

CELESTIAL IP440 Operational Procedures

Contents:

- **A/C Heating/Cooling**
- **Anchors**
- **Auto Pilot**
- **Battery Management**
- **Bow Thruster**
- **Breakers, Critical**
- **Chain Locker**
- **Compass Deviation Table**
- **Corrosion**
- **Customs Clearance**
- **Dehumidifier**
- **Dinghy & Motor**
- **Doors**
- **Electric Primary Winches**
- **Emergency Bilge Pump**
- **Emergency Boarding Ladder**
- **Engine**
- **Folding Table, Salon**
- **Genset**
- **Harnesses & Strobes**
- **Heads & Holding Tank**
- **HVAC**
- **Leather Cushions**
- **Lifeline Gates**
- **Lights**
- **Locker Numbering**
- **Locks**
- **Nav Table**
- **Official Numbers**
- **Oil Changes**
- **Ray Marine Master, Repeater**
- **Refrigerator/Freezer**
- **Running Rigging**
- **Sails**
- **Shore Power**
- **Shower At Swim Platform**
- **Single Sideband Radio Wiring**
- **Skymate Satellite Transceiver**
- **Stove LPG**
- **Strainers**
- **Teak Trim**
- **Towing Service**
- **Through Hull Penetrations**
- **Trash**
- **Water Tank**
- **Water Filter**
- **Windlass**
- **Zinc Fish**

Notes:

- Locker numbers are prefixed with Lk, such as (Lk#23) or (Lk#57) and refer to the attached locker diagram and list.
- Through hull penetrations are prefixed with Th, such as (Th#12) or (Th#27) and refer to the attached through hull diagram and list.

A/C Heating/Cooling:

- **S/W Intake Seacock:** (Th#4) Below drop-in under nav table (see Nav Table caution below!!): Close before getting underway, Open before A/C operation.
- **Overboard Discharge:** (Th#13)(Th#17) There are no sea cocks here as these hull penetrations are above the waterline.
- **110VAC Power:** If generator source is needed away from shore power (use most sparingly), AC Power bus 2 needs to be switched on with the parallel breaker at the AC panel in “on” position in order for the A/C pump and both A/C units to run. Refer to the Bus A and Bus B discussion in Section VII of the Island Packet owners manual.
- **To power up,** Verify that seacock is open (see above). At 110VAC panel, first turn on A/C pump breaker, then turn on both A/C 1 and A/C 2 breakers to allow proper start up. Finally, push “Heat” or “Cool” buttons at both unit control panels (main and aft cabins), verify water flow from two thru-hulls (port) and then adjust unit controls, as desired. Important: See also dehumidifier below
- **To power down,** First, push “Off” buttons at the unit control panels (main and aft cabins), then turn off A/C 1 & 2, and finally pump breakers at the AC panel.
- **A/C Cooling Water Bleed Procedure:** If air gets sucked into the cooling water system, the pump will lose its prime and not pump water. In that case, loosen the hose clamp on the white hose at the top pump discharge, start the A/C unit to vent air until water flows from this loosened connection, tighten the hose clamp, and verify from outside the hull that water flows from Th#13 and Th#17.

Anchors:

- Bruce Anchor (portside) with 30 feet of chain plus 260 feet of rope and label markers (Lk#2)
- Delta Anchor (starboard side) with 250 feet of chain and markers at 30 foot intervals in white, blue, red sequence or wire ties.
- Fortress Anchor stowed in Lk#79 with detached rode; no markings

Auto Pilot:

- **Breakers:** Turn breaker ON before all other nav instruments. (Activates GPS & fluxgate functions.) Leave on standby, as needed. Give unit time to acquire satellite signals before turning on radar chart plotter.

- **Autopilot:** Use judiciously and do not use in heavy sea conditions as the pin on arm has previously sheered twice under load.

Battery Management:

- Refer to the Island Packet technical manual, pages VII-12 to VII-14 (Lk#40).
- **House Bank** on *CELESTIAL* has six AGM batteries (Lk#37)(Lk#47) wired in parallel giving a total rated capacity of 550 amp hours (AH) of power. However, the batteries will be essentially fully discharged after drawing only half their capacity, or 275 AH from the fully charged condition.
 - Keep selector switch in the main salon in "on" position at all times. Monitor draw down, especially if freezer runs more than intermittently or Halogen ceiling and reading lights are used often. (Conversion to LED lights in progress.)
 - Batteries are fully charged (85%) at about 12.8 volts, and half charged at about 12.3 volts. Batteries should be recharged when voltage drops below 12.5 volts to avoid excessive depletion.
 - When charging, battery voltage can range from 13.7 to 14.1 volts
 - When underway, if battery charge drops to 12.3 volts, it could take a very long charging session (8 hours or more) to restore full charge. Operation of electronic equipment can be also adversely affected below 12.3 volts.
 - We are currently switching to LED lights wherever possible having started with navigation and anchor lights. As critical cabin light bulbs burn out absent spare LED's (Lk#45) they should be replaced with bulbs from peripheral cabin lights.
- **Electrical Consumption:** Running the refrigerator and freezer on a 50% duty cycle plus a few lights, instruments and radios might pull 10 Amps. Over a 24 hr period this would consume 240 AH which is about 50% of battery capacity and batteries would be fully depleted. Batteries should not be pulled down more than 50% and it takes many hours to charge the last 15% into a battery. So in reality there is only 35% of useable capacity or 192 AH ($0.35 \times 550 = 192$). This would require running the engine alternator or Genset for 2 to 3 hours per day to maintain batteries. Additional consumption, such as the Auto Pilot would increase this requirement. Following are some consumption numbers:

<u>Item</u>	<u>Amps</u>	<u>Item</u>	<u>Amps</u>
Cabin lights port	4.6	F/W pump	8.7
Cabin lights middle	1.7	Anchor Windlass	1.4
Cabin lights starboard	6.5	Bow Thruster	2.2
Head forward	2.6	Foredeck Light	1.6
Head aft	2.0	Running Lights	3.5
Reefer1	6.7	Elect Panel	0.3

Freezer	6.3	VHF radio	0.3
Stereo	0.5	SSB radio	2.5
Tricolor/Anchor LED	0.3	Radar	1.1

- **Engine Start Battery:** Single AGM battery located under quarterberth (Lk#70). Starting battery selector switch in the Q-berth should be kept in the "on" position at all times. If low voltage prevents cranking the engine, use the black parallel push button on the cockpit instrument panel to employ both the House Bank and the Engine Start Battery for engine startup.
- **Generator Start Battery:** Single AGM battery located on the generator. Charged directly and only by the generator. Monitor voltage level regularly.

Bow Thruster:

- **Note:** Bow thruster operates only with starting batt selector "on" and engine running.
- Simultaneously press the two "on" buttons on the binnacle to power up the bow thrusters and the joystick to operate them. Use bursts of 20 to 30 seconds to get bow moving. Push "off" button when finished.
- Overuse can create overheating and cause the electric motor to shut down until cool. If this happens, the two buttons on the binnacle need to be pressed to reset after cooling.

Breakers, Critical:

- **AC Power:** There is one breaker each for Shore Power 1 and Shore Power 2 located under screw plate directly below the 2 power receptacles in cockpit aft.
- **Air Conditioning:** Requires that three breakers are activated: Pump, A/C1 and A/C2 breakers.
- **Anchor Light:** Provides power to Tri-Color/Anchor/Strobe rotary switch located on panel below VHF radio. Rotary switch positions are:
 - 3:30 o'clock = Tri-Color
 - 4:30 o'clock = Anchor Light
 - 5:30 o'clock = Strobe Light (emergency use only).
- **Autopilot:** Turn breaker ON before all other nav instruments to give unit time to acquire satellite signals/position before turning on radar/chart plotter. See "Auto Pilot Mode" above.
- **Battery Charge Switch:** Located between protectors on panel at base of starboard settee. Keep switch secured with tape to reduce possibility of it being kicked accidentally into off position, and instruct crewmember to be careful not to kick switch off.

- **Battery Charger:** The DC "Charger Output (80A)" breaker in the main salon on the starboard settee panel has been correctly labeled "Inactive." Instead (as of April, 2009) a 150 amp DC charger output breaker has been installed next to the new 100 amp battery charger on the forward bulkhead, starboard lazarette (Lk#75). The AC panel breaker labeled "Battery Charger" is now a 30A breaker instead of 15A as in the Island Packet manual.
- **Battery Charger Ground Field Indicator:** Located outboard bottom right of charger in Lk#75. It may trip in very humid, wet conditions. Depress to reset.
- **DC Main:** Located on panel at base of starboard settee. Keep switch secured with tape to reduce possibility of it being kicked accidentally into off position, and instruct crewmember to be careful not to kick switch off.
- **GPS:** Requires powering up the Electronic breaker first, then the Auto Pilot breaker, and then the Radar breaker in that sequence.
- **Head Breakers:** The Forward Head and Aft Head breakers must be "on" before the heads are flushed, otherwise a positive pressure may exist in the waste piping causing a blowback of waste material when the head is flushed.
- **Instruments:** If the wind instrument goes blank momentarily, turn off all electronics breakers and wait 60 seconds before turning instrument and other electronics breakers back on.
- **LPG:** A secondary LPG breaker is located on a small panel facing the galley at the sink. Its 5 amp fuse is accessed behind a small, spring loaded door on the panel. To open the door, use a small, square match stick or such... not a metal tool. Also note that bypassing this breaker is not an option.
- **Macerator:** This overboard waste pump is referred to on the panel as a macerator pump even though it is simply a diaphragm pump and does not macerate. This DC breaker turns on the overboard waste pump (Lk#13) directly with no other switches in the system. Keep this breaker secured until the seacock (Th#3) is open to avoid very messy situation.
- **Power Genoa Winches:** Breakers are located in Lk#37 on inboard bulkhead. Can be switched off to avoid accidents.
- **Pump, DC:** On top of right bus. One master breaker for all DC operated pumps except the head vacuum pumps and the anchor washdown pump. Note Caution! under the Water Tanks paragraph.
- **Skymate Transceiver:** DC breaker must stay on - always - to ensure automatic transmission of position reports. See Skymate below.

