Section 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 selling dealer 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.

Yacht Certification
Figure 1-1

DECLARATION OF CONFORMITY

A CE mark means the boat complies with European directives for recreational vessels as published by the International Organization for Standardization (ISO).

TABLE OF CONTENTS

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 proper operation of all systems.

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

- Obtaining state registration of the boat.
- Providing the proper USCG required safety equipment.
- Following proper break-in procedures 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 floatation 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. 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, 1-800-368-5647, www.cgaux.org; United States Power Squadrons, 1-888-FOR-USPS, 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 USCG boating safety courseline 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.

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 equipment onboard will have a serial number for identification. It is a good practice to prepare a list of all serial number items and store it in a safe place other than onboard the boat. An Important Information Form is located at the end of this manual. Please refer to the equipment operator's manuals supplied in your Owner Information Binder for location of serial numbers.

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.

CAUTION

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

Diesel engine exhaust and some of its constituents are known to the State of California to cause cancer, birth defects and other reproductive harm.

Emission Control Warranty Information

CORC013

Your boat may be equipped with an engine that meets the strict requirements set forth by the California Air Resources Board (CARB). If so, the engine has a special environmental tag and the boat has this label affixed to it. The tag and the label are required by the California Air Resources Board (CARB). The label has 1, 2, 3, or 4 stars. The label MUST be affixed to the boat, if the boat is operated in the state of California and/or bordering waters.

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.

Section 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 the presence of a hazard which WILL cause SEVERE injury, death or substantial property damage.

⚠ WARNING

Indicates the presence of a hazard which CAN cause SEVERE injury, death or substantial property damage.

CAUTION

Indicates the presence of a hazard which WILL or CAN cause MINOR or MODERATE personal injury or property damage.

NOTICE

Indicates installation, operation or maintenance information which is important but not hazard-related.

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

Federal law requires at least one Type I, II, III, or V Personal Floatation Device (PFD), of the proper size, for each person on board or being towed, and at least one Type IV throwable PFD in the boat.

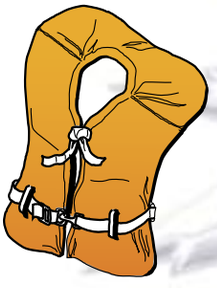
There are four types of PFDs to wear and one type used for throwing in emergency situations.

Type I Life Preserver: Most buoyant PFDs are effective on all waters, especially open, rough water.

KC-0041C

Type I
Life Preservers
Figure 2-1

Type II Buoyant Vest: Good for calm water near shore on most inland waters where quick rescue is likely.



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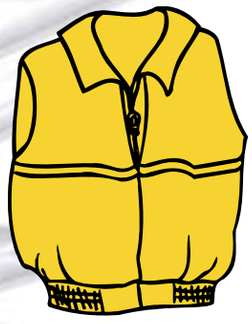
Type II
Buoyant Vests
Figure 2-2

Type III Flotation Aid: Good for most inland water applications where quick rescue is likely. Comes in various styles and some are designed for water sport activities.

KC-0042C

Type III Flotation Aids Figure 2-3

Type V Hybrid PFD: Inflatable design for special use activities. May be used instead of a Type I, II, or III PFD if used in accordance with the approval conditions on the label and if worn when the boat is underway. Some Type V PFDs provide increased protection against hypothermia.



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Type V Hybrid PFD Must Be Worn When Underway Figure 2-4

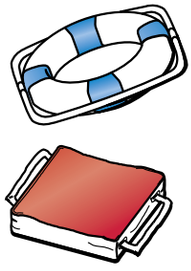
- **A Type V PFD must be worn to be counted toward the minimum carriage requirements.**
- **Special PFDs are available for skiing and other water sports. These PFDs are constructed with materials suitable for high impact falls.**

PFDs are intended to help save lives. The operator should set an example by wearing one. Wear a PFD whenever boating. It is especially important that children and non-swimmers wear a PFD at all times. Make certain all passengers know how to put on and properly adjust their PFDs. Also, selecting the proper type PFD for your kind of outing helps ensure your time on the water can be the safest possible.

At the beginning of each season, check PFDs for damage and test for proper flotation. Refer to the PFD manufacturer's information.

All boats over 16 feet (4.8 meters) in length must carry one USCG approved Type IV throwable lifesaving device, such as a ring buoy or buoyant cushion. To meet requirements, each lifesaving device must have a current, legible USCG approval stamp permanently affixed.

Type IV Throwable Device: Intended for heavy traffic inland waters where help is available. Designed to be thrown to a person in the water and should never be worn.



KC-0071C

Type IV Throwable Devices Figure 2-5

Your Formula dealer can help you select appropriate PFDs and throwable lifesaving devices for your area.

Navigation Lights

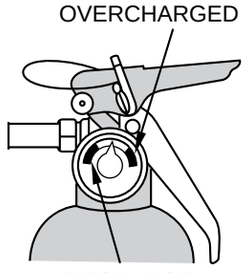
All power boats underway between sunset and sunrise must display proper navigation lights. All boats at anchor must display a proper anchor light. The anchor light must be visible 360 degrees. Your Formula boat is equipped with international navigation lights.

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

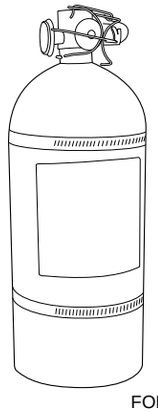
All boats must carry an appropriate portable marine type B (gasoline, oil or grease) fire extinguisher in operable condition and in an accessible location. Your Formula boat is equipped with two portable and a fixed system fire extinguisher. All passengers should know the location and operating procedure of each extinguisher.



KC-0083

Portable Fire Extinguisher
Figure 2-6

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



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Fixed Automatic Fire Extinguisher
Figure 2-7

A fixed automatic fire extinguisher is mounted on the engine compartment forward bulkhead. The extinguisher is activated when the heat sensitive head reaches a predetermined temperature. The extinguisher discharges and saturates the engine compartment, smothering the fire. For additional information, refer to **Halon Automatic Fire Extinguisher, Section 5.**

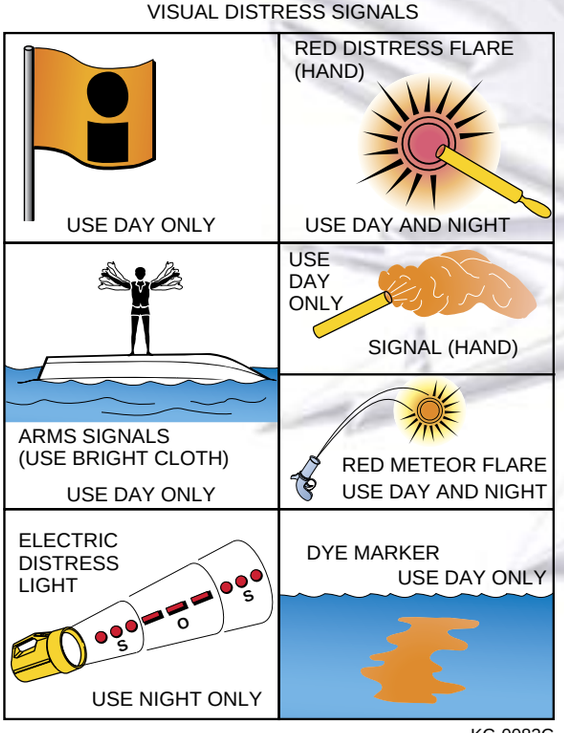
Visual Distress Signals

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

Visual Distress Signals
Figure 2-8

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.

- Sea anchor and anchor line
- Life raft
- Tow line
- Mooring lines and fenders
- Compass
- First aid kit and manual
- Day/night distress signals
- Radar reflector
- Flashlight and spare batteries
- Cellular phone
- Binoculars
- Portable AM/FM radio with weather band
- Emergency Position Indicating Radio Beacon (EPIRB)
- Engine, drive unit and trim tab lubricant
- Tool kit
- Spare propeller and mounting hardware
- Spare fuses and bulbs
- Boat hook
- Spare keys
- Sun glasses and sun block lotion
- Bottled water

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

Fuel 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 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.

KC-0153

No Alcohol or Other Drugs
Figure 2-9

NOTICE

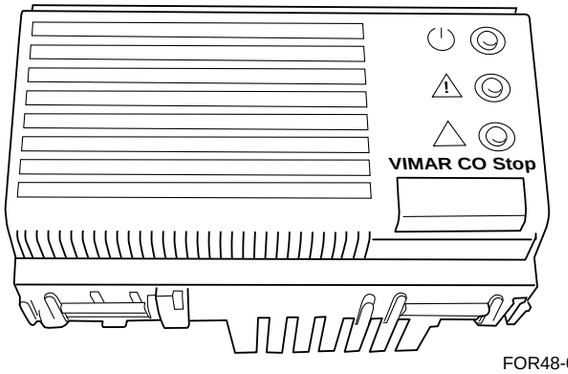
If the operator's blood alcohol content is 0.10% (0.08% in some states) or above, violators are subject to a civil penalty up to $1,000.00 or criminal penalty up to $5,000.00, one year imprisonment or both. Operating a boat under the influence can also result in a loss of automobile driving privileges.

Carbon Monoxide

Carbon Monoxide Safety Symbol
Figure 2-10

⚠ 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.



FOR48-056

Carbon Monoxide Detector
Figure 2-11

Your Formula boat is equipped with at least one carbon monoxide (CO) detector located in the cabin.

CAUTION

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.

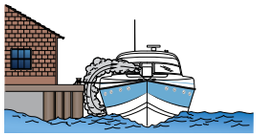
Have a suspected CO victim deeply breathe fresh air and immediately seek medical attention.

⚠ 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.

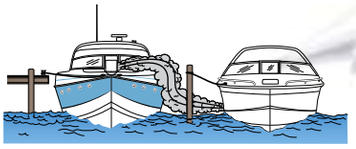
❷ Exhausts traveling along obstruction.



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.

FOR48-004

ENSURE ADEQUATE VENTILATION FOR CORRECT AIR MOVEMENT THROUGH BOAT!

Carbon Monoxide
Figure 2-12

Platform Dragging ("Teak Surfing")

READ, KNOW and UNDERSTAND the information on all warning labels and adhere to the boat operation practices described on them. The United States Coast Guard issued a SAFETY ALERT on August 28, 2001 which covers some issues of improper use of the boarding ladder/swim platform. The SAFETY ALERT and portions of the information follow:

Tragic deaths occur from the negligence of unsafe boating and dangerous activities. Experts say, "many of these deaths may have been caused by an invisible hazard, carbon monoxide poisoning." Taking the risk of swimming under a boarding platform when the engine is running, skiing within 20 feet (6.1 meters), or "platform dragging," "teak surfing" or "dragging" behind a moving boat can be fatal. Dangerous activities which can result in a serious injury or death are not considered water sports. Thunderbird Products does not promote unsafe boating risks or jeopardizing any boaters' safety.

⚠ WARNING

DO NOT use the swim platform for any other purpose than boarding the boat or preparation of entering the water, and DO NOT use the swim platform when the engines are running.

Carbon monoxide poisoning should not be confused with seasickness, intoxication or heat stress. If someone complains of irritated eyes, headache, nausea, weakness or dizziness, or you suspect carbon monoxide poisoning, immediately move the person to fresh air, investigate the cause, and take corrective action. Seek medical attention if necessary.

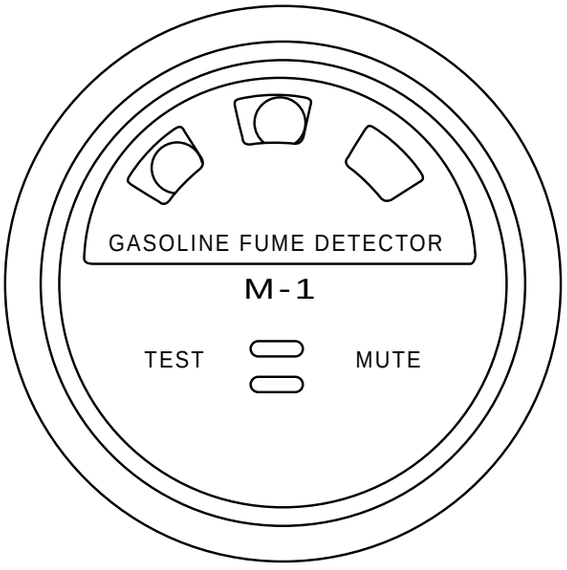
SAFETY ALERT FROM AUGUST 28, 2001:

The United States Coast Guard advised boaters not to "Teak/Drag Surf." Recent boating fatalities revealed carbon monoxide (CO) emitted from a vessel's exhaust resulted in CO poisoning and death. Do not allow persons in the vicinity of the Swim Platform (in the water or in the boat) with the engine(s) or generator operating, while at rest or underway at slow speed. "Teak/Drag Surfing" places the individual in position directly exposed to the CO in the engine's exhaust. This can result in a loss of coherent responses and even death. In addition, "Teak/Drag Surfing" dangerously exposes the individual to a possible propeller injury. Since "Teak/Drag Surfing" is done without a life jacket (PFD), it significantly increases the probability of drowning. The Coast Guard stresses, "Teak/Drag Surfing" is a very dangerous activity and advises boaters not to participate in it.

The Coast Guard also stated that carbon monoxide is one of the most dangerous gases. It strikes before you know you are exposed and it impairs in a way that can and too often does lead to death. That is why it is important to the Coast Guard that in every circumstance it should be avoided.

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.



FOR012

Fume Detector
Figure 2-13

In the event the detector goes into the alarm mode, immediately operate the engine compartment 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.

For all U. S. waters, the National Weather Service operates the NOAA Weather Radio (NWR). This service provides continuous weather information on the following VHF/FM frequencies:

- 162.400 MHz
- 162.425 MHz
- 162.450 MHz
- 162.475 MHz
- 162.500 MHz
- 162.525 MHz
- 162.550 MHz

It is good practice to periodically monitor the weather. For additional information, refer to your radio operator's manual in your Owner Information Binder.

A distress call is transmitted on VHF/FM radio channel 16 (156.800 MHz) or 2182 kHz (SSB). Know your audible signals:

- For emergency, the call sign is "Mayday."
- An urgent situation, the call sign is "Pan-Pan."
- For navigational safety and weather warnings, the call sign is "Security."

Repeat the call sign three times.

Immediately react to a distress call. Assist, if possible, using an emergency frequency. Otherwise continue to monitor the situation until help has arrived.

Cellular Telephone

A cellular phone can be extremely convenient. Cellular telephone service continues to improve by expanding service areas and advancing technology.

Seek the latest available information regarding network providers in your boating area before purchasing cellular telephone 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

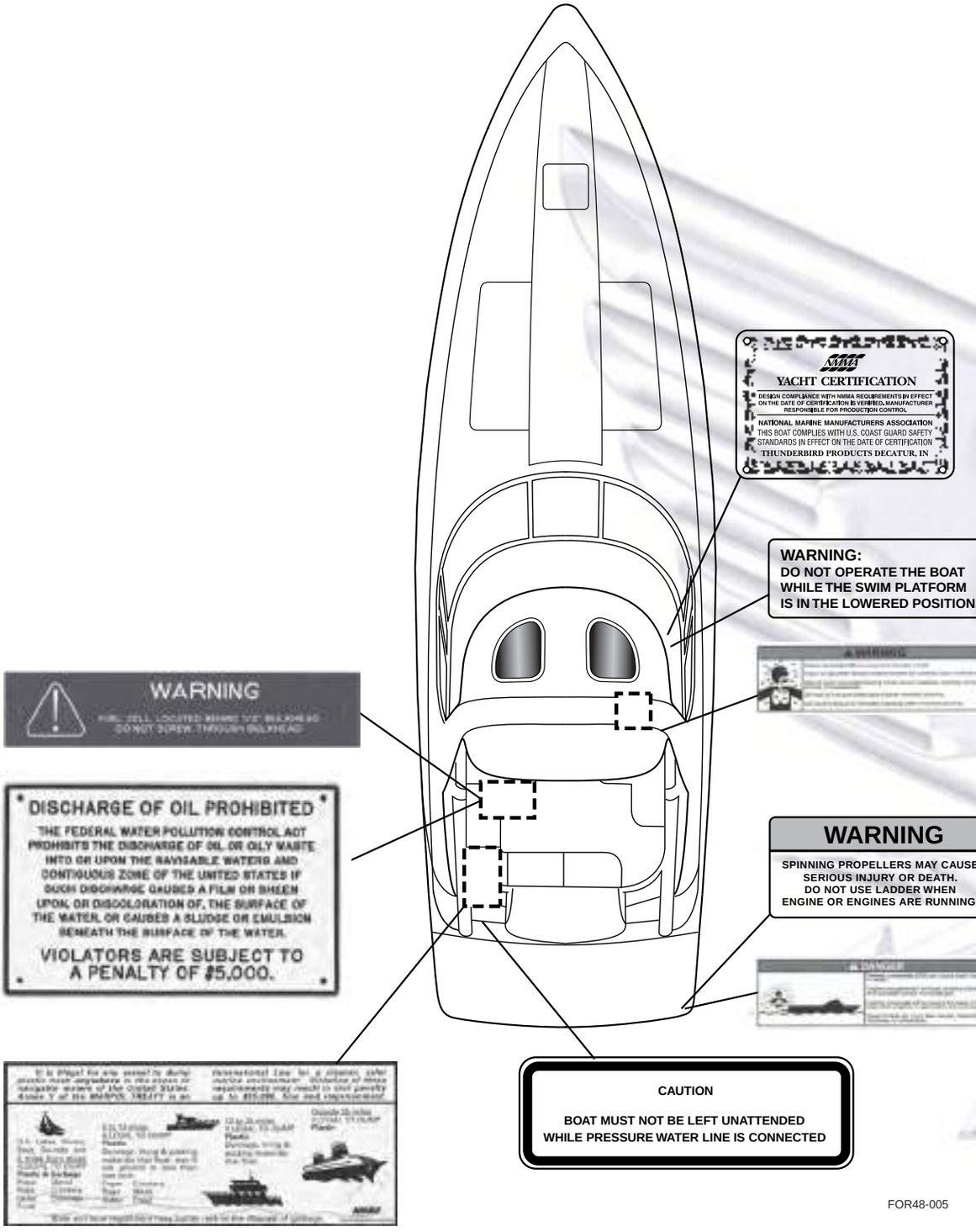
Your boat has various safety labels at the time of manufacture. These labels appear at specific locations on the craft where safety is of particular concern.

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.

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

Warning Label Location

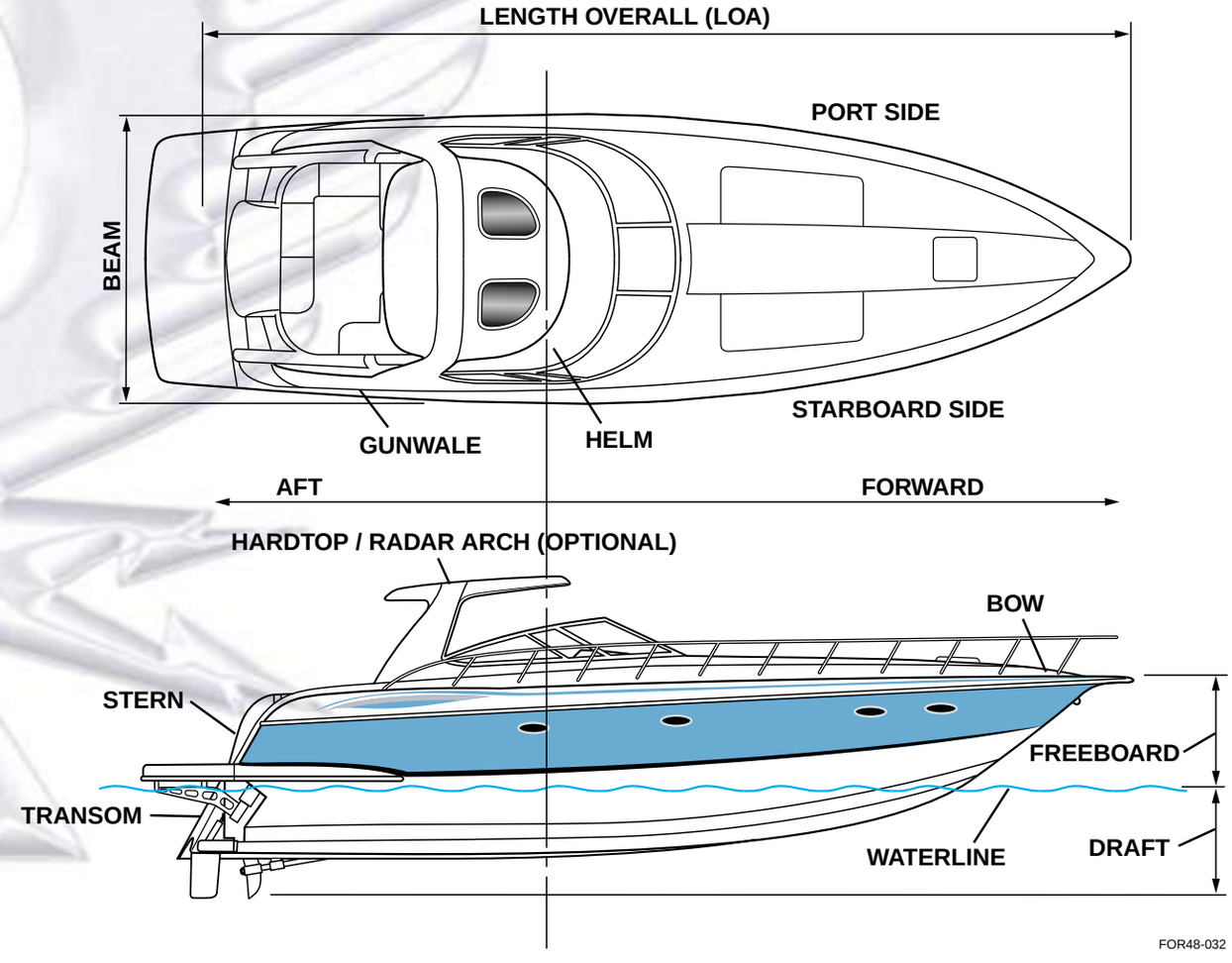


Warning Label Location
Figure 2-14

Section 3

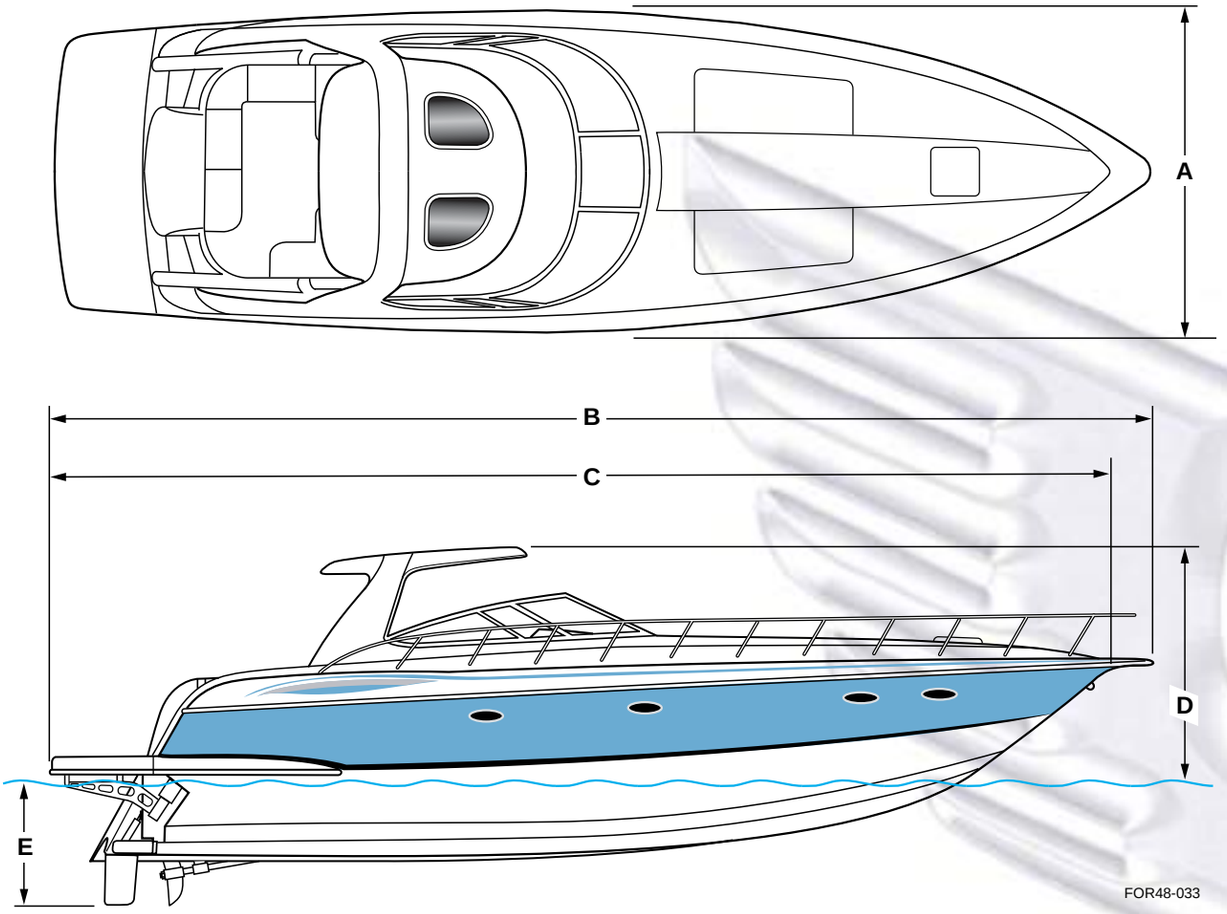
Specifications and Layout

BOATING TERMINOLOGY



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

DIMENSIONS



Yacht		48	45
A	Maximum Beam	14'0" (4.27 m)	13'11" (4.24 m)
B	LOA	51' (15.54 m)	48'2" (14.68 m)
C	LOA Less Bow Platform	48' (14.63 m)	45' (13.72 m)
*D	Bridge Clearance - Light Load	12'9" (3.89 m)	12'10" (3.91 m 13' (3.96 m) with Volvo IPS 13'9" (4.19 m) with Radar 13'11" (4.24 m) with Radar and Volvo IPS 15'5" (4.70 m) with Mast Light 15'7" (4.75 m) with Mast Light and Volvo IPS
*D	Bridge Clearance with SAT TV option	N/A	17'4" (5.28 m) with Volvo IPS 17'2" (5.21 m) with V-drive
E	Draft (Light Load)	44" (1.12 m)	41" (1.04 m) Inboard 39" (0.99 m) Volvo IPS
F	Dead Rise	18°	18°

* “D” does not include hardware mounted on top of the arch/hardtop (48 PY).

