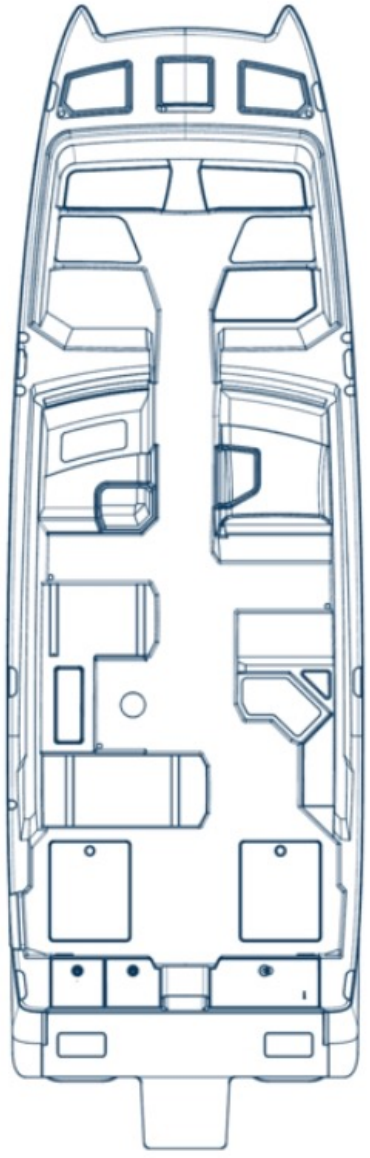
WORLDCAT
A BETTER WAY TO BOAT™

OWNER'S MANUAL
400 DC-X



Dear World Cat Owner:

Thank you for being our customer. Welcome aboard!

We wish to take this opportunity to sincerely thank you for putting your trust in our boat building team and becoming the newest member of the World Cat Family.

The following manual is designed to ensure you enjoy your new World Cat for many years to come. We have made every effort to ensure you and your family are safe, enjoy the unique features of a World Cat, and continue to love the World Cat ride that no other boat company can offer.

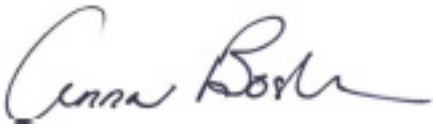
If you should ever need assistance with the care, maintenance, or operation of your boat, then please visit our website at WorldCat.com to find contact information for your nearest Factory Authorized Dealer.

Once again, thank you for becoming a part of our family.

Best Regards,

ANDREW BROWN
President

Best Regards,



ANNA BOSLER
Customer Care Representative

WORLDCAT

1090 West Saint James St.,Tarboro, North Carolina 27886

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HOW TO USE THIS MANUAL

This manual is designed to assist the user in operation of the yacht's systems as built by WorldCat Yachts. Thus the structure of the manual is yacht system based rather than yacht component based. It is the intention to describe the location and interrelation of subcomponents into total systems that are not covered in the subcomponent literature supplied by the manufacturers' of those subcomponents. The topics are organized in an order prioritized based upon safety and the perceived order of need that a new operator or person totally unfamiliar with the yacht would have.

The "Introduction" includes preliminary information about the yacht and items of a regulatory nature.

The "Specifications Section" contains important dimensional information about the overall yacht, weights, and measures and other vital statistics including a summary of equipment serial #s.

Sections are annotated by statements as necessary indicating danger and precautionary degrees with corresponding labels to alert the user. Those are indicated as follows:

Denotes an immediately hazardous situation. If the hazardous situation is not avoided, death or serious injury will occur.

Denotes a potentially hazardous situation. If the hazardous situation is not avoided, death or serious injury could occur.

Denotes a potentially hazardous situation. If the hazardous situation is not avoided, minor or moderate injury could occur.

Denotes a property-damage-only hazard, meaning no personal injury is possible.

The "Operations Section" is a list of step by step "menus" or checklists on how to carry out every important operation on the yacht that is not listed in the subcomponent literature file supplied by that subcomponent's manufacturer and delivered with the yacht. This section is illustrated with photos that correspond to the steps as necessary in order to have a clear understanding of the items within the various yacht systems referenced.

The "Figures Section" is a group of engineering drawings, figures, and illustrations of

the yacht providing general information about the yacht's systems, dimensions, and locations of equipment and components.

The "Troubleshooting Section" is a set of tables broken down by system of potentially common problem situations with their probable solutions.

The “Maintenance Section” is a spreadsheet of all of the suggested routine maintenance actions that should be carried out on the yacht broken down into *Systems* (ex.- “Propulsion”), *Items* (ex.- “Port Engine”), *Actions* (ex. “Change oil”), *Intervals* (ex. “200 hr.s”), and *Alternate Intervals* -(ex. “1 year”).

The "Spare Parts Section" is a summary list of suggested spare parts for the specific yacht.

***This manual does not attempt to teach navigation, piloting, seamanship, or marine engineering. The user should not attempt to operate the yacht without competence in those areas of skill.**

SPECIFICATIONS
2.0

SPECIFICATIONS

Length Overall (Hull)	39’8”
Beam	12’8”
Draft	25”
Bridge Clearance (keel to top of hard top)	8’6”
Dry Weight w/Power (approx.)	15,000 lbs
Fuel Capacity (2 x 232)	464 gallons
Diesel Fuel Tank Capacity	24 gallons
Fresh Water Capacity	60 gallons
Holding Tank Capacity	13 gallons
Main Engines	425 Hp ea. Yamaha XF-425 4S
Generator	Panda P8 Mini Digital 6.5 kW 120 volts 60Hz
D.C. Circuits	12 Volts
A.C. Circuits	120 Volts
Efficiency at 30 MPH Cruise	1.02 MPG
Typical WOT	46.3 MPH
Propellers	Yamaha 17 YL 16 7/8 XTO OS (spec.s may vary)

SERIAL NUMBERS

COMPONENT	MAKE	MODEL	SERIAL #
HIN #			
Port Main Engine			
Stbd. Main Engine			
Generator			
Battery Charger			
Stateroom Air Conditioning			
Main Deck Air Conditioning			
Stbd. Refrigerator			
Aft Refrigerator			
Grill			
Aft Deck Chiller			
Windlass			
Main Deck Stereo			
Head Fusion Stereo			
Stateroom Fusion Stereo			
Water Heater			
GPS			
Radar			
Depth Sounder			
VHF			
AIS			
Autopilot			
Port Monitor			
Stbd. Monitor			

SAFETY OPERATIONS
3.1

OPERATOR RESPONSIBILITIES

Prior to enjoying your World Cat, it is important to read and understand all the information detailed in your Owner's Portfolio. Knowing how to operate and maintain the systems on your vessel can make your experiences safe and enjoyable, as well as increase the performance and longevity of your boat. Federal law and most state laws clearly indicate that it is the operator's responsibility to maintain their vessel, and to operate it in a manner which protects the safety of their passengers and others. Reference page 10 of the National Marine Manufacturer's Association (NMMA) publication *Sportfish, Cruisers, Yachts Owner's Manual* for a detailed list of owner responsibilities. This manual will provide you a basic understanding of boating practices; however, we recommend all owners review federal, state, and local regulations regarding safety and traffic prior to using your World Cat. The U.S. Coast Guard Auxiliary and U.S. Power Squadrons offer excellent educational opportunities on a local level and are open to anyone. If a chapter does not exist in your area, reference page 10 of the *Sportfish, Cruisers, Yachts Owner's Manual* or contact the following numbers for other educational opportunities:
Boating Education Hotline 1-800-336-BOAT (2628) U.S. Coast Guard Boating Hotline 1-800-368-5647

REGISTRATION

Vessels are required by federal and state law to be registered in the state where they are primarily used. Registration numbers and validation stickers must be displayed per regulations, and a certificate of registration must be on board while the vessel is being operated. When traveling away from your home waters, contact authorities at your destination to determine if any additional registration is required. Some areas require permits or temporary registrations to operate in their waters. When completing registration forms you will be asked for the Hull Identification Number (HIN). On your World Cat, the HIN is located on the starboard side of the transom. This number is unique to your boat and will be important for registering your vessel, as well as communicating with your dealer and our service department. Including this information in any correspondence or conversations will help our support network serve you better.

COAST GUARD REQUIRED SAFETY EQUIPMENT

Once you have reviewed safe boating guidelines and filed for registration, it is time to equip your vessel. The U.S. Coast Guard's (U.S.C.G.) list of required equipment is shown below. To review the guidelines for each item, reference page 23 of the *Sportfish, Cruisers, Yachts Owner's Manual*.

- Audible Signaling Device (Bell, Horn, or Whistle)
- Fire Extinguisher

- Navigation / Anchor Lights
- Personal Flotation Devices (PFD's)
- Visual Signaling Devices

NOTICE Remember to check with state and local agencies to ensure that additional items are not required to operate your boat in their waterways.

RECOMMENDED SAFETY EQUIPMENT

Although not required, there are several additional items which help to ensure safety, and provide convenience for you and your passengers. A list of these items can be found in the *Sportfish, Cruisers, Yachts Owner's Manual* on page 24. Perform an annual inventory to keep tools, spare parts, and safety equipment in good condition. Immediately replace any items that have been removed from the kit.

⚠ CAUTION Use only marine grade replacement parts. Most automotive and residential parts are not suitable for use in the harsh marine environment. Using them could lead to premature product failure, property damage, or personal injury.

CAPACITY INFORMATION

As an owner you should be aware of the weight on board. Exceeding capacity can endanger your passengers and vessel, as well as void any warranty remaining on the boat should a failure occur. Remember that this is a guideline for normal operation, and does not release you from responsibility should an accident occur. You must use rational judgment when adverse conditions are expected, and reduce your loads to create a margin of safety.

This label means your World Cat is certified by the NMMA. With this tag, you are assured your fuel system, electrical system, lighting, ventilation, and steering are not only in compliance with the US Coast Guard regulations, but also meet the more stringent standards of the NMMA. The National Marine Manufacturer's Association is a national trade organization serving all elements of the recreational boating industry including manufacturers of boating equipment. With this tag, you can have confidence in the safety of your boat.

Pursuant to NMMA certification, all World Cats over 26' in length are “Yacht Certified” and carry the placard shown here. Person and gear capacities are not predetermined, they are left to the operator’s discretion. Therefore, the amount of load allowed onboard should result from considering all safety precautions.

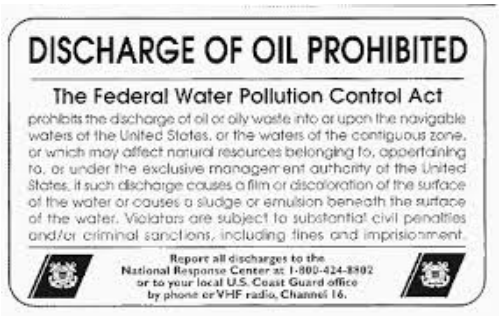
Horsepower ratings, however, are set by World Cat and *should not be exceeded.* Exceeding the factory recommendation stated on the tag on your model will result in loss of warranty coverage on your vessel.

POLLUTION REGULATIONS

The Refuse Act of 1899 prohibits throwing, discharging or depositing any refuse matter of any kind (including trash, garbage, oil and other liquid pollutants) into the waters of the United States. This information is provided in a pamphlet that is normally received when registering your boat. Use the information below asa guideline, but study the pamphlet and understand any local regulations regarding pollution control. As the operator, you are also liable for individuals on your vessel disposing of materials in an improper manner.

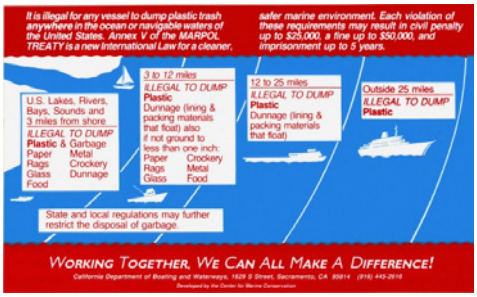
OIL AND HAZARDOUS SUBSTANCES

The Federal Water Pollution Control Act prohibits the discharge of oil or hazardous substances which may be harmful into U.S. navigable water. Vessels 26' in length and over must display a placard at least 5" x 8", made of durable material. The placard must be installed in a conspicuous place in the rigging compartments or near the bilge pumps and state the following:



DISPOSAL OF PLASTICS/ DUNNAGE/GARBAGE

Boats 26' in length and over must display a Save Our Seas placard which outlines the rules for dumping waste offshore. The placards must be at least 4" x 9" and should be displayed in an area visible during normal operation. They can be purchased from your dealer or marine equipment suppliers.



BOATING SAFETY GUIDELINES

As an owner / operator you should be prepared to handle any situation which arises before departure, while underway, or upon return to dock. Careful planning will add safety and pleasure to your experience and give you the confidence to handle emergencies if they develop. Listed below are some general guidelines which you should follow before any trip:

Pre-Departure

Establish a float plan and provide it to a person whom you trust. The plan should give the details of your trip, including where you are going and when you expect to return. If you deviate from the plan, notify that person as soon as possible.

If you anticipate operating in a new area, understand the local rules and request charts or information on any hazards you may not be aware of.

Verify that you have all necessary safety equipment. This should include all the USCG required equipment as well as spare parts or other items you decided to include.

Check fuel levels and determine if you require additional fuel for your trip.

Examine the weight of the gear on your vessel and make sure you are not overloaded. Distribute the weight evenly on your vessel to ensure predictable performance.

Instruct a passenger on the operation of the boat, and the location and function of all safety equipment onboard. You should never be the only person capable of safely operating your vessel.

Underway (See Chapter 5 on Performance)

Obey all “Rules of the Road” and any local regulations. Use the information located on page 13 of the *Sportfish, Cruisers, Yachts Owner’s Manual* to understand right-of-way and the various navigational and hazard indicators you will see on the water.

Never operate a boat under the influence of alcohol or drugs.

Do not allow individuals under the age of 16 to operate the vessel. Maintain direct supervision of inexperienced operators.

Ensure that all passengers are safely seated while underway, and are using the hand rails World Cat has provided to remain securely in their seats.

Use your electronics and judgment to remain abreast of changing weather. Storms develop quickly and you should be prepared to protect your passengers and vessel.

See page 22 of the *Sportfish, Cruisers, Yachts Owner's Manual* for more tips on weather.

Maintain a safe speed and respect other boaters as well as those on land. Obey all "No Wake Zones" and be aware of smaller vessels. The wake you produce could endanger other crafts and their passengers.

Know the limitations of your craft and your experience. Understand the boat's handling characteristics and do not attempt to operate the vessel in conditions that are unsafe or beyond your experience level.

Returning

Obey navigational markers and be aware of any tidal changes since departure.

Collect and dispose of refuse properly to maintain our waters for future generations.

Wash the boat and perform general maintenance upon returning. (See instructions in Chapter 5).

As stated above, these are only general guidelines for safe boating. We recommend using these and any other available resources to protect your passengers as well as your vessel. Checklists can be an important tool in accomplishing this; see the example on pages 44 & 45 of the *Sportfish, Cruisers, Yachts Owner's Manual*.

Trailering Due to the nature of the hull, catamarans require specialized trailers. Your dealer will be able to provide them, as well as information on safe trailering practices.

Anchoring There are several types of anchors available, each designed to operate in specific bottom conditions. Your dealer can provide information on which styles are most effective in your area. See page 56 of the *Sportfish, Cruisers, Yachts Owner's Manual* for more information and tips concerning anchoring.

⚠ CAUTION Never anchor your boat off the stern. The weight at the transom, combined with adverse sea conditions, could allow water to enter the boat over the transom.

Shallow Water

Although your World Cat draws a small amount of water for its size, shallow water should be a concern of all boaters. To avoid this hazard, pay particular attention to navigational markers and know the area you are operating in. Be aware of tidal changes, including those that have occurred during your trip. Rocks, stumps, or other

hazards are more prevalent in shallow water and can cause major damage to your hull bottom. Engines can also suffer damage if they are allowed to run in the sand or mud.

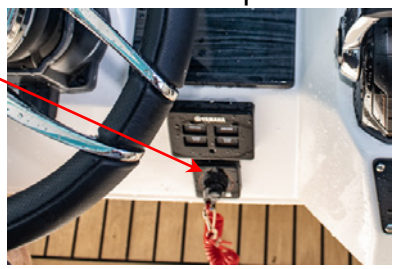
If you do become grounded, tilt the motors up to reduce the draft at the transom. Often this will solve the problem; however, it may be necessary to rock the boat from side to side to break the suction along the keel. If you are grounded on an incoming tide, allowing the water to rise can help. Being grounded on an outgoing tide is a larger issue and you need to act quickly to free your boat to avoid being driven further aground. Use the anchor to secure the boat and await the incoming tide, or use it to pull yourself free.

Emergency Situations

Unfortunately, even the safest boating practices cannot eliminate the potential of emergency situations developing. Therefore you should prepare yourself and your crew to handle any problems that may arise. Establish specific plans for fires, man overboard, collision, etc., and review them with your passengers prior to departing. Planning allows people to remain calm, and gives everyone the confidence to resolve the problem. Below is important information which all owners should be aware.

Emergency Stop Switch

Lanyard clips are provided on all World Cats and, when used properly, provide an emergency stop for the engines should the driver fall from the helm position, or need to perform an emergency shutdown to respond to or avoid an accident. The clip attaches the driver to the ignition panel using a cord. A pull on the cord will release the clip from the shut-off switch on the panel and shut down the engines. To restart the engines, turn ignition switch to the off position, return binnacle to neutral position, insert safety lanyard back into clip and then turn ignition switches back on. This should only be used to prevent or react to accidents, and the operator is solely responsible for the decision.



Communication

If you witness an emergency or become involved in one, you should request assistance via radio communication or visual signals. Review the information in Section 4 of the *Sportfish, Cruisers, Yachts Owner's Manual* for detailed information on how and when to request assistance.

Rendering Assistance

Owners are required by law to render assistance to other boaters involved in an emergency situation such as fire, collision, casualty, etc., as long as it does not endanger your vessel or its passengers.

Reporting Accidents

Federal regulations require that operators involved in an accident file a written account of the situation within 48 hours. Reports should be submitted to the State Boating Law Administrator. You can obtain forms through the USCG or local authorities (i.e. harbor patrol, sheriff or police offices). In the event that a casualty or disappearance occurs as the result of an accident, you must notify the authorities immediately by phone or radio and fill out a written statement.

Weather

Pay attention to weather patterns. If you find yourself in the path of a storm, seek shelter immediately. If you cannot reach a dock, seek refuge inside the boat while the storm advances. Never get in the water and stay clear of metal components on your boat. If lightning strikes, it would likely pass through metal objects seeking a ground.

Towing

Due to an accident or loss of power, it may become necessary to tow another vessel or have your boat towed. If you are providing assistance, never attempt to tow a boat larger than your own. Be certain to use proper lines (ropes) and rational judgment to prevent further damage. Tow lines are under heavy strain, therefore passengers should remain clear of the lines to protect themselves from injury. For more information on towing, reference page 39 of the *Sportfish, Cruisers, Yachts Owner's Manual.*

Carbon Monoxide (CO)

Carbon Monoxide (CO) is a colorless, odorless, and tasteless gas produced by the exhaust system of any combustible engine. CO can cause brain damage or death if inhaled over an extended period of time. To protect yourself and your passengers, never block the ventilation outlets in cabins, consoles, or other enclosed spaces.

One of the most important considerations when dealing with boating safety is carbon monoxide. Commonly referred to as CO, carbon monoxide is a colorless, odorless, and tasteless gas emitted from any engine exhaust. Including inboards and outboards. A CO particle is close in weight to the air we consume; therefore it does not rise or fall in the

atmosphere, but accumulates in enclosed spaces. Boat owners with enclosed heads, cabins, or canvas enclosures should pay particular attention to CO. Be aware that fumes produced on your boat can affect other vessels and other boats can affect you. A primary concern is the use of generators when boats are moored adjacent to each other.

Carbon Monoxide is poisonous and potentially fatal if inhaled over an extended period of time. Symptoms of CO poisoning include:

- Dizziness
- Nausea / Vomiting
- Headache / Throbbing in the temples
- Fatigue
- Muscular twitching
- Inability to focus or think clearly If you or any of passengers experience any of these symptoms, leave the area and find a source of fresh air immediately. If your symptoms persist, seek medical attention.

ABOUT THE CZONE SYSTEM

DESCRIPTION: This section is included here in the beginning in the Safety section because the Czone system also controls the monitoring and alarm functions. It will also be included in the Electrical section.

The Czone system on the Worldcat 400DCX is a state of the art monitoring and control system that integrates the ability to connect, protect, monitor and distribute both D.C. and A.C. electrical sources to loads (consuming devices) and to monitor the status of most onboard systems. The system facilitates the use wireless Bluetooth FOBs to operate the “House” battery switch, the overhead hard top lighting, and the boarding lighting from a distance. The architecture of the system consists of the D.C. and A.C. wiring to feed the load carrying devices, digitally controlled A.C. and D.C. controllers to act as circuit protection, switches, and status indication, a 12 volt D.C. NMEA 2000 data bus interconnecting all of the devices for monitoring and control with touch screens as a user interface. All of the devices have manual override capabilities.

Combination Output Interfaces (COIs) combine multiple input and output D.C. devices into single modules, offering a compact and intelligent replacement for traditional D.C. fuse boxes and circuit breaker panels with digital switching technology. There are two COIs in the Worldcat 400DC-X Czone system. There are two Switch Control Interfaces (SCIs) to integrate more traditional “hard” switches.

Each Combination Output Interface, however, uses just one compact 30-channel unit to provide all the necessary outputs.

A USB port on each COI allows for easy system upgrades.

The dash console Garmin monitor touch screens are used to operate the system centrally, and as the ABYC and CE safety authorities require every circuit to have both a fuse and a bypass, this is provided within the COIs. Each ATC fuse can be simply withdrawn to isolate a circuit, and pushed into a different position to create a bypass. To aid identification of the individual fuses, there is an adhesive circuit label. A clear plastic cover protects the fuses. Red and green LEDs on the COIs indicate a circuit’s status at a glance.

The Combination Output Interfaces have multiple layers of protection provided by software, hardware and mechanical means for ultimate reliability.

Other features include high power pump channels to allow manual control, plus pump running feedback, from a single channel without the need for additional wiring. In addition, the COIs each provide six digital switch inputs (wiper, horn, etc.) via connection of a Contact 6/SCI (Switch Control Interface) pair to connect conventional switches like those across the top of the dash brow, eight analogue monitoring inputs

(battery condition, tank fluid levels, wireless Bluetooth fob control, etc.) twelve low current (10 A) outputs (courtesy lights, anchor light, etc.) and four high current (25 A) outputs (bilge and water pumps etc.).

The COIs are supplied D.C. load power from the house battery bank to power the D.C. loads and the NMEA 2000 data network integrating the system is powered by 12 volt power from the house battery system fed from conventional manual circuit breakers on the main D.C. panel and fuses.

The yacht's A.C. sources are fed via traditional manual source selector circuit breakers from either the 50 amp 120 volt shore power cable or the diesel generator to the Cone ACOI (A.C. Output Interface).

The ACOI distributes the A.C. power to the onboard A.C. consumer devices by remote controlled distribution circuit breakers operated by the Garmin touch screens via signals through the NMEA 2000 12 volt D.C. data bus or manually actuated on the ACOI enclosure itself. Each remotely controlled A.C. consumer distribution circuit on the ACOI also has a backup manual override circuit breaker above it on the ACOI unit enclosure as well.

The ACOI provides the following functionality to the A.C. system:

- Monitoring of each distribution circuit' status and run current.
- Circuit protection and control.
- Manual override at the enclosure.
- Status LEDs on the ACOI enclosure.
- Staggered startup of loads.
- Delay before circuits come on to allow generator to come up to speed.
- Current, voltage, frequency and power monitoring incorporated (two channels).
- Circuit status and run current displayed for each circuit.

The ACOI (A.C. Output Interface) distribution circuit breakers supply the A.C. consumer circuits which are:

Battery Charger

Air Conditioner #1 (Cabin)

Air Conditioner #2 (Deck)

Microwave Oven

Water Heater

Refrigerator Drawers

Stbd. A.C. Receptacles

Port A.C. Receptacles

NOTICE **The engines are also fitted with Yamaha NMEA 2000 electronic monitoring (CL7 display) interfaced into the Garmin displays as well.**

Engine information is displayed for each engine redundant to the Yamaha CL7 stand alone display which also displays alarms, trouble codes, maintenance logs, and trip information such as distance and hours, and allows for reset of these values. The Yamaha CL7 display acts as the master display.

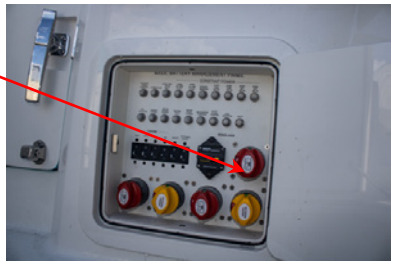
Engine maintenance information is displayed, and maintenance intervals can be set, as well as the time elapsed since the previous maintenance can be reset.

Tank level sensor information, trim angle of the engines, active alarms for the engines, and trouble codes for active engine alarms are displayed. This information is useful to Yamaha dealers for diagnosis.

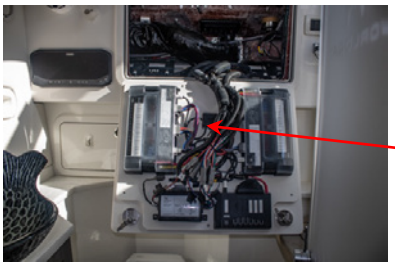
The following vessel system components are integrated into the data bus.

- The Yamaha CL7 display.
- Main (gasoline) and diesel (generator) fuel tank level sensors (KUS).
- Fresh water and sewage tank level sensors (KUS) and (Thetford).
- 2 17” Garmin GPS-MAP 8617 multi function touch screen monitors.
- Depth transducer.
- JL Audio MM 100-BE stereo.
- GPS s
- ITC Lighting RGB digital control unit.

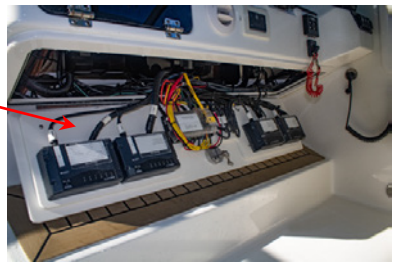
LOCATION: The house batteries are in the aft bilge compartments (mechanical rooms) port and stbd.. The main D.C. panel is to port aft on the aft deck side coaming just forward of the port boarding door. The 12 volt house battery isolator switch which feeds power to the main D.C. panel is the top forward one in the D.C. panel face.



The Czone wiring is built into the yacht. The COIs, OI, and Bluetooth fob remote control signal receiver are below the main helm station behind the drop down mirror panel on the aft wall of the head compartment.



The 2 Contact 6 units, a 12 volt fuse block, and 2 SCIs (switch control interfaces) are in the steering console lower portion on the helm (aft) side.

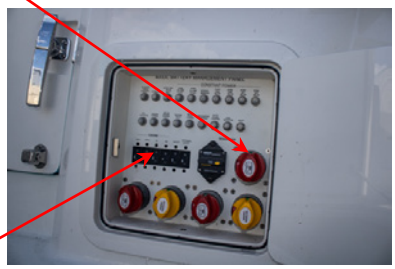


The ACOI is in the stateroom on the aft wall below the manual A.C. source select circuit breaker panel.

1 Ensure that the 12 volt “House” battery voltage is adequate (at least 12 volts).

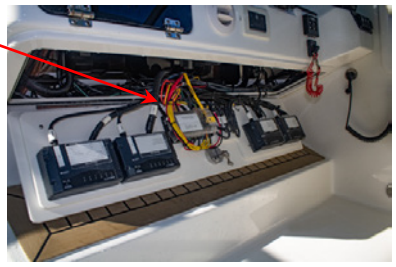
2 Ensure that the bilge pump and alarm float manual circuit breakers in the “Continuous Power” section of the main D.C. panel are on. These supply D.C. power to the automatic functions of the bilge pumps independent of the Czone system.

3 Ensure that the “House” battery switch is on at the main D.C. panel to feed power to all of the manual circuit breakers on the D.C. panel except the “Constant Power” circuit breakers which are fed direct from the house batteries all the time.

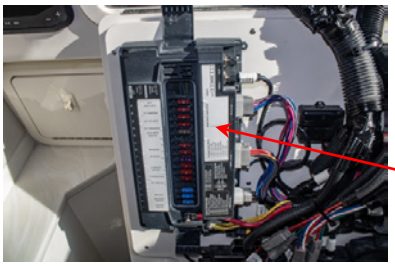


4 Ensure that the “Elect” (to feed the fuse block for the NMEA 2000 data bus, monitors, and other electronics) 50a, “COI 1” (to feed COI1 D.C. Loads) 100 a, “COI 2” (to feed COI2 D.C. loads) 100 a, “OI” (LROI 20a), and “C6” (5a Output Interface) manual circuit breakers are on at the main D.C. panel. These circuit breakers feed the D.C. loads and the Czone system.

5 Ensure that the fuses in the fuse block under the console are intact.



6 Ensure that the green power LEDs on the Czone COIs for feeding the devices are on.



7 Ensure that the green network LEDs on the COIs are on indicating that the Czone NMEA network is intact.

8 Ensure that the green LEDs for each Czone channel on the COIs are on solid indicating there is power to feed those devices.

9 If A.C. power is connected on the boat ensure that the green LED for each circuit on the ACOI #1 is on. A red LED indicates a fault for that circuit.

10 Turn on the multifunction Garmin touch screen displays on the dash.

11 You may now use the Garmin touch screens or switches and Bluetooth remote control fobs to operate the equipment as desired.

12 As long as the “Elect”, “COI1”, “COI2”, “OI”, and “C6” circuit breakers on the main D.C. panel are on when the house battery switch is turned on the system is programed so that the Yamaha CL7, Garmin displays, Czone system, and starting battery switches will all turn on too.

13 The Czone system also has 5 preprogramed vessel operational modes or configurations that can be selected on the Czone screens. These modes are as follows:

Day Cruise

- All air conditioning circuit breakers on.
- Grill circuit breaker on.
- Raw water pump circuit breaker on.
- Stbd. drawer refrigerator circuit breaker on.
- All A.C. outlets live.
- Water heater on.

Night Cruise

- All air conditioning circuit breakers on.
- Grill circuit breaker on.
- Raw water pump circuit breaker on.
- Stbd. drawer refrigerator circuit breaker on.
- All A.C. outlets live.
- Water heater on.
- Nav. Lights on.

Night Entertaining

- Courtesy lights on.
- Fresh pump circuit breaker on.
- Hardtop lights on.
- Step lights on.
- Underwater lights on.

Exit Lights/ Battery Off

- Boarding lights on.
- Hardtop lights on.
- Step lights on.
- House battery switch off after 90 seconds (all goes off).

All Off

- All Czone controlled circuits off.

NOTICE **Verify that batteries are charging as desired!**

TO USE THE ELECTRONICS

DESCRIPTION: The electronics installed on the Worldcat 400DCX are a Garmin integrated system including: two Garmin GPSMAP 8617 touch screens, B175 transducer color fathometer/fish finder/ GSD 25 advanced sonar module, GMR 24 XHD radar, GHP 40 autopilot for Helm Master, Garmin 315 VHF radiotelephone and AIS 800.

The Garmin system is interfaced with the Czone system and the Yamaha CL7 Helm Master system.

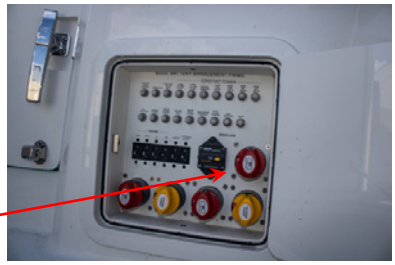
All of the devices use the Garmin touch screens as a user interface.

NOTICE The engines are also fitted with Yamaha NMEA 2000 electronic monitoring interfaced into the Garmin displays as well.

Engine information is displayed for each engine redundant to the Yamaha CL7 stand alone display which also displays alarms, trouble codes, maintenance logs, and trip information such as distance and hours, and allows for reset of these values. The Yamaha CL7 display acts as the master display.

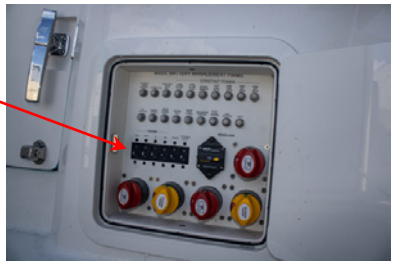
LOCATION: The Czone wiring is built into the yacht. The COIs, OI, and Bluetooth fob remote control signal receiver are below the main helm station behind the drop down mirror panel on the aft wall of the head compartment. The 2 Contact 6 units, a 12 volt fuse block, and 2 SCIs (switch control interfaces) are in the steering console lower portion on the helm (aft) side. The various Garmin gateway and interface boxes (GPS, Autopilot, AIS, Sonar) are mounted on the stbd. inner hull side outboard of the console.

1 Ensure that the 12 volt “House” battery voltage is adequate (at least 12 volts).

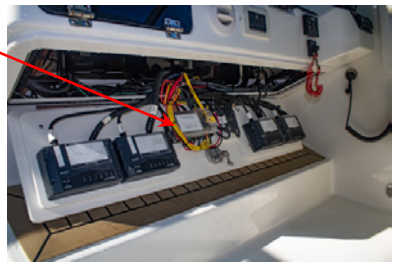


2 Ensure that the “House” battery switch is on at the main D.C. panel to feed power to all of the manual

circuit breakers on the D.C. panel except the “Constant Power” circuit breakers which are fed direct from the house batteries all the time.



3 Ensure that the “Elect” (to feed the fuse block for the NMEA 2000 data bus, monitors, and other electronics) 50a, “COI 1” (to feed COI1 D.C. Loads) 100 a, “COI 2” (to feed COI2 D.C. loads) 100 a, “OI” (LROI 20a), and “C6” (5a Output Interface) manual circuit breakers are on at the main D.C. panel. These circuit breakers feed the D.C. loads and the Czone system. The “Radar Power” circuit breaker must also be on to operate the radar.



4 Ensure that the fuses in the fuse block under the console (fed by the “Elect” 50a circuit breaker on the main D.C. panel) are intact. The “Compass” fuse feeds the Yamaha/Garmin gateway interfaces (for autopilot, GPS); the compass light, and the head vent fan. The “Sonar” fuse feeds the fathometer function. The “AIS” fuse feeds the AIS system. The “VHF” fuse feeds the VHF radiotelephone. The “Monitor” fuses feed the Garmin monitors. The “NMEA” fuse feeds the entire data bus that interconnects everything, its integrity is vital to the entire system. The “Yamaha” fuse feeds the Yamaha CL7 which is the master so it is vital too.

5 Ensure that the green power LEDs on the Czone COIs for feeding the devices are on.

6 Ensure that the green network LEDs on the COIs are on indicating that the Czone NMEA network is intact.

7 Ensure that the green LEDs for each Czone channel on the COIs are on solid indicating there is power to feed those devices.

8 Turn on the multifunction Garmin touch screen displays on the dash.

9 You may now use the Garmin touch screens or switches and Bluetooth remote control fobs to operate the equipment as desired.

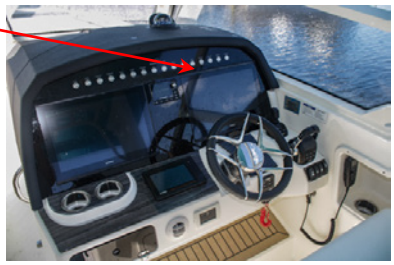
10 As long as the “Elect”, “COI1”, “COI2”, “OI”, and “C6” circuit breakers on the main D.C. panel are on when the house battery switch is turned on the system is programed so that the Yamaha CL7, Garmin displays, Czone system, and starting battery switches will all turn on too.

11 Read and understand the detailed operating instruction for each electronic component (radar, GPS, VHF, plotter, etc.) for details of operation.

TO USE THE HORN

DESCRIPTION: There is a 12 volt D.C. powered horn.

LOCATION: The horn is on top of the hard top stbd.. The horn button is in the group on the dash brow and on the Czone system screen.



1 Ensure that the 12 volt “House” battery voltage is adequate (at least 12 volts).

2 Ensure that the “House” battery switch is on at the main D.C. panel to feed power to all of the manual circuit breakers on the D.C. panel except the “Constant Power” circuit breakers which are fed direct from the house batteries all the time.

3 Ensure that the “Elect” (to feed the fuse block for the monitors and other electronics) 50a, “COI 1” (to feed COI1 D.C. Loads) 100 a, “COI 2” (to feed COI2 D.C. loads) 100 a, “OI” (LROI 20a), and “C6” (5a Output Interface) manual circuit breakers are on at the main D.C. panel. These circuit breakers feed the D.C. loads and NMEA 2000 bus of the Czone system.

4 Ensure that the fuses in the fuse block under the console are intact.

5 Ensure that the green power LEDs on the Czone COIs for feeding the devices are on.

6 Ensure that the green network LEDs on the COIs are on indicating that the Czone NMEA network is intact.

7 Ensure that the green LEDs for each Czone channel on the COIs are on solid indicating there is power to feed those devices.

8 Turn on the multifunction Garmin touch screen displays on the dash.

9 You may now use the Garmin touch screen or dash brow button to operate the horn as desired.

NOTICE **Do not blow the horn without reason. Horn blasts are**

considered signals by other vessels!

TO USE THE NAVIGATION AND ANCHOR LIGHTS

DESCRIPTION: The navigation and anchor lights are 12 volt D.C. LED lights.

LOCATION: On hard top and transom. Switches are in the Czone system.

1 Ensure that the 12 volt “House” battery voltage is adequate (at least 12 volts).

2 Ensure that the “House” battery switch is on at the main D.C. panel to feed power to all of the manual circuit breakers on the D.C. panel except the “Constant Power” circuit breakers which are fed direct from the house batteries all the time.

3 Ensure that the “Elect” (to feed the fuse block for the monitors and other electronics) 50a, “COI 1” (to feed COI1 D.C. Loads) 100 a, “COI 2” (to feed COI2 D.C. loads) 100 a, “OI” (LROI 20a), and “C6” (5a Output Interface) manual circuit breakers are on at the main D.C. panel. These circuit breakers feed the D.C. loads and NMEA 2000 bus of the Czone system.

4 Ensure that the fuses in the fuse block under the console are intact.

5 Ensure that the green power LEDs on the Czone COIs for feeding the devices are on.

6 Ensure that the green network LEDs on the COIs are on indicating that the Czone NMEA network is intact.

7 Ensure that the green LEDs for each Czone channel on the COIs are on solid indicating there is power to feed those devices.

8 Turn on the multifunction Garmin touch screen displays on the dash.

9 You may now use the Garmin touch screens or dash brow switches, to operate the lights as desired.

NOTICE **Observe Colregs (rules of the nautical road) pertaining to when and where navigation lights must be displayed!**

TO USE THE WINDSHIELD WIPER AND WASHER

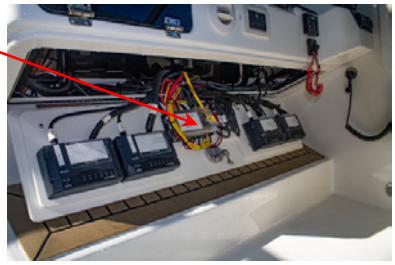
DESCRIPTION: There is a 12 volt windshield wiper and washer for the front console (stbd.) window. There is a 12 volt electric water valve on the fresh water connection to the windshield washer system.

LOCATION: On stbd. console window. The rocker switch for the wiper/washer is to stbd. on the console face. The 12 volt electric washer water valve is on the hull side under the sink in the head.

1 Ensure that the 12 volt "House" battery voltage is adequate (at least 12 volts).

2 Ensure that the "House" battery switch is on at the main D.C. panel to feed power to all of the manual circuit breakers on the D.C. panel except the "Constant Power" circuit breakers which are fed direct from the house batteries all the time.

3 Ensure that the "Elect" (to feed the fuse block for the monitors and other electronics) 50a, "COI 1" (to feed COI1 D.C. Loads) 100 a, "COI 2" (to feed COI2 D.C. loads) 100 a, "OI" (LROI 20a), and "C6" (5a Output Interface) manual circuit breakers are on at the main D.C. panel. These circuit breakers feed the D.C. loads and NMEA 2000 bus of the Czone system.



4 Ensure that the wiper fuse in the fuse block under the console is intact.

5 Ensure that the green power LEDs on the Czone COIs for feeding the devices are on.

6 Ensure that the green network LEDs on the COIs are on indicating that the Czone NMEA network is intact.

7 Ensure that the green LEDs for each Czone channel on the COIs are on solid indicating there is power to feed those devices.

8 Ensure that the fresh water pump circuit breaker is on and that there is water pressure (See the Fresh Water topics).

9 Use the windshield wiper rocker switch to control the wiper/washer.

RESPONDING TO A CARBON MONOXIDE ALARM

DESCRIPTION: There is an Intertek CMD5-MB battery operated Carbon Monoxide Alarm to detect dangerous levels of Carbon Monoxide in the stateroom.

LOCATION: In the stateroom on the aft bulkhead.

DANGER If the Carbon Monoxide alarms triggers respond as follows!

1 Immediately move to a spot where fresh air is available, preferably outdoors.

2 Phone from an area where the air is safe to your public safety service provider (the local fire department if in port or the USCG if underway).

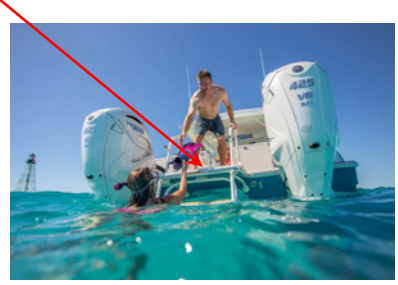
3 Tell your provider the detector alarm status, and that you require professional assistance in ridding your yacht of the carbon monoxide.

NOTICE This detector should be tested and maintained regularly following National Fire Protection Association (NFPA) 720 requirements.

MEANS OF REBOARDING

DESCRIPTION: Unassisted reboarding from the water (means and location).

LOCATION: Drop down hinged dive ladder on the swim platform centerline between the engines.



DANGER Ensure that the engines are off!

1 The ladder hinges back and down into the water.

2 Release the ladder retainer straps while hanging on to the side rails and taking care not to allow the ladder to drop back onto to you.

3 Ease the ladder back and down until the hinged portion is fully lowered into the water.

DANGER Reboard the vessel using the ladder only. Do not stand on or grab the engines!

4 Grasp the hand rails on each side of the ladder and climb the ladder.

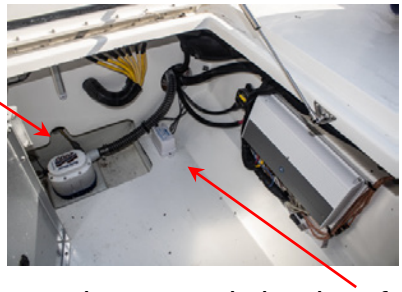
WARNING Swimming near the transom while engines or generator is running may led to carbon monoxide poisoning! Shut of engines and generator while persons are in the water!

WARNING Do not start the engines or get underway unless the ladder is fully retracted out of the water a secured!

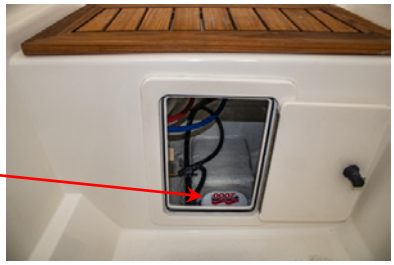
BILGE PUMP OPERATIONS
3.2

TO USE THE 12 VOLT BILGE PUMPS

DESCRIPTION: There are four bilge zones in the Worldcat. They are the port forward zone which is in the port hull from the bow to the aft end of the stateroom, the port aft bilge zone which is in the port hull from the stateroom to the transom, the stbd. forward bilge zone which is in the stbd. hull from the bow to aft end of the head, and the stbd. aft bilge zone which is in the stbd. hull from the head to the transom. Each zone contains a Rule-Mate 2000 (2000 GPH) 12 volt manual/automatic submersible bilge pump with an automatic internal switch and manual switching on the dash controlled by the Czone system. The automatic function of each pump receives power from a dedicated manual circuit breaker fed from the 12 volt house battery system off of the “Continuous Power” section of the main DC panel which is unswitched by the house battery switch. The aft two bilges have separate Rule-A-Matic Plus 40 A level alarm switches also fed from dedicated manual circuit breakers by the 12 volt house battery system off of the “Continuous Power” section of the main DC panel also unswitched by the house battery switch. The pumps are controlled manually by the Czone system dash brow buttons and touch screen buttons. The high level alarms and run status indicate on the Czone system with visual alarms only.



