PRINCIPALS OF OPERATION

S/V PILGRIM

2021 UPDATE:

AIS: REMOVED TO TUGLET DUE TO AIS MMSI TRANSFER ISSUES

M800 SSB: BOTH HEADS ARE IN NEED OF TESTING

MAIN UNIT FUNCTIONAL

706MKII SSB: REMOVED

SERIAL TO USB CONVERTER: REMOVED

BATTERIES: 6X6VOLT REMOVED AND REPLACED BY 2X6 VOLT AND 2X12 VOLT

STARTER BATTERY REPLACED

ALL TOPPED OFF AND CHARGED

SOLAR PANELS: ADDITIONAL COLMAN REGULATOR ADDED TO TEST

SP90: STARTED AND RUN TO TEST STARTER BATTERY

GENERAL DESCRIPTION

S/V PILGRIM, HULL #304, ZWB423040483

Previously registered in Canadian #824443 - USGC documented by original owner 661315

DIMENSIONS

- LOA: 42 ft plus Davits (3.5 feet) and Bowsprit (3.2 feet) 48.7 feet in total
- LWL: 32 ft 8 in
- Draft: 5 ft 6 in (loaded with fuel, water and cruising supplies), 5 feet when dry and unloaded
- Beam: 13 ft
- Height (Bridge Clearance): 57 ft when loaded
- Displacement: 23,500 lbs
- Ballast: Lead keel, 8000 lbs
- Headroom: 6 ft 9 in main salon, 6 ft 2 in aft cabin, 6 ft 3 in forward cabin
- Hull material: Fibreglass
- Bottom anti blister and paint: Interlux 2000 refinished in 2016, Seahawk ablative (Holland Marine 2019)
- Keel type: Modified keel (Brewer Byte) with aperture enclosed prop.

ENGINE & PROPULSION

- Engine make: Ford Lehman 4-236
- Engine model: 4 cyl
- Engine year: 1983
- Engine hours: 1478 on previous Tach, 5200 on new engine hour meter
- Horse power: 90 hp
- Cruising rpm: 1500-1900 rpm
- Fuel consumption 1.2 to 1.5 gal per hr at 1600 rpm
- Oil change requires 2 US gal Rotella straight 30 plus 32 oz of Marvel Mystery Oil
- Oil filter: XG8A
- Cruising speed: 6.5 average at 1600 rpm
- Max speed: 7.5 knots
- Max rpm: 2500 rpm
- Oil, Transmission coolers and heat exchanger replaced 2015
- Propeller type: fixed 3 blade included in price
- R&D Flex coupler used as shaft/prop protection and electrical (galvanic) isolation
- Prop shaft 1.25 inch
- Spare original shaft and coupler in storage
- Matched shaft and coupler new in 2013
- line cutter
- Transmission: Borg Warner Velvet Drive 72C … new in 2010
  - Uses ATF with cold fill top mark on dipstick

TANK CAPACITY

FUEL

- Fuel capacity: 210 gallons diesel
- Fuel tank material: Stainless steel
- Total No. fuel tanks: 3 tanks useable
- port & starboard 60 US gallons
- keel 90 US gallons
- Vetus Splash-Stop on keel tank filler
- Add 32 oz of Marvel Mystery Oil to centre tank per fill up
- Add fuel to keel tank only and transfer to saddle tanks via fuel polisher as required
- Fuel filters
  - Primary 2 x Racor 2000 (brown 2 micron) on engine room door fuel polishing system
  - Secondary 2 x Perkins 26561117 on engine
  - Gulf Coast filter is single ply toilet paper to fit
  - Water Separator has an optional water filter not used in current configuration
  - Fuel transfer/polishing instructions under separate section

WATER

- Water capacity: 2 x 90 US gal tanks
- Water tank material: Fiberglass & aluminum
- AIR VENT PLUGS MUST BE REMOVED WHILE FILLING
- Use 1/4 cup bleach per tank when filling from desalinator
- Use pool test kit to measure chlorine level in both tanks on a weekly basis
- Drinking water filter: Rainfresh RV style SST, Cleanable ceramic cartridge number 1S

HOLDING

- Holding capacity: 40 gallons,
- Electric Whale Gulper pump for holding tank discharge LABELED “SUMP” on electrical panel
- Y valve located under work bench for deck or hull discharge selection
- Thruhull for hull discharge located beside Gulper pump
- Holding tank material: plastic
- Use a strong flashlight to determine tank level.

ACCOMMODATIONS

- Aft Stateroom sleeps: 2 (Queen size)
- V-Berth sleeps: 2 (large double sized)
- Dinette sleeps: 1 (sea berth)
- Cabins: 2
- Heads: 2 x Jabsco Model 29090-3000
  - Shower fitting on aft head faucet
- Custom sheets, pillow cases and custom memory foam mattress,
- Optional Frolli springs aft

GALLEY

REFRIGERATION/FREEZER

- Refrigeration/Freezer: E-Z Kold 2 cold plates in freezer, one cold plate in refrigerator
- dual compressors/digital thermostats, water and/or air cooling
- Switches to control water pump and thermostat settings are beside refrigerator

STOVE

- Stove: Force 10 mariner 3 burner
- Cooking fuel: Propane - 2 x 20 lb tanks located in Aft Port Lazaret. Use swappable tanks due to rusting
- Propane tank on/off toggle switch beside refrigeration controls labeled “L.P.Gas”
- Propane tank power switch on Main panel labeled “L.P.Gas”

WATER

- Sink: Stainless steel double sink
- Drinking water filter: Rainfresh RV style SST, Cleanable ceramic cartridge number 1S
  - The delicate ceramic filter can be cleaned without turning off the fresh water pump by removing the discharge hose (blue) from the filter cartridge, unscrewing the cartridge top and removing the filter element.
- Water system: hot/cold, electric pump for fresh water. Jabsco 1210-0001 pump impeller
  - 4 port water manifold allows draw from port or starboard tank or winterizing solution and allows galley foot pump to access the fresh water tanks/ winterizing solution
  - Galley foot pump can be switched between fresh and sea water. Currently on sea water
- Water heater element is a dual 12/120 volt electric unit. 120 is currently used.
  - The 12 volt connection can be used as a heat sink for either solar or wind-generator use but is not required due to use of smart controllers on both the Kiss unit and solar panels
  - The water heater can be bypassed for winterizing and/or draining. The 2 valves are on the port side of the tank

BBQ

- Magma on aft rail
- Cooking fuel: Propane - hose from 20 lb tanks or adapter for small 1 lb bottles
- Propane tank on/off toggle switch beside refrigeration controls labeled “L.P.Gas”
- Propane tank power switch on Main panel labeled “L.P.Gas”
- Use small bottles for HIGH heat and hose for LOW-MED heat

ELECTRONICS & NAVIGATION EQUIPMENT

VHF

- VHF: ICOM IC-M402. Antenna is on the main mast. Selection switch beside Navigation desk
  - Switches allow VHF attachment to the mizzen VHF antenna currently in use by the AIS transponder
- Power supplied from main electrical panel marked “VHF Radio SSB Radio”

SSB

- Isolated backstay: Yes. Attached to the ICOM M800 Marine SSB.
- Power for the M800 transmitter is supplied from main electrical panel fuse marked “Marine SSB”
- Power for the M800 remote head is from the main electrical panel fuse marked “VHF Radio SSB Radio”

RADAR

Radar: JRC 1500. Power supplied from main electrical panel marked “RADAR”

- Radar reflector: Davis
- Radar receives waypoint data from either GPS or Chart Plotter. Selection wire in engine room.

