



33 Super Sport Owner's Guide

HIN: CDR_____



Carver Boat Corporation

790 Markham Drive
P.O. Box 1010
Pulaski, WI 54162-1010
USA
Phone (920) 822-3214
Fax (920) 822-3213
www.carveryachts.com

Robert VanGrunsven

President

Congratulations and Welcome Aboard!

This Owner's Guide was designed to acquaint you with the safe, proper operation and maintenance of your new boat and its systems. Your first duty as Captain of your new Carver should be to read your Owner's Guide and all manufacturer-supplied operating and maintenance instructions found within your Owner's Information kit.

Be sure to mail in all manufacturer registrations and warranty cards to validate your Carver and OEM warranties. These warranty cards have been assembled and are contained in the OEM information packets within your Owner's Information kit.

If you're new to boating, learn the proper rules of seamanship to ensure the safety of your passengers. Refer to Chapman's Piloting, Seamanship and Small Boat Handling and attend a safe boating class offered by the U.S. Coast Guard Auxiliary, United States Power Squadron, or any enterprise experienced in conducting safe boating courses.

Thank you for choosing Carver. We're confident your new boat will provide you and your family with years of enjoyable cruising.

Preface	i
Using Your Owner's Information Kit	i
Owner's Guide	i
OEM Information	ii
Pre-Delivery Service Record	ii
Warranty Registration	iii
Boating Safety	1.0
Safe Operation	1.1
Adverse Conditions	1.2
Weather	1.2.1
Fog	1.2.2
Emergency Procedures	1.3
Fire	1.3.1
Flooding	1.3.2
Swamped or Capsized Boat	1.3.3
Collision	1.3.4
Running Aground	1.3.5
Man Overboard	1.3.6
Medical Emergency	1.3.7
Equipment Failure	1.3.8
Radio Communication	1.3.9
Distress Signals	1.3.10
Safety Equipment	1.4
Personal Flotation Devices (PFDs)	1.4.1
Visual Distress Signals	1.4.2
Sound Signaling Device	1.4.3
Running and Navigational Lights	1.4.4
Radar Reflectors	1.4.5
Fire Extinguishers	1.4.6
Recommended Equipment	1.4.7
Owner's Responsibilities	1.5
Safe Boating Courses	1.5.1
Rules of the Road	1.5.2
Documentation	1.5.3
Drugs and Alcohol	1.5.4
Distress Calls	1.5.5
Voluntary Inspections	1.5.6
Boating Accidents	1.5.7

Boating Regulations	1.5.8
Garbage	1.5.8.1
Oil	1.5.8.2
Septic Waste	1.5.8.3
State and Local Ordinances	1.5.8.4
Pre-Departure Actions	1.5.9
Carbon Monoxide (CO) Warnings	1.6
Preventing CO Exposure	1.6.1
Identifying CO Exposure	1.6.2
Treating CO Exposure	1.6.3
Warning Labels.....	1.7
DC Electrical System	2.0
Batteries	2.1
Engine Batteries	2.1.1
“House” Battery	2.1.2
Generator Battery	2.1.3
Monitoring Battery Voltage Levels	2.1.4
Charging the Batteries	2.1.5
Engine/“House” Battery Charger	2.1.5.1
Generator Battery Charger	2.1.5.2
Operating the 12-Volt Equipment	2.2
Safety Breaker Panel	2.2.1
Stereo Memory	2.2.1.1
High Water	2.2.1.2
SeaKey®	2.2.1.3
Shower Sump	2.2.1.4
Accessory Main	2.2.1.5
CO Detector	2.2.1.6
Auto Bilge Pump - 1, 2	2.2.1.7
Main - One	2.2.1.8
Main - Two	2.2.1.9
Windlass	2.2.1.10
DC Control Center	2.2.2
Bilge Blower	2.2.2.1
Generator	2.2.2.2
Main	2.2.2.3
Panel Lights	2.2.2.4
Navigation / Anchor Lights	2.2.2.5
Spotlight	2.2.2.6
Salon Lights	2.2.2.7
Forward Lights	2.2.2.8

Exterior Lights	2.2.2.9
Bilge Blower (1 - 2)	2.2.2.10
Forward TV	2.2.2.11
DVD Player Aft.....	2.2.2.12
Water Pump	2.2.2.13
Waste Pump.....	2.2.2.14
Washdown Pump	2.2.2.15
Fuel Transfer Pump	2.2.2.16
Trim Tabs	2.2.2.17
Bridge Accessory	2.2.2.18
Salon Accessory	2.2.2.19
Horn	2.2.2.20
Wipers	2.2.2.21
Refrigerator	2.2.2.22
Stereo	2.2.2.23
Electric Head	2.2.2.24
Spare	2.2.2.25
Bridge Breaker Panel	2.2.3
Bridge VHF Radio.....	2.2.3.1
GPS/Plotter	2.2.3.2
Radar	2.2.3.3
Depth Sounder.....	2.2.3.4
Auto Pilot	2.2.3.5
Battery Maintenance	2.3
Troubleshooting the DC Electrical System	2.4
DC Schematic	2.5
AC Electrical System	3.0
System Organization	3.1
Wiring System	3.1.1
AC Power Sources.....	3.2
Shore Power	3.2.1
Generator Power	3.2.2
Operating AC Equipment.....	3.3
AC Main Circuit Breaker Groups	3.3.1
AC Control Center	3.3.2
Shore #1 and #2 Voltmeters	3.3.2.1
Shore #1 and #2 Polarity Indicators.....	3.3.2.2
Shore #1 and #2 Ammeters	3.3.2.3
Shore #1 and #2 Main	3.3.2.4
Receptacles One	3.3.2.5

Receptacles Two	3.3.2.6
Receptacles Galley	3.3.2.7
Range	3.3.2.8
Water Heater	3.3.2.9
Microwave	3.3.2.10
Battery Charger 1	3.3.2.11
Battery Charger 2	3.3.2.12
Icemaker	3.3.2.13
A/C Unit	3.3.2.14
Spare	3.3.2.15
Ground Fault Circuit Interrupters	3.4
GFCI Receptacle Locations	3.4.1
Testing GFCI Receptacles	3.4.2
Electrical Loads	3.5
Bonding System	3.6
Troubleshooting the AC Electrical System	3.7
AC Schematic	3.8
Internal Systems	4.0
Air Conditioning System	4.1
Producing Heat	4.1.1
Powering the Air Conditioning	4.1.2
Fresh Water System	4.2
Filling the Water Tank	4.2.1
Pressurizing and Priming the Water System	4.2.2
Using the Water System	4.2.3
Water Heater	4.2.3.1
Shower and Sinks	4.2.3.2
Cockpit Hand Shower	4.2.3.3
Fresh Water Washdown	4.2.3.4
Shore Water	4.2.4
Raw Water Washdown	4.3
Bilge System	4.4
Bilge Pump Operation	4.4.1
Automatic Operation	4.4.1.1
Manual Operation	4.4.1.2
Hull Drain	4.4.2
Sanitation System	4.5
Toilet	4.5.1

Emptying the Waste Tank	4.5.2
Dockside Discharge	4.5.2.1
Overboard Discharge	4.5.2.2
Grey Water Holding System	4.6
Dockside Discharge	4.6.1
Overboard Discharge	4.6.2
Propulsion	5.0
Fuel Systems	5.1
Gasoline Fuel Systems	5.1.1
Diesel Fuel Systems	5.1.2
Fuel Transfer Pump	5.1.2.1
Fuel Tanks	5.1.3
Fuel Tank Vents	5.1.4
Fuel Shut-Off Valves	5.1.5
Engine Room Ventilation	5.2
Cooling System	5.3
Exhaust System	5.4
Fire Suppression System	5.5
Engine Gauges	5.6
Tachometer	5.6.1
Temperature Gauge	5.6.2
Oil Pressure Gauge	5.6.3
Voltmeters	5.6.4
Fuel Gauges	5.6.5
Gauge Maintenance	5.6.6
Helm Controls	5.7
Shift/Throttle Levers	5.7.1
Control Cables	5.7.1.1
Steering	5.7.2
Preparing for Cruising	5.8
Fueling	5.8.1
Pre-Start Checklist	5.8.2
Starting the Engines	5.8.3
After the Engines Have Started	5.8.4
Operating and Maneuvering	6.0
Launching the Boat	6.1

Navigation	6.2
Charts	6.2.1
Compass	6.2.2
Horn	6.2.3
Depth Sounder	6.2.4
Shallow Water Operation	6.2.5
Controlling the Boat	6.3
Loading	6.3.1
Casting Off and Docking	6.3.2
Leaving a Pier or Mooring	6.3.2.1
Landing at a Pier	6.3.2.2
Picking Up a Mooring	6.3.2.3
Maneuvering	6.3.3
Maneuvering Astern	6.3.3.1
Checking Headway	6.3.3.2
Close Quarters Turns	6.3.3.3
Towing	6.3.4
Anchoring	6.4
Stern Anchors	6.4.1
Mooring Lines	6.4.2
Getting Underway	6.5
Shakedown Cruise	6.5.1
Operating at Planing Speed	6.5.2
Trim Tabs	6.5.3
Maintenance	7.0
Maintenance Schedule	7.1
Type A Maintenance	7.1.1
Type B Maintenance	7.1.2
Type C Maintenance	7.1.3
Type D Maintenance	7.1.4
Maintenance Log	7.1.5
Exterior Maintenance	7.2
Fiberglass Surfaces	7.2.1
Gelcoat Repair	7.2.1.1
Gelcoat Blisters	7.2.1.2
Hull Bottom	7.2.2
Underwater Metal Components	7.2.3
Caulking and Sealants	7.2.4
Stainless Steel Rails and Hardware	7.2.5
Decorative Striping Tape	7.2.6
Hatches and Windows	7.2.7

Exterior Vinyl Upholstery	7.2.8
Exterior Carpet	7.2.9
Canvas	7.2.10
White Vinyl	7.2.10.1
Sunbrella	7.2.10.2
Deck Enclosure Windows	7.2.10.3
Interior Maintenance	7.3
Woodwork	7.3.1
High Pressure Laminate	7.3.2
Fabrics	7.3.3
Carpet	7.3.4
Interior Fiberglass	7.3.5
Plexiglass	7.3.6
Mechanical Systems	7.4
Engines / Generator	7.4.1
Thru-Hull Valves	7.4.2
Propeller Shaft Seals	7.4.3
Props	7.4.4
Struts	7.4.5
DC Electrical System	7.4.6
Fresh Water System	7.4.7
Shower	7.4.7.1
Water Taps	7.4.7.2
Sump	7.4.7.3
Pressure Water Pump	7.4.7.4
Water Tank Vent Screen	7.4.7.5
Bilge System	7.4.8
Sanitation System	7.4.9
Winterization and Storage	8.0
Lifting	8.1
Blocking	8.2
Winterization	8.3
Engines	8.3.1
Generator	8.3.2
Air Conditioning System	8.3.3
Fresh Water System	8.3.4
Draining the System	8.3.4.1
Winterizing the System	8.3.4.2
Preparing the System for Use Again	8.3.4.3
Raw Water Washdown	8.3.5
Bilge	8.3.6

Sanitation System	8.3.7
Standard Sanitation System	8.3.7.1
Overboard Discharge System	8.3.7.2
Grey Water Holding System	8.3.8
Standard Grey Water Tank System	8.3.8.1
Overboard Discharge System	8.3.8.2
Exterior	8.3.9
Interior	8.3.10
Storage	8.4
Dry Storage	8.4.1
Wet Storage	8.4.2
Spring Recommissioning Checklist	8.5
Hull	8.5.1
Deck and Cabin	8.5.2
Engines	8.5.3
Electrical System	8.5.4
Plumbing	8.5.5
Safety Equipment	8.5.6
After Launch	8.5.7
Warranty and Parts	9.0
Warranty Information	9.1
Carver Dealer's Responsibilities	9.1.1
Warranty Information	9.1.1.1
Pre-Delivery Service Procedure	9.1.1.2
Boat and Systems Review	9.1.1.3
Owner's Responsibilities	9.1.2
Pre-Delivery Service Record	9.1.2.1
OEM Components	9.1.2.2
Delivery	9.1.2.3
Owner's Information Kit	9.1.2.4
Obtaining Warranty Service	9.2
Second and Third Owner Registration	9.3
Hull Identification Number	9.4
OEMs	9.5
Specifications	9.6
Component Locations	9.7
Hatches	9.7.1
Deck Plates	9.7.2
Thru-Hull Fittings	9.7.3

Engine Room	9.7.4
Bill of Material	9.8
Carver Limited Warranty	9.9

Using Your Owner's Information Kit

Your Owner's Information kit contains this Owner's Guide and a set of manuals referred to as "OEM information." Please read the Owner's Guide and OEM information carefully and familiarize yourself with your boat before operating the boat or any of its components or systems.

IMPORTANT: *The Owner's Information kit must be onboard whenever your boat is operated. If you sell your boat, make sure the new owner receives the entire kit.*

Owner's Guide

This guide explains how to safely operate and maintain your boat and its various systems. The guide also contains safety precautions and operational tips, as described below.



DANGER

Describes a hazard that can cause death or severe injury if the instructions are ignored.



WARNING

Describes a hazard that can cause serious injury and/or property damage if the instructions are ignored.



CAUTION

Describes a hazard that can cause damage to your boat or its components if the instructions are ignored.

NOTE: *Provides important information that can help you avoid problems.*

A TIP FROM CARVER!

There are many people within the Carver organization who are avid boaters. Some of the experience gained during our years of boating are presented in this Owner's Guide. This information is presented in the left margin and is entitled "A TIP FROM CARVER."

If this is your first boat, or if you are changing to a type of boat you are not familiar with, for your own comfort and safety, please obtain handling and operation experience before operating the boat. Your dealer or national sailing federation or yacht club can advise you of local sea schools or competent instructors.

NOTE: *Drawings and illustrations contained within this guide are included as graphic aids to assist in the general operation and maintenance of your boat. These drawings and graphics do not include all details of each system and are not drawn to scale. Do not reference these drawings to order parts or to service your boat. Contact your authorized Carver Dealer for any parts or service required for your boat.*

The information contained in this Owner's Guide was complete and accurate at the time the guide was printed. Carver reserves the right to change materials, part numbers, specifications, or system designs at any time without notice.

OEM Information

The OEM (Original Equipment Manufacturer) information is supplied by companies from whom Carver has purchased components to install in your boat. These components include, but are not limited to, standard items like the engines, sanitation system, various pumps, and 12-volt batteries, as well as optional items like the air conditioning system and navigation systems. The OEM information explains how to operate and maintain the components.

If you install an aftermarket accessory on your boat, add the OEM information that accompanies the accessory to the Owner's Information kit.

NOTE: *If the OEM information conflicts with this Owner's Guide, follow the instructions in the OEM information.*

Pre-Delivery Service Record

The Pre-Delivery Service Record that follows this page must be completed and signed by your Carver Dealer before you take delivery of your new Carver yacht. Your Carver Dealer will prepare your boat for delivery in accordance with the procedures detailed within this document.

Be certain that the boat's Pre-Delivery Service Record and all OEM warranty cards have been completed and mailed to their respective companies. Be sure you retain a copy of the Pre-Delivery Service Record for your own reference.

Warranty Registration

Carver warrants every boat we manufacture as explained in the Carver Limited Warranty. Your copy of the warranty is located in **Section 9**. Please review the warranty carefully.

The Warranty Registration that follows this page is the first step in activating your Carver limited warranty. This document must be completed and signed by you and your Carver Dealer before you take delivery of your new Carver yacht. Failure to complete and register this Warranty Registration could void your Carver limited warranty.

Your Carver Dealer will review the terms of the Carver warranty and make certain the warranty is registered with Carver.

To ensure that the warranty remains in effect during its lifetime, Carver Boat Corporation, your Carver Dealer, and you must each uphold specific responsibilities. These responsibilities are described in **Section 9**.

At time of delivery, make a complete inspection of the boat and its systems. Document any work that needs to be completed by the Dealer in order to meet the terms of your agreement.

There are two cards located at the end of this Preface. These are Second and Third Owner Registration Cards. We strongly recommend that the purchaser of a previously-owned Carver register ownership with Carver.



THIRD OWNER REGISTRATION

Owner's Name: _____

Street Address: _____

City: _____ State: _____ Zip Code: _____

Telephone: (____) _____ Date of Purchase: _____

Purchased From: _____

Boat Hull Identification Number: _____ CDR _____

Third Owner Registration does not extend, alter, or transfer the Carver Limited Warranty. Refer to the Carver Limited Warranty for details.



SECOND OWNER REGISTRATION

Owner's Name: _____

Street Address: _____

City: _____ State: _____ Zip Code: _____

Telephone: (____) _____ Date of Purchase: _____

Purchased From: _____

Boat Hull Identification Number: _____ CDR _____

Second Owner Registration does not extend, alter, or transfer the Carver Limited Warranty. Refer to the Carver Limited Warranty for details.

**CARVER BOAT CORPORATION
P O BOX 1010
PULASKI WI 54162-1010**

**CARVER BOAT CORPORATION
P O BOX 1010
PULASKI WI 54162-1010**

1.0 Boating Safety

Boating safety is your responsibility. You must fully understand the operating procedures and safety precautions in the Owner's Information kit and this owner's guide **before** you operate your new boat. **Safe boating is no accident.**

1.1 Safe Operation

Safe operation includes, but is not limited to, the following.

- Keep your boat and equipment in safe operating condition. Inspect the hull, engines, safety equipment, and all boating gear regularly.

NOTE: *Federal law requires you to provide and maintain safety equipment on your boat. Consult U.S. Coast Guard, state, and local regulations to ensure your boat has all required safety equipment onboard. Additional equipment may be recommended for your safety and that of your passengers. Make yourself aware of its availability and use.*

- Be very careful when fueling your boat. Be sure you know the capacity of your boat's fuel tank and the amount of fuel used when operating at frequently used engine speeds (RPMs). Refer to **9.6 Specifications** for the fuel tank capacity. Refer to **5.8.1 Fueling** for information on fueling your boat.
- Make sure you have enough fuel onboard for anticipated cruising requirements. In general, use 1/3 of your supply to reach your destination and use 1/3 to return. Keep 1/3 in reserve for changes in your plans due to weather or other circumstances.
- Be sure fire extinguishing and lifesaving equipment is onboard. This equipment must meet regulatory standards, and it should be noticeable, accessible and in proper operating condition. Your passengers should know where this equipment is and how to use it.
- Keep an eye on the weather. Be aware of possible changing conditions by checking local weather reports before your departure. Monitor strong winds and electrical storms.
- Always keep accurate, updated charts of the area you are cruising. Back up charts if you use a chart plotter.
- Before you leave the port or harbor, file a Float Plan with a family member, relative, friend, or other responsible person ashore.
- Always operate your boat with care, courtesy and common sense.

- Instruct at least one passenger onboard in the basic operation of your boat. This person can take over if you unexpectedly become unable to do so.
- Do not allow passengers to ride on parts of your boat other than designated seating areas.
- Ask all passengers to remain seated while the boat is in motion.
- Do not use the boarding platform or boarding ladder while either or both of the engines are running.
- Understand and obey the “Rules of the Road.” Always maintain complete control of your boat.
- Do not overload or improperly load your boat.
- Do not travel faster than conditions warrant or beyond your abilities.
- Do not operate your boat in weather or sea conditions beyond your skill and experience.
- Do not operate your boat while under the influence of drugs and/or alcohol.
- Do not operate your boat if your visibility is impaired.

1.2 Adverse Conditions

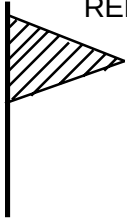
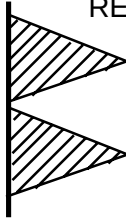
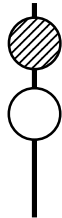
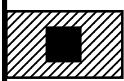
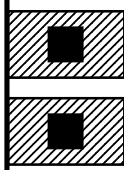
1.2.1 Weather

At all times, the boat operator should be aware of present weather conditions and the weather forecast. Check the forecast before you begin a day of boating. Be aware, however, that weather conditions can change rapidly. If you have a marine radio, listen to the weather reports issued by the U.S. Coast Guard and others. If you have a portable radio, keep it tuned to a station broadcasting frequent weather reports. Many boating clubs fly weather signals; learn to recognize these signals.

Storms rarely appear without advance notice. If storms are a possibility, keep a watch on the horizon, especially to the West, for their approach. Watch for changes in wind direction or cloud formations. There is no substitute for a good understanding of weather conditions and what to do when the weather takes a turn for the worse.

If a storm is approaching, the best course of action is to return to port. If you are unable to do so, then prepare to weather the storm:

WEATHER SIGNALS

Day Flags	Small Craft Adv Winds to 38 mph RED 	Gale Warning Winds to 54 mph RED 
	Night Lights  RED WHITE	Night Lights  WHITE RED
Day Flags	Storm Warning Winds to 72 mph BLACK on RED 	Hurricane Winds to 54 mph BLACK on RED 
	Night Lights  RED RED	Night Lights  RED WHITE RED

- Close portlights, exterior doors and hatches and secure them. Stow all loose gear below deck and tie down any gear on deck.
- Reduce speed as the seas build. Make sure all persons onboard have put on their personal flotation devices.
- Drop a sea anchor over the stern to maintain the bow into the seas. If you do not have a sea anchor onboard, use a canvas bucket, tackle box, or other object that will work like an anchor.

1.2.2 Fog

Fog is a result of either warm-surface or cold-surface conditions. You can judge the likelihood of fog formation by periodically measuring the air temperature and dew point temperature. If the difference between these two temperatures is small, fog is likely to develop.

Remember the following guidelines:

- Unless your boat is well equipped with charts and navigational equipment, head for shore at the first sign of fog and wait until conditions improve. If you have charts on board, take bearings as fog sets in, mark your position, and continue to log your course and speed.
- Make sure all persons onboard put on their personal flotation devices.
- If your boat has sounding equipment, take soundings regularly and match them with depths shown on your charts.
- Station a person forward in the boat as a lookout.
- Reduce your speed. From time to time, stop engines and listen for other fog signals.
- Sound the horn or fog bell intermittently to warn others.
- If there is any doubt in continuing your excursion, anchor. Listen for other fog signals while continuing to sound your fog horn or bell.

1.3 Emergency Procedures

The following is not an exhaustive list of situations which may be encountered while boating. You should obtain training to handle any emergencies which may arise.

1.3.1 Fire



DANGER

Any fire onboard your boat is serious. Explosion is possible. Develop a fire response plan. Respond immediately.

To help prevent a fire onboard your boat, keep your bilges clean and check for fuel vapors at regular intervals. Also, DO NOT fit free-hanging curtains or other fabrics in the vicinity of or above the stove top or other high-heat devices. Do not store any materials or equipment of any kind in the engine room.

Every boater should develop a fire response plan to determine what kind of fire (fuel, electrical, etc.) might break out, where it might break out, and the best way to react. Have a plan and, if possible, assign responsibilities to others to allow quicker decisions and reactions.



WARNING

Never:

- **Obstruct passage ways to exits and hatches.**
- **Obstruct safety controls, such as fuel valves and electrical system switches.**
- **Obstruct portable fire extinguishers in lockers.**
- **Leave the boat unattended when cooking or heating appliances are in use.**
- **Use gas lights in the boat.**
- **Modify any of the boat's systems (especially electrical or fuel).**
- **Fill the fuel tanks when machinery is running or when cooking or heating appliances are in use.**
- **Smoke while handling fuel.**

NOTE: *Everyone onboard should know where fire extinguishers are and how to operate them.*

In case of fire:

- Stop the engines **immediately**.
- If the fire is in the engine room, shut off the bilge blowers **immediately**. **Do not open the hatch to the engine room.** The fire will flare up if the fresh air supply increases suddenly.
- Keep the fire downwind if possible. If the fire is aft, head into the wind.
- Have all persons onboard put on their personal flotation devices.
- If you can get at the fire, aim the fire extinguisher at the base of the flames and use a sweeping motion to put out the fire.
- If the fire gets out of control, make a distress signal and call for help on the radio.

Deciding whether to stay with the boat or abandon ship will be difficult. If the decision is to abandon ship, all persons onboard should jump overboard and swim a safe distance away from the burning boat.

**WARNING**

Smoking, poor maintenance or carelessness when refueling can cause hazardous conditions. Always follow proper refueling procedures for your boat.

1.3.2 Flooding

If your boat is taking on water from a leak in the hull, turn on your bilge pumps. Assign someone to bail out the bilge and investigate the cause of the flooding. When the source of the leak is found, attempt to repair it.

Almost anything can be stuffed into a hole to stop the leaking temporarily. Material used to stop a leak will work better if it is applied from the outside where water pressure can help hold it in. If necessary, station a crew member to hold the plug in place if the plug is applied from the inside. In all cases, station a crew member or passenger to watch the plugged area and alert others if it fails.

1.3.3 Swamped or Capsized Boat

If your boat becomes swamped or capsizes, put on a personal flotation device immediately and set off a distress signal. Chances are good a capsized boat will stay afloat. For this reason, stay with the boat. Do not leave the boat or try to swim to shore except under extreme conditions. A capsized boat is easier to see than a swimmer, and the shore may be further away than it appears.

If water is coming over the bow, reduce headway and turn the boat slightly so that the bow is slightly off from meeting the waves head on. Drop a sea anchor over the stern of the boat and adjust the length of the line to hold the bow at the most favorable angle.

1.3.4 Collision

If a serious collision occurs, check everyone onboard for injuries, then inspect the boat to determine the extent of the damage.

- Prepare to help the other craft unless your boat or its passengers are in danger.
- If the bow of the other craft penetrated your boat's hull, prepare to plug the fracture once the boats are separated.
- Shore up the hole inside your boat with a spare life jacket or bunk cushion.
- While plugging the hole, trim weight to get the hole above the water level during repairs, if possible.

- If your boat is in danger of sinking, have everyone onboard put on their personal flotation devices.
- If your boat has a radio, contact the U.S. Coast Guard or other rescue authorities immediately on VHF channel 16 or CB radio channel 22. (You may also be able to use VHF channels 9 or 13 or your cellular phone in some states).

1.3.5 Running Aground

Excessive weight in the fore or aft sections of the boat will cause a trim change and may yield greater draft than expected. Equip your boat with a good quality depth-measuring instrument and allow ample water below the hull while operating.

If your boat runs aground, check everyone onboard for injuries, then inspect the boat for damage. If lightly grounded, shift the weight of the passengers or gear to heel the boat while reversing engines. If towing becomes necessary, use a commercial towing service.



WARNING

Never attach a tow line to a deck cleat or anchor windlass. The cleats and windlass are not designed to take the full load of the boat and may pull free from the deck, causing serious injury or property damage.

1.3.6 Man Overboard

You should know what to do in case someone falls overboard. Emergency procedures are published in *Chapman's* and instruction is offered by the U.S. Coast Guard.

WATER SURVIVAL CHART

Water Temp. (°F)	Exhaustion/ Unconsciousness	Expected Time of Survival
32.5	Under 15 min.	Under 45 min.
32.5-40	15-30 min.	30-90 min.
40-50	30-60 min.	1-3 hr.
50-60	1-2 hr.	1-6 hr.
60-70	2-7 hr.	2-40 hr.
70-80	3-12 hr.	3 hr.- Indefinite
Over 80	Indefinite	Indefinite

If a person falls overboard, hypothermia may be an immediate concern. Hypothermia occurs when a person's body loses heat faster than the body can replace it. If not rescued, the person will become exhausted or likely drown. In general, the colder the water, the faster body heat is lost. Personal flotation devices increase survival time because they provide insulation.

1.3.7 Medical Emergency

No one should act as a doctor if they are not properly trained and educated. Someone onboard your boat should know first aid. First aid training is available through your local Red Cross. Keep a fully stocked first aid kit onboard your boat at all times.

1.3.8 Equipment Failure

Steering, propulsion or control failure can be prevented by having your boat maintained correctly and checked periodically. If systems onboard your boat do fail, radio for help or signal with flags and wait until help arrives.

1.3.9 Radio Communication

You are responsible for obtaining a radio operator's permit and knowing and following proper rules and procedures. Private boats are not required to have their radio on at all times; however, if your radio is on, it should be tuned to channel 16 unless it is being actively used. Channel 16 is the frequency for emergency calls or initial calls between boats. After establishing contact on channel 16, change your frequency to channel 22.

More information on radio communications can be found in *Chapman's Piloting*.

1.3.10 Distress Signals

The operator is required to lend assistance to a craft in distress as long as your life or boat is not put in harm's way in the process. Good Samaritan laws protect you from any liability incurred while giving aid.

1.4 Safety Equipment

NOTE: *Federal law requires you to provide and maintain safety equipment onboard your boat. Consult U.S. Coast Guard, state and local regulations to ensure your boat has all required safety equipment onboard. You must learn about any additional recommended equipment before operating the boat.*

1.4.1 Personal Flotation Devices (PFDs)

There must be one U.S. Coast Guard-approved wearable personal flotation device of Type I, II, or III for each person onboard your boat. The PFDs must be readily accessible and in serviceable condition. They must also be

of a suitable size for each person onboard. Three PFDs (two wearable and one throwable) are required regardless of the number of persons onboard.

PFD Type I, Wearable: This offshore life jacket is most effective for all waters when rescue may be delayed. In the water, its design turns most unconscious people from a facedown position to a vertical or face-up position.

PFD Type II, Wearable: This near-shore buoyant vest is intended for calm inland waters where there is a chance of quick rescue. It turns its wearer to a face-up position, but the turning action is not as pronounced as the Type I, and it will not turn as many people under the same conditions as a Type I.

PFD Type III, Wearable: Classified as a flotation aid, this PFD will not turn a victim to a face-up position. This type of PFD is frequently used in water sports.

PFD Type IV, Throwable: You must also have onboard at least one throwable PFD Type IV device. The design of the Type IV device does not allow it to be worn. It must be thrown to a person in the water and held by the user until rescued. The most common Type IV PFDs are buoyant cushions or ring buoys. This PFD must be in serviceable condition and immediately available for use.

1.4.2 Visual Distress Signals

The U.S. Coast Guard requires that all boats operating on U.S. coastal waters have visual distress signal equipment. Boats owned in the United States and operating on the high seas must also carry this equipment.

Visual distress equipment must be readily accessible and in serviceable condition. Both pyrotechnic and non-pyrotechnic equipment must be U.S. Coast Guard approved. This equipment can become ineffective with age. If your equipment's usage date has expired, replace the equipment before taking your boat out.

Approved pyrotechnic equipment includes:

- Hand held or aerial red flares
- Hand held or floating orange smoke
- Launchers for aerial red meteors or parachute flares.

Approved non-pyrotechnic equipment includes:

- Orange distress flag
- Dye markers
- Electric distress light.

No one signaling device is ideal under all conditions. Consider carrying various types of equipment. Careful selection and proper stowage of visual distress equipment are very important. Select devices with packaging that children, but not adults, will find difficult to open, especially if young children are onboard.

1.4.3 Sound Signaling Device

Your boat must have an operable device that can produce a sound signal if conditions require. A horn is standard equipment on all Carver models.

Boats longer than 39 feet, 4 inches, must have a bell and a whistle. These devices must meet the requirements of the Inland Navigational Rules Act of 1980. Refer to the U.S. Coast Guard's publication **"Navigational Rules, International-Inland"** for details on the appropriate signals.

1.4.4 Running and Navigation Lights

Your boat must have running and navigation lights for safe operation after dark. Observe all navigation rules for meeting and passing. Do not run at high speeds during night operation. Always use common sense and good judgment when operating your boat at night.

1.4.5 Radar Reflectors

Radar reflectors (if installed on your boat) should be 18 inches, measured diagonally. They should be placed 12 feet above the waterline, otherwise, a boat with radar may have trouble "seeing" your boat.

1.4.6 Fire Extinguishers

Fire extinguishers must be approved by the U.S. Coast Guard. The U.S. Coast Guard classifies fire extinguishers by the type of fire they can extinguish. These classifications include foam, carbon dioxide, chemical, and Halon-type fire extinguishers. Below are the requirements for fire extinguishers at the time this guide was prepared.

Boats longer than 40' and shorter than 65': Because your boat has a fixed fire extinguishing system approved by the U.S. Coast Guard, Two Type B-I or one Type B-II extinguisher is required.

All fire extinguishers should be mounted in a readily accessible location away from the engine room. Everyone onboard should know where the fire extinguishers are and how to operate them.

If your fire extinguisher has a charge indicator gauge, cold or hot weather may affect the gauge reading. Consult the instruction manual supplied with the fire extinguisher to determine the accuracy of the gauge.

Check and maintain fire extinguishing equipment in accordance with its manufacturer's recommendations. Be sure to replace fire fighting equipment, if expired or discharged, by devices of identical or greater fire fighting capacity.

1.4.7 Recommended Equipment

In addition to required equipment, you may want to carry the following:

- Spare anchor
- Heaving line
- Fenders
- Flashlight
- Mirror
- Suntan lotion
- Spare propeller(s)
- Tool kit
- Ring buoy
- Navigational charts
- Mooring lines
- Binoculars
- Spare parts
- Spare pump.

1.5 Owner's Responsibilities

There are several areas you must have knowledge of to operate your boat in a safe, responsible manner.

1.5.1 Safe Boating Courses

Your 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 Virginia, at 1-800-245-BOAT (2628). For a course schedule in your area you may also contact your local U.S. Coast Guard Auxiliary or Power Squadron Flotilla for the time and place of their next scheduled class.

Carver also recommends that you read *Chapman's Piloting, Seamanship and Small Boat Handling* for further information on how to handle your boat in various situations.

1.5.2 Rules of the Road

Navigating a boat responsibly requires you to comply 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.

As a responsible boater, you must comply with the marine traffic rules enforced by the U.S. Coast Guard. There are two sets of rules: the United

States Inland Navigational Rules and the International Rules. The United States Inland Rules apply to all vessels inside the demarcation lines separating inland and international waters. The U.S. Coast Guard lists the traffic regulations in its publication **“Navigational Rules, International-Inland.”** You can get a copy from your local U.S. Coast Guard Unit or the United States Coast Guard Headquarters, 1300 E Street NW, Washington, D.C. 20226.

Other helpful publications available from the U.S. Coast Guard include **“Aids to Navigation”** (U.S. Coast Guard pamphlet #123), which explains the significance of various lights and buoys; the **“Boating Safety Training Manual”** and **“Federal Requirements For Recreational Boats.”** Check with your local U.S. Coast Guard station, your Carver Dealer, or a local marina about navigational aids unique to your area.

1.5.3 Documentation

The owner of a boat registered with the U.S. Coast Guard is issued a Certificate of Number. This certificate must be onboard whenever the boat is in use. State registration is also required. If your boat has a VHF radio onboard, an FCC license must also be displayed. Check with the U.S. Coast Guard or your state regulatory agency to determine what other records are required on your boat.

In addition to required documents, it is strongly recommended that you maintain the following logs. Log books are available from maritime supply stores.

