

# 7 DC ELECTRICAL SYSTEM

Your MS 390 PT has a 12 V DC negative ground and a 115 V 60 Hz (Hertz) AC electrical system. The electrical system was thoroughly checked at the factory before delivery of the yacht to your MAINSHIP dealer. See Section 8 for information about the AC system.

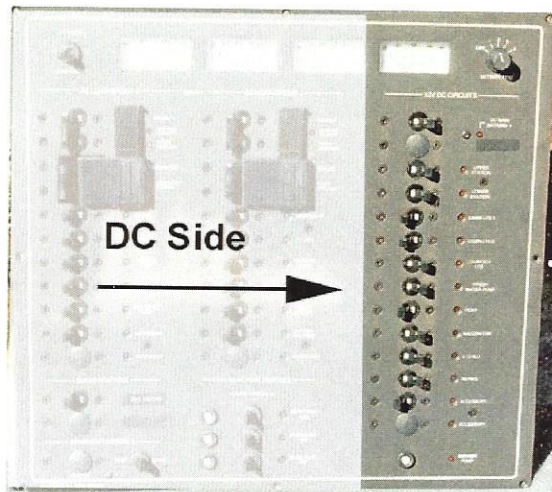
## DC POWER SUPPLY

### Batteries

The DC system derives its power from two batteries in the engine room at the aft engine room bulkhead. A third battery in the generator compartment is for the generator (if so equipped).

A circuit breaker near the battery switch connects the batteries to the electrical system. The batteries supply power to the DC Control Center on the main electrical panel in the salon. From this panel, power is distributed to such equipment as cabin lights, instruments, and accessories.

Figure # 1



The negative terminal of all banks is attached to a grounding stud on the engine. This system, known as a "negative ground system," is the approved system for marine DC electrical systems. The battery wiring system has two color-coded wires. The black wire is the ground (negative) and the red wire is the positive.

### Main Battery Switches

The batteries have a three-position selector switch on the aft engine room bulkhead on the exterior side. Access to the battery switch is through the generator engine hatch or the aft cabin steps (figure # 2).

Figure # 2



The positions on the battery selector switches are OFF, 1, 2 and BOTH. The switch must be turned to the 1, 2, or BOTH position to supply power to the DC system. When a switch is turned to OFF, the batteries are disconnected from the system. The switch allows you to use either battery or both batteries to power the DC system. When the switch is selected to the 1 position, power is supplied from one battery. When the switch is selected to the 2 position, power is supplied from the other battery. When the switch is selected to the **BOTH** position, power is supplied from both batteries.

