areas under certain conditions. Continually observe passengers for symptoms of CO poisoning.

### **LANYARD STOP SWITCH**

This safety device automatically stops the engine if the lanyard is attached to the operator and the operator falls from the control station. Refer to the engine manual for detailed information about using this switch.

The stop switch incorporates a shutoff switch, switch clip, lanyard, and lanyard clip. The lanyard clip must be securely attached to the operator's PFD, clothing,

arm, or leg. Be sure to attach the lanyard to a place where it is free of obstructions and to something that will move with the operator if he or she leaves the helm station. If the engine shuts down because this switch was activated, the clip must be reinstalled on the interrupter switch before the engine can be started.

### ⚠ WARNING

Keep lanyard stop switch free from obstructions that could interfere with its operation. Do not modify or remove lanyard stop switch or bypass its safety features. The proper use of the lanyard stop switch can prevent a runaway boat situation which can cause severe personal injury or death.



## SAFE BOATING PRACTICES

**YOU** are responsible for your own safety, the safety of your passengers, and the safety of fellow boaters.

### Drugs and Alcohol

### ⚠ WARNING

Alcohol consumption and boating do not mix! Operating under the influence endangers the lives of your passengers and other boaters. Federal laws prohibit operating a boat under the influence of alcohol or drugs.

Do not use drugs or drink alcohol while operating a boat. Like driving a car, driving a boat, requires sober, attentive care. Operating a boat while intoxicated or under the influence of drugs is not only dangerous, but it is also a Federal offense carrying

a significant penalty. These laws are vigorously enforced. The use of drugs and alcohol, singly or in combination, decreases reaction time, impedes judgment, impairs vision, and inhibits your ability to safely operate a boat.

### Safe Operation

Safe operation means that you do not misuse your boat nor do you allow your passengers to do so. Safe operation means using good judgment at all times. It includes, without limitation, the following actions:

- Load the boat within the limits listed on the capacity plate. Balance loads bow to stern and port to starboard.
- Maintain boat speed at or below the local legal limit. Avoid excessive speed or speeds not appropriate for operating conditions.
- Do not use the boat in weather or sea conditions beyond the skill or experience of the operator or the comfortable capability of the boat or passengers.
- Be sure at least one other passenger is familiar with the operation and safety aspects of the boat in case of an emergency.
- Make sure that passengers and gear do not obstruct the operator's view or ability to move.
- Do not exceed the maximum engine power rating stated on the certification plate attached to the boat.
- Observe all safety signs and warnings both inside the boat and in the immediate boating area.

### Passenger Safety

Before getting underway, show all passengers where emergency and safety equipment is stowed, and explain how to use it. Everyone aboard should wear rubber-soled shoes which resist slipping on wet surfaces. While underway, passengers should remain seated inside the deck rails. Don't allow passengers to drag their feet or hands in the water. Always use handholds and other safety hardware to prevent falls. All non-swimmers, poor swimmers, and small children should wear PFD's at all times.

### Propeller

## DANGER

**Personal Injury!** Do not allow anyone near a propeller, even when the engine is off. Propeller blades can be sharp and can continue to turn even after the engine is shut off. Do not allow anyone near the propeller when the throttle is in the neutral position. Contact with propeller will result in serious injury or death.

### **First Aid**

As a boat operator, you should be familiar with basic first aid procedures that may be needed while you are far from help. Fish hook accidents or minor cuts and abrasions may be the most serious mishaps on board a boat, but you should also learn the proper procedures and be ready to deal with the truly serious problems like excessive bleeding, hypothermia, and burns. First aid literature and courses are available through most Red Cross chapters.

### **Operation By Minors**

Minors should always be supervised by an adult whenever operating a boat. Some regions also have laws regarding the minimum age and licensing requirements of minors. Be sure to contact the local boating authorities for information.

### **Rules of the Road**

As a responsible boater, you will comply with the “Rules of the Road,” the marine traffic laws. Navigating a boat is much the same as driving an automobile. Operating either one responsibly means complying with a set of rules intended to prevent accidents. Just as you assume other car drivers know what they are doing, other boaters assume you know what you are doing. Chapter 3 has more information about navigational rules and the Rules of the Road.

### **Voluntary Inspections**

Boating officials in many regions or the U.S. Coast Guard Auxiliaries offer courtesy inspections to check out your craft. They will check for compliance with safety standards and required safety equipment. You may voluntarily consent to one of these inspections, and you are allowed time to make corrections without prosecution. Check with the appropriate state agency or the Coast Guard Auxiliary for details.

### **Safe Boating Courses**

The local U.S. Coast Guard Auxiliary and the U.S. Power Squadrons offer comprehensive safe boating classes several times a year. You may contact the Boat/U.S. Foundation at 1-800-336-BOAT (2628) or, in Canada contact the Canadian Power Squadron at 1-800-268-3579, for a course schedule in your area. Also contact the local U.S. Coast Guard Auxiliary or Power Squadron Flotilla for the time and place of their next scheduled class.



It is your responsibility to gain knowledge and experience in skills such as:

- Navigation
- Seamanship and boathandling
- Rules of the Road, international-inland
- Weather prediction
- Safety at sea
- Survival in bad weather
- Respect for others on the water
- First Aid
- Radio communication
- Distress signals
- Pollution controls

## WATER SPORTS

### DANGER

**Personal Injury!** Your boat is not designed for and should not be used for pulling parasails, kites, gliders, or any device which can become airborne. Use boat only for appropriate water sports.

### WARNING

Use Caution with skier in tow as the tow rope may snap back into cockpit when released. Ski pylon is for skiing, wake and knee boarding only. All other recreational towables use transom stern eyes. Do not tow other boats or use for parasailing See labels on ski pylon for additional warnings.

Water skiing, kneeboarding, or riding a towed, inflatable apparatus are some of the more popular water sports. Taking part in any water sport requires increased safety awareness by the participant and the boat operator. If you have never pulled someone behind your boat before, it is a good idea to spend some hours as an observer, working with and learning from an experienced driver. It is also important to be aware of the skill and experience of the person being pulled. Always have a second person on board to observe the person in the water so the driver can concentrate on operating the boat.

Everyone participating in a water sport should observe these guidelines:

1. Allow only capable swimmers to take part in any water sport.
2. Always wear an approved personal flotation device (PFD). Wearing a properly designed PFD helps a stunned or unconscious person stay afloat.
3. Be considerate to others you share the water with.

**SAFETY**

4. Give immediate attention to a person who has fallen. He or she is vulnerable in the water alone and may not be seen by other boaters.
5. Approach a person in the water from the lee side (opposite the direction of the wind). Turn off the motor before coming close to the person.
6. Turn off engine and anchor before swimming.
7. Always participate in water sports in safe areas. Stay away from other boats, beaches, restricted areas, swimmers, and heavily traveled waterways.
8. Swim only in areas designated as safe for swimming. These are usually marked with a swim area buoy (Figure 2-10). Do not swim alone or at night.

**⚠ DANGER**

**Rotating Propeller!** Rotating propeller can cut or sever, causing serious injury or death. Shut engine off and remove ignition key when anyone is swimming nearby.

9. Do not allow anyone near the propeller(s), even when the engine is off. Propeller blades can be sharp and can continue to turn even after the engine is off. Stay at least 150 feet away from areas marked by a diver down float (Figure 2-11).



**FIGURE 2-11 DIVER DOWN FLOAT**

10. Do not drive the boat directly behind a water skier. At 25 miles per hour, the boat will overtake a fallen skier who was 200 feet in front in about 5 seconds.

### **Water Skiing**

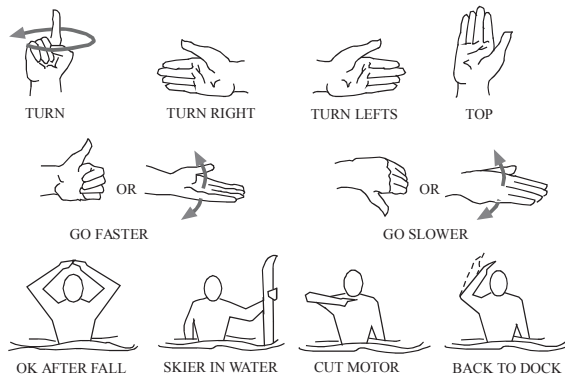
The popular sport of water skiing has brought a special set of safety precautions to observe in boating. The following guides help prevent accidents while water skiing.

1. Water ski only in safe areas, away from other boats and swimmers, out of channels, and in water free of underwater obstructions.
2. Allow no one who cannot swim to water ski. Skiers must wear a USCG approved personal flotation device. A type III water-ski vest is an approved and practical PFD.
3. Have a second person aboard to observe the skier and inform the driver about the skier's hand signals (Figure 2-12). The driver must give full attention to operating the boat and the waters ahead.
4. Give immediate attention to a fallen skier. He or she is vulnerable in the water alone and may not be seen by other boaters. Be careful not to swamp the boat while taking a skier on board.
5. Always participate in water sports in safe areas. Stay away from other boats, beaches, swimmers, and heavily traveled waterways.
6. Be considerate to others you share the water with.
7. Approach a person in the water from the lee side (opposite the direction of the wind). Stop the motor before coming close to the person.
8. Turn off engine and anchor your boat before swimming.

**⚠ DANGER**

Rotating propeller can cut or sever, causing serious injury or death. Switch engine off before skiers enter the water and before taking skiers aboard. Do not leave engine running in neutral. Accidentally engaging shift can seriously injure skier.

- 9. Do not water ski between sunset and sunrise. It is illegal in most states.



**FIGURE 2-12 SKIING SIGNALS**

For more information about water skiing, please contact the American Water Ski Association, 799 Overlook Drive, Winter Haven, FL 33884 (1-800-533-2972)





This chapter summarizes basic rules of seamanship, provides general information about navigational aids, and identifies sources for additional reading and boater education.

## BOATING REGULATIONS

The Coast Guard is the authority of the waterways. Boating regulations are also enforced by local authorities. Your boat is subject to the marine traffic laws known as “Rules of the Road,” which are enforced by the Coast Guard. You are subject to marine traffic laws and “Rules of the Road” for both federal and state waterways; you must stop if signaled to do so by enforcement officers, and permit them to board if asked. The “Rules of the Road” can be obtained from the local Coast Guard Unit or the United States Coast Guard website, [www.uscgboating.org/regulations/navigation-rules.php](http://www.uscgboating.org/regulations/navigation-rules.php). In Canada contact the local Coast Guard unit or go to [www.ccg-gcc.gc.ca/aids/home](http://www.ccg-gcc.gc.ca/aids/home).

Many pamphlets prepared by the Coast Guard are available. They explain signal lights, buoys, safety, international and inland regulations, and other information which goes beyond the scope of this manual. “Aids to Navigation” (U.S. Coast Guard pamphlet #123) explains the significance of various lights and buoys. Because of proposed alterations to buoys and markers, contact the U.S. Coast Guard to stay informed of changes.) Other pamphlets, including the “Boating Safety Training Manual” and “Federal Requirements For Recreational Boats,” are also available from the U.S. Coast Guard Headquarters.

**Note:** The spoken word “MAYDAY” is the international signal of distress. MAYDAY should NEVER be used unless there is grave or imminent danger, and you are in need of immediate assistance.

## RULES OF SEAMANSHIP

### Right-of-Way

In general, boats with less maneuverability have right-of-way over more agile craft. You must stay out of the way of the following vessels:

A vessel not under command or aground	These vessels have no maneuverability.
A vessel restricted in its maneuverability	These vessels are performing work, such as surveying, dredging, laying pipe or cable, or servicing navigational markers among others, which limits their maneuverability.
A vessel engaged in fishing	These include boats fishing with lines, trawls, or nets; but not trolling lines.
Sailboats	Sailboats have the right-of-way over power boats; however, if a sailboat is using a propeller to move forward, it is considered a power boat even if its sails are up.

**Meeting Head-On**

When two boats meet head-on, neither boat has the right-of-way. Both boats should decrease speed and pass port to port. However, if both boats are on the left side of a channel, each vessel should sound two short horn blasts and pass starboard to starboard. See Figure 3-1.

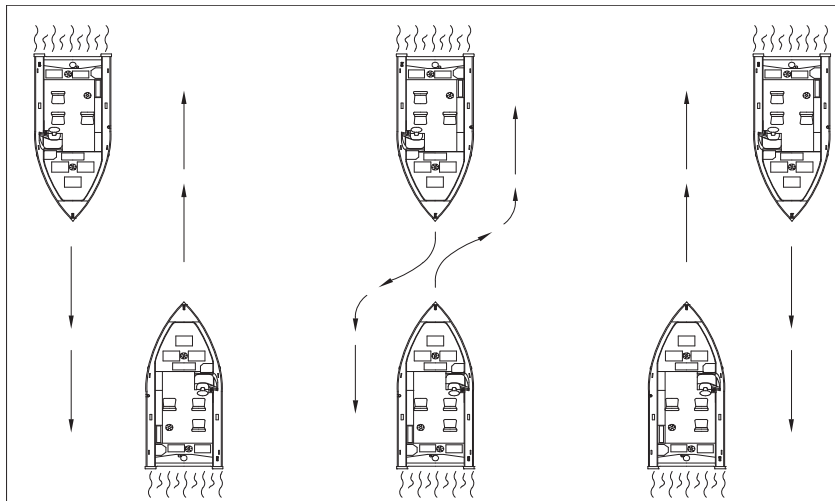


FIGURE 3-1 MEETING HEAD-ON



### Crossing Situations

In a crossing situation, the boat on the right from the 12-4 o'clock position has the right-of-way. It must hold course and speed. The boat without right-of-way must keep clear and pass to the stern. See Figure 3-2.

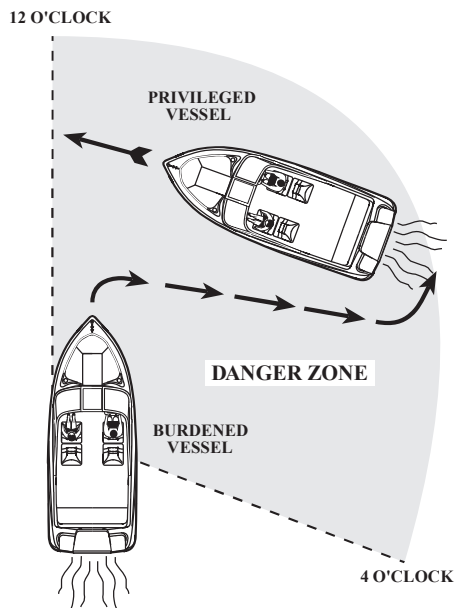


FIGURE 3-2 CROSSING

### Overtaking

The boat overtaking the one ahead must yield the right-of-way to the boat being passed. The overtaking boat must make any necessary adjustments to keep out of its path. The boat being passed should hold its course and speed. See Figure 3-3.

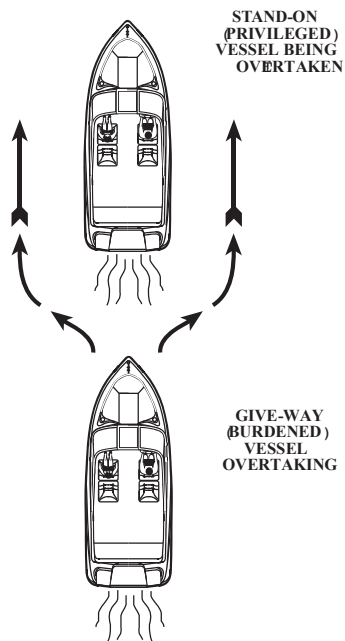


FIGURE 3-3 OVERTAKING

### The General Prudential Rule

The general prudential rule regarding right-of-way is that if a collision appears unavoidable, neither boat has right-of-way. As prescribed in the Rules of the Road, both boats must act to avoid collision.

### Night Running

Boats operating between sunset and sunrise (hours vary by state), or in conditions of reduced visibility, must use navigational lights. Night-time operation, especially during bad weather or fog, can be dangerous. All Rules of Road apply at night, but it is best to slow down and stay clear of all boats regardless of who has right-of-way.

To see more easily at night, avoid bright lights when possible. Also, it is helpful to have a passenger keep watch for other boats, water hazards, and navigational aids.

To determine the size, speed, and direction of other vessels at night, you should use the running lights. A green light indicates the starboard side, and a red light indicates the port side. Generally, if you see a green light, you have the right-of-way; if you see a red light, give way to the other vessel. See Figure 3-4.

**Note:** When conditions require the use of navigational lights, the bow mount trolling motor must be deployed in the furthest down position when in use, to prevent obstruction of the navigation lights.

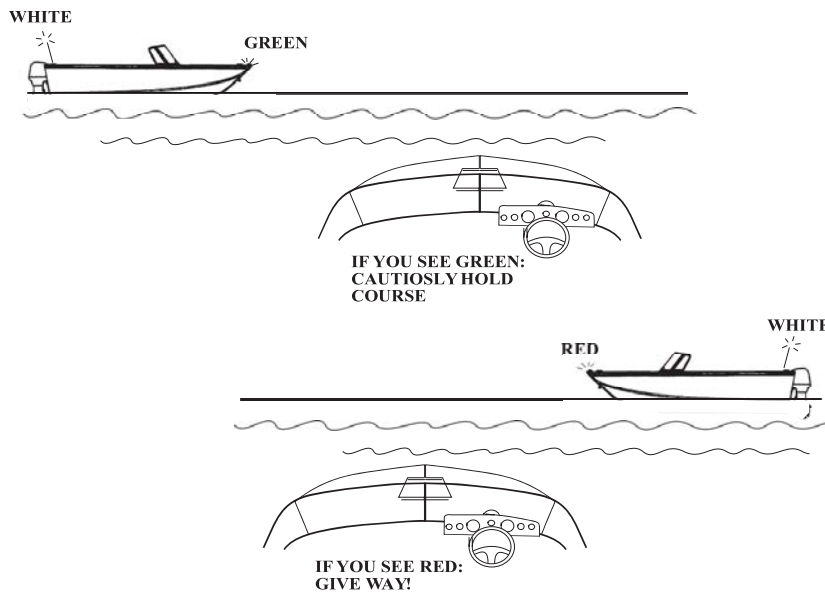


FIGURE 3-4 NIGHT RUNNING

## Whistle Signals

Out on the water, whistle signals are commonly used. Although using a whistle signal is not necessary every time a boat is nearby, operators must signal their intentions when necessary to avoid potentially confusing or hazardous situations. *Use whistle blasts early enough to be noticed and understood by other boaters.*

It is customary for the privileged boat to signal first and the yielding boat to return the same signal to acknowledge she understands and will comply. Use the danger signal (five or more short and rapid blasts) if intent is not clear. A short blast is 1 or 2 seconds long. A long blast is 4 to 6 seconds long. The Navigational Aids Chart at the end of this chapter lists the meanings of the various whistle signals.