LOCATION: The port forward bilge pump is in the port hull bilge forward under the aft end of the bed in the stateroom and discharges out the port hull side forward, the port aft bilge pump is in the port hull bilge (mechanical room) just forward of the transom and discharges out the port hull side aft, the stbd. forward bilge pump is in the stbd. hull bilge under the shower seat and discharges out the stbd. hull side forward, and the stbd. aft bilge is in the stbd. hull bilge (mechanical room) just forward of the transom and discharges out the stbd. hull side aft. The bilge level alarm switches are beside the aft pumps.

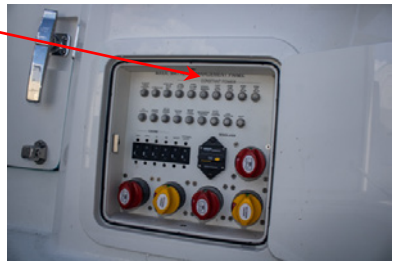


The port forward bilge zone contains the port forward discharge thru hulls and the lower deck air conditioning raw water discharge. The port aft bilge zone contains the port gasoline tank, generator diesel tank, generator raw water suction and exhaust, the sea chest raw water suction, and the port aft discharge thru hulls. The stbd. forward bilge zone contains the stbd. forward discharge thru hulls, the sewage tank discharge thru hull, the sink and shower sump discharges, and the fresh water tank. The stbd. aft bilge zone contains the stbd. gasoline tank and the stbd. aft discharge thru hulls.

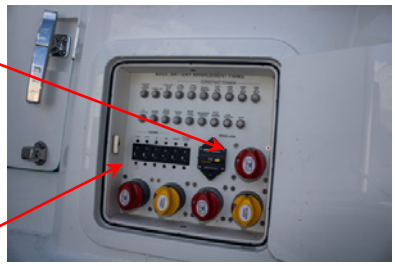
The manual bilge pump switches are across the top of the dash brow.

1 Ensure that the 12 volt “House” battery voltage is adequate (at least 12 volts).

2 Ensure that the bilge pump and alarm float manual circuit breakers in the “Constant Power” section of the main D.C. panel are on. These supply D.C. power to the automatic functions of the bilge pumps independent of the Czone system. If bilge water levels rise high enough to activate any of the pumps the corresponding pump will go on and pump until the level drops. A “Running” indicator on the applicable Czone screen will come on while the pump is running.

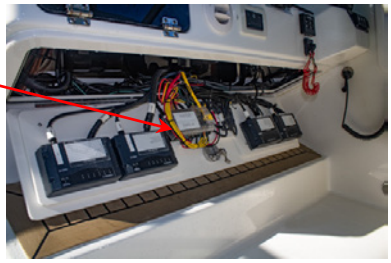


3 Ensure that the “House” battery switch is on at the main D.C. panel to feed power to all of the manual circuit breakers on the D.C. panel except the “Continuous Power” circuit breakers which are fed direct from the house batteries all the time.



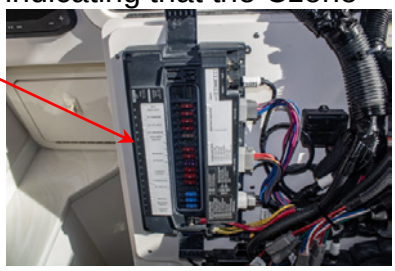
4 Ensure that the “Elect” (to feed the fuse block for the monitors and other electronics) 50a, “COI 1” (to feed COI1 D.C. Loads) 100 a, “COI 2” (to feed COI2 D.C. loads) 100 a, “OI” (LROI 20a), and “C6” (5a Output Interface) manual circuit breakers are on at the main D.C. panel. These circuit breakers feed the D.C. loads and NMEA 2000 bus of the Czone system.

5 Ensure that the fuses in the fuse block under the console are intact.



6 Ensure that the green power LEDs on the Czone COIs for feeding the devices are on.

7 Ensure that the green network LEDs on the COIs are on indicating that the Czone NMEA network is intact.



8 Ensure that the green LEDs for each Czone channel on the COIs are on solid indicating there is power to feed those devices.

9 Turn on the multifunction Garmin touch screen displays on the dash.

10 You may now use the Garmin touch screens or turn on any of the Rule submersible pumps manually using the bilge pump switches on the top of the dash brow. These manual switches operate their pumps for 10 minutes and turn off automatically if there is no more water to pump.

NOTICE **Observe local water pollution laws!**

NOTICE **Check function of all bilge pumps at regular intervals. Clear pump inlets from debris!**

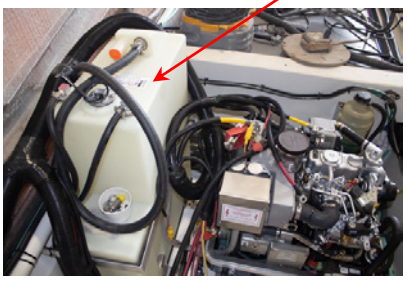
NOTICE **The combined capacity of the system is not intended to drain the craft in the case of damage!**

FUEL SYSTEM OPERATIONS
3.3

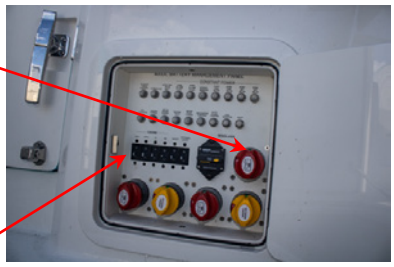
TO MEASURE THE LEVEL OF FUEL IN THE FUEL TANKS

DESCRIPTION: There are two 232 USG welded aluminum (engine) gasoline tanks and one 24 USG Duracast (generator) diesel tank. Fuel tank level is sensed by 12 volt sending units in the tank tops and sent to the Czone system digital display via the NMEA 2000 bus.

LOCATION: The main gasoline fuel tanks are port and stbd. under the mid deck. The generator diesel tank is under the port aft deck settee outboard of the generator. The tank sending units are on the tank tops.

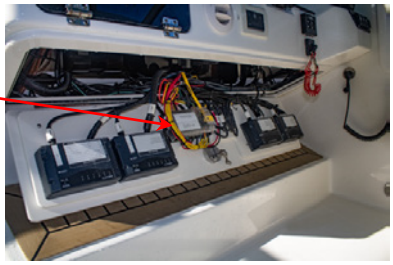


1 Ensure that the 12 volt “House” battery voltage is adequate (at least 12 volts).



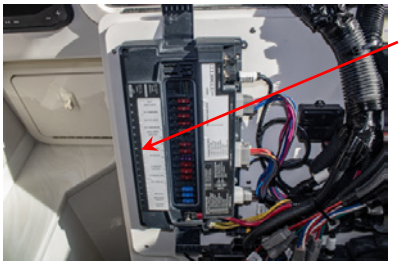
2 Ensure that the “House” battery switch is on at the main D.C. panel to feed power to all of the manual circuit breakers on the D.C. panel except the “Constant Power” circuit breakers which are fed direct from the house batteries all the time.

3 Ensure that the “Elect” (to feed the fuse block for the monitors and other electronics) 50a, “COI 1” (to feed COI1 D.C. Loads) 100 a, “COI 2” (to feed COI2 D.C. loads) 100 a, “OI” (LROI 20a), and “C6” (5a Output Interface) manual circuit breakers are on at the main D.C. panel. These circuit breakers feed the D.C. loads and NMEA 2000 bus of the Czone system.



4 Ensure that the fuses in the fuse block under the console are intact.

5 Ensure that the green power LEDs on the Czone COIs for feeding the devices are on.



6 Ensure that the green network LEDs on the COIs are on indicating that the Czone NMEA network is intact.

7 Ensure that the green LEDs for each Czone channel on the COIs are on solid indicating there is power to feed

those devices.

8 If A.C. power is connected on the boat ensure that the green LED for each circuit on the ACOI #1 is on. A red LED indicates a fault for that circuit.

9 Turn on the multifunction Garmin touch screen displays on the dash.

10 You may now use the Garmin touch screens to view the fuel tank levels.

TO FILL THE FUEL TANKS

DESCRIPTION: There are two 232 USG welded aluminum (engine) gasoline tanks and one 24 USG Duracast (generator) diesel tank. Fuel tank level is sensed by 12 volt sending units in the tank tops and sent to the Czone system digital display. Each tank has a fill and vent.

LOCATION: The main gasoline fuel tanks are port and stbd. under the mid deck. The generator diesel tank is under the port aft deck settee outboard of the generator. The tank sending units are on the tank tops. The fills are on the quarter decks and the vents are to the respective hull sides.

NOTICE **Ensure that fuel source meets Yamaha (gasoline) and Panda (diesel) specifications and that the fuel is clean and free of water! Do not use leaded gasoline or gasoline that contains more than 10% Ethanol!**

NOTICE **Do not use fuel additives unless approved by Yamaha (for main engines) and Panda (for the generator)!**

1 Check the present level of fuel in the tanks on the Czone display to determine how much fuel will be required. Allow some room for expansion.

⚠WARNING **Gasoline and its vapors are highly flammable and explosive. Always refuel with this procedure to reduce risk of fire and explosion. Gasoline is poisonous an can cause injury or death. Handle gasoline with care!**

NOTICE **Ensure that the vessel is securely moored to a pier or on a trailer with the engines and generator stopped in a well ventilated outdoor area and that the incoming fuel hose nozzle will be clear of lines, piers, etc.! Make sure that no one is smoking nearby and that there are no open flames, static discharge, or other sources of ignition. Touch the fuel nozzle to the filler opening to help prevent electrostatic sparks!**

2 Open the deck cap and place the fuel nozzle in the correct fill pipe.

3 Fill while having someone report on level changes by monitoring the Czone digital display.

NOTICE **Never leave the fuel hose shut off nozzle unattended while filling!**

NOTICE **Allow room for expansion after filling!**

4 When finished close caps securely.

NOTICE **Obey all local laws concerning fuel spillage!**

TO PRIME THE MAIN ENGINE FUEL SYSTEMS

DESCRIPTION: The main engines have hand priming bulbs in the fuel supply lines to prime the engines before starting.

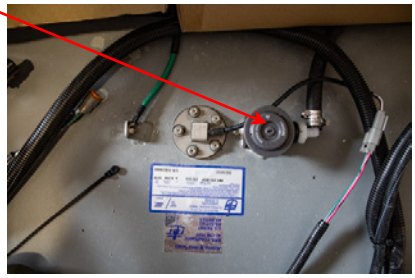
Each main engine is also fitted with an Attwood inline fuel demand valve that does not open until there is suction from the engine side. These are in the system to prevent any pressure built up in the tank from flowing toward the engine when it is off potentially causing a leak. The fuel demand valves have manual override capabilities built in.

LOCATION: Priming bulbs are in the fuel hoses forward of the engines on the downstream (discharge to the engines) side of the fuel/water separator filters. The demand valves are on the fuel tank top suction connections under the deck.

1 Ensure that there is sufficient gasoline in the engine fuel tanks.

2 Squeeze the fuel priming bulbs with the arrow molded on them pointing up until they resist squeezing.

NOTICE **If the fuel tank has fuel in it and the hand priming bulb cannot pull suction the demand valve can be overridden if stuck by pressing the end of a flat blade screw driver into the override slot on the top of the valve.**



TO SERVICE THE MAIN ENGINE FUEL/WATER FILTER ELEMENTS

DESCRIPTION: Each engine has a Yamaha 90 GPH/10 Micron MAR-10MEL-00-00 closed canister type disposable water/gasoline prefilter on the supply from the tank to the engine.

LOCATION: The Yamaha 90 GPH/10Micron canister filters are on the suction side of the priming squeeze bulbs on the inside of the transom in the bilge for each engine on their respective side.

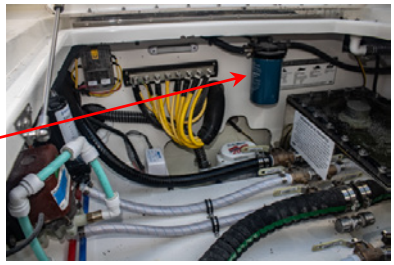
⚠WARNING Gasoline and its vapors are highly flammable and explosive. Make sure that no one is smoking nearby and that there are no open flames, static discharge, or other sources of ignition when carrying out this procedure. Gasoline is poisonous an can cause injury or death. Handle gasoline with care!

1 The engine must be shut down to change this filter.

2 Have a strap wrench, bucket, shallow pan, glass jar, and rags handy.

3 Remove the engine shut off clip from the engine shut off switch so that the engines cannot be inadvertently started during this operation.

4 Place a rag down with the shallow pan on top of it under the spin off filter.



5 Use the strap wrench to remove (unscrew) the filter.

6 Empty the filter contents into the glass jar and observe for debris and water. If debris or water is observed the gasoline tanks should be professionally cleaned and the contents replaced.

7 Retain the gasoline drained from the filter in the glass jar if it is clean and clear.

8 Place the empty old spin off canister element in the bucket for disposal.

9 Carefully fill the new clean filter canister with the clean gasoline retained in the glass jar.

10 Carefully spin on the new clean canister until it is hand tight.

11 Whether the new clean canister was refilled with clean gasoline or not remove the hose between discharge side of the priming squeeze bulb and the engine while capturing any gasoline drainage from the hose into the glass jar.

12 While still holding the open end of the bulb over the glass jar squeeze the fuel priming bulb with the arrow molded on it pointing up while holding your thumb tight over the open hose end to cap it on the release (expansion) strokes and then allowing gasoline and air to escape from under your thumb on the compression strokes until gasoline flows out of the bulb into the glass jar.

13 Reattach the hose between the priming bulb and the engine that was removed in step 11.

14 Squeeze the fuel priming bulb with the arrow molded on it pointing up until it resists squeezing.

NOTICE **Dispose of old filter elements and any spilled or discarded gasoline and saturated rags properly ashore!**

15 Replace the engine shut off clip on the engine shut off switch and start the engine.

See also the *Yamaha* literature.

TO SERVICE THE ON ENGINE FUEL FILTERS

DESCRIPTION: There is an on engine gasoline water separator with replaceable filter element (Xislet) for each engine.

LOCATION: The on engine gasoline filter/separators are on the port lower front side of each engine under the cowling covers.

WARNING Gasoline and its vapors are highly flammable and explosive. Make sure that no one is smoking nearby and that there are no open flames, static discharge, or other sources of ignition while carrying out this procedure. Gasoline is poisonous an can cause injury or death. Handle gasoline with care!

1 See Yamaha engine owner's manual.

2 Engine must be stopped.

3 Have rags and a bucket handy.

4 Replace filters as per Yamaha instructions.

5 Reprime the fuel system as necessary (see that topic).

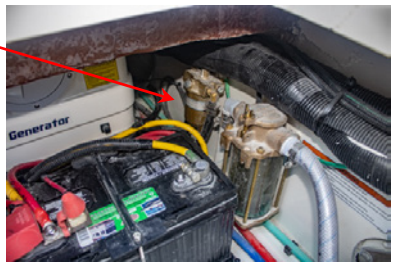
NOTICE Dispose of spent filter elements and any spilled fuel properly ashore!

NOTICE If while draining the canister there is water in the fuel see the Yanmar Owner's manual for instructions. After following those instructions ensure the 90 GPG/10 Micron fuel water separators in the aft bilges (mechanical rooms) are drained and clear of water as well!

TO CHANGE THE GENERATOR RACOR FILTER ELEMENT

DESCRIPTION: There is a Racor 110A fuel/water separator in the fuel supply line to the generator. The generator Racor fuel filter uses a Racor R11T 10 micron element.

LOCATION: Inboard of the generator in the port bilge (mechanical room) area.



1 Generator must be stopped.

2 Have a flat metal pan, bucket, and rags handy.

3 Open the vent plug on the top of the filter casing.

4 Drain the filter into the flat pan under the filer by opening the bottom plug. Close the bottom plug when done.

5 Spin off the bowl, remove the filter, and place in the bucket.

6 Lubricate the new filter seals with motor oil or clean fuel and install the new filter in the bowl.

7 Fill the filter bowl with fuel and spin back onto mounting head. Tighten snugly by hand.

8 Close the vent plug. Tighten Snugly. Open all fuel valves, if applicable.

9 Start the generator and check for leaks. Correct as necessary with the generator off.

10 Prime the system if necessary.

See also the *Racor* 110A filter literature.

NOTICE **Dispose of spent filter elements and any spilled fuel and saturated rags properly ashore!**

TO CHANGE THE ON GENERATOR FUEL FILTER

DESCRIPTION: In line fuel filter canister (Panda#: FP1000438).

LOCATION: On the generator under the sound shield in the fuel line on the aft side inboard.

NOTICE The generator must be stopped first!

1 See the *Panda* literature first.

2 Have a bucket and rags handy.

3 Turn off the port start battery switch so that the generator can not be started from the remote station during this operation.

4 Change the in line fuel filter on the generator as per the *Panda* instructions.

5 Turn back on the port start battery switch, prime the system, start the generator, and check for leaks.

6 The generator may be started and operated as desired.

NOTICE Dispose of the old filter and any spilled fuel properly ashore!

See also the *Panda* literature.

TO PRIME THE GENERATOR FUEL SYSTEM

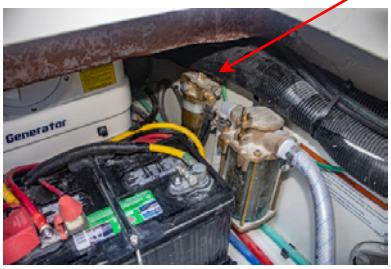
DESCRIPTION: A Facet 12 volt fuel priming pump is inline in the Panda generator fuel system feed line.

LOCATION: On the platform outboard of the generator engine.

1 Ensure that the port start battery switch is on in the main D.C. panel. This can be remotely turned on from the Czone system touch screen.

2 Check that the on generator 30 amp D.C. fuse is intact (on aft lower side of engine outboard).

3 Open the air vent screw on top of the generator Racor filter.



4 Press the “On/Off“ button on the remote panel in the stateroom by the AC source selector circuit breakers. The control light for the “On/Off” button must light up. The electric fuel pump should come on and dispel any air in the system out through the vent screw on the Racor fuel fiter until fuel starts to flow out. When fuel flows out shut the vent screw.

5 Should manual bleeding be necessary, press the ON button on the generator control panel and wait 30 seconds before starting the generator.

6 If all else fails press the manual override button on the generator to run the 12 volt priming pump.

ELECTRICAL SYSTEM OPERATIONS 3.4

ABOUT THE CZONE SYSTEM

DESCRIPTION: This section is included in the Safety section as well because the Czone system also controls the monitoring and alarm functions.

The Czone system on the Worldcat 400DCX is a state of the art monitoring and control system that integrates the ability to connect, protect, monitor and distribute both D.C. and A.C. electrical sources to loads (consuming devices) and to monitor the status of most onboard systems. The system facilitates the use wireless Bluetooth FOBs to operate the “House” battery switch, the overhead hard top lighting, and the boarding lighting from a distance. The architecture of the system consists of the D.C. and A.C. wiring to feed the load carrying devices, digitally controlled A.C. and D.C. controllers to act as circuit protection, switches, and status indication, a 12 volt D.C. NMEA 2000 data bus interconnecting all of the devices for monitoring and control with touch screens as a user interface. All of the devices have manual override capabilities.

Combination Output Interfaces (COIs) combine multiple input and output D.C. devices into single modules, offering a compact and intelligent replacement for traditional D.C. fuse boxes and circuit breaker panels with digital switching technology. There are two COIs in the Worldcat 400DC-X Czone system. There are two Switch Control Interfaces (SCIs) to integrate more traditional “hard” switches.

Each Combination Output Interface, however, uses just one compact 30-channel unit to provide all the necessary outputs.

A USB port on each COI allows for easy system upgrades.

The dash console Garmin monitor touch screens are used to operate the system centrally, and as the ABYC and CE safety authorities require every circuit to have both a fuse and a bypass, this is provided within the COIs. Each ATC fuse can be simply withdrawn to isolate a circuit, and pushed into a different position to create a bypass. To aid identification of the individual fuses, there is an adhesive circuit label. A clear plastic cover protects the fuses. Red and green LEDs on the COIs indicate a circuit’s status at a glance.

The Combination Output Interfaces have multiple layers of protection provided by software, hardware and mechanical means for ultimate reliability.

Other features include high power pump channels to allow manual control, plus pump running feedback, from a single channel without the need for additional wiring. In addition, the COIs each provide six digital switch inputs (wiper, horn, etc.) via connection of a Contact 6/SCI (Switch Control Interface) pair to connect conventional switches like those across the top of the dash brow, eight analogue monitoring inputs (battery condition, tank fluid levels, wireless Bluetooth fob control, etc.) twelve low

current (10 A) outputs (courtesy lights, anchor light, etc.) and four high current (25 A) outputs (bilge and water pumps etc.).

The COIs are supplied D.C. load power from the house battery bank to power the D.C. loads and the NMEA 2000 data network integrating the system is powered by 12 volt power from the house battery system fed from conventional manual circuit breakers on the main D.C. panel and fuses.

The yacht's A.C. sources are fed via traditional manual source selector circuit breakers from either the 50 amp 120 volt shore power cable or the diesel generator to the Czone ACOI (A.C. Output Interface).

The ACOI distributes the A.C. power to the onboard A.C. consumer devices by remote controlled distribution circuit breakers operated by the Garmin touch screens via signals through the NMEA 2000 12 volt D.C. data bus or manually actuated on the ACOI enclosure itself. Each remotely controlled A.C. consumer distribution circuit on the ACOI also has a backup manual override circuit breaker above it on the ACOI unit enclosure as well.

The ACOI provides the following functionality to the A.C. system:

- Monitoring of each distribution circuit' status and run current.
- Circuit protection and control.
- Manual override at the enclosure.
- Status LEDs on the ACOI enclosure.
- Staggered startup of loads.
- Delay before circuits come on to allow generator to come up to speed.
- Current, voltage, frequency and power monitoring incorporated (two channels).
- Circuit status and run current displayed for each circuit.

The ACOI (A.C. Output Interface) distribution circuit breakers supply the A.C. consumer circuits which are:

Battery Charger

Air Conditioner #1 (Cabin)

Air Conditioner #2 (Deck)

Microwave Oven

Water Heater

Refrigerator Drawers

Stbd. A.C. Receptacles

Port A.C. Receptacles

NOTICE **The engines are also fitted with Yamaha NMEA 2000 electronic monitoring (CL7 display) interfaced into the Garmin displays as well.**

Engine information is displayed for each engine redundant to the Yamaha CL7 stand alone display which also displays alarms, trouble codes, maintenance logs, and trip information such as distance and hours, and allows for reset of these values. The Yamaha CL7 display acts as the master display.

Engine maintenance information is displayed, and maintenance intervals can be set, as well as the time elapsed since the previous maintenance can be reset.

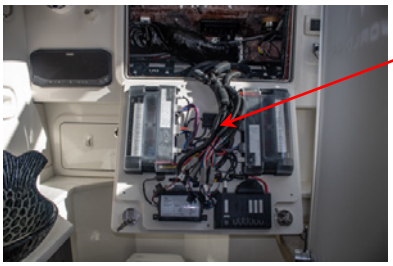
Tank level sensor information, trim angle of the engines, active alarms for the engines, and trouble codes for active engine alarms are displayed. This information is useful to Yamaha dealers for diagnosis.

The following vessel system components are integrated into the data bus.

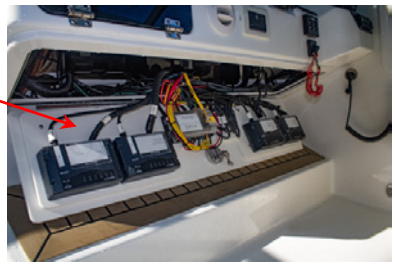
- The Yamaha CL7 display.
- Main (gasoline) and diesel (generator) fuel tank level sensors (KUS).
- Fresh water and sewage tank level sensors (KUS) and (Thetford).
- 2 17” Garmin GPS-MAP 8617 multi function touch screen monitors.
- Depth transducer.
- JL Audio MM 100-BE stereo.
- GPS s
- ITC Lighting RGB digital control unit.

LOCATION: The house batteries are in the aft bilge compartments (mechanical rooms) port and stbd.. The main D.C. panel is to port aft on the aft deck side coaming just forward of the port boarding door. The 12 volt house battery isolator switch which feeds power to the main D.C. panel is the top forward one in the D.C. panel face.

The Czone wiring is built into the yacht. The COIs, OI, and Bluetooth fob remote control signal receiver are below the main helm station behind the drop down mirror panel on the aft wall of the head compartment.



The 2 Contact 6 units, a 12 volt fuse block, and 2 SCIs (switch control interfaces) are in the steering console lower portion on the helm (aft) side.

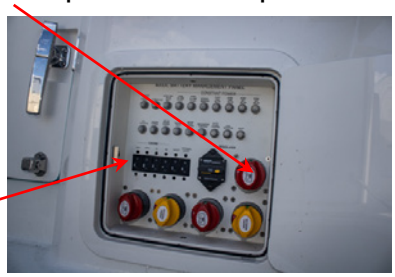


The ACOI is in the stateroom on the aft wall below the manual A.C. source select circuit breaker panel.

1 Ensure that the 12 volt “House” battery voltage is adequate (at least 12 volts).

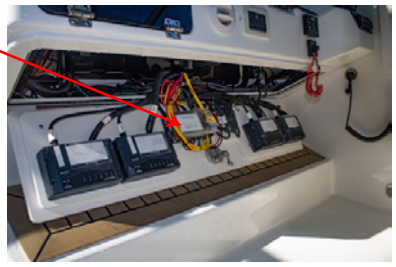
2 Ensure that the bilge pump and alarm float manual circuit breakers in the “Constant Power” section of the main D.C. panel are on. These supply D.C. power to the automatic functions of the bilge pumps independent of the Czone system.

3 Ensure that the “House” battery switch is on at the main D.C. panel to feed power to all of the manual circuit breakers on the D.C. panel except the “Constant Power” circuit breakers which are fed direct from the house batteries all the time.

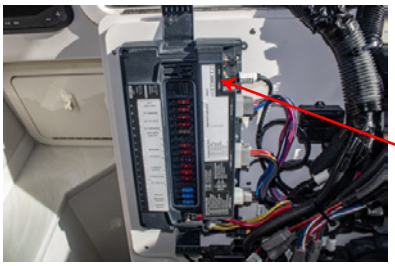


4 Ensure that the “Elect” (to feed the fuse block for the NMEA 2000 data bus, monitors, and other electronics) 50a, “COI 1” (to feed COI1 D.C. Loads) 100 a, “COI 2” (to feed COI2 D.C. loads) 100 a, “OI” (LROI 20a), and “C6” (5a Output Interface) manual circuit breakers are on at the main D.C. panel. These circuit breakers feed the D.C. loads and the Czone system.

5 Ensure that the fuses in the fuse block under the console are intact.



6 Ensure that the green power LEDs on the Czone COIs for feeding the devices are on.



7 Ensure that the green network LEDs on the COIs are on indicating that the Czone NMEA network is intact.

8 Ensure that the green LEDs for each Czone channel on the COIs are on solid indicating there is power to feed those devices.

9 If A.C. power is connected on the boat ensure that the green LED for each circuit on the ACOI #1 is on. A red LED indicates a fault for that circuit.

10 Turn on the multifunction Garmin touch screen displays on the dash.

11 You may now use the Garmin touch screens or switches and Bluetooth remote control fobs to operate the equipment as desired.

12 As long as the “Elect”, “COI1”, “COI2”, “OI”, and “C6” circuit breakers on the main D.C. panel are on when the house battery switch is turned on the system is programed so that the Yamaha CL7, Garmin displays, Czone system, and starting battery switches will all turn on too.

13 The Czone system also has 5 preprogramed vessel operational modes or configurations that can be selected on the Czone screens. These modes are as follows:

Day Cruise

- All air conditioning circuit breakers on.
- Grill circuit breaker on.
- Raw water pump circuit breaker on.
- Stbd. drawer refrigerator circuit breaker on.
- All A.C. outlets live.
- Water heater on.

Night Cruise

- All air conditioning circuit breakers on.
- Grill circuit breaker on.
- Raw water pump circuit breaker on.
- Stbd. drawer refrigerator circuit breaker on.
- All A.C. outlets live.
- Water heater on.
- Nav. Lights on.

Night Entertaining

- Courtesy lights on.
- Fresh pump circuit breaker on.
- Hardtop lights on.
- Step lights on.
- Underwater lights on.

Exit Lights/ Battery Off

- Boarding lights on.
- Hardtop lights on.
- Step lights on.
- House battery switch off after 90 seconds (all goes off).

All Off

- All Czone controlled circuits off.

NOTICE **Verify that batteries are charging as desired!**

TO MONITOR THE D.C. SYSTEM

DESCRIPTION: The Czone system monitors and displays the voltage, amperage incoming (charge) or outgoing (discharge), and % state of charge in all of the 12 volt battery systems (port starting battery, stbd. starting battery, and house battery bank).

The A.C. battery charger is also equipped with a multicolor LED display. Different LED colors and combinations have different meanings. Combinations of the current display (A) with the load bar shows the percentage of maximum current of the three Battery banks together. Combination of (V) with the load bar shows the actual charging voltage.

The Yamaha CL7 dedicated digital engine monitoring device also monitors engine battery condition and displays it as well as indicating low voltage alarms and logging trouble codes.

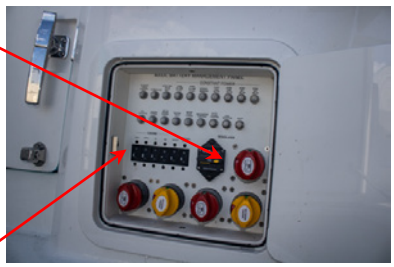
The Panda generator digital display indicates the generator 12 volt starting battery (stbd. starting battery) voltage.

Each battery has a 3 amp inline bus fuse connected to its positive terminal for its monitoring by the Czone system.

LOCATION: The Czone system (see that topic) components are mostly below the control console. The battery monitoring connection fuses are in yellow holders connected to the positive terminal on top of each battery in the aft bilges. The data monitored by the Czone system can be selected from and displayed on the Garmin touch screens on the dash. The A. C. battery charger is on the port hull side in the port aft bilge (mechanical room). The Yamaha CL7 is on the dash. The Panda generator digital display is on the aft bulkhead of the stateroom.

1 Ensure that the 12 volt “House” battery voltage is adequate (at least 12 volts).

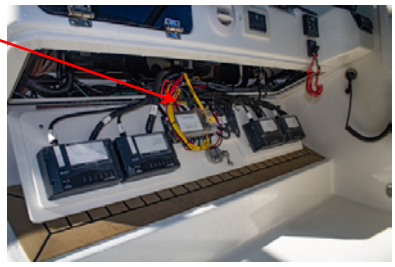
2 Ensure that the “House” battery switch is on at the main D.C. panel to feed power to all of the manual circuit breakers on the D.C. panel except the “Continuous Power” circuit breakers which are fed direct from the house batteries all the time.



3 Ensure that the “Elect” (to feed the fuse block for the monitors and other electronics) 50a,”Optional Distr” 50a, “COI 1” (to feed COI1 D.C. Loads) 100 a, “COI 2” (to feed COI2 D.C. loads) 100 a, “OI” (LROI 20a), and “C6” (5a

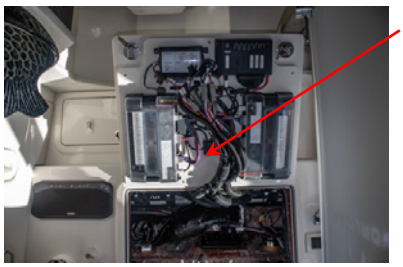
Output Interface) manual circuit breakers are on at the main D.C. panel. These circuit breakers feed the D.C. loads and NMEA 2000 bus of the Czone system.

4 Ensure that the fuses in the fuse block under the console and in the fuse holders on the battery tops are intact.



5 Ensure that the green power LEDs on the Czone COIs for feeding the devices are on.

6 Ensure that the green network LEDs on the COIs are on indicating that the Czone NMEA network is intact.



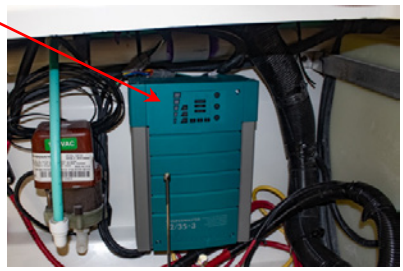
7 Ensure that the green LEDs for each Czone channel on the COIs are on solid indicating there is power to feed those devices.

8 If A.C. power is connected on the boat ensure that the green LED for each circuit on the ACOI #1 is on. A red LED indicates a fault for that circuit.

9 Turn on the multifunction Garmin touch screen displays on the dash.

10 You may now use the Garmin touch screens to view the Czone D.C. system status.

11 The Mastervolt battery charger displays charge information on its face. See the *Mastervolt* charger literature.



12 The Yamaha CL7 is on the dash. Use the buttons on the unit to change the display to indicate the battery information. See the *Yamaha* engine literature.

13 The Panda generator digital display will indicate the voltage of its starting battery (the port start battery) when it is running. Press the “Next Screen” (middle) button until the screen enters Generator View and displays “Bs:” at the bottom. The value for Bs will be the battery voltage. See the *Panda* generator literature.

TO CHARGE THE BATTERIES

DESCRIPTION: There is a Mastervolt Chargemaster 12/35-3 120 volt battery charger that charges all of the batteries directly. There is a Blue Sea Systems 4176 40 amp fuse on the charging input terminal connection to each battery direct from the Mastervolt charger. The Mastervolt charger outputs do not go thru the battery switches. The engines' alternators send a charge through their start battery switches to their respective starting battery and direct to the House Batteries via a 200 amp MRCB circuit breaker from each engine when they are running. In this way each engine charges its own respective starting battery and the house batteries when it is running. Thus both engines or the Mastervolt battery charger charge all of the batteries. The generator alternator charges only its own starting battery (port) battery. *See the Mastervolt battery charger and Yamaha engine literature first.*

LOCATION: The 120 volt charger is to port outboard in the port aft bilge (mechanical room) area. The fuses on the cable connections from the battery charger to each battery are on the positive lead terminal connections to each battery at the battery tops. The 200 amp circuit breakers on the engine alternator charge outputs to each house battery are in the port and stbd. hull aft bilge areas (mechanical rooms). The port one is aft of the battery charger on the hull side and the stbd. one is aft of the stereo amplifier on the inboard side. The engine fuse box is on top of each engine under the cowling.

NOTICE **Do not turn any of the battery switches off with the engines running or the ignitions on!**

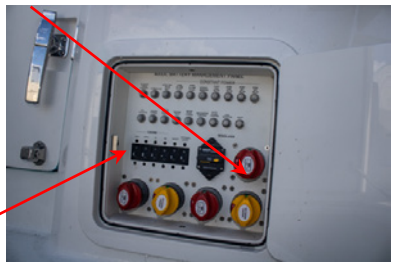
NOTICE **Do not turn off the port starting battery switch with the generator running!**

FOR CHARGING WITH THE MASTERVOLT A.C. POWERED CHARGER:

1 Ensure that the Blue Sea Systems 4176 40 amp fuses on the charging input terminal connection to each battery from the output side of the battery charger are intact.

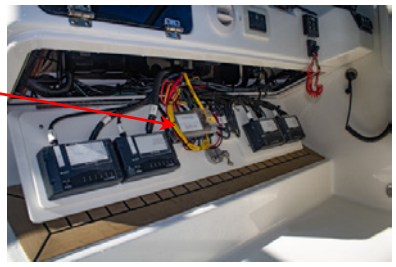
2 Ensure that the 12 volt "House" battery voltage is adequate (at least 12 volts) to power the Czone system.

3 Ensure that the “House” battery switch is on at the main D.C. panel to feed power to all of the manual circuit breakers on the D.C. panel except the “Constant Power” circuit breakers which are fed direct from the house batteries all the time.



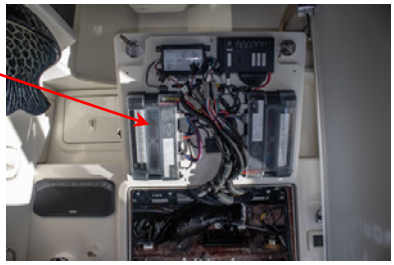
4 Ensure that the “Elect” (to feed the fuse block for the monitors and other electronics) 50a, “COI 1” (to feed COI1 D.C. Loads) 100 a, “COI 2” (to feed COI2 D.C. loads) 100 a, “OI” (LROI 20a), and “C6” (5a Output Interface) manual circuit breakers are on at the main D.C. panel. These circuit breakers feed the D.C. loads and NMEA 2000 bus of the Czone system.

5 Ensure that the fuses in the fuse block under the console are intact.



6 Ensure that the green power LEDs on the Czone COIs for feeding the devices are on.

7 Ensure that the green network LEDs on the COIs are on indicating that the Czone NMEA network is intact.



8 Ensure that the green LEDs for each Czone channel on the COIs are on solid indicating there is power to feed those devices.

9 Turn on the multifunction Garmin touch screen displays on the dash.

10 You may now use the Garmin touch screens to view the Czone D.C. system status and operate devices on it.

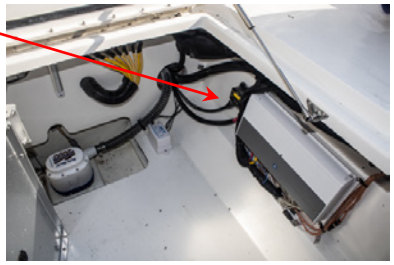
11 Ensure that A.C. power from the generator or shore power is connected to the main A.C. panel (ACOI #1) in the stateroom. Ensure that the “All AC Circuits” circuit breaker on the Czone screen is on and that the 20 amp Battery Charger feed A.C. circuit breaker on the ACOI #1 is on. The battery charger circuit breaker can be turned on from the Czone screen on the Garmin touch screens. The green LED for each circuit on the ACOI #1 in the stateroom indicates that it is on. A red LED indicates a fault for that circuit.

12 Turn on the battery charger on its face. The ChargeMaster is activated by holding the POWER switch on it pressed for approx. 5 seconds. The POWER switch will illuminate green. The state of charge (which is stored in the memory of the ChargeMaster) will be displayed. If necessary and if AC power is available, the ChargeMaster will start to charge the batteries. Once switched on, the ChargeMaster automatically resumes operation after it was disconnected from an AC-source temporarily. By pressing the POWER button again for approx. 5 seconds, the ChargeMaster will switch back to stand-by: the ChargeMaster stops and the POWER switch illuminates red.

13 The battery condition can be monitored on the Czone system screens or the Yamaha CL7 (for the start batteries) and the Panda remote (for the port start battery).

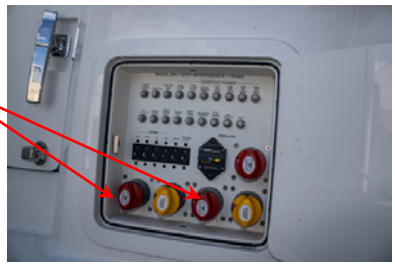
FOR CHARGING WITH THE ENGINES:

1 Ensure that the 200 amp MRCB circuit breakers on the output side of each engine are closed (yellow lever rotated to the “on” position) in order for the engines to charge the house batteries. Either or both engines running will charge *the house bank* regardless of the position of the starting battery switches.



2 Ensure that the fuses in the fuse blocks on top of the engines under the cowlings are intact.

3 Ensure that the port and stbd. start battery switches are on.



4 Run either engine.

5 The Czone screens will display the condition and charge information for all of the batteries and the Yanmar CL7 will display engine start battery state of charge information. The Panda generator remote control will display the port starting battery voltage when it is running.

See also the *Mastervolt charger and Yamaha engine literature*.

TO USE THE BATTERY SWITCHES

DESCRIPTION: There are three 12 volt battery banks (two starting battery banks and a "House" service battery bank). The starting battery banks consist of a single Interstate 27M-XHD, 800 CCA, lead acid 12 volt battery for each engine. The port starting battery also starts the generator and the stbd. starting battery also powers the anchor windlass. The "House" service battery bank consists of 2 Interstate SRM-31, 675 CCA, 98AH, lead acid 12 volt batteries wired in parallel for double capacity. The "House" service battery bank's function is to supply D.C. power to the yacht's 12 volt D.C. loads (devices). There are a total of five battery switches. They are all of the 2 position on/off type to isolate the supply from the batteries to/from each engine/alternator, the generator, the windlass, the "House" panel supply, as well as enable paralleling of the two engine start batteries and paralleling the "House" bank to the starting batteries. The "House" battery switch only switches on and off the load and not the charging sources coming into the "House" bank. The engine alternator output (charge) to the *House* batteries is not affected by the position of the starting battery switches. The battery switches are all manually operated and remote controlled by the Czone system. The House battery switch can also be operated remotely by one of the Bluetooth Czone (not the Yamaha EKS) key fobs.

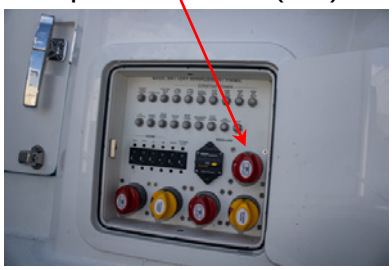
LOCATION: The port starting/generator battery is in the port aft bilge (mechanical room) in front of the battery charger.

The stbd. starting/windlass battery is in the port aft bilge in front of the port starting battery.

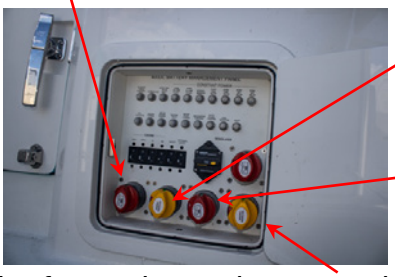
The port "House" battery of that two battery bank is in the port aft bilge inboard of the stbd. starting battery.

The stbd. "House" battery of that two battery bank is in the stbd. aft bilge (mechanical room).

The battery switches are mounted in the main D.C. panel to port on the aft deck just forward of the port aft boarding gate. The top most switch (red) is the "House" battery switch.



The aft most switch (red) is the port starting/generator battery switch.



The next battery switch (yellow) forward of that is the engine start battery paralleling switch.

The next switch (red) forward of that yellow switch is the stbd. starting/windlass supply battery switch.

The forward most bottom switch (yellow) is the starting batteries to house bank paralleling switch.

NOTICE **Do not turn the engine or generator battery switches off with the engines or generator running or the ignitions on! The battery switches switch both the load and the charge (only for the starting batteries) coming into the batteries from the engine alternators!**

1 The default position of the battery switches are as follows:

Normal running days:

Port and Stbd. start battery switches ON before starting and while running engines. Port starting battery switch ON while running generator.
“House” battery switch ON to run all systems onboard normally.
Both parallel switches off.
All batteries will still charge as necessary if A.C. battery charger is on (leave on while running generator).
Either or both engines running will charge house bank regardless of position of starting battery switches.

NOTICE **Do not turn the engine or generator battery switches off with the engines or generator running or the ignitions on!**

During shut down times:
Port and Stbd. start battery switches OFF while shut down unless running the generator.

NOTICE Do not turn the port starting battery (generator starting) off with the generator running!

"House" battery switch ON to run all systems onboard normally or OFF to run only "Constant Power" group.
Both parallel switches off.
All batteries will still charge as necessary if A.C. battery charger is on (leave on while connected to shore power).

