

OWNER'S MANUAL

95-96

CRUISERS
SPORT BOATS
DECK BOATS



JP-20

CHAPARRAL BOAT OWNER'S MANUAL — Table of Contents

INTRODUCTION.....1

Welcome Aboard!	1-1
About This Manual	1-1
Construction and Standards	1-2
Responsibilities	1-3
Laws and Regulations	1-4
Owner's Logs and Records	1-6
Warranty	1-6
Boat Data Record	1-7
Travel Plan Log	1-8
Fuel Usage Chart	1-9

BOATING SAFETY.....2

Hazard Communication	2-1
Owner Advisory Statements	2-1
Safety Recommendations	2-1
Safety Equipment	2-3
Running and Navigation Lights	2-5
Safety Afloat	2-5
Water Sports	2-9
Hazard Communication Labels	2-11
Navigational Aids Chart	2-14

SYSTEMS, SPORT BOATS.....3

Electrical Systems	3-1 _{SB}
Fuel System	3-4 _{SB}
Fresh Water System	3-4 _{SB}
Marine Sanitation Devices	3-6 _{SB}

SYSTEMS, DECK BOATS.....3

Electrical Systems	3-1 _{DB}
Fuel System	3-3 _{DB}
Fresh Water System	3-3 _{DB}
Marine Sanitation Devices	3-4 _{DB}

SYSTEMS, CRUISERS.....3

Electrical Systems	3-8 _C
Fuel System	3-14 _C
Fresh Water System	3-14 _C
Marine Sanitation Devices	3-16 _C

COMPONENTS, SPORT BOATS.....4

Dashboard and Instrument Panel	4-1 _{SB}
Steering	4-2 _{SB}
Throttle	4-2 _{SB}
Power Trim	4-2 _{SB}
Refrigerator (Optional)	4-2 _{SB}
Stove	4-3 _{SB}
Automatic Fire Extinguisher	4-3 _{SB}
Bilge Pump	4-4 _{SB}
Bilge Blower	4-4 _{SB}
Running or Navigation Lights	4-4 _{SB}
Stereo	4-4 _{SB}

COMPONENTS, DECK BOATS.....4

Dashboard and Instrument Panel	4-1 _{DB}
Steering	4-2 _{DB}
Throttle	4-2 _{DB}
Power Trim	4-2 _{DB}
Automatic Fire Extinguisher	4-2 _{DB}
Bilge Pump	4-3 _{DB}
Bilge Blower	4-3 _{DB}
Running or Navigation Lights	4-3 _{DB}
Stereo	4-4 _{DB}

Table of Contents continued on next page.

COMPONENTS, CRUISERS.....4

Dashboard and Instrument Panel.....	4-1c
Controls	4-2c
Generator (Optional).....	4-2c
Air Conditioner (Optional)	4-3c
Water Heater (Optional).....	4-4c
Refrigerator (Optional).....	4-5c
Stove.....	4-5c
Microwave Oven (Optional)	4-6c
Automatic Fire Extinguisher.....	4-6c
Bilge Pump	4-6c
Bilge Blower.....	4-6c
Running or Navigation Lights.....	4-7c
Stereo	4-7c

UNDERWAY.....5

Transporting Your Boat.....	5-1
Launching.....	5-2
Loading Your Boat.....	5-3
Fueling	5-4
Operating Your Boat.....	5-5
Anchoring Your Boat	5-9
Mooring Your Boat	5-10
Shutting Down the Engine.....	5-10

PREVENTIVE MAINTENANCE AND REPAIR6

Engine	6-1
Drive Belt Tension	6-2
Tuneup	6-2
Fuel System	6-2
Monthly Inspection	6-2
Stern Drive Unit (I/O).....	6-2
Outboard	6-2
Propeller.....	6-3
Bilge	6-3

TROUBLESHOOTING7

INTERIOR AND EXTERIOR CARE8

Fiberglass and Gel Coat	8-1
Hull Bottom Maintenance	8-1
Bottom Paint (Anti-Fouling)	8-2
Deck Hardware and Fittings.....	8-2
Windshield and Portals.....	8-3
Carpet	8-3
Seat Coverings and Vinyl.....	8-3
Canvas (Weather Coverings).....	8-3
Cabin Cushions, Side Curtains, and Fabrics	8-4

WINTERIZING AND STORAGE9

Dry Storage Preparation	9-1
Systems and Components	9-1
Engine	9-2
Stern Drive	9-2
Fuel System	9-2
Battery.....	9-2
Recommissioning.....	9-2

GLOSSARY10

INTRODUCTION

1

WELCOME ABOARD!

Congratulations!...

on your wise decision to purchase a Chaparral boat. We welcome you to the fraternity of thousands of other satisfied Chaparral boat owners. Since your boat is a substantial investment, we are sure you selected your Chaparral because of its value, style, comfort, and performance. This manual contains valuable information concerning your boat's operation, maintenance, and care plus tips on boating safety and seamanship.

ABOUT THIS MANUAL

More and more people are joining the ever expanding ranks of boat owners who find enjoyment in this leisure activity. For this reason, this manual is written for the first-time boat owner or operator. However, even if you are an experienced boater, you will still find much valuable information regarding the safe operation and maintenance of your new Chaparral boat. Keep this manual on your boat for ready reference.

This manual is part of your boat's equipment. Keep it on board the boat at all times. If you transfer ownership of this boat to someone else, be sure to give this manual to the new owner.

Your owner's packet contains the manual for the boat you selected. Also in this packet are instruction manuals from the suppliers of standard and optional equipment for your boat. Examples of these manuals include the engine, electrical equipment, pumps, and cabin amenities. The suppliers of these products maintain their own manufacturer's warranty and service facilities. Be sure to fill out each warranty card and mail it to the manufacturer to validate the warranty. Record all information regarding these products on the "Boat Data Record." A copy of this form is near the end of this chapter under Logs & Records.

Important: Keep the completed Boat Data Record in a safe place at home. Do not keep it aboard the boat.

Read this manual as well as the manuals for the systems and components on your Chaparral boat. They provide the information needed for safe operation and proper maintenance. The information in the manuals provided by the manufacturers takes precedence over any information in this manual if there is a conflict.

Following are summaries of each chapter in this manual:

1. Introduction

Included in this chapter is a summary of the manual plus general information about construction and standards, dealer and owner responsibilities, laws and regulations, logs and records, and the warranty for your boat.

2. Boating Safety

This chapter discusses potential hazards associated with boating, safety recommendations, safety information and practices, and water sports safety. It also discusses safety equipment needed to provide a reasonably safe operating environment.

Note: For your safety, this manual has specific safety warnings and comments where appropriate. Be sure to read the entire manual.

3. Systems

Here you will find detailed information about the electrical and fuel systems needed to operate your boat. This chapter discusses the fresh water system and marine sanitation devices which make your boating experience more comfortable.

Note: Information in Chapters 3 and 4 is grouped by boat type: Sport Boats, Deck Boats and Cruisers. Be certain that you read the version of Chapter 3 and 4 pertaining to your boat type.

4. Components

Standard features and optional equipment for your Chaparral boat are discussed in this chapter. In general, these pertain to equipment and amenities which make your boat a "home away from home."

5. Underway

The intent of this chapter is to explain what you need to do before, during, and after your boating excursion to make it an enjoyable and safe experience.

6. Preventive Maintenance & Repairs

Preventive maintenance is the key to troublefree operation and helps protect your investment. This chapter explains what you should do to maintain your boat and how to make adjustments and repairs.

7. Troubleshooting

Every boater encounters an operating problem at one time or another. This chapter provides solutions to problems you can correct.

8. Interior & Exterior Care

This chapter tells you how to inspect, clean, and maintain your boat's interior and exterior.

9. Winterizing & Storage

What do you do when you need to winterize or store your boat for extended periods of time? This chapter provides the necessary information.

10. Nautical Glossary

The Nautical Glossary defines terms associated with your boat and terms you may encounter during your boating experience.

CONSTRUCTION & STANDARDS

Chaparral builds exceptionally high quality boats. We offer numerous extras you won't see at a boat show. We've created a list for your review.

Gelcoat

The advanced technology polyester we use offers superior weathering resistance to surface yellowing and chalking. With time, it will also help protect and maintain the original glossy luster of your boat's finish. MaxGuard offers improved flexibility over other gelcoats, minimizing the potential for cracking and stress crazes.

Resin

It's an age-old problem. Water penetrates the gelcoat and blisters the bottom. The key is the resin. To cut costs, most use a general purpose resin. We use a modified acrylic epoxy resin, in the hull skin coat of every boat in our line because of its superior bonding characteristics and exceptional flex.

Plywood

To protect their wooden components from rot and deterioration, most boat builders dip their plywood parts in a vat of protective sealant. Unfortunately, this only offers very minimal protection for the outside plies. The plywood Chaparral uses throughout our boats is pressure treated with a wood preservative and fungi inhibiting chemical before it is kiln dried.

Loom Wrap Wiring

Attention to rigging detail is a Chaparral hallmark. Instead of routing the engine wiring harness haphazardly in the bilge in black tape, we rely on automotive style flexguard loom that not only keeps things neat, but also protects against abrasion.

Four Bolt Stainless Steel Cleats

It's one of the most often used components on your boat, but most people think a cleat is a cleat, right? Wrong. Chaparral's cleats are stainless steel so they won't corrode and attached with four bolts so they won't twist. Also, ours are big enough to accept a full-sized looped line.

Heavy Duty Rub Rail

A rub rail is supposed to protect your boat. Most don't because they're the wrong material. Chaparral uses a heavy-duty rub rail that absorbs far more impact without denting. The traditional aluminum frame, with its undersized rubber insert that is constantly pulling out of place, just won't hold up.

Acoustical Foam

The name says it all. Acoustical foam is the best way we've found to absorb engine noise. When sound hits a flat surface, like a fiberglass engine hatch cover, it resonates and echoes. When it hits the convoluted surface of the foam, noise is absorbed.

Acrylic Tops

It's often referred to as "canvas," but most are made of vinyl. Ours are acrylic because it's a superior material that won't crack, peel, or mildew. Further, acrylic tops don't shrink or expand like vinyl, which means they look fit and look better in all weather conditions.

Scotch-Guarded Fabrics

Accidents happen. Spilled drinks, soiled bathing suits and soggy towels are a fact of life on a boat. We Scotch-Guard all our cabin fabrics to help resist stains. Buyers can choose from a wide variety of colors. When it comes to interior fabrics, we've got the one that's right for you.

Superior Plastics vs. Wood

Chaparral prides itself on building seats that are not only comfortable, but durable. We use plastic seats because, unlike wooden seats, they hold their shape and don't retain water, reducing the potential for foam deterioration.

Flotation Requirements

All Chaparral boats meet or exceed U.S. Coast Guard requirements for flotation. All Chaparral inboard/outboard powered boats also meet or exceed U.S. Coast Guard requirements for the following:

- Engine and Fuel Tank Compartment Ventilation
- Factory-Installed Fuel Systems
- Navigational Lights
- Steering System

RESPONSIBILITIES

Chaparral's quality service does not end when you buy one of our boats. Through our dealer network, we do everything possible to assure that you are satisfied with your purchase. Every dealer has certain responsibilities to you, the boater. You too have responsibilities to make sure dealers achieve their objectives and to help assure that you are satisfied with your purchase.

Dealer

Dealer responsibilities include the following:

1. Discuss with you the terms of all warranties and stress the importance of registering warranties with the appropriate manufacturers.
2. Explain how you can obtain warranty service.
3. Complete new boat and pre-delivery inspection procedures. Complete the customer satisfaction form (found in the owner's manual). Sign the form to certify that all items were completed.

Your Chaparral dealer can provide you with thorough instruction in the operation of your boat and all of its systems and components. Please feel free to ask for assistance.

Boat Owner

Your responsibilities include the following:

1. Read this entire manual as well as all other manuals and information included in your owner's packet.
2. Schedule an appointment with your dealer to go over all warranties. After the appointment, complete the Chaparral Boat limited warranty registration card in an envelope inside the Owner's Manual packet. Keep a record of the hull number for future reference.
3. Inspect the boat at the time of delivery to make sure all systems and components are operating properly. Chaparral recommends that you refer to your engine warranty for initial inspection and service requirements.

The new boat and pre-delivery inspection form (found in your owner's manual) will help you as you inspect your new boat. After completing your inspection, sign the form to certify you have inspected the boat with your dealer.

4. Schedule an appointment with your dealer to go over the pre-delivery engine service record. Sign this record to indicate your dealer has explained this record to you.
5. Operate all equipment in accordance with the manufacturer's instructions.
6. Become familiar with all federal, state, and local laws affecting your boat and its operation.
7. Perform or provide for the appropriate periodic maintenance outlined in the manuals and service guides.
8. Schedule your boat's 20-hour checkup with your dealer ahead of time.

IMPORTANT: During the 20-hour checkup, make sure your dealer checks the engine alignment. Failure to follow the recommended procedures in the engine owner's manual could result in drive train damage not covered by the Chaparral Boat Warranty.

LAWS AND REGULATIONS

This section of the manual includes general information about government regulations. You, the boater, are responsible for complying with the requirements of Federal, state, and local laws. If you have any questions, contact the U.S. Coast Guard or other appropriate authority.

Boat Registration

Federal and state laws require that every boat having propulsion machinery of any type must be registered in the main state of usage. Registration numbers and validation stickers must be displayed on the boat according to regulations. The registration certificate must be carried on board when the boat is in use.

Safety Equipment

The following equipment is required on all boats:

- Fire extinguishers
- Personal flotation devices (PFDs)
- Navigational lights
- Visual distress signals
- Sound signalling device

See Chapter 2 for more information about safety equipment.

Discharge of Oil

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

Disposal of Plastics & Other Garbage

Plastic refuse dumped in the water can kill fish and marine wildlife, and can foul vessel propellers and cooling water intakes. Other forms of waterborne garbage can litter beaches and cause illness. U.S. Coast Guard regulations therefore strictly prohibit dumping plastic refuse or other garbage mixed with plastic into the water anywhere. Further, the regulations restrict the dumping of other forms of garbage within specified distances from shore.

Within 3 miles of shore and in U.S. lakes, rivers, bays and sounds, it is illegal to dump plastic; dunnage, lining, and packing materials that float; and Any garbage except dishwater, gray water, and fresh fish parts.

Between 3 and 12 miles, it is illegal to dump plastic; dunnage, lining, and packing materials that float; and any garbage not ground to less than one square inch.

Between 12 and 25 miles, it is illegal to dump plastic and dunnage, lining, and packing materials that float.

Beyond 25 miles, it is illegal to dump plastic.

The U.S. Coast Guard has issued these regulations to implement Annex V of the International Convention for the Prevention of Pollution from Ships, 1973, commonly known as Annex V of the MARPOL (Marine Pollution) Treaty 73/78. They apply to all U.S. vessels wherever they operate (except waters under the exclusive jurisdiction of a state), and foreign vessels operating in U.S. waters out to and including the Exclusive Economic Zone (200 miles).

If your boat is 26 feet or more in length, the regulations require U.S. recreational boaters attach one or more Coast Guard Trash Dumping Restrictions placards to your boat. The placard warns against the discharge of plastic and other garbage within U.S. navigable waters and specifies discharge restrictions beyond the territorial sea (generally within 3 or more nautical miles of shore). The placard must also contain the warning that a person violating these requirements is liable for civil and criminal penalties. The placard must also state that local regulations may further restrict the discharge of garbage. You may purchase these placards from local marinas, boat dealers, or marine equipment suppliers.

The U.S. Coast Guard has also issued regulations requiring boats to have a sanitation system on board to control pollution. Wastes are to be stored in a holding tank or other device, such as a Porta-Potti, until the device can be pumped out or otherwise disposed of at a shore facility. Discharging this waste overboard is in most cases prohibited. Check with the Coast Guard regarding regulations in your area.

OWNER'S LOGS AND RECORDS

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

Your dealer will sign the **Customer Satisfaction New Boat and Pre-delivery Operation Record** to certify that the dealer has completed all pre-delivery inspection items. You will also sign the form to certify that you have inspected the boat and all its components and have found them satisfactory.

Use the **Boat Data Record** to record all important information about your boat and the major components installed. After you have entered all the data, remove this form from your Owner's Manual and store in a safe place. **Do not** keep this form aboard your boat.

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

The **Fuel Usage Chart** is a handy way to record information covering engine hours, fuel consumption, miles traveled, as well as RPM (revolutions per minutes), Average MPH (miles per hour), and GPH (gallons per hour).

WARRANTY

Your Chaparral boat is backed by a Limited Express Warranty. It is important that you are aware of its terms. If a problem arises with your Chaparral boat as a result of workmanship or materials, contact your dealer as soon as possible to determine whether correcting the problem may be covered by the warranty. Please have your hull identification number, and necessary model numbers on hand for the items that may need service or repair. Your hull identification number is below the rub rail on the starboard rear corner of your boat.

BOAT DATA RECORD

Purchase Dealership

Name _____ Sales Manager _____
Address _____ Phone _____
Fax _____

Service Dealership

Name _____ Service Manager _____
Address _____ Phone _____
Fax _____

General

Model Name _____ State of Registration _____
Hull Identification Number _____
Boat Name _____
Hull Color(s) _____
Length _____ Beam _____ Weight _____
Draft (Drive Down) _____ Draft (Drive Up) _____
Freeboard (Fore) _____ Freeboard (Aft) _____

Engine

Manufacturer _____ Model Name/Number _____
Oil Type/SAE _____ Quarts _____ Filter Type _____
Serial Number _____ Transom Plate Serial Number _____

Drive Unit

Serial Number _____

Fuel System

Tank Capacity _____ Filter Type _____

Fresh Water

Tank Capacity _____

Propeller

Manufacturer _____ Pitch _____

Model Number _____

Battery

Manufacturer _____

Model Number _____

Radio

Manufacturer _____ Type _____

Model Number _____

Serial Number _____

Key Numbers

Cabin _____

Glove Box _____

Ignition _____

TRAVEL PLAN LOG

The boat listed below should return by:

_____ at the latest.

If it has not, please call the emergency numbers listed at the right.

Police

Coast Guard

Other Authority

Personal

Trip Information

Departure Date/Time

Departure Location

Return Date/Time

Return Location

Boat Description

Boat Name

Type

Registration Number

Manufacturer

Length

Hull Color

Deck (Color)

Cabin (Color)

Trim (Color)

Other Physical Characteristics

Engine

Type

HP

Fuel Type

Fuel Capacity

Safety & Emergency Equipment (YES/NO & NUMBER)

Life Jackets

Cushions

Distress Light

Flares

Smoke Signals

Flash Light

Mirror

Paddles

Anchor

Food

Water

Life Raft

Radio

Onboard (Yes/No)

Type

Frequencies usually used or monitored

Passenger List (Use Another Sheet If Necessary)

Full Name

Age/Sex

Phone Number

Complete Address

Full Name

Age/Sex

Phone Number

Complete Address

Full Name

Age/Sex

Phone Number

Complete Address

Full Name

Age/Sex

Phone Number

Complete Address

ALWAYS FILL THIS SHEET OUT COMPLETELY—IN AN EMERGENCY ALL INFORMATION MAY BE HELPFUL

Copyright 2012 Pearson Education, Inc. All rights reserved. Printed in the United States of America. This book is protected by copyright. No part of this book may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording, or by any information storage or retrieval system, without permission in writing from Pearson Education, Inc.

[illegible][illegible]

CHAPARRAL BOATS, INC. LIMITED WARRANTY
Nashville, GA 31636

Subject to the limitations to coverage discussed below, Chaparral Boats, Inc. (Chaparral) warrants that each new fiberglass boat manufactured by it is free from defects in material and workmanship under normal care, use and conditions for a period of twelve months from date of sale to the original retail purchaser. Only with respect to structural defects in the fiberglass hull of the boat so sold, this warranty is extended for an additional four years.

To validate this warranty, the warranty registration card must be returned to Chaparral within ten (10) days after purchase by original retail purchaser. Notification of claim of defect must be made in writing to Chaparral within one year from date of purchase by the original retail purchaser.

Chaparral's obligation under this warranty is limited to the cost of repair of the warranted item or replacement thereof, at Chaparral's option, when returned prepaid to Chaparral's plant P.O. Drawer 928, Industrial Park, Nashville, GA 31639, or other point of repair authorized by Chaparral. All costs of transportation to and from Chaparral's plant or authorized point of repair shall be paid by the owner. Under no circumstances shall Chaparral be liable for loss of use or any other consequential damages or losses resulting from any defects.

THIS WARRANTY DOES NOT COVER: (1) Engines, outdrives, controls, batteries, propellers, and other accessories or equipment which have been made by other manufacturers, whether subject to a separate warranty or not, by such other manufacturers; (2) Any failure resulting from lack of proper maintenance, normal wear and tear or climatic conditions; (3) Any boat which has been powered or loaded in excess of the manufacturer's maximum horsepower and/or capacity recommendations; (4) Any boat used for racing or commercial purposes or which has been subject to misuse, negligence, accident or structural modification; (5) Windshield breakage, windshield leakage, fuel gauges and fuel gauge systems, fuel tanks, and any defects in paint, gelcoat finishes and upholstery, canvas, vinyl, and other materials; (6) Installation of engines, parts or accessories installed by anyone other than Chaparral; (7) Any boat owned by anyone other than the original retail purchaser thereof.

THIS WARRANTY IS GIVEN IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED. No dealer or any other person is authorized to make on Chaparral's behalf any other warranty other than those expressly set forth herein. In the event of any dispute arises concerning this warranty, Chaparral reserves the right to have such dispute resolved by mediation or arbitration.

Chaparral reserves the right to make changes at any time, without notice, in prices or to make changes in colors, specifications, equipment, options, materials, hulls, and/or discontinue models and Chaparral shall be under no obligation to equip or modify boats built prior to such changes.

Chaparral is a registered trademark of Chaparral Boats, Inc.

BOATING SAFETY

2

YOU are responsible for your own safety and your boat, as well as the safety of your passengers and your fellow boaters. Remember: "Safe boating is no accident."

HAZARD COMMUNICATION

As you read this manual, please note the hazard warnings which alert you to safety precautions related to unsafe conditions or operating procedures. We have included these warnings because we are concerned about your safety and the safety of your passengers. Hazard statements generally have five parts:

1. The hazard symbol,
2. A signal word which indicates the severity of the hazard,
3. A concise description of the hazard,
4. The results of ignoring the hazard, and
5. Steps for avoiding the hazard.

The three signal words indicating the severity of the hazard are danger, warning, and caution. The meanings they convey are as follows:

⚠ DANGER

DANGER calls attention to immediate hazards that **WILL** result in severe personal injury or death.

⚠ WARNING

WARNING identifies hazards or unsafe practices that **COULD** result in severe personal injury or death.

⚠ CAUTION

CAUTION: indicates hazards or unsafe practices that **COULD** result in minor personal injury or product or property damage.

OWNER ADVISORY STATEMENTS

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

Important: *This is an advisory statement or procedure intended to prevent damage to the equipment or associated components.*

Note: This is a general advisory statement relating to equipment operation and maintenance procedures. Its intent is to call attention to information more important than normal text.

SAFETY RECOMMENDATIONS

Boating safety and the safety of your passengers are your responsibility. You should fully understand and become familiar with the operating procedures and safety precautions in this manual and the other manuals in the owner's packet before you launch your Chaparral boat.

Safe Operation

Following is general information about safe operation.

- Keep your boat and equipment in safe operating condition. Inspect the hull, engine(s), safety equipment and all boating gear regularly.
- Be very careful when fueling your boat. Be sure you know the capacity of your boat's fuel tank and the amount of fuel you use when operating at frequently used engine speeds (RPMs). Ask your Chaparral dealer about the capacity of your boat's fuel tank.
- Make sure you have enough fuel on board 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 lifesaving and fire extinguishing equipment is on board. This equipment must meet regulatory standards, and it should be noticeable, accessible and in safe 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 closely.
- Always keep accurate, updated charts of the area on board your boat.
- Before you leave the port or harbor, file a Travel 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 other passenger aboard in the basic operating procedures in handling 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 swim platform or boarding ladder while the engine or 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.

The information on your boat's capacity plate does not override your responsibility for using common sense or sound judgment. Turbulent water and unfavorable weather conditions reduce the capacity of your boat.

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 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.

Voluntary Inspections

State boating officials in many states or the U.S. Coast Guard Auxiliaries offer courtesy inspections to check out your craft. They will check your boat for compliance with safety standards and required safety equipment. You may voluntarily consent to one of

these inspections, and you are allowed time to make corrections without prosecution. Check with the appropriate state agency or the Coast Guard Auxiliary for details.

Rules of the Road

Navigating a boat is much the same as driving an automobile. Operating either one responsibly means complying with a set of rules intended to prevent accidents. Just as you assume other car drivers know what they are doing, other boaters assume you know what you are doing.

As a responsible boater, you will comply with the "Rules of the Road," the marine traffic laws 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 Coast Guard publishes the "Rules of the Road" 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 Coast Guard station, your Chaparral dealer, or a local marina about navigational aids unique to your area.

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 Coast Guard or other boaters if you have trouble.

Important: *Never send a "MAYDAY" message unless there is a serious emergency and you are in need of immediate assistance.*

Drugs and Alcohol

Drugs and alcohol affect a person's ability to make sound judgments and react quickly. As a responsible boater, you will refrain from using drugs or alcohol (singly or combined) while operating your boat. Operation of motorized vessels while under the influence carries a significant penalty. Drugs or alcohol decrease your reaction time, impair your judgement, and inhibit your ability to safely operate your boat.

SAFETY EQUIPMENT

Important: *Federal law requires you to provide and maintain safety equipment on your Chaparral boat. As the boat owner, you are responsible for supplying all required safety equipment. Consult your Coast Guard, state, and local regulations to ensure your boat has all required safety equipment on board. Additional equipment may be recommended for your safety and that of your passengers. Make yourself aware of its availability and use.*

Personal Flotation Devices (PFDs)

There must be one United States Coast Guard approved wearable personal flotation device of Type I, II, or III for each person on board or being towed on water skis, water sports tubes, kneeboards, etc. The PFDs must be of a suitable size for each person aboard and must be in serviceable condition and readily accessible.

PFD Type I, Wearable: This off-shore life jacket has the greatest buoyancy. It is most effective for all waters where rescue may be delayed. Its design allows for turning most unconscious persons in the water from face down position to a vertical or face-up position.

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

PFD Type III, Wearable: Classified as a flotation aid, this PFD allows wearers to place themselves in a vertical or face-up position in the water. Type III has the same minimum buoyancy as a Type II PFD. It has little or no turning ability. People participating in water sports often prefer this PFD because it is intended for use in waters where quick rescue is possible and it is generally the most comfortable for continuous wear.

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

Fire Extinguishers

As the boat owner, you are responsible for making sure you have the required number of fire extinguishers. Fire extinguishers must be approved by the U.S. Coast Guard.

Boats longer than 26 feet and shorter than 40 feet: Two Type B-1 or at least one Type B-2 portable hand extinguishers. 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 16 feet and shorter than 26 feet: At least one portable hand Type B-I fire extinguisher.