48 YACHT

Specifications

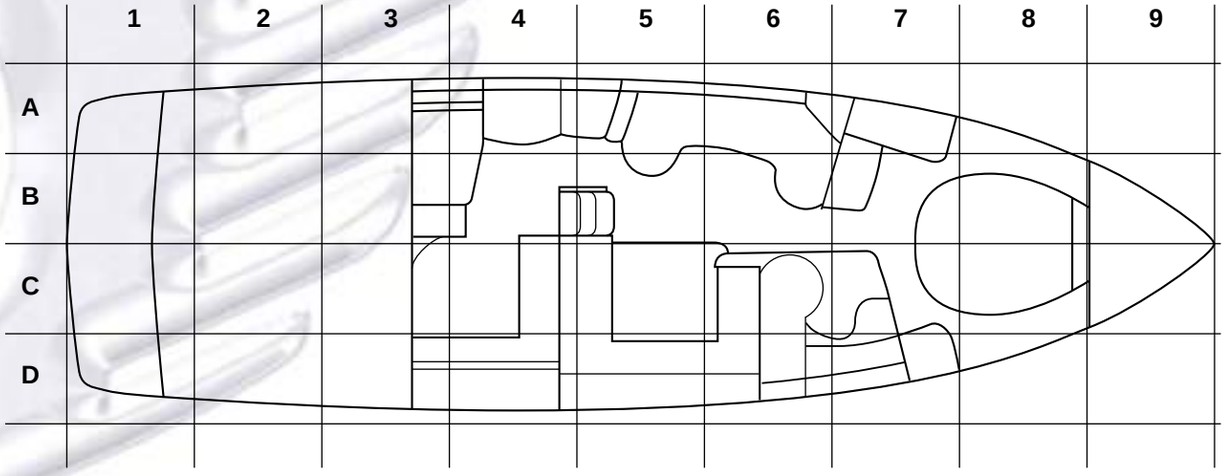
Approximate Weight:

Diesel Power	35,050 lbs (15,898 kg) 37,750 lbs (16,216 kg) - with hardtop

Capacities:

Port Fuel Tank	200 Gal. (757.0 L)
Starboard Fuel Tank	200 Gal. (757.0 L)
Fresh Water Tank	100 Gal. (379 L)
Hot Water Tank	20 Gal. (76 L)
Holding Tank	75 Gal. (284 L)

Steering System — Power Assisted Full Hydraulic



FOR48-034

Equipment Location

Item	Location	Remarks
AC/DC Control Panel	A-5	Aft of dinette seating area
Air Conditioning Controllers	A-6/D-7/B-3	Above fore dinette seat, next to owner's stateroom closet
Air Conditioner Controller (Cockpit)	C-4	Cockpit, beneath wet bar sink
Automatic Fire Extinguisher	B-3	Engine compartment, FWD wall
Battery Charger	A-3	Engine compartment, outboard wall
Battery ON/OFF Switches	A-5/C-4	Engine battery switches are on the AC/DC panel. Aux battery switch below sink in cockpit wet bar
Battery Parallel Switch	B-3	AC/DC panel A5
Bilge Pump - FWD	B-4	Aft cabin bilge
Bilge Pump - Rear	B-3	Engine compartment, beneath center walk thru
Carbon Monoxide Detectors	A-5/D-7/D-4	Next to AC/DC control panel, upper portion; next to owner's stateroom closet; guest stateroom/den
Central Vacuum	A-5	Dinette storage

Item	Location	Remarks
Circuit Breaker Panel - Helm	D-4	Beneath dash, throttle controls
Circuit Breaker Panel - Cockpit	B/C-3	Bilge - above generator
Circuit Breaker Panel - Shore Power	A-5	AC/DC panel
Circuit Breaker - Windlass	B-3	Bilge - PORT fuel tank wall
Circuit Breaker - Auxilliary Power	B/C-3	Bilge - DC distribution panel
Engine Compartment Blower	A-2	Engine walls - aft, PORT
Engine Compartment Manual Lift Handle	B/C-2	Aft cockpit day hatch
Engine Compartment Switch	B-2	PORT/forward corner of trunk assembly
Fire Extinguisher - Cabin	D-5	Cabin galley, beneath sink
Fire Extinguisher - Cockpit	C-4	Cockpit, beneath wet bar sink
Fresh Water Dockside Hookup	A-1	Swim platform, aft, PORT corner
Fresh Water Level Indicator	A-5	AC/DC panel
Fresh Water Pump	C-5	Galley - floor storage
Fuel Tank fill - PORT	A-2	Deck, aft PORT side
Fuel Tank Fill - STBD	D-2	Deck, aft STBD side
Helm Hydraulic Reservoir Fill	C-3	STBD engine - outboard of transmission
Hull Identification Number	D-1	Hull, aft STBD corner beneath swim platform
Seacock - Macerator Discharge	B-2	Front of PORT engine
Remote Oil Change System	B/C-2	Below aft engine compartment step
Seacock Air Conditioning	B/C-4	Aft cabin floor
Seacock - Generator	B/C-3	Below forward engine compartment step
Seacock - PORT Engine	B/C-3	Forward engine compartment - PORT side
Seacock - STBD Engine	B/C-3	Forward engine compartment - STBD side
Strainer - Air Conditioning	B/C-4	Aft cabin floor
Strainer - Generator	B/C-3	Aft center behind STBD engine
Strainer - PORT Engine	B/C-2	Forward engine compartment - PORT side
Strainer - STBD Engine	B/C-2	Forward engine compartment - STBD side
TV and Telephone Dockside Receptacle	A-1	Swim platform, aft, STBD side
Transom Shower	D-1	Swim platform, aft PORT side
Trim Tab Pump	A-2/D-2	Engine wall, STBD/PORT aft
TV Antenna/Cable Switch	C-6	Upper galley cabinet - directly behind TV
TV Signal Amplifier	D-5	Cabin galley, beneath aft trash receptacle
Waste Deck Plate	A-1	Swim platform, aft PORT side
Gray Water Manifold - STBD (2)	D-3	Engine wall, STBD forward
Gray Water Sump Tank	B-4	Aft cabin PORT bilge

45 YACHT

Specifications

Approximate Weight:

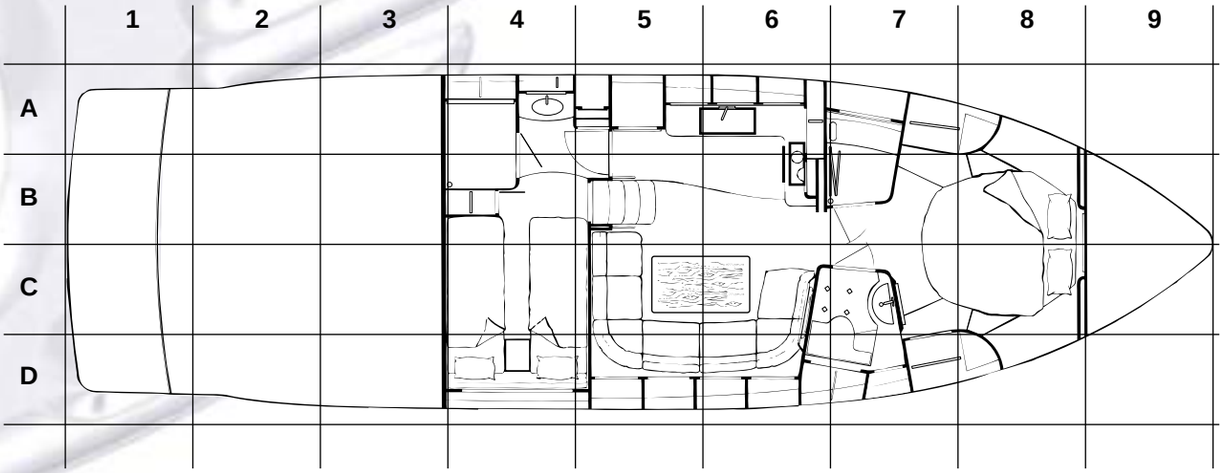
Diesel Power	33,395 lbs (15,148 kg) 31,800 lbs (14,424 kg) - with Volvo IPS

Capacities:

Fuel Tank	350 Gal. (1,325 L)
Fresh Water Tank	100 Gal. (379 L)
Holding Tank	75 Gal. (284 L)

Steering System

V-Drive	Power Assisted Full Hydraulic
Volvo IPS	Electric



FOR339

Equipment Location

Item	Location	Remarks
AC Control Panel	A-5	Aft cabin – FWD of vanity
Air Conditioning Control – Cockpit*	C-4	Beneath cockpit sink
Air Conditioning Control – Master Stateroom	D-8	STBD handing locker
Air Conditioning Control – Salon	D-5	STBD/aft corner of dinette
Automatic Fire Extinguisher	B-3	PORT fuel tank wall – outboard of generator
Battery – Auxiliary Battery	D-2	STBD bilge area – middle bank
Battery – Generator	D-3	Iinboard of PORT start battery bank
Battery – PORT Start	D-3	STBD bilge area – FWD bank
Battery – STBD Start	D-2	STBD bilge area – AFT bank
Battery Solenoid – Auxiliary Battery	B/C-3	Bilge 12VDC panel
Battery Solenoid – Battery Parallel	D-2	STBD bilge wall (FWD solenoid)
Battery Solenoid – PORT Start	C-3	STBD fuel tank wall
Battery Solenoid – STBD Start	D-2	STBD bilge wall (aft solenoid)

* Optional

Item	Location	Remarks
Battery Charger	D-3	STBD fuel tank wall
Battery ON/OFF Switch – Auxiliary	C-4	Beneath cockpit sink
Battery ON/OFF Switch – PORT Engine	A-5	Aft cabin – FWD of vanity
Battery ON/OFF Switch – STBD Engine	A-5	Aft cabin – FWD of vanity
Battery Parallel Switch	A-5	Aft cabin – FWD of vanity
Bilge Pump – AFT	B/C-2	Keel
Bilge Pump – FWD	B/C-3	Keel
Bilge Pump – Aft Cabin	B-4	Aft cabin – beneath aft bed
Black Water Holding Tank	B/C-3	Beneath generator
Carbon Monoxide Detector – Master	A-8	PORT hanging locker
Carbon Monoxide Detector – Salon	C-5	Salon aft wall
Carbon Monoxide Detector – Aft Cabin	D-4	Aft cabin FWD wall
Circuit Breaker Panel – Helm	D-4	Beneath shifters/throttles
Circuit Breaker Panel – Aft	B/C-3	Above generator
Circuit Breaker – Shore Power 1	N/A	N/A
Circuit Breaker – Bow Battery	B-3	STBD fuel tank wall
Circuit Breaker – Auxiliary Power	B/C-3	Bilge 12VDC panel
Cockpit Grill*	D-3	Cockpit wet bar
DC Control Panel	A-5	Aft cabin – FWD of vanity
Engine Compartment Blowers	A-3	PORT bilge wall
Engine Compartment Hatch Handle	B/C-3	Aft cockpit floor
Engine Compartment Switch	B-2	PORT side of engine hatch – beneath corner cushion
Fire Boy Control	C-4	Helm – beneath steering wheel
Fire Extinguisher – Cabin	A-6	Beneath galley sink
Fire Extinguisher – Cockpit	D-2	Line locker – aft of refrig/ice maker
Freshwater Dockside Hookup/Fill	A-1	Swim platform – FWD port corner
Freshwater Level Indicator	A-5	AC/DC panel
Freshwater Pump	C-4	Beneath aft cabin FWD bed
Freshwater Tank	B-5	Beneath cabin entry steps – access via aft cabin
Fuel Filter/Water Separator – PORT	B-3	PORT fuel tank wall
Fuel Filter/Water Separator – STBD	C-3	STBD fuel tank wall
Fuel Tank Fill – PORT	A-2	PORT deck
Fuel Tank Fill – STBD	D-2	STBD deck
Fuel Shutoff Valve – PORT	A-3	Beneath aft cockpit FWD PORT corner cushion
Fuel Shutoff Valve – STBD	D-3	Behind acrylic access panel – FWD of refrig/ice maker
Fuel Crossover Valve – PORT*	B-3	PORT fuel tank wall
Fuel Crossover Valve – STBD*	C-3	STBD fuel tank wall
Galvanic Isolator Monitor	A-5	Cabinet beneath AC/DC panel
Generator	B/C-3	FWD of motors
Gray Water Holding Tank*	B/C-3	Black water holding tank
Gray Water Manifold	D-3	STBD bilge wall
Gray Water Pump	D-3	STBD fuel tank wall
Gray Water Sump Tank	B-4	Aft cabin – beneath FWD bed drawer
Horn Air Compressor	D-3	Accessed via aft cockpit speaker hole (above grill)

* Optional

Item	Location	Remarks
Hull Identification Number	D-1	STBD aft corner of hull
Hydraulic Steering Fill (Helm)	C-4	Helm – not included with Volvo IPS package
iPod Cradle	D-5	STBD/aft dinette cabinet
Macerator Pump*	A-2	Aft of guest head waste vacuum generator
Oil Exchange Pump	B-2	Deck – aft bilge wall
Safe*	A-7	PORT hanging locker
Seacock – Air Conditioning Intake	C-4	Aft cabin – beneath aft bed
Seacock – Generator Intake	B/C-3	Keel
Seacock – Macerator Discharge*	B/C-2	Keel
Seacock – Raw Water Engine Intake – V-Drive	B/C-3	Keel
Seacock – Raw Water Engine Intake – Volvo IPS	B/C-2	Volvo IPS interior drive assembly
Shore Power Hookup	A-1	Swim platform – FWD PORT corner
Spotlight Control	D-4	Helm – STBD of steering wheel
Stereo Amplifier	D-6	Behind dinette backrest
Stereo Auxiliary Input	C-4	Helm
Stereo CD Changer	D-5	STBD/aft dinette cabinet
Stereo Control – Transom	N/A	N/A
Stereo Control – Helm	N/A	N/A
Stereo Receiver	C-4	Helm
Strainer – Air Conditioning Intake	C-4	Aft cabin – beneath aft bed
Strainer – Generator Intake – V-Drive	B/C-3	Keel
Strainer – Generator Intake – Volvo IPS	B/C-3	Keel
Strainer – Raw Water Engine Intake – V-Drive	B/C-2	Keel
Strainer – Raw Water Engine Intake – Volvo IPS	B-3/C-3	PORT, FWD, top corner of motor
Swim Platform – C-BKR*	D-2	Aft of STBD engine battery tank
Swim Platform – Pump*	B/C-2	Keel
Swim Platform – Pump Handle*	B/C-2	Keel
Swim Platform – Remote*	C-2	Trunk storage area
Telephone Jack	D-5	STBD/aft corner of dinette
Telephone/TV Dockside Inlet	A-1	Swim platform – FWD PORT corner
Transom Shower	D-2	Transom walk-thru area
Trim Tab Pump – V-Drive	A-2/D-2	Outboard aft corners of bilge
TV Antenna Amplifier	D-5	Dinette cabinets – aft of Bose receiver
TV Antenna/Cable Switch	D-5	Dinette cabinets – aft of Bose receiver
VHF Radio	D-4	Helm – PORT of steering wheel
Vacuum	D-4	Beneath aft cabin FWD bed
Vacuum Hose Receptacle	C-5	Dinette – STBD of cabin entry steps
Waste Deck Plate	A-1	Swim platform – FWD PORT corner
Waste Tank Indicator	A-5	AC/DC panel
Waste Vacuum Generator – Master Head	D-2	Outboard of PORT motor
Waste Vacuum Generator – Guest Head	A-2	Outboard of STBD motor
Water Heater	A-3	FWD, PORT area of bilge

* Optional

NOTES

Section 4

Controls and Indicators

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

GAUGES

Your Formula boat is equipped with two sets of gauges. The port set is for monitoring operation of the port engine. The starboard set is for monitoring operation of the starboard engine. The gauges are illuminated for night operation.

On occasion, a small fluctuation in a gauge reading is not unusual. If an instrument reading is outside the normal or recommended ranges, determine the cause or see your Formula dealer. Refer to the propulsion unit operator's manual for normal recommended ranges.

Engine Data Display—Displays engine parameters in a variety of formats. Use these displays to monitor engine RPM, coolant temperature, oil pressure, voltage, and many other useful parameters. For operating instructions, refer to the manufacturer's instructions in your Owner Information Binder.

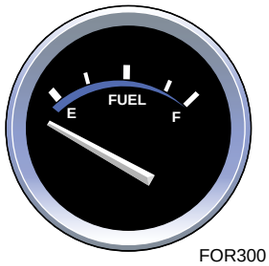
FOR341

Engine Data Display
Figure 4-1

Engine Alarm—Sounds an alarm when an engine temperature exceeds the set limit or the oil pressure drops below the set range. An audible alarm and warning light will turn ON if water is detected in the fuel. If either alarm sounds during operation, reference the Engine Data Display to determine the cause of the alarm. Consult the propulsion unit owner's manual in your Owner Information Binder for additional information.

CAUTION

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



FOR300

Fuel Gauge
Figure 4-2

Fuel—Measures the approximate level of fuel in a fuel tank. The left gauge indicates the fuel level in the port fuel tank. The right gauge indicates the fuel level in the starboard fuel tank. The ignition switch must be in the RUN position to activate the gauge. Since the accuracy of your gauge varies with the attitude of your Formula boat (trim and list), and the fuel pick-up tube cannot withdraw all fuel out of the tank, please observe the One Third Rule. Use one third of your fuel to go out, one third to come back and one third as a reserve.

Temperature—Indicates the water/coolant temperature inside the engine. Refer to the propulsion unit operator's manual for normal operating temperature. After starting the engine, check your temperature gauge for abnormally high readings. If the reading is outside the manufacturer's operating range, immediately turn off the engine. An abnormally high temperature is the result of cooling water blockage. Consult your Formula dealer when experiencing a high engine temperature reading.

FOR302

Temperature Gauge
Figure 4-3

Battery Voltage—Battery voltage is displayed on the Engine Data Display. This measurement indicates the condition of the engine's cranking batteries in volts DC.

Ignition switch ON –	
Engine not running	11.5-12.5 Volts
Engine running – Idle	10-12 Volts
Engine running – Cruise	12-14 Volts

Have your Formula dealer check the charging system if the voltmeter reads below these normal ranges.

Oil Pressure—Measures the pressure of the engine's lubricating oil. Oil pressure gauge readings can indicate many serious engine problems. If the pressure is lower than the manufacturer's specification, immediately shut off the engine. Contact your Formula dealer to correct the problem before operating the engine.

FOR301

Oil Pressure
Figure 4-4

Rudder—Indicates the position of the rudders.

FOR303

Rudder
Figure 4-5

Tridata Display—The Tridata gauge displays depth, speed, and temperature. Views are available for daytime and nighttime operation. For operating instructions, refer to the manufacturer's operating guide in your Owner Information Binder.

FOR48-051

Raymarine® ST60 Tridata Combined Depth, Speed and Temperature Display
Figure 4-6

Windlass Chain Counter—Displays the length of deployed anchor rode.

FOR305

Windlass Chain Counter
Figure 4-7

CONTROLS

Volvo Electronic Lever Control (Volvo IPS only)

Shift function and engine speed are controlled by the same lever.

N = Neutral – Drive is disengaged and engine runs at idle speed

F = Forward – Drive is engaged for forward movement

R = Reverse – Drive is engaged for reverse movement

Engine speed is controlled by advancing the lever while in the F or R position.

NOTICE

The shift lever must be in NEUTRAL to start the engine(s).

Volvo Electronic Vessel Control – Disengaging the Shift Function (Volvo IPS only)

To disengage the shift function, move the shift lever to the NEUTRAL position. Press and hold the NEUTRAL button and then advance the shift lever to the FORWARD position. Release the NEUTRAL button. A flashing green indicator acknowledges that the shift function is disengaged. To return to normal operation, simply return the shift lever to the NEUTRAL position.

FOR340

Volvo Electronic Vessel Control
Figure 4-8

Volvo IPS Joystick (Volvo IPS only)

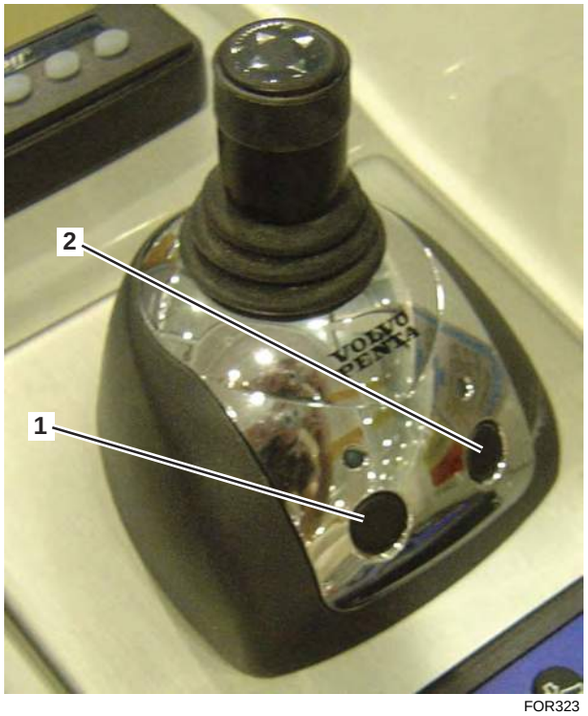
Use of the IPS Joystick allows for increased maneuverability of the boat during close quarter operation.

To enable the Joystick feature, move both shifters to the NEUTRAL position. Depress the left button (1) at the base of the Joystick for 1-2 seconds. A red indicator light will illuminate to confirm Joystick mode.

Use the directional motion of the Joystick to control the position of the boat. Twist the top portion of the Joystick to control the orientation of the boat.

Return to conventional control by either depressing the Joystick “ON” button or shifting into forward or reverse.

The Joystick also has a “High Speed” mode. This mode is to be used when currents or winds require more engine speed. To activate this feature, depress the right button (2) at the base of the Joystick for 1-2 seconds. A red indicator light will illuminate to confirm High Speed Joystick mode.



FOR323

Volvo IPS Joystick
Figure 4-9

CIRCUIT BREAKERS

A circuit breaker panel is located at the helm. All 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.

SWITCHES

Rocker-type switches are used in your Formula boat to activate electrical circuits. Push the bottom of the switch to activate the circuit. The switch will remain ON and a light will illuminate the switch. Push the top of the switch to turn the circuit OFF.

NOTICE

Some accessory switches (engine hatch, horn, etc.) are MOMENTARY switches. These switches must be held in place to operate the accessory. The switch returns to the OFF position when it’s released.

FOR324

Rocker Switches
Figure 4-10

AUX BATT (Auxiliary Battery)—Located beneath the cockpit wet bar, this switch supplies DC power to all cockpit DC components and to the main DC panel in the cabin. To turn the battery ON, depress the top portion of the switch. To turn the battery OFF, depress the bottom portion of the switch.

COURT LTS (Courtesy/Cockpit Lights)—Operates both the courtesy floor lighting and the swim platform lighting. It is possible to illuminate these areas in two different colors (white or blue). Use the COURT LTS switch to toggle between white, blue, and OFF. Hold the switch to dim the lighting to the desired level.

ARCH LTS (Arch/Hardtop Dimmer Switch)—Operates the overhead arch lighting. It is possible to illuminate this area in three different colors (white, blue, or red). Use the ARCH LTS switch to toggle between white, blue, red, and OFF. Hold the switch to dim the lighting to the desired level.

PANEL LTS (Panel Lights)—Press the corresponding switch to turn ON the panel lights.

ENG ROOM LTS (Engine Room Lights)—Press the corresponding switch to turn ON the engine room lights.

NAV/ANCH/LTS (Navigation and Anchor Lights)—This three position switch activates the navigational (running) lights and the anchor light. Push the top of the switch to activate all navigational lights. The center position is OFF. Push the bottom of the switch to activate only the all-round white anchoring light.

NOTICE

Use your navigation lights when operating the boat between sunset and sunrise. Navigational lights are legally required to indicate direction and right-of-way at night.

WIPER (Windshield Wiper Switch, port or starboard)—Activates the windshield wiper.

WINDSHIELD WASH (Windshield Washer Switch)—Sprays windshield washer fluid.

BLOWER (Blower Switch)—Activates the engine compartment ventilation blower to remove explosive fumes from the area.

The blower must be operated for a minimum of four minutes each time 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 (Bilge Pump Switch)—Manually controls the operation of the bilge pump.

HORN (Horn Switch)—Press and hold this switch to activate the horn.

AC BOOST—Activates the cockpit air conditioning (optional) auxiliary boost fan.

