401-862-4367
info@mjmyachts.com

July 2016

Dear 40z Owner:

Congratulations on becoming Captain and Owner of the world's best built and most eco-friendly yacht of its size. The enclosed copy of the 40z Owner's Manual should further contribute to your enjoyment and proficiency afloat.

This manual was created jointly with Zurn Yacht Design, Boston BoatWorks and MJM Yachts. Our experience with the first 200 boats (all models included) is included to make this manual as useful and relevant as possible. Keep in mind there will be some variances or custom additions to your boat, which wont' be separately detailed in this manual. And, from time-to-time we will change specifications to keep pace with changes made to improve the boats.

When addressing a problem with a specific piece of equipment, this 40z Owner's Manual is to be regarded only as a preliminary source of information. The equipment manufacturer's own manual with trouble-shooting procedures, etc. is the primary source and authority.

A Small Craft Owner's Manual accompanies, and forms part of, this 40z Owner Manual. This booklet has universal handling and operating tips worth reviewing.

This 40z Owner's Manual is designed to be a living document, not only for builder updates but for your own use and record. Each boat is provided with a copy of the current Manual organized in a STAPLES "Mini-Ring" type binder that allows you to add pages as needed.

One of the great advantages of purchasing a series-built or semi-custom design is that owners have the benefit of learning from one another. So, with your continued input and comments we can keep adding useful information and helpful hints to this manual.

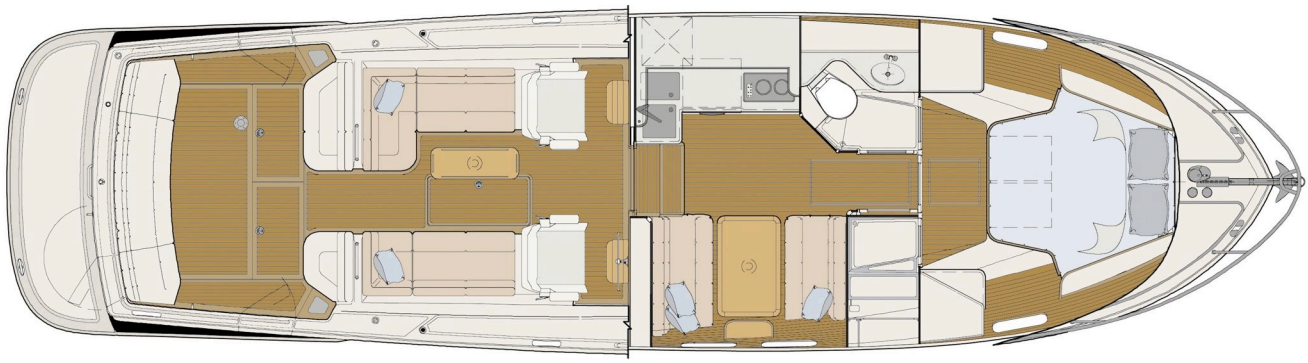
Part of the ISO CE Mark Certification Program is confirmation by the owner that the manual has been received. Please sign the extra page No. 3 included in the Manual as a receipt and return it in the stamped envelope provided.

Best wishes for fair winds and sunny skies. On behalf of the builder and designer, we are most appreciative, and I am particularly honored, that you have chosen the MJM Yachts 40z.

Robert L. Johnstone
Founder & CEO

Note: This manual is published in accordance with ISO standard 10240:1995E Small Craft - Owner's Manual

40z Owner's Manual



LOA - Length Overall Including Swim Platform & Bow Roller	44.3 ft.
LOD - Length On Deck	40.0 ft
Beam – Trailerable Max Width	12.0 ft.
Draft – Max Draft with IPS or Stern Drives Down	3.3 ft.
Displacement – ½ Load	18,900 lbs.
Fuel Tankage - In 2 175 gallon Tanks	350 gals.
Fresh Water Tankage – Including Hot Water Tank	112 gals.
Holding Tank	25 gals.
Air Height over Water w/Radar Mounted on Hard Top	10.0 ft

CE CERTIFICATION

CERTIFICATE NO.	BBBW003
AUTHORITY:	International Marine Certification Institute
ADDRESS:	Rue Abbe Cuypers 3 B-1040 Bruxelles, Belgique
PHONE:	+32-2-741-2418
WEBSITE:	www.imci.org
CLASSIFICATION:	ISO CE Mark Design *Category A Ocean* (EC Directive 94/25/EC) for craft designed for offshore voyages (1) where the vessel is correctly handled in the sense of good seamanship and operated at a speed appropriate to the prevailing sea state and (2) with significant wave heights above 4 m (calculations are based on 7 m) and wind speeds in excess of Beaufort Force 8, but excluding abnormal conditions, e.g. hurricanes.

CAPACITY

PERSONS:	Maximum 16 Persons
PERSONS/GEAR:	Maximum Load 3518 kg

RECEIPT BY OWNER In compliance with ISO 10240:1995(E) the owner hereby certifies receipt of this manual and has read and agrees to the terms of the Builder's Limited Warranty included herein.

NAME:

_____
Signature

_____
Printed Name Date

_____
Boat Name Hull #

ADDRESS: _____
Address

_____
City, State, Zip

MOBILE _____
Tel.

_____
E Mail

NOTE: PLEASE SIGN ONE OF THE TWO COPIES OF THIS PAGE AND RETURN IT IN THE ATTACHED STAMPED ENVELOPE TO: MJM YACHTS at 39 Washington St. Newport RI 02840

⚠ DANGER Denotes an extreme intrinsic hazard exits which would result in high probability of death or irreparable injury if proper precautions are not taken.

⚠ WARNING Denotes a hazard exists which can result in injury or death if proper precautions are not taken.

⚠ CAUTION Denotes a reminder of safety practices or directs attention to unsafe practices which could result in personal injury or damage to the craft or components.

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CHAPTER 1 OPERATION

1.1 GENERAL

This manual has been compiled to help you operate your yacht with safety and pleasure. It contains details of the yacht; the equipment supplied or fitted, its systems, and information on its operation and maintenance. Please read it carefully, and familiarize yourself with the yacht before using it.

If this is your first yacht, or you are changing to a type of yacht you are not familiar with, for your own comfort and safety, please insure that you obtain handling and operating experience before assuming command of the yacht. Your dealer or yacht club will be pleased to advise you of local schools, or competent instructors.

PLEASE KEEP THIS MANUAL IN A SECURE PLACE ON THE BOAT, AND HAND IT OVER TO THE NEW OWNER IF YOU EVER SELL THE CRAFT.

This Owner's Manual is not intended to be a course in boating safety, boat handling, navigation or general boating skills. It is the responsibility of the user to independently gain these skills. Instead, this manual will serve as a reference for matters specific to the 40z. Standard options are included in the manual with which your particular yacht may or may not be fitted. Custom options may be addressed in an addendum.

1.2 QUICK START GUIDE (See CHAPTER 16)

A separate "Quick Start Guide" is included that briefly reviews the key items to check before departure. Please review the topics in this manual before relying on the checklist – it is simply an "at-a-glance" sheet to insure that you don't overlook anything important.

1.3 OPERATING PROCEDURES – ENGINE INSPECTION

To access the propulsion system, the cockpit engine hatch must be raised. The procedure is as follows:

⚠ CAUTION Make sure personnel and equipment are clear of any moving parts before operating.

- Turn ON house battery rocker switch (located over DC electrical panel)
- Turn ON DC main breaker & engine hatch breaker on the DC panel
- Activate the engine hatch lift with the black toggle switch in the starboard cockpit seat locker.

1.4 NAVIGATION

The builder installed navigation system includes autopilot w/compass, depth sounder, chart-plotter, and radar. Modern marine electronics are a subject unto themselves and you should refer to the manuals that came with the equipment you purchased. However, here are a few points to consider:

+ If you are unfamiliar with navigation, educate yourself before using the boat. *Electronic equipment is NOT a substitute for dead-reckoning navigation skills.*
+ It is not recommended to rely solely on electronic charts- bring paper chart back-ups.
+ It is prudent to check (or have checked) your compass alignment once the boat is in your primary area of operation. See the Ritchie instructions for compensation.
+ Check that all equipment is functioning, even if you intend not to use it.
+ Radar and its overlay projection on the plotter should be properly aligned (Double-check when underway) See manual to adjust, tune and operate.

Compass Heading & Calibration

There are 3 heading references for navigation on the 40z: (1) The compass on the dash, (2) Autopilot digital compass, and (3) GPS COG (Course Over Ground). All of these headings should be within a degree or so of each other when underway. If not, it is recommended that differences be recorded on a deviation card after following the calibration method outlined below or better yet, employing the services of a compass adjuster. Use COG as the primary reference at a time when you are not influenced by wind/wave/tidal set. The digital compass sensor is located on a stringer outboard to starboard under the cabin sole. It is accessible by opening the cabin sole hatch and looking aft.

⚠CAUTION Avoid storing steel or iron items such as tools nearby.

Ritchie Ship's Compass Calibration Method

1) With the compass in its intended position, but not finally secured, select a course on your chart using two identifiable marks, buoys or landmarks that are within ten degrees (10°) of the north/south line. Try to select this course so that you can maneuver your boat "down range" of the marks selected.
2) From a position down range of the North/South marks, and keeping the marks lined up, run the boat visually along the northerly course selected. Turn the port/starboard compensator on the right side of the compass until the compass reads correctly.
3) Reversing direction, run the boat southerly, again keeping the marks lined up. If the compass is not correct at this time, there is an alignment error. To correct, rotate the compass itself to remove one half of this error. Repeat Steps 1 and 2 and then recheck this Step 3.
4) Simply repeat the procedures of Steps 1, 2 and 3, except this time, using an east/west course and the fore/aft compensator on the aft side of the compass, although at this time any alignment error should have been eliminated.
5) Upon completing the procedure, secure the compass in its final position.

Boat Speed Rather than a paddle wheel or sonic device, the Raymarine C120 plotter is used to generate SOG (Speed Over Ground) that is displayed by the chart-plotter and may also be shown in larger digits on the Autopilot display. Eventually, you will learn to approximate boat speed through the water by relating it to RPM on the tachometer.

1.5 HAULING OUT

A facility that is unfamiliar with the 40z may require information before hauling the boat with a Travelift or crane & straps. Refer to the illustration included at the back of this manual. The keel (centerline of the boat) and chines (edges) should be used to position weight-bearing supports. You will note that the fore and aft lift points are located approximately at either end of the pilothouse... e.g. abeam of the windshield and the aft end of the hard top.

⚠CAUTION Point loading flat areas other than centerline and chine or setting the weight of the hull on supports of insufficient area may result in damage to the hull.

CHAPTER 2 SAFETY EQUIPMENT

2.1 GENERAL

Spend time reviewing where your safety equipment is and how it functions BEFORE you need it. Remember, the best way to protect yourself and others from accidents is to eliminate potential causes of accidents before they occur. Good seamanship and common sense go a long way in this endeavor. [See Figure 14.1]

Here is a safety checklist derived in part from the USCG Vessel Check List. State Regulations may vary:

PFD's
A wearable USCG approved personal flotation device (life-jacket) must be provided for each person aboard. On the 40z, these can be types I, II, III or V. Also, one type IV throwable PFD must be immediately available for use.

Children under 13 years of age are required to wear a USCG life jacket that fits when underway unless they are in an enclosed cabin or belowdecks.

Visual Distress Signals (VDS)
You must carry VDS's aboard. If operating between sunset and sunrise, they must be suitable for night use and be within the age dates marked on the side of the flares. A minimum of 3 day/night use combination pyrotechnic flares are required. For a list of USCG approved devices, see the USCG recreational checklist.

Fire Extinguisher
In addition to the automatic fire suppression system fitted in the engine space, you are required to carry at least one type B-1 extinguisher aboard, which is located outboard of the starboard helm seat. This should be checked regularly.

EPIRB
Especially if operating offshore, an EPIRB (electronic position indicating radio beacon) is recommended.

Ships Papers & Registration
You should carry the vessel's registration papers and number plate.

Pollution Regulation Plaques
5"x8" Oil Discharge Plaque and a 4"x9" Waste Discharge Placard should be fixed were visible.

Charts & Light Lists
Charts, light lists and a USCG required copy of the Inland "Rules of the Road" Navigation Rules

Horn or Whistle
Recommended to signal intentions or signal position. For instance, when in a narrow channel or the Intracoastal Waterway: To signal which side of another boat you will pass on, blow **1 blast** if you are passing to their starboard side and **2 blasts** if passing on their port side. The Kahlenburg horn has a repetitive automatic fog signal that can be activated for either underway or at anchor.

Life Raft
If you plan to be coastal cruising out of sight of land, it is prudent to carry a Coastal Life Raft which come in compact sizes that can be stored in one of the aft cockpit lockers.

Heaving Line
These floating lines are available and handy to have ready in case of emergency or to simply trail behind the boat when swimming, .with the end attached to one of the stern cleats.

First Aid Kit
Not a place to scrimp. It is advisable to carry a good, comprehensive, and well-organized (by injury) marine first-aid kit with manual. We recommend that it be stored in the head and that everyone onboard be informed of its location. (Remember, you may be the one in need of it!)

Companionway Hatch Board or Closure
A teak board is provided with the label, " DO NOT REMOVE WHILE UNDERWAY" to comply with ISO requirements for cockpit draining and construction to prevent large waves from crashing down into the cockpit, running forward entering the interior of the boat. Better to just secure the companionway slider and lid. It's quieter, prevents someone from being pitched below and provides a Chart Kit navigation surface.

2.2 FUEL SHUT-OFF VALVES

The fuel shut-off valves are located on top of the fuel tanks and are accessible through pilothouse settee lockers. Make sure you know how to shut off the fuel valve. (When the handle is perpendicular to the hose, the valve is closed.) In case of a fuel fire, STOP any machinery and close the valve to cut the supply of fuel to the fire/engine. If you should ever see fuel in the bilges, turn off the valve, clean the bilges, and find the source of the leak immediately. Also note that there are fuel shut off valves, normally left open, on the lower inboard aft corner of the fuel tanks, which connect the two tanks together at the bottom for self-leveling. There is only one fuel level sensor and that is on the starboard tank.

2.3 FIRE

Fire aboard a boat is a serious matter, and fire safety begins with fire prevention. You can reduce the risk of fire by following common sense guidelines:

- Do not allow debris or oily rags to collect in bilges or machinery spaces.
- Understand your electrical system, allow only qualified marine electricians to work on it, and shut down as many circuits as practical when leaving the boat. Do not leave appliances running while unattended.
- Have your fire suppression equipment inspected regularly and learn how to use it.

An automatic fire suppression system is installed on every boat in the engine space. It is heat activated. Read the information that comes with the equipment. The system can also be manually activated at the helm station. [*See Helm Console Section*] Because a diesel engine would evacuate the suppression agent from the affected space, the system will shut down the engine (and generator) when it discharges. If manually activating the system, the engine should be shut down first. After the situation has stabilized, the shut-down feature can be over-ridden to restart the engine. A loud warning alarm will sound when the system has been activated.

The hand-held fire extinguisher mounted outboard of the starboard helm seat is rated to fight type A, B & C fires.

To extinguish a fire, the most effective method is to cut the source of fuel to the fire. In the case of a diesel fuel fire, the fuel tank valves should be closed. In the case of an electrical fire, the main battery switches or main disconnect breakers should be turned off. Fire needs oxygen to burn, so if a fire should occur in an enclosed area, the best course of action may be to exit the area and seal it from the outside by closing all means of air intake

CHAPTER 3 PROPULSION SYSTEM

INTRO - THE TOP 10 CAUSES OF ENGINE FAILURE

It doesn't happen often and if you're familiar with the most common causes of engine failure you can cut down on the chances of a breakdown. As an introductory to this chapter, we want to familiarize you with this list of causes, compiled by *Motorboating Magazine* (February 2006) and embellished with a few MJM incidents. Here are the Top Ten to be aware of:

1. NO FUEL: This is probably less of a problem on a fuel-efficient MJM than on other boats, but lack of owner attention to fuel consumption is the primary culprit for engine failure. A boat's fuel tank can be nearly dry as a bone – even when the gauge claims there's a 1/4 of a tank left. This makes sense when you realize that at cruising speed, the gauge shows the tanks reading higher than when the boat is at rest. A good rule of thumb is to never pass a fuel dock (no matter what the price) if your gauge is showing less than 1/3 full.

1b. AIR IN FUEL LINE: If air gets drawn into the fuel lines because of either a small leak in a fuel line connection or the Racor Filter lid gasket/filter basket tabs have interfered with the lid being secured fully, you may find the engine will turn over, but won't start. Check the Racor to insure the fuel level is within an inch of the top. Check the engine owner manual for the location of a manual primer pump.

1c. COMPUTER SETTING: On electronic engines, we've encountered several instances with Yanmar engines on the 34z, where after shutting down the engine for several hours (on a picnic), it was only possible to start the engine after many tries or not at all. The problem was that the setting that determines the amount of fuel to be injected into the engine upon starting was not set high enough to work on a warm engine. Solution was moving the setting from a "3" to a "5".

2. DIRTY FUEL: Engine problems are caused by dirt and water in the fuel. Debris, stirred up from the bottom of the tank by wave action, is drawn into the fuel line and clogs the fuel filter element. Starved for fuel, the engine begins to run poorly, and then not at all. Water in the fuel can drive you mad. Moisture condenses out of the highly humid air on the inside walls of a fuel tank, then runs down into the fuel. Water can also be introduced at the fuel dock from a contaminated fuel supply. Fuel floats on top of water and the fuel pick ups are near the bottom of the tank. A Racor fuel/water separator protects against this by handily extracting the water. Check the bowl daily and drain off the accumulated water. For severe contamination, use a fuel drying additive or have a diesel service "polish" the fuel.

3. FUEL BUGS: Diesel engines suffer from microbial bugs growing in the fuel. If left unchecked, these critters clog filters. If you leave the same diesel fuel in the tank for any length of time, a fuel conditioner similar to that supplied with your boat by the builder will kill the bugs and break up any hydrocarbon residue into particles that will burn completely in the combustion process.

4. TIRED/DAMAGED WATER PUMP IMPELLER: As boats age or if an engine isn't operated for a long period of time, a worn-out circulating water pump is another engine killer. Impeller blades are commonly made of a rubberized material that stiffens or distorts over time and can break off entirely, reducing coolant flow and clogging the heat exchanger. Periodic engine maintenance procedures can prevent this problem. A spare is provided in the engine spares Kit. Shown at right is a MJM 29z impeller that would have soon failed. It was replaced during the 50 hour inspection on a boat that had not been run for 11 months. Another cause for impeller disintegration is running the engine with the raw water intake shut off. By the time that the overheating is discovered and you shut down the engine, the impeller may already have been destroyed or damaged. This happened on a 34z when the operator forgot to be sure that the raw water intake valve was in the proper position.

5. HARD HOSE: Another issue to be concerned about with older boats. As water intake hoses age, they lose their resiliency and collapse under suction, causing a restriction in the flow of engine coolant. This results in over-heating.

Prevention is easy: Visually inspect cooling hoses and squeeze them to be sure they retain shape and set.

6. CLOGGED RAW WATER INTAKE: The first clue maybe high or erratic Coolant Temperature readings on one engine. This happened on a 50z when it picked up a crab pot in Florida and the warp and trap wrapped around the drive. Amazingly the RPMs weren't effected nor the IPS function (a wonderfully resilient system!). Subsequently all new MJMs are being equipped with warp cutters. Things like discarded plastic baggies, weeds, etc. can also plug up the raw-water intake on the drives. You can avoid this problem by visually inspecting the strainer basket. Good water flow should exist without evidence of lots of air. When removing debris, be sure to properly replace the seal, otherwise the pump will lose suction. Smearing the seal with Vaseline or other marine-grade grease helps.

