

# NOTES FROM THE OWNERS

## OF ‘DISCOVERY’

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*Welcome aboard “DISCOVERY”*

*DISCOVERY is a 3-stateroom 40’ 1999 Bayliner 4087. We hope that you will appreciate the gear and equipment choices and that you will enjoy cruising with her as much as we do. You will find she is very maneuverable and easy to pilot in tight areas. She has cruised throughout the San Juan Islands and the Canadian Gulf Islands with much success.*

*We’re immensely pleased with this fine vessel and look forward to sharing her with you, our guests. We hope you’ll love her as much as we do and we thank you for taking special care of her. You will find charts and numerous guide books on board that contain very useful information of the area and are enjoyable to read as well.*

*If you have any issues or suggestions that could enhance your experience with “DISCOVERY” please inform San Juan Charters and they will pass it on to us.*

*Thanks for choosing our boat, and we wish you a wonderful vacation and unforgettable memories!*

*Blessings!*

***The Haans***

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***INDEX:***

Introduction: Quick Start Notes

1. Anchors
2. Anchor Windlass
3. Barbecue
4. Batteries & Charging
5. Berths
6. Bilge Pumps
7. Dinghy / Davit
8. Bimini
9. Electrical Panel/Inverter
10. Electronics
11. Emergency / Safety
12. Engine
13. Fuel Tank
14. Head and Holding Tanks
15. Hot Water/Cabin Heat
16. Refrigerator
17. Shower / Sump Pump
18. Spares
19. Stove /Oven / Microwave
20. Water Pressure & Tanks

“DISCOVERY” Specs:

Year: 1999

LOA: 43' 4"

Beam: 13' 1"

Draft: 3' 6"

Displacement: 24,400 lbs (dry)

Fuel: 2- 110 gal. tanks

Water: 70 gal.

Holding: 2- 68 gallon waste holding tanks

## **Discovery Quick Start Notes**

## **Upon Boarding “Discovery” before Use:**

1. Turn shore power breaker “OFF” at the panel on the dock.
2. Disconnect shore power and store cords and adapters on board
3. Power panel: Insure that batteries are charged and needed breakers are “ON”
4. Remove flybridge seat canvas covers and stow in front compartment behind hinged seat cushion on flybridge.
5. If parts of the canvas enclosure needs to be removed, is to be stored in large, flat, navy canvas bag located on roof behind fly bridge.

## **First Thing Each Day:**

1. Check oil and coolant in engines.
2. Check engine oil pads.
3. Fill water coolant container under dining cushion to correct level. Easily runs dry.
4. Check fuel tanks (lower helm) and water tank (in power panel) levels with tank level gauges. Water tank gauge sometimes registers half full when tank is full.
5. Close and secure all portholes.
6. Turn off anchor light if illuminated.

## **Electronics:**

**Lower Helm Chart Plotter must be turned on FIRST or the Upper Helm Chart Plotter will not function correctly.**

### **Lower Helm:**

1. Turn “ON” Accessory Button to power to lower chart plotter.
2. Turn “ON” Chart Plotter.

### **Upper Helm:**

1. Turn “ON” Raymarine RL 70 Radar/Chart Plotter (can be used as a dual screen).
2. When navigation warning comes on, push “Enter”
3. See manual under the dinette settee for instructions if needed.

## **Starting Engines:**

1. Be sure gear controls are in “Neutral” with throttle down to “Idle”.
2. Turn key half way ON—buzzing will sound—both large and small red lights will illuminate.
3. When the small engine warm up lights go off, turn key to start. If engine doesn’t crank, verify controls are in neutral.
4. Red warning lights should go off within a few seconds.
5. Check to see if exhaust is coming from both engines.
6. All red lights should now be off. If one comes on when underway, turn off engine until problem is determined.
7. Engines should be kept a lower RPM, close to idle speed until they heat up to about 140 degrees. This is frequently attain with a few minutes of warm up and idling slowly out of the harbor.

## **Leaving Dock:**

1. Check around boat for any possible hazards or situations that could arise.
2. With deckhand on dock, untie and stow lines as appropriate as captain is at the helm and ready to depart.
3. Have deck hands with boat hooks in hand, ready to assist if necessary.
4. When away from dock, haul bumpers aboard and stow appropriately.

## **Underway:**

1. Again, helmsperson should be “On Watch” at all times while proceeding.
2. RPM under 1200 until engines warm to 140°; RPM never to exceed 2200 RPM.
3. Always keep wake effects in mind.
4. Trim tabs can be used for leveling but are seldom needed.

