OPERATION MANUAL

M/V Tahoe

Welcome aboard!

We are happy you have chosen M/V Tahoe for your vacation. We are sure you will enjoy cruising the lovely islands of the Pacific Northwest aboard Tahoe.

Tahoe was built with an open design, allowing whoever is cooking to be a part of all activities. The forward gathering area allows visiting with the skipper in the pilothouse while enjoying the view underway.

Tahoe is equipped with many conveniences to help make your adventure in the islands more convenient – with galley amenities to make cooking as easy as at home!

While Tahoe is a 59' boat, it was built on a 55' hull, with a 4' extension added at the factory. This allows for the maneuverability of a shorter boat.

We trust this manual will help you become familiar with the boat. If you have questions about the boat or about places to visit, please do not hesitate to ask the AYC staff.

TABLE OF CONTENTS

SYSTEMS OVERVIEW

MATHERS MOTOR CONTROLS ("MMC"):

This vessel is equipped with Mathers Motor Controls ("MMC"), which affords control of the throttles and transmissions via just the throttle.

Transfer of command: Control is easily transferred between helm stations by placing both throttles of the station relinquishing command into neutral, then pressing the "station transfer" button at the station assuming command. A red light on the base of both throttles at the station assuming command indicates that station has command.

When starting, the engine start signal is blocked unless all conditions are true:

- Power has been turned ON to the MMC System.
- A station has taken command.
- The controlling station is commanding Neutral.

The motor controllers will engage transmissions at idle by moving forward or aft to the first "click." There is a moment of lag time between this click and the transmissions engaging. Be patient. Advancing the throttle levers too quickly will result in engaging transmissions at higher rpms, which can damage the transmissions.

High speed idle: Press and hold the station transfer button while advancing the throttle for that engine. A flashing red light on the controller indicates that it is in idle mode. To cancel, return to neutral and advance the throttle in either direction.

Low speed idle: Press the "Low idle" button on the helm, affecting both engines.

Synchronization: Synchronization controls both engines from a single throttle (port). For cruising, it is normally best to synchronize the throttles to minimize vibration. Activate by pressing the "Synchro" button on the helm. A green arrow pointing to port indicates synchronization (and that the port throttle has control of both engines). Press again to cancel. Do not use synchronization when docking. Synchronization does not affect the transmissions, but synchronization would not be used when gears are being changed for maneuvering.

ENGINE MONITORING SYSTEM (EMS):

M/V Tahoe is equipped with a Caterpillar Engine Monitoring System (EMS), which monitors various parameters in the propulsion engines and transmissions. The displays at both helms alert to abnormal conditions with audible and visible alarms. A caution alarm (yellow) should result in immediate action to slow the vessel, consult the display, and potentially shut down the alerting engine. A warning alarm (red) requires shutting down that engine immediately.

The main unit at the lower helm (above eye-level) displays gauges for:

Engine oil pressure /Engine coolant temperature /Engine boost pressure
Transmission oil pressure /Transmission oil temperature /Engine boost pressure (%)
Tachometer

On the right-side are warning lights for:

Primary speed sensor /Engine oil pressure /Engine coolant temperature
Backup speed sensor /Engine boost pressure /Engine coolant level.
Throttle position sensor fault /Transmission oil pressure/Transmission oil temperature
Electronic fuel system fault

On the helm switch board are several affiliated switches: The “Scroll” switches (upper for starboard engine, lower for port) scroll between the parameters displayed by the 7 analog gauges to give a digital display below the tachometer.

The “Alarm mute” switch silences an alarm for that panel.

The “Dim” switch dims the MMC displays.

BOW THRUSTER:

M/V Tahoe has an electric bow thruster. It is a high current, short term use device, which can drain the dedicated batteries if overused and could overheat and shut down to protect the motor from damage.

Suggest testing the thruster before untying from the dock or while approaching to dock. The thruster controls turn off automatically after a few minutes and need to be re-armed.

EXHAUST:

Unlike most vessels in the fleet, cooling water does not discharge from the waterline ports, as the propulsion engines have two exhaust ports: Idle ports at the waterline and main exhausts underwater. Exhaust is diverted from the idle ports to the main exhaust ports at higher engine speeds.

Thus, the only way to detect cooling water flow is by checking for visible water movement through the sea strainers after starting and closely monitoring engine temperatures.

The underwater exhausts reduce sooting, but carbon monoxide still passes, so keep salon door closed while engines are running to prevent exhaust gases from entering the cabin.

BOAT OPERATION

ENGINE INSPECTIONS:

Remember your **“WOBBS”** every morning:

Water (Coolant)

Oil

Bilges (Inspect and Pump-out)

Belts and

Sea strainers clear and sea cocks open.

COOLANT: Check the level of COOLANT in the expansion tanks on the bulkheads forward of both engines and aft of the generator. USE ONLY ETHYLENE GLYCOL ANTIFREEZE (spare fluids are available in the engine room and lazarette).

OIL: Check the level of MOTOR OIL in both engines and the generator using the dipsticks (painted red) inboard of both engines, midpoint, and, for the generator, behind a removable panel forward of the generator.

Look at the etch marks on each dipstick that indicate the proper oil level. **DO NOT OVERFILL OIL!** Only fill if oil levels are below the ½ way mark. Ask your fleet captain at checkout if you have any questions about the markings on dipsticks. Please use a paper towel or oil rag, not the dish towels!

Transmission oil level is checked before check-out, so it only needs to be checked for extended rentals. If so, check the transmission oil levels weekly, with the engines off.

BELTS: Check the general condition of the BELTS, HOSES, and FUEL LINES.

SEA STRAINER: Ensure the valve on each RAW WATER THRU-HULL is open (lever in-line with valve). Using a flashlight, look for debris in each RAW WATER STRAINER. If obstructed, close the seacock, open the strainer cover, clean the strainer, and reassemble. Reopen the seacock.

Check the Racor fuel/water separators (aft, inboard of both engines).

The fuel gauges are inaccurate, so check the fuel levels on both tanks via the clear tubes at the stern of each tank.

*** Some valves are indicated with a colored band: Red indicates normally closed (handle perpendicular to the line) and green indicates normally open (handle in line).

START-UP:

After completing inspections:

DISCONNECT the shore power cord (see 120/240-volt section below).

Assign crew positions (lines, calling out distances, roving fender, etc.).

Close the portholes and salon door.

Remove objects from tables and counters that may fall off.