2 COMMON USAGE SCENARIOS:
Port Start switch ON
Enables power to port engine starter and charge of port start batteries from port engine alternator.
Enables power to generator starter and charge of port starting battery by generator alternator.
Either or both engines running will charge house bank regardless of position of starting battery switches.
All batteries will still charge as necessary if A.C. battery charger is on.

Port Start switch OFF
No power to port engine starter or charge to start batteries from port engine alternator.
No charge of port starting battery by generator alternator.

NOTICE Do not turn the port starting battery (generator starting) off with the generator running!

Either or both engines running will charge house bank regardless of position of starting battery switches. All batteries will still charge if A.C. battery charger is on.
No power to generator starter.

Stbd. Start switch ON
Enables power to stbd. engine starter and charge of stbd. start batteries from stbd. engine alternator.
Enables power to windlass power supply circuit breaker on main D.C. panel.
Either or both engines running will charge house bank regardless of position of starting battery switches.
All batteries will still charge as necessary if A.C. battery charger is on.

Stbd. Start switch OFF
No power to stbd. engine starter or charge of start batteries from stbd. engine alternator.
Either or both engines running will charge house bank regardless of position of starting battery switches. All batteries will still charge if A.C. battery charger is on.
No power to windlass power supply circuit breaker on main D.C. panel.

House battery switch ON
Enables power feed to main DC panel distribution circuit breakers except “Constant Power” group which are fed directly from “House” battery bank.
Either or both engines running will charge house bank regardless of position of starting battery switches.
All batteries will still charge as necessary if A.C. battery charger is on.

House battery switch OFF
No power feed to main DC panel distribution circuit breakers except “Constant Power” group which are always fed directly from “House” battery bank.
All batteries will still charge if A.C. battery charger is on.
Either or both engines running will charge house bank regardless of position of starting battery switches.

Engine Start battery paralleling switch ON
Either engine running will charge (or can drain) both starting batteries.
With both starting battery switches ON generator can start from or windlass can be fed by both starting batteries.
Both starting batteries could become totally discharged.
Either or both engines running will charge house bank regardless of position of starting battery switches.
All batteries will still charge if A.C. battery charger is on.

Engine Start batteries to “House” bank paralleling switch ON
Stbd. engine can be started from or when running will charge (or can drain) both stbd. start battery and “House” battery bank.
Stbd. start battery can feed “House” loads.
Stbd. starting battery and “House” bank could become fully discharged.
Either or both engines running will charge house bank regardless of position of starting battery switches.
All batteries will still charge if A.C. battery charger is on.

All battery switches ON
Both engines and generator can start off of all batteries.
Windlass and all other devices can run off of all batteries.
Either engine can charge all batteries.
All batteries can discharge leaving boat “dead in the water”.
Either or both engines running will charge house bank regardless of position of starting battery switches.
All batteries will still charge if A.C. battery charger is on.

All battery switches OFF
Both engines and the generator will not start.
Windlass and all other devices will not run other than the items powered by the circuit breakers in the “Constant Power” group on the main D.C. panel.
The 120 volt battery charger can charge all of the batteries.
Only the “House” batteries can discharge.

3 Operate the battery switches either by manually rotating them or by using the Czone system touch screens to operate them.

4 The “House” battery switch can be operated remotely using one of the Czone Bluetooth fobs.

⚠ CAUTION **Do not stow items on top of the battery boxes!**

NOTICE **Do not close the parallel switches unless you are doing so only to do an emergency parallel start! Leaving the switches closed can cause the possibility for the discharge of all of the batteries!**

NOTICE **For normal operation the parallel switches should be off and the other battery switches should be on!**

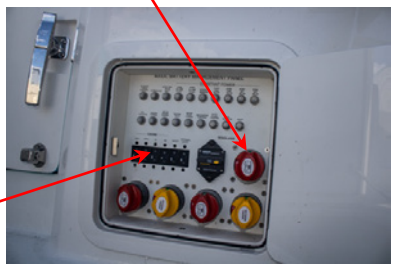
TO MONITOR THE A.C. LOADS

DESCRIPTION: The Czone system monitors the A.C. voltage, amperage, frequency (Hz), and Kw with programmable alarms. The on board A.C. system is a 120 volt 50 amp 60 Hz system capable of being supplied by either a 50 amp 120 volt shore power cable or the Fischer Panda P8 Minidigital 6.5 Kw 120 volt diesel generator. There is a manual source selector panel containing two 50 amp double pole circuit breakers for connecting either the shore power source or the generator output to the Czone ACOI (AC Output Interface). The source selector circuit breakers have a mechanical lockout slider to prevent simultaneous connection of both sources, green LEDs to indicate their connected status, and a red LED to indicate a reverse polarity connection on shore. The ACOI they feed is a distribution circuit breaker panel networked into the Czone NMEA 2000 bus which can be remotely controlled and monitored from the Czone interface via the touch screen on the dash. The ACOI contains 8 remote controlled distribution circuit breakers with LED network and circuit status indicators and manual override mechanical circuit breakers.

LOCATION: The A.C. source selector panel and ACOI are in the stateroom on the aft wall.

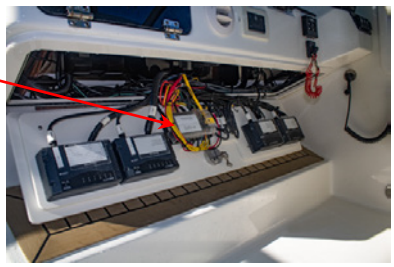
1 Ensure that the 12 volt “House” battery voltage is adequate (at least 12 volts) to power The Czone system.

2 Ensure that the “House” battery switch is on at the main D.C. panel to feed power to all of the manual circuit breakers on the D.C. panel except the “Constant Power” circuit breakers which are fed direct from the house batteries all the time.



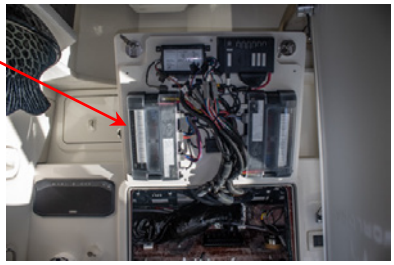
3 Ensure that the “Elect” (to feed the fuse block for the monitors and other electronics) 50a, “COI 1” (to feed COI1 D.C. Loads) 100 a, “COI 2” (to feed COI2 D.C. loads) 100 a, “OI” (LROI 20a), and “C6” (5a Output Interface) manual circuit breakers are on at the main D.C.panel. These circuit breakers feed the D.C. loads and NMEA 2000 bus of the Czone system.

4 Ensure that the fuses in the fuse block under the console are intact.



5 Ensure that the green power LEDs on the Czone COIs for feeding the devices are on.

6 Ensure that the green network LEDs on the COIs are on indicating that the Czone NMEA network is intact.



7 Ensure that the green LEDs for each Czone channel on the COIs are on solid indicating there is power to feed those devices.

8 Turn on the multifunction Garmin touch screen displays on the dash.

9 You may now use the Garmin touch screens to observe the Czone A.C. electrical screens to monitor the A.C. loads.

10 While A.C. power is connected on the boat ensure that the green LED for each circuit on the ACOI #1 is on. A red LED indicates a fault for that circuit.

11The Czone Volts display indicates the voltage coming through to the circuit groups on the A.C. panel. The voltage should read between 110 and 120 Volts to safely operate the 120 volt equipment.

12 The Amps displays indicate the current being consumed by a given circuit. When this value equals 50 amps for the whole boat when connected to generator power or shore power the maximum allowable has been reached and an overload condition could cause the main circuit breakers to trip shutting off the connection of that source to the yacht.

13The Hertz display indicates the frequency of the power supplying the panel from the source. This should read 60 Hz. In North America shore power frequency is controlled by the output of the utility company and should remain stable at 60 Hz. The frequency of the output of the on board generator however is controlled by the generator's electronics and its engine speed. Thus it can vary with changes in load and other factors. The Hertz output of the generator should remain as close as possible to 60 Hz for equipment to function properly.

14 The Watts display indicates the total power being consumed by the yacht (Amps x Volts = Watts). Under generator power this should not exceed 6500 Watts or (6.5 Kw) which is the rated capacity of the generator. Under shore power the Watts value should not exceed 6000 Watts (6 Kw).

⚠CAUTION If these values for Watts are exceeded A.C. powered items should be turned off until the values are back in line!

15 The Czone system is preset by Worldcat to give alarms for A.C. high voltage, low voltage, and high current. High voltage and low voltage can damage equipment. High current can cause overloads making circuits trip off and other issues that may damage equipment. If an alarm occurs, the audible alarm will sound and the display will indicate. Silence the alarm.

TO USE THE GENERATOR TO SUPPLY THE YACHT

DESCRIPTION: The generator is a 12 volt electric starting 6.5 Kw Fischer Panda P8 Mini Digital 3600 rpm diesel 120 volt 60 Hertz 60 Amp unit with sound shield. The generator has a 12 volt fuel supply pump that must run for the generator to operate. It operates automatically with the generator. The generator can be started at a remote control next to the A.C. source select panel or from the Czone screens.The generator holds 1.8 L , 2.2 qt.s of lube oil (10W40) and coolant (50/50 % Ethylene Glycol/water mixture).

LOCATION: In the port aft hull under the aft settee. The generator fuel supply pump is mounted on the platform outboard of the base of the unit. The generator exhaust discharges via a water lift type muffler out the port hull side.

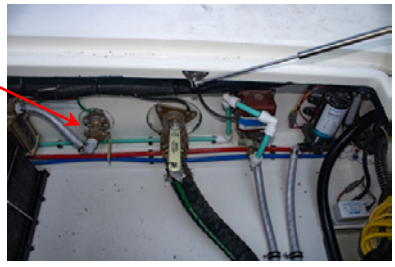
NOTICE **Consult the Panda literature first!**

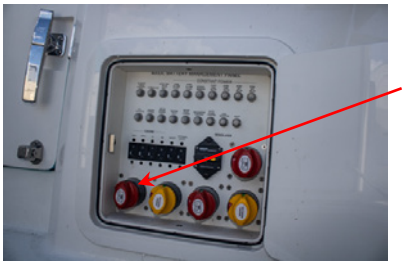
NOTICE **The port battery switch must be on to start the generator!**

NOTICE **The generator controller displays fault codes if a fault condition occurs or causes a shut down of the generator!**

1 Check generator fluid level and conduct prestart checks per Panda guidelines.

2 Ensure that the generator raw water seacock in the port aft compartment bilge (mechanical room) on the inboard side is open and that the sea strainer is clean.





3 Ensure that the port start battery switch is on in the main D.C. panel (this can be remotely turned on from the Czone system touch screen) and the generator D.C. fuse on the unit is intact.

4 Ensure that there is sufficient fuel in the generator diesel tank.

5 Ensure that the generator circuit breaker on the A.C. source select circuit breaker panel in the stateroom is off (lock out plate over the top of it).

⚠ CAUTION Ensure that everyone is clear in the generator compartment!

NOTICE Ensure that the generator oil drain screw is fitted tightly in the drain hose end!

6 Proceed with starting by pressing the “On/Off“ button on the remote panel in the stateroom by the AC source selector circuit breakers. The control light for the “On/Off” button must light up. The generator 12 volt fuel pump will start.

7 Press the Generator “Start Stop” button. Alternatively you may use the “Generator Enable” (press first, the generator 12 volt fuel pump will start) and the “Generator Start/Stop” buttons on the Czone touch screen.

8 After the pre-glow phase and the generator 12 volt fuel pump starts the engine starts. The LED button below the “Start Stop” on the remote panel blinks during the start procedure. And then glows constant.

NOTICE Do not turn the port starting battery (generator starting) off with the generator running!

9 The generator should run at idle speed for a predefined period and then run up to normal speed.

10 Allow 2 minutes running before applying load. Monitor the generator Czone screens to ensure that the generator operating parameters (voltage and frequency) (oil pressure, etc.) are OK.

NOTICE If you have been using shore power to supply the yacht leave it on and connected to shore until you have switched over as in the next steps!

11 The green LED beside the generator source select circuit breaker on the main A.C. source select panel will glow if A.C. power is available to the panel.

12 Switch off the “Shore” circuit breaker on the A.C. source select panel to allow you to move the plastic slider to switch on the "Generator" circuit breaker to supply the vessel from the generator.

13 Ensure that the “All AC Circuits” circuit breaker on the Czone screen is on. The green LEDs on the ACOI #1 should be on. If the air conditioning was on it will restart by itself after a time delay.

14 Once the Czone values are reading for the generator check that the Hertz meter reads 60 and that the Volts read between 110 and 120 you may press the “All AC Circuits” button on the Czone screen to connect the A.C. circuits. If not switch back to shore power and see the *Panda* literature.

15 A failure override button on the generator enables an immediate restart facility of the generator, should it cut out, even if this was caused by over-heating. There is normally a requirement to wait until the motor has cooled down to the correct temperature. This can last for several hours in certain circumstances, since the generator is enclosed in a sound- insulated casing, which prevents heat loss.

NOTICE **After a safety switch has tripped resulting in the generator stopping, the generator remote panel must be reset by pressing the Alarm Mute button in order to restart the generator.**

16 This period can be reduced by pushing the “Alarm Mute“ button. By pressing the button all faults are overridden for 10 seconds. When the button is pressed again during the 10 seconds, 10 seconds will be added to the remaining time. The generator can be started. The button bypasses any faults allowing the generator to run.

NOTICE **Use caution and ensure that you will not be causing damage if you use this feature!**

17 Push: ”Alarm Mute” to acknowledge again “Alarm Mute” to deactivate all sensors and “Start Stop” to restart the engine.

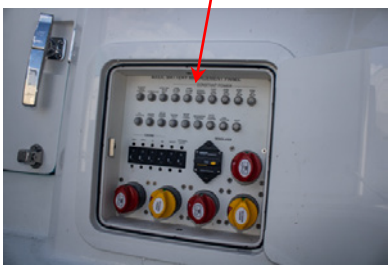
NOTICE **To prevent “dry stacking” the generator is ideally suited to be run under at least 70% load!**

NOTICE **The generator alternator charges the port (generator) starting battery when it is running!**

See also *TO MONITOR THE A.C. LOADS*.

18 If all systems are operating normally you may disconnect the shore power cable and retract it.

19 To retract the shore power cable ensure that the “12 V DC Shore Power” circuit breaker on the main D.C. panel is on.



20 Ensure that the circuit breaker for the shore mounted receptacle box is off and turn off the main incoming 50 amp shore power circuit breaker by the inlet connection at the stern.
.

21 Unplug in the end of the shore power cable from the shore connection box.

22 Use the rocker switch on the transom to retract the cable while guiding it clear from tangling on objects or kinking.

23 Once the cable is fully retracted close the cap on the transom entrance hole.

NOTICE **Periodically pull the cable all the way out and run it all the way in to prevent it from developing a tendency to kink!**

TO CLEAN THE GENERATOR RAW WATER STRAINER

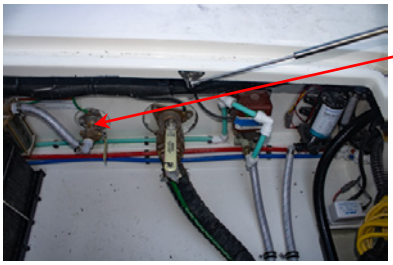
DESCRIPTION: Cylindrical transparent strainer housing with internal stainless steel basket.

LOCATION: In the port aft bilge compartment (mechanical room) inboard.

NOTICE **Ensure that the generator is shut down!**

1 Shut off the port start battery switch at the main D.C. panel or on the Czone screen.

2 Have a bucket and rags on hand.



3 Close the seacock that feeds the strainer.

4 Loosen the latch and hinge open the top of the strainer.

5 Withdraw the stainless steel basket.

6 Clean inside of debris and open any clogged holes.

7 Flush the inside of the strainer clean.

8 Replace the strainer basket in the housing.

9 Replace the strainer lid, latch, and tighten the wing nut until almost seated tight with a slight gap.

10 Open the seacock to purge air and then tighten the nut until the gap closes and leaks stop.

11 Turn the port start battery switch back on.

12 Start the generator and ensure that cooling water is flowing normally.

TO CONNECT SHORE POWER TO SUPPLY THE YACHT

DESCRIPTION: There is a 50' 50 amp 120 volt shore power cable on an (Optional) Cablemaster 12volt electrically operated storage reel that retracts the shore power cable on the swimplatform. There is a CT Line Guard ELCI ground fault circuit interrupter sensing moduleconnected to the 50 amp circuit breaker on the incoming hot (black) and neutral (white)wires for safety. This device will trip off the shore power 50 amp inlet breaker if there isan imbalance (leak) of more than 30 mA between the hot and neutral wires. The greenequipment ground wire is connected direct through a Pro Safe FS60 galvanic isolator toprevent galvanic corrosion currents from passing between the yacht's system and theshore while allowing A.C. fault currents to travel back to shore. There is a reversedpolarity indicator light on the A.C. source select panel to warn if the shore power sourcehas reversed polarity.

LOCATION: The shore power Cablemaster reel with cable is in the stbd. hull just inside the transom.

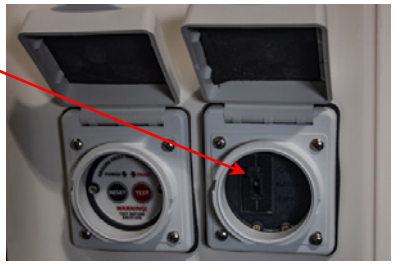
The cable entrance cap is on the stbd. transom, the ELCI sensor with test and reset buttons, and the 50 amp shore power incoming circuit breaker are in the stbd. aft cockpit.

The galvanic isolator is on the stbd. hull inside aft in the stbd, mechanical room.

NOTICE **Meters on the Czone screen indicate once A.C. sources are on line!**

1 Ensure that the yacht is securely moored.

2 Ensure that the incoming shore power circuit breaker in the stbd. aft deck corner is off.



3 Ensure that the “Shore” supply selector circuit breaker in the stateroom is off with the black slider over the top of it.

4 Ensure that the 12 volt “House” battery voltage is adequate (at least 12 volts) to power The Czone system.

5 Ensure that the “House” battery switch is on at the main D.C. panel to feed power to all of the manual circuit breakers on the D.C. panel except the “Constant Power” circuit breakers which are fed direct from the house batteries all the time.

6 Ensure that the “Elect” (to feed the fuse block for the monitors and other electronics) 50a, “COI 1” (to feed COI1 D.C. Loads) 100 a, “COI 2” (to feed COI2 D.C. loads) 100 a, “OI” (LROI 20a), and “C6” (5a Output Interface) manual circuit breakers are on at the main D.C. panel. These circuit breakers feed the D.C. loads and NMEA 2000 bus of the Czone system.

7 Ensure that the fuses in the fuse block under the console are intact.

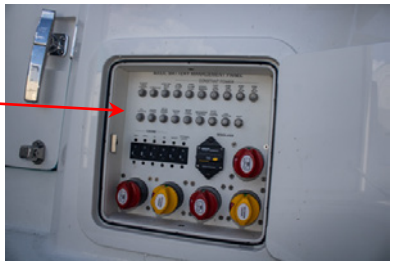
8 Ensure that the green power LEDs on the Czone COIs for feeding the devices are on.

9 Ensure that the green network LEDs on the COIs are on indicating that the Czone NMEA network is intact.

10 Ensure that the green LEDs for each Czone channel on the COIs are on solid indicating there is power to feed those devices.

11 Turn on the multifunction Garmin touch screen displays on the dash.

12 You may now use the Garmin touch screens to view the Czone D.C. system status and operate devices on it.



13 Ensure that the “12 V DC Shore Power” circuit breaker on the main D.C. panel is on to power the Cablemaster.

14 Open the cap on the transom for the shore power cable and pull out the cable. If the cable is hard to grip open the stbd. aft deck hatch and push the cable out from inside far enough to get a good grip on the end.

⚠CAUTION If the end plug touches the water do

not plug it in until it is fully disassembled and dried or replaced !

15 Ensure that the circuit breaker for the shore mounted receptacle box is off.

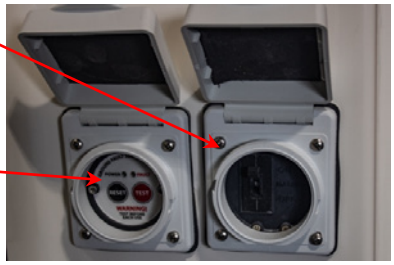
16 Plug in the end of the shore power cable into a 50 amp 120 volt shore connection box.

⚠CAUTION **If the shore mounted receptacle is loose or appears burnt do not use it. Select a different one!**

⚠CAUTION **Do not "tie up the boat" with the shore power cable and ensure that it is lead clear of any hazards of pinching, hooking on objects, or dangling in the water!**

17 Turn on the circuit breaker on the shore mounted receptacle box.

18 Turn on the main incoming 50 amp shore power circuit breaker by the inlet connection at the stern.



19 Press the "Test" button on the ELCI to insure that it trips the boat inlet breaker during the test. If it trips then press the "Reset" on the ELCI and reset the 50 amp inlet circuit breaker.

⚠CAUTION **If the ELCI does not trip the circuit breaker don't connect to shore power and have a qualified electrician investigate for a ground fault! !**

⚠CAUTION **If the red Reversed Polarity indicator LED is on at the top of the A.C. source select circuit breaker panel in the stateroom don't connect to shore power and have a qualified electrician investigate why or try another outlet on shore!**

20 If power is available from shore the green LED by the "Shore" source selector circuit breaker of the A.C. source selector panel will light and you may connect by sliding the plastic slider out of the way by turning off the circuit breaker labeled "Generator" as necessary to turn on the circuit breaker labeled "Shore".

21 Ensure that the “All AC Circuits” circuit breaker on the Czone screen is on. The green leds on the ACOI #1 should be on. A red LED on the ACOI #1 indicates a fault for that circuit. If the air conditioning was on it will restart by itself after a time delay.

22 Once the Czone monitor for the Shore Power is reading check that the Hertz meter reads 60 and that the Volts read between 110 and 120.

23 If the Volts are 115 or higher and the Hertz are 59-61 press the “All AC Circuits” button on the Czone screen and you may switch off the generator if it is running and not being used. If the Volts are too low (below 110) or the Hertz are off (below 59 or above 61) do not use shore power and switch back to main generator power until an in spec. shore power supply source is available.

24 After 2 minutes of running with no load you may shut off the generator by depressing the “Start Stop” switch on the generator remote controller or on the Czone screen. After the generator stops turn off the “On/Off” switch on the controller panel.

NOTICE **Always visually inspect the generator inside its sound shield after shutting it down!**

25 You may now monitor the loads of the load groups being supplied by the shore power cable. (See *TO MONITOR THE A.C. LOADS*).

26 To retract the shore power cable ensure that the “12 Volt Shore Power” circuit breaker and on the main D.C. panel is on.

27 Ensure that the circuit breaker for the shore mounted receptacle box is off and turn off the main incoming 50 amp shore power circuit breaker by the inlet connection at the stern.

28 Unplug the end of the shore power cable from the shore connection box.

29 Use the rocker switch on the transom to retract the cable while guiding it clear from tangling on objects, touching the water, or kinking.

30 Once retracted close the cap on the transom entrance hole.

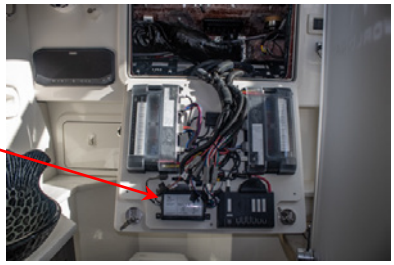
⚠CAUTION If the end plug of the shore power cable touches the water do not use it again until it is fully disassembled, flushed with fresh water, and dried or replaced!

NOTICE Periodically run the cable all the way out and all the way in to prevent it from developing a tendency to kink!

TO USE THE LOW VOLTAGE LIGHTING

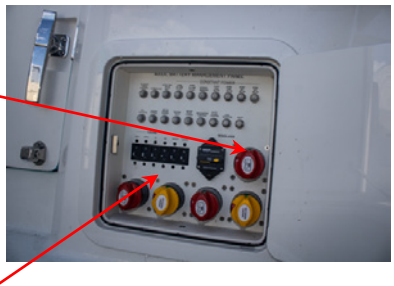
DESCRIPTION: The lighting on the 400 DC-X is variable 12 volt D.C. multicolored. The lighting circuits get their power from the Czone system via the main D.C. electric panel through an ITC Versi Control RGB Smart System 25000-RGB-01 4 lighting zone controller. The controller enables the user to turn on and off the lights, change the colors, and dim the lights. The user can set the “mood” as desired.

LOCATION: Lighting is installed throughout. The lighting zone controller interface is under the control console with the Czone equipment in the access panel behind the toilet.



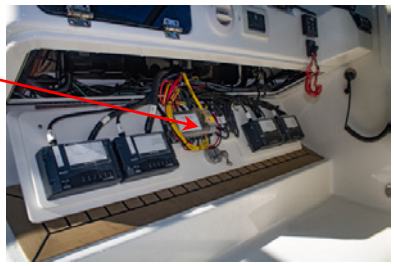
1 Ensure that the 12 volt “House” battery voltage is adequate (at least 12 volts) to power The Czone system.

2 Ensure that the “House” battery switch is on at the main D.C. panel to feed power to all of the manual circuit breakers on the D.C. panel except the “Constant Power” circuit breakers which are fed direct from the house batteries all the time.



3 Ensure that the “Elect” (to feed the fuse block for the monitors and other electronics) 50a, “COI 1” (to feed COI1 D.C. Loads) 100 a, “COI 2” (to feed COI2 D.C. loads) 100 a, “OI” (LROI 20a), and “C6” (5a Output Interface) manual circuit breakers are on at the main D.C. panel. These circuit breakers feed the D.C. loads and NMEA 2000 bus of the Czone system.

4 Ensure that the fuses in the fuse block under the console are intact.



5 Ensure that the green power LEDs on the Czone COIs for feeding the devices are on.

6 Ensure that the green network LEDs on the COIs are on indicating that the Czone NMEA network is intact.

7 Ensure that the green LEDs for each Czone channel on the COIs are on solid indicating there is power to feed those devices.

8 Turn on the multifunction Garmin touch screen displays on the dash.

9 Ensure that the “RGB Power” circuit breaker is on in the Czone screen.

10 You must use the ITC phone app to control full functionality of the lighting.

TO USE THE UNDERWATER LIGHTS

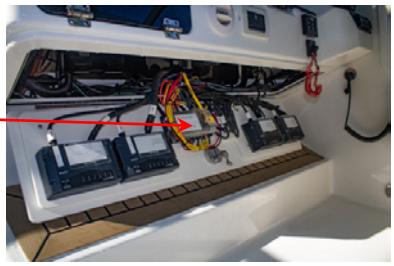
DESCRIPTION: There are 12 volt D.C. underwater lights on the transom.

LOCATION: The lights are mounted in the transom port and stbd.. The switch is in the Czone screen.

1 Ensure that the 12 volt “House” battery voltage is adequate (at least 12 volts) to power The Czone system.

2 Ensure that the “House” battery switch is on at the main D.C. panel to feed power to all of the manual circuit breakers on the D.C. panel except the “Constant Power” circuit breakers which are fed direct from the house batteries all the time.

3 Ensure that the “Elect” (to feed the fuse block for the monitors and other electronics) 50a, “COI 1” (to feed COI1 D.C. Loads) 100 a, “COI 2” (to feed COI2 D.C. loads) 100 a, “OI” (LROI 20a), and “C6” (5a Output Interface) manual circuit breakers are on at the main D.C. panel. These circuit breakers feed the D.C. loads and NMEA 2000 bus of the Czone system.



4 Ensure that the fuses in the fuse block under the console are intact.

5 Ensure that the green power LEDs on the Czone COIs for feeding the devices are on.

6 Ensure that the green network LEDs on the COIs are on indicating that the Czone NMEA network is intact.

7 Ensure that the green LEDs for each Czone channel on the COIs are on solid indicating there is power to feed those devices.

8 Turn on the multifunction Garmin touch screen displays on the dash.

9 Ensure that the “RGB Power” circuit breaker is on in the Czone screen.

10 You must use the ITC phone app to control full functionality of the lighting.

Turn on the “U/W Lights” circuit breaker on the Czone screen.

NOTICE **Do not use the underwater lights with the vessel out of the water!**

TO CHANGE THE GENERATOR OIL

DESCRIPTION: The generator holds (1.8 L), 1.9 qt.s of lube oil. There is a gravity drain hose connected to the unit.

LOCATION: The oil drain hose is mounted on the generator inside the sound shield.

NOTICE Do not run generator with the plug out of the oil drain hose!

1 Have rags and source of clean oil handy.

2 If changing oil heat the oil to be changed by running the generator first.

3 Ensure the generator is shut down and shut off the port start battery switch for the generator until the engine is refilled with oil.

4 Open the end of the oil drain hose.

5 Place the drain hose end into an empty container to catch the dirty oil and open the oil fill cap on top of the generator to relieve the vacuum.

6 Remove the filter with a strap wrench and replace it with a new one before refilling the new oil.

7 Refill the oil through the oil fill cap on the top of the unit.

8 Use a Panda specified oil.

9 After changing oil check the oil level in the engine with dip stick (see concerned *Panda* literature). If level is adequate (2/3 on the stick) you may turn back on the start battery switch previously turned off in step 3, start the generator, and check for leaks.

10 Shut down the generator and recheck the oil level on the dipstick after ten minutes. Add more oil until level is correct (between “Min.” and “Max.”) at rest.

NOTICE Dispose of rags and dirty oil properly ashore!

⚠ CAUTION Use care when handling hot oil!

TO CHANGE THE GENERATOR OIL FILTER

DESCRIPTION: Disposable cartridge type canister filter (Panda#: FP-00434) mounted on generator.

LOCATION: On the generator forward side inside the sound shield.

See *Panda* product literature and follow complete instructions.

NOTICE **Dispose of rags, filters, and dirty oil properly ashore!**

⚠ CAUTION **Use care when handling hot oil and filters!**

ABOUT THE BONDING SYSTEM

DESCRIPTION: A galvanic corrosion protection bonding system is installed consisting of green insulated wire to tie together all of the underwater metallic hardware, A.C. equipment grounds, D.C. grounds, and raw water carrying metallic parts to sacrificial zinc anodes bolted to the transoms underwater. The zinc anodes being the galvanicaly least noble metal should waste away before any other metals thus protecting the underwater running gear, fittings, and raw water carrying parts from corrosion. The engines are fitted with zinc anodes on their lower units. The shore power system includes an unswitched Pro Safe FS 60 galvanic isolator in the green shore power ground wire which breaks the physical bond for corrosion level D.C. current flow between the onboard green A.C. equipment ground and the dockside green ground while still allowing A.C. fault currents to pass back to shore for safety.

LOCATION: The bonding wiring is in the bilge. The sacrificial zinc anodes are on the transoms below the waterline and on the engines. The shore power ground galvanic isolator is on the stbd. hull side in the aft bilge area.

1 Inspect the anodes on the transom frequently and replace when loose or 50% wasted away.

2 Periodically inspect the bonding jumper (green wires) connections in the bilge to ensure that they are secure and making good contact free of corrosion.

3 Inspect zincs on the outboards' lower units and internally.

ABOUT FUSES IN THE SYSTEM

DESCRIPTION: Most of the yacht's circuits are protected by marine circuit breakers and the Czone system. However there are some fuses in the D.C. system that are critical to its proper operation so that their function and locations must be understood for proper operation and troubleshooting.

LOCATION: The fuses are in various locations as described below.

FUSE	FUNCTION	LOCATION
(3) Blue Sea Systems 5176 40 amp fuse	On the supply to each battery from the A.C. battery charger.	At the battery positive terminal connections.
(1) Blue Sea Systems 5181 80 amp fuse	On supply from the stbd. house battery to the 800 Watt stereo amplifier.	At the stbd. house battery positive terminal connection.
Automotive type blade fuses (various ampacities).	To protect the feed to Czone components, electronics, other devices.	In the fuse block under the helm console with Czone components.
Automotive type blade fuses (various ampacities).	To protect the feeds to DC primary circuits fed by the Czone system COIs.	On the Czone COIs behind the mirror in the head.
Automotive type blade fuses (various ampacities).	On supply from main D.C. panel "House" battery circuit to Baitwell pump and aft deck chiller system.	In fuse block in port hull on inside of transom.
(3) 3 Amp bus fuses.	To feed battery status information to display on the Czone system.	In yellow inline fuse holders on battery top positive terminal connections.
(1) 1.6 Amp slow blow fuse.	For generator output controller.	On generator mounted output controller board.
Various size Yamaha supplied fuses.	For engine and Helm Master functions.	In fuse block on top of engine. Spares supplied in fuse block top.

PROPULSION SYSTEM OPERATIONS 3.5

TO CHECK THE MAIN ENGINE LUBE OIL LEVEL

DESCRIPTION: The engines are delivered with Yamaha Yamalube 4M FC-W oil. Engines hold approximately 7.93 quarts of oil each. Oil must be changed every 100 hours.

LOCATION: Dip sticks are on the stbd. lower side of the engines inside the cowling.

⚠ CAUTION Use caution to avoid being burned!

1 Check the oil level with engines stopped and the engines in a vertical (tilted down) position and level.

2 The level should be between the “Add” and “Full” mark on the dip stick.

See *Yamaha* product literature and follow instructions.

TO START THE MAIN ENGINES AND GET UNDERWAY

DESCRIPTION: The main engines are 425 Hp V configuration 8 cylinder 4 stroke DOHC 32 valve 12 volt electric start raw water cooled Yamaha gasoline outboards.

The engines are fitted with the Yamaha EKS (Electronic Key Switch) security system which protects against theft and consists of the receiver and hand held remote control transmitters (fobs). The engines cannot be started if the security system is in lock mode. The engines can only be started in the unlock mode.

The engines are fitted with power tilt and trim which adjusts the outboard motor angle in relation to the transom. The trim function can be preset for best vessel performance at select engine speeds. This is done prior to delivery by Worldcat. The engine tilt mechanism is fitted with a manual override valve screw to enable manual tilting of the engines in the event of a power tilt system failure or loss of battery voltage (see the *Yamaha* manual for details).

The engines are fitted with a Yamaha CL7 monitoring system integrated with the Helm Master steering and control system to display engine status and alert information. This system is tied into the Czone system NMEA 2000 data bus as well and acts as the master. The system monitors and displays the following information and alerts:

- Current Time
- Tank Levels
- Troll Mode Status
- Shift Position
- Engine Condition (security system on, synchronizer status, warm up status)
- Tachometer and Trim Angle
- Engine Maintenance Alerts
- Engine Information
- GPS Signal Quality
- Trip Info
- Overheat Alert (causes the engine to slow down)
- Low Oil Pressure Alert (the engine speed will decrease to 2000-3500 rpm)
- Water in Water/Gas Separator Alert
- Low Battery Voltage Alert
- Engine Trouble Alert (with code)
- Low Cooling Water Pressure Alert
- Steering Alert (SCU)
- Low Fuel Pressure Alert (this alert will prevent the starter on the engine generating the alert from operating for 7 seconds after the alert. 10 or more start attempts may be required after this alert. When the engine is restarted let it idle for more than 5 minutes before attempting to resume normal operation).

- Helm Master Control System Alert.
- Engine Emission System Alert.
-

⚠ CAUTION The engines have a Yamaha notification light system that indicates by flashing and strobing a warning to anyone that can see them near the stern of the boat that the engines are running in the Set Point or Stay Point modes (See *Steering and Controls* topics) and that there is a potential propeller injury danger!

The Propellers are Yamaha 3 blade stainless steel 17 YL 16 7/8 XTO OS spec. as initially delivered.

LOCATION: On the transom. The notification lights are on the transom of each hull.

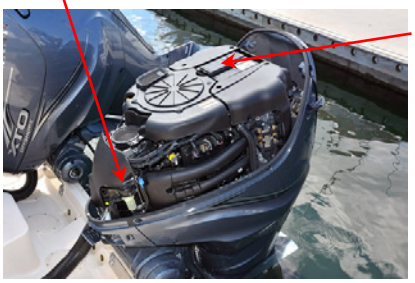
NOTICE Read and understand the *Yamaha Operation and Maintenance Manual* before proceeding!

NOTICE Read and understand the *Yamaha Helm Master controls manual* before proceeding!

1 Check engine crankcase oil levels and ensure that they meet Yamaha guidelines.

2 Check engines for any fluid leaks under the cowling.

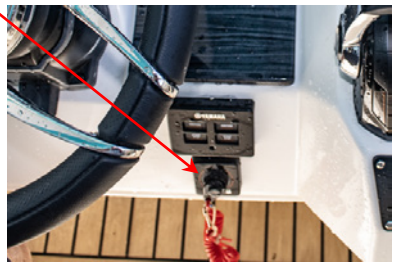
3 Check that the gasoline filters on the engines are clean and free of water. If any water is found in the fuel, or a significant amount of debris is found, the fuel tank should be checked and cleaned by a Yamaha dealer.



4 Ensure that the fuses in the fuse block on top of each engine under the cowling are intact.

5 Ensure that the engine cowlings are securely fitted on the engines before getting underway. If the top cowling is not installed correctly, water can enter the top cowling and damage the engine, or the top cowling can blow off at high speeds.

6 Check that the engine shut off clip and cord (lanyard) are free of damage (cuts, breaks, and wear).

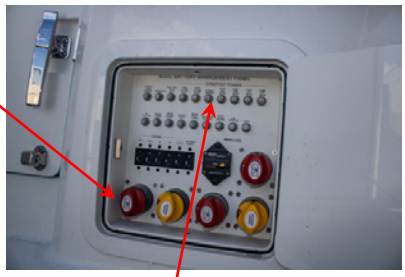


7 Ensure that the engine flushing devices' garden hose connectors are securely screwed to the fittings on the bottom of the engine cowlings.

8 Securely attach the engine shut-off clip/cord to the shut down switch.

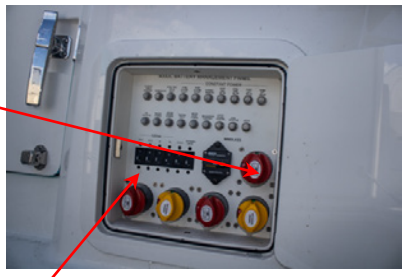
9 Ensure that there is sufficient voltage in the engine starting batteries (at least 12 volts).

10 Ensure that the engine start battery switches in the main DC panel are on This can be done remotely from the Czone system.



11 Check the power tilt/trim for any sign of oil leaks. Operate each of the power tilt and trim switches on the Helm Master digital electronic remote control and engine bottom cowling to check that all switches work. Tilt the outboard motor up and check that the tilt rod and trim rods are extended completely.

12 Ensure that the bilge pump and alarm float manual circuit breakers in the "Constant Power" section of the main DC panel are on. These supply D.C. power to the automatic functions of the bilge pumps independent of the Czone system.

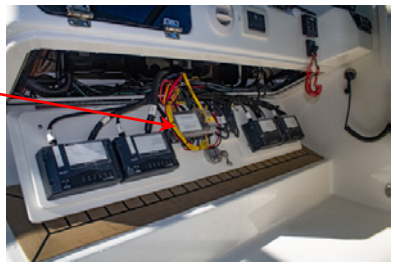


13 Ensure that the "House" battery voltage is sufficient (at least 12 volts) and that the "House" battery switch is on at the main D.C. panel to feed power to all of the manual circuit breakers on the D.C. panel except the "Constant Power" circuit breakers which are fed direct from the house batteries all the time.

14 Ensure that the "Elect" (to feed the fuse block for the Yamaha CL7, NMEA 2000 bus, monitors, and other electronics) 50a, "COI 1" (to feed COI1 D.C. Loads) 100 a, "COI 2" (to feed COI2 D.C. loads) 100 a, "OI" (LROI 20a), and "C6" (5a Output Interface) manual circuit breakers are on at the main D.C. panel. These circuit breakers feed the D.C. loads and the Czone system.

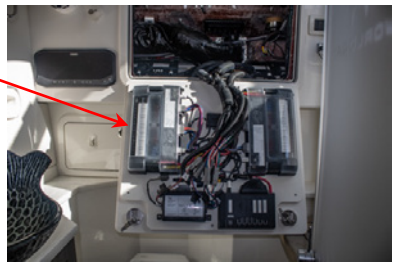
NOTICE **As long as the "Elect", "COI1", "COI2", "OI", and "C6" circuit breakers on the main D.C. panel are on when the house battery switch is turned on the Yamaha CL7, Garmin displays, Czone system,**

and starting battery switches will turn on too. This is a normal function of the programing.



15 Ensure that the fuses in the fuse block under the console are intact.

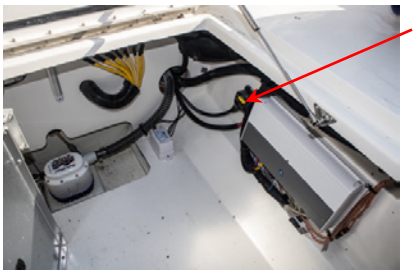
16 Ensure that the green power LEDS on the Czone COIs for feeding the devices are on.



17 Ensure that the green network LEDs on the COIs are on indicating that the Czone NMEA network is intact.

18 Ensure that the green LEDs for each Czone channel on the COIs are on solid indicating there is power to feed those devices.

19 If A.C. power is connected on the boat ensure that the green LED for each circuit on the ACOI #1 is on. A red LED indicates a fault for that circuit.



20 Ensure that the 200 amp House battery bank engine charging isolator circuit breakers in the aft bilges (mechanical rooms) are on for the engines to charge the House batteries while running.

21 Turn on the Garmin touch screen multifunction displays on the console with the power switches on the units.

22 Select an appropriate Czone preset mode of operation (“Day Cruises” or ”Night Cruise”).

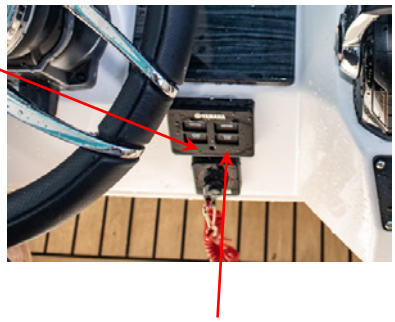
23 Tank levels can be viewed on the CL7 and the Czone system screens. Ensure that there is sufficient fuel in the main fuel tank. See *Fuel System* information.
The engines can only draw from the tank on their respective side.

24 Squeeze the gasoline prime bulbs until firm to send gasoline to the engines.

25 Ensure that control levers are in neutral position (straight up detent). See also *Steering & Controls* topics.

26 Ensure that the generator is on and supplying A.C. as desired to the yacht (see that topic under Electrical Operations). The yacht can be run without the generator on unless the optional Seakeeper gyro stabilizer is to be used. Follow the gyro start up procedure if the optional Seakeeper is fitted.

27 Place and hold the EKS fob over the lock indicator in EKS panel stbd. of the helm to unlock the EKS.



28 When the EKS fob is placed over the lock indicator, the beeper sounds twice. This indicates the unlock mode is selected and the ignition circuits can be turned to “ON”.

29 Pushing the Ignition button turns the power to each engine ON and OFF. When the power is ON, the active indicator will be illuminated. Turning the Ignition buttons on powers up the Helm Master system.

⚠ CAUTION Visually inspect the area around the engines to make sure engines are clear to start!

⚠ WARNING Ensure that swimmers are aboard the yacht (if any), the swim ladder is retracted and stowed, and the all the boarding doors are shut!

30 While observing the CL7 on the dash press the Start /Stop switches. The Helm Master electronics system will automatically start that engine. The Active indicator will be illuminated on the remote control lever binnacle when an engine is running.

31 Check that a steady stream of engine cooling water is flowing from the cooling water indicator pilot hole on the stbd. side of the engine.

32 A “Warm Up” indicator appears while an engine is being warmed up and goes off when warming up is finished. Until the engine is warm the idle speed may be higher than normal. Do not shift the engines or get underway until the “Warm Up” indicator is extinguished.

33 Check the shut down pull clip operation to ensure that it shuts down the engines when pulled. Restart the engines.

34 Observe the Yamaha screens and consult the *Yamaha* literature to ensure that the operating temperatures, pressures, etc. are within limits.

