



FORMULA



OWNER'S MANUAL
500 SUPER SPORT CROSSOVER

FUEL SYSTEMS

Boats manufactured for use in California for model year 2018 and after meet the California EVAP Emissions regulation for spark-ignition marine watercraft. Boats meeting this requirement will have the following label affixed near the helm.

WARNING

Operating, servicing and maintaining a recreational marine vessel can expose you to chemicals including engine exhaust, carbon monoxide, phthalates and lead, which are known to the State of California to cause cancer and birth defects or other reproductive harm. To minimize exposure, avoid breathing exhaust, service your vessel in a well-ventilated area and wear gloves or wash your hands frequently when servicing this vessel. For more information go to: www.P65warnings.ca.gov/marine

The fuel system in boats marketed in states other than California complies with U.S. EPA-mandated evaporative emission standards at time of manufacture using certified components.

CALIFORNIA AIR RESOURCES BOARD (CARB)

Outboard, sterndrive and inboard powered boats sold in the state of California are equipped with special components and certified to meet stricter environmental standards and exhaust emissions. All boats sold in California since 2009 are required to meet Super-Ultra-Low (four-star) emissions.

EXHAUST EMISSIONS



Sterndrive and inboard marine engine powered boats meeting CARB's exhaust emission standards are required to display the four-star label on the outside of the hull above the waterline. Outboard and personal watercraft marine engines may also comply with these standards.

DANGER

Carbon monoxide (CO) can cause brain damage or death. Engine and generator exhaust contains odorless and colorless carbon monoxide gas. Carbon monoxide will be around the back of the boat when engines or generators are running. Signs of carbon monoxide poisoning include nausea, headache, dizziness, drowsiness and lack of consciousness. Get fresh air if anyone shows signs of carbon monoxide poisoning. See engine manufacturer's manual for information regarding carbon monoxide poisoning.



1 | Introduction

Welcome Aboard

Dear Formula Owner:

Welcome aboard! We appreciate how much careful thought, research and planning you put into the decision to purchase a new boat, and we are pleased to welcome you as a new member of the Formula family.

Members of the Formula team – your local dealership’s personnel as well as all the Formula employees who had a part in building, inspecting and providing support for your boat – are dedicated to delivering the highest quality product possible, and we all share in your pride of ownership.

Your Formula boat will afford you many hours of relaxation and pleasure on the water. Along with the enjoyment, however, comes responsibility for not only yourself but also your passengers and others on the water. This Owner Information Manual is designed to help you familiarize yourself with your new Formula before you take her out on the water and as a quick-reference tool whenever a little information is needed. Your local dealer and/or Formula’s Technical Assistance Group will also be glad to help you learn more about your new boat should any questions arise.

We also encourage you, and all those who will be boating with you, to take a safe boating course. The United States Coast Guard Auxiliary, the United States Power Squadron, and the American Red Cross all offer free courses. Call 1-800-336-BOAT for information on the boating course nearest you (in Virginia, call 1-800-245-BOAT). The more you know about boating, the more fun you will have!

Congratulations on your wise decision. We wish many satisfying hours of boating pleasure to you and your crew!

Sincerely,

Scott D. Porter
President



NMMA Certification

Formula is a charter member of the National Marine Manufacturers Association (NMMA). This independent organization members include boat, engine and marine equipment manufacturers that are focused on the improvement and safety of boating.

Your new Formula boat is NMMA certified. A NMMA certification not only satisfies the U. S. Coast Guard (USCG) regulations but also the more rigorous equipment and system standards based on those established by the American Boat and Yacht Council, Inc. (ABYC). Your Formula meets or exceeds NMMA safety-based certifications.



FOR191

Figure 1-1: Yacht Certification



Table of Contents

INTRODUCTION1-1

Welcome Aboard	1-1
NMMA Certification	1-2
Owner/Operator Responsibilities	1-5
Publications	1-5
Qualified Boat Operators	1-5
Education Opportunities	1-6
Federal, State and Local Regulations	1-6
Reporting Accidents	1-6
Rendering Assistance	1-6
Serial Number Locations	1-6
Repairs and Modifications	1-7
Environmental Considerations	1-7

BOATING SAFETY2-1

Signal Words/Definitions	2-1
Required Safety Equipment	2-2
Visual Distress Signals	2-6
Recommended Equipment	2-7
Emergency Considerations	2-8
Hazardous Conditions	2-9
Operating By Minors	2-12
Communication	2-12

SPECIFICATIONS AND LAYOUT3-1

Boating Terminology	3-1
Dimensions	3-2
500 Super Sport Crossover	3-2

CONTROLS AND INDICATORS4-1

Display Panels	4-1
Switches	4-2
Circuit Breakers	4-8
Steering	4-9
Electronic Remote Controls (ERC)	4-9
Helm Controls and Indicators	4-11
Cabin Controls and Indicators	4-13
Battery Selector Switches	4-19

SYSTEM OPERATION AND EQUIPMENT5-1

Powertrain	5-1
Fuel System	5-1
Helm System	5-1
Bilge and Blower System	5-2
DC Electrical	5-2
AC Electrical	5-4
Shore Power	5-6
Shore Power Auto Reel	5-7
Generator	5-8
Battery Charger (Shore Power)	5-10
Air Conditioning System	5-11
Fresh Water System	5-11
Single-Point Water Fill System	5-13
Gray Water System	5-13
Waste Water (Head) System	5-13
Raw Water System	5-15
Automatic Fire Extinguisher System	5-17
Equipment	5-18

GETTING UNDERWAY6-1

Safety Checklist	6-1
Basic Safe Boating Rules	6-1
Fueling	6-4
Pre-Operational Checks	6-5
Boat Trim/Loading	6-6
Boarding	6-6

OPERATION7-1

Starting	7-1
Shifting	7-2
Steering	7-3
Running	7-3
Stopping	7-3
Cooling System Flushing	7-4
Operating at High Speed	7-5
Propeller Effect	7-5
Maneuvering Techniques	7-6



Boating at Night	7-8
Special Operating Conditions	7-8
Holding Course	7-9
Trimming-Drive Units and Trim Tabs	7-9
Anchoring and Sea Anchors	7-13
Towing and Being Towed	7-16
Heavy Weather	7-17
Swimming and Diving	7-19
Docking	7-20
Mooring Lines	7-22
Using Fenders	7-22
Navigational Hints	7-22
SCHEDULED CHECKS AND SERVICE	8-1
After Each Run	8-1
Scheduled Maintenance Checks	8-1
CARE AND MAINTENANCE	9-1
Interior Cleaning	9-1
Exterior Cleaning	9-2
Unscheduled Maintenance	9-5
Bilge	9-7
Corrosion and Electrolysis	9-7
Galvanic Corrosion Protection	9-7
Outboard Motor Maintenance	9-9
STORAGE	10-1
In-Water Storage Preparation	10-1
Trailing/Transporting	10-1
Lifting the Boat	10-1
Storage/Winterization	10-2
Reactivating the Boat After Storage	10-2
TROUBLESHOOTING	11-1
WARRANTY AND SERVICE	12-1
Formula Boats Limited Warranty Policy	12-1
FORMS	13-1
Service Log	13-1
Fuel Log	13-2
Useful Information	13-3



Owner/Operator Responsibilities

At the time of delivery, the owner/operator is responsible for:

- Understanding warranty terms and conditions of both the propulsion units and boat.
- Obtaining insurance.
- Examining boat to ensure satisfactory condition and proper operation of all systems.

Before operating the boat, the owner/operator is responsible for:

- Obtaining state registration of the boat.
- Equipping the boat with the proper USCG required safety equipment.
- Following proper break-in procedure for the propulsion unit(s).
- Understanding safety information and proper operating procedures within this manual.

While operating the boat, the owner/operator is responsible for:

- Knowing that all safety equipment and personal flotation devices (PFDs) are in good condition and suitable for your boat and passenger load.
- Having at least one other passenger who is capable of handling the boat in an emergency.
- Following safe operating practices and the "Rules of the Road."
- Understanding proper maintenance and knowledge of the boat's operating systems.
- Providing safety training for the passengers.
- Avoiding the use of alcohol and other drugs.
- Providing assistance to other boaters.

Insurance

You must obtain insurance before operating your new boat. Insurance for loss by fire, theft or other causes, or liability protection against accidents is a must for responsible boaters. The boat owner is legally responsible for any damage or injury caused when he, or someone else operating the boat, is involved in an accident. Many states have laws detailing minimum insurance needs. Your insurance agent or your dealer may be able to supply you with more information.

Registration/Documentation

The USCG requires that all power boats operated on the navigable waters of the U. S. must be registered in the state of main use; also, many states require registration in that state whenever boating on waters within their state boundary. Contact your state boating authorities (and neighboring states) for registration information on boats and trailers. Your Formula dealer can supply you with the appropriate forms.

Publications

Your Owner Information Binder includes information about onboard systems and equipment furnished by suppliers other than Formula Boats. Additionally, all manuals are available online at <http://www.vesselvanguard.com/>. Please refer to these manufacturer's manuals for additional operation and maintenance instructions not covered in this manual.

Qualified Boat Operators

This manual is not intended to provide complete training on all aspects of boat operation. We strongly recommend that all operators of this boat seek additional training on boat handling and safety. Have all operators become familiar with the handling characteristics, and proper steering and control system usage before attempting high-speed operation.

Some states require youths 16 years of age and younger to complete a boating safety course before operating any watercraft. Many others require operators under the age of 18 to be licensed in small boat operation.



Education Opportunities

Boat smart from the start, take a boating safety course and get a free vessel safety check annually for your boat. For more information, contact: United States Coast Guard Auxiliary, 1-877-875-6296, www.cgaux.org; United States Power Squadrons, 1-888-367-8777, www.usps.org.

Most boaters can enhance their enjoyment of boating experiences through increased knowledge of safe operation, navigation and regulation of pleasure boats. The following is a list of some other agencies and organizations that offer Water Safety, First Aid and CPR courses or information. To find boating safety courses in your area, call your state's local boating agency or the Boat U.S. Foundation course line at 1-800-336-2628 (1-800-245-2628 in Virginia).

- American Red Cross
- State Boating Offices
- Canadian Power and Sail Squadrons
- Boat Owners Association of the United States
- National Safe Boating Council
- Yacht Clubs

Federal, State and Local Regulations

The USCG is the authority of the waterways; they are there to help the boating public. State boating regulations are enforced by local authorities. You are subject to marine traffic laws and "Rules of the Road" for both federal and state waterways; you must stop if signaled to do so by enforcement officers, and permit to be boarded as asked.

Reporting Accidents

The USCG requires the owner or operator of a boat involved in an accident, to report the incident to the proper marine law enforcement agency for the state in which the accident occurred. Immediate notification to the nearest State boating authority is required if a person dies or disappears as a result of a recreational boating accident.

If a person dies or sustains injuries requiring more than first aid, a formal report must be filed within 48 hours of the accident. A formal report must be filed within 10 days for accidents exceeding \$500 in property damage or complete loss of boat. An accident report form is included toward the end of this manual.

Rendering Assistance

If you see a distress signal or suspect a boat is in trouble, you must assume it is a real emergency and render assistance immediately. By law, the operator in charge of the craft is obligated to provide assistance to any individual in danger if such assistance can be provided safely. Failure to render assistance can result in a fine and/or imprisonment.

The 1971 Boating Safety Act grants protection to a "Good Samaritan" boater providing good faith assistance, and absolves a boater from any civil liability arising from such assistance.

Serial Number Locations

Your Formula boat, its engines and propulsion units, and other major equipment onboard, such as the generator, will have a serial number for identification. A serial number information sheet is included with the Owner Information Binder for your boat. It is a good practice to keep a copy of this list in a safe place other than onboard the boat, such as with your boat insurance documents.

Additionally, a listing of all serial numbers for all major components for your boat can be found in your VesselVanguard account under *Boat Profile*.



INTRODUCTION

Repairs and Modifications

Your Formula boat has been designed for safety in the harsh marine environment and thoroughly tested and certified for compliance with applicable safety standards. Because of the possibility of interference with the structural design of the boat, owner installation of additional equipment or modifications of factory equipment is not recommended and may void manufacturer's warranties.

In addition, do not attempt to make repairs unless you are certified to do so. Be sure to have the necessary authorized repair information, and use approved marine replacement parts.

Your Formula dealer is qualified to ensure repairs, additions or modifications to your boat will not compromise safety, design integrity or warranty coverage.

Environmental Considerations

As a boater, you already appreciate nature's beauty and the peace of the great outdoors. It is a boater's responsibility to protect the natural environment by keeping waterways clean.

MARPOL Treaty

The USCG enforces the International Convention for the Prevention of Pollution from ships, commonly referred to as the MARPOL Treaty (MARine POLLution). This treaty prohibits the overboard dumping of all ship-generated plastics, chemicals, garbage and oil.

Fuel/Oil Spillage

WARNING

Fumes from rags can collect in bilge and be extremely hazardous. Do not store rags used to wipe-up fuel or solvent spills in the boat. Dispose of rags properly ashore.

The spilling of fuel or oil into our waterways contaminates the environment and is dangerous to wildlife. Do not discharge or dispose of fuel, oil or other chemicals into the water; it is prohibited and you can be fined. These are two common, accidental types of discharge:

- Overfilling the fuel tanks
- Pumping contaminated bilge water

Discharge/Disposal of Waste

Waste means all forms of garbage, plastics, recyclables, food, wood, detergents, sewage, and even fish parts in certain waters – in short, nearly everything. We recommend you bring back everything you take out with you for proper disposal ashore.

Use an approved pump-out facility at your marina. Many areas prohibit the discharge of sewage overboard or even an operable overboard waste discharge.

Marine Sanitation

NOTICE

Direct disposal of sanitation waste into some waters is prohibited and could result in being fined. Be sure to check local regulations.

NOTICE

To avoid damaging the waste disposal system and the environment, do not place facial tissues, paper towels or sanitary napkins in the head.

Have your Formula dealer properly service the waste disposal system when needed.



Excessive Noise

Noise means engine noise, radio noise or even voices. Many bodies of water have adopted noise limits. Do not use thru-transom exhaust unless you're well off shore. Music and loud conversation can carry a considerable distance on water, especially at night. Be sure to follow regulations and be courteous.

Wake/Wash



WARNING

You are responsible for injury and damage caused by your wake/wash.

Be alert for NO WAKE zones. Prior to entering a no wake zone, come off plane to the slowest steerable speed. Use caution when operating around smaller crafts, in channels and marinas, and in congested areas.

Exhaust Emissions

Increased exhaust (hydrocarbon) emissions pollute our water and air. Keep your engine tuned and boat hull clean for peak performance. Consult your Formula dealer and propulsion unit operator's manual for information.



WARNING

The engine exhaust from this product contains chemicals known to the State of California to cause cancer, birth defects or other reproductive harm.

Paints

If your boat is kept in water where marine growth is a problem, the use of anti-fouling paint may reduce the growth rate. Be aware of environmental regulations that may govern your paint choice. Contact your local boating authorities for information.

Cleaning Agents

Household cleaners should be used sparingly and not discharged into waterways. Do not mix cleaners and be sure to use plenty of ventilation in enclosed areas. DO NOT use products which contain phosphates, chlorine, solvents, non-biodegradable or petroleum based products. Citrus-based cleaners are excellent for marine cleaning purposes and are safe for you and the environment.

Fishery Resources

There is a tremendous drain on our fishery resources. Over-fishing and pollution have strained the fish population. Do your part by keeping only what you will eat and practice catch-and-release.

Foreign Species

If you trailer your boat from lake to lake, you may unknowingly introduce a foreign aquatic species from one lake to the next. Thoroughly clean the boat below the water line, remove all weeds and algae, and drain the bilge before launching the boat in a new body of water.



2 | Boating Safety

Your safety, the safety of your passengers, and other boaters are among your responsibilities as operator of this boat. Your boat must be in compliance with USCG safety equipment regulations. You should know how to react correctly to adverse weather conditions, have good navigation skills, and follow the “rules of the road” as defined by the USCG and state/county/local regulations.

WARNING

- Read and understand this manual, the propulsion unit manual, and the generator manual. Be sure that you understand all controls and operating instructions before attempting to operate the boat. Improper operation can be extremely hazardous.
- Be in control of your boat. Do not operate your boat under the influence of alcohol or other drugs.

Before each outing you should check all safety equipment, such as fire extinguishers, personal floatation devices (PFDs), flares, distress flags, flashlights, and the engine stop switch. They should be operable, in good condition, readily visible, and easily accessed.

Check local weather reports before casting off; do not leave the dock area when strong winds and electrical storms are in the area or predicted to be in the area.

Tell someone your travel plans and leave a float plan. A float plan makes the job of search and rescue much easier for authorities. A float plan template can be found in the back of this manual.

Signal Words/Definitions

The popularity of boating and other water sports has undergone an explosion in growth the past few years. Because of this, safety is an important issue for everyone who shares in the use of our waterways.

Throughout this manual specific precautions and symbols identify safety related information.



The Safety Alert Symbol means
**ATTENTION! BECOME ALERT! YOUR
SAFETY IS INVOLVED!**

DANGER

Indicates an imminently hazardous situation that, if not avoided, will result in death or serious injury.

WARNING

Indicates a potentially hazardous situation that, if not avoided, could result in death or serious injury.

CAUTION

Indicates a potentially hazardous situation that, if not avoided, may result in minor or moderate injury.

NOTICE

Indicates a situation that can cause damage to equipment, personal property and/or the environment, or cause the equipment to operate improperly.



The precautions listed in this manual and on your Formula boat are not all-inclusive. If a procedure, method, tool, or part is not specifically recommended, you must satisfy yourself that it is safe for you and others, and that the boat will not be damaged or made unsafe as a result of your decision. REMEMBER-- USE COMMON SENSE WHEN OPERATING YOUR BOAT!

Required Safety Equipment

The Federal Boat Safety Act of 1971 (FBSA/71) established minimum safety standards for boats and associated equipment, specified by the USCG. In addition, the ABYC and the NMMA work with boat builders to develop voluntary standards that exceed base requirements.

The included safety equipment on your Formula meets or exceeds the standards of the USCG, ABYC and the NMMA. Some required safety equipment such as PFDs are not included with your Formula boat. Your Formula dealer can help you choose the appropriate equipment.

NOTICE

Many states' equipment requirements go beyond USCG requirements. Contact your state boating office for further information.

Equipment requirements for coastal and inland waters differ. Check with local authorities or the USCG for further information about coastal water requirements.

The following equipment may or may not be required by federal/local regulations.

Life Saving Equipment

Boaters enjoy the feel of sun and spray, so it's tempting to boat without wearing a life jacket, especially on nice days. However, the failure to wear life jackets is by far the number one cause of boating fatalities.

Modern life jackets are available in a wide variety of shapes, colors, sizes and technologies. Many are thin and flexible. Some are built right into fishing vests or hunter coats. Others are inflatable and as compact as a scarf or fanny pack until they hit water and automatically fill with air. Ensure all passengers on board understand where the life jackets are located and how to put them on and use them.

There's no excuse for not wearing a life jacket on the water. Boat dealers or marine stores are the best sources for guidance when selecting this most important piece of safety equipment.

Starting in 2020, the U.S. Coast Guard working in cooperation with Transport Canada started transitioning to new life jacket labeling based on a performance classification system acceptable in both countries. If you have older approved life jackets, devices are approved in one country or the other, but not both. U.S.-approved devices are still acceptable in the U.S., and Canadian-approved devices are still acceptable in Canada when used in accordance with the approval label.

Always check and read the manufacturer's information booklet and label provided with all new life jackets. They will provide valuable information, including size, type, intended use, approval, inspection, and care information. For more information, go to <http://wearitlifejacket.com/>.

Things to Know about Life Jackets:

- Life jackets are now classified as wearable or throwable on the label.
- We recommend that all boaters and passengers wear a life jacket at all times while boating.
- Certain life jackets are designed to keep the head above water and help you remain in a position that permits proper breathing.
- To meet USCG requirements, a boat must have an approved life jacket for each person aboard. Boats 16 feet (4.9 meters) and over must have at least one throwable device as well.



- All states have regulations regarding children wearing life jackets. Special life jackets for children are available and based on the weight of the child.
- Adult-sized life jackets will not work for children. To work correctly, a life jacket must be worn, fit snugly and not allow the child's chin or ears to slip through.
- Test life jackets for wear and buoyancy at least once each year. Discard waterlogged, faded, leaky or damaged jackets.
- Properly stow life jackets but make them easily accessible.
- A life jacket, especially a snug-fitting flotation coat or deck-suit style jacket, can help people survive in cold water.
- Various types of life jackets are also available for pets.
- A life jacket can save a boater's life, but only if the boater wears it. Set the example and wear it whenever near the water.

Life Jackets Must Be:

- New jackets must be USCG or Transport Canada approved
- In good and serviceable condition
- Appropriately sized for the intended user
- Appropriate for the water activity
- Snug-fitting
- The best life jacket is the one you will wear

Accessibility

- Throwable devices must be immediately available for use in emergency situations.
- Wearable life jackets must be readily accessible.
- Boaters must be able to locate and put them on in a reasonable amount of time in an emergency.
- They should not be stowed in plastic bags, in locked or closed compartments, or have other gear stowed on top of them.

Child Life Jacket Federal Requirements

No person may operate a recreational boat underway with any child under 13 years old aboard unless each such child is either: (1) Wearing an appropriate PFD approved by the Coast Guard; or (2) Below decks or in an enclosed cabin.

Some states require that children wear life jackets at all times; check with the state boating safety authorities.

Since children grow quickly, many boat launches now feature free use of children's life jackets in several different weight categories.



KCB-0130

Life Jacket Requirements for Certain Boating Activities Under State Laws

The USCG recommends, and many states require, wearing USCG-approved life jackets:

- For waterskiing and other towed/surf activities, use a life jacket designed for waterskiing. **It is illegal in many states to participate in towed water sports without a USCG-approved life jacket. Be aware that some specialized water sports vests are NOT USCG-approved and should be worn in addition to a USCG-approved life jacket.**
- While operating personal watercraft (PWC) use a life jacket marked for PWC or waterskiing use.



Check with the state boating safety authorities. Other rules may apply if boating in an area under the jurisdiction of the Army Corps of Engineers or a federal, state or local park authority. Special local rules are usually posted at the boat launch.

The new life jacket labels make it easier for the boat owner to choose the appropriate sizes and types of jackets for the boat. Labels may be in English, French Canadian or both languages depending on where they are marketed, but all will use icons for key performance indicators.

Size

Chest size is used on ADULT devices to further define the fit not used on all others. Weight is used to define the basic size groups of:

- INFANT <30 LBS
- CHILD 30-50 LBS
- YOUTH 50-90 LBS
- ADULT >90 LBS

Performance Level

The performance level indicates the amount of floatation provided. The higher the number, the more floatation at the increase in bulk.

- Lower numbers are more comfortable to wear and are a good choice for near-shore, calm water boating.
- Mid numbers offer more stability for people who do not swim and for novice swimmers and are a better choice for coastal boating.
- Higher numbers have the greatest floatation and are the best choice for remote areas where rescue times may be long, for non-swimmers, and for offshore use.

Turnability

Typically, jackets with low performance levels will not turn an unconscious person face-up. Jackets with mid performance levels may not turn an unconscious person face-up. Jackets with high performance levels will turn an unconscious person face-up.

Warnings

Some life jackets are not approved for waterskiing, tubing, wakeboarding, white-water paddling, or use on a personal watercraft.

Find More Information

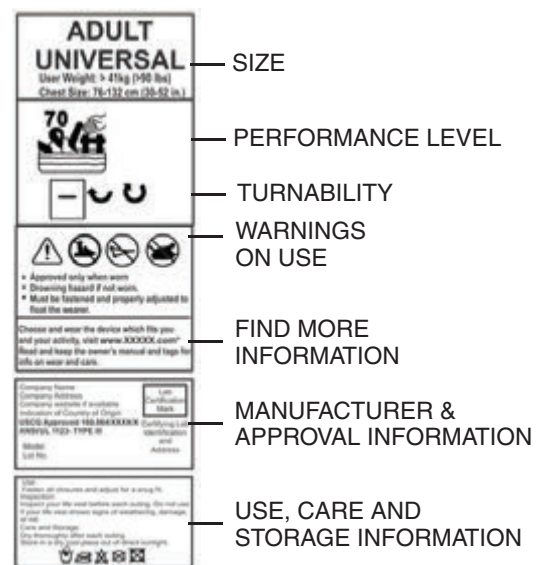
Additional information on the life jacket in the owner's manual and web sources.

Manufacturer and Approval Information

Manufacturer's information for possible future recalls. USCG approval number and certification agency to assure the jacket meets the law and is safe to use.

Use, Care and Storage Information

A summary of the use, care and storage information contained in the owner's manual.



KCB-0129

Figure 2-1: Typical Life Jacket Label



Inflatable Life Jackets

U.S. Coast Guard-approved inflatable life jackets are authorized for use by persons 16 years of age and older (check the label).

- They require regular maintenance. Also, pay attention to the condition of the inflator.
- They must have a full cylinder and all status indicators on the inflator must be green. If all status indicators are not green, the device is not serviceable and does not satisfy the legal requirements for the wearable life jacket carriage requirement.
- They must be worn at all times.

Navigation Lights

All power boats underway between sunset and sunrise must display proper navigation lights. All boats at anchor must display a proper anchor light. The anchor light must be visible 360 degrees. Your Formula boat is equipped with international navigation lights.

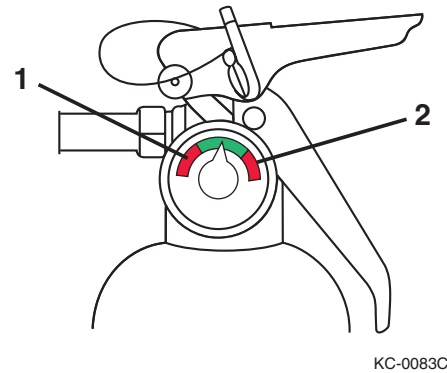
Horn or Whistle

All boats over 4.8 meters (16 feet) in length must be equipped with an operable horn or whistle, audible from one mile. Your Formula boat is equipped with a USCG approved horn.

Fire Extinguisher

Your Formula boat is equipped with three portable and a fixed marine type ABC (trash, paper, liquids, electrical equipment) multi-purpose fire extinguisher. The fire extinguisher is located in an accessible location. Always keep it in operable condition. Your Formula boat is equipped with three portable and a fixed system fire extinguisher. All passengers should know the location and operating procedure of each extinguisher.

Disposable (non-rechargeable) fire extinguishers with a date of manufacture stamped on the bottle older than 12 years must be removed from service and no longer count towards the minimum carriage requirements.



1. Recharge
2. Overcharged

Figure 2-2: Portable Fire Extinguisher

Check the pressure gauge regularly for proper pressure; have the extinguisher filled if necessary.

A fixed automatic fire extinguisher is mounted on the equipment room bulkhead. The extinguisher is activated when the heat sensitive head reaches a predetermined temperature. The extinguisher discharges and saturates the equipment room, smothering the fire. See Section 5 for more information.

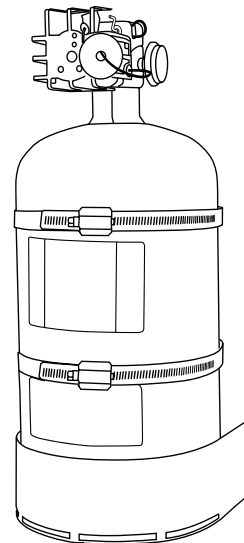


Figure 2-3: Fixed Automatic Fire Extinguisher



Visual Distress Signals

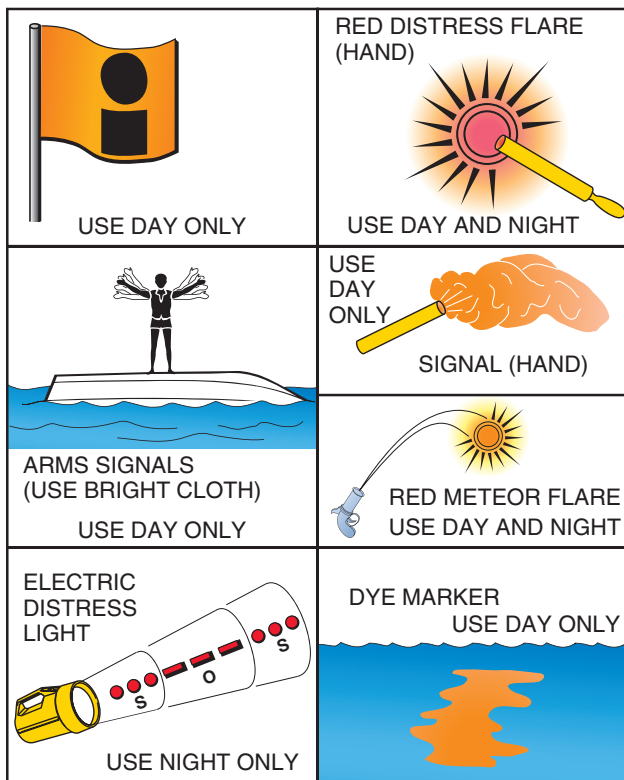
All boats over 16 feet (4.8 meters) must have onboard day and night visual distress signals when operating on coastal waters, the Great Lakes, territorial seas or those waters directly connected to them, up to a point where the body of water is less than two miles wide. Carry several types of signaling devices to handle a variety of conditions. Your Formula dealer can help you select appropriate visual distress signals for your area.

If you are required to carry distress signals, you must have three USCG approved pyrotechnic devices. Be sure they are in serviceable condition, not exceeding the expiration date and stored in a cool, dry location in a waterproof container. Have enough signals on board to last three days.



WARNING

Pyrotechnic signaling devices can cause injury and property damage if improperly handled. Follow the manufacturer's directions.



KC-0082C

Figure 2-4: Visual Distress Signals

Regulations prohibit using pyrotechnic VDS or any VDS in non-emergency situations.

VDS must be:

- USCG-approved
- In proper operating condition
- Safely stowed and readily available
- Within the clearly marked expiration date stamp on the device (where applicable)

Types of VDS vary by emergency situation. VDS are classified as either pyrotechnic or non-pyrotechnic.

NOTE — Some pyrotechnics may be restricted on certain bodies of water. Check with local authorities, or visit the National Association of State Boating Law Administrators (NASBLA) website: <http://www.nasbla.org> or the U.S. Coast Guard website: <http://www.uscg.mil> for additional information.

See the *U.S. Coast Guard Minimum Onboard Personal Safety Equipment Required* section of this manual for specific onboard requirements.

Advancements in technology have led to a number of electronic VDS devices (eVDSD). These devices are battery-powered and contain one or more LED lights and possibly other features. While eVDSDs are not “USCG Approved,” they are accepted as “equivalent” if compliant with RTCM Standard 13200.0 for nighttime use. Several can be equipped with a VDS flag for day/night use and/or a whistle for audible signaling. Talk to your boat dealer about the best device for your use.

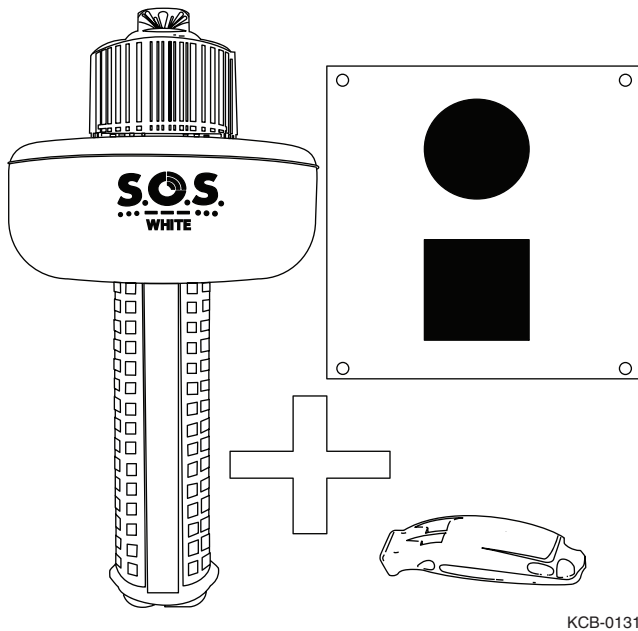


Figure 2-5: Electronic VDS Devices (eVDSD)

Ensure all passengers on board understand how to operate all VDS. Keep VDS in a readily accessible area and within immediate reach at all times when boating.

Recommended Equipment

In spite of all efforts to the contrary, problems or mishaps sometime occur while boating. Stock these items listed below on your boat to help make unexpected events more manageable.

- Cell phone with waterproof case
- Mobile device power pack (battery)
- Solar USB charger
- FLIR night vision
- Handheld waterproof GPS
- Handheld waterproof VHF radio
- Handheld waterproof compass
- Handheld waterproof two-way radios
- Ditch kit
- Dry bag

- Survival suit
- Foul weather gear and thermal clothing
- Throw raft with oars
- Spare keys/FOBs
- First aid kit and manual
- Emergency food and water
- Ring buoy
- Spare anchor and 150 feet (46 m) of 5/8" anchor line
- Sea anchor
- Heaving, mooring and towing lines
- Fenders and boat hook
- Waterproof flashlight, radio and spare batteries
- Mirror, whistle and strobe light
- EPIRB (Emergency Position Indicating Radio Beacon)
- Radar reflectors
- Sunscreen, insect repellent and sunglasses
- Navigational charts
- Binoculars
- Tool kit including propeller replacement tools
- Spare propellers and hardware, one each RH and LH rotation
- Spare parts: pumps, belts, filters
- Bung plug
- Duct and electrical tape
- Engine oil
- Extra transom plugs
- Selection of fuses

Sea Anchors

You should have a separate sea anchor onboard to slow drifting. In heavy seas, a sea anchor is set from the bow to control the boat's behavior. The sea anchor holds the bow to the sea and a slow drift. Please consult your Formula dealer for sea anchor recommendations.



Life Raft

If operating offshore, you should consider carrying an inflatable life raft. A USCG approved life raft meets a number of stringent specifications. The life raft must be large enough to hold all the boat's occupants and have its own equipment pack including a paddle.

Emergency Considerations

Be prepared to deal with emergencies before they happen. Try to formulate a plan for each type in advance so that decisions can be made quickly and without hesitation. Precious moments lost can mean the difference between losing and saving a life.

Fire/Explosion

You must be prepared and act quickly when dealing with a fire. It is not recommended to battle a fire for an extended period of time. Turn engines off and abandon the boat if the fire cannot be extinguished quickly. Swim at least 25 yards (23 meters) upwind from the boat and use the visual distress signals to get assistance.

WARNING

Gasoline will float on top of water and can burn. If the boat is abandoned, swim up wind, far enough to avoid fuel that may spread over the surface of the water.

Onboard fires involving the fuel system usually result in either an explosion that completely destroys the boat, or the boat burning to the waterline and self-extinguishing. Deciding on abandoning the boat or staying to fight the fire is difficult and depends on many factors. Try to formulate a fire plan in advance to make that decision quickly and without hesitation.

Be sure to:

- Use caution and do not smoke when refueling.
- Verify that fuel does not leak.
- Use only marine approved equipment on your boat.

Flooding/Swamping

Improper loading, handling, water conditions, weather and anchoring are the most common causes of flooding. Insist on a safe, stable load. Do not operate the boat exceeding your ability to maneuver it. Use extreme caution in hazardous weather and rough water conditions. Anchor from the bow when using one anchor.

Collisions/Leaks

If a collision occurs, immediately account for all passengers. Assess the hull for damage and activate the bilge pumps to reduce any water intake. Try to operate the boat to keep the damaged area above water. If necessary, call or signal for assistance.

If a leak is discovered, immediately determine the cause. A collision with an underwater object could cause the hull to develop a leak. A loose fitting or hose clamp on a piece of equipment could cause a leak. Try to repair the leak if possible. If a leak is threatening the safety of you and your passengers, call or signal for assistance.

Grounding

In the event you run aground, assess the situation before proceeding. Immediately stop any water from entering the boat. Inspect the propulsion units, steering and control systems, and the hull for damage. Maneuver the boat to safe water only if the hull and all operating systems are in satisfactory operating condition. Otherwise, call or signal for assistance.

Water Rescue (Man Overboard)

Immediately react to a person who has fallen overboard. Keep the victim constantly in your sight. Safely return to the victim as soon as possible. Throw the person a life preserver. Turn off the engines and help the person into the boat.



Medical Emergency

Be prepared in the event of an emergency. Know how to use your first aid kit. Be aware of any special medical conditions of your passengers.

Drowning

React to a drowning victim the same as described in Water Rescue. Handle the victim with care. They could be injured. If necessary, resuscitate the victim. Immediately signal for help and keep the victim warm.

Operation Failure

If you experience a propulsion, steering or control failure, immediately turn off the engines. Set the anchor if possible or release a sea anchor to prevent drifting. Try to determine the failure and repair, if possible. Otherwise, call or signal for assistance.

Hazardous Conditions

Every waterway poses hazards that you should avoid, such as shallow water, tree stumps and sand bars. Ask local boaters for information and consult a marine chart when boating on unfamiliar waters. As the operator of the boat, you should try to avoid all hazards, known and unknown. The following information does not contain all possible water hazards.

Operating in shallow water presents a number of hazards. Mud, sand, weeds and debris can foul a propulsion unit propeller or its cooling water. If a propulsion unit strikes an underwater object, check the propulsion unit and boat for damage. If a vibration is noticed after striking an object, it may indicate a damaged propeller.

Sand bars in narrow inlets are constantly shifting, making it difficult to mark them with buoys. Tides in coastal areas affect water levels producing sand bars. Sometimes sand bars are indicated by waves as they form into breakers when passing over the sand bar. Refer to Grounding, in this section, if you run aground on a sand bar.

The water level around a dam spillway is a hazardous area. It is subject to rapid changes caused by currents and turbulence. Keep clear of the spillway areas below dams.

Visibility

WARNING

Clear visibility must be maintained at all times. If necessary, arrange passengers and equipment for maximum visibility. Designate a passenger to assist when visibility is limited due to operating conditions.

Visibility is not only sight, but also hearing. It is very important the operator maintains good visibility at all times. Arrange passengers and equipment to ensure you have unobstructed vision at all times. Check for other boats or any obstacles before turning the boat.

Drugs/Alcohol

WARNING

Federal and state law prohibit operating a boat under the influence of alcohol and other drugs. These regulations are actively enforced. Impaired operation may result in severe personal injury or death.

Mixing boating with the use of alcohol and other drugs results in many marine accidents and deaths each year. These substances reduce your reaction time and affect your better judgement. Combined with the sun, wind, waves, and noise of other watercraft, the effects of drugs are increased and will significantly reduce your reaction time. As the owner/operator, you are responsible for the alcohol/drug use and onboard behavior of your passengers.



Figure 2-6: No Alcohol or Other Drugs



NOTICE

If the operator's blood alcohol content is 0.10% (0.08% in some states) or above, violators are subject to a civil penalty up to \$1,000.00 or criminal penalty up to \$5,000.00, one year imprisonment or both. Operating a boat under the influence can also result in a loss of automobile driving privileges.

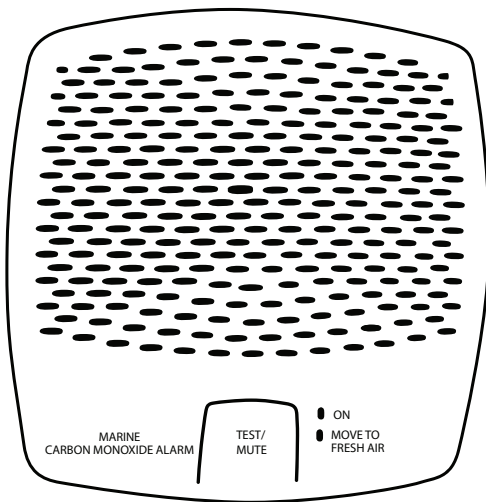
Carbon Monoxide



Figure 2-7: Carbon Monoxide Safety Symbol

WARNING

Test the carbon monoxide detectors operation before each trip, at least once a week and after the boat has been in storage. Do not tamper with the operation of the carbon monoxide detectors. They are installed for your safety.



KC-0387-A

Figure 2-8: Carbon Monoxide Detector

Your Formula boat is equipped with two carbon monoxide (CO) detectors in the cabin (one per sleeping area).

NOTE: A carbon monoxide (CO) detector will only detect the presence of carbon monoxide gas at its sensor. Carbon monoxide may be present in other areas.

NOTICE

A carbon monoxide detector will not detect other vapors such as gasoline.

Carbon Monoxide (CO) is a colorless and odorless gas produced by all engines and fuel burning appliances such as heaters, stoves and generators. Even with the best boat design and construction, plus the utmost care in inspection, operation, and maintenance, hazardous levels of CO may still be present in accommodation spaces under certain conditions. Dizziness, ears ringing, headaches, nausea, unconsciousness and cherry red skin color are symptoms of carbon monoxide poison.

To reduce CO accumulation:

- Ventilate the boat interior by opening the deck hatches, windows and cabin door to provide adequate ventilation.
- Do not operate the engines or generator with the canvas installed.
- Only operate fuel burning appliances in well-ventilated areas.
- Avoid idling or using the generator while at idle for extended periods.
- Regularly inspect the engine and generator exhaust system for proper operation.
- Do not use any fuel burning appliances with a transom exhaust port when swimming from the stern swim platform.

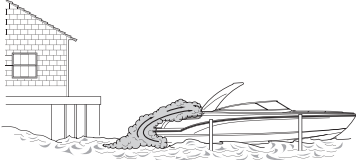
Have a suspected CO victim deeply breathe fresh air and immediately seek medical attention.



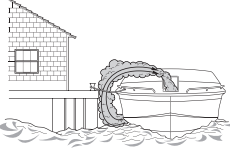
DANGER

EXTREME HAZARD – Carbon monoxide gas (CO) is colorless, odorless and extremely dangerous. All engines and fuel burning appliances produce CO as exhaust. Direct and prolonged exposure to CO will cause **BRAIN DAMAGE** or **DEATH**. Signs of exposure to CO include nausea, dizziness and drowsiness. Sources of CO include:


❶ Blockage of boat exhausts by obstruction.




❷ Exhaust traveling along obstruction.




❸ Operating at slow speed or while dead in the water.




❹ Operating with high bow angle.



❺ Exhausts from other vessels in confined areas.



❻ Operating with canvas tops and side curtains in place without ventilation.



ENSURE ADEQUATE VENTILATION FOR CORRECT AIR MOVEMENT THROUGH BOAT!

FOR355

Figure 2-9: Carbon Monoxide



Fume Alarm

Your Formula boat is equipped with a fume detector that provides an audible and visual alarm whenever explosive gases are detected in the bilge area.



Figure 2-10: Fume Detector

In the event the detector goes into the alarm mode, immediately operate the equipment room blowers and inspect for the source of fumes.

For testing procedure and additional information, refer to the fume detector instructions in your Owner Information Binder.

Operating By Minors

Minors must be supervised by an adult whenever operating a boat. Many states have laws regarding the minimum age and licensing requirements of minors. Be sure to contact the state boating authorities for information.

Communication

Radio communication is the most important avenue of receiving weather reports and Coast Guard warnings, and for transmitting information such as a request for assistance. Use a VHF/FM radio for short-range communication, and a single-sideband radio (SSB) for long-range.

VHF (Ship to Shore) Radio

The VHF radio is used to communicate with others, on and off the water. VHF channel 16 (156.8 MHz) is designated as the calling and distress channel and is used to summon rescue services such as the USCG, and, communicating with the harbor, the marina, bridges, locks and other boaters in the area. In emergency situations, when lives are in danger, use the VHF radio channel 16 (or 2182 kHz SSB); cell phones should only be used as a secondary means of communication. There are three emergency procedure words:

MAYDAY radio call – A Mayday call is reserved for life-threatening situations such as fire, severe weather or sinking where lives are in imminent danger or the vessel is in danger of sinking. Start the broadcast clearly and calmly with **“Mayday – Mayday – Mayday.”**

PAN - PAN radio call – A Pan - Pan call is used for urgent but non-life-threatening situations where there is no immediate danger to lives or the vessel such as a loss of steering control. Start the broadcast clearly and calmly with **“Pan – Pan – Pan.”**

Navigational Safety and Weather Warning call – A Security call is used for non-life-threatening situations to notify authorities and others in the vicinity of important navigation and weather alerts. Start the broadcast clearly and calmly with **“Security – Security – Security.”**

In an emergency situation there are two important pieces of information that the responder needs to know:

- The exact nature of the emergency and an assessment of the severity



- Your location (nav marker, visual reference or GPS coordinates in open water)
- What your vessel looks like (hull and top colors, unique features, flags, etc.)