PWC LIFT (Personal Watercraft Lift Switch)—Supplies power to the personal watercraft lift.

Personal Watercraft Lift Control—Operates the Personal Watercraft Lift.

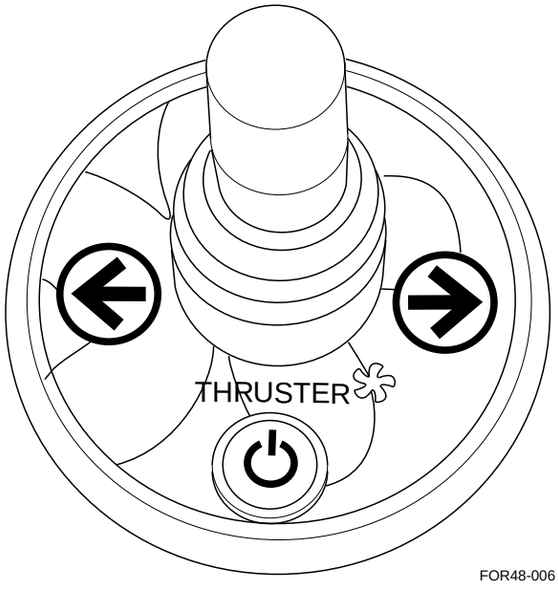
CABIN BILGE PUMP (Located in aft cabin bilge area)—Manually controls the operation of the cabin bilge pump.

UNDER WTR LTS (optional)—Activates the underwater lights.

SUNROOF (45 PY only)—Opens and closes the coupe sunroof.

WNDLS/THRSTR (Windlass/Bow Thruster Switch)—This switch is used to switch ON either the windlass or bow thruster system.

Bow Thruster—The bow thruster is a small electric thrusting device mounted in the bow that helps to increase maneuverability of your Formula boat.



Bow Thruster Control
Figure 4-11

The bow thruster's main function is to make small adjustments of the bow at slow speeds. It is not made for extended operation. The electric motor contains a thermal breaker to prevent the motor from overheating. When this breaker is activated, the bow thruster will not operate until the motor has cooled.

For more information on the bow thruster, refer to the manufacturer's instructions included in your Owner Information Binder.

⚠ WARNING

Do not operate the bow thruster while the boat is out of the water. Doing so will damage bow thruster components. Damage of this type is not covered by warranty.

NOTICE

Boats powered by the Volvo IPS are not equipped with a bow thruster.

WNDLS UP/DOWN (Windlass Up/Down Switch)—Raises and lowers the windlass. Before operating the windlass, free the chain and anchor from the chain stop and captive pin. Supply power to the switch by depressing the top portion of the **WNDLS/THRSTR** switch. Once power is available, use the dash-mounted **WNDLS UP/DOWN** switch to raise or lower the anchor.

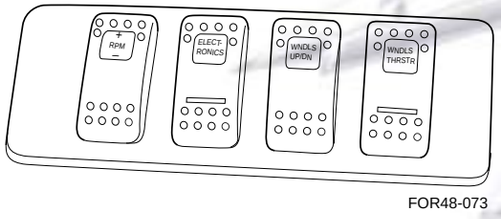
The windlass can be operated from the bow. Two foot operated switches are located under the anchor locker door. When power is supplied to the windlass, the foot switches are also active. After retrieving the anchor, engage the chain stop and captive pin before getting underway. Turn the windlass switch OFF when the system is not in use. For additional Windlass system information, refer to **Anchoring and Sea Anchors**, in **Section 7**.

NOTICE

The windlass and thruster operate independently of each other but cannot operate at the same time.

⚠ 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.



Windlass Switch Panel
Figure 4-12

IGNITION SWITCH PANEL—Each engine has a separate STARTING/STOP switch. The left switch is for the port engine and the right switch is for the starboard engine. To supply power to the ignition switches, switch both the STBD START BATT and PORT START BATT switches found on the AC/DC panel to the ON position.

Engine Hatch Switch—Activates the engine compartment hatch electronic lift system. The switch is located on the forward port corner of the hatch/trunk assembly. See **Specifications**, in **Section 3**.

The positioning of the transom door plays a role in the activation of the engine hatch switch. In other words, for the engine hatch switch to be operable, the door must be fully open to allow activation of the engine hatch switch.

If the battery is low or disconnected, the bilge area can be accessed through the day hatch located in the aft cockpit. Use this entry hatch as a means to restore power to the 12V DC system.

Battery Parallel Switch—The Formula Yacht is equipped with a battery parallel switch located on the AC/DC panel. The battery parallel switch allows an engine with a low battery to be started by using power from the other engine's battery. The switch should be in the OFF position during normal use. If one of the start batteries is low on cranking power, turn the battery parallel switch ON. Once both engines are running and the weak battery becomes charged, turn the battery parallel switch OFF. If you continue to have a low battery problem, have your Formula dealer check the charging system.

Trim Tab Switch—Labeled "TABS," 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.

Trim Tab Indicator—Displays the deflection percentage of each trim tab.

FOR326

Trim Tab Switches (V-Drive)
Figure 4-13

FOR327

Trim Tab Switches (Volvo)
Figure 4-14

Remote Switching Mechanism

Your Formula Yacht includes a remote switching mechanism. This waterproof device controls up to three functions on your boat.

Function 1

1A. Remote Courtesy Lights (standard)—Using the remote switching mechanism, platform and floor lighting can be operated from a distance of 300'. Use the COURT LTS ON/OFF switches to control this function.

1B. Under Water Lights (optional)—Using the remote switching mechanism, platform, interior, and bilge lighting can be operated from a distance of 300'. Use the UNDER WTR LTS and COURT LTS buttons to toggle through the various lighting configurations (refer to **Switches**, in this section, for additional information).

NOTICE

This remote lighting system is operational even with the auxiliary battery switch turned OFF. With the battery switch OFF and the remote switching mechanism activated, the lights will remain on for 14 minutes, flash once, and then remain ON for 1 additional minute. After 15 total minutes, the lights will turn OFF. This feature prevents the lights from draining the auxiliary battery.

Function 2

Shore Power Cord Reel (standard)—Using the remote switching mechanism, the shore power cord can be deployed or retracted from a distance of 300'.

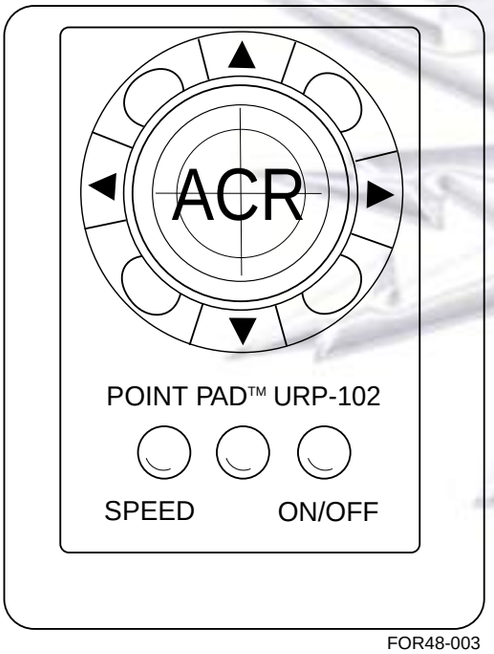
Function 3

Hydraulic Swim Platform (optional)—Using the remote switching mechanism, the swim platform can be lowered or raised from a distance of 300'.

FOR328

Remote Switching Mechanism
Figure 4-15

Search Light Remote Control—Electrically operates the search light from the helm. For operating information, refer to the search light operating instructions in your Owner Information Binder.



FOR48-003

Typical Search Light Remote Control
Figure 4-16

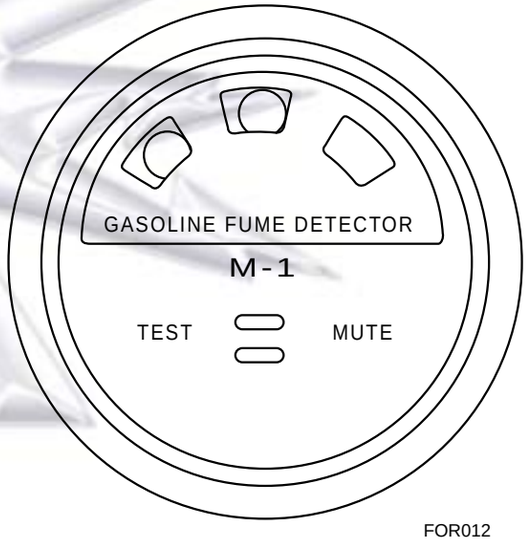
Fume Detector Gauge—Monitors the engine compartment for excessive fuel fumes. The gauge is mounted at the helm and a sensor is located in the bilge area where fumes collect. The system also monitors for unburned hydrocarbons from a faulty exhaust system and for hydrogen battery vapors. Refer to the fume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

⚠ WARNING

The fume detector system is meant to serve as 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 engine compartment to investigate the cause.**
- **Determine the cause and correct it immediately before resuming operation.**



FOR012

Fume Detector Gauge
Figure 4-17

Bilge High Water Alarm—This alarm alerts the operator of excessive water in the bilge. Sounding of the alarm may indicate problems with the automatic bilge pump system or an intrusion of water which exceeds the bilge pump system's removal capabilities.

If the shrill siren of the high water alarm is heard, check the bilge for the source of the water intrusion and to verify automatic operation of the bilge pump. The alarm will stop once the excess water is removed from the bilge. The alarm also has a built in 10-second delay, which is designed to eliminate nuisance tripping (i.e. – the alarm will not sound unless the float switch is activated for 10 or more consecutive seconds). Refer to **Bilge and Blower System** in **Section 5**.

CABIN CONTROLS AND INDICATORS

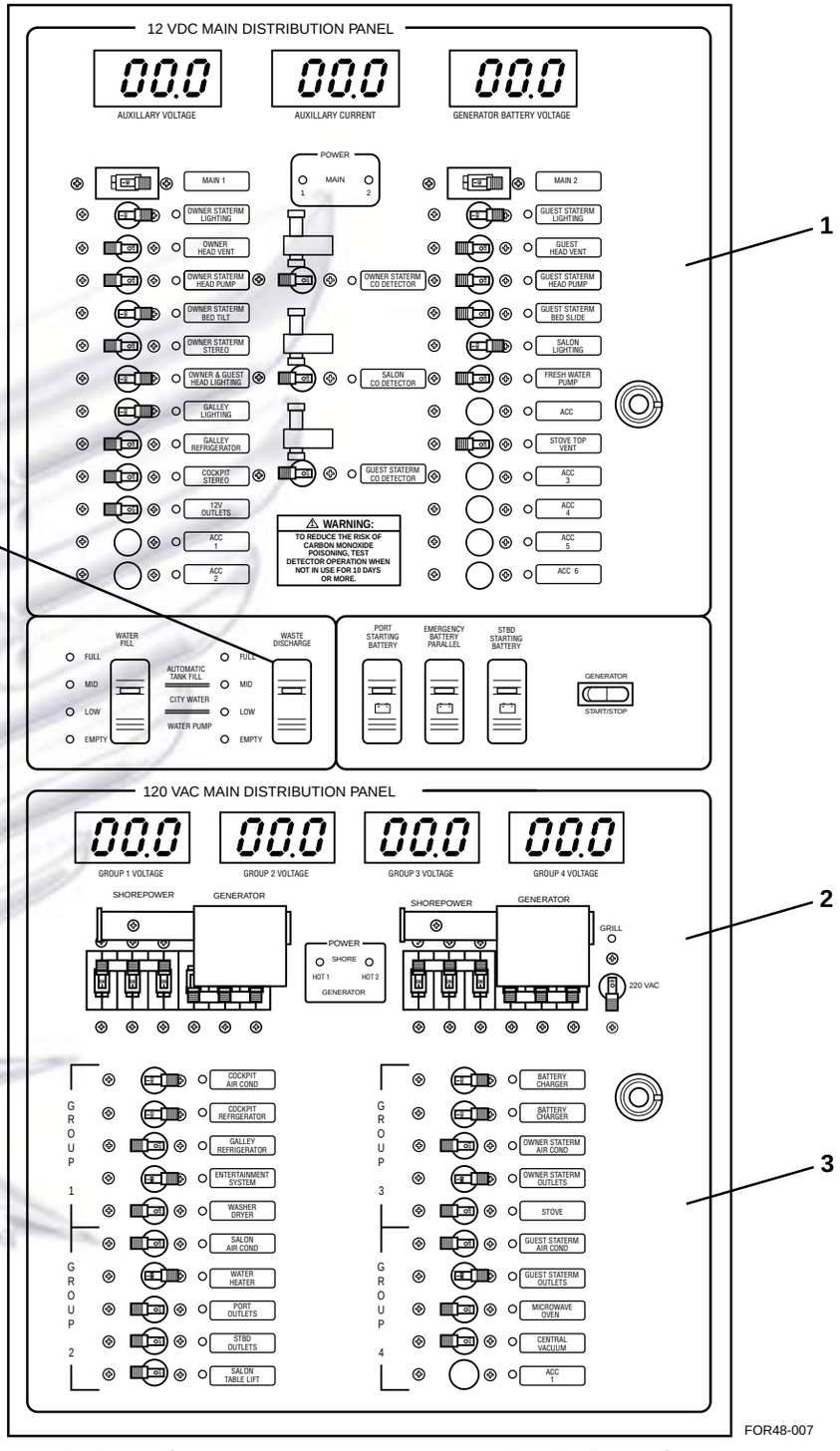
AC/DC Control Panel—This panel controls the distribution of the 110-volt alternating current (V AC) electrical system and the 12-volt direct current (V DC) electrical system.

Both the AC and DC circuits are controlled by switch-type circuit breakers. The circuit breakers function in two ways. First, they allow you to manually enable or interrupt a circuit by moving the switch ON or OFF. Second, 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 turning it back to the ON position. Contact your Formula dealer if a circuit beaker keeps tripping.

Refer to **Section 5** for operation of the 12V DC and 110V AC electrical systems.



1. DC Control
2. Generator Control
3. AC Control
4. Macerator Control

AC/DC/Generator Control Panel
Figure 4-18

Control Panel—Controls operation of all AC/DC and generator functions of the boat. 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.

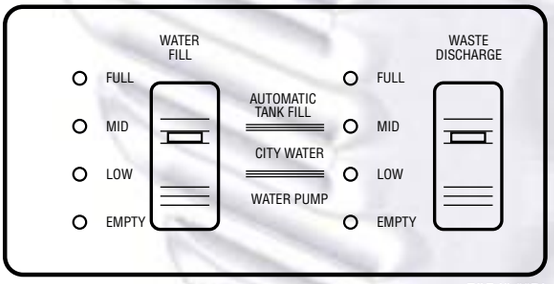
Freshwater and Waste Level Indicator—Displays the available fresh water in the freshwater tank and the level of waste water in the waste tank. The indicator is located on the AC/DC panel.

The Water Pump and Head Pump breakers are located in the 12V section of the AC/DC panel must be "ON" to activate the indicator. Refer to **Freshwater System** and **Waste Water System** in **Section 5**, for additional information.

Macerator Control—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 on the AC/DC/Generator Control Panel **(Figure 4-18)**. The seacock's valve must be opened to allow activation of the macerator pump switch. The Head Treatment breaker located in the 12V section of the AC/DC panel must be "ON" to activate the macerator. For additional operating information, refer to the macerator operator's manual.

CAUTION

Overboard discharge of waste water should only be done 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. 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.



Macerator Control
Figure 4-19

CAUTION

Before operating macerator:

1. **Switch Y-valve to direct flow to macerator.**
2. **Open seacock.**
3. **Press and hold switch to discharge waste.**
4. **Release switch when waste is discharged.**
5. **Close seacock.**

NOTICE

Coast Guard regulations do not allow discharging of non-treated waste in fresh water bodies or in salt water bodies, within three miles of shore.

Carbon Monoxide Detector—Detects carbon monoxide gas. Carbon monoxide detectors are located in primary berthing areas such as the main salon, aft cabin and V-berth.

⚠ 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.

⚠ WARNING

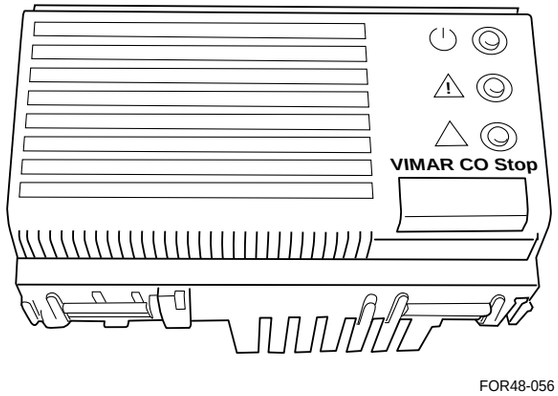
Test the carbon monoxide detectors operation before each trip, at least once a week, and after the boat has been in storage. Do not tamper with the operation of the carbon monoxide detectors. They are installed for your safety.

CAUTION

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.

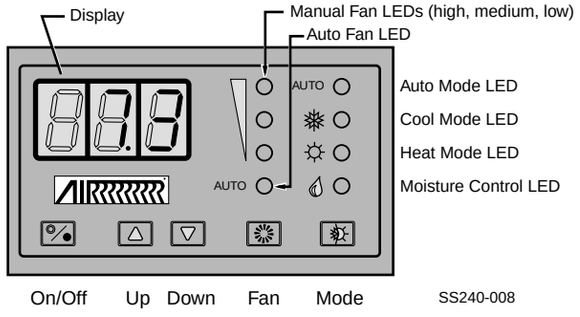
NOTICE

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



Carbon Monoxide Detector
Figure 4-20

Air Conditioning Controller—Displays information and controls certain aspects relative to the associated air conditioning system. A controller **(Figure 4-21)** 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.



Air Conditioning Controller
Figure 4-21

BATTERY ON/OFF SWITCHES

Your Formula boat is equipped with four battery switches. To turn a battery ON, depress the top portion of the switch. To turn a battery OFF, depress the bottom portion of the switch.

Description	Location	Purpose
Port Starting Battery	AC/DC Panel	Supplies power to the PORT engine
Emergency Battery Parallel	AC/DC Panel	Parallels the PORT START and STBD START battery banks
Starboard Starting Battery	AC/DC Panel	Supplies power to the STBD engine
Auxiliary Battery	Cockpit Wet Bar	Supplies 12VDC power to the boat

The bilge pump(s), stereo memory, anti-electrolysis system (if equipped) and CO detector(s) are wired direct to the battery through their circuit breakers and will remain energized even if battery switches are turned OFF. All other items will be disabled.

Battery Parallel Switch—The battery parallel switch allows you to start either engine off of either battery bank. The switch should be in the OFF position during normal use. In an emergency when one of the engine batteries is low on cranking power, turn the battery parallel switch ON. This allows the engine with the low voltage supply to start by using power from the other engine's battery. Once both engines are running and sufficient time has passed for the low voltage battery bank to recharge, turn the battery parallel switch OFF. If you continue to have a low battery problem, please contact your Formula dealer.

Section 5

System Operation and Equipment

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

Formula Boats provides “Quick Start and Quick Reference” instruction sheets to help you use and learn about major onboard systems and equipment on your Formula boat. These reference sheets are located in a separate binder included in your Owner Information Binder. Do not use these as a substitute for becoming completely familiar with your boat, its features or systems. Always refer to the manufacturer’s manuals for complete operation information.

⚠ 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 Formula boat’s powertrain consists of two propulsion units, one port unit and one starboard unit. The propulsion units are inboards (engine and transmission). The engines are diesel fueled.

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

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. Diesel is 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 uses fuel from the port fuel tank and therefore holds additional fuel. Refer to **Specifications**, in **Section 3**, for the fuel tanks 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.

Refer to **Specifications**, in **Section 3**, for your boat's steering system.

Power Assisted Hydraulic—Is the same as Full Hydraulic with the addition of a power assist pump connected to the transmission on the starboard engine. The power assist pump minimizes the effort required to turn the steering wheel.

Electric (Volvo IPS)—Uses electrical connections to control the drives. This system architecture allows the drives to work independently of each other when in the "joystick" mode.

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 pumps remove 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 switches located at the helm and aft cabin bilge (for the cabin bilge pump), provided the system is supplied with power (the house battery switch is ON).

CAUTION

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 engine compartment from fumes. The blowers are controlled by either a 3-position switch at the helm or from a switch on the generator portion of the AC/DC control panel.

⚠ WARNING

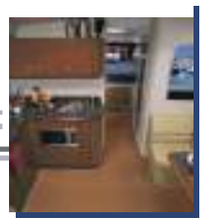
Operate the blower for at least four minutes each time you start the engines. In addition, the blower should be operated continuously when at idle and during slow speed operation. Failure to operate the blower can cause an explosion.

The following C-BKRs must be in the ON / closed position.

Engine Room Blower 1 – Aft Breaker PNL
Engine Room Blower 2 – Aft Breaker PNL
Engine Room Blower 3 – Aft Breaker PNL
Engine Bilge Blowers – Dash Breaker PNL

The blowers can now be operated by the "Blower" switch located on the helm accessory switch panel. This three-position switch activates the engine compartment ventilation blower to remove explosive fumes from the area. Depressing the top portion of the switch will automatically turn the blowers ON once the temperature of the bilge area reaches 180° (48 PY only). Depressing the lower portion of the switch allows for manual operation of the blowers.

The blowers can also be operated by switching ON the "Generator Blower" C-BKR found on the cabin AC/DC panel.



DC ELECTRICAL

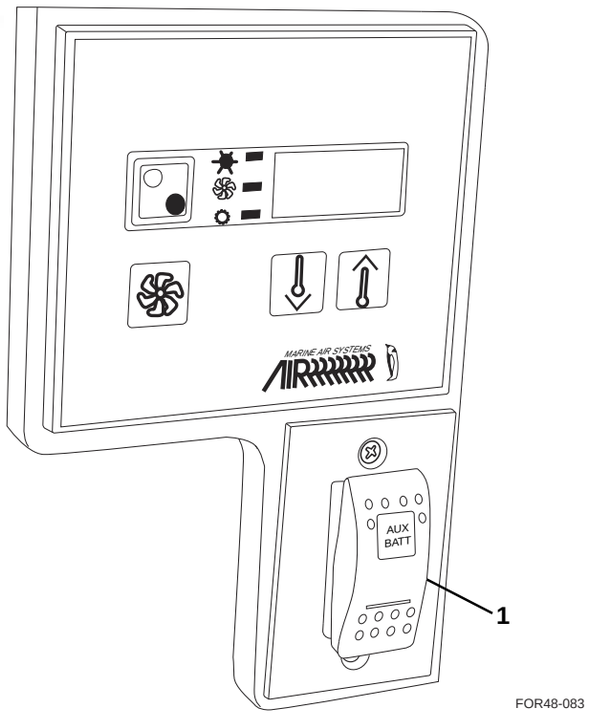
Your Formula boat has a battery powered 12-volt negative ground DC system. The house positive wire is hot, and feeds current from the house batteries to all 12-volt equipment; the negative wire is the ground and completes the circuit back to the battery.

The DC electrical panel in the cabin supplies electricity from the house battery to a number of accessories, including, but not limited to:

- Lights
- Bilge pumps
- Head pump
- Refrigerator
- Stereo
- Fresh water pump

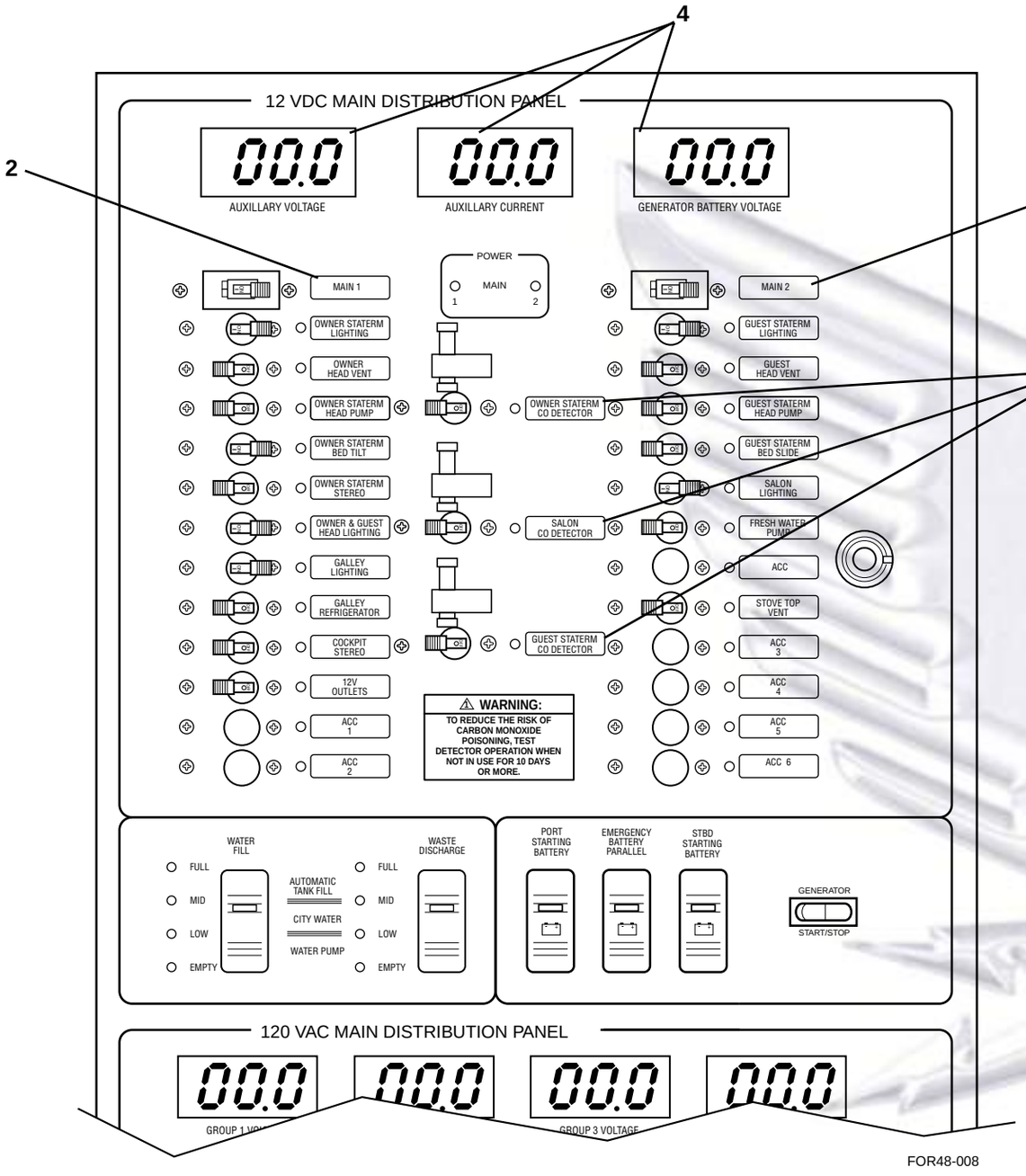
A 150-amp circuit breaker labeled AUXILIARY POWER protects the DC electrical system from the batteries to the DC control panel. Refer to **Specifications**, in **Section 3**, for location of the circuit breaker.