Outboard motorboats less than 26 feet long are not required to have a Type B-1 fire extinguisher on board as long as the boat is not used commercially for carrying passengers.

All fire extinguishers should be mounted in a readily accessible location away from the engine compartment. Everyone on board 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.

Visual Distress Signals

The U.S. Coast Guard requires all boats operating on U.S. coastal waters have visual distress signal equipment on board. In general, coastal waters include all waters except rivers, streams, and inland lakes. The Great Lakes are considered coastal waters as is a river mouth more than two miles wide. Boats owned in the United States and operating on the high seas must also carry visual distress signal equipment.

Visual distress equipment must be in serviceable condition and stowed in a readily accessible location. Equipment having a date showing useful service life must be within the specified usage date shown. Both pyrotechnic and non-pyrotechnic equipment must be U.S. Coast Guard approved.

Pyrotechnic U.S. Coast Guard approved visual distress signals and associated equipment include:

- Red flares, hand held or aerial
- Orange smoke, hand held or floating
- Launchers for aerial red meteors or parachute flares

Non-pyrotechnic equipment includes an orange distress flag and an electric distress light.

No single signaling device is ideal under all conditions for all purposes. Consider carrying various types of equipment. Careful selection and proper stowage of visual distress equipment are very important. If young children are frequently aboard, you should select devices with packages which children, but not adults, will find difficult to open.

Sound Signaling Device

Your Chaparral boat must have a device that can produce a sound signal when conditions require. For boats over 26 feet, the device must be able to produce a two-second blast which can be heard a mile away. It can be hand- or power-operated. For boats less than 26 feet, it must be able to produce a two-second blast which can be heard one-half mile away. It can be mouth-, hand-, or power-operated. Refer to the U.S. Coast Guard's publication "Navigational Rules, International-Inland" for details about the appropriate signals.

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.

SAFETY AFLOAT

Once your boat is launched and your excursion is underway, you need to be aware of your surroundings and how they may affect your safety and that of your passengers. No matter how many laws are passed, there is no substitute for good judgment and common sense.

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 broad-

casting frequent weather reports. Many boating clubs fly weather signals. Learn to recognize these signals, and listen to your local forecasts before leaving port.

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, 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 on board have 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 engine(s) 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

The present and forecasted weather conditions are a primary consideration, and the possibility of storms should always be a concern. 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. The best possible situation is to return to a safe port if time allows.

Other steps to follow to weather the storm include:

- Close portals 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 on board have put on their personal floatation devices.
- Drop a sea anchor over the stern to maintain the bow into the seas. If you do not have a sea anchor aboard, 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 diagonally. They should be placed 12 feet above waterline. Otherwise, a boat with radar may have trouble "seeing" your boat.

Fire

Important: A fire aboard your boat is a serious emergency. You must act immediately!

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. Having a plan and, if possible, assigning responsibilities to others result in quicker decisions and quicker reactions.

Important: Everyone on board should know where fire extinguishers are and how to operate them.

Any fire requires stopping the engine(s) **immediately**. Then:

- If the fire is in the engine compartment, shut off the bilge blower **immediately**.
- **Do not open the hatch to the engine compartment!** 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 on board put on their personal floatation devices.
- If you can get at the fire, aim the fire extinguisher at the base of the flames and use a sweeping action 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 on board should jump overboard and swim a safe distance away from the burning boat.

WARNING

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

Swamped or Capsized Boat

If your boat becomes swamped or capsizes, put on a PFD 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.

Hypothermia

If a person falls overboard, hypothermia may be an immediate concern. Hypothermia means a person's body loses heat to the water 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 shorter the time for survival. PFDs will increase survival time because they provide insulation.

Water Temperature (°F)	Exhaustion Unconsciousness	Expected Time of Survival
32.5	Under 15 min.	Under 15 to 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

Collision

If a serious collision occurs, first check the persons on board for injuries. Then inspect the boat to determine the extent of damage.

- Prepare to help the other craft unless your passengers or boat is in danger.

- If the bow of the other boat 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 out of the water during repairs.
- If your boat is in danger of sinking, have all persons put on their personal floatation devices.
- If your boat has a radio, contact the U.S. Coast Guard or other rescue authorities immediately (VHF channel 16 or 22 CB radio).

Running Aground

If your boat runs aground, check everyone for injury and inspect damages to the boat or propeller(s). If possible, shift weight of passengers or gear to heel the boat while reversing engine(s). If towing becomes necessary, do not attach tow line to deck cleats. These are not designed to take full load of the boat. Chaparral recommends using a commercial towing service.

WARNING

WARNING: When towing another boat or having your boat towed, make sure the tow line is fastened securely to the bow or transom towing eyes. Never attach tow line to deck cleat or anchor windlass. Cleat or windlass may pull free from deck and cause serious personal injury or property damage.

Carbon Monoxide Hazard During Operation

⚠ DANGER

DANGER: Carbon monoxide in engine exhaust can be harmful or fatal if inhaled. Open hatches, doors, windows, and vents to ensure adequate ventilation.

Carbon monoxide (CO) in the engine exhaust system is a poisonous gas which is odorless, colorless, and heavier than air. Direct prolonged exposure can result in carbon monoxide poisoning which can be harmful and may be fatal.

Indications of excessive exposure to carbon monoxide concentrations may include nausea, dizziness and drowsiness. Carbon monoxide poisoning requires the operator's special and immediate attention! To prevent excess exposure and reduce the possibility of carbon monoxide accumulation in the cabin of the boat, ensure adequate ventilation by opening cabin hatches, cabin doors, cabin windows, and side windshield vents to increase air movement.

Some Chaparral models are equipped with a CO detector. Follow the operating instructions supplied with the CO detector and test the unit to verify that it is functioning properly every time you use your boat.

The following illustrations show how carbon monoxide can possibly accumulate in your boat while either at the dock or underway. Become familiar with these examples and their precautions to prevent dangerous accidents from occurring on your boat.

⚠ DANGER

DANGER: Blocked hull exhaust outlets near a pier, dock, sea wall bulkhead or any other means can cause excessive accumulation of poisonous carbon monoxide gas within the cabin areas. Make sure hull exhaust outlets are not blocked. See Figure 2.1.

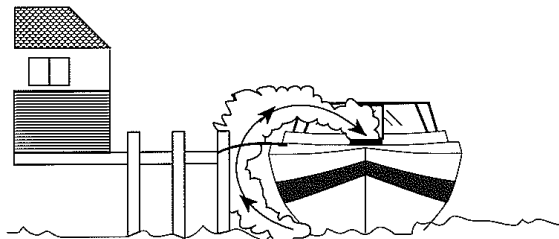


Figure 2.1 Running Engine or Generator in Confined Areas

⚠ DANGER

DANGER: Generator or hull exhaust from other vessels alongside your boat, while docked or anchored, can emit carbon monoxide and cause excessive accumulation within the cabin and cockpit areas. Be alert for generator exhaust from other vessels alongside. See Figure 2.2.

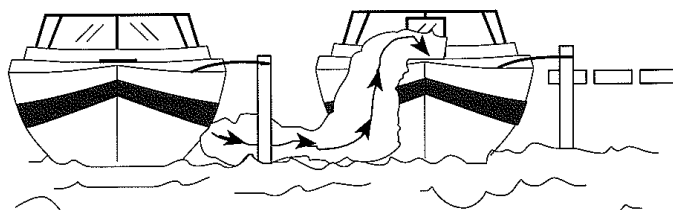


Figure 2.2 Exhaust Fumes from Vessel Alongside

⚠ DANGER

DANGER: Hull exhaust from your boat while underway can cause excessive accumulation of carbon monoxide within the cabin and cockpit areas when using protective weather coverings. Provide adequate ventilation when the canvas top, side curtains, and/or back curtains are closed. See Figure 2.3

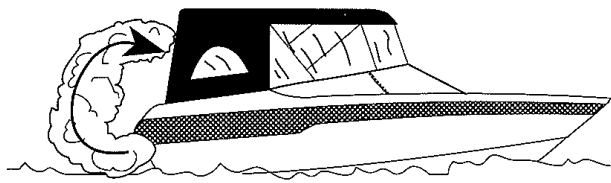


Figure 2.3 Exhaust Accumulation While Canvas is in Place

⚠ DANGER

DANGER: Engine exhaust from your boat while underway can cause excessive accumulation of carbon monoxide within cabin and cockpit areas or when operating boat with a high bow angle. Provide adequate ventilation, redistribute the load, or bring boat out of high bow angle. See Figure 2.4.

⚠ DANGER

DANGER: Engine exhaust from your boat while underway can cause excessive accumulation of carbon monoxide within the cabin and cockpit areas when operating at slow speed or stopped in the water. Tail wind can increase accumulation (force of wind entering from aft section of boat). Provide adequate ventilation or slightly increase speed if possible.. See Figure 2.4.

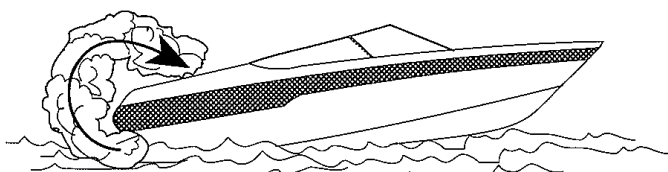


Figure 2.4 Exhaust Accumulation due to High Bow Angle or Slow Speed

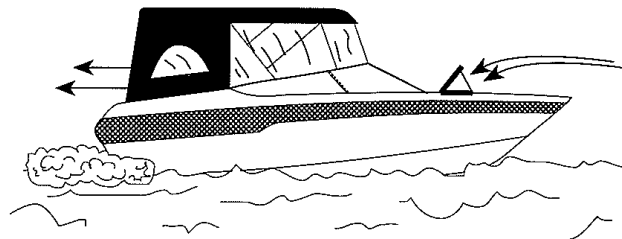


Figure 2.5 Desired Ventilation Through the Boat

Ensure proper ventilation aboard your boat and be aware of the possibility of carbon monoxide poisoning (See Figure 2.5). Keep your boat in safe operating condition. Periodically, inspect the hull, engine and engine compartment, and all other equipment and gear.

Navigation Aids Chart

The Navigation Aids Chart (located at the end of this section) contains information about various signals, buoys, and warnings. Chaparral recommends you participate in a safe boating course to learn more about navigating your boat safely.

WATER SPORTS

Water skiing and other water sports, such as kneeboarding and riding on inflatable towable devices, require an increased safety awareness by all the people involved.

Important: Remember that three people — not two — are required for safe water skiing: the boat operator, the skier, and an observer on the boat facing the skier. The observer relays signals from the skier to the operator. The operator can therefore give full attention to the operation of the boat and the waters ahead.

Figure 2.6 shows a set of hand signals recommended by the American Water Ski Association (AWSA). The skier, the observer, and the boat operator should know and understand these 10 simple signals.

Following these guidelines helps make water skiing a safe and enjoyable experience:

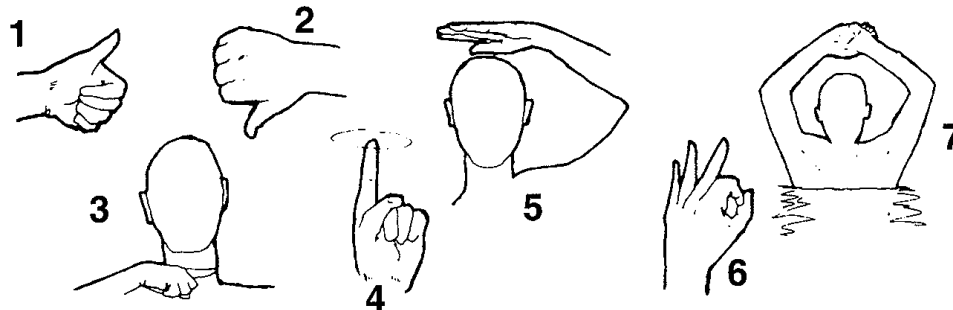
1. Water ski only in safe areas, away from other boats and swimmers, out of channels and in water free of underwater obstructions.
2. Make sure anyone who water skis is also a competent swimmer.
3. Be sure the skier is wearing a proper flotation device. A properly designed ski vest will keep a stunned or unconscious person afloat.

4. Approach a skier in the water from the lee side, and be certain to stop your motor before coming close to the skier.
5. Give immediate attention to a fallen skier. He or she is vulnerable in the water alone and is difficult to see by other boaters.

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

⚠ WARNING

WARNING: Serious injury may result from para-sailing, kiting, or similar water sports. Chaparral Boats are not designed for towing para-sails, kites, or any other device designed to become airborne when towed behind a boat.



1. **Thumb Up:** Speed up the boat.
2. **Thumb Down:** Slow down the boat.
3. **Cut Motor/Stop:** Immediately stop boat. Slashing motion over neck (also used by driver or observer).
4. **Turn:** Turn the boat (also used by driver). Circle motion—arms overhead. Then point in desired direction.
5. **Return to Dock:** Pat on the head.
6. **OK:** Speed and boat path OK. Or, signals understood.
7. **I'm OK:** Skier OK after falling.

Figure 2.6 AWSA Water Skiing Signals

Additional Equipment

You should consider having additional equipment on board to help make your boating experience safer and more enjoyable. Some examples include the following:

- Anchor and line
- Boat hook
- Bucket & sponge
- Commonly used spare parts
- Compass, navigation charts
- Distress signal kit
- Docking and towing lines
- Engine and accessory manuals
- Extra keys
- Extra V-belts
- Fenders
- First aid kit
- Flashlight & extra batteries
- Manually operated bilge pump
- Owner's manual
- Paddle
- Replacement light bulbs
- Ship-to-shore radio
- Spare fuel and oil filters
- Spare propeller with fastening hardware
- Spare set of spark plugs and ignition parts
- Tool kit

HAZARD COMMUNICATION LABELS

Some or all of the hazard communication labels shown below can be found in various locations on your boat. If your boat is missing any of these labels, notify your Chaparral dealer for replacement.

Note: Respective labels are determined by the standard and optional equipment actually installed on your boat upon delivery.



WARNING



LEAKING FUEL IS A FIRE AND EXPLOSION HAZARD. INSPECT SYSTEM REGULARLY. EXAMINE FUEL SYSTEM FOR LEAKS OR CORROSION AT LEAST ANNUALLY.

© NMMA 1990/ NO. 200

BOATMAN'S CHECK LIST

For maximum enjoyment and safety, check each of these items BEFORE you start your engine:

- ✓ DRAIN PLUG (Securely in place?)
- ✓ LIFE-SAVING DEVICES (One for every person on board?)
- ✓ STEERING SYSTEM (Working smoothly and properly?)
- ✓ FUEL SYSTEM (Adequate fuel? Leaks? Fumes?)
- ✓ BATTERY (Fully charged? Cable terminals clean and tight?)
- ✓ ENGINE (In neutral?)
- ✓ CAPACITY PLATE (Are you overloaded or overpowered?)
- ✓ WEATHER CONDITIONS (Safe to go out?)
- ✓ ELECTRICAL EQUIPMENT (Lights, horn, pump, etc.?)
- ✓ EMERGENCY GEAR (Fire extinguisher, bailer, paddle, anchor & line, signalling device, tool kit, etc.?)



© NMMA 1981

**WASTE DISCHARGE
MARINE HEAD**

**CLOSE SEACOCK
WHEN NOT IN USE**

**CAULK BEFORE
INSTALLING**



**RAW WATER INLET
MARINE HEAD
CLOSE SEACOCK
WHEN NOT IN USE**

**RAW WATER INLET
GENERATOR
CLOSE SEACOCK
WHEN NOT IN USE**

**RAW WATER INLET
AIR CONDITIONER
CLOSE SEACOCK
WHEN NOT IN USE**

NOTICE

**WHEN USING AIR CONDITIONER TURN
SUMP PUMP BREAKER ON. FORWARD
BILGE AREA MAY FLOOD IF BREAKER
IS NOT ON.**

NOTICE

**SECURE WINDSHIELD DOOR WHEN
UNDERWAY OR WHEN TRAILERING
TO PREVENT ITEMS FROM
BLOWING OUT.**

NOTICE

**ANCHOR CATCH SYSTEM
SET UP FOR RULE®/DANFORTH®
S-600 ANCHOR**

NOTICE

**Anchor catch system
set up for a DELTA
SL0057406 Anchor**

NOTICE

**AIR CONDITIONER SHORE POWER
HOOK UP**

NOTICE

**MAIN SHORE POWER
HOOK UP**

NOTICE

**DO NOT USE OR DISPOSE OF PRODUCTS
THAT CONTAIN CHLORINE IN THIS
WASTE SYSTEM**

NOTICE

FUEL SHUT OFF VALVE ENCLOSED

⚠ WARNING ⚠

**USING SWIM PLATFORM, FORWARD SUN
PAD, OR SUN DECK WHILE BOAT IS
UNDERWAY COULD RESULT IN SEVERE
PERSONAL INJURY**

STOP BOAT AND TURN OFF ENGINES BEFORE USING

⚠ WARNING ⚠

**NOT A STEP
MAY BREAK CAUSING DAMAGE
TO BOAT AND PERSONAL INJURY**

DO NOT STEP ON DOOR

⚠ WARNING ⚠

**THE OPERATOR OF THIS VESSEL IS
RESPONSIBLE FOR THE ACTIONS OF
PERSONS IN AND AROUND
THIS VESSEL**

SAFETY IS THE OPERATORS RESPONSIBILITY

⚠ WARNING ⚠

**OPEN DOORS MAY CAUSE
DAMAGE TO BOAT, AND/OR
PERSONAL INJURY**

SECURE ALL DOORS

⚠ WARNING ⚠

**DO NOT STORE FUEL OR
FLAMMABLE LIQUIDS HERE.
VENTILATION HAS NOT BEEN PROVIDED.**

FUEL VAPORS ARE A FIRE AND EXPLOSIVE HAZARD

⚠ WARNING ⚠
OPEN FLAME COOKING APPLIANCES
CONSUME OXYGEN-
THIS CAN CAUSE ASPHYXIATION OR
DEATH
**MAINTAIN OPEN VENTILATION
DO NOT USE THIS APPLIANCE
FOR COMFORT HEATING**

⚠ WARNING ⚠
IN CASE OF FIRE DO NOT OPEN ENGINE BOX
OR COMPARTMENT, SHUT DOWN ENGINES,
GENERATOR, AND BLOWERS, CONTINUOUSLY
DISCHARGE ENTIRE CONTENTS OF HALON
OR CO2 PORTABLE FIRE EXTINGUISHER THROUGH
PORT IMMEDIATELY
DO NOT OPEN ENGINE BOX

⚠ WARNING ⚠
LEAVING WINDOW OPEN WHILE BOAT
IS UNDERWAY OR AT DOCK
COULD INDUCE EXHAUST FUMES INTO
CABIN CAUSING INJURY OR DEATH
CLOSE WINDOW

⚠ WARNING ⚠
SECURE SUN DECK LID BEFORE
UNDERWAY LID MAY OPEN
CAUSING PERSONAL INJURY
SECURE SUN DECK LID WITH SAFETY STRAP

⚠ DANGER ⚠
USING BOARDING LADDER WHILE
ENGINE IS RUNNING CAN RESULT
IN SEVERE PERSONAL INJURY
TURN OFF ENGINE BEFORE USING LADDER

⚠ DANGER ⚠
ANCHOR MAY MOVE
CAUSING BOAT DAMAGE OR
SEVERE PERSONAL INJURY
SECURE ANCHOR

⚠ DANGER ⚠
CONTACT WITH UNPROTECTED ENGINE
BELTS WILL RESULT IN SEVERE INJURY
TURN OFF ALL ENGINES BEFORE ENTERING MOTORWELL

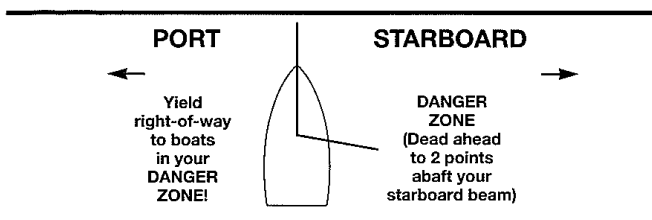
⚠ DANGER ⚠
USING SKI EYE FOR TOWING, LIFTING,
OR PARASAILING WILL RESULT IN
DAMAGE TO BOAT AND SEVERE
PERSONAL INJURY
USE ONLY TO PULL WATERSKIER

DISCHARGE OF OIL PROHIBITED

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 EMUL-
SION BENEATH THE SURFACE OF THE WATER.

**VIOLATORS ARE SUBJECT TO
A PENALTY OF \$5000**

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



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

SOUND		VISUAL	DAY (Flag)	NIGHT (Lights)
VESSEL: Open	— ●	VESSEL: Open	□	○
BRIDGE: OK	— ●	BRIDGE: OK	Same	Same
No	● ● ● ● ● ●	No	◀ ◻ ▶	◀ ○ ▶
VESSEL: Replies:	● ● ● ● ● ●			
RADIO: VHF CH. 13				

RED FLAG Small craft (winds to 33 knots)	2 RED FLAGS Gale (winds up to 47 knots)	SQUARE RED FLAG BLACK BOX (Storm)	2 SQUARE RED FLAGS BLACK BOX (Hurricane)

PORT SIDE ODD NUMBERED AIDS	SAFE WATER MID-CHANNELS OR FAIRWAYS NO NUMBERS-MAY BE LETTERED	STARBOARD SIDE EVEN NUMBERED AIDS
GREEN LIGHT ONLY FLASHING OCCULTING QUICK FLASHING ISOPHASE Mo(A) SPHERICAL MR LIGHTED BUOY CAN SG DAYMARK	WHITE LIGHT ONLY Mo(A) SPHERICAL MR LIGHTED AND OR SOUND PREFERRED CHANNEL NO NUMBERS-MAY BE LETTERED COMPOSITE GROUP FLASHING (2 + 1) GREEN LIGHT ONLY RED LIGHT ONLY	RED LIGHT ONLY FLASHING OCCULTING QUICK FLASHING ISOPHASE Mo(A) SPHERICAL MR LIGHTED BUOY CAN SG DAYMARK

PORT SIDE ODD NUMBERED AIDS	SAFE WATER MID-CHANNELS OR FAIRWAYS NO NUMBERS-MAY BE LETTERED	STARBOARD SIDE EVEN NUMBERED AIDS
GREEN LIGHT ONLY FLASHING OCCULTING QUICK FLASHING ISOPHASE Mo(A) SPHERICAL MR LIGHTED BUOY CAN SG DAYMARK	WHITE LIGHT ONLY Mo(A) SPHERICAL MR LIGHTED AND OR SOUND PREFERRED CHANNEL NO NUMBERS-MAY BE LETTERED COMPOSITE GROUP FLASHING (2 + 1) GREEN LIGHT ONLY RED LIGHT ONLY	RED LIGHT ONLY FLASHING OCCULTING QUICK FLASHING ISOPHASE Mo(A) SPHERICAL MR LIGHTED BUOY CAN SG DAYMARK

This chapter discusses the various systems needed to make your Chaparral boat a "home away from home." These include the electrical, fuel, fresh water, and sanitation systems and related equipment.

Note: The term "engine" in this chapter means one or two engines, depending on how your boat is equipped.

ELECTRICAL SYSTEMS

Your Chaparral boat has a 12 volt, direct current (DC) battery system. Some models may have an optional shore power connection to provide 120 volt alternating current (AC) to the AC system. Some electrical components on your boat are controlled by circuit breakers located on the main electrical panel. Electrical schematics for your boat are available from your dealer.

Safety Precautions

Follow these precautions when working with or on electrical systems or electrically powered equipment:

1. Shut off power supply before starting work.
2. Use insulated mats to prevent accidental grounding.
3. Make sure clothing is dry, not wet or damp. Keep skin dry.
4. Remove wrist watch and jewelry.

12 Volt DC Power

Batteries are the source of power for the 12 volt DC (direct current) electrical system. The batteries are charged through the engine-driven alternator. The voltmeter on the instrument panel in the dash shows the battery charging rate when the engine is running.

The negative terminal of each battery is connected to the grounding studs of the main engine(s). This type of negative ground system is the approved system for marine DC electrical systems. If you add additional equipment to your boat it must be adaptable to the negative ground system.

NOTE: Power feeds for accessory equipment must NOT be taken from the voltmeter terminals. A fuse block near the helm has been provided with additional accessory hookups. Consult your Chaparral dealer for additional DC power needs on your boat.

CAUTION

CAUTION: When adding electrical equipment, be careful not to overload the fuse block.

Note: The appropriate fuse must be used. Consult a qualified technician for proper fuse size.

Battery

Note: Two batteries are optional equipment on some models.

The battery installed on your boat by your Chaparral dealer supplies your boat with DC current for lights, starting the engine, and power to run accessories. It uses an absorbent electrolyte principle and provides high reserve capacity and cold cranking performance. When the engine is running, the alternator supplies the power needed to keep the batteries charged. Lights and accessories draw power from the batteries.

SYSTEMS

Battery Selector Switch

Some models have a battery selector switch as optional equipment. If your boat has a battery selector switch, you will find it in the engine compartment of stern area of the boat.

On/Off Switch with One Battery

2550 SX, 2500 SX, 2335 SS, 2330 SS, 2135 SS, 2130 SS, 1950 SS, 1930 SS, 1935 SS, 1830 SS.

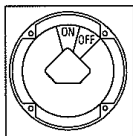
This switch has two positions:

OFF Power supplied to automatic bilge pump and optional mercathode.

Note: The automatic bilge pump is optional on the 2130 SS, 1950 SS, 1930 SS and 1830 SS.

ON Power supplied to entire boat

To start engine, place switch to ON position. Power is now supplied to your boat from the battery. Then start engine. Leave switch in this position to fully recharge battery.



Note: If engine is off and you are using boat accessories, you need to start your engine occasionally to allow engine alternator to fully recharge battery. Otherwise you may drain battery down and you will not have enough power to start engine.

Single Selector Switch with Two Batteries

A selector switch with two batteries is optional on some models.

This battery selector switch has four positions:

OFF Power supplied to automatic bilge pumps and optional mercathode from both batteries.

3-2ss

SPORT BOATS

Note: The automatic bilge pump is optional on the 2130 SS, 1950 SS, 1930 SS and 1830 SS.

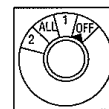
1. Use only Number 1 battery

ALL Use Number 1 and Number 2 batteries

2. Use only Number 2 battery

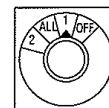
Recommended settings are as follows:

1. When boat is not in use or power is not required, turn the switch to OFF. The only power supplied at this setting is the automatic bilge pumps and optional mercathode.

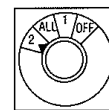


Note: The automatic bilge pump is optional on the 2130 SS, 1950 SS, 1930 SS and 1830 SS.

2. To start the engine, place switch in Number 1 position. With this setting, power will now be supplied to your boat from the Number 1 battery. This will allow the engine alternator to charge both batteries.



3. For cabin power with engine off, place the switch in the Number 2 position. Power will now be supplied to your boat from the Number 2 battery.