No Water Circulation…If upon starting the engine at idle you don't see water circulating in the strainer: (1) Stop the engine (2) Check to see that both intake and raw water outgo valves are open at the drives (3) Fill the strainer basket container with water, re-seal the strainer and turn on the engine again to deal with a possible air lock, (4) race the engine in neutral momentarily, (4) dive over the side to see if a plastic bag or other debris is covering the intake, (5) Inspect the impeller which pumps water through the engine.

7. HARD KNOCKS: Collision with an underwater obstacle that damages the propulsion system. Often you can still operate the boat at low RPM to return to port, being careful to avoid excessive vibration that might otherwise compound the damage by damaging the transmission. The problem may be corrected in a day or so without hauling by an experienced diver who has access to a prop shop where the blades can be repaired and the prop re-balanced and recoated with PropSpeed, then re-installed.

8. BAD BATTERY: Marine starting batteries die from old age and neglect. Keep the terminals and posts clean from that green corrosion that builds up, restricting the flow of current – preventing them from fully charging. Periodically have your batteries tested to determine their condition and expected longevity. The 40z is equipped with a "parallel" switch which can be turned on to employ the 400 ampere-hour house bank in starting the engine.

9. STALE GASOLINE: Not applicable

10. SAGGING BELT: As V-belts wear, they stretch and begin to slip. Consequently, alternators and water pumps don't spin to their full speed. Batteries may not fully charge and coolant circulates sluggishly. The solution is to check belt tension regularly and tighten belts when necessary. Drive belts can also snap. The only way to avoid this malady is to replace them once they begin to show wear. Some spare belts are provided in the engine spares kit.

What Diesel Mechanics Wish Every Boat Owner Knew

To run well, a diesel engine requires only clean fuel, clean lubricating oil, coolant, and lots of air. Below are ten important maintenance issues that diesel mechanics wish their customers knew:

1. Don't baby the engine. Diesels don't like to idle in neutral, or even in gear at low speeds; they do like to work hard under load. What's cruising RPM? Generally, 75-80% of the maximum RPM. Excessive idling leads to gradual build-up of detrimental varnish on the cylinders, and deposits soot and carbon on the engine's valves and in the exhaust system, particularly at the manifold injection elbow where raw cooling water exiting the engine mates with the exhaust gases. Run it hard. However...after running at cruising RPM for several hours, a brief cool-down at idle speed, with no load, is beneficial. A few minutes is enough.

2. Give your engine clean fuel. Fuel is "contaminated" when it contains water, sediment, other solids, or biological organisms, some of which thrive in diesel fuel. To minimize contamination, don't store your boat for the winter or let it sit around for weeks at a time with fuel tanks only partly full. A full tank minimizes condensation of water vapor on the tank's interior and the growth of micro-organisms. Fuel filters trap sediment, sludge, water and organic material and should be changed at periodic intervals.

3. Be conservative in your estimate of fuel consumption. When under way, do not delay re-fueling to the point where you have expended nearly all the fuel in the tank. The last 20% should be held in reserve. To suck up the last few gallons is to chance sucking up water (tank condensate), sludge, and other contaminants - perhaps even air - into your fuel lines.

4. Know how to vent ("bleed") the air out of your fuel system. Air locks in diesel fuel systems are a fact of life. The typical diesel fuel system operates with a lift pump (a vacuum pump) that lifts or sucks fuel out of the tank, draws it through the pump, then sends it to the filters and injectors, where the injector pump sends fuel to the individual cylinders for combustion. Whenever you open the fuel line between the tank and the engine (for example, to change a filter element) air enters the line. Air may also be sucked into the fuel line through cracked seals and gaskets, poorly fitted connectors and clamps, via the pick-up tube in the fuel tank, etc. This air must be removed, because even a tiny air bubble in the fuel line will block the flow of fuel, and without fuel, the engine will not start; if running, air in the fuel line will cause it to stop.

To clear your fuel line of air, you must vent or "bleed" it out. Consult your engine's manual to identify the bleeding nuts; paint them with white nail polish so you can easily find them again, in the dark, at sea. Given decent access to the engine, bleeding or venting air is a simple procedure that everyone should be able to perform. Using the engine manual, teach yourself how to do this.

5. Be diligent about checking your lube oil and oil filter. Diesel engines are rough on oil and usually require more frequent oil and oil filter changes than comparable gasoline engines. Follow the engine manual's recommendation for service intervals. Carry spares on board. Between oil changes, use the dipstick to check the oil level. Top it off as necessary from your on-board lube oil inventory, but do not exceed the "full" mark on the dipstick; more is NOT better.

6. Minimize risk of fire. Diesel engines vibrate a lot, and the typical marine diesel has a lot of wiring and hoses attached to it, crossing it, behind it and near it. Over time, as the engine vibrates, the fasteners may loosen and fail, the wiring and hoses droop or fall. One hates to see a loose hose or wire (such as the primary wiring harness, or the power supply to your fuel pump, or a hose to the hydraulic pump) cross and contact a hot exhaust manifold, for example; this could be a prescription for fire due to abrasion of insulation around wire, or chafing through the wall of a hose. From time to time, inspect your engine compartment for these potential risks. Add chafing protection, replace worn insulation, and supplement the fasteners if necessary. Consider re-routing wires and hoses where appropriate.

7. Know how to trouble-shoot the cooling system. Since overheating is a common problem familiarize yourself with engine's cooling systems: the raw water (sea-water) system, as well as the fresh water (internal circulating coolant) system. **The most likely causes of overheating are:**

* Raw-water valve closed.

* Raw-water through-hull blocked externally. Check for a plastic bag, or a clump of sea grass or other material, covering or plugging the inlet.

* Raw-water filter / strainer clogged with sediment, sand, goo, grass, or living critters such as barnacles, jelly fish, and algae.

* Defective or destroyed impeller in raw water pump. The impeller should be replaced every year or two, as the rubber vanes become brittle with age and may snap off.

* Heat exchanger dirty or clogged up with sediment and other deposits. The entire raw water cooling system should be flushed periodically to remove salt and sediment deposits.

* Exhaust elbow restricted by carbon deposits or other solids, reducing discharge of cooling water and exhaust gases. Routinely run the boat at high RPM for several minutes to clear.

* Thermostat stuck closed; likely will require removal or replacement. (Note: Some diesel engines operate OK - temporarily - without a thermostat.) Coolant temperature of 170-180o F is normal.

* Low level of coolant (50-50 mix of antifreeze-water). Coolant levels should be checked routinely at the expansion tank, adding more as needed.

* Broken or slipping V-belt, which drives the water pumps and the alternator. Even a new belt deserves re-tensioning and inspection. Suspect slippage or wear if you see dark "belt dust" settling at the engine's base. Belt tension is OK if pressure deflects the belt by about 1/2 inch.

* Overloading of the engine: Rope wrapped around propeller shaft, dirty bottom, fouled propeller, or air leaks in the raw water cooling system. Cracked or collapsed hose? Hose clamps tight?

8. Know your fuel additives. When crude oil is refined as diesel fuel, it acquires additives to reduce smoke, prevent pre-ignition ("knocking"), improve its cetane rating, etc. Few additives further enhance fuel. Some diesel mechanics actually recommend: Biocides, such as Killem and Biobor, lubricants, such as Lubricity and Stanadyne Performance Formula, and fuel stabilizers, such as Sta-Bil and Pri-D. BUT 1) Follow the instructions on the container. 2) Routinely, a little bit is better than a lot.and 3) Be guided by your mechanic's advice.

9. Monitor for exhaust leaks. From time to time, when the engine is operating, inspect the complete exhaust system from the engine to the through-hull and overboard discharge. Look for leaks, both exhaust (air) and water. Major leaks will be obvious, but early signs of leaks due to hairline cracks in hoses and water pot muffler systems may not be. Diesel exhaust contains acidic sulfur and other gasses that may poison the air within the boat. To detect air leaks, look for tell-tale traces of black soot. Water leaks should also be immediately repaired. Leaks never resolve spontaneously; they must be addressed as quickly as possible.

10. Properly dispose of hazardous waste. Be sure to properly dispose of used coolant, used engine oil and transmission fluid, contaminated fuel, old filters soaked with fuel and oil, etc. These fluids are generally poisonous to people, pets, wildlife, and the environment, and some of them can be recycled.

Edited from an article by *Captain Bernie Weiss at www.AtlanticYachtDelivery.com.*

CHAPTER 3 PROPULSION SYSTEM

3.0 PROPULSION SYSTEM

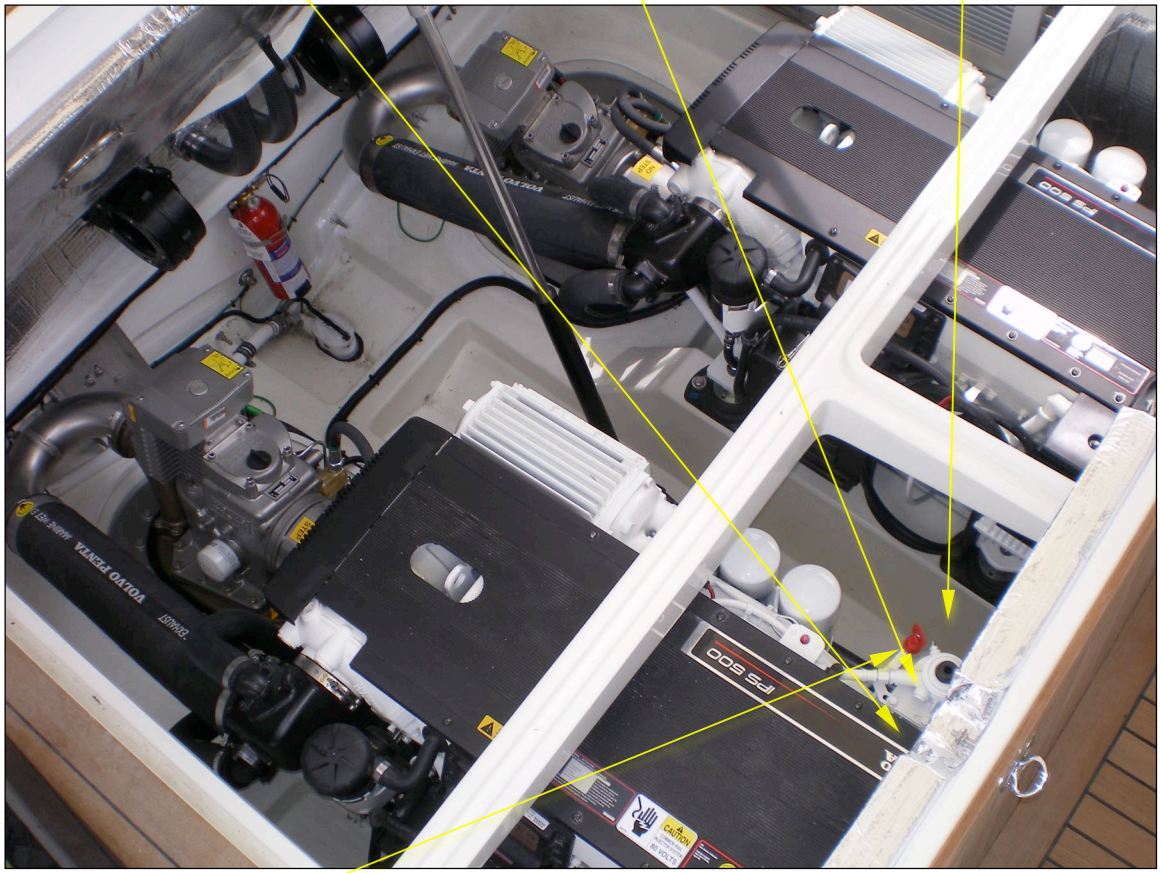
3.1 GENERAL Your 40z is propelled by twin Volvo diesel 370 HP D6 engines with 24 overhead valves, turning (via IPS transmission) forward facing duo-prop propellers. The dual-lever electronic control acts as a combination throttle and gear selector. Care should be taken when shifting. Always allow the transmission to engage the new gear before throttling up. If the two levers are set to within 200 RPM of one another, they will automatically synchronize.

The engine should never be running when swimmers are near the boat.

Unscrew Cap when engine cold to check COOLANT LEVEL

RAW WATER INTAKE STRAINERS

FUEL FILTER w/bleeding pump & nipple



OIL LEVEL DIPSTICK

See Page 65 of Volvo IPS Operator's Manual for greater detail of engine components

NEW ENGINE BREAK-IN While running the engine for the first time and after shut-down, check for proper engine oil pressure, diesel fuel leaks, engine oil leaks, coolant leaks, proper operation of the indicators and gauges, proper exhaust color, engine vibrations and sounds, If temperature is high (a) Is the raw water intake seacock open at the base of the IPS drives? (b) Are the raw water strainers clogged?

⚠WARNING The engine may seize if it is operated when seawater intake is restricted or if load is applied without allowing the water temperature (engine) to warm up.

During the first 10 hours of operation, full load should only be applied for short periods. Never run the engine for a long period at a constant RPM during this period. Higher oil consumption is typical at this time, so carefully observe oil pressure and engine temperature, exhaust color and check engine oil and coolant levels frequently... i.e. daily.

VOLVO PENTA INBOARD DIESEL

D6-370

272 kW (370 hp) crankshaft power acc. to ISO 8665

Diesel performance for marine use

Volvo Penta's 6-cylinder D6-370 is developed from the latest design in modern diesel technology. The engine has common rail fuel injection system, double overhead camshafts, 4 valves per cylinder, turbocharger and aftercooler. Together with a large swept volume and the EVC system (Electronic Vessel Control), this results in world-class diesel performance, combined with low emissions.

D6-370 with HS80AE reverse gear

World-class performance

The common rail fuel injection system, controlled by EVC, in combination with a large swept volume, ensures outstanding torque during the acceleration, with virtually no sign of smoke. This matched with the engine's high load carrying capability creates a sporty feeling and power, when needed.

Compact and robust

The engine is lightweight and extremely compact for its large swept volume and high output. With the rear-end transmission, driving the high-pressure injection pump and the camshafts, a high degree of integrated systems, a high-efficiency aftercooler, a marinization performed with very few hoses, and a fully symmetric engine, the package simply gets that compact.

The rigid cast-iron cylinder block and head, ladder frame, and exactly controlled (up to three steps) fuel injection gives excellent onboard comfort with low noise and vibration levels.

EVC/EC – Plug and go

EVC Electronic Vessel Control is the latest development in engine control and instrumentation for Volvo Penta marine engines. It offers a higher level of integration in your boat: electronic shift and throttle for smooth and safe control, a complete range of easy to read data link gauges, an EVC System Display (option) and much more, everything in just one CAN cable.

EVC makes boating easier and safer with twin engine synchronization and new software functions such as Volvo Penta Low Speed (option), which significantly reduces boat speed at idle to simplify maneuvering in tight quarters.

EVC is scalable from one station up to four, from a classic dashboard up to an advanced driver information system. EVC works closely together with the engine management system offering you constant power output regardless of temperature (5–55°C/41–131°F) and quality of the fuel. The system is built on the latest automotive technology with waterproof connectors, so it's just plug and go.

A propulsion package fully matched, tested and supported by one company

Volvo Penta's hydraulically shifted reverse gear has been specially developed with a view to increasing the standard of comfort on board.

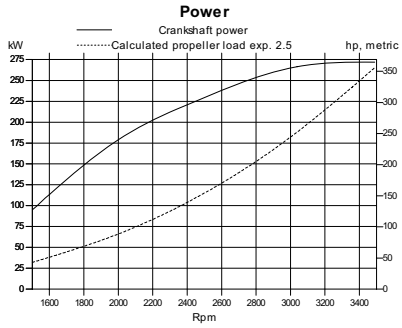
Matched with the characteristics of the D6 engine, the hydraulic shifting mechanism and a gear technology that uses bevel gears throughout the gear train, we have developed a complete package for high torque, operational reliability and reduction of engine noise and vibrations.

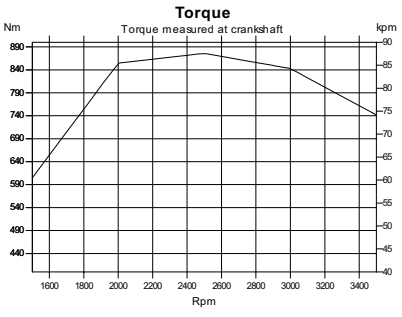
The combination of 8° down angle, large drop center and small dimensions provides for optimized installations. V-drives are also available.

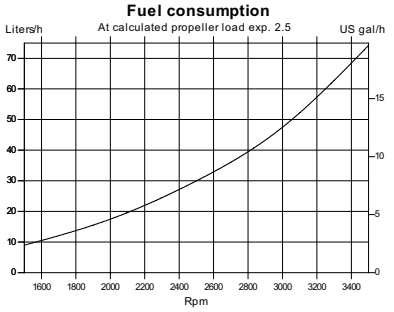
In order to get full benefit of the EVC system the reverse gear is equipped with electric shifting valve.

Meeting new emission standards

The common rail injection system in combination with electronics and an advanced combustion system are setting new standards in minimizing noxious emissions and particulates. The engine complies with the comprehensive emission requirements introduced in Europe and the US in 2006.







VOLVO PENTA

D6-370

Technical description:

Engine block and head
- Cylinder block and cylinder head made of cast-iron
- Ladder frame fitted to engine block
- 4-valve technology with hydraulic lash adjusters
- Double overhead camshafts
- Oil-cooled pistons with two compression rings and one oil scraper ring
- Integrated cylinder liners
- Replaceable valve seats
- Seven-bearing crankshaft
- Rear-end transmission

Engine mounting
- Flexible engine mounting

Lubrication system
- Easily replaceable separate full-flow and by-pass oil filter
- Seawater-cooled tubular oil cooler

Fuel system
- Common rail fuel injection system
- Control unit for processing the injection
- Fine filter with water separator

Air inlet and exhaust system
- Air filter with replaceable insert
- Crankcase gases vented into the air inlet
- Exhaust elbow or exhaust riser
- Freshwater-cooled turbocharger

Cooling system
- Thermostatically regulated freshwater cooling
- Tubular heat exchanger with separate large volume expansion tank
- Coolant system prepared for hot water outlet
- Easily accessible seawater impeller pump

Electrical system
- 12V or 24V two-pole electrical system
- 14V/115A or 28V/80A marine alternator with Zener-diodes to protect the system from peak voltage, and integrated charging regulator with battery sensor cable for maximum use of alternator
- Fuses with automatic reset (12V) and fuses with manual reset (24V)
- Auxiliary stop button

Instruments/control
- Complete instrumentation including key switch and interlocked alarm
- EVC monitoring panels for single or twin installations
- Electronic remote control for throttle and shift
- Plug-in connections

Reverse gear
- Reverse gear with matched drop center and 8° down angle for compact installation and minimum propeller shaft angle. V-drive available.
- Bevel gears which results in smooth running at all speeds
- Hydraulically operated clutch for smooth shifting
- Electrical shifting performed by electromagnetic valves
- When under sail propeller shaft can rotate 24 hours without engine start
- Seawater-cooled oilcooler
- Low speed as option

Accessories
An extensive range of accessories are available. For detailed information, please see the Accessories & Maintenance Parts catalog (www.volvopenta.com).

Contact your local Volvo Penta dealer for further information.

Not all models, standard equipment and accessories are available in all countries. All specifications are subject to change without notice.