Turn on breakers: Low voltage panel:

PORT MMC
STBD MMC
(An alarm will sound. Mute by pressing the “Transfer” station button)
TRIM TABS
HORN
RADAR
RADAR
GPS
AUTOPILOT
FISH FINDER
BOW THRUSTER

VHF LOWER
VHF UPPER
DEPTHSOUNDER

120-volt panel:

LASER PLOTTER

24-volt panel in the engine room:

ENG. RM. FANS (Turn on fan while there)

The engines can be started from either helm.

Take command at a station by pressing the “TRANSFER” button. A red light on the base of both throttles confirms that station has assumed command.

Ensure the throttles are in neutral or the engines will not start because of the “neutral lockout.” Throttle levers should be advanced then brought back to the neutral position to ensure in neutral.

Ensure both keys are inserted. The ignition keys are interchangeable but cannot be removed while running. Please keep the keys in the ignition switches.

To start at the lower helm, turn the keys fully to start.

To start at the upper helm: The keys below must be on. Press the green start buttons at the upper helm to start.

Check oil pressure level, that there is a good supply of water thru the sea strainers, and that the batteries are charging.

FAILURE TO START: If the starter does not engage when the key is turned, move the gearshift lever slightly until you find neutral and try again.

If the engine cranks slowly or fails to turn over, check the condition of the battery on the electrical panel. If the battery is low, try the “Battery parallel switch” (found on both helms) to connect both starting batteries momentarily. Turn off after using.

If none of the primary engine control stations will activate (after confirming the shifters are in neutral), there are control panels on each engine. Do not, however, use these in lieu of normal throttle control, rather, merely to isolate the problem.

AFTER STARTING: Start-up and initial running of the diesel engines is when most wear occurs. Allowing the engines to reach normal operating temperatures before putting them under heavy load helps ensure long engine life and reduced engine problems.

Engage the fast idle mode as needed to warm the engines. Move the THROTTLE to raise the engine speed to 1000 rpm on the TACHOMETER. Warm the engine for about 5 minutes before engaging transmission. Monitor the gauges.

If oil pressure is low, shut down engine, and inspect engine compartment and look for possible cause (for example, loss of oil). Caution -- If an engine is overheating or there is lack of raw water circulating through the sea strainer, stop the engine immediately. Recheck the raw water-cooling system to ensure the seacock is 'open' (handle in-line with valve). Check the sea strainer for debris. If suspected, close the seacock. Remove the strainer, clean, re-assemble, and reopen the raw water intake valve (seacock). Restart the engine and re-check water flow through the sea strainer. If water is not flowing properly, the RAW WATER PUMP may need servicing. Seek help.

GETTING UNDERWAY:

Close quarter maneuvering should take place at the flybridge helm, where visibility is better.

Once outside the marina, idle the engines while crew brings in fenders and lines. Use the bow thruster to hold the bow to the dock while the bowline is removed.

TURN ON ELECTRONICS:

LOWER STATION:

VHF Radio: Press the volume button.

Radar: Press the "Power" button and the "ST BY/XMIT" button.

GPS: Press "PWR."

Autopilot: Press "MENU/OFF."

Fish finder: Turn the "BRILL" knob on.

Laser plotter: Turn on the computer (under the forward settee) by pressing the button on the computer. Turn on the display by pressing the button on the lower-right of the display. This will follow a normal boot-up sequence for the Windows 98 OS. See below for further instructions.

UPPER STATION:

VHF Radio: Press the volume button.

Radar: Press the "Power" button and the "ST BY/XMIT" button.

Autopilot: Press "MENU/OFF."

Dockside maneuvering should be performed with the throttles at dead idle speed and rudder amidships.

Shift gears only at idle RPM. Allow a brief pause when shifting.

Before removing the lines, confirm the engines and thruster are working in all directions by giving them a quick test in and out of gear. The thruster disengages after a few minutes and may need to be re-armed.

When ready, cast off the lines.

Once outside the marina, bring in and stow fenders and lines.

CRUISING:

Cruising speed is a maximum of about --------- RPMS. If you run at ---- RPMS you will cruise at ---- knots and use only --- gallons of diesel per hour. Your speed will vary depending upon the weight and load and weather conditions.

TRIM TABS can be adjusted for comfort and visibility by putting in the "bow down" position. The Trim Tabs are only effective above about 8 Kts.

Avoid higher engine speeds as it causes higher engine temperature, possible damage, and higher fuel consumption. In general, lower RPMs result in much improved fuel economy.

DOCKING:

Prior to docking, rock TRIM TAB switches to the 'bow up' position to make backing and turning easier. While moving slowly to the dock or mooring location, center the rudder and use only the gearshifts, throttles, and thruster to maneuver.

During docking, use the upper helm for greater visibility. Have the crew make ready the lines and fenders and give clear instructions on how you will be docking. Often, a crew member will need to step from the swim platform with the stern line. Another crew member will need to be at the bow or mid-ships to hand over the next lines. Use the thrusters, in short bursts, to hold the vessel while lines are secured.

SHUT DOWN:

Before shutting down, allow the engines to idle for about 5 minutes to cool gradually. The time docking is usually sufficient. Ensure each throttle is in neutral. Turn off engines by pressing the "STOP" button for both engines. Turn the keys counterclockwise to "off." Turn off the "underway" breakers listed above.

FUELING:

MAKE SURE YOU HAVE THE RIGHT FUEL! DIESEL! DIESEL! DIESEL! MAKE SURE IT IS GOING INTO THE RIGHT DECK FILL! DOUBLE-CHECK!

Filling with the wrong fuel can cost you several thousand dollars. Caution is worth it!

Filler caps are on the cockpit deck, port and starboard (labeled). Open with a deck fitting key, which is kept in the pilothouse cabinet, or a large screwdriver.

Place sorbs downhill from the filler hole to absorb spilled fuel.

Especially since the fuel gauges are inaccurate, sighting the fuel lines prior will give an estimate of the fuel needed. Tahoe holds 525-gallons per tank. Have someone monitor the tank sight gauges (at the stern of each tank) to monitor fueling progress.

Place the DIESEL nozzle into the tank opening and pump slowly and evenly. Note the sound of the fuel flow – which will alert you when nearly full by a change in pitch. Pumping too fast may not allow enough time for air to escape, which may result in spouting from the tank opening. Pay attention to the tank overflow vent on the outside of the hull near and below the filler cap. The sound may indicate when nearly full. Top off carefully and be prepared to catch spilled fuel.