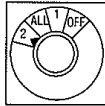


Note: Chaparral does not recommend leaving the switch in the **ALL** position when the engine is off. This will drain both batteries down and you will not have a starting battery.

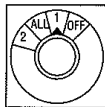
4. If one battery is low, you still have the option of starting the engine from the other battery.

SYSTEMS

Example 1: If the Number 1 battery is low, place the switch in the Number 2 position. Then start the engine. This will allow the engine alternator to recharge both batteries.



Example 2: If the Number 2 battery is low, place the switch in the Number 1 position. Then start the engine. This will allow the engine alternator to recharge both batteries.



Note: When recharging a low battery, be sure to run the engine for a sufficient amount of time to fully recharge the batteries.

Note: Chaparral does not recommend any other settings than mentioned because of possible damage to batteries or engine alternator.

120 Volt AC Power (Optional)

Some models have an optional 120 volt AC shore power hookup. The alternating current (AC) electrical system operates off a standard 30 amp 120 volt, 60 cycle shore power system. Schematics of the AC electrical system for your boat are available from your dealer.

Shore Power

⚠ CAUTION

CAUTION: To prevent damage to electrical system, never operate shore power system at less than 105 volts.

Your Chaparral boat has a single male receptacle outside on the deck for shore power connection. When not in use, a water-resistant cover protects the receptacle.

SPORT BOATS

Before you connect your boat to shore power, turn off the main cabin circuit breaker. Attach the shore power cord to the boat first and turn clockwise to lock. Thread the locking ring on the inlet to secure the cord. Connecting the cord to the boat first will prevent dropping a "hot" cord into the water. (When you leave the dock, remove the cord from the shore outlet first.)

Make sure the dockside shore power breaker is OFF, then plug in the cord. Turn the dockside shore power breaker on. Immediately check the polarity light(s) on the main panel. If the REVERSED POLARITY light on the main cabin panel illuminates, **do not turn on the main cabin breaker.**

⚠ CAUTION

CAUTION: Electric shock is possible if you turn on main cabin breaker when reverse polarity is illuminated.

Turn off the dockside shore power breaker and disconnect your shore power cord. Inform the marina manager of the problem. If the reverse polarity light does not illuminate, push the test button next to the light. If the light is functioning properly it will illuminate during this test and you are now assured that the polarity of your shore power connection is correct. At this point, turn on the main cabin AC circuit breaker(s). You may now use AC powered components on your boat.

Important: Some equipment will not work or may be damaged if polarity is reversed. Damage caused by reversed polarity is not covered under your warranty. Be sure polarity is correct when you connect your boat to shore power.

When you are using AC power, a circuit may overload if you are using several accessories at the same time. Turning off one accessory may be necessary while you operate another.

SYSTEMS

Lighting

Lighting operates off the 12 volt DC system. See your Chaparral dealer for information regarding bulb replacement.

Ground Fault Interrupter Outlet

The ground-fault interrupter outlet in the cabin provides protection against currents which can be dangerous even though they do not overload 15- or 20-ampere circuit breakers. This outlet has a test and reset switch in the middle of the faceplate. If there is a difference of more than 5 milliamperes, a safety switch trips in the outlet and interrupts the circuit. This protects the person who is operating the electrical equipment from serious electric shock or loss of life. The outlet may not eliminate the feeling of an electric shock, but it does open the circuit quickly enough to prevent injury to a person of normal health.

When the outlet's circuit breaker is tripped, you must push the RESET button. Check this outlet periodically by pushing the TEST button. Pushing the TEST button cuts power to some 120 volt outlets.

Electrolysis

Electrolysis is the decomposition of metals exposed to an electric current. When your boat is connected to a shore power AC electrical system, it is also connected to an earth ground circuit. This circuit "grounds" all metal parts to the earth on shore. Although it provides protection against hazardous shocks, it creates an electrolytic current which causes the decomposition of all submerged metal.

Sacrificial zinc anodes, installed by the dealer or the engine manufacturer, protect submerged metal. Electrolysis attacks the softest or least "noble" metals first. Zinc, a less noble metal, decomposes before the more noble metals. Zinc is also used to protect metal exposed to salt water. Salt causes a galvanic action that decomposes metals.

SPORT BOATS

Important: Check these zinc anodes periodically and have them replaced as required. See your Chaparral dealer for parts and service. Damage resulting from electrolytic corrosion is not covered by the Chaparral Boat warranty.

FUEL SYSTEM

The internal fuel system on your Chaparral boat meets all current Federal requirements. The fuel tank is forward of the engine compartment under the cockpit floor. The fuel tank fill pipe is on the outside deck. The fuel tank vent allows air to escape as the tank is being filled and helps equalize tank pressure as temperatures change. It is located near the fuel fill on all stern drive models. The tank has an anti-siphon valve which keeps fuel from leaking into the boat in case of fuel line breaks.

Check the condition of the fuel tank components from time to time. Fuel tank fittings are accessible through the inspection plate in the cockpit floor.

FRESH WATER SYSTEM

Some models have a non-pressurized water system as standard equipment and a pressurized system as optional. The fresh water system provides water at surrounding air temperatures from an onboard storage tank. A water pump and filter provide water under pressure to the optional transom shower and the sink in the galley. See Chapter 4 for more information.

On some models, the fresh water tank is filled through the fill plate on the side of the deck. The tank vent is next to the fill plate. The vent allows air to enter and escape as water levels change. Fill the tank only with potable water. Using and refilling the tank often keeps drinking water fresh and clean.

SYSTEMS

Sanitizing the Fresh Water System

Sanitize the fresh water system before you use it the first time, when you recommission your boat after winter storage, or when the system has not been in use for extended periods of time.

Note: Fresh water tank must be empty before beginning sanitizing process. Empty tank if necessary.

CAUTION

CAUTION: Bleach causes eye and skin irritation. Notify all person on board the fresh water system is being sanitized. Do not allow anyone to drink water from fresh water system while it is being sanitized. In case of body contact, follow directions on bleach container.

TO SANITIZE THE TANK:

1. In appropriate size container, make a solution of 2-1/2 cups (20 oz.) of household bleach and 10 gallons of fresh water.
2. Place solution into empty tank, then fill to capacity with fresh water.
3. Manually pump water throughout system.
4. When a steady stream of water is coming from the faucet, air is out of the system. Close faucet and pump off.
5. Allow treated water solution to remain in tank for 3 to 4 hours.
6. Drain treated water solution from tank and lines.

SPORT BOATS

7. Thoroughly flush entire system with fresh water after each sanitizing.

Note: If fresh water tastes like chlorine after sanitizing, pour a solution of 1 quart vinegar and 5 gallons of fresh water into the tank and allow solution to stand in tank for several days. Then drain entire system and flush with fresh water. Fill tank with fresh water.

INITIAL START-UP

1. Fill fresh water system.
2. Manually pump water faucet until water is coming out faucet or if optional pressure water system, turn on water pump breaker.
3. Open galley faucet to allow air to escape.
4. Close faucet when steady flow of water appears.

Optional Water Pump and Filter

Once the water pump switch is ON, the water pump supplies water under pressure to the fresh water system. The filter keeps particles from entering the pump reservoir. Check the filter periodically and clean if necessary. A clogged filter may result in low water pressure to the system.

Before servicing the filter, turn the water system breaker OFF and release pressure on the system by opening all faucets. To clean the filter, remove screen and rinse with clean water. Replace and make sure the O-ring is seated properly when installing the cover.

Note: Refer to the water pump manual for detailed operation and maintenance procedures.

SYSTEMS

SPORT BOATS

MARINE SANITATION DEVICES

A porta-potti is standard on some models. On some models a pump-out porta potti is optional (Figure 3.1)

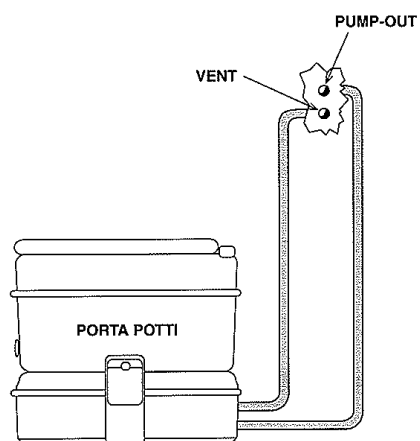


Figure 3.1 Pump-Out Porta-Potti

Note: See the owner's manual supplied by the manufacturer for safety precautions and for detailed operation, maintenance, and winterizing procedures. The manual is in your owner's packet.

The U.S. Coast Guard has also issued regulations requiring boats to have a sanitation system on board to control pollution. Wastes are to be stored in a holding tank or other device, such as a Porta-Potti, until the wastes can be pumped out or otherwise disposed of at a shore facility. Discharging this waste overboard is in most cases prohibited. Check with the Coast Guard regarding regulations in your area.

SYSTEMS

DECK BOATS

3

This chapter discusses the various systems needed to make your Chaparral boat a "home away from home." These include the electrical, fuel, fresh water, and sanitation systems and related equipment.

Note: The term "engine" in this chapter means one or two engines, depending on how your boat is equipped.

ELECTRICAL SYSTEMS

Your Chaparral boat has a 12 volt direct current (DC) battery system. Electrical schematics for your boat are available from your dealer.

Safety Precautions

Follow these precautions when working with or on electrical systems or electrically powered equipment:

1. Shut off power supply before starting work.
2. Use insulated mats to prevent accidental grounding.
3. Make sure clothing is dry, not wet or damp. Keep skin dry.
4. Remove wrist watch and jewelry.

12 Volt DC Power

Batteries are the source of power for the 12 volt DC (direct current) electrical system. The batteries are charged through the engine-driven alternator. The voltmeter on the instrument panel in the dash shows the battery charging rate when the engine is running.

The negative terminal of each battery is connected to the grounding studs of the main engine(s). This type of negative ground system is

the approved system for marine DC electrical systems. If you add additional equipment to your boat it must be adaptable to the negative ground system.

NOTE: Power feeds for accessory equipment must NOT be taken from the voltmeter terminals. A fuse block near the helm has been provided with additional accessory hookups. Consult your Chaparral dealer for additional DC power needs on your boat.

CAUTION

CAUTION: When adding electrical equipment, be careful not to overload the fuse block.

Note: The appropriate fuse must be used. Consult a qualified technician for proper fuse size.

Battery

Note: Two batteries are optional equipment on some models.

The battery installed on your boat by your Chaparral dealer supplies your boat with DC current for lights, starting the engine, and power to run accessories. It uses an absorbent electrolyte principle and provides high reserve capacity and cold cranking performance. When the engine is running, the alternator supplies the power needed to keep the batteries charged. Lights and accessories draw power from the batteries.

Battery Selector Switch

Some models have a battery selector switch as optional equipment. If your boat has a battery selector switch, you will find it in the engine compartment.

SYSTEMS

On/Off Switch with One Battery

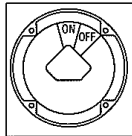
Sunesta 250, Sunesta 230, Sunesta 210

This switch has two positions:

OFF Power supplied to automatic bilge pump and optional mer-
cathode.

ON Power supplied to entire boat

To start engine, place switch to ON position. Power is now supplied to your boat from the battery. Then start engine. Leave switch in this position to fully recharge battery.



Note: If engine is off and you are using boat accessories, you need to start your engine occasionally to allow engine alternator to fully recharge battery. Otherwise you may drain battery down and you will not have enough power to start engine.

Single Selector Switch with Two Batteries

A selector switch with two batteries is optional on some models.

This battery selector switch has four positions:

OFF Power supplied to automatic bilge pumps and optional mer-
cathode from both batteries.

1. Use only Number 1 battery

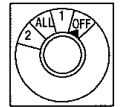
ALL Use Number 1 and Number 2 batteries

2. Use only Number 2 battery

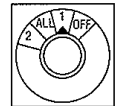
DECK BOATS

Recommended settings are as follows:

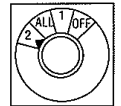
1. When boat is not in use or power is not required, turn the switch to OFF. The only power supplied at this setting is the automatic bilge pumps and optional mercathode.



2. To start the engine, place switch in Number 1 position. With this setting, power will now be supplied to your boat from the Number 1 battery. This will allow the engine alternator to charge both batteries.



3. For cabin power with engine off, place the switch in the Number 2 position. Power will now be supplied to your boat from the Number 2 battery.



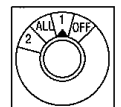
Note: Chaparral does not recommend leaving the switch in the ALL position when the engine is off. This will drain both batteries down and you will not have a starting battery.

4. If one battery is low, you still have the option of starting the engine from the other battery.



Example 1: If the Number 1 battery is low, place the switch in the Number 2 position. Then start the engine. This will allow the engine alternator to recharge both batteries.

Example 2: If the Number 2 battery is low, place the switch in the Number 1 position. Then start the engine. This will allow the engine alternator to recharge both batteries.



Note: When recharging a low battery, be sure to run the engine for a sufficient amount of time to fully recharge the batteries.

Note: Chaparral does not recommend any other settings than mentioned because of possible damage to batteries or engine alternator.

SYSTEMS

Electrolysis

Electrolysis is the decomposition of metals exposed to an electric current. Sacrificial zinc anodes, installed by the dealer or the engine manufacturer, protect submerged metal. Electrolysis attacks the softest or least "noble" metals first. Zinc, a less noble metal, decomposes before the more noble metals. Zinc is also used to protect metal exposed to salt water. Salt causes a galvanic action that decomposes metals.

Important: Check these zinc anodes periodically and have them replaced as required. See your Chaparral dealer for parts and service. Damage resulting from electrolytic corrosion is not covered by the Chaparral Boat warranty.

FUEL SYSTEM

The internal fuel system on your Chaparral boat meets all current Federal requirements. The fuel tank is forward of the engine compartment under the cockpit floor. The fuel tank fill pipe is on the outside deck. The fuel tank vent allows air to escape as the tank is being filled and helps equalize tank pressure as temperatures change. It is located near the fuel fill on all stern drive models. The tank has an anti-siphon valve which keeps fuel from leaking into the boat in case of fuel line breaks.

Check the condition of the fuel tank components from time to time. Fuel tank fittings are accessible through the inspection plate in the cockpit floor.

FRESH WATER SYSTEM

Some models have a non-pressurized water system as standard equipment and a pressurized system as optional. The fresh water system provides water at surrounding air temperatures from an onboard storage tank. A water pump and filter provide water under pressure to the optional transom shower and the sink in the galley. See Chapter 4 for more information.

DECK BOATS

On some models, the fresh water tank is filled through the fill plate on the side of the deck. The tank vent is next to the fill plate. The vent allows air to enter and escape as water levels change. Fill the tank only with potable water. Using and refilling the tank often keeps drinking water fresh and clean.

Sanitizing the Fresh Water System

Sanitize the fresh water system before you use it the first time, when you recommission your boat after winter storage, or when the system has not been in use for extended periods of time.

Note: Fresh water tank must be empty before beginning sanitizing process. Empty tank if necessary.

CAUTION

CAUTION: Bleach causes eye and skin irritation. Notify all persons on board the fresh water system is being sanitized. Do not allow anyone to drink water from fresh water system while it is being sanitized. In case of body contact, follow directions on bleach container.

TO SANITIZE THE TANK:

1. In appropriate size container, make a solution of 2-1/2 cups (20 oz.) of household bleach and 10 gallons of fresh water.
2. Place solution into empty tank, then fill to capacity with fresh water.
3. Manually pump water throughout system.
4. When a steady stream of water is coming from the faucet, air is out of the system. Close faucet and pump off.
5. Allow treated water solution to remain in tank for 3 to 4 hours.

SYSTEMS

6. Drain treated water solution from tank and lines.
7. Thoroughly flush entire system with fresh water after **each** sanitizing.

Note: If fresh water tastes like chlorine after sanitizing, pour a solution of 1 quart vinegar and 5 gallons of fresh water into the tank and allow solution to stand in tank for several days. Then drain entire system and flush with fresh water. Fill tank with fresh water.

INITIAL START-UP

1. Fill fresh water system.
2. Manually pump water faucet until water is coming out faucet or if optional pressure water system, turn on water pump breaker.
3. Open galley faucet to allow air to escape.
4. Close faucet when steady flow of water appears.

OPTIONAL WATER PUMP AND FILTER

Once the water pump switch is ON, the water pump supplies water under pressure to the fresh water system. The filter keeps particles from entering the pump reservoir. Check the filter periodically and clean if necessary. A clogged filter may result in low water pressure to the system.

Before servicing the filter, turn the water system breaker OFF and release pressure on the system by opening all faucets. To clean the filter, remove screen and rinse with clean water. Replace and make sure the O-ring is seated properly when installing the cover.

Note: Refer to the water pump manual for detailed operation and maintenance procedures.

DECK BOATS

MARINE SANITATION DEVICES

A porta-potti is standard on some models. On some models a pump-out porta potti is optional (Figure 3.1)

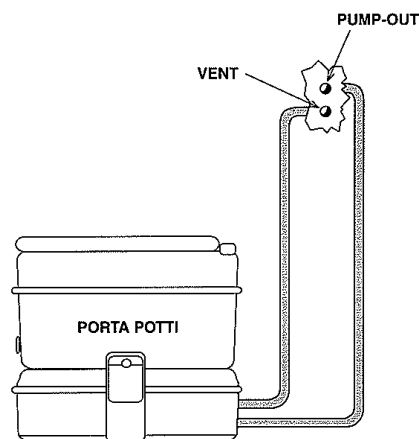


Figure 3.1 Pump-Out Porta-Potti

Note: See the owner's manual supplied by the manufacturer for safety precautions and for detailed operation, maintenance, and winterizing procedures. The manual is in your owner's packet.

The U.S. Coast Guard has also issued regulations requiring boats to have a sanitation system on board to control pollution. Wastes are to be stored in a holding tank or other device, such as a Porta-Potti, until wastes can be pumped out or otherwise disposed of at a shore facility. Discharging this waste overboard is in most cases prohibited. Check with the Coast Guard regarding regulations in your area.

SYSTEMS

CRUISERS

3

This chapter discusses the various systems needed to make your Chaparral boat a "home away from home." These include the electrical, fuel, fresh water, and sanitation systems and related equipment. Figures 3.1 to 3.7 show the typical location of system equipment for boats with twin and single engines, respectively.

Note: For location of items listed in this chapter, refer to the respective drawing as shown below. Depending on how your boat is equipped the location of some items may be different than shown in the illustration.

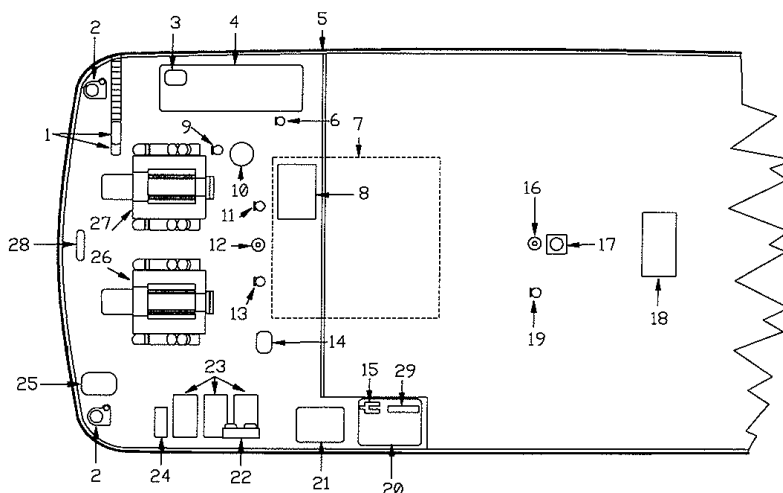


Figure 3.1 Signature 31 Engine Compartment

- | | | |
|--------------------------------------|--|---|
| 1. Blowers | 11. Air Conditioning Seacock (Optional) | 21. Water Heater with Heat Exchanger (Optional) |
| 2. Lower Unit Trim Pump Reservoirs | 12. Aft Bilge Pump | 22. Selector Switches |
| 3. Water Pump & Filter | 13. Air Conditioning Sea Strainer (Optional) | 23. Batteries |
| 4. Fresh Water Tank | 14. Air Conditioning Sea Pump (Optional) | 24. Battery Charger (Optional) |
| 5. Bulkhead | 15. Y-Valve (Optional) | 25. Trim Tab Reservoir |
| 6. Generator Sea Strainer (Optional) | 16. Forward Bilge Pump | 26. Starboard Engine |
| 7. Fuel Tank | 17. Sump Pump | 27. Port Engine |
| 8. Generator (Optional) | 18. Air Conditioner (Optional) | 28. Halon Fire Extinguisher |
| 9. Generator Seacock (Optional) | 19. Head Seacock | 29. Macerator (Optional) |
| 10. Generator Muffler (Optional) | 20. Holding Tank | |

SYSTEMS

CRUISERS

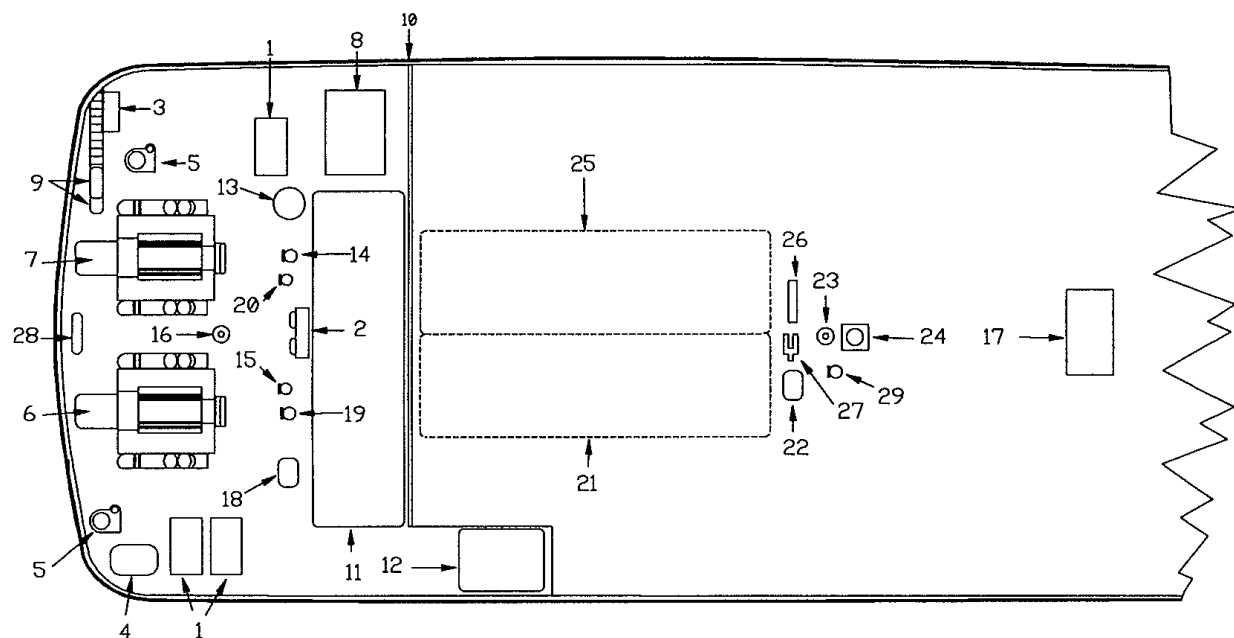


Figure 3.2 Signature 29 Engine Compartment - Twin Engine

- | | | |
|-----------------------------------|---|--|
| 1. Batteries (3) | 11. Fuel Tank | 20. Air Conditioner Seacock (Optional) |
| 2. Battery Selector Switches | 12. Water Heater with Heat Exchanger (Optional) | 21. Fresh Water Tank |
| 3. Battery Charger (Optional) | 13. Generator Muffler (Optional) | 22. Water Pump and Filter |
| 4. Trim Tab Pump | 14. Generator Sea Strainer (Optional) | 23. Forward Bilge Pump |
| 5. Lower Unit Trim Pump Reservoir | 15. Generator Seacock (Optional) | 24. Sump Pump |
| 6. Starboard Engine | 16. Aft Bilge Pump | 25. Holding Tank (Optional) |
| 7. Port Engine | 17. Air Conditioner (Optional) | 26. Macerator (Optional) |
| 8. Generator (Optional) | 18. Air Conditioner Sea Pump (Optional) | 27. Y-Valve (Optional) |
| 9. Blowers | 19. Air Conditioner Sea Strainer (Optional) | 28. Halon Fire Extinguisher |
| 10. Bulkhead | | 29. Head Seacock (Optional) |

SYSTEMS

CRUISERS

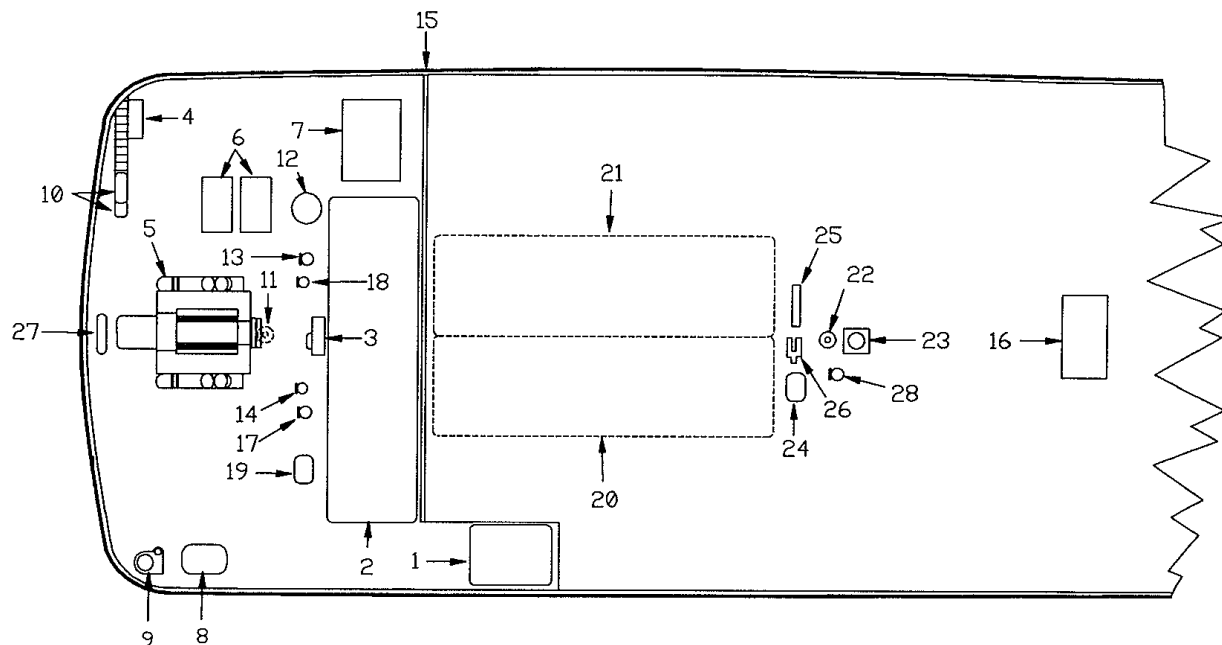


Figure 3.3 Signature 29 Engine Compartment - Single Engine

- | | | |
|--|---|-----------------------------|
| 1. Water Heater with Heat Exchanger (Optional) | 11. Aft Bilge Pump | 21. Holding Tank (Optional) |
| 2. Fuel Tank | 12. Generator Muffler (Optional) | 22. Forward Bilge Pump |
| 3. Battery Selector Switch | 13. Generator Sea Strainer (Optional) | 23. Sump Pump |
| 4. Battery Charger (Optional) | 14. Generator Seacock (Optional) | 24. Water Pump and Filter |
| 5. Engine | 15. Bulkhead | 25. Macerator (Optional) |
| 6. Batteries (2) | 16. Air Conditioner (Optional) | 26. Y-Valve (Optional) |
| 7. Generator (Optional) | 17. Air Conditioner Sea Strainer (Optional) | 27. Halon Fire Extinguisher |
| 8. Trim Tab Pump | 18. Air Conditioner Seacock (Optional) | 28. Head Seacock (Optional) |
| 9. Lower Trim Pump Reservoir | 19. Air Conditioner Sea Pump (Optional) | |
| 10. Blowers | 20. Fresh Water Tank | |