- A navigation log containing engine speeds, compass courses and time records, which are essential for both cruising and maintenance purposes.
- A radio log, which is mandatory on vessels required to have a radio. A radio log can be useful to record unusual events, especially for future litigation.
- A maintenance log to track the type and frequency of maintenance procedures performed on your boat and its systems. Refer to **Section 7** for more information on maintaining your boat.
- An engine/fuel log, which is essential for calculating range and fuel requirements.
- A GPS/Loran log if your boat contains this equipment.

1.5.4 Drugs and Alcohol

Drugs and alcohol adversely affect a person's ability to make sound judgments, react quickly and, in general, safely operate a boat. As a responsible

boater, you must refrain from using drugs or alcohol while operating your boat. Operating a motorized boat while under the influence of drugs or alcohol carries a significant penalty.

1.5.5 Distress Calls

If you have a ship-to-shore radio telephone, heed storm warnings and answer any distress calls from other boats. The word “MAYDAY” spoken three times is the international signal of distress. Monitor marine radio channel 16 which is reserved for emergency and safety messages. You can also use this channel to contact the U.S. Coast Guard or other boaters if you have trouble. **Never send a “MAYDAY” message unless there is a serious emergency and you are in need of immediate assistance.**

1.5.6 Voluntary Inspections

The U.S. Coast Guard Auxiliaries or state boating officials in many states offer courtesy inspections to check your boat for compliance with safety standards and required safety equipment. You may voluntarily consent to one of these inspections, after which you are allowed time to make corrections without prosecution. Check with the appropriate state agency or the U.S. Coast Guard Auxiliary for details.

1.5.7 Boating Accidents

The operator of a vessel used for recreational purposes is required to file a report whenever an accident results in loss of life or disappearance from a vessel, an injury requiring medical treatment beyond first aid, property damage in excess of \$200 or complete loss of the vessel.

In cases of death and injury, reports must be submitted within 48 hours. In other cases, reports must be submitted within 10 days. Reports must be submitted in the state where the accident occurred.

1.5.8 Boating Regulations

It is your responsibility to make sure that your boat is in compliance with all federal, state and local regulations. Check with your local U.S. Coast Guard office for relevant federal regulations. Your state’s Department of Natural Resources may have some publications available which deal with relevant state laws.

1.5.8.1 Garbage

Dumping garbage into the sea is a worldwide problem. U.S. Coast Guard regulations prohibit dumping plastic refuse and garbage mixed with plastic into any waters, and restrict the dumping of other forms of garbage. It is essential that all boaters help to clean our waterways by properly disposing of all garbage.

Within three miles of the shore of U.S. lakes, rivers and bays it is illegal to dump plastic, dunnage, lining and packing materials that float, and any garbage except dishwater/greywater or fresh fish parts. From three to twelve miles from shore it is illegal to dump plastic, dunnage, lining and packing materials that float, and any garbage not ground to less than one square inch. From 12 to 25 miles from shore it is illegal to dump plastic, dunnage, lining and packing materials that float. Beyond 25 miles from shore it is illegal to dump plastics.

1.5.8.2 Oil

The Federal Water Pollution Control Act prohibits the discharge of oil or oily waste into or upon the navigable waters and contiguous zone of the United States if such discharge causes a film or sheen upon, or discoloration of, the surface of the water, or causes a sludge or emulsion beneath the surface of the water. Violators are subject to a significant fine.

1.5.8.3 Septic Waste

On U.S. inland and coastal waters, it is illegal to discharge septic waste directly overboard. If your boat is equipped with an overboard discharge option, check with your local U.S. Coast Guard office to be sure that you are in compliance with federal regulations.

1.5.8.4 State and Local Ordinances

Your state or locality may have laws limiting speed, noise, or your boat's wake. Check with your harbor master to find out whether your boat's operation is restricted in any way by local ordinances or state laws. Check with state and local authorities to make sure that you are in compliance with local regulations regarding marine sanitation, noise, speed and wake.

1.5.9 Pre-Departure Actions

- Check the weather. Make sure conditions and seas will not be hazardous during your voyage.
- Make sure all safety equipment is onboard, accessible and in good working condition.
- Check the bilge for fuel vapor or water. Ventilate or pump out the bilge as necessary.
- Be sure the horn, navigation equipment and lights are working properly.
- Instruct guests and crew in safety and operational matters.

- Check engine and transmission oil and coolant levels. After starting the engines, check the overboard flow of cooling water, engine temperatures and oil pressures.
- Fill fuel tanks as full as you need. Know your tank capacity and fuel consumption at various RPMs and the cruising radius this gives you. When estimating your range, it is best to count on using 1/3 of your fuel to reach your destination and 1/3 of your fuel to return, with the remaining 1/3 of your fuel in reserve for emergencies.
- Have a second person onboard capable of taking over the boat's operation in case you are disabled.
- Before departing, inform a friend or relative where you intend to cruise and when you will return so they can tell the U.S. Coast Guard where to look and the type of boat in case you are delayed. Remember to tell them of your safe return to prevent false alarms. Do not file a float plan with the U.S. Coast Guard. They do not have the manpower to monitor all boats.
- Stow all loose gear securely. Fenders and docklines should be stowed immediately after getting underway.

1.6 Carbon Monoxide (CO) Warnings



DANGER

Carbon monoxide (CO) is a colorless, odorless and tasteless gas which is emitted in all engine and generator exhaust. Prolonged exposure to CO can result in unconsciousness, brain damage and death.

Carver has installed CO detectors on your boat. Have these detectors professionally calibrated at regular intervals.

1.6.1 Preventing CO Exposure

To help prevent the accumulation of CO in your boat's cabin and in enclosed exterior areas:

- Pay attention to prevailing conditions and provide ventilation to induce fresh air and minimize exhaust re-entry. Position the boat to maximize the dissipation of CO. Be aware that CO can enter the boat through cockpit and deck drains, especially when the cockpit and deck are enclosed.
- Do not operate the engines or generator for more than a very short period of time while the boat is stationary, especially if the boat is rafted or moored in a confined area.

- Be aware that mooring and anchoring in an area where other boats' engines or generators are running may put your boat in an atmosphere containing CO, even if your boat's engines and generator are not running.
- Keep the engine room hatch closed when operating the engines and generator.
- Be aware that exterior enclosures can create air flows that draw in and trap CO in the enclosed areas. Provide adequate ventilation to these areas.
- Do not occupy aft lounging areas, including the boarding platform, or swim near the engine or generator exhaust outlets while the engines or generator are running.
- Because CO production is greater when the engines are cold, minimize the time spent getting underway.
- Avoid backdrafting. Backdrafting occurs when air moving past the boat creates a low pressure or suction area near the stern. This low pressure area can draw CO into the boat's cabin and enclosed exterior areas.

Under certain speed and operating conditions, the low pressure area may form in other areas of the boat and permit CO to enter through openings that are not near the stern.

To avoid backdrafting:

- Maintain the proper trim angle; avoid a high bow angle.
- Distribute the boat's load evenly.
- Do not operate the boat at slow speeds, especially with a following wind.
- Provide adequate ventilation; make sure the air flow is moving from forward to aft inside the cabin and enclosed exterior areas.
- Have a trained marine technician inspect the boat's exhaust systems whenever the boat is in for service or if you notice a change in the sound of an engine or the generator.
- Maintain the propulsion and generator engines to optimize their efficiency; this in turn reduces CO emissions.

For additional information on carbon monoxide as it relates to boating, please contact marine organizations that produce safety publications.

1.6.2 Identifying CO Exposure

In high concentrations, CO can be fatal in minutes; however, the effects of lower concentrations can also be lethal. Symptoms of exposure to CO are:

- Watery and itchy eyes
- Flushed appearance
- Throbbing temples
- Inattentiveness
- Inability to think coherently
- Loss of physical coordination
- Ringing in the ears
- Tightness across the chest
- Headache
- Drowsiness
- Incoherence / slurred speech
- Nausea
- Dizziness
- Fatigue
- Vomiting
- Collapse
- Convulsions.

1.6.3 Treating CO Exposure

If you suspect that someone is suffering from exposure to CO, take the following actions immediately:

- Thoroughly ventilate the area if possible
- Evacuate the area and move the affected person(s) to a fresh air environment
- Administer oxygen, if available
- Get medical assistance
- Determine the probable source of the CO and correct the condition.

1.7 Warning Labels

Warning labels are posted throughout your boat to protect you, your passengers, your boat and its equipment, and any personal property on the boat. It is important to read, understand and obey all warning labels. Failure to obey a warning label may result in serious injury or damage to the boat, its equipment, or any personal property on the boat.

2.0 DC Electrical System

Your boat is equipped with a 12-volt DC (Direct Current) electrical system. This is a comprehensive system that is designed to meet your present and future 12-volt electrical needs. Wire-runs and connections are positioned to prevent abrasion and exposure to moisture, as well as to remain accessible for inspection, repairs, and the addition of aftermarket electrical accessories.

Wires used throughout the DC electrical system are plastic-coated and color-coded. Connections are made using crimped connector points. The electrical system is virtually maintenance free, with only the batteries requiring periodic inspection and maintenance.

2.1 Batteries

The DC electrical system is divided into three areas, each powered by one or more 12-volt batteries:

- Engines (two batteries - one for each engine)
- “House” (one battery)
- Generator (one battery).

2.1.1 Engine Batteries

Each propulsion engine has its own dedicated battery. These batteries are located in the engine room beneath the centerline catwalk. The engine batteries are the two middle batteries.

Electricity from each battery to its engine is controlled by a master disconnect switch. These switches are located in the engine room on the forward bulkhead. To provide electricity to the engines, turn the master disconnect switches to the “ON” position.

Refer to **9.7.4 Engine Room** for the exact location of the engine batteries and their master disconnect switches.

2.1.2 “House” Battery

The equipment controlled by the three DC circuit breaker panels (Safety Breaker Panel, DC Control Center and Bridge Breaker Panel) is powered by a single battery. This battery is located in the engine room beneath the centerline catwalk, forward of the engine batteries.

Electricity from the battery to the boat’s various DC circuit breaker panels is controlled by a master disconnect switch. This switch is located on the Safety Breaker Panel, which is located in a cabinet in the inboard end of the galley counter. To provide electricity to these breaker panels, turn the master disconnect switch to the “ON” position.

Refer to **9.7.4 Engine Room** and **2.2.1 Safety Breaker Panel** for the exact locations of the “house” battery and its master disconnect switch.

2.1.3 Generator Battery

The generator has its own dedicated battery. This battery is located in the engine room beneath the centerline catwalk, aft of the engine batteries.

Electricity from the battery to the generator starter is controlled by a master disconnect switch. This switch is located beneath a hatch in the cockpit, next to the generator. To provide electricity to the generator starter, turn the master disconnect switch to the “ON” position.

Refer to **9.7.4 Engine Room** and **9.7.1 Hatches** for the exact location of the generator battery and its master disconnect switch.

2.1.4 Monitoring Battery Voltage Levels



DANGER

Carefully follow the procedures described in Section 5 before starting your boat's engines. Improper starting procedures can create hazardous situations.

You can determine the voltage level of each engine battery by activating the battery's dedicated voltmeter. The voltmeters are located with the other engine gauges at the helm. To activate each engine's voltmeter, turn the engine's ignition key one position to the right.

NOTE: *You do not need to start the engine to activate its voltmeter. Refer to the OEM information for details on operating the engines.*

A fully charged battery that has not been charged or discharged for at least two hours should indicate between 12.3 and 12.6 volts. A reading below this level indicates a partly discharged battery.

2.1.5 Charging the Batteries

While the engines are running, their alternators generally supply enough power to replace the power used by the boat's 12-volt equipment.

Without an engine running, however, the 12-volt equipment will eventually drain the batteries they are using. If this occurs, either start the engines or use the onboard battery charger to recharge the batteries.

**CAUTION**

Never allow the boat's batteries to become completely discharged. Completely discharging a battery can damage it to the point that it can no longer be recharged. The battery chargers should always be operating when your boat is connected to shore power. If you leave your boat for an extended period of time and the boat is not connected to shore power, turn all battery master disconnect switches to the "OFF" position.

Your boat is equipped with two battery chargers: one for the engine and "house" batteries and one for the generator battery.

2.1.5.1 Engine / "House" Battery Charger

The voltage levels of both the engine and "house" batteries are monitored and maintained by a single battery charger.

To operate the battery charger:

1. Provide AC power to the boat, from either a shore power source or the generator. Refer to **3.2.1 Shore Power** or **3.2.2 Generator Power** for more information.
2. On the AC Control Center, switch the Battery Charger 1 circuit breaker "ON." Refer to **3.3.2.11 Battery Charger 1** for more information. The engine / "house" battery charger now automatically charges the engine and "house" batteries when their voltage drops below a predetermined level.

The engine / "house" battery charger is located in the engine room on the port forward bulkhead. Refer to **9.7.4 Engine Room** for the exact location of this battery charger.

2.1.5.2 Generator Battery Charger

The voltage level of the generator battery is monitored and maintained by a single battery charger. The voltage level of the generator battery is also maintained by the generator's alternator whenever the generator is operating.

To operate the battery charger:

1. Provide AC power to the boat, from either a shore power source or the generator. Refer to **3.2.1 Shore Power** or **3.2.2 Generator Power** for more information.
2. On the AC Control Center, switch the Battery Charger 2 circuit breaker "ON." Refer to **3.3.2.12 Battery Charger 2** for more information. The generator battery charger now automatically charges

the generator battery when its voltage drops below a predetermined level.

The generator battery charger is located in the engine room on the port forward bulkhead. Refer to **9.7.4 Engine Room** for the exact location of this battery charger.

2.2 Operating the 12-Volt Equipment

Power to your boat's 12-volt equipment is controlled by circuit breakers and, in most cases, individual controls for each piece of equipment.

Your boat contains three 12-volt circuit breaker panels:

- Safety Breaker Panel
- DC Control Center
- Bridge Breaker Panel.

The circuit breakers on these panels enable you to control the electricity to either the equipment itself or to the equipment's controls by switching the breakers "ON" or "OFF." They also protect the electrical system by automatically disconnecting the circuit from the power source in the event of a short or overload. Power is supplied to these circuit breaker panels by the "house" battery.

There are also thermal circuit breakers installed in many circuits to provide added protection for components in those circuits. These circuit breakers are located near the master disconnect switches.



WARNING

Never reset a breaker that has been automatically tripped without first correcting the problem. Failure to follow this procedure may create a dangerous situation.

NOTE: *Sometimes a circuit breaker location is labeled but no circuit breaker is present. In this case, the component named on the label is an option that is not installed on your boat.*

2.2.1 Safety Breaker Panel

The Safety Breaker Panel, located in a cabinet in the inboard end of the galley counter, manages the power supply to various safety and other equipment.

Because of the importance of the safety equipment, the circuit breakers on this panel should remain "ON" at all times. If a circuit breaker trips, immediately identify and correct the cause of the problem, then reset the breaker.

Power is always provided to the Stereo Memory, High Water Alarm, SeaKey®, Shower Sump, CO Detector and Auto Bilge Pump circuit breakers on this panel. To provide power to the other circuit breakers, the “house” battery master disconnect switch must be turned to the “ON” position. The Safety Breaker Panel contains the switches and circuit breakers described below.

2.2.1.1 Stereo Memory

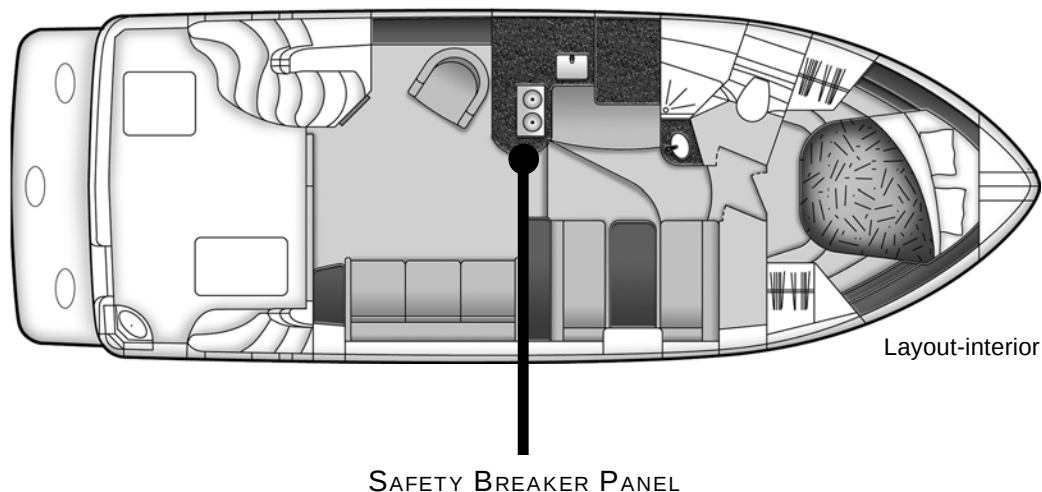
This breaker controls the flow of electricity to the salon stereo system. This breaker should always be “ON” to maintain the information programmed into the stereo’s memory. If this breaker is ever switched “OFF,” you will have to reprogram the stereo. Refer to the OEM information for details on programming the stereo.

2.2.1.2 High Water

This breaker controls the flow of electricity to the high bilge water alarm. Refer to **4.4 Bilge System** for a description of the high bilge water alarm. This breaker must be “ON” whenever the boat is in the water.

2.2.1.3 SeaKey®

This breaker controls the flow of electricity to the Volvo SeaKey telemetric equipment. This equipment is installed on all Carver yachts, but can only be activated with a current service subscription. If you have a subscription, then this breaker must be “ON” to provide electricity to the equipment. Refer to the OEM information for details on the SeaKey equipment.



2.2.1.4 Shower Sump

This breaker controls the flow of electricity to the sump pump. Because the sump is located below the boat's water line, the sump pump is needed to pump used (grey) water from the head sink and shower, as well as air conditioning condensation overboard. The sump pump is activated automatically by a float switch whenever water within the sump rises above a predetermined level. Make sure the Shower Sump circuit breaker is "ON" before using the shower, head sink or air conditioning.

2.2.1.5 Accessory Main

This is the "house" battery master disconnect switch. Refer to **2.1.2 "House" Battery** for a description of this master disconnect switch.

2.2.1.6 CO Detector



DANGER

Always activate the CO detectors when the boat's engines or generator are running. Carbon monoxide is dangerous. Refer to Section 1 of this Owner's Guide for information on minimizing, detecting and controlling carbon monoxide accumulation.

Carver has installed carbon monoxide (CO) detectors on your boat for your safety. The CO detectors monitor the air throughout the boat's cabin for the presence of carbon monoxide. The CO Detector circuit breaker must be "ON" for the CO detectors to operate.

When the CO detectors are operating, they alert you to the presence of carbon monoxide in the cabin by emitting a loud, high pitched sound. When you hear this alarm, determine the cause and correct it immediately.

There is a test button on each CO detector. Test each unit on a weekly basis. If you suspect that a CO detector is faulty, have your dealer repair or replace it immediately. Refer to **1.6 Carbon Monoxide (CO) Warnings** for more information on CO.

2.2.1.7 Auto Bilge Pump - 1, 2

These breakers control the flow of electricity to the bilge pumps. Each pump is activated automatically by a float switch whenever water within the bilge rises to a predetermined level. These breakers must be "ON" whenever the boat is in the water.

NOTE: *Periodically test each bilge pump by lifting its float. The pump should turn on when the float is lifted.*

2.2.1.8 Main - One

This breaker protects the circuitry between the DC Control Center and the “house” battery. This breaker must be “ON” to provide power to the DC Control Center.

2.2.1.9 Main - Two

This breaker helps protect the circuitry between the Bridge Breaker Panel and the “house” battery. This breaker must be “ON” to provide power to the Bridge Breaker Panel.

2.2.1.10 Windlass

This breaker controls the flow of electricity to the controls that operate the windlass. A set of windlass controls are located both at the helm and on the fore deck. To supply power to the controls, switch this breaker “ON.” Refer to the OEM information for details on operating the windlass.

NOTE: *The windlass circuit also contains an in-line fuse that protects the windlass switch solenoid. This fuse is located in the anchor chain locker.*

2.2.2 DC Control Center

The DC Control Center, located in a cabinet next to the forward end of the salon sofa, manages the power supply to most of the boat’s 12-volt equipment, except for the equipment on the bridge.

To provide power to this breaker panel, turn the “house” battery master disconnect switch to the “ON” position.

The DC Control Center contains the switches and circuit breakers described below.

2.2.2.1 Bilge Blower

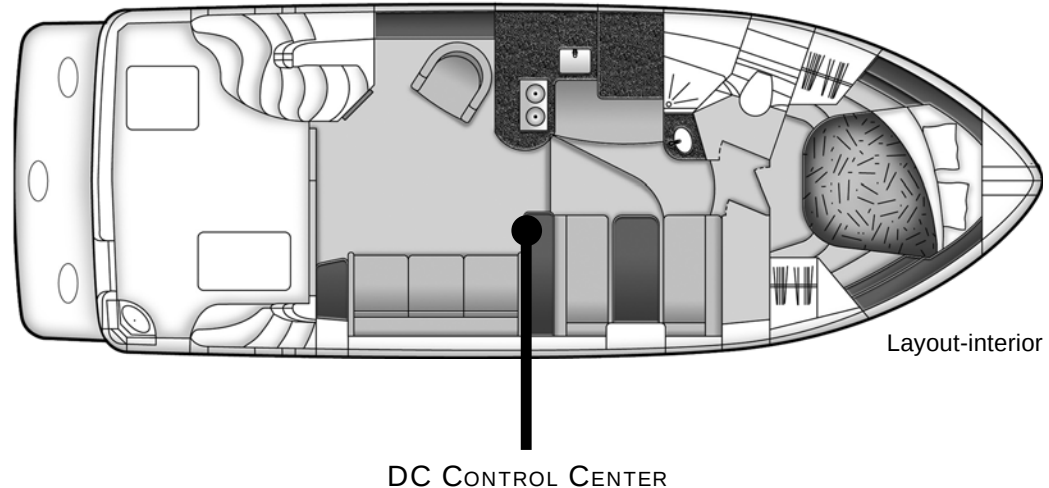
Use this switch to operate the bilge blowers. To activate this switch, first switch the two Bilge Blower circuit breakers “ON.”

2.2.2.2 Generator

Use this switch to start and stop the generator. Refer to the OEM information for details on operating the generator.

2.2.2.3 Main

This breaker controls the flow of electricity to all of the other circuit breakers on this panel. To supply power to the other circuit breakers, switch the Main breaker “ON.”



2.2.2.4 Panel Lights

This breaker controls the flow of electricity to the helm instrument panel light switch. To supply power to the switch, switch this breaker "ON." Turn on the panel lights when the natural light level is insufficient to clearly view the instrument panel.

2.2.2.5 Navigation / Anchor Lights

This breaker controls the flow of electricity to the navigation and anchor light switches at the helm. To supply power to the switches, switch this breaker "ON."

2.2.2.6 Spotlight

This breaker controls the flow of electricity to the controls for the spotlight. The controls are located at the helm. To supply power to the controls, switch this breaker "ON." Refer to the OEM information for details on operating the spotlight.

2.2.2.7 Salon Lights

This breaker controls the flow of electricity to the light switches in the salon, dinette and galley. To supply power to the switches, switch this breaker "ON."

2.2.2.8 Forward Lights

This breaker controls the flow of electricity to the light switches in the stateroom and head. To supply power to the switches, switch this breaker "ON."

2.2.2.9 Exterior Lights

This breaker controls the flow of electricity to the switch for the cockpit and bridge lights. This switch is located in the cockpit next to the starboard side deck stairway. To supply power to the switch, switch this breaker “ON.”

2.2.2.10 Bilge Blower (1 - 2)

These two breakers control the flow of electricity to the Bilge Blower switch at the helm and on the DC Control Center. To supply power to these switches, switch these breakers “ON.” Use the Bilge Blower switch to manually operate the bilge blowers. The bilge blowers also operate automatically when the starboard engine ignition switch is turned ON.

2.2.2.11 Forward TV

This breaker controls the flow of electricity to the optional stateroom TV. To supply power to the TV, switch this breaker “ON.” Refer to the OEM information for details on operating the TV.

2.2.2.12 DVD Player Aft

This breaker controls the flow of electricity to the optional salon DVD. To supply power to the DVD, switch this breaker “ON.” Refer to the OEM information for details on operating the DVD.

2.2.2.13 Water Pump

This breaker controls the flow of electricity to the fresh water system’s pressure water pump. After the fresh water tank is filled, switch this breaker “ON” to activate the pressure water pump. Refer to **4.2.2 Pressurizing and Priming the Water System** for information on using the pressure water pump to fill and prime the water system.

2.2.2.14 Waste Pump

This breaker controls the flow of electricity to the pump switch for the optional overboard discharge system. Use the pump to empty the waste tank directly overboard. To supply power to the switch, switch this breaker “ON.” Refer to **4.5.2.2 Overboard Discharge** for information on using the pump.

2.2.2.15 Washdown Pump

This breaker controls the flow of electricity to the pump for the optional raw water washdown system. To activate the washdown pump, switch this breaker “ON.” When you are finished using the washdown, turn the washdown pump off by switching this breaker “OFF.” Refer to **4.3 Raw Water Washdown** for information on using the washdown.

2.2.2.16 Fuel Transfer Pump

This breaker controls the flow of electricity to the fuel transfer pump switch at the helm. This pump is present only if your boat has optional diesel engines. To supply power to the pump switch, switch this breaker “ON.” When you are finished using the pump, switch this breaker “OFF.” Refer to **5.1.2.1 Fuel Transfer Pump** for information on using the fuel transfer pump.

2.2.2.17 Trim Tabs

This breaker controls the flow of electricity to the trim tab controls at the helm. Trim tabs are used to improve the running angle of your boat while underway. Switch this breaker “ON” to activate the trim tab controls. Refer to **6.5.3 Trim Tabs** for more information on using the trim tabs.

2.2.2.18 Bridge Accessory

This breaker controls the flow of electricity to any aftermarket accessories installed at the bridge helm. Switch this breaker “ON” to activate these accessories. Refer to the accessories’ manuals for information on operating the accessories.

2.2.2.19 Salon Accessory

This breaker controls the flow of electricity to any aftermarket accessories installed at the optional lower helm. Switch this breaker “ON” to activate these accessories. Refer to the accessories’ manuals for information on operating the accessories.

2.2.2.20 Horn

This breaker controls the flow of electricity to the horn switch at the helm. To supply power to the switch, switch this breaker “ON.”

2.2.2.21 Wipers

This breaker controls the flow of electricity to the windshield wiper switch at the optional lower helm. To supply power to the switch, switch this breaker “ON.”

2.2.2.22 Refrigerator

This breaker controls the flow of electricity to the dual-voltage refrigerator in the galley. The refrigerator operates on either AC power or DC power. To supply DC power to the refrigerator, switch this breaker “ON.”

The refrigerator automatically uses AC power whenever your boat is connected to a shore power source or the generator is operating, and the Receptacles Galley circuit breaker on the AC Control Center is “ON.” Refer to the OEM information for details on operating the refrigerator.

2.2.2.23 Stereo

This breaker controls the flow of electricity to the stereo in the salon. To supply power to the stereo, switch this breaker “ON.” Refer to the OEM information for details on operating the stereo.

2.2.2.24 Electric Head

This breaker controls the flow of electricity to the electric pump for the toilet. Switch this breaker “ON” to enable the pump. Refer to **4.5.1 Toilet** and the OEM information for details on operating the toilet.

2.2.2.25 Spare

These breakers are reserved for aftermarket accessories you install on your boat.

2.2.3 Bridge Breaker Panel

The Bridge Breaker Panel, located in a cabinet next to the bridge helm seat, protects the circuitry between the DC Control Center and optional navigational equipment installed at the helm. The circuit breakers on this panel are normally “ON” and cannot be manually switched “OFF.” To reset a tripped breaker, press its button. To provide power to this breaker panel:

1. Turn the “house” battery master disconnect switch to the “ON” position.
2. On the Safety Breaker Panel, switch the Main - Two circuit breaker “ON.”

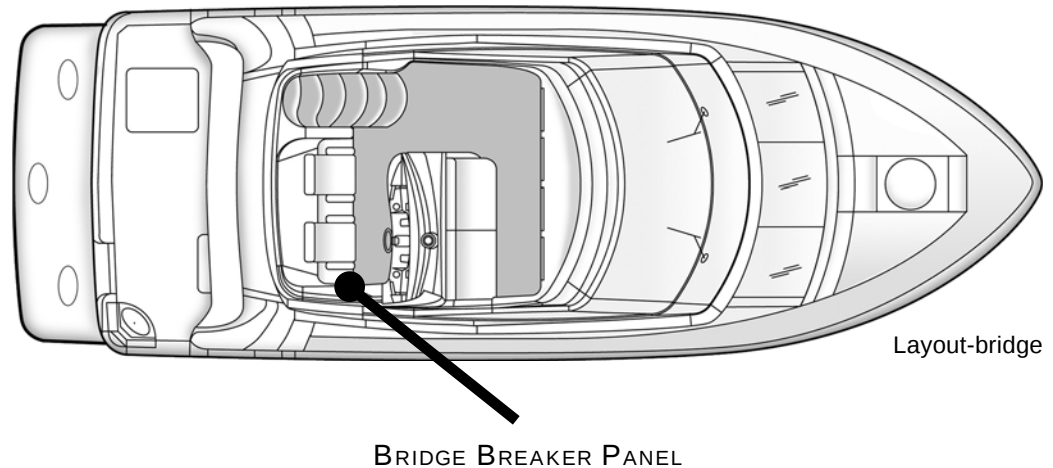
The Bridge Breaker Panel contains the circuit breakers described on the following pages.

2.2.3.1 Bridge VHF Radio

This breaker controls the flow of electricity to the optional VHF radio. Refer to the OEM information for details on operating the radio.

2.2.3.2 GPS/Plotter

This breaker controls the flow of electricity to the optional global positioning system and chart plotter. Refer to the OEM information for details on operating the GPS and chart plotter.



2.2.3.3 Radar

This breaker controls the flow of electricity to the optional radar system. Refer to the OEM information for details on operating the radar.

2.2.3.4 Depth Sounder

This breaker controls the flow of electricity to the optional depth sounder. Refer to the OEM information for details on operating the depth sounder.

2.2.3.5 Auto Pilot

This breaker controls the flow of electricity to the optional automatic piloting system. Refer to the OEM information for details on operating the auto pilot.

2.3 Battery Maintenance



DANGER

The batteries contain electrolyte which is an acid. Wear gloves and protective eyewear when working on and around the batteries.

When servicing the batteries avoid spilling electrolyte into the engine room or bilge. Also, avoid getting any salt water in or on the battery. Either of these conditions can create a poisonous gas that is harmful if inhaled.

If you spill electrolyte:

1. Ventilate the area of the spill.

2. Neutralize the acid in the electrolyte by pouring baking soda on the spill.
3. Remove the neutralized electrolyte using a disposable rag or paper towel.

While the batteries are relatively maintenance-free, there are a few things you can do to increase their effectiveness and life:

- Keep your batteries fully charged. Batteries that are kept fully or near fully charged last longer than batteries stored with a partial charge. The charge level of the batteries can be monitored using the voltmeters on the helm instrument panel.
- Inspect the batteries at least once every 30 days.



WARNING

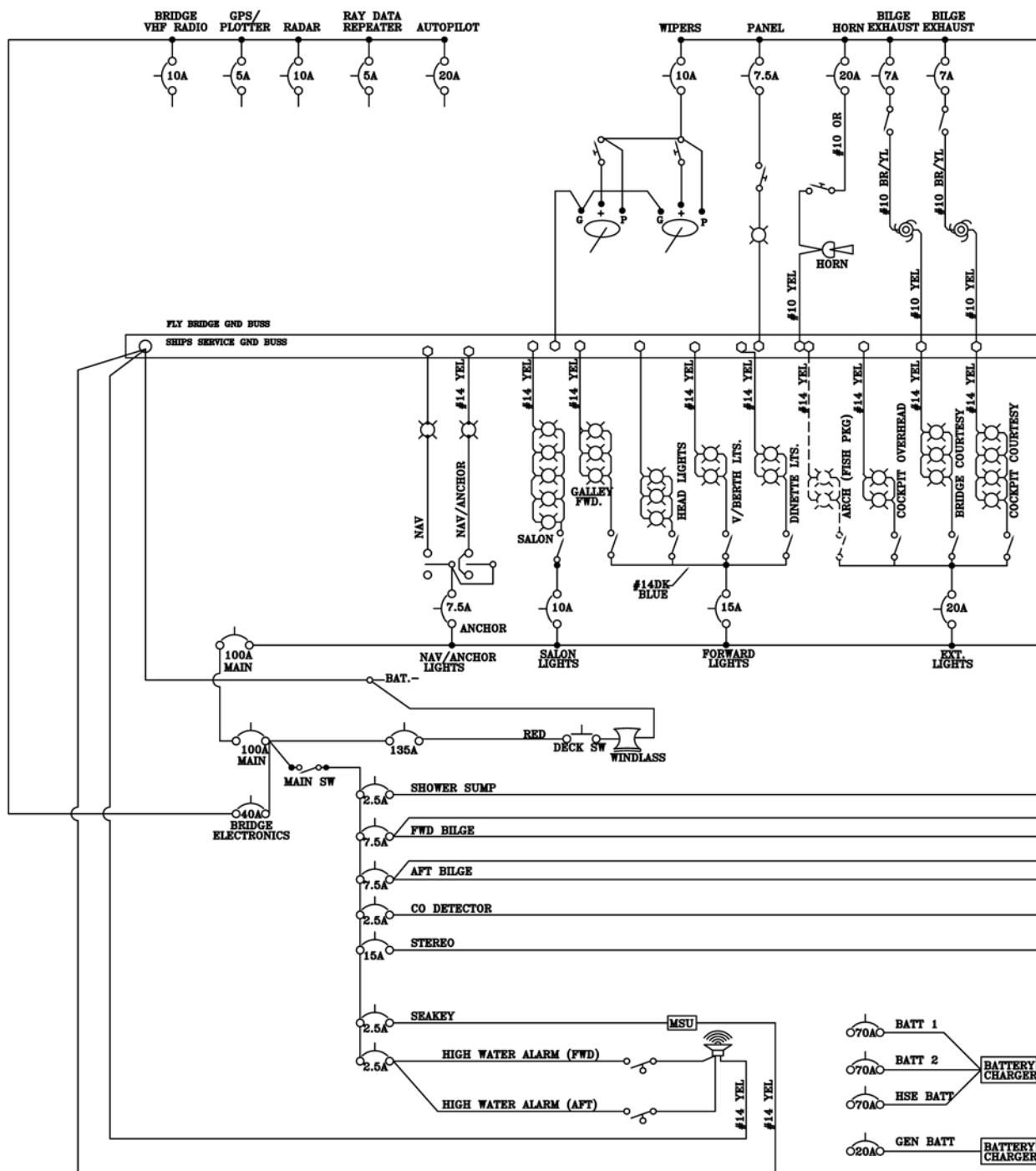
Disconnect the batteries before cleaning them.

