Owner's Notes

Amazing Grace

Bavaria 37 Cruiser

Dear Friends,

Welcome aboard *Amazing Grace*!

Amazing Grace is brand new in 2017 and available for charter with San Juan Sailing for its first season. Before purchasing *Amazing Grace*, we were long time charter guests of theirs, so we have been in your shoes, so to speak. We've watched designs come and go, and frankly, we think the Bavaria 37 Cruiser is the finest design we've seen. And the sailing is superb.

We've made many wonderful cruising memories in the San Juan Islands and points north…our hope is that you enjoy *Amazing Grace* as much as we do. If something comes up, please feel free to give us a call at (303) 709-8800.

If you can think of anything – anything at all – that would make her more enjoyable for you, please let us know through San Juan Sailing. We've tried not to overlook any detail in our effort to make her our ultimate sailboat.

Finally, any items you see highlighted below in yellow are under review, so if you are previewing these notes before your charter, be sure to check those areas again before you leave port. The onboard Guest Charter Manual should always have the most current version available. As we receive your feedback, we will flag the notes for review according to your comments when appropriate.

We wish you fair winds and wonderful memories. Thank you for being our guests!

Sincerely,

RBS Management LLC
Howard & Barb Kelley
Amazing Grace

Amazing Grace **Boat Specifications**

LOA: 37’ 0”	Displacement: 15,432 lbs	Fuel Tank: 40 gal
LWL: 33’ 6”	Ballast: 4,585 lbs	
Beam: 12’ 0”	Draft: 6’ 4”	Holding: 20 gal
Year built: 2016	Water: 95 gal	

Engine: Volvo D1-30 30hp diesel with saildrive, 2 blade fixed propeller

Sails: Fully battened Elvstrom mainsail with MDS-system, 2 reefs, lazy jacks and cover; Elvstrom furling jib with UV protection; Elvstrom Gennaker, sheets and blocks

Electronics: Garmin 820 GPSMap Chartplotter and WiFi in cockpit, Garmin GMI 20 Bundle (wind, speed, depth, log, temp), GND 10 gateway with mini USB port, Garmin Radar, Fusion Audio Pack including remote control in cockpit

Staterooms: 2 double: Forward 6’ 6”L V-berth; Aft 6’ 6”L x 4’ 9”W
Headroom: 6’ 4”
Heads: 1, manual marine toilet, shower room separation
Refrigerator: 12V top-load
Freezer: None
Other:

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1 – Emergency Equipment

Highlights

- **5 fire extinguishers**: forward cabin starboard locker; 2 under the galley sink, aft cabin under seat, cockpit starboard lazarette
- **5 regular life jackets + 2 inflatable vests**. NSO: please check for "green" visible at bottom of clear canister before each cruise. That verifies the auto-inflate function when immersed. We wear these at all times when working the deck and often in the cockpit.
- **Fog horn and spare canister**. In cockpit table
- **3 emergency flares**. Under nav seat.
- **Emergency bilge pump**. Integrated unit (no separate handle) located behind the engine throttle and below the engine monitor panel in the cockpit on the starboard side. Note: if water rises above floorboards, can use shower sump pump also in emergency.
- **Emergency tiller**. The emergency tiller looks like a metal pipe with an "elbow" bend in it. It's hanging on the wall in the port cockpit locker. The rudderpost attachment point is under the cover in the middle of the cockpit sole between the helm positions. To remove the cover, insert a winch handle in the star-shaped fitting and unscrew. Then insert the handle.
- **Lifesling**, starboard stern pulpit. Please review the cartoons on the face of the case for procedures. The lanyard is secured to the boat so that tossing the floating harness allows it to tow behind the boat like a ski tow rope. Circling the person overboard will draw the recovery line near them.
- **First Aid Kit.** A complete first aid kit is located in one of the cabinets above the nav station. Please note any usage of these items at check-in so they may be replaced for the next guest.
- **VHF**. Located at nav station, with cockpit RAM stowed in cabinet above. Portable VHF mounted on forward bulkhead of nav station.
- **Cockpit cushions**. In case of COB, throw anything that floats, quickly.

Details

Through hulls: A schematic showing through all through-hull locations is in the Charter Guest Reference Manual aboard, facing the title page of these Notes. Below deck level through-hull locations are listed below, fore to aft; reference numbers are those shown on the schematic:

1. Forward cabin, under floorboard, centerline: #11 – transducers for depthsounder and knotmeter.

2. Galley, behind starboard settee back cushion closest to galley: #8 – galley sink drain

3. Head, under sink: #1 – intake flushing water for toilet; #3 – holding tank drain (closed in US waters); #6 – sink drain; #7 – shower sump drain.

4. Engine compartment, aft: #21 – engine raw water (behind engine)

5. Stern: #12 – Heater exhaust; #13 – Engine exhaust

2. Anchors

Highlights

- **Please be careful of fingers and feet around the windlass**
- **35# Delta primary, 165' chain plus 150' rode; chain has 3' Yellow Mark at 50', then 10' Yellow mark at 100' and at 150'**
- **Small snubber always hooked when anchor on roller**
- **Large snubber always hooked when anchor deployed**
- **Chain can build into mountain in chain locker when retrieving**
- **600' polypropylene stern tie line in port cockpit locker**
- **25# Danforth secondary in port cockpit locker, 30' chain plus 150' rode**

Details

Main anchor – Windlass circuit breaker is on the nav station electrical panel, fourth button from the left on the top row. The controller for the windlass is located in one of the storage cabinets above the nav station, and connects to a plug in the anchor locker. Please return the controller to the storage cabinet and turn off the windlass circuit breaker after completing windlass operations.

Snubber – There are two snubber lines in the anchor locker. The longer, heavier line is the 15' gray braided line with open hook to be used when the anchor is deployed. The shorter, lighter line is only long enough to attach when then anchor is onboard. When the anchor is deployed, we recommend that you use substantially all of the snubber line; the longer the line, the more shock absorption and the better your ride at anchor.

Secondary – Heavy duty but lightweight aluminum Fortress anchor hanging on the wall in the port cockpit locker, with 30' 3/8" chain and 150' rode in a 5-gallon bucket.

To Deploy Anchor:

1. We check tide tables to determine current water level and amount of drop while anchored.
2. Weather (VHF channel 4, "Northern Inland Waters") helps select an anchorage.