## **Approaching Dock:**

1. Put bumpers out on appropriate side.
2. Attach Bow line to cleat and put line *UNDER* the stanchions and blouse around toward amidships.
3. Attach Stern line to cleat and have ready to tie to dock.
4. Trim Tabs in fully “Bow Up” position! (Important!)
5. Engines should be dead slow...often need to idle with one engine in neutral.
6. Mate ready to secure stern first (in most circumstances).

## **Upon Arrival at Dock in Marina:**

1. Secure all lines...2 lines forward, 2 lines back.
2. (Reminder) Trim Tabs brought to the up position if being used!
3. **Before** using shore power, check that BOTH main power switches are “OFF”.... in the *power panel* and the *breaker on shore*.
4. **After** the adaptor (if needed) and yellow electrical cord are connected, turn *both* “ON”.

## **Using a Mooring Buoy:**

1. Have Trim Tabs fully in up position.
2. Skipper puts starboard side next to buoy.
3. A deck hand should be stationed in the aft cockpit and use boat hook to grab ring on buoy.
4. Mate loops 30' or so of *white heavy* line through buoy ring.
5. Mate holds two ends together, walks up side of boat to bow of boat.
6. With buoy held close to bow, secure line to front bow cleat.
7. Secure 2<sup>nd</sup> line as a safety line to other bow cleat.

## **Mooring at Anchor:**

1. Have Trim Tabs in up position if being used. (Important!).
2. Turn “On” Windlass Power in power panel.

3. Anchor is lowered with foot pedals while boat is backed up slowly away from anchor.
4. When desired chain length out (4:1 or 5:1 scope), windlass is stopped.
5. Engines reversed for “count of five” until chain pulls up virtually straight.  
Note: The boat should *not be held in reverse* against a taught anchor chain!
6. Attach snubber (located in exterior storage hatch on bow) to chain 10-12 ft from final chain length and secure ropes to the bow cleats so rope is taut. Loosen chain just enough to put pressure on tie lines and a bit of slack on chain coming on windlass. The main pressure of the anchor should be secured on the snubber and cleats and not on the windlass.
7. Turn “Off” Windlass Power in power panel.
8. See “Owners Notes” for more info on anchoring.

### **Stopping Engines:**

1. After operating at cruising speed, allow engines to idle a few minutes to cool down and then turn key to “OFF”. Normally, time spent docking or anchoring is enough cool down.

### **Overnight at Anchor or Buoy:**

1. Anchor light “On”.
2. Unnecessary DC electrical items “Off” (i.e. extra lights, etc).
3. Turn off water pressure switch.
4. Turn off heat (in most situations).

### **Upon Arising:**

1. Turn on heat if necessary.
2. Turn on water pressure switch if needed

### **Retrieving Anchor:**

1. Turn Windlass Power “ON”
2. Fill bucket with water to rinse chain as it retracts
3. Captain powering boat forward slowly.
4. Use foot pedal to retract chain, while rinsing chain
5. Remove and store snubber at appropriate time
6. Secure anchor in bow
7. Turn Windlass Power “OFF”

### **Before leaving vessel: (After Use or After Arrival at Dock)**

1. Power panel: Turn water pressure switch “OFF”.
2. Canvas covers on in all locations appropriate.
3. If desired, close blinds for sunlight and theft protection.

1. **Anchors.** “DISCOVERY” is equipped with two anchors, one forward and one in the aft cockpit locker. The **primary bow anchor** is a 44lb claw with 180 feet of 5/16” chain and 30’ nylon rode. The chain is marked with yellow paint as follows: At 50 feet there is a 12” yellow painted section; at 100 feet, there are two 12” painted sections with a 12” unpainted section in between; at 150 feet, there are three 12” yellow painted sections with 12” unpainted sections in between. The last 10 feet of chain is marked with solid yellow paint. Under normal conditions you should not go beyond the yellow paint, but keeping the chain on the windlass and not going onto the rode. There is only 30 feet of rope and it is hard to secure.

The **secondary stern anchor** is a 22lb Sentinel with 30 feet of 5/16” chain and a 300 foot spool of nylon rode, this spool is also used for a **stern tie line**. These are located in the aft cockpit locker. (Please do not cut the line; it is all needed for certain places in Desolation Sound.)

There is also a spare 300 foot tie line in the most forward storage compartment under the forward berth in the rare case both are needed.

*The scope to use in the islands is 4-to-1. Most coves are 15’-30’ deep, so expect to pay out about 60’-120’ of rode. After you have paid out the suitable amount of rode, a couple of in and out of reverse (idle speed) sets the anchor and tests its holding power. For storm conditions, extend scope to 7 or 9-to-1 (180’ in 20’ of water, maximum chain is 190’), provided you have room to leeward. Otherwise, set two bow anchors (using the secondary anchor, chain and rode) in a v-type pattern for extra holding power.*

2. **Anchor windlass.** Power is received from the ENGINE START battery. Always operate the windlass while the engine is running! Otherwise, the windlass will drain the START battery. To operate the windlass, first TURN “ON” the windlass power lever in the power control panel in the salon area. There are UP/DOWN foot pedals located on the bow near the anchor to lower and retract the anchor. The Windlass BREAKER is located below lower helm controls in cabinet (starboard side). The MANUAL CRANK is under the seat cushion in salon.

