



2004

466 Motor Yacht

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.

DECLARATION OF CONFORMITY

Model Designation

466 Motor Yacht

Carver Boat Corporation declares that the 466 Motor Yacht complies with EC directive 94/25/EC, and in accordance with the following harmonized standards and the recreational craft sectoral guidelines in effect at the time of construction.

<u>ISO Reference</u>			<u>(Directive) Requirement (RSG) Reference</u>	
8666	12216	8469	Annex I	3.2
12217	8849	8099	Annex V-VIII, XII	3.3
8665	11812	10088	Article 8	2.1
14945	12216	12217	2.2	2.3
15083	10087	9094	3.6	2.4
15084	14945	15085	2.5	3.1
8885	11592	11591	3.4	3.5
10240	11192	7840	3.7	3.8
8846	10133	11105	3.9	4
12215	9093	13592	5.1.1	5.1.3
9097	13297	15584	5.2.1	5.2.2
8847	8848	9775	5.3	5.4.1
10592	13929	15852	5.5	COLREGS
10239		4505		

Type Examination

EC Module B

Notified Body

IMCI
Rue Abbe Cuypers 3
B-1040 Bruxelles
Belgique

Certification Number

BCAR021

Robin J. Clonkey
Manager Manufacturing Methods
Carver Boat Corporation
790 Markham Drive
Pulaski, WI 54162
USA

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.

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".



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.*

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**

Boating Safety

Safe Operation	2
Safety Recommendations	2
Adverse Conditions	3
Emergency Procedures	6
Safety Equipment	11
Owner's Responsibilities	14
Safe Boating Courses	14
Rules of the Road	15
Documentation	15
Drugs and Alcohol	16
Distress Calls	16
Voluntary Inspections	16
Boating Accidents	16
Boating Regulations	17
Pre-Departure Actions	18
Carbon Monoxide (CO) Warnings	19
Preventing CO Exposure	19
Identifying CO Exposure	21
Treating CO Exposure	21
Warning Labels	21

Safe Operation

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.**

Safety Recommendations

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 the "**Specifications**" portion of **Section 9** for the fuel tank capacity. Refer to the "**Fueling**" portion of **Section 5** 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.

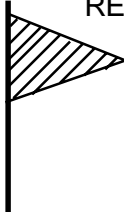
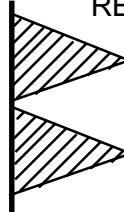
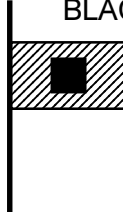
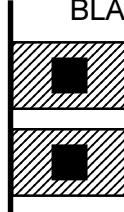
Adverse Conditions

Weather

Storms rarely appear without advance notice. Check the weather 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, and listen to your local forecasts before leaving port.

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

Your surroundings can also be a good indicator of changing weather conditions. 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.

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.

Storms

At all times, the boat operator should be aware of present weather conditions and the weather forecast. If storms are a possibility, keep a watch on the horizon, especially to the West for approaching storms. Monitor the weather forecast on a marine channel or local weather station. It would be best to return to a safe port if time allows.

Other steps to follow to weather the storm include:

- 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 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.

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.

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.

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 and gas 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 open flame 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, gas 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, fuel or gas).**
- **Fill any fuel tank or replace gas bottles when machinery is running or when cooking or heating appliances are in use.**
- **Smoke while handling fuel or gas.**

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.

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.

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 and adjust the length of the line to hold the bow at the most favorable angle.

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).

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.

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.

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.

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

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.

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.

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*.

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.

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.*

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.

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.

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.

For boats over 26 feet and under 39 feet, 4 inches, the device can be hand or power operated and must be able to produce a four-second blast which can be heard one-

half mile away. Refer to the U.S. Coast Guard's publication "**Navigational Rules, International-Inland**" for details on the appropriate signals.

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.

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.

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 26' and shorter than 40': Two Type B-I or at least one Type B-II portable hand extinguisher. If your boat has a fixed fire extinguishing system approved by the U.S. Coast Guard, one Type B-1 extinguisher is required.

Boats longer than 40' and shorter than 65': Three Type B-I or one Type B-I and one Type B-II portable hand extinguishers. If 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.

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.

Owner's Responsibilities

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

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.

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.

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.

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.

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.**

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.

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.

Boating Regulations

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.

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.

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.

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.

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.

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.

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.

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.

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(es) 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 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.

Identifying CO Exposure

In high concentrations, CO can be fatal within 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.

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.

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.

NOTES

NOTES

NOTES

DC Electrical System

Introduction	26
Batteries	26
Engine Batteries	26
"House" Battery	26
Generator Battery	27
Bow Thruster Battery Bank	27
Monitoring Battery Voltage Levels	28
Charging the Batteries	28
Operating the 12 Volt Equipment	31
DC Control Center	31
Bridge Breaker Panel	41
Safety Breaker Panel	43
Battery Maintenance	47
Troubleshooting the 12 Volt Electrical System	49
DC Wiring Schematic	51

Introduction

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.

Batteries

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

1. Engines (two batteries - one for each engine)
2. "House" (one battery)
3. Generator (one battery)
4. Optional bow thruster (four batteries connected to provide 24 volts DC).

Engine Batteries

Each propulsion engine has its own dedicated battery. These batteries are located in the engine room beneath two hatches between the engines. The starboard engine battery is the aft-most, while the port engine battery is just forward of it.

Electricity from each battery to its engine is controlled by a master disconnect switch. These switches are located in the engine room on the center of the aft bulkhead, each near its respective engine. To provide electricity to the engines, turn the master disconnect switches to the "ON" position.

Refer to the "**Engine Room**" portion of **Section 9** for the exact location of the engine batteries and their master disconnect switches.

"House" Battery

The "house" equipment controlled by the three DC circuit breaker panels (Safety Breaker Panel, DC Control Center, and Bridge Breaker Panel) is powered by one battery. This battery is located in the engine room just forward of the port engine battery.

Electricity from the battery to the Safety Breaker Panel is controlled by a master disconnect switch. This switch is located behind the engine room access ladder. To provide electricity to the Safety Breaker Panel, turn the master disconnect switch to the "ON" position. Circuit breakers on the Safety Breaker Panel control the flow of electricity to the other DC circuit breaker panels.

Refer to the "**Engine Room**" portion of **Section 9** for the exact location of the "house" battery.

Generator Battery

The generator has its own dedicated battery. This battery is located in the engine room just forward of the "house" battery.

Electricity from the battery to the generator starter is controlled by a master disconnect switch. This switch is located forward of the generator battery. To provide electricity to the generator starter, turn the master disconnect switch to the "ON" position.

Refer to the "**Engine Room**" portion of **Section 9** for the exact location of the generator battery and its master disconnect switch.

Bow Thruster Battery Bank

The optional bow thruster is powered by a bank of four batteries connected together to provide 24 volts. These batteries are located in the port forward corner of the engine room beneath a hatch.

Electricity from the batteries to the bow thruster is controlled by a master disconnect switch. This switch is located in the engine room on the aft side of the box in which the bow thruster batteries are located. To provide electricity to the bow thruster, turn the master disconnect switch to the "ON" position.

Refer to the "**Engine Room**" portion of **Section 9** for the exact location of the bow thruster battery bank and its master disconnect switch.

Monitoring Battery Voltage Levels

Engine Batteries



DANGER

Carfully 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. These two voltmeters are grouped within each engine's multi-gauge at the helm. For each engine, a single gauge provides information on engine temperature, oil pressure, fuel tank level, and battery voltage level. To activate each engine's gauge, turn the engine's ignition key one position to the right.

NOTE: *You do not need to start the engine to activate its gauge. 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.

"House" Battery

You can determine the voltage level of the house battery using the voltmeter located on the DC Control Center. When the "house" battery master disconnect switch, the Main One circuit breaker on the Safety Breaker Panel, and the System DC Main circuit breaker on the DC Control Center are "ON", the voltmeter indicates the voltage level within the house battery. An ammeter, located next to the voltmeter, indicates the current load on the DC electrical system.

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.

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 chargers to recharge the batteries.

Your boat is equipped with two battery chargers. If your boat has the optional bow thruster, there is an additional battery charger for its battery bank.

Engine/Generator Battery Charger

The voltage levels of both engine batteries and the generator battery are monitored and maintained by a single battery charger. Additionally, when the generator is operating, its alternator maintains the voltage level of the generator battery.

To operate the battery charger:

1. Provide AC power to the boat, from either a shore power source or the onboard generator. Refer to the **"Shore Power"** or **"Generator Power"** portion of **Section 3** for more information.
2. On the Safety Breaker Panel, switch "ON" the Port Engine, Starboard Engine, and/or Generator circuit breaker(s). Refer to the **"Safety Breaker Panel"** portion of this section for more information on these circuit breakers
3. On the AC Control Center, switch "ON" the Battery Charger 2 circuit breaker. Refer to the **"AC Control Center"** portion of **Section 3** for more information on this circuit breaker. The engine/generator battery charger now automatically charges the engine and generator batteries when their voltage drops below a predetermined level.

The engine/generator battery charger is located in the engine room on the port aft bulkhead. Refer to the **"Engine Room"** portion of **Section 9** for the exact location of this battery charger.

"House" Battery Charger

The voltage level of the "house" battery is 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 onboard generator. Refer to the **"Shore Power"** or **"Generator Power"** portion of **Section 3** for more information.
2. On the Safety Breaker Panel, switch "ON" the "House" circuit breaker. Refer to the **"Safety Breaker Panel"** portion of this section for more information on these circuit breakers
3. On the AC Control Center, switch "ON" the Battery Charger 1 circuit breaker. Refer to the **"AC Control Center"** portion of **Section 3** for more information on this circuit breaker. The "house" battery charger now automatically charges the "house" battery when its voltage drops below a predetermined level.

The "house" battery charger is located in the engine room next to the forward, inboard side of the starboard fuel tank. Refer to the **"Engine Room"** portion of **Section 9** for the exact location of this battery charger.

Bow Thruster Battery Charger

The voltage levels of the four bow thruster batteries are monitored and maintained by a single battery charger. This battery charger is installed only if your boat has the optional bow thruster.

To operate the battery charger:

1. Provide AC power to the boat, from either a shore power source or the onboard generator. Refer to the **"Shore Power"** or **"Generator Power"** portion of **Section 3** for more information.
2. On the AC Control Center, switch "ON" the Bow Thruster Battery Charger circuit breaker. Refer to the **"AC Control Center"** portion of **Section 3** for more information on this circuit breaker. The bow thruster battery charger now automatically charges the bow thruster batteries when their voltage drops below a predetermined level.

The bow thruster battery charger is located in the engine room on the port forward bulkhead. Refer to the **"Engine Room"** portion of **Section 9** for the exact location of this battery charger.

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:

- DC Control Center
- Bridge Breaker Panel
- Safety 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.



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.*

DC Control Center

The DC Control Center, located in a cabinet in the aft salon bulkhead, manages the power supply to most of the boat's 12 volt equipment, except for some equipment on the bridge. To provide power to this breaker panel:

1. Turn the "house" battery master disconnect switch to the "ON" position. This switch is located behind the engine room access ladder
2. On the Safety Breaker Panel, switch the Main - One circuit breaker "ON."

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

Generator

Use this switch to start and stop the generator.

Bilge Blower

Use this switch to operate the four bilge blowers. To activate this switch, first switch the four Bilge Blower circuit breakers "ON".

Ammeter

The ammeter indicates the amount of current that is being drawn by the components listed on the DC Control Center.

Voltmeter

The voltmeter indicates the amount of voltage that is being provided by the "house" battery. When the "house" battery master disconnect switch is "ON", the Main - One circuit breaker on the Safety Breaker Panel is "ON", and the "house" battery is fully charged, the voltmeter should read 12.3 to 12.6 volts. If the DC electrical system is not operating properly, contact a qualified electrician.

Water Level Gauge

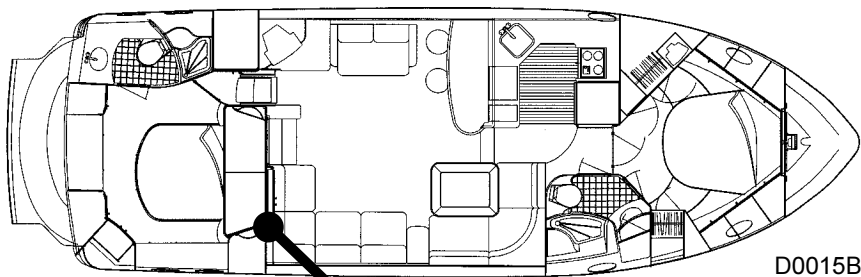
This gauge indicates the amount of water in the fresh water tank. To activate the optional fresh water monitoring system, switch the Water Monitor circuit breaker on this panel "ON".

Grey Water Level Gauge

This gauge indicates the amount of grey water in the optional grey water tank. To activate the grey water monitoring system, switch the Grey Water Monitor circuit breaker on this panel "ON".

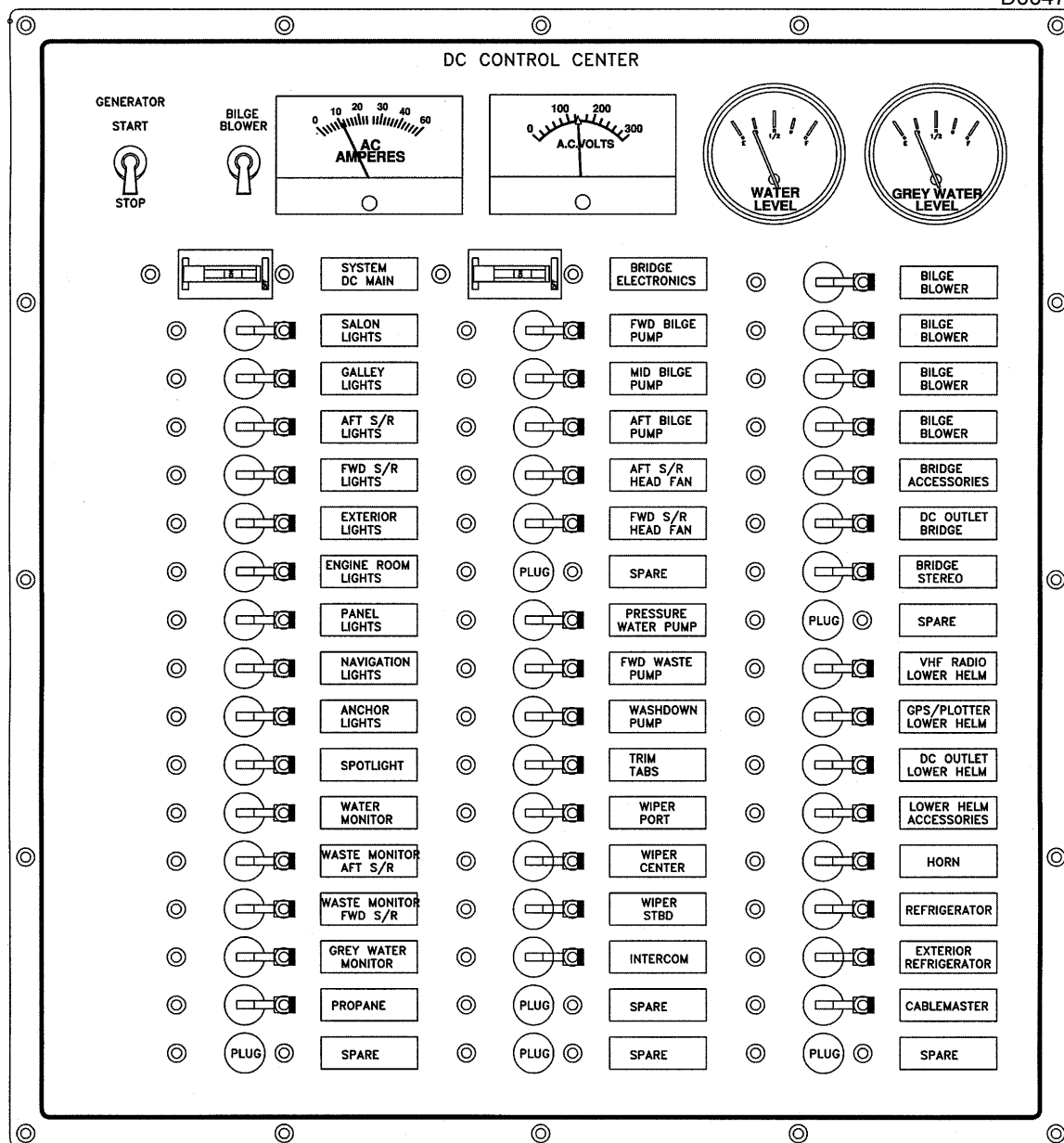
System DC Main

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 System DC Main breaker "ON". To cut the power to the other breakers, switch this breaker "OFF".



DC CONTROL CENTER

D0047B



Salon Lights

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

Galley Lights

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

Aft Stateroom Lights

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

Forward Stateroom Lights

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

Exterior Lights

This breaker controls the flow of electricity to the light switch on the aft deck. To supply power to the switch, switch this breaker "ON."

Engine Room Lights

This breaker controls the flow of electricity to the engine room's light switch. The switch is located on the port aft salon bulkhead. When the engine room lights are on, a small light above the switch is illuminated. To supply power to the switch, switch this breaker "ON."

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.

Navigation 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."

Anchor Lights

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

Spotlight

This breaker controls the flow of electricity to the controls for the optional spot light. 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 spot light.

Water Monitor

This breaker controls the flow of electricity to the optional fresh water monitoring system, including the water level gauge. To supply power to the system, switch this breaker "ON."

Waste Monitor Aft Stateroom

This breaker controls the flow of electricity to the aft waste tank's monitor. The monitor, located in the aft head inside the port medicine cabinet, indicates the amount of waste in the aft waste tank. To supply power to the monitor, switch this breaker "ON."

Waste Monitor Forward Stateroom

This breaker controls the flow of electricity to the forward waste tank's monitor. The monitor, located in the forward head inside the medicine cabinet, indicates the amount of waste in the aft waste tank. To supply power to the monitor, switch this breaker "ON."

Grey Water Monitor

This breaker controls the flow of electricity to the monitoring system, including the grey water monitor gauge, for the optional grey water system. To supply power to the system, switch this breaker "ON."

Propane

This breaker controls the flow of electricity to the optional propane stove in the galley. Before switching this breaker "ON," read both the propane stove OEM information and the "**Propane Stove**" portion of **Section 4**.

Spare

This breaker is reserved for aftermarket accessories you install on your boat.

Bridge Electronics

This breaker controls the flow of electricity to the flybridge's electronic equipment, such as the optional VHF radio, optional auto pilot, and optional radar system. To provide power to this equipment:

1. On the Safety Breaker Panel, switch the Main - Two breaker "ON."
2. Switch the Bridge Electronics breaker "ON." Refer to the OEM information for details on operating the equipment.

Forward, Mid, and Aft Bilge Pumps

A TIP FROM CARVER!

A certain amount of water will always collect in your boat's bilge, especially in the bilge area where the shaft logs are located. The small amount of water that normally accumulates is usually not enough to activate the bilge pumps' automatic float switches. While underway and on plane, use the helm switch to turn your bilge pumps on manually and let them run for 30 seconds to a minute.



CAUTION

Don't forget to turn the bilge pumps off. Leaving the forward, mid, or aft bilge pump on for extended periods of time could cause excessive wear to the pump.

These breakers control the flow of electricity to the forward, mid, and aft bilge pump controls, respectively. These controls are located at the helm. Switch these breakers "ON" to activate the bilge pump controls.

Aft Stateroom Head Fan

This breaker controls the flow of electricity to the exhaust fan switch in the aft head. To supply power to the switch, switch this breaker "ON."

Forward Stateroom Head Fan

This breaker controls the flow of electricity to the exhaust fan switch in the forward head. To supply power to the switch, switch this breaker "ON."

Spare

This breaker is reserved for aftermarket accessories you install on your boat.

Pressure 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 the "**Priming the Water System**" portion of **Section 4** for information on using the pressure water pump to fill and prime the water system.

Forward Waste Pump

This breaker controls the flow of electricity to the waste pump switch for the optional overboard discharge system. Use the waste pump to empty the waste tanks directly overboard. The switch is located in the engine room above the aft waste tank, next to the Y-valve. Refer to the "**Engine Room**" portion of **Section 9** for the exact location of this switch. To supply power to the switch, switch this breaker "ON." Refer to the "**Overboard Discharge**" portion of **Section 4** for information on using the pump.

Washdown Pump

This breaker controls the flow of electricity to the optional bow and transom raw water washdown pump. 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 the "**Raw Water Washdowns**" portion of **Section 4** for information on using the washdowns.

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 the "**Trim Tabs**" portion of **Section 6** for more information on using the trim tabs.

Wiper Port

This breaker controls the flow of electricity to the optional lower helm's port windshield wiper controls. Use this wiper to clear water from the port windshield. Switch this breaker "ON" to activate the wiper controls.

Wiper Center

This breaker controls the flow of electricity to the optional lower helm's center windshield wiper controls. Use this wiper to clear water from the center windshield. Switch this breaker "ON" to activate the wiper controls.

Wiper Starboard

This breaker controls the flow of electricity to the optional lower helm's starboard windshield wiper controls. Use this wiper to clear water from the starboard windshield. Switch this breaker "ON" to activate the wiper controls.

Intercom

This breaker controls the flow of electricity to the boat's telephone/intercom system. To use this system:

1. Connect a telephone to each of the boat's phone jacks, where desired. There is a jack in the salon, master stateroom, forward stateroom, and on the bridge.
2. If you wish to use the system to make telephone calls, connect a shore telephone line to the phone connector located outboard of the stairway leading from the boarding platform to the aft deck.
3. Switch the Intercom breaker "ON." The telephones then operate in the same manner as a telephone in your home, or as an intercom system. Refer to the OEM information for details on operating the telephone/intercom system.

Spare

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

Bilge Blower

These four breakers control the flow of electricity to the bilge blower controls at the helm, and to the Bilge Blower switch at the upper left corner of this breaker panel. Switch these breakers "ON" to activate the controls. Use the controls to manually operate the bilge

blowers. The bilge blowers also operate automatically when the starboard engine ignition switch is turned on.

Bridge Accessories

This breaker controls the flow of electricity to any aftermarket accessories installed at the flybridge helm. Switch this breaker "ON" to activate these accessories. Refer to the accessories' manuals for information on operating the accessories.

DC Outlet Bridge

This breaker controls the flow of electricity to the 12 volt outlet located at the flybridge helm. You can operate various types of 12 volt equipment from the outlet, such as a cellular phone, spot light, and laptop computer. Switch this breaker "ON" to activate the outlet.

Bridge Stereo

This breaker controls the flow of electricity to the flybridge's optional stereo. To supply power to the stereo, switch this breaker "ON". Refer to the OEM information for details on operating the stereo.

Spare

This breaker is reserved for aftermarket accessories you install on your boat.

VHF Radio Lower Helm

This breaker controls the flow of electricity to the optional lower helm's optional VHF radio. Switch this breaker "ON" to activate the VHF radio. Refer to the OEM information for details on operating the radio.

GPS/Plotter Lower Helm

This breaker controls the flow of electricity to the optional Global Positioning System and optional plotter. Switch this breaker "ON" to activate the GPS and plotter. Refer to the OEM information for details on operating the GPS and plotter.

DC Outlet Lower Helm

This breaker controls the flow of electricity to the 12 volt outlet located at the optional lower helm. You can

operate various types of 12 volt equipment from the outlet, such as a cellular phone, spot light, and laptop computer. Switch this breaker "ON" to activate the outlet.

Lower Helm Accessories

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.

Horn

This breaker controls the flow of electricity to the boat's horn controls at the helm. To supply power to the horn's ON/OFF switch, switch this breaker "ON." To operate the horn, press the horn switch to the "ON" position.

Refrigerator

This breaker controls the flow of electricity to the galley's dual-voltage refrigerator. The refrigerator can operate on either 110 volt AC power or 12 volt DC power. To operate the refrigerator using DC power, switch this breaker "ON."

Exterior Refrigerator

This breaker controls the flow of electricity to the flybridge's optional dual-voltage refrigerator. The refrigerator can operate on either 110 volt AC power or 12 volt DC power. To operate the refrigerator using DC power, switch this breaker "ON."

Cablemaster

This breaker controls the flow of electricity to the optional Cablemaster's motor and its transom-mounted controls. To supply power to the motor and controls, switch this breaker "ON." Refer to the OEM information for details on operating the Cablemaster.

Spare

This breaker is reserved for aftermarket accessories you install on your boat.

Bridge Breaker Panel

The Bridge Breaker Panel, located in a cabinet in the starboard bridge bulkhead, next to the starboard companion seat, manages the power supply to the bridge's electronic equipment and windshield wiper(s). To provide power to this breaker panel:

1. Turn the "house" battery master disconnect switch to the "ON" position. This switch is located behind the engine room access ladder
2. On the Safety Breaker Panel, switch the Main - Two circuit breaker "ON."
3. On the DC Control Center, switch the Bridge Electronics circuit breaker "ON."

The Bridge Breaker Panel contains the circuit breakers described below.

Bridge VHF Radio

This breaker controls the flow of electricity to the optional VHF radio. To supply power to the radio, switch this breaker "ON." Refer to the OEM information for details on operating the radio.

GPS/Plotter Bridge

This breaker controls the flow of electricity to the optional global positioning system and chart plotter. To supply power to these systems, switch this breaker "ON." Refer to the OEM information for details on operating the GPS and chart plotter.

Radar

This breaker controls the flow of electricity to the optional radar system. To supply power to the radar, switch this breaker "ON." Refer to the OEM information for details on operating the radar.

Ray Data Repeater

This breaker controls the flow of electricity to the optional data repeater system installed at the optional lower helm. To supply power to this system, switch this breaker "ON." Before activating the data repeater, first activate the primary navigation equipment located at the bridge helm. Refer to the OEM information for details on operating the data repeater.

Auto Pilot

This breaker controls the flow of electricity to the optional automatic piloting system. To supply power to the auto pilot, switch this breaker "ON." Refer to the OEM information for details on operating the auto pilot.

Wiper Port

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

Wiper Center

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

Wiper Starboard

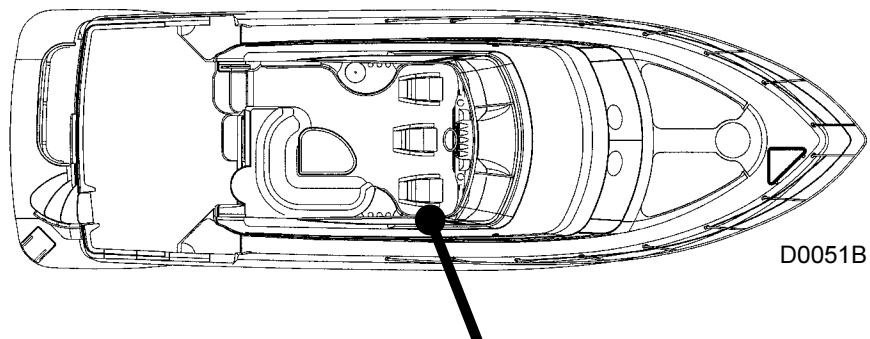
This breaker controls the flow of electricity to the optional starboard windshield wiper switch at the helm. To supply power to this switch, switch this breaker "ON."

Defogger Center

This breaker controls the flow of electricity to the optional center windshield defogger switch at the helm. To supply power to this switch, switch this breaker "ON."

Power Hatch

This breaker controls the flow of electricity to the optional sun roof switch at the helm. To supply power to this switch, switch this breaker "ON."



D0051B

BRIDGE BREAKER PANEL

Safety Breaker Panel

The Safety Breaker Panel, located behind the engine room access ladder, 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 Auto Bilge Pump, Auto Sump, CO Detector, Stereo Memory, Electric Shift, and Battery Charger 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.

Auto Bilge Pump - Forward, Mid Forward, Mid Aft, and Aft

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: *Because the bilge pumps are "hard-wired" to the breaker panel, they operate automatically regardless of the position of the bilge pump breakers. Periodically test each float switch by lifting the float. The pump should turn on when the float is lifted.*

Auto Sump - Forward and Aft

These breakers control the flow of electricity to the forward and aft sump pumps. Because the sumps are located below the boat's water line, the sump pumps are needed to pump shower and sink waste (grey) water overboard or into the optional grey water tanks. Each sump pump is activated automatically by a float switch whenever water within the sump rises above a predetermined level. Switch the Auto Sump circuit breakers "ON" before using the showers or sinks in the heads.

NOTE: *Because the condensation from the air conditioning units drains into the sump, the Auto Sump circuit breakers must be "ON" whenever the air conditioning units are on.*

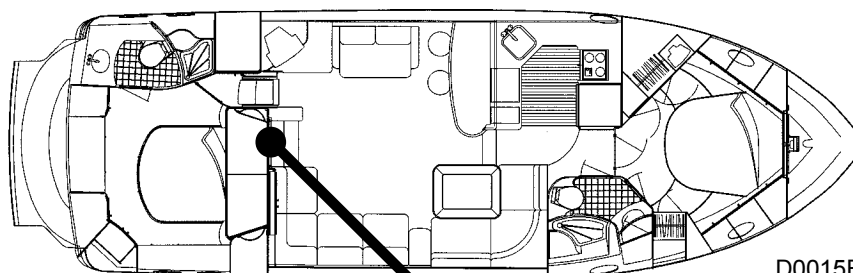
A TIP FROM CARVER!

A certain amount of water will always collect in your boat's bilge, especially in the bilge area where the shaft logs are located. The small amount of water that normally accumulates is usually not enough to activate the bilge pumps' automatic float switches. While underway and on plane, use the helm switch to turn your bilge pumps on manually and let them run for 30 seconds to a minute.

