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Electrical System

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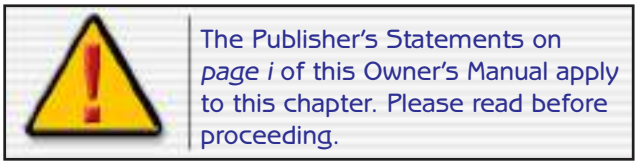


The major components and safety features of the electrical system are outlined. Basic instruction in the use of the system and subsystems is provided.

Major Topics:

Overview

There are four electrical systems:

- 240 VAC – from shore power or the on-board Onan generator. The full rated "100 amp service" is available only when on two shore power cords (50 A).
- 120 VAC – "made' from 240 VAC supply.
- 24 VDC – based on batteries charged by engine alternators and/or chargers powered by 240 VAC.
- 12 VDC - mostly for entertainment equipment. Supply is from 24-to-12 volt converters. The generator has a self-contained 12 volt system and battery for starting.

The electrical system is complex, with many high amperage circuits. It is best worked upon by qualified technicians only. Information given here is meant to help you understand and operate the system, and to do some basic troubleshooting. Safety must be paramount.

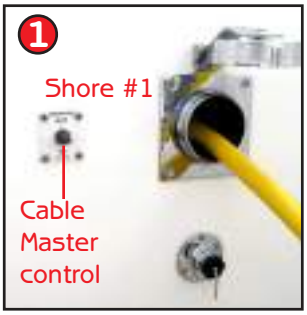
Shore power 240/120 VAC

There are two shore power cables (1 & 2) stored in two Glendinning Cable Master drums A. Normally both cables are plugged in. Each cable feeds a separate isolation transformer T in the lazarette. Each transformer has a pair of 240 volt high amperage breakers. One of the pair B protects power input from shore; the other C protects the output from the transformer, which directly supplies an isolator inside the AC distribution cabinet in the lazarette.

If only one shore plug is available, either shore 1 or 2 may be used. However, with only one 50A shore line loads must be carefully managed – particularly air conditioning loads. The full aircon system draws over 40 amps so you must decide where your priorities are. Two large A/C compressors use about 20-25 amps, half of what you have on one line. In such a case, watch the ammeter as you apply loads. Leave some leeway, but you should not exceed 45 amps total load. If it's a nice day you might be comfortable with no aircon at all – that would leave lots of power for heavy loads such as the cooktop. If overnighting, leave on as few aircon units as possible, and use the generator between times.

Note that you must put off all AC loads before changing between generator and shore power.

If the generator was running, after you switch to shore power let it run without load for about 5 minutes to cool down before shut off.



Shore power / transformer breakers

Each isolation transformer has a pair of breaker switches. One is for shore input the other for transformer output.

Cable in water

DO NOT let the cables fall in the water. The electrical field can injure swimmers. It also causes corrosion of fittings in your vessel and others nearby.

If your shore power cord plug falls in the water it should be professionally examined and restored.

Isolation transformers

Isolation transformers are a very important safety feature – there is no *direct* electrical connection to shore. This protects people aboard the vessel from stray AC and DC currents. It separates the vessel from shore ground potential, reducing problems with galvanic corrosion.

ONLY RED, BLACK & GREEN are fed to the transformer from shore power – white is not used. Thus, the isolation transformer is supplied with 240 VAC ONLY. On board, 120 VAC is produced internally by the isolation transformer. This means that electrical polarity can never be a problem, ensuring the bonding system is never compromised.

Isolation transformer (standard)

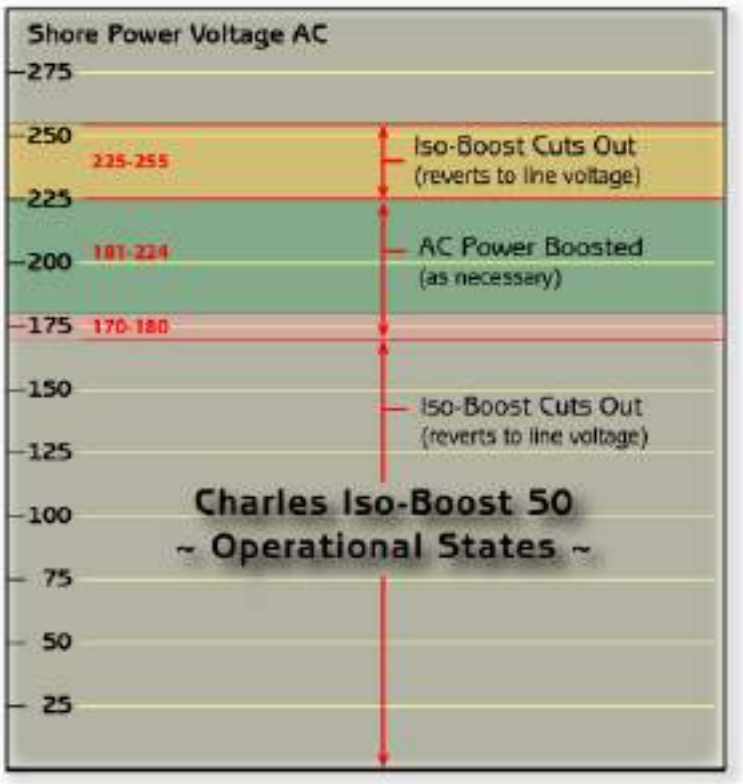
The standard isolation transformer ONLY ISOLATES – it does not alter voltage, thus voltages in and out are virtually the same. Since *it will not correct* low shore power voltage, it becomes especially important to CHECK DOCK POWER CAREFULLY before use.

If shore voltage is very low, use minimum AC power. If no-load voltage is below 210 VAC air conditioning units probably will not start, or if they do they won't operate for very long. When A/C units or the stove are switched on voltage in the system will drop further. Use the generator if this is a problem.

Iso-Boost transformer (optional)

The optional Iso-Boost 50 isolation transformer DOES CORRECT SHORE POWER VOLTAGE. Shore power at marinas can vary widely in AC voltage, especially if you are at the end of a long dock. The Iso-Boost feature of this unit will, within limits, automatically correct the supply voltage. Particularly between 175 and 210 VAC the boost feature activates, increasing boat voltage about 15%

The operational range of the Iso-Boost is shown in the figure, above right. If dock voltage is lower or higher than the operational range, the Iso-Boost function ceases and the line voltage supplied from shore is passed through unaltered. Note that in reality dock voltage may never exceed 244 volts because most marinas have their own transformers.