AUTOPILOT

- Autopilot: Auto Helm 6000 plus (hydraulic) with 2 cockpit mounted remote controllers
- Power supplied from main electrical panel marked “Auto Pilot Wind and Speed”
- “Wind/Hydraulic” Toggle switch allows selection of Wind direction or remote controllers to control course
- Rudder angle indicator part of ST6000 located in aft state room on main ST6000 computer display

DEPTH SOUNDER

- Depth sounder: Garmin 300c fish finder. Zero depth is currently set to the bottom of the keel.
- Transducer is located in the forward stateroom in a plumbing cleanup fitting glued to the hull
  - The fitting is filled with mineral oil and does not require maintenance

AUTOHELM UNITS

- Wind speed/Direction: Auto Helm ST 40
- Knot-meter: Auto Helm ST 40 display unit using a ST-60 speed transducer due to hull thickness
- All units interconnected using ST type wiring

CHART PLOTTER

- Chart Plotter: Standard Horizon CP300i. Current chip is North America 2018. Not being renewed.
- Display Interfaces with AIS unit
- GPS data switchable to RAPIDFIX 406 Epirb
- Provides waypoint data to radar

COMPASS

- Compass: Ritchie Globe Master
- Bulb replaced by LED

MISC

- Badboy Extreme MJ internet amplifier incl WiFi unit
  - Ap name pilgrim 192.168.1.1 pw pil1grim

ELECTRICAL SYSTEMS

BATTERIES

- 12V House Bank 1 : 12V deep cycle (2) Housed in 1 of 2 boxes port side of engine room under white table
  - Selector switch in engine room to isolate the 2 banks from the system and each other
  - Wet cells need to be checked for water level monthly

- 12V House Bank 2 : 6V deep cycle (2) 230AH each
  - Housed in 2 boxes starboard side of main cabin under nav seat
  - Selector switch on seat side to isolate the bank
  - Wet cells need to be checked for water level monthly

- Start bank: 12V Starter
  - In a battery box inside the engine room beside the door
  - Sealed unit
  - Starter/House Battery Selector Switch under main companion way stairs

- Windlass and Desalinator pump deep cycle battery
  - In a battery box inside V berth under the mattress
  - Starter/House Battery Selector Switch under main companion way stairs
  - Charged from main house bank
  - ON-OFF switch and fuses
  - Wet cells need to be checked for water level monthly

BATTERY CHARGERS

- Battery charger: 120 volt IOTA 50 amp
- Alternator: One Balmar 90 amp
  - Smart Reg: Smart alternator regulator Balmar ARS-4
- Wind Generator: KISS with new high output controller
- Solar panels: 2 x 85 watt with a 40 amp Tristar smart controller

BATTERY MONITOR

- Monitor Amp hours: Victron Energy BMV-700

MISC

- Deck level nav lights are bulbs, Mast head nav lights are LED
- Solar Powered air vents in both heads
- Dynaplate and interior counterpoise for SSB grounding

SAILS & RIGGING

RIGGING TYPE

- Dual headsail ketch
- Sail area: 1256 sq ft cutter ketch with staysail
- Rigged for Spinnaker (halyard, pole, down haul, mast fittings)
- Lazy jacks on both main and mizzen

SAILS

- Offshore Main: In very good conditions with sail bag and cover
- Coastal Mizzen: In very good conditions with sail bag and cover
- Offshore Staysail: on roller furler in good condition with UV protection and sail bag
- Offshore 130% Genoa: on roller furler in good condition with UV protection and sail bag
- Spinnaker NOT available
- Mizzen staysail NOT available

STANDING RIGGING

- Masts: Aluminum main and mizzen with shortened mizzen boom
- Park Avenue type Main boom, lazy jacks
- Roller Furl: Harken for Jib, Profurl for Staysail
- Standing rigging replaced 2005, 2017, 2019
- All chainplates pulled, inspected, cleaned 2012
- Towing/drogue/sea anchor attachment plates on stern

RUNNING RIGGING

- Main halyard, spinnaker, reefing and furling lines led aft into cockpit
- Reefing: 2 reef points on main. Single line reefing into cockpit
- Secondary main and mizzen halyards
- Mizzen staysail halyard
- Spinnaker/Reaching poles (genoa, staysail): Stowed forward

WINCHES

- Winch: Cockpit, 2 Lewmar #48 ST + 2 Barient #21 ST
- Winch: Main mast, 2 Lewmar #30 and 2 Lewmar #8 single speed
- Winch: Cockpit Halyard Lewmar #30 ST
- Winch: Mizzen mast, 2 Lewmar #8 single speed

DECK EQUIPMENT

GROUND TACKLE

- Anchor: 55 Lb Rocna
- Chain length/size: 200' plus 60' line (on bow) new 2019
- Windlass: Lofrans Tigres 3/8 BBB new 2019

LIFE LINES

- Rails: SS stanchions with SS rails aft to gate
- Gates: Starboard and port coated cable w/SS latches
- Forward Lifelines: Amsteel
- Stern Lifelines: upper 1 inch S/S tubing, lower Amsteel
- Ladder: Portable folding S/S with mounts on port and starboard
- Bow pulpit: SS and trampolene mesh

NAVIGATION LIGHTS

- Nav lights: Steaming light forward on main mast, anchor light top of mast, red/green light on bow and stern light mounted on davits
  Backup tri-light (LED) on main mast
  Backup anchor light on mizzen
- Spreader lights: LED on Mizzen starboard spreader
- Main Mast deck light (halogen)

MISC

- Dinghy davits: SS
- Deck wash: salt water Bow and Stern, fresh water Stern
- Bow rollers: Two
- Deck material: Fiberglass
- 8 Fenders, 2 fender balls
- dock lines
- SS Tempered glass ports new in 2005
- Teak cockpit grating
- 2 x fender boards, 2 x fender rollers

MECHANICAL SYSTEMS

- Blower: Engine room exhaust
- Fire extinguishing: Five
- Fuel filters: 2 x Racor primaries in fuel polishing system
- Water maker: PUR 160E element replaced in 2012
- Bilge pump: PAR model 36680, automatic pump switch
- whale MKII Gusher manual back up
- Water Heater: Seaward (16 gal)
- Dickinson Newport Diesel furnace
- Steering type: Hydraulic
- Raw water sea strainer: Yes
- House fans: Yes
- All manuals organized in binders
- Maintenance logs available