SYSTEMS

CRUISERS

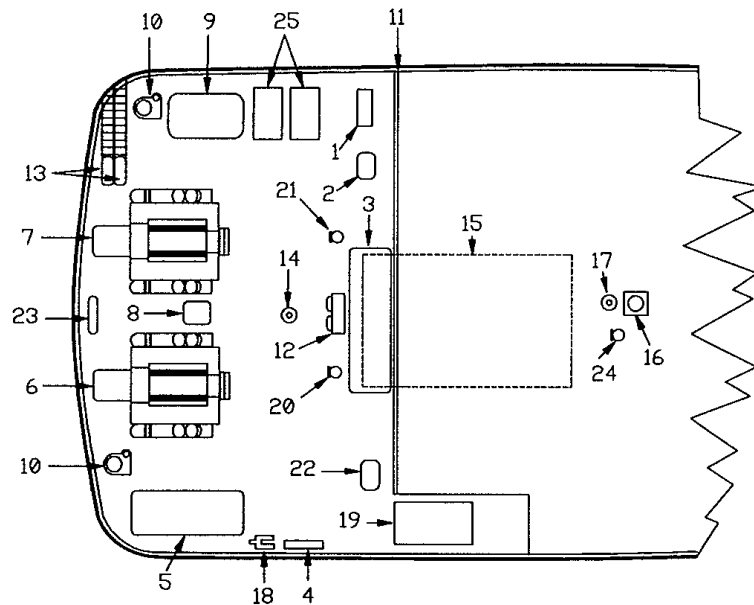


Figure 3.4 Signature 27 Engine Compartment - Twin Engine

- | | | |
|--|------------------------------------|---|
| 1. Battery Charger (Optional) | 10. Lower Unit Trim Pump Reservoir | 20. Air Conditioner Sea Strainer (Optional) |
| 2. Water Pump and Filter | 11. Bulkhead | 21. Air Conditioner Seacock (Optional) |
| 3. Fresh Water Tank | 12. Battery Selector Switches | 22. Air Conditioner Sea Pump (Optional) |
| 4. Macerator (Optional) | 13. Blowers | 23. Halon Fire Extinguisher |
| 5. Holding Tank (Optional) | 14. Aft Bilge Pump | 24. Head Seacock (Optional) |
| 6. Starboard Engine | 15. Fuel Tank | 25. Batteries (2) |
| 7. Port Engine | 16. Sump Pump | |
| 8. Trim Tab Pump | 17. Forward Bilge Pump | |
| 9. Water Heater with Heat Exchanger (Optional) | 18. Y-Valve (Optional) | |
| | 19. Air Conditioner (Optional) | |

SYSTEMS

CRUISERS

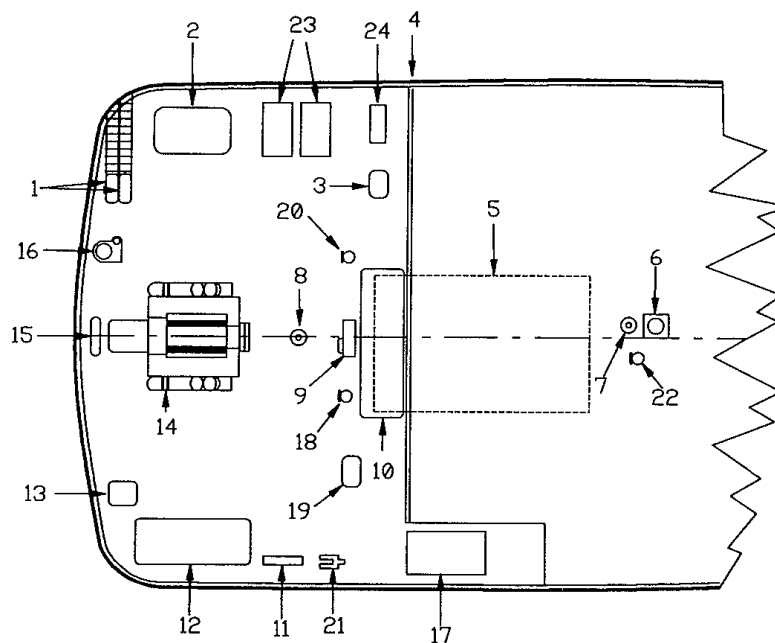


Figure 3.5 Signature 27 Engine Compartment - Single Engine

- | | | |
|--|---|--|
| 1. Blowers | 10. Fresh Water Tank | 20. Air Conditioner Seacock (Optional) |
| 2. Water Heater with Heat Exchanger (Optional) | 11. Macerator (Optional) | 21. Y-Valve (Optional) |
| 3. Water Pump and Filter | 12. Holding Tank (Optional) | 22. Head Seacock (Optional) |
| 4. Bulkhead | 13. Trim Tab Pump | 23. Batteries (2) |
| 5. Fuel Tank | 14. Engine | 24. Battery Charger (Optional) |
| 6. Sump Pump | 15. Halon Fire Extinguisher | |
| 7. Forward Bilge Pump | 16. Lower Unit Trim Pump Reservoir | |
| 8. Aft Bilge Pump | 17. Air Conditioner (Optional) | |
| 9. Battery Selector Switch | 18. Air Conditioner Sea Strainer (Optional) | |
| | 19. Air Conditioner Sea Pump (Optional) | |

SYSTEMS

CRUISERS

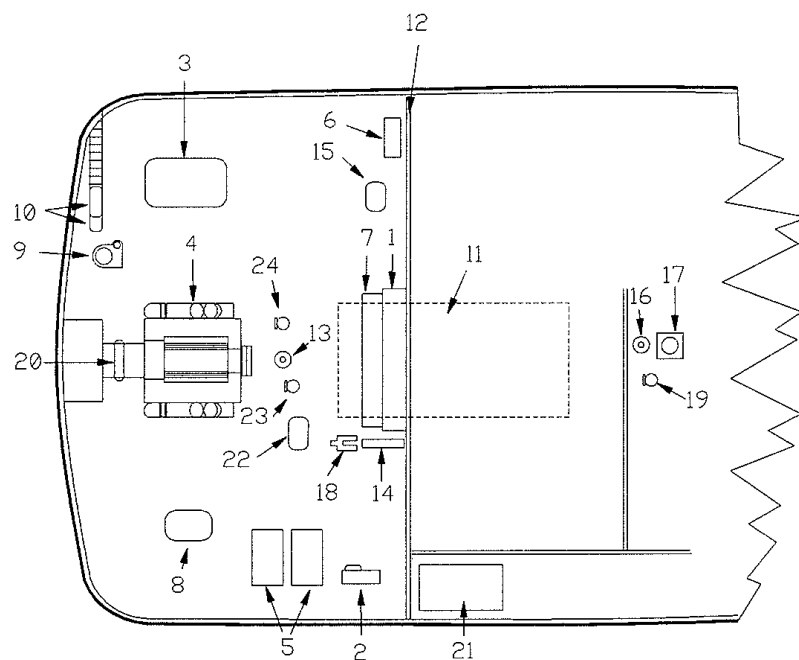


Figure 3.6 Signature 25 Engine Compartment

- | | | |
|--|-----------------------------------|---|
| 1. Fresh Water Tank | 9. Lower Unit Trim Pump Reservoir | 18. Y-Valve (Optional) |
| 2. Battery Selector Switch | 10. Blowers | 19. Head Seacock (Optional) |
| 3. Water Heater with Heat Exchanger (Optional) | 11. Fuel Tank | 20. Halon Fire Extinguisher (Optional) |
| 4. Engine | 12. Bulkhead | 21. Air Conditioner (Optional) |
| 5. Batteries (2) | 13. Aft Bilge Pump | 22. Air Conditioner Sea Pump (Optional) |
| 6. Battery Charger (Optional) | 14. Macerator (Optional) | 23. Air Conditioner Sea Strainer (Optional) |
| 7. Holding Tank (Optional) | 15. Water Pump and Filter | 24. Air Conditioner Seacock (Optional) |
| 8. Trim Tab Pump | 16. Forward Bilge Pump | |
| | 17. Sump Pump | |

SYSTEMS

CRUISERS

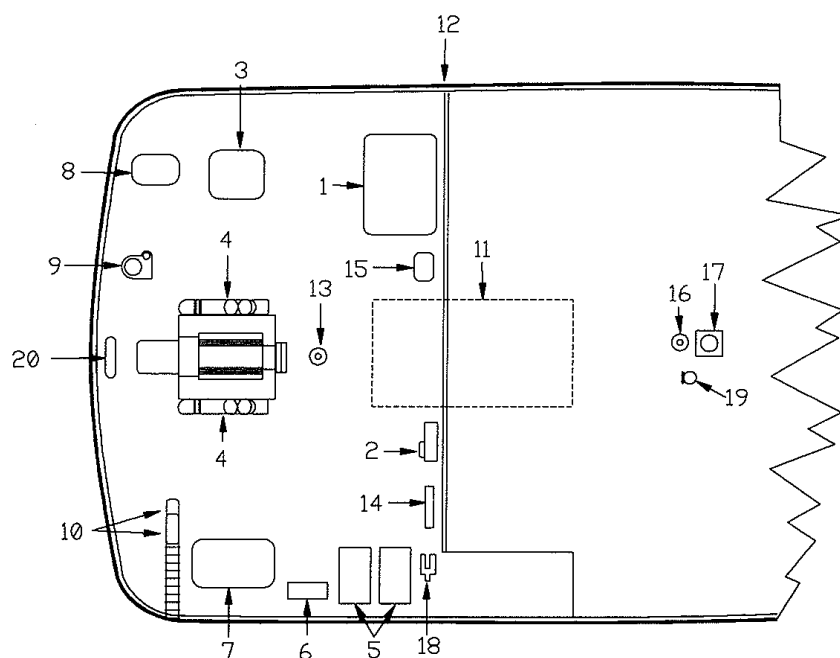


Figure 3.7 Signature 24 Engine Compartment

- | | | |
|---|-----------------------------------|--|
| 1. Fresh Water Tank | 7. Holding Tank (Optional) | 14. Macerator (Optional) |
| 2. Battery Selector Switch | 8. Trim Tab Pump (Optional) | 15. Water Pump and Filter |
| 3. Water Heater with Exchanger (Optional) | 9. Lower Unit Trim Pump Reservoir | 16. Forward Bilge Pump |
| 4. Engine | 10. Blowers | 17. Sump Pump |
| 5. Batteries (2) | 11. Fuel Tank | 18. Y-Valve (Optional) |
| 6. Battery Charger (Optional) | 12. Bulkhead | 19. Head Seacock (Optional) |
| | 13. Aft Bilge Pump | 20. Halon Fire Extinguisher (Optional) |

SYSTEMS

Note: The term “engine” in this chapter means one or two engines, depending on how your boat is equipped.

ELECTRICAL SYSTEMS

Your Chaparral boat has two electrical systems: a 12 volt, direct current (DC) battery and a 120 volt alternating current (AC) system. An optional generator or shore power connection provides power to the AC system. Electrical schematics for your boat are available from your dealer.

Safety Precautions

Follow these precautions when working with or on electrical systems or electrically powered equipment:

1. Shut off power supply before starting work.
2. Use insulated mats to prevent accidental grounding.
3. Make sure clothing is dry, not wet or damp. Keep skin dry.
4. Remove wrist watch and jewelry.

12 Volt DC Power

Batteries are the source of power for the 12 volt DC (direct current) electrical system. The batteries are charged through the engine-driven alternator or the optional AC (alternating current) battery charger. The voltmeter on the instrument panel in the dash shows the battery charging rate when the engine is running. Power from the battery is supplied through the selector switch in the engine compartment, then to the helm dash and the main distribution panel in the cabin. Exceptions to this power supply are the forward and aft bilge pumps, refrigerator, macerator, and the windlass. Breakers for these items are in the engine compartment on the selector switch box. All DC power is distributed through the battery selector switch.

CRUISERS

The negative terminal of each battery is connected to the grounding studs of the main engine(s) and generator. This type of negative ground system is the approved system for marine DC electrical systems. If you add additional equipment to your boat it must be adaptable to the negative ground system. Chaparral supplies a fuse block at the helm for additional electrical equipment.

CAUTION

CAUTION: When adding electrical equipment, be careful not to overload the fuse block.

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

Batteries

The batteries installed on your boat by your Chaparral dealer supply your boat with DC current for lights, starting the engine or generator, and power to run accessories. They use an absorbent electrolyte principle and provide high reserve capacity and cold cranking performance. When the engine is running, the alternator supplies the power needed to keep the batteries charged. Lights and accessories draw power from the batteries.

Battery Selector Switch

The battery selector switch is in the engine compartment or stern area of your boat. Some models will have more than one switch.

Single Selector Switch with Two Batteries

These settings are recommended for the following single engine models: Signature 29, Signature 27, Signature 25, and Signature 24.

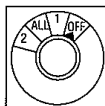
SYSTEMS

This battery selector switch has four positions:

- | | |
|-----|---|
| OFF | Power supplied only to automatic bilge pumps, optional mercathode and carbon monoxide detector. |
| 1 | Use only Number 1 battery |
| ALL | Use Number 1 and Number 2 batteries |
| 2 | Use only Number 2 battery |

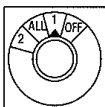
Recommended settings are as follows:

1. When boat is not in use or power is not required, turn the switch to OFF. The only power supplied at this setting is to the automatic bilge pumps, optional mercathode and carbon monoxide detector from both batteries.

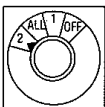


Note: When the switch is set to OFF, the optional battery charger will charge both batteries. Shore power or the generator must be hooked up and the battery charger breaker ON to recharge the batteries.

2. To start the engine, place switch in Number 1 position. With this setting, power will be supplied to your boat from the Number 1 battery. This will allow the engine alternator to charge both batteries.



3. For cabin power with engine off, place the switch in the Number 2 position. Power will now be supplied to your boat from the Number 2 battery.

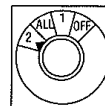


Note: Chaparral does not recommend leaving the switch in the ALL position when the engine is off. This will drain both batteries down and you will not have a starting battery.

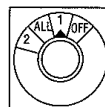
4. If one battery is low, you still have the option of starting the engine from the other battery.

CRUISERS

Example 1: If the Number 1 battery is low, place the switch in the Number 2 position. Then start the engine. This will allow the engine alternator to recharge both batteries.



Example 2: If the Number 2 battery is low, place the switch in the Number 1 position. Then start the engine. This will allow the engine alternator to recharge both batteries.



Note: When recharging a low battery, be sure to run the engine for a sufficient amount of time to fully recharge the batteries.

Note: Optional generator receives its starting power supply from both batteries. When the switch setting is in the Number 1 position, it receives its power from the Number 1 battery. When the switch setting is in the Number 2 position, it receives its power from the Number 2 battery.

Note: Chaparral does not recommend any other settings than mentioned because of possible damage to batteries or engine alternator.

Two Selector Switches with Two Batteries

These settings are recommended for the Signature 27 model with twin engines.

The port battery selector switch has four positions:

- | | |
|-----|---|
| OFF | Power supplied only to automatic bilge pumps, optional mercathode and carbon monoxide detector. |
| 1 | Use only port battery |
| ALL | Use port and starboard batteries |
| 2 | Use only starboard battery |

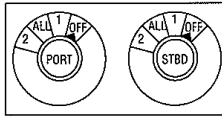
SYSTEMS

The starboard battery selector switch has four positions:

- OFF Power supplied only to automatic bilge pumps, optional mercathode and carbon monoxide detector.
- 1 Use only port battery
- ALL Use port and starboard batteries
- 2 Use only starboard battery

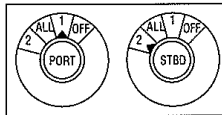
Recommended settings are as follows:

- When boat is not in use or power is not required, place both selector switches in the OFF position. The only power supplied at this setting is to the bilge pumps, optional mercathode and carbon monoxide detector.

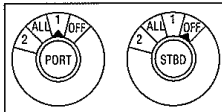


Note: With both switches set to OFF, the battery charger will charge both batteries. Shore power must be hooked up with battery charger breaker ON to recharge the batteries.

- To start the engines, place STBD (starboard) switch in Number 2 position and port switch in Number 1 position. With this setting, the port battery will supply power to the port engine and the starboard battery will supply power to the starboard engine. This will allow both engine alternators to charge both batteries.



- For cabin power with engine off, place STBD switch in the OFF position and the port switch in the Number 1 position. Power will now be supplied to your boat from the port battery.

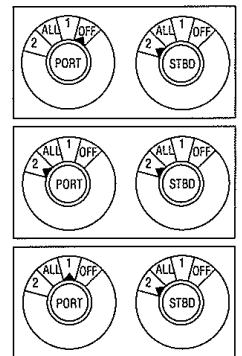


CRUISERS

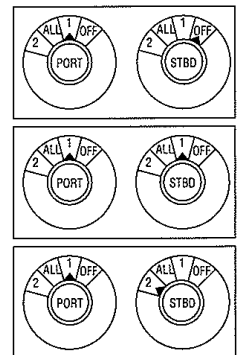
Note: Chaparral does not recommend leaving both switches in the ALL position when the engines are off. This will drain both batteries down and you will not have a starting battery.

- If one battery is low, you still have the option of starting the engine from the other battery.

Example 1: If the port battery is low, place the STBD switch in the Number 2 position and the port switch in the OFF position. Then start the starboard engine. After the engine is running, place the port switch in the Number 2 position and start your port engine. When both engines are running, place the port switch in the Number 1 position. This setting will allow both engine alternator(s) to recharge both batteries.



Example 2: If the starboard battery is low, place the starboard switch to the OFF position and the port switch in the Number 1 position. Then start the port engine. After the engine is running, place the starboard switch in the Number 1 position and start the starboard engine. When both engines are running, place the starboard switch in the Number 2 position. This setting will allow both engine alternator(s) to recharge both batteries.



SYSTEMS

Note: When recharging low batteries, be sure to run engines for a sufficient amount of time to fully recharge the batteries.

Note: Chaparral does not recommend any other settings than mentioned because of possible damage to batteries or engine alternator.

Two Selector Switches with Three Batteries

These settings are recommended for the Signature 31 and Signature 29 with twin engines.

The port battery selector switch has four positions:

OFF	Power supplied to automatic bilge pumps, optional carbon monoxide detector and mercathode from port and starboard battery.
1	Port battery
ALL	Port and house battery
2	House battery

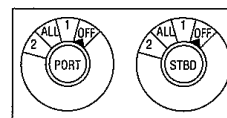
The starboard battery selector switch has four positions:

OFF	Power supplied to automatic bilge pumps, optional carbon monoxide detector and mercathode from starboard and port battery.
1	Starboard battery
ALL	Starboard and house battery
2	House battery

CRUISERS

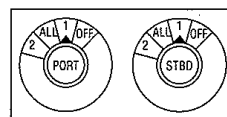
Recommended settings are as follows:

1. When boat is not in use or power is not required, place both selector switches in the OFF position. The only power supplied at this setting is to the automatic bilge pumps, optional mercathode and carbon monoxide detector.

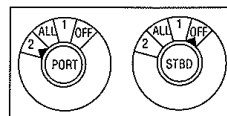


Note: With both switches set to OFF, the battery charger will charge all three batteries. Shore power or the generator must be hooked up and running with the battery charger breaker ON to recharge the batteries.

2. To start the engines, place both switches in the Number 1 position. With this setting, the port battery will supply power to the port engine and the starboard battery will supply power to the starboard engine. This setting will allow both engine alternators to recharge all three batteries.



3. For cabin power with engines off, place STBD switch in the OFF position and the port switch in the Number 2 position. Power will now be supplied to your boat from the house battery.



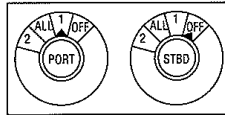
Note: Chaparral does not recommend leaving both selector switches in the ALL position when the engines are off. This will drain all batteries down and you will not have a starting battery.

4. If two batteries are low, you still have the option of starting both engines and generator off one battery.

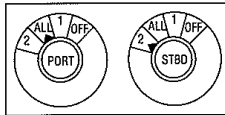
SYSTEMS

Example 1: If the house battery and starboard battery are low, power can be supplied to both engines by:

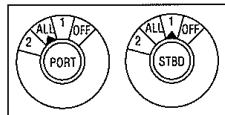
A. Placing the port switch in the Number 1 position and the starboard switch in the OFF position. Now you can start the port engine.



B. Place the port switch in the ALL position and the starboard switch in the Number 2 position. Now you can start the starboard engine and generator.



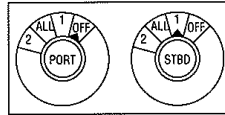
C. After both engines are started, place the starboard switch in the Number 1 position. This setting will allow both engine alternators to recharge all three batteries.



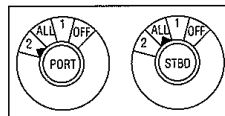
Note: When recharging low batteries, be sure to run engines for a sufficient amount of time to fully recharge the batteries.

Example 2: If the house battery and the port battery are low, power can be supplied to both engines by:

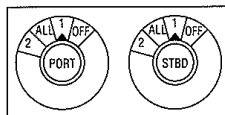
A. Placing the starboard switch to the Number 1 position and the port switch in the OFF position. Now you can start the starboard engine and generator.



B. Then place the STBD switch to the ALL position and the port switch to the Number 2 position. Now you can start the port engine.



C. After both engines are started, place both switches in the Number 1 position. This setting will allow both engine alternators to recharge all three batteries.



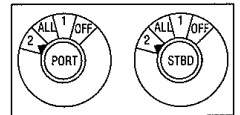
3-12c

CRUISERS

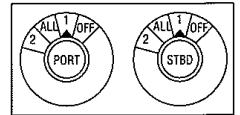
Note: When recharging low batteries, be sure to run engines for a sufficient amount of time to fully recharge the batteries.

Example 3: If port and starboard batteries are low, power can be supplied to both engines from the house battery by:

A. Placing the port and starboard switch to the Number 2 position. Now you can start both engines and generator.



B. After both engines are started, place both port and STBD switches in the Number 1 position. This setting will allow both engine alternators to recharge all three batteries.



Note: When recharging low batteries, be sure to run engines for a sufficient amount of time to fully recharge the batteries.

Note: Optional generator receives its power supply from the STBD selector switch. Place the switch in Number 1 position; power supply comes from the starboard battery. Place STBD switch in Number 2 position; power is now supplied from the house battery.

Note: Chaparral does not recommend any other settings than mentioned because of possible damage to batteries or engine alternator.

AC/DC Converter and Battery Charger

Your Chaparral boat may have an optional battery charging system which operates off 120 volt AC power from shore or the generator charging system. Turn the charger on at the main cabin electrical panel whenever your boat is connected to shore power to keep batteries fully charged. The AC-to-DC converting and charging system is fully automatic and permanently wired into the 12 volt DC system. If the monitored battery level drops under the full charge range, the

6/95

SYSTEMS

charger automatically turns ON and restores the battery to FULL charge status. If the battery is deeply discharged, the charger will deliver full output. Output automatically decreases as the battery is charged. If the battery is fully charged, the charger provides a trickle charge as needed.

120 Volt AC Power

The alternating current (AC) electrical system operates off a standard 30 amp 120 volt, 60 cycle shore power system or the optional onboard generator. Schematics of the AC electrical system for your boat are available from your dealer.

The main distribution panel in the cabin area has SHIP and SHORE toggle switches which are covered by a sliding panel to prevent turning both switches to ON at the same time.

If your boat has an air conditioning system, the main panel has an additional set of SHIP and SHORE switches dedicated to the air conditioner. If your boat has an onboard generator, you can use the generator to power the air conditioner. More detailed information about the generator and the air conditioning is in Chapter 4 and in the manufacturer's literature in the owner's packet. Check with your Chaparral dealer about proper generator usage.

Shore Power

CAUTION

CAUTION: To prevent damage to electrical system, never operate shore power system at less than 105 volts.

Your Chaparral boat has a single male receptacle outside on the deck for shore power connection (two receptacles if you have air conditioning). When not in use, a water-resistant cover protects the receptacle.

CRUISERS

Before you connect your boat to shore power, turn off the main cabin circuit breakers. Attach the shore power cord to the boat first and turn clockwise to lock. Thread the locking ring on the inlet to secure the cord. Connecting the cord to the boat first will prevent dropping a "hot" cord into the water. (When you leave the dock, remove the cord from the dockside shore outlet first.) If you have any questions, contact your Chaparral dealer.

Make sure the dockside shore power breaker is OFF, then plug in the cord. Turn the dockside shore power breaker on. Immediately check the polarity light(s) on the main panel. If the REVERSED POLARITY light on the main cabin panel illuminates, **do not turn on the main cabin breaker.**

CAUTION

CAUTION: Electric shock is possible if you turn on main cabin breaker when reverse polarity is illuminated.

Turn off the dockside shore power breaker and disconnect your shore power cord. Inform the marina manager of the problem. If the reverse polarity light does not illuminate, push the test button next to the light. If the light is functioning properly it will illuminate during this test and you are now assured that the polarity of your shore power connection is correct. At this point, turn on the main cabin AC circuit breaker(s). You may now use AC powered components on your boat.

Important: *Some equipment will not work or may be damaged if polarity is reversed. Damage caused by reversed polarity is not covered under your warranty. Be sure polarity is correct when you connect your boat to shore power.*

When you are using AC power, a circuit may overload if you are using several accessories at the same time. Turning off one accessory may be necessary while you operate another.

SYSTEMS

Generator

The optional onboard generator can also provide AC power to your boat's electrical system. The generator is mounted in the engine compartment. AC power output, in kilowatts, will vary, depending on the generator selected. The control panel for the generator is on the main panel in the cabin. Before turning on the ship circuit breaker to energize the AC system with the generator, test the polarity of your system as described in the Shore Power section on page 3-12 of this manual.

