

Compass Rose

OWNER'S NOTES

Welcome aboard *Compass Rose!*

We sailed monohulls for many years and after chartering several catamarans we fell in love with their spaciousness, stability, and speed. We began a search that ended with becoming the proud owners of *Compass Rose*, our Gemini 105 MC catamaran. We hope that you will also appreciate her many wonderful attributes.

This well designed catamaran offers performance and stability, sailing well in both light and stronger winds. She has centerboards that allow her to point higher than other cats and they also kick up allowing you to enter shallow waters where few others can venture.

The interior space is open, light, and airy. The term "down below" just does not apply. Sitting at the dinette or cooking in the galley you have eye level views of our beautiful Pacific Northwest cruising area. The master stateroom is located forward on the bridge deck and offers occupants an unobstructed panoramic view from the queen-size bunk.

We hope you will enjoy the speed and comfort of a non heeling platform and appreciate the novelty of not putting everything away before the hook is raised, as things stay in place while underway.

We are delighted to share *Compass Rose* with you and sincerely hope you have a wonderful time. We would love for you to use the log book to record highlights of your trip and also to leave any ideas for ways we could help make your next charter more enjoyable. We also would welcome emails with any feedback our suggestions. Our email address is catboat30@yahoo.com We hope you have a wonderful sail and enjoy your time aboard *Compass Rose*.

Fair Winds,

Kurt Hammes & Peggy Goldberg



Compass Rose

IDENTIFICATION:

USCG NAME / HOME PORT	COMPASS ROSE / BELLINGHAM WA
VESSEL HULL NUMBER	1001
USCG DOCUMENTATION NO.	1207616

MEASUREMENTS:

DISPLACEMENT	9,600 pounds
MAST HEIGHT OFF DECK	39 feet
MAST HEIGHT OFF WATER	46 feet
DRAFT (boards up)	1.5 feet
DRAFT (boards down)	5.5 feet
DISPLACEMENT	9,600 lbs
LOA	33.5 feet
LWL	31.75 feet
BEAM	14 feet

CAPACITIES:

DIESEL FUEL CAPACITY	36 gallons total (2 tanks, 18 gallons per tank)
FRESH WATER CAPACITY	60 gallons total (2 tanks, 30 gallons per tank)
WASTE HOLDING TANK	18 gallons

POWER:

DRIVE LEG OIL	synthetic gear oil
ENGINE	27 hp Westerbeke 30B diesel engine

SAILS:

GENOA	350 square feet
MAIN	340 square feet

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ANCHORING

The bow anchor on Compass Rose is a 22 lb Bruce with 60' of chain and 150' of 5/8" nylon rope. The chain is marked at 10' intervals and the line at 20'. Catamaran anchors are much lighter than they would be for a monohull of the same length. The ground tackle is lighter foot for foot for a catamaran than a comparable sized monohull. The holding power is sufficient because of the weight characteristics; there is no keel to add to the weight of a catamaran. This is a good balance between weight and holding power. Compass Rose only draws 18" with the boards up, so she can be anchored in much shallower places than other sailboats.

Anchoring in shallow water needs a lot less line and is much easier to raise. **Normal scope of the anchor is 4-to-1 in the San Juan Islands.** A second anchor is located in the starboard stern compartment. This can be used for "V anchoring" (with both anchors) in storm conditions if safety does not allow proper extension of scope with one anchor (7-to-1 or 10-to-1). Instead of using one anchor off the bowsprit in the center of the boat, one anchor can be cleated to each hull bow.

RAISING ANCHOR - Have the helmsman drive the boat slowly towards the anchor with the person raising the anchor giving directions to head toward the anchor. The person raising the anchor only has to flake the loose line into the anchor locker. We do recommend using the gloves that are in the bucket in the anchor locker. As soon as the anchor line goes vertical, or the length of chain comes to just below the roller, cleat the anchor line and let the forward inertia of the boat release the anchor from the seabed. Then simply raise the anchor. Once the anchor is visible in the water, recleat it and let the forward motion of the boat wash the anchor. There is a bucket with line attached to wash down the deck.