Iso-Boost 50 transformer service map

This graphic shows the various operational states of the Iso-Boost as it "normalizes" AC voltage fed to the on-board system, despite variation in the voltage input from shore power sources.

Graphic below shows status of lights on units in various modes. Notice LOW VOLTS flashes at 170-180V. Constant red indicates MANUAL OVERRIDE in effect.

Shorepower In	MANUAL OVERRIDE	POWER	BOOST	LOW VOLTS	Iso-Boost Voltage Out
<169 V	●	●	●	●	0 V
170-180 V	●	●	●	●	195-207 V
181-224 V	●	●	●	●	208-257 V
225- 255 V	●	●	●	●	225-255 V

Notes:-

- In boost mode usable amperage is decreased.
- The Iso-Boost 50 unit has surge suppression capability that qualifies for the 600 minimum SVR per UL 1449.
- Either transformer outputs voltage across red and the white neutral wire, and also the black and white neutral for 120 volt circuits.
- With an Iso-Boost 50 there is a 4 second delay when plugging into shore power.

240 VAC Isolators

The 240 Volt AC shore/generator isolators are inside the AC distribution cabinet A in the lazarette, port side. They are activated by the Power Selector switch P on the helm console. There is high amperage AC in this cabinet so it should never be opened unless there is a problem with the shore power or generator main breaker.

When POWER SELECTOR SWITCH P on the salon helm console selects SHORE POWER, a solenoid is briefly energized that will open (or close) isolator switch B. Shore Power 1 & 2 is then supplied to all the AC circuit breakers. 120 Volt power is also supplied. This is also a transfer switch that will not allow shore power and generator power to be available at the same time – which would cause a serious problem. It also safely allows shore 1, 2, or both, to supply power to the 240 VAC air conditioning system.

When GENERATOR is selected as power source, isolator switches B switch OFF, and isolator switches C switch ON.

When the Power Selector switch is in the OFF position no power is selected from either source.

Circuit breakers D protect the energizing coils of the isolators. They are used by technicians to disable the isolation switches for safety when working on the AC system.

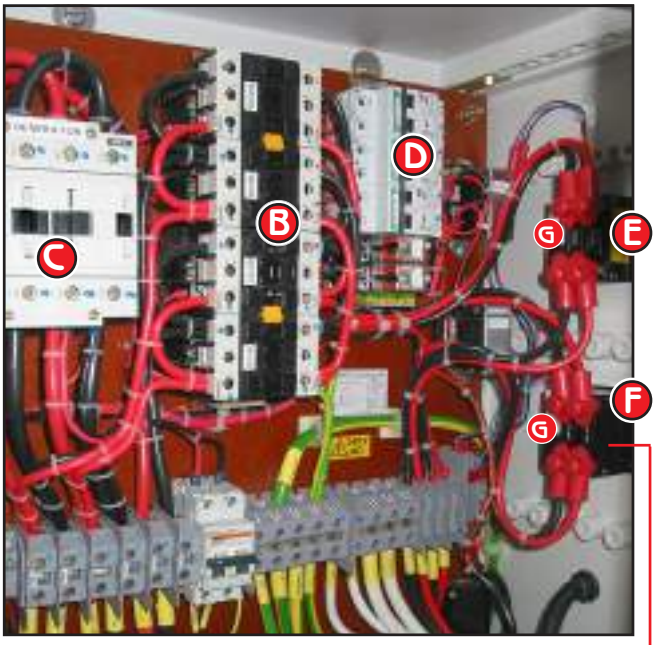
When the isolators are activated, they feed the selected high amperage current to all equipment at the same time. If either isolator is moved with load on its contactors can be damaged by heavy arcing, which will certainly occur as loads are engaged or disengaged. Loads must be applied and removed progressively.

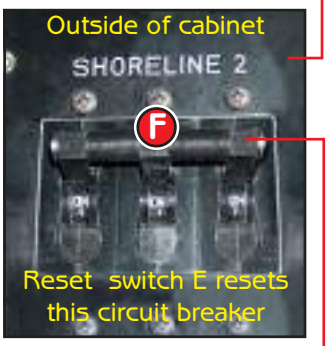
No power after selection

To protect this high amperage AC system if a circuit is overloaded or shorted, two circuit breakers G remotely pull down the main shore power kill switches E or F and shut off shore power 1 or 2. To reset these circuit breakers first resolve the overload or short circuit problem. Make sure the shore power dock outlet plugs are securely locked in place.

If all seems secure you can remotely reset the large breakers G by pushing the small RESET buttons E_1 or F_1 on the helm console.

The green power available lights should both be on if shore 1 and 2 both have shore power.





Meter readings

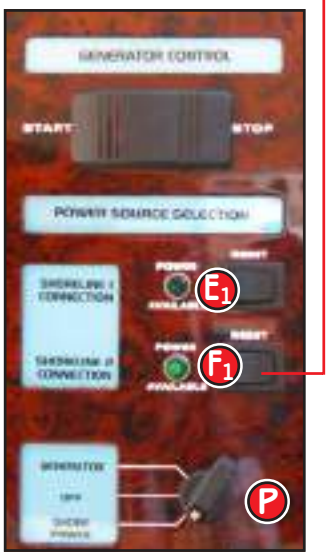
To read 240 volt power select LEG A.

To read 120 volt power press LEG B.

Press DOMESTIC to read amperage of power to system excluding the A/C.

Press AIRCON to read the amperage of the A/C load.

These options are useful for assessing loads when on low shore power or if only one shore power outlet is available.



Power selector, P

When turning the rotary power selection switch pause briefly at OFF to allow the isolators to switch over.

Switching to Shore Power

Switch off all AC loads including the A/C system. Pull out both shore power cables and connect to 240 volt shore outlets. If only one outlet is available either shore 1 or 2 can be used.

On the POWER SOURCE SELECTION panel turn rotary switch P from GENERATOR to OFF (pause), to SHORE POWER. Shore line green lights C will come on, and voltmeters will register voltage. Check that meters D read about 240 VAC on Leg A and 120 VAC on Leg B. Amps will be zero (no load).

Allow the generator to run for about five minutes with no load before it is shut down. Push and hold generator STOP button B until it stops.

Switch on the BATTERY CHARGER G and DC lighting J.

On the DC panel check the DC voltage F; it should be about 28.0 volts.

Switch on aircon units progressively as required.