Note: See the generator instruction manual for detailed information about safe operation and proper maintenance.

Lighting

Lighting operates off the 12 volt DC system. Turn lights on or off at the main electrical panel in the cabin or at the light fixture. See your Chaparral dealer for information regarding bulb replacement.

Ground Fault Interrupter Outlet

The ground fault interrupter outlet provides protection against currents which can be dangerous even though they do not overload 15- or 20 ampere circuit breakers. These outlets, which have a test and reset switch in the middle of the faceplate, provide ground fault protection to the head and galley outlets on the boat. If there is a difference of more than 5 milliamperes, a safety switch trips in the outlet and interrupts the circuit. This protects the person who is operating the electrical equipment from serious electric shock or loss of life. The outlet may not eliminate the feeling of an electric shock, but it does open the circuit quickly enough to prevent injury to a person of normal health.

When the outlet's circuit breaker is tripped, you must push the RESET button. Check this outlet periodically by pushing the TEST button. Pushing the TEST button cuts power to some 120 volt outlets.

CRUISERS

Electrolysis

Electrolysis is the decomposition of metals exposed to an electric current. When your boat is connected to a shore power AC electrical system, it is also connected to an earth ground circuit. This circuit "grounds" all onboard metal parts to the earth on shore. Although it provides protection against hazardous shocks, it creates an electrolytic current which causes the decomposition of all submerged metal.

Sacrificial zinc anodes, installed by the dealer or the engine manufacturer, protect submerged metal. Electrolysis attacks the softest or least "noble" metals first. Zinc, a less noble metal, decomposes before the more noble metals. Zinc is also used to protect metal exposed to salt water. Salt causes a galvanic action that decomposes metals.

Important: Check these zinc anodes periodically and have them replaced as required. See your Chaparral dealer for parts and service. Damage resulting from electrolytic corrosion is not covered by the Chaparral Boat warranty.

FUEL SYSTEM

The internal fuel system onboard your Chaparral boat meets all current Federal requirements. The fuel tank fill pipe is on the outside deck. The fuel tank vent allows air to escape as the tank is being filled and helps equalize tank pressure as temperatures change. It is located near the fuel fill. The tank has an anti-siphon valve which keeps fuel from leaking into the boat in case of fuel line breaks.

Check the condition of the fuel tank components from time to time. Check with your Chaparral dealer about the location of fuel tank fittings.

FRESH WATER SYSTEM

The fresh water system provides water at surrounding air temperatures for bathing from an onboard storage tank. A water pump and

SYSTEMS

CRUISERS

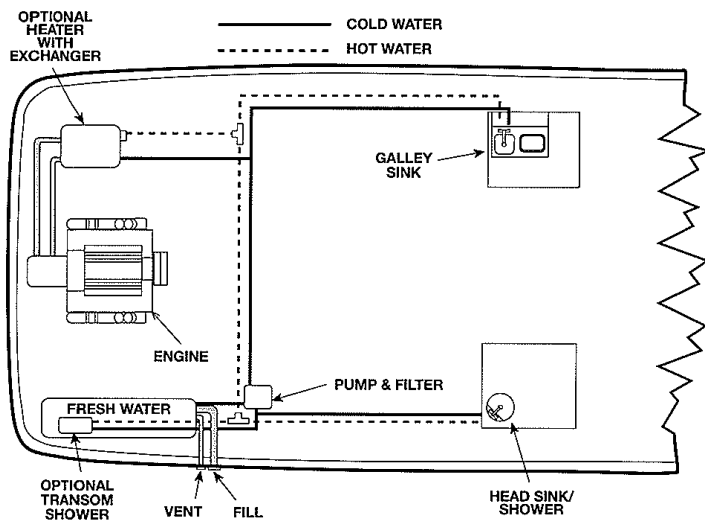


Figure 3.8 Potable Water System

filter onboard the boat provides water under pressure to the sink and shower in the head compartment, the optional transom shower in the cockpit, and the sink in the galley. Figure 3.8 shows a typical system and its components. An optional hot water heater can provide hot water to the fresh water system. Before using any fresh water system component, the water pump breaker switch on the DC electrical panel must be switched on. When using the shower in the head compartment, be sure to switch on the sump pump switch (if so equipped) on the DC electrical panel, to activate the automatic sump pump connected to the shower drain. See Section 4 for more information.

The fresh water tank is filled through the fill plate on the side of the deck. The tank vent is next to the fill plate. The vent allows air to enter and escape as water levels change. Fill the tank only with potable water. Using and refilling the tank often keeps drinking water fresh and clean.

Sanitizing the Fresh Water System

Sanitize the fresh water system before you use it the first time, when you recommission your boat after winter storage, or when system has not been used for extended periods of time.

Note: Fresh water tank must be empty before beginning sanitizing process. Empty tank if necessary.

CAUTION

CAUTION: Bleach causes eye and skin irritation. Notify all persons onboard the fresh water system is being sanitized. Do not allow anyone to drink water from fresh water system while it is being sanitized. In case of body contact, follow directions on bleach container.

To sanitize the tank:

1. In an appropriate size container, make a solution of 2-1/2 cups (20 oz.) of household bleach and 10 gallons of fresh water.
2. Place solution into empty tank, then fill to capacity with fresh water.
3. Turn fresh water pump ON at main panel in the galley. Open all faucets, beginning with faucet farthest from pump, to bleed air from entire system.
4. When a steady stream of water is coming from the faucets, air is out of the system. Close faucets and turn pump off.
5. Allow treated water solution to remain in tank for 3 to 4 hours.
6. Drain treated water solution from tank and lines.
7. Thoroughly flush entire system with fresh water after **each** sanitizing.

SYSTEMS

Note: If fresh water tastes like chlorine after sanitizing, pour a solution of 1 quart of vinegar and 5 gallons of fresh water into the tank and allow solution to stand in tank for several days. Then drain entire system and flush with fresh water. Fill tank with fresh water.

Initial Startup

After you have sanitized the fresh water system, follow these procedures to start the system:

1. Partially fill the fresh water tank.
2. Move WATER PUMP breaker switch at main panel in cabin to ON.
3. Open cold water galley faucet to allow air to escape. Close faucet when you see a steady flow of water.
4. If your boat has a hot water heater, open hot water galley faucet to fill water heater and allow air to escape from line. Close faucet when you see a steady flow of water.
5. Bleed air from remaining faucets by opening each one until you see a steady flow of water and then closing faucet.
6. Fill fresh water tank to capacity.

Water Pump and Filter

Once the water pump switch on the DC electrical panel is switched on, the water pump supplies water under pressure to the fresh water system. The filter keeps particles from entering the pump reservoir. Check the filter periodically and clean if necessary. A clogged filter may be the cause of low water pressure to the system.

CRUISERS

Before servicing the filter, turn the water system breaker OFF and release pressure on the system by opening all faucets. To clean the filter, remove screen and rinse with clean water. Replace and make sure the O-ring is seated properly when installing the cover.

Note: Refer to the water pump manual for detailed operation and maintenance procedures.

MARINE SANITATION DEVICES

Standard and optional sanitation equipment varies with the boat model. These options include a pump-out porta-potti (Figure 3.9), a porcelain or electric porcelain head with holding tank (Figure 3.10), and a macerator.

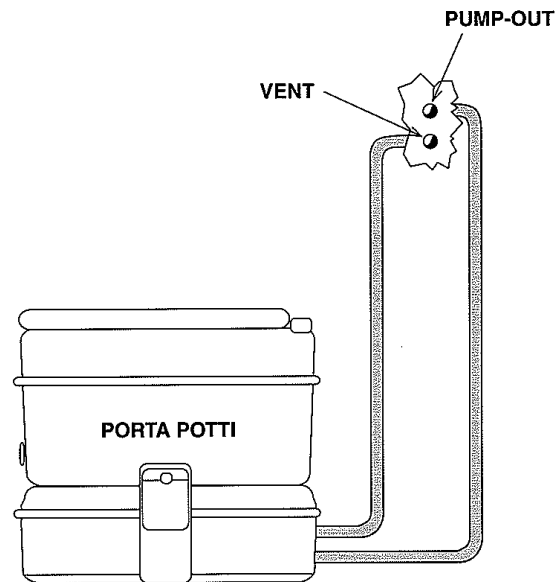
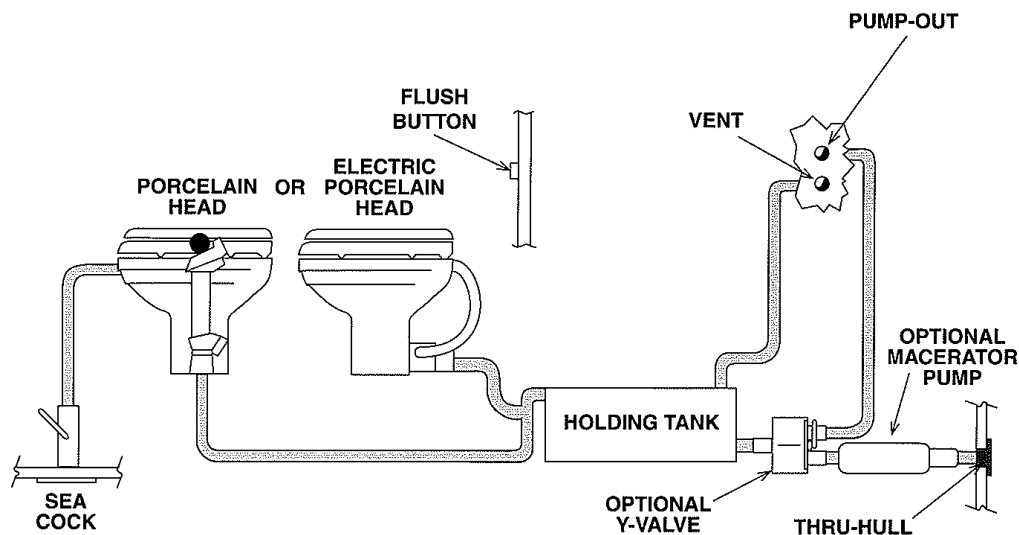


Figure 3.9 Pump-Out Porta-Potti

SYSTEMS

CRUISERS



Insert Figure 3.10 Pumpout Porcelain Head

The marine sanitation device (MSD), or head, installed on your Chaparral boat is similar to your home toilet. The major difference is that it is flushed with sea water using an electric pump or a manual pump. Also the tandem flushing system provides for sea water to be pumped in and waste water and material to be flushed out into a holding tank. The MSD seacock should only be opened when you wish to flush the head using sea water. It should be closed at all other times to avoid accidental boat flooding in the event of a hose or valve failure.

If you empty the holding tank overboard, the optional macerator grinds waste material into small particles as it empties the holding tank. The only time you will use the macerator is when you empty the holding tank overboard.

Note: See the owner's manual supplied by the manufacturer for safety precautions and for detailed operation, maintenance, and winterizing procedures. The manual is in your owner's packet.

The U.S. Coast Guard has also issued regulations requiring boats to have a sanitation system on board to control pollution. Wastes are to be stored in a holding tank or other device, such as a Porta-Potti, until the device can be pumped out or otherwise disposed of at a shore facility. Discharging this waste overboard is in most cases prohibited. Check with the Coast Guard regarding regulations in your area.



This chapter describes standard and optional components factory installed on our pleasure boats. Depending on how your boat is equipped, it may or may not have all of the equipment described in this chapter.

Be sure to read all operation, maintenance, and safety information contained in each component's manual before operation. The manuals are in your owner's packet.

Important: *Adhere to all safety precautions in the manufacturer's literature when operating the components.*

Note: "Engine" in this Chaparral manual means one or two engines depending on how your boat is equipped.

WARNING

WARNING: When using electrical components, observe safety precautions to reduce the risk of fire, electrical shock, personal injury or damage to your boat and/or component.

DASHBOARD AND INSTRUMENT PANEL

Note: Some outboard models have multi-functional gauges instead of full instrumentation.

Instruments on the dashboard are important for monitoring the performance of your boat and alerting you to possible problems or causes of problems.

The **fuel gauge** indicates the approximate amount of fuel in your fuel tank. The reading is most accurate when your boat is operating at idle speed. Be aware that you should compare gauge readings

with hours of use versus known fuel consumption because the gauge is only an approximate reading of the amount of fuel in your boat's tank.

The **oil pressure gauge** is an accurate indicator about what is going on inside your boat's engine. Any serious problem with your engine will likely be indicated on this gauge. Check the reading when the engine is new, and use it as the reference point during the life of your engine. Also, check with your Chaparral dealer for the normal pressure reading for your boat's engine.

The **water temperature gauge** indicates the temperature of the cooling water circulating inside your engine. A thermostat keeps the temperature of the water at a preset temperature. If the temperature rises or continues to rise above normal, shut down your engine and determine the cause of the high temperature.

The **voltmeter** indicates battery voltage. When the engine is running, the meter should read between 12 and 15 volts. A significantly lower reading may indicate a battery or alternator problem or a heavy drain on the battery. If the voltmeter needle moves back and forth in wide swings, the alternator may not be charging properly.

The **tachometer** indicates the operating speed of the engine in revolutions per minute (RPM). It does not indicate the speed of your boat moving through the water. Do not exceed the maximum full throttle RPMs stated in the engine operator's manual.

The **speedometer** indicates the speed your boat is crossing the water in miles per hour. Water pressure from a water pickup at the boat's stern is measured and converted into a reading on the speedometer.

COMPONENTS

The optional **depth finder** measures the depth of the water from the bottom of your boat. See the manufacturer's instruction manual for details about proper operation and maintenance.

The **compass** (optional on some models) indicates the direction or heading in which your boat is traveling. Have the compass calibrated by an experienced technician. See the manufacturer's instruction manual for details about proper operation and maintenance.

CAUTION

CAUTION: Compass reading may be erroneous if compensator is not properly adjusted. Always make a deviation table and use it when navigating with compass.

STEERING

Other than the common sense and good judgment of the operator, the steering system is the most important safety system on your boat. Factors requiring operator attention for safe steering include engine torque, trim tabs settings, waves and speed.

Power steering provides positive steering control while providing the operator with the steering sensitivity and "feel" needed for good steering control. An enclosed cable system connects the steering wheel to the stern drive. Check cables regularly and tighten them as needed.

On outboard models, hydraulic steering is standard. Check fluid levels and for leaks in the system on a regular basis.

Note: Whether your boat has a **mechanical steering (I/O)** or a **hydraulic steering (O/B)** system, refer to the steering manufacturer's owners manual found in your Owner's Packet, for detailed information regarding use, care and maintenance of the steering system.

4-2SB

SPORT BOATS

Note: Refer to the engine manufacturer's information found in your Owner's Packet for use, care and maintenance instructions for power steering units installed on their motors.

THROTTLE

The throttle controls the boat's speed and the direction the boat travels. If the throttle is in its center neutral position, the boat will not move forward or aft with the engine running. Moving the throttle forward from center moves the boat forward. Moving the throttle aft moves the boat backward. The speed at which the boat moves is directly related to how far the operator pushes the throttle.

Note: The throttle must be in its center neutral position before the engine will start. See your engine manufacturer's owners manual for specific starting instructions.

POWER TRIM

The power trim system allows the operator to raise and lower the stern drive to adjust the drive angle while underway. It also allows the operator to raise and lower the drive for trailering, beaching, and operation in shallow water. Control your trim setting with the trim switch on the control handle. Section 5 discusses the importance of proper trim while operating your boat.

Note: Refer to your engine manufacturer's owners manual for information concerning maintenance and operation.

REFRIGERATOR (OPTIONAL)

Note: A refrigerator is available as an option on some models when the overnight package is ordered.

The refrigerator is designed to operate on 120 volt AC and 12 volt DC power. When the 120 volt system is not operating, the refrigerator operates on 12 volt power. A built-in relay automatically switches to the correct power. The alternating current electrical control is an

6/95

COMPONENTS

OFF/ON breaker switch at the main panel in the cabin. The unit also has a 10 amp direct current (DC) breaker on the battery switch panel in the engine compartment.

The power needed by the refrigerator exerts a continuous drain on the battery when it is powered by the 12 volt DC system. It can draw a 100 amp battery dead in a short period of time.. To avoid excessive battery drain, keep the temperature control at a medium setting when air temperatures are in the 70° to 90° F range. If you plan an overnight trip and shore power is not available, run the engine occasionally to ensure your battery is charged.

Note: Refer to the refrigerator instruction manual for safety precautions and for detailed operation and maintenance instructions. The manual is in your owner's packet.

STOVE

Note: An alcohol/electric stove is available as an option on some models when the overnight package is ordered.

Some boats may have an alcohol or optional alcohol/electric stove in the galley. The stove has a bottle which is to be used for measuring the amount of alcohol needed to fill the burner. Never fill burner so that you can see fuel in the center chimney. Use marine stove alcohol only. The alcohol/electric stove operates off the optional shore power system or alcohol, and has a circuit breaker on the main electrical control panel.

Note: Some boats may have an optional butane stove. Please refer to your stove manual for proper usage, maintenance and caution statements.

IMPORTANT: The operator's manual and safety instructions explain special safety precautions, maintenance, safety and proper operating procedures. Chaparral Boats cannot overemphasize the importance of operating your stove safely. **CAREFULLY READ and understand the instructions before operating the stove.**

SPORT BOATS

WARNING

WARNING: Alcohol flame is invisible in sunlight. Fueling ignited burner can cause explosion. Do not light burner unless flame is extinguished and burner is cool. Carefully follow all instructions in stove owner's manual.

WARNING

WARNING: Stove flame consumes oxygen. Suffocation is possible. Ventilate cabin when using stove.

AUTOMATIC FIRE EXTINGUISHER

Note: A halon fire extinguishing system is available as standard equipment on some models and as optional equipment on other models.

The fire extinguishing system in the engine compartment uses a Halon fire extinguishing agent. In case of fire, the heat-sensitive automatic nozzle releases Halon as a vapor, totally filling the area with halon to extinguish the fire.

WARNING

WARNING: If system discharges, immediately turn OFF engine, bilge blower(s), and electrical systems. Extinguish all smoking materials. Do not open engine compartment. Fresh air supplies oxygen to fire and fire may flash back through opening.

The system's indicator light at the helm is illuminated when the ignition switch is on. When the system is discharged, the indicator light will go out.

COMPONENTS

Allow Halon to fill entire engine compartment for at least 15 minutes. Hot metals or fuel can also begin cooling during this time. **Cautiously** inspect compartment for cause of fire and damage to equipment. Have portable extinguishers readily available. **Do not** breathe fire caused fumes or vapors.

Note: See the manufacturer's owner's manual for detailed information about safety precautions and procedures for operating and maintaining the Halon system. The manual is in your owner's packet.

BILGE PUMP

Note: An automatic bilge pump is standard equipment on some models. Other models have an electric bilge pump operated from the helm station.

The electric bilge pump removes water from the bilge area. If the pump motor runs but does not remove any water, the pump may be clogged. If there is no visible debris clogging the pump and water is still not being removed, check the discharge hose for kinks or obstruction.

Note: The Federal Water Pollution Act prohibits the discharge of oil or oily waste into or upon the navigable waters and contiguous zones 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 penalty.

BILGE BLOWER

The bilge blower, controlled by a switch at the helm, evacuates fumes out of the engine compartment while bringing fresh air in through the deck vents. Make sure all fumes are evacuated from the engine compartment prior to starting the engine. The bilge blower must be running before and when you start the engine and while operating your boat below cruising speed.

SPORT BOATS

WARNING

WARNING: Never assume that operating the blower removes all explosive fumes from engine compartment. If you smell any fuel, immediately stop engine and turn off all electrical components. Extinguish all smoking materials. Determine source of smell immediately.

RUNNING OR NAVIGATION LIGHTS

If you operate your boat at night, the law requires you to turn your boat's running lights ON. Your Chaparral boat has one white, one red (port), and one green (starboard) light. Check running lights periodically for proper operation. Check them before heading out after dusk.

There are various running light combinations for the types of vessels you may encounter while boating. You should learn to identify what these combinations are and the type of vessel they are associated with. Chaparral recommends participation in a "safe boating" course to learn more about the various light combinations.

The running/navigation lights are controlled at the helm station by a three position rocker switch. This allows for selection of the mast (white) light ON when anchored or moored, or to have the mast (white), port (red) and starboard (green) lights all ON while underway.

STEREO

The stereo in your boat is equipped with an AM/FM radio, cassette player and in some boats an optional compact disc player. The stereo also has a digital clock and power antenna lead.

Note: The above mentioned features may vary on some stereo models. See the manufacturer's Owner's Manual for detailed information about operation and complete list of features.

COMPONENTS

DECK BOATS

4

This chapter describes standard and optional components factory installed on our deck boats. Depending on how your boat is equipped, it may or may not have all of the equipment described in this chapter.

Be sure to read all operation, maintenance, and safety information contained in each component's manual before operation. The manuals are in your owner's packet.

Important: *Adhere to all safety precautions in the manufacturer's literature when operating the components.*

Note: "Engine" in this Chaparral manual means one or two engines depending on how your boat is equipped.

WARNING

WARNING: When using electrical components, observe safety precautions to reduce the risk of fire, electrical shock, personal injury or damage to your boat and/or component.

DASHBOARD AND INSTRUMENT PANEL

Note: Some outboard models have multi-functional gauges instead of full instrumentation.

Instruments on the dashboard are important for monitoring the performance of your boat and alerting you to possible problems or causes of problems.

The **fuel gauge** indicates the approximate amount of fuel in your fuel tank. The reading is most accurate when your boat is operating at idle speed. Be aware that you should compare gauge readings

with hours of use versus known fuel consumption because the gauge is only an approximate reading of the amount of fuel in your boat's tank.

The **oil pressure gauge** is an accurate indicator about what is going on inside your boat's engine. Any serious problem with your engine will likely be indicated on this gauge. Check the reading when the engine is new, and use it as the reference point during the life of your engine. Also, check with your Chaparral dealer for the normal pressure reading for your boat's engine.

The **water temperature gauge** indicates the temperature of the cooling water circulating inside your engine. A thermostat keeps the temperature of the water at a preset temperature. If the temperature rises or continues to rise above normal, shut down your engine and determine the cause of the high temperature.

The **voltmeter** indicates battery voltage. When the engine is running, the meter should read between 12 and 15 volts. A significantly lower reading may indicate a battery or alternator problem or a heavy drain on the battery. If the voltmeter needle moves back and forth in wide swings, the alternator may not be charging properly.

The **tachometer** indicates the operating speed of the engine in revolutions per minute (RPM). It does not indicate the speed of your boat moving through the water. Do not exceed the maximum full throttle RPMs stated in the engine operator's manual.

The **speedometer** indicates the speed your boat is crossing the water in miles per hour. Water pressure from a water pickup at the boat's stern is measured and converted into a reading on the speedometer.

The optional **depth finder** measures the depth of the water from the bottom of your boat. See the manufacturer's instruction manual for details about proper operation and maintenance.

COMPONENTS

The **compass** (optional on some models) indicates the direction or heading in which your boat is traveling. Have the compass calibrated by an experienced technician. See the manufacturer's instruction manual for details about proper operation and maintenance.

CAUTION

CAUTION: Compass reading may be erroneous if compensator is not properly adjusted. Always make a deviation table and use it when navigating with compass.

STEERING

Other than the common sense and good judgment of the operator, the steering system is the most important safety system on your boat. Factors requiring operator attention for safe steering include engine torque, trim tabs settings, waves and speed.

Power steering provides positive steering control while providing the operator with the steering sensitivity and "feel" needed for good steering control. An enclosed cable system connects the steering wheel to the stern drive. Check cables regularly and tighten them as needed.

On outboard models, hydraulic steering is standard. Check fluid levels and for leaks in the system on a regular basis.

Note: Whether your boat has a mechanical steering (I/O) or a hydraulic steering (O/B) system, refer to the steering manufacturer's owners manual found in your Owner's Packet, for detailed information regarding use, care and maintenance of the steering system.

Note: Refer to the engine or hydraulic steering manufacturer's information found in your Owner's Packet for use, care and maintenance instructions.

DECK BOATS

Note: Refer to the engine manufacturer's information found in your Owner's Packet for use, care and maintenance instructions for power steering units installed on their motors.

THROTTLE

The throttle controls the boat's speed and the direction the boat travels. If the throttle is in its center neutral position, the boat will not move forward or aft with the engine running. Moving the throttle forward from center moves the boat forward. Moving the throttle aft moves the boat backward. The speed at which the boat moves is directly related to how far the operator pushes the throttle.

Note: The throttle must be in its center neutral position before the engine will start. See your engine manufacturer's owners manual for specific starting instructions.

POWER TRIM

The power trim system allows the operator to raise and lower the stern drive to adjust the drive angle while underway. It also allows the operator to raise and lower the drive for trailering, beaching, and operation in shallow water. Control your trim setting with the trim switch on the control handle. Section 5 discusses the importance of proper trim while operating your boat.

Note: Refer to your engine manufacturer's owners manual for information concerning maintenance and operation.

AUTOMATIC FIRE EXTINGUISHER

Note: A halon fire extinguishing system is available as optional equipment on all models.

The fire extinguishing system in the engine compartment uses a Halon fire extinguishing agent. In case of fire, the heat-sensitive automatic nozzle releases Halon as a vapor, totally filling the area with halon to extinguish the fire.

COMPONENTS

WARNING

WARNING: If system discharges, immediately turn OFF engine, bilge blower(s), and electrical systems. Extinguish all smoking materials. Do not open engine compartment. Fresh air supplies oxygen to fire and fire may flash back through opening.

The system's indicator light at the helm is illuminated when the ignition switch is on. When the system is discharged, the indicator light will go out.

Allow Halon to fill entire engine compartment for at least 15 minutes. Hot metals or fuel can also begin cooling during this time. **Cautiously** inspect compartment for cause of fire and damage to equipment. Have portable extinguishers readily available. **Do not** breathe fire caused fumes or vapors.

Note: See the manufacturer's owner's manual for detailed information about safety precautions and procedures for operating and maintaining the Halon system. The manual is in your owner's packet.

BILGE PUMP

Note: An automatic bilge pump is standard equipment on all models.

The electric bilge pump removes water from the bilge area. If the pump motor runs but does not remove any water, the pump may be clogged. If there is no visible debris clogging the pump and water is still not being removed, check the discharge hose for kinks or obstruction.

Note: The Federal Water Pollution Act prohibits the discharge of oil or oily waste into or upon the navigable waters and contiguous zones 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 penalty.

6/95

DECK BOATS

BILGE BLOWER

The bilge blower, controlled by a switch at the helm, evacuates fumes out of the engine compartment while bringing fresh air in through the deck vents. Make sure all fumes are evacuated from the engine compartment prior to starting the engine. The bilge blower must be running before and when you start the engine and while operating your boat below cruising speed.

WARNING

WARNING: Never assume that operating the blower removes all explosive fumes from engine compartment. If you smell any fuel, immediately stop engine and turn off all electrical components. Extinguish all smoking materials. Determine source of smell immediately.