SAFETY EQUIPMENT

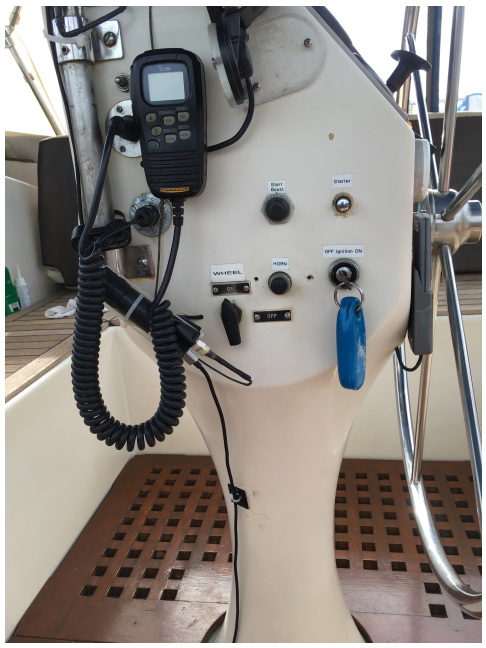
- Life Jackets: Five
- Mob pole: Yes
- Jack lines: yes
- Ring with line, 2 bagged throwing lines, electronic signal (USCG approved)
- Bell with interior and mizzen mount
- Mizzen mounted horn/alarm

COVERS & CUSHIONS

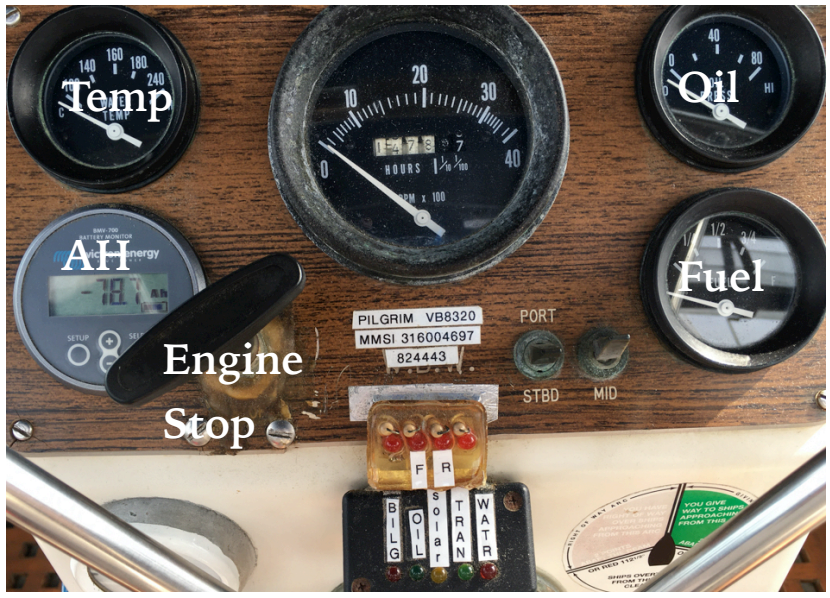
- Dodger: Full cockpit enclosure, heavy duty SS frame, Strataglass
- Binnacle Cover: Blue Sunbrella
- Hatches: Two canvas covers for dry storage
- Cockpit cushions: Custom fit with mesh bottoms, helm seat cushion
- Bug screens: On all portholes and hatches
- Sun awning for main boom
- Sun screens for enclosure windows
- Grab rail covers
- Center hatch awning

PROCEDURES

BINNACLE LAYOUT



- Binnacle port side has ignition key slot, starter button, starter boost button and hydraulic valves for turning the wheel on or off (off when auto steering is engaged)
  - Use the starter boost only if in freezing temperature since it only supplies extra fuel
  - It is NOT a glow plug switch/button
- Binnacle starboard side has a combined gear shift lever and throttle control with transmission disconnect pull out knob
- Binnacle top has a manual STOP cable handle and various instruments
- Binnacle face has a green LED marked “TRAN” that lights up when the transmission is in neutral
- Binnacle face has a green LED marked “OIL” that lights up when the Oil pressure is zero
- Binnacle face has a red LED marked “WATER” that lights up when the fresh water pump isrunning



- Binnacle face has a red LED marked “BILG” that lights up when the bilge pump is running
- Binnacle face has an orange LED marked “Solar” that lights up when the solar panels are operational
- The engine will not start if the transmission is in gear (Green TRAN LED off)
- Engine START fuse is on main electrical panel marked “Engine Start - Alarm”
- There is NO alarm for zero or low oil pressure … there is a red LED on the Binnacle instead
- Additional red LEDs marked F - Freezer and R - Refrigerator are on when the compressors are running
- Unlabelled red LED is on if the refrigeration/freezer water cooling pump is running

• ENGINE START/STOP SEQUENCE

- Start sequence
  - Check oil and transmission fluid level
  - Transmission in neutral verified by green light and gearshift black knob pulled out
  - Pull out Engine STOP handle to stop fuel delivery to the injectors
  - Key in and turned on, RED oil LED should come on
  - Press START button to turn over engine 4 times (gets oil moving)
  - Release START button and push in Stop handle
  - Move throttle level up a bit to increase starting rpm
  - Press START button again to start engine, RED oil LED should go out
  - Once started wait until the Tachometer wakes up, alternator starts working then reduce speed to idle
  - Oil pressure should be 40 psi or above, Engine thermostat is set to 70 degrees
  - At low speed the temperature should be 160-165 degrees.
  - Press in the gearshift black knob to engage the transmission ensuring the green neutral LED is ON
  - Move the throttle lever forward to go forward and back to reverse

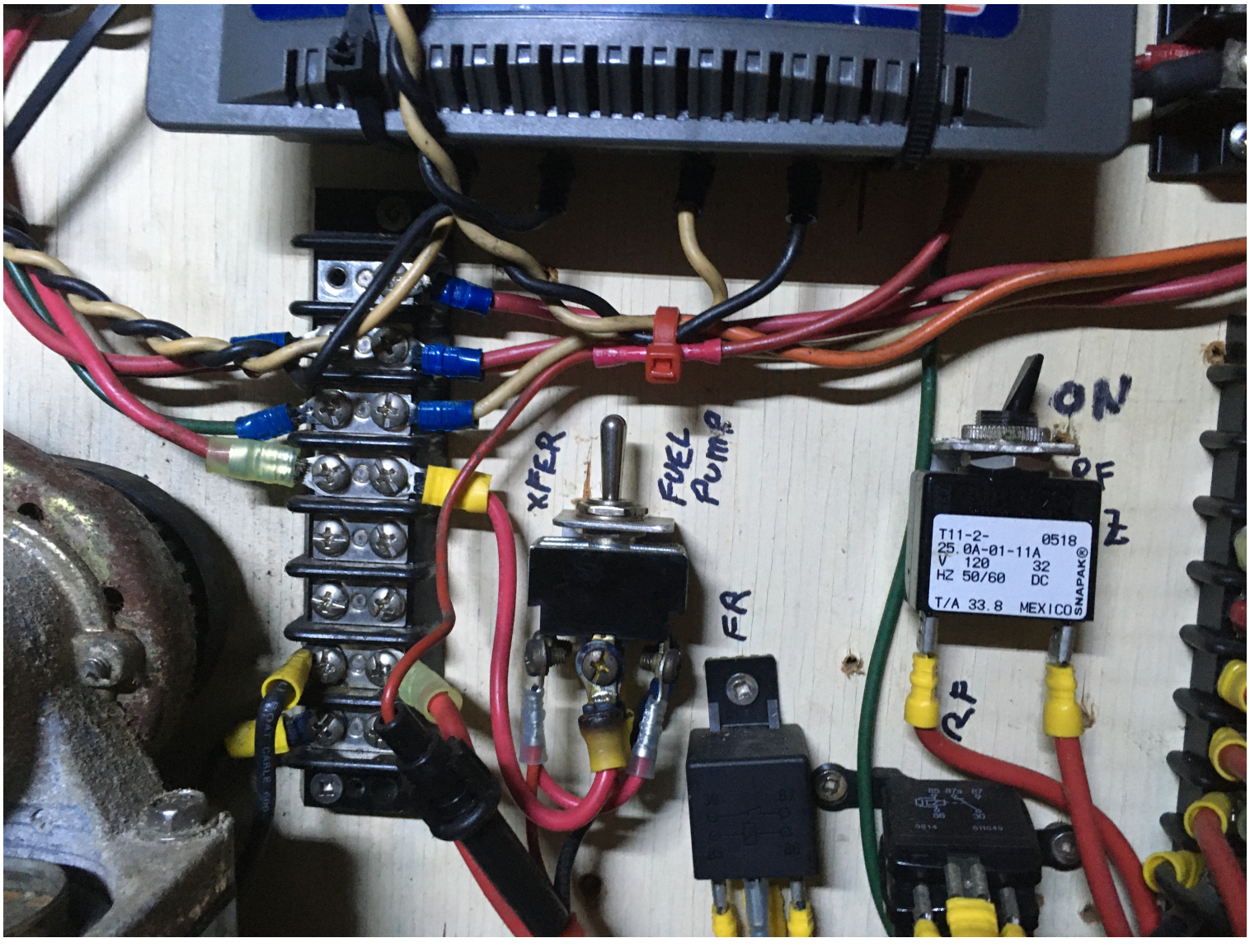
- Stop sequence
  - Move throttle to neutral position and pull out gearshift black knob
  - Pull out Engine STOP handle, RED oil LED may come on
  - Turn ignition key OFF otherwise the fuel pump keeps working