PICKING UP A MOORING - Always approach an open mooring at a slow speed and note how other boats are positioned relative to their buoys. The boats will be pointing into the wind or with the current. As you motor up to pick up the mooring, shift into neutral when the boat has enough forward momentum to reach the mooring. Have a crew person stand on the bowsprit ready to pick up the pennant float with a boat hook. Do not expect the person on the bowsprit to be able to hold the boat in position once in contact with the pennant float. Keep the engine running and ready until you are sure that the pennant eye has been secured to the anchor cleat.

BARBECUE

The BBQ is fueled from the main propane locker. It is attached to a “Y” fitting on the large propane tank. This is the high pressure side (350 PSI). The other end of the “Y” fitting is regulated to low pressure (1 PSI) for the fridge and stove inside the cabin. To keep the grill in top shape, please clean the BBQ grill with the wire brush after each use. The next family to take the boat out will appreciate it! If the “igniter” doesn’t spark, there is a matchless lighter in the galley drawer by the stove.

BILGE PUMPS

The Gemini 105Mc comes with a combination shower pump /bilge pump system which enables you to get “double-duty” out of the Gulper 220 pump.. The pump is located under the port dinette and is accessible from the cabinet door closest to the head. Through the use of the two diverter handles located on the outside of the cabinet, you can convert the pump to act either as a shower sump pump, or as a port or starboard bilge pump. There are two 6’ section of hoses housed in the same cabinet as the pump (on the port side) and in the corresponding cabinet on the starboard side. You can move the end of these hoses to the area of the boat you would like to pump out.

Configurations:

The two-way diverter handles enable the following selections:

Diverter 1

1. Pump from Port Bilge
2. Pump from Starboard

Diverter 2

1. Pump from Bilge (Port or Starboard)
2. Pump from shower



To turn on the pump – make sure “shower sump pump” is turned on at the electrical panel. To turn the pump on and off use the grey switch located below the sink in the head.



CENTERBOARDS AND RUDDERS

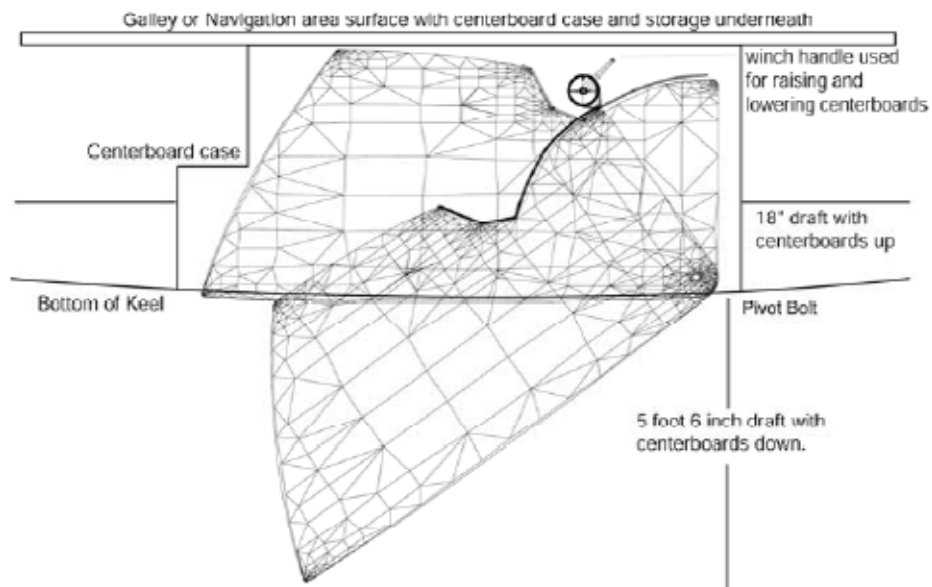
CENTERBOARDS - The centerboards are 7' long and pivot from a case in the hull. When the centerboards are fully down the centerboards go down 4 ft below the keel. Inserting a winch handle in the socket and turning the drum counterclockwise approximately 1 3/4 turns lowers the centerboard. Turning clockwise raises the centerboard. The centerboard is held in position by sliding the wing nut over the nut behind the winch handle socket. Turning the wing nut clockwise jams the drum to the side and prevents the board from moving. The direction of rotation is such that if the centerboards were down and it struck bottom it would push up and simply undo the locking nut.