#### **A. Deploying the Anchor:**

*With engines, running, come to a complete stop before releasing the anchor from the bow. Drop the anchor slowly off the bow roller and into the water. Determine the depth and let out enough chain to allow the anchor to hit the bottom. Inform the helmsman to reverse the engine(s) slowly and pay out the chain until you reach the desired scope (Usually 4 to 1) Make sure to take into account the tide and how much the water is going to rise or fall. Using a combination of reverse and neutral, gently tug on the anchor until it is set. A snubber is located in the bow deck hatch. Attach snubber to last 10 feet of chain being used and secure ropes to the two bow cleats, one on the port side and one the starboard side. This should create a cradle that takes the pressure of the anchor off the windlass and will provide extra security for the anchor line. **Remember to turn OFF the windlass power lever in the power panel.** Perform an anchor watch for about a half an hour. Provided you are not losing your position, you should sleep well.*

## **B. Retrieving the Anchor:**

*When retrieving the anchor, never use the windlass to pull the boat forward to where the anchor is set. (The windlass is not designed for it, would be a large draw on the batteries, and might cause serious damage to the attachment base.) Instead, under power, head the boat toward the anchor while using the windlass to take up the slack in the chain. When raising the anchor, please remove debris and rinse off the chain with buckets of sea water as it is retracting. This will prevent mud and bad smells from entering the chain storage compartment.*

*To help prevent the anchor chain from bunching up under the windlass, take your time. You might need to push it down to the bottom of the chain locker to prevent the chain from jamming in the windlass. If necessary, the chain locker is accessed from the forward stateroom and is located behind a hinged mirrored panel toward the very front of bow.*

## **C. Securing the Anchor:**

*Once the anchor is on the bow roller, and properly secured in place, be sure to secure the anchor with the “keeper” line. Snap the line through a link in the chain nearest the anchor, and then tie the line to the port bow cleat. (The chain over the wildcat on the windlass should not be the only thing keeping the anchor from unexpectedly returning to the sea bottom!) After securing the anchor with a line, immediately switch the windlass lever “off” to prevent draining the engine start battery should the windlass system decide to short.*

- 3. Barbecue.** The propane BBQ is located in the lazarette. Please bring it down to the cockpit and attach to BBQ to quick release mount on back wall to cook. Squeeze the top set of pins on the mount attached to the BBQ and lower in into the mount located on the cockpit wall. Make sure lower set of pins engage in the holes to secure it. The separate propane tank (or small canisters can be used) is located in the cockpit step. When the lid is closed, the BBQ tends to be hot and cook quickly, so tend meat often. As a courtesy to the next guest, please use the wire brush attached to the BBQ to clean it after use. There is a grease tray under BBQ that may need to be wiped out as well. For grilling, a long handled spatula is provided. When done cooking, please replace cover after it has cooled. Please return the BBQ to lazarette before going underway. To remove, squeeze top set of pins to disengage the lower pins.

- 4. Batteries & Charging.** For normal operations, leave all battery switches on. Each engine has its own separate starting battery. A battery combiner isolates the start battery, assuring all batteries are charged, while protecting the engine start batteries from draw-down by house usage. The house batteries are a bank of 6 deep cell golf cart batteries.

Battery voltage can be checked in the electrical panel. You should try not to discharge below 11.5 volts before recharging the batteries by one of the following methods:

- a.) running the diesel engines
- b.) plugging into shore power with the charger breaker
- c.) using the generator (refer to section 14 for generator use)