- **Washdown Pump:**
 - Keep breaker secured until hose is firmly inserted into deck receptacle and nozzle is held open. Turn breaker on to prime pump, which can take several seconds.
 - **Caution!** There is no pressure switch in this system. Do not close hose nozzle with pump running as this will trip the pump breaker on the DC panel.
- **Windlass (electric):** Breaker on panel at base of starboard settee. To operate windlass, engine must be running. (See “Caution” under “Windlass” below!)

Chain Locker:

- Access to this locker is only through forward deck hatch (Lk#1)(Lk#2). Doubles as line locker. Hang tight coils, no trailing ends. Secure hose nozzle and hooks of snubber lines to reduce noise.
- Stuff rags into hawse pipe when going offshore to reduce seawater entry to chain locker.
- Sluice valve to bilge operates from access hatch under forward shower seat.

Compass Deviation Table:

- Kept in nav table and green 3-ring binder. Prepared as an ASA106 DELMARVA cruise exercise. Please include any updates in your Captain’s report.

Corrosion:

- Install canvass binnacle cover whenever you leave the boat. Lubricate locks (especially dinghy) and pelican hooks to ensure the next captain and students can operate them.

Customs Clearance:

- For cruises going between USVI and BVI, Captains can file the required paperwork by computer via <https://enoad.nvmc.uscg.gov/> either from home or from the ST Thomas Communications mail office at Crown Bay Marina. You will need the passport info for all passengers on board and also the vessel information. This is located in the Captain's packet provided by the School office. The passport info will be on the students' personal data forms and the vessel info is on the float plan or the ship's documents. If there is a required field that you need to fill in, but don't know the answer, put in a "dummy" answer that you can save until you can update with the correct info. Ensure that you bring your login password information so you can update if required once you are in STT.

- When clearing into BVI, carry the red Document Binder (Lk#40) and Float Plan with you as you may be asked any number of questions the answers of which are in the red binder. The USCG Official Doc shows CYM Co. as owner; FCC Radio Station License shows both the name of an owner (H. J. Hoffmann) and CYM Co. plus a U.S. address; the Island Packet Specs page shows the IP440 stability index; Float Plan shows captain as authorized operator. Use a yellow, water tight grab bag (Lk#33) to keep documents dry.

Dehumidifier:

- Run the dehumidifier when docked in port when no one is on board to prevent mold from forming. Set the temperature on the two A/C control panels to 70 deg F. Simultaneously, press "Cool", "Heat", and "Fan". The letters "Hu" will flash on the control panel, and the fan will then run for quite a few minutes to start the "Hu" mode.
- Lift appropriate cushions and drop-in boards before leaving to allow circulation throughout. Prop open the hanging locker (Lk#22) door in main salon.
- As described under A/C Heating/Cooling, verify the A/C seacock position dockside vs underway and check for A/C water flow at port midships (Th#13) and aft (Th#17).

Dinghy & Motor:

- Carry dinghy motor on wooden bracket below lift arm, ensuring that motor clears bow of dinghy. Do not carry motor on dinghy when underway.
- When towing, use double painter to dinghy. Pay off sufficient length of painter to avoid dinghy riding up on stern and its D-ring damaging the gel coat.
- Do NOT lift dinghy on arch with motor still attached to dinghy.
- **Lock both at all times**, especially in the islands. Dinghy should always be locked to *CELESTIAL* when at anchor or on a mooring. Dinghy and motor should always be locked to a pier or other strong point when ashore.
- Stow fuel tank in dinghy, never on *CELESTIAL*.
- Dinghy paddles may be stowed in starboard lazarette, and the dinghy grapnel anchor stores in coaming Lk#78. Underway, carry the paddles and grapnel anchor well secured in the dinghy.
- The outboard engine is a Yamaha 8 HP, 2 cycle requiring 100 to 1 fuel/oil mixture. When engine is running, ensure that you see a strong stream of cooling water exiting from the pilot hole on starboard side of engine. If there's no flow, it either means that the cooling water pump is not working or that the pilot hole is blocked. Probe the pilot hole with a

paper clip; if flow does not begin, shut down the engine and verify that the cooling water pump is operable.

Doors:

- **Aft Head Door to Salon:** Always keep secured with lanyard from inside while underway to avoid injury or damage. Enter head from aft state room.
- **Accidental lock-in:** If door is accidentally locked with no one in the head, it can be unlocked from the outside using an awl or metal coat hanger to push against locking mechanism through the dedicated hole near the handle.
- **Locking pins** have been removed from the head door locks since they are prone to falling out and lodging in the shower drains. Also, this avoids the potential danger of an injured or sick crewmember inadvertently locking themselves in the head.
- **Hanging Lockers:** Never lean or bang against doors as doors are fragile and subject to breakage.

Electric Primary Winches:

- The primary winches used for the genoa sheets can be operated manually in the normal fashion or with electric drive motors. At the touch of a button they have the power to over stress and destroy other equipment to which they are attached including sails, sheets and rigging and cause injury to crewmembers if not properly used.
- These winches should never be used to winch in the mainsail furling line or the headsail furling lines, nor should they be used to winch a crewmember up the mast, haul up an anchor or tension a docking line. Their electrical power feature should only be used to tension the genoa sheets, and then with the utmost of care while paying close attention to sail and sheets and immediately securing the power if a jam or stoppage occurs.
- Captains will clearly instruct all crewmembers in the proper use and operation of these winches, and permit their electrical operation only in the presence and under the guidance of the Captain or First mate. (See also "Breakers, Critical")
- Also note that the electrical push button guards can be forced open as a sheet runs past and allow accidental motor start, which can cause injury or damage.

Emergency Bilge Pump:

- The portable, emergency bilge pump along with hoses and two red handles of different lengths are stowed on the shelf in the starboard lazarette (Lk#79).

Emergency Boarding Ladder:

- An emergency boarding ladder made of webbing is stowed under the swim platform (Lk#82). Its yellow webbing loop needs to be led correctly and protrude from the hatch to allow grab/pull and extension.
- Boarding the yacht via the emergency boarding ladder requires an additional handhold to hoist yourself up to the swim platform. This can be provided by tying a short loop of line between two of the stern pulpit stanchion bases so that it hangs down almost to the swim platform.

Engine:

- At completion of each cruise, Captains should report engine and generator hours accrued to Tom Tursi either by phone at 215-817-2612 or email at tomtursi@comcast.net
- Engine and transmission oil and three filters are required to be changed at 300-hour intervals by a professional mechanic. Captains should track engine hours, and anticipate this requirement when preparing to depart on a cruise, and arrange for professional service for these oil and filter changes. As a rule of thumb, these oil and filter changes should be made prior to the start of any cruise if more than 250 hours has accrued since last oil and filter change in order to eliminate the need of doing this work during the cruise. Oil and filter changes meeting this guideline do not require advance approval by the Owner.
- Except in emergencies, Engine filters will only be changed by professional mechanics.
- Engine oil only is required to be changed at 100 hour and 200 hour intervals (after each 300-hour oil and filter changes described above) by a School representative, either the Captain assigned to the yacht or a mechanic hired by the School. Captains should track engine hours, and anticipate this requirement when preparing to depart on a cruise, and either make the oil change or arrange for professional service for this work. As a rule, this oil change should be made prior to the start of any Advanced Coastal Cruise if more than 50 hours has accrued since last oil change, and should always be made before an Ocean Cruise in order to eliminate the need of doing this work during the cruise.
- Captains should ensure that oil and filter changes are entered in the ship's maintenance logbook, and reported, either by phone or email, to Tom Tursi.
- Engine oil Spec is SAE 15-40. Use Shell Rotella if available. Use marker pen to label containers with new oil remaining. Label empty containers and save for used oil during oil changes.