When motoring, the centerboards are not needed. Maneuvering at slow speeds with centerboards down will make the boat easier to control. In strong cross winds when docking, both boards down will stop the boat from drifting and being blown around. The boards will push up if run aground. ***The boards are only necessary for windward work or when close maneuvering in a marina.*** Only the leeward board is necessary but it does not hurt if they are both used. If in doubt put both down 1 1/4 turns. If the boards are down and they do not need to be, the lack of side pressure will cause them to rattle in the slot. Simply raise them. The boat will sail at any angle with no boards. However tacking is more difficult and the boat will slip sideways when sailing windward. It is more difficult to sail in light airs with no centerboards down.

Centerboard Design



RUDDERS - The rudders should always be all the way down even in light airs. To raise the rudders simply pull the control lines on the transom. One line pulls the rudder up and the other pulls the rudder down. The rudders are designed to kick up if they hit something under the water. The engine is steered by ropes connected to the end of the tillers that exit the transom.

DINGHY

The dinghy is suspended from dinghy davits. A foot operated air pump is in the aft port storage locker if the dinghy needs a top-off. The out-drive leg must be down to raise and lower the dinghy from the davits. Be sure to store the bow higher than the stern and leave the drain plug out when on the davits so water will drain out. If using an outboard on the dinghy, turn it sideways to provide clearance at the stern. Be careful to not hit the hull of the boat with the outboard motor or propeller. Secure the dinghy with spring lines to eliminate motion underway. Please use extra care when you beach the dinghy. Rocks here are very sharp and often are covered with barnacles that have razor-edged shells. Choose your landing site carefully. Nudge onto the beach while moving weight aft a bit. Once grounded, the bow person can jump off with the painter in hand. The rest of the crew should debark before moving the dinghy. Then carefully lift the dinghy and carry it onto the beach. *Please do not drag it on the beach. We appreciate your care.*

ELECTRICAL SYSTEM

SHORE POWER

MAKE SURE THE INVERTER IS TURNED OFF BEFORE PLUGGING IN SHORE POWER CORD TO AVOID A HEAD-ON COLLISION OF THE POWER.

The shore power inlet is rated for 30 amps. The switches on the 110v panel are all circuit breakers. The top two are linked together as the main breaker. In the "ON" position, a green light indicates proper operation while a red light indicates a bad connection or possibly a badly wired marina. Under the main breaker are circuit breakers for the port outlets, starboard outlets, refrigerator, water heater, and spare.



BATTERIES and INVERTER

Compass Rose is equipped with 3 deep cycle AGM marine batteries; 2 house batteries (210 amp each) and starter battery. They are located in the locker under the navigation table. Due to modern technology (and our wizard friend Phil), the battery system is basically hands free. *Please do not change the settings.* Both banks charge automatically whether under engine power or shorepower. So if you are not connected to shore power it's a good idea to use the engines for 1-2 hours a day.

We have installed a 1500 watt inverter and a Link 2000 which can be used to monitor the batteries. You might notice the blinking "lobat" on the display... Please disregard as it came on during installation and we have yet to find the reset button. The actual number that is displayed is what you need to look at.



To turn the inverter on and off press the "invert idle mode" selector.

If you are using a heavy draw item like the microwave we recommend that you turn the engine on for 15-30 minutes.

12 VOLT SWITCH PANEL

CABIN LIGHTS

Both 12-volt outlets located next to the panel and above the refrigerator run from the cabin lights circuit breaker.

SHOWER SUMP PUMP

This provides power not only for the shower sump pump, but for the bilge pumps.

WATER PRESSURE

Turns on the water pump.

GAS ALARM

This turns on the Propane Alarm system and enables power to be provided to operate the propane.

REFRIGERATOR

This operates the fan inside the refrigerator.



ELECTRONICS/INSTRUMENTS

Autopilot: Controls are located at the helm. To use the autopilot, engage the clutch lever below the wheel and press "AUTO". To disengage, press "STANDBY" and release the clutch lever. The "Sailing Instruments" switch on the 12-volt panel activates the **autopilot, chart plotter, depth sounder, radar and wind speed and direction**. The chart plotter is a Raymarine C80 and detailed instructions are located in the port navigation table.