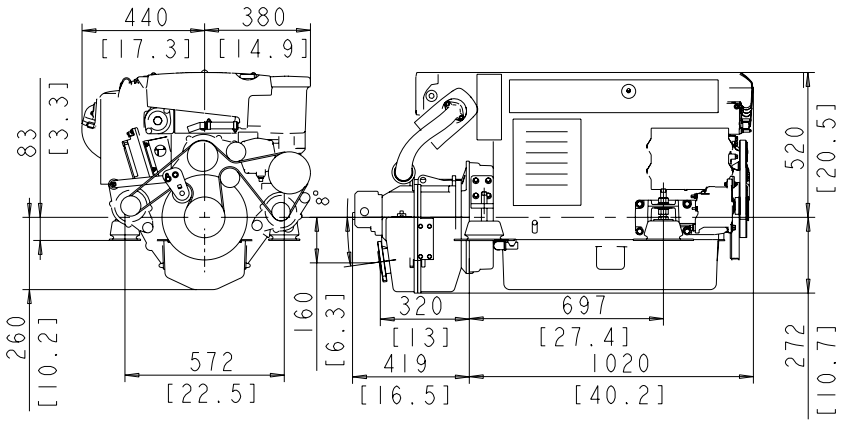
The engine illustrated may not be entirely identical to production standard engines.

Technical Data

Engine designation	**D6-370 I**
Crankshaft power, kW (hp)	272 (370)
Propeller shaft power, kW (hp)	267 (363)
Engine speed, rpm	3500
Displacement, l (in³)	5.5 (336)
Number of cylinders	6
Bore/stroke, mm (in.)	103/110 (4.05/4.33)
Compression ratio	17.5:1
Dry weight with HS80AE, kg (lb)	677 (1493)
Ratio HS80AE	2.50:1, 1.96:1, 1.57:1
Ratio HS80IVE	2.49:1, 2.0:1, 1.64:1

Duty rating: R5
Technical data according to ISO 8665. With fuel having an LHV of 42,700 kJ/kg and density of 840 g/liter at 15°C (60°F). Merchant fuel may differ from this specification which will influence engine power output and fuel consumption.
The engine complies with the comprehensive emission requirements introduced in Europe and the US in 2006.

Dimensions D6-370/HS80AE
Not for installation



VOLVO PENTA

AB Volvo Penta
SE-405 08 Göteborg, Sweden
www.volvopenta.com

3.2 COOLING

Your engine passes seawater (raw water) through an intake in the IPS drive unit under the hull through a heat exchanger where it cools the engine's coolant. This coolant is circulated through the engine and returns to the heat exchanger. For the engine to keep cool, it must have an adequate supply of raw water and coolant. Periodically check to be sure it's clean and check the coolant level by opening the caps on top of the engine. Coolant should be close to the top of the reservoir on top of the front port corner of the engines.

⚠CAUTION Do not attempt to remove the coolant cap of a hot engine.

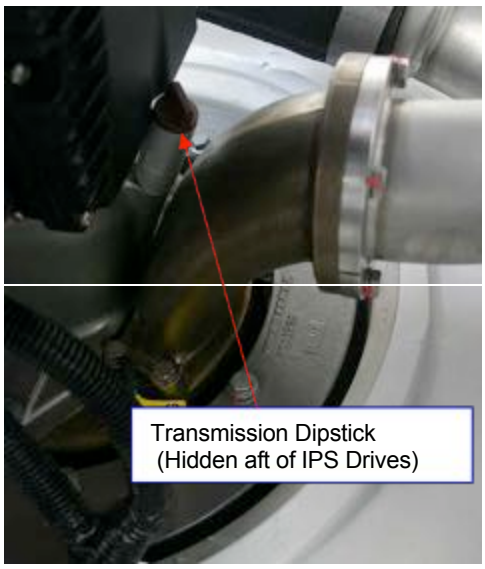
For details on what type of coolant to use, consult the engine operator's manual or the maintenance schedule included in this manual. As the water and exhaust exit out the back of the drives, it is not as easy to check raw water flow. It is recommended to pay close attention to water temperature (167°-194° F is normal) at the outset.

3.3 LUBRICATION (IPS 500 Drive Shown)

Both the engine and transmission use oil for lubrication. The transmission will tend to use less oil than the engine, but both should be checked frequently. For the proper type of oils to use (which may depend on the service area and conditions) consult the engine manufacturer's operator's manual.

The engine oil may be checked between the engines by pulling up the red dipsticks, at least ½ hour after running of the engines to allow the oil to drain down from the upper part of the engine.

The transmission dipstick is red and unscrews. It is difficult to find and reach as one must get down between engines aft, move aft then reach behind the IPS drives to unscrew these caps. A small price to pay perhaps for the wonders of how well the IPS operates.



⚠CAUTION Be sure not to overfill this reservoir as damage to the engine could result.

3.4 CORROSION PROTECTION

Read page 79 and pages 89-91 of the Volvo Operators Manual (VOM) carefully. In addition to transom zincs, there are two engine zincs plus an iron anode in the exhaust cavity of the drive and care must be taken of the drive housing and coating of the propulsion unit. The props and propulsion unit have "PropSpeed" applied when delivered. Be sure to inspect and recoat if there are any scratches or whenever the boat is hauled. The timing for replacing zincs varies depending on the characteristics of the seawater, the amount of electrical current in marinas, or could indicate (if excessive wear is noted) an electrical short on the boat, etc. Inspect the engine zinc periodically at the time of oil changes and remove the corroded area on the surface, replacing them when deteriorated to less than 50% of original size. Otherwise corrosion-cooling system will occur and water leakage or parts breakage will result. Be sure to close the raw water intakes at the base of drives, before removing a plug to replace a zinc.

3.5 AIR INTAKES

Diesel engines use a large quantity of air for combustion. The engine of the 40z gets this air thru grills under the cockpit coaming, both port and starboard. Be sure that these aren't blocked with gear on deck when underway.

3.6 ENGINE CONTROL/DISPLAY PANEL

The EVC Control Panel allows the operator to perform settings and choose information displayed on the engine LCD Display screen below. See Volvo Operator's Manual for settings and options.

3.7 ENGINE CONTROL LEVERS

There 5 positions (front to back). FORWARD
IDLE FORWARD
NEUTRAL
IDLE REVERSE
REVERSE

The port and starboard engine RPMs will synchronize automatically when within 200 RPM of each other.

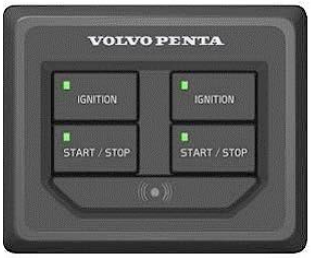
Emergency Shifting If a fault occurs which prevents electronic gear shifting with the control levers; it is possible to shift manually using the procedure outlined on page 56-57 of the VPOM.

⚠CAUTION **SUDDEN MOVEMENT HAZARD**

This control lever governs both throttle and shifting functions. The boat may start to move abruptly when the marine gear is engaged: Ensure the boat is clear of all obstacles forward and aft. Cautiously shift to the IDLE FORWARD position then quickly back to NEUTRAL position. Observe whether the boat moves as you expect.

Before starting the engine, make sure (1) the raw water intake seacock over the IPS drive flange is in the OPEN position (2) the raw water strainer is clean (3) the engine has sufficient oil and coolant (4) transmission fluid is at the proper level (5) there are no restrictions to the air intake grills (6) the fuel valves over the tanks are OPEN (8) the HOUSE and BOTH ENGINE battery banks are turned ON (9) the throttle is in the neutral position (9) no one is in the water near the boat and (10) all machinery space hatches are closed.

3.8 STARTING



TURN ON ENGINES Push IGNITION button then wait until the Engine data appears on the control screen.

A long continuous beep indicates that the self-test function has failed.

START ENGINES by pushing the START/STOP button. Note: If you can't hear the engines (These are quiet boats), look at the RPM on the display to see that it climbs to 600-700. The engine will not start unless the shift levers are in NEUTRAL.

Never engage the starter motor while the engine is running. This may damage the pinion and/or ring gear.

⚠CAUTION IF BATTERY VOLTAGE is low and you have difficulty turning over the engine, a momentary. Parallel Switch is located next to two Engine Start Battery Switches on the electrical panel belowdecks. By pushing this switch on, you add the capacity of the house bank to the start battery. Once started, turn OFF the Parallel Switch. It is for emergency use only.

TO REV THE ENGINES out of gear. See Volvo Penta Owner Manual.

3.9 ALARM DISPLAY

When the ignition key is first turned ON to position **I**, you may hear an audible alarm signal and see a "Stop Sign" appear on the Display, indicating that the diagnostic function has registered a malfunction.

Please refer to Volvo Operator's Manual chapters for detailed information about FAULTS and recommended action starting on page 40 of the VPOM.

3.10 STOPPING

Put both engine controls in NEUTRAL. Turn & hold the spring-loaded Ignition Key with pressure to the left until the engine stops. If unsuccessful, there's a clearly labeled "Emergency Shutdown" button in the upper middle poside of the engine.

Make sure to turn OFF Engine Battery Switches on the electrical panel when leaving the boat.

Engine Stop & Restart after Crash-Stop If the engine otherwise stops, the following procedure for re-start must be followed.

1. Put control lever in NEUTRAL
2. Acknowledge any ALARM
3. TURN & HOLD ignition switch left to OFF until all lamps have gone out.
4. Then TURN the ignition system to the ON (not the engine Start) position only.
5. Acknowledge any ALARM
6. START the engine by: TURNING & HOLDING the ignition switch to the right.
7. STOP the engine. Wait again until all lamps have gone out.
8. RESTART the Engine.

3.11 OPERATING PARAMETERS

While it's good to run the engine at top speed periodically for a minute or so, "Max Cruising Speed" is at least 10% below full throttle of 3500 rpm, or 3150 rpm.. While running, pay attention to the engine gauges on the LCD display. A significant change in oil or coolant temperature, oil pressure, or voltage should investigated immediately before the engine is damaged.

OIL PRESSURE – Normally between 4.5 and 5 bars, except lower when idling

COOLANT TEMPERATURE – Normally between 167 and 194 degrees F.

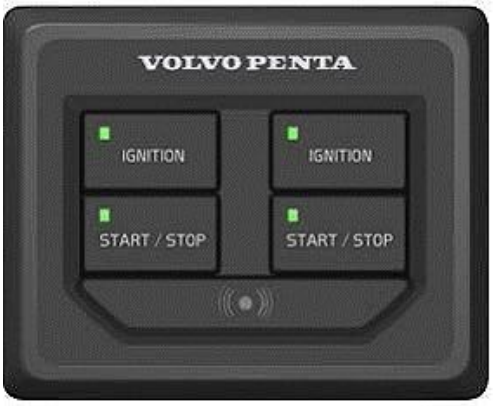
CHARGING – Normally about 14 Volts when underway.

Depending on hull structure and engine installation, engine and hull resonance may be greater at some speeds than others. This is normal and you will learn to pick the sweet spots. If you hear any abnormal sounds, stop the engine and inspect.

⚠ WARNING If any warning lights or buzzers activate, stop the engine immediately. Determine the cause and repair the problem before continuing to operate.

ELECTRONIC CONTROL ISSUES – KEYLESS IGNITION & JOYSTICKS

Recently, there were two IPS Joystick and DPS malfunction incidents on 40z's: ZING #25 here in Newport and on BATEAU RELAXEAU #30 in Maine. Here are the lessons you can learn.



1) KEYLESS IGNITION SHUTDOWN SEQUENCE

I am guilty of this, because it seems one saves a step by pushing the Engine STOP button to shutdown the engines and then going below to push Engine Battery switches OFF. WRONG!

To STOP the engines, press START/STOP buttons. Then press the "IGNITION" button to turn the panel OFF causing its light to go out . The engine control system needs to be SHUT DOWN before the power source is removed by turning off the battery switches. This will shut down the system properly, and should prevent confusing the software of the Joystick or Dynamic Positioning System (DPS).

2) REBOOT!

This can solve any number of mysterious engine control issues. Electronic engine controls are not much different than your computer, iPhone or other electronic devices. 90% of the problems are probably caused by an unusual switching sequence (e.g. *random, unanticipated operator button pushing*) and can be rectified by a "reboot". After pushing STOP to shutdown the engines: Turn the Engine Ignition Panel Switches OFF. Then, go below to turn the Engine Battery switches OFF. Be sure the Engine Emergency Parallel (EEP) battery combiner switch is OFF. Also, turn the house battery switch OFF. In other words, shut down the entire boat.

Wait at least 10 seconds for the system to sort itself out (*My printer and router called for 25 seconds*). Then turn House and Engine Battery switches ON… but not the EPP Parallel. Go on deck. Turn Ignition switches ON next to the helm. WAIT until the engine display is showing data numbers and has gone through it's initial warm up. Then START the engines and check the Joystick Control functions (IPS & DPS).

3) USE BATTERY COMBINERS TO OVERCOME LOW VOLTAGE

Upon turning ON the engine ignition switches next to the helm. Check the voltage on each engine. In the case of #30, the Port Engine had only 10 volts instead of 12.5 volts. This creates alarms, particularly when trying to start it, because Volvo Penta electronics don't function below 10 Volts. The starter, when activated, draws lots of current and will pull down the voltage even lower and won't start.

You might think that it's a simple matter of turning on the EEP switch (that combines the two engine batteries) between the Engine Battery switches. And, it would be if there were only a small voltage differential reading on the engine displays. But in this case, with the port engine battery as low as 10 volts, combing them gets to a an inadequate 11 volts.

Fear not! There are 3 other ways to get going again in the above extreme case. In each method below, start with House and Engine battery switches OFF and the EEP Switch OFF. Then after turning the House Battery Switch ON:

A. Boost the port engine battery with the starboard engine alternator & battery.

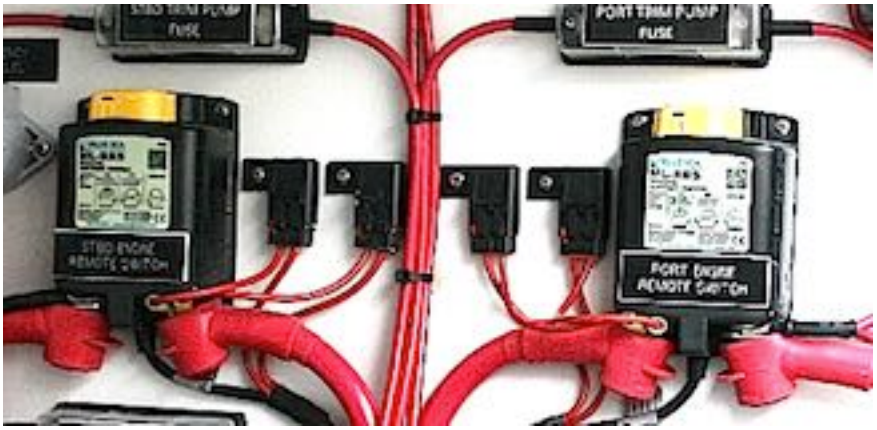
Turn the Starboard Engine battery switch ON (Not the Port Engine or EEP switch). Up on deck, turn the Starboard Engine ignition switch ON. Wait until the engine display shows data. Then START the Starboard Engine. With that alternator now charging batteries as evidenced by voltage climbing, go belowdecks and first push the EEP switch ON. Then turn the Port Engine Battery Switch ON. Then up on deck, turn the Port Engine Ignition Switch ON. Check to see that the voltage on each engine display is reading above 12 volts and climbing. If so, START the Port Engine.

B. Charge with the Genset

Turn the Genset ON and be sure it's showing a charge by rising voltage over the House DC Panel. Turn the EEP switch ON. Turn both Engine Battery switches ON. Turn Engine Ignition switches ON. Insure good voltage readings on the Engine Data Displays. Start engines. With the engines now charging through alternators, you can shutdown the Generator.

C. Combine the House Battery with the Port Engine Battery

On recent boats (see below) use the yellow rotating knob with a push button center labelled "Port Engine Remote (PER) Switch" on top of a small black box. On the 40z for example it is located on the starboard bulkhead inside the systems compartment under the pilothouse hatch. See below.



Starting with all ignition and battery switches OFF again. Turn the House Battery and Engine Battery switches ON (not the EEP switch). Then go into the central pilothouse hatch and push the yellow button on top of the PER switch down until it clicks in place. Proceed with turning the Engine Ignition switches ON. Check for equal, good voltage on the Engine Displays. START the engines.

WARNING: The above procedures may get you going for a short run, but don't be complacent about it. Too much on the boat depends on both batteries functioning properly. Lower voltage in one engine start battery than the other indicates a problem with the charging system or a bad battery. Monitor closely and rectify immediately if the problem persists.

CHAPTER 4 STEERING CONTROL SYSTEM

4.1 STEERING SYSTEM

The 40z has an integrated, electronically controlled power steering system which through electric motors rotate the two IPS pod drives below the hull. When running, the 40z is steered as with outboards or sterndrives. Thrust of the propellers is directed more immediately and precisely from side to side through a 26° arc to steer the boat.... rather than bouncing the prop wash from a conventional straight shaft propulsion unit off a rudder.

When the throttle/shift levers are put in (N) neutral and a button pushed to activate the IPS joystick: Control of the pod drives is transferred from the throttle/shift levers to the IPS computer controlled joystick. When the joystick is activated, the steering wheel locks and no longer functions. Do not try to force it or damage may occur.

Emergency Alignment If a fault occurs which prevents one or both of the propulsion units from being operated with the steering wheel, it is possible to align the faulty propulsion unit(s) so that its aimed straight ahead (and won't act like a rudder), so as not to impair operation of either the remaining propulsion unit or the steering of the boat with the two engines. See pages 58-60 of the VPOM.

Emergency Steering These controls are attached to the engine with cables, so if the electronic steering ever failed on both propulsion units, a steering method using the two engines can be employed. This is outlined on pages 60-61 of the VPOM.

4.2 IPS JOYSTICK DOCKING CONTROL

This control is used only for docking and maneuvering at slow speed. Learn to handle the joystick in a safe and correct manner before you start using the function in tight quarters. When the joystick is active, the normal engine controls are Neutral and inactive. A computer operates the drives and shifting. Rotation of the wheel is frozen and it should not be turned, as damage may occur.

To **Activate**: Both engines must be running and the engine control handles must be IN NEUTRAL. Press "DOCKING" button. A beep confirms it is active.

To **Deactivate**: Either move the engine controls OUT OF NEUTRAL (forward or reverse) or press "DOCKING" button again. A double beep will confirm that it is OFF.

Boost Function In windy weather or current when you need more oomph, push the right **"HIGH"** button after having frst activated the "Docking" button. A beep will confirm it's engaged. Deactivate by pushing the button again. You'll hear a double-beep confirmation.

DPS - "DYNAMIC POSITIONING SYSTEM" OPTION. If the boat is equipped with this option to hold the boat on it's heading and GPS position, it is activated by pushing the upper left button and deactivated by pushing it again, or simply engaging the engine controls.

Maneuvering with Joystick Follow the arrows. Lean the joystick post in the direction you'd like to go. Release and the thrust stops. The boat may keep moving, so you may have to tap it in the opposite direction to stop it. The top of the joystick is rotated to orient the bow and stern, or to

spin the boat completely around on its own axis. Pretty simple Takes some practice until it becomes completely intuitive.

Joystick Calibration When moving the boat sideways if it seems that the bow or stern moves more than the other see page 109 of the Volvo Penta Operator's Manual to make adjustments.

4.3 HELM STATION NOTE: Panel Layout may vary between boats.

The helm station console is where most of the operational controls of the boat are located. Become familiar with these before you need to use them. In addition, make sure that when you are using the boat, even if you are not using a specific piece of equipment, that the circuit breakers are on for any equipment you *might* need.

4.4 CONSOLE SWITCH PANEL

With the exception of the Anchor Washdown which is activated along with the “Windlass” breaker (and must have the “Water Pressure” switch ON as does the washer function of the “Wiper” switch) functions of this panel on the console are activated by turning on their respective breaker switches on the DC Electrical Panel in the main saloon.