CO Detector

**DANGER**

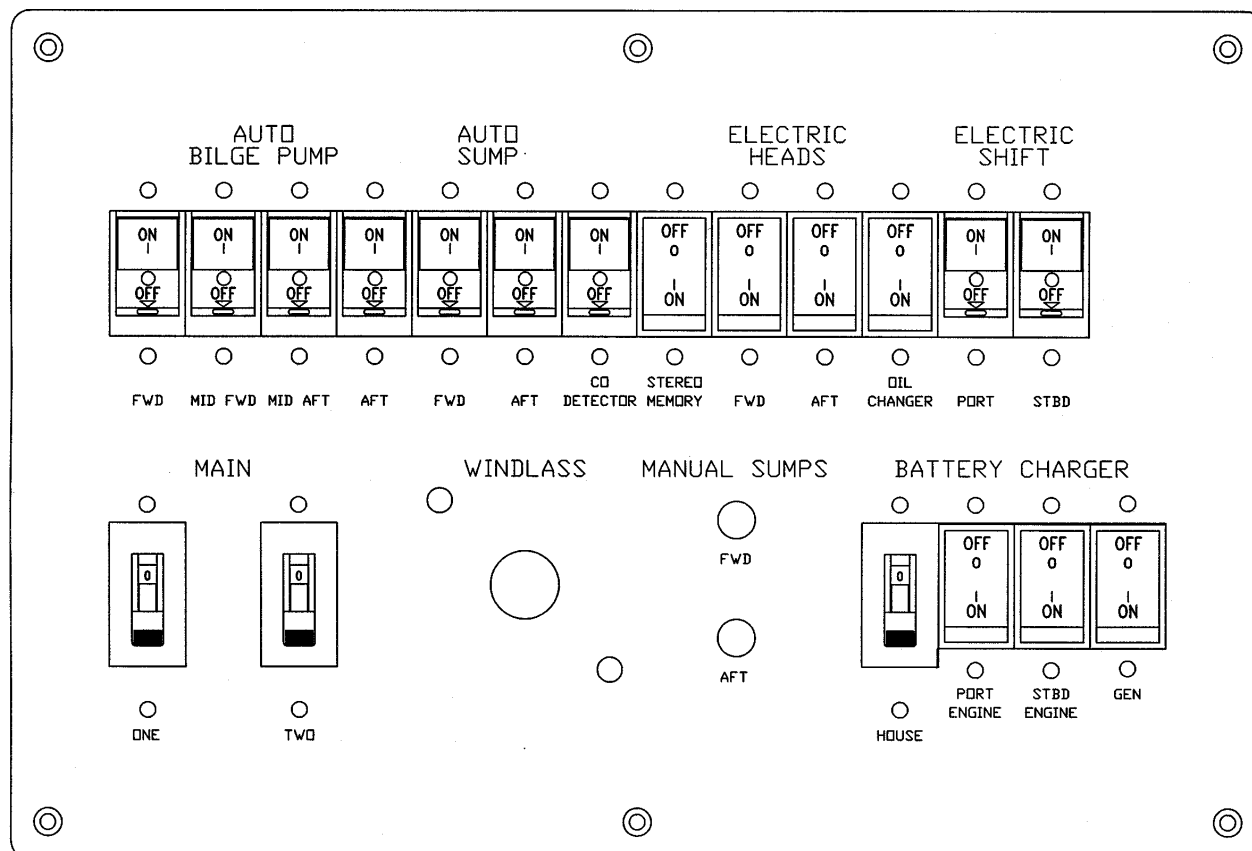
Always activate the CO detectors when the boat's engines or generator are running. Carbon monoxide is dangerous. Refer to Section 1 of this Owner's Guide for information on minimizing, detecting, and controlling carbon monoxide accumulation.



D0015B

SAFETY BREAKER PANEL

D0067B



Carver has installed several carbon monoxide (CO) detectors on your boat for your safety. This breaker must be "ON" for the CO detectors to operate.

The CO detectors monitor the air throughout the boat's cabin for the presence of carbon monoxide. Carbon monoxide is a colorless and odorless gas that is present in engine and generator exhaust fumes. Carbon monoxide is a very dangerous gas that is potentially lethal when inhaled.

When your CO detectors are activated, 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. More information concerning carbon monoxide is included in **Section 1** of this Owner's Guide.

Stereo Memory

This breaker controls the flow of electricity to the optional bridge stereo system. When the stereo is installed, 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.

Electric Heads - Forward and Aft

These breakers control the flow of electricity to the electric motor or vacuum pump, depending on the flushing system installed, for each toilet. Switch these breakers "ON" to enable the pumps. Pressing the foot lever at the base of the toilet then flushes the toilet. Refer to the OEM information for details on operating the toilets.

Oil Changer

This breaker controls the flow of electricity to the optional oil change system. This system is located in the engine room and is designed to assist you in changing the propulsion and generator engine oil. Switch this breaker "ON" to enable the system. Refer to the OEM information for details on operating the system.

Electric Shift - Port and Starboard

These breakers control the flow of electricity to the optional electronic shift levers at the helm. The shift levers control the direction of the boat: forward, neutral, or reverse. The left shift lever controls the port engine; the right shift lever controls the starboard engine. Switch these breakers "ON" to activate the shift levers. Refer to the "**Shift and Throttle**" portion of **Section 5** for more information on operating the shift levers.

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.

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 Electronics circuit breaker on the DC Control Center.

Windlass

This breaker controls the flow of electricity to the controls that operate the optional 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 on the fore deck.*

Manual Sumps - Forward and Aft

Use these controls to manually operate the forward and aft sump pumps. Pull the controls out to turn "ON" the sump pumps. Push the controls in to turn "OFF" the pumps. Use these controls if you wish to drain the sumps when there is not enough water in them to automatically activate the sump pumps.

Battery Charger - "House," Port Engine, Starboard Engine, and Generator

These breakers protect the circuitry between the "house" battery charger and the "house" battery, and the engine/generator battery charger and the port engine battery, starboard engine battery, and generator battery, respectively. When these breakers are "ON" and the voltage level of one or more of the batteries decreases below a predetermined level, the appropriate battery charger automatically charges the battery(ies).

Battery Maintenance

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



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, ventilate the area of the spill. Neutralize the acid in the electrolyte by pouring baking soda on the spill. Remove the neutralized electrolyte using a disposable rag or paper towel.

Maintaining Your Batteries

1. 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.
2. Inspect the batteries at least once every 30 days.



WARNING

Disconnect the batteries before cleaning them.

3. 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.

4. 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.
5. 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.

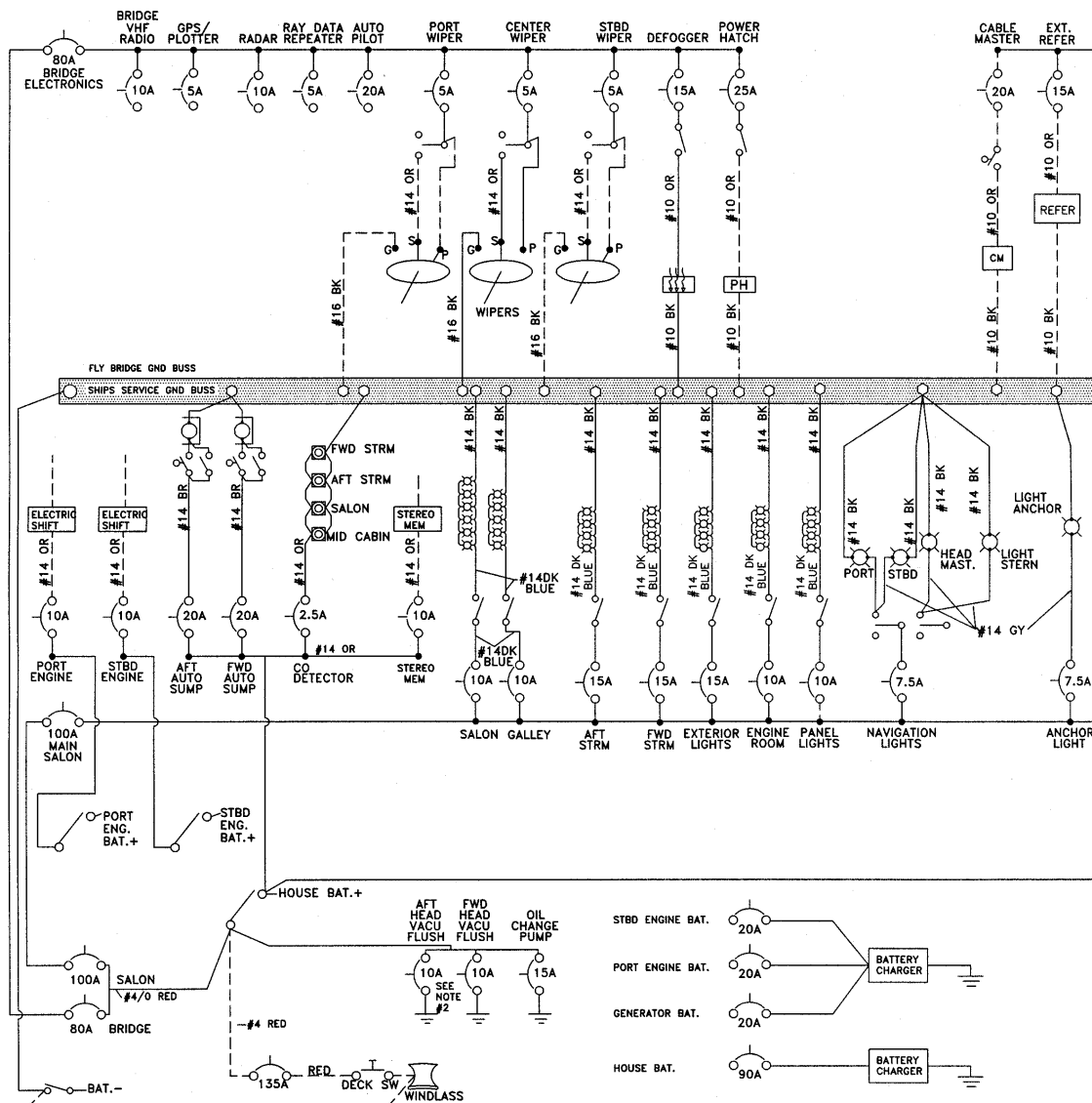
Check the battery charge level every three months using a hydrometer or voltmeter. If the specific gravity of the battery is less than 1.225 or the voltage is less than 12.4 volts, charge the battery. Avoid overcharging the batteries.

Troubleshooting the 12 Volt Electrical System

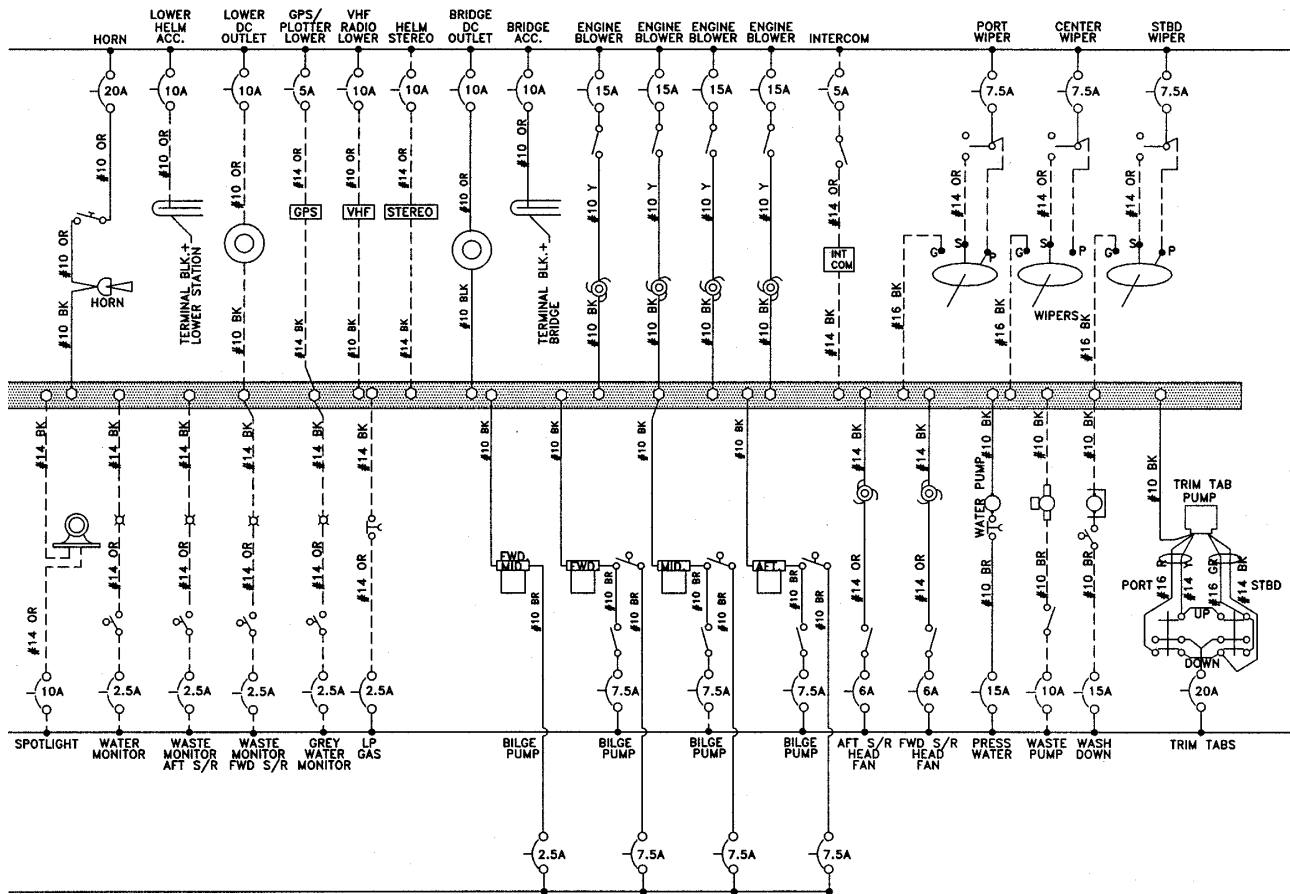
Problem	Possible Cause	Possible Solution
12 volt equipment does not function.	Battery master disconnect switch is in the "OFF" position.	Turn the switch to the "ON" position.
	Main left or right circuit breaker on the Safety Breaker Panel is "OFF".	Turn both circuit breakers "ON".
	System DC Main or Bridge Electronics circuit breaker on the DC Control Center is "OFF".	Turn the circuit breaker "ON".
	Battery is weak or dead.	Start the engines or activate the battery chargers.
Individual 12 volt component does not function.	Circuit breaker for that component is "OFF".	Switch the circuit breaker for that component "ON".
	Battery is weak or dead.	Start the engines or activate the battery chargers.
	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 battery chargers.
	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.

Problem	Possible Cause	Possible Solution
Engine is running and voltmeter does not indicate adequate voltage.	Engine alternator belt is loose.	Refer to engine OEM information to tighten the belt.

DC Wiring Schematic



D0093DA



NOTE:
 #1 - - - - - DENOTES OPTIONAL EQUIPMENT
 #2 PAR HEADS REQUIRE 25A BREAKERS

D0093DB

NOTES

NOTES

AC Electrical System

AC Electrical System	56
Wiring System	56
Shore Power.....	57
Generator Power.....	60
Operating AC Equipment	63
AC Main Circuit Breaker Group(s)	64
AC Control Center (interior systems).....	64
AC Control Center (exterior air conditioning).....	75
Ground Fault Circuit Interrupters	79
Electrical Loads	82
Bonding System	83
Troubleshooting the AC Electrical System	85
AC Wiring Schematic	87

AC Electrical System

Your boat is equipped with either a 50 amp (for North America) or 32 amp (for Europe) 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.

The AC electrical system is divided into three circuits: Line 1, Line 2, and Line 3. Each circuit is configured as either 125 volts 60 Hertz (for North America) or 230 volts 50 Hertz (for Europe).

Line 1

The Line 1 circuit provides power to all of your boat's AC equipment except for the optional interior and exterior air conditioning systems.

Line 2

The Line 2 circuit provides power to the optional interior air conditioning system.

Line 3

The Line 3 circuit provides power to the optional exterior air conditioning system.

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 that is installed in the AC Control Center.

The white wire returns the current from the equipment or receptacle back 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.

Shore Power

NOTE: Remove all perishables from your refrigerator if you leave your boat for more than forty-eight hours. The power supply to your refrigerator may be interrupted and your food may spoil.

To supply shore AC power to your boat, you must have one shore power cord for Line 1 and Line 2, and a second shore power cord for Line 3.

To connect to a shore power source:

**DANGER**

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

1. Switch the Water Heater circuit breaker on the AC Control Center (interior systems) "OFF". Do not switch the breaker on again until the fresh water system has been filled, pressurized and primed.
2. Switch all Shore and Generator circuit breaker groups on the two AC Control Centers "OFF".

**DANGER**

Make sure each shore power cord you use is in excellent condition with no cuts, nicks or abrasions in the exterior plastic cover. Also, make sure that each cord 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.

3. Switch "OFF" the AC Main circuit breaker group(s), located in a locker outboard of the stairway leading from the boarding platform to the aft deck.

4. Locate your 50' shore power cord(s).
5. Connect the female end of the cord(s) to your boat's shore power receptacle(s). The Line 1/Line 2 and Line 3 (if present) receptacles are located on the starboard transom. If your boat has the optional forward shore power receptacles, these are located on the starboard forward side deck.
6. Secure the nonmetallic threaded locking ring that locks each cord to the boat's shore power receptacle. This prevents the cords from being accidentally disconnected and from arcing due to a gap between the cord plug and the receptacle.

**DANGER**

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

7. Choose a neat and safe way to route the shore power cord(s) to the shore power source box.
8. Switch the circuit breaker that is installed in the shore power source box "OFF".
9. Plug the male end of the shore power cord(s) into the shore power source box.
10. 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.
11. Switch the circuit breaker that is installed in the shore power source box "ON".
12. Switch the AC Main circuit breaker group(s), located just above the boat's shore power receptacle(s), "ON".
13. Turn the shore power receptacle selector switch (if present), located on the upper left corner of the AC Control Centers, to select your boat's forward or aft

shore power receptacle(s), whichever the shore power cord(s) is connected to.

14. Switch the applicable Shore circuit breaker groups on both AC Controls Centers "ON".
15. If the Reverse Polarity indicator(s) on the AC Control Center(s) illuminates, immediately switch the Shore circuit breaker groups "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 10 through 14. If the Reverse Polarity indicator illuminates again, disconnect the 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 Power Available indicator(s) illuminates, power is now available to the other circuit breakers on the AC Control Center(s) (as long as the Line circuit that the circuit breakers are on is connected to the shore power source).

16. Monitor the voltmeter and ammeter 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.

Generator Power

You can use the generator to supply AC power to Line 1, Line 2, and Line 3 when a shore power source is not available. The generator is installed in the forward engine room on the boat's centerline. Refer to the "**Engine Room**" portion of **Section 9** for the exact location of the generator and its system components. Fuel for the generator is drawn from the port 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. This battery is located in the engine room, beneath a hatch on the boat's centerline, just aft of the generator. Power to the generator from its battery is controlled by a master disconnect switch located just forward of the generator battery. Turn this switch to the "ON" position.

NOTE: *The boat's engine/generator battery charger automatically monitors the voltage level in the generator battery and recharges the battery when necessary as long as the Battery Charger - Gen circuit breaker on the Safety Breaker Panel is "ON", and the Battery Charger 2 circuit breaker on the AC Control Center (interior systems) is "ON".*

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 two 12 volt propulsion engine batteries. If these batteries become discharged to the point where they are unable to start an engine, start the generator and turn on the engine battery charger. When the engine batteries are recharged to an adequate level, you can then start the engines.

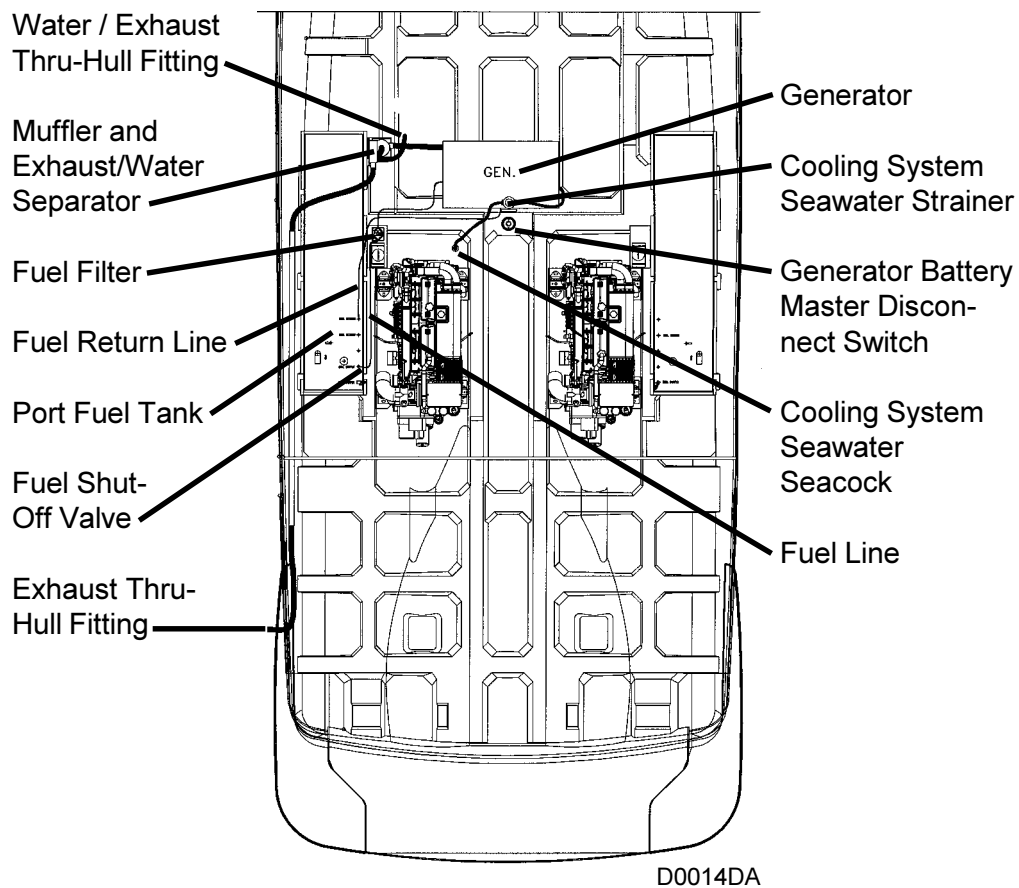


CAUTION

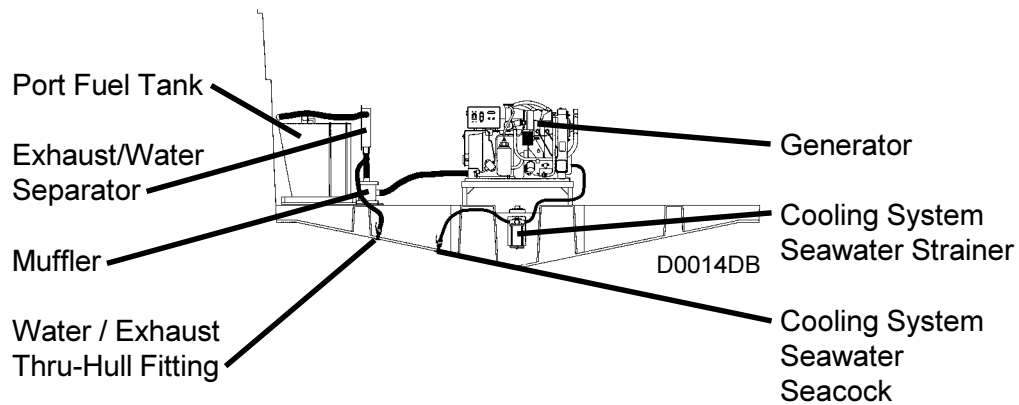
Never turn the generator battery master disconnect switch to the "OFF" position while the generator is operating. Doing this can damage the generator or its alternator wiring.

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. Remove and clean the strainer. The strainer is located under the aft center of the generator. Refer to the "**Engine Room**" portion of **Section 9** for the exact location of the strainer.
4. Reinstall the strainer.

GENERATOR LAYOUT

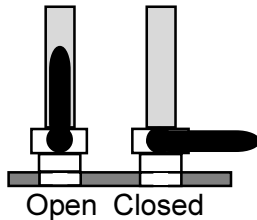


(VIEW FROM AFT)



**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. If the strainer leaks when the seacock is opened, close the seacock, then check the strainer for correct installation. The seacock is located just forward of the forward in-board corner of the port engine. Refer to the "**Engine Room**" portion of **Section 9** for the exact location of the seacock.
6. Open the water/exhaust seacock. This seacock is located between the generator and the port fuel tank. Refer to the "**Engine Room**" portion of **Section 9** for the exact location of the seacock.
7. Switch the four Bilge Blower circuit breakers on the DC Control Center "ON".
8. Turn the bilge blowers "ON" using the blower switch on the DC Control Center.

**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.

9. A spring-loaded generator STOP/START switch is located at the top left of 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.

10. When the generator is running smoothly, switch the Generator circuit breaker group(s) on the AC Control Center(s) "ON". This connects the generator to the boat's AC electrical system. AC components and receptacles can now be used in the same manner as when the boat is connected to a shore power source.
11. 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.
12. To change the boat's AC power source from the generator to a shore power source, switch the Generator circuit breaker group(s) on the AC Control Center(s) "OFF". Then connect to a shore power source as described earlier in this section.

**DANGER**

Do not inhale generator exhaust. Generator exhaust contains carbon monoxide, a poisonous gas. Refer to the "Carbon Monoxide Warnings" portion of Section 1 for more information on engine exhaust and carbon monoxide.

Operating AC Equipment

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

Your boat contains two or three AC circuit breaker panels:

- AC Main Circuit Breaker Group(s)
- AC Control Center (interior systems)
- AC Control Center (exterior air conditioning)

The circuit breakers on these panels enable you to control the electricity to either the AC component itself or to the component'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 two circuit breaker panels by either a shore power source or the generator.

**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.

AC Main Circuit Breaker Group(s)

All AC power is routed through an AC Main circuit breaker group before it enters your boat. If your boat has the optional exterior air conditioning system, there is a second AC Main circuit breaker group for that system. The circuit breaker group(s) is located in a locker on the starboard transom. When the AC Main circuit breaker group(s) is "ON," the power then flows to the AC Control Center(s).

AC Control Center (interior systems)

The AC Control Center (interior systems), located in a cabinet in the aft salon bulkhead, manages the power supply to all of the AC components except for the optional exterior air conditioning system. To provide power to this breaker panel:

1. Provide a source of AC power to the boat, through either a shore power connection or the generator.
2. Switch "ON" the appropriate AC Main circuit breaker group.

The AC Control Center contains the gauges, switches, and circuit breakers described below.

Shore Power Receptacle Selector Switch

Use this switch to select the boat's shore power receptacle, either forward or aft, to which the shore power cords is connected. If you are not using shore power, turn this switch to the "OFF" position. This switch is not present if the optional forward shore power receptacle is not present.

Line Voltage (Voltmeter)

The voltmeter indicates the amount of voltage that is entering the Line 1 or Line 2 circuit, as selected by the Select Voltage switch, described below.

When your boat's AC electrical system is connected to either a shore power source or the generator (and the generator is running), the voltmeter should read between 100 and 130 volts in a 125 volt system or between 210 and 240 volts in a 230 volt system. If the voltmeter reads 100 volts (205 volts in a 230 volt system) or less, **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 the voltmeter reads zero voltage, it means that no electricity is reaching the AC Control Center. If you are using the generator, make sure it is operating properly and the safety circuit breaker on the generator control panel is "ON." If you are using shore power, check your shore power cord to make sure it is properly attached to both the boat and the shore power source. Also, make sure you have turned "ON" both the circuit breaker(s) at the shore power source box and the AC Main circuit breaker group. If the voltmeter continues to read zero voltage, contact marina management to ensure that the shore power source is operating properly. If the problem appears to be with your boat's AC electrical system, have the system inspected by a qualified electrician.

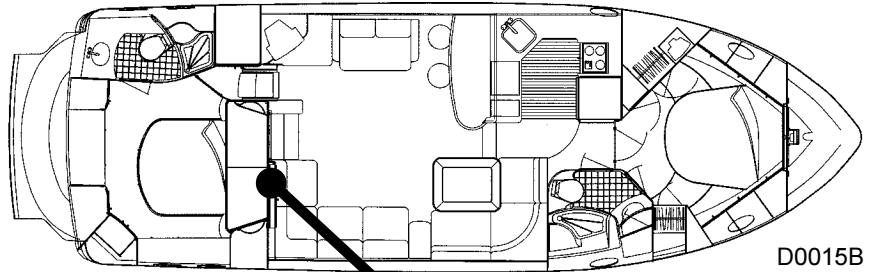
Select Voltage Switch

This switch determines which Line circuit's voltage is shown on the voltmeter.

Load Current (Ammeter)

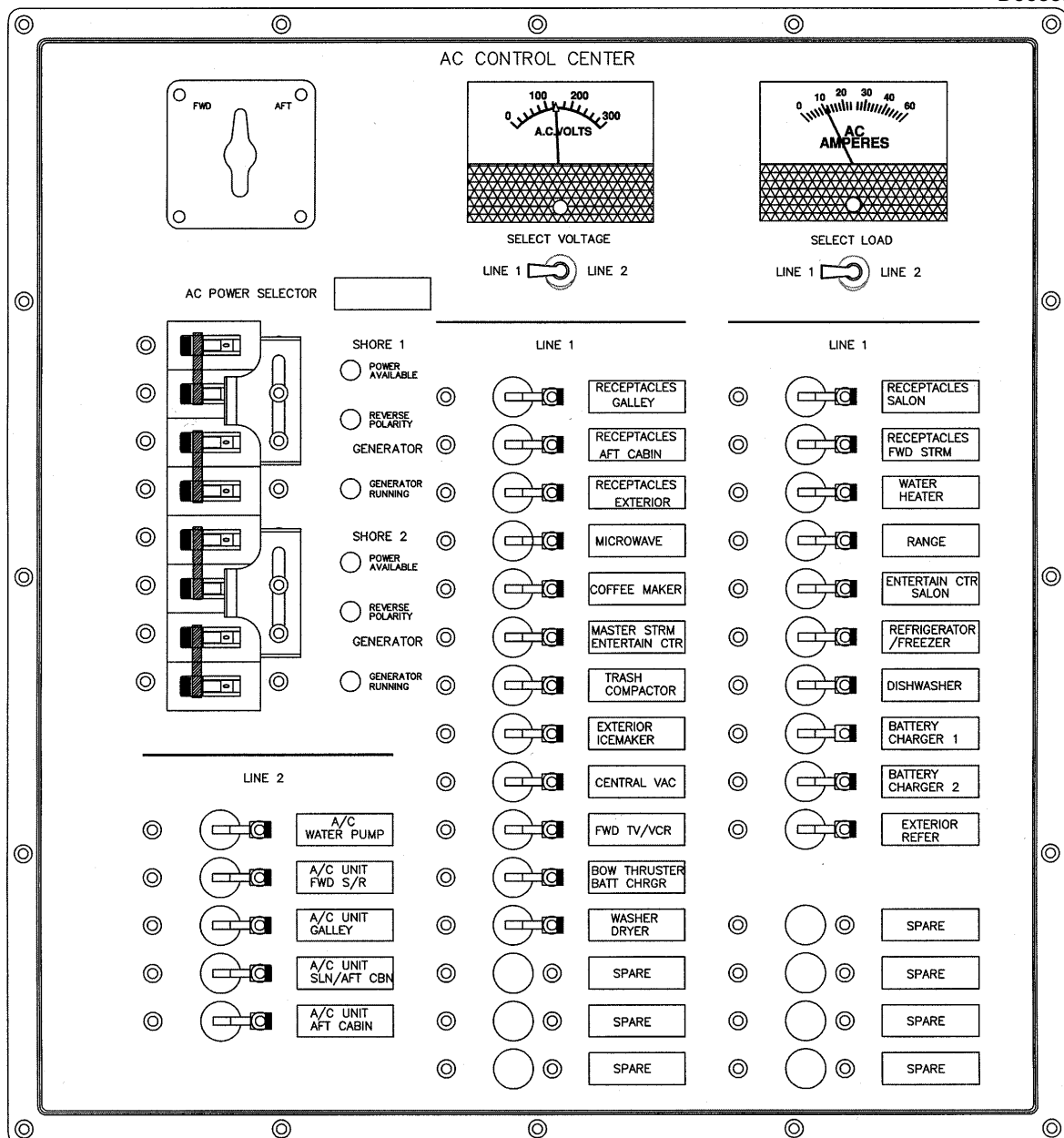
The ammeter indicates the amount of current that is being drawn from the Line 1 or Line 2 circuit, as selected by the Select Load switch, described below.