Depth sounder: Delivers accurate readings down to 200 feet deep. Deeper water will cause false readings that may vary greatly. The depth sounder is a useful tool but does not always help you avoid the many rock hazards in the islands. *Know where you are on the chart at all times.*

Knotmeter: If the display shows a reading of 0 while underway, the impeller may be fouled with eelgrass. If it doesn't rectify itself while sailing, your speed can always be viewed through the GPS input on the chart plotter.

VHF radio: Monitor Channel 16 during your cruise. After establishing contact on Channel 16, switch to working channels 68, 69, or 79.

Weather information: Press WX button on the VHF radio and change channel up or down for the best reception. Listen for "Inland Waters of Western Washington".

SONIC DRIVE LEG

The sonic drive leg has a claw that goes over the thrust bar. The claw is held down by an inverted "L" shaped lever, this allows the engine to reverse without coming up. The "L" lever is pulled forward by a knob in the starboard cockpit locker. Once this lever is moved forward the claw can move up off the thrust bar and the whole drive leg can be raised out of the water. As the leg drops back down to prepare for use, the claw pushes the spring loaded inverted "L" lever out of the way so that the claw can go over the 7/16" thrust bar. The spring loaded "L" then goes over the claw, preventing the sonic drive leg from raising up.

TO RAISE THE LEG:

- 1: There is a small red lever next to the pump handle in the locker. Place it in a horizontal position.
- 2: The black knob must be tightened (closed): turn clockwise.
- 3: Pull out the silver reverse lock knob at back wall of the locker.
- 4: Pump the handle to raise the leg up all the way
- 5: Turn the small red lever vertical - this will lock the leg up in case of a leak in the pump seal.

TO LOWER THE LEG:

1. Turn the small red lever to the horizontal position, in line with the hydraulic line.
2. Loosen the black knob on the pump and the leg will drop into place. You should hear a loud click as it lock into place. *Please loosen the knob slowly, to prevent the leg from slamming down*
3. If the boat is still moving forward as the leg is lowered, it likely will not lock into position as it drags through the water. In this case, with the engine running **slowly** move the throttle forward and out of neutral. As the prop engages, you will hear the “click” as the leg locks into place.

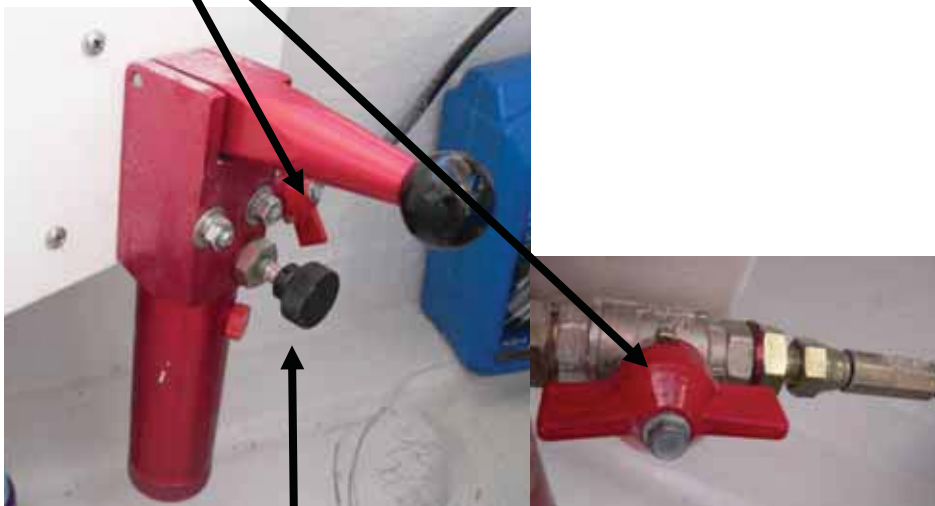
When the drive leg is down, lines from the 8-inch tiller on the rudders go tight to the pad eye on the top of the drive leg. The drive leg is then steered when the rudders are steered.

ENGINE

STARTING AND STOPPING PROCEDURES

DIESEL ENGINE START:

1. **Check oil level daily.** Dipstick access is behind the side panel in the propane locker. NEVER OVERFILL OIL IN A DIESEL.
2. **Lower the sonic drive leg.**
Turn red stop cock lever to horizontal position (starboard cockpit locker).