5. **Berths.** “DISCOVERY” is ideal for 6 people, but she’ll sleep a maximum of 8 - two in the forward cabin; two in the port forward cabin, two in the aft cabin; two on the dinette table (converts to a double berth) The forward berth is 6’8” long, 4’10” wide. The middle berth is 6’3” long, 4’ wide. The aft berth is 6’6” long, 4’8” wide. The converted dinette is 5’8” long, 4’ wide. The port settee is 4’10” long, 2’ wide.  
**Converting the Dinette into a Double Bed:** Pull up on each side of the table; remove central leg (there is friction and can be stubborn) Allow the table to swing down and rest on the supports. Place the extra cushion (found in the third stateroom) on top of the table.
6. **Bilge pumps.** Please check the bilge each day, morning and evening. It is accessed by lifting the floorboard in the main salon. There are both automatic pumps that have float switches and switches that you can operate manually on the driving consoles.
7. **Dinghy/Davit.** The “DISCOVERY” has an inflatable, hard bottom “Silver Marine” 10’6” dinghy. The 15 HP Yamaha is a 4-stroke motor and it uses *Unleaded Gas* only. (NO OIL is required.) There is a container marked “Unleaded Gas” in the cockpit area.  
The “DISCOVERY” dinghy is equipped with a Sea Wise Davit system. To lower, remove the pin and crank the dinghy down. Keep a hand on the crank at all times to prevent the handle from free spinning which could result injury or damage. Have the motor tilted slightly up so it clears the pontoon. The outboard will automatically go down into place, though it sometimes needs a little push to the rear of the dinghy to be guided into place. When down, unhook the Seawise cable and tighten the fastener that holds the motor in place. To release the dinghy from the swim step, pull the pins and lift the handles to unhook. When returning, it is easier to hook back into place when everyone but the operator is out of the dinghy. *Exercise extreme caution to prevent getting hands and fingers pinched between the dinghy and the swim step.*

*Please take special care when beaching the dinghy (refer to the dinghy beaching procedure in your charter guest book). Most of the beaches you will land at are strewn with barnacle-covered, bottom-slicing rocks. When approaching the shore, weight the dinghy aft by leaning or moving the crew toward the back of the dinghy. Then offload everyone over the bow. For dock tying, there is a small rope on the dinghy. If doing a beach landing, there is a long rope with attached anchor in the cockpit hatch. Also remember to secure the painter under a rock or tie to a large driftwood log – we have very large tidal fluctuations (so your dinghy won’t float away).*

**IMPORTANT:** *Please REMEMBER to top off both the dinghy fuel cans and the two diesel tanks at the end of your charter (at the fueling dock) to avoid extra charges by SJY for doing so.*

8. **Bimini.** *The bimini’s plastic “glass” is vulnerable to scratching from salt crystals, especially after motoring into a challenging breeze. The salt spray on the glass dries in the wind, leaving behind tiny salt deposits that obscure your vision. Please avoid directly touching the glass with a rag or sponge. Salt does dissolve in water, but not as fast as you might think. The salt crystals remain un-dissolved for several seconds. It’s like rubbing*

*the glass with sand paper! To clean, please use generous amounts of fresh water from a pan from the galley or a sopping wet sponge to “flood” the glass and dissolve the salt crystals away. (Better yet, wait until you’re at a dock where you can hose off the salt crystals. If the bimini glass is really clear, you can thank previous guests for their diligence. And we thank you too!*

**CAUTION:** *Most spray sunscreens react chemically with the Plexiglas. So please inform your crew to spray sunscreen downwind of the bimini glass. And please don’t lean against the bimini glass with sunscreen on your back and shoulders. Once that chemical reaction takes place, the glass is ruined and must be replaced.*

9. **Electrical Panel.** DISCOVERY is equipped with a Heart Interface Freedom Combo Inverter Charger. This control panel monitors DC current, inverter input, battery state and power share.

**CHARGE LED.** When the CHARGE LED light is solid green, the charger is on and charging. When the LED is off, the charger is off. When external AC power is detected, this unit automatically begins to charge the batteries.

**INVERT LED.** When the INVERT LED is ON (solid green), the inverter is operating (making AC power from DC battery power). When the LED is not lit, the inverter is OFF. When the INVERT LED is blinking green, the inverter is in STANDBY, waiting for the external AC power to be removed or it is in idle mode, meaning it is standing by until an AC appliance is turned and more power is needed.

**POWER SHARE.** Power Share limits the amount of external AC current used by the charger and power loads. If total AC load is larger than the available AC power, the external AC breaker in the power box may trip. Reduce the POWER SHARE setting to reduce AC power consumption by the charger and power loads thus reducing the total AC load.

Before you plug into an external AC source, note the breaker size. Then press the POWER SHARE until the appropriate Incoming AC Breaker is on the corresponding AMP light. For example, if the external breaker is 30 AMP, press the POWER SHARE until the 30 AMP Incoming AC Breaker LED is on.

When using the generator to charge the batteries, start with the Incoming AC Breaker light on 20 AMP. If the generator is really bogged down, reduce it to 15 AMP and if needed to 5 AMP. See section #14 for instructions on operating the generator.

**AC (120V) Power.** The AC outlets will function either while connected to shore power OR with the inverter as described above (when not connected to shore power). The outlets are covered with GFI breakers which are located in the outlet above the electrical panel and the outlet below the kitchen counter. Be sure to check these if your outlets are not working properly.