Spillage may result in a nasty fine from law enforcement. Clean up any spillage immediately for environmental and health reasons.

Replace each tank cap. Turn on blower before starting engines.

M/V Tahoe is outfitted with Racor Lifeguard model LG100 Fuel/air separators to prevent fuel from overflowing thru the vents. However, no system is foolproof: If enough fuel is poured into a vessel, it will have to go somewhere! This just reduces the possibility of inadvertent overflows through the fuel vents.

M/V Tahoe carries a small oil spill capture boom. In the event of a spill of fuel or oil, use this boom to absorb the oil or fuel. It can be drained and reused.

BOAT ELECTRICAL

The boat has two electrical systems: 120/240-volt AC and the low voltage (24 or 12-volt DC).

120/240-VOLT SYSTEM:

The 120/240-volt system is fed by shore power, generator, or inverter and is controlled by 4 breaker panels:

The main AC panel is in the pilothouse. Two interlocked breakers limit the sources of electricity that can feed the vessel. Slide the interlock to switch between shore power/generator and the inverter. Only either “Shore power” or “Generator” buttons should be pressed at any time.

Downstream from that is a subpanel hidden in the chase between the galley and the pilothouse, which feeds the range and oven. This is normally unchanged.

A 240-volt panel in the engine room controls the feed to the barbecue, water maker, and small AC subpanel above that, which controls some unused outlets in the lazarette.

Normally, when first boarding the boat, it will be connected to shore power, with the “Shore power” selector button engaged, with most breakers turned off (except for bilge pumps). Turn on appropriate breakers for battery charger, refrigeration, water heater, etc. Watch the ammeter for load. Exceeding amperage with trip breakers. If so, turn off some items and wait until usage drops to turn on more systems.

Most breakers are labeled by colored dots: Green signifies “normally on” (when using the boat); Pink signifies “always on” (bilge pumps and alarms); Orange signifies needed when underway. No dots signify use when needed, irregular use, or use with discretion.

To disconnect from shore power: Turn off the breaker on the dock pedestal. Disconnect the shore power cable and reel it in – feeding it by hand – not by using the Cablemaster motor to pull the cord in, as this will overload the motor and strain the cable – damaging them. Stow the extension cord and/or adapter.

To connect to shore power: Press the switch on the starboard side to pay out cable from the Cablemaster reel (up to pay out, down to reel in). Turn off the dock breaker. Plug in the 50-amp power cord. A 25’ extension and a dual 30-amp adapter are found in the lazarette. Once plugged in, engage the dock breaker. Cords should be secured using the large twist ties in the pilothouse cabinet or wrapped loosely around the rail.

***It is imperative that the shore power breaker be OFF at the dock box when connecting the cord to prevent against arcing – which could damage the boat's electronics.

To switch from shore power/generator to inverter:

Release the "Shore power" or "Generator" button on the main AC panel.

Switch off the "Shore power" breaker on the panel.

Switch on the "Inverter" breaker below that. The inverter should automatically start providing 120-volts AC. If not, go to the Magnum Energy control panel (in the lazarette, high on the forward bulkhead, starboard of the hatch and press the "On/off" button on the "Inverter" control (lower left). A green light indicates success.

Check the meter on the main panel to ensure receiving 120-volts. If not, check the control panel to see if the battery contains sufficient charge. Ensure the "Shore power" and "Generator" buttons are released. If not, less than 120-watts will be generated – potentially damaging electrical items.

To switch from inverter to shore power/generator: Switch off the "Inverter" breaker on the main AC panel. Switch on the "Shore power" breaker just above that. Press either the "Shore power" or "Generator" button on the main AC panel. Check the meter on the main panel to ensure receiving 240-volts.

To switch from shore power to generator:

Release the "Shore power" button (Yellow button on left).

Start the generator by pressing the start switch up. Once generating power, the white "Generator" button will light up. Press that button to receive power from the generator.

Check the panel meter to ensure receiving 240-volts.

To switch from generator to shore power:

Shut off the generator.

Release the "Generator" button.

Press the "Shore power" button.

Check the panel meter to ensure receiving 240-volts.

When connecting to shore power, check for a reverse polarity alert on the entrance service box in the lazarette, starboard upper, forward.

GENERATOR OPERATION:

For generator start, first check that generator oil and coolant are topped off and the raw water intake is open. The generator controls are on the 120-volt panel and at the generator. Ensure all individual AC breakers are turned off. Start the generator by pushing up on the generator start switch. Ensure water and exhaust is exiting from the starboard exhaust. After generator is running, engage the white "Generator" button. It should be lit to indicate it is generating. Turn

on AC systems one at a time. The generator has automatic shutoffs for high coolant temperature, high exhaust gas temperature, or low oil pressure. This does not, however, replace the need for pre-use inspection (WOBBS).

INVERTER:

The INVERTER provides 120-volt AC power when the boat is disconnected from shore power. The inverter does not provide power to the battery charger or these 240-volt devices: Water heater, oven, range, barbecue, and water maker. The inverter panel (Magnum Energy) is in the lazarette, on the forward bulkhead, starboard of the engine room hatch. The inverter is in the engine room, port side, aft.

The inverter's power source is the house batteries in the lazarette, port side. Capacity of power that can be inverted is limited by the battery capacity. Therefore, running high-demand devices will quickly discharge the batteries. Use these items VERY SPARINGLY! Monitor battery usage very carefully! If anticipating heavy power usage, run the generator or engines to keep the batteries charged.

When connected to shore power, the inverter automatically becomes a battery charger for the HOUSE BATTERIES. If the inverter fails to charge the house batteries, check the breaker in the AC Panel and the inverter control panel.

The inverter has a "Low Battery Cut Out" set to 20.0 volts. If the batteries reach this voltage, the inverter will shut-off until battery voltage corrects.

12 AND 24-VOLT SYSTEMS:

Five battery banks support 12 and 24-volt DC power:

1) Propulsion engines starting batteries: Charged by the engine alternators, with a master switch port of the 24-volt panel, aft of the engine.

2) Generator starting battery: With a dedicated charger and a master switch port side of the generator.

3) House batteries: Charged by the inverter-charger, with a master switch on the 24-volt panel, starboard side, bottom.

4) Bow thruster battery: Charged by the main engine alternators. There is no master switch for this (a switch in the forward bilge is inoperative).

5) Flybridge battery: With a dedicated charger, but not master switch.