## NAVIGATIONAL AIDS

Aids to navigation (ATONS) help you to travel safely on the water. They help you get from one place to another and are most helpful if you have a nautical chart. A navigational aids chart is at the end of this chapter.

**IMPORTANT:** NEVER tie your vessel to an ATON. It is illegal because it blocks the ATON from the view of other boaters. Decreased visibility can contribute to a serious accident which may result in property damage, personal injury, or death.

There are two ATON systems. The system used on federal waters is known as the International Association of Lighthouse Authorities System B (IALA-B). The Coast Guard maintains this system. The second system is the Uniform State Waterway Marking System (USWMS). This system is maintained by state authorities.

### International Association of Lighthouse Authorities System B (IALA-B)

IALA-B uses four types of ATONS. This chapter discusses the two most common markers: lateral markers and safe water markers. Other federal markers include special markers and isolated danger markers. The Navigational Aids Chart at the end of this chapter shows these aids.

#### Lateral Markers

Lateral markers indicate the sides of navigable channels. They consist of lighted can or nun buoys and daymarks. Each has a number and is either red or green. The numbers on green markers are odd. Red markers have even numbers.

Buoys are red or green floating ATONS. If lighted, they have either red or green lights. Unlighted green buoys, called cans, look like cylinders. Unlighted red nun buoys have cone shaped tops with their points cut off. Don't pass too close to a buoy. You may foul the propeller in its chain.

**Note:** Buoys are anchored floating objects and may not always be exactly in the same position.

Daymarks are red or green boards with numbers. They are on posts or groups of pilings tied together and called dolphins. Daymarks and their supports are daybeacons. Daybeacons may or may not have lights. If a red or green daybeacon has a light, it is the same color as the marker – red or green. Red daymarks are triangular and have even numbers. Green daymarks are square and have odd numbers.

Red, Right, Returning is a basic rule to assist you in using lateral markers. When you are returning from seaward, keep red markers on the starboard (right) side when you pass them. Keep green markers to the port side.

Returning from seaward is very clear if you have been on the ocean. You are returning to port. By agreement, going upstream on a navigational river is returning from seaward. The outlet ends of the Great Lakes are also the seaward ends. Travelling from a large body of water to a smaller one is considered returning from seaward.

### Safe Water Markers

Safe water markers have vertical red and white stripes and mark the center of navigable channels and fairways. Safe water markers include both lighted and unlighted buoys and daymarks. If a marker is lighted, the light is white and flashes the letter “A” in Morse code.

Preferred Channel markers have horizontal red and green bands. If lighted, the color of the light is the same as the top of the band. They show the preferred channel for you to use at a junction point. Be sure to notice the color of the top band, and treat it as any other marker you would of that color. If the band is red and you are returning from seaward, keep the marker to the right.

Most lights on markers flash on and off. Others, such as lights on aids with no lateral significance, are fixed. They stay on all night. ATON lights flash in regular patterns. For example, they may flash every three seconds, or in groups such as two flashes and a pause. There are a number of flashing patterns, which help you identify the light at night. To identify a light, note its color and pattern or timing of flashes, and compare it to your chart to find its location.

### The Uniform State Waterway Marking System

This section discusses three kinds of markers in this system: Regulatory, Informational, and Lateral.

Regulatory markers in this system are either signs or buoys. Signs are square with orange borders. Regulatory buoys are white and shaped like cylinders. They have horizontal orange bands near their tops and just above the water’s surface. An orange circle on a marker means a controlled area. A message such as “No Wake,

Idle Speed, No Skiing, or 5 MPH” may appear on the marker. An orange diamond means danger. If the diamond has an orange cross inside it, don’t enter the area. The reason you should stay out, such as “Swim Area,” may be printed in black on the marker.

Informational markers are white signs with orange borders. They give information such as direction, distance, and location.

Lateral markers in the USWMS system are either numbered red or black buoys. Black buoys may have green reflectors or lights. They are the equivalent of green buoys in the IALA-B system. Red buoys may have red reflectors or lights. They are the same as red buoys in the IALA-B system. Red and black buoys are usually found in pairs – pass between them.

### A Special Sign

In Florida, you may see a special sign: “Caution, Manatee Area.” When you see this sign, slow down to idle speed. Manatees, an endangered species, are passive, large, slow-moving mammals. Many manatees are seriously injured or killed each year by boat propellers.

### Noise

Always be aware of local laws on noise limits. Noise means engine noise, radio noise, or even yelling by people on your boat. Good seamanship demands that you operate your boat quietly so as not to infringe on the rights of others.

## RECOMMENDED READING

We recommend that you read the boating literature published by your state boating agency and the U.S. Coast Guard. Other suggested reading includes the following:

Damford, Don. *Anchoring*. (ISBN 0-915160-64-1). Seven Seas.

United States Coast Guard Auxiliary. *Boating Skills and Seamanship*. LC74-164688. (illus.). (ISBN 0-930028-00-7). U.S. Coast Guard.

Bottomley, Tom. *Boatman’s Handbook*, (illus.). 316 p. (ISBN 0-688-03925-1, Hearst Marine Book). Morrow.

Whiting, John and Bottomley, Tom. *Chapman’s Log and Owner’s Manual*. 192 p. (ISBN 0-87851-801-0); (ISBN 0-686-96737-2). Hearst Marine Book.

Chapman, Charles F. and Maloney, E.S. *Chapman’s Piloting, Seamanship and Small Boat Handling*. (illus.) 62 p. (ISBN 0-87851-814-2, Pub. by Hearst Bks.); deluxe ed. (ISBN 0-87851-815-0). Morrow

National Fire Protection Association. *Fire Protection Standard for Pleasure and Commercial Motor Craft*. (ISBN 0-317-07388-5, NFPA 302). National Fire Protection Association.

Brotherton, Miner. *Twelve-Volt Bible*. (ISBN 0-915160-81-1). Seven Seas.

## CONTACTS

There are many good boating publications that have information about your area and what other boats are doing, such as clubs and other activities. Education programs are sponsored by publications and organizations such as the U.S. Power Squadron, U.S. Coast Guard Auxiliary, and The American Red Cross. See your dealer about special courses available in the area. For detailed information contact:

American Red Cross  
Local address (see local telephone directory)

Boat U.S. Foundation for Boating Safety  
[www.boatus.org](http://www.boatus.org)

Coast Guard Boating Safety  
[www.uscgboating.org](http://www.uscgboating.org)

NMMA Sources of Waterways Information – National Marine Manufacturers Association has five (5) booklets which list sources for safety, cruising, and local waterway information. Each covers a different region of the U.S. (North Central, South Central, Northeastern, Southeastern, and Western). For single copies contact NMMA at [www.nmma.org](http://www.nmma.org)

United States Coast Guard Auxiliary  
[www.cgaux.org](http://www.cgaux.org)

United States Coast Guard Headquarters  
[www.uscg.mil](http://www.uscg.mil)

United States Power Squadron  
[www.usps.org](http://www.usps.org)

## OWNER'S LOGS AND RECORDS

At the end of this chapter are several forms which you will find very helpful.

The **Float Plan** provides a record of your destination, departure and return times, boat description, passenger list, and other information about the trip you have planned. At the bottom of the form is space for listing emergency telephone numbers in case your return is delayed past the expected time. It also has space for indicating information about the person filing this report. Leave the completed form ashore with a responsible person. We recommend you make several copies of this form each boating season to assure an ample supply.

The **Fuel Log** is a handy way to record information covering engine hours, fuel consumption, miles traveled, as well as RPM (revolutions per minutes), average mph (miles per hour), and gph (gallons per hour).

The **Service/Maintenance Log** provides a record of maintenance work completed, the date of completion, and the engine hour reading. This log also helps you identify the frequency of routine maintenance work, such as engine oil changes. If you should decide to sell your boat, it demonstrates to prospective buyers that you have done a good job of taking care of it.

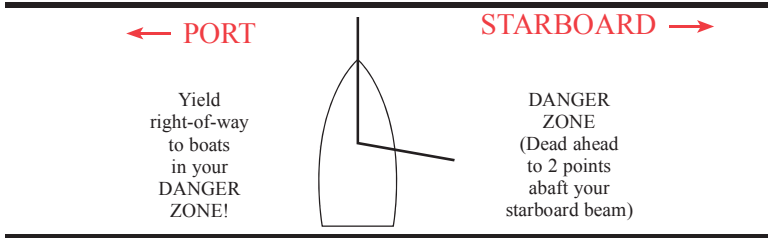
## NAVIGATIONAL AIDS CHART

The illustrated Navigational Aids Chart on the next two pages contains information concerning whistle signals, storm warnings, bridge signals, and buoy descriptions..

# NAVIGATIONAL AIDS CHART

## REMEMBER THESE RULES

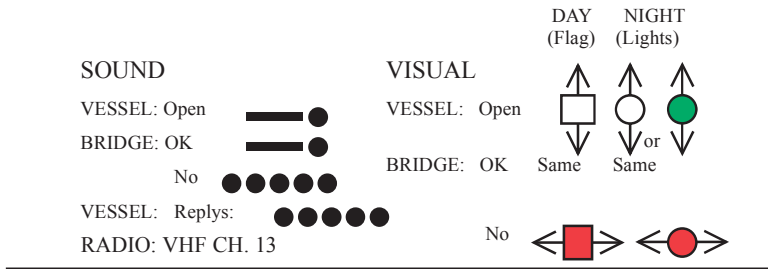
1. OVERTAKING - PASSING: Boat being passed has the right-of way. KEEP CLEAR.
2. MEETING HEAD ON: Keep to the right.
3. CROSSING: Boat on right has the right-of-way. Slow down and permit boat to pass.



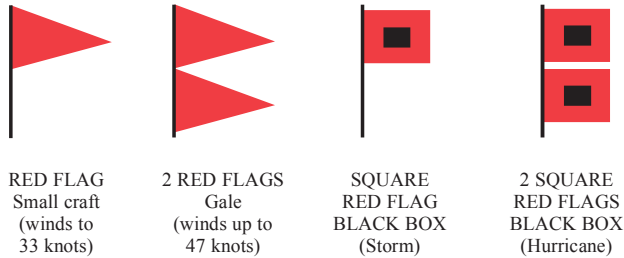
## WHISTLE SIGNALS

- ONE LONG BLAST: Warning signal (Coming out of slip)
- ONE SHORT BLAST: Pass on my port side
- TWO SHORT BLASTS: Pass on my starboard side
- THREE SHORT BLASTS: Engine(s) in reverse
- FOUR OR MORE BLASTS: Danger signal

## BRIDGE SIGNALS

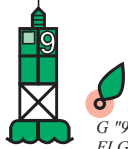




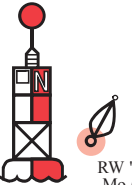
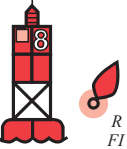
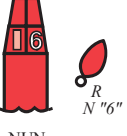

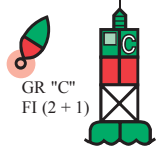


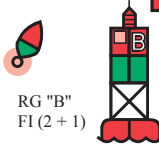




## STORM WARNINGS





## LATERAL AIDS AS SEEN ENTERING FROM SEAWARD

PORT SIDE	SAFE WATER MID-CHANNELS OR FAIRWAYS NO NUMBERS-MAY BE LETTERED	STARBOARD SIDE
<p><b>ODD NUMBERED AIDS</b></p> <p><span style="color: green;">■</span> GREEN LIGHT ONLY</p> <p>FLASHING </p> <p>OCCULTING </p> <p>QUICK FLASHING </p> <p>ISOPHASE </p> <div style="text-align: center;">  <p>G "9" FI G 4sec</p> <p>LIGHTED BUOY</p> </div> <div style="text-align: center;">  <p>G "7"</p> <p>CAN</p> </div> <div style="text-align: center;"> <p>SG</p>  <p>DAYMARK <span style="color: green;">■</span> G "1"</p> </div>	<p><b>WHITE LIGHT ONLY MORSE CODE</b></p> <p>Mo(A) <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/></p> <div style="text-align: center;">  <p>RW SP "G"</p> <p>SPHERICAL</p> </div> <div style="text-align: center;">  <p>RW "A"</p> <p>MR</p> </div> <div style="text-align: center;">  <p>RW "N" Mo (A)</p> <p>LIGHTED AND/OR SOUND</p> </div> <p style="text-align: center;"><b>PREFERRED CHANNEL</b> NO NUMBERS-MAY BE LETTERED</p> <p style="text-align: center;">COMPOSITE GROUP FLASHING ( 2 + 1 )</p> <p style="text-align: center;"><input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/></p>	<p><b>EVEN NUMBERED AIDS</b></p> <p><span style="color: red;">■</span> RED LIGHT ONLY</p> <p>FLASHING </p> <p>OCCULTING </p> <p>QUICK FLASHING </p> <p>ISOPHASE </p> <div style="text-align: center;">  <p>R "8" FIR 4sec</p> <p>LIGHTED BUOY</p> </div> <div style="text-align: center;">  <p>R N "6"</p> <p>NUN</p> </div> <div style="text-align: center;"> <p>TR</p>  <p>DAYMARK <span style="color: red;">▲</span> R "2"</p> </div>
<p><span style="color: green;">■</span> GREEN LIGHT ONLY</p> <div style="text-align: center;">  <p>GR "C" FI (2 + 1)</p> </div> <div style="text-align: center;"> <p>PREFERRED CHANNEL TO STARBOARD TOPMOST BAND GREEN</p>  <p>GR C "L"</p> <p>CAN</p> </div> <div style="text-align: center;"> <p>JG</p>  <p>GR "A"</p> </div>	<p>LIGHTED</p> <hr style="width: 100%;"/>	<p><span style="color: red;">■</span> RED LIGHT ONLY</p> <div style="text-align: center;">  <p>RG "B" FI (2 + 1)</p> </div> <div style="text-align: center;"> <p>PREFERRED CHANNEL TO PORT TOPMOST BAND RED</p>  <p>RG N "W"</p> <p>NUN</p> </div> <div style="text-align: center;"> <p>JR</p>  <p>RG "B"</p> </div>

BASIC SEAMANSHIP

### FLOAT PLAN

Copy this page and fill out the copy before going boating. Leave the completed copy with a reliable person who can be depended upon to notify the Coast Guard, or other rescue organization, should you not return as scheduled. DO NOT file this plan with the Coast Guard.

Name \_\_\_\_\_ Telephone \_\_\_\_\_

Description of Boat: \_\_\_\_\_ Type \_\_\_\_\_ Color \_\_\_\_\_ Trim \_\_\_\_\_

Registration Number \_\_\_\_\_

Length \_\_\_\_\_ Name \_\_\_\_\_ Make \_\_\_\_\_

Hull Identification Number \_\_\_\_\_

Other Info. \_\_\_\_\_

Persons Aboard:	Name	Age	Address	Telephone

Engine Type: \_\_\_\_\_ HP \_\_\_\_\_

No. of Engines: \_\_\_\_\_ Fuel Capacity: \_\_\_\_\_

Survival Equipment:

PFDs \_\_\_\_\_ Flares \_\_\_\_\_ Mirror \_\_\_\_\_

Smoke Signals \_\_\_\_\_ Flashlight \_\_\_\_\_ Food \_\_\_\_\_

Paddles \_\_\_\_\_ Water \_\_\_\_\_ Anchor \_\_\_\_\_

Raft or Dinghy \_\_\_\_\_ EPIRB \_\_\_\_\_ Sea Anchor \_\_\_\_\_

Navigation Equipment

Compass \_\_\_\_\_ Loran \_\_\_\_\_ GPS \_\_\_\_\_ Radar \_\_\_\_\_

Radio: Yes \_\_\_\_\_ No \_\_\_\_\_ Type \_\_\_\_\_ Freq \_\_\_\_\_

Phone: Yes \_\_\_\_\_ No \_\_\_\_\_ Phone No. \_\_\_\_\_

Destination _____	Est. Time of Arrival _____
Expect to Return By _____	
Auto Type _____	License No. _____
Where _____	
If not returned by _____ call the Coast Guard, or _____ <small>(Local Marine Authority)</small>	
Coast Guard Telephone Number: _____	
Local Marine Authority Telephone Number: _____	





A correctly selected trailer supports the boat properly, makes towing safer, and makes loading and unloading easier. Improper trailering can cause serious traffic accidents and is one of the major causes of boat damage. The warranty does not cover damage of this type. Familiarize yourself with proper towing procedures before towing your boat on the road. If using the transportation and storage top, the supplied poles must be installed to keep the top tight. If the top is not tight, damage can occur during storage or trailering.

**IMPORTANT:** Your boat's trailer was specifically designed to properly transport your boat. Do not use any other trailer with your boat. Your dealer can help you with the proper tow vehicle connections. Check with the state Department of Motor Vehicles for registration and licensing regulations in your state. Some states require that boat trailers be registered and licensed. Some states, and provinces, also have brake requirements of which you should be aware.

## WARNING

Overloading trailer can lead to frame or component failure or loss of tow vehicle control. To prevent accidents and injury, total weight of trailer, boat, and gear must not exceed trailer weight rating.

### GROSS VEHICLE WEIGHT RATING

The trailer should be able to accommodate the weight of the boat, engine, full fuel tank, and any other equipment that will normally be carried. Check the certification label on the frame of the trailer for the gross vehicle weight rating (GVWR). The total weight of your boat, engine, fuel, gear, and trailer should not exceed the GVWR.

### WEIGHT DISTRIBUTION

If your towing vehicle is equipped with a weight distribution hitch, it must be capable of handling the GVWR. The weight on the trailer should be evenly distributed. If too much weight rests on the hitch, the front end of the vehicle will sway or oversteer. Insufficient tongue weight will cause the trailer to fishtail. In either case, the vehicle will be hard to handle and could become uncontrollable at high speeds.

State and provincial regulations usually require that trailers above a specified weight rating be equipped with brakes. Requirements vary; check with your dealer for additional information.

## HITCH

### ⚠ WARNING

Overloading can cause hitch failure, leading to injury-causing accidents. Total weight of the loaded trailer must not exceed capacity marker on hitch of tow vehicle.

### TRAILERING

Hitches are divided into classes that specify the gross trailer weight and maximum tongue weight for each class. Always use a hitch with the same class number as the trailer. Most boat trailers connect to a ball hitch that is bolted or welded to the towing vehicle. Be certain that the tow vehicle is equipped with a hitch capable of handling the GVWR. The two basic types of trailer hitches are a weight-carrying hitch, which is adequate for some of the smaller models, and a weight-distributing hitch for heavier models.

The trailer hitch coupler must match the size of the hitch ball. The correct ball diameter is marked on the trailer coupler. When it is latched, the coupler should fit snugly on the ball.