Figure # 3

### Main Battery Switch



### Optional Generator Switch



## DC Side Of The MDP

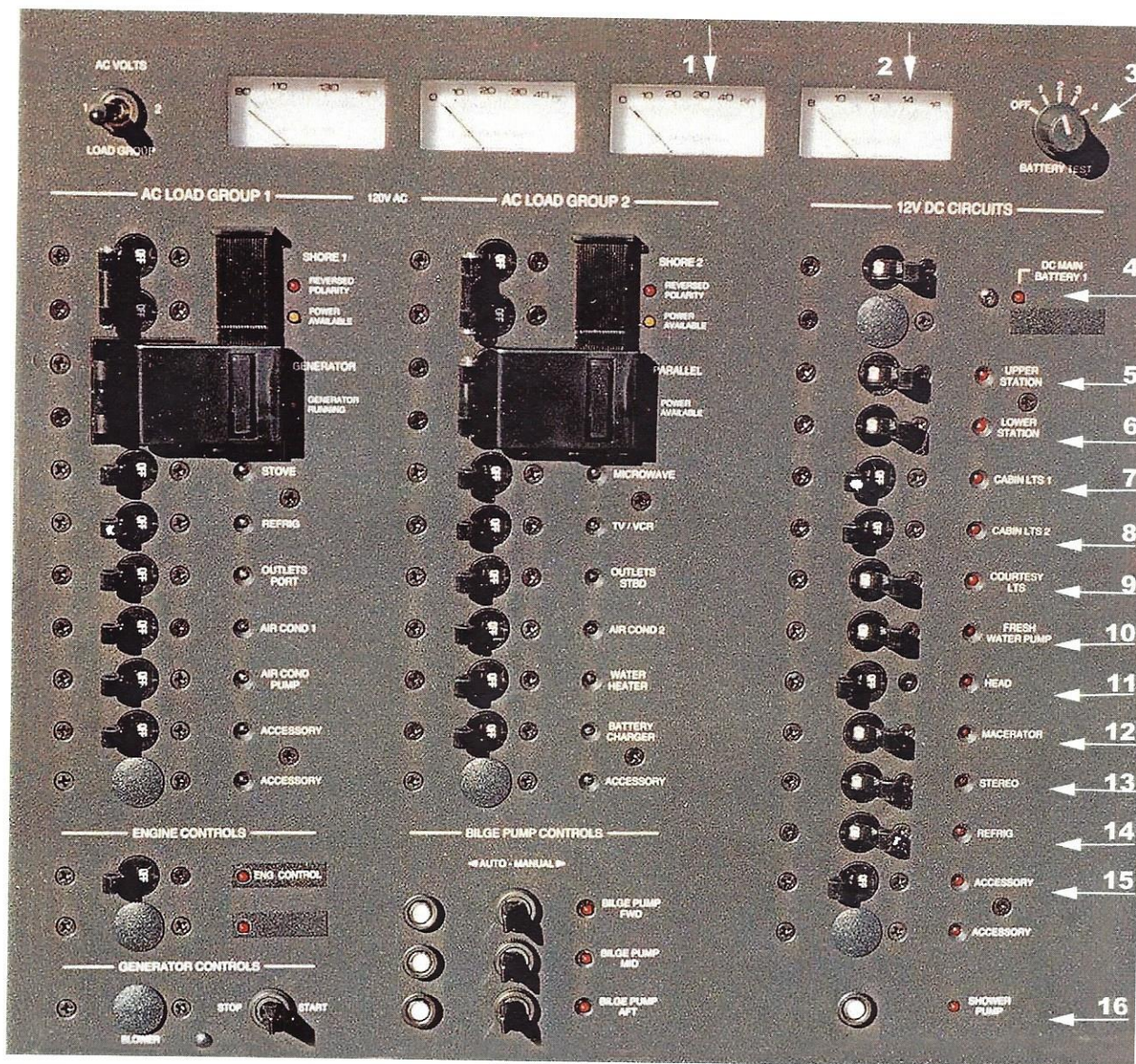


Table 1:

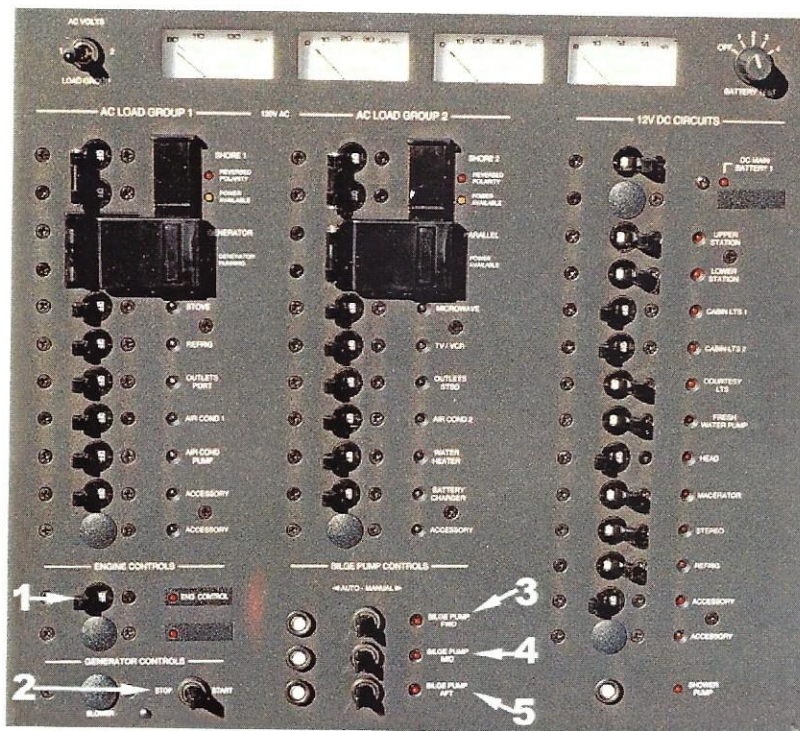
1. DC AMP METER
2. DC VOLT METER
3. BATTERY TEST SWITCH
4. BATTERY 1 SWITCH
5. UPPER STATION SWITCH
6. LOWER STATION SWITCH
7. CABIN LTS 1
8. CABIN LTS 2

