



CROWNLINE

OWNER'S/ OPERATOR'S MANUAL

Crownline Boats, Inc.
11884 Country Club Road
West Frankfort, IL 62896
(618)-937-6426
Fax: (618)-937-2277
Customer Service Fax: (618)-937-2061
Web Site: www.crownline.com

CROWNLINE BOATS OWNER'S/OPERATOR'S MANUAL

Model/Number _____ Unladen Weight
Kilograms (Pounds) _____
Hull Identification
Number _____ Maximum Load
Weight - Kilograms
(Pounds) _____
Engine Serial
Number(s) _____ Number of People _____
Design Category
(European Certification)
A-Ocean B-Offshore
C-Inshore D-Sheltered
Waters
Maximum Rated Engine Power
Kilowatts (Horsepower) _____

This manual has been compiled to help you to operate your craft with safety and pleasure. It contains details of the craft, the equipment supplied or fitted, its systems and information on its operation and maintenance. Please read it carefully, and familiarize yourself with the craft before using it.

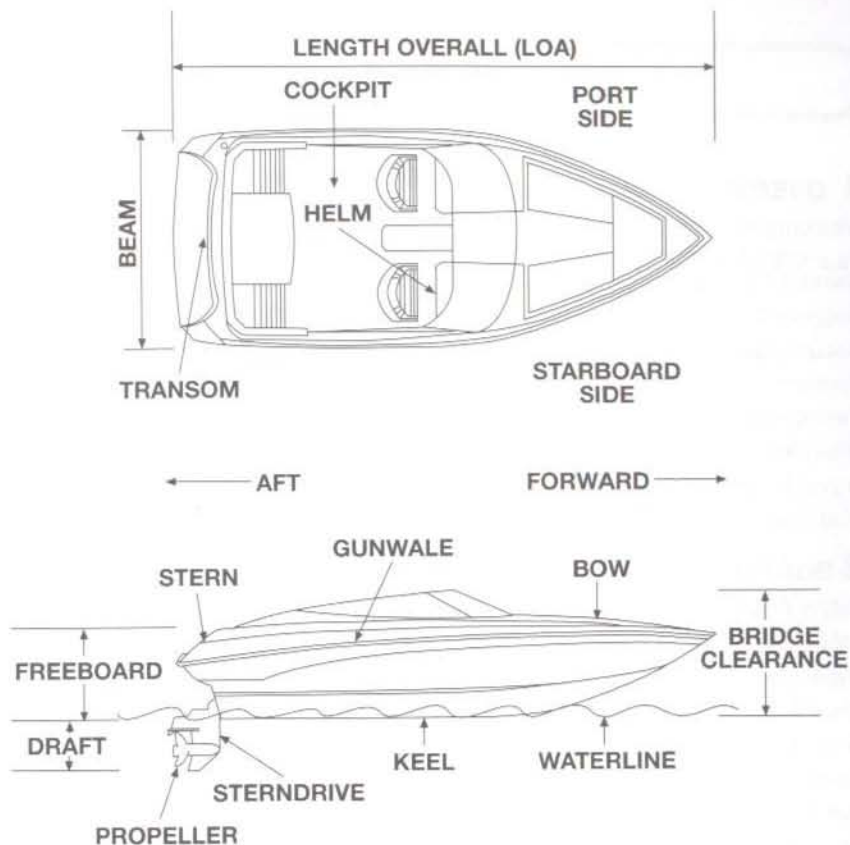
If this is your first craft, or you are changing to a type of craft you are not familiar with, for your own comfort and safety, please ensure that you obtain handling and operating experience before "assuming command" of the craft. Your dealer, national sailing federation or yacht club will be pleased to advise you of local sea schools, or competent instructors.

PLEASE KEEP THIS MANUAL IN A SECURE PLACE, AND HAND IT OVER TO THE NEW OWNER WHEN YOU SELL THE CRAFT.

For a complete list of standard and optional features and equipment, consult your local dealer. Due to a policy of continual product improvement, specifications are subject to change without notice. The weights and volumes shown are estimated and can vary from boat to boat because of equipment, etc.

TABLE OF CONTENTS

1 OVERVIEW.....1-1	4 SYSTEMS & COMPONENTS4-1
Welcome Aboard!.....1-1	Electrical Systems.....4-1
Your CROWNLINE Owner's Manual.....1-1	Fuel System.....4-15
Responsibilities.....1-2	Fuel Tank Selection.....4-16
Documentation.....1-3	Fire Prevention Systems.....4-17
Warranty.....1-3	Fresh Water System.....4-18
Certification and Specification.....1-4	Sanitizing.....4-20
Information & Inventory Sheet.....1-5	City Water Hook-Up.....4-21
Travel & Destination Log.....1-6	Components.....4-22
Fuel Consumption Log.....1-7	Engine Exhaust.....4-27
2 BOATING SAFETY2-1	Marine Sanitation Device (MSD) ..4-31
Safety Awareness.....2-1	Holding Tank.....4-32
Safety Onboard.....2-2	Overboard Discharge.....4-32
Water Sports.....2-2	Running/Navigation Lights.....4-35
Weather.....2-5	Stereo.....4-35
Emergency Conditions.....2-6	Refrigerator/Freezer.....4-35
Navigational Aids Chart.....2-8	Stove.....4-36
Safety Equipment.....2-10	Air Conditioning System.....4-36
Hazard Communication Labels.....2-12	5 GENERAL MAINTENANCE & REPAIR.....5-1
3 BOAT HANDLING & OPERATION.....3-1	Fiberglass & Gelcoat.....5-1
Trailing.....3-1	Cabin and Topside.....5-4
Launching.....3-1	General Maintenance.....5-6
Loading.....3-2	Troubleshooting Chart.....5-9
Fueling.....3-3	6 EXTENDED STORAGE.....6-1
Instruments.....3-5	Lifting the Boat.....6-1
Start-Up.....3-8	Prior to Storage.....6-1
Canvas.....3-11	Engine.....6-2
Carbon Monoxide.....3-13	Air Conditioner.....6-3
Acceleration.....3-13	Fresh Water System.....6-3
Trimming.....3-14	Marine Sanitation Device (MSD).....6-3
Mooring Lines.....3-14	Interior Cleaning.....6-3
Boat Registration.....3-15	Recommissioning.....6-4
Waste Disposal.....3-15	7 SPECIFICATIONS.....7-1
Additional Underway Information.....3-16	8 GLOSSARY.....8-1



TERMINOLOGY

1

OVERVIEW

WELCOME ABOARD!

Thank you for choosing CROWNLINE for your boating pleasure. We're sure that you will be completely satisfied with the unmatched performance, style and luxury of your new CROWNLINE.

Your new CROWNLINE has been designed, assembled and tested to give you the maximum in boating enjoyment and safety. CROWNLINE is proud to say that every boat we build is carefully constructed by skilled craftsman to meet or exceed all safety and quality standards established by the U.S. Coast Guard.

One last note: Read this manual and the *Engine Operation and Maintenance Manual*. And then keep them in a safe place onboard for easy reference. Preparation is the key to a safe and enjoyable boating experience. So read all the manuals, put your new CROWNLINE in the water, experience recreational boating, and have fun!

YOUR CROWNLINE OWNER'S/OPERATOR'S MANUAL

Your CROWNLINE Owner's/Operator's Manual contains all necessary information for the operation and maintenance of all current CROWNLINE models. The major systems (engine, electronics, etc.) and components (refrigerator, air conditioner, stereo, etc.) also come with their own instruction manuals, and the information in these manuals should be considered a part of this manual. The suppliers of these products maintain their own manufacturer's warranty and service facilities.

IMPORTANT: Fill out and return each warranty card to inform the manufacturer that you are a registered owner of their product.

Record all information regarding these products on the CROWNLINE Information & Inventory sheet located in this section under Documentation. And keep this information in a safe place at home.

Your CROWNLINE Owner's/Operator's Manual provides an overview of systems and components on your boat. Additional information can be found in the supplied manufacturer's literature, boating reference books (available at various book stores), or at the local library.

Not all equipment described in this manual is available on all models. See your dealer for equipment availability.

NOTE: In keeping with CROWNLINE Boats, Inc. policy of continuing product improvement, equipment and specifications may be changed without notice. In the event of conflicting information between your CROWNLINE Owner's/Operator's Manual and the supplied manufacturer's manuals, in all cases adhere to the manufacturer's recommendations for equipment installed on your boat. Equipment manufacturer's information concerning service, maintenance, repair, and operation shall supersede this manual. Consult your CROWNLINE dealer for confirmation and additional information.

The following outline provides you a glimpse of the information that can be easily found in your CROWNLINK Owner's/Operator's Manual:

1. The **Overview** section introduces you to CROWNLINK Boats, Inc. and your Owner's/Operator's Manual.
2. The **Boating Safety** section is especially important because it provides a good foundation for safe boating practices. Safety notices are also located throughout your Owner's/Operator's Manual when necessary.
3. In the **Operation** section, the manual covers normal, every-day boating procedures.
4. **Systems & Components** section of the manual provides an overview of the various systems and components on your CROWNLINK. Remember, this section is not intended to replace the supplied manufacturers literature, but merely act as a general guide.
5. The **General Maintenance & Repair** section tells you how to properly maintain your new CROWNLINK. Included in each sub-section are recommendations for keeping your boat in sound operational condition, adjustments, and frequency of checks and inspections. Also included is a troubleshooting chart to help find the source of any problems.
6. The section covering **Extended Storage** explains procedures for keeping your CROWNLINK in good condition during seasonal or prolonged storage situations.
7. Specifications by model are provided in Section 7.
8. A list of boating terminology is provided in the **Glossary**. For more detailed information, you may wish to purchase a general reference book.

RESPONSIBILITIES

The following sub-sections outline the responsibilities for both you and your CROWNLINK Dealer. This ensures that you will receive maximum performance and enjoyment from your new CROWNLINK.

Dealer

Your CROWNLINK dealer will be responsible to you for:

1. Discussing the terms of all warranties, and stressing the importance of registering each warranty with its respective manufacturer. Complete and return the CROWNLINK Boats, Inc. Limited Warranty registration card.
2. Providing instructions on how to get warranty service.
3. Reviewing the pre-delivery service record with you, and then signing it to certify it is correct.
4. Ensuring you know the general operating procedures for your boat, and you are familiar with its specific systems and components.

Owner

As the owner you are responsible for:

1. Schedule an appointment with your dealer to review all warranties.
2. Inspecting the physical condition of the boat at time of delivery, and making sure that all systems and components are operating properly.

3. Scheduling an appointment with your dealer to review the pre-delivery engine service record, then signing it to indicate the dealer has provided a complete explanation.
4. Using all equipment in accordance with the manufacturer's instructions.
5. Providing periodic maintenance as outlined in the CROWNLINK Owner's/Operator's Manual and all manufacturer Service Guides.

NOTE: CROWNLINK recommends that you refer to your engine warranty for initial inspection and service requirements.

6. Scheduling your engine's service as detailed in the engine owner's manual.

IMPORTANT: Make sure the dealer checks the engine alignment in accordance with the engine operation and maintenance manual. If this is not done, drive train damage is possible, and not covered by your CROWNLINK Boats, Inc. Warranty.

DOCUMENTATION

At the end of this sub-section are three forms to help keep your important documentation organized. Make photo-copies of them as necessary.

CROWNLINK Information & Inventory Sheet

Complete this form when you take delivery of your boat. After filling it out, remove this form from your CROWNLINK Owner's/Operator's Manual and store it in a safe place. Do Not keep this form onboard your boat. Also remember to update this form if you add, remove or change any equipment.

Travel & Destination Log

This log is designed to provide a record of your departure and return times, destination, boat description, passenger list, and other important trip information. Be sure to include emergency numbers at the bottom of the form in case you don't return at the pre-arranged time. Leave this form with someone who will be aware of your return time. In the event you do not return on time have that person contact the police, Coast Guard or other appropriate authority.

Remember: Make copies of this form and complete it each time you take your CROWNLINK out.

Fuel Consumption Log

This log is a convenient way to record information on engine hours, fuel consumption, miles traveled, as well as RPM, average MPH, and GPH(gallons per hour). This information is useful for scheduling maintenance and early detection of possible engine trouble.

The three charts described above can be referenced on the following pages.

WARRANTY

In the unlikely event a problem should arise with your CROWNLINK as a result of defective workmanship or materials, contact your CROWNLINK dealer as soon as possible. Please have your hull identification number, and necessary model numbers on hand for the item(s) needing service or repair. Your hull identification number is located below the rub rail on the starboard rear corner of your boat.

CERTIFICATION AND SPECIFICATION

All CROWNLINE boats meet or exceed U.S. Coast Guard requirements.

The CE Mark means your CROWNLINE boat(s) meets or exceeds the European Directives for Recreational Vessels as published by the International Organization for Standardization (ISO).

All CROWNLINE Boats are National Marine Manufacturers Association (NMMA) certified. NMMA certified vessels are in compliance with applicable federal regulations and American Boat and Yacht Council (ABYC) standards and recommended practices.

CROWNLINE Boats are International Marine Certification Institute certified (IMCI) for the EU Directive for recreational craft.

International Marine Certificate Institute

Treves Centre

rue de Treves 45

1040 Brussels, Belgium

Tel. Int + (32) 2 238 7892

Crownline Certificates - CRWN002 thru CRWN021 and
BCRWN022 thru BCRWN032

National Marine Manufacturers Association

200 E. Randolph Dr.

Suite 5100

Chicago, Illinois U.S.A. 60601

Tel. (312) 946-6200

Crownline Boats, Inc. does not condone or encourage modifications to Crownline boats or engine packages, including modifications to enhance the performance of the boat or engine. Modifications may create hazardous conditions that represent a risk of serious harm. Persons making such modifications do so at their own risk and, by doing so, agree to assume any and all liabilities for any consequences which may occur as a result of such modifications. Crownline Boats, Inc. reserves the right to limit or refuse warranty coverage on any boat that has been modified beyond original factory specifications.

CROWNLINE INFORMATION & INVENTORY SHEET

Purchase Dealership

Name _____ Sales Manager _____

Address _____ Phone _____

Fax _____ Fax _____

Service Dealership

Name _____ Sales Manager _____

Address _____ Phone _____

Fax _____ 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 Serial Number _____

DRIVE UNIT

Serial Number _____

FUEL SYSTEM

Tank Capacity _____

Filter Type _____

FRESH WATER

Tank Capacity _____

PROPELLER

Pitch _____

Model Number _____

BATTERY

Manufacturer _____

Model Number _____

RADIO

Manufacturer _____

Type _____

Model Number _____

Serial Number _____

KEY NUMBERS

Cabin _____

Glove Box _____

Ignition _____

AIR CONDITIONER

Manufacturer _____

Kilowatts _____

Model Name/Number _____

Serial Number _____

TRAVEL & DESTINATION LOG

Other Authority

TRIP INFORMATION	ENGINE	PASSENGER LIST (Use Another Sheet if Necessary)
Departure Date/Time	Type	Full Name
Departure Location	HP	Age/Sex
Return Date/Time	Fuel Type	Phone Number
Return Location	Fuel Capacity	
BOAT DESCRIPTION	SAFETY & EMERGENCY EQUIPMENT	Complete Address
Boat Name	(YES/NO & NUMBER)	
Type	Life Jackets	Full Name
Registration Number	Cushions	Age/Sex
Manufacturer	Distress Light	Phone Number
Length	Flares	
Hull Color	Smoke Signals	Complete Address
Deck (Color)	Flash Light	
Cabin (Color)	Mirror	Full Name
Trim (Color)	Paddles	Age/Sex
Other Physical Characteristics	Anchor	Phone Number
	Food	
	Water	Complete Address
	Life Raft	
	RADIO	Full Name
	Onboard (Yes/No)	Age/Sex
	Type	Phone Number
	Frequencies usually used or monitored	Complete Address

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

FUEL CONSUMPTION LOG

[illegible]

2 BOATING SAFETY

SAFETY AWARENESS

Your CROWLINE Owner's/Operator's Manual uses five levels of advisory and hazard statements to alert you to special information, operating procedures or safety precautions. All statements begin with a signal word to identify the importance of the statement. Statement levels follow this order (increasing importance):

Advisory

Advisory statements signal conditions that effect equipment operation, maintenance and servicing practices and occur in two levels:

Level 1 - NOTE

Signals a general advisory statement that clarifies or highlights a particular section of text.

Level 2 - IMPORTANT

Used to signal the possibility of damage to equipment or associated components.

Hazard

The use of hazard statements is determined by the likely consequence of the warning with regard to severity (minor injury, severe injury, death), and the probability of severity (COULD result in, WILL result in). Not following the recommendations contained in any of these statements may result in personal injury.

Level 3 - Caution



CAUTION: Hazards or unsafe practices that COULD result in minor personal injury.

Level 4 - Warning



WARNING: Hazards or unsafe practices that COULD result in severe personal injury or death.

Level 5 - Danger



DANGER: Immediate hazards that WILL result in severe personal injury or death.

SAFETY ONBOARD

Safe Boating Instruction

The local U.S. Coast Guard Auxiliary and the U.S. Power Squadrons offer comprehensive safe boating classes several times a year. You can contact the Boat/U.S. Foundation at 1-800-336-BOAT (2628), or in Virginia 1-800-245-BOAT (2628) for a course schedule. You can also contact the local U.S. Coast Guard Auxiliary or Power Squadron Flotilla for the time and place of their next scheduled class.

United States Coast Guard Website: <http://www.uscg.mil>

U.S. Power Squadron Website: <http://www.usps.org>

Rules of the Road

Your CROWLINE boat is subject to marine traffic laws known as *Rules of the Road*. There are two sets of rules: the United States Inland Navigational Rules and the International Rules. The United States Inland Rules are applicable to all vessels inside the boundary lines separating inland and international waters. These rules can be obtained from your local U.S. Coast Guard Unit or the United States Coast Guard Headquarters (1300 E. Street NW, Washington, D.C. 20226) in the publication titled, **Navigational Rules, International-Inland**.

The Coast Guard also publishes several other helpful pamphlets, including the **Boating Safety Training Manual**, **Federal Requirements For Recreational Boats**, and **Aids to Navigation** (U.S. Coast Guard pamphlet #123), which explains the significance of various lights and buoys.

Note: Because of proposed changes in buoys and markers, CROWLINE advises you to contact the U.S. Coast Guard for the latest information.

Warning Markers

Always check with local authorities concerning regional hazardous areas and how they are marked. Other considerations include:

- Boat operators must be able to recognize marine flag designs and respond accordingly.
- Caution should always be exercised relative to swimmers. Swimming areas may not always be marked.
- Navigation markers identify navigable routes and indicate water hazards. Boat operators should familiarize themselves with these important navigational tools and operate their boats accordingly.
- Be prepared to assist anyone flying a 'distress' flag as they are requesting immediate assistance.

Drugs and Alcohol

Do Not use drugs or alcohol while boating. The operation of motorized vessels while under the influence carries a significant penalty and is strictly enforced by the Coast Guard. The use of Drugs or Alcohol will decrease your reaction time, impair your judgment, and keep you from safely operating your boat.

WATER SPORTS

Advancements in technology have created new and improved products for enjoyment on the water. Water skiing, kneeboarding and riding on popular inflatable towed devices requires an increased safety awareness.

⚠ WARNING

WARNING: CROWLINE boats are not designed for the towing of Para-sails, Kites, Gliders, or any other device that is designed to become airborne when towed behind a boat.

Safety Hints

1. Always wear a U.S. Coast Guard approved personal flotation device.
2. Have a rear-facing observer aboard to inform boat operator of what is taking place behind the boat.
3. Never participate in towed water sports near beaches or in restricted areas.
4. Pay extra attention to commercial and recreational traffic when boating in shipping channels and other heavily traveled waterways.
5. Do not allow anyone near the propeller(s), even when the engine is off. Propeller blades can be sharp and can continue to turn after the engine is off.

Water Skiing

Water skiing presents a special set of precautions to observe in recreational boating. The following precautions will reduce the hazards while water skiing:

1. Water ski only in safe areas, away from other boats and swimmers, out of channels and in water free of underwater obstructions.
2. Only individuals that are capable swimmers should water ski.
3. Be sure that the skier is wearing a personal flotation device. A properly designed ski vest is intended to keep a stunned or unconscious person afloat.
4. Always carry a second person aboard to observe the skier so the boat operator can give full attention to the operation of the boat and the waters ahead.
5. Approach a skier in the water from the lee side (down wind), and be certain to stop your motor before coming in close proximity to the skier.
6. Give immediate attention to a fallen skier. He or she is vulnerable in the water alone, and is difficult to be seen by other boaters.

The following illustration (Figure 2.1) identifies a set of hand signals recommended by the American Water Ski Association (AWSA). Skier, observer and boat operator should all know and understand these seven (7) simple signals from the skier.



FIGURE 2.1

For more information about water skiing, Please contact the American Water Ski Association, 799 Overlook Drive, Winter Haven, Florida 33884 (1-800-533-2972) or visit their website at www.usawaterski.org.

Safety Recommendations

As the owner of your new CROWNLINER boat, you are responsible for the safety of both yourself and your passengers. It is your responsibility to know and follow all safety recommendations.

1. Your boat and equipment should be kept in safe operating condition. Make a practice of regularly inspecting the hull, engine, safety equipment and all boating gear.

NOTE: Inspections before going out and on return are a good idea.