Cooling down the engine room

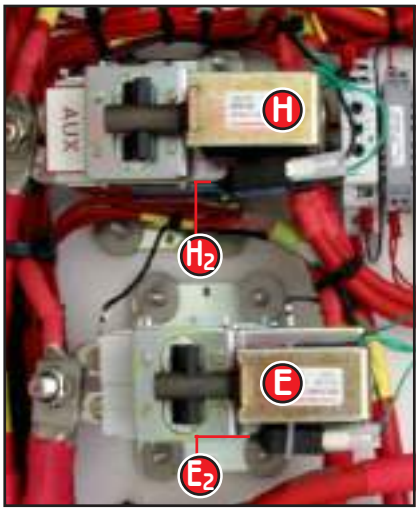
After you have tied up and switched to shore power, you will want to cool down the engine room. This is accomplished automatically (in part at least) by the engine room blowers (extractor fans), which are programmed to continue operating for a set interval after engine shutdown.

You can extend the cooling interval by switching ON either ignition key for a few seconds, then off again. This causes the blower timer to recycle.

When the engine room is cooler, switch OFF ENGINE START BATTERY switch E on the DC panel if it is not required. Generally, it should always be off when engines are not running. Note that blowers always are running when the engines are, this helps to keep the engine room cooler.

Never switch under load

Both AC and DC systems employ remote isolators, also called contactors. These are inside the distribution cabinets. When activated by small switches on the helm panel, they feed high amperage current to vessel equipment. If activated with load on the circuit they can be damaged by heavy arcing, which will certainly occur as the load is engaged or disengaged. NEVER move AC POWER SELECTOR switch P or DC power switches E or H ON or OFF under load.



NEVER move isolators under load.

High amperage DC or AC is exposed when either distribution cabinet is opened. Do not have tools in your hand when this is live. Do not allow anyone to open this box unless necessary and the person is qualified.

DC isolators

Photo at right shows two hi-amp DC isolators activated by panel switches E for the Engine Start and H House (Aux) batteries. The DC isolators can be operated manually should the panel switch fail. Mini breakers H2 or E2 may also have to be reset.

Onan Generator

The Viking 61FY is equipped with a model MDKAE Onan diesel generator rated for 21.5 kW, 89.6 amps, 240 volts, 60 Hz. Noise level is little more than a gentle purr thanks to the integral soundshield, an installed water muffler M, and its location in the lazarette.

It has a 4-cylinder engine, with a bore of 3.43 in and stroke of 3.62 in, giving 36.7 bhp @ 1800 rpm.

Lube oil capacity is 8 quarts (incl. filter). Coolant capacity is also 8 quarts. A coolant recovery bottle makes service easier. The engine uses a Bosch injector pump burning 1.9 gph @ full load, or 1.1 gph @ half load. It has an electric fuel pump for priming and lift capability, plus a gear-driven raw water pump.

Sensors monitor and automatically shut down the Onan for high engine coolant and exhaust temperatures, low oil pressure, overspeed or over voltage. After a safety shutdown the problem must be located and resolved, then manually reset the FAULT breaker (labeled 1 at top right of next page).

The Onan has its own independent 12 volt maintenance-free lead-acid starting battery, charged by the GenSet alternator, assuring that you can be independent of shore power.

An access panel B at the top of the soundshield simplifies service. Thruhull T is aft of the entrance ladder. Strainer J is at left. The generator fuel filter F is in the engine room.

On GenSet panel, P, regularly check oil and coolant pressure (50 psi approx.), temperature (185°F), and alternator output when the generator is in use. If you intend extensive use it is better to service and start the Onan from here, so its performance can be checked. Use Shell Rotella 10W-30 or a similar good oil. Keep coolant recovery bottle N up to correct level and NEVER top-up with tap water. Use distilled water ONLY mixed with diesel truck antifreeze: ratio is 50/50 max, 60/40 recommended. *Examine the Onan Owner's Manual thoroughly for complete information.*

Kill switch, K

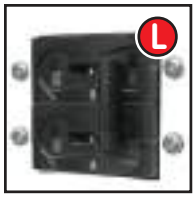
Kill switch K shuts off 12 volt battery power to the generator, preventing it from being started.

Generator strainer, J

Before starting the generator ALWAYS check:

- kill switch K is ON,
- thru-hull T is open, and
- strainer J is free of weeds and debris.

See the Operations chapter for cleaning details. Running a generator in a weedy location can quickly fill the strainer with weeds. The usual cause of generator overheating is a clogged strainer, or a loose belt.



Onan generator

The double-pole output circuit breaker L (on outside of GenSet panel) protects the generator from a short in the wiring to the high amperage distribution box.

Coolant recovery bottle N is outboard of the generator. The coolant header tank is accessed via an easily removable panel B on top of the soundproof housing.

Water muffler M discharges through a fitting below the waterline at aft starboard (see drawing, page 114).

Never start or stop generator under load.

In a heavy thunderstorm DISCONNECT shore power and use the generator only.

Starting the Generator

The Onan generator can be started and stopped from either the Salon switch panel A or the the GenSet panel B.

Preliminary Checks:–

- oil and coolant level normal
- strainer not clogged, C
- thru-hull valve open
- fuel valve open
- generator kill switch ON

Procedure

1. On Salon AC panel, switch off ALL loads.
2. Push GENERATOR button H_1 or H_2 for preheat. Hold in for 10 seconds. Push START S_1 or S_2. The generator will start. If it doesn't start after holding button for 20 seconds, let go and try again after 30 seconds.
3. When it starts, let it run a few minutes with no loads on. (Starter disconnects after voltage is sensed.)

   Check water discharge from generator or flow through the strainer. You will get to know how the water flow should look.
4. Double-check that all loads are off. Turn rotary Power Selector switch P to GENERATOR.
5. The red light D on the panel start switch will glow, indicating the generator is running and power is avaiable.
6. CHECK AC VOLTAGE: it should be 240 VAC.
7. Apply loads as required. The generator runs best with at least half load on it.

Notes:– The SHORELINE lights E stay on until shore power is disconnected.

Check the GenSet panel for oil pressure, coolant temperature, and alternator charge.

Spares for the generator should be carried aboard. The Onan *Cruise Kit* (MDKAF 100-3478-06) has maintenance parts, impellers, zinc pencils, and an alternator belt – a wise investment if the generator will be used frequently.

