

# 540 Sundancer®

## *Welcome*

Congratulations on becoming the new owner of the world's most prestigious yacht. We at Sea Ray® Boats, Inc. welcome you into our world-wide and ever-expanding family of boating enthusiasts.

Every journey lets you enjoy the excitement of a new adventure. Your new yacht is more than a boat; it is a way of living. Our organization is dedicated to providing pleasure and fulfillment to your boating experience.

Sea Ray's commitment – Excellence by Design – has enabled us to create a superior craft providing you with comfort, performance, safety and dependability. All of our boats comply with safety standards set by the United States Coast Guard and are designed, engineered and manufactured in accordance with applicable recommendations and guidelines of the National Marine Manufacturers Association (NMMA) and the American Boat and Yacht Council (ABYC).

The Owner's Manual Packet, to be kept on board your Sea Ray, introduces you to all the features which make our boats so incomparable. For years of trouble-free boating, take the time now to carefully review the information in your Owner's Manual Packet and really get to know your boat. **Have everyone who will operate your yacht read this manual.**

The Owner's Manual Packet contains the following:

- **Sea Ray Warranty Statement**  
Read the Sea Ray Warranty Statement so you will be familiar with the terms.
- **Specification Sheet**  
The Specification Sheet lists standard equipment for your boat as well as available optional equipment and useful specifications needed for safe boating.

- **Parts Manual**

The Parts Manual helps you locate items and understand the layout of your Sea Ray.

- **Sea Ray Yacht Owner's Manual**

The Sea Ray Yacht Owner's Manual gives you valuable operating and safety information about your responsibilities as a Yacht owner/operator.

- **Original Equipment Manufacturer (OEM) Information**

This section of your Owner's Manual Packet contains information from the manufacturer of equipment installed on your boat. Examples include the engine, steering and VHF radio. Throughout the Owner's Manual Packet you will be referred to information provided by manufacturers of specific systems.

Because our Product Development and Engineering Division is continually upgrading our products, some descriptions in this manual may differ somewhat from equipment on your boat. If this occurs, please refer directly to the updated information in the accompanying Owner's Manual Packet. If such information is not included, consult your authorized dealer for assistance.

Because your purchase represents a substantial investment, we know you will want to take the necessary measures to protect its value. We suggest you plan a program for proper operation, periodic maintenance and safety inspections. If you have questions which are not fully covered by the Owner's Manual Packet or the manufacturer's instructions, please consult your authorized dealer for assistance.

*Thank you for selecting a Sea Ray®!*

*Bon Voyage*

*Sea Ray* 

## OWNER'S MANUAL PACKET CONTENTS

	Sea Ray Owner's Manual	Sea Ray Specification Sheet	Sea Ray Parts Manual	Engine Operator's Manual	OEM Manual	Sea Ray Owner's Manual Packet
Accident Reporting	X				X	
Alarms	X				X	X
AM/FM Cassette Stereo	X					
Anchoring	X					X
Auto-Pilot System					X	
Battery System	X		X			
Bilge Layout			X*			
• Bilge Blower	X				X	
• Bilge Pump	X				X	
Canvas	X		X			
Capacity Plate	X		X			
Carbon Monoxide	X					
Certifications	X					
Cleaning	X				X	
Cockpit						
Communication Equipment	X				X	
Compass	X				X	
Console	X		X			
Construction Standards	X					
Controls	X					
Depth Finder					X	
Dimensions		X				
Drains	X		X			
Education	X					
Electrical System	X		X			
Electrolysis	X					
Emergency Engine Shutdown	X				X	
Emergency Procedures	X					
Engine	X			X		
Environmental Considerations	X					
Equipment:						
• Recommended	X					
• Required	X					X
• Standard		X				
Fire	X					
Fire Suppression Equipment	X				X	X
Flame Arrestor				X		X
Flooding, Swamping	X					
Fuel System	X			X	X	
Gauges	X					
Gear Shift	X			X		
Global Positioning System (GPS)					X	
Graphics			X			
Head System	X		X			
Homologations (International)	X					
Hotlines (Safety)	X					X
Identification Numbers	X					
Ignition	X			X		
Ignition Protection	X			X		
Impaired Operation	X					X
Instrument Use & Calibration	X			X	X	










































	Sea Ray Owner's Manual	Sea Ray Specification Sheet	Sea Ray Parts Manual	Engine Operator's Manual	OEM Manual	Sea Ray Owner's Manual Packet
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Lifting	X					
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Lights	X		X			
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Operation	X					
Optional Systems						
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Propulsion				X		
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Registration						X
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Switches						
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Through-Hull Fittings	X					
Trim Tabs	X		X			
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Warning Labels	X		X			
Warranty						X
Water System	X		X			
Weight		X				
Winterizing	X				X	
Wiring Schematics					X	

To replace any material from the Owner's Manual Packet, contact your Sea Ray® dealer.

Information in this publication is based upon the latest product specifications available at printing. Sea Ray Boats, Inc. reserves the right to make changes at any time, without notice, in the colors, equipment, specifications, materials and prices of all models, or to discontinue models. Should changes in production models be made, Sea Ray® is not obligated to make similar changes or modifications to models sold prior to the date of such changes.

\* If available at the time of publication of the manual.

## KEY TO SYMBOLS ON PRINTS

 PROPULSION SYSTEM TRIM	 PROPULSION SYSTEM TRIM BOW UP	 PROPULSION SYSTEM TRIM BOW DOWN	 TRIM TAB TRIMMING OPERATION	 SINGLE LEVER CONTROL (THROTTLE & SHIFT)	 CONTROL LEVER OPERATING DIRECTION
 LIFT POINT OR PROPER LOCATION OF SLING	 ENGINE START	 ENGINE STOP	 FUEL LEVEL	 FUEL FILTER	 ENGINE
 ENGINE COOLANT	 ENGINE (COOLANT) WATER JACKET TEMPERATURE	 ENGINE OIL PRESSURE	 WARNING ELECTRICAL HAZARD	 FIRE RISK	 NO OPEN FLAME NO SMOKING
 ROTARY CONTROL (QUANTITY INCREASES WITH WIDTH OF SYMBOL)	 FRESH WATER BASED COOLANT	 LEADED FUEL	 UNLEADED FUEL	 OIL	 WASTE WATER/ SEWAGE
 FUEL, GENERAL	 DIESEL FUEL	 LIFT POINT	 ELAPSED TIME	 ENGINE ROTATIONAL SPEED	 BILGE PUMP
 BILGE BLOWER	 PROPELLER	 INTERIOR LIGHT	 RUNNING LIGHTS UNDER POWER	 ANCHOR LIGHT	 WINDSHIELD WIPER
 WINDSHIELD WASHER	 WINDSHIELD WIPER AND WASHER	 COMPASS	 ANCHOR	 HORN	 BATTERY



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# Section 1 • General

## CERTIFICATIONS & SPECIFICATIONS

### MANUFACTURER'S CERTIFICATIONS

A **CE mark** means that your Sea Ray® Yacht has been certified with applicable International Organization for Standardization directives.

**NMMA certification** means that your Sea Ray® Yacht has been judged by the National Marine Manufacturers Association to be in compliance with applicable federal regulations and American Boat and Yacht Council standards.

The following information is furnished in compliance with ISO directives and RSG guidelines in effect as of the date of publication of this manual. Sea Ray® will provide additional information if standards are amended.

### MANUFACTURER'S SPECIFICATIONS

Sea Ray® provides specific information about your boat in compliance with ISO 10240, American Boat and Yacht Council (ABYC) Technical Report T-24 and other applicable standards and directives. The following is included in the Owner's Manual Packet supplied with the boat.

- Warranty Terms & Conditions
- Hull Identification Number
- Engine/Transmission Serial Numbers
- Type of Boat/Series Name
- Dimensions – Feet (Meters):
  - Length
  - Beam
  - Vertical Clearance
  - Draft
- General Arrangements:
  - Deck Plan
  - Interior Plan
  - Profile
- Propulsion:
  - Engine Type
  - Propeller
  - Shafting
- Electrical:
  - Rated Amperage
  - Voltages – Frequency – Phases
  - Battery Capacity
  - Switches, Fuses, Circuit Breakers (location, type)
  - Wiring Diagrams
- Lightning Protection System
- Tank Capacities – Gallons (Liters):
  - Fuel
  - Fresh Water
  - Holding Tanks
- System Diagrams:
  - Water
  - Fuel
  - Exhaust
  - Ventilation
  - Bilge Pumping
  - Steering
  - Engine Cooling
- Stability/Flotation Capability
- Strong Points for Docking & Lifting
- Warning Labels, Part Numbers & Ordering Procedure
- Standard Equipment
- Optional Equipment
- Reference Manuals for Other Equipment
- Contacting Manufacturers of Other Systems
- Contacting Factory Service Department
- Construction Features
- Construction Standards

## INTRODUCTION

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

If you are not familiar with the Sea Ray® Yacht, for your own comfort and safety, please ensure that you obtain handling and operating experience before taking command. Your dealer or yacht club can direct you to sources of instruction.

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

## WARRANTY & CONSTRUCTION STANDARDS

Sea Ray® provides a Warranty Statement describing terms and conditions under which defects in your boat will be repaired. Familiarize yourself with the warranty and follow instructions regarding proper operation and maintenance. Lack of attention to instructions can void the warranty.

Sea Ray® also provides a Construction Standards Statement detailing industry standards followed in building your boat (see the *Welcome* page at the beginning of the manual). Consult your marine dealer for additional information.

## REGISTRATION

Register your boat in the state where it is used most frequently. Many states require additional registration when an out-of-state boat is used within their boundaries. Contact state boating authorities or your marine dealer for registration requirements and forms.

## EDUCATION

Learn how to operate your boat safely. This book cannot teach everything you need to know. We strongly urge you to get training in proper boat handling and navigation before taking command.

Some agencies which offer boating courses are:

- U.S. Coast Guard Auxiliary
- United States Power Squadrons
- Canadian Power and Sail Squadrons

- Red Cross
- State Boating Offices
- Yacht Clubs

Ask your marine dealer or check your telephone directory for agencies near you. Information is also available from the Boat U.S. Foundation by calling 1-800-336-BOAT. **International owners/operators should consult their marine dealer.**

Many books provide information that is valuable to you as a boat owner/operator. A book that is considered to be the most well-rounded is ***Chapman – Piloting, Seamanship and Small Boat Handling*, by Elbert S. Maloney**, published by Hearst Marine Books. In addition, there are many free pamphlets available from your local Coast Guard Auxiliary. It is highly recommended that you read additional publications other than just this owner's manual to become a well-informed boat owner/operator.

## DEALER RESPONSIBILITIES

Although your boat has undergone a series of rigid inspections throughout the manufacturing process, the final factory check is not the last one before you take delivery. Your dealer must perform additional pre-delivery checks and service your Sea Ray® in preparation for delivery. Dealer responsibilities include providing:

- An adequate orientation in the general operation of your Sea Ray® boat.
- An "In Service Form" to be completed and signed by both the dealer and the consumer after inspection of boat by consumer.
- An explanation of safety considerations regarding the use of containment systems and components.
- A complete Owner's Manual Packet containing literature and information regarding your Sea Ray® boat and its separate warranted products, warranty and registration cards, and operation, installation and maintenance instructions.
- A review of all warranties, pointing out the importance of mailing warranty and registration to various manufacturers within the required time limits, and assistance in accomplishing same.
- Instructions on obtaining local and out-of-area service during and out of warranty periods.

## OWNER/OPERATOR RESPONSIBILITIES

The owner/operator is responsible for examining the boat before accepting delivery to ensure all systems are working properly. In addition, the owner/operator is responsible for understanding and complying with

the following procedures and operational requirements:

- State registration
- Warranty registration
- Warranty terms and conditions
- Rules of the road
- Break-in procedure
- Return boat to dealer for inspection after 50 hours of operation in salt water, 100 hours fresh water, or at the end of the first year, whichever comes first
- Proper maintenance of boat and its systems
- Safety equipment
- Safety training of passengers and crew
- Insurance
- Knowledge of boat systems
- Seaworthiness/operational inspection
- Safe operating practices
- Avoiding use of drugs/alcohol
- Environmental regulations
- Accident reports
- Assistance to other boaters

## PARTS & EQUIPMENT

Personal equipment and supplies accumulated on a boat can amount to a great deal more weight than the owner realizes, and may result in a loss of speed. Keep such weight to a reasonable minimum. When accessories or extra items are added, consider their weight and select their location to maintain the desired trim of the boat, fore, aft and athwartship. A drop in RPM will be noted as weight is added, and it may be advisable to change propeller size to compensate. Because of these variables, Sea Ray® cannot guarantee performance standards such as speed. Consult your Sea Ray® dealer when considering the addition of a major weight.

Replacement parts or additional equipment may be purchased through your Sea Ray® dealer.

## NAUTICAL TERMS

**Abeam** – object 90 degrees to center line on either side of boat.

**Abaft** – a point on a boat that is aft of another.

**Aft** – toward the rear or stern of the boat.

**Beam** – the width of a boat.

**Bow** – the fore part of a boat.

**Bulkhead** – vertical partition in a boat.

**Chine** – meeting juncture of side and bottom of boat.

**Chock** – deck fitting, used as guides for mooring or anchor lines. Also, a wedge to stop wheels from rolling.

**Cleat** – deck fitting with arms or horns on which lines may be made fast.

**Cockpit** – an open space from which a boat is operated.

**Deck** – upper structure which covers the hull between gunwales.

**Draft** – depth of water required to float boat and its propulsion system.

**Fathom** – six feet.

**Fenders** – rope or plastic pieces hung over the side to protect the hull from chafing.

**Freeboard** – height of exposed hull from water line to deck.

**Ground tackle** – general term referring to anchors, anchor lines, etc.

**Gunwale** (pronounced gun'l) – meeting juncture of hull and deck.

**Hatch** – an opening in deck to provide access below.

**Head** – toilet or toilet area in a boat.

**Headroom** – vertical distance between the deck and cabin or canopy top.

**Helm** – steering console.

**Hull** – the basic part of a boat that provides buoyancy to float the weight of the craft and its load.

**Keel** – the major longitudinal member of a hull; the lowest external portion of a boat.

**Knot** – unit of speed in nautical miles per hour.

**Lee** – the side that is sheltered from the wind.

**Port** – term designating left side of the boat.

**Scupper** – hole permitting water to drain overboard from deck or cockpit.

**Sheer** – curve or sweep of the deck as viewed from the side.

**Snub** – to check or tighten a line suddenly.

**Starboard** – term designating right side of the boat.

**Stern** – the aft end of a boat.

**Stern drive** – outboard unit of an inboard/outboard (I/O) engine installation.

**Stringer** – longitudinal members fastened inside the hull for additional structural strength.

**Transom** – transverse part of stern.

**Wake** – disturbed water that a boat leaves behind as a result of forward motion.

**Windward** – toward the direction from which the wind is blowing.

## SAFETY

The freedom of boating is a magnificent feeling. However, fun can be overtaken by disaster if you ignore safety precautions. This manual presents basic guidelines, but it cannot describe every possible risk you may encounter. You are strongly urged to:

- Take a boating safety course.
- Get hands-on training from your boat dealer.
- Regularly review safety requirements.
- Maintain your boat and its systems.
- Have your boat inspected at least annually by a qualified mechanic or dealer.

## EXPLANATION OF SAFETY PRECAUTIONS



### DANGER

**DANGER** – Immediate hazards which **WILL** result in severe personal injury or death if the warning is ignored.



### WARNING

**WARNING** – Hazards or unsafe practices which **COULD** result in severe personal injury or death if the warning is ignored.



### CAUTION

**CAUTION** – Hazards or unsafe practices which could result in minor injury or product or property damage if the warning is ignored.

### NOTICE

Information which is important to proper operation or maintenance, but is not hazard-related.

This book contains safety precautions which must be observed when operating or servicing your boat. Review and understand these instructions.



## FIRE

Fire is always serious, but it usually can be brought under control if you are prepared and act quickly. Extinguishers required by the Coast Guard or other boating law enforcement agency are only the minimum needed. Install fire extinguishers where they might be needed, and test equipment and emergency plans regularly.

Prevention is the safest method of fighting fires. Remember:

- Use extreme caution while fueling.
- Refrain from smoking while fueling.
- Use only marine safety-approved cooking and heating systems.
- Open flames demand constant attention.
- Run exhaust blowers at least 4 minutes before starting engine.
- Use “sniff test” to check for fumes in bilge and engine compartment.
- Store flammable material in safety-approved containers.
- Keep flammable material containers in a locker, sealed from the interior of the boat and vented overboard.
- Ensure ventilation systems are unobstructed.
- Remove canvas before starting engine.
- Ensure fuel does not leak.
- Extinguish smoking material carefully.
- Use special care with flames or high temperature near urethane foam.
- Check cleaning products for flammability.
- Ventilate when cleaning or painting.
- Disconnect electrical system from its power source before performing maintenance. (See *Section 7 – Electrical*.)
- Replace breaker or fuse with same amperage device.
- Electrical appliances must be within the rated amperage of boat circuits.
- Observe the boat carefully while the electrical system is energized.
- Only a qualified marine electrical technician may service the boat’s electrical system.



## FIRE SUPPRESSION EQUIPMENT

### General

- Fire suppression equipment can be either fixed or portable. Fixed systems are located in machinery compartments. They should be supplemented by portable extinguishers mounted at key sites, for example, near the engine compartment, galley and helm.
- Coast Guard or other boating law enforcement agency regulations govern the number and type of devices on board. (See *Safety – Minimum Required Equipment*.)

### Fixed System

- Fire extinguishant is installed permanently in one or more machinery spaces. In the event of a fire, a sensor releases fire-killing extinguishant in the compartment.
- Fixed system is wired to the ignition and turns on with the engine.
- An indicator light on the dash is lit when the fire suppression system is available. The light goes out when the system discharges.
- See *Section 8 – Automatic Fire Extinguisher System*.

### Portable Extinguishers

Fire extinguishers are classified according to fire type:

- “A” – Combustible solids (wood, plastic)
- “B” – Flammable liquids (oil, gasoline)
- “C” – Electrical fires

Sizes are identified by Roman numerals – from I (smallest) to V (largest). Small size provides only a few seconds of firefighting capability.

Test fire extinguishers according to manufacturer’s instructions. Do not test by squirting small amounts of the agent; the extinguisher might not work when needed.

## FLOODING, SWAMPING

Flooding or swamping can be caused by many factors. Operator disregard for hazardous weather and water conditions is one of the most common causes, along with improper loading, handling and anchoring. Be aware of the possible consequences of your actions. Have everyone wear a personal flotation device when boating.

Remember:

- Ensure proper bilge pump operation.
- Anchor from bow if using only one anchor.
- Match speed to sea conditions.
- Adjust trim and close openings in rough weather.
- Reverse engine only when headway slows to prevent following sea from swamping boat.
- Operate boat within maneuvering speed limitations.

## LIFESAVING EQUIPMENT

Wear a personal flotation device (PFD) when boating. Boat operators are required to carry one wearable personal flotation device (Type I, II, III or V) for every person on board. Boats must also have at least one throwable device (Type IV). Classifications of PFDs are:

- Off-Shore Life Jacket (Type I) – most buoyant, it is designed to turn an unconscious person face up; used in all types of waters where rescue may be slow.
- Near-Shore Life Vest (Type II) – “keyhole” vest with flotation-filled head and neck support is also designed to turn a person face up, but the turning action is not as pronounced; used in calm, inland waters or where quick rescue is likely.
- Flotation Aid (Type III) – vest is designed so conscious wearers can turn face up; often designed for comfort while engaged in sports such as skiing.
- Throwable Devices (Type IV) – horseshoe buoys, ring buoys and buoyant cushions are designed to be grasped, not worn.
- Special-Use Devices (Type V) – sailboat harnesses, white-water vests, float coats, and hybrid vests which have minimum inherent buoyancy and an inflatable chamber.

When purchasing PFDs, look for an attached tag saying they are approved by the U.S. Coast Guard or by your national boating law enforcement agency.

Children and non-swimmers must wear PFDs at all times when aboard. All passengers and crew should wear them, since a loose PFD is often useless in an emergency. The law requires that PFDs, if not worn, must be readily accessible, that is, removed from storage bags and unbuckled. Throwable devices must be readily available, that is, right at hand. The operator is responsible for instructing everyone aboard on their location and use.

Size PFDs for the wearer. Children require special attention.

Test PFD buoyancy at least once a year.



## IMPAIRED OPERATION

Give special attention to the effects of alcohol and drugs while boating. No other single factor is involved in so many marine accidents and deaths. Wind, waves and sun heighten the effects of alcohol and drugs, so your reactions may be quickly impaired. Laws are stricter today than in the past, and enforcement is tougher on those who use alcohol and drugs when boating.



### WARNING

**CONTROL HAZARD** – Federal laws prohibit operating a boat while under the influence of alcohol or drugs. These laws are vigorously enforced.

## LOAD CAPACITY

- The number of seats does not necessarily indicate how many people a boat can carry safely.
- When operating on-plane (above idle speed), carry no more passengers than there are real seats, and insist that passengers sit down in those seats.
- Do not permit passengers to ride on parts of your boat not designed for such use.



### DANGER

**EXTREME HAZARD** – Do not use sun pads (if equipped) while craft is underway.

- Overloading, improper loading and distribution of weight are significant causes of accidents. Give yourself an extra margin of safety in rough water.

## LOAD CAPACITY

### (European Certified Vessels)

- The builder's plate, attached near the helm, states the maximum number of persons and the maximum weight the boat will handle safely under normal conditions.
- Overloading violates regulations. Do not carry more weight or passengers than indicated on the builder's plate.
- The presence of the builder's plate does not relieve the owner/operator from responsibility for using common sense and sound judgement.

## POWER CAPACITY

### (European Certified Vessels)

Do not exceed the maximum engine power rating stated on the builder's plate attached to your boat.

## STABILITY

- Stability may be substantially reduced if equipment is added to the superstructure.
- Stability is substantially reduced by loose fluids or weight within the hull. Keep bilge area as dry as possible, and close openings in rough weather.

## BOARDING

- Board only one person at a time.
- Load gear after you are aboard. Carrying gear while boarding can make you lose balance.



### WARNING

**STABILITY HAZARD** – Load boat properly. The manufacturer's load rating is the maximum allowed under normal conditions. Adjust downward if weather, water or other conditions are adverse.

**Allow passengers to ride only in areas that do not pose a hazard to themselves or the boat.**

**Passengers should remain seated while boat is moving.**



### WARNING

**SLIPPING HAZARD** – Wet decks are slippery. Wear proper footwear and use extreme caution on wet surfaces.

- Distribute weight evenly.
- Instruct passengers where to sit during on-plane operation to reduce possibility of falling overboard during high speed maneuvers.
- If gear is not immediately needed, stow it in secure area.
- Safety gear must be immediately accessible at all times.
- Children and non-swimmers must wear PFDs at all times when aboard. All passengers and crew should wear them, since a loose PFD is often useless in an emergency. The law requires that PFDs, if not worn, must be readily accessible, that is, removed from storage bags and unbuckled. Throwable devices must be readily available, that is, right at hand. The operator is responsible for instructing everyone aboard on their location and use.

## MANEUVERING/MAINTAINING CONTROL

### DANGER

**EXTREME HAZARD** – Ensure adequate ventilation. Gasoline powered engines produce odorless, colorless carbon monoxide gas (CO). Prolonged exposure can cause serious injury or death. Symptoms include dizziness, nausea, drowsiness. To reduce accumulation of CO, increase air movement by opening windows or adjusting canvas. The following conditions require special attention:

- Operating at slow speed or dead in the water.
- Operating with the bow high.
- Operating engine in confined spaces. Be aware of possible CO from nearby boats in a confined docking area.
- Using canvas curtains.
- Blocking hull exhausts.
- Winds blowing exhaust toward boat occupants.

### WARNING

#### CONTROL HAZARD

- A qualified operator must be in control of the boat at all times.
- Always operate boat within maneuvering speed limitations.
- Exercise constant attention to the boat's direction when underway.
- Always keep a firm grip on the steering control.

### WARNING

#### PERSONAL INJURY HAZARD

- When underway, keep passengers clear of areas not designed for riding. Especially hazardous areas include seat backs, bow, gunwale, transom platform and fore and aft decks.

### WARNING

#### SPEED HAZARD

- Operate boat at speeds within ability to maintain control and react if an emergency occurs.
- Reduce speed at night, in congested waterways and when weather and sea conditions warrant.
- Watch your wake. It might capsize a small craft. You are responsible for damage caused by your wake.

### WARNING

**COLLISION HAZARD** – Turn on navigation lights at night and in other reduced visibility situations, and cruise at reduced speed to allow time to avoid dangerous situations.

## General Considerations

- You are responsible for passengers' actions. If they place themselves or the boat in danger, immediately correct them.
- Know how your boat handles under different conditions. Recognize your limitations and the boat's limitations. Modify speed in keeping with weather, sea and traffic conditions.
- Instruct passengers on the fundamentals of operating your boat in case you are unable to do so.
- Instruct passengers on location and use of safety equipment and procedures.

## Visibility

- Law requires the operator to "maintain a proper lookout by sight (and hearing)."
- Operator must insist on unobstructed vision, particularly to the front. Move passengers or load if they block the view when the boat is above idle speed.
- Post a lookout to watch for obstacles when visibility from the helm is limited due to operating conditions.

## **WARNING**

### **VISIBILITY HAZARD**

- Designate a lookout to watch for obstacles and other vessels when the field of vision from the helm is limited due to operating conditions.
  - Keep visibility clear. Move passengers if they obstruct operator's view.
- Be sure that other boats or objects are not in the way before making quick turns.

### **Trimming**

- Hydraulic tabs at the transom control trim. Use short bursts of rocker switches to adjust trim tabs. Pushing switches too far at once may cause sudden steering problems. Adjusting one trim tab more than the other will adjust list caused by improper storage, too many people on one side or a strong cross wind.

### **Swimming, Skiing, Diving**

- Do not swim from a moving boat.

## **WARNING**

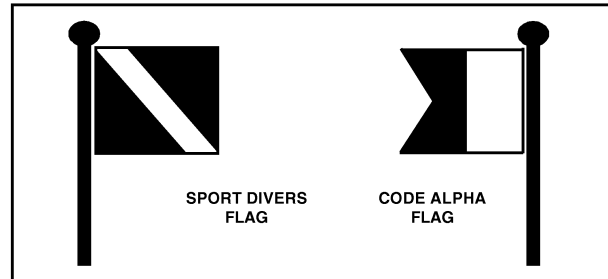
### **PERSONAL INJURY HAZARD**

- Keep clear of areas designated for swimming, skiing or diving. Recognize markers used for such areas.
  - When engine is running, close and lock transom door and do not use boarding ladder and swim platform.
- Many areas prohibit swimming from boats except in designated areas.
  - Make sure boat's engine is turned off before allowing people to swim anywhere near your boat. Shut the engine OFF and remove the key from the ignition switch so that nobody will accidentally start the engine while swimmers are nearby.
  - Turn off engine when taking swimmers or skiers aboard or when putting them overboard. Never permit use of the transom swim platform while engine is running.
  - Slow down and exercise extreme caution when cruising in an area where there might be swimmers or skiers in the water.
  - Never drive the boat directly behind a water skier. At 22 knots (25 m.p.h.), it takes only 5 seconds to overtake a fallen skier who was 60 meters (200 feet) in front.

- Keep a downed skier in sight and on the operator's side of the boat when approaching the skier. Never back up to anyone in the water.
- Recognize and respect diving flags. Keep at least 30 meters (100 feet) away.

**Sport Divers Flag** – Red flag with diagonal white stripe marks a diver in the water.

**Code Alpha Flag** – Blue and white pennant designates boat being used in dive operations.



(fig. 1.8.1)

## **WARNING**

**COLLISION HAZARD** – Use extra caution when underwater/floating objects may be present. Hitting an object at high speed or severe angle can seriously injure people and damage your boat. Use extreme care when operating in shallow water or when operating in reverse.

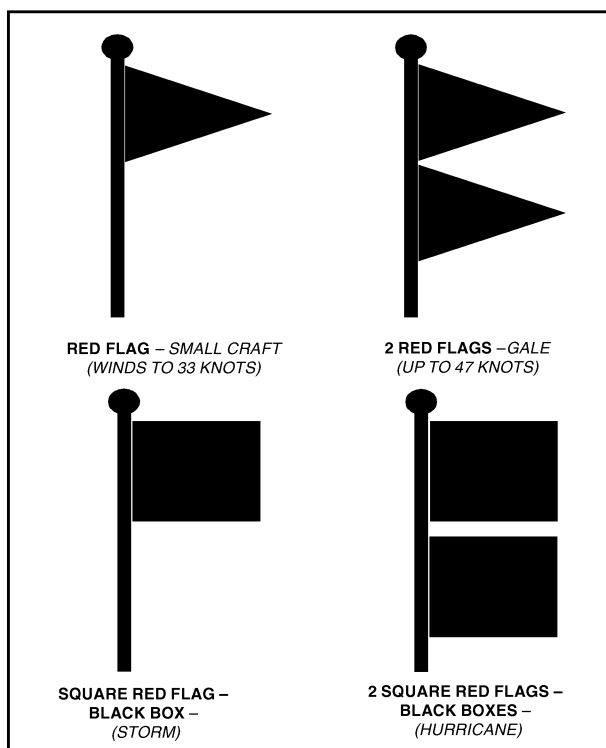
### **Operating In Shallow Water**

- Shallow water presents obvious hazards. In addition to insufficient draft, shallow means sand bars, stumps, or other unmarked obstructions in deep water.
- Other hazards in shallow water include mud, sand, weeds and debris, which can foul your engine's cooling water intakes.
- Know the area in which you are operating. Consult charts and ask local boaters. If you know or suspect shallow water, post a lookout and proceed slowly.

## **WEATHER**

Learn to understand weather patterns and signs of change. Bad weather and sea conditions can cause an uncomfortable and unsafe situation. Here are a few basic weather-related rules:

- Learn storm signals and be guided accordingly.
- Check the forecast and sea conditions before leaving and while underway.
- A sudden change in wind direction or speed or an increase in wave height indicates deteriorating weather.
- Wear a personal flotation device.
- If a storm approaches, immediately seek a safe harbor.
- If a storm hits, have everyone sit low in the boat. Head the bow into the wind with enough power to maintain slow headway.
- If you encounter fog, determine your position, set a safe course, slow down and alert other boats of your presence with a sound signal.
- The best lightning protection is a properly grounded lightning rod that is high enough to provide a protective umbrella over the hull. Lightning will seek a ground when it strikes. Stay clear of the lightning rod, all attached wiring and all metal parts of the boat.
- If a lightning storm approaches, the safest action is to dock and disembark. If you cannot return to shore, seek shelter **inside** the boat and remain there until the storm passes.
- **Stay out of the water during a lightning storm.** If caught swimming during a storm, get back into the boat and remain there until the storm passes.



(fig. 1.9.1)

## FLOAT PLAN

- File a float plan with a friend or relative about where you intend to cruise. Give a good description of the boat. Advise of any changes in cruise plans.
- These precautions will enable your friend or relative to tell the Coast Guard or your national boat agency where to search for you and what type of boat to look for if you fail to return.
- Advise the same person when you complete your trip to prevent false alarms about your safety.

## WARNING LABELS

Warning labels are mounted at key locations to advise you of safety precautions when operating or servicing equipment. Do not remove or cover warning labels. Replace when illegible. See the Parts Manual for replacement part numbers and ordering procedure.

## ACCIDENT REPORT

The U.S. Coast Guard and state agencies require a report to be filed by the operator of a boat involved in an accident involving loss of life, disappearance, injury requiring treatment beyond first aid, loss of boat or property damage exceeding \$500. Contact the state boating agency where the accident occurs for a copy of the state's accident report form. In the absence of a state enforcement agency, contact the Coast Guard office nearest the accident site. Other countries have other reporting requirements. Consult your nation's boating law enforcement agency.

## SAFETY HOTLINES

The Coast Guard offers many pamphlets on safety and other information not covered in this book. Contact your local Coast Guard unit or call these toll-free safety hotlines:

- U.S. Coast Guard 1-800-368-5647
- Canadian Coast Guard 1-800-267-6687

**In other countries, ask your marine dealer how to contact the national boating law enforcement agency.**

## ADDITIONAL RECOMMENDED EQUIPMENT

A wise boater will include many of the following items:

- Visual distress signals for day and night use (required in some areas; consult local regulations)
- Marine radiotelephone
- Charts of your intended cruising area
- Spare keys
- Emergency position-indicating radio beacon
- Portable radio with weather band
- Waterproof flashlight(s)
- Extra batteries
- Mooring lines
- Fenders
- Lead line
- Ground tackle (at least 2 anchors, rode, shackles)
- Boat hook
- Manual bilge pump
- Spare parts kit (spark plugs, fuses, etc.)
- Instruction manuals for engine and accessories
- First aid kit
- Tool kit:
  - Assorted screwdrivers (Phillips and flat blade)
  - Pliers (regular, vise-grip, and water pump)
  - Wrenches (box, open-end, allen, adjustable)
  - Socket set (metric or U.S. standard as appropriate)
  - Electrical tape

## MINIMUM REQUIRED EQUIPMENT

Consult your national boating law enforcement agency.

<b>EQUIPMENT</b>	<b>CLASS A</b> (Less than 4.8 meters [16 feet])	<b>CLASS 1</b> (4.8 to less than 7.9 meters [16 to less than 26 feet])	<b>CLASS 2</b> (7.9 to less than 12.2 meters [26 to less than 40 feet])	<b>CLASS 3</b> (12.2 to less than 19.8 meters [40 to less than 65 feet])
<b>Bell, Whistle</b>	Some means of making efficient sound signal, for example, whistle or air horn <b>and</b> a bell audible for .5 nautical mile.			
<b>Fire Extinguisher -Portable</b> (if <u>no fixed fire extinguishing system</u> is installed in machinery spaces)	At least one (ABYC recommends two for boats 4.8 to less than 7.9 meters [16 to 26 feet]) B-I type Coast Guard approved portable marine fire extinguisher. (Not required on outboard motor boats less than 7.9 meters [26 feet] in length without permanently installed fuel tanks and not carrying passengers for hire, provided construction of boat will not permit entrapment of explosive or flammable gases or vapors.)		At least two (ABYC recommends at least three) B-I type approved portable marine fire extinguishers, or at least one B-II type Coast Guard approved portable marine fire extinguishers.	At least three (ABYC recommends at least four) B-I type approved portable marine fire extinguishers, or at least one B-I type plus one B-II type Coast Guard approved portable marine fire extinguisher.
<b>Fire Extinguisher -Portable</b> (if <u>fixed fire extinguishing system is installed</u> in machinery spaces)	None	None	At least one B-I type approved portable marine fire extinguisher.	At least two B-I type approved portable marine fire extinguishers, or at least one B-II type Coast Guard approved portable marine fire extinguisher.
<b>Lights</b>	Required between sunset and sunrise or in reduced visibility.			
<b>Muffling</b>	Efficient muffling device or system to prevent excessive or unusual engine noise.			
<b>Personal Flotation Devices (PFDs)</b>	One Coast Guard approved Type I, II or III device for each person aboard, plus one throwable Type IV device. Type V device is acceptable if worn for approved use. Always wear a PFD when boating.			
<b>Ventilation</b>	Boats with closed compartments or permanently installed fuel tanks must be equipped with an efficient natural or mechanical bilge ventilator or meet applicable Coast Guard construction standards for fuel and electrical systems.			

## ENVIRONMENTAL CONSIDERATIONS

### FUEL & OIL SPILLAGE

Regulations prohibit discharging fuel or oily waste in navigable waters. Discharge is defined as any action which causes a film, sheen or discoloration on the water surface, or causes a sludge or emulsion beneath the water surface. A common violation is bilge discharge. Use rags or sponges to soak up fuel or oily waste, then dispose of it properly ashore. If there is much fuel or oil in the bilge, contact a knowledgeable marine service to remove it. Never pump contaminated bilge overboard. Help protect your waters.

Fill tank(s) less than rated capacity. Allow for fuel expansion.

### WASTE DISPOSAL



#### CAUTION

**Do not place facial tissues, paper towels or sanitary napkins in head. Such material can damage the waste disposal system and the environment.**

#### NOTICE

- **There is a possibility of being fined for having an operable direct overboard discharge of waste in some waters. Removing seacock handle, in closed position, or other means must be used to avoid fine.**
  - **It is illegal for any vessel to dump plastic trash anywhere in the ocean or navigable waters of the United States.**
- Many areas prohibit overboard sewer discharge. Close and disable flow-through waste systems to prevent discharge in such areas.
  - Bag all refuse until it can be disposed of ashore. Regulations prohibit disposal of plastic anywhere in the marine environment and restrict other garbage disposal within specified distances from shore.
- The Coast Guard is requiring any ocean-going boats 40 feet or larger to have a written "waste management" plan on board. While the requirement is aimed at commercial and passenger ships, there is no exception for recreational boats. "Ocean-going" means any boat going beyond the three-mile coastal

U.S. boundary. The written plan can be as simple as:

"All vessel refuse is placed in trash bags which are stored on board until they can be disposed of in dumpsters on shore. This policy is reviewed by all crew and passengers. The person in charge of carrying out the plan is:

Name: \_\_\_\_\_

### EXCESSIVE NOISE

Many areas regulate noise limits. Even if there are no laws, courtesy demands that boats operate quietly.

### WAKE/WASH



#### WARNING

**SPEED HAZARD - Watch your wake. It might capsize a small craft. You are responsible for damage caused by your wake.**

Power boat wakes can endanger people and vessels. Each power boat operator is responsible for injury or damage caused by the boat's wake. Be especially careful in confined areas such as channels or marinas. Observe "no wake" warnings.

### EXHAUST EMISSIONS

You can be overcome by fumes from your own engine or generator or from neighboring boats. Ensure continuous movement of fresh air.



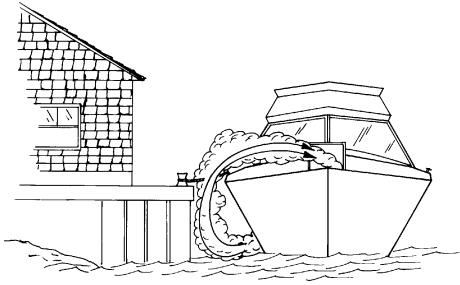
#### DANGER

**EXTREME HAZARD – Ensure adequate ventilation. Gasoline engines produce carbon monoxide gas (CO). Prolonged exposure can cause serious injury or death. To reduce CO accumulation, increase air movement by opening windows or adjusting canvas. The following conditions require special attention:**

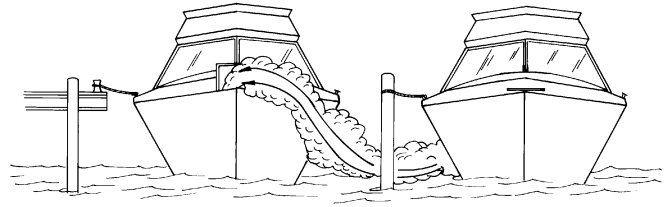
- **Operating at slow speed or dead in the water.**
- **Operating with the bow high.**
- **Operating engine and/or generator in confined spaces.**
- **Using canvas curtains.**
- **Blocking hull exhausts.**
- **Winds blowing exhaust toward boat occupants.**



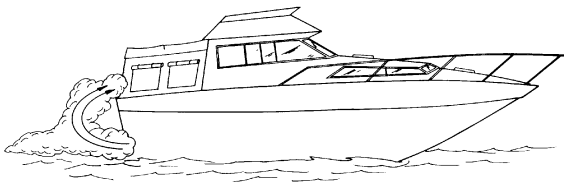
## EXAMPLES OF HOW HIGH LEVELS OF CARBON MONOXIDE MAY ACCUMULATE



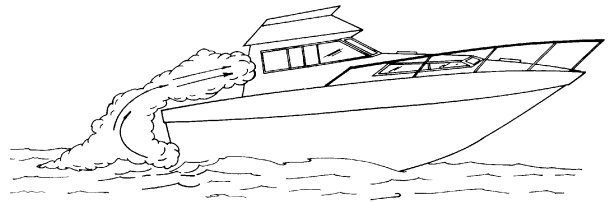
Blocking hull exhausts. Operating at slow speed or dead in the water. (fig 1.13.1)



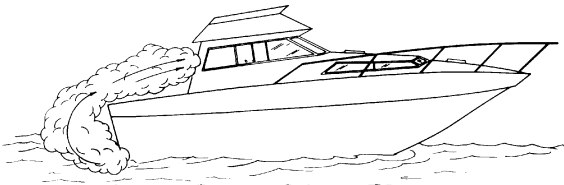
Operating engine and/or generator in confined spaces. (fig 1.13.4)



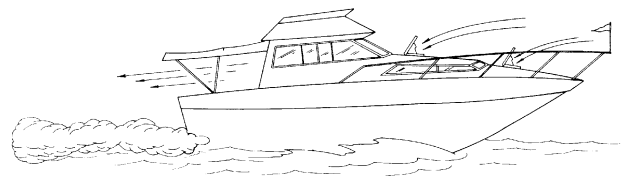
Using canvas curtains. (fig 1.13.2)



Operating with the bow high. (fig 1.13.5)



Winds blowing exhaust toward boat occupants. (fig 1.13.3)



Good ventilation. (fig 1.13.6)

## PAINT, CLEANING AGENTS & OTHER SUBSTANCES



### WARNING

**EXPLOSION/FIRE HAZARD – Ventilate when painting or cleaning. Ingredients may be flammable/explosive.**

### NOTICE

**Refer to cleaning product manufacturers' specifications and directions before use.**

Common household cleaning agents may cause hazardous reactions. Fumes can last for hours, and chemical ingredients can attack people, property and the environment. Avoid products containing chlorine, phosphates, perfumes and non-degradable ingredients.

Consult your marine dealer about environmental regulations before painting the hull.

## EMERGENCY PROCEDURES

The time to think about emergencies is before they happen. Plan ahead. Know what to do before you encounter any of these situations. **Wear a PFD when boating.**



### WARNING

#### EXPLOSION/FIRE/ASPHYXIATION

- Open flame cooking appliances consume oxygen. This can cause asphyxiation or death.
- Maintain open ventilation.
- Liquid fuel may ignite, causing severe burns.
- Use fuel appropriate for type of stove.
- Turn off stove burner before filling.
- Do not use stove for comfort heating.



### WARNING

**FIRE/ASPHYXIATION HAZARD** – Use special care with flames or high temperature near urethane foam used in construction of your boat. Burning, welding, lights, cigarettes, space heaters and the like can ignite urethane foam. Once ignited, it burns rapidly, producing extreme heat, releasing hazardous gases and consuming much oxygen

## EXPLOSION & FIRE

### Explosion

- If explosion is imminent, put on PFDs, grab distress signals and survival gear, and immediately abandon ship.

### Fire

- Turn off engines, generators and blowers. Extinguish smoking materials.
- Fixed fire suppression system has heat sensors that automatically flood machinery space with a fire extinguishant. Allow extinguishant to “soak” compartment for at least 15 minutes to cool hot metals or fuel before cautiously inspecting fire area. Have portable fire extinguishers ready. Do not breathe fumes or vapors caused by the fire or extinguishant.

- If you have access to fire, direct contents of extinguishers at base of flames, not at the top.
- Throw burning materials overboard if possible.
- Move anyone not needed for firefighting operations away from the flames.
- Signal for help.
- Put on PFDs, grab distress signals and survival gear, and prepare to abandon ship.

### Abandoning Ship



### WARNING

**BURN HAZARD** – Swim against the current or wind if you abandon ship. Leaking fuel will float with the current and may ignite.

- When clear of danger, account for all who were on board, and help those in need.
- Use distress signal.
- Keep everyone together to make rescue easier.

## FLOODING, SWAMPING OR CAPSIZING

- **STAY WITH THE BOAT!** A boat will usually float even if there is major hull damage. Rescuers can spot a boat much easier than a head bobbing in water.
- Signal for help.

## COLLISION

- Account for everyone on board.
- Check for injuries.
- Inspect structural damage.
- Reduce flooding.
- Signal for help.
- **STAY WITH THE BOAT!**

## GROUNDING

Action depends on how hard the boat hits bottom and whether the boat remains stranded. If it is a simple touch, you may need only to inspect the hull. If you are aground, assess the situation before reacting. In some cases, throwing the boat into reverse can cause more damage.

### Basic Guidelines

- Inspect damage to hull, propulsion and steering systems.
- Check for leaks. If water is coming in, stopping the flow takes priority over getting free.
- Determine water depth all around the boat and type of bottom (sand, mud, rocks, etc.). This will help you decide which way to move the boat.
- Determine if tide, wind or current will drive the boat harder aground or will help free it.

## LEAKS

- Immediately switch on bilge pumps.
- Assign crew to operate manual pumps if needed.
- Check extent of leaks.
- If boat is taking on water, have someone take the helm while you manage damage control.
- Slow or stop to minimize inflow. However, if you can keep a hole above water by maintaining speed, do so.
- If possible, patch the outside with whatever material is available.

## TOWING

### WARNING

**PERSONAL INJURY HAZARD** – Towing or being towed stresses the boat's hardware and lines. Failure of any part can seriously injure people or damage the boat.

### CAUTION

**PRODUCT DAMAGE** – While being towed, seacocks on non-operating engines and generator must be closed to prevent water from being forced into the engine's exhaust and causing internal damage.

**PRODUCT DAMAGE** – While being towed and engines are not being operated, propeller shaft(s) should be prevented from turning by locking the shaft(s) using a pipe wrench or other suitable method. This will prevent damage to the shaft seal and transmission bearing.

A recreational boat towing another is usually a last resort because of possible damage to one or both boats. The Coast Guard or a private salvage company is better equipped. A recreational boat may assist by standing by, and possibly keeping the disabled boat's bow at a proper angle until help arrives. Only when conditions are ideal – that is, seas are calm, disabled boat is small, and one or both skippers know correct technique – should a recreational boat tow another.

### Towing Vessel

- Be sure your boat will not run aground too.
- Because you are maneuverable and the grounded boat is not, you should pass the towline to the grounded boat.
- Use double-braided or braid-on-braid line. Never use three-strand twisted nylon; it has too much elasticity and can snap back dangerously.
- Fasten the towline as far forward as possible on the upwind or up-current side of the towing boat. Fastening it to the stern will restrict maneuverability of the towing boat.
- If possible, use a bridle.
- Move slowly to prevent sudden strain on slack line.
- Be ready to cast loose or cut the line if the towing situation becomes hazardous.

### Vessel Being Towed

- Attach the towline to the bow eye, or forward bitt if the fitting can take the load.
- If it is necessary to be towed after being freed, keep someone at the wheel to steer.

### Both Vessels

- If you secure the towline to a fitting, be sure the fitting is fastened with a through bolt and is reinforced on the underside.
- Creating a bridle with a line around the hull or superstructure will distribute the load over a wide area; pad pressure points. This technique can be used on both the towing and towed boat.
- Keep lines clear of propellers on both boats.
- Keep hands and feet clear of the other boat.
- Never hold a towline after it is pulled taut.

## PERSON OVERBOARD

- Immediately sound an alarm and keep pointing to the person overboard.
- Throw a life preserver even if the person is wearing a PFD. It will serve as a marker.
- Immediately stop or slow the boat, then circle toward the victim.
- Keep person overboard on helm side so operator has the person constantly in sight.
- Approach from downwind and move alongside into the wind for pickup.
- When almost alongside, stop the engine in gear to prevent dangerous propeller “windmilling.”
- As part of your emergency plan, consider what to do if you were alone and fell overboard (e.g., wear PFD, keep signal device in PFD, attach emergency engine stop switch lanyard to yourself).

## DROWNING

- Swim to rescue a drowning victim only as a last resort.
- Immediate resuscitation is critical! At least two people on board should be certified in CPR.
- Keep the victim warm.
- Use care in handling. Spinal injury may exist if the victim fell overboard.
- Signal for help.

## MEDICAL EMERGENCY

In an emergency, you may be far from professional medical assistance. Be prepared. Take a first aid course, and carry a first aid kit. Be aware of special conditions that may affect anyone on board.

## CARBON MONOXIDE

Carbon monoxide is an odorless, colorless, extremely toxic gas. Symptoms of carbon monoxide poisoning are dizziness, ears ringing, headaches, nausea and unconsciousness. A poisoning victim’s skin often turns cherry red.

Have the victim breathe fresh air deeply. If breathing stops, resuscitate. A victim often revives, then relapses because organs are damaged by lack of oxygen. Seek immediate medical attention.

## PROPULSION, CONTROL OR STEERING FAILURE

- Shut off engine.
- Put out an anchor to prevent drifting.
- Determine if you can fix the problem yourself. See engine operator’s manual if engine is flooded.
- Signal for help.

## RADIO COMMUNICATION

Radio is the boat operator’s main method of receiving safety information and summoning aid. VHF-FM radio is the primary means of short-range communication. Single sideband radio (SSB) is used for longer range communication.

VHF-FM Channel 16 and SSB 282 kHz are designated for emergency use. Such situations can be categorized as:

- **Emergency** –  
“MAYDAY, MAYDAY, MAYDAY” – Used when a life or vessel is in imminent danger.
- **Urgency** –  
“PAN-PAN, PAN-PAN, PAN-PAN” (pronounced PAHN-PAHN) – Used when a person or vessel is in some jeopardy less than indicated by a Mayday call.
- **Safety** –  
“SECURITY, SECURITY, SECURITY” (pronounced SAY-CURE-IT-TAY) – Used for navigational safety or weather warning.

An emergency situation will be hectic and there will not be time to learn proper radio procedure. **LEARN WHAT TO DO BEFORE YOU NEED TO DO IT.**

If you hear a distress call, stop all radio transmissions. If you can directly assist, respond on the emergency frequency. If you cannot assist, do not transmit on that frequency. However, continue to monitor until it is obvious that help is being provided.

## DISTRESS SIGNALS

Consult your national boating law enforcement agency.

### Visual Distress Signals

- U.S. Coast Guard regulations require boats in coastal waters and the Great Lakes to carry visual distress signals for day or night use, as appropriate for the time of operation. Exempt from the day signals requirement, but not night signals, are boats less than 4.8 meters (16 feet), open sailboats less than 7.9 meters (26 feet), boats participating in organized events, and manually propelled boats.
- If you are required to have visual distress signals, at least three safety-approved pyrotechnic devices in serviceable condition must be readily accessible. They must be marked with a date showing the service life, which must not be expired.
- Carry three signals for day use and three signals for night use. Some pyrotechnic signals, such as red flares, meet both day and night use requirements.
- Store pyrotechnic signals in a cool, dry location. An orange or red watertight container prominently marked "Distress Signals" is recommended.

Other recognized visual distress signals include:

- Flames in a bucket
- Code flags November and Charlie
- Square flag and ball
- Black square and ball on orange background flag
- Orange flag (certified)
- Electric distress light (certified) – for night use only
- Dye marker (any color)
- Person waving arms
- U.S. ensign flown upside down

### Audible Distress Signals

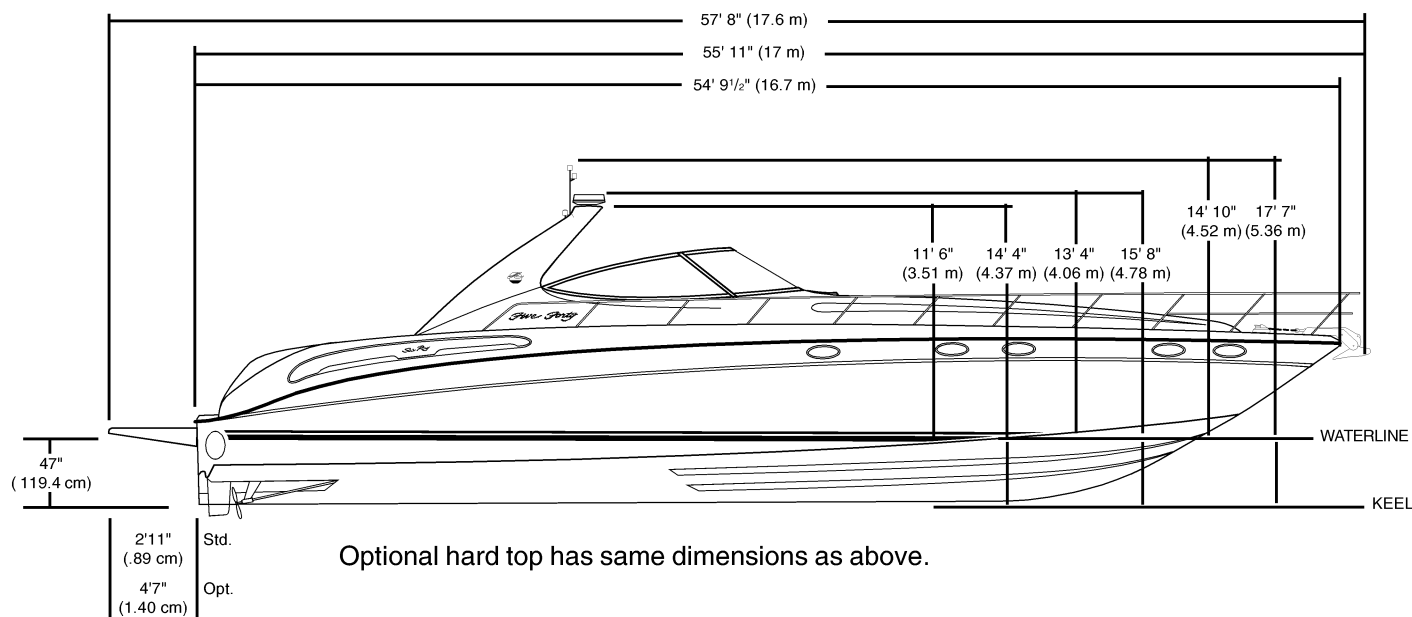
U.S. Coast Guard regulations require one hand, mouth or power-operated whistle or horn, audible for at least a half mile.

Other recognized audible distress signals include:

- Radio communication (see *Emergency Procedures – Radio Communication*)
- Radio-telegraph alarm
- Position indicating radio beacon
- Morse Code SOS (3 short, 3 long, 3 short) sounded by any means
- Fog horn sounded continuously

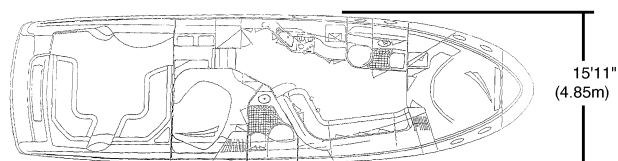
## SPECIFICATIONS AND DIMENSIONS

**Profile:** Standard 540DA with Sport Spoiler shown.  
(fig. 1.18.1)



## SPECIFICATIONS & HEIGHT DIMENSIONS

Overall Length .....	54' 11" (16.74 m)
w/Standard Platform .....	57' 8" (17.6 m)
Beam .....	15' 11" (4.85 m)
Draft .....	47" (119.4 cm)
Dry Weight* .....	39,000 lbs. (17,690 kg)
Fuel Capacity .....	600 gal. (2,271 liters)
Usable Fuel** .....	570 gal. (2,157 liters)
Water Capacity .....	150 gal. (567 liters)
Holding Tank .....	68 gal. (257.3 liters)
Dead Rise .....	17°
Waterline To Top Of Spoiler .....	11' 6" (3.51 m)
Waterline To Top Of Radar .....	13' 4" (4.06 m)
Waterline To Top Of Mast Light .....	14' 10" (4.52 m)
Keel To Top Of Spoiler .....	14' 4" (4.37 m)
Keel To Top Of Radar .....	15' 8" (4.78 m)
Keel To Top Of Mast Light .....	17' 7" (5.36 m)

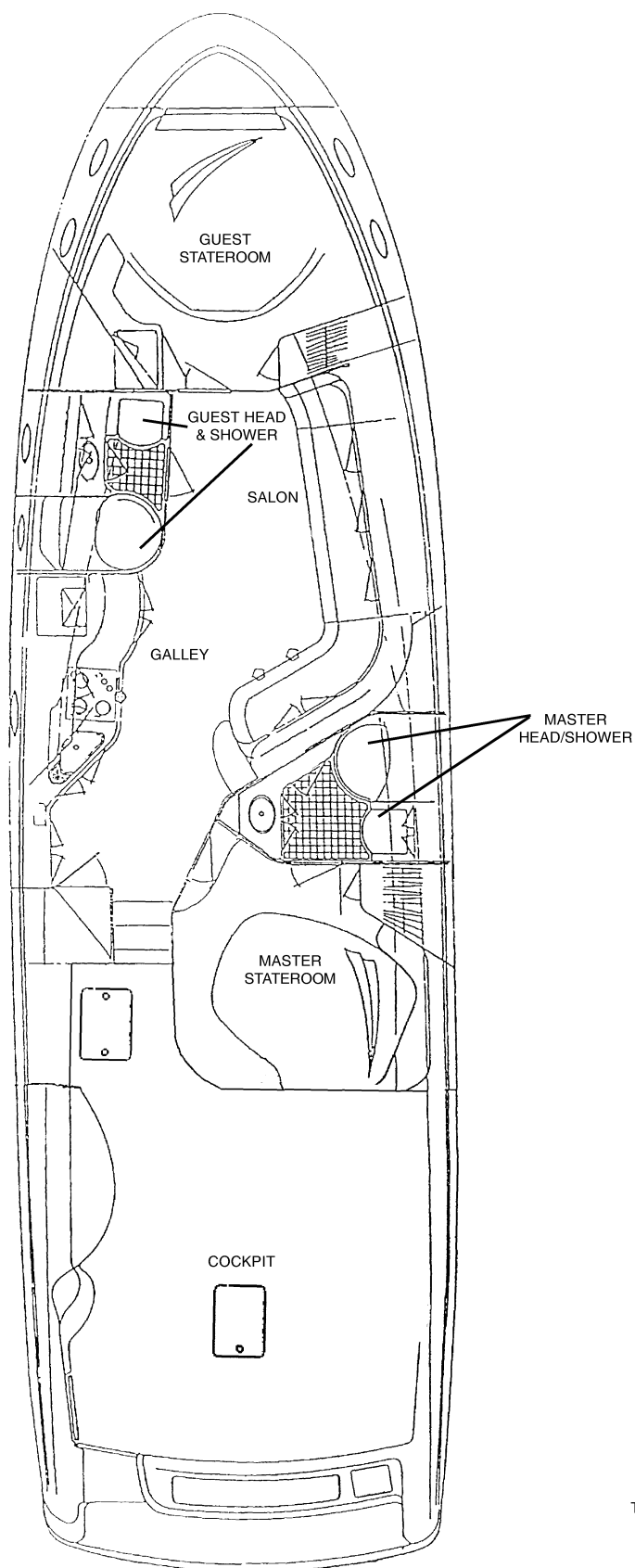


(fig. 1.18.2)

\*This is an approximation. Weight is variable due to manufacturing and equipment variances. Each vessel must be independently weighed.