9. COURTESY LTS
10. FRESH WATER PUMP
11. HEAD
12. MACERATOR
13. STEREO
14. REFRIGERATOR
15. ACCESSORY
16. SUMP PUMP BREAKER



## DC MDP Legend

1. DC AMPERAGE METER, used in reading battery amperage.
2. DC VOLT METER, used to check how many volts are currently being used.
3. BATTERY TEST SWITCH, used to check volts and amps on the 3 (three) batteries.
4. BATTERY 1 SWITCH, supplies the DC side of the MDP with DC power.
5. UPPER STATION SWITCH, supplies the upper station with DC power.
6. LOWER STATION SWITCH, supplies the lower station with DC power.
7. CABIN LIGHTS 1, supplies DC power to the cabin lights associated with this switch.
8. CABIN LIGHTS 2, supplies DC power to the cabin lights associated with this switch.
9. COURTESY LIGHTS, supplies power to the courtesy lights.
10. FRESH WATER PUMP, supplies power to the fresh water pump.
11. HEAD, supplies power to the head (toilet).
12. MACERATOR, supplies power and protects the circuit to the macerator.
13. STEREO, supplies power and protects the circuit to the AM/FM Stereo.
14. REFRIGERATOR, supplies power and protects the circuit to the refrigerator.
15. ACCESSORY, supplies power and protects the accessory circuit.
16. SUMP PUMP BREAKER, protects the sump pump circuit.



1. ENGINE CONTROL, sends power to the engine.
2. GENERATOR START/STOP switch.
3. BILGE PUMP FWD, automatic and manual switch with circuit breakers.
4. BILGE PUMP MID, automatic and manual switch with circuit breaker.
5. BILGE PUMP AFT, automatic and manual switch with circuit breaker.

## Lower Station DC Breaker Panel

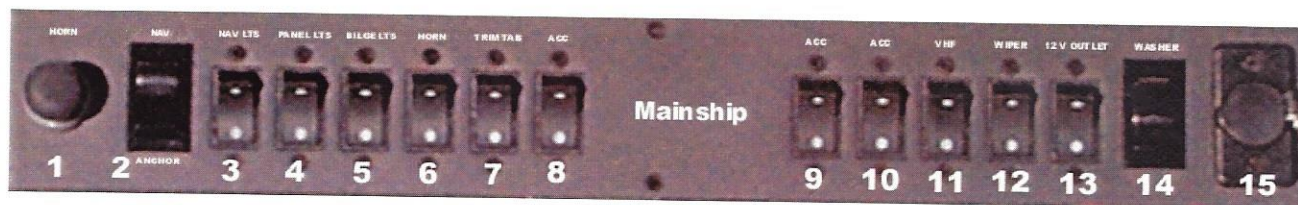


Table 2:

<ol style="list-style-type: none"> <li>1. Horn Button</li> <li>2. Navigation and Anchor Light Switch</li> <li>3. Navigation Light Circuit Breaker</li> <li>4. Panel Light Switch and Circuit Breaker</li> <li>5. Bilge Light Switch and Circuit Breaker</li> <li>6. Horn Circuit Breaker</li> <li>7. Trim Tab Circuit Breaker</li> </ol>	<ol style="list-style-type: none"> <li>8. Accessory Circuit Breaker</li> <li>9. Accessory Circuit Breaker</li> <li>10. Accessory Circuit Breaker</li> <li>11. VHF Circuit Breaker</li> <li>12. Windshield Wiper Circuit Breaker</li> <li>13. 12 V Outlet Circuit Breaker</li> <li>14. Windshield Washer Circuit Breaker</li> <li>15. 12 V Outlet</li> </ol>
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## Upper Station DC Breaker Panel



Table 3:

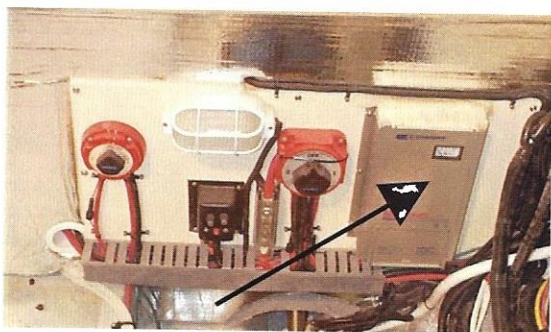
<ol style="list-style-type: none"> <li>1. 12 V Plug</li> <li>2. Horn Button</li> <li>3. Navigation &amp; Anchor Light Switch</li> <li>4. Navigation Light Switch</li> <li>5. Courtesy Light Switch</li> <li>6. Panel Light Switch</li> <li>7. Horn Circuit Breaker</li> <li>8. 12 V Outlet Circuit Breaker</li> <li>9. Trim Tab Circuit Breaker</li> </ol>	<ol style="list-style-type: none"> <li>10. Depth Sounder Switch / Breaker</li> <li>11. GPS / Loran Switch / Breaker</li> <li>12. VHF Switch / Breaker</li> <li>13. Radar Switch / Breaker</li> <li>14. Accessory Switch / Breaker</li> <li>15. Accessory Switch / Breaker</li> <li>16. Fuel Gauge Transfer Switch (Stbd. &amp; Port)</li> <li>17. Fuel Gauge Transfer Switch (Upper &amp; Lower)</li> <li>18. Engine / Ignition (Start - Stop)</li> </ol>
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## DC Powered Equipment

### Battery Charging System

Alternators on the engine charge the batteries while the engine is running. Your yacht also has a convertor which converts 115 VAC power from either the generator (if so equipped) or shore power into 12 VDC power. The battery charger is located next to the battery switches. See Section 8: AC Electrical System.



**BATTERY CHARGER**

### Bilge Pumps

The MS 390 PT has three (3) bilge pumps which receive power from the DC control panel.

DC power is continuous to the bilge pumps. Circuit breakers are located on the DC side of the MDP. See page 7.3 for location of the circuit breakers.

For more information on the bilge pump, refer to Section 10: Sanitary System & Bilge.

### Fresh Water Pump

Your MS 390 PT is equipped with a fresh water pump that supplies fresh water throughout your MAINSHIP.

The fresh water pump receives its power from the DC side of the MDP. For the location of the fresh water pump breaker, refer to page 7.2.

For more information regarding the fresh water

system, refer to Section 9: Water System.

### Macerator

Your MS 390 PT is equipped with a macerator which receives its power from the DC side of the MDP. The circuit breaker for the macerator is located on the MDP. Refer to page 7.2 for the location of the circuit breaker.

For more information regarding the macerator and its operation refer to Section 10 Sanitary System & Bilge.

### Head

Your yacht has an electric head which receives its power from the DC electrical system. The circuit breaker is located on the DC side of the MDP. Refer to page 7.2 for the location of the circuit breaker.

For more information regarding the head, see Section 10: Sanitary System & Bilge.

### Stereo

Your yacht comes standard with an AM/FM Stereo cassette player which operates on DC power. The stereo breaker can be found on the DC side of the MDP. See page 7.2 for the location of the circuit breaker.

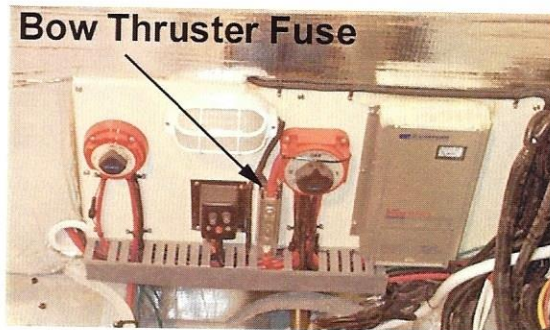
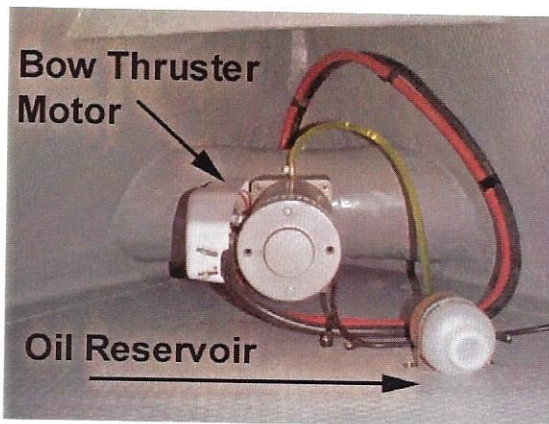
Refer to the manufacture's owner's manual for stereo operating instructions.