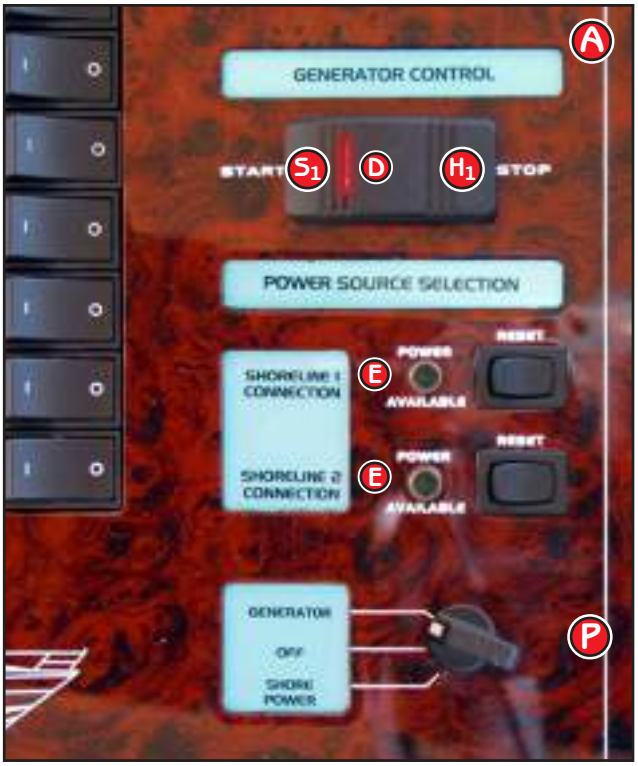
Repeated starting attempts if the generator fails to start can result in a buildup of seawater from the water muffler getting into the exhaust valves and damaging the engine.

Onan GenSet panel

1. *Engine fault breaker. Check engine. If engine shuts down this pops out, indicating there is a problem.*
2. *DC supply breaker.*
3. *Emergency generator STOP / DC circuit breaker.*
4. *Field breaker. Check generator, electrical problem.*

H_2. PREHEAT if held before startup; STOP if running.

S_2. START generator engine.



Helm panel

It is a vital practice to turn off all loads before switching power source with Power Selection switch P.

It is good practice to momentarily pause Power Selection switch P in the OFF position while switching.

Stopping the Generator

1. Switch off all AC loads on the main panel.

   Let the generator run with no load for at least 5 minutes to cool down. Red light D will continue to glow. You can carry on with the shore connection procedures while the generator cools. To STOP the generator push rocker switch H_1 (Salon panel) or H_2 (GenSet panel, opposite page).

2. Connect BOTH shore power cables to shore plugs R.

3. In the lazarette, if they are off, switch ON the breakers J for shore power input and transformer output. The green shoreline POWER AVAILABLE lights E will come on (though power is not engaged at this moment).

   Note:- If only one shore power plug is available, only one shoreline POWER AVAILABLE light E will be lit.

4. Turn rotary power switch P to SHORE POWER – now shore power is engaged.

5. Voltmeters will register voltage. Check that AC meters read about 120 and 240 volts. Amps will be zero.

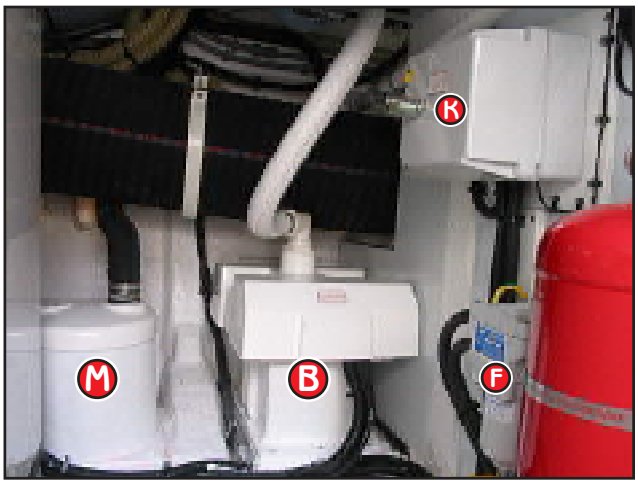
6. Now you can progressively apply loads as required. The ammeter will display increasing loads.

Salon power control panel

Shore power is connected and generator is cooling down.

Service panels

Panels on the generator are easily removed for servicing. Check for leaks regularly and attend to them promptly.



Generator components

B. Generator 12V battery *K. Gen. battery cut-off.*
M. Water muffler *F. Gen. fuel filter*

Lazarette Components

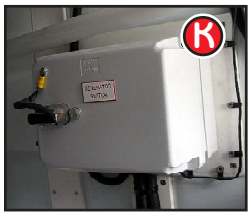
The X-act voltage regulator unit X is connected to 240 AC power. This reduces voltage to a bulb-saving 23.8 volts @ 50 amps to supply the vessel lighting system. If AC is not available the lights draw power from the House batteries. The 240 VAC DC Lighting breaker H MUST ALWAYS BE ON. If not, House batteries will rapidly deplete. Don't add additional lights – overload and a tripped breaker will result.

The 12 volt start battery B for the generator has an overboard vent pipe for battery fumes. Near it is the generator start battery kill switch K for preventing starts during servicing.

Two X-split regulator devices L have input from each alternator, and output to both House and Engine batteries.

The Newmar Phase 3 charger U is for the the House and Engine batteries. The generator battery is charged by the generator's own alternator.

The DC distribution cabinet V houses the isolators from both of these batteries, and windlass and main DC circuit breakers.



Generator exhaust gas/water separator

Generator gas discharge

Cable Master motor

Shore water feed pipe

Generator water discharge

24 Volt Systems

Engine Start & House systems

At the back of the lazarette are two large white battery boxes with labels. One contains Engine Start; the other House (Aux) batteries; connected in series pairs to produce 24 volts. With dedicated Engine Start batteries you will always have power to start the engines, and any spikes or surges created by the vessel's House system will not interfere with engine electronics or computer components.

Both sets of batteries are charged by the engines' alternators and/or by a 24 volt Newmar Phase Three charger. The charge goes into both sets of batteries.