Do not shut the house batteries off while the inverter is operating.

The switches are normally left on.

There are 3 low-voltage panels:

Just forward of the main AC panel,

In the engine room, port side, and

In the forward bilge, controlling the feed from the bow thruster batteries.

On the main panel, all breakers are 24-volt, except for the 7 on the lower starboard, which are 12-volt. Energizing these breakers requires turning on the "DC/DC CONVERTER" breaker just above them.

When not connected to shore power or the generator is not running, the HOUSE BATTERY BANK provides power for all DC systems, except the engines and bow thruster. Monitor resting or charging battery levels with the voltmeter and power usage with the ammeter on the low voltage panel. This can be selected between batteries. Turn off unneeded electrical devices.

The low voltage panel shows all the systems supported by the batteries. Primarily, turn on breakers for lights, water pump, electronics, etc. Bilge pumps should always be left on.

When a battery bank is being charged, the voltage will read from about 13.1 volts to 14.4 volts depending upon state-of-charge of the battery bank. When the battery bank is not being charged, the voltmeter can give a rough indication of the state-of-charge of the battery bank.

Engine start batteries are charged by the engine ALTERNATORS while underway. The house batteries are charged by the INVERTER/BATTERY CHARGER when connected to shore power or the generator. Ensure the Battery Charger breakers are ON.

Voltage (Wet Cell Battery)	**Battery State**
12.65 volts	100%
12.47 volts	75%
12.25 volts	50%
11.95 volts	25%
11.70 volts	0%

Bilge pumps should always be left on.

Breakers for the range, oven, barbecue, and clothes dryer should be turned off after every use.

SANITATION SYSTEM

MARINE TOILET:

Tahoe uses Tecma heads, which are very reliable and very efficient. Despite that, it is important that all are trained on the proper use of the MARINE TOILET. The valves, openings, and pumps are small and may clog easily. If the toilet clogs, it is YOUR RESONSIBILITY! Always pump the head for children, to ensure nothing foreign is flushed.

Caution – **Never** put paper towels, tampons, Kleenex, sanitary napkins, household toilet paper, or food into the marine toilet. Use only the special dissolving marine toilet tissue provided by AYC.

There is a control panel near each toilet. For liquid waste only, to flush, press the right button. For solid waste, press the left button before using to fill the toilet. To flush, press the right button. It will flush twice, so do not be surprised!

The water supply for the aft toilet is in a panel behind the head and for the forward head, in the bilge below the forward stateroom.

HOLDING TANK:

The HOLDING TANK holds approximately 80 gallons. The rate of waste production is about 0.60 gallons/flush. With an overfilled tank, it is possible to break a hose, clog a vent, or burst the tank. The result will be indescribable catastrophe and an EXPENSIVE FIX to you. Empty the tank EVERY OTHER DAY to avoid this problem. Flushing a few ounces of AYC-provided deodorizer will reduce odors.

The HOLDING TANK is in below the master stateroom bunk.

There is a Tankwatch monitor panel on the wall between the galley and the pilothouse (activated by turning on the "WASTE MASTER" breaker on the DC panel). Do not rely on this only, as they often get clogged. Paying attention to the general number of flushes is best.

EMPTYING:

The holding tank is emptied in one of two ways:

PUMPING OUT: At a Marine Pump-Out Station, remove the WASTE CAP, port side midship. ***THE AFT WASTE CAP IS NOT CONNECTED TO ANYTHING.

Insert the pump-out nozzle into the waste opening, holding firmly against the deck fitting to ensure a tight seal.

Turn on pump and open valve on handle.

When pumping is finished, close valve on handle and turn off pump.

Remove from deck fitting.

Replace deck fitting.

If there is a freshwater hose on the dock, rinse the tank by adding 2 minutes of water into tank. Then re-pump to leave the tank rinsed to reduce head odors.

OVERBOARD: The tank's contents can be discharged with the macerator only in Canadian waters in areas of open, flowing current (no bays or marinas).

To operate, open the discharge valve on the thru-hull beneath the forward stateroom.

Turn on the "Holding tank pump" breaker on the low voltage electrical panel. Effluent should come out the starboard side.

Listen to the macerator's sound. When the pitch rises, the tank is empty. It should only take a few minutes to empty the tank.

Close the discharge valves after.

Y-VALVE:

The Y-VALVE directs waste effluent into the sanitation-holding tank or flushes the effluent directly overboard and is beneath the forward stateroom. In compliance with Coast Guard regulations, tie wire secures the handle to direct effluent to the holding tank. Please leave it unless there is an emergency. Be familiar with the applicable laws concerning dumping sewage directly overboard.

WATER SYSTEM

FRESH WATER TANKS:

The FRESH WATER TANKS hold 325 gallons between 2 interconnected tanks on either side of the lazarette. Check the water level by sighting thru the viewing slits.

Fill the tanks either thru the water caps aft (on either side) or by connecting directly to the street water supply inlet on the swim deck. Switch the yellow-handled valve just inside the lazarette (starboard) to allow for direct connection – alleviating the need to run the freshwater pump – or use it just to fill – monitoring for water flowing overboard when full. Direct connection bypasses the tanks so they do not fill this way. When using direct connection, shut off the freshwater pump – which will run needlessly.

When filling via direct connection or by filling one tank with the fill cap, allow time for the water to equalize between the tanks. Faster to fill both tanks via their respective fill caps.

When filling the tanks via the WATER CAPS, avoid flushing debris from the deck into the tank opening. DO NOT fill water and diesel at the same time to prevent spillage from one contaminating the other tank.

FRESH WATER PUMP:

The FRESH WATER PUMP is in the stern, port side. Activate the pump at the DC panel by turning on the breaker. If the water pump continues to run, it is either out of water or might have an air lock and system needs bleeding by opening a faucet. If out of water, SHUT OFF THE WATER HEATER on the AC panel. Serious damage can occur!

Suggest shutting off the pump breaker when away from the boat for extended periods in case a leak develops so that you do not lose all your water.

WATER HEATER:

The WATER HEATER holds 20-gallons and is 240-volt AC and is port side of the lazarette. Do not use the water heater if the water tank level is low. The water heater will keep water hot for 5-6 hours. If more than 6 hours have passed since being on generator or shore power, will need to connect to shore power or run the generator. It can take 2+ hours to fully heat the water in the heater.

WATER MAKER:

NORMAL START-UP PROCEDURE & OPERATION PROCEDURE

M/V Tahoe is equipped with an HRO Water maker capable of making about 35 gallons/hour. It is operated from the panel just outside the engine room hatch.