The responder may then ask you for other information to help you. It is important to remain calm, speak slowly and be succinct. Short and concise communications are best – no matter what the situation is.

Since VHF radios have limited distance line-of-sight (to the horizon) capabilities, it is important for all boaters receiving the distress call to attempt to render assistance until the rescue authorities arrive. The very nature of open water escalates the importance of any distress call. Boaters should always monitor channel 16 but never use it for casual communications. Assist others in distress if possible or monitor the situation until help has arrived.

In other communications, call the other party on channel 16 using your call-sign. Bridges and Locks will instruct you on what to do. Harbors, marinas, and other boaters in the area will inform you of what channel to switch to.

Be sure to read the VHF manufacturer's information on the special features and use of the radio.

Cell Phones

In an emergency situation, cell phones should only be used as a backup to the VHF radio since the U.S. Coast Guard and other boating authorities constantly monitor Channel 16.

Since cell phone service and technology constantly evolves, seek the latest information from service providers in your boating area before purchasing service.

Emergency Position Indicating Radio Beacon (EPIRB)

Every boat that goes offshore beyond the 20 mile VHF radio range should carry a satellite EPIRB.

The latest satellite EPIRBs are known as 406 EPIRB. The operating frequency is 406.0 MHz. This is a dedicated frequency free from interference from other communications. When activated, the satellite 406 EPIRB transmits a unique registration number for identification. The system detects a signal, checks the registration number against a database (boat and owner information), calculates an accurate distress position and quickly alerts rescue personnel.

Warning Label Location

Your boat has various safety labels at the time of manufacture. These labels appear at specific locations on the craft where safety is of particular concern.

Safety labels must remain legible. If you suspect a label is missing or becomes damaged, please contact your Formula dealer for immediate replacement.

NOTICE

Included in your Owner Information Binder is a label regarding the discharge of overboard trash. Thunderbird Products does not affix this label to the boat. It is the owner's/operator's responsibility to read, understand, and comply with the label's requirements.

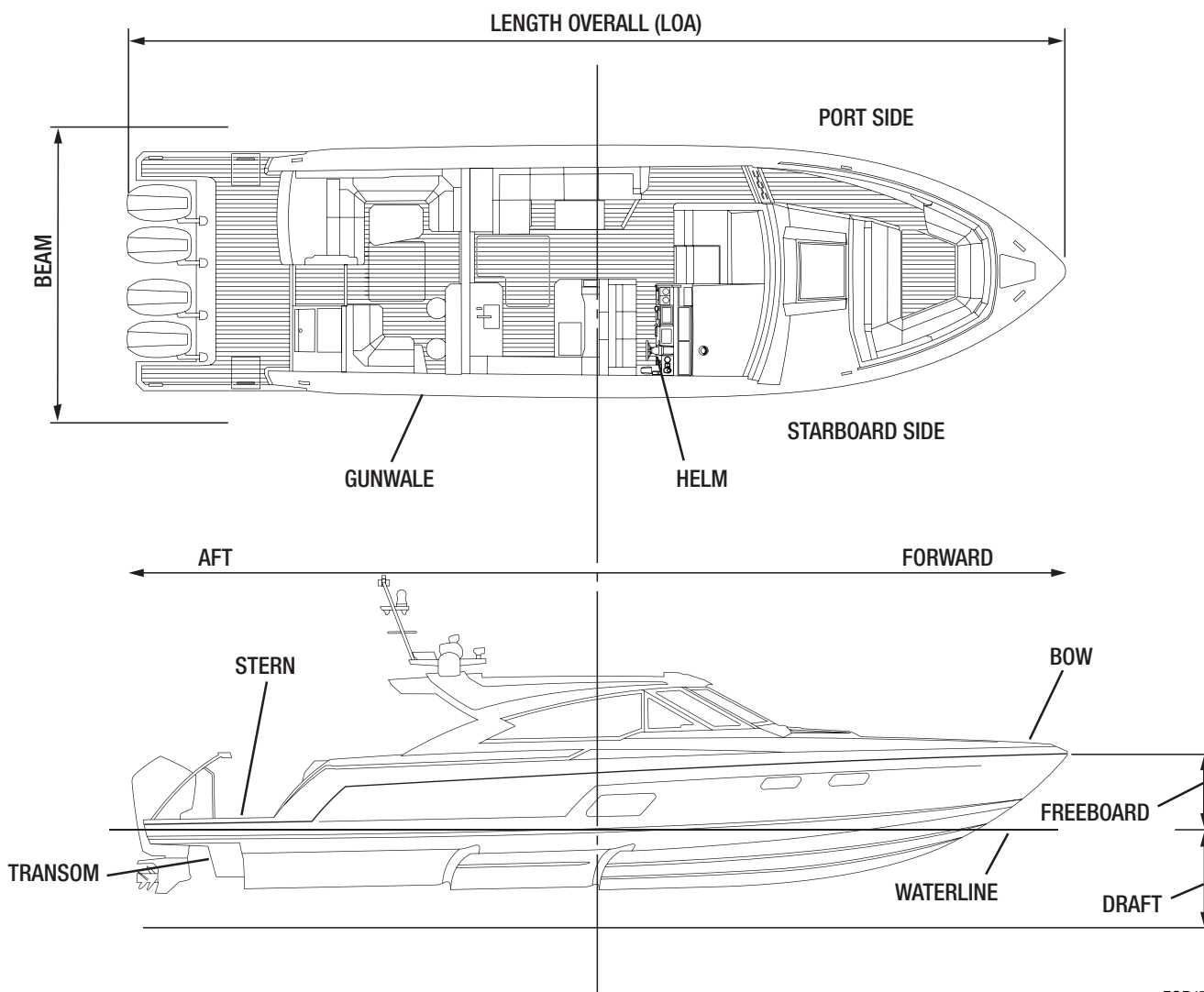
[illegible]

Figure 2-11: Typical Warning Label Location



3 Specifications and Layout

Boating Terminology

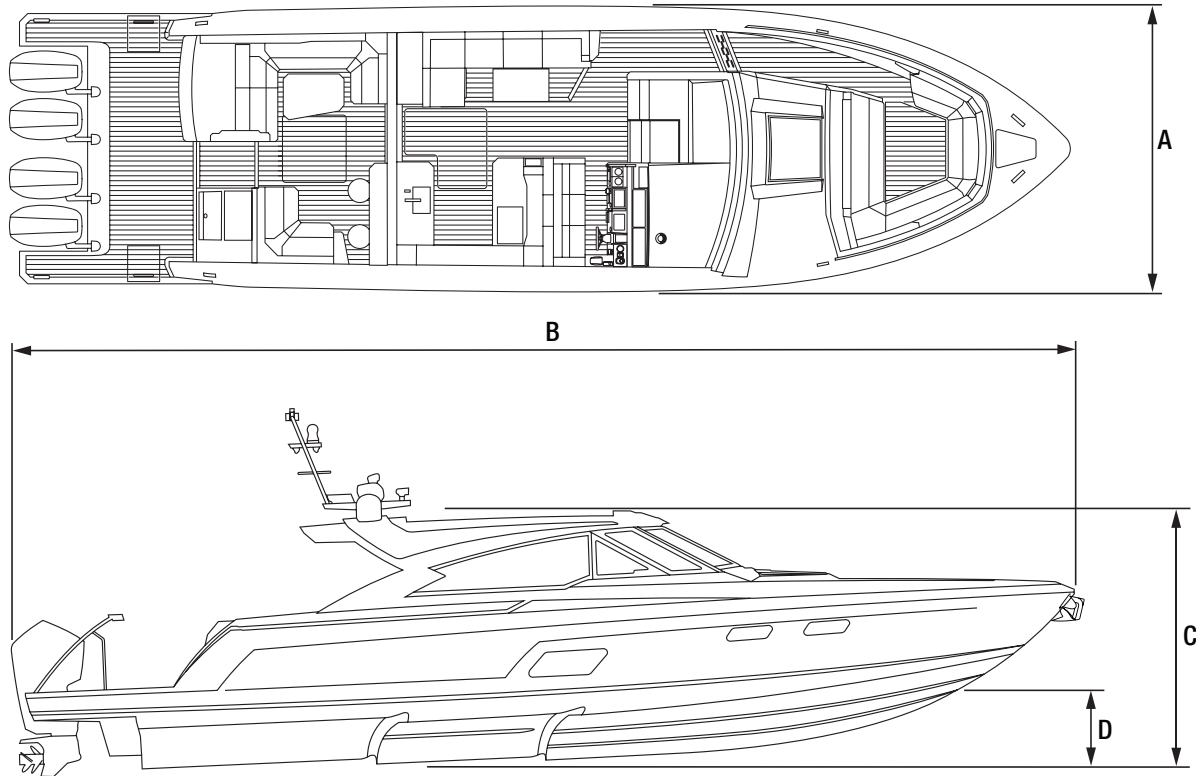


FOR479

* An easy way to remember PORT side from STARBOARD side is “PORT” and “LEFT” both have four letters.



Dimensions



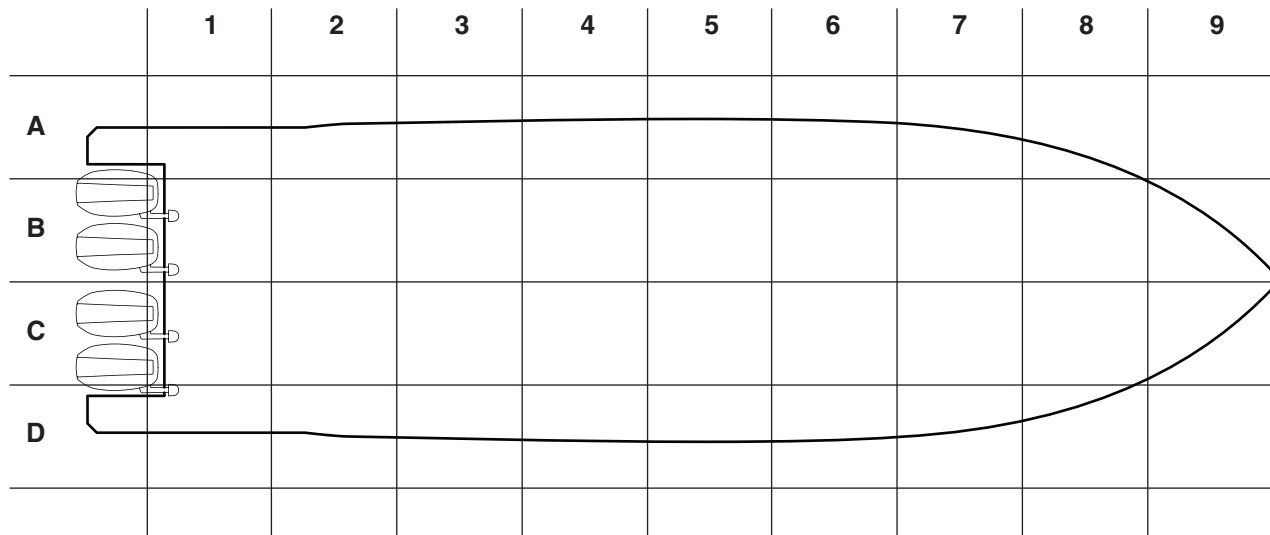
FOR499

500 Super Sport Crossover Specifications

Maximum Beam (A)	14'6" (4.42 m)
Length Overall (LOA) (B)	53'4" (16.26 m)
Length Overall OB/Trailered	53'10"/56'3" (16.41/17.15 m)
Bridge Clearance w/radar, mast light down (C)	12'0" (3.66 m)
Bridge Clearance w/mast light up (C)	19'10" (6.05 m)
Draft (D)	51" (1.3 m)
Dead Rise	19 degrees
Approximate Weight	43,400 lb (19,686 kg)
Cabin Headroom	6'7" (2.01 m)
Capacities:	
Fuel Tank	650 gal (2,460 L)
Diesel Fuel Tank (Generator)	50 gal (189 L)
Water Tank	100 gal (380 L)
Holding Tank	60 gal (227 L)



500 Super Sport Crossover Equipment Location



FOR480

Item	Location	Remarks
12 Volt Charging Outlets	A1&C5	Aft Port Trunk & STBD dash under glove box
Air Conditioning Water Circ. Pump/Bleeder Valve-helm	B2	Equipment room PORT side under hinge floor
Air Conditioning Water Circ. Pump/Bleeder Valve-salon	C2	Equipment room STBD side under hinge floor
Air Conditioning Water Circ. Pump/Bleeder Valve-cabin	B3	Equipment room PORT side FWD
Air Conditioning Compressor/Condenser Unit-cabin	B5	Aft cabin, FWD bedroom wall
Air Conditioning Compressor/Condenser Unit-cockpit	C5	Under helm seat
Air Conditioning Compressor/Condenser Unit-lounge	B4	PORT side lounge, below FWD seat
Air Conditioning Control Helm	A6/B6	PORT bow walk-thru
Air Conditioning Control Cabin	B6	Mid galley FWD
Air Conditioning Control Cockpit Salon	A6	PORT outer walkway
Automatic Fire Extinguisher	B3	Equipment room center PORT side
Automatic Fire Extinguisher Manual Trigger	A5	Bow walkway, port aft storage cabinet
Battery - Auxiliary	A2	Equipment room, outboard PORT shelf
Battery - Generator	C4	Equipment room, STBD side below fuel tank
Battery - Port Inboard/Outboard Start	A1/B1	Equipment room AFT PORT
Battery - Starboard Inboard/Outboard Start	C1/D1	Equipment room AFT STBD
Battery Charger	B3	Equipment room PORT AFT FWD wall

**500 Super Sport Crossover Equipment Location - continued**

Item	Location	Remarks
Battery Isolator	B1/C1	Transom wall, PORT wall
Battery ON/OFF Switch	C2	STBD utility locker, swim platform
Battery Parallel Switch	C2	STBD utility locker, swim platform
Bilge Pump Aft	B2/C2	Equipment room, in front of gyro, transom wall
Bilge Pump FWD	B5	Aft cabin, below bed
Black Water Holding Tank	C2	Equipment room, aft of STBD fuel tank
Black Water Holding Tank Vent Filter	C2	Equipment room, aft of STBD fuel tank
Carbon Monoxide Detector Aft	C5	Aft cabin bedroom, fwd STBD wall
Carbon Monoxide Detector Fwd	C6	Cabin, STBD upper Galley cabinet
Cordless Upright Vacuum	B5	Cabin, under entry stairs
Circuit Breaker Panel-Helm	D5	Helm, lower outboard wall
Circuit Breaker Panel-Aft	B3	Equipment room, PORT aft forward wall
Circuit Breaker- Auxiliary Power	A2	Equipment room, PORT wall
Circuit Breaker- Shore Power	B6	Below AC/DC panel
Circuit Breaker- Electric Windlass	A3	Equipment room PORT wall
Depth Finder Transducer	B5	Aft cabin under bed
Drive Unit Trim Pump- PORT	A1	Equipment room, aft PORT floor
Drive Unit Trim Pump- STBD	D1	Equipment room, aft STBD floor
Electric Control Panel, Main AC	B6	Mid cabin, lower cabinet
Electric Control Panel, Main DC	B6	Mid cabin, lower cabinet
Electronic latches switch - Cockpit	C4	Aft cockpit galley wall
Electronic latches switch - Cabin	B5	Cabin entry wall
Emergency Shutdown Switch *	B2	STBD upper utility locker, swim platform
Equipment Room Blowers	B3	Equipment room, PORT aft forward wall
Equipment Room Hatch Handle (Manual)	C2	STBD utility locker, swim platform
Engine Flush Remote Connections	C2	STBD utility locker, swim platform
Fire Extinguisher-Cabin	B6	PORT under seat storage
Fire Extinguisher-Cockpit	C2	STBD utility locker, swim platform
Fire Extinguisher-Cockpit Salon	C4	Cockpit Salon under sink
Fresh Water Dockside Hookup	C2	STBD utility locker, swim platform
Fresh Water Tank Level Indicator	C4	Cockpit galley under sink storage
Fresh Water System Circulating Pump	C3	Equipment room under starboard fuel tank
Fresh Water System Holding Tank	B4/C4	Equipment room forward center below generator
Fuel Tank Fill-PORT	A1	Aft PORT deck corner
Fuel Tank Fill-STBD	D1	Aft STBD deck corner
Fuel Tank Vent Carbon Canister (Filter)	B3 & C3	Equipment room, above PORT and STBD fuel tanks
Fuse-Auxiliary Power	A2	Equipment room, PORT wall



500 Super Sport Crossover Equipment Location - continued

Item	Location	Remarks
Galvanic Isolator	B6	Below cabin galley sink, behind drawer
Generator	B5/C5	Equipment room forward center
Generator Fuel Fill (Diesel)	A1	Aft PORT deck corner
Generator Service Hatch Access Latch	B4/C4	STBD Salon galley walkway, below galley cabinetry
Gray Water Holding Tank*	C3	Gray water plumbed to black water holding tank
Gray Water Sump Tank	B6/C6	Mid cabin floor
Gray Water Sump Pump	C3	Below STBD fuel tank
Horn Air Compressor	D3	STBD side wall below hard-top leg
Hull Identification Number	D1	Aft STBD corner below rubrail
Icemaker Reservoir	A4	Port Salon lounge mid seat storage
Raw Water Wash Down Pump	B1	Center transom brace
Remote Joystick *	D2	STBD upper utility locker, swim platform
Safe*	C7	Mid cabin, STBD seat backrest
Sea Chest Water Reservoir	B3/C3	Equipment room, aft center
Seacock- Air Conditioning Intake	B2/C2	FWD of seachest
Seacock- Generator Intake	B2/C2	FWD of seachest
Seacock- Gyro Stabilizer	B2/C2	Front of seachest
Seacock - Macerator Discharge*	C3	Equipment room, STBD side aft of black water tank
Seacock- Raw Water Intake	C1	Equipment room, transom lower wall port of support
Service Hatch Access Latch	D2	STBD utility locker, swim platform
Shore Power Inlet	D2	STBD utility locker, swim platform
Spotlight Control	C5	Helm
Stereo Amplifier	C5	STBD Aft cabin, behind lounge seat backrest
Stereo Auxiliary Input	C5	STBD dash under glove box
Stereo Control-Transom	C2	Side of STBD utility locker walkway
Stereo Control-Cabin	B5	FWD upper galley
Stereo Control-Helm	C5	Helm
Stereo Control-Bow	A7	PORT walk-thru wall
Stereo Receiver/Tuner	C5	Helm
Stereo USB Input	C5	STBD dash under glove box
Strainer- Air Conditioning Intake	B3/C3	Inside sea chest
Strainer- Generator Intake	B3/C3	Inside sea chest
Strainer- Gyro Stabilizer *	B3/C3	Inside sea chest
Strainer- Raw Water Intake	B3/C3	Inside sea chest
Transom Shower	C3	Side of STBD utility locker walkway
Trim Tab Pump STBD	C1	Equipment room, STBD floor
Trim Tab Pump PORT	A1	Equipment room, PORT wall



500 Super Sport Crossover Equipment Location - continued

Item	Location	Remarks
TV Antenna Amplifier	C4	Below salon galley sink
TV Antenna/Cable Switch	C4	Below salon galley sink
TV Dockside Inlet	D2	STBD utility locker, swim platform
USB Charging Outlets		Various locations throughout the boat
Waste System, Toilet Electric Flush Control	C6	Head unit
Waste Tank Discharge Control Panel	C6	Head unit
Waste Tank Discharge/Pumpout Deck Plate	D1	STBD ladder
Waste Tank Discharge/Macerator Pump*	C3	Equipment room, STBD side aft of black water tank
Waste Tank Level Indicator	C6	Head unit
Waste Vacuum Generator	C3	Equipment room, STBD side, aft of black water tank
Water Heater	B2	Equipment room, aft PORT
Wiper Access	C6	Head ceiling panel

* Optional



4 Controls and Indicators

Knowing the controls and indicators on your boat is essential for safe and proper operation.

Display Panels

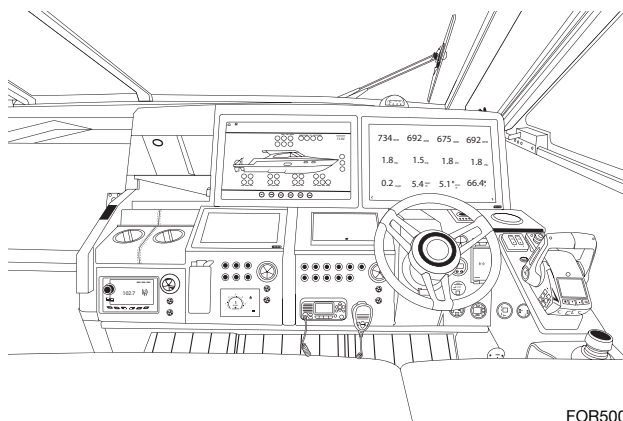


Figure 4-1: Display Panel

Your boat may be equipped with multiple display panels that allow greater flexibility when using such functions as the chartplotter, sonar, radar, engine data, digital switching, etc. Panels are available in different sizes and can be dedicated to a single function, side-by-side or four-quadrant display of information at the same time.

Operation of the displays can vary by type, brand and installed options; be sure to read the display operation information and control-specific owner's manuals in the Skipper's Kit for proper use.



Figure 4-2: MerCruiser® VesselView®

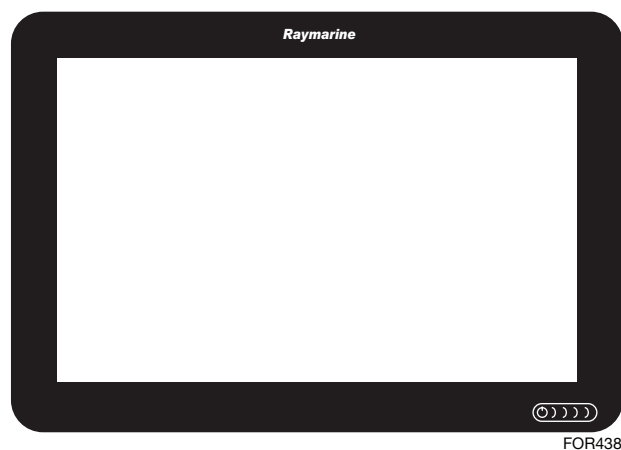


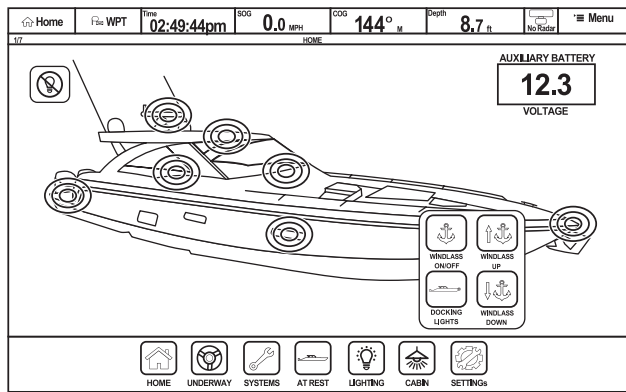
Figure 4-3: Raymarine Multifunction Display



CONTROLS AND INDICATORS

Digital Switching

Digital switching allows you to control onboard electrical and electronic systems such as lighting, air conditioning, wiper, horn, windlass, sunroof and much more from network-connected, multi-function displays and tablet. Select the designated area on the screen, and then select the function you would like to enable. Digital switching can be brought up on any display panel and can also be brought up on an iPad.

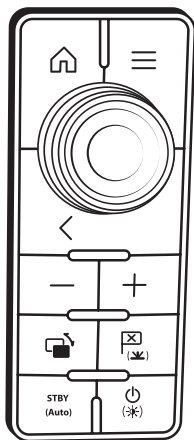


FOR406

Figure 4-4: Raymarine

Raymarine Remote Keypad

Raymarine Remote Keypad provides full control of your Raymarine multi-function display with dedicated keys for home, menu, zoom in/out, window control, waypoint management, power/brightness, and autopilot control.

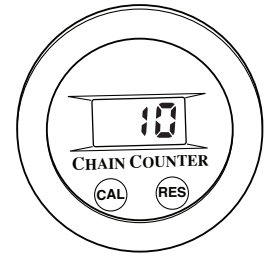


FOR501

Figure 4-5: Raymarine Remote Keypad

Windlass Chain Counter

Displays the length of deployed anchor rode.



FOR305

Figure 4-6: Windlass Chain Counter

Switches

Pushbutton-type switches are used in your Formula boat to activate an electrical circuit. Push the switch to activate the circuit. The switch will remain ON and a light will illuminate the switch. Push the switch again to turn it OFF.

NOTICE

Some accessory switches (windlass, horn) are MOMENTARY switches. These switches must be held in place to operate the accessory. The switch returns to the OFF position when it is released.



CONTROLS AND INDICATORS

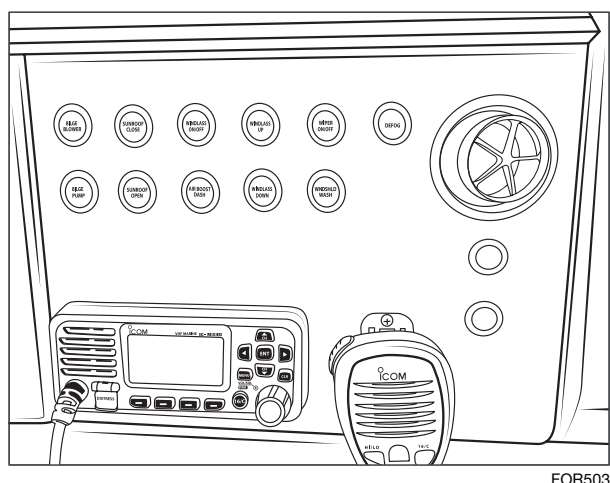
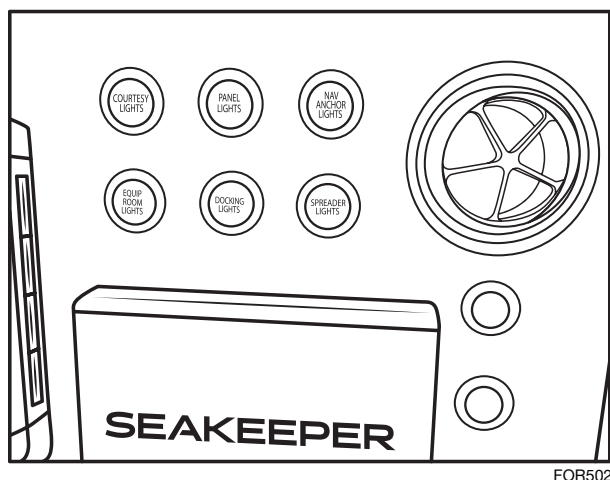


Figure 4-7: Accessory Switches

Blower Switch

Activates the equipment room ventilation blower to remove explosive fumes from the area.

The blower must be operated for a minimum of four minutes before starting the engines or generator. In addition, the blower should be operated continuously when at idle or running at slow speeds.



WARNING

Failure to operate the blower can lead to conditions favorable for an explosion which can cause severe personal injury or death.

Bilge Pump Switch

Manually controls the operation of the bilge pump.

Nav/Anchor Light Switch

This push-button switch activates the navigational (running) lights and anchor light. Depress the button once to activate the underway navigational lights. Depress the button a second time to deactivate the navigational lights and activate the anchor light only. Depress the button a third time to deactivate all lights.

NOTICE

Operate the boat between sunset and sunrise using your navigational lights. Navigational lights are legally required to indicate direction and right-of-way at night.

Cockpit Courtesy Light Switch

Operates the courtesy lighting. Push the switch to cycle through interior/swim platform and hardtop lighting.

Remote Courtesy Lights—Using the remote switching mechanism, platform, interior and bilge lighting can be operated from a distance of 300’.

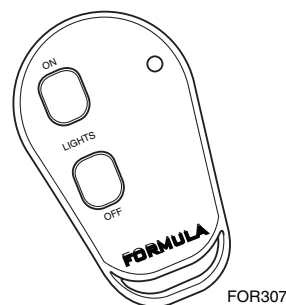


Figure 4-8: Handheld Remote Switches



CONTROLS AND INDICATORS

Panel Light Switch

Illuminates the instrument panel when in the ON position.

Docking Lights Switch

Operates the docking lights. Docking lights are to be used for docking only. It is illegal to use your docking lights while cruising.

Wiper Switch

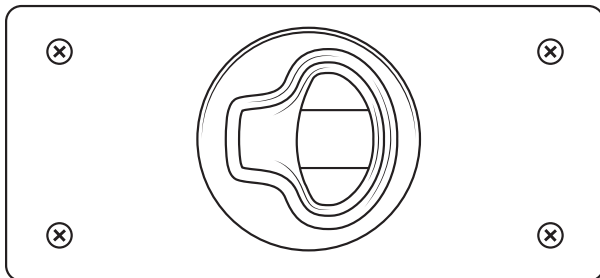
Activates the windshield wiper.

Horn

A push-button switch activates the horn.

Service Hatch Latch

Releases the equipment room hatch. The hatch will open assisted by gas lift struts. The latch lever for the equipment room service hatch is located in the utility locker that is on the starboard side of the swim platform. The generator service hatch latch is located at the starboard salon walkway below the cabinetry.



FOR516

Sun Roof Open/Close Switches

Operates the motorized coupe-top sun roof. Push the respective button to open or close the roof.

Air Boost (Dash)

This activates the dashboard fan.

Spreader Lights

These operate the flagstaff spreader lights.

Underwater Lights Switch

This operates the transom-mounted underwater lights.

Equipment Room Lights

This activates the bilge room lights.

Windlass On/Off Switch

Windlass operation is controlled by a pushbutton switch located on the dash. Power is supplied to the dash switch via the windlass breaker located on the dash circuit breaker panel.

Windlass Up/Down Switches

Raises and lowers the windlass. The safety pin must be removed from the lock bracket before operating the windlass. Install the safety pin when the system is not in use. For additional Windlass system information, refer to **Anchoring and Sea Anchors**, in **Section 7**.

WARNING

The safety pin must be installed in the lock bracket when the windlass is not in use. Do not operate your Formula boat without the safety pin installed.



TV Lift Switch

This switch, located in the galley cabinet, raises and lowers the salon TV. The TV can also be raised and lowered using the remote control.

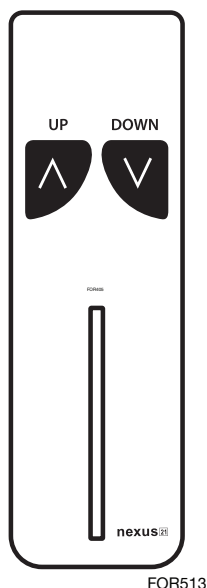
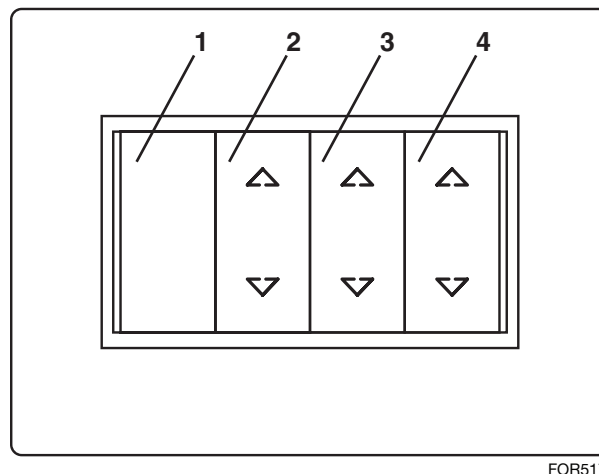


Figure 4-9: Remote

Salon Switches

These switches control the electric power drawer locks, power window, SureShade and the electric power cockpit table (optional).



1. Electric Drawer Lock
2. Power Window
3. SureShade
4. Electric Power Cockpit Table (optional)

Figure 4-10: Salon Switches

Accessory Switch

This switch is available to operate an accessory item.

Ignition Switches

Each engine has a separate ignition switch.

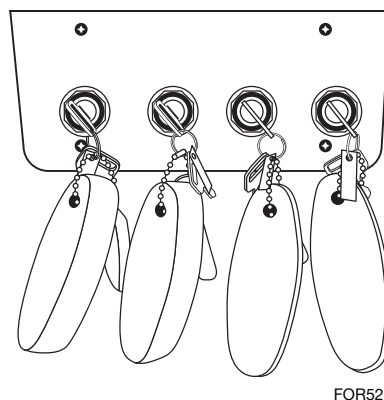


Figure 4-11: Ignition Panel

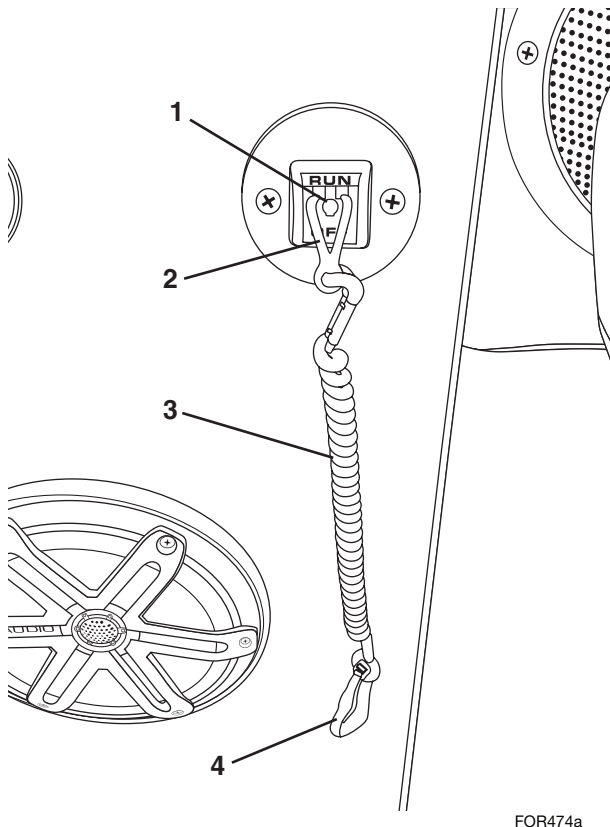


Ignition Safety Switch

Your Formula boat is equipped an ignition safety switch.

WARNING

Do not allow your Formula boat to be operated without the proper use of the ignition safety switch and lanyard.



FOR474a

1. Ignition Safety Switch
2. Clip
3. Lanyard
4. Clothing Hook

Figure 4-12: Ignition Safety Switch

The ignition safety switch and lanyard will stop an engine in case of an emergency. Attach the lanyards to the boat operator whenever the engines are running. Be aware there will be a loss of boat control if the switches are activated. If the operator is thrown from the seat or moves too far from the helm, the lanyards will become disconnected from the ignition safety switches, shutting off the engines.

To attach a lanyard, connect the clip to the ignition safety switch and the hook to a strong piece of clothing on the operator, such as a belt loop.

WARNING

Attach the ignition safety switches' lanyards to the operator before starting the engines. This will prevent the boat from becoming a runaway if the operator is accidentally thrown away from the helm.

WARNING

The ignition safety switches can only be effective when they are in good working condition. Observe the following:

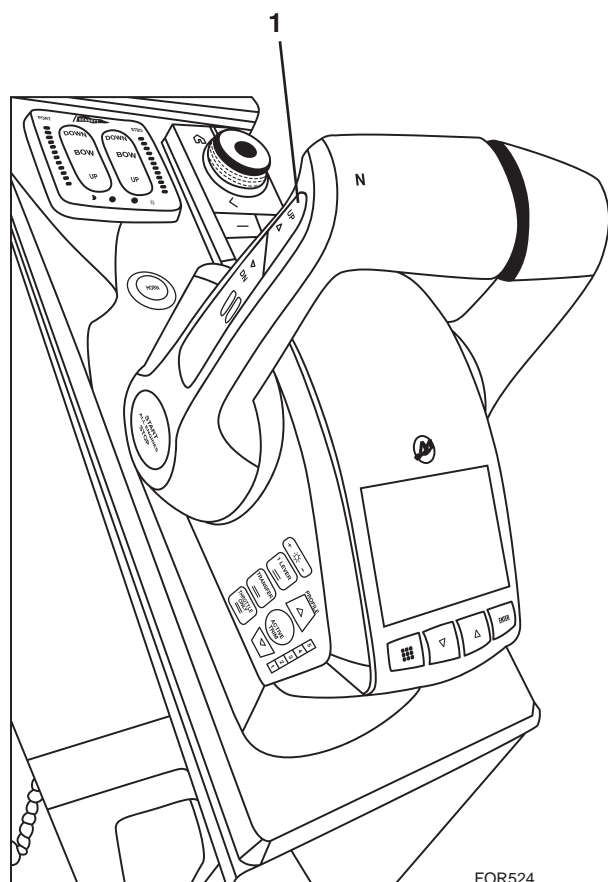
- Do not remove or modify an ignition safety switch and/or its lanyard.
- The lanyard must be free from obstructions that could interfere with its operation.



CONTROLS AND INDICATORS

Quad Engine Trim Switch

Activates the drive unit's power trim feature. Quad engine remote controls have a combination port and starboard drive unit trim switch located in the throttle handle of the electronic remote control (ERC) (**Figure 4-13**). Use this switch in combination with the trim gauge to maximize your boat's performance. See the engine operation manual for further operating instructions.



1. Trim Switch

Figure 4-13: Quad Engine Remote Control Trim Switch

Trim Tab Switch

These switches control the operation of the trim tabs. Adjusting trim tabs will improve the ride of your boat and correct listing from side to side due to varying weight distribution and/or sea and wind conditions. Refer to **Trimming-Drive Units and Trim Tabs**, in **Section 7**, for further trimming procedures.

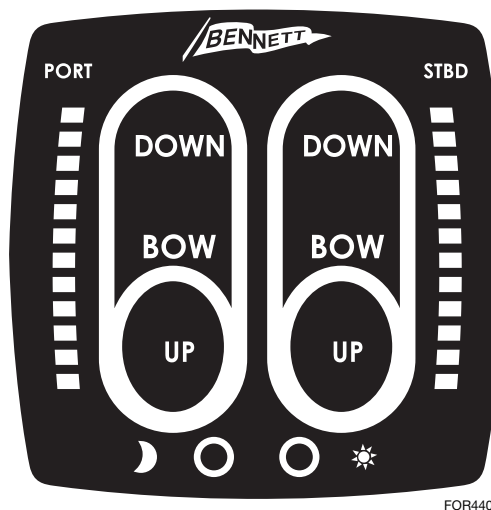


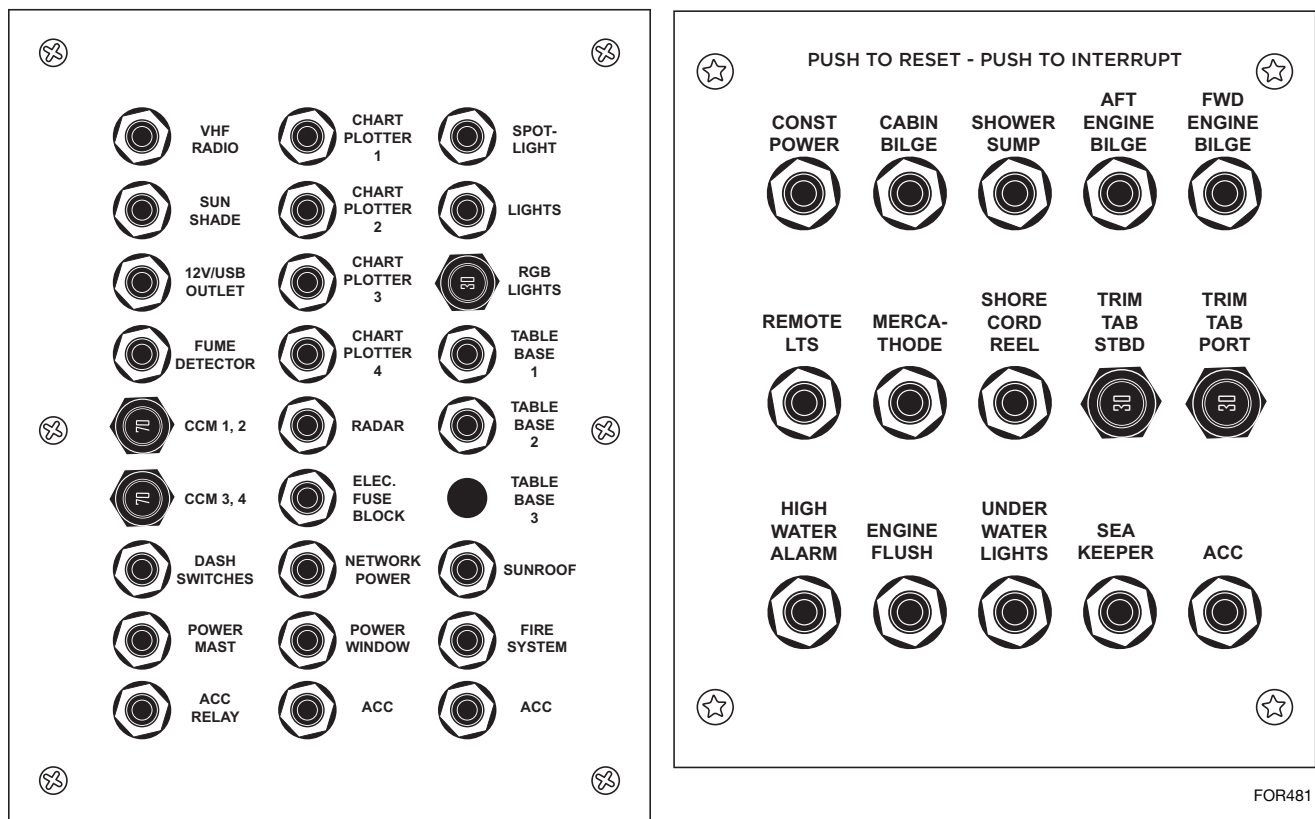
Figure 4-14: Typical Trim Tab Switches



Circuit Breakers

A circuit breaker panel(s) is located at the helm. Most electrical equipment is controlled with circuit breakers. These breakers will activate if overloaded and cut power to the switch. To restore power, push the button in and release. If a circuit continuously overloads under normal operating conditions, have your boat inspected by your Formula dealer immediately.

Your Formula has additional circuit breaker panels. For the location of these panels, refer to **Specifications**, in **Section 3**, for your specific model.



FOR481

Figure 4-15: Circuit Breaker Panels



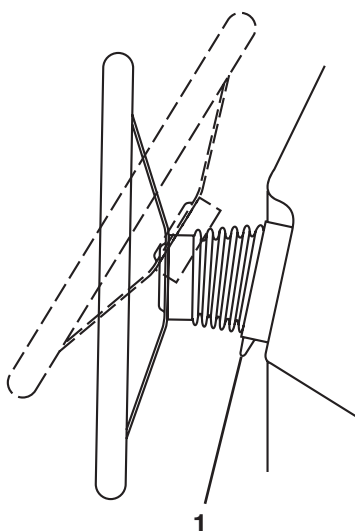
Steering

Your Formula boat is equipped with a tilt steering wheel. Adjust the tilt position by grasping the top of the steering wheel and depressing the release lever with your thumb. Release the lever to lock the steering wheel when achieving a comfortable position.



WARNING

Do not adjust the steering wheel tilt position while the boat is moving. Sudden boat movement may cause loss of balance resulting in loss of control and/or injury.



FOR059

1. Release Lever

Figure 4-16: Tilt Steering Wheel

Electronic Remote Controls (ERC)

NOTICE

Your Formula boat is equipped with a safety switch for “start-in-neutral-only” operation. Be sure the shift lever is in NEUTRAL before attempting to start an engine.

The shift/throttle control on your Formula boat differs from model to model and may depend on the engine used. The following information relates to the general description about remote controls. Refer to the propulsion unit operator’s manual or the control operator’s manual for specific use.

The shift lever controls the drive unit. The throttle lever controls the engine speed. One of two different types of controls may be used: a single lever which combines both shift and throttle functions for each engine/drive, or a dual lever with one lever controlling the shift function and the other lever controlling the throttle function of each engine/drive.