3. Normal for the islands is a 4 to 1 scope, bow to bottom (add 5 feet to depthsounder reading: 4' freeboard and 1' for transducer below waterline). In the San Juan Islands, anchorages are often about 25' bow to bottom, so we often deploy about 100' chain.
4. To avoid hitting the hull we push the anchor forward keeping the shank *level* before gradually allowing the shank to rise as we ease it forward slowly into the hanging position (no swing!). Otherwise the fluke anchors into the fiberglass of the bow (Ouch!).
5. With one fluid motion we lower to approximately the number of feet on the depthsounder so the anchor is near the bottom, either by easing the brake or depressing the down switch. To loosen, pull aft, then use a pulsing motion to moderate gravity descent.
6. A signal to the helmsman prompts reverse at idle speed while deploying rode to the desired scope.
7. We then allow the anchor to set and to stop the boat while it continues in reverse, idle speed. We then line up objects on shore to determine if we are holding, staying in reverse at idle for about one minute.
8. Finally, we set the heavy snubber, hooking the chain beyond the anchor cradle so that the snubber line can be fully extended when attached to the bow cleat. Then ease the windlass so it is not under strain.
9. If stronger winds are forecast, we test with RPM at half the projected windspeed (1,000 rpm for winds to 20 knots; 1,500 rpm for 30 knots, etc), *after* setting snubber. (We check movement shoreside, not the significant prop current going by the chain.)
10. In storm conditions (or storm forecast), you can increase scope if there is adequate room to leeward.
11. The secondary anchor is available for additional holding power if a storm is anticipated, but best if set before the storm hits.
12. If anchored in a small cove, you may wish to deploy a line ashore. 600' floating polypropylene on a reel resides in a cockpit locker. Open transom doors; use the mop handle as an axle through the reel; set mop handle on helm seats. Deploy the line with the dinghy while the spool unwinds. If sufficient length, bring the line around a secure shore object and back to the boat to a transom cleat for ease of retrieval.

<u>To retrieve the anchor</u>:

1. Start the engine first, given that the windlass draws from the engine start battery.
2. Slowly raise the anchor chain so that the snubber hook can be removed <u>before</u> it reaches the anchor cradle – do not allow the hook to travel through the cradle – and remove the snubber line.
3. Depress port "up" switch on the controller, always assuring the chain is vertical during retrieval—this avoids either towing the boat or dragging the chain against

the hull. Into a breeze, we engage forward gear as needed, but exercise care that we don't overstand and drag the chain against the hull.

4. A mountain under the windlass can jam it and in rare cases cause a wild gravity runout of rode. If that happens, stand clear for safety. If necessary, use the mop handle to clear the mountain of chain.
5. As the length of rode remaining approaches the water depth, the sound of the windlass laboring alerts us to immediately stop. Sometimes a brief pause will cause the anchor to break free, given the 90-degree angle of pull. A brief tap on the button, if laboring, says to break out the anchor with the engine in idle forward, not with the windlass.
6. To nest the anchor without chipping the hull, the anchor may need to be swiveled. We use the windlass to bring the anchor shank up and over the bow roller in one continuous motion, then nest the anchor by hand.
7. Attach the lightweight snubber line to the anchor chain near the swivel. Then ease the windlass so it is not under strain.
8. Stow the heavy snubber line to the left of the windlass.
9. Reminder: cover the windlass switches *before* closing the anchor locker lid.

3. Barbecue

Highlights

- **Blue in-line valve behind cockpit access panel immediately below grill**
- **Please clean grill when finished and attach cover**

Details

The propane fired stainless steel BBQ is mounted on the port stern rail and is connected to the propane tank by a separate line attached to the blue control valve stored in the cockpit access panel immediately below the grill. To use the BBQ, there is *no need to open* the propane solenoid in the salon.

After removing the grill cover and attaching the blue in-line valve to the grill, open the BBQ lid and use the lighting stick (from the galley) to ignite. Please remove the BBQ cleaning brush from inside the grill before lighting the grill. It is attached with an SS lanyard for convenient cleaning when the BBQ cools.

After use, and when cool, clean the grill with the cleaning brush, store the brush inside the grill, remove the blue in-line valve and store it in the cockpit access panel, then replace the grill cover. We have found that unless we *turn off* the blue in-line valve in the propane locker when finished, it *may drain out* all the propane! P.S. Wind isn't a friend of the BBQ.

4. Batteries/Charging/Inverter

Highlights

- **No need to touch battery switches. All automatically charged with combiner**
- **Engine start – Bank #1**
- **House batteries – Bank #2, has 285 usable amp hours (Ah)**
- **Average consumption, engine shutdown until next morning: 100 Ah**
- **Capacity remaining measured in volts (11.8v minimum). Meters for both.**

Details

Batteries: there are two sets of batteries:

- the engine starter and windlass battery is located under the main cabin sole just forward of the companionway steps; and
- the house "service" battery bank, located under the center of the port settee, consists of three 95-amp hour deep cycle batteries, which provides a total capacity of 285 amp hours and a normal capacity of 140 amp hours.

Battery charging is supervised by a "smart" charging system and requires no user input. The engine (or shore power) drives a high-capacity 40-amp charger which is located behind the seatback cushion of the port settee.

We check the voltmeter on the electrical panel LED for both battery banks before retiring for the night, then check it again on engine startup next day to assure we are charging properly. Paging through the LED monitor using the "up or down"  keys will show the voltages for the starter battery and the service (house) bank. Try not to discharge below 12.0 volts before recharging the batteries by running the engine or plugging into shore power. If the service battery voltage drops below 12 volts, please reduce battery use by turning off electrical appliances, including the refrigerator and freezer, until you have the opportunity to recharge the batteries. Allowing the batteries to fall below 12.0 volts significantly decreases the battery life.

The Inverter draws from the house bank to provide 110v power for the microwave (we are careful to limit the microwave to reheating, not cooking) and 110v outlets in both cabins and above the stove.

The controls for the inverter are to the left of and on the AC panel below the nav station desk. The AC panel has a 3-position rotary switch – turning the switch to the left connects shore power to the panel; turning it to the right connects power from the inverter; the center (straight up) position connects neither. To the left of the AC panel is a red rocker switch labeled "INVERTER". After switching the rotary switch to

"INVERTER", switch the red rocker switch to the on position. To check if you have AC power, see if digits show at the microwave display.

The inverter's 3,000 watts is sufficient for hair dryers (light use, please), the microwave (for warming only, not for cooking), and other electrical devices, but *not* simultaneously and *not* for extended use. The total load cannot exceed 3,000 watts. Most importantly, check the battery level before and when using the inverter to assure that the service battery is not below 12.0 volts (see battery information above).