2. Maximum care should be used when refueling your boat.
3. Know the fuel tank capacity and average fuel consumption at frequently used RPMs. Ensure sufficient fuel is onboard for anticipated cruising requirements. And keep an adequate reserve of fuel in case your plans change due to weather or other circumstances.
4. Make sure required lifesaving and fire extinguishing equipment is onboard, clearly marked, accessible and in working condition. Instruct all passengers on the location and proper operation of this equipment.
5. Be aware of the weather. Check the latest weather reports for possible changing conditions prior to departure. Strong winds and thunderstorms can be especially dangerous.
6. Keep up-to-date charts onboard.
7. Always leave a travel plan with someone onshore before you go out (use a copy of the Travel & Destination Log located in Section 1).
8. On the water, common sense and courtesy should be used at all times.
9. In case of emergency, at least one other person should know the basic operation of your boat.
10. Passengers should ride only in seating areas. **Passengers should not ride on sundecks or on seating in the sundeck position while the boat is under way.** Never dive from a boat.
11. While the boat is underway, all passengers should remain seated, and all doors and walk-through windshields should be secured in their closed positions. While boat is NOT underway or anchored, water and/or wave conditions can affect passenger stability.
12. Do not use the swim platform or boarding ladder(s) while the engine(s) are running. **Ladder(s) should be stowed away before getting underway.**
13. Know and obey the Rules of the Road.
14. Do not overload or improperly load your boat. The capacity plate should be used as a guide only. Common sense dictates that the capacity of your boat will be reduced by large waves or bad weather conditions. Be aware of local weather reports and water conditions.
15. If you have a ship-to-shore radio telephone, always respond to distress calls.

16. The extended swim platform (if applicable) is not intended for storage or occupancy while underway. Static load (persons) ratings are 500 lbs. for each model (note: 192 BR = 400 lbs.).

NOTE: The spoken word **Mayday** is the international signal of distress. Mayday should never be used unless there is present danger (an emergency) and you are in need of immediate assistance.

WEATHER

While local weather forecasts are generally accurate, it is always possible for the weather to change quickly. There is no substitute for personal observation and a good understanding of weather conditions. Weather and wave conditions can affect fuel consumption and travel plans—always prepare for the worst.

NOTE: Many marinas fly weather pennants. You should learn these since they can provide valuable information on changing weather conditions.

Storms

Thunderstorms can spring up at any time. Weather forecasts may often indicate only the possibility of thunderstorm development.

1. Learn basic cloud formations and watch the horizon for developing thunderstorms.
2. Keep a radio tuned to the local weather channel.
3. In the event of a storm, return to port if possible.
4. Close portals and hatches and secure them. Stow all loose gear below deck and tie-down any gear on deck.
5. Reduce speed and turn into the waves as the water gets rougher. Make sure everyone is wearing a personal flotation device.

IMPORTANT: Running a boat parallel to large waves greatly increases the chances of capsizing.

6. Put a sea anchor out. If you don't have one, use a canvas bucket or any object that will offer resistance.
7. Radar reflectors (if installed on your boat) should be 18 inches diagonally and placed 12 feet above waterline.

Fog

The two types of fog you most likely will encounter is warm-surface or cold-surface fog. You can determine the chances of fog formation by periodically measuring air temperature and dew point temperature. Anticipate the presence of fog if a slight variation in temperature develops between air and dew point readings.

1. As fog sets in take bearings, mark your position on the chart while continuing to log your course and speed.
2. Turn on navigation lights.
3. Make sure that all boat occupants have their personal flotation devices on properly.
4. If equipped with a depth sounder compare its readings with soundings on your chart.

5. Have someone go forward to act as a lookout.
6. Reduce your speed. From time to time stop the engine and listen for other fog signals.
7. Sound the horn or fog bell intermittently to warn others.
8. Anchor if you have any doubt about going on. Be sure to listen for other fog signals and continue to sound your fog horn or bell.

Man Overboard

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

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

Navigational Aids Chart

A Navigational Aids Chart is provided in your CROWNLINE Owner's/Operator's Manual. The Navigational Aids Chart contains information on the following areas:

1. Whistle Signals
2. Storm Warnings
3. Bridge Signals
4. Buoy Description and Information

NOTE: Because this information is subject to change, CROWNLINE Boats, Inc. recommends that you contact the Coast Guard for the latest information.

EMERGENCY CONDITIONS

Because an emergency requires immediate attention, it is important to stay calm and use good judgment. Regularly review all safety procedures and thoroughly check all safety equipment before going out on the water. Many serious situations can be lessened or avoided with careful planning, observation and common sense.

Fire

A boat fire is very serious, and you must react quickly to get it under control. The most important thing to remember in controlling a fire is to immediately stop your boat to decrease the risk of the fire spreading.

IMPORTANT: Everyone aboard should know the location and proper operation of the fire extinguishers.

1. Make sure everyone has their personal flotation devices on properly.
2. Attempt to put the fire out with the fire extinguisher, aiming at the base of the fire and using a sweeping motion.

3. If the fire gets out of control, use a distress signal and call for help on the radio. Everyone should then jump overboard and swim a safe distance away from the burning boat.

NOTE: If you do abandon your boat, stay together and try to stay as near as possible to your boat. It will be much easier for searchers to find you as a group.

Guidelines for Fire Prevention

- Check the bilge for fuel leaks
- Check cleaning products for flammability
- Ventilate when cleaning or painting
- Disconnect electrical system from power source when performing any type of maintenance
- Use extra caution when using exposed flame around urethane foam
- Extinguish smoking materials carefully
- Ensure ventilation systems are not obstructed
- Use only approved marine cooking and heating systems
- Open flames demand constant attention
- Keep flammable materials in approved container
- Replace circuit breaker fuse with one of the same amperage
- Electrical appliances must be within rated amperage of boat circuits
- A qualified marine electrician should service the electrical system

Collision

If a serious collision occurs, check everyone aboard for injury and then inspect for damage.

1. If your hull has a hole caused by another boat, be ready to plug it once the boats are separated.
2. A spare personal flotation device or bunk cushion makes an excellent plug for larger holes.
3. While plugging the hole, reposition the weight on the boat opposite the hole. This will bring the hole nearer to the surface, or even raise it out of the water.
4. If the boat is in danger of sinking, make sure everyone has their personal flotation device on properly.
5. If your boat has a radio, call the U.S. Coast Guard or other rescue authorities (VHF channel 16 or 22 CB radio).

Running Aground

If your boat runs aground, check everyone for injury and damage to the boat. Be sure to check the propeller. To free the boat, try to shift weight of passengers and/or gear to heel boat while reversing engine.

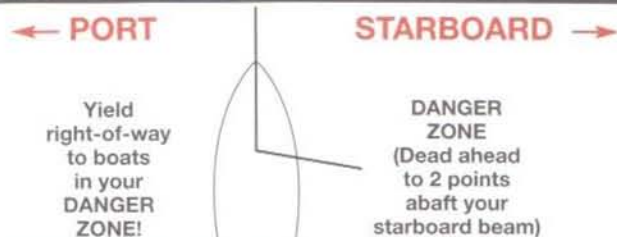
⚠ DANGER

DANGER: Do not use deck hardware for towing. CROWNLINE Boats, Inc. recommends using a commercial towing service if your boat becomes grounded.

NAVIGATIONAL AIDS CHART

REMEMBER THESE RULES

- 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.



WHISTLE SIGNALS

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

BRIDGE SIGNALS

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

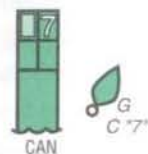
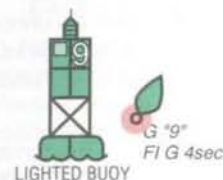
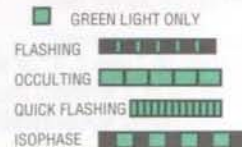
STORM WARNINGS



LATERAL AIDS AS SEEN ENTERING FROM SEAWARD

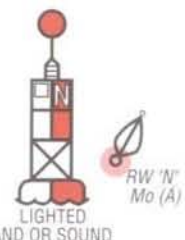
PORT SIDE

ODD NUMBERED AIDS



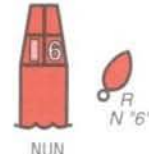
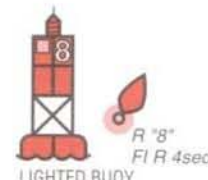
SAFE WATER

MID-CHANNELS OR FAIRWAYS NO NUMBERS-MAY BE LETTERED



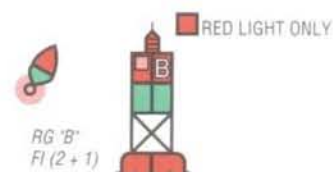
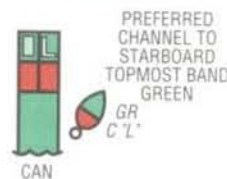
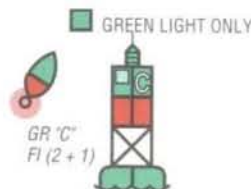
STARBOARD SIDE

EVEN NUMBERED AIDS



PREFERRED CHANNEL NO NUMBERS-MAY BE LETTERED

COMPOSITE GROUP FLASHING (2 + 1)



United States Coast Guard: <http://www.uscg.mil>

SAFETY EQUIPMENT

Federal law requires you to provide and maintain safety equipment onboard your CROWNLINE boat. Please refer to Federal, State, and Local Regulations for complete and up-to-date lists of required equipment.

Personal Flotation Devices (PFDs)

United States Coast Guard approved personal flotation devices of Type I, II, or III can be used onboard your CROWNLINE boat. The PFDs must be of a suitable size for each person aboard and shall be in serviceable condition and easily accessible.

Wearable PFDs

Type I - This PFD has the greatest buoyancy. It is designed to turn an unconscious person in the water from face down to a vertical or slightly backward position. Type I is most effective for all waters, and especially further out where rescue may be delayed.

Type II - Turns the wearer into the same position as a Type I, but the turning action is not as pronounced as the Type I because it is less buoyant. The Type II is generally more comfortable than a Type I.

Type III - Allows the wearer to place themselves in a vertical or slightly backward position. The Type III has the same buoyancy as a Type II. It has little or no turning ability and may not be adequate in rough waters.

Throwable PFD

The Type IV (throwable PFD) - Is designed to be thrown to a person in the water and held until rescue. It is not designed to be worn. The most common Type IV PFDs are buoyant cushions or ring buoys. The Type IV shall be immediately accessible and in good condition.

Fire Extinguishers

All fire extinguishers should be mounted in a clearly marked and accessible location away from the engine compartment. Everyone should know the location and proper operation of the fire extinguishers. Check with your CROWNLINE dealer for the location of your fire extinguisher.

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

Visual Distress Signals

Pyrotechnic or non-pyrotechnic Visual Distress Signal equipment is required. Regulations require this equipment on all recreational boats used in coastal waters, including the Great Lakes, territorial seas and those waters directly connected to the Great Lakes and the territorial seas, up to a point where the waters are less than two miles wide. This also applies to boats owned in the United States when operating on the high seas.

Pyrotechnic and non-pyrotechnic equipment must be U.S. Coast Guard approved, in good operating condition and in a readily accessible location. Equipment with a maximum serviceable life must not have expired.

Pyrotechnic Equipment

U.S. Coast Guard approved pyrotechnic 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

- Orange distress flag
- Electric distress light

No single signaling device is ideal under all conditions for all purposes. Consideration should be given to carrying various types of equipment. Careful selection and proper storage of visual distress equipment is important when boating with young children.

Additional Equipment

CROWNLINE Boats, Inc. recommends the following additional equipment to help make your boating experience safer and more enjoyable.

- Anchor and line
- Boat hook
- Bucket & sponge
- Compass & navigational charts
- Docking and towing lines
- Empty plastic fuel can (7 gallon capacity or less)
- Engine & Accessory Manuals
- Engine lubricating oil
- Extra keys
- Extra V-belts
- Fenders
- First aid kit
- Flashlight & extra batteries
- Manually operated bilge pump
- Paddle
- Replacement light bulbs
- Ship-to-shore radio
- Spare fuel filter
- Spare oil filter
- 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 can be found in various locations on board your Crownline boat. If your boat is missing any of these labels, notify your Crownline dealer for replacement.

NOTE: Respective labels are determined by the standard and/or optional equipment that is actually installed on board your boat upon delivery.

WARNING

TO MINIMIZE SHOCK AND FIRE HAZARDS:

- (1) TURN OFF THE BOAT'S SHORE CONNECTION SWITCH BEFORE CONNECTING OR DISCONNECTING SHORE CABLE.
- (2) CONNECT SHORE POWER CABLE AT THE BOAT FIRST.
- (3) IF POLARITY WARNING INDICATOR IS ACTIVATED, IMMEDIATELY DISCONNECT CABLE.
- (4) DISCONNECT SHORE POWER CABLE AT SHORE OUTLET FIRST.
- (5) CLOSE SHORE POWER INLET COVER TIGHTLY.

This label is applied to all boats equipped with shore power (AC).

WARNING

ROTATING PROP CAN CAUSE SERIOUS INJURY OR DEATH. SHUT OFF ENGINE WHEN NEAR SWIMMERS OR PRIOR TO USING SWIM PLATFORM OR LADDER.

This label is applied to all boats at the helm.

WARNING

ROTATING PROPELLER CAN CAUSE SERIOUS INJURY OR DEATH. DO NOT USE LADDER OR SWIM PLATFORM IF ENGINE IS RUNNING.

This label is applied to all boats near the swim platform or swim ladder.

WARNING

In all gasoline powered boats, engine and generator exhaust systems produce colorless and odorless carbon monoxide gas ("CO"). Direct prolonged exposure can result in CO poisoning which may be harmful or fatal. To prevent excess exposure and reduce the possibility of accumulations of CO in the cabin and cockpit of the boat, the operator should insure adequate ventilation in each the cabin and cockpit areas, through utilization of cabin hatches, cabin doors, cabin windows, cockpit windshield windows and side windshield vents to increase air movement through the cabin and cockpit areas. The following conditions tend to increase the accumulation of CO in and about the boat and require the operator's particular attention:

1. Operation at slow speeds or dead in the water.
2. Operation with a high bow angle attitude.
3. The utilization of canvas tops, side curtains and back curtains.
4. Contributing climatic conditions, such as a head wind.
5. Operation of engines and/or generator in confined spaces or at dockside.
6. Any blockage of hull exhaust outlets.

Indications of excessive exposure to CO concentrations may include nausea, dizziness and drowsiness.

This label is applied to all boats with accommodation spaces.

TRAILERING

Improper trailering can damage your boat. Selecting the correct trailer and using it properly ensures adequate support for the hull, safe and easy towing, and smooth unloading and loading in any weather.

The trailer for your CROWNLINE boat should be designed to carry the full weight of your boat and engine. Never overload your trailer by storing excess baggage, camping equipment, etc. in the boat. Be sure to check the certification label on the frame of the trailer for the Gross Vehicle Weight Rating (GVWR). The total weight of your boat, engine, fuel, gear and trailer should not exceed the GVWR. Your CROWNLINE dealer can help you select the trailer that will best fit your boat.

On older trailers, proper adjustment of the side support pads is critical each time the boat is loaded. Newer trailers feature side supports that are self-adjusting. Periodically inspect your trailer to make sure the side supports are in proper working condition.

IMPORTANT: The side supports should only be tight enough to keep the boat from leaning side to side. Any unnecessary pressure can damage the hull.

Make sure that the weight-distribution hitch on your vehicle is capable of handling the GVWR. The weight on the trailer should be evenly distributed and can be checked by determining the tongue weight. Tongue weight is measured as a percentage of the total weight of the loaded trailer on its tongue. Ideal tongue weight is not less than 5% and not more than 10% of the GVWR. For example, if the weight of the loaded trailer is 3000 pounds, the weight on the tongue should be more than 150 pounds but less than 300 pounds. Excessive tongue weight will cause the front end of the towing vehicle to sway. Insufficient tongue weight will cause the trailer to sway or fishtail.

WARNING

WARNING: Sway and fishtailing are especially dangerous at higher speeds where they can become uncontrollable.

Most trailers with a GVWR of 1500 pounds or greater are required to have brakes, although this requirement may vary from state to state. Check with your CROWNLINE dealer for additional information.

LAUNCHING

1. Before backing your boat onto the ramp:
 - A. Remove all tiedowns.
 - B. Store all loose gear properly.
 - C. Inventory your safety equipment.
 - D. Lock winch and trailer unit.
 - E. Ensure transom drain plug is in.

- F. Tilt drive unit up to clear the ramp.
- G. Disconnect car to trailer wiring.
2. Have someone on the ramp give you directions. Back slowly down the ramp.

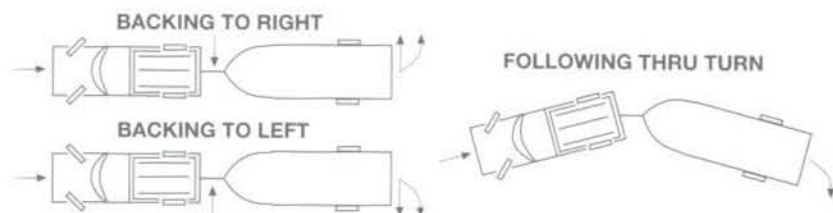


FIGURE 3.1 — TRAILERING

NOTE: If you do not have experience in backing a trailer, then **Practice**. Take your trailer to an open area and get accustomed to using it before you get into a confined launch site. Figure 3.1 shows proper towing vehicle wheel alignment when backing up with trailer.

3. When the boat's transom is in several inches of water:
 - A. Stop towing vehicle, shift transmission to park, turn OFF engine and set the parking brake.
 - B. Disconnect launching cable.
 - C. Attach bow line to the boat.

NOTE: Be sure to hold onto the bow line so your boat does not drift away.

- D. If transporting your CROWNLINE on a "bunk" type trailer, back trailer into water until propeller is under water. Tilt drive unit down, start engine, place gear shift in reverse and slowly drive boat off trailer into the water. If using a "roller" type trailer, back trailer into water until stern is touching water. Manually push boat down rollers and off trailer into the water.
- E. Tie boat to the pier.
4. Pull away and safely park your vehicle and trailer.

LOADING

The maximum load your CROWNLINE boat can safely handle is found on the capacity plate near the helm, if applicable. When loading your CROWNLINE boat remember to stay within the stated capacity and distribute the load evenly, keeping it low to the deck. Always secure loose items so they don't shift or slide while you are on the water. When loading your boat always step onto the boat, never jump. Have someone on the dock pass any gear aboard.

CAUTION

CAUTION: Overloading or improper weight distribution onboard can make your boat difficult to handle. Bad weather or rough seas could significantly reduce the stated capacity. Overloading is a violation of U.S. Coast Guard regulations.

NOTE: All boats over 20 feet (6.1 meters) are not subject to U.S. Coast Guard safe loading or labeling requirements. However, it is the boat operator's responsibility to execute prudence, good judgement, and common sense in maintaining safe load limitations at all times.

Passengers should board the boat one at a time and find a seat. Passengers should remain seated during loading of the boat to maintain an even trim. See Figure 3.2.

WARNING

WARNING: Passengers must not ride on the bow, cabin deck, gunwale, engine hatch or swim platform while underway.

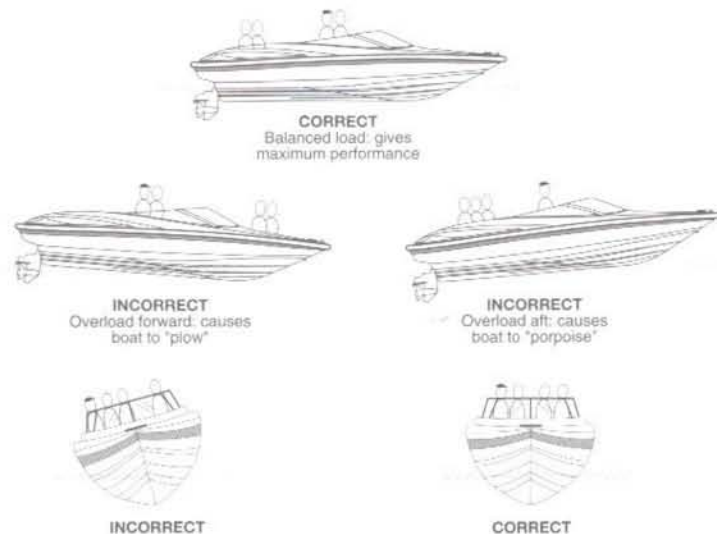


FIGURE 3.2 — PASSENGER SEATING

FUELING

Inspect for leakage, weakening, hardening, swelling or corrosion of fuel components, including: fuel tank, fuel line, fittings, fuel filter, and carburetor. Any problems should be corrected immediately.

DANGER

DANGER: Never let the odor of gasoline go unchecked. Fuel leakage can cause fire and explosion.

Preliminary Procedures

WARNING

WARNING: Do Not use fuels that have added alcohol or alcohol derivatives. Alcohol causes marine fuel system hoses and components to deteriorate.

1. Safely moor your boat to the dock.
2. Turn OFF all electrical equipment, engine, generator, air conditioner, appliances, lights, bilge pump and blower, etc.
3. Extinguish all flames or smoking materials.
4. Close all hatches, windows, doors, and compartments.

DANGER

DANGER: Fuel vapors are explosive and can become trapped within the lower portions of the boat. All hatches, windows, doors, and compartments must be closed when fueling your boat.

5. Ensure a fire extinguisher is close by.

Fuel Tank Capacity

Refer to the CROWNLINe specification sheet or sales brochure, or check with your CROWNLINe dealer for fuel tank capacity of your particular CROWNLINe model. Use this information, along with current fuel tank level, to avoid overfilling the tank.