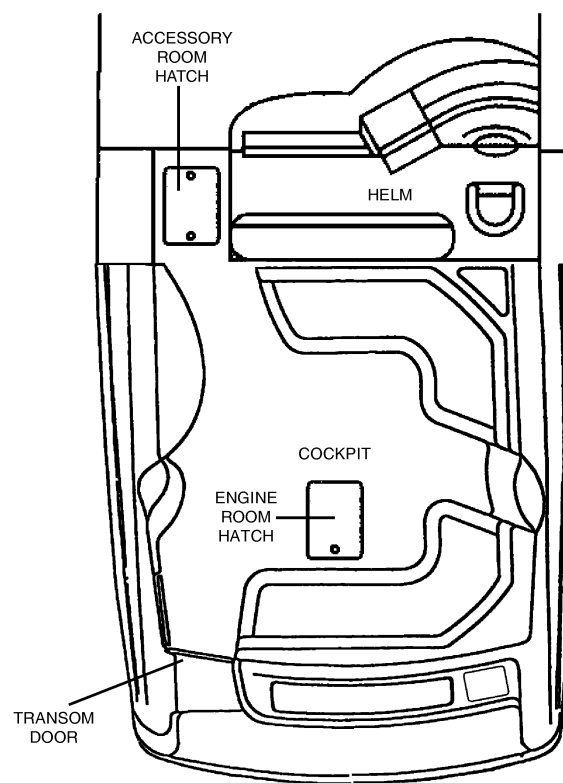
\*\* Allow 15% reserve fuel for running in heavy seas.

# ACCOMMODATION PLAN



(fig. 1.19.1)

540 DA

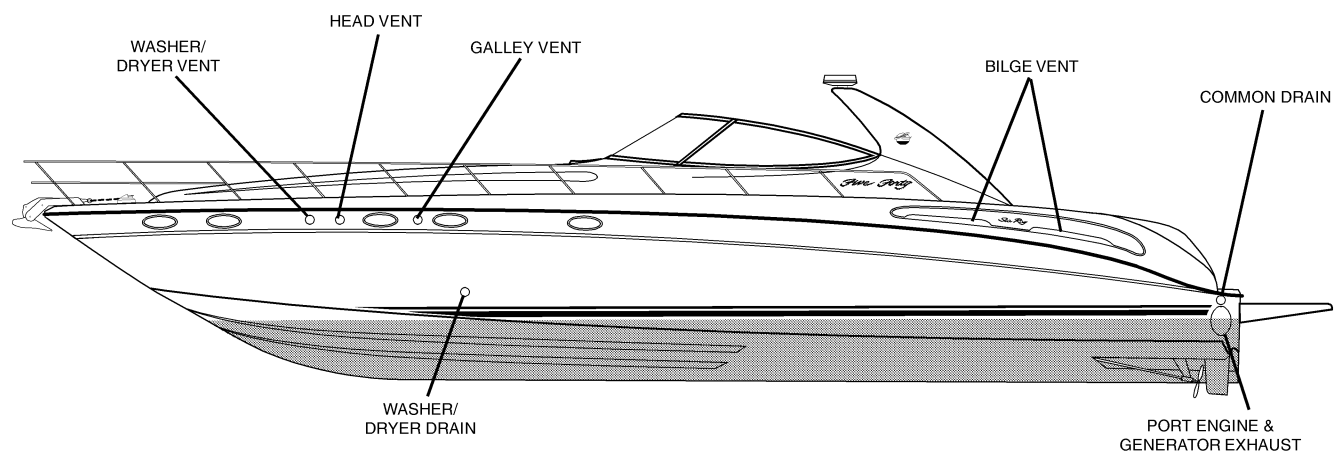


(fig. 1.19.2)

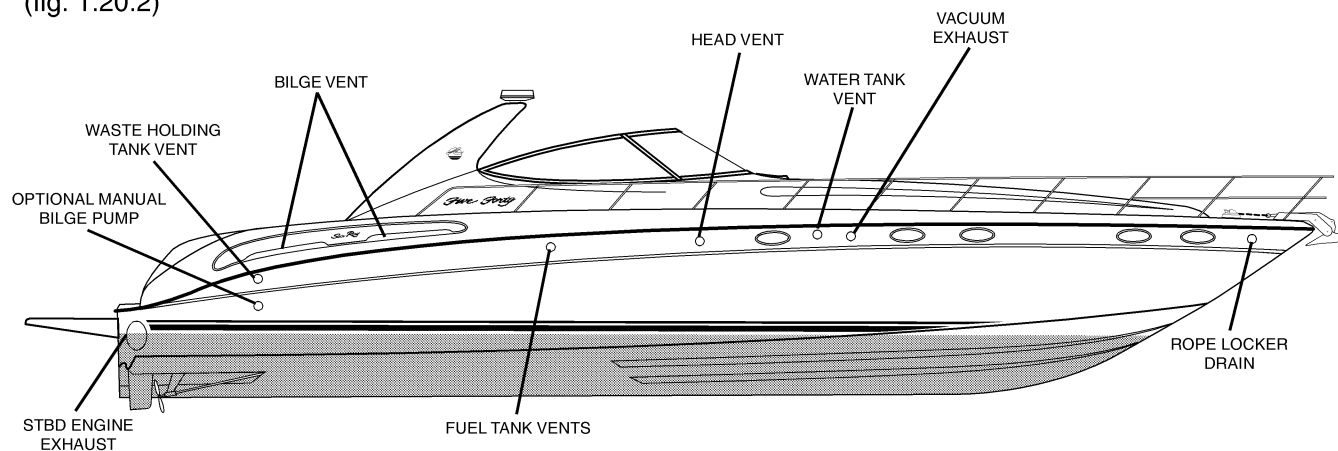
1.19

## LOCATION OF THROUGH-HULL FITTINGS

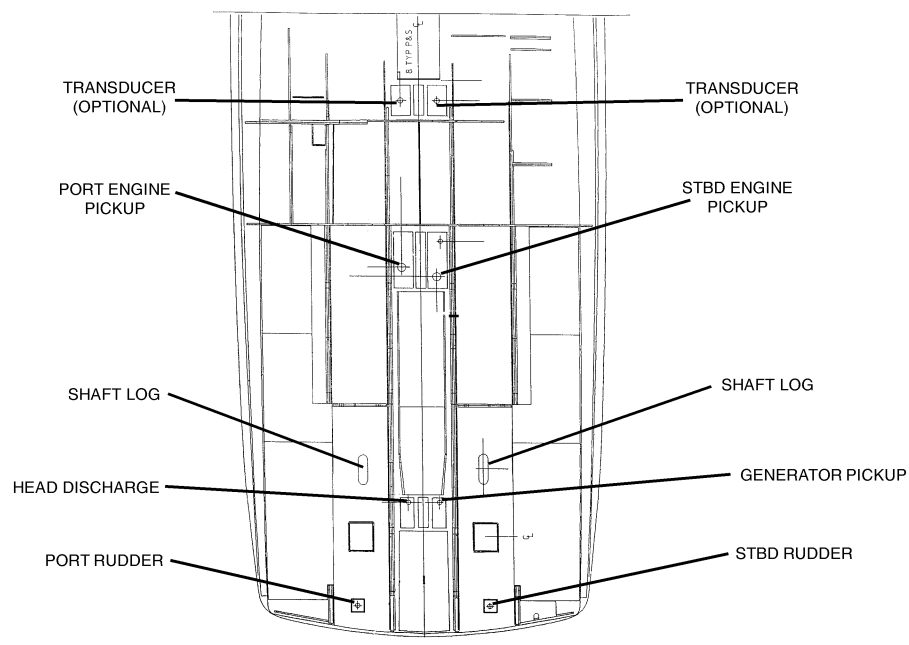
**Port Side**  
(fig. 1.20.1)



**Starboard Side**  
(fig. 1.20.2)



**Bilge Hull Cutouts**  
(fig. 1.20.3)





## Section 2 • Bilge & Underwater Gear

### Bilge

#### FUEL & OIL SPILLAGE

Regulations prohibit discharging fuel or oily waste in navigable waters. Discharge is defined as any action which causes a film, sheen or discoloration on the water surface, or causes a sludge or emulsion beneath the water surface. A common violation is bilge discharge. Use rags or sponges to soak up fuel or oily waste, then dispose of it properly ashore. If there is much fuel or oil in the bilge, contact a knowledgeable marine service to remove it. Never pump contaminated bilge overboard. Help protect your waters.

Fill tank(s) less than rated capacity. Allow for fuel expansion.

#### BILGE PUMPS

The 540 DA is equipped with four (4) bilge pumps with float switches. Three (3) are located in the engine room bilge, and the other bilge pump and float switch is located behind the shower sump located under the hatch in the master stateroom. See figures 2.9.1, 2.10.1 and 5.6.1 for locations.

#### WARNING

**SINKING HAZARD – Ensure the bilge pumps are operating properly.**

Your yacht is equipped with a shower sump pump and float switch (see “SHOWER SYSTEM” in Section 5).

The forward and aft bilge pumps are equipped with switches on the control station switch panel (see fig. 3.3.1). These switches have MANUAL and AUTO positions. When the switch is in the MANUAL position, the pump will run continuously. When the switch is in the AUTO position, the pump is activated when there is enough water in the bilge to raise the float switch to its highest position; and deactivated when the water recedes.

The other two (2) pumps are emergency high water pumps and are wired directly to the battery banks. Periodically check the operation of all pumps.

#### CAUTION

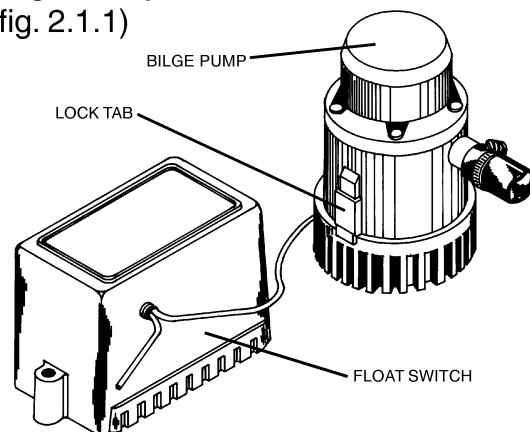
**Run bilge pumps in the manual position only as long as necessary to remove water. Running bilge pumps dry can damage the pump motor.**

The bilge pumps and high water alarms are wired to the systems monitor located on the dash at the control station (see “SYSTEMS MONITOR” in Section 3).

Whenever a bilge pump turns ON, either manually or automatically, the systems monitor will display which pump is active. **Should the high water alarms become activated, immediate attention to the area indicated on the systems monitor panel is required.**

Each pump is protected by a breaker on the main DC breaker panel located in the aft starboard bilge (see Section 7 fig. 7.5.1).

#### Bilge Pump & Float Switch (fig. 2.1.1)



#### Maintenance:

Frequently inspect the area under the float switches to ensure they are free from debris and gummy bilge oil. To clean, soak in heavy duty bilge cleaner for 10 minutes, agitating several times. Check for unrestricted operation of the float. Repeat the cleaning procedure if necessary.

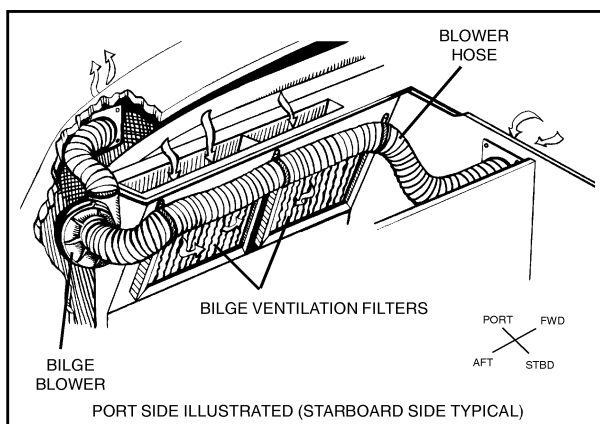
**Inspect the bilge pump intakes and keep them free of dirt or material which may impede the flow of water through the pump.** To clean the pump strainer, depress the lock tabs on both sides of the pump and lift the pump motor.

### Troubleshooting:

If water does not come out of discharge hose:

1. Depress the breaker on the Main DC Breaker Panel to ensure it has not tripped.
2. Remove the motor module to see if the impeller rotates with the power on.
3. Remove any debris that may have accumulated in the nozzle section or strainer base.
4. Check hose and connection on hull side for debris and proper connections.

## BILGE BLOWERS & BILGE VENTILATION FILTERS



**Bilge Blower & Bilge Ventilation Filters (fig. 2.2.1)**

The two bilge blowers remove fumes from the engine compartment and provide ventilation through the deck vents. The blowers are wired through individual circuit breakers on the main DC breaker panel (see fig. 7.4.1) with a switch on the control station switch panel (see fig. 3.3.1) and on the DC distribution panel located in the salon (see fig. 7.6.1).

Blower switches can be turned ON at one location and turned OFF at the other location.

### Blower Switch Light:

**Light On:** When a blower is turned ON, the light in the switch will come on and stay on, indicating that there is power to the blower.

**Light Blinking:** If the light is blinking, it is an indication that the blower breaker has tripped. Correct the problem and reset the breaker.

**Light Not On:** If you try to turn ON the blower and no light comes on, then the breaker is tripped and the blower is not receiving power. Correct the problem and reset the breaker.

Blower switch lights do not indicate that the blower motors are operating. To ensure blower motors are operating, listen for blower motor noise and **confirm air flow at bilge vent** (see page 1.20 for bilge vent location).



### WARNING

**EXPLOSION/FIRE HAZARD – Run blower at least 4 minutes before starting engine or generator. Check bilge and engine compartment for fumes.**

Run the blowers when operating below cruising speed to dissipate bilge heat buildup, when idling, and at all times when vessel is at rest with the generator running.

- No ventilation system can remove the vapors of liquid fuel in the bilge. (See Section 1 – *Environmental Considerations – Fuel & Oil Spillage*.)
- Store flammables only in approved, vented containers securely fastened in a locker sealed from the interior of the yacht and vented overboard. Storing flammables in areas not designed for vapor removal creates a hazard.
- Be aware of carbon monoxide from your own or other boats. Allow air movement to dissipate fumes. (See Section 1 – *Environmental Considerations – Exhaust Emissions*.)

### Maintenance:

The bilge blowers should be checked periodically to ensure that the hoses are securely fastened to blowers. Check and make sure electrical wires are secured in place.

### Troubleshooting:

If your bilge blower fails to operate:

1. Depress the breakers on the main DC breaker panel to ensure they have not tripped.
2. Check to see if the blower hose is fastened to the blower.

The bilge ventilation filter intake ports are fitted with foam air filters in the bilge. These filters are installed to remove the salt mist from the air coming into the bilge through the hull vents (see fig. 2.2.1). **Keep vents free from obstructions.**

### Location:

On the port and starboard sides of the bilge.

### Maintenance:

Clean filters after every 100 hours of boat use. Remove the filters, hose them down with fresh water, shake off remaining water and reinstall.

## NOTICE

The filters are directional. Note direction of filter installation before removal. Filter must be reinstalled facing the proper direction.

## Engines

The engines are the heart of your Sea Ray® boat. Proper attention to and maintenance of your engines will assure you of many hours of pleasurable, safe boating and will prevent unnecessary engine problems. You must therefore become thoroughly familiar with all aspects of the engine's proper operation outlined in the Engine Operator's Manual. A general maintenance program consists of proper lubrication, cleaning of fuel filters, fuel lines and air filters. When washing down, or at any other time, take care that water does not enter the air inlets. Water entering the air inlets when the engines are not operating may go directly into the cylinders, resulting in rust and possibly internal engine damage.

The engines are warranted directly by the engine manufacturer, not Sea Ray®.

Sea Ray® strongly urges you to fully comply with the manual provided by the engine manufacturer. Follow the recommended maintenance and warranty schedule in your Engine Operator's Manual included in the owner's packet. Engine abuse or improper maintenance may adversely affect the claims made under the independent warranty provided by the engine manufacturer.

## ENGINE GAUGE PACKAGE

Each of your engines have been equipped with an engine gauge package. This package is provided as a safety feature in the event of an electrical malfunction and the helm gauges becoming inoperative.

### Detroit Engine Gauges Include:

- Engine Oil Pressure
- Engine Oil Temperature
- Jacket Water Temperature

### Location:

The engine gauge package is located on the inboard side of each engine.

**Gauge package may differ with different engine options.**

Refer to your Engine Operator's Manual for proper gauge readings.

## BILGE HEAT DETECTOR

The 540 DA is equipped with a forward bilge heat detection device located in the forward engine bilge, mounted above the engine area.

The bilge heat detector detects heat buildup in the engine room bilge area. The heat detector alarm is connected to the systems monitor panel on the control station dash (see fig. 3.13.1). **Never ignore an alarm.**

## ENGINE BLOCK HEATER

The 540 DA is equipped with engine block heaters for each engine. The block heaters, if applied for 8 hours continuously, should raise the engine jacket water temperature by 50° F (28° C) over ambient. If the engine temperature is maintained at 90° F (32° C) or above, start-up smoke should be nonexistent. Energize the block heaters by turning ON the "PORT BLOCK HEATER" and "STARBOARD BLOCK HEATER" breakers on the AC main distribution panel (see fig. 7.13.1).

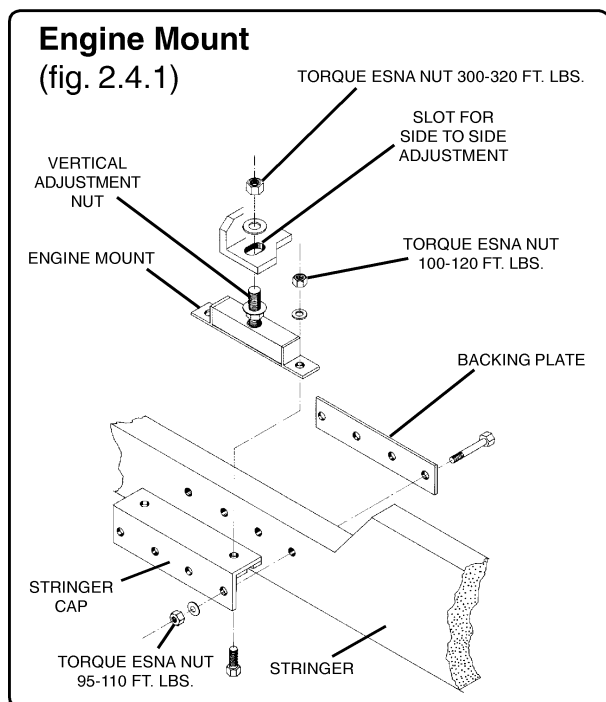
The engine block heaters are designed to be left on. The block heaters are thermostatically set to turn themselves on and off as needed. It takes about 8 – 12 hours for the engine blocks to heat up. Keep in mind that with the block heaters turned on, the engine room will be warmer than it would be otherwise.

**Note:** It is not necessary for the block heaters to be on to start the engines.

## ENGINE MOUNTS

The adjustable type engine mounts permit adjustment sideways as well as vertically. Vertical adjustment nuts lock up or down on the threaded vertical stud, with a slot provided to allow side to side adjustment on the engine.

**Important:** The large adjustment locknuts on these mounts must be tightened properly to retain alignment. It is also advisable to spray a protective coating on the studs and nuts to prevent corrosion.



## MARINE GEARS

### Reduction Gears

A reduction gear reduces the rotating speed of the propeller shaft in relation to the engine RPM. This permits the use of a larger propeller while allowing the engine to attain its rated RPM, thereby increasing efficiency.

### Reverse Gears

The reverse gear incorporates the clutch and controls the rotation of the propeller. The position of the clutch control or shifting lever indicates the motion which the clutch and reverse gear are transmitting. The center position of the lever indicates neutral. **Engine RPM should never exceed 1000 when engaging or disengaging the clutch. Higher RPM will result in unnecessary wear and shortened life of the unit, and perhaps breakage.**

Marine reverse gears are hydraulically operated, thereby making it imperative to periodically maintain and check oil level. If the correct oil level is not maintained, slippage occurs, causing damage to the clutch plates. Too much oil will cause foaming and erratic clutch operation. For additional information see the Engine Operator's Manual.

## ENGINE REMOVAL

Should the removal of an engine become necessary, **see your Sea Ray® dealer or an authorized service representative of the engine manufacturer.** The following is only a generalized procedure to follow.

Shut off the fuel lines and close the engine seacocks. Remove all electrical wires, fuel lines and raw water intake hoses from the engine. Unbolt the engine coupling from the shaft coupling and slide the shaft and coupling back from the engine. Detach both throttle and shift connections. Cap off hoses to avoid hydraulic fluid loss. **Do not bend or twist the hoses, as damage may result.** Remove the mounting bolts for the engine and lift the engine out, leaving the mounts bolted to the stringer caps.

To reinstall, reverse the above procedure. Check the coupling and shaft alignments, as well as water hoses and wiring connections. Also check for fuel and exhaust leaks and make sure seacocks are open before starting engines.

## ENGINE EXHAUST SYSTEM

The exhaust system used on Sea Ray® boats with inboard engines is designed so that water from the raw water cooling system enters the exhaust system through the stainless steel elbows where water and exhaust are mixed. Water and exhaust is then pumped through the mufflers then overboard through the exhaust outlet through-hull fitting. Make sure water is flowing from the exhaust outlets while the engines are operating. Prior to every boat use, examine the exhaust system fittings to ensure tightness.

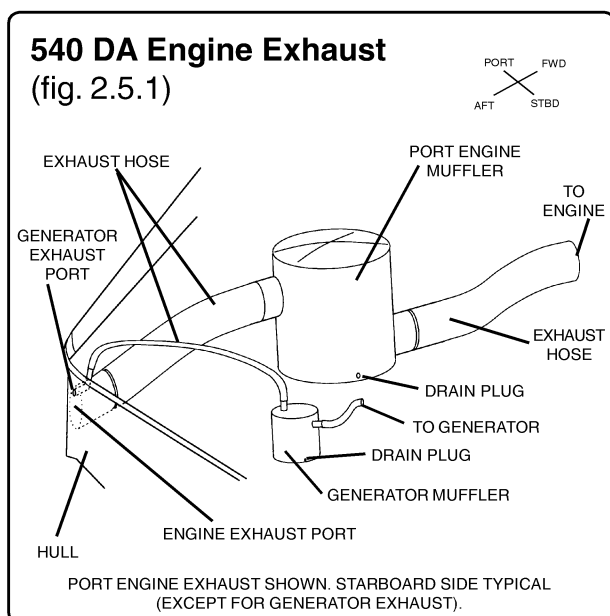
A plug is located on the aft section of each muffler (see fig. 2.5.1). When servicing or winterizing, remove the plug to drain the water out of each muffler. Replace the plug after all water has drained from the muffler.

### **WARNING**

**CARBON MONOXIDE HAZARD** – Ensure engine exhaust system is working properly. Carbon monoxide poison is extremely toxic.

### **WARNING**

**Hose clamps must be tight at all times to avoid exhaust leaks.**



## VIBRATION & CAUSES

Some vibration is to be expected in your boat because of the action of the engines and the propeller. But excessive vibration indicates conditions which must be promptly corrected to avoid damage. Contact your Sea Ray® dealer immediately if you are experiencing severe vibration. The following are some conditions which may cause vibrations.

### Foreign Object Interfering With Propeller Action

Weeds, ropes, fishing lines or nets can become wrapped around the propeller and/or shaft, causing vibration and loss of speed. Always stop and then reverse the propeller after going through a weedy area to unwrap and clear away any weeds which may have accumulated. Although reversing will sometimes help to unwrap lines and nets, they are difficult to remove without hauling boat.

Always check for loose or trailing dock lines before getting underway. When towing a dinghy, remember that a long line may easily become entangled with the propeller when backing down.

### Bent Propeller and/or Shaft

A badly damaged or distorted propeller or shaft is an obvious cause of vibration. Even when the propeller appears to be perfect, make sure it has not been pulled off-center by the propeller key.

### Engine and Shaft Out of Alignment

Although the shaft is properly aligned when it leaves the factory, after transit and after the boat has been in the water a few days, the alignment should be

rechecked. The shaft coupling is the connecting point between the shaft and the engine and the alignment should be set at .003" to .005." Refer to "SHAFTS" in this section of the Owner's Manual.

### Coupling Out of True

Although an extremely unlikely condition, check the couplings if other efforts to correct the vibration fail. Check the engine half of the coupling (with dial indicator on the face) to see that it runs true with the shaft coupling. Also check the coupling keys. They must fit correctly to prevent forcing the couplings off center.

### Engine Part Hitting Boat Structure

Engines are flexibly mounted to reduce transmission of vibration to the hull structure. If some part of the engine, such as the oil pan, reverse gear or reduction gear housing, contacts a stringer, brace or part of the hull, vibration will result. The flexible shaft log allows a limited side motion of the shaft, but an excessive "whip" can cause the shaft to strike the sides of the shaft hole or the shaft log with resultant vibration.

### Other Causes

Other causes of vibration include the following: engine out of tune, a bent rudder, a worn strut bearing, a component of the exhaust system vibrating against the hull or improper contact between shaft taper and the propeller hub bore.

## FRESH WATER COOLING SYSTEM

The fresh water cooling system is a closed system which helps protect engines from internal corrosion and provides more even distribution of engine temperature. The tank is located forward on the engine with an overflow bottle. Change the coolant annually.

### Coolant Recommendations

The standard mixture of water and coolant is a mixture of 30% antifreeze and 70% water, which protects to 0°F (-18°C). This will allow the coolant to expand properly and maintain normal operating engine temperature. In colder climates, the coolant level should be increased to 50/50, which protects to -34°F (-37°C), for proper coverage. **To find engine coolant requirements, refer to your Engine Owner's Manual in the Owner's Manual Packet.**

# Underwater Gear

## PROPELLERS

Propellers should be free of nicks, excessive pitting and any distortions that alter them from their original design. Badly damaged propellers should be replaced, but those that are chipped, bent or merely knocked out of shape can be reconditioned by your marine dealer.

When doing extensive cruising, it is advisable to carry extra propellers aboard.

### Propeller Installation:

For proper rotation, the installation of propellers on inboard engine boats requires the right hand propeller to be installed on the starboard side and the left hand propeller to be installed on the port side. Install in the following manner:

1. Inspect the key. It must be chamfered so that the corners of the key do not touch the keyway fillets (see illustration #2).
2. Install the propeller on the shaft without the key in the keyway. Slide the propeller all the way on the shaft until it seats. Mark the shaft on the leading edge of the hub with a felt tip marker and remove the propeller.
3. Install the key in the keyway and slide the propeller on the shaft. If the key is not pinned, tap the key back slightly as the propeller slides up the taper. This will ensure that the propeller does not ride the key up the keyway end radius,

thus forcing the propeller off-center. The propeller is properly seated if the hub is in the same position as previously marked.

4. Install a board (2 x 4) against the hub perpendicular to the keel and rotate the propeller clockwise until one blade rotates against the board. Do not put a board between the strut and the rudder. (See illustration #4.)
5. Install the large bronze nut on the propeller shaft and seat the propeller with the correct torque as listed on the following table.
6. Install the small nut to 100 ft. lbs.
7. Install the cotter pin.

### NOTICE

**If the jam nut and prop nut are installed properly, the propeller should not loosen. If you tighten both nuts holding only the propeller blade, the nuts could possibly thread back on the shaft to the cotter pin. It is important that the above procedure be followed.**

### Propeller Nut Torque Specifications (fig. 2.6.1)

Shaft Diameter	Thread Size	Nut	Torque Ft. Lbs.
1"	3/4"	Bronze	100-125
1 1/4"	7/8"	Bronze	150-175
1 1/2"	1 1/8"	Bronze	250-275
1 3/4"	1 1/4"	Bronze	275-300
2"	1 1/2"	Bronze	325-350
2 1/2"	1 3/4"	Bronze	400-425

### Propeller Installation

(fig. 2.6.2)

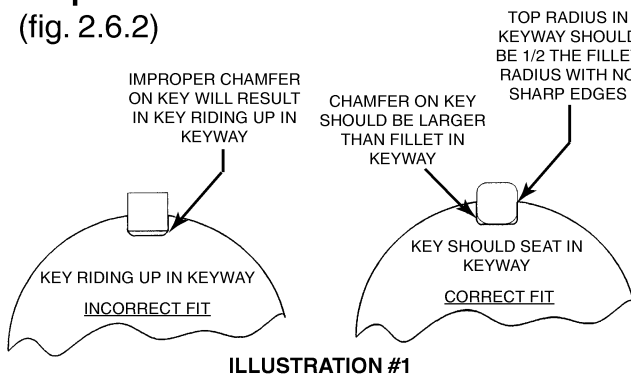


ILLUSTRATION #1

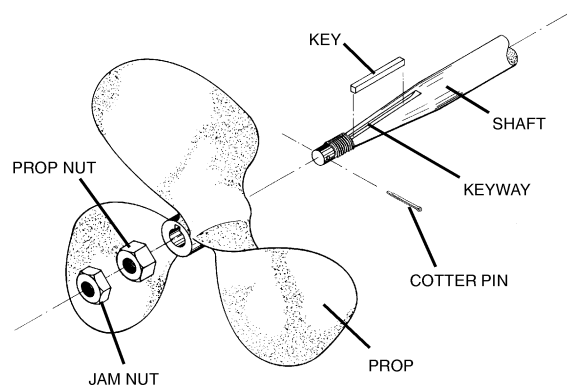


ILLUSTRATION #3

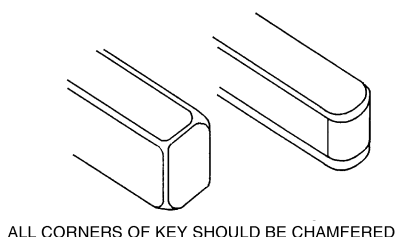


ILLUSTRATION #2

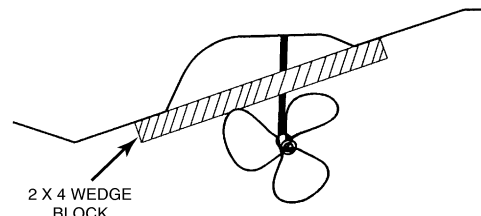


ILLUSTRATION #4

## SHAFTS

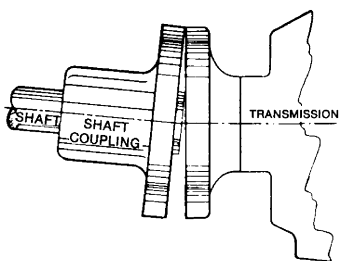
The shaft coupling is the connecting point between the shaft and the engine. The alignment should be set at .003" to .005" (0.08-0.13mm). Misalignment is much exaggerated in Figure 2.7.1, but a slight misalignment will cause loss of power, excessive wear, noise and vibration. It should not be tolerated. When checking for parallel coupling faces (the proof of proper alignment), use a feeler gauge not more than .003 to .005 of an inch thick (0.08 - 0.13mm).

With coupling faces brought together by hand – not bolted – the feeler gauge should be tightly gripped at all points around the edges of the couplings. Next, hold the engine coupling flange stationary and rotate the shaft coupling flange 90 degrees in either direction. The feeler gauge should still be tightly gripped at all points around the edges of the couplings.

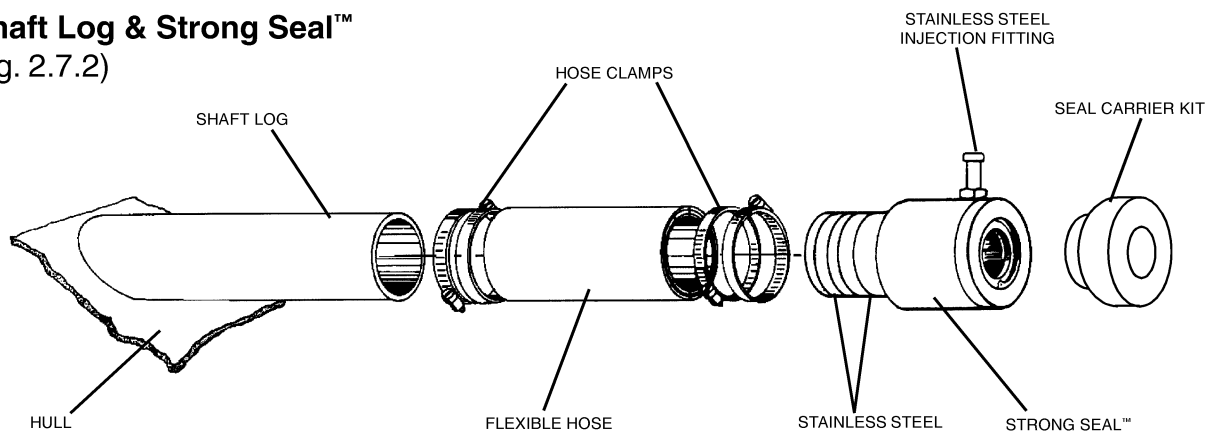
## SHAFT LOG & STRONG SEAL™

The shaft log is a fiberglass tube which provides an opening through the bottom of the boat for the propeller shaft. The Strong Seal™ is connected to it by a short length of special flexible hose which serves to absorb normal shaft vibration. The Strong Seal™ prevents water from leaking around the shaft and into the boat. Shaft alignment and straightness must be correct to assure proper operation of the Strong Seal™. Refer to the Strong Seal™ information for the seal carrier kit in the Owner's Manual packet.

### Shaft Misalignment (fig. 2.7.1)



### Shaft Log & Strong Seal™ (fig. 2.7.2)



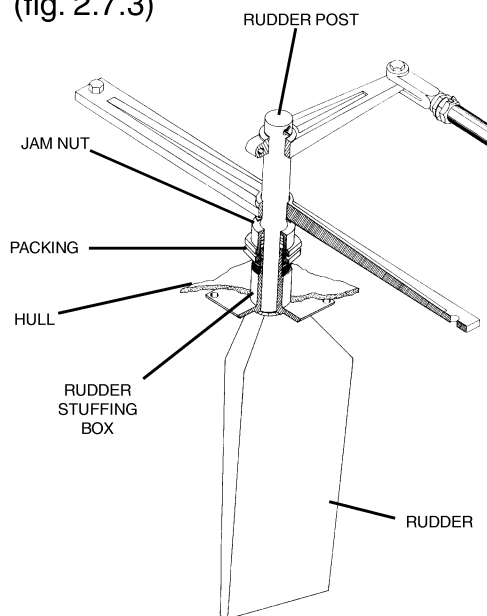
## STRUT

The strut is the bronze casting fastened to the bottom of the hull to support and form a bearing for the propeller shaft. A replaceable rubber bearing is inserted to minimize wear and protect the shaft where it passes through the strut hub. During lay up periods, squirt castor oil into this bearing to keep it from freezing to the shaft. **Never use machine oil or grease on rubber bearing.** Periodically check all strut fastenings to assure that they are secure.

## RUDDER & RUDDER STUFFING BOX

The rudder is the vertical flat surface aft of the propeller that pivots about a vertical axis and changes the direction of the boat through the water. The rudder stuffing box prevents water from leaking into the boat where the rudder post enters the hull.

### Rudder & Rudder Stuffing Box (fig. 2.7.3)



## Seacocks & Strainers

Seacocks and strainers are located in the bilge area. To open the seacock, turn the handle in line with water flow (vertically). To close, turn the handle against water flow (horizontally). Some seacocks are equipped with locking tee handles and must be loosened before operating the handle. **The seacock body should be inspected and lubricated annually.** Sea water strainers should be inspected frequently and cleaned out when plugged. To clean the strainer, close the seacock and unscrew the cap, or wingnuts, on top of the strainer housing. Remove and wash the stainless steel screen. After replacing the screen, replace and tighten the cap, open the seacock and check for leaks.

**NOTE:** Engine seacock on the port side is for the starboard engine, and the seacock on the starboard side is for the port engine.

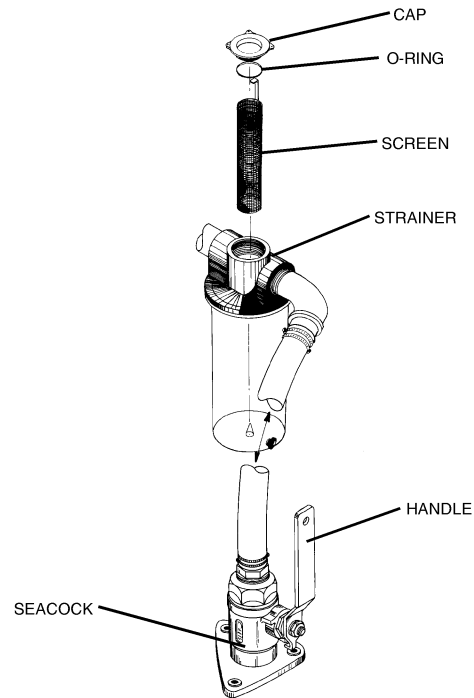
### ! CAUTION

As a safety measure, close all seacocks when leaving boat for any length of time to impede water ingress in the event of water hose failure.

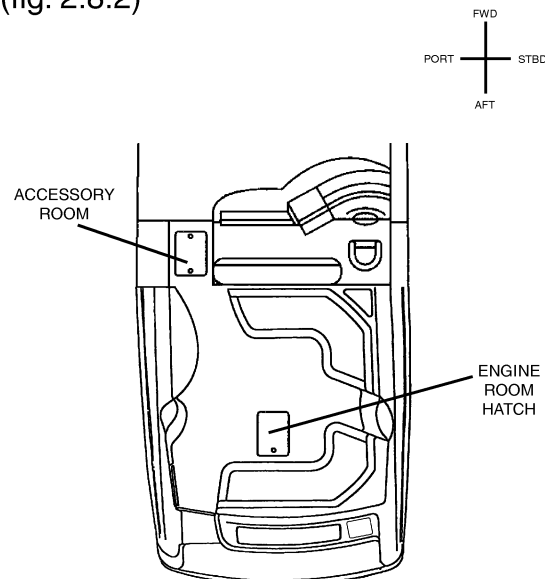
## Accessory Room

The Accessory Room is located under a cockpit hatch aft of the salon door (see fig. 2.8.2). Located in the Accessory Room are 3 A/C compressor units, an air conditioner relay, and a galley refrigerator/freezer ice maker water shutoff valve.

### Seacock & Strainer (fig. 2.8.1)

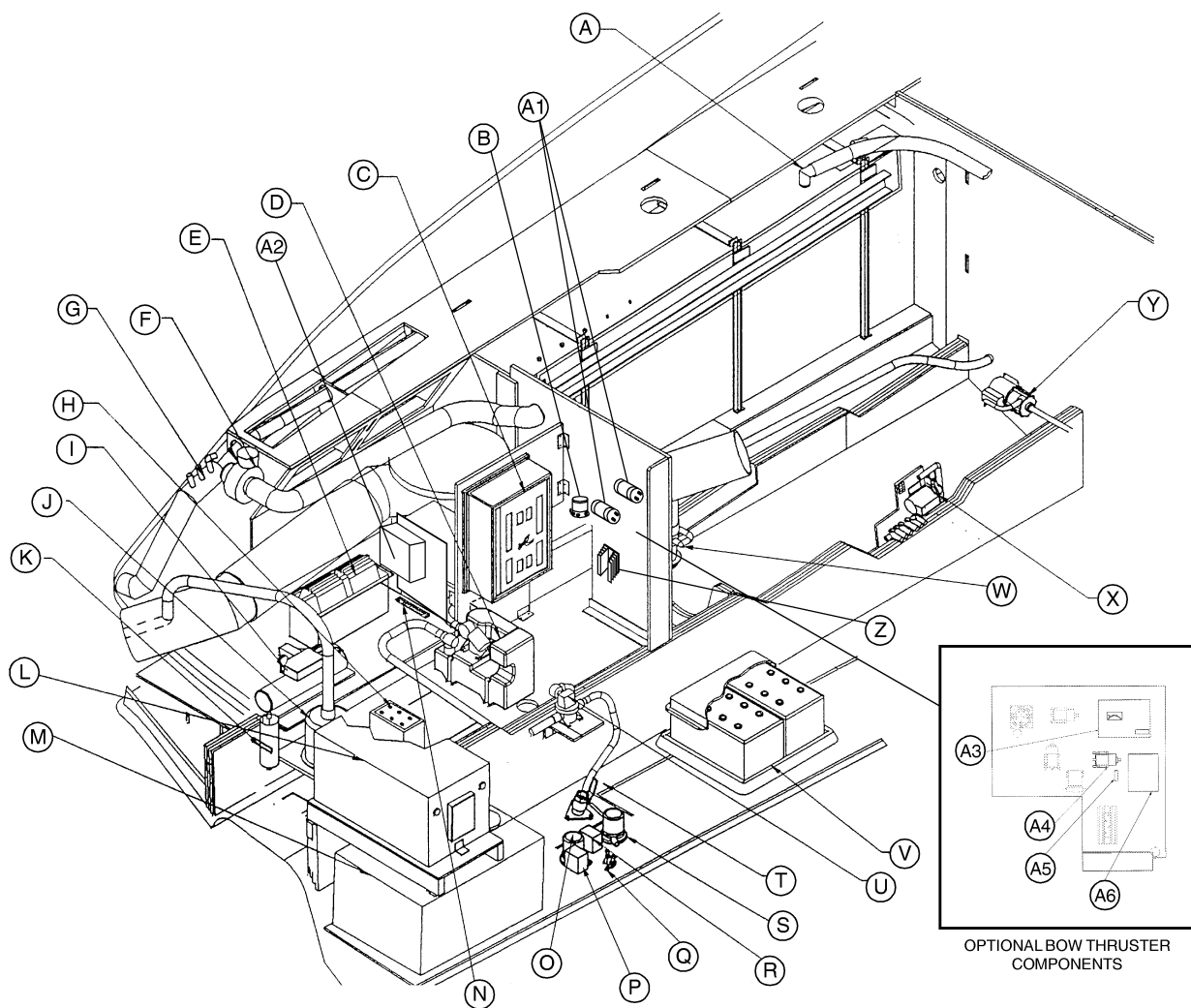
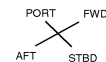


### 540 DA Accessory Room (fig. 2.8.2)



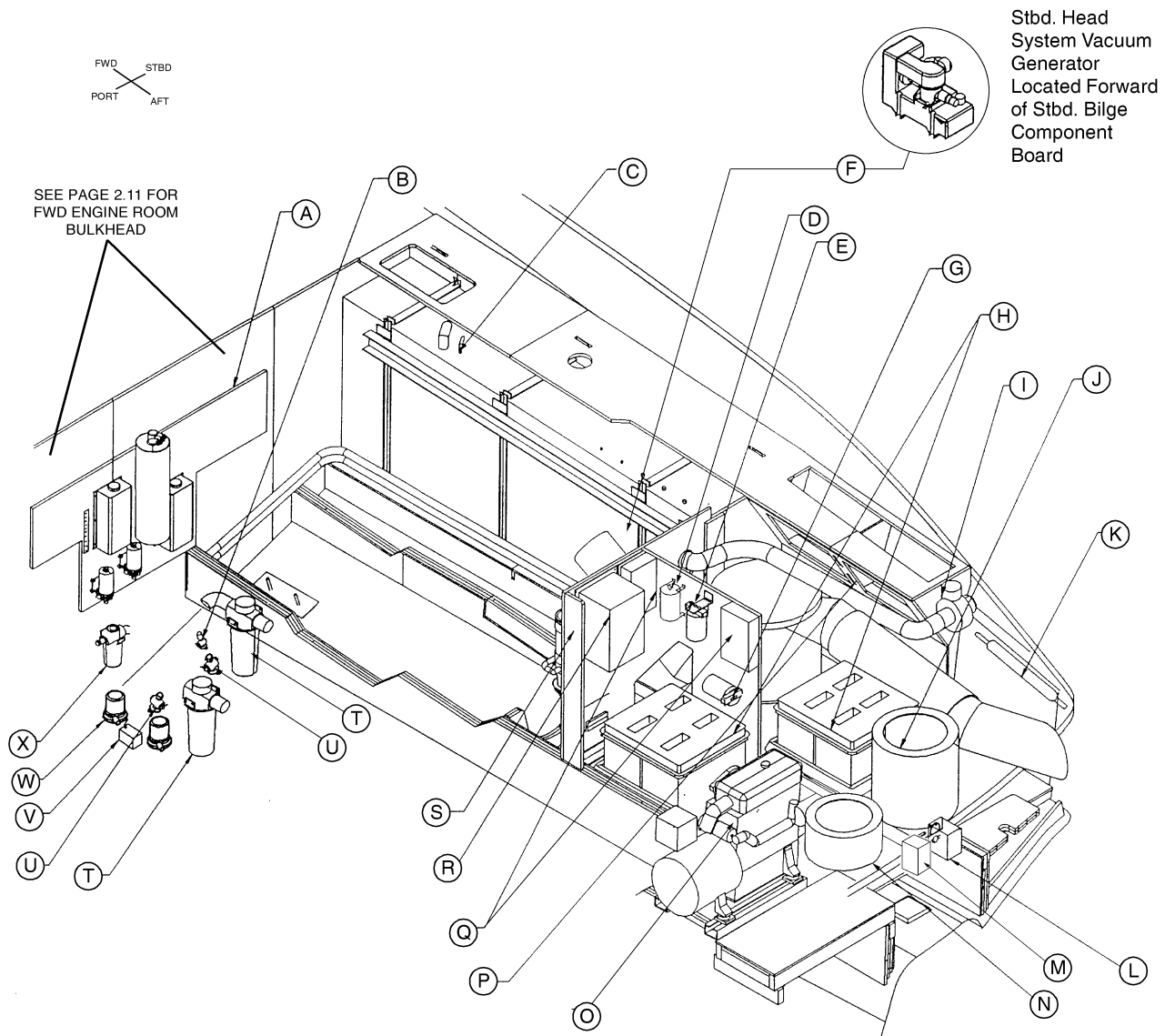


## 540 DA Bilge Layout (Port) (fig. 2.9.1)



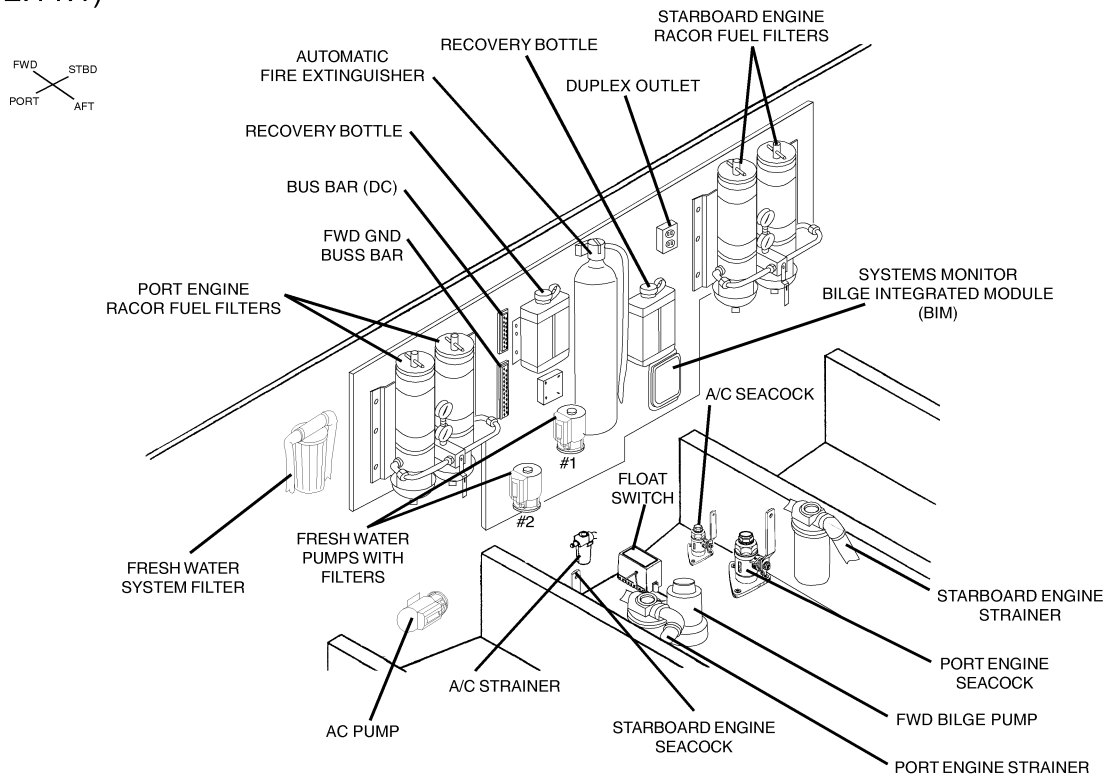
- |                                |                                    |                                     |
|--------------------------------|------------------------------------|-------------------------------------|
| A Port Fuel Tank               | L Water Heater                     | W Starboard Bilge Component Board   |
| B Emergency Start Solenoid     | M Waste Holding Tank               | X Oil Exchange Pump                 |
| C DC Main Breaker Panel        | N Buss Bar, Main DC                | Y A/C Pump                          |
| D Head System Vacuum Generator | O Aft Emergency Bilge Pump         | Z Battery Isolator                  |
| E Oil Containers               | P Aft Emergency Bilge Pump Switch  | A1 Battery Switch Solenoid          |
| F Bilge Blower                 | Q Generator Seacock                | A2 12 Volt Converter                |
| G Common Drain                 | R Aft Bilge Pump Switch            | A3 24V Bow Thruster Converter       |
| H Generator Battery            | S Aft Bilge Pump                   | A4 Bow Thruster Disconnect Solenoid |
| I Hydraulic Swim Platform Lift | T Waste Discharger Seacock         | A5 Fuse                             |
| J Generator Muffler            | U Maserator Pump                   | A6 Control Box                      |
| K Accumulator Tank             | V Batteries, Optional Bow Thruster |                                     |

## 540 DA Bilge Layout (Starboard) (fig. 2.10.1)

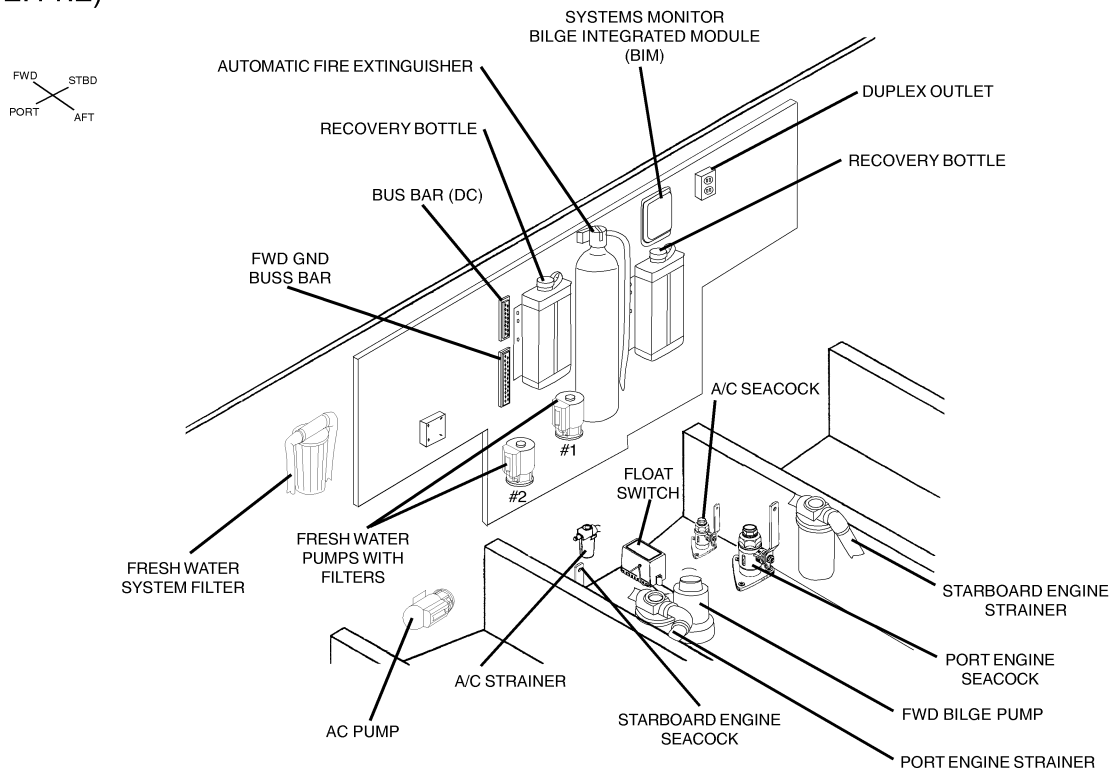


- |                                |                                   |                                   |
|--------------------------------|-----------------------------------|-----------------------------------|
| A Fwd Component Board          | I Starboard Bilge Blower          | Q Vanner Equalizers               |
| B A/C Seacock                  | J Cable Master Tub                | R Converter                       |
| C Starboard Fuel Tank          | K Waste Tank Vent Filter          | S Starboard Bilge Component Board |
| D Steering Reservoir           | L Trim Pump                       | T Engine Strainer                 |
| E Steering Filter              | M AC Main Shore Power Breaker Box | U Seacock                         |
| F Head System Vacuum Generator | N Cable Master Tub (Optional)     | V Bilge Pump Switch               |
| G Autopilot Pump               | O Generator                       | W Bilge Pump                      |
| H Batteries                    | P Starboard Ventilation Filters   | X A/C Strainer                    |