When the Shore 1, Shore 2, or Generator circuit breaker groups are "ON", all other breakers on the AC Control Center are "OFF", and the voltmeter for the selected Line circuit reads between 100 and 130 volts (210 and 240 volts for a 230 volt system), the ammeter for that Line circuit should read zero amps.



AC CONTROL CENTER (INTERIOR SYSTEMS)

D0035B



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 **"Electrical Loads"** later in this section for information on the AC electrical system load limits.

Select Load Switch

This switch determines which Line circuit's load is shown on the ammeter.

AC Power Selector

The four AC Power Selector circuit breaker groups allow you to provide power to the other circuit breakers on the AC Control Center. Each breaker group consists of two circuit breakers that operate together.

Sliding lockout plates prevent you from switching "ON" both the Shore 1 and upper Generator breaker groups or both the Shore 2 and lower Generator breaker groups. Slide each lockout plate to the position necessary to expose the breaker group that you wish to use.

Shore 1 - Switch this breaker group "ON" if you are using a shore power source to provide electricity to the Line 1 circuit breakers.

Generator (upper) - Switch this breaker group "ON" if you are using the generator to provide electricity to the Line 1 circuit breakers.

Shore 2 - Switch this breaker group "ON" if you are using a shore power source to provide electricity to the Line 2 circuit breakers.

Generator (lower) - Switch this breaker group "ON" if you are using the generator to provide electricity to the Line 2 circuit breakers.

Power Available Indicator

This indicator illuminates when your boat is connected to a working shore power source. To provide that power to your boat's AC electrical system, switch the appropriate Shore circuit breaker group "ON".

Reverse Polarity Indicators



WARNING

If reverse polarity occurs, immediately switch the Shore 1 and Shore 2 circuit breaker groups "OFF" and disconnect your power cord from the shore power source. Notify marina management of the problem. Use a different shore power source box.

Reverse polarity can occur only with 125 volt electrical systems. If your boat is equipped with a 230 volt system, disregard this section.

The Line 1 and Line 2 circuits are designed to sense the voltage difference between the neutral and ground terminal blocks. If the shore power source is incorrectly wired so that the polarity is reversed, the red Reverse Polarity light in the shore power source box illuminates. If reverse polarity occurs while your boat is connected to shore power, the Reverse Polarity lights on the AC Control Center illuminate.

Generator Running Indicator

This indicator illuminates when the generator is operating. To provide the generator's power to your boat's AC electrical system, switch the Generator circuit breaker group "ON".

Receptacles Galley

This breaker controls the flow of electricity to the receptacles 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 "Ground Fault Circuit Interrupters" later in this section for more information.*

Receptacles Aft Cabin

This breaker controls the flow of electricity to the receptacles in the master stateroom and aft head. 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 "Ground Fault Circuit Interrupters" later in this section for more information.*

Receptacles Exterior

This breaker controls the flow of electricity to the receptacles on the bridge and aft deck. 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 "Ground Fault Circuit Interrupters" later in this section for more information.*

Microwave

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

Coffee Maker

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

Master Stateroom Entertainment Center

This breaker controls the flow of electricity to the optional entertainment center (TV, VCR, and stereo) in the aft stateroom. Switch this breaker "ON" to supply power to the entertainment center. Refer to the OEM information for details on operating the TV, VCR, and stereo.

Trash Compactor

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

Exterior Icemaker

This breaker controls the flow of electricity to the optional icemaker below the wet bar on the bridge. Switch this breaker "ON" to supply power to the icemaker. Refer to the OEM information for details on operating the icemaker.

Central Vacuum

This breaker controls the flow of electricity to the optional central vacuum system. Switch this breaker "ON" to supply power to the system. The central vacuum hose connection is located in a locker near the bottom of the aft stateroom stairway. Refer to the OEM information for details on operating the central vacuum system.

Forward TV/VCR

This breaker controls the flow of electricity to the optional TV/ VCR in the guest stateroom. Switch this breaker "ON" to supply power to the TV/VCR. Refer to the OEM information for details on operating the TV/ VCR.

Bow Thruster Battery Charger

This breaker controls the flow of electricity to the battery charger that maintains the voltage levels in the optional bow thruster batteries. Switch this breaker "ON" to supply power to the battery charger. The bow thruster battery charger is located in the engine room on the port forward bulkhead. Refer to the **"Engine Room"** portion of **Section 9** for the exact location of this battery charger. Refer to the OEM information for details on operating the battery charger.

Washer/Dryer

This breaker controls the flow of electricity to the optional clothes washer and dryer in the aft stateroom. Switch this breaker "ON" to supply power to the washer and dryer. Refer to the OEM information for details on operating the washer and dryer.

Spare

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

Receptacles Salon

This breaker controls the flow of electricity to the receptacles in the salon. 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 circuit, the circuit's GFCI breaker may have tripped. Refer to "Ground Fault Circuit Interrupters" later in this section for more information.*

Receptacles Forward Stateroom

This breaker controls the flow of electricity to the receptacles in the guest stateroom and forward head. 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 circuit, the circuit's GFCI breaker may have tripped. Refer to "Ground Fault Circuit Interrupters" later in this section for more information.*

Water Heater

A TIP FROM CARVER!

Whenever your water heater has been winterized for storage, or your water tanks are empty, Carver recommends taping the Water Heater breaker in the "OFF" position. This helps prevent the breaker from accidentally being switched "ON" when no water is in the water system.



DANGER

Do not supply power to the water heater when it is empty. Doing so may damage the unit's heating element and cause a fire. Refer to the "Fresh Water System" portion of Section 4 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. The water heater is located in the port forward corner of the engine room. Refer to the **"Engine Room"** portion of **Section 9** for the exact location of the water heater. Refer to the OEM information for details on operating the water heater.

Range

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

NOTE: *If your boat contains the optional propane stove, an additional circuit breaker labeled Propane on the DC Control Center must be switched "ON" to operate the stove. Refer to the OEM information for details on operating the propane stove.*

Entertainment Center Salon

This breaker controls the flow of electricity to the entertainment center (TV, VCR, and stereo) in the salon. Switch this breaker "ON" to supply power to the entertainment center. Refer to the OEM information for details on operating the TV, VCR, and stereo.

Refrigerator/Freezer

This breaker controls the flow of electricity to the galley's refrigerator/freezer. Switch this breaker "ON" to supply power to the refrigerator/freezer. Refer to the OEM information for details on operating the refrigerator/freezer.

Dishwasher

This breaker controls the flow of electricity to the galley's optional dishwasher. Switch this breaker "ON" to supply power to the dishwasher. Refer to the OEM information for details on operating the dishwasher.

Battery Charger 1

This breaker controls the flow of electricity to the battery charger that maintains the voltage level in the "house" battery. Switch this breaker "ON" to supply power to the battery charger. The "house" battery charger is located in the engine room next to the forward, inboard side of the starboard fuel tank. Refer to the "Engine Room" portion of **Section 9** for the exact location of this battery charger. Refer to the OEM information for details on operating the battery charger.

Battery Charger 2

This breaker controls the flow of electricity to the battery charger that maintains the voltage levels in the engine and generator batteries. Switch this breaker "ON" to supply power to the battery charger. The engine/generator battery charger is located in the engine room on the port aft bulkhead. Refer to the "**Engine Room**" portion of **Section 9** for the exact location of this battery charger. Refer to the OEM information for details on operating the battery charger.

Exterior Refrigerator

This breaker controls the flow of electricity to the optional refrigerator below the wet bar on the bridge. Switch this breaker "ON" to supply power to the refrigerator. Refer to the OEM information for details on operating the refrigerator.

Spare

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

A/C Water Pump



CAUTION

Do not switch the A/C Water Pump breaker "ON" until after you have opened the seacock that supplies the interior air conditioning system with seawater. Refer to the "Air Conditioning System" portion of Section 4 for more information.

This breaker controls the flow of electricity to the water pump that supplies the interior air conditioning system with seawater. Switch this breaker "ON" to supply power to the water pump.

A/C Unit Forward Stateroom



CAUTION

Do not switch the A/C Unit Forward Stateroom breaker "ON" until after you have opened the seacock that supplies the interior air conditioning system with

seawater. Refer to the "Air Conditioning System" portion of Section 4 for more information.

This breaker controls the flow of electricity to the air conditioning unit located beneath the forward stateroom berth. Before switching this breaker "ON" to supply power to the unit, switch the A/C Water Pump breaker "ON".

A/C Unit Galley



CAUTION

Do not switch the A/C Unit Galley breaker "ON" until after you have opened the seacock that supplies the interior air conditioning system with seawater. Refer to the "Air Conditioning System" portion of Section 4 for more information.

This breaker controls the flow of electricity to the air conditioning unit located beneath the step between the salon and galley. Before switching this breaker "ON" to supply power to the unit, switch the A/C Water Pump breaker "ON".

A/C Unit Salon/Aft Cabin



CAUTION

Do not switch the A/C Unit Salon/Aft Cabin breaker "ON" until after you have opened the seacock that supplies the interior air conditioning system with seawater. Refer to the "Air Conditioning System" portion of Section 4 for more information.

This breaker controls the flow of electricity to the air conditioning unit located in the port aft corner of the salon beneath the salon TV. Before switching this breaker "ON" to supply power to the unit, switch the A/C Water Pump breaker "ON".

A/C Unit Aft Cabin



CAUTION

Do not switch the A/C Unit Aft Cabin breaker "ON" until after you have opened the seacock that supplies the

interior air conditioning system with seawater. Refer to the "Air Conditioning System" portion of Section 4 for more information.

This breaker controls the flow of electricity to the air conditioning unit located in the master stateroom beneath the starboard side of the berth. Before switching this breaker "ON" to supply power to the unit, switch the A/C Water Pump breaker "ON".

AC Control Center (exterior air conditioning)

The AC Control Center (exterior air conditioning), located in a cabinet in the aft salon bulkhead, manages the power supply to the optional exterior air conditioning system. To provide power to this breaker panel:

1. Provide a source of AC power to the boat, through either a shore power connection or the generator.
2. Switch "ON" the appropriate AC Main circuit breaker group.

The AC Control Center contains the gauges, switch, and circuit breakers described below.

Shore Power Receptacle Selector Switch

Use this switch to select the boat's shore power receptacles, either forward or aft, to which the shore power cord is connected. If you are not using shore power, turn this switch to the "OFF" position. This switch is not present if the optional forward shore power receptacles are not present.

Line Voltage (Voltmeter)

The voltmeter indicates the amount of voltage that is entering the Line 3 circuit of the AC system.

When your boat's AC electrical system is connected to either a shore power source or the generator (and the generator is running), the voltmeter should read between 100 and 130 volts in a 125 volt system or between 210 and 240 volts in a 230 volt system. If the voltmeter reads 100 volts (205 volts in a 230 volt system) or less, **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 the voltmeter reads zero voltage, it means that no electricity is reaching the AC Control Center. If you are using the generator, make sure it is operating properly and the safety circuit breaker on the generator control panel is "ON." If you are using shore power, check your shore power cord to make sure it is properly attached to both the boat and the shore power source. Also, make sure you have turned "ON" both the circuit breaker(s) at the shore power source box and the AC Main circuit breaker group. If the voltmeter continues to read zero voltage, contact marina management to ensure that the shore power source is operating properly. If the problem appears to be with your boat's AC electrical system, have the system inspected by a qualified electrician.

Load Current (Ammeter)

The ammeter indicates the amount of current that is being drawn by the exterior air conditioning system.

When either the Shore or Generator circuit breaker group is "ON", all other breakers on the AC Control Center are "OFF", and the voltmeter reads between 100 and 130 volts (210 and 240 volts for a 230 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, the ammeter readings increase above zero amps.

AC Power Selector

The two AC Power Selector circuit breaker groups allow you to provide power to the other circuit breakers on the AC Control Center. Each breaker group consists of two circuit breakers that operate together.

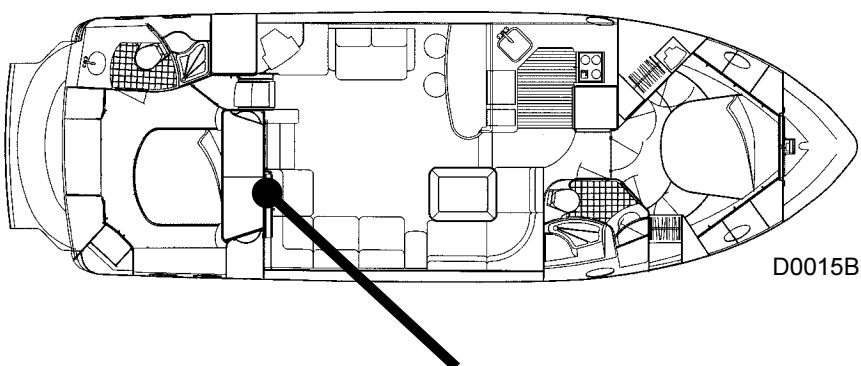
A sliding lockout plate prevents you from switching "ON" both the Shore and Generator breaker groups. Slide the lockout plate to the position necessary to expose the breaker group that you need to use.

Shore - Switch this breaker group "ON" if you are using a shore power source to provide electricity to the AC Control Center.

Generator - Switch this breaker group "ON" if you are using the generator to provide electricity to the AC Control Center.

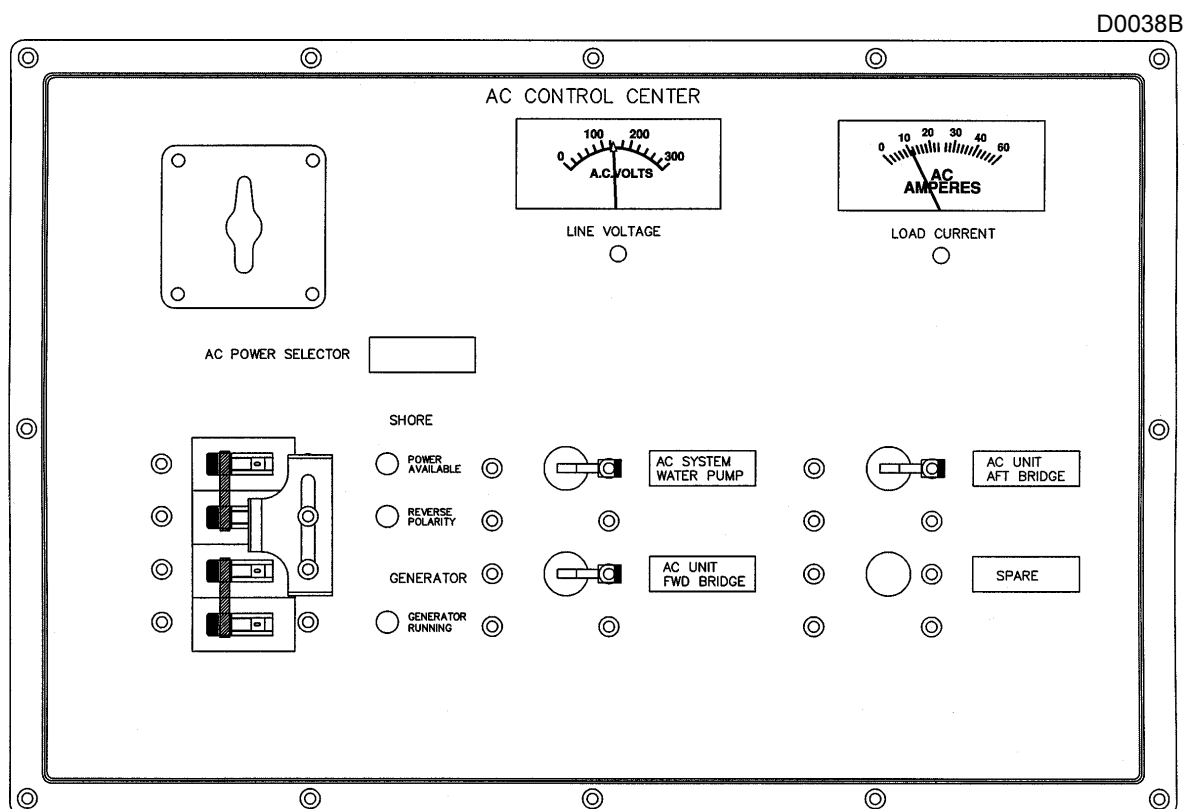
Power Available Indicator

This indicator illuminates when your boat is connected to a working shore power source. To provide that power to your boat's AC electrical system, switch the Shore circuit breaker group "ON".



D0015B

AC CONTROL CENTER (EXTERIOR AIR CONDITIONING)



D0038B

Reverse Polarity Indicator



WARNING

If reverse polarity occurs, immediately switch the Shore circuit breaker group "OFF" and disconnect your power cord from the shore power source. Notify marina management of the problem. Use a different shore power source box.

Reverse polarity can occur only with 120 volt electrical systems. If your boat is equipped with a 230 volt system, disregard this section.

The exterior air conditioning circuit is designed to sense the voltage difference between the neutral and ground terminal blocks. If the shore power source is incorrectly wired so that the polarity is reversed, the red Reverse Polarity light in the shore power source box illuminates. If reverse polarity occurs while your boat is connected to shore power, the Reverse Polarity light on the AC Control Center illuminates.

Generator Running Indicator

This indicator illuminates when the generator is operating. To provide the generator's power to your boat's AC electrical system, switch the Generator circuit breaker group "ON".

A/C System Water Pump



CAUTION

Do not switch the A/C System Water Pump breaker "ON" until after you have opened the seacock that supplies the exterior air conditioning system with seawater. Refer to the "Air Conditioning System" portion of Section 4 for more information.

This breaker controls the flow of electricity to the water pump that supplies the exterior air conditioning system with seawater. Switch this breaker "ON" to supply power to the water pump.

A/C Unit Forward Bridge**CAUTION**

Do not switch the A/C Unit Forward Bridge breaker "ON" until after you have opened the seacock that supplies the exterior air conditioning system with seawater. Refer to the "Air Conditioning System" portion of Section 4 for more information.

This breaker controls the flow of electricity to the air conditioning unit that cools the bridge. Before switching this breaker "ON" to supply power to the unit, switch the A/C System Water Pump breaker "ON".

A/C Unit Aft Bridge**CAUTION**

Do not switch the A/C Unit Aft Bridge breaker "ON" until after you have opened the seacock that supplies the exterior air conditioning system with seawater. Refer to the "Air Conditioning System" portion of Section 4 for more information.

This breaker controls the flow of electricity to the air conditioning unit that cools the aft deck. Before switching this breaker "ON" to supply power to the unit, switch the A/C System Water Pump breaker "ON".

Spare

This breaker is reserved for aftermarket accessories you install on your boat.

Ground Fault Circuit Interrupters

Certain receptacles on your boat contain Ground Fault Circuit Interrupters (GFCI). The GFCI measures both the amount of current flowing to the receptacle and the amount of current returning from the receptacle, then compares the two values. If the values are not the same, the GFCI instantly trips, shutting off power to the receptacle.

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.

GFCI Receptacle Locations

Five 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:

- Just forward of the bridge lounge on the starboard bulkhead, to protect the exterior receptacles.
- In the salon on the back of the aft galley cabinets, to protect the salon receptacles.
- Between the upper aft galley cabinets, to protect the galley receptacles.
- In the forward head above the sink, to protect the receptacles there, in the forward stateroom, and in the mid stateroom.
- In the aft stateroom on the starboard forward bulkhead, to protect the receptacles there and in the aft head.

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.

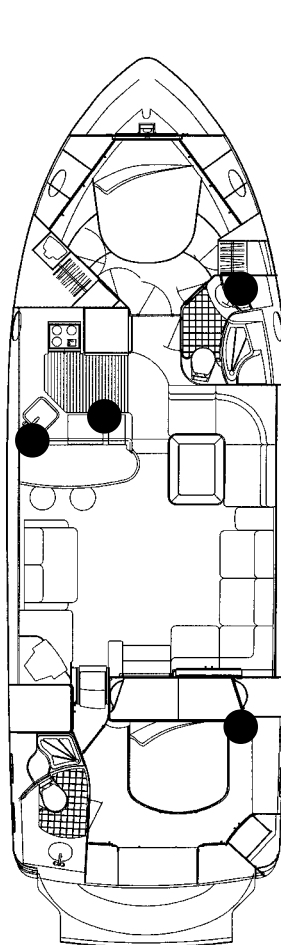


DANGER

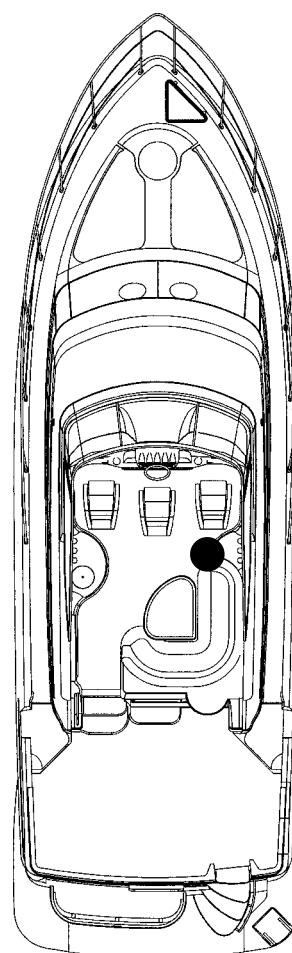
If the GFCI receptacle or any other receptacle on that circuit still has power after the Test button is pressed, do not use any of the receptacles on that circuit. Contact a qualified electrician to make the appropriate repairs.

2. Plug a lamp or other AC powered device into the GFCI receptacle and turn on the device. The device should not operate.

GFCI RECEPTACLE LOCATIONS



D0015B



D0051B

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.

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 circuit on your boat has an electrical load capacity of 50 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.



WARNING

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 on the next page. 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.

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.

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
Electric frying pan	12.3
Space heater	13.7
Refrigerator	1.5

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 and aft bilge compartments and are connected to the transom-mounted zinc plate.

**WARNING**

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

**WARNING**

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 the "Maintenance Schedule" portion of Section 7 for recommended inspection intervals.

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

Troubleshooting the AC Electrical System

Problem	Possible Cause	Possible Solution
No AC power as indicated by voltmeter.	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 breaker "ON."
	The AC Main circuit breaker group is "OFF."	Switch the breaker "ON."
	The shore power cord failed.	Replace the cord.
	The generator ran out of fuel.	Refuel the port fuel tank.
	The safety circuit breaker on the generator control panel is "OFF."	Switch the circuit breaker "ON."
	The generator failed.	Contact a qualified electrician to make the appropriate repairs.
	The voltmeter failed.	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.	A wire within the AC electrical system is loose or disconnected.	Contact a qualified electrician to make the appropriate repairs.
	The Shore circuit breaker group (if you are using a shore power source) on the AC Control Center is "OFF."	Switch the circuit breaker group "ON."
	The Generator circuit breaker group (if you are using generator power) on the AC Control Center is "OFF."	Switch the breaker group "ON."

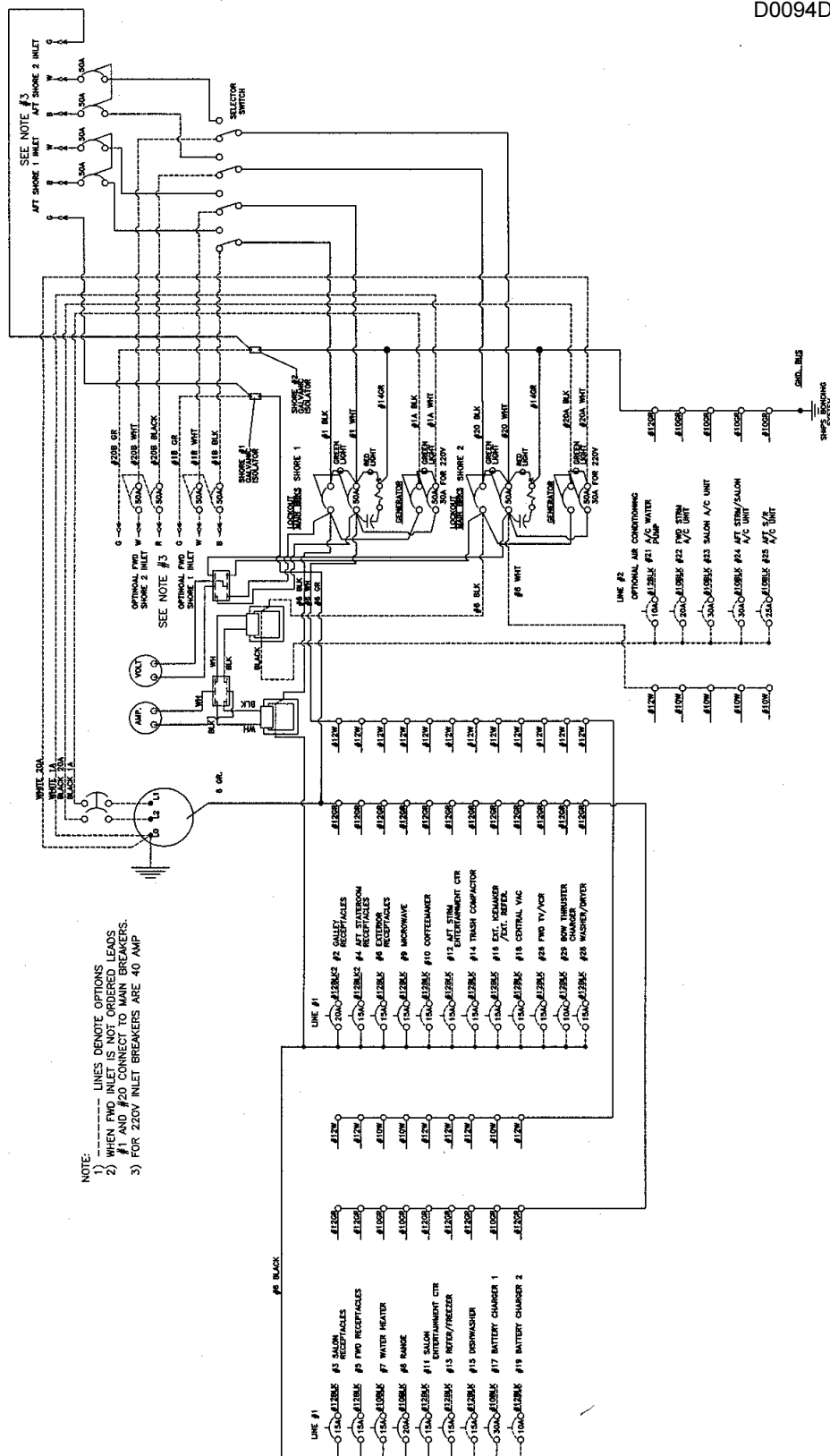
continued

continued

Problem	Possible Cause	Possible Solution
	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 or Generator circuit breaker group on the AC Control Center trips immediately after being reset.	The circuit breaker group failed.	Contact your Carver Dealer to have the circuit breaker group replaced.

AC Wiring Schematic

D0094D



NOTES

NOTES

NOTES

Internal Systems

Air Conditioning System	92
Interior System	92
Exterior System	92
Producing Heat	92
Powering the Air Conditioning	95
Fresh Water System	96
Filling The Water Tanks	96
Pressurizing and Priming the Water System	98
Using the Water System	98
Raw Water Washdowns	101
Shore Water	102
Bilge System	103
Bilge Pump Operation	104
Hull Drain	105
Sanitation System	106
Toilets	106
Emptying the Waste Tanks	107
Grey Water Holding System	111
Propane Stove	114
Checking the System For Leaks	116

Air Conditioning System

This section applies only to the optional interior and exterior air conditioning systems installed at the Carver factory. An air conditioning system installed as an aftermarket accessory may not necessarily operate as described in this section.

For the air conditioning systems to operate they need 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 factory-installed air conditioning systems consist of six air conditioning units: four for the interior system and two for the exterior system

Interior System

A 12,000 BTU unit, located in the aft stateroom beneath the starboard side of the berth, cools the aft stateroom and starboard salon.

A 16,000 BTU unit, located in the port aft corner of the salon beneath the salon TV, cools the port salon and aft head.

A 16,000 BTU unit, located beneath the step between the salon and galley, cools the galley, forward salon, and mid stateroom.

A 10,000 BTU unit, located beneath the forward stateroom berth, cools the forward stateroom and forward head.

