

# DC ELECTRICAL SYSTEM



## DC ELECTRICAL SYSTEM

A 12-volt DC (Direct Current) electrical system is equipped onboard. The DC electrical system is a comprehensive system designed to meet the present and future 12-volt electrical needs. Wire-runs and connections are positioned to prevent abrasion and exposure to moisture, as well as to remain accessible for inspection, repairs, and the addition of aftermarket electrical accessories.

Wires used throughout the DC electrical system are plastic coated and color-coded.

### **CAUTION**

EXERCISE CAUTION WHEN RECHARGING AND/OR DISCONNECTING/RECONNECTING THE BATTERIES.

### **DANGER**

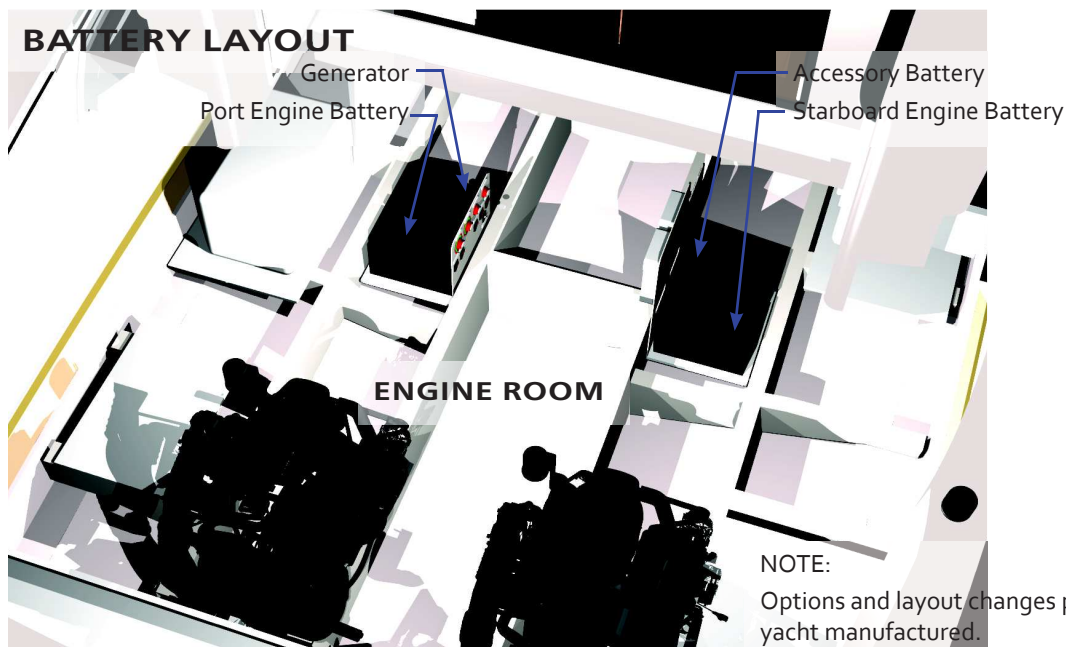
FIRE OR EXPLOSION MAY RESULT FROM IMPROPER USE OF ELECTRICAL DC AND AC SYSTEMS.

## BATTERIES

### BATTERIES

The batteries located in the engine room power the DC electrical system. The batteries are allocated to four sets of DC Components:

- Engine Batteries - A single 12-volt starting battery is designated for each engine for Mercury and Volvo Engines. Cummins engines require (2) 12-volt starting batteries connected to create 24-volts per engine.
- Accessory Batteries - A single 12-volt deep cycle battery is designated for the accessory items onboard
- Generator Battery - A single 12-volt starting battery is designated for the generator
- Stern Thruster - Two 12-volt batteries designated for each stern thruster (If installed)
- Bow Thruster - Two 12-volt batteries designated for each bow thruster (If installed)



## MASTER DISCONNECT SWITCHES

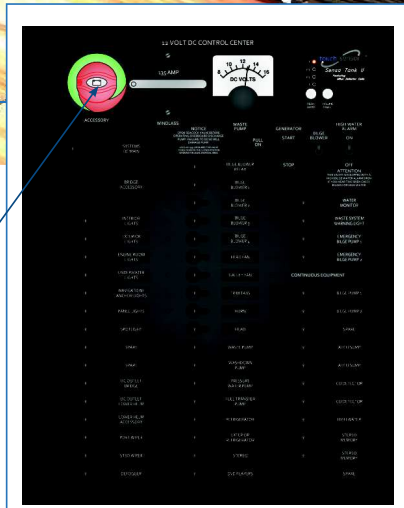
### MASTER DISCONNECT SWITCHES

Master disconnect switches control electricity from the batteries to the DC Control Panel, engines, and accessory items. Multiple master disconnect switches control the flow of electricity to the DC components. The switches are allocated to the following DC electrical component: accessory equipment, bow thruster, generator, engine port, and engine starboard. Turn the master disconnect switch to

the ON position to provide electricity to the DC Control Panel (below the helm seating) and the breakers control the flow of electricity the DC panel's allocated items.



**ACCESSORY MASTER DISCONNECT SWITCH**



**DC CONTROL PANEL**

### ACCESSORY BATTERY AND MASTER DISCONNECT SWITCH

The accessory equipment is controlled by the DC Control Panel. The DC Control Panel is located below the helm seating. The DC Control Panel is powered by a single 12-volt accessory battery located in the engine room. See previous page for battery location.