Item	Spec
Engine Lube Oil	SAE 15W-40

Transmission Oil	SAE T30
Generator Oil	SAE 15W-40

- **Cooling Water Flow:** Check for strong, pulsating S/W discharge flow from transom (Th#23) after engine start up. Also, note secondary, pulsating flow from exhaust pressure release at thru hull on starboard side of transom (Th#26).
- **Racor Fuel Filter:** Monitor the Racor filter of the main engine as water has collected here in the past and some was siphoned from the fuel tank. Drain any remaining water if it settles at the Racor filter. This requires two wrenches to loosen pet cock.
- **Transmission:** Use Valvoline or Havoline SAE 30W. Do not change brands unless absolutely necessary. Do not overfill the transmission (Lk#71) as very little fluid shows on the dipstick as the full mark is near the bottom of the stick. Transmissions are wash bath lubricated, meaning that as they turn they are rotated through the oil in the bottom of the case. Overfilling builds excessive case pressure and can lead to seal failure. Transmissions don't usually fail without some warning in the form of a leaking seal and the more common failure is at the rear of the transmission by the coupling. If the seal fails, it can dump oil in a hurry. When checking oil level, smell the transmission oil; if it smells burnt like an electrical fire there should be some concern.

Folding Table, Salon:

- Do not use this table (Lk#23) for chart work or to hold on to as it can be easily pulled out of alignment. Use nav table or lap board in chart drawer (Lk#36) for chart work.

Genset:

- At completion of each cruise, Captains should report engine and generator hours accrued to Tom Tursi either by phone at 215-817-2612 or email at tomtursi@comcast.net
- Generator oil and filter changes are to be made at the same intervals and guidelines as outlined above for the main engine. Genset oil Spec is SAE 15-40. Use Shell Rotella if available. Quantity is 3.5 to 4.5 quarts.
- The generator has a stand alone starter battery. There is a toggle switch low on the instrument panel for the stop/start function. Run the generator for five minutes with no load to warm up and cool down. Run under load for one to two hours or more if house bank battery voltage drops below 12.5 volts.
- Keep selector switch on the instrument panel outboard of the Nav Station in the "on" position at all times. If generator start is attempted with this switch "off" it will trip a relay on the generator, which must be manually reset. To do this, first set the selector switch to "on" and ensure that the toggle switch on the instrument panel is depressed once in the "start" position, then open the front of the generator compartment and press

the yellow "hand" button, wait until the generator is running, and then press the yellow "auto" button.

- **CAUTION!** If the Gen "on" toggle is accidentally pushed on the instrument panel immediately after the "off" toggle has been depressed to stop the generator and while the generator is still idling down, the auto relay will trip, the red light at the generator instruments will come on and the generator may keep running. To correct: Open the generator front panel and depress the red "Stop" button on the generator front. To reset auto function, see bullet above.
- **CAUTION!** The Genset has no operating gages and is supposed to be self monitoring. But if it shuts down automatically, check for cooling water flow at next startup.
- To check belts, water pump and impeller, the inboard panel can be lifted out of housing if angled correctly. (Some crewmembers, in frustration, actually cut this panel for access.)
- To check oil, open forward panel.

Harnesses & Strobes:

- The Maryland School placed five safety harnesses and two personal strobe lights onboard for use by student crew who neglect to bring their own. These are located in Lk#22 and need to be collected at end of each cruise and stored in this locker for future use.

Heads & Holding Tank:

- The Sealand Vacuflush heads are very sensitive to malfunction from blockage of the duckbill valves in the system with toilet paper or other bulky solids. Should any one of the six duckbill valves in the system become blocked, it will be necessary to disassemble waste piping and hoses to clean or replace these valves. It is imperative that Captains clearly instruct crewmembers to use only small quantities of toilet paper, and put nothing else into head.
- There is a vented loop (refer to attached diagram) in the holding tank discharge between the pump and the seacock, which can become blocked with waste material and prevent emptying of the holding tank. It is located on the port side in the salon locker (Lk#16) near the holding tank vent. If blocked beyond the loop up to the filter, spare charcoal filters are kept in Lk#44.
- The Vacuflush heads dump only to the holding tank, and they cannot be pumped directly overboard. The holding tank can then be periodically dumped overboard with the electric waste pump (Lk#13). Do so at 50% full to leave room for troubleshooting. See the Breakers Critical paragraph above. If the electric pump fails to operate, use the manual bypass pump discussed below; study and follow the arrows on top of the two bypass Y-

valves located upstream and downstream of the electric pump to ensure proper flow. On master Y-valve, the silver arrows (not the valve position) will show the waste flow.

- **CAUTION!** It is imperative that the holding tank level be monitored closely and that it be pumped out when no more than 3/4 full. Otherwise, pumping a head with a full holding tank will force waste products up into the tank vent line, clogging the vent filter, possibly spewing waste material into the hanging locker of the main salon, and rendering the Vacuflush system inoperative.
- Monitor holding tank level sensors on gauge below AC panel. Sensors (empty or full) have been calibrated to read correctly. Turn sensor off/on to refresh reading while you pump.
- **CAUTION!** Ensure that the waste pump seacock (Th#3) is open before turning on the Vacuflush breaker at the DC panel; otherwise back pressure from pumping with the seacock closed will reverse the one-directional duck bill valves and the heads will become inoperative.
- **CAUTION!** The Forward Head and Aft Head DC breakers must be "on" before the heads are flushed, otherwise a positive pressure may exist in the waste piping causing a blowback of waste material when the head is flushed.
- **CAUTION!** Keep the head lids closed when not in use to avoid objects accidentally falling in and making that head inoperative.
- **CAUTION!** The Vacuflush heads use fresh water for flushing, and it behooves Captains to be extra cautious regarding fresh water consumption.
- Diluted, liquid laundry detergent without bleach should be used to clean toilet bowls as other cleaners will damage rubber seals. Do not use household cleaners.
- Whenever available, RV toilet paper should be used as other toilet papers will accelerate clogging of the system. Scott individually wrapped rolls claim to be safe for septic and RV use.
- **To Operate Vacuflush:**
 - Lift foot paddle before using head to add a little water to bowl as a lubricant before toilet solid waste use. To flush, depress foot paddle for 1 to 2 seconds and the vacuum pump will operate for 25 to 30 seconds.
 - Do not depress pedal again until vacuum pump has stopped and light under sink in head has turned from red to green. If pump action continues longer than this, it may be due to solid waste preventing the vacuum seal of the toilet bowl from closing completely. To correct, wipe vacuum seal gently with toilet paper, add water, flush, and ensure that vacuum pump has stopped.

- **Waste Pumps:**

- Refer to the attached schematic of the holding tank, waste pumps (Lk#13) and valves. Notice that there is an electric waste pump and a manual bypass waste pump plus three Y-valves for operation of this system.
- **CAUTION!** Do not turn on pump breaker at the DC panel before opening the proper waste valves to ensure that the overboard discharge seacock (Th#3) is open to the sea. Pumping against a closed valve will produce back pressure and damage the duck bill valves located on either of the electric pump. Before turning on the electric pump breaker at the DC panel, ensure that:
 - The sea cock is open
 - The Y-valve to deck pumpout is aligned with the electric waste pump (Only the silver arrows will properly show the direction of flow.)
 - Both Y-valves for the manual bypass pump are aligned with the electric waste pump
- Waste pumpout requires vessel to be on fairly even keel. Monitor holding tank level gauge below AC panel. Turn on the pump breaker at the DC panel, monitor holding tank sensor by turning it on/off to refresh the sensor reading; turn off breaker and secure its protective cover.
- If the duckbill valves are inadvertently over pressurized, the pump will shut down and heads will become inoperative. To repair, remove the duck bill valves at either end of electric waste pump and manually push them back into shape for one-directional flow and reinstall. If duck bill valves are damaged, replace with new ones located in Lk#44. Clean space and tools with disinfectant after repairs.
- **The Manual Bypass Pump** and two Y-valves are located under the forward drop-in plate (Lk#13) in the V-Berth floor. To bypass the electric diaphragm pump in case it fails, ensure that the DC macerator pump breaker is secured, the sea cock is open, and the deck pumpout Y-valve is aligned to overboard discharge. Then align the two bypass Y-valves to the manual bypass pump.

- **Waste Sea Cock:**

- We've experienced obstruction of the waste thru hull with what appeared to be sea weed or sargasso weed drawn into the thru hull and sea cock to a length of about 4 inches causing a complete blockage that could not be removed by pump action or manual prodding from inside the hull with the hose removed. This blockage was finally removed by diving on the outside of the hull and probing with a hooked wire.

- This experience implies that a vacuum is pulled on the seacock at times. There are two sources for this vacuum pressure: (1) the Vacuflush system, and (2) deck pumpout of the holding tank. In either case, there would need to be vacuum leakage past the waste system valves in order to pull on the thru hull.
- Since this experience, we established the policy of keeping the waste sea cock closed at all times except when actually pumping waste overboard, and waste system operation has improved markedly since then. (Note: The most recent obstruction at that thru hull, also cleared by diving, resulted from a wad of baby wipes.)
- However, if the waste sea cock blocks while at sea, it may be necessary to pump out the holding tank using the portable manual bilge pump. Rig the 8 foot length of dedicated white hose (Lkr # 21) with a threaded deck fitting at one end to the deck pumpout fitting topside. Connect this hose to the manual bilge pump and connect the other hose to the pump discharge and route overboard. Shift the Y-valve to align the deck pumpout side of the system. This method has been used successfully on more than one occasion. Disinfect when done.