5. Berths.

Amazing Grace is ideal for 4 people in two cabins. Both beds are extremely comfortable. Each berth has feather/down duvets. SJS provides 2 sheets and pillow cases for each berth. Each settee can provide an additional 6' 4" berth. The table does not convert to a berth. Cabin berth measurements are under Boat Specifications above.

6. Bilge Pumps

Highlights

- **Electric Bilge Pump:** immediately forward of the galley sink and in front of the starboard settee.
- **Emergency Hand Pump:** under the starboard helm seat

Details

Amazing Grace is equipped with saildrive propulsion. Since there is no leakage through the propeller shaft packing, the bilge should always be completely dry, with the possible exception of a small amount of condensation. Please check the bilge each day. Lifting the floorboard directly forward of the galley provides access. For your own safety and the safety of guests chartering *Amazing Grace* after you, please do NOT store ***anything*** in the bilge pump area.

- Electric Bilge Pump – The automatic float switch is located under the floorboard access panel immediately forward of the galley sink and in front of the starboard settee. Note: the circuit breaker  labeled "Bilge pump" *must be "on" at all times* for the float switch to work. *If pump fails to empty bilge, we check the strainer, in case it may have become clogged with debris.*
- Emergency Hand Bilge Pump – This hand operated pump is located at the starboard helm station, just aft of the engine throttle lever. Open the pump diaphragm and push it back and forth. There is no emergency bilge pump handle; it is completely hand operated.

Note: in emergencies, the shower sump pumps can be turned on if water rises into the heads.

Last, but not least, there is a bucket in the port cockpit locker. Empty the water into the cockpit and it will drain off the boat.

7. Dinghy and Outboard

Highlights

- **10' fiberglass hulled West Marine dinghy (2017), 2.3hp Honda outboard**
- **Tow 6' off stern, place loop over starboard aft cleat; tie off bitter end**
- **Please don't tow with outboard attached, or leave on overnight—may flip**

Details

NOTE: The Honda Outboard motor is brand new, and requires a break-in period. Please do not run the motor above half-throttle until after September 1, 2017.

We have learned these precautions, please:

1. *Never tow the dinghy with the outboard* on the dinghy, or leave the outboard on the dinghy overnight. Always transfer the outboard to the sailboat transom. It could flip and swim, costing you an outboard.
2. The 2.3hp OB takes straight gas. The gas tank is topped 2/3 (for expansion in hot weather) by our staff. We will top it off when you return the boat, no charge. We stow it in the dinghy, tied to the transom. For safety, please *never* store gasoline in a compartment.

A large loop in the painter about 7' in front of the dinghy makes it convenient to drop over a stern cleat for towing. We suggest that you tow the dinghy about 6 feet off the *starboard quarter, away from the port engine exhaust*, to avoid any sooting of the dinghy. If we use the cabin heater, we lift the painter so it rests on the end of the rail. This avoids the heater exhaust (on starboard quarter), which *melts painters!* The 6' scope also avoids wrapping the painter around the engine shaft when in reverse! Plus, underway the bow is raised slightly, reducing drag, so you sail faster.

Dinghy painters inexplicably come loose (and dinghies disappear), so we suggest you tie the bitter end to the rail.

In a storm, towing on the low side makes it unlikely the dinghy will flip in the wind and waves.

When preparing to use the dinghy with the outboard, unlock the outboard (combination is the same as the companionway lock box), then carefully loosen the mounting screws

keeping one hand on the outboard handle at all times. We actually witnessed a crew member allowing an outboard to flip off the rail and quickly sink into 30 feet of water! When you are ready to transfer the outboard to the dinghy, untie the safety line from the stern rail. Transferring the outboard to the dinghy is best accomplished by having one crew member in the dinghy to receive the outboard from another crew member on deck, rather than a single crew member trying to get off the boat and onto the dinghy with outboard in hand. Although the outboard is relatively light, it should be handled carefully.

Mount the outboard centered on the stern transom of the dinghy and tighten the mounting screws securely, then attach the safety line to the dinghy.

<u>To Start the Outboard</u>.

1. Push the fuel valve lever (starboard aft corner of the outboard) aft to open the fuel valve.
2. Pull out the choke switch (starboard forward corner of the outboard).
3. Open the air vent on the top of the fuel cap (top of outboard) by turning the indicator to the on position.
4. Make sure the black U-shaped kill clip (with the red lanyard) is clipped into the red shut-off knob (port forward corner of the outboard).
5. Turn the handle throttle to the start position.
6. Pull the ripcord until it starts. (You shouldn't have to pull it more than 5 times.)

<u>While Outboard Is Running</u>.

1. Keep the red lanyard kill clip connected to your belt or PFD while operating.
2. Push the choke back in shortly after the engine starts (after about 10 seconds).
3. There is no transmission--just throttle up to go forward and throttle down to stop. If you want to go in reverse--just swivel the outboard around 180 degrees.
4. Note that you will only have steerage when the propeller is driving the boat.

<u>To Shut Off Outboard</u>.

1. Shut the outboard off by pushing in the red shut-off knob (where the kill clip is clipped in) or just pull the red lanyard until the clip pops off.
2. To avoid prop damage, shut the outboard off and raise it out of the water before you reach the shore. Pull the outboard forward and out of the water until it clicks and stays in place.
3. To put the outboard shaft back in the water, release the stainless steel lever on the starboard side of the shaft.

<u>When The Outboard Is Not In Use</u>.

1. Put the outboard back on the outboard mount on the stern rail and tighten both braces, then secure with the combination lock (same combination as the companionway key box).
2. Pull the fuel valve lever forward to close (starboard aft corner of the outboard).
3. Close the air vent on top of the fuel cap (top of outboard) by turning it to the off position.
4. Secure the outboard by tying the safety lanyard to the stern rail.

Outboard Troubleshooting.

If the engine won't start, review steps 1-6 above to make sure you've done all 6 steps.

- There is a blue "Honda Outboard Tools" kit containing a spare spark plug and spark plug wrench in the "Engine Spares" box in case the outboard engine won't start or is running rough. (A new spark plug solves myriad outboard problems.)
- If you use the spare spark plug, notify your check-in skipper upon your return so a new one can be placed aboard for future guests.
- If the outboard is running and you're heading toward shore, and the engine suddenly quits, it's usually that someone has forgotten to vent the fuel cap.
- If the engine is running fine but the propeller isn't moving, the shear pin is probably broken – just take the cotter pin out to remove the propeller and replace the broken shear pin (a spare pin is located forward of the shaft under the handle grip) and put the propeller and new pin back into place.