NOTICE Main engine alarm states will indicate on the Yamaha CL7. The Yamaha CL7 on the dash must be used to silence alarms!

35 Engine malfunction alarms will generate explanatory codes and display them on the CL7. See the *Yamaha* literature for an explanation of the codes. The engines store certain engine data to assist in diagnosis of malfunctions which can be downloaded by a Yamaha technician with a special diagnostic tool.

36 Verify and test steering function. See also *Steering & Controls* topics.

⚠ CAUTION Disconnect and stow the shore power cable and close the entrance cap securely! See *Electrical topics*.

37 Moving the remote control levers from the neutral (N) position to the forward (F) position (towards the bow of the boat) makes the boat move forwards, while moving it to the reverse (R) position (towards the stern of the boat) makes the boat move backwards. The boat will be moving with the engine at idle. Moving the lever farther opens the throttle, and the engine will begin to accelerate. Steering friction while underway will vary automatically in response to boat speed so as not to be too sensitive.

Free throttle switch- When activated, the free throttle switch allows opening the throttles of all engines without engaging forward or reverse gear. With the remote control levers in the N position, press the free throttle switch, and then move the remote control levers forward to open and close the throttle. Moving the remote control levers rearward will also open and close the throttle. The active indicator will be illuminated during operation.

38 With the vessel tied alongside or anchored securely verify and test control function. See also *Steering & Controls* topics.

39 The joystick switch transfers boat operation from the remote control and steering helm to the joystick.While the engine is running, placing the remote control lever and the joystick lever in the N position and pushing the joystick switch causes the controls to enter the joystick mode, allowing operation with the joystick lever.The active indicator illuminates during operation. While in the joystick mode, the engine speed is limited and the steering wheel is locked.

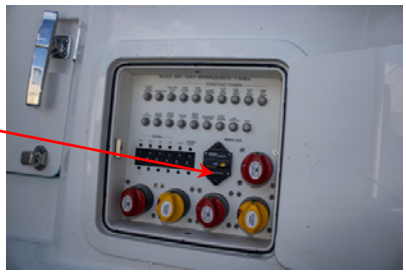
Joystick High mode switch The function of this switch is to allow the engines to run at a higher speed than normal, if extra power is needed (e.g., when there is strong wind or current). Pressing the high mode switch while in joystick mode engages the high mode. The active indicator illuminates during operation. Pressing the high mode switch again exits high mode. The active indicator will turn OFF.

Pressing the joystick switch on the joystick, shifting the remote control lever into F or R, or stopping one engine exits the joystick mode. The active indicator will turn OFF.

When exiting the joystick mode even if the steering wheel is turned, the engines will automatically return to the initial positions.

⚠ CAUTION **The engines have a Yamaha notification light system that indicates by flashing and strobing a warning to anyone that can see them near the stern of the boat that the engines are running in the Set Point or Stay Point modes (See *Steering and Controls* topics) and that there is a potential propeller injury danger!**

40 Ensure that the windlass circuit breaker in the main D.C. electric panel is on in case the windlass is needed.



41 NOTICE **Close and secure the forward deck hatches, interior doors, front windshield, side boarding gates, and transom door securely prior to getting underway!**

42 Turn on the desired electronics.

43 Cast off the mooring lines or hoist the anchor and get underway.

44 Trim the engines as desired for optimum vessel performance using the Trim Assist function.

45 Turn off the D.C. windlass control circuit breaker once underway if the windlass is not needed. This will deactivate the foredeck foot switches.

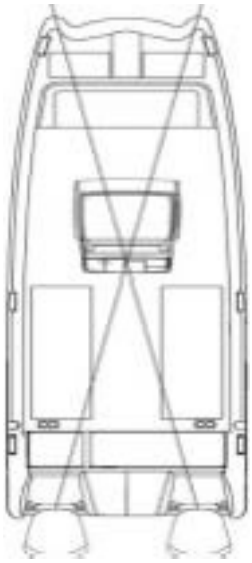
NOTICE **Idle speed in neutral is 650-750 rpm and full speed is 5000-6000 rpm!**

NOTICE **In the event that the vessel must be towed without either engine running be sure to tilt the inoperative motor up. Otherwise water could enter the exhaust pipe due to wave action, causing engine trouble!**

PERFORMANCE CHARACTERISTICS THAT THE OPERATOR NEEDS TO KNOW

These topics will provide information on the performance characteristics of your catamaran; this is not a substitute for seamanship training or hands-on experience. First time boat owners should learn proper methods of boat operation. Experienced boaters who have never owned a catamaran should study this material completely. Do not assume that previous boating experience will apply to all situations, as there are several subtle differences in the handling characteristics of twin-hulled boats. For existing catamaran owners, this material should be a reference.

Motor Trim-
The smooth riding characteristics of a catamaran are a result of the twin hull design. Their ability to slice through oncoming waves is far superior to the slamming characteristics seen on conventional vessels. Motor trim plays an integral part in how your catamaran accomplishes this. In a level or bow down attitude, your boat will slice through larger chop, but you may experience sluggish performance, a wetter ride and increased bow steering in a following sea. In a bow up attitude the boat will perform better, but may ride less smoothly. Experiment with the trim settings in various sea conditions to determine what you are most comfortable with. When using the trim to correct a listing condition, imagine an “X” connecting the starboard engine to the port bow, and port engine to the starboard bow (see drawing).



Bow Up Condition-
To correct a bow up condition on the port sponson, adjust the motor trim “down” on the starboard engine. This will help the starboard sponson to rise and level the vessel. If moving to the lowest trim setting on the starboard engine does not correct the list, trim the port engine “up” to assist the change. Reverse the instructions to accommodate for a bow up condition on the starboard sponson.

Bow Down Condition-
To correct a bow down condition on the port sponson, adjust the motor trim “up” on the starboard engine. This will help the starboard sponson to fall and level the vessel. If cavitation occurs on the starboard engine, lower it to correct the problem, then trim the port engine “down” to assist the change. Reverse the instructions to accommodate for a bow down condition on the starboard sponson.

Handling Characteristics-
World Cat's patented VectroFloTM hull is a semi-displacement hull, which exhibits characteristics of both planing and displacement hulls. Planing hulls provide speed and economy of operation since a limited amount of the hull is in contact with the water. However, they feature flat sections along the chine which can negatively affect handling at low speeds and harder impacts at high speed. Displacement hulls provide superior handling characteristics, even at low speed, and an improved ride in rough water. Speed and economy suffer however, since more of the hull is submerged. Our proven design provides a superior ride, excellent handling characteristics in a variety of conditions, and speed with economy of operation. To help you experience "The Ultimate Ride", study the following sections:

Turning Characteristics-
Turning a catamaran is slightly different than cornering on a conventional vessel. Imagine the difference between an automobile and a motorcycle: Automobiles take turns in a flatter, more stable manner similar to a catamaran hull, while motorcycles pitch hard into a turn similar to a monohull. Do not underestimate a catamaran's cornering ability. Hard adjustments to the steering wheel can make a World Cat bite quickly and execute high-performance turns. Experiment with the handling ability of your cat so you are prepared for any situation on the water.

Adverse Sea Conditions-
Catamarans are designed to handle some of the roughest waters in the world, but that is no substitute for common sense. As an operator, you are responsible for the safety of your passengers and vessel; therefore, your trips should be limited by your level of experience. Planning and paying constant attention to the weather and sea conditions is paramount. If you are forced to operate in dangerous seas you can be confident that your World Cat, when operated properly, can handle them safely.

Here are a few tips on how to handle your boat in adverse sea conditions:

- When traveling into the wind, changing your direction a few degrees to allow one sponson to settle before the other, can make the ride smoother and allow for increased speed.

- In a rough chop with short wave intervals, increasing your speed may allow the boat to skim across the tops of each wave. This will result in a smoother ride.

- Steer to avoid larger swells and breaking waves.

- In a following sea, position your vessel on the back of a wave and match its speed to remain ahead of the trough. Speed is paramount. Work the throttle to avoid going over the wave or being thrown down the face of a following wave.

Cross Clutching- Twin Engines
World Cat 400DC-X twin engines are mounted at a specific distance, based on the configuration of the boat, allowing you to cross-clutch (one motor in forward while one in reverse).

To dock, reverse the boat into a slip: put the outside motor in reverse and turn to face aft. Keeping the wheel straight, steer with the inside motor putting it in forward and reverse to guide you into the slip. Keep it simple and slow. Use the joy stick to make it really simple.

Get the Boat on Plane-

- Trim both engines down (the motors act as trim tabs forcing the bow down).
- Quickly increase speed to get the boat on plane then slow down to 3500 RPM's.
- Adjust trim up until the motors cavitate, then tap trim down.
- Feel / hear the motors and do not watch the trim gauges.
- A smooth ride is more important than having your engine RPM's synchronized.

Keep the Boat Level- (if the seas change or people move on the boat)
Trim the **High-Side-High**. When one side of the bow is high compared to the horizon, simply trim the high-side motor up. (If it cavitates then trim the **low-side-low**). Different models have different sensitivity to trim (do not over-correct as this may cause the boat to pitch in flat calm water at high speeds).

Handling Different Sea Conditions-

- **Head Sea:** trim motors down to keep the bow down.
- **Following Sea:** trim up to keep the bow out of the water.
- **Calm Water:** trim engines up to run on the back of the hull.

Boating Tips-
Experience is the best way to determine the handling characteristics of your catamaran. Operating the boat in multiple sea conditions and under various loads will help you predict how the boat will perform in any situation. World Cat provides the following recommendations regarding the performance of your catamaran:

- Establish an RPM chart which details the speed and fuel consumption at various RPM levels to achieve the most economical operation.
- Monitor fuel gauges to determine the amount of operating time remaining at a given reading.
- Determine minimum speed for effective steering in close quarters.
- Determine the turning radius required at various speeds.
- Determine the rates of acceleration and deceleration with various load conditions. Include the distance required to stop the boat at various speeds. Use the information provided in section 6 of the *Sportfish, Cruisers, Yachts Owner's Manual* for more information on boat handling.

Performance Factors- Proper setup and maintenance of the systems on your boat is important to ensuring proper performance, but be aware they are not the only factors which affect it. Several things which contribute to the level of performance of your catamaran can change between or during trips.

Engine Efficiency- Without proper maintenance, your engine(s) will gradually lose power, resulting in a loss of speed. Use the recommendations in the engine's owners manual to schedule routine maintenance procedures and as a guide for the correct RPM range for your engines. Neglecting to do so may result in loss of performance and an increased risk of failure.

Propeller Condition- The size and condition of your propeller also plays a major role in the performance of your catamaran.A damaged propeller can result in lower speeds, sudden drops in RPM, increased fuel consumption, and severe vibration while running. Improperly sized propellers can cause damage to your engine as a result of exceeding the maximum or minimum RPM levels.

Weather Conditions-
Barometric pressure and humidity can affect the output of your engines. For example, on an extremelyhot and humid day, your engine can experience as much as a 10 percent loss in horsepower. Although you should monitor your engines' performance, be aware that the weather could be a major factor in your boat's performance.

Load-
Increased load can affect performance, especially if the load is unbalanced. Passengers, gear, and fuel are all examples of things which can affect your vessel. Fuel levels change throughout the day, and greatly affect the attitude of your boat. When necessary, make adjustments to engine trim and load distribution to compensate for fuel usage.

Marine Growth-
If you store your boat in the water or fail to clean it after each trip, the existence of marine growth can contribute to a loss of performance. A decline in speed or increased fuel consumption can occur. Prevent this by applying a marine growth inhibitor or by cleaning your boat thoroughly after each trip.

Bottom Paint-
Bottom painting your catamaran will also change the performance. Although not significant, you can expect a drop in speed between 1 and 5 miles per hour.

TO STOP THE ENGINES AND SECURE

DESCRIPTION: Engine Start/Stop buttons.

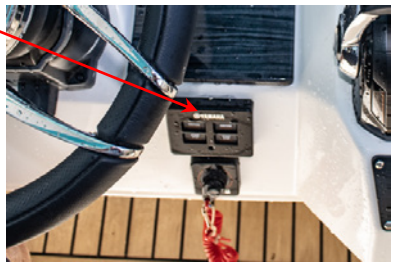
LOCATION: In EKS panel stbd. on the console.

1 Secure vessel moored to a pier or at anchor.

2 Ensure that controls are in neutral positions.

3 Allow engines to run at low idle for at least 3 minutes to reduce and stabilize internal temperatures.

4 Depress the Start/Stop switch for each engine in the EKS panel stbd. of the helm on console to stop the engines.

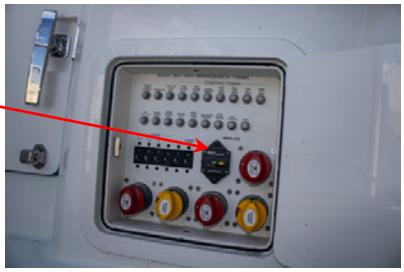


5 Turn off (press) the Ignition switches.

6 Inspect the engines under the cowlings for leaks.

7 To lock the engines off place the EKS fob over the lock indicator, the beeper sounds once. This indicates the lock mode is selected and the ignition switch cannot be turned to “ON”. When in lock mode, the EKS panel lock indicators blink. When the Ignition switch is OFF, or the Ignition switch is ON and the engines are not running, locking can be performed.

8 Turn off the 70 amp D.C. windlass control circuit breaker in the main D.C. panel if the windlass is not needed. This will deactivate the foredeck foot switches.



9 Connect the A.C. shore power cable as desired (See Electrical topics).

10 Set the Czone boat Mode of Operation to “All Off” as desired if leaving the boat. In the “All Off” mode the automatic bilge pump, high water alarm, and stereo memory circuits will remain energized unless their pop out type circuit breakers on the main D.C. panel are turned off.

NOTICE **See also *Yamaha* literature and follow recommended procedures!**

TO FLUSH THE ENGINES AFTER USE

DESCRIPTION: An optional Reverso 12 volt automatic outboard flushing system 2.0 is fitted to flush the engines' cooling systems with fresh water after salt water use.

LOCATION: In the stern.

1 Ensure that the "House" battery voltage is sufficient (at least 12 volts) and that the "House" battery switch is on at the main D.C. panel to feed power to the manual circuit breakers on the D.C. panel.

2 Ensure that the "Auto Flush System" manual circuit breaker on the D.C. panel is on.

3 Connect water hose to unit.

4 Turn on water. The unit will not work without water pressure.

5 **To activate**:

- Push start button once - **15 minute** cycle per engine.
- LED is solid blue during operation.
- At 14 minute and 55 seconds, the next engine will engage to overlap for 5 seconds.
- Push start button twice - **7.5 minute** cycle per engine.
- LED is blinking blue during operation.
- At 7 minute and 25 seconds, the next engine will engage to overlap for 5 seconds.

6 The unit will automatically cycle each engine and shuts off once complete.

7 Disconnect water hose.

8 To **Stop** Operation:

- Stopping in the middle of a cycle will stop program. The system will reset back to engine.

- If running the **15 minute** cycle per engine, then press the button **twice** to stop.
- If running the **7.5 minute** cycle per engine, then press the button **once** to stop.
- The system can be activated again by following Operation instructions.

9 **Loss of Water Pressure** During Operation:

- The LED will turn solid red.
- If water pressure is restored within 5 minutes, the system will resume operation from the point of pressure loss.
- If water pressure is not restored within 5 minutes, the system will reset. Press the start button to begin the cycles again, starting at the first engine.

STEERING & CONTROL SYSTEM OPERATIONS
3.6

TO USE THE YAMAHA POWER STEERING

DESCRIPTION: The Worldcat 40 Yamaha XF425 engines are fitted with integrated 12 volt D.C. electronic steering as a part of the Helm Master control system to turn the engines each engine independently. There is an electronic helm (wheel) and a multi function control joystick at the control console. If a fault occurs which prevents one or both of the engine's steering from being operated it is also possible to align the engines manually so that the vessel can be steered by alternating the engines' thrust. The autopilot steers the yacht by sending commands to the Helm Master system through a Yamaha/Garmin autopilot gateway interface with an integrated Yamaha/Garmin GPS gateway. There is no separate autopilot pump. A steering system malfunction alert is built into the Yamaha CL7 system.

LOCATION: The electronic helm is at the control console. The 12 volt electronic engine steering actuators are built into the front of the engine clamp brackets. The Garmin autopilot flux gate compass (Reactor) is mounted on the stbd. inside of the hull side outboard of the helm seat. The Yamaha autopilot gateway interface is on the stbd. hull side behind the stbd. deck settee.

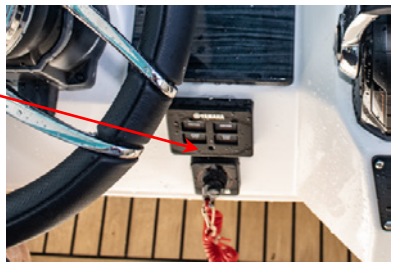
1 Ensure that the engine starting battery voltages are sufficient (12 volts).

2 Ensure that engine starting battery switches are on at the main D.C. panel on the aft deck. These can also be operated by remote control from the Czone system screens or the wireless fobs.

3 Ensure that the fuses in the fuse boxes on the top each engine under the cowling are intact.

4 The electronic steering can be used without the Czone system on.

5 Place and hold the EKS fob over the lock indicator in EKS panel stbd. of the helm to unlock the EKS.



6 When the EKS fob is placed over the lock indicator, the beeper sounds twice. This indicates the unlock mode is selected and the ignition switches can be turned to “ON”.

7 Pushing the ignition switch turns the power to each engine ON and OFF. When the power is ON, the active indicator will be illuminated. Turning the ignition buttons on powers up the Helm Mate system.

8 Turn on the ignitions.

9 Start the engines. (the control levers must be in neutral position for the engines to start).

10 The engines will be centered when the engines are started and when the joystick is first engaged.

11 Once engaged, using the docking joystick will turn the engines in the direction necessary automatically to maneuver the boat as desired.

12 The steering is very sensitive. Therefore the steering wheel friction “feel” and steering sensitivity is automatically adjusted based upon the speed of the vessel to maximize user control. Go gently until accustomed to the feel of the boat.

13 Steering with the docking joy stick while moving forward in the open may impart a yawing and rolling movement in the boat. It is best to use the wheel or autopilot in the open or at higher speeds for steering in normal forward operation.

14 For autopilot steering the autopilot computer commands the Helm Master integrated steering. While autopilot is engaged changing the heading will disengage the autopilot from auto steering.

15 In the event that either of the engines cannot be steered normally there is an emergency alignment procedure outlined in the Yamaha Engine Operation Manual. A manual override lever is provided on each engine’s steering assembly under the end cap to allow it to be released and centered so that the vessel can return to port steering by varying the engine thrust.

NOTICE **Emergency steering is then to be accomplished by judicious use of the twin engine’s thrusts with great loss of control! Use great caution and proceed at slow speed!**

TO USE THE ENGINE CONTROLS

DESCRIPTION: The engines are fitted with integrated electronic traditional style dual engine single lever remote control levers, and a control joystick as a part of the Helm Master system for steering the engines and to shift the engines through forward, neutral, and reverse, and to vary the speed of the engines. The remote control lever binnacle has function switches and system indicators. The Helm Master remote controls have additional functions including:

- Engine trim assist (sets engine trim to a predetermined level for a given speed)
- Remote control alert indicator (indicates that control is active for that engine)
- Free throttle switch (allows adjusting throttle without that engine in gear)
- Single lever switch (enables control of throttle and gear selection of both engines simultaneously using only the port side control lever).
- Speed control switch (makes small incremental speed changes while in forward)
- Active indicator (station selector switch active indicator, shows when operation of that engine shift and throttle are possible)
- PTT switch (All) Adjusts both engines power trim and tilt equally.
- PTT switch (STBD) Adjusts STBD. engine power trim and tilt.
- PTT switch (PORT) Adjusts PORT engine power trim and tilt.
- Remote control alert indicator Shows if a steering control system malfunction occurs, remote control alert indicators will blink. The blinking alert indicators show which engine or engine's steering system has a malfunction. A buzzer will also sound (alternating ON/OFF) to alert the operator. Tapping the "Confirm" button on the CL7 Display will stop the buzzer.

The directional joy stick enables the vessel to be maneuvered in close quarters by controlling both engines and their steered positions as required to position the vessel as desired. Low speed shifting, throttle operation and steering of all engines can be performed with the joystick lever when activated. Moving the joystick lever left, right, forwards, backwards, or diagonally moves the boat in the corresponding direction.The joystick will return to the neutral (N) position when released. The joystick has two speed modes: normal active, and high with activate buttons and mode indicator lights.

The joystick additionally has four “Set Point” modes:

Stay Point -This mode keeps bow direction and boat position set automatically when activated.This is useful when preparing for docking or waiting near a refueling dock or fishing.

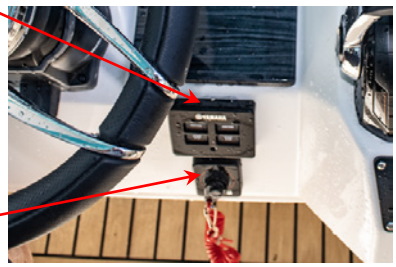
Fish Point Bow -This mode keeps boat position with bow into the wind or current. This is useful for fixed point fishing. Shifting and engine rpm is minimized to help avoiding scaring fish from noise.

Fish Point Stern -This mode keeps boat position with Stern into the wind or current. This mode is useful for fixed point fishing. Shifting and engine rpm is minimized to help avoiding scaring fish from noise.

Drift point -This keeps bow direction only and allows lateral movement according to the wind or/and current.This mode is useful for drift fishing or drift cruising.

⚠CAUTION The engines have a Yamaha notification light system that indicates by flashing and strobing a warning to anyone that can see them near the stern of the boat that the engines are running in the Set Point or Stay Point modes (See the *Yamaha* Helm Master literature for details on operating Set Point and Stay Point modes) and that a potential propeller injury danger exists!

There is an EKS (Electronic Key Switch) panel for the two engines with an EKS wireless fob. The EKS panel accomplishes locking/unlocking (for security purposes) using the wireless fob, ignition On/OFF, and Starting/Stopping for each engine. The EKS panel has a status indicator light and beeper.



There is a normally off engine shut off switch with a “Deadman” clip lanyard for instantly emergency stopping both engines at once. When the clip is attached it holds the engine shut off switch on.

There is a multi-hub connector strip for each engine to interconnect all of the Helm Master components.

The additional components are:

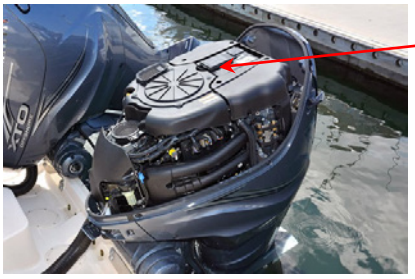
- the Yamaha CL7 data and programming display
- A Yamaha PCU (propulsion control unit) for each engine (2)
- A Yamaha/Garmin GPS gateway interface
- 2 Yamaha notification lights and a light interface
- A Yamaha /Garmin autopilot gateway interface

LOCATION: The remote control lever binnacle is at the control station on the console to stbd.. The multi function joy stick is forward of the remote control lever binnacle. The EKS panel is on the console face to stbd.. The engine shut off switch is below the EKS panel. The multi-hub connector strip is under the helm bench. The CL7 is in the center of the console dash. The PCUs are in the stbd. bilge aft on the hull side. The Yamaha/Garmin GPS gateway interface and the Yamaha /Garmin autopilot gateway interface are on the stbd. hull side outboard of the helm bench. The Yamaha notification lights are on each transom and the light interface is on the inside of the port aft transom.

⚠CAUTION **The engines have a Yamaha notification light system that indicates by flashing and strobing a warning to anyone that can see them near the stern of the boat that the engines are running in the Set Point or Stay Point modes (See the *Yamaha* Helm Master literature for details on operating Set Point and Stay Point modes) and that there is a potential propeller injury danger!**

See *Yamaha* engine and *Helm Master* literature before attempting to start engines.

1 Ensure that engine starting battery switches are on in the main D.C. panel. This can be done in the Czone system by remote control.



2 Ensure that the fuses in the fuse block on top of each engine under the cowling are intact.

3 Place and hold the EKS fob over the lock indicator in EKS panel stbd. of the helm to unlock the EKS.

4 When the EKS fob is placed over the lock indicator, the beeper sounds twice. This indicates the unlock mode is selected and the ignition switches can be turned to “ON”.

5 Pushing the ignition switch turns the power to each engine ON and OFF. When the power is ON, the active indicator will be illuminated. Turning the ignition buttons on powers up the Helm Mate system.

6 Turn on the ignitions.

7 While observing the CL7 on the dash press the Start /Stop switches. The Helm Master electronics system will automatically start that engine. The active indicator will be illuminated on the remote control lever binnacle when an engine is running.

NOTICE **Main engine alarm states will indicate on the Yamaha CL7. The Yamaha CL7 on the dash must be used to silence alarms!**

8 Engine and Helm Master controls’ malfunction alarms will generate explanatory codes and display them on the CL7. See the Yamaha literature for an explanation of the codes. The engines store certain engine data to assist in diagnosis of malfunctions which can be downloaded by a Yamaha technician with a special diagnostic tool.

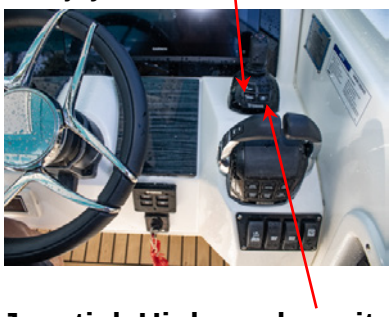
9 With the vessel tied alongside or anchored securely verify and test control function. See also *Steering & Controls* topics.

⚠ CAUTION **Disconnect and stow the shore power cable and close the entrance cap securely!** See *Electrical topics*.

10 Moving the remote control levers from the neutral (N) position to the forward (F) position (towards the bow of the boat) makes the boat move forwards, while moving it to the reverse (R) position (towards the stern of the boat) makes the boat move backwards. The boat will be moving with the engine at idle. Moving the lever farther opens the throttle, and the engine will begin to accelerate. Steering friction will vary automatically in response to boat speed so as not to be too sensitive.

11 **Free throttle switch** When activated, the free throttle switch allows opening the throttles of all engines without engaging forward or reverse gear.With the remote control levers in the N position, press the free throttle switch, and then move the remote control levers forward to open and close the throttle. Moving the remote control levers rearward will also open and close the throttle. The active indicator will be illuminated during operation.

12 The joystick switch transfers boat operation from the remote control and steering helm to the joystick.While the engine is running, placing the remote control lever and the joystick lever in the N position and pushing the joystick switch enters the joystick mode, allowing operation with the joystick lever.The active indicator illuminates during operation. While in the joystick mode, the engine speed is limited and the steering wheel is locked.



13 **Joystick High mode switch**The function of this switch is to allow the engines to run at a higher speed than normal, if extra power is needed (e.g., when there is strong wind or current). Pressing the high mode switch while in joystick mode engages the high mode. The active indicator illuminates during operation. Pressing the high mode switch again exits high mode. The active indicator will turn OFF.

NOTICE **It is normal when using the joystick mode for maneuvering that the engines will make significant clunking noises while engaging and disengaging the gears in response to the joystick commands.**

14 Pressing the joystick switch, shifting the remote control lever into F or R, or stopping one engine exits the joystick mode. The active indicator will turn OFF.

15 When exiting the joystick mode even if the steering wheel is turned, the engines will automatically return to the initial positions.

NOTICE **Both engines should be running during reversing maneuvers, to avoid the risk of water entering the engines via the exhaust pipes! Do not shift into reverse while traveling at planning speeds. Loss of control, swamping, or damage to the boat could occur!**

TO USE THE POWER TILT/TRIM

DESCRIPTION: Each engine has built in power tilt and power trim with a trim assist function that allows the trim angle of all engines to be automatically adjusted according to the engine speed. You must enter the RPM or boat speed and percentage of trim data for all five preset positions. The RPM or boat speed for position 1 is automatically set to IDLE.

LOCATION: The power tilt/trim is built into the motor brackets. The power tilt/trim control and trim assist buttons are built into the remote control binnacle and levers. A power tilt button is built into port side front of each engine.

1 The PTT system adjusts the position of the engines in relation to the transom.

2 PTT switch “1” (on the top side of the control lever) controls both engines simultaneously. PTT switches “2”, “3” and “4” (across the bottom back of the remote control binnacle) control each engine individually. When the engines are in the fully down position, pressing UP will first move the engine(s) through the trim range then into tilt range. Pressing DN will lower the engine(s). When the switches are released, the engine(s) will stop in its current position.

3 The trim assist function can be activated when the remote control levers are in the forward (F) position. The active indicator will be illuminated during operation. See page 36 of the *Yamaha* Helm Master Operations manual for information on setting engine speeds and the appropriate trim angle settings.

4 The trim assist settings must be setup on the Yamaha CL7 screen in advance in order for the trim assist switch to function. You must enter the RPM or boat speed and percentage of trim data for all five preset positions. The RPM or boat speed for position 1 is automatically set to IDLE.

5 Trim assist mode does not operate in the free throttle mode and joystick mode. Only pushing the trim assist switch exits from trim assist mode. The active indicator will go out. When the trim assist function has been switched ON, it will remain active until cancelled by the operator even when turning the ignition switch OFF and back to ON.

STABILIZER SYSTEM OPERATIONS 3.7

THIS OPTIONAL SECTION DOES NOT APPLY TO THIS VESSEL

GROUND TACKLE OPERATIONS
3.8

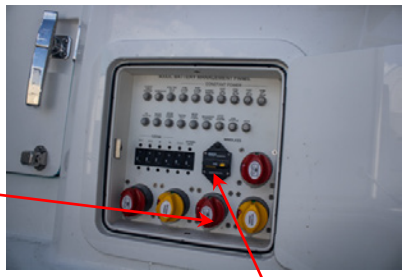
TO LET THE ANCHOR FREE FALL

DESCRIPTION: There is a 12 volt Lewmar HX-1 combination chain/line windlass with foot switches in the fore deck hatch and a rocker switch on the dash for in and out hauling of chain and line. 20' 5/16" G4 chain spliced to 300' 5/8" 8 strand nylon braid line is supplied with the yacht. The anchor is a stainless steel Lewmar DTXOHP 35# plow type stowed on a bow roller. The anchor can be allowed to free fall if power is not available to the windlass.

LOCATION: The windlass is mounted in the stbd. bow locker offset to the stbd. side of the bow pulpit with a turning fair lead and anchor roller. The rode locker is on the stbd. side below the windlass. The foot switches are inside the stbd. bow locker. The rocker switch is on the dash to stbd. of the helm.

1 See *Lewmar* literature.

2 Ensure that the 12 volt stbd. battery voltage is adequate (at least 12 volts).

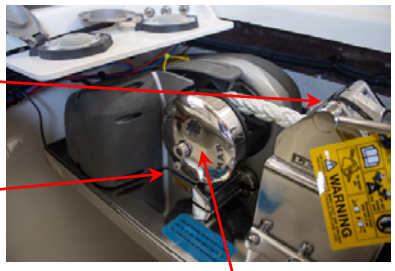


3 Ensure that the stbd. start battery switch in the main D.C. panel is on. This can also be done remotely from the Czone screen.

4 Ensure that the 100 amp BEP circuit breaker on the main D.C. panel for the windlass load is off (lever rotated down).

5 Determine depth of the water and ensure that you have sufficient rode to reach bottom with adequate scope. The yacht is commissioned with 20' 5/16" G4 chain spliced to 300' 5/8" 8 strand nylon line.

6 Ensure that the yacht does not have way on.



7 Flip the chain stopper up out of the way so that the chain can run.

8 Disengage the rode drive by pressing the plunger button on the edge of the free fall cap and press in the locking button on the face of the free fall cap until the plunger remains in the down position.

9 When safe insert the Lewmar wrench into the keyed hole in the face of the free fall cap and rotate clockwise to grip the gypsy and anticlockwise to free the gypsy

controlling the rate of descent of the anchor. Once the anchor is deployed adjust to the desired scope. Lock the clutch by turning the free fall cap clockwise and engage the chain stopper.

10 Remove the wrench handle.

11 To return the windlass back to powered operation pull the locking button out disengaging the plunger so that it pops up.

12 Ensure that the 100 amp BEP circuit breaker on the main D.C. for the windlass load is on (lever rotated up horizontally “reset”) and press the UP/DOWN buttons by the windlass or the rocker switch on the dash to ensure that the windlass turns.

⚠CAUTION **Always keep hands and limbs clear of the chain and windlass!**

TO LOWER/RAISE THE ANCHOR WITH THE WINDLASS

DESCRIPTION: There is a 12 volt Lewmar HX-1 combination chain/line windlass with foot switches in the fore deck hatch and a rocker switch on the dash for up and down hauling of chain and line. 20' 5/16" G4 chain spliced to 300' 5/8" 8 strand braid nylon line is supplied with the yacht. The anchor is a stainless steel Lewmar DTXOHP 35# plow type.

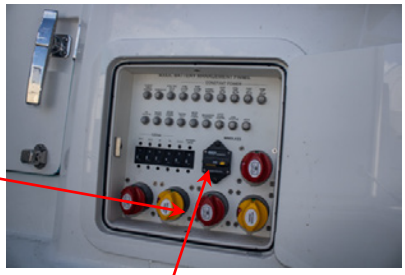
The windlass receives its power from the stbd. start battery via the Windlass circuit breaker on the main D.C. panel.

LOCATION: The windlass is mounted in the stbd. bow locker offset to the stbd. side of the bow pulpit with a turning fair lead and anchor roller. The rode locker is on the stbd. side below the windlass. The foot switches are inside the stbd. bow locker. The rocker switch is on the dash to stbd. of the helm. The up/down directional contactor is mounted inside the stbd. bow locker by the windlass on the hull.

1 See the *Lewmar* literature.

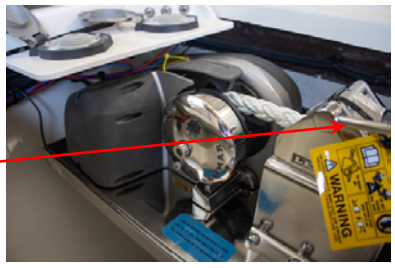
2 Ensure that the 12 volt stbd. battery voltage is adequate (at least 12 volts).

3 Ensure that the stbd. battery switch in the main D.C. panel is on. This can also be done remotely from the Czone screen.



4 Ensure that the 100 amp BEP circuit breaker on the main D.C. panel for the windlass load is on (lever rotated horizontal).

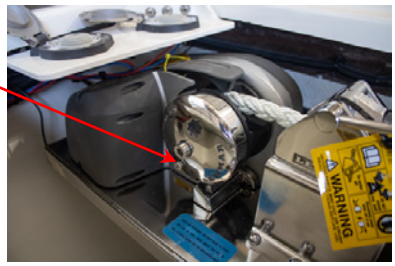
5 Determine the depth of the water and ensure that you have sufficient rode to reach bottom with adequate scope. The yacht is commissioned with 20' 5/16" G4 chain spliced to 300' 5/8" 8 part nylon line.



6 Ensure that the yacht does not have way on.

7 Flip the chain stopper up out of the way so that the chain can run.

8 Check that the windlass is not in manual mode by ensuring that that the button on the face of the free fall cap is released and the plunger on the edge is extended.

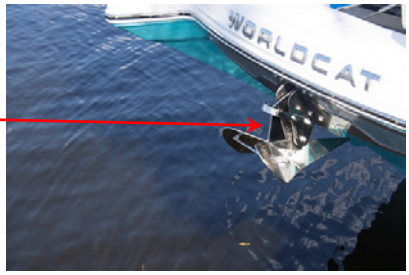


9 When lowering the anchor press the DOWN foot/rocker

switch until the anchor is under free fall. If the clutch was left in a locked position the anchor will start to fall almost immediately. If unlocked it could take several seconds to fully re-engage the internal clutch. NOTE: Pressing the DOWN button for over 5 seconds will result in a longer clutch re-engagement time during the next UP command.

NOTICE Failure to lock the windlass clutch could result in rode creeping out!

10 Press the UP button continuously to raise the anchor until it is stowed snug against the bow roller.



NOTICE To avoid damaging the bow roller, retrieve the last meter (3') of rope/chain slowly and take care when docking the anchor!

NOTICE The windlass is not designed to pull the yacht to the anchor against the wind and tide! The yacht must be gently maneuvered up towards the anchor while the rode/chain slack is retrieved!

11 Once the anchor is stowed flip the chain stopper back into position to stop the chain from running out while underway.

12 Turn off the "Windlass" control circuit breaker (press the yellow button on it) at the main D.C. panel so that no one can accidentally operate the windlass.

⚠ CAUTION **Always keep hands and limbs clear of the chain and windlass!**

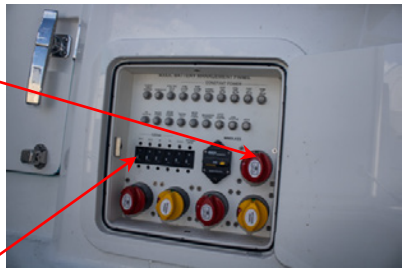
FRESH WATER SYSTEM OPERATIONS 3.9

TO MEASURE THE LEVEL IN THE WATER TANK

DESCRIPTION: The water tank is a 60 gallon linear polyurethane FDA accepted tank. The water tank level is monitored by a KUS sender tied in to the Czone system via the NMEA 2000 bus.

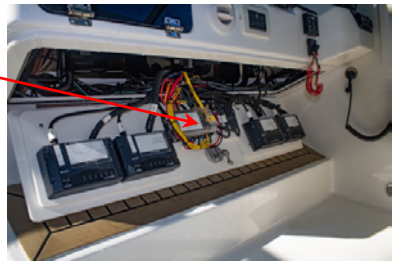
LOCATION: The tank sender is in the water tank top. The water tank level display reads on the Garmin touch screen monitor Czone display.

1 Ensure that the 12 volt “House” battery voltage is adequate (at least 12 volts).



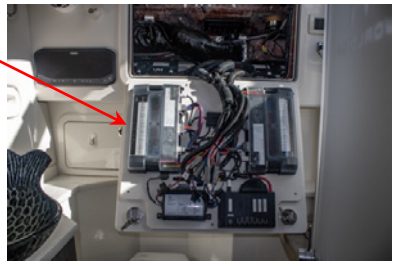
2 Ensure that the “House” battery switch is on at the main D.C. panel to feed power to all of the manual circuit breakers on the D.C. panel except the “Continuous Power” circuit breakers which are fed direct from the house batteries all the time.

3 Ensure that the “Elect” (to feed the fuse block for the monitors and other electronics) 50a, “COI 1” (to feed COI1 D.C. Loads) 100 a, “COI 2” (to feed COI2 D.C. loads) 100 a, “OI” (LROI 20a), and “C6” (5a Output Interface) manual circuit breakers are on at the main D.C. panel. These circuit breakers feed the D.C. loads and NMEA 2000 bus of the Czone system.



4 Ensure that the fuses in the fuse block under the console are intact.

5 Ensure that the green power LEDs on the Czone COIs for feeding the devices are on.



6 Ensure that the green network LEDs on the COIs are on indicating that the Czone NMEA network is intact.

7 Ensure that the green LEDs for each Czone channel on the COIs are on solid indicating there is power to feed those devices.

8 Turn on the multifunction Garmin touch screen displays on the dash.

9 The water tank level can be monitored on the Czone screen.

TO FILL THE WATER TANK

DESCRIPTION: The water tank is a 60 gallon linear polyurethane FDA accepted tank.

LOCATION: The tank is under the deck aft of the toilet below the front of the steering console. The tank fill is on the forward stbd. side deck. The vent is on stbd. side of the hull forward.

NOTICE Check the quality and purity of the source water before putting it into the yacht's tank!

1 Check the Czone screen to determine the water tank level.

2 Locate the water fill cap on the stbd. forward deck and open the cap.

3 Place hose in fill pipe and begin filling.

4 Monitor level while filling on the Czone screen.

5 Replace cap when finished filling.

See Czone topics.

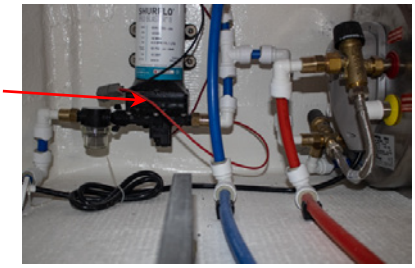
NOTICE To purify the water or sanitize the system use the following procedure:

- Turn off the hot water heater until finished.
- Remove any carbon canisters or micron rated filters. Remove any faucet aerator screens. Wire mesh pump protection strainers should stay in place. The plumbing will very likely slough off a layer of bacteria during later flushing steps.
- Clean and remove the vent screen and flush the vent hose.
- Use either following method to determine the amount of common household bleach needed to sanitize the tank.
- Multiply gallons of tank capacity by 0.13; the result is the ounces of bleach needed to sanitize the tank. This is 1/8 cup of plain bleach (no fragrance) per 10 gallons.
- Mix the proper amount of bleach (7.8 oz. or 3/4 cup) within a 1-gallon container of water. This will provide better mixing.

- Pour the solution (water/bleach) into the tank and fill the tank with potable water.
- If possible, allow some solution to escape though the vent. Prevent any spillage into local waters. This will sanitize the vent line.
- Open all faucets (hot and cold) allowing the water to run until all air is purged and the distinct odor of chlorine is detected. Leave the pressure pump on.
- The standard solution must have four hours of contact time to disinfect completely. Doubling the solution concentration reduces the contact time to one hour.
- When the contact time is completed, drain the tank. Refill with potable water and purge the plumbing of all sanitizing solution. Repeat until bleach is no longer detectable.
- If the smell of bleach persists after two refill and drain cycles, add a teaspoon of hydrogen peroxide per 20 gallons (3 tsp.) and mix. The peroxide will oxidize the hypochlorite to chloride (salt) and oxygen, neutralizing the bleach. Any excess peroxide will be harmless to drink and will have no taste. Peroxides are common ingredients in commercially available water freshening preparations. Don't use vinegar, which can ferment, undoing all of your hard work.

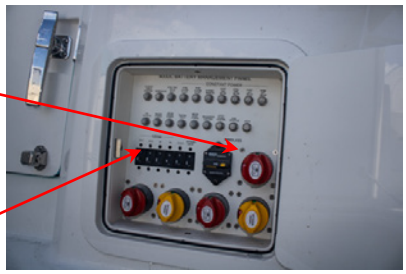
TO USE THE 12 VOLT WATER PRESSURE PUMP

DESCRIPTION: There is a 12 volt Shurflo Pro Blaster II water pressure pump with an inline suction strainer and built in demand pressure switch which draws from the tank and feeds the system. The fresh water system is assembled using the Whale Quick Connect vinyl tubing system.



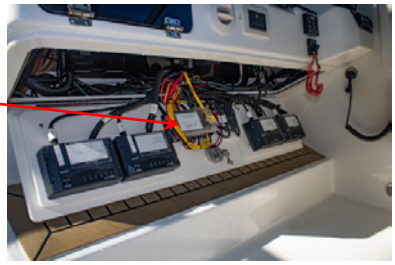
LOCATION: The pump and suction strainer are mounted under the port side U shaped on deck settee forward seat bottom inboard of the water heater.

1 Ensure that the 12 volt “House” battery voltage is adequate (at least 12 volts).



2 Ensure that the “House” battery switch is on at the main D.C. panel to feed power to all of the manual circuit breakers on the D.C. panel except the “Constant Power” circuit breakers which are fed direct from the house batteries all the time.

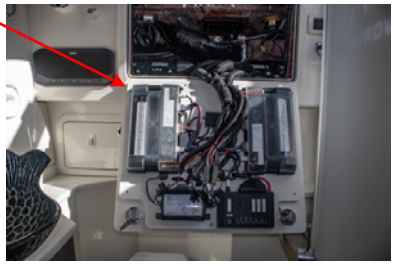
3 Ensure that the “Elect” (to feed the fuse block for the monitors and other electronics) 50a, “COI 1” (to feed COI1 D.C. Loads) 100 a, “COI 2” (to feed COI2 D.C. loads) 100 a, “OI” (LROI 20a), and “C6” (5a Output Interface) manual circuit breakers are on at the main D.C. panel. These circuit breakers feed the D.C. loads and NMEA 2000 bus of the Czone system.