- Periodically clean the battery terminals and cable connections. Remove any accumulation of dirt on the top of the battery case. Use a wire brush to clean the terminals. Coating the terminals with a terminal protecting product will help reduce corrosion that can form in these areas.
- Check that the battery cables are securely attached to the terminal posts. Tighten the terminal nuts 1/4 turn beyond finger-tight using a wrench.
- Check the level of electrolyte in each cell of each battery. The correct level is just above the plates. If the fluid level is low, add DISTILLED water only until the electrolyte is at the correct level. DO NOT OVERFILL the cells.
- Remove the batteries from the boat during periods of extended storage. Store your batteries in a cool (above freezing temperature), dry area. All batteries lose some charge during storage, but the lower the temperature the less charge is lost. Avoid storing the batteries in a humid place. Humidity causes the terminals to corrode.
- Check the battery charge level every three months using a hydrometer or voltmeter. If the specific gravity of the battery is less than 1.225 or the voltage is less than 12.4 volts, charge the battery. Avoid overcharging the batteries.

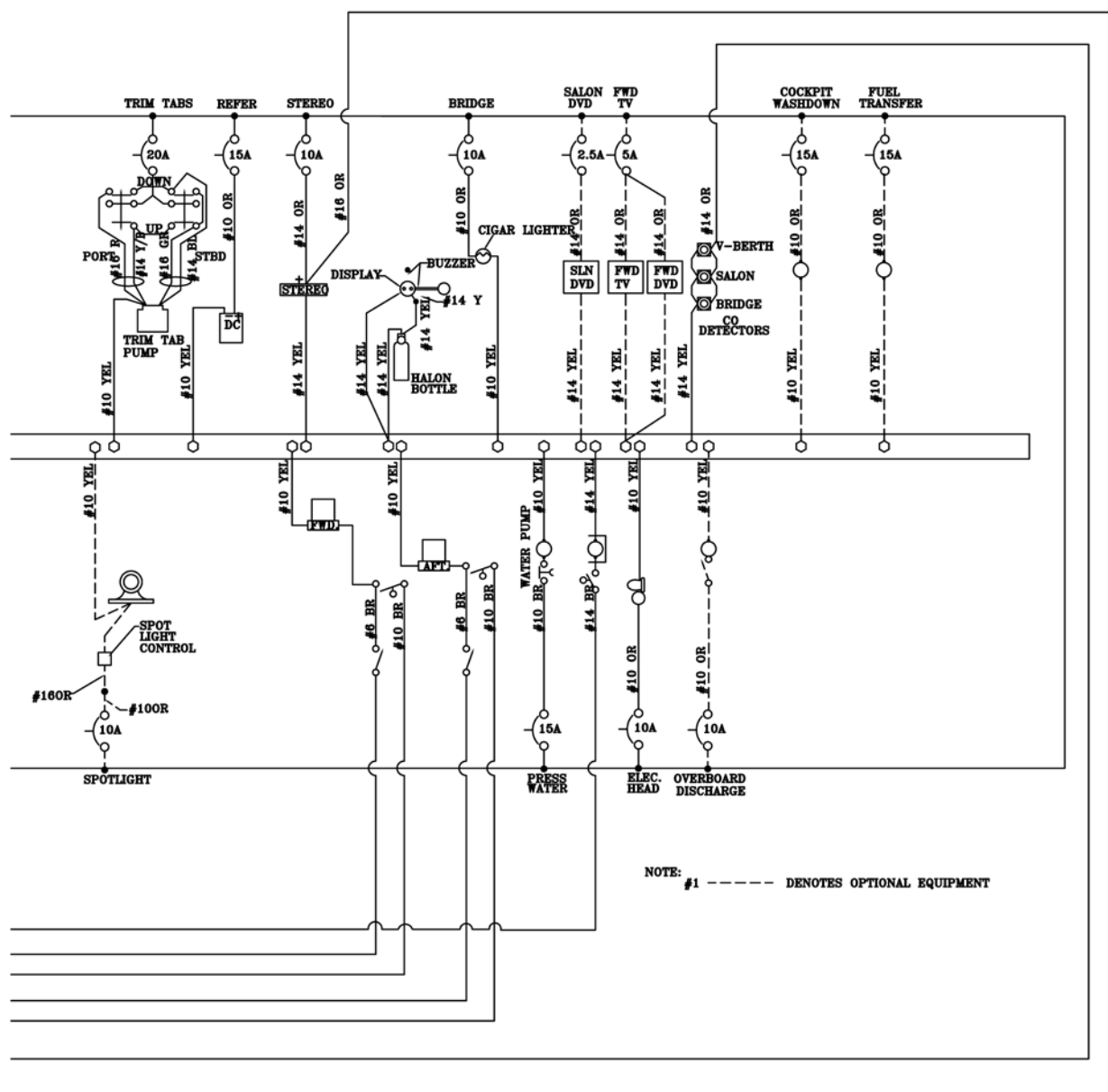
2.4 Troubleshooting the DC Electrical System

Problem	Possible Cause	Possible Solution
12-volt equipment does not function.	“House” battery master disconnect switch is in the “OFF” position.	Turn the switch to the “ON” position.
	Main-One or Main-Two circuit breaker on the Safety Breaker Panel is “OFF.”	Switch the appropriate circuit breaker “ON.”
	Main circuit breaker on the DC Control Center is “OFF.”	Switch the circuit breaker “ON.”
	Battery is weak or dead.	Start the engines or activate the appropriate battery charger.
Individual 12-volt component does not function.	Circuit breaker for that component is “OFF” or tripped.	Switch the circuit breaker for that component “ON” or reset tripped breaker.
	Battery is weak or dead.	Start the engines or activate the appropriate battery charger.
	A wire within the 12-volt system is loose or disconnected.	Locate and repair the wire.
Cabin lights do not come on or are dim.	The appropriate circuit breaker(s) on the DC Control Center is “OFF.”	Switch circuit breaker(s) “ON.”
	Battery is weak or dead.	Start the engines or activate the appropriate battery charger.
	One or more light bulbs are burned out.	Replace light bulb(s).
Battery does not hold a charge.	Battery failed.	Replace with a new battery.
Engine is running and voltmeter does not indicate adequate voltage.	Engine alternator belt is loose.	Refer to engine OEM information to tighten the belt.

2.5 DC Schematic



3327-300-016a



3327-300-016b

3.0 AC Electrical System

Your boat is equipped with a 30 amp AC (alternating current) electrical system. The power for this system is supplied by either a shore power source or the generator. The procedures for connecting to a shore power source and to the generator are explained later in this section.

3.1 System Organization

The AC electrical system is divided into two circuits: Line 1 and Line 2. If your boat was built for use in North America or the Pacific Rim, each line is configured as 120 volts 60 Hertz. If your boat was built for use in Europe or Australia, each line is configured as 220 volts 50 Hertz.

Line 1 provides power to all of your boat's AC equipment except for the air conditioning system. Line 2 provides power to the air conditioning system.

3.1.1 Wiring System

The AC electrical system on your boat uses three types of color-coded wires.

The black wire carries the current from the power source to the equipment or receptacle. Each black wire is connected to and protected by a circuit breaker installed in the AC Control Center.

The white wire returns the current from the equipment or receptacle to the power source.

Safety ground wires are green. During normal operation, current does not flow through the ground wires.

Buss bars are used in the AC electrical system to help route and organize the wires. The system's white, or neutral, wires are connected together at buss bars. The ground wires are also connected together at a separate buss bar.



DANGER

Do not touch the black or white wires while the AC electrical system is connected to a power source. These wires carry enough current to kill or cause serious injury.

3.2 AC Power Sources

You can supply power to your boat's AC electrical system by using either a shore power source or the onboard generator.

3.2.1 Shore Power

You can use a shore power source to supply AC power to your boat's AC electrical system. To do this, you will need one shore power cord for each Line circuit in use on your boat. Line 1 corresponds to Shore #1 on the AC Control Center; Line 2 corresponds to Shore #2.

NOTE: *If you leave your boat for more than 48 hours while your boat is connected to shore power, remove all perishables from your refrigerator. If the shore power supply to your boat is interrupted, your food may spoil.*

To connect to shore power:

1. Make sure the generator is not running. If you start the generator while your boat is connected to shore power, the AC electrical system will automatically connect itself to the generator and disconnect itself from shore power.



CAUTION

Do not supply power to the water heater when it is empty. Doing so may damage the unit's heating element.

2. On the AC Control Center, located in a cabinet above the stairway to the stateroom level, switch the Water Heater circuit breaker "OFF." Do not switch the breaker on again until the fresh water system has been filled, pressurized and primed.
3. On the AC Control Center, switch the Shore #1 and Shore #2 Main circuit breakers "OFF."
4. Switch the AC Main circuit breaker groups "OFF." These breaker groups are located in the cockpit in the port aft locker.



DANGER

Make sure the shore power cord(s) you use is in excellent condition with no cuts, nicks or abrasions in the exterior plastic cover. Also make sure that the cord(s) is specifically designed to connect your boat to a shore power source. Using a damaged cord or a cord that is not designed for this purpose can cause electrical shock resulting in death or serious injury.

5. Locate your 50' shore power cord(s).

**DANGER**

Do not allow the end of the shore power cord(s) to hang in the water. This can cause an electrical field to form which can kill or seriously injure nearby swimmers or passengers.

6. Connect the female end of the cord(s) to the boat's shore power receptacle(s). The receptacles are located in the cockpit in the port aft locker.
7. Secure the nonmetallic threaded locking ring that locks each cord to the boat's shore power receptacle. This prevents the cord(s) from being accidentally disconnected and from arcing due to a gap between the cord plug and the receptacle.
8. Choose a neat and safe way to route the shore power cord(s) to the shore power source box.
9. Switch the circuit breaker that is installed in the shore power source box "OFF."
10. Plug the male end of the shore power cord(s) into the shore power source outlet.
11. Secure the nonmetallic threaded locking ring that locks each cord to the shore power source outlet. This prevents the cord(s) from being accidentally disconnected and from arcing due to a gap between the cord plug and the outlet.
12. Switch the circuit breaker that is installed in the shore power source box "ON."
13. Switch the AC Main circuit breaker group(s) "ON."
14. There are Polarity indicators on the AC Control Center for Shore #1 and Shore #2. If either or both of the Polarity Reverse indicators illuminate, immediately switch the respective AC Main circuit breaker group(s) "OFF."

If you are in Germany or Italy, disconnect the shore power cord from the shore power source outlet, rotate the cord's plug 180 degrees, then plug the cord into the outlet again. Repeat steps 11 through 13. If the Reverse Polarity indicator(s) illuminates again, disconnect the affected shore power cord. Notify marina management of the reverse polarity problem and use a different shore power source box.

If you are not in Germany or Italy, disconnect the shore power cord. Notify marina management of the reverse polarity problem and use a different shore power source box.

If the Polarity Safe indicator(s) illuminates, it is safe to proceed to step 15.

15. On the AC Control Center, switch the Shore #1 and/or Shore #2 Main circuit breaker(s) “ON.” Power is now available to the other AC Control Center circuit breakers on that line.
16. Monitor the voltmeter(s) and ammeter(s) on the AC Control Center while your boat is connected to the shore power source. The operation of the voltmeter and ammeter is described later in this section.



DANGER

Only people who are trained and experienced in working with electricity should service your boat's high voltage AC electrical system. Inexperienced or untrained people may be killed or seriously injured by incorrectly servicing the AC electrical system.



DANGER

Always disconnect the boat from the shore power source and shut off the generator before attempting to service the AC electrical system.

3.2.2 Generator Power

You can use the generator to power the boat's AC electrical system when a shore power source is not available. The generator is installed beneath the center of the cockpit. Fuel for the generator is drawn from the starboard fuel tank.

To start the generator:

1. Read, understand and follow the OEM information that describes the generator.
2. The generator starter is powered by its own 12-volt battery. Turn the generator battery master disconnect switch to the “ON” position.

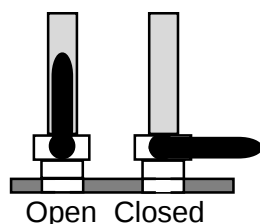


CAUTION

Never turn the generator battery master disconnect switch to the “OFF” position while the generator is operating. Doing this can damage the generator or its alternator wiring.

A TIP FROM CARVER!

Dedicating a 12-volt battery to the generator provides an important safety feature. A dedicated battery enables you to start the generator regardless of the condition of the propulsion engine batteries. If the batteries become discharged to the point where they are unable to start an engine, start the generator, then turn on the engine battery charger. When the engine batteries are recharged to an adequate level, you can then start the propulsion engines.



3. The generator engine uses a seawater cooling system. This system includes a strainer that prevents debris in the seawater from entering the cooling system's water pump. Make sure the cooling system's seacock is closed. Remove and clean the strainer. The seacock is located aft of the generator; the strainer is located above the seacock. Refer to **9.7.1 Hatches** for the exact location of the seacock and strainer.
4. Reinstall the strainer. If the strainer leaks when the seacock is opened, close the seacock, then check the strainer for correct installation.

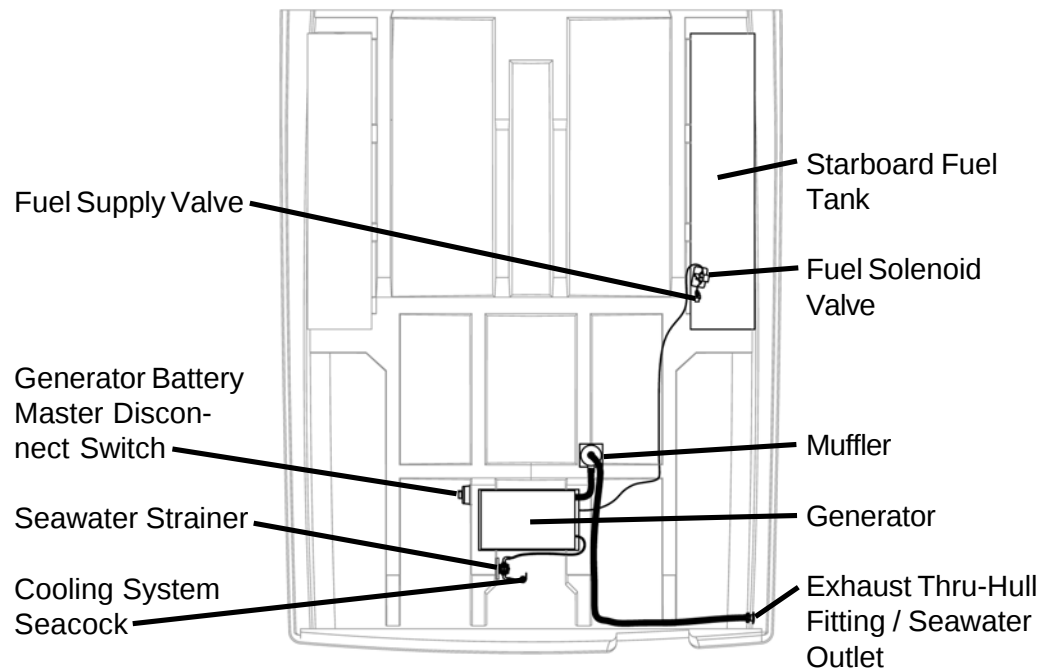
**CAUTION**

Do not operate the generator when its cooling system seacock is closed. Operating the generator in this manner can damage it.

5. Open the cooling system's seacock.
6. On the Safety Breaker Panel:
 - a. Turn the "house" battery master disconnect switch to the "ON" position.
 - b. Switch the Main - One circuit breaker "ON."
7. On the DC Control Center:
 - a. Switch the Main circuit breaker "ON."
 - b. Switch the two Bilge Blower circuit breakers "ON."
8. Turn the bilge blowers "ON" using the blower switch at the helm or on the DC Control Center.

Make sure the bilge blowers are operating properly by feeling for air being blown from the bilge vents. These vents are located on either side of the cabin's exterior just aft of the salon windows.

GENERATOR LAYOUT - GASOLINE



3327-252-001

Operate the blowers for at least 4 minutes and until the engine room is free of any fuel vapor before starting the generator. Continue operating the blowers while the generator is running.

9. If your boat has the standard gasoline generator, a fuel solenoid valve is installed in the generator fuel line. The valve automatically stops the flow of fuel to the generator if the fuel hose ruptures or becomes disconnected. For the valve to operate properly, its manual bypass switch must be "OFF." This switch is located in the engine room above the aft inboard corner of the starboard fuel tank.

**CAUTION**

The generator STOP/START switch is spring activated. Release the switch from its "START" position as soon as the generator starts. If you continue to hold the switch in its "START" position after the generator starts, you may damage the starter.

While you are attempting to start the generator, never hold the STOP/START switch in the "START" position for more than 10 seconds.

10. A spring-loaded generator STOP/START switch is located on the DC Control Center. Push the switch to the “START” position and hold it there until the generator starts. Release the switch when the generator starts.

If the generator does not start within 10 seconds, release the STOP/START switch, wait 1 minute, then try to start the generator again.

11. When the generator is running smoothly, switch the Shore #1 and/or Shore #2 Main circuit breaker(s) on the AC Control Center “ON.” Power is now available to the other AC circuit breakers on that line.
12. To turn the generator “OFF,” push the STOP/START switch to the “STOP” position. If you do not intend to use the generator again for at least a few days, turn the generator battery master disconnect switch to the “OFF” position.



DANGER

Do not inhale generator exhaust. Generator exhaust contains carbon monoxide, a poisonous gas. Refer to “1.6 Carbon Monoxide (CO) Warnings” for more information on engine exhaust and carbon monoxide.

3.3 Operating AC Equipment

Power to your boat’s AC equipment is controlled by circuit breakers and, in most cases, individual controls for each component.

Your boat contains two AC circuit breaker panel:

- AC Main Circuit Breaker Groups
- AC Control Center.

The circuit breakers on the AC Control Center enable you to control the electricity to either the equipment itself or to the equipments’ controls by switching the breakers “ON” or “OFF.” They also protect the electrical system by automatically disconnecting the circuit from the power source in the event of a short or overload. Power is supplied to the AC Control Center by either a shore power source or the generator.



WARNING

Never reset a breaker that has automatically tripped without first correcting the problem. Failure to follow this procedure may create a dangerous situation.

NOTE: *Sometimes a circuit breaker location is labeled but no circuit breaker is present. In this case, the component named on the label is an option that is not installed on your boat.*

3.3.1 AC Main Circuit Breaker Groups

There is one AC Main circuit breaker group for each Line circuit. All AC power entering your boat from a shore power source is routed through these AC Mains.

The AC Main circuit breaker groups are located in the cockpit in the port aft locker. When the AC Mains are “ON,” power flows to the AC Control Center.

3.3.2 AC Control Center

The AC Control Center, located in a cabinet next to the forward end of the salon sofa, manages the power supply to all of the boat’s AC equipment. To provide power to this breaker panel, first provide a source of AC power to the boat, either through a shore power connection or the generator, as described earlier in this section. The AC Control Center contains the gauges and circuit breakers described below.

3.3.2.1 Shore #1 and #2 Voltmeters

These voltmeters indicate the amount of voltage that is entering the Line 1 and Line 2 circuits, respectively.

When the boat’s AC electrical system is connected to either a shore power source or the generator (and the generator is running), each voltmeter should read between 100 and 130 volts in a 120-volt system or between 210 and 230 volts in a 220-volt system.

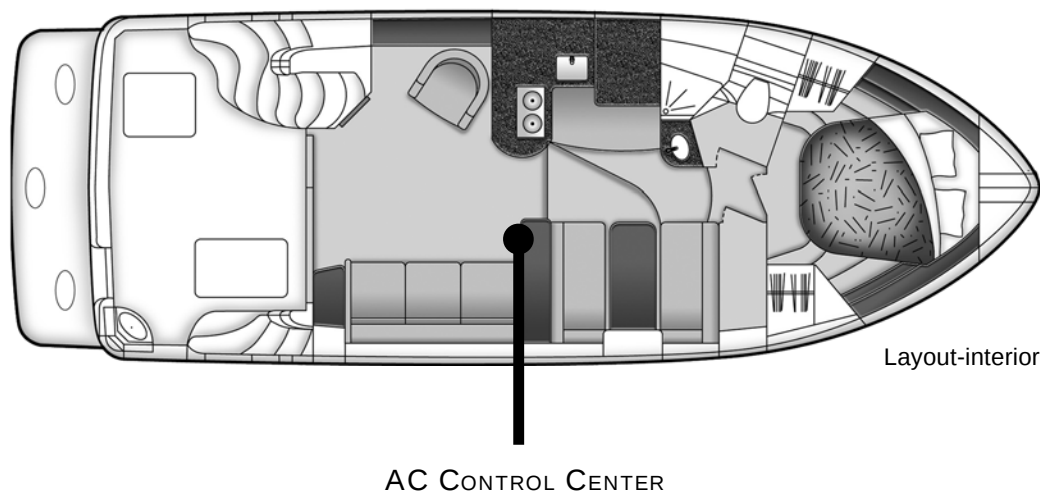
If a voltmeter reads 100 volts or less (205 volts in a 220-volt system), DO NOT USE THE AC SYSTEM; in this situation, either contact the marina’s management to identify and correct a shore power problem, or have a qualified technician service your generator.

If a voltmeter reads zero voltage, it means that no electricity is reaching the AC Control Center for the respective line circuit. If you are using the generator, make sure:

- It is operating properly.
- The safety circuit breaker on the generator control panel is “ON.”

If you are using shore power, make sure:

- Your shore power cord(s) is properly attached to the shore power source.
- The circuit breaker(s) at the shore power source box is “ON.”
- The Main circuit breaker(s) on the AC Control Center is “ON.”



If the voltmeter continues to read zero voltage, either have a qualified technician service your generator or contact the marina's management to identify and correct a shore power problem. If the problem appears to be with your boat's AC electrical system, have the system inspected by a qualified electrician.

3.3.2.2 Shore #1 and #2 Polarity Indicators

These indicators show the polarity of the shore power voltage for the Line 1 and Line 2 circuits, respectively.



CAUTION

If reverse polarity occurs, immediately switch the respective AC Main circuit breaker group(s) "OFF."

If the polarity is correct, the Safe indicator illuminates. If the polarity is incorrect, the Reverse indicator illuminates. Refer to **3.2.1 Shore Power** for information on correcting reverse polarity.

3.3.2.3 Shore #1 and #2 Ammeters

These ammeters indicate the amount of current that is being drawn by the Line 1 and Line 2 circuits, respectively.

When the Main circuit breaker is "ON," all other breakers on the AC Control Center are "OFF," and the voltmeter is reading between 100 and 130 volts in a 120-volt system (210 and 230 volts in a 220-volt system), the ammeter should read zero amps.

As you switch the circuit breakers on the AC Control Center "ON" and turn on their associated equipment or turn on equipment plugged into

the AC receptacles, the ammeter readings increase above zero amps. Refer to **3.5 Electrical Loads** for information on the AC electrical system load limits.

3.3.2.4 Shore #1 and #2 Main

These breakers control the flow of electricity to the rest of the Line 1 and Line 2 circuit breakers, respectively, on the AC Control Center. Switch the Main breakers “ON” to supply power to the other circuit breakers.

3.3.2.5 Receptacles One

This breaker controls the flow of electricity to the receptacles on the starboard side of the boat. Switch this breaker “ON” to supply power to these receptacles. Use the receptacles as you would the outlets in your home.

NOTE: *If this circuit breaker is “ON” but power is not available at any of the receptacles in this group, the circuit’s GFCI breaker may have tripped. Refer to **3.4 Ground Fault Circuit Interrupters** for more information.*

3.3.2.6 Receptacles Two

This breaker controls the flow of electricity to the receptacles on the port side of the boat, except those in the galley. Switch this breaker “ON” to supply power to these receptacles. Use the receptacles as you would the outlets in your home.

NOTE: *If this circuit breaker is “ON” but power is not available at any of the receptacles in this group, the circuit’s GFCI breaker may have tripped. Refer to **3.4 Ground Fault Circuit Interrupters** for more information.*

3.3.2.7 Receptacles Galley

This breaker controls the flow of electricity to the receptacles in the galley, and to the galley refrigerator/freezer. Switch this breaker “ON” to supply power to these receptacles and to operate the refrigerator using AC power. Use the receptacles as you would the outlets in your home.

NOTE: *If this circuit breaker is “ON” but power is not available at any of the receptacles in this group or to the refrigerator, the circuit’s GFCI breaker may have tripped. Refer to **3.4 Ground Fault Circuit Interrupters** for more information.*

3.3.2.8 Range

This breaker controls the flow of electricity to the galley’s stove top. Switch this breaker “ON” to supply power to the stove top. Refer to the OEM information for details on operating the stove top.

3.3.2.9 Water Heater



WARNING

Do not supply power to the water heater when it is empty. Doing so may damage the unit's heating element. Refer to "4.2 Fresh Water System" to fill, pressurize and prime the fresh water system before turning on the water heater.

This breaker controls the flow of electricity to the water heater. The water heater supplies hot water to your fresh water system. Switch this breaker "ON" to supply power to the water heater. Refer to **4.2 Fresh Water System** for more information.

3.3.2.10 Microwave

This breaker controls the flow of electricity to the galley's microwave oven and integral coffeemaker. Switch this breaker "ON" to supply power to the microwave. Refer to the OEM information for details on operating the microwave oven and coffeemaker.

3.3.2.11 Battery Charger 1

This breaker controls the flow of electricity to the battery charger that maintains the voltage levels in the engine and "house" batteries. Switch this breaker "ON" to supply power to the battery charger. Refer to the OEM information for details on operating the battery charger.

3.3.2.12 Battery Charger 2

This breaker controls the flow of electricity to the battery charger that maintains the voltage level in the generator's battery. Switch this breaker "ON" to supply power to the battery charger. Refer to the OEM information for details on operating the battery charger.

3.3.2.13 Icemaker

This breaker controls the flow of electricity to the optional icemaker located in the cockpit. Switch this breaker "ON" to supply power to the icemaker. Refer to the OEM information for details on operating the icemaker.

3.3.2.14 A/C Unit



CAUTION

Do not switch the A/C Unit breaker "ON" until after you have opened the seacock that supplies the air conditioning system with seawater. Refer to "4.1 Air Conditioning System" for more information.

This breaker controls the flow of electricity to the air conditioning unit and its water pump.

3.3.2.15 Spare

These breakers are reserved for aftermarket accessories you install on your boat.

3.4 Ground Fault Circuit Interrupters

When someone receives an electrical shock through a GFCI receptacle, the current flowing to the receptacle continues flowing through the person's body and into any grounded object the person is touching or standing on. Thus, the current does not return from the receptacle through the appropriate wire. The GFCI "sees" this difference in current and shuts off power to the receptacle. This limits the amount of time the person is being shocked to a brief moment, which can reduce the amount of injury to the person.



DANGER

Any electrical shock from the AC electrical system, even through a GFCI receptacle, can cause death or serious injury. Always seek immediate medical attention after receiving such a shock.

3.4.1 GFCI Receptacle Locations

Three GFCI receptacles are installed on your boat. Each one protects a group of receptacles that can include both open outlets and those that are already in use for built-in equipment. A GFCI receptacle is located:

- In the port aft corner of the salon, to protect the port receptacles, except for those in the galley.
- In the galley above the trash container, to protect the galley receptacles.
- In the cockpit on the side of the starboard side deck staiway, to protect the starboard receptacles.

3.4.2 Testing GFCI Receptacles

The GFCI receptacles are identified by Test and Reset buttons located between the receptacles' two outlets.

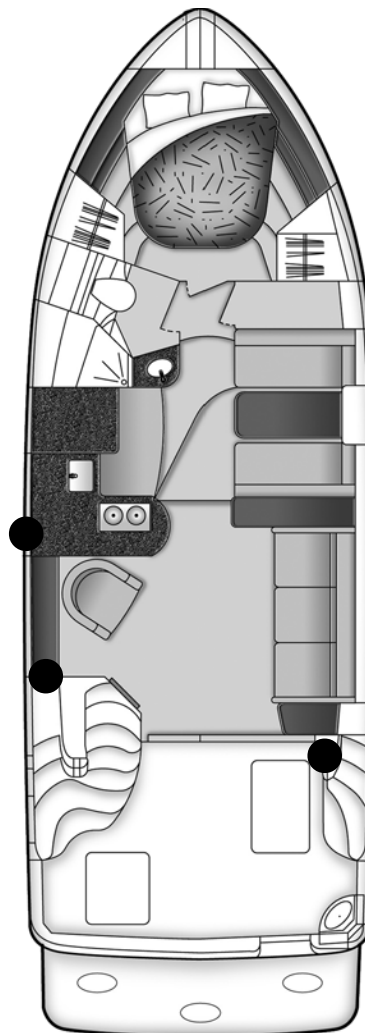
Test each GFCI receptacle once every week:

1. Press the Test button. If the GFCI is operating normally, this cuts the power supply to the GFCI receptacle and to all other receptacles on that circuit.

**WARNING**

If the GFCI receptacle or any other receptacle on that circuit still has power after the Test button is pressed, do not use any of the receptacles on that circuit. Contact a qualified electrician to make the appropriate repairs.

2. Plug a lamp or other AC powered device into the GFCI receptacle and turn on the device. The device should not operate.
3. Repeat Step 2 for each receptacle on the same circuit as the GFCI receptacle.
4. Press the Reset button to restore power to the GFCI receptacle and to all other receptacles on that circuit.

GFCI RECEPTACLE LOCATIONS

Layout-interior

3.5 Electrical Loads

When operating AC powered devices through your boat’s AC electrical system, be aware that each device exerts a “load” on the system. This load is equal to the amount of current (amps) that the device draws from the AC electrical system. The AC electrical system, like your house’s electrical system, has a maximum total load that it can handle. Each line circuit has an electrical load capacity of 30 amps.

If the total load on the circuit exceeds the circuit’s capacity, the breaker for that circuit trips. This means that the devices operating from the circuit are drawing too much current.

**CAUTION**

Do not overload the electrical circuits. If an excessive load trips a circuit breaker, turn off all devices connected to the circuit, then switch the breaker back “ON.”

A list of common AC powered devices and the approximate maximum current that they draw when operating is shown below. If you use an AC powered device that has an electric motor, such as a vacuum cleaner or electric drill, the device should have a “motor load plate” mounted on it. This plate lists the current that the device draws while operating.

ELECTRICAL LOADS

AC Device	Approximate Maximum Current Used (Amps)
Fan	0.7
Electric blanket	2.0
Television	2.7
Coffee maker	6.3
Battery charger	7.3
Toaster	10.5
Fry pan	12.3
Space heater	13.7
Refrigerator	1.5

As the chart indicates, appliances that use a motor or a heating element draw relatively large amounts of current. Therefore, be especially careful when using curling irons, toasters, coffee makers, hair dryers, food mixers or similar types of AC powered devices. Do not use too many of these types of devices at the same time.

3.6 Bonding System

Your boat is equipped with a comprehensive metallic bonding system that interconnects all underwater equipment and thru-hull fittings. The bonding system ensures that the “cases” of all metallic equipment onboard your boat, including the fittings, are at the same electrical potential. This minimizes corrosion of the underwater fittings caused by stray electrical currents.

Included within this bonding system are sacrificial zinc anodes that have been installed on each of the boat’s propeller shafts and onto the underwater portion of the boat’s transom. These anodes corrode and deteriorate before the boat’s underwater fittings and provide a visual reference to the level of stray current to which your boat is being exposed.

Your boat’s 12-volt DC electrical system, AC electrical system, and the batteries’ negative leads are all connected to the bonding system through buss bars. The buss bars are located in the engine room and bilge area and are connected to the transom-mounted zinc plate.



CAUTION

Do not tamper with or modify the boat’s bonding system. Doing so could threaten the integrity of the system.



CAUTION

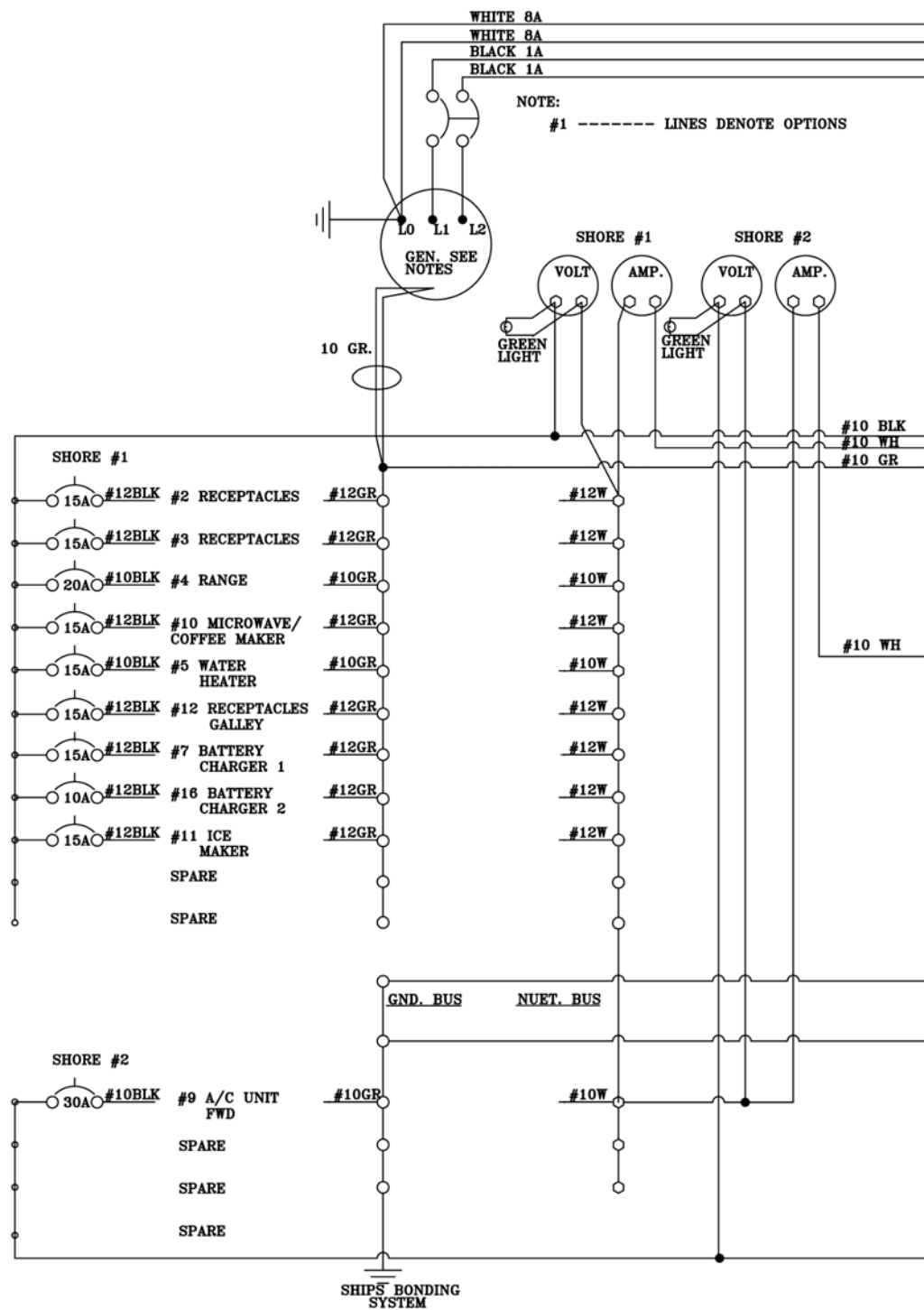
Monitor the condition of your boat’s zinc anodes. Replace the zinc anodes when they have deteriorated to 50% of their original size. Do not allow the zinc anodes to completely deteriorate. Refer to “7.1 Maintenance Schedule” for recommended inspection intervals.