## SAFETY CHAINS OR CABLES

Safety chains or cables provide added insurance that an unhitched trailer will not become completely separated from the towing vehicle while it is being towed. Crisscross the chains or cables under the trailer tongue to prevent the tongue from dropping to the road if the trailer separates from the hitch ball (Figure 4-1). Safety chain or cables should have a minimum breaking strength equal to the upper limit of the GVWR.

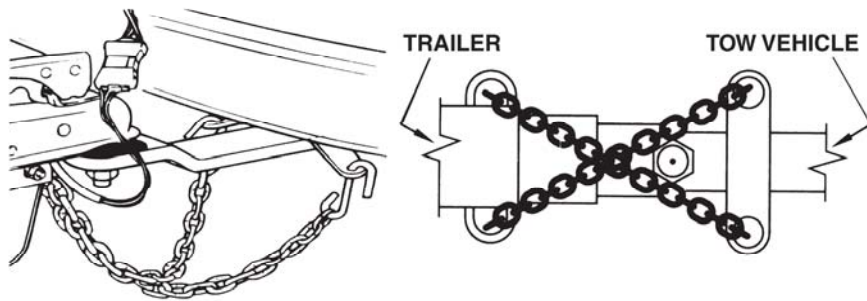


FIGURE 4-1 SAFETY CHAINS

## BRAKES

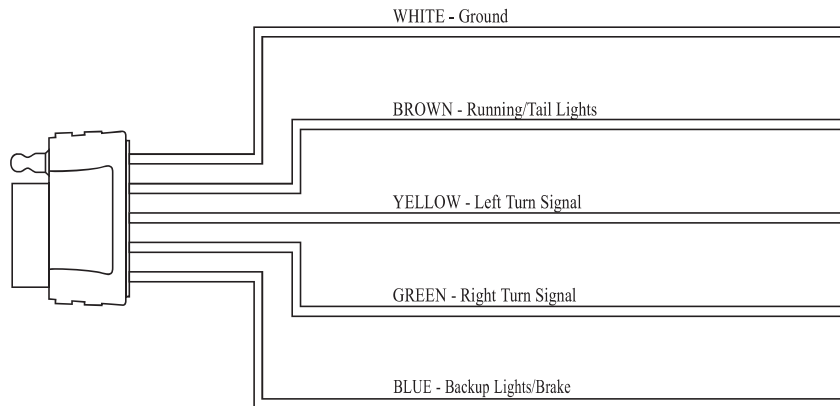
### ⚠ WARNING

**Property Damage! Personal Injury!** Failure to use brakes when required can result in an injury-causing accident. Observe conditions carefully and be prepared to stop. Maintain brakes properly to assure they are in good working order.

Your boat trailer may be equipped with surge brakes. Trailer brakes help relieve stress on the tow vehicle by transferring some of the braking action to the trailer wheels. As the towing vehicle slows and decelerates, the momentum of the trailer applies pressure through linkage to the trailer's master cylinder mounted on the tongue near the coupler. This hydraulic pressure is transmitted through the brake lines to the wheel brake assemblies to assist with slowing or stopping the vehicle and the trailer. A shock absorber assures smooth and even operation of the brakes by preventing intermittent application of the brakes.

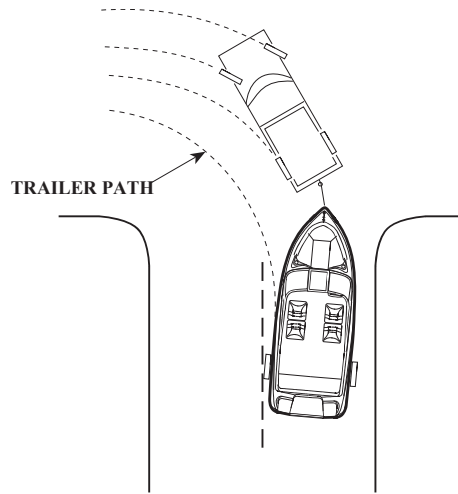
#### NOTE

Some trailers are equipped with disc brakes. The wiring harness for these trailers incorporate a 5 connector plug. The tow vehicle wiring harness plug must be wired as shown to release the disc brakes when backing.



## TURNING WHILE TOWING A TRAILER

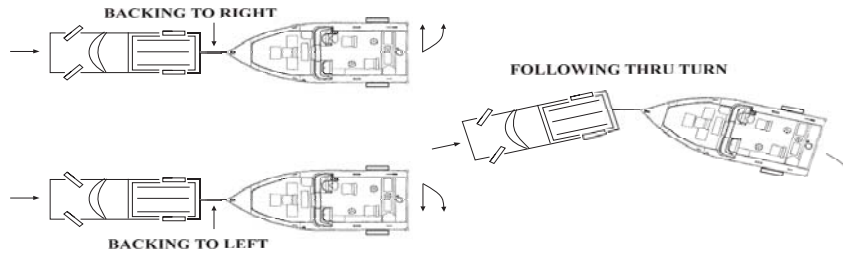
When you are towing a trailer, be aware that the trailer will track in a tighter turn than the tow vehicle (Figure 4-2). When making a turn, be careful that the trailer does not strike another vehicle or object. Turns made when you are towing a trailer should be made at appropriate speeds.



**FIGURE 4-2 TURNING WITH TRAILER**

**BACKING A TRAILER**

Practice backing with a trailer before you get into a confined launch site. Get accustomed to using the trailer in an open area. Take someone with you who knows how to back a trailer. Backing a trailer works the opposite of backing a car. If the trailer needs to travel to the right, turn the steering wheel to the left and vice versa (Figure 4-3). Do not turn the wheel too far or oversteer. Turn the wheel gradually until you get the feel of safe backing.



**FIGURE 4-3 BACKING A TRAILER**

**LAUNCHING GUIDELINES**

Before launching your boat, stay to one side and watch a couple of launchings to notice any problems on the ramp and the effects of the wind and the current on launching.

It's a common courtesy to prepare the boat for launching away from the ramp. This includes removing tie-downs, securing loose gear, loading personal gear, and making sure drain plugs are installed.



Have an individual at the launch ramp give you directions. Back slowly down the ramp. Always remember to launch the boat at a right angle to the shoreline. If launching from a trailer, tilt the outdrive up to avoid damage.

When the boat's transom is in several inches of water, stop the towing vehicle. If the vehicle has a manual transmission, leave it in gear. If it has an automatic transmission, shift to PARK. Turn off the engine and set the parking brake. Place blocks behind the vehicle's back wheels.

Do not detach the winch cable from the bow eye until a mooring line has been secured to one of the boat's cleats. Otherwise, the boat could slide off the trailer and float away. Attach one line to the bow and one line to the stern to help control the boat. See the mooring information in Chapter 8 for suggested securing procedures.

After moving the boat down and off the trailer into the water, secure it to the dock or have someone hold mooring lines. Then lower the outdrive all the way into the water.

Pull the towing vehicle away from the launch ramp. Park only in designated areas. When parking, be sure the towing vehicle and trailer do not block other boaters from approaching the launch ramp or hinder their ability to maneuver a boat and trailer when launching.

## LOADING YOUR BOAT ON THE TRAILER

Loading your boat is similar to launching except loading is done in reverse.

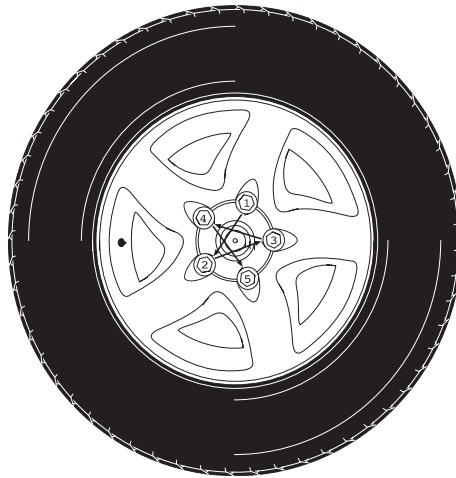
1. Back the trailer into the water.
2. When the trailer is in enough water so the boat will "float on" the trailer bunks:
  - STOP the towing vehicle.
  - Leave manual transmission in gear or place automatic transmission in park.
  - Turn off the engine.
  - Set the parking brake.
  - Place blocks behind the vehicle's back wheels.

3. Tilt the boat's drive up to the high tilt position to avoid damage while loading.
4. Pull boat up onto trailer and secure safety chain.
5. After securing the boat to the trailer, start engine on towing vehicle and pull trailer out of water to boat securing area. (If blocks are connected with a rope to the trailer tongue, you will not need to remove them before pulling trailer out.)
6. Remove the hull drain plug to allow bilge to drain. Keep plug open to prevent accumulation of water in bilge. Be sure to close hull drain plug before next boat usage, to prevent flooding.
7. Use tie-downs to secure boat on trailer. Use stern tie-downs to prevent the boat from shifting.
8. Wipe hull down to prevent water spots and keep hull clean.
9. Make sure all cargo, lids, and canvas are secure or tied down before trailering on the road. Place loose gear in towing vehicle.
10. Be sure the coupler is secured to the trailer hitch and safety chains or cables are attached.

## TRAILER MAINTENANCE

\* Refer to trailer manufacturers owners manual.

1. Check tires for proper inflation (check tire rating on sidewall). Under-inflated tires heat up rapidly and may blow-out or cause uncontrolled swaying.
2. All lug nuts must be checked to trailer manufacturer specifications after 25 miles, again after 100 miles, and periodically thereafter. Lug nuts must be tightened in a star crisscross pattern (see illustration) to insure uniform pressure and alignment. Apply torque evenly by repeating star pattern until desired torque is reached.



3. Be sure the coupler is secured to the trailer hitch and safety chains or cables are attached.
4. Check the brakes for proper operation prior to departure. See Owner's Manual for brakes or trailer for complete instructions.
5. Check the springs and under carriage for loose parts.
6. Carry a spare tire for both the trailer and towing vehicle. On extended trips, carry spare wheel bearings, seals, and races. Be sure and carry the proper tools to complete the repairs.
7. When traveling, check the wheel hubs during stops at gas stations, restaurants, or other places. If the hub feels abnormally hot, the bearing should be inspected before continuing the trip.

**Note:** All boats and trailers used in salt or brackish waters must be rinsed off completely with fresh water immediately after use, to prevent rust and corrosion. Failure to rinse the trailer could cause cosmetic trailer damage that is not covered by your warranty.

## WHEEL BEARINGS

The best protection you can give to your wheel bearings is to always keep the hubs fully lubricated. Periodically add fresh grease to the trailer hubs with a water resistant wheel bearing grease. Fill the hubs with grease to the manufacturer's specifications.



# ELECTRICAL SYSTEM

# 5

This section of the manual includes information about your boat's electrical system. Your boat is designed with a safe electrical system to protect you from hazardous shocks and was checked carefully before it was shipped to your dealer. To protect yourself from electric shock, always have a qualified technician make any modifications to the system. If you have questions, see your dealer for more information.

## CAUTION

**Electric Shock! Equipment Damage!** Disconnect battery cables before performing all inspections, checks, and repairs to avoid possible personal injury and damage to equipment.

ELECTRICAL SYSTEM

### INSTALLING ELECTRICAL COMPONENTS:

When wiring electronic devices, be certain all are properly grounded and protected from over-current situations. The aluminum hull should not be used as a ground path, grounding to the aluminum hull will cause electrolysis and will void your warranty. It is always best to consult with a dealer regarding the electronic installations unless you have a clear understanding of circuit protection and proper grounding procedures.

### 12-VOLT DC BOAT SYSTEM

The 12-Volt D.C. electrical system is a 12-Volt, 2-wire, negative ground type. The hot wire is positive, feeding the lights and appliances for instance, and the negative return is by an insulated wire to the negative terminal of the battery.

\* DO NOT connect negative (black) wires to positive battery terminal.

### TROLLING MOTOR SYSTEM

The Trolling Motor System on your boat is designed to use the stored electrical power from 1, 2, or 3 deep cycle marine batteries to power your trolling motor. The number of batteries you have, and the type of trolling motor on your boat, will determine how this system is configured.

**IMPORTANT:** Turning the ignition switch off does not cut off power to all components. Powered components, such as the stereo, can draw down the battery if they are left on for an extended period without running the engine. A master power switch, which can shut off these components, is standard on some models.

The electrical system is wired at the factory to handle factory-installed electrical equipment. It is recommended that you have your dealer install any additional equipment. An error in wiring the electrical circuits can cause a fire or damage electrical system components. Have your dealer repair the electrical system and install additional equipment.

### WARNING

**Fire or Explosion Hazard!** Electrical system parts are designed and manufactured to comply with U.S. Coast Guard requirements to minimize risks of fire or explosion. **Never substitute automotive parts for marine parts.** Automotive parts do not provide the necessary ignition spark protection.

If you do add additional equipment, it must be adaptable to the negative ground system. When installing additional equipment, be sure to take the power supply from the fuse panel. If additional circuit protection is required, it must be added at the fuse block at the helm console. Be sure to protect all electrical components from rain, water, or sea spray.

**Note:** Power feeds for accessory equipment must NOT be taken from the voltmeter terminals. Consult with your dealer for additional DC power needs.

## BATTERY

### WARNING

**Poison!** Sulfuric acid in batteries can cause severe burns. Avoid contact with skin, eyes, or clothing. Wear goggles, rubber gloves, and protective apron when working with batteries. In case of skin contact, flush with water at least 15 minutes. If swallowed, drink large quantities of water or milk. Follow with Milk of Magnesia, beaten egg, or vegetable oil. Get medical attention immediately.

### WARNING

**Fire or Explosion Hazard!** Only qualified personnel should install batteries and perform electrical system maintenance. Do not expose batteries to open flame or sparks. Do not smoke near batteries.

Your dealer has installed a battery or batteries which supply power to the DC electrical system. Marine batteries provide high reserve capacity plus cold cranking performance. When the primary engine is running, the battery is charged automatically.

\* Kicker engine will not charge battery.

\* Periodic charging may be required to maintain battery life.

Batteries produce hydrogen and oxygen gases when being charged. These explosive gases escape through the vent/fill caps and may form an explosive atmosphere around the battery if ventilation is poor. This gas may remain around the battery for several hours after charging. Sparks or flames can ignite the gas and cause an explosion.

**Note:** Never disconnect the battery cables while the engine is running. Doing so can damage the electrical system.

## AC/DC BATTERY CHARGER

Your boat may have a battery charger installed. Review the information supplied with the battery charger manual for proper operation procedures. Your dealer can also assist you with the use of this equipment.

### CAUTION

**CAUTION:** Before plugging in battery charger, make sure all trolling motors are unplugged. Failure to do so could damage trolling motor. Always make your extension cord connection on the charger side before connecting to a nearby 120VAC GFCI protected (Ground Fault Circuit Interrupt) outlet. Failure to use a GFCI outlet may result in electric shock.

## BATTERY CHARGING

The primary engine alternator will recharge the engine battery when the engine is running. On some models a voltage regulator controls the rate of charge by sensing battery voltage and increases or decreases alternator output accordingly. If your boat is equipped with a battery charger, please refer to battery charger owner's manual for detailed instructions.

### WARNING

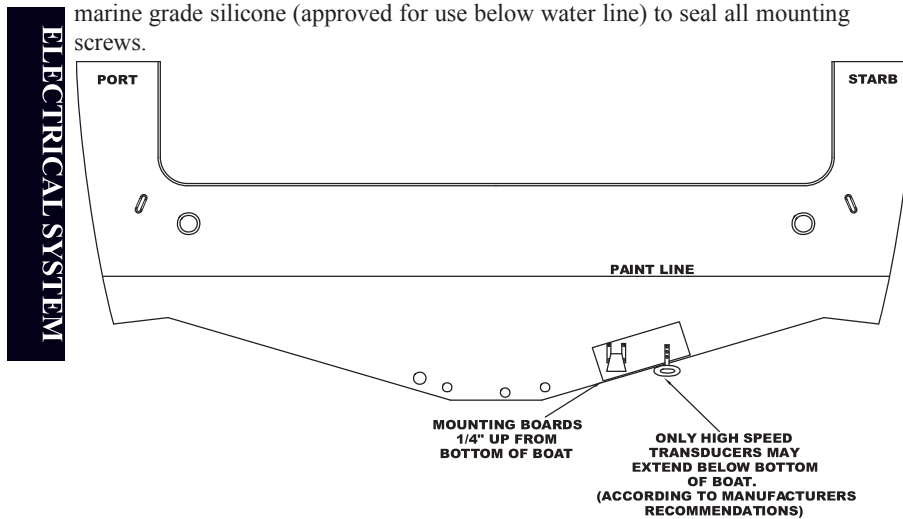
To prevent personal injury, do not attempt to start your engine with jumper cables. The use of jumper cables could create dangerous sparks, which could cause the battery's hydrogen vapors or gasoline fumes to explode.

## OVERLOAD PROTECTION

The engine is equipped with a fuse or circuit breaker to protect the engine wiring harness and instrumentation power leads. If an electrical overload occurs, a circuit will “open” and interrupt current flow when the current draw exceeds the rated amperage. Refer to your engine manual for breaker location, resetting procedure, or for fuse rating and replacement procedure

## TRANSDUCER MOUNTING (DEALER OR CUSTOMER INSTALLED)

Transducer Boards are available from your dealer. Mounting boards must not extend below bottom of boat, and should be mounted 1/4” above bottom of boat. Use marine grade silicone (approved for use below water line) to seal all mounting screws.



## TROLLING MOTOR RECEPTACLE

Your boat may have a trolling motor receptacle located at the bow of the boat. This receptacle is to be used only when the trolling motor is in use. Running from the receptacle is a heavy-duty copper wire harness that extends back to your batteries. This extra-heavy wire assures you of maximum thrust and longer battery life. All of our boats feature an electrical device that protects this harness, which is located near the trolling motor batteries.

**Note:** To prevent equipment damage and possible injury, always connect the trolling motor and batteries by using the factory or dealer supplied wiring.