RUNNING OR NAVIGATION LIGHTS

If you operate your boat at night, the law requires you to turn your boat's running lights ON. Your Chaparral boat has one white, one red (port), and one green (starboard) light. Check running lights periodically for proper operation. Check them before heading out after dusk.

There are various running light combinations for the types of vessels you may encounter while boating. You should learn to identify what these combinations are and the type of vessel they are associated with. Chaparral recommends participation in a "safe boating" course to learn more about the various light combinations.

The running/navigation lights are controlled at the helm station by a three position rocker switch. This allows for selection of the mast (white) light ON when anchored or moored, or to have the mast (white), port (red) and starboard (green) lights all ON while underway.

4-3DB

COMPONENTS

DECK BOATS

STEREO

The stereo in your boat is equipped with an AM/FM radio, cassette player and in some boats an optional compact disc player. The stereo also has a digital clock and power antenna lead.

Note: The above mentioned features may vary on some stereo models. See the manufacturer's Owner's Manual for detailed information about operation and complete list of features.



This chapter describes standard and optional components factory installed on Signature Series boats. Depending on how your boat is equipped, it may or may not have all of the equipment described in this chapter.

Be sure to read all operation, maintenance, and safety information contained in each component's manual before operation. The manuals are in your owner's packet.

Important: Adhere to all "safety" precautions in the manufacturer's literature when operating the components.

Note: "Engine" in this Chaparral manual means one or two engines depending on how your boat is equipped.

WARNING

WARNING: When using electrical components, observe safety precautions to reduce the risk of fire, electrical shock, personal injury or damage to your boat and/or component.

DASHBOARD AND INSTRUMENT PANEL

Instruments on the dashboard are important for monitoring the performance of your boat and alerting you to possible problems or causes of problems.

The **fuel gauge** indicates the approximate amount of fuel in your fuel tank. The reading is most accurate when your boat is operating at idle speed. Be aware that you should compare gauge readings with hours of use versus known fuel consumption because the gauge is only an approximate reading of the amount of fuel in your boat's tank.

The **oil pressure gauge** is an accurate indicator about what is going on inside your boat's engine. Any serious problem with your engine will likely be indicated on this gauge. Check the reading when the engine is new, and use it as the reference point during the life of your engine. Also, check with your Chaparral dealer for the normal pressure reading for your boat's engine.

The **water temperature gauge** indicates the temperature of the cooling water circulating inside your engine. A thermostat keeps the temperature of the water at a preset temperature. If the temperature rises or continues to rise above normal, shut down your engine and determine the cause of the high temperature.

The **voltmeter** indicates battery voltage. When the engine is running, the meter should read between 12 and 15 volts. A significantly lower reading may indicate a battery or alternator problem or a heavy drain on the battery. If the voltmeter needle moves back and forth in wide swings, the alternator may not be charging properly.

The **tachometer** indicates the operating speed of the engine in revolutions per minute (RPM). It does not indicate the speed of your boat moving through the water. Do not exceed the maximum full throttle RPMs stated in the engine operator's manual.

The **speedometer** indicates the speed your boat is crossing the water in miles per hour. Water pressure from a water pickup at the boat's stern is measured and converted into a reading on the speedometer.

The optional **depth finder** measures the depth of the water from the bottom of your boat. See the manufacturer's instruction manual for details about proper operation and maintenance.

COMPONENTS

The **compass** indicates the direction or heading in which your boat is traveling. Have the compass calibrated by an experienced technician. See the manufacturer's instruction manual for details about proper operation and maintenance.

CAUTION

CAUTION: Compass reading may be erroneous if compensator is not properly adjusted. Always make a deviation table and use it when navigating with compass.

CONTROLS

Steering

Other than the common sense and good judgment of the operator, the steering system is the most important safety system on your boat. Factors requiring operator attention for safe steering include engine torque, trim tab settings, waves and speed.

Power steering provides positive steering control while providing the operator with the steering sensitivity and "feel" needed for good steering control. An enclosed cable system connects the steering wheel to the stern drive. Check the cables regularly and tighten them as needed.

Note: Your boat has a mechanical steering system. Refer to the steering manufacturer's owners manual found in your Owner's Packet, for detailed information regarding use, care and maintenance of the steering system.

Note: Refer to the engine manufacturer's information found in your Owner's Packet for use, care and maintenance instructions for power steering units installed on their motors.

Throttle

The throttle controls the boat's speed and the direction the boat travels. If the throttle is in its center neutral position, the boat will not

CRUISERS

move forward or aft with the engine running. Moving the throttle forward from center moves the boat forward. Moving the throttle aft moves the boat backward. The speed at which the boat moves is directly related to how far the operator pushes the throttle.

Note: The throttle must be in its center neutral position before the engine will start. See your engine manufacturer's owners manual for specific starting instructions.

Power Trim

The power trim system allows the operator to raise and lower the stern drive to adjust the drive angle while underway. It also allows the operator to raise and lower the drive for trailering, beaching, and operation in shallow water. Control your trim setting with the trim switch on the control handle. Section 5 discusses the importance of proper trim while operating your boat.

Note: Refer to your engine manufacturer's owners manual for information concerning maintenance and operation.

GENERATOR (OPTIONAL)

The optional onboard generator provides AC power to your boat's electrical system. If your boat has a generator, it is mounted in the engine compartment. Figure 3.1 or 3.2 shows its general location on your boat. Depending on the generator selected, AC power output ranges from 3.5 kilowatts (kW) to 4.0 kW.

WARNING

WARNING: Accidental starting the generator can cause severe personal injury or death. Stop generator and disable by disconnecting battery cables (negative [-] cable first) when maintenance or repairs are made to the engine, controls, or generator. Do not disconnect cables if gas fumes are present.

COMPONENTS

CAUTION

CAUTION: Prior to starting generator, check for proper operation of carbon monoxide detector.

Note: For further information on carbon monoxide hazards, refer to Section 2 pages 8 and 9. Please refer to your owner's manual for specific instructions concerning proper operation of carbon monoxide detector.

Note: Follow all generator instructions in the operator's manual. The manual includes detailed information of specifications and procedures for safe operation, maintenance, and winterizing. It also explains how you can obtain service for the generator. The manual is in your Owner's Packet.

WARNING

WARNING: Never assume that operating the blower removes all explosive fumes from engine compartment. If you smell any fuel, immediately stop engine and turn off all electrical components. Extinguish all smoking materials. Determine source of smell immediately.

WARNING

WARNING: Gasoline vapors can explode before starting engine compartment. Check engine compartment for gasoline or vapors. Operate blower for four (4) minutes. Run blower below cruising speed.

1. Run bilge blower for five minutes before starting generator. Run blower while generator is operating.

CRUISERS

2. Make sure seawater intake valve (seacock) is open. Seacock must remain open at all times when generator is operating. Seawater strainer must be free of debris to prevent clogging intake. Inspect seawater strainer frequently.

Note: Chaparral recommends not using the generator when underway. When underway and not using the generator, the seacock should be closed.

3. Press GENSET START switch on main panel in cabin. When starting generator, never operate starter for more than 30 seconds. Wait at least 30 seconds before each attempted start.

The generator may also be started using the switch on the generator. Please refer to generator manufacturer's owner's manual for more information.

4. Look over side of boat and check for water flowing from discharge port. If water is not flowing, stop the generator. Check for the following: blocked water intake, air in line, clogged sea strainer, or closed sea cock that should be open. Correct the problem before restarting the generator.
5. Before stopping, run generator at no load for three to five minutes to allow lubricating oil and engine cooling water to carry heat away from combustion chamber.

AIR CONDITIONER (OPTIONAL)

Electrical control for the unit is at the main electrical panel in the cabin. Refer to Section 3 for additional information about this panel. The air conditioner runs on 120 volt AC power from either the onboard generator or shore power. You can control heating and cooling from the air conditioner control panel.

General instructions for operating the air conditioner are as follows:

1. Make sure the sea water inlet cock is open and strainer is free of debris.

COMPONENTS

2. Make sure the sump pump is on when you operate the air conditioner. Condensation from the air conditioner drains to the sump pump.
3. Make sure 120 volt AC switch for air conditioner is on.
4. Set temperature on display. Select either heating or cooling. Set fan speed to high.
5. Turn switch to ON. Fan, water pump, and compressor will start.
6. Look over side of boat and check for water flowing from discharge port. If water is not flowing, stop air conditioner. Check for the following: blocked water intake, air in line, clogged sea strainer, or closed sea cock that should be open. Correct the problem before restarting the air conditioner.

The air conditioner has its own shore power cord. Follow these procedures to operate the air conditioner on shore power:

1. Make sure the air conditioner breaker in the cabin is off.
2. Plug AC shore power cord into the receptacle on the boat, and turn clockwise to lock. Thread the locking ring on the inlet to secure the cord. Connecting the cord to the boat first will prevent dropping a "hot" cord into the water.
3. Make sure dockside power is off. Then, plug in the cord. Turn the dockside shore breaker on.
4. Immediately check the polarity light on the main cabin panel. If the reversed polarity light on the main panel illuminates, do not turn on the cabin main breaker. Turn off the dockside shore power breaker and disconnect the power cord. Inform marina manager of the problem.
5. Make sure the sea water inlet cock is open and strainer is free of debris.

CRUISERS

6. Make sure the sump pump is on when you operate the air conditioner. Condensate from the air conditioner drains to the sump pump.
7. Make sure 120 volt AC switch for air conditioner is on.
8. Set temperature on display. Select either heating or cooling. Set fan speed to high.
9. Turn selector switch to ON. Fan, water pump, and compressor will start.
10. Look over side of boat and check for water flowing from discharge port. If water is not flowing, stop air conditioner. Check for the following: blocked water intake, air in line, clogged sea strainer, or closed sea cock that should be open. Correct the problem before restarting the air conditioner.

Note: The manufacturer's operation manual covers detailed information for operating the air conditioner including temperature setting, display and calibration, and fan speed and calibration. Also provided are technical data and troubleshooting information to help you keep the unit in safe and proper operating condition.

WATER HEATER (OPTIONAL)

The water heater, which runs on 120 volt AC power, has an ON/OFF switch at the main panel in the cabin area. A check valve in the water heater piping prevents hot water from washing back

WARNING

WARNING: Hydrogen gas may develop if you have not used heater for two weeks or more. Hydrogen gas is extremely flammable. Open hot water faucet at galley sink before you use any appliance connected to hot water system. Do not smoke or have open flame near open faucet.

COMPONENTS

into the cold water source. A pressure relief valve prevents damage if pressure or temperature get higher than safe settings. The thermostat on the water heater is preset and is not adjustable.

Note: Refer to the water heater instruction manual for safety precautions and for detailed operation, maintenance, and winterizing instructions. In areas where frost is possible, the heater tank must be drained to prevent possible damage during winter storage.

Before turning on power to hot water heater, be sure tank is full and water is covering the heating element. The heater tank must be kept full of water to avoid damage to the heating elements.

The hot water heater has a heat exchanger which captures heat from the engine cooling water by circulating the hot water through the exchanger to heat potable (fresh) water in the heater. Engine cooling water circulating through heater for more than two hours results in excessively HOT water.

REFRIGERATOR (OPTIONAL)

The refrigerator/freezer is designed to operate on 120 volt AC and 12 volt DC power. When the 120 volt system is not operating, the refrigerator operates on 12 volts. A built-in relay automatically switches to the correct power. The AC control is an OFF/ON breaker switch at the main panel in the cabin. The unit also has a 10 amp direct current (DC) breaker on the battery switch panel in the engine compartment.

The power needed by the refrigerator exerts a continuous drain on the battery when it is powered by the 12 volt DC system. It can draw a 100 amp battery dead in a short period of time. To avoid excessive battery drain, keep the temperature control at a medium setting when air temperatures are in the 70° to 90° F range. If you plan an overnight trip and shore power is not available, run the generator or the engine occasionally to ensure your battery is charged.

CRUISERS

Note: Refer to the refrigerator instruction manual for safety precautions and for detailed operation and maintenance instructions. The manual is in your owner's packet.

STOVE

Your boat has an alcohol stove or an optional alcohol electric stove in the galley. The stove has a bottle which is to be used for measuring the amount of alcohol needed to fill the burner. Never fill burner so that you can see fuel in the center chimney. Use marine stove alcohol only. The alcohol electric stove operates off the shore power system, onboard generator, or alcohol, and has a circuit breaker labeled "range" on the main electrical control panel.

Important: The operator's manual and safety instructions explain special safety precautions, maintenance, safety and proper operating procedures. Chaparral Boats cannot overemphasize the proper use of safety when operating your stove. CAREFULLY READ and understand the instructions before operating the stove.

WARNING

WARNING: Alcohol flame is invisible in sunlight. Fueling ignited burner can cause explosion. Do not light burner unless flame is extinguished and burner is cool. Carefully follow all instructions in stove owner's manual.

WARNING

WARNING: Stove flame consumes oxygen. Suffocation is possible. Ventilate cabin when using stove.

COMPONENTS

MICROWAVE OVEN (OPTIONAL)

The microwave oven is controlled by an electronic touch control panel. The breaker at the main panel must be on in order to use the microwave. For a detailed description of the microwave oven features see the owner's manual supplied by the manufacturer.

CAUTION

CAUTION: To reduce the risk of burns, electric shock, fire, injury to persons or exposure to excessive microwave energy, read ALL instructions before using the microwave oven. Be sure to secure turntable while underway to prevent damage to the unit.

AUTOMATIC FIRE EXTINGUISHER

The fire extinguishing system in the engine compartment uses a Halon fire extinguishing agent. In case of fire, the heat-sensitive automatic nozzle releases Halon as a vapor, totally filling the area with halon to extinguish the fire.

WARNING

WARNING: If system discharges, immediately turn OFF engine, bilge blower(s), and electrical systems. Extinguish all smoking materials. Do not open engine compartment. Fresh air supplies oxygen to fire and fire may flash back through opening.

The system's indicator light at the helm is illuminated when the ignition switch is on. When the system is discharged, the indicator light will go out.

Allow Halon to fill entire engine compartment for at least 15 minutes. Hot metals or fuel can also begin cooling during this time. **Cautiously** inspect compartment for cause of fire and damage to

CRUISERS

equipment. Have portable extinguishers readily available. **Do not** breathe fire caused fumes or vapors.

Note: See the manufacturer's owner's manual for detailed information about safety precautions and procedures for operating and maintaining the Halon system. The manual is in your owner's packet.

BILGE PUMP

The automatic electric bilge pump(s) removes water from the bilge area. If the pump motor runs but does not remove any water, the pump may be clogged. If there is no visible debris clogging the pump and water is still not being removed, check the discharge hose for kinks or obstruction. The bilge pump can also be operated in a manual mode by the switches on the main electrical panel.

Note: The Federal Water Pollution Act prohibits the discharge of oil or oily waste into or upon the navigable waters and contiguous zones 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 penalty.

BILGE BLOWER

The bilge blower, controlled by a switch at the helm, evacuates fumes out of the engine compartment while bringing fresh air in through the deck vents. Make sure all fumes are evacuated from the

WARNING

WARNING: Never assume that operating the blower removes all explosive fumes from engine compartment. If you smell any fuel, immediately stop engine and turn off all electrical components. Extinguish all smoking materials. Determine source of smell immediately.

COMPONENTS

CRUISERS

engine compartment prior to starting the engine. The bilge blower must be running before and when you start the engine and while operating your boat below cruising speed.

RUNNING OR NAVIGATION LIGHTS

If you operate your boat at night, the law requires you to turn your boat's running lights ON. Your Chaparral boat has one white, one red (port), and one green (starboard) light. Check running lights periodically for proper operation. Check them before heading out after dusk.

There are various running light combinations for the types of vessels you may encounter while boating. You should learn to identify what these combinations are and the type of vessel they are associated with. Chaparral recommends participation in a "safe boating" course to learn more about the various light combinations.

The running/navigation lights are controlled at the helm station by a three position rocker switch. This allows for selection of the mast (white) light ON when anchored or moored, or to have the mast (white), port (red) and starboard (green) lights all ON while underway.

STEREO

The stereo in your boat is equipped with an AM/FM radio, cassette player and in some boats an optional compact disc player. The stereo also has a digital clock and power antenna lead.

Note: The above mentioned features may vary on some stereo models. See the manufacturer's owners manual for detailed information about operation and complete list of features.

UNDERWAY

5

This chapter discusses the operation of your boat from the beginning of a boating excursion to its end.

Note: The term “engine” in this chapter means one or two engines depending on how your boat is equipped.

Note: If your boat is equipped with a carbon monoxide detector, it should be tested to determine that it is functioning properly every time you use your boat.

TRANSPORTING YOUR BOAT

A correctly selected trailer supports your boat properly, makes towing safer, and makes unloading and loading in varying weather conditions easier.

Important: *Improper trailering is one of the major causes for damage to the hull. The warranty does not cover damage of this type.*

The type and size of the side supports, or pads, are very important. Side supports run lengthwise to the boat and parallel to the keel. Side supports should only be tight enough to keep the boat from leaning side to side. Any unnecessary pressure will damage the hull. Newer trailers have self-adjusting side supports and a bow pad that can be easily adjusted. These eliminate the need for manually adjusting side supports and keel rollers every time you load your boat. Your Chaparral dealer can help you select best trailer for your boat.

Inspect your trailer regularly to make sure the side supports are in good working condition. Check bolts securing rollers and supports from time to time to make sure they are tight.

The trailer should be designed and built to carry the full weight of your boat, engine, and gear while providing support for the hull. Be sure not to overload your trailer by loading the boat with excess

baggage, camping equipment, etc. Check the certification label on the frame of the trailer. It is required to show the gross vehicle weight rating. Be sure the total weight of your boat, engine, fuel, gear, and trailer does not exceed this rating. Make sure your towing vehicle has a hitch appropriate for the rating.

Distributing the weight on the trailer is important. Place the heaviest items at the bottom of the boat over a roller or chock, and secure them to keep them from shifting.

Balancing the load on the trailer is also important. If too much weight rests on the hitch, the towing vehicle will oversteer, a condition that causes the front end of the vehicle to sway. Conversely, too little weight on the hitch causes the trailer to fishtail. In both cases, the vehicle will be difficult to handle and at higher speeds the swaying or fishtailing can become uncontrollable and result in personal injury and damage to the boat, trailer, or towing vehicle.

Weight on the hitch, or tongue weight, should be 5% to 10% of the total weight of the loaded trailer to avoid overloading the tow vehicle and to provide adequate pressure on the hitch ball. If the weight of the loaded trailer is 2000 pounds, the weight on the tongue should be between 100 and 200 pounds. A weight distributing hitch transfers portions of tongue weight to a point between the front and rear wheels of the towing vehicle and to the trailer wheels.

Important: *Bumper hitches are not safe and are illegal in many states.*

All trailers with a Gross Vehicle Weight Rating of 1500 pounds or greater are required by law to have brakes. (State laws may vary; be sure to check your state's requirements.) The brake system is usually completely self-contained on the trailer and no hook-up is required to the towing vehicle. Brakes are either drum or disc type. They work the same way as the brakes on a standard passenger vehicle, but the method of applying the brakes is different. Your Chaparral or trailer dealer can explain how the brakes on your trailer work.

Make sure your boat is secure before towing it.

- Close all windows, hatches, and doors.
- Store equipment to keep it from shifting or falling.
- Remove and store convertible top if your boat is so equipped.
- Use a second safety chain to secure your boat's bow to the trailer tongue. Tie down the stern to the trailer.

WARNING

WARNING: Improper towing can result in an accident causing personal injury and equipment damage. Become familiar with towing instructions in owner's manuals and with warnings supplied with your trailer and towing vehicle.

Towing a boat requires extra caution by the vehicle's driver. Allow extra distance between vehicles. Obey speed limits. Some states have lower speed limits for vehicles with trailers. If you are traveling slower than other traffic, pull over when it is safe to do so and allow traffic to pass. As with all other aspects of owning and operating your boat, use common sense and good judgment.

If you do not have experience backing a trailer, practice before you get into a confined public or private launch site. Take your trailer to an open area and get accustomed to using it. If possible, take someone with you who knows how to back a trailer.

Steering a trailer while backing it up works the opposite of steering a car. If the trailer needs to go to the right, turn the steering wheel to the left and vice versa. Inexperienced backers tend to turn the wheel too far. Do not oversteer. Turn the wheel gradually until you get the feel of safe backing.

LAUNCHING

Here are some tips to remember when you are putting your Chaparral boat in the water:

Important: *Before launching your boat, make sure the transom drain plug is installed. If it is not installed, the bilge could fill with water quickly.*

1. Before backing your boat onto the ramp:
 - Remove all tiedowns.
 - Store all loose gear properly.
 - Inventory your safety equipment.
 - Lock winch and trailer unit.
 - Tilt drive unit up to clear the ramp.
 - Disconnect trailer wiring from car to trailer.
2. Have someone at the ramp to give you directions. Back slowly down the ramp. Always remember to launch your boat at a right angle to the shore.
3. When the boat's transom is in several inches of water:
 - Stop towing vehicle with manual transmission in gear or automatic transmission in PARK. Remember to turn off engine and set the hand brake.
 - Disconnect launching cable.
 - Attach bow line to the boat. To keep the boat from drifting away, the other end of the line needs to be held on shore.
 - Move boat down the trailer and into the water.

- Tie boat to the pier.

4. Pull your vehicle away and park it.

Important: After each launching, monitor the bilge periodically to assure against abnormal water intake. Do not leave a new boat unattended for at least 8 hours after its initial launching. A forgotten plug, a loose through-hull fitting, or faulty valve can easily cause swamping. Neither the boat nor the engine warranties cover engine or engine components damaged by abnormal bilge water accumulations.

LOADING YOUR BOAT

Larger pleasure boats remain stable under a most operating conditions because of their beam, draft, and weight displacement. However, the U.S. Coast Guard does require that a capacity plate be affixed to all boats up to 20 feet long. This plate states the maximum load capacity. The plate shows persons and gear in pounds the boat will handle safely under normal conditions. The U.S. Coast Guard establishes these load capacity ratings. *Overloading and improper distribution of weight are significant causes of accidents. Keep weight below maximum limits for safety in turbulent water.*

Important: The presence of the capacity plate does not relieve the boat operator from the responsibility of using common sense or sound judgement. Turbulent waters and adverse weather conditions reduce the maximum load capacity rating of the boat.

When loading your gear on board your boat, remember to distribute the load evenly, keep the load low and do not overload. Always step onto the boat, never jump! Have someone on the dock pass your gear aboard. Secure all gear firmly so that it will not move or interfere with operation of the boat.

The way your passengers are seated and gear stowed in the boat affects your boat's performance. Passengers should board the boat one at a time and find a seat. Passengers should remain seated during loading of gear to maintain an even trim. Distribute your passengers and gear so that your boat is balanced side to side and front to rear (see Figure 5.1).

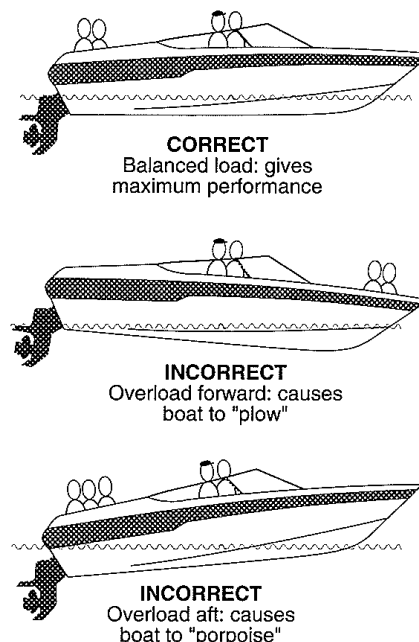


Figure 5.1 Boat Loading

As the operator, you are responsible for the safety of your passengers.

- **Do not** allow passengers to ride on the bow with feet hanging over the side.
- **Do not** allow passengers to ride sitting on the stern or gunwales. Falling from moving boats is a major cause of fatal recreational boating accidents.
- **Do not** allow passengers to sit in the bow rider area (if so equipped) while underway if doing so will obscure the operator's vision.

A shift in passenger weight changes the planing angle of the hull or the thrust of the propeller. This has the same affect on the boat as if the angle of the drive unit were changed. Minor deficiencies in your boat's ride can be quickly corrected by shifting passengers or gear forward or aft. By taking a little extra time to carefully place such gear as coolers, water jugs, tackle box, anchor, and tools, you create a more desirable trim. On planing-type boats, utilize stern loading in order to slightly raise the bow.

FUELING

Improper fueling procedures are the most common cause of boat fires.

DANGER

DANGER: Fuel leaking from any part of the fuel system can lead to fire and explosion that can cause serious bodily injury or death. Inspect system before refueling.

Before fueling your boat, check the entire fuel system for leaks. Check for weakening, hardening, swelling, or corrosion of fuel system components. These include the fuel tank, fuel lines and fittings, fuel filter, and carburetor. Any sign of leakage or deterioration requires immediate replacement before further engine operation.

WARNING

WARNING: Fuels with alcohol or alcohol derivatives can lead to hazardous leaks, fire or explosion. Do not use this type of fuel.

Chaparral Boat recommends using alcohol-free gasoline when possible because alcohol tends to destroy marine fuel system hoses and other components. If only gasoline containing alcohol is avail-

able or if you do not know whether the gasoline contains alcohol, inspect the fuel system for leaks and abnormalities more frequently.

DANGER

DANGER: Fuel vapors are explosive and can become trapped within the lower portions of the boat. Close all hatches, windows, doors, and compartments while fueling your boat.

Preliminary Procedures

1. Safely and securely moor your boat to the dock.
2. Turn off engine and all electrical equipment including lights, bilge pump, bilge blower, etc.
3. Extinguish all cigarettes, cigars, pipes, or other items that may produce a spark or flame.
4. Close all hatches, windows, doors, and compartments.
5. Make sure a fire extinguisher is readily available.

Fueling Procedures

1. Always fuel in an area which has sufficient lighting. Gasoline spills are hard to see when lighting is poor or it is dark.

Important: When fueling or having someone else fuel your boat, be sure the waste or water fill caps are not mistaken for the fuel fill cap. Also, make sure a fishing rod holder is not mistaken for a fuel fill plate.

2. Your Chaparral boat has through-hull fittings for filling the fuel tank. Remove fuel fill plate. Insert the fuel supply nozzle. Allow nozzle to stay in contact with through-hull fitting to prevent possible static-produced sparks.

3. After pumping approximately 5 gallons of fuel into tank, inspect engine and fuel tank area for any signs of fuel leakage. Continue fueling if you do not detect any leaks or other problems.
4. Allow space at the top of the tank for thermal expansion. Do not overfill tank so that fuel comes out fuel tank vent.
5. If fuel cannot be pumped in at a reasonable rate, check for a plugged fuel vent plug or kink in the line.

Post-Fueling Procedures

1. When you have finished fueling, replace fuel fill cap and wash off any fuel spillage around fuel fill area. Discard, in a safe place, any rags you may have used to wipe off fuel spills.
2. Open engine compartment and all hatches, windows, doors and compartments closed during fueling. Inspect these areas for fuel fumes or fuel line leakage visually and by smelling. Check out any sign of fuel leakage or any indication of fumes and correct problem before starting the engine.
3. Run bilge blower at least five minutes before restarting engine to ventilate engine compartment.