The water maker should not be used in harbors, as the dirtier water present there quickly fouls the system.

1) Check the sea strainer. Ensure seacock is open.

2) Check the high-pressure pump oil level.

3) Loosen the RO unit's high pressure regulating valve.

4) Turn on main breaker to System Control Panel.

5) Turn on boost pump by pressing and holding start button for 5 seconds.

6) Verify raw water supplied to RO unit for proper flow and pressure. Check flow through thru brine on long tubes. Silver float should rise about 2". Check pressure gauge at filters by tank.

7) Once all flowing, start high pressure pump then dial on long tubes.

8) Inspect all plumbing connections in the unit for leakage.

9) When flow through reject discharge flow meter appears to be free of air bubbles, slowly tighten HP regulating valve until the high-pressure gauge reads 800 psi.

10) The first two minutes of processed water should be discarded as it will contain trace amounts of salt present as membrane begins to produce water.

11) Close sample valve and observe product water flow meter, this flow meter indicates, in gallons per minute (GPM), the product water flow rate.

Log dates of production and GPH. Change filters when rate drops.

Keep power on so system can flush. Leave freshwater pump on.

Keep tanks full for weekly flush.

Pressure requirements will be lower in fresh water (200 psi) and brackish water (400 psi) applications. Product water output should not exceed 120% of rated capacity of individual unit. Reduce pressure at the high-pressure regulating valve, as necessary.

Should the pre-filters (on the wall in the lazarette) show excessive signs of algae buildup during visual inspection or you notice a significant drop in water production rate, spare pre-filters are near the water maker. There is a plankton filter below the unit.

4. Water production is indicated on the left side of the unit as Product Water Flow in GPM. Expect about 0.4-0.5 GPM (24-30 gal/hr). While running the water maker, the freshwater tank should be checked periodically to ensure the tank isn't overfilled. You should have a rough idea of how long you should run the water maker based on starting tank level and estimated rate above.

SHUT DOWN:

1. Press the STOP button. The unit will start a 10-minute freshwater flush cycle.

2. Turn OFF the breaker on the AC panel.

Short Term Shutdown Procedure

It is recommended that the system be flushed with fresh water anytime it will be unused for over 48 hours.

1) Turn off the unit, open the high-pressure regulating valve.

2) Open fresh water flush system valve and flush unit for 5 minutes with fresh water to enhance the life of the membranes and the stainless-steel components.

This shutdown procedure applies if the RO unit is to be shut down for periods less than 7 days. If the anticipated shutdown is 7 days or greater, refer to the Extended Shutdown Procedure given below or simply flush the system every 7 days repeatedly. It is important that for

extended repeated freshwater flushing, that the prefilter cartridges be cleaned or changed prior to starting process. This is to eliminate any organic material that is trapped in fouled filters that will increase organic fouling of the system.

SHOWER:

To conserve water, take only short "boat" showers (turning water off between soaping up and rinsing). To keep shower tidy, wipe down the shower stall and floor. Check for accumulation of hair in the shower and sink drains. Ensure that the faucets and nozzle are completely off after use.

The breaker for the graywater pump is normally on, so the pump should start automatically. If not, use the helm switch to override.

Wastewater from the sinks, clothes washer, and dishwasher drains overboard through various discharges.

RAW WATER WASHDOWN:

RAW WATER WASHDOWN spigots are at the windlass and aft (port of the salon door, UPPER) – where a FRESH WATER SPIGOT is also available below that.

To activate the RAW WATER WASHDOWN PUMP, turn on the SWITCH in the bilge below the forward stateroom (accessible via a hatch (is on the aft bulkhead, center). After use, turn the switch off to prevent pump burn out.

Set a timer as a reminder.

GALLEY

The galley appliances are home-style and operate conventionally. Except for the range, oven, and barbecue, all appliances are 120-volts AC and operate off the inverter when not connected to shore power or the generator is not running. Breakers for most appliances should be off when not in use.

REFRIGERATOR/FREEZER:

The refrigerator and freezer are SubZero drawer-style. The two forward drawers are the refrigerator and the two aft are the freezer. Temperatures are set at 36° F and 4° F, respectively. While the temperatures can be set individually for each drawer, please do not change the settings.

STOVE/OVEN:

The stove is electric and uses 240-volts – requiring shore power or the generator. Turn on the breaker to the "RANGE SUBPANEL." Do not leave the stove unattended when cooking – in case of fire. The oven does not work.

MICROWAVE:

The microwave can function normally, as a convection microwave, or convection broiler. It can run from the inverter. If intending to use it for a long period, run the generator or use shore power to minimize drain on the DC battery systems.

As a convection microwave, it uses much less energy to cook than a conventional oven.

First, select the function desired (microwave, convection, etc.). Select the time and adjust the power settings (if desired). Press “Start.”

TRASH COMPACTOR:

Turn switch and hold briefly.

To empty, fully open slide unit. Disengage the catch on the right side of the slide unit and fully open door. If needed, use the handles on the lifting cradle to lift the bag out of the slide unit. Replace bag and re-engage latch.

Use only bags designed for use with trash compactors. Replacement bags are inside the compactor, at the top, behind a panel.

GARBAGE DISPOSER:

The garbage disposer discharges waste directly into the sea (under the water line) as “gray water,” which is permissible in both U.S. and Canadian waters. Run tap water while running the disposal.

DISHWASHER:

The dishwasher uses considerable electricity, thus should be used sparingly when operating from the inverter. The dishwasher door requires firm pressure to latch so it will operate. Soap pods are under the sink.

ICEMAKER:

The icemaker is on the flybridge. To operate, turn on the breaker and the switch on the front, behind a panel (marked). Ensure the water is turned on by turning counterclockwise.

BARBECUE:

The barbecue is on the swim deck and uses 240-volt AC. Turn on the breaker in the engine room, port side, forward of the bulkhead. Turn off when finished. Utensils are in the locked cabinet below the BBQ. The key is left in the cabinet. A spare is on board

A bungee strap holds the lid up.

DRYING DISHES:

A roll-up dish drainer and a cloth dish drying mat are under the sink. Take care to dry dishes and flatware thoroughly before putting away. If more space is needed for stacking dishes for drying, the dishwasher is a handy option.

COUNTERTOPS:

The countertops are very durable, but please do not chop food on them or place hot items directly on them. Cutting boards and heat-proof trivets are in the galley cabinet, starboard.