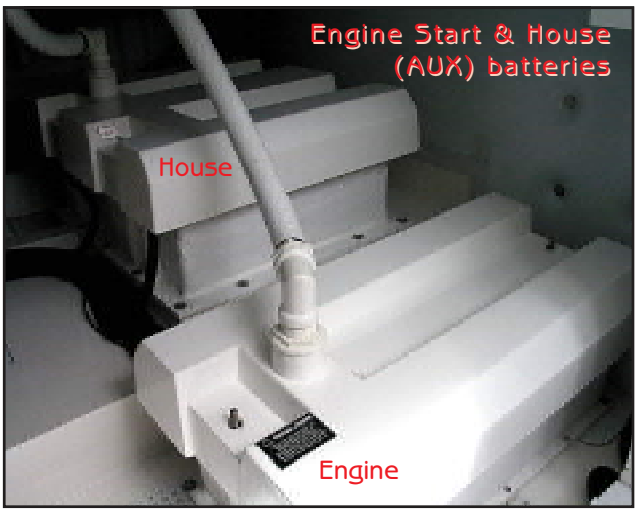
Calcium type batteries are used for both Engine Start E and House (Aux.) batteries H. These calcium alloy plate deep-cycle batteries are maintenance-free, and use demineralized electrolyte. They are heavy duty marine – designed to resist vibration with sturdy cases and leakproof design.

Any fumes given off when under charge are removed safely by a large overboard vent pipe on each box.

24 V charging system

The Newmar Phase Three PT-24-35-CE charger is designed for multiple banks. Thus if House batteries require charging, but Engine Start batteries are up to voltage, the high charge rate required for the House batteries is controlled by a timer and current sensing circuit that switches the float rate, thus preventing overcharging of the Engine Start batteries. Charger power goes straight to the batteries.

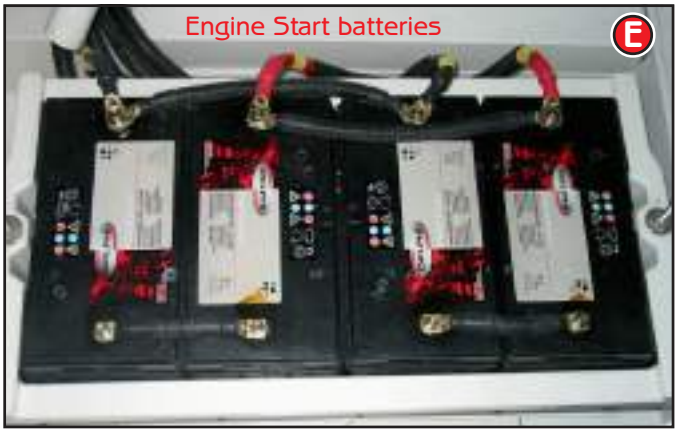
The charger has a status light S on front and a chart to explain what is happening. Read your Newmar manual for all features.



Newmar battery charger

This unit features: 3-phase charging. Bulk, current ascending, absorption, decreasing current, & float, low current. Float voltage is 26.8 V. Charge voltage is 28.4 V.

The battery chargers will operate at 170-270 VAC, and each draw 8 amps at 230 volts.



Tensioning & changing V-belt

The 120 amp 24 volt alternators are generally maintenance free. However to maintain full output at high engine revs the belt must be kept at correct tension.

Switch off master switch for engine start battery.

Test belt for tension:-

Apply an UPWARD force under the belt J of about 25 pounds. The belt should deflect a maximum of 1/2 inch. If it deflects more, the belt needs to be tightened.

To tighten belt:-

Loosen nut H.

Turn setting bolt K clockwise to increase belt tension – DO NOT OVERTENSION. Check for correct deflection. Retighten nut H.

To change belt, turn bolt K anti-clockwise until belt is loose enough to be removed. Fit new belt and adjust for correct tension. Retest tension after several hours of running.

On long voyages it would be prudent to carry spare belts.

X-split charging

Each engine alternator connects to an X-split heavy duty diode that prevents DC current from flowing back from one battery into the other. It is an isolator, essentially a one-way valve that makes each battery independent of the other when discharging. House and Engine Start batteries are tied together during charging, but separated by the X-split when *dis*charging.

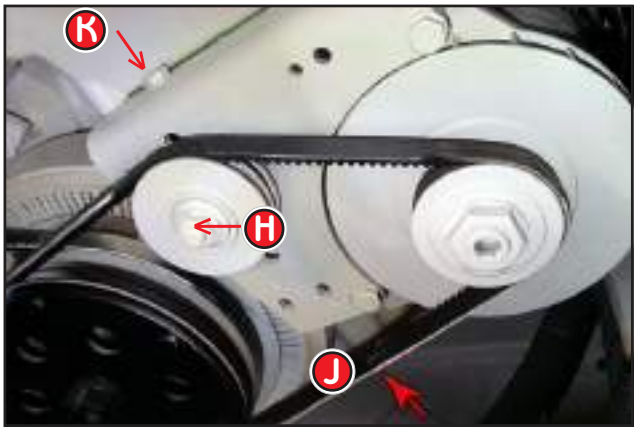
Diodes in the X-split reduce voltage into the batteries about a volt. When running, battery voltage will be 27.4 to 28.4 maximum. Use a digital voltmeter for an accurate check.

X-act 24 volt voltage regulator, R

House battery voltage is usually about 28 volts, sometimes a little higher. However, the bulbs you buy for lighting the vessel are nominally 24 volt. At 28 volts bulbs have a very bright, but short life. Viking Sport Cruisers address the problem with a solid state X-Act voltage regulator to stabilize voltage supplied to lights at 23.8 volts. Bulbs will last their rated life, saving bother and money.

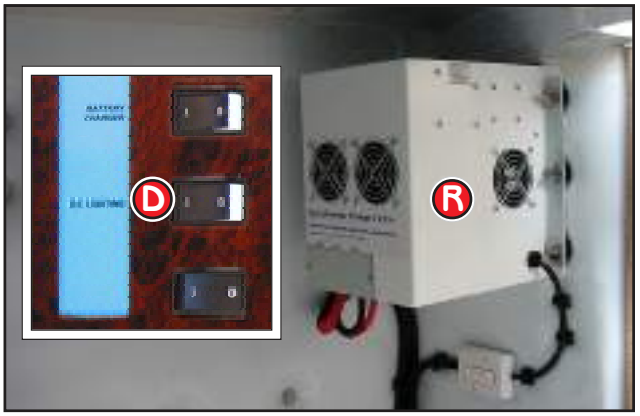
The X-act unit runs whenever the House battery is supplying power to the system. The unit uses 240 volts for its integral transformer. Thus the breaker for DC LIGHTING D on the main panel must be on. If you leave the DC LIGHTING D breaker off the House batteries will deplete.

If AC is not available an internal switch transfers the power supply for vessel lighting to the house batteries, but still regulates the voltage.



Alternator belt tension

25 pounds of upward pressure at the midpoint should cause the belt to deflect no more than 1/2 inch.



DC lighting breaker, D & X-act regulator, R

The panel breaker for DC LIGHTING must be on to power the X-act unit and preserve the House batteries.