TRANSMISSION

- The Borg Warner Velvet Drive 72C replaced an existing 71C
- There is a neutral position switch in the transmission which is wired to a GREEN LED on the Binnacle
- There is a transmission fluid heat exchanger mounted above the transmission that needs replacement every 1500 engine hours
- The throttle and transmission cables were replaced in 2018
- To place the transmission in neutral move the throttle handle up/down until the GREEN LED comes on to show transmission is physically in neutral. Pull out the black knob on the throttle handle to disconnect the transmission cable from the throttle handle
- Replace ATF fluid every 500 engine hours or annually

DIESEL FUELLING AND TRANSFER

- Port and Centre fuel tank filler ports are located on the port side beside the cockpit
- Starboard filler port is located on the starboard side opposite
- Only the centre tank is filled from on shore facilities to prevent contamination
- Both saddle tanks are refilled from the centre tank using the fuel polishing system to remove any water and/or contaminants
- Fuel additives are only added to the centre tank except for layup
- The centre tank gauge is not accurate and should NOT be used during refuelling
- Have someone monitor tank level with the sight tube on the centre tank
- The saddle tank gauges are accurate with full being just before the FULL mark
- There are 3 electric fuel pumps
    - Heater fuel pump to deliver fuel to the diesel furnace
    - Transfer fuel pump to boost fuel loading from the centre tank during saddle tank transfers
    - Main/Polishing fuel pump to allow fuel to be moved between tanks, cleaned or assist the engine mounted mechanical fuel pump
- The electrical switch to operate the diesel furnace fuel pump is mounted on the furnace
- The Main/Polishing and Transfer pump switch is located in the engine room on the forward bulkhead
    - The switch is a 3 position toggle with centre off,
        - “Transfer” position will turn on both the Main and Transfer fuel pumps to allow fuel to be moved from the centre to a saddle tank
        - “Fuel Pump” position will turn on the Main fuel pump for use in fuel polishing. The Main fuel pump is also turned on when the ignition key is switched on

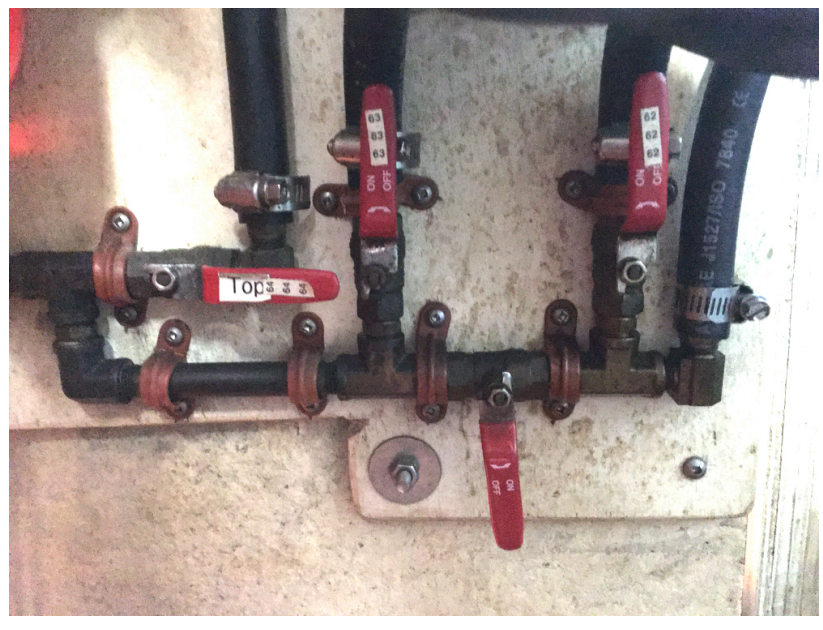


Fuel pump switched to right turns on the main fuel pump if polishing the starboard or port tank. Switch to the left also turns on the centre tank fuel pump if transferring fuel from the centre tank to a saddle tank. Black on Yellow crimp connection due to soldering overheating.