Electricity from the accessory battery is controlled by a master disconnect switch. The switch is located on the DC Control Panel, (below the helm seating). Circuit breakers on the DC Control Panel control the flow of electricity to the other DC circuit breaker panels.

### ENGINE BATTERIES AND MASTER DISCONNECT SWITCHES

Each propulsion engine has one or two designated engine batteries depending on the installed engine. See beginning of this section for engine and battery options. Each engine battery set is located outboard of the designated engine. See previous page for engine battery location.

A master disconnect switch controls the electricity from each battery bank to the battery's designated engine. The engine master disconnect switches are located in the engine room, aft, forward the generator. See next page for illustration. Turn ON the master disconnect switches to provide electricity to the engines. See the following pages for engine battery master disconnect switch location.

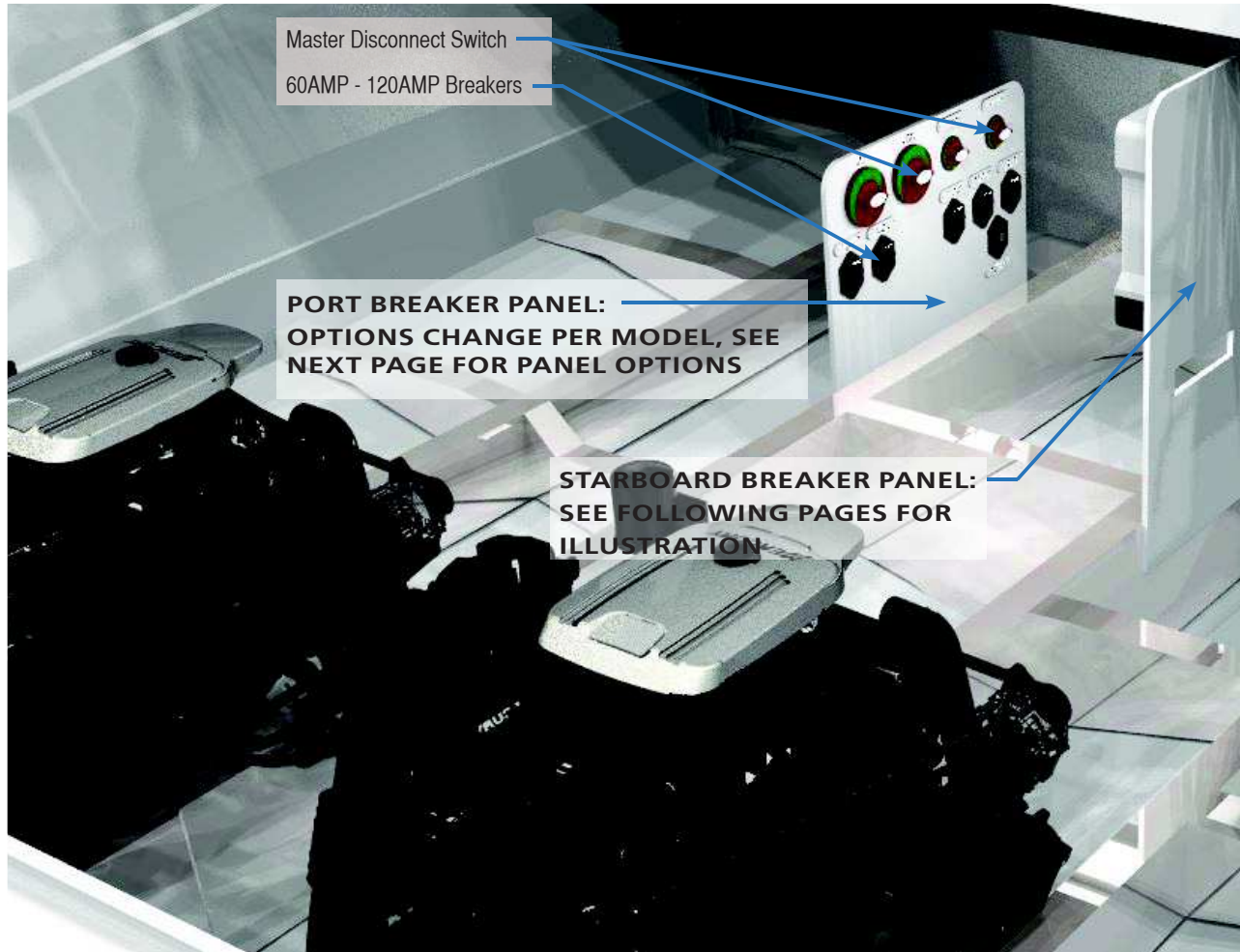
### GENERATOR BATTERIES AND MASTER DISCONNECT SWITCH

The generator has a single, dedicated battery. Electricity from the battery to the generator starter is controlled by a master disconnect switch. The switch is located in the engine room, aft directly behind the port engine. Turn ON the master disconnect switch to provide electricity to the generator starter. See previous page for generator battery location. See next page for generator master disconnect switch location.