"12-volt system" is a misnomer. In reality, at 12 volts a so-called "12-volt" battery is about half discharged. Normally, the voltage should be 14.4 V (max) on charge.

24 volt breakers – DC distribution cabinet

From House (AUX) battery

70. Constant supply
71. High load isolation
94. Battery charger start
95. Battery charger aux
73. Passerelle / crane control
74. Passerelle / crane
75. Engine room fan port
76. Engine room fan stb
77. Engine room fan timer
78. 24 V regulator lighting
79. Aft window
80. Aft window control
81. Glendinning port
82. Glendinning stb

From Engine Start battery

84. Snub winch control, port
85. Snub winch control, stb
86. Snub winch control, port
87. Snub winch control, stb
88. Snub winch relay control
92. Rexroth controls, port
93. Rexroth controls, stb

This installation is typical. Circuit maps inside the cabinets are specific to your vessel.

Notes

Battery source:- House (AUX) batteries supply breakers 70 to 91– except for breakers 84-93 which are supplied by the Engine Start batteries.

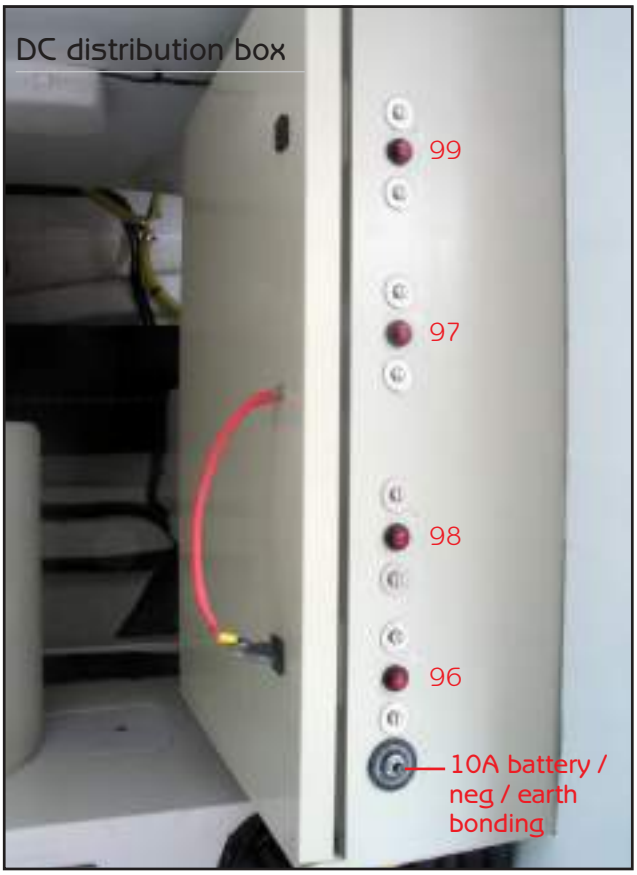
Bilge Pumps:- Breaker 70 is the constant supply of 24 V 63 A power to bilge pumps, and 24-to-12 V converters. Power comes directly from the House isolator.

Voltage Regulator:- 24 V House supply is regulated to 23.8 V 50 A by the X-act unit in the lazarette.

Rexroth Controls:- Power supply to controls is through breakers 92 and 93. Check these if a there's a problem with the Rexroth controls.

Alternator 130A breakers

99. Port engine, Aux
97. Port engine, Start
98. Starboard engine, Aux
96. Starboard engine, Start



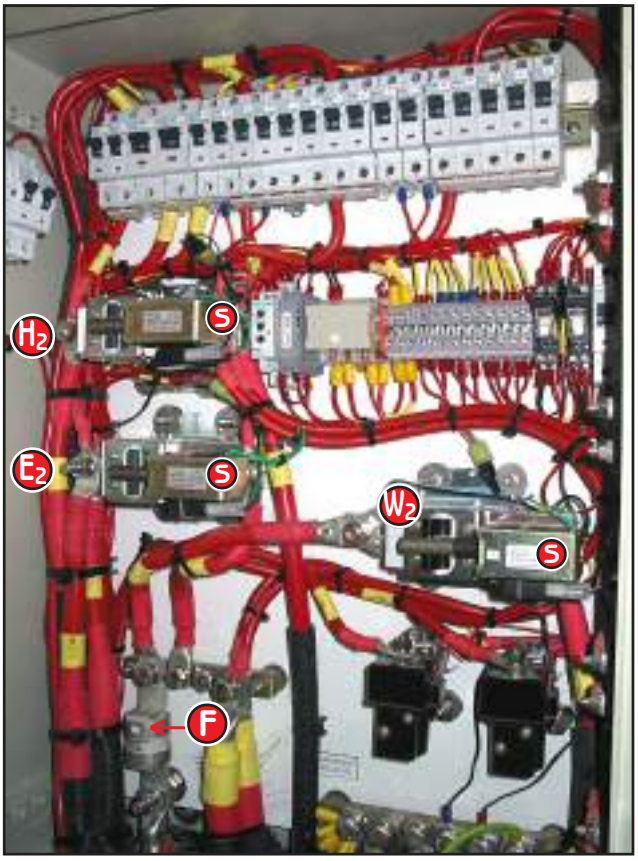
DANGER – High amperage inside this cabinet.

24 volt breakers – DC distribution cabinet

DC isolators:- The DC system employs remote isolators, also called contactors. These are inside the DC distribution cabinet. Isolators are activated by corresponding small switches on the Salon breaker panel. Switch H_1 (opposite page) activates isolator H_2 for HOUSE DC supply. Switch E_1 actvates isolator E_2 for ENGINE START DC supply. When the small panel switches are activated a brief pulse of 24VDC triggers solenoids S to move an integral heavy duty caged switch that connects/disconnects hi-amp battery current for vessel equipment. If activated with load on the circuit isolators can be damaged by heavy arcing, which will certainly occur. NEVER put DC power switches E_1 or E_2 ON or OFF under load. (For troubleshooting, see page 44.)