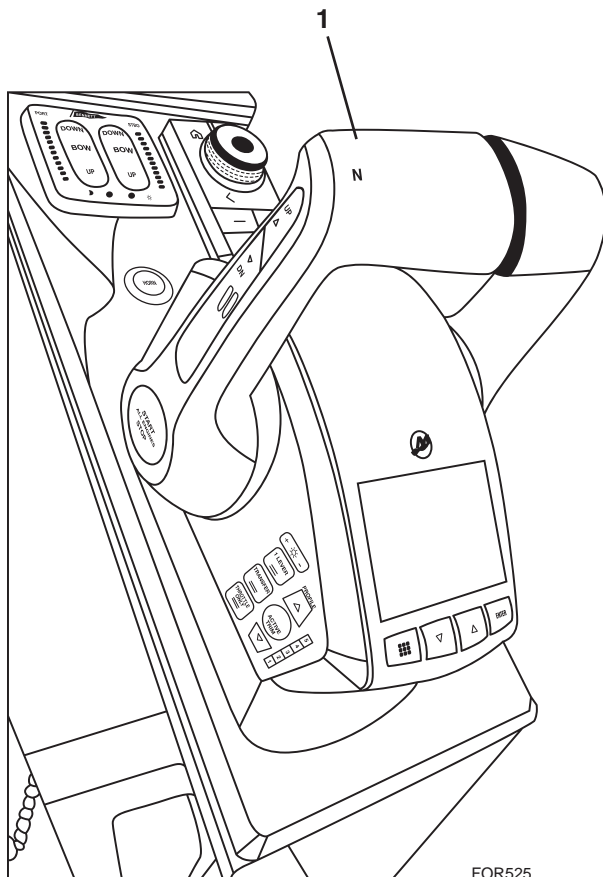
CONTROLS AND INDICATORS

Quad Engines

Operation of the quad engines is controlled by two single-lever remote controls. With all engines operating, the port lever controls the shift/throttle operation of the port inner and outer engines, and the starboard lever controls the shift/throttle operation of the inner and outer starboard engines. Shift/throttle operation will be different depending on which engines are operating.

Use the THROTTLE ONLY button on the control to increase engine RPM during warmup. This allows the warmup of the engines without shifting into gear.

Refer to the Engine Operation Manual for features and operating information of the remote control.



1. Mercury Lever

Figure 4-17: Typical Quad Engine – Single-Lever Electronic Controls

Joystick Controls

Your boat may be equipped with an optional joystick control that works in conjunction with electronic steering and propulsion controls. Joystick controls provide precision maneuverability for docking and slow-speed navigation, such as in a marina, and may offer other optional functions. Boats equipped with bow thrusters may also use a joystick control for basic left/right/thrust control. Practice using the joystick in open water away from traffic to get the feel of the control. Refer to the joystick/propulsion manufacturer owner's manual for more information.

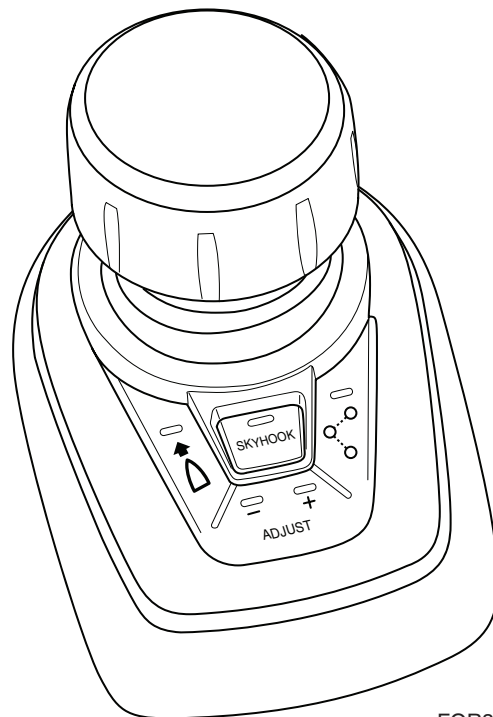


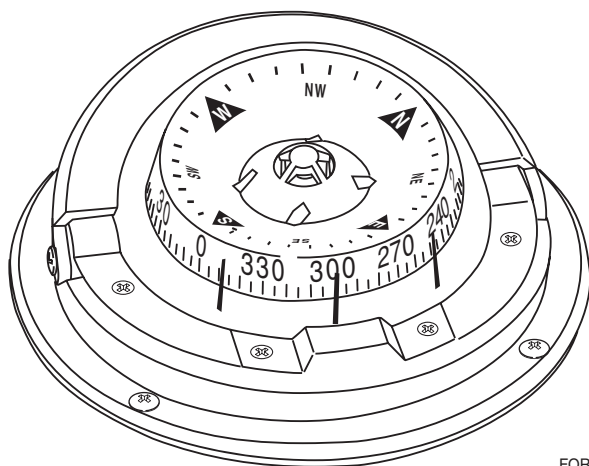
Figure 4-18: Typical Mercury Joystick Control



Helm Controls and Indicators

Compass

Aids in navigation of your Formula boat, a compass is mounted at the helm. Refer to the compass user's manual supplied in your Owner Information Binder for operating information.

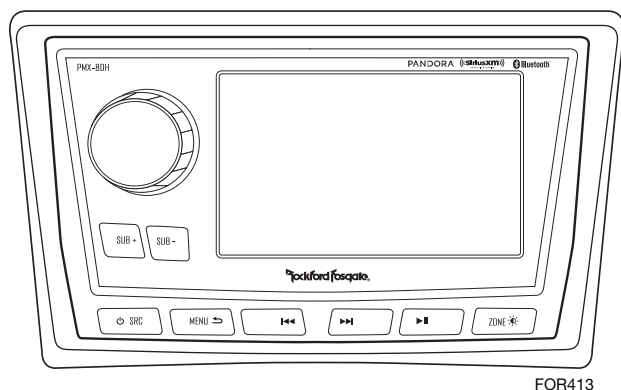


FOR025

Figure 4-19: Compass

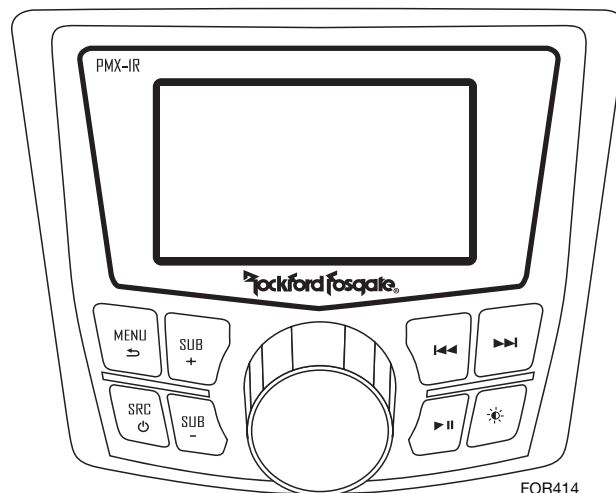
Stereo Remote Control

This provides full-feature stereo remote control from the helm and/or transom (**Figure 4-20** and **Figure 4-21**).



FOR413

Figure 4-20: Stereo Remote Control – Helm

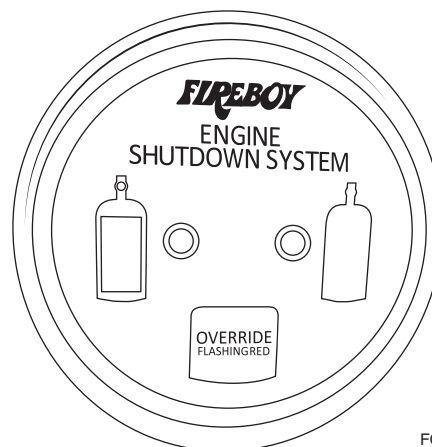


FOR414

Figure 4-21: Stereo Remote Control – Bow, Cabin, Transom

Automatic Fire Suppression Indicator

Models equipped with an automatic fire suppression system in the equipment room have a helm-mounted monitor indicating system status (**Figure 4-22**). The monitor is wired to the engine ignition systems. The green monitor light should be on when the engine ignition system is on, indicating a charged system. Should the extinguisher discharge or the pressure drop, then the green LED will turn off and the red LED and the horn will turn on. The suppression system has an engine shut-off circuit.



FOR473

Figure 4-22: Fire Suppression Monitor

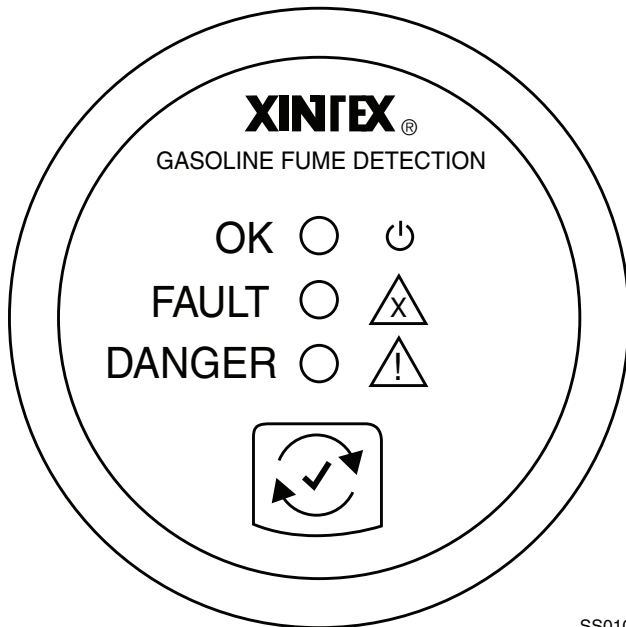


CONTROLS AND INDICATORS

The fire suppression system function can be reversed after a fire has been extinguished. Press the OVERRIDE button to activate OVERRIDE mode. The red LED will begin flashing, indicating you are in OVERRIDE mode. This allows the engines to be restarted.

Fume Detector Gauge

Monitors the equipment room for excessive fuel fumes. The gauge is mounted at the helm and a sensor is located in the bilge area where fumes collect. The system also monitors for unburned hydrocarbons from a faulty exhaust system and hydrogen battery vapors. Refer to the fume detector owner's manual for additional information.



SS010

Figure 4-23: Fume Detector Gauge

WARNING

The fume detector system should be considered a supplemental warning system. It is not meant to replace standard safety practices which should be followed around explosive gases.

If the fume detector indicates a dangerous condition, do the following:

- Do not operate electrical equipment.
- Extinguish open flames and smoking materials immediately.
- Turn OFF the engines and generator.
- Wait five minutes before opening the equipment room to investigate the cause.
- Determine the cause and correct it immediately before resuming operation.

Bilge High Water Alarm

Alerts operator of excessive water in the bilge. Sounding of the alarm may be an indication of a) problems with the automatic bilge pump system, or b) an intrusion of water which exceeds the bilge pump system's removal capabilities. A sensor mounted in the equipment room activates the alarm, which manifests itself as a shrill wavering siren. The alarm has a built-in 10-second delay, which is designed to eliminate nuisance tripping (i.e., the alarm will not sound unless the sensor is activated continuously for 10 seconds or greater). The alarm will stop once the excessive water is cleared. Refer to **Bilge and Blower System** in **Section 5**.

Engine Alarm

Sounds an alarm when an engine temperature exceeds the set limit or if the oil pressure drops below the set range. If the alarm sounds during operation, immediately turn OFF the engine and determine the cause. The engine alarm will also sound if the outdrive lube level falls to a critical level. Consult the propulsion unit owner's manual in your Owner Information Binder for additional information.



NOTICE

Continued operation of an engine after the warning alarm has sounded may cause severe engine damage.

Cabin Controls and Indicators

AC/DC Control Panel

This panel controls the distribution of the 120/240-volt alternating current (VAC) electrical system and the 12-volt direct current (VDC) electrical system.

Both the AC and DC circuits are controlled by switch-type circuit breakers. The circuit breakers serve two functions: 1) They allow you to manually enable or disable a circuit by moving the switch ON or OFF, and 2) they protect the system by automatically opening the circuit if a short or overloaded condition occurs.

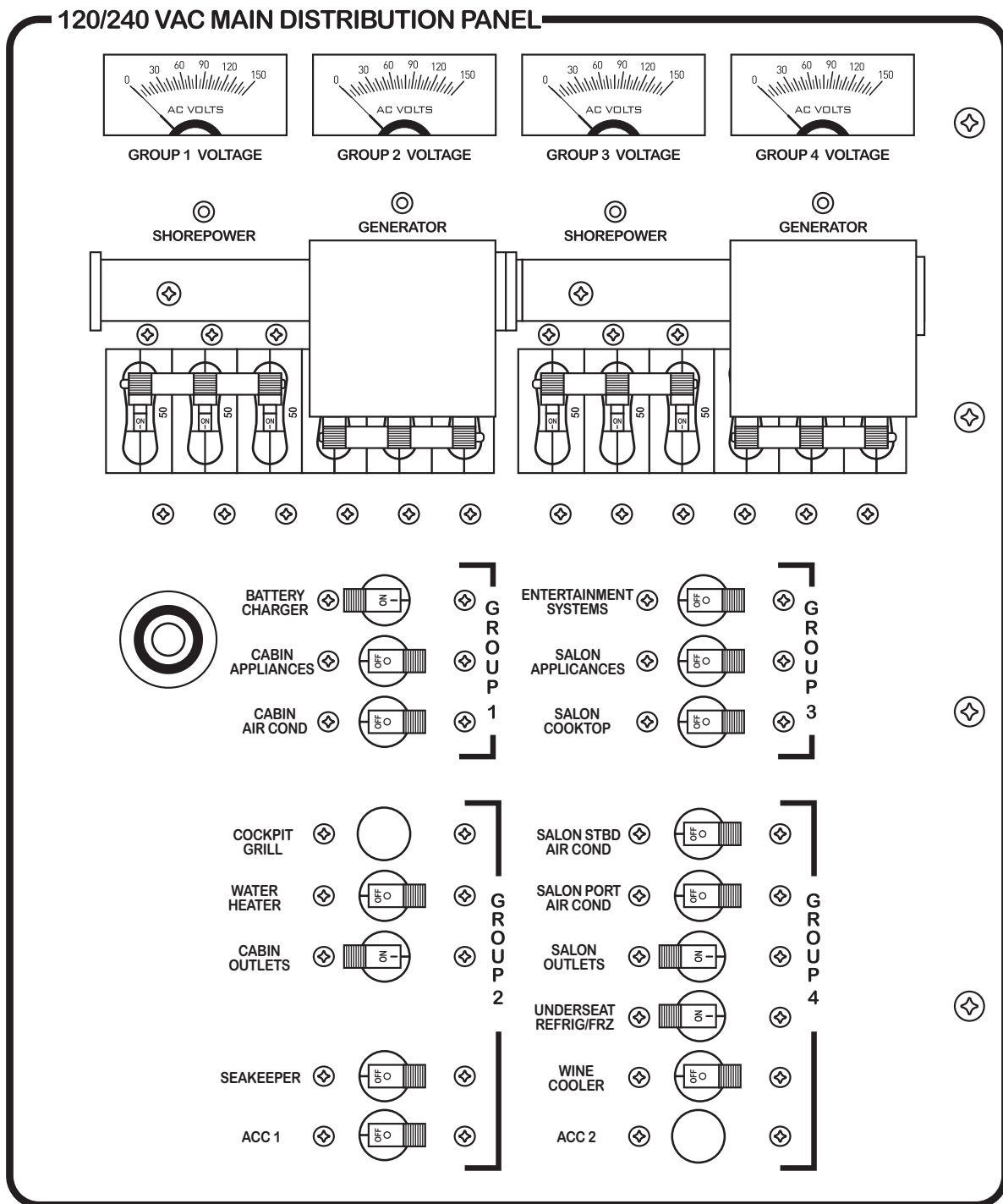
Check the circuit if a particular piece of equipment stops working. A tripped circuit breaker indicates the circuit is overloaded. You should determine and correct the cause of a problem before resetting a circuit breaker.

Reset the breaker by pressing it back into place. Contact your Formula dealer if a circuit breaker trips repeatedly.

Refer to **Section 5** for operation of the 12-VDC and 120/240-VAC electrical systems.

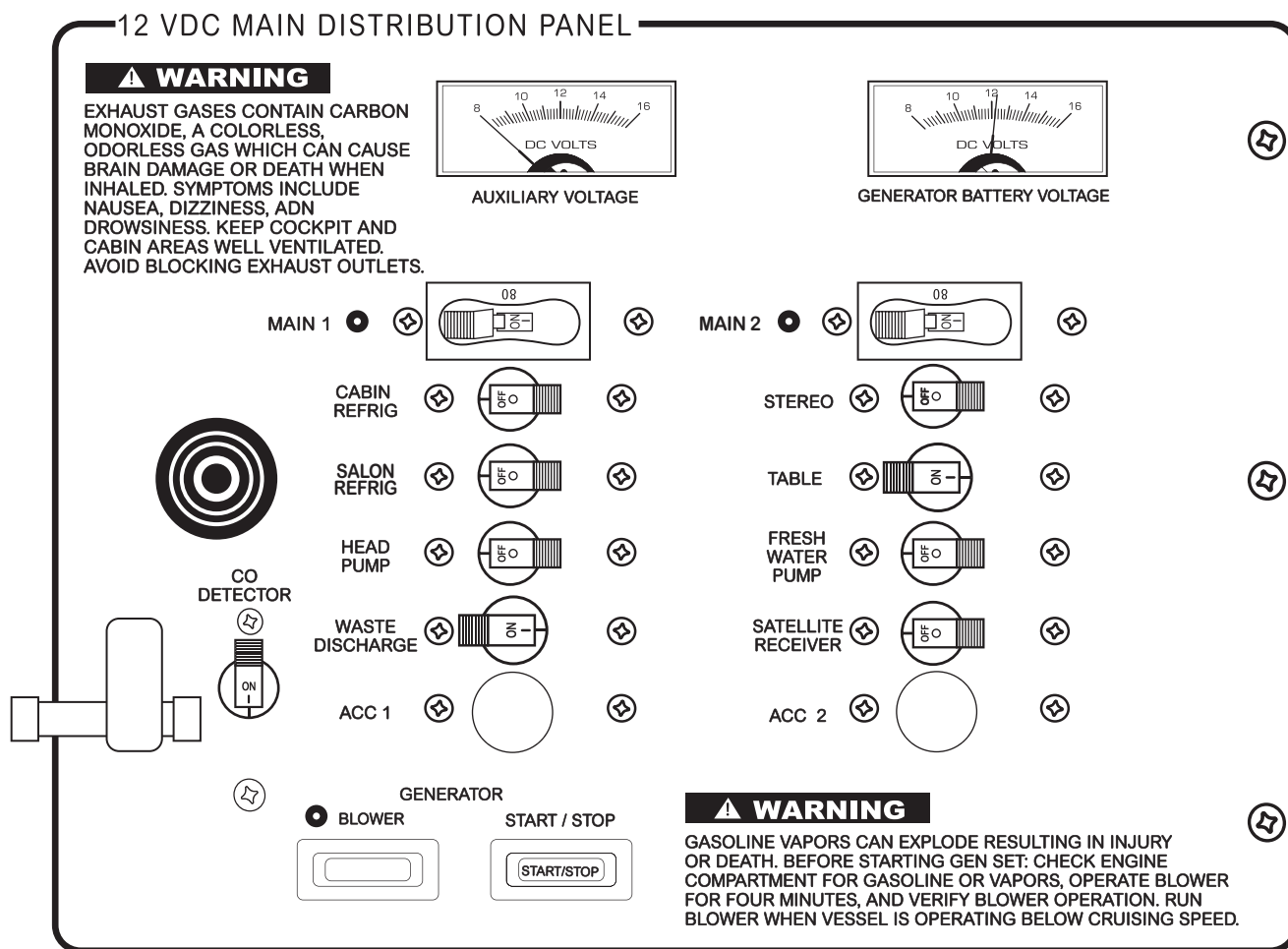


CONTROLS AND INDICATORS



FOR482

Figure 4-24: AC Control Panel



FOR483

Figure 4-25: DC Control Panel

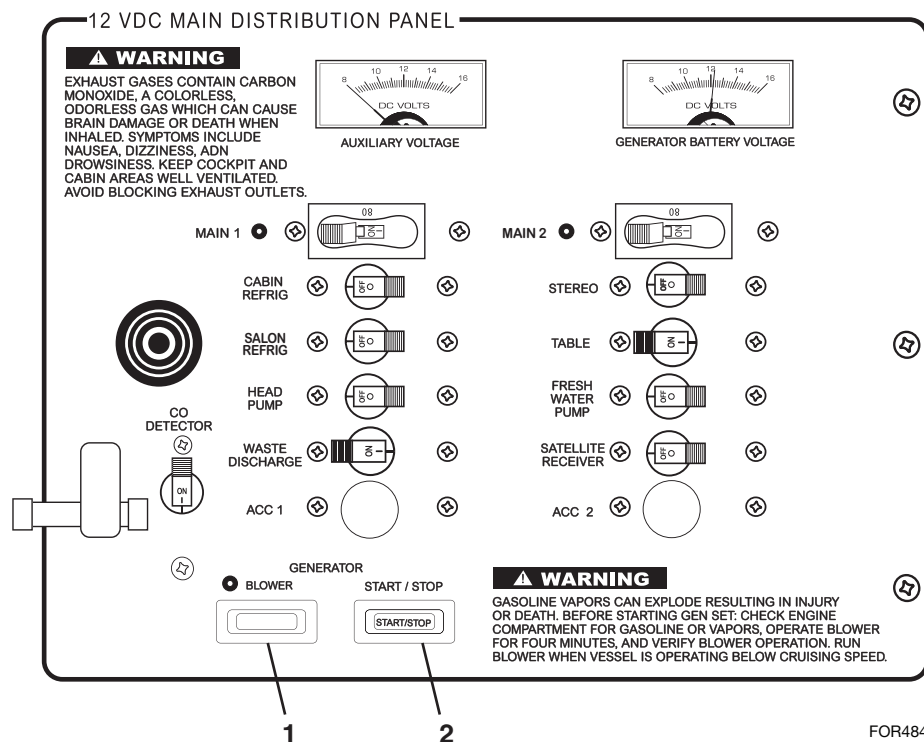


Generator Control Panel

Controls operation of the generator. The generator control panel is located on the AC/DC control panel. Refer to **Generator**, in **Section 5**, for operating information.

WARNING

Operate the generator blower for at least four minutes each time before you start the generator.



1. Blower Switch

2. Start/Stop Switch

Figure 4-26: Generator Control Panel



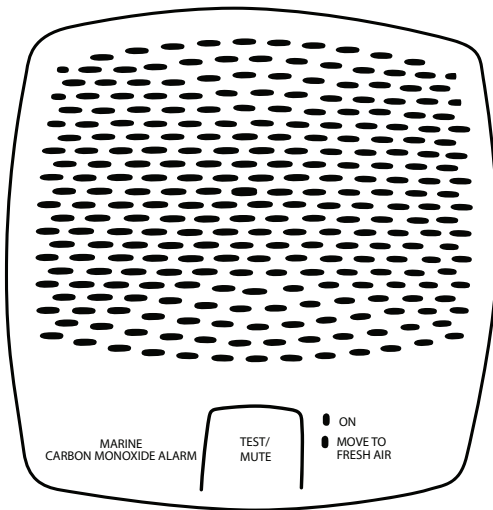
Carbon Monoxide Detector

Detects carbon monoxide gas. Formula installs carbon monoxide detectors in closed-cabin models only.



DANGER

Carbon monoxide gas (CO) is colorless, odorless and extremely dangerous. All engines and fuel burning appliances produce CO as exhaust. Direct and prolonged exposure to CO will cause BRAIN DAMAGE or DEATH. Signs of exposure to CO include nausea, dizziness and drowsiness.



KC-0387-A

Figure 4-27: Carbon Monoxide Detector



WARNING

Test the carbon monoxide detectors operation before each trip, at least once a week and after the boat has been in storage. Do not tamper with the operation of the carbon monoxide detectors. They are installed for your safety.

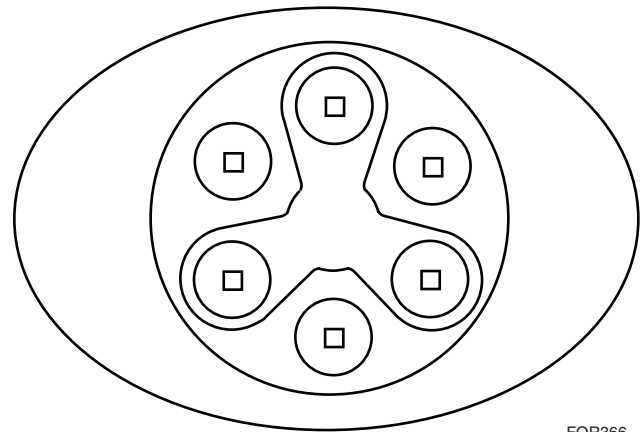
A carbon monoxide (CO) detector will only detect the presence of carbon monoxide gas at its sensor. Carbon monoxide may be present in other areas.

NOTICE

A carbon monoxide detector will not detect other vapors such as gasoline.

Moving Propeller (MP) Alert

Boats equipped with Mercury joystick controls have an MP Alert indicator on the transom to warn swimmers to stay away from the transom area until the engine(s) are switched off. The indicator alert lights are activated to flash when the engine(s) are started. The indicator lights will show propeller rotation when running in neutral or in gear. When engine speed reaches 2500 RPM for five seconds, the indicator lights will turn off automatically. **The boat operator must instruct all passengers on MP Alert operation and boat re-boarding protocol.** Refer to the MP Alert manufacturer owner's manual for more information.



FOR366

Figure 4-28: Typical Outboard Moving Propeller Alert Indicator



CONTROLS AND INDICATORS

Air Conditioning Controller

Displays information and controls certain aspects relative to the associated air conditioning system. A controller (**Figure 4-29**) for each unit is located centrally, relative to the area being cooled/heated. Refer to the air conditioning owner's manual in your Owner Information Binder for operating instructions.

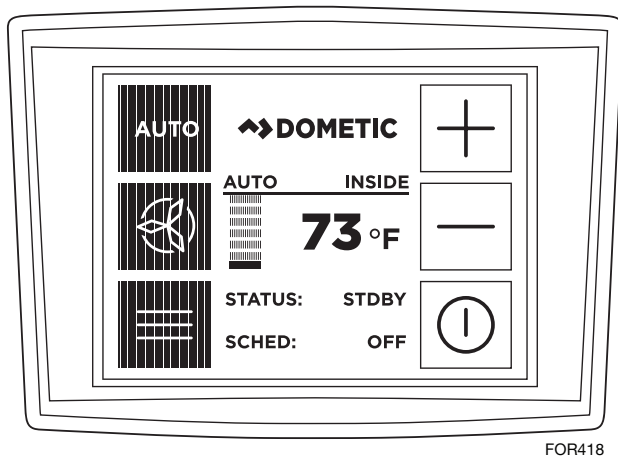


Figure 4-29: Air Conditioning Controller

Waste Tank Level Monitor

Displays the level of waste water in the tank. The monitor is located in the head. Refer to **Waste Water System**, in **Section 5**, for additional information.

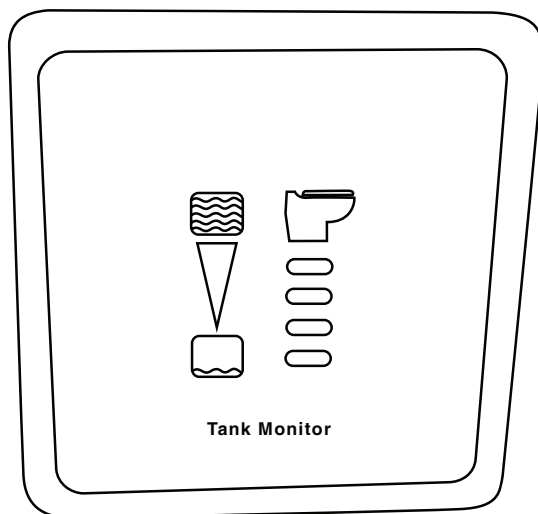


Figure 4-30: Waste Tank Level Monitor

VacuFlush®

Flushing is controlled by button switches near the toilet. A different switch will raise the water level in the bowl, if needed.

NOTE: Once the waste holding tank is “FULL,” the head pump is automatically disabled to prevent further flushing of the toilet until the tank has been evacuated.

Please refer to the head unit's operator manual located in your Owner's Information Binder for additional information.

Macerator Control (optional)

Controls operation of the macerator waste system. Your Formula boat may be equipped with a macerator system that allows the discharging of waste water directly overboard through a seacock. The macerator control is located in the head compartment. The macerator overboard Y-valve must be opened to allow activation of the macerator pump switch. For additional operating information, refer to the macerator operator's manual.

NOTICE

Overboard discharge of waste water should only be used in approved areas. It is your responsibility to comply with local regulations regarding the discharge of waste. You could be fined if your boat has an operable overboard discharge system in a non-approved area. Removing the handle of the seacock while in a closed position, or disabling the system by other means may be required to avoid a fine.

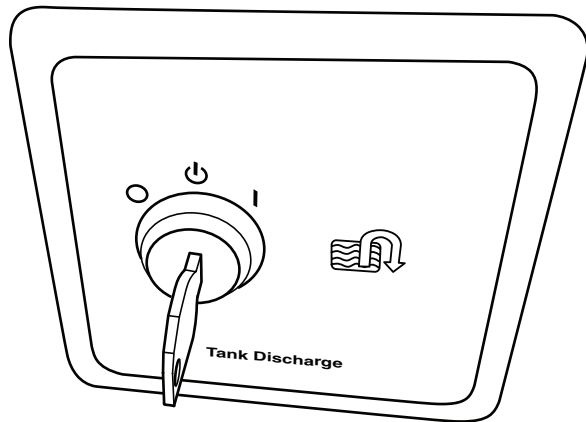


Figure 4-31: Waste Tank Overboard Discharge Control

Battery Selector Switches

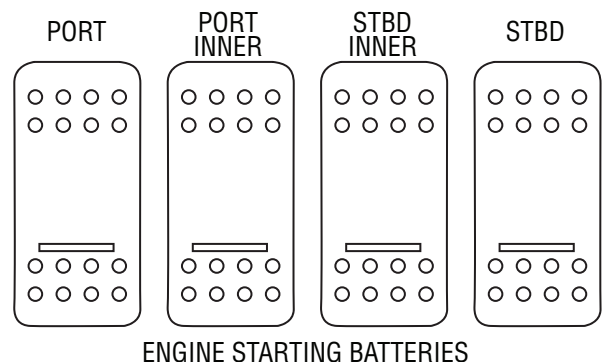
Your Formula boat is equipped with a battery switch for each engine. The switch provides isolation and positive disconnect of the battery to protect against tampering, electrical fire hazards and draining the battery's power. The battery switch used in each Formula boat is dependent upon model and engine options.

NOTE: Power is supplied to the bilge pumps, high water alarm, and galvanic protection system through the constant power circuit, independent of the battery switch position (i.e., these components receive power even with the battery switch in the OFF position).

For the location of the battery selector switch, refer to **Specifications**, in **Section 3**.

Typical Engine Battery Switch Arrangement

Boats equipped with two or more engines have a START switch and battery for each engine. Each battery is charged by its corresponding engine. The battery parallel switch allows additional flexibility in choosing the battery(s) to parallel. Refer to **Battery Parallel Switch** and **Auxiliary Power Switch** in this section for more information.



FOR379

Figure 4-32: Typical Battery Switch Arrangement

Battery Parallel Switch

All multi-engine boats are equipped with a battery parallel system. The battery parallel switch allows you to start either engine off of either start battery.

CAUTION

The battery parallel switch must be in the OFF position during normal boat operation. Failure to do so may damage the engine alternators.

Should one of the engine batteries be low on cranking power, turn the battery parallel switch on. This allows the engine with the low battery to start by using power from the other engine's battery. Once both engines are running, turn the battery parallel switch off. If you continue to have a low battery problem, please contact your Formula dealer.



CONTROLS AND INDICATORS

There are two switches (port and starboard). The port switch parallels the port and port inboard engine. The starboard switch parallels the starboard and starboard inboard engine.

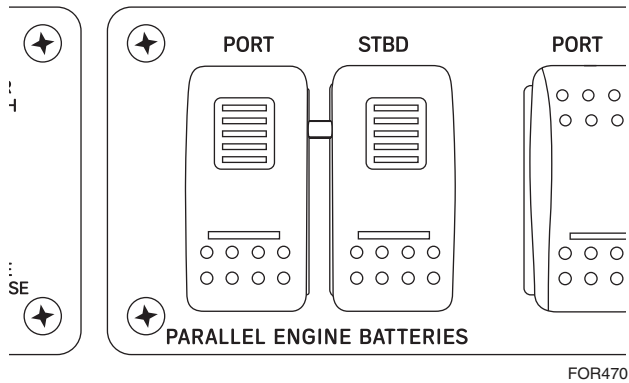


Figure 4-33: Two Battery Parallel Switches (On Models with Four Outboards)

Auxiliary Power Switch

Your boat is equipped with one or more auxiliary (house) batteries that feed the 12 VDC accessory circuit. Turn the switch to the ON position during boat operation. Turn the switch to the OFF position when the boat is unattended.



5

System Operation and Equipment

This section describes the basic operational principles of major systems and equipment.

Your Formula boat's powertrain consists of four outboard propulsion units. The engines are gasoline fueled.



WARNING

Regularly inspect and maintain all systems to prevent unexpected hazards associated with worn or faulty components. When replacement parts are required, use marine grade parts with equivalent characteristics, including type, strength and material. Using substandard parts could result in injury and product failure.

Powertrain

Your Owner Information Binder includes the operator's manual for your propulsion units. All operation, specifications and maintenance information for your engine(s) is in this manual. Be sure to read, understand and follow the safety, operating and maintenance information.

Manuals for the propulsion units and their electronic controls (if equipped) are also available online as part of the VesselVanguard.com subscription service.

Fuel System



WARNING

Check your fuel system before each operation. Have your fuel system thoroughly checked at least once a year by a certified Formula service technician. Gasoline is highly flammable. Use extreme caution at all times.

The line between the fuel tank and the fuel inlet of the engine is made of a synthetic material. Alcohol can deteriorate it, especially during periods of storage. Have your Formula dealer inspect this fuel line at least annually and replace, if necessary.

The generator has a separate diesel fuel tank. Refer to **Specifications**, in **Section 3**, for the fuel tank capacities.

Refer to your propulsion unit operator's manual for additional fuel system information.

Helm System

The helm (steering) system is not self-centering. Be sure to keep a sure grip on the steering wheel at all times.

Your Formula boat is equipped with electric/hydraulic steering. An electronic signal cable connects the steering wheel to a hydraulic cylinder mounted on the engine. A hydraulic pump is also mounted to the engine. The pump has two hoses running to the hydraulic cylinder giving it power assist. Movement of the hydraulic cylinder turns the outboard units.



Bilge and Blower System

NOTICE

The Federal Water Pollution Control Act prohibits the discharge of oil or oily waste into the water. Violators can be fined \$5,000.00.

Water will enter the boat under a number of adverse conditions such as heavy seas, strong storms and long periods of rain. The bilge is the deepest part of the hull where the water settles. The bilge pump(s) removes the collected water from the bilge through an opening in the hull. Most bilge pumps are automatically operated by a switch that monitors the level of water in the bilge. The bilge pump system is designed to function automatically when the battery switches are in the OFF position. The bilge pump can also be manually operated by a switch located at the helm, provided the system is supplied with power (the house battery switch is ON).

NOTICE

Do not allow the bilge pump to operate after all the water has been cleared from the bilge area. Damage to the pump will occur if the pump is allowed to operate without water.

Bilge blowers ventilate the equipment room. The blowers are controlled by a switch at the helm or from a switch on the generator panel of the DC control panel.

WARNING

Operate the blower for at least four minutes each time you start the engines. In addition, the blower should be operated continuously when at idle and during slow speed operation. Failure to operate the blower can cause an explosion.

DC Electrical

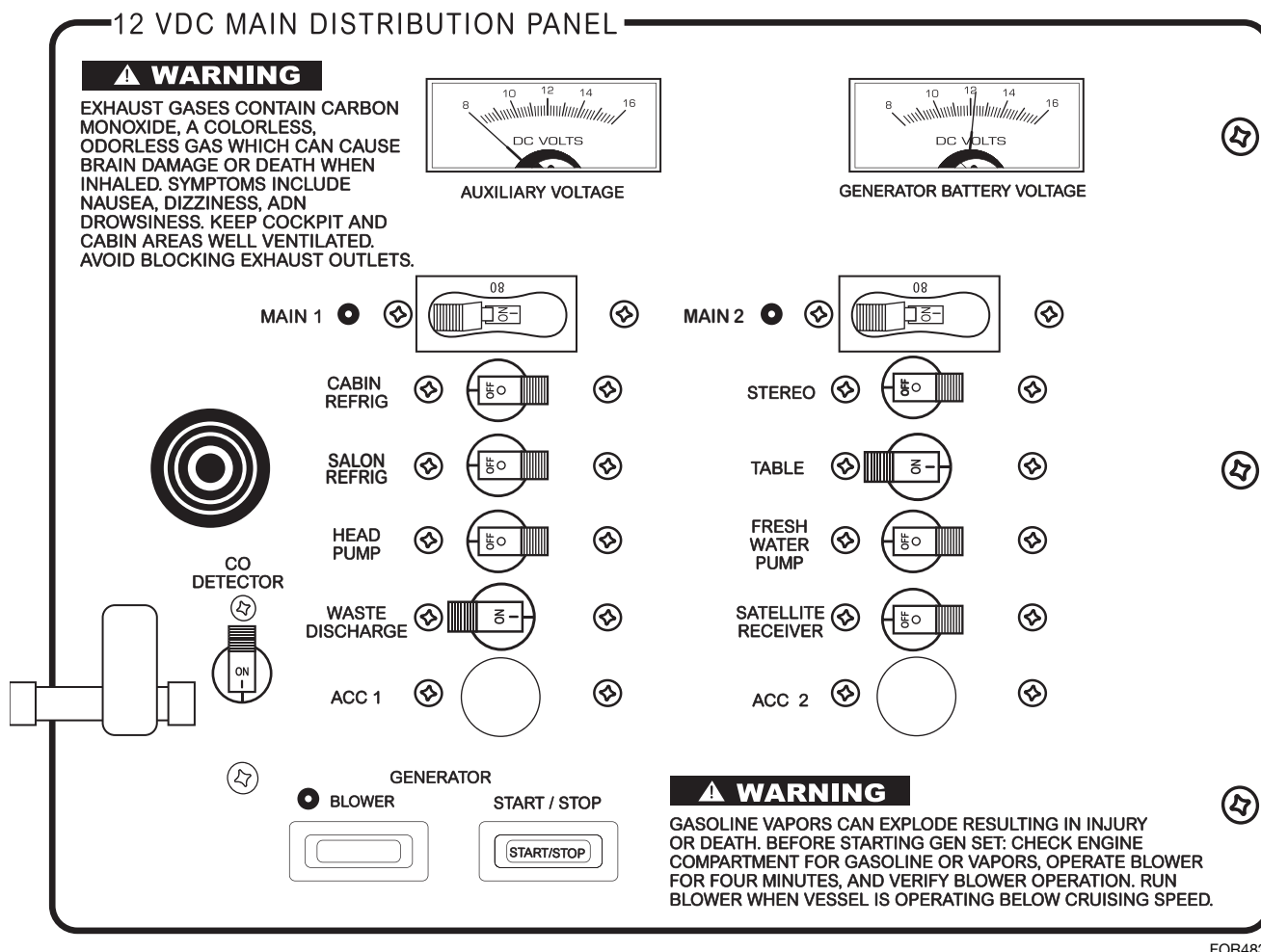
Your Formula boat has a battery powered 12-volt negative ground DC system. The positive wire is hot, and feeds current from the auxiliary batteries to all 12-volt equipment; the negative wire is the ground and completes the circuit back to the battery.

NOTE: Power is supplied to the bilge pumps, high water alarm, and galvanic protection system through the constant power circuit, even with the battery switch turned “OFF.”

The cabin DC panel distributes power through the main circuit breaker which in turn supplies electricity to operate the:

- CO Detector
- Interior Lights
- Waste Pump
- Refrigerator
- Stereo
- Fresh Water Pump

A 100-amp circuit breaker labeled AUXILIARY POWER protects the DC electrical system from the batteries to the DC control panel. Refer to **Specifications**, in **Section 3**, for location of the circuit breaker.



FOR483

Figure 5-1: DC Control Panel

The 12 VDC system consists of a 30-amp main circuit breaker and a series of switch-type circuit breakers, including a dedicated circuit for the CO detector.

The CO detector (sensor) circuit breaker must be in the ON position at all times with the slide lock engaged. Only disengage the slide lock and turn OFF the CO detector circuit breaker during long periods of storage.

To operate the 12 VDC system:

- Turn ON the DC main circuit breaker.
- Activate the individual component circuit breaker.



USB Charging Outlet

Your boat may be equipped with one or more USB receptacles for charging mobile devices; it cannot be used for uploading data or music. Each receptacle has a maximum output current of 2.1 A DC.

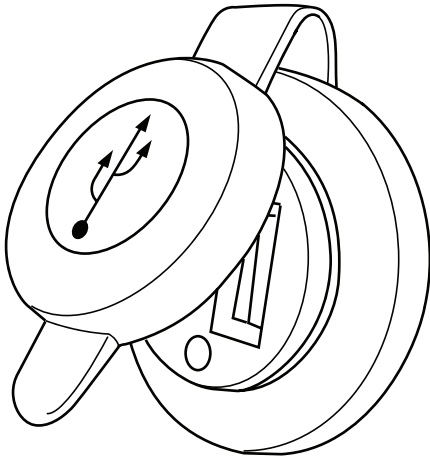


Figure 5-2: USB Charging Outlet

AC Electrical

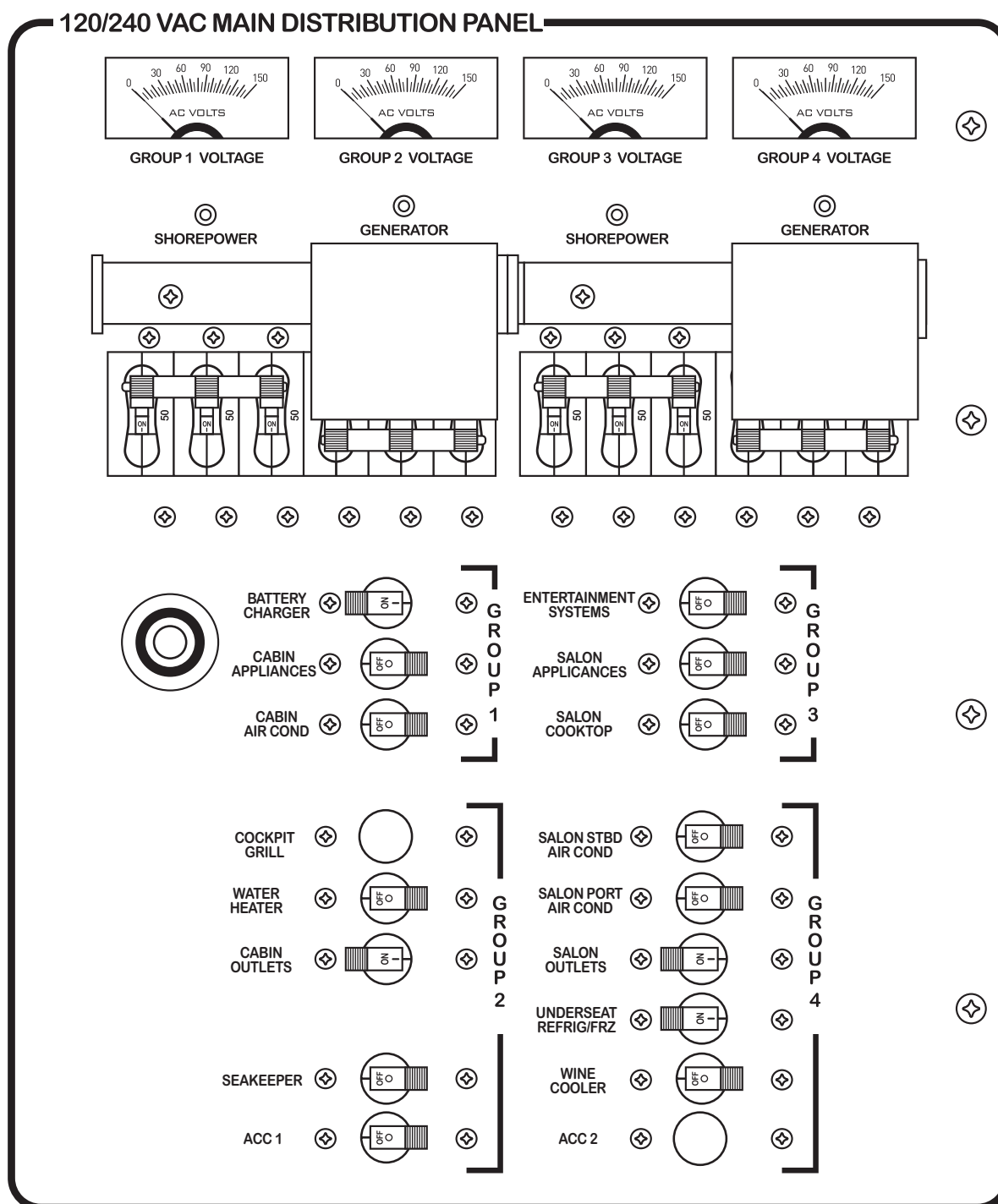
NOTICE

Any modification performed on the boat's AC system must be made by a qualified marine technician. The modification must be checked to assure compliance with ABYC guidelines and National Electrical Codes.