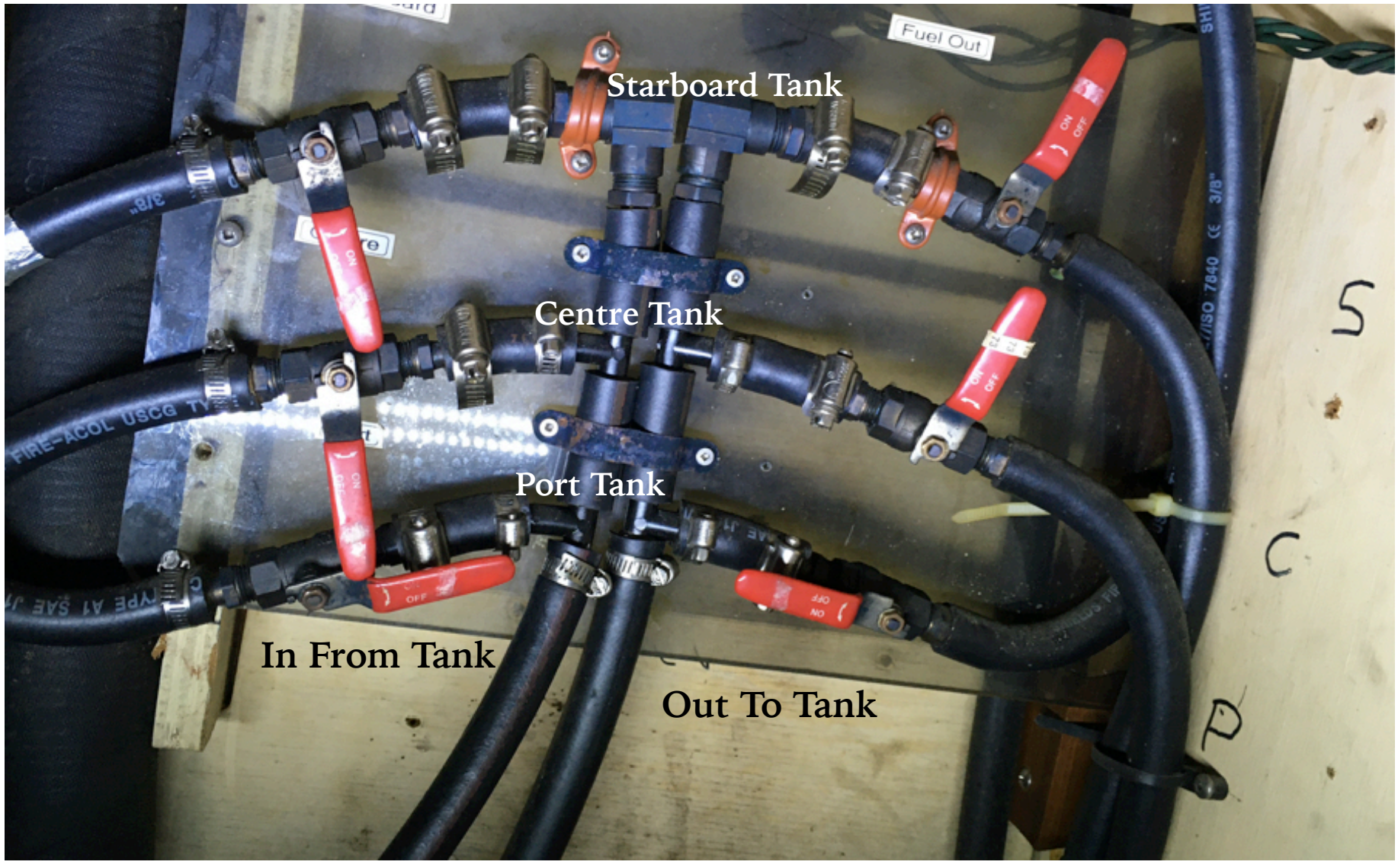
DIESEL POLISHING

Door Mounted Filter Elements

Fuel Hose from tank selector valves



Example of bypass valve arrangement used for pump, gulf coast filter and primary filter elements. All components can be bypassed except the Vacuum gauge. Valve handle in line means open, at a 90 degree angle means closed.



Tank selection valves in engine room starboard side wall showing Port tank selected as source and output (via injector or transfer valve) directed back to port tank. Any single tank can be selected as source and any single tank can be selected as return.

- To polish fuel select the same input and return tank, open the transfer valve located on the door, close the injector valve located on the engine fuel hose and set the fuel pump switch to “Fuel Pump”
- To transfer fuel from the centre tank select the Centre tank as source and the desired return tank. Open the transfer valve located on the door, close the injector valve located on the engine fuel hose and set the fuel pump switch to “Xfer” The main fuel pump and the centre tank booster fuel pump will both be turned on to maximize fuel transfer speed.

THRU-HULL MAINTENANCE

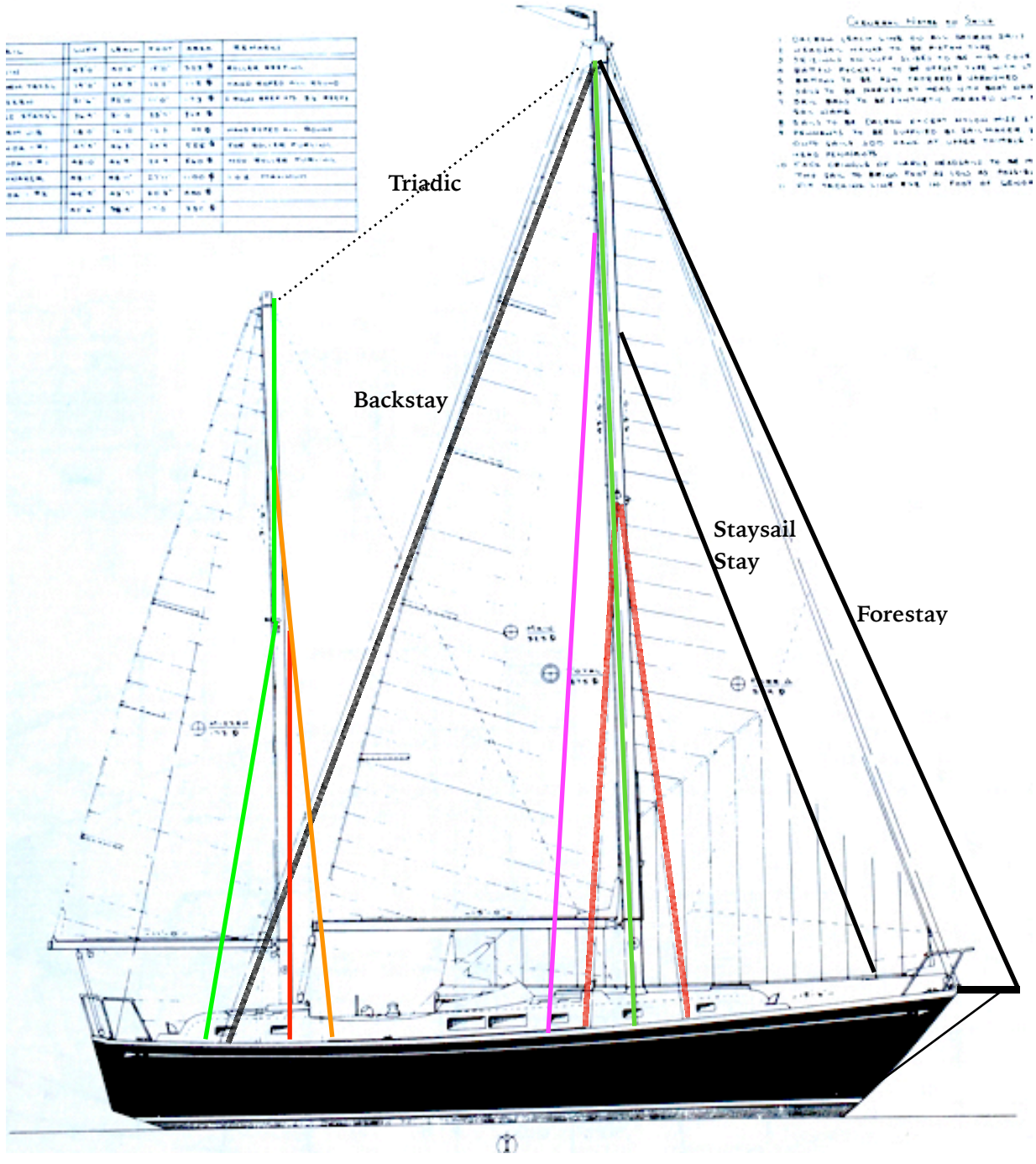
- Most thru-hulls are bronze tapered with two nuts on the small end
- To free up a stuck valve simply back off the nuts a bit and hit the end with a mallet
- Once freed lubricate with grease using grease fittings and a grease gun located in the tool bin.
- Snug up the nuts
- All thru-hulls must be exercised once a month