If cooking creates a lot of steam (such as when cooking crab), please open the pilothouse and salon doors to encourage air flow or use a fan to reduce buildup on upper cabinets and ceiling in the galley.

HEATING SYSTEM

WEBASTO DIESEL HEATER:

The Webasto DIESEL FORCED-AIR FURNACE heats water to send to the individual units for heating. Separate units are in the pilothouse, salon, aft cabin, and forward cabin, controlled by individual thermostats and fan switches (in the salon and pilothouse, near the thermostat and distinguished by a brass switch cover; in the forward and aft cabins, switches are next to the bunks). The fans only function when a signal is being sent by the thermostat and the switch is on.

To operate, turn on the “Heater” breaker on the 24-volt panel in the Engine Room and the “Cabin fans” breaker on the low voltage panel in the pilothouse. Set the thermostats and turn on the fan switches. It will take a little while to produce heat.

Check the furnace exhaust port (port side, aft) for any obstruction such as fenders or lines. Do not block this opening when operating the furnace. Heat will damage fiberglass or rubber. If needed, there is an exhaust diverter pipe in the lazarette starboard drawer (marked).

Once it is on, allow it to run for at least 15 minutes before turning it off. Turn ‘off’ the furnace heater by turning the breaker off.

The Webasto unit uses little electricity and operates from 24-volts, thus, it is ideal for operating from the inverter.

WINDSHIELD DEFROSTER:

Defrosters: This unit also sources the defroster air for the lower helm windshield, which is activated by pressing the “Defrost” switch on the helm.

REVERSER CYCLE HEATING/AC:

Tahoe is equipped with an Aqua-Air reverse cycle heating/air conditioner, which operates from 120-volt and functions as a heat pump. These are independent systems in the salon, pilot house, forward stateroom (feeding the bunkroom), and aft stateroom, controlled by individual thermostats. The thermostat for the aft stateroom is hidden in the starboard closet.

Each system can operate in fan-only mode.

To operate, turn on the breaker for that unit and the master “Air conditioner” switch (on the 120-volt panel). Set the thermostat by pressing the top-right button until the desired mode lights. Set the temperature.

When the system is heating or cooling, water discharges from the sides of the boat.

We recommend only using the reverse cycle units for air conditioning. The Webasto diesel heaters are more efficient and easier to operate for heating.

PORTABLE SPACE HEATERS:

There are two portable space heaters, which use much electricity.

ELECTRONICS

All electronic manuals are in the pilothouse cabinet.

VHF RADIOS:

There are VHF RADIOS at both helm stations. Turn on the breakers for the "VHF UPPER" and "VHF LOWER" on the low voltage panel. Always monitor channel 16 while underway. It should be monitored when at anchor.

Loud hailer:

The radios have a loud hailer/microphone function. At the upper helm is a toggle switch marked "FB" (Flying bridge), "Off,' and "PH" (Pilot house). Set to the desired station to use. At that station, press "HL/IC" and press transmit to speak via the loudspeaker. Press again to enable listening mode.

DEPTH SOUNDERS:

There are DEPTH SOUNDERS at both helm station, activated by the "DEPTHSOUNDER" breaker on the low voltage breaker panel. This activates the wind direction and speed, vessel speed, and depth gauges at both stations.

Remember to **ALWAYS** consult your charts for depth!

FISH FINDER:

A fish finder at the lower helm station (starboard) gives an adjunct to the depth sounder (using the same transponder).

RADAR:

The radar is port side, forward.

To operate, turn on the breakers for the upper and lower radars in the low voltage panel. Press the POWER button. To turn off, press and hold POWER button. Remember you are not allowed to travel in FOG or in serious wind conditions.

Radar's primary use is to sense objects and land masses that are within a 10-15 mile radius of the vessel. When used properly, it provides a useful tool in monitoring the performance of the navigation and AIS systems by providing independent 'painted' images of other vessels, navigation aids and land masses that should be depicted already.

LASER PLOTTER:

The laser plotter display is center of the helm; the computer is under the port settee.
Turn on the breaker on AC panel.
Turn on the power switch on the computer.
Turn on the screen.
Click on the start menu.
Select Nobeltec or Tides and currents.

To turn off the computer, exit the app. Click on "Start." Click on "Shut down computer.
Turn off the display.
Turn off the breaker.

GPS:

A Northstar GPS is port side, aft, upper. Turn on the "GPS" breaker and press "PWR."

GPS is considered a navigation aid. Do not rely on it. Compasses, charts, and dividers are the tools to plot position, course, and speed.

AUTOPILOT:

M/V Tahoe is equipped with a Robertson autopilot, which can be controlled from the pilothouse (port side, lower) and the flybridge. Autopilots should not be used as a watch is still required while underway.

RUDDER POSITION INDICATOR:

The rudder position indicator on the panel is inoperative. An analog/digital display on the autopilot (bottom of the screen), fulfills this need.

INTERCOM SYSTEM:

M/V Tahoe has a local intercom telephone system, allowing calling room-to-room.

ENTERTAINMENT SYSTEMS

The salon and all staterooms have separate sound systems (typical home or car systems). The tuner in the salon delivers sound to: Speaker "A" (The salon and the pilothouse (with its own volume control)) and Speaker "B" (the flybridge, with its own volume control).

The salon TV has a DVD player. All TVs can be fed from your devices via USB or HDMI.

BLUETOOTH SOUNDBAR:

To pair the soundbar, turn on soundbar.

Go to Bluetooth settings on your device to search for "Visio SB3831".

SATELLITE TV:

Under the salon TV, right side, are 2 switches. To use the satellite TV, turn the right switch (SAT TV) up. Turn the TV on. Awaiting subscribing next week for full details.

ANCHORING

The primary WORKING ANCHOR is a 66 pound/30kg anchor and is attached to a 280 ft. chain stored in the anchor locker, which can be accessed from under the forward stateroom bunk.

LOWERING:

Survey the intended anchorage area, paying heed to the other vessels already at anchor, being aware of boat swing.

Identify a fixed point to determine whether the anchor is dragging. There are apps that can help monitor your position and that of the anchor.

Determine how much chain to deploy.

Turn on the "Windlass" breaker at the low voltage panel. The windlass can be controlled by the foot switches at the windlass or from switches on either helm. Release the anchor keeper. Turn the clutch lock mechanism clockwise (to "free"). Lift the cover for the foot switch. Step on the "down" button momentarily to lower the anchor. Lower the first 10' in short bursts, while guiding the anchor over the roller, to prevent the anchor from swinging wildly. Watch for pinch points. Once hanging safely below, promptly deploy it to the bottom.