NOTE: *Damage resulting from stray current or galvanic corrosion is NOT covered under the Carver limited warranty.*

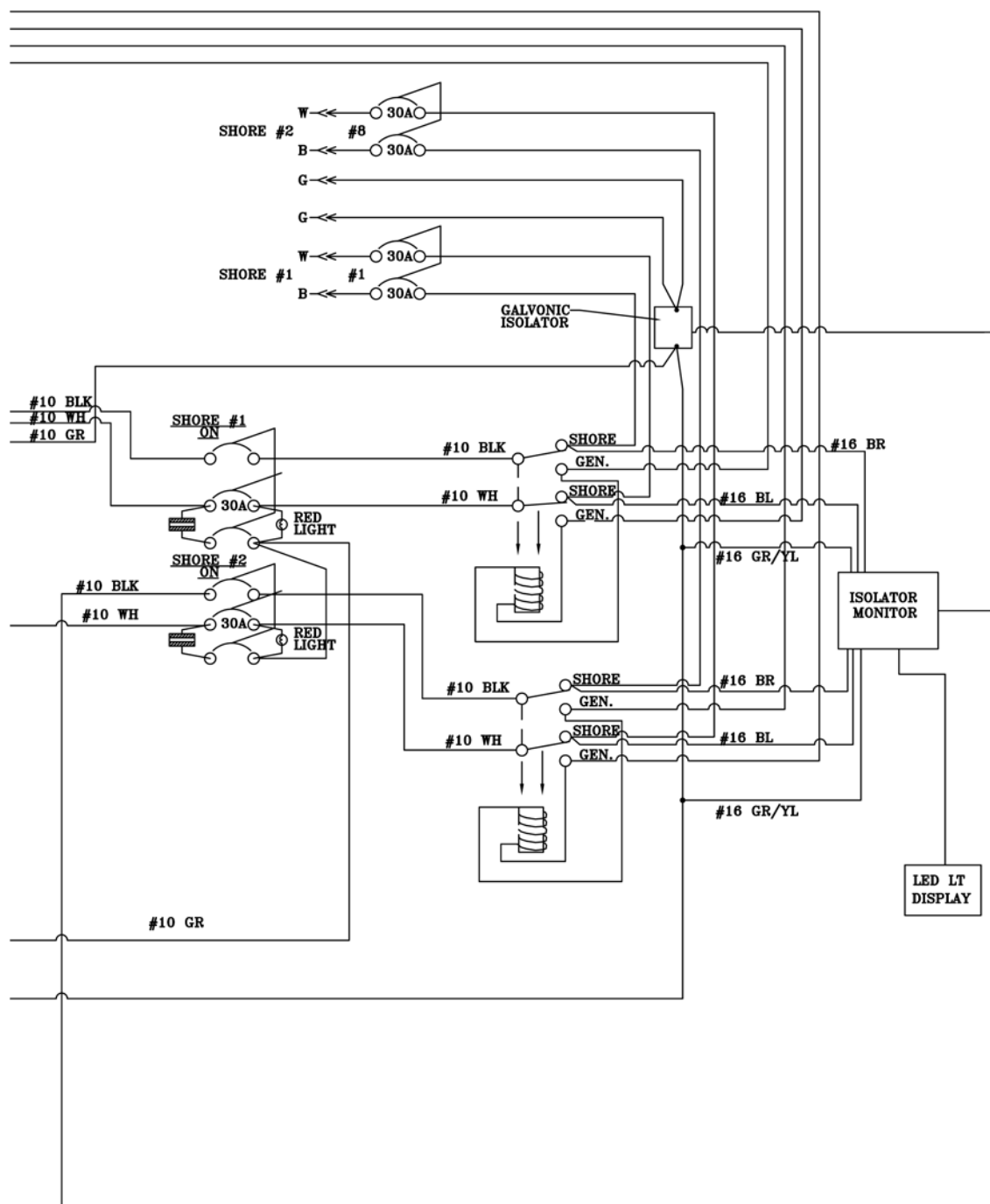
3.7 Troubleshooting the AC Electrical System

Problem	Possible Cause	Possible Solution
Voltmeter on the AC Control Center reads zero volts.	Shore power cord is not connected.	Connect the shore power cord.
	There is no power at the shore power source box.	Contact marina management.
	The circuit breaker installed in the shore power source box is "OFF."	Switch the circuit breaker "ON."
	The AC Main circuit breaker group is "OFF."	Switch the AC Main "ON."
	The shore power cord failed.	Replace the cord.
	The generator ran out of fuel.	Check the fuel level in the port fuel tank; refuel if necessary.
	The safety circuit breaker on the generator control panel is "OFF."	Switch the circuit breaker "ON." Refer to the OEM information.
	The generator failed.	Contact a qualified electrician to make the appropriate repairs.
	The voltmeter failed.	Contact a qualified electrician to make the appropriate repairs.
	A wire within the AC electrical system is loose or disconnected.	Contact a qualified electrician to make the appropriate repairs.
No power at the receptacles, but the voltmeter on the AC Control Center indicates an adequate voltage level.	The Shore #1 or Shore #2 Main circuit breaker on the AC Control Center is "OFF."	Switch the circuit breaker "ON."
	The Receptacles breakers on the AC Control Center are "OFF."	Switch the circuit breakers "ON."
	A GFCI tripped.	Locate the tripped GFCI and press the Reset button.
The Shore #1 or Shore #2 Main circuit breaker on the AC Control Center trips immediately after being reset.	The circuit breaker failed.	Contact your Carver Dealer to have the circuit breaker replaced.

3.8 AC Schematic



3327-300-015a



3327-300-015b

4.0 Internal Systems

4.1 Air Conditioning System

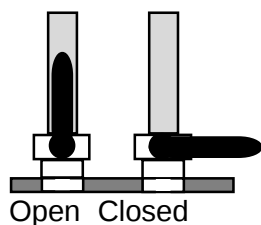
For the air conditioning system to operate it needs a source of AC power (supplied by either a shore power source or the generator) and a supply of seawater (either salt or fresh).

The air conditioning system consists of one air conditioning unit. This unit is located either beneath the storage locker forward of the dinette or in the optional second stateroom.

4.1.1 Producing Heat

The air conditioning system can produce heat when it is operated in reverse cycle mode. Reverse cycle operation, however, is affected by the temperature of the seawater. As seawater temperature decreases so does the air conditioning system's ability to produce warm air. Carver recommends that the air conditioning system not be operated in reverse cycle mode when the seawater temperature is below 40 degrees F.

4.1.2 Powering the Air Conditioning



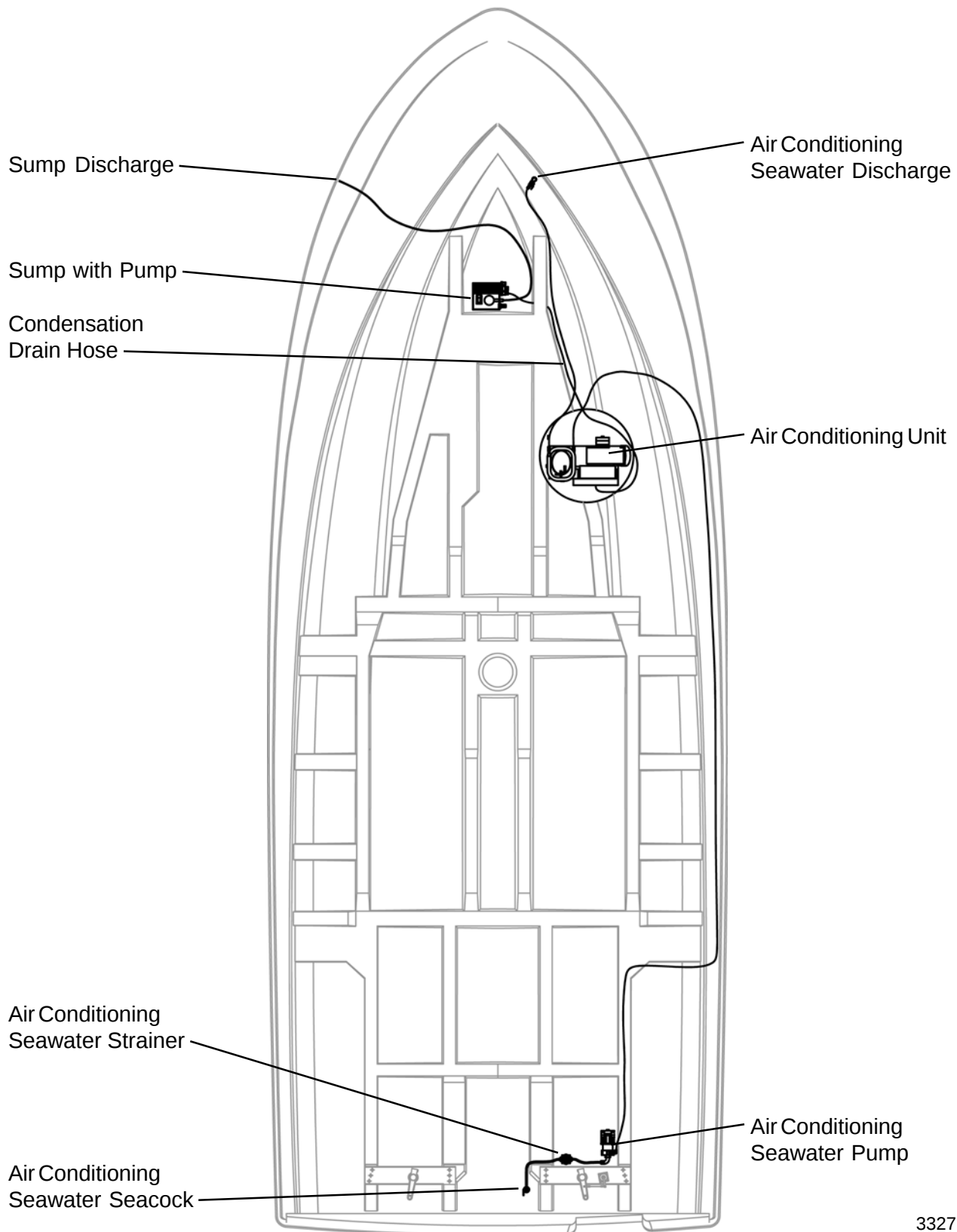
1. Make sure the air conditioning seacock is closed. Remove and clean the air conditioning system's seawater strainer. The strainer prevents debris in the seawater from entering the air conditioning system. The seacock, strainer and pump are located beneath a hatch in the cockpit. Refer to **9.7.1 Hatches** for the exact location of the strainer.
2. Reinstall the seawater strainer. If the strainer leaks when the air conditioning seacock is opened, close the seacock, then check the strainer for correct installation.



CAUTION

Do not run the air conditioning system's water pump when the seacock that supplies seawater to the system is closed. Operating the pump with no seawater can damage it.

3. Open the A/C seacock to supply seawater to the A/C pump.
4. Supply AC power to your boat. Refer to **3.2.1 Shore Power** or **3.2.2 Generator Power** to do this.

Air Conditioning System

3327 AC

**CAUTION**

Because the air conditioning unit's condensation drains into the sump, the Shower Sump circuit breaker on the Safety Breaker Panel must be "ON" whenever the air conditioning system is operating.

5. On the Safety Breaker Panel, verify that the Shower Sump circuit breaker is "ON."
6. On the AC Control Center:
 - a. Switch the Shore #2 Main circuit breaker "ON."
 - b. Switch the A/C Unit circuit breaker "ON."
7. Verify that seawater is being pumped through the air conditioning unit. As the seawater exits the units, it flows out of a discharge thru-hull fitting. Refer to **9.7.3 Thru-Hull Fittings** for the location of this thru-hull fitting.
8. Use the controls for each air conditioning unit to set the desired temperature. The controls are located in the salon and master stateroom. Refer to the OEM information for details on operating the air conditioning controls.

4.2 Fresh Water System

The capacity of your boat's fresh water system is approximately 89 gallons. The water is divided between one 78-gallon fresh water tank and an 11-gallon water heater. The water tank and water heater are located beneath a hatch in the cockpit. Refer to **9.7.1 Hatches** for the exact location of the water tank and water heater.

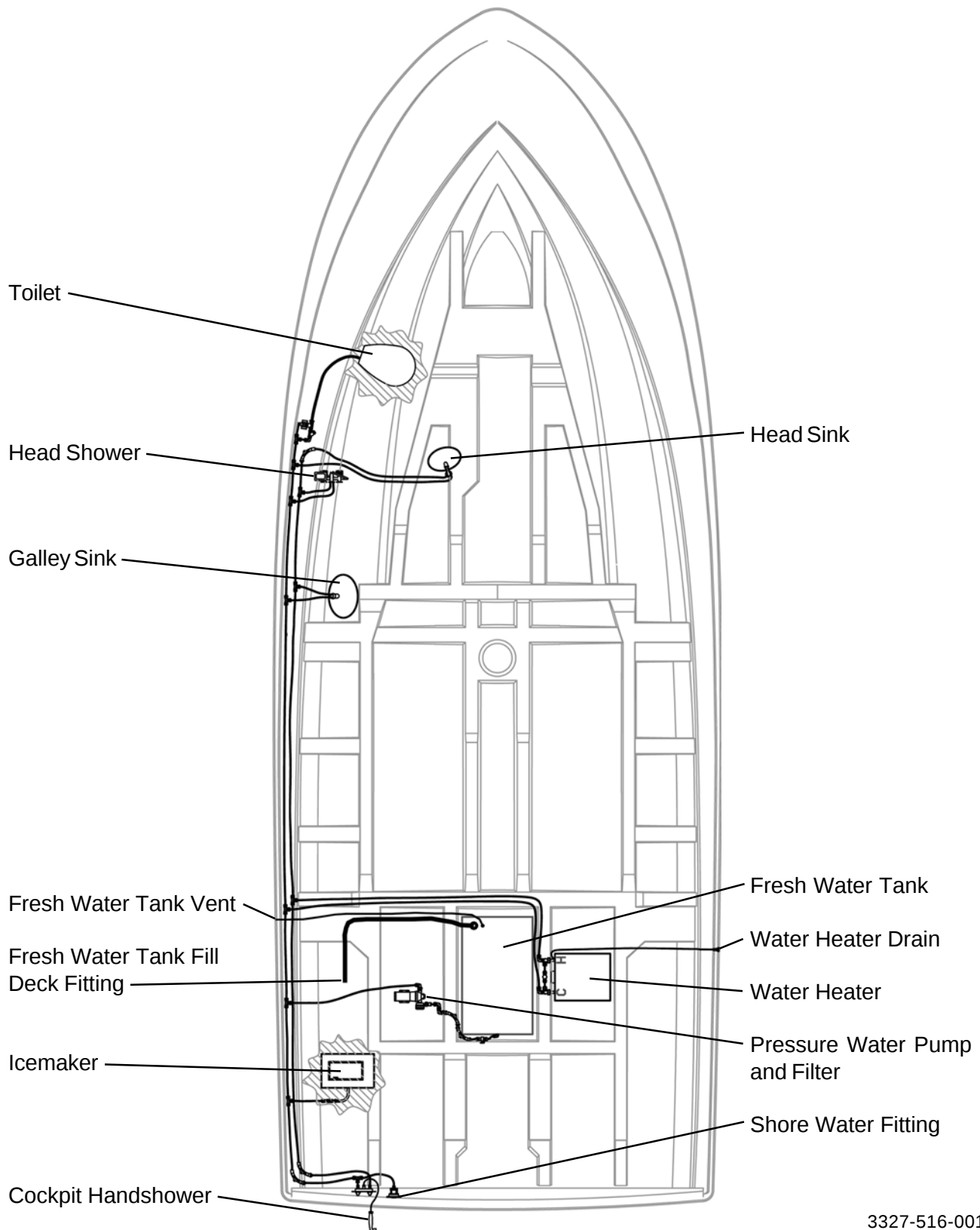
4.2.1 Filling the Water Tank

The fresh water tank is filled through a single deck fitting with a plate labeled "WATER." The plate is located in the cockpit on the port side deck stairway. Refer to **9.7.2 Deck Plates** for the exact location of this plate.

NOTE: *Thoroughly flush and sanitize the water system before initial use and at least once each season.*

**CAUTION**

Do not overfill the water tank or leave the fill hose unattended while the tank is being filled. Overfilling the tank could cause it to rupture.

Fresh Water System

3327-516-001

Put only clean, fresh water into your water tank. The tank is full when water is discharged from the water tank vent, located on the aft port hull. Refer to **9.7.3 Thru-Hull Fittings** for the exact location of the water tank tank vent.

4.2.2 Pressurizing and Priming the Water System

Perform the following **ONLY** after the fresh water tank is full.

1. On the Safety Breaker Panel:
 - a. Turn the “house” battery master disconnect switch to the “ON” position.
 - b. Switch the Main - One circuit breaker “ON.”
 - c. Verify that the Shower Sump circuit breaker is “ON.”
2. Partially open all cold water faucets, including the faucets for the optional cockpit hand shower and cockpit fresh water washdown.
3. On the DC Control Center:
 - a. Switch the Main circuit breaker “ON.”
 - b. Switch the Water Pump circuit breaker “ON.” This activates the boat’s pressure water pump, which pressurizes the water system. The pump is located beneath a hatch in the cockpit. Refer to **9.7.1 Hatches** for the exact location of the water pump.

A Tip From Carver!

If your boat will be left unattended for at least a few days, switch the Pressure Water Pump circuit breaker “OFF.” If this breaker is left on, pressure in the fresh water system may fall and cause the water pressure pump to engage. If this happens frequently, it could discharge your batteries.

4. The fresh water system is primed when all air is purged from the system’s pipes. Monitor each sink tap, shower head, and washdown. When a steady stream of cold water flows from the tap, shower head, or washdown, close its cold water faucet, then open its hot water faucet (the washdown provides cold water only). When a steady stream of hot water flows from the tap or shower head, close its hot water faucet. When you have done this for each sink tap, shower head, and washdown, the water system is primed.
5. Add water to the fresh water tank to replace that which was used in the previous step. Refer to **4.2.1 Filling the Water Tank**.

When water pressure within the system increases to a predetermined point, the pressure water pump automatically shuts off. Priming the system also fills and maintains the water level within the water heater.

4.2.3 Using the Water System

The fresh water system is designed to operate in the same manner as the water system in your home. After filling, pressurizing, and priming the fresh water system, simply open a faucet to receive fresh water. As you draw water from the system, the pressure in the system decreases. When the pressure decreases to a predetermined point, the pressure water pump automatically turns on and increases the pressure. This ensures a steady flow of water any time you open a faucet.

Sometimes a recently filled system or one that has not been used for some time may need re-priming. This is normal and is caused by an accumulation of air bubbles at the pressure water pump. To re-prime the fresh water system, repeat the steps in **4.2.2 Pressurizing and Priming the Water System**.

4.2.3.1 Water Heater



WARNING

Do not supply power to the water heater when it is empty. Doing so may damage the unit's heating element. Fill, pressurize, and prime the fresh water system as described in "4.2.1 Filling the Water Tank" and "4.2.2 Pressurizing and Priming the Water System" before turning on the water heater.

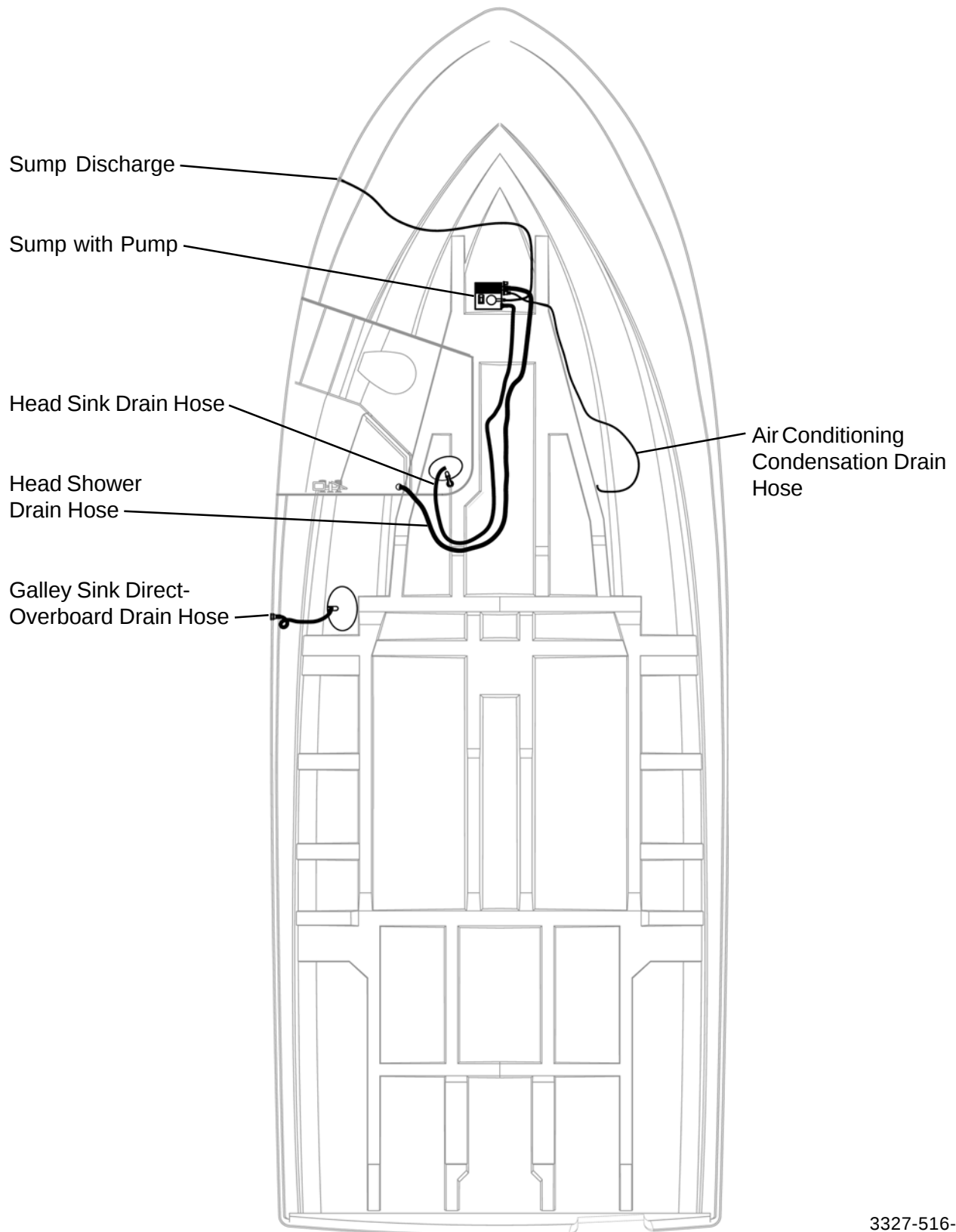
To operate the water heater:

1. Fill, pressurize and prime the fresh water system. This automatically fills the water heater.
2. On the AC Control Center, switch the Shore #1 Main circuit breaker "ON," then switch the Water Heater circuit breaker "ON."
3. Refer to the OEM information for details on operating the water heater.

4.2.3.2 Shower and Sinks

Your boat has a shower and sink in the head, and a sink in the galley.

Used (grey) water from the galley sink flows directly overboard, unless the optional grey water holding system is installed. Grey water from the head sink and shower drains into a sump. Because the sump is located below the boat's waterline, a pump is needed to drain the sump and

Grey Water System

3327-516-004

discharge its water overboard or into an optional grey water holding tank. When the Auto Sump circuit breaker on the Safety Breaker Panel is “ON,” the sump pump operates automatically when water in the sump rises above a predetermined level.

NOTE: *The sump pump can not operate if the Auto Sump circuit breaker is “OFF.” Verify that the circuit breaker is “ON” before using the shower or sinks.*

A Tip From Carver!

To obtain the most consistent shower temperature, turn on the cold water faucet fully, then slowly turn on the hot water faucet until the water flowing from the shower head is at the desired temperature. This method keeps the pressure water pump running, eliminating widely fluctuating water temperatures.

4.2.3.3 Cockpit Hand Shower

The optional cockpit hand shower enables you and your guests to rinse off with warm, fresh water after swimming without having to enter the cabin. The hand shower is especially useful if you operate your boat in salt water.

The hand shower is an integral part of your boat’s fresh water system. Simply turn on the faucets and adjust them for the desired water temperature. The hand shower and its faucets are located in the cockpit in the small aft locker.

4.2.3.4 Fresh Water Washdown

The optional cockpit fresh water washdown enables you to use water from the fresh water tank to washdown and clean your boat. Fresh water washdown is especially useful if you operate your boat in salt water.

To use the fresh water washdown:

1. Locate the transom-mounted hose fitting, which is in the cockpit in the small aft locker.
2. Attach one end of an appropriately sized garden hose to the hose fitting you wish to use.
3. Attach a nozzle to the other end of the hose. The best type of nozzle to use is the “pistol grip” type that can be opened and closed by squeezing your hand.
4. Open the faucet at the base of the hose fitting to supply water to the hose. Use the washdown as you would a garden hose at your home.

A Tip From Carver!

Remember that the fresh water washdown system draws its water from the boat's fresh water tank. Prolonged use of the washdown system quickly reduces the amount of fresh water in the water tank.

4.2.4 Shore Water

Your boat has a shore water fitting that enables your fresh water system to draw water from a land water source while your boat is docked. When you use shore water you are not drawing water from the onboard water tank.

NOTE: *Connecting your boat to shore water bypasses the boat's fresh water tank and pressure water pump, therefore the water tank does not get filled. The only way to fill the fresh water tank is through the deck plate labeled "WATER."*

When you connect your boat to shore water, switch the Water Pump circuit breaker on the DC Control Center "OFF."

To connect to shore water:

1. Locate the shore water fitting, labeled "SHORE WATER," in the cockpit in the port aft locker.
2. Attach one end of a garden hose to the shore water fitting.
3. Attach the other end of the hose to the dockside water tap.
4. Close all sink and shower faucets.
5. On the Safety Breaker Panel, verify that the Shower Sump circuit breaker is "ON."
6. Turn ON the dockside water tap.

**CAUTION**

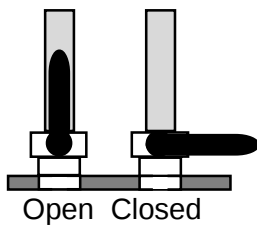
Do not leave your boat unattended when it is connected to shore water. Should one of the water lines in your boat develop a leak, an unlimited amount of water could enter your boat. Disconnect the shore water hose whenever you leave your boat unattended.

4.3 Raw Water Washdown

The optional transom raw water washdown enables you to use seawater to washdown and clean your boat.

To use the raw water washdown:

1. Locate the transom-mounted hose fitting, in the cockpit in the port aft locker.
2. Attach one end of an appropriately sized garden hose to the hose fitting.
3. Attach a nozzle to the other end of the hose. The best type of nozzle to use is the “pistol grip” type that can be opened and closed by squeezing your hand.



4. Make sure the raw water washdown seacock is closed. Remove and clean the raw water washdown's seawater strainer. The strainer prevents debris in the seawater from entering the washdown pump. The seacock, strainer and pump are located beneath a hatch in the cockpit. Refer to **9.7.1 Hatches** for the exact location of the seacock, strainer and pump.
5. Reinstall the seawater strainer. If the strainer leaks when the raw water washdown seacock is opened, close the seacock, then check the strainer for correct installation.
6. Open the washdown seacock to supply seawater to the washdown pump.
7. On the Safety Breaker Panel:
 - a. Turn the “house” battery master disconnect switch to the “ON” position.
 - b. Switch the Main - One circuit breaker “ON.”



CAUTION

Do not operate the washdown pump when the seacock that supplies seawater to the washdown system is closed. Operating the pump with no seawater can damage it.

8. On the DC Control Center, switch the Main circuit breaker “ON,” then switch the Washdown Pump circuit breaker “ON.” This activates the boat's raw water washdown pump.

9. The raw water washdown pump, when activated, creates pressure in the raw water washdown system. When the hose nozzle is closed, water pressure within the system increases to a predetermined point at which the pump automatically shuts off. When the hose nozzle is open, releasing water from the system, the pressure in the system decreases. When the pressure decreases to a predetermined point, the pump automatically turns on and increases the pressure. This ensures a steady flow of water any time you use the raw water washdown.

4.4 Bilge System

Your boat contains one bilge and two automatic bilge pumps. The bilge is the lowest point in the interior of the boat's hull where any water that finds its way into the hull will accumulate. Each bilge pump can remove up to 1500 gallons of water per hour.

- The forward bilge pump is located beneath a hatch at the base of the forward engine room bulkhead. Refer to **9.7.4 Engine Room** for the exact location of the forward bilge pump.
- The aft bilge pump is located beneath a hatch in the cockpit at the stern. If your boat was built for use in Europe, there is also a hand bilge pump aft. Refer to **9.7.1 Hatches** for the exact location of the aft bilge pump.



CAUTION

Never store anything in the bilge. Storing loose items in the bilge could damage pumps, pipes or other components that are essential for the proper operation of your boat.



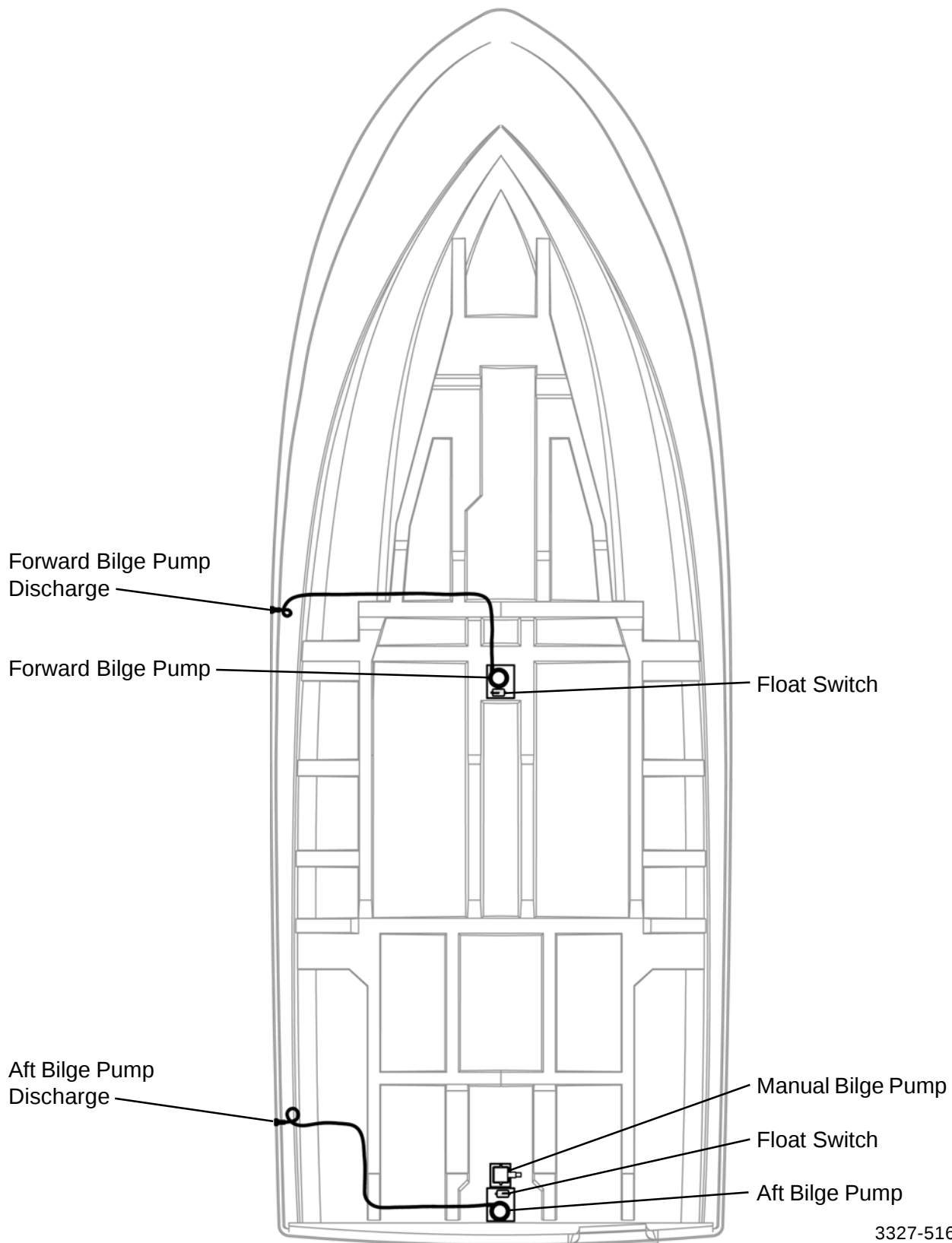
CAUTION

If you keep your boat in a climate where temperatures can drop below freezing, make sure that all water within the bilge is drained before you store the boat for the winter. Water that freezes in the bilge could cause severe damage to your boat and its components. Refer to "8.3.6 Bilge" for more information on winterizing the bilge.

4.4.1 Bilge Pump Operation

For safety and convenience, each bilge pump can be operated either automatically or manually.

The bilge pumps remove almost, but not quite, all of the water that collects within the bilge. If you want the bilge to be completely dry, use a sponge and bucket to remove the small amount of water that remains.

Bilge System

3327-516-003

NOTE: *Before operating your boat's bilge pumps, wipe up any oil that may have accumulated in the bilge. Pumping oil overboard contributes to water pollution and is in violation of the Federal Water Pollution Control Act. Violators are subject to a substantial penalty.*

Your boat is equipped with a high bilge water alarm. If the alarm sounds, there is most likely a hull breach, faulty bilge pump, or faulty seacock/hose. Immediately identify and correct the cause of the high water, and remove the water. Silence the alarm by turning its circuit switch "OFF." The switch is located in the same cabinet as the AC and DC Control Centers.

A Tip From Carver!

A certain amount of water always collects in your boat's bilge, especially where the shaft log is located. The small amount of water that normally accumulates is usually not enough to activate an automatic float switch.