Functions of the panel rocker switches are described below the corresponding switch:

Press to Sound HORN	AUTO HORN FWD Underway 1 Blast AFT at Anchor 2 Blasts	NAV LTS FWD Underway AFT At Anchor	WIPERS WASHERS Read Instr Booklet.	Press when Wash Rode, Chain & Anchor with Fresh Water

4.5 TRIM TAB SYSTEM

The trim tab breaker on the DC panel must be ON for the unit to work. The arc series of lights, on either side of the LectroTab panel are wired to show what the tabs are doing under the boat. Push BOW DOWN STBD, you’ll see the lights to port appear. The port tab is going down to lift the aft port side of the boat to make the starboard bow lean down.

Normally tabs are adjusted simultaneously with 2 fingers.

Trim tabs aren’t necessary at low speeds or high speeds other than for wind compensation.

At speeds over 8 knots, trim tabs allow you to trim the boat from side to side to compensate for crew location, gear placement or to counteract wind pressure. The boat leans into the breeze. They are useful in lowering the bow for better visibility or for powering into waves without pounding. Don’t hesitate to apply maximum tabs in the 15-22 knot range. At higher speeds in smooth water,when the boat naturally runs flatter or when running downsea into the back of waves, it’s advisable to raise the trim tabs for dry running and control, allowing the bow to lift.

⚠ WARNING The 40z with IPS drives has 48”x12” of trim tabs on each side of the transom. This is a lot of tab area, installed to make it possible to lower the bow going into larger seas in the 10-20 knot range. Applying trim tabs unevenly at speeds over 20 knots under certain conditions

could cause the boat to attempt to roll over, particularly in a turn, due to the angle of IPS drives under the hull. Caution is advised.

4.6 AUTOPILOT p70r

The Navigtion Electronics breaker on the DC panel must be ON for the autopilot to function. Check the autopilot display and note the rudder angle indicator which helps in maneuvering the boat.

When the compass heading is displayed on the autopilot it is operational and can be activated by pushing AUTO. The boat will then maintain the displayed heading. Turn the knob for incremental course changes.

The Autopilot has been calibrated specifically for 40z operation. If you notice “hunting” rather than steady course keeping, see the Raymarine Manual to check Configuration parameters applied to your device or Contact Erik Rochelle at Boston BoatWorks

4.7 WINDSHIELD OPERATION

While the triple windshield design creates individual windows that are smaller than those on the 34z, some owners have found that a stick with a rubber can tip is a handy way to push the windows out and assist in lowering them, without having to stretch over the console.

We have investigated various electric options but have been unable to find any system that wasn’t ungainly, unsightly, tight, or unable to fully raise the windows for the open “flybridge” effect for good ventilation or perfect visibility at night or in fog. To travel at 14-15 knots without being blasted by the wind. Simply move slightly toward the centerline of the boat rather than directly behind the wheel to get out of the wind flow.

WINDSHIELD WIPERS The 40z is fitted with three windshield wipers. To activate the function, turn ON the breaker labeled “Wipers” on the DC Panel and also be sure that the “Fresh Water Pump” breaker is ON for the washer function to operate.

To operate all 3 wipers at once, momentarily push the rocker switch slightly forward to the first detente. To operate just the starboard wiper, push the rocker switch, all the way forward.

To change the wiper speed: While either all 3 or just the starboard wiper is operating, quick push the rocker switch all the way forward. Each quick push changes the speed.

To operate the wash function for either all 3 wipers or just the starboard washer, PUSH and HOLD the rocker switch all the way forward until water jets appear.

CHAPTER 4

⚠ CAUTION If the wiper's washer system is to be used in sub-freezing temperatures, a separate system must be installed which utilizes anti-freeze.

4.8 SPOTLIGHT

The spotlight is mounted properly on the bowrail where reflection off the foredeck and stainless fittings is eliminated. To activate, the "searchlight" breaker on the DC panel must be ON and the "S" for spot or "F" for floodlight must be depressed. The center button with the arrows controls the direction. If "SOS" is pressed, a series of dots and dashes will be emitted, signaling, "Emergency, I need help". The double-ended arrow in the upper right is a very handy sweep function. The spot will swing about 30 degrees, back and forth, picking up objects that might otherwise not have been seen.

4.9 HELM POSITION TEAK RISER (Option)

This removable teak & thiokol (to match teak decking) riser raises the level of the helm station sole by 4" to improve visibility over the bow for anyone under 5'6" tall.

This nicely crafted piece of teak simply lifts out and may be stored in one of the pilothouse settee lockers when not in use.

5.0 OPTIONAL DOCKING LIGHTS ("Headlights")

The "BOW LIGHT" switch must be ON on the 12v DC Panel and the switch marked "DOCKING LIGHTS" must be ON. These lights do a good job of supplementing the spot light (even in sweep mode) to light up lobster pots at night, moored boats in a harbor and either shore of the Intracoastal. Like blinking your car lights at a friend, they also serve that function even in daylight when approaching another boat. A way to say "hello".

CHAPTER 5 FUEL SYSTEM

5.0 GENERAL

It is important to understand the fuel system aboard your boat. Diesel fuel is different than gasoline. In most respects it is safer, however precautions need to be taken to maintain the safety of your boat. Please study the safety precautions in the NMMA publication “Sportfish, Cruisers, Yachts – Owner’s Manual.”

Diesel engines need to intake more fuel than they burn, and so they differ from gasoline engines in that they return excess fuel to the tank. Both feed & return of port and starboard engines are to their respective 175-gallon fuel tanks. The two fuel tanks are connected at the bottom by a “compensating” fuel line with isolating shut-off valves at both aft inboard corners.

5.1 FUEL SHUT-OFF VALVES

These valves are located on top of the fuel tanks aft and are accessed through pilothouse seat lockers. In the photos below they are shown in the open position, parallel with the fuel lines.

⚠CAUTION These valves should be shut down if inspecting a Racor filter, in an emergency or in case of a fire in the engine compartment.

STARBOARD TANK showing fuel shut-off and top of fuel level sensor (right center)

PORT TANK showing fuel shut-off for port engine and generator (center hose).

5.2 FILLING THE TANKS

Deck fills are mounted on the side decks, port & starboard, and are labeled “DIESEL.” Each one services only its respective tank, although with the connecting fuel line valve open, you will get some transfer to the opposite tank. As the tank is filled, vapor escapes the tank thru the vent. Overflow is prevented by an in-line fuel/air separator that will not allow fuel to pass.

⚠CAUTION should be taken while filling. Check the fuel level gauges and listen for the rise in pitch at the deck fill, as fuel reaches the top. Shut off the nozzle immediately. *Do not attempt* to “top off” the tanks. Have an absorbent cloth handy to prevent any overboard spillage. Variations in temperature as well as trim angle could cause overflow or vent-line blockage.

5.3 RACOR PRIMARY FUEL FILTERS

Racor Filters are your first line of defense against bad fuel and are installed just after the shut-off valves in the fuel lines, inside the Systems Room, on either side bulkhead just forward of the generator. Check these filters regularly for any accumulation of water or contamination. Water will appear as a dirty gray, cloudy substance in the clear bowl. You should be able to see thru the pink fuel in the bowl at all times. Also, you should not see bubbles passing through the filter while running. This would indicate a leak on the suction side of the fuel system.

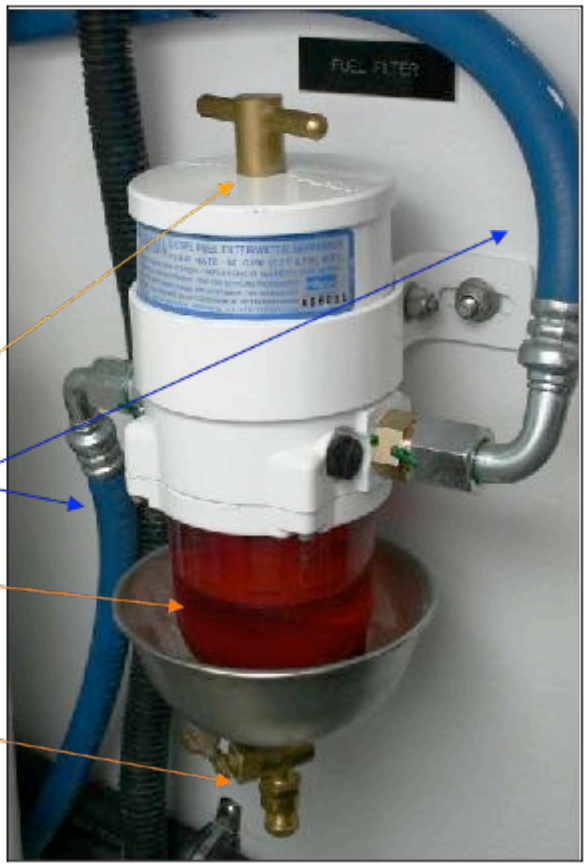
RACOR FUEL FILTERS Starboard and Port in Systems Room under the Pilothouse

FILTER ACCESS LID – Be sure to close fuel shut-off valve before opening. Be careful to seal properly without pinching gasket.

FUEL LINES from tank and to engine

CLEAR GLASS INSPECTION BOWL

WATER DRAIN PETCOCK – If water seen in bowl, hold a paper cup under the petcock and drain until clear fuel seen.



5.4 FUEL CONSUMPTION

You can learn several things from the chart below prepared from 3 separate runs in Jan-Feb 2009 in Boston Harbor, near Captiva Fl, and during the Miami Boatshow. Volvo-Penta technicians conducted two of the runs.

Displacement (Boat Weight) Assuming similar hull designs, fuel efficiency is a function power: weight ratios. Less weight equals less fuel for a given HP and we're sure to see a difference between IPS pod drives and sterndrives. Test runs were done on 40z #1 powered with an IPS 500 propulsion system consisting of twin D6 370 HP diesel engines. Each run was at approximately 21,000 lbs. displacement. Dry and empty scale weight of the boat was 16,000 lbs. The 21,000 lbs. included at least ¾ full tankage and approximately 1400 lbs. of cruising gear and 2-4 people.

Propulsion Systems. The NMPG and Range numbers will also vary depending on engines installed and the relative efficiency of the propulsion unit. It's anticipated that the standard sterndrives and/or lighter Volvo D4 or the Cummins QSD4.2 engines will improve the efficiency by a tenth or two from those shown below.

Range of Efficient Operation It's interesting to note that it doesn't particularly matter whether you are going 9 knots or 27 knots on a 40z, nautical miles per gallon remain fairly constant.

Cruising Speed Volvo Penta suggest that given suitable conditions, 10% below wide open throttle, or about 3200 RPM at 30 knots is an optimum cruising speed. The data below would indicate that 2900-3000 RPM in the 28-knot range would be a more efficient range.

Sour Spot The 40z seems to have a huge "Sweet Spot" and just one small "Sour Spot" to avoid at about 1600-1700 rpm where the most power is applied in overcoming resistance prior to the boat jumping up on a plane at just over 10 knots. You can see that the boat is no more efficient at that point than at 30 knots.

Acceleration Tests Volvo technicians commented, "This is a Ferrari!" as I mashed the throttles forward to hit 20 knots in 5.3 seconds from a standstill. No wonder, that's on a par with some "thunder" boats and about what it takes a Mercedes SL550 to hit 60 mph (52 knots).

	FUEL EFFICIENCY			RANGE	ACCELERATION (secs)		
RPM	GPH	KTS	NMPG	NMrng*	0-10	0-20	0-30
600	0.6	4.8	7.6	2392			
1000	2.3	6.7	3.0	937			
1200	3.5	7.6	2.2	684			
1300	3.9	8.0	2.1	646			
1400	4.7	8.2	1.8	555			
1500	6.8	9.3	1.4	428			
1600	7.8	9.5	1.2	384			
1700	9.5	10.0	1.1	333	2.5		
1800	9.7	13.1	1.4	425			
1900	10.6	14.3	1.3	425			
2000	12.7	15.1	1.2	374			
2200	14.8	17.9	1.2	380			
2400	17.6	20.9	1.2	374		5.3	
2600	20.5	24.0	1.2	370			
2800	22.9	26.9	1.2	370			
3000	26.4	30.0	1.1	357			9.5
3200	30.5	32.8	1.1	339			
3400	35.7	36.1	1.0	319			
3500	38.5	37.7	1.0	308			

⚠ CAUTION Remember that fuel level readings when underway, with the fuel pushing back in the tank where the fuel level sensor is located, could be reading ¼ tank more than what's really there. So, when you get down to 1/3 tank, it's time to top off.... not roll the dice on finding another fuel dock open later in the day.

MJM FUEL CONSUMPTION LOG

DATE	LOCATION	ENG HRS	HRS since LAST FILL	GALS to FILL	GPH	COMMENTS

CHAPTER 6 ELECTRICAL SYSTEM

6.0 GENERAL

The 40z's electrical system may be more advanced than what you are accustomed to. It combines DC and AC power in several ways.

Most of the electrical components on your boat use DC power. 12 volt DC power is stored in two 8D House Batteries and two 31G Start Batteries, totaling 700 Ampere Hours of capacity. This battery capacity is replenished in 3 ways :(1) Alternator output from the engines when running (2) From 110V 60cyle AC shorepower through the Mastervolt Charger or (3) From the Northern Lights Generator which outputs 110V 60-cycle power to the charger.

120-volt AC power, typically found in homes, is supplied to the boat in 3 ways: (1) via 1 or 2 shore-power cords plugged into a shoreside receptacle (2) by an optional generator or (3) by inverting DC power from a battery into AC power through the Mastervolt Inverter. The AC components aboard your boat include the refrigerator/freezer, cooktop, microwave, some TV components, the air-conditioning, water heater, inverter, and receptacles (plug in AC equipment).

⚠ DANGER Both AC and DC electrical power sources are potentially dangerous. Do not attempt to work on any part of your boat's electrical system if you are not a qualified marine electrician.

6.1 ELECTRICAL PANELS

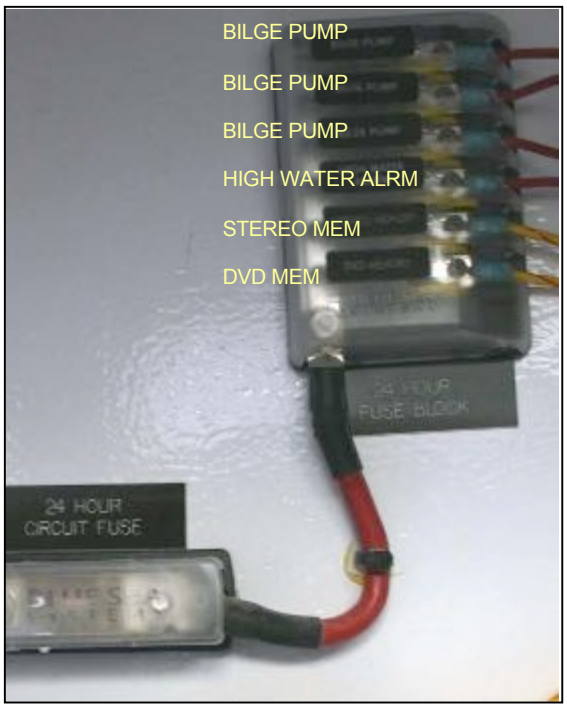
There are two battery banks on your boat. The house bank consists of (2) 245Ah, absorbed-glass mat (D8 AGM) batteries. The engine bank consists of two 105Ah Group 31 AGM start batteries which are also used to run the windlass. Whenever a charging source is present (either from the battery charger or an engine-driven alternator) *both* banks are automatically charged. AGM batteries are essentially no-maintenance.

⚠ CAUTION *Do not attempt to open the batteries*. Other than keeping them properly charged, stored, and clean (especially between the terminals), there is virtually nothing you need to do to them. The battery charger is factory set specifically for AGMs.

If the engine is not running, the batteries can be charged via the battery charger, which is powered by AC electricity either from your generator or shore-power. It is important to read and understand the inverter/charger manual to be sure that the unit is functioning as you expect.

⚠ CAUTION Never allow your DC system's voltage to fall below 11.2 volts. Sensitive electronics may fail to function. For this reason, it is advisable when leaving the boat to turn off all loads, turn off their respective circuit breakers, and turn off the main DC battery switches and turn off the inverter.

24 Hour Circuits The only load that remains on when the battery switches are in the OFF position are the "24 Hour" circuits (shown at right) which by-pass the panel circuit breakers and are connected directly to the batteries.



DC Breaker Panel This custom MJM panel includes s digital readout that will show voltage and amperage drain on top. The main house battery and genset breaker switches are in the upper right.

The breaker switches for all the 12v DC equipment on the boat are clearly labeled and some spares are available for later installations.

AC Breaker Panels The main AC Engine battery breakers are located at the top right over AC Panel #2.

AC Panel 1 (left half) includes breakers for those items which can be handled by the Mastervolt Inverter. To use the inverter, (1) the house battery selector switch must be ON (2) the inverter breaker on the AC panel must be ON as well as the Inverter switched to ON on the Victron panel. (Turn off the Charger on the Victron panel when using the Inverter.

When the Shore 1 shore-power cable is attached turn OFF the Inverter on the Mastervolt panel and turn ON the Charger. Then turn ON the Shore 1 breaker so Shore 1 will supply AC power to equipment on AC Panel #1…and with the Transfer Switch ON..also to AC Panel #2,
.

AC Panel Shore 2 (right) is designed for those items having too much load for the batteries and inverter, thus requiring either shorepower or the generator to supply AC power. The high amperage water heater and air-conditioning systems are best supplied with a shorepower cord to inlet #2 which bypasses the inverter and goes right to AC Panel #2.

The AC **Transfer** switch allows either Shore 1 or generator to power the AC Panel #2 circuits. If this function is utilized, be aware that using too many AC appliances at once will cause a shorepower breaker to blow.

Fresh Water Tank Level… This is shown in the lower right and is activated when the fresh water DC breaker is ON. Otherwise, you may think you have run the tank dry!

Charging The HOUSE battery switch can be switched OFF when the boat is not used, and the batteries will still accept a charge from 110V Shorepower through the battery charger. Leave "Inverter/Charger" breaker ON on AC Panel 1.

⚠CAUTION

Disconnecting shore power with INVERT left ON will cause discharge of the house battery bank.

6.2 AC SHOREPOWER

The first of three ways to supply AC power to boat appliances/systems is through Shorepower #1 (plugged in) and #2 30A 125V connections in the transom. These are shown at right, along with a TV Cable hook-up socket. The cover lid springs back open by pushing sharply in at the bottom,

If two 30A 125V sockets are not available on the dock, very often you will find a 50A 225V socket to which you can connect a "Y" pigtail (West Marine 410373).

If you overload, an AC circuit, one of the two breakers may activate. To reset, locate the shorepower breaker box (shown at right) outboard under the port cockpit hatch cover and be sure both switches are in the UP position.

Hot Water Source If a second shore-power receptacle is not available and you have not operated the boat recently; there won't be any hot water from the engine's heat exchanger. Simply turn ON the Transfer switch of Shore 2, flick the hot water breaker on, wait 15 minutes and your shower will be ready. The above method can also be used to power the Air Conditioners, but beware that it will be more likely to overload the system if you are trying to use Air Conditioners and Hot Water at the same time.

6.3 AC GENERATOR (Option) See Northern Lights M673L3 6 KW 60 Hz 1800 RPM Generator Operating Manual.

NOTICE! RUN YOUR GENSET You've heard that diesels like to be run. Don't be concerned about engines that have been maintained and have good hours on them…worse are engines with too few hours. Your Genset is no exception. Having to deal with refurbished injectors, water-pump replacements, cooling-system rehabs and new hoses, etc. can be costly, if you don't run It enough. Ideally, run it for at least 20 minutes with a good load (air conditioning systems and/or a Seakeeper are good examples) every time you take your boat out. The list of evils predicted for an underemployed genset is frightening. Salt-laden air can corrode the windings of the generator unit itself and sneak into the cylinders of the engine, bringing rust to cylinder walls and piston rings. Salt-laden moisture can build up in the oil, creating all kinds of acidic havoc. And fuel may turn to shellac or gum in or around the injectors. Lesson here is USE YOUR GENERATOR!