NOTE: *Since the air conditioning condensation drains into the sumps, the forward and aft Auto Sump circuit breakers on the Safety Breaker Panel must be "ON" whenever the air conditioning system is on.*

Exterior System

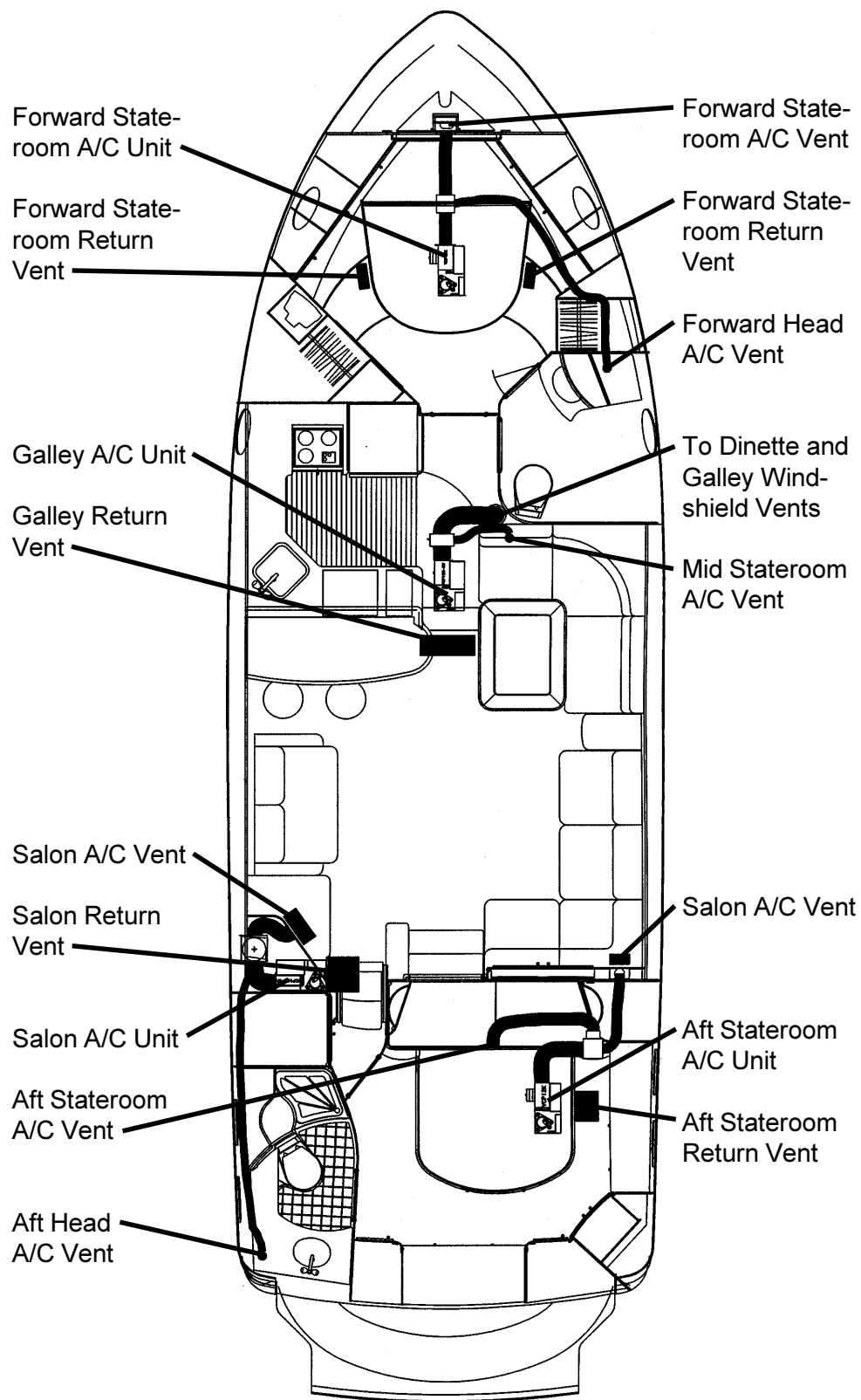
A 16,000 BTU unit, located beneath the center of the helm, cools the forward bridge.

A 16,000 BTU unit, located above the wet bar, cools the aft bridge and aft deck.

Producing Heat

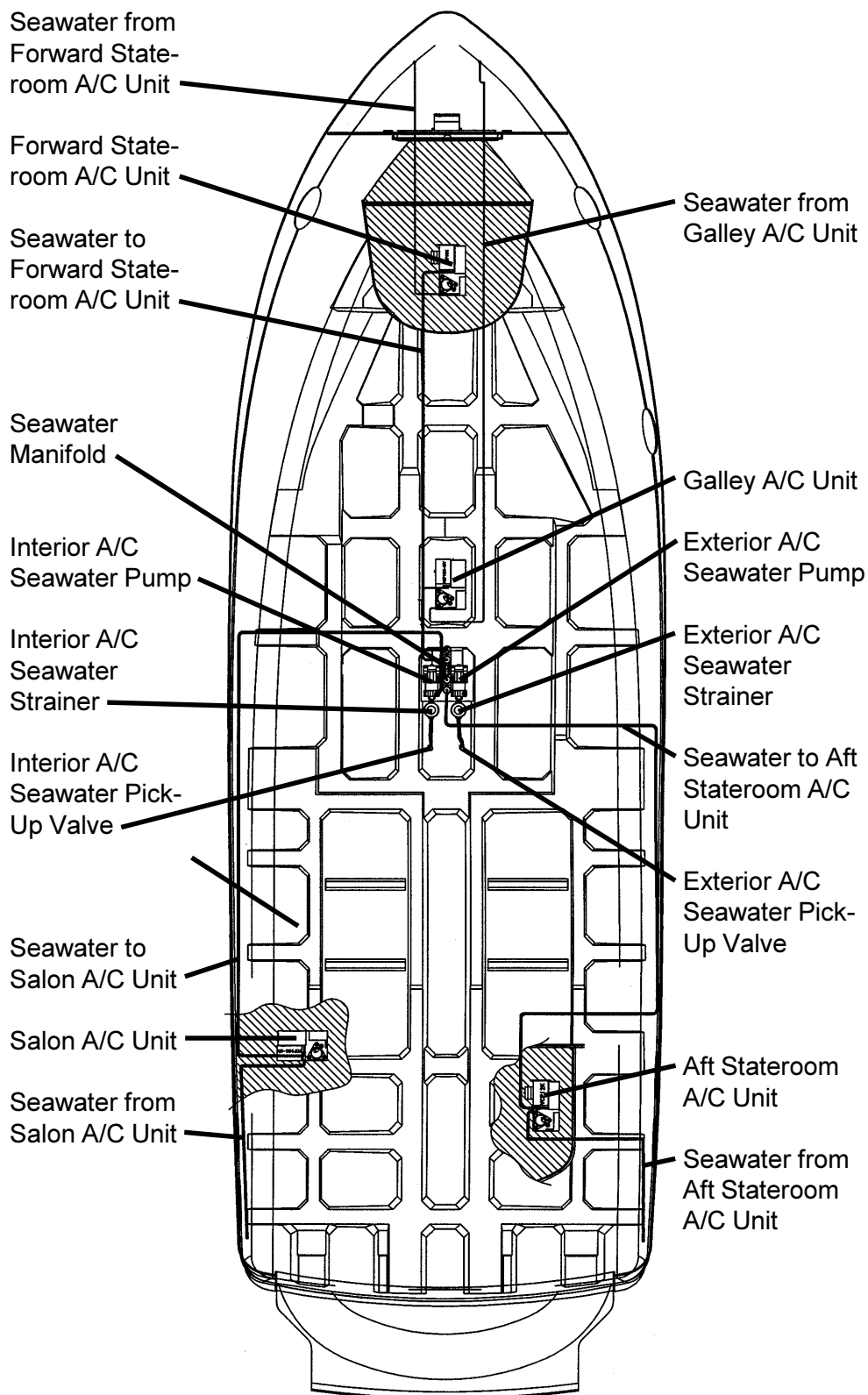
The air conditioning systems can produce heat when they are operated in reverse cycle mode. Reverse cycle operation, however, is affected by the temperature of the seawater. As seawater temperature decreases so

AIR CONDITIONING SYSTEM - DUCTS



D0023DA

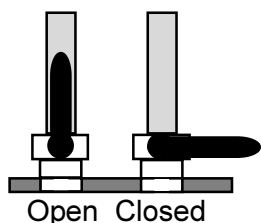
AIR CONDITIONING SYSTEM - WATER HOSES



D0023DB

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.

Powering the Air Conditioning



1. Remove and clean the air conditioning systems' seawater strainers (each system has its own strainer). The strainers prevent debris in the seawater from entering the air conditioning systems. The strainers are located in the engine room just forward of the generator. Refer to the "**Engine Room**" portion of **Section 9** for the exact location of the seawater strainers.
2. Reinstall the seawater strainers. If a strainer leaks when the air conditioning seacock is opened, close the seacock, then check the strainer for correct installation.
3. A separate pump supplies each air conditioning system with seawater. Open the seacocks that supply seawater to the pumps. Each seacock is located near its strainer.
4. Supply AC power to your boat. Refer to the "**Shore Power**" or "**Generator Power**" portion of **Section 3** to do this.
5. If you are using shore power, switch the Shore 2 (for interior air conditioning) and Shore (for exterior air conditioning) circuit breaker groups on the appropriate AC Control Centers "ON."

If you are using generator power, switch the appropriate Generator circuit breaker groups on the AC Control Centers "ON."



CAUTION

Do not run an 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.

6. On the AC Control Centers, switch the A/C Water Pump circuit breakers "ON," then switch all A/C Unit circuit breakers "ON."

7. Verify that seawater is being pumped through the air conditioning units. As the seawater exits the units, it flows out of the discharge thru-hull fittings in the boat's hull. Refer to the **"Thru-Hull Fittings"** portion of **Section 9** for the location of these thru-hull fittings.
8. Use the controls for each air conditioning unit to set the desired temperature. The interior air conditioning controls are located in the aft stateroom, salon, dinette, and forward stateroom. The exterior air conditioning controls are located on the aft deck and bridge. Refer to the OEM information for details on operating the air conditioning controls.

Fresh Water System

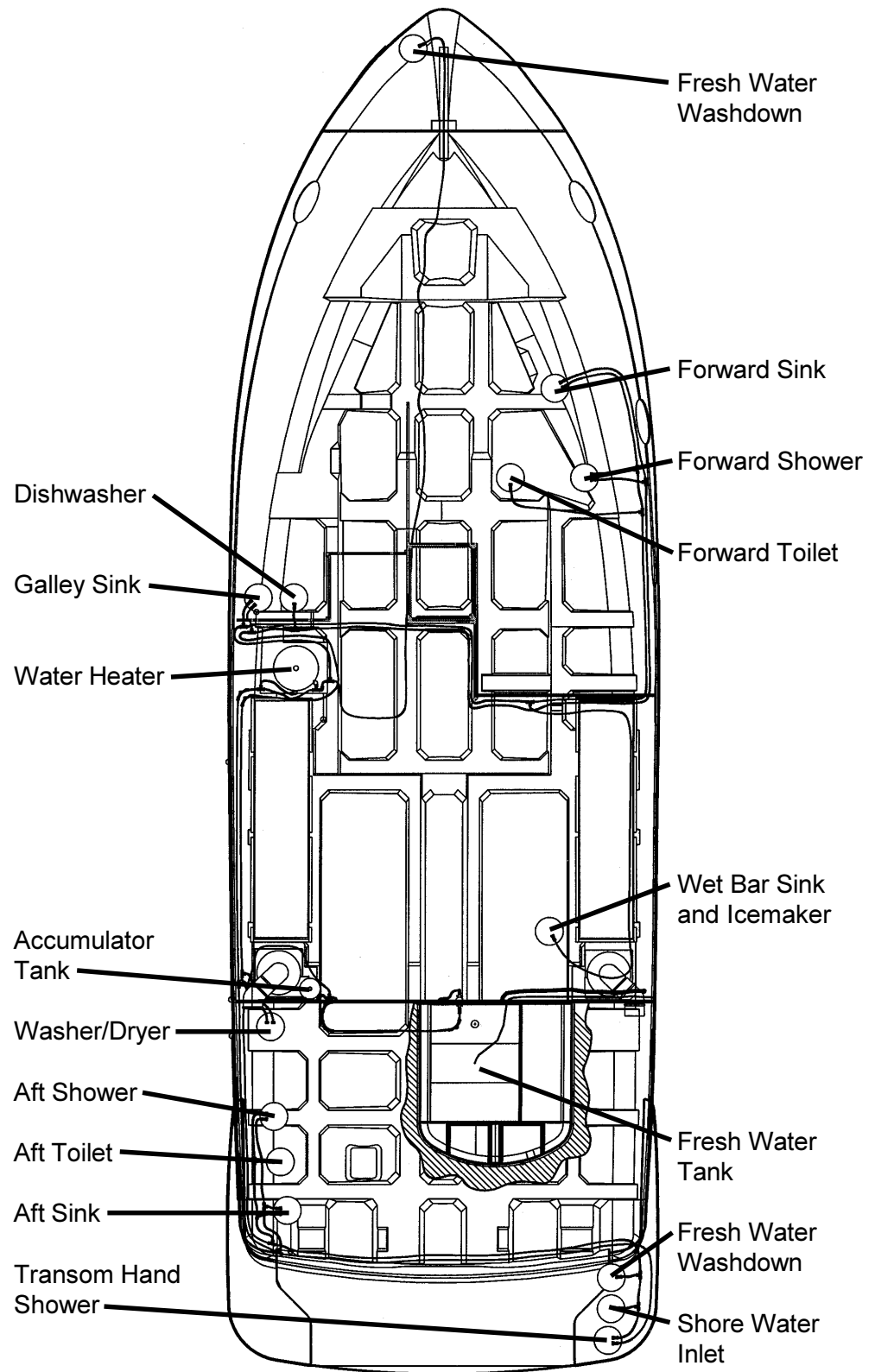
The capacity of your boat's fresh water system is approximately 150 gallons. The water is divided between one 130 gallon fresh water tank and a 20 gallon water heater. The water tank is located beneath the aft stateroom berth. The water heater is located in the port forward corner of the engine room. Refer to the **"Interior Hatches"** and **"Engine Room"** portions of **Section 9** for the exact location of the water tank and water heater.

Filling The Water Tanks

The fresh water tank is filled through a deck fitting with a plate labeled WATER. The plate is located beneath the starboard side deck rail door. Refer to the **"Deck Plates"** portion of **Section 9** for the exact location of this plate.

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

Put only clean, fresh water into your water tanks. The tanks are full when water is discharged from the water tank vents installed through your boat's hull. Refer to the **"Thru-Hull Fittings"** portion of **Section 9** for the location of the water tank vents. DO NOT overfill the water tanks or leave the fill hose unattended while the tanks are being filled.

FRESH WATER SYSTEM

D0022D

Pressurizing and Priming the Water System

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

1. Turn the "house" battery master disconnect switch to the "ON" position.
2. Switch the forward and aft Auto Sump circuit breakers on the Safety Breaker Panel "ON."
3. Switch the Main - One circuit breaker on the Safety Breaker Panel "ON."
4. Partially open all cold water faucets, including the faucets for the optional transom hand shower and bow and transom fresh water washdowns.
5. On the DC Control Center, switch the System DC Main circuit breaker "ON," then switch the Pressure Water Pump circuit breaker "ON." This activates the boat's pressure water pump, which pressurizes the water system. The pump is located in the engine room on the boat's centerline beneath the aft bulkhead. Refer to the "**Engine Room**" portion of **Section 9** for the exact location of the water pump.
6. The fresh water system is primed when all air is purged from the system's pipes. Monitor each sink tap and shower head. When a steady stream of water flows from the tap or shower head, close the cold water faucet for that tap or shower head, then open its hot water faucet. When a steady stream of water again flows from the tap or shower head, close the hot water faucet for that tap or shower head. When you have done this for each sink tap and shower head, the water system is primed.

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.

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 predeter-

A TIP FROM CARVER!

If your boat will be left unattended for at least a few days, switch the Pressure Water Pump circuit breaker on the DC Control Center "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.

mined 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 "Pressurizing and Priming the Water System".

Water Heater



DANGER

Do not supply power to the water heater when it is empty. Doing so may damage the unit's heating element and cause a fire. Fill, pressurize and prime the fresh water system as described in "Filling the Water Tanks" and "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. Switch the Shore 1 or upper Generator circuit breaker group (depending on the boat's AC power source) on the AC Control Center (interior systems) "ON".
3. Switch the Water Heater circuit breaker on the AC Control Center "ON".
4. Refer to the OEM information for details on operating the water heater.

Showers and Sinks

Your boat has a shower in both the aft head and forward head. There is a sink in each head, the galley, and the bridge wet bar.

Used water from the sink and shower in the forward head, the galley sink, and the optional dishwasher drains into a forward sump. Used water from the sink and shower in the aft head, the wet bar sink, and the

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.

optional clothes washer drains into an aft sump. Because the sumps are located below the boat's waterline, a pump is needed for each sump to drain the sump and discharge its water either overboard or into an optional grey water holding tank. When the forward and aft Auto Sump circuit breakers on the Safety Breaker Panel are "ON," each sump pump operates automatically when water in the sump rises above a predetermined level.

NOTE: *The sump pumps can not operate if the forward and aft Auto Sump circuit breakers are "OFF." Make sure both circuit breakers are "ON" before using the showers or sinks.*

Transom Hand Shower

The optional transom hand shower is a convenient device that 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 outboard of the stairway leading from the boarding platform to the aft deck.

Fresh Water Washdowns

The optional bow and transom fresh water washdowns enable you to use water from the fresh water tanks 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 washdowns:

1. Locate the bow- and transom-mounted hose fittings. The bow-mounted fitting is located inside the anchor chain locker on the fore deck. The transom-mounted fitting is located outboard of the stairway leading from the boarding platform to the aft deck.
2. Attach one end of an appropriately sized nylon water hose to the hose fitting you wish to use.

A TIP FROM CARVER!

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

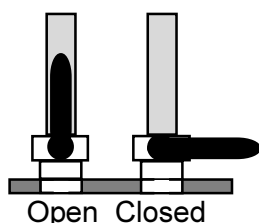
3. Attach a nozzle to the other end of the hose. The best type of nozzle to use is the "pistol grip" type that can be opened and closed by squeezing your hand.
4. Open the faucet at the base of the hose fitting to supply water to the hose. Use the washdown as you would a garden hose at your home.

Raw Water Washdowns

The optional bow and transom raw water washdowns enable you to use seawater to washdown and clean your boat.

To use the raw water washdowns:

1. Locate the bow- and transom-mounted hose fittings. The bow-mounted fitting is located inside the port bow rope locker. The transom-mounted fitting is located outboard of the stairway leading from the boarding platform to the aft deck.
2. Attach one end of an appropriately sized nylon water 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. Remove and clean the raw water washdown system's seawater strainer. The strainer prevents debris in the seawater from entering the washdown pump. The strainer is located in the engine room immediately outboard of the aft waste tank. Refer to the **"Engine Room"** portion of **Section 9** for the exact location of the seawater strainer.
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 seacock that supplies seawater to the raw water washdown pump. The seacock is located in the engine room just aft of the strainer. Refer to the **"Engine Room"** portion of **Section 9** for the exact location of the seawater seacock.



7. Turn the "house" battery master disconnect switch to the "ON" position.
8. Switch the Main - One circuit breaker on the Safety Breaker Panel "ON".
9. On the DC Control Center, switch the System DC Main circuit breaker "ON", then switch the Washdown Pump circuit breaker "ON". This activates the boat's raw water washdown pump.



CAUTION

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

10. 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.

Shore Water

Your boat has an optional 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 tanks do not get filled. The only way to fill the fresh water tank is through the WATER deck plate fitting.*

To connect to shore water:

1. Locate the shore water fitting, labeled SHORE WATER, outboard of the stairway leading from the boarding platform to the aft deck. Refer to the

"Deck Plates" portion of **Section 9** for the exact location of this fitting.

2. Attach one end of a water 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. Switch the forward and aft Auto Sump circuit breakers on the Safety Breaker Panel "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.

Bilge System

A TIP FROM CARVER!

A certain amount of water always collects in the 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 forward and aft

Your boat contains two bilges and four automatic bilge pumps. The bilge is the lowest point beneath the cabin sole 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 bilges include the areas described below.

- The forward bilge runs from the bow to beneath the stairway between the salon and galley. The forward bilge pump is located beneath a hatch in the galley sole. Refer to the "**Interior Hatches**" portion of **Section 9** for the exact location of the forward bilge pump.
- The aft bilge runs from the forward engine room bulkhead to the boat's stern. It contains two amidships bilge pumps, one each located at the base of the forward and aft engine room bulkheads, and an aft bilge pump, located beneath a hatch inside a locker in the aft stateroom. If your boat was built for use in Europe, there is also a hand bilge pump amidships. Refer to the "**Engine Room**" portion of

bilges flows to the aft of these bilge areas, where the bilge pumps are located. The mid bilge pumps are near the lowest point in the hull when the boat is at rest.

Section 9 for the exact location of the amidships and aft bilge pumps.

CAUTION

Never store anything in the bilges. Storing loose items in the bilges 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 bilges 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 the "Bilges" portion of Section 8 for more information on winterizing the bilges.

Bilge Pump Operation

For safety and convenience, each bilge pump, except the forward amidships pump, can be operated either automatically or manually. The forward amidships bilge pump operates automatically only.

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

NOTE: *Before operating your boat's bilge pumps, wipe up any oil that may have accumulated in the bilge area. 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.*

Automatic Operation

Each bilge pump is wired to its own circuit breaker on the Safety Breaker Panel and then routed to the batteries. 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 four 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.*

Manual Operation

The forward, aft amidships, and aft bilge pumps can also be operated manually. A set of bilge pump control switches have been installed at the helm to manually control the pumps. To operate the pumps manually:

1. Turn the "house" battery master disconnect switch to the "ON" position.
2. On the Safety Breaker Panel, switch the Main - One circuit breaker "ON."
3. On the DC Control Center, switch the System DC Main circuit breaker "ON", then switch the Forward, Mid, and Aft Bilge Pump circuit breakers "ON".



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.

4. Place the Forward, Mid, and Aft Bilge Pump controls at the helm in the "ON" position. This activates the three bilge pumps.

Hull Drain

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.

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.

Sanitation System

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

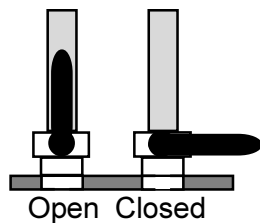
Toilets

The two types of toilets available for your boat are described below. The electric, seawater toilet is standard. 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 toilets.

Electric Toilet

Electric toilets use either fresh water or seawater to flush.

If the toilets use fresh water, there must be water in the fresh water tanks or your boat must be connected to shore water before the toilets can be flushed.



If the toilets use seawater, you must open the seacocks for the toilets before they can be flushed. The forward toilet's seacock is located beneath a hatch in the mid stateroom sole. The aft toilet's seacock is located aft of the port engine on the outboard side.

Each electric toilet uses an electric motor to flush. To operate the motors:

1. Turn the "house" battery master disconnect switch to the "ON" position.
2. Switch the Forward and Aft Electric Heads circuit breakers on the Safety Breaker Panel "ON."
3. Press the foot pedal at the base of the toilet. This flushes the toilet.

Vacuum Head

The optional vacuum head uses fresh water and vacuum pressure to remove waste from the head. To operate the vacuum flush system:

1. Turn the "house" battery master disconnect switch to the "ON" position.

A TIP FROM CARVER!

If your boat will be left unattended for at least 48 hours, flush each electric head for at least 30 seconds. This ensures that waste has cleared the sanitation transfer hose and has entered the waste tank. Waste left in the transfer hose tends to dry and harden. This could become an obstruction which prevents the sanitation system from operating properly.

Make sure that there is always a small amount of water left in the

bowl of the head. This acts as a trap and reduces odors.

If seawater is used to flush the head, material suspended in the water (seaweed, aquatic organisms, etc.) can become trapped within the passages of the system and lead to bowl staining and odors. Contact your marine supply dealer to obtain an in-line deodorant dispenser that can minimize these problems.

Emptying the Waste Tanks

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 cap 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.

2. Switch the Forward and Aft Electric Heads circuit breakers on the Safety Breaker Panel "ON".
3. Press the foot pedal at the base of the toilet. This flushes the toilet.

It is common for vacuum systems to gradually lose vacuum pressure. When pressure in the system drops below a predetermined level, the vacuum pump engages automatically to bring vacuum pressure back to the optimum level.

NOTE: *Whenever you don't want to hear the toilet's vacuum pump operating, such as at night, you can temporarily shut it off using the Toilet Run/Sleep switch. This switch is located inside the outboard medicine cabinet in each head. Placing the switch in the "Sleep" position shuts off the toilet's vacuum pump.*

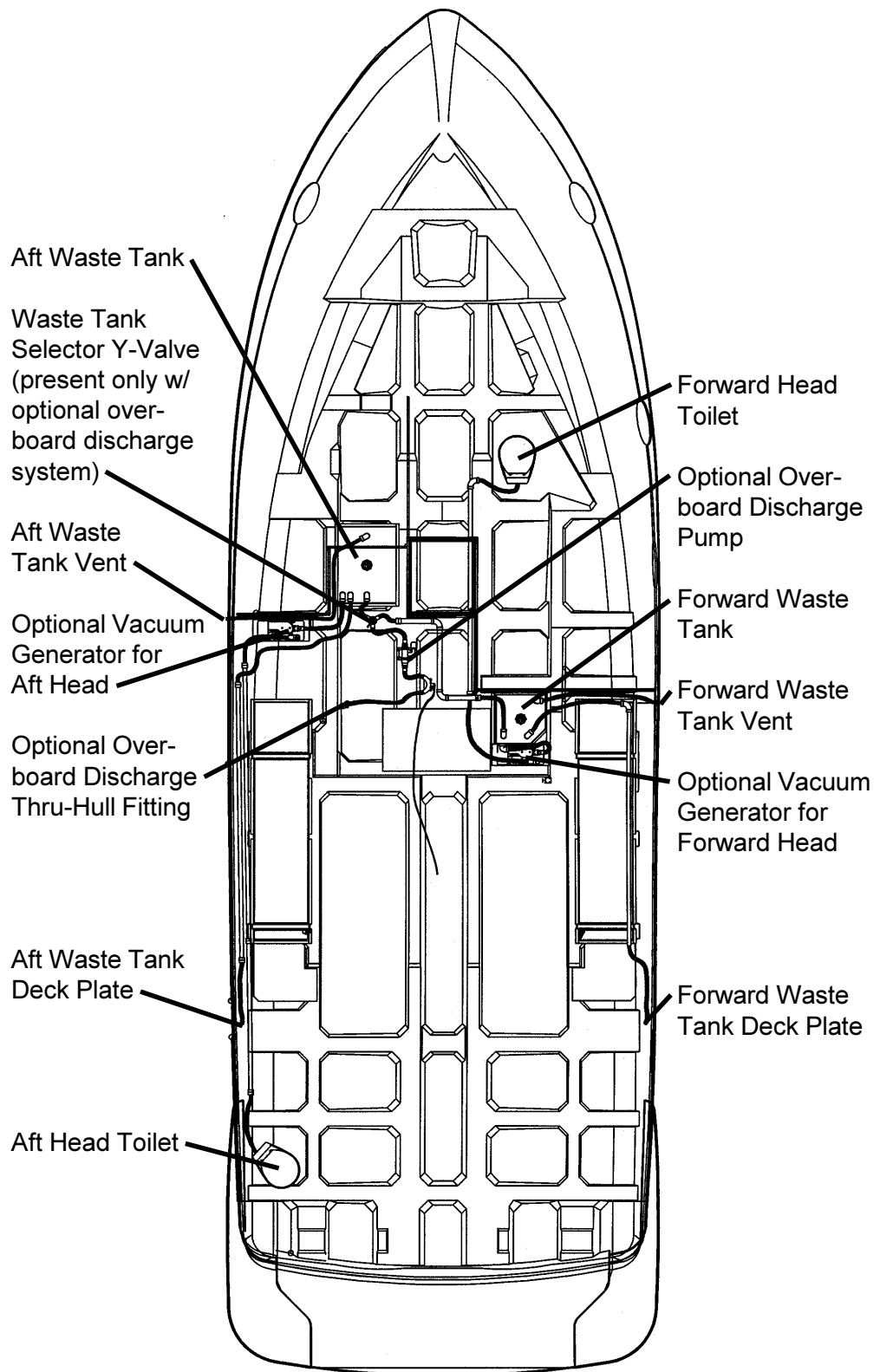
The sanitation system contains two polyethylene waste tanks. The tank for the forward head is located in the starboard forward corner of the engine room. The tank for the aft head is located in the port forward corner of the engine room. Refer to the "**Engine Room**" portion of **Section 9** for the exact location of this tank. The two methods of disposing of waste are described below.

Dockside Discharge

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

1. Locate a dockside pumpout station.
2. Remove the forward waste tank deck plate labeled WASTE using the removal tool supplied with your boat. This plate is located beneath the starboard side deck rail door. Refer to the "**Deck Plates**" portion of **Section 9** 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.

SANITATION SYSTEM



D0021D

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.
6. Replace the WASTE deck plate.
7. Remove the aft waste tank deck plate labeled WASTE using the removal tool supplied with your boat. This plate is located beneath the port side deck rail door. Refer to the "**Deck Plates**" portion of **Section 9** for the exact location of this plate.
8. Repeat steps 3, 4, 5, and 6 for the aft waste tank.

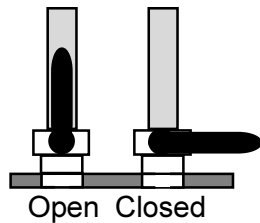
Overboard Discharge

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 waste 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 toilets to the waste tanks where it is stored. Where it is legal, you can then transfer the waste 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 tanks.

To empty the tanks:



1. Open the overboard discharge seacock. The seacock is located in the port forward area of the engine room. Refer to the "**Engine Room**" portion of **Section 9** for the exact location of this seacock.
2. Turn the waste tank selector Y-valve to the forward waste tank position. The Y-valve is located in the port forward corner of the engine room, above the aft waste tank.
3. Turn the "house" battery master disconnect switch to the "ON" position.
4. Switch the Main - One circuit breaker on the Safety Breaker Panel "ON."
5. On the DC Control Center, switch the System DC Main circuit breaker "ON," then switch the Forward Waste Pump circuit breaker "ON."
6. Turn the waste pump switch "ON." The switch is located in the engine room above the aft waste tank, next to the Y-valve. This activates the waste pump, which pumps the waste overboard. The pump is located midway between the aft waste tank and the generator. Refer to the "**Engine Room**" portion of **Section 9** for the exact location of the pump and its switch.



CAUTION

When the waste tank is empty, turn the waste pump "OFF." Operating the waste pump when the waste tank is empty can damage the pump.

7. After all waste is pumped overboard, turn the waste pump switch "OFF".
8. Remove the forward waste tank deck plate labeled WASTE using the removal tool supplied with your boat. This plate is located beneath the starboard side deck rail door. Refer to the "**Deck Plates**" portion of **Section 9** for the exact location of this plate.
9. Flush the waste tank by pouring a few gallons of fresh water through the WASTE deck fitting. Re-activate the waste pump to remove the fresh water

and any remaining waste, then turn the waste pump "OFF."