Open the black valve (turn counter clockwise). Please loosen the knob slowly, to prevent the leg from slamming down.

When the sonic drive is down & locked, there should be a loud click. This ensures the drive leg is locked in the down position.

3. Disengage gears / advance throttle. Center the throttle / gear lever. Use left hand to pull out lever 1/4" to the left while the right hand pushes the lever forward approximately 45 degrees.

4. Turn the key to "run" (1 o'clock position), buzzer will sound.

Press pre-heat button for a few seconds.

Then press start button while still pressing pre-heat. Once engine starts, let go of buttons.

5. Check to ensure water is coming out of the exhaust on the transom beside the outdrive leg. (If there is no water coming out follow procedures outlined below for engine overheating.) Idle the throttle lever back so the engine warms up at 1200-1400 RPM for a several minutes. Pull the throttle gear lever back to the center (neutral position) until it slips to the right: the lever is now ready to be put into gear. Push up for forward gear or pull down for reverse gear. Allow a few seconds between shifting into gear to ensure propeller stops turning. **Ensure the ignition key to does not go to "off" position while the engine is running.**

-DO NOT EXCEED 3,000 RPM. Normal cruising is optimized at 2,200 – 2,500 RPM. This is the most efficient use of engine power without greatly increasing fuel and oil consumption.

IF ENGINE OVERHEATS: check for water discharge from the exhaust. Stop engine immediately (when safe to do so). Check the sea water strainer located under aft starboard bunk. *Ensure strainer is full of water & free of debris.* If you need to remove debris (usually eel grass): close cooling water seacock also located under the bunk. Open the lid to the sea strainer and remove any debris from the filter. Ensure the strainer lid is seated properly and sealed. Open cooling water seacock.

If clogged water strainer is not the problem, check the coolant level and add water if necessary. If nothing else seems to indicate a problem, it is possible the impeller must be replaced (spare impeller located in the Westerbeke spare parts box).

NOTE: Engine may overheat while motor-sailing on starboard tack. If heeled more than 5 degrees the thruhull can come out of the water.

DIESEL ENGINE STOP

(Engine must only be stopped by cutting off the fuel supply to the engine)

1. Put gear handle in neutral.

2. Pull **T handle** above the steering wheel to cut fuel supply to the engine. Turn off ignition with the key when the engine has stopped and the alarm sounds. Push T handle back down to be in position to start the engine.



3. **Raise drive leg** when not running engine. (and see how your sailing speed increases!) Close the black valve knob. Open red stopcock (horizontal). Pull out the chrome T knob in the back of the locker



to release the reverse lock, and then pump the redhandle.

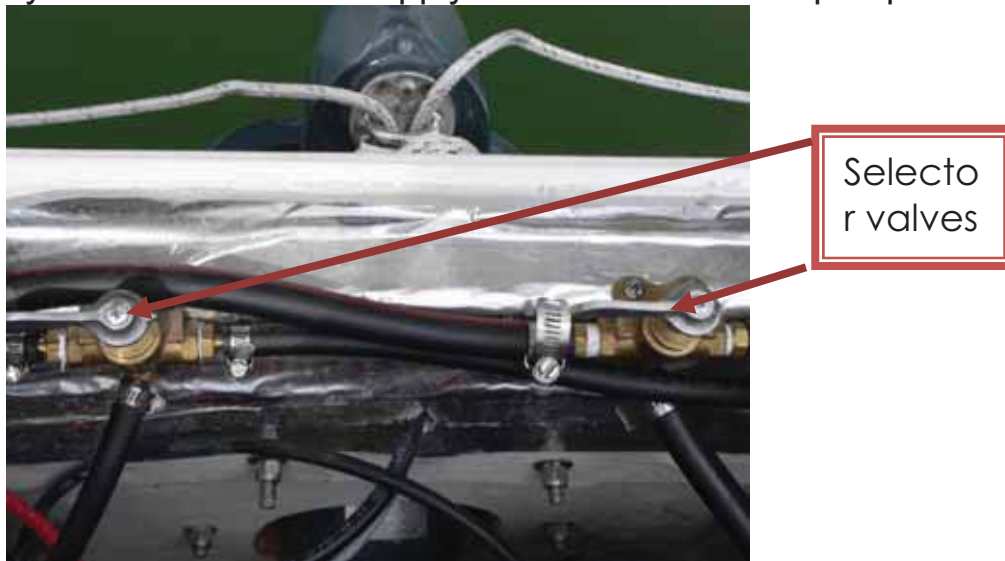
The first pump will be hard and then you should be able to feel the leg slip out of reverse lock and start to raise up. At that point, push in the chrome T knob and continue pumping. Once the leg is up all the way, turn the red stopcock vertical to stop any fluid flow through the pump.