# WIRING COLOR CODES

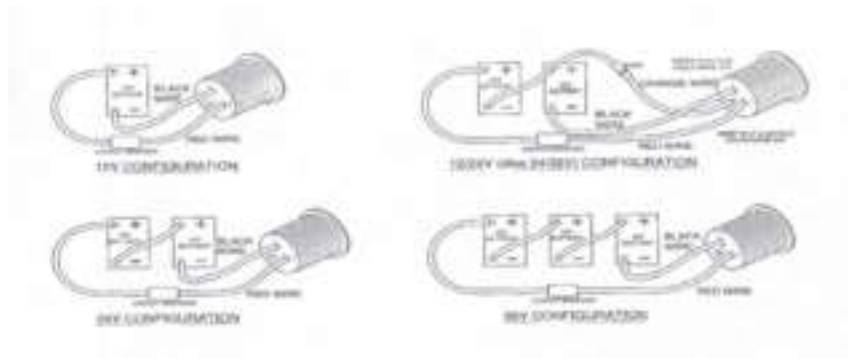
## Main Accessory Harness

	Functions	Wire Color
	Battery Positive (+) (To F.B. or Master Power Sw.)	Red
	Battery Positive (+) (Master Power Sw. to F. B.)	Red/White
	Battery Ground (-)	Black
	Navigation Lights (Bow Lights)	Gray/Green
	Anchor Light (Stern Light)	Gray/Blue
	Bilge	Brown
	Auto Bilge	Brown/Red
	Fuel Sender	Pink
	Courtesy Lights (Switched)	Blue/Yellow
	Horn	White
	Radio (Switched Power)	14ga. Red/Purple
	Radio (Power/Memory)	Yellow/Red
	12 Volt Outlet	Red/Black
	Livewell Aerator (Aft)	Brown/Orange
	Livewell Aerator (Front)	Brown/Yellow
	Livewell Recirculator (Front)	Brown/White
	Livewell Recirculator (Aft)	Brown/Blue
	Livewell Pump Out	Brown/Green
	Livewell Level Sender	Orange/Blue
	Livewell Light	Blue/Black
	Accessory Bow	Red/Blue
	Accessory Stern/Console	Red/Purple
	Washdown Pump	Orange
	Antenna Power	Orange/Red

**ELECTRICAL SYSTEM**

## Wires Off Fuse Block

	Functions	Wire Color
	12V. Accessory Plug	14ga. Red/Black
	Accessory (Both 1 & 2)	Orange
	Bilge	14ga. Brown/Black
	Bow Accessory Power	Red/Blue
	Courtesy Lights	Blue
	Ground	Black
	Horn	White/Black
	Livewell Aerator (Aft.)	Orange/Brown
	Livewell Aerator (Fwd.)	Tan/Yellow
	Livewell Recirculator (Aft.)	Tan/Blue
	Livewell Recirculator (Fwd.)	Tan/White
	Livewell Pump Out	Tan/Black
	Navigation/Anchor Lights	Gray
	Radio Memory	14ga. Yellow/Red
	Radio Power	Red/Purple
	Washdown Pump	Orange



### Trolling Motor System

The trolling motor plug located in your boat is designed to allow you to use the electrical charge from 1/2/or 3 deep cycle marine batteries to power your trolling motor. Depending on how many batteries you use, and the type of trolling motor you have, there are many different methods of configuring the batteries.

Your Lund dealer can prepare the electrical connections between your battery(ies) and trolling motor(s). He has the knowledge and proper equipment to safely configure this system to avoid risk of electrical failure, fire, or equipment damage. Have your dealer perform this service.

### Mounting Trolling Motor

The front deck of your boat has been reinforced to withstand the maximum thrust put out by today's heavy-duty trolling motors. Follow manufacturer's directions when mounting trolling motor bracket. Always use washers on the underside of the deck when bolting on a trolling motor, and use all available bolt holes for maximum strength.

### Detachable Trolling Motor Mount

Some models are equipped with a device that allows removal of the trolling motor. Please refer to the owner's manual for proper mounting and securing instructions.

## CORROSION

Corrosion of metal parts, especially those exposed to brackish water, is common for boats. Corrosion can be caused by stray electric currents from shorepower installations, improperly grounded electrical lines and circuits, and poorly insulated A.C. powered equipment from boats moored nearby.

Corrosion is accelerated when electric current is present. For example, in the following list, aluminum is less noble than copper. This means the aluminum will corrode faster than copper if the two are submerged in seawater.

Be aware of the fact that your boat's hull is not a ground path. **Never ground any electronics to the hull.** Use grounding blocks that are provided. **Grounding components to the hull may result in hull damage by electrolysis.** Make sure your battery terminals are kept clean at all times. Make sure that no electrical connections are in an area of your boat that could come in contact with water.

If you are adding any accessories to your boat, insulate the accessory to avoid physical contact with the aluminum in your boat, if the accessory is manufactured from a dissimilar metal.

### Galvanic Series of Metals

The metals in the chart (below) range from the Least Noble (Anode Active) to the Most Noble (Cathode Passive). Combinations of any of them will show you what to expect relative to Active and Passive Corrosion.

This information is important to know when adding or replacing hull fittings: use metals that are close to each other in the galvanic series. The best way to avoid corrosion is to use genuine replacement parts. When adding accessories not supplied by us, consult your dealer regarding selection and proper installation.

#### Least Noble (Anode-Active)

1. Zinc
2. Galvanized steel or galvanized iron
3. Aluminum
4. Cadmium
5. Mild steel
6. Wrought iron
7. Cast Iron
8. Ni-Resist
9. Type 304 Stainless Steel
10. Lead
11. Tin
12. Manganese bronze
13. Naval brass (60% copper-39% zinc)
14. Nickel (active)
15. Yellow brass (65% copper-15% zinc)
16. Admiralty brass
17. Aluminum bronze
18. Red brass (85% copper-35% zinc)
19. Copper
20. Silicon bronze
21. Nickel (passive)
22. Hastelloy C

#### Most Noble (Cathode-Passive)



# BOAT SYSTEMS & EQUIPMENT 6

This chapter discusses major systems or components on your boat. Information about boat controls is in Chapter 7. Equipment discussed in this chapter is standard or optional on some models and not available on others. See your dealer for more information.

## ENGINES

Your boat may be available with a range of engine options. In your Owner's Packet is an owner's manual for the engine. Refer to that manual for information about engine care and maintenance.

Keep your engine well tuned to decrease exhaust hydrocarbon emissions that pollute the air and water.

Your dealer employs factory trained technicians certified to service the engine. If you choose to do so, you can handle basic servicing such as checking engine oil. But with today's ever-advancing engine technology, these technicians have the tools and the expertise required for efficient and safe engine service.



Do not attempt to maintain or adjust an engine while it is running. Failure to shut off the engine for maintenance or adjustment can result in serious injury or death.

## FUEL SYSTEM

### A. Gasoline Fuel System

If equipped with, the permanently installed gasoline fuel system on your boat consists of a fuel tank, fuel tank vent, anti-siphon valve, engine fuel supply line and fuel fill. Your vessel contains a new EPA certified fuel system. The system prevents spit back when filling the tank and lowers the out gassing emissions through the tank and vent.

### B. Carbon Canister Venting System

Lund Boats are equipped with a carbon canister. This canister filters all the hydrocarbons that pass through the canister. Periodically check that the shield has not become damaged.

### C. Fuel Vent

Lund Boats are equipped with a fuel tank vent for each tank which serves as a pressure/vacuum release. Periodically check the vents to assure that they are not clogged.

### Fuel Recommendations

## CAUTION

Never start an engine until you are certain that fuel fumes are not present in the engine compartment or elsewhere in the boat.

The quality of the fuel is very important for satisfactory engine performance and long engine life. Care should be taken to select fuels having the octane rating recommended for the engine, as indicated in the owner's manual, for proper operation. Fuel should be clean and free of contamination. Your fuel tanks should be kept full of fuel whenever possible. This will reduce the amount of water condensation and reduce the possibility of contamination.

When filling the tank, do NOT attempt to top off the tank. When the fill nozzle shuts off, the tank is full. Continuing to fill past the fuel fill shut off will cause the system to spit back.

### NOTICE

### GASOLINE RECOMMENDATIONS

#### Minimum octane rating of 87 AKI.

**The use of improper gasoline or additives can damage your fuel system and is considered misuse of the system. Damage caused by improper gasoline or additives WILL NOT be covered under warranty.**

### Ethanol-Blended Fuels

Ethanol is an oxygenated hydrocarbon compound that has a high octane rating and therefore is useful in increasing the octane level of unleaded gasoline.

The fuel-system components of your Mercury engine(s) have been tested to perform with the maximum level of ethanol blended gasoline (10% ethanol) currently allowed by the EPA in the United States.

Special precautions should be considered with the use of fuel containing ethanol in your system. Fuels with ethanol can attack some fuel-system components, such as tanks and lines, if they are not made from acceptable ethanol compatible materials.

This can lead to operational problems or safety issues such as clogged filters, leaks or engine damage.

Your boat was manufactured, and shipped from the factory, with ethanol-compatible materials. Before introducing gasoline with ethanol into your fuel tank, ask your dealer if any components have been added or replaced that are not recommended by Lund, Mercury or may not be ethanol-compatible.

### **Filling the Tank**

It is best to maintain a full tank of fuel when the engine is not in use. This will reduce air flow in and out of the tank due to changes in temperature as well as limiting exposure of the ethanol in the fuel to humidity and condensation.

### **Phase Separation**

Humidity and condensation create water in your fuel tank which can adversely affect the ethanol blended fuel. A condition called phase separation can occur if water is drawn into the fuel beyond the saturation point. The presence of water in the fuel beyond the saturation level will cause most of the ethanol in the fuel to separate from the bulk fuel and drop to the bottom of the tank, significantly reducing the level of ethanol in the fuel mixture in the upper level (phase). If the lower level (phase), consisting of water and ethanol, is deep enough to reach the fuel inlet it could be pumped directly to the engine(s) and cause significant problems. Engine problems can also result from the reduced ethanol/fuel mixture left in the upper phase of the tank.

### **Additives**

There is no practical additive known that can prevent or correct phase separation. The only solution is to keep water from accumulating in the tank.

If phase separation does occur, your only remedy is to drain the fuel, clean and dry the tank completely and refill with a fresh, dry load of fuel.

### **Fuel Filters**

Mercury already provides the appropriate level of filtration to protect the engine from debris. The addition of another in-line filter to the system will create a possible flow restriction that can starve the engine(s) of fuel. As a precaution, it is advisable to carry extra on-engine filters in case filter plugging from debris in the fuel tank becomes a problem during boating.

### **Maintenance**

Periodically inspect for the presence of water in the fuel tank. If any is found, all water must be removed and the tank completely dried before refilling the tank with any fuel containing ethanol.

### Storage

Long periods of storage and/or non-use, common to boats, create unique problems. When preparing to store a boat for extended periods, of two months or more, it is best to completely remove all fuel from the tank. If it is not possible to remove the fuel, maintaining a full tank of fuel with a fuel stabilizer added to provide fuel stability and corrosion protection is recommended.

REFER TO THE ENGINE MANUFACTURER'S MANUAL IN YOUR OWNER'S MANUAL PACKAGE FOR COMPLETE INSTRUCTIONS AND WARRANTY INFORMATION.

### CAUTION

The use of fuels containing ethanol higher than 10 percent (E-10) can damage your engine and/or fuel system and will void the warranty.

E-85 FUELS COULD SERIOUSLY DAMAGE YOUR ENGINES AND MUST NEVER BE USED.

### WARNING

**Fire and Explosion Hazard!** Leaking gasoline and fuel vapors can burst into flames or explode. Inspect fuel system regularly for leaks, deterioration, and corrosion. Replace defective parts before starting engine.

### WARNING

**Fire or Explosion Hazard!** Ignition and fuel system parts are designed and manufactured to comply with U.S. Coast Guard requirements to minimize risks of fire or explosion. **Never substitute automotive parts for marine parts.** Automotive parts do not provide the necessary ignition spark protection.

## PROPELLER

The selection of the correct propeller and its condition are the most important items for peak boat performance. Consult your dealer for proper propeller selection. See your engine owner's manual for propeller removal and replacement procedures.

All models should be "propped" to be in the upper half of the maximum RPM range with the boat lightly loaded and the outboard trimmed up to maximum. This configuration allows the engine to operate within the recommended RPM range with a heavy load.



If fuel consumption is higher than normal or the handling characteristics have changed, the propeller may be damaged. A damaged or unbalanced propeller can cause excessive vibration or increased noise. If you notice either condition, stop the engine and check the propeller for nicks, cracks, pitting, distortion, or other damage.

**Note:** Never run with a damaged propeller. You can damage the engine or drive unit. Keep a spare propeller on board. You can continue your excursion without spoiling your day.

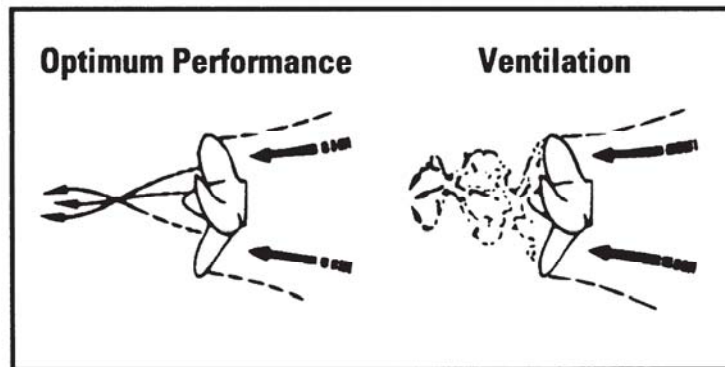
If the propeller is damaged, change it. Detailed procedures are in the engine manual. Otherwise, return to port slowly to prevent further drive and engine damage from an out-of-balance condition. Watch the temperature gauge to make sure the engine does not overheat.

**Cavitation**

Cavitation is the formation of air bubbles along the surface of the propeller. Typical causes of cavitation are a damaged propeller, the outboard trimmed out too far, or a hull projection in front of the engine. Recondition or replace damaged propellers.

**Ventilation**

Ventilation is the formation of a void around the propeller, usually on entering or leaving a sharp turn (Figure 6-1). Without water to turn in, the propeller runs free and the boat nearly stops moving forward until the propeller finds water to turn in again. When ventilation occurs, throttle back immediately. If ventilation continues when you resume speed, you may have to adjust engine trim or the load.



**FIGURE 6-1 PROPELLER VENTILATION**

## STEERING SYSTEM

Your boat is equipped with a mechanical cable system, hydraulic steering system, or power steering system.

### Mechanical Cable System

The mechanical cable system consists of a rotary drum mounted under the dash behind the steering wheel with a one-piece cable running through the boat to the engine. At the transom, the cable turns and is connected to the engine.

### Hydraulic Steering System

The hydraulic steering system consists of a helm pump and reservoir, hydraulic hoses, and the hydraulic cylinder. Turning the helm causes fluid in the hydraulic hoses to flow and activate the hydraulic cylinder to turn the outboard engine.

**NOTICE: A slight clicking sound may be heard as the wheel is turned. This sound is the opening and closing of the valves in the helm unit; this is normal.**

### Power Steering System

The power steering system is like a car's power steering, making steering almost effortless.

It is important that you get the “feel” of your boat’s steering system. Turn the steering wheel from full left to full right, and make sure the motor steering arm is turning accordingly. The system should operate freely and smoothly. The cable end and its fittings should be kept clear of fuel line, control cables, electrical wiring, or onboard gear when the motor is moved through its full steering cycle in both running and full tilt positions.

All fittings and cables should be inspected for corrosion or damage and replaced if necessary. Check for the presence of the original self-locking nuts that are used to fasten the “steering link rod” or “drag link” between the steering cable(s) and the engine. These nuts must never be replaced by common or non-self-locking nuts, which can vibrate off. Also, the steering wheel should be inspected for looseness and tightened, if necessary. Replace the steering wheel if there are any cracks around hub or base of spokes.

Steering or propeller torque can be present in any drive system. In some systems, it is more noticeable than in others.

**Note:** See Steering Manufacturer’s recommendations for cleaning, lubrication, and maintenance of the steering system.

**Note:** The steering system should be inspected by a qualified mechanic at regular service intervals.

For additional information refer to the “Getting Underway” section of this manual.

## WARNING

Steering effort can vary significantly with engine acceleration, steering angle, trim angle, and sea condition. Whenever possible, it is best to trim your outboard to generate minimum steering effort. Under all circumstances, the boat operator should keep at least one hand on the steering wheel at all times.

### LIVEWELL SYSTEM

The livewell system on your boat is designed to supply the water and oxygen needed for the survival of your catch. We encourage the careful handling and livewell maintenance of all fish that you catch, and ask that you consider the live release of any fish that you do not care to eat or mount as a trophy.

**Note:** To control water output from the aerator head in the livewell, turn the aerator head clockwise to close or counter-clockwise to open.

### LIVEWELL OPERATION

#### **Aerated Livewells:**

Operates with a single pump with a single-switch control. You also have the option of running the aerator pump continuously, in manual mode, or intermittently, in automatic mode.

#### **ProLong Livewells:**

Operates with a two pump design. One pump fills and aerates the well from above the fish, while the other recirculates and injects fresh air, via the Max-Air system, for maximum oxygenation.

#### **ProLong Plus Livewells:**

Same operation as the ProLong livewell system with the addition of the freshwater pickup.

#### **Fresh Water Pick-up System:**

The Fresh Water Pick-up is controlled by a spray-head inside the live well which is turned on by turning counter clockwise and off by turning clockwise. This system uses a pick-up that is integrated into the bottom of the boat which scoops up water when the boat is moving forward without the use of a pump.

### General Livewell Plumbing Information

The plumbing system for your livewell may consist of one or more pumps, hoses, fittings, and clamps. All hoses are heavy-duty and are reinforced for years of service. All hardware, clamps, screws, and valve control cables are stainless steel. Through-hull fittings are constructed of PVC, sealed with marine sealant, and have a retaining nut to prevent leaks. While the plumbing system is designed to be leak free, it is the owner's responsibility to frequently check the system's components for leaks, cracks, and worn components. In the event a leak should develop, contact your dealer immediately.

### BILGE

The deepest part of the hull, under the floor, is the bilge. Water may accumulate in the bilge. Be sure to keep the bilge area free of debris so that water can drain through the stringers and bulkheads to the bilge pump area. It is normal to have a small amount of water in the bilge.

### BILGE PUMP

Your boat may be equipped with an electric bilge pump, and may have an automatic float switch. Rising water activates a float switch to start the bilge pump. When the water is pumped out, the pump shuts off automatically.

**Note:** Electrically operated bilge pumps can fail. There is no substitute for checking the bilge frequently, especially during periods of heavy rain, high seas, or storm conditions.

If for some reason the pump fails to start, check the fuse and wiring connections. If the pump motor runs but no water is discharged, it may be clogged. Keep the area around the switch and the pump free of debris. If there is no visible debris clogging the pump or blocking the float switch and water is still not being removed, inspect the discharge hose for kinks or obstruction.

If oil is spilled in the bilge, do not run the pump. Keep the oil from spreading in the bilge and properly dispose of the oil on shore. Your dealer can help you select products you can use to soak up the oil and give you advice about methods of disposal.

The bilge pumps on some models may not have automatic float switches. You must check the water level in the bilge and, if necessary, operate the pump manually using the on-off switch at the helm. Check with your dealer if you have any questions.

## FISHING SEATS WITH POWER PEDESTAL

Some models are equipped with a “power pedestal” is a nitrogen gas filled steel cylinder that is used to raise and lower the fishing seats mounted on the forward and aft casting platforms. This enables you to select the proper seat height for comfort in any fishing situation. Pushing the empty seats all the way down helps provide an unobstructed viewing area around the boat when underway and the lower seats also offer less wind resistance.