Auxiliary Battery Switch—The auxiliary battery switch **provides DC power to the entire boat**. When the auxiliary switch is ON, it allows power to be distributed to the helm DC panel and cabin DC panel. The auxiliary switch will illuminate when it is ON and is located beneath the cockpit wet bar sink. When leaving the boat make sure the auxiliary switch is OFF.



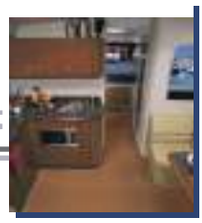
1. Auxiliary Switch

Auxiliary Switch
Figure 5-1



1. CO Detector Circuit Breakers
2. No. 1 Main Circuit Breaker
3. No. 2 Main Circuit Breaker
4. Voltmeters

DC Electrical Panel
Figure 5-2



The 12V DC system consists of two voltmeters, two main circuit breakers and a series of switch-type circuit breakers, including dedicated circuits for the CO detector(s). The auxiliary voltage meter allows you to check the voltage of the house battery.

The bilge pumps, CO detector(s) and stereo memory will remain energized, even if the battery switches are turned OFF. All other items will be disabled.

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

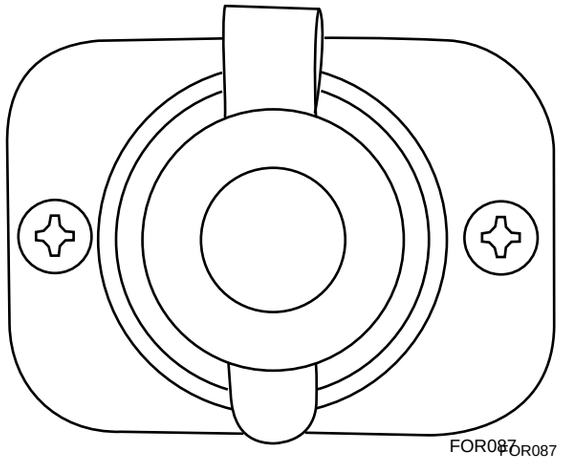
To operate the 12V DC system:

- Turn ON the auxiliary battery switch.
- Turn ON the DC main circuit breakers.
- Activate the individual component circuit breaker.

CAUTION

The boat's bilge pumps are powered by the DC Electrical System. A boat left moored in the water for extended periods of time, without shorepower to maintain its batteries, may find itself without adequate battery power in time of need. Even though one shuts off the battery switches prior to leaving a boat, there are systems aside from bilge pumps that remain connected to the batteries, i.e. electronics memory, alarms, etc. If the batteries do not have an opportunity to be recharged, these systems will eventually drain the battery. Boats left moored in the water are to be checked regularly (twice weekly) to ensure the batteries are adequately charged.

12-Volt Accessory Power Receptacle—Your Formula is equipped with 12-volt accessory power receptacle(s). The receptacle provides electricity to operate 12V DC accessory items. Limit amperage to 10 amps.



12-Volt Accessory Power Receptacle
Figure 5-3

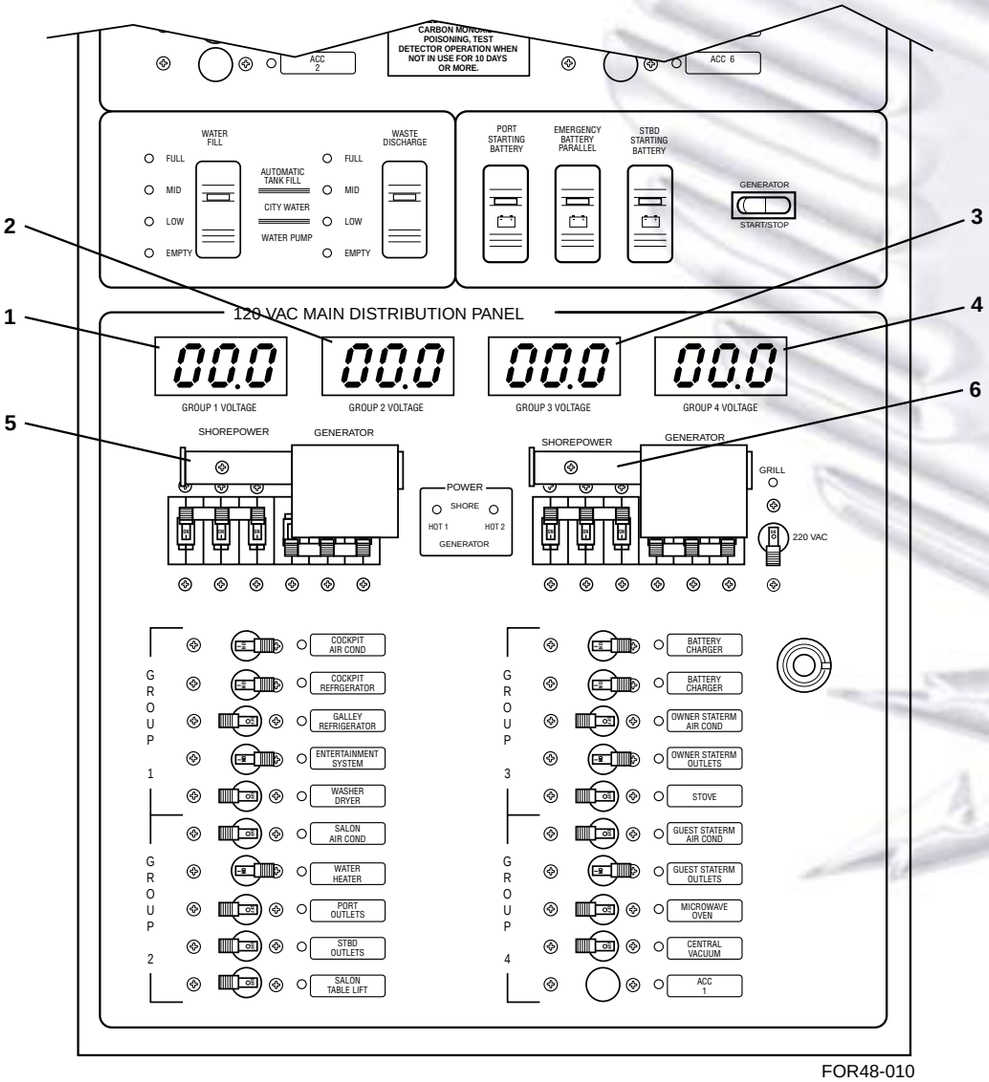
AC ELECTRICAL

CAUTION

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.

The AC portion of the control panel receives AC power from the shore power cable or the generator. The AC panel distributes power through two main circuit breakers which in turn supply power to the individual branch circuit breakers. AC electricity typically operates the following equipment:

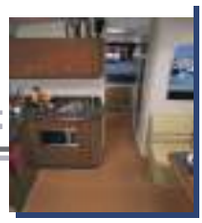
- Electrical outlets
- Microwave, Stove, Refrigerator and Optional Cockpit Grill
- Battery Charger and Hot Water Heater
- Air Conditioning and Vacuum



FOR48-010

1. Group 1 Voltmeter
2. Group 2 Voltmeter
3. Group 3 Voltmeter
4. Group 4 Voltmeter
5. Shore Power No. 1 Main Circuit Breaker
6. Shore Power No. 2 Main Circuit Breaker

AC Electrical Panel
Figure 5-4



The 110V AC system consists of two shore power circuit breakers (located on the AC/DC panel) and four voltmeters.

The voltmeters monitor 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.

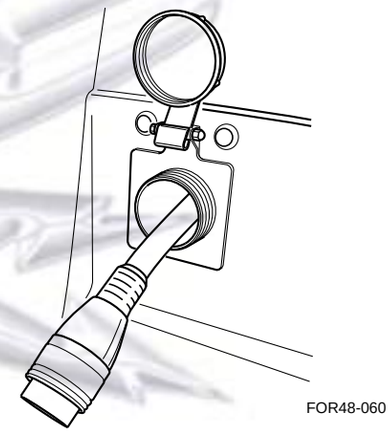
Each main circuit breaker controls individual component circuit breakers. This allows you to check for proper AC voltage immediately after making the shore power cable connection without damaging any equipment.

SHORE POWER

⚠ WARNING

To minimize shock and fire hazards:

- **Turn the AC main circuit breakers OFF before connecting or disconnecting shore cable.**
- **Connect the shore power cable to the dockside connection.**
- **Do not alter shore power cable connections.**



Shore Power Cable
Figure 5-5

The shore power cord supplies power to all AC breakers.

NOTICE

Operation of multiple high amperage components, such as air conditioning, microwave, stove, simultaneously may cause MAIN breakers to trip.

Shore Power Connection

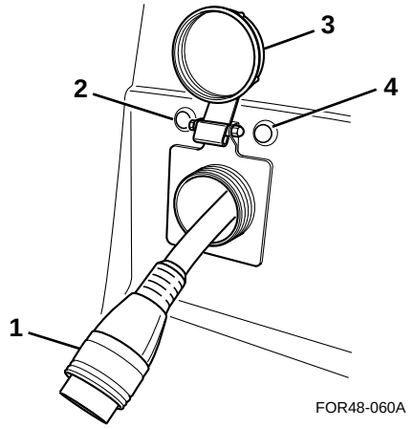
The shore power system has a special, marine grade three-conductor cable to make a proper connection to the shore. Dockside connections are plug-in. Refer to **Specifications**, in **Section 3**, for location of your shore power receptacles.

⚠ 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.

Shore Cable Auto Reel

To supply power to the shore cable auto reel, switch the “Hose Reel” C-BKR to the ON position. 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. Consult the unit’s user guide located in the Owner’s Information Binder for additional information.



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

Shore Cable Auto Reel
Figure 5-6

NOTICE

45 PY – The optional cockpit grill and optional cockpit air conditioner require 220 VAC power to operate. As such, the AC system of the boat must be powered by either the onboard generator or 50A shore power service for these two components to properly function. Using the supplied 50A to 30A shore power adapter will not allow you to operate these two components.

To Connect:

1. Move the slide covers over to cover the generator switches.
2. Turn OFF the boat's two AC main circuit breakers on the AC control panel.
3. If the outlet on the pier has a disconnect switch, turn the switch OFF.
4. Extend the shore power cable.
5. Make sure the cable has more slack than the mooring lines.
6. Remove the cap from the outlet on the pier. Connect the cable to the outlet. Turn ON the shore disconnect switch.
7. Turn ON the two AC main circuit breakers on the AC control panel.
8. Turn ON the respective circuit breakers as needed.

To Disconnect:

1. Turn OFF the boat's two main circuit breakers.
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.
4. Retract the cable and close the cap.

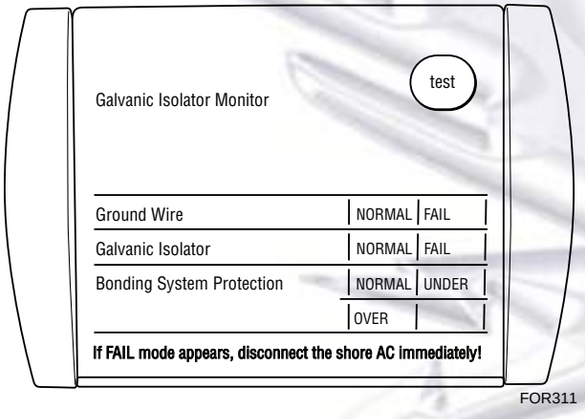
⚠ WARNING

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.

Galvanic Isolator Monitor—The galvanic isolator electrically connects the boat's bonding system to the earth. This system prevents the bonding system from becoming electrically "hot." The galvanic isolator monitor checks the galvanic isolator system for proper operation.

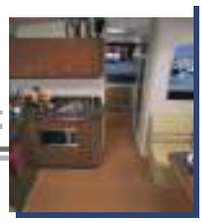
Please refer to the Galvanic Isolator Monitor operator's manual located in your Owner's Information Binder for additional information.



Galvanic Isolator Monitor
Figure 5-7

⚠ WARNING

Should the display indicate a system failure, immediately disconnect shore power sources (refer to Shore Power – Section 5) and contact your Formula dealer.



GENERATOR

⚠ WARNING

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

CAUTION

Diesel power generators do have a preheat switch to use during cold starts. Do not exceed 30 minutes of preheat time or the manifold heater and plugs can be damaged.

The generator control panel is mounted on the AC/DC control panel. The generator control panel contains the blower switch and the Start/Stop switch.

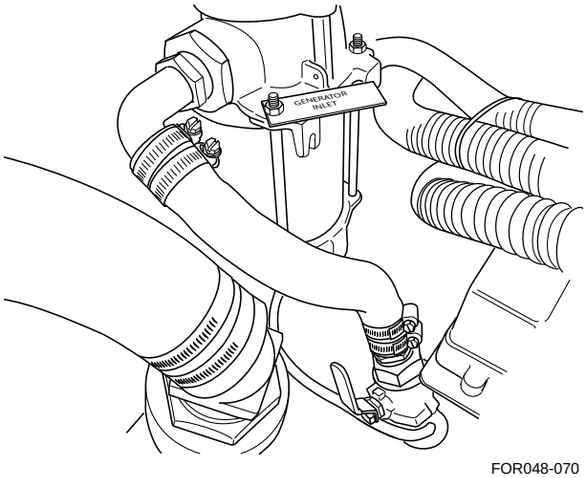
The generator is used to provide AC power when shore power is not available.

1. Inspect the generator seawater intake strainer basket for accumulated debris and clean as necessary.
2. Make sure the generator seacock is open.
3. Turn OFF the two AC main circuit breakers.
4. Move the slide covers over both AC main circuit breakers.
5. Turn ON the blower and operate it for at least four minutes.
6. Push the START side of the generator's Start/Stop switch. Allow generator to operate for at least one minute to stabilize voltage.
7. Move the generator switch and the transfer switch to the ON position.
8. Switch the respective branch breakers below generator as needed. In this configuration, all components can be used with power supplied by the generator up to a maximum of 50 amps.
9. 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.



FOR048-070

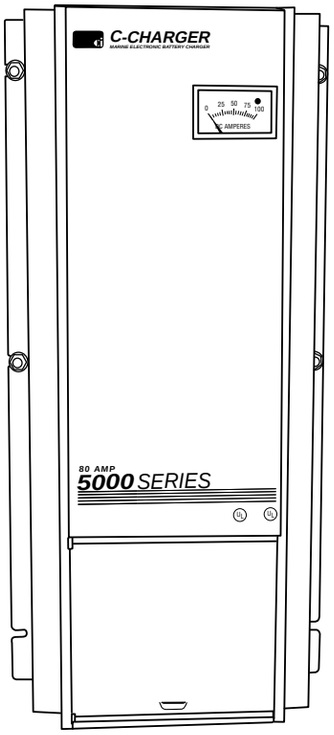
Generator Seacock
Figure 5-8

BATTERY CHARGER

Your Formula boat is equipped with a battery charger located in the engine compartment. Anytime AC voltage is available 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 operator's manual for additional information.

NOTICE

The generator battery is charged by a small 6 amp charger dedicated to the generator starting battery. This charger is operational anytime the AC/DC panel is supplied with 110 V power and the BATTERY CHARGER switch is ON.



FOR48-014

Battery Charger
Figure 5-9

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.

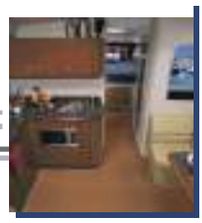
The fresh water system provides potable (drinkable) water to the sinks, showers, hot water heater, ice maker and transom shower. Refer to **Specifications**, in **Section 3**, for the fresh water tank capacity of your Formula boat.

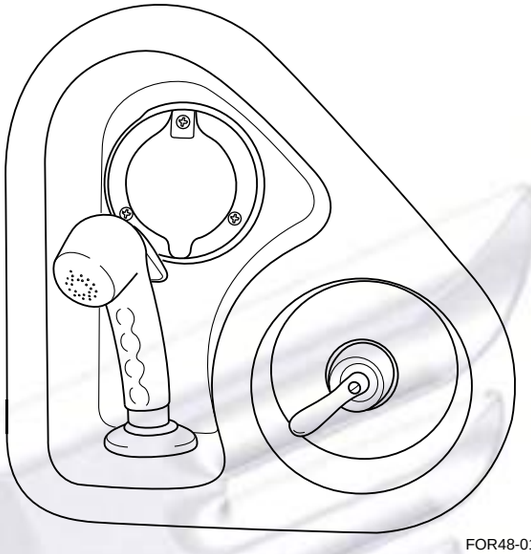
The onboard fresh water system is operated by a 12V DC water pump. To use the vessel's onboard water supply, the 12V DC system must be activated and the WATER PUMP switch turned ON.

The fresh water level indicator shows the level of the water in the water tank. Refer to **Fresh Water Level Indicator**, in **Section 4**.

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—A hot/cold transom shower is located at the stern of the boat. The 12V DC WATER PUMP circuit breaker switch must be ON for the unit to function.





FOR48-015

Transom Shower
Figure 5-10

Fresh Water Dockside Hookup

CAUTION

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.

The fresh water dockside hookup allows usage of city water while you are docked. Refer to **Specifications**, in **Section 3**, for location.

To connect to city water:

1. Turn the 12V DC WATER PUMP circuit breaker OFF.
2. Unscrew the plug from the boat's water inlet hose fitting.
3. Pull fresh water dockside hookup hose to desired extended length and connect to the dockside city water source.
4. Follow instructions in the next section to use dockside (city) water and/or fill the onboard fresh water tank.

Single Point Water Fill Systems

Your Formula Yacht uses a single point water fill system, which allows the user at the flip of a switch, to manually alternate between the boat's fresh water pump and the dockside hookup. The switch is located on the AC/DC control panel. This system also allows the user to fill the fresh water holding tank via the dockside source.

To use the system:

45 PY

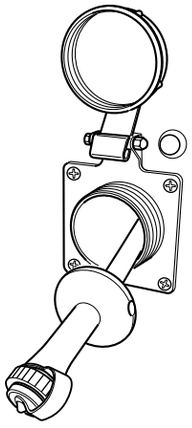
- Attach a sanitary drinking water hose to the dockside city water outlet. Turn ON the water to flush the hose before connecting it to your boat.
- Turn OFF the water.
- Attach the water hose to the water fitting located on the transom of the boat.
- Turn the dockside supply ON.

FOR329

Freshwater Dockside Hookup – 45 PY
Figure 5-11

48 PY/45 PY (optional)

- Pull the fresh water hose from the transom of the boat (use the button at the top right of the hose outlet to retract the hose).
- Attach the water hose to the dockside water supply.
- Turn the dockside supply ON.

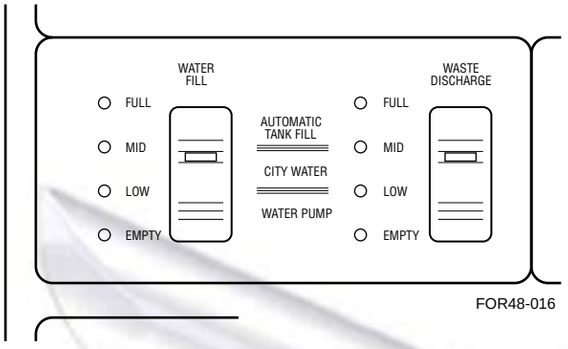


FOR48-074

Freshwater Dockside Hookup – 48 PY
Figure 5-12

ALL

- Turn the selection switch **(Figure 5-13)** to the center position. The water system is now ready to use with the dockside source supplying the pressure.
- Depress the top of the selection switch to fill the onboard fresh water 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.
- 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.



Single Point Water Fill Systems
Figure 5-13

Hot Water Heater— Formula equips some models with an on-board water heater, which operates on 110V AC power. To operate the water heater, the AC/DC panel must be supplied with 110V 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.

NOTICE

A "passive" means for heating onboard water is accomplished via plumbing between the engines and the water heater. Whenever the engines are operated, water contained within the water heater will be heated by circulating engine coolant. Refer to your Formula Owner Information Binder for specific instructions and information pertaining to this accessory as described in the manufacturer's literature.

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

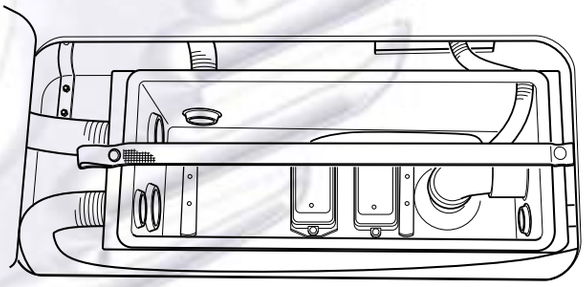
Do not smoke or have any flame near an open faucet; hydrogen gas is extremely flammable.

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.

GRAY WATER SYSTEM

The waste water from the sink and shower drains, and air conditioning condensation drain(s), is collected into a sump tank. When the waste water in the tank reaches a predetermined level, a float switch turns ON a pump, which discharges the waste water overboard. Periodic cleaning of the sump tank will prevent the buildup of debris that can lead to foul odors, or cause slow drains. Refer to **Specifications**, in **Section 3**, for sump tank locations.

Certain inland waters maintain a no discharge requirement for gray water. Your boat may have come equipped with the Gray Water option. Therefore, all gray water (sinks and shower drains) is plumbed into the boat's waste holding tank. Monitor your waste holding tank level indicator regularly to know when it's time to have the waste holding tank pumped out.



FOR48-061

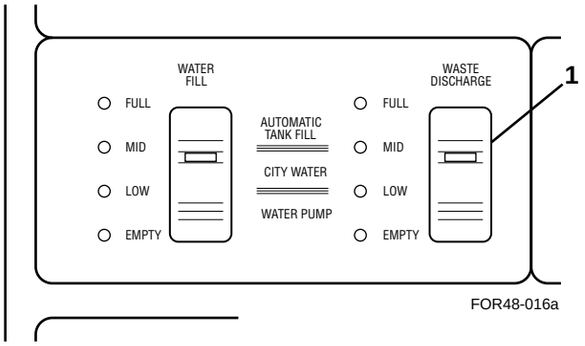
Sump Tank
Figure 5-14

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

CAUTION

Do not flush into a full holding tank. Attempting to flush the head when the tank is full could result in damage to the waste system.

The waste tank level indicator shows the level of the water in the waste tank. Refer to **Waste Water Level Indicator**, in **Section 4**.



1. Waste Discharge Switch

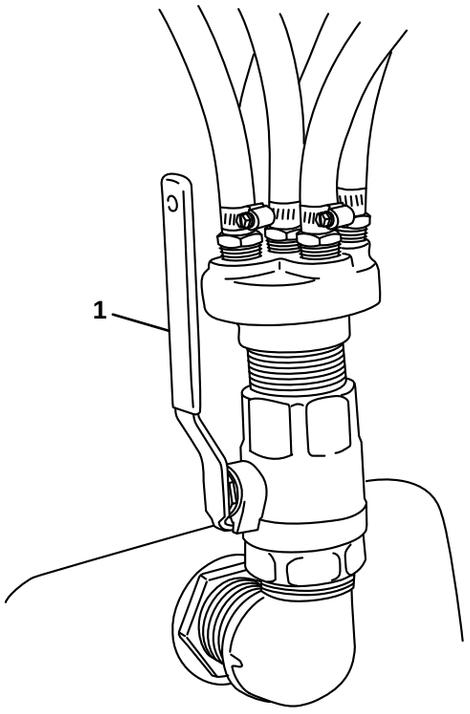
Waste Discharge Switch
Figure 5-15

To clear the tank of gray water, you will need to use the dockside pump-out services provided at marinas. Hook a suction hose to the pump-out deck fitting marked WASTE and to the dockside pump. The marina will handle the proper disposal of the waste and may charge for this service.

It is strongly recommended that you regularly add chemicals to your waste tank by flushing it through the head to control odor and break down the waste. Follow the waste tank manufacturer's recommendations on chemical use.

WASTE WATER SYSTEM

Waste water from the bilge pump(s) and sump tank is directed to a waste water manifold. The waste water manifold handle must be in the open position for the waste water to discharge through the hull fitting. Refer to **Specifications**, in **Section 3**, for waste water manifold(s) location(s).