**Hot Water Breaker.** When NOT connected to shore power, have the Hot Water Breaker turned OFF (or the batteries will get drained.) Use the diesel furnace to heat the hot water tank. It is very efficient and fast. See *Hot Water* under item #16.

**Autopilot.** The breaker for the autopilot and most of the other instruments are always ON.

**Water Pressure.** This pump pressurizes an accumulator tank located beneath the aft berth. This accumulator tank builds up water pressure so that the water pump does not need to run every time water is turned on. It shuts down when the tank is at “working pressure”. If you don’t hear the pump start up when you turn the switch in the electrical panel ON, it means that the system is at working pressure – you may hear the pump start again after you use a couple of gallons of fresh water. When no one is below deck, especially while motoring, turn off the water pressure breaker. If the tank would run dry, the pump will continue to run until it burns out. An added note, when on the flybridge, you would not hear it running

**Anchor Light.** Okay to run all night in an anchorage (won’t deplete batteries). There is a switch on both helms.

10. **Electronics:** Radar, Chart Plotter, Depth Sounder

a.) **First: Turn ON Lower Helm Chart Plotter.**

b.) **Second:** Turn on Raymarine RL 70 Radar/Chart Plotter (can be used as a dual screen) on the flybridge. See manual in tan carry bag under dinette cushion for instructions if needed.

c.) The Garmin Chart Plotter on the flybridge is not normally used, but can be used for a backup if needed.

d.) The main depth sounder is on the Raymarine RL 70. There is an additional backup depth sounder on the flybridge that is turned on with accessory button on upper helm panel.

e.) Turn off chart plotters when not in use by holding the power button for three seconds. This conserves battery power.

**IMPORTANT:** *The key to avoiding rocks is NOT the depth sounder – but knowing where you are at all times. (Rocks are the greatest navigational and safety hazard in the islands – but they are all clearly marked on the charts.)*

*SJS does not recommend using the depth sounder’s alarm during night. 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.)*

*We recommend that in addition to using your PRIMARY navigation aids – namely, the Maptech waterproof chart book or the roll charts (with the most active “killer rocks” marked in red) – up at the helm while underway, you also utilize the chart plotter for added safety. It helps you to see if you are where you think you are on the chart book or paper charts. If someone asks, “Where are we?” Within 3 seconds, you need to be able to*

*point to the chart and show them the vessel's precise position. If you can't, you're in danger of hitting a rock.*

*The only time when the chart plotter becomes your primary navigation tool is when you're in a "tight spot" like going through a narrow pass or approaching the entrance to a secluded cove. (With the chart plotter, you can "zoom in" to make something that's the size of a dime on a paper chart into the size of a paperback novel or larger on the screen. You can see more detail and, importantly, any hazards in the area. Your boat's position on the chart plotter is accurate to within 3 meters – about 10 feet)*

*You should have little need of the radar except for the highly unlikely event that you are suddenly enveloped by fog, which is rare in this area. The fog that we've encountered in the islands usually forms in the wee hours of the morning and burns off by mid-day. So if it's a little soupy after breakfast, we put on an extra pot of coffee until it lifts. Never depart from a safe location into the fog! To do so, even with radar, would be contrary to prudent seamanship. FYI – Fog becomes "reduced visibility" when you can see ¼ mile (about 4 football fields) in all directions. It is safe to proceed CAREFULLY in reduced visibility using your radar to "see" beyond the haze, but be sure to look up from the screen about every 10 seconds and use your eyes to scan the horizon forward, behind, and side to side. A motor yacht, tanker or freighter traveling at 20 knots takes only 39 seconds to travel ¼ mile! You need to see these fast-moving vessels sooner-rather-than-later so you can prepare, if indicated, to quickly take evasive action to avoid an impending collision.*

*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.*

**Knot meter.** GPS input to the chart plotter provides an alternate and quite accurate speed indication called SOG (speed over ground).

**VHF Radios:** There are two VHF radios. The radio at the flybridge is on the port side of the wheel in a locked cabinet. (This also houses a CD/stereo player). The key is stored at the base of the electrical panel in the salon. The other is a portable radio and is located on the shelf in the salon above the electrical panel.