10. Replace the WASTE deck plate.
11. Turn the waste tank selector Y-valve to the aft waste tank position.
12. Repeat steps 6 and 7 for the aft waste tank.
13. Remove the aft waste tank deck plate labeled WASTE using the removal tool supplied with your boat. This plate is located beneath the port side deck rail door. Refer to the **"Deck Plates"** portion of **Section 9** for the exact location of this plate.
14. Flush the waste tank by pouring a few gallons of fresh water through the WASTE deck fitting. Reactivate the waste pump to remove the fresh water and any remaining waste, then turn the waste pump switch "OFF."
15. Replace the WASTE deck plate.
16. Close the overboard discharge seacock.
17. Switch the Forward Waste Pump circuit breaker on the DC Control Center "OFF."

Grey Water Holding System

Certain areas of the United States and Europe have instituted antipollution regulations that require the use of a grey water holding system on boats. With this system, grey water is stored in tanks rather than being pumped directly overboard.

When the optional grey water holding system is installed, drain water from the forward head and galley sinks, forward head shower, and optional dishwasher, as well as condensation from the forward stateroom and galley air conditioning units, is transferred from the forward sump to a forward grey water holding tank. Drain water from the aft head and bridge wet bar sinks, aft head shower, and optional clothes washer, as well as condensation from the aft stateroom and salon air conditioning units, flows directly into an aft grey water holding tank.

The forward grey water tank is located beneath a hatch in the galley sole. The aft grey water tank replaces the aft sump, and is located beneath a hatch near the foot of the aft stateroom berth. Refer to the "**Interior Hatches**" portion of **Section 9** for the exact location of the grey water tanks.

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

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:

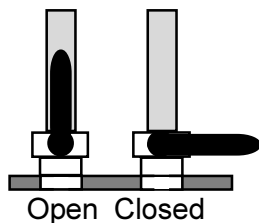
1. Locate a dockside pumpout station.
2. Remove the forward grey water tank deck plate labeled GREY WATER using the removal tool supplied with your boat.
3. Attach the pumpout vacuum hose to the GREY WATER deck fitting. Because the transfer process uses a vacuum action, there must be a secure connection 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 grey water is removed, flush the grey water tank by pouring a few gallons of fresh water through the GREY WATER 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 GREY WATER deck plate.
7. Remove the aft grey water tank deck plate labeled GREY WATER using the removal tool supplied with your boat.
8. Repeat steps 3, 4, 5, and 6 for the aft grey water tank.

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.

To empty the tanks:



1. Open the overboard discharge seacock. The seacock is located in the port forward area of the engine room. Refer to the "**Engine Room**" portion of **Section 9** for the exact location of this seacock.
2. Turn the waste tank selector Y-valve and grey water tank selector Y-valve to the forward grey water tank position.
3. Turn the "house" battery master disconnect switch to the "ON" position.
4. Switch the Main - One circuit breaker on the Safety Breaker Panel "ON."
5. On the DC Control Center, switch the System DC Main circuit breaker "ON," then switch the Forward Waste Pump circuit breaker "ON."
6. Turn the waste pump switch "ON." The switch is located in the engine room above the aft waste tank, next to the waste tank selector Y-valve. This activates the waste pump, which pumps the grey water overboard. The pump is located midway between the aft waste tank and the generator. Refer to the "**Engine Room**" portion of **Section 9** for the exact location of the pump and its switch.

**CAUTION**

When the grey water tank is empty, turn the waste pump "OFF." Operating the waste pump when the grey water tank is empty can damage the pump.

7. After all grey water is pumped overboard, turn the waste pump switch "OFF."
8. Remove the forward grey water tank deck plate labeled GREY WATER using the removal tool supplied with your boat.
9. Flush the grey water tank by pouring a few gallons of fresh water through the GREY WATER deck fitting. Reactivate the waste pump to remove the fresh water and any remaining grey water, then turn the waste pump switch "OFF."
10. Replace the GREY WATER deck plate.
11. Turn the waste tank selector Y-valve and grey water tank selector Y-valve to the aft grey water tank position.
12. Repeat steps 6, 7, 8, 9, and 10 for the aft grey water tank.
13. Close the overboard discharge seacock.
14. Switch the Forward Waste Pump circuit breaker on the DC Control Center "OFF."

Propane Stove

The optional propane stove system includes the stove and a liquid propane gas (LPG) storage tank. Refer to the OEM information for details on operating the propane stove. The propane tank is installed in a fiberglass box on the boat's boarding platform.

Once the propane stove system is properly set-up:

1. Turn the "house" battery master disconnect switch to the "ON" position.
2. Switch the Main - One circuit breaker on the Safety Breaker Panel "ON."

3. Switch the Propane circuit breaker on the DC Control Center "ON." The stove is now ready to operate.



WARNING

The stove system is designed to use only LPG. Do not use any other fuel.

The propane tank must be firmly secured to the boat with the tank in a horizontal position. The American Boat and Yacht Council (ABYC) has developed specific standards on how propane tanks must be installed. Carver has installed this tank according to the ABYC standards. Do not relocate or reposition the tank.

NOTE: *The propane tank valve outlet fitting and the regulator system nut, by law, have left-hand threads. The nut is so marked with a slot.*

Always close the propane supply line valves and cylinder valve when the stove is not in use. Close valves immediately in an emergency. The appliance valves must be closed before opening the cylinder valve.



DANGER

When the propane stove is lit, it burns propane. The burning process uses cabin oxygen and releases carbon monoxide (CO). You must ventilate the cabin when using the stove. Failure to do so could result in a lack of oxygen and/or a build-up of CO, which can cause death or serious injury. Do not operate the stove for space heating. Never obstruct the ventilation openings.

Never obstruct quick access to the propane stove system components and shut-off valves. Keep valves on empty propane tanks closed and disconnected.

Keep protective covers, caps or plugs in place. Store reserve or empty tanks on open decks or in gas-tight lockers that vent overboard and are intended for storing propane tanks. Do not use the propane tank box for storing any other equipment.

Never leave your boat unattended when the propane stove is in use. Do not smoke or use an open flame while replacing propane tanks. Hoses in the propane stove system must be inspected regularly, at least annually, and replaced if any deterioration is found. Inspect the flue pipes, at least annually, and replace them if any deterioration, cracks or openings are found.

Checking the System For Leaks



WARNING

Never use flame to check your propane stove system for leaks.

The propane stove system is inspected and pressure checked as part of Carver's quality assurance process. We do, however, suggest that you test the system for leaks regularly. Use the following system inspection process every time you remove and reinstall the propane tank. The following information has been taken from the Seaward Products Owner's Manual For Gas-Operated Stoves.

1. After the propane tank has been installed, the regulator system connected, the hose run and connected to both the stove and regulator, slowly open the propane tank valve until the propane is flowing. The pressure gauge on the regulation system should read approximately 110 psi at 70 degrees F. (the pressure is higher if the air around you is warmer; lower if the air is cooler).
2. Close the propane tank valve and observe the pressure gauge. It should hold a constant reading over a 15-minute period. If the gauge reading decreases over that time, there is a leak in the system.

If a leak is present:

1. Make sure the propane tank valve is closed.



CAUTION

Do not use soap that contains ammonia.

2. Use a soap and water solution to check all propane fittings. The solution forms bubbles where propane is leaking from the system.

If you cannot find the leak, contact SeaWard Products or your Carver Dealer.

3. Have a qualified person repair the propane system.



DANGER

Propane is heavier than air and if allowed to leak, could settle and accumulate. This accumulation could then ignite and explode.

NOTES

NOTES

NOTES

Propulsion

Introduction	122
Fuel System	122
Fuel Tanks	122
Fuel Equalization Valves	122
Fuel Shut-Off Valves	123
Fuel Tank Vents	123
Engine Room Ventilation	123
Cooling System	124
Exhaust System	125
Fire Suppression System	126
Engine Gauges	128
Gauge Maintenance	131
Helm Controls	132
Shift and Throttle Controls	132
Steering	134
Preparing for Cruising	134
Fueling	134
Operating the Engines	136

Introduction

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.

Fuel System

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 port fuel tank only.

Fuel Tanks

Your boat holds a maximum 480 gallons of fuel in two 240 gallon tanks. The fuel tanks are located on the starboard and port sides of the engine room. 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.

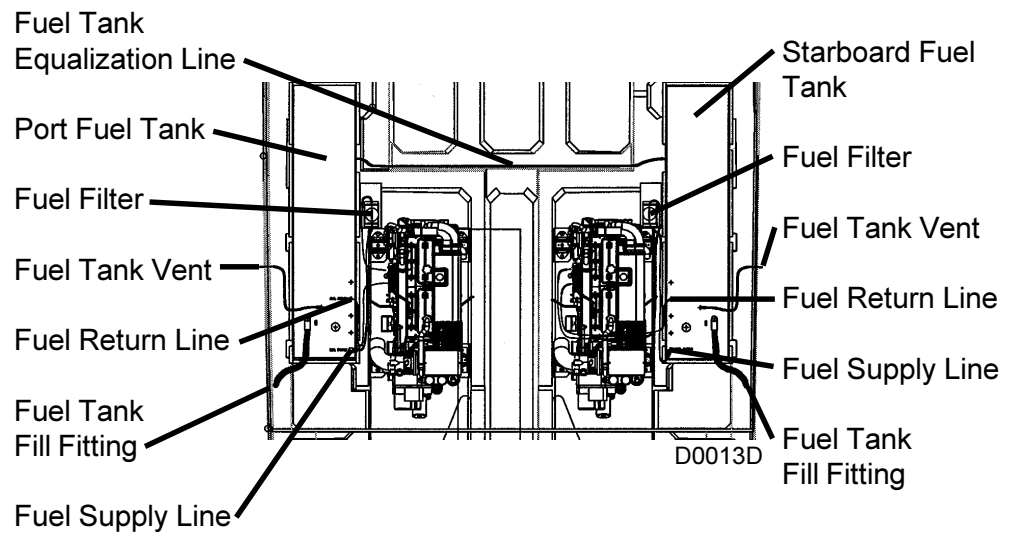
Fuel Equalization Valves

Because the generator draws fuel only from the port fuel tank, the fuel levels in the tanks may become unequal. If this occurs, open the fuel equalization valves, located near the center bottom on the aft of each tank. When the fuel levels are equal, close the valves.



WARNING

Always close both fuel equalization valves when you are not equalizing the fuel levels in the fuel tanks. If one of the valves developed a leak while open and unattended, fuel could spill into the engine room undetected, creating a hazardous condition.

FUEL SYSTEM**Fuel Shut-Off Valves**

A fuel shut-off valve is installed between each fuel supply line and the fuel tank that it is connected to. The valves are located on top of the fuel tanks and must be open when operating the engines.

Fuel Tank Vents

Each fuel tank is vented overboard. As the fuel tank is filled during fueling, air is displaced from inside the tank and escapes through the vent. Refer to the "**Thru-Hull Fittings**" portion of **Section 9** for the exact location of the fuel tank vents.

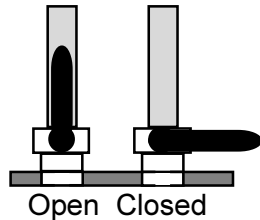
Engine Room Ventilation

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 and excess heat from the engine room. The bilge blowers operate whenever the engines are running, as long as the four Bilge Blower circuit breakers on the DC Control Panel 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.

Cooling System

The cooling system removes excess heat from the engines and exhaust system. Closed systems use a fresh-water/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.



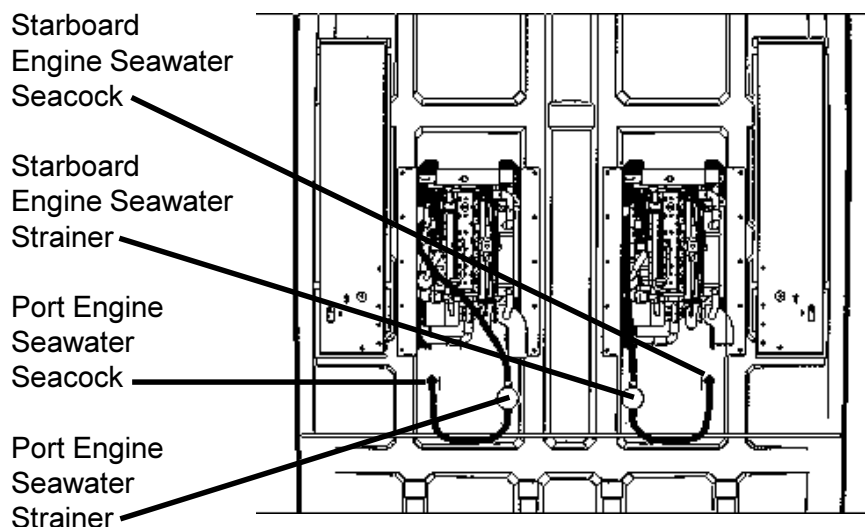
Both open and closed cooling systems require seawater to function. Before each cruise, make sure the seawater strainers, located in the engine room beneath hatches just forward of each engine, are free of seaweed and other debris. Open the cooling system seacocks before you start your engines. Each seacock is located near the aft outboard corner of its engine. If you have a closed system, make sure that you have a sufficient level of coolant in the system.



WARNING

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

SEAWATER INTAKE SYSTEM (FOR CUMMINS ENGINES)



D0025DD

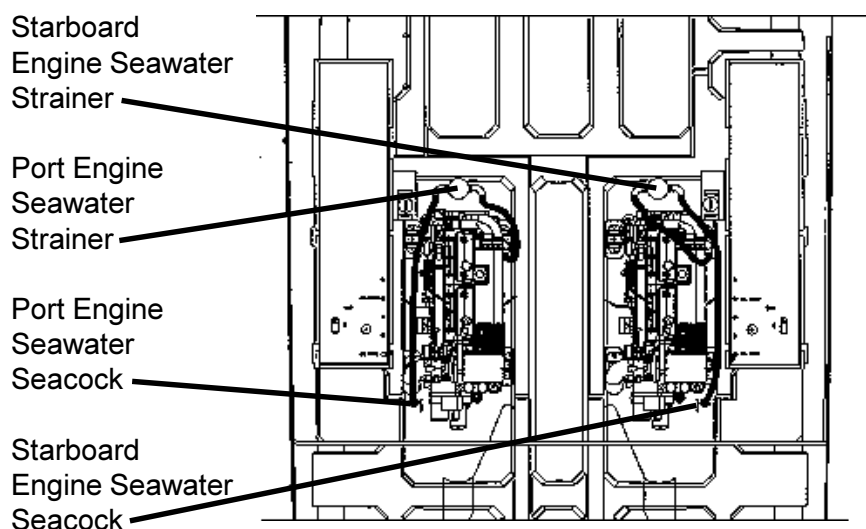
After starting your engines, check the engine exhaust outlets. Refer to the **"Thru-Hull Fittings"** portion of **Section 9** for the location of the engine exhaust outlets. If water is not being ejected from the outlets, immediately shut down the engines. Determine why seawater is not being pumped through the system. Have the problem corrected before restarting the engines.

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

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.

SEAWATER INTAKE SYSTEM (FOR VOLVO ENGINES)



D0025DC

Fire Suppression System

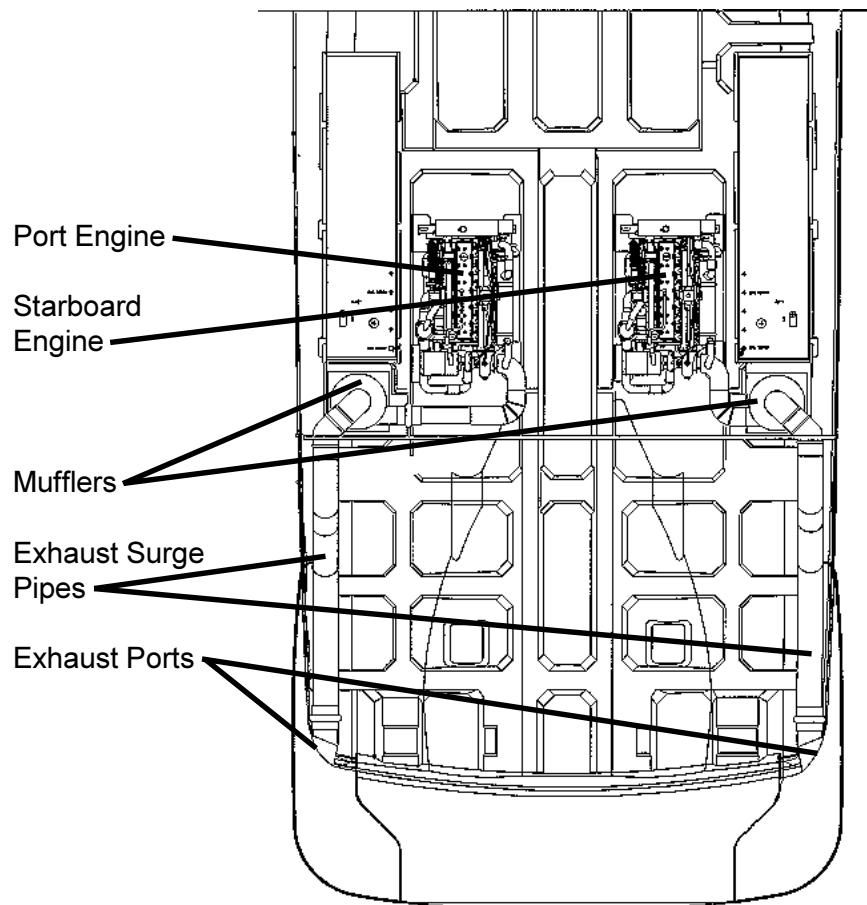
An automatic fire suppression system is installed in the engine room. This system provides an added measure of safety in the event of an engine room fire. Refer to the OEM information for details on operating the fire suppression system. If your boat was built for use in Europe, the system can also be 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 extinguished and the system is deactivated, ventilate the engine room with fresh air before reentering it.

ENGINE EXHAUST SYSTEM (FOR CUMMINS ENGINES)



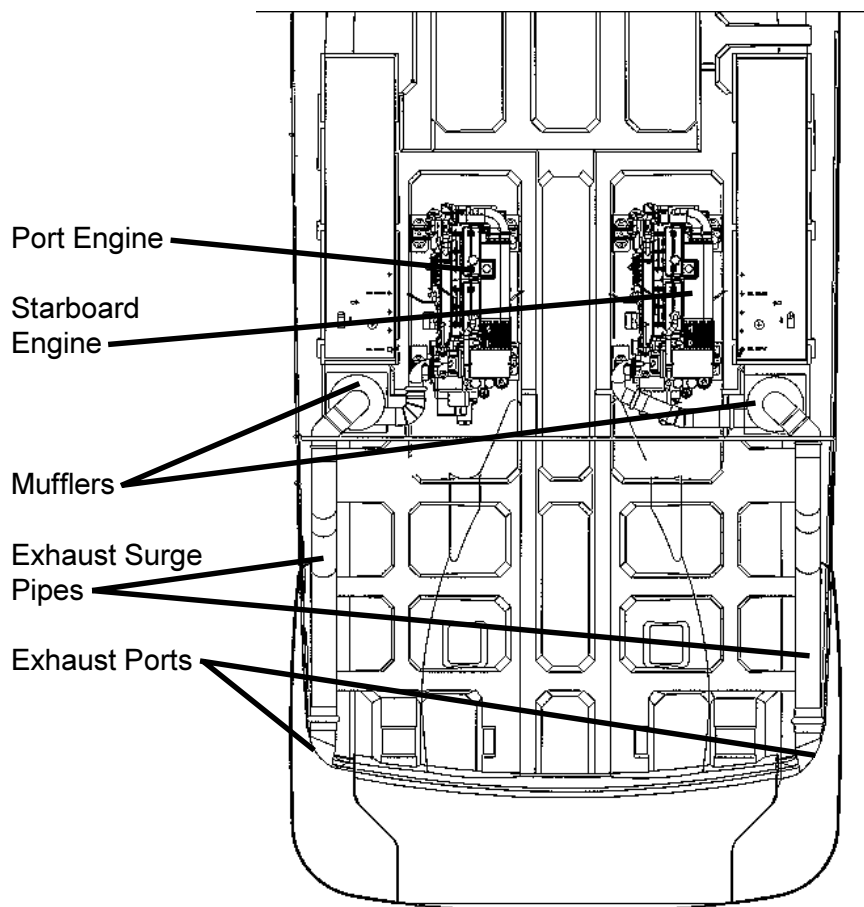
D0025DB

The fire suppression chemical tank is installed in the engine room on the aft bulkhead. 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 down. 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.

ENGINE EXHAUST SYSTEM (FOR VOLVO ENGINES)



D0025DA

Engine Gauges

Each 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. The side of the instrument panel that the gauges are on (port or starboard) determines which engine (port or starboard) that the gauges are for. Familiarize yourself with the gauges before starting the engines for the first time.



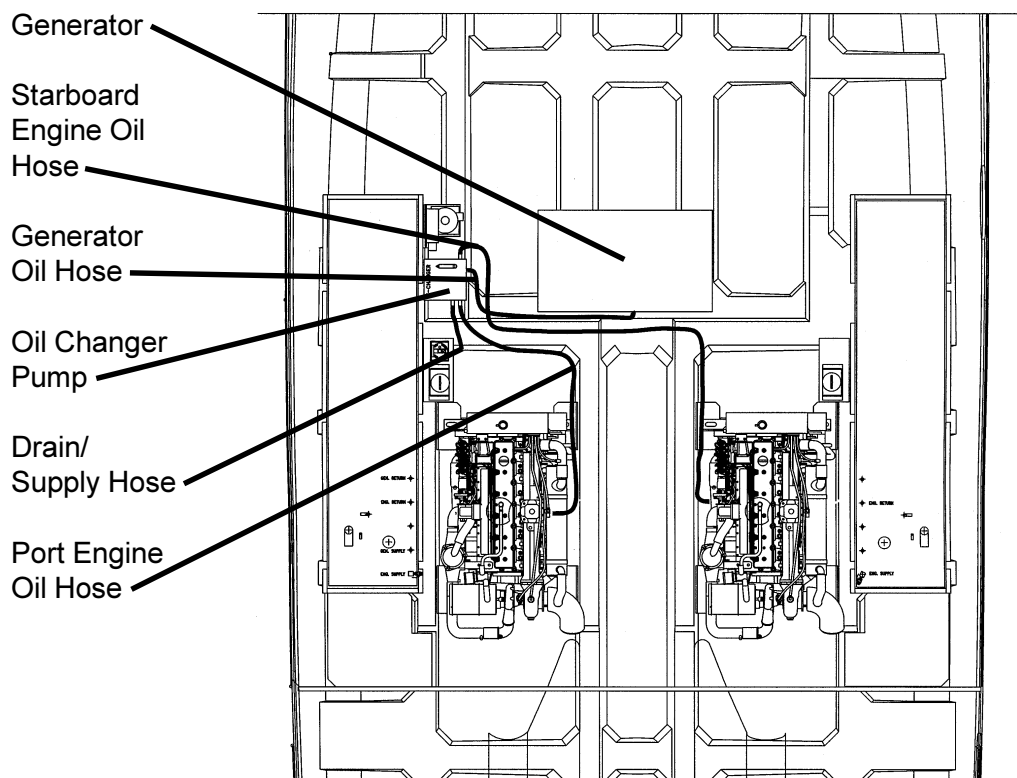
CAUTION

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

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.

OIL CHANGER SYSTEM (FOR CUMMINS ENGINES)



D0019BA

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.

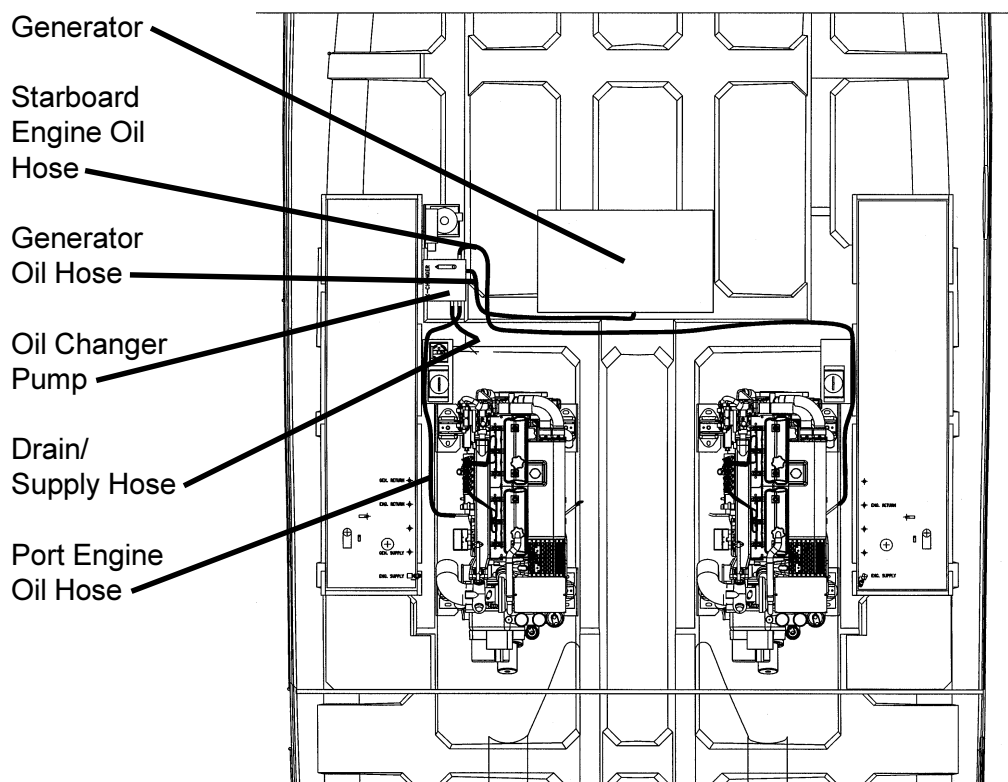
Temperature Gauge

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.

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. A sudden increase in the temperature gauge reading could indicate that the cooling water intake system has become blocked; a water intake hose has failed; or the coolant system's water pump has malfunctioned.

OIL CHANGER SYSTEM (FOR VOLVO ENGINES)



D0019BB

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 down 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 down 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.

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 oil pressure gauges. If either gauge indicates abnormally low oil pressure, immediately shut down the affected 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 down 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 down if the oil pressure is below the minimum rating.

Voltmeter

The voltmeter displays the amount of charge in the engine's battery. When the battery is fully charged, the voltmeter indicates 12.5 volts. As a battery is used, its indicated voltage decreases. Each engine battery has its own voltmeter. Refer to the "**Engine Batteries**" portion of **Section 2** for additional information on the voltmeters.

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".

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.

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.

Shift and Throttle Controls

The shift and throttle controls on your boat are either mechanical or electronic. Mechanical controls are standard; electronic controls are installed if your boat has Volvo engines, the lower helm, or you ordered electronic controls. Both type of controls are described below.

Mechanical Controls

Shift Levers - Two shift levers allow you to shift the engines from neutral to forward or reverse. The shift levers are located on the port side of the steering wheel. The outboard lever controls the port engine and the inboard lever controls the starboard engine. The engines can be shifted independently to improve maneuverability in tight quarters.



WARNING

Do not shift into or out of gear while the engine speed (as indicated by the tachometers) is above idle. Doing so could result in serious damage to the engine's drive train.

A TIP FROM CARVER!

If you turn the ignition switch key and the engine starter fails to engage, it may be because the neutral safety switch for that engine is slightly out of adjustment. If this happens, wiggle the shift lever for that engine forward and aft until the starter engages.

A neutral safety switch is incorporated into the linkage of each shift lever. When properly adjusted, the safety switch does not permit you to start an engine while it is in gear.

Throttle Levers - Two throttles allow you to increase or decrease the speed of the engines. The throttles are located on the starboard side of the steering wheel. The inboard lever controls the port engine and the outboard lever controls the starboard engine. The levers are designed to allow independent control of each engine's speed.



WARNING

Before shifting an engine into or out of gear, always return its throttle to the extreme low speed position. Failure to follow this procedure could result in serious damage to the engine's drive train.

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

Electronic Controls

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.

Shift/Throttle - Engine Interface - The shift/throttle levers from both helms are connected to the engines by an electronic control system. Refer to the OEM information for details on adjusting and maintaining the shift/throttle control systems.

Engine Synchronization

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 engine synchronizer gauge to monitor the speed of each engine. Adjust the throttles so that the synchronizer gauge needle is centered.

NOTE: *Aligning the throttles with each other does not necessarily mean the engines are synchronized. To accurately synchronize the engines, rely on the tachometers or the engine synchronizer gauge.*

The optional engine synchronizer, which is available only with electronic controls, allows you to electronically and mechanically interconnect both engine shift/throttle levers. This keeps the engines precisely synchronized.

Refer to the OEM information for details on operating the engine synchronizer.

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 retracting 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 source 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.

Preparing for Cruising

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

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 oven, 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 DIESEL deck plate, located just forward of the port or starboard side deck rail door, using the cap removal tool supplied with your boat. Refer to the "Deck Plates" portion of **Section 9** for the exact locations of both plates.

**WARNING**

While fueling, keep the fuel hose nozzle in constant contact with the metal fuel fill fitting. This is a safeguard against static sparks that could cause a fuel 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 DIESEL fill deck plate.
13. Repeat steps 9 - 12 for the other fuel tank.
14. Wipe up all spilled fuel.

Operating the Engines

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 as detailed in **Section 7**.
4. Turn the engine battery and "house" battery master disconnect switches to the "ON" position.
5. On the Safety Breaker Panel, switch the Auto Bilge Pump, Electric Shift - Port and Starboard (if present), Main - One, and Main - Two circuit breakers "ON".

Also switch "ON" any other circuit breakers for equipment you may need.

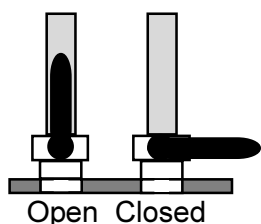
6. On the DC Control Center, switch the System DC Main circuit breaker "ON", then switch the four Bilge Blower circuit breakers "ON".

Also switch "ON" any other circuit breakers for equipment you may need.

7. Verify that all safety gear is onboard and in proper operating condition. Check items such as the navigation lights, VHF radio, depth sounder, etc. Make sure your boat carries all safety equipment required by Federal, State, and local regulations.

8. Verify that you have an adequate supply of fresh water.
9. Check the level of waste in the waste tanks. Empty them if necessary. Refer to the **"Emptying the Waste Tanks"** portion of **Section 4**.
10. Disconnect and store the shore power cord(s) and shore water hose.

Starting the Engines



1. Open the cooling system seacocks for both engines.
2. Move both shift (mechanical controls) or shift/throttle (electronic controls) levers to neutral.
3. For electronic controls, a three-position switch located on the helm lets you choose one of three engine idle settings. Select the desired setting.
4. 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.