THRU-HULL LOCATIONS

Thru-Hull Location	Type
Forward Head Sink	Bronze tapered
Forward Head toilet	Bronze tapered
Galley Sink	Bronze tapered
Main Sea Chest	Bronze tapered
Aft Head sink and Port Deck Scupper	Bronze tapered
Aft Head toilet	Bronze tapered
Starboard Deck Scupper	Bronze tapered
Cockpit Drain	Bronze tapered
Holding Tank pump out	S/S Ball

RIGGING SIZES AND TENSION

- Standing rigging is numbered from main mast forward lower stay in a clockwise manner
- The Headstay and Staysail Stay are not included in the numbering scheme
- Chainplates have been etched with the corresponding wire number to prevent confusion
- Chainplates are removable for inspection and should be checked when the masts are removed
- Standing rigging should be replaced if damaged or survey recommended



Rigging Number	Use	Wire Size	Tension *	Replaced
1	Main Forward Lower Starboard	1/4	34	2005
2	Main Cap Starboard	5/16	24	2019
3	Main Aft Lower Starboard	1/4	34	2005
4	Main Intermediate Starboard	1/4	34	2005
5	Mizzen Intermediate Starboard	7/32	28	2005
6	Mizzen Lower Starboard	7/32	28	2019
7	Main Backstay Starboard	1/4	34	2019
8	Mizzen Cap Starboard	7/32	28	2019
9	Mizzen Cap Port	7/32	28	2019
10	Main Backstay Port	1/4	34	2017
11	Mizzen Lower Port	7/32	28	2019
12	Mizzen Intermediate Port	7/32	28	2005
13	Main Intermediate Port	1/4	34	2005
14	Main Aft Lower Port	1/4	34	2005
15	Main Cap Port	5/16	24	2019
16	Main Forward Lower Port	1/4	34	2005
Headstay	In furler, tension set by backstay			2019
Staysail stay	In furler, tension set by backstay			2019

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Notes:

Tension according to Loos & Co Professional Tension Gauges

2005 - Rigging Shop in Toronto
2017 - Spice Island Marina in Grenada
2019 - Holland Marine in Green Cove Springs

Chain Plates Inspected, replaced, electro-polished by HMP in Toronto

The TRIADIC wire between the main and mizzen is secured at the mast end but can be disconnected at the mizzen base in order to unstep the masts. The wire is lead up the mizzen with fixed guides leading to a turning block at the top of the mizzen.

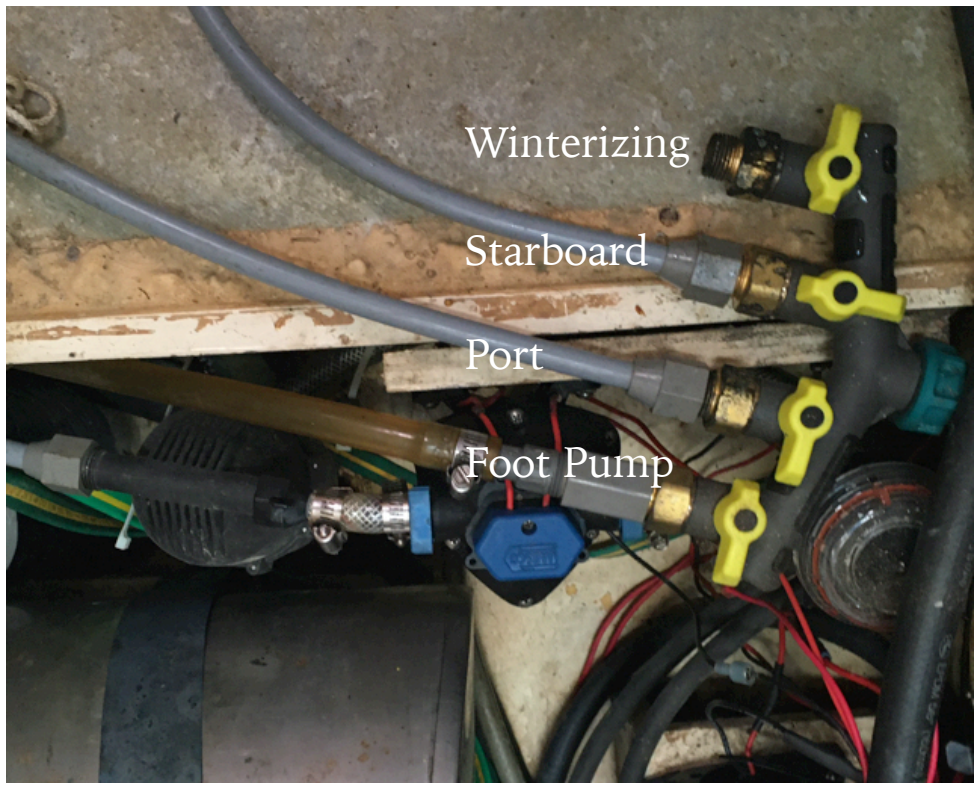
BATTERY CHARGING

- There are 2 battery combiners and two battery on/off switches used to isolate each battery group
- House Bank Combiner: in the engine room port side
  - Two banks select either 1 or 2, BOTH or OFF 4x6 volt wired as 2x12 volt in 2 boxes
- Starter/House Bank Combiner: under the companion way stairs in the main salon
  - House Bank and Starter select 1 (Starter battery 1x12 volt), 2 (House battery), BOTH or OFF
- House Bank Switch: on outside of navigation seat
  - One bank select BOTH or OFF 2x6volt wired as 1x12 volt
- Windlass Battery: in the V berth starboard side bulkhead aft
  - Select ON or OFF by turning knob clockwise for ON and counterclockwise for OFF 1x12 volt

- Charging options include
  - KISS wind generator controlled by a smart regulator located beside the aft stateroom companion way stairs. ON/OFF toggle switch is on the regulator.
  - Solar panels controlled by a Trimark smart regulator located under the main salon companion way stairs. ON/OFF switch is in the engine room forward bullhead labelled “SOLAR”
  - Shore power connection for 30 and 50 amp shore power into an IOTA smart charger. AC plug in engine room … orange cable with a black plug
  - AH Charge monitoring display is mounted on the binnacle