HVAC: (See “A/C Sea Cock” above.) First, turn A/C units off before turning off DC breaker.

Leather Cushions:

- No pens, markers, sharp objects on cushions.

Lifeline Gates:

- Tape pelican hooks and cotter rings when going offshore. Inspect fitting threads to avoid accidental opening of the pelican hook.
- When going offshore, secure lower open space in gate by tying a stout line across it a mid-height to prevent a crewmember from falling through the opening.
- It's advisable not to rely on lifelines since wires can break with a shock load and lifeline fittings can work loose due to vibrations and wave action.

Lights:

- The white stern light at the top of the stern arch is functional and illuminates when the Running Lights DC breaker is turned on.
- The white stern light on the transom is disconnected – as readily viewed outboard in the starboard cockpit locker (Lk#79) near the life raft shelf.

- The multi-function light at the masthead includes a Tricolor Light (red, green & white), an Anchor Light and an Emergency Strobe. It is operated with a rotary switch located at the panel below the VHF radio, and the Anchor Light Breaker must be turned on.
- We are currently switching to LED lights wherever possible, having started with nav and anchor lights. As critical cabin light bulbs burn out absent spare LED's, please replace them with bulbs from peripheral cabin lights.

Locker Numbering:

- Refer to the attached Locker Diagram and list of Locker Descriptions.
- Also refer to the detailed Inventory, copy attached, and the latest Google Docs inventory titled *CELESTIAL* IP440 Inventory

Locks:

- Combo for the companionway slide hatch lock is 4400
- Brass key locks and a security cable are provided for the dinghy and O/B motor, plus spares in the Nav Table or the plastic box next to it. Normally, all keys fit all locks, except for the one taped to a spare all-brass lock.
- Lubricate locks regularly to prevent jamming with salt buildup.

Nav Table:

- **Position Up:** Table, together with its tray, folds up to provide access to generator front panel, A/C motor and A/C seacock under drop in. Always secure table tray with hook to eye above electronics panel (light next to eye slides out of the way).
- **Position Down:** Before lowering table tray to its original position, always fold out supports and then secure them with dedicated hooks to table tray.

Official Numbers:

- USCG Document: 1194943
- Radio Call Sign: WDD6893
- MMSI: 3671 7912 0
- U. S. Customs Decal #: Renewed annually. See Float Plan and Document Binder in Lk#40 for current info.

Ray Marine Master, Repeater:

- Follow “Auto Pilot Mode” (i.e., GPS) above; turn on breakers as needed. Turn on master first, then repeater in cockpit second.
- To turn off, secure power button on unit first, then repeater and master in that sequence. Lastly, attach sun cover.
- **CAUTION!** Touching screens will damage anti-glare coating. To clean salt spray, use only eyeglass cleaner spray and special cloth in pouch of manual locker (Lk# 40 or Lk#32). (Never use Windex or alcohol-based cleaner.)
- **Malfunction:** If the unit shuts down and reboots intermittently (simulating loose connection) check battery status as low voltage will cause the unit to shut down.

Refrigerator/Freezer:

- **CAUTION!** Keep latch in open position before lowering hatch to avoid damage to latch.
- Refrigerator/Freezer cooling can be conserved somewhat by placing a blanket inside the refrigerator over the contents. Ensure that the two IP-provided black rubber plugs in the galley remain in the drain holes during operation to prevent heat intrusion plus cold air exchange between the two boxes. Remove (briefly) during activation of the ice box drain pump.
- Once frozen food is consumed, power can be saved by raising the freezer temperature setting at the panel above the box.
- Food placed adjacent to the cold plate in the fridge will freeze; soda and beer bottles/cans will burst! Keep the latter far outboard. Plastic storage containers are onboard.

Running Rigging:

- Captains are urged to continually monitor the condition of all sheets, halyards, furling lines and reefing lines, and to protect the ends with proper whipping.

Sails:

- **Genoa:**
 - The standard Quantum genoa is 110%, the spare Hood genoa (fractional, blue sail number) is 120%. Both are of 8 oz Dacron with Sunbrella UV cloth.

- Furling is best accomplished off the wind with main sail blanketing genoa. Control tension of both sheets to ensure tight furl on stay.
- On three occasions, the genoa furling line chaffed through due apparently to misalignment of the first lead block or misalignment of the furling drum cowling.
 - Check that the lead places the furling line in the left side (toward boat centerline) of the opening of the cowling when the sail is furled. If not, loosen the clamping screw below the cowling and realign the cowling.
 - Ensure that the clamping screw is made up very tight to prevent slippage of the cowling.
 - During operation recheck the lead periodically.
- On one occasion, the genoa halyard chaffed through adjacent to the splice at the head of the sail. It appears that the halyard chaffed on the sheave or sheave box at the masthead possibly due to tensioning the halyard along with a stretched sail luff. The sail luff may need to be shortened, but in the interim, the halyard should be periodically inspected for chafe.
- If genoas are damaged and unusable at sea, the staysail can be raised on the jib foil. The staysail and the two genoas are fitted with # 6 luff tape boltrope of 3/16" diameter.
- **Mainsail:**
 - Keep boom at 5° above horizontal. To furl, keep wind at 1 o'clock, mainsheet eased, traveler/boom on port, and sail luffing to port. Control outhaul line as it is eased to prevent excessive bagging of the sail. Check for obstructions, fabric folds, and jams. Follow similar procedures for unfurling the mainsail. Allow camber in foot and do not over tension outhaul.
 - Main sail halyard tension: Avoid over or under tensioning. Stretch marks or fabric wrinkles will cause fabric to build up loosely potentially forming a constricting bulge at the slot while unfurling. In such an event, crew aloft will have to manually push the bulge back into the slot during the unfurling process.
 - Never use electric genoa winch for mainsail furling.
 - We carry two smaller spare mainsails:
 - IP370 mainsail
 - IP420 mainsail
- **Staysail:**
 - Unfurling the staysail is initially difficult until sail is part way out. To unfurl, take sheet and furling line off their winches to reduce resistance and control these lines

by hand but don't let them run free. Intermittently yank on the sheet to overcome friction and set the sail. As soon as the sail begins to run out, take a turn on the furling winch and the sheet winch to control these lines.

- The staysail, when furled, is subject to excessive wear from the genoa sheet dragging across it when tacking. In lower level classes in protected waters, Captains should consider removing the staysail to prevent this wear.
- **Trisail:**
 - The trisail sheets are run directly to removable turning blocks on the quarter rails and then directly to the primary winches, the tack pennant is lashed to the padeye at the base of the mast, and the trisail is raised on the auxiliary track so that the tack is higher than the mainsail boom. Fine adjustments in trisail height are made to produce proper lead to the sheets.
 - The trisail clew has also been secured to the boom end with success as an emergency mainsail.
 - On most sea boats, it's common practice to keep the trisail rove into its track on the mast, and to slide it down to deck level, bag it and lash it when not in use.
 - On *CELESTIAL*, this is not feasible since the trisail track on the mast is interrupted by the cutout for the mainsail roller furling drum. However, when not in use, the trisail can be flaked and stowed in its bag and lashed to the mast at main boom level. This is made feasible by the sail slugs recently added to the trisail luff boltrope.

Shore Power:

- Shore power is applied through two 50 foot long 30 Amp 125 Volt power cords connected to Shore Power 1 and 2 receptacles at the stern to power the battery charger and the air conditioning. To avoid scorching and physical damage to the power cord ends and the receptacle, ensure that cords have a firm connection and enough slack to allow for tidal shifts, and also apply lashings to prevent their being yanked out. Separate breakers are located below the receptacles.
- When docked bow in to a slip, the 50 foot cords may not reach to the power post ashore. In this case, it may be necessary to use the 25 foot 50 Amp extension cord plus the 50A to 30A splitter to connect to the two 50 foot 30A cords. Again, ensure firm connections and use lashings.

Shower At Swim Platform:

- Ensure that there are no snags in hose in port lazarette for hose to extend.

- The upper of the two round covers accesses the control on/off, hot/cold.

Single Sideband Radio:

- Power wiring to the single sideband unit in the starboard settee seatback aft (#33) is vulnerable to damage with movement of equipment stored there.

Skymate Satellite Transceiver:

- Connect onboard PC and follow on-screen prompts. DC breaker must stay on - always - to ensure automatic transmission of position reports.
- The Skymate satellite transceiver, when connected to a laptop computer allows email service and download of weather text and graphics. When not connected to a laptop, it will automatically transmit position data to a designated email account ashore if programmed to do so, and power to the unit must remain on for this purpose.
- Email service is very basic and slow compared to land based email, and attachments and enclosures cannot be transmitted. Also, the owners pay for all transmissions, both sent and received, on a per character basis so transmissions must be brief, be restricted to ship's business and are not for personal communications.
- If connecting to an on-board portable converter, ensure PC is charged before turning on PC. If PC emits loud beep rather than starting up (as noticed in the tropics), brush hand across keyboard to release a stuck key.