## 540 DA Standard Detroit Fwd. Engine Room Bulkhead (fig. 2.11.1)



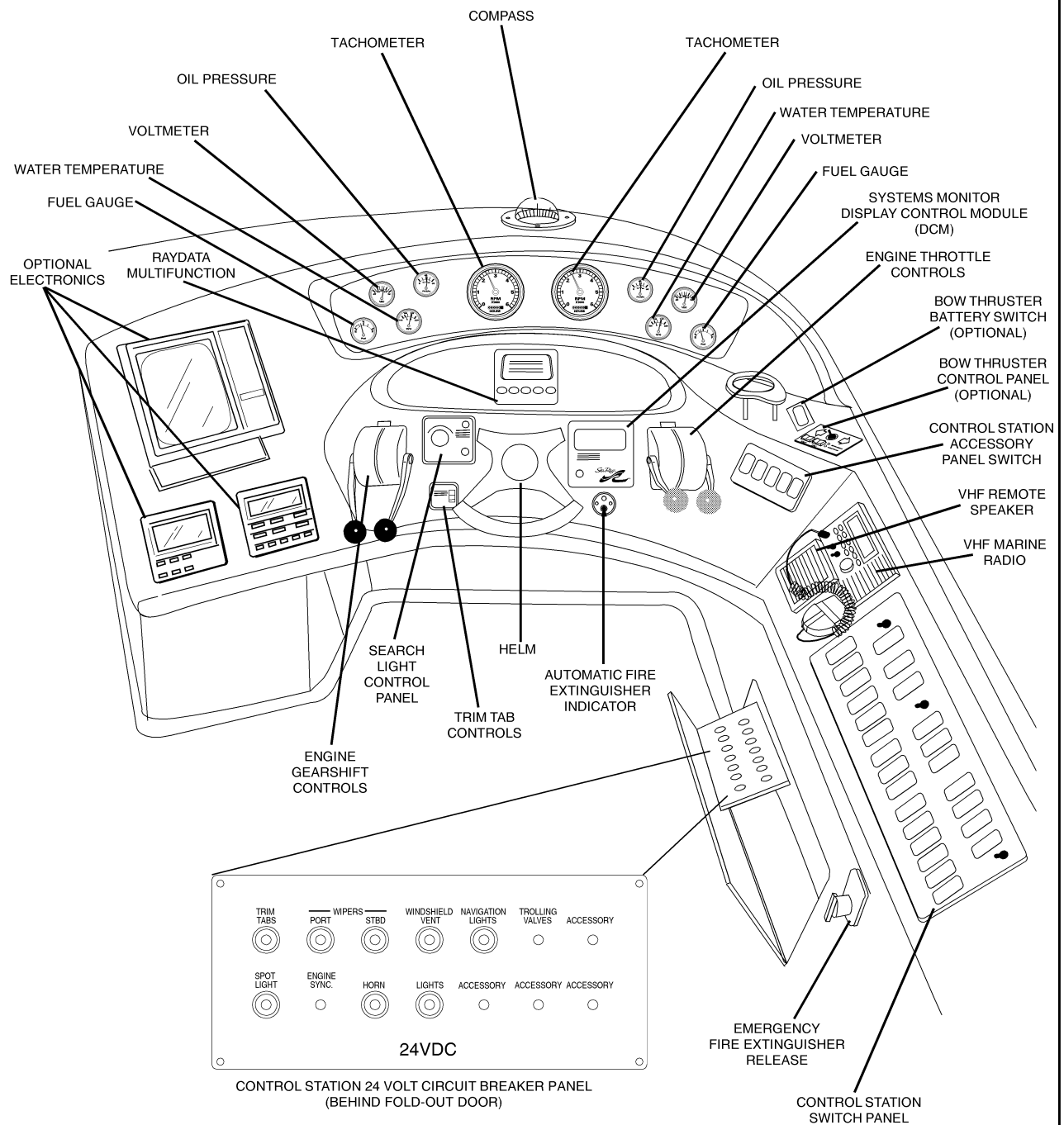
## 540 DA Optional Caterpillar® Fwd. Engine Room Bulkhead (fig. 2.11.2)



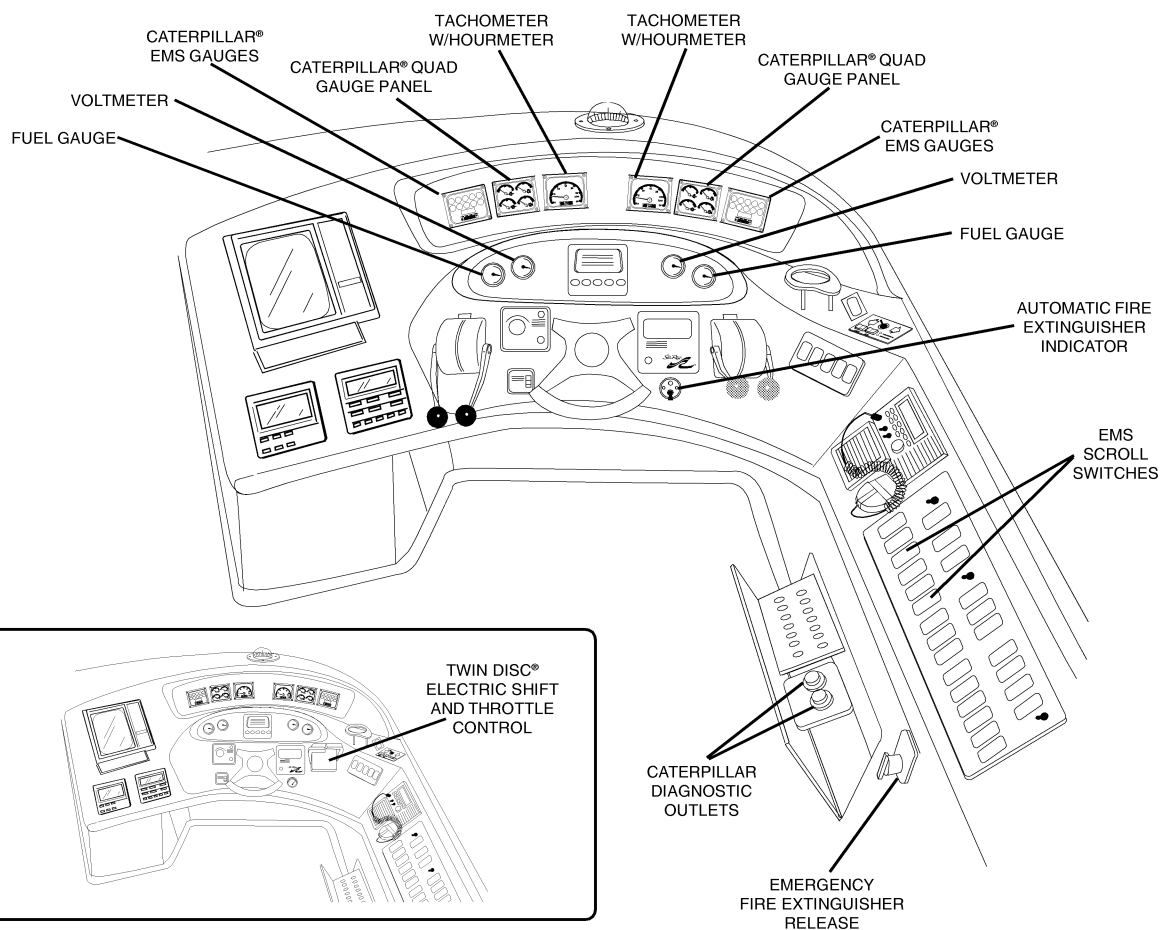


# Section 3 • Instruments & Controls

**Control Station  
Analog Dash Panel**  
(fig. 3.1.1)

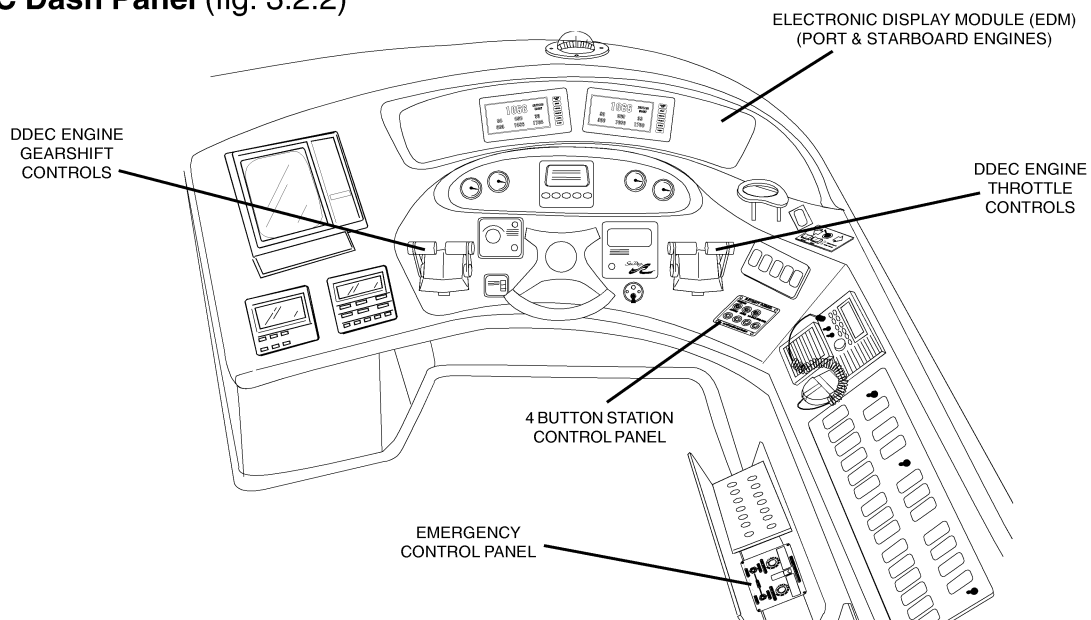


## Optional Caterpillar® Engine Monitoring System (EMS) (fig. 3.2.1)



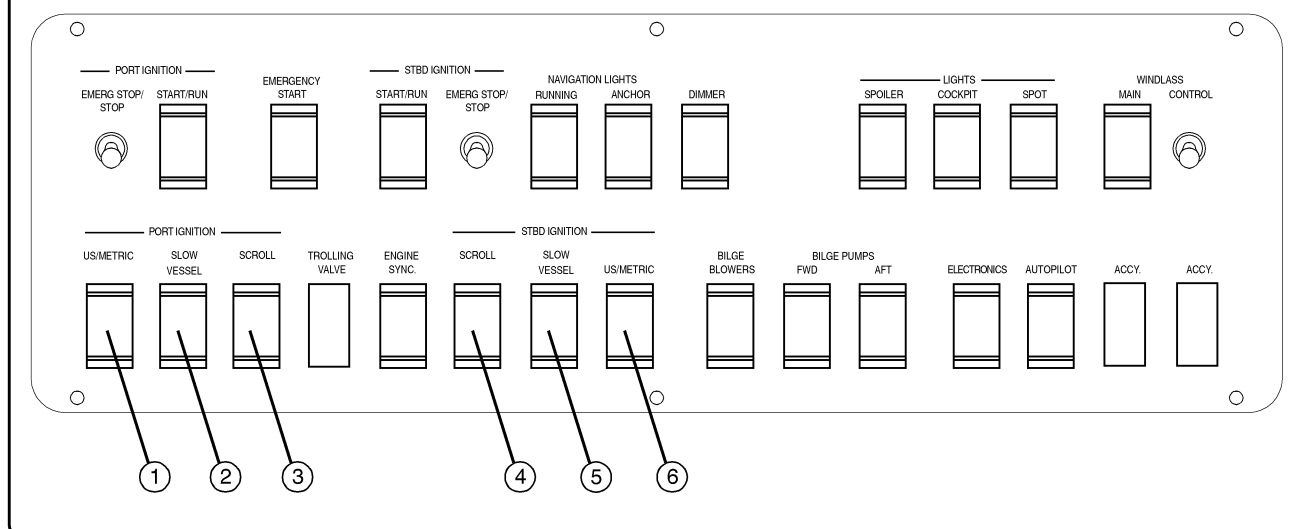
OPTIONAL TWIN DISC® ELECTRIC SHIFT AND THROTTLE CONTROLS

## Optional Detroit Electronic Display Module (EDM) DDEC Dash Panel (fig. 3.2.2)



## Control Station Switch Panel (fig. 3.3.1)

(See fig. 3.1.1 for location)



The following switches are for Caterpillar® Electronic Engines. If your engine choice is a Caterpillar® Mechanical Engine, or any Detroit Engine, these switches will be plugged.

1. **U.S./Metric**  
Changes port EMS gauge readout to U.S. or metric measurements.
2. **Slow Vessel**  
Allows port engine RPM to drop (only at idle throttle position). See information below for slow vessel mode operation.
3. **Scroll**  
Allows operator to scroll through the port EMS gauge (see page 3.10 – main EMS display).
4. **Scroll**  
Allows operator to scroll through the starboard EMS gauge (see page 3.10 – main EMS display).
5. **Slow Vessel**  
Allows starboard engine RPM to drop (only at idle throttle position). See information below for slow vessel mode operation.
6. **U.S./Metric**  
Changes starboard EMS gauge readout to U.S. or metric measurements.

## SLOW VESSEL MODE

If your 540 DA engine option is one of the Caterpillar® electronic engines, a Slow Vessel Mode may be available. The Slow Vessel Mode enables the operator to reduce engine idle RPM by the push of a

rocker switch located on the control station switch panel (see above panel). This reduction in RPM at idle helps reduce the yacht's wake in a Slow Speed or No Wake zone.

With the Slow Vessel Mode turned ON your yacht may produce a wake that violates a NO Wake zone or cause a nuisance to other boat traffic. To correct this, the operator should shift one of the engines to NEUTRAL, remembering to adjust your steering to maintain your heading.

Pushing the rocker switch activates the Electronic Control Module (ECM) to reduce the engine RPM by 100 RPM's. Example: Programmed engine idle is 700 RPM's. When Slow Vessel Mode is ON engine RPM will drop to 600 RPM's.

### CAUTION

Slow Vessel Mode Should NOT be used during any type of maneuvering such as docking at a slip or rafting to other boats. Slow Vessel Mode reduces engine RPM and could cause engine(s) to stall during maneuvering.

### NOTICE

Slow Vessel Mode should be used at engine idle speed. Using Slow Vessel Mode at higher than engine idle speed may limit top end performance.

### To Engage Slow Vessel Mode:

- Bring engines' throttle controls to IDLE
- Push the Slow Vessel Mode switch to ON, engine RPM's will drop by 100 RPM's
- Remember, shift one of the engines to NEUTRAL if your yacht's wake is not reduced enough with Slow Vessel Mode

### To Disengage Slow Vessel Mode:

- Ensure engines are at idle speed
- Push Slow Vessel Mode switch to OFF, engines' RPM will increase to programmed engine idle RPM

are required, such as when docking, trolling or passing through no wake areas.



### CAUTION

**Trolling valve and Detroit DDEC low idle should NOT be used at the same time. DDEC low idle reduces engine RPM and could cause engine(s) to stall during maneuvering.**

The **LOW IDLE** switch (DDEC option only) activates the engines to IDLE at a lower RPM, enabling slower vessel speed for maneuvering and a reduction in wake.

Refer to your Owner's Manual Packet for your yacht's Trolling Valve or Low Idle option for operating instructions.

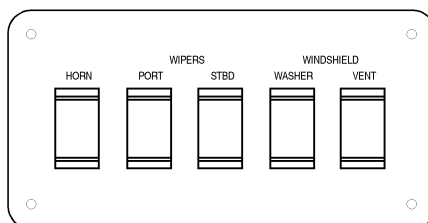
## TROLLING VALVE AND LOW IDLE OPTION

### (Only Available With Some Engine Options)

The **TROLLING VALVE** switch controls a valve on both engine transmissions. When turned on, this allows the shafts to turn slower when slow speeds

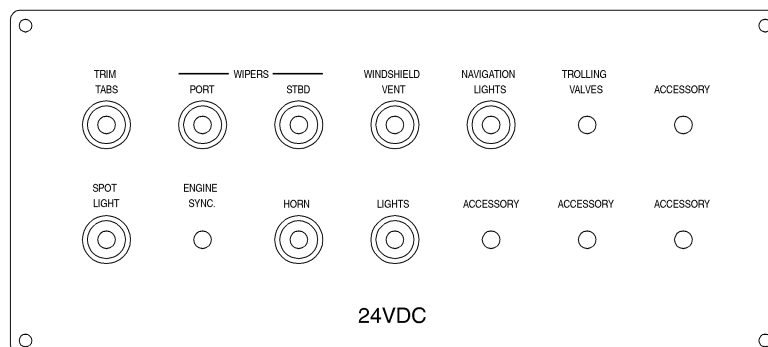
### Control Station Accessory Switch Panel (fig. 3.4.1)

(See fig. 3.1.1 for location)



### Control Station Breaker Panel (fig. 3.4.2)

(See fig. 3.1.1 for location)





## HYDRAULIC POWER STEERING SYSTEM

The hydraulic power steering system uses the boat's engines to provide the "power" for the steering system, via a mechanical or electrical motor driven hydraulic pump.

A manual hydraulic steering system, consisting of a helm and a hydraulic cylinder (fitted with an integral servo cylinder and a power steering valve), supplies the "control" portion of the steering system.

Under normal conditions, with engines running, a hydraulic oil supply is in a standby mode, ready to be directed to the steering cylinder as dictated by the steering wheel, servo cylinder and power steering valve. Turning the steering wheel left or right makes the system go from "standby" into "operating" mode and move the steering cylinder accordingly.

In the event of a power source failure, hydraulic oil from the steering helm is automatically diverted into the servo and steering cylinder, providing the helmsman with manual backup steering.

An engine room mounted oil reservoir allows easy fill and assists the in-line cooler in cooling the hydraulic oil. An in-line oil filter helps to protect the steering system components against contaminants.

REFER TO OWNER'S MANUAL PACKET FOR INSTRUCTIONS AND WARRANTY INFORMATION.

## GEAR SHIFTS & THROTTLE CONTROLS

Your yacht may be equipped with **hydraulic** or **electric** throttle control(s). There are different functions, operating and maintenance instructions

which must be followed to prevent improper operation and maintenance. Read and understand the information in the Owner's Manual Packet for your yacht model's gear and throttle controls.

Your yacht has start in-gear protection. For safety's sake and as a good habit to get into, always put the gear selector in the "NEUTRAL" position and the throttle selector in the "IDLE" position before starting the engines.



### WARNING

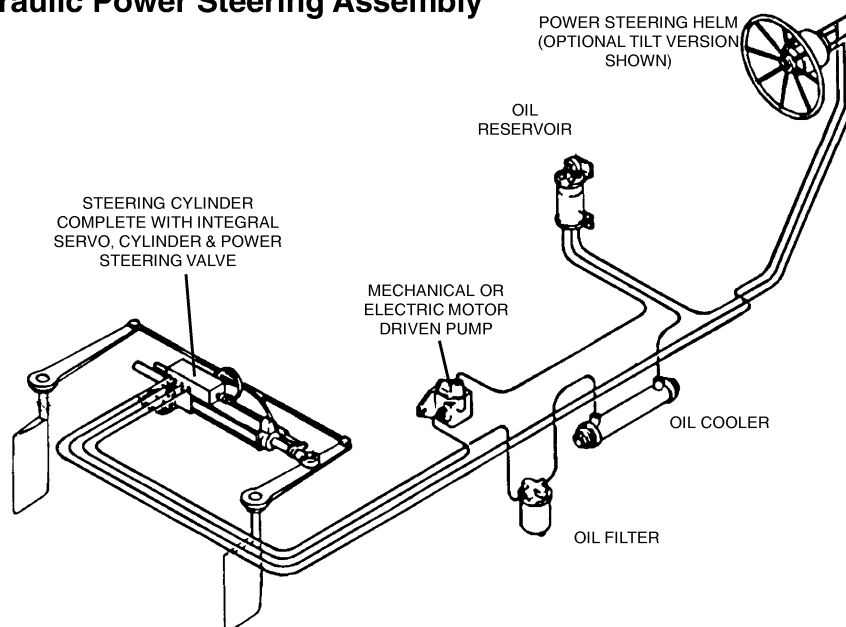
- Shift selector(s) to "NEUTRAL" before starting engines.
- Shift only when engine is at idle.
- Reversing at high speeds can cause flooding/swamping due to water being pushed over the transom (stern).



### CAUTION

- Shift quickly; easing into gear can damage the transmission.
- Hydraulic controls "FORWARD" and "REVERSE" positions should always be in the full travel extremes in either direction for positive engagement and minimum wear.

**Typical Hydraulic Power Steering Assembly**  
(fig. 3.5.1)



## Maneuvering

Operating your yacht in reverse comfortably requires practice. Find open water and practice reversing techniques. Here are a few things to remember:

- Bring engine to “IDLE” before shifting.
- Pause in “NEUTRAL” while shifting to allow the boat to lose headway, then shift quickly.

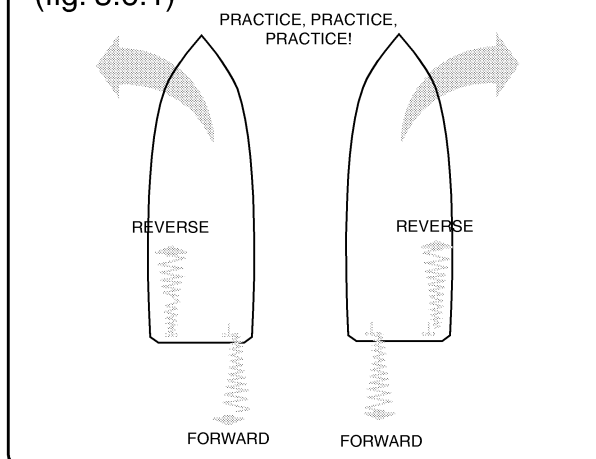
Reversing the shift lever will cause a “braking action” when maneuvering the boat at low speeds. Care should be exercised in using the reverse throttle for “braking action” as the sudden slowing of the boat’s forward motion will create a following wake which may rise above the transom and flood/swamp the boat if the boat is moving at too great a speed. All propellers are designed to give maximum forward thrust, so the reverse thrust of the propeller will not be as efficient.

Each gear shift lever can be used independently from the other. For example, while idling you can shift one forward and the other in reverse. This is called *differential power*, and it will increase your boat’s maneuverability. We suggest that you go to open water and practice, practice, practice.

## GEAR SHIFTS & THROTTLE CONTROLS (Hydraulic)

Your yacht is equipped with hydraulic gear shifts and throttle controls as standard equipment.

### Examples of Differential Power (fig. 3.6.1)



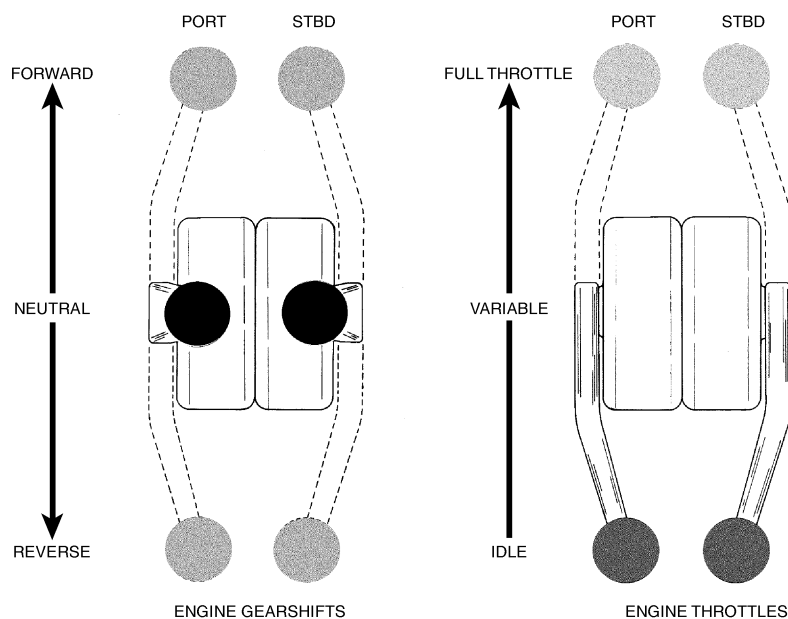
The gear shift lever for each engine, twin lever controls on port side of control station, has three positions: forward, neutral, and reverse. The control lever must be in the neutral (center) position when starting the engine(s). A positioning indent can be felt when the control is in exact neutral. Forward and reverse positions should always be in full travel extremes in either direction for a positive engagement and minimum wear.

The throttle controls, twin lever controls on starboard side of control station, regulate the RPM of the engines. Periodically check and seasonally lubricate the linkage with medium weight oil.

**NOTE:** Prior to starting engines, put throttles at idle and clutches in neutral.

### Engine Shift & Throttle Functions (Hydraulic)

(fig. 3.6.2)



### Operation (Hydraulic) (See fig. 3.6.2)

1. Throttle Levers:  
Forward Motion – Increases Throttle  
Aft Motion – Decreases Throttle
2. Gearshift Levers:  
Forward Position – Forward Direction  
Center Position – Neutral  
Aft Position – Reverse Direction

### Maintenance

The clutch and throttle lever bodies are made of anodized aluminum. To clean them, a warm soapy water solution should be used. Do not use an abrasive compound.

**NOTE:** Refer to your Engine Owner's Manual to operate the throttle arm by hand for maintenance.

REFER TO OWNER'S MANUAL PACKET FOR INSTRUCTIONS AND WARRANTY INFORMATION.

## GEAR SHIFTS & THROTTLE CONTROLS (Electric Option – DDEC or Twin Disc®)

Your yacht may be equipped with either DDEC or Twin Disc® electric gear shifts and throttle controls as optional equipment. They are located on the control station (see fig. 3.2.1 & 3.2.2). Electric controls offer many advantages, including ease of shifting, no mechanical linkages, and much more.

Sea Ray® recommends that you read the **Owner's Manual for electric control options on your 540 DA** to take full advantage of this option. Enjoy!

**NOTE:** Prior to starting engines (diesel):

- Shift throttle and gear levers into the NEUTRAL position.
- Ensure that the boat's DC power is ON.
- **DDEC only** – Turn system activation switch ON.
- Follow the engine START sequence according to the Engine Owner's Manual. Also see Section 4 – *Fueling & Starting*.

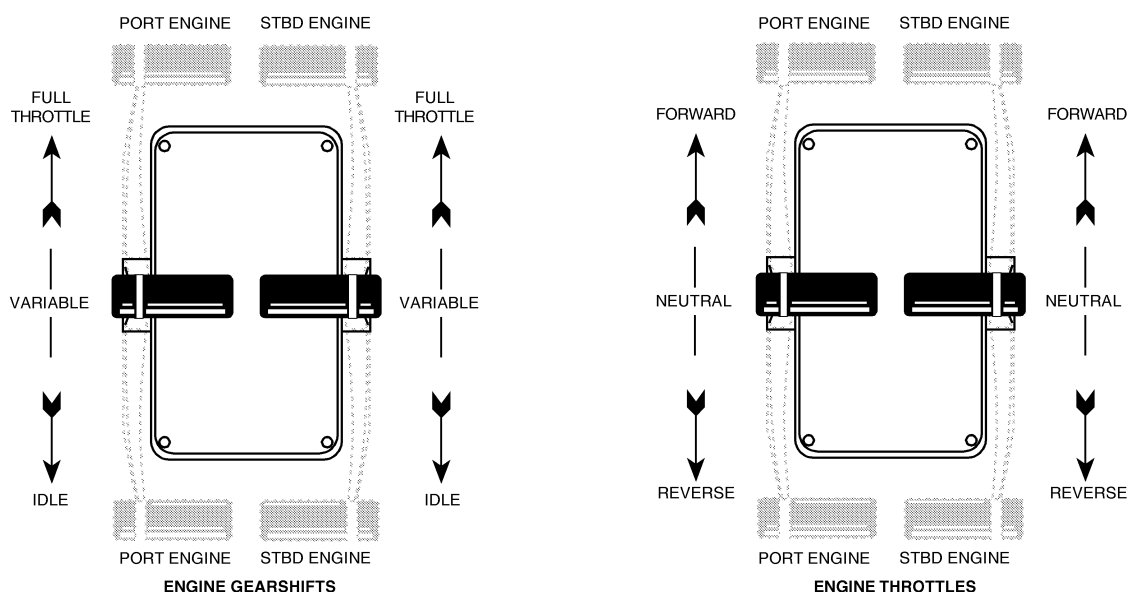
### Operation (DDEC) (See fig. 3.7.1)

1. Throttle Senders:  
Forward Motion – Increases Throttle  
Aft Motion – Decreases Throttle
2. Clutch Senders:  
Forward Position – Forward Direction  
Center Position – Neutral  
Aft Position – Reverse Direction

### Operation (Twin Disc®) (See fig. 3.8.1)

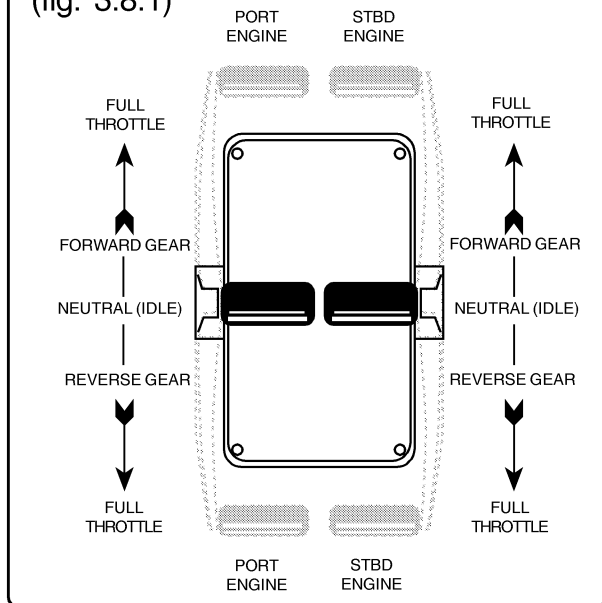
1. The port lever operates the gear and throttle for the port engine and the starboard lever operates the starboard engine gear and throttle.

### Engine Shift & Throttle Functions (DDEC Electric Option) (fig. 3.7.1)



## Engine Shift & Throttle Functions (Twin Disc® Electric Option)

(fig. 3.8.1)



2. Moving the lever forward to the first indent engages the forward gear. Moving the lever backwards to the first indent engages the reverse gear.
3. Moving the levers further forward or backwards increases throttle and boat speed.

REFER TO OWNER'S MANUAL PACKET FOR INSTRUCTIONS AND WARRANTY INFORMATION.

## ENGINE SYNCHRONIZERS

When the engine synchronizers are in operation, any engine speed differential is immediately sensed and automatically corrected. A single throttle movement is all that is necessary to ensure that both engines maintain identical RPM.

The standard helm for the 540 DA is equipped with Glendinning synchronizers and hydraulic gearshift and throttle controls. The optional helms offer synchronizers that accompany the electronic gauge and electric gearshift and throttle control package (i.e. Twin Disc® or DDEC). If you have either of these options, refer to your Owner's Manual Packet for the correct operating instructions for your 540 DA engine synchronizers.

### Glendinning Synchronizers:

1. Have both engines running and advance speed slightly above idle.
2. Turn ON synchronizer switch located on the control station switch panel.

3. MOVE SLAVE (STARBOARD) ENGINE THROTTLE LEVER TO "MAXIMUM" SPEED POSITION since the synchronizer is now controlling the slave engine, the lever is "limp" or non-effective. Advancing the slave engine lever eliminates the synchronizer of undue strain in moving the entire control system.
4. Both engines are now under the control of a single movement of the lead (port) engine throttle control and may be advanced or retarded through the entire cruising range. ADVANCE LEAD (PORT) ENGINE CONTROL SLOWLY. The indicator light next to the synchronizer switch will illuminate when engines are synchronized.
5. To disengage - switch OFF synchronizer - move slave engine lever back towards idle. It will automatically reengage with the engine control. A safety collar assures positive return to idle when switching OFF and moving lever back.

Use of the automatic synchronizer at minimum and maximum engine speeds call for engine speed settings to be as follows:

- SLAVE engine at "IDLE:" Set SLAVE throttle LOWER than LEAD engine.
- SLAVE engine at "MAXIMUM:" Set SLAVE throttle HIGHER than LEAD engine.

Automatic deactivation of the Automatic Synchronizer will result from conditions contrary to the above settings. The power light will go OFF and the automatic synchronizer will be deactivated. To re-engage, switch OFF and ON again.

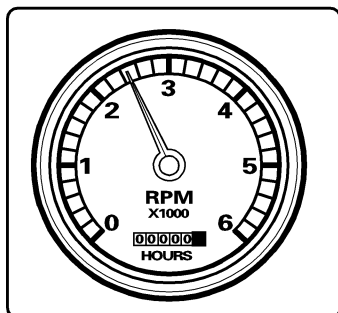
REFER TO OWNER'S MANUAL PACKET FOR INSTRUCTIONS AND WARRANTY INFORMATION.

## Instrument Gauges

Your 540 DA is equipped with analog gauges as standard equipment (see fig. 3.1.1). There are two optional electronic gauge packages available. They are the Caterpillar® Engine Monitoring System (EMS) and the Detroit Diesel® Electronic Display Module (EDM) (refer to fig. 3.2.1 or 3.2.2 for the display installed on your yacht).

The following information is a brief description of the standard and optional gauge packages. Refer to the Owner's Manual Packet and/or consult the dealer for complete instructions regarding your 540 DA gauge package.

## TACHOMETER (With Hourmeter)



(fig. 3.9.1)

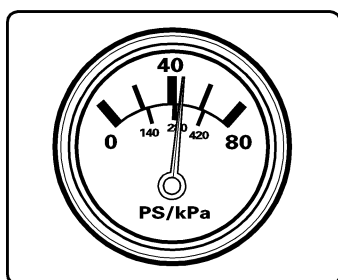
The tachometer indicates the revolutions per minute (RPM) of the engine. It does not indicate the speed of the boat through the water or over the bottom. Your Engine Operator's Manual states the maximum full throttle RPM at

which your engine should operate. This should not be exceeded. The tachometer should also be used to determine the most comfortable and economical cruising RPM.

### Hourmeter

Hourmeters measure cumulative hours of operating time and are available for both engines and the generator. They should be used to keep a careful log of engine maintenance as well as performance data and fuel consumption. Do not leave ignition key on with the engines off, as this will increase the engine hours on the hourmeter. A generator hour meter is located on the generator gauge panel (see fig. 7.19.3).

## OIL PRESSURE GAUGE



(fig. 3.9.2)

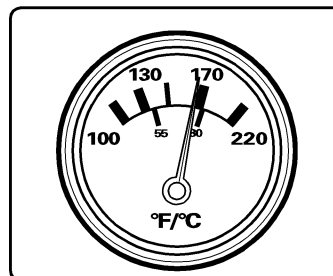
Very little serious trouble can occur in an engine which will not be reflected on the oil pressure indicator. Maximum pressure is controlled by a preset valve in the oil pump. Note the reading which this

gauge records when the engine is new, as it is the "norm" which can be used as reference during the life of the engine. IF A COMPLETE LOSS OF OIL PRESSURE OCCURS, TURN ENGINE OFF AT ONCE. Continued running after loss of pressure will cause engine damage. First, manually check the oil level. If low oil level is not the cause, consult your Sea Ray® dealer. DO NOT RESTART THE ENGINE UNTIL THE PROBLEM HAS BEEN CORRECTED.

Slight fluctuations in gauge readings are not uncommon during operation and may be due to the characteristics of the lubricating oil. Greater fluctuations should be investigated. The cause may

be a clogged oil filter element which should be replaced with every oil change.

## WATER TEMPERATURE GAUGE



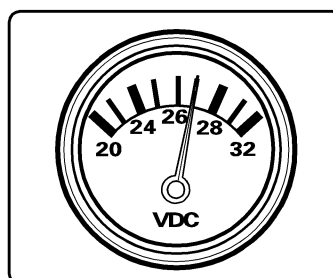
(fig. 3.9.3)

The water temperature gauge indicates temperature of the cooling water circulating inside the engine. Your engine is equipped with a thermostat so a pre-determined engine temperature should be reached soon

after starting the engine and maintained thereafter while the engine is running.

Refer to your Engine Operator's Manual for proper gauge readings. **If the temperature approaches above normal on your gauge, shut down engine at once.**

## VOLTMETER

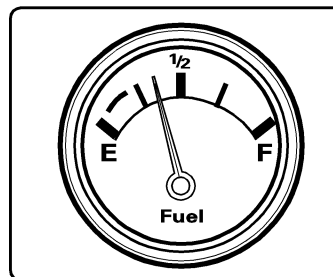


(fig. 3.9.4)

The voltmeter indicates battery bank voltage. Normal engine operating voltage will range between 24.0 to 28.5 volts when the alternator is charging. Significantly higher or lower readings indicate a battery problem, alternator malfunction or heavy battery drain.

## FUEL GAUGE

The fuel gauge indicates the amount of fuel in the fuel tank. The most accurate reading of the fuel gauge is at idle speeds when your boat is in an approximately level position. At slow plane, when your boat is in a bow up position, the gauge will read inaccurately because the fuel in the tank travels to the rear of the tank and away from the fuel sending unit.



(fig. 3.9.5)

Because gauge readings are approximate, they should be compared to the hours of use versus known fuel consumption (GPH).

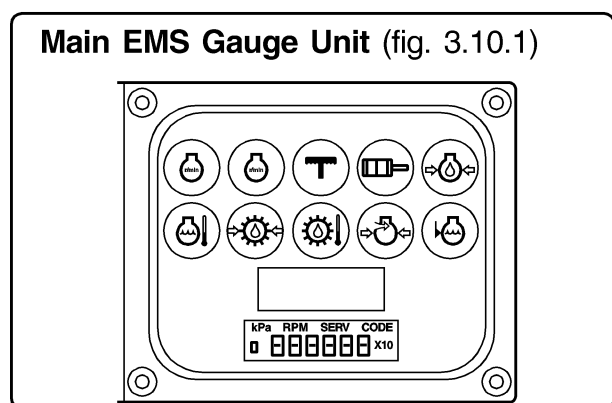
## ENGINE MONITORING SYSTEM (EMS) (OPTIONAL)

The optional Caterpillar® Engine Monitoring System (EMS) incorporates three individual gauge units per engine (see figure 3.2.1). They are:

- Main EMS Gauge
- Quad Gauge
- Tachometer

**Refer to the Owner's Manual Packet for more information about your gauge display operation and instructions.**

### MAIN EMS DISPLAY



EMS is an electronic monitoring system designed to display various engine/transmission parameters. The main EMS gauge has ten (two rows of five) indicators to display system related diagnostics. A digital LCD is functional to scroll through the different engine/transmission parameters monitored. **A port and starboard scroll switch is located on the control station switch panel (see fig. 3.3.1).**

The parameters monitored include the following functions:

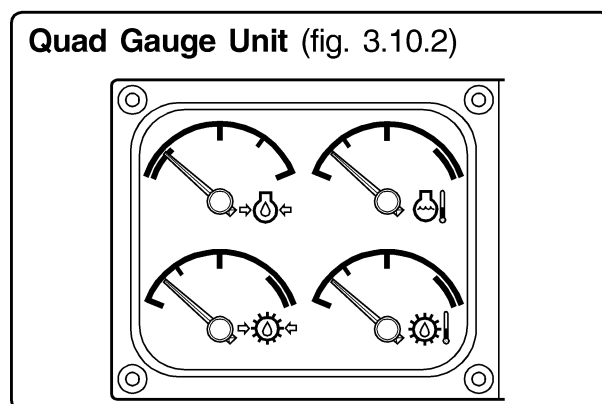
- Engine Overspeed (Main and Back-up Speed Sensors)
- Engine Oil Pressure
- Engine Coolant Temperature and Coolant Level
- Transmission Oil Pressure and Oil Temperature
- Percent Load (Actuator)

- Fuel Rate (Throttle)
- Engine Hours

## HOURLMETERS

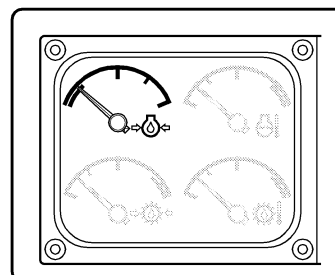
The hourmeters measure cumulative hours of operating time. There are hourmeters on top of each Caterpillar® engine and an hourmeter readout on the Main EMS display by method of scrolling. They should be used to keep a careful log of engine maintenance as well as performance data and fuel consumption. Do not leave ignition key on with the engines off, as this will increase the engine hours on the hourmeter. The generator hourmeter is located on the generator gauge panel (see fig. 7.19.3).

### QUAD GAUGE



The quad gauge unit displays in analog format engine oil pressure, engine coolant temperature, transmission oil pressure and transmission oil temperature.

## OIL PRESSURE GAUGE



(fig. 3.10.3)

The oil pressure gauge is often the best indicator of engine problems or difficulties. Maximum pressure is controlled by a preset valve in the oil pump. Note the reading which this gauge

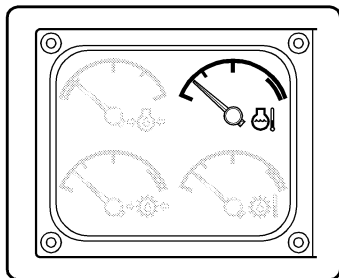
records after the break-in period, as it is the "norm" which can be used as reference during the life of the engine.

**IF A COMPLETE LOSS OF OIL PRESSURE OCCURS, TURN ENGINE OFF AT ONCE.**

Continued running after loss of pressure will cause engine damage. First, manually check the oil level. If low oil level is not the cause, consult your Sea Ray® dealer. **DO NOT RESTART THE ENGINE UNTIL THE PROBLEM HAS BEEN CORRECTED.**

Slight fluctuations in gauge readings are not uncommon during operation and may be due to the characteristics of the lubricating oil. Greater fluctuations should be investigated. The cause may be a clogged oil filter element which should be replaced with every oil change.

## WATER TEMPERATURE GAUGE

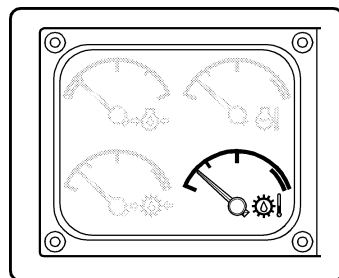


(fig. 3.11.1)

The water temperature gauge indicates temperature of the cooling water circulating inside the engine. Your engine is equipped with a thermostat so a predetermined engine temperature

should be reached soon after starting the engine and maintained thereafter while the engine is running. Refer to your Engine Operator's Manual for proper gauge readings. **If the temperature approaches above normal on your gauge, shut down engine at once.**

## TRANSMISSION OIL TEMPERATURE GAUGE



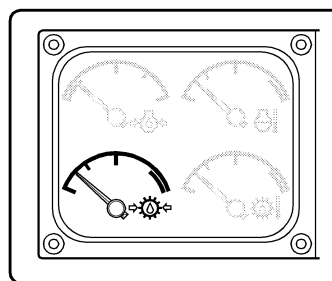
(fig. 3.11.2)

The transmission oil temperature gauge indicates temperature of the transmission fluid inside the engine transmission. **If the temperature approaches above**

**normal on your gauge, shut down engine at once. Refer to Engine Owner's Manual for normal operating range.**

## TRANSMISSION OIL PRESSURE GAUGE

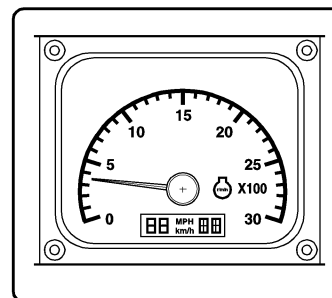
The transmission oil pressure gauge indicates pressure of the transmission fluid inside the engine transmission. **If the pressure approaches above or below normal on your gauge, shut down engine at once. Refer to Engine Owner's Manual for normal operating range.**



(fig. 3.11.3)

**Note:** It is normal for the oil pressure to fluctuate when the engines are throttled up.

## TACHOMETER



(fig. 3.11.4)

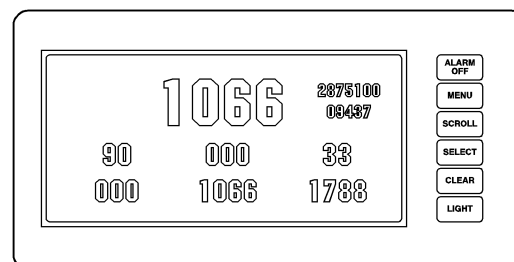
The tachometer indicates the revolutions per minute (RPM) of the engine on an analog gauge. It does not indicate the speed of the boat through the water or over the bottom. Your

Engine Operator's Manual states the maximum full throttle RPM at which your engine should operate. This should not be exceeded. The tachometer should also be used to determine the most comfortable and economical cruising RPM.

A three-digit LCD indicator displays vessel speed and a two-digit indicator displays trolling mode status or synchronization mode status.

## DETROIT DIESEL ELECTRONIC DISPLAY MODULE (EDM) (OPTIONAL)

### Detroit Diesel® EDM (fig. 3.11.5)



The Electronic Display Module (EDM) automatically turns on with the ignition key. The module briefly sounds its audible alarm and runs through checks of the display and internal circuits. Following the checks, it receives and displays engine and transmission data. It always shows engine speed,

coolant temperature, oil pressure, fuel consumption rate, battery voltage, transmission oil temperature, transmission oil pressure, gear direction, and the active control station number.

The six pushbuttons on the keypad allow you to access information and features, displaying it in the text window.

## CONSOLE DIMMER

There is a “DIMMER” control switch located on the control station switch panel which controls the intensity of the gauge and switch panel lights. The gauge and switch panel lights are energized when the navigation running lights are turned on.

## MARINE COMPASS -◆-

A marine compass is deflected and its usefulness impaired when other instruments or objects containing iron, magnets, or electric current carrying wires are in its vicinity. A newly installed compass must be adjusted to compensate for these influences if they must remain in proximity to it.

The compensating or adjusting should be done by a qualified compass adjuster. A compass can seldom be corrected to zero deviation on all headings, so you will be provided with a deviation card or chart showing the correction to be applied when laying out a compass course or making your navigational calculations. **Keep this card at the control station at all times.**

After your compass is adjusted, do not permit items such as iron or steel to be placed near it, even temporarily, as they will affect its accuracy. The compass must be readjusted if any items which affect it are removed, relocated or added in its vicinity.

When not in use, the compass should be protected from excessive and prolonged sunlight. If your compass becomes sluggish or erratic, it should be serviced by an authorized repair station.

To keep the plexiglass dome free from scratches, remove salt deposits and dust with a damp cloth. An occasional treatment with paste wax will help preserve the dome surface.

REFER TO OWNER'S MANUAL PACKET FOR INSTRUCTIONS AND WARRANTY INFORMATION.

## NAVIGATION LIGHTS

Navigation lights must be displayed while underway from sunset to sunrise. The term “underway” denotes not anchored or docked. Trolling or drifting with power off is considered underway and normal running lights must be displayed. At anchor, in open water, a 360° white anchor light must be displayed.

### To operate the RUNNING lights:

Push “NAVIGATION” switch on control station switch panel to the RUNNING position.

### To operate the ANCHOR lights:

Push “NAVIGATION” switch on control station switch panel to the ANCHOR position.

Your boat is equipped with a sport spoiler. If you opt to install a radar, it then becomes your responsibility to reevaluate your lighting situation to make certain the navigation lights on your boat meet government navigational lighting requirements. You will most likely have to raise the mast light. Consider the weight of the radar you install; be certain it is not too heavy for your sport spoiler.

## SYSTEMS MONITOR

The Systems Monitor consists of a Display Control Module (DCM) located at the control station and a Bilge Interface Module (BIM) located on the fwd bilge bulkhead component board (see fig. 2.10.1 and 2.10.2). The DCM and BIM are connected to each other by a coax cable and the BIM is continuously looking at all inputs for an alarm condition.

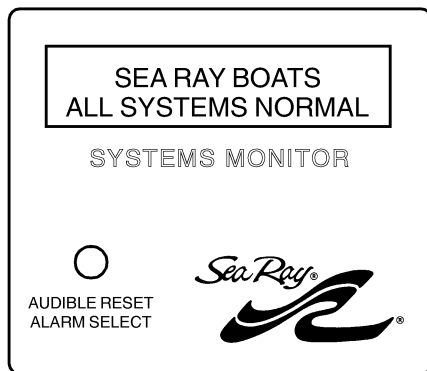
The Systems Monitor is connected directly to the 24 volt battery bank through a circuit breaker and continuously monitors two emergency high water pumps, two bilge pumps and the bilge heat detector. The engine and generator functions are only active when ignition voltage is turned on. The circuit breaker is on the main DC breaker panel located on the port bilge component board (see fig. 7.5.1 and 2.9.1).

The BIM collects signals from critical engine functions, generator oil pressure, bilge pumps, high water emergency bilge pumps and bilge heat detection and transmits that information to be displayed on the DCM.

The features of the DCM include a two line LCD display with backlighting of the display, audible alarm and an Audible Reset/Alarm Select pushbutton switch.



## Systems Monitor Display Control Monitor (DCM) (fig. 3.13.1)



The LCD display will read in two lines. For example, at normal operation will read:

SEA RAY BOATS  
ALL SYSTEMS NORMAL

**Note:** Some functions only read on one line. See page 3.14 (DCM functions) for all DCM display readouts.

Backlighting of the LCD is achieved by turning ON the navigation lights switch. Intensity is controlled by the electronic dimmer control. Both are located on the control station switch panel.

### Audible Alarms

An audible alarm will sound to alert the operator to look at the DCM and determine the high level fault. Only high level faults such as critical engine functions, generator, emergency pumps and bilge heat detector will have an audible alarm. The forward and aft bilge pumps do not have an audible alarm, instead the DCM will display those functions.

### Audible Reset/Alarm Select

The **Audible Reset/Alarm Select** pushbutton switch on the DCM is a dual purpose switch. It enables the operator to reset an audible alarm or to manually scroll the display during multiple alarms.

The **Audible Reset** is used to temporarily quiet an alarm that is displayed on the LCD. If that function is not corrected within 30 seconds, the audible alarm will sound again. Pushing the switch again will permanently quiet (turn off) the audible alarm for that function. The LCD will still display that fault until it is corrected.

The **Alarm Select** is active only during multiple alarms. For example, if the engine oil pressure, forward emergency pump and transmission temperature had faults at the same time the systems monitor would sound an audible alarm and would display the alarm with the highest priority. Each push of the switch will show the new alarm and then the LCD will automatically scroll through the multiple alarm functions approximately every three (3) seconds. By pushing on the switch, the operator will be able to manually scroll the LCD for faulting functions.

To monitor critical engine functions and generator oil pressure:

1. The 24 volt main battery solenoid switches must be energized either at the main DC breaker panel on the port bilge component board or the DC distribution panel on the port side just aft of the galley.
2. At the DC distribution panel turn the port and starboard master ignition key switch to the ON position.
3. At the control station, locate the port and starboard START/RUN switches. Without starting the engines, push the START/RUN switch(es) to the RUN position. The Display Control Monitor (DCM) will display:

SEA RAY BOATS  
ALL SYSTEMS NORMAL

**Note:** The generator and Detroit diesel engines will have an alarm as soon as ignition is turned on.

4. Start the engines per the engine start instructions in Section 4 pages 4.3 and 4.4.
5. Start the generator per the generator start instructions in Section 7 page 7.19.

With the main engines and generator engine running, the yacht's Systems Monitor is fully activated. When the engine and generator engine ignition is turned OFF, approximately five (5) minutes later the LCD will go into a "Sleep Mode" and the display will be blank. Engine and generator functions are disabled because they are unnecessary, however, the bilge heat detector and all pumps are still being monitored.

The following DCM Function table will name each function, describe the function and show how it is displayed on the DCM. An \* by the function indicates that function has an audible alarm.

## TRIM TABS

Function	Description	DCM
Normal Operation	No Alarms	SEA RAY BOATS ALL SYSTEMS NORMAL
BIM Coax Cable to DCM	Cable Connection Fault	DATA LINK FAILURE ALARM SYSTEM OFF-LINE
Bilge Heat Detector *	Sense Extreme (190°) Heat in the Bilge or a 15° Increase in Temperature	HEAT DETECTOR (NO SECOND LINE READING)
Forward Emergency *	Forward Emergency Pump Under the Master Stateroom Hatch is Running	PUMP ALARM FORWARD EMERGENCY
Aft Emergency *	Aft Emergency Pump in the Engine Room is Running	PUMP ALARM AFT EMERGENCY
Forward Bilge	Forward Bilge Pump in the Engine Room is Running	PUMP ALARM FORWARD BILGE
Aft Bilge	Aft Bilge Pump in the Engine Room is Running	PUMP ALARM AFT BILGE
Oil Pressure *	Engine Oil Pressure Too Low	PORT (OR STBD) ENGINE ALARM OIL PRESSURE
Water Temperature *	Engine Cooling System Too Hot	PORT (OR STBD) ENGINE ALARM WATER TEMPERATURE
Transmission Temperature *	Transmission Cooling System is Hot	PORT (OR STBD) ENGINE ALARM TRANSMISSION TEMPERATURE
Exhaust Temperature *	Engine Malfunction, Exhaust Too Hot	PORT (OR STBD) ENGINE ALARM EXHAUST TEMPERATURE
Fuel Filter Condition *	Fuel Filter Needs Cleaning	PORT (OR STBD) ENGINE ALARM FUEL FILTER CONDITION
Generator Alarm *	Generator Oil Pressure is Low Generator Stopped Running	GENERATOR ALARM (No Second Line Reading)
CAT Diagnostics * Caterpillar Electric Engines Only	For CAT Diagnostic Engines	PORT (OR STBD) ENGINE ALARM CAT DIAGNOSTIC
<p>The CAT Diagnostic feature is for Caterpillar electronic engines and will refer the operator to look at the port or starboard Caterpillar Engine Monitoring System (EMS) on the gauge panel at the helm. See fig. 3.2.1 for EMS gauge location and fig. 3.10.1 and text for more information on the EMS gauge unit.</p>		

If your Systems Monitor does not operate or display functions correctly per the instructions provided, recycle the circuit breaker by pushing the circuit breaker to the OFF position and then pushing it to the ON position. Use a small tool that will fit through the hole to push the breaker to the OFF position.

The trim tabs on your Sea Ray® are operated with a rocker type momentary switch at the control station. They are protected by a circuit breaker on the control station breaker panel which must be ON to use the trim tabs (see fig. 3.4.2).

To trim the bow of your boat down, push the top halves of both rockers down in half second bursts. If you hold the rockers down, you will over trim the boat and the bow will dig in. To correct over-trimming, push bottom halves of both rockers to obtain desired planing angle.

The two trim tabs on the transom of your boat can also be used to trim the list of your boat that may be caused by improper storage of gear, too many people on one side or a strong cross wind. Operation of the rocker switch should be momentary short bursts to achieve proper attitude of the hull.

When running wide open, most boats do not require

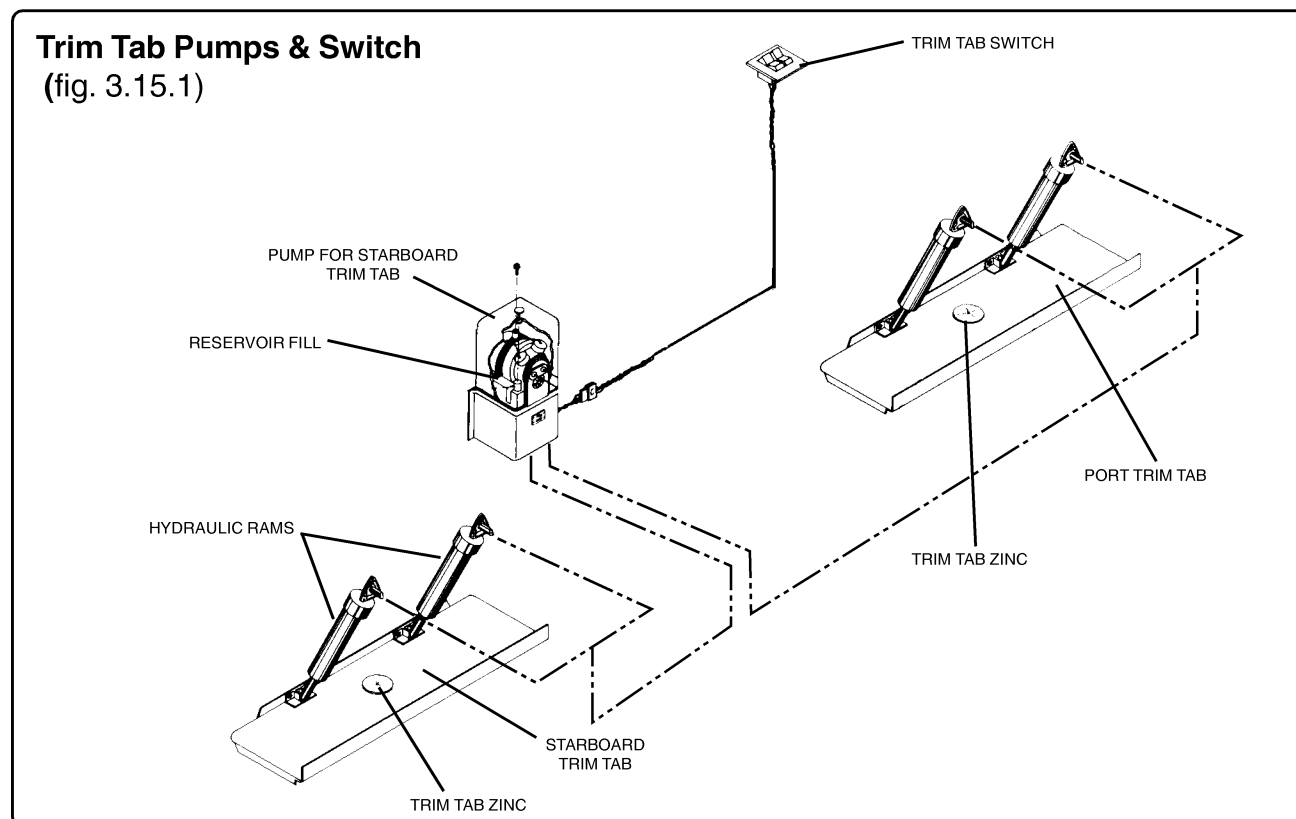
any trim unless heavily loaded.