Fueling Procedures

1. Make certain all passengers are ashore.
2. Always fuel in good lighting. Gasoline spills may not be noticed in poor lighting or in darkness.
3. A through-hull fitting on your CROWNLINe boat is for fuel tank filling. Remove fuel fill plate typically located on port side of transom. Insert the fuel supply nozzle while keeping it in contact with the through-hull fitting. This will prevent possible static discharge.

DANGER

DANGER: Do Not overflow the fuel tank or allow fuel spills into the hull or bilges. Visually monitor fuel vent located on some models near the fuel fill plate. Some models are equipped with a combination fill/vent. Do not fill tank so full that fuel spills out the fuel vent.

IMPORTANT: When fueling be sure that the water fill plate is not mistaken for the fuel fill plate.

4. After pumping approximately 10 gallons of fuel into the fuel tank, inspect the engine and fuel tank area for any signs of fuel leakage. Continue fueling if you do not detect leakage or other problems.
5. Allow space at the top of the tank for thermal expansion.
6. If fuel appears to be entering fuel tank very slowly, check for fuel vent blockage or kink in the fuel line.

After Fueling Procedure

1. When you have finished fueling, replace the fuel fill plate and wipe up any spills in the fuel fill area. Properly dispose of any cleaning materials.

2. Open engine compartment and all hatches, windows and doors closed during fueling. Inspect these areas for fuel fumes or fuel line leakage. Any sign of fuel leakage, must be investigated and corrected before starting the engine.
3. Run the bilge blower for at least four minutes before starting the engine. Continue to run the bilge blower until the boat is underway and has reached cruising speed.

INSTRUMENTS

Ask your CROWNLINe dealer about the normal ranges and readings of the gauges for the power package installed on your boat. When boating, always keep an eye on the gauges and promptly investigate any abnormal readings.

Fuel Gauge

The fuel gauge shows the level of fuel present in the fuel tank. The ignition switch must be ON when checking fuel level. To get the most accurate reading, keep the boat level. At normal speeds the fuel gauge will usually read higher due to the angle of the bow.

Because fuel gauge readings are approximate, you should generally use the *One-Third Rule*. One-third of your total fuel should be used to travel to your destination and one-third to return. The remaining one-third is reserved for emergencies.

Oil Pressure Gauge

The oil pressure gauge will often show engine problems. It provides an indication of the pressure in the engine lubrication system. A pre-set valve in the oil pump controls the maximum oil pressure. A drop in oil pressure is a possible indication of oil pump or leakage problems.

CAUTION

CAUTION: If a complete loss of oil pressure occurs, STOP the engine immediately. Serious damage will occur if the engine continues to run after loss of oil pressure.

Tachometer

The tachometer gauge indicates the speed of the engine in revolutions per minute (RPM). This speed is not the boat speed or necessarily the speed of the propeller. The tachometer may not register ZERO with the ignition key in the OFF position.

Temperature Gauge

The temperature gauge monitors the cooling system of the engine. A sudden increase in the temperature could be indication of a blocked cooling passage or a water pump malfunction.

This gauge should always be checked immediately after starting the engine. Marine engines draw external water, circulate it through the heat exchanger on the engine and pump it overboard through the exhaust system. If the temperature gauge is high, STOP the engine immediately. Refer to your Engine Operation and Maintenance Manual for instructions and corrective action.

Voltmeter

The voltmeter monitors battery condition and thus alternator performance. Under normal engine running conditions (1000 RPMs or higher) the voltage will range between 12.0 to 15.5 volts when the alternator is charging. The batteries are fully charged if the voltmeter reading is high when the engine is not running and the ignition key or switch is ON.

Significantly higher or lower readings show a battery problem, alternator malfunction or heavy drain on the battery. An oscillating reading shows a loose wiring connection or loose belts. Displayed low voltage readings after stopping engine shows a bad battery or large battery load.

Power Trim Gauge

This gauge provides a visual indication of the inward-outward position of the out-drive.

Engine Hour Meter

The meter operates automatically as a timing device and records engine running time. The operation is very similar to the odometer in your personal vehicle. By observing the actual operating time of the engine, you will be alerted to scheduled service and maintenance intervals. The engine hour meter is located at the helm dash, in the engine compartment, or in a cockpit storage compartment.

NOTE: Do Not leave the ignition key ON with the engine OFF. This automatically activates the meter and will increase the engine operating time.

Ignition Switch (Key)

Operation of the ignition switch (key) will START and STOP the engine. Refer to your engine operation and maintenance manual for diesel operation.

START - turn switch to START position; once engine is started, turn switch to RUN position.

RUN - switch in RUN position should only be used when your engine is actually running. Engine running also allows your boat's engine alternator to recharge battery while you run your boat. If switch is allowed to remain in the RUN position without the engine running, this will discharge your battery.

OFF - switch should always be in OFF position when the boat is not in use or power is not required.

Accessories Switch

The accessory switch supplies power to your boat's accessories. When using boat accessories, you need to start your engine occasionally to allow the engine alternator to fully recharge the battery. Otherwise you may drain the battery and you will not have enough power to start engine. When not in use, make sure all accessory and light switches are turned to the OFF position to eliminate battery discharge.

Battery

The battery installed in your boat supplies your boat with DC current for starting the engine, lights and power for accessories. Inspect the battery frequently for cleanliness and tight connections. Be sure that the battery compartment is well ventilated.

Engine Safety Switch

The spring loaded engine safety switch will automatically shut down the engine during emergency situations if activated, to prevent uncontrolled or unattended operation. Certain emergency conditions (i.e. turbulent water, wakes, accidental shove, etc.) may impair a person's ability to operate the boat safely.

The switch, located on the helm, dash, or the shift control, must be pulled out from its normal position, and a plastic clip (with attached lanyard) must be placed between the knob of the switch and its base. This will activate the protective shut-down circuitry. Next, securely attach the other end of the lanyard to the boat operator. If the operator moves or falls so that he is an unsafe distance from the steering wheel, this action will cause tension on the lanyard thus pulling the plastic housing. When the plastic housing is removed the engine safety switch is released and automatic engine shut down occurs.

Bilge Blower Switch

This switch activates the engine compartment ventilation system (bilge blowers). When the LED is illuminated, the system is ON. The LED is extinguished when OFF. The boat operator should check in the engine compartment to make sure the blower is working properly.

Navigational/Anchor Light Switch

This three-position switch controls the ON or OFF operation mode of the navigational and anchor lights. The FORWARD position operates the navigational lights. The AFT position operates the Anchor Light. Middle position is the OFF position.

Washdown Pump Switch

This switch controls the ON or OFF operation mode of the washdown shower pump. To prevent burning out the pump, ensure that both the seacock and the shower wand or spigot are open before turning ON system.

Courtesy Light Switch

This switch controls the ON or OFF operation mode of the courtesy lights.

Spotlight Switch

This switch controls the ON or OFF operation mode of the spotlight. It also activates the remote control for side to side and up and down positioning. For further information regarding spotlight use and operation, refer to the spotlight manufacturer's literature.

Compass

Various factors affect the operation of the compass, such as local magnetic variation and deviation (induced needle deflection caused by metal components and the operation of electrical equipment on board your boat). Each must be compensated to adjust for the specific characteristics of each boat. It is vitally important, therefore, that you have your compass professionally compensated before using it for marine navigation. Consult your CROWNLINE dealer regarding compass compensation.

NOTE: The compass should be re-compensated when having additional electrical equipment installed on your boat.

Steering

The standard steering system is a single rack and pinion system. Detailed information on the power steering assembly can be found in the engine operation and maintenance manuals.

Steering a boat has a different feel than driving a car. Always use caution when turning. The stern will respond by pitching in the opposite direction of the bow. Always use extreme caution when you're leaving the dock or trying to avoid an object in the water. Give yourself plenty of room to make a turn. You also should slow the speed of your boat while turning. All passengers should remain seated when turning.

NOTE: Most CROWLINE boats are equipped with power steering as a standard feature, which provides easier and more responsive steering characteristics. Your engine owner's manual contains power steering system maintenance information.

Throttle & Gear Shift

The throttle control regulates the engine RPMs. Moving the throttle lever forward of NEUTRAL increases forward engine speed and moving the throttle back increases reverse engine speed.

NOTE: When maneuvering forward at low speeds, shifting the engine into neutral and then reverse can assist in slowing the boat. Allow engine to slow to idle speed before shifting into reverse.

CAUTION

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

WARNING

WARNING: High speed acceleration in reverse creates a wake that could wash over the transom and enter the boat and/or engine.

CAUTION

CAUTION: Acceleration at full throttle is not recommended until after the engine "break-in period." Read the engine owner's manual to determine the "engine break-in period."

START-UP

NOTE: If your boat's engine is carbureted, the starting procedure may be slightly different than the instructions below.

The Engine Operation and Maintenance Manual supplied with your CROWLINE boat provides pre-start and starting instructions. The following information is a guideline and not intended to explain in detail all starting procedures and instructions.

Preliminary Checks

1. Secure boat to dock or mooring slip before attempting to START engine. Boat should be kept secure until engine is warm and ready for departure.
2. Check oil and coolant fluid levels.
3. Check fuel supply to ensure you have enough fuel for your expected travel plan.
4. Inspect for leaks of fuel, oil, coolant, exhaust, and power steering fluid.
5. Make sure throttle is in the NEUTRAL position.

Starting

1. Move dual battery switch to number 1, 2, or ALL setting, if so equipped.
2. Run the bilge blower for four minutes.

DANGER

DANGER: Gasoline vapors are highly explosive. To prevent a possible explosion and fire, check engine and fuel compartments for fumes or accumulation of fuel before each engine start. Always operate bilge blower for at least four minutes before starting engine.

3. If engine fails to start, refer to the troubleshooting chart on 5-8 of your engine owner's manual.

CAUTION

CAUTION: Do Not continually operate starter for more than 15 seconds. Allow starter to cool at least three minutes between START attempts.

4. When engine is cold, run approximately one to two minutes at fast idle (1200 to 1500 RPM).
5. Once engine has warmed up, check temperature gauge to ensure engine temperature is normal. If temperature reading is abnormally high, STOP engine immediately, and inspect engine to determine cause.
6. With engine running, voltmeter should show a reading between 12 to 15 volts.
7. Check steering operation. Turn steering wheel to FULL port and to FULL starboard while observing outdrive movement.
8. Inspect for leaks of fuel, oil, coolant, exhaust, and power steering fluid.
9. Ensure boat is still securely moored to dock and engine is idling between 600 to 800 RPMs. Move throttle FORWARD and AFT, then back to NEUTRAL to check for proper shift operation.



FIGURE 3.2
TYPICAL CANVAS - TOP VIEW

⚠ DANGER

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

⚠ DANGER

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

CANVAS

Your CROWLINE boat canvas is constructed of the highest quality materials.

NOTE: Once installed, a bimini top is much higher than a convertible top. The convertible top snaps directly to the windshield. The bimini top provides standing room and bow to stern air flow. When the window piece is installed from front of bimini to top of windshield, the canvas set is closed off in front while maintaining full visibility.

The Bowrider and Cuddy models canvas is rolled up inside a boot and stored in a concealed compartment on top of the stern, located behind the engine box or in the engine compartment. The Cruiser canvas is rolled up and stored inside a protective weather covered boot.

Canvas Installation Instructions

IMPORTANT: For all canvas installations, ALWAYS zipper windows and curtains to main section of canvas BEFORE attempting to snap canvas in place. This will make for an easier installation and prevent possible damage to the zipper and canvas. Refer to Figures 3.2 and 3.3.

Convertible Top

1. Open storage compartment and remove canvas set.
2. Unzip boot cover and remove bow extensions.
3. Insert bow ends into fittings, located on the windshield frame, then lock in place by installing connecting pins.
4. Unfold convertible top, then attach front snaps to windshield.
5. Attach aft straps of convertible top to deck hooks.

NOTE: Canvas should be tight and may require extra force when stretching to proper snap location.

For optional bow cover snap in place, for side and aft curtains, zip then snap in place.

Bimini Top

1. Open storage compartment and remove canvas set.
2. Unzip boot cover, remove bow extensions and secure into bow ends.
3. Insert bow ends into fittings, located on the windshield frame, then lock in place by installing connecting pins.
4. Unfold bimini top, then attach stanchions at rear of bimini top to deck mounts.
5. Attach front straps of bimini top to windshield hooks.

NOTE: Canvas should be tight and may require extra force when stretching to proper snap location. Avoid grasping the canvas near zippers.

6. Zip front window connector onto front of bimini top.
7. Snap front of window connector to windshield.
8. Adjust bimini top so that it is squared properly over bow set. There should be an equal amount of pull on each strap.
9. Seal velcro at corners to complete installation.

For optional side and aft curtains, zip and snap in place, then seal velcro at corners.

Cruiser (Bimini Top)

NOTE: Canvas bow set has been pre-installed by CROWNLIN. Your CROWNLIN dealer should re-install bow set for you which will eliminate any additional installation requirements.

1. Unzip boot, then unfold canvas.
2. Attach two (2) aft stanchions to deck mounts.
3. Attach two (2) forward straps to windshield hooks.
4. Zip front window connector onto front of bimini top.
5. Snap front of window connector to windshield.
6. Adjust bimini top so that it is squared properly over bow set. There should be an equal amount of pull on each strap.

For side and aft curtains, zip and snap in place, then seal velcro at corners.

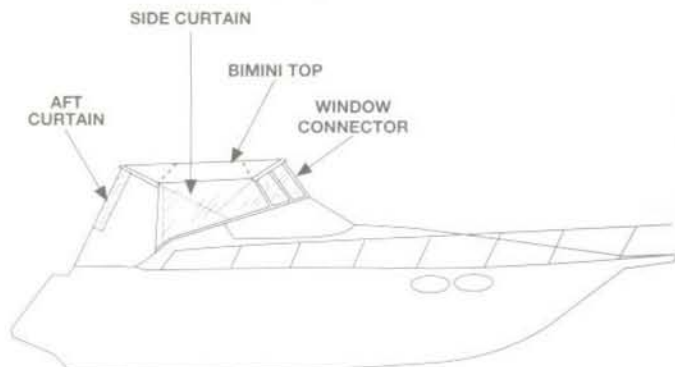


FIGURE 3.3 TYPICAL CANVAS - SIDE VIEW

Your CROWNLIN boat is fundamentally an open vehicle. Therefore, in spite of well-designed and well-fitting canvas enclosures, your boat is NOT waterproof in the same sense that your automobile is waterproof. In spite of the best efforts to design these enclosures to conform with the boat, a certain amount of leakage may transpire. The construction of the canvas tops and curtains involves sewing as the primary choices of fastening. The needle results in holes at the seam lines which can admit water. Needle holes elongate with time and usage. After cleaning with soap and water, allow seams to thoroughly dry. A vinyl sealant can be applied on the seams to somewhat close the needle holes. This sealant must be applied with the canvas up and stretched tight. Your canvas system is not warranted by CROWNLIN Boats, Inc. to provide a water-tight enclosure. The canvas top supplied with your CROWNLIN is not a storage cover. Canvas tops which have been used as a storage cover will not be covered by the manufacturer's warranty.

CARBON MONOXIDE

Engine and generator exhaust systems produce carbon monoxide (CO), a poisonous gas which is odorless, colorless, and heavier than air. Indications of excessive exposure to CO concentrations are nausea, dizziness and drowsiness. Direct prolonged exposure can result in CO poisoning that may be harmful or fatal.

⚠ WARNING

WARNING: The following conditions have the potential to increase CO accumulation in and about the boat and require immediate attention:

1. Operation at slow speeds or stopped in the water.
2. Operation with a high bow angle.
3. Utilization of canvas top, side curtains and back curtains.
4. A tail wind.
5. Operation of engines or generators in confined areas **created by the boat, by the boat and adjoining structures** or at docksides.
6. Any blockage of hull exhaust outlets.

ACCELERATION

⚠ CAUTION

CAUTION: Acceleration at FULL throttle is not recommended before the engine break-in period has been completed. This break-in period coincides with the engine check-up. Therefore, FULL throttle acceleration should not take place until after this check-up.

Your boat increases the angle of trim and rides bow-high when you throttle UP and accelerate. Continued acceleration will reduce the trim. The maximum trim angle is commonly known as the hump. Accelerate through the hump as quickly as possible due to limitations in visibility, handling, and performance. This should only take a few seconds. Then throttle DOWN to cruising speed as this will provide for better fuel efficiency. Reference Figure 3.4.

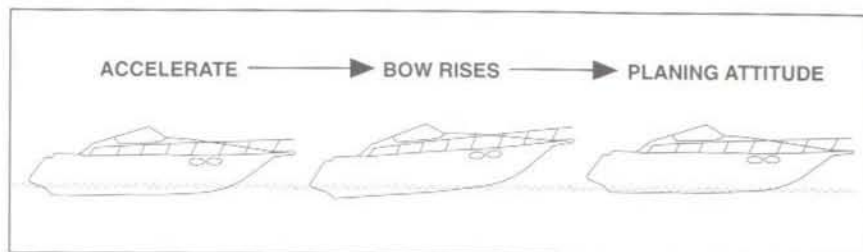


FIGURE 3.4 BOAT ATTITUDE

TRIMMING

Power Trim Drive Unit

NOTE: Refer to your Engine Operation and Maintenance Manual or drive unit instruction manual regarding power trim controls and drive unit installed on your boat.

To adjust to the ideal boat angle for given load and water conditions, the drive unit must be trimmed. The best all-around performance obtained is when the drive unit is adjusted to allow the boat to run at an angle between 3 to 5 degrees to the water.

MOORING LINES

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. 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 heave off one end of the mooring line and bring the entire length of mooring line back into the boat.

The mooring lines you will use most often are the bow line, the stern line, and spring lines as shown on Figure 3.5. Each line has a specific purpose. The bow lines and the stern line secure your boat's bow and stern. The two spring lines keep your boat from moving forwards or backward when you are moored alongside a dock.

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

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

NOTE: If tides are a consideration, be sure to leave slack in the lines to make up for the rise and fall of the water while your boat is docked.

Procedures described above are to be used as guidelines only. Wind, weather and water conditions (tides, etc.) may affect mooring procedures.

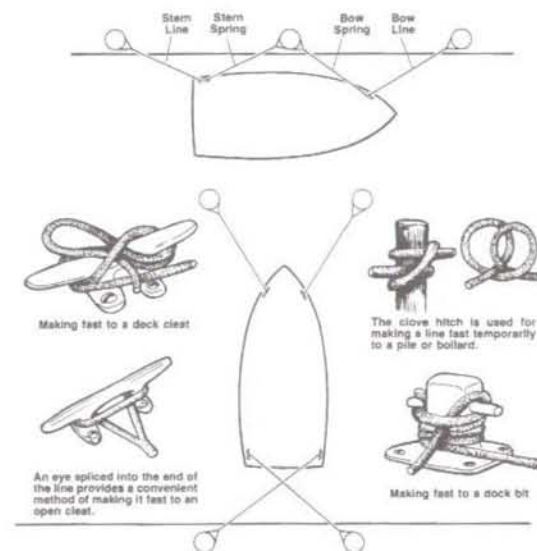


FIGURE 3.5 MOORING LINES

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

BOAT REGISTRATION

Federal and state laws require that every boat equipped with 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 onboard when the boat is in use.

WASTE DISPOSAL

Discharge of Oil

⚠ WARNING

WARNING: 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 of \$5,000.

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. Because of this, U.S. Coast Guard regulations completely prohibit the dumping of plastic refuse or other garbage mixed with plastic into the water anywhere, and restrict the dumping of other forms of garbage within specified distances from shore.

USCG Dumping Placard:

ILLEGAL TO DUMP

INSIDE 3 MILES (and in U.S. Lakes, Rivers, Bays and Sounds)

- PLASTIC
- DUNNAGE, LINING AND PACKING
- MATERIALS THAT FLOAT
- ANY GARBAGE EXCEPT DISHWATER/
- GRAYWATER/FRESH FISH PARTS

3 TO 12 MILES

- PLASTIC
- DUNNAGE, LINING AND PACKING
- MATERIALS THAT FLOAT
- ANY GARBAGE NOT GROUND TO
- LESS THAN ONE SQUARE INCH

12 TO 25 MILES

- PLASTIC
- DUNNAGE, LINING AND PACKING
- MATERIALS THAT FLOAT

OUTSIDE 25 MILES

- PLASTIC

ADDITIONAL UNDERWAY INFORMATION

1. Be sure to run the bilge blower whenever the boat is operated under cruising speed.
2. Keep all bilge blower and engine compartment vents free of obstructions to allow proper ventilation.
3. Always be aware of local laws on noise limits. Noise means engine noise, radio noise or even yelling by people on your boat. Good seamanship demands that you operate your boat quietly so as not to infringe on the rights of others. Don't use thru-transom or thru-side exhaust unless you are well offshore.
4. You are responsible for any damage or injury caused by your boat's wake. Observe no wake speed zone warnings. Operate your boat with regard for the safety of other boats and people in your boating area.
5. Keep your engine well tuned to decrease exhaust hydrocarbon emissions that pollute the air and water.

NOTE: Before making any changes to the systems or components on your boat, refer to the applicable Coast Guard, American Boat and Yacht Council, or CE Standards. See your dealer for additional information.