While underway and on plane, use the helm switches to manually turn the bilge pumps on and let them run for 30 seconds to a minute.

When your boat is on plane, water in the bilge flows to the aft of the boat, where the aft bilge pump is located. The forward bilge pump is near the lowest point in the hull when the boat is at rest.

4.4.1.1 Automatic Operation

Each bilge pump is wired to its own circuit breaker on the Safety Breaker Panel and then routed to the "house" battery. Incorporated into each bilge pump is a float switch. If the pump is not already operating, the float switch automatically turns on the appropriate bilge pump when bilge water rises to a predetermined level. The pumps operate in automatic mode as long as the Auto Bilge Pump circuit breakers on the Safety Breaker Panel are "ON." Periodically test each switch by lifting the float, which should turn the bilge pump on.

NOTE: *The Auto Bilge Pump circuit breakers should be "ON" at all times so that the pumps can operate in automatic mode when necessary.*

4.4.1.2 Manual Operation



CAUTION

When operating a bilge pump in manual mode, turn the pump "OFF" when the bilge water level is so low that the pump can not drain it. Allowing the pump to operate when it is not pumping water can damage it.

To operate the bilge pumps manually, press the Forward and Aft Bilge Pump switches, located at the helm, to their up position. This activates the two bilge pumps.

4.4.2 Hull Drain

Your boat is equipped with one hull drain. The drain allows water to drain from the bilges while the boat is in dry storage. The boat and cradle should be positioned to allow water to flow toward the hull drain. The drain is located in the transom in the deepest portion of the hull's "V."



CAUTION

Make sure the hull drain plug is securely screwed into the hull drain before launching the boat.

A Tip From Carver!

Coat the threads of the hull drain plug with waterproof grease before you install the plug into the hull drain fitting. This makes it easier to remove the plug at a later date.

4.5 Sanitation System

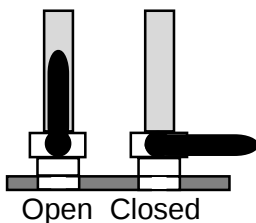
Your boat's sanitation system includes the head, waste tank, and the optional overboard waste discharge system. When properly used, this system conforms to all United States antipollution laws.

4.5.1 Toilet

The toilet uses either raw water (standard) or fresh water (optional) and an electric pump to remove waste from the head. If you have guests who are unfamiliar with marine sanitation systems, instruct them on how to properly use the toilet. Refer to the OEM information for details on operating the toilet.

To operate the toilet system:

1. Provide water to the toilet:



For a raw water toilet, open the seacock that supplies seawater to the toilet. The seacock is located in the engine room near the forward outboard corner of the port engine.

For a fresh water toilet, either make sure there is sufficient water in the fresh water tank or connect the fresh water system to shore water.

2. On the Safety Breaker Panel:
 - a. Turn the “house” battery master disconnect switch to the “ON” position.
 - b. Switch the Main - One circuit breaker “ON.”
3. On the DC Control Center:
 - a. Switch the Main circuit breaker “ON.”
 - b. Switch the Electric Head circuit breaker “ON.”
4. Use the control switches mounted on the bulkhead next to the toilet to flush the toilet.

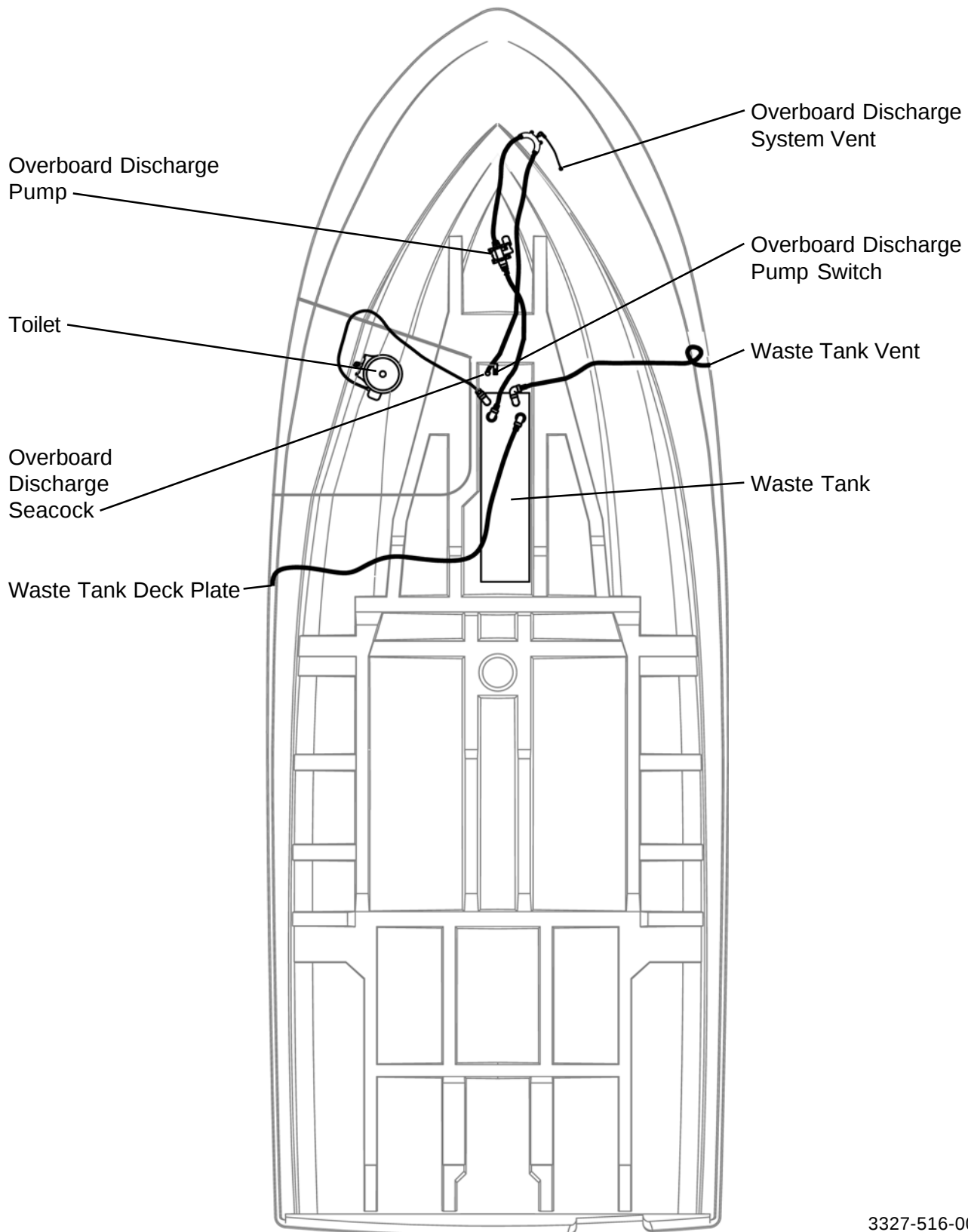
4.5.2 Emptying the Waste Tank

The sanitation system contains one polyethylene waste tank. The tank is located beneath a hatch in the companionway outside the head. Refer to **9.7.1 Hatches** for the exact location of the tank. The two methods of disposing of waste are described below. Use waste tank deodorizer inside the waste tank between pumpouts.

4.5.2.1 Dockside Discharge

With the dockside discharge method, waste is flushed from the toilet to the waste tank where it is stored until it can be transferred to a dockside pumpout station. To empty the tank:

1. Locate a dockside pumpout station.
2. Remove the waste tank deck plate labeled “WASTE” using the removal tool supplied with your boat. This plate is located on the forward port side deck. Refer to **9.7.2 Deck Plates** for the exact location of this plate.
3. Attach the pumpout vacuum hose to the “WASTE” deck fitting. Because the transfer process uses a vacuum action, there must be a secure connection between the transfer hose and the deck fitting.
4. Activate the pumpout vacuum. The pumpout vacuum transfers onboard waste to the dockside holding station.
5. After all waste is removed, flush the waste tank by pouring a few gallons of fresh water through the “WASTE” deck fitting. Reattach the vacuum hose to the deck fitting and activate the pumpout vacuum again to remove the fresh water and any remaining waste.

Sanitation System

3327-516-002

6. Replace the “WASTE” deck plate.

A Tip From Carver!

The WASTE deck plate is not connected to the fitting and does not float. Be careful that you don't drop the plate in the water when you remove it.

If you do lose the plate, you can order a replacement from your Carver Dealer. WASTE deck plates are dropped overboard frequently enough that we suggest you carry an extra in your onboard spare parts kit.

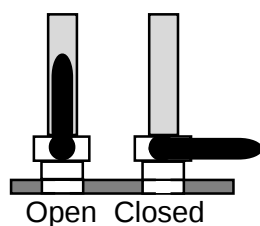
4.5.2.2 Overboard Discharge

NOTE: *It is against the law to discharge waste overboard in many areas of the United States. It is your responsibility to make sure that you are in compliance with all applicable federal, state and local laws when using your boat's overboard discharge system. People who discharge waste overboard in restricted areas are subject to significant penalties.*

In certain coastal areas of the world it is legal to discharge the waste from your boat's waste tank into the sea. To accommodate this procedure Carver offers an optional overboard discharge system for your boat. This system is available only on boats that are exported or used in the coastal areas of the United States.

With the overboard discharge system, waste is flushed from the toilet to the waste tank where it is stored. Where it is legal, you can then empty the waste tank directly overboard. If overboard discharge is not legal where you are, you can either wait until you reach an area where it is legal or use a dockside pumpout station to empty the waste tank.

To empty the tank:



1. Open the overboard discharge seacock. The seacock is located beneath a hatch in the companionway outside the head. Refer to **9.7.1 Hatches** for the exact location of the seacock.
2. If your boat has the optional grey water holding system, turn the Y-valve to select the waste tank. The Y-valve is located next to the overboard discharge seacock. Otherwise, proceed to step 3.
3. On the Safety Breaker Panel:
 - a. Turn the “house” battery master disconnect switch to the “ON” position.
 - b. Switch the Main - One circuit breaker “ON.”

4. On the DC Control Center:
 - a. Switch the Main circuit breaker “ON.”
 - b. Switch the Waste Pump circuit breaker “ON.”
5. Turn the overboard discharge pump switch “ON.” The switch is located near the overboard discharge seacock. Refer to **9.7.1 Hatches** for the exact location of the switch. This activates the overboard discharge pump, which pumps the waste overboard.

**CAUTION**

When the waste tank is empty, turn the overboard discharge pump switch “OFF.” Operating the pump when the waste tank is empty can damage the pump.

6. After all waste is pumped overboard, turn the overboard discharge pump switch “OFF.”
7. Remove the waste tank deck plate labeled “WASTE” using the removal tool supplied with your boat. This plate is located on the forward port side deck. Refer to **9.7.2 Deck Plates** for the exact location of this plate.
8. Flush the waste tank by pouring a few gallons of fresh water through the “WASTE” deck fitting.
9. Reactivate the overboard discharge pump and remove the fresh water and any remaining waste, then turn the pump “OFF.”
10. Close the overboard discharge seacock.
11. Replace the “WASTE” deck plate.
12. On the DC Control Center, switch the Waste Pump circuit breaker “OFF.”

4.6 Grey Water Holding System

Certain areas of the United States and Europe have initiated antipollution regulations that require the use of a grey water holding system on boats.

When the optional grey water holding system is installed, all sink and shower drain water, as well as condensation from the air conditioning unit, drains into a grey water holding system rather than directly overboard. This system contains two 40-gallon holding tanks that are interconnected by a gravity-feed hose so that they function as a single tank.

The two methods of emptying the grey water tanks are described below. Use waste tank deodorizer inside the grey water tanks between pumpouts.

4.6.1 Dockside Discharge

With the dockside discharge method, grey water is stored in the grey water tanks until it can be transferred to a dockside pumpout station. To empty the tanks:

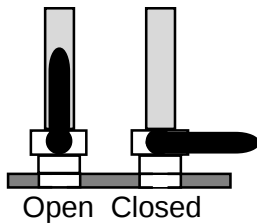
1. Locate a dockside pumpout station.
2. Remove the grey water tank deck plate labeled “WASTE” using the removal tool supplied with your boat. This plate is located on the forward port side deck. Refer to **9.7.2 Deck Plates** for the exact location of this plate.
3. Attach the pumpout vacuum hose to the “WASTE” deck fitting. Because the transfer process uses a vacuum action, there must be a secure connection between the transfer hose and the deck fitting.
4. Activate the pumpout vacuum. The pumpout vacuum transfers onboard grey water to the dockside holding station.
5. After all grey water is removed, flush the grey water tanks by pouring a few gallons of fresh water through the “WASTE” deck fitting. Reattach the vacuum hose to the deck fitting and activate the pumpout vacuum again to remove the fresh water and any remaining grey water.
6. Replace the “WASTE” deck plate.

4.6.2 Overboard Discharge

NOTE: *It is against the law to discharge grey water overboard in some areas of the United States. It is your responsibility to make sure that you are in compliance with all applicable Federal, state, and local laws when using your boat’s overboard discharge system. People who discharge grey water overboard in restricted areas are subject to significant penalties.*

With the overboard discharge method, grey water is stored in the grey water tanks until you enter an area where it is legal to pump the grey water directly overboard. Or, you can still use a dockside pumpout station to empty the grey water tanks.

To empty the tanks:



1. Open the overboard discharge seacock. The seacock is located beneath a hatch in the companionway outside the head. Refer to **9.7.1 Hatches** for the exact location of the seacock.
2. Turn the Y-valve to select the grey water tanks. The Y-valve is located next to the overboard discharge seacock.
3. On the Safety Breaker Panel:
 - a. Turn the “house” battery master disconnect switch to the “ON” position.
 - b. Switch the Main - One circuit breaker “ON.”
4. On the DC Control Center:
 - a. Switch the Main circuit breaker “ON.”
 - b. Switch the Waste Pump circuit breaker “ON.”
5. Turn the overboard discharge pump switch “ON.” The switch is located near the overboard discharge seacock. Refer to **9.7.1 Hatches** for the exact location of the switch. This activates the overboard discharge pump, which pumps the grey water overboard.



CAUTION

When the grey water tanks are empty, turn the overboard discharge pump switch “OFF.” Operating the pump when the grey water tanks are empty can damage the pump.

6. After all grey water is pumped overboard, turn the overboard discharge pump switch “OFF.”
7. Remove the grey water tank deck plate labeled “WASTE” using the removal tool supplied with your boat. This plate is located on the forward port side deck. Refer to **9.7.2 Deck Plates** for the exact location of this plate.
8. Flush the grey water tanks by pouring a few gallons of fresh water through the “WASTE” deck fitting.
9. Reactivate the overboard discharge pump and remove the fresh water and any remaining grey water, then turn the pump “OFF.”
10. Close the overboard discharge seacock.
11. Replace the “WASTE” deck plate.
12. On the DC Control Center, switch the Waste Pump circuit breaker “OFF.”

5.0 Propulsion

Your boat can be equipped with several types of inboard engine packages. The engines may be gas or diesel. This section gives a general overview of your propulsion system and how it works. For a detailed explanation of the engines installed in your boat, including how to operate and maintain them, refer to the OEM information.

5.1 Fuel Systems

Your boat's propulsion engines use either a gasoline or diesel fuel system. The major components used by each system are explained below.

5.1.1 Gasoline Fuel Systems

Each gasoline propulsion engine in your boat is plumbed to the fuel tank located on the same side of the boat as the engine. The generator draws fuel from the starboard fuel tank.

Anti-siphon check valves are installed in gasoline fuel systems between the fuel hose and the fuel tank withdrawal tube. These check valves automatically stop the flow of fuel if the fuel hose ruptures or becomes disconnected.



WARNING

Never remove an anti-siphon check valve from the fuel system. The valves are important safety components. Clean or replace obstructed or sticking valves.

5.1.2 Diesel Fuel Systems

Each diesel propulsion engine in your boat is plumbed to the fuel tank located on the same side of the boat as the engine. The diesel propulsion system uses fuel supply and return lines. The supply lines feed fuel to the engine. The return lines transfer fuel not burned by the engine back to the fuel tank. The generator draws fuel from the starboard fuel tank.

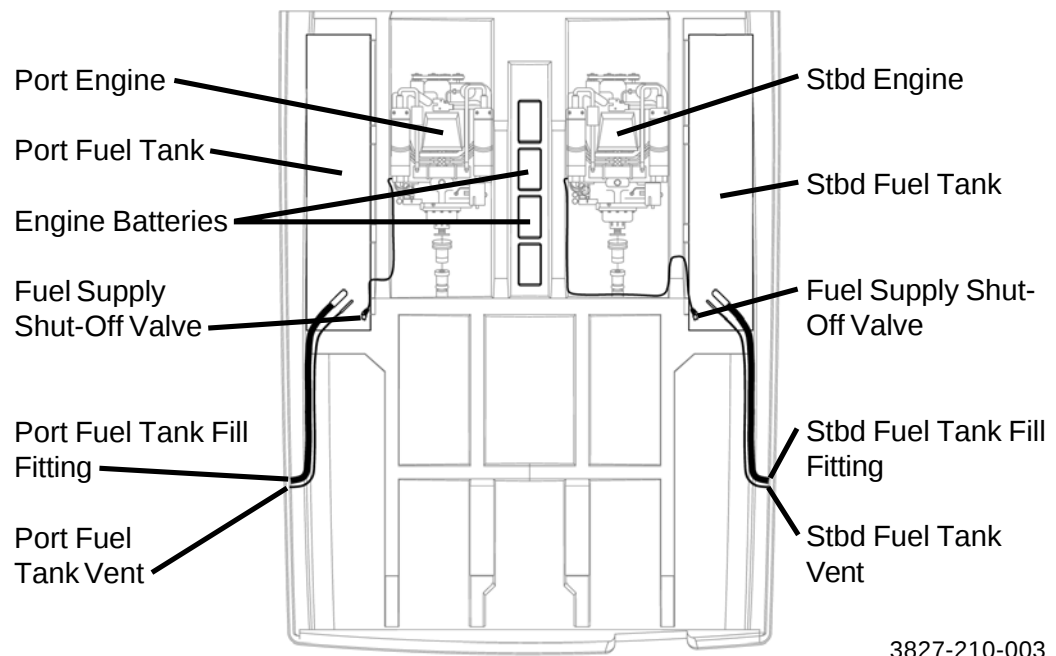
5.1.2.1 Fuel Transfer Pump

A fuel transfer pump is included with the diesel fuel system. Because the generator draws fuel only from the port fuel tank, the fuel levels in the tanks may become unequal. If this occurs, use the fuel transfer pump to pump fuel from one tank to the other until the fuel levels are equal.

To transfer fuel between fuel tanks:

1. Open the fuel transfer line valves. These valves are located on the bottom of the fuel tanks near the aft inboard corner.

FUEL SYSTEM - GASOLINE



2. On the Safety Breaker Panel:

- a. Turn the “house” battery master disconnect switch to the “ON” position.
- b. Switch the Main - One circuit breaker “ON.”

3. On the DC Control Center:

- a. Switch the Main circuit breaker “ON.”
- b. Switch the Fuel Transfer Pump circuit breaker “ON.”

4. Check the fuel gauges at the helm. Identify the fuel tank that has the highest fuel level.

5. Turn the fuel transfer switch, located at the helm, to the fuel tank to which you want the fuel to flow.

6. Monitor the fuel gauges as the fuel transfers. When the fuel levels in the tanks are equal, turn the fuel transfer switch to the “OFF” position.

7. Switch the Fuel Transfer Pump circuit breaker “OFF.”

8. Close the fuel transfer line valves.

5.1.3 Fuel Tanks

Your boat holds a maximum 252 gallons of fuel in two tanks. The fuel tanks are positioned aft of each engine. The fuel system meets or exceeds the standards set by the U.S. Coast Guard, the Boating Industry Association and the American Boat and Yacht Council that were in effect when your boat was constructed. Each fuel tank has passed a rigorous test conducted by the tank manufacturer. Additionally, the entire fuel system passed Carver's own pressure testing and inspection.

Before your boat is delivered, your Carver Dealer also makes a full inspection of the fuel system. An entry on the Carver Pre-Delivery Service Record verifies the dealer's completion of this inspection.

5.1.4 Fuel Tank Vents

Each fuel tank is vented overboard. As the fuel tanks are filled during fueling, air is displaced from inside the tanks and escapes through the vents. Conversely, when the engines are running, air enters the fuel tanks through the vents to displace the fuel being used. Refer to **9.7.3 Thru-Hull Fittings** for the exact location of the fuel tank vents.

5.1.5 Fuel Shut-Off Valves

Fuel shut-off valves are included with the fuel system:

- Fuel supply shut-off valves are located on the top of the fuel tanks near the aft inboard corner.
- Fuel transfer line valves (diesel systems only) are located on the bottom of the fuel tanks near the aft inboard corner.

The fuel supply shut-off valves must be open when operating the engines.

5.2 Engine Room Ventilation

Your boat's engine room is equipped with a ventilation system consisting of intake ducts, exhaust ducts and bilge blowers. This system is designed to remove any fuel vapor from the engine room. The bilge blowers operate whenever the engines are running, as long as the two Bilge Blower circuit breakers on the DC Control Center are "ON."

You are responsible for keeping the engine room ventilation system in proper operating condition. Inspect the intake and exhaust ducts regularly to make sure they are free of obstructions and have not collapsed or torn. Inspect the blowers to make sure they are operating properly. Replace any worn components with new components of the same type.



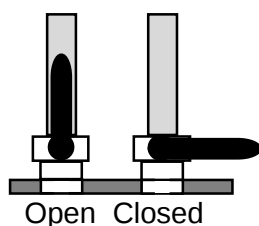
DANGER

Operate the blowers for at least 4 minutes and until the engine room is free of any fuel vapor before starting the engines or the generator.

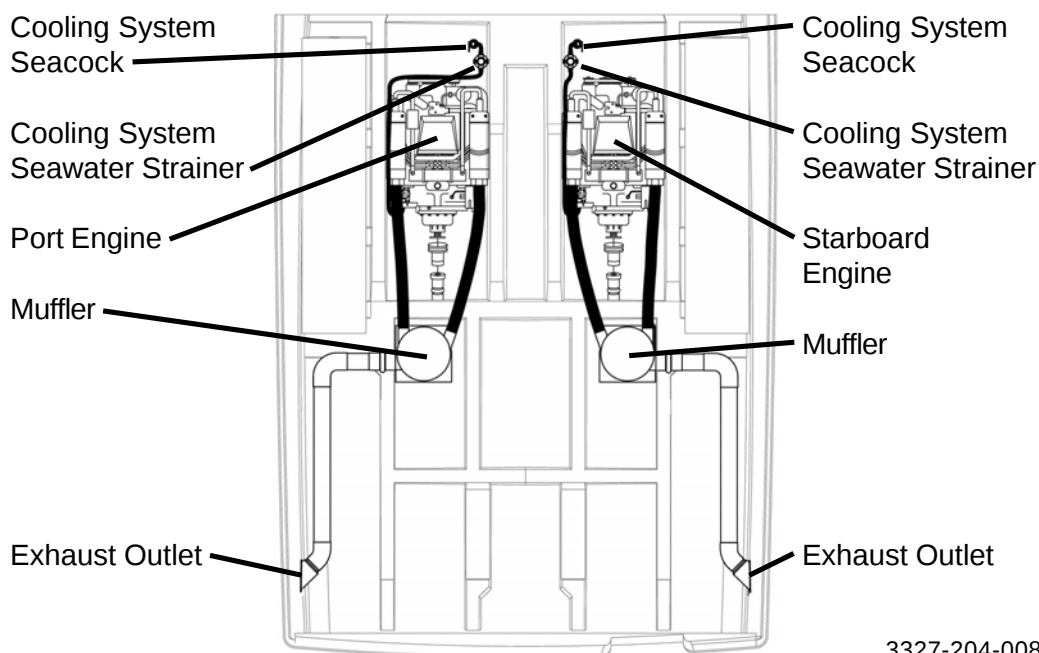
5.3 Cooling System

Each propulsion engine has a cooling system which removes excess heat from the engine and its exhaust system. Closed systems use a freshwater/antifreeze mixture to cool the engine. The coolant runs through a heat exchanger where the excess heat is transferred to seawater taken in through a seacock for each engine. Open cooling systems use seawater to cool the engines directly. If you are not sure which type of cooling system is installed on your boat, contact your Carver Dealer.

Both open and closed cooling systems require seawater to function. Before each cruise, make sure the cooling system seacocks are closed, then make sure the optional strainers are free of seaweed and other debris. Open the cooling system seacocks before you start your engines. The seacock and strainer for each engine's cooling system is located forward of the engine. Refer to **9.7.4 Engine Room** for the exact location of the seacocks and strainers. If the engines have closed cooling systems, make sure that you have a sufficient level of coolant in each system.



COOLING AND EXHAUST SYSTEMS



3327-204-008

**CAUTION**

If you intend to operate the boat with only one engine running, you must first turn off the cooling system seacock for the engine that will not be running. Failure to do so can flood the non-running engine with seawater, damaging it. Before you restart the non-running engine, open its seacock again.

**CAUTION**

Running an engine with an inadequate supply of antifreeze, or with obstructed or restricted seawater pickups or strainers can cause serious damage to the engine and its related systems.

After starting your engines, check the engine exhaust outlets. Refer to **9.7.3 Thru-Hull Fittings** for the location of the engine exhaust outlets. If water is not being ejected from the outlets, immediately shut off the engines. Determine why seawater is not being pumped through the system. Have the problem corrected before restarting the engines.

If the engine temperature gauges show a higher than normal temperature, the cooling system may need to be repaired. If the needles move quickly toward a high temperature reading, immediately shut off the engines and have the cooling system inspected and repaired.

5.4 Exhaust System

The exhaust system for each engine consists of an exhaust manifold, a muffler, and the exhaust pipes used to remove exhaust from the engine to the atmosphere. If the exhaust system contains leaks or obstructions, or has any other problem that prevents it from venting exhaust properly, carbon monoxide may escape and endanger you and your passengers. Check the exhaust system regularly for proper operation. Any change in engine noise could indicate an exhaust system problem and should be immediately investigated.

5.5 Fire Suppression System

An automatic fire suppression system is installed in the engine room. This system provides extra security in the event of an engine room fire. Refer to the OEM information for details on operating the fire suppression system. The system can also be activated manually using a release control located at the helm.

**WARNING**

If the fire suppression system is activated, anyone in the engine room must immediately evacuate the room. The chemical used in the fire suppression system can cause asphyxiation. Once the fire is extin-

guished and the system is deactivated, ventilate the engine room with fresh air before reentering it.

The fire suppression chemical tank is installed on the center forward bulkhead. Refer to **9.7.4 Engine Room** for the exact location of the fire suppression chemical tank.

A fire suppression system monitor, installed near the helm, is wired to an ignition switch. The monitor's light should be "ON" when the ignition switch is turned "ON."

The system contains an engine shut-off circuit. When the system is activated, the engines automatically shut off for safety reasons. Do not attempt to restart the engines until the fire is out and any damage to the engines and fuel system has been repaired. An override switch, located on the system monitor, resets the engine shut-off circuit after the system has been activated, allowing you to restart the engines.

When replacing components while servicing the fire suppression system, you must use new components that have the same designation or that are equivalent in their technical and fire-resistance capabilities.

5.6 Engine Gauges

The helm is equipped with a complete set of gauges on the instrument panel. The gauges allow you to monitor the operation and condition of your boat's propulsion systems while underway. The side of the instrument panel that the gauges are on (port or starboard) determines the respective engine that the gauges are for. Familiarize yourself with the gauges before starting the engines for the first time.



CAUTION

Do not start the engines until you have read and understood the engine OEM information.

5.6.1 Tachometer

The tachometer displays the speed of the engine in revolutions per minute (RPMs). This is not the boat's speed over the water or the speed of propeller rotation. The tachometer may not register zero RPM when its engine's ignition key is turned off; this is normal.



CAUTION

The engine manufacturer has established a maximum RPM rating for your engines, as listed in the engine OEM information. Do not exceed the maximum RPM. Doing so could damage the engines.

5.6.2 Temperature Gauge

The temperature gauge displays the temperature of the coolant in the engine's cooling system. Every engine is designed to operate within a specific temperature range. Refer to the engine OEM information for the normal operating temperature range of your engines. A sudden increase in the temperature gauge reading could indicate that the cooling water intake has become blocked; a water intake hose has failed; or the coolant system's water pump has malfunctioned.

A TIP FROM CARVER!

A cold engine has a tendency to stall when first put into gear. Let your engines warm up a few minutes before departing your dock or anchorage.

Each engine is equipped with a temperature alarm. The alarm sounds when the temperature of the engine's coolant increases to a predetermined point. If the alarm sounds, immediately shut off the affected engine.

Even with high temperature alarms installed, it is important that you visually monitor both temperature gauges while running the engines. If a temperature gauge indicates excessive engine temperature, immediately shut off the affected engine.



CAUTION

The engine manufacturer has established a maximum coolant temperature rating for your engines, as listed in the engine OEM information. Do not exceed the maximum coolant temperature. Doing so could damage the engines.

5.6.3 Oil Pressure Gauge

The oil pressure gauge displays the pressure within the engine's lubrication system. The oil pressure reading changes as engine speed changes. However, a noticeable decrease (either sudden or gradual) in an engine's oil pressure while the boat is maintaining a constant speed may indicate an oil pump failure, a leak in the lubrication system or excessive engine wear.

Each engine is equipped with a pressure alarm. The alarm sounds when the pressure in the lubrication system decreases to a predetermined point. The alarm also sounds when the engine is started or when the ignition switch is "ON" and the engine is not running. In these situations, the engine does not yet have adequate oil pressure; the alarm is silenced as soon as the oil pressure increases to within the normal

operating range. Refer to the engine OEM information for the normal operating range.

If the alarm sounds after the engine has been running for a while, or if the alarm is not silenced within 15 seconds after starting the engine, check the engine's oil pressure gauge. If the gauge indicates low oil pressure, immediately shut off the engine.

Even with the low oil pressure alarms installed, it is important that you visually monitor both oil pressure gauges while running the engines. If a pressure gauge indicates low oil pressure, immediately shut off the affected engine.



CAUTION

The engine manufacturer has established a minimum oil pressure rating for your engines, as listed in the engine OEM information. To avoid damaging the engines, shut them off if the oil pressure is below the minimum rating.

5.6.4 Voltmeters

The voltmeters display the amount of charge in the engine batteries. When a battery is fully charged, its voltmeter indicates 12.5 volts. As the battery is used, its indicated voltage decreases. Each engine battery has its own voltmeter. Refer to **2.1.4 Monitoring Battery Voltage Levels** for details on the operating the voltmeters.

5.6.5 Fuel Gauges

The fuel gauges display the approximate amount of fuel in the fuel tanks. These gauges are not calibrated and should not be regarded as an accurate method of measuring the amount of fuel in the tanks. Both fuel gauges are "OFF" until the ignition switch for the port engine is turned "ON."

5.6.6 Gauge Maintenance

The gauges on the helm instrument panel should be protected from the sun and weather when not in use. The gauges are not waterproof. Protecting them from the elements prolongs their life.

NOTE: *Small beads of moisture (condensation) can form behind the glass bezel on some gauges. This does not mean the gauge is defective. The Carver Limited Warranty does not cover the replacement of gauges that are cosmetically affected by condensation.*

The gauges can be affected by static electricity that may build up on their glass bezels. To help reduce the static electricity and thus improve the gauges' accuracy, periodically wash the bezels with warm water and a mild liquid detergent.

5.7 Helm Controls

The helm controls allow you to engage the boat's engines, control the boat's speed and engine RPMs, and control the direction in which the boat is traveling.

5.7.1 Shift/Throttle Levers

Two shift/throttle levers allow you to both shift the engines from neutral to forward or reverse and control the engine RPMs. With the levers in the center position, the engines remain in neutral at their lowest RPM levels. Lifting the levers above the neutral position shifts the engines to forward and increases the RPM levels. Lowering the levers below the neutral position shifts the engines to reverse and increases the RPM levels.

The shift/throttle levers are located on the starboard side of the steering wheel. The outboard lever controls the starboard engine and the inboard lever controls the port engine. The engines can be shifted/throttled independently to improve maneuverability in tight quarters.

Because your boat has dual engines, it is recommended that you operate the engines at the same speed while cruising. This reduces engine noise and vibration, and improves engine efficiency.

Use the tachometers to monitor the speed of each engine. Adjust the shift/throttle levers so that the tachometers display the same RPM reading.

NOTE: *Aligning the shift/throttle levers with each other does not necessarily mean the engines are synchronized. To accurately synchronize the engines, rely on the tachometers.*

5.7.1.1 Control Cables

Push-pull cables are used to connect the shift/throttle levers to the engines. Refer to the OEM information for details on adjusting and maintaining the shift and throttle control systems.

5.7.2 Steering

Your boat uses a hydraulic steering system. This system is preferable over a mechanical steering system because it provides better response for large boats.

The boat's helm is connected to the rudders through a hydraulic pump, a network of hydraulic lines, an oil reservoir, a hydraulic cylinder, and a tiller tie rod. When the helm is turned, oil pumps through the hydraulic line, which activates the hydraulic cylinder. The cylinder is connected to the tiller tie rod. Extending and retract-

ing the cylinder moves the rudders, enabling you to steer the boat. With hydraulic steering, the effort needed to turn the helm remains the same regardless of the boat's speed.

For the hydraulic steering system to operate properly, it must have an adequate supply of hydraulic fluid and sufficient pressure within the hydraulic pump and lines. Refer to the OEM information for details on operating and maintaining the steering system.

5.8 Preparing for Cruising

Follow the steps below to safely fuel your boat and operate its engines.

5.8.1 Fueling

1. Make sure that your boat is securely moored.
2. Close all portlights, windows, hatches, and doors.
3. Turn "OFF" all devices that could create a spark, including fans, motors, the galley range, and the generator.
4. Extinguish all open flames and smoking material, such as cigarettes, on the boat and in the area around the fuel dock.
5. Turn all battery master disconnect switches to the "OFF" position.
6. Have all guests and passengers leave the boat. Only the fuel handlers should be in the area.
7. Estimate the amount of fuel you wish to take on.
8. Select the fuel tank you wish to fuel first.
9. Remove the appropriate fuel fill deck plate (GAS or DIESEL) using the cap removal tool supplied with your boat. The deck plates are located on top of the weatherboards on either side of the cockpit. Refer to **9.7.2 Deck Plates** for the exact locations of these plates.



WARNING

While fueling, keep the fuel hose nozzle in constant contact with the metal fuel fill fitting. This is a safeguard against static electricity that could ignite any fuel vapor and cause an explosion.



CAUTION

You must use the correct fuel for your boat's engines. Refer to the engine OEM information for the recommended type of fuel.

**CAUTION**

Avoid spilling fuel on the gelcoat surface of your boat. Fuel can stain the gelcoat and damage the hull accent stripes.