4 Ensure that the fuses in the fuse block under the console are intact.

5 Ensure that the green power LEDs on the Czone COIs for feeding the devices are on.

6 Ensure that the green network LEDs on the COIs are on indicating that the Czone NMEA network is intact.



7 Ensure that the green LEDs for each Czone channel on the COIs are on solid indicating there is power to feed those devices.

8 Turn on the multifunction Garmin touch screen displays on the dash.

9 Ensure that the “Fresh Water” circuit breaker on the dash brow switch group or on the Czone screen is on.

10 Ensure that the pump suction strainer is clean.

11 The pump will turn on in response to the pressure demand switch mounted on it.

12 Monitor the fresh water tank level with the Czone system.

See the *Shurflo* pump literature and Czone topics.

TO USE THE WATER HEATER

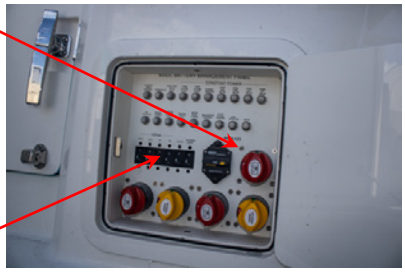
DESCRIPTION: There is an Webasto Isotemp Slim 20 L USG 115 volt electric heater.

LOCATION: The water heater is mounted under the port side U shaped on deck settee forward seat outboard of the fresh water pressure pump.

1 Ensure that there is water in the tank.

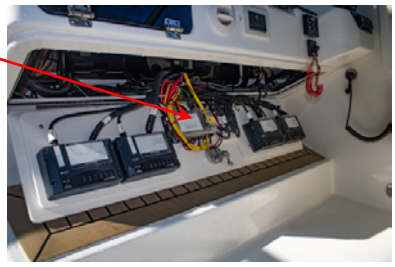
2 Ensure that the 12 volt “House” battery voltage is adequate (at least 12 volts).

3 Ensure that the “House” battery switch is on at the main D.C. panel to feed power to all of the manual circuit breakers on the D.C. panel except the “Constant Power” circuit breakers which are fed direct from the house batteries all the time.



4 Ensure that the “Elect” (to feed the fuse block for the monitors and other electronics) 50a, “COI 1” (to feed COI1 D.C. Loads) 100 a, “COI 2” (to feed COI2 D.C. loads) 100 a, “OI” (LROI 20a), and “C6” (5a Output Interface) manual circuit breakers are on at the main D.C. panel. These circuit breakers feed the D.C. loads and NMEA 2000 bus of the Czone system.

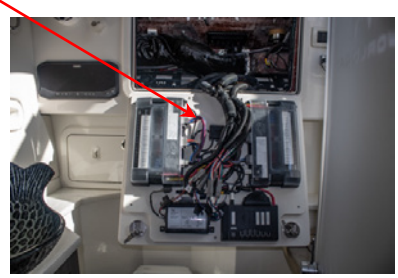
5 Ensure that the fuses in the fuse block under the console are intact.



6 Ensure that the green power LEDs on the Czone COIs for feeding the devices are on.

7 Ensure that the green network LEDs on the COIs are on indicating that the Czone NMEA network is intact.

8 Ensure that the green LEDs for each Czone channel on the COIs are on solid indicating there is power to feed those devices.



9 Ensure that A.C. power is connected to the ACOI #1 (the Czone screen “All AC Circuits” circuit breaker is on) and that the green LED for each circuit on the ACOI #1 is on. A red LED indicates a fault for that circuit.

10 Turn on the multifunction Garmin touch screen displays on the dash.

11 Ensure that the “Fresh Water” pressure pump circuit breaker on the dash brow switch group or on the Czone screen is on and that there is fresh water pressure.

12 Ensure that the "Water Heater" circuit breaker is on in the Czone system.

13 The water heater has an overpressure relief valve on the inboard end of it which will dump the hot water in the bilge if an overpressure state occurs.

SEWAGE & DRAINS SYSTEM OPERATIONS 3.10

TO MEASURE THE LEVEL IN THE SEWAGE HOLDING TANK

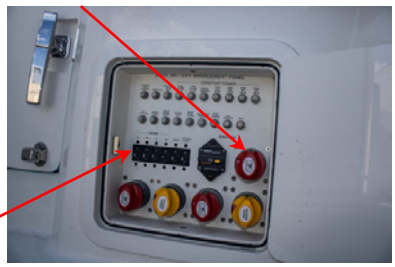
DESCRIPTION: The toilet discharges only into the 13 gallon polyurethane sewage holding tank which can be emptied by the yacht's own 12 volt D.C. pump or by suction to a shore pump out facility from the deck. The holding tank level is measured by the Czone system and is displayed only on the Czone screens. The sewage tank level sender is a Thetford Tecma model mounted in the tank top.

LOCATION: The sewage holding tank is under the sole in the stbd. hull forepeak. The 12 volt sewage tank discharge pump is in the compartment under the shower stall seat. The deck suction point for the sewage holding tank is on the port forward quarter deck. The sewage tank vent is to the stbd. hull side.

No chemicals should be put into the sewage tank other than *Raritan KO*.

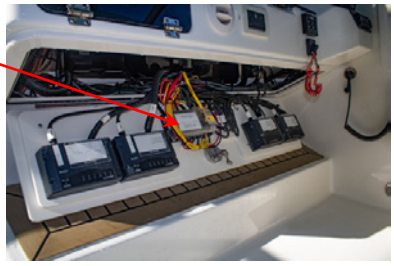
1 Ensure that the 12 volt “House” battery voltage is adequate (at least 12 volts).

2 Ensure that the “House” battery switch is on at the main D.C. panel to feed power to all of the manual circuit breakers on the D.C. panel except the “Constant Power” circuit breakers which are fed direct from the house batteries all the time.



3 Ensure that the “Elect” (to feed the fuse block for the monitors and other electronics) 50a, “COI 1” (to feed COI1 D.C. Loads) 100 a, “COI 2” (to feed COI2 D.C. loads) 100 a, “OI” (LROI 20a), and “C6” (5a Output Interface) manual circuit breakers are on at the main D.C. panel. These circuit breakers feed the D.C. loads and NMEA 2000 bus of the Czone system.

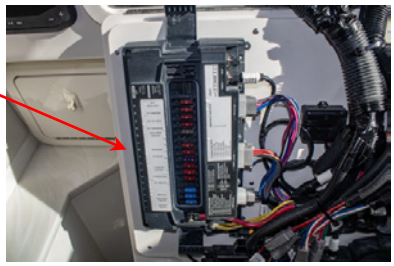
4 Ensure that the fuses in the fuse block under the console are intact.

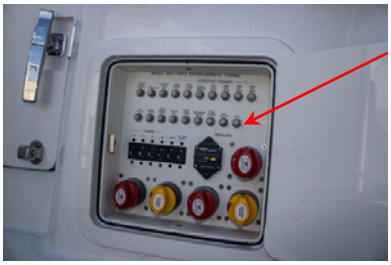


5 Ensure that the green power LEDs on the Czone COIs for feeding the devices are on.

6 Ensure that the green network LEDs on the COIs are on indicating that the Czone NMEA network is intact.

7 Ensure that the green LEDs for each Czone channel on the COIs are on solid indicating there is power to feed those devices.





8 Ensure that the “Marine Head” circuit breaker on the main DC electric panel is on.

9 Turn on the multifunction Garmin touch screen displays on the dash.

10 The sewage tank level can be viewed on the Czone screens.

TO FLUSH THE TOILET

DESCRIPTION: The toilet is a Thetford Tecma Silence Plus 12 volt D.C. fresh water flushed unit. The toilet is supplied fresh water pressure from the yacht's fresh water pressure system.

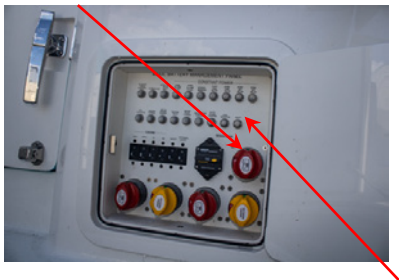
The toilet discharges only into the 13 gallon polyurethane sewage holding tank which can be emptied by the yacht's own 12 volt D.C. pump or by suction to a shore pump out facility from the deck. The holding tank level is measured by the Czone system and is displayed on the Czone screens.

LOCATION: The sewage holding tank is under the sole in the stbd. hull forepeak. The 12 volt sewage tank discharge pump is in the compartment under the shower stall seat. The deck suction point for the sewage holding tank is on the port forward quarter deck. The sewage tank vent is to the stbd. hull side. The toilet flush switch panel is in the compartment by the toilet. The 12 volt toilet flush water solenoid valve is on the hull side in the head under the sink.

NOTICE **Do not clean the toilet with harsh chemicals like bleach!**
Raritan C.P. **is a safe product that will not damage the toilet.**

1 Check the sewage holding tank level on the Czone system.

2 Ensure that there is adequate water pressure the water pressure pump.



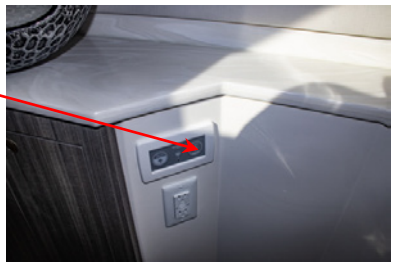
3 Ensure that the 12 volt “House” battery voltage is adequate (at least 12 volts).

4 Ensure that the “House” battery switch is on at the main D.C. panel to feed power to all of the manual circuit breakers on the D.C. panel except the “Constant Power” circuit breakers which are fed direct from the house batteries all the time.

5 Ensure that the “Marine Head” circuit breaker on the main D.C. electric panel is on.

6 ADDING WATER TO TOILET BOWL:
On the toilet flush panel by the toilet press the “Before” switch (up arrow) until desired water level is achieved.

(Water flow will shut off automatically if switch is pressed too long to avoid overflow.) More water is usually added only when flushing solids.



7 FLUSHING TOILET: Press the “After” switch (down arrow) then release it. This activates a powerful macerator pump that siphons water and waste from the bowl, macerates, and propels the effluent through the discharge line to the holding tank.

NOTICE **Do Not Flush Foreign Objects! Flush only water, bodily wastes and rapid-dissolving toilet tissue. Do not flush wet wipes, sanitary napkins, condoms, diapers, paper cups, cotton swabs, food, hair or liquids such as oils or solvents as clogging or damage to the toilet or toilet system may occur.**

8 On the Tecma flush switch panel, a steady green “Power On” light indicates when electrical power to the toilet is activated. A momentary flashing green light indicates when flush mode is changing.

NOTICE **Fresh water pressure must be on for the toilet to flush properly!**

See also the *Thetford Tecma* literature.

TO PUMP THE SEWAGE TANK FROM A SHORE PUMP OUT FACILITY

DESCRIPTION: The toilet discharges only into the 13 gallon polyurethane sewage holding tank which can be emptied by the yacht's own 12 volt D.C. pump or by suction to a shore pump out facility from the deck. There is a suction T on the tank to take suction from the deck or the macerator pump.

LOCATION: The sewage holding tank is under the sole in the stbd. hull forepeak. The 12 volt sewage tank discharge pump is in the compartment under the shower stall seat. The deck suction point for the sewage holding tank is on the port forward quarter deck. The sewage tank vent is to the stbd. hull side.

1 Check the level of the sewage holding tank on the Czone system. (See *Czone* topics).

2 Secure the yacht port side to (unless the hose will reach otherwise) at a pier with a sanitary pump out station.

3 Open the suction hose deck cap on the port forward side deck.

4 Place the hose from the shore pump out facility into the deck connection and begin pumping.

5 Monitor the level on the Czone system screen and stop when empty.

6 The tank can be flushed out with fresh water.

NOTICE **No chemicals other than *Raritan KO* should be put into the tank!**

7 Replace the deck cap when finished.

TO PUMP THE SEWAGE TANK WITH THE YACHT'S OWN PUMP

DESCRIPTION: The toilet discharges only into the 13 gallon polyurethane sewage holding tank which can be emptied by the yacht's own12 volt D.C. macerator pump or by suction to a shore pump out facility from the deck. The macerator pump is a Shurflo 3200-003. The holding tank level is measured by the Czone system and is displayed on the multifunction monitors. The sewage tank level sender is a Tecma mounted in the tank top. The on board sewage tank discharge pump has a switch on the Czone screen.

LOCATION: The sewage holding tank is under the sole in the stbd. hull forepeak. The 12 volt sewage tank discharge pump is forward in the compartment under the shower stall seat. The deck suction point for the sewage holding tank is on the port forward quarter deck. The sewage tank vent is to the stbd. hull side. The discharge seacock for the sewage tank discharge macerator pump is in the stbd. hull bilge on the inboard side under the shower seat.

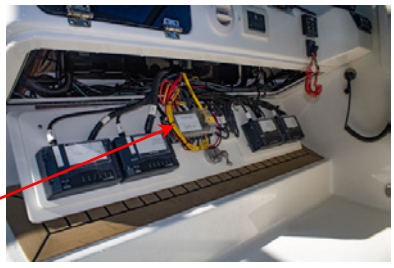
1 Ensure that the sewage tank discharge seacock is open.

NOTICE **Obey all local laws regarding the discharge of sewage!**

2 Ensure that the 12 volt “House” battery voltage is adequate (at least 12 volts).

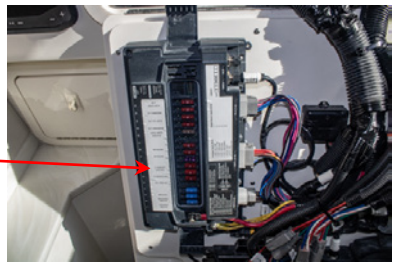
3 Ensure that the “House” battery switch is on at the main D.C. panel to feed power to all of the manual circuit breakers on the D.C. panel except the “Constant Power” circuit breakers which are fed direct from the house batteries all the time.

4 Ensure that the “Elect” (to feed the fuse block for the monitors and other electronics) 50a, “COI 1” (to feed COI1 D.C. Loads) 100 a, “COI 2” (to feed COI2 D.C. loads) 100 a, “OI” (LROI 20a), and “C6” (5a Output Interface) manual circuit breakers are on at the main D.C. panel. These circuit breakers feed the D.C. loads and NMEA 2000 bus of the Czone system.



5 Ensure that the fuses in the fuse block under the console are intact.

6 Ensure that the green power LEDs on the Czone COIs for feeding the devices are on.



7 Ensure that the green network LEDs on the COIs are on indicating that the Czone NMEA network is intact.

8 Ensure that the green LEDs for each Czone channel on the COIs are on solid indicating there is power to feed those devices.

9 Turn on the multifunction Garmin touch screen displays on the dash.

10 Turn on the “Discharge Pump” circuit breaker switch on the Czone screen.

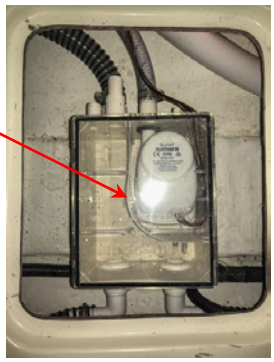
11 Check the sewage holding tank level on the Czone system to see when the tank is empty. (See Czone topics.)

12 Close the sewage tank discharge seacock.

Use only *Raritan K.O.* to control odors in the holding tank.

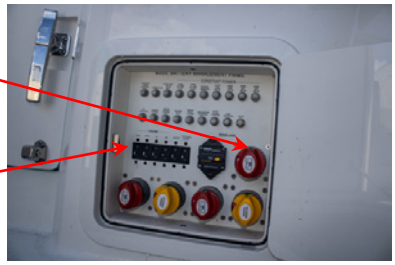
TO EMPTY THE DRAIN SUMPS

DESCRIPTION: There are two drain sumps. There is a drain sump for the shower water and one to collect any water that accumulates from the floor drains of the stateroom. The shower/sink drain sumps are plastic covered boxes that contain Attwood 12 volt Sahara S750 submersible automatic bilge pumps. The sinks, aft deck chiller box, baitwell, and icemaker gravity drain overboard.



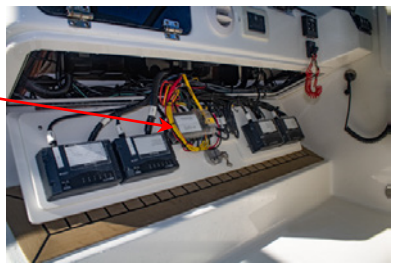
LOCATION: The shower drain sump and pump are under the floor in the head and discharge/vent out the stbd. hull side. The stateroom floor drain sump and pump are under the floor of the stateroom and discharge/vent out the port hull side.

1 Ensure that the 12 volt “House” battery voltage is adequate (at least 12 volts).



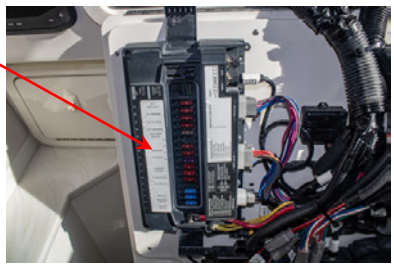
2 Ensure that the “House” battery switch is on at the main D.C. panel to feed power to all of the manual circuit breakers on the D.C. panel except the “Constant Power” circuit breakers which are fed direct from the house batteries all the time.

3 Ensure that the “Elect” (to feed the fuse block for the monitors and other electronics) 50a, “COI 1” (to feed COI1 D.C. Loads) 100 a, “COI 2” (to feed COI2 D.C. loads) 100 a, “OI” (LROI 20a), and “C6” (5a Output Interface) manual circuit breakers are on at the main D.C. panel. These circuit breakers feed the D.C. loads and NMEA 2000 bus of the Czone system.



4 Ensure that the fuses in the fuse block under the console are intact.

5 Ensure that the green power LEDs on the Czone COIs for feeding the devices are on.



6 Ensure that the green network LEDs on the COIs are on indicating that the Czone NMEA network is intact.

7 Ensure that the green LEDs for each Czone channel on the COIs are on solid indicating there is power to feed those devices.

8 Turn on the multifunction Garmin touch screen displays on the dash.

10 Turn on the “Shower Sump-Port” and “Shower Sump-Stbd.” circuit breakers on the Czone screen.

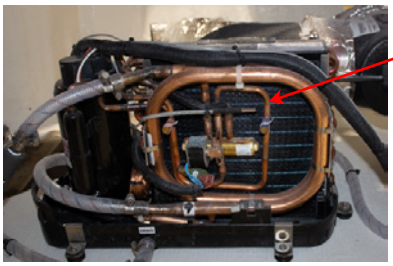
11 The sump pumps will operate automatically in response to their automatic level switches.

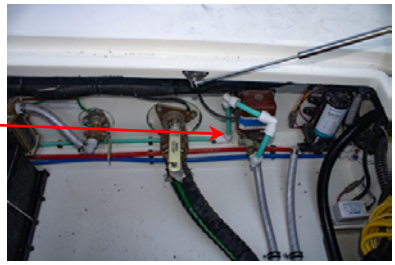
NOTICE **No chemicals should be used to clean the sumps but hot water and vinegar!**

VENTILLATION & AIR CONDITIONING SYSTEM OPERATIONS 3.11

TO USE THE AIR CONDITIONING

DESCRIPTION: There is a 115 volt Dometic DTU8-410A 8,000 BTU self contained raw water cooled air conditioning system to service the lower deck and a 115 volt Dometic DTU12-1161-410A t12,000 BTU self contained system to service the main deck. These are fed raw water by two dedicated 115 volt Dometic 336183 115 VAC raw water pumps. The condensate is collected in the pan under the units which is then discharged into the cooling water overboard discharge line for each unit by a Marvair siphon suction device with an inline Shurflo debris filter on the suction side. Each unit has a lint screen on it and its own thermostatic digital controller.



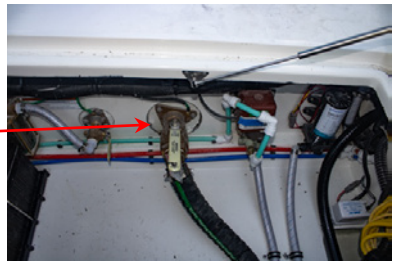


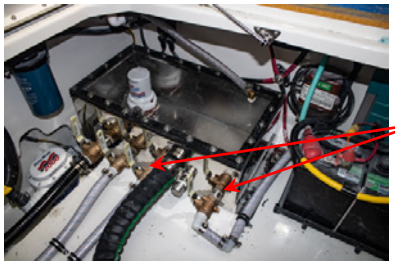
LOCATION: The compressor/air handler units are aft in the stateroom for the lower deck and under the curved forward corner of the stbd. aft deck settee aft of the helm bench for the main deck. The raw water pumps are in the port hull aft bilge (mechanical room). The air conditioning raw water pump sea valves are on the inlet raw water sea chest in the port mechanical room as well. The condensate drain debris filters are near the units. The thermostatic digital controllers are in the stateroom for the lower deck and on the dash console for the upper deck.

1 See the *Dometic* literature first.

2 The yacht must be in the water.

3 The raw water supply sea chest seacock in the port aft bilge (mechanical room) must be open.

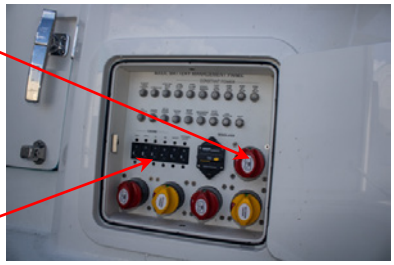




4 The air conditioning raw water pump supply seacocks on the sea chest must be open.

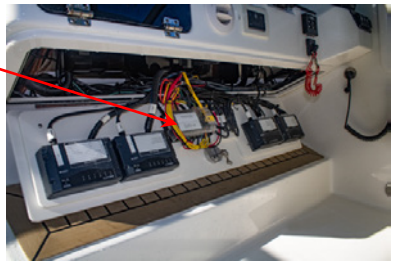
5 Ensure that the 12 volt “House” battery voltage is adequate (at least 12 volts).

6 Ensure that the “House” battery switch is on at the main D.C. panel to feed power to all of the manual circuit breakers on the D.C. panel except the “Constant Power” circuit breakers which are fed direct from the house batteries all the time.



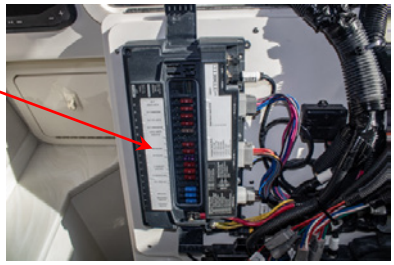
7 Ensure that the “Elect” (to feed the fuse block for the monitors and other electronics) 50a, “COI 1” (to feed COI1 D.C. Loads) 100 a, “COI 2” (to feed COI2 D.C. loads) 100 a, “OI” (LROI 20a), and “C6” (5a Output Interface) manual circuit breakers are on at the main D.C. panel. These circuit breakers feed the D.C. loads and NMEA 2000 bus of the Czone system.

8 Ensure that the fuses in the fuse block under the console are intact.



9 Ensure that the green power LEDs on the Czone COIs for feeding the devices are on.

10 Ensure that the green network LEDs on the COIs are on indicating that the Czone NMEA network is intact.



11 Ensure that the green LEDs for each Czone channel on the COIs are on solid indicating there is power to feed those devices.

12 Ensure that A.C. power is connected to the main A.C. panel (ACOI #1) and that the “All AC Circuits”, “Air Con-Cabin”, and “Air Con-Deck” circuit breakers are on in the Czone screen.

13 Turn on the multifunction Garmin touch screen displays on the dash.

14 With A.C. power connected on the boat ensure that the green LED for each circuit on the ACOI #1 is on. A red LED indicates a fault for that circuit.

15 Turn on the air conditioning units at their digital controllers.

16 To dim the controller digital displays at night press the “Mode” button and the up arrow buttons on the controllers simultaneously.

NOTICE **Use only Hydrogen Peroxide to clean the condensate pan! Do not use bleach it is corrosive!**

TO USE THE VENT FAN

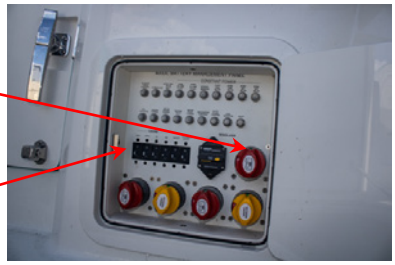
DESCRIPTION: There is a 12 volt vent fan to evacuate steam and odors from the head compartment.

LOCATION: The fan is on the aft wall of the compartment behind the toilet in the head.

1 Ensure that the fan is not covered.

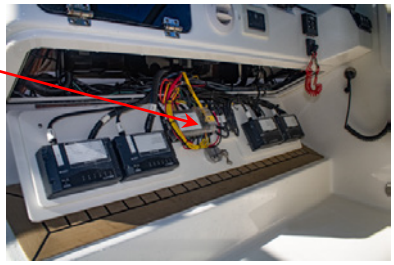
2 Ensure that the 12 volt “House” battery voltage is adequate (at least 12 volts).

3 Ensure that the “House” battery switch is on at the main D.C. panel to feed power to all of the manual circuit breakers on the D.C. panel.



4 Ensure that the “Elect” (to feed the fuse block for the equipment, monitors and other electronics) 50a, manual circuit breaker is on at the main D.C. panel.

5 Ensure that the compass light fuse fuse in the fuse block under the console is intact. It also feeds the vent fan.

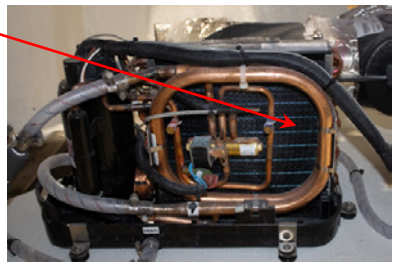


6 Turn on the vent fan with the rocker switch on the unit.

TO CLEAN THE AIR CONDITIONING AIR FILTERS

DESCRIPTION: Flat polymer lint screen filters.

LOCATION: The air handler lint screens are behind the coil on each air handler.



1 Open the access to the air handler that you wish to service.

2 Lift up and out the lint screen behind the coil on the air handler.

3 Wash the filter and blow dry with air.

4 Replace the filter and close up the access.

TO SERVICE THE AIR CONDITIONING CONDENSATE DRAINS

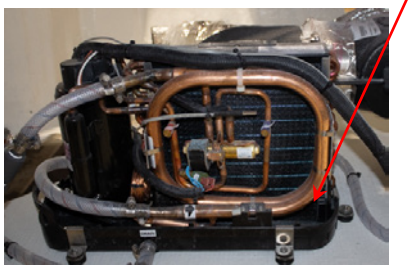
DESCRIPTION: A drain pan is mounted under each air conditioner unit. The condensate is collected in the pan and siphoned out by a Marvair siphon suction device with an inline Shurflo debris filter on the suction side into the unit's cooling water discharge.

LOCATION: The compressor/air handler units are aft in the stateroom for the lower deck and under the curved forward corner of the stbd. aft deck settee aft of the helm bench for the main deck.

⚠ CAUTION **!!CAUTION! Air conditioning circuit breakers should be off first!**

1 Open the access to the air conditioning unit.

2 Open, clean, and reassemble the inline Shurflo debris filter on the suction side of the condensate drain line. Pour Hydrogen Peroxide into the open edge of the drain pan.



3 Restart the system and ensure that the pan drains.

4 Vacuum dry and clean with a wet dry vacuum after draining.

5 Repeat until the pan drains freely with the unit running.

NOTICE **Use only Hydrogen Peroxide to clean the condensate pan! Never use bleach it is corrosive!**

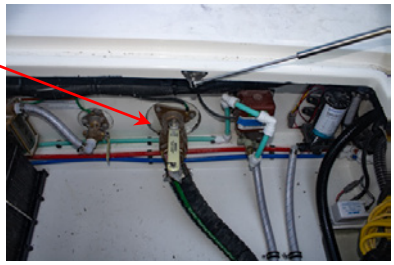
RAW WATER SYSTEM OPERATIONS 3.12

TO USE THE RAW WATER INTAKE SEACHEST

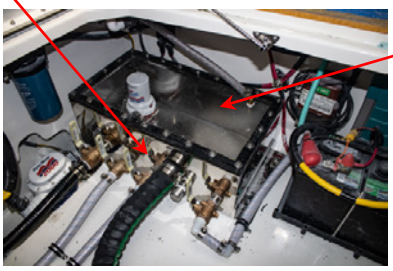
DESCRIPTION: There is a stainless steel raw water intake sea chest below the waterline to combine the intake water needed for auxiliary devices that use raw water. A single through hull suction fitting with an external strainer supplies the water coming in to a welded stainless steel box with a removable Lexan see through top. Individual seacocks come off of the side of the box to feed each air conditioning system raw water cooling pump, and the raw water wash down pressure pump. The submersible baitwell pump is submerged inside the box and discharges out the side of the box via a seacock as well. There is a spare fitting on the sea chest to supply an additional device if needed. There is an air vent on top of the sea chest.

LOCATION: The sea chest is in the port aft bilge ("mechanical room"). The seacock that supplies it raw water is in the port aft hull inboard side (tunnel) in the same compartment. The suction inlet through hull has an external strainer on the inside of the port hull tunnel.

1 Open the seacock on the inboard side of the port hull aft by the sea chest.



2 Open the individual seacocks coming off of the sea chest for the items that you wish to supply raw water to.



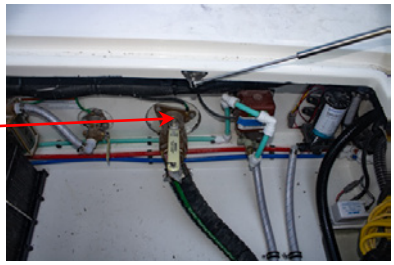
3 Inspect the interior of the sea chest periodically to ensure that it is clean of any debris that could plug pump suctions and is free of marine fouling.

4 Remove the Lexan top to clean any debris from inside the sea chest as necessary.

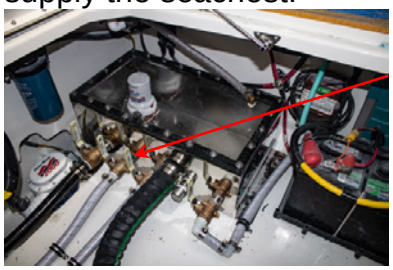
TO USE THE RAW WATER DECK WASH PUMP

DESCRIPTION: There is a Pentair Shurflo ProBlaster II Deluxe 4.0 60 psi 12 volt deck wash pump with a demand pressure switch to supply raw water pressure for the quick disconnect raw water wash down connections on deck.

LOCATION: The raw water wash down pump is inboard under the port aft deck in the "Mechanical room". The raw water suction seacock is on the raw water seachest in the compartment with it. The raw water wash down connections are on the aft deck and in the port bow hatch.



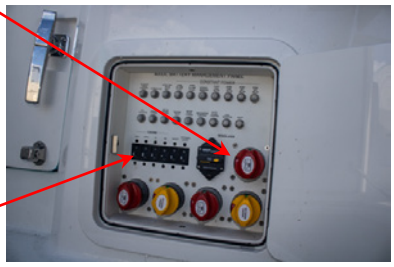
1 Ensure that the raw water seachest supply seacock in the port aft bilge on the inboard hull side is open to supply the seachest.



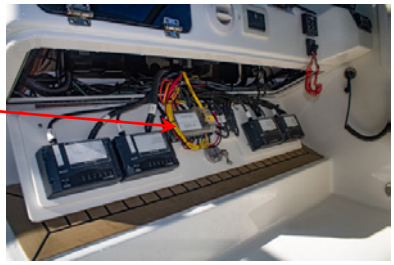
2 Open the raw water deck wash pump suction seacock on the sea chest.

3 Ensure that the 12 volt "House" battery voltage is adequate (at least 12 volts).

4 Ensure that the "House" battery switch is on at the main D.C. panel to feed power to all of the manual circuit breakers on the D.C. panel except the "Constant Power" circuit breakers which are fed direct from the house batteries all the time.



5 Ensure that the "Elect" (to feed the fuse block for the monitors and other electronics) 50a, "COI 1" (to feed COI1 D.C. Loads) 100 a, "COI 2" (to feed COI2 D.C. loads) 100 a, "OI" (LROI 20a), and "C6" (5a Output Interface) manual circuit breakers are on at the main D.C. panel. These circuit breakers feed the D.C. loads and NMEA 2000 bus of the Czone system.



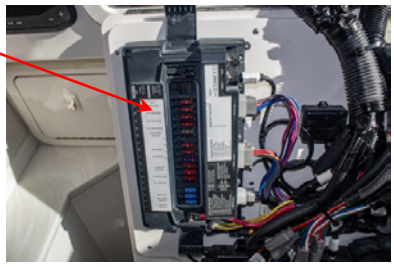
6 Ensure that the fuses in the fuse block under the console are intact.

7 Ensure that the green power LEDs on the Czone COIs

for feeding the devices are on.

8 Ensure that the green network LEDs on the COIs are on indicating that the Czone NMEA network is intact.

9 Ensure that the green LEDs for each Czone channel on the COIs are on solid indicating there is power to feed those devices.



10 Turn on the multifunction Garmin touch screen displays on the dash.

11 Turn on the “Raw Water” pump circuit breaker on the Czone touch screen or in the row on the top on the dash brow.

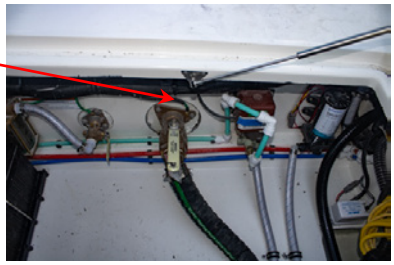
12 Fit the quick disconnect adapter to the hose and plug it into the wash down socket to use the water. The pump will start on demand. When you are finished using the wash down pump turn off the pump circuit breaker so that the pump cannot be inadvertently turned on with the seacock shut and close the seacock.

TO USE THE LIVE BAIT WELL (Optional)

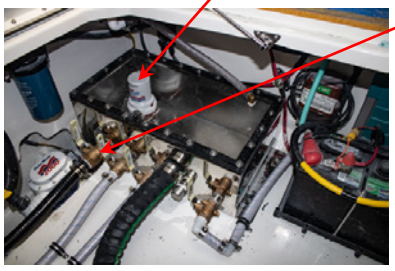
DESCRIPTION: There is a 12 volt 1500 GPH Rule submersible bilge pump in the raw water seachest to serve as a live bait well circulating pump to supply circulating water to the live bait well. It draws suction from the seachest and discharges out the side of the seachest through a seacock to the baitwell. The bait well fills with water and the overflow valves allow the water to drain out overboard by gravity causing circulation. The bait well has a light in it and a valve in the bottom to drain it when finished with use.

LOCATION: The pump is mounted inside the seachest in the port aft bilge (mechanical room). The seacock on the discharge from the pump to the bait well is on the inboard side of the seachest. The pump and well light buttons are on the inside of the stern to port by the well.

1 Ensure that the raw water seachest supply seacock in the port aft bilge on the inboard hull side is open to supply the seachest.

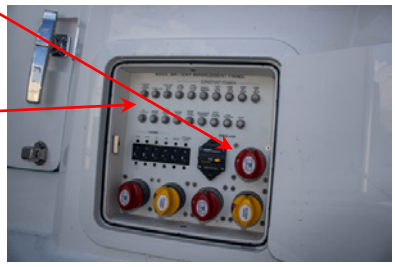


2 Open the live well pump discharge seacock on the sea chest.



3 Ensure that the 12 volt “House” battery voltage is adequate (at least 12 volts).

4 Ensure that the “House” battery switch is on at the main D.C. panel to feed power to all of the manual circuit breakers on the D.C. panel except the “Constant Power” circuit breakers which are fed direct from the house batteries all the time.



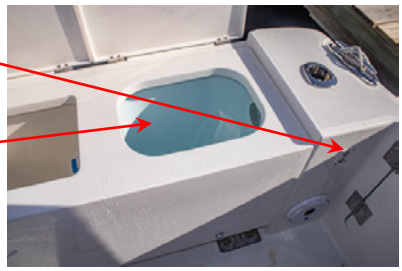
5 Ensure that the ”Optional Distr” 50a manual circuit breaker is on at the main D.C, panel. This circuit breaker feeds the fuse block in the port hull aft (mechanical room) containing the fuse for the bait well pump.

6 Ensure that the “Livewell” fuse in the fuse block is intact.

7 Close the drain in the bottom of the baitwell.

8 Turn on the “Livewell” pump and light with the push button switches by it in the stern.

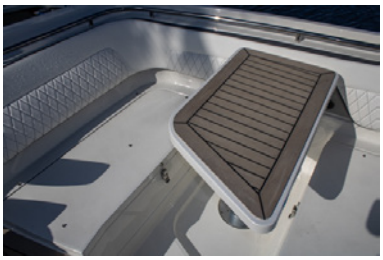
9 Regulate the valves in the side and bottom of the baitwell to adjust the water flow.



DECK APPLIANCES & OTHER OPERATIONS
3.13

TO USE THE FORWARD TABLE LIFTS

DESCRIPTION: The forward deck seating area tables have two stage Scandvik 12 volt electric vertical lift mechanisms to raise and lower them.



LOCATION: The tables are port and stbd. in the bow seating area. The buttons for raising and lowering them are on each side of the walk thru from the control console area. The lift actuators are incorporated into the table pedestals. The relay/termination boxes are outboard of the tables behind the stereo speakers.

⚠ CAUTION Ensure that everyone is clear of the tables or from under them when operating the lift mechanisms!

NOTICE Do not sit on the tables!

1 Ensure that the 12 volt “House” battery voltage is adequate (at least 12 volts).

2 Ensure that the “House” battery switch is on at the main D.C. panel to feed power to all of the manual circuit breakers on the D.C. panel.

3 Ensure that the “12-24 volt Table Convert” circuit breaker on the main D.C. electric panel is on.

4 Operate the table lifts from the buttons on each side of the walk thru from the control console area.

5 The table heights can be adjusted to form beds by bridging the settees.

TO USE THE MOON ROOF

DESCRIPTION: There is a 12 volt electrically operated moon roof over the central console area. The moon roof has a manually operated sliding sun shade on the inside to decrease heat and glare.

LOCATION: The moon roof is above the centerline of the console area. The rocker switch for controlling the moon roof is to stbd. of the helm on the main control console.

⚠ CAUTION **Ensure that everyone is clear of the moon roof before operating the sliding glass. Do not stand on the moon roof ever!**

NOTICE **Open the manually operated sun shade before operating the moon roof. Do not close the sun shade with the glass portion of the moon roof open. Operating the vessel with the moon roof open and the sun shade closed could tear the sun shade and jam the moon roof!**

1 Ensure that the 12 volt “House” battery voltage is adequate (at least 12 volts).

2 Ensure that the “House” battery switch is on at the main D.C. panel to feed power to all of the manual circuit breakers on the D.C. panel.

3 Ensure that the “Moon Roof” circuit breaker on the main D.C. electric panel is on.

4 Operate the moon roof with the rocker switch to stbd. of the helm on the main control console.

NOTICE **Do not close the moon roof sun shade with the glass portion of the moon roof open even when stopped if rain is expected. The rain and wind could damage the sun shade!**

TO USE THE SURE SHADE (Optional)

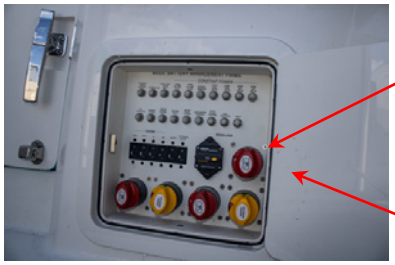
DESCRIPTION: There is a 12 volt electrically operated sliding shade awning to cover the aft deck area.

LOCATION: The Sure Shade stows and deploys from a slot in the aft end of the hard top. The Sure Shade controller is mounted on the stbd. hull side behind the settee. The buttons for controlling the Sure Shade are on the aft edge of the stbd. aft deck counter above the refrigerator.

⚠ CAUTION **Ensure that everyone is clear of the aft edge of the hardtop before operating the Sure Shade. Do not place hands between the aft end of the shade and the aft end of the hard top ever!**

NOTICE **Do not operate the vessel with the Sure Shade extended. Operating the vessel with the Sure Shade extended could tear the shade and jam the mechanism so that the shade may not be able to be retracted. Do not leave the shade extended even when stopped if rain is expected. The rain and wind could damage the shade!**

1 Ensure that the 12 volt “House” battery voltage is adequate (at least 12 volts).



2 Ensure that the “House” battery switch is on at the main D.C. panel to feed power to all of the manual circuit breakers on the D.C. panel.

3 Ensure that the “Sure Shade” circuit breaker on the main D.C. electric panel is on.

4 Operate the Sure Shade with the buttons on the aft edge of the stbd. aft deck counter above the refrigerator.

NOTICE **If the Sure Shade will not fully extend or retract there is a "Force Hard Reset" procedure described on the Sure Shade web site and in the Sure Shade manual. If the Sure Shade canvas is sagging during operation unzip the canvas from the outer crossbar and rotate the canvas to add more tension.**

TO USE THE ELECTRIC HELM SEAT

DESCRIPTION: There is a 12 volt electrically operated helm seat for the main control console area.

LOCATION: The helm seat is aft of the console area. The rocker switch for controlling the helm seat is to stbd. of the helm on the main control console.

⚠ CAUTION Ensure that everyone is clear of the sides and bottom of the helm seat before operating it!

NOTICE Do not allow clothing or towels etc. to get into the pinch areas of the helm seat mechanism that move!

1 Ensure that the 12 volt “House” battery voltage is adequate (at least 12 volts).

2 Ensure that the “House” battery switch is on at the main D.C. panel to feed power to all of the manual circuit breakers on the D.C. panel.

3 Ensure that the “Stbd. Fwd. Helm Seat” circuit breaker on the main electric panel is on.

4 Operate the helm seat with the rocker switch to stbd. of the helm on the main control console.

APPLIANCES & ENTERTAINMENT OPERATIONS
3.14

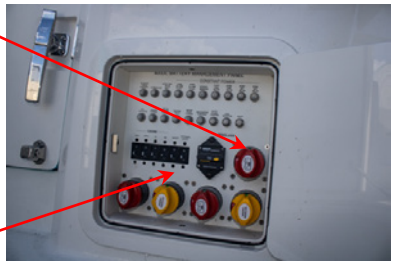
TO USE THE AFT DECK CHILLER BOX (Optional)

DESCRIPTION: There is a 12 volt Dometic CU-85 air cooled chiller unit for the chiller box in the transom. The chiller power supply comes from the port house battery via a fuse in the compartment below it. The chiller box has a drain in the bottom.

LOCATION: The chiller box is built into the port side of the transom top. The chiller compressor is located under the chiller box.

1 Ensure that the 12 volt “House” battery voltage is adequate (at least 12 volts).

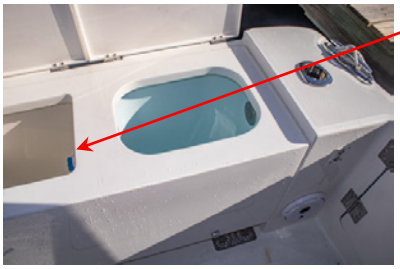
2 Ensure that the “House” battery switch is on at the main D.C. panel to feed power to all of the manual circuit breakers on the D.C. panel except the “Constant Power” circuit breakers which are fed direct from the house batteries all the time.



3 Ensure that the ”Optional Distr” 50a manual circuit breaker is on at the main D.C. panel. This circuit breaker feeds the fuse block in the port hull aft (mechanical room) containing the fuse for the chiller compressor.

4 Ensure that the “Chiller” fuse in the fuse block is intact.

5 Close the drain in the bottom of the chiller box.



6 Rotate the knob on the port side of the inside of the chiller box clockwise to turn on the unit. If the red LED on the control flashes or glows, a fault has occurred and the unit cannot be operated. See the manual for the Dometic chiller unit for details.