Your boat is equipped with shore power and the AC portion of the control panel receives AC power from the shore power cable or the generator. The AC panel distributes power through the shore power switch or the generator power switch which in turn supplies electricity to the individual branch circuit breakers.

AC electricity operates the following equipment:

- Battery Charger
- Refrigerators
- Air Conditioning
- Hot Water Heater
- Electrical Outlets
- TV
- Salon Stove
- Seakeeper



FOR482

Figure 5-3: AC Electrical Panel



The voltmeter monitors the AC voltage. Damage can occur to your equipment if the voltage is less than 105 volts. Do not use AC powered equipment if voltage is less than 105 volts.

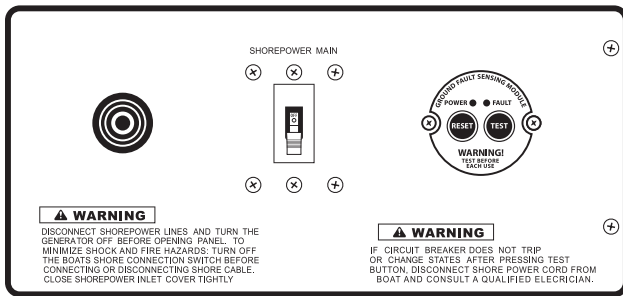
The shore power switch is also a 50-amp main circuit breaker and controls individual component circuit breakers. This allows you to check for proper voltage and polarity immediately after making the shore power cable connection without damaging any equipment.

Shore Power

WARNING

To minimize shock and fire hazards:

- Turn the AC main circuit breaker OFF before connecting or disconnecting shore cable.
- Disconnect shore power cable at shore outlet first.
- Do not alter shore power cable connections.



FOR435

Figure 5-4: Shore Power Panel

When the shore power cord is plugged in and the shore power switch is in the ON position, all AC equipment can be operated.

Shore Power Inlet Breaker

A shore power inlet breaker protects the AC circuit from the boat's shore power connection to the AC control panel. The AC electrical system is also equipped with an Electronic Leakage Circuit Interrupter (ELCI) which will open (trip) when an imbalance of up to 30-milliamperes is detected between the hot and neutral wires. This dangerous situation can occur when there is a combination of a ground fault and a faulty ground, and is a hazard to both people in the boat and in the water.

WARNING

If circuit breaker does not trip or changes states after pressing the ELCI Test button, disconnect shore power cord from boat and consult a qualified electrician.

The ELCI is installed near the yacht shore power panel and provides whole boat protection for everything downstream of it. ELCIs are equipped with a test button for monthly testing, and status LEDs. AC outlets are further protected with Ground Fault Circuit Interrupters (GFCI) for protection at the 5-milliamperes threshold in potentially wet environments. Refer to **Specifications**, in **Section 3**, for shore power inlet breakers' location.

The shore power system requires a special, marine grade four-conductor cable to make a proper connection to the shore. Dockside connections are plug-in. Boatside connections are hardwired. Refer to **Specifications**, in **Section 3**, for the location of your shore power receptacles.

WARNING

Plugs and receptacles for different systems are designed in non-interchangeable configurations. A plug from one system cannot fit into the receptacle of another system. Do not modify a shore power cable. Use only commercially available adapters for system modification.



To Connect:

1. Turn OFF the generator power switch on the AC control panel. Move the lock over to secure the switch in place.
2. Turn OFF the shore power switch on the AC control panel.

Ensure Shore Power Inlet Breaker(s) is switched OFF.

3. If the outlet on the dock has a disconnect switch, turn the switch OFF.
4. Make sure the cable has more slack than the mooring lines.
5. Remove the cap from the outlet on the dock. Connect the cable to the outlet.
6. Turn ON the dock's outlet breaker(s). Turn ON the Shore Power Inlet Breaker(s).
7. Turn ON the shore power switch on the AC control panel.
8. Turn ON the respective branch circuit breakers as needed.

To Disconnect:

1. Turn OFF the shore power switch.
2. If the shore outlet has a disconnect switch, turn it to the OFF position.
3. Disconnect the shore power cord at the shore outlet.

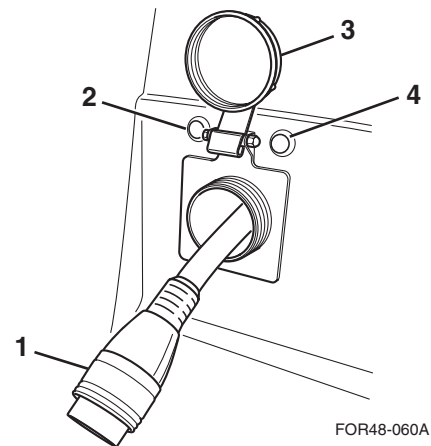
WARNING

Some marinas have been known to “break” shore power ground circuits to prevent electrolysis. Opening the ground circuit creates a potentially dangerous onboard shock hazard. Use caution when using a “break” shore power ground circuit.

For further information regarding your shore power system, please contact your Formula dealer.

Shore Power Auto Reel

The 500SSC has a shore power auto reel. To supply power to the shore cable auto reel, engage the “shore cord reel” circuit breaker. The auto reel control buttons are located on the transom above the shore power cable receptacle. The outboard button extends the cable and the inboard button retracts the cable. The auto reel system can also be controlled by a remote key fob.



1. Shore Power Cable
2. Extend Button
3. Receptacle Cover
4. Retract Button

Figure 5-5: Shore Power Auto Reel



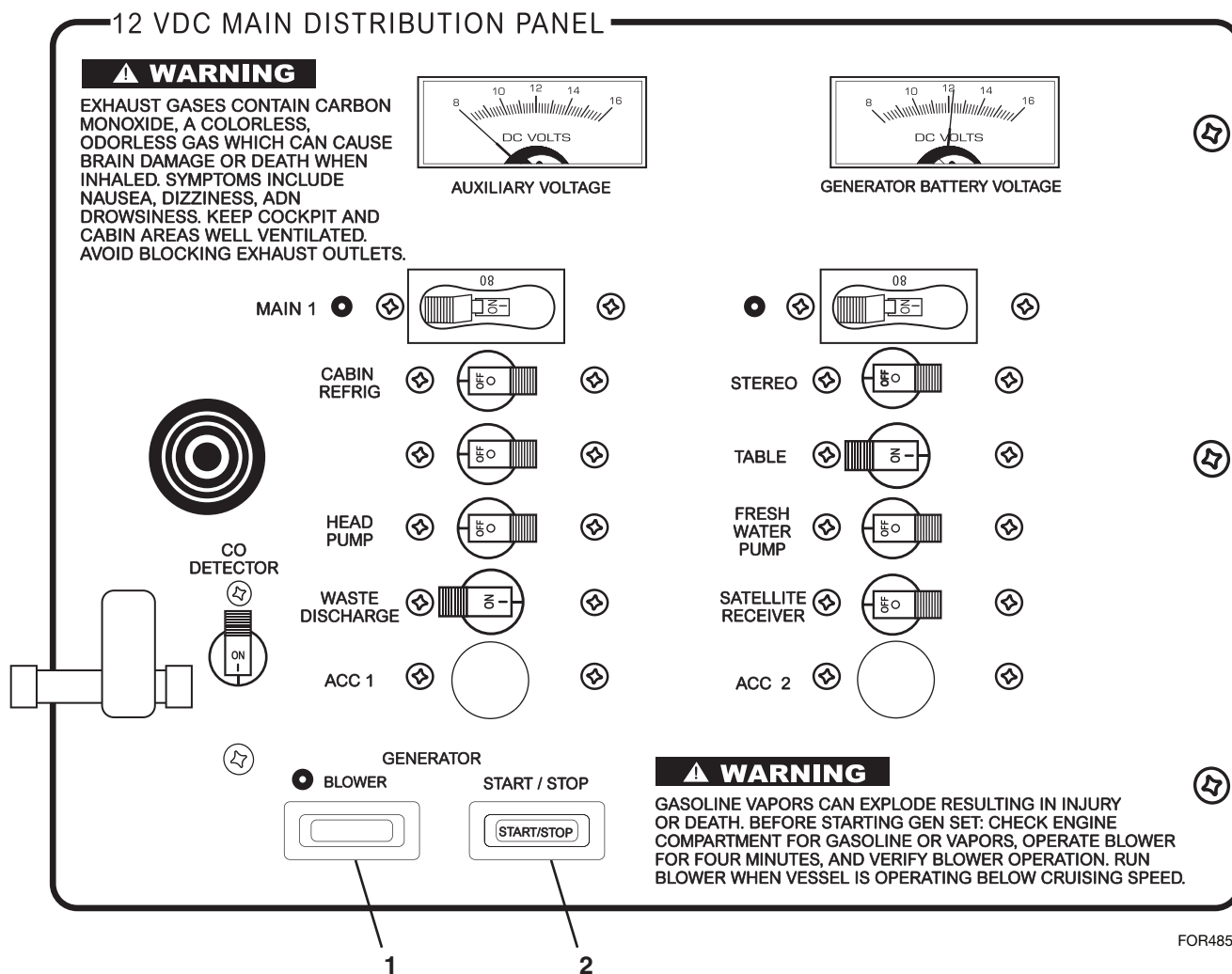
Generator

WARNING

Operate the blower for at least four minutes each time you start the generator. In addition, the blower should be operated continuously when at idle and during slow speed operation. Failure to operate the blower can cause an explosion.

NOTICE

A diesel power generator may have a preheat switch used during starting. Do not exceed 30 minutes of preheat time or the manifold heater and plugs can be damaged.



1. Blower Switch

2. Start/Stop Switch

Figure 5-6: Generator Controls



The generator controls are mounted on the DC control panel. Both the generator Start/Stop and Blower switches are located there.

The generator is used to provide AC power when shore power is not available.

1. Make sure the generator seacock is open.
2. Turn OFF the shore power switch on the AC control panel. Move the lock over to secure the switch in place.
3. Turn OFF the generator power switch.
4. Turn ON the blower and operate it for at least four minutes.
5. Push the START side of the generator's Start/Stop switch. Allow generator to operate for at least one minute to stabilize voltage.
6. Turn ON the generator power switch.
7. Switch ON the respective branch breakers as needed. In this configuration, all components can be used with power supplied by the generator up to a maximum of 30 amps.
8. Do not operate the generator in conjunction with high speed operation of the boat. The resulting reduction in water flow to the generator could damage the unit's water pump impeller.



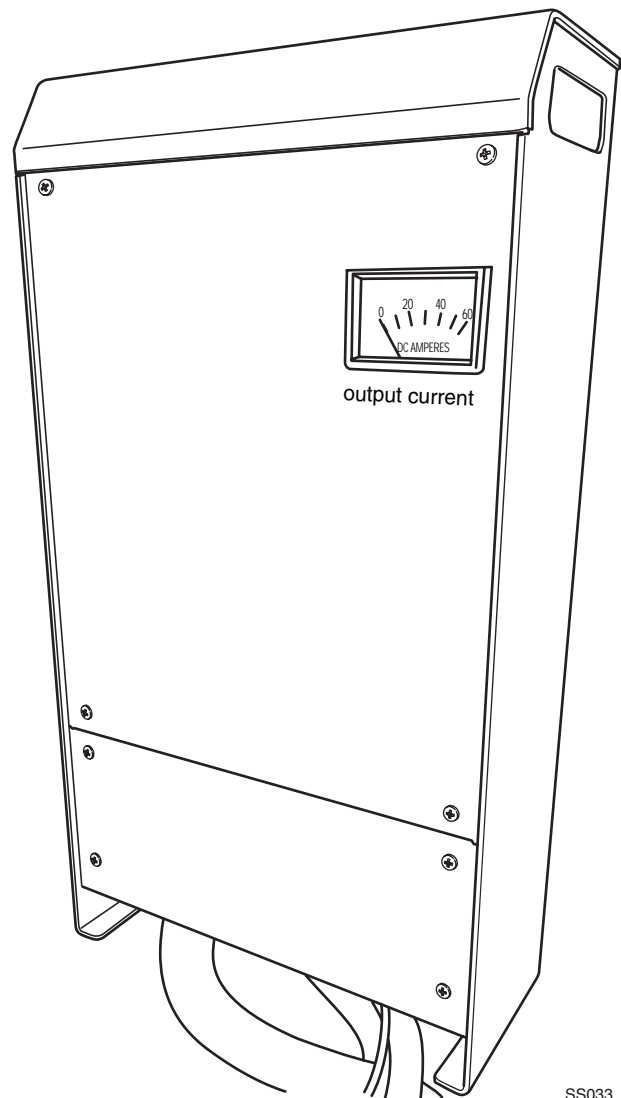
DANGER

Carbon monoxide gas (CO) is colorless, odorless and extremely dangerous. All engines and fuel burning appliances produce CO as exhaust. Direct and prolonged exposure to CO will cause BRAIN DAMAGE or DEATH. Signs of exposure to CO include nausea, dizziness and drowsiness.

Stop the generator by pressing the STOP side of the Start/Stop switch. Close the generator's seacock.

Battery Charger (Shore Power)

Your Formula boat may be equipped with a battery charger located in the equipment room. Anytime your boat is connected to shore power or the generator is running and the BATTERY CHARGER switch at the AC control panel is ON, the battery charger will operate and act to keep the batteries fully charged. Please refer to the battery charger manufacturer's information for additional information.



SS033

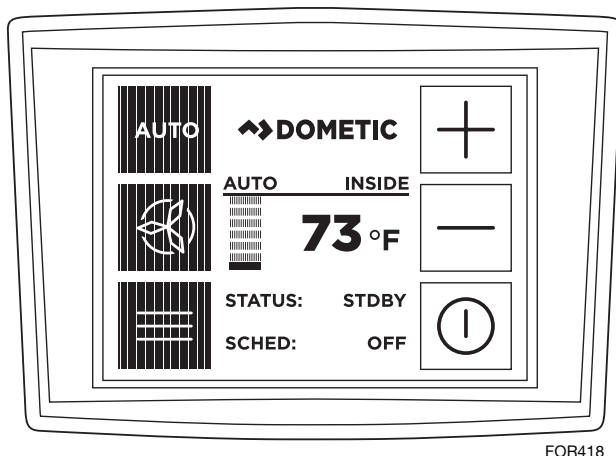
Figure 5-7: Battery Charger



Air Conditioning System

Air conditioning systems are standard on this model. To operate the air conditioning system:

- Open the air conditioner intake seacocks.
- Make sure 120VAC power is supplied to the AIR COND circuit breaker. Turn the AIR COND circuit breaker ON.
- Press the ON/OFF button on the control pad to turn the system ON.
- Use the UP/DOWN arrows to set the desired cabin temperature.
- Check the air conditioner return thru-hull for a solid steady stream of water.
- Check the air supply grille for a steady flow of air.



FOR418

Figure 5-8: AC Control Pad

Periodically inspect the air conditioner intake strainer and filter for signs of debris which may inhibit the cooling abilities of the air conditioning system. For an in-depth description of the operation and maintenance procedures for the air conditioning system specific to your boat, refer to the manufacturer's literature located in the "Systems" section of the Formula Owner Information Binder.

Fresh Water System

WARNING

Before connecting to any water fitting, dockside or otherwise, make sure the water is potable and suitable for human consumption. A special sanitary drinking water hose is required for potable water connection. Do not use common garden hose for drinking water.

The fresh water system provides potable (drinkable) water to the sinks, showers, hot water heater, toilet and transom shower. Refer to **Specifications**, in **Section 3**, for the fresh water tank capacity for your model.

The onboard fresh water system is operated by a 12 VDC water pump. To use the vessel's onboard water supply, the 12 VDC system must be activated and the WATER PUMP switch turned ON. The fresh water pump "switch" is also a re-settable circuit breaker.

The water pump works on demand. It will not automatically shut off when the fresh water tank is empty. Monitor the level of water in the tank. If the water pump is allowed to run continuously, it may overheat.



Transom Shower

The transom wash-down shower is located at the stern of the boat. The 12 VDC WATER PUMP circuit breaker switch must be ON for the unit to function.

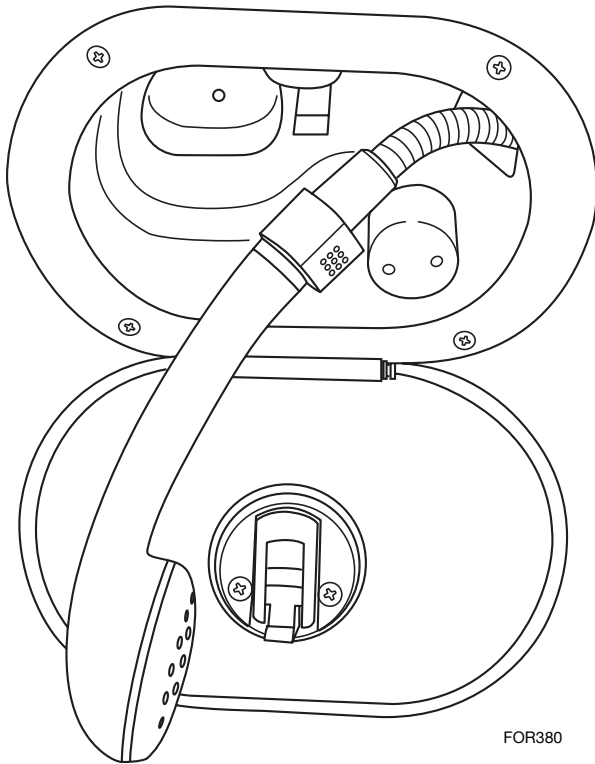


Figure 5-9: Pull-Out Transom Shower

Fresh Water Dockside Hookup

NOTICE

Monitor the fresh water dockside hookup during the initial use. The boat is connected to an unlimited supply of water. Do not leave the boat unattended while using this feature. Any major leak or break in the system will allow continuous water flow into the boat causing severe damage.

A fresh water dockside hookup is provided, which allows usage of city water while docked. Refer to **Specifications**, in **Section 3**, for location.

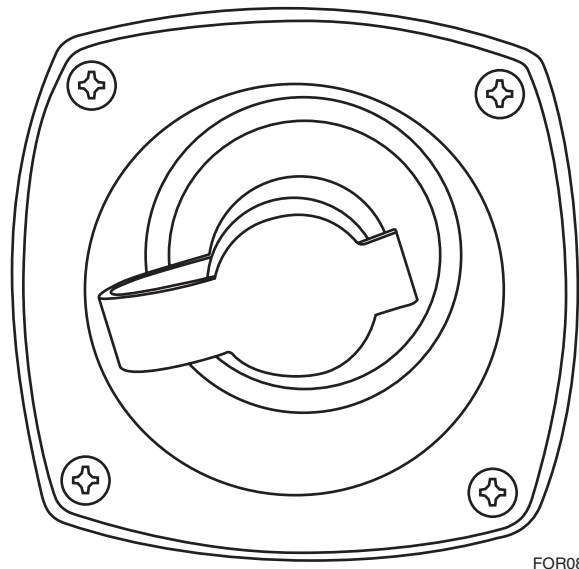


Figure 5-10: Fresh Water Dockside Hookup

To connect to city water:

1. Turn the 12 VDC WATER PUMP circuit breaker OFF.
2. Remove the plug from the boat's water inlet fitting.
3. Attach the proper sanitary drinking water hose to the dockside city water outlet. Turn on the water and flush the hose before connecting it to your boat.

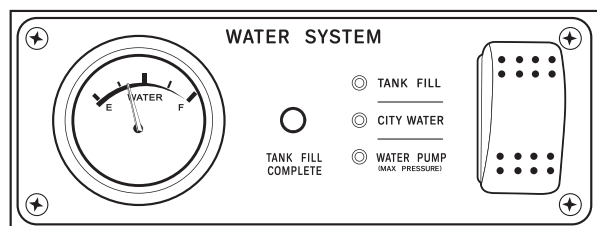


Single-Point Water Fill System

Your Formula boat uses a single-point water fill system that allows the user (at the flip of the switch) to manually alternate between the boat's freshwater pump and the dockside hookup. This system also lets the user fill the freshwater holding tank.

To use the system:

1. Attach a water hose between the dockside water supply and the dockside water inlet on the boat.
2. Turn the dockside supply ON.
3. Turn the selection switch to the center position. The water system is now ready to use with the dockside source supplying the pressure.
4. Depress the top of the selection switch to fill the onboard freshwater holding tank. A solenoid will open, allowing the dockside source to fill the tank. When the tank is full, the solenoid will automatically close to prevent overfilling the tank.
5. Press the bottom of the selector switch to use the onboard water supply and pump. The solenoid will close and the 12V DC pump will automatically pressurize the system and deliver water from the onboard tank.



FOR457

Figure 5-11: Single-Point Water Fill Panel

Gray Water System

The gray water from the sink drains, shower drains and air conditioning condensation drain flows into a shower sump box. When the gray water in the sump box reaches a predetermined level, a switch activates a pump. The water is then evacuated overboard or, in the case of boats with the "gray water" option, into the waste holding tank.

Black water from the head is also stored in the waste tank. Refer to **Specifications**, in **Section 3**, for waste tank capacity.

Waste Water (Head) System

Your Formula is equipped with VacuFlush/electric head.

For an in-depth description of the operation and maintenance procedures for the head system specific to your boat, refer to the manufacturer's literature located in the "Systems" section of the Formula Owner Information Binder. The following general information provides the basics of each system's operation.

VacuFlush Head

The VacuFlush system is active when the 12VDC system is energized and the HEAD PUMP breaker is turned ON. The head pump creates vacuum in the system. When the toilet is flushed, the stored vacuum clears the bowl of waste. The vacuum pump will run for a few minutes after flushing to restore vacuum in the system. The pump will then automatically shut off upon reaching the set vacuum level.

The WATER PUMP breaker on the 12VDC panel must be turned ON (not necessary if the boat is connected to a dockside water supply). This provides the water needed for flushing.



SYSTEM OPERATION AND EQUIPMENT

Monitor your waste tank level indicator to know when your tank has reached its full capacity. Never attempt to overfill the waste tank.

NOTE: Your head system is equipped with a safety mechanism that shuts down the head pump, not allowing the toilet to flush when the tank FULL level light is illuminated. This safety measure prevents overfilling the waste holding tank.

After emptying the waste holding tank, recharge the holding tank with the approved waste treatment chemical as detailed in the head unit owner's manual found in your Formula Owner's Information Binder.

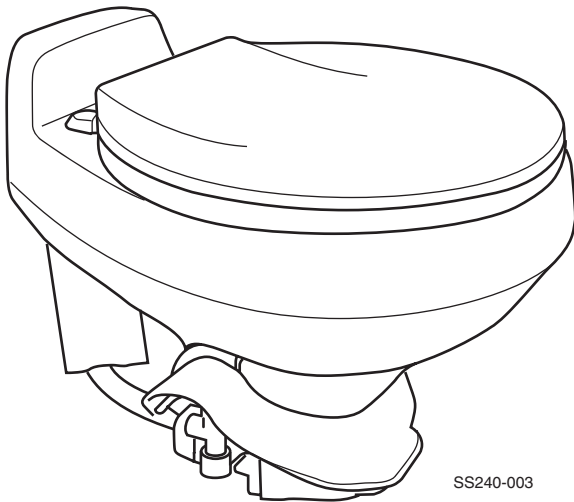
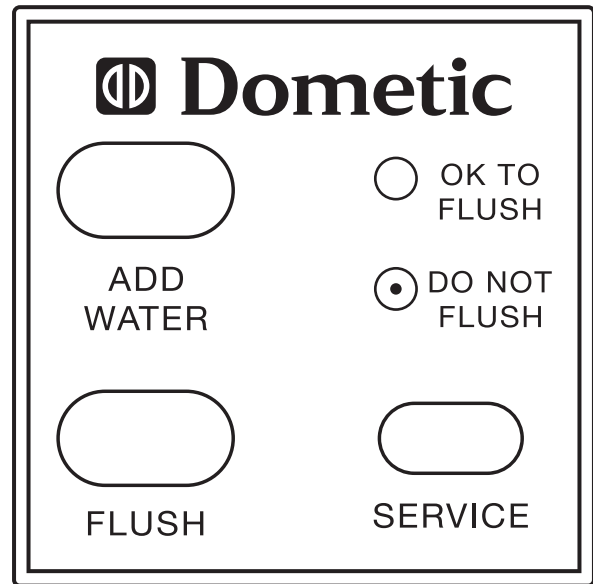


Figure 5-12: VacuFlush/Electric Head

Your boat is equipped with one of the following style water system electronic controls.



FOR442



FOR458

Figure 5-13: Waste System Electronic Control



Macerator Discharge Pump

The optional macerator system allows the discharging of waste water directly overboard through a thru-hull located in the engine bilge. The macerator system is active when the 12VDC system is energized and the WASTE TREATMENT breaker is turned ON. The macerator seacock must be open in order to discharge waste. Activate the macerator key, located in the head compartment, until the tank has reached the empty level. The macerator switch operates independently of the seacock or Y-valve's position.

NOTICE

Overboard discharge of waste water is prohibited in many areas. It is your responsibility to comply with local regulations regarding the discharge of waste. You could be fined if your boat has an operable overboard discharge system. Removing the handle of the seacock while in closed position, or disabling the system by other means may be required to avoid a fine.

Raw Water System

Your Formula boat has accessory components (generator, air conditioning, Seakeeper)—in addition to the engines—with complete raw water systems.

Each raw water system will have its own thru-hull water intake, seacock and strainer. The seacock is very important. It protects the boat from sinking if a hose or fitting should fail. It is important to close any seacock not in use.

Waste water from the generator is routed with the generator's exhaust system. Waste water from the air conditioning units and Seakeeper is directed overboard through a discharge port in the hull.

Your engines have their own raw water system for cooling. Refer to the propulsion unit operator's manual for engine cooling information.

Sea Chest Raw Water Intake System

Your boat is equipped with a sea chest raw water intake system that supplies raw water to all components requiring raw water cooling (except the engines). The components include:

- Cabin and cockpit air conditioning systems
- Generator
- Gyro stabilizer

The sea chest combines two transom-mounted intake thru-hulls with seacocks, strainers and individual supply valves for each component.

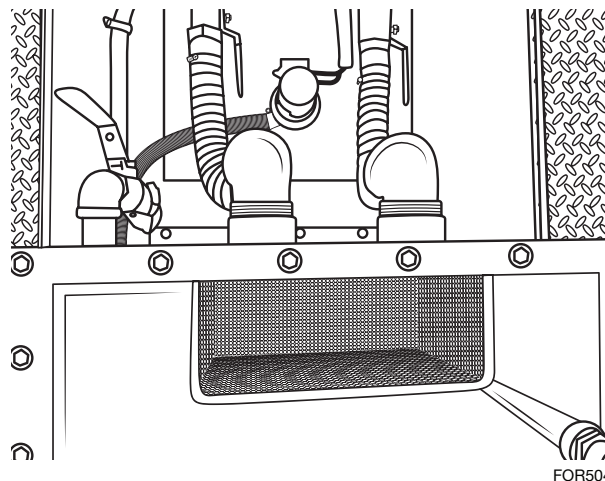


Figure 5-14: Intake Seacocks



SYSTEM OPERATION AND EQUIPMENT

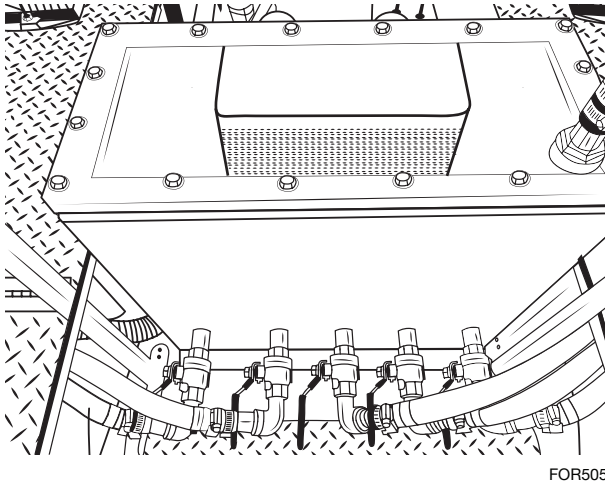


Figure 5-15: Individual Supply Valves

The tank is also equipped with a vent and a flush-hose with valve. By replacing individual raw water intake thru-hulls with a tank/reservoir, the sea chest provides a steady supply of cooling water regardless of boat speed, water conditions or hull attitude. Sea chests vary in shape/size depending on the boat model and all valves are clearly marked.

If the boat is kept in the water for more than five days, you need only to close the intake seacocks (along with the engine seacocks if applicable) for safety should a downstream hose fail.

Hot water from the generator is routed with the generator's exhaust system. Hot water from the air conditioning and gyro units is directed overboard through discharge thru-hulls. Engines have their own raw water system for cooling. Refer to the propulsion unit operator's manual for engine cooling information.

Sea Chest Maintenance

Fresh Water (Boat kept in same body of water): Flush the sea chest thoroughly at the end of the season.

Fresh Water (Boat trailered to other bodies of water): Flush the sea chest with hot water (120° for at least 2 minutes) after each use and allow it to dry thoroughly (pressurized airflow for 15 minutes or air-dry for 5 days) before the next use to prevent cross-contamination from Aquatic Invasive Species (AIS).

Salt/Brackish/Polluted Water: Flush the sea chest with fresh water after each use.

To flush: Connect the adapter to the end of a garden hose. Remove the cap on the flush port. Push the adapter into the flush port and turn on the water. When done, remove the hose and replace the cap on the flush port.

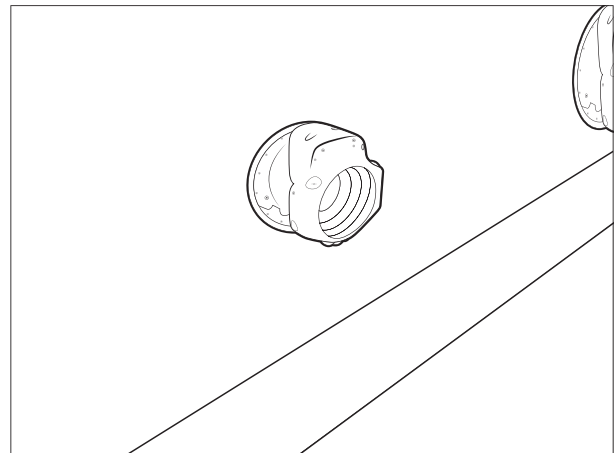
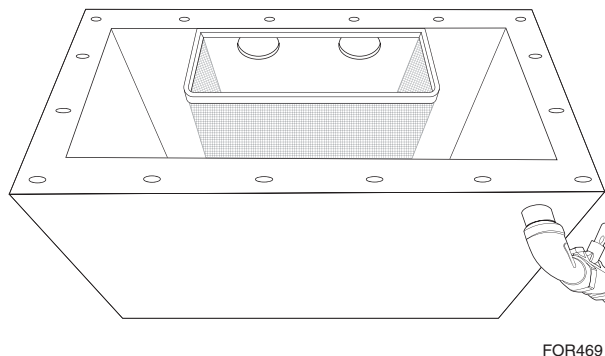


Figure 5-16: Sea Chest Flush Port (located at the transom)



Strainer

A strainer is located in the sea chest. It can be viewed by looking through the clear top.



FOR469

Figure 5-17: Top of Sea Chest

If it is necessary to clean the strainer, perform the following:

1. Close the water inlet valves to the sea chest.
2. Remove the hex head bolts retaining the top of the sea chest.
3. Lift the top off and remove the strainer for cleaning.
4. Re-install the strainer.
5. Position the top on the sea chest. The gasket for the top is reusable.
6. Install and tighten the hex head bolts to 9 ft-lbs.
7. Open the water intake valve and check for leaks.

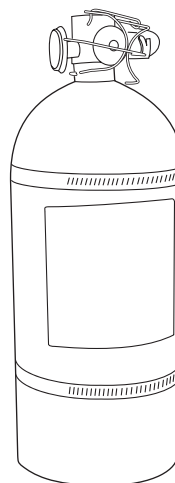
Automatic Fire Extinguisher System

A fixed automatic fire extinguisher is mounted on the equipment room bulkhead. The extinguisher is activated when the heat sensitive head reaches a predetermined temperature. The extinguisher discharges and saturates the equipment room, smothering the fire.

WARNING

When the fire extinguisher discharge occurs, turn OFF all engines, bilge blowers and electrical system components. Refrain from opening the equipment room hatch, as the introduction of oxygen could accelerate any fire present there.

Allow the extinguishant to soak for 15 minutes after it discharges. With a portable fire extinguisher in your hand, cautiously inspect for damage. Avoid breathing fire vapors or fumes.



FOR021a

Figure 5-18: Automatic Fire Extinguisher

Refer to **Automatic Fire Suppression Indicator**, in **Section 4**, for information on the automatic fire extinguisher monitoring indicator. Refer to **Scheduled Checks and Service**, in **Section 8**, for information on maintaining the automatic fire extinguisher.



Equipment

Boarding Ladder

The boat is equipped with a flip-out ladder mounted in the swim platform. The ladder is for entering and re-boarding the boat when in the water.

Never allow the engine or generator to run when persons are using or are around the swim platform and/or ladder. Post a lookout to prevent persons from approaching the platform and/or ladder until the engine is shut down. Ladders are telescopic and must be fully extended before use.



DANGER

- Carbon monoxide (CO) can cause brain damage or death.
- Engine and generator exhaust contains odorless and colorless CO gas. CO gas will be around the back of the boat when engines or generators are running.
- Move to fresh air if you feel nausea, headache, dizziness or drowsiness.

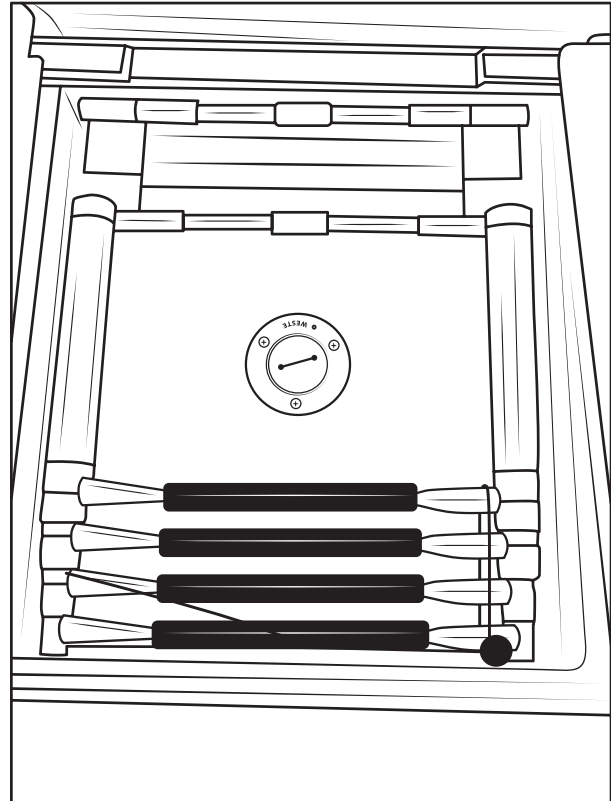


WARNING

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

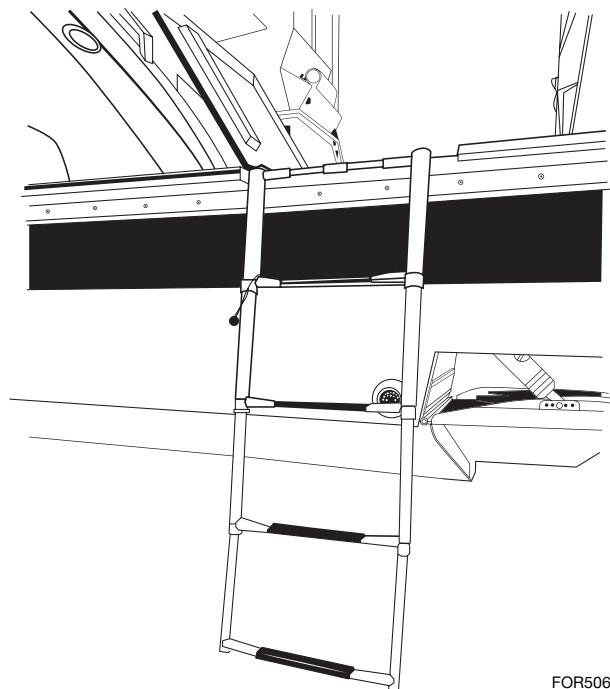
To use:

1. Be sure engine(s) are switched off and MP Alert indicator is not lit.
2. Open the hatch on the swim platform to access the ladder.



FOR514

3. Lift the ladder and flip it over the side.
4. Unhook the lanyard from the bottom rung.
5. Extend the rung sections until they stop. **Use care not to pinch fingers in the assembly during deployment or storage.**
6. Face ladder when using; do not use the ladder for diving, jumping or boarding the boat when not in the water.



FOR506

Figure 5-19: Typical Outboard Flip-Out Transom Ladder

To stow:

1. Pull up the rung sections until they are fully collapsed.
2. Hook the lanyard over the bottom rung.
3. Lift the ladder and flip it back into the storage area.
4. Close the swim platform hatch.

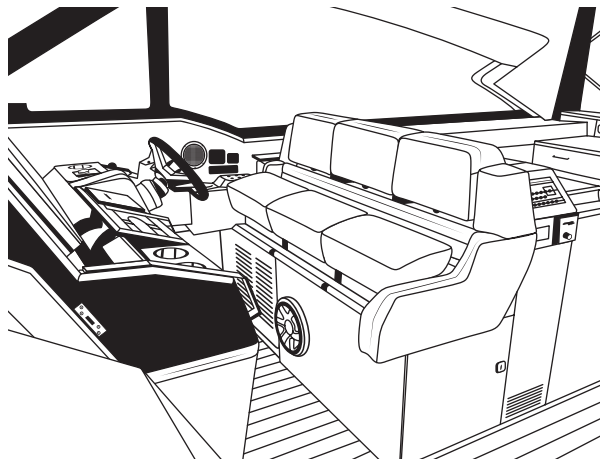
Helm Seat

The captain's seat has a flip-up bolster position for improved visibility while docking or when otherwise navigating in close quarters. One can sit on the raised cushion or stand in front of the cushion.

⚠ WARNING

EJECTION HAZARD

Standing while driving should only be attempted by an experienced driver, and then only while maneuvering at idle speeds in calm conditions. Failure to do so may result in the operator being ejected from the boat.



FOR507

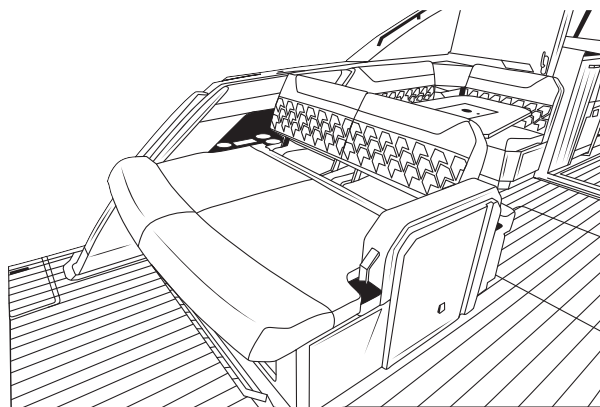
Figure 5-20: Helm Seat Bolster in Raised Position

Sun Lounge

The aft seat backrest folds forward to create an expansive sun lounge. Fore and aft-facing adjustable backrests also accommodate passengers alternating between the forward-facing and aft-facing positions. Lifting up on the backrests will disengage the lock mechanism and allow the operator to adjust positions.

⚠ WARNING

To avoid serious injury, do not occupy aft-facing lounge with engine(s) running.



FOR508

Figure 5-21: Fore/Aft-Facing Passenger Seating



Electric-Powered Bow Table

Your boat is equipped with an electric-powered bow table.

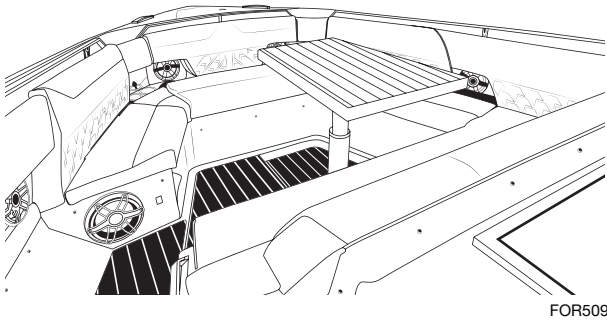


Figure 5-22: Electric-Powered Bow Table

Port bow table: Operates the two switches on the left to raise and lower the port bow table.

Starboard bow table: Operates the two switches on the right to raise and lower the starboard bow table.

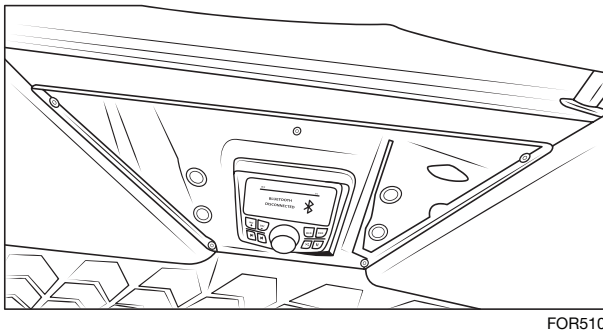


Figure 5-23: Bow Table Operation

Electric-Powered Cockpit Table

Your boat may be equipped with an electric-powered cockpit table.

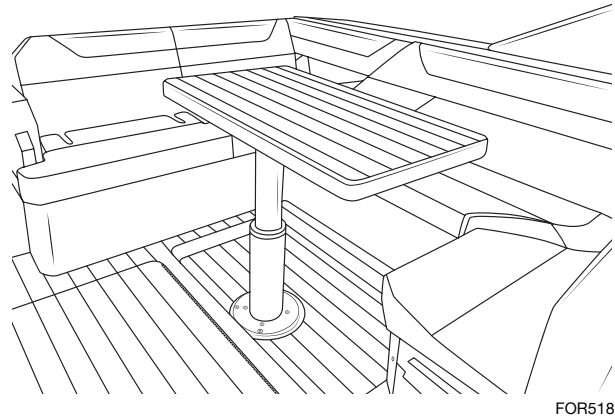
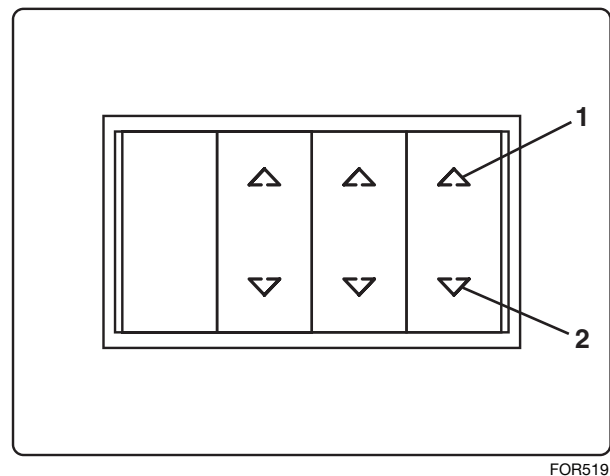


Figure 5-24: Electric-Powered Cockpit Table

Power to the table is provided by the switches located in the salon. Press the upper half of the switch to raise the table. Press the lower half of the switch to retract the table.



1. Raise Cockpit Table

2. Lower Cockpit Table

Figure 5-25: Cockpit Table Operation



Salon Table

The L-shaped raised salon nook includes a fold-out Corian® dining table and two tip-out barstools which can be retracted when not in use.