8. Dodger and Bimini

Highlights

- **Dodger center panel can be unzipped. The rest of the dodger stays in place.**
- **Bimini-dodger insert zips in and out; canvas cover for glass insert if desired**
- **Recommend the bimini and the bimini-dodger insert remain in place**
- **Hint: if we get early morning dew fogging our dodger or bimini-dodger insert glass, or salt crystals from spray, we rinse off with a pan of fresh water from the galley (salt crystals may need a second splash). We *avoid wiping*. By the way, if you or your guests use *aerosol sunscreen, please apply well away* from the glass. Sunscreen will destroy the glass.**

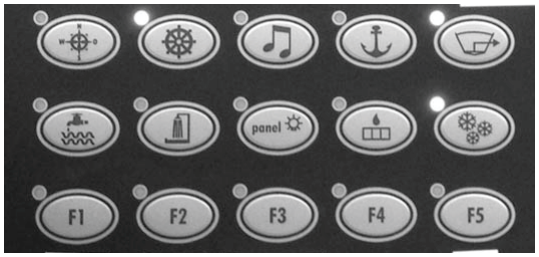
9A. Electrical Panel – 12 Volt DC

The main breaker for the DC panel is located under the nav table to the left of the AC panel and above the inverter on/off switch. The breaker is ON when the black switch slide cover is positioned at the bottom and the red battery indicator switch is lit. To turn the breaker off, move the black switch slide cover to the top of the switch and press the red battery indicator switch.

- The top left section of the panel is an LED display and controls. You can page through monitors of fresh water tanks, holding tank, starter battery, and service (house) battery status by using the "up/down"  keys. Please note that tank monitors are notoriously inaccurate. A blinking red light to the left of the LED display indicates an alarm for one of the displays, normally a water tank level of 50% or less. After reviewing the alarm condition, you can turn off the light by holding down the "enter/return"  button for several seconds.

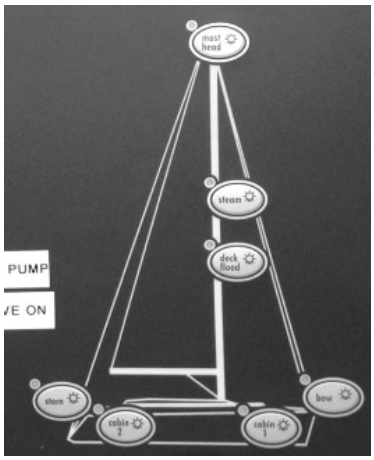
- At the bottom right of the electrical panel is a round 12-volt "cigarette lighter" receptacle and two USB ports for charging devices such as cell phones. In addition to these 12-volt receptacles, each cabin has its own 12-volt receptacle and two USB ports for devices such as a portable CPAP machine, cell phones, computers, etc. to prevent clutter at the NAV station.

- The circuit breaker buttons are located on the electrical panel below the Bavaria logo; there are three rows of five buttons in each row. These are used to turn the specified electronics on and off. The icons are not entirely intuitive, so here is the usage of each, reading from left to right, top to bottom:



  - First row: 1 – Helm Compass Light (only needed if underway at night); 2 – All Cockpit Navigation Instruments and the VHF Radio; 3 – Fusion Entertainment System; 4 – Anchor Windlass (on only when needed); 5 – Bilge Pump (always on)
  - Second row: 1 – Water Pressure (turn OFF while underway unless needed); 2 – Shower Sump Pump; 3 – Electrical Panel LED Display (turns off automatically after use); 4 – Furnace (Webasto Heating System); 5 – Refrigerator (always on)
  - Third row: F1 – LPG (Propane) Delivery System (on only while cooking); F2 – Television; F3 – Not Used; F4 – Not Used; F5 – Cockpit Table Light

- The third section of the electrical panel contains the circuit breaker buttons for the interior and exterior lights. Exterior lights are turned on at the electrical panel only; interior lights also have conveniently placed light switches. Above deck, from top to bottom, left to right, the lights are: Mast Head; Steaming; Deck Flood; Stern Light; and Bow Lights. Below deck, the aft cabin lights, salon lights, and head lights are powered by the "Cabin 2" breaker, and the forward cabin lights are powered by the "Cabin 1" breaker.



9B. Electrical Panel – 110 Volt AC

The AC electrical panel is located below the nav desk and is designed to utilize 30-amp shore power.

The AC electrical panel is used a) while operating on shore power, or b) while using the inverter (see "Batteries/Charging/Inverter" section above) to provide 110-volt alternating current to selected equipment (primarily the microwave) and to the outlets when the boat is not connected to shore power.

There are two sets of AC circuit breakers – a set of 3, and a set of 5. Only the first set of 3 breakers and 2 breakers of the set of 5 are used; the last 3 breakers in the set of 5 are unused. Reading left to right, each breaker controls the following circuit:

1 & 2 – Cabin outlets (Always ON)
3 – Microwave outlet and GFI outlet above galley countertop (Always ON)
4 – Boiler/Water Heater (ON when on shore power; OFF when on inverter)
5 – Battery Charger (ON when on shore power; OFF when on inverter)

10. Electronics and Navigation Instruments

Highlights

- *Amazing Grace* has a complete suite of technically sophisticated Garmin instrumentation.
- Both Radar and AIS are integrated into the chart plotter to enhance collision avoidance, especially with larger commercial vessels in low visibility.

Details

Initiating the Navigation Instruments

The radar/chart plotter/GPS, depth sounder, wind instrument, and autopilot are all Garmin products. The Garmin chart plotter and GMI instruments (those by the steering wheels), as well as the VHF radio, are activated using the instruments circuit

breaker button ( second from the left on the top row of breakers on the instrument panel).

Depth Sounder. The digital depth sounder will not give accurate readings beyond 400'. In deeper water, the sensitivity on the unit increases as the transducer tries to get some reading back. Consequently, you will receive many false readings caused by currents, changes in water temperature, fish, and seaweed. Use the depth sounder only as an aid to navigation in shallow water.

We do not recommend using the depth sounder's alarm during the night. Besides a fairly high battery drain, it's likely to sound at inappropriate times such as late at night while fish are passing beneath the transducer. Instead, consult the onboard tide data to determine whether you're anchored in a safe location, considering how shallow your depth will become when the tide ebbs out of your anchorage in the middle of the night.

Chart Plotter. *Amazing Grace* is equipped with a color Garmin 800 GPSMap chart plotter. The chart plotter is generally used without the radar to minimize battery drain.

After powering up the chart plotter, the "Home Page" will appear. You can always return to the Home Page by pressing the Home button to the right of the screen. Charts are accessed by pressing "Charts" on the Home Page followed by "Navigation Charts". Navigation charts are available in several formats. The "+" and "-" keys are used to zoom in and out.