*You should monitor channel 16 (the hailing and distress channel) during your cruise. After establishing contact on channel 16, switch to working channels 68, 69, or 80. Scan the weather channels for the one with the best reception before sailing in the morning and prior to anchoring for the evening. This is generally a light wind region but weather changes can be sudden. Listen for the "inland waters of western Washington" or "Camano Island to Point Roberts". Both cover the San Juan Islands. You will also hear "Strait of Juan de Fuca" (south of the San Juans), "Georgia Strait" (north), and "Rosario Strait" (runs through the eastern part of the San Juans). San Juan Sailing*

*monitors channel 80 during office hours (closed Sundays). By phone you can reach the San Juan Sailing office at (800) 677-7245 or SJS's owner, Roger Van Dyken, at (360) 224-4300 (cell) or (360) 354-5770 (home).*

**TV/DVD.** There are 2 flat screen TVs and DVD players in both the aft (cabinet behind mirror) and forward staterooms. There are remotes that accompany these. They can be moved into the galley for use while at anchor if so desired. For DVD, TV must be set on AV (not HD)

**MUSIC.** There are 2 CD/Stereos on board. One is located on the fly bridge in the locked compartment, and the other is in the salon near the stairs (this one is equipped with an iPod port).

## 11. Emergency / Safety

**Flares:** Visual day/night distress signals are located under the port side settee cushion in the salon.

**Horn:** Located on shelf by lower helm

**Fire Extinguishers:** There are 3 fire extinguishers. One is located under the galley sink, one mounted starboard side of forward berth above the TV/DVD shelf, and one mounted lower starboard side of aft berth (side of the bed).

**Life Jackets:** PFDs are located in lazarette locker and under the wet bar on the sundeck, under the port side settee on the flybridge and in the forward cabins. There are a total of ten adult and two children sizes on board.

**Quick ER throws:** Two floatation cushions on sundeck and two orange rope-throw packs are in the ice maker cabinet.

## 12. Engine

### **Starting:**

1. Check the oil level daily. The dipstick is accessed by opening the floor boards in the main salon. The dipsticks are on the port & starboard side of the engines. There is a wide gap on the dipstick between the full line and the fill line. **Do not overfill; it is a bad thing to do to a diesel engine.** The excess oil will escape somehow, perhaps by blowing the head gasket. Use the onboard spare oil to add no more than a cup at a time. Then check the level again. If the dipstick indicates no oil the first time you check it, reinsert and try again - the correct level will show when the air lock bubble is broken. Expect the oil to be blacker than that of a gasoline powered automobile engine...this is normal for a diesel after a few hours of operation.
2. Check the coolant level...anywhere between the two lines on the overflow reservoir is "good".
3. While you have access to the front of the engine, check for belt tightness or leaking fluids. Look over the stern for things that could foul the propeller.

6. Make sure the gearshift is in neutral.
7. Insert the key and turn it clockwise partway to engage until warm-up light goes off.
8. Turn the key further to start the engine. Expect the engine to start in 2 seconds or less. If the engine doesn't start after 5 seconds of cranking, turn the key back to the left and remove it. Wait 15 seconds and try again. When engine starts the overheat buzzer should turn off within 5-10 seconds.
9. After the engine starts check for water gurgling out the exhaust, then gradually ease the throttle back to idle near 1000 RPM.
10. Also check and record your engine hours. Fuel gauges sometime stick but hour meters seldom lie.
11. Please allow 5-10 minutes of warm up before placing a load on the engine. The engines can idle out of the harbor while warming up but should not be brought up to cruising speed until temperature warms up to about 150 degrees. It is very hard on diesels to be placed under load when cold.

**Operation.** 270 HP Cummins series diesel engines are very reliable. Fuel consumption is approximately 12 gallon/hour at 2200 RPM, a cruising speed of **14-16 knots**. Please do not exceed 2300 RPM because it's hard on the diesel engines and fuel consumption goes WAY UP (at very little increase in actual speed). (8-10 knots at 1200-1500 RPM is economy cruise speed.)

*To avoid the possibility of sucking air or sludge when the fuel level approaches 1/4 of a tank, refuel when the fuel drops below 1/2 full and before it reaches 1/4 full.*

**Engine Overheat.** *If the buzzer sounds while the engine is running, most of the time it's no more serious than eelgrass plugging up the raw water strainer. The best upfront solutions to this problem is prevention—keep an eye peeled for eelgrass mats, especially along those “soapy” looking tide and eddy lines in the water. And don't run over it. When eelgrass gets sucked into the engine cooling water intake, it jams at the raw water strainer.*

*To clear the eelgrass from the raw water strainer (above the water line in the engine compartment in “DISCOVERY”), close the valve on the through hull, turn the wing nuts off the tops of the strainer, remove the tops and remove the eelgrass and toss it in the galley garbage can. Replace the lid and wing nuts; tighten until the lid is seated firmly on the rubber gasket. Open the through hull valve.*

*Check the oil level and belts on the engine. If a belt is broken or off, the coolant won't circulate to cool the engine. Check the coolant levels, but **only after engine has cooled**, and check the bilge for a light green liquid. If found in the bilge, call San Juan Yachting. There are replacement belts with the spare parts.*

*If upon restarting the engine overheats again, check the seal between the strainer, the rubber gasket, and the lid. If the strainer is drawing air, it won't draw water. If needed, open and then retighten the lid on the strainer...and check to make sure the rubber gasket is in place in the lid (and not lying in the bilge.)*

*One other possibility is that the impeller in the raw water pump has failed. While they are replaced each spring with a new one, it's still possible that a hard object may be drawn in and will break off an impeller blade. (A replacement impeller is found with the engine*

spares.) Call San Juan Yachting if you suspect you have an impeller problem or can not solve the problem.