FOR082

1. Handle in Open Position

Waste Water Manifold
Figure 5-16

HEAD SYSTEM OPERATION

Your Formula Yacht is equipped with a **Sealand Vacuflush Head System**.

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 this system's operation.

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

The Electric VacuFlush Head is controlled via a remote switch. When the GREEN light is illuminated, it is safe to flush the toilet. To do this, momentarily press the bottom portion of the rocker switch. If it is necessary to add water to the bowl, press the top portion of the rocker switch. Do not attempt to flush the toilet if the RED light is illuminated.

FOR330

VacuFlush Head Remote Switch
Figure 5-17

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

Monitor your waste tank level indicator to know when your tank has reached its full level and it's time to have it pumped out.

NOTICE

Your head system is equipped with a safety mechanism that shuts down the head pump, not allowing the toilet to flush, when the waste tank full level light has illuminated. This safety measure prevents the waste holding tank from being overfilled.

After pumping out your waste holding tank, recharge the holding tank with the approved waste treatment chemical as prescribed in the **Sealand Operation Manual** found in your boat's systems information binder.

Macerator—The optional macerator system allows the discharging of wastewater directly overboard through a seacock/underwater through-hull fitting. Before operating the macerator make sure the macerator seacock is open. Activate the macerator by depressing and holding the macerator switch located on the AC/DC Generator Control Panel until the tank has reached the empty level.

CAUTION

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. 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 components (generator and air conditioning) 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 the seacock for any component not in use.

Cooling water from the generator is routed with the generator's exhaust system. Cooling water from the air conditioning unit is directed overboard through a drain 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.

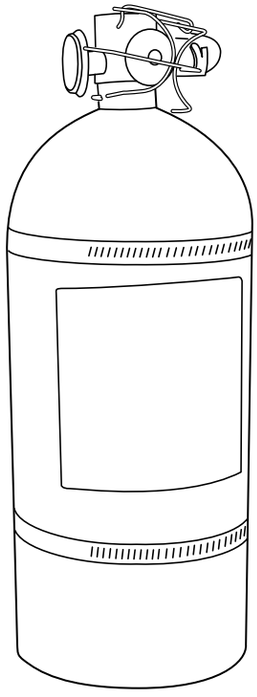
AUTOMATIC FIRE EXTINGUISHER SYSTEM

A fixed automatic fire extinguisher that uses FE-241 (FM-200 for European requirements) as an extinguishing agent is mounted on the engine compartment forward bulkhead. The extinguisher is activated when the heat sensitive head reaches a predetermined temperature. The extinguisher discharges and saturates the engine compartment, smothering the fire.

⚠ WARNING

When the fire extinguisher discharge occurs, turn OFF all engines, bilge blowers and electrical system components. Do not immediately open the engine compartment hatch. This will allow oxygen to the fire and flashback can occur.

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.

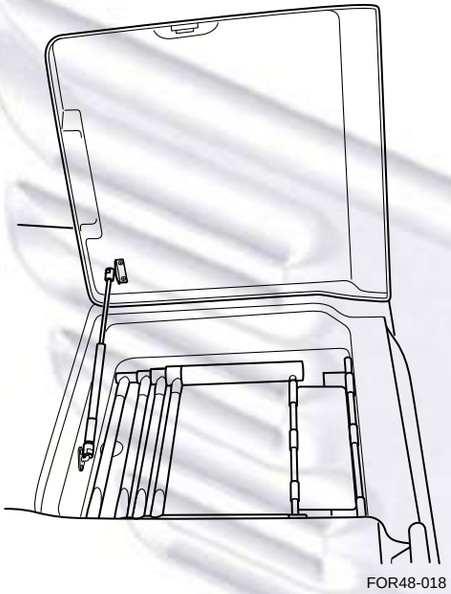


Automatic Fire Extinguisher
Figure 5-18

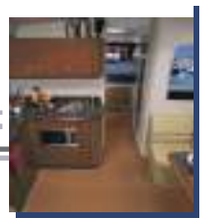
Refer to **Automatic Fire Extinguisher Indicator**, in **Section 4**, for information on the automatic fire extinguisher monitoring indicator.

EQUIPMENT

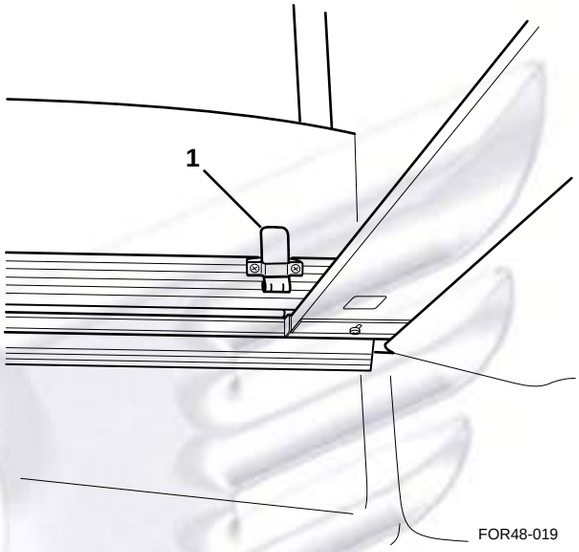
Boarding Ladder—The boarding ladder is mounted on the swim platform at the stern of the boat. A fiberglass lid covers the stowed ladder. Lift this lid to access the ladder.



Boarding Ladder
Figure 5-19



Cabin Access Door—Whenever practical, secure the door in either the open or closed position before operating boat.



1. Door Stop

Cabin Access Door
Figure 5-20

Coupe Sunroof (45 PY)—The sunroof is controlled via a switch at the helm. The boat can be operated with the sunroof either in the open or closed position.

Coupe Sunroof – 45 PY
Figure 5-21

Walk-Thru Windshield (45 PY)—The large, walk-thru windshield allows for easy access to the fore deck.

CAUTION

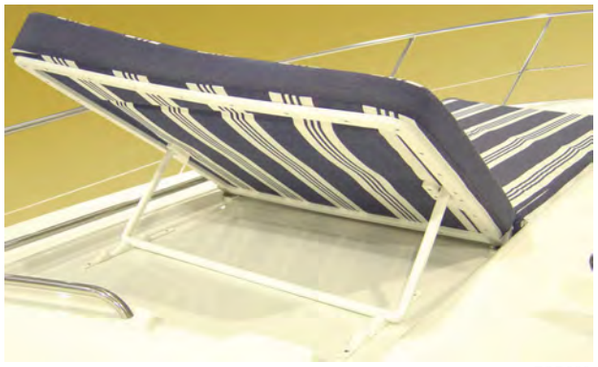
Close windshield walk-thru door before getting underway.

Walk-Thru Windshield – 45 PY
Figure 5-22

Deck Sun Pads (45 PY)—The sun pads include a reclining feature. The 3-position support on the underside of the cushion allows for variable reclining angles.

CAUTION

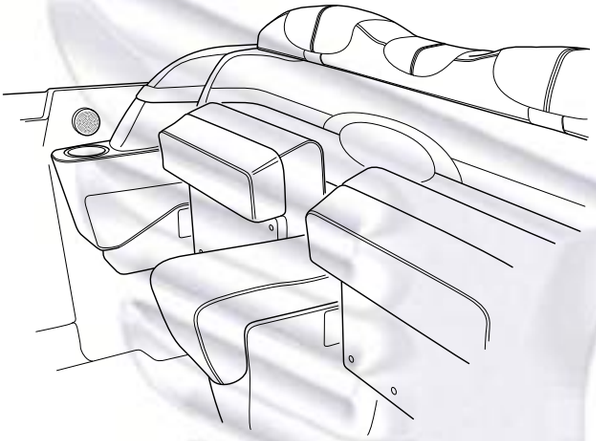
The deck sun pads should not be occupied while the boat is underway.



FOR333

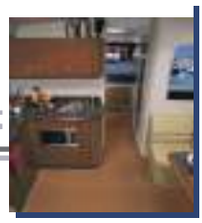
Deck Sun Pads – 45 PY
Figure 5-23

Captain's Chair—Your captain's chair has a flip-up bolster position for greater visibility for the captain and passenger. You can sit on the raised cushion or stand in front of the cushion. Standing while driving your boat should only be attempted by an experienced driver, and then only while maneuvering at an idle speed.



Captain's Chair Bolster
Figure 5-24

To raise the bolster, push aft on the front edge of the cushion, and then pull up. To lower the bolster, pull up on the front edge of the cushion, then push down.

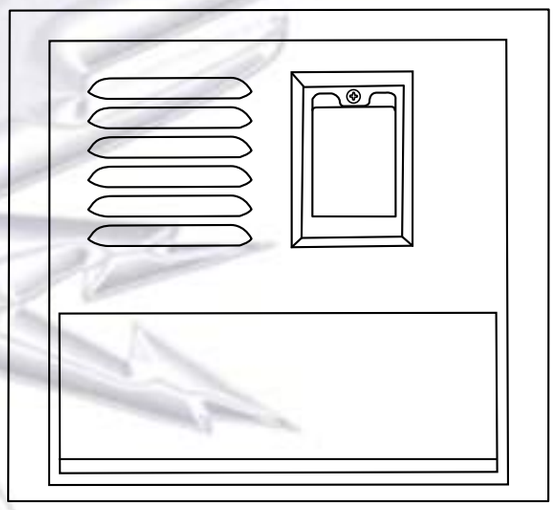


Central Vacuum—To operate this accessory, the AC/DC panel must be supplied with 110V power, and the AC switch labeled WALL VACUUM must be ON. Refer to manufacturer's operating instructions in your Owner Information Binder for additional information pertaining to this accessory.

⚠ WARNING

Electrical shock could occur if used on wet surfaces.

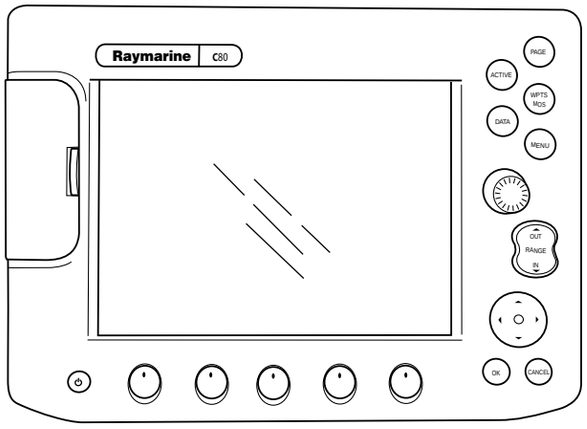
- **Do not pick up hot ashes or cigarette butts.**
- **Do not operate the vacuum near flammable gases or liquids.**
- **Do not pick up water, damp materials or flammable powders.**
- **Do not operate without a filter bag installed.**
- **Be sure to disconnect the hose from the inlet before changing the filter bag.**



FOR094

Central Vacuum
Figure 5-25

Global Positioning Satellite (GPS)—Various GPS/Chartplotter options are available for your Formula boat. A GPS provides precise information regarding a vessel's location and speed and can also be used to plan and record trip routes. The chartplotter provides additional navigation capabilities, including the use of digitized charts for specific boating areas, which can be purchased in chip format. Refer to the manufacturer's owner manual in the Formula Owner Information Binder for specific information relative to your boat's electronics package.

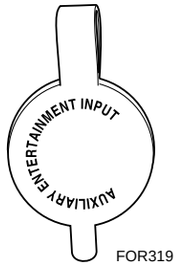


FOR48-028

GPS Unit
Figure 5-26

Stereo Auxiliary Input

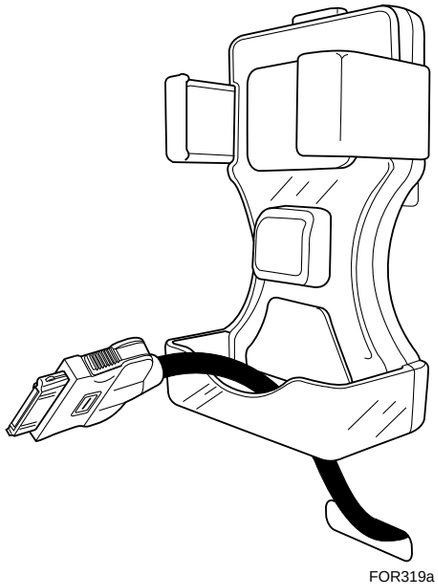
2.5 mm Auxiliary Input—Located at the helm; this input allows you to connect an external audio device, such as an MP3 player, via a 2.5 mm audio cable (not supplied) to the AUX source on the factory-installed stereo system.



FOR319

Stereo Auxiliary Input
Figure 5-27

iPod™ Cradle (optional)—Located in the cabin, this input allows you to connect an Apple iPod™ (not supplied) directly to the AUX source on the factory installed stereo system. While docked, iPod™ playlist and media information is displayed on the stereo head unit. Docking the iPod™ also allows the unit to be charged.



FOR319a

iPod™ Cradle
Figure 5-28

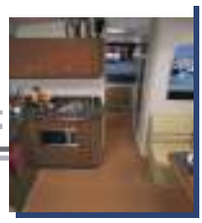
Cockpit Refrigerator—The cockpit wet bar features a refrigerator concealed below the Corian® Countertop. The unit operates on either 12V DC or 120V AC power. To operate the refrigerator, supply the unit with either DC or AC power. The unit will begin to cool in approximately 30 minutes. For additional information on the refrigerator, refer to the manufacturer's instructions in your Owner Information Binder.

Cockpit Icemaker (optional)—An optional cockpit icemaker is available for your Formula 48 Yacht. The unit operates on either 12V DC or 120V AC power and receives its water supply from the boat's fresh water system. To operate the icemaker, supply the unit with either 12V DC or 120V AC power, verify the shut-off valve in the plumbing to the icemaker is OPEN and the fresh water system is pressurized (see FRESH WATER SYSTEM, this section). Refer to the manufacturer's owner manual in the Formula Owner Information Binder for additional information pertaining to this component.

FOR336

Icemaker
Figure 5-29

- When operating either the cockpit refrigerator or cockpit icemaker using the 12V DC system, the COCKPIT REFRIGERATOR C-BKR located on the Aft DC Control Panel must be ON, and the 120V AC COCKPIT REFRIGERATOR C-BKR located on the AC/DC Control Panel must be OFF.



- When operating either the cockpit refrigerator or cockpit icemaker using the 120V AC system, the 120V AC COCKPIT REFRIGERATOR C-BKR located on the AC/DC Control Panel must be ON. The refrigerator/icemaker will automatically resort to AC power if supplied with both 12V DC and 120V AC power.

Microwave / Convection Oven—Your Formula boat is equipped with a microwave / convection oven. Since either function of the unit operates on 110V power, the AC side of the AC/DC panel must be energized and the AC switch labeled MICROWAVE turned ON for the accessory to function. Please refer to the respective owner manual in the Formula Owner Information Binder for information specific to these units.

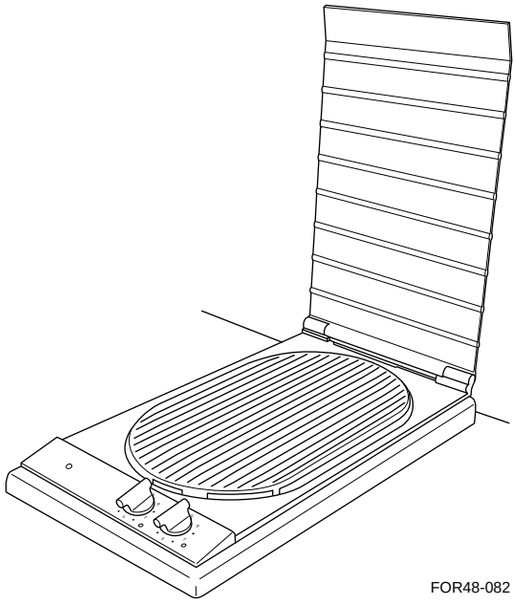
NOTICE

Remove the microwave carousel dish while the boat is underway.

FOR337

Microwave
Figure 5-30

Cockpit Grill—The optional cockpit grill operates only on 110V AC. The switch marked Grill on the AC control panel must be in the ON position to operate the grill. Keep the grill cover closed when it is not in use. Clean the grill after every use, allow it to cool down completely before cleaning it. Do not use stainless steel cleaner to clean the control panel, or high pressure to clean any components of the grill. Use a moist cloth and mild detergent to clean the control panel and wipe it dry with a soft dry cloth. For extended periods of non-use coat the grill with oil. Refer to the cockpit grill operator's manual in your Owner Information Binder.

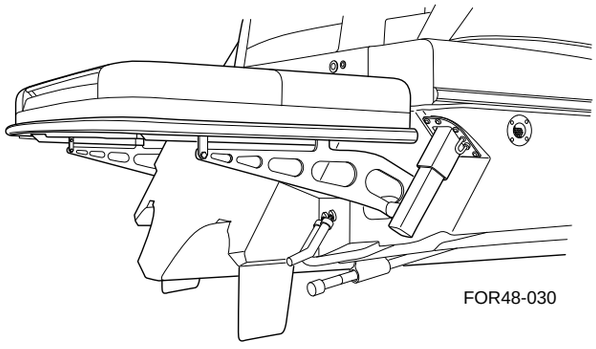


FOR48-082

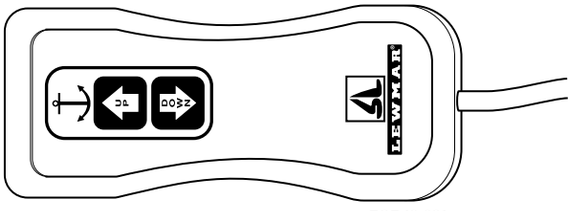
Cockpit Grill
Figure 5-31

PWC Hydraulic Lift

This lift is designed to lift many types of tenders and/or personal watercraft and consists of two telescoping lift assemblies, each with an internal hydraulic cylinder that both pushes and pulls, driving the system down and pulling it up. To operate the lift, turn ON the AUX POWER switch. At the helm, turn the PWC LIFT switch ON to energize the lift system with 12V DC power. Press the appropriate remote control buttons to move the lift up or down. Please refer to the manufacturer's operator manual for specific information relative to this component.



FOR48-030



FOR48-031

PWC Hydraulic Lift and Remote
Figure 5-32

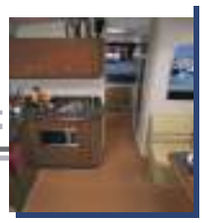
Refrigerator/Freezer—The refrigerator / freezer can be operated from both the 120V AC system and the 12V DC system.

- When operating the refrigerator using the 12V DC system, the 12V DC REFRIGERATOR C-BKR located on the AC/DC Control Panel must be ON, and the 120V AC REFRIGERATOR C-BKR located on the AC/DC Control Panel must be OFF.
- When operating the refrigerator using the 120V AC system, the 120V AC REFRIGERATOR C-BKR located on the AC/DC Control Panel must be ON. The refrigerator will automatically resort to AC power if supplied with both 12V DC and 120V AC power.

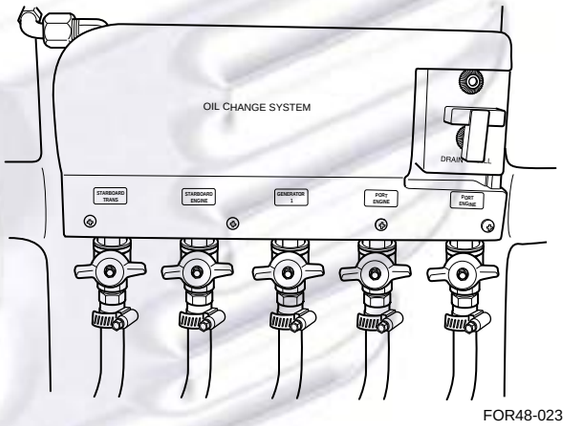
A freezer is included with the refrigerator. Refer to the refrigerator operator's manual in your Owner Information Binder.

FOR338

Cabin Refrigerator/Freezer
Figure 5-33



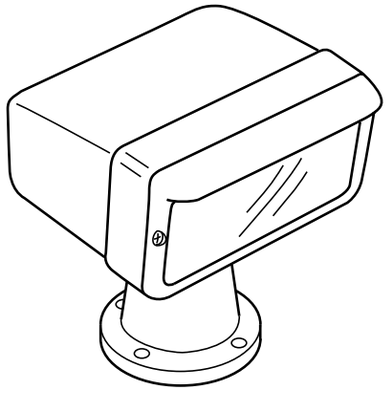
Remote Oil Change System—This 12V DC system is designed to remove crankcase oil from two engines, a generator and two transmissions and to refill each crankcase oil pan and transmission with fresh oil. The system is fully plumbed to allow draining and filling of each engine/transmission simply by flipping two switches on the oil changer. Refer to the manufacturer's operating instructions included in the Formula Owner Information Binder for additional details relating to the proper operation of this system.



FOR48-023

Remote Oil Change System
Figure 5-34

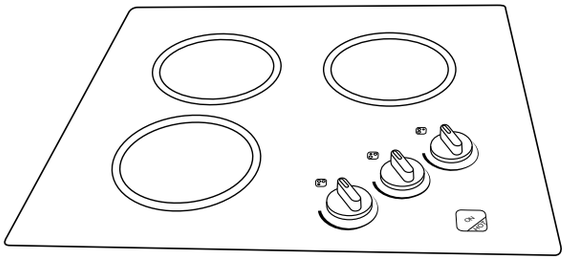
Search Light—The bow-mounted search light is operated by a remote control panel located at the helm. The search light movements are controllable relative to speed and range of motion. The search light operates on 12V DC. Please refer to the respective manufacturer's owner manual in the Formula Owner Information Binder for more detailed information relative to this accessory. Refer to **Search Light Remote Control** in **Section 4**.



FOR091

Search Light
Figure 5-35

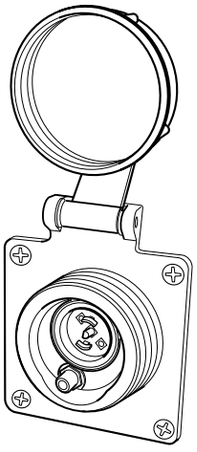
Stove—The galley-mounted electric stove operates only on 110V AC. The switch marked STOVE on the AC control panel must be in the ON position to operate the stove. Refer to the stove operator's manual in your Owner Information Binder.



FOR48-024

Stove
Figure 5-36

Telephone System—The onboard telephone system includes a waterproof dockside telephone receptacle. The receptacle, along with a cord, allows you to connect to a dockside telephone service. For location of the dockside telephone receptacle, refer to **Specifications**, in **Section 3**.



FOR48-062

Dockside Telephone Receptacle
Figure 5-37

Cabin Entertainment Systems—Your cabin audio and video entertainment systems require 120V AC power for operation. With 120V AC power present, turn ON the Entertainment System circuit breaker located on the AC/DC panel in the cabin.

Refer to each component's owner's manual as well as the Thunderbird wiring diagrams and Quick Reference Cards for further operating instructions. All of this information can be found in your Owner's Information Binder.

Salon Entertainment System—The LCD TV/monitor is operated by the Bose Lifestyle 28II Surround Sound theater system with DVD/CD player. For detailed operating instructions, refer to the manufacturer's operating information found in the Owner Information Binder.

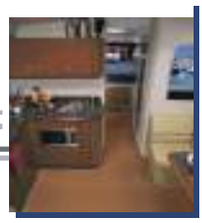
FOR334

LCD TV/Monitor
Figure 5-38

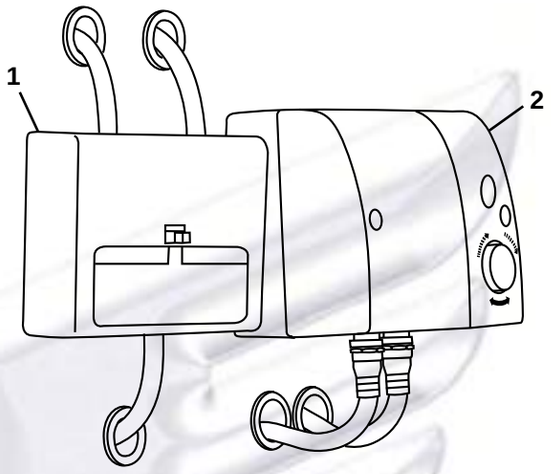
FOR335

DVD/CD
Figure 5-39

Satellite TV (optional)—To view the satellite source, switch the salon TV to the "S-Video" source and the salon BOSE unit to the "TV" source. A subscription is required for this feature. For detailed operating instructions, refer to the manufacturer's operating information found in the Owner Information Binder.



A TV antenna amplifier maximizes the TV signal in your area. Refer to manufacturer's operating information in your Owner Information Binder.

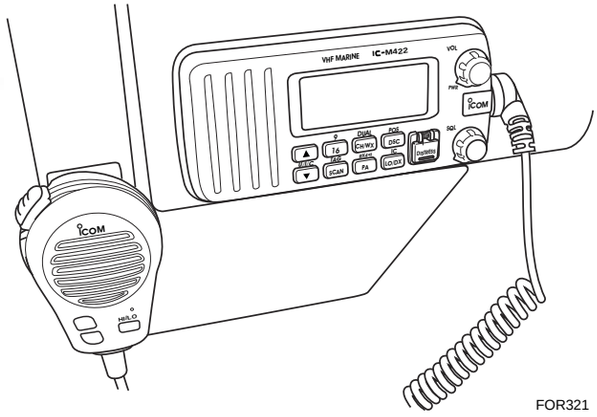


1. Antenna/Cable TV Switch
2. TV Antenna Amplifier

TV Switch and Amplifier
Figure 5-40

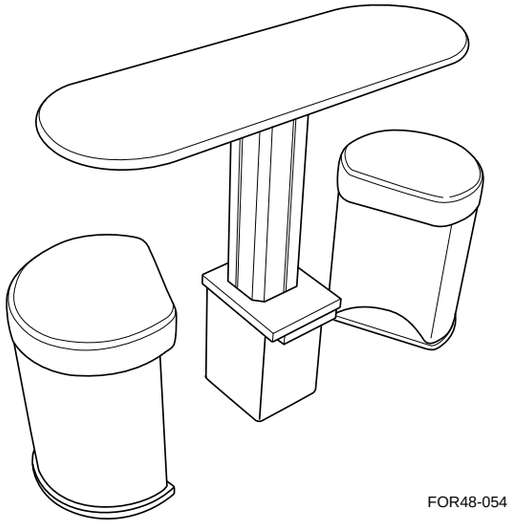
An antenna/cable TV switch allows you to alternate between local (antenna) and cable television. Refer to **Specifications**, in **Section 3**, for location.