FUEL TANKS

Be very careful filling the diesel tanks. Have someone watch the fuel level while filling. They are 18 gallon tanks, but please use the black line as a

stopping guide. It is too easy to overfill beyond this point. Even a small diesel spill carries a hefty fine, and we want to keep Puget Sound as clean as possible. It is a good idea to keep some paper towels under the nozzle while fueling and be sure to wipe up any drips.

You need to manually select the tank that fuels the engine. Two fuel selector valves are located behind the engine under the hatch on the center stern. **BOTH valves MUST point the same way.** One valve is fuel feed and the other is fuel return. These valves simply point to starboard or port. Keep in mind the cabin heater draws from the port tank. **Neither tank should go below 1/8 full** because of the lengthy process to prime the system once the fuel supply is broken to the fuel pump.

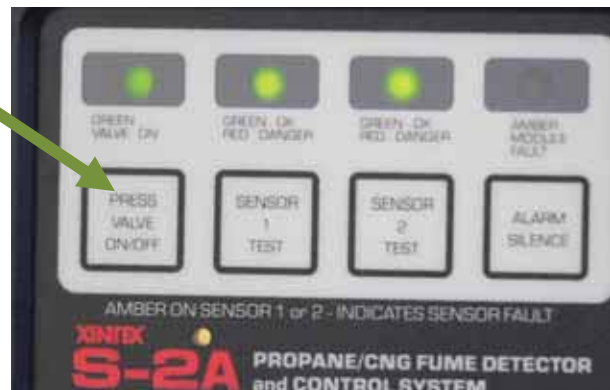


GALLEY

PROPANE SYSTEM

A vertical propane tank is located in the starboard aft cockpit locker and Supplies propane via a regulator to a junction box for the appliances inside the cabin. Open the valve at top of the propane tank. Switch on the gas alarm circuit breaker on the electrical panel. When the switch is first turned on, the propane detector goes through a checking system and stabilizes with a green light over the number of each sensor on the control panel.

Pressing the “valve on/off” button on the control panel opens the solenoid to supply propane to the appliances inside the cabin (you should hear a click in the propane locker when the solenoid opens)



Turn off solenoid and knob on propane tank when propane is not needed.

STOVE

The stove has 2 burners, a broiler, and an oven. The unit includes a flame failure device to each burner so that if the flame were to blow out, after about 10 seconds the heat sensor beside each burner will cool down and the propane will automatically cut off.

To light each unit push the knob in and turn it so the red dot is at the “flame”. For the oven, push in and turn the knob to 8. Hold in the knob, and push in the “igniter” button located on the far right.



When the burner lights, keep the knob pushed in for a few seconds. This warms up the heat sensor and the unit will continue to run.

Oven Setting	Fahrenheit
1	230°
2	266°
3	302°
4	338°
5	374°
6	410°
7	446°
8	482°

There is a copy of this table on the shelf above the stove.

REFRIGERATOR

Press the ON/OFF button to the “Down” position which illuminates the “Auto” light indicator.



The refrigerator has an automatic set up which means if shore power is available, the unit will select A/C operation. If shore power is not available, the unit will automatically switch to propane operation (make sure that the propane is turned on at the tank and the propane control panel). Within 45 seconds, the burner should ignite and operate normally. If the “Check” indicator light comes on, the control has failed to light the burner on propane. To reset when the “Check” light comes on, press the main power button to the “Off” position and then “On” again which re-initiates the automatic lighting procedure. There are detailed lighting instructions on the inside of the refrigerator.