**Engine Shutdown.** First bring the engine to idle and the gearshift to neutral. Allow the engine 5 minutes to cool down.

13. **Fuel Tanks.** (2 tanks at 110 gallons each) The engine consumes approximately 12 gallons of fuel per hour @ 16 knots, around 2200 RPM.

*Please be very careful when fueling. It takes only a few drops of diesel fuel in the water to create a sheen and subject you to a Coast Guard fine. Fill carefully. There is a Davis No Spill safety bottle in the starboard side of the sundeck ice maker cabinet. This is to cover the air vent to prevent spilling. Remove the top of the No Spill Bottle so the vent can still get air, otherwise a vacuum can be created and the tank can foam up. Make sure to tie the string around the railing in case the suction cups come loose. Fill slowly as diesel can create a lot of foam that can come bubbling out the fill hole or the air vent. Wipe up any excess fuel to avoid yellowing the stern or polluting the water. Also be very careful of drips when removing the hose. Diesel fuel and shoe bottoms are a very slippery and dangerous combination. After wiping, please use soapy water to scrub down any drips so it does not stain the fiberglass.*

*Note: Unlike automobile fuel gauges, fuel gauges on boats are notoriously inaccurate. Therefore, whenever the fuel level drops below ½ full, you should refuel at your next opportunity. NEVER let the fuel level fall below ¼ full or you're in danger of running out of fuel. (Towing and the cost of a mechanic to bleed the air from the fuel lines is an expensive proposition for a charter guest.)*

14. **Heads and Holding Tanks**

**“DISCOVERY” is equipped with 2 manual heads. Instructions for use are located on the toilets. Please do not overuse toilet paper....overuse can cause plugging in marine heads.**

*If the toilet pump starts to resist your flushing effort, don't force it! **Exploding or leaking sewage is most unpleasant! Search out the problem and correct it. Pumping the toilet puts everything into the holding tank.***

*Use vinegar down toilets to help control smells.*

**There are two holding tanks, one for each head, with 68 gallon capacity. A good rule is to empty at least every day-and-a-half. (San Juan Yachting staff will discuss holding tanks, overboard discharge and pump outs upon your arrival.) If tanks do fill completely, there are red light indicators located in the bathrooms to let you know they are at capacity.**

**Pump out access is marked “Waste” and these stations are located on the starboard side, one is forward and the other near the cockpit steps. There are two sets of**

**macerator pump buttons in the control panel. The TOP set is for the AFT head and the LOWER set is for the FORWARD head. Directions for use are posted by buttons. If you are in appropriate water for dispensing waste, have someone watch starboard side to indicate when no more waste is being dispensed. Once this occurs, release the macerator button. Do not run them dry as the macerator pump can burn out easily.**

*If you pump out the holding tank at a shore facility, please fill it with about 5 gallons of fresh water through the deck fitting to rinse, and then pump it out again. Thank you!*

*\*\*Remote cruisers have a rule: “Never put anything down a marine toilet that hasn’t been eaten first.” And that, of course, **includes feminine items**. In fact, remote cruisers do not even put soiled toilet tissue down a marine head. They simply deposit soiled toilet tissue (and feminine items) in a receptacle such as a waste basket with a liner bag or a ziplock baggie, but not down the toilet. We and San Juan Yachting highly recommend you follow this rule. And since we’ve been recommending this, we’ve had almost no incidents of plugged heads!*

15. **Hot Water/Cabin Heat.** There is very efficient Hurricane Diesel Heater that is used for cabin heat and hot water. Please be sure there is enough water in coolant container under dining cushion. This is necessary for proper operation.