VHF 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.



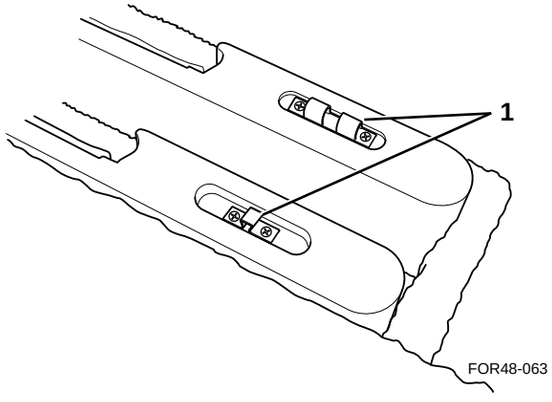
VHF Marine Radio
Figure 5-41

Adjustable Height Cocktail Table
(48 PY only)—The Cocktail/Dining table height can be adjusted by using the UP or DOWN arrows on the base of the table. With AC voltage present, turn ON the SALON TABLE LIFT C-BKR located on the AC/DC Control Panel. DO NOT continue to operate adjustment arrows when the table is fully extended or retracted. Remove the cherry dining table leaves to use the Corian® surface as a cocktail table.



Adjustable Height Cocktail Table
Figure 5-42

The cherry dining table leaves are split for easy storage. When using the leaves, make sure the two halves' clips are securely snapped together.



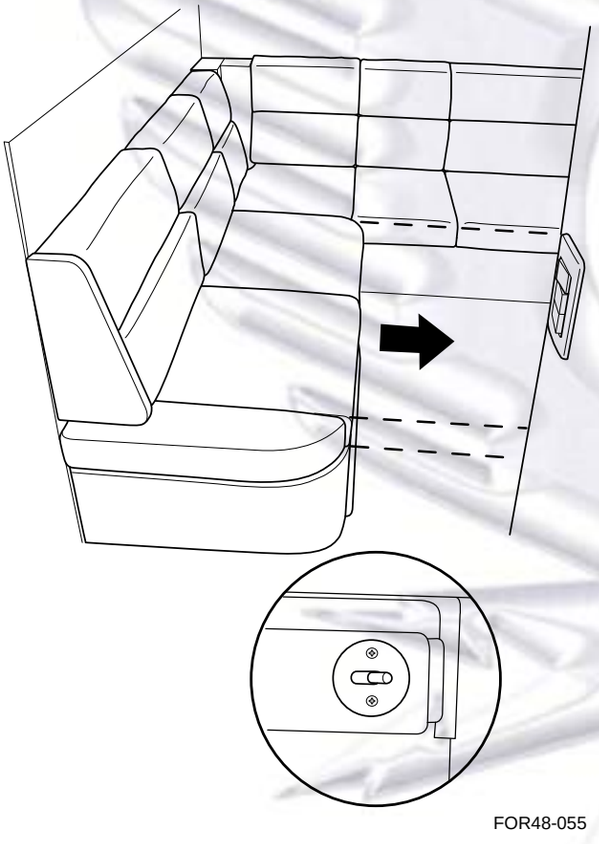
1. Clips

Dining Table Leaf Clips
Figure 5-43

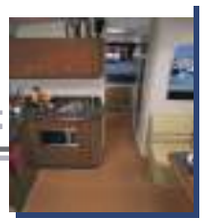
Private Guest Stateroom/Den Lounge/Bed
(48 PY only)—The aft cabin seating area can be converted into either 2 twin sized beds or 1 queen sized bed.

To convert the seating area into 2 twin sized beds, open the latch on the aft cabin wall and fold down the bed.

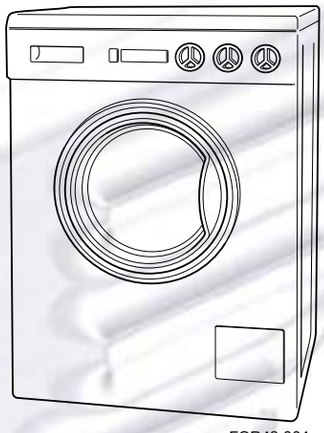
To convert the seating area into a queen sized bed, with the aft bed deployed, use the bed slide switch to slide the forward wall cushions towards the aft wall bed. The power toggle switch for the bed slide is located adjacent to the washer/dryer.



Private Guest Stateroom/Den Lounge/Bed
Figure 5-44



Combination Washer/Dryer (48 PY only)—To operate this accessory, the AC/DC panel must be supplied with 110V power, and the AC switch labeled WASHER/DRYER must be ON. Refer to manufacturer's operating instructions in your Owner Information Binder for additional information pertaining to this accessory. Leave doors open when operating the washer/dryer.



Combination Washer/Dryer
Figure 5-45

NOTES

Section 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.

BASIC SAFE BOATING RULES

The General Prudential Rule regarding right-of-way is that if a collision appears unavoidable, neither boat has right-of-way. As prescribed in the “Rules of the Road,” both boats must act to avoid collision.

The information in this section outlines only the most basic of the nautical rules of the road. For more information, contact your local USCG Auxiliary.

⚠ 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

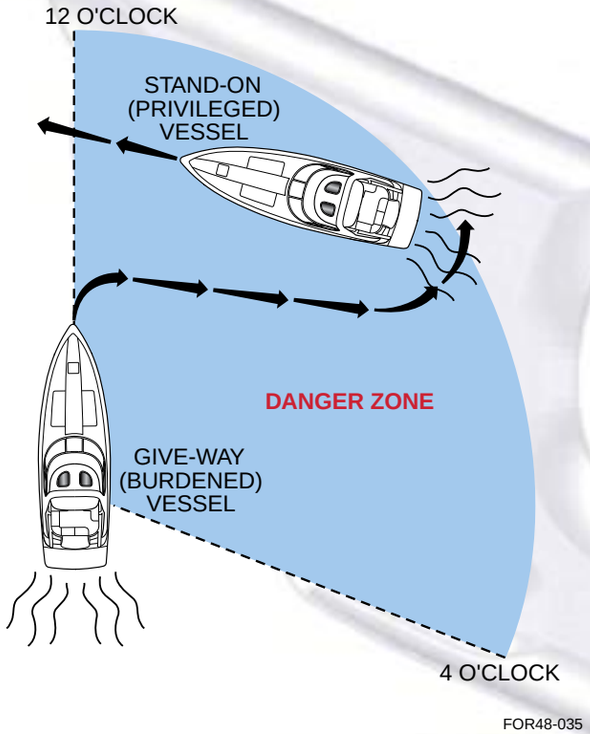
Privileged boats have right-of-way and can hold course and speed. Sailboats and boats paddled or rowed have the right-of-way over motor boats. Sailboats under power are considered motorboats. Small pleasure crafts must yield to large commercial boats in narrow channels.

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

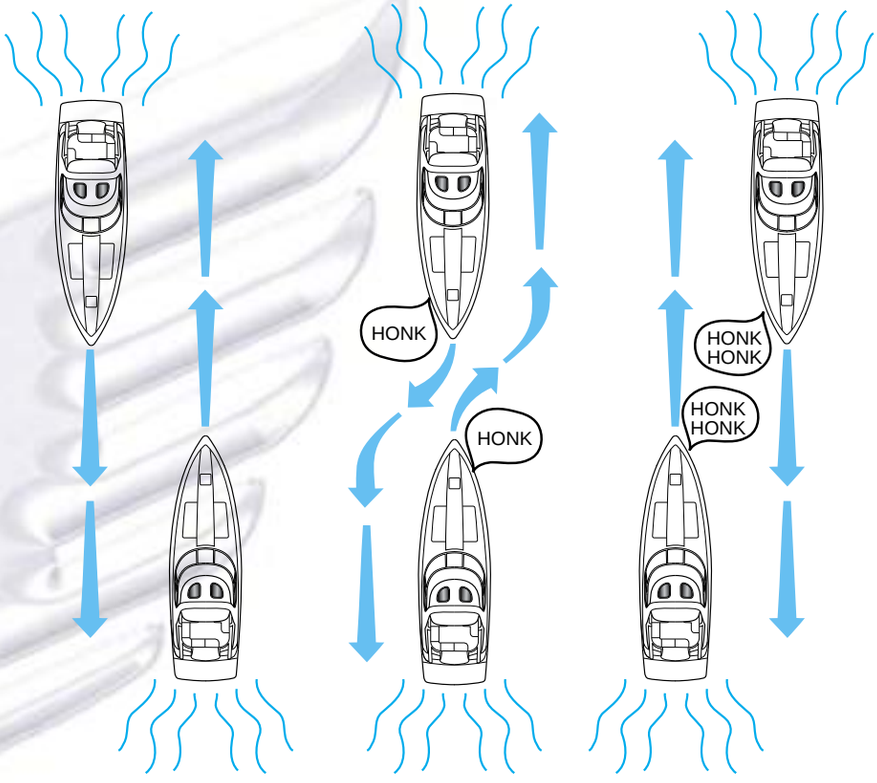
In crossing situations, the boat to the right from the 12 o'clock to the 4 o'clock position has the right-of-way. It must hold course and speed. The burdened boat keeps clear and passes behind the privileged boat. Boats going up and down a river have the privilege over boats crossing the river.



Crossing
Figure 6-1

Meeting Head-On

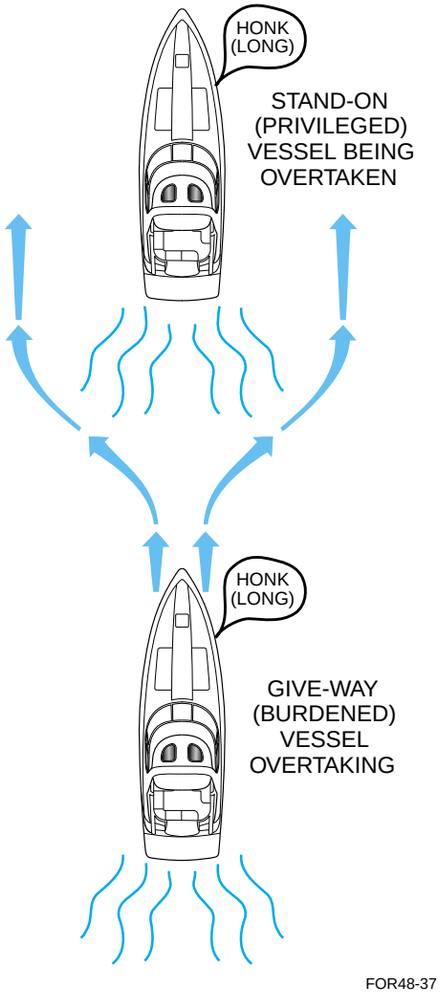
Neither boat has the right-of-way in this situation. Both boats should decrease speed, turn to the right, and pass port-to-port. However, if both boats are on the left side of the channel, each vessel should sound two short blasts and pass starboard-to-starboard.



Meeting Head-On
Figure 6-2

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.



Overtaking
Figure 6-3

FUELING

⚠ WARNING

All precautions must be taken every time you fuel your boat, whether it's gasoline or diesel fuel. Diesel fuel is non-explosive, but it will burn.

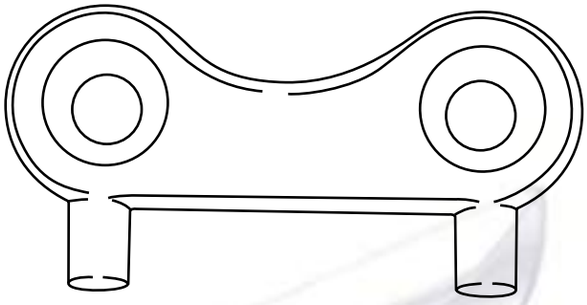
CAUTION

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:

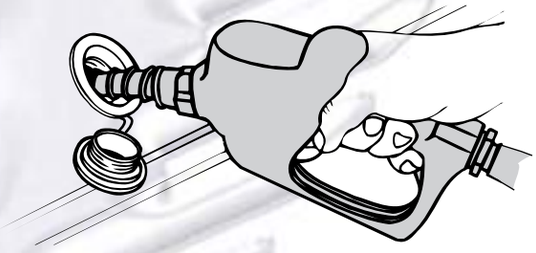
1. Know your fuel tank capacity. Be sure to have enough fuel to reach your destination. If departing for an extended cruise, know the availability of fuel along your route. Practice the One Third Rule; 1/3 to reach the destination, 1/3 to return and 1/3 in reserve.
2. Avoid fueling at night, except under 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 using the deck plate key supplied with your boat.



FOR047

Deck Plate Key
Figure 6-4

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.



KC-0991

Fueling
Figure 6-5

10. Add fuel in accordance with the propulsion unit operator's manual. Do not overfill, and allow enough room for fuel expansion.

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 using the deck plate key. 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 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, distribution 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.

Section 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 is 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.

CAUTION

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 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

- **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.**

1. Move shift lever(s) to the NEUTRAL position.
2. Press START switch (ignition) of one engine to START position. Release the switch immediately after the engine starts. If the engines fail to start, refer to the engine operator's manual for additional information.

CAUTION

Failure to release the ignition switch after the engine starts may damage the engine's starter motor.

3. Operate the engine slightly above idle. Check the oil pressure gauge. If the oil pressure does not rise to specified range in 15 seconds, stop the engine immediately. Contact your Formula dealer to service the engine.
4. Repeat starting procedure for the second engine. The second engine may be difficult to hear when it starts due to the noise of the first engine. Observe the tachometer of the second engine. When the RPMs increase, release the ignition switch immediately.
5. Allow the engines to warm up. Check the water temperature gauges to be sure water temperature remains within the specified range. If the temperature gauge reads abnormally high, stop the engine immediately. Check the drive unit's water inlets for blockage. If the inlets are open, contact your Formula dealer to service the engine.

SHIFTING

CAUTION

- **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, 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 Engines

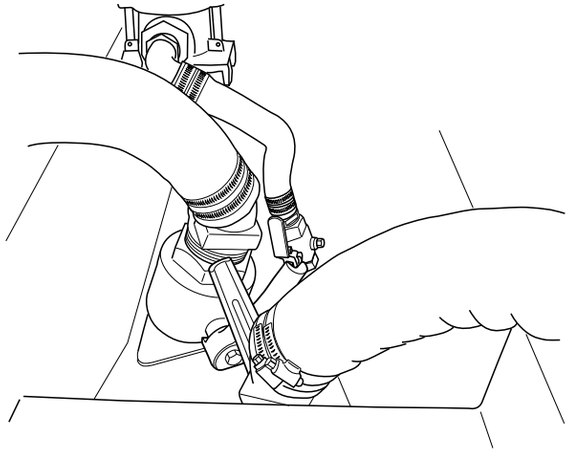
⚠ WARNING

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. Move the throttle lever(s) forward until engine speed is approximately 1400 RPM. Refer to propulsion unit operator's manual for cool down procedure.
4. After cooling the engines, move the throttle lever(s) back to the IDLE position.
5. Press the STOP switches to turn off the engines.
6. Close both engines' raw water seacocks.

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.



Engines' Raw Water Seacock
Figure 7-1

OPERATING AT HIGH SPEED

⚠ WARNING

- **Maneuverability above 50 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.

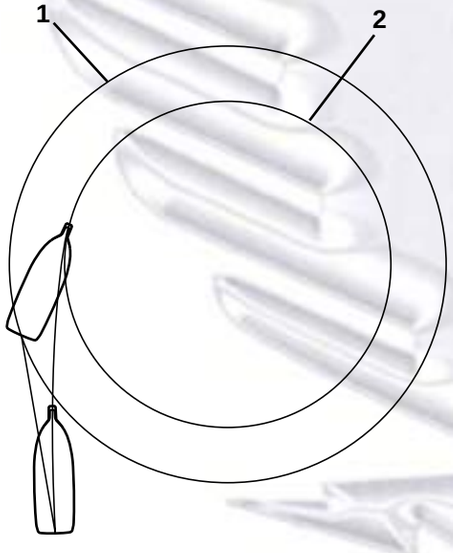
⚠ WARNING

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.

MANEUVERING TECHNIQUES

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



1. Stern Circle
2. Bow Circle

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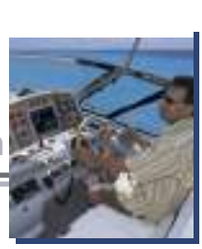
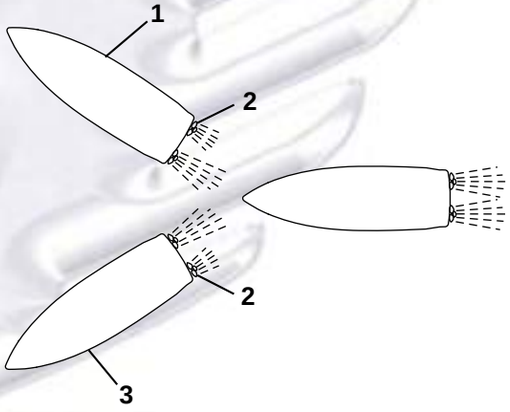
Maneuvering
Figure 7-2



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 rudders. 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.



FOR197

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

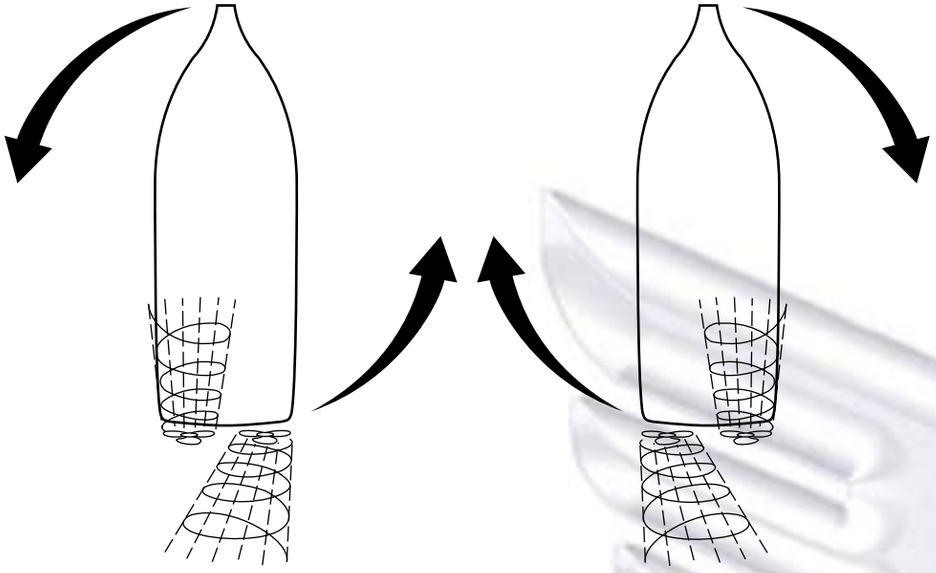
Slow Speed Maneuvering
Figure 7-3

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 transmissions.
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.

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



TWIN ENGINE MANEUVERING

KC-1521

Close Quarter Turns
Figure 7-4

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 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 Engine 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

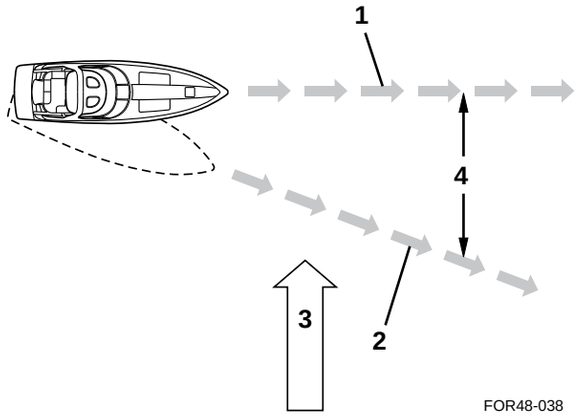
When boating in temperatures below freezing, keep the propulsion unit's drives tilted down (submerged) at all times. This will prevent damage from freezing.

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 vinyl canvas in low temperatures to prevent damage from cracking.

HOLDING POSITION

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.



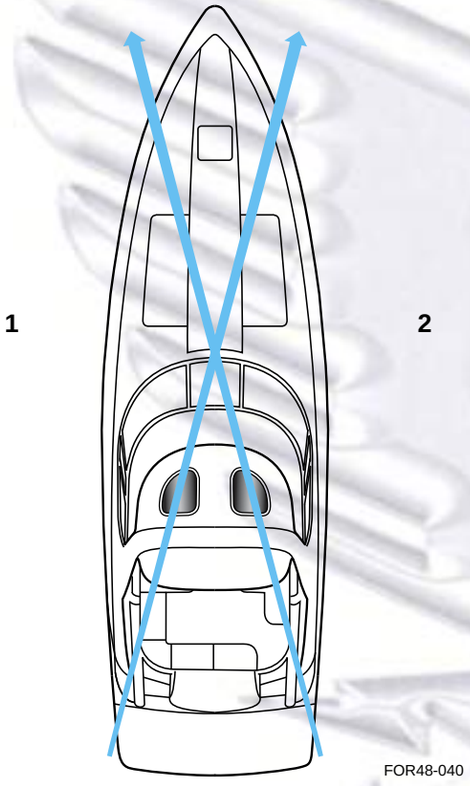
1. Intended Course
2. Traveled Course
3. Wind/Current
4. Leeway

Effects of Wind/Current
Figure 7-5

USE OF TRIM TABS

Trim Tabs

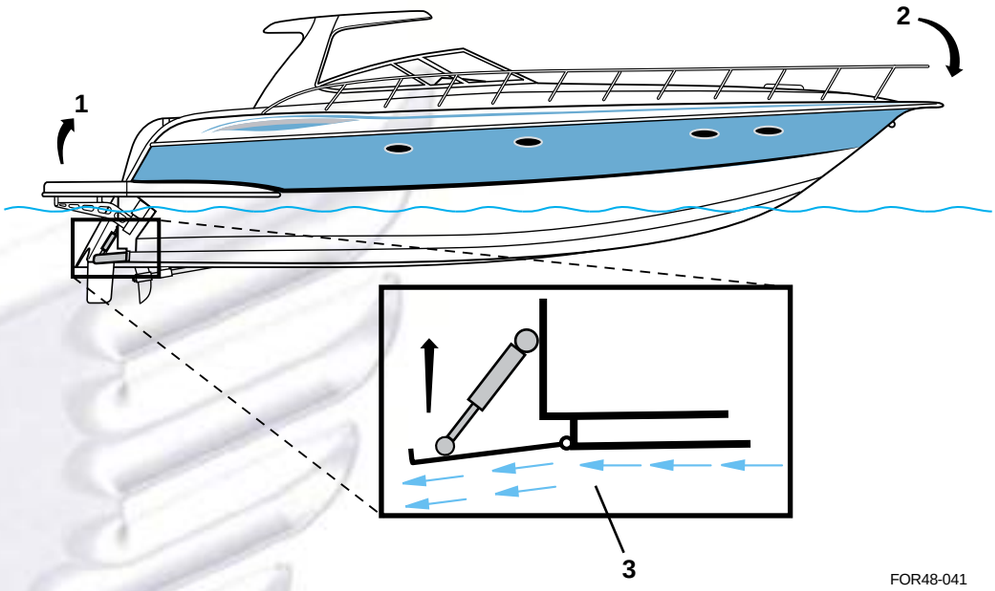
Water is deflected and redirected as the trim tabs are raised and lowered. This change in the water flow creates upward pressure under the tabs and raises the stern. When the stern raises, the bow is lowered. Likewise, lowering the port tab will cause the port stern to raise, making the starboard bow lower.



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

Trim Tabs
Figure 7-6

Using trim tabs will compensate for uneven weight distribution, listing, water conditions and other factors that cause inefficient operation.



1. Stern Rises
2. Bow Lowers
3. Water Is Redirected Creating Upward Force At Stern

Trim Tab Operation
Figure 7-7

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. 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.
4. 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.

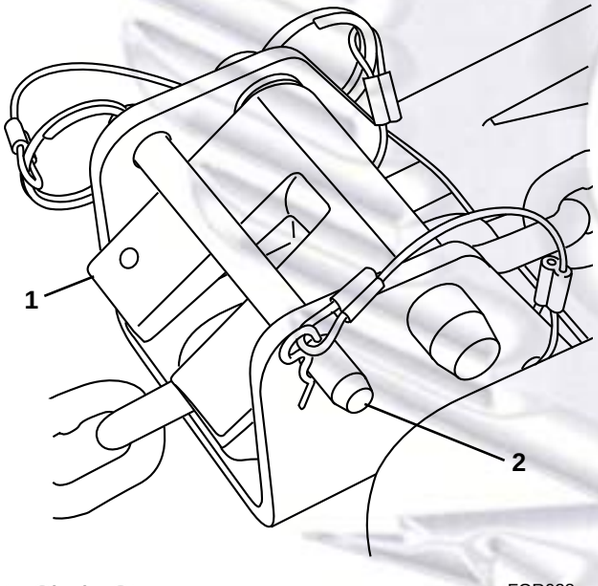
ANCHORING AND SEA ANCHORS

⚠ 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.