10. Your boat's fuel tanks are designed to take on fuel at a maximum rate of 9 gallons per minute (GPM) when the tank is between 25% and 75% full. During this time the pressure inside the tank must not exceed 4 psi. Be aware that many marine fuel pumps can deliver fuel at rates up to 35 GPM. This high fueling rate should never be used with your boat as it could damage your fuel system.

When fueling a tank that is either nearly empty or nearly full, decrease the fueling rate. This helps prevent fuel surge when the tank is empty, and back-up and spillage when the tank is full.

Begin pumping fuel into the fuel tank at a rate of no more than 9 GPM. When the tank is close to full, slow the fuel rate to less than 9 GPM.

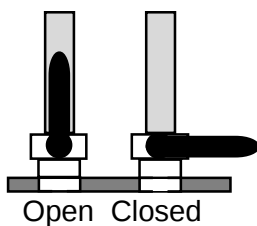
11. Monitor the fuel tank's air vent. When the fuel tank is almost full, air whistles through the vent.
12. Replace the fuel fill deck plate.
13. Repeat steps 9 - 12 for the remaining fuel tank.
14. Wipe up all spilled fuel.

5.8.2 Pre-Start Checklist

1. Read and understand this Owner's Guide and all OEM information.
2. Check both fuel gauges to verify that you have sufficient fuel for your trip.
3. Inspect the engine room:
 - a. Sniff for fuel vapor.
 - b. Check the bilge water level.
 - c. Check for oil in the bilge.
 - d. Check the crank case oil level in each engine.
 - e. Make an overall inspection of the engine room to look for signs of potential problems.
 - f. Follow all maintenance instructions described in **Section 7**.
4. Turn both engine battery and the "house" battery master disconnect switches to the "ON" position.
5. On the Safety Breaker Panel:

- a. Verify that both Auto Bilge Pump circuit breakers are “ON.”
 - b. Switch the Main - One circuit breaker “ON.”
 - c. Switch “ON” any other circuit breakers for equipment you may need.
6. On the DC Control Center:
- a. Switch the Main circuit breaker “ON.”
 - b. Switch the two Bilge Blower circuit breakers “ON.”
 - c. Switch “ON” any other circuit breakers for equipment you may need.
7. Turn the bilge blowers “ON” using the blower switch at the helm or on the DC Control Center.
- Make sure the bilge blowers are operating properly by feeling for air being blown from the bilge vents. These vents are located on either side of the cabin’s exterior just aft of the salon windows.
- Operate the blowers for at least 4 minutes and until the engine room is free of any fuel vapor before starting the engines.
8. Verify that all safety gear is onboard and in proper operating condition. Make sure your boat carries all safety equipment required by federal, state and local regulations.
 9. Verify that you have an adequate supply of fresh water.
 10. Check the level of waste in the waste tank. Empty them if necessary. Refer to **4.5.2 Emptying the Waste Tank**.
 11. Disconnect and store the shore power cord(s) and shore water hose.

5.8.3 Starting the Engines



1. Open the cooling system seacocks for both engines.
2. Move both shift/throttle levers to neutral.
3. Select the engine you wish to start first. NEVER start both engines at the same time.

**WARNING**

The ignition switch is spring activated. Release the key as soon as the engine starts. Failure to do so may damage the starter.

**WARNING**

If the engine does not start within 10 seconds, release the key, then try starting the engine again. Do not hold the ignition key in the START position for more than 10 seconds.

4. Place one hand on the shift/throttle lever of the engine you are starting. With the other hand, turn the ignition key.

The oil pressure alarm sounds for the first few seconds after the engine has started. This is normal. The alarm is silenced as soon as the oil pressure increases to within the normal operating range.

If the engine is cold when it starts, it may run rough. Advance its shift/throttle lever slightly to keep it running.

5. When the engine is idling smoothly, start the other engine in the same manner as the first.

5.8.4 After the Engines Have Started

1. Check the engine gauges. Make sure all readings are within the normal range.
2. Verify that water is being pumped through each engine's exhaust outlet, located near the transom. Refer to **9.7.3 Thru-Hull Fittings** for the exact location of the exhaust outlets. If you do not see water being pumped out, turn the affected engine(s) off. Identify and correct the cause of the problem before restarting the engine(s).

**DANGER**

The engine room contains moving, hot machinery. Keep your hands, feet and body out of the engine room while one or both engines are operating.

3. Look into the engine room and visually inspect the fuel system hoses and exhaust hoses. If you see a leak or suspect that anything is out of order, shut off the engines and investigate. Identify and correct the cause of any problem before restarting the engines.
4. Let the engines warm up until the needles on the temperature gauges begin moving up.

5. Make sure any navigation systems installed are operating properly.
6. Periodically perform a visual inspection of the engine room while underway.

6.0 Operating and Maneuvering

6.1 Launching the Boat

Have a professional launch your boat. Your dealer can either provide experienced people to do this or recommend someone.

6.2 Navigation

Understanding navigation is very important when operating your boat on the open seas. Instructions on how to navigate your boat are beyond the scope of this guide. Carver encourages you to read *Chapman's Piloting and Seamanship* and obtain instruction regarding how to navigate your boat.

6.2.1 Charts

You can obtain charts of the waters in which you intend to navigate from the National Ocean Survey, a branch of the National Oceanic and Atmospheric Administration in Washington D.C. The NOS offers a publication listing the charts you will need for your area; however, this listing may not include inland rivers. Charts of inland rivers are also available from the appropriate district office of the U.S. Army Corps of Engineers. Your dealer may also have charts of the waters in which you intend to cruise.

Keeping your charts up-to-date is a very important part of navigation. The Weekly Notice to Mariners available from the Defense Mapping Agency or the U.S. Coast Guard is an excellent resource for updating charts.

6.2.2 Compass

The compass is the most important piece of navigation equipment onboard your boat. To operate properly, the compass must be free from interference by local magnetic influences and electrical components. Refer to the OEM information for details on using and maintaining the compass. When it is time to compensate your compass, Carver recommends having it done professionally.

6.2.3 Horn

If you are navigating in fog or at night, use your boat's horn to alert other boaters of your presence. The horn meets U.S. Coast Guard standards.

6.2.4 Depth Sounder

An optional depth sounder can help you avoid entering waters that are too shallow for your boat and can aid in navigation.

6.2.5 Shallow Water Operation

Always pay attention to the depth of the waters in which you are cruising. Do not venture into waters which are too shallow for your boat's draft. Shallow water navigation can be very hazardous. If you do find yourself in shallow waters, reduce speed immediately. Consult nautical charts to determine your position. Try to plot a course out of the shallows through waters deep enough for your boat's draft. If your boat runs aground, radio for help and wait until it arrives. Do not attempt to relaunch your boat. You may do serious damage to your hull or underwater gear.

6.3 Controlling the Boat

Every boat owner should know how to perform the following procedures competently. Do not attempt any of these procedures without first receiving appropriate training.

6.3.1 Loading

When you load items onto the boat, have someone on the pier hand them to you after you have boarded the boat. Stow all items securely to prevent them from shifting when the boat is in motion. If your boat is loaded near capacity or if seas get rough, distribute the weight evenly and keep the load low. Don't make any abrupt changes in its distribution. Shift the load or move about only after stopping or slowing the boat.

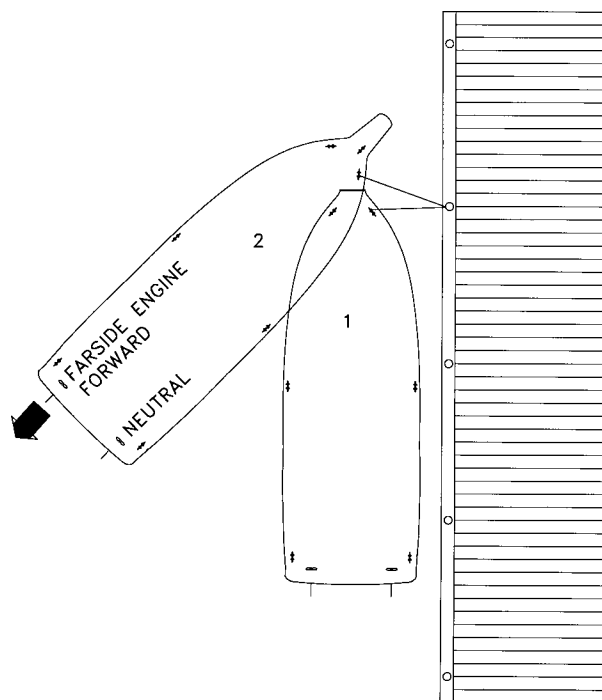
6.3.2 Casting Off and Docking

Docking and casting off can be hampered by wind and current. It is important to use the current by approaching or leaving with the current instead of fighting against it. Also, the operator should adequately fender his boat against collisions with docks or other boats.

6.3.2.1 Leaving a Pier or Mooring

Getting underway from a pier is normally accomplished by taking in all lines except the bow spring. With a neutral rudder, power the boat forward using only the engine farthest from the pier. The boat will pivot around the bow spring line, moving the stern out and away from the pier. A fender should be placed between the bow and the pier to prevent scraping as the boat pivots about the bow spring. Once the stern is clear of boats and other obstructions, take the bow spring in and back the boat away.

At marina anchorages, boats are often secured to a mooring buoy. Fouling your propeller with a mooring line is the principal hazard when leaving a mooring. If you use a dinghy to reach your boat, make sure the dinghy line does not foul the propeller.



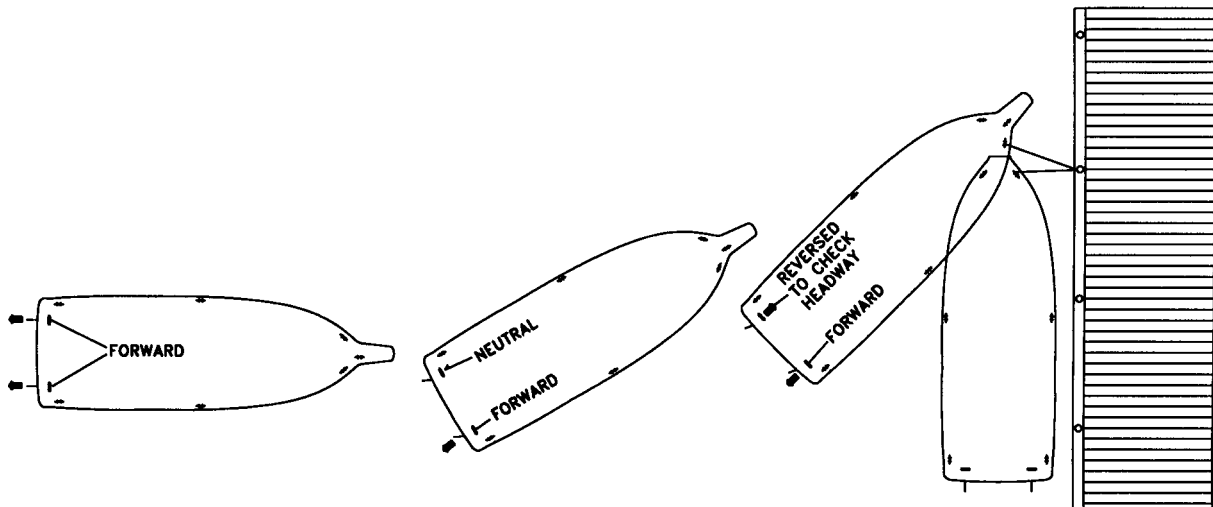
After getting onboard, start the engines and send someone forward to slacken the line. Release the line. In a river with current, the boat will gain headway with the current. After you are clear of the buoy, power the boat forward. In a calm bay, if there is neither wind nor current, back the boat away a few boat lengths. As you power forward, keep the buoy in sight and give it ample room until you are clear. Run slowly until you clear the anchorage to avoid creating a nuisance with your wake.

6.3.2.2 Landing at a Pier

To land at a pier, approach the pier at a right angle. If you desire a starboard side landing, place the rudders to port and reverse the port engine to check headway. Leave the starboard engine in forward gear to swing the boat parallel to the pier. For landings on the port side, turn the rudders to starboard and put the starboard engine into reverse as the boat comes in. You may have to shift into and out of gear to control the boat's speed.

6.3.2.3 Picking Up a Mooring

As you return to the anchorage, approach your mooring at slow speed. Take note of how other boats are lying at their buoys. They are heading into the wind or current and your approach course should be roughly parallel to their heading. Stay clear of other moorings to avoid fouling them. If you tow your dinghy, station a crew member at the helm to keep the dinghy line from fouling the propeller.



Shift the engines into neutral when you estimate that the boat's forward momentum will carry you to the buoy. Station someone at the bow with a boat hook to pick up the pennant float. If you are about to overshoot your mark, check headway as the bow comes up to the buoy. If you fall short, a few turns of the propeller should get you to the buoy. Keep the engine running until the pennant eye has been secured on the bitt or bow cleat.

If your crewman can not reach the pennant or if you overshoot, get clear and calmly try again.

6.3.3 Maneuvering

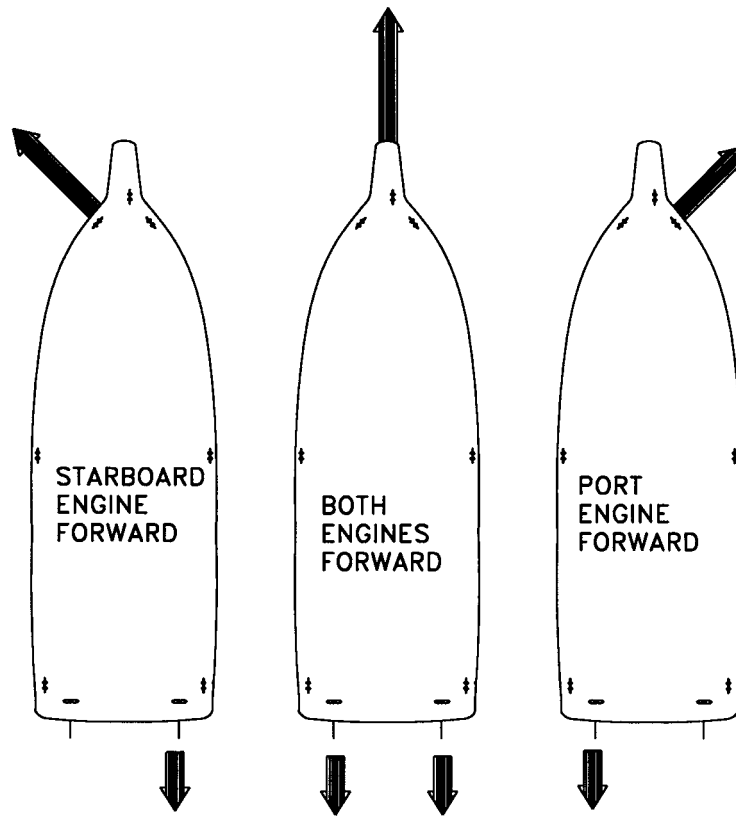
The propellers on your boat rotate in opposite directions. With only the port propeller rotating, your boat tracks forward and to starboard in forward gear and to port in reverse gear. With only the starboard propeller rotating, your boat tracks forward and to port in forward gear and to starboard in reverse gear.

With both propellers rotating at the same speed, the rudders amidships and the engines in forward gear, your boat tracks straight forward.

When the boat is moving backward, its rudders are not as effective and the side force from the propellers is used to steer the boat.

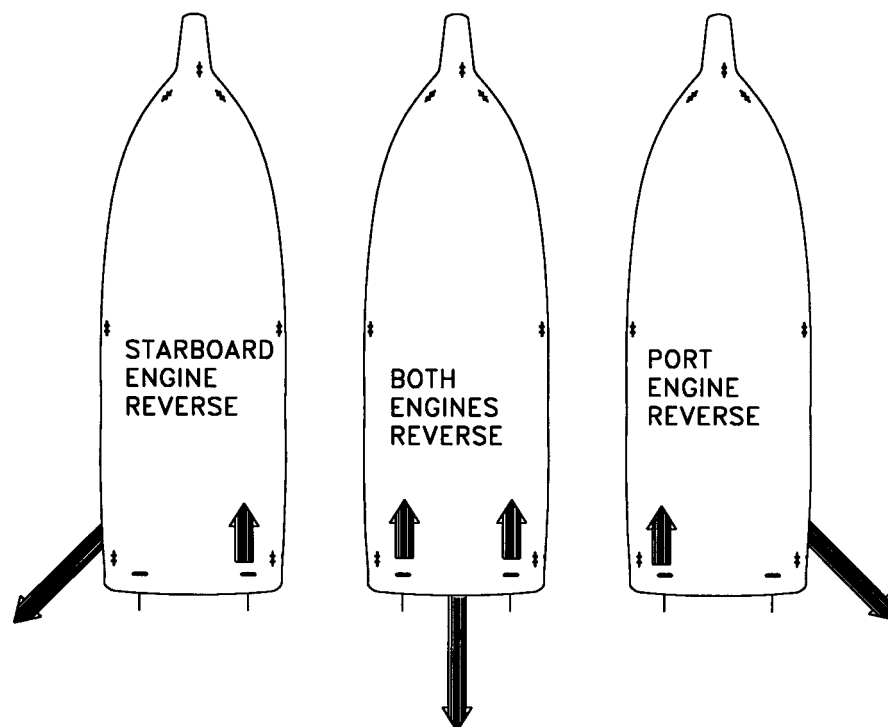
6.3.3.1 Maneuvering Astern

Backing a boat may be necessary in a crowded marina. Your boat's twin engines allow the boat to track straight astern or to either side. When backing, be sure to keep your trim tabs up. To make a turn to port, shift the port engine to neutral. A starboard turn astern is made by shifting the starboard engine to neutral.



TRACKING FORWARD (PROPS ONLY)

TRACKING ASTERN (PROPS ONLY)



Check sternway (stop reverse motion) by shifting your engines to forward gear and throttling forward.

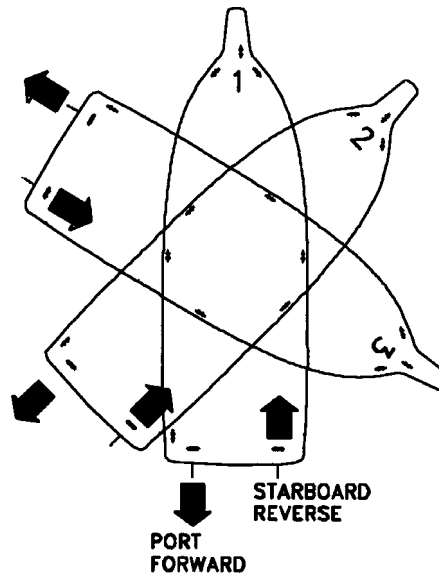
Full stern turns can be executed, but watch the bow. The bow cuts a much wider arc than the stern and collisions could occur in crowded areas.

6.3.3.2 Checking Headway

Stopping the boat's forward motion is referred to as "checking headway." You should learn how to confidently stop your boat within any required distance. You can check headway by shifting engines to neutral and coming to a complete stop over a long distance, or by reversing engines and stopping within a shorter distance.

6.3.3.3 Close Quarters Turns

To execute a close quarters turn, check your headway, then shift one engine into reverse while shifting the other into forward gear. As you advance the throttles, the opposing forces cause the boat to pivot about a point centered between the propellers. You can assist the rate of turn by turning the rudders in the direction of the turn.



6.3.4 Towing

Always offer assistance to a vessel in distress. However, towing a cap-sized boat or a boat with a damaged hull is not recommended. In these situations, lend aid to the occupants and call the proper authorities. Remember, you are obligated to lend aid to any person in distress, but not to the vessel. If you believe your vessel can not tow the vehicle in distress, do not attempt it. One disabled boat is better than two.

6.4 Anchoring

An anchor's holding power depends on its weight and the length of the anchor line. The most effective length is six to seven times the depth of the water you intend to anchor in. For example, if the water is 10 feet deep, you should have 60-70 feet of anchor line.

Approach your selected anchor site from downwind. Come to a dead stop over the spot where you want to drop anchor. Have a crew member lower the anchor. When the anchor hits bottom, reverse engines and slowly move the boat backward to pay out more anchor line as the crew member keeps a slight tension on the line. When the proper length is out, the crew member can snub the line by winding it around the bow cleat. This should cause the anchor flukes to dig in and hold effectively.

Check for anchor drag. Immediately after anchoring, observe shoreline landmarks. After thirty minutes, observe the landmarks again. If the points of reference have changed, reset your anchor.

When weighing (pulling in) your anchor, pull the line in until it is vertical. When the line is taut, a hard tug will pull the anchor's shank up. If the anchor is stuck, wrap some of the line around a bow cleat and keep tension on the line. The boat's momentum may free the anchor. If there is a swell, wind the line around a bow cleat when the bow drops into a wave trough. As the bow lifts, it may free the anchor. If neither of these methods works, pay out a few feet of line, secure it around the bow cleat, and maneuver around the anchor. Keep the line tight until you find the angle that pulls the anchor loose.

A TIP FROM CARVER!

To avoid potentially damaging stress on the windlass, always tie off the anchor rope to the anchoring cleat.

An electric windlass simplifies the above procedures. Follow the above procedures and use the windlass control at the helm to drop anchor. To relieve strain on the windlass, hooks called *devil's claws* engage the chain when the anchor is down.

If you intend to stay at anchor overnight or if you anchor your boat close to another structure, consider dropping another anchor from the stern. This prevents your boat from swinging around if the wind or current shifts.

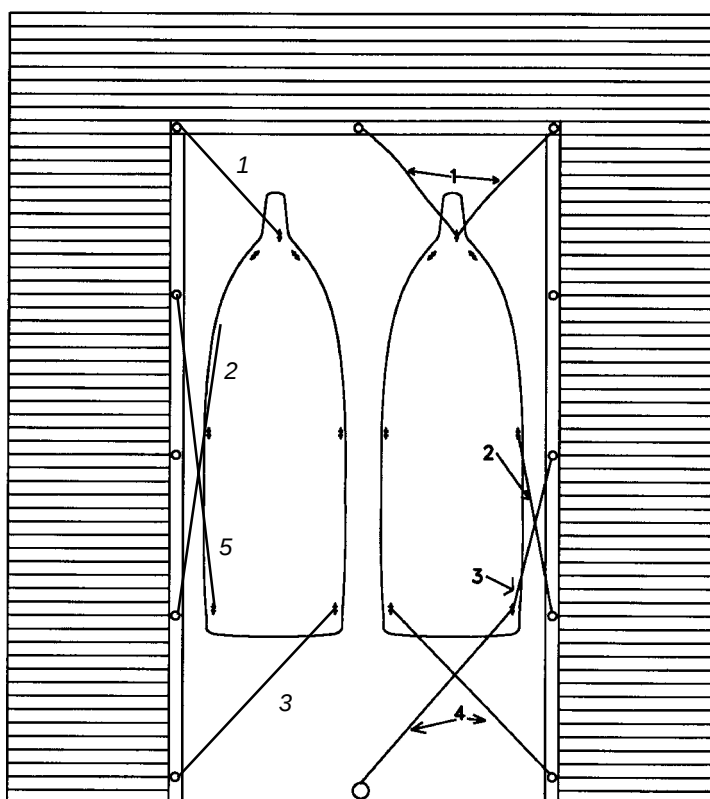
You may also need to anchor in a strong wind. If you drop your spare anchor, make sure the two anchors are laid out at an angle. If both anchors are set in-line and one of them drags, it may cut a trough for the other anchor to follow.

6.4.1 Stern Anchors

In some anchorages, boats use bow and stern anchors at the same time. To get these anchors down, drop the bow anchor first, then pay out extra anchor line (15-18 times the depth). Drop the stern anchor and adjust the length of line payed out on both anchors as necessary.

6.4.2 Mooring Lines

It's a good idea to familiarize yourself with mooring line terminology and using mooring lines. If necessary, obtain training on mooring your boat. Learn how and when to tie the various knots used in seamanship. Boats that are not moored correctly can suffer and cause serious damage. The following information serves only as a guide to mooring your boat.



The mooring illustration above demonstrates possible mooring lines for a small vessel. These lines include the (1) bow line, (2) after bow spring, (3) after quarter spring, (4) stern lines and (5) forward quarter spring. Of the two dockings shown, the left one shows how to tie up when docking your boat in an alongside berth. The docking shown on the right is used when tying up at four corners of the boat.

The two spring lines are crossed and running to separate deck cleats. If possible, the stern line should be run to the offshore quarter cleat. Spring lines are useful in preventing undesired movement ahead or astern in a berth; they also keep a moored vessel in position when there is a significant rise or fall in tide.

6.5 Getting Underway

It takes training and experience to become an “expert yachtsman.” Reading and understanding this Owner's Guide gives you only part of the knowledge you'll need to operate a boat safely and skillfully.

Carver owners have a wide range of abilities, from seasoned yachtsmen with years of experience to absolute beginners with a new-found love for the water. Be honest with yourself in appraising your level of skill.

6.5.1 Shakedown Cruise

Before taking your boat on its first outing, be sure that the following tasks have been completed.

1. Your Carver Dealer has completed Pre-Delivery commissioning. This inspection is documented on the Pre-Delivery Service Document and is signed by the dealer.
2. All warranty registration cards have been completed and mailed.
3. You have read and understand this Owner's Guide and all OEM information.
4. The safety equipment onboard your boat is in compliance with federal, state and local regulations.
5. Your boat has been documented or registered and displays the appropriate identification on the hull.
6. A representative of your Carver Dealer has reviewed the operation of the boat and its systems with you and answered all of your questions to your satisfaction.

If possible, pick a calm day for your first outing. The shakedown cruise with a new boat is not the best time to bring friends or guests along.

Entertaining guests can distract you from the real purpose of the cruise, which is to familiarize yourself with your new boat. Bring only those people (spouse and children) who will make up your regular crew. Invite the sales person who sold you the boat or a member of your Carver Dealer's service staff along for the ride.

Carry a pad and pencil with you during this first outing. Write down any questions that come to mind during the cruise so you can discuss them with your dealer.

Follow the procedures outlined at the beginning of this section for fueling and starting the boat's engines.

This may be the first time you have been in total command of your new boat. Proceed slowly. Have fun but remember that the objective of the cruise is to learn more about how your boat operates and handles. Operate the engines at different RPMs. Try different trim angles. Monitor the gauges. Practice backing down and turning slow speed tight corners that simulate docking maneuvers.

6.5.2 Operating at Planing Speed

Your boat has a “planing” hull. A planing hull skims “over” the water rather than “through” it. To do this, however, your boat first has to reach a certain speed, called “planing speed.”

When you first accelerate from a dead stop, the trim angle of the boat increases, causing the bow to rise and the stern to drop. If you continue to accelerate, the boat eventually achieves plane, which means the bow slowly drops to a more level attitude.



CAUTION

It is important to get on plane as soon as possible and avoid speeds that cause the boat to plow through the water with the boat in a bow-high attitude. A bow-high attitude obstructs your vision and limits the boat's handling and performance capabilities.

Once the boat is on plane, you can back the throttles off to a point where the hull is still planing but the engines are operating at a fuel-efficient speed.

6.5.3 Trim Tabs

Your boat is equipped with a set of electro-hydraulic trim tabs. Trim tabs help the boat get on plane by allowing you to adjust the attitude of the boat for variables such as load, passengers, seas or wind. Under normal conditions your boat does not need adjustments to the trim tabs to

achieve plane. Use the tabs at planing speeds to make minor adjustments in the fore-to-aft and beam-to-beam angle of the boat.

To use the trim tabs:

1. On the Safety Breaker Panel:
 - a. Turn the “house” battery master disconnect switch to the “ON” position.
 - b. Switch the Main - One circuit breaker “ON.”
2. On the DC Control Center:
 - a. Switch the Main circuit breaker “ON.”
 - b. Switch the Trim Tabs circuit breaker “ON.”
3. A set of trim tabs controls are located at the helm. The controls consist of two switches. The port switch controls the port tab; the starboard switch controls the starboard tab. Each switch is labeled “BOW UP” and “BOW DOWN.” Before advancing the throttles, press both switches on the “BOW UP” side for 5 seconds. This lifts the trim tabs to the full “up” position.
4. Advance the throttles to bring the boat on plane. Adjust the engine RPMs for cruising speed.



CAUTION

Do not overtrim your boat. When adjusting the trim tabs, press their control switches for only one-half second at a time, then allow the boat to respond. Continue to adjust the trim tabs in this manner until the boat is at the desired trim angle. Over-trimming can cause the bow to veer and may lead to loss of control. Always reset the trim tabs to the "BOW UP" position before advancing throttles to achieve plane. Accelerating the boat to planing speed while the trim tabs are lowered can cause a loss of control.



CAUTION

When the seas are at any angle to the boat's stern, put the trim tabs in the full “BOW UP” position. Do not change the trim tabs' position until the seas are no longer at the stern.

5. Use the trim tabs individually to make beam-to-beam adjustments. If the majority of your passengers are sitting on the port side, you may

find that the starboard side of your boat is riding higher than the port side. Use the “BOW DOWN” side of the starboard trim tab switch to adjust the trim.

If your passengers decide to shift to the other side of the boat, level the boat by pressing the “BOW UP” side of the starboard trim tab switch for a few seconds. This undoes your previous adjustment. Then, use the “BOW DOWN” side of the port trim tab switch to adjust the trim.

6. The trim tab switches can be used together to bring the bow of the boat to a lower attitude. This adjustment is often used when running into choppy seas. Bringing the bow down uses the sharper part of the boat’s “V” hull to break through waves. Use the “BOW DOWN” side of both trim tab switches simultaneously to adjust the trim. Be careful when making bow down adjustments. Excessive bow down trim can cause considerable bow spray which hampers visibility and reduces control of your boat.

7.0 Maintenance

7.1 Maintenance Schedule

The maintenance activities and their intervals listed on the following pages are provided as guidelines only. The ideal maintenance activities and maintenance schedule depend on the components installed in your boat and the manner and environment in which you use your boat. The more frequently you use your boat, the more often maintenance needs to be performed. If you use your boat in salt water, it requires more maintenance, especially on its exterior.

For instructions on when and how to maintain many of your boat's components, refer to the OEM information.

Maintenance activities are divided into four types:

7.1.1 Type A Maintenance

Perform Type A maintenance 48 hours after the first launching of your boat, and 48 hours after launching your boat following a period of on-shore storage.

7.1.2 Type B Maintenance

Perform Type B maintenance after the engines have operated for 25 hours following launching, whether your boat is new or coming out of onshore storage.

7.1.3 Type C Maintenance

Perform Type C maintenance semiannually or after the engines have operated for 100 hours, whichever comes first.

7.1.4 Type D Maintenance

Perform Type D maintenance annually or after the engines have operated for 200 hours, whichever comes first.

7.1.5 Maintenance Log

Use a maintenance log to keep a record of the maintenance activities you perform on your boat. The log should list both the activities described in the following charts and the maintenance activities for the OEM equipment as recommended in the OEM information. Make copies of the log and keep the copy in a safe place.

	Type A	Type B	Type C	Type D
Engines and Drive System				
Perform maintenance as outlined in the engine OEM information.	Refer to OEM information.	Refer to OEM information.	Refer to OEM information.	Refer to OEM information.
Inspect water intake hoses and connections.		X	X	X
Inspect exhaust system hoses and connections.	X	X	X	X
Inspect exhaust guard covers.				X
Check props for balance and nicks.				X
Check strut bearings.				X
Check rudder alignment.				X
Check all thru-hull fittings.				X
Inspect shaft seals.	X	X	X	X
Check engine and shaft alignment.	X	X	X	X
Spray ignition switches with contact cleaner.				X
Tighten engine mounts.		X		X
Weigh fire suppression chemical tank.			X	X
Control System				
Make any necessary throttle and shift adjustments.		X		X
Lubricate cables and controls.				X
Steering System				
Inspect linkage and connections.		X		X
Inspect hydraulic fluid level.	X	X	X	X
Inspect rudder seals.	X	X	X	X
Inspect tiller tie bar linkage.		X	X	X
Inspect trim tab reservoir.		X	X	X

	Type A	Type B	Type C	Type D
Electrical System				
Inspect and clean batteries.			X	X
Check battery fluid levels.		X	X	X
Check operation of all 12-volt equipment.	X	X	X	X
Check operation of all AC equipment.		X	X	X
Inspect shore power cords.			X	X
Inspect generator water intake and discharge.		X	X	X
Inspect zinc anodes.	*	*	*	*
Perform generator maintenance.	Refer to OEM information.	Refer to OEM information.	Refer to OEM information.	Refer to OEM information.
Fuel System				
Clean engine fuel filters.		X	X	X
Inspect for fuel leaks.	X	X	X	X
Inspect fuel lines for signs of chafe.		X	X	X
Fresh Water System				
Flush water tank(s) and system.			X	X
Clean in-line water filter.			X	X
Fiberglass / Woodwork				
Clean fiberglass.				X
Wax hull and all non-tread areas.				X
Repair chipped fiberglass.			X	X
Clean interior woodwork.				X

* Inspect the zinc anodes at least once every two weeks. Check with your marina or consult other local boat owners to determine the average life expectancy of your boat's zinc anodes. If you notice a rapid deterioration of the zinc anodes, have a professional yacht corrosion specialist check your boat, local seawater and dock.

	Type A	Type B	Type C	Type D
Interior				
Perform maintenance on the heads.	Refer to OEM information.	Refer to OEM information.	Refer to OEM information.	Refer to OEM information.
Inspect thru-hull fittings.	X	X	X	X
Clean refrigerator/freezer.			X	X
Clean range and microwave oven.			X	X
Lubricate door hinges and locks.			X	X
Clean vinyl fabrics and wall coverings.			X	X
Spot clean woven fabrics.				X
Spot clean carpet.				X
Exterior				
Check compass for magnetic deviation.				X
Check trim tab system for leaks.		X		X
Check tightness and caulking of deck hardware.				X
Clean upholstery.			X	X
Clean plexiglass surfaces.				X
Lubricate hinges, latches and locks.			X	X
Wash weather covers.				X
Bilge System				
Check hull drain plug.	X	X		X
Check and test bilge pumps.	X	X	X	X
Inspect sump pump(s).			X	X
Check and test bilge blowers.	Each time before starting engines.	Each time before starting engines.	Each time before starting engines.	Each time before starting engines.

7.2 Exterior Maintenance

The following paragraphs explain how to maintain the various materials present outside your boat's cabin to help keep the boat looking new.

7.2.1 Fiberglass Surfaces

The exterior fiberglass surfaces of your boat are coated with a protective layer of gelcoat. Gelcoat forms a hard, smooth and durable surface. It does, however, contain microscopic pores that, over time, can collect dirt and discolor if the gelcoat is not kept clean.



CAUTION

Do not use abrasive cleaners when washing your boat. Abrasive cleaners scratch and dull the gelcoat.