5. Place one hand on the throttle (mechanical controls) or shift/throttle (electronic controls) 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 throttle lever slightly to keep it running.

NOTE: *The electronic controls system has a shift cancel feature that allows you to advance the throttle without engaging the shift. Refer to the OEM information for details on this feature.*

6. Start the other engine in the same manner as the first engine.
7. Make sure the bilge blowers are operating properly by feeling for air being blown from the bilge vents. These vents are located amidships on either side of the boat, just below the side deck.

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 port, located near the transom. Refer to the "**Thru-Hull Fittings**" portion of **Section 9** for the exact location of the exhaust ports. If you do not see water being pumped out, turn the affected engine off. Identify and correct the cause of the problem before restarting the engine.



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 down 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 all navigation systems are operating properly.

NOTES

NOTES

Operating and Maneuvering

Launching the Boat	142
Navigation	142
Controlling the Boat	143
Loading	143
Casting Off and Docking	143
Maneuvering	147
Anchoring	148
Stern Anchors	149
Mooring Lines	149
Getting Underway	151
Shakedown Cruise	151
Operating at Planing Speed	152
Trim Tabs	152

Launching the Boat

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

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.

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.

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.

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.

Depth Sounder

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

Speed Log

Keeping a speed log is essential when trying to determine your position over time. Use the information recorded on the log to plot your approximate position from a known position.

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.

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.

Loading

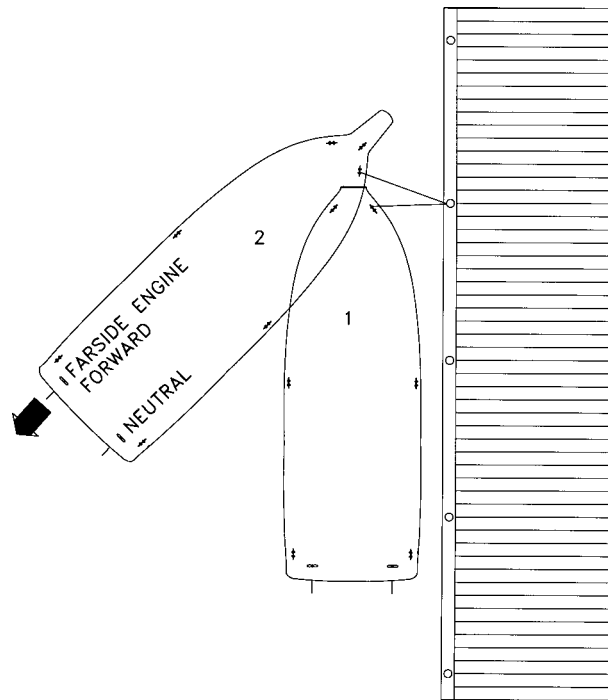
When you load items onto the boat, have someone on the pier hand them to you after you have boarded the boat. Stow all items securely to prevent them from shifting when the boat is in motion. If your boat is loaded near capacity or if seas get rough, distribute the weight evenly and keep the load low.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

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.

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.

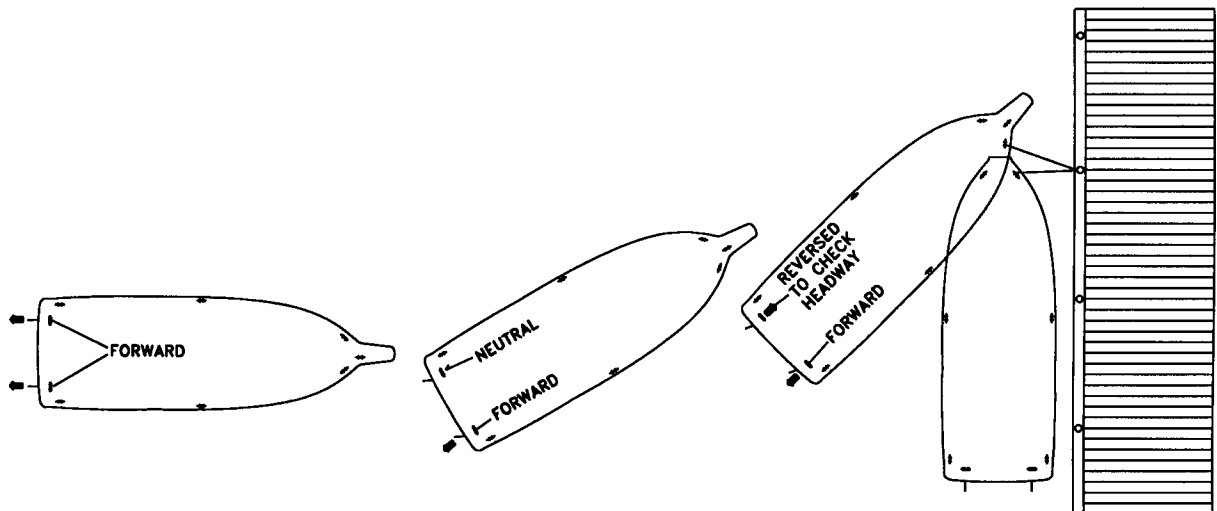


At marina anchorages, boats are often secured to a mooring buoy. Fouling your propeller with a mooring line is the principal hazard when leaving a mooring. If you use a dinghy to reach your boat, make sure the dinghy line does not foul the propeller.

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.

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.

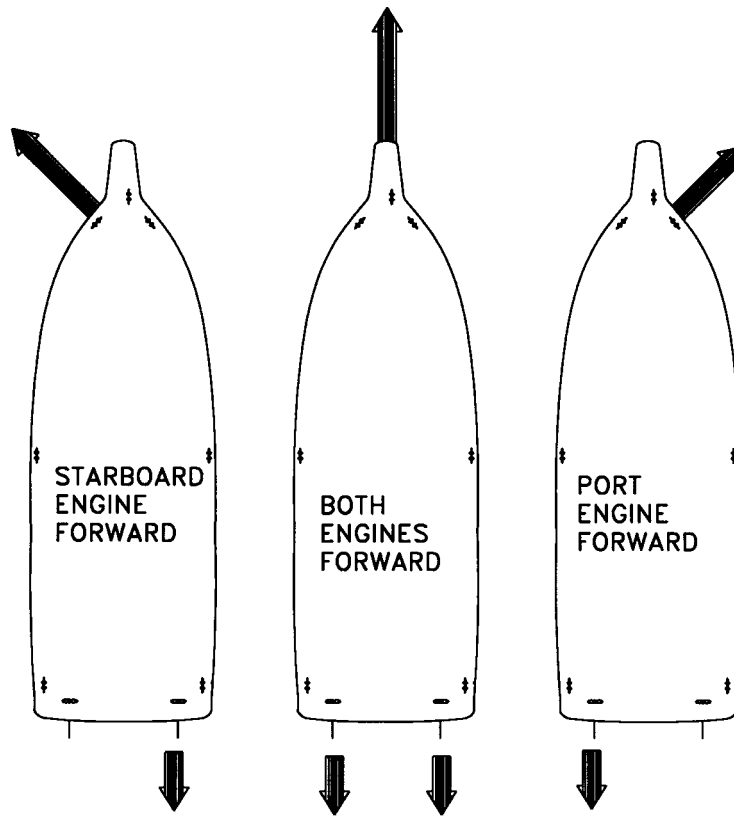


Picking Up a Mooring

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.

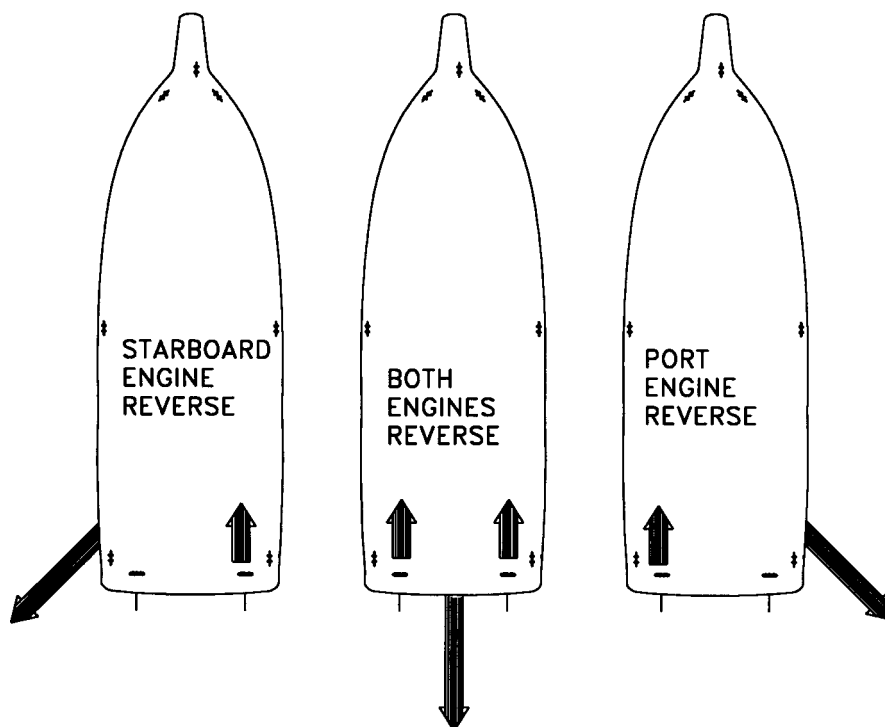
Shift the engines into neutral when you estimate that the boat's forward momentum will carry you to the buoy. Station someone at the bow with a boat hook to pick up the pennant float. If you are about to overshoot your mark, check headway as the bow comes up to the buoy. If you fall short, a few turns 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.



TRACKING FORWARD (PROPS ONLY)

TRACKING ASTERN (PROPS ONLY)



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 backward and to port in reverse gear. With only the starboard propeller rotating, your boat tracks forward and to port in forward gear and backward 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.

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.

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.

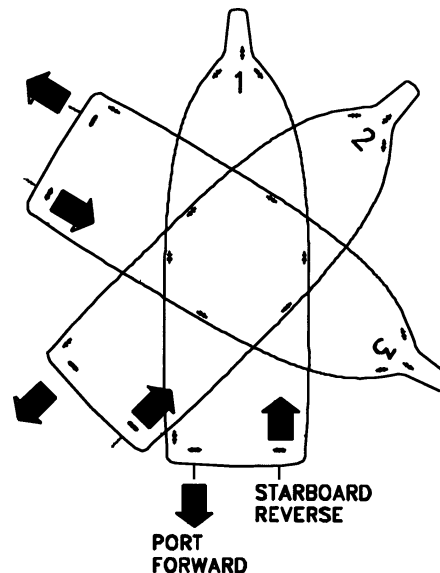
Checking Headway

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.

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.



Towing

Always offer assistance to a vessel in distress. However, towing a capsized 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.

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 backwards 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.

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.

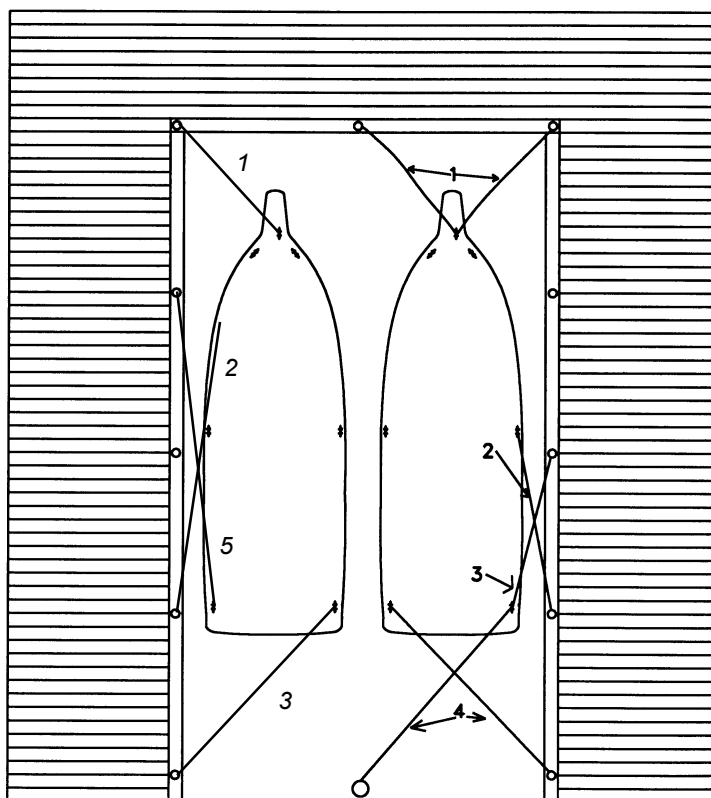
You may also need to anchor in a strong wind. If you drop your spare anchor, make sure the two anchors are laid out at an angle. If both anchors are set in-line and one of them drags, it may cut a trough for the other anchor to follow.

Stern Anchors

In some anchorages, boats lie to anchors bow and stern. 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 paid out on both anchors as necessary.

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 which 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.

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.

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 and the owner.
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 at different RPM settings. Try different trim angles. Monitor the gauges. Practice backing down and turning slow speed tight corners that simulate docking maneuvers.

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.

Trim Tabs

Your boat is equipped with a set of electric / 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 plan-

ing speeds to make minor adjustments in the fore and aft and beam-to-beam angle of the boat.

To use the trim tabs:

1. Turn the "house" battery master disconnect switch to the "ON" position.
2. On the Safety Breaker Panel, switch the Main - One circuit breaker "ON."
3. On the DC Control Center, switch the System DC Main circuit breaker "ON," then switch the Trim Tabs circuit breaker "ON."
4. The 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.
5. 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.

6. 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.

7. 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.

NOTES

NOTES

Maintenance

Maintenance Schedule	158
Maintenance Log	158
Exterior Maintenance	162
Fiberglass Surfaces	162
Anti-Fouling Bottom Paint	163
Caulking and Sealants	164
Stainless Steel Rails and Hardware	164
Decorative Striping Tape	165
Hatches and Windows	165
Exterior Vinyl Upholstery	166
Exterior Carpet	166
Canvas	166
Interior Maintenance	169
Woodwork	169
High Pressure Laminate	169
Woven Fabrics	169
Carpet	171
Interior Fiberglass	171
Plexiglass	171
Mechanical Systems	172
Engines / Generator	172
Thru-Hull Valves	172
Propeller Shaft Seals	172
Props	173
Struts	173
DC Electrical System	173
Fresh Water System	175
Bilge System	176
Sanitation System	176

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:

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 onshore storage.

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.

Type C Maintenance

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

Type D Maintenance

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

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 cover.				X
Check prop for balance and nicks.				X
Check strut bearings.				X
Check rudder alignment.				X
Check all thru-hull fittings.				X
Inspect shaft log packing nut.	X	X	X	X
Check engine and shaft alignment.	X	X	X	X
Spray ignition switch 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
Test neutral safety switch.				X
Lubricate cables and controls.				X
Steering System				
Inspect linkage and connections.		X		X
Inspect hydraulic fluid level.	X	X	X	X
Inspect rudder packing nut.	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 cord(s).			X	X
Inspect generator water intake and discharge.		X	X	X
Inspect zincs anodes.			X	X
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
Check propane system for leaks.		X	X	X
Inspect propane storage system.			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

	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.				X
Clean stove.			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 vinyl upholstery.			X	X
Clean plexiglass surfaces.				X
Lubricate hinges, latches, and locks.			X	X
Wash weather covers.				X
Bilge System				
Check garboard 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.

Exterior Maintenance

Fiberglass Surfaces

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

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 very small pores that, over time, 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.*

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.

Gelcoat Blisters

While fiberglass is a durable and economical material, it is not indestructible as is often assumed by many boat-ers. 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.

Anti-Fouling Bottom Paint

The underwater surfaces of your boat are coated with a high-quality, factory-applied coat of antifouling bottom paint, applied after the hull has been carefully prepared and primed.

The paint has a high copper content and antifouling elements that retard the growth of marine life on the bottom of your boat's hull. The antifouling elements in

this paint have a limited life span, usually about 12 months. Because of this, Carver suggests you repaint the hull with a fresh coat of bottom paint on an annual basis. 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 best 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.

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.

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.

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 decorative striping tape. Fuel damages the striping tape.

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 the windows using a soft rag and glass cleaner. The bridge wind screen is made from formed plexiglass. Do not use glass cleaner to clean plexiglass; instead, use a solution of fresh water and mild soap.

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

To care for the exterior vinyl on your boat, refer to the cleaning recommendations in the following "Vinyl Cleaning and Care" insert. The insert also contains specific information on removing certain types of stains. The treatment for additional types of stains is described below.

Grease and Pencil Marks: Use a medium-soft brush to apply either a solution of fresh water and Ivory Soap or Fantastik Spray Cleaner.

Tough Stains, Adhesive, Teak Oil and Rust: Use 3M Citrus Cleaner; rinse with soap and water.

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.

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.

Canvas

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.



VINYL CLEANING & CARE

Important information concerning your G&T vinyls. G&T vinyls are made to withstand the effects of sun, heat, acid rain, and soiling under normal conditions. Please consult these cleaning recommendations.

Steps	1	2	3
Betadine	B	A	
Chewing Gum	D	A	B
Eyeshadow	B		
Motor Oil	B		
Spray Paint	B	E	
Mildew or Wet Leaves*	C	A	B
Shoe Polish*	D	B	E
Yellow Mustard	A	B	C
Oil Base Paint (fresh)	D	B	E
Oil Base Paint (dried)	D	A	B
Suntan Lotion*	A	B	E

Steps	1	2	3
Tar/Asphalt	D	A	B
Lipstick	A	B	
Latex Paint	A	B	E
Crayon	D	B	
Ketchup	A	B	
Grease	D	B	E
Ballpoint Ink*	A	B	E
Household Soil	A	B	
Permanent Marker*	B	C	E
Coffee, Tea, Chocolate	B		

- A. Medium-soft brush, warm soapy water/Rinse/Dry
 B. Fantastik Spray Cleaner/Rinse/Dry
 C. One (1) tablespoon ammonia, one-fourth (1/4) cup of hydrogen peroxide, three-fourth (3/4) cup of water/Rinse/Dry
 D. Wipe or scrape off excess (Chill gum with ice)
 E. 3M Citrus Base Cleaner Rinse/Dry (617-733-1110 *55)
 F. Denatured Alcohol/Rinse/Dry
 Note: All cleaning methods must be followed by a thorough rinse with water.
 *Suntan lotion, shoe polish, wet leaves, and some other products contain dyes that stain permanently.

Certain household cleaners, powdered abrasives, steel wool and industrial cleaners can cause damage and discoloration and are not recommended. Dry cleaning fluids and lacquer solvents should not be used as they will remove the printed pattern and gloss. Waxes should be used with caution. Many contain dyes or solvents that can permanently damage the protective coating. Always remove stains immediately.

96 Willard Street, Suite 201, 1726 Mariners Square, Cocoa, FL 32922, (800) 628-3775 — 700 Collins Road, Elkhart, IN 46516, (800) 343-1565
 1726 Henry G Lane, Maryville, TN 37801, (800) 247-9901 — 475 36th Street, S.E., Grand Rapids, MI 49548, (800) 967-7753

For More Personalized Information About Our Products and Services:

1-800-247-9901

DO NOT USE
 409 CLEANER
 OR
 SILICONE BASE PRODUCTS!!!



MARINE SPECIALTIES GROUP

G&T INDUSTRIES

IMPORTANT INFORMATION REGARDING YOUR VINYL

WHILE YOUR VINYL IS MADE TO WITHSTAND THE ELEMENTS, IT IS IMPORTANT TO CARE FOR IT BY KEEPING IT CLEAN AT ALL TIMES. MANY SUBSTANCES MAY STAIN YOUR VINYL IF LEFT ON OVER A PERIOD OF TIME. REMEMBER TO REMOVE ANY CONTAMINANT AND CLEAN VINYL IMMEDIATELY.

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. Brush all loose dirt off the Sunbrella, then hose down the fabric with a solution of natural soap and lukewarm fresh water (no more than 100 degrees F.). Rinse with fresh water until the soap is removed. Do not use detergents.



WARNING

Do not soak the Sunbrella in Clorox for an excessive amount of time as this can damage the stitching. Cleaning the Sunbrella using bleach may reduce the fabric's water repellency. To restore its water repellency, apply an air-curing fluorocarbon water repellent treatment.

For stubborn stains: Remove the fabric from the bow supports. Soak the fabric for 20 minutes in a solution of no more than 1/2 cup (4 oz.) Clorox and 1/4 cup (2 oz.) natural soap per gallon of lukewarm fresh water (no more than 100 degrees F.). Rinse with fresh water until the soap is removed, then allow the fabric to air dry.

Do not subject canvas fabric to excessive heat. Before storing the fabric, thoroughly air dry it. Store it in a dry, ventilated area.

Enclosure Curtains

The enclosure curtains' 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.

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.

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 lemon oil and a soft rag. Avoid using wax-based furniture polish.

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 MOHAWK POUR-N-WIPE FINISH #603-3017. This is an industrial/commercial grade finish that is not commonly found at local paint and hardware stores. You can order MOHAWK POUR-N-WIPE (Carver part number 81069-00) through your Carver Dealer. Follow the manufacturer's instructions on the product package when applying this product to your wood surfaces.

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.

Woven Fabrics

The woven fabrics used in your boat's interior include drapes, pillow shams, bed spreads, woven (fuzzy) headliners and sofa and barrel chair coverings. These fabrics have been treated with a popular stain retardant product. Even so, the fabrics still need periodic cleaning. To care for the fabrics, refer to the cleaning recommendations in the following "**Fabric Cleaning and Care**" insert. The insert also contains specific information on removing certain types of stains. The treatments for additional types of stains are described below.

Pencil Marks: Use a clean, white cloth and Westley's Clear Magic.



FABRIC CLEANING & CARE

Important information concerning your G&T Marine Headliner and Fabrics

Steps	1	2	3
Water Stain	B	C	E
Motor Oil	A		
Spray Paint	A	D	F
Mildew	A	E	
Yellow Mustard	A	D	
Wet Leaves*	A		
Oil Base Paint	A	D	F
Suntan Lotion*	A	F	
Chewing Gum	D		
Tar	D	A	
Lipstick	A		

Steps	1	2	3
Ketchup	A		
Grease	A	D	
Ball Point Ink	A		
Household Soil	A		
Permanent Marker*	A	F	
Coffee, Tea	A		
Chocolate	A		
Adhesive	D		
Teak Oil	D		
Latex Paint	A	D	F
Crayon	A	D	

- A. White cloth - Westley's Clear Magic.
1-800-545-0982
- B. White cloth - Westley's Clear Magic - air hose.
- C. Lendow Glass Cleaner. 313-777-2236
- D. Lift Off Spot Remover. 216-881-4070
- E. Clothes shaver to remove lint.
- F. Follow instructions of staining agent manufacturer.

*Suntan lotions, wet leaves, permanent markers and some other products contain dyes that permanently stain.

Always clean immediately. Test an unseen area of fabric before cleaning stain.

96 Willard Street, Suite 201, 1726 Mariners Square, Cocoa, FL 32922, (800) 628-3775 — 700 Collins Road, Elkhart, IN 46516, (800) 343-1565
1726 Henry G Lane, Maryville, TN 37801, (800) 247-9901 — 475 36th Street, S.E., Grand Rapids, MI 49548, (800) 967-7753

For More Personalized Information About Our Products and Services:

1-800-247-9901



Tough Stains and Set Water Stains: Always try the technique outlined in the insert first. If that doesn't remove the stain, spray Westley's Clear Magic on the area, going two inches around the stain or, if possible, bring the wetness to a break point, such as a bulkhead. Spray water on the area as directed on the product bottle. Let set about 5 minutes. Rub the area with a clean towel, rotating the towel as the stain is removed. As you rub, go a little beyond the wetness with the towel, flaring the edges.

Allow the area to dry or blow the entire cleaned area with compressed air. Repeat if necessary or use Lendow glass cleaner. After the stain is removed, use the clothes shaver to remove "fuzzies".

Carpet

The carpet used on the interior of the boat has been treated with a popular stain retardant product. 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.

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

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.

Plexiglass



CAUTION

Do not use glass cleaner, 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.

Mechanical Systems

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

Engines / Generator

Refer to the engine and generator OEM information for instructions on maintaining your boat's engines and generator. There is an in-line 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. The strainers are located in the engine room. Refer to the **"Engine Room"** portion of **Section 9** 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.

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 the **"Thru-Hull Fittings"** portion of **Section 9** for the location of the thru-hull valves.

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.

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.



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.

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 your marine technician inspect the strut bearings whenever the boat is pulled. Replace the bearings when the technician recommends it.

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 and overcharging a battery can shorten its life span.

To maximize the useful life of the batteries:

1. Do not store batteries that are only partially charged. Recharge the batteries to a voltage reading between 12.3 and 12.6 volts before storing. Monitor the voltage reading every 30 days while

the batteries are in storage and recharge them if the voltage drops below 12.3 volts.

2. Do not overcharge the batteries. Stop charging the batteries when the voltage is between 12.3 and 12.6 volts. Do not continuously (trickle) charge the batteries. Trickle charging a fully charged battery reduces its useful life.

While using the boat, use the voltmeters to frequently monitor the charge level of each battery bank. Monitor the charge level with the engines turned off (static condition). Use the onboard battery chargers (the controls are on the Safety Breaker Panel) or the engine alternators (which work automatically while the engines are running) to recharge the batteries when they are not fully charged. When the battery bank is fully charged the voltmeter reads between 12.3 and 12.6 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 switches to trickle charge mode.



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.

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.

NOTE: *The fresh water system, including the water heater, must be drained as part of the winterization process. Failure to winterize the water system could lead to damaged pipes, valves, faucets, tanks, or a ruptured water heater. Refer to the "Fresh Water System" portion of Section 8.*

Shower

If the water flow from the shower becomes restricted, it may be due to the accumulation of sediment in the shower head. If this happens, remove the head and rinse it with clean water. If necessary, clean the discharge holes with a narrow wire.

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.

Sumps

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

Pressure Water Pump

There is an in-line filter installed near the pressure water pump. Clean the filter once a month. The pump is located in the engine room. Refer to the "**Engine Room**" portion of **Section 9** for the exact location of the pump and strainer.

Water Tank Vent Screen

A vent for the fresh water tank is installed through the boat's hull. Each vent has a screen over its opening to prevent dirt and insects from entering the fresh water tank. Clean the vent screens once every six months or

twice a season. Refer to the **"Thru-Hull Fittings"** portion of **Section 9** for the exact location of the vents.

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.

1. Periodically inspect and clean each bilge pump's strainer. The strainers prevent dirt and debris from clogging the bilge pump intakes. The bilge pumps are located in the engine room, beneath a hatch in the aft stateroom, and beneath a hatch next to the galley. Refer to the **"Engine Room"** and **"Interior Hatches"** portions of **Section 9** for the exact location of the bilge pumps.
2. 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.
3. Clean the bilge pumps twice a season by wiping any dirt or oil from their exterior surfaces.
4. Remove any oil, dirt or debris from the bilges. Treat the bilges with a commercial bilge cleaner twice a season. Bilge cleaners are available from your Carver Dealer.

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 toilets.

Empty the waste tanks often and when you know the boat will not be used for an extended period. Each time you empty the waste tanks, flush them with fresh water. This helps remove any remaining waste from the tanks.

NOTES

NOTES

Winterization and Storage

Introduction	180
Lifting	180
Blocking	180
Winterization.....	181
Engines	181
Generator.....	181
Air Conditioning System.....	181
Fresh Water System	181
Raw Water Washdowns.....	184
Bilge	185
Sanitation System	185
Grey Water Holding System	189
Exterior	192
Interior	192
Storage.....	192
Dry Storage.....	192
Wet Storage	193
Spring Recommissioning Checklist	196

Introduction

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, 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.

Lifting

To lift your boat from the water, hire a professional experienced and 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 side deck 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.

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 compartment 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.

Winterization



CAUTION

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

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

Engines

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

Generator

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

Air Conditioning System

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

Fresh Water System



CAUTION

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

Refer to the "Fresh Water System" portion of Section 4 for a description of your boat's fresh water system, including optional equipment.

Draining the System

1. Switch the Water Heater circuit breaker on the AC Control Center "OFF." Carver recommends taping the breaker in the "OFF" position until the water system is filled and primed after spring re-commissioning.

**DANGER**

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

2. Turn the "house" battery master disconnect switch to the "ON" position.
3. On the Safety Breaker Panel, switch the forward and aft Auto Sump circuit breakers "ON," then switch the Main - One circuit breaker "ON."
4. On the DC Control Center, switch the System DC Main circuit breaker "ON," then switch the Pressure Water Pump circuit breaker "ON."
6. Open all sink and shower faucets on the boat, including the faucets for the optional transom hand shower and bow and transom fresh water washdowns.
7. When there is no more water coming from any of the sink taps, shower heads, or fresh water washdowns, switch the Pressure Water Pump circuit breaker "OFF."
8. Drain the water heater. It is located in the port forward corner of the engine room. Refer to the **"Engine Room"** portion of **Section 9** for the exact location of the water heater. Refer to the OEM information for details on draining the water heater.

Winterizing the System**WARNING**

You must use an approved, nontoxic antifreeze in your boat's fresh water system. Refer to the SeaLand Technical Bulletin at the end of this section for information on the proper type of antifreeze to use. Using the wrong type of antifreeze can damage the fresh water system. The repair of such damage is not included under the terms of either the Carver Limited Warranty or the fresh water system OEM's warranty.

1. Pour 15 gallons of nontoxic recreational vehicle antifreeze into your boat's fresh water tank. The fresh water tank is filled through a deck fitting with a plate labeled WATER. The plate is located beneath the starboard side deck rail door. Refer to the "**Deck Plates**" portion of **Section 9** for the exact location of this plate.

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. Switch the Pressure Water Pump circuit breaker on the DC Control Center "ON."
4. 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 transom hand shower and bow and transom fresh water washdowns.

For the transom 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 bow and transom fresh water washdowns:

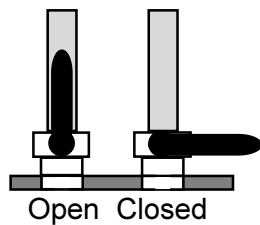
- a. Remove the hose(s) from the fresh water washdown fittings.
 - b. Place a bucket under the washdown fittings to catch the antifreeze, which can be reused.
 - c. Open the washdown faucets. When a steady stream of antifreeze flows from the fittings, close the faucets.
5. If the toilets use fresh water to flush, flush each toilet until antifreeze has filled the bowl.
 6. Pour one or two quarts of the antifreeze into each shower drain until the sump pumps turn ON.

7. Pour a quart of the antifreeze into each sink drain.

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.