### Bow Thruster

Your MS 390 PT comes with a Side-Power bow thruster. The bow thruster receives its power from DC electrical system. The fuse is located next to the battery switch in the generator compartment.

The bow thruster is located beneath the bunk in the master state room. Also located within this area is the oil reservoir. It is very important that the reservoir is checked on a regular basis. Refer to the manufacture's owner's manual for proper maintenance procedures.





The bow thruster can be operated from either station. Refer to the manufacture's owners manual for operating procedures.

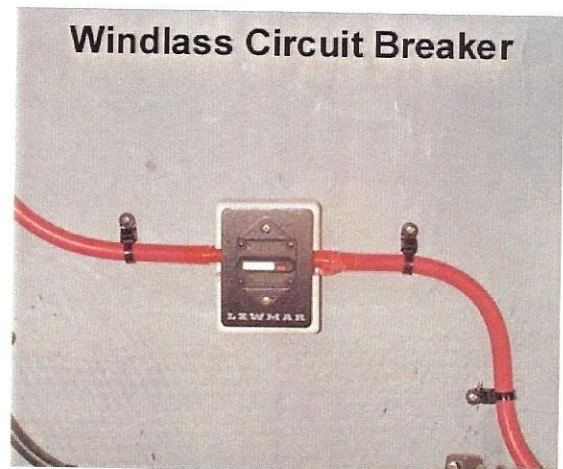


## Optional Windlass

Your MS 390 PT may be equipped with an windlass. It receives its power from the DC circuit. The windlass breaker is located on the aft engine room bulkhead above the batteries.

The windlass can be operated from either helm station as well as from the bow.

Refer to the manufacture's owner's manual for operating instructions and safety precautions.



Upper station windlass switch.

## Optional Oil Changer

The optional oil changer operates on DC power. The oil changer is located on the aft engine room bulkhead. The circuit protector is an inline fuse that is located at the battery switch panel. For more information regarding the oil changer, refer to the manufacture's owner's manual.

**Note: Discharge of Oil Prohibited.** The Federal Water Pollution Control act prohibits the discharge of oil or oily waste into or upon navigable waters and contiguous zone of United States if such discharge causes a film or sheen upon, or discoloration of, the surface of the water, or causes a sludge or emulsion beneath the surface of the water. Violators are subject to a penalty of \$5,000.

## Electrical Bonding System

This system has three major functions. The first bleeds static electric charges to "ground", in this case the water. The second insures that all electrical components are at the same voltage. The third minimizes the electrolytic removal of metal from underwater metal components (such as rudders).

Fiberglass is a poor conductor of electricity. A fiberglass hull with no metal through hull fittings can store a large charge of static electricity.

It there is electric leakage from an electrical component, or if lightning should strike, it could build up a very large charge.

The electrical bonding system dissipates any stray electric charges.

**CAUTION:** It is essential to maintain the integrity of the electrical bonding system. Never break the connections between components and the electrical bonding system. Always make sure any new electrical component, metal fixture, or through hull fitting is connected to this system and remains connected to it.

Refer to locator drawing on page 7.9 for a schematic of the electrical bonding system.



**CAUTION**



## TROUBLESHOOTING

Problem	Cause	Solution
12 VDC equipment not working	Battery selector switch turned to OFF	Check battery selector switches to make sure that they are on.
	Main breaker at DC Control Center OFF	Switch breaker to ON.
	Weak or dead battery	Change battery selector switch position; recharge battery.
Battery not charging (engine running)	Engine alternator belt loose	Tighten belt.
Battery not holding a charge	Bad battery	Replace battery.
	Bad battery charger	Have your MAINSHIP Dealer check battery charger.
12 VDC device not working	Circuit breaker for device is OFF	Switch breaker to ON.
	Weak or dead battery	Change battery selector switch position; recharge battery.
	Faulty electrical connection	Check 12 VDC connections. Tighten or repair as needed.
Cabin lights not working (off or dim)	CABIN LIGHTS breaker OFF	Switch breaker to ON.
	Weak or dead battery	Recharge or replace battery.
	Light bulb burned out	Replace bulb.
Blower(s) inoperative	Blown fuse	Replace fuse.
	Weak or dead battery	Recharge or replace battery.