In heavy following seas or when running in an inlet, best maneuverability is obtained with a bow high attitude. To be sure the tabs are full up in the zero position, push the bottom halves of the rockers for several seconds.

The trim tab pump is located on the starboard aft bilge bulkhead, mounted on the inside of the transom. To service the unit, remove the tinted plastic cover to gain access to reservoir fill plug and motor parts. Hydraulic trim tabs use Type A Dexron II automatic transmission fluid, which should be filled up to the "FULL" mark on the pump base. **Add fluid with the trim tabs in the up position only.**

REFER TO OWNER'S MANUAL PACKET FOR INSTRUCTIONS AND WARRANTY INFORMATION.

RUNNING ATTITUDE	LIST	PUSH
BOW UP	---	TOP OF BOTH ROCKERS
BOW UP	PORT	TOP OF STARBOARD ROCKER
BOW UP	STARBOARD	TOP OF PORT ROCKER
BOW DOWN	PORT	BOTTOM OF STARBOARD ROCKER
BOW DOWN	STARBOARD	BOTTOM OF PORT ROCKER





## Section 4 • Fueling & Starting

### Fuel Systems

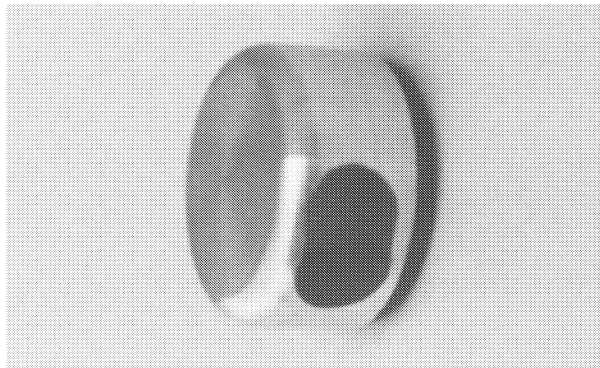
Fuel lines, filters and all fuel system components should be checked at the start of each season and periodically thereafter, particularly after any work has been done aboard the boat which might have affected any part of the system. Be certain that all are in proper condition and that the entire system is fuel tight. Each fuel tank has a manual shut-off valve on the crossover fuel board to close off the fuel system in case of leakage or line failure.

### FUEL TANKS

The 540 DA has two (2) aluminum fuel tanks mounted port and starboard (see figure 4.1.2 and 4.1.3). The fuel tanks each have a capacity of 300 gallons (1,135.5 liters). Fuel fills are located on the starboard deck walkway. The port fuel fill fills the port tank, the starboard fuel fill fills the starboard fuel tank. The generator draws from the starboard fuel tank only.

Your Sea Ray® is equipped with a fuel tank vent for each tank which serves as a pressure/vacuum release and safety overflow. The through-hull fitting has a flame arrester, making it imperative that you keep the screen clean and in excellent repair.

Replace the screen immediately if it becomes damaged or displaced. Periodically check the vent to assure that it is not clogged.



Fuel Vent With Screen/Flame Arrestor (fig. 4.1.1)

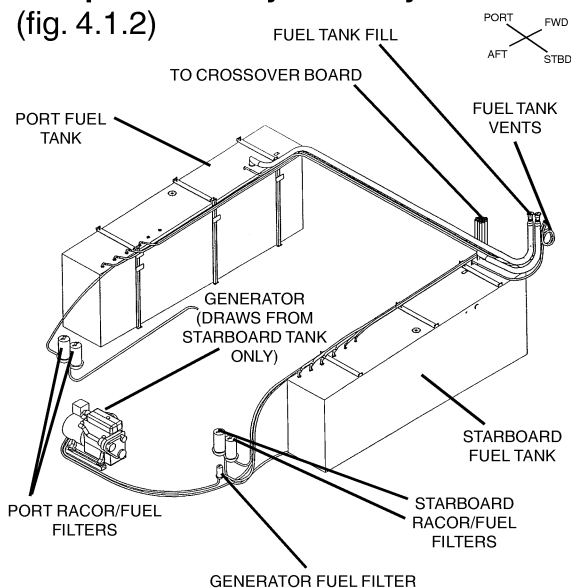
#### **WARNING**

**DO NOT** store fuel or flammable liquids in closed storage areas. Ventilation has not been provided for explosive vapors.

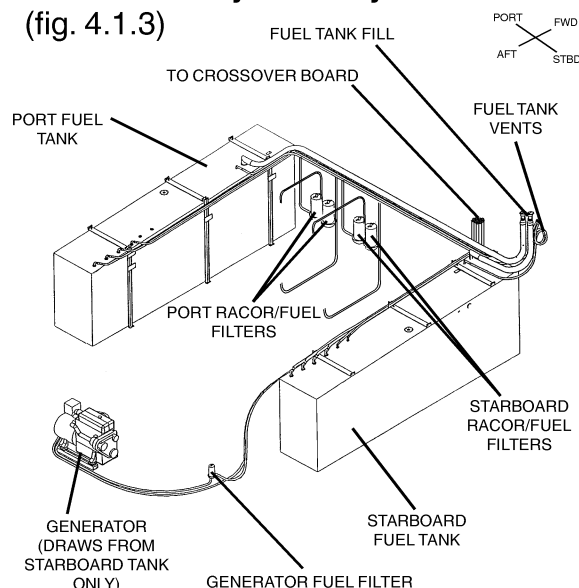
#### **WARNING**

**Leaking fuel is a fire and explosion hazard. Inspect system at least annually. Examine fuel tanks for leaks or corrosion at least annually.**

#### Catepillar Fuel System Layout (fig. 4.1.2)



#### Detroit Fuel System Layout (fig. 4.1.3)

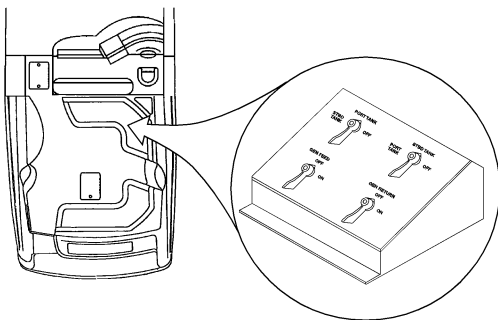
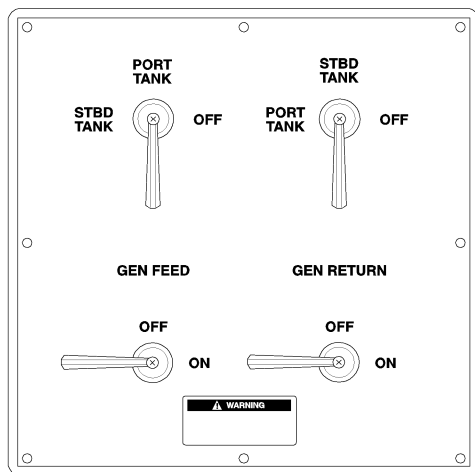


## CROSSOVER FUEL SYSTEM

The crossover fuel system allows the engines to draw fuel from either tank. This allows switching to an alternate tank in case of fuel contamination or for even fuel weight distribution. Each engine and the generator are equipped with valves on the crossover fuel board. The generator only draws fuel from the starboard fuel tank utilizing valves offering OPEN, CLOSED and RETURN settings only.

The crossover fuel board is located under the cockpit seat cushion (see figure 4.2.1). For access to the fuel board, lift the cushion on top of the starboard seating area.

**Crossover Fuel Board (fig. 4.2.1)**



## FUEL RECOMMENDATIONS

The quality of the fuel is very important for satisfactory engine performance and long engine life. Fuel should be clean and free of contamination. Your fuel tanks should be kept full of fuel whenever possible. This will reduce the amount of water condensation and reduce the possibility of contamination.

Recommended Fuel: **#2 Diesel fuel**

## Fuel Filters: (Diesel)

Primary and secondary fuel filters are located on your Sea Ray® to help keep the fuel as clean as possible. Primary fuel filters are the Racor® water separating fuel filters installed in the engine room (see figs. 4.1.2 and 4.1.3). The secondary fuel filters are located on the engines and should be replaced in accordance with the Engine Owner's Manual.

**Use of any methanol, gasohol or alcohol based fuel additive will damage the fuel filter.**

### Primary Fuel Filter Selection Valve:

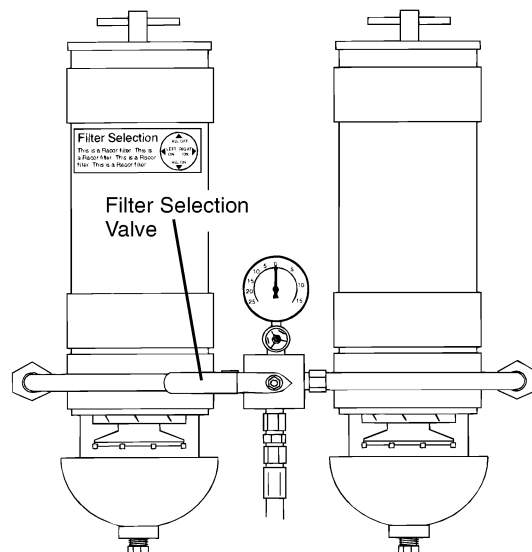
Arrow Up: ALL OFF

Arrow Right: RIGHT ON

Arrow Down: ALL ON

Arrow Left: LEFT ON

**Diesel Racor® Fuel Filters (fig. 4.2.2)**



**NOTE: IN ROUGH SEAS, ALLOW APPROXIMATELY 15% RESERVE WHEN PLANNING FUEL CONSUMPTION.**

**REFER TO THE ENGINE OPERATOR'S MANUAL FOR MORE DETAILED INFORMATION.**

## Fueling Precautions

Certain precautions must be carefully and completely observed every time a boat is fueled, even with diesel fuel. Diesel fuel is nonexplosive but it will burn.

### General:

- Fuel during daylight.
- Check fill plate label to ensure fuel is placed only in fuel tank. Fuel fill plates are located on the starboard deck.
- Avoid spills.
- Know your fuel capacity and consumption. Record the amount of fuel used since your last fill up, and compute the engine's hourly fuel usage. As a backup check to your fuel gauge, deduct the average hourly fuel usage from fuel tank capacity.
- Observe the "Rule of Thirds": one-third fuel for trip out, one-third for return and one-third for reserve.
- Allow an additional 15 percent fuel reserve when operating in rough seas.

### Before and During Fueling – Checklist:

- Fire extinguisher – close at hand.
- Mooring – boat tied securely to fueling pier.
- Crew – at least one knowledgeable person present.
- Passengers – unnecessary people off the boat.
- Engines – stopped.
- Electrical equipment, including blowers – power off.
- Windows, doors, hatches – closed.
- Smoking material – extinguished.
- Inboard tanks – grounded.
- Portable cans – placed on pier during filling.
- Filler pipe – marked "FUEL."
- Fuel nozzle – in contact with can or filler pipe to prevent static sparks.
- Fill level – fill less than rated capacity of tank; allow for fuel expansion.
- Trim – fuel weight distributed equally if more

than one tank.

### After Fueling – Checklist:

- Windows, doors, hatches – open.
- Blowers – operate at least four (4) minutes before starting engines.
- Sniff test – if fuel fumes remain, operate blowers until fumes are gone.
- Fuel tank – secure filler cap.
- Spills – wipe; dispose of rags ashore.

## Starting Engines

The engine operation and maintenance manual furnished with your boat describes pre-start and starting procedures. The following notes are basic reminders and not intended to cover every detail of starting. We urge you to thoroughly read and understand your engine manual.

1. Check battery switches for ON position.
2. Check the fuel tank levels.
3. Check the oil and coolant levels. See your Engine Operator's Manual for proper readings.
4. Check engines for coolant drain plug installations.
5. Check seacocks for open position.
6. Make sure strainers are clean and water tight.
7. Check fuel filters for tightness.
8. Turn on fuel valves on crossover fuel board.
9. Check the bilge for fuel fumes or liquid. **Do not start the engines until the source of fumes**

### DANGER

#### GASOLINE VAPORS CAN EXPLODE.

##### Before Starting Engine:

- Check engine compartment for fuel vapors.
- Operate blower for four (4) minutes.
- Run blowers below cruising speed.

**is determined and corrected and the bilge area is safely ventilated.**

10. Turn on the master key switches located on the DC distribution panel. Listen for alarms which indicate ignition power.

**NOTE:** Ignition switches on the control station must be in the RUN position.

**NOTE:** If your yacht is equipped with the Caterpillar® EMS (Engine Monitoring System), the Caterpillar® gauges on the control station gauge panel will undergo an automatic self-test on power-up. While executing this internal test, the display will also provide a visual indication by ramping gauges and displaying all digits to the operator that the panel is (or is not) functioning properly. Refer to your Engine Owner's Manual in the Owner's Manual Packet.

**NOTE:** Electric Twin Disc® shift and throttle controls require that the "STATION SELECT" button be pushed twice: once before the start of the port engine and again before the start of the starboard engine, or vice versa (refer to the Original Equipment Manual in the Owner's Manual Packet).

11. After ignition power is verified, check the gearshift lever(s) in the "NEUTRAL" position and the throttle lever(s) at "IDLE," then push on the top of the ignition switch(es) until the engine(s) start.

Do not operate starter for more than 10 seconds without allowing starter to cool for two (2) minutes. This will also allow the batteries to recover between starting attempts. Once engine has started and sufficient oil pressure is achieved, alarm buzzer will stop.

**Important:** Check engine RPM on tachometer as soon as engine starts. Do not allow RPM to exceed 1,500. Move throttle lever down to decrease RPM.

Alarm will sound when:

- Engine oil pressure is too low.
- Engine temperature is too hot.
- Transmission oil is too low.
- Transmission temperature is too hot.
- Engine stalls.

- Fuel filter condition
- Exhaust temperature too high.

12. Check the oil pressure and look at exhaust port to assure that engine is pumping water.
13. Let the engines warm up at idle and check for leaks. If engine is cold, run for a short period of time at fast idle speed that does not exceed 1500 RPM.
14. Shut down the engines and recheck fluid levels; top off if necessary.

**NOTE:** For general operation of the boat, its instruments and the engine, follow detailed instructions on "Engine Break-in" in the Engine Operator's Manual.

## Stopping Engines

1. Bring throttle controls to "IDLE" position.
2. Bring gear shift controls to "NEUTRAL" position.
3. Secure mooring lines.
4. Idle for five (5) minutes to cool the engines.
5. Switch momentary start switch or ignition key to OFF position.
6. Turn battery switches OFF.
7. Turn fuel valves OFF.



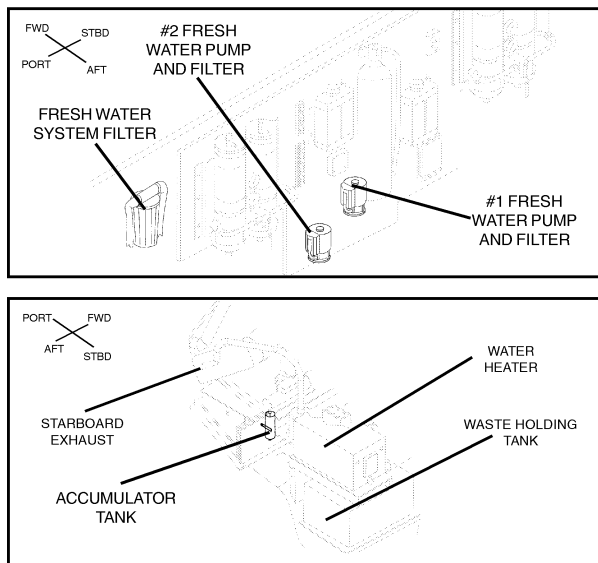
## Section 5 • Water System

### Water System

The fresh water system consists of two 24 volt water pumps with filters, water system filter and pneumatic accumulator tank (see fig. 5.5.1 for water system layout).

The fresh water system is activated by the water pump breakers on the DC distribution panel. The breakers must be ON to operate the head, shower, ice maker, fresh water wash down or faucets.

(fig. 5.1.1)



To begin initial operation:

1. Fill the water tank with potable water.
2. Switch the water pump breakers to the ON position.
3. One at a time, open all hot and cold faucets to bleed air from the water lines.
4. Once air has been eliminated from water lines, close faucets.
5. Shutting off the last faucet should cause the pump to shut off.

#### WARNING

**Make certain the hot water lines are air free, indicating the water heater is full. Damage will occur to water heater if it is not full when turned on.**

### FILLING THE WATER TANK

To fill your water tank you should use a plastic hose. Do not use a rubber hose; it can give the water a disagreeable flavor. The hose should be kept for filling use only. After using the hose it should be emptied. Start at one end and raise the hose to shoulder level and walk to the opposite end of the hose, allowing the remaining water to flow out. You should store your water tank filling hose in a clean dry place. It is also a good practice to cover the ends of the hose to keep the inside clean.

### WATER TANK

The 540 DA has a 150 gallon water tank. Access to the tank fittings is gained through a hatch in the salon.

The tank is filled through a fill plate located on the starboard deck walkway. Fill the water tanks only from a source known to provide safe, pure drinking water.

To check the water level in the tank, press the water level switch on the 24V DC distribution panel. The lights will indicate the amount of water in the tank.

### SANITIZING THE WATER SYSTEM

Although your dealer initially sanitizes the water system, if the system has not been used for a long period of time, or you suspect it may be contaminated, use a water treatment additive to sanitize the potable water system. Water treatment additives are available at marine/RV supply stores.

If water treatment additives are not available, adhere to the following procedure for complete sanitation of your potable water system.

1. Prepare a chlorine solution using one gallon of water and 1 cup Clorox or Purex household bleach (5% Hypochlorite solution). With tank empty, pour chlorine solution into tank, using one gallon solution for each 60 gallons of tank capacity.
2. Complete filling of tank with fresh water. Open each faucet until air has been released and the entire system is filled.
3. Allow to stand for three (3) hours.
4. Drain and flush with potable fresh water.

5. To remove excessive chlorine taste or odor which might remain, prepare a solution of 4 quarts of vinegar to 20 gallons of water and allow this solution to agitate in the tank for several days by vehicle motion.
6. Drain tank and again flush with potable water.
7. Replace water filter.

## WATER PUMPS & FILTERS

### Pumps

The 24 volt water pumps for the fresh water system are located on the forward engine room bulkhead (see fig. 2.11.1).

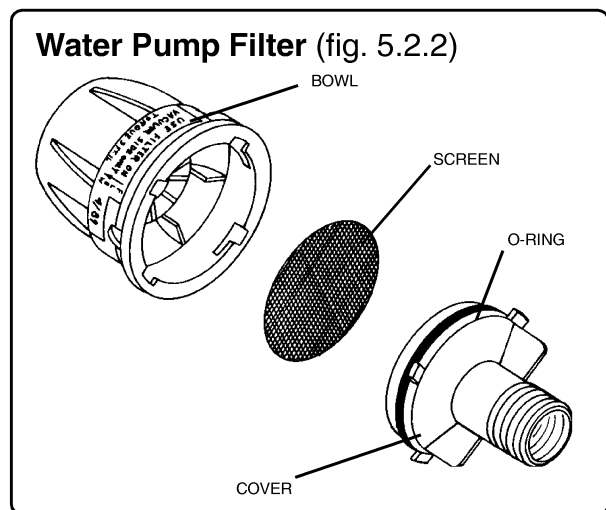
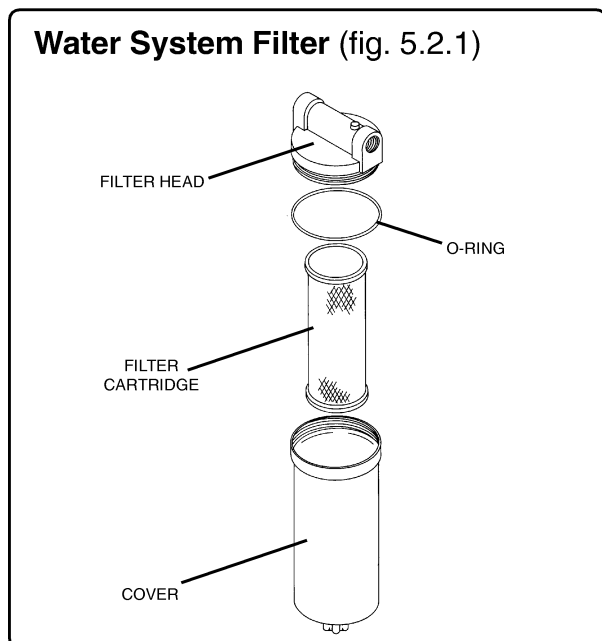
The pumps are turned on by the “FRESH WATER PUMP” breakers on the DC main distribution panel.

### Filters

Each of the water pumps have a filter on the suction side of the pump to prevent particles from entering the pump head. The filters should be checked and cleaned periodically (see fig. 5.2.2).

There is also a water system filter on the supply side of the pumps to filter any particles that the pump filters did not trap. The filter should be checked and cleaned periodically (see fig. 5.2.1).

Before servicing the system, turn the “WATER SYSTEM” breakers OFF and release pressure on the system by opening a faucet. To clean the filter, remove the screen and rinse with clean water. Replace, making sure the O-ring is in place when replacing the cover.



REFER TO OWNER'S MANUAL PACKET FOR INSTRUCTIONS AND WARRANTY INFORMATION.

## WATER SYSTEM ACCUMULATOR TANK

The water system pneumatic accumulator tank is located on the starboard side of the transom (see fig. 2.9.1).

The Accumulator Tank smoothes water flow and reduces on/off cycling of the pump by lessening the variation in pressure and flow between the pump and the outlets in the system.

The even flow of water gives better control of hot water temperature *especially noticeable with instantaneous gas water heaters* and with showers.

The reduced on/off cycling reduces noise from the pump motor, and from shock pressures (pipe hammer). It also reduces battery drain, and gives longer pump life.

REFER TO OWNER'S MANUAL PACKET FOR INSTRUCTIONS AND WARRANTY INFORMATION.

## WATER HEATER

The 20 gallon water heater is located in the engine room behind the generator. It runs on the 240 volt dockside system or generator and has a circuit breaker on the main distribution panel.

The water heater has a check valve to prevent hot water from back-washing into the cold water source and a pressure relief valve to avoid damage to the heater from over pressure or too high a temperature.

### Initial Start-Up Or After Winterization:

1. Make sure the “WATER HEATER” breaker is OFF.
2. Fill the heater with water.

3. Open the hot water faucets until all air is eliminated from the system.
4. Make certain the heater is full of water.  
**COMPLETE FAILURE OF THE HEATING ELEMENTS WILL RESULT IF THEY ARE NOT COMPLETELY IMMERSSED IN WATER AT ALL TIMES.**
5. Turn the "WATER HEATER" breaker ON.

To maintain water heater properly, drain whenever the possibility of freezing occurs and frequently inspect lines and connections for leaks.

REFER TO OWNER'S MANUAL PACKET FOR INSTRUCTIONS AND WARRANTY INFORMATION.

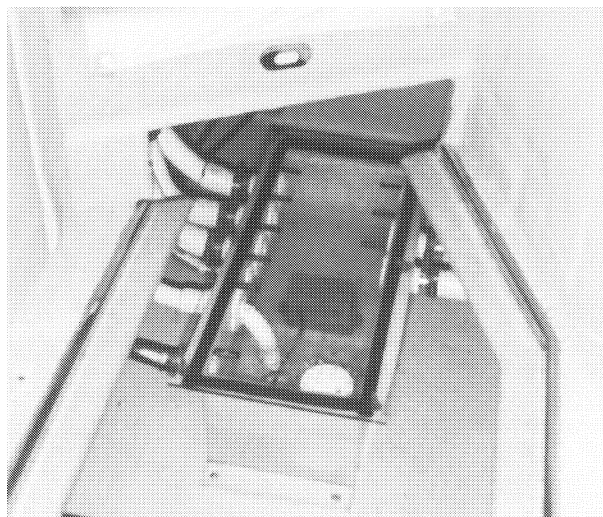
## SHOWER SYSTEM

The 540 DA is equipped with a shower sump. Grey water from the shower system drains into the shower sump to be pumped overboard.

The shower sump is located under a hatch in the master stateroom. The sump contains a pump and float switch. Also draining into this sump are all of the cabin air conditioner condensation drains, galley sink and both cabin head sinks.

The sump pump is fully automatic and protected by a breaker on the main DC breaker panel in the port engine room. Periodically remove the clear cover; check and clean the pump and float switch. Check the pump and float switch for obstructions and proper working order. The shower sump pump comes on when there is enough water in the sump to raise the float switch and start the pump. If it does not come on after one or two gallons of water drain from the shower, turn the water off and check the pump and float switch for proper operation.

After using the shower, it is recommended that you run a gallon of clean water through the shower drain to clean out soap residue.



Shower Sump (fig. 5.3.1)

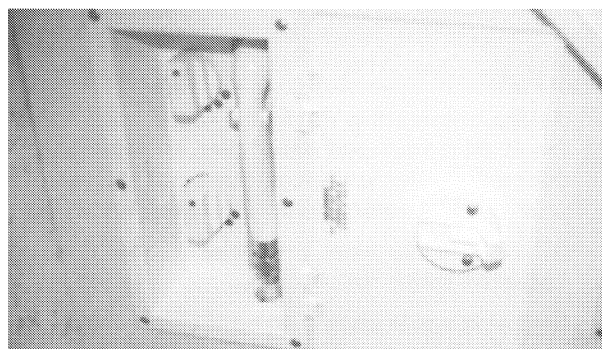
## FRESH WATER WASHDOWN

The 540 DA is equipped with three fresh water spigots; one in the bilge, one at the transom and one in the bow rope/chain locker. The bilge spigot comes with a 12-foot hose and a strap for storage when not in use. The transom spigot is located on the starboard transom. The rope/chain locker spigot is accessible through the bow deck hatch. The system uses water from the fresh water tank. The "FRESH WATER PUMP" breakers on the DC main distribution panel must be ON to operate the system.

## COCKPIT SHOWER

(See fig. 7.10.1 for location)

The cockpit shower has a hot and cold control and shower wand which are located in the starboard transom. Squeeze the button on the shower wand to dispense water and turn the knob to adjust water temperature. The "FRESH WATER PUMP" breakers on the main distribution panel must be ON to operate the shower.



Cockpit Shower (fig. 5.3.2)

## DOCKSIDE WATER INLET

(See fig. 7.10.1 for location)

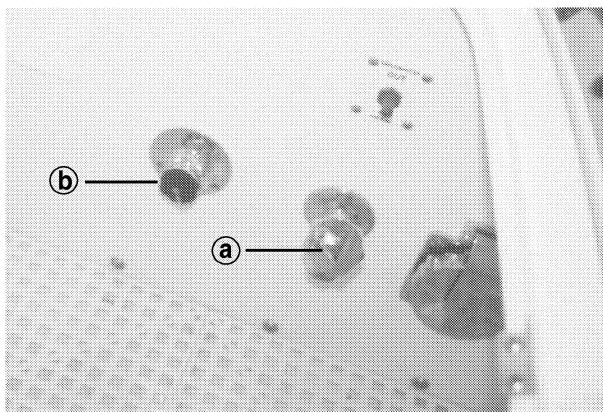
The dockside water inlet, located at the starboard transom, allows use of a dockside water source to provide water for the boat's fresh water system.

To use the system:

1. Make sure the "FRESH WATER PUMP" breakers are OFF.
2. Remove the watertight plug from the face of the dockside water inlet.
3. Connect a drinking water hose to the water outlet on the dock, then to the dockside water inlet on the boat and turn on the water at the dock.

All fresh water faucets and showers are now usable. To disconnect the system, reverse the procedure, making sure the watertight plug is reinstalled tightly.

Remove the dockside water hose when leaving the boat. This is a safety precaution to prevent the unlikely event of a water system failure and the intake of extreme amounts of water to the vessel.



(a) Fresh Water Washdown, (b) Dockside Water Inlet  
(fig. 5.3.3)



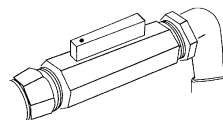
### WARNING

- Before connecting dockside water hose to the yacht's dockside water inlet, ensure that dockside water pressure does not exceed your yacht's water system pressure limit.
- DO NOT leave boat unattended with the dockside water hose connected.
- Dockside water should be connected during periods of heavy water usage only.

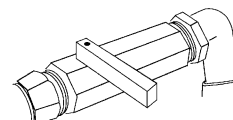
## WASHER & DRYER WATER VALVE (OPTION)

The washer/dryer unit is located in the guest stateroom. Hot and cold water lines are connected to the back of the unit. The valves on the back of the unit should be turned OFF when not in use. An access hatch is provided in the bottom of the cabinet above the washer/dryer.

### Washer & Dryer Water Valve (fig. 5.4.1)



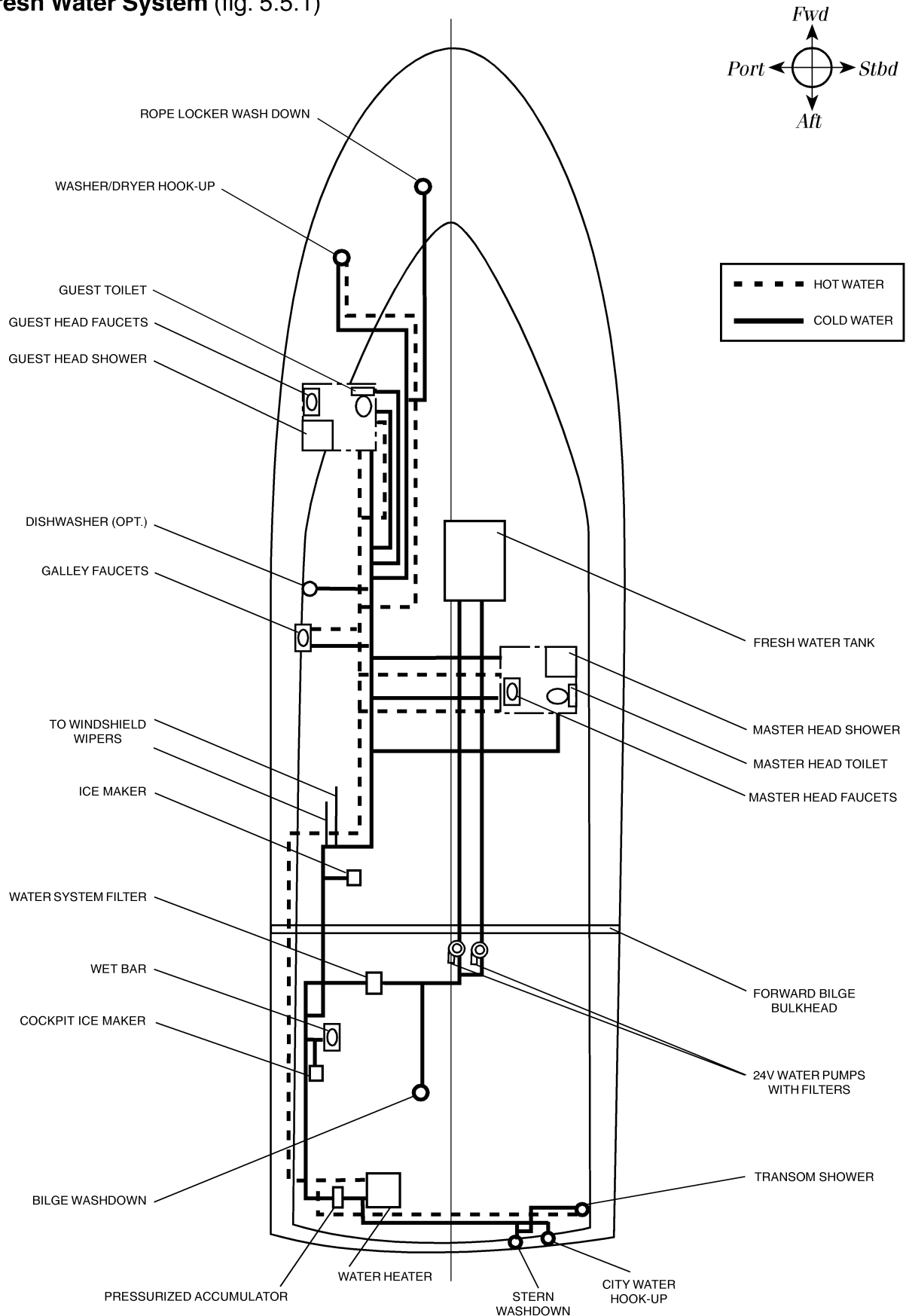
OPEN



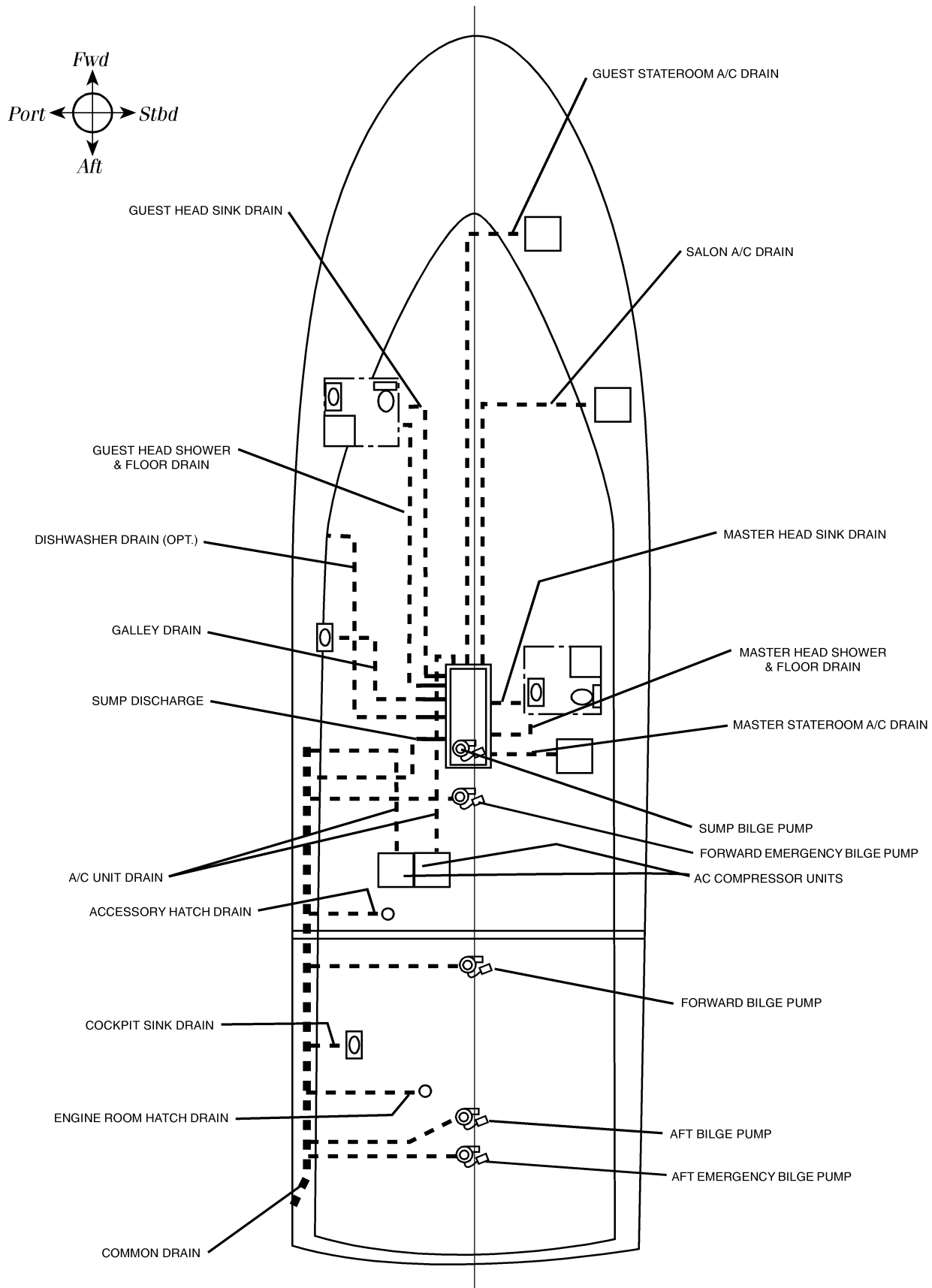
CLOSED

For information on the optional washer/dryer, see page 8.11 and owner's manual packet.

## Fresh Water System (fig. 5.5.1)



## Gray Water System (fig. 5.6.1)



REFER TO PARTS MANUAL FOR GRAY WATER LINE ROUTING, HOSE LENGTHS AND FITTINGS

# Section 6 • Head System

## Head System

The head system on your Sea Ray® is available with a variety of options. Below is a description of each option. You should be aware of which option your boat is equipped with and read the section pertaining to it. The owner's packet in your boat contains information pertaining to your head system that should be read carefully.



### CAUTION

**Do not flush facial tissue, paper towels or sanitary napkins in head.**

## REQUIREMENTS FOR VESSEL OPERATORS

The Environmental Protection Agency (EPA) standards state that in freshwater lakes, freshwater reservoirs or other freshwater impoundments whose inlets or outlets are such as to prevent the ingress or egress by vessel traffic subject to this regulation, or in rivers not capable of navigation by interstate vessel traffic subject to this regulation, marine sanitation devices certified by the U.S. Coast Guard installed on all vessels shall be designed and operated to prevent the overboard discharge of sewage, treated or untreated, or of any waste derived from sewage. The EPA standards further state that this shall not be construed to prohibit the carriage of Coast Guard-certified flow through treatment devices which have been secured so as to prevent such discharges. They also state that waters where a Coast Guard certified marine sanitation device permitting discharge is allowed include coastal waters and estuaries, the Great Lakes and interconnecting waterways, freshwater lakes and impoundments accessible through locks, and other flowing waters that are navigable interstate by vessels subject to this regulation (40 CFR 140.3).

## VACU-FLUSH HEAD

The Vacu-Flush head utilizes the "HEAD SYSTEM" breaker on the main distribution panel. The foot pedal at the base of the toilet opens a mechanical seal

and vacuum forces waste through the opening in the bowl to the vacuum bottle, through the vacuum pump and then to the holding tank.

To Operate:

1. Turn ON the "FRESH WATER PUMP" breaker.
2. Turn ON the "HEAD SYSTEM" breaker.

## HOLDING TANK OPERATION

Waste from the head is directed into the holding tank located under the generator (see fig. 2.9.1). The holding tank fluid level indicator is located on the main distribution panel and in each head which indicates "POWER," "1/2" and "FULL-DO NOT FLUSH." When the "FULL-DO NOT FLUSH" light is on, the holding tank must be emptied before the head can be reused. However it would be a good practice to empty the holding tank when the "1/2" light is on to avoid overflowing the holding tank and ruining the vent filter.

To empty the holding tank, the services of a dockside pump out station will be needed. Follow instructions at the station and make sure pump out station hose is inserted into the deck plate marked "WASTE," located on the starboard transom.

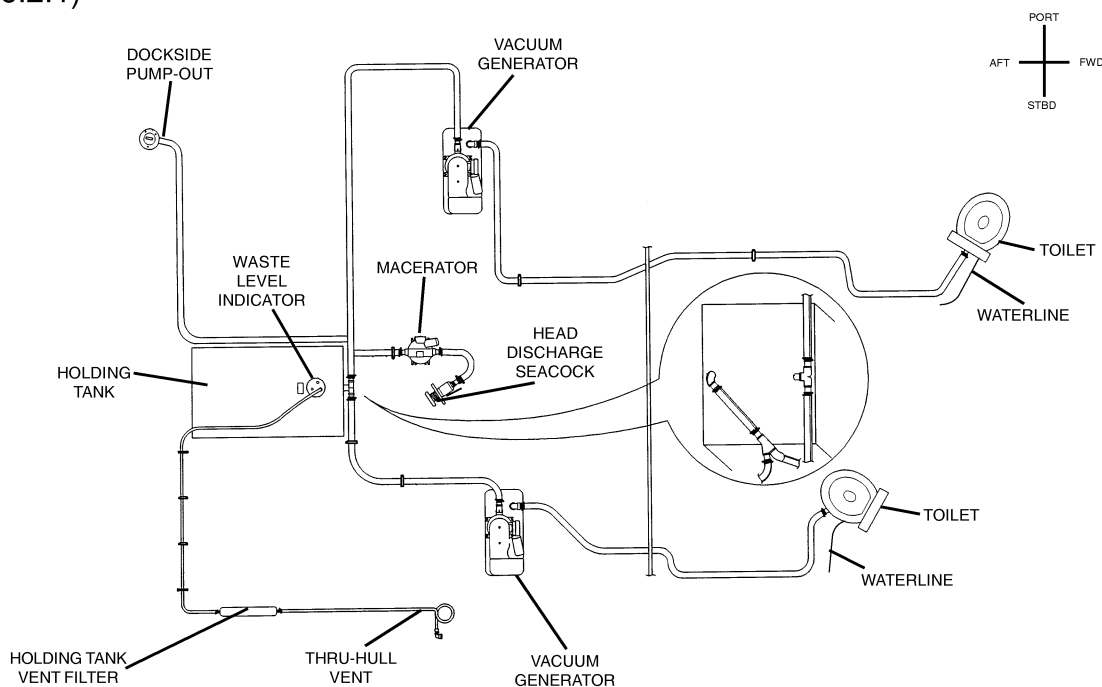
The holding tank can also be emptied by the optional macerator (see page 6.2 for instructions).

## VENT FILTER

The vent filter is designed to control odors associated with the head system operations. The vent filter is located on the aft starboard bilge wall above the engine exhaust (see fig. 2.10.1). The filter must be changed at the beginning of each boating season to be effective. The vent filter is installed in-line on the holding tank ventilation hose (see fig. 6.2.1).

**NOTE:** Do not overfill the holding tank as this will flood the vent filter and render it useless. Filter replacement will then be required. See Parts Manual for correct replacement filter.

## Vacu-Flush Head System With Holding Tank & Overboard Discharge Pump (fig. 6.2.1)



### MACERATOR DISCHARGE PUMP

The macerator gives the boat operator the means of discharging the holding tank contents directly overboard through a seacock in the bottom of the hull. This is available in conjunction with the dockside pump out. **DISCHARGE OF SEWAGE DIRECTLY OVERBOARD IS FOR USE ONLY WHERE APPROVED.**

#### To Operate The Macerator:

1. Turn ON the "DISCHARGE PUMP" breaker on the DC distribution panel and open the waste discharge seacock located on the bilge floor (see fig. 2.9.1 for seacock location).
2. Operate "DISCHARGE" switch under the WASTE SYSTEM CONTROL area on the main distribution panel.
3. When tank is empty, release the switch and close waste discharge seacock.

### NOTICE

This boat is equipped with an optional overboard discharge valve.

Discharging of sewage directly overboard is for use where approved only.

### NOTICE

There is the possibility of being fined for having an operable overboard discharge in U.S. waters. Removing handle of seacock, in closed position, or other means must be utilized to avoid fine.



# Section 7 • Electrical System

## DC System

The 24/12 volt direct current (DC) electrical system derives its power from the batteries, which are kept charged by alternators and/or AC to DC converter. The battery voltage is indicated by a digital voltmeter on the 24 volt DC distribution panel located to port as you descend the companionway to the salon, and the voltmeter on the control station instrument panel. Each battery bank's voltage can be checked at the 24 volt distribution panel by using the Battery Bank Selector and voltmeter. The batteries supply power to the main DC breaker panel, the control station and DC distribution panel breakers. The 12 volt control station circuits are protected by the "ACCESSORY (12V)," "ELECTRONICS (12V)" and fuse blocks. The 24 volt functions on the control station breaker panel are protected by the control station main breaker in the main DC breaker panel. The 24 volt functions on the DC distribution panel are protected by the cabin main breaker in the main DC breaker panel.

All main grounds are connected at the main DC ground buss located on the port side of the engine room (see fig. 7.1.1). The negative terminal of each bank of batteries is connected to the ground buss, and then on to ground the engines. This negative ground system is the approved system for marine DC electrical systems.

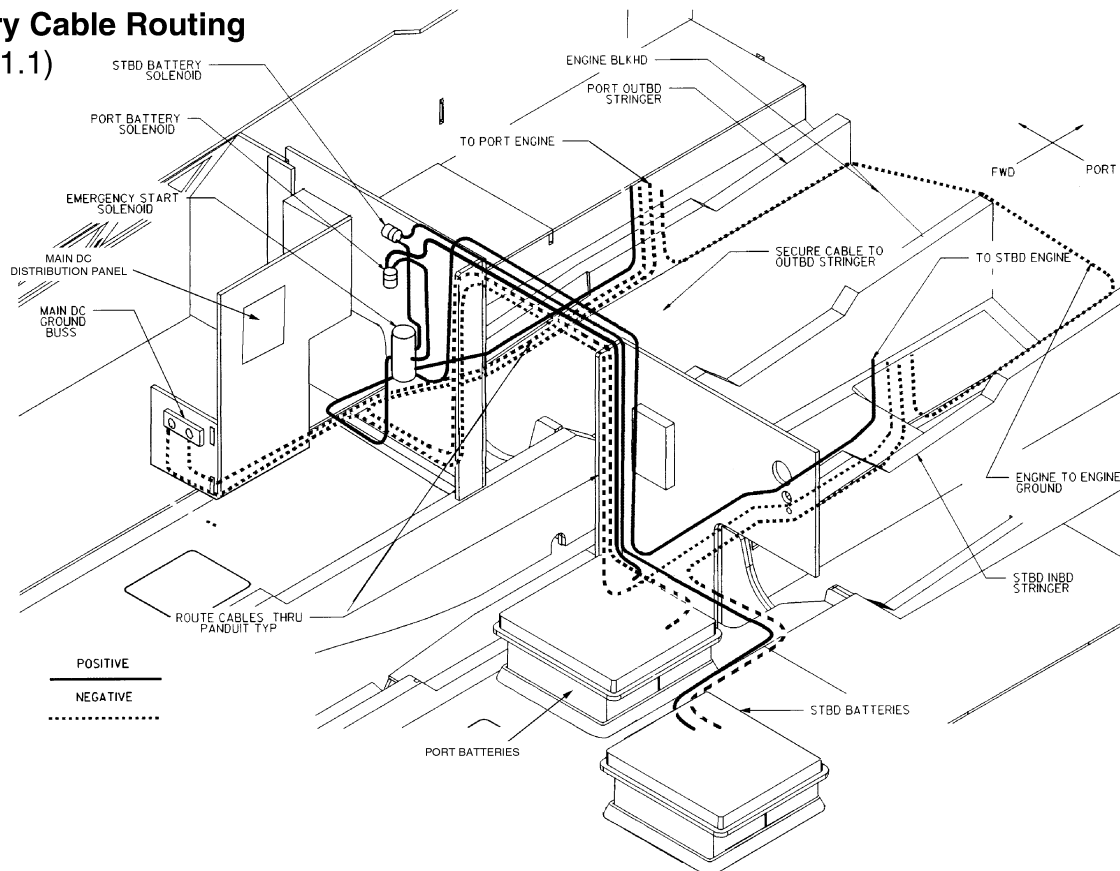
## BATTERIES

The batteries in your boat have been selected for their ability to furnish starting power based on engine and generator starting requirements as well as their ability to supply power to the DC system.

The main engine cranking batteries consist of two (2) banks (port and starboard). Each bank consists of two (2) 12 volt batteries connected in series to create the 24 volts required for engine start, as well as to supply the electrical system loads.

The recommended main engine battery to install in your boat is a Group 8D, 12 volt marine battery with a minimum of 1400 cold cranking amps and 435 minutes reserve capacity.

**Battery Cable Routing**  
(fig. 7.1.1)



The generator has its own battery for starting. The recommended battery is a Group 27, 12 volt marine battery with a minimum of 575 cold cranking amps and 165 minutes reserve capacity. The generator battery has its own dedicated converter.

Sea Ray® recommended batteries are available through your local Sea Ray® dealer.



### CAUTION

**Always disconnect battery cables before doing any work on the engine's electrical system or alternator wiring to prevent arcing or damage to the alternator.**

#### To remove the battery cables:

1. Turn OFF all items drawing power from the batteries.
2. Turn OFF the "CONVERTER" breaker.
3. Turn OFF battery switches.
4. Remove the negative cable first, then the positive cable. To replace the cables, reverse the procedure.

#### Battery maintenance:

Check the fluid level in the cells approximately every four (4) weeks, and more often in summer and hot zones.

The fluid level must be between the lower and the upper markings.

Only replenish with distilled water. Do not use metal funnels.

Coat battery terminal clamps with dielectric silicone grease. Keep batteries clean and dry.

Only use a battery charger designed to charge automotive/marine type batteries when batteries are disconnected from the boat's electrical circuit.



### CAUTION

**While the engine is running the battery terminal clamps must not be loosened or detached nor should the battery switch(es) be turned off, otherwise the alternator and other electronic units will be damaged.**



### DANGER

**Never use an open flame in the battery storage area.  
Avoid striking sparks near the batteries.  
A battery will explode if a flame or spark ignites the free hydrogen given off during charging.**

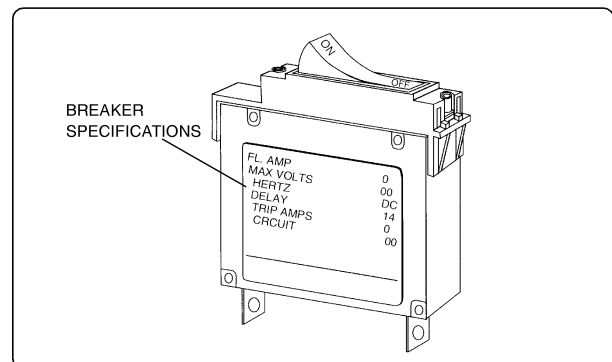
## 12 VOLT SYSTEM

Although the boat's DC system is primarily a 24 volt system, the control station electronics require 12 volts to operate and has a dedicated fuse block. Also operating on the 12 volt system is the cockpit stereo, cablemaster remote, and 12 volt receptacle.

The 12 volt system derives its power from the 12 volt side of the 24 volt battery banks. The boat is equipped with two (2) battery equalizers that allow a differential amp draw between the 24 volt side and the 12 volt side. The equalizers electronically balance an equivalent voltage at each battery within tenths of a volt of each other. Without equalizers, an over or under charge of the individual batteries could occur. The 12 volts are fed to the main DC breaker panel, then distributed to the areas listed on the 12 volt side of the panel, i.e., electronics and accessories (see fig. 7.5.1). The 12 volt system power can be turned off by the 12 volt battery switches.

## ELECTRICAL SYSTEM BREAKERS

In the event it becomes necessary to replace an electrical breaker, REPLACE THE BREAKER ONLY WITH A BREAKER OF THE SAME RATING. The breaker's amperage is marked on the breaker.



### Main Distribution Panel Breaker (fig. 7.2.1)

If a breaker is replaced with a breaker of lower amperage, it will be insufficient to carry the electrical load of the equipment it is connected to and cause nuisance tripping.

If a breaker is replaced with a breaker of higher amperage, it will not provide adequate protection against an electrical malfunction and could create a possible fire hazard.

## BATTERY SWITCHES

There are four (4) main battery solenoid switches, two (2) for 24 volt and two (2) for 12 volt, located on the DC distribution panel in the salon and a duplicate set on the main DC breaker panel in the engine room. Your yacht's battery 24/12 volt power can be turned ON or OFF at either location or ON at one location and OFF at the other location. You do not have to use the same battery switch location to turn ON or OFF battery power. The indicator lights on each switch are illuminated when the system is energized. When the switches are in the "OFF" position all 24/12 volt power to engines and accessories are turned off, except power to the bilge pumps, emergency bilge pumps, shower sump and stereo memory circuits.



### CAUTION

**Always stop engines and/or generator before switching to "OFF" position. This will help prevent damage to your alternator and electrical system.**

NOTE: The bilge pumps, emergency bilge pump and stereo memory CANNOT be turned OFF with the battery switches. The entire remaining DC system can be turned OFF with the battery switches.

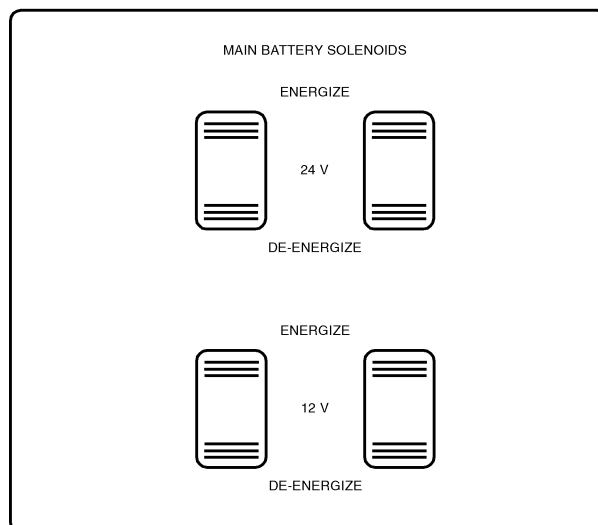
### 24 Volt Battery Switch Solenoids (Control Station Circuits, Cabin Circuits, Lighting, Head System, etc.)

The two (2) 24 volt battery switch solenoids are located at the port engine room component board (see fig. 2.9.1). When turned on, the 24 volt system becomes energized. The port and starboard sides can be turned on and off independently. (Refer to figure 7.3.1)

Each solenoid is equipped with two (2) fuses, one on the line side to power the solenoid and the other on the load side to power the rocker switch indicator light.

### 12 Volt Battery Switch Solenoids (Accessories, Electronics)

The two (2) 12 volt battery switch solenoids are located on the port engine room component board (see fig. 2.9.1). When turned on, the 12 volt system becomes energized. The port (accessories) and starboard (electronics) sides can be turned on and off independently. (Refer to figure 7.3.1)

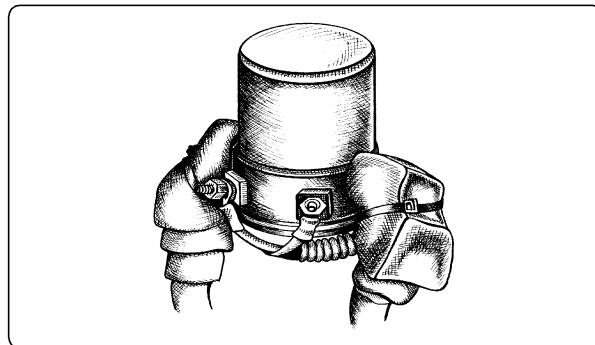


**24 & 12 Volt Battery Switches** (fig. 7.3.1)

Each solenoid is equipped with two (2) fuses, one on the line side to power the solenoid and the other on the load side to power the rocker switch indicator light.

## EMERGENCY START SYSTEM

The emergency start system utilizes a momentary switch, located on the control station switch panel and an emergency start solenoid, located on the port engine room component board (see fig. 2.9.1). Holding the switch energizes the solenoid which parallels the batteries to assist in starting. Use emergency start when the charge of one bank of batteries is insufficient to start its corresponding engine. To engage the emergency start system, start whichever engine has sufficient battery power, then hold emergency start switch while starting the other engine.

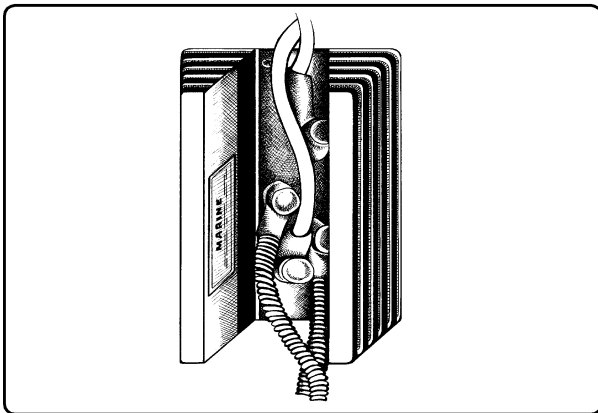


**Emergency Start Solenoid** (fig. 7.3.2)

## CROSSOVER CHARGING SYSTEM

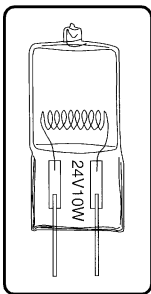
The crossover charging system utilizes a battery isolator with blocking diodes and passes current to the batteries from the engine alternators. It is an automatic system with no switches, and designed to charge each bank of batteries from both engine alternators when necessary, while the diodes prevent the discharge from one bank to the other bank. The battery isolator is located in the engine room on the port component board (see fig. 2.9.1).