Raw Water Washdowns



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

1. Close the seacock that supplies the raw water washdown pump with seawater. The seacock is located in the port forward corner of the engine room next to the water heater. Refer to the "**Engine Room**" portion of **Section 9** for the exact location of the seawater seacock.
2. Disconnect the end of the hose that is attached to the washdown side of the seacock.



WARNING

You must use an approved antifreeze in your boat's raw water washdown system. Refer to the SeaLand Technical Bulletin at the end of this section for information on the proper type of antifreeze to use. 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 either the Carver Limited Warranty or the raw water washdown system OEM's warranty.

3. Place the disconnected hose end into a bucket that contains about a gallon of nontoxic recreational vehicle antifreeze.
4. Remove the hose(s) from the bow and transom raw water washdown fittings.
5. Place a bucket under the washdown fittings to catch the antifreeze, which can be reused.

6. Turn the "house" battery master disconnect switch to the "ON" position.
7. Switch the Main - One circuit breaker on the Safety Breaker Panel "ON."
8. On the DC Control Center, switch the System DC Main circuit breaker "ON," then switch the Washdown Pump circuit breaker "ON."
9. When a steady stream of antifreeze flows from the washdown fittings, switch the Washdown Pump circuit breaker "OFF."
10. Reconnect the hose to the washdown fitting.
11. Reconnect the hose that was disconnected in Step 2.

Bilge

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 the "**Bilge**" portion of **Section 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.

NOTE: *If the toilets use fresh water to flush, you must winterize the fresh water system, as described earlier in this section, before you winterize the sanitation system.*

Refer to the "**Sanitation System**" portion of **Section 4** for a description of your boat's sanitation system.

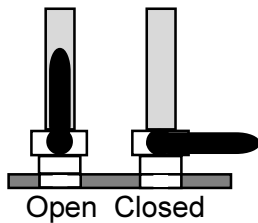
There are two types of sanitation systems: the standard system and the overboard discharge system.

Standard Sanitation System

1. Empty the waste tanks as described in the "**Emptying the Waste Tanks**" portion of **Section 4**.

Remove as much of the fresh water used in flushing the tanks as possible.

2. If the toilets use seawater to flush, follow steps a - d below; otherwise, proceed to step 3.



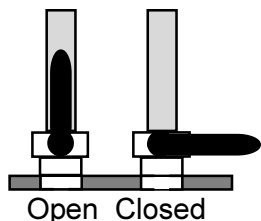
- a. Close the seawater pickup seacock for each toilet. Refer to the **"Interior Hatches"** and **"Engine Room"** portions of **Section 9** for the exact location of these seacocks.
- b. For each seacock, disconnect the end of the seawater pickup hose that is attached to the toilet side of the seacock.
- c. Flush the toilets until all water is drained from the seawater pickup hoses.
- d. Reconnect the seawater pickup hoses to the seacocks. Leave the seacocks closed.



WARNING

You must use an approved antifreeze in your boat's sanitation system. Refer to the SeaLand Technical Bulletin at the end of this section for information on the proper type of antifreeze to use. Using the wrong type of antifreeze can damage the sanitation system. The repair of such damage is not included under the terms of either the Carver Limited Warranty or the sanitation system OEM's warranty.

3. Flush 4 gallons of nontoxic recreational vehicle antifreeze through each toilet and allow it to remain in the waste tanks 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 each toilet.
 - b. Empty the waste tanks as described in the **"Emptying the Waste Tanks"** portion of **Section 4**.

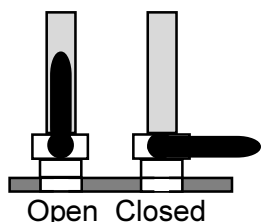


- c. If the toilets use seawater to flush, open the seacock for each toilet. Flush the toilets a few times to prime the sanitation system.
- d. Charge the waste tanks by adding deodorizer. Use the brand of deodorizer recommended by your Carver Dealer.

Overboard Discharge System

1. Empty the waste tanks as described in the **"Emptying the Waste Tanks"** portion of **Section 4**. Remove as much of the fresh water used in flushing the tanks as possible.

2. If the toilets use seawater to flush, follow steps a - d below; otherwise, proceed to step 3.



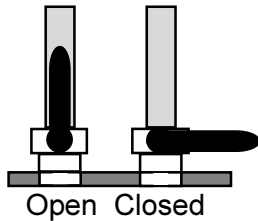
- a. Close the seawater pickup seacock for each toilet. Refer to the **"Interior Hatches"** and **"Engine Room"** portions of **Section 9** for the exact location of these seacocks.
 - b. For each seacock, disconnect the end of the seawater pickup hose that is attached to the toilet side of the seacock.
 - c. Flush the toilets until all water is drained from the seawater pickup hoses.
 - d. Reconnect the seawater pickup hoses to the seacocks. Leave the seacocks closed.
3. Under the boat, place a large bucket beneath the overboard discharge fitting to collect antifreeze pumped out later in this procedure. Refer to the **"Thru-Hull Fittings"** portion of **Section 9** for the location of the forward and aft overboard discharge fittings.



WARNING

You must use an approved antifreeze in your boat's sanitation system. Refer to the SeaLand Technical Bulletin at the end of this section for information on the proper type of antifreeze to use. Using the wrong type of antifreeze can damage the sanitation system. The repair of such damage is not included under the

terms of either the Carver Limited Warranty or the sanitation system OEM's warranty.



4. Flush 10 gallons of nontoxic recreational vehicle antifreeze through each toilet.
5. Open the overboard discharge seacock. The seacock is located in the port forward area of the engine room. Refer to the "**Engine Room**" portion of **Section 9** for the exact location of this seacock.
6. Turn the waste tank selector Y-valve to the forward waste tank position. The Y-valve is located in the port forward corner of the engine room, above the aft waste tank.
7. Switch the Main - One circuit breaker on the Safety Breaker Panel "ON."
8. On the DC Control Center, switch the System DC Main circuit breaker "ON," then switch the Forward Waste Pump circuit breaker "ON."
9. Turn the waste pump switch "ON." The switch is located in the engine room above the aft waste tank, next to the Y-valve.
10. When a steady stream of antifreeze flows from the overboard discharge fitting, turn the waste pump switch "OFF."
11. Turn the waste tank selector Y-valve to the aft waste tank position.
12. Repeat steps 9 and 10 for the aft waste tank.
13. Close the overboard discharge seacock.
14. Switch the Forward Waste Pump circuit breaker on the DC Control Center "OFF."
15. When you remove your boat from storage and prepare to use it again, flush and pump out the waste tanks to remove the antifreeze.

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 and sanitation systems.

Refer to the **"Grey Water Holding System"** portion of **Section 4** 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.

Standard System

1. Empty the grey water tanks as described in the **"Grey Water Holding System"** portion of **Section 4**. Remove as much of the fresh water used in flushing the tanks as possible.
2. Turn the "house" battery bank master disconnect switch to the "ON" position.
3. Switch the forward and aft Auto Sump circuit breakers on the Safety Breaker Panel "ON."



WARNING

You must use an approved antifreeze in your boat's grey water holding system. Refer to the SeaLand Technical Bulletin at the end of this section for information on the proper type of antifreeze to use. 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 either the Carver Limited Warranty or the grey water holding system OEM's warranty.

4. Pour 5 gallons of nontoxic recreational vehicle antifreeze through the forward and aft shower drains.
5. When you remove your boat from storage and prepare to use it again:
 - a. Pour 5 gallons of fresh water through each shower drain.

- b. Empty the grey water tanks as described in the **"Grey Water Holding System"** portion of **Section 4**.
- c. Charge the grey water tanks by adding deodorizer. Use the brand of deodorizer recommended by your Carver Dealer.

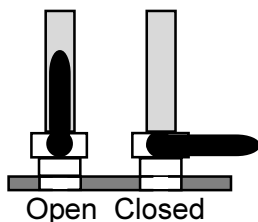
Overboard Discharge System

1. Empty the grey water tanks as described in the **"Grey Water Holding System"** portion of **Section 4**. Remove as much of the fresh water used in flushing the tanks as possible.
2. Under the boat, place a large bucket beneath the waste tank overboard discharge fitting to collect antifreeze pumped out later in this procedure. Refer to the **"Thru-Hull Fittings"** portion of **Section 9** for the location of the overboard discharge fitting.
3. Turn the "house" battery bank master disconnect switch to the "ON" position.
4. On the Safety Breaker Panel, switch the forward and aft Auto Sump circuit breakers "ON," then switch the Main - One circuit breaker "ON."



WARNING

You must use an approved antifreeze in your boat's grey water holding system. Refer to the SeaLand Technical Bulletin at the end of this section for information on the proper type of antifreeze to use. 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 either the Carver Limited Warranty or the grey water holding system OEM's warranty.



5. Pour 5 gallons of nontoxic recreational vehicle antifreeze through the forward and aft shower drains.
6. Open the waste tank overboard discharge seacock. The seacock is located in the port forward area of the engine room. Refer to the **"En-**

gine Room" portion of **Section 9** for the exact location of this seacock.

7. Turn the waste tank selector Y-valve and grey water tank selector Y-valve to the forward grey water tank position.
8. On the DC Control Center, switch the System DC Main circuit breaker "ON," then switch the Forward Waste Pump circuit breaker "ON."
9. Turn the waste pump switch "ON." The switch is located in the engine room above the aft waste tank, next to the waste tank selector Y-valve. Refer to the **"Engine Room"** portion of **Section 9** for the exact location of the switch.
10. When a steady stream of antifreeze flows from the overboard discharge fitting, turn the waste pump switch "OFF."
11. Turn the waste tank selector Y-valve and grey water tank selector Y-valve to the aft grey water tank position.
12. Repeat steps 9 and 10 for the aft grey water tank.
13. Close the waste tank overboard discharge seacock.
14. Switch the Forward Waste Pump circuit breaker on the DC Control Center "OFF."
15. When you remove your boat from storage and prepare to use it again:
 - a. Pour 5 gallons of fresh water through each shower drain.
 - b. Empty the grey water tanks as described in the **"Grey Water Holding System"** portion of **Section 4**.
 - c. Charge the grey water tanks by adding deodorizer. Use the brand of deodorizer recommended by your Carver Dealer.

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.

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.

Storage

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.

Dry 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.

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 accumulator packets 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 or aft deck 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.

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.

IMPORTANT ANTIFREEZE BULLETIN

SeaLand Technical Bulletin
TECHNOLOGY, INC.

P.O. Box 38, Fourth Street, Big Prairie, Ohio 44611 • Telephone: 216/496-3211 In Ohio • 800/321-9889 • Fax: 216/262-1727

Bulletin Number: VF-005
Effective: February 15, 1990

SANITATION HOSE MALODOR: ALCOHOL ANTIFREEZE

Affected Installations: Any pleasure craft sanitation systems utilizing SeaLand heavy duty, smooth wall hose (identified with "SeaLand" marked in blue on outer surface).

Symptoms: A strong malodor is evident from a non-specific source. No indication of leakage or a loose fitting is present.

Cause: SeaLand heavy duty, smooth wall sanitation hose is especially formulated with a malodor resistant ingredient. This ingredient is designed to prevent malodor molecules from permeating the hose wall. If an alcohol based antifreeze is used, the malodor resistant ingredient in the hose is removed and failure will result sometime later.

One brand which has been found to definitely cause this type of failure is **ARTIC BAN** from Camco Manufacturing Company. This statement is supported by gas chromatography and scanning electron microscopy studies at the Institute of Polymer Science, University of Akron.

Note: Other liquids such as petroleum solvents, fuels and pine oil cleaners will also produce similar results.

Troubleshooting: 1.) Carefully inspect all fittings and joints to assure malodor is not coming from a loose fitting or hose joint. 2.) With a clean paper towel or cloth, rub the outside of the hose. At regular intervals check the cloth to determine if malodor has been transferred to cloth or paper. 3.) Determine if boat has been winterized using antifreeze, and if so, determine the type. SeaLand can verify if the hose has failed due to chemical attack by examination of a small sample.

Corrective Action: Once a hose has been degraded by exposure to an alcohol based antifreeze, it cannot be repaired. The only remedy is to replace the contaminated hose. It is clearly stated in the SeaLand Owner's Manuals that alcohol based products should never be used (see exhibit on reverse side). Hose failure for this reason is considered misuse and is not covered by SeaLand's warranty policy.

The recommended antifreeze is propylene glycol base without alcohol. Brands recommended by SeaLand are listed on the reverse side.

Information concerning proper hose care should be given to all boat owners. An information card with this information is enclosed. Instructions for ordering copies are on the card.

Winterizing

At the end of each boating season, the VacuFlush® system must be winterized for storage. The following procedure should be used:

CAUTION: DO NOT use chlorine, alcohol or alcohol based products in the system.

1. Thoroughly flush system with fresh water.
2. Pump out holding tank.
3. Shut off water supply to toilet(s), remove water line.
4. Press flush lever until all water is drained from toilet.
5. For each toilet, flush 4 gallons of permanent type anti-freeze and water in a 50:50 mixture through toilet. Each installation is different so amounts may vary. User discretion is required to assure adequate protection.
6. Turn off electrical power.

Maintenance

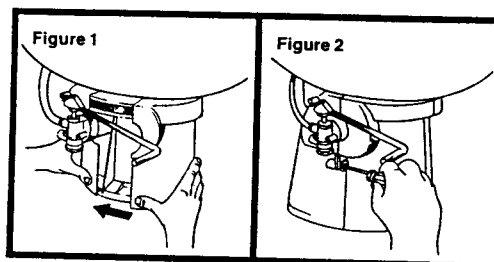
SeaLand Technology has endeavored to provide the boatowner with a toilet system which provides "at home" convenience and reliability. As with any quality product, satisfactory use depends on proper maintenance.

Maintenance intervals and normal parts replacement vary widely depending on numerous factors such as; type of vessel, frequency of system use, quality of flushing water, etc. The chart below is intended strictly as a general guideline. Owner discretion and consideration of actual usage must be the first basis for determining proper maintenance levels.

Pedestal Cover Installation

Before installing pedestal and pedal covers, unit must be mounted to floor flange and water supply line connected.

1. Install pedestal cover around base and snap bottom into place (see Figure 1).
2. **Tall base unit only.** Install (2) mounting screws (see Figure 2).
3. Slide pedal cover onto foot pedal rod (see Figure 3).
4. Attach pedal cover side plate and secure with (2) mounting screws (see Figure 4). For short base units, secure front screw, then press foot pedal down completely to secure second screw.
5. To remove, reverse above procedure.



RECOMMENDED ANTIFREEZE PRODUCTS

"WINTER-PRUF"

CENTURY CHEMICAL PRODUCTS
28790 C.R. 20 W.
P.O. Box 1442
Elkhart, IN 46515

219/293-9521
800/348-3505 (Outside Indiana)

Fax: 219/522-5723

"FREEZE BAN"

CAMCO MANUFACTURING, INC.
121 Landmark Dr.
Greensboro, NC 27409-9626

919/668-7661
800/334-2004

Fax: 919/668-2049

Spring Recommissioning Checklist

Before launching your boat, complete the following.

Hull

- ☐ Remove old anti-fouling bottom paint
- ☐ Fill nicks and gouges
- ☐ Inspect props, struts, rudders
- ☐ Inspect thru-hull fittings
- ☐ Apply new anti-fouling bottom paint
- ☐ Buff out minor hull scratches
- ☐ Remove dirt, stains
- ☐ Apply wax

Deck and Cabin

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

Engines

- ☐ Follow manufacturer's recommissioning guidelines
- ☐ Check crankcase, transmission oil levels
- ☐ Inspect belts, hoses
- ☐ Tune-up engines
- ☐ Replace fuel filters

Electrical System

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

Plumbing

- ☐ Purge antifreeze
- ☐ Replace taste/odor filters
- ☐ Inspect, lubricate seacocks
- ☐ Inspect, repair heads
- ☐ Chemically charge waste and grey water tanks
- ☐ Fill fresh water tanks

Safety Equipment

- ☐ Inspect PFDs
- ☐ Replace old distress signals
- ☐ Inspect fire extinguishers
- ☐ Inspect, test bilge pumps
- ☐ Inspect mooring lines, fenders

After launching your boat, complete the following.

- ☐ Check for engine cooling water flow
- ☐ Check propeller shaft alignment
- ☐ Check propeller shaft seals
- ☐ Have compass professionally readjusted

NOTES

NOTES

NOTES

Warranty and Parts

Warranty Information	202
Carver Dealer's Responsibilities	202
Owner's Responsibilities	202
Obtaining Warranty Service	203
Second and Third Owner Registration	204
Hull Identification Number	204
OEMs	205
Serial Number Record Sheet	212
Specifications	213
Component Locations	213
Interior Hatches	214
Deck Plates	216
Thru-Hull Fittings	217
Engine Room	219
Bill of Material	224
Carver Limited Warranty	226

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.

Carver Dealer's Responsibilities

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.

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.

Boat and Systems Review

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

Owner's Responsibilities

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.

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.*

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.

Owner's Information Kit

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

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

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 Dealership is staffed with knowledgeable professionals who are familiar with your boat and are capable of providing the highest level of service. The Carver Dealership service personnel will communicate with the Carver Boat Corporation to ensure that you receive fast and satisfactory solutions to any problem that may arise.

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.

Hull Identification Number

The United States Coast Guard has established a universal system of numerically identifying vessels by using a hull identification number (HIN). This number consists of 12 alphanumeric characters and identifies the boat's make, model, hull number, and month and year of manufacture.

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

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 OEM of the system or component.

The OEMs used by Carver are listed below. When contacting an OEM for information, be ready to provide the component's serial number. A Serial Number Record Sheet is provided after the OEM list. Use this sheet as a convenient location to record the serial numbers for your boat's OEM components.

Engines

Mercury Marine

3003 N. Perkins Road
Stillwater, OK 74074
(405) 743-6566

Thermo-Electron/Crusader Corporation

7100 E. 15 Mile Road
Sterling Heights, MI 48312
(810) 264-1200

Volvo Penta of North America

1300 Volvo Penta Drive
Chesapeake, VA 23320
(804) 436-5100
Fax (804) 436-5313

Cummins Engine Company

875 Lawrence Drive
DePere, WI 54115
(414) 337-1991

Fuel Filters**Racor Industries, Inc.**

P.O. Box 3208
Modesto, CA 95353
(209) 521-7860

Drive Systems**Walters Machine Company**

84-98 Cambridge Avenue
Jersey City, NJ 07307
(201) 656-5654

Velvet Drive Transmissions

200 Theodore Rice Blvd.
New Bedford, MA 02745
(508) 979-4800

ZF Industries

Attn: Marine Dept.
777 Hickory Hills Drive
Vernon Hills, IL 60061
(847) 634-3500

Generators**Kohler Generators / Kohler Company**

444 Highland Drive
Kohler, WI 53044
(414) 565-3381

Onan Corporation

1350 73rd Avenue N.E.
Minneapolis, MN 55432
(612) 574-5000

Westerbeke Corporation

41 Ledin
Avon, MA 02322
(508) 588-7700

Steering Systems**TD Electronics**

P O Box 2455
Loves Park, IL 61132-0455
(815) 633-9232

Teleflex Steering Systems

640 N. Lewis Road
Limerick, PA 19468
(610) 948-5100

Heads**ITT Jabsco**

152 South West 8th St.
Miami, FL 33130

Raritan Engineering Corporation

P.O. Box 1157
530 Orange Street
Millville, NJ 08332
(609) 825-4900

SeaLand Technology, Inc.

P.O. Box 38
4th Street
Big Prairie, OH 44611
(800) 321-9886

Water Heaters**Raritan Engineering Corporation**

P.O. Box 1157
530 Orange Street
Millville, NJ 08332
(609) 825-4900

SeaWard Products

3721 Capitol Drive
Whittier, CA 90601
(310) 699-7997

Air Conditioners**Marine Air Systems**

2000 N. Andrews Avenue Extension
Pompano Beach, FL 33069
(954) 973-2477

Trim Tabs**Bennett Marine Inc.**

550 N.W. 12th Avenue
Deerfield Beach, FL 33442
(305) 427-1350

Boat Leveler Company

7305 Natural Bridge
St. Louis, MO 63121
(314) 385-7470

Entertainment Equipment**JVC Service & Engineering Company of
America - Div. of JCV Corporation**

107 Little Falls Rd.
Fairfield, NJ 07004
1-800-537-5722
(110 volt stereo system)

Capitol Sales Co.

3110 Neil Armstrong Blvd.
Eagan, MN 55121
1-800-545-2672
(Quasar TV)

Marine Audio Sales

16137 Westwoods Business Park
Ellisville, MO 63021
(314) 394-2631
(12 volt Clarion AM/FM/CD stereo system)

Battery Chargers**Professional Mariner**

2970 Seaborg Ave.
Ventura, CA 93003
(805) 644-1886

Guest Corporation

95 Research Parkway
Meridin, CT 06450
(203) 235-4421

Charles Marine Products

5600 Apollo Drive
Rolling Meadows, IL 60008
(847) 806-6300

Refrigerators and Ice Makers**Norcold Inc. (Division of Stolle Co.)**

P.O. Box 4248
2655 Cambell Rd.
Sidney, OH 45365
1-800-543-1219

Nova Kool Mfg., Inc.

1457 Barrow St.
North Vancouver, B.C.
Canada V7JIB6
(604) 984-7794

Raritan Engineering Corporation

P.O. Box 1157
530 Orange Street
Millville, NJ 08332
(609) 825-4900

General Electric Company

Consumer Affairs Dept.
Appliance Park
Louisville, KY 40225
1-800-626-2000

Sub-Zero

1-800-222-7820

Ranges and Microwaves**SeaWard Products**

3721 Capitol Drive
Whittier, CA 90601
(310) 699-7997

Miscellaneous Accessories**Teleflex Marine, Inc.**

1816 57th Street
Sarasota, FL 34243
(941) 355-7721
(Instruments)

**Teleflex Marine
Mechanical Products**

640 North Lewis Rd.
Limerick, PA 19468
(610) 948-5100
(Controls)

Teleflex of Canada LTD

3831 No. 6 Road
Richmond, British Columbia
Canada V6V 1P6
(604) 270-6899
(Steering)

Beede Electrical Instrument Co.

P O Box 8910
Penacook, NH 03303-8910
(800) 451-8255
(Gauges)

Guest Company, Inc.

95 Research Parkway
Meriden, CT 06450
(203) 235-4421
(Spotlights)

NW Controls Inc.

P O Box 325
Harleysville, PA 19438
(610) 287-7871
(Shift Cables)

ITT Jabsco

152 South West 8th St.
Miami, FL 33130
(7" and 8" Spotlights)

E.S. Ritchie & Sons Inc.

P.O. Box 548
243 Oak Street
Pembroke, MA 02359
(617) 826-5131
(Compass)

Alson Corporation

42 Union Street
Hillsdale, MI 49242
(517) 439-1411
(Shower Controls)

Maxwell Winches, Inc.

1610 Babcock St.
Costa Mesa, CA 92627
(949) 631-2634
(Winches)

Sea-Fire**Division of Metalcraft, Inc.**

9331-A Philadelphia Road
Baltimore, MD 21237
(410) 687-5500
(Halon System)

MTI Industries**Division of Marine Technologies, Inc.**

1000 Brown Street
Suite 107
Wauconda, IL 60084
1-800-383-0269
(CO Detector)

Bomar, Inc.

South West Street
P.O. Box W
Charlestown, NH 03603
(603) 826-5791
(Hatches)

Aluminum 2000, Inc.

595 East Oregon Road
Lititz, PA 17543
(717) 569-2300
(Doors and Windshields)

Trend Marine Products

Catfield
Great Yarmouth
Norfolk NR29 5BG
United Kingdom
011-69-258-2550

Fireboy Xintex Safety System**Division of Consolidated Marine Products**

100 Commerce SW
Grand Rapids, MI 49508
(616) 454-8337
(Halon System)

**Serial Number
Record Sheet**

Specifications

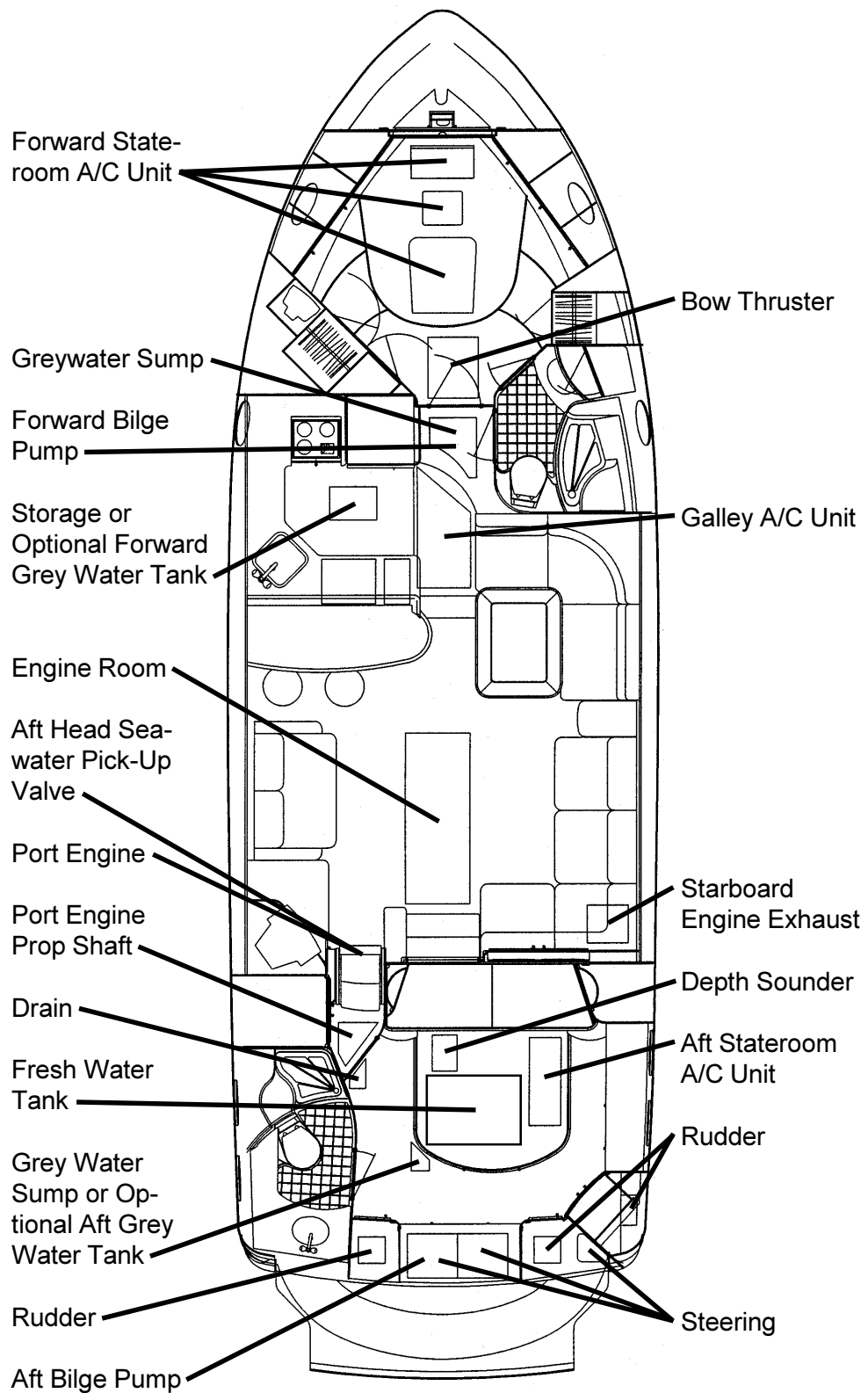
The specifications listed here are based on a standard model with no options installed. Certain options may change some of these specifications.