ELECTRICAL SYSTEMS

12 Volt DC System

The 12 Volt DC system is battery powered. The battery is charged through the engine-driven alternator and/or (optional) battery charger. A voltmeter, located on the helm dash, shows the charge level of the battery. DC circuit breakers operate onboard 12 volt equipment.

The negative terminal of the battery is connected to the engine grounding stud. This is the approved negative ground set-up for marine DC electrical systems. Any additional equipment must be adapted to this negative ground system. Additional equipment must be supplied and fused, if necessary, from DC circuit breakers located on the helm dash. A yellow DC grounding wire or yellow band cable will identify DC ground from the black or hot wire on the AC 120 Volt system. Consult your CROWNLIN dealer about additional DC power requirements.

IMPORTANT: Power feeds for accessory equipment must not be taken from the voltmeter terminals.

120 Volt AC System

(Optional Shore Power system including battery charger on some models)

The AC electrical system operates from a dock-side shore power (30 amp 120 volt, 60 cycle). The dock-side system uses three wire, color-coded circuitry. The black or hot wire is the ungrounded current carrying conductor. The white or neutral wire is the grounded current carrying conductor. The bare copper or green wire, referred to as the "equipment ground," is a grounding conductor, and under normal conditions is not a current carrying wire. The neutral wires are connected together at a buss bar. The equipment grounds are similarly connected together at another buss bar. Each hot wire is connected to, and protected by, a circuit breaker in the main distribution panel.

The main distribution panel houses the system circuit breakers. The dock-side system has a MAIN circuit breaker which protects the overall distribution network. The MAIN breaker protects both the hot and neutral input leads. The MAIN breaker will also trip if reverse polarity should occur. This breaker is very sensitive. The resulting power surge which occurs when connecting the shore power cord may cause the MAIN breaker to trip.

To avoid this power spike, turn OFF all MAIN breakers before plugging IN the shore power cord. Securely connect the power inlet of the boat and the shore power receptacle. If the connection is broken and later re-secured, the MAIN breaker will trip. Connections must be secure for uninterrupted dock-side service.

Appropriately labeled breakers control actuation of the optional electric stove and optional electric hot water heater. The electric stove also has heat controls governing the burner elements.

All AC receptacles can be used for 120 volt household appliances.

NOTE: Due to the detailed nature of electrical schematic drawings your dealer can provide additional information.

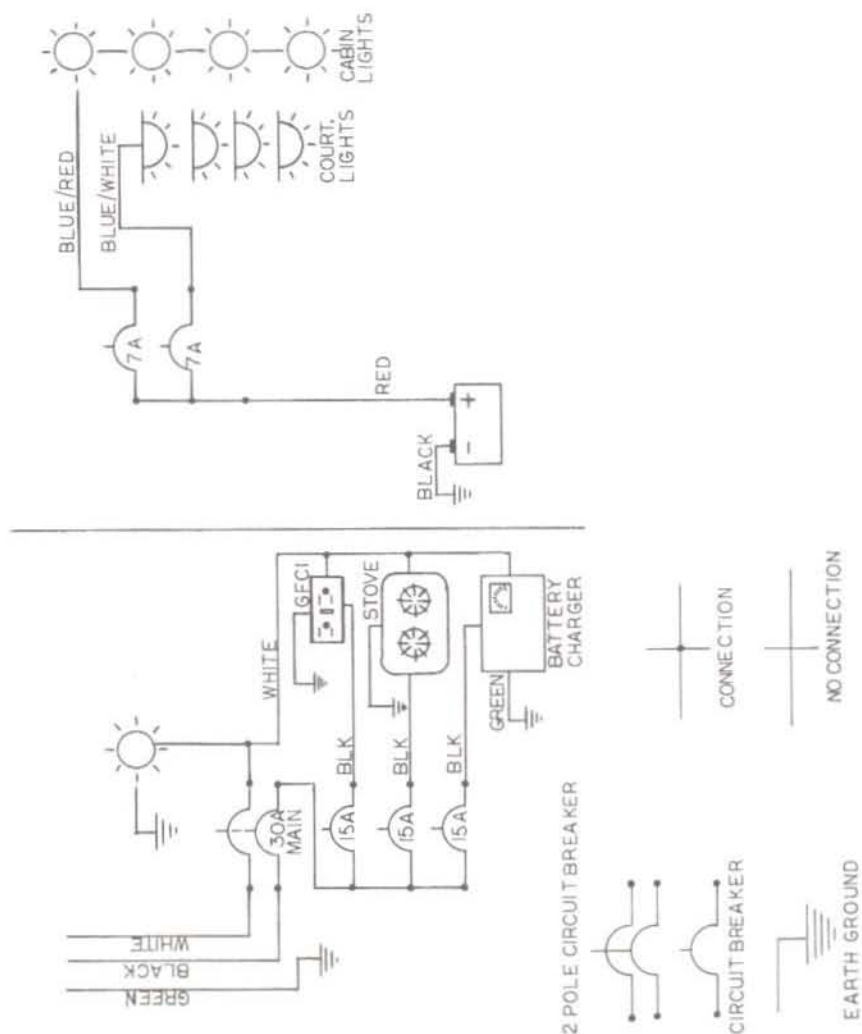


FIGURE 4.1
CCR DC AND AC ELECTRICAL SCHEMATIC

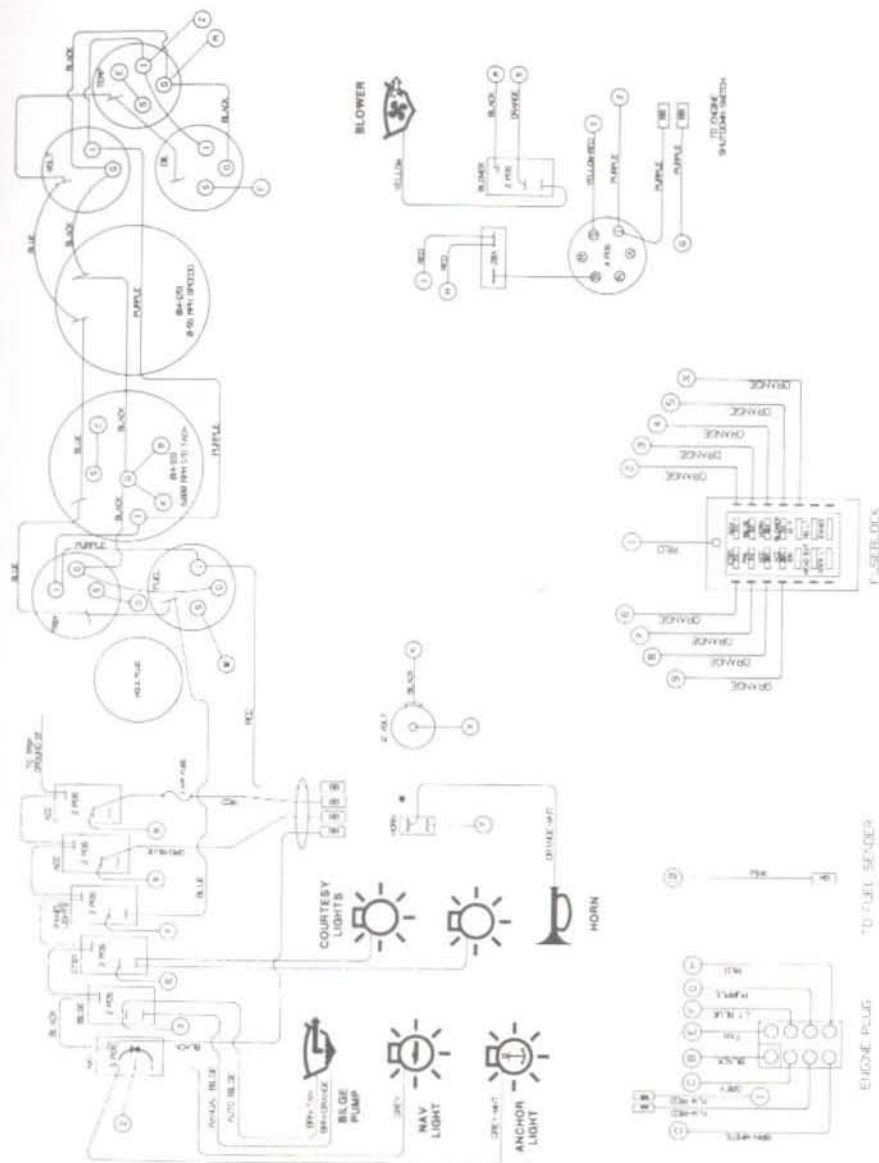


FIGURE 4.2
BR AND CCR DC ELECTRICAL SCHEMATIC

FIGURE 4.4
290 CR INSTRUMENT PANEL (DUAL ENGINES)

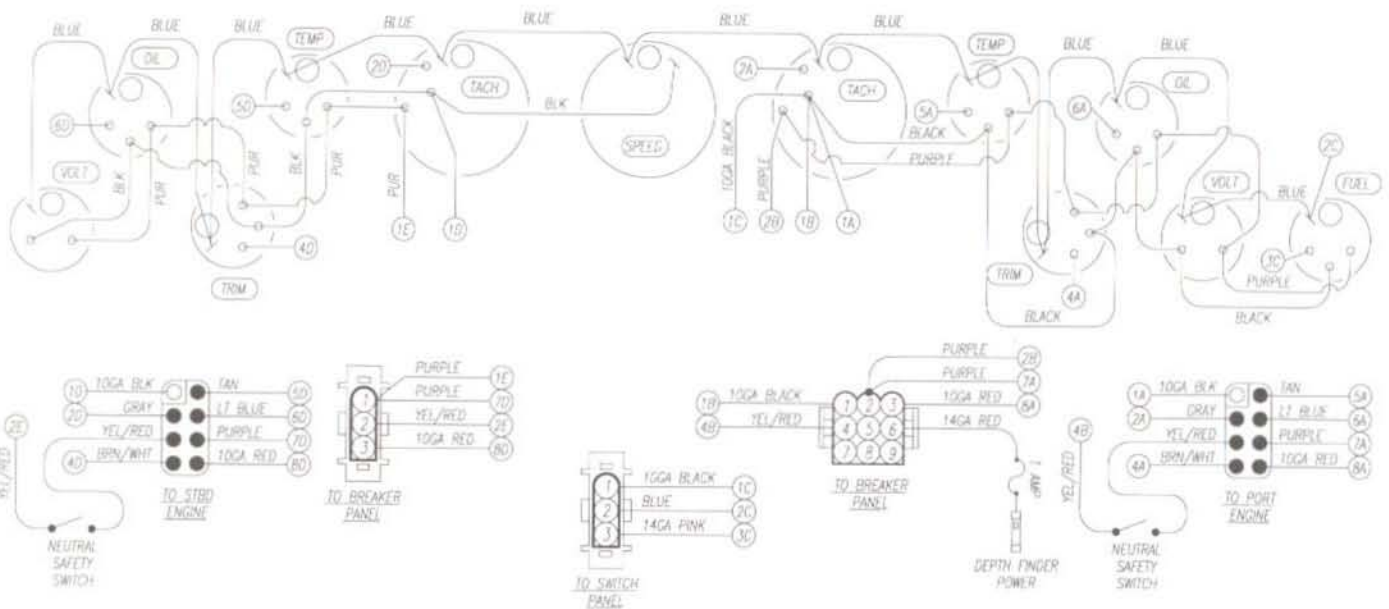
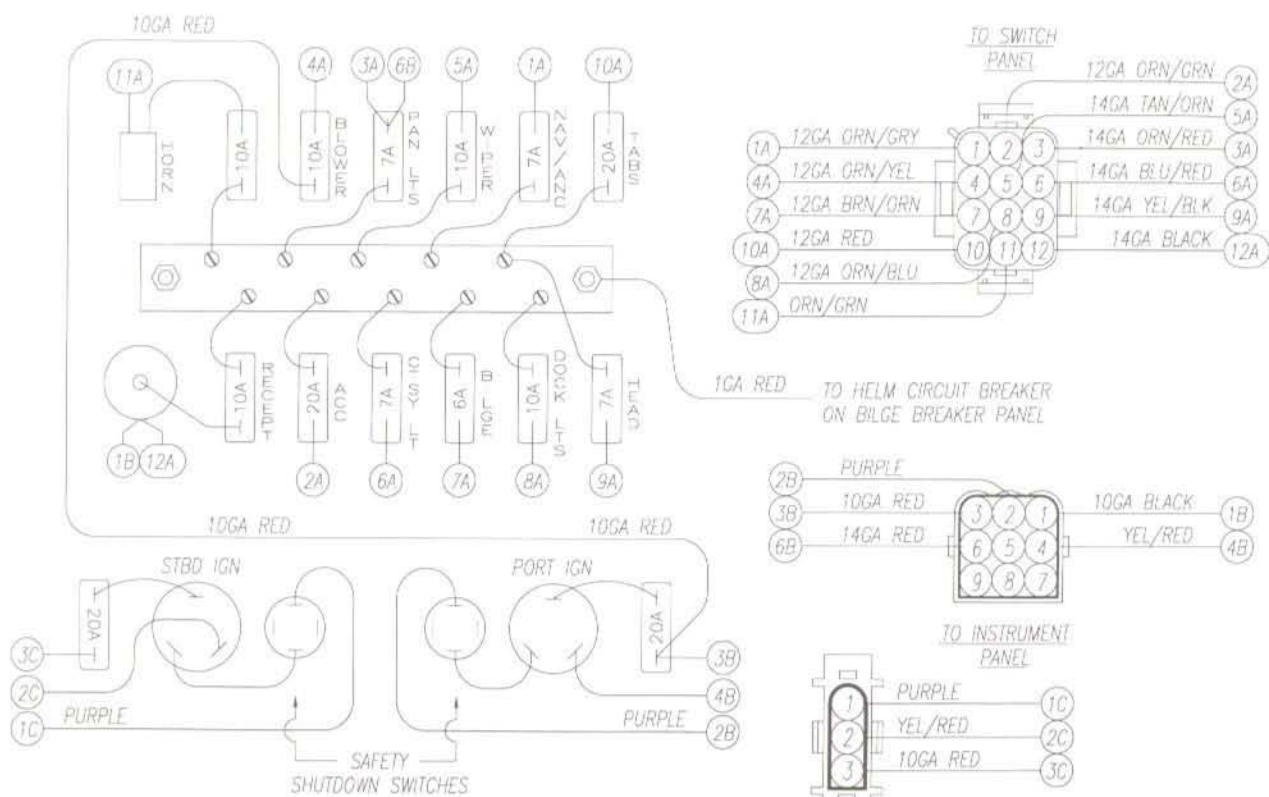


FIGURE 4.5



290 CR SINGLE ENGINE HELM BREAKER PANEL

FIGURE 4.6

FIGURE 4.7
290 CR HELM ACCESSORY PANEL

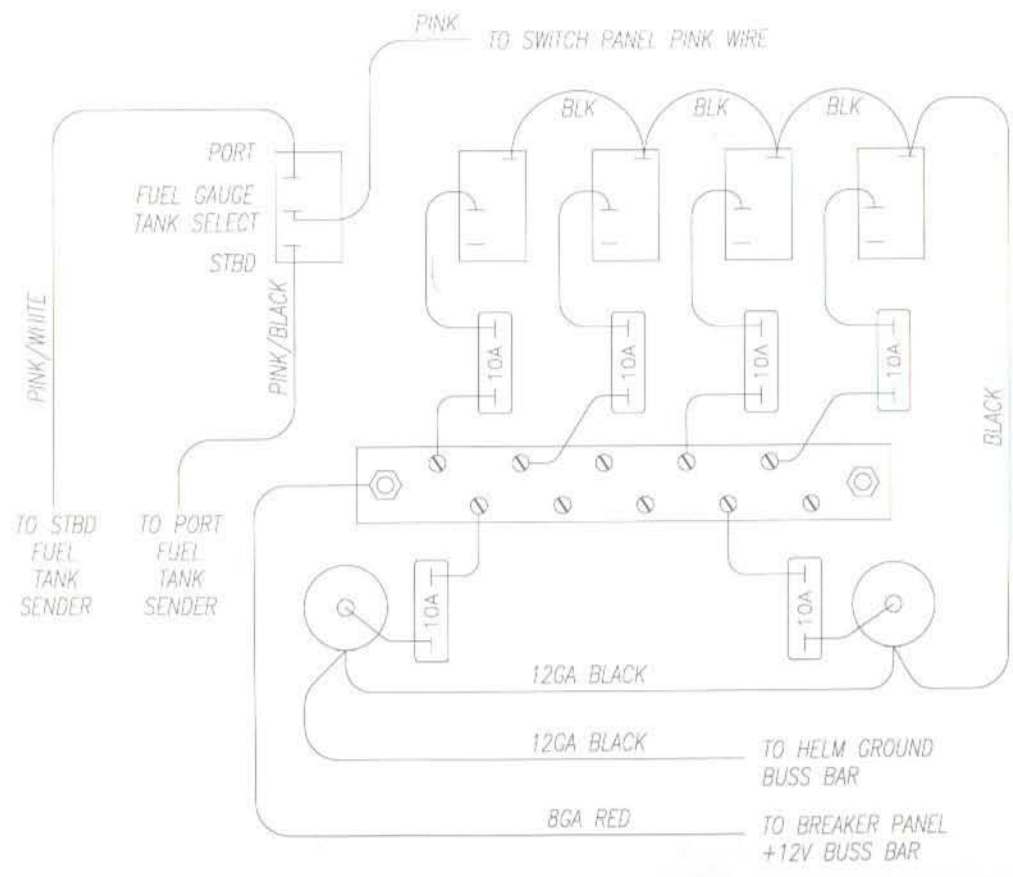
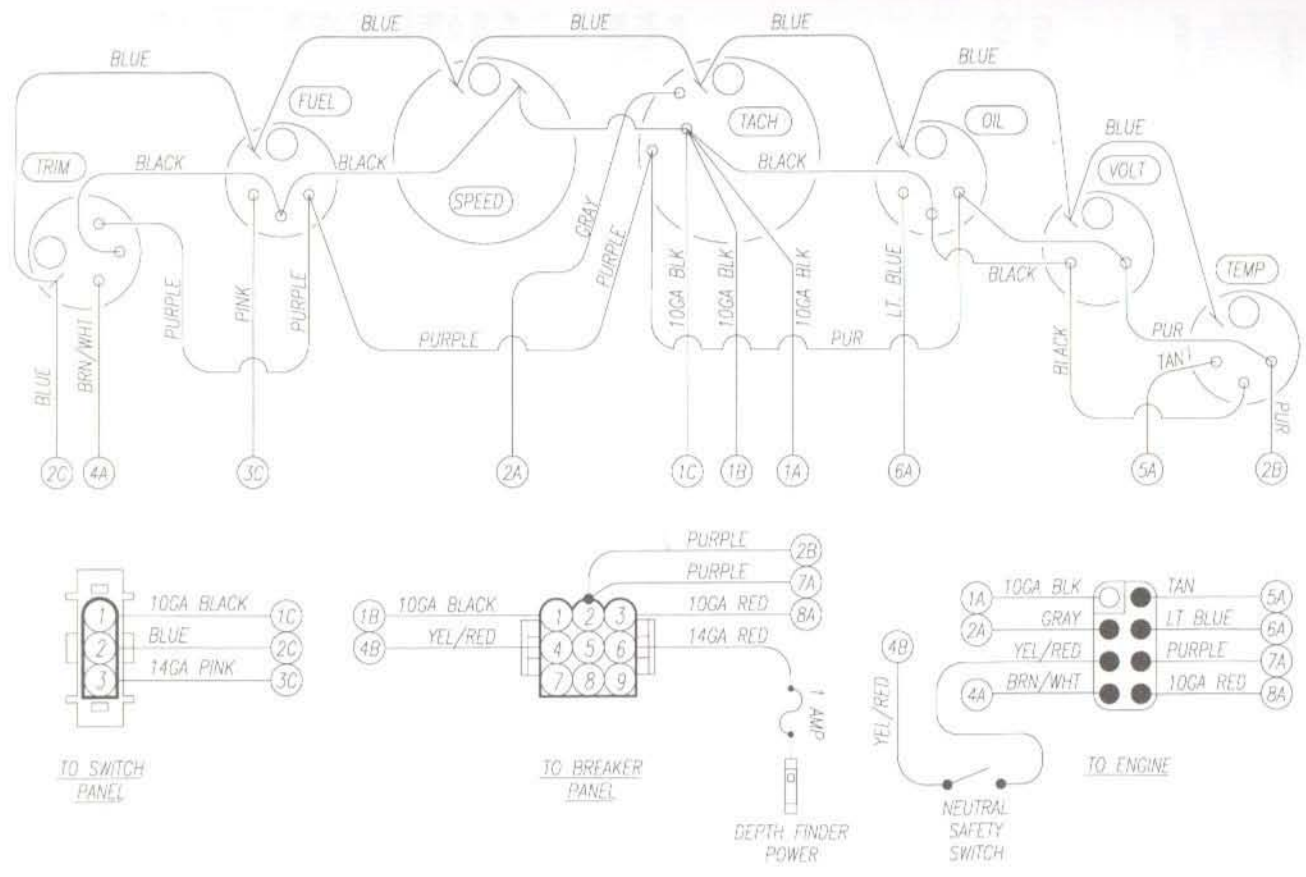


FIGURE 4.8
290 CR SINGLE ENGINE INSTRUMENT PANEL



CAUTION

CAUTION: Do Not overload the receptacle circuits. Most receptacle circuits are capable of handling 15 amps (amperes).