FAUCETS

We added two faucets to the existing hot/cold sink faucet. The tall one is hooked up to an Aquasana water filter. The water from the tanks is perfectly safe, we just wanted a “better tasting” alternative. This faucet does continue to stream a while after turning it off.



The other faucet is a seawater pump faucet. If you want to conserve fresh water you can start your dishwashing with a seawater rinse. There is also a whale foot pump in the floor beside the galley. This pump is in the line direct from the pressure pump to the cold faucet in the galley, so to use it the cold water faucet needs to be turned on. This pump can only be used when the pressure pump is not in use. The purpose of this pump is to

conserve battery power and water. It also pumps water from the tanks if the pressure pump does not work. To keep it down, press and turn 90 degrees clockwise.

HEAD

TOILET

“The rule of the sea is this: The person who clogs the head, unclogs the head. Experienced sailor rule: To avoid the ‘rule of the sea’ above, nothing goes down the toilet that hasn’t been eaten. Please place feminine articles and toilet paper in the waste basket, plastic bag, or zip lock... this makes for a much more pleasant cruise!”

There is no macerator system in the holding tank. Toilet paper and feminine products will plug the tank.

To flush the toilet:

1. Move flush/dry bowl selector to flush position (counter-clockwise) and pump handle to add fresh sea water to bowl prior to use or to flush toilet after use.



(1)



(2)

2. Move flush/dry bowl selector to dry bowl position (clockwise) after flushing and continue to pump until toilet bowl is empty.

WARNING: Be sure to leave the selector in the dry bowl position when not in use.

This will keep seawater from over filling the toilet and flooding the boat.

HOLDING TANK & SELECTION VALVES

The valves located behind the access panel behind the toilet direct the toilet water either overboard or into the holding tank.



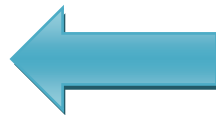
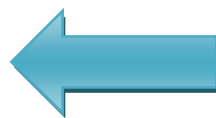
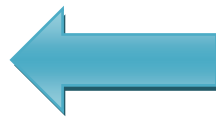
Overboard



Into Holding Tank



Gravity Drain Holding Tank



The selection valves behind the toilet direct the toilet water either overboard or into the holding tank. (The photos show all the possible valve configurations for the toilet) This photo is also taped to the back of the access panel behind the toilet.

The 18 gallon holding tank is on the same level as the sail locker base. The holding tank level can be inspected visually through the Plexiglas bulkhead in the sail locker. The holding tank is fairly small and should be emptied on a regular basis at a pump out station. If you use the holding tank, please monitor it carefully! If the tank is over filled, exploding or leaking sewage is most unpleasant. The deck pumpout is on the port side of the foredeck

next to the sail locker. The Coast Guard is very strict on valves: they must be set to pump from toilet to the holding tanks! The Coast Guard is routinely boarding boats and checking the valve positions...

SEACOCKS - DO NOT CLOSE unless there is a problem of water leaking into the boat.

HEATER

We installed a Webasto Hydronic heater to heat the interior of Compass Rose and also to heat the water. It runs on diesel with the engine on or off - so there can be heat and hot water without a noisy engine or generator! There are two heater vents, one on the port side under the chart table and the other is starboard under the stove. Each vent has its own control to set



the fan speed to low, high, or off. The main switch (SYSTEM HEAT) is located on the electrical panel. Just flip the switch up or down to turn it on or off. There is an automatic thermostat located in the salon right below the chart plotter. There is a day and a night setting (sun and moon). Raise or lower the temperature setting using the arrows. The heating unit is located outside under the aft port locker. The exhaust comes out through the step below and when the unit is on the exhaust is very hot, so please be cautious.