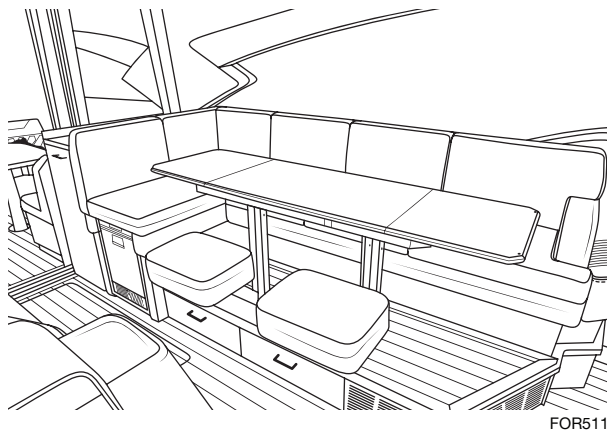


Figure 5-26: Salon Table

Stereo Auxiliary Input

3.5 mm Auxiliary Input

Located at the helm, this input allows you to connect an external audio device, such as an MP3 player, via a 3.5 mm audio cable to the AUX source on the factory-installed stereo system.

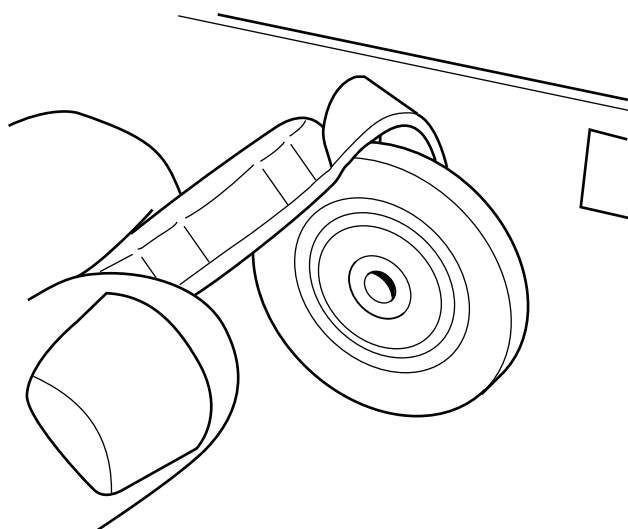


Figure 5-27: 3.5 mm Auxiliary Input

Hot Water Heater

Your boat is equipped with an on-board water heater, which operates on 120V AC power. To operate the water heater, the AC/DC panel must be supplied with 120V power and the AC panel switch labeled WATER HEATER must be ON. To avoid damaging the water heater element, the water heater tank must be full before turning the unit ON.

Water heaters unused for more than two weeks may produce hydrogen gas.

To reduce the risk of injury under these conditions, open the hot water faucet for several minutes at the galley sink before you use any electrical appliance connected to the hot water system.

WARNING

Do not smoke or have any flame near an open faucet; hydrogen gas is extremely flammable.

If hydrogen is present, you probably will hear unusual sounds like air escaping through the pipe as water begins to flow. Allow the water to flow until these sounds disappear.

Microwave Oven

Your Formula boat is equipped with a microwave oven in the salon and in the cabin galley. Since the unit operates on 120V power, the AC side of the AC/DC panel must be energized and the AC switch labeled SALON APPLIANCES or CABIN APPLIANCES turned ON for the accessory to function. Please refer to the respective owner manual in the Formula Owner Information Binder for information specific to this unit.

CAUTION

Remove the microwave's interior glass dish while boat is underway.

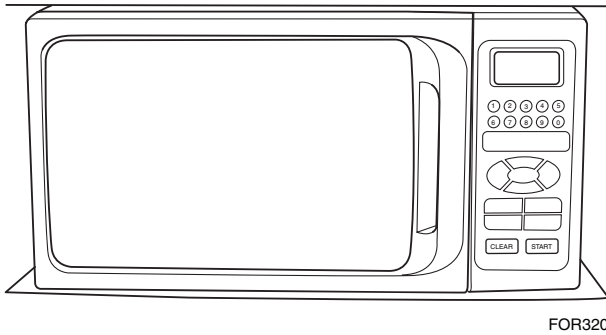


Figure 5-28: Microwave

Port Seat Refrigerator/Freezer

Your boat is equipped with a refrigerator/freezer located beneath the long portside cushion in the aft cockpit. The box is controlled with a digital thermostat.


1. Turn on the designated circuit breaker labeled UNDERSEAT REFRIG/FRZ ON THE BOAT'S ELECTRICAL PANEL.
2. Press and hold the set button until SET flashes in the display followed by numbers flashing and the cold icon.
3. Use the power button  for UP and the aux button for DOWN to change the temperature.
4. Press the set button to save the new setting.



Figure 5-29: Port Seat Refrigerator/Freezer Control Panel

Refrigerator

The dual electric refrigerators can be operated from both the 120 VAC system and the 12VDC system.

- When operating the refrigerator using the 12 VDC system, the SALON REFRIG or CABIN REFRIG circuit breaker on the DC control panel must be ON, and the SALON APPLIANCES or CABIN APPLIANCES circuit breaker on the AC control panel must be OFF.
- When operating the refrigerator using the 120 VAC system, the SALON APPLIANCES or CABIN APPLIANCES circuit breaker on the AC control panel must be ON, and the SALON REFRIG or CABIN REFRIG circuit breaker on the DC control panel must be OFF.

The thermostat control is inside the refrigerator. Refer to the refrigerator operator's manual in your Owner Information Binder.

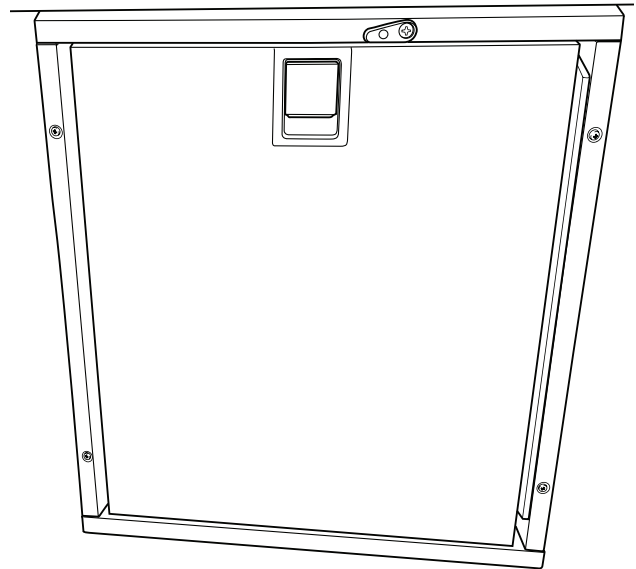


Figure 5-30: Refrigerator



VHF/FM Marine Radio

Provides reliable communications between boats, and between a boat at sea to public and private shore stations. For operating information, refer to the radio owner's manual in your Owner Information Binder.

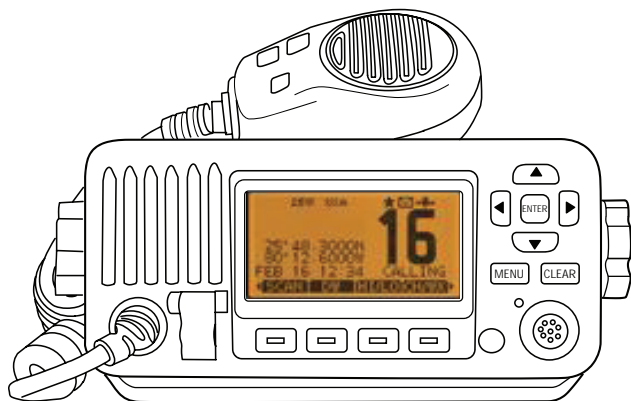
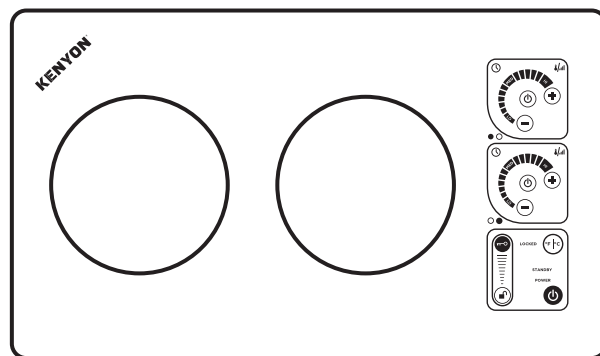


Figure 5-31: VHF/FM Marine Radio

Electric Stove

The salon-mounted electric stove operates only on 120 VAC. The switch marked CABIN STOVE on the AC control panel must be in the ON position to operate the stove. Refer to the stove operator's manual in your Owner Information Binder.

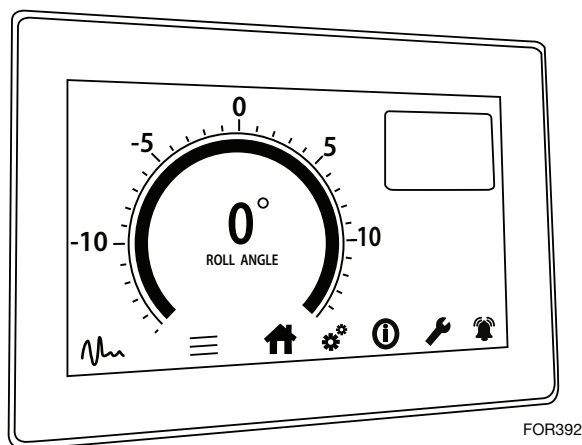


FOR526

Figure 5-33: Electric Stove

Seakeeper

Your boat is equipped with the Seakeeper stabilizer system. This system reduces pitch and roll while at sea. A control panel located at the helm programs the activity of the system.



FOR392

Figure 5-32: Seakeeper Control Panel



SYSTEM OPERATION AND EQUIPMENT

Electric Grill

An electric grill is located in the aft starboard corner of the cockpit.

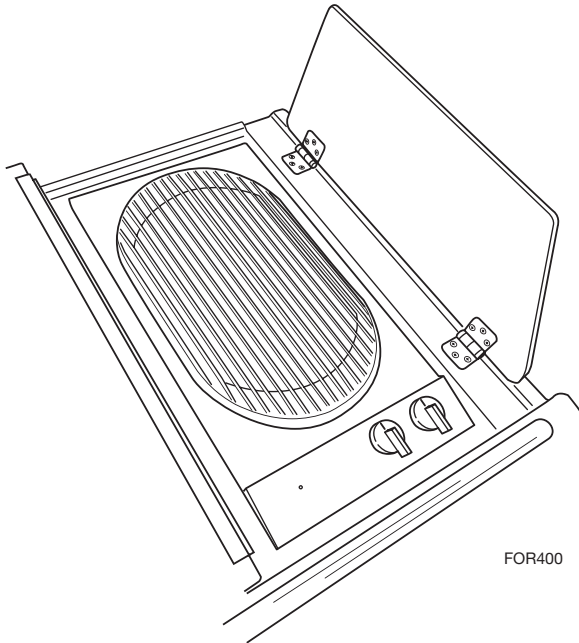


Figure 5-34: Cockpit-Mounted Electric Grill

Electronic Security Safe

An electronic security safe is installed in the cabin.

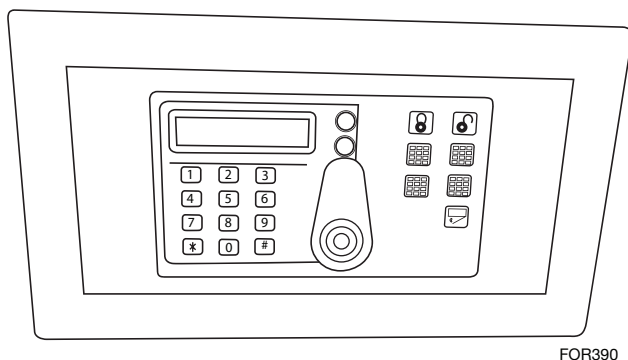


Figure 5-35: Electronic Security Safe

Tow Eye

The optional tow eye must be used when towing the boat.

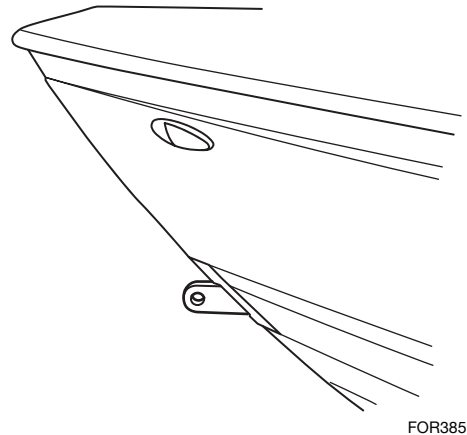


Figure 5-36: Tow Eye

WARNING

Use extreme caution when using tow lines and when connecting tow lines to a tow eye or cleats. Death or serious injury could occur if lines and/or cleats fail while they are under extreme tension.

Follow these guidelines when towing or being towed:

- Use extreme caution when throwing weighted lines to a boat in distress. When in rough seas, use a light throwing line with a weight secured on the throwing end and a heavier towing line secured to the other end.
- Never attempt to tow a boat larger or heavier than your own.
- Never attempt to tow a grounded, damaged or capsized boat.
- Use a tow line that is rated at least four times the gross weight of the boat being towed.
- Make sure tow lines are in good condition and are free of damage, cuts or abrasions.
- Attach a tow line to the tow/bow eye on the disabled boat. Never attach a tow line to any point on the disabled boat other than the tow/bow eye.

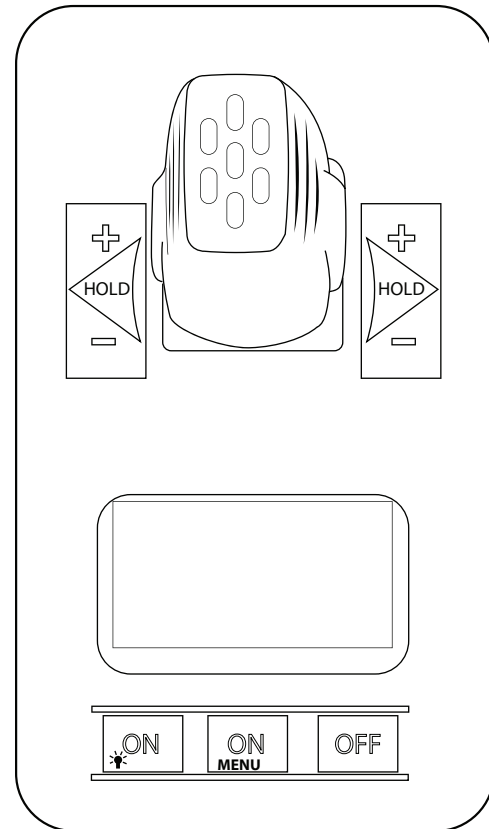


- Attach the tow line to the stern eyes of the towboat. Wrap the tow line with chafing gear where it rubs against the boat or any corners.
- Leave at least two boat lengths between the boats for adequate movement.
- Never allow anyone to be in line with the tow line. If the line breaks or pulls free, dangerous recoil could occur, resulting in severe injury or death to anyone in its path.
- Adjust the tow line to match wave action. Keep the boats on the crest or in the trough of the waves at the same time. In protected, calm waters, shorten the line for better handling.
- Tow at moderate speed, allowing for adverse wind and wave conditions.
- Have the operator of the towed boat steer with you if possible.
- Have a person on the tow boat watch the disabled vehicle and, if necessary, be available to signal the operator of the disabled boat.

Check with local and state authorities prior to towing for additional regulations and restrictions on towing other boats or equipment.

Bow Thruster

The boat is equipped with a bow thruster option to aid in docking; read the thruster operation information for proper use.



FOR530

Figure 5-37: Bow Thruster Joystick



Stand-Up Paddleboard Racks

Stand-up paddleboard racks are available as an option. They plug into sockets on the swim platform.

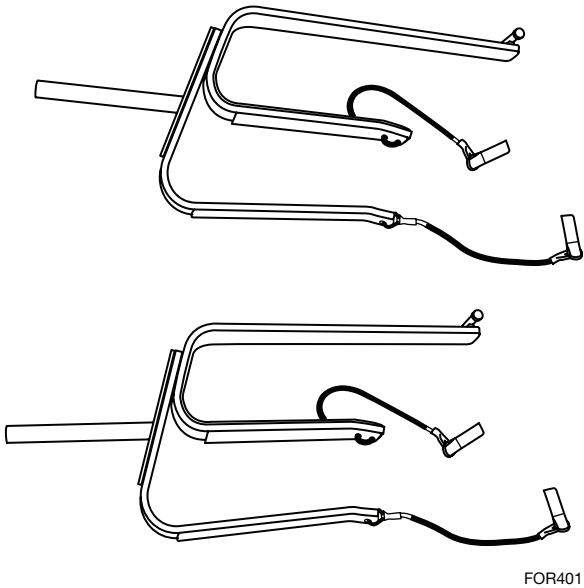


Figure 5-38: Paddleboard Racks

LED Underwater Lights

RGB underwater lights are installed on the transom.

NOTICE

Never operator the underwater lights when the boat is out of the water or when the boat is planing, as the water provides the necessary cooling. Make sure the lens bezel is completely submerged at all times.

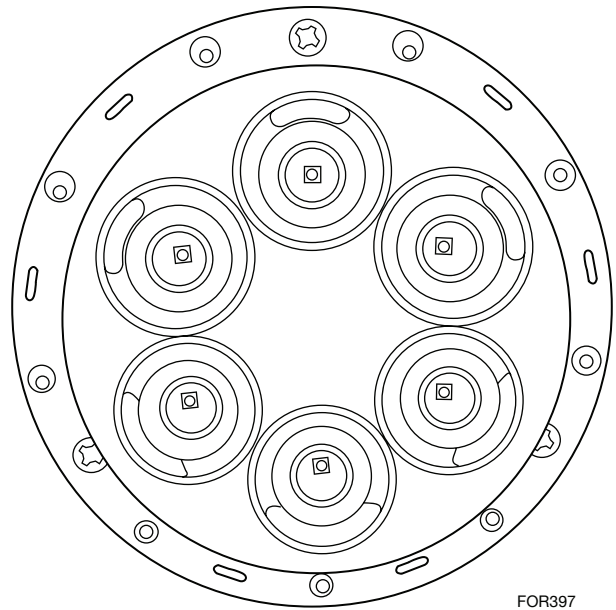
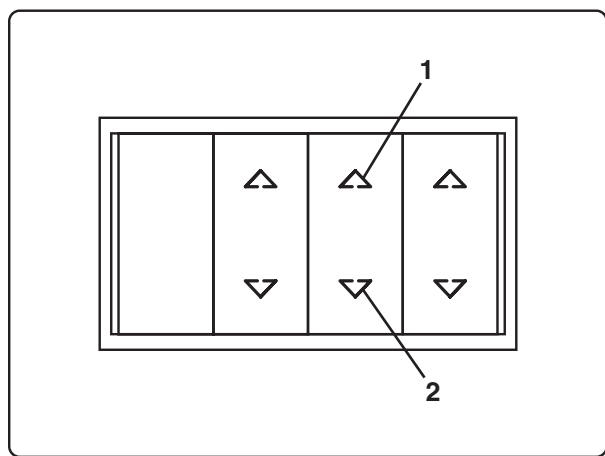


Figure 5-39: LED Underwater Lights



SureShade

The boat is equipped with a sunshade awning system that extends and retracts the shade from the hardtop. Power to the shade is provided by a switch in the salon.



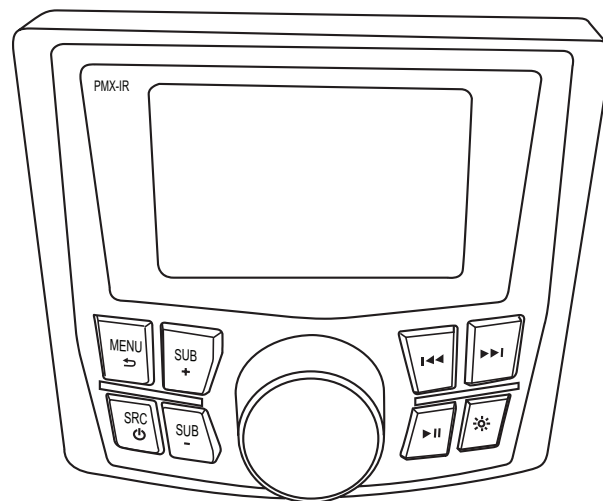
FOR520

1. Extend Awning
2. Retract Awning

Figure 5-40: SureShade Control Panel

Stereo Radio

A stereo radio control is located in the bow to regulate the radio throughout the boat.



FOR383

Figure 5-41: Stereo Radio Control

Vacuum Cleaner

The boat is equipped with a portable vacuum cleaner located in the pullout storage under the cabin entry steps. A charging station for the vacuum cleaner is also provided in the storage area.



NOTES



6

Getting Underway

There are many things to consider to make your boating trip safe and enjoyable. You are responsible for the safety of all passengers, the boat and any damage the boat or its wake may cause. Keep passengers from blocking your view so that you do not run into other boats, swimmers, water skiers, personal water vehicles or aids to navigation.

Safety Checklist



WARNING

Do not operate the boat if any problem is found during this inspection. A problem could lead to an accident during the outing causing severe injury or death. Problems found during this inspection should be handled by your Formula dealer.

The following checks are essential to safe boating and must be performed before starting the engines.

- Check the weather report, wind and water conditions.
- Check that required safety equipment is onboard and in proper operating condition.
- Check that fire extinguishers are fully charged.
- Test operation of the carbon monoxide detectors.
- Be sure the boat is not overloaded.
- Check that all maintenance has been performed.



WARNING

The nautical rules of the road must be followed to prevent collisions between vessels. Like traffic laws for automobiles, the operator is legally required to follow the rules.

NOTICE

In general, boats with less maneuverability have right-of-way over more agile craft. You must stay clear of the vessel with right-of-way and pass to his stern.

Signaling other boats with a whistle or horn is similar to using turn signals on an automobile. It is not necessary to sound a signal every time a boat is nearby. In general, boat operators should signal their intention to avoid potentially confusing or hazardous situations.

It is customary for the privileged boat to signal first, and the give-way boat to return the same signal to acknowledge she understands and will comply. Use the danger signal (five or more short and rapid blasts) if intent is not clear.



Use the following signal blast early enough to be noticed and understood by other boaters:

- One long blast: Warning signal (coming out of slip or passing astern)
- One short blast: Pass on my port side
- Two short blasts: Pass on my starboard side
- Three short blasts: Engines in reverse
- Five or more short and rapid blasts: Danger signal!

Privileged Boats

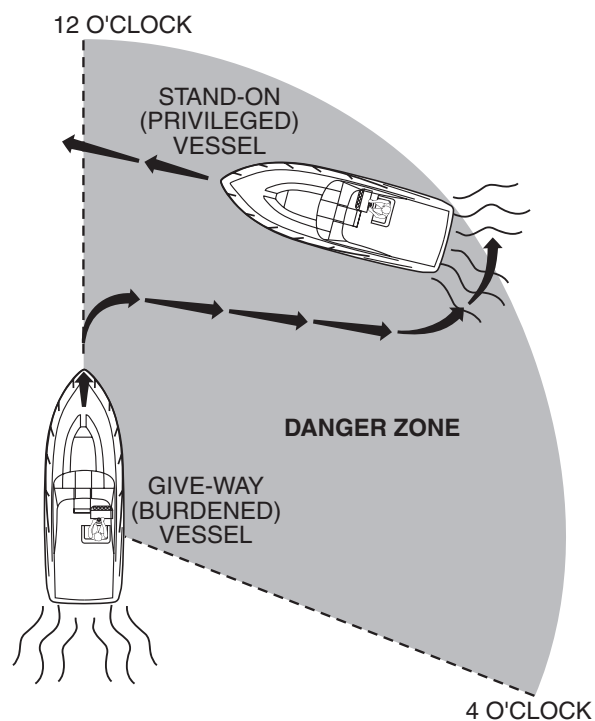
Privileged boats have right-of-way and can hold course and speed. Sailboats and boats paddled or rowed have the right-of-way over motor boats. Sailboats under power are considered motorboats. Small pleasure crafts must yield to large commercial boats in narrow channels.

Burdened Boats

The burdened boat is the boat that must make whatever adjustment to course and speed necessary to keep out of the way of the privileged boat.

Crossing Situation

In crossing situations, the boat to the right from the 12 o'clock to the 4 o'clock position has the right-of-way. It must hold course and speed. The burdened boat keeps clear and passes behind the privileged boat. Boats going up and down a river have the privilege over boats crossing the river.



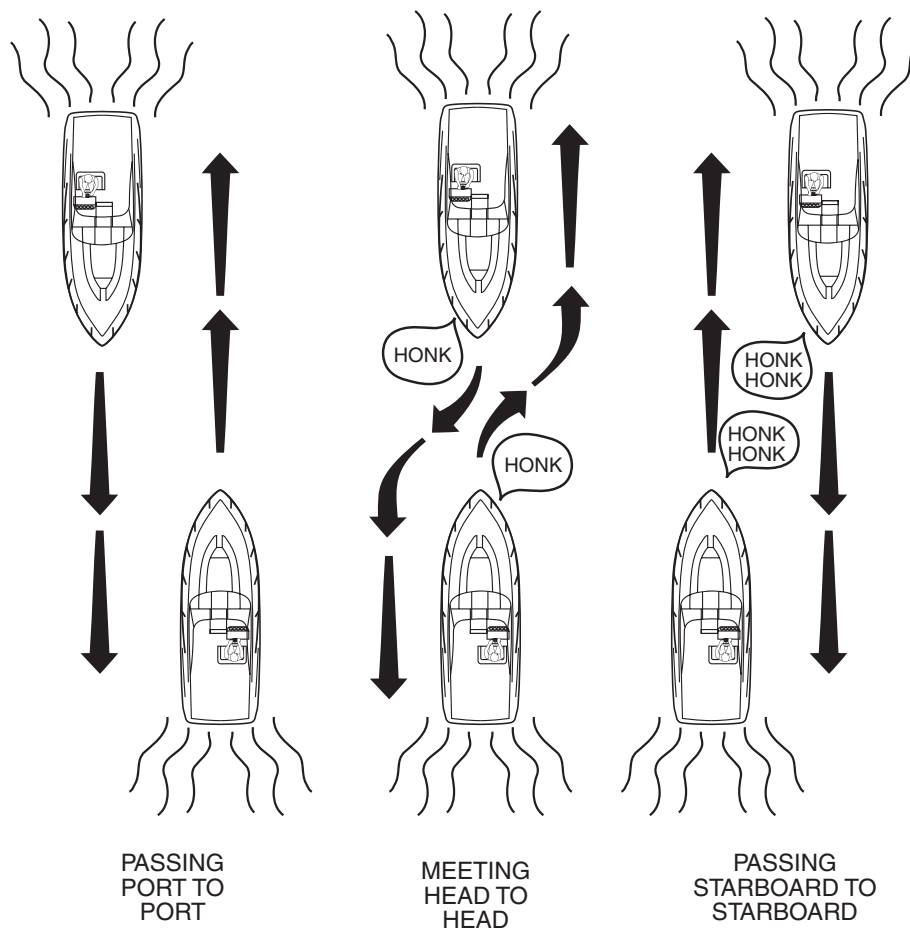
KC-0477-A

Figure 6-1: Crossing



Meeting Head-On

Neither boat has the right-of-way in this situation. Both boats should decrease speed, turn to the right, and pass port-to-port. However, if both boats are on the left side of the channel, each vessel should sound two short blasts and pass starboard-to-starboard.



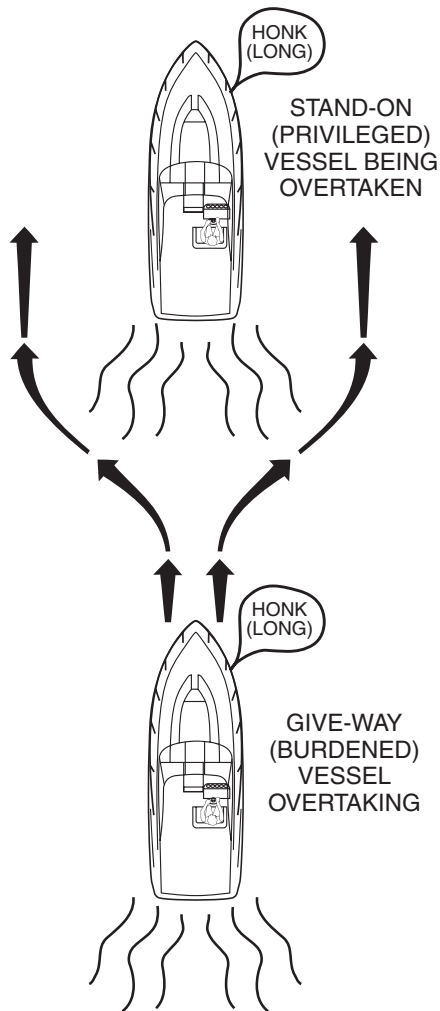
KC-0475-A

Figure 6-2: Meeting Head-On



Overtaking

The boat that is overtaking one ahead of it is the give-way boat and must make any adjustments necessary to keep out of the way of the stand-on boat. The stand-on boat should hold its course and speed.



KC-0476-A

Figure 6-3: Overtaking

Fueling



DANGER

Gasoline is extremely flammable and highly explosive under certain conditions. Stop the engines and generator, and do not smoke or allow open flames or sparks within 50 feet (15 meters) of the fueling area.

NOTICE

To prevent unwarranted engine damage, refer to your propulsion unit operator's manuals for recommended fuel type and octane rating.

Take care not to spill gasoline. If gasoline is accidentally spilled, wipe up all traces of it with dry rags and immediately dispose of the rags properly ashore. Spilled fuel may yellow the gelcoat finish, damage gunwale trim and discolor Imron.

When fueling:

1. Know your fuel tank capacity. Be sure to have enough fuel to reach your destination. If departing for an extended cruise, know the availability of fuel along your route. Practice the One Third Rule; 1/3 to reach the destination, 1/3 to return and 1/3 in reserve.
2. Avoid fueling at night, except under well-lighted conditions.
3. Moor your boat securely to the dock. Know the location of the fire extinguisher in case of emergency.
4. Keep accurate records of your fuel consumption. A fuel log tracking fuel use over time will help determine average consumption.
5. Close all doors, hatches, windows and other compartments.
6. Extinguish cigarettes, pipes, and all other flame producing items.



7. Make sure all power is off, and do not operate any electrical switches.
8. Remove the fuel fill cap.
9. Insert the hose nozzle and make sure nozzle is in contact with or grounded against fill opening. This will reduce the risk of static spark.

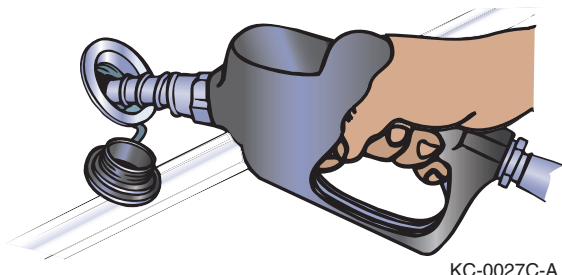


Figure 6-4: Fueling

10. Add fuel in accordance with the propulsion unit operator's manual. Do not overfill.

NOTICE

- Each time you refuel, inspect all fuel lines, hoses and connections for leaks and deterioration.
- The Federal Water Pollution Control Act prohibits the discharge of oil or oily waste into the water. Violators can be fined \$5,000.00. We urge you to protect our fragile environment by avoiding any type of discharge, trash or litter into our waterways.

After fueling:

1. Tighten the fuel fill cap. Wipe up any fuel spillage.
2. Open all windows, hatches, doors and compartments.
3. Check all fuel lines, hoses and connections for leaks and deterioration.
4. Be sure to run the blower for at least four minutes before starting the engines. If you smell gasoline fumes, do not start the engines; continue to run the blower until fumes have dissipated.

Pre-Operational Checks

WARNING

Do not operate the boat if any problem is found during this inspection. A problem could lead to an accident during the outing causing severe injury or death. Have any problem attended to by your Formula dealer.

Get into the habit of performing these checks in the same order each time so that it becomes routine.

- Make sure to check all safety items listed in **Safety Checklist**, in this section.
- Check that the bilge drain plug(s) is properly installed.
- Check that all batteries are fully charged and have the proper level.
- Verify the amount of fuel in the fuel tanks.
- Be sure the lights, horn, bilge pumps and other electrical equipment are in operating condition.
- Check that no fuel, oil or water is leaking or has leaked into the bilge compartment.
- Check all hoses and connections for leakage and damage.
- Open all seacocks and check for leaks.
- Check seawater strainers for leaks and accumulation of debris.
- Open raw water drain valves.
- Check that steering system operates properly.
- Make sure the shift lever(s) is in the NEUTRAL position.
- Do not overload your boat.
- Operate the bilge blowers for at least four minutes before starting the engines or generator.



Boat Trim/Loading

WARNING

All passengers should be carefully seated while the boat is moving. Do not sit on the bow, bow pulpit, deck or gunwale when the boat is moving.

Know the weight capacity of your boat. Do not overload your boat. Overloading of passengers, personal equipment and supplies could result in an accident, especially in rough waters.

The performance of your boat is dependent on load weight and distribution, drive unit trim and trim tab position. Passengers should distribute themselves to maintain trim. Remember to distribute weight from right to left, and also from front to back.

- Avoid excess weight in the bow or stern.
- Securely stow all extra gear in stowage areas to prevent load shifting. Do not stow gear on top of safety equipment; safety equipment must be quickly accessible.
- In adverse weather, reduce the load in the boat. People/load capacity ratings are based upon normal boating conditions.

Overloading of passengers, personal equipment and supplies could result in an accident, especially in rough waters. Maintain a balanced load at all times.

Boarding

When boarding the boat, always step in. Do not jump. Avoid stepping on smooth fiberglass or other potentially slippery surfaces. Board one person at a time.

Do not board the boat while carrying gear. Set the gear on the dock, board the boat and then pick up the gear.

Do not use the drive units as a boarding ramp, use the boarding ladder. To prevent injury, make sure the engines are OFF when swimmers, drivers and skiers are boarding.



7 | Operation

This section describes the basics of starting, running, stopping, steering, trimming and docking your boat. Formula strongly recommends all operators of your boat seek additional training on boat handling and safety. Have all operators become familiar with the handling characteristics and proper steering and control system usage before attempting high-speed operation.

Whenever you are going for an outing, make sure at least one passenger is familiar with the operation and safety aspects of the boat in case of emergency. Show all passengers the location of emergency equipment and explain how to use it. Don't allow passengers to drag their feet or hands in the water, or sit on the bow, bow pulpit, deck, gunwale or transom platform while the engines are running.

Starting

Your Formula boat may be equipped with a warning system that will sound an alarm if an engine problem develops. The horn may emit a short chirping sound during starting to verify operation. If the warning horn sounds when operating the boat, IMMEDIATELY throttle back to idle speed and shift into NEUTRAL. IMMEDIATELY check the gauges and stop the engines.

NOTICE

Continued operation after the warning alarm has sounded may cause severe engine damage.

WARNING

Test the carbon monoxide detectors operation before each trip, at least once a week and after the boat has been in storage. Do not tamper with the operation of the carbon monoxide detectors. They are installed for your safety.

Starting Gas Engines

WARNING

Operate the blower for at least four minutes each time you start the engines. In addition, the blower should be operated continuously when at idle and during slow speed operation. Failure to operate the blower can cause an explosion.

Complete the safety checklist before starting the engines. Please refer to the propulsion unit operator's manual for additional starting procedure information.

WARNING

- Attach the ignition safety switches' lanyards to the operator before starting the engines. This will prevent the boat from becoming a runaway if the operator is accidentally thrown away from the helm.
- Start the engines with the shift lever(s) in NEUTRAL. Your boat is equipped with a neutral safety switch which will not allow engines to be started unless the shift lever(s) is in the NEUTRAL position.

To start the engines on your 500SSC:

1. Power up the boat auxiliary battery and all four engine batteries.
2. Once all the systems have booted up, turn on the four engine keys in the glove box.



3. Allow the Vessel View to boot up.
4. Confirm the shifters are in neutral.
5. Press and release once the Start/Stop All Engines button on the side of the ERC (throttle/shifter) (see Figure 7-1). The engines should start one at a time.

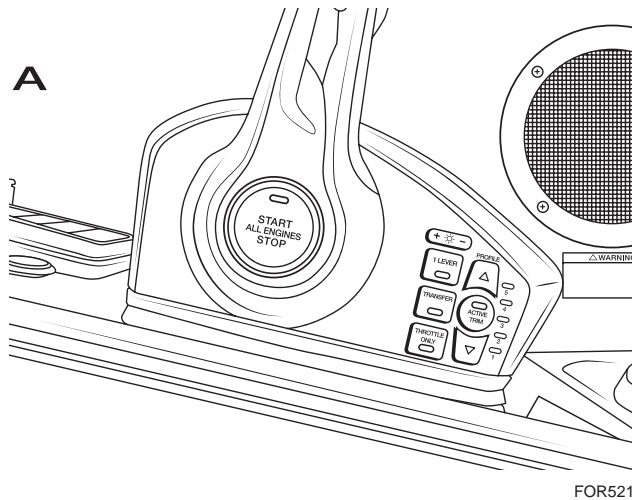


Figure 7-1: ERC Start/Stop Button

6. Allow the engines to warm up to operating temperature.

Alternatively, if you need to start just one engine or select which ones you want running, you may use the individual Start/Stop buttons on the back of the ERC (see Figure 7-2).

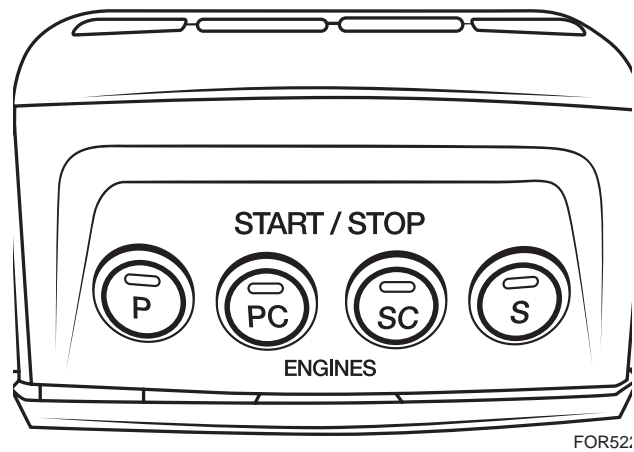


Figure 7-2: ERC "Individual Engines" Start/Stop Button

Shifting

NOTICE

- Go slowly in REVERSE to avoid taking water in over the transom. You can swamp the boat by taking on too much water.
- Do not shift too quickly from FORWARD to REVERSE. Damage to the engines may result. When shifting from FORWARD to REVERSE, pause in NEUTRAL until the engines are at idle speed and the boat has slowed.

Follow these guidelines when shifting your boat:

- Keep the control area clean and clear of obstructions.
- Pause in NEUTRAL before shifting from FORWARD to REVERSE, or REVERSE to FORWARD.
- Avoid shifting into REVERSE while the boat is traveling forward at speed.



Steering



WARNING

The boat's steering system is not self-centering. Propeller torque, trim setting, water condition and boat speed affects the steering. Constant attention to the steering system is required for safe operation.

The steering system must be working correctly and properly maintained. Be sure to:

- Keep mooring lines, tow lines and other obstructions clear of the steering system.
- Keep the steering system's moving parts clean and lubricated.
- Regularly inspect the steering system for kinks, damage and corrosion.

Running

Make sure the transom door remains closed when operating your boat. Observe the tachometers and maintain equal RPMs on both engines.

Stopping

Stopping (checking headway) is a technique that must be developed. Reverse thrust of the engines is used to slow and stop the boat. The boat's momentum will vary according to load, speed and water condition. Slow the engine speed to an idle, shift to NEUTRAL and pause, before shifting to REVERSE. Refer to your propulsion unit operator's manual for additional information concerning shifting.

Stopping Gas Engine



WARNING

Do not use the ignition safety switch and lanyard for normal stopping of the engines. Doing so will impair your ability to restart the engines quickly or may create a hazardous swamping condition.

1. Slowly bring the throttle lever(s) to the IDLE position.
2. Move the shift lever(s) to NEUTRAL.
3. After operating at high speeds, allow a 2-3 minute engine cool-down period at low idle.
4. Press and release the Start/Stop All Engines button on the side of the ERC (see Figure 7-3). All currently running engines will be stopped.

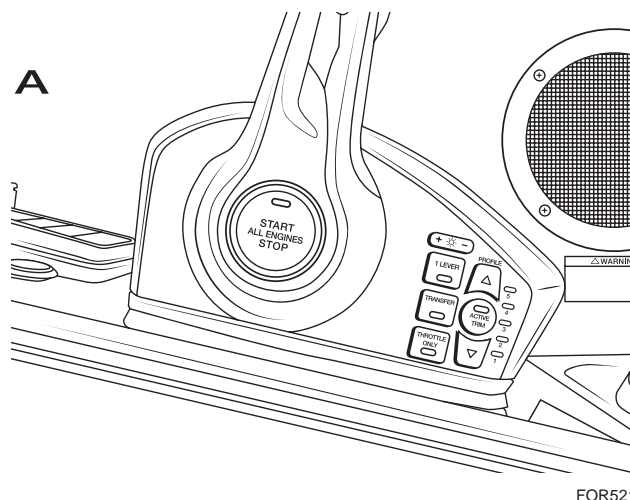


Figure 7-3: ERC Start/Stop Button

5. Turn the ignition keys to the OFF position. Alternatively, you may shut down individual engines by pressing the corresponding Start/Stop button on the back of the ERC, or turn off the corresponding ignition key switch (see Figure 7-4).

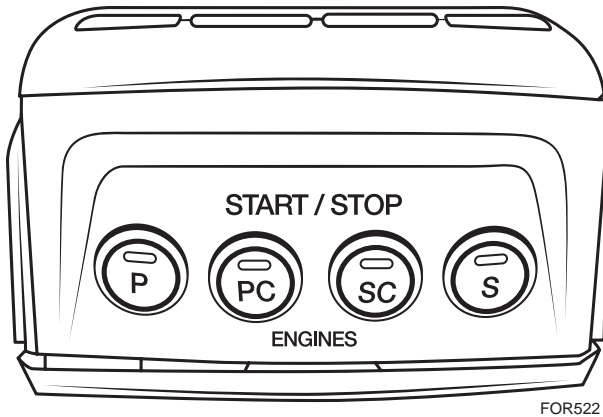


Figure 7-4: ERC “Individual Engines” Start/Stop Button

NOTICE

If any problems are encountered during the outing, have your boat inspected by your Formula dealer and request any necessary repairs before your next outing.

Cooling System Flushing

Flushing the heat exchanger or cooling system with fresh water is recommended after each use in salty, brackish, polluted or muddy water to minimize the formation of deposits that can clog cooling passages.

To facilitate engine flushing, fresh water flush kits are available as a factory-installed option from both Formula and the various propulsion manufacturers. Most outboard motors are equipped with a manual cooling system flush fitting. The following descriptions and instructions pertain only to Formula-installed fresh water flush systems.

The motors are equipped with a manual cooling system flush fitting. Refer to the engine manufacturer's owner's manual for flushing information. Your boat may be equipped with an automatic flushing system that greatly simplifies multi-outboard flushing. Automatic systems simply need to be connected to a fresh water source. To use:

1. Connect water hose to the fresh water port in aft of boat.

2. Turn on fresh water.
3. Push START button:
 - Once for 15-minute cycle per engine (LED solid blue)
 - Twice for 7.5-minute cycle per engine (LED blinks blue)
4. The unit will cycle through each engine and shut down once complete.
5. Remove water hose.

To manually stop the flush cycle:

- For 15-minute cycle, press START button twice
- For 7.5-minute cycle, press START button once

Refer to the automatic flush manufacturer's owner's manual for more information.

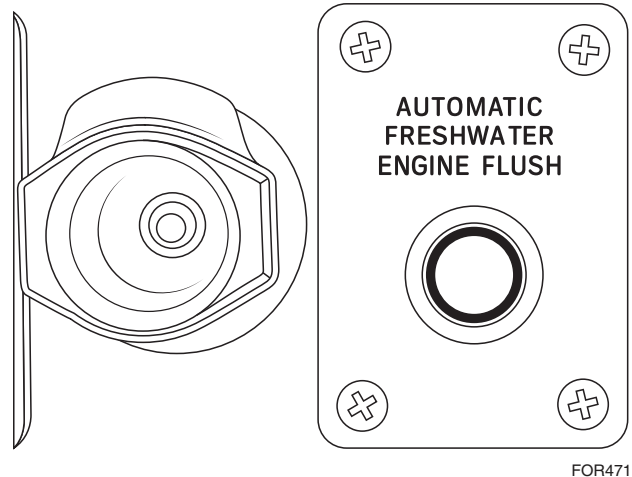


Figure 7-5: Outboard Automatic Fresh Water Port and Start Button



Operating at High Speed

WARNING

- Maneuverability above 45 MPH is limited. Sudden turns may cause loss of control.
- Your Formula boat is not designed for wake jumping. When crossing another boat's wake, throttle back to prevent your boat from leaving the water. Wake jumping is very dangerous. It is possible for the boat to re-enter the water on its side, transom or bow. You and your passengers could suffer serious injury. Also, damage to the boat could take place causing a hazardous condition.