To raise the seat, simply lift your weight slightly off the seat while raising the seat actuating (upper) lever simultaneously. To lower the seat, keep your weight on the seat and lift the lever up. The lower lever is used to lock the swivel motion of the seat. These pedestals are constructed to the highest standard of workmanship and will give years of trouble-free service. A minimum amount of care will insure proper operation. Periodically apply a light weight oil (like household “3 and 1” oil) to the power unit piston. Take care not to over stress the pedestal by placing excessive strain on the seat and power unit while it is extended into the full up position. Always lower the seat to the full down position when the boat is underway. We recommend that the seat and pedestal be removed from the front casting deck and remounted into the special base mounted in the front of the deck floor when running. Should your boat not have the additional base, the front fishing seat should be removed and securely placed in the floor of the boat.



Avoid serious or fatal injury due to rotation of seat. Lock swivel when boat is in motion.

If your power pedestal will not remain in position, either up or down, you may need to make a minor adjustment to the air cylinder that causes the pedestal to be raised up and down.

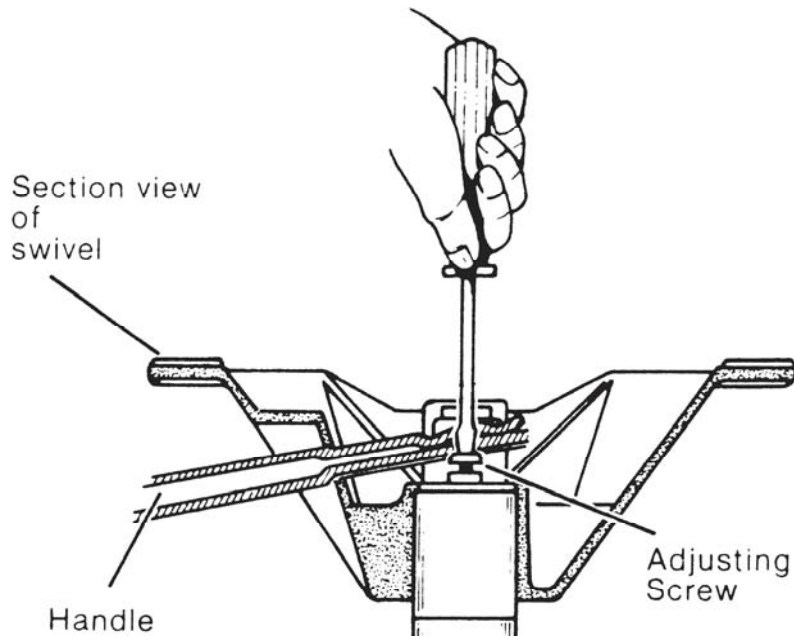


Power unit is under pressure. Do not attempt to disassemble it or tamper with it in any way. Improper handling could result in severe injury or death.

With your chair removed from the pedestal, use a screwdriver to move the adjustment screw as shown in the accompanying diagram.

If your seat will not raise up to the proper height, remove seat and adjust the screw approximately 1/4 (one-quarter) turn in a counter-clockwise direction and try the pedestal again. If your seat will not remain in the upright position, move the adjustment screw approximately 1/4 (one-quarter) turn in a clockwise direction

**Note:** You may need to fine-tune your pedestal by moving the adjustment screw a bit more in one direction or the other.



**FIGURE 6-2 ADJUSTING POWER PEDESTAL**

# INSTRUMENTS AND CONTROLS 7

## HELM INSTRUMENTS

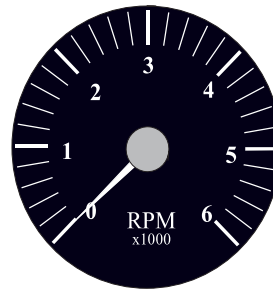
The instruments at the helm tell you what is going on inside the engine. Whenever an engine is running, check the instruments frequently for unusual readings. If a gauge shows a substantial variation from its normal reading, don't take chances. Check for the cause immediately.

When you take delivery, ask your dealer about the normal readings of the gauges. This provides a reference point for the life of the engine. Keep in mind that the reading on some gauges may fluctuate.

**Note:** Your boat may not have all the instruments discussed in this section. The ranges of the gauges may also vary from the readings listed. Condensation in gauges is not covered under warranty.

### Tachometer

The tachometer shows engine rotation speed in revolutions per minute (RPMs) under all engine operating conditions. Engine speed is different from boat speed. Weather conditions, boat load, and other factors determine boat speed at a given engine RPM. Consult with your dealer if you require additional information. Do not exceed engine manufacturer's recommendations for maximum RPM.



TACHOMETER

### Speedometer

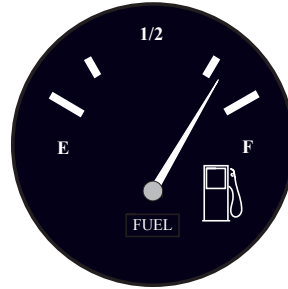
The speedometer measures boat speed in miles per hour (MPH). Boat speed is different from engine speed (RPMs). The accuracy of this instrument depends on the placement and cleanliness of the pickup tube. Some boats may be equipped with a remote pickup tube which may be tilted up for trailering to prevent damage. It may also be tilted up during operation in shallow water to prevent damage or clogging the tube with sand or silt. It should be tilted down while underway.



SPEEDOMETER

### Fuel Gauge

The fuel gauge displays the **approximate** amount of fuel in the fuel tank(s). The most accurate reading of the gauge is at idle speed. While running, the fuel gauge usually reads fuller than the actual level because the bow is higher. Since gauge readings are approximate, it is best to compare them to the hours of use versus known fuel consumption or gallons per hour (gph).

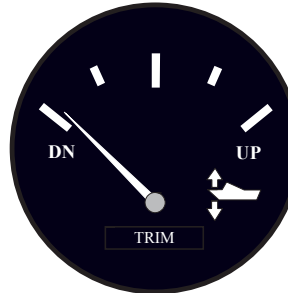


**FUEL GAUGE**

**Note:** A good way to manage the fuel supply is the one-third rule. Use one-third of the fuel to travel to your destination, use one-third to return, and keep one-third in reserve for emergencies.

### Power Trim Gauge

The power trim gauge shows the relative position of the outboard unit. Read the gauge carefully, as it does not show position of unit in the degrees. Proper trim should be indicated by bow attitude and engine RPM. For more information see the engine owner's manual.



**POWER TRIM GAUGE**

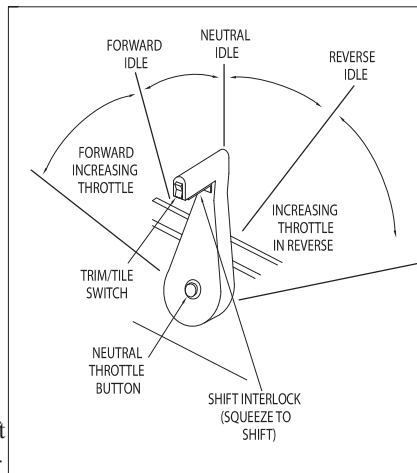
**CAUTION**



DO NOT TRIM ENGINE WITH A SEAT INSTALLED AT THIS LOCATION

### ENGINE THROTTLE/SHIFT CONTROL

The engine owner's manual included with your Owner's Packet has detailed information about the throttle/shift control installed on your boat. The control serves two purposes: (1) it regulates the engine speed and (2) it acts as a gear shift lever to control the rotation of the propeller. When the handle is in the center, the gearshift is in neutral.



**FIGURE 7-1 TYPICAL THROTTLE SHIFT CONTROL**



As you move the handle forward and backward, you should feel the handle drop into a detent when the handle moves into the NEUTRAL position. The engine will not start unless the control is in NEUTRAL. Figure 7-1 shows a typical control.

**IMPORTANT:** Allow the engine to warm up before engaging the shift control. Monitor all instruments while engine is idling during warmup. See the engine manufacturer's specifications for proper operating ranges.

Some controls have an engine warmup button near the base. Pressing the warmup button allows the transmission to remain in neutral while the operator advances the throttle for warming up the engine. Allow the engine to warm up before engaging the shift control.

Moving the throttle forward or backward increases engine speed and increases boat speed if the engine is in either forward or reverse gear. The further the throttle is moved, the faster the engine runs.

The throttle control also acts as the gear shift lever to control forward or astern movement of the boat. Moving the throttle forward from the neutral position engages the shifting mechanism, causing the boat to move forward. Continuing the forward movement of the throttle increases engine RPM and causes the boat to move forward faster.

Moving the throttle backward from the neutral position causes the boat to move backward. Continuing the backward movement increases the engine RPM. Continued aft movement causes the boat to move backward faster. *Rapid acceleration in reverse can cause a wake that could rise above the transom and flood the boat.*

When maneuvering at low speeds, reversing the direction of propeller rotation causes a braking action which helps stop the boat.

**Note:** When reversing direction, hesitate in neutral until engine slows to idle speed, to avoid damage to the shifting mechanism.

Some controls may have a trim control switch which you can use to adjust the position of the outboard. Pressing the switch in the UP position moves the outboard out and away from the transom. Pressing the switch in the DOWN position, moves the outboard in closer to the transom. The switch returns to its center neutral position when released.

## SWITCHES

**Note:** Not all models will have all switches.

### **Bilge Pump**

The two position switch will turn the bilge pump on or off.

### **Power Master**

This switch must be on in order for other switches and equipment to function.

### **Courtesy Lights**

This switch operates illumination lighting for the console and bow panel, and on some models rod locker lighting.

### **Navigation Lights**

This switch operates running lights on bow and stern.

### **Acc.**

This spare switch is provided as a control switch for any aftermarket equipment that may be added to the boat.

### **Horn**

This switch operates the boat's horn.

### **Aerator**

This switch controls the livewell aerator pumping new water into the livewell. The two position switch turns the aerator on or off. The three position switch allows you to run the aerator in the automatic mode (cycles on and off automatically), in addition to full time on or off.

### **Recirc**

This switch activates a pump that will recirculate the water already in the livewell to increase the water's oxygen content. This switch can be used any time there is water in the livewell, even while the boat is on the trailer.

**Note:** All switches should be in the off position when not in use. Bilge and livewell system pumps can be damaged if allowed to run dry.

## FRONT BOW PANEL

**Note:** Not on all models.

The front bow panel on your boat has several switches, which may include out-board tilt switch, navigation lights, and courtesy lights. These switches work in the same manner as in the console and should be turned off while not in use.



**OPERATOR'S CHECKLIST**

Go through this checklist before starting your trip.

- Will the weather be favorable? Did you get a current weather report?
- Is there a suitable operator? Is operator impaired from drug or alcohol use?
- If the boat has been out of the water, have hull drain plugs been installed?
- Are the hull and propeller free of damage, excessive dirt, and marine growth?
- Are electrical system and navigation lights working?
- Is battery fully charged? Are connections clean and tight?
- Have you checked engine compartment for fuel odors?
- Have you checked engine(s) for leaks or signs of deterioration? Are fluid levels OK?
- Have you checked fuel system for odors, leaks, and deterioration?
- Does the steering system work smoothly? Are all components tight?
- Is the bilge pump OK? Have you pumped all water possible out of the bilge?
- Is all required safety equipment on board? Does it work? Is there one PFD for each passenger? Is safety equipment easily accessible?
- Do passengers and crew know what to do in an emergency? Do they know how to use safety equipment?
- Does the horn work?
- Is the lanyard safety switch working?
- Is other needed equipment on board, such as mooring lines, anchor and line, tool kit, first aid kit, etc.?
- Do you have enough fuel for your trip? Fuel tanks should be filled to slightly less than capacity. Allow space for fuel expansion.
- Do you have navigation charts and equipment on board? Are you familiar with area where you will be boating?
- Have you filed a float plan with a responsible party ashore?
- Do you have an emergency supply of food and water?
- Are all required documents on board?
- Are all passengers properly seated?
- Is the boat overloaded or underpowered (compared with capacity plate)?
- Are there any persons or debris near the propeller?
- Are the pedestal seats lowered from the fishing positions and stored so as not to interfere with visibility?

- Are all articles of clothing, fishing tackle, etc. stored and situated so that they will not be blown out of the boat or strike a passenger?
- Is the trolling motor folded up and resting securely on its mounting bracket and secured with the strap or latching mechanism supplied with the trolling motor?

After the boat is in the water and secured to the dock, go through the Skipper's Checklist before starting your cruise.

## FUELING

### WARNING

**Fire and Explosion Hazard!** Gasoline leaking from any part of fuel system can burst into flames or explode, causing death or serious injury. Inspect entire fuel system carefully at regular intervals and after storage. Check all components for leakage, softening, hardening, swelling, or corrosion. Replace any component showing signs of deterioration before starting the engine.

#### GETTING UNDERWAY

Because gasoline fumes are heavier than air, they migrate to the lowest part of the boat. Fumes can accumulate in the bilge and, if conditions are right, in the cockpit. These areas must be thoroughly ventilated before starting an engine.

Although alcohol boosts the octane level of gasoline, it also attacks the rubber fuel distribution lines and even metal fuel system components. Alcohol permeates most fuel hoses and other components such as fuel pump, gaskets, and seals, and can also contribute to fuel system contamination.

The fuel hoses are alcohol-resistant as are the materials used by the engine manufacturers. If only fuel containing alcohol is available, or the presence of alcohol is unknown, you must perform more frequent inspections for leaks and abnormalities. Any sign of leakage or deterioration requires immediate attention. Refer to the engine manufacturer's recommendations on fuel type and octane ratings.

#### Preliminary Steps

- Safely secure the boat to the dock.
- Close all compartment lids to prevent accumulation of fuel vapors.
- Make sure that a fire extinguisher is readily available.

## Pumping Fuel



**Fire and Explosion Hazard!** Do not smoke. Extinguish all open flames. Stop engines. Do not use electrical switches and other devices that could cause a spark or flame. Close all openings. During fueling operations, smoking should be forbidden onboard or anywhere nearby.

**IMPORTANT:** Follow engine manufacturer's recommendations for types of fuel and oil. Use of improper products can damage the engine and void the warranty.

1. Be sure to fuel in a well-lit area. It's hard to see gasoline spills if lighting is poor or in the dark.
2. Open the gas fill cover.
3. The fuel delivery nozzle should be put in contact with the fill pipe before the flow of fuel is begun, and this contact should be maintained continuously until fuel flow has stopped. There is a serious hazard posed by static discharge unless this practice is observed.

## ⚠ WARNING

Overloading and improper distribution of weight are significant causes of accidents. Do not exceed maximum load stated on capacity plate. For safety, carry a lighter load in rough waters. Distribute the load evenly. Keep the load low.

### LOADING PASSENGERS AND GEAR

**Note:** Your capacity label indicates the number of designated occupant positions available on board your Lund boat. See the designated occupant location drawing added to the owner's manual. Always remember to properly and evenly distribute your load (persons and gear) for optimal safety and boat operation.

#### GETTING UNDERWAY

Affixed to your boat is a capacity rating plate showing the boat's maximum load capacity under normal conditions. This plate shows the maximum weight capacity for persons and for gear. The U.S. Coast Guard determines these load capacity ratings. Your boat's capacity plates are also certified by the National Marine Manufacturer's Association (NMMA). Overloading is a violation of Coast Guard regulations!



FIGURE 8-1 CAPACITY PLATE

The capacity plate also states the maximum horsepower engine that can be used on your boat. It is dangerous to exceed the recommended maximum horsepower capacity rating.

**Note:** The operator is responsible for using sound judgment when loading the boat. Turbulent waters and adverse weather conditions reduce the maximum load capacity. Carrying the maximum load stated on the capacity plate can be dangerous.



When you are loading gear, have someone on the dock pass gear aboard instead of stepping into and out of the boat. Secure all gear firmly so it doesn't shift or interfere with boat operation. When boarding, passengers should step into the boat one at a time, not jump. Passengers not helping load gear should be seated during loading to maintain an even trim. Position passengers and gear so that the load is balanced (Figure 8-2). Secure swivel seats above trolling speed. Secure unoccupied seats. Observe warnings on seat pedestals.

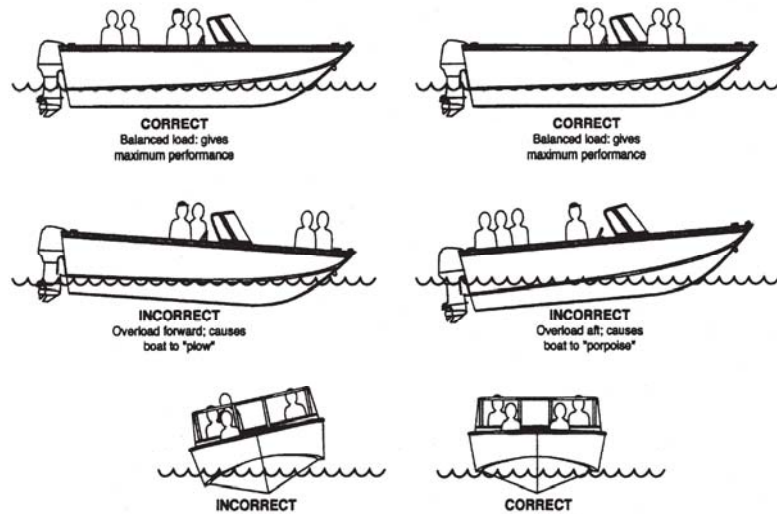


FIGURE 8-2 LOADING PASSENGERS

## STARTING PROCEDURES

**Note:** The engine manual included with your Owner's Packet has detailed starting instructions. The following information is merely a guide and does not explain all starting procedures in detail.

### Preliminary Checks

1. If the boat is not secured to the dock, do so before starting the engine. Keep it secure until the engine is running and warmed up.
2. If the fuel system has a manual fuel valve, open it.
3. Run the bilge pump until the flow of water stops.
4. Make sure the throttle is in the neutral position and trim lower unit into water.

5. Make sure passengers seated in the bow area do not obstruct the operator's vision.

### WARNING

**Fire or Explosion Hazard!** Gasoline vapors are explosive. Check fuel tank compartment for fumes or gasoline leaks before starting engine. Do not start engine if gasoline or fumes are present.

#### Starting Engine

1. Check the engine oil tank for proper level.
2. Pump the fuel primer bulb on the fuel line.
3. Turn the key to start the engine. Engine will not turn over if throttle is not in the neutral position.

**IMPORTANT:** Do not operate starter continuously for more than 15 seconds without pausing. Starter will overheat and can be damaged. Allow at least two minutes between starting attempts so starter has time to cool.

### DANGER

**Carbon Monoxide Hazard!** A cold engine produces more carbon monoxide than a warm engine. Provide adequate ventilation in the cockpit to prevent excessive exposure and reduce the possibility of carbon monoxide accumulation. Open all canvas and side vents to increase air movement.