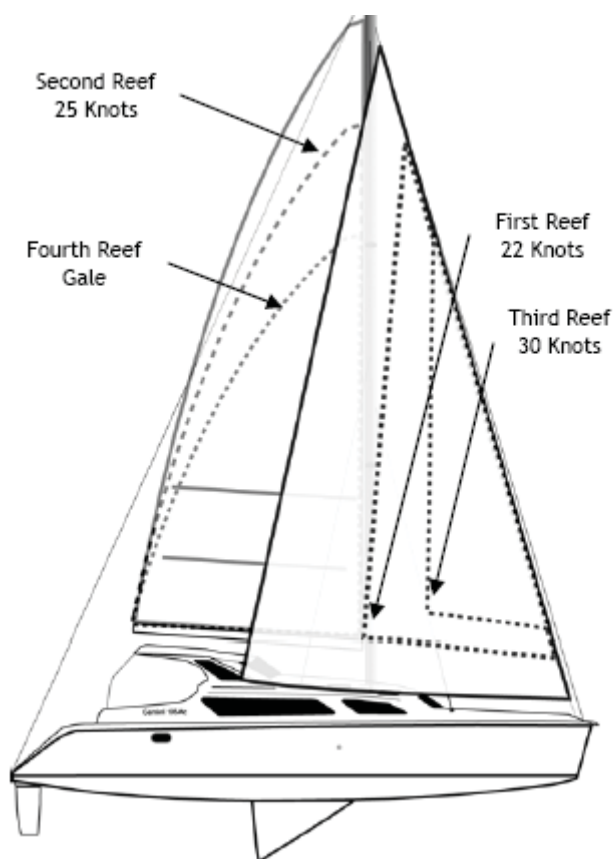
SAILS

REEFING

The following are suggested guidelines. Good judgment goes a long way to a safe and happy trip. Reduce sails when winds reach to following strengths:

18 knots MAIN & full GENOA
22 knots MAIN & 1st reef GENOA
25 knots 1st reef in MAIN & 1st reef in GENOA
30 knots 1st reef in MAIN & 2nd reef in GENOA
Gale 2nd reef in MAIN & 2nd reef in GENOA

Reefing the Genoa first is important because the Genoa puts max load in mast and rig particularly when pounding to windward



SHOWER

There is a partial shower door that should be closed when taking a shower. It stores flush against the port side and opens up in front of the toilet to the fastener located next to the sink.

Experienced cruisers know the sailor's shower: get wet, turn it off, soap up, rinse off.



There is a push valve that turns water off and on located on the shower head handle.

Shower water collects in the sump below the panel on the floor of the head. The sump pump is operated manually by the grey switch mounted on the wall below the head sink. This will activate the sump pump for as long as the switch is depressed. Ensure “Y” valve is set to “drain shower”. (See the BILGE PUMP section above.) The shower water is pumped overboard. Listen for the change in the sound as the water empties from the drain to know when to release the pump switch. It is a good practice to wipe down shower walls and floor after use.

WATER

FILLING FRESH WATER TANKS

The water tanks are filled individually from inlets on opposite ends of the combing behind the mainsheet traveler track. A 30 gallon water tank is located under each aft cabin bunk. Do not overfill water tanks. Fill the tanks slowly and remove the hose when you first notice or hear overflow or gurgling. You can also have one person watching the tank under the bunk as it fills.

If the overflow tube fills with water at the fill inlet, the tank will not fill properly. To avoid this we have a short hose piece that attaches to the water hose and inserts into the water fill inlet. It is kept in the aft port locker.



TANK SELECTION

The water tanks are also used individually, and you need to select which tank to draw from. There is a Y valve in the port aft cabin. Simply turn the handle so the arrow points to the port or starboard tank.



The fresh water pressure pump will take the water from the selected tank and deliver it to the faucets in the galley and head.

PRESSURE PUMP

The pressure pump is located under the aft port bunk to the side of the water heater. We have placed some soundproofing around the pump, and you don't readily see it. If you want to access it simply move the insulation. If you notice that the pump is continually cycling this means the tank it is drawing from is empty.

WATER HEATER

There is a 6 gallon "Torrid" marine water heater located under the bunk in the port berth. When plugged into shore power the water heats when the "water heater" circuit breaker is turned on. It also heats when the diesel heater is running. (**See heater section above**) You don't need to have the fans turned on (if you don't want to heat the boat) but you need to set the thermostat higher than the current temperature display.

Note: The water does not heat from the engine, but operates from shore power or the diesel heater

WINDOWS

The sliding windows are designed for ease of maintenance. To open and close windows: hold the knob with one hand to ensure the window does not drop.



Remove the lock pin with the other hand, then lower (open) window by moving the knob. ***Only clean windows with soap and water: anything else will destroy the protective coating on the window.***

THROUGH-HULL LOCATIONS