Break-In Period Change engine oil and filter at 50 hours and again at 100 hours. Oil consumption is greater until piston rings are seated. Maintain at least a 75% load on the generator for the first 100 hours, varying the load to help seat the rings.

Pre-Start Checks Refer to diagrams of genset on next page.

(1) Check coolant is 1" below filler cap
(2) Check oil at dipstick
(3) Open fuel line lever over fuel tank.
(4) Close the raw water seacock, check & clean sea strainer & reopen the seacock
(5) Be sure that the AC Circuit Breaker and AVR Circuit Breaker are both in the "Up" position
(5) Turn ON battery switch for Generator. Keep ON while running, otherwise, the battery-charging regulator could die.
(6) Turn OFF all AC Panel 1&2 switches/breakers, including Generator double-handled switch on top of AC Panels 1. You don't want to start the generator with any load.
(7) Turn OFF the Inverter Function on the Mastervolt MICC Panel.

PREHEAT: On the Northern Lights Generator Control Panel on the face of the piloting console Depress PREHEAT and hold for 4-10 seconds To activate the control system.

START: Then, depress START switch while continuing to depress PREHEAT switch. When generator starts, release both switches. Do not crank for more than 20 seconds at a time. Allow the generator to run for about 15 seconds until LED green light appears next to double-switch "Generator" on AC 1 Panel indicating that the panel is receiving electric current.

Then:
(1) Turn ON double Generator Selector switch and
(2) Turn ON Charger/Inverter Breaker on AC Panel 1. There is a delay until Volts (about 115) register in the digital display over AC-1.
(3) Turn ON the double-transfer switch for AC Panel 2.

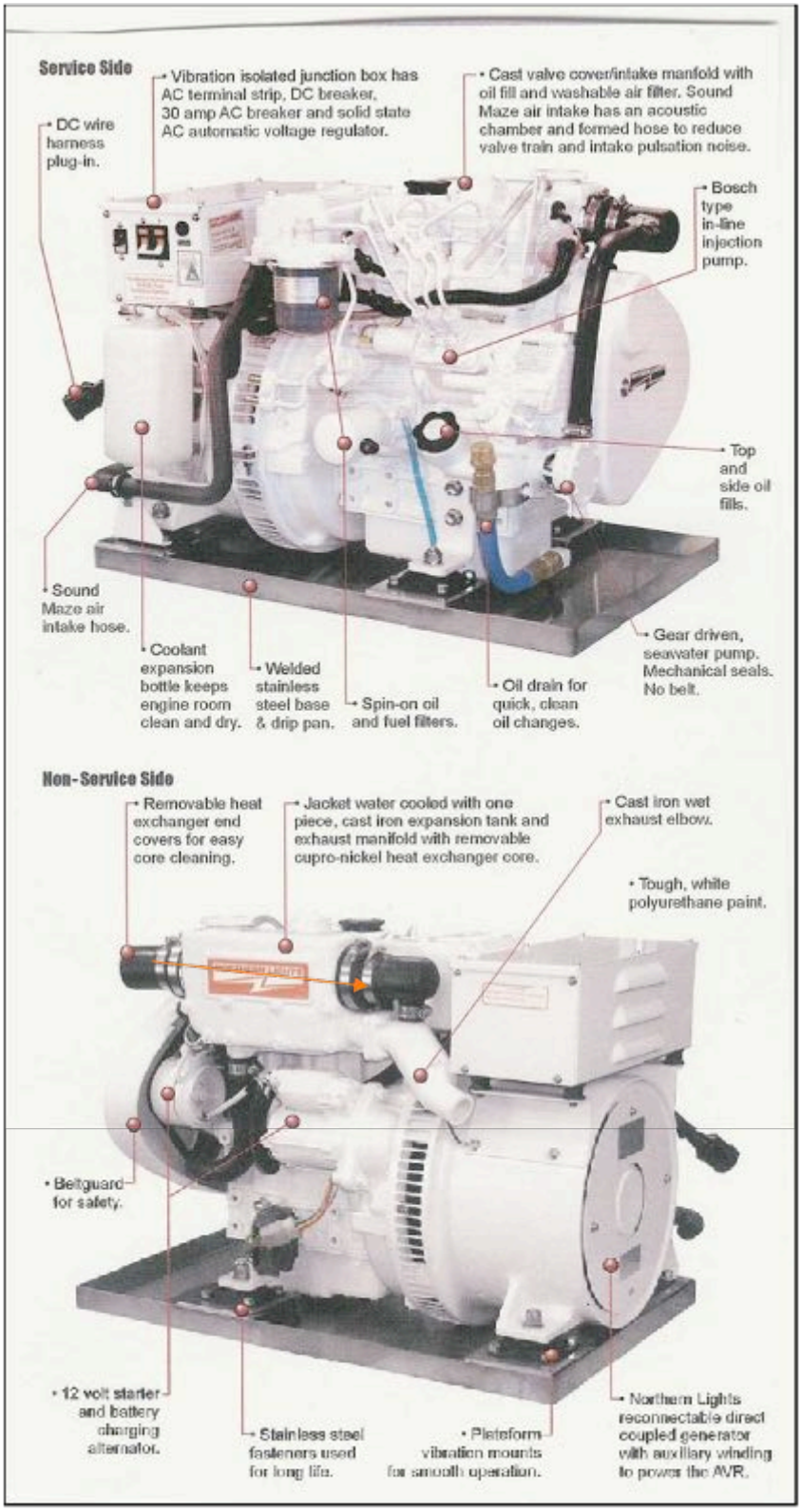
Check to see that AC volts are now reading on the digital meter over AC Panel 2 by throwing the toggle switch between the digital displays to “Shore 2”.

TURN BREAKERS ON for the items you wish to operate.

Note: if the generator starts, but no AC voltage is seen at the panel, check first that the selector switches (sliding interlocks) at the top of the AC panel are ON. If so, there is a possibility the generator was overloaded and the AC breaker on the generator Control Box has tripped due to a momentary overload. Open the generator cover and reset (pull up) the AC Output Circuit Breaker

TO STOP: Remove electrical load from the generator by turning off all breakers. Allow the generator to run for a 3-5 minute cool-down period. Depress STOP momentarily on the lower part of the rocker switch.

Generator Fuel Pre-Filter is located behind the genset against the bulkhead.



GENSET WATER SEPARATOR DISHCHARGE THRU HULL
Located outboard of engine compartment to starboaard

6.4 VICTRON ENERGY AUTOMATIC INVERTER/CHARGER

Under normal circumstances there is no need for adjustment or operation besides switching the toggle ON and OFF. The purpose of the inverter is to convert stored 12v DC energy in the extensive battery banks into 120v AC power to operate those accessories such as the microwave, hotplate, 120v outlets and TV, etc. that have breakers on the 120v Panel

This Victron unit also takes AC power from the 30Amp Shorepower or the Generator to charge both house and engine start battery banks.

The Inverter Control is shown at right.

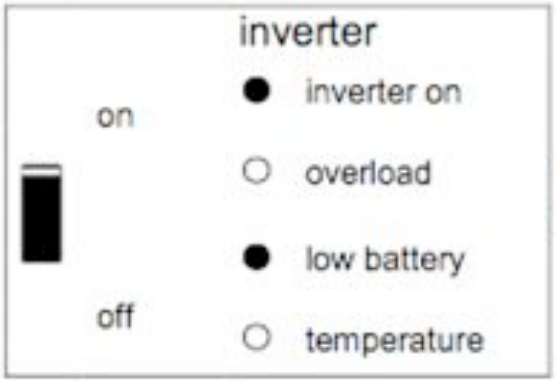
INVERTING To source AC power when no generator or shore-power is available:

(1) Make sure the switch on top of the unit itself over the starboard fuel tank, under the pilothouse settee is ON. See diagram below.

(2) Push the toggle switch on the Multi Control to “on” . AC power should now be supplied to the AC Panel 1, which includes those items which may be run from the inverter alone. The Air Conditioning and Water Heater Breakers can only be run either with the “Transfer” switch or directly from Shorepower 1 inlet or with the Generator.

⚠CAUTION DO NOT LEAVE THE INVERT SWITCH “ON” either o the panel or on top of the unit itself IF YOU ARE NOT INVERTING AS THIS MAY DRAW 10-12 AMPS EVEN IF NO AC DEVICE IS TURNED ON. OR, YOU MAY END UP WITH DEAD BATTERIES (All of them if the Parallel Switch is ON too.)

IN FACT, ALTHOUGH THIS UNIT CLAIMS TO HAVE AN AUTOMATIC SHUT OFF IF THE VOLTAGE GETS LOW TO PROTECT THE BATTERIES, IT’S BEST NOT TO OCUNT ON THAT IF YOU ARE GOING TO LEAVE THE BOAT ON A MOORING OR STORED ON LAND WITHOUT SHORE POWER. TURN OFF THE INVERTER ON THE TOP OF THE UNIT OVER THE FUEL TANK IN THE STARBOARD PILOTHOUSE SETTEE LOCKER.



The inverter has switched off due to low battery voltage.

07106 - Electrical Loads WIP

AC Loads

ON/OFF	Voltage	Unit	Description	Make	Model	Amps/Unit	Total Watts	Usage (%)	Amp Draw	Watts
	Invertable loads									
No	115	1	Microwave/Convection	Sharp	R-820JS	13.00	1495	100%	0.0	0
Yes	115	3	Television	LG	26LN4500	0.33	114	66%	0.7	75
Yes	115	8	GFCI outlets			2.50	2300	15%	3.0	345
No	115	1	Coffee Maker	Keruig	Keruig MINI Plus	11.88	1366	100%	0.0	0
No	115	1	Central Vacuum	Dirt Devil	Dirt Devil CV1500	11.70	1346	100%	0.0	0
No	115	1	Cooktop	Kenyon	Kenyon Lite Touch	20.00	2300	60%	0.0	0
Yes	115	1	Refrigerator - Galley	Isotherm	Isotherm DR 160	9.20	1058	25%	2.3	265
									Total Amp Draw:	6.0
							Total (kW):	**10.0**	**Usage (kW):**	**0.7**

	Non-Invertable loads									
Yes	*115*	1	Battery Charger	Victron	Centaur Charger 12/100	14.40	1656	25%	1.8	414
Yes	*115*	2	A/C Air Handlers*	Marine Air	VTD 16K-HV	13.60	3128	65%	8.8	2033
Yes	*115*	1	A/C Pump - Sea Water	Marine Air	PMA1000	2.20	253	100%	1.1	253
No	*115*	1	Cloths Washer/Dryer	TBD	TBD		0	100%	0.0	0
Yes	*115*	1	Gyro Seawater Pump	Marine Air	PMA500	2.10	242	100%	1.1	242
Yes	*115*	1	Gyro Stabilizer	Seakeeper	Seakeeper 5	17.39	2000	75%	6.5	1500
Yes	*115*	1	Water Heater	Indel	Isotemp Basic 50	6.52	750	50%	1.6	375
									Total Amp Draw:	20.9
							Total (kW)	**6.4**	Total (kW):	**4.8**

* Full Load Amps HEAT (Cool is 10.4 Amps)

6.5 CHARGING

Push the toggle switch to “charge only” on the Multi Control Panel to activate the charger when SHORE POWER is connected or when the GENERATOR is on.

6.6 REVERSE POLARITY ⚠ WARNING

As a safety precaution, your AC panel is fitted with reverse polarity indicators. If an AC supply were wired incorrectly, either aboard your boat or shoreside, a dangerous shock situation could exist. Normally, the reverse polarity lights should not be illuminated. If they are, disconnect that source of power and alert the appropriate person.

6.7 ELECTROLYSIS & GALVANIC CORROSION

Metallic fittings that are exposed to saltwater are subject to electrolysis and galvanic corrosion. To minimize potential damage, your boat is fitted with a sacrificial zinc at the transom. This zinc is connected to the bonding system of your boat. It should be visually inspected whenever possible and replaced when 1/2 of the zinc has been eroded. Pay special attention to its condition when in new waters and marinas, as environmental conditions affect the rate of deterioration. If the zinc erodes rapidly, current meters can be used to assess possible causes and remedies. See the Volvo Penta Operator’s Manual for sacrificial anode location and inspection on the engine as well as the drives.

6.8 BONDING

The bonding system of your boat connects all underwater metallic fittings to the sacrificial zinc and the boat’s negative bus bar. In order for the zinc to protect an underwater part, the connection must be clean and secure. The green wires that make up this system are not normally current carrying.

6.9 ELECTRICAL SAFETY

Please read and understand the important safety precautions included in the included NMMA
publication “Sportfish, Cruisers, Yachts – Owner’s Manual” concerning electrical safety.

6.10 FUSE LOCATIONS & SPECIFICATION (SEE NEXT PAGE)

CHAPTER 7 FRESHWATER SYSTEM

7.0 GENERAL

The 40z incorporates a pressurized freshwater system from either of two sources (1) a single 100-gallon tank under the main saloon sole that supplies a pump which maintains a constant pressure in the system, or (2) a **dock hose inlet** located to port in the cockpit as shown at right. When connected, dock water and pressure is used directly by all outlets in the boat... by passing the freshwater pump and water tank. A check valve keeps the dock water supply from backing up into the boat's water tank and overflowing it.

CAUTION When using the dock water supply, be sure to turn OFF the "fresh water pump" breaker on the 12V DC Panel, otherwise the ship's water pump may win the battle of water pressure and emptying your water tank into the city system.

CAUTION When leaving the boat with the dock water supply hooked up, be sure to turn OFF the dock water faucet. If there's a failure of a fresh water fitting or the pressure regulator, the boat could fill up with water and sink... as there is no limit to the amount of water from the city
source as there is with the boats own water tank.

7.1 FILLING WATER TANK

A deck fill is provided on the starboard side deck near the helm station and is labeled WATER. As the tank is filled, air escapes thru the vent. This tank cannot be filled using the dock hose inlet. The Fresh Water Gauge is located at the bottom of the AC Electrical Panel.

7.2 JOHNSON AQUA JET WPS 10.4 DUO 12V FRESH WATER PUMP

The breaker is located on the 12v DC Panel. When a faucet is turned on or a device such as the head or wipers activated, the pumps run, pressure builds until 0 bar/ 9 psi. At this point, the integrated pressure automatically switch off the first pump. At .8 bar/4 psi the second pump is shut off in the same way. The pumps are equipped with positively checking outlet valves, which ensure that the pressure is maintained after the pumps shut off. When water is demanded (at the faucet, shower etc.) the pressure decreases. After a moderate drop in pressure, the inte-grated pressure switches automatically turns the pumps back on.

If the pump s heard running continually, check that no faucet has been left open. The transom shower is a frequent culprit. If this is not the case, turn off the pump and check the tank is not emptied.

The pump is protected from sediment by an in-line strainer mounted adjacent to the pump. The strainer should be checked periodically and cleaned if necessary.

6.9 FUSE LOCATIONS & SPECIFICATIONS

Item / Fuse Label		Size	Type
Bilge Pump 1	5 amp	AGC	In the Bilge Pump Switch at the Dash
Bilge Pump 2	5 amp	AGC	In the Bilge Pump Switch at the Dash
Bilge Pump 3	5 amp	AGC	In the Bilge Pump Switch at the Dash
Bilge Pump 1	7.5 amp	ATC	Fuse Block next to House Battery 1 (Stbd Settee)
Bilge Pump 2	7.5 amp	ATC	Fuse Block next to House Battery 1 (Stbd Settee)
Bilge Pump 3	7.5 amp	ATC	Fuse Block next to House Battery 1 (Stbd Settee)
Amplifier	40 amp	ATC	Fuse Block next to House Battery 1 (Stbd Settee)
Stereo Memory	15 amp	ATC	Fuse Block next to House Battery 1 (Stbd Settee)
DVD Memory	15 amp	ATC	Fuse Block next to House Battery 1 (Stbd Settee)
Emergency Parallel Supply	15 amp	ATC	Fuse Block next to House Battery 1 (Stbd Settee)
High Water Alarm	20 amp	ATC	Fuse Block next to House Battery 1 (Stbd Settee

Sea Fire Supply	10 amp	AGC	House Bus at the Black Fuse Board (Stbd Settee Hatch)
House Switch Supply	15 amp	AGC	Remote Battery Switch next to House Battery 2 (Port Settee Hatch)
House Remote Supply	5 amp	AGC	Remote Battery Switch next to House Battery 2 (Port Settee Hatch)
Start 1 Switch Supply	15 amp	AGC	Remote Battery Switch next to Start Battery 1 (Stbd Settee Hatch)
Start 1 Remote Supply	10 amp	AGC	Remote Battery Switch next to Start Battery 1 (Stbd Settee Hatch)
Start 2 Switch Supply	15 amp	AGC	Remote Battery Switch next to Start Battery 2 (Stbd Settee Hatch)
Start 2 Remote Supply	10 amp	AGC	Remote Battery Switch next to Start Battery 2 (Stbd Settee Hatch)
Generator Switch Supply	15 amp	AGC	Remote Battery Switch next to Generator Battery (Port Settee Hatch)
Generator Remote Supply	5 amp	AGC	Remote Battery Switch next to Generator Battery (Port Settee Hatch)
Combiner 1 Negative	15 amp	AGC	Battery Combiner next to Air Conditioner Control (Bridge Deck Hatch)
Combiner 2 Negative	15 amp	AGC	Battery Combiner next to Air Conditioner Control (Bridge Deck Hatch)
Engine Room Blower	15 amp	AGC	Behind the dash next to the ignition relay
Engine Room Blower	15 amp	AGC	Behind the dash next to the ignition relay
VacuFlush	3 amp	AGC	Top of the Holding Tank (Port Aft Hatch)
ATC - Plastic Fuse AGC - Glass Fuse			

Item / Fuse Label	Size	Type	Location
Horn Fuse	40 amps	ANL	Port Settee Hatch (next to the horn compressor)
Main Panel Fuse	100 amps	ANL	Stbd Settee Hatch (fuse board)
Start Battery 1 Fuse	200 amps	ANL	Stbd Settee Hatch (behind start battery)
House Battery 1 Fuse	200 amps	ANL	Stbd Settee Hatch (next to the house battery)
Start Battery 2 Fuse	200 amps	ANL	Stbd Settee Hatch (behind start battery)
House Battery 2 Fuse	200 amps	ANL	Port Settee Hatch (next to the house battery)
House Bank Fuse	250 amps	ANL	Port Settee Hatch (next to the house battery)
House Parallel Fuse	250 amps	ANL	Bridge Deck Hatch (fwd wall off the hatch)
Inverter Charger Fuse	250 amps	ANL	Stbd Settee Hatch (fuse board)
Inverter Fuse	250 amps	ANL	Stbd Settee Hatch (next to the house battery)
Inverter Charger Fuse	250 amps	ANL	Stbd Settee Hatch (fuse board)
Inverter Fuse	250 amps	ANL	Stbd Settee Hatch (next to the house battery)

7.3 INDEL ISOTEMP 13 GALLON HOT WATER TANK

Water in the 13-gallon hot water tank is located in the port pilothouse settee locker. Water in the tank is heated in one of 2 ways (1) whenever the engine is operating or (2) when the engine is not running, by turning on the “Water Heater” breaker on the 110v AC Panel. It is part of the freshwater system and does not need to be filled separately.

There is virtually no need for maintenance, but the connections at the tank should be visually inspected occasionally.

⚠CAUTION The coolant lines from the engine to the tank have shut-off valves. These need to be OPEN in order for the engine to heat the water in the tank. For service, or in case or a ruptured line, these valves can be closed to stop this water loop.