Stove LPG:

- There are two LPG breakers wired in series. One is located on the 12V panel at the Nav Station. The other is at the galley sink and this one contains a fuse, which requires a toothpick or wood splinter. Fuse size is 5 amps.
- If the propane systems fails, alternative cooking sources include:
 - Microwave oven, but use at sea should be closely monitored since it is not gimbaled and contents are likely to spill out as the boat rolls to wave action.
 - Electric skillet necessitating operation of the Genset for 110VAC power.
- Ensure that the propane locker drain is free and clear to allow drainage of sea water which easily flows into this locker. We've experienced flooding of this locker due to a blocked drain thus putting the propane solenoid underwater and shortening its life.

Strainers:

- S/W intake strainers for main engine and generator are located in Lk#61: Clean monthly. Before opening strainer housing, check to ensure that a spare gasket is available in case the existing gasket becomes damaged.
- Shower sump pumps strainers are located Lk#21 and Lk#67: Clean weekly to remove hair and other debris that will clog the strainer and prevent pump operation. Remove the clear plastic housing by unscrewing it; carefully remove screen; remove debris; thoroughly flush with clean water; carefully replace screen and plastic cover.
- Refrigerator drain pump strainer is located in Lk#79: Clean monthly following guidance provided above for shower strainers. Also the following:
 - **CAUTION!** Loose grapes, olives, nuts and cherry tomatoes are the perfect size to block the refrigerator drain lines. Carefully manage the contents of the refrigerator to prevent these items from becoming loose and rolling into the drain line.
 - If the refrigerator drain line becomes completely blocked, it may be necessary to back flush it as follows: Disconnect the drain line from the pump suction, temporarily connect a dock water hose by wrapping the joint with a rag and squeezing with your hand; turn on the dock water full force for a few seconds; verify that the line is clear; reconnect the drain hose to the pump
- Fresh water pump strainer located in Lk#72: Clean monthly.
- Deck wash strainer located in Lk#2: Clean monthly.

Deck wash intake screen located outside of the hull below waterline at Lk#1. This screen normally needs only annual cleaning at haulout.

Teak Trim:

- As part of final wash down at end of each cruise, ensure that salt is rinsed off all trim to prolong its life until next haul out.

Towing Service:

- CELESTIAL has an "Unlimited Gold" towing contract for coverage outside of the normal service area up to \$3,000 per towing incident. Captains must first contact Boat U.S. on behalf of the contract holder (H. Jochen Hoffmann) by calling the BoatUS 24-hour dispatch service for help at 1-800-391-4869. This step is required for you to be reimbursed once Boat U.S. pays.

- Boat US provided the following discussion of towing and salvage and the Boat US Open Form Yacht Salvage Contract is attached to this document:

"Historically and legally, salvage is any voluntary and successful rescue of a boat, its cargo and/or its passengers from a peril at sea. Salvage often results in a "demand" for a percentage of the boat's post-casualty value - sometimes a considerable amount of money. Towing costs much less and is billed by the hour, averaging \$140 per hour.

"The distinction between towing and salvage is reflected in the different types of programs available to boaters. Towing assistance, like the pre-paid service available to BoatUS members, provides help for breakdowns and light groundings. The far more expensive salvage claims are covered only by yacht insurance policies.

"Since the same marine assistance company often provides both towing and salvage services, it is essential that the boat owner reach an understanding with the marine assistance provider before action is taken.

"BoatUS Towing Service Providers are required to inform the captain of a boat before beginning any work if the procedure is salvage, not towing. If this isn't possible due to wind and sea conditions, the towing company should tell the captain as soon as possible.

"However, boaters should not assume they will always be told. Boaters should always ask whether the job is towing or salvage before they accept a tow.

"If the answer is "salvage," the boater should ask if the company - or "salvor" - will give a fixed price or one based on time and materials before beginning the job. If so, get the price in writing or, if an oral agreement, try to have someone witness it.

"If the salvor wants to do the job first and says he does not know what the cost will be but will make a salvage claim afterwards, the final charge will be decided one of three ways: negotiation with the boater's insurance company; binding arbitration (a variety of forums exist, including the BoatUS Salvage Arbitration Program, a low-cost option available to all boat owners, marine assistance and insurance companies); or - rarely - through litigation in federal admiralty courts.

"If the salvor does not give a price before doing the job, the boater should ask the salvor if he uses or will agree to use the BoatUS Open Form Yacht Salvage Contract (attached) which assures that any claim can go to binding arbitration if negotiation fails.

"As long as the situation is not dangerous and not deteriorating, boaters should feel free to look for another company by radio or by calling the BoatUS 24-hour dispatch service for help at 1-800-391-4869.

"To further protect the interests of the boating public, BoatU.S requires that its marine assistance companies distinguish between simple towing/soft groundings and the much more serious and expensive salvage efforts where distress or danger exist.

"To be an approved BoatUS Towing Operator, marine assistance companies must agree that Towing/Ungrounding is any operation not involving immediate danger to the boat or to a legally protected marine environment. It requires just one towing vessel with lines attached to a grounded boat to refloat it or to the disabled boat to tow it. If a grounded boat can rest without peril until the tide returns to float her free, or a boat is drifting in calm conditions after losing power, it almost always calls for towing, not salvage.

"Salvage, on the other hand, involves imminent peril to a grounded, sinking or stranded boat or to a protected marine environment, or the use of more than one towing vessel and/or special salvage equipment such as air bags or high capacity pumps.

"Finally, even though the U.S. Coast Guard no longer tows recreational boats unless it's a life-threatening situation, they will help boaters contact commercial assistance and stand by on the radio to make sure they get that help. You can ask the Coast Guard to call the BoatUS 24-hour dispatch service for you if necessary."

Through Hull Penetrations:

- Refer to the attached Through Hull Penetrations Diagram and Descriptions.

Trash:

- At Crown Bay Marina in St Thomas, Wet Trash is handled as follows: Pick up the wet trash bag from the marina office before leaving the marina and they can fill you in on the exact procedures.
- However, the main point is that any wet trash (including fruits/vegetable) has to be in the designated wet trash bag when you return to port. You must call the Marina for pick up, it must be physically handed to Marina staff; and it must not be placed on the dock by crew. Fines are huge.

Water Tank:

- **CAUTION!** The fresh water pump is not self-priming (as near as we can tell) and running the water tank dry will produce an air lock in the pump suction line. Good seamanship practice should institute early water conservation measures to prevent the tank from running dry.
- If the tank is run dry and then refilled, the water pump will not be able to lift water from the tank and refill the suction line; refer to the attached water tank and suction hose diagram. In this case it's necessary to refill the pump suction line by one of the following methods:

- Temporarily reconnect the pump suction line to the pump discharge, and temporarily rig a line from a bucket of water to the pump suction. Activate the pump to refill the suction line back to the tank. Reconnect both lines to their proper arrangement. Open one water faucet and activate the pump to pressurize the system until water and air are discharged from the open faucet.
- Alternately, refill the suction line by disconnecting it at the pump and back filling it through a three or four foot length of hose and a funnel held vertically. After refilling, reconnect this line to the pump, and open one water faucet and activate the pump to pressurize the system until water and air are discharged from the open faucet.
- Monitor water tank level on gauge (sensor) below the AC panel. Sensors (empty or full) have been calibrated to read correctly. Temperature variation can affect correct reading. Cycle switch off/on to refresh sensor reading.
- When water tank is down to three bars, a red warning light will come on when you turn on sensor switch. Top off water tank before sensor indicates level is down to three bars. Add a small amount (3 oz) of hydrogen peroxide- not bleach- to stifle algae growth.
- See also Critical Breakers above.

Water Filter:

- When exchanging the Seagull IV drinking water filter element, note that bracket on outboard bulkhead next to the hot water tank is intentionally loose to allow installation in confined space.