The following list of equipment specifies the required electrical current to operate each item:

Item	Electrical Load
Battery Charger	Up to 800 watts (7.3 amps)
Coffee Maker	550 to 700 watts (6.3 amps)
Electric Blanket	50 to 200 watts (2 amps)
Electric Drill	See drill motor load plate
Frying Pan	1350 watts (12.3 amps)
Lights	Wattage as marked on bulb
Space Heater	1500 watts (13.7 amps)
Television	1500 watts (10.5 amps)
Vacuum Cleaner	See vacuum motor load plate

The power requirement is usually specified on the electrical equipment. The above listed items is only an approximation of the electric current usage normally experienced. Monitor the ammeter when using electrical equipment, amperage draw must not exceed 30 amps.

Electrolysis

When connected to shore power your boat is earth grounded (i.e., there is a complete electrical circuit from the shore power, through the grounded metal parts of your boat, to the water). While this circuit is designed to provide protection against hazardous shocks, it also creates an electrolytic current which causes the decomposition of all submerged metal.

Sacrificial Zinc Anodes

IMPORTANT: It is the boat owner's responsibility to periodically inspect and replace the sacrificial zinc anodes. Damage resulting from electrolytic corrosion is not covered by your CROWNLIN warranty.

1. Sacrificial zinc anodes, installed by the dealer or the engine manufacturer, protect the hardware that is exposed to the water. Electrolysis attacks the softest metals first. Because zinc is a relatively soft metal, it will decompose before harder metals. Check these zincs periodically, and have them replaced as required. See your CROWNLIN dealer for parts and service.
2. A ground circuit isolator will prevent the flow of relatively low electrolytic currents, but provide a path for catastrophic short-circuit currents which are sufficient to actuate circuit breakers.

FUEL SYSTEM

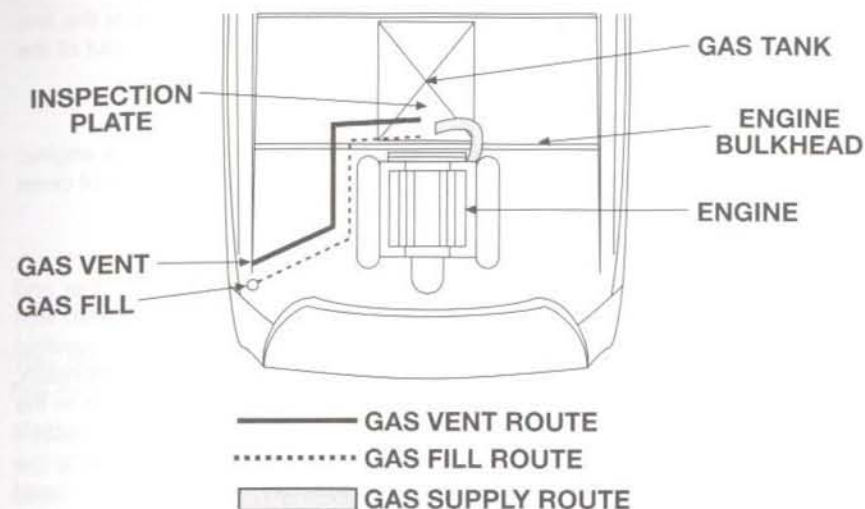


FIGURE 4.9
TYPICAL STERNDRIVE GAS SYSTEM

(NOTE: SOME MODELS WILL HAVE A FILL/VENT COMBINATION)

The internal fuel system onboard your CROWNLIN boat is designed to meet or exceed federal requirements, at the time of manufacture, of the U.S. Coast Guard and the American Boat and Yacht Council.

The fuel system has been factory inspected and pressure tested in accordance with regulations in effect at time of manufacture. Additionally, each fuel tank must pass rigid tests and inspections performed by the fuel tank manufacturer.

Prior to taking delivery of your CROWNLIN boat, it is important that a full inspection be made of the entire fuel system by your CROWNLIN dealer.

Fuel Fill Plate

The fuel fill plate on all CROWNLIN models is located typically on the port side transom, and is labeled GAS or DIESEL. Be sure to utilize the proper grade fuel.

WARNING

WARNING: Use of gasoline that contains alcohol is dangerous.

Fuel Vent

The fuel tank is vented overboard. While the tank is being filled, the air displaced by the fuel escapes through the fuel vent. Do not allow fuel to be ejected from the fuel vent during fueling process.

Periodically, remove the inside screen from the fuel vent and clean both vent and screen of any dirt, foreign material, etc. Be sure the screen is replaced securely after cleaning. The screen prevents insects and other foreign material from contaminating the fuel and fuel system. Some models have a combination fuel fill and vent and do not have a screen.

Anti-Syphon Valve (Gas Engines Only)

The fuel withdrawal line is equipped with an anti-syphon valve where the line attaches to the fuel tank. The valve prevents gasoline from siphoning out of the fuel tank in the event of a fuel line rupture.

Fuel Filter

Fuel filters supplied by engine manufacturers are installed on or near the engine. The filters should be replaced frequently to maintain an adequate supply of clean fuel to the engine.

FUEL TANK SELECTION

The configuration of your boat's fuel system varies depending on the number and type of engines it has and whether it has an onboard generator. Boats with twin engines have twin fuel tanks and a fuel manifold (Figure 4.10). The fuel manifold allows the operator to run both engines off of either fuel tank. In normal operation, the starboard tank supplies the starboard engine and the selector should be in the normal position. The port tank supplies the port engine and the selector should be in the normal position. To crossover engine supplies, simply turn the selector to the tank position labeled on the manifold to the tank selected. If your boat has diesel engines, a fuel return manifold is also part of your fuel system. (Figure 4.11)

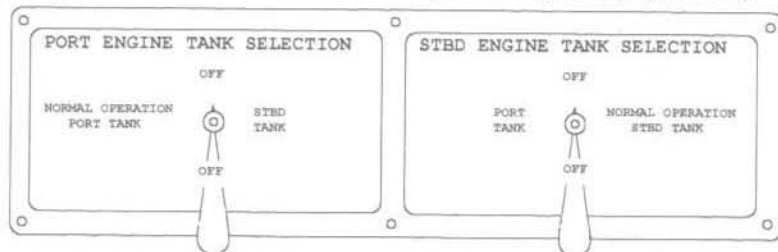


FIGURE 4.10
TWIN ENGINE FUEL MANIFOLD

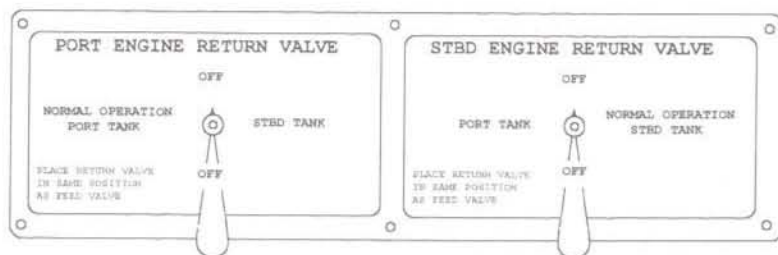


FIGURE 4.11
DIESEL FUEL RETURN MANIFOLD

Some single engine boats can be equipped with twin fuel tanks. The boat operator can use the fuel manifold to select which tank will supply the engine. If your boat is equipped with a generator, it will also have a fuel manifold (Figure 4.12).

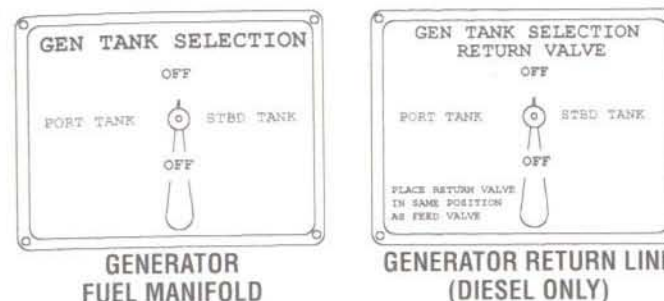


FIGURE 4.12

Your dealer can provide additional information about the operation of your boat's fuel manifold valve settings.

FIRE PREVENTION SYSTEMS (OPTIONAL)

The automatic fire extinguishing system, located in the engine compartment, is wired to a 5 amp circuit breaker/fuse (located on the helm dash) that must be ON before starting the engine. In the event of a fire, Halon-substitute gas is released through a heat sensitive automatic nozzle. The Halon-substitute gas will completely fill the engine compartment and extinguish the fire.

⚠ WARNING

WARNING: When actuation occurs, immediately turn engine OFF, shut down electrical systems and extinguish all smoking materials. Do Not open the engine compartment. Fresh air could cause flashback. Wait at least fifteen minutes for hot metals or fuels to cool down.

Cautiously inspect for the cause of fire and damage to the engine compartment. Have portable extinguishers readily available. **Do Not** breathe fire caused fumes or vapors.

⚠ DANGER

DANGER: Automatic fire prevention systems are installed only in normally unoccupied areas. Principal health hazards are: Inhalation of high concentrations may cause death without warning. Vapor reduces oxygen available for breathing and is heavier than air. Liquid contact may cause frostbite, liquid concentrated agent and by-product of application to fire are toxic. Avoid breathing fumes. Refer to your specific installation instructions owners manual provided by the fire extinguishing company.

This system should be checked at least annually and more frequently if recommended by the manufacturer. CROWNLINe Boats, Inc. recommends an inspection at the beginning of your boating season, and again at mid-season.

NOTE: See the Halon-substitute system manufacturer's manual for more detailed operation, maintenance instructions, and safety precautions.

Hand Portable Fire Extinguisher

The hand portable fire extinguisher is located under the helm and is a Type B-I (5 BC rating). The U.S. Coast Guard requires all Class 1 boats (16 feet to less than 26 feet), that **Do Not** have a fixed fire (Halon) extinguishing system installed in the engine compartment, to keep a Type B-1 onboard at all times. All Class 2 (26 to 39.4 feet) powerboats are required to carry two (2) approved B-I Extinguishers or one (1) approved B-II type hand portable fire extinguisher unless equipped with a fixed fire extinguishing system in the engine compartment. When equipped with a fixed fire extinguishing system, only one (1) B-I type hand portable fire extinguisher is required.

Type B-I fire extinguishers should be checked at least every three (3) months. CROWNLINe Boats, Inc. recommends monthly inspections.

NOTE: See the Type B-I fire extinguisher manufacturer's manual for more detailed operation, maintenance instructions, and safety precautions.

FRESH WATER SYSTEM (CRUISERS)

Hot and standard cold fresh water is available to the sink and shower in the head compartment, optional transom shower in cockpit, and sink in the galley.

The fresh water system provides water for drinking and bathing. The water tank is vented through a fitting on the side deck to allow air to enter and escape as water levels change. The fresh water tank is filled through the fill plate located on the deck. See illustrations for vent and fill locations.

IMPORTANT: Fill tank only with fresh water. Using and refilling the tank often will help keep it a source of fresh and clean drinking water.

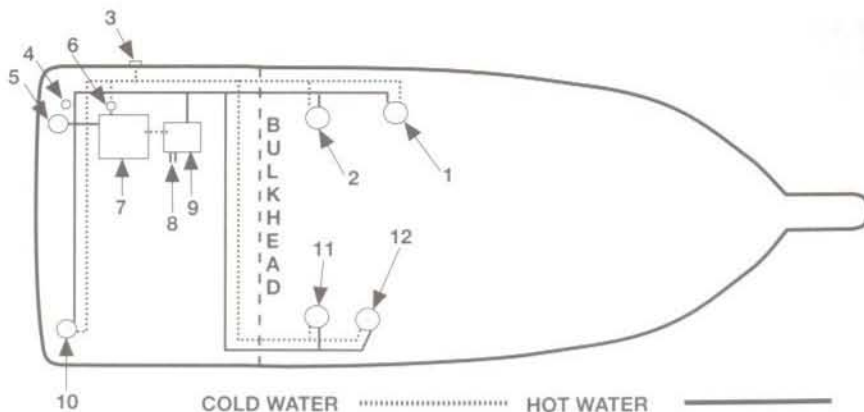


FIGURE 4.13
290 CR FRESH WATER SYSTEM

Placement of some components may differ from drawing due to optional installed equipment.

- | | | |
|-------------------------|---------------------|--------------------|
| 1. Galley Sink | 5. Fresh Water Fill | 9. Water Heater |
| 2. Wet Bar | 6. Pump | 10. Transom Shower |
| 3. Dockside Fresh Water | 7. Fresh Water Tank | 11. Lavatory |
| 4. Vent | 8. To Engine | 12. Shower |

Batteries are not supplied by Crownline. See your dealer.

SANITIZING

The fresh water system should be sanitized before initial use, after winter storage, or when system has not been used for an extended period of time.

CAUTION

CAUTION: Notify all persons aboard that the fresh water system is being sanitized. **Do Not** allow anyone to drink from the fresh water system during the sanitizing process.

NOTE: Fresh water tank must be empty before beginning sanitizing process.

1. Mix 2-1/2 cups (20 oz.) of household bleach to 10 gallons (38 liters) of fresh water.
2. Place solution into empty tank and fill to capacity with fresh water.
3. Turn fresh water pump ON. Open all faucets, beginning with faucet located farthest from pump, to bleed air from entire fresh water system.
4. Treated water solution should remain in tank for 3 to 4 hours.
5. Drain treated water solution from tank and lines.
6. Flush entire system with fresh water.

IMPORTANT: Thoroughly flush entire system with fresh water after each sanitizing process. If excessive chlorine taste is still present after sanitizing perform the following:

- A. Pour a solution of 1 quart (approx. 1 liter) of vinegar and 5 gallons (19 liters) of fresh water into tank.
- B. Allow solution to stand in tank for several days.

CAUTION

CAUTION: Notify all persons aboard that the fresh water system is being treated. **Do Not** allow anyone to drink from the fresh water system during the treatment.

- C. Drain entire system and flush with fresh water.

IMPORTANT: Thoroughly flush entire system with fresh water after treatment.

- D. Fill tank with fresh water and bleed all lines.

Initial Start-Up

1. Partially fill fresh water tank with three gallons of fresh water.
2. Turn Fresh Water breaker ON.

3. Open galley cold water faucet to allow air to escape. Close faucet when steady flow is reached.
4. Open galley hot water faucet to fill optional water heater and allow air to escape from line. Close faucet when steady flow of water is reached.
5. Bleed air from remaining faucets.
6. Fill fresh water tank to capacity.

CITY WATER HOOK-UP

CAUTION

CAUTION: Monitor water system during initial usage of *city water* hook-up. In this process, the boat is connected to an unlimited supply of water. Never leave boat unattended while using *city water* hook-up. Any major leak or break in the system will allocate abnormal bilge water accumulation which in turn could cause sinking or swamping of batteries and engine. Damage from swamping and/or submergence are not covered by the CROWLINE Boats, Inc. warranty.

To conserve your fresh water tank supply, the fresh water system can be connected to *city water* at the receptacle on inside the cockpit. Due to the water entering the boat under pressure, it bypasses the tank, filter, pump, and the pressure accumulator of the fresh water system on your boat.

Using *city water* hook-up does not replenish water supply in the tank. The tank can only be filled at the fresh water fill plate. When using a dock-side hook-up, you must bleed all lines just as you would for the fresh water tank system. Refer to initial start-up procedures for fresh water system.

COMPONENTS

Refer to Figures 4.14 and 4.15 on pages 4-17 and 4-18 for equipment location.

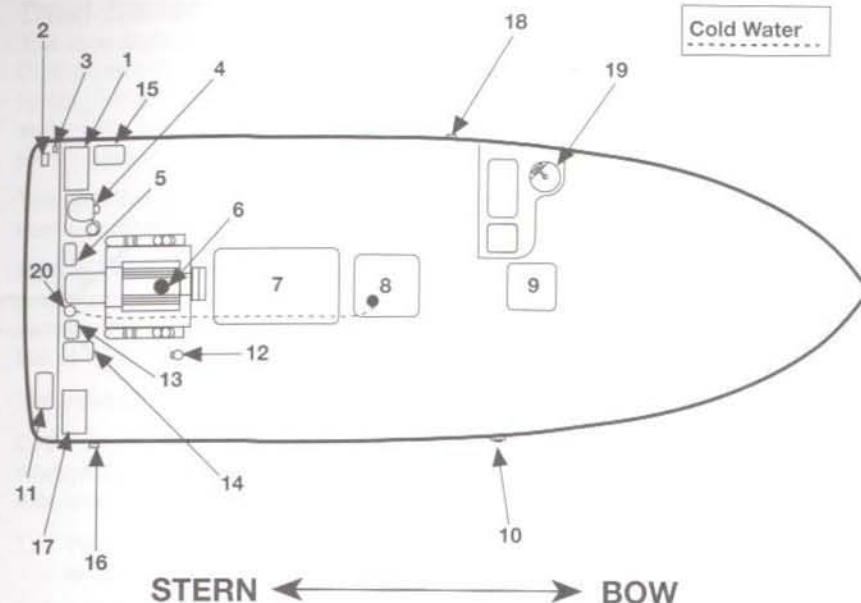
Battery (Not furnished by Crownline Boats, Inc.)

Marine batteries are completely sealed using an absorbent electrolyte principle to provide high reserve capacity, plus cold cranking performance.

If more than one (1) battery is installed, all batteries are electrically isolated from each other. When the engine is running, each battery is charged automatically and independent of the other in the **all** position on the battery switch. This provides complete freedom of battery selection for power use.

WARNING

WARNING: Battery electrolyte can cause severe eye damage and burns to the skin. Wear goggles, rubber gloves and a protective apron when working with battery. If spillage occurs, immediately wash area with a solution of baking soda and water.

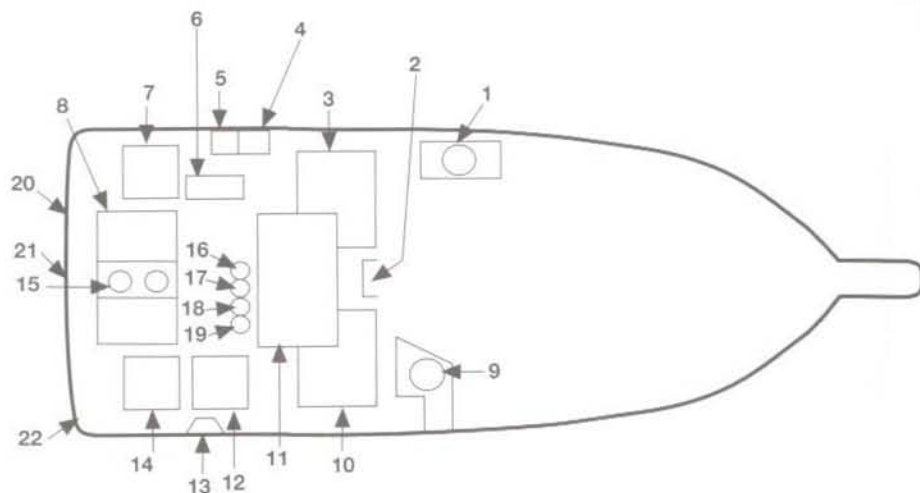


Placement of some components may differ from drawing due to optional installed equipment.

1. Battery (Diesel Option - box and wiring only w/optional dual battery switch)
2. Gas Fill
3. Gas Vent
4. Power Trim Pump & Reservoir
5. Bilge Blower
6. Bilge Pump (Under Engine)
7. Fuel Tank
8. Optional Water Tank for Transom Shower
9. Water Tank
10. Head Pumpout (Optional)
11. Transom Shower (Optional)
12. Transom Shower Seacock (Optional)
13. Transom Shower Water Pump-Raw water (Optional)
14. Trim Tab Pump (Optional)
15. Battery Charger (Included with optional shore power)
16. Water Fill for Tank (Optional)
17. Battery (Standard - box and wiring only)
18. Shore Power (Optional)
19. Galley Sink
20. Transom Shower Water Pump-Fresh water (Optional)

Batteries are not supplied by Crownline. See your dealer.

FIGURE 4.14
TYPICAL CCR ENGINE, FUEL, AND WATER DIAGRAM



Placement of some components may differ from drawing due to optional installed equipment.

1. Galley Sink
2. Fuel Tank Selector
3. Fuel Tank
4. Battery Charger
5. Water Pump
6. Water Heater
7. Fresh Water Tank
8. Engines
9. Head
10. Fuel Tank
11. Genset (Optional)
12. Battery Bank
13. Macerator
14. Waste Holding Tank with Y-Valve
15. Bilge Pump(s)
16. Air Conditioning Seacock
17. Genset Seacock
18. MSD Seacock
19. Accessory Seacock
20. Blower
21. Trim Tab Pump
22. Power Trim Pump and Reservoir

Batteries are not supplied by Crownline. See your dealer.

FIGURE 4.15
290 CR ENGINE COMPARTMENT

Dual Battery Switch

The dual battery switch, located in the starboard storage compartment on most Cruiser and Cuddy models, enables DC power to be used from one or both batteries. Power to the engine and all 12 volt electrical equipment, except the **automatic bilge pump**, is controlled by the dual battery switch. The dual battery switch settings available are OFF, 1, 2, and ALL.

The dual battery switch is located under the cockpit wet bar or stern bench on some models.

IMPORTANT: Dual battery switch should be in the OFF setting when not in use and especially while the boat is unattended. While in the OFF setting, only the **automatic bilge pump** is supplied with DC power. All helm dash instrumentation is OFF.