7.4 GENERAL ECOLOGY SEAGULL WATER PURIFIER

[*See also Seagull owner’s manual*]
The galley is fitted with the best available water purifier in the world that probably produces better water than obtained in supermarket bottled water. It is used on 85 airlines.and by the military where the water supply is contaminated by chemical warfare agents. This purifier has a cartridge (in stainless pressure vessel under sink) that should be replaced annually or when either reduced water flow indicates that it has become plugged with sediment or the taste is odd.

⚠CAUTION It is best to clear the pressure water system of any winter anti-freeze before running water through the cartridge. The filter is rated for 1000 gallons, which is approximately 15 water tanks’ worth. Replace it at least once per year.
The Jabsco Sensor Max VSD5.0 freshwater pump is turned on at the DC breaker panel. It is combned with the Groco, 2 gallon PSC-1 which accumulates pressure to 100 psi so the pump doesn’t have to scyle repeatedly. If the pump s heard running continually, check that no faucet has been left open. If this is not the case, turn off the pump and check that the tank has not been emptied.

The pump is protected from sediment by an in-line strainer mounted adjacent to the pump. The strainer should be checked periodically and cleaned if necessary.

7.

CHAPTER 8 RAW WATER SYSTEM

8.1 GENERAL

Raw water (seawater) is used to cool the engine and the generator. It is also used in the washdown and air-conditioning options. Wherever raw water enters the boat, it does so through a seacock, which is a valved thru-hull penetration with double-clamped hoses.

8.2 ENGINE RAW WATER

The engine intakes are through the drives as seen in the chapter on propulsion. The generator (if fitted) use separate seacocks and strainers. Before using the engine or the generator, make sure its seacock is in the INTAKE position. While you are checking this, visually inspect the strainer to insure that it is not fouled. *Using an engine with restricted raw water flow can cause over-heating and damage to the engine.* When you start an engine, it is advisable to check the exhaust as it exits the boat to make sure water is being mixed into the exhaust gas. You should see a surge of water every few seconds. (It make take more than a few seconds for the first surge.)

CHAPTER 9 GRAY WATER SYSTEM

9.1 GENERAL

Gray water is liquid that can legally be pumped overboard, generally from sink drains, shower drains, and bilges. Your boat also directs deck run-off to of all gray water through common drains (port & starboard) in the transom.

9.2 GRAY WATER SUMPS

There are two gray water sump boxes aboard your boat located (a) in the storage compartment under the hatch in the cabin sole between the shower and head and (b) below the bottom companionway step. These collect water from the shower drain, the dish locker drain, and the air-conditioning condenser. The sump pump switch on the DC panel operates a bilge pump with normal float switch to empty the tank when any of the above systems are in use. Periodically, the cover of the tank should be removed and the contents/strainers cleaned.

9.3 BILGE PUMPS

There are three automatic electric bilge pumps fitted on your boat, plus an emergency manual pump.

The manual bilge pump is located under the port piloting seat and is operated by opening the plastic cover, inserting the handle, and pumping up and down. There is a noticeable difference when the bilge has run dry. This pump is most often used as a back-up system to the 3 automatic pumps. Its capacity is 15 gal/min.

The automatic pumps are located forward of the engine and under the companionway steps, are wired directly to the house battery bank. This means that even when the main battery switches are OFF, the bilge pump can continue to function properly. A three-way switch controls the pumps. When held in the manual position, the pump will work regardless of whether there is water in the bilge or not. In the OFF position, the pump will not turn on. In the AUTO position operates if the water level rises. If water is detected, the pump continues to run until the water is gone. Generally, the pump should be left in the AUTO position.

9.4 COMMON DRAINS

To eliminate unnecessary thru hull penetrations in the topsides, a common drain system is utilized on both port and starboard sides. Make sure, especially when air-conditioning is running, that the outlets for these drains, located in the transom under the swim platform, are not obstructed. Items that drain into the common drains include: hatch gutters, galley and head sinks, deck drains, sump tank and air-conditioning discharge.

10.1 SEAKEEPER 5 GYROSTABILIZER (OPTION)

GENERAL

The Seakeeper Gyro is a 500 lb. sphere that spins at up to 10,700 RPM to create a near-immovable force. It is anchored to a reinforced structure over the bottom of the boat to withstand the torque applied to the hull by waves, thus dramatically reducing the boat's tendency to roll. The Seakeeper must be run from the Generator or the 110V AC Shorepower.

START SEAKEEPER **CAUTION** Before starting the Seakeeper, check the raw water strainer to be sure that the cooling water intake to the Gyro is not blocked.

(1) Turn ON Genset Main Breaker rocker switch and START Genset (110v and 12v panels do not have to be on)

(2) ACTIVATE 110v AC Panel 2 and MAIN 12v DC Panel rocker switches

(3) Turn ON 110v AC GYRO breaker

(4) Turn ON 12v DC Gyro to DISPLAY the HOME screen. If FAULT, ALARM screen will show.

SEAKEEPER POWER ON

Press POWER ON/OFF FAULT RESET button once (turns GREEN)

Wait until RED PROGRESS BAR turns GREEN when GYRO ready for STABILIZING. This takes about 35 minutes.

ACTIVATE/DE-ACTIVATE

Press 2nd button LOCK/UNLOCK (lock turns Green) Takes 5-10 secs. GREEN PROGRESS BAR disappears and Gyro Graphic starts rolling when MAX STABILIZING in effect.

Press LOCK/UNLOCK button (turns RED) to *DE-ACTIVATE* Gyro

SEAKEEPER POWER OFF

Press left button for POWER OFF (turns RED) Gyro takes 4.5 hours to spool down to "0" RPM when no longer needed. You can leave Seakeeper AC and DC circuit breakers ON, which maximizes cooling time until leaving the boat.

ENGAGE & DISENGAGE UNDERWAY

When underway, you can show your friends how the Seakeeper works when ON and when OFF. PUSH the 2nd "lock/unlock button" and you will see the Gyro image stop rotating. You can go back and forth between "GYRO ON" and "GYRO OFF" by continuing to push this 2nd button…it takes maybe 10-15 seconds to respond to either action.

CHECK SEAKEEPER STATUS

To check for the temperature of bearings and the RPM, the procedure is as follows: With the Seakeeper Control Panel ON, push the 5th button (Gears) – then the 4th button (tools) then the 4th button (right arrow) again. Fill in the **Code 4442** when prompted, then hit button 5 (left arrow). Keep hitting button 4 (right arrow) to display: RPM, Upper & Lower Bearing Temp and Drive Temp. Hit button 5 (left arrow) to return.

10.1 SEAKEEPER 5 GYROSTABILIZER (OPTION)

GENERAL

The Seakeeper Gyro is a 500 lb. sphere that spins at up to 10,700 RPM to create a near-immovable force. It is anchored to a reinforced structure over the bottom of the boat to withstand the torque applied to the hull by waves, thus dramatically reducing the boat's tendency to roll. The Seakeeper must be run from the Generator or the 110V AC Shorepower.

START SEAKEEPER **CAUTION** Before starting the Seakeeper, check the raw water strainer to be sure that the cooling water intake to the Gyro is not blocked.

(1) Turn ON Genset Main Breaker rocker switch and START Genset (110v and 12v panels do not have to be on)

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(4) Turn ON 12v DC Gyro to DISPLAY the HOME screen. If FAULT, ALARM screen will show.

SEAKEEPER POWER ON

Press POWER ON/OFF FAULT RESET button once (turns GREEN)

Wait until RED PROGRESS BAR turns GREEN when GYRO ready for STABILIZING. This takes about 35 minutes.

ACTIVATE/DE-ACTIVATE

Press 2nd button LOCK/UNLOCK (lock turns Green) Takes 5-10 secs. GREEN PROGRESS BAR disappears and Gyro Graphic starts rolling when MAX STABILIZING in effect.

Press LOCK/UNLOCK button (turns RED) to *DE-ACTIVATE* Gyro

SEAKEEPER POWER OFF Gyro takes 4.5 hours to spool down to "0" RPM, so turn OFF as soon as not needed, but leave Seakeeper AC and DC circuit breakers O as long as possible to maximize cooling time until leaving the boat.

Press POWER OFF (turns RED). The Gyro continues to spin down to 0 rpm with no cooling needed. "0" RPM will appear on Screen if still ON.

ENGAGE & DISENGAGE UNDERWAY

When underway, you can show your friends how the Seakeeper works when ON and when OFF. PUSH the 2nd "lock/unlock button" and you will see the Gyro image stop rotating. You can go back and forth between "GYRO ON" and "GYRO OFF" by continuing to push this 2nd button…it takes maybe 10-15 seconds to respond to either action.

CHECK SEAKEEPER STATUS

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10.2 ANCHOR WINDLASS

Refer to the manual that came with your windlass for specific operating instructions.

The windlass draws power from the engine start battery. It is therefore advisable to only use the windlass when the engine is running, and to allow time for the battery to recharge after windlass use. Never try to move the boat forward with the windlass- it is sized to retrieve the anchoring gear, not to pull the boat forward. If the windlass bogs down, use the boat's engine to move directly over the anchor. If the anchor has become firmly lodged, use the boat's engine to free it, then commence retrieval with the windlass. Note: always let the windlass come to a stop before reversing direction; otherwise, the windlass fuse/breaker may blow.

To use the windlass, the engine start battery switch and house battery switch must both be ON and the windlass breaker on the panel must be ON.

⚠ CAUTION

To avoid chafe on the anchor rode when anchoring, it is advisable to remove the rode from the anchor chute by grabbing it below the roller, then pulling it up directly from the anchor, feeding it through a bow chock to a mooring cleat. Never rely on the windlass itself to hold the anchor rode- the chain stopper or a cleat should be used to take the load so as to avoid damaging the windlass' gears.

⚠ CAUTION

When not using the windlass or when underway, we recommend securing the anchor and chain with the anchor hook and line provided as standard to one of the mooring cleats. This prevents the anchor and rode from inadvertently running free underway and fouling the props.

ANCHOR WASHDOWN A spray nozzle to wash saltwater or mud from the anchor rode and chain is located under the anchor roller. It is activated, when raising the anchor, by depressing a rocker switch on the switch panel on the piloting console. The Windlass and Water Pressure breakers must be ON.

10.3 STRATAGLASS PILOTHOUSE CURTAINS

Do not use any chemicals or brushes to clean, only mild soap. If the curtains become scratched a mild polishing compound (a white cream similar to what is used on Awlgrip) can be applied by hand to remove them. Test a small, unobtrusive area first.

WARNING The acid in gull droppings on the hardtop which then drizzle down the side curtains after a rain or heavy dew… and left for a period of time without washing….can irretrievably etch the clear Strata Glass curtains requiring them to be replaced at a cost of $2,000 or more each. There is one known instance with a 36z that was on a mooring in Chilmark on Martha's Vineyard. Stuff is nasty.

It is best to leave the curtains in place. But, if they are removed, be sure to always store curtains either flat or rolled together and not folded (to avoid creases).

-

10.4 PRIVACY/SUNSCREEN CURTAINS (OPTION)

Fine white mesh allows you to see out but makes it difficult to see in as demonstrated below. When installed at night, these curtains convert the Pilothouse to an additional stateroom. The 2 Large side curtains now roll up in place.

The other 4-6 curtains roll up in a carry bag. Aft and windshield curtain(s) hook/Velcro up inside. The two large side curtains can be deployed with StrataGlass curtains rolled up.

The advantage of inside curtains is that they don't become dirty over time or require storage wet from dew when departing in the morning.

Rolling of the curtains is best accomplished by laying over the top of the pilothouse table. Then roll all sections up together to place in the storage tube.

10.5 TRANSOM DOOR & SEAT (OPTION)

This transom door is intended for swimming, showering or stern boarding. When closed, you'd hardly know it was there.

The starboard section of the standard ransom seat is now a moveable chair for après boating in the cockpit.

10.6 STIDD SEAT POSITIONS

The two piloting seats are designed to swivel around and be lowered for a more sociable setting in the pilothouse. Be careful to slide the seats fully forward prior to swiveling so the seat is not jammed into the pilothouse sidewalls.

Optional “Wide” Stidd Seats are available that function in the same manner.

10.7 WINDSHIELD OPERATION

While the triple windshield design creates individual windows that are smaller than those on the 34z, some owners have found that a stick with a rubber can tip is a handy way to push the windows out and assist in lowering them, without having to stretch over the console.

Night or Fog If you haven’t discovered it already, it is possible to open the starboard window for unobstructed visibility and still travel at 14-15 knots without being blasted by the wind. Simply move slightly toward the centerline of the boat rather than directly behind the wheel to get out of the wind flow.

POWER WINDSHIELDS (OPTION)

These new windows opened to any angle by electric powered lineal actuators, unique to MJM, are a great addition to boating.

One precaution, however, is that if left unused and closed for some time, there’s a tendency for them to stick and pop up when first opening. The remedy is to coat the gasket with a Teflon grease such as Snap & Zipper Lube.

You will find that the windows shut with such a solid thunk, that it’s not necessary to go to the trouble of dogging them down along the bottom except in the roughest weather… not even when leaving the boat.

CHAPTER 11 EQUIPMENT

11.1 MARINE VACUFLUSH HEAD SYSTEM

NOTICE Waste discharge regulations vary by location. Check with local authorities.

The waste system aboard your boat employs freshwater and a vacuum generator. The freshwater pump breaker and Vacuflush breaker must both be ON (DC panel) for the system to work. Further controls are located on a panel in the head (shown).

Refer to the manufacturer's manual for more details.

When the foot-pedal of the toilet is depressed, waste is drawn through the vacuum generator to the waste tank. Tank capacity is 20 gallons, which may seem small, but since each flush requires about a cup full of fresh water compared to the several quarts of sea-water using a conventional marine pump-head, the capacity is more than adequate and there's no odor. Waste can be discharged two ways:

(a) Via the shore-side pump-out fitting on the after-deck labeled WASTE using marina facilities. To effectively remove all the waste from the holding tank using, be sure to first turn OFF the vacuum pump system and step on the head flush pedal to remove all vacuum.

(b) Offshore beyond restricted waste disposal zones by (1) OPENING the large waste thru-Hull discharge valve, accessible to starboard and aft under the cockpit, then (2) TURN & HOLD the switch in the Head to the right to activate overboard pumping using the macerator pump. The control panel lights indicate the level of waste in the holding tank. The level can be double-checked by viewing the dark waste line through the side of the semi-transparent holding tank.

Before activating this discharge, check to insure compliance with local regulations.

11.2 FRIDGE amd FREEZER

The DC Panel breaker for the Vitrifrigo double-fridge drawer unit must be ON. Temperature is controlled on the unit itself. Once on, the unit will self-regulate. It can take awhile for temperature to stabilize, particularly after initial stocking with food and beverages. (Photo is of a different unit)

The separate top-load Indel freezer unit is capable of holding bags of marina ice or making ice in plastic trays.

11.3 KENYON TWO-BURNER CERAMIC COOKTOP

The galley cooktop aboard your boat is powered by AC electricity. To use it, make sure the "COOKTOP" breaker on the AC panel is ON and that a supply of AC power is present. This two-burner unit is unique in that it has flush-mount, pop-up, heat-resistant rubber pot holders.

⚠CAUTION **Do not leave the cooktop ON while unattended.**

11.4 SHARP GRILL 2 CONVECTION MICROWAVE

This unit offers several cooking modes which maybe operated without shorepower by utilizing the inverter for AC power and turning ON the MICROWAVE switch on AC Panel #1. Please refer to the Sharp Users Manual for operating instructions and precautions. The manual is stored inside the oven when the boat is initially delivered.

11.5 MARINE-AIR AIR-CONDITIONING UNITS (Optional)

This 16,000 BTU air-conditioning system can help keep the interior and pilothouse of the boat at comfortable temperatures by either cooling or using reverse cycle heat to act as a heater. The heat works particularly well to warm both the interior and pilothouse if the sea temperature is above 40 degrees.

For a full explanation of the A/C controls, see the manufacturer's user's manual.

To adjust fan speed range so that the lowest setting "1" is hardly noticeable and high-speed setting "6" is sufficient:

Push the Fan Control button until "P1" shows.
Then Press Star to select "P2"
Press Up or Down Arrow until reading "65"
Press Star to get to "P3"
Press Up or Down Arrow until reading "40"

The A/C system uses raw water, much like the engine, for heat exchange. There is an intake seacock, strainer & pump located in the Systems Room under the pilothouse. These should be checked frequently, and are the first things to check if the unit fails to deliver cold air.

11.6 WALLAS 40D DIESEL HEATER (Optional)

This heater is DC powered, controlled by a thermostat on the forward side of the entertainment center and draws diesel fuel from the starboard fuel tank. Please read the manual for instructions

⚠CAUTION Do not use the Circuit Breaker Switch to turn off the Heater when it is operating. Before turning off the breaker switch, be sure to turn the control panel from heat to vent until the heating element has a chance to cool off.

11.7 FUSION 700 PLAYER (Optional)

This multi-media unit operates on DC power. The STEREO breaker on the DC panel must be ON. See the instruction manual for operating details. This unit is also the CD and DVD player, with a single slot. It takes some getting used to… particularly the volume controls for different areas of the boat.

11.8 SIRIUS SATELLITE RADIO ACTIVATION (Optional)

To activate Sirius Satellite Radio services you will need to access the serial number. See instructions in the Fusion Manual:

11.9 22" LED TELEVISIONS (Optional)

TV receivers operate with 120V AC Power. Turn ON the "TV" Breaker on the AC Panel. Click the "Menu" button and select Source. Video signals maybe acquired from the Fusion DVD player, from a dockside cable TV outlet, from a Glomax local TV antenna, or from the optional KVH satellite dish system.

An access port is provided for MP3.

Surround-Sound may be achieved using the "AUX" function on the Fusion Stereo Receiver to integrate both TV Audio and the 6 speaker stereo audio. Or, kids can watch TV with dedicated Audio belowdecks while parents are listening to jazz, with the "Fade" function directing sound to the 2 cockpit speakers.

At right is the TV installation in the forward cabin. The optimum angle of viewing from the berth can be adjusted by turning the twist nut on the supporting arm. The cabinet behind the TV holds the "entertainment center" with the CD Changer, DVD Player, Satellite TV Receiver and the KVH Antenna if installed.

11.10 KVH M3 SATELLITE TV RECEIVER (Option)

To activate the receiver, turn ON the breaker labeled “Satellite Dish” on the DC Panel. Then be sure that the KVH dish control and receiver are turned on in the Entertainment Center. Follow the instructions in the KVH Owner’s Manual to initiate subscription and enjoy television reception aboard the boat.

Either DISH Network or Direct TV has been selected prior to installation.

The Dome and Radar unit mounted on the hard top must be removed for overland truck shipment. The procedure for installing the unit is described below:

KVH / RADAR DOME INSTALLATION INSTRUCTIONS

(1) Run KVH and anchor light wires up through the KVH dome platform then fasten the base to the hardtop. See pic 1 below.

(2) Install the anchor light on the back of the strut and connect the Deutsch connector for the anchor light then push the remaining length of the anchor light wire (yellow and gray in Pic 1) back inside of the hole. The only cable that remains on top of the dome platform is the black RG6 cable for the KVH dome shown.

(3) Run the radar dome harness through the hole in the front of the strut, just behind where the radar dome will sit. See Pic 2 above.

(4) After installing the radar on it's platform and running the harness inside the radar dome you will need to remove 5 screws from the top of the metal box (the cover will than hinge to the side-- see Pic 3) giving you access to the radar connections). You will have 2 red wires, 2 black wires and a plug with 7 smaller wires attached to it.

(5) With a small flat head screwdriver loosen the positive and negative screws at the white terminal box. Plug the two red wires in the positive side and the two black wires in the negative side. The plug with the seven smaller wires will be plugged right in front of the white terminal box where the red and black wires are. See Pic 4. It can only plug in one direction. Make sure it's connected and pushed in all the way and that the small gauge wires are in good conditions and not making too much of a bend. Slide the cover back in place (See Pic 5) and make sure the shield wires are sitting in the cable groove right at the edge of the opening. The grounding shield wires need to be sandwiched between the cover and the base of the metal box. Reinstall metal plate and radar dome cover.