If you make an emergency call ("Pan, Pan, Pan" or "Mayday") either U S Coast Guard Sector Puget Sound or Victoria Coast Guard Radio will respond. After asking if you need assistance and the nature of your emergency, the responding agency will immediately ask you for your position (longitude and latitude). **The boat position can be accessed by pushing the "Gauges" button on the Home Page followed by the "Numbers" button.**

Man Over Board**:** The chart plotter includes a MOB button (at the bottom of the Home Page) that will record the boat's location with a MOB icon. The chart plotter then provides course and distance to return to that location.

Although sophisticated and highly reliable, chart plotters are not infallible. If the instruments lose connection with one or more GPS satellites, the chart plotter may show the boat in an erroneous position, often significantly displaced from your actual condition. This requires that you reboot the system by turning off the chart plotter and the instrument circuit breaker and then turning them back on.

Radar. *Amazing Grace* is equipped with the Garmin model GMR 18HD radar. To activate the radar:

a. If the chart plotter is not already in operation, power up the chart plotter.
b. On the Home Page, press the "Radar" button.
c. On the Radar screen, press "Cruising" for full screen radar.
d. When the "Ready to Transmit" message appears, press the "Menu" button followed by the "Transmit Radar" button.
e. It takes a few seconds for the radar to spin up and the radar screen to be populated with the radar scan.

Some sailors like to see radar overlaid on the navigation chart. To do so:

a. With the radar scan operating, go to the Home Page and then the Radar screen.
b. Press the "Overlay" button.

To get the navigation chart on one side and the radar scan on the other:

a. Go to the Home Page and then the Radar screen
b. Press the "Combination" button.
c. Page down to Combination 3 (Navigation Chart and Radar) and select that combination.

AIS. To assist you in collision avoidance, *Amazing Grace* is equipped with AIS (Automatic Identification System). AIS is an automatic tracking system used on ships and by vessel traffic services for identifying and tracking vessels. It provides traffic information and collision avoidance information in real-time.

AIS is required to be used by (1) all sea-voyaging ships with a gross tonnage of 300 gross tons or more and (2) all passenger ships. Most commercial vessels are equipped with AIS. Larger recreational vessels often have AIS; smaller boats, such as recreational fishing boats, generally do not have a broadcast AIS installation (but may be able to receive AIS signals).

On *Amazing Grace* AIS is integrated into the chart plotter. The chart plotter will automatically display vessels broadcasting AIS signals if those vessels may approach your course. The chart plotter will display the vessel name and its position, course and speed. The display projects the vessels course and may indicate a danger of collision. The AIS on *Amazing Grace* is a receive-only system, meaning that it does not transmit its own signal to be received by other vessels.

Knotmeter. Speed is indicated in knots or nautical miles per hour. (For comparison, 7 knots is approximately 8 statute mph.)

If the digital knotmeter shows a reading of "0.00" while underway, the impeller is most likely clogged with a piece of eelgrass. Sometimes it will float off overnight. You can also try removing it by traveling for a short distance in reverse.

The chart plotter also displays speed through water information from the knotmeter and speed over ground (SOG) as determined by the GPS.

VHF Radio. Power to the VHF is activated automatically when the instruments circuit breaker button ( second from the left on the top row of breakers on the instrument panel) is pressed.

The remote access microphone (RAM), when plugged into the outlet on the starboard side aft of the engine controls in the cockpit, can control all radio functions. We find this very convenient while entering and leaving docks. The RAM should be plugged in before activating the instruments circuit breaker to assure proper function.

If you would like to review VHF radio protocol and procedures please see the section in the onboard Charter Guest Manual.

DSC Signal

This radio receives DSC (Digital Select Calling) distress signals, which start with a long series of what can only be described as shrieks. The location of the vessel sending the DSC distress signal will be shown on the chart plotter. This will likely be followed by a message from either US Coast Guard or Victoria Coast Guard radio; this may alert you to the opportunity of being of assistance to another mariner.

Weather

To listen to the weather reports (which should be done in the morning before you head out and ½ hour before reaching your final destination), push the "WX" button on the radio. Scan the weather channels for the one with the best reception (channel 4 or 7 in our experience). This is generally a light wind region in the summer but weather changes can be sudden. Listen for the "inland waters of western Washington" and the "northern inland waters", which cover the San Juan Islands and the Canadian Gulf Islands.

Monitoring the Hailing/Distress Channel

Please monitor channel 16 (the hailing and distress channel) during your cruise. You may save a vessel or a life. You may hail vessels on channel 16, but after establishing contact on channel 16, ask the skipper of the other boat to switch to working channels 78, 79 or 80.

11. Engine

Highlights

- **Volvo D1-30 Penta 30hp diesel with saildrive and 2-blade fixed propeller**
- **Perform a daily engine "lookover". This "before engine start" shows us in one quick view any black powder belt wear or loose belt, oil in bilge, eelgrass in strainer, or coolant spillage.**
- **Avoid excessive idling**
- **2200 rpm is economy cruise**
- **2500 rpm is fast cruise**
- **2800 rpm is emergency fast cruise**

Details

The raw water strainer is above water level. No need to open or clean it unless the engine overheats. After cleaning, the strainer bowl should refill itself. If not, you may need to "blow out" eelgrass from the hose/seacock with the dinghy foot pump, very forcefully. When replacing the lid, please carefully seat the O-ring and avoid over-tightening the cap.

Oil dipstick access is via a panel in the starboard aft cabin and can also be accessed through the companionway stairs. The engine is not known to use oil; nevertheless, a spare quart lies just below the dipstick in the engine compartment. Mechanics check the oil levels weekly.

To Start the Engine:

1. Check for ropes or debris that could foul the propeller.
2. No key is used to start the engine. However, there is a circuit breaker key at the bottom right side of the companionway engine access door which is used to secure the boat when you are away from it. Make sure that it is in the vertical (on) position. If it is in the horizontal (off) position, the engine cannot be started.
3. Assure throttle/gearshift is in neutral. In cold weather, we depress the black button at the base of the throttle, and push the throttle forward slightly for starting. This disengages the transmission for cold weather 1100 rpm starting and warm-up.