The chain is marked with white Zip Ties every 25' and a black Zip Tie every 100'.

Deploy the estimated length to reach bottom and then continue to pay out the anchor chain as the helmsman begins to slowly back down the vessel.

If the anchorage is crowded put down at least a 3 to 1 scope (60 feet for 20 feet of water), back the anchor in with a short burst from the engine. Then let out additional scope dependent upon conditions.

Once enough chain has been released, turn the clutch lock mechanism to "Lock." Retract the chain a few "clicks" to secure the clutch lock mechanism.

Attach the anchor bridle to the chain, through the hawsepipes, and secure to the bow cleats to relieve strain on the windlass. Leave a slight loop in the windlass side of the anchor chain to ensure strain is borne by the bridle.

Turn off the windlass breaker.

Occasionally check that your position is static and you aren't dragging anchor. Suggest using an anchor watch app to assist.

RAISING:

Before raising the anchor, start the engines as the windlass uses large amounts of power and to enable advancing the vessel to keep the anchor chain slack. Do not use the windlass to advance the vessel as it strains the windlass motor.

Turn on the WINDLASS breaker, start the washdown pump (the switch is in the bilge under the forward stateroom), and attach the 6' washdown hose and nozzle.

Forward the throttle if needed to create slack to remove pressure on the chain bridle. Remove the bridle.

Uncover the starboard “up” button and press to raise the anchor, periodically advancing the throttle to maintain slack in the anchor chain. Give the windlass short rests while retracting.

Maintain vessel alignment with the anchor chain while retracting to avoid side load on the bow pulpit.

Wash the chain as it retracts.

As the anchor rises, be careful not to allow it to swing against the hull. Position someone to guide the anchor onto the roller.

Reconnect the keeper between the anchor and the windlass. Close the plastic covers on the FOOT PEDAL CONTROLS. Confirm the clutch lock is in “Lock” position. Turn ‘off’ the WINDLASS POWER SWITCH.

OTHER CONDITIONS:

If the anchor chain needs to be freed, it is secured at the rear of the anchor locker (below the forward stateroom) and can be manually detached. Topside, secure a fender to the bitter end of the chain and mark its position using the “MOB” function on the GPS to aid later retrieval.

A SPARE 47# ANCHOR and 200’ rode is stowed in the middle hatch in the swim deck. Attach the rode securely to a cleat.

MANUAL RAISING:

Two anchor handles are in the pilothouse cabinet (tagged). To use the crank, unscrew the knurled screw on the top of the clutch cover and remove. Place the crank handle in the slot and turn to raise the anchor. For the two-handed handle, simply secure over the notched ring at the top of the windlass and turn.

MOORING:

M/V Tahoe is equipped 4, 25-ft. and 2, 30-ft. dock lines.

M/V Tahoe is bigger than State rules allow for mooring to Washington Parks buoys. You may use the linear moorage lines, docks, or anchor.

DINGHY

The dinghy is a Novurania, 11’, with a 15-HP engine, with 670 pounds capacity.

LAUNCHING:

When launching or recovering the dinghy, have the generator or engines running, as the davit consumes much electricity.

Attach the davit controller (kept under the flybridge sink) to the davit cable.

Remove the cover.

Check fuel and oil levels.

Ensure that the 3 lifting straps are secured to the dinghy and the lifting ring.

Ensure that the bilge plug is in place.

Position the davit over the center of the dinghy.

Attach the davit hook to the lifting ring.

Make ready the mooring line.

Disconnect the straps securing the dinghy to the deck.

Raise the dinghy. When clear of obstructions, swing the boom to the side.

Position crew on the side deck to keep the dinghy away from the boat.

Lower the dinghy to the water. Pay out enough cable to allow the dinghy to be pulled to the swim deck.

Secure the mooring line.

Release the bridle hooks from the dinghy. Retract the cable and resecure it to the deck plate to avoid swinging. Stow the lifting bridle.

Coast Guard regulations state that any child 14 and under must wear a life jacket in a dinghy. It is a good idea for EVERYONE to follow this rule.

STARTING THE DINGHY:

Attach the safety switch to the pilot.

Lower the motor into the water.

Loosen the vent cap on the gas tank.

Turn the key to start.

Adjust the idle throttle with the lower lever.

After starting, ensure water is flowing from the discharge port starboard, from the engine cover.

If dinghy doesn't start, check that the safety clip is in place and the vent cap is loosened.

RECOVERY:

Ensure the generator or engines are ON.

Raise the motor.

Connect the lifting bridle to the hook.

Lower the davit cable and connect it to dinghy lift points (with straps connected correctly: Forward, Port, Starboard).

Raise the dinghy to the flybridge, position it over the mounting brackets, and lower it.

Reconnect the straps securing the dinghy to the deck

Reposition the davit arm. Reattach the hook to the deck plate.

Drain any water in the bilge.

Reinsert the bilge plug.

Flush the engine of salt water (see below).

Stow the davit control.

Cover the dinghy.

The motor is a 4-stroke and uses straight gas. DO NOT USE GAS WITH OIL IN IT. Please refuel at the end of your trip.

Towing the dinghy is discouraged. If needed, assign someone to monitor the tow line to ensure it does not wrap in the propeller.

FLUSHING THE DINGHY:

After daily use, the outboard motor needs to be flushed of salt water. This is easiest on the flybridge. Fill the flushing device with Salt Away. Attach to a water hose attached to the FRESH WATER wash down on the aft deck (the bottom faucet). Attach to the "earmuffs," then place on the engine water intake. Turn on the water (with the selector turned to water, only).

Once the water is flowing, start the engine. Be sure water exits the engine discharge port. If not, shut down the engine and adjust the muffs.

Once the discharging water is warm, switch to solution. Run until the container is empty. Then run for another minute to flush out the Salt Away and then shut off the engine.

CRABBING & FISHING

Always check the fishing and crabbing requirements before departing. Licenses are required. Many areas are CLOSED to crabbing and fishing on certain months.

Crab Fishing and Cooking Equipment: A collapsing crab cage is stowed in the lazarette, along with line, a buoy, and a bait box.