4. After engine has warmed up, check water temperature gauge (if equipped) to ensure engine temperature stays within proper ranges. If temperature reading is abnormally high, stop engine immediately and inspect for cause of high reading.
5. Check steering operation. Turn steering wheel all the way in both directions, and check that outboard moves freely.
6. With boat moored to the dock and engine idling, check for proper operation of the shifting motion by moving throttle forward, back, and then to neutral. *Leave the engine in gear for only a second or two.*

## MANEUVERING

### WARNING

Boat steering is not self-centering. Engine and propeller torque, wave and current action, and boat speed affect steering. Pay constant attention to steering for safe operation.

When you have finished all pre-departure checks, you are ready to leave the dock. Cast off the lines. Idle speeds work best when maneuvering. Take wind, tide, current, and other forces into account as you maneuver away from the dock. Check for other boats in the area.

**IMPORTANT:** Falls from moving boats are a major cause of fatal recreational boating accidents. Do not allow passengers to ride on the bow with feet hanging over the side or ride while sitting on the stern, gunwales, or seat backs. The Coast Guard considers these acts to be negligent or grossly negligent operation and prohibits them by law.

### Stopping

Practice stopping maneuvers and learn early how the boat reacts. If the boat is moving forward, pull the throttle back to NEUTRAL and let it coast. Depending on speed, the distance the boat will coast until it comes to a complete stop varies. Through experience, you will be able to measure that distance more accurately.

There will be times when you must stop more quickly, but boats don't have a brake pedal. Back down on the throttle and shift into NEUTRAL. The boat will begin to slow down. When the engine is idling, shift into REVERSE and gradually increase engine speed. The boat will stop in a shorter distance.

**Note:** In reverse, a boat does not steer nearly as well as it does when going forward. Don't expect to accomplish tight turning maneuvers when backing up.

### Steering

Boats steer by the stern. (The feeling is much like steering when you are backing up an automobile.) This means that when the boat is moving forward, the stern swings in the direction opposite to the turn. For example, when you turn the helm wheel to port, the stern swings to starboard. This is especially important to keep in mind when docking, operating in close quarters with other boats, or when approaching a swimmer or downed skier in the water.

Once you have spent enough time practicing maneuvers and have a feel for how the boat handles, you are ready to run in open waters.

## HIGH PERFORMANCE BOATS

Your boat may be capable of being operated at very high speeds. It has been equipped and rigged for safe operation, but safe operation requires:

- Driver awareness of how the boat will perform under all operating conditions.
- Driver skill in anticipating and reacting to often rapidly changing boat control conditions.

For the safety of boat occupants, and to prevent damage to the boat, the number of passengers, speed, and manner of boat operation must be adjusted to suit weather conditions. The boat operator is responsible for any acts of negligence or carelessness.

### WARNING

Some models are capable of speeds in excess of 45 mph. Consult your dealer for full performance capabilities of your boat. High Performance Boats should not be operated by inexperienced persons until complete instruction is accomplished under the supervision of a qualified instructor.

The boat operator is responsible for the safety of all boat occupants, and nearby boaters. Passengers should be advised of the possibility of being thrown to the deck or overboard if they are not properly seated while the boat is operated at high speeds. Swivel seats are only to be used at trolling speeds. Lock swivel seats when traveling above trolling speed. Do not operate at high speeds near other boats, pilings, underwater obstructions, people in the water, shorelines, seawalls, or any other obstacles.

When first learning to drive a high performance boat, try to pick a day and time when the waterway is relatively clear of traffic. Driving a high performance boat requires concentration, coordination and an awareness of everything going on around the boat. You'll feel more comfortable learning to operate your boat without a lot of other boats in the same area.

## ACCELERATION

Before bringing the boat "on-plane," check the entire area to make sure you have a clear, safe path. As you throttle up and accelerate, the boat's trim angle changes, causing the bow to ride high (Figure 8-3). This trim angle is sometimes referred to as the "hump." As the boat continues to accelerate, the boat levels out to its planing attitude. A few seconds at full throttle should get the boat over the hump and into its planing attitude; then throttle down to cruising speed. This also improves fuel efficiency.

## ⚠ WARNING

While accelerating, bow rises and may obstruct forward vision. Before accelerating, be sure path is clear. Make sure passengers know you intend to accelerate.

You are responsible for any damage or injury caused by your boat's wake. Observe no wake speed zone warnings. Operate your boat with regard for the safety of other boats and people in your boating area.

**Note:** Visibility, handling, and performance are reduced while accelerating. It's a good idea to get "over the hump" as soon as possible.

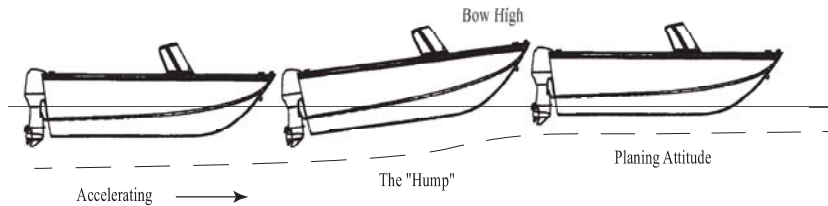


FIGURE 8-3 PLANING

## POWER TRIM OPERATION

The power trim feature on your boat allows you to raise or lower the outboard motor to affect the boat's running angle while underway. While your boat is on-plane, the best performance is obtained when the boat is running at a 3° to 5° angle to the water, with the bow slightly out of the water.

**Note:** The following information is general. Refer to the instructions in the engine manual for more detailed information about the power trim controls.

1. The standard trim control switch is on the control lever handle.
2. The switch controls the position of the outboard. Proper trim is very important in boating. Before you accelerate, the outboard should be down.
3. In the case of low or heavy bow attitude, the boat tends to "plow" (Figure 8-4). The outboard is trimmed too far down (in). Trim the outboard up (out) to correct this situation.

- If the bow is too high, the boat tends to “porpoise” (Figure 8-4) and the bow will bounce up and down on the water. The outboard is trimmed too far up (out). Trim down (in) to correct. The boat is trimmed correctly when it is just short of porpoising. If you are an inexperienced driver or are having difficulty correcting a porpoising condition, reduce your speed until the boat levels off.

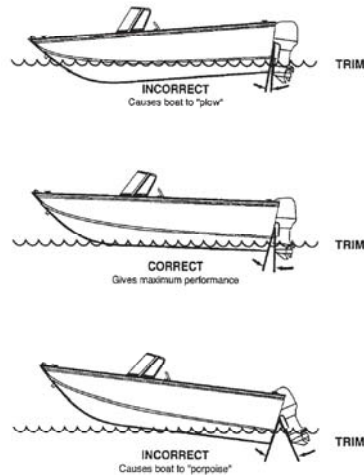


FIGURE 8-4 TRIMMING THE BOAT OUTDRIVE

- A good practice is to get underway with the outboard trimmed all the way in. After the boat is on-plane, trim the outboard up slightly to obtain the proper bow attitude and engine speed.
- The outboard should never be trimmed up to a point where the propeller cavitates (or slips). A rapid increase in engine RPM's is evidence of cavitation. If this occurs accidentally while running at full throttle, immediately trim the outboard down and reduce the throttle until the slipping stops. If necessary, consult your dealer for this problem.

If the prop slips at lower planing speeds, the outboard may be trimmed too far up. Immediately trim the outboard down until the prop “grabs” again to restore efficiency.

- Trimming the outboard up lifts the boat higher in the water. It will travel faster because less hull is in the water.

### WARNING

**Loss of Steering Control!** Improper trim adjustment can result in loss of steering and can cause a serious accident.

## STEERING FORCES

As the motor's propeller turns, it causes a twisting force on the motor about its steering axis. At high speed, the driver must apply a correcting force on the steering wheel when the motor is trimmed up to hold the motor's steering forces. The direction and amount of force on the wheel are affected by the height of the motor, the amount of propeller in water, the propeller type, and direction of propeller rotation.

Before attempting a high speed turn a common safe practice is to trim DOWN slightly.

If your is boat equipped with power steering, the steering forces are controlled by the power steering system.

## ANCHORING

**Note:** This section includes general information about anchoring. It does not address all possible anchoring situations. It is recommended that you attend a safe boating course to learn more about anchoring.

Anchors are available in different shapes, sizes, and weights to fit different boats, uses, and conditions. The boat's size and weight governs the weight of the anchor and diameter of anchor line. Your dealer can tell you which anchor will work best. You need an anchor line at least 6 to 7 times longer than the depth of water anchored in (Figure 8-5). For example, if you anchor in water 20 feet (6 m) deep, use an anchor line 120 to 140 feet (36 to 43 m) long (minimum).

If you are anchoring overnight or for extended periods, use two or more anchors set at 45° to each other. If you don't use two anchors, make certain there is enough space for the boat to swing in a full circle to prevent damage in case of shifting winds.

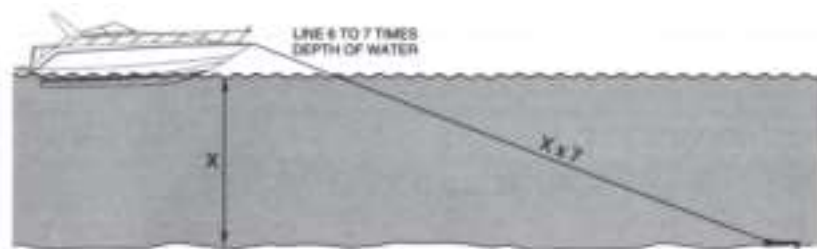


FIGURE 8-5 WEIGHING ANCHOR

**Note:** Keep the anchor secure while underway to prevent damage or injury in case the boat's attitude should shift suddenly.

### **Dropping Anchor**

1. Have a crew member carefully lower the anchor. Keep slight tension on the anchor line while lowering and maintain the tension after reaching the bottom.
2. Maneuver the boat slowly backwards until length of anchor line is 6 or 7 times the depth of the water.

**IMPORTANT:** Secure anchor line only to bow eye or bow cleat. Never tie anchor line to a rail, rail fitting, or other hardware not designed to support this stress. Never anchor using only a stern cleat. Waves could swamp your boat under windy conditions.

3. Fasten the anchor line around the bow eye or bow cleat. Anchor flukes should dig in and catch. Watch for anchor drag by checking shoreline landmarks at the time the anchor is dropped and one-half hour later. If the boat has drifted away from these reference marks, the anchor is dragging and must be reset.

### **Pulling In the Anchor**

The engine should be running when you pull in anchor.

1. Slowly maneuver the boat forward to reduce tension on the line and make retrieval of the anchor line easier.
2. Pull in anchor line until the line is vertical. Pull firmly to lift the anchor's shank and free the flukes from the bottom.

If the anchor becomes stuck, attach the vertical line to the mooring cleat. Wave action on the bow may lift flukes from the bottom and free the anchor. If the anchor is still stuck, feed out a few feet of line and attach it to the bow cleat. Maneuver the boat slowly around the anchor, keeping the line firm. Determine the angle that will work to pull the anchor free.

## **RETURNING TO SHORE**

### **Docking**

Always approach the dock slowly. If possible, come in against the wind or current, whichever is stronger. Approach the dock at a 30-45° angle. As the boat nears the dock, slowly swing parallel to it. Tie the bow line first; then the stern.



**Note:** If wind or current is moving toward the dock, move parallel to the dock further out. Let the wind or current push you in.

Use extreme caution if wind or current is from the stern. Back in toward the dock slowly at a slight angle with engine in slow reverse. Gently swing parallel. Tie stern first, then the bow. If the wind is changeable, place fenders over the side between the boat and the dock.

### Mooring

After you have positioned the boat next to the dock, secure it with mooring lines to keep it in position. Mooring lines must be long enough to secure the boat in any docking situation. For example, the length of the lines for a 16-foot runabout should be at least 15 feet (4.5 m). An eye splice at the end of each line works well with bow or stern cleats (Figure 8-6). If tides are a consideration, be sure to leave slack in the lines to make up for the rise and fall of the water while the boat is docked.



Making fast to a deck cleat



An eye spliced into the end of the line provides a convenient method of making it fast to an open cleat.



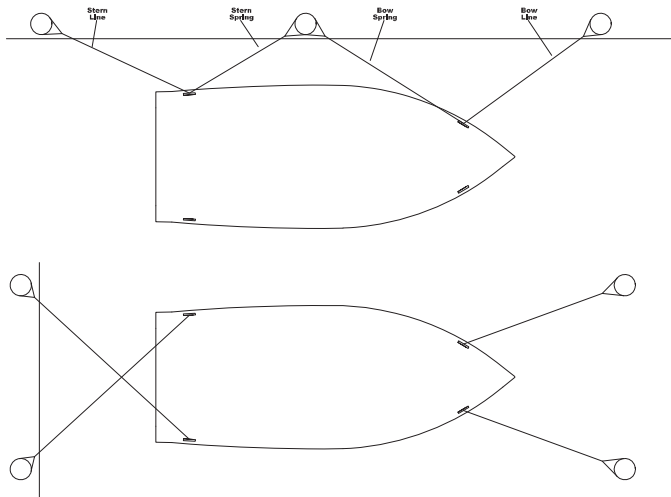
The clove hitch is used for making a line fast temporarily to a pile or bollard.



Making fast to a dock bit

**FIGURE 8-6 MOORING LINE TIES**

The mooring lines you use most often are the bow line, the stern line, and spring lines as shown on Figure 8-7. Each line has a specific purpose. The bow line and the stern line secure the boat's bow and stern. The two spring lines keep the boat from moving forward or backward when you are moored alongside a dock.



## GETTING UNDERWAY

If you are mooring for a short time, bow and stern lines may be the only lines you need. If you are mooring for a longer time, the currents are swift, or the weather looks bad, you should use spring lines. The stern spring line leads from the boat's stern cleat forward to the piling or cleat on the dock. The bow spring line leads from the bow cleat aft to the dock.

If you are mooring in a slip, bow and stern lines, port and starboard, will keep the boat in position.

**Note:** Manila rope, the standard for many years, is not as strong as some ropes made of synthetic materials. For mooring, its ability to stretch is an advantage, but it tends to shrink whenever it gets wet. Nylon rope is strong and elastic. Because of its elasticity, it works well for mooring lines and anchor lines. Rope made of high tensile strength polyester fibers like Dacron™ is just about as strong as nylon rope, but it does not stretch. Kevlar rope is strong and does not stretch, but it is quite expensive. Polypropylene rope tends to deteriorate rapidly when it is exposed to sunlight. Because it floats, it is well-suited for use as a tow rope for water skiing. Use for other nautical purposes is not recommended.

## NAVIGATION LIGHTS

Cruising at night can be very pleasurable, but it can also be dangerous. Be especially careful of shallow waters and watch for submerged debris, rocks, and other obstacles in the water. Navigation lights are intended only to prevent collision, not to improve night vision.

**Note:** It is illegal to use a spotlight as a headlight. Use it only temporarily to check the position of your boat and the surrounding area.

Your boat has one white (stern), one red (port) and one green (starboard) light. The stern light may be a removable pole light. To use the light, line up the two-prong plug in the pole with the receptacle in the base. Plug the light in, and lock it into place with lever/slide lock. When not in use, stow the light inside the boat for safe keeping.

Check lights for proper operation before heading out at night. You should also learn to identify the running light combinations for other vessels. We recommend that you participate in a boating safety course to further learn about navigation lights and safe boating practices.

A three-position switch at the helm controls the anchor lights and the navigation lights. You can use it to turn on just the stern (white) light when anchored or moored or to turn on all navigation lights while underway.

## HAZARDOUS CONDITIONS

### Fog

When warm air is above cooler water, its temperature drops. As the air cools, it loses its ability to hold moisture and fog will develop when the air temperature drops to the dewpoint temperature. Dewpoint temperature depends on the amount of humidity in the air. You should be aware that fog can form quickly as the air temperature drops, especially if the air is calm and humid. Remember the following guidelines:

- Turn on running lights.
- As fog sets in, take bearings and mark your position on the chart while continuing to log course and speed.
- Prompt all persons aboard to put on their PFD (personal flotation device).
- If your boat has depth finding equipment, take soundings to find the depth and match them to the depths shown on your charts.
- Station a person forward on the boat as a lookout.
- Reduce speed. From time to time, stop engine and listen for fog signals.
- Sound the proper horn or fog bell at proper intervals to warn other boaters.
- If there is any doubt in continuing boat movement, anchor. Listen for other fog signals while continuing to sound the proper fog horn or bell for a boat at anchor.

## Storms

Storms sometimes appear without much advance notice. Although information from meteorological observation and reporting stations is available, we all know that weather forecasts aren't always accurate. Many marinas fly weather signals. You should learn to recognize these signals and monitor local weather forecasts before leaving port.

While underway, keep a watch on the horizon for signs of an approaching storm. If there are signs of bad weather, turn the radio on. Dial in a local weather station and monitor the forecast. Use the VHF radio (if provided) to check the weather channels. Everyone aboard should put on a PFD. The best precaution is to return to a safe port if there is time.

If you cannot get back to port, there is no substitute for knowing what to do. Close and secure all portals and hatches. Reduce speed as the seas build. Stow all loose gear below deck and tie down any gear required to remain on deck. Change course to one perpendicular to the storm's path; you may be able to avoid it.

**Note:** Coping with a storm while underway can challenge the best of operators. The information presented in a safe boating course will be very valuable in this situation.

## Running Aground

Operating in shallow water can present a number of hazards. Sand bars in narrow inlets are constantly shifting, making it difficult to mark them with buoys. Sometimes waves form into breakers when they pass over sand bars. In coastal areas, tides can change water levels by as much as 30 feet. Check with local marinas or Coast Guard stations for tide tables and current charts.

If the boat runs aground, first check persons aboard for injury. Then check for damage to the boat. If the outboard strikes an underwater hazard, check for boat and outboard unit damage. If the engine vibrates excessively after striking an underwater obstruction, it may indicate a damaged propeller. If vibration is noticeable, return to port slowly to prevent further outboard damage from an out-of-balance condition. Watch the temperature gauge to make sure you do not overheat the engine.

If the boat is not taking on any water, it may be possible to rock the boat by shifting the weight of the passengers and gear and by raising the outboard unit while reversing the engine.

If you ground the boat on a sand bar, shut down the engine and seek help from another boater or radio for help. See your dealer as soon as possible, as sand ingested in the engine cooling system can cause major engine damage. If you need to be towed, we recommend using a commercial towing service.

## WARNING

Deck cleats may pull free from deck. Towline broken under tension may whip about. To prevent injury, attach towline only to transom or bow towing eye. Stay clear of towline attachment points on towed and towing boats.

### Warning Markers

It is a good idea to find out about hazardous areas and how they are marked by asking local authorities.