(6) Look for a yellow tag inside of the KVH dome with a screw; Very important, this screw is for shipping purpose only. This screw needs to be removed before you can run the unit

(7) Connect the RG6 cable to the 90º connector, located in the bottom of the KVH dome. Once this is done, mount the dome on the strut with the bolts provided.

CHAPTER 12 ROUTINE MAINTENANCE

12.1 SCHEDULE

Refer to the following chart for an approximation of routine maintenance actions. Refer to the Volvo-Penta IPS Operator' Manual, page 62-64, for more complete instructions on each item. Perform all maintenance once a year even if hour levels have not been reached. Some of the items you may choose to leave to professionals, but many you can do yourself. In particular, it is a good idea to have a certified mechanic perform check-ups from time to time on the engine, generator, and any other key equipment installed onboard. Volvo Penta & Northern Lights engines are assumed – check your manuals if your brands differ.

ITEM	FREQUENCY	ACTION
ENGINE		
Oil Level	**Daily** Check	Change after 1st 50 hrs, then ea. 200 hrs
Engine Oil Filters		Replace after 1st 50 hrs, then ea. 200 hrs
Air Cleaner	Check ea. 50 hrs	Clean if necessary and replace oil.
Drive-Belt Tension/Wear	Check ea. 14 days	Tension if necessary.
Remove Zincs & Check	Every 100 hrs	At each oil change or 6 months
Check Valve Clearances		Check after 1st 50 then ea. 500 hrs
Turbo Charger	Every 200 hrs	Clean Blower
Mounts	Annually	Tighten
Coolant Level	**Daily** Check	Add if necessary. Do not overfill!
Drive Unit Oil Level	**Daily** Check	Add if necessary. Do not overfill!
Valve Clearance & Injectors	Check	500 hrs.
Oil in Bilge	**Daily**	Identify source, Correct, Clean-Up
Engine Area & Leakage	**Daily**	Identify source, Correct, Clean-Up
FUEL SYSTEM		
Tanks/Valves/Connections	Monthly	Inspect for leaks and ease of valve operation
Racor Primary Fuel Filter	**Daily**	Clean if necessary. Change ea. 200 hrs.
Secondary Engine Filter		Change ea. 200 hrs. or when necessary.
Fuel System	When necessary	Bleed
Injectors	Check ea. 500 hrs	
Fuel Injection Pump	Check	Every 2400 hrs.
GENERATOR		
Oil Level	**Daily** or ea 8 hrs.	Check and add if necessary
Oil	Ea. 100 hrs.	Change (1st time after 50 hrs.)
Fuel Filter/Water Separator	**Daily** or ea 8 hrs.	Check for contamination and clean
Fuel Filter	Ea 100 hrs.	Check Drain and replace filter ea 100 hrs.
Engine Hoses	Weekly	Check that they are hard & tightly secured
Exhaust System	Weekly	Inspect for leaks. Check ant-siphon.
RAW WATER COOLINGSYSTEM		
Heat Exchanger	Every 2400 hrs	Check & clean
Sea Water Filter	Check ea. 14 days	Clean screen & bowl if necessary
Cooling System	Every 500 hrs.	Check & Flush
FRESH WATER SYSTEM		
Water Tank	Annually	Flush clean & disinfect.
Water Pump Strainer	Monthly or Less	Remove & clean
Hoses & Valves	**Daily**	Observe leaks or note recycling of pressure system
Seagull Purifier Cartridge	Annually	Replace cartridge more frequently if reduced flow

GRAY WATER SYSTEM	
Sumps Annually	In Main Cabin Floor Hatch & Systems Room
Automatic Bilge Pumps (3) **Daily Check**	Test with manual switch
Manual Bilge Pump Monthly	Check operation
Bilge Area **Daily Check**	Inspect and clean as needed
ELECTRICAL SYSTEM	
Batteries Monthly	Remove Lids, check for loose cables, clean
House & Engine Batteries **Daily Check**	Voltage
Connections Annually	Inspect all connections
Transom & Drive Zincs Quarterly	Inspect and replace if necessary
MISCELLANEOUS	
Trim Tabs **Daily**	Check Operation
Trim Tabs Monthly	Inspect & remove barnacles for proper operation
Bottom Paint Monthly or Less	Remove growth with diver to sustain performance

12.2 FLUIDS

Record from that supplied with boat

CHAPTER 13 SEASONAL MAINTENANCE

13.1 START OF SEASON

[commissioning]

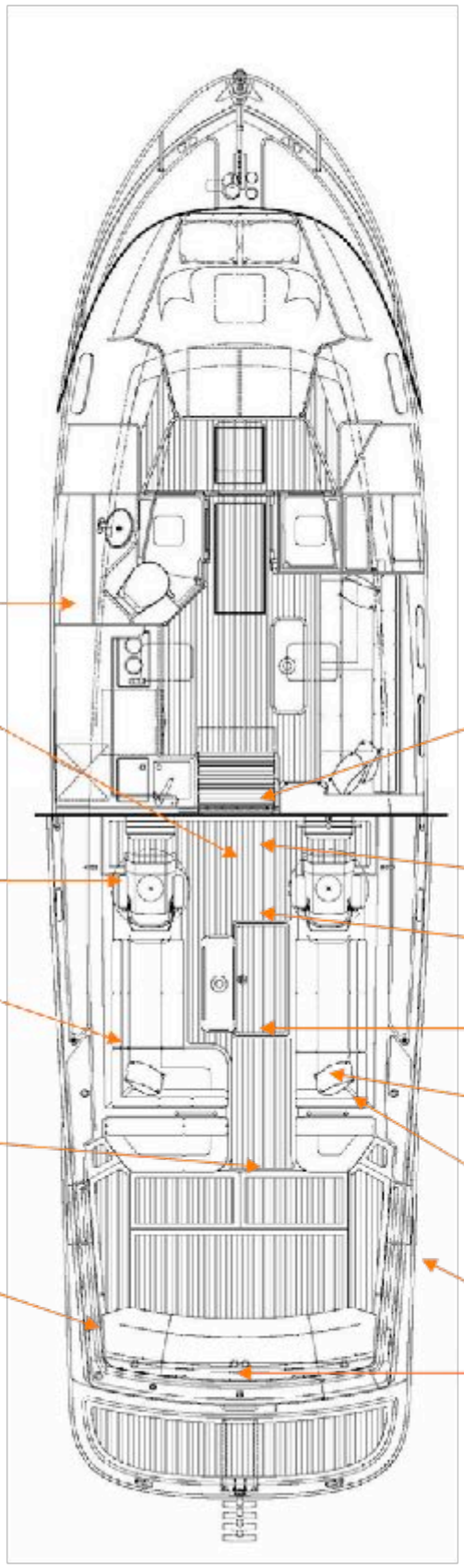
13.2 END OF SEASON

Most facilities will not require additional information before hauling the boat with a Travelift or crane, but if this is the case, use the included Lifting Diagram Figure 14.10.

The end of the season is a good time to have the bottom power-washed and to check all thruhulls and seacocks for growth. Careful inspection of all underwater hardware at this point may avoid a potential problem in the future. This is also a good time to check the zincs of the boat and replace as necessary.

If the boat is to be stored in a place where the ambient temperature may fall below the freezing point, it must be winterized. Plumbing lines need to be emptied and anti-freeze added where applicable. Consult also the engine operator's manual.

14.1 - EMERGENCY DIAGRAM



First Aid Kit

AC Raw Water Intake

Manual Bilge Pump

Fuel Shut-Off Valve (over tanks)

EngineRoom Fireboy

Waste Discharge Thruhull

Electric Bilge Pump

Electric Bilge Pump

Genset Raw Water Intake

Systems Room Fireboy

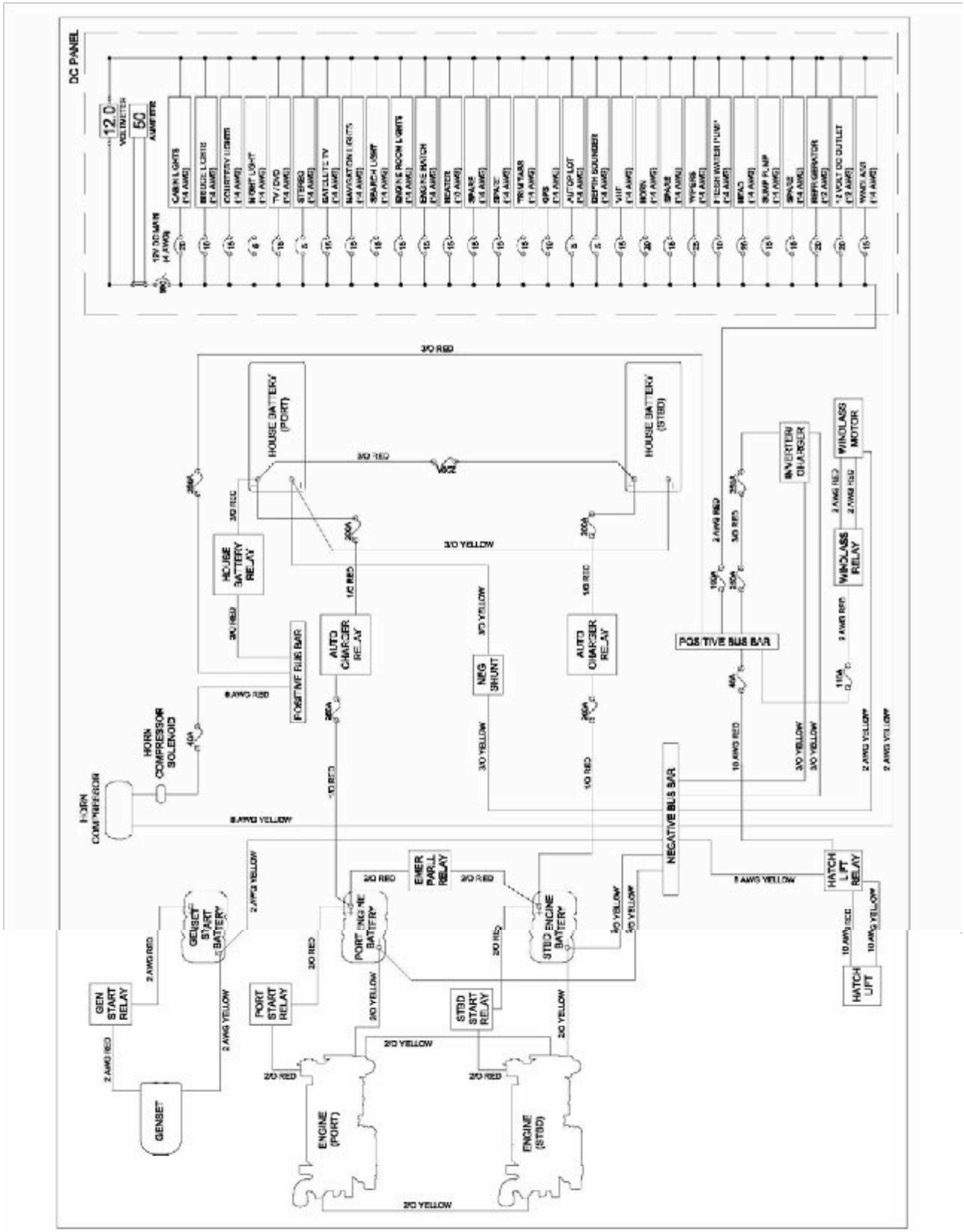
Battery Disconnects

Fuel Shut-Off Valve (over tanks)