TO USE THE STEREOS

DESCRIPTION: There is a JL Audio MM 100S-BE Sirius XM capable water resistant stereo running off of 12 volts with a JL Audio Nex D M800/8V2 800 Watt marine 8 channel amplifier for the on deck area speakers. There are Fusion–PS-A302B active sound panel all-in-one stereos with AM, FM, USB and Bluetooth in the head and stateroom. A Fusion-Link control app can be used.

The main stereo is tied into the Czone system. There are JL Audio marine speakers on deck with lights in them. The stereo memory is fed uninterrupted power from the 15 amp "Stereo Memory" circuit breaker in the "Constant Power" group on the main D.C. panel. This circuit is not affected by turning off the House battery switch. There is also a USB port for connecting smart phones and other digital music source devices.

LOCATION: The JL Audio MM 100S-BE main control unit is located in the dash.

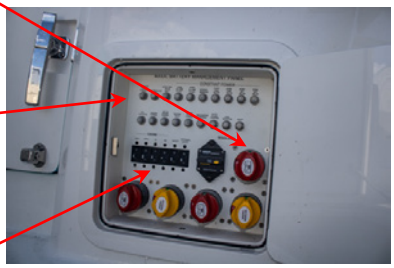
The Fusion all-in-one units are in the hull side and aft wall panels in the head and stateroom.

The speakers are integrated into the stateroom and head all-in-one units and mounted strategically on the exterior for the main unit.

Two automotive type blade fuses for the stereos are located in the compartment below the dash. The 80 amp fuse on the supply from the stbd. house battery to the 800 Watt amplifier is on the connection at the battery terminal in the stbd. bilge area.

1 Ensure that the 12 volt "House" battery voltage is adequate (at least 12 volts).

2 Ensure that the "House" battery switch in the main D.C. panel is on.

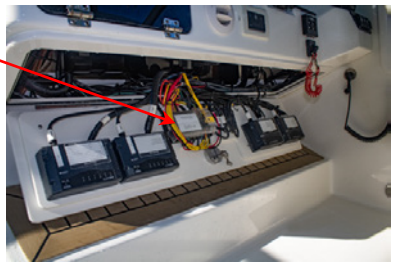


3 Ensure that the "Stereo Memory" circuit breaker in the "Constant Power" group on the main D.C. panel is left on to preserve items saved to the memory.

4 Ensure that the "Elect" (to feed the fuse block for the monitors and other electronics) 50a, "COI 1" (to feed COI1 D.C. Loads) 100 a, "COI 2" (to feed COI2 D.C. loads) 100 a, "OI" (LROI 20a), and "C6" (5a Output Interface)

manual circuit breakers are on at the main DC panel. These circuit breakers feed the D.C. loads and NMEA 2000 bus of the Czone system.

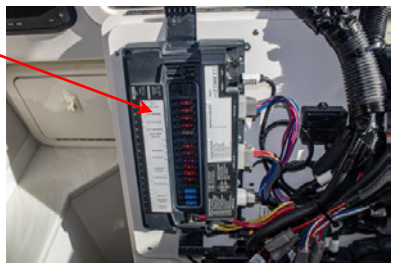
5 Ensure that the “Audio Power” (for the head and stateroom units) and “Stereo Power” (for the main unit) fuses in the fuse block under the console are intact.



6 Ensure that the green power LEDS on the Czone COIs for feeding the devices are on.

7 Ensure that the green network LEDs on the COIs are on indicating that the Czone NMEA network is intact.

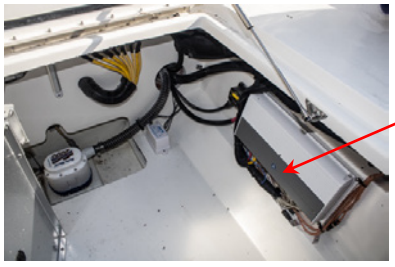
8 Ensure that the green LEDs for each Czone channel on the COIs are on solid indicating there is power to feed those devices.



9 Turn on the multifunction Garmin touch screen displays on the dash.

10 You may now use the Garmin touch screens to view the Czone D.C. system status and operate devices on it.

11 Ensure that the Blue Sea Systems #5181 80 amp amplifier feed fuse on the terminal connection to the stbd. house battery is intact.



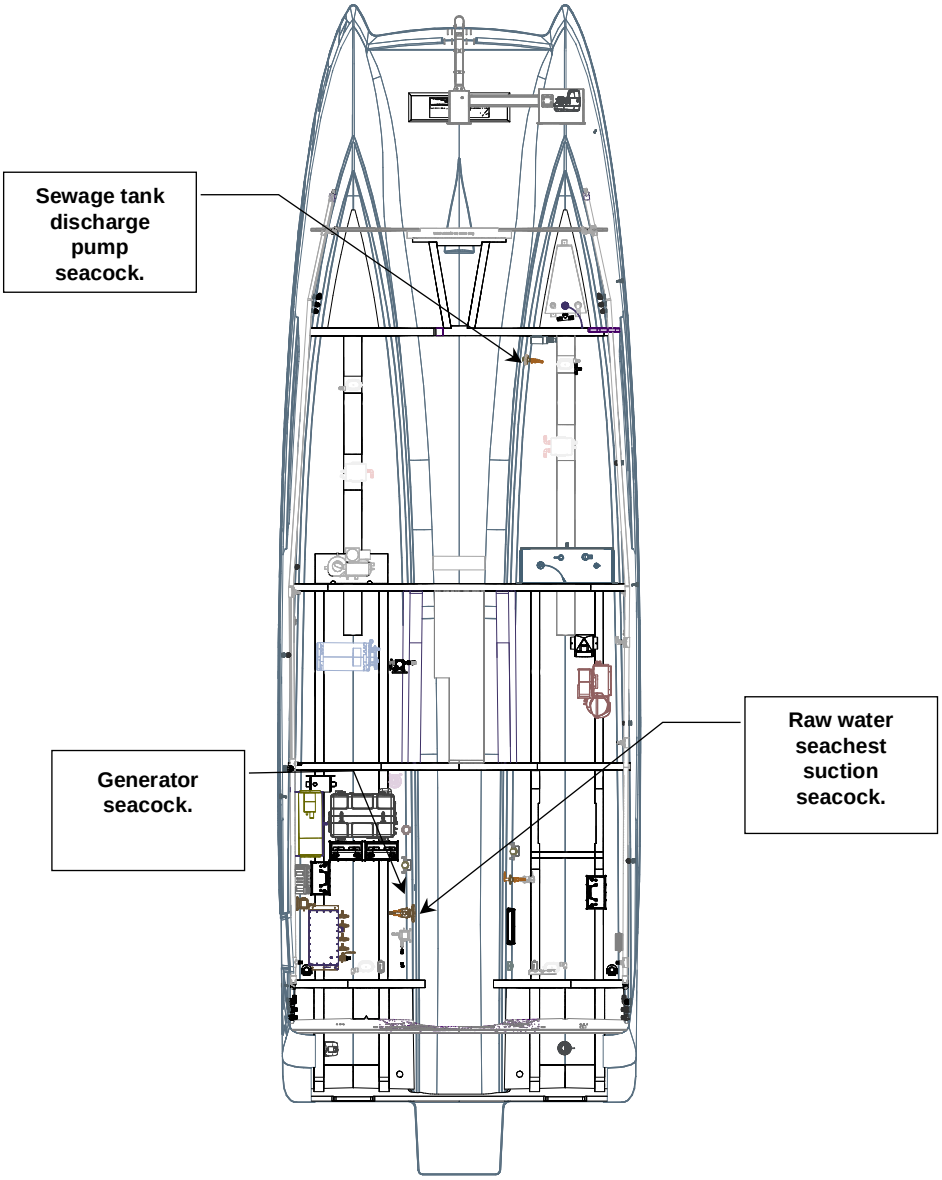
12 Set the turn on mode switch on the amplifier to “Rem.” or remote so that it will turn on when the main on deck stereo turns on.

13 Turn on the stereo on the main control unit.

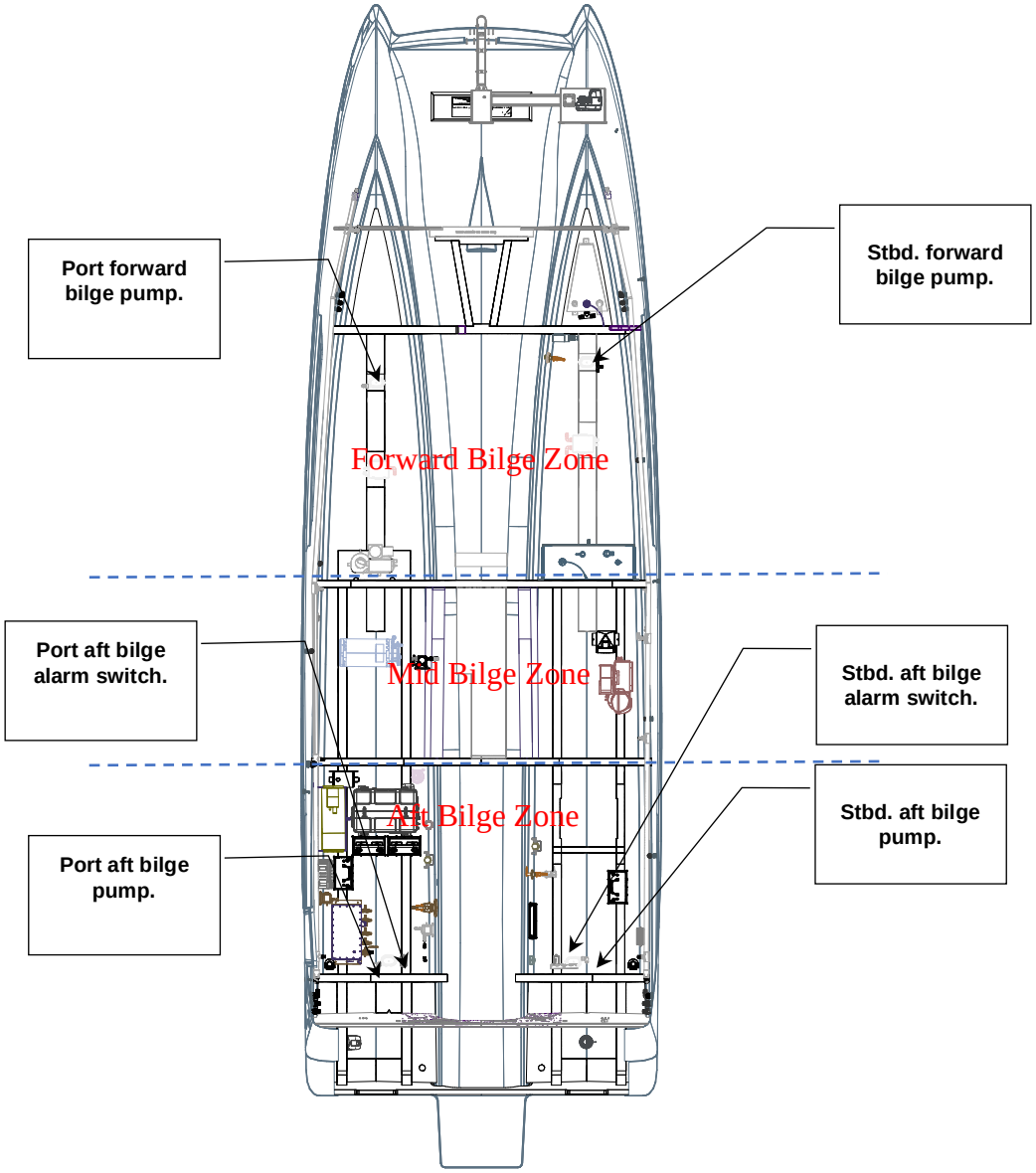
See the *Fusion* product literature.

FIGURES & DRAWINGS
4.0

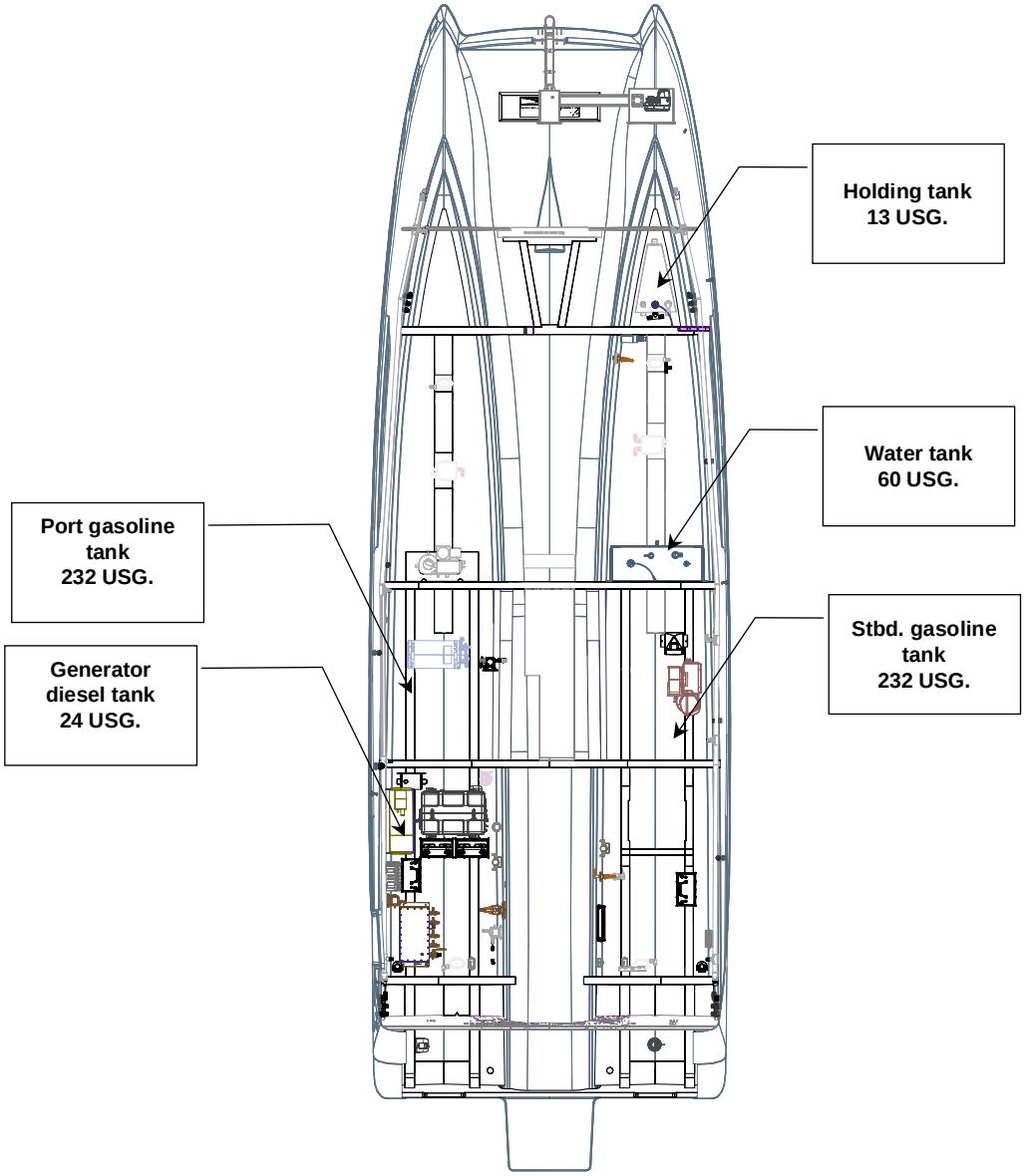
SEACOCKS


Sewage tank discharge pump seacock.
Generator seacock.
Raw water seachest suction seacock.

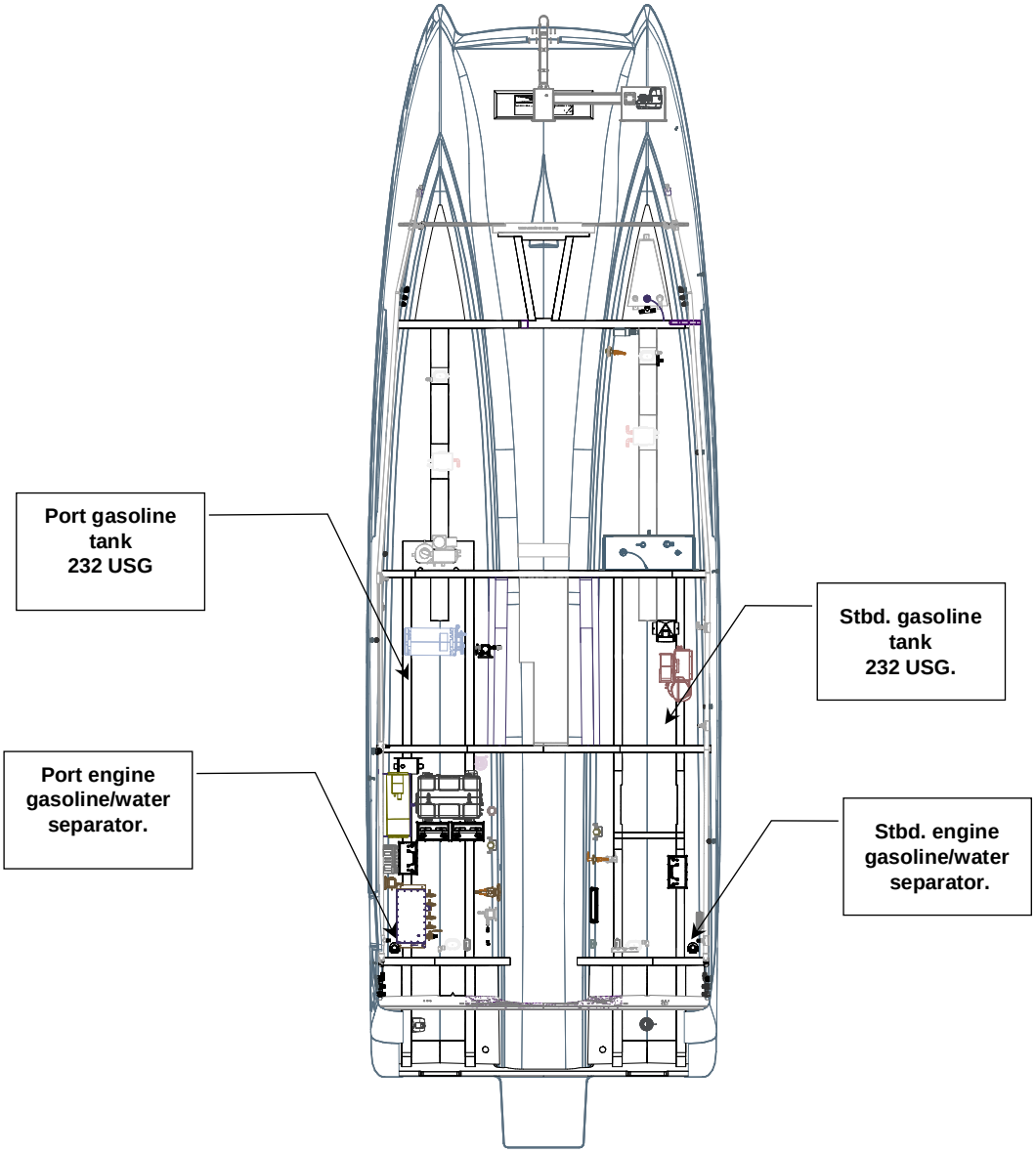
BILGE PUMPS


Port forward bilge pump.
Stbd. forward bilge pump.
Forward Bilge Zone
Port aft bilge alarm switch.
Mid Bilge Zone
Stbd. aft bilge alarm switch.
Aft Bilge Zone
Stbd. aft bilge pump.
Port aft bilge pump.

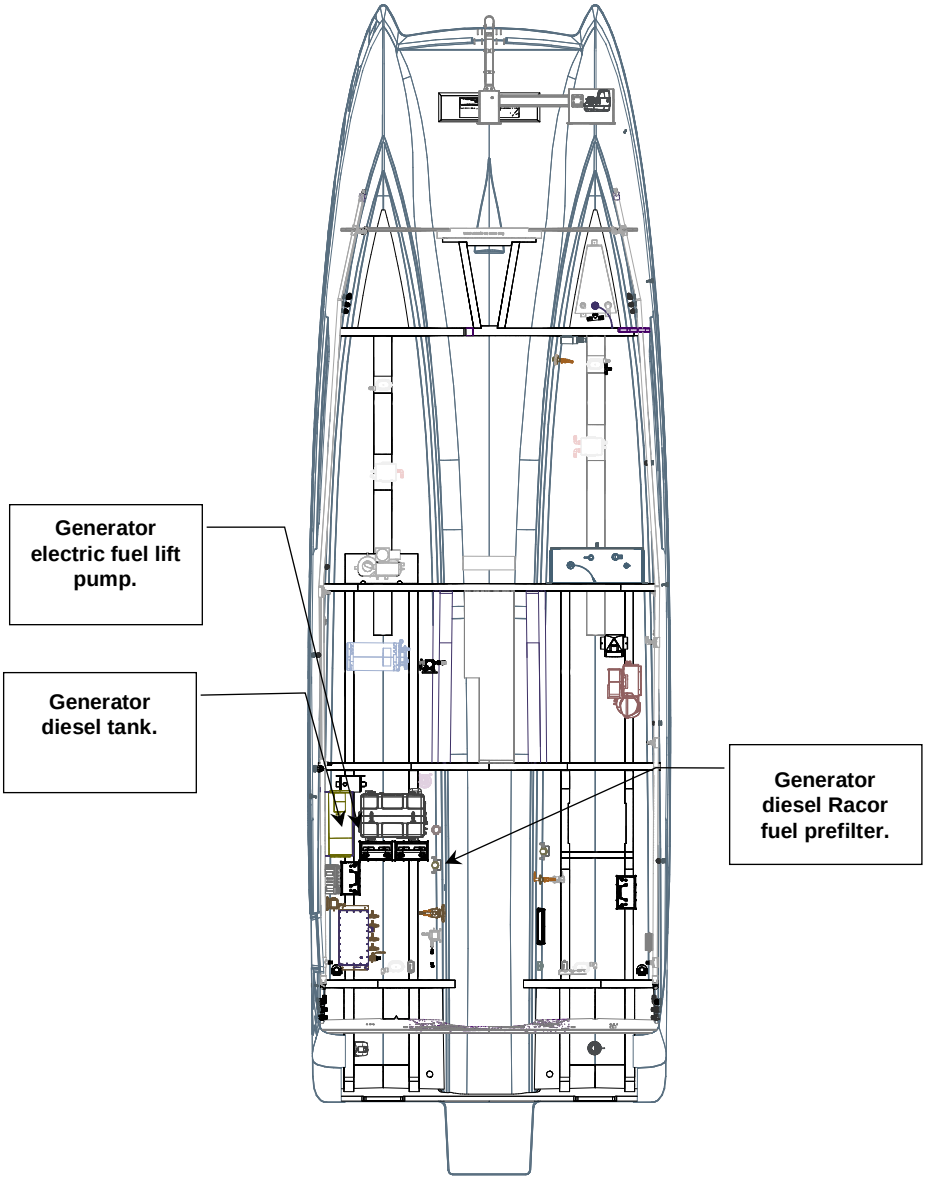
TANKAGE


Holding tank
13 USG.
Water tank
60 USG.
Stbd. gasoline
tank
232 USG.
Port gasoline
tank
232 USG.
Generator
diesel tank
24 USG.

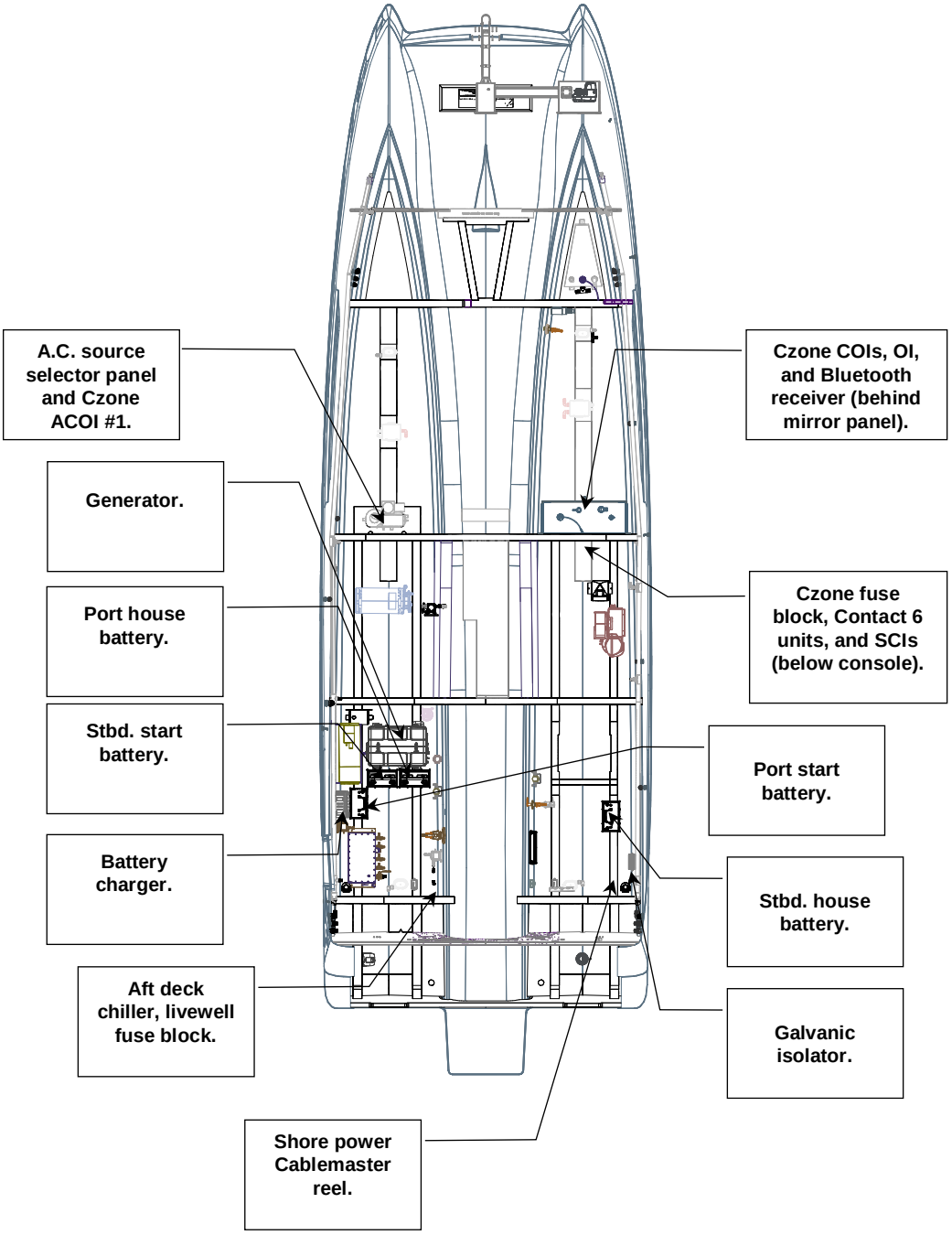
GASOLINE


Port gasoline tank 232 USG
Stbd. gasoline tank 232 USG.
Port engine gasoline/water separator.
Stbd. engine gasoline/water separator.

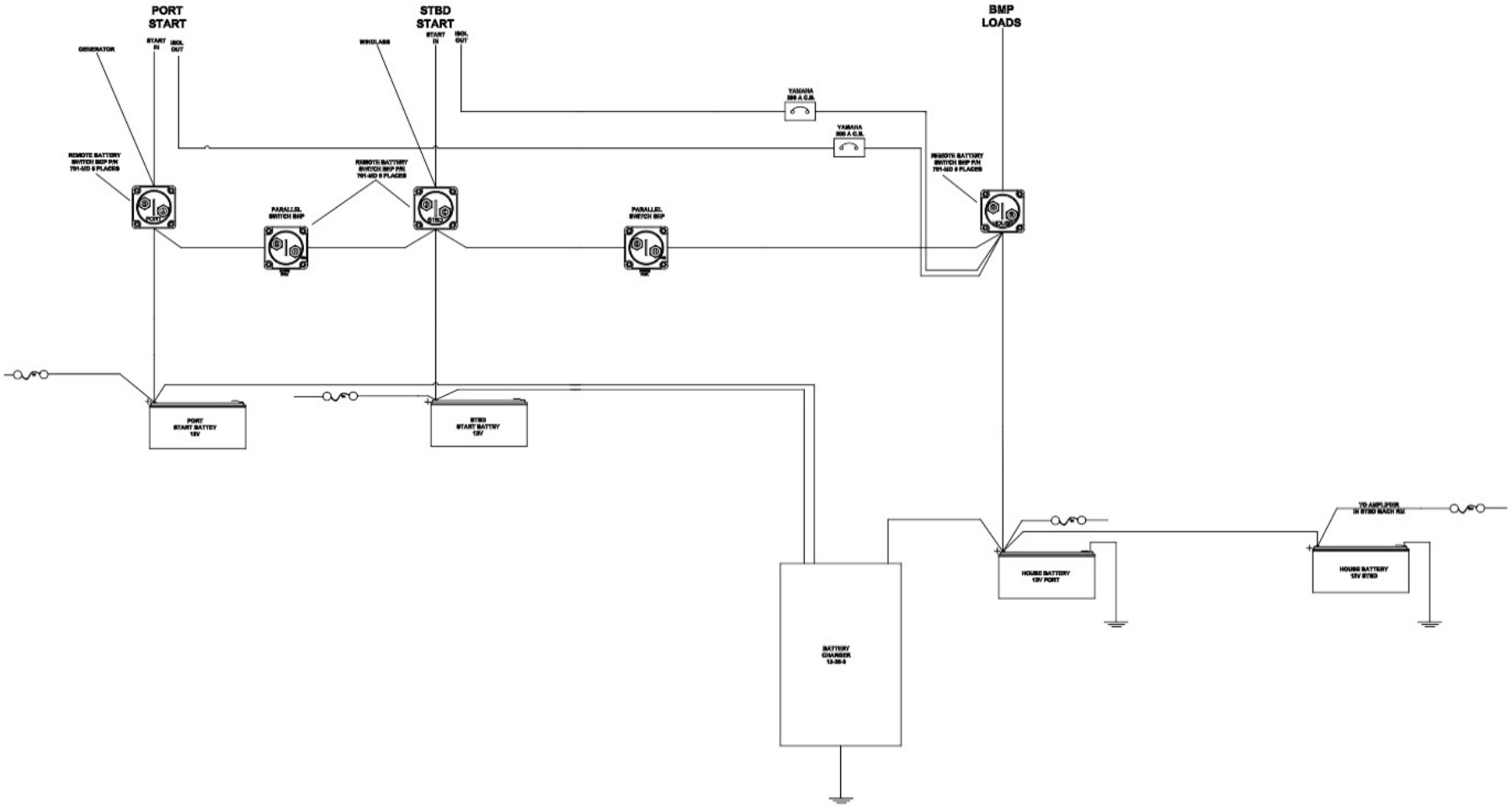
DIESEL


Generator electric fuel lift pump.
Generator diesel tank.
Generator diesel Racor fuel prefilter.

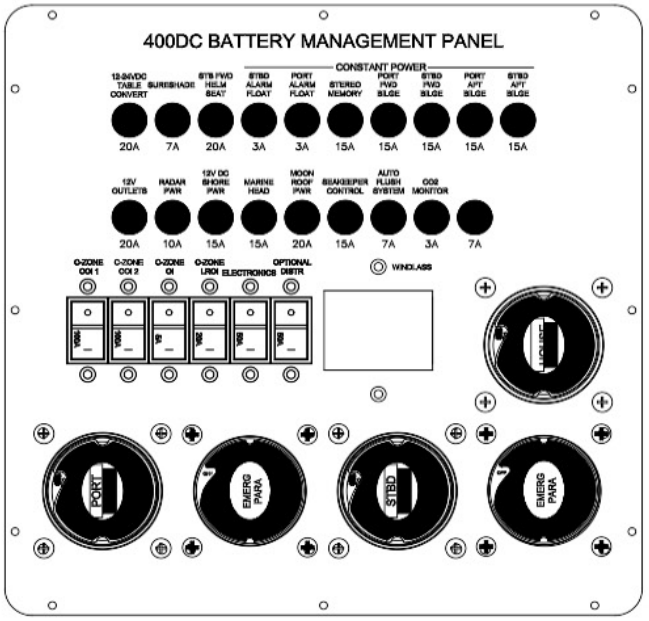
ELECTRICAL

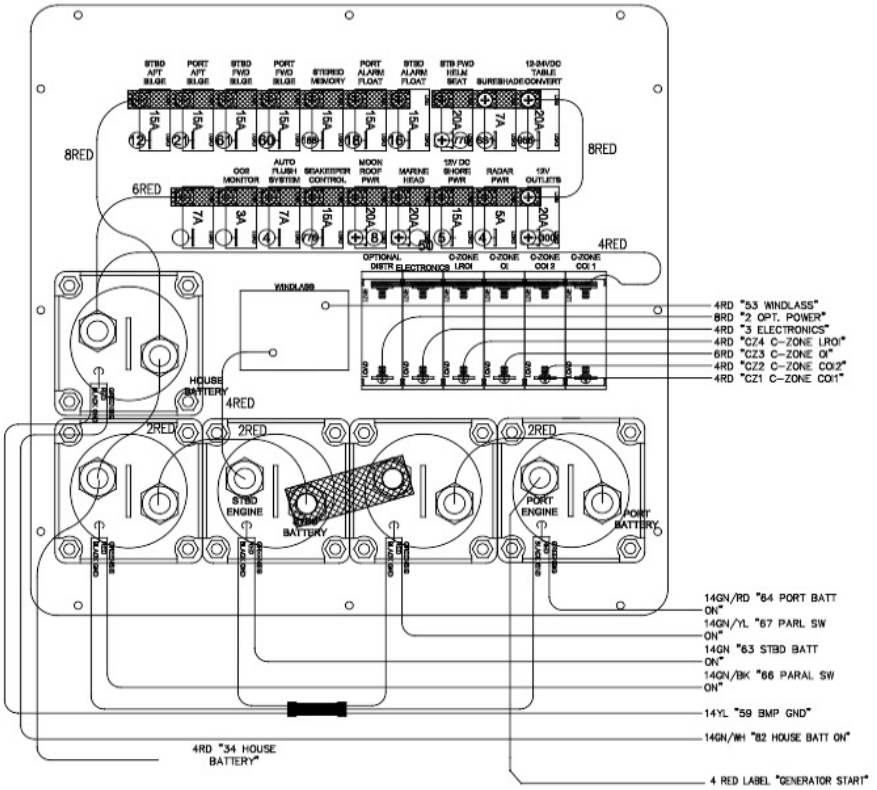

A.C. source selector panel and Czone ACOI #1.
Generator.
Port house battery.
Stbd. start battery.
Battery charger.
Aft deck chiller, livewell fuse block.
Shore power Cablemaster reel.
Czone COIs, OI, and Bluetooth receiver (behind mirror panel).
Czone fuse block, Contact 6 units, and SCIs (below console).
Port start battery.
Stbd. house battery.
Galvanic isolator.

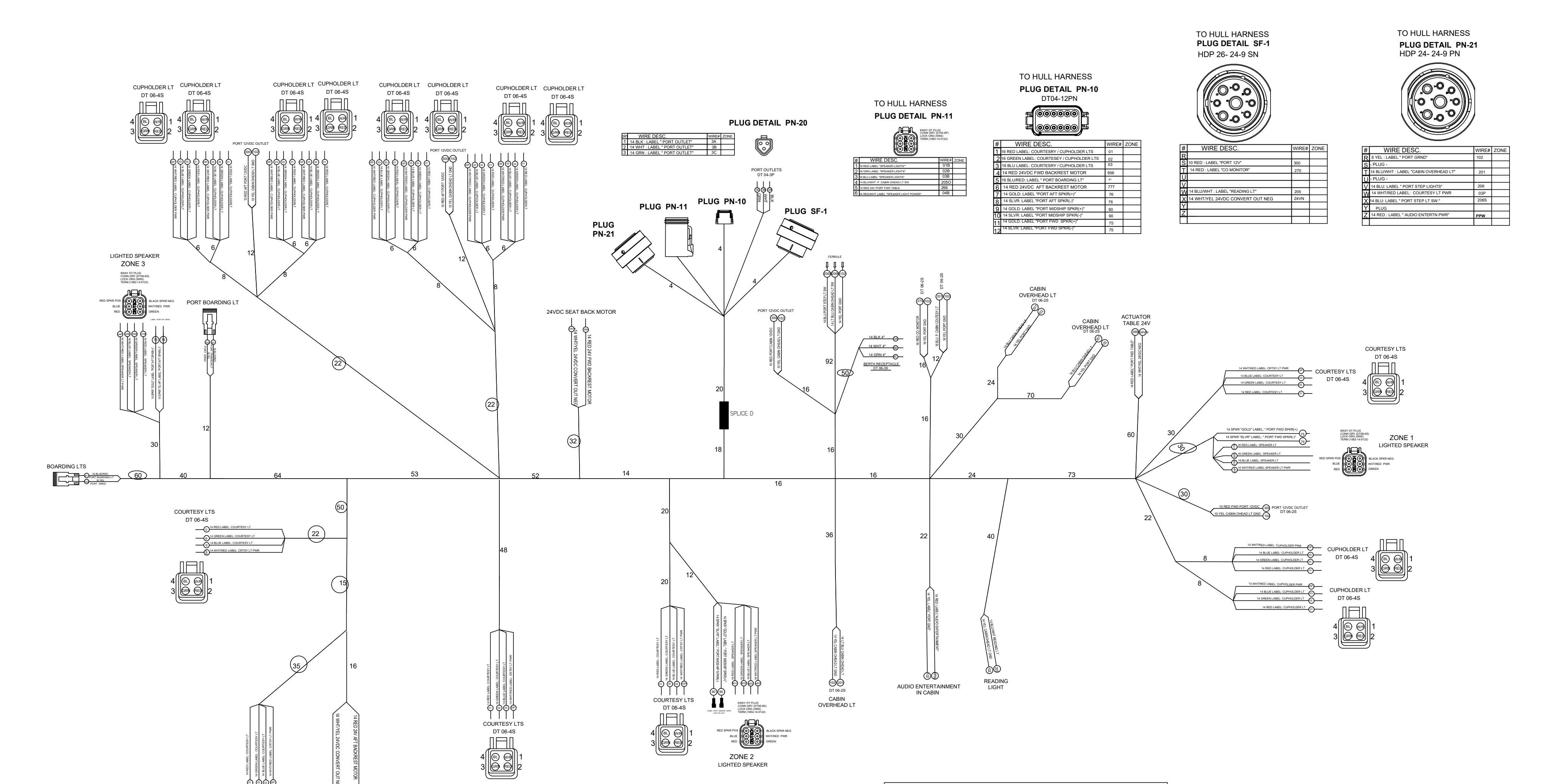
400DC BATTERY MANAGEMENT PANEL rev E.dwg



400DC BATTERY MANAGEMENT PANEL rev E.dwg







PLUG DETAIL PN-20

pin	WIRE DESC.	WIRE#	ZONE
1	14 BLK : LABEL " PORT OUTLET"	3A	
2	14 WHT : LABEL " PORT OUTLET"	3B	
3	14 GRN : LABEL " PORT OUTLET"	3C	

TO HULL HARNESS

PLUG DETAIL PN-11

6WAY DT PLUG
CONN GRY (DT04-6P)
LOCK ORG (W6S)
TERM (1062-14-0122)

#	WIRE DESC.	WIRE#	ZONE
1	16 RED LABEL "SPEAKER LIGHTS"	01B	
2	16 GRN LABEL "SPEAKER LIGHTS"	02B	
3	16 BLU LABEL "SPEAKER LIGHTS"	03B	
4	14 BLU/WHT: P. CABIN OHEAD LT SW	205O	
5	14 RED 24V PORT FWD TABLE	266	
6	16 RED/WHT LABEL "SPEAKER LIGHT POWER"	04B	

TO HULL HARNESS

PLUG DETAIL PN-10

DT04-12PN

#	WIRE DESC.	WIRE#	ZONE
1	16 RED LABEL: COURTESRY / CUPHOLDER LTS	01	
2	16 GREEN LABEL: COURTESEY / CUPHOLDER LTS	02	
3	16 BLU LABEL: COURTESRY / CUPHOLDER LTS	03	
4	14 RED 24VDC FWD BACKREST MOTOR	956	
5	16 BLU/RED: LABEL " PORT BOARDING LT"	81	
6	14 RED 24VDC AFT BACKREST MOTOR	777	
7	14 GOLD: LABEL "PORT AFT SPKR(+)"	76	
8	14 SLVR: LABEL "PORT AFT SPKR(-)"	76	
9	14 GOLD: LABEL "PORT MIDSHIP SPKR(+)"	90	
10	14 SLVR: LABEL "PORT MIDSHIP SPKR(-)"	90	
11	14 GOLD: LABEL "PORT FWD SPKR(+)"	75	
12	14 SLVR: LABEL "PORT FWD SPKR(-)"	75	

TO HULL HARNESS

PLUG DETAIL SF-1

HDP 26- 24-9 SN

#	WIRE DESC.	WIRE#	ZONE
R			
S	10 RED : LABEL "PORT 12V"	300	
T	14 RED : LABEL "CO MONITOR"	270	
U			
V			
W	14 BLU/WHT : LABEL "READING LT"	205	
X	14 WHT/YEL 24VDC CONVERT OUT NEG	24VN	
Y			
Z			

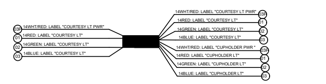
TO HULL HARNESS

PLUG DETAIL PN-21

HDP 24- 24-9 PN

#	WIRE DESC.	WIRE#	ZONE
R	6 YEL : LABEL " PORT GRND"	102	
S	- PLUG -		
T	14 BLU/WHT : LABEL "CABIN OVERHEAD LT"	201	
U	- PLUG -		
V	14 BLU: LABEL " PORT STEP LIGHTS"	206	
W	14 WHT/RED LABEL: COURTESY LT PWR	03P	
X	14 BLU: LABEL " PORT STEP LT SW."	206S	
Y	PLUG		
Z	14 RED : LABEL " AUDIO ENTERTN PWR"	PPW	

SPLICE DETAIL: D



Rev.#	Description of Change	Date
Rev-C	removed electric back rest	11/22/19
Rev-C	remove U lounge table lift	6/26/19
Rev-B	change length, add wires, plugs	2/20/19
Rev-C	remove microwave wiring	6/26/19
Rev-C	remove tv wiring	6/26/19
Rev-C	add lights to speakers	6/26/19
Rev-C	change table to 24vdc	6/26/19
Rev-C	change backrest to 24vdc	6/26/19
Rev-C	remove Lenco seat lift	6/26/19
Rev-C	added plug for AC circuit	6/26/19

World Cat
1090 West St. James Street
Tarboro, N.C. 27886
Phone: (252) 641-8000 Fax: (252) 641-9866