- Boaters must also recognize the flag designs which indicate that scuba divers are present and keep well clear of the area.
- Watch for swimmers. Swimming areas may not be marked, so always remain alert.
- Distress flags indicate a fellow boater is in need of assistance.
- Navigation markers serve as a means of identifying navigable routes and indicate water hazards. Boaters should become familiar with navigation markers and stay within marked boundaries and clear of hazards.

### REACTING TO EMERGENCIES

**Note:** In any emergency, the first thing all passengers must do is to put on their PFDs.

#### Flooding

If the boat starts taking on water, start the bilge pump immediately. Open all compartments and look for the cause of the flooding. Check all hoses and through hull fittings. If flooding occurs as a result of collision or grounding damage, call for assistance and head for shore if possible.

#### Capsizing

If the boat capsizes, and others were on board, find them and guide them to the safety of the hull. Even if the boat is floating upside-down, stay with it. Rescuers can spot a boat hull much easier than a human head sticking out of the water. *Do not try to swim ashore; it may be further than it looks.*

## Man Overboard

Think through and follow these procedures if someone in the boat falls overboard.

### WARNING

Rotating propeller may cause serious injury or death - do not approach when engine is running.

- Remember, every second counts, you must act fast.
- Move throttle to idle position immediately and yell “MAN OVERBOARD.”
- Throw a Type IV PFD out to the person immediately. (This is why it should be readily accessible at all times. If it’s not, throw out some other floating object.)
- Keep the person in the water in sight at all times. Make one passenger responsible for watching the person. Do not go into the water to help the victim. One person in the water is enough trouble, and a panicky person in the water can present a drowning hazard to rescuers.
- Circle around quickly, approaching into the wind and waves. When the person is alongside, put the engine in neutral and throw them a Type IV PFD with a line attached or extend a paddle or boat hook within his/her reach.

### Collision

If a serious collision occurs, you should first check the condition of all passengers aboard, then inspect the boat to determine the extent of damage. If the boat or passengers are not in danger, prepare to assist the other vessel. If you need help and the boat has a ship-to-shore radio, first contact the U.S. Coast Guard (VHF Channel 16) or other rescue authorities immediately.

If the bow of the other boat penetrated the boat’s hull, prepare to block the opening once the boats are separated. Shore up the hole with a spare PFD or bunk cushion. While blocking the hole, trim the weight of the boat (where hole exists) so that it is out of the water during repairs.

Be sure to report the accident to the proper authorities.

## Fire

**IMPORTANT:** All persons aboard should know the location and proper operation of the fire extinguishers.

Most fires are caused by electrical problems or careless fueling practices. A fire is a serious emergency. You must work quickly to implement safety procedures. If a fire occurs, immediately stop the engine. If it is small, try to put it out with a fire extinguisher. Do not open fuel tank compartment. This feeds oxygen to the fire and may cause it to flare up.

If the fire gets out of control, execute a distress signal and call for help if equipped with a ship-to-shore radio. All persons aboard should jump overboard and swim a safe distance away from the flames.

Guidelines for fire prevention:

- Use only approved marine cooking and heating systems.
- Open flames demand constant attention.
- Keep flammable materials in approved containers in a vented locker sealed from the interior of the boat.
- Ensure ventilation systems are unobstructed.
- Remove mooring covers before starting engine.
- Check the bilge for fuel leaks.
- Extinguish smoking materials carefully.
- Use special care with flame or high temperatures around urethane foam.
- Check cleaning products for flammability.
- Ventilate when cleaning or painting.
- Disconnect electrical system from its power source before performing maintenance.
- Replace breaker or fuse with one of the same amperage.
- Electrical appliances must be within rated amperage of boat circuits. Observe the boat carefully while the electrical system is being energized.
- Allow only a qualified marine electrician to service the electrical system.

## Medical Emergency

Accidents while boating can happen. Be prepared to handle these emergencies when they happen. Keeping a first aid kit and dry blankets on board can assist during these situations. It is also a good idea to contact the local Red Cross for information and training on first aid and CPR.

### **Propulsion Failure**

Before you call for help regarding an outboard failure, it is a good idea to eliminate the possibility of simple problems. Turn off the engine and check to see that (1) there is fuel in the tank; (2) the engine cooling intakes on the outboard are not clogged; (3) props are clean and free of weeds, netting, etc.; (4) no hoses are leaking; (5) there is oil in the engine; (6) the lanyard stop switch is connected.

Once you have checked out the possibilities listed above and find they are not the problem, call for help giving your position and a detailed description of your boat.

### **Control Failure**

In the unlikely event of a throttle/shift failure, shut down the engine immediately. Carefully check the control connections in the engine compartment to see if they are secure. If not, try to locate the attaching hardware and reassemble. If that is not possible, try to use whatever is available such as paper clips, hair clips, tape, etc., to secure the connections. If a temporary repair is made, return to port at the slowest steerable speed and be prepared to take emergency action should the temporary repair fail also. Have your dealer make repairs before using the boat again.

### **Steering Failure**

If a problem with the steering occurs, shut down the engine immediately. Check the connections to the outboard unit. Some boats have a push/pull cable while others have hydraulic or power steering. With cable connections, check the attaching hardware and tighten it if necessary. If you have hydraulic or power steering, have your dealer check the fluid level of the reservoir. If the steering is not operating properly, do not operate the boat and call for assistance.



# CARING FOR YOUR BOAT 9

Proper care and maintenance preserves the value of your investment. This chapter explains how to keep your boat looking like new as the years go by.

## ⚠ WARNING

**Fire Hazard!** Spontaneous combustion can ignite rags wetted with acetone, cleaning fluids, fuel, or other solvents. Never store wetted rags on board. Dispose of them properly on shore.

Use cleaning agents sparingly. Never discharge cleaning solutions into the waterways. Do not use products containing phosphates, chlorine, solvents, or nonbiodegradable or petroleum based products.

### BATTERY CARE

1. Check level of electrolyte solution and add only distilled water when needed.
2. Keep battery cables tightly connected and corrosion free. (A solution of baking soda and water works to remove corrosion on battery terminals.)
3. Periodic checks at your dock or service station will keep your battery running at top efficiency.
4. Store battery in cool place (but avoid freezing temperatures). All batteries will lose some charge when stored, but the lower the temperature, the less loss of charge.

### BATTERY INSTALLATION SPECIFICATIONS

REFERENCE: Federal Boat and Safety Act No. 183.420  
Dated 1/31/77

The battery must be installed with a boot on positive end and secured in the factory installed retainer hold down system. Battery movement must be restricted to a maximum of 1" in any direction (to all sides and up).

### MAINTENANCE

1. Check battery monthly for proper fluid levels.
2. Remove battery during prolonged boat storage periods.

## FUEL SYSTEM

1. All factory installed fuel systems comply with Industry Standards.
2. During boating season, keep tanks filled to prevent condensation of moisture.
3. Check exterior of your portable tank periodically.
4. **Once a year, have your dealer inspect the complete fuel system for leaks**

## STEERING SYSTEM

 **DANGER**

LEAKING FUEL IS A FIRE AND EXPLOSION HAZARD INSPECT SYSTEM REGULARLY. EXAMINE FUEL TANKS FOR LEAKS AT LEAST ANNUALLY. ALLOW FOR FUEL EXPANSION. DO NOT OVERFILL.

1. Ask dealer to adjust steering.
2. Have your dealer winterize the steering system for storage.
3. At beginning of each boating season, ask your dealer to lubricate the steering system.

## FLOOR COVERING

1. Treat vinyl, and indoor/outdoor marine carpeting, as you would home floor covering.

## ALUMINUM TRIM SURFACE

1. Avoid acid or abrasive cleaners.
2. Occasionally rinse with clear water or mild detergent.
3. Wax for added protection.

## STORAGE COMPARTMENTS

 **DANGER**

Do not store fuel or flammable liquids here. Ventilation has not been provided for explosive vapors.

## **SALT WATER INFORMATION**

LUND'S aluminum hulls are made of high quality 5052 Marine Aluminum recommended for salt-water use by the Aluminum Association. However, care must be taken in both salt water and fresh water to avoid creating electrolytic action. Do not place, brass, bronze or copper fittings in direct contact with the aluminum. A thorough fresh water bath after every use is recommended by Lund and will prolong the life of your boat.

## **GALVANIC CORROSION**

Galvanic corrosion of aluminum boats is due primarily to the electrolytic action between dissimilar metals, such as aluminum and brass. When the two metals are immersed in a conductive fluid (water), an electric current flows and one metal will be corroded. The corrosion is intensified when the metals contact salt water due to the high conductivity of salt water. Unprotected aluminum is very susceptible to galvanic action and the resultant corrosion.

Galvanic action can be hastened by the presence of stray electric currents. Batteries or any other sources of electricity should be disconnected when not in use.

Due to the electrolytic action between dissimilar metals, all fittings and fasteners attached to an aluminum hull should be aluminum or stainless steel. The use of nickel, brass or ferrous fittings and fasteners may result in aluminum corrosion if the fitting or fastener contacts the aluminum. If nickel, brass or ferrous metals must be attached to aluminum, then the surfaces should be insulated with a non-wicking gasket, tape or sealant. Fasteners should be insulated by using nonmetallic sleeves, bushings and washers.

## **REPAINTING ALUMINUM**

### **TOUCH-UP**

1. Contact your LUND dealer for a can of touch-up paint or paint code for your boat. It should be understood that on older boats exposed to sun and weather colors may not match exactly.
2. A few tips: Using graded sand papers, smooth area to be painted; clean area with clearing agent to remove wax, dust, grease, etc. without lifting surrounding paint; treat bare surface with either zinc chromate primer or acid etch wash primer; always use several light coats of paint rather than a single heavy one.

## USE OF ANTI-FOULING PAINTS



Under no circumstances should a copper, lead, arsenic, or mercury based anti-fouling paint be applied, either with or without the use of a primer coat. Consult your dealer and follow paint manufacturer's application instructions. Lund boats cannot be held responsible for chemical reactions resulting from the application of anti-fouling paint products.

To prolong the beauty of your boat, use fresh water to wash salt deposits off bare aluminum trim.

## WINDSHIELDS

### PLEXIGLASS WINDSHIELD

1. Rinse loose dirt from windshield with clear water only.
2. After all abrasive dirt is removed, use mild soapy water.
3. DO NOT wipe dirt from a dry windshield.
4. DO NOT use powdered cleaners with abrasive, or harsh liquids like gasoline, carbon tetrachloride, acetone, and lacquer thinner.
5. Remove minor surface scratches by buffing with plexiglass polish.

### GLASS WINDSHIELD

Safety glass windshields should be cleaned just like automobile windows.

### CANVAS TOPSET

Your topset will give you years of service, if you follow these simple rules.

1. Never roll up TOP when wet.
2. Brush down the TOP occasionally, both inside and out.
3. Vinyl coated tops can be cleaned with detergent and water. In extremely soiled cases on vinyl surfaces, scrub with a solution of ammonia and water, then rinse.
4. Do not allow bug sprays (petroleum products) to come in contact with top or curtains.
5. Remove boot occasionally to air out. We recommend setting up top periodically to dry out.

Many models have a storage area (top hider) for the canvas topset, located in the aft portion of the boat. Be careful when placing topset in the storage area (or removing it) to avoid damaging the boat's interior.

## **STORAGE (See dealer for winterization and storage)**

1. Remove wet gear, and allow to dry before storing.
2. Clean the boat thoroughly inside and out.
3. Drain the lower unit and change the lubricant.
4. Lubricate all control and steering cables.
5. Plexiglass windshield should be washed with mild soapy water. Rinse. Allow to dry. If stored outdoors, boat should be covered against direct sunlight to prevent discoloration.
6. Remove battery, check water level, store in a cool, dry place.
7. Remove portable tanks.
8. Fill gas tanks or drain completely empty. If the tanks are full add a preservative to the fuel.
9. Drain bilge pump and hoses.
10. If boat is covered, provide adequate ventilation to assure evaporation of condensed moisture and the prevention of mildew. If using the transportation and storage top, the supplied poles must be installed to keep the top tight. If the top is not tight, damage can occur during storage or trailering.
11. Repack wheel bearings on trailer.
12. Store with bow up and drain plug removed.



# WINTER LAYUP & STORAGE 10

This section of your owner's manual will assist you in preparing your boat for prolonged storage. When cold weather has arrived, or a change in your boat's usage requires extended storage, we suggest you follow the guidelines contained within this section. For areas that do not require seasonal storage, Lund recommends a thorough annual inspection.

**IMPORTANT:** Consult your engine manual for specific instructions covering winterization of the engine. Your dealer is qualified to perform engine winterization. Do not attempt to winterize the engine yourself without proper knowledge and equipment.

## PRIOR TO STORAGE

1. Clean boat thoroughly.
2. Drain the lower unit and change lubricant.

**IMPORTANT:** In regions where temperatures fall below freezing, all engine plugs must be removed before storing your boat for the winter. Failure to do so will seriously damage the engine. Freeze damage is not covered by the Warranty.

Make sure your boat's engine is slightly bow up during the extended storage period.

## Fuel System

Fill the fuel tank completely, or empty completely. Either method will minimize condensation. You may want to add a gasoline stabilizer solution to the fuel, if the tank is to remain full. Follow the product manufacturer's recommended procedure.

## Engine Lubrication

1. Drain oil when engine is warm. This will ensure complete drainage of oil. If the engine oil contains sludge, use a flushing oil to clean away the residue. Refer to your engine manual.
2. Replace the engine oil filter.
3. Fill the crankcase(s) with the required quantity of recommended engine oil as specified in your engine manual.
4. Start the engine.

5. Pour or spray fogging oil through the carburetor air intake. Continue to pour or spray fogging oil until the engine stops.
6. Clean and lubricate all linkage.
7. Spray the entire exterior surface of the engine with a rust and corrosion inhibitor.
8. Have the engine alignment checked and adjusted by a qualified marine technician.
9. Inspect all gaskets and seals, grease the U-joints, and change gear oil.
10. Remove the propeller. Clean and lubricate the prop shaft and check for damage.

#### **Battery**

1. Remove battery, check water level, and store away from freezing temperatures.

**IMPORTANT:** Battery should be stored in a cool dry place.

2. Clean outside battery case, terminals, and battery clamps with a solution of baking soda and water.

**NOTE:** Do not allow baking soda/water solution to enter the cells.

3. Lightly sand battery posts and clamps with fine grit emery cloth.

### **WARNING**

**WARNING:** To prevent personal injury, wear goggles, rubber gloves and protective apron when working with battery. Battery electrolyte can cause severe eye damage and burns to the skin. In case of spillage, wash area with a solution of baking soda and water.

4. Apply a light coat of petroleum jelly to the cover end of the battery cables.
5. A monthly recharge or continuous trickle charge should be applied to the battery during storage.



## LIVEWELL

1. Remove the drain plug.
2. It is important to remove the water remaining in the hoses and pumps. Use a compressed air hose in all fittings and drain holes to remove all remaining water.

**IMPORTANT:** Failure to remove all water from the livewell system in freezing weather could result in component damage and/or leaks. This damage is not covered by the Warranty.

## WASH DOWN PUMPS

If water is not drained from the system during freezing temperatures, damage is likely to be sustained in the plumbing and in the pump. To prevent damage follow the instructions beneath:

1. Disconnect suction hose from water supply (sea water supply) or if water supply is taken from a tank, drain water storage tank.
2. Open all spray nozzles/taps.
3. Run pump until remaining water is expelled.
4. Disconnect inlet and outlet tubes.
5. Run pump until briefly to confirm that water has been expelled.
6. Spray nozzles/taps shall remain disconnected until temperatures are above freezing.

Never start a frozen pump. Even if it is drained it might contain a small amount that locks the rotor. Make sure fittings are securely connected when returned to service. See Owners Manual for further onstructions.

## STORAGE ON TRAILER

If you are storing the boat on a trailer, make sure that the trailer supports are aligned with the structural members of the hull. Distribute the weight properly. Make sure the boat is well supported across the transom and keel. Loosen all tie-downs to relieve the stress on the hull. Position the bow to allow water to drain via the transom drain. Do not allow rain water to collect inside the boat. Put the rig on blocks or else move the trailer from time to time to prevent flat spots on the tires.

## RECOMMISSIONING THE BOAT AFTER STORAGE

Follow this handy checklist to recommission your craft after storage.

**NOTE:** For detailed information about recommissioning, refer to the engine manual and accessory manuals in the Owner's Packet.

- Inspect the fuel system and all associated equipment for proper connections, corrosion, leaks, or other damage. Always be aware of any odor of fuel vapors.
- Charge the batteries before installing them.
- Inspect all battery wiring. Repair or replace if necessary.
- Attach the battery cables and tighten the cable clamps. After tightening, apply petroleum jelly or marine grade grease on posts and clamps to eliminate air pockets and acid build-up after clamps are tightened.
- Check bilge for signs of nesting animals and clean as necessary.
- Reinstall hull drain plug.
- Clean the bilge area.
- Test the navigational lights and all other lighting on board.
- Inspect all wiring for fraying, wear, loose connections, and other damage.
- Inspect all switches, controls, and other related equipment for proper operation.
- Inspect all safety equipment for proper operation and physical condition.
- Launch the boat and start the engine. It may take a minute of cranking to allow the fuel system to prime. When the engine starts, keep a close watch over the gauge readings and check for leakage and abnormal noises. Keep speeds low until the engine has reached normal operating temperature. If the engine was fogged for winterization, you will see exhaust smoke for a few minutes while the fogging oil is burned off.

# TROUBLE SHOOTING GUIDE 11

BOAT TRAILERS		
Issue	Possible Cause(s)	Possible Solution(s)
Boat not loading evenly onto trailer	A-Trailer backed too far into water B-Unlevel boat ramp C-Trailer backed into water at an angle D-Poor weight distribution causing listing while loading	A-Pull trailer forward B-Back trailer at an angle that offsets unlevel ramp C-Straighten trailer before loading D-Distribute weight as evenly as possible

ELECTRICAL COMPONENTS		
Issue	Possible Cause(s)	Possible Solution(s)
No Power to switches	A-Dead battery B-Master power switch off C-Blown fuse or breaker at battery D-Loose or corroded battery connections	A-Test battery; if battery is good then recharge, if battery is bad then replace battery. B-Turn on master power switch C-Reset circuit breaker or replace fuse D-Disconnect battery terminals, clean and retighten
No power to accessory components	A-Blown fuse for specific component B-Loose or corroded wiring connections	A-Inspect fuses and replace as needed B-Check connections at switch and electric components and service as needed
Transducer not reading properly	A-Transducer not aligned properly B-Improper wiring connections	A-Contact dealer for service or refer to Locater Owner's Manual B-Contact dealer for service or refer to Locater Owner's Manual
LED courtesy flip-lights (Pro V models) will not come on	A-LED Courtesy flip light is in centered/neutral off position	A-Ensure light has been flipped upward or downward to work; center position is off position and light will not come on.