REFER TO OWNER'S MANUAL PACKET FOR INSTRUCTIONS AND WARRANTY INFORMATION.



**Battery Isolator** (fig. 7.4.1)

## HALOGEN LIGHTING



(fig. 7.4.2)

Use appropriate protection, such as clean cloth gloves, when handling or disposing of all halogen-cycle bulbs. Wear eye protection. Turn power off when installing or before removing lamp. Allow lamp to cool before removal.

Remove grease or fingerprints from quartz halogen-cycle bulbs with a grease-free solvent before use.

### ! CAUTION

The filament bulbs used in all halogen-cycle lamps generate intense heat. To avoid the possibility of fire, do not use lamp at close range to materials that are combustible or affected by heat or drying. Halogen-cycle bulbs are pressurized and could shatter if scratched or damaged. Glass halogen-cycle bulbs should be protected against contact with liquids when operating.

## ELECTRONICS CIRCUIT WITH GROUND PLATE

The 50 amp electronics circuit utilizes a circuit breaker in the main DC breaker panel to feed the fuse block at the control station. The fuse block is to be used for electronic equipment only. There is a static ground buss located at the control station for mounting of electronic equipment static grounds only, not for current carrying grounds. It is grounded via a ground plate mounted on the bottom of the hull. Do not use bottom paint on the ground plate as it will destroy the effective area of grounding.

## MAIN DC BREAKER PANEL & CONTROL STATION BREAKER PANEL

The main DC breaker panel is located on the port engine room component board (see fig. 2.9.1). It has breakers for both 24 and 12 volt electrical loads.

The control station breaker panel is located in a fold-out door at the starboard helm and only has 24 volt breakers (see Control Station Layout, page 3.1).

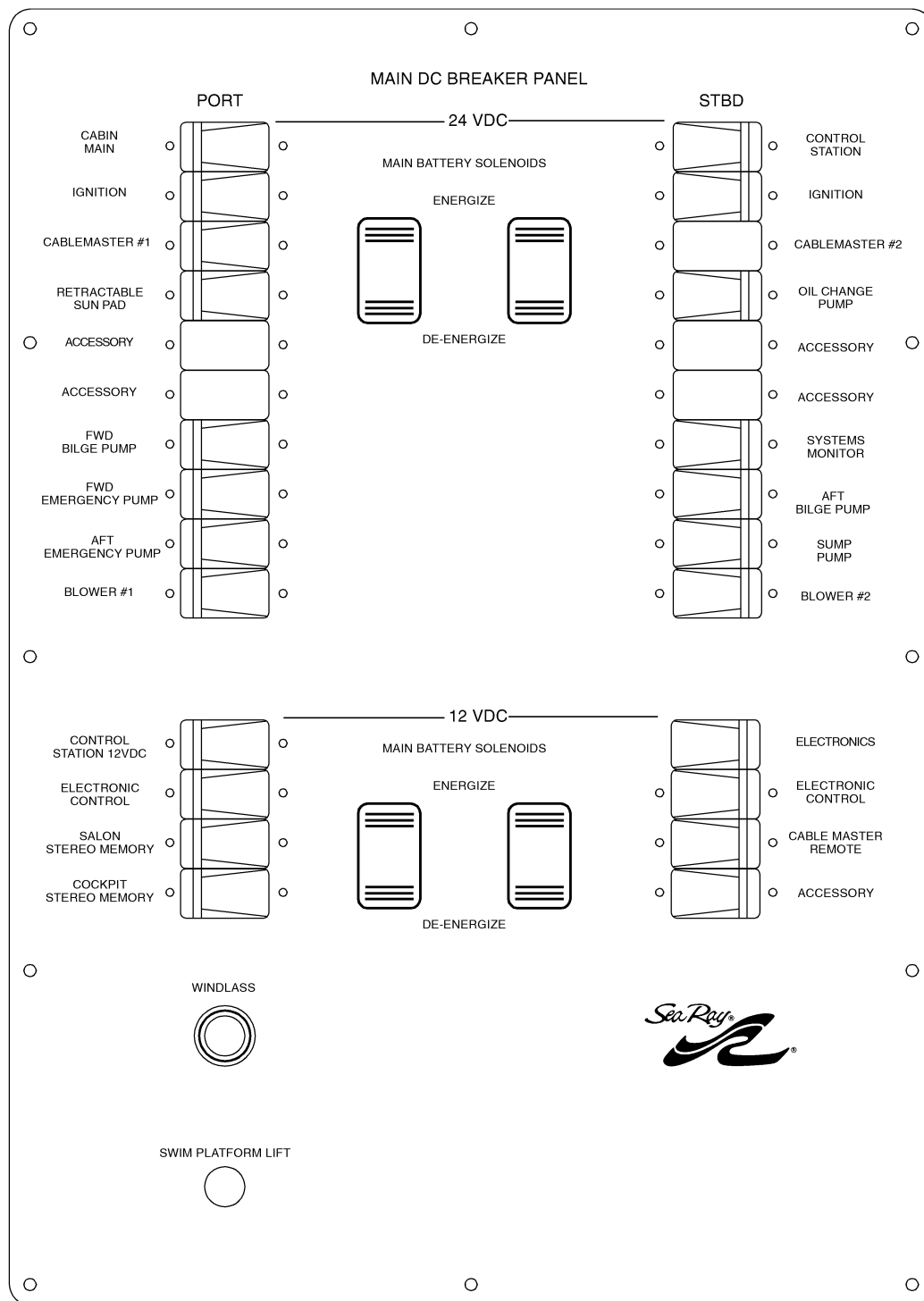
On the main DC breaker panel, notice that the breakers are locked in the "ON" position. This prevents all circuits from being inadvertently turned off. The bilge pumps are connected directly to the battery banks and CANNOT be turned off with the battery switches. If maintenance is to be performed on the pumps, use a small tool that will fit through the hole to push the breaker to the "OFF" position. When maintenance is complete, push the breaker to the "ON" position.

### ! WARNING

**FLOODING AND SWAMPING HAZARD –**  
Always check the operation of bilge pumps, emergency bilge pumps and float switches after performing maintenance.

## 540 Sundancer Main DC Breaker Panel (fig. 7.5.1)

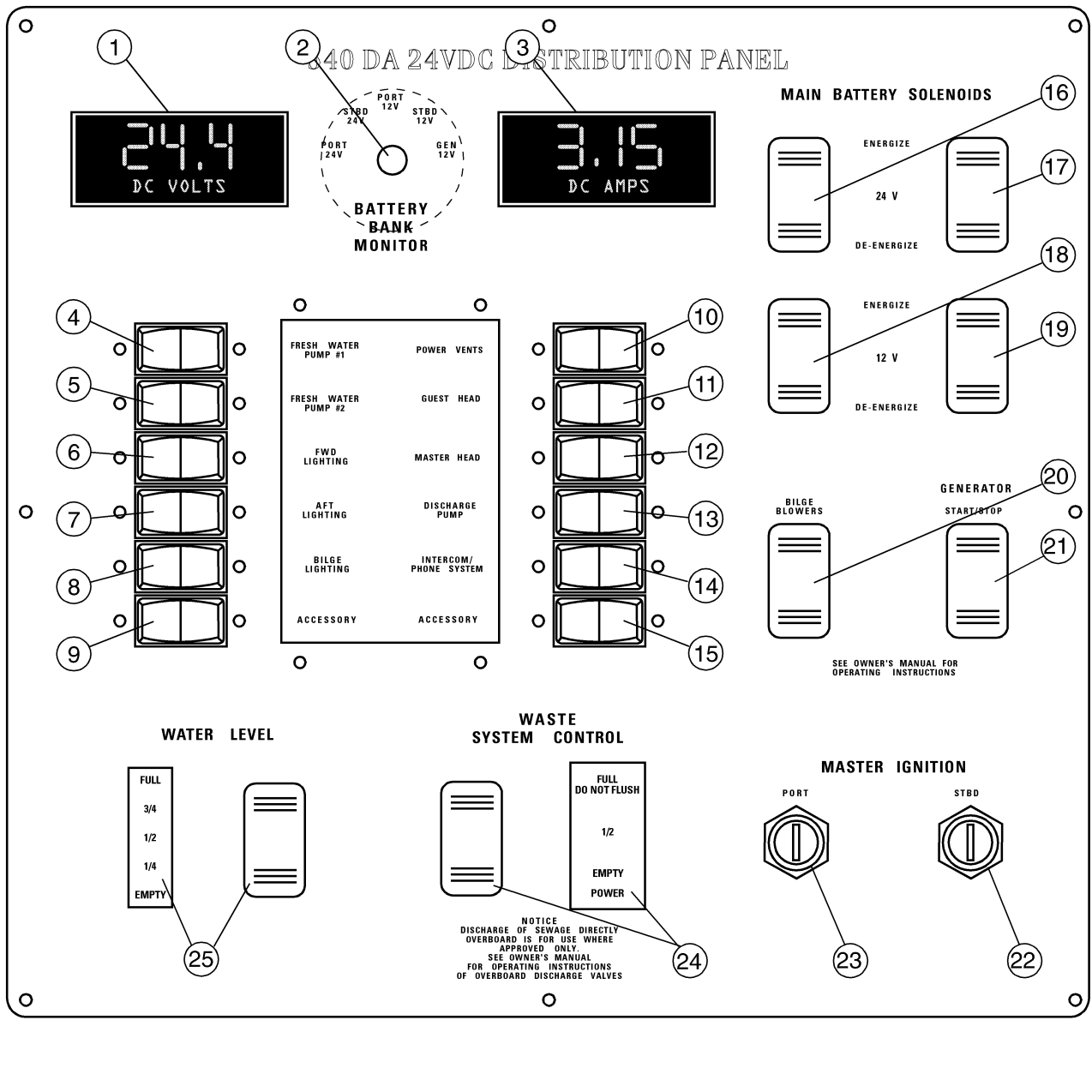
Note: Panel layout and labeling are subject to variance due to customizing optional accessories and equipment updates.



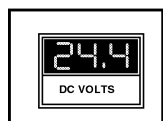
# DC Distribution Panel Controls & Functions

## 24 Volt DC Distribution Panel (fig. 7.6.1)

Note: Panel layout and labeling are subject to variance due to customizing optional accessories and equipment updates.

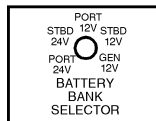


### 1. VOLTMETER DC



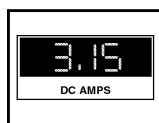
Indicates the amount of DC volts being produced by the selected bank.

### 2. BATTERY BANK SELECTOR



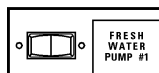
Selects which bank of batteries is indicated on the voltmeter and ammeter.

### 3. AMMETER DC



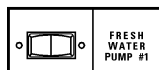
Indicates the amount of DC amps being used from the selected bank.

### 4. FRESH WATER PUMP #1 24V BREAKER



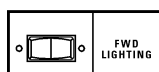
Supplies 24 volt DC power to the port fresh water pump.

### 5. FRESH WATER PUMP #2 24V BREAKER



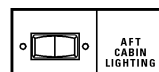
Supplies 24 volt DC power to the starboard fresh water pump.

### 6. FWD. LIGHTING 24V BREAKER



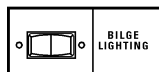
Supplies 24 volt DC power to guest stateroom and guest head light switches.

### 7. AFT LIGHTING 24V BREAKER



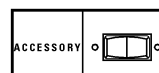
Supplies 24 volt DC power to master stateroom light switches.

### 8. BILGE LIGHTING 24V BREAKER



Supplies 24 volt DC power to "BILGE LIGHTS" light switches on salon entrance way switch panel above AC main distribution panel.

### 9. ACCESSORY 24V BREAKER



For future use.

### 10. POWER VENTS 24V BREAKER



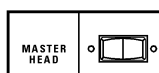
Supplies 24 volt DC power to power vent switches in galley and heads.

### 11. GUEST HEAD



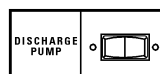
Supplies 24 volt DC power to fwd/ guest head system.

### 12. MASTER HEAD



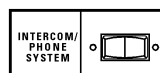
Supplies 24 volt DC power to master head system and waste level indicator.

### 13. DISCHARGE PUMP 24V BREAKER



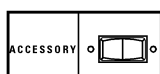
Supplies power to holding tank discharge pump or macerator.

### 14. INTERCOM/PHONE SYSTEM



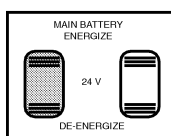
Supplies 24 volt DC power to intercom/phone.

### 15. ACCESSORY 24V BREAKER



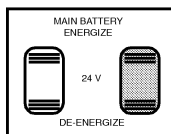
For future use.

### 16. MAIN BATTERY SOLENOIDS: 24V Port Battery Bank Switch



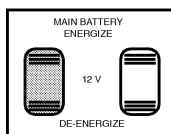
Energizes and de-energizes the 24 volt port battery bank. The 24 volt port battery bank is used to start the port engine.

### 17. MAIN BATTERY SOLENOIDS: 24V Starboard Battery Bank Switch



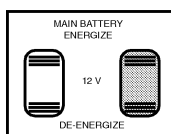
Energizes and de-energizes the 24 volt starboard battery bank. The 24 volt starboard battery bank is used to start the starboard engine.

### 18. MAIN BATTERY SOLENOIDS: 12V Port Battery Bank Switch



Energizes and de-energizes the 12 volt port battery bank.

### 19. MAIN BATTERY SOLENOIDS: 12V Starboard Battery Bank Switch



Energizes and de-energizes the 12 volt starboard battery bank.

### 20. BILGE BLOWER ON/OFF SWITCH



Turns the bilge blowers ON and OFF.

**21. GENERATOR START/STOP SWITCH**



Starts and stops generator.

**22. STARBOARD IGNITION KEY SWITCH**



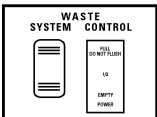
Master key switch for providing ignition power to control station ignition switch.

**23. PORT IGNITION KEY SWITCH**



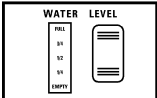
Master key switch for providing ignition power to control station ignition switch.

**24. WASTE SYSTEM CONTROL SWITCH**



“DISCHARGE” switch operates macerator with holding tank macerator option. The level indicator indicates power to head system and amount of waste in holding tank when head system breaker is ON.

**25. WATER LEVEL INDICATOR & SWITCH**



Displays level of water in water tank. Pressing momentary switch supplies power to tank indicators.



## AC System ⚠

### ⚠ DANGER

**EXTREME HAZARD – Swimming near a boat operating on AC electrical system can lead to severe shock and death. Never swim or allow swimming when AC system is in use.**

The 540 DAAC standard electrical system operates on a 240 volt/50 amp shore power system and/or generator with one (1) shore power cable located at the starboard transom. An optional 240/120 volt/50 amp electrical system is available with two (2) shore power cables located at the starboard transom (see fig. 7.10.1 for shore power cable(s) location).

The standard and optional AC electrical system Main Distribution Panels (MDP) are different only in the way shore and/or generator power is supplied to the yacht's electrical system. Take time to look at your yacht's MDP and read the MDP breaker descriptions on pages 7.13-7.15.

**NOTE: ACTUAL USAGE OF EQUIPMENT WILL DEPEND ON THE AMPERAGE OUTPUT OF THE POWER SOURCE AVAILABLE.**

Line voltage from the generator or shore power is shown by the voltmeters on the main distribution panel. The ammeters indicate amperes being drawn through the selected power source's circuit breakers on the main distribution panel.

The main distribution panel main breakers are equipped with a source selector slide to prevent the generator and shore power from being energized at the same time and damaging the electrical system. Both breakers must be in the OFF position before switching to an alternate power source.

### ⚠ WARNING

**Under no circumstances override the source select system.**

The 240 volt system wiring consists of four (4) color-coded wires. The black and black/red wires are the "hot" feeds, the white is the common, or neutral, and the green wire is the safety ground. The shore main circuit breakers protect the white neutral feed and the black hot feed wires. All branch breakers and switches for AC equipment are installed on the "hot" wires. The green conductor of the shore power is connected through the galvanic isolator, and then connected to the AC grounding buss bar behind the main distribution panel.

### ⚠ CAUTION

**Never operate 240 volt shore power at less than 205 volts.**

The 120 volt wiring installed on Sea Ray® boats consists of three (3) color-coded wires. The black wire is the "hot" feed, white is the common, or neutral, and the green wire is the ground. All branch breakers and switches for AC equipment are installed on the "hot" wire. The green conductor of the shore power is connected through the galvanic isolator and then connected to the AC grounding buss bar behind the main distribution panel.

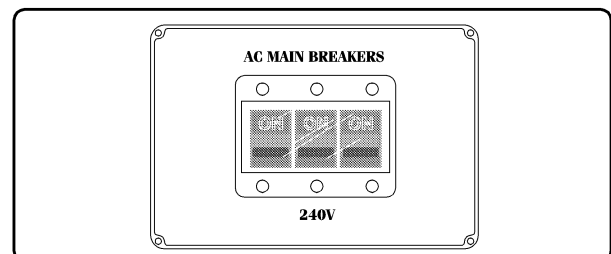
### ⚠ CAUTION

**Never operate shore power at less than 105 volts.**

The main breakers may trip if there is a surge in line voltage, an electrical storm or an onboard system overload. The main breaker interrupts both the neutral and hot feeds in the AC circuit to prevent equipment damage due to internal overloads and external surges.

## MAIN SHORE POWER BREAKER BOX

The 540 DA is equipped with an AC Main Shore Power Breaker Box mounted on the inside transom above the starboard rudder shaft. The breaker(s) must be "ON" at all times to operate the shore AC power system.



Main Shore Power Breaker Box (fig. 7.9.1) (see fig. 2.10.1 for location)

## CABLEMASTER WITH REMOTE (Automatic Shore Power Cord Advance/Retrieve System)

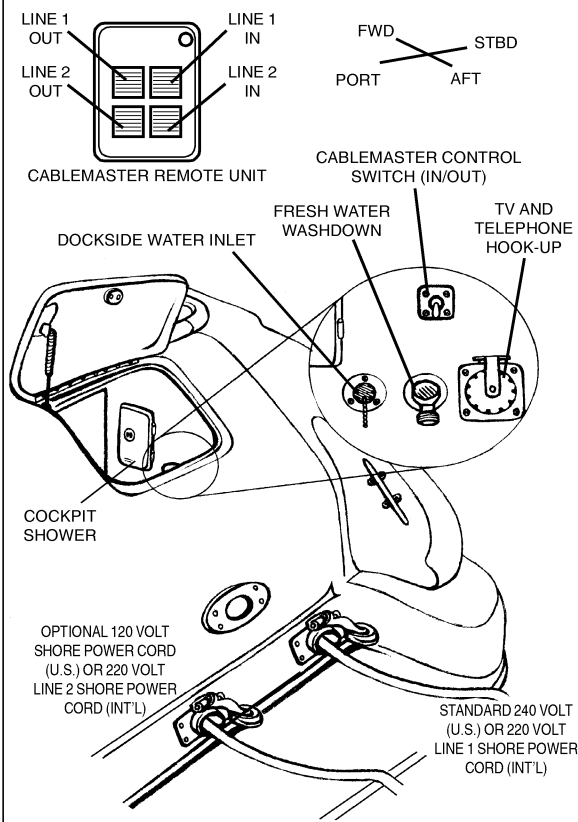
Your Sea Ray® is equipped with the Cablemaster shore power cord system located at the starboard transom (see fig. 7.10.1). The system will advance and retrieve the shore power cord(s) as needed to hook up the shore power system. The circuit breaker is located on the DC breaker panel (see fig. 7.5.1).

### To Operate:

1. Remove shore power cord cover.
2. Press the switch on the aft starboard transom to the “OUT” position to advance cable to the shore power hookup, or the “IN” position to rewind cable for storage. This is a momentary switch which returns automatically to the center OFF position.
3. For **Remote** operation, leave the regular Cablemaster switch in the center (OFF) position.
  - a. By pressing the buttons on the remote unit, you will be able to advance and retrieve the cable. Two (2) points should be observed when using the Cable-Control system:
    - There is a slight delay (approximately 700 milliseconds) between pressing the transmitter button and operation of the Cablemaster system. This gives the radio transmitter and receiver time to establish communications and for the transmitter to provide the receiver with the appropriate instructions.
    - When using the Cable-Control Radio Control system, the regular Cablemaster switch should be left in the center (OFF) position. The regular switch is still fully operational when the Cable-Control system is not used.

REFER TO OWNER'S MANUAL PACKET FOR INSTRUCTIONS AND WARRANTY INFORMATION.

Cablemaster (fig. 7.10.1)



## SHORE POWER HOOKUP (U.S.)

Your 540 DA 240/120 volt main distribution panel distributes the required voltage for all the boat's AC equipment and accessories. It is very important to know and understand where the power originates and how the power is distributed to the different voltage equipment and accessories.

To access the shore power cable(s), read the instructions on page 7.10 for "CABLE-MASTER WITH REMOTE," then follow these steps:



### CAUTION

**Shore power cord should be secured or routed to avoid laying or falling into water and to avoid stress on shore power plug and inlet.**

1. Make sure the shore power breaker(s) and all "AC" branch breakers on the AC main distribution panel are OFF.
2. Advance shore power cord(s) to dockside power box. Ensure dockside breaker is OFF, then plug the dockside cord(s) into the shore power outlet box on the dock. Turn the circuit breaker on the dock to the ON position.
3. Check the polarity lights on the main distribution panel. The "POWER" lights should be on. If the "REVERSED" lights are on, have the dockmaster check the dockside power for a reversed connection.



### CAUTION

**Do not energize main breaker under reversed polarity conditions.**

#### For using the GENERATOR:

Start the generator by following the generator start-up procedures on pages 7.19 and 7.20 or in your generator owner's manual.

Make sure the shore power breaker(s) and all "AC" branch breakers on the AC main distribution panel are OFF.

Slide the source selector to the right to expose the three (3) breakers marked "GENERATOR." Push up on the three breakers to energize the 240 volt side of the AC MDP.

## SHORE POWER HOOKUP (INT'L.)

The 220 volt main distribution panel distributes the required voltage for all the boat's AC equipment and accessories. It is very important to know and understand where the power originates and how the power is distributed to the LINE 1 and LINE 2 equipment and accessories.

Your 540 DA is equipped with 220 volt AC service. There are two (2) shore power cables. Both are for 220 volt AC power.

By looking at the AC main distribution panel (AC MDP), notice there is a LINE 1 and LINE 2 side for equipment and accessories. There are two (2) ways to supply shore power to both lines.

1. Make sure the "MAIN" shore power breaker and all "AC" branch breakers on the main AC distribution panel are OFF.
2. Advance shore power cord(s) to dockside power box. Ensure dockside breaker is OFF, then plug the dockside cord into the shore power outlet box on the dock. Turn the circuit breaker on the dock to the ON position.



### CAUTION

**Shore power cord should be secured or routed to avoid laying or falling into water and to avoid stress on shore power plug and inlet.**

3. Check the polarity lights on the main distribution panel. The "POWER" lights should be on. If the "REVERSED" lights are on, have the dockmaster check the dockside power for a reversed connection.



### CAUTION

**Do not energize main breaker under reversed polarity conditions.**

#### For using only one (1) of the 220 volt shore power cables:

Follow the shore power hookup sequence above.

Take the LINE 1 220 volt cable and plug into the proper dockside outlet. Ensure proper polarity and slide upper source selector to the left to expose the two (2) breakers marked "SHORE." By pushing the two (2) breakers up you will be supplying 220 volts of AC power through the AC MDP to only the LINE 1 side.

To supply power to the LINE 2 side of the AC MDP, slide the lower source selector to the right to expose the two (2) breakers marked "TRANSFER." Push up on the two (2) breakers. This will take the 220 volts supplied by the LINE 1 shore power cable and transfers 220 volts to the LINE 2 side of the AC MDP.

**NOTE: KEEP IN MIND THAT UTILIZING ONLY ONE POWER CORD WILL SEVERELY LIMIT THE AMOUNT OF EQUIPMENT THAT CAN BE USED.**

**For using the two (2) 220 volt shore power cords:**

Take both 220 volt cables and plug into the proper dockside outlets. Ensure proper polarity and slide the upper and lower source selectors to the left to expose the two (2) breakers marked "SHORE." Push up on the two (2) breakers to energize the 220 volt LINE 1 and LINE 2 sides of the AC MDP.

**For using the GENERATOR:**

Start the generator by following the generator start-up procedures on pages 7.19 and 7.20 or in your generator owner's manual.

Once the generator is started, slide upper source selector to the right to expose the two (2) breakers marked "GENERATOR" and push the two (2) breakers up to energize LINE 1.

Slide lower source selector to the right to expose the two (2) breakers marked "TRANSFER" and push the two (2) breakers up to energize LINE 2.

## MAINTENANCE FOR SHORE POWER CABLE SET & SHORE POWER INLETS



### WARNING

**Disconnect the power cable from power source before performing maintenance.**

The metallic parts of your cable set and inlet are made to resist corrosion. In salt water environment, life of the product can be increased by periodically wiping the exposed parts with fresh water, drying and spraying with a moisture repellent.

A soiled cable can be cleaned with grease-cutting household detergent. A periodic application of vinyl protector will help both ends and cable maintain their original appearance.

In case of salt water spray or immersion: Rinse plug end and/or connector end thoroughly in fresh water, shake or blow out excess water and allow to dry. Spray with a moisture repellent before reuse.

## SERVICING THE MAIN DISTRIBUTION PANEL

**(Servicing should be referred to a qualified electrician)**

**To replace a faulty component on the main distribution panel:**

1. Turn all breakers OFF.
2. Make sure the generator is OFF.
3. Unplug the shore power.
4. Remove screws from all sides except the hinged side of panel. The main distribution panel is hinged to swing open for servicing.

Reverse the procedure for closing the panel.

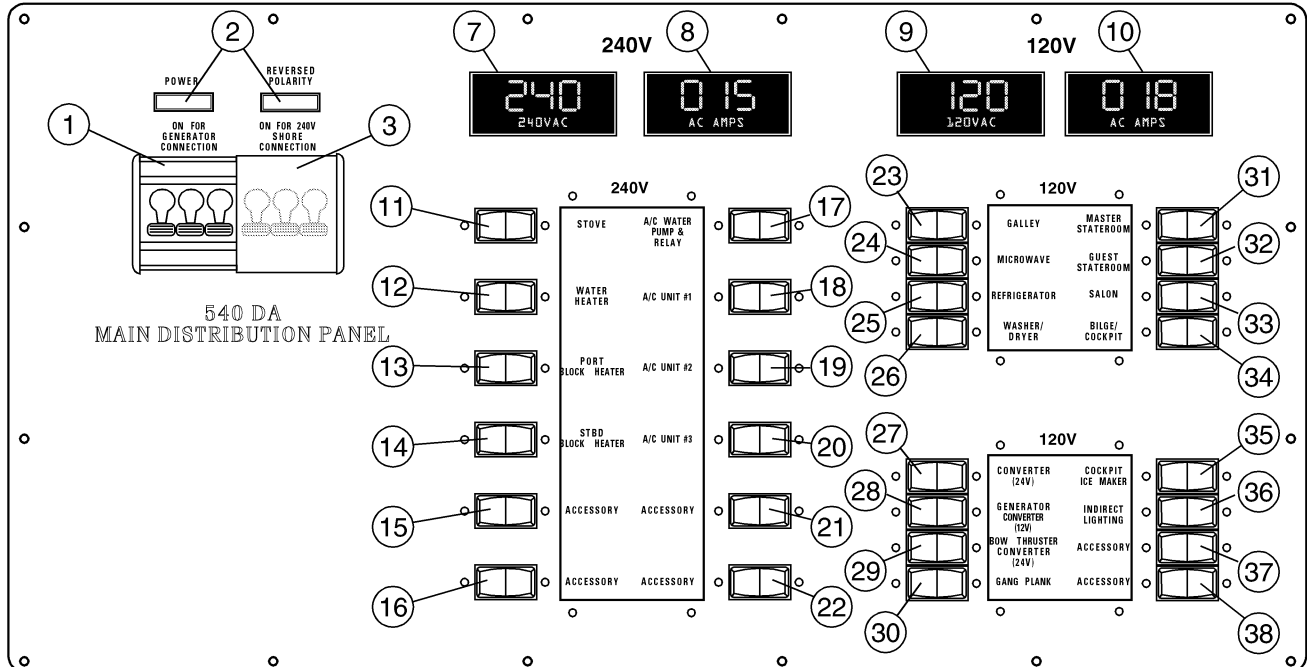
# AC Main Distribution Panel Controls & Functions (U.S.)

The following main distribution panels descriptions are based on standard construction with the 240 volt/50 amp AC electrical system. If your 540 DA is equipped with the optional 240/120 volt/50 amp AC

electrical system, pay attention to descriptions #4, 5, 6 and 21 as these are different than the standard main distribution panel.

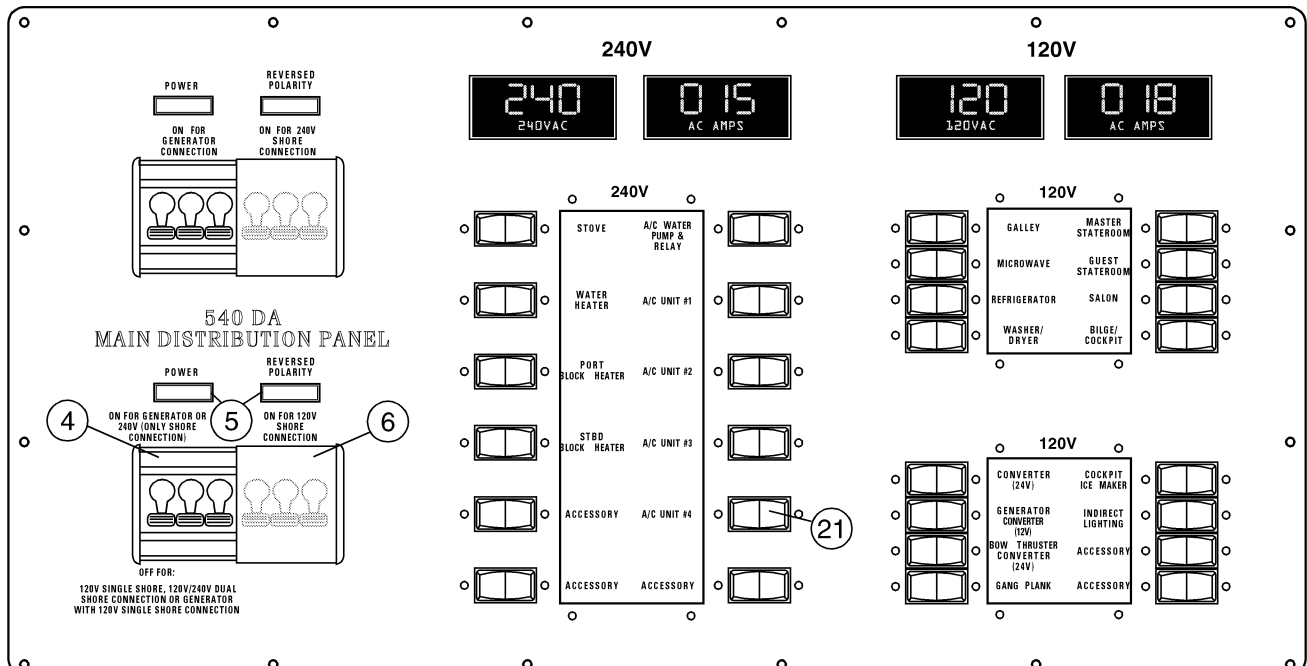
## Standard 240 Volt/50 Amp Main Distribution Panel (U.S. Version) (fig. 7.13.1)

Note: Panel layout and labeling are subject to variance due to customizing optional accessories and equipment updates.

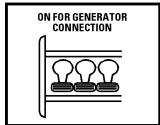


## Optional 240/120 Volt/50 Amp Main Distribution Panel (U.S. Version) (fig. 7.13.2)

Note: Panel layout and labeling are subject to variance due to customizing optional accessories and equipment updates.



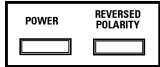
1. **(U.S.) GENERATOR MAIN BREAKER**



**w/15KW GENERATOR: 240V/70 amp BREAKER**

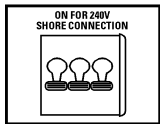
Power source selection. Supplies power to 240 volt branch breakers on main distribution panel from generator.

2. **(U.S.) POWER/REVERSED POLARITY INDICATOR LIGHTS**



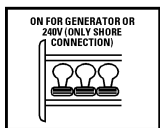
Indicates wiring connections condition for 240 volt main shore power system. When shore power connection is correct, the "POWER" light will be lit.

3. **(U.S.) SHORE POWER MAIN BREAKER 240V BREAKER**



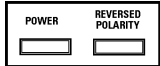
Power source selection. Supplies power to 240 volt branch breakers on main distribution panel from shore power.

4. **OPTIONAL (U.S.) TRANSFER BREAKER**



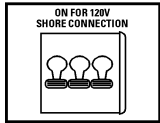
Power source selection. Supplies power to 120 volt branch breakers on main distribution panel from either 240 volt shore power or generator.

5. **OPTIONAL (U.S.) POWER REVERSED POLARITY INDICATOR LIGHTS**



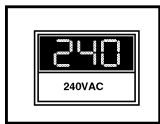
Indicates wiring connections condition for 120 volt main shore power system. When shore power connection is correct, the "POWER" light will be lit.

6. **OPTIONAL (U.S.) 120 VOLT MAIN BREAKER 120V breaker**



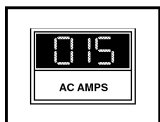
Power source selection. Supplies power to 120 volt branch breakers on main distribution panel from shore power.

7. **(U.S.) AC VOLTMETER**



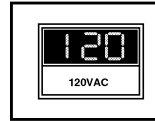
Indicates the 240 volt AC power source voltage.

8. **(U.S.) AC AMMETER**



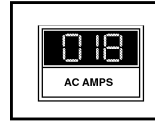
Indicates the amount of 240 volt amperage being used by the equipment that is energized on 240 volt branch breakers and 120 volt branch breakers if transfer breaker is energized.

9. **(U.S.) AC VOLTMETER**



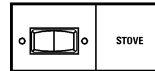
Indicates the 120 volt AC power source voltage.

10. **(U.S.) AC AMMETER**



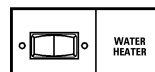
Indicates the amount of 120 volt amperage being used by the equipment that is energized for 120 volt shore power.

11. **(U.S.) STOVE 240V BREAKER**



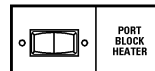
Supplies 240 volt AC power to the stove.

12. **(U.S.) WATER HEATER 240V BREAKER**



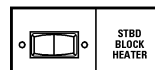
Turns on hot water heater. WATER HEATER MUST BE FULL OF WATER.

13. **(U.S.) PORT BLOCK HEATER**



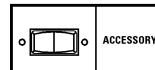
Supplies 240 volt AC power to the port engine block heater.

14. **(U.S.) STARBOARD BLOCK HEATER**



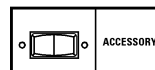
Supplies 240 volt AC power to the starboard engine block heater.

15. **(U.S.) ACCESSORY 240V BREAKER**



For future use.

16. **(U.S.) ACCESSORY 240V BREAKER**



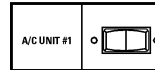
For future use.

17. **(U.S.) A/C WATER PUMP & RELAY 240V BREAKER**



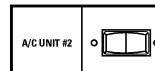
Turns on air conditioner raw water cooling pump and relay to cycle water pump on and off with air conditioner compressors. It must be ON when any A/C unit is on.

18. **(U.S.) A/C UNIT #1**



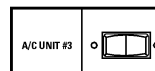
Supplies 240 volt AC power to the guest stateroom A/C unit.

19. **(U.S.) A/C UNIT #2**



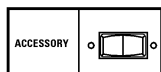
Supplies 240 volt AC power to the salon A/C unit.

20. **(U.S.) A/C UNIT #3**



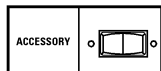
Supplies 240 volt AC power to the master stateroom A/C unit.

**21. (U.S.) ACCESSORY 240V BREAKER**



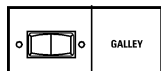
Standard MDP accessory. Optional cockpit A/C unit.

**22. (U.S.) ACCESSORY 240V BREAKER**



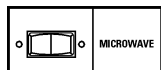
For future use.

**23. (U.S.) GALLEY 120V BREAKER**



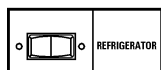
Supplies power to 120 volt galley equipment and light switch.

**24. (U.S.) MICROWAVE 120V BREAKER**



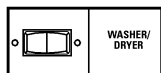
Supplies 120 volt AC power to microwave.

**25. (U.S.) REFRIGERATOR 120V BREAKER**



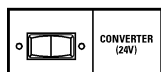
Supplies 120 volt AC power to the galley refrigerator/freezer.

**26. (U.S.) WASHER/DRYER 120V BREAKER (Optional)**



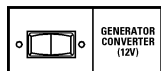
Supplies 120 volt AC power to clothes washer and dryer unit.

**27. (U.S.) CONVERTER (24V) 120V BREAKER**



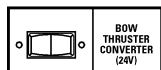
Turns on the main batteries 120V AC to 24V DC converter.

**28. (U.S.) GENERATOR CONVERTER**



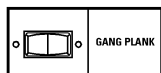
**(12V) 120V breaker**  
Turns on the generator battery 120V AC to 12V DC converter.

**29. (U.S.) BOW THRUSTER CONVERTER (24V) 120V BREAKER (Optional)**



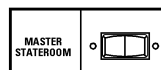
Supplies 120 volt AC power to the bow thruster converter.

**30. (U.S.) GANG PLANK 120V BREAKER**



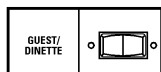
**(Optional)**  
Supplies power to gang plank switch.

**31. (U.S.) MSTR STATEROOM 120V BREAKER**



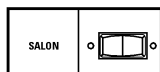
Supplies 120 volt AC power to master stateroom, TV, light switch, receptacle, head light switch, and receptacle.

**32. (U.S.) GUEST STATEROOM 120V BREAKER**



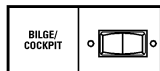
Supplies 120 volt AC power to guest stateroom, TV, light switch, receptacle, and head receptacle.

**33. (U.S.) SALON 120V BREAKER**



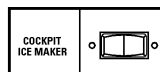
Supplies 120 volt AC power to receptacle on entertainment center, 120 volt salon lights and receptacles above sofa.

**34. (U.S.) BILGE/COCKPIT 120V BREAKER**



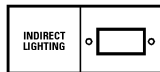
Supplies 120 volt AC power to the cockpit and bilge receptacles.

**35. (U.S.) COCKPIT ICE MAKER 120V BREAKER**



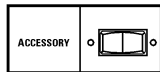
Supplies 120 volt AC power to the cockpit ice maker and optional refrigerator.

**36. (U.S.) INDIRECT LIGHTING 120V BREAKER**



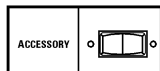
Plugged.

**37. (U.S.) ACCESSORY 120V BREAKER**



For future use.

**38. (U.S.) ACCESSORY 120V BREAKER**



For future use.

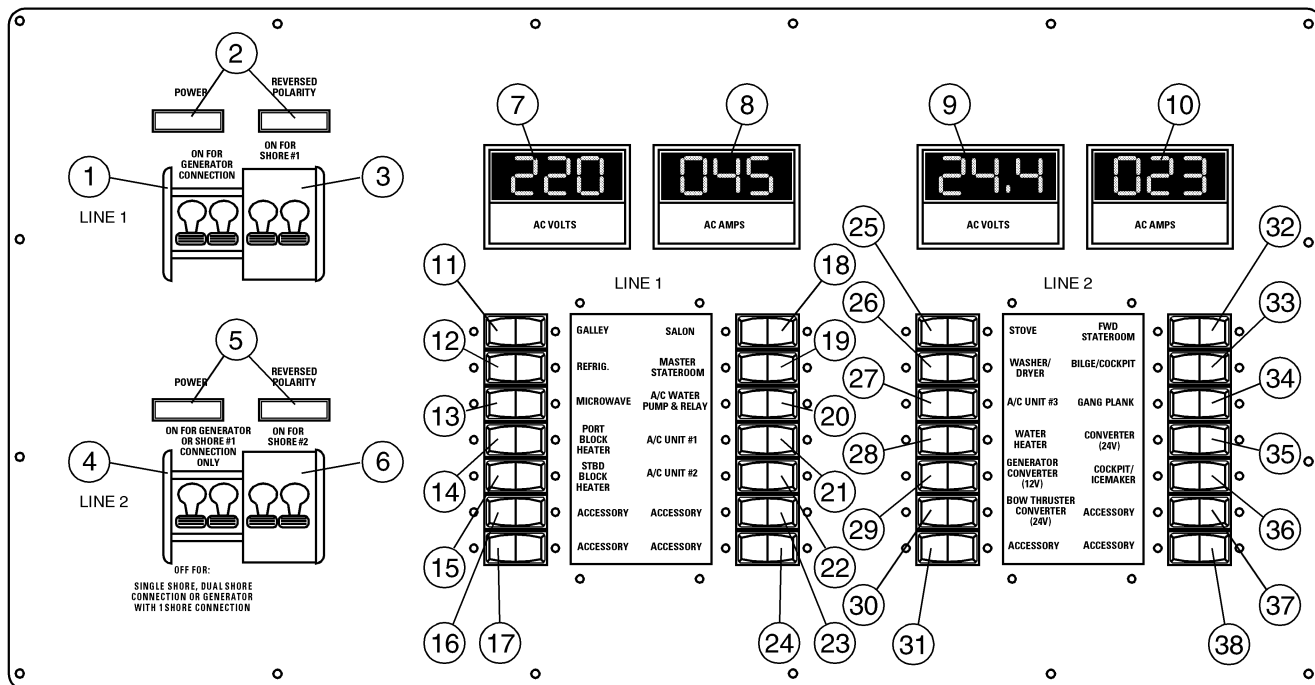
# AC Main Distribution Controls & Functions (Int'l.)

**NOTE:** The following main distribution panel descriptions are based on standard construction with the 220 volt AC system. The main distribution panel

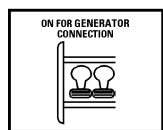
in your yacht will be equipped with the appropriate AC voltage breakers and meters.

## 220 Volt Main Distribution Panel (International Version) (fig. 7.16.1)

Note: Panel layout and labeling are subject to variance due to customizing optional accessories and equipment updates.

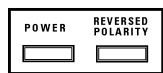


### 1. (Int'l) LINE 1 / GENERATOR MAIN BREAKER w/15KW GENERATOR: 220V/70 amp BREAKER



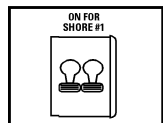
Power source selection. Supplies power to 220 volt branch breakers on main distribution panel from generator.

### 2. LINE 1 POWER/REVERSED POLARITY INDICATOR LIGHTS



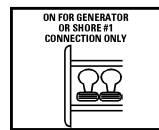
Indicates wiring connections condition for 220 volt main shore power system. When shore power connection is correct, the "POWER" light will be lit.

### 3. (Int'l) LINE 1 / SHORE POWER MAIN BREAKER 220V BREAKER



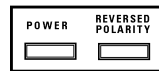
Power source selection. Supplies power to line 1 220 volt branch breakers on main distribution panel from shore power.

### 4. (Int'l) TRANSFER BREAKER 2 POLE BREAKER



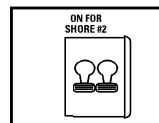
Power source selection. Supplies power to 220 volt branch breakers on main distribution panel from either line 1 220 volt shore power or generator.

### 5. LINE 2 POWER/REVERSED POLARITY INDICATOR LIGHTS



Indicates wiring connections condition for 220 volt main shore power system. When shore power connection is correct, the "POWER" light will be lit.

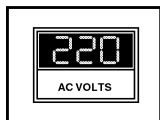
### 6. (Int'l) LINE 2 / SHORE POWER MAIN BREAKER 220V BREAKER



Power source selection. Supplies power to 220 volt branch breakers on main distribution panel from line 2 shore power.

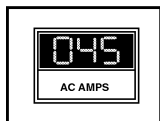


**7. (Int'l) AC VOLTMETER**



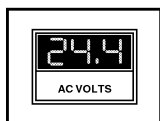
Indicates the 220 volt AC power source voltage on line 1.

**8. (Int'l) AC AMMETER**



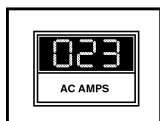
Indicates the amount of 220 volt amperage being used by the equipment that is energized on line 1.

**9. (Int'l) AC VOLTMETER**



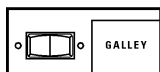
Indicates the 220 volt AC power source voltage on line 2.

**10. (Int'l) AC AMMETER**



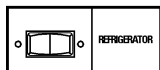
Indicates the amount of 220 volt amperage being used by the equipment that is energized on line 2.

**11. (Int'l) GALLEY 220V BREAKER**



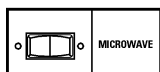
Supplies power to 220 volt galley equipment and light switch.

**12. (Int'l) REFRIGERATOR 220V BREAKER**



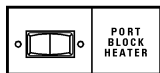
Supplies power to the refrigerator.

**13. (Int'l) MICROWAVE 220V BREAKER**



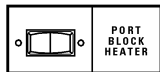
Supplies power to the microwave.

**14. (Int'l) PORT BLOCK HEATER 220V BREAKER**



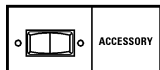
Supplies power to the port engine block heater.

**15. (Int'l) STARBOARD BLOCK HEATER 220V BREAKER**



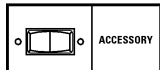
Supplies power to the starboard engine block heater.

**16. (Int'l) ACCESSORY 220V BREAKER**



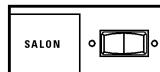
For future use.

**17. (Int'l) ACCESSORY 220V BREAKER**



For future use.

**18. (Int'l) SALON 220V BREAKER**



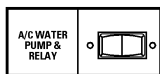
Supplies 220 volt AC power to receptacle on entertainment center, 220 volt salon lights, and outlets above aft sofa.

**19. (Int'l) MASTER STATEROOM 220V BREAKER**



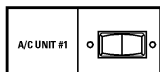
Supplies 220 volt AC power to master stateroom, TV, light switch, receptacle, head light switch, and receptacle.

**20. (Int'l) A/C WATER PUMP & RELAY 220V BREAKER**



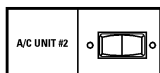
Turns on air conditioner raw water cooling pump and relay to cycle water pump on and off with air conditioner compressors. It must be ON when any A/C unit is on.

**21. (Int'l) A/C UNIT #1 220V BREAKER**



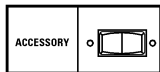
Supplies 220 volt AC power to the guest stateroom A/C unit.

**22. (Int'l) A/C UNIT #2 220V BREAKER**



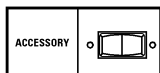
Supplies 220 volt AC power to the salon A/C unit.

**23. (Int'l) ACCESSORY 220V BREAKER**



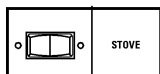
For future use.

**24. (Int'l) ACCESSORY 220V BREAKER**



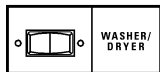
For future use.

**25. (Int'l) STOVE 220V BREAKER**



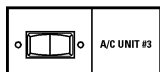
Supplies power to the stove.

**26. (Int'l) WASHER DRYER 220V BREAKER**



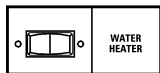
Supplies 220 volt AC power to washing machine/dryer unit.

**27. (Int'l) A/C UNIT #3 220V BREAKER**



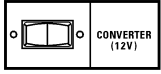
Supplies 220 volt AC power to the master stateroom A/C unit.

**28. (Int'l) WATER HEATER 220V BREAKER**



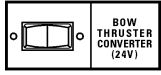
Turns on hot water heater. WATER HEATER MUST BE FULL OF WATER.

29. (Int'l) **GENERATOR CONVERTER (12V) 220V BREAKER**



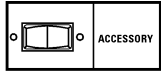
Turns on the main batteries 220V AC to 12V DC converter.

30. (Int'l) **BOW THRUSTER CONVERTER (24V) 220V BREAKER (Optional)**



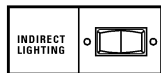
Supplies 220 volt AC power to the bow thruster converter.

31. (Int'l) **ACCESSORY 220V BREAKER**



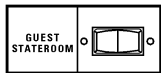
For future use.

32. (Int'l) **FWD STATEROOM 220V BREAKER**



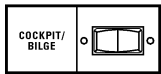
Supplies 220 volt AC power to fwd stateroom, TV, light switch, receptacle, and head receptacle.

33. (Int'l) **BILGE/COCKPIT 220V BREAKER**



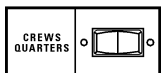
Supplies 220 volt AC power to cockpit and bilge receptacles.

34. (Int'l) **GANG PLANK 220V BREAKER**



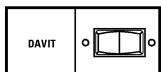
Supplies power to gang plank switch.

35. (Int'l) **CONVERTER (24V) 220V BREAKER**



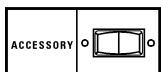
Turns on the main batteries 220V AC to 24V DC converter.

36. (Int'l) **COCKPIT ICE MAKER 220V BREAKER**



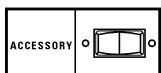
Supplies 220V AC power to the cockpit ice maker and optional refrigerator.

37. (Int'l) **ACCESSORY 220V BREAKER**



For future use.

38. (Int'l) **ACCESSORY 220V BREAKER**

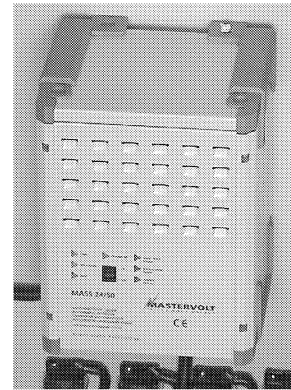


For future use.

## Converters

The battery charging unit installed on your yacht is fully automatic and is designed specifically for the marine environment. The high frequency characteristic has allowed these chargers to achieve a huge size and weight reduction over their previously used equipment. Commonly called high frequency or smart chargers, these units bring a new sophistication to the battery charger field. These units feature a built-in amperage indicator located on the front panel. This gives an accurate reading of the combined battery current and load current. If the batteries are fully charged and no load is present, the ammeter will read near zero. To verify that the charger is functioning properly, turn on lights or other load. The ammeter should register an increase.

Converter (fig. 7.18.1)



### WARNING

Never block air circulation through the unit.  
Never store any gear on top of the units.

### NOTICE

Leave the converter running at all times to maintain the 12 volt system voltage.

Charging characteristics contain three (3) elements:

- **Bulk Charge** - this is initiated at power up and provides the chargers full-rated current to the battery bank until a predetermined voltage level of 14.2V to 14.4V is achieved and/or a certain time has passed.

- **Absorption Charge** - this stage immediately follows the bulk charge mode. It maintains the battery voltage at the bulk charge voltage level, but gradually decreases the current as the battery accepts the charge until it reaches a predetermined current level.
- **Float Charge** - this stage is designed to hold the battery at a safe, low voltage (typically 13.3V) providing up to the chargers full rated amperage to accommodate DC load requirements. The charge will remain in this mode until the AC power is cycled off and then on again.

**Location** - The converter is located on the starboard aft side of the aft engineroom bulkhead.

REFER TO OWNER'S MANUAL PACKET FOR INSTRUCTIONS AND WARRANTY INFORMATION.

## Ground Fault Interrupter Receptacle

The ground fault interrupter receptacles (GFI) are located in the aft galley inside the upper cabinet, master head lower storage cabinet under the sink, guest head upper cabinet, and mid salon upper cabinet. The GFI receptacles are out of sight and wired in-line with the exposed Vmar receptacles throughout the yacht. This allows your yacht to have an elegant exposed receptacle while still providing some protection from shock hazards. Please read and understand the CAUTION block for GFI receptacles.

The GFI receptacle is designed to protect people from the line-to-ground shock hazards which could occur from defective power tools or appliances operating from this device, or from down-line outlets protected by it. It does not prevent line to ground electric shock, but does limit the time of exposure to a period considered safe for normally healthy persons. It does not protect persons against line-to-line or line-to-neutral faults.

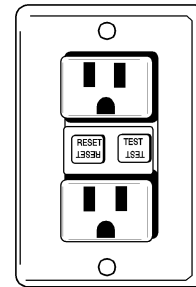
The GFI receptacle does not protect against short circuits or overloads. This is the function of the circuit breaker.



### CAUTION

Persons with heart problems or other conditions which make them susceptible to electric shock may still be injured by ground faults on circuits protected by the GFI receptacle. No safety devices yet designed will protect against all hazards or carelessly handled or misused electrical equipment or wiring.

**GFI Outlet (fig. 7.19.1)**



## Generator

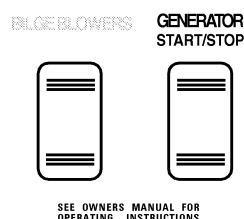
Sea Ray® strongly urges you to fully comply with the manual provided by the generator manufacturer. The generator is warranted separately by the generator manufacturer, not Sea Ray®. Follow the recommended maintenance and warranty schedule in your Generator Operator's Manual included in the Owner's Manual Packet. Generator abuse or improper maintenance may adversely affect claims made under generator manufacturer separate warranty.



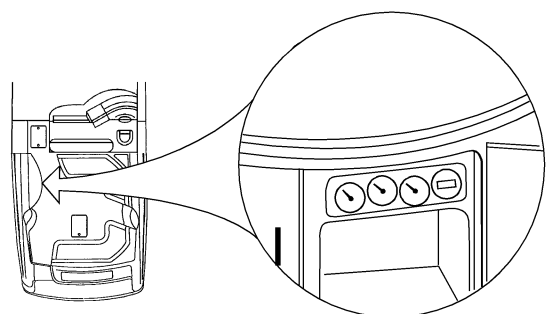
### CAUTION

Do not run the generator or engines in an enclosed area, such as a closed boat house, as there is the possibility of inhaling exhaust fumes and the build up of carbon monoxide (see *Exhaust Emissions* pgs. 1.12 and 1.13).

### Generator Controls On Main Distribution Panel (fig. 7.20.1)



### Generator Cockpit Instrument Panel (fig. 7.20.2)



## STARTING THE GENERATOR

**NOTE: PRE-START GENERATOR PRIOR TO GETTING UNDERWAY AS THERE IS A POSSIBILITY THAT IT WILL NOT PICK UP WATER IF STARTED UNDERWAY. MAKE SURE THE "MAIN GENERATOR" BREAKERS ARE "OFF" AND THERE IS NO LOAD ON THE GENERATOR BEFORE STARTING IT.**

**To start the generator: (Switches located on the 24 volt distribution panel or on the generator set.)**

1. Check the fuel tank levels. The generator draws from the starboard fuel tank.
2. Check the oil and coolant levels. See your Generator Operator's Manual for proper readings.
3. Check generator for coolant drain plug installations.
4. Open the generator seacock.
5. Press and release the "GENERATOR" switch on the main distribution panel. This puts the generator into the preheat mode and the light in the switch will begin to flash for approximately 30 seconds. The generator can be started at any time during this period.  
At the end of the 30 second period, the light begins to flash rapidly, indicating that the generator must be started in the next few seconds or the cycle must be repeated.
6. When the light on the switch begins to flash rapidly, the generator is ready to start. Push and hold the "GENERATOR" switch until the unit starts, then release the switch.
7. Once the generator is started, the light will stay on continuously.

### Bypass Switch

To start the Westerbeke® generator from the generator mounted controls, a bypass switch, located on the side of the generator mounted control box, must be turned ON. The bypass switch must be OFF to start and stop the generator from the DC main distribution panel.

## SHIFTING FROM SHORE POWER TO GENERATOR POWER

1. Turn all AC systems and branch circuit breakers OFF. Turn main breaker on the main distribution panel to the OFF position.
2. Start the generator.
3. Slide the source select shuttle mechanisms on the main distribution panel to expose the "GENERATOR" breakers and turn them ON, (see fig. 7.13.1, #1 on the main AC distribution panel).
4. Turn the individual system breakers ON.

## STOPPING THE GENERATOR

1. Press the "GENERATOR" switch until the unit stops.

After stopping the generator, the module will need a few seconds to reset before restarting is possible.