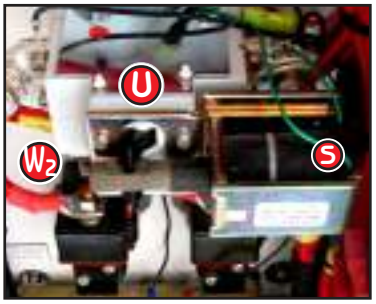
Windlass:- Power for the windlass is also supplied through an isolator, W_2. The WINDLASS switch W_1 on the DC panel when switched ON triggers a solenoid S to close the contacts on the integral caged switch U, thus energising the circuit and enabling windlass rocker switch R to function. The isolator is also a 120 amp overload circuit breaker. On overload the solenoid pulls caged switch U to the open position. To reset: wait a few minutes to let it cool down; then put WINDLASS switch W_1 fully to OFF; pause; then switch W_1 to ON again – now the windlass will operate.

Fuse F is a 400 amp fuse for the bowthruster. Before this can be replaced the positive cable from the ENGINE START BATTERY must be disconnected at the battery.



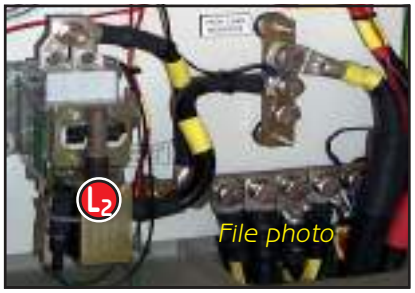
Mechanical lock

Push & hold in to raise & lower anchor.



24 volt Negative High Load Isolation (HLN)

The HLN system is safety feature to cope with a DC equipment emergency, such as a motor overheating or running away, or a motor fire. HLN enables you operate a momentary remote battery switch to shut down heavy DC equipment, without disconnecting essential Engine Start or House battery circuits. The HLN isolator L_2 is inside a small box outboard of the DC distribution cabinet.



The HLN isolator is activated by a panel switch L_1 labelled HIGH LOAD ISOLATION and fed from the battery positive busbar through 16 amp breaker #71 in the DC distribution box. Switch L_1 switches the common negative through Isolator L_2 (both battery negatives are joined) to any of the selected high amperage electrical equipment that draws 40 amps or more. Snub winches, and passerelle / crane have their own isolator switches in this area of the panel.

Switch L_1 has a green pilot light beside it to show when HLN is selected, as does the passerelle / crane switch. The snub winches have red and green pilot lights, indicating power to port and starboard winches, respectively.

Normally, for safety, unless the equipment is in use these switches should be OFF. This prevents accidental or unauthorized running of the equipment.

Before servicing equipment the appropriate breakers in the DC distribution box should be put off as well.

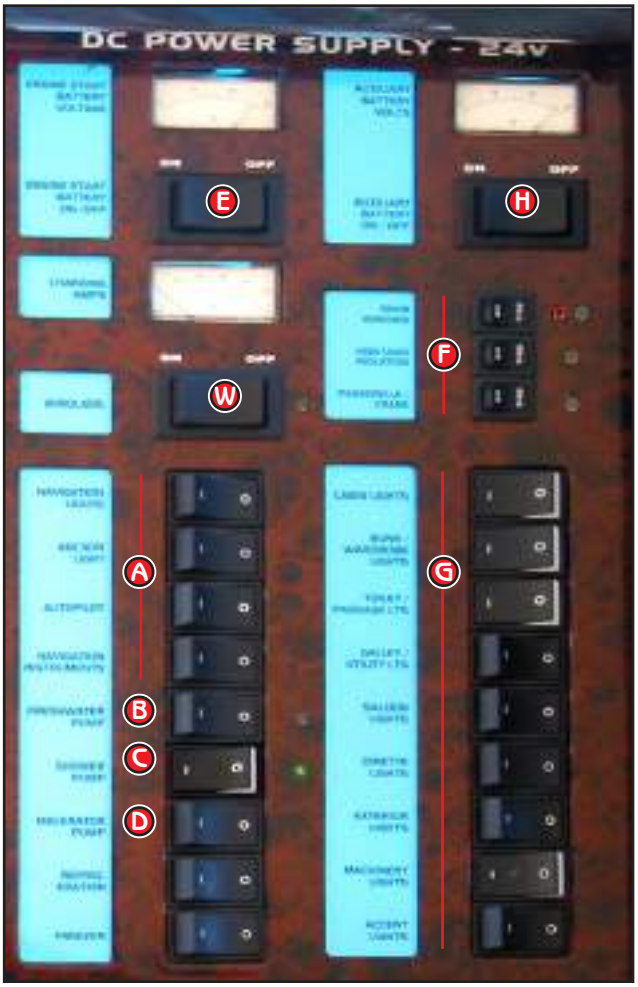
24 VDC Salon helm breakers

The 24 VDC switches for various services are actually circuit breakers. Some operate hi-amp remote isolators.

Switches for Engine Start E and House batteries H control the Engine and House battery isolators – if they off there is no power to any of the DC switches. For safety, keep Engine Start E off unless the engines are in use, or the snubbing winches or high load negative is required.

As a general rule, leave switched off all breakers not required. (Note:- DC connections are behind the panel.)

- When docked, switch off navigation-related breakers A.
- When on city water, WATER PRESSURE PUMP B must be OFF.
- *Always* leave SHOWER DISCHARGE PUMP C ON, otherwise shower water will overflow into the bilges. A recent design change has put shower discharge pumps on constant supply, like the bilge pumps, because the A/C CONDENSATE drains into the shower boxes.
- MACERATOR PUMP D must be OFF unless discharging overboard.
- ISOLATION - HIGH LOAD NEGATIVE F: A GREEN light indicates switch is closed (circuits enabled). Activate only when you are about to use crane, bow thruster and/or snubbers. Otherwise: OFF, for safety.
- The row of switches G are for lights, as labelled.
- ANCHOR WINDLASS W should ALWAYS be off unless you are dropping or retrieving the anchor. *This is an important safety issue*. When switch W is ON, the windlass is energized to drop anchor at will – a potentially dangerous situation.



24-to-12 VDC converters

24-to-12 volt HC 100 voltage converters provide 12 VDC power for shipboard radios, entertainment systems, VHF radio, etc. Each stereo in the cabins is powered by a separate converter.