<b>INSTRUMENTATION</b>		
<b>Issue</b>	<b>Possible Cause(s)</b>	<b>Possible Solution(s)</b>
Fuel level varies or is inaccurate	A-Fuel tank geometry contributes to variation	A-For most accurate reading, check gauge when boat is level.
Speedometer not working	A-Speedometer not working due to plugged pickup at engine B--Speedometer not working due to hose disconnected at back of speedometer	A-Inspect pickup at engine and unplug, or refer to engine owner's manual, or contact dealer for service. B-Reconnect speedo hose to back of speedometer using a tie strap to tighten hose onto gauge.
Water is leaking from underside of console	A-The most probable cause is if the speedo hose has become disconnected from the barb on the back of the speedometer.	A-Reconnect speedo hose to back of speedometer using a tie strap to tighten hose onto gauge
<b>BOAT PERFORMANCE</b>		
<b>Issue</b>	<b>Possible Cause(s)</b>	<b>Possible Solution(s)</b>
Boat lists while at rest	A-Improper weight distribution	A-Distribute weight evenly throughout boat cockpit including position of passengers and equipment.
Boat lists while underway	A-Improper weight distribution B-Improper adjustments to transom mounted accessories C-Propeller torque and rotation	A-Distribute weight evenly throughout boat cockpit including position of passengers and equipment. B-Review accessory owner's manuals for installation instructions or contact dealer for service. C-Some listing is normal based on the amount of propeller torque from rotation however if severe, contact dealer for service.

Propeller cavitates	A-Overtrimmed engine B-Incorrect propeller C-Engine mounted too high on transom	A-Lower trim of engine. B-Contact dealer to review propeller choices understanding that SS propellers maintain contact with water better than aluminum. C-Contact dealer for service.
Boat has poor bow lift while underway	A-Not enough engine trim B-Incorrect propeller C-Improper adjustments to transom mounted accessories D-Poor weight distribution E-Improper engine mounting height	A-Trim engine upwards. B-Contact dealer to review propeller choices. C-Review accessory owner's manuals for installation instructions or contact dealer for service. D-Review location of passengers and equipment and determine if more weight can be distributed towards aft of boat or contact dealer for service. E-Contact dealer for service.
Boat porpoises while underway	A-Overtrimmed engine B-Incorrect propeller C-Engine trim tab D-Poor weight distribution E-Improper engine mounting height	A-Lower engine trim angle. B-Contact dealer to review propeller choices. C-If engine is equipped with trim tab, adjust per engine owner's manual. D-Review location of passengers and equipment and determine if more weight can be distributed towards bow of boat or contact dealer for service. E-Contact dealer for service.
Water spray is coming from transom of boat	A-Improper adjustment to transom mounted accessories	A-Review accessory owner's manuals for installation instructions or contact dealer for service.

<b>MECHANICAL CABLE &amp; HYDRAULIC STEERING</b>		
<b>Issue</b>	<b>Possible Cause(s)</b>	<b>Possible Solution(s)</b>
Experiencing steering torque while underway	A-Improper engine trim angle B-Incorrect propeller C-Improper engine mounting height	A-Adjust engine trim angle. B-Contact dealer to review propeller choices. C-Contact dealer for service.

<b>LIVEWELLS</b>		
<b>Issue</b>	<b>Possible Cause(s)</b>	<b>Possible Solution(s)</b>
Water is spilling out the top of livewell lid	A-Spray head volume is greater than overflow drain capacity	A-Spray head volume can be controlled by turning head clockwise to reduce or shut off water volume and counter clockwise to increase volume.
Livewell is not filling	A-Spray head is not open B-Livewell drain plug or overflow standpipe not installed	A-Spray head must be opened by turning counter clockwise. B-Install livewell drain plug or standpipe overflow.

<b>PEDESTALS</b>		
<b>Issue</b>	<b>Possible Cause(s)</b>	<b>Possible Solution(s)</b>
Air ride pedestal does not travel up or down	A-Air pedestal out of adjustment	A-Remove seat from pedestal and adjust screw on top of post counter clockwise until movement is achieved or contact dealer for service.
Air ride pedestal will not hold position	A-Air pedestal out of adjustment	A-Remove seat from pedestal and adjust screw on top of post clockwise until seat holds position or contact dealer for service.

<b>HARDWARE</b>		
<b>Issue</b>	<b>Possible Cause(s)</b>	<b>Possible Solution(s)</b>
Door pull latch is loose or not working properly	A-Set screw has loosened or is out of adjustment B-Plastic nut for assembly has loosened	A-Adjust latch to proper setting and tighten set screw on end of latch. B-Tighten plastic retaining nut on underside of latch to keep latch from turning.





<b>Abaft</b>	Toward the stern.
<b>Abeam</b>	Amidships, at a right angle to the keel.
<b>Aboard</b>	On, in, or into a boat.
<b>ABYC</b>	American Boat and Yacht Council, Inc., the organization that sets voluntary safety and construction standards for small craft in the USA.
<b>Adrift</b>	Without motive power and without anchor or mooring.
<b>Afloat</b>	On the water.
<b>Aft</b>	Describing the after section of a vessel or things to the rear of amidships and near the stern.
<b>Aground</b>	Touching bottom.
<b>Amidships</b>	In the center, the center portion of a vessel.
<b>Anchor</b>	A forging or casting shaped to grip the sea bottom and, by means of a cable or rope, hold a boat in a desired position.
<b>Anchorage</b>	A customary, suitable, and (usually) designated harbor area in which vessels may anchor.
<b>Astern</b>	Toward the stern. An object that is aft of a boat is said to be astern of the boat.
<b>Athwart</b>	Across.
<b>Aweigh</b>	Off the bottom, said of an anchor.
<b>Aye</b>	Yes, while aboard a boat or ship. Means "I understand."
<b>Bail (Bale)</b>	To remove water from a boat by pump or bailer.
<b>Beacon</b>	A post or buoy placed over a shoal or bank to warn vessels. Also a signal mark on land.
<b>Beam</b>	Imaginary line amidships at right angles to keel of vessel. Also vessel's width amidships.
<b>Bearing</b>	The direction or point of the compass in which an object is seen.
<b>Belay</b>	To make fast to a cleat or belaying pin; to cancel an order.
<b>Below</b>	Beneath or under the deck. One goes below when going down into the cabin.
<b>Bend</b>	To fasten by means of a bend or knot.

<b>Berth</b>	A position, as a place to sleep or in which a vessel may be made fast; a margin of safety, as “a wide berth.”
<b>Bilge</b>	The lower internal part of a boat’s hull.
<b>Bollard</b>	A strong post for holding lines fast.
<b>Bow</b>	The forward part or front of the boat.
<b>Breakers</b>	Waves cresting as they reach shallow water, as at or on a beach.
<b>Breakwater</b>	A structure, usually stone or concrete, built to create a harbor or improve an existing one.
<b>Bulkhead</b>	Vertical partition in a boat.
<b>Burdened Vessel</b>	Former term for the vessel which must stay clear of vessels with the right-of-way.
<b>Camber</b>	The arch of a deck sloping downward from the center toward the sides.
<b>Capsize</b>	To turn over.
<b>Cardinal Points</b>	The four main points of a compass; north, east, south, and west.
<b>Ceiling</b>	The inside lining of the hull.
<b>Certificate</b>	Government paper, such as a boat’s license.
<b>Chart</b>	A map of a body of water that contains piloting information.
<b>Chine</b>	The intersection of sides and bottom of a boat.
<b>Cleat</b>	A piece of wood or metal with projecting ends to which lines are made fast.
<b>Clinker</b>	A method of planking in which the lower edge of each strake overlaps the upper edge of the strake next below. (Also called lapstrake.)
<b>Coaming</b>	A raised edge, as around part or all of a cockpit, that prevents seawater from entering the boat.
<b>Coast Guard</b>	The federal marine law enforcement and rescue agency in the US and Canada.
<b>Cockpit</b>	A well or sunken space in the afterdeck of a small boat for the use of the helmsman and crew.
<b>Companionway</b>	A hatch or entrance from deck to cabin.
<b>Compass</b>	The instrument which shows the heading of a vessel.

<b>Cowls</b>	Hooded openings used for ventilation.
<b>Cradle</b>	A frame used to support a vessel on land.
<b>Current</b>	The movement of the water in a horizontal direction.
<b>Deadrise</b>	The rise of the bottom of a midships frame from the keel to the bilge.
<b>Deck</b>	Any permanent covering over a compartment.
<b>Deep-six</b>	To discard or throw overboard.
<b>Depth Sounder</b>	An electronic depth-finding instrument measuring the time a sound wave takes to go from the vessel to the bottom and return, then displaying the result in feet, fathoms, or meters.
<b>Dinghy</b>	A small, open boat.
<b>Displacement Hull</b>	Type of hull that plows through the water even when more power is added.
<b>Dock</b>	An enclosed or nearly enclosed water area; all the port installations; a place where vessels can moor, as a pier, wharf, or floating dock.
<b>Dolphin</b>	A small group of piles in the water generally used for mooring or as a channel marker.
<b>Draft</b>	The depth of the vessel below the water line measured vertically to the lowest part of the hull.
<b>Dunnage</b>	Mats, boughs, pieces of wood, or other loose materials placed under or among goods carried as cargo in the hold of a ship to keep them dry and to prevent their motion and chafing; cushioning or padding used in a shipping container to protect fragile articles against shock and breakage; baggage or personal effects.
<b>Ebb</b>	An outgoing tide.
<b>Estuary</b>	An inlet or arm of the sea.
<b>Fathom</b>	Six feet.
<b>Fenders</b>	Objects placed along the side of the boat to protect the hull from damage.
<b>Flare</b>	The outward spread of the boat's sides from the waterline to the rail at the bow. Also, a pyrotechnic signaling device that can indicate distress.
<b>Fore</b>	Used to distinguish the forward part of a boat or things forward of amidships. It is the opposite of aft or after.

<b>Forward</b>	Toward the bow.
<b>Frame</b>	Ribs of the hull extending from the keel to the highest continuous deck.
<b>Freeboard</b>	The vertical distance measured on a boat's side from the waterline to the gunwale.
<b>Galley</b>	The kitchen area of a boat.
<b>Gimbals</b>	Swivels used to keep equipment level.
<b>Give-Way Vessel</b>	The one which must stay clear of vessels which have the right-of-way.
<b>Grab Rail</b>	A convenient grip on a cabin top or along a companion ladder.
<b>Gunwale</b>	The upper edge of a boat's side. (Pronounced gunnel.)
<b>Harbor</b>	A safe anchorage protected from most storms; may be natural or man-made, with breakwaters and jetties; a place for docking and loading.
<b>Hatch (Lid)</b>	An opening in a boat's deck for persons or cargo to go below.
<b>Head</b>	A marine toilet.
<b>Headway</b>	Forward motion of a vessel through the water.
<b>Helm</b>	The wheel or tiller by which a ship is steered.
<b>Holding Tank</b>	Storage tank for sewage so that it will not be pumped overboard into the water.
<b>Hull</b>	The body of a boat.
<b>Hypothermia</b>	A physical condition where the body loses heat faster than it can produce it.
<b>Inboard</b>	More toward the center of a vessel; inside; a motor fitted inside the boat.
<b>Inland Rules</b>	Rules of the road that apply to vessel operation in harbors and certain rivers, lakes, and inland waterways.
<b>Intracoastal Waterways</b>	(ICWs): bays, rivers, and canals along the coasts (such as Atlantic and Gulf of Mexico coasts) connected so that vessels may travel without going into the open sea.
<b>Jetty</b>	A structure, usually masonry, projecting out from the shore; a jetty may protect a harbor entrance.
<b>Keel</b>	The permanently positioned fore and aft backbone member of a boat's hull.

<b>Knot</b>	To bend a line. Also, a unit of speed equal to one nautical mile (6076.10 feet) an hour.
<b>Launch</b>	(1) To put a vessel into the water; (2) A small open powerboat mainly used for transportation between a vessel and shore.
<b>Lee</b>	The side opposite to that from which the wind blows.
<b>Leeward</b>	Situated on the side turned away from the wind. (Opposite of windward.)
<b>Leeway</b>	The amount a boat is carried sideways by the wind's force or current.
<b>Lid (Hatch)</b>	An opening in a boat's deck for persons or cargo to go below.
<b>Limber Holes</b>	Drainage holes in the bilge timbers of a vessel allowing water to run to a low point for pumping out.
<b>List</b>	(1) A continuous leaning to one side often caused by an imbalance in stowage or a leak into one compartment; (2) A light list is a printed listing of aids to navigation in geographical order or inclining of a vessel toward the side.
<b>LOA</b>	Length overall; the maximum length of a vessel's hull, excluding projecting spars or rudder.
<b>Locker</b>	A storage place, a closet.
<b>Log</b>	A record or diary of a vessel's journey.
<b>Lubber's Line</b>	A mark or permanent line on a compass that shows the course of the boat.
<b>Making Way</b>	Making progress through the water.
<b>Marina</b>	A place, essentially a dock area, where small recreational craft are kept; usually where floats or piers as well as service facilities are available.
<b>MAYDAY</b>	A radio distress call from the French m'aidez (help me); SOS in Morse Code.
<b>Mooring</b>	Commonly the anchor chain, buoy, pennant, etc., by which a boat is permanently anchored in one location.
<b>Motor</b>	A source of mechanical power.
<b>Motorboat</b>	Any watercraft 65 feet or less in length propelled by machinery, whether or not such machinery is the principal source of propulsion.
<b>Navigation</b>	The art of conducting a ship from port to port.

<b>Nautical Mile</b>	6076.12 feet, or 1852 meters, an international standard; the geographical mile, the length of one minute of latitude at the equator, is 6087.20 feet.
<b>Nun Buoy</b>	A conical, red buoy bearing an even number and marking the starboard side of a channel from seaward.
<b>Oar</b>	A long, wooden instrument with a flat blade at one end used for propelling a boat.
<b>Outboard</b>	(1) A propulsion unit for boats attached at the transom; includes motor, drive shaft, and propeller; fuel tank and battery may be integral or installed separately in the boat; (2) Outside or away from a vessel's hull; opposite of inboard.
<b>Outdrive</b>	A propulsion system for boats with an inboard motor operating an exterior drive with drive shaft, gears, and propeller; also called stern drive and inboard/outboard.
<b>Overall Length</b>	The extreme length of a vessel, excluding spars or rigging fittings. See LOA.
<b>Painter</b>	A rope attached to the bow of a boat for making it fast.
<b>PFD</b>	Personal Flotation Device.
<b>Pier</b>	A structure, usually wood or masonry, extending into the water used as a landing place for boats and ships.
<b>Pile</b>	A vertical wooden or concrete pole driven into the bottom; may be a support for a pier or floats; also used for mooring.
<b>Piling</b>	A structure of piles.
<b>Pitch</b>	(1) The up and down movement as the bow and stern rise and fall due to wave action; (2) The theoretical distance advanced by a propeller in one revolution.
<b>Planing Hull</b>	Type of hull that is shaped to lift out of the water at high speed and ride on the surface.
<b>Port</b>	The left side of a boat when you are facing the bow. Also a destination or harbor.
<b>Privileged Vessel</b>	Former term for the vessel with the right-of-way.
<b>Propeller</b>	Wheel or screw mechanism that pushes water aft to propel the boat.
<b>Rigging</b>	The general term for all lines (ropes) of a vessel.
<b>Roll</b>	The sideward motion of a boat caused by wind or waves.

<b>Rules of the Road</b>	The nautical traffic rules for preventing collisions on the water.
<b>Scope</b>	The length of the anchor rope or chain. 6 to 1 scope means that the length of the anchor rope from the boat to the anchor is 6 times the depth of the water.
<b>Scupper</b>	A hole allowing water to run off the deck.
<b>Sea Anchor</b>	A floating canvas cone held open by wire rings with an opening in the smaller end and a rope bridle at the larger end attached to a line leading to the vessel; used in storm conditions to (a) keep the bow of the boat to the wind, and (b) slow downwind drift of the boat.
<b>Seacock</b>	A thru-hull valve; a shutoff on a plumbing or drain pipe between the vessel's interior and the sea.
<b>Slip</b>	(1) A berth for a boat between two piers or floats; (2) The percentage difference between the theoretical and the actual distance that a propeller advances when turning in water under load.
<b>Sole</b>	The cabin or cockpit floor.
<b>Spar Buoy</b>	A channel marker that looks like a tall, slender pole.
<b>Stand-On Vessel</b>	The vessel with the right-of-way.
<b>Starboard</b>	The right side of a boat when you are facing the bow.
<b>Stern</b>	The after end or back of the boat.
<b>Stow</b>	To store items neatly and securely.
<b>Strake</b>	Planks running fore and aft on the outside of a vessel.
<b>Taffrail</b>	The rail around a boat's stern.
<b>Tide</b>	The alternate rise and fall of waters caused by the gravitational attraction of moon or sun.
<b>Topsides</b>	(1) The sides of a vessel above the waterline; (2) On deck as opposed to below deck.
<b>Transom</b>	The transverse planking which forms the after end of a small, square-ended boat. (Outboard motors are usually attached to a transom.)
<b>Trim</b>	To arrange weights in a vessel in such a manner as to obtain desired draft at bow and stern.
<b>Unbend</b>	To cast off or untie.

<b>Underway</b>	Vessel in motion, i.e. when not moored, at anchor, or aground.
<b>USPS</b>	United States Power Squadron, a private membership organization that specializes in boating education and good boating practices.
<b>Vessel</b>	Every kind of watercraft, other than a seaplane on the water, capable of being used as a means of transportation on water.
<b>VHF Radio</b>	A Very High Frequency electronic communications and direction-finding system.
<b>Wake</b>	Moving waves created by vessel motion. Track or path that a boat leaves behind it when moving across the water.
<b>Wash</b>	The loose or broken water left behind a vessel as it moves along; the surging action of waves.
<b>Waterline</b>	The intersection of a vessel's hull and the water's surface; the line separating the bottom paint and the topsides.
<b>Way</b>	Movement of a vessel through the water. Technically it is underway when not at anchor, aground, or made fast to the shore. The common usage is interpreted as progress through the water. Headway when going forward and sternway when going backward.
<b>Well</b>	Area at the rear of a boat where the motor may be located.
<b>Wharf</b>	A structure, parallel to the shore, for docking vessels.
<b>Wheel</b>	(1) The steering wheel; (2) The propeller.
<b>Whistle Signal</b>	A standard communication signal between boats to indicate change of course, danger, or other situations.
<b>Windward</b>	Situated on the side closest to the wind. (Opposite of leeward.)
<b>Yaw</b>	To swing or steer off course as when running with a quartering sea.