The description and purpose for each of the settings is described here:

OFF - All 12 volt power to boat is shut OFF, except for the automatic bilge pump. Always turn dual battery switch to OFF setting when boat is unattended for extended periods.

1. Will use battery #1 to power engine and all 12 volt equipment. Battery #2 is isolated and remains in reserve. Battery #1 is charged by the alternator.
2. Will use battery #2. Except for automatic bilge pump, battery #1 is isolated and remains in reserve. Battery #2 is charged by the alternator.

ALL - Batteries are connected in parallel. Both batteries are used by the engine and all 12 volt equipment.

CAUTION

CAUTION: Do Not turn dual battery switch to OFF setting while engine is running; alternator and wiring damage could occur.

CROWLINE Boats, Inc. recommends the use of only one (1) battery at a time. This is accomplished by using the number 1 or 2 setting. Avoid using the ALL setting. Use the ALL setting only when a single battery is not capable of starting the engine.

NOTE: Rotating battery usage increases battery longevity.

DANGER

DANGER: Do Not disconnect or reconnect battery cables if gasoline fumes are present.

AC/DC Converter & Battery Charger

The AC/DC converting and charging system is fully automatic and permanently wired into the 12 volt DC system. It operates with standard AC power sources from 105 to 125 volts.

Shore Power

Shore power is connected through a port forward receptacle. A ten gauge, three wire, shore power cord is provided with dock-side wiring. The shore power cord has 30 amp twistlock type connectors, which are approved by the American Boat and Yacht Council. Always connect the cord to the power inlet receptacle of the boat before making connection to the shore power source.

⚠ CAUTION

CAUTION: Do Not use a two-wire adapter to connect to a three-wire system. This type adapter does not provide adequate grounding.

Some marinas are not equipped with approved twistlock type receptacles. An adapter is available from your CROWNLIN dealer which converts the twistlock shore plug to a three-wire grounded household type plug. Use only an approved adapter when this type connection is required.

NOTE: See the shore power instruction manual for detailed operation, maintenance, and safety precaution information.

DC Lighting

See your CROWNLIN dealer for information regarding bulb replacement.

Ground-Fault Circuit Interrupt

The ground-fault circuit interrupt (GFCI) Provides added electric shock protection. All 120 volt outlet circuits are protected by the GFCI. The GFCI outlet is located in the galley and comes with a built-in test and reset switch.

When a circuit breaker is tripped by the GFCI, push the RESET button. The GFCI outlet should be checked periodically by pushing the TEST button. Pushing the TEST button will cut power to the 120 volt outlets. If the GFCI should trip, this will shut off power to all other electrical outlets on the same circuit. Be sure to check the GFCI reset button if electrical appliances do not function.

Bilge Pump

The automatic bilge pump with manual override, removes water from the bilge area. If the pump motor runs but no water is discharged, it may be clogged. If there is no visible debris clogging the pump and water is still not being removed, inspect the discharge hose for kinks or obstruction. If the automatic bilge pump does not run, check the inline fuse located near the battery(s).

⚠ WARNING

WARNING: The Federal Water Pollution Act prohibits the discharge of oil or oily waste into or upon the navigable waters and contiguous zone of the United States if such discharge causes a film or sheen upon, or discoloration of, the surface of the water, or causes a sludge or emulsion beneath the surface of the water. Violators are subject to a penalty of \$5000.

ENGINE EXHAUST

The engine exhaust system removes harmful gas created by the engine during combustion. Inspect the system for leaks before each use of the boat. Make sure all hose clamps and connections are tight and there are no cracks in any exhaust system component that would allow carbon monoxide gases to escape.

Some models are equipped with an optional two position exhaust valve which is controlled by a switch at the helm. The exhaust valve controls the output of

engine exhaust either to through hull side pipes, through transom, or through the propeller hub.

You should use this valve to direct the engine exhaust through the propeller hub to control engine noise when near shore or other boaters. Only use the hull side exhaust in situations where the noise will not infringe on the enjoyment of others.

When using the through hull option, be sure to shut off the engine when anyone is boarding the boat from the water. Check your local law enforcement regulations for additional sound requirements.

⚠ CAUTION

CAUTION: To prevent injury, avoid contact with the through hull exhaust tips or cooling water, as they can be very hot and could cause burns.

Engine Water Ingestion

IMPORTANT: To avoid possible ingestion of water that can damage engine components:

- Do not turn the ignition key off when the engine is running above idle speed.
- Do not use the lanyard stop switch to shut off the engine, except during an emergency.
- When coming off plane, if a large following wave may roll over the boat's transom, apply a short, light burst of throttle to minimize the wave action against the stern of the boat.
- Do not come off plane quickly, shift into reverse and shut off engine.

Engine water ingestion can also occur if your boat is heavily stern loaded. Distribute the weight of gear and passengers forward and aft to maintain a level trim.

Engine water ingestion is not limited only to the situations described above. Be sure to read and understand all the information provided in your engine owner's manual on this subject.

Bilge Blower

The bilge blower forces fumes out of the engine compartment area and circulates fresh air in through the deck vents. The bilge blower must be running 4 minutes before, and during engine start-up, and while boat is operating below cruising speed.

⚠ WARNING

WARNING: Never assume all explosive fumes have been removed from the engine compartment. If you detect any fuel odors, shut down the engine and electrical circuits, and immediately determine where the odor is materializing.

Trim Tabs

The electric/hydraulic trim tabs can be adjusted at the helm. Trim tabs act in the same way as the power trim on the drive unit. Trim tabs force the stern up as they move through the water. This allows compensation for uneven loads by trimming up one side or the other. They also assist in providing maximum control

of the hull in all water and load conditions. If used properly, trim tabs can greatly improve performance and fuel efficiency. The proper use of trim tabs requires a basic understanding of trim tab operation and some practice in calm water.

Your trim tab control has two, two position, momentary switches and are labeled *Bow Down* and *Bow Up*:

- Depress front starboard button to move trim plane on port side downward. This moves starboard bow downward when boat is planing.
- Depress front port button to move trim plane on starboard side downward. This moves port bow downward when boat is planing.
- Depress back starboard button to move trim plane on port side upward. This moves starboard bow upward when boat is planing.
- Depress back port button to move trim plane on starboard side upward. This moves port bow upward when boat is planing.

NOTE: See the trim tab instruction manual for detailed operation, maintenance, and safety precaution information.

Figure 4.16 shows an example of bow and stern movement as a result of extended tabs.

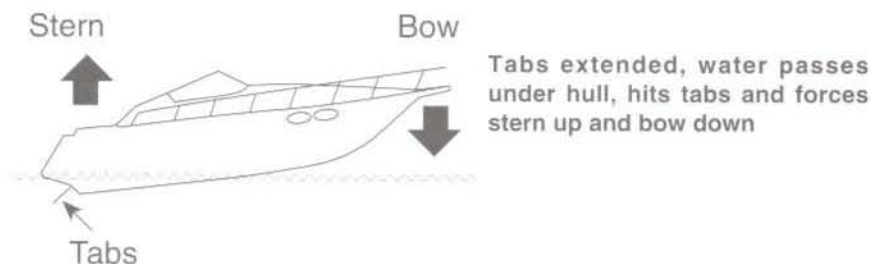


FIGURE 4.16 BOAT ATTITUDE

CAUTION

CAUTION: When cruising at high speeds **DO NOT** extend trim tabs to their lowest position, as this can result in instability. To avoid possible damage to trim tabs while moving in reverse, **NEVER** place trim tabs in their lowest position.

Always remember to retract the trim tabs after cruising.

Basic safety precautions for the trim tabs are:

1. Disconnect power to unit while servicing to prevent electrical shorts.
2. Do not use trim tabs as a loading platform.
3. Stay clear of trim tabs and hinges during operation.

To extend the cylinder life expectancy, keep cylinders retracted (UP) while at dock side. Press both bow up trim tab controls until tabs reach their UP position.

Stopping (Coming Off Plane)

You cannot stop a boat as quickly as a land vehicle because a boat has no brakes. Stop the boat by allowing it to slow down to less than 5 miles per hour. Then, put the engine in reverse. By **slowly** increasing reverse power, you can stop the boat in a short distance. Remember that a boat does not respond to steering in reverse as well as it does when going forward.

WARNING

WARNING: Check behind you before coming OFF plane. Many accidents occur each year as a result of a driver coming off plane while being followed by a boat that is unable to slow down in time to avoid collision.

Water Pump & Filter

The water pump draws water from the fresh water tank. The water is then pressurized and circulated to the faucet(s), water heater, etc. The water pump filter prevents foreign matter from entering pump reservoir and should be periodically inspected and cleaned. Before servicing the system, 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 filter and make sure the O-ring is seated properly when installing cover.

NOTE: See the water pump instruction manual for detailed operation, maintenance, troubleshooting, and winterizing information.

Water Heater

The water heater circuit breaker (15 amp) is located on the main AC distribution panel in the galley area. Located on the water heater is a check valve to prevent hot water from back washing into the cold water line, and a pressure relief valve to prevent damage to the heater from over pressure. The water heater thermostat is preset and is not adjustable.

IMPORTANT: The heating element inside the water heater will be damaged if 120 volt power is supplied to the water heater and there is an insufficient amount of water in the tank.

NOTE: Refer to the water heater instruction manual for detailed operation, maintenance, winterizing, and safety precautions.

Transom Shower

Several transom shower options are available. For operating instructions see your dealer.

Raw Water Washdown

- Raw water is fed from same seacock that supplies the head and then fed to the transom shower pump.

Raw/Fresh Water Washdown

- Raw water is fed from same seacock that supplies the head and then fed to the transom shower pump.

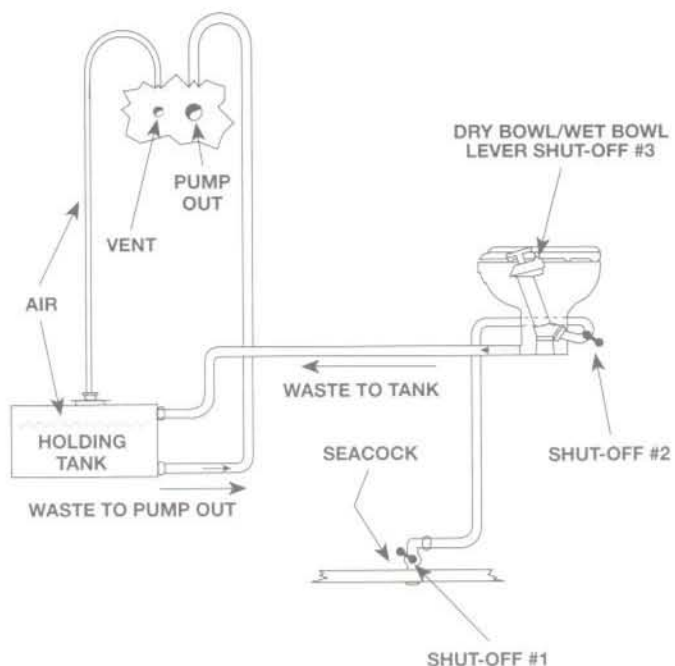
- Fresh hot and cold water is supplied from the fresh water systems water tank, assuming optional hot water heater is also installed. If not, fresh water feed would be cold water only.

MARINE SANITATION DEVICE (MSD)

Cruiser Model

While the ceramic Marine Sanitation Device (MSD), or head, installed on your CROWLINE boat is similar to your home toilet, flushing is achieved with raw water through a manual pump, and the tandem system provides wet or dry flushing while waste water is flushed out into the holding tank.

IMPORTANT: If flushing selector switch on head is set for WET flush, seacock in engine compartment must be OPEN. If the boat is moving water can be forced into the seacock and flood the toilet. To avoid flooding of toilet while underway, place lever #2 in the OFF position and lever #3 in the Dry Bowl position. Refer to Typical Waste System, Figure 4.17.



IMPORTANT: When underway, place Shut Off lever (#2) in OFF position and Dry Bowl/Wet Bowl lever (#3) in DRY BOWL position, to prevent water from backing up into the system, thus overflowing the head. Lever #2 is located at base of toilet, lever #3 is located on top of manual flush pump.

FIGURE 4.17
TYPICAL CRUISER WASTE SYSTEM

If your boat is equipped with a vacuflush MSD system, the toilet is flushed using a DC electric switch found in the head compartment. This system uses fresh water to flush the waste instead of raw water, to minimize odor problems.

Complete information on the operation and maintenance of the system is provided by the manufacturer in your important papers bag.

Cuddy Model

The standard head on select models is a portable toilet and provides simple operation and convenient disposal of waste. A dockside pumpout system for the portable toilet's built-in holding tank is optional.

As with any quality product, proper use and operation eliminates unnecessary maintenance. Before using your portable toilet read the manufacturers manual for detailed operation and maintenance instructions.

IMPORTANT: Overboard discharge of untreated sewage within three miles of land is prohibited by law. Check with local authorities for proper discharge procedures in your area. If your boat is going to be used on inland waters, have your dealer seal the overboard discharge portion of your waste system.

HOLDING TANK

Waste from the toilet is flushed to the holding tank. You can empty the holding tank using a dockside pumpout or, when permitted, by using the macerator to discharge the waste directly overboard.

WARNING

WARNING: Explosion Hazard! Waste in the holding tank can form methane, an explosive gas. Keep vent open and clear of obstructions. Keep fire and flame away when maintaining sanitary system.

Check the level of the waste tank regularly to see waste levels. When the tank is full, do not use the head. If the tank is overfilled, waste can plug the vent or cause the tank to rupture, allowing its contents to empty into the bilge. Checking the tank regularly is time well spent.

To empty the holding tank, connect the hose from the pumpout facility to the fitting marked WASTE. After pumping out the holding tank, flush the head several times to clean waste buildup out of the lines and rinse out the tank.

Flushing fresh water through the head is also a good idea if you will be leaving the boat for two or more days. Doing so will clear all waste from the lines into the holding tank. Waste in the lines tends to dry out. These hardened wastes may affect the future operation because they make the inside diameter of the hose smaller.

OVERBOARD DISCHARGE

IMPORTANT: Overboard discharge of untreated sewage within three miles of land is prohibited by law. Check with local authorities for proper discharge procedures in your area. If your boat is going to be used on inland waters, have your dealer seal the overboard discharge portion of your waste system.

If regulations permit, the macerator can be used to pump waste from the holding tank overboard. The MACERATOR circuit breaker switch at the DC control panel controls the power supply to the macerator. The macerator pulls the waste from the holding tank, grinds the waste into small particles, and pumps the waste overboard through a hull discharge fitting above the water line.

Follow these procedures to operate the macerator:

1. Switch the MACERATOR breaker switch at the DC main electrical control panel to ON.
2. Allow the macerator to run until the holding tank is empty, but no longer. **Running the macerator when the tank is empty will cause damage to the pump.**
3. When you hear the pump speed up (indicates tank is empty), immediately switch the MACERATOR breaker to OFF.

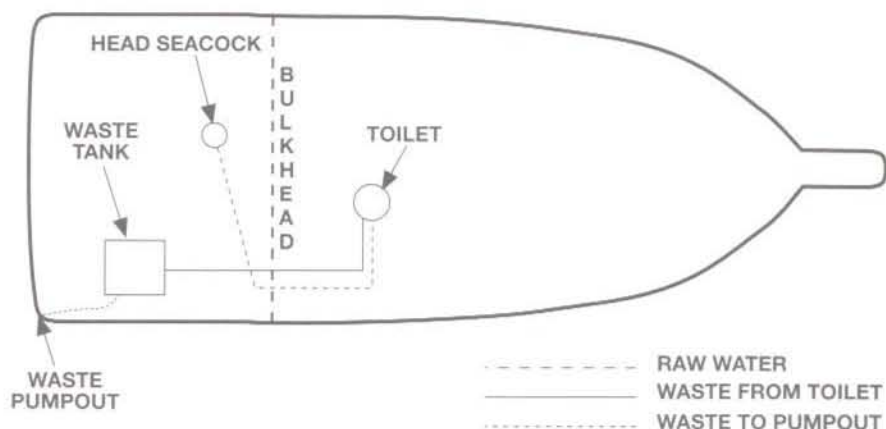


FIGURE 4.18
290 CR STANDARD WASTE SYSTEM

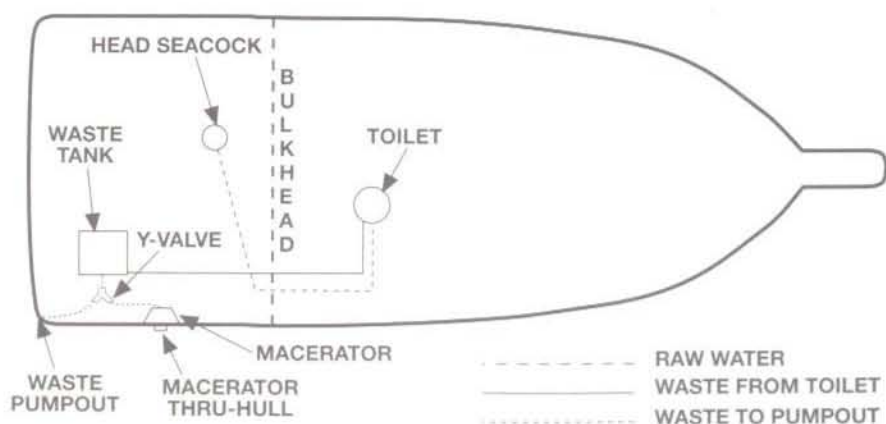


FIGURE 4.19
290 CR MACERATOR OPTION

RUNNING/NAVIGATION LIGHTS

Night boating requires running lights. Your CROWNLINe boat has one white (mast or all-around), one red (port), and one green (starboard) light. Check for proper operation before heading out. You should also learn to identify the running light combinations for other vessels. CROWNLINe Boats, Inc. recommends your participation in a safe boating course.

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

STEREO

The stereo is a highly sensitive AM/FM stereo receiver with a cassette tape player. The stereo and speakers are water resistant but not waterproof. To avoid potential damage, prevent water from spraying directly on stereo components.

NOTE: See stereo manufacturer's owner manual for detailed operation, safety precautions, and complete list of features.

REFRIGERATOR/FREEZER

The refrigerator/freezer operates on either 120 volt AC or 12 volt DC power. A built-in relay automatically switches to the correct power. When using 12 volt DC power keep the temperature control dial setting at the #3 position (#5 if storing frozen foods) when outside temperatures are between 70 to 90 degrees F. For long periods without shore power, run the engine occasionally to ensure your battery maintains an adequate charge.

STOVE (CABIN MODELS ONLY)

Your boat is or can be equipped with either an alcohol or alcohol/electric stove. The alcohol/electric stove uses either alcohol or 120V 30 amp electrical power.

NOTE: The stove manufacturer's manual and safety instructions explain special precautions, maintenance, and proper operating procedures.

⚠ WARNING

WARNING: Use marine stove alcohol only. Always provide adequate ventilation when using alcohol flame.

AIR CONDITIONING SYSTEM

Your boat may have an optional air conditioning system. Figure 4.20 shows the components of a typical air conditioning system. The air conditioning pump draws in sea water through a seacock in the bilge. When the air conditioner is running it discharges the sea water through a thru-hull fitting above the water line. Air conditioning units are controlled through a breaker switch at the AC control panel. When using an air conditioner, its breaker switch must be on.

When you operate the air conditioner:

1. Open the air conditioner seacock. The valve is open when the handle is in line with the seacock valve.

2. Check the sea strainer next to the seacock. Clean it if necessary to assure a steady flow of water to the unit.
3. Set the thermostat to the temperature desired.

IMPORTANT: Be sure to close air conditioner seacock when air conditioner is not in use.

Consult your air conditioner owner's manual for more detailed information.