WATER TANK USE

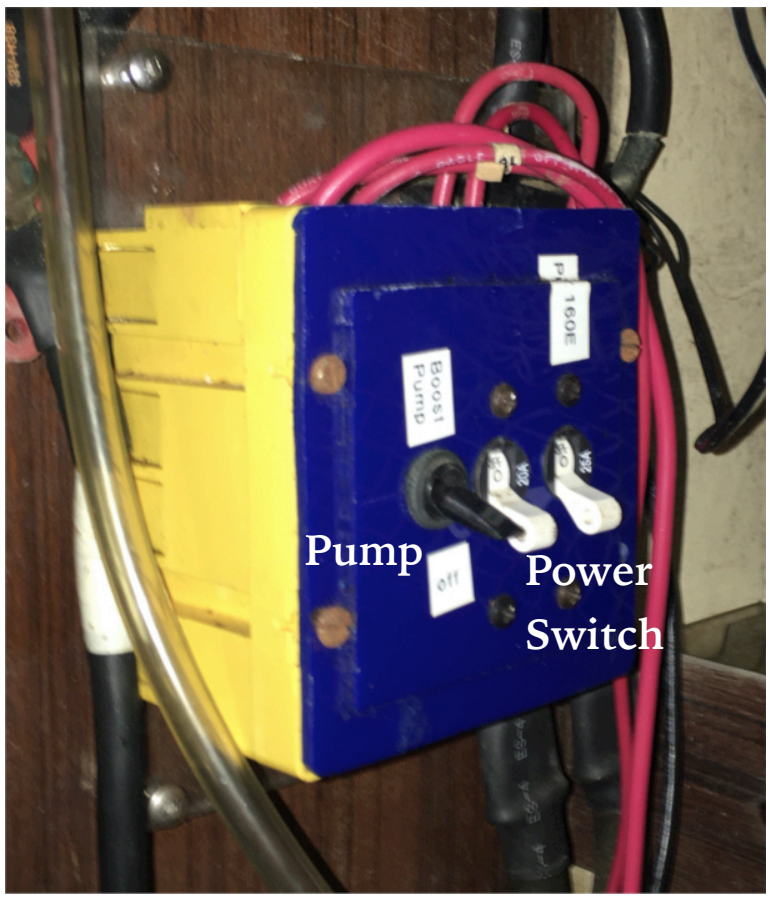
- Two 100 US gallon water tanks with filler access on deck
  - Air breather plugs located on the tanks MUST BE OPENED while filling otherwise the tanks will pop their tops
  - A water selection manifold allows selection of port or starboard tank located under the main salon floor small cutout just ahead of the stairs



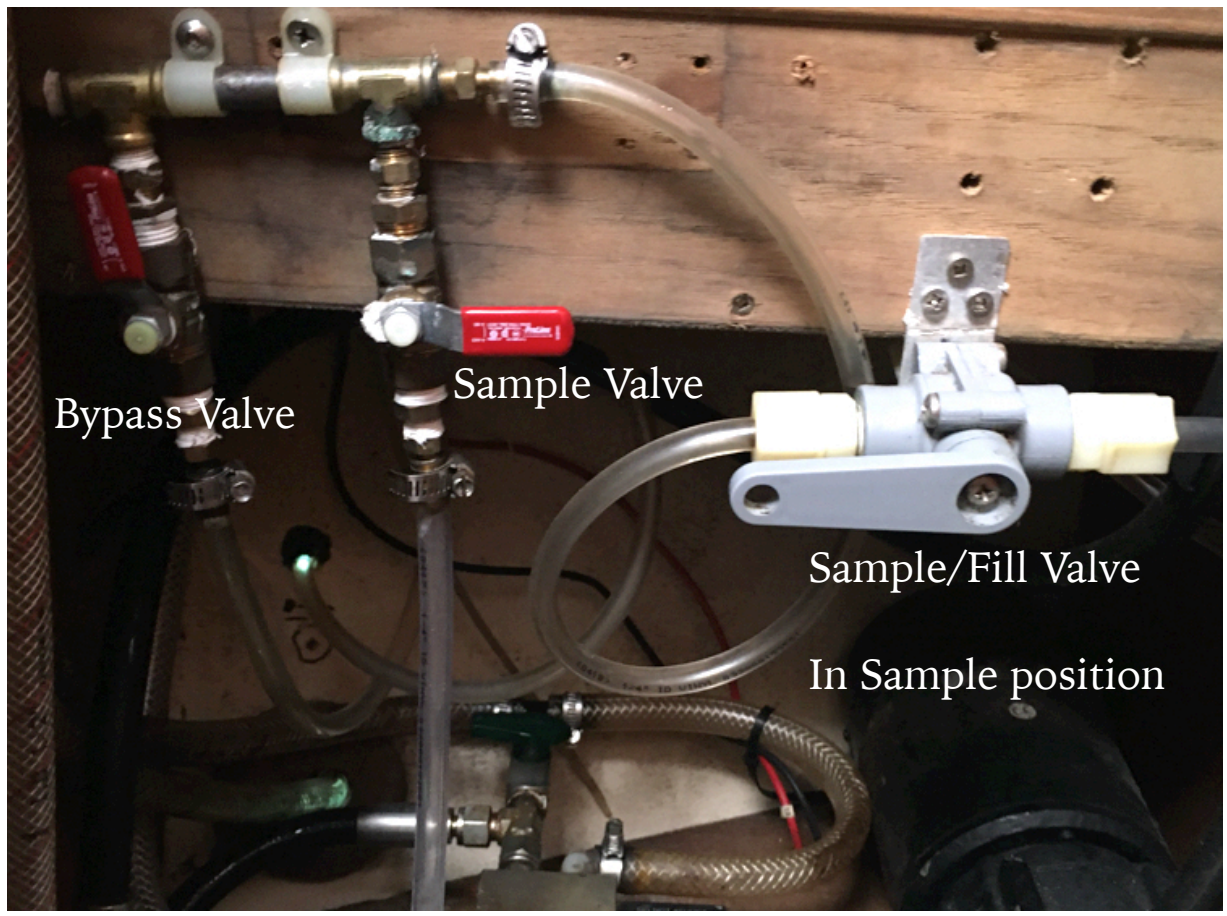
- The manifold has a selectable inlet to allow connection of a winterizing solution container hose
- The manifold has a selectable outlet to allow the galley foot pump to access the fresh water tanks
  - Open the manifold outlet valve and switch the foot pump selection valve to the fresh water side (valve located under the galley floor beside the hot water tank)
- After the manifold is a strainer, water pump and accumulator with a spare pump stored alongside

DESALINATOR OPERATION

- All controls are located in the V berth hanging locker
  - The two fused switches both need to be turned on at the same time to handle the startup current



  - The small switch provides power to the pump located under the forward head floor



- Output can be directed to either Starboard or Port water tanks
- Remember to remove Air breather plugs in the water tanks

- The first 10 minutes of output must be bypassed to the outside by opening the Bypass Valve and rotating the Sample/Fill Valve clockwise
- After 10 minutes sample the output by opening the Sample Valve, collecting a sample and measuring the TDS. Remember to close the Sample Valve
- If the TDS is below 200 select which tank is to be filled by opening the appropriate output valve and rotating the Sample/Fill Valve clockwise
- Output should be approx 9 gal per hour. Sample the output every hour
- Add 1 tsp chlorine for every 10 gal of water , test level after 1 hour