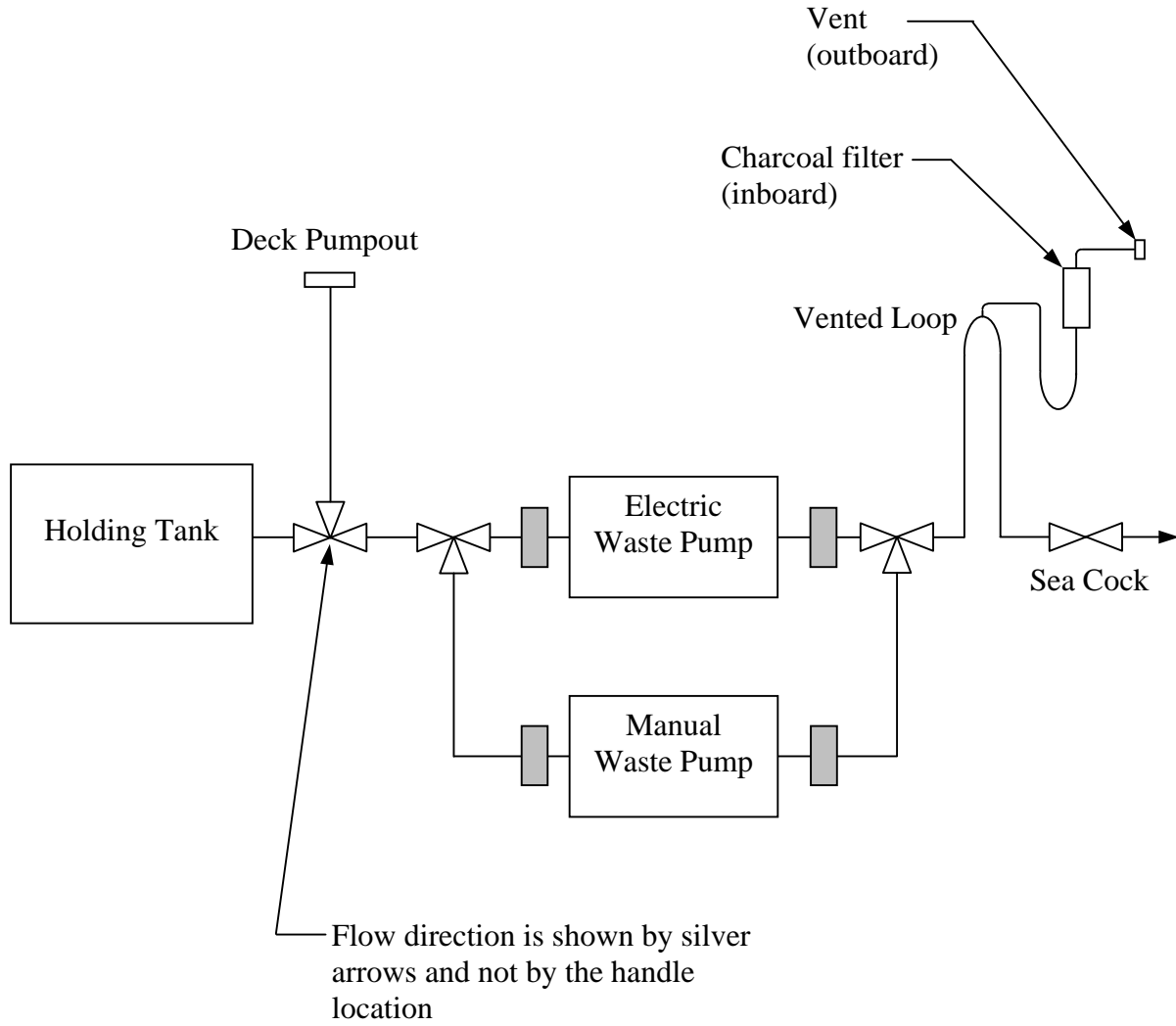
Windlass:


- Operate only with engine running. Close deck switch cover immediately, each time switch is not depressed to avoid unintended operation resulting in damage or injury.
- **CAUTION!** Ensure stainless steel pawl is lifted and released off ratchet teeth before operation of the windlass. Do not rely on pawl to hold chain once anchored; force on chain rode will break (and has broken) pawl out of housing requiring windlass replacement.
- After anchoring, use a nylon snubber line (Lk#1) to transfer the anchoring loads from the windlass to a bow cleat.
- Dedicated manual handle for the windlass is a two foot long stainless tube located in Lk#1.

Zinc Fish:

- A zinc fish with wire, clamp and lashing lead is kept in the portside lazarette shelf (Lk#78). When at dock, lower zinc fish over stern into the seawater and secure the clamp to the portside backstay. Tie webbing leader to the portside stern cleat over the dock line as a reminder that the zinc is deployed
- Remember to ship the fish before starting engine in preparation for getting underway, and stow it in Lk#75.

Waste Pumps



 3-Way Valves

 Duck Bill Valves

Fresh Water Tank

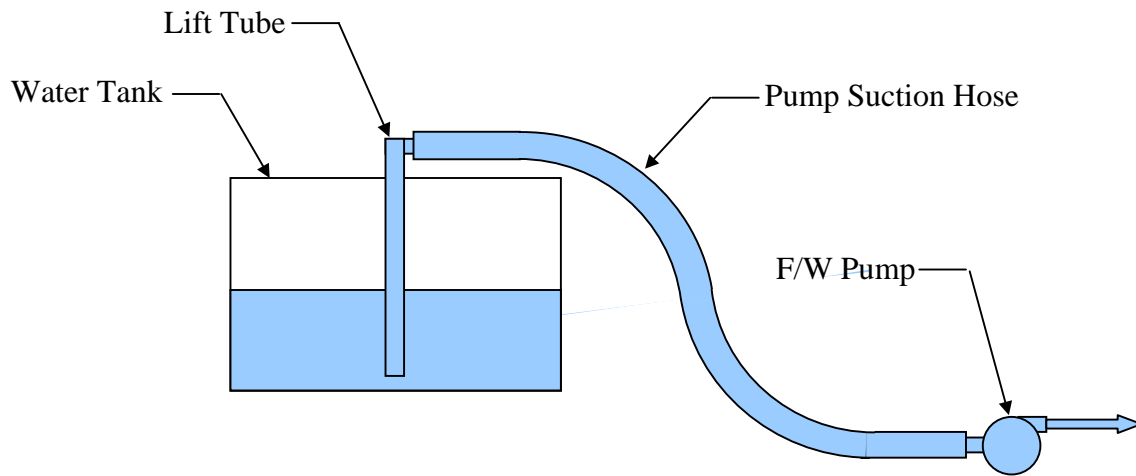


Fig 1: Tank partly full & pump primed

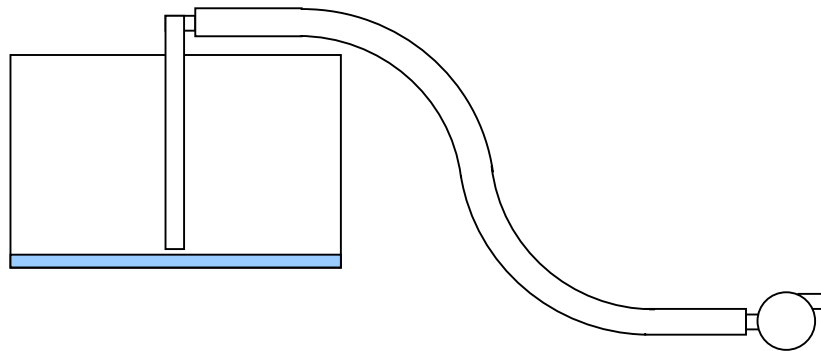


Fig 2: Tank pumped dry; pump lost prime

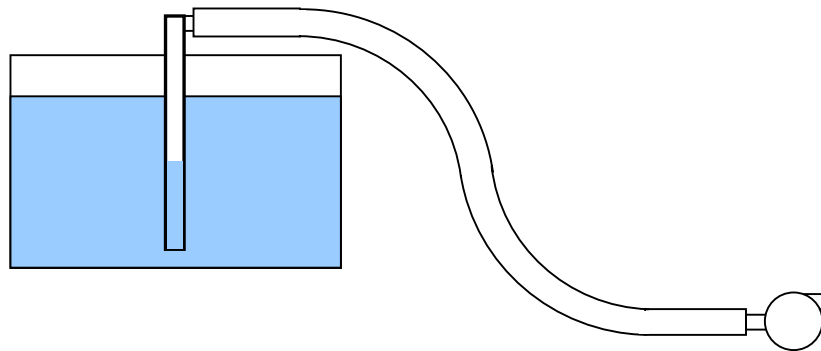


Fig 3: Tank refilled; pump not primed

CELESTIAL IP440 Hull Penetrations

v7: 2/15/2010

<u>#</u>	<u>Description</u>	<u>Type</u>	<u>Internal Access</u>	<u>Elevation</u>
1	Knotmeter	Plastic Instrument	Locker #17	Below Boot Stripe
2	Depth Sounder	Plastic Instrument	Locker #17	Below Boot Stripe
3	Holding Tank O/B Discharge	Sea Cock	Locker #13	Below Boot Stripe
4	A/C S/W Intake	Sea Cock	Locker #51	Below Boot Stripe
5	Main Engine S/W Intake	Sea Cock	Locker #61	Below Boot Stripe
6	Galley Sink Drain	Sea Cock	Locker #61	Below Boot Stripe
7	Generator S/W Intake	Sea Cock	Locker #61	Below Boot Stripe
8	Refrigerator Keel Coolers	Through Hull Bolts & Tube	Locker # 79	Below Boot Stripe
9	Rudder Stock	Through Hull Packing Gland	Locker #77	Below Boot Stripe
10	Fwd Sink Drain	Sea Cock	Locker #5	Boot Stripe
11	Fwd Shower Drain Pump Discharge	Through Hull Fitting	Locker #22	Boot Stripe
12	Holding Tank Vent	Through Hull Fitting	Locker #22	Above Boot Stripe
13	Fwd A/C Cooling Water Discharge	Through Hull Fitting	Locker #42	Boot Stripe
14	Aft Sink Drain	Sea Cock	Locker #5	Boot Stripe
15	Aft Shower Drain Pump Discharge	Through Hull Fitting	Locker #65	Boot Stripe
16	Deck Drain Thru Hull	Through Hull Fitting	Locker #65	Boot Stripe
17	Aft A/C Cooling Water Discharge	Through Hull Fitting	Locker #75	Boot Stripe
18	Fuel Tank Vent	Through Hull Fitting	Locker #75	Above Boot Stripe
19	Water Tank Vent	Through Hull Fitting	Locker #79	Above Boot Stripe
20	Generator Exhaust	Through Hull Fitting	Locker #75	Above Boot Stripe
21	Electric Bilge Pump Discharge	Through Hull Fitting	Locker #75	Above Boot Stripe
22	Cockpit Drain	Through Hull Fitting	Locker #75	Above Boot Stripe
23	Main Engine Exhaust	Rubber Cap w/ Flapper	Lockers #75 & 79?	Above Boot Stripe
24	Cockpit Drain	Through Hull Fitting	Locker #79	Above Boot Stripe