4. Push the “on/off” button on the engine control panel, located above the throttle at the starboard helm, which will activate the LED display below the “on/off” button. Then push the start button. The engine should start immediately, however, if the engine is cold a warming cycle could be initiated which will take 20 seconds before the engine starts. The engine will idle in neutral at about 850 RPM.
5. Listen/look for water coming from aft port stern; if none is seen, shut the engine off and diagnose the problem, including checking the raw water strainer.
6. After startup, most engines idle too long, causing carbon buildup. *You do not need to run the engine at idle to warm it up.* When in a marina, we start the engine just before loosing lines; same protocol if hoisting anchor or untying from a buoy—minimal idle. The slow speed of undocking and leaving the marina, lifting the anchor, or getting off a buoy will warm the engine sufficiently for normal engine use.

Running:

- 1400 rpm is about 4 knots—marina speed
- 2200 rpm is economy cruise, about 7.2 knots, 1.0 gph, range: 40 hours = 294 NM
- 2500 rpm is fast cruise, about 8 knots, 1.3 gph, range: 35 hours = 246 NM
- 2800 rpm is emergency max cruise, for short burst only.
- We are careful to pause 1-2 seconds after the “click” into gear before accelerating, to protect the transmission. And, of course, we always pause when changing from forward to reverse and vice-versa.

Shutdown:

1. Cool at modest rpm for 2 minutes after running at cruising speed, mainly if shutting down after the wind comes up (it is not necessary to cool down after entering a marina or anchoring, since the lower rpm will have cooled engine.)

2. Push the “Stop” button on the engine control panel. The engine is off if the RPM guage goes to zero. Then push the “On/Off” button and the LED display will go blank. If you fail to push the “On/Off” button, the system will give an audible alarm after a minute or so.

Engine overheat:

Normal engine temp is 180 degrees, straight up at the helm gauge. If the needle climbs, or the alarm sounds, or steam comes out the exhaust, please check the amount of water coming out the exhaust. If it is little or none, the most likely cause is eelgrass plugging the raw water strainer, located at the forward port end of the engine, which you saw on your Daily Engine Lookover. (Note: raw water impellers are replaced annually as part of preventive maintenance.) If the engine overheats with adequate water flow out the exhaust, check the coolant level in the engine. Normally, the coolant level in the overflow plastic container is at the “low” level. If below the “low” level, we add coolant from the cockpit lazarette, but not before.

12. Entertainment Systems

Fusion MS-RA205 Tuner

The Fusion system, controlled at the NAV station, is integrated into the speakers in the salon and cockpit, with remote control in the cockpit, to give a full range of audio entertainment options.

The  button controls the input source, including FM, AUX, and BT (Bluetooth). AUX incorporates a USB port immediately below the control panel at the nav station to attach any type of USB device, and also serves as the source for TV sound.

Pressing the Menu Button  gives a menu of devices available for connection. Your devices can be paired with the Fusion system via Bluetooth or USB.

The cockpit speakers are mounted immediately in front of each wheel and deliver quite remarkable sound. There is a separate remote control at the port helm above the wind instrument which provides most of the same functions available on the main unit.

Note: if no stereo or TV, and all circuit breakers are on, check the 110v safety outlet under the center settee. The red safety breaker may have popped. Also, if a Bose remote does not work, tap it gently into the palm of your hand (ok, we don't understand why either ;-)

TV/DVD

The 19 inch 12V Jensen HD LED TV with integrated DVD player is mounted on the forward wall of the main salon. A remote controller for the TV/DVD is stowed in the bottom drawer in the aft side of the salon table. There is no TV antenna, so the TV is used only with the DVD player or with a laptop computer connected through an HDMI port inside the nav table.

13. Fuel Tank

Highlights

- **Fuel tank capacity is 40 gallons**
- **The fuel gauge is at the starboard helm, but it is *unreliable*!**
- **Calculate consumption based upon engine hours since last fill up**
- **Engine consumes approximately 1 gallon per hour**
- **Fuel fill port is on the starboard stern**

Details

Fuel tank is located under the starboard aft stateroom, and the fuel vent is on the starboard side about 4 feet from the stern.

Fueling: Please fill very carefully because it is difficult to tell when the tank is full. You need to put your ear to the tank, not fill "too fast", and be prepared. The pitch of the sound of fuel entering the tank gets higher as the fuel level rises or the fuel begins to surge. As soon as you hear the pitch rising, STOP FUELING IMMEDIATELY. You should resume fueling only if you are certain that the rising pitch was caused by surging and not by the tank being nearly full. It helps to know approximately how many gallons the tank will accept based upon the number of engine hours since the last fill-up. Most attendants will watch the fuel pump. In any event, please fill slowly so that fuel does not surge out of the fill port or vent. While fueling, we recommend that one crew member stand at the vent with absorbent towels to catch any fuel that may exit through the vent.

In the cockpit locker, we have rubber fueling gloves. The attendant will normally give you absorbent pads; if not, ask for them. Before fueling, we build a fuel absorbent dam fore and aft of the fuel fill port in case of overfill (reaching for the pads after the spill is too late). Diesel fuel will stain fiber glass, so please use soapy water to clean up any fuel drips.

The fuel gauge will stay on "full" until about 30% of the available fuel is used. Due to the inaccuracy of the fuel gauge, whenever the fuel level drops below ½ full, or after 20 hours of engine use, you should refuel at your next opportunity. Please do not let the fuel level fall below ¼ full, as you are in danger of running out of fuel which could result in the need for a tow as well as potentially requiring extensive and expensive engine maintenance.

14. Head and Holding Tank

Highlights

- **Toilet is manual flush, using salt water**
- **20 gallon Holding tank is gravity drain (no macerator)**
- **No Y valve**

Rule of the Sea: The person who clogs the head, unclogs the head.

Details

Experienced sailor rule: *To avoid the "rule of the sea" above, nothing goes down the toilet that hasn't been digested.* Please place feminine articles *and toilet paper* in the waste basket, plastic bag, or zip lock…makes for a much more pleasant cruise!

Operating the Toilet:

- Place the T-handle in the unlocked position (white arrow on handle pointing to unlocked icon).
- If the bowl is empty, move the Flush Control Lever to the Open (⇦) position and pump the handle handle up and down until the flushing pump is primed and water enters the bowl. Then Shut (⇨) the Flush Control.
- Operate the pump with long, smooth strokes for efficient and easy operation.
- During use, pump as necessary to keep the contents of the bowl low enough for comfort.
- After use, keep the Flush Control Shut (⇨) and pump until the bowl is empty.
- When the bowl is empty, Open (⇦) the Flush Control again, and continue to pump until all waste has either left the boat, or reached the holding tank.
- Then Shut (⇨) the Flush Control and pump until the bowl is empty. Always leave the bowl empty to minimize odor and spillage.