HEAD MAINTENANCE

- Joker valves need to be replaced annually in both heads … they leak … reason unknown
- Pump cylinder interior needs to be lubed once a year with silicon grease
- Heads need to be rebuilt every few years
- The plastic fittings are weak and subject to breakage if screwed down too hard
- Aft head has a new Y Valve design that should prevent jam up
- Aft head handles liquid waste and is generally directed to the outside unless in port
- Forward head has a Y valve but is normally used for solid waste into the holding tank
- Turn OFF the Main Thru-hull into the sea chest before disconnecting any head hoses
- CLR can be used to remove any calcium built up on the inside of the output hoses
  - Close the Thru-hull
  - Direct the Y valve to the holding tank and pump the head dry
  - Direct the Y valve to the Thru-hull
  - Disconnect the black hose from the anti-siphon fitting
  - Pour CLR into the hose from the anti-siphon end until full
  - Reattach hose
  - Leave for as long as possible before opening the Thru-hull
  - Don’t try pumping CLR into the hose via the head … it will not work
- The holding tank should be purged before it is full … smelly
  - The holding tank can be emptied by onshore pump out gear or via a Thru-hull and Gulper pump
  - The Y valve is located in the workbench cabinet … follow the black hose
  - Rotate the valve counterclockwise for the Thru-hull and clockwise for the deck fitting
  - The Thru-hull valve is under the main salon floor aft of the fresh water pump assembly
  - The Gulper switch is on the main panel labelled “SUMP”
  - The anti-siphon is located in the wet locker under the main companion way stairs

CHANGING PRIMARY FUEL FILTERS CHANGING PRIMARY FUEL FILTERS

- Filter change is required if vacuum gauge on fuel polishing system shows -30 or just below RED
- Switch to the alternative filter if the engine is running
- Drain a bit of the fuel from the filter unit using the bottom drain
- Open the cap and carefully remove the cartridge with the cap
- Top up the filter with the drained fuel if the fuel is clean
- Replace the filter element on the cap and replace cap on the filter

- Switch back to the replaced filter and run the fuel pump if the engine is not running
- Purging of any air introduced is automaticChanging Secondary fuel filters
- This process is VERY messy
- Shut down the engine
- Locate the two secondary fuel filters on the engine starboard side
- Each has a bolt head in the top centre and another just to the right (bleed bolt)
- The centre bolt attaches the bottom and top to the filter element. Once this bolt is loose any fuel in the filter element will rush out
- To minimize the mess, drain as much fuel from the filter as possible by opening the bottom drain plug with a container underneath to catch the fuel. There is not a lot of room to work in.
- Use oil absorbent cloths to catch any fuel that leaks
- Once the filter has been drained, remove the centre bolt to loosen the assembly while holding the bottom to prevent the filter element from detaching from the bottom
- With any luck the bottom and filter element can be removed without spilling out any remaining fuel
- Use new filter elements and O rings when reassembling otherwise leaks will abound
- Once the filters are reassembled prime the filters using the electric fuel pump while backing off the filter bleed bolts to allow air to escape. Bleed the right one first until you get a bubble free stream of fuel then bleed the left one. Any remaining air will be purged by the injectors once fuel is flowing. Use of the fuel pump can speed up the air purge process if the engine is not to be run.

CHANGING ENGINE OIL/FILTER

- Use the red pump located in the engine room blue starboard side box and a red flex pipe with a brass fitting
- Locate the oil extraction hose attached to the bottom of the SP90 oil pan
- Remove the end cap and attach to the pump hose brass fitting
- Extract the used oil into 2 empty 1 gal containers
- Remove the oil filter and empty contents into one of the two containers
- Remove the pump hose from the oil extraction hose
- Recap the oil extraction hose
- Replace the filter and add 32 oz of Marvel Mystery Oil to the crankcase
- Add sufficient SAE 30 to the crankcase to reach the top mark of dip stick
- Start the engine and run until the oil pressure gauge reads 40 or above
- Top-up the crankcase with SAE 30 oil until the top mark on the dipstick is reached
- Clean up the floor with Simple Green
- There is an engine oil heat exchanger mounted on the starboard side of the engine that needs replacement every 1500 engine hours

CHANGING TRANSMISSION FLUID

- Use the red pump located in the engine room blue starboard side box and a red flex pipe without brass fittings
- THE HOSE IS IN 2 SECTIONS the small hose goes into the transmission dipstick hole
- Insert the larger red hose into the handle end of the pump
- Place the other end of the pump into an empty 1 L container or use another red hose to eliminate spills
- Extract the ATF fluid into the 1 L container
- Smell the old ATF for a burnt smell … means high heat has broken down the fluid
- Add new ATF to the cold fill mark … above the factory marks
- There is a transmission fluid heat exchanger mounted on the top of the transmission that needs replacement every 1500 engine hours

REMOVING/INSTALLING FEATHERING PROPELLER

- All required tools except for the large adjustable wrench and grease gun are in a plastic bag stored in the blue box in the engine room. Grease gun is under the nav table, wrench is in nav seat
- Additional thread compound may be required … use pink
- Turn rudder to hard port to allow prop to be removed from shaft
- Test the prop to ensure feathering action is smooth
- If stiff add a bit of prop grease and work it until it frees up DO NOT STORE IF NOT WORKING well
- Use Allen key to remove 3 prop zinc bolts, the inside of the zinc will be full of grease
- Use Allen key to remove 2 grub screws securing the shaft lock nut
- Clean the grub screws well
- Back off the lock nut with the large adjustable wrench
- Pull the prop off the shaft by wiggling it to clear the rudder … it will fit
- Store all parts removed together in the same bag after cleaning off grease
- Use a bronze brush to clean the prop after degreasing the exterior
- Store the prop inside the hull with the parts removed
- Add a prop zinc and shaft zinc to the parts
- Trash the old zincs

COMMISSIONING

- Remove black net covering
- Deploy water and electrical connections
- Clean exterior deck to avoid tracking in dirt
- Inspect interior for water damage
- Cleanup interior
- Switch House/Starter/Windlass batteries online
- Start battery charge
- Install 3 Garbor plugs
- Install Propeller, zincs and add prop grease
- Add prop grease until if forces water from the blade shaft
- Grease fitting is in the plastic bag with the prop tools. Do Not Leave the fitting On the Prop.
- When installing zincs use red nail polish to set the shaft and prop zinc screws
- Tighten alternator belt
- Replace the 3/8 inch pencil zinc in the cooling system heat exchanger
- Start fuel polishing … sequence centre, port then starboard
- Cleanup insect bait
- Fill water tanks, test chlorine level
- Restore hot water tank connection
- Launch
- Increase rigging tension by 6 turns
- Install sails
- Load personal items
- Resupply consumables

LAYUP

- Top-up fuel tanks and add whatever additives are required for fuel storage
- Remove sails
- Store sails
- Pump out holding tank
- Bypass and drain hot water tank
- Drain water tanks
- Lift and block hull
- Deploy water and electrical connections
- Remove 3 Garbor plugs from below water line starboard side
- Remove Propeller and clean
- Pressure wash bilge
- Change engine oil/filter
- Change transmission fluid
- Reduce alternator belt tension
- Reduce rigging tension by 6 turns
- Top up batteries
- Charge batteries
- Switch House/Starter/Windlass batteries offline
- Remove all food consumables including liquids
- Remove personal items
- Deploy insect bait
- Secure electrical and water connections
- Cover hull with black netting