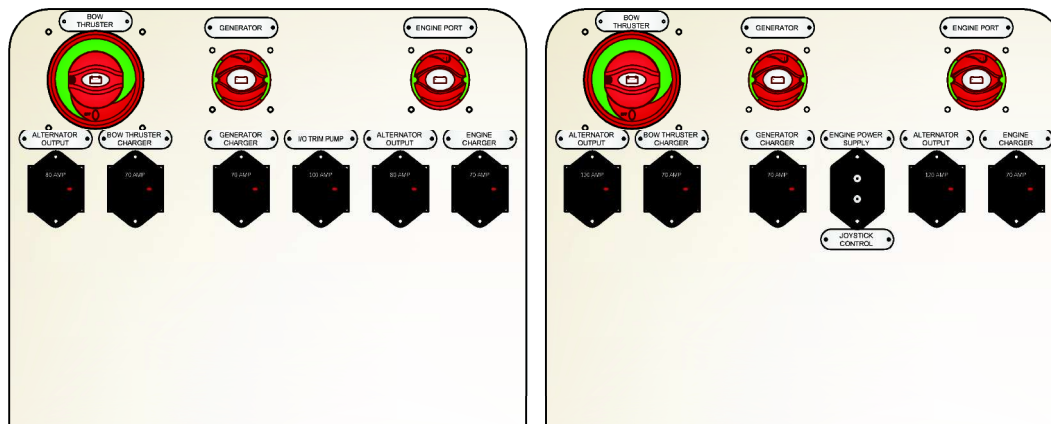
# DC ELECTRICAL SYSTEM



## PORT ENGINE ROOM BREAKER PANEL



## PORT ENGINE ROOM BREAKER PANEL OPTIONS

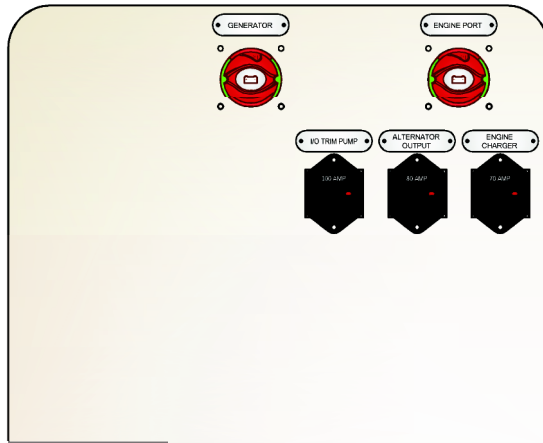


OPTION 1

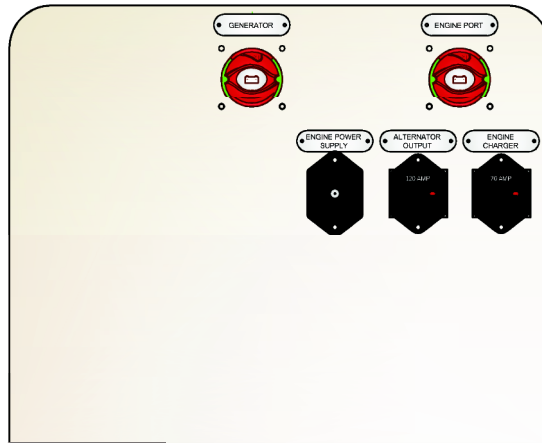
OPTION 2

PANEL OPTIONS CONTINUED ON NEXT PAGE

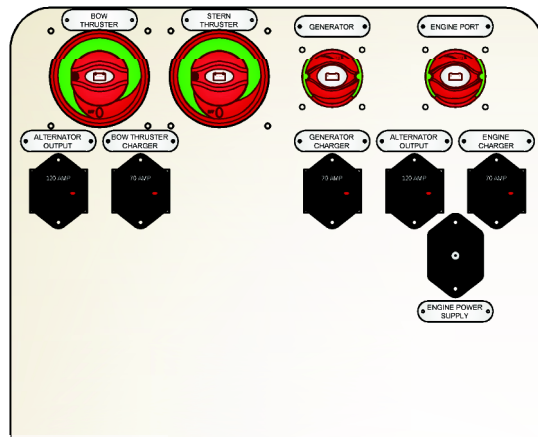
# PORT ENGINE ROOM BREAKER PANEL OPTIONS CONT'D