Windlass

The windlass can be operated at the driver's helm or from the foredeck. The windlass system can also be operated manually. A manual hand crank is located in the anchor locker.



1. Chain Stop
2. Lock Pin

Windlass Lock Pin Installed
Figure 7-8

The chain stop **(Figure 7-8, 1)** is used to immobilize the anchor in the stowed position and a lock pin **(Figure 7-8, 2)** secures the chain stop. The lock pin must be installed at all times when the windlass is not in use. 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.**
- **Do not use the winch as a bollard. When anchored, secure the anchor line directly to a bollard or deck cleat.**
- **Secure the anchor with a rope or fastener pin when operating the boat at high speed or in heavy weather.**
- **Turn the windlass power switch OFF when the winch is not in use and before leaving the boat.**

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.

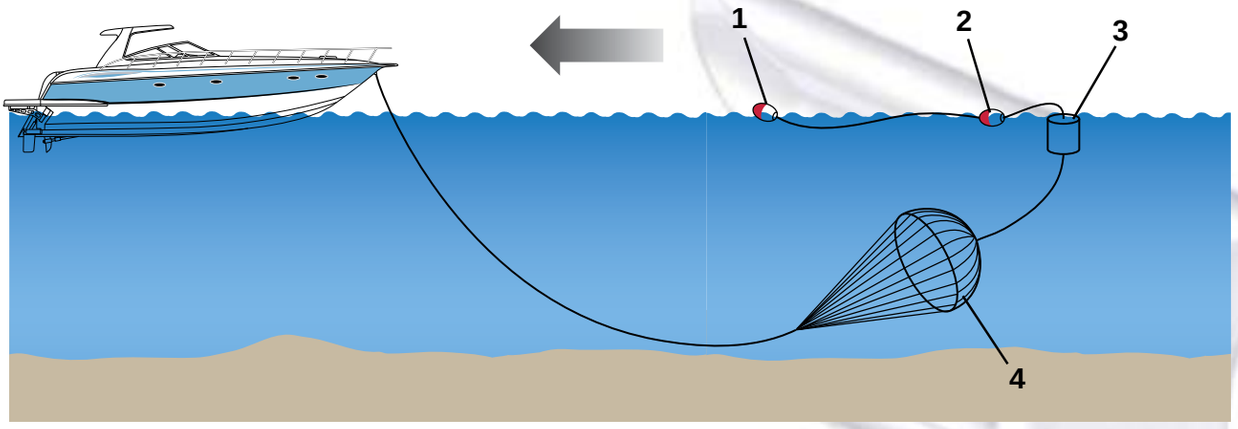
Setting—When the anchor hits bottom, slowly back up the boat, keeping tension on the chain. The anchor line should be five to seven times the depth of the water.

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.

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.



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

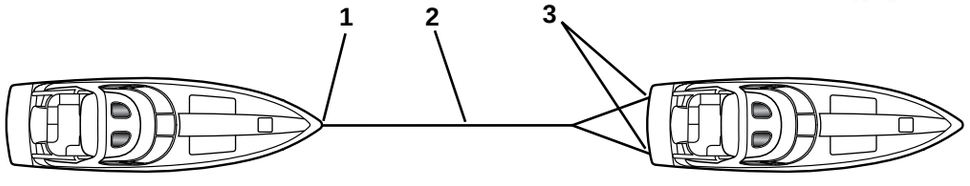
Sea Anchor
Figure 7-9

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.



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

Towing
Figure 7-10

⚠ WARNING

When towing, use only the bow and stern eyes; 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.

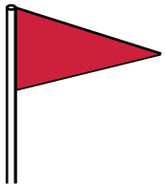
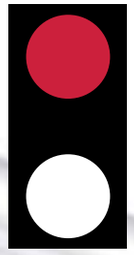
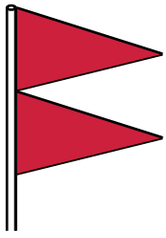
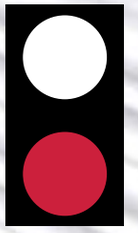
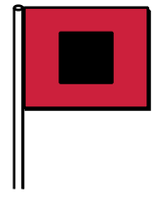
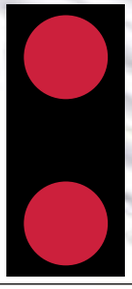
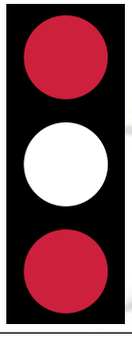
HEAVY WEATHER

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	NIGHTIME 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.	

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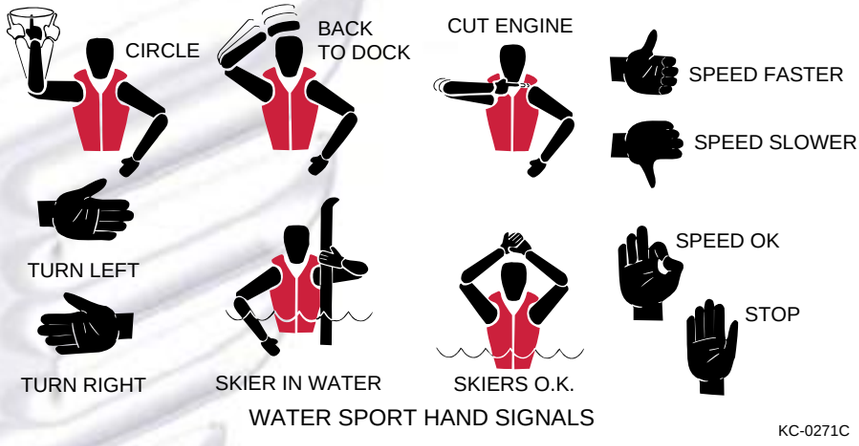
Storm Signals
Figure 7-11

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.



Water Sport Hand Signals
Figure 7-12

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

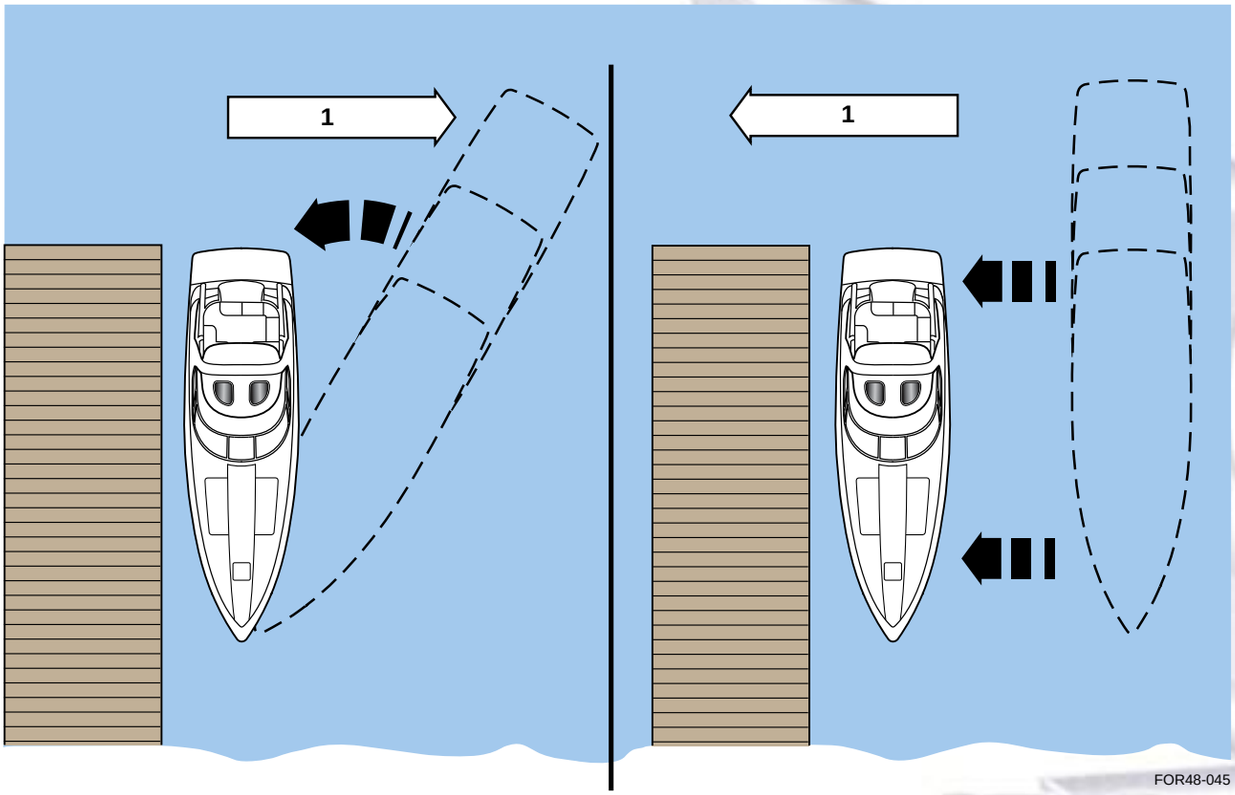
- **Water sport participants must wear a USCG approved floatation device. A Type III water ski vest is an approved and practical PFD.**
- **Keep at least 100 ft away from all other objects.**
- **When water sporting, have an experienced driver and aft facing observer in the boat.**
- **Do not water sport 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.



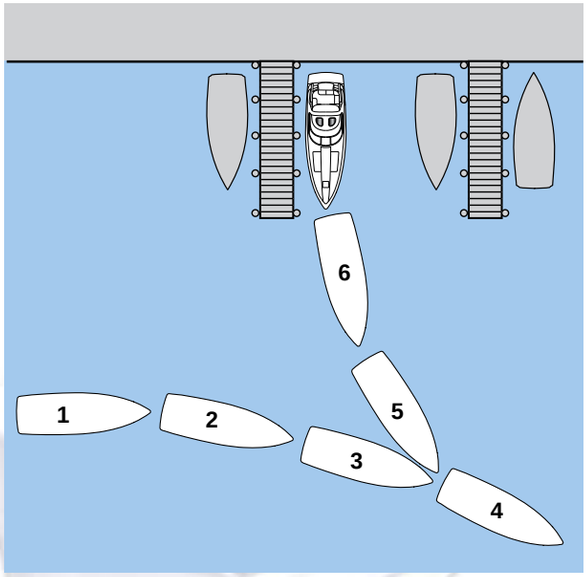
1. Wind or Current

Docking
Figure 7-13

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



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Approaching a Slip
Figure 7-14

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

FOR48-050

1. Mooring Buoy

Mooring to a Mooring Buoy
Figure 7-15

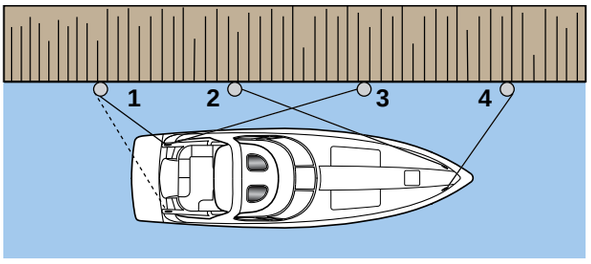
The only buoys you are permitted to moor to are mooring buoys. Mooring to a navigation buoy or other navigational aids or regulatory marker is illegal.

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.



FOR48-047

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

Mooring Lines
Figure 7-16

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 sized 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. The United States Aids to Navigation System (USATONS) is the primary marking system used on inland water, coastal waters and rivers. This system is maintained by the U.S. Coast Guard (USCG).

Types of Buoys

There are several types and shapes of buoys. Buoys may be unlighted, lighted, with sound, or may have both an audible and a visual signal. Lights, bells, and horns are used on buoys for night or poor visibility conditions. Different shapes of buoys are shown below.

Types of Buoys
Figure 7-17

Buoys with unique light flashing characteristics are identified on nautical charts with the specific flashing pattern.

Mooring Buoys

The only buoys you are permitted to moor to are mooring buoys. Mooring buoys are white with a blue horizontal stripe. Mooring to a navigation buoy, regulatory markers, or lateral markers is illegal.

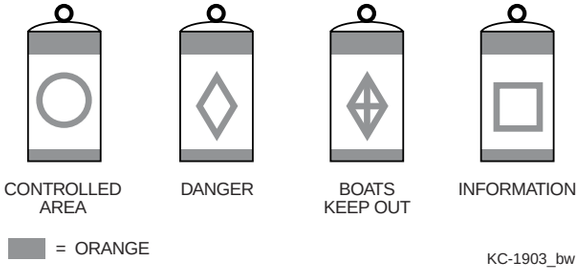
1. White with Blue Band—May Show White Reflector or Light

Mooring Buoy
Figure 7-18

Regulatory Markers

Regulatory markers indicate dangerous or restricted controlled areas. These markers are used to indicate speed zones, areas set aside for particular use, general information, and directions.

Regulatory markers are white with orange geometric shapes and also have orange bands near the top and at the water line of the buoy. You must obey regulatory markers.



Regulatory Markers
Figure 7-19

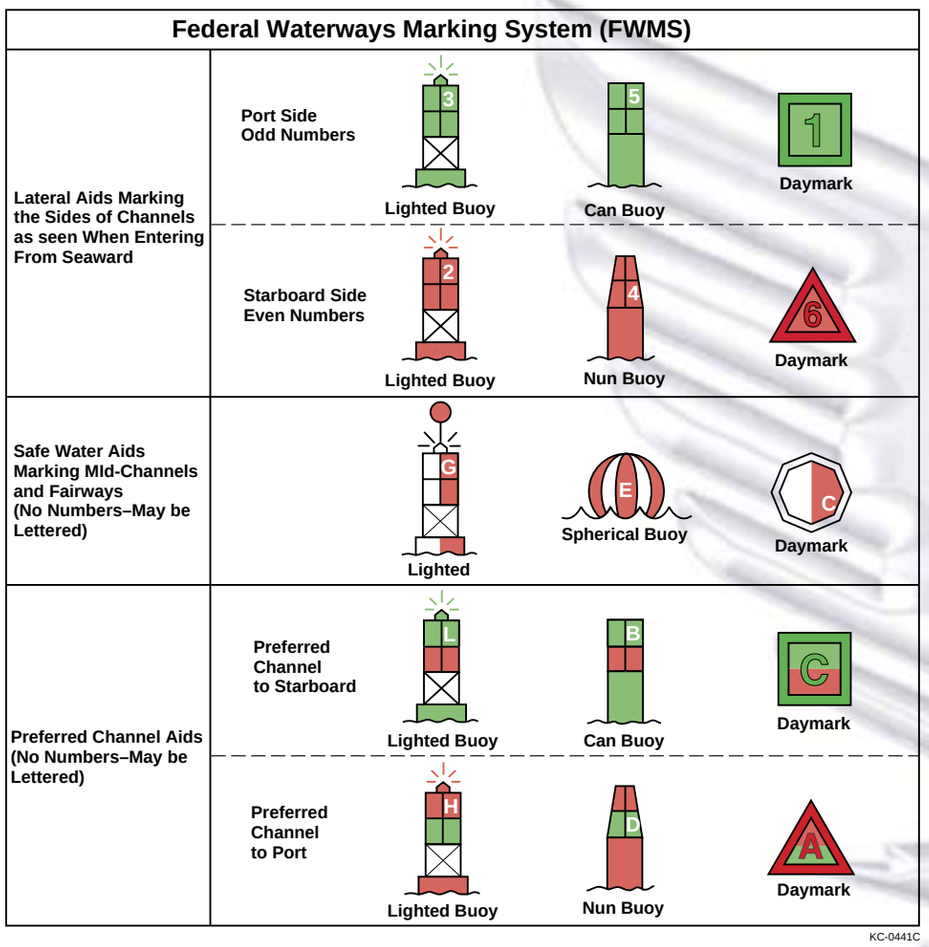
Lateral Markers

Lateral markers 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 side (port) of the channel is marked with GREEN, odd-numbered buoys.

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.

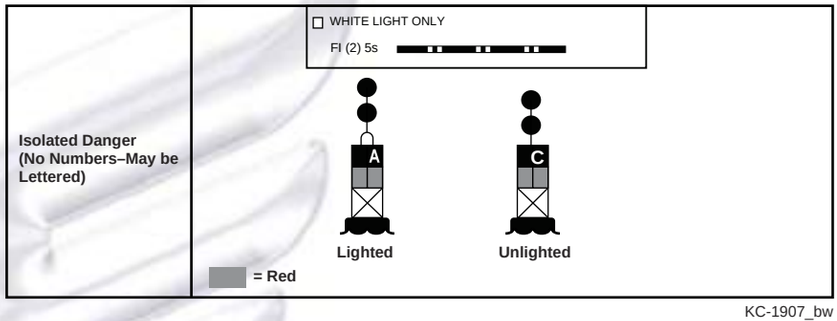
Fairways and mid-channels may be marked with safe water marks or buoys. These marks indicate safe water all around. Safe water marks are red and white striped and are round or have a red spherical topmark.



Federal Waterways Marking System (FWMS)
Figure 7-20

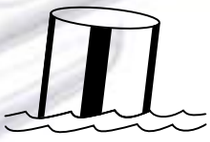
Isolated Danger Markers

Isolated danger markers indicate an isolated danger which may be passed on all sides. These markers are colored black with one or more broad horizontal red bands and are equipped with a topmark of two black spheres, one above the other.



KC-1907_bw

On inland waters, a buoy with alternating vertical black and white stripes may be used to indicate that an obstruction or other danger exists between the buoy and the nearest shore. DO NOT pass between the buoy and the shore.



BLACK-STRIPED
WHITE BUOY

KC-1902

Isolated Danger Markers
Figure 21

Light Structures

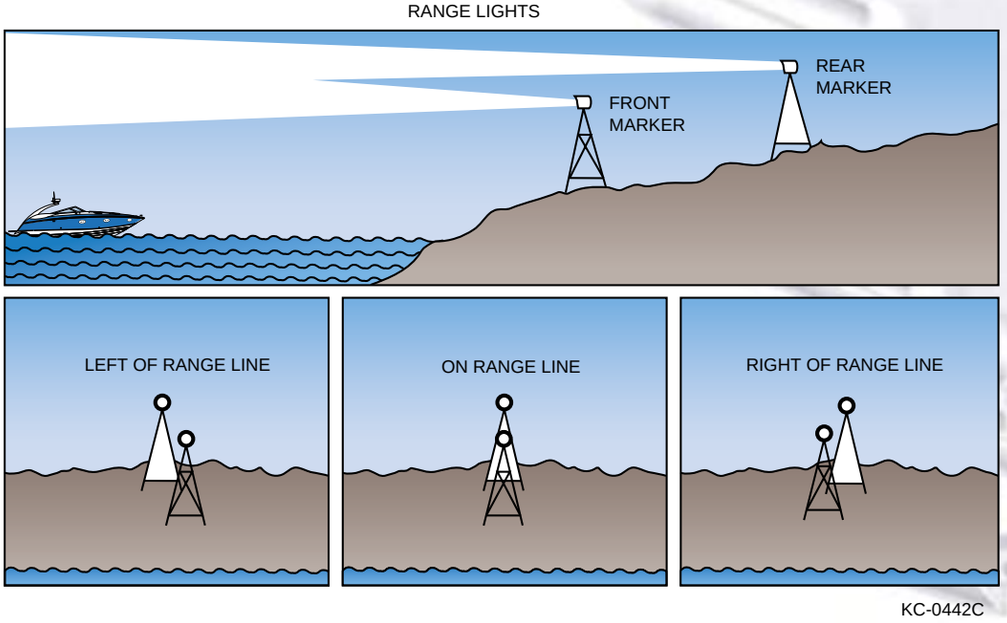
Maneuvering a boat at night can be dangerous and confusing. To aid boaters with navigation and to warn of hazards, the USCG and the state and local authorities maintain a variety of light structures. Some light structures may be equipped with radio beacons, radar reflectors, and/or signals.

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

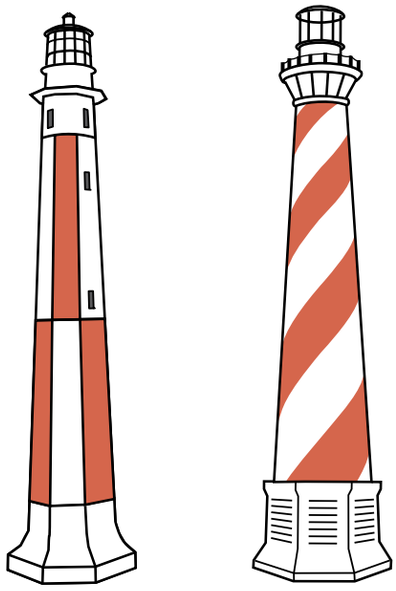
Range lights are usually visible in one direction and help a boat operator navigate in a generally safe direction. Steering a course to keep range lights arranged in a line (one on top of the other) will help guide a boat through a channel.



Range Lights
Figure 7-22

Lighthouses

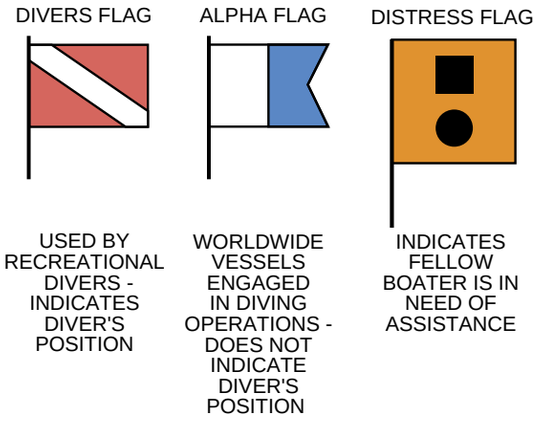
Lighthouses can be found at harbor entrances, prominent headlands, isolated danger areas, and along the coast. These striped or patterned structures have unique flashing characteristics to help identify them.



KC-0443C

Lighthouses
Figure 7-23

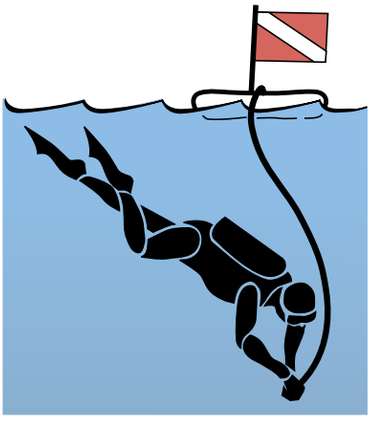
Warning Markers



KC-0352C

Warning Markers
Figure 7-24

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

Skin Diver Warning Flag
Figure 7-25

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

KC-0260C

Swim Area Warning Buoy
Figure 7-26

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.

Section 8

Schedule Checks and Service

Use the checks and maintenance information outlined in this section along with service information contained within the individual component operator's manuals supplied in your Owner Information Binder. It is extremely important that you read and understand the periodic maintenance tasks outlined in your operator's manuals (propulsion unit, generator and other accessories) because 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 IN position.
- Stow and secure all equipment.
- Pump bilge dry with manual control switch.
- Close all water inlet seacocks.
- 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 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 detectors.
	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 propeller shaft logs for water entry (inboard models).
	Check generator's fuel/water separator.
	Check exhaust system for leaks.
	Check fuel system for leaks.
	Check condition of batteries.
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.

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.

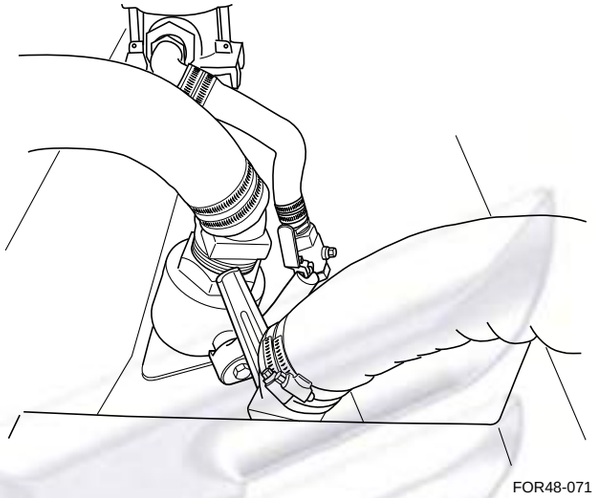
⚠ WARNING

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.

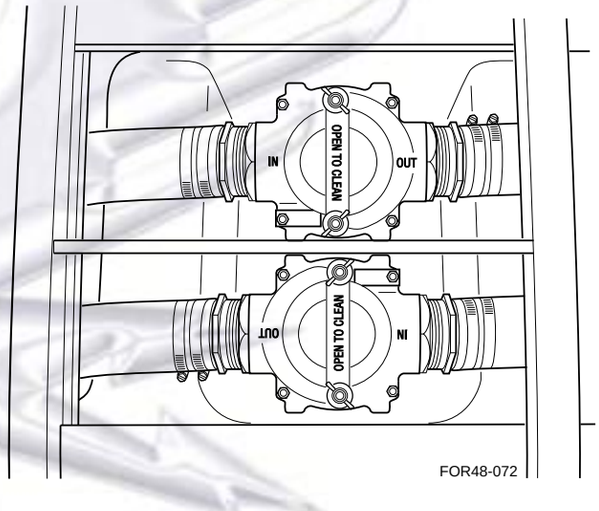
CAUTION

- **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.**



Seacocks
Figure 8-1

5. Check all seawater strainers for leaks and accumulation of debris.



Seawater Strainers
Figure 8-2

- 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. If the container is full of sediment, remove the plug at the bottom of the container and allow water to drain into the bilge. Remove the container and clean any sediment. Install the container and plug. Install strainer in container and secure cover. Open the seacock and check for leaks.