Wash the boat with fresh water after each outing to help keep the gelcoat clean. If you operate your boat in salt water, wash it at least once every week, even if it hasn't been used since the last washing. Periodically wash the boat with a solution of fresh water and mild soap. Use a sponge to wash smooth surfaces and a stiff nylon or natural bristle brush to wash nonskid surfaces.



WARNING

Do not wax the nonskid surfaces. Waxing them makes them slippery and dangerous to walk on.

Wax all non-tread areas at least once a season. Use a high quality, non-yellowing, marine wax. Waxing your boat provides a shiny surface and seals the pores in the gelcoat, making it easier to keep clean.



CAUTION

The continued and frequent use of abrasive polishing compounds eventually erodes the gelcoat.

Gelcoat eventually dulls with age, much like the paint on your car. When it does this, you can restore the gelcoat's luster using an electric buffer and a very fine grade polishing compound. Ask your Carver Dealer what brand and grade of polish to use.

Stress cracks are common on all fiberglass boats. In the majority of instances these cracks are cosmetic and limited to the gelcoat surface only. Gelcoat stress cracks are rarely an indication of structural problems. If you discover stress cracks in your boat contact your Carver Dealer.

NOTE: *The repair of cosmetic (non-structural) gelcoat stress cracks is not included under the terms of the Carver Limited Warranty.*

7.2.1.1 Gelcoat Repair

Cosmetic repair of minor gelcoat nicks and scratches is not difficult nor does it require the use of special or unique tools. Any boat owner with a little practice can make visually satisfying repairs. Repairs to fiberglass laminates or structural fiberglass components are best left to the experienced technicians at your Carver Dealer.

A gelcoat repair kit is available from your Carver Dealer (Carver part number 82036-03). This kit includes color matched gel, gel hardener and detailed instructions on making gelcoat repairs.

7.2.1.2 Gelcoat Blisters

While fiberglass is a durable and economical material, it is not indestructible. The most commonly known problem associated with fiberglass is blistering. These blisters generally form in the gelcoat or in the outer most layer of laminate. They can range in size from microscopic to two inches or larger in diameter.

The appearance of fiberglass blisters does not indicate structural problems or faulty hull lamination. Gelcoat blisters form through a natural process and are quite common. If you discover blisters on the underwater portion of your boat's hull, contact your Carver Dealer.

7.2.2 Hull Bottom

The underwater portion of your boat's hull is coated with a high-quality, factory-applied coat of anti-fouling bottom paint, applied after the hull has been carefully prepared. The paint has a high copper content and anti-fouling elements that retard the growth of marine life on the bottom of your boat's hull. The anti-fouling elements in this paint have a limited life span, usually from one to three years, depending on how and where you use your boat.

Inspect the hull bottom once a year. If you see gelcoat showing through the bottom paint, repaint the hull. Be sure to use a paint that is compatible with the factory-applied paint. Failure to do so can void your bottom paint warranty. Also make sure the paint is formulated for the type of water you operate the boat in. See your Carver Dealer for assistance in selecting an appropriate bottom paint.

To prepare the hull bottom for painting, lightly sand the existing paint with 80 grit or 100 grit sandpaper. Remove all dirt and sanding residue from the hull. Apply the new paint using a brush, roller or sprayer. If you wish to apply a second coat, allow the first coat to dry before proceeding.

7.2.3 Underwater Metal Components

All of your boat's underwater metal components, including the shafts, struts, propellers, trim tabs, and thru-hull fittings, have been factory-prepared with a high quality primer and anti-fouling paint. The lifespan of this paint varies depending on how and where you use your boat.

Inspect the underwater metal components once a year. If you see bare metal showing through the paint, repaint the component. To obtain the best results when repainting, Carver recommends that you use Interlux products in the steps listed below.

IMPORTANT: *When repainting the propellers, all primers and paints must be applied by spraying only. This helps maintain as smooth a finish as possible, which enables proper engine rpms and boat performance.*

1. Degrease the component surface using Special Thinner 216.
2. Sand the metal to a uniform bright finish using coarse to medium sandpaper. Remove the sanding residue.



CAUTION

The time between step 2 and step 3 must not exceed two hours. If it does, repeat step 2.

3. Apply one thin coat of Viny-Lux Prime Wash 353/354 that has been thinned 25% with Viny-Lux Solvent 355. Allow this coat to dry for at least one hour but not more than 24 hours.
4. Apply two coats of 370 R Primer. Follow the drying time listed on the label.
5. Apply three coats of Micron 33 anti-fouling paint. Follow the drying times listed on the label.

7.2.4 Caulking and Sealants

Deck fittings, rail bases, window and all underwater fittings have been sealed with the finest quality sealants. These sealants, however, do not last indefinitely. The working action of the boat and the expansion and contraction caused by variations in outside temperature eventually break down the sealant.

Fittings that have begun to leak must be resealed. Remove the fitting and clean the old sealant from both mating surfaces. Reseal the fitting using the sealant recommended by your Carver Dealer.

7.2.5 Stainless Steel Rails and Hardware

Stainless steel is not rust-resistant nor is it stain-resistant. When left in contact with the marine environment it does rust and corrode. Proper care helps keep the stainless fittings on your boat looking bright and shiny.

Clean the stainless steel rails and fittings after each outing with either soap and water or glass cleaner. If you operate your boat in salt water, clean the rails and fittings at least once every week, even if the boat hasn't been used since the last cleaning.

If you discover any rust, remove it immediately. Failure to do so leads to irreversible pitting. Use brass, silver or chrome polish to remove rust on stainless steel. Wax the stainless fittings and rails to help protect them from the elements and keep them looking their best. Use the same wax you use on the fiberglass surfaces of the boat.



CAUTION

Never use abrasives like sandpaper or steel wool to clean stainless steel fittings or rails. Never use mineral acids or bleach to clean stainless steel. Never let stainless steel come into prolonged contact with iron, steel or other metals which cause contamination leading to rust or corrosion.

7.2.6 Decorative Striping Tape

A variety of decorative stripes are used on the exterior of your boat. Striping tapes are custom-made to Carver's color and size specifications. Replacement striping tape is only available through Carver Dealers. To remove a damaged section of tape, heat the area with a hair dryer. This softens the adhesive and makes the tape easier to remove. To remove any adhesive residue, use acetone.



CAUTION

When fueling your boat, avoid spilling fuel on any of the striping tape. Fuel damages the striping tape.

7.2.7 Hatches and Windows

The hatch frames on your boat are fabricated from aluminum. Some of these frames are painted with enamel. To clean both the painted and unpainted frames, use a sponge dipped in a solution of fresh water and mild soap. Do not use a brush or abrasive cleaner as these can scratch the painted frame surfaces, damaging their appearance.

The cabin windows are made from tempered glass. Clean them with a soft cloth and glass cleaner. The bridge wind screen is made from formed plexiglass. Clean it with a solution of fresh water and mild soap.

7.2.8 Exterior Vinyl Upholstery



CAUTION

If you have used Dr. Vinyl to repair damaged upholstery, do not use the following cleaners on the repaired area as they will damage it.

- **Denatured alcohol**
- **3M Citrus Cleaner**
- **Ammonia and hydrogen peroxide**

Refer to the OEM information for details on cleaning the exterior vinyl upholstery.

Avoid saturating the exterior cushions with water. To enhance the appearance of the exterior cushions and upholstery, occasionally treat them with an approved vinyl protectant.

7.2.9 Exterior Carpet

Rinse the bridge and deck carpet with fresh water when cleaning the other portions of the boat's exterior. When the exterior carpet becomes soiled, remove the carpet from the boat and wash it with hot water and any brand of carpet detergent suitable for hot water extraction. To remove stains from the carpet, refer to the carpet OEM information.

7.2.10 Canvas

7.2.10.1 White Vinyl

White exterior enclosures are made from vinyl coated materials. Clean the enclosures using a sponge dipped in a solution of fresh water and mild soap. To remove heavy dirt, use a vinyl cleaner. Treat the vinyl with a vinyl protectant twice each season.

7.2.10.2 Sunbrella

Colored canvas enclosures are made from Sunbrella fabric. This fabric should be cleaned regularly before dirt accumulates and becomes embedded in it. The fabric can be cleaned without removing it from the stainless steel bow supports. Refer to the OEM information for details on cleaning the Sunbrella fabric.

Do not subject Sunbrella fabric to excessive heat. To store the fabric:



CAUTION

The fabric must be completely dry before you store it. Moisture on stored fabric can cause the glass to cloud, and the fabric and thread to break down.

1. Thoroughly air dry the fabric.
2. If possible, store the fabric flat (avoid rolling it).
3. Avoid storing the fabric so that its zipper(s) imprints into the next curtain.
4. Place the fabric in a dry, ventilated area.

When you remove the fabric from storage, check it for cloudy glass and zipper imprints. In most cases, these can be removed by hanging the fabric in the sun.

7.2.10.3 Deck Enclosure Windows

The enclosure curtain's clear vinyl windows are easily scratched if cleaned incorrectly. Because of this, use only nonabrasive cleaners and a soft cloth to clean the vinyl windows. To remove water spots, use glass cleaner and a clean, soft cloth. To remove dirt and dust, use a clean, soft cloth dipped in a solution of fresh water and very mild soap. Do not use paper towel to clean the clear vinyl windows as it will scratch them.

There are several cleaners made specifically for vinyl windows. If you decide to use one of these cleaners, first try the product on a small, inconspicuous area to make sure that it does not damage or scratch the vinyl surface.

7.3 Interior Maintenance

One of the best things you can do to maintain the interior of your boat is to ventilate the cabin as often as possible. Do not allow moisture to accumulate in the boat's interior. Moisture leads to a damp, musty environment, which encourages the growth of mildew.

7.3.1 Woodwork

Solid hardwood and hardwood veneer are used throughout the interior of your boat. Treat this woodwork like you treat your finest furniture. Dust it on a regular basis using 3M Clean and Shine and a soft rag. Do not use wax-based furniture polish or cleaner containing abrasives.

Do not lay wet or damp towels or clothing on or against the finished hardwood surfaces.

The interior woodwork was finished at the factory with a special industrial/commercial grade finish. If you need to refinish any woodwork, contact your Carver Dealer to order the appropriate product. Follow the manufacturer's instructions on the product package when applying the finish.

7.3.2 High Pressure Laminate

High Pressure Laminate (HPL) is used on many of the cabinet faces and counter tops inside your boat. HPL is extremely durable and easy to clean. Clean the laminated surfaces with a cleaner made for use on household counter tops. Avoid using the counter tops as cutting surfaces. Cutting or slicing on the HPL surfaces can permanently scratch them.

7.3.3 Fabrics

The fabrics used in your boat's interior include drapes, pillow shams, bed spreads, woven headliners, and some sofa and chair coverings. Some of these fabrics have been treated with a stain protector. All of the fabrics require periodic cleaning. For best results, have the fabrics dry cleaned.

For furniture upholstered in Ultraleather, refer to the OEM information for details on cleaning this material.

7.3.4 Carpet

The carpet used on the interior of the boat has been treated with a stain protector. Even so, the carpet still needs periodic cleaning. Care for the carpet as you would care for the carpet in your home. Vacuum it often and shampoo it as needed using a carpet shampoo.

When your boat is new, the carpet sheds and needs to be vacuumed frequently. This is normal. The shedding stops after a few weeks.

7.3.5 Interior Fiberglass

Some of your boat's interior components, such as the shower stalls and stateroom berth platforms, are made of gelcoated fiberglass. Interior fiberglass can be cleaned with any household cleaner that has been made for cleaning fiberglass. Many of these types of cleaners are marketed as "tub and tile" cleaners. Do not use abrasive cleaners on the interior fiberglass surfaces. Abrasive cleaners scratch and dull the shiny gelcoat surface.

7.3.6 Plexiglass



CAUTION

Do not use glass cleaners, abrasive cleaners, or aromatic solvents on plexiglass. Doing so etches the plexiglass.

The shower door, mirrored face of the head medicine cabinets, and other areas of your boat are made of plexiglass. Clean plexiglass with a solution of fresh water and mild liquid detergent. Remove any fine scratches with a fine automotive acrylic rubbing and polishing compound.

7.4 Mechanical Systems

The following paragraphs explain how to maintain your boat's propulsion, electrical, fresh water, bilge and sanitation systems.

7.4.1 Engines/Generator

Refer to the engine and generator OEM information for instructions on maintaining your boat's engines and generator. There may be a seawater strainer installed in the water intake lines for each engine and the generator. At least once every 30 days, close the seawater seacocks, then open and clean the strainers. Refer to **9.7.1 Hatches** and **9.7.4 Engine Room** for the exact location of the strainers. If you are operating the boat in dirty waters or areas with a high degree of aquatic vegetation, inspect the strainers more frequently. A clogged strainer restricts the intake of seawater which can cause the affected engine or the generator to over-heat.

7.4.2 Thru-Hull Valves

Inspect the thru-hull valves on a monthly basis. Make sure the connections between the hose and the valve are tight. Look for water leaks around the area where the valve and hull meet. Every 30 days open and close each valve two or three times. This guards against the valve seizing in the open or closed position. While doing this make sure the valve handle is securely fastened. Tighten any loose handles. Refer to **9.7.3 Thru-Hull Fittings** for the location of the thru-hull valves.

7.4.3 Propeller Shaft Seals



DANGER

Make sure the engines are OFF before inspecting the propeller shaft seals. The engine room contains moving, hot machinery. Keep your hands, feet and body out of the engine room while one or both engines are operating.

The propeller shaft extends through a watertight fitting called a shaft seal. Check the shaft seal every month; if the seal is leaking, contact your Carver Dealer.

7.4.4 Props



WARNING

Wear gloves when handling a propeller. Its blades are sharp.

Inspect your props often. Carry a swim mask in your boat so you can inspect the props while swimming. Props that are out-of-balance or damaged can diminish the boat's performance by reducing the boat's speed, causing steering problems, and creating vibrations. Vibrations can lead to drive train damage.

Have the propellers balanced by an established propeller repair shop at least once a year. Repair or replace damaged props.

A TIP FROM CARVER!

Consider purchasing and carrying a spare set of props onboard your boat. Many marine dealers do not carry a full inventory of replacement propellers. A spare set allows your vacation or cruise to continue in the event that your boat's primary set of props is damaged.

7.4.5 Struts

Propeller shaft struts require very little maintenance. Within each strut is a strut or cutlass bearing that provides a smooth surface for the shaft to rotate. These bearings occasionally need to be replaced. They need replacement more often if you use your boat in water that has a lot of sand or other abrasive material suspended in it. Have a marine technician inspect the strut bearings whenever the boat is pulled. Replace the bearings when the technician recommends it.

7.4.6 DC Electrical System

The majority of difficulties that occur with the 12-volt DC electrical system are caused by poor battery maintenance. The factory-installed batteries on your boat should function normally for several years if properly maintained. These heavy-duty batteries can be discharged and recharged repeatedly without damaging them; however, completely discharging or overcharging a battery can shorten its life span.

To maximize the useful life of the batteries:

- While using the boat, use the voltmeters to frequently monitor the voltage level of each battery or battery bank. Monitor the charge level with the engines turned off (static condition). Use the onboard battery charger or the engine alternators to recharge the batteries when they are not fully charged. Refer to **2.1.5 Charging the Batteries** for more information. When the battery bank is fully charged, the voltmeter reads between 12.3 and 12.6 volts.
- Do not store batteries that are only partially charged. Recharge each battery, if necessary. Check the voltage level every 30 days while the battery is in storage and recharge it if the voltage reads below 12.3 volts.
- Do not charge the batteries if they are already fully charged. The engine alternators can not overcharge the batteries. The onboard battery charger can overcharge the batteries because, when it determines the batteries are fully charged, it does not shut off but rather switches to trickle charge mode. Trickle charging a fully charged battery reduces its useful life.

**WARNING**

Disconnect the batteries when performing maintenance tasks on the DC electrical system. Failure to do so can lead to electrical shock.

Inspect the batteries once every month. Clean any corrosion that has developed on the battery terminals. Spray a terminal protector on the terminals and battery cable eye connectors. Make sure the battery cables are securely fastened to the terminals. Tighten the nuts only slightly beyond finger tight with a wrench.

Check the level of fluid in each battery cell. Fill any low cells with distilled water only. The fill level is marked on the side of the battery case.

Spray the connections for the bridge instruments and switches with an electrical connection protector every six months.

7.4.7 Fresh Water System

Flush and sanitize the fresh water system at least once every season. Flushing involves draining all water from the system. Sanitizing involves using a commercially-made fresh water tank sanitizing liquid that is available at many marine supply stores.

7.4.7.1 Shower

If the water flow from a shower head becomes restricted, it may be due to the accumulation of sediment in the shower head. If this happens, re-

move the head and rinse it with clean water. If necessary, clean the discharge holes with a narrow wire.

7.4.7.2 Water Taps

Periodically remove and clean the filter screens from the sinks' water taps. Rinse the screens with clean water. If necessary, clean the screens with a narrow wire. A buildup of debris in the filter screens can block the water flow enough to cause the pressure water pump to repeatedly cycle on and off.

7.4.7.3 Sump

Clean the sump and sump filter frequently. Hair, dirt and soap scum collect in the sump and, if not removed, eventually clog the sump pump or sump hoses.

7.4.7.4 Pressure Water Pump

There is an in-line filter installed near the pressure water pump. Clean the filter once a month. Refer to **9.7.1 Hatches** for the exact location of the pump and filter.

7.4.7.5 Water Tank Vent Screen

A vent for the fresh water tank is installed through the boat's hull above the fresh water tank fill plate. The vent has a screen over its opening to prevent dirt and insects from entering the fresh water tank. Clean the vent screen once every six months or twice a season. Refer to **9.7.3 Thru-Hull Fittings** for the exact location of the fresh water tank vent.

7.4.8 Bilge System

Keeping the bilges clean is important. A dirty bilge leads to clogged bilge pumps and unpleasant odors in the cabin. Keeping the bilges dry helps reduce moisture in the cabin.

- Periodically inspect and clean each bilge pump's strainer. The strainers prevent dirt and debris from clogging the bilge pump intakes. Refer to **9.7.4 Engine Room** and **9.7.1 Hatches** for the exact location of the bilge pumps.
- Frequently check the operation of each bilge pump float switch to ensure that it is operating properly. Clean the float switch so that it can move freely.
- Clean the bilge pumps twice a season by wiping any dirt or oil from their exterior surfaces.

- Remove any oil, dirt or debris from the bilges. Treat the bilges with a commercial bilge cleaner, available from your Carver Dealer, twice a season.

7.4.9 Sanitation System

Unlike the other systems in your boat, the sanitation system requires ongoing maintenance to avoid problems.

- Always use sanitation system deodorizer. Use the brand recommended by your Carver Dealer.
- Your boat's sanitation system is not like the toilet and sewer in a home. Do not flush any items down the toilet that the toilet was not designed to accommodate. Refer to the OEM information for details on maintaining the toilet.
- Empty the waste tank often and when you know the boat will not be used for an extended period. Each time you empty the waste tank, flush it with fresh water. This helps remove any remaining waste from the tank.

8.0 Winterization and Storage

Before you store your boat for an extended period of time during which temperatures could fall below freezing (such as during winter), you must properly winterize it. Winterizing your boat removes all water from its various systems. If this water froze, it could cause extensive damage to the boat and its systems.

Carver recommends that you hire a professional to winterize your boat and its systems. Carver also recommends that you place your boat in dry (out-of-water), as opposed to wet, storage. Some of the winterizing procedures can only be completed when the boat is out of the water. Dry storage also gives you the opportunity to thoroughly inspect your boat's hull and underwater components for any maintenance needs.

8.1 Lifting

To lift your boat from the water, hire an experienced professional who has the proper equipment and is trained in lifting yachts. The boat's hull must be properly supported during the lifting operation to avoid serious and permanent hull deformation.



CAUTION

Do not place a lifting strap around the boat's shaft or any other underwater component.

Use approved lifting straps. "SLING" tags are located on the sidedeck of the boat. These are the only places where lifting straps should be positioned for lifting.



WARNING

Never go under the boat when it is suspended in a lift.

8.2 Blocking

When your boat is placed in dry storage its hull must be properly blocked to avoid damaging it. You can either use a cradle designed specifically by Carver to support your model of boat or build your own blocking supports.

If you are using the Carver-designed cradle, the forward end of the cradle should be slightly elevated to position the boat in a bow-high attitude. This allows any water in the bilges to flow to the back of the aft bilge and drain through the hull drain.

If you wish to build your own blocking supports, contact Carver for instructions on the material to use and the design to follow. All of the

supports should be setup to prevent the boat from shifting while it is in storage.

8.3 Winterization



CAUTION

Your boat must be properly winterized before storage. Failure to winterize the boat could result in damaged pipes, valves, faucets, tanks, hot water heater, and other components.

The following paragraphs explain how to winterize the systems that require it.

8.3.1 Engines

Refer to the OEM information for details on winterizing the engines.

8.3.2 Generator

Refer to the OEM information for details on winterizing the generator.

8.3.3 Air Conditioning System

Refer to the OEM information for details on winterizing the air conditioning system. Carver recommends that you have a qualified marina winterize your air conditioning system for you.

8.3.4 Fresh Water System



CAUTION

When winterizing your boat's fresh water system, drain the entire system including the water heater.

Refer to **4.2 Fresh Water System** for a diagram of your boat's fresh water system, including optional equipment.

8.3.4.1 Draining the System

1. On the AC Control Center, switch the Water Heater circuit breaker "OFF."



CAUTION

Do not supply power to the water heater when it is empty. Doing so may damage the unit's heating element.

2. On the Safety Breaker Panel:
 - a. Turn the “house” battery master disconnect switch to the “ON” position.
 - b. Switch the Main - One circuit breaker “ON.”
 - c. Verify that the Shower Sump circuit breaker is “ON.”
3. On the DC Control Center:
 - a. Switch the Main circuit breaker “ON.”
 - b. Switch the Water Pump circuit breaker “ON.”
4. Open all sink and shower faucets on the boat, including the faucets for the optional cockpit hand shower and cockpit fresh water washdown.
5. When there is no more water coming from any of the sink taps, shower heads, or washdown, switch the Water Pump circuit breaker “OFF.”
6. Drain the water heater. Refer to the OEM information for details on draining the water heater.

8.3.4.2 Winterizing the System



DANGER

You must use a nontoxic, non-alcohol, RV-type (pink) antifreeze in your boat's fresh water system. Using the wrong type of antifreeze can damage the fresh water system. The repair of such damage is not included under the terms of the Carver Limited Warranty.

1. Pour 25 gallons of nontoxic recreational vehicle antifreeze into your boat's fresh water tank.

NOTE: *If the fresh water system loses pressure during this procedure, you will have to add more antifreeze into the water tank.*

2. Close all faucets.
3. On the DC Control Center, switch the Water Pump circuit breaker “ON.”
4. If your boat does not have the optional grey water holding system, place a large bucket under the sump discharge fitting and galley sink drain fitting. This catches the antifreeze pumped out in the next

step. Refer to **9.7.3 Thru-Hull Fittings** for the exact location of these fittings.

5. Open the galley sink cold water faucet. When a steady stream of antifreeze flows from the tap, close the faucet. Repeat this step for the galley hot water faucet, then for each cold and hot water faucet on the boat, except for the optional cockpit hand shower and cockpit fresh water washdown.

For the cockpit hand shower, place the shower head in a bucket before turning on the shower faucet. This catches the antifreeze, which can be reused. Proceed as described earlier in this step.

For the cockpit fresh water washdown:

- a. Remove the hose from the fresh water washdown fitting.
 - b. Place a bucket under the washdown fitting to catch the antifreeze, which can be reused.
 - c. Open the washdown faucet. When a steady stream of antifreeze flows from the fitting, close the faucet.
6. If your boat does not have the optional grey water holding system, pour one quart of antifreeze into the shower and each sink drain. Otherwise, refer to **8.3.8 Grey Water Holding System** to winterize the shower and sink drains.

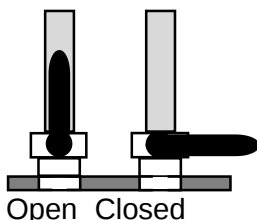
8.3.4.3 Preparing the System for Use Again

When you remove your boat from storage and prepare to use it again, flush the entire fresh water system with fresh water. Nontoxic antifreeze is colored, so the water system is adequately flushed when uncolored water flows from all of the faucets and shower heads. You may need to fill the water tank more than once to flush the system.

8.3.5 Raw Water Washdown

Before performing this procedure on the optional transom raw water washdown, your boat should be pulled from the water.

Refer to **4.3 Raw Water Washdown** for a description of your boat's raw water washdown system.



1. Close the seacock that supplies the raw water washdown pump with seawater.
2. Disconnect the end of the hose that is attached to the washdown side of the seacock.

**WARNING**

You must use a nontoxic, non-alcohol, RV-type (pink) antifreeze in your boat's raw water washdown system. Using the wrong type of antifreeze can damage the raw water washdown system. The repair of such damage is not included under the terms of the Carver Limited Warranty.

3. Place the disconnected hose end into a bucket that contains about a gallon of nontoxic recreational vehicle antifreeze.
4. Remove the hose from the transom raw water washdown fitting.
5. Place a bucket under the washdown fitting to catch the antifreeze, which can be reused.
6. On the Safety Breaker Panel:
 - a. Turn the "house" battery master disconnect switch to the "ON" position.
 - b. Switch the Main - One circuit breaker "ON."
7. On the DC Control Center:
 - a. Switch the Main circuit breaker "ON."
 - b. Switch the Washdown Pump circuit breaker "ON."
8. When a steady stream of antifreeze flows from the washdown fitting, switch the Washdown Pump circuit breaker "OFF."
9. Reconnect the hose to the washdown fitting.
10. Reconnect the hose that was disconnected in Step 2.

8.3.6 Bilge

Refer to **4.4 Bilge System** for a description of your boat's bilge system.

1. Open the hull drain. Leave the drain open while your boat is in storage.
2. Remove all water from the bilge.
3. Clean the bilge as described in **7.4.8 Bilge System**.

8.3.7 Sanitation System

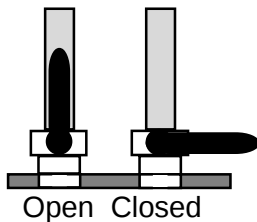
Before performing this procedure on the sanitation system, your boat should be pulled from the water. Refer to the OEM information for more information on winterizing the sanitation system.

Refer to **4.5 Sanitation System** for a description of your boat's sanitation system.

There are two types of sanitation systems: the standard system and the overboard discharge system.

8.3.7.1 Standard Sanitation System

1. Empty the waste tank as described in **4.5.2 Emptying the Waste Tank**. Remove as much of the fresh water used in flushing the tank as possible.
2. If the toilet uses seawater to flush, follow steps a - d below; otherwise, proceed to step 3.



- a. Close the seacock that supplies seawater to the toilet.
- b. Disconnect the toilet seawater hose from the seacock.
- c. Flush the toilet until all water is drained from the seawater hose.
- d. Reconnect the seawater hose to the seacock. Leave the seacock closed.



WARNING

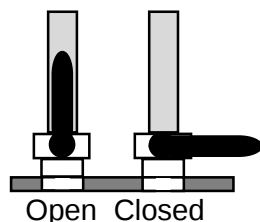
You must use a nontoxic, non-alcohol, RV-type (pink) antifreeze in your boat's sanitation system. Using the wrong type of antifreeze can damage the sanitation system. The repair of such damage is not included under the terms of the Carver Limited Warranty.

3. Flush 4 gallons of nontoxic recreational vehicle antifreeze through the toilet and allow it to remain in the waste tank while the boat is in storage.
4. When you remove your boat from storage and prepare to use it again:
 - a. Pour 5 gallons of fresh water through the toilet.
 - b. Empty the waste tank as described in **4.5.2 Emptying the Waste Tank**.

- c. If the toilet uses seawater to flush, open the seacock that supplies seawater to the toilet. Flush the toilet a few times to prime the sanitation system.
- d. Charge the waste tank by adding deodorizer. Use the brand of deodorizer recommended by your Carver Dealer.

8.3.7.2 Overboard Discharge System

1. Empty the waste tank as described in **4.5.2 Emptying the Waste Tank**. Remove as much of the fresh water used in flushing the tank as possible.
2. If the toilet uses seawater to flush, follow steps a - d below; otherwise, proceed to step 3.



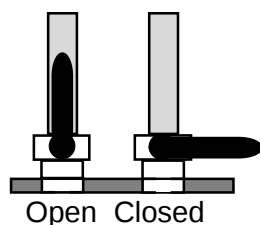
- a. Close the seacock that supplies seawater to the toilet.
- b. Disconnect the toilet seawater hose from the seacock.
- c. Flush the toilet until all water is drained from the seawater hose.
- d. Reconnect the seawater hose to the seacock. Leave the seacock closed.



WARNING

You must use a nontoxic, non-alcohol, RV-type (pink) antifreeze in your boat's sanitation system. Using the wrong type of antifreeze can damage the sanitation system. The repair of such damage is not included under the terms of the Carver Limited Warranty.

3. Flush 10 gallons of nontoxic recreational vehicle antifreeze through the toilet.
4. Under the boat, place a large bucket under the overboard discharge fitting to collect antifreeze pumped out later in this procedure. Refer to **9.7.3 Thru-Hull Fittings** for the exact location of the overboard discharge fitting.



5. Open the overboard discharge seacock.
6. If your boat has the optional grey water holding system, turn the Y-valve to select the waste tank.
7. On the Safety Breaker Panel:
 - a. Turn the "house" battery master disconnect switch to the "ON" position.

- b. Switch the Main - One circuit breaker “ON.”
- 8. On the DC Control Center:
 - a. Switch the Main circuit breaker “ON.”
 - b. Switch the Waste Pump circuit breaker “ON.”
- 9. Turn the overboard discharge pump switch “ON.”
- 10. When a steady stream of antifreeze flows from the overboard discharge fitting, turn the overboard discharge pump switch “OFF.”
- 11. Close the overboard discharge seacock.
- 12. On the DC Control Center, switch the Waste Pump circuit breaker “OFF.”
- 13. When you remove your boat from storage and prepare to use it again:
 - a. Pour 5 gallons of fresh water through the toilet.
 - b. Empty the waste tank as described in **4.5.2 Emptying the Waste Tank**.
 - c. If the toilet uses seawater to flush, open the seacock that supplies seawater to the toilet. Flush the toilet a few times to prime the sanitation system.
 - d. Charge the waste tank by adding deodorizer. Use the brand of deodorizer recommended by your Carver Dealer.

8.3.8 Grey Water Holding System

Before performing this procedure on the optional grey water holding system, your boat should be pulled from the water. Winterize the grey water holding system only after you have winterized the fresh water system.

Refer to **4.6 Grey Water Holding System** for a description of your boat’s grey water holding system.

There are two types of grey water holding systems: the standard system and the overboard discharge system.

8.3.8.1 Standard Grey Water Tank System

1. Empty the grey water tanks as described in **4.6 Grey Water Holding System**. Remove as much of the fresh water used in flushing the tanks as possible.
2. On the Safety Breaker Panel, verify that the Shower Sump circuit breaker is “ON.”



WARNING

You must use a nontoxic, non-alcohol, RV-type (pink) antifreeze in your boat's grey water holding system. Using the wrong type of antifreeze can damage the grey water holding system. The repair of such damage is not included under the terms of the Carver Limited Warranty.

3. Pour 3 gallons of nontoxic recreational vehicle antifreeze through the shower and each sink drain.
4. When you remove your boat from storage and prepare to use it again:
 - a. Pour 5 gallons of fresh water through the shower and each sink drain.
 - b. Empty the grey water tanks as described in **4.6 Grey Water Holding System**.
 - c. Charge the grey water tanks by adding deodorizer. Use the brand of deodorizer recommended by your Carver Dealer.

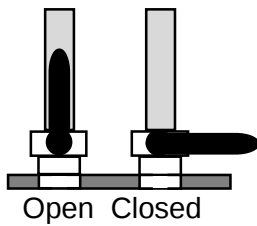
8.3.8.2 Overboard Discharge System

1. Empty the grey water tanks as described in **4.6 Grey Water Holding System**. Remove as much of the fresh water used in flushing the tanks as possible.
2. On the Safety Breaker Panel:
 - a. Turn the “house” battery master disconnect switch to the “ON” position.
 - b. Switch the Main - One circuit breaker “ON.”
 - c. Verify that the Shower Sump circuit breaker is “ON.”

**WARNING**

You must use a nontoxic, non-alcohol, RV-type (pink) antifreeze in your boat's grey water holding system. Using the wrong type of antifreeze can damage the grey water holding system. The repair of such damage is not included under the terms of the Carver Limited Warranty.

3. Pour 3 gallons of nontoxic recreational vehicle antifreeze through the shower and each sink drain.
4. Under the boat, place a large bucket beneath the grey water overboard discharge fitting to collect antifreeze pumped out later in this procedure.



5. Open the grey water overboard discharge seacock.
6. Turn the Y-valve to select the grey water tanks.
7. On the DC Control Center:
 - a. Switch the Main circuit breaker "ON."
 - b. Switch the Waste Pump circuit breaker "ON."
8. Turn the overboard discharge pump switch "ON."
9. When a steady stream of antifreeze flows from the overboard discharge fitting, turn the overboard discharge pump switch "OFF."
10. Close the overboard discharge seacock.
11. Switch the Waste Pump circuit breaker "OFF."
12. When you remove your boat from storage and prepare to use it again, flush and pump out the grey water tanks to remove the antifreeze.

8.3.9 Exterior

Wash the exterior of the boat, particularly the underwater portions. Remove as much aquatic growth as possible while it is still wet. Once the growth has dried it is more difficult to remove.

Check the zinc sacrificial anodes for deterioration. If the zincs show signs of deterioration have them replaced before spring launch. Check stainless steel rails and fittings for signs of rust. Remove rust prior to winter lay-up. Inspect the underwater portions of the hull. Review anything that looks out of the ordinary with your Carver Dealer.

8.3.10 Interior

Air out the cushions and make sure they are dry. Storing damp cushions leads to mildew. Position the cushions so air can circulate around them. Purchase and position moisture accumulators throughout the boat. These help reduce the amount of moisture that accumulates during storage. Remove everything from the boat that could spoil or freeze while the boat is stored. Also remove all dried food. Food attracts mice and insects.

To give your boat the maximum protection while it is in storage, Carver recommends that you place your boat in dry, as opposed to wet, storage.

Protecting the boat from the elements during winter storage is advised. Have your marina shrink wrap the boat or have a winter storage cover made. Occasionally check on the boat while it is in storage to make sure that it is in good condition.

8.4 Storage

8.4.1 Dry Storage

If your boat will be in outside storage, properly support a storage cover and secure it over the boat. Do not secure the cover to the boat too tightly. Allow adequate ventilation to protect against dry rot. Do not store the boat in a damp storage enclosure. Purchase and position moisture accumulators between the shrink-wrap and your boat's enclosures to help prevent moisture from accumulating. Excessive dampness can lead to mildew, electrical problems, corrosion and dry rot.