OPTION 3



OPTION 4



OPTION 5

SEE NEXT PAGE FOR STARBOARD ENGINE ROOM BREAKER PANEL



# DC ELECTRICAL SYSTEM

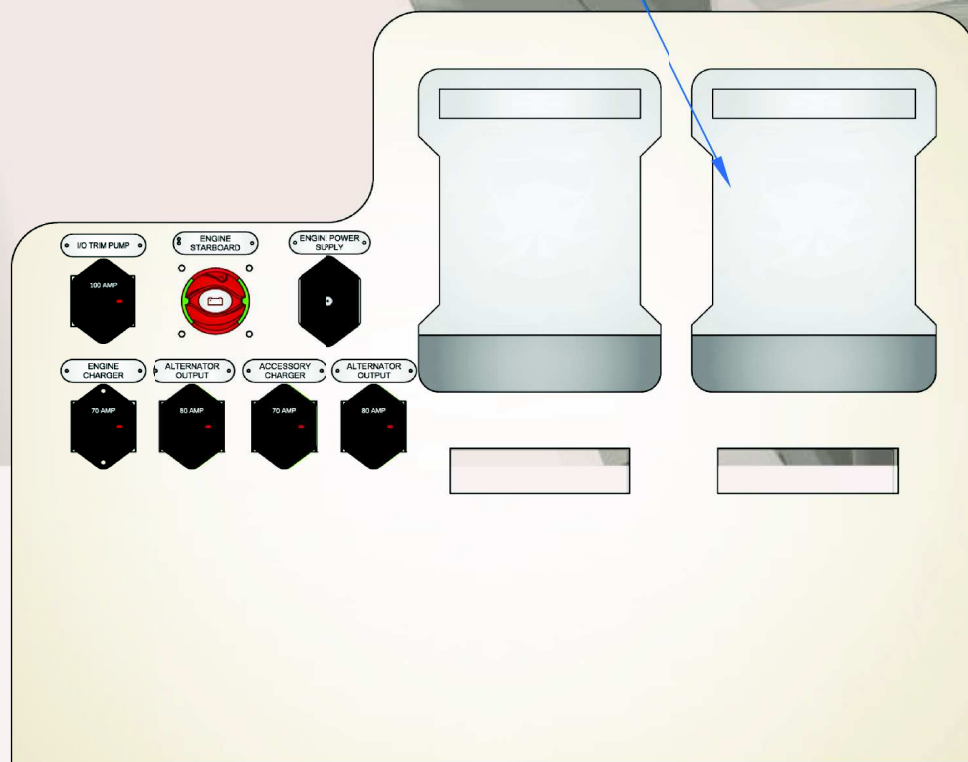
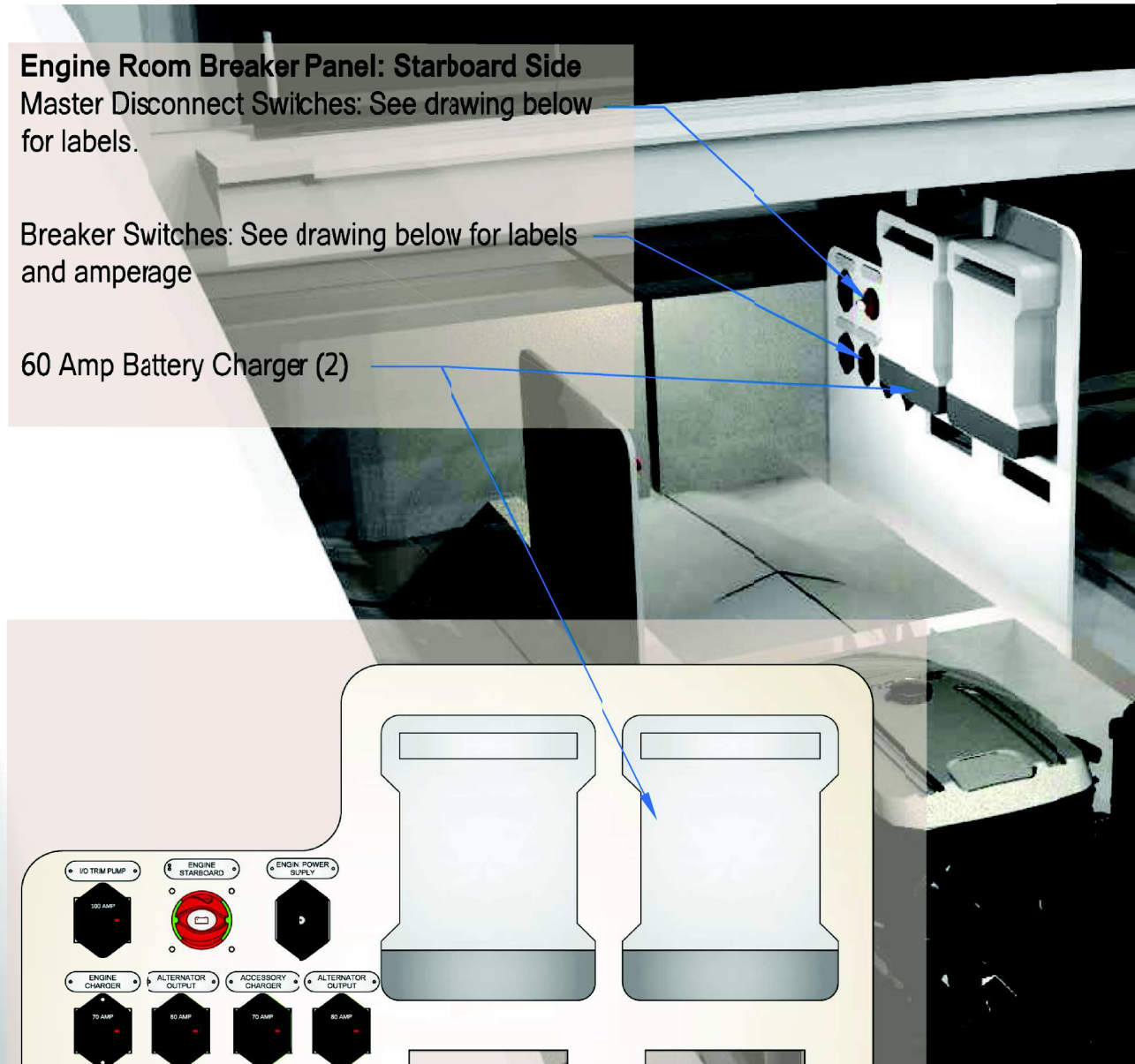


## STARBOARD ENGINE ROOM BREAKER PANEL

Engine Room Breaker Panel: Starboard Side  
Master Disconnect Switches: See drawing below  
for labels.