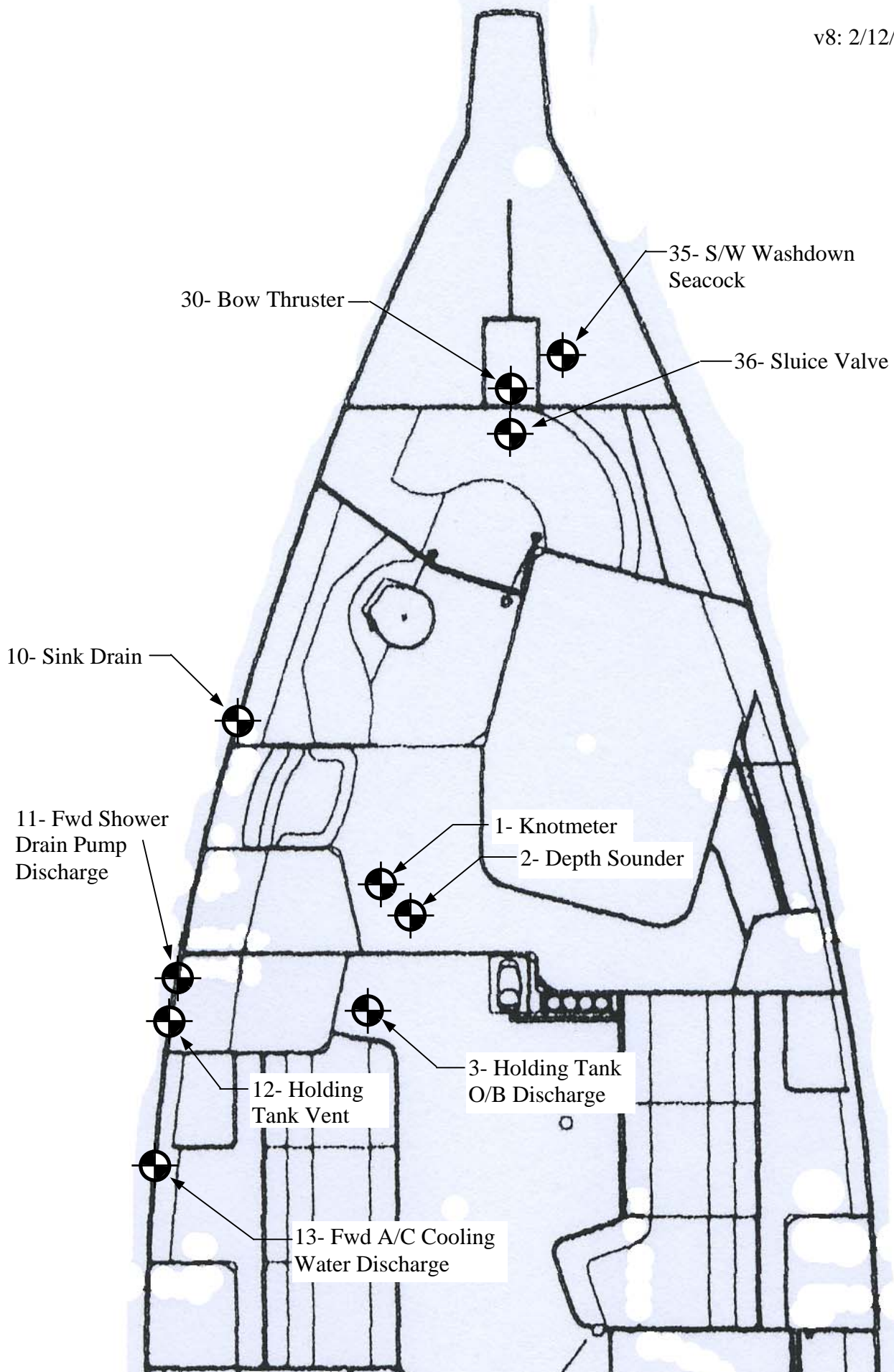
CELESTIAL IP440 Hull Penetrations

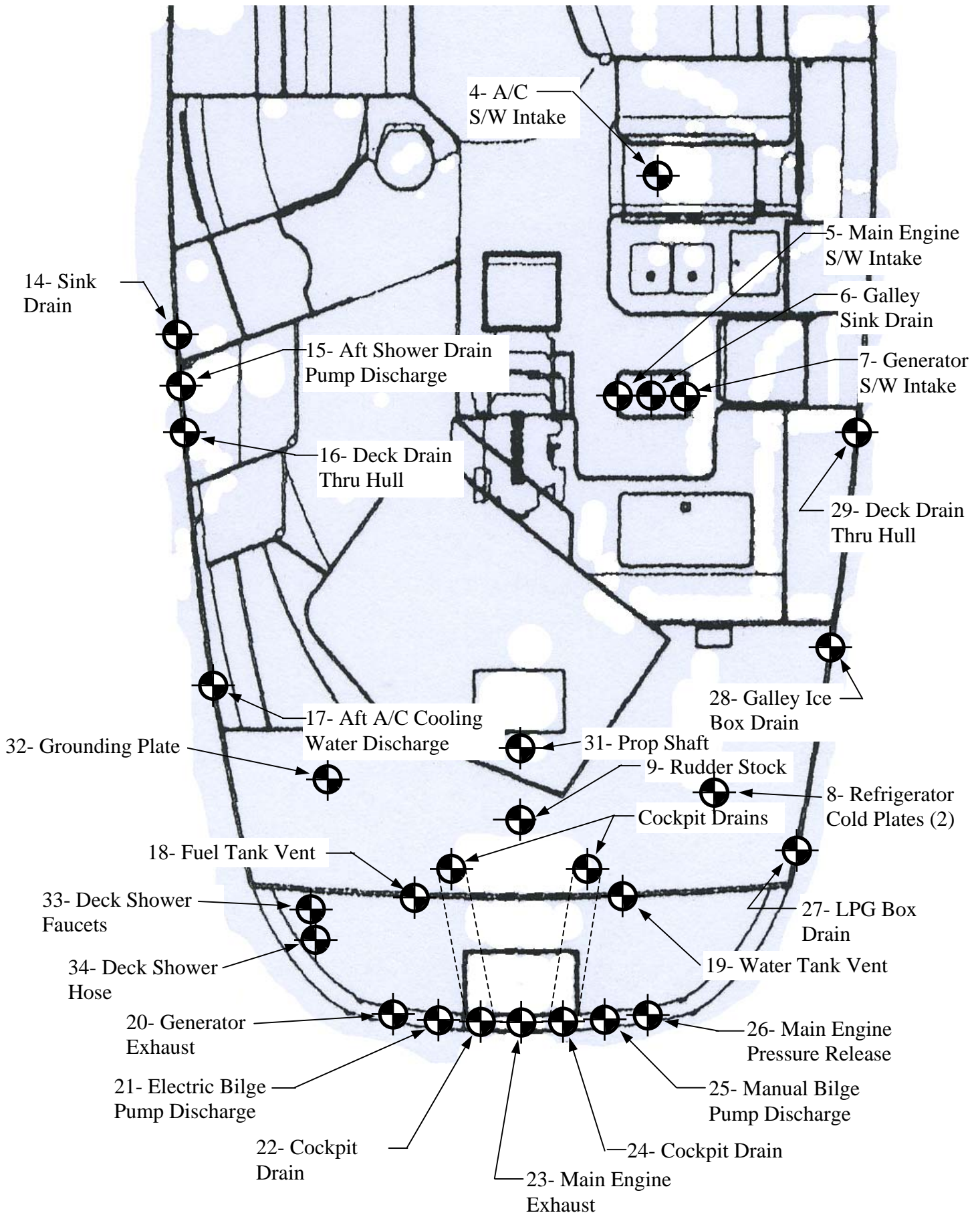
v7: 2/15/2010

25	Manual Bilge Pump Discharge	Through Hull Fitting	Locker #79	Above Boot Stripe
26	Main Engine Pressure Release	Through Hull Fitting	Lockers #75 & 79?	Above Boot Stripe
27	LPG Box Drain	Through Hull Fitting	Locker #79	Boot Stripe
28	Galley Ice Box Drain	Through Hull Fitting	Locker #73	Boot Stripe
29	Deck Drain Thru Hull	Through Hull Fitting	Locker #25	Boot Stripe
30	Bow Thruster	Through Hull Electrical Wires	Lockers #1 & 2	Below Boot Stripe
31	Prop Shaft	Through Hull Packing Gland	Locker #71	Below Boot Stripe
32	Grounding Plate	Through Hull Bolts		Below Boot Stripe
33	Deck Shower Faucets	Valve	Locker #75	
34	Deck Shower Hose	Hose & Nozzle	Locker #75	
35	S/W Washdown Intake	Sea Cock	Locker #2	Below Boot Stripe
36	Interior Sluice Valve from Lockers #1 & #2 to Bilge	Manual Valve	Under Fwd Shower Seat	Interior Below Boot Stripe