## Electrolysis & Zinc Anodes

Electrolysis corrosion of metals on power boats can result in serious deterioration. The boat owner must be aware of the possibilities of galvanic action (the deterioration of metals due to dissimilar characteristics when placed in salt water), and/or electrolysis. It is the owner's responsibility to check for and replace damaged parts due to galvanic deterioration. Refer to your Sea Ray® dealer to investigate the source of stray corrosive currents.

Zinc plates are installed on the transom and trim tabs to protect underwater hardware. Zinc, being much less "noble" than copper based alloys and aluminum used in Sea Ray® underwater fittings, will deteriorate first and protect the more noble parts.

**Zinc anodes generally require replacement about once a year. (In salt water areas, replace every six (6) months).** The need to replace anodes more frequently may indicate a stray current problem within the boat or at the slip or mooring. If zinc anodes do not need replacing after one year, they may not be providing proper protection. Loose anodes or low-grade zinc may be the problem.

**DO NOT PAINT BETWEEN THE ZINC AND THE METAL IT CONTACTS, AND DO NOT PAINT OVER THE ZINC.**

When an AC shore power system is connected to the boat, the underwater metal fittings will, in effect, be connected through the water to grounded metals ashore. The zincs will be consumed at a faster rate unless the marina maintains a protective system to prevent this. In this case, hanging a zinc in the water bonded to the metal outlet box on the dock will reduce zinc loss on the boat. Do not connect this zinc to the boat's ground system.

It is extremely important that all electrically operated DC equipment and accessories be wired so that the

### CAUTION

**Never disconnect AC green wire (safety ground) from the main DC ground buss. Removing safety ground wire would create the possibility for electrical shock hazard.**

ground polarity of each device is the same as that of the battery. Sea Ray® boats have a negative ground system, which is the recommended practice throughout the marine industry. All metal items (fuel tanks, underwater gear, etc.) in the boat are connected to the zinc anode by the green bonding wire.

Electrolysis can also be caused by "stray currents" due to a fault in an electrical item, even though correctly grounded. A galvanic current blocker (zinc saver) is standard on all Sea Ray® boats. It is installed between the shore power ground and the boat's AC ground connection to the DC bonding system. This connection maintains the safety ground from dockside power while stopping the back-flow of DC corrosive currents.

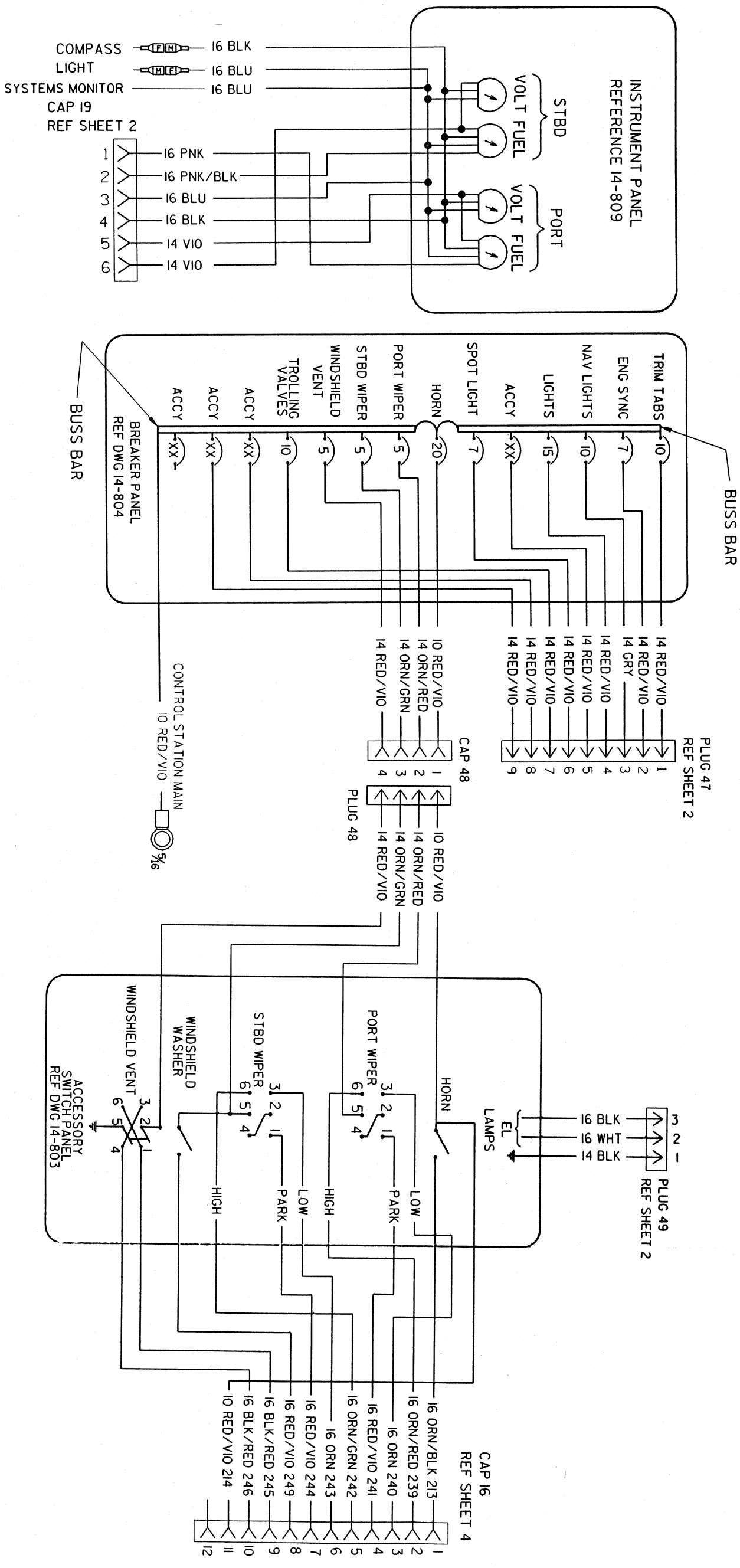
## AC & DC Electrical Schematics

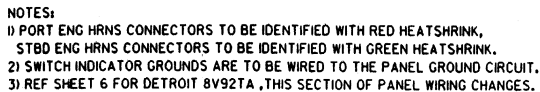
This owner's manual contains electrical schematics for your boat. These electrical schematics were generated by technicians at the engineering division for technical reference and service technicians. Sea Ray® does not recommend that you attempt to work on the boat's electrical system yourself. Instead we recommend that you take your boat to your authorized Sea Ray® dealer for service. Sea Ray® reserves the right to change or update the electrical system on any model at any time without notice to the consumer and is NOT obligated to make any updates to units built prior to changes.



## 540 Sundancer: DC Wiring Schematic 09-601 (1 of 6)

Note: This schematic is subject to variance due to customizing optional accessories and equipment updates

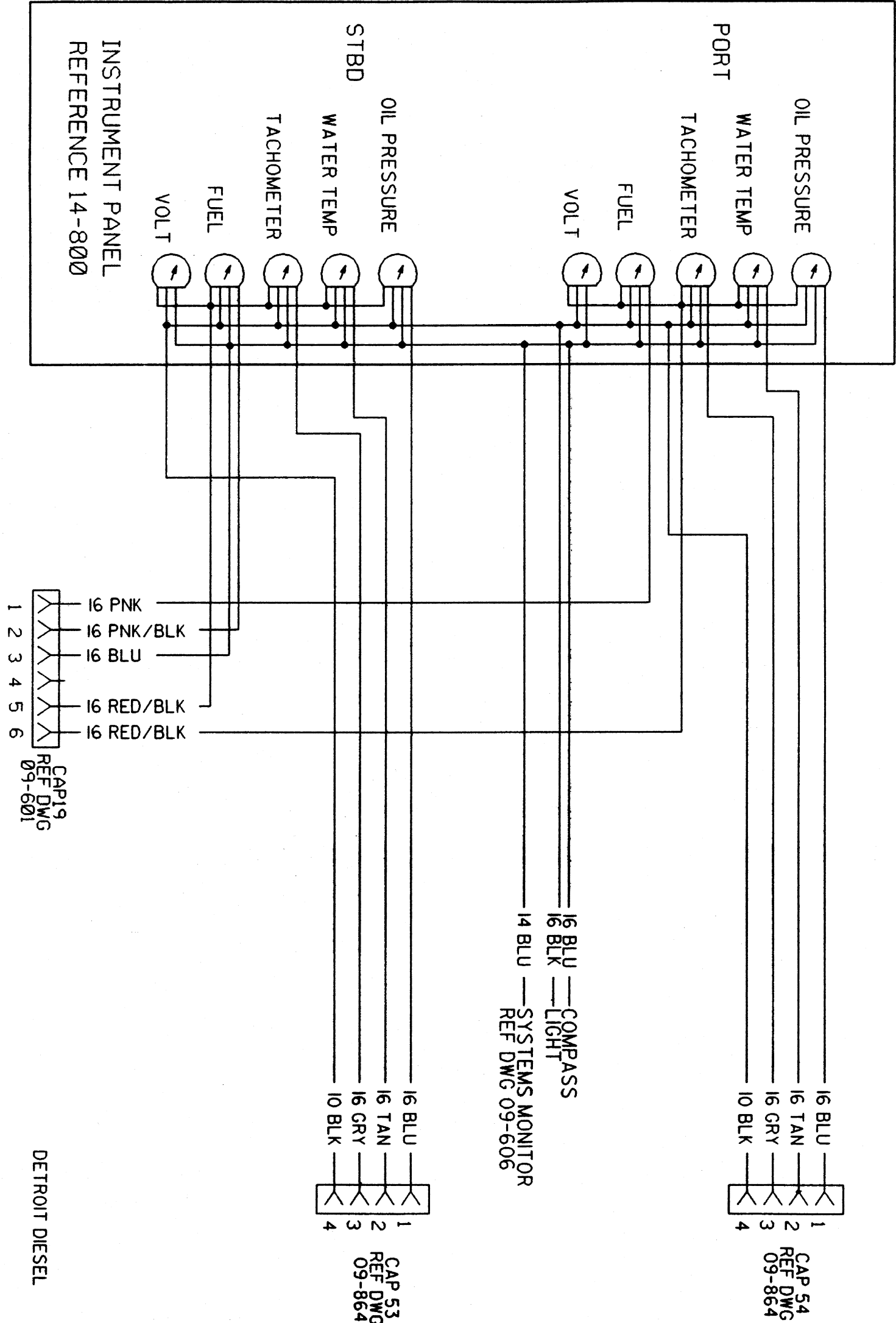






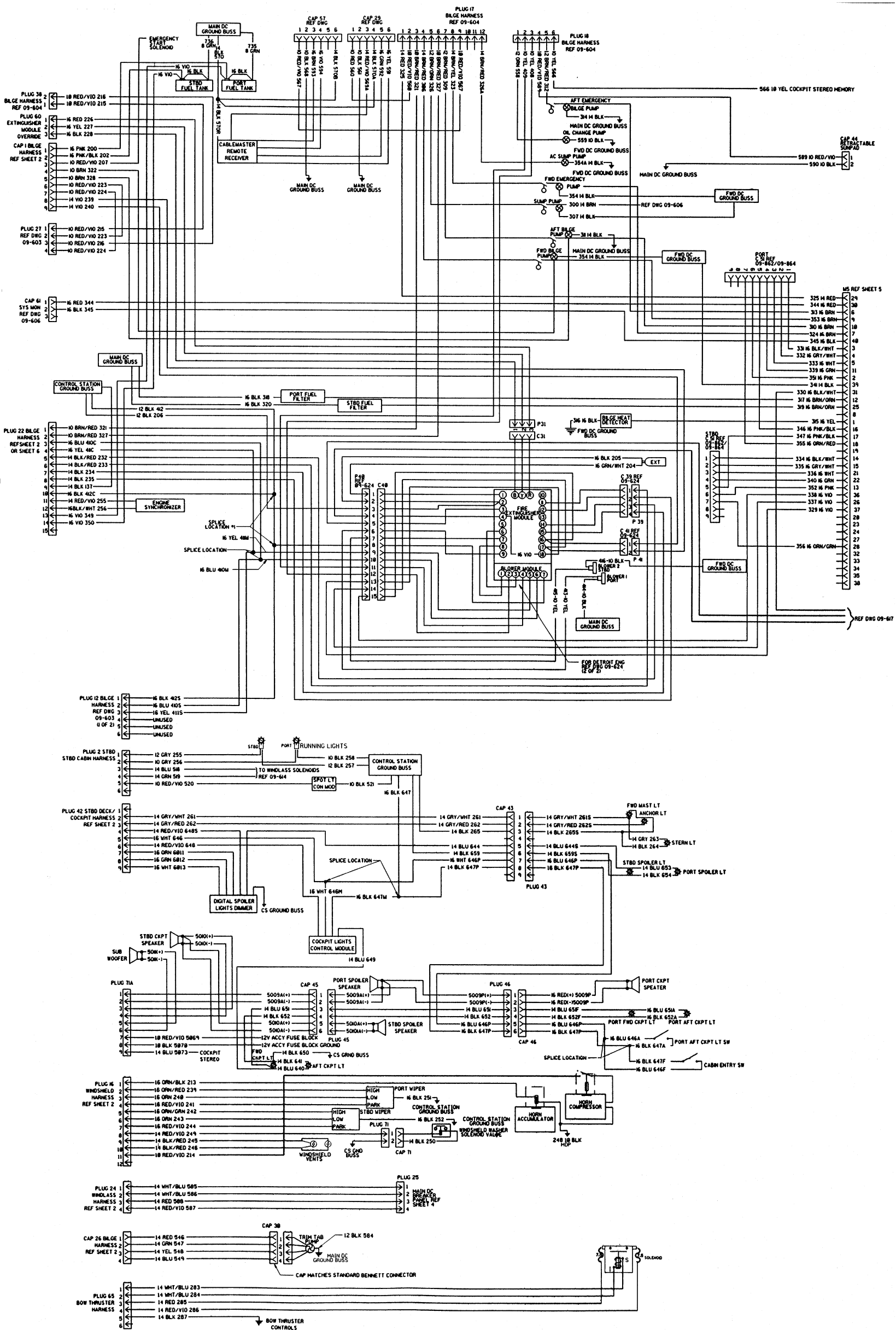
540 Sundancer: DC Wiring Schematic 09-601 (3 of 6)

Note: This schematic is subject to variance due to customizing optional accessories and equipment updates.

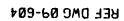


540 Sundancer: DC Wiring Schematic 09-601 (4 of 6)

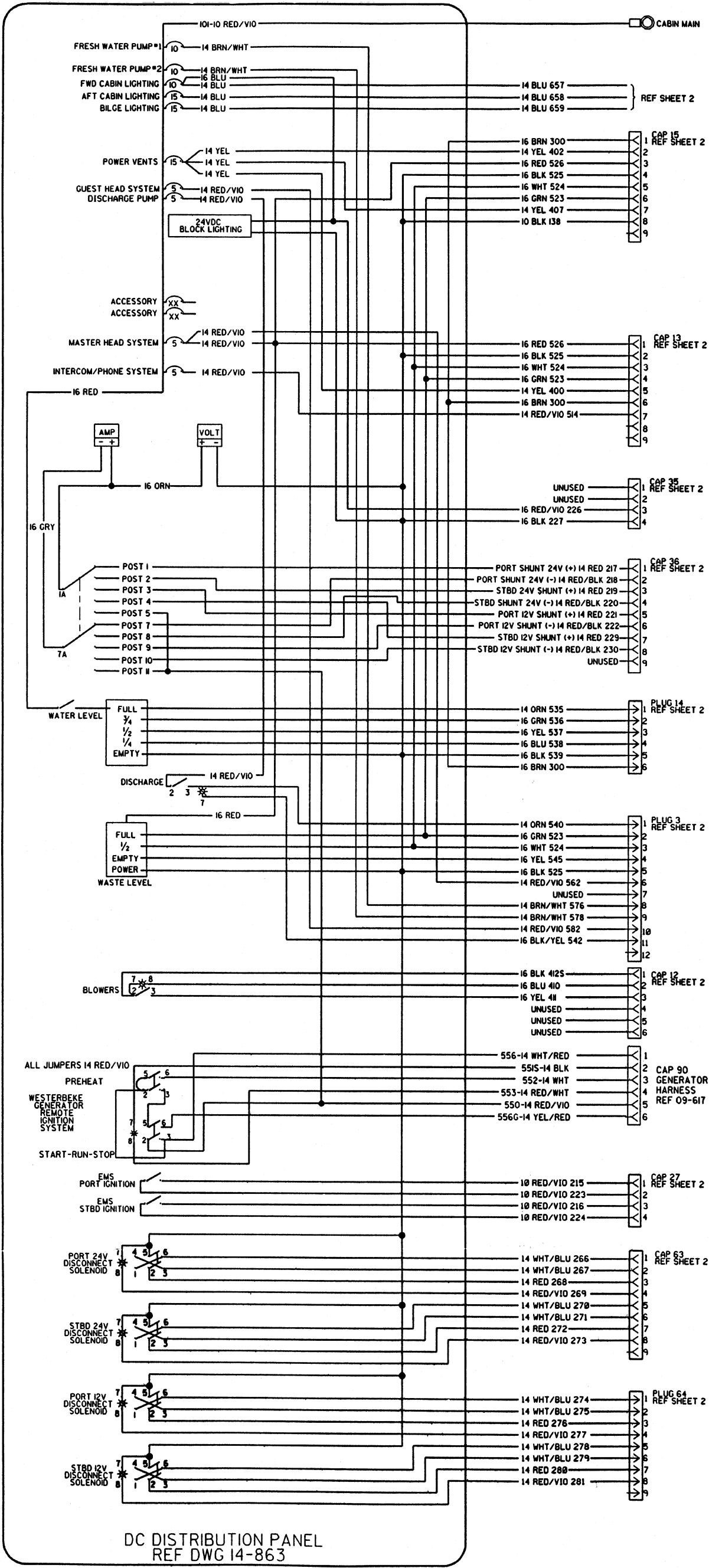
Note: This schematic is subject to variance due to customizing optional accessories and equipment updates.



**Note:** This schematic is subject to variance due to customizing optional accessories and equipment updates.









**Note:** This schematic is subject to variance due to customizing optional accessories and equipment updates





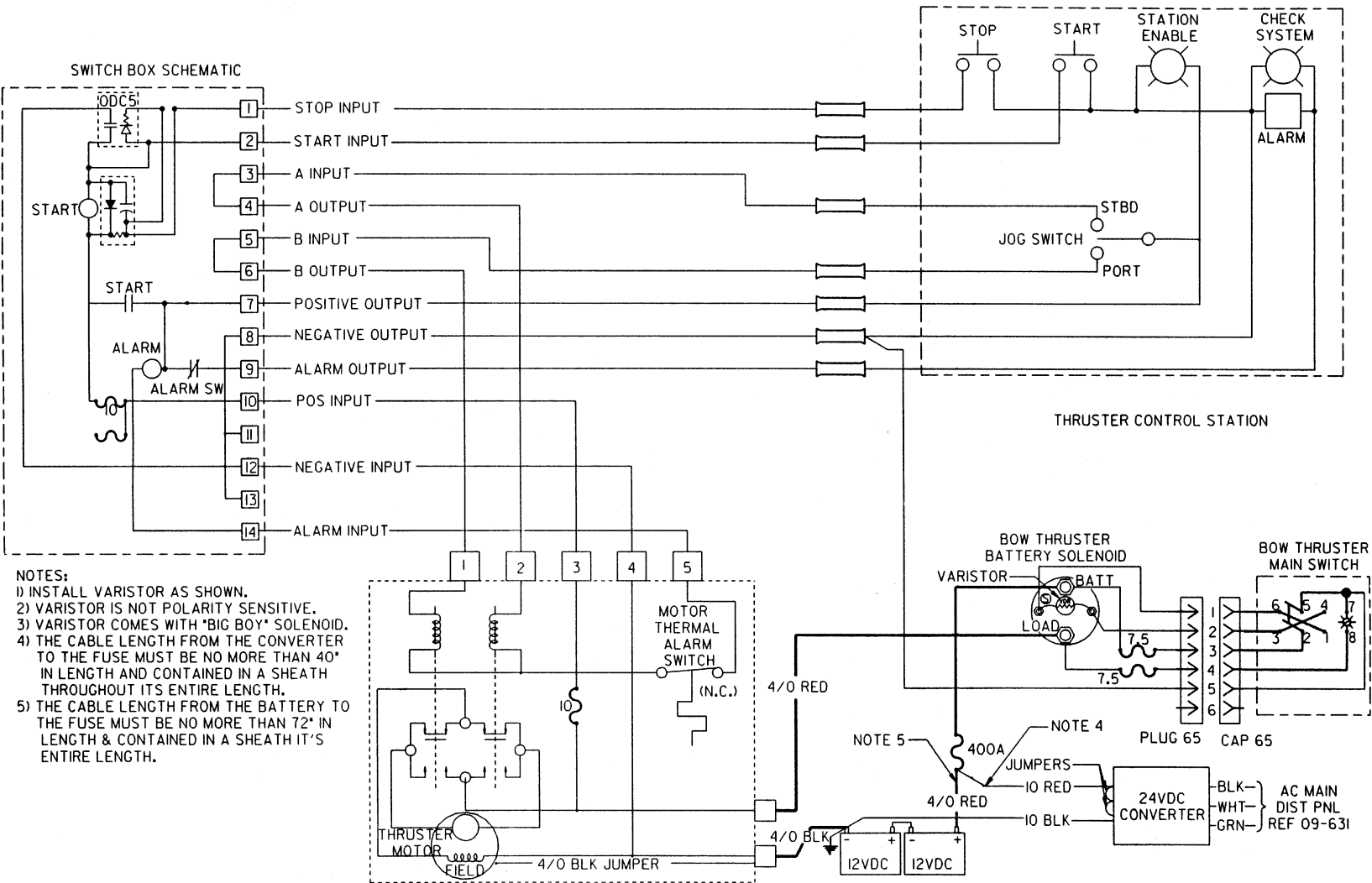
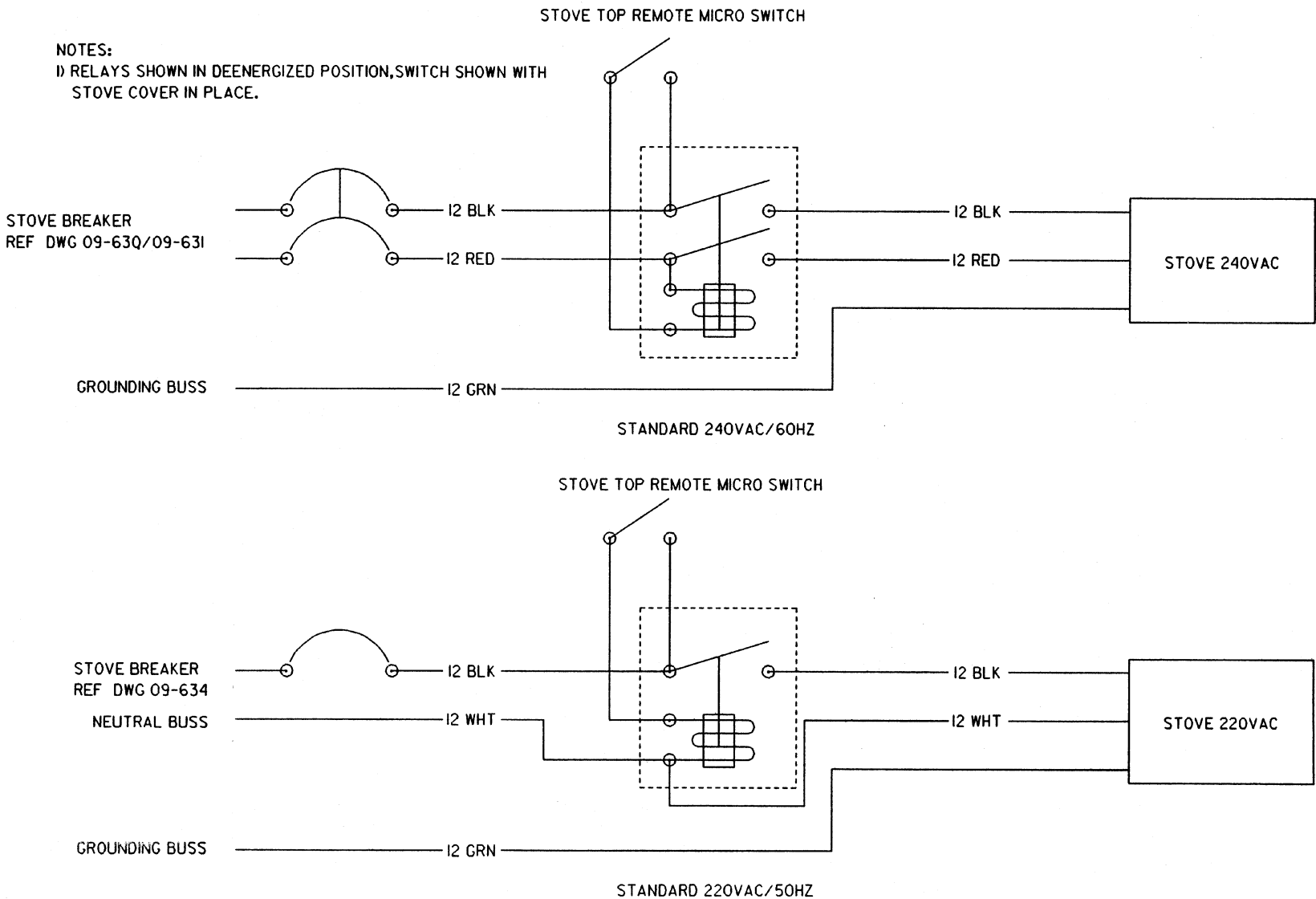


540 Sundancer: Stove Top Switch Wiring Diagram 09-607

Note: This schematic is subject to variance due to customizing optional accessories and equipment updates.

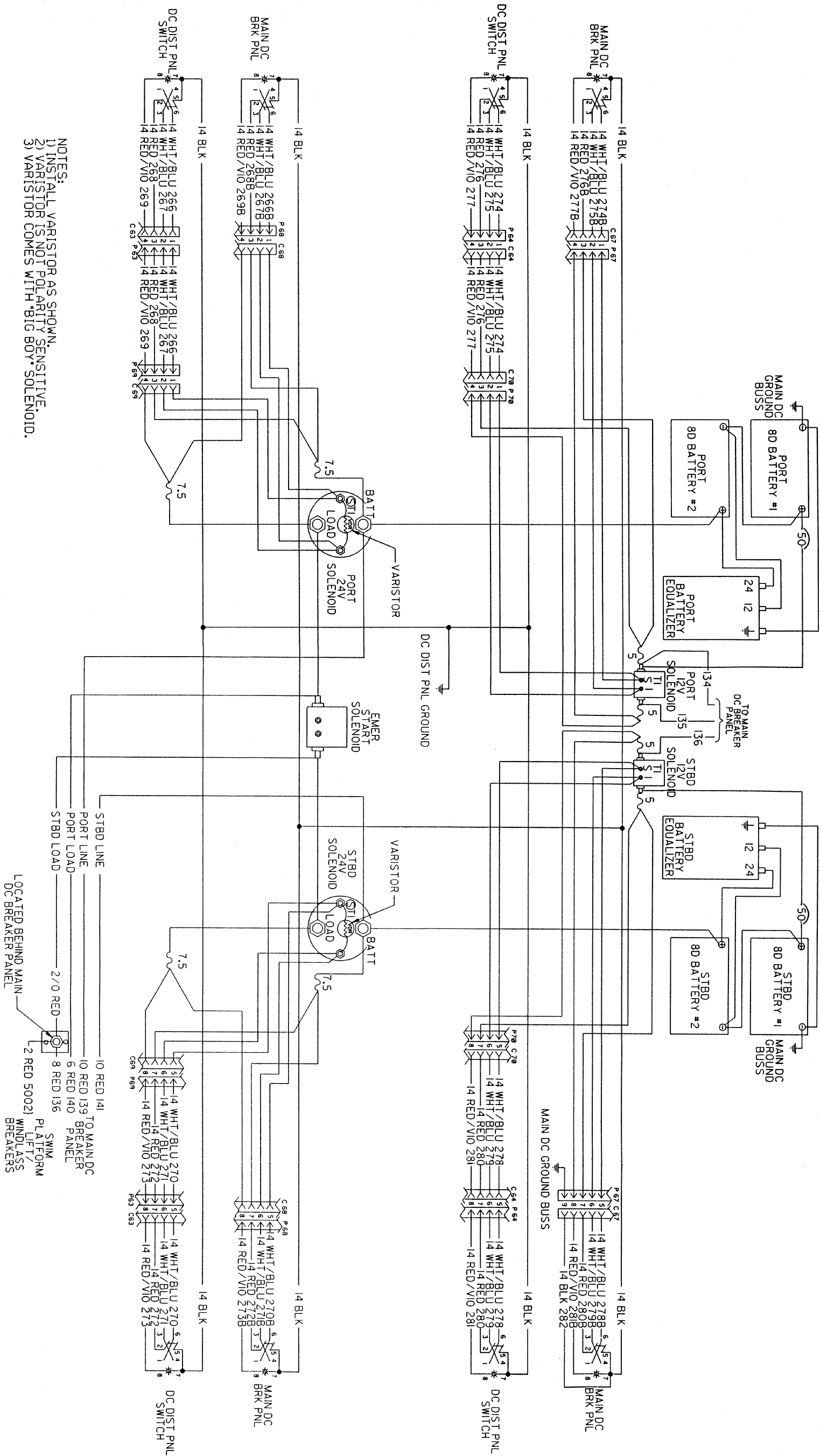
540 Sundancer: Bow Thruster Schematic (Trek 10) 09-608

Note: This schematic is subject to variance due to customizing optional accessories and equipment updates.



540 Sundancer: Battery Solenoid Schematic 09-609

Note: This schematic is subject to variance due to customizing optional accessories and equipment updates.

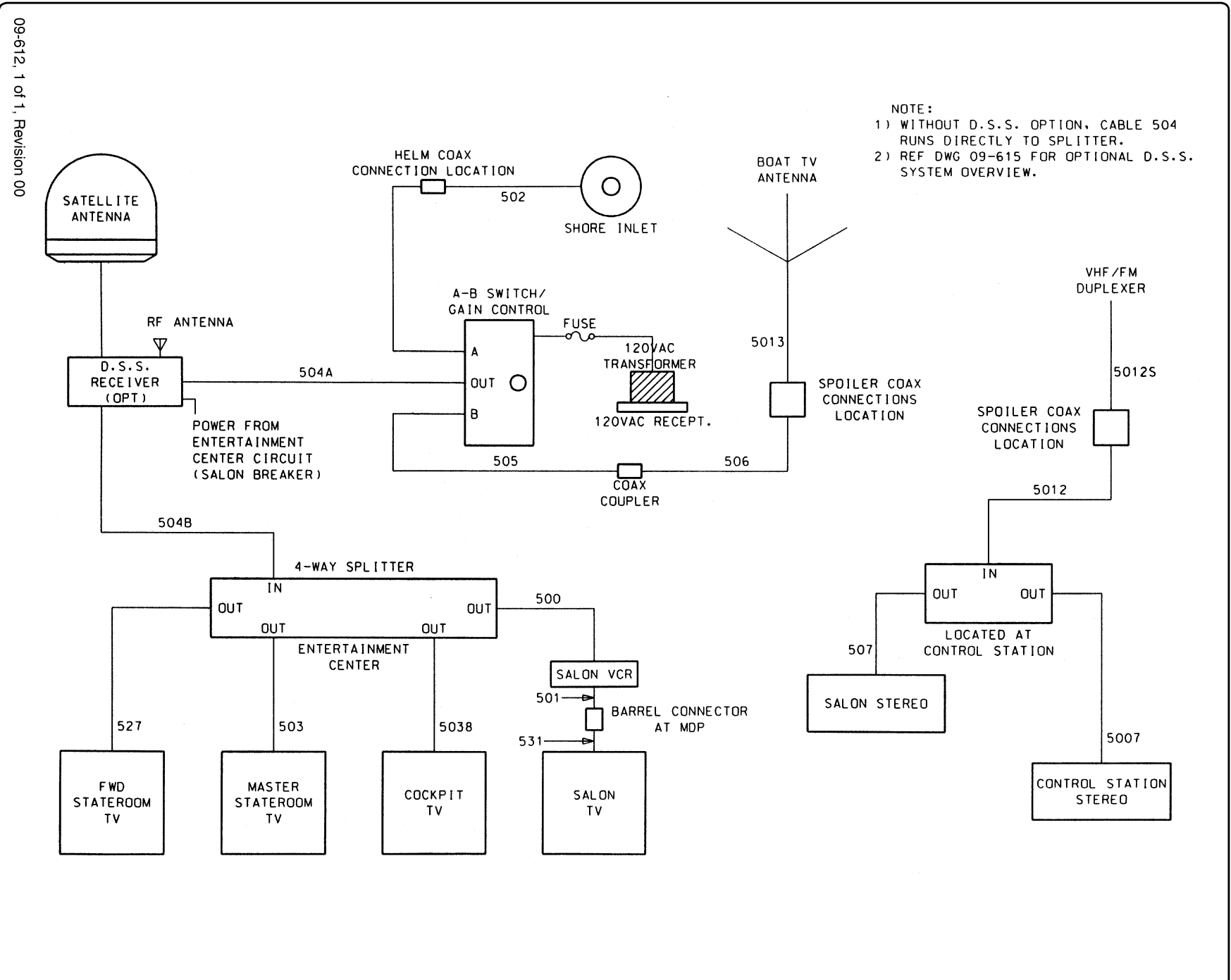


- NOTES:
- 1) INSTALL VARISTOR AS SHOWN.
  - 2) VARISTOR IS NOT POLARITY SENSITIVE.
  - 3) VARISTOR COMES WITH "BIG BOY" SOLENOID.

STBD LINE  
PORT LINE  
STBD LOAD  
TO MAIN DC BREAKER  
PANEL  
SWIM PLATFORM LIFT WINDLASS BREAKERS  
LOCATED BEHIND MAIN DC BREAKER PANEL

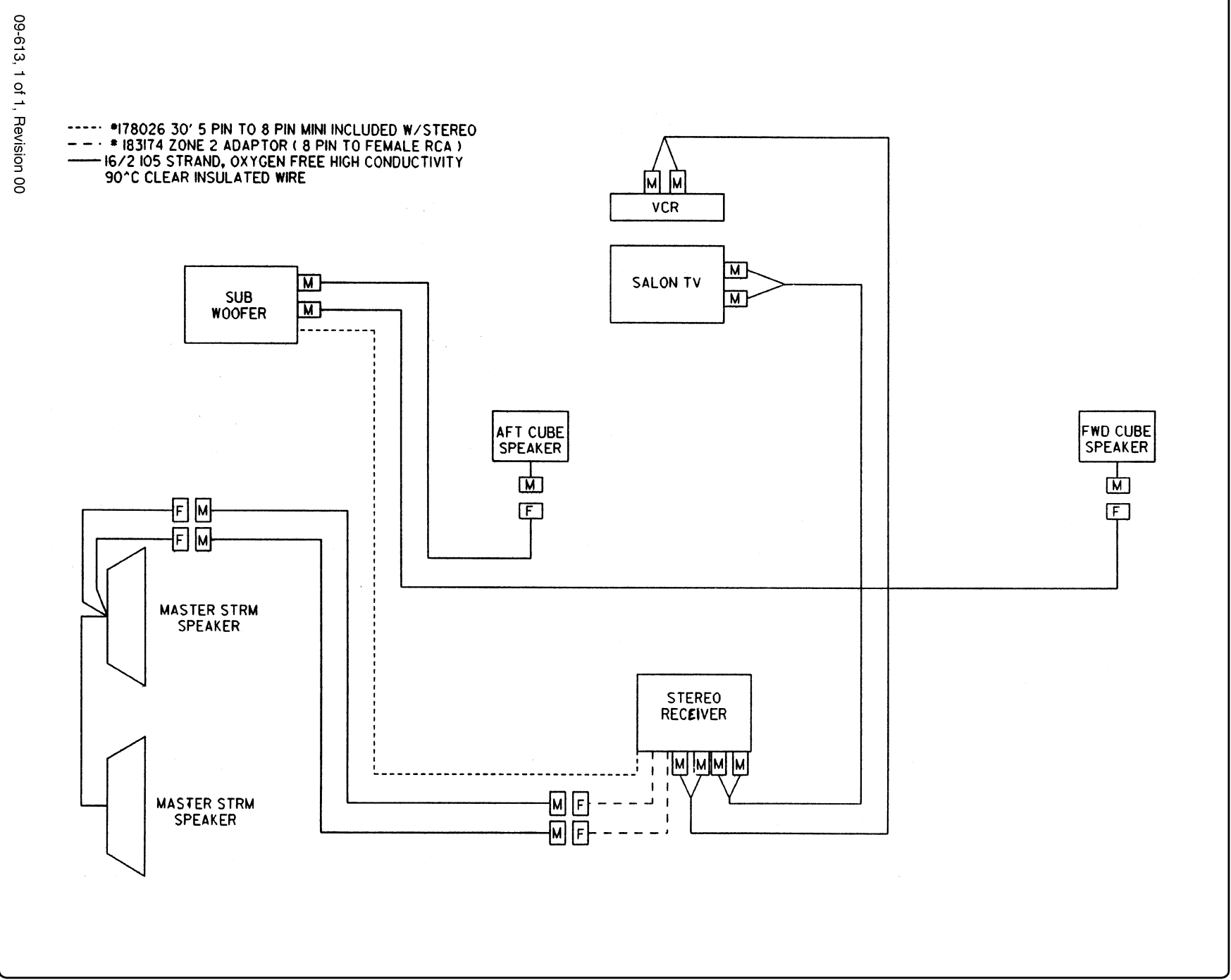
Note: This schematic is subject to variance due to customizing optional accessories and equipment updates





540 Sundancer: TV & Stereo Coaxial Cable Schematic 09-612

Note: This schematic is subject to variance due to customizing optional accessories and equipment updates.

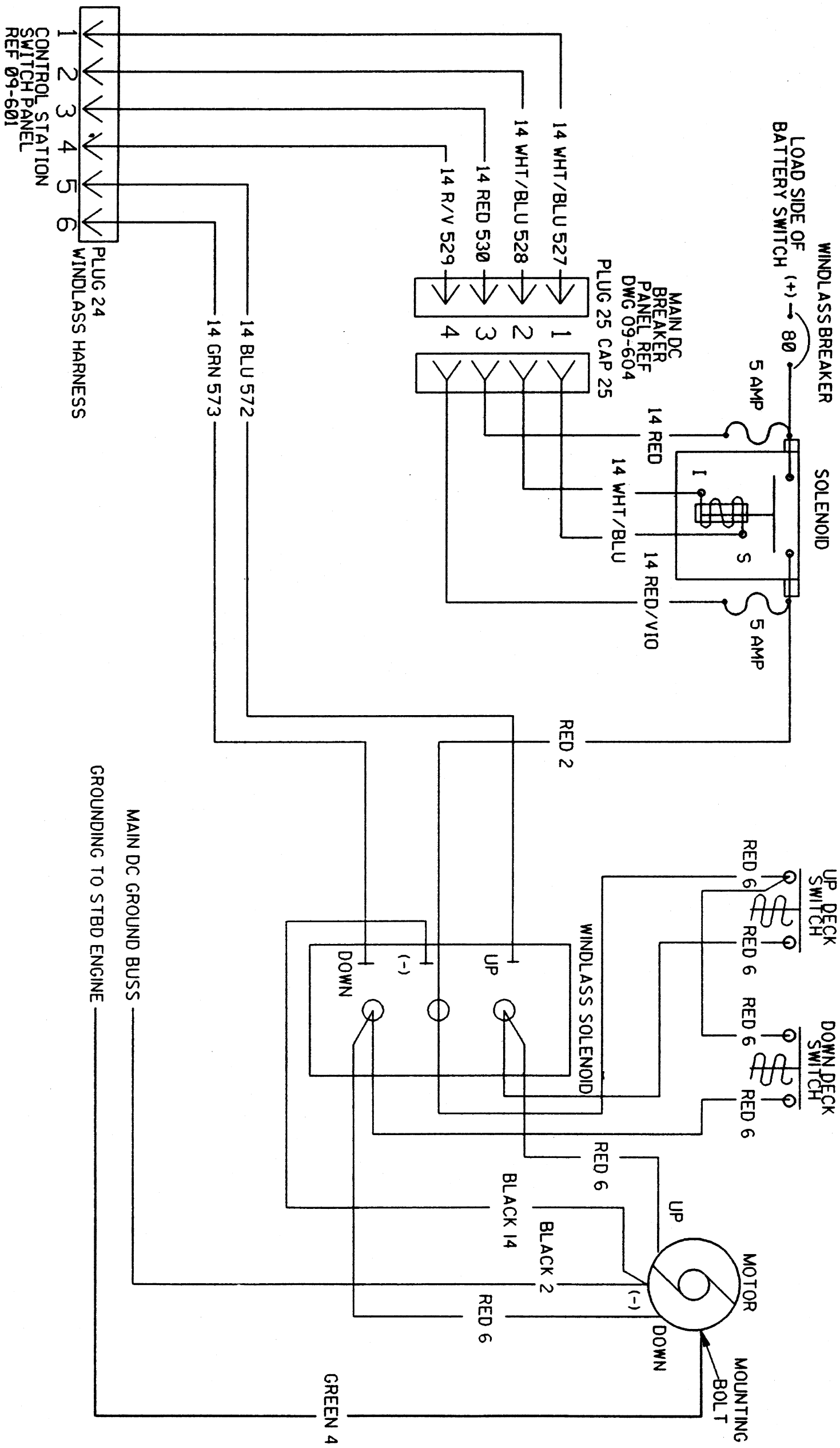


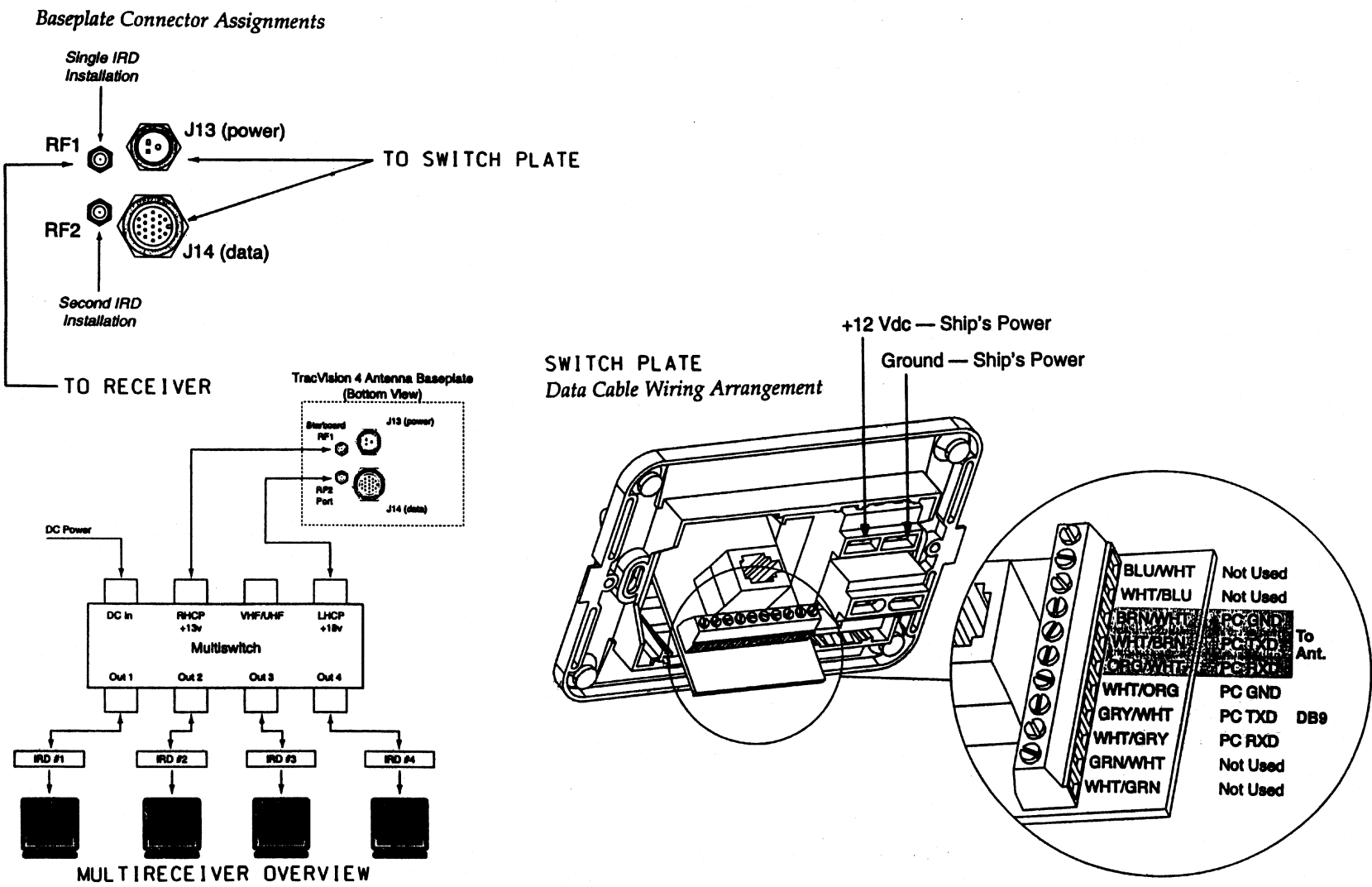
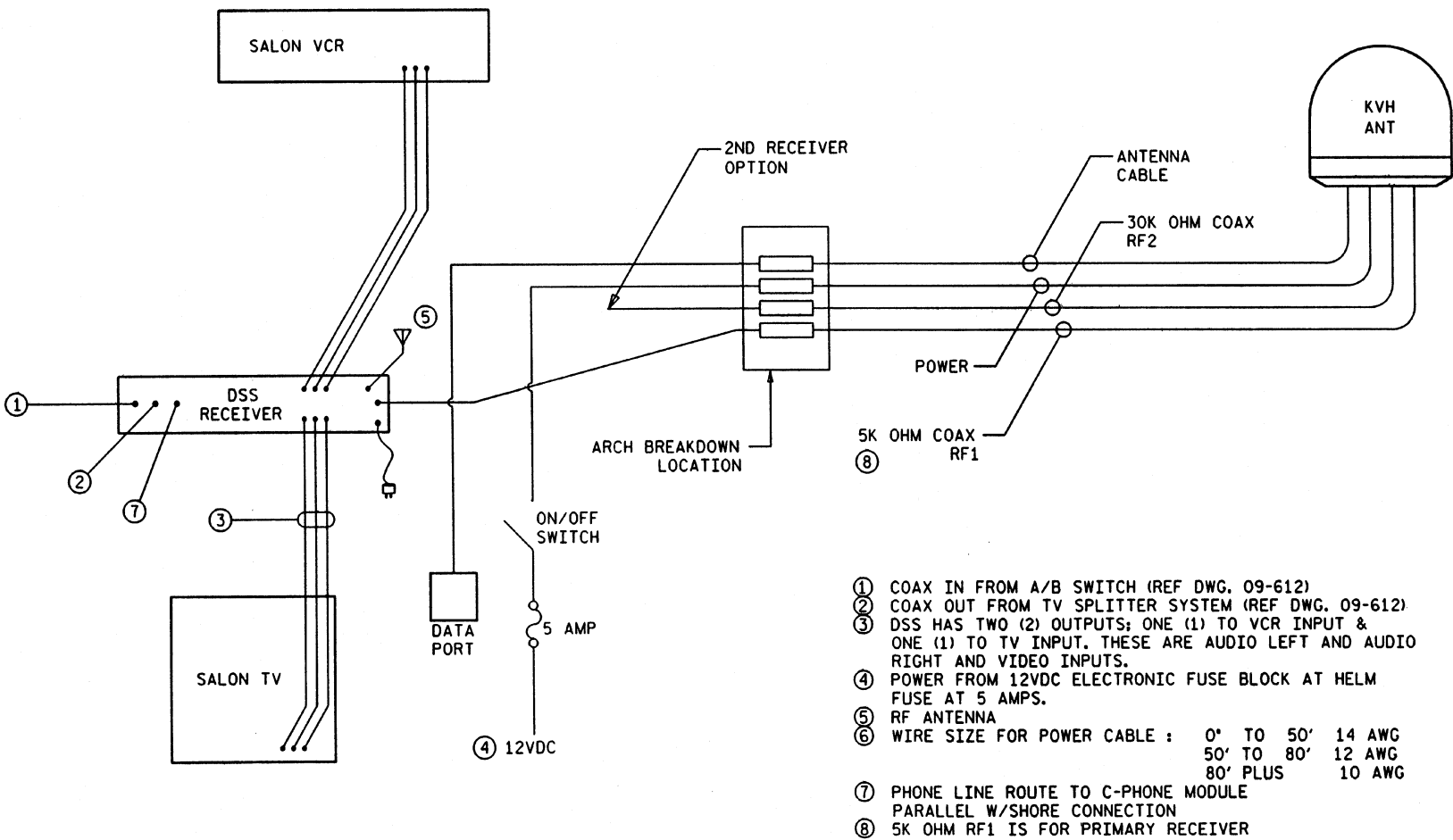
540 Sundancer: Bose Stereo System Wiring Diagram 09-613

Note: This schematic is subject to variance due to customizing optional accessories and equipment updates.

540 Sundancer: Lofrans® Progress II Windlass Wiring Schematic 09-614

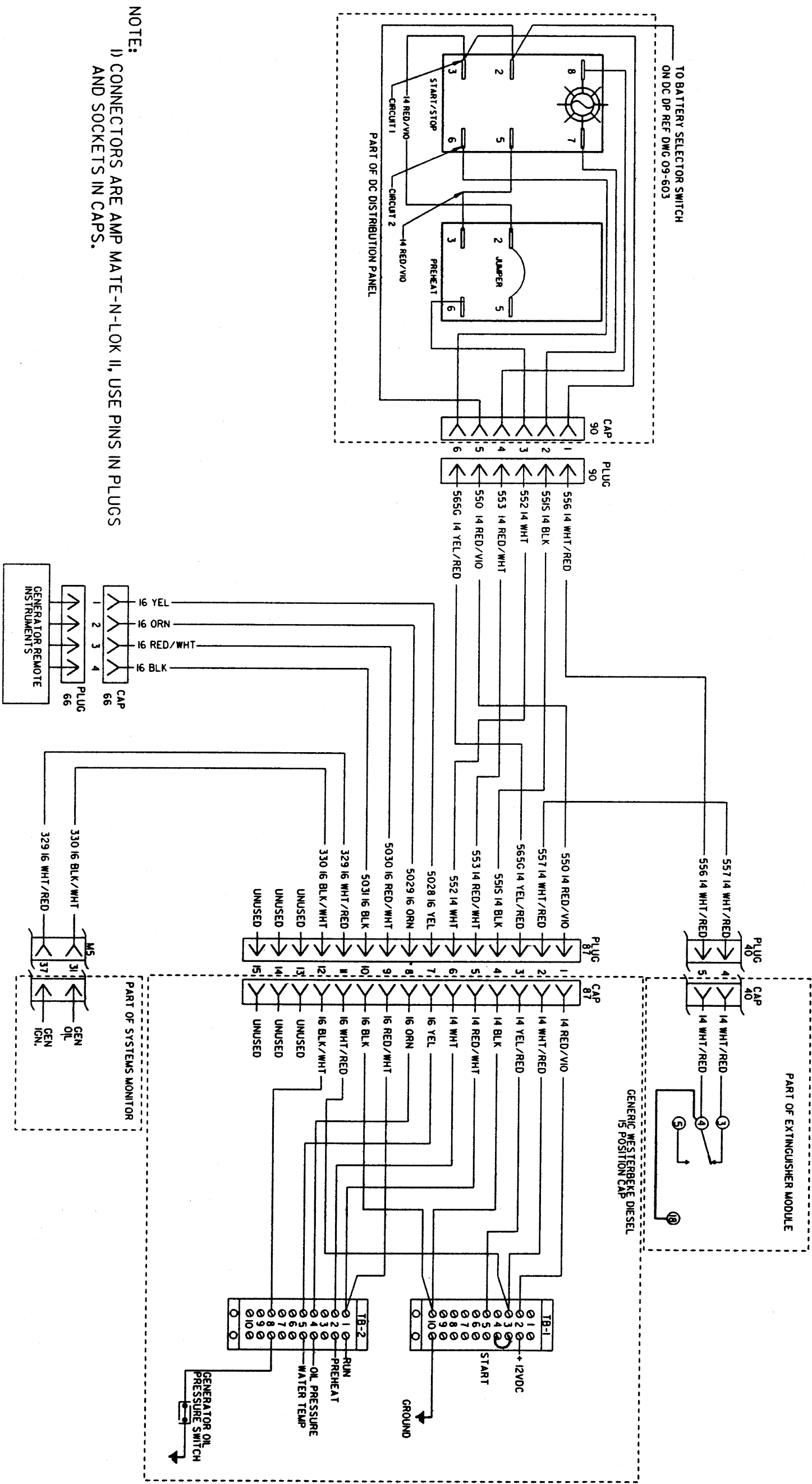
Note: This schematic is subject to variance due to customizing optional accessories and equipment updates.