CAUTION

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

6. While operating your boat at cruising speed, inspect the propeller shaft logs (inboard models only) for water dripping. If water dripping is apparent, contact your Formula dealer for service.
7. Start both engines and the generator. Check all exhaust systems for leakage. If you notice a leak, contact your Formula dealer.
8. 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.

9. Check the battery charge of both engine batteries (or battery banks) and the generator battery. Be sure the batteries can start both engines and the generator before proceeding on your cruise.

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

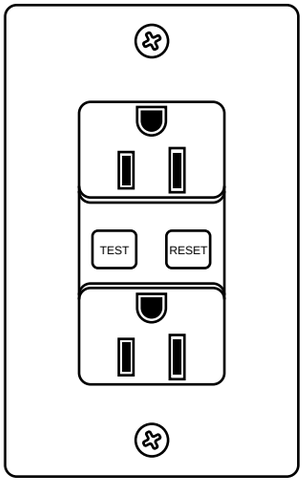
Clean the bilge area. Make sure all drain passageways are clear.

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

GFCI Outlet
Figure 8-3

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 freshwater system for leaks and proper component operation.
3. Inspect the steering, shift and throttle systems for proper operation.
4. Check all batteries for proper electrolyte level.
5. Check trim tab pump fluid level.

Section 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 towards 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.

CAUTION

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 spot to air dry. If needed, you may use a hair dryer on the warm setting. For stubborn stains, use a mild solvent and follow 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		■

Corian® Counter Top

Use warm soapy water or ammonia based cleaner, rinse and wipe dry. Use a little stronger solution for more stubborn residue.

Disinfect the surface occasionally by wiping the surface with diluted household bleach (1 part water/1 part bleach). Rinse top thoroughly with water and wipe dry.

DO NOT get bleach solution in eyes or on bare skin. Wear rubber gloves and protective eyewear when working with bleach.

Prevent heat damage by using heat trivets or hot pads or allow cookware to cool before placing them onto the surface. Prevent other damage by avoiding surface from strong chemicals. If contact occurs, quickly flush the surface with water and dry. DO NOT use the surface as a cutting board.

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 boat finish.

Vinyl Upholstery

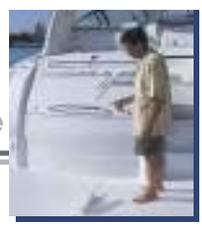
CAUTION

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 more than 6 times. Additional rubbing could possibly damage the vinyl finish.

CAUTION

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 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.

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.

CAUTION

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.

NOTICE

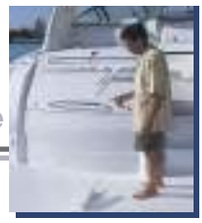
Do not use any abrasive cleaner on the front, sides or aft curtains as it will scratch or mar the clear vinyl surface.

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 cockpit or storage 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, silicone spray or paraffin.

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

NOTICE

Teak preservatives and oils can be harmful to other materials. Make sure you thoroughly remove any of these products if they come in contact with the gelcoat surface, vinyl or canvas.

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 course 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.

Radar Arch

Depending on your model boat, the radar arch is constructed from either aluminum or fiberglass and has a very durable finish. Wash the arch with a mild detergent and a clean soft cloth. Apply a non-abrasive wax to the finish.

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.

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

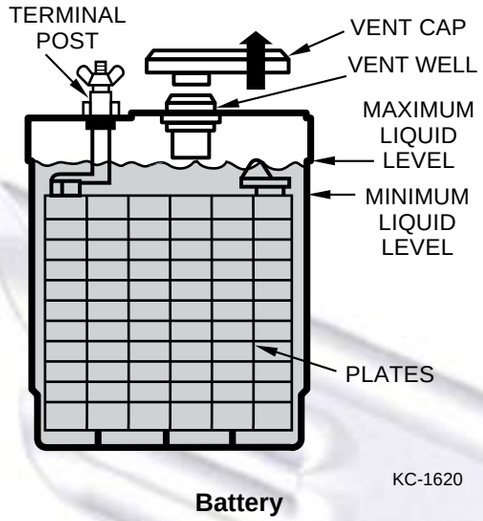
⚠ WARNING

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. Before cleaning, remove the vent caps and seal the vent wells with corks to prevent the solution from getting inside the battery.

NOTICE

Some batteries are sealed and cannot be filled.



Battery
Figure 9-1

Check the fluid levels in the battery cells. A level approximately 1/4 to 1/2 in. (6 to 13 mm) above the plates is sufficient. If needed, fill with distilled water. Do not overfill.

⚠ WARNING

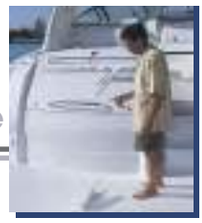
Batteries produce explosive hydrogen gas. Do not attempt to start an engine with jumper cables under any circumstances. Keep all sparks, flames and smoking material away from batteries. The risk of a spark at the battery post, igniting gasoline or hydrogen fumes, is too great.

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.

CAUTION

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. Refer to the accessories operator's manuals in your Owner Information Binder for the location of in-line fuses.

⚠ 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

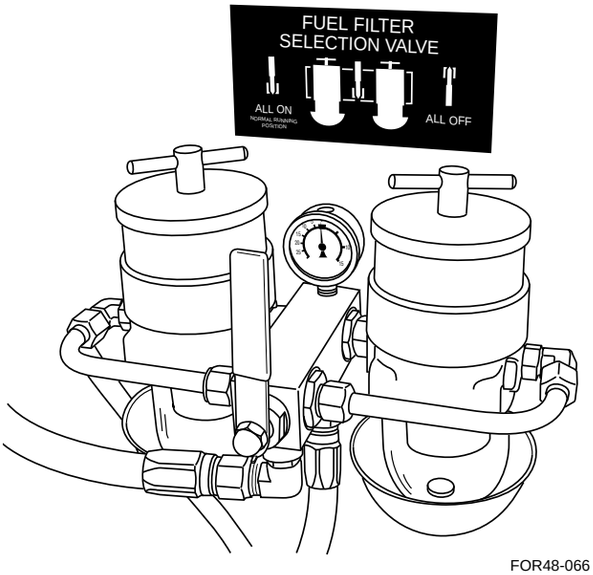
Typical In-Line Fuse Holder
Figure 9-2

Fuel System

⚠ WARNING

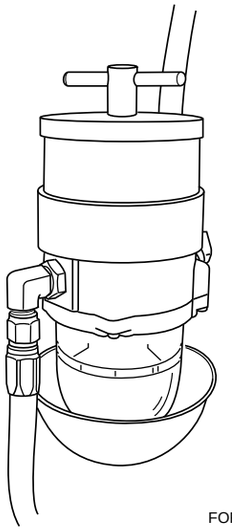
All fuels are combustible. Check the fuel system before each use. Do not operate the boat when a fuel leak is found. A fuel leak must be repaired before starting the engines or generator.

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.



FOR48-066

Fuel Filters (48 PY)
Figure 9-3

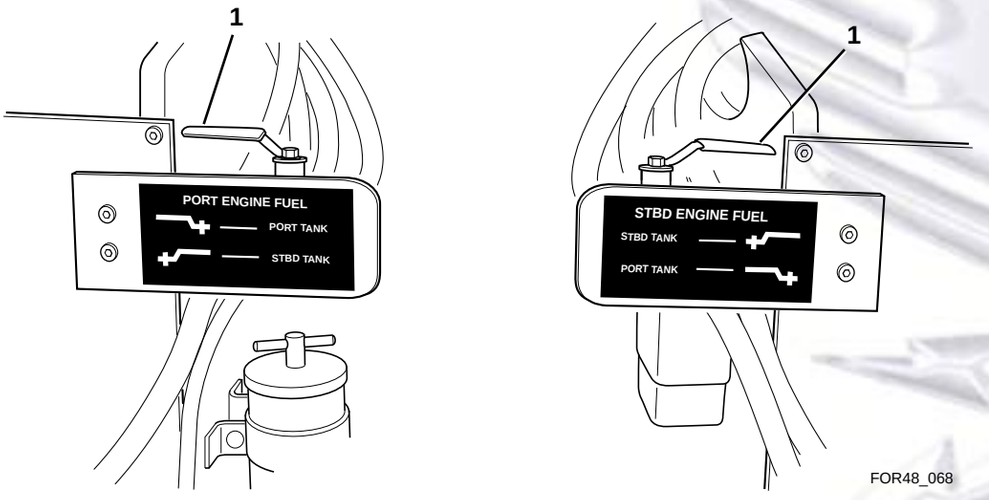


FOR48-067

Fuel Filters Generator
Figure 9-4

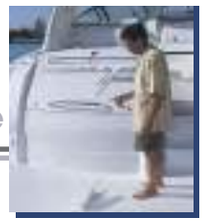
Fuel Crossover Valves (45 PY Optional)

Your yacht is equipped with an internal fuel system meeting or exceeding current federal requirements. High quality materials and components are used to assemble the fuel system. The fuel tank outlets to the engine have a manual valve for crossover from tank to tank. These valves are within the fuel tank outlet and return lines. The illustration for the STBD ENGINE FUEL shows the starboard tank valve OPEN and the port tank CLOSED. The illustration for the PORT ENGINE FUEL shows the port tank valve OPEN and the starboard tank CLOSED.



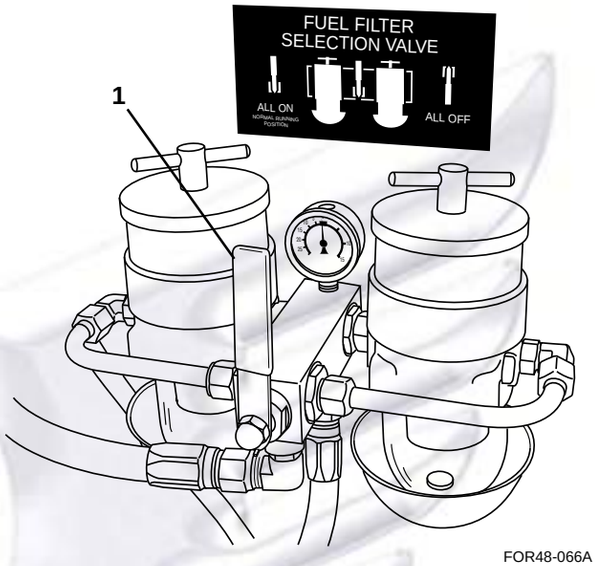
1. Crossover Valves

Fuel Crossover Valves
Figure 9-5



Fuel Filter Selection Valve (48 PY Only)

The fuel filter selection valves are manual valves used to stop delivery of fuel to the fuel filters.



1. Fuel Filter Selection Valve

Fuel Filter Selection Valve
Figure 9-6

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.

Gray 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. 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 can occur in fresh or salt water, however, salt, brackish and polluted waters accelerate galvanic corrosion.

GALVANIC CORROSION PROTECTION

NOTICE

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

A self-sacrificing anode can be mounted to your Formula boat to help prevent damage to metal components from galvanic corrosion. The anode will require frequent inspections. If the anode shows deterioration of 50% or more, it must be replaced for continued protection.

Self-Sacrificing Anode
Figure 9-7

CAUTION

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.

FORMULA

Section 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 and cause 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

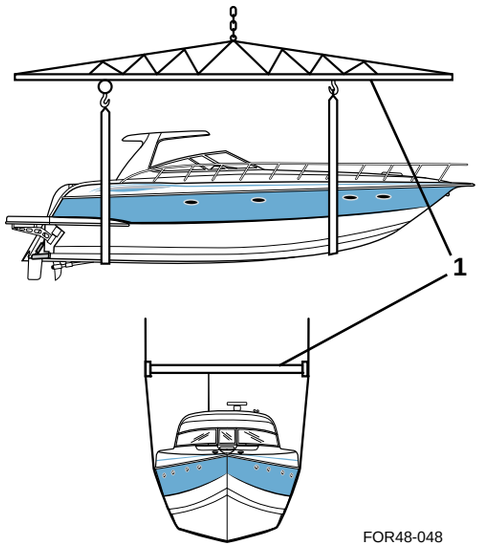
While the boat is still in the water, fill the fuel tanks and add the proper amount of fuel stabilizer and conditioner. Follow the instructions on the label. Operate the engines and generator for at least 15 minutes to be sure the treated fuel has reached them.

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.

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.



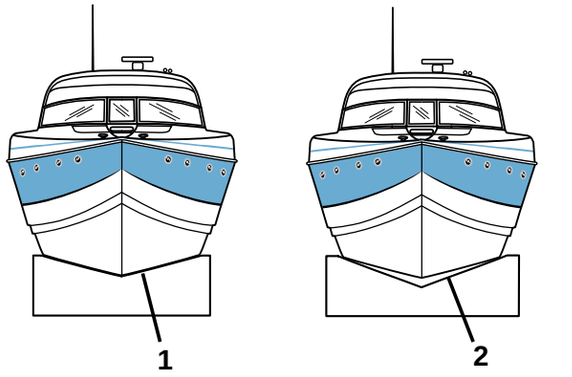
1. Spreader Bar

Lifting with Slings
Figure 10-1

STORAGE CRADLE

A storage cradle will provide proper support and prevent stress on the hull. Position the storage cradle as close to the sling tag locations as possible. Use caution not to damage any underwater fittings.

The storage cradle must completely touch the hull for proper support. Avoid any gaps between the cradle and the hull.



FOR48-049

1. Hull completely on cradle—right
2. Gap between hull and cradle—wrong

Storage Cradle
Figure 10-2

Store your Formula boat on a storage cradle with the bow elevated. Remove the transom drain plug. Be sure all compartments in the bilge drain completely to prevent mold and mildew. Mold and mildew may form as a result of the inability of moisture to escape.

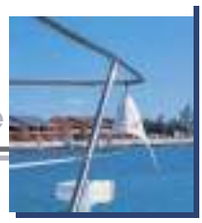
STORAGE/WINTERIZATION

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 manufacturer's storage recommendations for the following items that require special attention for winterization:

- Propulsion units—engine, drive unit and exhaust
- Generator and muffler
- Hot water heater
- Air conditioning
- Ice maker
- Refrigerator
- Head and waste system

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. Check the electrolyte level and 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.



RE-ACTIVATING 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
- Hot water heater
- Air conditioning
- Refrigerator
- Ice Maker
- Generator and muffler

It is very important that both the engine and generator fuel systems and their exhaust systems 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.

NOTES

Section 11

Troubleshooting

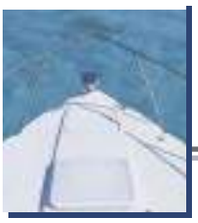
The chart in this section is designed to assist you in locating and repairing minor mechanical, electrical and boat system problems. Special tools and trained personnel may be required to correct some problems. Please have your Formula dealer assist you with service issues.

⚠ WARNING

- **Diesel fuel is flammable. Use caution when handling any fuel.**
- **Use extreme caution whenever 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.**

Engines

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



Symptom	Possible Cause
Engine will not crank	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 engines. Check for bent, broken or damaged propeller. Check for weeds on propeller.
	Engine problem – see your Formula dealer.
Excessive vibration, inboard models	Bent propeller or shaft – see Formula dealer.
	Engine and shaft misaligned – see Formula dealer.
	Engine or transmission touching hull – see Formula dealer.
	Bent rudder – replace rudder.
	Engine-to-shaft coupling out-of-round – have alignment checked.
	Worn strut, engine or transmission bearing – replace bearing.
Engine runs but boat makes little or no progress	Fouled or damaged propeller – shut off engines. Check for weeds on propeller, bent or broken propeller. See your Formula dealer.
Performance Loss	Throttles not fully open – check to see that both throttles open fully at engines.
	Improper fuel – fill tanks with correct fuel.
	Overheating – immediately turn off the engines 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.
Generator will not start	Battery switch in OFF position – turn switch to ON position.
	Engine problem – see Formula dealer.
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	Fresh water pump circuit breaker tripped or in the OFF position – correct or sinks 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

Section 12

Warranty and Service

Each Formula is protected by a combination of original manufacturers' warranties and supplemental product protection, which provides comprehensive coverage for a minimum of five years from the boat's original purchase date. In general, Formula and the boat's major component manufacturers (engines, transmissions, generator) administer warranty for the first year of ownership. Thereafter, a supplemental product protection plan – Formula Guard – takes over, providing extended coverage for many factory-installed accessories and components, including the major components noted above. Following is a general breakdown of warranty coverages:

Item Description	Administrator	Coverage Period
Most component materials and small purchased parts and accessories	Formula (1st year only) and Formula Guard Administrator (years 2-5)	Total of five (5) years
Propulsion system components (engines, outdrives, transmissions), major electronics and appliances (generator, GPS, radar, autopilot, refrigerator, ice maker, etc.	Original Manufacturers (1st year only) and Formula Guard Administrator (years 2-5)	Total of five (5) years (see manufacturers' literature for specifics regarding original warranties' duration)
Materials used in fabrication of Thunderbird-produced canvas products (e.g., cockpit covers, storage coves)	Formula	Two (2) years
Gel coat finish - protection against osmotic blistering, air voids, and crazing/cracking if attributed to manufacturing defect	Formula	Two (2) years
Materials used in fabrication of Thunderbird-produced cockpit seating structures (e.g., vinyl, foam, and thread)	Formula	Five (5) years
Hull and deck structural elements, including stringers, supporting bulkheads, and fiberglass matrix grid systems	Formula	Ten (10) years

THUNDERBIRD LIMITED WARRANTY POLICY

Beginning in model year 2004, FORMULA boats, by THUNDERBIRD PRODUCTS, are warranted to the original retail purchaser for a period of:

- One (1) year – general defects in materials and workmanship, including most materials, components and accessories used in the boat's construction.
- Two (2) years - materials used in the fabrication of any canvas product manufactured by THUNDERBIRD PRODUCTS (i.e., cockpit covers, storage covers).
- Two (2) years – gel coat finish, to include protection against osmotic blistering, air voids, and crazing/cracking if attributed to manufacturing defect.
- Five (5) years - materials (e.g., vinyl, foam, and thread) used in cockpit seating structures manufactured by THUNDERBIRD PRODUCTS.
- Ten-years (10) - hull and deck structural defects. Structural elements include stringers, matrix grid systems, bulkheads, and pultrusions.

Each warranty period listed above begins on the date of delivery to the original retail purchaser. **These warranties exist provided that the purchaser has used, maintained and stored the same in accordance with THUNDERBIRD'S recommendations and procedures described in the FORMULA Owner's Manual.**

During these periods, the warranty repairs shall be made at the dealer's store or service center, or at THUNDERBIRD'S option at the THUNDERBIRD manufacturing plant. Transportation charges on FORMULA boats, if any, to and from the dealer's service center or to and from the THUNDERBIRD manufacturing plant, shall be the sole responsibility of the owner.

This warranty may be transferred to a second or subsequent owner of the boat provided that the second or subsequent owner notifies THUNDERBIRD in writing within 30 days of the change of ownership and pays THUNDERBIRD the established transfer fee. A transferred warranty shall be limited in duration to the 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.
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.

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 THUNDERBIRD. NO OTHER WARRANTIES ARE GIVEN BEYOND THOSE SET FORTH HERIN.

THE WARRANTY PROVIDED HEREIN IS IN LIEU OF ALL OTHER EXPRESS WARRANTIES AND MAY NOT BE EXTENDED OR MODIFIED BY ANYONE. TO THE EXTENT ALLOWED BY LAW, ANY IMPLIED WARRANTIES, INCLUDING ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE ARE LIMITED IN DURATION OF THE WRITTEN WARRANTY. CORRECTION OF NON-CONFORMITIES, IN THE MANNER AND FOR THE PERIODS OF TIME AS SET FORTH ABOVE, SHALL CONSTITUTE FULLFILLMENT OF ALL LIABILITIES OF THUNDERBIRD TO THE PURCHASER WHETHER BASED ON CONTRACT, NEGLIGENCE OR OTHERWISE.

THUNDERBIRD PRODUCTS SHALL NOT, UNDER ANY CIRCUMSTANCES, BE LIABLE FOR INCIDENTAL, CONSEQUENTIAL OR SPECIAL DAMAGES SUCH AS, BUT NOT LIMITED TO: DAMAGE TO OR LOSS OF OTHER PROPERTY OF EQUIPMENT, LOSS OF PROFIT, COST OF PURCHASED OR REPLACEMENT GOODS, CLAIMS OF CUSTOMERS OF THE PURCHASER, FAILURE TO WARN AND/OR INSTRUCT, OR LACK OF SEAWORTHINESS. THE REMEDIES OF THE PURCHASER SET FORTH HEREIN ARE EXCLUSIVE, AND THE LIABILITY OF THUNDERBIRD PRODUCTS SHALL NOT, EXCEPT AS EXPRESSLY PROVIDED HEREIN, EXCEED THE PRICE OF THE GOODS UPON WHICH SUCH LIABILITY IS BASED.

Some states do not allow limitations on how long an implied warranty lasts or the exclusions or limitations of incidental or consequential damages, so the above limitations or exclusions may not apply to you. This warranty gives you specific legal rights and you may have other legal rights, which vary from state to state.

THIS WARRANY DOES NOT APPLY TO THE FOLLOWING:

1. Equipment and accessories not manufactured by THUNDERBIRD (engines, outdrives, generators, refrigerators/ice makers, air conditioning systems, instruments, controls, propellers, and optional electrical equipment are generally covered by warranties of the manufacturer supplying those units);
2. Installation of engines by persons other than THUNDERBIRD, or the misuse, neglect or lack of proper maintenance of the boat.
3. Components that have been altered.
4. Failure of any cockpit cover which has been used while trailering the vessel.
5. Windshield breakages or damage.
6. Cost for haul-out, launch, lift charges, towing, travel time charges and storage costs, and inconveniences or loss of time or income.
7. Any FORMULA boat that is modified for operation, in any contest of speed, acceleration, or endurance whatsoever.
8. Any guarantee whatsoever that a particular boat will achieve a certain level of performance relating to speed, range, fuel consumption or performance characteristics.
9. 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 is considered a commercial vessel.
10. Transportation charges on FORMULA boats, if any, to and from the dealer's service center or to and from the THUNDERBIRD manufacturing plant.

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

NOTE: In addition to the Thunderbird Limited Warranties, ***Formula Guard Extended Protection*** provides transferable supplemental coverage for the propulsion system and many components and accessories on each Formula boat for five years from the date of delivery to the original retail purchaser. See the Formula Guard owner's manual for specific coverage parameters.

The manuals and warranty information for Formula, Formula Guard and major components can be found in the OWNER INFORMATION BINDER included with your boat. For additional information on individual warranties, contact your selling dealer.

NOTES

Section 13

Forms

SERVICE LOG

Date	Hour Reading	Service/Repairs Performed

FUEL LOG

Date	Gallons	Date	Gallons	Date	Gallons	Date	Gallons

FLOAT PLAN

Copy this page and fill out the copy before boating. Leave the filled out copy with a reliable person who can be depended upon to notify the USCG or other rescue organization, should you not return as scheduled. Do not file this plan with the USCG.

Name_____ Telephone_____

Description of Boat: Type _____ Color_____ Trim _____

Registration Number _____

Length _____ Name _____ Make _____

Other Info._____

Persons Aboard: Name Age Address & Telephone

_____

_____

_____

_____

Engine Type: _____ HP _____

No. of Engines: _____ Fuel Capacity: _____

Survival Equipment:

PFDs _____ Flares_____ Mirror _____

Smoke Signals _____ Flashlight _____ Food _____

Paddles_____ Water _____ Anchor _____

Raft or Dinghy _____ EPIRB _____

Radio: Yes _____ No_____ Type _____ Freq _____

Destination_____ Est. Time of Arrival _____

Expect to Return By _____

Auto Type_____ License No. _____ Parked _____

If not returned by _____ call the Coast Guard, or _____

(Local Authority). Coast Guard Telephone Number: _____

Local Authority Telephone Number: _____

USEFUL INFORMATION

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

Owner _____

Home Port _____

Boat Name _____

Selling Dealer _____

Ignition Key Number(s) _____

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 _____

TRANSFER FORM

Interstate National Dealer Services, Inc.
333 Earle Ovington Blvd.
P.O. Box 9340
Uniondale, NY 11553-9340
800-942-0400

WARRANTY TRANSFER APPLICATION

Warranty #:

ORIGINAL WARRANTY HOLDER			NEW WARRANTY HOLDER		
NAME:			NAME:		
ADDRESS:			ADDRESS:		
CITY:	STATE:	ZIP:	CITY:	STATE:	ZIP:
TELEPHONE: ( )			TELEPHONE: ( )		

DESCRIPTION					
YEAR:	MAKE:	MODEL:	HULL ID:	TRANSFER DATE:	ENGINE HOURS:

PLEASE ENCLOSE TRANSFER FEE OF $50.00

IMPORTANT

TRANSFER MUST BE SUBMITTED WITHIN 30 DAYS OF CHANGE OF OWNERSHIP AS SET FORTH IN YOUR WARRANTY

ACKNOWLEDGMENT

I HEREBY DECLARE THAT I HAVE FULLY READ THE TERMS OF THE WARRANTY NAMED ABOVE AND I UNDERSTAND AND ACCEPT ALL OF THE PROVISIONS THEREIN.

Signature of Original Warranty Holder _____ Date _____

Signature of New Owner _____ Date _____

TRANSFER PROCEDURE

Submit the following:

1. **Warranty Transfer Application (above).**
2. **Bill of sale showing sale date and engine hours at time of sale.**
3. **$50.00 check made payable to Interstate National Dealer Services, Inc.**

V-918 (7/06)

NOTES