Breaker Switches: See drawing below for labels  
and amperage

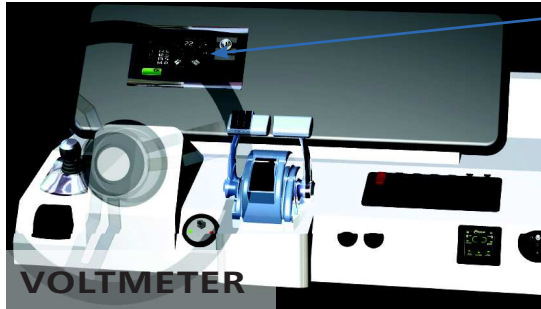
60 Amp Battery Charger (2)



Engine Room Breaker Panel: Starboard Side

## MONITORING BATTERY VOLTAGE LEVELS

A fully charged battery that has not been charged or discharged for at least two hours should indicate a reading between 12.3 and 12.7 volts. A reading below this level indicates a partially charged battery. The battery is dead if the voltmeter reads zero.



### ENGINE BATTERY VOLTAGE LEVEL

The voltage level of each engine battery pair is determined by activating the battery's dedicated voltmeter. The voltmeters are located at each helm. For both engines, a single LCD display provides information on the engine temperature, oil pressure, and battery voltage level.

### ACCESSORY BATTERY

The voltage level of the accessory battery is determined by using the voltmeter, labeled "DC VOLTS", located on the DC Control Panel (below the helm seating, within the cabinetry forward the galley).

#### ACTIVATING THE VOLTMETER:

1. Turn ON the Accessory battery master disconnect switch. The Accessory master disconnect switch is located on the DC Control Panel (below the helm seating within the cabinetry, forward the galley).
2. Switch ON the SYSTEMS DC MAIN circuit breaker on the DC Control Panel (below the helm seating within the cabinetry, forward the galley).

## CHARGING THE BATTERIES

While the engines are running, the designated alternators generally supply enough power to replace the power used by the yacht's DC equipment.

The PORT and STBD engines are each equipped with alternators that charge each 12-volt battery installed, except for the generator battery. The DC equipment will eventually drain the batteries being used without the engines running.

#### IF THE BATTERIES GET DRAINED, EITHER:

- Start the PORT or STBD engine or use the onboard battery chargers to recharge the batteries.
- If not connected to shore power, run the generator to activate the battery chargers.

## NEVER

**NEVER ALLOW THE YACHT'S BATTERY'S CHARGE LEVEL TO REACH <10 VOLTS. DISCHARGING A BATTERY < 10 VOLTS CAN DAMAGE THE BATTERY SO THAT IT CAN NO LONGER RECHARGE.**

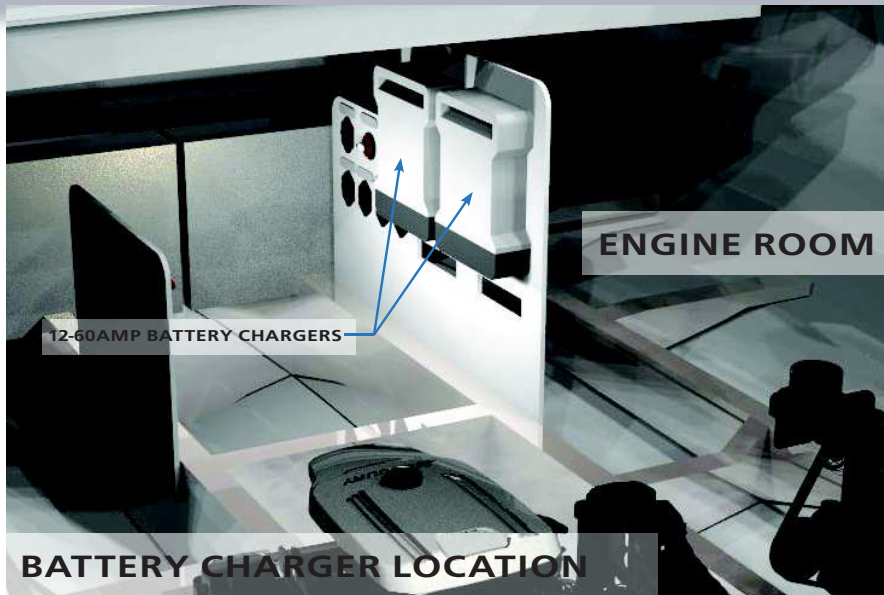
**THE BATTERY CHARGER SHOULD ALWAYS BE OPERATING WHEN THE YACHT IS CONNECTED TO SHORE POWER. TURN ALL BATTERY MASTER DISCONNECT SWITCHES TO THE OFF POSITION IF THE YACHT IS UNOCCUPIED FOR AN EXTENDED PERIOD OF TIME AND IF THE YACHT IS NOT CONNECTED TO SHORE POWER.**

### BATTERY CHARGERS

Two battery chargers are equipped onboard. If a bow thruster or stern thruster is installed, one battery is designated per charger. See below for illustration.

- (1) 60 amp battery charger: monitors the voltage levels of the engine and accessory batteries
- (1) 60 amp battery charger: monitors the bow thruster and generator battery

# DC ELECTRICAL SYSTEM



Each battery charger monitors and maintains the voltage levels of one or more factory installed battery. When the chargers are ON, they automatically charge the attributing batteries when the voltage drops below the manufacturers level. Each charger is mounted in the engine room, forward the starboard engine. See above for illustration.

If neither a bow or stern thruster is installed, the voltage levels of the generator battery are monitored and maintained by a single battery charger. See above for illustration.