OPERATING YOUR BOAT

Starting the Engine

The following information is only a general guide. Chapter 4 has specific starting instructions for boats with battery selector switches. Detailed instructions are also in the engine owner's manual. Be sure to read and follow all of those instructions.

1. Secure boat to the dock or mooring slip before attempting to start engine. Keep boat secure until engine is running and warmed up.

2. Check lubricating fluid levels. Check fuel supply to make sure you have enough fuel for your planned excursion.

DANGER

DANGER: Gasoline vapors are highly explosive. Run bilge blower for at least 5 minutes before starting engine. Check engine and fuel compartments for fumes or accumulation of fuel.

3. To prevent an explosion or fire, look for leaks in fuel, oil, coolant, exhaust, and power steering systems. Be aware of any odors of these fluids.
4. Make sure the throttle is in the neutral position.
5. Start the engine. Refer to your engine owner's manual for recommended procedures for break-in, service, and other related operation. If the engine is cold, advance throttle several times. Then move it to SLOW/START position to actuate carburetor accelerator pump and feed fuel to engine.
6. Turn ignition key to START. Release key and allow to return to RUN after engine starts. If engine fails to start, wait one minute. Move throttle only once to maximum position then back to the neutral position. Try to start engine again.

Note: Throttle must be in neutral position before engine will turn over.

Important: Do not operate starter continuously for more than 15 seconds without pausing. Allow starter to cool at least three minutes between start attempts.

7. Warm up a cold engine by running it at fast idle speed (as recommended in engine manual) approximately one to two minutes.

Leaving the Dock

After the engine has warmed up, you are ready to leave the dock. Before you cast off, check all gauges, particularly the oil pressure gauge, for proper readings. Check the operation of the steering by turning the steering wheel to full port and to full starboard while observing outdrive movement. Check that charging system is working properly. Check again for fuel, oil, and exhaust leaks.

When you are sure your boat is ready, check wind, tide, current or other forces that will affect the way you maneuver your boat away from the dock. The cast off mooring lines and stow fenders.

Shift your boat's engine into forward or reverse depending on whether you want to move the bow or the stern away from the dock first. Move the throttle lever to neutral position. Then push forward quickly and firmly to shift into forward gear or backward to shift to reverse. Your engine should be running at a slow speed as you move away from the dock. If you move the bow out first, watch that the swim platform does not swing into the dock or a piling.

Getting Up To Cruising Speed

After slowly motoring from the dock area to open water, you can safely accelerate to cruising speed. Advance throttle to setting which provides your desired engine speed (RPMs). As you move the throttle forward, engine RPMs increase, and your boat moves faster through the water.

Important: Acceleration at full throttle is not recommended dur-

ing the engine "break-in period." This "break-in period" coincides with the engine "20-hour check-up." Do not attempt full throttle acceleration during the first 20 hours of operation.

When you throttle up and accelerate, your boat increases the trim angle and causes the boat to ride bow-high. From a maximum angle, the boat levels out to its planing attitude as you continue to accelerate. See Figure 5.2

The maximum angle is commonly known as the "hump." You should get over the hump as quickly as possible because visibility, handling, and performance are limited until you do. Only a few seconds at full throttle should be needed; however, the way your boat is loaded, the wind, and sea conditions affect the time required. When the boat gets over the hump, it reaches its planing attitude. Then, accelerate until your boat reaches a comfortable plane and then throttle down to cruising speed. This also provides for better fuel efficiency.

When maneuvering at low speeds you can reverse (move throttle forward or aft) the shift mechanism. This will react in a braking action.

CAUTION

CAUTION: When shifting between forward and reverse, always pause in neutral for a few seconds before reversing the rotation of the propeller. This will prevent unnecessary damage to the drive system.

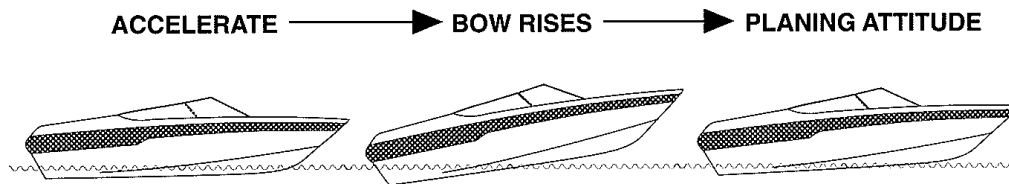


Figure 5.2 Boat Acceleration and Attitude

⚠ CAUTION

CAUTION: High speed acceleration in reverse can create a wake that could wash over the transom and flood the boat.

Steering Your Boat

Watch the stern when you turn! Steering a boat can be compared to driving a car on slippery or icy pavement. **Be cautious always.** When you turn the wheel, the stern responds first by swinging out in the opposite direction of the bow. When you are trying to avoid an object in the water, this swing could turn out to be critical.

Always give yourself plenty of room to make a turn. You also should slow the speed of your boat while turning. Never make sharp, fast turns as this could cause loss of control. Remember that your passengers should be seated whenever you're making a turn.

Trimming Your Boat

Trim refers to the way a boat floats on the water. Your boat will work best when it is trimmed to run at an angle between 3 to 5 degrees to the water. You can trim your boat by shifting gear or passengers or, if your boat is so equipped, by adjusting the drive unit angle or the trim tabs.

Power Trim

The operator can adjust his craft to the ideal boat angle for load and water conditions by trimming the drive unit (see Figure 5.3). The power trim system allows the operator to adjust the drive angle while underway by changing the angle of the outdrive in relation to the boat's transom. It also allows the operator to raise and lower the drive for trailering, beaching, launching, or operating in shallow water.

Note: Refer to your engine owner's manual regarding the operation of the power trim controls installed on your boat.

⚠ CAUTION

CAUTION: Never trim drive unit up and out using TRAILER switch while boat is underway. Use extreme caution when operating with drive unit raised. Severe damage to drive unit may result if unit is raised beyond the gimbal ring support flanges at engine speeds above 1200 RPM.

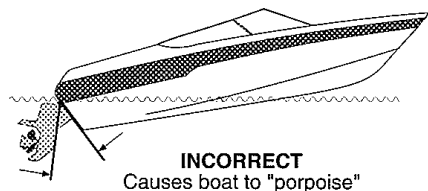
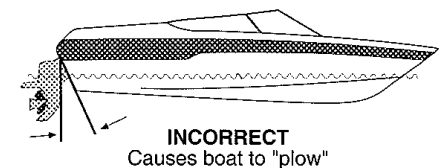
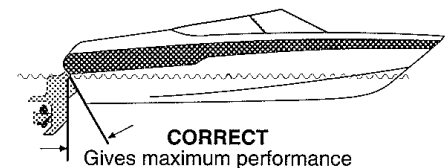


Figure 5.3 Trimming the Drive Angle

Drive Angle

The drive angle of the boat is the relationship between propeller thrust to the planing surface of the hull's bottom. You can improve the performance of the same boat under varying conditions by adjusting the drive angle.

Moving the drive unit angle towards its innermost adjustment brings the propeller in as close as possible to the transom. The angle of the propeller causes an upward thrust which pushes the boat's bow downward as shown on Figure 5.3.

By gradually shifting the drive unit from its innermost adjustment towards the outermost adjustment, the propeller thrust pushes in a downward motion. This motion, the opposite of that shown in Figure 5.3, tends to lift the bow.

After reaching plane, under certain load conditions, your boat could have a tendency to bury its forward V-ed section. The boat will begin to plow and lose speed. If the water is choppy the boat will yaw. A boat will spin out if its bow is excessively buried. The only way to correct this situation is to increase the angle and swing the drive unit outward.

If the drive unit is angled out too far, your loaded boat will be sluggish in coming to plane. Once on plane, your boat will tend to porpoise. To correct this motion, move the propeller inward to decrease the angle between the drive shaft and the transom.

⚠ WARNING

WARNING: Excessive trim decreases maneuverability, changes steering characteristics, and may cause "porpoising" (bow oscillates up and down) or "chine walking" (rocking side to side). Use power trim with care.

Very often, the optimum drive unit angle setting for the highest speed while carrying a light load will be just short of the porpoise point. However, such a setting is unsuitable when you have a heavy load or are pulling skiers. By reducing the drive angle, you will find it easier to maneuver the boat and to pull skiers to the surface.

Trim Tabs

Trim tabs also help the operator trim the boat. Trim tabs are mounted on the port and starboard transom near the water line. The operator can control the operation of the trim tabs at the helm with a joy stick or rocker switches depending on how the boat is equipped. (See Figure 5.4.) Pushing the switch or moving the joy stick activates the hydraulic system which moves its tab up or down.

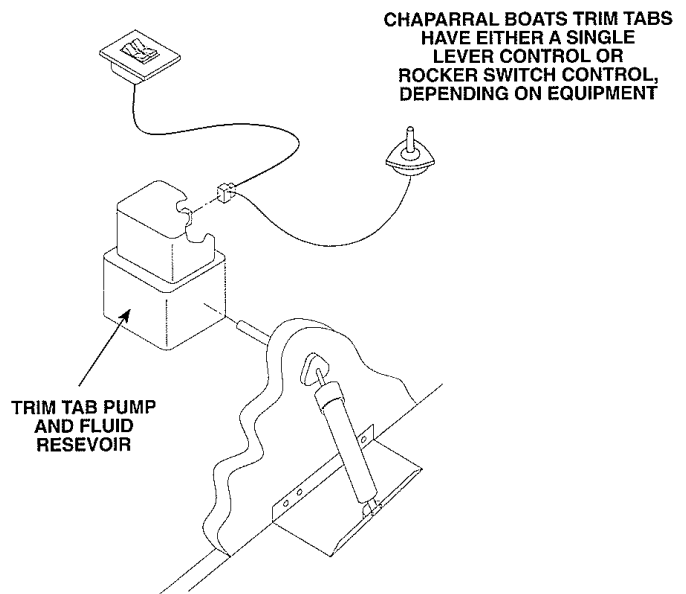


Figure 5.4 Trim Tab, Reservoir and Switch

If the trim tabs are angled down, they cut into the water as it passes under the hull to force the stern up and the bow down (see Figure 5.5). Trim tabs also compensate for uneven loads in the boat by allowing the operator to trim up one side of the boat or the other.

Tabs extended, water passes under hull, hits tabs and forces stern up and bow down.

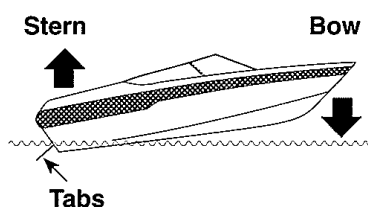


Figure 5.5 Trim Tab Operation

Stopping Your Boat

A boat has no brakes. Stop the boat by allowing it to slow down to less than 5 miles per hour and then putting the engine in reverse. Slowly increasing reverse power will allow you to stop the boat in a short distance. Remember that boat does not respond to steering in reverse as well as it does when going forward.

ANCHORING YOUR BOAT

Anchoring is necessary if you stop for recreation or an emergency. Practice anchoring techniques to make sure you know what to do when an emergency occurs. The size and weight of your boat govern the weight of the anchor and the diameter of the anchor line. Your Chaparral dealer can help you select the proper anchoring equipment for your boat.

Use a burying anchor, such as a Danforth or plow anchor, which grips into the bottom and holds your boat secure. Holding power should be more important than weight. For anchoring in relatively quiet waters, you can use a mushroom anchor as an alternative.

The length of the anchor line should be six to eight times the depth of the water to assure that the anchor bites into the bottom. The bottom end of the anchor line should be galvanized chain which holds up well as the line moves back and forth on the bottom. The rest of the line should be nylon anchor line which stretches to soften the impact of wind and waves on your boat.

Following are general guidelines for anchoring your boat:



WARNING: Keep anchor secure while underway to prevent damage or injury if boat's attitude changes suddenly. If your boat has a power winch, do not use it as the primary source for securing anchor or anchor line. See the power winch instruction manual for details about proper operation and maintenance.

- Secure the anchor line to the bow eye or deck cleat. Do not tie line to hardware not designed to support this stress.
- Use two or more anchors if anchoring overnight or extended periods of time. Otherwise, make sure your boat has enough space to swing full circle in case of shifting winds.
- Keep the anchor and line in an area where it will be readily available in an emergency.

Dropping Anchor

1. Have a crew member carefully lower anchor, keeping a slight tension on the line as the anchor drops. Maintain tension after the anchor reaches the bottom. Simply throwing the anchor overboard usually fouls the line and requires starting over.

-
2. Maneuver the boat backwards slowly until the proper length of line is run out.
 3. Fasten the anchor line around the bow eye or deck cleat. Anchor flukes should dig into bottom and hold boat in position.
 4. Check shoreline landmarks at the time anchor is dropped and check again 30 minutes later. If position has changed, anchor is dragging and must be reset.

Weighing Anchor

Weighing, or pulling in the anchor, requires moving the boat in the direction of the anchor and pulling in the anchor as the boat moves. For this reason, the engines should be running. When the line is vertical, pull up firmly on the anchor line to free the flukes from the bottom. If the anchor remains stuck, feed out a few feet of line and attach it to the bow cleat. Maneuver the boat around the anchor, keeping the line taut, until you find an angle that will pull the anchor free.

Docking Your Boat

Important: When operating or docking in close quarters, maneuver your boat at idle speed. Proceed with caution in congested areas.

As you approach the dock or other mooring area, slow down your boat in time to prevent your wake to subside before it reaches other boats or docks. As you get close to the dock, check for wind or currents, and allow them to carry the boat toward the dock if you can. When approaching, check that lines are attached to the cleats on the mooring side and that fenders are lowered on that side. Be sure fenders are at the proper height. If you can, have one person at the stern and one person at the bow, each with a boot hook and a mooring line attached to a cleat.

To dock a boat to the starboard side:

1. Approach at an angle approximately 45 degrees to the dock.
2. When the bow is within a few feet of the dock, bring the stern alongside the dock by turning hard to port.
3. Turn to starboard and, at idle speed, put the engine in reverse to bring the stern closer to the dock.

Reverse these steps to dock to the port side.

MOORING YOUR BOAT

When attaching mooring lines to deck cleats on your boat, make a loop in one end of the mooring line. Then, pass it through the hole in the base of the deck cleat. Next, pass the loop back over the deck cleat. The mooring line can now safely be used to secure your boat. Mooring lines may remain attached to the cleats on your boat while underway. The lines must be coiled and placed where they cannot get tangled in deck gear or the propellers.

When you tie up, run the mooring line from your boat around the dock cleat and then back to your boat. This enables you to untie the mooring line without leaving your boat. Just throw off one end of the mooring line and then bring the entire length of mooring line back into the boat.

SHUTTING DOWN THE ENGINE

Following are general instructions for engine shutdown. Refer to your engine owner's manual for specific instructions.

1. Allow engine to idle so engine cools gradually.
2. Turn engine off.

PREVENTIVE MAINTENANCE AND REPAIR

6

Chaparral recommends having an authorized Chaparral dealer do your maintenance and repair work. This chapter includes information you can use to do general maintenance and repair. If you choose to do your boat's maintenance and repairs, always refer to the product manuals for detailed information.

ENGINE

Refer to the engine owner's manual for detailed information about engine maintenance and repair. That manual has a maintenance and service schedule for the engine on your boat.

Checking the Oil

NOTE: During the engine 20-hour break-in period, Chaparral recommends that you check the oil level every two hours.

To check the oil:

1. Make sure boat is in the water and engine is stopped.
2. If engine is warm, let it cool for ten minutes to allow oil to drain back into the engine oil pan. This will make the check more accurate.
3. Pull engine oil dipstick out of its sleeve, wipe clean, and push dipstick back into the sleeve. Make certain the dipstick is pushed all the way back in.
4. Pull dipstick out again and check oil level on dipstick. The oil level must be between the ADD and FULL marks on the dipstick.
5. If oil level is at or below the ADD mark you must add oil.
6. Push dipstick back down into the sleeve. Be sure it is all the way in and properly seated.

Adding Oil

To add oil:

1. Remove oil fill cap from valve cover.
2. Add oil as required to raise the oil level up between the ADD and FULL marks on the dipstick. Do not overfill. One quart (0.95 liter) of oil will be required if oil level was at the ADD mark on the dipstick. Add more oil if oil level was below ADD mark on dipstick.
3. Check oil level after adding oil.

NOTE: Chaparral Boat recommends that you use a funnel when you add oil to prevent spillage and to help keep your engine free of surface grime and dirt.

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

Fuel Filter

WARNING

WARNING: Gasoline vapor explodes easily. Explosion is likely to cause fire and may burn you and damage your boat. Always STOP engine and do not smoke or allow open flames in area when changing filter.

Refer to your engine owner's manual for detailed information about checking and maintaining the fuel filter.

DRIVE BELT TENSION

Refer to your engine owner's manual for detailed information about proper belt tension for the alternator, sea water pump, and other equipment.

TUNEUP

Tuneups at recommended intervals keep your engine in top-notch operating condition and help assure the highest possible performance from your engine. Engines should be tuned up every 200 to 300 hours or when engine is hard to start or does not run well. If your boat is used less than 200 to 300 hours per year, Chaparral recommends that the boat be tuned up at least once a year.

Refer to your engine owner's manual for detailed information.

FUEL SYSTEM

This information describes only the fuel system beyond the engine. The fuel system provides a clean, continuous supply of fuel to the engine, in addition to helping prevent possible fire and explosion. All fuel systems installed at the Chaparral factory meet federal requirements.

Note: Refer to your engine owner's manual for detailed information about checking and maintaining the fuel system.

The fuel system must be inspected frequently and maintained regularly. Check for leaks and/or vapors and repair any problems **immediately**. Keep fuel tank filled during the boating season to prevent moisture from condensing in the tank.

MONTHLY INSPECTION

Note: A trained marine mechanic should replace parts or repair the fuel system. See your Chaparral dealer for parts and repair.

1. Starting at the fuel tank, check the entire fuel system for leaks or vapors.
2. Check fuel lines and hoses for wear, kinks, cracks, or deterioration.
3. Inspect fuel line fittings, carburetor, and fuel pump to make sure mounting brackets are tight.
4. Check fuel ventilation ducts and clamps for wear or damage.
5. Check fuel tank vent screens (located outside of hull) for any obstruction.

STERN DRIVE UNIT (I/O)

Note: Some models do not have a stern drive or outdrive. If you have questions, contact your Chaparral dealer.

Refer to the engine owner's manual for recommended frequency for checking stern drive unit and its oil.

CAUTION

CAUTION: Hot oil in operating stern drive can burn you. Do not remove oil vent plug immediately after using boat. Hot oil expands and flows rapidly from vent plug opening if oil vent plug is removed.

OUTBOARD

Refer to your engine owner's manual for detailed maintenance information.

Oil Level Check

Refer to the outboard engine owner's manual for recommended oil check and inspection intervals.

Engine Alignment Check

Consult your Chaparral dealer for more information about checking engine alignment.

PROPELLER

NOTE: Refer to the propeller manufacturer's manual for installation, removal, and further detailed information.

The propeller shipped with your boat is the size Chaparral Boat recommends for the best overall performance. However, factors such as altitude, temperature, load, bottom growth, and propeller condition can affect your boat's performance. Consult your Chaparral dealer regarding your specific performance requirements.

Periodically check propeller for excessive wear and damage. Repair or replace, if required.

Steering System

Note: Some engine models do not have power steering as a standard feature. Refer to the engine owner's manual or check with your dealer for details.

If your boat has a power steering system, it needs periodic maintenance to be troublefree and safe. Regular checks of the complete system are essential.

Lubricate, inspect, and maintain system regularly.

Note: Operating boat in saltwater is classified as excessive use.

1. Lubricate control valve through grease fitting with multi-purpose lubricant until grease is visible around rubber boot.
2. Coat power steering output shaft and exposed steering cable end with multi-purpose lubricant.

3. Lubricate cable end guide pivot point with SAE 30W engine oil.
4. Run engine for 20 to 30 minutes, then check power steering fluid level. If low, add type "A" automatic transmission fluid to bring level up to FULL mark on the dipstick.

NOTE: If engine is cold, the correct fluid level should be at the ADD mark to allow for oil expansion when engine is hot.

5. Check all hydraulic lines and hoses for leaks. Make sure no lines and hoses rub against other parts and or come into contact with any extremely hot parts. Tighten all fittings and clamps as required.
6. Check all bolts for tightness.
7. Check pump pulley drive belt for wear and proper tension.

NOTE: Over-tightened belts cause bearing failure. Loss of pump pulley drive belt affects steering effort.

Consult your Chaparral dealer regarding all repairs or replacement parts.

BILGE

Inspection

Check the bilge before you use your boat—every time! A small amount of water in the bilge is normal and not a cause for concern. If the amount of water is excessive, check for water leaks. Repair leaks immediately.

If the bilge is ever filled with fuel or oil, check engine, hoses, fuel tanks, etc. for leaks. Repair immediately.

Important: Pumping fuel or oil overboard into the water violates the Federal Clean Water Act. Pump into suitable container and dispose of properly.

Cleaning

Run bilge until pump is dry. Remove all sand, silt, dirt, or foreign material. Make sure all limber holes are open and strainers are clean. Use bilge cleaner to remove any obvious oil stains.

WARNING

WARNING: Gasoline or vapors in bilge can explode. Remove all sources of ignition. Do not start engine, Repair immediately.

Important: Never use any flammable type solvents for cleaning the bilge. Check with your Chaparral dealer for recommended cleaners.

TROUBLESHOOTING

7

The troubleshooting procedures listed in this chapter are designed to correct minor malfunctions for engine, performance, and vibration. Troubleshooting is a process of elimination. The troubleshooting chart displays areas that could be at fault and are presented in the order of probable occurrence.

Use good common sense and always refer to the manufacturer's Engine Owner/Service Manual. If the malfunction(s) appears too complicated or unsafe, contact your Chaparral dealer. If underway, and contacting your Chaparral dealer is not practical, contact the local marina for information regarding available marine mechanic service.

CAUTION

CAUTION: Disconnect battery cables before performing all inspections, checks, and repairs to avoid possible personal injury and damage to equipment.

PROBLEM	CAUSE	SOLUTION
Engine will not crank (Ignition system)	1. Ignition breaker tripped 2. Neutral safety switch not making proper contact 3. Throttle lever in wrong position 4. Loose wire in starting circuit 5. Ignition switch defective 6. Defective solenoid 7. Dead battery 8. Spark plug(s) fouled or broken 9. Distributor broken, wet, cracked, or dirty 10. Battery switch in wrong position	1. Reset by pushing ignition breaker next to starting key on dash. 2. Have your Chaparral dealer inspect throttle assembly. 3. Check position of throttle lever, ensure it's in the "neutral" position. 4. Tighten all wiring connections. 5. Test switch continuity. Replace switch as required. 6. Replace solenoid. 7. Recharge or replace battery. 8. Clean, adjust gap, or replace. 9. If wet or dirty, wipe with cloth and cleaning solvent. Inspect cap for cracks, carbonized paths (inside and out) replace cap as required. 10. Turn selector switch to battery on position.

PROBLEM	CAUSE	SOLUTION
Engine will not crank (Ignition system) cont.	11. Hydrostatic lock	11. Remove spark plugs and crank engine. If engine cranks, it indicates that water is getting into the cylinders from the exhaust system or from a possible gasket leak. If water gets into the engine through the exhaust line, it indicates improper draining of exhaust system. Contact your Chaparral dealer or a qualified marine mechanic to correct problem.
Engine cranks but will not start (Fuel system)	1. Lack of fuel 2. Improper starting procedure 3. Distributor cap brush cracked or broken 4. Choke plate sticking 5. Clogged fuel filter 6. No fuel reaching carburetor (providing all fuel valves are open) 7. Engine flooded 8. Contaminated fuel	1. Clean fuel filter, check fuel level; check anti-syphon valve, if equipped. 2. See Engine Owner/Service Manual to review starting procedure. 3. Replace brush. 4. Check thermostatic spring housing adjustment. 5. Check and replace fuel filter. 6. Check fuel pump, fuel pump filter, carburetor fuel filter, and fuel tank line for cracked flanges or restricted fittings. 7. Do not attempt to start engine for at least 5 minutes. For hot engine, fully advance throttle, (make sure throttle lever is in neutral) and crank engine. 8. Inspect for water or other contaminants in fuel. If contaminated, drain tank and flush with fresh fuel.
Low cranking speed	1. Loose or dirty electrical connections or damaged wiring 2. Bad battery 3. Engine oil too heavy for prevailing temperatures	1. Check all related electrical connections and wires. 2. Test battery (See Engine Owner/Service Manual). 3. Drain oil and refill with correct grade and viscosity oil (See Engine Owner/Service Manual).

PROBLEM	CAUSE	SOLUTION
Starter will not crank engine(s)	1. Discharged battery 2. Corroded battery cables 3. Loose connection in starting circuit 4. Defective starter switch 5. Starter motor brushes dirty 6. Jammed "starter drive"	1. Charge battery. 2. Clean battery terminals. 3. Check and tighten all connections. 4. Replace switch. 5. Clean or replace brushes. 6. Loosen starter motor, then free stuck gear.
Poor acceleration	1. Accelerating pump 2. Throttle not fully open 3. Ignition or carburizing 4. Flame arrestor dirty or air intake obstructed 5. Engine overheating	1. Replace. 2. Inspect cable and linkages for binding, obstructions, or loose fasteners. 3. Service ignition system and carburetor. 4. Clean flame arrestor and check air intake. 5. Check engine temperature (See Engine Owner/Service Manual).
Engine runs but misfiring	1. Improper timing 2. Fouled spark plug(s) 3. Wet spark plug wires 4. Carbon tracked distributor 5. Loose ignition wires 6. Cold engine with improperly set choke 7. Defective fuel pump 8. Partially clogged fuel filter 9. Incorrect carburetor mixture 10. Contaminated fuel	1. Check timing and adjust as required (See Engine Owner/Service Manual). 2. Remove, clean, or replace. 3. Wipe dry, inspect and replace damaged wires. 4. Clean or replace as required. 5. Inspect all wire connections. 6. Check Engine Owner/Service Manual for proper choke setting. 7. Repair or replace as required. 8. Clean or replace fuel filter. 9. See Engine Owner/Service Manual for proper carburetor adjustment. 10. Drain fuel tank, flush clean and replace fuel filter.
Excessive fuel consumption	1. Restriction in flame arrestor 2. Faulty fuel pump 3. Dirty flame arrestor screen	1. Remove flame arrestor and clean. 2. Repair or replace as required. 3. Clean or replace as required.