The Flush Control lever should always be on Shut (⇨) and the T-handle should be locked (white arrow on T-handle pointing to locked icon) except when flushing to prevent flooding the boat in case of valve failure. Move the lever to Open (⇦) to bring water in and out, then back to Shut (⇨) to empty the bowl. If it gets hard to flush, try "oil and vinegar". SJS staff puts vinegar and vegetable oil in the head cabinet.

Vinegar sanitizes and reduces odors. A tablespoon of vegetable oil flushed will lubricate the valves and seals, making pumping much easier as well as more efficient.

Holding Tank:
The holding tank capacity is approximately 20 gallons, and it is located above the toilet. The holding tank is above the water line, and it has a deck fitting for use at a pump-out facility. Alternatively, the large seacock, accessed under the head sink, will evacuate the holding tank by gravity.

We urge you to use shoreside facilties for solid effluent when moored in shallow bays and marinas where solid effluent has a measurable adverse impact. Be aware that discharge in deep water is permissible in Canadian waters, but USCG regs prohibit such discharge in US waters. The state director of salt water quality told us that urine from boaters has no adverse impact on marine waters.

The holding tank status on the electrical panel LED display is inaccurate about 10% of the time due to the sensor being clogged. Please forgive us if the holding tank gauges are inaccurate or show partially full upon boarding. If you find that to be true, please let our staff know upon your return so we can clean them for the next guest. And, of course, we take your word that you do indeed have empty tanks when you return to the slip—very important for the next guest!

If the holding tanks are overfilled, effluent will overflow through the vents, which gives foul odors and dirties the hull.

Depending upon the number and type of flushes above, and the number of people aboard, the holding tank may hold about one to two day's usage.

15. Heaters

Highlights

- **Webasto forced air, set thermostat to white arrow**
- **Not efficient to run all night, noise wakes light sleepers**
- **Auxiliary portable electric heater for use when on shorepower**

Details

The Webasto thermostatically controlled forced air heating system draws from the main diesel fuel tank. In our waters, we use the heater on cool evenings or to take the chill off in the morning.

The thermostat is the round knob on the furnace control panel located at the nav station at shoulder level as you sit. To turn the heating system on, turn on the furnace

circuit breaker on the electrical panel, then press the white power button on the furnace control panel. We leave the thermostat dial on the white arrow, which holds it nicely at comfortable room temperature.

The heater takes several minutes to "cycle up" and get hot before the fan starts blowing hot air. The fan will continue to run for several minutes after the unit is turned off as the heater cycles down. Heater vents are located in the salon and forward cabin. The heat is dry, comfortable, and on those rainy days or cool evenings, makes a huge difference in cruising comfort!

We normally turn off the heater at night, both to sleep cool and to avoid the clicking sound of its electric fuel pump. When it's cool, we recommend warming the boat before turning in for the night, with the last person to go to bed instructed to turn the diesel heater off before retiring. Otherwise, the boat will get too hot and the electric fan in the heater will drain the house batteries when not on shore power. Then, the first one up in the morning can simply turn the heater back on.

The cube electric heater is for marina use. It is normally stowed under the starboard settee.

16. Propane

Highlights

- **Circuit breaker is on the electrical panel at the nav station**
- **Secondary solenoid is on the bulkhead to the right of the range**
- **Single propane tank**
- **For safety, we turn off the circuit breaker after stove use**

Details

We have one propane tank under the port helm seat, vented to the outside for safety. This tank supplies the range as well as the barbeque grill. A tank normally lasts about 4 weeks. The San Juan Sailing staff weighs these tanks weekly to assure that you don't run out.

There are three points of control for the propane supply: the valve on the top of the tank; the circuit breaker on the electrical panel at the nav station; and the solenoid on the bulkhead to the right of the stove. All three must be "on" before propane will be available at the range. After opening the tank valve and turning on the "LPG" circuit breaker (lower left "F2" button on the electrical panel), the solenoid unit to the right of the range will begin flashing a green light in the upper right corner. When the green light stops blinking and stays on solid, press the "On" button on the lower left of the solenoid unit. A second green light should come on in the upper left corner of the solenoid unit, indicating that the propane system is ready.

17. Refrigeration

Highlights

- **Ideal thermostat setting is about 7**
- **Circuit breaker is on the electric panel at the nav station**
- **When disconnected from shore power, check to be sure there is sufficient battery power to operate the refrigeration equipment all night. Usually there is.**

18. Sails and Rigging

Highlights

- **Full-battened main, roller furling jib, Gennaker**
- **All lines led aft**
- **Single line reefing from cockpit**

Details

She sails best when kept under 20 degrees of heel.

Mainsail:

We have a "stack pack" zipped boom cover and lazy jack system. *No need to adjust the lazy jacks* – just unzip and hoist!

The mainsail utilizes a common European rigging with twin main sheets and no traveler to control the boom and main sail. We often use both weather and leeward sheets in tandem to obtain proper mainsail trim.

To hoist:

1. The main halyard is normally stowed attached to the deck or a lifeline to prevent slapping against the mast. After assuring that the main halyard leads inside the lazy jacks, attach the halyard, release the boom vang, and leave a little slack in the main sheets (but keep the sheet clutches closed).
2. With the boom cover top unzipped and the mainsail directly into the wind (any wind in the sail makes hoisting and lowering difficult!), crew at the mast pulls down on the main halyard while a second crew takes up slack through the closed sheet stopper in the cockpit. When hoisting gets hard, (normally about 80% up) crew #1 pulls the halyard horizontally out—like a bow string, with cockpit crew quickly taking

up slack on each release. Do this repeatedly to raise as high as possible, normally about 95%.
3. Tension with the cockpit halyard winch.
4. Fall off the wind slightly before hoisting the headsail.

Reefing the main:

Two large reefs are pre-rigged with lines led to the cockpit.
"*Reef early and reef often*." Reefing the mainsail is easy, here's how to do it.

1. De-power the main (by pointing head-to-wind, or heaving to).
2. Be sure the topping lift is tight and holding up the boom.
3. Let the tension off of the boom vang and one or both main sheets.
4. Lower the mainsail so that the reefing point you desire is about 24 inches above the boom and cleat off the main halyard to keep tension on the mainsail halyard when reefing down the main. Otherwise, the reefing line will bind at the gooseneck as it turns the corner to run through the boom.
5. Grind down on the reefing line and tighten the sail, which will draw down the reef point much closer to the boom and “shape” the sail.
6. Raise the main halyard slightly, if needed.

Jib:

Please do *not* adjust the luff tension on the jib. The primary sheet winches for the roller furling jib are two speed Harken winches, two on each side of the cockpit for ease of handling from the helm or forward in the cockpit.