NOTE: *Do not use the bridge enclosure canvas in place of a winter storage cover. This canvas is not designed for long-term storage purposes. The life of the enclosure canvas may be significantly shortened if it is exposed to harsh weather for prolonged periods.*

8.4.2 Wet Storage

Wet storage procedures vary from region to region. Consult your Carver Dealer before preparing to leave your boat in the water over the winter.

8.5 Spring Recommissioning Checklist

Before launching your boat, complete the following.

8.5.1 Hull

- ☐ Fill gelcoat nicks and gouges
- ☐ Inspect props, struts, rudders

- ☐ Inspect thru-hull fittings
- ☐ Apply new antifouling bottom paint or touch up failing areas
- ☐ Buff out minor hull scratches
- ☐ Remove dirt, stains
- ☐ Apply wax

8.5.2 Deck and Cabin

- ☐ Inspect hatches and windows for leaks
- ☐ Wax non-walk surfaces

8.5.3 Engines

- ☐ Follow manufacturer's recommissioning guidelines
- ☐ Inspect belts, hoses
- ☐ Tune-up engines
- ☐ Replace fuel filters

8.5.4 Electrical System

- ☐ Check battery water level
- ☐ Charge batteries
- ☐ Inspect connections for corrosion

8.5.5 Plumbing

- ☐ Purge fresh water system of antifreeze
- ☐ Replace Sealand vent filters.
- ☐ Inspect seacocks
- ☐ Inspect heads
- ☐ Chemically charge waste and grey water tanks
- ☐ Fill fresh water tank

8.5.6 Safety Equipment

- ☐ Inspect PFDs
- ☐ Replace old distress signals
- ☐ Inspect fire extinguishers
- ☐ Inspect, test bilge pumps
- ☐ Inspect mooring lines, fenders
- ☐ Test, recalibrate and/or replace CO detectors

8.5.7 After Launch

- ☐ Check for engine cooling water flow
- ☐ Check propeller shaft alignment
- ☐ Check propeller shaft seals
- ☐ Check crankcase (boat must be in-water). Check transmission oil levels
- ☐ Have compass professionally calibrated
- ☐ Inspect thru-hulls, exhaust, etc.

9.0 Warranty and Parts

9.1 Warranty Information

Carver warrants every boat we manufacture as explained in the Carver Limited Warranty. Your copy of the warranty is located at the end of this section. Please review the warranty carefully.

To ensure that the warranty remains in effect during its lifetime, Carver Boat Corporation, your Carver Dealer, and you must each uphold specific responsibilities. Carver's responsibilities are described in the Carver Limited Warranty.

9.1.1 Carver Dealer's Responsibilities

9.1.1.1 Warranty Information

Your Carver Dealer will review the terms of the warranty and make certain the warranty is registered with Carver. Your Dealer will also instruct you on how to obtain warranty service.

9.1.1.2 Pre-Delivery Service Procedure

Your Carver Dealer will prepare your boat for delivery in accordance with the procedures detailed on the Pre-Delivery Service Record. Your dealer will sign the Pre-Delivery Service Record and provide you with a copy.

Registration of your boat and its engines is required by the Federal Safe Boating Act of 1971. Your Carver Dealer will complete and mail your engine warranty cards as part of the Pre-Delivery Service procedure.

9.1.1.3 Boat and Systems Review

A representative from your Carver Dealer will review the operation of your boat and its systems with you.

9.1.2 Owner's Responsibilities

9.1.2.1 Pre-Delivery Service Record

Verify that the boat's pre-delivery service record has been completed and mailed to Carver. The pre-delivery service record is located in the **Preface** of this guide. Review the Pre-Delivery Service procedure with your dealer. Read the Pre-Delivery Service Record. Be certain you sign a copy of the Pre-Delivery Service Record and retain a copy for your records.

9.1.2.2 OEM Components

Many of the OEM components installed in your boat are warranted by their respective manufacturers. To activate these warranties, complete and mail all OEM warranty cards. The warranty card for each component that is warranted is located with its respective OEM information. Many of these OEMs also have programs designed to resolve any problems you may experience with their products. Your Carver Dealer can assist you when necessary in gaining access to these programs.

NOTE: *All warranty cards must be completed and forwarded to the appropriate company within 5 days of taking delivery of your boat.*

9.1.2.3 Delivery

At the time of delivery, make a complete inspection of the boat and its systems. Document any work that needs to be completed by the dealer in order to meet the terms of your agreement.

9.1.2.4 Owner's Information Kit

Read, understand and follow the instructions in this Owner's Guide and all other guides and manuals supplied with your boat, including all OEM information.

Contact your Carver Dealer if you have any questions regarding warranty responsibilities.

9.2 Obtaining Warranty Service

The following requirements must be met before warranty work can be performed on your boat.

1. Your boat must be registered with the Carver Boat Corporation. Registration is accomplished by completing, then submitting the Pre-Delivery Service Record to the Carver Boat Corporation, P.O. Box 1010, Pulaski, WI 54162-1010.
2. Pre-Delivery Service must be completed by your Carver Dealer. Information concerning Pre-Delivery Service can be found in the preface of this manual. The Pre-Delivery Service Record must be signed by both the dealer and the owner.

NOTE: *Your Carver Dealer is the ONLY person authorized to approve warranty work. If warranty service is needed you MUST contact your Carver Dealer first. There are no exceptions to this policy.*

Your Carver Dealer has knowledgeable professionals who are familiar with your boat and are capable of providing the highest level of service. The Carver Dealer's service personnel will communicate with the Carver

Boat Corporation to ensure that you receive fast and satisfactory solutions to any problem that may arise.

9.3 Second and Third Owner Registration

A “Second Owner Registration” card and “Third Owner Registration” card are located in the **Preface** of this Owner’s Guide. The purchaser of a previously-owned Carver boat should complete the appropriate card and mail it as soon as taking title to the boat.

Registration of a previously-owned Carver boat does not extend or in any way modify the boat's original limited warranty. However, purchasers of a previously-owned Carver boat should register the boat so that, if it is ever necessary, Carver can contact you.

9.4 Hull Identification Number

The U.S. Coast Guard has established an identification system which assigns a unique hull identification number (HIN) to each boat. The HIN consists of 12 alphanumeric characters which provide coded information about the boat.

When contacting your Carver Dealer for parts or service, provide them with your boat’s HIN.

9.5 OEMs

Whenever you need information about a system or component on your boat, contact your Carver Dealer first. If your Dealer is unable to provide the information, contact the manufacturer (OEM) of the system or component. Refer to the OEM information for telephone numbers and addresses.

When contacting an OEM for information, be ready to provide the component's serial number. A Serial Number Record Sheet is provided on the following pages. Use this sheet as a convenient location to record the serial numbers of your boat's OEM components.

9.6 Specifications

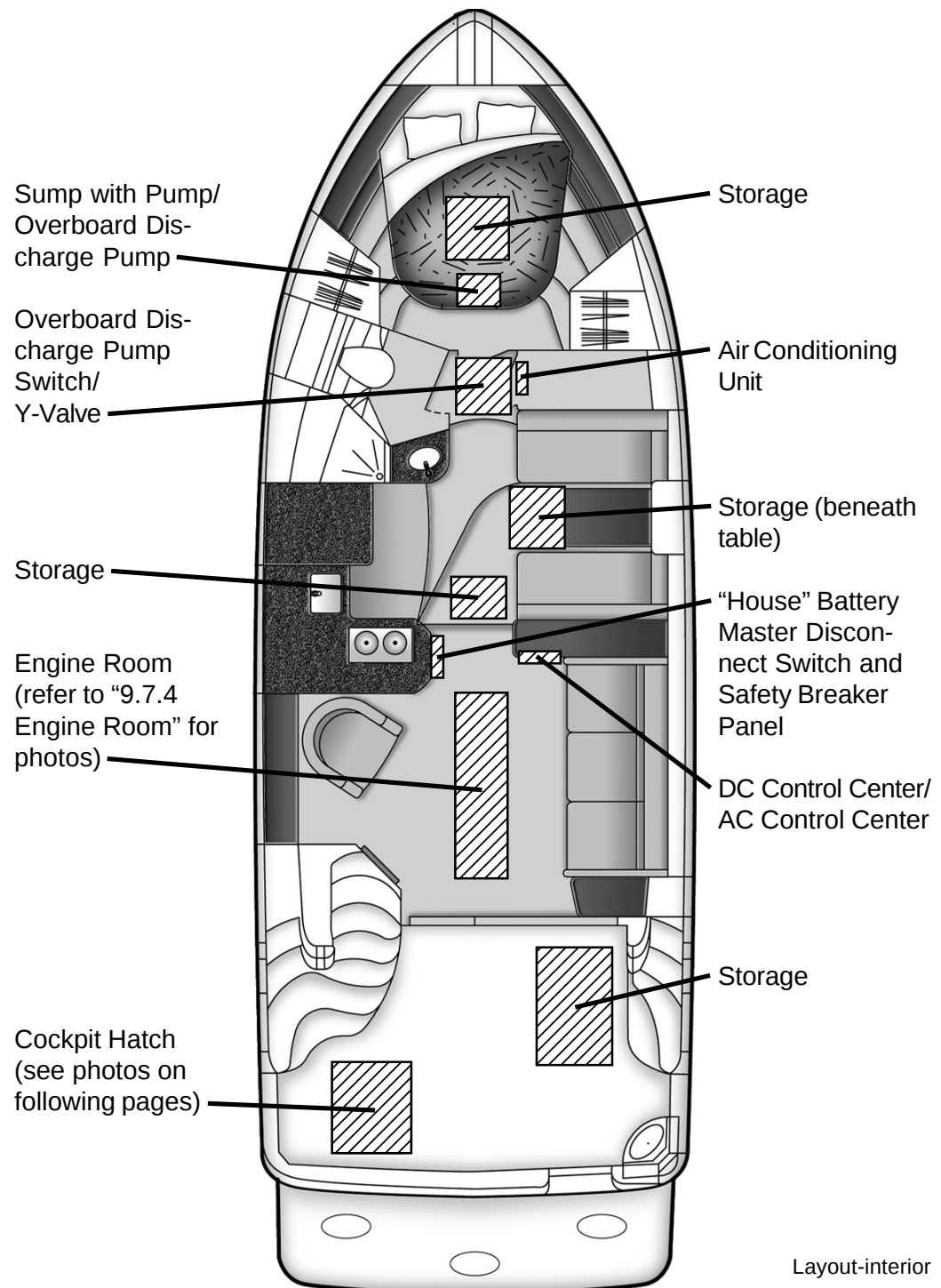
The specifications listed here are based on a standard model with no options installed. Certain options may change some of these specifications.

Length Overall (LOA) with boarding platform	38'3" (11,66 m)
Beam	13'1" (4,00 m)
Bridge Clearance (waterline to arch)	14'8" (4,47 m)
Draft	37" (0,94 m)
Weight (estimated, with fuel and water)	21,753 lbs. (9867,16 kg)
Fresh Water	78 U.S. gals. (295,26 liters)
Hot Water	11 U.S. gals. (41,64 liters)
Waste	37.5 U.S. gals. (142,00 liters)
Fuel	252 U.S. gals. (954,00 liters)
Cabin Headroom	6'7" (2,00 m)
Sleeps	4 (5 optional)

9.7 Component Locations

The illustrations on the following pages show the locations of various components, deck plates, and thru-hull fittings discussed throughout this guide.

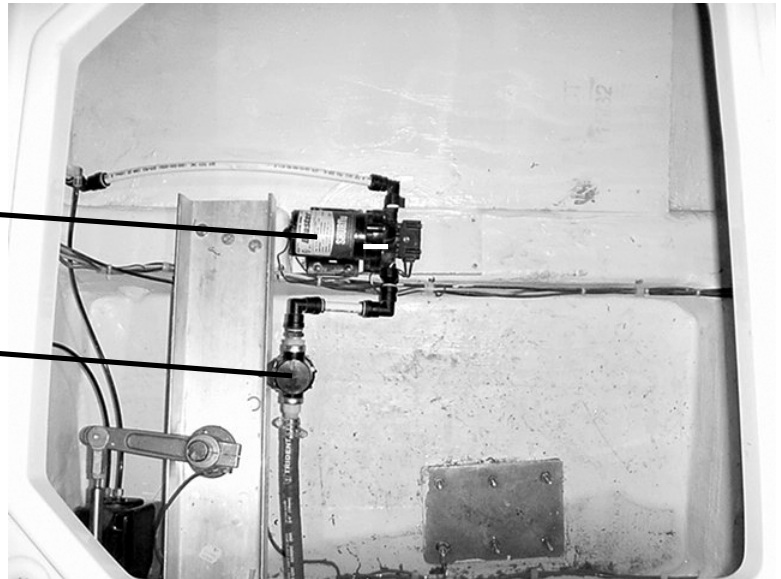
9.7.1 Hatches



COCKPIT HATCH - DIRECTLY BENEATH

Raw Water Wash-
down Pump

Raw Water Wash-
down Strainer



Hatch-1

COCKPIT HATCH - AFT CENTERLINE

Air Conditioning
Strainer and Pump

Generator

Air Conditioning
Seawater Seacock

Aft Bilge Pump

Generator Cooling
System Seacock

Generator Cooling
System Strainer



Hatch-3

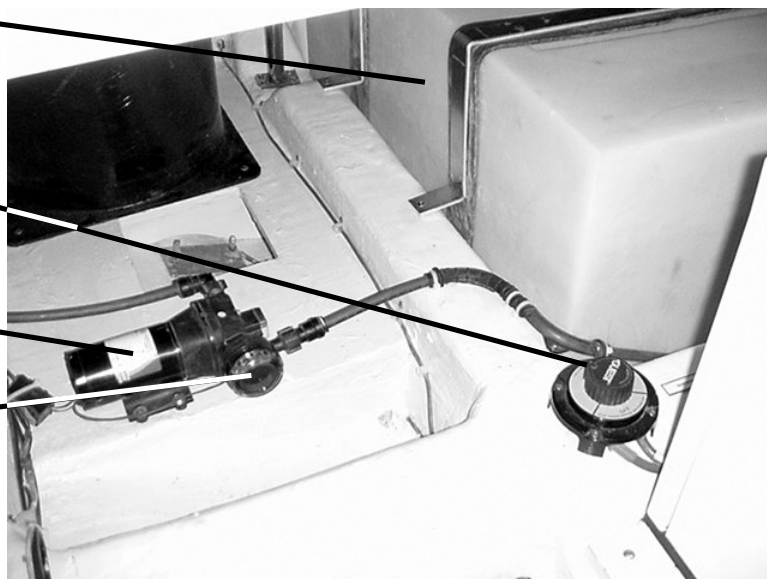
Raw Water
Washdown
Seacock

Fresh Water Tank

Generator Battery
Master Disconnect
Switch

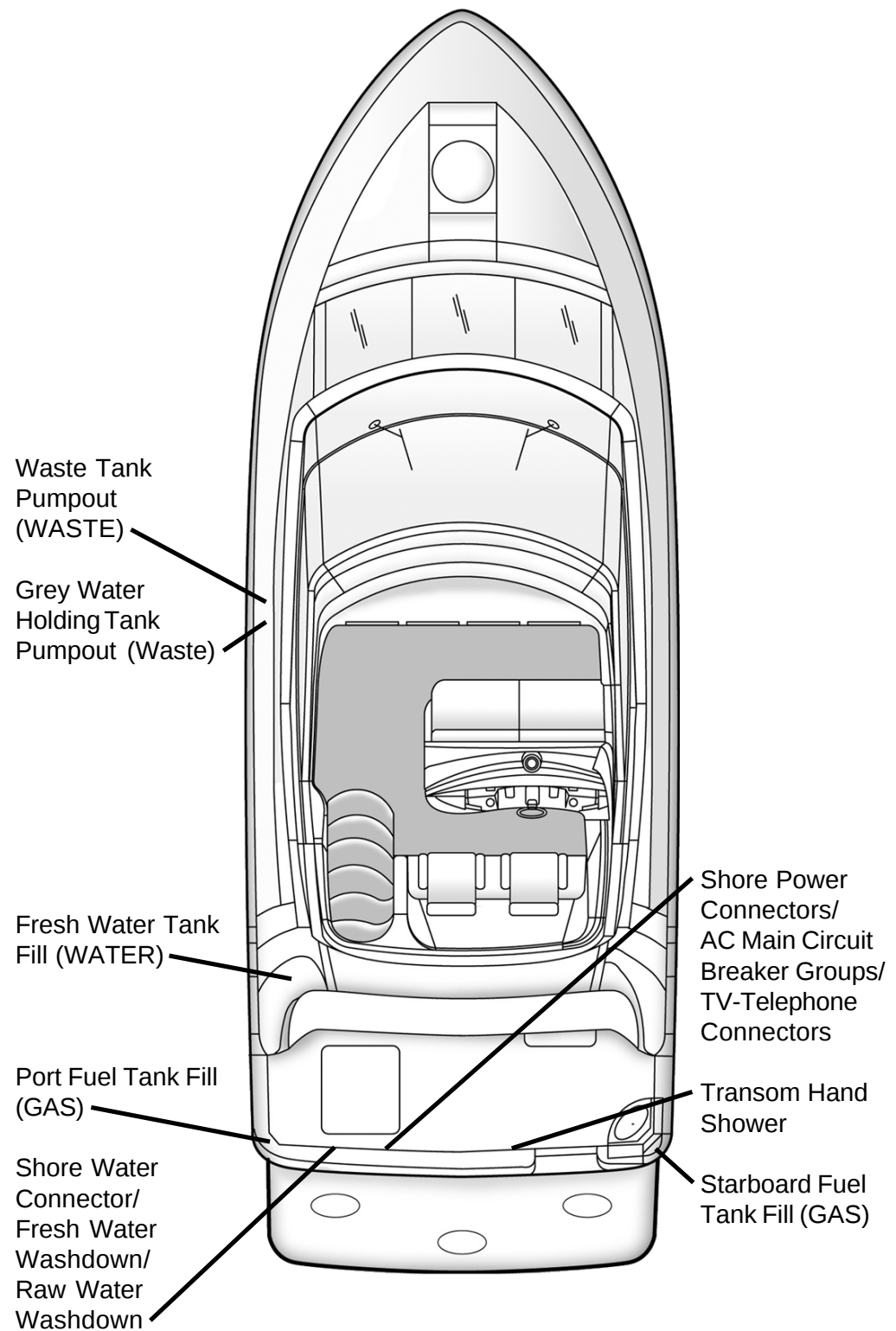
Pressure Water
Pump

Fresh Water Filter -



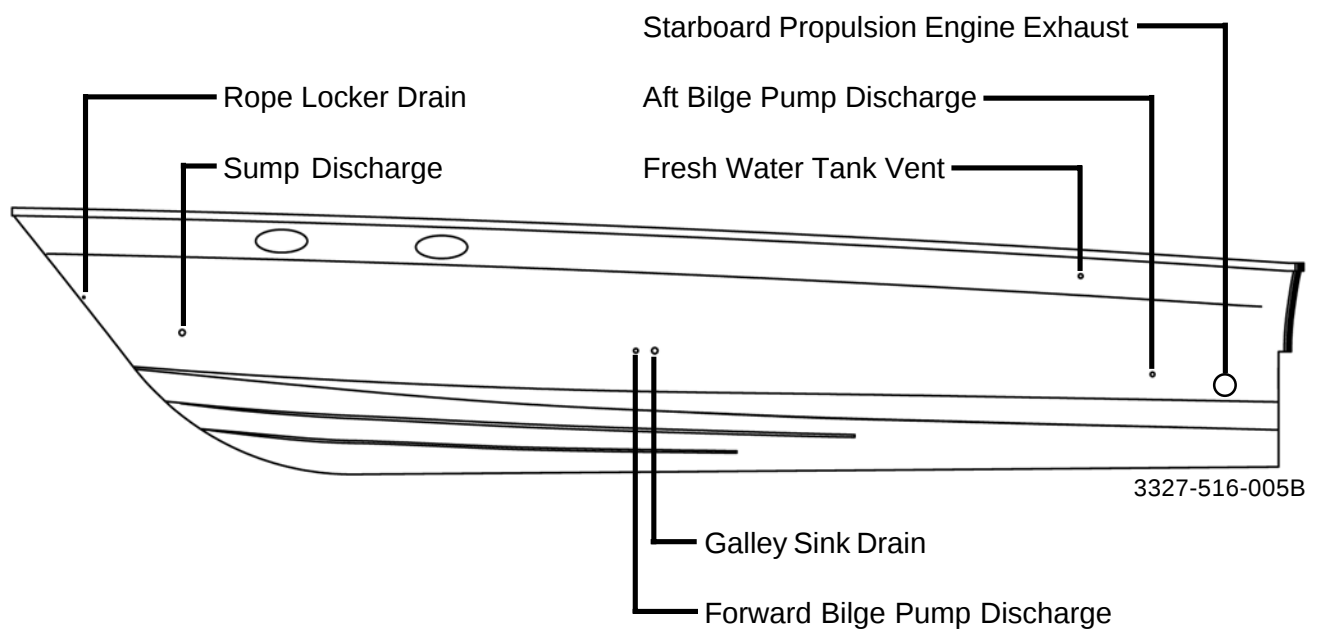
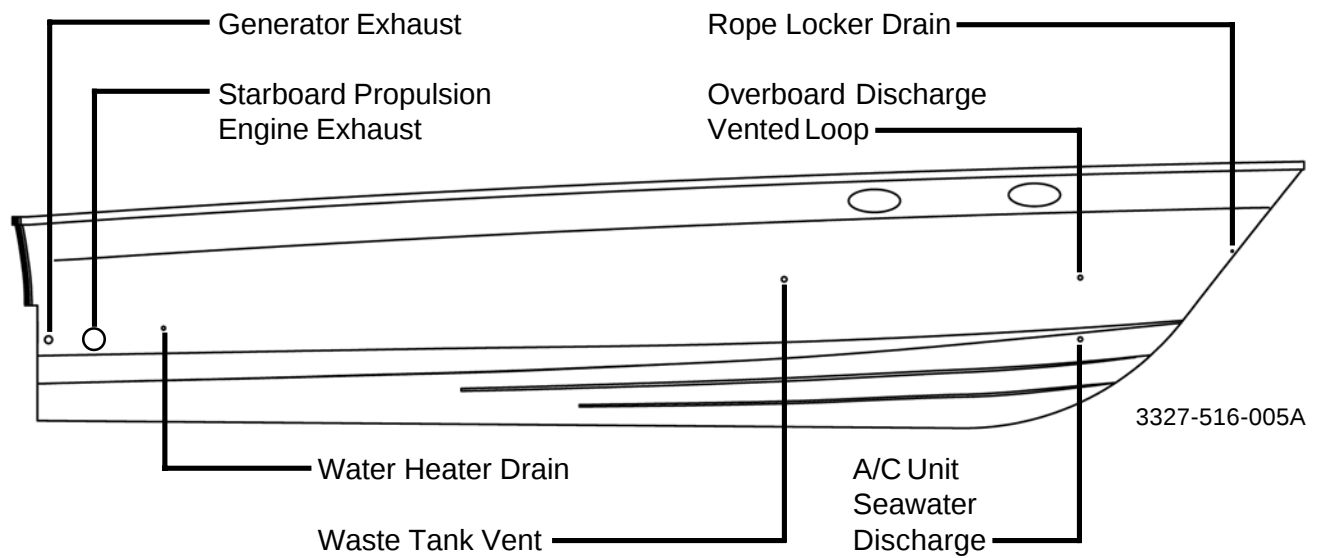
Hatch-2

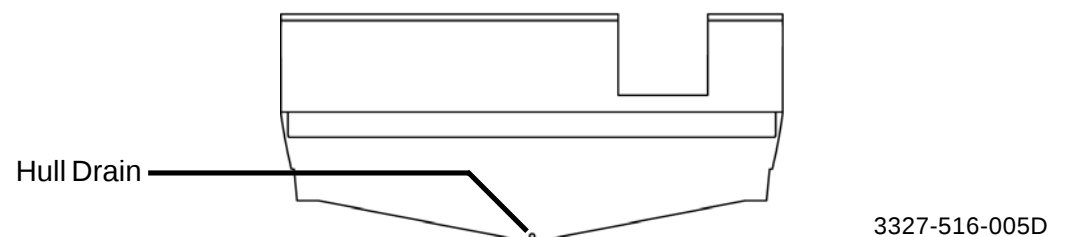
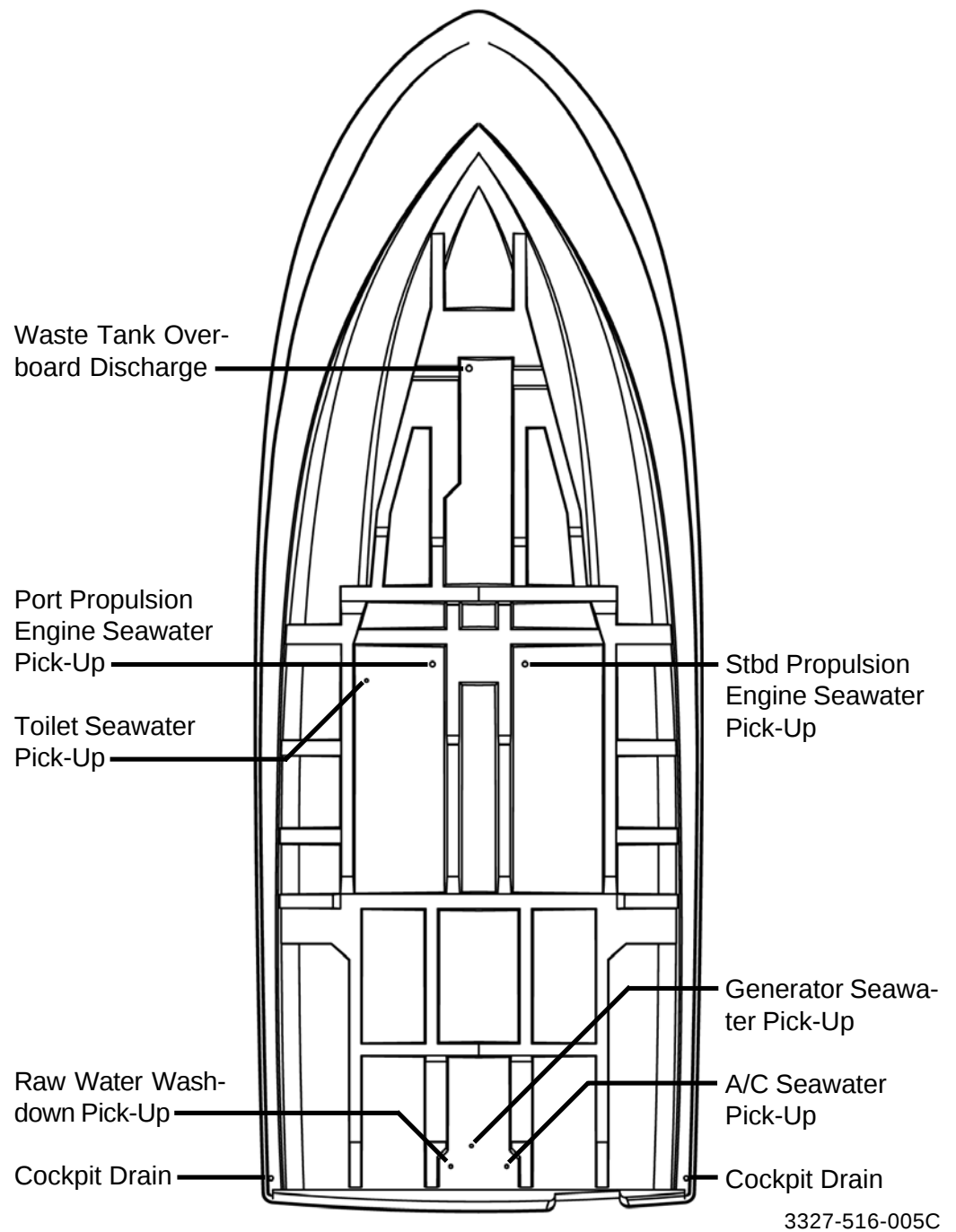
9.7.2 Deck Plates



Layout-bridge

9.7.3 Thru-Hull Fittings





9.7.4 Engine Room

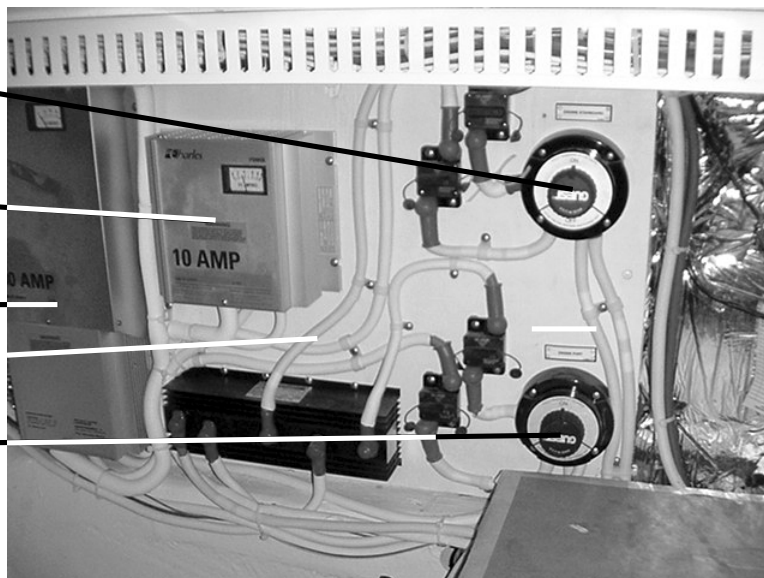
PORT FORWARD BULKHEAD

Starboard Engine
Battery Master
Disconnect Switch

Generator Battery
Charger

Engine / "House"
Battery Charger

Port Engine Battery
Master Disconnect
Switch



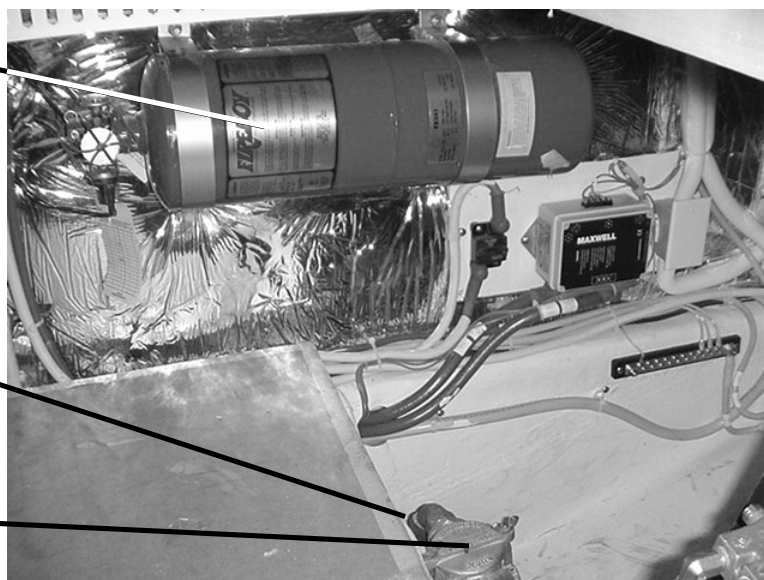
ER-1

STARBOARD FORWARD BULKHEAD

Fire Suppression
Chemical Tank

Starboard Engine
Cooling System
Seacock

Starboard Engine
Cooling System
Strainer



ER-2

CENTERLINE

Generator Battery
(aft)

Engine Batteries



ER-4

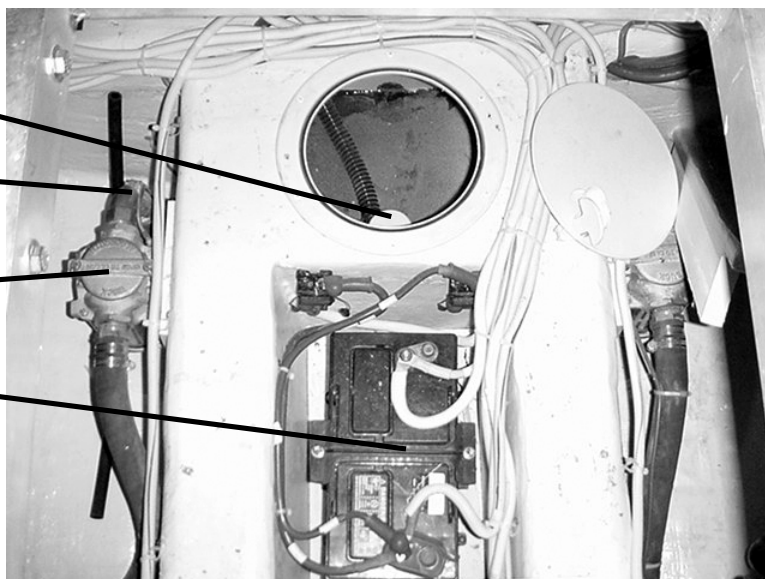
FORWARD CENTERLINE

Forward Bilge
Pump

Port Engine Cooling
System Seacock

Port Engine Cooling
System Strainer

"House" Battery



ER-3

Fuel S
Manua
(mount
on floo

9.8 Bill of Material

Any component that begins with a letter or has a category number lower than 50 is a manufactured component and therefore may not have all of its subcomponents listed.

Category Number	Part Description
50	Engines and V-Drives
51	Inboard Engine Equipment
52	Propellers
53	Steering Cables
54	Steering Helms and Kits
55	Control Cables
56	Controls and Kits
57	Instruments and Instrument Accessories
58	Fresh Water Cooling
59	Engine Equipment; Batteries
60	Fuel System and Tanks
61, 62	Galley, Head and Shower Equipment, and Tanks
63	Pressure Water System
64	Navigation and Interior Lighting
65	Bilge Pumps, Blowers, and Ventilators
66	Deck Hardware; Arch
67	Rails, Taffrail Kits, and Ladders
68	Wire Harnesses, Dockside Kits, and Panels
69	Electrical Equipment, Generator, Windlass
70	Windows, Doors, Windshield Sets, Hatches, and Screens
71	Hardware, Logo
72	Pilot Seat Hardware, Table Legs and Footrests
73	Accessories; Hatch, Horn, Screens, Stereo, TV, Vacuum
74	Fittings, Pipe and Tube
75	Clamps, Hoses, and Tubing
77	Wood Screws and Sheet Metal Screws
78	Lag and Machine Screws, Bolts, Nuts, and Washers
79	Nails, Staples, and Rivets
80	Blinds, Canvas, Carpet, Curtains, and Upholstery Material
81	Finishing Material and Adhesives; Logos, Paint, Plaques, Stripe
82	Fiberglass Materials, Gel and Putty
83	Extrusions
84	Lumber, Plywood, Hardboard, and Balsa
85	Plastics, Plastic Laminates, Doors, Lids, and Covers
89	Electrical
90	Air Conditioning and Accessories
91	Foam
94	Woodset

9.9 Carver Limited Warranty