PROBLEM	CAUSE	SOLUTION
Excessive fuel consumption cont.	4. Distributor breaker points or spark plugs bad or set improperly 5. Incorrect timing 6. Choke not properly adjusted 7. Float level too high	4. Clean and set; or replace breaker points and spark plugs. 5. Time engine. 6. Adjust choke as required. 7. Reset float level as required (See Engine Owner/Service Manual).
Blue exhaust smoke	1. Lube level too high 2. Oil too thin 3. Oil overheated	1. Drain off excessive oil. 2. Drain and replace oil (See Engine Owner/Service Manual). 3. Check cooling system.
Black or Gray exhaust smoke	1. Fuel mixture too rich 2. Choke stuck 3. Poor carburetor setting 4. Carburetor fuel level too high 5. Clogged flame arrestor	1. Adjust carburetor. 2. Lubricate and adjust. 3. Readjust carburetor (See Engine Owner/Service Manual). 4. Adjust float in carburetor. 5. Clean or replace as required.
White exhaust smoke	1. Engine misfiring 2. Spark plugs dirty or not gapped correctly	1. See Engine Owner/Service Manual. 2. Clean, adjust gap, or replace.
Low oil pressure	1. Insufficient oil in crankcase 2. Excessive oil in crankcase 3. Diluted or improper grade and viscosity oil 4. Oil leak in pressure line	1. Check and add correct grade and viscosity oil. Visually check engine for leaks. 2. Check and remove required amount of oil. Check for cause of excessive oil (improper filling, bad fuel pump, etc.). 3. Change oil and oil filter; be sure to use the correct grade and viscosity oil. 4. Inspect all oil lines and tighten all connections as necessary.
No oil pressure	1. Defective gauge, gauge tube, or oil line 2. No oil in engine	1. Replace gauge, or tube, and tighten or replace line as necessary. 2. Fill with proper grade and viscosity oil (See Engine Owner/Service Manual).

PROBLEM	CAUSE	SOLUTION
High oil pressure	1. Too heavy grade of oil 2. Dirt or obstruction in oil line	1. Drain oil and replace with proper grade (See Engine Owner/Service Manual). 2. Drain and clear oil system. Check for bent or flattened oil lines and replace as required.
Knocking or pinging	1. Incorrect type fuel 2. Incorrect timing 3. Pre-ignition 4. Overheated engine 5. Cooling system trouble	1. Drain tank and replace with proper fuel. 2. Time engine (See Engine Owner/Service Manual). 3. Clean or replace spark plugs; check engine timing. 4. Check engine cooling system. 5. Check water intake connections for leaks.
Rough running	1. Choke not operating 2. Faulty fuel pump 3. Idle speed too low 4. Faulty ignition system components 5. Clogged fuel filter 6. Contaminated fuel 7. Kinked or clogged fuel lines, or fuel tank vent line	1. Check choke linkages for binding or obstruction. 2. Refer to Engine Owner/Service Manual for fuel pump testing procedures. 3. Check idle speed and adjust. 4. Service ignition system (See Engine Owner/Service Manual). 5. Replace fuel filter. 6. Inspect fuel for water or other contaminants. If contaminated, drain tank and flush with fresh fuel. 7. Use compressed air, at not more than 20 psi, to blow-out obstruction. Replace line if kinked. ⚠ WARNING WARNING: Wear protective eye wear when performing compressed air cleaning.

PROBLEM	CAUSE	SOLUTION
Rough running cont.	8. Flame arrestor plugged with foreign material; or air intake hose obstructed	8. Clean flame arrestor and check hose.
Engine overheating	1. Bad sending or receiving unit 2. Loose wiring connections at sending or receiving unit 3. Worn or broken impeller in sea water pump 4. Clogged oil cooler 5. Exhaust lines plugged 6. Ignition timing late 7. Choke valve stuck closed 8. Collapsed water pump suction hose 9. Loose or worn belts 10. Restricted water intake	1. Replace unit(s). 2. Tighten all connections. 3. Replace impeller. 4. Remove obstruction. 5. Remove obstruction. 6. Time engine. 7. Free choke valve movement. 8. Install new hose. 9. Adjust or replace belts as required. 10. Clean water intake.
Sludge in oil	1. Infrequent oil changes 2. Dirty oil filter 3. Water in oil	1. Drain and refill with proper grade and viscosity oil. 2. Replace oil filter. 3. Drain and refill. If trouble persists, check for cracked block, or defective head gasket and cracked head.
Poor Performance	1. Damaged or improper propeller 2. Excessive water in bilge area 3. Boat overloaded or improper distribution of load 4. Fouled or damaged hull bottom	1. Inspect propeller and replace if required. 2. Pump out bilge area. Inspect for causes related to excess water. 3. Reduce load or redistribute load. 4. Inspect, clean, or repair as required.
Vibration	1. Loose engine mounting bolts 2. Damaged propeller shaft 3. Propeller bent or pitch out of true 4. Engine out of alignment	1. Inspect and tighten as required. 2. Replace shaft. 3. Inspect propeller and replace as required. 4. See Engine Owner/Service Manual.

INTERIOR AND EXTERIOR CARE

8

The following information will help you keep the interior and exterior of your boat in tip-top shape. If you need more specific information, contact your Chaparral dealer.

Note: Before you use a particular cleaning solution or method, test the material to be cleaned in a hidden or inconspicuous area for possible adverse reactions.

FIBERGLASS AND GEL COAT

The hull and deck are made of fiberglass. The outer layer of the hull and deck is a color pigmented polyester resin, called gel coat. Gel coat is highly resistant to scratches that occur during normal boat use. Nevertheless, during the life of your boat, some damage to the gel coat is bound to occur.

Gel Coat Maintenance

To remove and prevent the buildup of most salt, soil, and grime, clean the hull and deck regularly with household detergent and water.

Note: Make sure household detergent does not contain ammonia or chlorine. Because ammoniate or abrasive cleaners dull and discolor the gel coat surface, they are not recommended for routine maintenance.

Gel coat surfaces are very resistant to deep stains. To remove minor stains, wash the affected area with a soft cloth and household detergent. Then rinse thoroughly with clear water. If deep stains do occur, use a special fiberglass cleaner and stain remover.

Waxing the gel coat surface regularly will help prevent soiling and preserve its luster. Chaparral recommends a fiberglass wax that fills the gel coat pores. Chemicals in fiberglass wax screen out harmful ultraviolet rays that cause fading of the gel coat color.

CAUTION

CAUTION: Waxed gelcoat is slippery. Falls causing bodily injury or falls overboard are possible. Never wax deck surfaces that require sure footing.

Repairing Gel Coat Damage

Minor Scratches

Repair minor scratches with automotive rubbing compound or polishing wax. Follow the manufacturer's instructions. Although the scratches may not disappear completely, they should not be as noticeable. Apply rubbing compound or polishing wax to a damp, soft cloth. Rub the gel coat surface with the damp, soft cloth in a circular motion.

Chips, Hairline Cracks, and Small Patches

Your Chaparral dealer has qualified personnel capable of making this type of repair.

Chaparral uses the finest gelcoats and resins available to prevent gelcoat crazing and hairline cracks. Over time your boat *may* develop slight hairline cracks in the outermost gelcoat layer. These usually do not damage the structure of your boat or affect its integrity.

HULL BOTTOM MAINTENANCE

If your boat will be in water continuously for the majority of the boating season, Chaparral recommends sealing the hull bottom with a high quality barrier coating. Repairing water blister damage is not covered under the Chaparral Boat Warranty. Your Chaparral dealer

can recommend the best barrier coating product for your boat.

Never use wire brushes, scouring pads, or other abrasive materials or solutions on the bottom surface of your boat. They cause small scratch marks that will collect dirt, silt, sand, marine growth and other foreign materials.

Keep the hull bottom of your boat clean. Checking it regularly for any signs of excessive wear or damage. Make needed repairs to the hull bottom as soon as possible. Accumulation of natural coatings from water and marine growth can create drag and limit the efficiency of your boat.

BOTTOM PAINT (ANTI-FOULING)

Important: Consult your Chaparral dealer for recommended bottom paints and local laws that govern your area. Many states regulate the chemical content of bottom paints to meet environmental standards and regulations.

Anti-fouling bottom paint is designed to prevent marine growth by dissolving slowly. As a result, the bottom of your boat will usually need painting after the boating season. Some variables to consider when selecting a protective bottom paint are the water temperature, water pollution, salinity, current, and organic matter in the water. To protect and repaint the boat bottom, perform the following:

- Remove boat from water once a year. Scrub bottom with a soap and water solution and a bristled brush.

Note: Repainting the bottom is not necessary each time the bottom is scrubbed, as long as no bare areas are visible in the bottom paint.

- Sand entire bottom surface of the boat.
- Fair (smooth out) all rough areas as required.
- Clean bottom surface to remove all dust and foreign materials.

- Make sure bottom surface is completely dry.
- Apply new coat of bottom paint.

Allow new bottom paint to dry 24 to 36 hours. Never attempt to haul, paint, and launch on the same day.

DECK HARDWARE AND FITTINGS

Note: Always follow the manufacturer's recommendations (found in your owner's packet) for cleaning and maintaining deck hardware and fittings. These recommendations include the proper cleaning methods and cleaning agents.

Inspection

Inspect hardware and fittings to make sure they are tight. All screws, bolts, clamps, cleats, etc., should be secure.

Cleaning and Care

- Always clean stainless steel frequently with soap and water. Any cleaner safe for glass is usually safe for stainless steel.
- Always remove rust spots as soon as possible with a brass, silver, or chrome cleaner. Irreversible pitting will develop under rust that remains on stainless steel for any period of time.
- Always use a cleaner, like a good car wax, for added beauty and protection.
- Never use coarse abrasives like sandpaper or steel wool on stainless steel. These may actually cause rusting.
- Never clean with mineral acids or bleaches.
- Never leave stainless steel in contact with iron, steel, or other metals which cause contamination leading to rust or corrosion.

WINDSHIELD AND PORTALS

Clean windshield safety glass with a glass cleaner or ammonia water; then rinse with plenty of clear water.

Important: Solvents can penetrate glass or portal surfaces and cause hazing. Hazing obstructs visibility. Never use acetone, benzine, carbon tetrachloride, lacquer thinner, or similar solvents to clean glass or portals.

The canvas or weather covering windows are made of a synthetic material. Wash any Plexiglass, clear vinyl or other synthetic materials with a mild detergent or dishwashing liquid and water solution, then rinse with plenty of clear water.

When stowing plastic or vinyl windows, be sure they are dry. Make sure the vinyl is rolled and not folded or creased. Store them in a bag that will breathe.

CARPET

After a boating excursion, allow carpet to dry completely in the sun to prevent mildew. Apply a light coating of ScotchGuard to protect against accidental spills.

Vacuum carpeting frequently. Clean up spills as quickly as possible. Remove spots before they dry. Clean indoor/outdoor carpet with a mild detergent or dishwashing liquid and warm water solution and a scrub brush. After cleaning, thoroughly rinse carpet with clear water. Your owner's packet has more detailed information provided by the manufacturer. Follow the manufacturer's recommendations for cleaning and stain removal.

SEAT COVERINGS AND VINYL

Because seat coverings and trim are made of expandable vinyl, extreme temperatures have little effect on them.

Note: Follow the manufacturer's recommendations (found in your owner's packet) for cleaning and seat covering and removing stains. These recommendations include the proper cleaning methods and cleaning agents.

Care

Place removable exterior cushions inside the boat when they are not in use.

Cleaning

Remove stains as soon as possible to eliminate any possible reaction between the staining agent and the vinyl. Wipe away dirt and smudges with mild soap and warm water. If additional cleaning is required, scrub with a soft bristle brush to remove dirt from textured patterns. Dry with a soft, lint-free cloth or towel.

For more difficult stains, use a stronger detergent. Follow manufacturer's instructions closely. Never use steel wool or powdered abrasive cleaners. They will mar the surface and leave an unsightly appearance.

To store cushions onboard boat for winter or extended periods of time, open zippers and elevate cover away from foam padding. Place a small rounded object (for example, a plastic bowl) inside to allow for air circulation.

CANVAS (WEATHER COVERINGS)

The canvas, or weather coverings, are 100% acrylic yarn. Besides its resistance to mildew, rot and weather, canvas also resists industrial pollutants and the effects of ultraviolet light from the sun.

Care

- Keep the top up when boat is not in use or when it's raining. Never trailer your boat with the canvas up.

-
- Keep canvas clean. Acrylic fabric will not support mildew growth, but dirt and dust on the canvas will.
 - Lubricate zippers with paraffin and snaps with petroleum jelly.
 - If canvas seams leak, apply a light coating of a fluorocarbon based water repellent.
 - Allow all canvas to air dry before storing. Never store canvas damp or wet. Provide proper ventilation to limit the possibility of mildew.
 - Avoid mooring under trees.
 - Avoid towing your boat with the top in the raised position.
 - Be careful not to scratch clear vinyl windows. Dry well before stowing. When stowing clear vinyl, make sure the vinyl is rolled and not creased.

Cleaning

- Wet down all canvas material. Scrub with a soft bristle brush and a solution of mild soap and water. Never use a detergent or bleach on your canvas.
- Brush or sweep the underside of the top. Spray with Lysol or other disinfectant to prevent mildew.

CABIN CUSHIONS, SIDE CURTAINS, AND FABRICS

Clean interior cabin cushions with a foam type cleaner. Follow all instructions as recommended by the product manufacturer. Dry clean All side curtains & fabrics, other than vinyl.

WINTERIZING AND STORAGE

9

This chapter tells you how to winterize and store your Chaparral boat in regions where temperatures fall below freezing. If you keep your boat in an area not requiring winter storage, Chaparral recommends you perform an annual inspection, similar to the preparation for storage as indicated in this chapter. With proper care, you will have many years of enjoyable boating with your Chaparral boat.

DRY STORAGE PREPARATION

Note: Refer to Chapter 8, Interior and Exterior Care, for specific cleaning solutions and procedures.

Deck

- Wash the deck and walkway surfaces.
- Clean all deck hardware, and apply one coat of rust inhibitor.
- Clean the indoor/outdoor carpet.

Hull

- Scrape off any barnacles or crusted marine growth.
- Scrub hull thoroughly to remove marine growth, scum and loose paint.
- Inspect underwater gear and propeller for excessive wear or damage.
- Apply fresh coat of bottom paint.
- Remove hull drain plug; store it in a safe place.

General Housekeeping

- Scrub boat interior including all cabinets and drawers.
- Remove all cushions, mattresses, curtains, blankets and sheets, pillows, towels and linens, clothing, and any other items that can hold moisture and cause mildew.

Note: Leave mattresses and cushions onboard only if you can prop them up so air can circulate around them.

- Make sure cabin is well ventilated.
- Check for adequate air circulation around life jackets and other safety equipment left onboard.
- Clean and dry bilge. Remove any materials such as rags, sponges, or other cleaning material.
- Weather permitting, open all doors, hatches, portals, and windows to air out the interior for a day or two.
- If covering boat while in storage, use a cover constructed of fabric that allows for plenty of ventilation.

SYSTEMS AND COMPONENTS

In regions where temperatures fall below freezing, winterization of the systems and components is necessary. Failure to do so will seriously damage them. They include, but are not limited to: generator, mufflers, air conditioner, strainers, hot water heater, sump pump, porta-potti, head, holding tank, water tank, sewer system, and water systems. Refer to the owner's manual for each component or system listed above for detailed information on winterization.

Note: Chaparral strongly recommends having a qualified dealer perform winterization procedures for your boat.

ENGINE

Important: In regions where temperatures fall below freezing, winterizing your engine is necessary. Failure to do so will seriously damage the engine. Refer to your engine owner's manual for detailed winterization information.

Change engine oil before storing your boat. Refer to the instructions in your engine owner's manual.

STERN DRIVE

Remove stern drive unit. Have a qualified technician engine check and adjust alignment as necessary.

FUEL SYSTEM

Add a gasoline stabilizer solution to the fuel tank. Follow the product manufacturer's recommended procedure.

BATTERY

Remove battery from boat, and store battery in a cool dry place away from freezing temperatures.

WARNING

WARNING: Battery electrolyte can cause severe eye damage and burn your skin. Wear goggles, rubber gloves and a protective apron when working with battery. If electrolyte spills, wash area with a solution of baking soda and water.

- Cover battery terminals with rubber or plastic caps to prevent accidental contact between battery posts and metal objects.

- Clean outside battery case, terminals, and battery clamps with a baking soda and water solution. Do not allow solution to enter battery cells.
- Clean battery posts and clamps with fine grit emery cloth. Use a light sanding motion when cleaning.
- Apply a light coat of petroleum jelly to cover end of battery cables.
- Recharge battery monthly or trickle charge continuously while battery is stored.

RECOMMISSIONING

NOTE: For detailed information on recommissioning your boat's systems and equipment, refer to the owner's manual for each system or component.

1. Inspect, visually and by smelling, the fuel system and all associated components for proper connections, wear, leaks, or other damage and needed repair.

Important: Inspection of the fuel system at recommissioning is very important. We cannot overemphasize our concern for your safety.

2. Clean battery terminal posts with wire brush or steel wool before reinstallation.
3. Check charge on battery. Recharge or replace if necessary.
4. Inspect all battery wiring. Repair or replace if necessary.
5. Attach battery cables, and tighten cable clamps.
6. Apply petroleum jelly or marine grade grease on battery posts and clamps to eliminate air pockets and possible acid buildups.

-
7. Reinstall hull drain plug after coating threads with petroleum jelly.
 8. Clean bilge area.
 9. Reinstall exhaust drain plug.
 10. Inspect all exhaust connections to avoid exhaust and carbon monoxide (CO) leaks. Adjust as required.
 11. Inspect all wiring for fraying, wear, loose connections, or other damage. Repair or replace if necessary.
 12. Test operation of navigational lights and other lighting onboard. Inspect all switches, controls, and other related equipment for proper operation. Repair or replace as necessary.
 13. Inspect all life jackets, anchor lines, and other safety equipment for proper operation and physical condition. Repair or replace if necessary.

GLOSSARY

10

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

Bow	The forward part or front of the boat.
Breakers	Waves cresting as they reach shallow water, as at or on a beach.
Breakwater	A structure, usually stone or concrete, built to create a harbor or improve an existing one.
Bulkhead	Vertical partition in a boat.
Burdened Vessel	Former term for the vessel which must stay clear of vessels with the right-of-way.
Calking (Caulking)	Forcing filler material into the seams of the planks in a boat's deck or sides, to make them watertight.
Camber	The arch of a deck, sloping downward from the center toward the sides.
Capsize	To turn over.
Carburetor Backfire Flame Arrestor	Required equipment on all motorboats except outboards and diesels. Reduces chance of fire caused by backfires in internal combustion engines.
Cardinal Points	The four main points of a compass; north, east, south, and west.
Ceiling	The inside lining of the hull.
Certificate	Government paper, such as a boat's license.
Chart	A map of a body of water that contains piloting information.

Chine	The intersection of sides and bottom of a boat.
Cleat	A piece of wood or metal with projecting ends to which lines are made fast.
Clinker	A method of planking in which the lower edge of each strake overlaps the upper edge of the strake next below. (Also called lapstrake.)
Coaming	A raised edge, as around part or all of a cockpit, that prevents seawater from entering the boat.
Coast Guard	The federal marine law enforcement and rescue agency in the US.
Cockpit	A well or sunken space in the afterdeck of a small boat for the use of the helmsman and crew.
Companionway	A hatch or entrance, from deck to cabin.
Compass	The instrument which shows the heading of a vessel.
Cowls	Hooded openings used for ventilation.
Cradle	A frame used to support a vessel on land.
Current	The movement of the water in a horizontal direction.
Deadrise	The rise of the bottom of a midships frame from the keel to the bilge.
Deck	Any permanent covering over a compartment.
Deep-six	To discard or throw overboard.

Depth Sounder	An electronic depth-finding instrument, measuring the time a sound wave takes to go from the vessel to the bottom and return, then displaying the result in feet, fathoms, or meters.
Dinghy	A small, open boat.
Displacement Hull	Type of hull that plows through the water even when more power is added.
Dock	An enclosed or nearly enclosed water area; all the port installations; a place where vessels can moor, as a pier, wharf, or floating dock.
Documented Vessel	Vessel registered with the U.S. Coast Guard.
Dolphin	A small group of piles, in the water, generally used for mooring or as a channel marker.
Draft	The depth of the vessel below the water line, measured vertically to the lowest part of the hull.
Dunnage	Mats, boughs, pieces of wood, or other loose materials placed under or among goods carried as cargo in the hold of a ship to keep them dry and to prevent their motion and chafing; cushioning or padding used in a shipping container to protect fragile articles against shock and breakage; baggage or personal effects.
Ebb	An outgoing tide.
Estuary	An inlet or arm of the sea.

Fathom	Six feet.
Fenders	Objects placed along the side of the boat to protect the hull from damage.
Flare	The outward spread of the boat's sides from the waterline to the rail at the bow. Also, a pyrotechnic signalling device that can indicate distress.
Fore	Used to distinguish the forward part of a boat or things forward of amidships. It is the opposite of aft or after.
Forward	Toward the bow.
Frame	Ribs of the hull, extending from the keel to the highest continuous deck.
Freeboard	The vertical distance measured on a boat's side from the waterline to the gunwale.
Galley	The kitchen area of a boat.
Gimbals	Swivels used to keep equipment level.
Give-Way Vessel	The one which must stay clear of vessels which have the right-of-way.
Grab Rail	A convenient grip, on a cabin top or along a companion ladder.
Gunwale	The upper edge of a boat's side. (pronounced gunnel.)
Harbor	A safe anchorage, protected from most storms; may be natural or man-made, with breakwaters and jetties; a place for docking and loading.

Hatch	An opening in a boat's deck for persons or cargo to go below.
Head	A marine toilet.
Headway	Forward motion of a vessel through the water.
Helm	The wheel or tiller by which a ship is steered.
Holding Tank	Storage tank for sewage, so that it will not be pumped overboard into the water.
Hull	The body of a boat.
Hypothermia	A physical condition where the body loses heat faster than it can produce it.
Inboard	More toward the center of a vessel; inside; a motor fitted inside the boat.
Inland Rules	Rules of the road that apply to vessel operation in harbors and certain rivers, lakes, and inland waterways.
Intracoastal Waterways	ICW: bays, rivers and canals along the coasts (such as Atlantic and Gulf of Mexico coasts), connected so that vessels may travel without going into the open sea.
Jetty	A structure, usually masonry, projecting out from the shore; a jetty may protect a harbor entrance.
Keel	The permanently positioned, fore-and-aft backbone member of a boat's hull.
Knot	To bend a line. Also, a unit of speed equal to one nautical mile (6,076.10 feet) an hour.

Launch	(1) To put a vessel into the water; (2) a small open powerboat, mainly used for transportation between a vessel and shore.
Lee	The side opposite to that from which the wind blows.
Leeward	Situated on the side turned away from the wind. (Opposite of windward.)
Leeway	The amount a boat is carried sideways by the wind's force or current.
List	(1) A continuous leaning to one side, often caused by an imbalance in stowage or a leak into one compartment; (2) A light list is a printed listing of aids to navigation, in geographical order, or inclining of a vessel toward the side.
LOA	Length over all; the maximum length of a vessel's hull, excluding projecting spars or rudder.
Locker	A storage place, a closet.
Log	A record or diary of a vessel's journey.
Lubber's Line	A mark or permanent line on a compass that shows the course of the boat.
Making Way	Making progress through the water.
Marina	A place, essentially a dock area, where small recreational craft are kept; usually floats or piers, as well as service facilities, are available.

MAYDAY	A radio distress call, from the french m'aidez (help me); SOS in Morse Code.
Mooring	Commonly, the anchor chain, buoy, pennant, etc., by which a boat is permanently anchored in one location.
Motor	A source of mechanical power.
Motorboat	Any watercraft 65 feet or less in length propelled by machinery, whether or not such machinery is the principal source of propulsion.
Navigation	The art of conducting a ship from port to port.
Nautical Mile	6076.12 feet, or 1852 meters, an international standard; the geographical mile, the length of one minute of latitude at the equator, is 6087.20 feet.
Nun Buoy	A conical, red buoy bearing an even number and marking the starboard side of a channel from seaward.
Oar	A long, wooden instrument with a flat blade at one end, used for propelling a boat.
Outboard	(1) a propulsion unit for boats, attached at the transom; includes motor, driveshaft, and propeller; fuel tank and battery may be integral or installed separately in the boat; (2) outside or away from a vessel's hull; opposite of inboard.
Outdrive	A propulsion system for boats, with an inboard motor operating an exterior drive, with driveshaft, gears, and propeller; also called stern-drive and inboard/outboard.

Overall Length	The extreme length of a vessel, excluding spars or rigging fittings. See LOA.
Painter	A rope attached to the bow of a boat for making it fast.
PFD	Personal Flotation Device.
Pier	A structure, usually wood or masonry, extending into the water, used as a landing place for boats and ships.
Pile	A vertical wooden or concrete pole, driven into the bottom; may be a support for a pier or floats; also used for mooring.
Piling	A structure of piles.
Pitch	(1) The up and down movement as the bow and stern rise and fall due to wave action; (2) The theoretical distance advanced by a propeller in one revolution.
Planning Hull	Type of hull that is shaped to lift out of the water at high speed and ride on the surface.
Port	The left side of a boat when you are facing the bow, also a destination or harbor.
Privileged Vessel	Former term for the vessel with the right-of-way.
Propeller	Wheel or screw. Mechanism that pushes water aft to propel the boat.
Rigging	The general term for all lines(ropes) of a vessel.

Roll	The sideward motion of a boat caused by wind or waves.
Rules of the Road	The nautical traffic rules for preventing collisions on the water.
Scope	The length of the anchor rope or chain. 6 to 1 scope means that the length of the anchor rope from the boat to the anchor is 6 times the depth of the water.
Scupper	A hole allowing water to run off the deck.
Sea Anchor	A floating canvas cone, held open by wire rings, with an opening in the smaller end, and a rope bridle at the larger end attached to a line leading to the vessel; used in storm conditions to (a) keep the bow of the boat to the wind, and (b) slow downwind drift of the boat.
Sea Cock	A through-hull valve, a shut-off on a plumbing or drain pipe between the vessel's interior and the sea.
Slip	(1) a berth for a boat between two piers or floats; (2) The percentage difference between the theoretical and the actual distance that a propeller advances when turning in water under load.
Sole	The cabin or cockpit floor.
Spar Buoy	A channel marker that looks like a tall, slender pole.
Stand-On Vessel	The vessel with the right-of-way.
Starboard	The right side of a boat when you are facing the bow.

Stern	The after end or back of the boat.
Stow	To store items neatly and securely.
Strake	Planks running fore and aft on the outside of a vessel.
Taffrail	The rail around a boat's stern.
Tide	The alternate rise and fall of waters caused by the gravitational attraction of moon or sun.
Topsides	(1) The sides of a vessel above the waterline; (2) On deck as opposed to below deck.
Transom	The transverse planking which forms the afterend of a small, square-ended boat. (Outboard motors are usually attached to a transom.)
Trim	To arrange weights in a vessel in such a manner as to obtain desired draft at bow and stern.
Trimaran	Boat with three hulls, the center one is the largest.
Unbend	To cast-off or untie.
Underway	Vessel in motion, i.e., when not moored, at anchor or aground.
USPS	United States Power Squadron, a private membership organization that specializes in boating education and good boating practices.

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