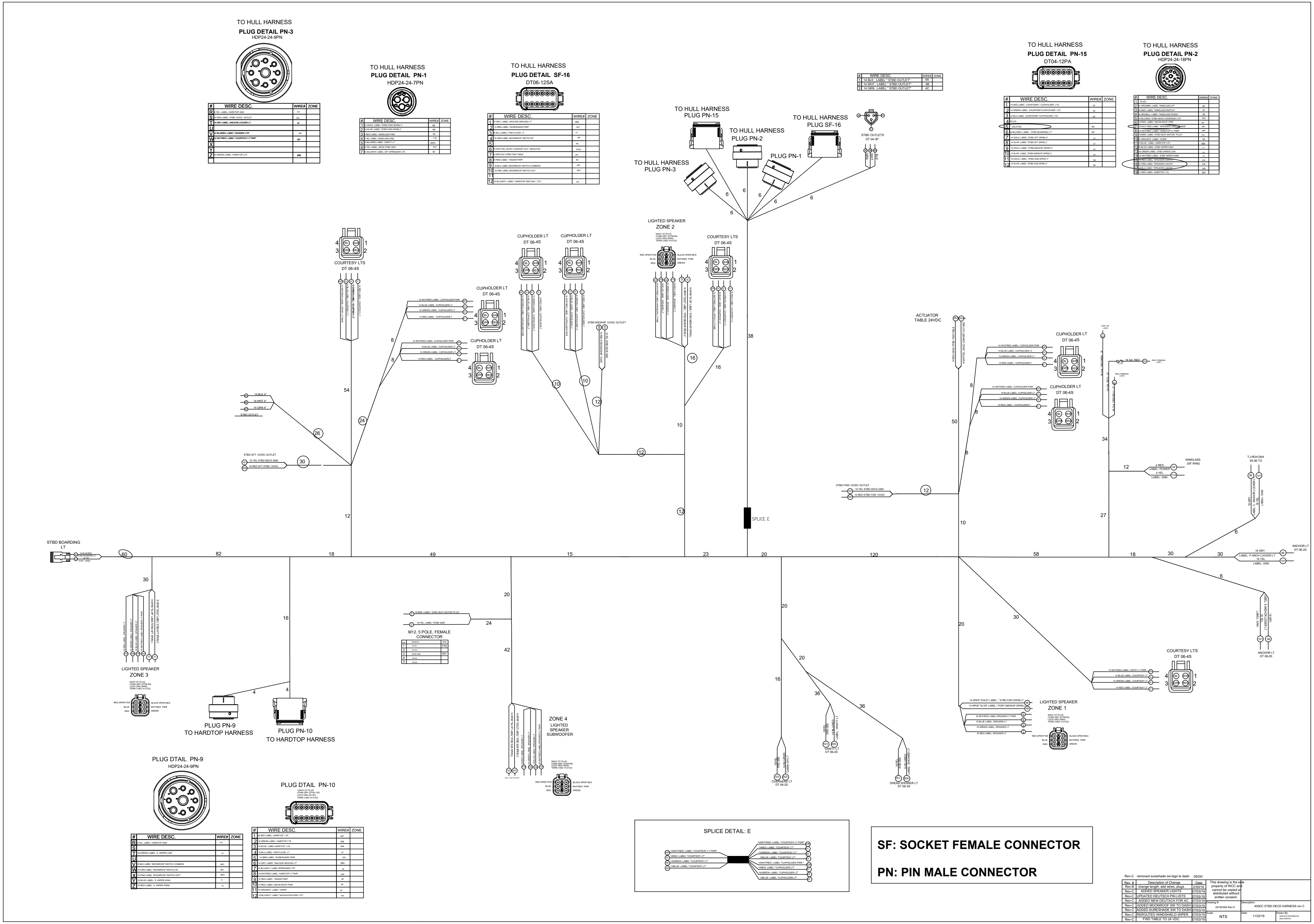
Drawing #: 20192385 Rev-C

Description: 400DC PORT DECK HARNESS

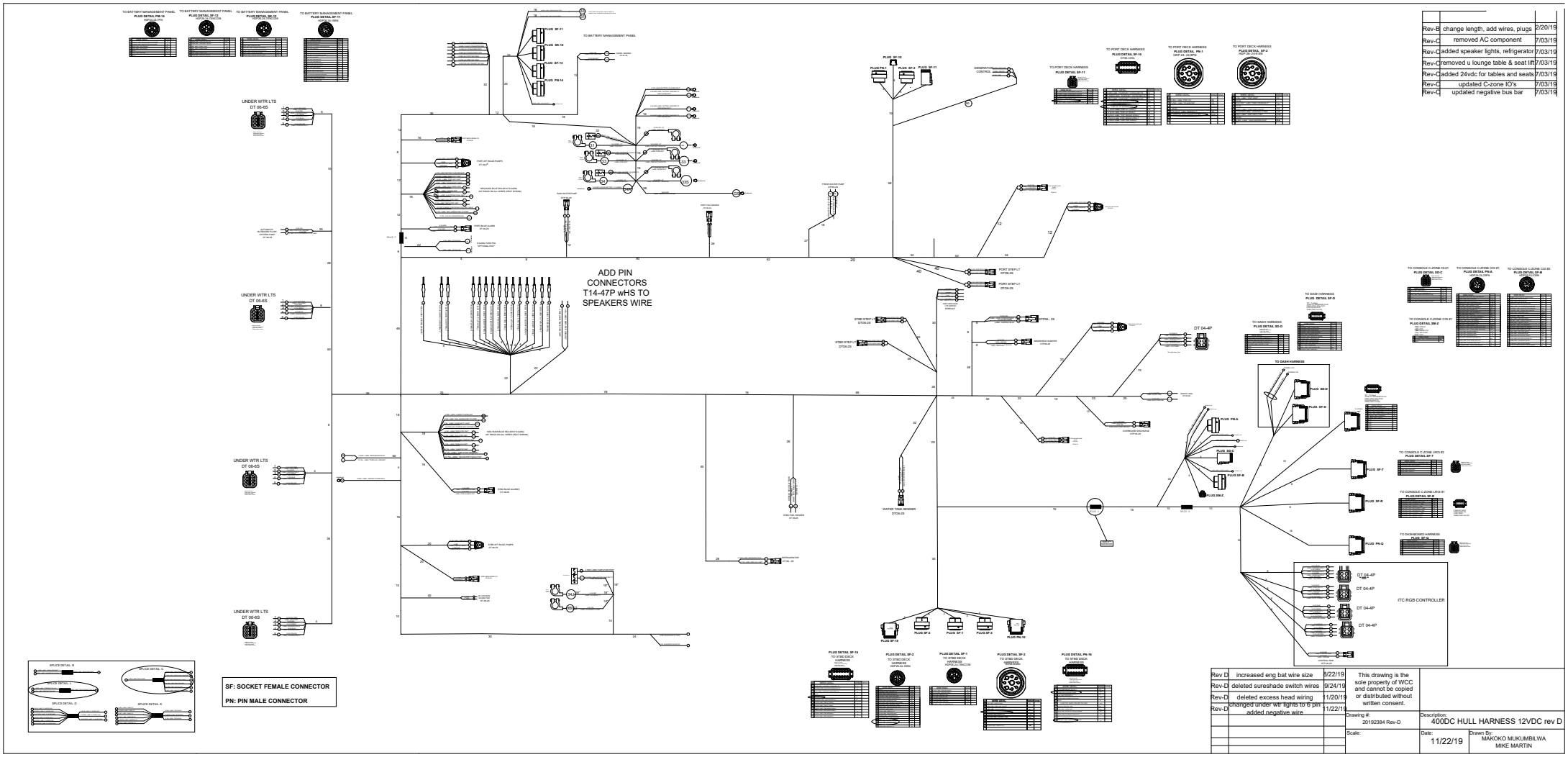
Scale: NTS

Date: 11/22/19

Drawn By: MAKOKO MUKUMBILWA, MIKE MARTIN



TO HULL HARNESS
PLUG DETAIL PN-3
HDP24-24-9PN
TO HULL HARNESS
PLUG DETAIL PN-1
HDP24-24-7PN
TO HULL HARNESS
PLUG DETAIL SF-16
DT06-12SA
TO HULL HARNESS
PLUG DETAIL PN-15
DT04-12PA
TO HULL HARNESS
PLUG DETAIL PN-2
HDP24-24-18PN
TO HULL HARNESS
PLUG PN-15
TO HULL HARNESS
PLUG PN-2
TO HULL HARNESS
PLUG SF-16
PLUG PN-1
TO HULL HARNESS
PLUG PN-3
STBD OUTLETS
DT 04-3P
COURTESY LTS
DT 06-4S
CUPHOLDER LT
DT 06-4S
LIGHTED SPEAKER
ZONE 2
ACTUATOR
TABLE 24VDC
WINDLASS
ANCHOR LT
DT 06-2S
STBD BOARDING
LT
SPLICE E
LIGHTED SPEAKER
ZONE 3
PLUG PN-9
TO HARDTOP HARNESS
PLUG PN-10
TO HARDTOP HARNESS
M12, 5 POLE, FEMALE
CONNECTOR
ZONE 4
LIGHTED
SPEAKER
SUBWOOFER
LIGHTED SPEAKER
ZONE 1
OVERHEAD LT
DT 06-2S
OHEAD SHOWER LT
DT 06-2S
PLUG DTAIL PN-9
HDP24-24-9PN
PLUG DTAIL PN-10
SPLICE DETAIL: E
SF: SOCKET FEMALE CONNECTOR
PN: PIN MALE CONNECTOR
400DC STBD DECK HARNESS rev C
NTS



Rev-B	change length, add wires, plugs	2/20/19
Rev-C	removed AC component	7/03/19
Rev-C	added speaker lights, refrigerator	7/03/19
Rev-C	removed u lounge table & seat lift	7/03/19
Rev-C	added 24vdc for tables and seats	7/03/19
Rev-C	updated C-zone IO's	7/03/19
Rev-C	updated negative bus bar	7/03/19

Rev D	increased eng bat wire size	9/22/19
Rev-D	deleted sureshade switch wires	9/24/19
Rev-D	deleted excess head wiring changed under wtr lights to 6 pin added negative wire	11/20/19
Rev-D		11/22/19

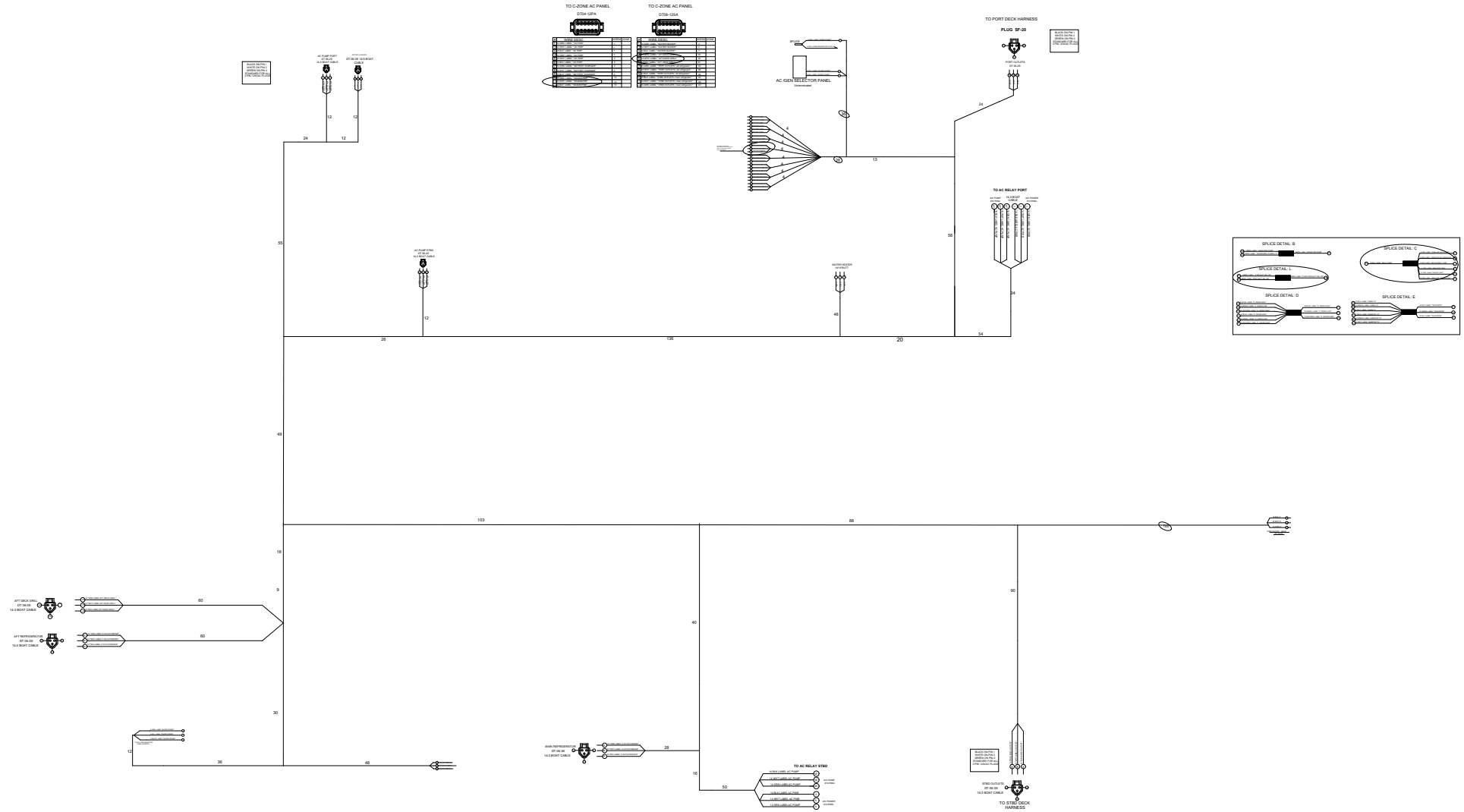
Drawing #: 20192384 Rev-D

Description: 400DC HULL HARNESS 12VDC rev D

Scale:

Date: 11/22/19

Drawn By: MAKOKO MUKUMBILWA, MIKE MARTIN



SF: SOCKET FEMALE CONNECTOR

PN: PIN MALE CONNECTOR

Rev.#	Description of Change	Date
Rev-B	change length, add wires, plugs	2/20/19
Rev-C	removed generator and wiring	11/20/19
Rev-C	change length of shore power feed	11/20/19
Rev-C	chng length of subpanel branch circuits	11/20/19
Rev-C	change length of stbd head outlet	11/20/19

Drawing #: 20192384 Rev-C

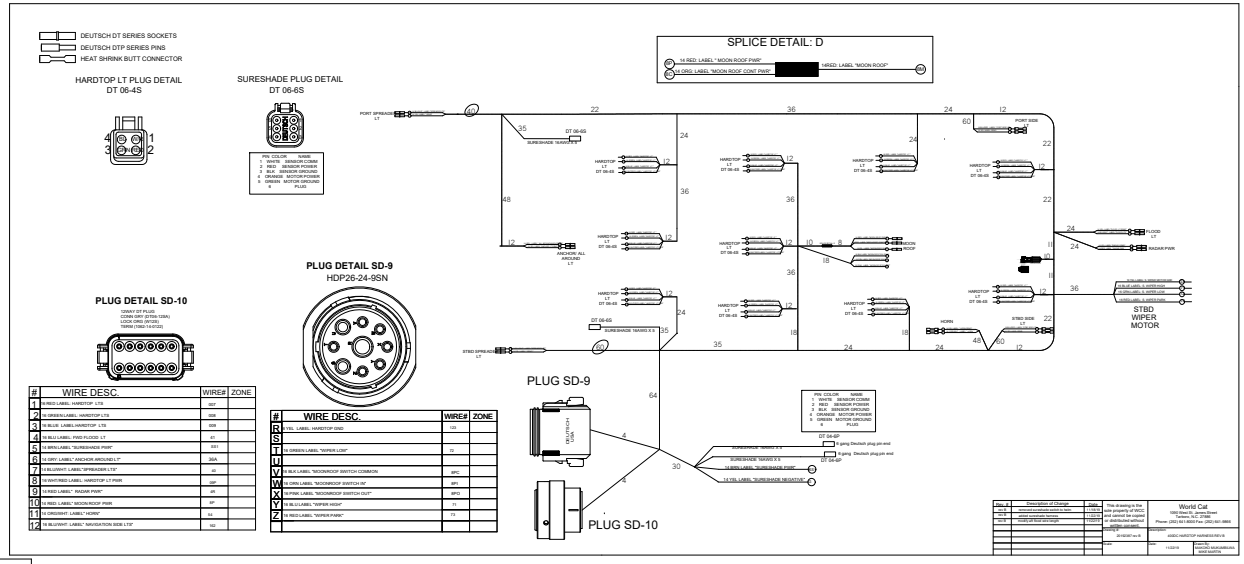
Description: 400DC HULL HARNESS-AC rev C

Scale:

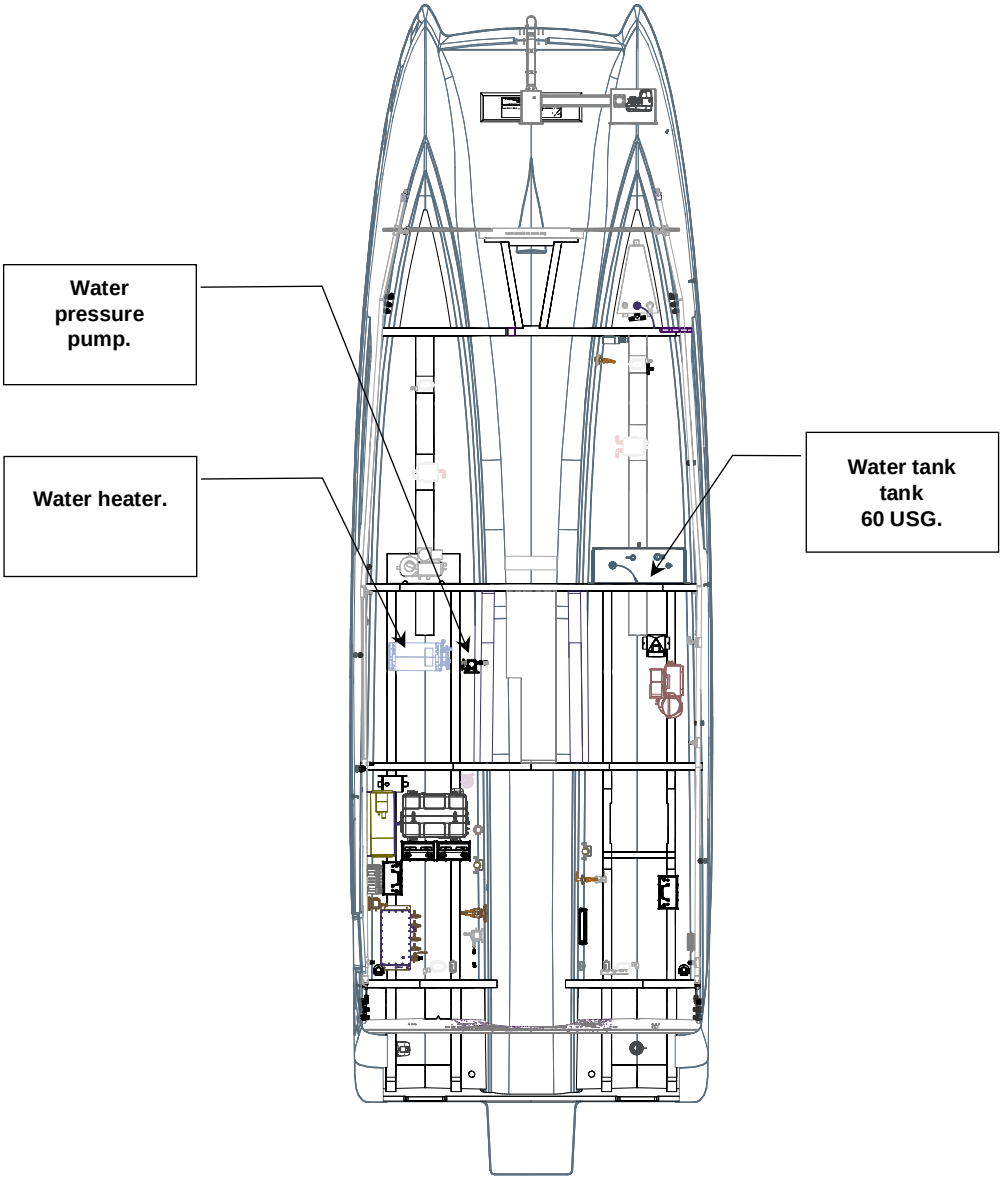
Date: 11/22/19

Drawn By: MAKOKO MUKUMBILWA, MIKE MARTIN

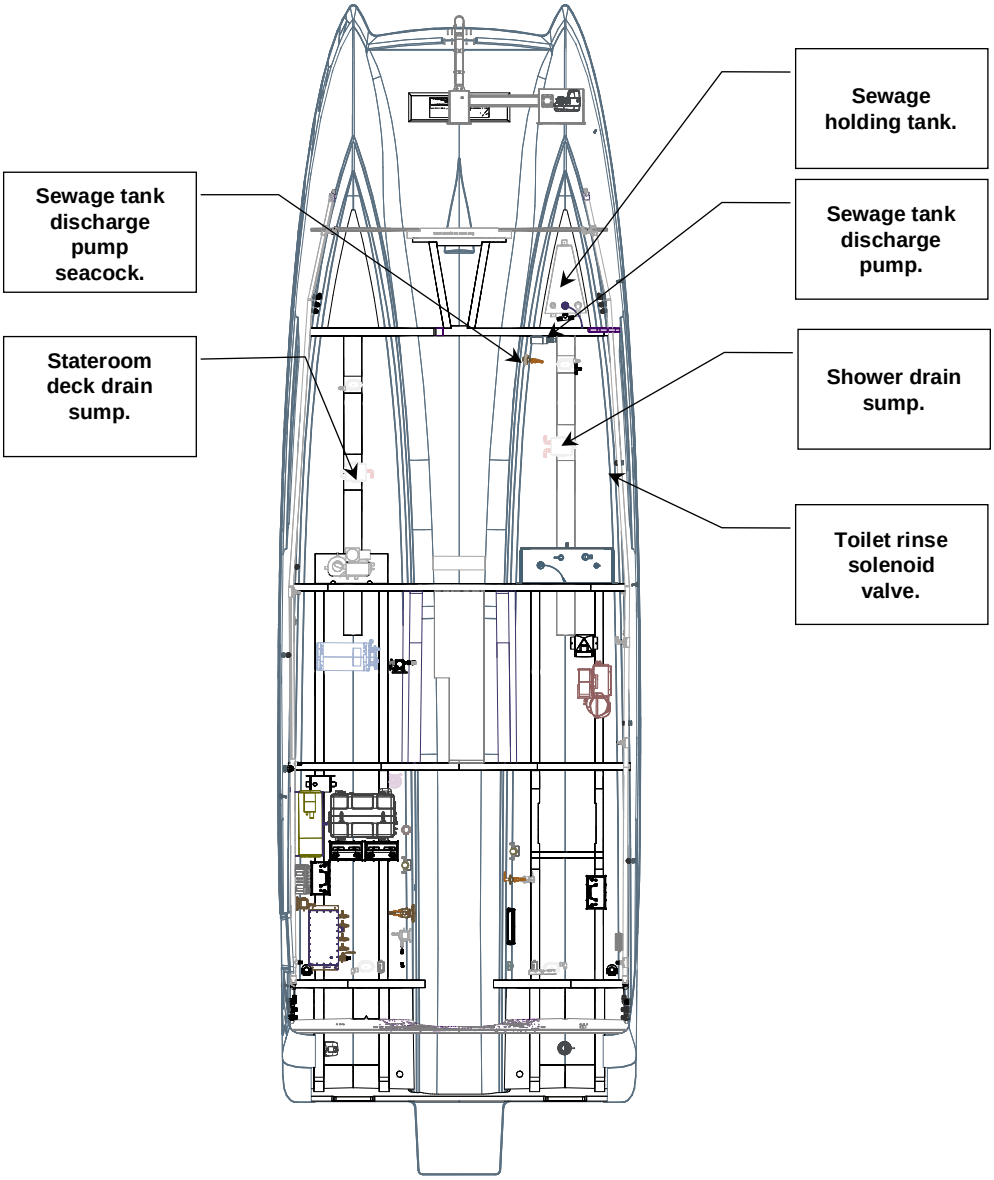
6WAY DT PLUG
CONN GRY (DT06-6S)
LOCK ORG (W6S)
TERM (1062-14-0122)



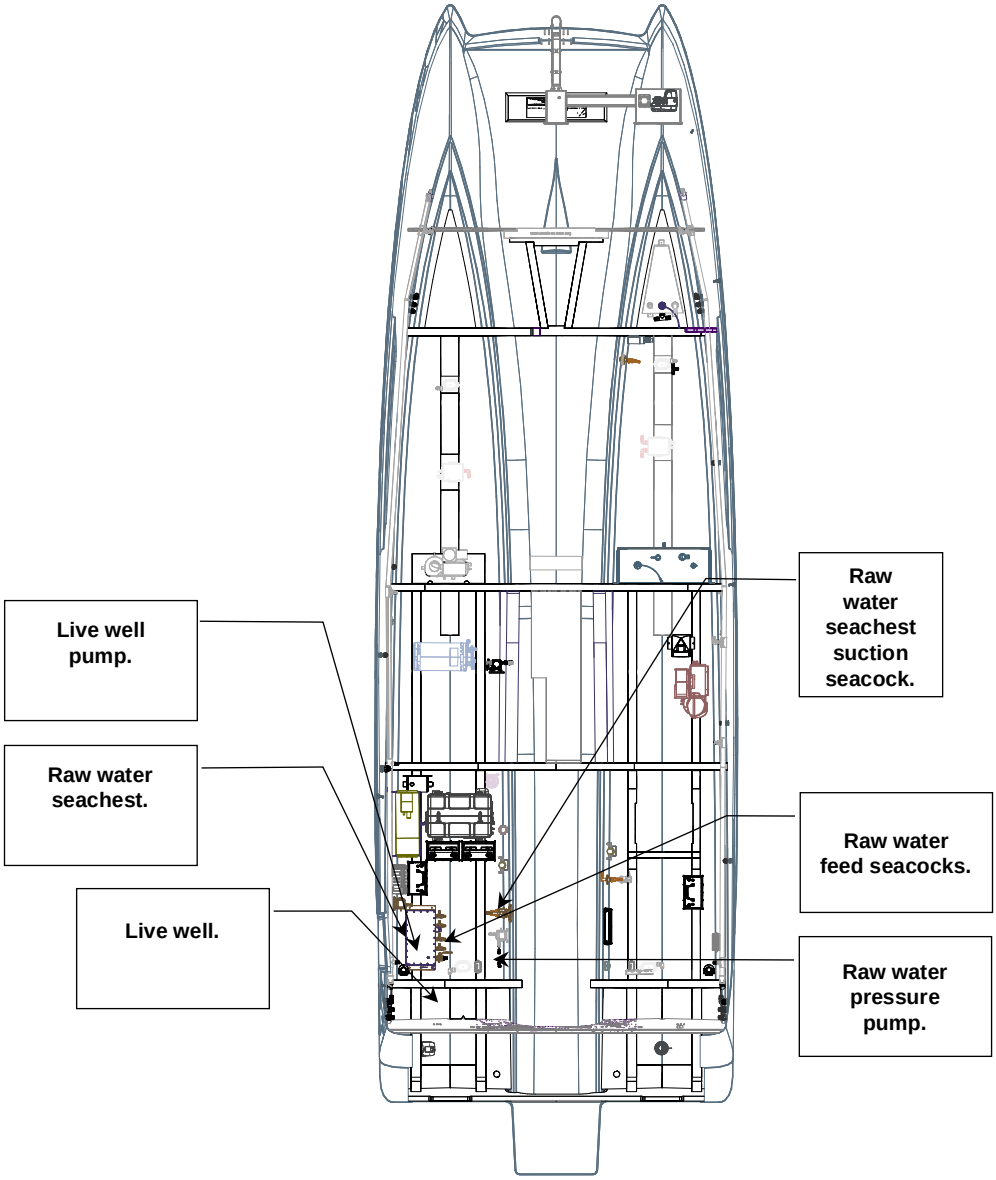
FRESH WATER



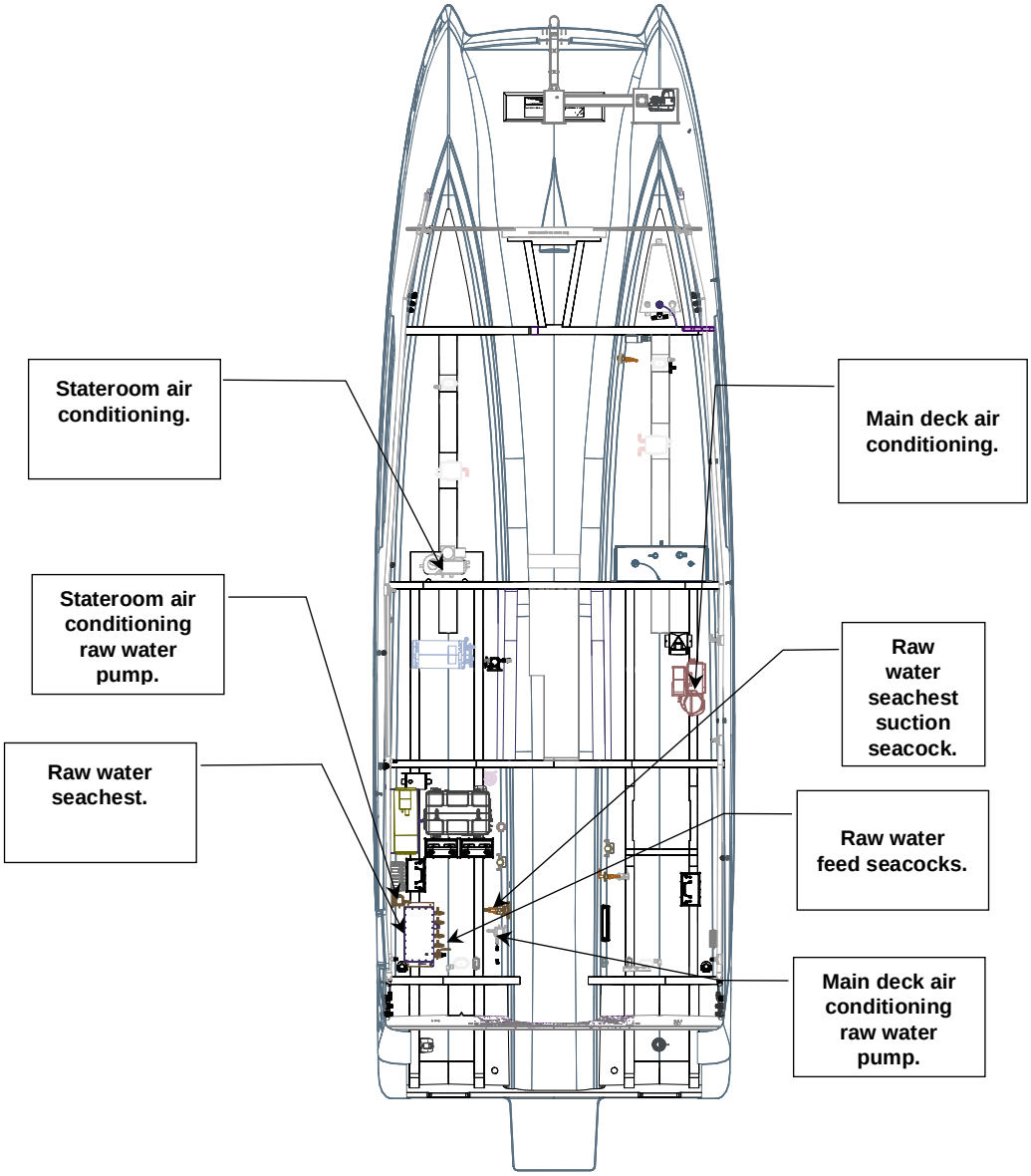
SEWAGE & DRAINS



RAW WATER


Live well pump.
Raw water seachest.
Live well.
Raw water seachest suction seacock.
Raw water feed seacocks.
Raw water pressure pump.

AIR CONDITIONING



TROUBLESHOOTING
5.0

SAFETY SYSTEMS TROUBLESHOOTING

PROBLEM	CAUSE	ACTION
1. The Czone system does not operate.	- The house battery switch is not on. - The “Elect” circuit breaker on the main D.C. panel is not on. -The NMEA and/or the Yamaha fuse under the dash is blown. - The “COI1”, “COI2”, “OI”, and “C6” circuit breakers on the main D.C. panel are not on. -The Garmin monitors are not on.	- Turn on the house battery switch and/or check the house battery voltage. - Turn on the “Elect” circuit breaker on the main D.C. panel. -Ensure that the NMEAa and Yamaha fuses under the dash are intact. - Turn on the “COI1”, “COI2”, “OI”, and “C6” circuit breakers on the main D.C. panel. -Turn on the Garmin monitors on the dash.
2. The dash monitors do not turn on.	- The house battery switch is not on. - The “Elect” circuit breaker on the main D.C. panel is not on. - The monitors fuse in the fuse block under the dash is blown.	- Turn on the house battery switch. - Turn on the “Elect” circuit breaker on the main D.C. panel. - Ensure that the monitors fuse in the fuse block under the dash is intact.
3. There is no Czone data on any channel.	- The “COI1”, “COI2”, “OI”, and “C6” circuit breakers on the main D.C. panel are not on.	- Turn on the “COI1”, “COI2”, “OI”, and “C6” circuit breakers on the main D.C. panel.
4. One Czone channel is not indicating.	- The sensor for that Czone channel is defective. - The fuse for that Czone channel in the COI is blown.	-Check that all of the LEDs on the Czone COIs behind the mirror in the head are green.

PROBLEM	CAUSE	ACTION
5. The horn is inoperative.	- The “COI1”, “COI2”, “OI”, and “C6” circuit breakers on the main D.C. panel are not on. - The “Elect” circuit breaker on the main D.C. panel is not on. - The fuse for the horn Czone channel on COI #2 is blown. - The fuse for the horn in the fuse box is blown.	- Ensure that the “COI1”, “COI2”, “OI”, and “C6” circuit breakers on the main D.C. panel are on. - Turn on the “Elect” circuit breaker on the main D.C. panel. - Ensure that the fuse for the horn Czone channel on COI #2 is intact. - Ensure that the fuse for the horn in the fuse box under the dash is intact.
6. The navigation or anchor lights are inoperative.	- The “COI1”, “COI2”, “OI”, and “C6” circuit breakers on the main D.C. panel are not on. - The fuse for the lights Czone channel on COI# 1 is blown. - The LEDs in the lights are burned out.	- Ensure that the “COI1”, “COI2”, “OI”, and “C6” circuit breakers on the main D.C. panel are on. - Ensure that the fuse for the lights Czone channel on COI# 1 is intact. - Ensure that the LEDs in the lights are not burned out.
7. The windshield wiper/washer is inoperative.	- The “COI1”, “COI2”, “OI”, and “C6” circuit breakers on the main D.C. panel are not on. - The “Elect” circuit breaker on the main D.C. panel is not on. -The fuse for the wipers in the fuse box is blown. - There is no water pressure. -The windsheild washer valve is stuck shut.	- Ensure that the “COI1”, “COI2”, “OI”, and “C6” circuit breakers on the main D.C. panel are on. - Ensure that the “Elect” circuit breaker on the main D.C. panel is on. -Ensure that the fuse for the wipers in the fuse box under the dash is intact. - Ensure that there is water pressure. -Check that the washer valve under the head sink is opening.

PROBLEM	CAUSE	ACTION
8. One batterie's data is missing.	-The fuse for that batterie's data feed is blown.	-Check that the fuse for that batterie's data feed in the yellow fuse holder on top of the battery is intact.
9. As long as the "Elect", "COI1", "COI2", "OI", and "C6" circuit breakers on the main D.C. panel are on when the house battery switch is turned on the Yamaha CL7, Garmin displays, Czone system, and starting battery switches will turn on.	This is normal as part of the programing. The Yamaha CL7 screen is the master and turns on the Garmin equipment and Czone.	This is normal behavior.

BILGE SYSTEMS TROUBLESHOOTING

PROBLEM	CAUSE	ACTION
1. A high water bilge alarm failed to turn on with high bilge levels.	- The -The “House” 12 volt battery bank has discharged. - The “Alarm Float” circuit breaker on the main D.C. panel for that bilge is not on. - The “COI1”circuit breaker on the main D.C. panel is not on.	- Check house battery voltage and charge as necessary. - Turn off and then on the “Alarm Float” circuit breaker in the main D.C. panel for that bilge pump. - Turn on the “COI1”circuit breaker on the main D.C. panel.
2. A bilge pump failed to turn on with high water.	- The bilge pump circuit breaker on the main D.C. panel for that bilge is not on. - The pump or its internal sensor has failed. - The house batteries are dead.	- Turn on the bilge pump circuit breaker on the main D.C. panel for that bilge pump. - Check that the pump is getting voltage. - Check the house battery voltage.
3. A bilge pump will not operate in manual mode.	- The “House” 12 volt battery switch is not on. - The “House” 12 volt battery bank has discharged. - The Czone “COI2” feed circuit breaker on the main D.C. panel is not on.	- Check that the “House” 12 volt battery switch is on. - Check and/or charge the “House” 12 volt battery bank. - Turn on the Czone “COI2” feed circuit breaker on the main D.C. panel.
4. Bilge alarm indicators stay on after the high water alarm is silenced.	- Water level is still high in compartment. - The float switch is stuck in the up position.	- Check the level of water in the compartment. - Turn the high water float switch upside down to reset the switch.
5. A bilge pump runs but fails to discharge water.	-The impeller may be plugged with debris.	- Check the bilge pump impeller for free rotation and clean any debris.

FUEL SYSTEM TROUBLESHOOTING

PROBLEM	CAUSE	ACTION
1. Fuel level indicators are inoperative.	- Czone system is down.	- Turn on Czone system.
2. One engine is running rough, speeding up, and slowing down.	- That engine's fuel/water separtator prefilter may be plugging. - The on engine fuel filter may be plugging or contain water.	- Check CL7 for water in fuel alarms - Pump the fuel bulb. -Check the on engine fuel filter for water or debris.
3. One engine is starving for fuel.	- The fuel demand valve on the fuel tank top may be stuck shut. - The on engine secondary fuel filter may be plugged.	- Press the override on top of the fuel demand valve on the fuel tank top. -Check the on engine fuel filter for water or debris.
4. The generator is starving for fuel.	- The generator fuel tank level may be low. - The generator electric fuel lift pump may not be running. -The fuel solenoid valve may have failed shut. -The generator Racor fuel filter may be plugging. - The on generator secondary fuel filter may be plugged. - The in line fuel filter in the feed line on the generator is dirty.	-Check the level in the generator fuel tank. -Check that the generator electric fuel pump is running. -Check the operation of the fuel solenoid valve on the generator. Try a restart with the failure bypass switch on the generator (see the Panda manual). - Check the Racor filter condition. - Change the on generator secondary fuel filter. -Replace the inline filter. See Panda literature.

ELECTRICAL SYSTEM TROUBLESHOOTING

PROBLEM	CAUSE	ACTION
1. All battery voltages are low while at the dock.	- The battery paralelling switches have been left on with the battery charger off.	- Ensure that the battery charger is on while at the dock. - Leave the battery paralelling switches off.
2. The battery charger is not operating.	-There is no A.C. power on the boat. - Ensure that the battery charger is on at its face. -Ensure that the “All AC Circuits” breaker is on at the Czone screen. - Ensure that the battery charger is on in the Czone system.	-Plug in the shore power cable or start the generator and connect A.C. power to the boat. - Turn on the battery charger. - Turn on the “All AC Circuits” breaker on the Czone screen. - Turn on the battery charger on the Czone screen.
3. A battery switch will not operate remotely.	- The Czone system is not on. - The “COI #2” circuit breaker is off at the main D.C. panel. -The fuse is blown on the Czone COI channel for that battery switch.	- Turn on the Czone system and. - Reset the “COI #2” circuit breaker on the main electric panel and check the green LEDs on the COI behind the mirror in the head. -Ensure that the fuse on the Czone COI channel for that battery switch is intact.
4. One battery is not charging.	- The 40 amp fuse on the charging input terminal connection to that battery may be blown.	- Check that the 40 amp fuse on the charging input terminal connection to that battery is intact.
5. One battery voltage value is missing on the Czone screen.	- The 3 amp inline fuse on the battery sensing wire connection at the battery top may be blown.	- Check that the 3 amp inline fuse on the battery sensing wire connection at the battery top is intact.
6. There is no power to any of the “House” 12 volt D.C. loads.	- The house battery switch is off.	- Make sure the house battery switch is on.

PROBLEM	CAUSE	ACTION
7. The A.C. voltage is low.	- The voltage from the dock shore power outlet is low. - The generator is overloaded. - The generator engine is not reaching rated rpm. - The generator output capacitors are defective.	- Move the shore power connection to another outlet on the dock and try. - Reduce the electrical load (turn stuff off). - Refer to the “Motor Faults” portion of the Panda manual. - Check capacitors and replace as necessary.
8. The A.C. frequency (Hertz) is too high/too low.	- The generator engine is running to slow or too fast.	- Check that the generator and adjust per the Panda generator manual.
9. The port start battery discharges when the generator is running.	- Check the generator digital control panel to display its starting battery voltage.	- Ensure that the generator starting battery voltage is not dropping or turn on the battery charger.
10. The generator will not start.	- The port start battery switch is off. -The fuel solenoid valve on generator is failed. -The electric fuel pump is not running. -The generator glow plugs are not working properly. -The Racor fuel element is plugged.	- Check that the port starting battery switch is on. -Check the operation of the fuel solenoid valve on the generator. Try to restart with the failure bypass switch on the generator (see Panda manual). -Check that generator electric fuel pump is running. -Check that the glow plugs are heating. -Change the generator Racor fuel filter element.

PROBLEM	CAUSE	ACTION
11. The generator is running but there is no power to the boat.	-The main A.C. power source selector 50 A circuit breaker is not set to Generator. -“All A.C. Circuits” breaker is off in the Czone system. - Rotor magnetism is lost.	- Set the main A.C. power source selector 50 A circuit breaker to Generator. -Turn on “All A.C. Circuits” breaker on Czone screen or manually overide the circuit breakers on the ACOI #1 box in the stateroom. -See the procedure to restore rotor magnetism in the Panda generator manual.
12. The Cablemaster will not operate.	- The house battery switch is not on. - The “12 V DC Shore Power” circuit breaker on the main D.C. panel is not on. - The Cablemaster switch may be defective. - The Cablemaster drive motor may be defective.	-Turn on the house battery switch. - Turn on the “12 V DC Shore Power” circuit breaker on the main D.C. panel. - Check power to the Cablemaster switch. - Check the Cablemaster drive motor.
13. The shore power cable will not retract.	- Check all of the above.	- If the motor runs, turn off and pull the cable all the way out, remove kinks, and run back in.
14. The shore power cable is connected but there is no power to the boat.	- Check that the shore power entrance circuit breaker in the stern is on. -Check that the ELCI in the stern is not tripped out.	-Cycle on/off the entrance circuit breakers on the shore and boat. -Trip and reset the ELCI. -Check that the shore mounted box is live.
15. The shorepower ELCI keeps tripping.	-There is a ground fault on the boat. - The ELCI is defective.	- Turn off all A.C. circuit breakers on the boat, reset the ELCI, and then turn them back on one by one until it trips. Have an electrician diagnose that circuit. -Replace the ELCI.

PROBLEM	CAUSE	ACTION
16. The red reversed polarity light is on at the main A.C. power source selector panel.	- There is a reverse polarity in the dock wiring.	- Try another dock outlet or do not plug in.
17. The exterior lights do not operate properly.	-The house battery switch is not on. -The Czone system is not on. -The “RGB Power” circuit breaker on the Czone screen is not on. -The ITC Versicontrol box has failed.	-Turn on the house battery switch. - Turn on the Czone system. - Turn on the “RGB Power” circuit breaker on the Czone screen and try the Versicontrol phone app. to control the lights. - Check for power to the ITC box behind the mirror in the head.
18. The aft deck grill will not turn on.	-A.C. power is not connected to the boat’s system. -The grill circuit breaker is not on in the Czone system. - The GFCI outlet in the summer kitchen that feeds the grill has tripped.	-Ensure that A.C. power is connected to the yacht’s system. -Ensure that the grill circuit breaker is on in the Czone screen. -Check and reset the GFCI outlet in the summer kitchen area.
19. A D.C. circuit will not respond to the Czone touch screen controls.	-You may need to manually override that Czone system D.C. circuit.	- Open access to the Czone D.C. COIs behind the mirror in the head. -Remove the fuse for that circuit and if it is intact place it in the override position to temporarily turn on the circuit. -Reposition the fuse to turn it back off.