**For Hot Water Only:** The hot water can be heated either by using Shore Power (most efficient) or by using the Diesel Furnace. When using the furnace for Hot Water only, it is necessary to:

1. Turn “ON” the “furnace switch” located in the cockpit hatch-port side.  
(Verify as this is typically turned to “ON” in charter season.)
2. Turn the “Y” valve on the red heater hose (located in cockpit hatch-port side) to “Hot Water Only” for the water to be heated *when* heating the cabin is *not* desired.
3. Turn the remote switch located on the cabinet face by the galley sink to ON.
4. Turn remote switch OFF at night, when not in use and when under power.
5. **Please don’t try to create hot water with the inverter by flipping the “Water Heater” breaker “ON”. It will rapidly drain the house batteries and not much water will be heated to make a difference.**

**For Cabin Heat:**

1. Verify the furnace switch is turned “ON” (in cockpit hatch-port side)
2. Turn control valve on the red heater hose (located in the cockpit hatch-port side to “CABIN HEAT”)
3. Turn “ON” remote switch (located on the cabinet face by galley sink).
4. Cabin heat is controlled with a thermostat located next to the lower helm near the couch. The furnace can heat the cabin to a very comfortable temperature within minutes.
5. Turn “OFF” remote switch at night *and* when under power.

When the furnace is being used for cabin heat, it will also heat the water. The heat is dry, comfortable, and on rainy days or cool evenings, it makes a huge difference in cruising comfort!

*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 fans in the diesel heater will put a drain on the house batteries.) Then, the first one up in the morning can simply turn the cabin heater back on.*

## **16. Refrigerator / Freezer.**

**The ON/OFF switch to the well-insulated refrigerator is at the bottom of the refrigerator door. The refrigerator automatically uses shore power when it is connected and the switches in the power panel are ON. When shore power is disconnected it automatically reverts to battery power. Keeping it about the 2 or 3 level is good average for battery operation. If you prefer it to be colder when plugged in to shore power, you may increase the number.**

*We recommend running the refrigerator at all times to avoid it becoming smelly. You may want to turn the thermostat down a bit (the medium setting) at night. This will help conserve house battery power. Then turn it up during the day if necessary.*

## **17. Shower / Sump Pump. For hot water see section 16.** The sump pumps for the showers have floats that automatically turn on when needed.

*To conserve water, experienced cruisers know the sailor's shower: get wet, turn off the water, soap up, rinse off. CAUTION: The engine heats water to scalding temperatures! So please BE CAREFUL!*

*On warm, sunny days, an alternative to the below decks shower is the swim platform shower (with hot and cold water) located next to the swim ladder. This is also a good way to rinse off salt after swimming or dirt after going ashore.*

## **18. Spares.** "DISCOVERY" has spare propellers, engine belts and impellers that are in the most forward storage compartment under the forward berth bed. The spare oil and coolants are located in the cockpit hatch. The rest of the spares are under the main dining table seat in the galley. A tool box is under there as well.

## **19. Stove / Oven / Microwave.**

**The stove is a Princess three burner propane stove & oven. To operate, you must switch the safety button to ON to allow the gas to come to the stove. This switch is located just above the lower sink cabinet doors. After you have done this, turn the**

burner knob to ignite, push and hold the burner knob “IN”. As you are doing this, quickly turn the igniter knob to get a spark. After a click or two, it should light.

**Note:** The first lighting after the boat has not been used for awhile can take a little extra time for the gas to reach the burner. Be patient and keep clicking!

To light the oven, turn to “Light” and “push and hold” Safety knob. If igniter does not work, manually use flame flicker or a match and place in back oven area near igniter to start the pilot light. When pilot stays lit, turn up heat and watch flame move down burner.

The propane tank (large) which supplies stove/oven is located under the board in lazarette on the sun deck.

Use of the microwave works best when plugged into shore power. It will consume a lot of your battery power so use is not recommended when relying on the house batteries.

*Please note that the propane tank and both propane valves (the hand valve and the solenoid valve) are located in the propane locker in the lazarette on the sundeck. This is vented and isolated from the rest of the boat. Any leaks there will move down, out, and away from the boat. The tank is located under the board in the lazarette and can be turned off at night if so desired.*

*While the propane tank normally lasts for 4 weeks or more, San Juan Yachting’s staff tops them off every 2 weeks...so you’ll have plenty for your cruise!*

## **20. Water Pressure & Tanks.**

**Water tanks.** The fresh water tank holds 70 gallons and a gauge is in the power panel. The water fill is on the starboard deck by the cockpit steps and is marked “Water”. Use the two-pronged key that is located on the small shelf at the bottom of the power panel to loosen and tighten.

**Water pressure.** Discovery is equipped with a pressure tank that provides approximately 1.5 gallons of tap water before the pump runs. The On/Off switch for the pump is located in the power panel and will be lit when it is ON.

*It’s okay to leave on while someone is below decks. But please turn “off” when motoring. You could burn out the domestic water pump should the tanks run dry as it tries in vain to pump water to build pressure (and you would not hear the pump running continuously over the sound of motoring).*

*State parks have no pressurized water to refill tanks, but all points of civilization do. If your crew does not let the water run continuously while they brush their teeth, shave or shower, you shouldn’t need to refill too often.*

\* \* \*