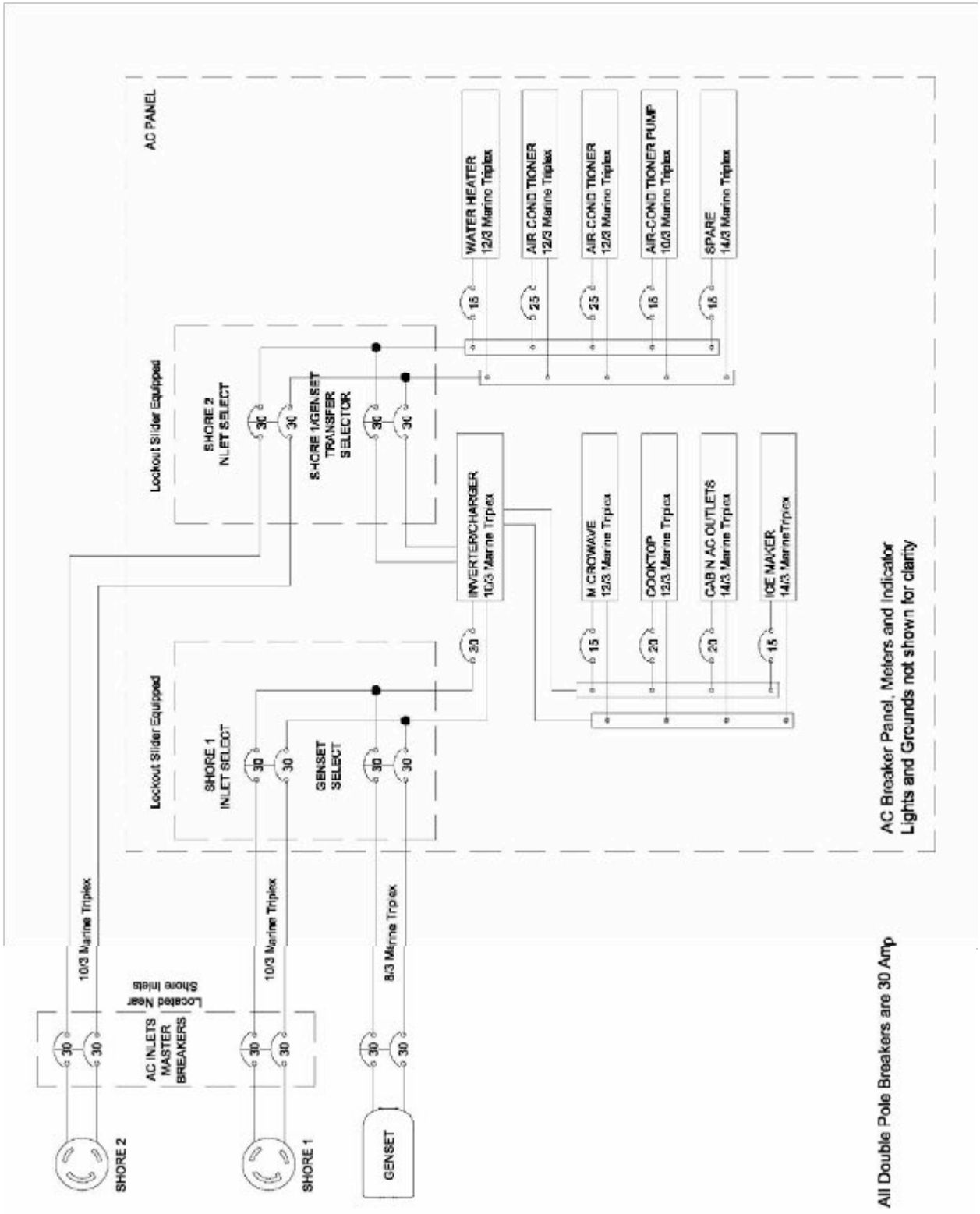
Gen Set Separator Discharge Thruhull

Electric Bilge Pump

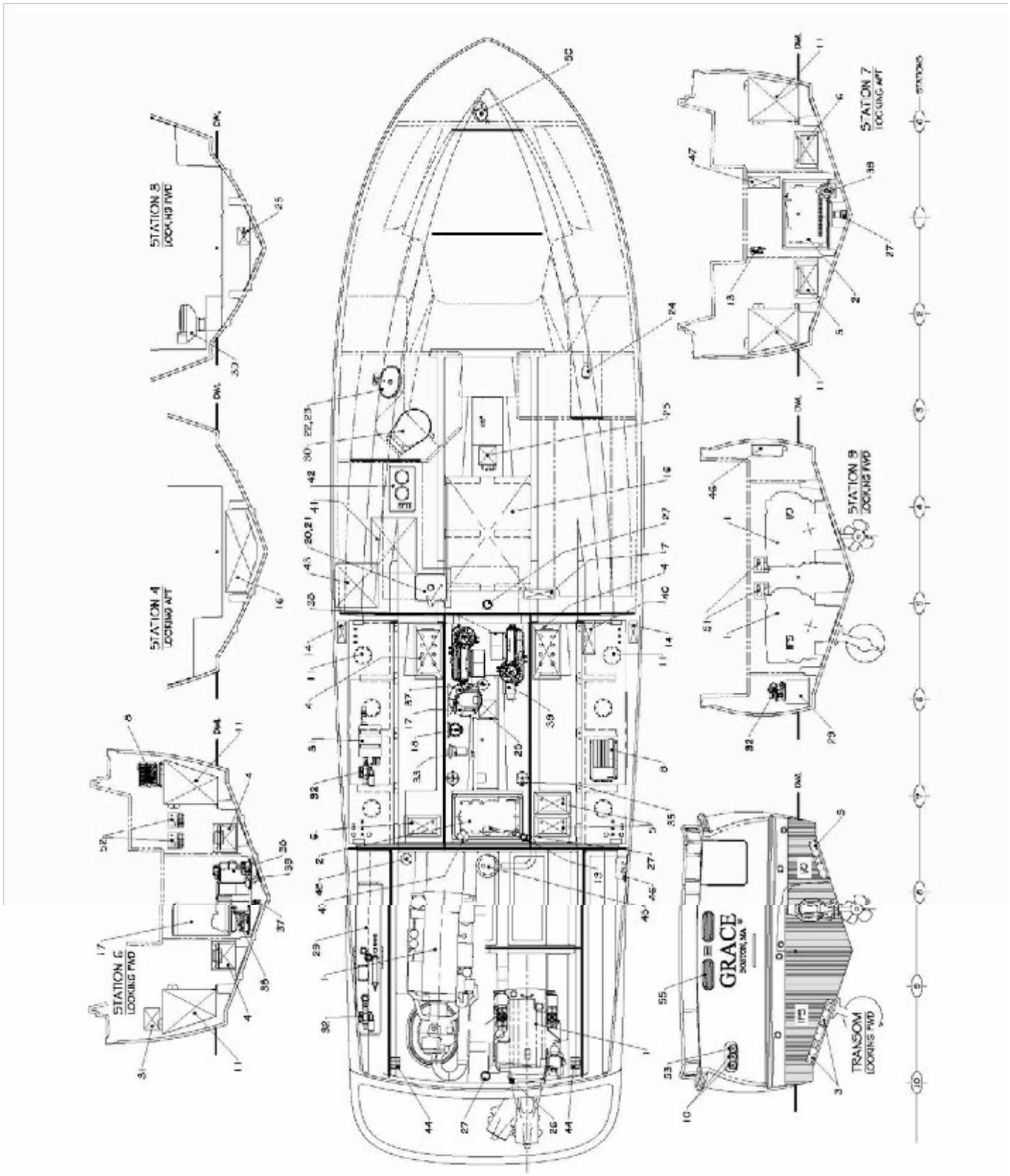
14.2 - 12 Volt DC WIRING DIAGRAM



14.3 - 120 Volt AC WIRING DIAGRAM



14.4 - SYSTEMS DIAGRAM

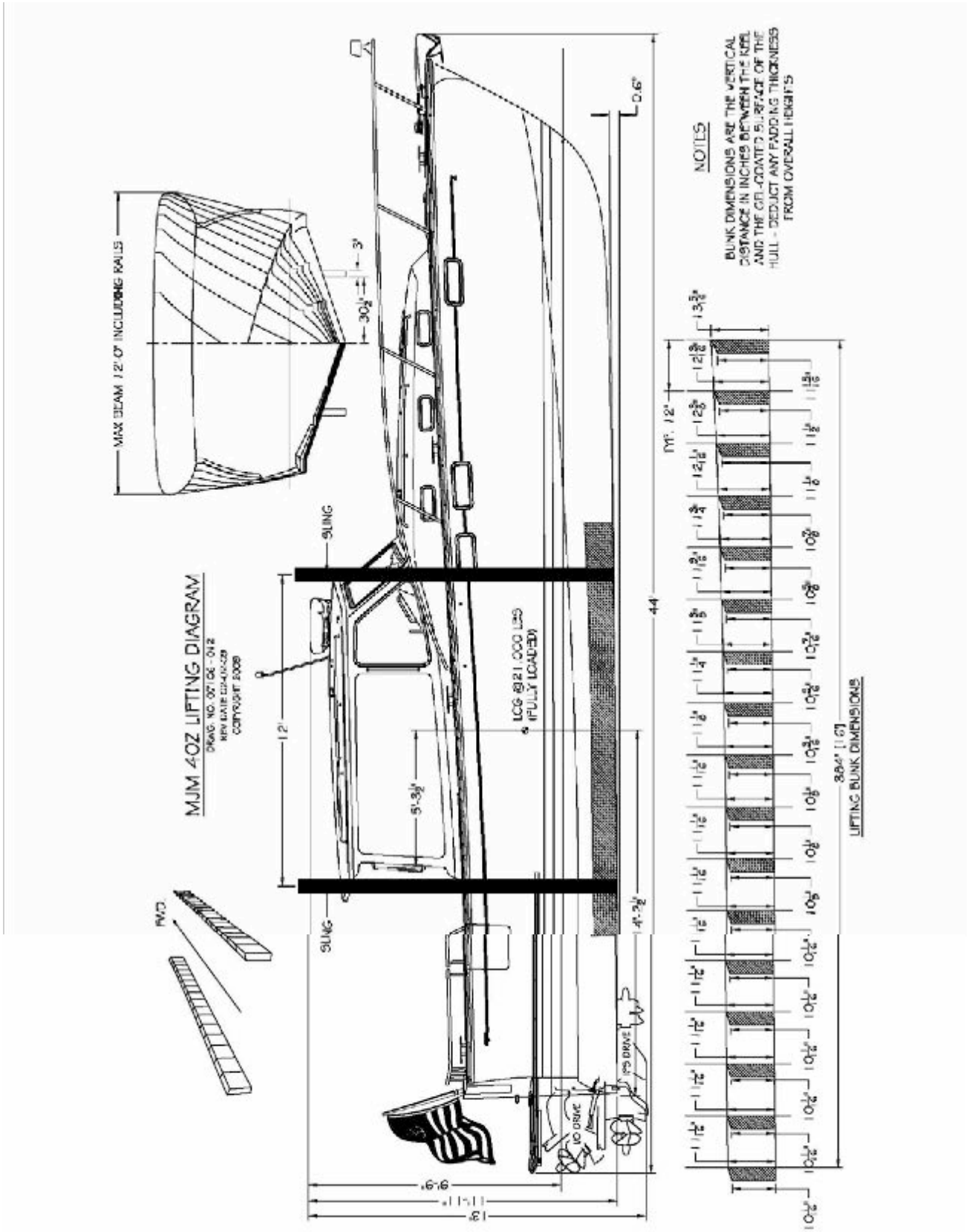


14.5 - SYSTEMS KEY

REF	QTY	DESCRIPTION	MAKE / MODEL
1	2	MAIN ENGINE	SEE SPECIFIC WORK ORDER
2	1	GENERATOR (6kW)	NORTHERN LIGHTS M673L3
3	2-4	TRIM CONTROL SYSTEM	VOLVO QL 450 (+300 IPS)
4	2	HOUSE BATTERY	DEKA 8A8D
5	2	START BATTERY (ENGINE)	DEKA 8A31DT
6	1	START BATTERY (GENSET)	TBD
7	1	ELECTRICAL PANEL AC/DC	PACER BBW-010/011
8	1	CHARGER/INVERTER	MASTERVOLT 12/4000-200A
9	2	BATTERY SWITCH	BLUE SEAS
10	2	SHORE POWER	MARINCO 30356EL-B
11	2	FUEL TANK (175 GAL)	REFER TO DWG 07106-655
12	2	FUEL FILTER (ENGINE)	RACOR 500MA
13	1	FUEL FILTER (GENSET)	RACOR 215R30
14	2	FUEL/AIR SEPARATOR	RACOR LG
15	1	FUEL TRANSFER PUMP	TBD
16	1	F.W. TANK (100 GAL)	RONCO B400
17	1	F.W. HEATER (13 GAL)	ISOTHERM BASIC 50
18	1	F.W. PRESSURE PUMP	HEADHUNTER EXCALIBER
19	1	F.W. PURIFICATION SYSTEM	G. ECOLOGY SEAGULL IV
20	1	GALLEY FAUCET	SCANDVIK 10460
21	1	GALLEY SINK	SCANDVIK 10220
22	1	HEAD FAUCET	SCANDVIK 46010
23	1	HEAD SINK	SCANDVIK 10211
24	1	SHOWER/MIXER	SCANDVIK 10763/10813
25	2	SUMP PUMP	RULE 98A
26	1	COCKPIT SHOWER/MIXER	WHALE DS0003
27	3	BILGE PUMP (AUTO)	RULE RM1100
28	1	BILGE PUMP (MAN)	BOSWORTH GUZZLER

REF	QTY	DESCRIPTION	MAKE / MODEL
29	1	B.W. TANK (32 GAL)	SEALAND
30	1	TOILET	SEALAND VACUFLUSH 506
31	1	VACUUM GENERATOR	SEALAND
32	2	MACERATOR PUMP	SEALAND
33	1	WASHDOWN PUMP	SHURFLO 5901-2212
34	1	SEACOCK (GENSET)	FORESPAR 931143
35	1	STRAINER (GENSET)	GROCO ARG-755-P
36	1	SEACOCK (A/C)	FORESPAR 931263
37	1	STRAINER (A/C)	GROCO ARG-755-P
38	2	A/C UNIT	MARINE AIR VTD16K-HV
39	1	A/C PUMP	MARINE AIR
40	3	HEATER	WALLAS 40D
41	1	REFRIGERATOR	VITRIFRIGO DW180RFX - DW180RFXAC
42	1	COOK TOP	KENYON B40575UPUPS
43	1	MICROWAVE	SHARP R-820JS
44	2	EXHAUST FAN	DELTA T 500-304122 1P
45	1	GENSET MUFFLER	CENTEK 1500071
46	1	GAS/WATER SEPARATOR	CENTEK 1020150
47	1	FIRE SUPPRESSION (FWD)	SEA-FIRE FG-100M
48	1	FIRE SUPPRESSION (AFT)	SEA-FIRE FG-125M
49	2	HATCH LIFT	ACCULIFT C-18-33.320, 28
50	1	WINDLASS	MUIR VR 1250
51	2	POWERTRAIN CONTROL UNIT	VOLVO 888997
52	2	HELM CONTROL UNIT	VOLVO 3863511
53	1	PHONE/TV INLET	MARINCO PM6592TV-SS
54	1	GENSET DRY OUTLET	ORCAS 9005208
55	2	LOUVERED SUCTION VENT	VETUS ASV 60

FIGURE 14.6 – BOAT LIFT & BUNK OFFSETS



TRAILER LOADING CHECKLIST

1. Place all cockpit & pilothouse cushions below on island berth.
2. Remove canvas from Bimini, detach aft legs and hinge the main hoop forward against the hardtop. Secure the short legs, pad the main hoop where it touches the hardtop (AC hose) secure the hoop to handrails with fender whips.
3. Hinge down VHF antenna and reverse tape it to starboard handrail.
4. Hinge down running light and tighten.
5. Remove any KVH or FLIR tower and seal hardtop openings and wire connections. Wrap domes and strut in blanket and securely park it in a pilothouse locker…or the shower, braced with throw pillows.
6. Max height over road is 13'6" which works for standard radar dome if bolted to hardtop without strut.
7. Wrap plastic around horn trumpets to avoid ingress of water.
8. Face searchlight aft and be sure that the anchor chain grabber is secure.
9. Be sure that all cabinet doors, drawers and fridge are latched securely shut.
10. Do not apply adhesive take directly to any surface particularly ultra leather.
11. Turn off all battery switches and make sure the Victron Control for the inverter as well as the Unit over the Starboard Fuel tank are OFF.
12. NEVER PERMIT THE BOAT TO BE LOADED STERN FIRST .
13. Shrink wrapping is not recommended as it can do more damage if breaking loose than it prevents.
14. Provide driver with detailed contact information so that he can remain in contact with you and the destination yard.
15. In addition to aft and midship supports in locations seen on the previous page, the boat should be supported under the bow, forward of any straps.
16. We've found that with the new zipper and track system that the the StrataGlass side & aft curtains as well as the interior of the boat is better protected by leaving the side and aft pilothouse curtains down in place, rather than trying to remove and roll them up, then trying to find a secure place below.
17. Lock the companionway door and advise driver and receiving yard where the key is hidden.

CHAPTER 15 BOSTON BOATWORKS LIMITED WARRANTY

Manufacturer's Sole and Limited Warranty for Pleasure craft

A. **General.** This document sets forth the sole and limited warranty, which Boston BoatWorks ("The Manufacturer") is giving you in connection with the "Vessel" which you are acquiring. It is the only warranty being given by the Manufacturer and should be reviewed carefully together with manuals and other instructional material provided by the Manufacturer before you take delivery of the Vessel.

B. **Basic Warranty.** The Manufacturer warrants that the Vessel (except for Excluded items described below and when Properly Used, will be free of defects in material and workmanship for a period of twelve (12) months from delivery of the Vessel to you by an Authorized Dealer. If you sell the Vessel during this period, your buyer may receive the benefit of the balance of the warranty by agreeing to be bound by its terms.

C. **Extended Warranty for Structure.** In addition to the foregoing warranty, the Manufacturer warrants that the stringer systems, structural bulkheads and composite laminates of the Vessel (except for Excluded items) and when the Vessel is Properly Used, will be free of defects in material and workmanship for a period of five (5) years from delivery date by an Authorized Dealer. This warranty may be transferred to your buyer in the same manner as the Basic Warranty.

D. **Extended Warranty Against Osmotic Blistering**. In addition to the foregoing warranties, the Manufacturer warrants that any gelcoat surfaces of the Vessel below the waterline will not blister when the Vessel is Properly Used for a period of ten (10) years from delivery date by an Authorized Dealer. This warranty may be transferred to your buyer on the same manner as the Basic Warranty.

E. **Dealers.** The name and address of Authorized Dealers is available from the Manufacturer. The Manufacturer does not authorize the Dealer, or any other person, to assume for the Manufacturer any liability in connection herewith or any liability or expense incurred in the repairing of its products other than those expressly authorized by the Manufacturer in writing.

F. **Excluded Items.** The Manufacturer gives no warranty as to:

a. Paints, varnishes, gelcoat (except where included in paragraph D above)a, exterior wood, vinyl, fabrics, glass, chrome plating or anodized or other finishes or surface coatings because of the varying quality of these items manufactured by others and the effect resulting from different climactic and use conditions

b. Engines, mechanical equipment, pumps, batteries, heating, plumbing, refrigeration, electronic components, masts, or other components manufactured by other than the Manufacturer, or the cost of removal or re-installment of the part and disassembly, or reassembly of the unit of which it is a component.

c. All items not installed by the Manufacturer or altered after their installation, and items installed or altered by Authorized Dealers.

d. Other than upon first being delivered, leaks in or around hatches, companionways, deck hardware or other leaks which are above the waterline.

e. Damage to the Vessel (including, but not limited to, wet core) caused by leakage around decks, hardware or other accessories attached to, or incorporated into, the Vessel.

f. Speed, fuel consumption or other performance characteristics, because they are estimated and not guaranteed.

G. **Proper Use.** The warranties contained herein are expressly conditioned upon your Proper Use of the Vessel. This means that you must use the Vessel solely as a pleasure craft (no commercial use) and operate it as directed in and after reviewing the Manuals provided by the original equipment manufacturer and the

Manufacturer, and perform maintenance to the Vessel as recommended in the Manuals and as required by periodic inspections by an Authorized Dealer or Service Center.

H. **Warranty Claims.** To make a claim under this warranty you must do the following

a. Report the defect to the Manufacturer or Authorized Dealer within thirty (30) days of discovering it, and when possible prior to incurring any expense, identifying the Vessel and submitting photographs (email digital preferred).
b. Make the Vessel available for inspection by the Manufacturer or Authorized Dealer when requested.
c. Make the vessel available for repairs, if required, by the Manufacturer or Authorized Dealer.
d. Major components, such as engines, generators, air-conditioners, electronics, appliances for example are warranted by the manufacturer of the component. They have authorized service dealers in most major boating markets. The Manufacturer or Dealer will identify such service dealers upon request.

I. **Repair or Replacement**. The manufacturer shall perform its obligations under this warranty by, at it option, repairing or replacing (at Manufacturer's expense) the defective part or component. Parts or components replaced will become the property of the Manufacturer. The replacement of parts o components will not extend the warranty but the replacement parts and components will be covered for the balance of the warranty period. You shall be responsible for returning the Vessel to Manufacturer at its plant or at a designated marina in the State of Massachusetts or to such other repair facility that the Manufacturer shall designate, at your sole expense.

J. **Specification Changes.** The manufacturer reserves the right to make changes in design, equipment, layout or construction without notice or being obligated to incorporate such changes in previous products.

K. **Registration Cards.** The Manufacturer recommends that you immediately fill out and return the Warranty Registration Card for the Vessel. The information contained on this card will enable the Manufacturer to more quickly process any warranty claims and to comply with the Federal Boating Safety Act. Should you sell the Vessel, the Manufacturer recommends that your buyer also fill or a Warranty Registration Card.

L. **Exclusion of Implied Warranties.** The foregoing warranty is intended to be in lieu of all other warranties, express or implied. In part, due to the hazardous, life-threatening environment, capable of overwhelming vessels of any size, that the Vessel will operate in, THE MANUFACTURER OR ITS DEALER DISCLAIMS ALL IMPLIED WARRRANTIES INCLUDING WARANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR USE. In some jurisdictions, the Manufacturer is prohibited from excluding or limiting implied warranties. In those jurisdictions, the Manufacturer expressly limits any implied warranties to the greatest extent and to the shortest duration allowed by law.

M. **Limitation of Damages.** THE MANUFACTUER OR ITS DEALER DISCLAIMS ANY LIABILITY TO YOU FOR INCIDENTAL, CONSEQUENTIAL OR INDIRECT DAMAGES TO YOU, including loss of use, loss of revenue, travel expenses, transportation charges, food or lodging charges or loss of personal property. In some jurisdictions, the Manufacturer is prohibited from excluding or limiting implied warranties. In those jurisdictions, the Manufacturer expressly limits any implied warranties to the greatest extent and to the shortest duration allowed by law.

N. **Whole Agreement.** This warranty is the sole warranty given to you by the Manufacturer. Authorized Dealers are not authorized to make changes to this warranty. Any questions about the warranty should be directed to the Manufacturer. If you do bring a claim against the Manufacturer that is related to the Vessel, you must bring it in the Courts for the State of Massachusetts.

BOSTON BOATWORKS

Pre-Approval for Warranty

Please Fax Claim to: (617) 561-9222 **Date**_____

Boat Model_____Boat Name_____Hull #_____

Dealer_____Contact Person_____

Phones_____Fax_____ Email_____

Description of Problem: _____

_____

_____

_____

Description of Resolution: _____

_____

_____

_____

_____

_____

Estimated Completion Date: _____

Labor Rate $ _____ Total Materials Cost $ _____

Total Labor Hours _____ Total Estimated Cost $ _____

AMOUNT APPROVED: $_____ **APPROVED BY:**_____

Warranty Claim Application Form

Boston BoatWorks, LLC
256 Marginal Street, East Boston MA 02128
Phone: (617) 561-9111 Fax: (617)561-9222

Date:_____ Boats Name:_____ 40z Hull # _____

Dealer/Service_____ Boat Owner:_____

Address: _____ Address:_____

_____ _____

Phone:_____ Phone # _____

Fax:_____ Boat Location:_____

Contact Person:_____ Delivery Date:_____

Description of Defect (please include photos)

Description of Corrective Action (include invoices)	Labor Hrs:
	Labor Rate:
	Labor Cost:
	Material Cost:
Total amount of claim	**$**

All claims require prior approval by BBW Customer Service using the Pre-Approval Form

Date Approved:_____ Amount Approved:_____ Approved by:_____

CHAPTER 16 QUICK START GUIDE

1 - Disconnect Shore-side Connections

To disconnect shore power cords, turn off all AC loads on the boat and make sure the main AC breakers on the AC panel (the double breakers) are all OFF. Then disconnect the cord *at the dock end first*. Disconnect the cord at the boat and close the shore power inlet cover. Ditto for any phone/cable TV lines and dock water inlet..

2 - Set Battery Switches

The Engine battery selector switches are at the top of the AC electrical panel. Slide the covers down and Push Start STBD engine switch and Start PORT engine switch, both ON. Be sure that the HOUSE battery switch on the DC panel is also ON. Unless running the generator underway, the GENERATOR switch should be OFF with the cover slid upwards. If the engine start battery is low the Combiner switch can be turned on until underway, then turned OFF.

Remember to turn all switches OFF when leaving the boat, except the HOUSE battery switch, if needed to keep the Refrigeration going.

3 - Check Engine

It is advisable to check the engine fluid levels before starting the engine. Refer to the Owner's Manual for instructions on lifting the engine hatch cover and checking the oil coolant and transmission levels.

4 - Check Raw Water Seacock

Make sure that the raw water seacocks are in the position to supply the engine with seawater for cooling. It is also advisable to check to see a good surge of water through the plexiglass top of the raw water strainers on top of the engines.

5 - Visually Inspect the Engine Room

While doing other checks, it is a good idea to take a look around the engine for loose belts, wires, oil drips or water in the bilge or anything else that may be out of order.

6 - Check DC Panel

Check the DC panel to insure that the house bank has a reasonable charge (12.2V or greater). If there is any problem, now is the time to learn of it. Make sure the DC MAIN breaker is ON, as well as any other circuits that you might need in the course of your trip. If you need the searchlight in a hurry, for instance, it's better to have the breaker already on.

7 - Turn ON Navigation Instruments

Turn on TRIM TABS, NAV INSTRUMENTS, HORN, WIPERS.

8 - Check Lights

If the boat is to be operated after sunset or in reduced visibility or fog, TURN on NAVIGATION LIGHTS & SEARCHLIGHT and check that they are working.

9 - Start Engine

⚠CAUTION *See earlier pages in this Owner's Manual for specific instructions for operating these new electronically controlled engines.*

10 - Check IPS, Steering and Trim Tab Function

With the engine controls in Neutral, push the left "Docking: button under the IPS joystick and listen for a confirming beep. Briefly test its operation with a slight tap in any direction.

⚠CAUTION Make sure that no one is on the foredeck or handling a dock-line when this test is performed. Also check that the trim tabs are working properly, and that the steering turns smoothly.

11 - Final Checks

Before departing, make sure the engine and house batteries are being charged. (Note: by design, there is a delay between starting the engine and alternator charging.) Make sure your navigation plans have been prepared and that all equipment is functioning (even that which you don't necessarily intend to use). Check your fuel and water levels. Be sure the anchor is secured.

12 - Casting Off

When you are confident that everything is in order, cast off all dock lines and when maneuvering with the IPS joystick remember that a light touch (taps) on the joy stick with short bursts are usually sufficient to move the boat in the direction desired.