PROBLEM	CAUSE	ACTION
20. An A.C. circuit will not respond to the Czone touch screen controls.	-You may need to manually override that Czone system A.C. circuit.	- In the stateroom on the aft wall hinge open the clear plastic door on the ACOI#1 box. - Operate the black override for the concerned circuit as desired to turn it on or off.
21. As long as the “Elect”, “COI1”, “COI2”, “OI”, and “C6” circuit breakers on the main D.C. panel are on when the house battery switch is turned on the Yamaha CL7, Garmin displays, Czone system, and starting battery switches will turn on.	This is normal as part of the programing. The Yamaha CL7 screen is the master and turns on the Garmin equipment and Czone.	This is normal behavior.

PROPULSION SYSTEM TROUBLESHOOTING

PROBLEM	CAUSE	ACTION
1. The engines will not start or turn over.	- The engines' emergency shut off clip is not engaged. - The ignitions are not energised on the EKS panel. - The controls are not in neutral position.	- Securely attachn the shut off clip. - Use the ignition fob to turn on the ignitions at the EKS panel. - Place the control levers in neutral position.
2. The engines will turn over but do not start.	- An engine fuse is blown. - The engine is starved for fuel.	- Check for and replace blown fuse on top of engine. - Pump the fuel line priming bulbs. -Check the fuel water separator and on engine fuel filter for plugging/water. - Press the override on top of the fuel demand valve on the fuel tank top.
3. An engine is overheating.	- The raw water intakes may be blocked. - The raw water pump in the engine my not be functioning properly.	- Check the raw water intakes on the lower unit of the engine and clear away any blocking debris. - If no water is discharging out the pilot hole on the engine while it is running the raw water pump may be malfuctioning and needs repair.
4. No water is coming out of one engine	-See above.	- See above.
5. An engine will not tilt/trim.	- The starting battery voltage may be too low. - The 20 amp PTT fuse may be blown. -The power tilt/trim control may be defective. - The power tilt/trim motors may be defective.	- Check the starting battery voltage. - Check the PTT fuse on top of the engine. -The power tilt has a manual override valve on the side of the bracket that can be released to allow manual tilting of the engine.

PROBLEM	CAUSE	ACTION
6. The Yamaha alert buzzer sounds or the alarm indicator lights come on.	- Engine may be overheating. -Engine may have low oil pressure. -Engine may have water in the fuel filter.	- Check CL7 for alarm codes to narrow cause. -Check cooling water indicator stream from engine. -Check oil level. -Check the on engine fuel filter bowl.
7. The engine water separator alert activates.	-Engine may have water in the fuel filter.	-Check the on engine fuel filter bowl. -Check the main fuel/water separators in the stern mechanical rooms.
8. The CL7 Yamaha display is dead. This may also take down the Czone system.	- The house battery switch is off. - The “Elect” circuit breaker on the main DC panel is off. -The Yamaha fuse in the fuse box under the dash is blown.	- Turn onthe house battery switch. - Turn on the “Elect” circuit breaker on the main DC panel. -Ensure that the Yamaha fuse in the fuse box under the dash is intact.

STEERING & CONTROLS SYSTEM TROUBLESHOOTING

PROBLEM	CAUSE	ACTION
1. The steering does not work or the steering alarms activate.	- The start battery switch is not on. - The ignition is not energised. - Power steering fuse may be blown. - Steering may be defetive.	- Check that the start battery switch is on. - Check that the ignition is on. - Check that the power steering fuse on top of the engine is intact. - Override the steering to center the engine and steer with the throttles and gears to get home (See the procedure in the engine manual).
2. The engine controls do not power up.	- The start battery switch is not on. - The ignition is not energised. -Fuse on top of engine is blown.	- Check that the start battery swith is on. - Check that ignition is on. - Check the fuses on top of the engine are intact.
3. The Yamaha controls alert buzzer sounds or the alarm indicator lights come on.	- An engine alarm may have occurred. -A control malfunction may have occurred.	- Check the CL7 for an alarm explanation.

GROUND TACKLE TROUBLESHOOTING

PROBLEM	CAUSE	ACTION
1. The windlass will not power the rode in or out.	- Check that the windlass is not in manual mode.	- Ensure that the button on the face of the free fall cap is released and the plunger on the rim is extended.
	- The Stbd. start battery switch may be off.	- Turn on the Stbd. start battery switch.
	- The Stbd. start battery may be dead.	-Check the Stbd. start battery voltage. Close the paralelling switch if necessary.
	-The windlass power feed circuit breaker may be tripped.	-Check that the Windlass circuit breaker on the D.C. panel is on.
	- The foot switch on deck or rocker switch on the console may have failed.	- Check the switch.
	- The windlass directional solenoid may have failed.	- Check the directional solenoid in the rode locker.
2. The line is jamming while running out.	- The line is tangled in the locker.	- Align the line stack in the locker.
3. The chain/line is pilling up on deck while retrieving it with the windlass.	- The rode may be piled up below in the locker.	- Align the rode stack in the locker.

FRESH WATER SYSTEM TROUBLESHOOTING

PROBLEM	CAUSE	ACTION
1. The water tank level gauge is not indicating.	- The house battery switch is off. -The “Elect” circuit breaker on the main D.C. panel is not on. - The “COI1”, “COI2”, “OI”, and “C6” circuit breakers on the main D.C. panel are not on. - The Czone sensor for the water tank level channel is defective.	- Turn on house battery switch. -Turn on the “Elect” circuit breaker on the main D.C. panel. - Turn on the “COI1”, “COI2”, “OI”, and “C6” circuit breakers on the main D.C. panel. - Check the Czone sensor for the water tank level channel.
2. There is no water pressure.	-The water tank is empty. - The house battery switch is off. - The Czone system is not on. -The fuse for the fresh water pump in the Czone system COI is blown. -The fresh water pump strainer may be plugged. -The fresh water pump may have failed.	-Fill the water tank. - Check that the house battery switch is on. -Check house battery bank voltage. -Check that the fuse for the fresh water pump in the Czone system COI behind the mirror in the head is intact. - Clean the pump strainer. - Check that pump is receiving power if not responding.
3. The water pressure is weak.	-The house battery voltage may be low. -The fresh water pump strainer may be plugged.	- Check the house battery bank voltage. - Clean the pump strainer.

PROBLEM	CAUSE	ACTION
4. There is no hot water.	- No A.C. power is connected to the boat. - The Czone system is off. -The “All AC Circuits” circuit breaker on the Czone system is off. -The Water heater circuit breaker on the Czone system is off. - The water heater circuit breaker on the Czone ACOI #1 in the stateroom has failed. -The Water heater pressure relief valve has failed and dumped all the hot water.	- Restore A.C. power. - Turn on the Czone system. - Reset The “All AC Circuits” circuit breaker on the Czone system. -Reset the water heater circuit breaker on the Czone system. -Manually override the water heater circuit breaker on the Czone ACOI #1 in the stateroom. - Check for steam and water coming out a port side discharge through hull.

SEWAGE & DRAINS SYSTEM TROUBLESHOOTING

PROBLEM	CAUSE	ACTION
1. The holding tank level is not indicating.	- The house battery switch is off. -The “Elect” circuit breaker on the main D.C. panel is not on. - The “COI1”, “COI2”, “OI”, and “C6” circuit breakers on the main D.C. panel are not on. - The “Marine Head” circuit breaker on main D.C. electric panel is off. - The sensor for the holding tank level Czone channel is defective.	-Turn on the house battery switch. -Turn on the “Elect” circuit breaker on the main D.C. panel. - Turn on the “COI1”, “COI2”, “OI”, and “C6” circuit breakers on the main D.C. panel. -Turn on the “Marine Head” circuit breaker on main D.C. electric panel. - Check the level sensor for the holding tank level Czone channel.
2. Toilet will not operate.	- The head is in lockout mode and the holding tank is full. - The house battery switch is off. - The “Marine Head” circuit breaker on the main D.C. electric panel is off. -The toilet panel in the head has failed. - The toilet pump motor has failed.	-Empty the holding tank or turn off the lockout mode on the toilet (see the toilet manual). - Turn on the house battery switch. - Turn on the “Head” circuit breaker. - Check if the motor is receiving power but not responding. - Replace the toilet pump.
3. Toilet runs but there is no rinse water.	- The boat’s water pressure pump is off. -The toilet panel in the head has failed. - The toilet rinse valve has failed.	- Restore water pressure on boat. - Check that the panel is commanding the toilet rinse valve to open. -Check that the toilet rinse solenoid valve (under the sink) is operable.

PROBLEM	CAUSE	ACTION
4. Toilet runs but does not drain the bowl fully.	- The holding tank is full. - The toilet's macerator/evacuation pump has failed.	- Empty the holding tank as necessary. - Check the toilet's evacuation/macerator function.
5. The holding tank discharge pump does not operate.	- The Czone system is not on. -The "OI" circuit breaker on the main D.C. panel is not on. -The Czone Output Interface may have failed. -The holding tank discharge pump may have failed.	- Turn on Czone system. - Ensure that "OI" circuit breaker on the main D.C. panel is on. - If the OI has failed the spreader lights may not work either. -Check for power to pump.
6. The holding tank pump operates but does not empty the tank.	- The pump discharge seacock may be shut. - The pump suction is plugged. - The pump macerator has failed.	- Open the seacock if in legal discharge waters. - Remove the pump and check the suction hose. - Check the macerator impeller.
7. The shower does not drain.	- The shower sump pump is not turning on automatically.	- Check that the Czone system is on. - Check that the "Shower Sump Stbd." circuit breaker on the Czone system is on. - Check that the fuse in the Czone COI for the "Shower Sump Stbd." chanel is intact. -Check that the shower sump pump float switch is activating the pump.
8. The shower sump pump runs but does not drain shower.	-The shower sump pump impeller may be fouled.	-Open and the inspect sump pump impeller, remove hair and debris. -Flush the sump with hot vinegar solution until clean.

PROBLEM	CAUSE	ACTION
9. Water is pooling on the stateroom floor.	- The stateroom deck drain pump is not turning on automatically.	- Check that the Czone system is on. - Check that the “Shower Sump Port” circuit breaker on the Czone system is on. - Check that the fuse in the Czone COI for the “Shower Sump Port” chanel is intact. - Check that the deck drain sump pump float switch is activating the pump.

VENTILATION & AIR CONDITIONING SYSTEM TROUBLESHOOTING

PROBLEM	CAUSE	ACTION
1. The air conditioning does not run.	- There is no A.C. power. - The Czone system is not on. - The Czone “All AC Circuits” ciruit breaker is not on. -The Czone “Air Con Deck” and “Air Con Cabin” ciruit breakers are not on. -The thermostat control has failed.	- Connect A.C. power to main electric panel. - Turn on the Czone system. - Turn on the “All AC Circuits” ciruit breaker on the Czone screen. -Turn on the “Air Con Deck” and “Air Con Cabin” ciruit breakers on the Czone screen. -Check the thermostat control.
2. The air conditioning runs but doesn’t cool.	- There is inadequate sea water flow through the unit. The control may display “HPF”. - The unit(s) seawater coils are scaled internally. - Low refrigerant gas level.	- Check that the air conditioning raw water pump seacocks on the sea chest sides are open. -Check for adequate water discharge thru pumps from hull sides. - Check that exterior sea strainer is clean. -Check that sea chest is clear of debris. - Check the temp. of compressor coils to see if they are hot to touch. If so descale. - Check refrigerant gas pressure.
3. Coils on the units ice up.	- The unit fans may be set too low. - Return air filters may need cleaning to increase flow.	- Increase fan rate or set to automatic. - Clean return air filters on units.

PROBLEM	CAUSE	ACTION
4. Low air flow with high fan speeds.	- Return air filters are dirty. - Fan motor is failing.	- Clean return air filters. - Check fans operation.
5. Condensate pans overflow.	- Condensate pan drains are plugged. -The condensate venturi suction debris filters are plugged.	- Clear the drain pan ports and pour Hydrogen Peroxide into the open edge of the drain pan. -Open, clean, and reassemble the inline Shurflo debris filters on the suction side of the condensate drain lines.
6. The head compartment extractor fan does not run.	- The house battery switch is off. - The “Elect” circuit breaker on the main D.C. panel is not on. -The Compass Light fuse which also feeds the fan may be blown. -The vent fan switch may be defective.	- Turn on the house battery switch. - Turn on the “Elect” circuit breaker on the main D.C. panel. -Check that the Compass Light fuse (which also feeds the fan) in the fuse box under the dash is intact. - Check that the vent fan has power.

RAW WATER SYSTEM TROUBLESHOOTING

PROBLEM	CAUSE	ACTION
1. The raw water wash down pump does not turn on.	- The house battery switch is off. - The Czone system is not on. -The fuse for the raw water pump on the Czone system COI is blown. -The raw water pump may have failed.	- Turn on house battery switch. - Turn on the Czone system. -Ensure that the fuse for the raw water pump in the Czone system COI is intact. -Check the raw water pump ops..
2. The raw water pump runs but pressure is weak.	-The raw water seachest strainer may be plugged. - House battery voltage may be low.	- Check that sea chest exterior sea strainer is clean. -Check that sea chest is clear of debris. - Check house battery bank voltage.
3. The raw water pump runs but does not deliver any water.	- The raw water sea chest suction seacock may be shut. -The raw water pump suction seacock may be shut. -The raw water seachest external strainer may be plugged. - Pump may have failed internally.	- Open the raw water sea chest suction seacock. -Open the raw water pump suction seacock on the seachest. - Check that the exterior sea strainer on the sea chest is clean. -Check that the sea chest is clear of debris. - Check pump ops..

PROBLEM	CAUSE	ACTION
4. The baitwell does not circulate.	-The raw water seachest suction seacock may be shut. -The raw water seachest external strainer may be plugged. -The baitwell pump discharge seacock on the seachest may be shut. - The house battery switch is off. - The “Optional Distr” circuit breaker on the main D.C. panel is not on. -The “Livewell” fuse may be blown. -The discharge valves in the baitwell may be set wrong.	-Open the raw water seachest suction seacock. -Ensure that he raw water seachest external strainer is clear. -Open the baitwell pump discharge seacock on the sea chest. - Turn on the house battery switch. - Turn on the “Optional Distr” circuit breaker on the main D.C. panel. -Ensure that the “Livewell” fuse in the fuse block in the port mechanical room is intact. -Adjust the discharge valves in the baitwell for proper flow through.

DECK APPLIANCES TROUBLESHOOTING

PROBLEM	CAUSE	ACTION
1. The forward table lifts do not operate.	- The house battery switch is off. -The “12-24 VDC Table Convert” circuit breaker on the main D.C. panel is not on. -The table level buttons are inoperative. -The table lift cylinder is inoperative.	- Turn on the house battery switch. -Turn on the “12-24 VDC Table Convert” circuit breaker on the main DC panel. -Check that the table level buttons have power. -Check that the table lift cylinder has power. -Open the hatch access and disconnect the table lift cylinder to manually adjust the table height or release it.
2. The moon roof does not operate.	- The house battery switch is off. -The “Moon Roof” circuit breaker on the main D.C. panel is not on. -The moon roof rocker switch is inoperative. -The moon roof drive mechanism is inoperative.	- Turn on the house battery switch. -Turn on the “Moon Roof” circuit breaker on the main DC panel. -Check that the moon roof rocker switch has power. -Check that the moon roof drive mechanism has power.
3. The Sure Shade does not operate.	- The house battery switch is off. -The “Shure Shade” circuit breaker on the main D.C. panel is not on. -The Shure Shade operation buttons are inoperative. -The Shure Shade mechanism is inoperative.	- Turn on the house battery switch. -Turn on the “Shure Shade” circuit breaker on the main DC panel. -Check that the Shure Shade operation buttons have power. -There is a “Force Hard Home Reset” procedure. See the Sure Shade manual.

4. The Sure Shade doe not fully extend or retract.	-Sensor and motor malfunction.	-See Sure Shade techinical support web site or execute the “Force Hard Home Reset” procedure. See the Sure Shade manual.
5. Sure Shade is sagging when shade is retracting.	-Not enough tension set on roller spring.	-Unzip canvas from outer crossbar and rotate canvas to add more tension. See the Sure Shade manual.
6. The electric helm seat does not operate.	- The house battery switch is off. -The “Stbd Fwd Helm Seat” circuit breaker on the main D.C. panel is not on. -The helm seat rocker switch is inoperative. -The helm seat drive mechanism is inoperative.	- Turn on the house battery switch. -Turn on the “Stbd Fwd Helm Seat” circuit breaker on the main D.C. panel. -Check power to the helm seat rocker switch. -Check power to the helm seat drive mechanism.

APPLIANCES AND ENTERTAINMENT TROUBLESHOOTING

PROBLEM	CAUSE	ACTION
1. The aft deck chiller box does not cool.	- The house battery switch is off. - The “Optional Distr” circuit breaker on the main D.C. panel is not on. -The Aft deck “Chiller” fuse may be blown. -The thermostatic control inside the box may have failed.	- Turn on the house battery switch. - Turn on the “Optional Distr” circuit breaker on the main D.C. panel. -Ensure that the Aft deck “Chiller” fuse in the fuse block in the port mechanical room is intact. -Check the thermostatic control inside the box.
2. The main deck stereo is not working.	-The house battery switch is off. -The “Elect” circuit breaker on the D.C. panel is off. -The “Stereo” fuse in the fuse block under the dash is blown. -The main deck stereo may be defective.	-Turn on the house battery switch. -Turn on the “Elect” circuit breaker on the D.C. panel. -Check that the “Stereo” fuse in the fuse block under the dash is intact. -Check that there is power to the main deck stereo.
3. The stereo amplifier is not working.	-The stbd. house battery may be dead or have low voltage. - The turn on mode switch on the amplifier is not set to “Rem.” or remote so that it will turn on when the main on deck stereo turns on. -The 80 amp fuse feeding the amplifier from the stbd. house battery may be blown.	-Check the stbd. house battery voltage. - Set the turn on mode switch on the amplifier to “Rem.” or remote so that it will turn on when the main on deck stereo turns on. -Check that the 80 amp fuse on top of the stbd. house battery positive terminal that feeds the amplifier is intact.

PROBLEM	CAUSE	ACTION
4. The stereo in the head or the stateroom is not working.	-The house battery switch is off. -The “Elect” circuit breaker on the D.C. panel is off. -The “Audio Power” fuse in the fuse block under the dash is blown. -The head or stateroom stereo may be defective.	-Turn on the house battery switch. -Turn on the “Elect” circuit breaker on the D.C. panel. -Check that the “Audio Power” fuse in the fuse block under the dash is intact. -Check that there is power to the head or stateroom stereo.

MAINTENANCE
6.0

MAINTENANCE

Overview

This chapter provides basic information for maintaining the original appearance and dependable performance of your World Cat. Although your vessel is constructed of the finest materials available, the harsh saltwater environment and other factors, including geography and usage rate, will affect its finish and function over time. It is imperative that you understand how to care for your catamaran properly. Some simple steps will help maintain its aesthetics, value, and reliability.

Gelcoat Maintenance

Gelcoat is a thin layer of resin mixed with colored pigments, which provides the exterior finish on your boat. Gelcoat provides a smooth durable surface to protect the fiberglass construction of the hull, but is still flexible enough to absorb the pressure exerted upon it during operation. Mainly used for cosmetics, gelcoat is relatively simple to maintain. However, without routine cleaning, it will discolor due to the microscopic pores in the surface.

Cleaning

After each trip on the water, or after trailering long distances, you should clean the boat immediately. Washing the boat with mild detergents, such as dishwashing soaps, and fresh water will help eliminate build up or discoloration resulting from environmental pollutants. Use a sponge or other soft cleaning device on the smooth exterior surfaces of the hull and deck. A soft brush can be used when cleaning nonskid portions of the deck. Make sure to rinse the boat thoroughly after cleaning.

Waxing

Similar to automotive finishes, gelcoat will begin to fade over an extended period of time. Constant exposure to environmental pollutants will result in a loss of shine. However, it is possible to restore the original luster and color using a polishing compound (mild abrasive) or a rubbing compound (harsh abrasive). Each will remove scratches, discoloration, and help restore weathered gelcoat surfaces. You should select which compound to use based on the severity of the problem

Use the following steps to restore the finish of your gelcoat.

(Note that these procedures assume a moderate level of expertise of the person performing the work. If there is any doubt about ability to successfully accomplish the procedure, for best results it may be best to turn the process over to a professional.)

- Clean the affected area completely using a mild detergent.
- Gently wet sand the affected area using a fine sandpaper (600 grit) to remove any stains. Use plenty of water and always sand in one direction using curved strokes. Sanding in alternating directions could result in damage to the finish.
- Apply polishing compound to a buffing pad and follow the manufacturers instructions. If you apply the compound mechanically, we recommend a lamb wool buffing pad and an electric buffer capable of 1750 to 1800 RPM.
- When you have completely buffed the area, wash away any remaining compound using clean water. After thoroughly cleaning the surface, wax the affected area. This will help restore the finish and provide a seal against future discoloration.

NOTICE Using strong or caustic cleaning agents, such as bleach, citrus based cleaners, or one containing ammonia, will damage the appearance and strength of your gelcoat.

NOTICE When using an electric buffer, maintain constant motion. Allowing the pad to rest on an isolated spot can cause heat buildup, which can damage the gelcoat.

NOTICE Routinely clean and wax your catamaran to help prevent the need for excessive use of rubbing and polishing compounds, which over time can deteriorate the gelcoat.

By following the instructions listed above you can guarantee that your catamaran will remain in near showroom condition and remain a source of pride for years to come.

Repair

Although gelcoat is a flexible material capable of handling environmental punishment and extended use, it is susceptible to scratches, blistering and cracking over time. Gelcoat distortion or cracking is unappealing, but rarely represents any structural failure. Have your dealer inspect any damage to your gelcoat to determine the nature of the failure. If it is only cosmetic, they can provide color matched kits, instructions, and any chemicals you need for application or cleanup. Structural damage should be repaired by your dealer or a qualified fiberglass repair shop.

Bottom Paint

If you intend to leave your boat in wet storage, or routinely dock it for more than a few days, you should coat the hull beneath the water line with anti-fouling paint. This will help prevent marine growth, such as barnacles, which damage the gelcoat and affect performance. World Cat recommends using an epoxy barrier coat prior to painting a new vessel. This will help to prevent, but will not eliminate, gelcoat blistering on the hull, which is not covered by the warranty. Your dealer can provide information on bottom painting to protect against environmental toxins in your area. Anti-fouling paints are made to dissolve over time, so inspect and clean the hull bottom annually and recoat when necessary.

⚠ CAUTION Gelcoat and the chemicals used for its application and cleanup are extremely flammable and toxic. Follow all handling and mixing instructions, provide for proper ventilation, and keep water containers nearby to submerse catalyzed materials.

Upholstery

Basic Stains - Clean with a mild detergent and a soft to medium brush, or an all-purpose cleaner and rinse well with fresh water after cleaning.

Mildew - Use a 4 to 1 mixture of water and ammonia, brushing the stain vigorously to remove the bacteria responsible for the mildew. If the stain remains, briefly apply bleach to the area and rinse with fresh water.

Tough Stains or Mildew - Use a mixture of 1 tablespoon of ammonia, 1/4 cup of hydrogen peroxide, and 3/4 cup distilled water. Briefly, apply to the surface, allowing the peroxide to bubble. Rinse with fresh water.

Trim / Plexiglass / Polyethylene

World Cat uses vinyl, plexiglass, and polyethylene material (StarboardTM) throughout the interior of our catamarans.
Use the following instructions to care for these items:
Use mild detergents to clean vinyl trim commonly used in cabins and helm. Routinely use a commercially available surface protector to seal the vinyl.

Surface or glass cleaners can be used to clean plexiglass. It is commonly used for radio boxes and as a protective material for instrument panels.
StarboardTM can be cleaned using surface cleaners such as 409TM.

Stainless Steel / Aluminum

Stainless steel and aluminum are used throughout your vessel. World Cat uses only 316 marine grade stainless hardware and anodized aluminum to provide you with years of service; however, these metals can deteriorate and fail if improperly cared for. Upon returning, clean all hardware using a mild detergent and rinse thoroughly with fresh water. Avoid using abrasive cleaners or chlorine based products, as they will remove the metal's protective coating and lead to pitting or rust. Throughout the year, coat the metal using a non-abrasive metal protector to help displace moisture, remove contaminates, and shield the metal. World Cat recommends high quality sealants such as Boeshield T-9TM developed by BoeingTM Aviation. If you cannot find it locally call PMS Products Inc. at 800-962-1732.

Bilge Compartments

Routinely check the condition of the bilge compartments in your boat. This will help identify potential problems and eliminate odors associated with stagnant water and the buildup of residue. Clean the compartments using a freshwater rinse. This will also enable you to check the function of your drain system and the operation of the bilge pumps.

Cockpit Drains

All World Cats have four drains located in the cockpit, two on both the starboard and port sides. These drains are designed to quickly evacuate the cockpit should the boat become swamped. Flushing these drains routinely will ensure the safety of your crew and vessel, as well as eliminate the potential for odors associated with fish residue. These drains are evacuated through the scuppers located on the hull side. Each scupper has a rubber flap to prevent water from entering the boat. Check this material occasionally to keep the scuppers free of debris and in good working condition.

⚠ CAUTION **Do not mix ammonia and household bleach. Doing so will result in the formation of deadly chlorine gas. If it is necessary to use bleach, clean up any traces of ammonia and ventilate the work space for a minimum of 15 minutes prior to applying bleach.**

Winterization

Routine maintenance checks should be performed prior to each trip, but a broader assessment should be done before winterizing your catamaran and prior to the first trip of the season. If your local climate does not require winter storage, complete the following steps at least annually to ensure the safe operation of your boat:

- Do not leave loose items or personal effects onboard during storage.

- Remove all trash and debris prior to cleaning the boat.

- Before storage, clean the boat thoroughly, including exterior surfaces, fish boxes, livewells, and thru hull fittings. If possible, leave lids open slightly to allow fresh air exchange.

- Remove the garboard drains and store the boat with the bow up to allow drainage.

- Inspect all electrical connections and the operation of pumps or other electrical devices. Perform repairs if necessary. Coat electrical panels with an anti-corrosive spray (available from your dealer).

- Inspect the batteries and charge fully to prevent damage during storage. Disconnect the cables and apply a coat of grease to the terminals to prohibit corrosion.

- Inspect all plumbing components and connections to prevent leaks. Replace any damaged hoses. Drain all lines and devices to prevent damage from freezing. Lubricate valves to maintain proper operation. Use the manufacturer's recommendations for portable and marine heads.

- Inspect fuel system components and replace fuel / water separators. You can keep the system fueled but do not overfill, and use a fuel additive to prevent condensation.

- Lubricate hinges and coat all metal surfaces with a metal protecting compound. Tighten down any hardware if necessary.

- Inspect caulking around hardware, windows, hatches, etc., to prevent water damage. Normal use will break down sealants and can lead to costly repairs if not maintained.

- Remove or cover all electrical devices to prevent damage from UV rays. The rays will cloud electrical displays and make them hard to read.

- Remove cushions and store indoors to prevent damage.

- Winterize the engines and controls per manufacturer's recommendations and inspect all connections, filters, and parts thoroughly. Replace parts as needed.

400 DC-X MAINTENANCE SCHEDULE

System/ Category	Item	Interval	Alt. Interval	Action
Engines	Anodes on lower unit.	100 hours.	1 Year.	Inspect and replace as necessary.
Engines	Cooling water leakage	100 hours.	1 Year.	Inspect.
Engines	Cowling lock lever	100 hours.	1 Year.	Inspect.
Engines	Engine starting condition/noise	100 hours.	1 Year.	Inspect.
Engines	Engine idle speed/noise	100 hours.	1 Year.	Inspect.
Engines	Engine oil	100 hours.	1 Year.	Change oil.
Engines	Engine oil filter.	100 hours.	1 Year.	Replace.
Engines	On engine fuel filter.	100 hours.	1 Year.	Inspect and replace as necessary.
Engines	Fuel line (High Pressure)	100 hours.	1 Year.	Inspect and replace as necessary.
Engines	Fuel line (Low pressure)	100 hours.	1 Year.	Inspect and replace as necessary.
Engines	Fuel pump.	300 hours.	3 Years.	Inspect and replace as necessary.
Engines	Fuel/engine oil leakage	100 hours.	1 Year.	Inspect.
Engines	Gear oil	100 hours.	1 Year.	Change.
Engines	Greasing points	100 hours.	1 Year.	Grease.
Engines	Impeller/water pump housing	100 hours.	1 Year.	Inspect and replace as necessary.
Engines	Impeller/water pump housing	300 hours.	3 Years.	Replace.
Engines	OCV (oil control valve) filter	500 hours.	5 Years.	Replace.
Engines	Power trim and tilt unit	100 hours.	1 Year.	Inspect
Engines	Propeller/propeller nut/cotter pin	100 hours.	1 Year.	Inspect and replace as necessary.
Engines	PCV (Pressure control valve)	100 hours.	1 Year.	Inspect and replace as necessary.
Engines	Spark plugs	100 hours.	1 Year.	Inspect and replace as necessary.
Engines	Water from cooling water pilot hole	100 hours.	1 Year.	Inspect
Engines	Thermostat	100 hours.	1 Year.	Inspect and replace as necessary.
Engines	Timing Belt	100 hours.	1 Year.	Inspect and replace as necessary.
Engines	Cooling water inlet	100 hours.	1 Year.	Inspect
Engines	Main switch/stop switch	100 hours.	1 Year.	Inspect and replace as necessary.
Engines	Wire harness connections/wire coupler connections	100 hours.	1 Year.	Inspect and replace as necessary.
Engines	Yamaha Meter/Gauge	100 hours.	1 Year.	Inspect
Engines	SBW (steer by wire)	100 hours.	1 Year.	Inspect and replace as necessary.
Engines	Exhsut guide/exhaust manifold	1000 hours.		Inspect and replace as necessary.
Engines	Timing belt	1000 hours.		Replace
Engines	Cam chain	1000 hours.		Inspect and replace as necessary.
Engines	Cam chain tensioner	1000 hours.		Inspect and replace as necessary.
Engines	Valve clearance	1000 hours.		Inspection and adjustment
Engines	Fuel strainer	1000 hours.		Inspect and replace as necessary.
Engines	Fuel line (DI Pressure)	1000 hours.		Inspect
Engines	Fuel line (DI Pressure)	1000 hours.		Inspect and replace as necessary.
Engines	Anodes internal	1000 hours.		Inspect and replace as necessary.
Engines	Anodes under the timing belt	1000 hours.		Inspect and replace as necessary.
Engines	SBW (steer by wire)	1000 hours.		Inspect and replace as necessary.
Generator	Coolant water hoses	5000 hours.		Change.
Generator	Raw water pump (impeller).	1000 hours.	5000 hours.	Change.

400 DC-X MAINTENANCE SCHEDULE

System/ Category	Item	Interval	Alt. Interval	Action
Generator	Racor fuel/water separator	50 hours.		Change.
Generator	Generator oil	50 hours.		Change.
Generator	Oil filter	50 hours.		Change.
Generator	Air filter	100 hours.		Change air cleaner element.
Generator	Inline fuel filter	100 hours.		Change fuel filter.
Generator	Valve clearance	50 hours.	500 hour.s	Check valve clearance.
Generator	Valve cover gasket	50 hours.	100 hours.	Change valve cover gasket.
Generator	V belts	50 hours.		Inspect belt.
Generator	Generator rotor bearing	1000 hours.	5000 hours.	Change bearing.
Generator	Injectors	500 hours.		Change.
Generator	Compression	1000 hours.	5000 hours.	Check compression.
Generator	General operation	50 hours.	Monthly	Test run generator set.
Safety	Survival raft	1 year.		Inspect and recertify.
Safety	Epirb	90 Days.		Inspect bracket and clean. Check battery and hydrostatic release dates.
Safety	Portable fire extinguishers	1 year.		Recertify.
Safety	Flares	1 year.		Inspect and replace out dated.
Safety	PFDs	6 months.		Inspect condition.
Bilge pumps	Submersible bilge pumps	Monthly.		Prove float and manual switches.
Bilge pumps	Submersible bilge pumps	2 months.		Lift pumps, inspect impellers, and clean strainers.
Bilge pumps	Bilge alarms	Weekly.		Prove bilge alarms.
Steering	Steering tilt/trim system.	100 hours.	6 months.	Check for mechanical play or slop.
Steering	Steering system.	100 hours.	6 months.	Check for corrosion.
Steering	Electrical cables.	100 hours.	6 months.	Check for chafting and wear.
Steering	Greasing points	100 hours.	1 year.	Apply marine grease.
Controls	Control system.	100 hours.	6 months.	Check for corrosion.
Electrical	Shore power cable end	Monthly.		Inspect plugs.
Electrical	Interior lighting	Weekly.		Prove all interior lighting, replace bulbs as necessary.
Electrical	Exterior lighting	Weekly.		Prove all exterior lighting, replace bulbs as necessary.
Electrical	Underwater zincs	6 months.	Haul out.	Check and replace transom zincs as necessary.
Electrical	Batteries	Monthly.		Check terminals for corrosion. Clean as necessary.
Electrical	Battery charger	Weekly.		Check output.
Electrical	Electrical panels	1 year.		Open and inspect connections.
Electrical	Electrical panels	6 months.		Check indicator light op.s.
Electrical	Shore power ELCI	When connecting.		Test ELCI with test button each time shore power cable is connected.
Electrical	A.C. outlet GFCIs.	Monthly.		Test all GFCI outlets.
Fuel	Fuel fill deck fittings	6 months.		Lube cap threads, inspect keeper chains and "O" rings.
Fuel	Fuel vent screens	6 months.		Inspect vent flame screen.
Fuel	Fuel hoses and tubing	Weekly.		Visually inspect for leaks and corrosion.

400 DC-X MAINTENANCE SCHEDULE

System/ Category	Item	Interval	Alt. Interval	Action
Fuel	Fuel tanks.	1 year.		Clean/drain sediment.
Ground Tackle	Windlass	3 months.		Clean windlass with cloth damp with Kerosene. Spray with CRC3097.
Ground Tackle	Windlass	3 months.		Spray under deck components with CRC3097.
Ground Tackle	Windlass	2 months.		Grease windlass main bearing.
Ground Tackle	Windlass	3 months.		Clean and spray electrical terminals with corrosion block.
Ground Tackle	Windlass	3 months.		Check tightness of all fasteners.
Ground Tackle	Windlass	1 year.		Derust and paint motor.
Ground Tackle	Chain locker	1 year.	Haul out.	Clean chain locker.
Ground Tackle	Rodes	Haul out.	1 year.	Range rodes, inspect, and renew markings.
Fresh Water	Water fill deck fittings	6 months.		Lube cap threads, inspect keeper chain and "O" ring.
Fresh Water	Water tank vent	6 months.		Inspect and prove clear.
Fresh Water	Faucets and mixing valves	Monthly.		Prove free of leaks and for normal operation.
Fresh Water	Pump suction strainer.	Weekly.		Inspect and clean fresh water pump suction strainer.
Fresh Water	12 volt pressure pump	Monthly.		Prove leak free and check system pressure.
Fresh Water	Water heater	Monthly.		Inspect for leaks and prove element operational.
Fresh Water	Water heater	6 months.		Test water heater pressure relief valve.
Fresh Water	Water heater	Risk of freezing.		Drain water heater and winterise water system.
Raw Water	Sea chest suction strainer.	Monthly.		Check/clean external suction strainer.
Raw Water	Wash down pump.	Monthly.		Operate raw water pressure pump.
Raw Water	Sea chest seacocks.	Monthly.		Exercise seacocks on seachest.
Raw Water	Seachest.	Monthly.		Open and clean seachest.
Sewage & drains	Toilet	3 Days.		Flush toilet and inspect.
Sewage & drains	Toilet	Daily.	As req.'d	Clean toilet.
Sewage & drains	All toilet hoses	1 year.		Inspect hoses and clamps.
Sewage & drains	Sewage discharge seacock	Monthly.		Operate and inspect sewage discharge seacock.
Sewage & drains	Holding tank	2 months.		Visually inspect holding tank.
Sewage & drains	Holding tank	Weekly.	As req.'d	Pump holding tank, flush with clean water, and add Raritan KO.
Sewage & drains	Holding tank vent openings	6 Months.		Inspect to prove clear.
Sewage & drains	Shower sump	Monthly.		Flush shower sump with vinegar and verify operation of float switch.
Sewage & drains	Stateroom deck drain sump	Monthly.		Flush drain sump and verify operation of pump and float switch.
Sewage & drains	Sink and shower drains	Monthly.		Prove free of leaks and for normal operation. Prove stopper operation.
Sewage & drains	Holding tank pump out fitting	6 months.		Lube cap threads, inspect keeper chain and "O" ring.
Sewage & drains	Holding tank pump.	Weekly.		Observe holding tank pump in operation.
Ventilation	Head compartment vent fan	Weekly.		Prove operational.
Ventilation	Return air conditioning grills	Weekly.		Clean return air grills.
Ventilation	Air conditioning condensate drains	6 months.		Flush condensate pans and drain with hydrogen peroxide.
Ventilation	Air conditioning Freon charge	1 year.		Check all air conditioning compressors Freon charge.
Ventilation	Air conditioning compressor coil temp.	Weekly.		Measure and log airco coil temps..

400 DC-X MAINTENANCE SCHEDULE

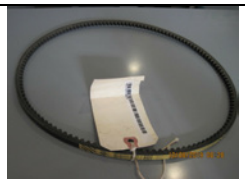
System/ Category	Item	Interval	Alt. Interval	Action
Ventilation	Air conditioning compressor coils	2 years.		Descale coils.
Ventilation	Air conditioning raw water seacocks	Monthly.		Operate and inspect airco raw water seacocks.
Ventilation	Air conditioning raw water hoses	Monthly.		Inspect for cracks, leaks, and clamps condition.
Ventilation	Air conditioning raw water pumps	Weekly.		Visually inspect.
Ventilation	Air conditioning controls	6 months.		Perform factory reset of controls.
Appliances	Refrigerators	Weekly.		Clean lint from air grills.
Appliances	Refrigerators	Weekly.		Clean interior and check door gasket.
Appliances	Grill	2 months.	As req.'d	Clean grill.
Exterior	Lock Tumblers	Monthly.		Lubricate lock tumblers.
Exterior	Hand rails	Weekly.		Polish hand rails.
Exterior	Stainless steel fittings	Weekly.		Polish stainless steel.
Exterior	General exterior surfaces	Weekly.	As req.'d	Wash down and dry.
Exterior	Mooring lines	6 months.		Inspect and replace/repair as necessary.
Exterior	Fenders	2 months.	As req.'d	Clean and inspect, top air pressure.
Exterior	Gel coat surfaces	6 months.	As req.'d	Clean and reseal.
Exterior	Windows	2 months.		Reapply Rainex.
Exterior	Canvas	2 months.	As req.'d	Remove and scrub.
Exterior	Canvas snaps and zippers.	2 months.	As req.'d	Lubricate snaps and zippers.
Exterior	Boot line	Monthly.	As req.'d	Scrub.
Exterior	Boot line	1 year.	Haul out.	Clean and apply wax.
Interior	Bilges	Monthly.	As req.'d	Clean and inspect.
Interior	Latches	2 months.		Check fit and lubricate.
Interior	Drawers	6 months.		Wax sliding surfaces.
Interior	Cabinetry general	Monthly.		Check fit/op.s of doors, drawers, etc..
Interior	Upholstery	1 year.	As req.'d	Professionally clean.
Interior	Bed shams and drapes	1 year.	As req.'d	Professionally dry clean.
Interior	Hard decks	Weekly.	As req.'d	Wet mop and dry.
Interior	Wood surfaces	6 months.		Clean to remove salt film and dry.
Interior	Headliners	6 months.		Clean to remove salt film, lint, and dry.
Interior	Plumbing fixtures	Weekly.		Polish.
Interior	Shower	Weekly.		Clean and polish.
Interior	Shower door	Weekly.		Clean and polish.

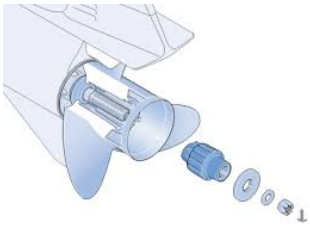
SPARE PARTS
7.0

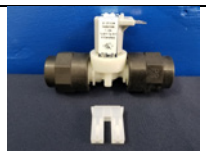
SPARE PARTS

SYSTEM	COMPONENT	PART	PART #	PHOTO
Safety	Czone System	Automotive Blade Fuses	5,7.5,10,15,20 amp	
Safety	Windshiled Wiper System	Wiper Blade	N/A	N/A
Bilge Pumps	High Water Alarm Switch	Rule- A-Matic Plus series 40A 12 volt	N/A	
Bilge Pumps	Bilge Pumps	Rule Mate 2000 12 volt	N/A	
Fuel	Main Engine	Fuel/water separator prefilter	Yamaha# MAR-10MEL-00-00	
Fuel	Main Engine	Inline on engine fuel prefilter element	Xislet# 2PCS	
Fuel	Main Engine	Fuel additive	Yamalube Ring Free Fuel Additive and Fuel Stabilizer & Conditioner Plus	
Fuel	Main Engine fuel supply	Gasoline supply integrated fuel demand valve	Attwood#: 991FDV00-1	

SYSTEM	COMPONENT	PART	PART #	PHOTO
Fuel	Gasoline Tanks	Gasoline tank level senders	KUS#: SSL-26153058-1119W02	
Fuel	Generator	Racor fuel/water separator filter element	Racor#: R11T 10 Micron	
Fuel	Generator	On engine diesel inline filter	Panda #: FP1000438	
Fuel	Generator	12 volt fuel feed pump	Facet#:	
Electrical	Generator	Lube oil filter	Panda #: FP-000434	
Electrical	Generator	Raw water pump impeller	Panda #: FP1-001724	
Electrical	Generator	Raw water pump complete	Panda # FP1-044908	

SYSTEM	COMPONENT	PART	PART #	PHOTO
Electrical	Generator	V belt	Panda # FP1-026197	
Electrical	Generator	Fuel solenoid Valve	Panda # FP1-0056244	
Electrical	Generator	Thermostat	Panda # FP1-018729	
Electrical	Generator	40 Amp DC fuse	Panda # FP1-054148	N/A
Electrical	Battery Charger	40 Amp input fuse at battery terminal	Blue Sea Systems # 5176	
Electrical	Stereo Amplifier	80 Amp supply fuse at battery terminal	Blue Sea Systems # 5181	
Electrical	Czone Battery Monitoring	3 Amp inline fuse at battery terminal	AGC 3	

SYSTEM	COMPONENT	PART	PART #	PHOTO
Propulsion	Main Engine	Spare Propeller	Yamaha#: 17YL 16 7/8 XTO OS	
Propulsion	Main Engine	Propeller Cotter Key	Check w/dealer	
Propulsion	Main Engine	Propeller Nut	Check w/dealer	
Propulsion	Main Engine	Propeller Thrust Washer	Check w/dealer	
Propulsion	Main Engine	Propeller nut wrench	Check w/dealer	
Ground Tackle	Windlass	Reversing Relay	Lewmar#: DC6C6-46P-12V	
Fresh Water	Pressure Pump	Pump Complete	Pentair Shurflo Problaster II 12 Volt#: 428-153-J09	

SYSTEM	COMPONENT	PART	PART #	PHOTO
Fresh Water	Windshield Washer	Washer solenoid valve	SeaTech# EDP 81902556n12104-0415-12 15mm	
Sewage	Drain Sumps	12 volt sump pump	Attwood Sahara #: S750 mod. 4507 12 volt	
Sewage	Toilet	Flush Water Valve	Tecma #: 98183 12 volt	
Sewage	Toilet	Discharge Pump Complete	Tecma# 38056 12 volt	
Sewage	Holding Tank	Discharge Pump	Pentair Shurflo#: 3200-003 12 Volt	
Ventilation & Air Conditioning	Cooling System	Raw water pump complete	Dometic # 336183 110 Volt	

SYSTEM	COMPONENT	PART	PART #	PHOTO
Ventilation & Air Conditioning	Condensate Drains	Condensate suction strainer	Shurflo#: 255-213	
Ventilation & Air Conditioning	Condensate Drain Pans	Condensate Pan Cleaner	Hydrogen Peroxide	
Raw Water	Raw Water Pressure	Raw water Pressure Pump	Pentair Shurflo Problaster II 12 Volt#: 428-153-J09	

400DC-X