## BATTERY MAINTENANCE

### **DANGER**

THE BATTERIES CONTAIN AN ACID CALLED ELECTROLYTE. WEAR GLOVES AND PROTECTIVE EYE WEAR WHEN WORKING ON AND AROUND THE BATTERIES. AVOID CAUSING DAMAGE THAT COULD SPILL ELECTROLYTE INTO THE ENGINE ROOM OR BILGE WHEN SERVICING THE BATTERIES. AVOID GETTING SALTWATER IN OR ON THE BATTERY. EITHER CONDITION CAN CREATE A POISONOUS GAS THAT IS HARMFUL IF INHALED. WHEN A BATTERY IS BEING CHARGED, IT CREATES HYDROGEN GAS.

#### IF THE BATTERY IS DAMAGED AND ELECTROLYTE GETS SPILLED:

1. Ventilate the area of the spill.
2. Neutralize the spilled acid by pouring baking soda on the spill.
3. Remove the neutralized electrolyte, using a disposable rag or paper towel.
4. Replace damaged/leaking battery.

Batteries are relatively maintenance free; however, to increase the batteries effectiveness and life perform the following:

- Keep the batteries fully charged at all times. Batteries should never be stored partially charged. The charge level of the batteries can be monitored using the voltmeters on the helm instrument panel (engine batteries) or control panel (accessory batteries).
- Inspect the batteries at least once every 30 days for corrosion, loose wiring, dirt, etc.

### **WARNING**

DISCONNECT THE BATTERIES BEFORE CLEANING.

- Periodically clean the battery terminals and cable connections. Remove any accumulation of dirt on the top of the battery case. Use a wire brush to clean the terminals. Coating the terminals with a terminal protecting product will help reduce corrosion that can form in these areas.
- Make sure the battery cables are securely attached to the terminal posts. Tighten the terminal nuts snugly using a torque wrench, to 20ft/lbs.
- Remove the batteries from the yacht during periods of extended storage in freezing climate areas. Store the batteries in a cool (above freezing temperature), dry area. All batteries lose some charge during storage, but the lower the temperature the less charge is lost. Avoid storing the batteries in a humid area.
- Check the battery charge level monthly, using a hydrometer or installed voltmeter. Charge the battery if the specific gravity of the battery is less than 1.225 or the voltage is less than 12 Volts.

**NOTE:** Batteries are maintenance free. Electrolyte CANNOT be checked.

## SAFETY SYSTEM

The safety systems include:

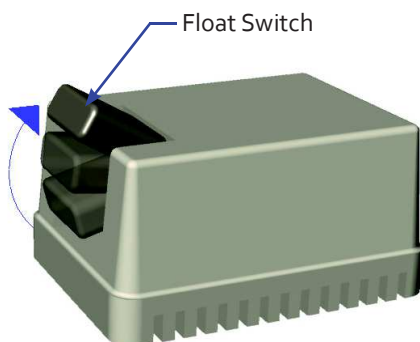
- High water alarm
- CO detectors in salon and staterooms
- Two - four (depending on region the yacht is shipped to) automatic/manual bilge pumps, 2000 gpm each pump

The safety system circuit breakers should remain ON at all times due to the high level of importance the system holds.

### IF A SAFETY SYSTEM CIRCUIT BREAKER TRIPS:

1. Immediately identify and correct the cause of the problem.
2. Reset the breaker.

**NOTE:** Periodically test each bilge pump by operating the manual switch, or by raising the switch on the bilge pump float switch. The switch is located next to the pump. See below for bilge pump float switch illustration.



## BILGE PUMP FLOAT SWITCH

### CO DETECTORS

CO Detectors should be calibrated periodically. See OEM Manual for manufacturer's explanation.

**NOTE:**

CO Detectors will chirp when battery voltage is low.

## OPERATING THE DC EQUIPMENT

Power to the boat's DC components is controlled by circuit breakers and individual controls for each component. The C40 contains a single DC Control Panel located in the Dinette aft, STBD cabinet.