When operating any boat at high speed, exercise a great deal of caution. This is particularly true during turns. Gradual turns can be completed at high speed by a competent driver, but, it must be emphasized that sudden turns at any speed and particularly at high speed can be especially dangerous. It is possible to throw passengers from their seats and even from the boat if caution is not exercised. Remember, common sense is the rule for safe boating.

We recommend you should have ten hours of experience with the boat before any full throttle operation. Do not operate your boat until you are completely experienced with its handling characteristics. The following are some guidelines for performance operation.

- Keep the bottom of the hull clean and free of barnacles and other growth. Growth on the hull can slow the boat down considerably.
- Prepare the boat. Be sure all gear is properly stowed and compartments are latched.
- Weight distribution affects performance. Keep weight in the boat to a minimum and evenly distributed.
- The propellers should be of the proper pitch to turn the recommended RPM rating for the engine with an average boat load. Refer to your propulsion unit operator's manual for additional information.

- Watch the tachometer. Keep the engines within the full throttle operating range. Refer to the propulsion unit operator's manual for full throttle operating range.

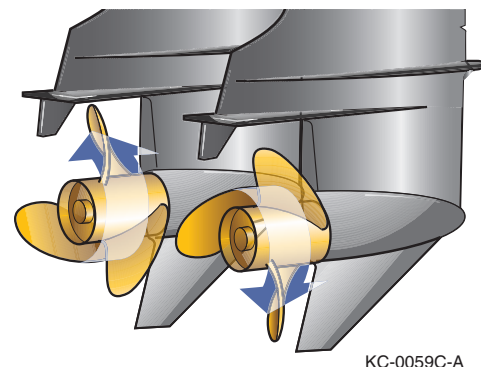
WARNING

Keep one hand on the steering wheel and the other on the throttle levers at all times. If the boat begins to operate in an unsafe way, pull back on the throttle levers. Trim the drive units IN at the same time. Failure to maintain control could result in severe injury or death.

High-speed operation on smooth water is very stable, but quick reactions and adjustments are needed to maintain control. Know your limits and stay within them. Keep one hand on the steering wheel and the other on the throttle levers; constant adjustments are necessary for rapidly changing conditions. Small inputs of throttle and steering movement are exaggerated at high speeds. Keep watch well ahead so you have enough time to react.

Propeller Effect

The effects of unequal propeller thrust, wind and current must also be kept in mind. While wind and current may not always be present, an experienced boater will use them to his advantage.



KC-0059C-A

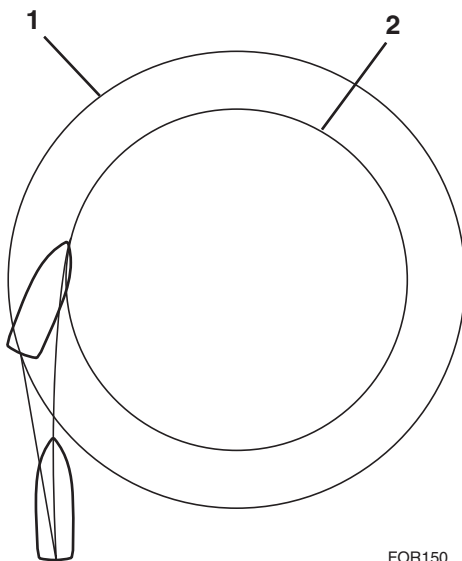
Figure 7-6: Propeller Effect



Multi-engine craft with counter-rotating drive units operate with less propeller-torque-induced drifting as compared to the same craft with like-rotating drives or, for that matter, single-engine boats with one propeller. This helps maintain an even keel, as the torque of the counter-rotating propellers is effectively a “wash.”

Maneuvering Techniques

Steering response depends on drive unit position, trim tab position, motion and throttle.



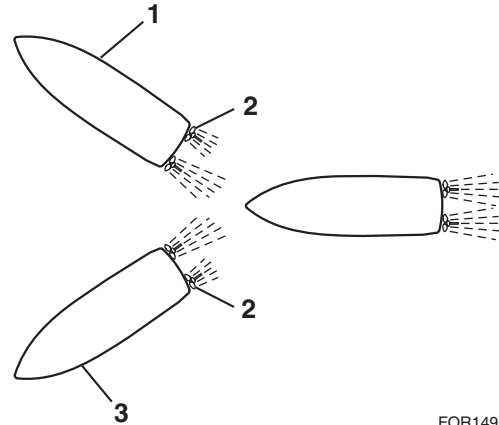
FOR150

1. Stern Circle
2. Bow Circle

Figure 7-7: Maneuvering

Wandering is a characteristic of all deep vee hulls at slow speed. There is no cure for wandering, however, a very basic operational technique can be applied which will minimize this characteristic. If the steering wheel is moved back and forth to compensate for wandering, invariably, the situation will be magnified. If the steering wheel remains in a centered position, the boat will wander back and forth slightly, however, the overall course of the boat will be a straight one.

When operating your Formula boat at low speeds, use propeller thrust to maneuver the boat, do not just turn the drive units. This enables you to maneuver in a smaller area and have more control of the boat. This technique is a combination of propeller direction, engine thrust and steering wheel maneuvers.



FOR149

1. Starboard Turn
2. Slower Propeller
3. Port Turn

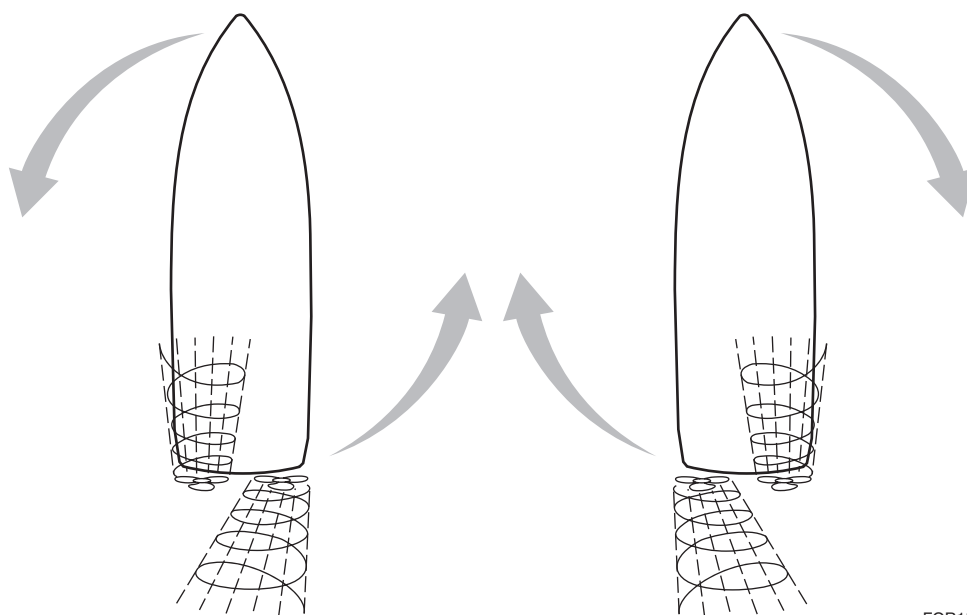
Figure 7-8: Slow Speed Maneuvering

When making tight maneuvers, it is important to understand the effects of turning. Since both thrust and steering are at the stern of the boat, the stern will push away from the direction of the turn. The bow follows a smaller turning circle than the stern.



To Make Sharp and Close Quarter Turns:

1. Slow engine speed to an idle, shift to NEUTRAL and pause, then shift to REVERSE. This practice will help prevent damage to your drive units.
2. Reverse the direction of the propeller on the side you want to turn. For example, if you want to turn starboard, shift the starboard engine into REVERSE. The forward speed of the port engine, along with the reverse rotation of the starboard propeller, will pivot your boat into a starboard turn.
3. Practice using the shift lever(s) to control the boat. Try maneuvers in open water before attempting them near docks or other boats.
4. Use a quick “burst” of your shifters to control the boat. Keep in mind that once the boat starts to move, momentum will carry through.



FOR151

Figure 7-9: Close Quarter Turns

It is best to learn maneuvering skills in open water away from traffic. Adequate practice is the only way to develop your boating skills.



Boating at Night

NOTICE

Operate the boat between sunset and sunrise using your navigational lights. Navigational lights are legally required to indicate direction and right-of-way at night.

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

Protect your night vision by avoiding bright lights. Have a passenger, if possible, help keep watch for other boats, water hazards, and aids to navigation.

The size, speed, and direction of the other vessels are determined at night from the running lights. A green light indicates the starboard side of the boat, and a red light indicates the port side. Generally, if you see a green light, you have the right-of-way; if you see a red light, give-way to that vessel.

Navigational Lights

You must use your navigational lights (running lights) when operating your Formula boat between sunset and sunrise, and when day time visibility is limited. Also, check with the local authorities before operating your boat for other requirements concerning the use of navigational lights.

The navigational lights are identified by a masthead light, stern light, a red light on the port side of the vessel, and a green light on the starboard side.

Anchor Light

All boats at anchor must display a proper white anchor light. The anchor light (all around light) is the white light located on top of the radar tower. The anchor light must be visible 360 degrees and remain on anytime the boat is moored.

Docking lights are to be used for docking only. It is illegal to use your docking lights while cruising.

Special Operating Conditions

Using your boat in different environments requires special operating considerations.

Salt Water

During long periods of mooring, if possible, tilt the propulsion units drives out of the water—except in freezing temperatures.

Fresh water flushing of the engines is recommended after operating in salt, polluted or brackish water. On non-closed water cooling engines, Formula may provide a fresh water flushing port. Refer to **Cooling System Flushing**, in this section, for additional flushing information.

Refer to the propulsion unit operator's manual for that manufacturer's salt water operating recommendations.

Freezing Temperatures

When boating in temperatures below freezing, keep the propulsion unit's drives tilted down (submerged) at all times. This will prevent damage from freezing.

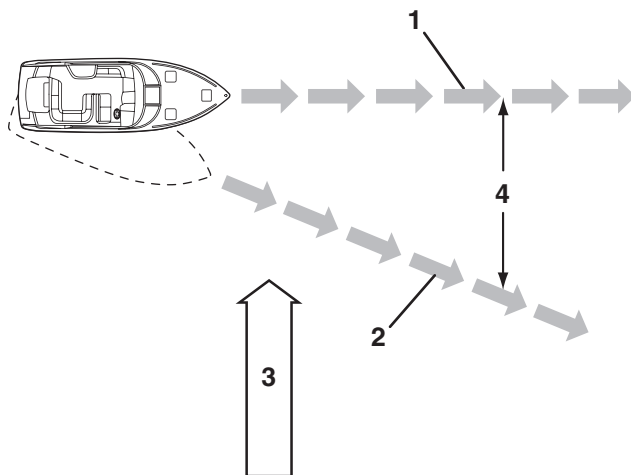
Upon removing your Formula boat from the water, leave the drive units in the vertical position until the cooling system has drained. Refer to your propulsion unit operator's manual for additional information.



Use caution when handling clear isinglass on the Bimini enclosure in low temperatures to prevent damage from cracking.

Holding Course

Wind and/or current will affect the boat's speed, course and time to reach your destination. When traveling to your destination, wind and/or current will cause the boat to deviate from the intended course. The amount of difference between the intended course and the course the boat must travel to reach your destination is called leeway. The wind or current pushes sideways on the boat causing it to travel at an angle to the intended course. The speed of the boat determines the amount of leeway between the intended course and the traveled course.



FOR196

1. Intended Course
2. Traveled Course
3. Wind/Current
4. Leeway

Figure 7-10: Effects of Wind/Current

Trimming-Drive Units and Trim Tabs

Boat trim while on plane is influenced by load distribution, drive unit trim and trim tab trim.

Determining the best boat trim while underway takes time. It is best to experiment with different drive and tab trim combinations while taking note of the condition.

Drive Unit

Trim angle is the angular relationship between the drive unit and the transom of the boat. Boat trim while underway greatly affects the performance and efficiency of your boat. For best results, the boat should be on plane and trimmed to reduce the amount of the boat's hull in the water (known as wetted surface). With less boat in the water, both speed and fuel economy increase. Continuous trim adjustment is required when operating your boat to maintain maximum performance and efficiency.

If the drive units are trimmed in too far (closer to the boat bottom), speed drops, fuel economy decreases and the boat may not handle correctly. However, it does provide better acceleration from a standstill; and because it forces the bow down, visibility is improved. If the drive units are trimmed out too far (away from the boat bottom), steering torque may increase, the boat may be difficult to get on plane, and may bounce.

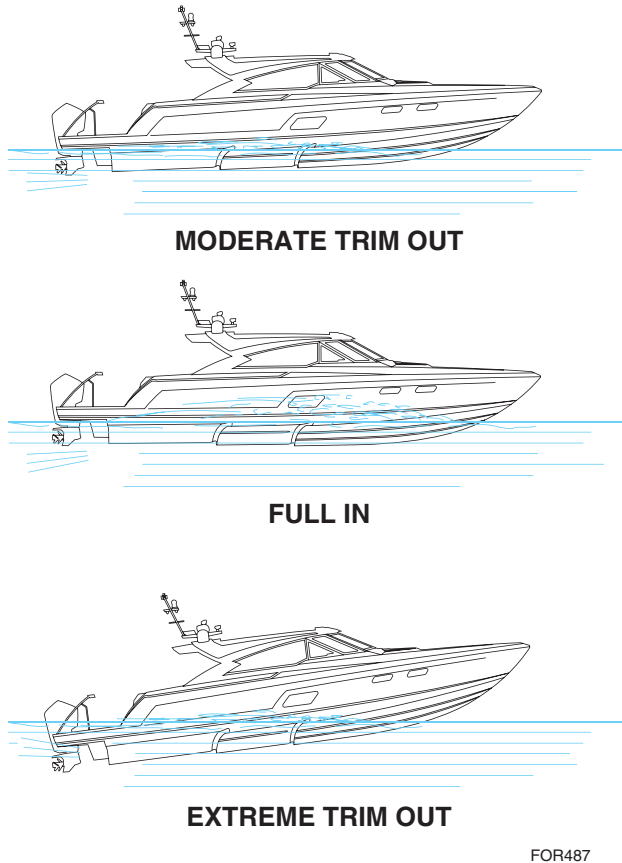
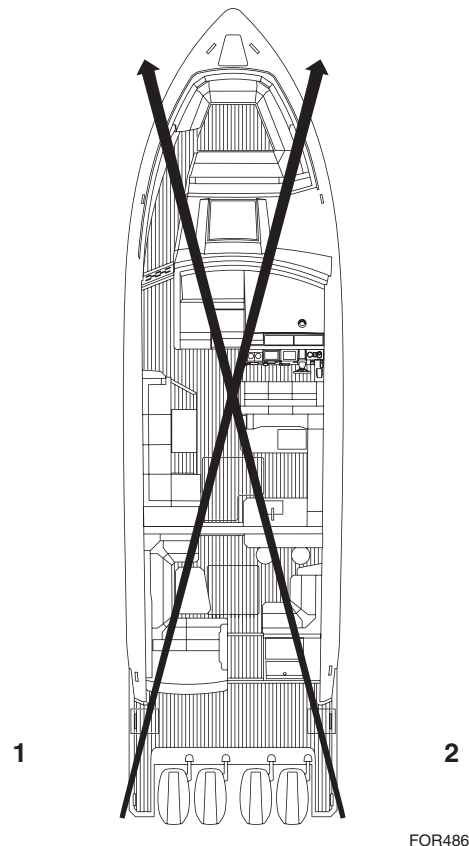


Figure 7-11: Drive Angle Trim

To use power trim effectively, start with the drive units trimmed in. As the boat planes, increase the angle out. Experience is the best teacher for understanding proper drive trim.

Trim Tabs

The trim tabs are a separate system in themselves and are not to be used in lieu of the drive unit power trim system. Water is deflected and redirected as the trim tabs are raised and lowered. This change in the water flow creates upward pressure under the tabs and raises the stern. When the stern raises, the bow is lowered. Likewise, lowering the port tab will cause the port stern to raise, making the starboard bow lower.

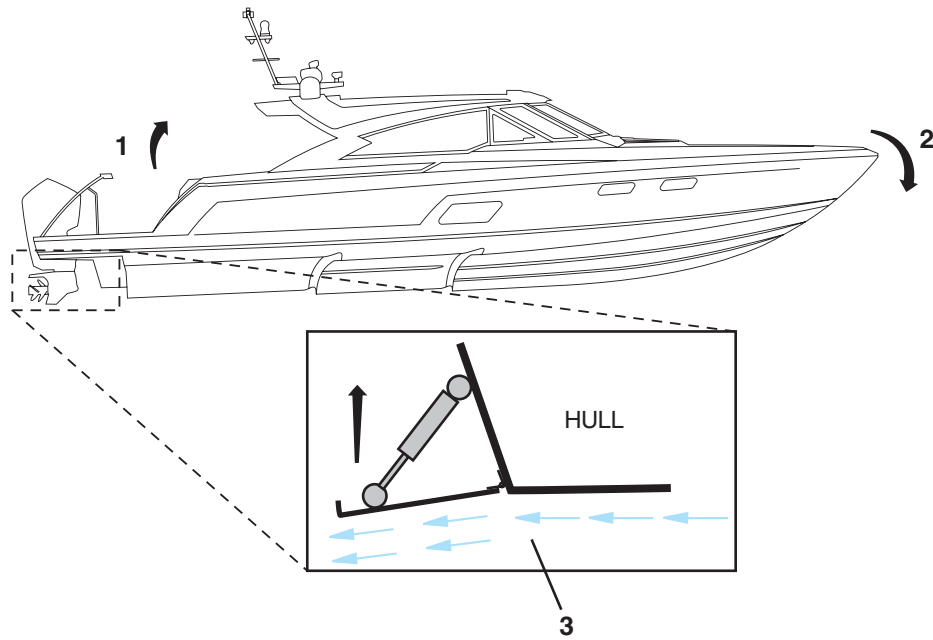


1. Port Trim Tab Lowered
 - Port Stern Rises
 - Starboard Bow Lowers
2. Starboard Trim Tab Lowered
 - Starboard Stern Rises
 - Port Bow Lowers

Figure 7-12: Trim Tabs



Using trim tabs in conjunction with the drive trim will compensate for uneven weight distribution, listing, water conditions and other factors that cause inefficient operation. Remember that trim tabs are trimming the hull while the power trim is trimming the drive unit.



FOR488

1. Stern Rises

2. Bow Lowers

3. Water Is Redirected Creating Upward Force at Stern

Figure 7-13: Trim Tab Operation



To adjust boat trim while underway:

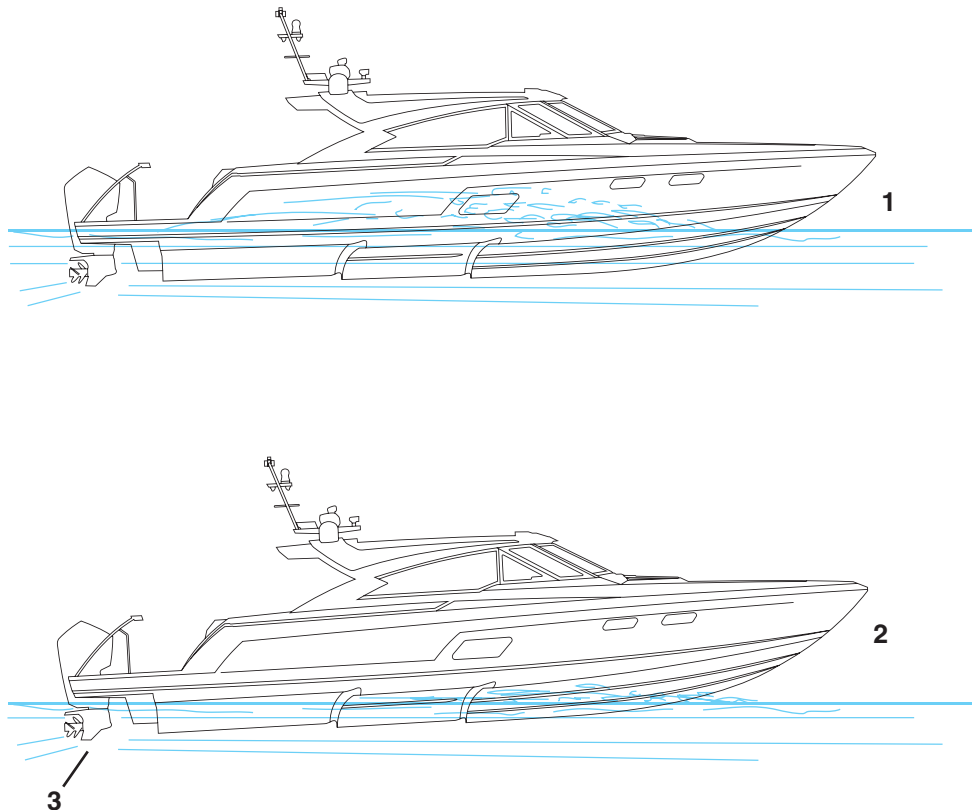
1. Before accelerating, make sure both trim tabs are fully raised.
2. Adjust the trim tabs to achieve a planing attitude.
3. Use the drive trim to position the propeller path parallel to the water flow.
4. Readjust the trim tabs to fine tune attitude. Operate only one tab at a time and in small increments. As the tab takes effect, you will notice it causes the boat to veer off course slightly. Correct for this as it happens.

5. To prevent the boat from listing, do not have one tab further down than the other tab.



WARNING

Improper use of the trim tabs at high speeds can cause an accident or injury.



FOR489

1. Untrimmed
2. Planing Altitude
3. Propeller Parallel to Water Flow

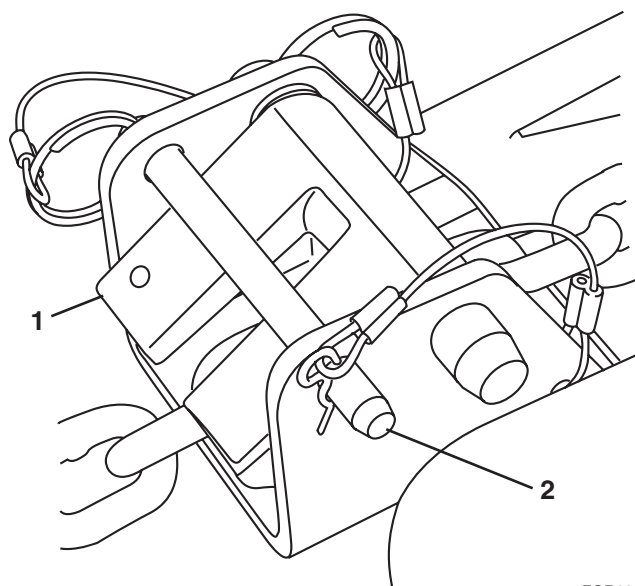
Figure 7-14: Trim Tab/Power Trim Operation



Anchoring and Sea Anchors

Windlass

The windlass is operated from the driver's helm and by switches near the anchor davit. The windlass system can also be operated manually. A manual hand crank is located in the anchor locker.



FOR028

1. Chain Stop
2. Lock Pin

Figure 7-15: Windlass Lock Pin Installed

The chain stop (**Figure 7-15, 1**) is used to lock the anchor when it is deployed. A locking pin (**Figure 7-15, 2**) secures the chain stop.

After retrieving the anchor, be sure to tighten the gypsy cap using the provided wrench.

NOTICE

Do not use the chain stop to hold the anchor in the stored position. Be sure to tighten the gypsy cap to store the anchor. Otherwise, damage to the windlass system may occur.

Refer to the operator's manual supplied with the windlass system for proper operation of the windlass in the electric and manual modes.

⚠ WARNING

The lock pin must be installed in the anchor bracket when the windlass is not in use. Do not operate your boat without the lock pin installed.

A 100-amp circuit breaker protects the Windlass electrical circuit. Refer to **Specifications**, in **Section 3**, for location of the circuit breaker.

Use caution when anchoring. Look for signs of underwater pipes or cables. With the engines off, you have no control of the boat. Water and wind conditions will affect an anchored boat. Be sure the anchor will hold before leaving the boat.

⚠ WARNING

- Keep hands, feet, loose clothing and hair well clear of the winch and chain during operation.
- Be sure you have a clear view of the winch when operating it.
- Run the boat's engines while raising or lowering the anchor. Not only is this a safety precaution, it also prevents draining of the batteries.
- Use the chain stop to remove the load from the anchor chain.
- Secure the anchor with a rope or fastener pin when operating the boat at high speed or in heavy weather.



Lowering

Bring the boat to a stop with the bow facing into the wind or current. Lower the anchor. Press the toggle switch down to pay out sufficient chain to set the anchor.

Setting

When the anchor hits bottom, slowly back up the boat, keeping tension on the chain. The anchor line should be five to seven times the depth of the water.

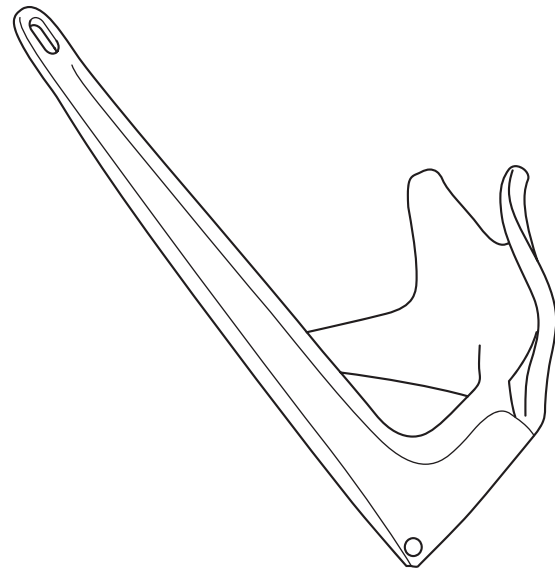
Weighing

To weigh (retrieve) the anchor, start the engines and slowly move forward. Press the windlass switch up while taking in anchor line as you go. Carefully retrieve the last 36 inches of chain, then seat the anchor in the bow fitting.

Conventional Anchor

WARNING

Anchor from the bow, not from the stern. A strong current can pull a boat, anchored by the stern, underwater and keep it there.



FOR348

Figure 7-16: Claw Anchor



There are many types of anchors available on the market. The choice of one anchor over another depends on many factors. An anchor will usually hold best in a mixture of mud and clay or in hard sand. A claw anchor is recommended for general boating. For more information on anchors, contact your Formula dealer.

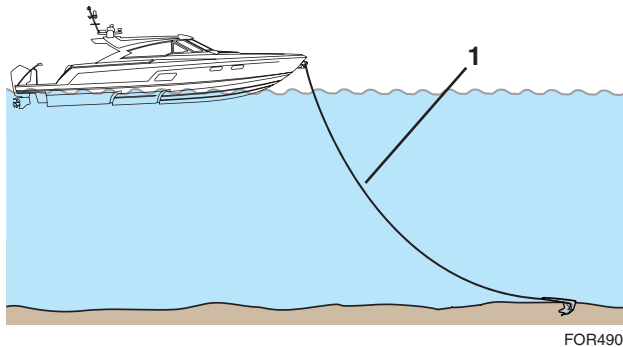
Lowering

Make sure the line is tied to the anchor and tie the other end to the forward cleat or bow eye.

Head the boat into the wind or current over the spot where you want to lower the anchor. Spot the boat before lowering the anchor.

Setting

When the anchor hits bottom, slowly back up the boat, keeping tension on the line. Let out an anchor line that is 4 to 6 times the depth of the water. For example, if you are in 10 feet of water, let out 40 to 60 feet of line.



1. Length of Line – 4 to 6 Times Depth of Water

Figure 7-17: Anchoring

Occasionally check your position against the shoreline. If the anchor is dragging and you are drifting, reset the anchor.

Weighing

Start the engine(s) and move forward until the anchor line is straight up and down. Pull hard to lift the anchor from the bottom material.

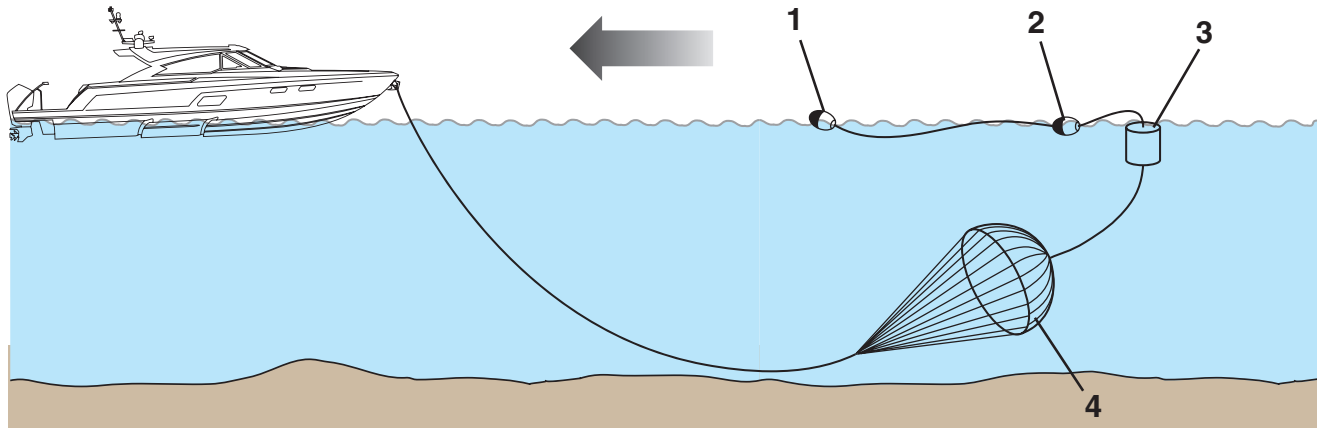
If the anchor is caught on the bottom, attach a line to the bow cleat so that it is taut. The up and down motion of the bow from wave action may lift the anchor from the bottom. If the anchor remains caught, let out a few more feet of line and attach it to the bow cleat. Slowly maneuver the boat around the anchor until the anchor pulls loose. Be sure to keep the line tight during this procedure.



Sea Anchor

A sea anchor is used to hold the boat's bow into the wind and waves in heavy seas when the boat has lost its power. This will reduce the drifting of the boat.

A sea anchor has a general shape of a parachute. A sea anchor construction can be like a parachute canopy or a lattice web design. A rope attaches the sea anchor to the boat. Floats with trip lines allow the sea anchor to be pulled back into the boat.



FOR491

1. Recovery Float
2. Float
3. Stowage Bag
4. Sea Anchor

Figure 7-18: Sea Anchor

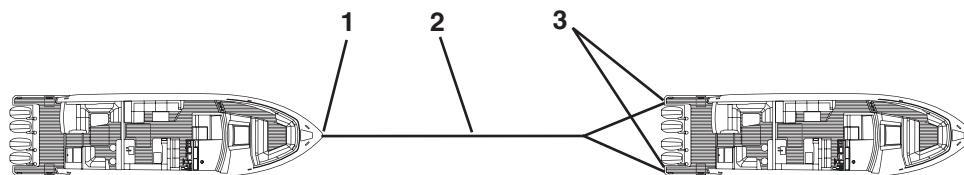
Towing and Being Towed

If seas are rough, it may not be easy to extend the tow line from one boat to another. In these cases, use a light throwing line with a weight on one end and with the heavier towing line secured to it.

Do not attempt to tow a much larger or grounded vessel. Because of the tremendous stress caused by towing, use a tow line that is rated at least four

times the gross weight of the boat being towed. Tow ropes must be in good condition, free of any cuts or abrasions.

Attach the tow line to the bow eye on the disabled boat. Attach the opposite end of the bridle only to the stern eyes of the tow boat. Wrap the bridle with chafing gear where it rubs against the boat. Leave at least two boat lengths between the boats for adequate movement.



FOR492

1. Bow Eye
2. Tow Line
3. Stern Eyes

Figure 7-19: Towing



WARNING

When towing, use only the bow and stern eyes or tow eye, if equipped; do not use cleats, handrails, etc. Do not allow anyone to be in line with the tow rope. If the rope should break or pull free, a dangerous recoil could occur resulting in severe injury or death to anyone in its path.

Adjust the tow line to match wave action. Keep the boats on the crest or in the trough of the waves at the same time. In protected, calm waters, shorten the line for better handling. Tow at moderate speed, allowing for adverse wind and wave conditions. Have the operator of the towed boat steer with you, if possible.

If you need a tow, or wish to tow another boat, use great care. The boat structure can be damaged by excessive pulling strain. You should offer help to a boat in trouble. However, towing a capsized, grounded or hull damaged boat is dangerous. Give assistance to the occupants; then call the proper authorities.

Heavy Weather

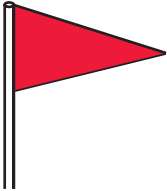

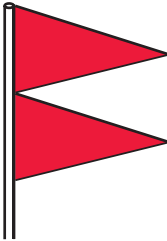





Getting caught in severe weather is hazardous. Check with local weather stations, the USCG, or Weather Service Broadcasts for the latest conditions. It is recommended to check the weather, sea and wind conditions not only before you leave, but, periodically while you are boating.

A change in wave height, wind direction and speed indicates deteriorating weather. Take common sense precautions if you are forced to operate your boat in stormy conditions:

- Wear PFDs.
- Stow gear below deck and batten down equipment on deck.
- Reduce speed and head for a safe place that you can easily reach.
- If you lose power, keep the boat headed into the waves by using the anchor.



Learn the storm signals.

DAYTIME WARNING	DESCRIPTION	NIGHTTIME WARNING
	Small Craft Advisory - Winds greater than 18 knots, sustained for two hours or more or hazardous wave conditions. Following a storm, hazardous wave conditions can persist long after the high winds have subsided.	
	Gale Warning - Sustained winds (2 or more hours), of 34-47 knots.	
	Storm Warning - Sustained winds of 48 knots or greater.	
	Hurricane Warning - Forecast winds of 64 knots and above. Displayed only in connection with a hurricane.	

 Actual Signal in red

KC-0371C

Figure 7-20: Storm Signals

It is best to avoid operating your boat in foggy weather. When fog sets in, take bearings and log courses and speeds. You are required to emit a

five-second blast from your horn or whistle once every minute. Additionally, have passengers wear PFDs and watch for oncoming vessels.



Swimming and Diving

Larger boats produce a wake too big for skiers. Only boats equipped with a ski-tow eye should be used to

pull water skiers. It is unlikely that anyone would ski behind your Formula boat, but you should be familiar with water sport safety and hand signals.



Figure 7-21: Water Sport Hand Signals

NOTICE

It is unlawful to participate in water sports while under the influence of alcohol or other drugs.

When participating in water sports, be safe and courteous and follow these guidelines:

- Be considerate to fishermen and others you share the water with.
- Do not perform water sports in congested areas.
- Stay away from navigation markers.
- Stay away from other boats and water sports participants.
- Return immediately to a fallen water sport participant.
- Regularly inspect water sport equipment to ensure it is safe.
- Do not use any fuel burning appliances with a transom exhaust port when swimming from the stern swim platform.

WARNING

- Water sport participants must wear a USCG approved flotation device. A Type III water ski vest is an approved and practical PFD.
- Keep at least 100 ft away from all other objects.
- When water sporting, have an experienced driver and aft facing observer in the boat.
- Do not water sport in shallow water or at night.
- Do not jump from a moving boat.
- Keep a downed water sporter in sight.
- Turn the engines OFF before you get close to someone in the water.

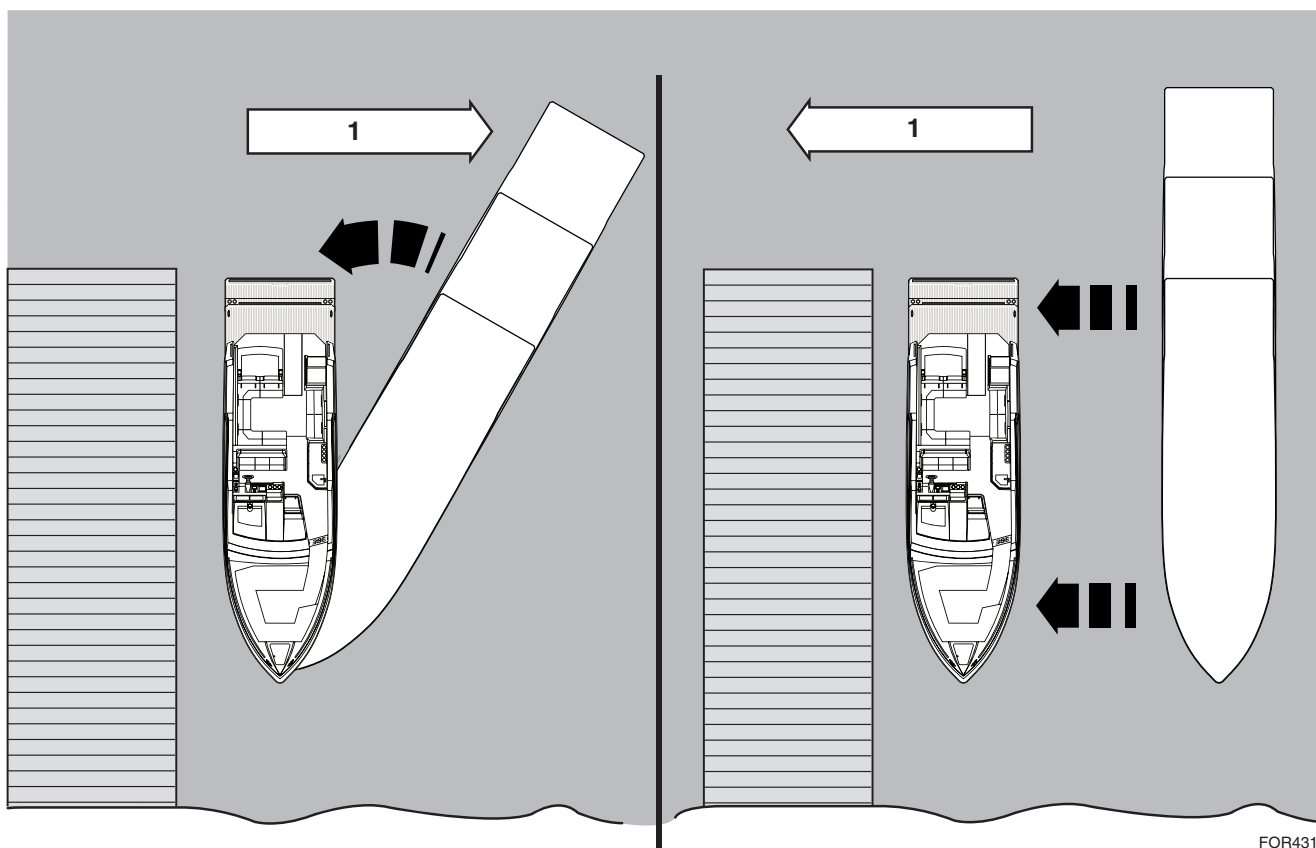


Docking

Approach a dock slowly and use caution. Plan your maneuvers ahead of time. Allow wind and current movement to help maneuver your boat.

WARNING

Do not use your hands, arms or another part of your body to attempt to keep the boat from hitting the dock. The boat could push against the dock, causing severe injury.



FOR431

1. Wind or Current

Figure 7-22: Docking

Follow these guidelines when docking:

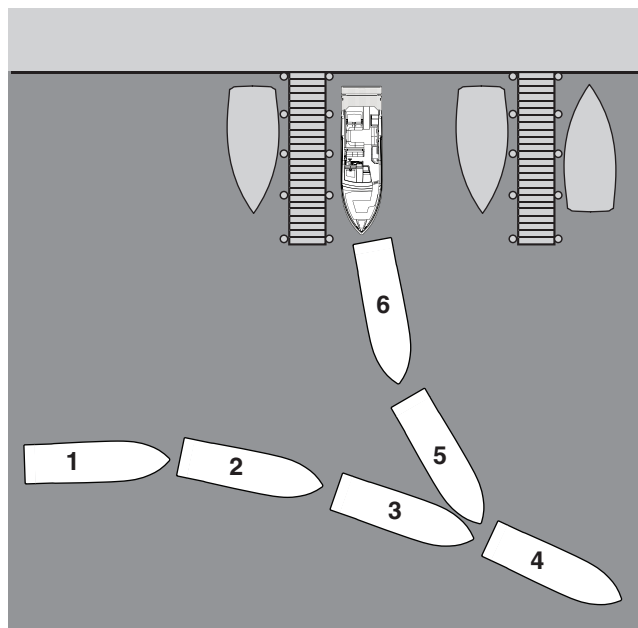
- Come to a stop a short distance from the dock, then proceed slowly.
- Have your fenders, mooring lines and the crew ready.
- Observe how the wind and current are moving your boat. Approach the dock with the boat pointed into the wind, if possible. If the wind or current is pushing you away from the dock, use a sharper angle of approach. If you must approach

the dock downwind or down current, use a slow speed and shallow angle. Be ready to reverse to stop and maintain position.

- If there is no wind or current, approach the dock at a 10° to 20° angle.
- If possible, throw a line to a person on the dock and have that person secure a bow line. If no one is on the dock, maneuver as close as you can, then secure any line to a piling or dock cleat.
- With the bow secure, swing the stern in using engine thrust, or pull it in with a boat hook.



Approaching a Slip



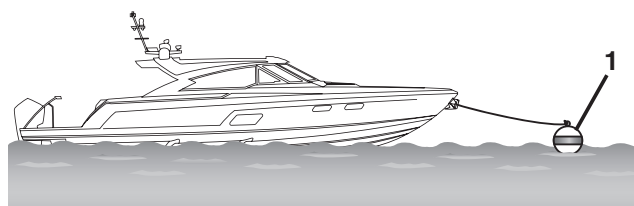
FOR432

Figure 7-23: Approaching a Slip

This maneuver is similar to backing an automobile into a garage or parking space. When approaching a slip:

- Have fenders, mooring lines and the crew ready.
- Turn the boat's stern toward the slip.
- Shift to REVERSE.
- Maneuver slowly into the slip then shift to forward. Use your steering wheel and throttles to align the boat with the slip.
- Once aligned, shift to reverse and continue to back in slowly. Shift to FORWARD when completely in to stop the movement of the boat.
- Shift to NEUTRAL, secure the mooring lines and stop the engines.

Approaching a Mooring



FOR493

1. Mooring Buoy

Figure 7-24: Mooring to a Mooring Buoy

The only buoys you are permitted to moor to are mooring buoys. Mooring to a navigation buoy or other navigational aids or regulatory marker is illegal.

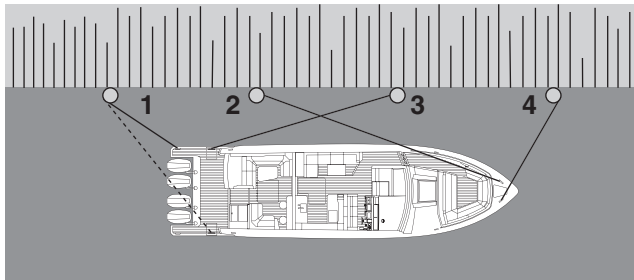
Approach a mooring buoy by heading into the wind or current. Observe the direction of other boats that already lie at mooring buoys. Since they are heading into the wind or current, approach your buoy at the same heading.

- When you think you can move enough forward without using your engines, shift to NEUTRAL.
- Have a crew member positioned on the bow with a hook to retrieve the mooring line. At that point, the crew member should be guiding your maneuvers toward the buoy.
- Turn OFF the engines after the mooring line is attached to the boat.



Mooring Lines

Only use good quality double-braided nylon line. Use chafing protectors on the lines to protect your boat's finish. Only use the cleats, bow eye and stern eyes to secure your boat. Do not use the hand rails or windshield. If possible, tie up your boat with the bow toward the waves and leave a little slack in the lines to allow for some wave movement or tidal action.



FOR494

1. Stern Line
2. Forward Quarter Spring
3. After Bow Spring
4. Bow Line

Figure 7-25: Mooring Lines

Use your dock lines to help maneuver the boat near the pier and to secure it. Use the following information to secure your boat to a pile or dock cleat:

The bow line is fastened to the bow cleat and is pulled forward at about a 45° angle. This line keeps the boat from moving astern.