The jib fairleads are not adjustable from the cockpit. We position the fairleads approximately in the center, then move them forward or aft as desired when sailing off the wind or close hauled, respectively.

The Harken roller furling system allows for infinite reefing of the jib. Simply depower the jib, then haul in the furling line while easing the leeward jib sheet to reduce sail by the desired amount.

Gennaker:

If you are *well-experienced* in handling a cruising spinnaker or gennaker, you are welcome to use the gennaker in appropriate conditions. It is a *very* large sail suitable for breezes under 15 knots. It is stowed with its sheets and snatch blocks in the sail locker at San Juan Sailing and must be requested to be brought on board in advance of your charter.

The gennaker is enclosed in a sock with a fiberglass “mouth” for ease of employment and dousing. To jibe, douse the sail, complete the jibe, redeploy the sail to the opposite side of the boat, and open the sock.

As you may know, spinnakers and gennakers are the most vulnerable of sails. Thank you for your care!

19. Showers and Sump Pumps

Highlights

- **separate shower stall**
- **transom shower**
- **shower sump pump circuit breakers at nav station, float switch in floor drain**

Details

The circuit breaker  on the electric panel powers the shower sump which has a float valve that senses water in the drain. Turning it on before you enter the head may avoid an embarrassing call for help!

Note: the shower sump pump can become an emergency bilge pump if water rises to that level.

Experienced cruisers know the sailor’s shower: get wet, turn off the water, soap up, rinse off. This will reduce the number of stops to refill water during your cruise, as well as reducing the probability of running out of water.

The shower also has a shower door to minimize the amount of water falling on the sink and door of the head. Since the shower head is mounted pretty low, you may find it most convenient to sit on the commode while showering. After showering, please take the time to wipe down the entire shower and commode area and any other parts of the head that get wet. While showering, it is also a good time to clean in and around the commode and the floor. Please turn off the sump pump circuit breaker when the shower basin is empty.

The transom shower features both hot and cold water. To turn the water on and off, move the T-handle up or down. That brings water to the shower head. Turn the T handle left or right to adjust temperature. Depress the spring loaded top of the shower head for spray.

20. Spares and Tools

Engine Spares
Location: under starboard settee cushion
Contents: fuel filters, oil filter, belt, impeller and impeller plate gaskets.

General Spares
Location: under starboard settee cushion
Contents: replacement head pump, light bulbs, zip ties, hose clamps, assortment of screws, nuts and bolts, lifeline clevis pins, whipping twine for end of sheets, stainless seizing wire, sail repair needles and thread, sail repair tape

Tools
Location: under starboard settee cushion
Contents: two tool boxes, one gray the other orange, containing a variety of hand tools

21. Storage

The amount of storage is one of the appealing factors of this model. We found these of greatest use:

Food:
1 – In the overhead cabinets above the port settee
2 – Under forward bulkhead settee cushion. Big storage compartment under the cushion.
3 – In the two forward overhead cabinets above the starboard settee
4 – Behind starboard settee cushions and the forward port settee cushion.
5 – In the cabinet above the microwave

Clothes: The forward stateroom has two closets, one on each side, each containing both a hanging locker and shelves. The forward cabin also has a huge storage area under the bed, but access to it requires lifting the mattress, so we use that for infrequently needed items like empty luggage. The aft stateroom has one closet containing a hanging locker and shelves. Both staterooms have a bench seat under which items can be stored. Both staterooms also have open shelving above the bed along the hull.

Fenders: We store them in the starboard cockpit locker.

Dock Lines: In the starboard cockpit locker.

Cooking utensils: In the drawer next to the stove.

22. Stove and Oven

Highlights

- **2 burners, depress knob, turn left, use hand lighter**
- **stove off, then solenoid off**

Details

The two burner gimbaled Force 10 propane stove must have the propane solenoid switch on to operate (above and to the right of the nav station).

We suggest that whenever you turn off the stove burner, you shut off the propane solenoid, which, for safety, shuts off the propane flow in the cockpit.

Lighting the Stove and Oven

Stove burners – using a butane lighter or a match, hold the flame next to the burner. Turn the burner knob one-quarter turn counterclockwise while pressing in and holding the burner knob that is positioned slightly to the left of the burner – NOTE: the rightmost knob is the oven knob, not the right burner knob. The burner should light immediately, but may take a few seconds for the propane line to fill if this is the first use since the tank was changed. After the burner ignites, hold the knob in for 5-10 seconds, then release it and the burner should stay lit.

Oven – first remove the bottom heat deflector pan in the oven, Then, using a butane lighter or a match, hold the flame under the thermocouple on the left rear of the oven burner. Turn the oven burner knob one-quarter turn counterclockwise while pressing in and holding the knob. It may take a moment for the thermocouple to sense the flame and the burner to ignite. After the burner lights, put the heat deflector pan back in the oven, and adjust the burner to the desired heat level. There is a thermometer inside the bottom right corner of the oven glass door, but its accuracy is questionable so pay close attention to cooking progress.

Troubleshooting: If the stove won't start, check a) propane valve is full open, b) circuit breaker labeled “LPG” on electric panel at nav station is on, c) both lights on the solenoid next to the range are green, and d) you are turning the knob that corresponds to the desired burner or oven.

Caution: propane is heavier than air. If leak is detected, extinguish all flames and ventilate the bilges.

23. Water

Highlights

- **95 gallon capacity in two tanks, one forward and one aft**
- **Tank water level is indicated as "Forw" and "Aft" fresh water on the electrical panel LCD screen, and these indicators are reasonably accurate.**
- **Deck fills are forward in the anchor locker, and aft on the port stern**

Details

One water tank is under the forward stateroom bunk, the other under the port cockpit locker.

The valves are controlling tank usage selection are located high up under the vanity, and are marked "Isolating Tap". Turning the round knob clockwise one-quarter turn opens the valve; counterclockwise closes the valve. The leftmost valve is the bow tank, rightmost valve is the stern tank. Before starting our cruise, we check that one valve is closed, the other open, so we can monitor use and forecast when we need to top off at fuel docks or marinas. A daily check of the water levels on the electrical panel LCD may prevent someone running out of water in the middle of a shower; if the level of the tank currently in use is less than 20%, the tanks should be switched, then both tanks filled at the next opportunity.

Hot water is produced by two methods:

- Engine: It takes about thirty minutes under solid load to heat the 5 gallon hot water tank. (Running the engine at idle won't heat the water.)

- Shore power: If hooked up, turn on the "hot water" circuit breaker on the 110v panel below the nav station desk (fourth switch from the left). When disconnecting from shore power, turn the breaker off.