CELESTIAL IP440 Hull Penetrations

v8: 2/12/2010





4- A/C
S/W Intake

5- Main Engine
S/W Intake

6- Galley
Sink Drain

7- Generator
S/W Intake

29- Deck Drain
Thru Hull

28- Galley Ice
Box Drain

8- Refrigerator
Cold Plates (2)

27- LPG Box
Drain

26- Main Engine
Pressure Release

25- Manual Bilge
Pump Discharge

24- Cockpit Drain

23- Main Engine
Exhaust

22- Cockpit
Drain

21- Electric Bilge
Pump Discharge

20- Generator
Exhaust

34- Deck Shower
Hose

33- Deck Shower
Faucets

18- Fuel Tank Vent

Cockpit Drains

9- Rudder Stock

31- Prop Shaft

17- Aft A/C Cooling
Water Discharge

32- Grounding Plate

16- Deck Drain
Thru Hull

15- Aft Shower Drain
Pump Discharge

14- Sink
Drain

CELESTIAL IP440 Locker Descriptions

v5: 2/15/2010

<u>#</u>	<u>Location</u>	<u>Description</u>	<u>Contents</u>
1	Foredeck	Anchor Locker, Stb	Plow Anchor, Snubber lines, Lines
2	Foredeck	Anchor Locker, Port	Bruce Anchor, Chain/Line rode ; Wash down hose; Lines
3	Forward Head	Shower cubby	
4	Forward Head	Vanity	Toiletries
5	Forward Head	Head sink cabinet	Cleaning supplies
6	V-Berth	Drawer under berth	Owners Locker; books
7	V-Berth	Drop-in under mattress	Owners Locker; bedding
8	V-Berth	Drop-in under mattress	Owners Locker
9	V-Berth	Drop-in under mattress	Owners Locker
10	V-Berth	Drop-in under hydraulic liftup	Owners Locker
11	V-Berth	Berth hydraulic liftup	Chart Cases; Bedding
12	V-Berth	Drawer under berth	Crew Storage
13	V-Berth	Floor Drop-in	Y-Valve; Waste pumps
14	V-Berth	Locker Shelf; Upper	Crew Storage
15	V-Berth	Locker Shelf; Lower	Crew Storage
16	V-Berth	Hanging Locker	Crew Storage; Dry Foulies; Jackets
17	V-Berth	Floor Drop-in	Speed & Depths transducers
18	V-Berth	Storage Locker Shelf; Upper	Crew Storage
19	V-Berth	Storage Locker Shelf; Lower	Crew Storage
20	V-Berth	Floor Drop-in	Snorkel gear; Owners' boots
21	Salon	Floor Drop-in	O/B discharge seacock; Fwd shower sump pump & strainer
22	Salon	Hanging Locker	Dry Foulies, Clothing; Legs-salon table; Vacuum; Vent lines
23	Salon, Stb	Pantry Shelves	Non-skit mats, salon table; Breakfast, snack items; Bottle rack
24	Salon, Stb	Sliding door locker above seatback, Fwd	Crew Storage
25	Salon, Stb	Seatback, Fwd, Upper	Crew Storage
26	Salon, Stb	Seatback, Fwd, Lower	Crew Storage
27	Salon, Stb	Seatback, Fwd, Deep	Deep storage potentially exposed to wet
28	Salon, Stb	Book Shelf	Captain's books; Sextants
29	Salon, Stb	Seatback, Middle, Upper	MDS books, etc.; Paper towels
30	Salon, Stb	Seatback, Middle, Lower	Galley storage
31	Salon, Stb	Seatback, Middle, Deep	Deep storage potentially exposed to wet
32	Salon, Stb	Locker above seatback, Aft	Cockpit & USCG-required equipment; Binox; Spotlight, etc.

CELESTIAL IP440 Locker Descriptions

v5: 2/15/2010

33	Salon, Stb	Seatback, Aft	Offshore med kit; PC; Office supplies. EXPOSED cable connectns !!!
34	Salon, Stb	Seatback, Aft, Deep	Deep storage potentially exposed to wet: Provisions etc.
35	Salon, Stb	Drop-in under settee seat, Fwd	Deep storage potentially exposed to bilge water
36	Salon, Stb	Chart drawer under settee	Charts/Plotting sheets current route; Lap board; Nav tools # 2;
37	Salon, Stb	Drop-in under settee seat, Aft	2 AGM house batts in box; Ditch bottles/bag; Spare med supply duffle
38	Salon, Port	Sliding door locker above seatback, Fwd	Crew Storage
39	Salon, Port	Book Shelf	Book Shelf; Sextants
40	Salon, Port	Locker above seatback, Aft	Manuals; Radar screen cleaner & microfiber cloth; Red Doc Binder
41	Salon, Port	Seatback, Fwd, 2 Shelves	A/C Duct; Duffel w/ blocks, sail mending kit; spare vent filter, etc
42	Salon, Port	Seatback, Middle	Not for storage: A/C Compressor; vacuflush pump
43	Salon, Port	Seatback, Aft	Galley stowage
44	Salon, Port	Drop-in under settee seat, Fwd	Spare parts; engine oil; coolant; Plastic jars bosun/engineer items
45	Salon, Port	Drop-in under settee seat, Middle	Air return space; Spare belts; Tool boxes; Hardware organizers
46	Salon, Port	Drop-in under settee seat, Aft	Lubricants; Drill (restricted use) Large tools in duffles
47	Salon, Port	Drop-in below #46	4 AGM batteries boxed in
48	Salon	Floor Drop-in	Bilge; Raw water strainers
49	Salon	Floor Drop-in	Fuel Tank shut off and gauge
50	Nav Station	Nav Table	Nav tools, logs, etc; Hinged to fold up for access to gen set
51	Nav Station	Floor Drop-in	A/C pump and its sea water sea cock
52	Galley	Counter Drop-in	Pots, pans, cutting board
53	Galley	Locker under sink	Dish washing & cleaning supplies
54	Galley	Sliding door locker	Coffee, tea, filters, spices, condiments




CELESTIAL IP440 Locker Descriptions

v5: 2/15/2010

55	Galley	Sliding door locker	Spices, condiments, cooking oil, Gator Aid
56	Galley	Pantry shelves	Cereal, snacks, toaster
57	Galley	Pantry drawer below frig	Plactic bags, foil
58	Galley	Pantry drawer below frig	Clothes pins; large utensils
59	Galley	Racks, drawers	Dishes; Glasses; silverware
60	Galley	Rack, high up	Galley belt; matches
61	Galley	Floor Drop-in	Access to hoses & 3 sea cocks
62	Companionway	Floor Drop-in	Access to generator lift muffler
63	Aft Head	Sliding door locker	Crew Storage; toilet kits
64	Aft Head	Cabinet	First Aid day kit; Toilet paper; Cleaning supplies
65	Q-Berth	Hanging Locker Top Shelf	Crew Storage; Sextant
65	Q-Berth	Hanging Locker	Crew Storage; Dry Foulies, Jackets
66	Q-Berth	Cabinet; 2 shelves	Crew Storage
67	Q-Berth	Floor Drop-in	Aft shower strainer; Spare Lines; Bosun's Chair
68	Q-Berth	Floor Drop-in	Provisions
69	Q-Berth	Berth hydraulic liftup	Crew Storage
70	Q-Berth	Drop-in under hydraulic liftup	Crew Storage; sea boots
71	Q-Berth	Drop-in under mattress	Coupling shaft; Transmission & dip stick
72	Q-Berth	Drop-in under mattress	Water heater; Water filter; Outboard Bulkhead, Manifolds
73	Q-Berth	Drop-in under mattress	Sensors; Hoses
74	Cockpit, Portside	Combing Hatch	Running rigging, flaked; Preventer Line
75	Cockpit, Portside	Lazarett	A/C aft compressor; Sea anchor; Fortress Anchor; Lines
76	Cockpit, Portside	Lazarett Shelf	Rubber gloves; Sail ties
77	Cockpit	Helmsman Seat Drop-in	Rudder shaft; emergency steering
78	Cockpit, Stb	Combing Hatch	Small lines; Barber hauler; Block/tackle #1; Manual pump handle
79	Cockpit, Stb	Lazarett	PFDs; Docking lines; Fenders; Boat hooks; Buckets
80	Cockpit, Stb	Lazarett Shelf; Upper	Fire extinguisher; Block/tackle #2; Dinghy air pump
81	Cockpit, Stb	Lazarett Shelf; Outboard	Winslow Life Raft
82	Swim Platform	Cubby	Emergency boarding ladder

CELESTIAL, IP-440 Locker Numbers

v9: 2/12/2010

-  Boat Lockers
-  Crew Storage
-  Owner's Storage