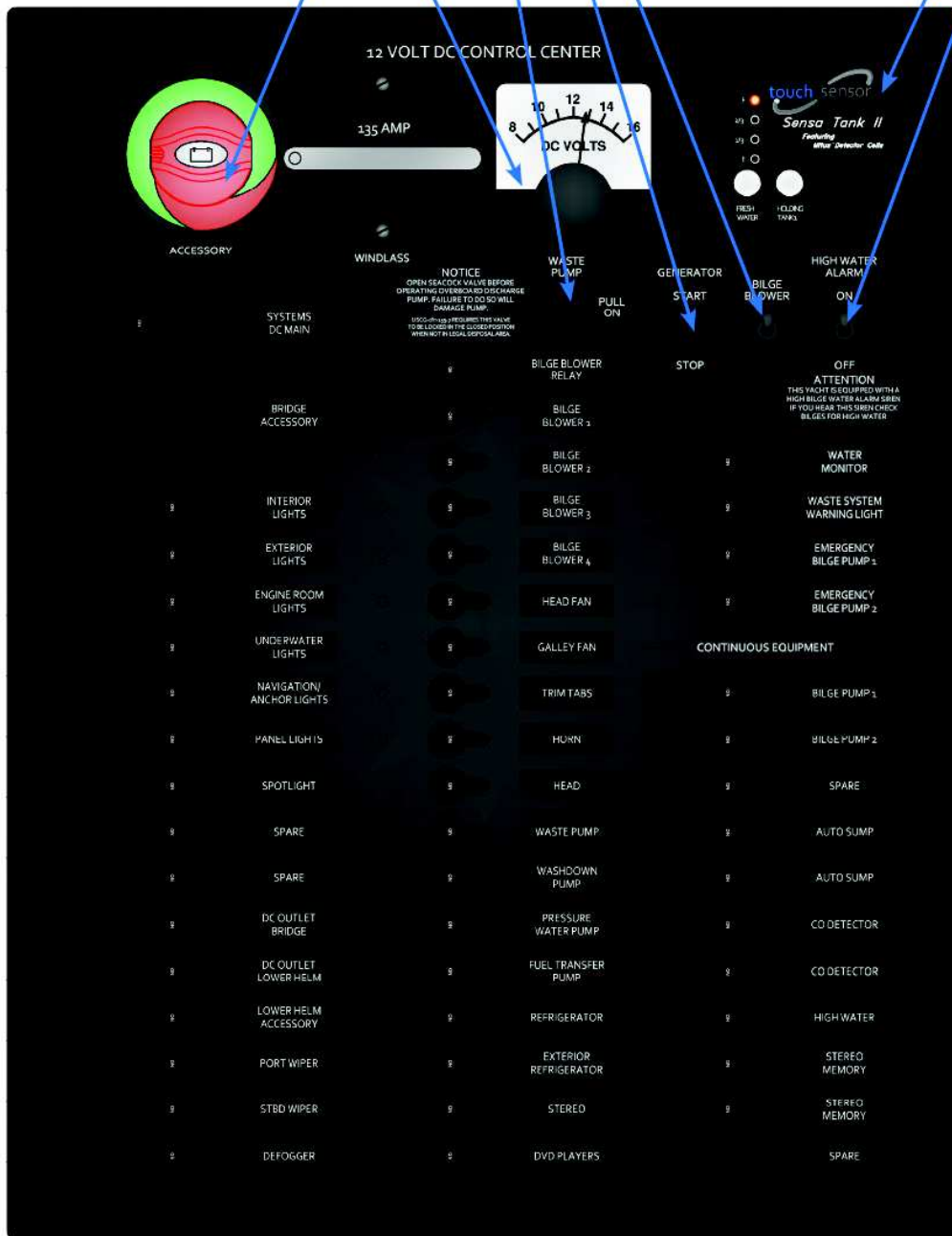
# DC ELECTRICAL SYSTEM



## DC CONTROL PANEL

The DC Control Panel manages the power supply to the DC components listed on the panel. The DC panel is located below the helm seating and contains the circuit breakers described in this section. The panel also contains additional controls and meters, described in the vendor literature. See beginning of this section for DC Control Panel location.

- DC Voltmeter
- Accessory Master Disconnect Switch
- Waste Pump Activation Switch
- Generator Switch
- Bilge Blower
- High Water Alarm Switch: ON/OFF
- Waste Tank Monitor



**NEVER** 

**NEVER RESET A BREAKER OR REPLACE A FUSE THAT HAS AUTOMATICALLY TRIPPED WITHOUT FIRST CORRECTING THE PROBLEM. FAILURE TO MAKE NECESSARY CORRECTIONS MAY CREATE A DANGEROUS SITUATION.**

The circuit breakers on the DC Control Panel enables the user to control the DC components by switching the breakers ON or OFF. All of the circuit breakers protect the electrical system by automatically disconnecting the circuit from the power source in the event of a short or overload. Power is supplied to the circuit breaker panels by the accessory batteries.

**NOTE:** If a circuit breaker location is labeled, but no circuit breaker is present, the component named on the label is an option that is not installed.

**DC CONTROL CENTER CIRCUIT BREAKERS**

(Breakers are listed alphabetically below)

**AUTO SUMP (2 BREAKERS)**

Switch the AUTO SUMP breakers ON before using any items on the yacht that drain into the sump. The sump pump is activated automatically by a float switch when water within the sump rises above a point where the water needs to be relocated.

**BILGE BLOWER 1 - BILGE BLOWER 4**

The Bilge Blower breaker controls the electricity to the bilge blower. Switch the Bilge Blower circuit breaker ON to supply power to the Bilge Blower. Refer to the OEM information for details on operating the Bilge Blower.

**BILGE PUMP 1, BILGE PUMP 2**

Each bilge pump is activated automatically by a float switch when water within the bilge rises to the pump manufacturer's design level. THE AUTO BILGE PUMP BREAKERS MUST BE ON WHEN THE BOAT IS IN THE WATER.

**BILGE BLOWER RELAY**

The Bilge Blower Relay breaker controls the relays for the automatic bilge pumps. Each bilge pump relay at the helm is connected to a relay that operates the switch's designated bilge pump.

**CO DETECTOR (2 BREAKERS)**

Carver has installed several carbon monoxide (CO) detectors for personal safety. The CO detectors continuously check the air in the cabin for the presence of carbon monoxide. The breakers must be ON for the CO detectors to operate.

**WARNING** 

**ALWAYS ACTIVATE THE CO DETECTORS WHEN THE ENGINES OR GENERATOR ARE RUNNING. CARBON MONOXIDE IS DANGEROUS.**

**FOR INFORMATION ON MINIMIZING, DETECTING, AND CONTROLLING CARBON MONOXIDE ACCUMULATION REFER TO SECTION 1: CARBON MONOXIDE (CO) WARNINGS.**

The CO Detectors alert passengers to the presence of carbon monoxide in the cabin. The detectors emit a loud, high-pitched sound when activated. If the alarm sounds, determine the cause of the CO accumulation, and correct the problem immediately.