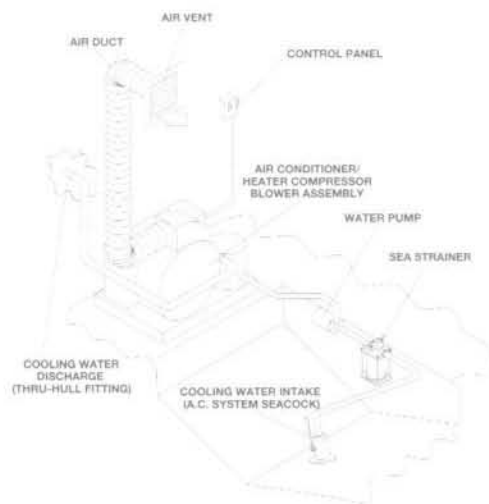
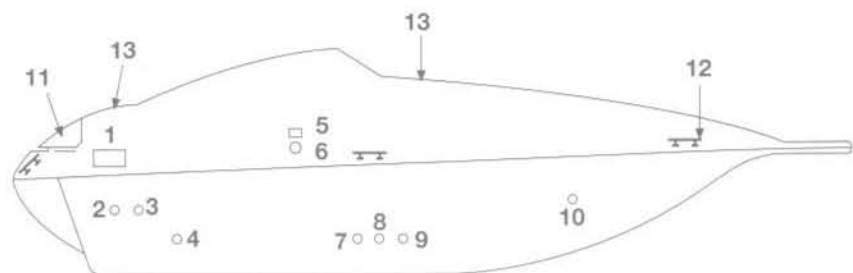
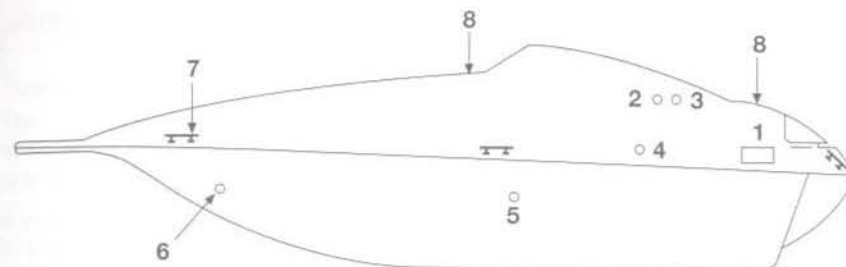


FIGURE 4.20
TYPICAL AIR CONDITIONING SYSTEM



- | | |
|----------------------------------|-----------------------------------|
| 1 ENGINE COMPARTMENT VENTILATION | 8 FORWARD BILGE THRU-HULL |
| 2 BILGE PUMP THRU-HULL | 9 LAVATORY THRU-HULL |
| 3 BILGE PUMP THRU-HULL | 10 AIR CONDITIONING THRU-HULL |
| 4 MACERATOR DISCHARGE | 11 ENGINE COMPARTMENT VENTILATION |
| 5 HEAD EXHAUST | 12 CLEAT |
| 6 HORN | 13 APPROX. SLING POINTS |
| 7 SHOWER SUMP THRU-HULL | |

FIGURE 4.21
290 CR STARBOARD LOCATIONS



- | | |
|----------------------------------|-------------------------|
| 1 ENGINE COMPARTMENT VENTILATION | 5 GALLEY SINK THRU-HULL |
| 2 MAIN SHORE POWER | 6 ANCHOR STORAGE DRAIN |
| 3 TELEPHONE/TV | 7 CLEAT |
| 4 COCKPIT SINK THRU-HULL | 8 APPROX. SLING POINTS |

FIGURE 4.22
290 CR PORT LOCATIONS

NOTE: CROWNLINe Boats, Inc. reserves the right to change, alter, and modify it's finished boats, parts, specifications, and prices at any time without notice.

This section contains general maintenance and repair information as well as a troubleshooting chart. For more detailed information concerning the engine, refer to your Engine Operation and Maintenance Manual.

If you do not fully understand the information contained within this section, or in any of the related product information materials, contact your CROWNLINE dealer. Your dealer is qualified to make repairs or modifications to your boat in such a manner as to not compromise safety, design integrity, or warranty coverage.

NOTE: Do not attempt any repairs on your boat unless qualified to do so. Only use approved marine replacement parts available from your CROWNLINE dealer.

NOTE: Before attempting to use a particular cleaning solution or method, test the material to be cleaned in a hidden or inconspicuous area for possible adverse reactions. Use cleaning agents sparingly. Never discharge cleaning solutions into the waterways. Do not use products containing phosphates, chlorine, solvents, or non-biodegradable or petroleum based products.

FIBERGLASS & GELCOAT

The hull and deck are made of fiberglass covered with gelcoat, a scratch resistant, color-pigmented, polyester resin. During normal use, some damage to the gelcoat should be expected. Proper maintenance of the gelcoat will keep the underlying fiberglass in good condition.

IMPORTANT: Foot traffic on soiled fiberglass surfaces will severely scratch and mar finish. Ensure fiberglass is kept as clean as possible.

Gelcoat Maintenance

NOTE: Make sure household detergent does not contain ammonia or chlorine. Ammonia or abrasive type cleaners will dull and discolor the surface of the gelcoat and are not recommended for routine maintenance.

The gelcoat should be regularly cleaned with mild household detergent and water. Waxing the gelcoat surface regularly will preserve its luster. CROWNLINE Boats, Inc. recommends a fiberglass wax that is capable of filling gelcoat pores. Fiberglass wax also contains various chemicals that screen out harmful ultraviolet rays that may cause the gelcoat color to fade.

WARNING

WARNING: To prevent personal injury. Never wax nonskid deck surfaces. Wet or dry waxed gelcoat is very slippery and will cause unsafe footing.

Minor Stains

1. Wash with a soft cloth and household detergent to remove surface stains. Rinse thoroughly with clear water.
2. If deep stains do occur, use a special fiberglass cleaner and stain remover.

Minor Scratches

Minor scratches can be repaired with car wax. Treatment will repair or lessen scratches.

1. Apply wax to a damp, soft cloth.
2. Rub the gelcoat surface with the damp, soft cloth in a circular motion.

NOTE: Apply wax in accordance with manufacturer's label instructions.

Chips, Hairline Cracks, and Small Patches

NOTE: Cracking, crazing, discoloration, blistering, chalking or fading of exterior gelcoat surfaces are not covered under the warranty. See your dealer for more information.

Purchase matching gelcoat color from your CROWNLIN dealer. To match the color exactly, specify boat model name, color, and year manufactured.

NOTE: Air temperature must be greater than 65 degrees F to apply gelcoat.

1. Area to be repaired must be clean, dry and free from oil or wax.
2. Sand damaged area with #50 sandpaper, or use a power drill with a burr bit. Round out and feather edges. Remove all flaky edges.

NOTE: If surface damaged covers a large area, use of a power sander may be required.

3. Cleanse the area with rubbing alcohol or acetone after you have completed sanding.

⚠ WARNING

WARNING: Acetone is toxic and highly flammable and should be used only in well ventilated areas. Follow the manufacturer's label instructions. Also, never store rags that are diluted with acetone or any other solvent onboard your boat. Immediately remove and discard to prevent fire hazard.

4. Place one teaspoon of gelcoat on a piece of wood or cardboard.
5. Add two or three drops of hardener. Mix for 10 to 15 seconds using a spatula or knife.
6. Apply gelcoat to damaged area. Fill in slightly higher than surrounding surface.
7. Cover with wax paper or clear plastic and smooth to the desired contour.
8. Let dry completely. This usually takes an hour or two.
9. Remove wax paper or plastic. Next, water sand with #600 wet or dry sandpaper.
10. Buff repaired area with buffing compound. Follow with wax and polish.

⚠ WARNING

WARNING: If using a power buffer, be very careful not to pause in one area too long. This may cut into the boat's underlying surface.

Hull Maintenance

NOTE: If your boat will be in water continuously for two or more weeks, CROWNLIN Boats, Inc. recommends sealing the hull bottom with a high quality barrier coating. Unsealed gelcoat may form water blisters. Repair of water blister damage is not covered under the CROWNLIN Boats, Inc. Warranty. If required, contact your CROWNLIN dealer for further information.

⚠ CAUTION

CAUTION: Wire brushes, scouring pads, or other abrasive type materials/solutions should never be used on the bottom of your boat. They create small scratch marks that will collect dirt, silt, sand, marine growth and other foreign materials.

Keep the hull bottom of your boat clean and make frequent inspections for any signs of excessive wear or damage. Repairs to the hull bottom should be made immediately. Accumulation of dirt and marine growth may cause drag which limits the performance and fuel efficiency of your boat.

Bottom Paint (Anti-fouling)

Anti-fouling bottom paint is designed to dissolve slowly to prevent marine growth. Therefore, the hull bottom should be repainted at the end of the boating season. Factors to take into consideration when selecting a protective bottom paint are: water temperature, pollution, salinity, current, and organic material in the water.

IMPORTANT: Consult with your CROWNLIN 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.

1. Scrub hull bottom with a bristled brush and solution of soap and water.

NOTE: Repainting hull bottom is not required after each scrubbing, unless bare areas are visible in the bottom paint.

2. Sand entire bottom surface of boat.
3. Fair (smooth-out) all rough areas as required.
4. Clean bottom surface to remove all dust and foreign materials.
5. Ensure bottom surface is completely dry.
6. Apply new coat of bottom paint.

NOTE: Follow the paint manufacturer's recommendations regarding drying times for bottom paint.

Corrosion

It is essential that engines, stern drives, and other metal components that come in contact with the water, be properly protected against "stray current" and "galvanic" corrosion.

Several possible sources of corrosion can be attributed to improper dockside wiring, improperly protected neighboring boat, submerged wiring in bilge, faulty grounding, and an insufficient number of anodes, etc.

Severe damage to the stern drive unit and related components may occur if these components are either under-protected or over-protected against the effects of these various electrical currents.

We recommend that you have your dealer perform "hull potential" testing to ensure that the proper level of corrosion protection is being utilized for your local water conditions.

These tests should be performed at the location where you use and dock your boat.

Damage that is the result of galvanic, or stray current corrosion is not covered by Crownline warranty!

CABIN AND TOPSIDE Deck Hardware & Fittings

Inspection

Make sure hardware and fittings are secure. All screws, bolts, clamps, cleats, etc., should be tight.

Cleaning

The hardware is either stainless steel or chrome plated brass. Clean with fresh water and a mild, non-abrasive detergent. Use of other cleaners or abrasives will remove a protective film from your stainless hardware. As a final step, apply a coat of wax or chrome polish.

Windshield & Portals

CAUTION

CAUTION: Never use acetone, benzene, carbon tetrachloride, lacquer thinner, or similar type solvents. They penetrate the glass/ Plexiglass surfaces and cause hazing that will obstruct visibility.

Glass Cleaning

The helm windshield is constructed of 100% tinted safety glass.

1. Clean all glass with glass cleaner or water and rinse with clear water.
2. Remove grease and oil with kerosene or Hexane.

Plexiglass Cleaning

1. Wash all Plexiglass, clear vinyl or other synthetic materials with a mild detergent and water solution and rinse with clear water.
2. Remove grease and oil with kerosene or Hexane.

Carpeting

Exterior

Scrub indoor/outdoor carpeting with a brush using mild detergent and warm water, then thoroughly rinse with clear water. Allow carpet to dry completely before use. Apply a light coating of Scotch Guard® to protect against accidental spills.

Interior

Vacuuming and occasional carpet shampoo are recommended for extended life and appearance. Apply a light coating of Scotch Guard® to protect against accidental spills.

Exterior Seat Coverings & Vinyl

The seat coverings and trim are made of temperature resistant expandable vinyl.

1. Always try to clean up spills quickly to prevent staining.
2. Clean dirt and smudges with mild soap and warm water. If necessary scrub with a soft bristle brush to remove dirt from textured vinyl. Dry with a soft, lint-free cloth or towel.
3. Use a stronger detergent (always follow label instructions) for tougher stains.
4. Never use steel wool or abrasive, powdered cleaners. They will mar the surface.
5. Removable outside seat cushions should be placed inside when not in use.
6. Consult the vinyl care guide supplied with your boat for additional information.

Canvas

Convertible and bimini-tops are designed and intended to provide coverage of the helm seating areas from the sun. These tops are not a weather cover and will be damaged by accumulation of rain water. While these tops are intended to provide ample weather protection for the helm, the tops are not completely weather-tight like a winter storage cover. In addition, canvas tops necessarily contain openings to accommodate support stanchions. To prevent getting exterior helm seat cushions wet, it is recommended that all removable exterior cushions be removed and properly stored when helm cover is installed. The canvas top supplied with your CROWNLINE is not a storage cover. Canvas tops which have been used as a storage cover will not be covered by the manufacturer's warranty.

Cleaning

IMPORTANT: Do Not use hot water, dry in an automatic dryer, dry clean or steam press.

1. Wet down all canvas and use a soft bristle brush to scrub with a mild detergent and water solution.

2. Use a mild solution of ammonia/water and scrub for heavy soil or mildew build-up. Be sure to rinse thoroughly.
3. Brush or sweep underside of the top. Spray with Lysol™ or other disinfectant to prevent mildew.

Care

1. Keep the top up in rain or when boat is not in use.
2. Lubricate zippers with paraffin and snaps with petroleum jelly.
3. If a leak occurs along a canvas seam, rub with paraffin or apply a light coating of Scotch Guard®.
4. Air dry all canvas material before storing. Never store canvas damp or wet, and provide proper ventilation to prevent mildew.
5. Avoid mooring under trees.
6. Do not tow your boat with the top up.

Cabin Cushions, Interior Curtains & Fabrics

Treat the fabric upholstery the same as home fabric upholstery. To keep clean and odor free, vacuum and shampoo. Spray with Lysol™ or other disinfectant to prevent mildew.

GENERAL MAINTENANCE

CROWLINE Boats, Inc. recommends maintenance and repairs be performed at an authorized CROWLINE dealer. The following information is of a general nature.

NOTE: Refer to your Engine Operation and Maintenance Manual and all other installed equipment manuals for detailed information.

Engine

Refer to your Engine Operation and Maintenance Manual for recommended service, scheduled maintenance, repair and fluid check intervals.

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 of \$5,000.

Fuel System

IMPORTANT: Check for fuel leaks frequently. Be sure to repair any problems immediately. Any replacement of parts or repairs to the fuel system should be performed by a trained marine mechanic. See your CROWLINE dealer for parts and repair.

1. Starting at the fuel tank, inspect the complete fuel system for leaks.
2. Inspect fuel lines and hoses for wear, kinks, cracks, or deterioration.
3. Inspect fuel line fittings, carburetor, and fuel pump for proper mounting bracket tightness.
4. Inspect for wear or damage to the fuel ventilation ducts and clamps.

5. If your boat has a stand alone fuel tank vent, inspect the vent screen (located outside of deck) for obstructions.

IMPORTANT: Keep fuel tanks filled during the boating season to prevent moisture condensation.

Drive Unit

Refer to your Engine Operation and Maintenance Manual for recommended service, scheduled maintenance, repair and fluid check intervals.

Propeller

The propeller shipped with your boat is the size CROWLINE Boats, Inc. recommends for the best overall performance. However, factors such as altitude, temperature, load, and bottom growth may affect performance. Also, periodic inspection of the propeller for excessive wear or damage is recommended. Consult your CROWLINE dealer for specific details.

NOTE: If you change to a different size propeller, CROWLINE Boats, Inc. assumes no responsibility for any damage resulting from this change.

Power Steering System

If your boat is equipped with a rack and pinion power steering system, periodic inspection and lubrication is required to maintain safe operating conditions.

Normal Use

Inspect and lubricate every 50 hours of operation or 60 days.

High Level Use

Inspect and lubricate every 25 hours of operation or 30 days.

NOTE: Saltwater operation is considered high level 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 and check power steering fluid level. If low, add type "A" automatic transmission fluid to bring level up to the FULL mark on the dipstick.

NOTE: The correct fluid level in a cold engine is up to, but not beyond the ADD mark. This allows for oil expansion when the engine is hot.

5. Inspect all hydraulic lines and hoses for leaks. Ensure all lines and hoses are free from friction and exposure to extreme heat. Tighten all fittings and clamps as required.
6. Check all bolts for tightness.
7. Check pump pulley drive belt for wear and proper tension.

IMPORTANT: Avoid over tightening drive belts. Belts that are too tight can cause excessive bearing wear and failure.

Bilge

Inspection

The bilge should always be checked after launch. A small amount of water in the bilge is normal. Large amounts of water or any signs of fuel or oil requires immediate investigation. Never pump fuel or oil overboard when your boat is in the water.

Cleaning

1. Remove all sand, silt, dirt, or foreign material prior to activating the bilge pump to remove excess bilge water.
2. Ensure all limber holes are open and strainers are clean.
3. Use a bilge cleaner product to remove any obvious oil stains. Consult your CROWNLIN dealer for recommended types of approved cleaner.

IMPORTANT: Never use flammable solvents (i.e. kerosene) for bilge cleaning.

TROUBLESHOOTING CHART

The troubleshooting procedures listed in this chart are designed to correct minor malfunctions for the engine, performance, and vibration. The chart displays areas that could be at fault and are presented in the order of probable occurrence. Use common sense and always refer to the Engine Operation and Maintenance Manual. If the malfunction appears too complicated or unsafe, contact your CROWNLIN dealer if possible. Otherwise contact a local marina for information regarding a marine mechanic.

CAUTION

CAUTION: Disconnect battery cables before performing all inspections, checks, and repairs.

ENGINE

The following information is at times general in nature. Consult your engine operation manual for more information.

Problem	Probable Cause	Corrective Action
Engine will not crank (Ignition system)	Throttle lever in wrong position	Check position of throttle lever to ensure it is in the NEUTRAL position.
	Loose wire in starting circuit	Tighten all wiring connections.
	Ignition switch defective	Test switch continuity. Replace switch as required.
	Defective solenoid	Replace solenoid.
	Battery switch in OFF position	Turn dual battery switch to battery setting 1 or 2; if equipped.
	Dead battery	Recharge or replace battery.
	Hydrostatic lock	Remove spark plugs and crank engine. If engine cranks, 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, there is improper draining of exhaust system. Contact your CROWNLIN dealer or a qualified marine mechanic to correct problem.


Problem	Probable Cause	Corrective Action
Engine cranks but will not start (Fuel system)	Engine safety switch lanyard pulled off the switch	Reinstall lanyard.
	Lack of fuel	Open shut-off valve, clean filter, check fuel level, and check anti-siphon valve.
	Improper starting procedure	See Engine Operation and Maintenance Manual to review starting procedure.
	Distributor cap brush cracked or broken	Replace brush.
	Choke plate sticking	Check thermostatic spring housing adjustment.
	Clogged fuel filter	Check and replace fuel filter.
	No fuel reaching carburetor (providing all fuel valves are open)	Check fuel pump, fuel pump filter, carburetor fuel filter, and fuel tank line for cracked flanges or restricted fittings, check anti-siphon valve.
	Engine flooded	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.
Low cranking speed	Contaminated fuel	Inspect for water or other contaminants in fuel. If contaminated, drain tank and flush with fresh fuel.
	Loose or dirty electrical connections or damaged wiring	Check all related electrical connections and wires.
	Bad battery	Test battery (See Engine Operation and Maintenance Manual).

Problem	Probable Cause	Corrective Action
	Engine oil too heavy for current temperature	Drain oil and refill with correct grade and viscosity oil (See Engine Operation and Maintenance Manual).
Starter will not crank engine	Discharged battery	Charge battery, change battery selector switch to ALL; if equipped.
	Corroded battery cables	Clean terminals.
	Loose connection in starting circuit	Check and tighten all connections.
	Defective starter switch	Replace switch.
	Starter motor brushes dirty	Clean or replace brushes.
	Jammed starter drive	Loosen starter motor, then free stuck gear.
Poor acceleration	Accelerating pump	Replace.
	Throttle not fully open	Inspect cable and linkages for binding, obstructions, or loose fasteners.
	Ignition or carburetor	Service ignition system and carburetor.
	Flame arrestor dirty or air intake obstructed	Clean flame arrestor and check air intake.
	Engine overheating	Check engine temperature (See Engine Operation and Maintenance Manual).
Engine runs but misfiring	Fouled spark plug(s)	Remove, clean or replace.
	Wet spark plug wires	Wipe dry, inspect and replace damaged wires.

Problem	Probable Cause	Corrective Action
	Carbon tracked distributor	Clean or replace as required.
	Loose ignition wires	Inspect all wire connections.
	Cold engine with improperly set choke	Check Engine Operation and Maintenance Manual for proper choke setting.
	Defective fuel pump	Repair or replace as required.
	Partially clogged fuel filter	Clean or replace fuel filter.
	Incorrect carburetor mixture	See Engine Operation and Maintenance Manual for proper carburetor adjustment.
	Contaminated fuel	Drain fuel tank and flush clean and replace fuel filter.
Excessive fuel consumption	Restriction in flame arrestor	Remove flame arrestor and clean.
	Faulty fuel pump	Repair or replace as required.
	Dirty flame arrestor screen	Clean or replace as required.
	Distributor breaker points or spark plugs improperly set or bad	Clean and set or replace breaker points and spark plugs.
	Incorrect timing	Time engine.
	Choke not properly adjusted	Adjust choke as required.
	Float level too high	Reset float level as required (See Engine Operation and Maintenance Manual).

Problem	Probable Cause	Corrective Action
Blue exhaust smoke	Lube level too high	Drain off excessive oil.
	Oil too thin	Drain and replace oil (See Engine Operation and Maintenance Manual).
	Oil overheated	Check cooling system.
Black or gray exhaust smoke	Fuel mixture too rich	Adjust carburetor.
	Choke stuck	Lubricate and adjust.
	Poor carburetor setting	Readjust carburetor (See Engine Operation and Maintenance Manual).
	Carburetor fuel level too high	Adjust float in carburetor.
	Clogged flame arrestor	Clean or replace as required.
White exhaust smoke	Engine misfiring	See Engine Operation and Maintenance Manual.
	Spark plugs dirty or not gapped correctly	Clean, adjust gap, or replace.
Low oil pressure	Insufficient oil in crankcase	Check and add correct grade and viscosity oil. Visually check engine for leaks.
	Excessive oil in crankcase	Check and remove excess amount of oil. Check for cause of excessive oil (improper filling, bad fuel pump, etc.).
	Diluted or improper grade and viscosity oil	Change oil and oil filter, being sure to use the correct grade and viscosity oil.
	Oil leak in pressure line	Inspect all oil lines and tighten all connections as necessary.

Problem	Probable Cause	Corrective Action
No oil pressure	Defective gauge, gauge tube, or oil line	Replace gauge, or tube, and tighten or replace line as necessary.
	No oil in engine	Fill with proper grade and viscosity oil (See Engine Operation and Maintenance Manual).
High oil pressure	Oil grade too heavy	Drain oil and replace with proper grade (See Engine Operation and Maintenance Manual).
	Dirt or obstruction in oil lines	Drain and clear oil system. Check for bent or flattened oil lines and replace as required.
Knocking or ping-ing	Incorrect fuel	Drain tank and replace with proper fuel.
	Incorrect timing	Time engine (See Engine Operation and Maintenance Manual).
	Pre-ignition	Clean or replace spark plugs and check engine timing.
	Overheated engine	Check engine cooling system.
	Cooling system trouble	Check water intake connections for leaks.
Rough running	Choke not operating	Check choke linkages for binding or obstruction.
	Faulty fuel pump	Refer to Engine Operation and Maintenance Manual for fuel pump testing procedures.
	Idle speed too low	Check idle speed and adjust.