CRAB AWAY FROM THE BOAT! Lines can get wrapped around props. Great baits are fish-flavored cat food with the pop-up ringed lids or frozen chicken. After 15-20 minutes, retrieve the crab line and ring quickly. Check water depth before lowering crab rings or pots: Ensure the buoy line is long enough for the depth. Measure the crabs using the CRAB MEASURING GAUGE kept in the lazarette, with the crab rig. Keep the male crabs of at least 6 ¼ inches across the carapace. Boil crabs about 12 minutes to cook.

After using, wash equipment thoroughly with fresh water (available from the cockpit shower faucet). Please do not store wet rings and gear inside the boat.

SAFETY

SAFETY should be paramount in your daily cruising. A MAN OVERBOARD DRILL should be discussed and practiced with an empty life vest. 6 adult and 2 child life vests are stowed in the port side closet in the lazarette. A few should always be out and ready.

Signaling devices are in the salon, forward of the TV (near a likely evacuation point):

Aerial flares and launcher
Handheld flares
Whistles
Signal mirrors
Air horns (2)
A ship's bell is on the flybridge, starboard.

Fire: Fire extinguishers are in the following locations:

a) Galley (starboard side)
b) Laundry room (above the washing machine)
c) Lazarette (at the entrance)
d) Flybridge

The Engine Room has a fixed, automatic thermal release extinguisher. This device acts by flooding the entire engine room with Halon to suppress the flames. Thus, the engine room hatch needs to be kept secured to confine the flames and the extinguishing agent. If activated, do not enter the engine room until cleared by Coast Guard or the fire department, as Halon creates a toxic gas.

Smoke Detectors: There are smoke detectors in the pilothouse and each cabin and a carbon monoxide detector in the salon.

M/V Tahoe is equipped with 5 automatic bilge pumps, with manual overrides. The four forward pumps can be overridden at the lower helm. The pump for the stern extension is controlled at the 24-volt electrical panel in the engine room, port side. It is normally in the AUTO position. Pumps occasionally operate due to condensation and water from the shaft log accumulating in the bilge.

ENGINE SPARES (fluids, oil filters, fuel filters, fuel/water separators, raw water impellers, drive belts, and other small parts) are stowed in the port side of the lazarette.

A swim ladder is stowed in the starboard side of the lazarette.

When working on the engines, engage the kill switches (the red buttons on either engine). Remember to re-engage after.

Throwable life rings are on either side of the flybridge.

A first aid kit is mounted on the center wall in the port side of the lazarette,

In case of pending evacuation, gather on the swim deck, near the life vests. Promptly don life vests.

Flashlight: A flashlight is kept in the pilothouse:

Boat Hook: In the storage under the swim deck.

Tools: A toolbox is in the lazarette.

Thru-hull Plugs are provided. They are in a bag labeled “Damage Control.”

To open the forward cabin skylight, press the blue buttons then turn.

THRU-HULL LOCATIONS

Under the forward cabin:

Raw water washdown (port). Normally open.

Wastewater direct discharges (3, starboard). Normally closed.

Engine Room:

Cooling water thru-hulls for the main engines (forward, center) and the generator (aft, center), normally open.

A disconnected thru-hull (port), normally closed.

Lazarette:

Reverse cycle air conditioning pump (including the bait well inflow pump) and the water maker. Normally open.

MISC.

Lighting:

Flybridge: The spreader lights are controlled by a switch on the upper helm.

Cockpit lighting is controlled by the 2 switches closest to the helm, allowing red night lighting.

Navigation and Anchor Lights:

Controls are on the right switch panel. Midpoint is nav lights and top is anchor. The breaker is on the low voltage panel.

Flags: U.S. and Canadian flags are stowed in the forward, port closet. The Canadian flag is displayed when in Canadian waters – after clearing Canadian customs.

Pilothouse Settee: The pilothouse settee is a distinctive element of Tahoe. From here, is a broad view of the surrounding landscape. Enjoy! For added seating, a table and seat inserts (bottom and back) are found under the settee (aft). The seat bottom is a very tight fit, so please handle carefully. Do not place excessive weight on the seat insert.

Cleaning:

Cleaning Supplies are stowed under the galley sink and in the port side of the lazarette.

Vacuum cleaner:
Tahoe has a built-in vacuum cleaner. The hose and devices are stored in the forward hull,

accessible via the carpeted hatch in the forward stateroom (by the door). The hose and one wand are starboard. A carpet wand is stored port side. The device is set to start automatically by inserting the hose in the inlet at the top of the stairs and turning on the switch on the hand wand. If it does not start, ensure that the switch on the unit (below the forward stateroom) is set to "AUTO."

Washer and Dryer:

Tahoe has a washer and dryer between the staterooms. The boat must be plugged into shore power or have the generator running and the AC breaker ON to function. These will only handle small loads and will take much longer than a household unit. If weather is conducive, consider drying outside on a makeshift clothesline. Clean the filter after every use.

Windshield Wipers:

Controls for the individual windshield wipers and washers are on the center of the helm.

Bait well:

The bait well (starboard hatch on the swim deck) can be filled with raw water and drained by pumps controlled by switches in the lazarette (starboard). Be sure to turn them off when finished.

Keys:

You were issued a salon key. Additional keys available on the boat are: Ignition keys (2 in both switches and a spare); dinghy ignition key (in place); barbecue locker (1 in place, with 1 spare); and engine room key. These keys are kept in the drawer immediately forward of the refrigerator.

Safe:

There is a small safe in the master stateroom. The combination is 2160B. Press the keys carefully. If a key beeps more than once, start over. Once the display shows green, turn the inner handle to open. Please do not reset the combination.

"Fireplace:"

In the aft stateroom, there is a decorative fireplace, turned on by a switch on the starboard leg inside the fireplace.

SPECIFICATIONS:

Queenship 59
Built: 1996
USCG documentation #: 1045576
Hull #: QCWED002M95J-96
length: 59' 0" (17.98 M)
Draft 5' 3" (1.52 M)
Beam: 17' 2" (5.23 M)
Weight
Anchor rode: 300' (91.4 M)
Cruising speed: 16 kts.
Max. speed: 34 kts.
Sleeps 7 (with one in the crew quarters in the lazarette).
Fresh water capacity: 294 gal. (1,113 L)
Fuel capacity: 1,050 gallons (3,975 L)
Holding tank capacity:
Engines: Twin Caterpillar 3176B, turbocharged, 600 HP each
Generator: Kohler 18.5 KVA
Dinghy: 11' Novurania, with 15 HP Nissan motor