Length Overall (LOA) with boarding platform	46'11" (14,30 m)
Beam	14'11" (4,55 m)
Bridge Clearance (waterline to arch)	19'5" (5,92 m)
Draft	42.5" (1,08 m)
Weight (estimated, with fuel and water)	37,000 lbs (16783,20 kg)
Fresh Water Capacity	130 U.S. gal. (492,1 liters)
Hot Water Capacity	20 U.S. gal. (75,71 liters)
Waste Capacity	80 U.S. gals (302,83 liters)
Fuel Capacity	480 U.S. gal. (1816,99 liters)
Cabin Headroom	6'4" (1,93 m)
Sleeps	6 (8 optional)

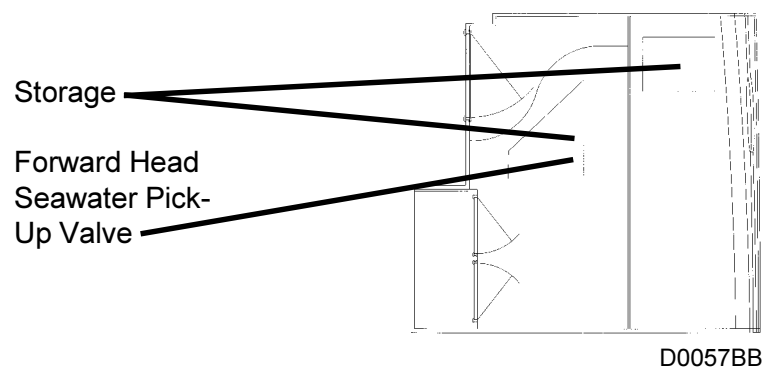
Component Locations

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

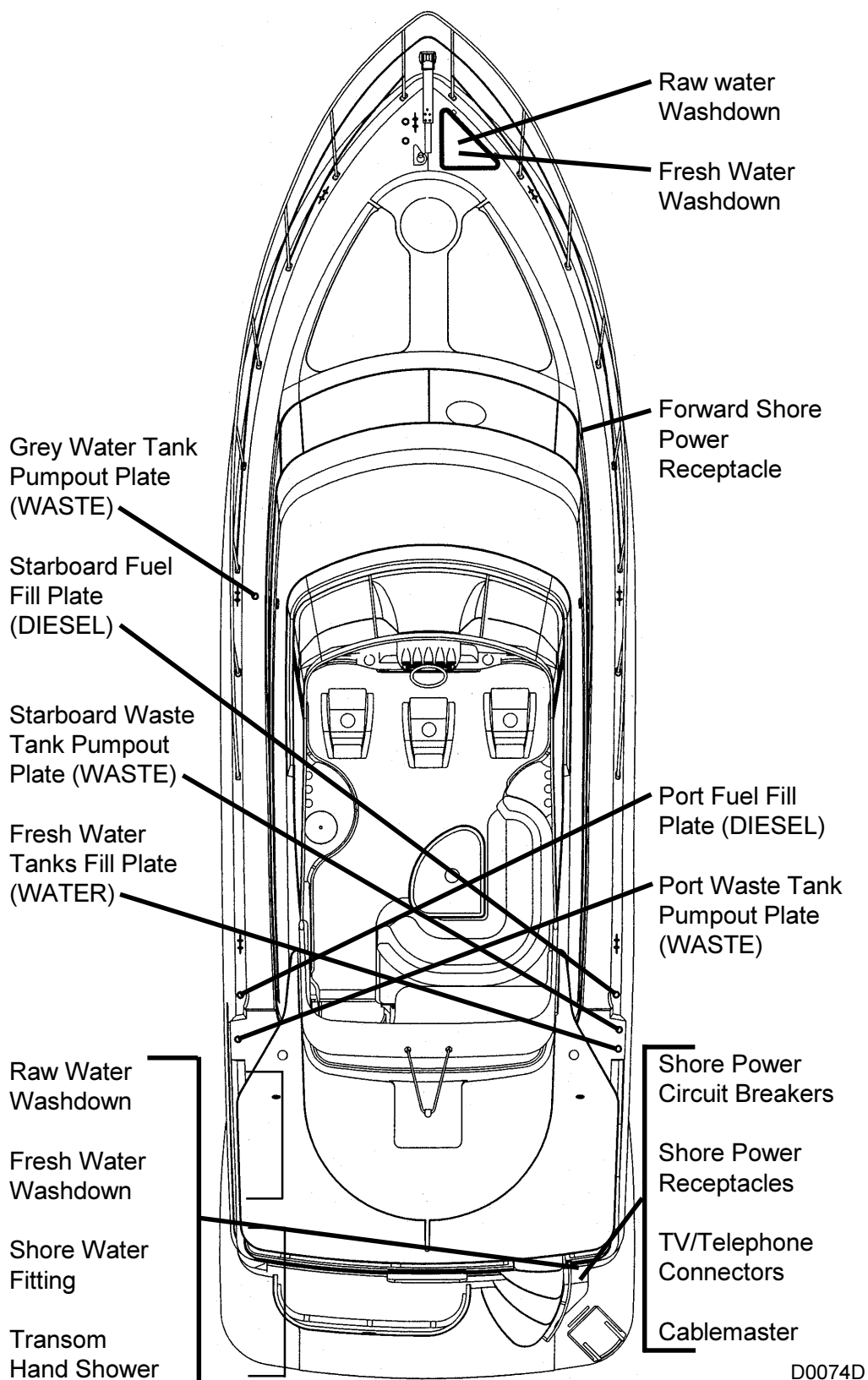
Interior Hatches

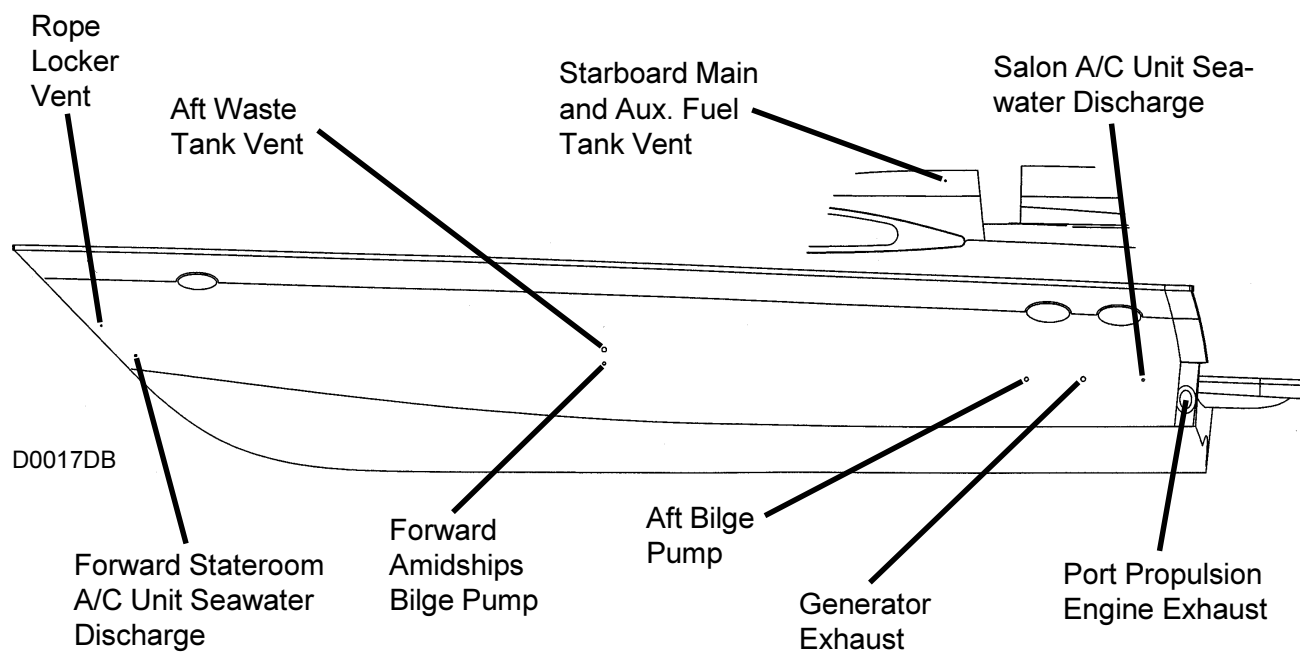
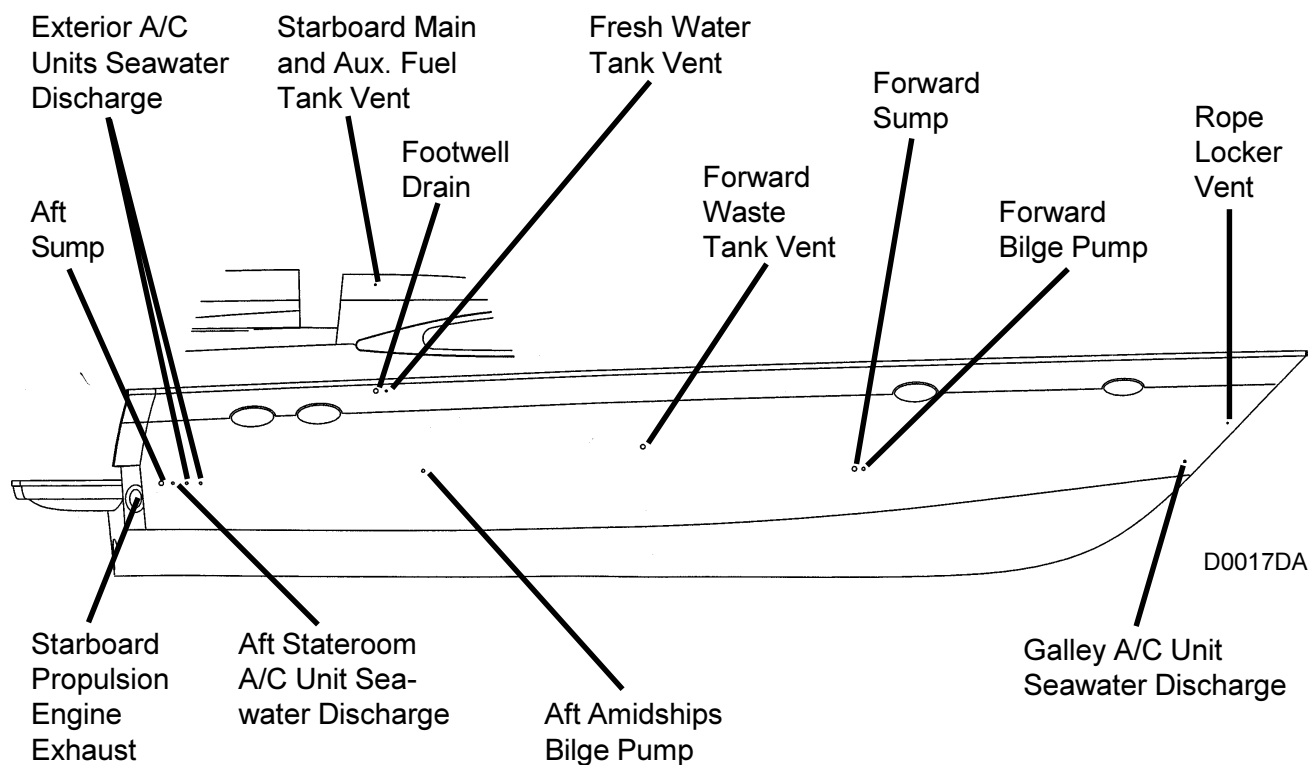


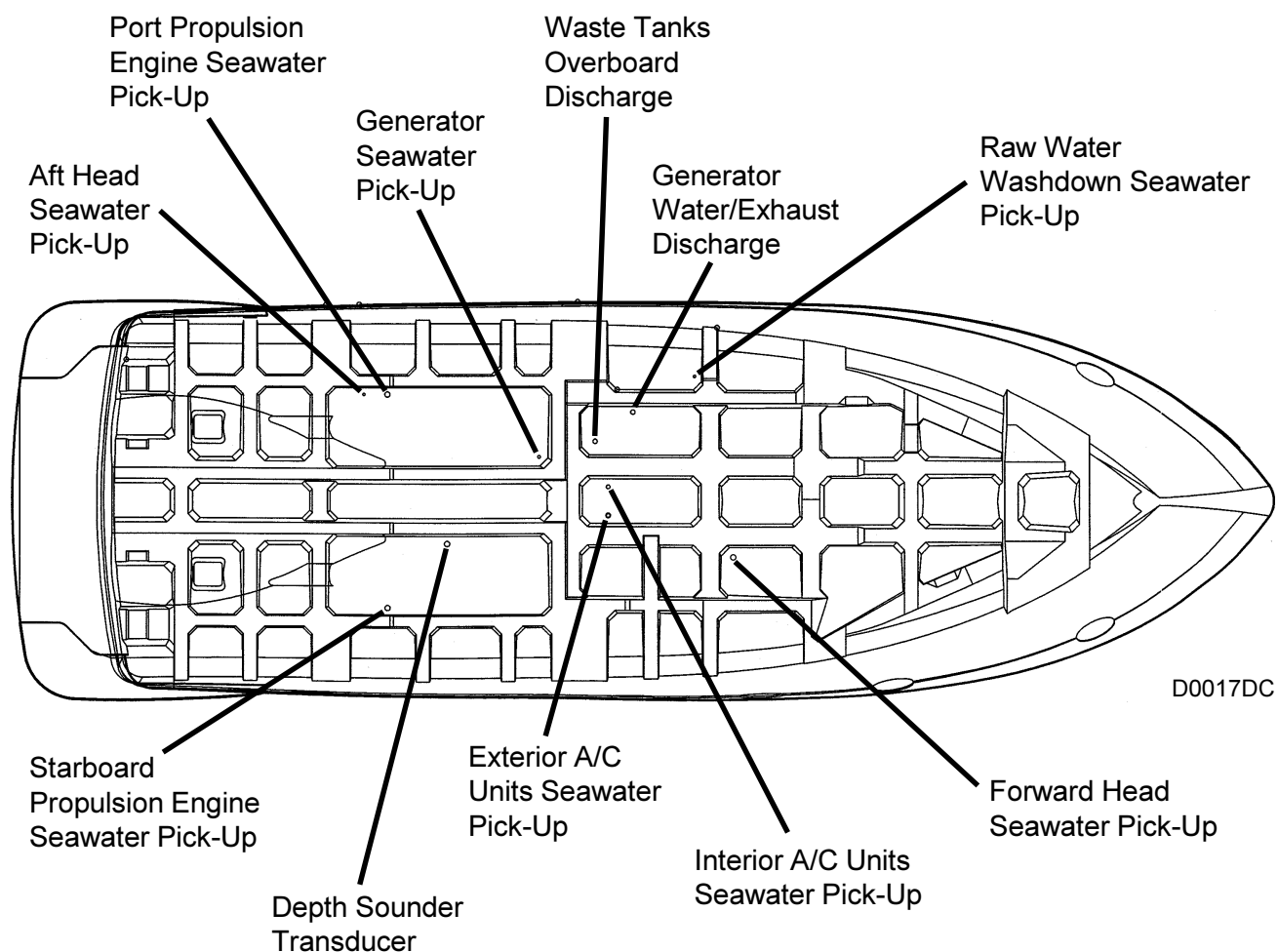
D0057BA

MID STATEROOM

Deck Plates



Thru-Hull Fittings

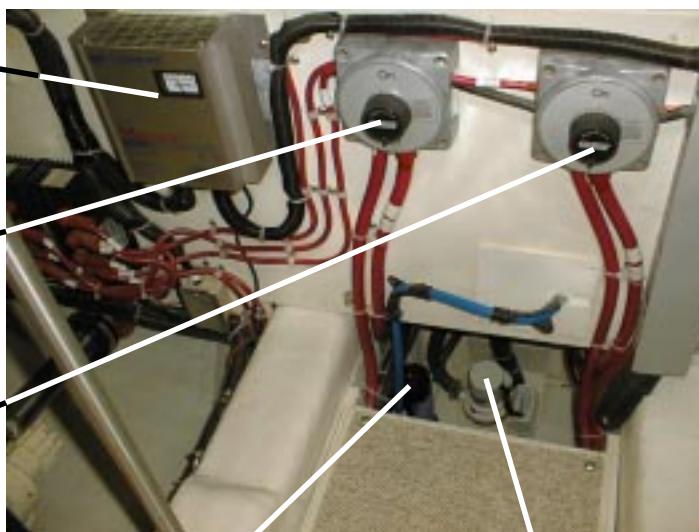


Engine Room**MIDDLE AFT BULKHEAD**

Engine/Generator
Battery Charger

Starboard Engine
Battery Master
Disconnect Switch

Port Engine
Battery Master
Disconnect Switch



Pressure
Water Pump

Aft Amidships
Bilge Pump

PIC00001

AFT OF STARBOARD ENGINE

Starboard Engine
Cooling System
Seacock



PIC00002

AFT OF PORT ENGINE

Port Engine
Cooling System
Seacock



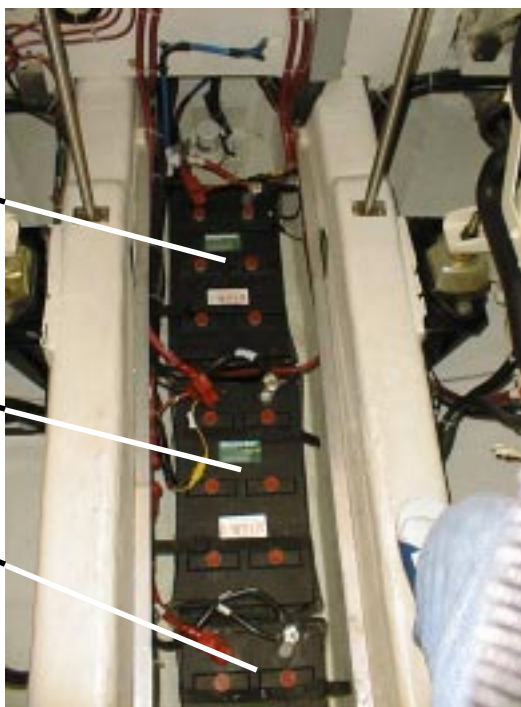
PIC00003

AFT ON CENTERLINE

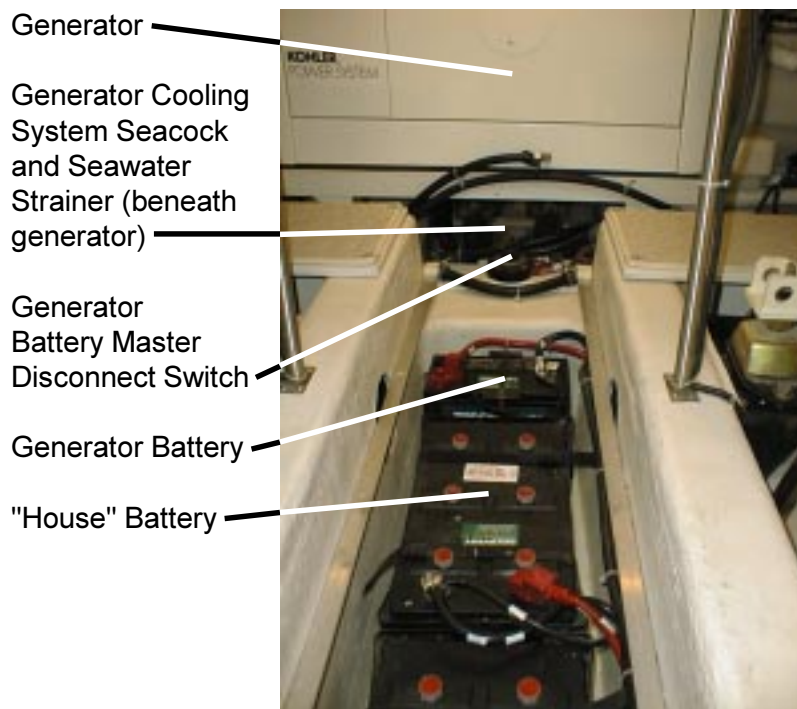
Starboard Engine
Battery

Port Engine
Battery

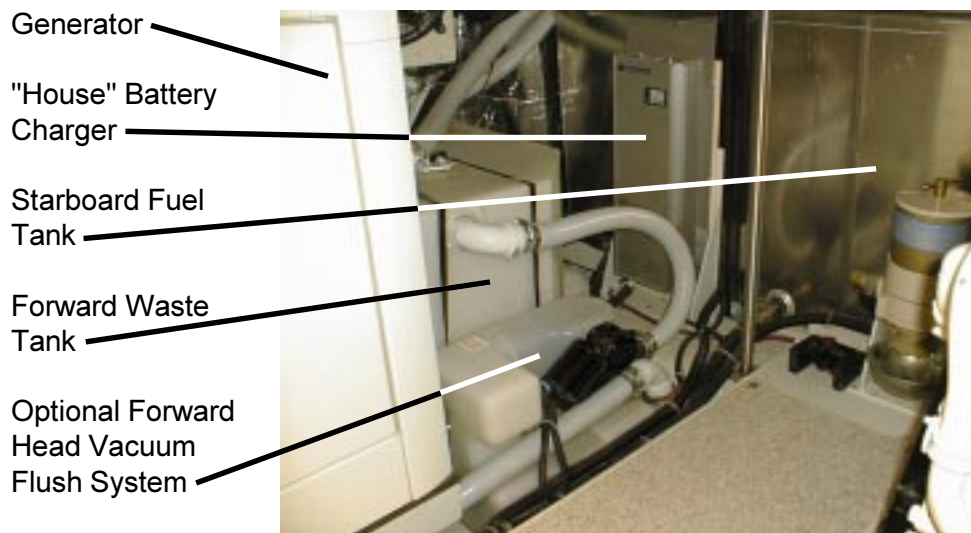
"House" Battery



PIC00004

FORWARD ON CENTERLINE

PIC00005

STARBOARD FORWARD CORNER

PIC00006

FORWARD OF PORT ENGINE - INBOARD

Port Engine
Cooling System
Seawater Strainer

Port Engine



PIC00007

FORWARD OF PORT ENGINE - OUTBOARD

Optional Raw
Water Washdown
System Seacock

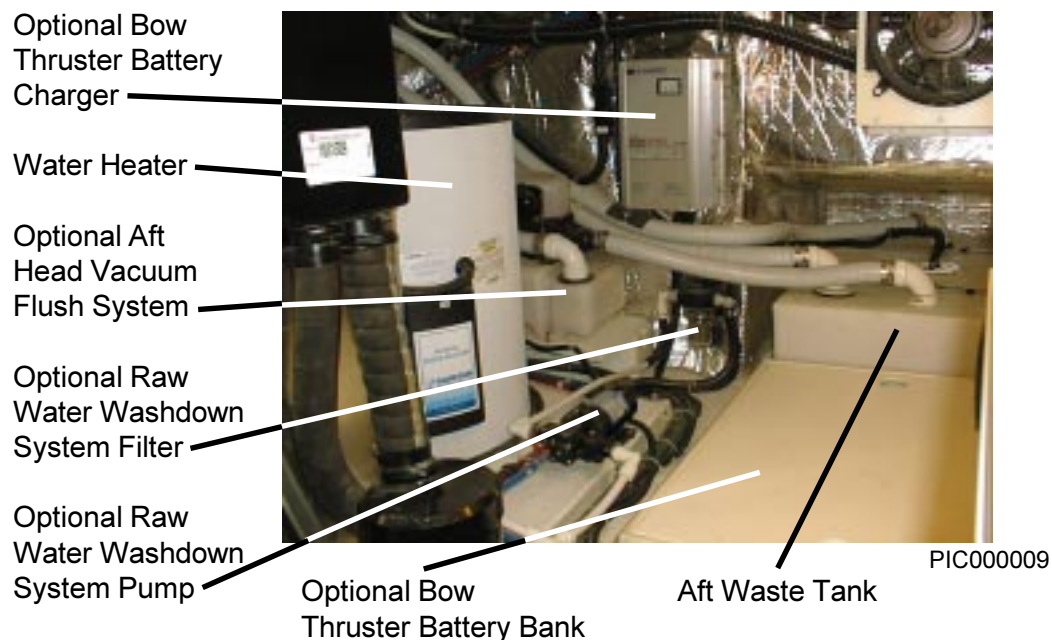
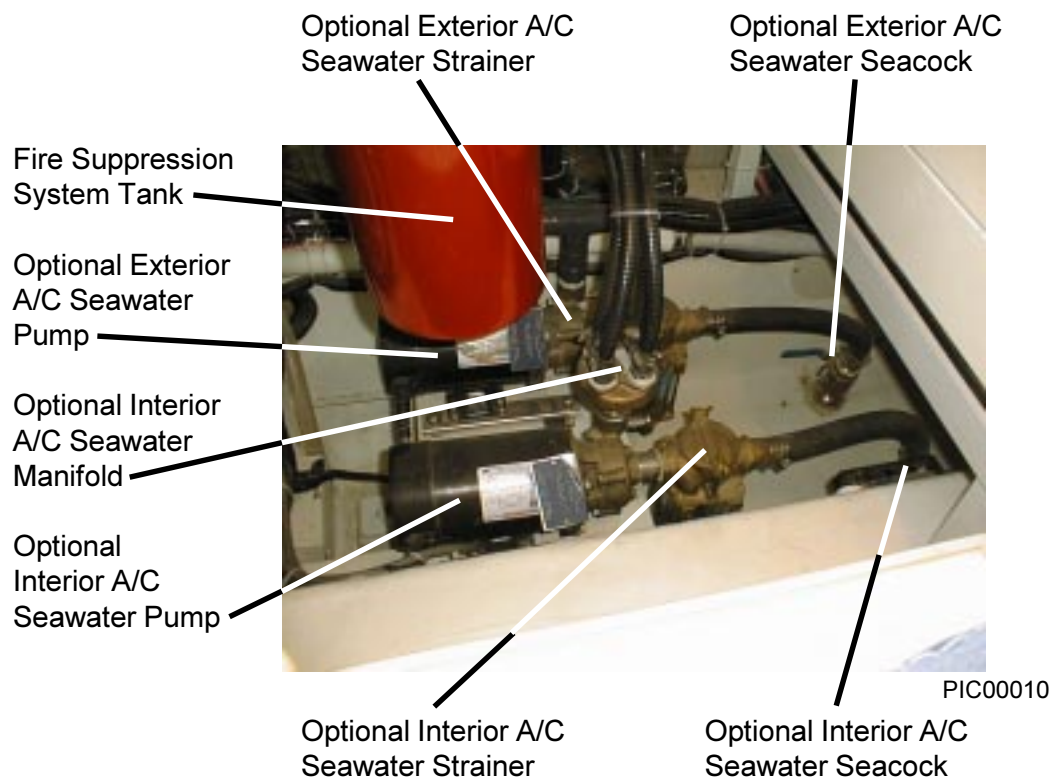
Optional Engine
Oil Change
System

Optional Bow
Thruster Battery
Bank Master
Disconnect Switch

Generator Cooling
System Seawater
Outlet Seacock



PIC00008

PORT FORWARD CORNER**FORWARD OF GENERATOR**

Bill of Material

Any component that begin with a letter or have 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

Category Number	Part Description
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

Carver Limited Warranty

NOTES

A

Abandon ship 7
AC power available indicator 67
 Exterior air conditioning 77
AC power selector 67
 Exterior air conditioning 76
AC reverse polarity 68, 78
AC wiring schematic 87
Accessory OEMs 209
Air conditioning
 Aft deck 79
 Aft stateroom 74
 Bridge 79
 Forward stateroom 73
 Manifold 223
 OEMs 207
 Reverse cycle mode 92
 Salon 74
 Seawater seacock 95, 223
 Seawater strainer 223
 Water pump 73, 78, 95, 223
Ammeter (AC) 65
 Exterior air conditioning 76
Auto bilge pump 43
Auto pilot 42
Auto sump 43

B

Batteries 23
 Bow thruster 223
 Cables 48
 Correct voltage 48
 Electrolyte 47
 Engine 220
 "House" 220
 Inspection 47
 Maintaining 47, 174
Battery charger
 Engine/generator 29, 47, 218
 Bow thruster 30, 70, 223
 "House" 221
 OEMs 208
Battery master disconnect switch
 Bow thruster 27, 222
 Engines 26, 218
 Generator 27, 221
 "House" 27
Bilge blowers 38
Bilge pumps 8, 36, 43
 Aft 103, 214

 Aft amidships 218
 Amidships 104
 Automatic operation 104
 Forward 103, 214
 Manual operation 105

Bilges

 Aft 103
 Forward 103
Boarding ladder 3
Boarding platform 3
Boat and systems review 202
Boat delivery 203
Bridge accessories 39
Bridge DC main 35
Bridge power hatch 42
Buss bars 56, 83

C

Capsized boat 8
Central vacuum 70
Certificate of number 15
Charts 3, 142
Checking headway 147
Circuit breakers 63
Close quarters turns 147
CO detector 44
Coffee maker 69
Compass 142

D

Depth sounder 143
Direct overboard waste discharge 111
Dishwasher 72
Distress signals - visual 12
Dockside waste discharge 107
Drive system OEMs 206

E

Electric heads 45
Electric shift 46
Engines
 Antifreeze 124
 Batteries 28
 Battery charger 47
 Battery master disconnect switch 26, 218
 Cooling system seacock 219, 220
 Cooling system seawater strainer 222
 OEMs 205
 Oil change system 222

 Pre-start checklist 136
 Synchronizer gauge 133
 Temperature alarm 130
 Temperature gauge 125, 129

Engine/fuel log 16

Entertainment center

 Master stateroom 69
 Salon 72

Entertainment equipment
 OEMs 208

F

Fire extinguishers 2
 use 7
Fire response plan 6
Float plan 3, 18
Freezer - galley 72
Fresh water system
 Draining 181
 Preparing for use after winter 184
 Shore water fitting 216
 Showers 99
 Tank monitor 35
 Transom hand shower 100, 216
 Winterizing 182
Fresh water washdown 100, 216
Fuel filter OEMs 206
Fuel gauges 131
Fuel system - gas 123
Fueling 2

G

Gelcoat 162
 Blisters 163
 Repair 163
 Stress cracks 163
Generator
 Battery master disconnect switch 27, 221
 Cooling system 222
 Cooling system seacock 221
 Cooling system seawater outlet 219, 222
 Cooling system seawater pick-up 219
 Cooling system seawater strainer 221
 Layout 61
 OEMs 206

Generator running indicator 68
 Exterior air conditioning 78
 GFCI receptacles 79
 Locations 80
 Testing 80
 GPS/Loran log 16
 Grey water system
 Dockside discharge 112
 Overboard discharge 113

H

Heads 45
 Electric 106
 Vacuum 106
 OEMs 207
 Horn 142
 "House" battery 31
 Master disconnect switch 26
 Hypothermia 10

I

Icemaker OEMs 209

L

Landing at a pier 145
 Leaving a mooring 144
 Leaving a pier 144
 Lifesaving equipment 2
 Local ordinances 18
 Logs 15

M

Maintenance
 Type A 158
 Type B 158
 Type C 158
 Type D 158
 Log 15
 Manual sump 46
 MAYDAY message 16
 Microwave 69
 OEMs 209
 Mooring 150

N

Navigation lights 13, 34
 Navigation log 15
 Neutral safety switch 132

O

OEM components 203
 Oil change system
 45, 124, 125, 128
 Oil pressure alarm 130
 Oil pressure gauge 130
 Overboard waste discharge 109
 Owner's information kit 203

P

Panel lights 34
 Personal flotation devices 5
 Picking up a mooring 145
 Planing hull 152
 Plotter/GPS 41
 Pre-delivery service procedure 202
 Pre-delivery service record 202
 Pressure water pump
 37, 98, 218
 Propane 35
 Safety 115

R

Radar 41
 Reflectors 6
 Radio log 15
 Range - galley 71
 OEMs 209
 Raw water washdown 216
 Ray data repeater 41
 Receptacles
 Exterior 69
 Galley 68
 GFCI receptacles 79
 Guest stateroom 68
 Master stateroom 71
 Salon 71
 Refrigerator 40
 Bridge 73
 Galley 72
 OEMs 209
 Running lights 13

S

Sanitation system
 Aft waste tank 223
 Forward waste tank 221
 Head seawater pick-up 219
 Overboard discharge 219
 Guest stateroom waste monitor 35, 37

Sea anchor 6, 8
 Select load switch 67
 Select voltage switch 65
 Shallow water operation 143
 Shift/throttle 46
 Shore power 22
 Circuit breakers 216
 Receptacle selector switch 64

Shore water fitting 216
 Showers 99
 SLING tags 180
 Speed log 143
 Spot light 35
 State ordinances 18
 Station wagon effect 21
 Steering system OEMs 207
 Stereo memory 45
 Storage cradle 180
 Sump pump 43
 Swamped boat 8

T

Tachometer 128
 Telephone connectors 216
 Tow line 9
 Towing 148
 Tracking
 Astern 146
 Forward 146
 Transom hand shower 100, 216
 Trash compactor 69, 71
 Trim tabs 37
 OEMs 208
 TV connector 216

V

VHF radio 41
 Visibility 3
 Voltmeter 28
 AC 65
 Engine 131
 Exterior air conditioning 75
 Fresh water washdown 100, 216

W

Warranty information 202
 Washdowns
 Raw water filter 223
 Raw water pick-up 219
 Raw water pump 223
 Raw water seacock 222

INDEX

Washer 70
Waste system - *see* Sanitation
system
Water heater 23, 71, 223
OEMs 207
Water survival chart 10
Water system - *see* Fresh water
system
Weather 2
Weather signals 4
White vinyl - cleaning 166
Windlass 46
Windshield wipers 37, 38

Z

Zinc anodes 83