The stern line is fastened to an after cleat and pulled astern at about a 45° angle. This line keeps the boat from moving forward.

The spring lines can help you control the boat when leaving a dock. Be sure to use spring lines when boating in waters where the tide movement is significant. The forward quarter spring line is fastened to a forward cleat and heads aft. The after bow spring is fastened to a stern cleat and heads forward.

Using Fenders

Be sure to use enough fenders to protect your boat from damage when docking or tying it along side another boat. Fenders protect your boat from scarring the finish and cushion it from striking a solid object.

Using different size and shaped fenders will increase the protection of your boat.

An average size cruiser can use six fenders to protect it from damage.

Navigational Hints

Learn to recognize the different buoys and day markers; they are the signposts of the waterways. There are two primary marking systems in use in the U.S.; the Uniform State Waterway Marking System (USWMS) used on inland waters and maintained by each state, and the Federal Waterway Marking System (FWMS) used on coastal waters and rivers and maintained by the USCG. In addition, the FWMS has two modified systems; the Western River Buoyage, and the Intercoastal Waterway Buoyage. Be sure to check with local authorities on the buoyage system in use.

The only buoys you are permitted to moor to are mooring buoys. Mooring to a navigation buoy or other navigational aid or regulatory marker is illegal.



1. White with Blue Band – May Show White Reflector or Light

Figure 7-26: Mooring Buoy



The type of hazard/warning buoys and markers depend on the area of jurisdiction. Check with local boating authorities.

The USWMS Cardinal System is used when there is no well-defined channel or where an obstruction may be approached from more than one direction. With the cardinal system:

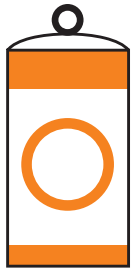
- Pass north or east of BLACK-TOPPED WHITE buoys.
- Pass south or west of RED-TOPPED WHITE buoys.
- RED and WHITE VERTICALLY STRIPED buoys indicate boats should pass outside of the buoy (away from shore).



Uniform State Regulatory Markers

USWMS regulatory markers are white with international orange geometric shapes; you must obey regulatory markers.

UNIFORM STATE WATERWAY MARKING SYSTEM (USWMS)



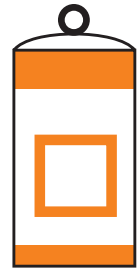
CONTROLLED
AREA



DANGER



BOATS
KEEP OUT



INFORMATION



DO NOT PASS
BETWEEN SHORE
AND BUOY



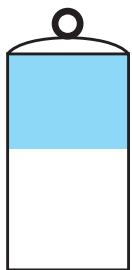
SPECIAL
PURPOSE



NAVIGATE TO
STARBOARD
FACING UPSTREAM



NAVIGATE TO
PORT FACING
UPSTREAM



NAVIGATE TO
SOUTH OR WEST



NAVIGATE TO
NORTH OR EAST



MID-CHANNEL

KC-0411C

Figure 7-27: Uniform State Waterway Marking System (USWMS)



FWMS

The FWMS Lateral System is for use on navigable waters except Western Rivers and Intercoastal Waterways.

The markings on these buoys are oriented from the perspective of being entered from seaward (the boater is going toward the port). This means that red buoys are passed on the starboard (right) side of the vessel when proceeding from open water into port, and green buoys to the port (left) side.

The right side (starboard) of the channel is marked with RED, even numbered buoys. The left (port) side of the channel is marked with GREEN, odd numbered buoys.

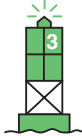
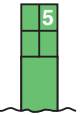

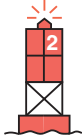
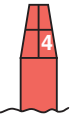





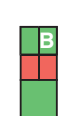




The middle of the channel is marked with RED and WHITE vertically striped buoys; pass close to these buoys.

Obstructions, channel junctions, etc. are marked with RED and GREEN horizontally striped buoys.

A RED band at the top means the preferred channel is to the left of the buoy; a GREEN top band means the preferred channel is to the right of the buoy.

Day markers are colored and numbered the same as buoys. RED, triangular day markers with even numbers mark the starboard side of the channel. GREEN, square day markers with odd numbers mark the port side of the channel.

Lights, bells and horns are used on buoys for night or poor visibility conditions. Buoys with unique light flashing characteristics are identified on nautical charts with the specific flashing pattern.

Federal Waterways Marking System (FWMS)				
Lateral Aids Marking the Sides of Channels as seen When Entering From Seaward	Port Side Odd Numbers	 Lighted Buoy	 Can Buoy	 Daymark
	Starboard Side Even Numbers	 Lighted Buoy	 Nun Buoy	 Daymark
Safe Water Aids Marking Mid-Channels and Fairways (No Numbers—May be Lettered)		 Lighted	 Spherical Buoy	 Daymark
Preferred Channel Aids (No Numbers—May be Lettered)	Preferred Channel to Starboard	 Lighted Buoy	 Can Buoy	 Daymark
	Preferred Channel to Port	 Lighted Buoy	 Nun Buoy	 Daymark

KC-04

Figure 7-28: Federal Waterways Marking System (FWMS)



Light Structures

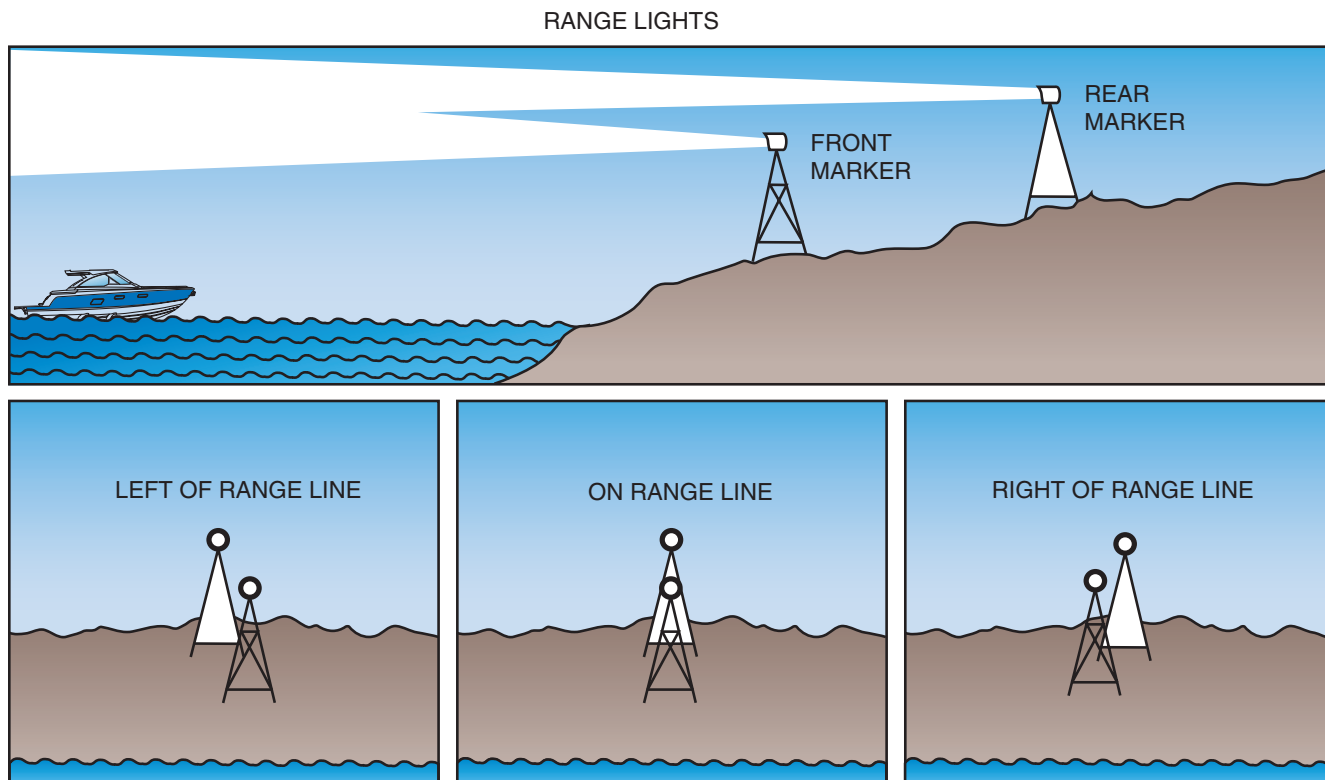
Maneuvering a boat at night can be dangerous and confusing. To aid boaters with navigation and to warn of hazards, the USCG and the state and local authorities maintain a variety of light structures. Some light structures may be equipped with radio beacons, radar reflectors, and/or signals.

Minor Lights

Minor lights are colored according to the buoyage marking system in use. They are similar to lighted buoys, except they are usually higher and on more stable platforms to increase visibility. Most minor lights are part of a series to mark a channel, river or harbor.

Range Lights

Range lights are usually visible in one direction and help a boat operator navigate in a generally safe direction. Steering a course to keep range lights arranged in a line (one on top of the other) will help guide a boat through a channel.



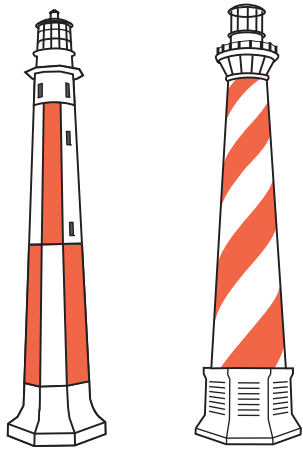
FOR476

Figure 7-29: Range Lights



Lighthouses

Lighthouses can be found at harbor entrances, prominent headlands, isolated danger areas, and along the coast. These striped or patterned structures have unique flashing characteristics to help identify them.



KC-0443C

Figure 7-30: Lighthouses

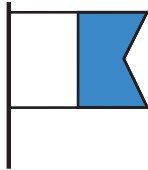
Warning Markers

DIVERS FLAG



USED BY
RECREATIONAL
DIVERS -
INDICATES
DIVER'S
POSITION

ALPHA FLAG



WORLDWIDE
VESSELS
ENGAGED
IN DIVING
OPERATIONS -
DOES NOT
INDICATE
DIVER'S
POSITION

DISTRESS FLAG



INDICATES
FELLOW
BOATER IS IN
NEED OF
ASSISTANCE

KC-0352C

Figure 7-31: Warning Markers

It is a good idea to ask local authorities if there are hazardous areas and how they are marked. Boaters must also recognize the flag designs which indicate that skin divers are present and keep well clear of the area.



KC-0250C

Figure 7-32: Skin Diver Warning Flag

Watch for swimmers. Swimming areas may not be marked. Steer clear from the area and remain alert.



KC-0260C

Figure 7-33: Swim Area Warning Buoy

Navigation markers serve as a means of identifying navigable routes, and indicate water hazards. Boaters should become familiar with navigation markers and stay within marked boundaries and clear of hazards.



NOTES



8

Scheduled Checks and Service

Each new Formula boat comes standard with a 5-year subscription to VesselVanguard (www.vesselvanguard.com), a cloud-based service that lets owners view, manage and share information about their boats' maintenance and service online, whenever and wherever needed. Your Formula dealer will provide the necessary login information. Check the Apple iTunes or Google Play store for Formula/Vessel View mobile applications.

Use the checks and maintenance information outlined in this section along with the maintenance/service information contained within the individual component manuals supplied in your Owner Information Binder, or, in your VesselVanguard account under "Maintenance." It is extremely important that you read and understand the periodic maintenance tasks outlined in the component manuals as those maintenance tasks are not repeated in this manual.

After Each Run

Perform the following tasks after each run.

- Fill fuel tanks to prevent moisture due to condensation.
- To prevent marine growth from accumulating on the hydraulic cylinder shafts, make sure trim tabs are UP and propulsion unit drives are in the full OUT position.
- Stow and secure all equipment.
- Pump bilge dry with manual control switch.
- Close all water inlet seacocks unless keeping the air conditioning active.
- If possible, inspect the hull and propellers for damage.
- Check for fuel, oil and water leakage.
- Clean any spills, stains or moisture from the boat. Inspect sea strainers.
- Turn battery selector switches OFF.
- Secure lockers, hatches and canvas as equipped.

Scheduled Maintenance Checks

This chart is based on average operating conditions. Shorten the intervals if operating in salt water or other severe operating conditions.

Frequency	Task
Break-In	Refer to propulsion unit operator's manual.
	Refer to generator operator's manual.
Before Every Use	Test operation of carbon monoxide detector(s).
	Test operation of fume detector.
	Check remote control for proper operation.
	Check seacocks for leaks and ensure handles are secure.
	Check seawater strainers for leaks and accumulation of debris.
	Check generator's fuel/water separator.
	Check exhaust system for leaks.
	Check fuel system for leaks.
	Check condition of batteries.
	Inspect automatic fire extinguisher pressure gauge and system.
Every 50 Hours	Clean seawater strainers.
	Inspect propellers for damage.
Every 100 Hours	Test for proper operation of the ignition safety switches, if equipped.
	Clean bilge area.
Monthly	Test GFCI outlets.
	Check self-sacrificing anodes.
Quarterly	Have your Formula dealer perform scheduled maintenance as outlined in this section.
Every 6 Months	Verify condition of automatic fire extinguisher.



Break-In

Careful break-in allows internal engine components to “seat” properly, resulting in maximum engine life and performance. Refer to the propulsion unit and generator operator manuals for manufacturers’ break-in requirements.

Before Each Use

1. Test for proper operation of the carbon monoxide detector(s). Refer to the carbon monoxide detector operator’s manual.
2. Test for proper operation of the fume detector. Refer to the fume detector operator’s manual.
3. Check the remote control for proper operation and maintenance following the manufacturer’s recommendations.

WARNING

Improperly maintained remote controls are hazardous and may cause sudden loss of control. Make sure all shift/throttle hardware and cables are regularly inspected and maintained. Improper maintenance may result in a loss of control, resulting in serious injury or death.

4. Check all seacocks and hoses for leakage. If you notice a leak, contact your Formula dealer.

NOTICE

- Seacocks can only be replaced when the boat is out of the water.
- Be sure a seacock is in the closed position before replacing a hose.

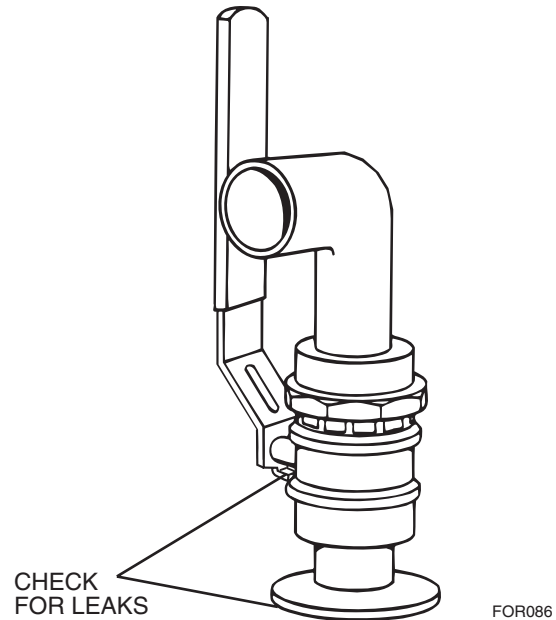


Figure 8-1: Seacock

5. Check the sea chest strainer for accumulation of debris. Refer to **Strainer**, in **Section 5**, for additional information.

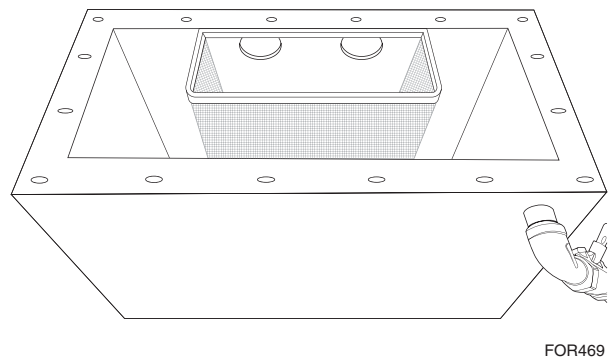


Figure 8-2: Sea Chest Strainer

- If a hose is leaking or damaged, close the appropriate seacock. Contact your Formula dealer for repairs.



- If debris is seen within the container, close the appropriate seacock and remove the strainer cover. Lift strainer from container and thoroughly clean. Install strainer in container and secure cover. Open the seacock and check for leaks.

NOTICE

Seacock must be in the closed position before servicing a strainer.

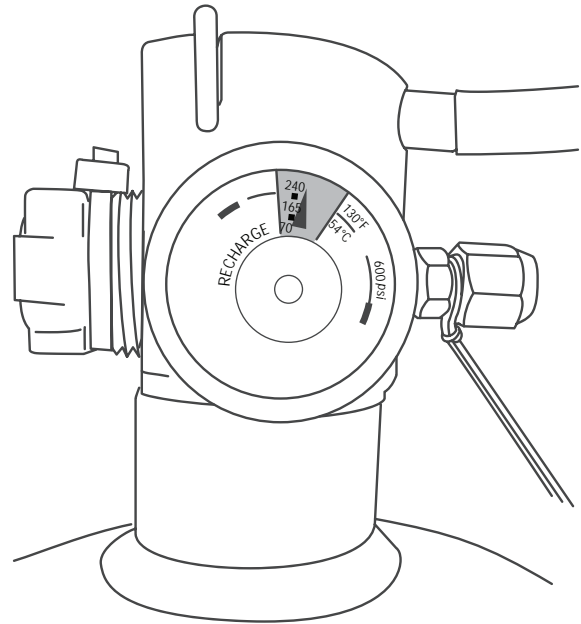
6. Start the engine(s) and the generator, if equipped. Check all exhaust systems for leakage. If you notice a leak, contact your Formula dealer.
7. Check all fuel lines and connections at fuel tanks, engines and the generator for leakage. If you detect a fuel leak, immediately contact your Formula dealer.

⚠ WARNING

Do not operate your boat when a fuel leak is detected. All fuels are combustible. A fuel leak must be repaired before starting the engines or the generator.

8. Check charge of all the batteries. Be sure the batteries can start the engines and the generator, if equipped, before proceeding on your cruise.

9. Inspect the automatic fire extinguisher pressure gauge and the system daily. The gauge pointer must indicate in the green zone.



FOR347

Figure 8-3: Automatic Fire Extinguisher Pressure Gauge



SCHEDULED CHECKS AND SERVICE

Every 50 Hours

1. Be sure to clean seawater strainers.
2. Check propellers for damage. If bends, cracks or other damage are found, contact your Formula dealer for service. Do not continue to use badly damaged propellers. Using damaged propellers may damage the drive units.

Every 100 Hours

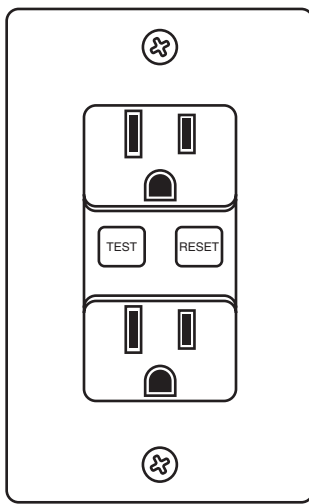
Clean the bilge area. Make sure all drain passageways are clear.

Monthly

WARNING

With the engines running, pull the lanyard off the ignition safety switch. Both engines must stop running. If neither or only one engine stops running, immediately contact your Formula dealer for service.

1. Test each GFCI outlet circuit breaker feature. Push the test button on each outlet. Power should be interrupted to all the outlets onboard. Press the reset button to restore power. If power is not interrupted, consult your Formula dealer.



FOR054

Figure 8-4: GFCI Outlet

2. Check the condition of all self-sacrificing anodes (commonly referred to as “zincs”). If an anode shows deterioration of 50% or more, it must be replaced. Refer to the propulsion unit operator's manual for additional information.

Quarterly

Have your Formula Dealer perform the following scheduled maintenance.

WARNING

The steering system is the most important system on the entire boat from a safety standpoint. Have the system inspected and maintained on a quarterly basis by a qualified service technician.

1. Clean the fresh water filter.
2. Fill, pressurize and inspect the fresh water system for leaks and proper component operation.
3. Inspect the steering, shift and throttle systems for proper operation.
4. Check trim tab pump fluid level.

Every 6 Months

Have your Formula dealer remove and weigh the automatic fire extinguisher unit (without brackets) on a certified scale and record weight on the tag provided. The extinguisher must be repaired or replaced if the gross weight is greater than 5% below what is stated on the unit's label.

The cylinder must be inspected in accordance with CGA-6 every 5 years or have the cylinder hydrostatic tested every 12 years.

WARNING

Avoid accidental discharge of the extinguisher during servicing of the extinguisher. Wear eye protection. Accidental discharge during servicing of the extinguisher may cause serious injury.



9 Care and Maintenance

This section describes how to care for and maintain your Formula boat. As the owner of a Formula boat, you have purchased a boat that is easy to clean and maintain. Periodic cleaning will make a large contribution toward your boat's future value as well as add to the enjoyment you experience while using your boat. This is the best way to maintain your Formula's original, "like new" condition.

NOTICE

Certain automotive, household and industrial cleaners can cause further damage and discoloration. Solvents and dry cleaning fluids, or products that contain dyes such as waxes, should be used with caution. Be sure to test cleaners in an unseen area first. The following stain treatments should be used with discretion. Between steps, be sure to rinse thoroughly with clean water and allow to dry.

Interior Cleaning

⚠ CAUTION

Most cleaners require adequate ventilation during use. Open all hatches, windows and doors before cleaning.

Carpet

All Formula cockpit carpet is heavy duty, all weather indoor/outdoor type carpet resistant to fading. Cabin carpet is high quality indoor carpet, resistant to staining and wear. Periodic cleaning with a vacuum will restore the original beauty. Use household carpet stain removers and cleaners to clean the carpet.

Cabin Upholstery

Your cabin lounge upholstery is made of UltraLeather HP™. UltraLeather is a tough and durable product that is easy to maintain.

For spots and spills, wipe up liquid using a clean absorbent cloth or sponge. Spot clean with mild soap and water. Allow the seat to air dry. If needed, you may use a hair dryer on the warm setting. For stubborn stains, use a mild solvent and follow the instructions on the label.

Type of Stain	Mild Detergent	Mild Cleaning Solvent
Coffee, Tea	■	
Red Wine, Liquor	■	
Soft Drinks	■	
Milk	■	
Ketchup	■	
Steak Sauce, Soy Sauce	■	
Mayonnaise, Butter	■	■
Salad Oil	■	■
Chocolate	■	■
Cosmetic Foundation	■	■
Lipstick	■	■
Face Cream	■	■
Suntan Lotion	■	■
Shoe Polish	■	■
Urine	■	■
Machine Oil		■
Blood from Laminate Flooring		



Cabin Options

Refrigerators, stoves, microwaves and other appliances have individual instruction manuals in your Owner Information Binder. These instruction manuals list the proper care and maintenance of the appliance. If you have any questions after reading the instruction manuals, contact your Formula dealer for assistance.

Exterior Cleaning

Proper care and prevention is the best way to take care of your Formula's finish.

Vinyl Upholstery

NOTICE

Suntan lotion and insect repellents can cause rapid staining and deterioration of the vinyl surface. Remove these products immediately after contact. Wash the area with mild soap solution, rinse with clean, warm water and then towel dry.

Your cockpit upholstery is made of Nautolex® marine vinyl. Nautolex is a cleanable, stain-resistant vinyl product designed to take the extremes of weather and still provide years of dependable service with normal use and care. Even though it is designed to take punishment, it can be damaged if a sharp object contacts it.

The Nautolex vinyl upholstery may have PreFixx® protective finish applied to it. Ask your Formula dealer for additional information.

Each week, wipe Nautolex surfaces with a soft damp cloth and towel dry. In very rainy weather, cover or remove the cushions to prevent the seams from trapping and absorbing moisture. Cushions should be stored in a dry, well-ventilated place.

Special Cleaning Instructions

For dirt and stains that cannot be removed with a damp cloth:

- Step 1.** Use mild soap and water and, if necessary, a soft-bristle brush.
- Step 2.** Any stains still remaining should be immediately cleaned with isopropyl (rubbing) alcohol. After using mild soap or isopropyl alcohol, rinse off any remaining residue with a damp cloth and towel dry.
- Step 3.** If a residual stain remains, and your vinyl upholstery is protected with PreFixx, use fingernail polish remover containing acetone. If the stain has not become permanent, it should be removed after rubbing the spot 5 or 6 times. Do not continue to rub a spot with fingernail polish remover more than 6 times. Additional rubbing could possibly damage the vinyl finish.

NOTICE

Do not use abrasive powders, steel wool, undiluted bleach, lacquer solvents, industrial strength or solvent cleaners or vinyl "conditioners" or "protectants" to clean your vinyl upholstery.



Recommended cleaning solutions for Nautolex.

Type of Stain	Cleaning Steps for Nautolex	Nautolex with PreFixx
Spray paint	1-2	1-2-3
Ballpoint pen	1-2	1-2-3
Lipstick	1-2	1-2-3
Yellow mustard	1-2	1-2-3
Bird droppings	1-2	1-2-3
Suntan lotion*	1-2	1-2-3
Insect repellent	1-2	1-2-3
Crayons	1-2	1-2
Eye shadow	1-2	1-2
Oily soot	1-2	1-2
Petroleum products	1-2	1-2
Coffee, tea	1	1
Grape juice	1	1
Baby and olive oil	1	1
Chocolate	1	1
Ketchup	1	1
Hair oil tonic	1	1
Blood	1	1
Urine	1	1

* Independent laboratory testing has shown that most sunscreen lotions and oils can permanently stain vinyl products including those protected by PreFixx.

Hull/Deck

The unpainted areas with the high-lustre finish on your Formula boat is called gelcoat. Gelcoat can be easily maintained by washing the surface with mild (non-abrasive) detergent on a regular basis. Do not use abrasive cleaners, solvents, ammonia or chlorine as these will scratch and dull the gelcoat surface.

Wax the entire gelcoat surface with a good-quality marine wax at least once a year after a thorough cleaning. Use of a specially formulated marine gelcoat wax will prevent color fade, and soil and scum adhesion.

Your boat will actually perform better with a clean waxed bottom. If a heavy algae is noticed on the bottom, your Formula dealer can recommend a good remover for your particular area.

Extended in-water storage increases the risk of osmotic blistering of the hull's gel coat surface. Consequently, owners whose boats will remain in the water for several months at a time should consider applying barrier coat materials or a protective paint to the hull below the water line.

When taking your boat out of salt water, the entire boat should be washed down with fresh water immediately. This includes the deck, hardware and any surface exposed to the salt water.

To extend the life of your gelcoat finish, cover your boat with a mooring cover for maximum protection. A tonneau cover will only protect the cockpit interior, not the gelcoat finish. Your Formula dealer can supply more information on this subject.

Canvas

In most cases, boat canvas is subjected to more abuse than any other item on the boat. Canvas must be maintained for long life and top performance.

NOTICE

Do not place canvas in hot water or run it through the hot drying cycle of an automatic dryer. Fabric should be line dried. Do not have fabric steam pressed at a dry cleaners.

Formula canvas sets are made from the highest quality Sunbrella® canvas and clear vinyl. With the proper care, this canvas will last you many seasons. Each canvas set is custom fit to each boat to assure a proper fit.

The outer canvas surfaces can be cleaned with a soft scrub brush and mild detergent. The underside of the canvas should be sprayed periodically with a disinfectant to prevent the growth of mildew. Do not use cleaners on clear vinyl curtains and windows. Wash with clean water and a soft, clean cloth.



CARE AND MAINTENANCE

NOTICE

Do not use any abrasive cleaner on the front, side or aft curtain as it will scratch or mar the clear vinyl surface.

Moisture, dirt, heat, ultraviolet rays, salt water and chemicals from industrial fallout can all contribute to the deterioration of canvas. These elements can cause serious damage if left unattended. Follow these guidelines to keep your canvas in good condition.

NOTICE

Wet canvas must be allowed to dry thoroughly before storage. Do not allow canvas to dry loose since shrinkage can occur. Canvas must be erected on the boat when drying.

- The convertible top is not designed to withstand long periods of time exposed to the elements and direct sunlight. It is not designed to be a protective cover. Use a full, properly fitted mooring cover for these purposes.
- If the canvas gets wet during storage, remove the side curtains and open the windshield to allow seams to dry out. The air circulation will allow all canvas to dry and prevent the growth of mildew. Do not store folded or rolled up damp canvas.
- Occasionally set up all canvas and curtains and hose down with fresh water to remove accumulated soot and dirt. Sweep or brush the underside of the canvas to prevent the accumulation of dirt and mildew.
- Do not store or dock your boat under trees. Tree sap is very corrosive to canvas and can also be harmful to gelcoat and vinyl interiors.
- Adjust the top bows to eliminate pockets in which rain water can accumulate. The weight of this accumulated water can collapse the top or sag the canvas.
- Do not trailer your boat with the convertible top in the mounted position. All canvas should be dismantled, rolled and properly stored while trailering your boat to prevent wind damage.

When setting up the canvas, be sure to zip in the side and aft curtains before using the snaps. Snaps and zippers should be regularly lubricated with Vaseline.

Do not force zippers. The most vulnerable part is the starting point. Be careful when starting a zipper to prevent damage.

Hardware Care

Deck fittings, cleats and bow rails are stainless steel. Frequent washing with a mild detergent should bring back the original shine. Remove rust spots as soon as possible with a brass, silver or chrome cleaner. Apply a coat of wax to protect the finish.

NOTICE

Do not use coarse abrasives like sandpaper or steel wool, or cleaning agents like mineral acids or bleaches to clean stainless steel. Do not allow stainless steel components to contact iron, steel or other metals which can cause stainless steel to rust or corrode.

Periodically check deck fittings, cleats and bow rails for tightness. Have your Formula dealer tighten any loose items.

Windows and Windshield

All Formula windshields, wing windows and walk-through windows are of tempered glass construction. They can be cleaned with a non-abrasive glass cleaner applied with a soft cloth. Do not use a dry cloth or a harsh detergent. These items will scratch the surface.

Marine Growth

If accelerated marine growth is a problem in your area, an anti-fouling bottom paint may be necessary to slow growth and prevent gelcoat damage. Consult your Formula dealer for anti-fouling bottom paint recommendations.



CARE AND MAINTENANCE

Unscheduled Maintenance

Periodically check cleats, seats, fittings, windshield mounting hardware and other items for tightness and proper operation. A problem with a piece of equipment can occur at anytime. Have your Formula dealer service a problem. The safety of you and your passengers depends upon a well maintained boat.

Immediately service any problem with an engine, propulsion unit or generator. A minor repair could become a major overhaul if left unchecked. Pay close attention to the cooling system operation of these components.

Propulsion Units and Generator

Follow the maintenance schedules outlined in your propulsion unit and generator operator's manuals. Obtain the required service at the specified interval from your Formula dealer.

Electrical System

WARNING

Use extreme caution when checking for an electrical problem.

An electrical system problem must be treated seriously. Do not operate your boat knowing there is a problem with the system. When a problem is discovered, have your Formula dealer service it immediately.

NOTICE

The electrical system is designed to protect you from short circuits and overloads. Any modifications to the system, such as adding electrical accessories should be done by a qualified technician.

Batteries

WARNING

Batteries contain sulfuric acid which can cause severe burns. Wear eye protection and protective clothing to avoid contact with skin.

Check the batteries frequently for signs of corrosion. If corrosion is found, clean terminal posts with a baking soda and water solution and a wire brush.

WARNING

Batteries produce explosive hydrogen gas. Do not attempt to start an engine with jumper cables under any circumstances. Keep all sparks, flames and smoking material away from batteries. The risk of a spark at the battery post, igniting gasoline or hydrogen fumes, is too great.

Circuit Breakers

All electrical circuits are protected from overload by the use of circuit breakers. In the event of an overload or short circuit, the circuit breaker will trip. You should determine and correct the cause of a problem before resetting the circuit breaker. Contact your Formula dealer if a circuit breaker continues to trip.

NOTICE

Determine and correct the cause of a problem before resetting a tripped circuit breaker.

To reset a push-button circuit breaker at the remote circuit breaker panels, wait about one minute for the breaker to cool. Push the breaker button in fully.

To reset a switch-type circuit breaker at the cabin distribution panel, wait about one minute for the breaker to cool. Push the breaker tab back into place.

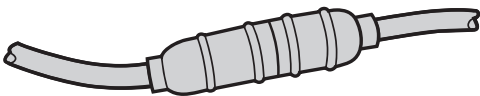
Some accessories, such as the stereo, have a fuse located in the positive lead. Some accessories may have a fuse located in the fuse block that is located behind the dash panel. Refer to the accessories operator's manuals in your Owner Information Binder for the location of in-line fuses.



Please refer to digital switching reset document in the Owner Information Binder for resetting tripped circuit breakers with digital switches.

WARNING

Do not exceed the recommended fuse size or bypass the fuse safeguard. Install the proper type and rating fuses whenever replacing or changing fuses. Continuous fuse failure indicates a severe problem and requires immediate attention. Failure to install the correct fuse may result in damage to the electrical system or personal injury.



(TWIST AND PULL TO OPEN)

KC-1640

Figure 9-1: Typical In-Line Fuse Holder

Fuel System

WARNING

All fuels are combustible. Check the fuel system before each use. Do not operate the boat when a fuel leak is found. A fuel leak must be repaired before starting the engines or generator.

The fuel system should be inspected before each use. Fuel lines, fuel filters and other fuel system components should be checked for leaks. Fuel vents must be free from obstructions. Surface cracking on a fuel hose indicates wear and must be replaced. Use fuel system parts certified for marine use. Do not substitute automotive parts in a marine application.

Water System

Fresh Water

The following maintenance should be performed each month to keep the fresh water system clean and sanitary:

- Use the faucets and shower to drain the fresh water tank completely. Refill the tank with at least 20 gallons of clean, fresh water and drain again.

If the water in the tank has been allowed to stagnate and you suspect that the fresh water system may be contaminated, sanitize the system.

- Drain the fresh water tank completely.
- Mix a solution of 2-1/2 cups (20 oz.) of household bleach to 10 gallons of water. Pour the solution into the fresh water tank.
- Fill the tank with clean, fresh water.
- Turn the fresh water pump ON and bleed the air from all faucets and showers. Start with the faucet farthest from the pump.
- Allow the solution to stand for 3 to 4 hours. Drain the system completely.
- Flush the system with at least one full tank of water.
- Fill the tank with clean, fresh drinking water.

If you smell or taste bleach in the water:

- Drain the system completely.
- Mix a solution of one quart of white vinegar to 5 gallons of water. Pour the solution into the tank.
- Allow the solution to remain in the tank for several days.
- Drain the system completely.
- Flush the tank with at least one full tank of water.
- Fill the tank with clean, fresh drinking water and bleed the air from all lines.

Waste or Black Water

Make sure the waste system is always operating properly. Periodically check the level of waste water and have the tank pumped out when needed.



Bilge

The bilge accumulates oil and greasy dirt over a period of time. Usually, ordinary soap and water will not remove the accumulation. The use of a stronger detergent is necessary. Consult your Formula dealer for recommendations on special bilge cleaning products.

Corrosion and Electrolysis

Corrosion destroys underwater metal parts and can occur in fresh or salt water. However, salt, brackish and polluted waters will accelerate corrosion.

Galvanic corrosion (electrolysis) can result in serious damage to any metal component of your Formula boat that is in the water. Galvanic corrosion is the deterioration of metals due to the effects of electrolytic action. When dissimilar metals are immersed in a conductive fluid such as salt water, an electric current is produced, similar to the action of a battery. The softest of the metals will be the first to become damaged.

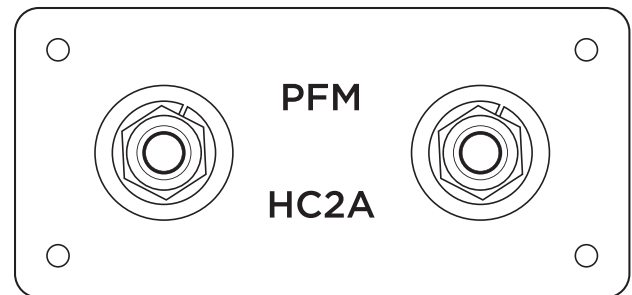
Galvanic Corrosion Protection

NOTICE

Refer to the propulsion unit operator's manual for their requirements for galvanic corrosion protection.

Sacrificial Anodes

Anodes (sometimes called “zincs”) are used to protect hardware exposed to the water. Since galvanic corrosion attacks the least “noble” metals first, less noble metal anodes are used to purposefully “sacrifice” themselves, thereby protecting the more noble metals of the drives, propeller, tabs, swim platform and other metal items below the waterline, i.e., underwater gear.



FOR422

Figure 9-2: Example of Self-Sacrificing Anode

Anodes are installed on your boat transom at the factory. Additional anodes may be installed on the underwater gear as well as any metal components exposed to raw water such as engine heat exchangers and water cooling jackets. Anodes are made in three different metals which must be matched to the water type and local conditions. Formula boats are equipped from the factory with transom-mounted zinc anodes on the recommendation from engine and drive manufacturers. The anodes that are installed on the trim tabs are typically zinc and are isolated from the boat bonding system.



CARE AND MAINTENANCE

Selection, monitoring and replacement of the anodes on the transom, drives, trim tabs, swim platform supports and other underwater gear is the customer's maintenance responsibility. Any damage done because of lack of maintenance will not be covered under warranty.

Water Type	Anode Material	Replace At
Salt Water	Zinc	40% decomposition
Brackish Water	Aluminum	50% decomposition
Fresh Water (clean)	Aluminum/Magnesium Alloy	50% decomposition
Fresh Water (polluted)	Magnesium	40% decomposition

NOTICE

To be effective, anodes must be bare metal. If boat is dry-docked more than 24 hours, sand the anodes to clean oxidation from the surface.

- *Zinc and aluminum anodes left in fresh water, or zinc anodes used in brackish water, will become covered with white oxide which effectively stops the sacrificial process and exposes the underwater gear to damage.*
- *Bottom paints/sealants on anodes will block the sacrificial process and expose the underwater gear to damage.*
- *Depending on local conditions, some anodes can deteriorate very quickly and must be closely monitored. Talk to local boaters and your marina for recommendations.*

Because of the vital function that anodes play in the protection of underwater gear, replace anodes at the recommended level of decomposition, or annually, with the correct type. Boats stored in saltwater will normally need to have the anodes replaced every 6 months to one year. Anodes requiring replacement more frequently may indicate a stray current problem within the boat or at the slip or marina.

Anodes that do not need to be replaced after one year may not be providing the proper protection. Loose or low quality anodes could be the problem. There could also be a problem in the bonding system or the wrong anode material is being used.

The customer has the responsibility in maintaining and ensuring that the proper anodes are installed for the area (water) in which the boat will be used. See your boat dealer if you think you need to change material or add additional anodes.

NOTICE

Do not paint an anode, its fasteners or its mounting surface. Painting will reduce the anode's corrosion protection capabilities.

Wash the entire boat after each use in salt water. If you continue to operate in salt water, the entire boat should be protected against salt water damage as described in **Exterior Cleaning**, in this section.



Outboard Motor Maintenance

It is important to periodically clean and wax the outboard motor cowls to remove dirt and dust buildup. In addition, outboards used in salt, brackish or polluted waters need occasional cleaning of the powerhead and components to remove corrosive salt buildup.

CAUTION

The outboard motor requires special cleaning, lubricating and anti-corrosion products to prevent damage to the outboard. See your Formula or outboard manufacturer dealer for marine-grade products for cleaning, waxing, polishing and lubricating the outboard.

To clean the cowls:

1. Rinse the cowls thoroughly with clean, fresh water.
2. Wash the cowls with a clean water/mild soap solution and a clean microfiber towel.
3. Rinse the cowls thoroughly with clean, fresh water.
4. Dry the cowls with a clean microfiber towel.
5. Wax the cowls with a non-abrasive marine polish suitable for clear-coat finishes.
6. Remove wax per manufacturer's instructions.
7. If cowls have minor scratches, see your Formula or outboard manufacturer dealer for approved finishing compound.

To clean the powerhead:

1. Remove the top cowl. Refer to engine manufacturer's operator's manual.
2. Visually inspect the powerhead and components for salt buildup.

3. Wash the powerhead and components with a clean water/mild soap solution and a clean microfiber towel.
4. Rinse the powerhead thoroughly with clean, fresh water. Avoid spraying the air filter intake and alternator.
5. Allow to dry thoroughly.
6. Touch up painted surfaces; see your Formula or outboard manufacturer dealer for approved paint.
7. Apply corrosion inhibitor spray on plated metal components; DO NOT allow inhibitor to come in contact with belts, rubber and plastic components.



NOTES



10 | Storage

Storage/winterization requires special preparation to prevent damage to the boat, propulsion units, generator and other equipment. Perform all annual maintenance at this time.

Without proper preparation, storage for long periods of time may cause internal parts of the engine and drive units to rust due to a lack of lubrication. Water inside the bilge or cooling system may also freeze causing damage to components if the boat is stored in below freezing temperatures. Damage to the boat due to improper storage will not be covered by the warranty. The following procedures should help prevent damage to your boat.

In-Water Storage Preparation

While the boat is still in the water, fill the fuel tanks and add the proper amount of fuel stabilizer and conditioner. Follow the instructions on the label. Operate the engines and generator for at least 15 minutes to be sure the treated fuel has reached them.

NOTICE

Follow the engines and generator's recommendation for treating the equipment with a rust preventative fogging oil. Fogging oil should be used if the boat is to be stored in a high moisture (humidity) environment, in extreme temperatures or stored outdoors.

Trailer/Transporting

The drives need to be in trailering position for transporting.

All items must be removed from the hard top.

The bow walkway door and cockpit Salon door should be open if trailering in backwards position.

Make sure the provided brace is installed on the cockpit Salon door if trailering in forward position.

Lifting the Boat

To prevent structural damage to your Formula boat, the proper procedure must be used when lifting your boat. The recommended method of removing the boat from the water is to use lifting slings. Slings must be the flat, wide belting-type. Do not use cable-type slings. The spreader bars used with the slings must be long enough to avoid pressure to the gunwales.

Sling location decals on the boat indicate area to place the slings.



Figure 10-1: Sling Location Decal



Storage/Winterization

Preparing for winter lay up is important. In frigid zones, be particularly attentive to items that can be damaged by freezing. Freeze damage is not covered by warranty.

1. After the boat has been properly positioned on a storage cradle, thoroughly wash the hull, deck and interior compartments. Allow a couple of days of air drying before covering the boat. Store all cushions in the open position and open all storage areas. This will help prevent mold/mildew from forming. Perform preventative maintenance to the interior and exterior of your boat following the information in **Care and Maintenance**, in **Section 9**.
2. Refer to the propulsion unit manufacturer's storage recommendations.
3. Open all faucets and allow the fresh water pump to empty the water tank and water lines.
4. Remove strainer and seacock drain plugs. Open all drains and seacocks.
5. Remove the batteries from the boat. Clean and check their condition. Store the batteries in a cool, dry place, out of direct sunlight. Do not store the batteries close to heat, spark or flame producing devices. Charge them periodically during the storage period.
6. Cover the boat with the mooring cover. If a temporary poly cover, such as shrink wrap is used, vents must be installed to provide adequate ventilation to prevent mold or mildew.

Reactivating the Boat After Storage

There are many systems that require special attention to ensure your boat is in proper operating condition.

1. Refer to the manufacturer's recommendations and prepare the following items for use:
 - Carbon monoxide detector(s)
 - Fume detector
 - Engine's cooling, exhaust and lubrication systems

It is very important the engine fuel system and exhaust system be thoroughly inspected and repaired, if necessary, before operating the boat. Also, all of the accessory exhaust systems must be in proper operating condition.

WARNING

Failure to inspect the fuel system could allow fuel leakage to go undetected, becoming a fire or explosion hazard.

DANGER

Carbon monoxide gas (CO) is colorless, odorless and extremely dangerous. All engines and fuel burning appliances produce CO as exhaust. Direct and prolonged exposure to CO will cause BRAIN DAMAGE or DEATH. Signs of exposure to CO include nausea, dizziness and drowsiness.

2. Make sure the batteries are fully charged before installing.
3. Fill the fresh water tank then check the system for proper operation.
4. Install the strainer and seacock drain plugs. Open and close the seacock to check operation.
5. Check condition of all hoses and make sure all hose clamps are tight.
6. Check for proper operation of the steering, shift and throttle systems.
7. Check condition of all fire extinguishers.
8. Check drive unit and trim tab fluid levels.