Problem	Probable Cause	Corrective Action
	Faulty ignition system components	Service ignition system (See Engine Operation and Maintenance Manual).
	Clogged fuel filter	Replace fuel filter.
	Contaminated fuel	Inspect fuel for water or other contaminants. If contaminated, drain tank and flush with fresh fuel.
	<div style="border: 1px solid black; padding: 5px;">  WARNING </div> <p>WARNING: Wear protective eye wear when performing compressed air cleaning.</p>	
	Fuel lines or fuel tank vent line kinked or clogged	Use compressed air (20 psi or less) to blow out obstruction. Replace line if kinked.
	Flame arrestor plugged with foreign material or air intake hose obstructed	Clean flame arrestor and check hose.
Engine overheating	Bad sending or receiving unit	Replace unit(s).
	Loose wiring connections at sending or receiving unit	Tighten all connections.
	Worn or broken impeller in sea water pump	Replace impeller.
	Clogged oil cooler	Remove obstruction.
	Exhaust lines plugged	Remove obstruction.

Problem	Probable Cause	Corrective Action
	Ignition timing late	Time engine.
	Choke valve stuck closed	Free choke valve movement.
	Collapsed water pump suction hose	Install new hose.
	Loose or worn belts	Adjust or replace belts as required.
	Restricted water intake	Clean water intake.
Sludge in oil	Infrequent oil changes	Drain and refill with proper grade and viscosity oil.
	Dirty oil filter	Replace oil filter.
	Water in oil	Drain and refill. If trouble persists, check for cracked block, or defective head gasket and cracked head.
Poor Performance	Damaged or improper propeller	Inspect propeller and replace if required.
	Buildup of marine growth on hull.	Clean hull.
	Excessive water in bilge area, boat overloaded, or improper distribution of load	Pump out bilge area. Inspect for causes related to excess water. Reduce load or redistribute load.
Vibration	Fouled or damaged hull bottom	Inspect, clean, or repair as required.
	Loose engine mounting bolts	Inspect and tighten as required.
	Damaged propeller shaft	Replace shaft.

Problem	Probable Cause	Corrective Action
	Propeller bent or pitch out of true	Inspect propeller and replace as required.
	Engine out of alignment	See Engine Operation and Maintenance Manual.

6 EXTENDED STORAGE

This section covers procedures for readying your boat for prolonged storage. For areas that do not require seasonal storage, CROWNLINe Boats, Inc. recommends a thorough annual inspection.

IMPORTANT: In regions where temperatures fall below freezing, all engine plugs must be removed before storing your boat for the winter. Failure to do so will seriously damage the engine.

LIFTING THE BOAT

Unless your boat is trailerable, have your dealer or qualified marina personnel lift your boat out of the water for you. Each boat has main frame components designed to support the boat when it is being lifted out of the water. Severe gel-coat crazing or more serious hull damage can occur if the lifting slings exert pressure on the gunwales. Flat, wide belting-type slings should be used. Don't use cable-type slings. The spreader bar at each sling should be as long as the distance across the widest point of the boat that the sling surrounds.

- Never hoist the boat with more than a minimal amount of water in the bilge.
- Empty fuel and water tanks, especially if they have large capacities. Properly dispose of fuel so as not to pollute the waterways.
- Do not place the slings where they may lift on underwater fittings.
- Do not use deck cleats or bow or stern eyes for lifting unless they are labeled.
- Do not use a sling to store your boat out of the water. Use only lifting devices which will properly support the hull bottom for out of the water storage.

PRIOR TO STORAGE

Hull

1. Scrape off any barnacles or crusted marine growth.
2. Scrub hull thoroughly to remove marine growth and scum.
3. Inspect underwater gear and propellers for excessive wear or damage.
4. Remove hull drain plug and store in a safe place.

Deck

1. Wash deck, superstructure and cockpit.
2. Clean all deck hardware (i.e. cleats, rails, instruments, etc.) and apply a coat of nonabrasive metal polish or wax.
3. Clean indoor/outdoor carpet.

NOTE: Refer to Section 5, General Maintenance and Repair, for specific cleaning procedures.

ENGINE

Cooling System

Drain cooling system for extended storage or when freezing weather threatens. This will prevent corrosion damage.

IMPORTANT: Ensure boat engine is level during extended storage.

1. While draining cooling system, make sure that plug openings are free of sand, silt, marine growth, rust etc.
2. Additional corrosion and freeze-up protection can be provided by filling cooling system with non-toxic anti-freeze and fresh water.
3. Mix non-toxic anti-freeze according to label directions for the lowest expected temperature.
4. Refer to Engine Owner/Service Manual for detailed winterizing and storage instructions.

Lubrication

1. Drain oil when engine is warm. This will ensure complete drainage of oil.

NOTE: If engine oil contains sludge, flushing oil should be used. Refer to Engine Owner/Service Manual for detailed winterizing and storage instructions.

2. Replace engine oil filter.
3. Fill each crankcase with required quantity of recommended engine oil.
4. Shut off fuel line and start engine.
5. Pour or spray fogging oil through carburetor air intake. Continue to pour or spray fogging oil until engine stops.

NOTE: Engine should stop due to lack of gasoline.

6. Clean and lubricate all linkage.
7. Spray entire exterior of engine with rust and corrosion inhibitor.
8. Have engine alignment checked and adjusted by a qualified technician.
9. Inspect all gaskets and seals, grease the U-joints, and change gear oil.
10. Remove propeller. Clean and lubricate the prop shaft and check for damage.

Fuel System

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

Battery

1. Remove battery and store away from freezing temperatures.

NOTE: Battery should be stored in a cool dry place on a wooden pallet. Avoid direct contact with concrete, brick, or dirt floors.

WARNING

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

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

NOTE: Do not allow baking soda and water solution to enter cells.

3. Lightly sand battery posts and clamps with fine grit emery cloth.
4. Apply a light coat of petroleum jelly to the cover end of the battery cables.
5. A monthly recharge or continuous trickle charge should be applied to the battery during storage.

AIR CONDITIONER

1. Disconnect the pump plug and drain the sea water circuit.

NOTE: The system is self purging to ensure that all water is drained.

2. Pump a non-toxic anti-freeze solution through the condensing coil to displace any water in the system.

FRESH WATER SYSTEM

1. Turn off water heater, if equipped.
2. Open all faucets and allow pump to empty water tank and intake lines. Run pump dry, for one to two minutes, before turning off pump.
3. Open all drains.
4. Disconnect discharge and intake hoses from pump.
5. Allow pump to run to force all water from unit.

NOTE: Running pump when dry will not damage it.

6. Reconnect all hoses, close all drains, and leave all faucets open.
7. Remove water pump fuse to prevent cycling during storage.

MARINE SANITATION DEVICE (MSD)

Improper winterizing can cause your MSD to fail. In salt water environments, the toilet bowl should be filled with fresh water and allowed to stand for several days. This will ensure that any accumulated salt has sufficient time to dissolve.

1. Pump system dry and flush with fresh water.
2. Fill system with non-toxic anti-freeze.

INTERIOR CLEANING

Be sure to clean the interior of your boat thoroughly. A little effort at the end of the season will really pay off when you get underway next spring.

1. Scrub all interior surfaces including cupboards, cabinets and drawers.
2. Be sure to remove everything that can hold moisture and cause mildew. Remove and store off the boat all cushions, mattresses, curtains, blankets and sheets, pillows, towels, linen and clothing.
3. If it is necessary to store cushions onboard:
 - A. Open zippers and elevate cover away from foam padding.
 - B. Place a small plastic bowl inside to allow for air circulation.
 - C. Seats that can be folded should be stored in the down position.
 - D. Use plastic seat covers to keep out dampness and protect against mildew.

4. Make sure the cabin is well ventilated.
5. Life jackets and other safety equipment must be clean and dry. If left onboard, leave them out so air can circulate around them.
6. Clean and thoroughly dry the bilge. Remove rags, sponges, or other cleaning materials.
7. Let the interior completely air out for a couple of days.
8. If a boat cover is used, be sure to use a breathable fabric that allows ample air circulation.

NOTE: After cleaning, make sure that everything is thoroughly dried and air can circulate freely throughout the inside of your boat.

RECOMMISSIONING

For maximum safety, be sure to inspect the fuel system carefully.

1. Inspect the fuel system and all associated equipment for proper connections, wear, leaks, or other damage. Always be alert for fuel vapors.

NOTE: For detailed information on re-launching, refer to the Engine Operation and Maintenance Manual.

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 cables and tighten cable clamps.
6. Apply petroleum jelly or marine grade grease on posts and clamps to eliminate air pockets and acid build-up.

IMPORTANT: Do Not apply petroleum jelly or marine grade grease before connecting and tightening clamps.

7. Coat hull drain plug threads with petroleum jelly and reinstall.
8. Clean the bilge.
9. Reinstall the exhaust drain plug.
10. Inspect all exhaust connections for carbon monoxide (CO) leakage. Adjust and repair as required.
11. Test navigational lights and other lighting onboard.
12. Inspect all wiring for fraying, wear, loose connections, and other damage.
13. Inspect all switches, controls, and other related equipment for proper operation.
14. Inspect all safety equipment for proper operation and physical condition.

7

SPECIFICATIONS

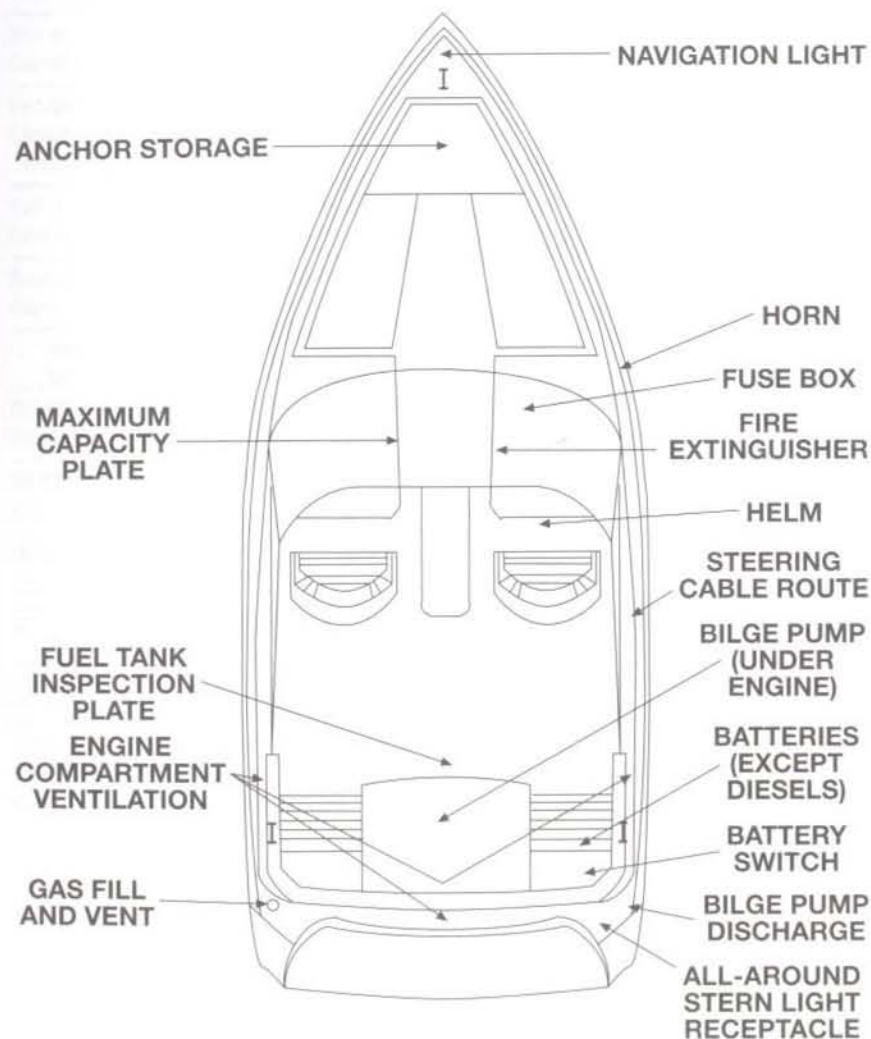


FIGURE 7.1
TYPICAL STERN DRIVE EQUIPMENT

BOAT SPECIFICATIONS

SPECIFICATIONS	180 BR	192 BR	202 BR	210 LX	210 BR
L.O.A	5.5m (18')	5.8m (19'1")	6.15m (20'2")	6.2m (20'4")	6.2m (20'4")
Draft Up	33cm (13")	33cm (13")	41cm (16")	48cm (19")	41cm (16")
Draft Down	69cm (27")	69cm (27")	76cm (30")	84cm (33")	76cm (30")
Maximum Capacity	526kg (1160 lbs.)	621kg (1370 lbs.)	767kg (1690 lbs.)	767kg (1690 lbs.)	767kg (1690 lbs.)
Person Capacity **	526kg (8 Persons or 1160 lbs.)	526kg (8 Persons or 1160 lbs.)	767kg (12 Persons or 1690 lbs.)	767kg (12 Persons or 1690 lbs.)	653kg (10 Persons or 1440 lbs.)
Fuel Capacity	102 l (27 gal.)	102 l (27 gal.)	155 l (41 gal.)	174 l (46 gal.)	155 l (41 gal.)
Freshwater Capacity				39 l (10 gal.)	
Maximum Rated Engine	168kw (225PHP)	209kw (280PHP)	239kw (320PHP)	239kw (320PHP)	239kw (320PHP)
Holding Tank Capacity					
Design Category (European Certification)	C	C	C	C	C
AC					
DC	12 Volts	12 Volts	12 Volts	12 Volts	12 Volts

Blank Space - This information does not apply to this model

NA - Information not available

Parenthesis = Domestic standard

** CE Requirements may differ for European capacity

BOAT SPECIFICATIONS

SPECIFICATIONS	220 CC	225 BR	230 BR	235 CC	239 DB
L.O.A	6.4m (21'1")	6.83m (22'5")	7m (23')	7m (23')	7.2m (23'7")
Draft Up	46cm (18")	46cm (18")	46cm (18")	46cm (18")	48cm (19")
Draft Down	81cm (32")	81cm (32")	81cm (32")	84cm (33")	86cm (34")
Maximum Capacity	767kg (1690 lbs.)	850kg (1875 lbs.)	850kg (1875 lbs.)	728kg (1605 lbs.)	1000kg (2205 lbs.)
Person Capacity **	653kg (10 Persons or 1440 lbs.)	783kg (12 Persons or 1725 lbs.)	782kg (12 Persons or 1725 lbs.)	719kg (11 Persons or 1585 lbs.)	909kg (14 Persons or 2005 lbs.)
Fuel Capacity	223 l (59 gal.)	220 l (58 gal.)	223 l (59 gal.)	291 l (77 gal.)	273 l (72 gal.)
Freshwater Capacity	39 l (10 gal.) Bag or 64 l (18 gal.) Option			OPT. 42 l (11 gal.)	39 l (10 gal.)
Maximum Rated Engine	239kw (320PHP)	317kw (425PHP)	317kw (425PHP)	317kw (425PHP)	239kw (320PHP)
Holding Tank Capacity					64 l (17 gal.)
Design Category (European Certification)	C	C	C	C	C
AC	240v - 50hz (120v - 60hz)		240v - 50hz (120v - 60hz)	240v - 50hz (120v - 60hz)	
DC	12 Volts	12 Volts	12 Volts	12 Volts	12 Volts

Blank Space - This information does not apply to this model

NA - Information not available

Parenthesis = Domestic standard

** CE Requirements may differ for European capacity

BOAT SPECIFICATIONS

SPECIFICATIONS	240 EX	250 CR	266 BR	270 BR	270 CR
L.O.A	6.9m (22'6")	7.5m (24'8")	8.08m (26'6")	9.75m (26'1")	8.1m (26'8")
Draft Up	53cm (21")	58 cm (23")	51cm (20")	53cm (21")	53cm (21")
Draft Down	89cm (35")	97 cm (38")	89cm (35")	97cm (38")	91cm (36")
Maximum Capacity	937kg (2065 lbs.)				
Person Capacity **	846kg (13 Persons or 1865 lbs.)	610 kg (9 Persons or 1344 lbs.)			
Fuel Capacity	235 l (62 gal.)	307 l (81 gal.)	261 l (69 gal.)	333 l (88 gal.)	322 l (85 gal.)
Freshwater Capacity	57 l (15 gal.)	95 l (25 gal.)		76 l (20 gal.)	95 l (25 gal.)
Maximum Rated Engine	239kw (320PHP)	317 kw (425 PHP)	317kw (425PHP)	317kw (425PHP)	317kw (425PHP)
Holding Tank Capacity		98 l (26 gal.)			95 l (25 gal.)
Design Category (European Certification)	C	B	C	C	B
AC		240v - 50hz (120v - 60hz)			240v - 50hz (120v - 60hz)
DC	12 Volts	12 Volts	12 Volts	12 Volts	12 Volts

Blank Space - This information does not apply to this model

NA - Information not available

Parenthesis = Domestic standard

** CE Requirements may differ for European capacity

BOAT SPECIFICATIONS

SPECIFICATIONS	288 BR	290 CR			
L.O.A	8.7m (28'8")	8.8m (28'11")			
Draft Up	53cm (21")	43cm (17")			
Draft Down	97cm (38")	89cm (35")			
Maximum Capacity					
Person Capacity **					
Fuel Capacity	488 l (129 gal.)	553 l (146 gal.)			
Freshwater Capacity	76 l (20 gal.)	76 l (20 gal.)			
Maximum Rated Engine	Single - 317kw (425PHP) Duals Total - 477kw (640PHP)	Duals Total - 477kw (640PHP) Single - 317kw (425PHP)			
Holding Tank Capacity	64 l (17 gal.)	64 l (17 gal.)			
Design Category (European Certification)	C	B			
AC	240v - 50hz (120v - 60hz)	240v - 50hz (120v - 60hz)			
DC	12 Volts	12 Volts			

Blank Space - This information does not apply to this model

NA - Information not available

Parenthesis = Domestic standard

** CE Requirements may differ for European capacity

8

GLOSSARY

Adrift	Floating without mooring or direction.
Afloat	On the water.
Aft	Describing the after section of a vessel, or things to the rear of amidships and near the stern.
Aground	Touching bottom.
Amidships	In the center, the center portion of a vessel.
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.
Anchorage	A customary, suitable and (usually) designated harbor area in which vessels may anchor.
Bail	To remove water from a boat by pump or bailer.
Beacon	A post or buoy placed over a shoal or bank to warn vessels, also a signal mark on land.
Beam	Imaginary line amidships at right angles to keel of vessel. Also vessels width amidships.
Bearing	The direction or point of the compass in which an object is seen.
Bilge	The lower internal part of a boat's hull.
Bow	The forward part or front of the boat.
Bulkhead	Vertical partition in a boat.
Burdened Vessel	Former term for the vessel which must stay clear of vessels with the right-of-way.
Carburetor Backfire Flame Arrestor	Required equipment on all motorboats except outboards and diesels. Reduces chance of fire caused by backfires in internal combustion engines.
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.
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.
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.
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.
Displacement Hull	Type of hull that plows through the water even when more power is added.
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.
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 signaling device that can indicate distress.
Forward	Toward the bow.
Freeboard	The vertical distance measured on a boat's side from the waterline to the gunwale.
Galley	The kitchen area of a boat.
Give-Way Vessel	The one which must stay clear of vessels which have the right-of-way.
Gunwale	The upper edge of a boat's side. (pronounced gunnel.)
Hatch	An opening in a boat's deck for persons or cargo to go below.
Head	A marine toilet.
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.
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.

Keel	The main structural member of a vessel, the backbone; the lateral area beneath the hull to provide steering stability and reduce leeway.
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.)
Limber Holes	Drainage holes in the bilge timbers of a vessel, allowing water to run to a low point for pumping out.
List	A continuous leaning to one side, often caused by imbalance in stowage or wind.
LOA	Length over all; the maximum length of a vessels hull, excluding projecting spars or rudder.
Locker	A storage place, a closet.
Log	A record or diary of a vessels 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.
MAYDAY	A radio distress call, from the French m'aidez (help me); SOS in Morse Code.
Mooring	Permanent ground tackle; a place where vessels are kept at anchor.
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.
Outdrive	A propulsion system for boats, with an inboard motor operating an exterior drive, with drive shaft, gears, and propeller; also called stern-drive and inboard/outboard.
PFD	Personal Flotation Device.
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.
Planing 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.
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.
Seacock	A through-hull valve, a shut-off on a plumbing or drain pipe between the vessels interior and the sea.
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 bow.
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. Underway Vessel in motion, i.e., when not moored, at anchor or aground.
USCG	United State Coast Guard
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 seaplane on the water, capable of being used as a means of transportation on water.
VHF Radio	A Very High Frequency electronic communications and direction finding system.
Wake	Moving waves, created by vessel motion. Track or path that a boat leaves behind it, when moving across the water.
Way or Underway	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.
Whistle Signal	A standard communication signal between boats, to indicate change of course, danger, or other situations.
Windward	Situated on the side closest to the wind. (Opposite of leeward.)