Test each unit on a weekly basis. Locate the test button on each CO detector. If suspected that the CO detector is faulty, have your dealer repair the detector or replace the detector immediately.

Refer to Section 1: *Carbon Monoxide (CO) Warnings* for more information on CO.

# DC ELECTRICAL SYSTEM



## DC OUTLET BRIDGE

The DC Outlet Bridge breaker controls the flow of electricity to the 12V DC Outlet located at the bridge helm. Switch the breaker ON to allow use of the DC Outlet.

## DC OUTLET LOWER HELM

The DC Outlet Lower Helm breaker controls the flow of electricity to the 12V DC Outlet located at the lower helm. Switch the breaker ON to allow use of the DC Outlet.

## DEFOGGER

The Defogger breaker controls the switch for the optional lower helm windshield defoggers.

## DVD PLAYERS

The DVD Player breaker controls the flow of electricity to the DVD player located in the Salon. Switch the breaker ON to allow use of the DVD player.

## EMERGENCY BILGE PUMP 1, EMERGENCY BILGE PUMP 2 (EUROPEAN CE OPTION ONLY)

The Emergency Bilge Pump breakers control the emergency bilge pumps in the hull. The emergency bilge pumps operate continuously when the breakers are switched ON.

## EXTERIOR REFRIGERATOR

The Exterior Refrigerator breaker controls the onboard refrigerator located on the cockpit.

## FUEL TRANSFER PUMP (DIESEL ENGINE OPTION ONLY)

The Fuel Transfer Pump breaker controls the pump that transfers the fuel to the fuel tank.

## GALLEY FAN

The Galley Fan breaker controls the exhaust fan switch in the galley.

## GUEST HEAD

The electric head breaker controls the electric pump that flushes the toilet in the Guest Head. Switch the head breaker ON to enable the pump. Pressing the wall mounted switch on the vanity, labeled, "HEAD" flushes the toilet. Refer to Section 4: *Toilets* and the OEM information for details on operating the toilet.

## HEAD FAN

The head fan breakers controls the fans in the head.

## HIGH WATER

The high water alarm breaker controls the flow of electricity to the high bilge water alarm. For a description of the high bilge water alarm, refer to Section 4: *Bilge System*. The high water alarm breaker must be ON when the boat is in the water.

## HORN

The Horn breaker controls the flow of electricity to the switch that operates the horn.

## LIGHTS (All): ENGINE ROOM LIGHTS, EXTERIOR LIGHTS, INTERIOR LIGHTS, PANEL LIGHTS, NAVIGATION LIGHTS, SPOTLIGHT, UNDER WATER LIGHTS

The Lights breakers control the various light switches throughout the yacht.

## LOWER HELM ACCESSORY

The Lower Helm Accessory breaker controls the accessory items at the lower helm. Switch the breaker ON to enable the lower helm accessories.

## MASTER HEAD

The electric head breaker controls the electric pump that flushes the toilet in the Master Head. Switch the head breaker ON to enable

the pump. Pressing the wall mounted switch on the vanity, labeled, "HEAD" flushes the toilet. Refer to Section 4: *Toilets* and the OEM information for details on operating the toilet.

#### **PORT WIPER**

The PORT Wiper breaker controls the switches that operate the windshield wiper on the PORT side.

#### **PRESSURE WATER PUMP**

The pressure water pump breaker controls the fresh water system's pressure pump. Switch the water pump breaker ON to activate the pump after the fresh water tank is filled. Refer to Section 4: *Pressurizing and Priming the Water System* for information on using the water pump to fill and prime the water system.

#### **REFRIGERATOR**

The refrigerator breaker controls the onboard refrigerator in the galley.

#### **STARBOARD WIPER**

The Starboard Wiper breaker controls the switches that operate the windshield wiper on the starboard side.

#### **STEREO**

The Stereo breaker controls the power to the stereo in the Salon. Switch the breaker ON to supply power to the system.

#### **STEREO MEMORY (2 BREAKERS)**

The stereo memory breakers control the stereo systems. The stereo memory breakers should always be ON to maintain the information programmed into the stereo's memory. The stereos will need to be reprogrammed if the stereo memory breaker is switched OFF.

Refer to the OEM information for details on programming the stereos.

#### **SYSTEMS DC MAIN**

The Systems DC Main breaker controls the other circuit breakers on the DC Control panel.

#### **TRIM TABS**

The Trim Tabs breaker controls the DC power to the trim tab controls at the helm. Trim tabs are used to improve the running angle of the yacht while underway. Refer to Section 6: *Trim Tabs* for more information on using the trim tabs.

#### **VIP HEAD FAN**

The VIP head fan breakers controls the fan in the VIP Head.

#### **WASHDOWN PUMP**

The washdown pump breaker controls the optional transom raw water washdown pump. Switch the washdown pump breaker ON to activate the washdown pump. Turn the washdown pump off by switching the washdown pump breaker OFF when finished using the washdown. For information on using the washdown pump, refer to Section 4: *Raw Water Washdown*.

#### **WASTE PUMP**

The waste pump breaker controls the waste pump switch for the optional overboard discharge system. Use the waste pump to empty the waste tank directly overboard.

#### **WASTE SYSTEM WARNING LIGHT**

The Waste System Warning Light breaker controls the waste level gauge located in the head. Switch the breaker ON to supply power to the system.

#### **WATER MONITOR**

The Water Monitor breaker controls the fresh water monitoring system, including the water level display.