11

Troubleshooting

The chart in this section is designed to assist you in locating and repairing minor mechanical, electrical and boat system problems. Special tools and trained personnel may be required to correct some problems. Please have your Formula dealer assist you with service issues.



WARNING

- Gasoline is flammable. Use extreme caution when handling gasoline.
- Use extreme caution when checking for electrical problems.
- Battery acid can cause blindness if splashed in eyes; may burn skin.
- Disconnect battery cables at the battery before making checks or adjustments around the engines and electrical components.

Your Formula boat is equipped with an ignition safety switch (one per engine). Make sure the lanyard(s) is installed on the switch. Please contact your Formula dealer for assistance.

Engine

For further troubleshooting information other than what is given here, refer to the propulsion unit operator's manual.



TROUBLESHOOTING

Symptom	Possible Cause
Engine will not crank	Lanyard – install on ignition safety switch.
	Battery switch – turn to ON position.
	Shift position – check to see that lever is in start or NEUTRAL position.
	Battery condition – battery must be fully charged.
	Starter connections – check connections and tighten. If solenoid clicks when attempting to start engine, check battery connections. If condition persists, see your Formula dealer.
	Engine circuit breaker – breaker must be in operating position.
	Faulty ignition switch – see Formula dealer.
	Engine problem – see your Formula dealer.
Engine cranks but will not start	Contaminated fuel – see Formula dealer.
	Engine problem – see Formula dealer.
Low starter speed	Weak or bad battery – see Formula dealer.
Engine runs erratically	See your Formula dealer.
Engine vibrates	Propeller condition – shut off engine. Check for bent, broken or damaged propeller. Check for weeds on propeller.
	Engine problem – see Formula dealer.
Engine runs but boat makes little or no progress	Fouled or damaged propeller – shut off engine. Check for weeds on propeller, bent or broken propeller. See your Formula dealer.
Performance Loss	Throttle(s) not fully open – check to see that throttle opens fully at engines.
	Improper fuel – fill tanks with correct fuel.
	Overheating – immediately turn OFF the engine and contact your Formula dealer.
	Boat overloaded – reduce load.
	Boat trim – distribute boat load evenly.
	Improper propeller selection – see Formula dealer.
	Excessive bilge water – check for excessive water, drain bilge.
	Boat hull condition – clean if marine growth is present.
Lack of power	Throttle not fully open – adjust throttle linkage.
	Contaminated fuel – drain fuel tank and lines. Flush with clean fuel and replace fuel filters.
Hard shifting	Corroded or pinched linkage.



Electrical

CAUTION

Correct a problem with the electrical system before resetting a circuit breaker.

Symptom	Possible Cause
Electrical component will not function	Circuit breaker tripped or in the OFF position – correct the problem and reset; turn circuit breaker ON.
Dim or no lights	Circuit breaker tripped or in the OFF position – correct the problem and reset; turn circuit breaker ON.
No AC power	Circuit breakers tripped or in the OFF position—correct the problem and reset.
	Ground fault circuit interrupter tripped—reset button on the outlet and test. If problem exists—see Formula dealer.

Plumbing

Symptom	Possible Cause
No water at shower or sinks	Fresh water pump circuit breaker tripped or in the OFF position – correct the problem and reset; turn circuit breaker ON.
	Fresh water tank empty.
	Fresh water pump defective – see Formula dealer.
	Filter plugged – clean filter.
Low water pressure at all sinks and shower	Damaged fresh water pump – see Formula dealer.
Low water pressure at only one sink	Restriction or obstruction in water line.
Head will not flush	Head circuit breaker tripped or in OFF position – correct the problem and reset; turn circuit breaker ON.
	Line to waste tank blocked – see Formula dealer.
	Holding tank full - pump out tank.



NOTES



12

Warranty and Service

Formula Boats Limited Warranty Policy (Effective beginning with model year 2020 boats)

Limited Warranty Statement and Terms

Thunderbird Products Corporation ("FORMULA BOATS"), warrants to the original retail purchaser that the following components of each new boat it manufactures shall be free from defects in materials and workmanship to the following extent, under normal use and when operated and maintained in accordance with Formula Boats' recommendations and procedures as described herein and in the Formula Owner's Manual and other relevant owner's information and documentation supplied with each new boat, beginning on the date of delivery to the original retail purchaser for the period indicated below (refer to section labeled **"Warranty Conditions, Limitations and Exclusions"** for details on exceptions):

- One (1) year — Materials and workmanship, including most materials, components and accessories used in the boat's construction.
- Two (2) years — Canvas products manufactured by FORMULA BOATS (e.g., cockpit covers). *
- Two (2) years — Gel coat finish, to include protection against osmotic blistering, air voids, and crazing/cracking. *
- Two (2) years — Painted graphics (not bottom paint) and clear coat finishes. *
- Five (5) years — Cockpit upholstery items manufactured by FORMULA BOATS. *
- Five (5) years — Equipment and accessories NOT manufactured by FORMULA BOATS; Major equipment and accessories NOT manufactured by FORMULA BOATS (e.g., engines, outdrives, generators, navigational electronics, etc.) shall be covered by the respective original equipment manufacturers' warranties – periods generally ranging from one (1) to five (5) years – and thereafter by the Formula Limited Warranty for a combined total of five (5) years. **
- Ten-years (10) — Hull and deck structure. Structural elements include fiberglass, fiberglass- reinforced stringers, matrix grid systems, bulkheads, and pultrusions. ***

*The limited warranties pertaining to canvas, gel coat, painted graphics and cockpit upholstery shall commence one year from the date of delivery to the original wholesale (i.e., dealer) purchaser or from the date of delivery to the original *retail* purchaser, whichever date comes first.

**All propulsion systems and ancillary components have 5 years' warranty coverage administered by either the components' respective manufacturer directly (e.g., ILMOR and Volvo gas packages), or via a combination of the manufacturer (e.g., Mercury/MerCruiser and Volvo Penta diesel packages) and a third-party administrator; excludes optional Seakeeper™ anti-roll gyro systems.

***The ten (10) year Warranty on hull and deck structure does not cover or include any other components fastened or applied to the hull or deck, mechanical or otherwise - those components are covered by their own specific warranties as noted above.



Disclaimer and Limitation of Implied Warranties

THE EXPRESS LIMITED WARRANTY SET FORTH HEREIN IS IN LIEU OF ALL OTHER WARRANTIES AND REPRESENTATIONS, EXPRESS OR IMPLIED, AND TO THE MAXIMUM EXTENT PERMITTED BY APPLICABLE LAW, FORMULA BOATS DISCLAIMS, AND THE BOAT OWNER HEREBY EXPRESSLY WAIVES, ANY AND ALL OTHER WARRANTIES OR REPRESENTATIONS OF ANY KIND OR NATURE, INCLUDING, BUT NOT LIMITED TO IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, OTHER THAN THOSE WARRANTIES WHICH ARE IMPLIED BY, AND ARE INCAPABLE OF EXCLUSION, RESTRICTION OR MODIFICATION UNDER APPLICABLE LAW.

The term of any implied warranties that cannot be disclaimed under applicable law, including but not limited to, implied warranties of merchantability and fitness for a particular purpose, shall be limited to the duration of the express warranty periods applicable to the respective components. **EXCEPT AS OTHERWISE NOTED HEREIN, ALL FORMULA PRODUCTS ARE PROVIDED “AS IS” AND “WITH ALL FAULTS.” CORRECTION OF NONCONFORMITIES, IN THE MANNER AND FOR THE PERIODS OF TIME AS SET FORTH ABOVE, SHALL CONSTITUTE FULFILLMENT OF ALL LIABILITIES OF FORMULA BOATS TO THE PURCHASER WHETHER BASED ON CONTRACT, NEGLIGENCE OR OTHERWISE.** Some states do not allow the exclusion of implied warranties and/or do not allow limitations on the amount of time an implied warranty lasts, so the above limitations may not apply to you. This limited warranty gives you specific legal rights. You may have other legal rights which vary from state to state.

Warranty Conditions, Limitations and Exclusions

Formula Boats are manufactured by trained crafts persons from high quality materials and components. However, conditions outside of Formula Boat's control require specific limitations on, and exclusions from, coverage under this Limited Warranty. **THIS LIMITED WARRANTY CONSTITUTES THE FINAL, COMPLETE AND EXCLUSIVE STATEMENT OF WARRANTY TERMS, AND NO OTHER PERSON OR ENTITY – INCLUDING THE SALES PERSONNEL AND/OR OTHER EMPLOYEES OF FORMULA DEALERS – IS AUTHORIZED TO MAKE ANY OTHER WARRANTIES OR REPRESENTATIONS ON BEHALF OF FORMULA BOATS. DEALERS' EMPLOYEES' ORAL STATEMENTS DO NOT CONSTITUTE WARRANTIES, SHALL NOT BE RELIED UPON BY THE PURCHASER, AND ARE NOT PART OF THE CONTRACT OF SALE. THE DEALERS ARE NOT AGENTS OF FORMULA BOATS. FURTHERMORE, THE LIMITED WARRANTY SET FORTH HEREIN DOES NOT APPLY TO THE FOLLOWING, AND FORMULA BOATS MAKES NO WARRANTY WHATSOEVER WHETHER EXPRESS OR IMPLIED, FOR THE FOLLOWING:**

- Damage and/or defects covered by insurance, manufacturer recalls or other warranties/service contracts;
- Damage caused by accident, impact or collision with any object;
- Damages caused by acts of God and/or other insurance perils;
- Incidental, consequential or special damages such as, but not limited to damage or loss of other property or equipment, loss of profit, inconveniences or loss of time or income, cost of purchased or replacement goods, claims of customers of the purchaser, failure to warn and/or instruct, or lack of seaworthiness;
- Unauthorized repairs;
- Dealer and/or customer installed options;
- Misuse, neglect or lack of proper maintenance of the boat, including use of contaminated or unapproved fuel;



- Any aesthetic degradation of colored gel coat, including fading, oxidation (chalking), and discoloration; colored gel coats do not perform as well as white-based gel coats and are generally more susceptible to degradation of the gel's aesthetic properties, especially in below-the-waterline applications.
- Corrosion damage if attributed to improper or inadequate maintenance as recommended by the respective original equipment manufacturer;
- Components that have been altered;
- Failure of any cockpit cover which has been used while trailering the vessel;
- Windshield breakages or damage;
- Cost for haul-out, launch, lift charges, towing, travel time, boat transport, storage costs****;
- Any Formula boat that is modified for operation, in any contest of speed, acceleration, or endurance whatsoever or damage caused by any improper alteration or modification to the boat or any of its component parts or accessories, including damage resulting from alteration, modification, repair or replacement in such a way as to increase the cubic-inch capacity or horsepower output of the engine and boat as originally manufactured;
- Any guarantee whatsoever that a particular boat will achieve a certain level of performance relating to speed, range, fuel consumption or performance characteristics*****;
- Any Formula boat that is used for commercial purposes. A vessel that is used 50% or more of the time for business or revenue-producing purposes may, at Formula's sole discretion, be considered a commercial vessel;
- Repairs occurring outside the United States and Canada, unless specifically noted as an International boat on the original (first owner) factory invoice;
- Standard maintenance items that wear with use and must be periodically replaced or replenished, including but not limited to: batteries; light bulbs; fuses; spark plugs; spark plug wires; fuel filters; air filters; oil filters; engine oil; transmission fluid; engine belts; antifreeze; raw water impellers;
- Seakeeper™ anti-roll gyro systems after expiration of the OEM warranty.

****The "Service Assist Benefit" of one hour of labor (up to \$125) can be claimed for each instance of the following if associated with a warrantable repair: haul-out/launch, lift, towing, or travel/mobile service; not to exceed a total of \$375 on any one claim.

*****Due to a continuing program of product development and improvement, Formula Boats reserves the right to change Formula specifications, features and prices without notice.

Warranty Repairs & Service / Warranty Claims

During these periods, all warranty repairs shall be made by **authorized personnel only**, preferably at the dealer's store or service center, or – at FORMULA BOATS' option – Formula's manufacturing plant. Warranty repairs may be made at another location, but **only if performed by manufacturer-authorized personnel** and if mutually agreed upon by FORMULA BOATS and the boat owner. All travel and/or transportation charges associated with warranty repairs shall be the sole responsibility of the boat owner, with the exception of the Service Assist Benefit and/or those charges specifically approved by FORMULA BOATS.

All repairs under the terms of this warranty are subject to authorization of the factory-trained personnel whose decision shall be final in all events.



WARRANTY AND SERVICE

In order to maintain warranty service under this Limited Warranty, the owner must return the defective boat and/or component part to an authorized Formula dealer's service department, or as otherwise specified above, within the applicable warranty period. For questions regarding this Limited Warranty and/or how to obtain warranty service or for assistance in locating the nearest Formula-authorized service facility, please direct inquiries to:

FORMULA BOATS

Attn: Technical Assistance Group (TAG)
2200 W. Monroe St.
Decatur, IN 46733

(260) 724-1412 | phone
(260) 724-1110 | fax
support@formulaboats.com

Subject to the terms of this Limited Warranty, any covered boat or component part with a defect in materials or workmanship if brought to the attention of FORMULA BOATS during the appropriate warranty period will be repaired or replaced, at Formula's sole discretion, without charge to the owner for parts and labor. **This provision is subject to the following terms and conditions:**

- Formula shall be obligated to repair or replace only those items that prove defective, in Formula's sole discretion, upon examination by an authorized dealer's service department or Formula's own personnel, as applicable;
- Formula warrants its repairs or replacements only for the remainder of the applicable warranty period;
- Formula shall fulfill its obligation to repair or replace any defective item utilizing factory-authorized personnel and/or their repair facilities or, at Formula's sole discretion, Formula personnel and/or the Formula manufacturing facility in Decatur, IN;
- The owner shall be responsible for all costs associated with the transportation of the boat, trailer or component part(s) to the factory-authorized/designated service location and for any return transportation, except as otherwise noted herein.

NOTE: Beginning with model year 2020 boats, the balance of Formula's five (5) year Limited Warranty for Mercury/MerCruiser, and Volvo diesel engine-related components & accessories shall be administered by a third party administrator, Brunswick Product Protection, **following the expiration of the Original Equipment Manufacturers' warranties.** Please direct applicable inquiries to:

Brunswick Product Protection

Attn: Claims Administration – Formula Guard
544 Lakeview Parkway, Suite 100
Vernon Hills, IL 60061

(847) 735-4695 | phone
(866) 404-5832 | fax
admin@boatwarranty.com
claims@boatwarranty.com



Transfer of Limited Warranty

This warranty may be transferred to a second or subsequent owner of the boat provided that the second or subsequent owner notifies Formula Boats in writing within 30 days of the change of ownership while providing reasonable proof of said purchase. A transferred warranty shall be limited in duration to the original periods set forth herein, and the second or subsequent owner shall be required to use, maintain and store the boat in the manner described above. Notwithstanding the foregoing, this Limited Warranty may – at the sole discretion of FORMULA BOATS – be voided should the boat in question be repossessed or if ownership of subject boat is otherwise transferred to a secured party prior to the first retail sale.

No Modification of Warranty / Limits of Liability

NO ORAL OR WRITTEN INFORMATION, ADVICE OR COMMUNICATION OF ANY NATURE TO OR FROM FORMULA OR ITS REPRESENTATIVES, EMPLOYEES, AUTHORIZED DEALERS, AGENTS, DISTRIBUTORS OR SUPPLIERS SHALL CREATE A WARRANTY OR IN ANY MANNER INCREASE OR MODIFY THE SCOPE OF THIS LIMITED WARRANTY IN ANY MANNER WHATSOEVER.

THE SALES PERSONNEL OR OTHER EMPLOYEES OF THE SELLING FORMULA DEALER ARE NOT AUTHORIZED TO MAKE WARRANTIES CONCERNING FORMULA BOATS. THE DEALER'S EMPLOYEES' ORAL STATEMENTS DO NOT CONSTITUTE WARRANTIES, SHALL NOT BE RELIED UPON BY THE PURCHASER, AND ARE NOT PART OF THE CONTRACT OF SALE. THE DEALERS ARE NOT AGENTS OF FORMULA BOATS. NO OTHER WARRANTIES ARE GIVEN BEYOND THOSE SET FORTH HEREIN.

THE LIABILITY OF FORMULA BOATS SHALL NOT, EXCEPT AS EXPRESSLY PROVIDED HEREIN, EXCEED THE ORIGINAL RETAIL PURCHASE PRICE OF THE GOODS UPON WHICH SUCH LIABILITY IS BASED.

Litigation Forum / Jurisdiction

ANY LITIGATION RELATED TO THIS LIMITED WARRANTY POLICY OR THE BOAT MUST BE MAINTAINED IN EITHER THE FEDERAL DISTRICT COURT FOR THE NORTHERN DISTRICT OF INDIANA, FORT WAYNE DIVISION (OR ANY SUCCESSOR JURISDICTION) OR IN A STATE COURT SITTING IN ALLEN COUNTY, INDIANA. YOU HEREBY IRREVOCABLY CONSENT AND SUBMIT TO THE EXCLUSIVE JURISDICTION OF THE APPLICABLE FEDERAL OR STATE COURTS SPECIFIED HEREIN AND IRREVOCABLY WAIVE ANY OBJECTION YOU MAY HAVE BASED UPON IMPROPER VENUE, FORUM NON CONVENIENS, OR OTHER SIMILAR DOCTRINES OR RULES.



NOTES

**FORMULA**

FORMULA PRE-OWNED WARRANTY TRANSFER APPLICATION

To transfer the remaining factory and Formula Guard warranties, submit the following to **Formula Boats** (below) within 30 days of change of ownership:

1. **Completed Warranty Transfer Application (below)**
2. **Bill of Sale showing sale date and engine hours at time of sale**

ORIGINAL WARRANTY HOLDER	NEW WARRANTY HOLDER
Name*:	Name:
Address:	Address:
City: State: ZIP:	City: State: ZIP:
Telephone: () Cell/Home	Telephone: () Cell/Home
Email:	Email:
*If original owner is unknown, information may be omitted.	Primary Boating Location:
Purchased from: Broker / Marina / Previous Owner / Other	Servicing Dealer:

BOAT DETAILS

Hull Number:	Model:	Engine Hours:
Date of Sale:	Date of Delivery:	
Homeport:	Primary Boating Area:	

ACKNOWLEDGEMENT

I hereby declare that I have fully read the terms of the warranty and I understand and accept all of the provisions therein.

Signature of New Owner

Date

Submit completed form to: Formula Boats, 2200 West Monroe Street, Decatur, IN 46733
Fax: 260-724-1110 or email: support@formulaboats.com

A copy of the Thunderbird Limited Warranty can be found at www.formulaboats.com.

[illegible]



Fuel Log

[illegible]



Useful Information

Store this information in a safe place other than your boat.

Owner _____

Home Port _____

Boat Name _____

Selling Dealer _____

Port Ignition Key Number _____ Starboard Ignition Key Number _____

Registration Number _____ State _____

Hull Serial Number _____ Warranty Registration Date _____

Engine Make and Model Number _____

Port Engine Serial Number _____

Starboard Engine Serial Number _____

Port Drive Serial Number _____

Starboard Drive Serial Number _____

Propeller Size _____

Generator Make and Model Number _____ Serial Number _____

VHF Radio Make and Serial Number _____ Serial Number _____

GPS Make and Model Number _____ Serial Number _____

Radar Make and Model Number _____ Serial Number _____



www.cgaux.org

FLOAT PLAN

INSTRUCTIONS: Complete this plan before you go boating and leave it with a reliable person who can be depended upon to notify the Coast Guard, or other rescue agency, should you not return or check-in as planned. If you have a change of plans, or will be delayed, notify the person holding your Float Plan. Finally, close your plan by notifying the holder you have arrived home safely and if the holder has reported you overdue, notify all applicable rescue authorities of your safe return.



www.uscgboating.org

Do NOT file this plan with the Coast Guard

VESSEL

IDENTIFICATION:

Name & Hailing Port _____
 Document / Registration No. _____ HIN _____
 Year, Make & Model _____
 Length _____ Type _____ Draft _____ Hull Mat. _____
 Hull & Trim Colors _____
 Prominent Features _____

PROPULSION:

Primary-- Type _____ Eng. _____ Fuel Capacity _____
 Auxiliary--Type _____ Eng. _____ Fuel Capacity _____

COMMUNICATION:

Radio Call Sign / Number _____
 DSC MMSI No. _____
 Radio-1: Type _____ Ch. / Freq. Monitored _____
 Radio-2: Type _____ Ch. / Freq. Monitored _____
 Cell / Satellite _____
 Email _____

NAVIGATION: (Check all onboard)

☐ Compass ☐ Radar ☐ GPS / DGPS ☐ Depth Sounder
☐ Charts ☐ Maps ☐ _____

SAFETY & SURVIVAL

VISUAL DISTRESS SIGNALS:

☐ Electric Distress Light (night only)
☐ Flag (day only)
☐ Flare, Aerial (day & night)
☐ Flare, Handheld (day & night)
☐ Signal Mirror (day only)
☐ Smoke (day only)

AUDIBLE DISTRESS SIGNALS:

☐ Bell
☐ Horn
☐ Whistle

EPIRB:

UIN* _____

ADDITIONAL GEAR:

☐ Anchor - Line length _____
☐ Dewatering device
☐ Exposure suits
☐ Fire Extinguisher
☐ Flashlight / Searchlight
☐ Raft / Dinghy
☐ Food for _____ days / person
☐ Water for _____ days / person
☐ _____
☐ _____
☐ _____
☐ _____

PERSONS ONBOARD

OPERATOR:

Name _____
 Address _____
 City _____ State _____ Zip Code _____
 Age _____ Gender _____ PFD ☐ PLB UIN* _____
 Note _____
 Float Plan Note _____

Has experience with: ☐ this vessel; ☐ the boating area(s).
 Home Phone _____
 Vehicle (Year, Make & Model) _____
 Vehicle License No. _____ Trailer ☐
 Vehicle parked at _____

PASSENGERS / CREW: (Identify all on board)

Name	Home Phone	Age	Gender	PFD	Note
1. _____	_____	_____	_____	<input type="checkbox"/>	_____
2. _____	_____	_____	_____	<input type="checkbox"/>	_____
3. _____	_____	_____	_____	<input type="checkbox"/>	_____
4. _____	_____	_____	_____	<input type="checkbox"/>	_____
5. _____	_____	_____	_____	<input type="checkbox"/>	_____
6. _____	_____	_____	_____	<input type="checkbox"/>	_____
7. _____	_____	_____	_____	<input type="checkbox"/>	_____
8. _____	_____	_____	_____	<input type="checkbox"/>	_____
9. _____	_____	_____	_____	<input type="checkbox"/>	_____
10. _____	_____	_____	_____	<input type="checkbox"/>	_____
11. _____	_____	_____	_____	<input type="checkbox"/>	_____
12. _____	_____	_____	_____	<input type="checkbox"/>	_____

Passenger PLB UIN*
 (Not listed in a specific order)

If you have a genuine concern for the safety or welfare of the persons onboard this vessel that have not returned or checked-in, in a reasonable amount of time, then follow the step-by-step instructions on the Boating Emergency Guide™ located on the last page of this Float Plan.

(*) EPIRB and PLB registration required by Federal regulations. www.beaconregistration.noaa.gov



www.cgaux.org

FLOAT PLAN continued

INSTRUCTIONS: Complete this plan before you go boating and leave it with a reliable person who can be depended upon to notify the Coast Guard, or other rescue agency, should you not return or check-in as planned. If you have a change of plans, or will be delayed, notify the person holding your Float Plan. Finally, close your plan by notifying the holder you have arrived home safely and if the holder has reported you overdue, notify all applicable rescue authorities of your safe return.



www.uscgboating.org

Do NOT file this plan with the U.S. Coast Guard

CONTACTS

Contact 1 _____ Phone Number _____

Contact 2 _____ Phone Number _____

Rescue Authority _____ Phone Number _____

ITINERARY

		DATE	TIME	LOCATION / WAYPOINT	MODE OF TRAVEL	REASON FOR STOP	CHECK-IN TIME
1	Depart						
2	Arrive						
	Depart						
3	Arrive						
	Depart						
4	Arrive						
	Depart						
5	Arrive						
	Depart						
6	Arrive						
	Depart						
7	Arrive						
	Depart						
8	Arrive						
	Depart						
9	Arrive						
	Depart						
10	Arrive						
	Depart						
11	Arrive						
	Depart						
12	Arrive						
	Depart						
13	Arrive						
	Depart						
14	Arrive						
	Depart						
15	Arrive						
	Depart						
16	Arrive						
	Depart						
17	Arrive						
	Depart						
18	Arrive						
	Depart						
19	Arrive						
	Depart						
20	Arrive						
	Depart						
21	Arrive						

If you have a genuine concern for the safety or welfare of the persons onboard this vessel that have not returned or checked-in, in a reasonable amount of time, then follow the step-by-step instructions on the Boating Emergency Guide™ located on the last page of this Float Plan.

USCG Float Plan - BOATING EMERGENCY GUIDE™

BEFORE YOU BEGIN – This guide is designed to work either with or without a Float Plan. You will need the following items: 1) the Float Plan, if one was given to you; 2) a pen or pencil; 3) a clean sheet of paper or writing tablet; and 4) your local telephone directory.

Step 1: Do you have a genuine concern for the safety or welfare of any persons who have not returned or checked-in, in a reasonable amount of time?

If yes, then continue with **Step 2**. Otherwise **STOP** -- no further action is required at this time.

Step 2: Were you given a prepared Float Plan by anyone on board the vessel?

If yes, then continue with **Step 3**. Otherwise, go to **Step 5**.

Step 3: Locate the Contacts at the top of page 2 on the Float Plan. Call Contact number 1...

IF CONTACT #1	THEN						
Answers phone	Take notes during your conversation. <ol style="list-style-type: none">Let the person know you are responding to a late return or check-in by the individuals designated on the Float Plan.Determine if the person you are talking to, or anyone else at that location, has recently had contact with anyone on the vessel, and when and where that contact occurred.Are you still concerned about the safety or welfare of any persons on board the vessel?<table><tr><th>IF</th><th>THEN</th></tr><tr><td>Yes</td><td>Continue with Step 4.</td></tr><tr><td>No</td><td>STOP. No further action is required.</td></tr></table>	IF	THEN	Yes	Continue with Step 4 .	No	STOP . No further action is required.
IF	THEN						
Yes	Continue with Step 4 .						
No	STOP . No further action is required.						
Does not answer phone	Continue with Step 4 .						

Step 4: Call Contact number 2...

IF CONTACT #2	THEN						
Answers phone	Take notes during your conversation. <ol style="list-style-type: none">Let the person know you are responding to a late return or check-in by the individuals designated on the Float Plan.Determine if the person you are talking to, or anyone else at that location, has recently had contact with anyone on the vessel, and when and where that contact occurred.Are you still concerned about the safety or welfare of any persons on board the vessel?<table><tr><th>IF</th><th>THEN</th></tr><tr><td>Yes</td><td>Continue with Step 6.</td></tr><tr><td>No</td><td>STOP. No further action is required.</td></tr></table>	IF	THEN	Yes	Continue with Step 6 .	No	STOP . No further action is required.
IF	THEN						
Yes	Continue with Step 6 .						
No	STOP . No further action is required.						
Does not answer phone	Continue with Step 6 .						

Step 5: Using the checklist below, jot down only what you know about each item:

DO NOT SPECULATE. Incorrect information may mislead Search and Rescue personnel; add to the overall search and rescue time; and adversely affect the outcome.

- ☐ Period of time the vessel has been overdue.
- ☐ Purpose of the trip or voyage.
- ☐ Description of vessel. (Type, size, color, features, etc.)
- ☐ Vessel's departure point and destination.
- ☐ Places the vessel planned to stop during transit.
- ☐ Navigation equipment aboard. (Examples: GPS, radar, compass, sounder, etc.)
- ☐ Number of persons aboard. Relevant characteristics such as dependability, reliability, etc.
- ☐ Was the vessel initially docked or moored or did a vehicle tow it to a launch point?
- ☐ License plate number and description of the tow vehicle and/or the passenger's transport vehicle.
- ☐ Communications equipment aboard, including type of radio and frequencies monitored, cellular or satellite telephone numbers of individuals, etc.
- ☐ Additional points of contact along the vessel's planned route.
- ☐ Operator and/or a passenger/crew member absolutely had to be back at the scheduled return time.
- ☐ Call your local Rescue Authority that responds to marine emergencies (Police, Sheriff, Constable, First responder, etc.).

Go to **Step 6-2**.

Step 6:

- Call the Rescue Authority contact at the top of page 2 on the Float Plan.
- Tell the dispatcher you are responding to a late return or check-in by the persons on board the vessel.
- The dispatcher will instruct you from there.

Note: The dispatcher will provide you with the necessary contact or agency connection to get a search and rescue mission started. This puts you in direct contact with the agency conducting the actual search and rescue, eliminating unnecessary middlemen.
The dispatcher will tell you if he/she desires a follow-up call on the outcome of the rescue.

- Continue with **Step 7**.

Step 7: Be patient... you've done everything you can possibly do for now. It is important to keep the telephone available so emergency personnel can contact you with additional information and/or questions concerning the search and rescue effort.

STOP -- End of Guide

Provided as a courtesy by:

<Unit or Organization Name>
<City>, <State>
<phone number>
<website URL>

Get a Vessel Safety Check before you go boating.



The USCG Float Plan is the official Float Plan of the U.S. Coast Guard and U.S. Coast Guard Auxiliary. For more information visit:

www.floatplancentral.org

DEPARTMENT OF HOMELAND SECURITY
U.S. Coast Guard

OMB No: 1625-0001
Exp. Date: 07/31/2022

REPORT of MARINE CASUALTY, COMMERCIAL DIVING CASUALTY, or OCS-RELATED CASUALTY

Section I - Reporting Vessel/Facility Information

1. Vessel or Facility Name		2. Vessel Official Number or IMO Number		3. Vessel Flag	
4. Vessel Length <div style="display: flex; align-items: center;"><input type="checkbox"/> Feet <input type="checkbox"/> Meters</div>		5. Vessel Gross Tons		6. Vessel Propulsion Type	
7. Vessel or Facility Type		8. Vessel or Facility Service or Occupation			
9. FOR TOWING ONLY	9a. Arrangement:	9b. Number of Vessels Towed:		9c. Maximum Size of Tow/Tow-Boat(s):	
	<input type="checkbox"/> Pushing Ahead	Empty _____		Length _____ feet	
	<input type="checkbox"/> Towing Astern	Loaded _____		Width _____ feet	
	<input type="checkbox"/> Towing Alongside	Total _____			
9d. Did one or more of the barges in the tow cause or sustain damage in the marine casualty? <div style="display: flex; align-items: center;"><input type="checkbox"/> Yes <input type="checkbox"/> No</div> <i>(If Yes complete and attach one or more CG-2692A forms to this report)</i>					

Section II - Reason for Submitting this Report (Check all that apply)

10. The above vessel was involved in a Marine Casualty consisting in (46 CFR 4.05-1 and 4.05-10):

☐ 1. Unintended grounding or an unintended strike of (allision with) a bridge

☐ 2. Intended grounding or intended strike of a bridge that created a hazard to navigation, the environment or the safety of the vessel, or that meets any of the criteria in 3 through 8 below

☐ 3. Loss of main propulsion, primary steering, or any associated component or control system that reduces the maneuverability of the vessel

☐ 4. Occurrence materially and adversely affected the vessel's seaworthiness or fitness for service or route

☐ 5. Loss of life

☐ 6. Injury that requires professional medical treatment (treatment beyond first aid) and, if the person is engaged or employed on board a vessel in commercial service, that renders the individual unfit to perform his or her routine duties

☐ 7. Occurrence causing property damage in excess of \$75,000

☐ 8. Occurrence involving significant harm to the environment

11. The above facility or vessel was involved in a Commercial Diving Casualty involving (46 CFR 197.484):

☐ 1. Loss of life

☐ 2. Diving-related injury to any person causing incapacitation for more than 72 hours

☐ 3. Diving-related injury to any person requiring hospitalization for more than 24 hours

12. The above facility or vessel was involved in an OCS Facility Casualty Resulting in (33 CFR 146.30 and 146.35):

☐ 1. Death

☐ 2. Injury to 5 or more persons in a single incident

☐ 3. Injury causing any person to be incapacitated for more than 72 hours

☐ 4. OCS Facility only - Damage affecting the usefulness of primary lifesaving or firefighting equipment

☐ 5. OCS Facility only - Damage to the facility exceeding \$25,000 resulting from a collision by a vessel with the facility

☐ 6. OCS Facility only - Damage to a floating OCS facility exceeding \$25,000

Section III - Associated Parties Information (Fill all fields that apply)

13. Name of Owner		Telephone	14. Name of Operator or Manager		Telephone
Address		Email address	Address		Email address
15. Name of Master or Person-In-Charge (Last, First, Middle)		Telephone	16. Name of Agent (Last, First, Middle)		Telephone
Address		Email address	Address		Email address
17. Name of Dive Supervisor (Last, First, Middle)		Telephone	18. Name of Pilot (Last, First, Middle)		Telephone
Address		Email address	Address		Email address

Section IV - Casualty Information

19. Date/Time (local) of Occurrence		20. Location-Name of Body of Water or Waterway: Latitude: _____ OR River Mile Marker: _____ Longitude: _____	
21. Property Damage Estimated Damage Cost(s) to: Vessel: \$ _____ Cargo: \$ _____ Facility: \$ _____ Other: \$ _____		Describe the Extent of Property Damage	
22. Status of Involved Persons (If there are 1 or more injured, dead or missing persons complete and attach one or more CG-2692C forms to this Report) Total Number of Persons: _____ On Board the Vessel: _____ Injured: _____ Dead: _____ Missing: _____			

Section IV - Casualty Information (continued)

23. Was This Casualty a Serious Marine Incident (SMI) as Defined in 46 CFR 4.03-2?

☐ Yes ☐ No ☐ Not at this Time, But is Likely to Become an SMI (If Yes or Is Likely to Become an SMI complete/attach one or more CG-2692B forms to this report)

24a. Is there any evidence of alcohol or drug use by or intoxication of individuals directly involved in the casualty?

☐ Yes ☐ No (If Yes, identify those individuals for whom evidence has been obtained and specify the method to obtain such evidence in block 24c)

24b. Did any individual directly involved in a casualty refuse to submit to, or cooperate in, the administration of a timely chemical test, when directed by a law enforcement officer or by the marine employer?

☐ Yes ☐ No (If Yes, note the individual(s) who refused in block 24c)

24c. Individuals with evidence of drug or alcohol use, evidence of intoxication, or who refused to submit/cooperate in a timely chemical test (if more space is needed, continue in block 25c)

24d. Is there evidence that alcohol use contributed to this casualty?

☐ Yes ☐ No (If Yes, discuss in block 25b)

25. Nature and Circumstance of the Casualty:

25a. Activity or Operation Being Conducted at the Time of the Casualty:

25b. Description of the Casualty (casualty events and the conditions and actions that were believed to be causal factors as well as any hazards created as a result of the casualty. Attach additional sheets if necessary.):

25c. Any other comments, including with respect to use of or need for emergency response equipment:

Section V - Person Making this Report

24. Name (PRINT) (Last, First, Middle)	25. Signature:	26. Date
27. Title	28. Address	
29. Telephone No.	30. Email	

INSTRUCTIONS FOR COMPLETION OF FORM CG-2692
REPORT OF MARINE CASUALTY, COMMERCIAL DIVING CASUALTY, OR OCS-RELATED CASUALTY

An agency may not conduct or sponsor, and a person is not required to respond to a collection of information unless it displays a valid OMB control number. The Coast Guard estimates that the average burden for this report is 1 hour. You may submit any comments concerning the accuracy of this burden estimate or any suggestions for reducing the burden to: Commandant (CG-INV), U.S. Coast Guard Stop 7501, 2703 Martin Luther King Jr Ave SE, Washington, DC 20593-7501 or Office of Management and Budget, Paperwork Reduction Project (1625-0001), Washington, DC 20503.

WHEN TO USE THIS FORM

1. This form satisfies the requirement for written reports of casualties and accidents found in the Code of Federal Regulations for vessels, commercial diving operations, and Outer Continental Shelf (OCS) facilities. Depending on the circumstances surrounding an incident, a written report may be required if it meets one or more of the conditions described in instructions 2 - 4.
2. **VESSELS.** If you are the owner, agent, master, operator, or person in charge of a vessel, other than a public vessel or an uninspected recreational or state-numbered vessel, you must submit a report if your vessel:
- A. is involved in a marine casualty or accident that occurs upon the navigable waters of the United States, its territories or possessions and meets any of the criteria in block 10, or
 - B. is a United States vessel involved in a marine casualty or accident, wherever such casualty or accident occurs, that meets any of the criteria in block 10, or
 - C. is a foreign vessel engaged in OCS activities as defined in 33 CFR 140.10 and is involved in a marine casualty or accident that meets any of the criteria in block 10, or
 - D. is a foreign tank vessel operating in waters subject to the jurisdiction of the United States, including the Exclusive Economic Zone (EEZ), which involves significant harm to the environment or material damage affecting the seaworthiness or efficiency of the vessel.
3. **DIVING.**
- A. Commercial Diving. If you are the master or person in charge of a vessel or facility from which a commercial diving operation is conducted: (1) at any deepwater port or the safety zone thereof as defined in 33 CFR Part 150; (2) from any artificial island, installation, or other device on the Outer Continental Shelf (OCS) and the waters adjacent thereto as defined in 33 CFR Part 147 or otherwise related to activities on the OCS; (3) from any vessel required to have a certificate of inspection issued by the Coast Guard, including mobile offshore drilling units, regardless of their geographic location; or (4) from any vessel connected with a deepwater port or within the deepwater port safety zone or from any vessel engaged in activities related to the OCS, you must submit a report if there is a diving casualty meeting the criteria in block 11, except if the diving operation is:
 - 1. performed solely for marine scientific research and development purposes by educational institutions,
 - 2. performed solely for research and development for the advancement of diving equipment and technology, or
 - 3. performed solely for search and rescue or related public safety purposes by or under the control of a governmental agency.
 - B: All Other Diving. Any occurrence of injury or loss of life to any person while diving from a vessel subject to instruction 2 and using underwater breathing apparatus must be reported under instruction 2.
4. **OUTER CONTINENTAL SHELF (OCS) FACILITIES.** If you are the owner, operator, or person in charge of an OCS facility engaged in OCS activities as defined in 33 CFR 140.10, you must submit a report if your facility is involved in a casualty or accident that meets any of the criteria in block 12.

COMPLETION OF THIS FORM

5. In accordance with 46 CFR §4.05-10, 46 CFR §197.486, and 33 CFR §146.35, this form shall be filled out as completely and accurately as possible. Please type or print clearly. Fill in all blanks that apply to the kind of accident that has occurred. If a block is not applicable, the abbreviation "NA" should be entered in that space. If the answer is unknown and cannot be obtained before the report has to be submitted (i.e. within 5 days of the accident), the abbreviation "UNK" should be entered in that block. If "NONE" is the correct response, enter it in the block.
6. Once completed, deliver, email, or fax this form within 5 days of the casualty to the Coast Guard Sector, Marine Safety Unit, or Activity nearest the location of the casualty or, if at sea, nearest the arrival port. <https://www.uscg.mil/Units/Organization/>
7. Tugs or towboats with tows under their control shall complete blocks 9a through 9d and, if one or more barges in their tow causes or sustains damage or meets any other reporting criteria, use the "Barge Addendum," CG-2692A to report information on the barge(s) involved.
8. If an incident involves multiple barges suffering or causing damage while moored or anchored (such as in a fleeting area), or breaking away from their moorage and causing or sustaining damage, enter the location of the moorage in Block 1 of the CG-2692 and complete the form except for blocks 2-8. Details for the barges will be entered on the CG-2692A. If a single barge is involved in a marine casualty while moored or anchored, it shall be documented as any other vessel using the CG-2692.
9. If the casualty meets the criteria for a serious marine incident as defined in 46 CFR §4.03, use the "Chemical Drug and Alcohol Testing Addendum," CG-2692B to report information on required drug and alcohol testing following a serious marine incident.
10. If one or more persons on the vessel or facility were injured, killed, or missing as a result of the casualty, use the "Personnel Casualty" Addendum," CG-2692C to report information on the extent of all personnel casualties.
11. For facilities and vessels engaged in OCS activities who are reporting a casualty in accordance with 33 CFR §146.35 or 33 CFR §146.303, use the "Involved Persons and Witnesses Addendum," CG-2692D to provide a list of all involved persons and witnesses to the casualty being reported. The CG-2692D may also be used to provide data on persons involved or witnessing a marine casualty or commercial diving casualty.
12. Block 20 - "Location": Always identify the body of water or waterway. Latitude and longitude to the nearest tenth of a minute should always be entered except in those rivers and waterways where a mile marker system is commonly used. In those cases, the mile number to the nearest tenth of a mile should be entered. If the latitude and longitude, or mile number, are unknown, reference to a known landmark or object (buoy, light, etc.) with distance and bearing to the object is permissible.

Privacy Act Notice

(CG-2692, CG-2692A, CG-2692B, CG-2692C and CG-2692D)

Authority: Title 46, United States Code (U.S.C.) §6301, Title 46, Code of Federal Regulations (CFR), Parts 4 and 197, and Title 33, CFR Part 146 authorizes the collection of this information. Specifically, 46 CFR §4.05-10 mandates that vessel owners, agents, masters, operators, or persons in charge file a written report of any marine casualty required to be reported under 46 CFR §4.05-1, 46 CFR §197.486 mandates that persons in charge of vessels or facilities file a report of any diving casualty required to be reported under 33 CFR §197.484, and 46 CFR §146.35 mandates that owners, operators, or persons in charge of an OCS facility or vessel engaged in OCS activities file a report of any OCS-related casualty required to be reported under 33 CFR §146.30. For marine casualties, diving casualties when the diving installation is on a vessel, and The written report must be provided on Form CG-2692 (Report of Marine Casualty, Commercial Diving Casualty, or OCS-Related Casualty) supplemented as necessary by appended Forms CG-2692A (Barge Addendum), CG-2692B (Chemical Drug and Alcohol Testing Addendum), CG-2692C (Personnel Casualty Addendum), and CG-2692D (Involved Persons and Witnesses Addendum). The forms may be used for diving casualties when the diving installation is on a facility or for OCS-related casualties that are not also marine casualties under 46 CFR Part 4.

Purpose: The Coast Guard uses this information in gathering facts to determine causes surrounding reportable marine casualties. This information assists in promoting the safety of life, property, and the protection of the marine environment through preventing the recurrence of accidents.

Routine Uses: Reportable marine casualty information is needed for Coast Guard investigations of vessel casualties involving injury, death, property damage, environmental damage and dangerous conditions and for preparation and submission of data reports mandated by Congress (see 46 U.S.C. 6301). Information gathered is also used to determine whether new or revised safety laws, regulations, and policies are necessary. Additionally, chemical testing information is needed to improve Coast Guard detection and reduction of drug use by mariners. The information contained on forms CG-2692, CG-2692A, CG-2692B, CG-2692C, and CG-2692D may be disclosed under the Freedom of Information Act (FOIA) in response to a written FOIA request.

Disclosure: Furnishing this information is mandatory per 46 CFR §4.05-10. Failure to furnish the requested information for occurrences that are reportable marine casualties, diving casualties, or OCS-related casualties may result in civil penalty sanctions as outlined in 33 CFR Part 1. Coast Guard credentialed mariners may be subject to administrative adjudication per 46 CFR Part 5 for reporting failures. Some of the casualty information collected on this form may be made available for public inspection; however, information collected is protected from use in civil litigation per 46 U.S.C. §6308. Personal privacy information will not be disclosed routinely. Social Security numbers are not mandated on this form.

BATTERY MAINTENANCE LIST

The boat may be equipped with any number of sensors, systems, electronics or equipment that have batteries and must be periodically checked to assure proper performance. Use this form as a handy reference for these items such as EPIRBs, handheld electronics, automatic fire extinguishers, CO detectors, etc.

[illegible]

THUNDERBIRD PRODUCTS

2200 WEST MONROE STREET • DECATUR, IN 46733

260.724.1412 • 1.800.736.7685 • SUPPORT@FORMULABOATS.COM

WWW.FORMULABOATS.COM



BOAT SMART FROM THE START. TAKE A BOATING EDUCATION COURSE AND GET A VESSEL SAFETY CHECK FOR YOUR BOAT. FOR MORE INFORMATION, CONTACT THE UNITED STATES COAST GUARD AUXILIARY WWW.CGAUX.ORG OR FOR BOATING SAFETY VISIT WWW.USCOBOATING.ORG.