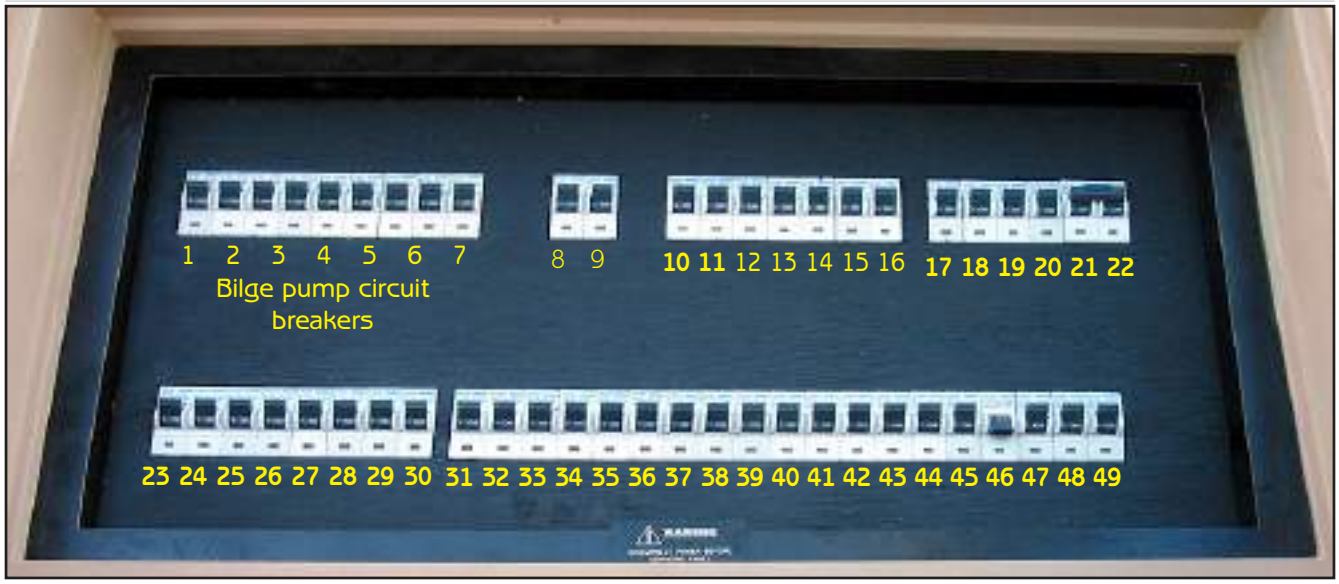
The converters J each have a 10 amp output and must not be overloaded. They are always live when the House (Aux) battery switch is ON.

Secondary circuit breaker #51 protects 24V supply to the 12V converters; #47 is the VHF 12V converter.

Nearby electrical connections are listed on the cards attached to some of the converters. They are located above the headliner in the starboard stateroom.

- Before resetting a breaker or changing a fuse, investigate the cause of the problem.
- Never force a breaker to reset.
- A short circuit will cause sparks and heat behind the breaker.
- A breaker that trips constantly is overloaded. Take steps to reduce its load.

Secondary 24 VDC circuit breaker panel – Salon steering console



1-7. Bilge pumps
8. Aircon greybox
9. Port wiper
10. Center wiper
11. Starboard wiper
12. Horn
13. Searchlight
14. Trim tabs
15. Screen wash
16. Compass / chart light
17. Intercom
18. Exhaust alert
19. Toilet, fwd cabin
20. Toilet, port cabin
21. Toilet, stb stateroom
22. Toilet fans
23. Water/holding tank gauges
24. Holding tank pumpout
25. Passerelle / crane control
26. Sea-Fire master
27. TV booster
28. Switch illumination
29. Salon hi-fi inverter
30. Master cabin Inverter
31. BBQ safety switch
32. Dinette drop window
33. Crew shower pump
34. Reverso oil Changer
35. Bow docking lights
36. Stern docking lights
37. Spare
38. Spare
39. Demist
40. Converter 12V
41. Converter 12V
42. Radar / plotter
43. Radar / plotter repeater
44. Processor
45. Plotter
46. Plotter repeater
47. VHF
48. Interface box
49. Ent. system control

Not shown:

50. 24V Constant converter supply
51. Ext Amp Converter
52. Magic eye Converter

This installation is typical. Circuit maps inside the cabinets are specific to your vessel.

Discussion

The two rows of switches shown here are all 24 volt circuit breakers, and also switches.

The first 7 are for each individual bilge pump – these must always be on for the bilge pumps to operate automatically. However, be aware of environmental concerns about contaminated bilge water discharge.

The rest of the switches/circuit breakers operate equipment.

Trim tabs control switch #14 should be put on ONLY when required. If it is left on casually there is potential danger to swimmers from inadvertent operation of the tabs.

2ndary breaker panel

24 volt DC breakers listed here are under the hinged plastic chart cover. *

Ground Fault Protection

All 120 VAC power points aboard are protected by Ground Fault Circuit Interrupted (GFCI) plugs – meaning a sensor will trip the built-in breaker within .025 second if it detects a dangerous short to ground, or an open ground over 240 milliamps.

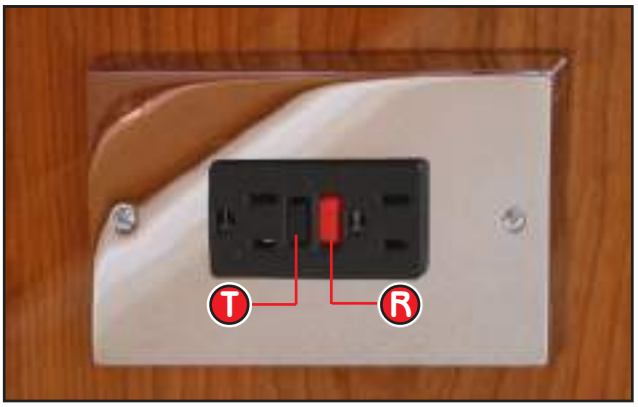
If a power point goes dead, the GFCI breaker is the first thing to check. Typically, three or four ordinary-looking sockets are linked to one socket with a GFCI installed. Thus be sure to check surrounding GFCI sockets if you find you have no power in one receptacle.

It is possible a GFCI could trip during a lightning storm, or when changing over to shore power from the generator.

If a GFCI has tripped, a RED button R will protrude. To reset push it in again – power will be restored to the circuit. Monthly, use the black test button T to confirm the GFCI is operating properly.

Photos show typical GFCI locations on the vessel.

Note:– The GFCI breakers DO NOT prevent overloading of a circuit, that is the function of the power points breakers on the main 120 V panel.



Typical GFCI-protected power point

Black button T is used to test the circuit protection. Reset a tripped GFCI by pushing in red button R.

GFCI-protected power points & breakers

If power is not available from a duplex socket check all 120 volt breakers for a circuit overload problem.

Typical GFCI installations

Generally, GFCI-protected power points are installed in living areas, bathrooms, the galley, staterooms, in a cupboard, the engine room, etc. They enhance the electrical safety of all on board.

Owner's Notes