**540 Sundancer: Westerbeke® Diesel Generator Remote Wiring 09-6177**

Note: This schematic is subject to variance due to customizing optional accessories and equipment updates

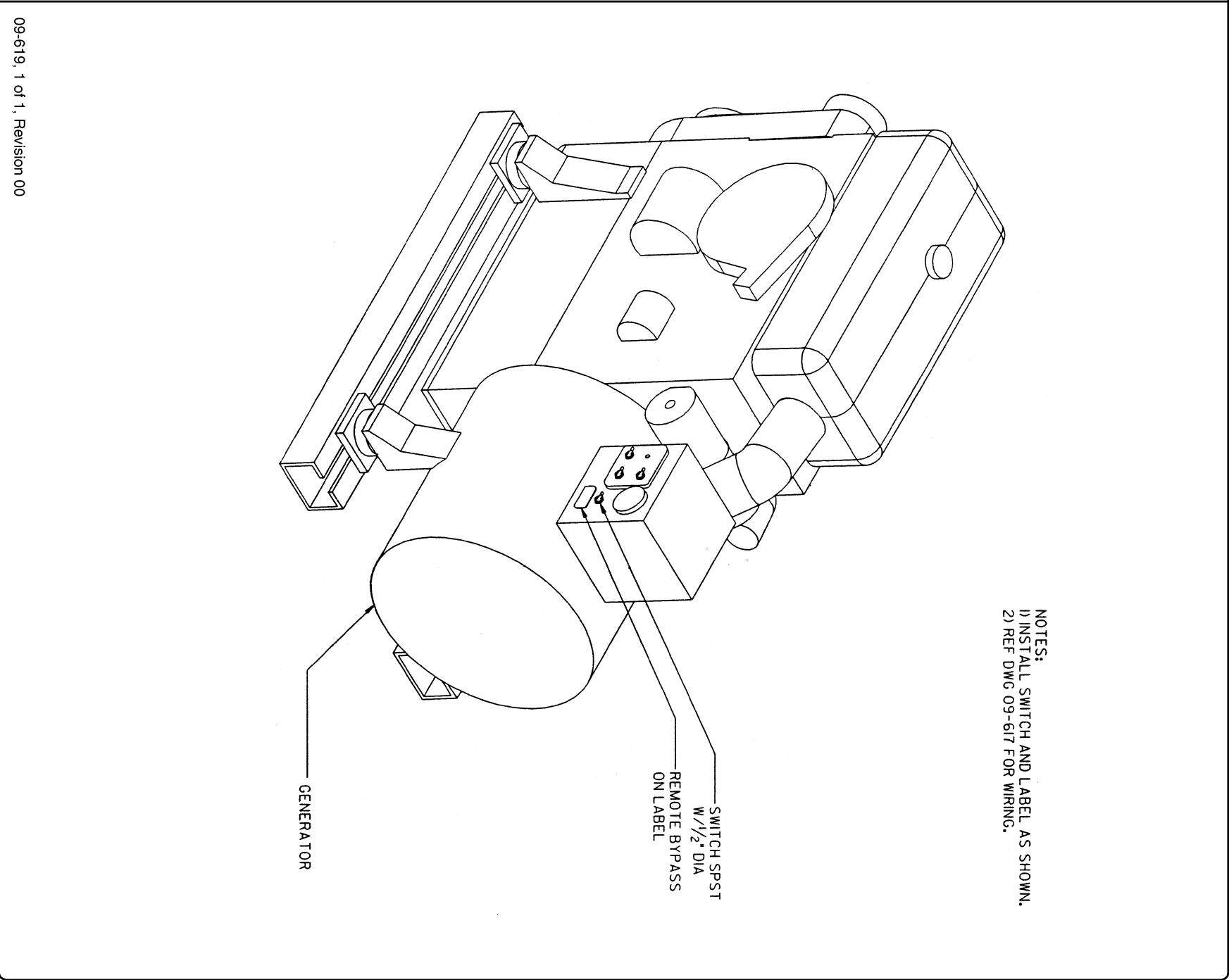
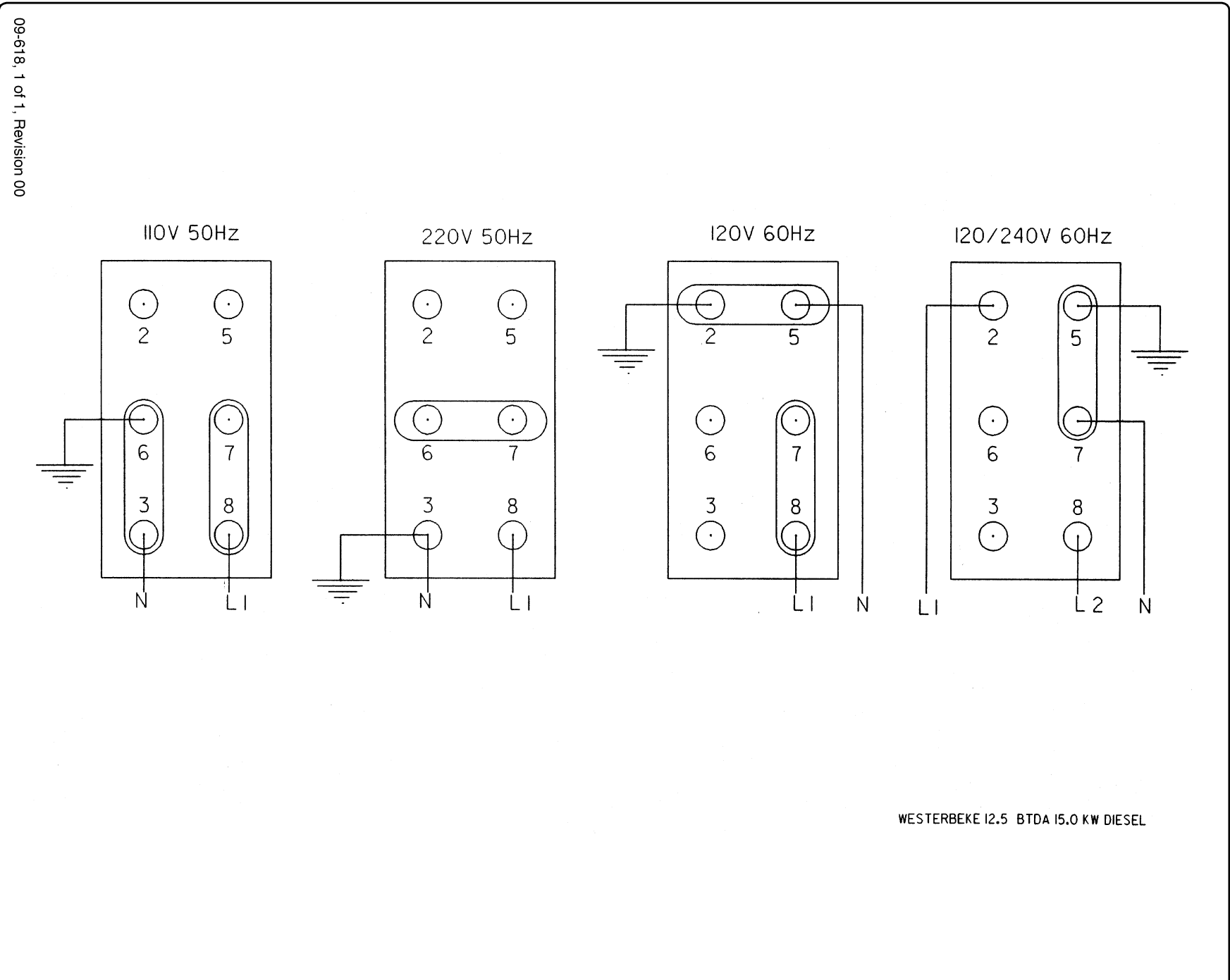


**NOTE:**

1) CONNECTORS ARE AMP MATE-N-LOK II, USE PINS IN PLUGS AND SOCKETS IN CAPS.

Note: This schematic is subject to variance due to customizing optional accessories and equipment updates.

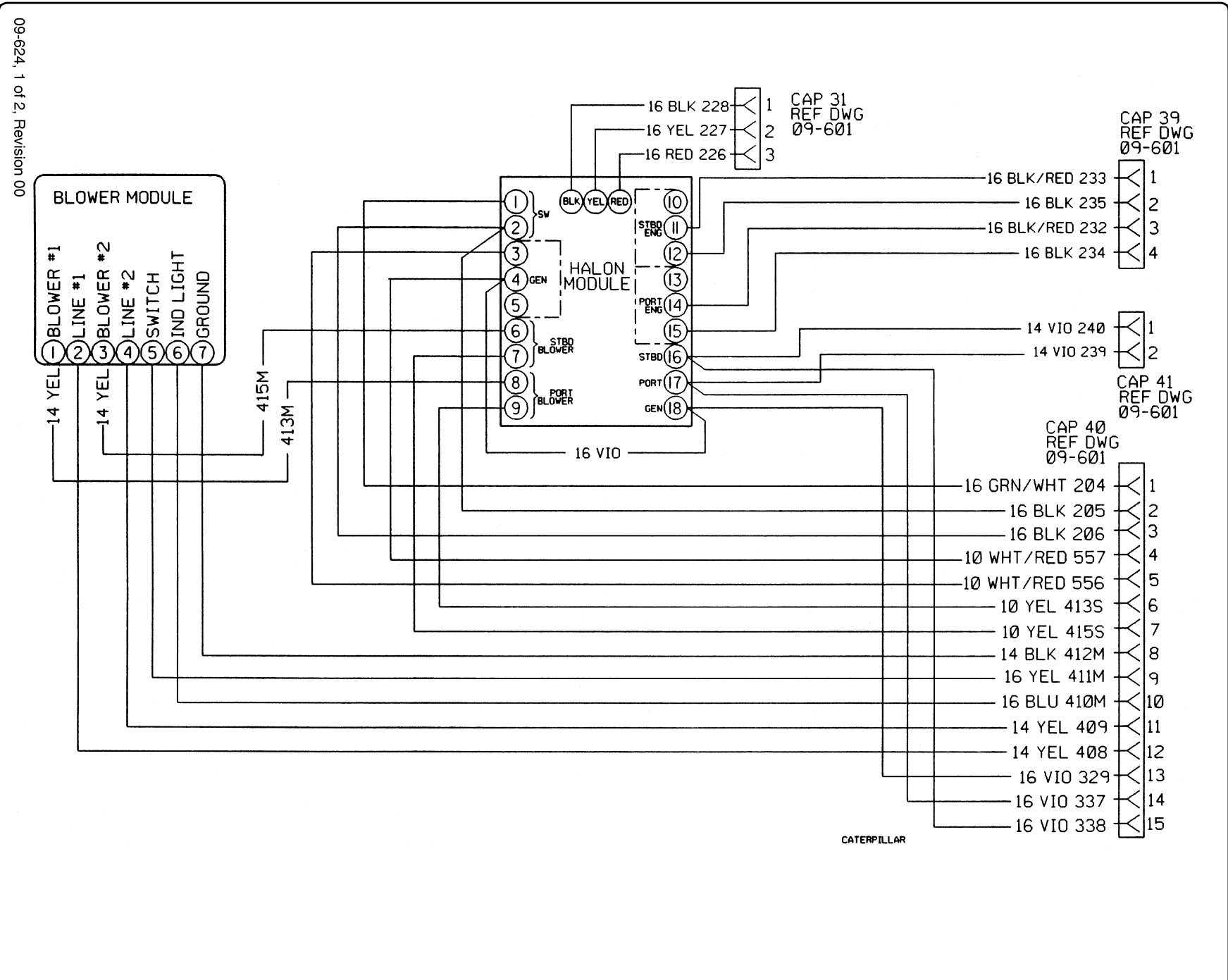
Note: This schematic is subject to variance due to customizing optional accessories and equipment updates.





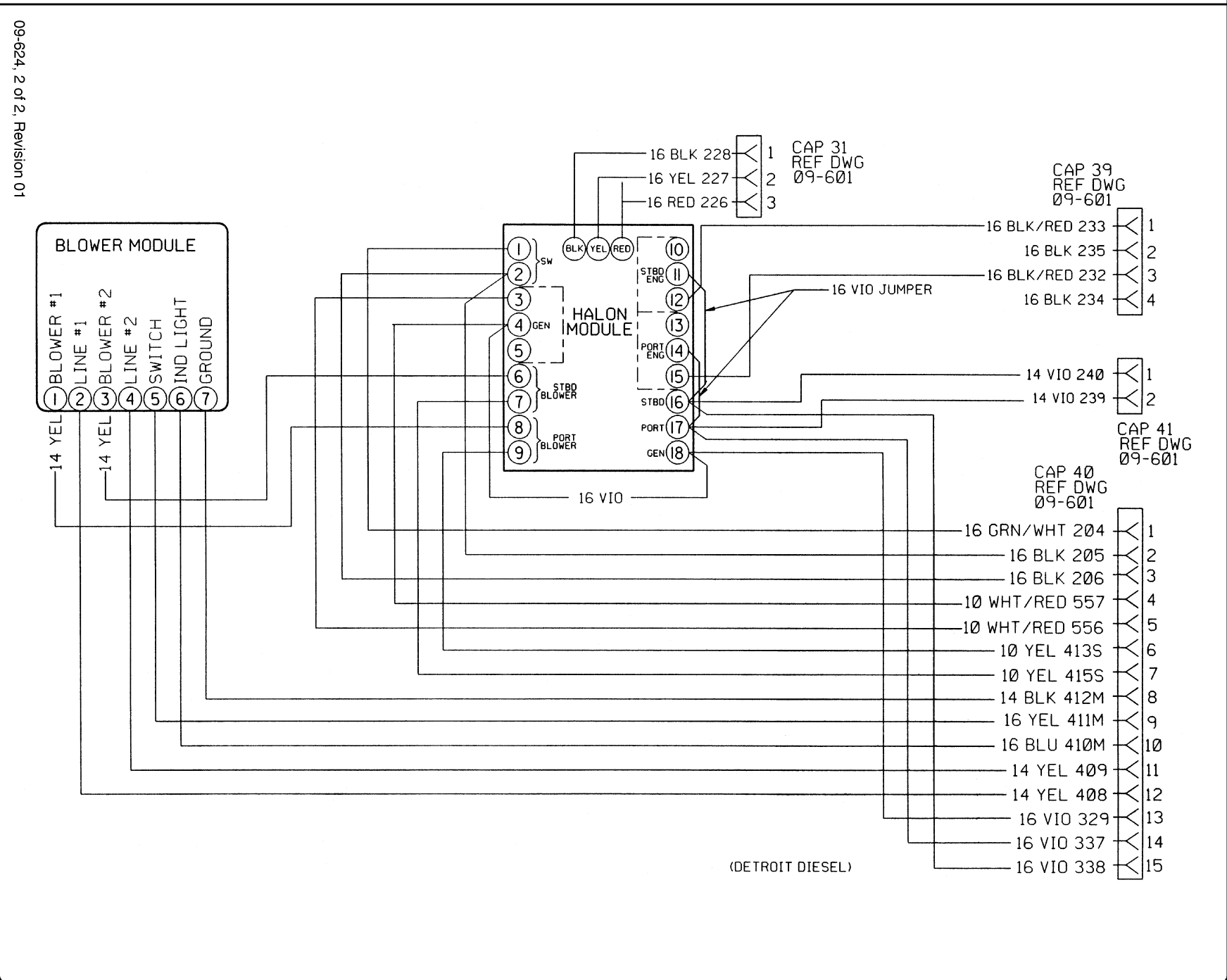
540 Sundancer: Halon System Wiring 09-624 (1 of 2)

Note: This schematic is subject to variance due to customizing optional accessories and equipment updates.



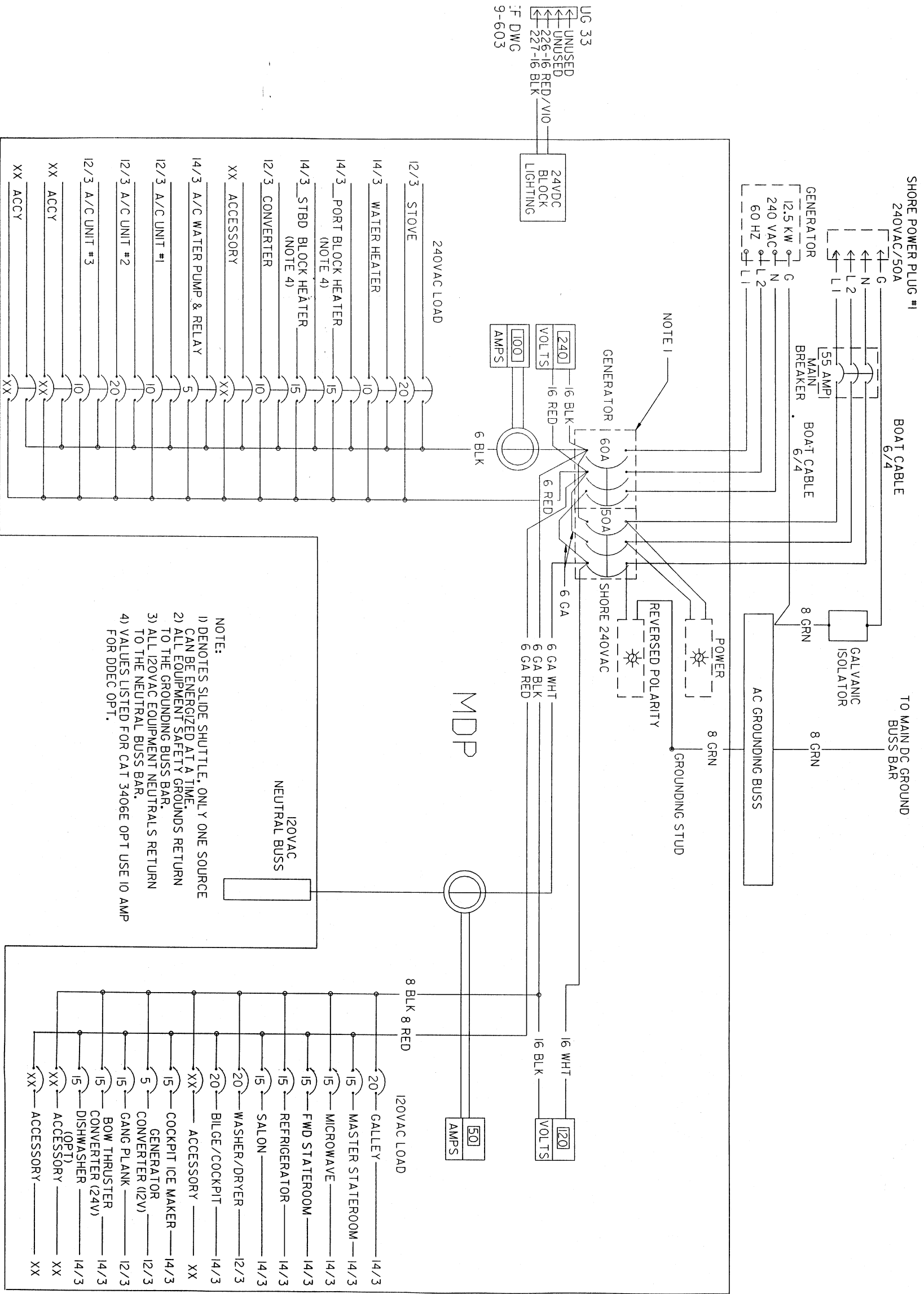
540 Sundancer: Halon System Wiring 09-624 (2 of 2)

Note: This schematic is subject to variance due to customizing optional accessories and equipment updates.



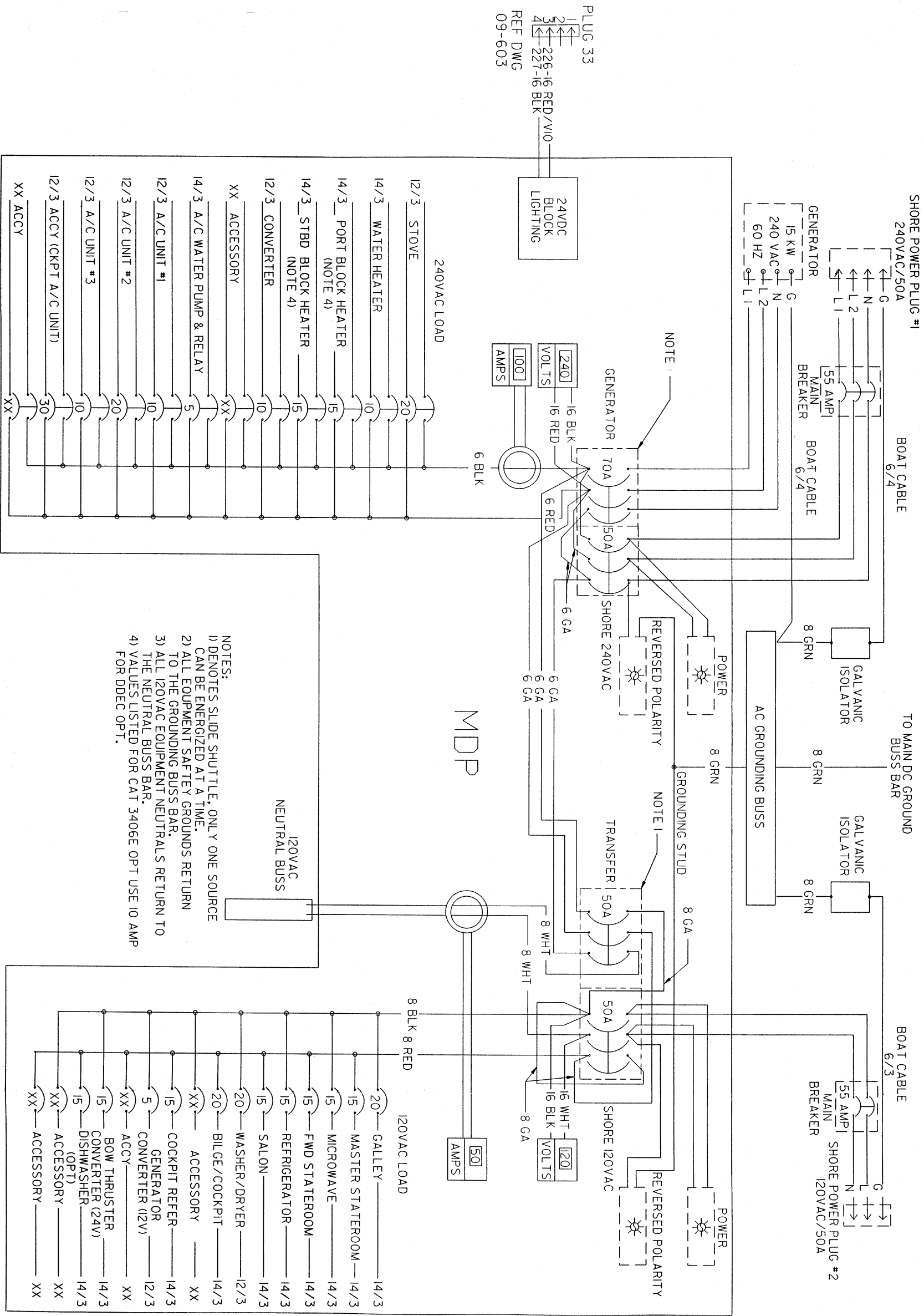
540 Sundancer: AC Wiring Schematic (240VAC) 09-630

Note: This schematic is subject to variance due to customizing optional accessories and equipment updates.



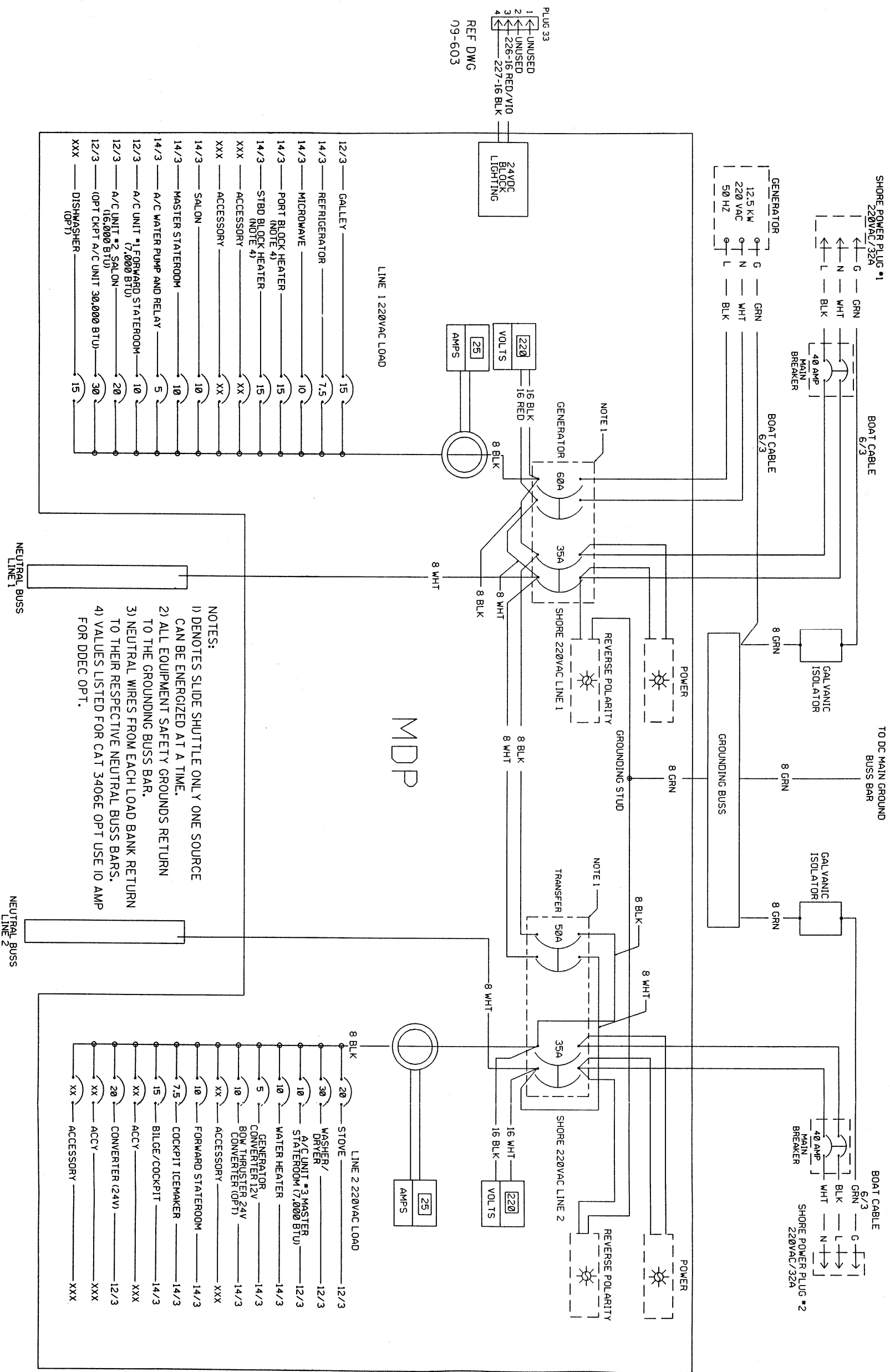
540 Sundancer: AC Wiring Schematic (240VAC/120VAC) 09-631

Note: This schematic is subject to variance due to customizing optional accessories and equipment updates.



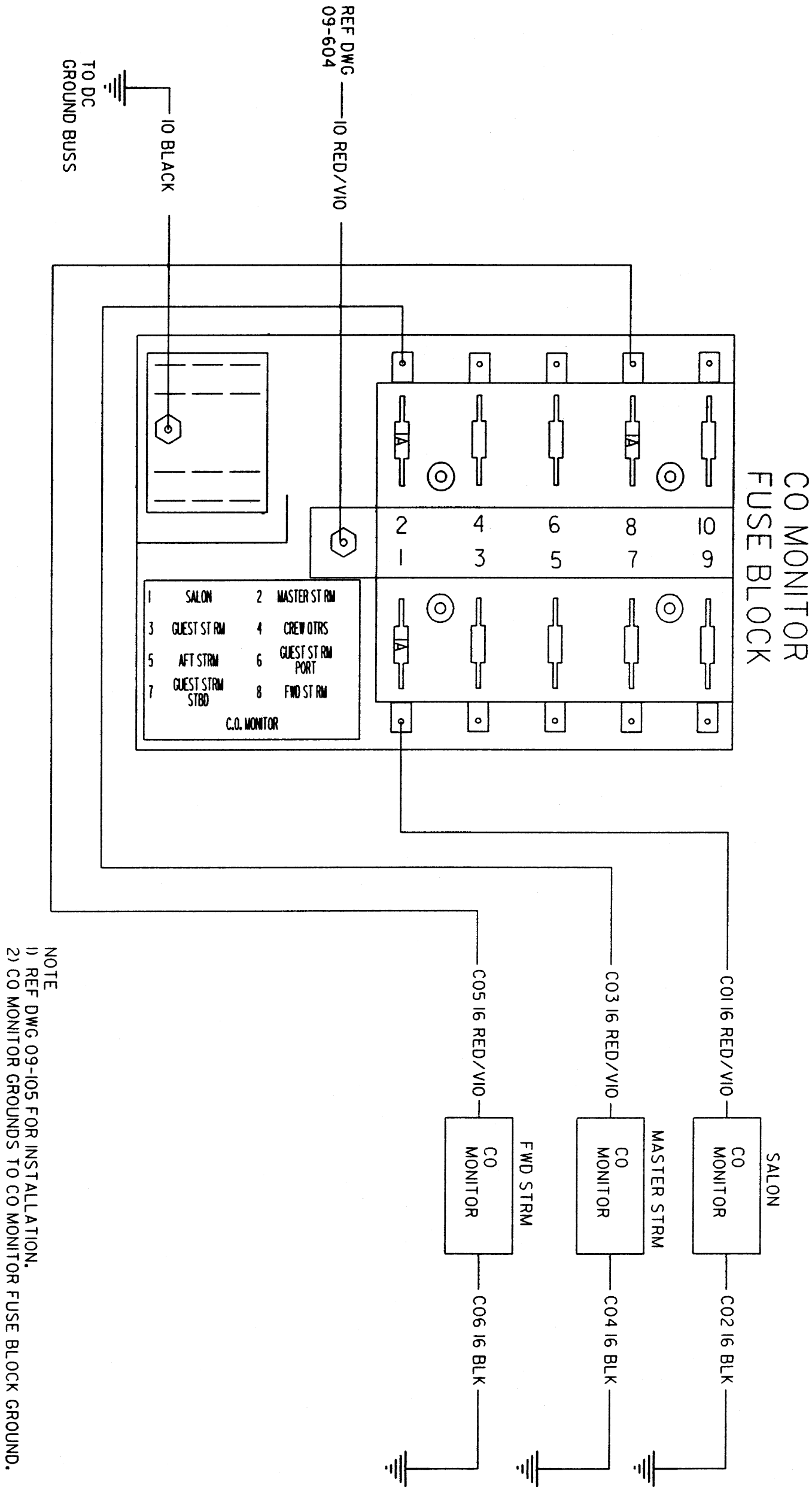
540 Sundancer: AC Wiring Diagram (220V-50hz) (Optional) 09-634

Note: This schematic is subject to variance due to customizing optional accessories and equipment updates.

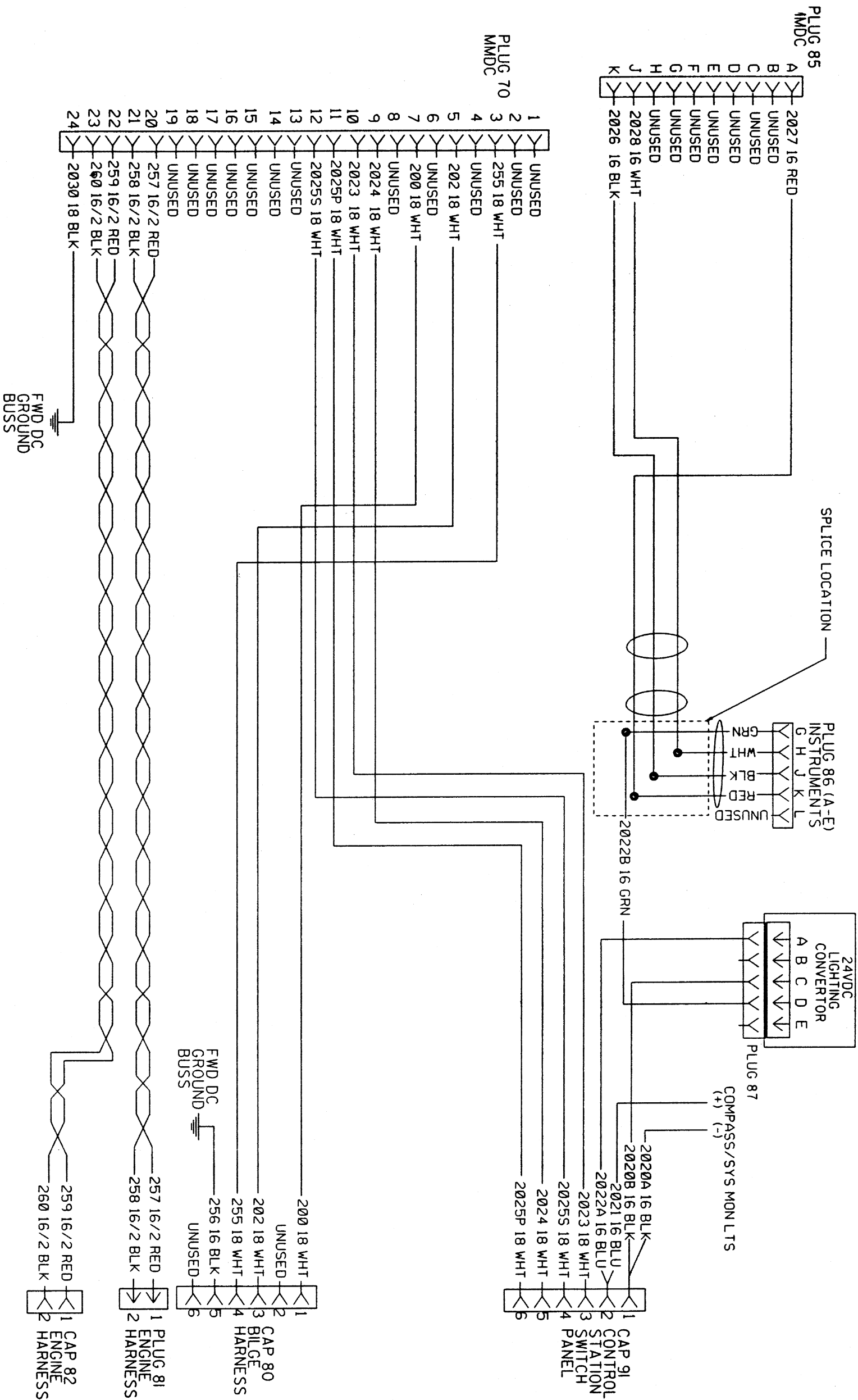


540 Sundancer: CO Monitoring Wiring 09-699

Note: This schematic is subject to variance due to customizing optional accessories and equipment updates.

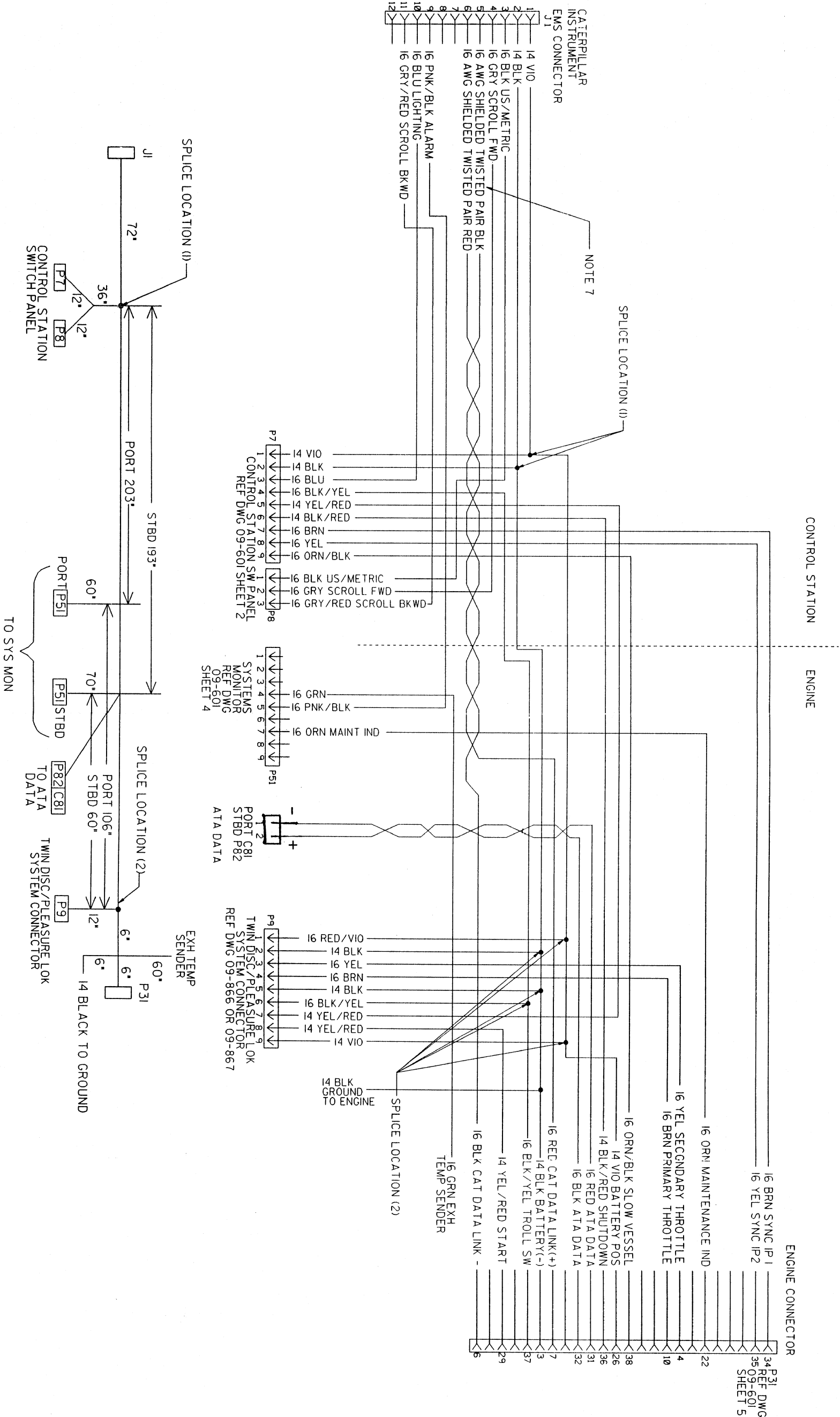


MRP# 1420082



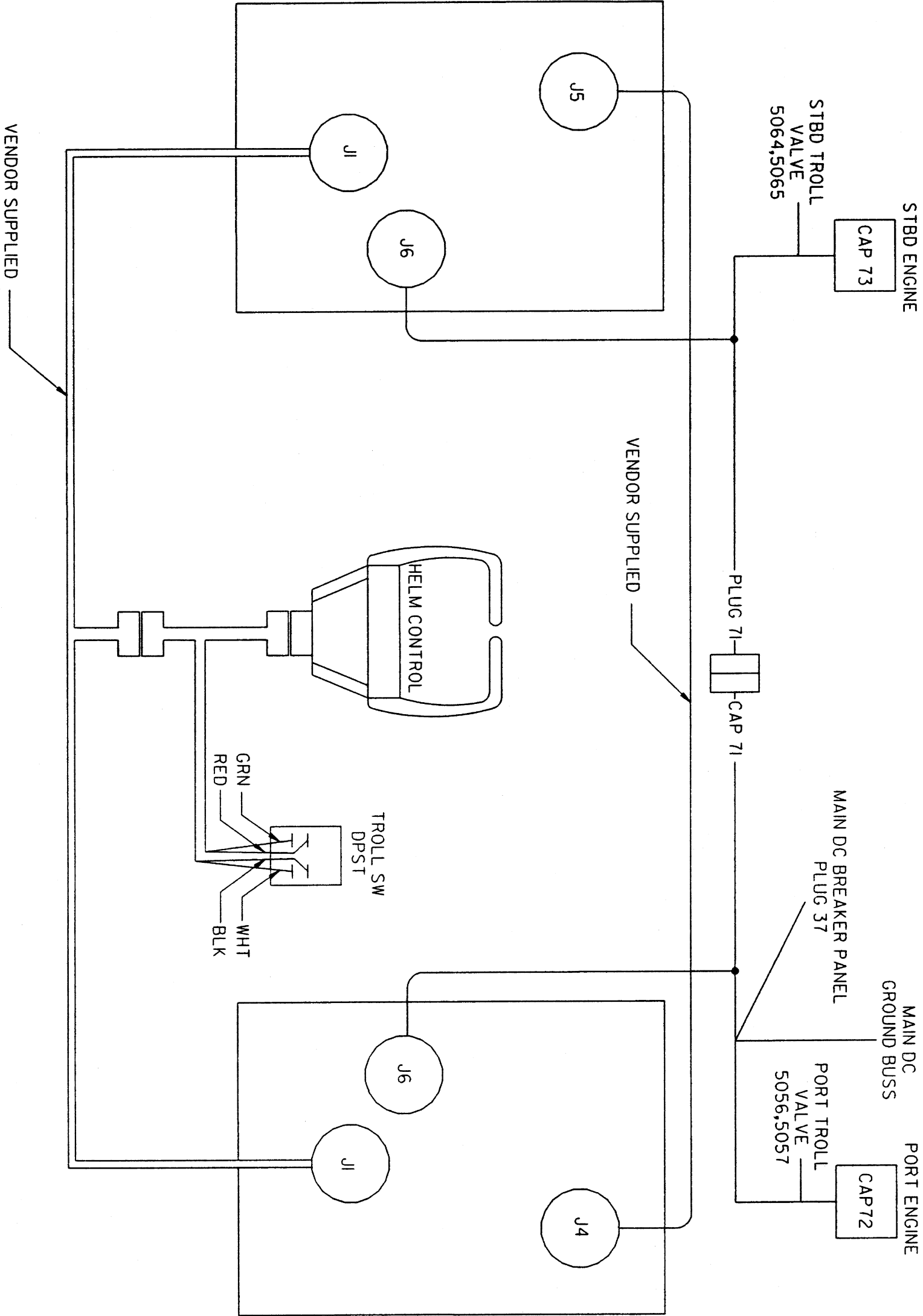
540 Sundancer: Engine Harness Construction (CAT 3406E/3196) 09-862

Note: This schematic is subject to variance due to customizing optional accessories and equipment updates.



540 Sundancer: Twin Disc System Wiring Schematic 09-869

Note: This schematic is subject to variance due to customizing optional accessories and equipment updates.





## Section 8 • Accessories

### Air Conditioning & Heating

The 540 DA air conditioning/heating system consists of three (3) standard air conditioning/heating units, one (1) raw water pump with a seacock and strainer and a relay unit so the water pumps will be activated by demand when any AC unit comes on.

The forward unit is located under the guest stateroom bunk. The controls for the unit are located on the forward side of the starboard hanging locker. The air filter is located on the face of the unit.

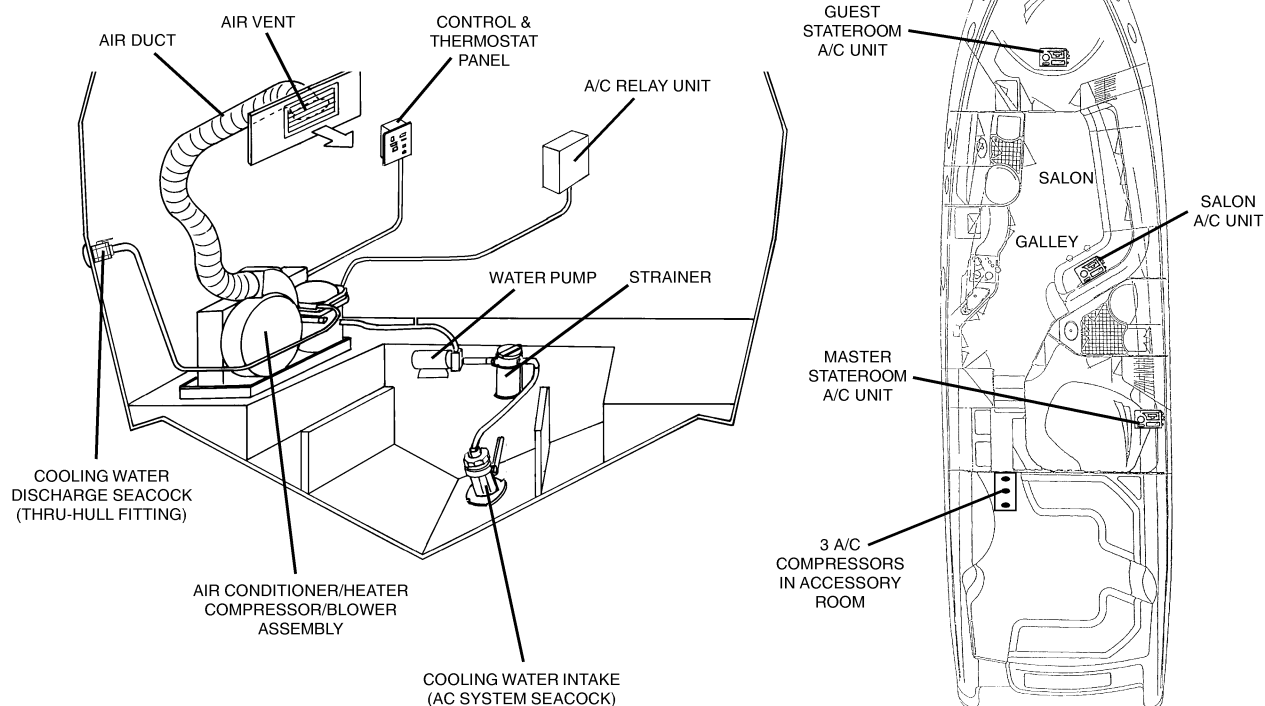
The salon unit is located under the aft end of the salon sofa. The controls for the unit are located above the sofa. The air filter is located on the face of the unit.

The 540 DA master stateroom unit is located under the master stateroom bunk. The controls for the unit are located on the starboard side of the bunk. The air filter is located on the face of the unit.

The system is cooled to maintain optimal operating temperature by the raw water pump located in the bilge, forward of the port engine (see fig. 2.11.1). The pump draws water through a seacock and filters it through a sea water strainer. The water passes through each compressor cooling the condensing coils, then flows overboard. (The sea water strainer should be inspected frequently and cleaned out when plugged. To clean strainer, refer to “Section 2, Seacocks & Strainers”).

The condensation drains for all the cabin units drain into the shower sump located under a salon hatch. Remove the hatch to access the sump (see fig. 5.3.1).

**Typical Air Conditioning Component Arrangement**  
(fig. 8.1.1)



To start system:

1. Make sure the seacock for the cooling water pump is open.
2. Turn ON the "A/C WATER PUMP & RELAY" circuit breaker on the main AC distribution panel. Turn ON each "A/C UNIT" circuit breaker.
3. Refer to air conditioner owner's manual in the owner's packet for instructions on operation of the control panels.

REFER TO OWNER'S MANUAL PACKET FOR INSTRUCTIONS AND WARRANTY INFORMATION.

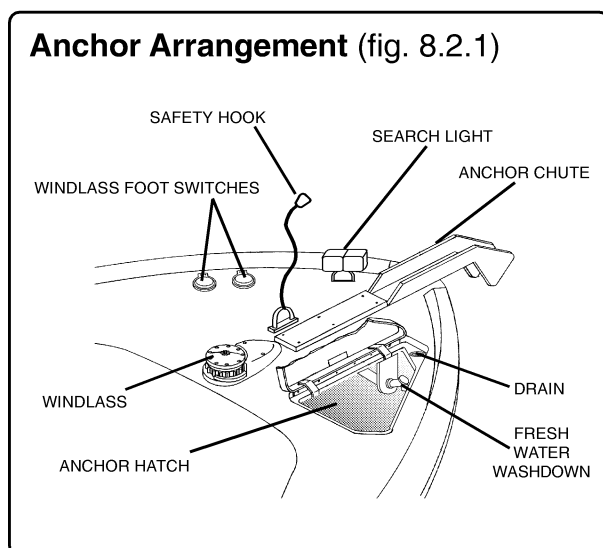
## Anchoring

To anchor, bring the bow into the wind or current and put the engine in neutral. When the vessel comes to a stop, lower the anchor from the bow. The anchor line should be 5 to 7 times the depth of the water.

### ANCHORING ARRANGEMENT

The 540 DA is equipped with a windlass and an anchor chute. Stow the anchor in the chute when not in use.

**NOTE:** Before using the anchor, be sure the anchor lanyard is removed from the anchor and the anchor is secured to the windlass chain.



### Anchoring

The rode is the line connecting the anchor to the boat.

- Nylon line is ideal because it is light, strong, stretches, can be stowed wet and is easy to handle.

- Add a short chain between the anchor and the nylon line to prevent abrasion of the line.

The **scope** is technically defined as the ratio of the rode length to the vertical distance from the bow to the sea floor.

- Scope depends on the type of anchor, bottom, tide, wind and sea conditions.

$$\text{Scope} = \frac{\text{Rode Length}}{\text{Bow Height} + \text{Water Depth}}$$

- Minimum is 5:1 for calm conditions; norm is 7:1; severe conditions may require 10:1.

Since you want to know how much rode to use when anchoring, the formula is:

$$\text{Rode Length} = (\text{Bow Height} + \text{Water Depth}) \times \text{Scope}$$

#### Example:

$$\text{Rode Length} = (3 \text{ feet} + 10 \text{ feet}) \times 7^*$$

$$\text{Rode Length} = 13 \text{ feet} \times 7^*$$

$$\text{Rode Length} = 91 \text{ feet}$$

\* Scope factor may range from 5 to 10 or more. Less than 5, the anchor breaks out too easily.

### Lowering Anchor

- Be sure there is adequate rode.

### WARNING

**SINKING HAZARD** – Anchor from the bow if using one anchor. A small current can make a stern-anchored boat unsteady; a heavy current can drag a stern-anchored craft under water.

**COLLISION HAZARD** – Anchor only in areas where your boat will not disrupt other boats. Do not anchor in a channel or tie up to any navigational aid. It is dangerous and illegal.

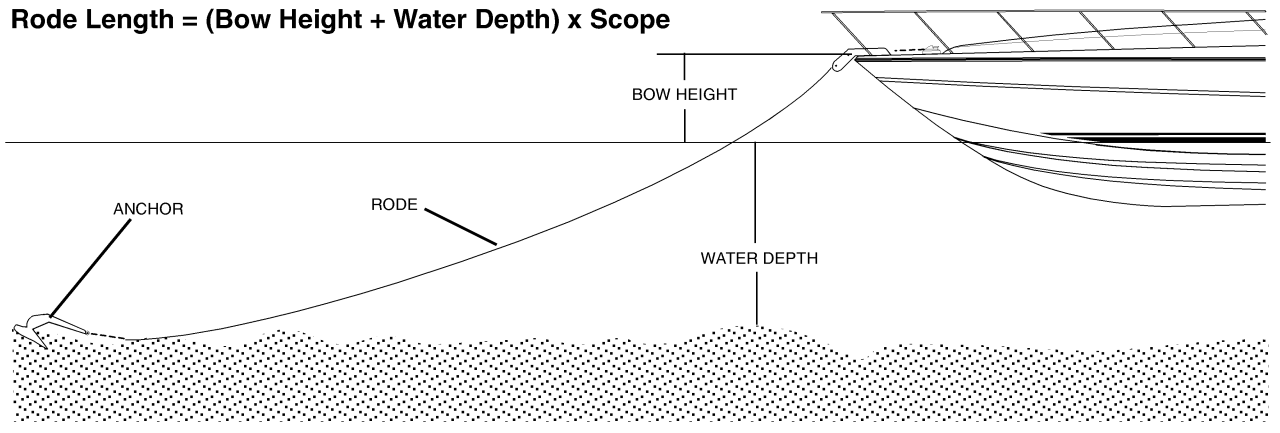
- Secure rode to both the anchor and the boat.
- Stop completely before lowering anchor.
- If using windlass, refer to windlass operator's manual.
- Keep feet clear of coiled line.
- Turn on anchor light at night and in reduced visibility.

### Setting Anchor

- There is no best way to set an anchor. Experiment to see how your anchor performs.
- One method is to turn the rode around a bit and slowly pay out as the boat backs from the

### Anchoring (fig. 8.3.1)

$$\text{Rode Length} = (\text{Bow Height} + \text{Water Depth}) \times \text{Scope}$$



anchor site. When the proper scope has been reached, snub the rode quickly, causing the anchor to dig into the bottom.

- Reverse engine slowly to drive the anchor in and prevent it from dragging.
- Secure the rode to the bitt or cleat.

#### Weighing Anchor

- Run the boat slowly up to the anchor, taking in the rode as you go.
- The anchor will usually break out when the rode becomes vertical.
- Be careful that trailing lines do not foul in the propeller.
- Coil lines to let them dry before stowing.

#### Clearing a Fouled Anchor

A fouled anchor can test your patience and ingenuity. One of the best methods of breaking free is to set a **tripline** before you lower anchor.

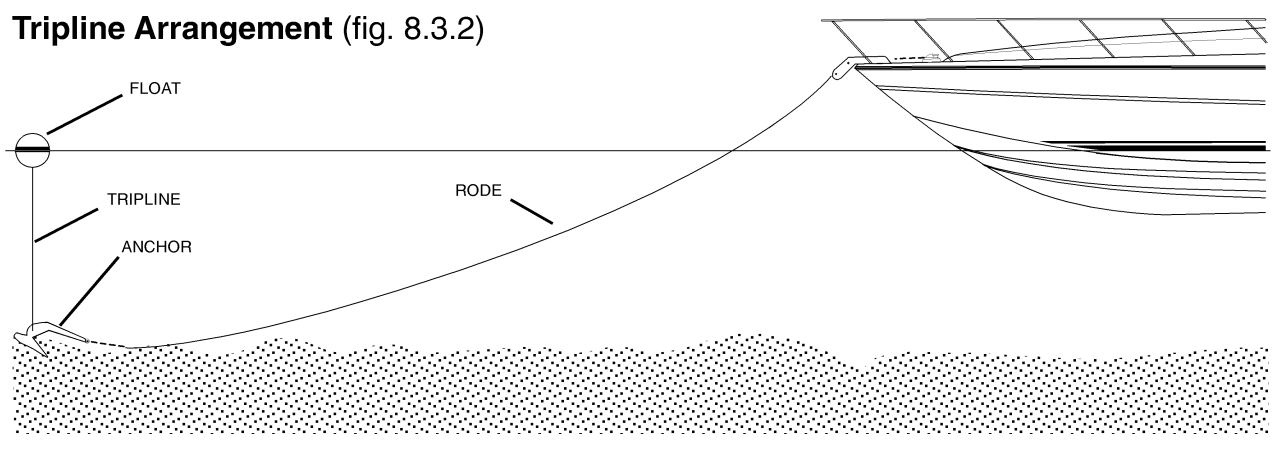
- Attach a line to the crown or head of the anchor and the other end to a float.
- The line should be just long enough to reach the surface of the water, allowing for tides.
- A polypropylene line is a good choice because it is light, strong and floats.
- If the anchor snags, pull vertically on the tripline to lift the anchor by the crown.

#### A Final Word

An anchored boat is affected by wind and sea conditions. Because there is no headway, there is no control. Be alert! If leaving the boat, be sure the anchor will hold under all circumstances.

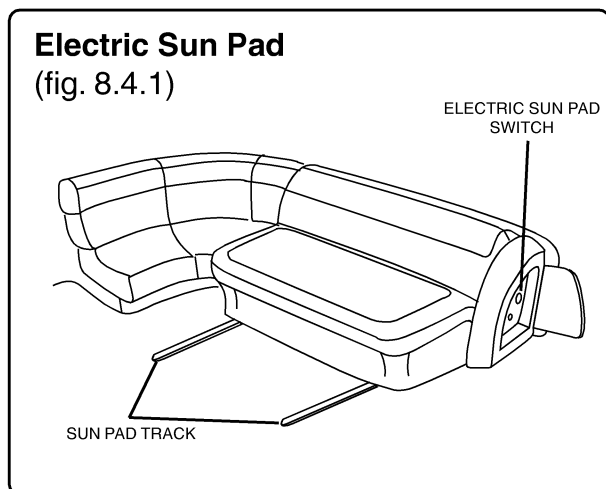
We suggest you read this section on anchoring again and fully understand rode and scope and their affect on anchor performance.

### Tripline Arrangement (fig. 8.3.2)

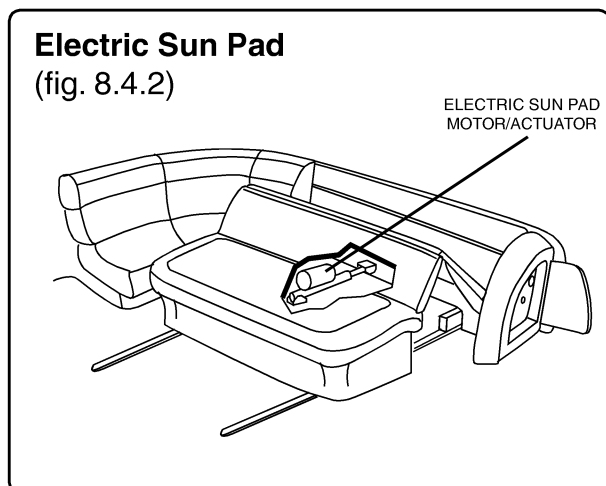


## Retractable Sun Pad

The electrically actuated retractable sun pad is located at the aft portion of the U shaped cockpit seating area and is mounted at the transom wall base and extends and retracts on two sliding tracks (see fig. 8.4.1).



The electric motor actuator is located under the retractable sun pad (see fig. 8.4.2). To extend (out) and retract (in) the sun pad, a momentary switch is located behind a hinged door located on the port side of the sun pad at the transom door (see fig. 8.4.1). The switch is protected by a 5 amp breaker located on the main DC breaker panel called Retractable Sun Pad (see fig. 7.5.1).



When extending or retracting the sun pad a clicking noise will occur at the end of the extension or retraction. Immediately release the switch allowing the motor actuator to stop.

When the sun pad is fully retracted back to the seating position, two (2) electrical latches lock and secure the seating position. When the switch is pushed to extend (out) the sun pad, a solenoid releases the locks. The motor actuator acts as a locking security while the sun pad is extended.

Operating instructions:

1. Clear all persons and items away from sun pad/seat and sliding track areas.
2. Push the sun pad switch to the OUT position until fully extended.
3. Push the sun pad switch to the IN position until fully retracted.

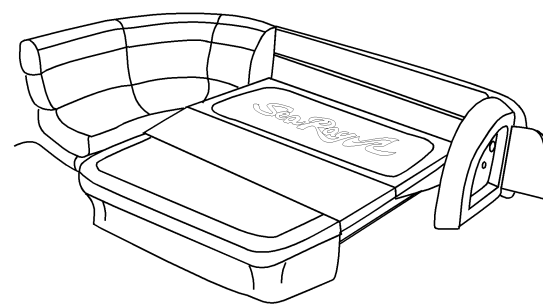
### **! WARNING**

- Never allow anyone to lay under or crawl under the sun pad/seat at any time.
- Before operating the sun pad/seat, clear all persons and items in the aft cockpit away from the sliding tracks.
- Ensure sun pad is fully extended (out) or fully retracted (in) before allowing anyone to use the sun pad or seating position.
- Never allow anyone to lay or sit on the sun pad/seat while operating the motor actuator.
- Do not store any items under the sun pad/seat. The area under the sun pad/seat is not for storage. This area allows free movement while extending or retracting the sun pad/seat.

### **! CAUTION**

Use CAUTION while utilizing sun pad while yacht is underway at all speeds.

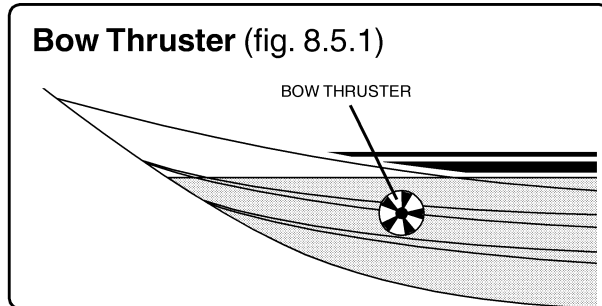
### **Electric Sun Pad** (fig. 8.4.3)



## Bow Thruster

The optional Bow Thruster is electrically driven and gives the operator more maneuverability of the bow. The Bow Thruster battery switch and control panel are located on the control station (see fig. 3.1.1).

The control panel has a START switch, STOP switch, CHECK SYSTEM indicator light, STATION ENABLED indicator light and a HAND OPERATED joy stick or push pads for thrust direction.



The Bow Thruster motor is equipped with an internal thermally activated breaker. The thermal breaker protects the motor from overheating. When the thermal breaker is activated the thruster motor will not operate and must be allowed to cool down for normal operation. Refer to Owner's Manual Packet for instructions and warranty information.

The Bow Thruster will add the following equipment to your yacht:

- Bow Thruster – Access is gained to the Bow Thruster motor by a hatch located in salon.
- Batteries – Two (2) Group 8D 12 volt batteries connected in series to provide 24 volts DC, located in the bilge (see fig. 2.9.1).
- Battery Switch – Located on the control station is a rocker with indicator light switch.
- Battery Switch Solenoid – Located on the port bilge component board (see fig. 2.9.1). The solenoid is equipped with two (2) automotive style fuses, one on the line side to power the rocker switch which energizes the solenoid and one on the load side to power the rocker switch indicator light.
- Converter – Domestic-24 volt/10 amp, International- 120/240 volt/20 amp, located on the port bilge component board (see fig. 2.9.1).
- Fuse Protection – Two (2) 500 amp in-line fuses. One (1) located on the Bow Thruster unit and one (1) mounted located on the port bilge component board (see fig. 2.9.1).

Remember – if breakers or fuses fail, always replace with the same amperage device. Never alter overcurrent protection.

## Canvas

It is recommended that you read pages 1.12 – 1.13 and understand the effects of exhaust emissions.

### CARE & MAINTENANCE

Care and maintenance instructions have been provided by the canvas manufacturer for the canvas used on your Sea Ray®. The information can be found in the owner's manual packet.

By following the provided instructions, your canvas set will give you protection from the elements and comfort that you expect. Most of all, the instructions provide you with installation and removal procedures that will simplify the task.

#### Standard 540 DA Canvas:

- 1 Bimini Top
- 1 Sun Shade
- 1 Aft Curtain
- 3 Windshield Visors
- 2 Windshield Side Curtains

#### 540 DA Hard Top Option:

- 1 Aft Curtain
- 3 Windshield Visors
- 2 Windshield Side Curtains

Components of your canvas set consist of metal tube frames, sliding adjustable frame tubes, frame mounts, zippers, zipper tracks, Velcro® and snaps. These components can be found in the parts manual located in the Owner's Manual Packet.

#### Storage:

- Do not fold or store any of the canvas set pieces while wet. All canvas should be rolled or folded when dry and stored in a clean, dry place.
- For clear vinyl pieces, rolling or laying down flat are the recommended methods for storage. The clear vinyl should never be folded or creased as cracking will result. To protect the clear vinyl from rubbing against itself while rolled or stored flat, place a piece of very soft, nonabrasive cloth between the pieces, or rolled up in it. If the surface of your clear vinyl becomes scratched, the canvas manufacturer has provided a canvas care sheet in your Owner's Manual Packet.

#### Installation Tips:

- The zippers, attached forward and aft on the spoiler, are mounted on a zipper track. Do not remove the zippers or zipper track on the spoiler.

- When attaching any of the pieces of the canvas set, zip the zippers only partially. This helps to hold the piece in place and relieves tension, helping the other side zip or snap easier. After all of the sides of the piece are secure, then finish zippering. This will ensure a tight fit.

REFER TO OWNER'S MANUAL PACKET FOR INSTRUCTIONS AND WARRANTY INFORMATION.

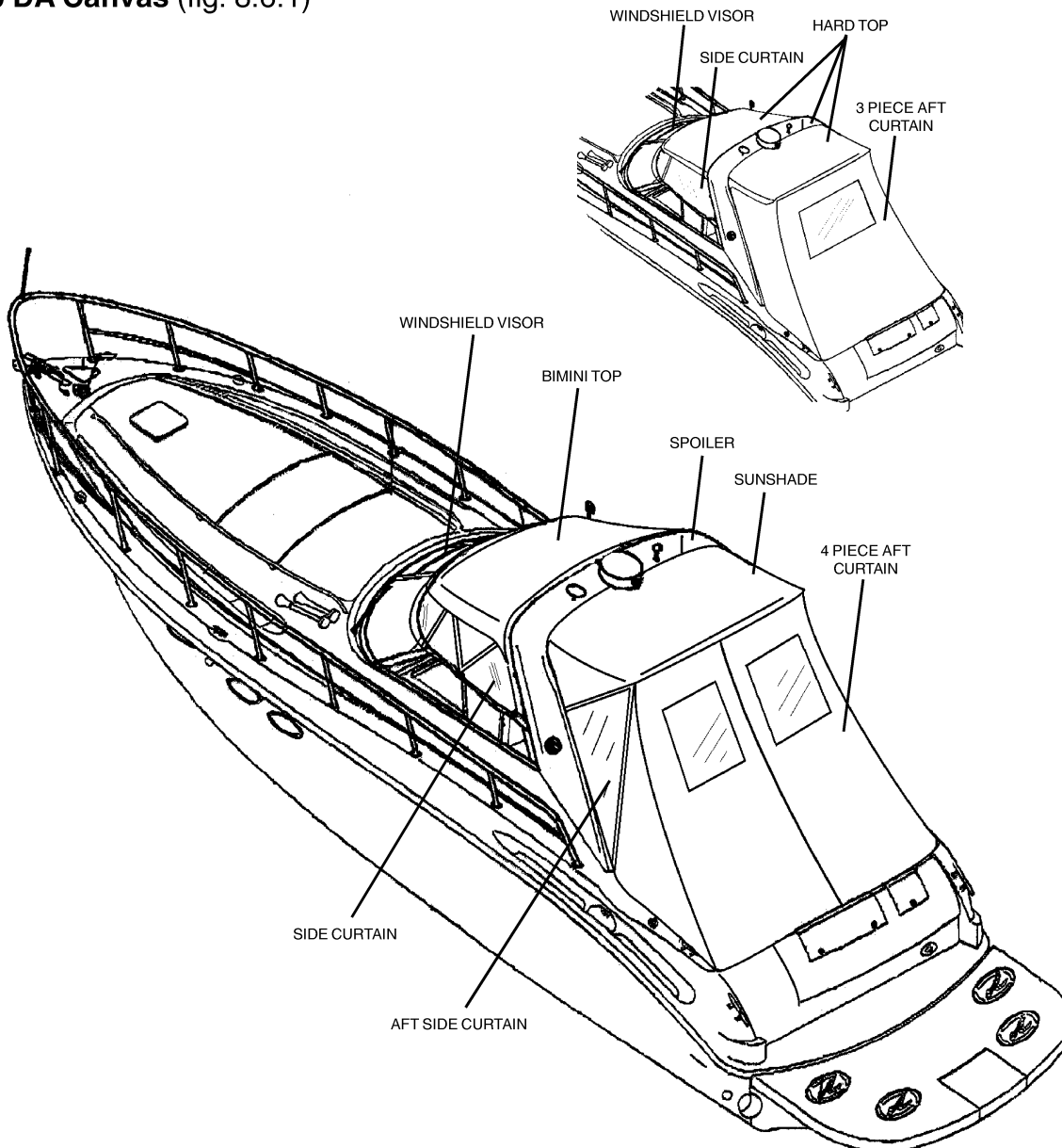
## CANVAS INSTALLATION

**Note:** The Bimini Top and Sun Shade must be installed first. All the other pieces are attached to the Bimini Top and Sun Shade.

### Bimini Top and Sun Shade (540 DA with Sport Spoiler Only)

The Bimini Top and Sun Shade canvas is supported by tubular stainless steel. Some of the frame tubes are adjustable. When attaching the Bimini Top and Sun Shade pieces to the spoiler, adjust the frame tubes to relieve tension on the canvas, engage the spoiler zippers and zip completely. By pulling down on the front of the Bimini Top (and back of the Sun Shade), the adjustable frame tubes will adjust to provide tension on the canvas material and give a tight fit.

**540 DA Canvas (fig. 8.6.1)**



### **Aft Curtain (540 DA with Sport Spoiler or Hard Top)**

The Aft Curtain attaches to the aft edge of the Sun Shade or Hard Top. Partially attach the Aft Curtain to the Sun Shade or Hard Top zippers, then attach the snaps to the gunwale and transom. After attaching the snaps, finish zipping.

### **Windshield Visor (540 DA with Sport Spoiler or Hard Top)**

The front Windshield Visor consists of three (3) pieces. The Windshield Visor is best installed by attaching all three (3) pieces to the forward edge of the Bimini Top or Hard Top, then loosen the zipper on the Bimini Top or Hard Top at the spoiler. Attach the bottom of the three (3) pieces to the windshield frame with snaps, then finish zipping.

### **Windshield and Sunshade Side Curtains**

The Side Curtains attach in the same manner: partially zip, snap, then finish zipping.

## **Coffee Maker**

The drip coffee maker operates on the 120 volt system. It is protected by the "GALLEY" breaker on the main distribution panel which must be ON to operate the coffee maker.

To keep the coffee maker operating efficiently, the mineral deposits left by water must be flushed out using the cleaning method described in the instruction booklet.

#### **To remove coffee maker:**

1. Make sure the "GALLEY" breaker is OFF.
2. Remove the carafe and water reservoir.
3. Remove the screws going through the right and left sides.
4. Slide out coffee maker and unplug.

REFER TO OWNER'S MANUAL PACKET FOR INSTRUCTIONS AND WARRANTY INFORMATION.

## **Entertainment Center**

### **SALON ENTERTAINMENT CENTER**

The salon entertainment center consists of a 25" television with remote, video cassette recorder with remote, AM/FM stereo with compact disc player and antenna. The 120 volt "SALON" breaker must be ON

to operate the AM/FM stereo with compact disc player and antenna. The 120 volt "GALLEY" breaker must be on to operate the television and video cassette recorder.

The system has two (2) speakers in the salon with a subwoofer under the salon entry steps. Speakers in the master and guest staterooms are optional.

REFER TO OWNER'S MANUAL PACKET FOR INSTRUCTIONS AND WARRANTY INFORMATION.

### **MASTER AND GUEST STATEROOM ENTERTAINMENT CENTER**

The stateroom entertainment centers consist of a television and video cassette recorder with remote. To operate, turn ON the 120 volt "MASTER or GUEST STATEROOM" breaker on the main distribution panel.

REFER TO OWNER'S MANUAL PACKET FOR INSTRUCTIONS AND WARRANTY INFORMATION.

### **TV SIGNAL SELECTOR**

The antenna/cable selector panel is located inside the mid salon upper cabinet. Push the button marked "SHIP" for onboard TV antenna reception. Push the button marked "SHORE" for dockside cable reception. The dock side cable television inlet is located aft of the transom door (see fig. 7.10.1).

REFER TO OWNER'S MANUAL PACKET FOR INSTRUCTIONS AND WARRANTY INFORMATION.

### **CABLE TELEVISION CONNECTION**

1. Open the starboard transom hatch (see fig. 7.10.1).
2. Screw the TV coax cable into the TV cable connector.
3. Run the cable to the dockside receptacle and screw coax cable into receptacle.

### **COCKPIT ENTERTAINMENT CENTER**

The system consists of a 12 volt AM/FM stereo compact disc player with disc changer and four (4) speakers. The CD changer is located in the salon on the entertainment center. The unit is also equipped with a cockpit remote located on the starboard side. The system is wired to the fuse block under the control station.

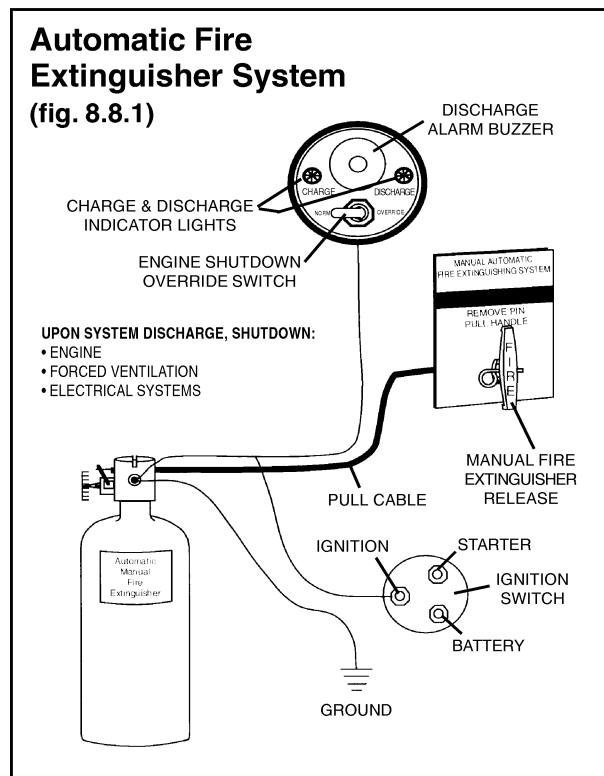
REFER TO OWNER'S MANUAL PACKET FOR INSTRUCTIONS AND WARRANTY INFORMATION.

## Automatic Fire Extinguisher System

Your 540 DA is equipped with an automatic fire extinguisher system, located in the engine room bilge (see fig. 2.11.1 and 2.11.2). The system uses fire extinguishant and in the event of a fire, the heat sensitive automatic head will release the extinguishant as a vapor, totally flooding the area in fire-killing concentrations. The system indicator light is wired to the ignition and is turned ON when the ignition is turned ON.

The system incorporates an engine shutdown switch with override system.

The indicator light, located on the control station instrument panel, indicates to the helmsman when the unit has discharged. Under normal circumstances, when the engines are operating, the indicator light is lit. If the unit discharges, the light will go out.



**WHEN ACTUATION OCCURS, IMMEDIATELY SHUT DOWN ALL ENGINES, POWERED VENTILATION, ELECTRICAL SYSTEMS AND EXTINGUISH ALL SMOKING MATERIALS. DO NOT IMMEDIATELY OPEN THE ENGINE COMPARTMENT!! THIS FEEDS OXYGEN TO THE FIRE AND FLASHBACK COULD OCCUR.**

Allow the extinguishant to “soak” the compartment for at least fifteen (15) minutes and for hot metals or fuels to cool before cautiously inspecting for cause of damage. Have portable extinguishers at hand and ready. Do not breathe fumes or vapors caused by the fire.

REFER TO OWNER'S MANUAL PACKET FOR INSTRUCTIONS AND WARRANTY INFORMATION.

## Horn

The dual air horn is operated and protected by a momentary toggle switch and “HORN” breaker on the control station switch panel. The compressor and accumulator tank are located behind the main distribution panel.

REFER TO OWNER'S MANUAL PACKET FOR INSTRUCTIONS AND WARRANTY INFORMATION.

## Ice Maker

The 120 volt “COCKPIT ICE MAKER” breaker turns ON the cockpit ice maker. The “FRESH WATER PUMP” breaker must also be ON to supply water to the ice maker. Do not block air flow through the ventilation panels at the bottom of the unit.

### To start unit:

1. Make sure water tank is full.
2. Turn “FRESH WATER PUMP” breaker ON.
3. Turn ON ice maker switch, located under the ice maker door.

As a precaution, the first few cycles of ice cubes should not be used because of possible contamination in the line. Once the ice maker is full, the unit will shut off automatically and cycle as ice cubes are used.

### To remove the ice maker:

1. Make sure the “FRESH WATER PUMP” and “COCKPIT ICE MAKER” breakers are OFF.
2. Remove screws securing the unit to the bulkhead.
3. Disconnect the ice maker water lines and unplug.

REFER TO OWNER'S MANUAL PACKET FOR INSTRUCTIONS AND WARRANTY INFORMATION.



## Oil Change System

The oil change system, located under the port engine, simplifies changing the oil in the engines and transmissions. The pump is self-priming and pumps in either direction. The reservoir jugs provided sit behind the port engine. The oil change pump is protected by the 24 volt "OIL CHANGE PUMP" breaker on the DC distribution panel in the cockpit.

### Operating instructions: (Service one (1) engine at a time.)

1. Run engines or generator for several minutes to warm the oil and mix the sludge.
2. Select the first unit to be serviced. Turn the valve to the open position, in line with valve body.



### CAUTION

Have only one (1) valve open at a time. Make sure other valves are closed to prevent accidental over filling.

3. Turn the pump on (switch position indicates the direction of flow) and pump the old oil into containers to be disposed of properly.
4. After oil has been pumped out of unit being serviced, place the pump discharge hose into a container of pre-measured fresh oil and reverse the pump switch to pump the fresh oil into the engine. **NOTE: Fresh oil should be at least 60° F (16° C).**

5. When pumping is complete, shut the pump off and close the valve leading to the unit being serviced.
6. Repeat for each engine, generator or transmission to be serviced.

REFER TO OWNER'S MANUAL PACKET FOR INSTRUCTIONS AND WARRANTY INFORMATION.

## Power Ventilation System

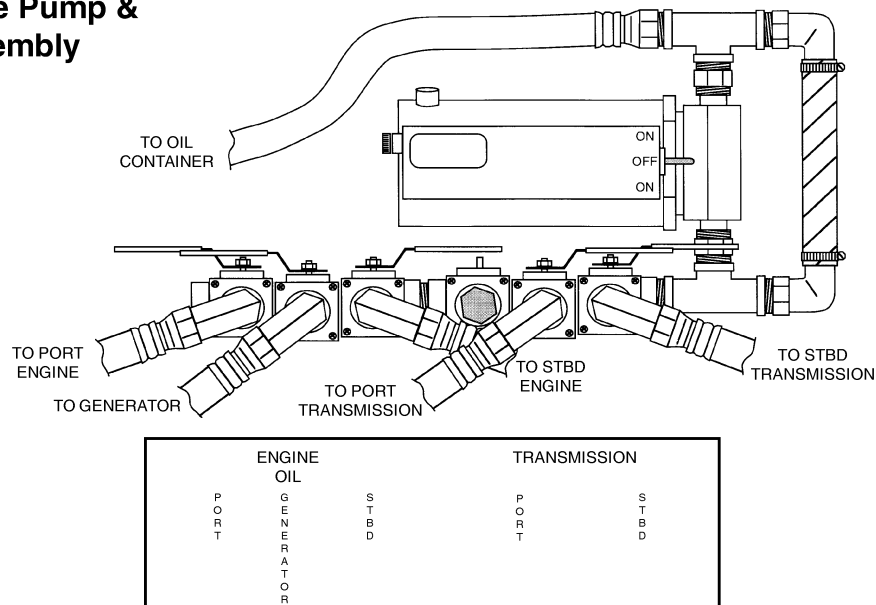
The power ventilation system removes stagnant air from the heads and galley by means of 24 volt exhaust fans. They are powered by the "POWER VENTS" breaker on the DC main distribution panel and individually turned on and off by the power vent switch in each head and the galley.

## Refrigerator/Freezer

The refrigerator/freezer units operate on the 240 volt AC system.

The "REFRIGERATOR" breaker on the AC main distribution panel supplies power to the unit. To operate, connect the shore power system, turn the "MAIN" breaker(s) ON. Then turn the "REFRIGERATOR" breaker on the AC main distribution panel and the switch inside the unit ON.

### Oil Change Pump & Valve Assembly (fig. 8.9.1)



### To Remove the Refrigerator/Freezer:

1. Turn the 240 volt "REFRIGERATOR" breakers OFF.
2. Turn "REFRIGERATOR/FREEZER" icemaker water valve OFF, located in accessory room (see fig. 2.8.2), and disconnect water line at refrigerator/freezer.
3. Remove screws securing unit.
4. Pull unit straight out and unplug.



### CAUTION

Do not cover refrigerator/freezer vents.

REFER TO OWNER'S MANUAL PACKET FOR INSTRUCTIONS AND WARRANTY INFORMATION.

## Salon Sofa/Sleeper (Electric)

The 540 DA salon sofa center section folds out and down electrically to convert to a bed that can accommodate two guests. The electric switch is located in the aft salon at the aft sofa end table.

The electric motor and switch is protected by a 12 volt fuse located on the 12 volt fuse block behind the helm foldout door (see fig. 3.1.1).

REFER TO OWNER'S MANUAL PACKET FOR INSTRUCTIONS AND WARRANTY INFORMATION.



### WARNING

- Do not sit or lay on the sofa/sleeper while operating the switch.
- Remove the salon table and anything that could be in the way while the sofa/sleeper folds out and down.
- Do not use the underside of the center salon sofa/sleeper for storage. This area is for the sofa/sleeper folding mechanical linkage and its travel.
- Before raising the sofa/sleeper back to the sofa position, visually inspect under and behind for obstructions. MAKE SURE AREA IS CLEAR.

## Searchlight

The 540 DA searchlight is mounted on the bow.

### To Operate:

1. Turn ON the "SPOTLIGHT" breaker on the control station switch panel.

2. Press the POWER button on the spotlight pad to turn on the searchlight.
3. Press SPEED button to adjust the movement speed of the searchlight.

REFER TO OWNER'S MANUAL PACKET FOR INSTRUCTIONS AND WARRANTY INFORMATION.

## Stove & Microwave

### ELECTRIC STOVE

The 240 volt "STOVE" breaker on the AC main distribution panel supplies power to the stove and must be ON to operate the stove.

The stove has three (3) burners with control knobs to provide a variation of heat.

A stove power safety switch is installed on the lid recess.

When the stove lid is installed it deactivates the switch turning off power to the stove control knobs.

REFER TO OWNER'S MANUAL PACKET FOR INSTRUCTIONS AND WARRANTY INFORMATION.

### MICROWAVE/CONVECTION OVEN

The "MICROWAVE" breaker on the AC main distribution panel supplies power to the microwave and must be ON to operate the microwave.

**Note:** Turn on the galley power ventilation system when operating the convection oven.

REFER TO OWNER'S MANUAL PACKET FOR INSTRUCTIONS AND WARRANTY INFORMATION.

## Telephone

The telephone option consists of a waterproof inlet located inside the transom storage (see fig. 7.10.1), a fifty foot shore cord and telephone outlets in various rooms throughout the boat.

### Telephone System Hookup:

1. Locate telephone shore hookup inside transom storage.
2. Connect shore cord to dock telephone inlet and then to the boat inlet.
3. Telephone outlets are located in the salon, master stateroom and guest stateroom.
4. Telephone system is now operational.

## Washer & Dryer (Optional)

The washer/dryer is a single front load washing and drying combination unit. The unit operates on the "WASHER/DRYER" breaker on the AC main distribution panel.

The washer/dryer is connected to hot and cold water shutoff valves behind the unit. The shutoff valves are located under an access panel in the bottom of the cabinet above the unit (see fig. 5.4.1). The supply valves should only be on when the unit is being used. The dryer lint filter can be cleaned by opening the access hatch located on the bottom of the cabinet over the washer/dryer unit.

REFER TO OWNER'S MANUAL PACKET FOR INSTRUCTIONS AND WARRANTY INFORMATION.

### CAUTION

Washer/dryer should only be used when connected to dockside water.

## Central Vacuum System

The central vacuum unit is located under the aft end of the salon sofa. The "SALON" breaker must be ON to operate the system. The 24 foot hose connects to the inlets located in the master and guest staterooms. The built in switch on the hose inlet fitting activates the vacuum when the hose is plugged in.

REFER TO OWNER'S MANUAL PACKET FOR INSTRUCTIONS AND WARRANTY INFORMATION.



Wall Vacuum System (fig. 8.11.1)

## Windlass

The windlass is wired to the 24 volt system through the "WINDLASS" breaker located on the cockpit DC main breaker panel.

REFER TO WINDLASS OPERATOR'S MANUAL FOUND IN YOUR OWNER'S PACKET FOR DETAILED OPERATING INSTRUCTIONS.

**Note:** Use the fresh water washdown spigot in the rope/chain locker to hose down the rope and/or chain in the locker after haul-in (see fig. 8.2.1).

### NOTICE

Use the safety hook supplied to ensure that the anchor is held in place should the windlass fail. Do not use the safety hook to support the anchor in a stored position. The windlass should always support the anchor and ensure that it is held in the roller device securely.

## WINDSHIELD WIPERS

There are two (2) windshield wipers, each having its own switch to operate. The switches are located on the control station switch panel. Each wiper is protected by a breaker on the control station breaker panel.

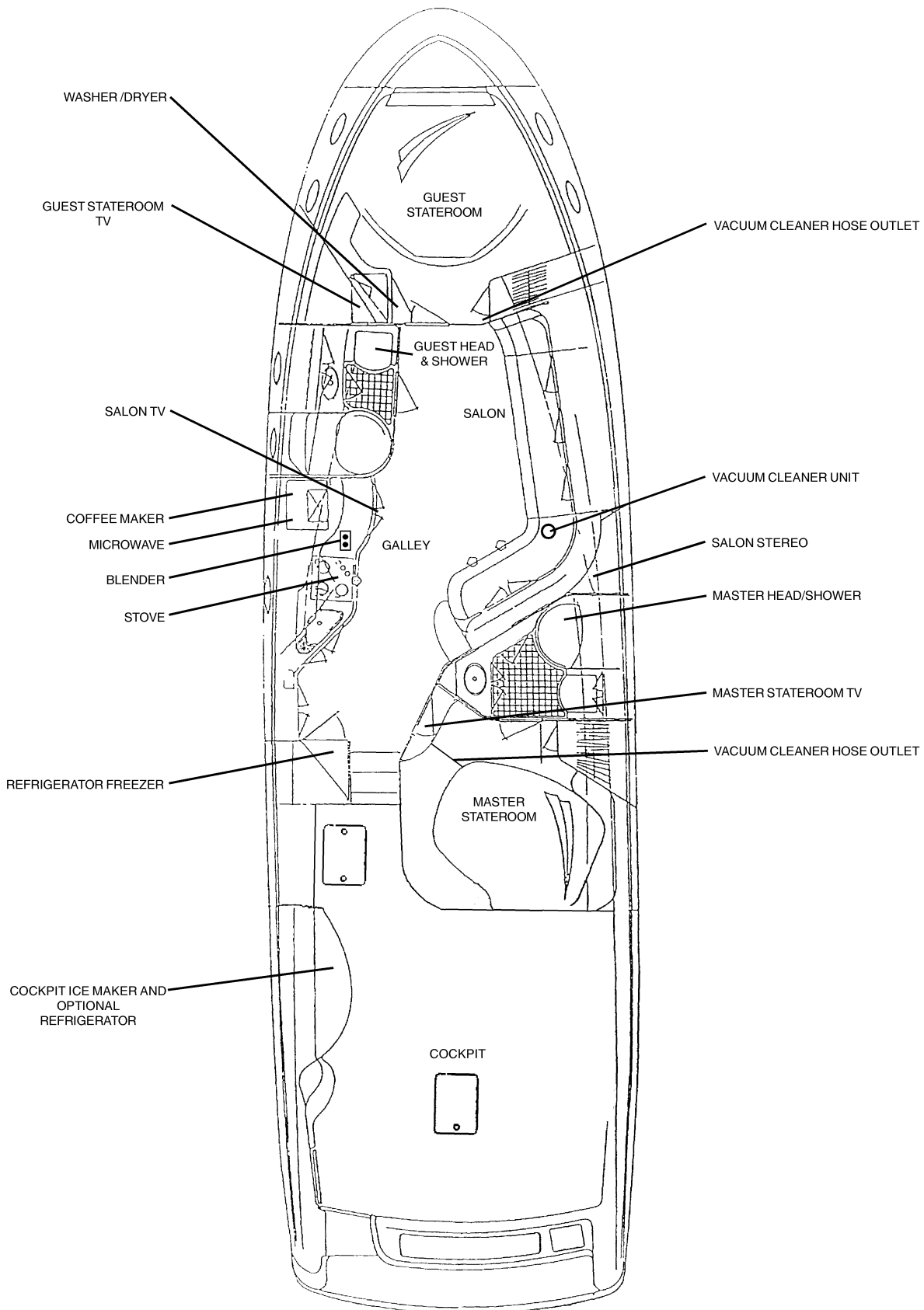
## WINDSHIELD WASHER

To operate, press the "WINDSHIELD WASHER" switch on the control station switch panel and hold the switch. The windshield washer system is connected to the fresh water system. There is an electric valve that controls the water flow to the washer ports located behind an access hatch behind the starboard cockpit seat back.

## WINDSHIELD VENT

The windshield vent is located at the center windshield. To open and close, press the "WINDSHIELD VENT" switch located on the control station accessory board (see fig. 3.4.1).

## ACCESSORY LOCATIONS



(fig. 8.12.1)

# Section 9 • Storage & Launching Procedures

## Laying-Up Instructions

### LIFTING THE BOAT

When lifting the boat always keep the bow higher than the stern to drain the exhaust lines and to prevent water from running forward through the manifold and into the engine where it can become trapped. It may seem expedient to lift only the stern when changing a propeller, but this can result in water entering the engine cylinders, causing hydrostatic lock and resulting in possible internal engine damage and quite possibly engine failure. Even a small amount of water in the engine can cause rust and is to be avoided.

With fiberglass boats, severe gelcoat crazing or more serious hull damage can occur during launching and hauling if pressure is created on the gunwales by the slings. Flat, wide belting-type slings and spreaders long enough to keep pressure from the gunwales are necessary. Cable-type slings should be avoided. Do not place the slings where they may lift on the propeller shaft or other underwater fittings. The slings should be in accordance with the designated areas imprinted on the deck to assure the least amount of stress on the hull.

**Never hoist the boat with an appreciable amount of water in the bilge.** Fuel and water tanks should preferably be empty, especially if of large capacity.



### CAUTION

**Do not use cleats for lifting.**

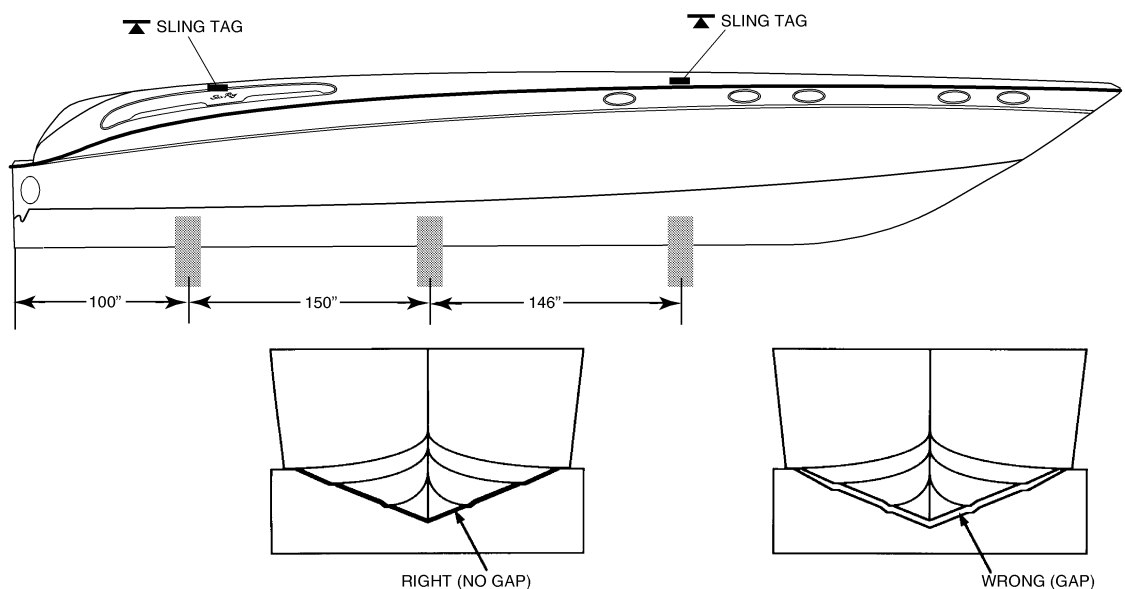
### SUPPORTING THE BOAT DURING STORAGE

A cradle is the ideal support for the boat whenever it is not in the water. Properly designed and constructed, it will provide support at the proper points, which is essential to avoid stress on the hull. Boat placement on the cradle should line-up as closely as possible to the sling tags on the side of the deck. Do not rest boat on underwater fittings.

### DRAINING THE BOAT

In climates where freezing occurs, it is important that the bilge be completely drained and dried out when the boat is laid up for the winter. Some compartments in the bilge may not drain completely because of the position of the boat. They should

**Proper Storage on Cradle (fig. 9.1.1)**



be pumped out and sponged until totally free of water or add sufficient amount of antifreeze to standing water to prevent freezing.

The boat's entire fresh water system must be drained. Open all faucets, including the shower faucets, throughout the boat. Open a connection at the lowest point in the fresh water lines to completely drain them. Break the connections on each side of the water pump. Drain the heads. Drain the water heater. Break the lower connection if necessary.

The engine cooling system and the exhaust system must be free of water if there is danger of freezing. Drain plugs are provided on the engine for this purpose. It is necessary to open a connection or two in the exhaust system to drain the lowest portions; these should be reassembled securely immediately after draining is accomplished.

**CONSULT YOUR ENGINE AND GENERATOR OPERATOR'S MANUAL FOR DETAILED INFORMATION ON PREPARING FOR STORAGE.**

## **WINTERIZATION CHECKLIST FOR BOATS STORED ON LAND**

### **1. Boat Storage**

- Store boat in a bow high attitude.
- Pour one (1) pint of 50% water/antifreeze mixture in each bilge sump.

### **2. Water System**

- Turn ON fresh water pump.
- Open all faucets, let system drain completely, leave faucets open.
- Remove hoses from water pump.
- Remove hoses from water heater and open drain plug.
- Blow out all lines to clean.
- Pour one (1) pint of 50% water/antifreeze mixture in shower drain to fill shower sump.

### **3. Ice Maker(s)**

- Shut OFF water supply.
- Disconnect the water supply from the unit(s).
- Allow the unit to run for one hour. Remove any ice cubes ejected during this period.
- Shut OFF the electricity and prop the door open to allow the unit to thaw.
- After it has thawed, wipe it dry.
- **Refer to your Ice Maker Owner's Manual for detailed information on preparing the ice maker for storage and winterization.**

### **4. Engines**

- Flush engines with fresh water.
- Remove engine drain plugs. If boat is left in the water, close the engine seacocks. If boat is removed from the water, open the engine seacocks.
- Remove drain plugs from mufflers and strainers.
- **Refer to your Engine Operator's Manual for detailed information on preparing the engines for storage and winterization.**

### **5. Generator**

- Flush generator with fresh water.
- Remove generator drain plugs. If boat is left in the water, close the generator seacock. If boat is removed from the water, open the generator seacock.
- Remove drain plugs from muffler and strainer.
- **Refer to your Generator Operator's Manual for detailed information on preparing the generator for storage and winterization.**

### **6. Air Conditioner**

- Close through-hull seacock, remove hoses from sea water pump.
- Flush with fresh water through hose from sea water pump.
- Blow out water lines with air pressure.
- Loosen the screws on the pump head, allowing water to drain from the pump.
- Remove hoses from condensing unit.
- Remove strainer plug.

### **7. Batteries**

- Remove from boat.
- Remove grease and dirt from top surface.
- Grease terminal bolts.
- Store on wooden pallet or thick plastic in a cool dry place. Do not store on concrete.
- Keep under a trickle charge.
- When replacing battery in service, remove excess grease from terminals, recharge as necessary and reinstall in boat.

### **8. Head System - Vacu-Flush System With Holding Tank**

- Flush entire system thoroughly with fresh water.
- Pump out holding tank.
- Shut "FRESH WATER PUMP" breakers OFF on the main distribution panel and remove hoses from each side of water pump.

- Remove water line from inlet fitting located on back bottom half of water valve on head.
- Flush one gallon antifreeze mixed with one gallon of water through toilet and let vacuum pump run for one or two minutes.
- Pump out holding tank.



### CAUTION

Use an automotive or commercial ethylene glycol base antifreeze. Do not use alcohol base products.

## 9. Fuel System

### Diesel:

- Diesel fuel must be treated with a biocide, “Biobor,” which prevents bacteria and fungi from contaminating diesel fuel that contains some water.
- Diesel fuel should also get a petroleum distillate additive, such as “Sta-bil” or “Racor RX1000.” This will help assimilate water in the fuel and prevent freezing problems.
- Fill fuel tanks with the treated fuel.
- Run engines for ten (10) minutes to ensure that all diesel fuel in injectors and fuel lines is treated.



### CAUTION

Do not overfill. Filling a tank until the fuel flows from vents is dangerous. Allow room for expansion.

REFER TO INDIVIDUAL OWNER’S MANUALS FOR SPECIFIC PROCEDURES.

## Fitting Out After Storage

### FUEL SYSTEM

Check the entire fuel system for loose connections, worn hoses, leaks, etc. and repair. This is a primary safety precaution.

### EXHAUST SYSTEM

Examine the complete exhaust system, from engine to transom. It is imperative that the entire exhaust system be vapor proof and water tight. If a plug or cover was used at the exhaust port, don’t forget to remove it. Also check the drain plugs on the bottom of the mufflers (see fig. 2.4.1). Do not over tighten. Recheck the system with the engines running.



### WARNING

**CARBON MONOXIDE HAZARD** – ensure engine exhaust system is working properly. Carbon monoxide poison is extremely toxic.

## BATTERIES

Before installing the batteries, clean the terminal posts with a wire brush or steel wool and then attach the cables. After the cable clamps are tightened, smear the post and clamps with grease to exclude air and acid. Do not apply grease before attaching and tightening the terminal clamps. Examine all wiring.

Refer to Section 7, page 7.2 for battery cable removal and replacement procedures.

## SHAFT ALIGNMENT

After winter storage and launching, some engine-to-shaft misalignment can be expected. Refer to “Section 2, Shafts” for instructions on checking the alignment.

## MISCELLANEOUS

1. Check all through-hull fittings for unobstructed water passage. Be alert for any deteriorated hoses and/or fittings below the water line which might fail in service and admit water.
2. Inspect the rudder stuffing boxes. They should be just tight enough to prevent excessive leaking. Overtightening will destroy the packing and score the shaft. Check the hose clamps for tightness.
3. Inspect the propeller shaft Strong Seals™. There should be no leaks. Check the hose clamps for tightness (see Section 2, page 2.7 for more information).
4. Make sure the rudder clevis pin on each side of the tie bars is in and safe tied.
5. Check all strut fastenings and through-hull fastenings.
6. Test the navigation lights.
7. Check all wiring for loose connections.
8. Check all switches and equipment for proper operation. Anchor lines and gear should be inspected and replaced if necessary.
9. Clean bilge thoroughly if it was not done at lay-up.
10. Check all engine and generator fluid levels.





## Section 10 • Care & Refinishing

### Fiberglass

The fiberglass hull, deck and some interior parts consist of the molded shell and exterior gel coat. The gel coat is the outer surface, often colored, that presents the shiny smooth appearance which is associated with fiberglass products. In some areas, this gel coat surface is painted or taped for styling purpose.

Wash the fiberglass regularly with clean, fresh water. Wax gel coated surfaces to maintain the luster. In northern climates, a semiannual waxing may suffice for the season. In southern climates, a quarterly application of wax will be required for adequate protection.



#### WARNING

Gel coat surfaces are slippery when wet. Use extreme care when walking on wet gel coat.



#### WARNING

Care should be utilized in waxing commonly walked upon areas of the boat to ensure that they are not dangerously slippery.

If the gel coated surface gloss cannot be restored by waxing, power buff with a rubbing compound such as 3M Super Duty #05955, followed with 3M Finesse-It 2 #05928, then wax.

An alternate method is to use Meguiars #44 Heavy Duty Color Restorer followed with Meguiars #50 Boat Cleaner/Polish, then wax.

Recommended waxes are; 3M Imperial Hand Glaze #05990 or Meguiars #26 Hiteck Yellow Wax.

If gel coat is not maintained and becomes heavily oxidized, light sanding may be required before buffing.



#### CAUTION

If your boat is equipped with a forward deck sun pad it should not be left on the deck when not in use. The gel coat finish may be affected over a prolonged period of time.

### STAINS & SCRATCHES

Gel coat surfaces are very resistant to deep stains. Common surface stains can be removed with diluted household detergents, providing these detergents do not contain ammonia or chlorine. Porcelain cleaning powders are too abrasive and often contain chlorine and ammonia, either of which would permanently discolor the gel coat. Alcohol or kerosene can be used for difficult stains but should be washed away promptly with a mild detergent and water. Never use acetone or any ketone solvents.

Minor scratches and deeper stains which do not penetrate the gel coat may be removed by light sanding and buffing.

### SPECIAL CARE FOR BOATS THAT ARE MOORED

If permanently moored in salt water or fresh water, your boat will collect marine growth on its bottom. This will detract from the boat's beauty and greatly affect its performance. There are two methods of preventing this:

- Periodically haul the boat out of the water and scrub the bottom with a bristle brush and a solution of soap and water.
- Paint the hull below the waterline with a good grade of antifouling paint. **DO NOT paint the engine drive surfaces.**

**NOTE:** There are EPA regulations regarding bottom paint application. Consult your Sea Ray® dealer for proper application methods.

### Care for Bottom Paint

From time to time a slight algae or slime forms on all vessels. The bottom painted portion of the hull can be wiped off with a coarse turkish towel or a piece of old rug while the boat is in the water. **Do not use a stiff or abrasive material to clean the bottom.**

The bottom paint should be inspected annually. If it needs repainting, flush the old paint and wash with hot water and powder laundry detergent. Rinse well and let surface dry completely. Feather any deep scratches with sandpaper and repaint, following the directions on the bottom paint label. Replacement coating can be ordered from your Sea Ray® dealer.

Fiberglass hulls should never be hauled, painted and relaunched the same day since this does not allow sufficient time for the moisture which has been absorbed into the old paint film to completely dry out. Generally, 24 to 36 hours of drying time is required.

## Bilge/Engine Compartment

1. Pump the bilges dry and remove all loose dirt. Be sure that all limber holes are open. If there is oil in the bilge and the source is not known, look for leaks in engine oil lines or engine gaskets. Oil stains can be removed by using a bilge cleaner available from your dealer or a marina. **DO NOT** use flammable solvents.
2. Check all wiring to be sure it is properly supported, that its insulation is intact, and that there are no loose or corroded terminals. If there are corroded terminals, they should be replaced or thoroughly cleaned. Tighten all terminals securely and spray them with light marine preservative oil.
3. Inspect the entire fuel system (including fill lines and vents) for any evidence of leakage. Any stains around joints could indicate a leak. Try a wrench on all fittings to be sure they are not loose, but do not over tighten them. Clean fuel filters and vent screens.
4. Inspect the entire bottom for evidence of seepage, damage or deterioration, paying particular attention to hull fittings, hoses and clamps. Straighten kinked hoses and replace any that do not feel pliable. Tighten loose hose clamps and replace those that are corroded. Tighten any loose nuts, bolts or screws.
5. Refer to your engine operator's manual for engine maintenance details. Wipe off engines to remove accumulated dust and grease. If a solvent is used, make sure it is nonflammable. Go over the entire engine and tighten nuts, bolts, and screws. Inspect the wiring on the engine and clean and tighten the terminals. Inspect the belts and tighten them if needed. Clean and lubricate the battery terminals; fill the battery cells with distilled water as needed.

## Topside Areas

1. Check grab rails for loose screws, breaks, sharp edges, etc., that might be hazardous in rough weather. Inventory and inspect life jackets for tears and deterioration. Check your first aid kit to make sure it is complete. Check the signaling

equipment. Inspect anchor, mooring and towing lines and repair or replace as required. **DO NOT** stow wet lines or they may mildew and rot.

2. Stainless steel and alloy fittings should be cleaned with soap and water or household glass cleaner. Remove rust spots as soon as possible with a brass, silver or chrome cleaner. Irreversible pitting will develop under rust that remains for any period of time. Never use an abrasive like sandpaper or steel wool on stainless. These may actually cause rust. To help protect the stainless we recommend the use of a good car wax.
3. When instruments are exposed to a saltwater environment, salt crystals may form on the bezel and the plastic covers. These salt crystals should be removed with a soft, damp cloth; never use abrasives or rough, dirty cloths to wipe plastic parts. Mild household detergents or plastic cleaners can be used to keep the instruments bright and clean.

## Acrylic Plastic Sheeting (Plastic Glass)

**Never use a dry cloth or duster, or glass cleaning solutions on acrylic.**

To clean acrylic, first flood it with water to wash off as much dirt as possible. Next, use your bare hand, with plenty of water, to feel and dislodge any caked dirt or mud. A soft, grit-free cloth may then be used with a nonabrasive soap or detergent. A soft sponge, kept clean for this purpose, is excellent. Blot dry with a clean damp chamois.

Grease and oil may be removed from acrylic with kerosene, hexane, white (not aviation or ethyl) gasoline or aliphatic naphtha (no aromatic content).

**Do not use solvents such as acetone, silicone spray, benzine, carbon tetrachloride, fire extinguisher fluid, dry cleaning fluid or lacquer thinner on acrylic, since they attack the surface.**

Remove fine scratches with fine automotive acrylic rubbing and polishing compounds.

## Upholsteries

Exterior fabrics should be cleaned with a sponge or very soft scrub brush and a mild soap and warm water solution. Rinse after scrubbing with plenty of

cold, clean water and allow the fabric to air dry in a well ventilated place, preferably away from direct sunlight.

Mildew can occur if your boat does not have adequate ventilation. Heat alone will not prevent mildew, you must also provide for fresh air circulation.

## VITRACORE® CABINETS

To maintain the beauty of the galley cabinet surfaces and to prevent using the wrong cleaning agents, please follow the cleaning recommendations listed below.

The following NOTICE label is placed on the fiberglass area of the galley countertop.

NOTICE
<p><b>Care and maintenance of your Vitracore® Cabinets</b></p> <ul style="list-style-type: none"> <li>• <b>Never use ammoniated window sprays or kitchen scouring components.</b></li> <li>• <b>Never use solvents such as acetone, gasoline, benzene, alcohol or lacquer thinner.</b></li> <li>• <b>Polish with light coat of automobile paste wax or plastic cleaner/polish.</b></li> <li>• <b>Failure to follow these instructions will result in damage to your cabinets.</b></li> </ul>

 <b>CAUTION</b>
<p><b>Sun pad should not be left on deck when not in use. May affect gel coat finish.</b></p>

Clean often with a soft cloth or sponge and **mild** soap and water. A **non-ammoniated** spray may also be used. (Examples: Glass Cleaner-Vinegar Glass Works by Miles, Inc.) **Never** use paper towels, abrasive pads or abrasive cleaners! Hairline scratches and minor abrasions can be removed or minimized by using mild automobile polish, Johnson Paste or Mirror Glaze (M.G.M.10).

These care instructions refer specifically to the Vitracore Cabinets surfaces. Ask your dealer about cleaning any hardware or trim which has been incorporated in your cabinetry.

## CLEANING RECOMMENDATIONS FOR MARINE FABRICS

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

Type of Stain	Steps			Cleaning Recommendations
	1	2	3	
Water Stain	B	C	E	<p>A. White cloth - Westley's Clear Magic.  B. White cloth - Westley's Clear Magic - air hose.  C. Lendow Glass Cleaner.  D. Lift Off Spot Remover.  E. Clothes shaver to remove lint.  F. Follow instructions of staining agent manufacturer.</p> <p>*Suntan lotions, wet leaves, permanent markers and some other products contain dyes that permanently stain.</p>
Motor Oil	A			
Spray Paint	A	D	F	
Mildew	A	E		
Yellow Mustard	A	D		
Wet Leaves*	A			
Oil Base Paint	A	D	F	
Suntan Lotion*	A	F		
Chewing Gum	D			
Tar	D	A		
Lipstick	A			
Ketchup	A			
Grease	A	D		
Ball Point Ink	A			
Household Soil	A			
Permanent Marker*	A	F		
Coffee, Tea	A			
Chocolate	A			
Adhesive	D			
Teak Oil	D			
Latex Paint	A	D	F	
Crayon	A	D		

Cleaning recommendations provided by G&T® Industries.



# Section 11 • Service Information

## Useful Service Information

OWNER \_\_\_\_\_

HOME PORT \_\_\_\_\_

BOAT NAME \_\_\_\_\_

REGISTRATION NUMBER \_\_\_\_\_ STATE \_\_\_\_\_

HULL SERIAL NUMBER \_\_\_\_\_

WARRANTY REGISTRATION DATE \_\_\_\_\_

ENGINE MAKE & MODEL \_\_\_\_\_

SERIAL NUMBER PORT \_\_\_\_\_ STARBOARD \_\_\_\_\_

GEAR MAKE & REDUCTION RATIO \_\_\_\_\_

SERIAL NUMBER PORT \_\_\_\_\_ STARBOARD \_\_\_\_\_

PROPELLER SIZE PORT \_\_\_\_\_ STARBOARD \_\_\_\_\_

PART NUMBER PORT \_\_\_\_\_ STARBOARD \_\_\_\_\_

SHAFT SIZE (DIAMETER X LENGTH) \_\_\_\_\_ MATERIAL \_\_\_\_\_

FUEL CAPACITY FWD TANK \_\_\_\_\_ AFT \_\_\_\_\_

WATER CAPACITY \_\_\_\_\_

KEY NUMBER, IGNITION \_\_\_\_\_ DOOR \_\_\_\_\_

SELLING DEALER \_\_\_\_\_

CITY & STATE \_\_\_\_\_

LENGTH \_\_\_\_\_ BEAM \_\_\_\_\_ DRAFT \_\_\_\_\_

VERTICAL CLEARANCE \_\_\_\_\_

ESTIMATED WEIGHT \_\_\_\_\_

GENERATOR SERIAL # \_\_\_\_\_ MODEL # \_\_\_\_\_ KILOWATTS \_\_\_\_\_

## Service Guide

**NOTE:** The Service Guide is based on average operating conditions. Under severe operating conditions, intervals should be shortened.

	BEFORE EVERY USE	AFTER FIRST 20 HRS.	EVERY 50 HOURS	EVERY 100 HOURS	ANNUALLY
CHECK SEA WATER STRAINERS & SEACOCKS	X	X	X		
LUBRICATE SEACOCKS					X
CHECK ENGINE ALARMS	X				
CHECK EXHAUST SYSTEM FOR LEAKS	X	X		X	
CHECK FUEL SYSTEM LINES & CONNECTIONS	X	X	X		
CHANGE WATER SEPARATING FUEL FILTER		X			X
CHECK STRONG SEAL™ ON PROP SHAFT	X	X	X		
CHECK RUDDER PACKING, TIGHTEN FOR NO LEAKS		X	X		X
INSPECT CLEVIS PIN ON RUDDER TIE BAR		X	X		
LUBRICATE RUDDER SHAFT					X
LUBRICATE THROTTLE & SHIFT LINKAGE PIVOT POINTS		X		X	X
CHECK BATTERY ELECTROLYTE LEVEL	X	X	X		
CHECK ALL ELECTRICAL CONNECTIONS		X			X
INSPECT PROPELLER FOR POSSIBLE DAMAGE			X		
CHECK ENGINE TO SHAFT ALIGNMENT		X			X
CHECK WATER SYSTEM PUMP FILTERS		X	X		X
INSPECT FRESH WATER PUMPS & WATER SYSTEM		X		X	
CHANGE HEAD SYSTEM VENT FILTER					X
CHECK FLUID IN TRIM TAB PUMPS		X			X
TEST GFI OUTLETS					X
CHECK OIL IN STEERING SYSTEM	EVERY 3 MONTHS				

## Quick Reference Departure Checklist

### BEFORE DEPARTING

1. Weather Conditions - Safe To Go Out
2. Required Documents - All On Board
3. Navigation Equipment - All On Board
4. Coast Guard Equipment - Required Equipment On Board
5. Bilge Pumps - Working & Clean
6. Blowers - Working
7. Navigation Lights - Working
8. Horn - Working
9. Trim Tabs - Working
10. Fresh Water Tank - Full
11. Head System Holding Tank - Empty
12. Fuel Tanks - Filled With Recommended Fuel
13. Fuel System - Check For Leaks, Fumes
14. Fuel Filter - Check For Tightness & Clean
15. Diesel Racor Fuel Filters - Clean & Water Free
16. Engine Coolant Drain Plugs - Secured
17. Steering Fluid - Full
18. Steering System - Working Smoothly & Properly
19. Shift & Throttle Controls - Synchronized, Working Smoothly & Properly
20. Oil - Check Level
21. Transmission Fluid - Check Level
22. Engine Coolant - Check Level
23. Engine Seacocks - Check For Open Position
24. Systems Monitor Panel - Test Alarm
25. Shore Power Cord - Disconnected & Stored

## STARTING ENGINES



### CAUTION

**Do not run the generator or engines in an enclosed area, such as a closed boat house, as there is the possibility of inhaling exhaust fumes and the build up of carbon monoxide.**

1. Engine Seacocks - Open
2. Engine Compartment - Ventilated
3. Blowers - Run When Operating Below Cruising Speeds & While Operating Generator
4. Fuel Valves - Check For Open Position & Proper Direction Of Flow
5. Bilge Area - Check For Leaks, Fumes
6. Battery Switches - Check For ON Position
7. Shift Controls - In Neutral Position
8. Throttle Controls - Advance Throttle Slightly As Required While Operating Starter
9. Ignition Breakers - Turn ON
10. Alarm (Test) - Should Sound After A Few Seconds
11. Ignition Key - Turn ON
12. Momentary Start Switch - Hold ON Until Engine Starts Then Release
13. Exhaust Port - Check To See That Engines Are Pumping Water

**Important: Do not continue to operate starter for more than 10 seconds without pausing to allow starter motor to cool for 2 minutes. This also will allow battery to recover between starting attempts.**

## AFTER STARTING ENGINES

- |                             |                             |
|-----------------------------|-----------------------------|
| 1. Oil Pressure Gauges      | - Check For Normal Reading* |
| 2. Water Temperature Gauges | - Check For Normal Reading* |
| 3. Voltmeter                | - Check For Normal Reading* |
| 4. Fuel Gauges              | - Check For Adequate Level  |
| 5. Fuel Lines               | - Check For Leaks, Fumes    |
| 6. Engine Operation         | - Check Idle & Shift        |

\*REFER TO ENGINE OWNER'S MANUAL FOR PROPER READINGS.

## STOPPING ENGINES

- |  |                             |
|--|-----------------------------|
| 1. Throttle Controls                               | - Bring To Idle Position    |
| 2. Gear Shift Controls                             | - Bring To Neutral Position |
| 3. Mooring Lines                                   | - Secured                   |
| 4. Idle Engines For 5 Minutes                      | - To Cool Engines           |
| 5. Momentary Start Switch Or Ignition Key Position | - Switch To OFF Position    |
| 6. Battery Switches                                | - Switch To OFF Position    |
| 7. Fuel Shut-Off Valve                             | - Switch To OFF Position    |

## OPERATING GENERATOR

### Starting:



### CAUTION

**Do not run the generator or engines in an enclosed area, such as a closed boat house, as there is the possibility of inhaling exhaust fumes and the build up of carbon monoxide.**

- |   |   |
|---|---|
| 1. Generator Seacock                    | - Open  |
| 2. Bilge Blowers                        | - Run Any Time Generator Is Running                                       |
| 3. Depress And Release GENERATOR Switch | - Generator Goes Into Preheat Mode. Light Flashes On The Switch.          |
| 4. START Switch                         | - When Light Flashes Rapidly, Depress Until Generator Starts              |
| 5. Generator Starts                     | - Release The START Switch  |
| 6. Load The Generator                   | - Select "Generator" Power Source On Main Distribution Panel Main Breaker |

### Stopping:

- |                     |   |
|---------------------|---|
| 1. Breakers         | - Switch OFF "Generator" Main Breakers At Main Distribution Panel |
| 2. Generator        | - Let Run A Few Minutes To Cool                                   |
| 3. GENERATOR Switch | - Depress To Stop The Generator Set                               |



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