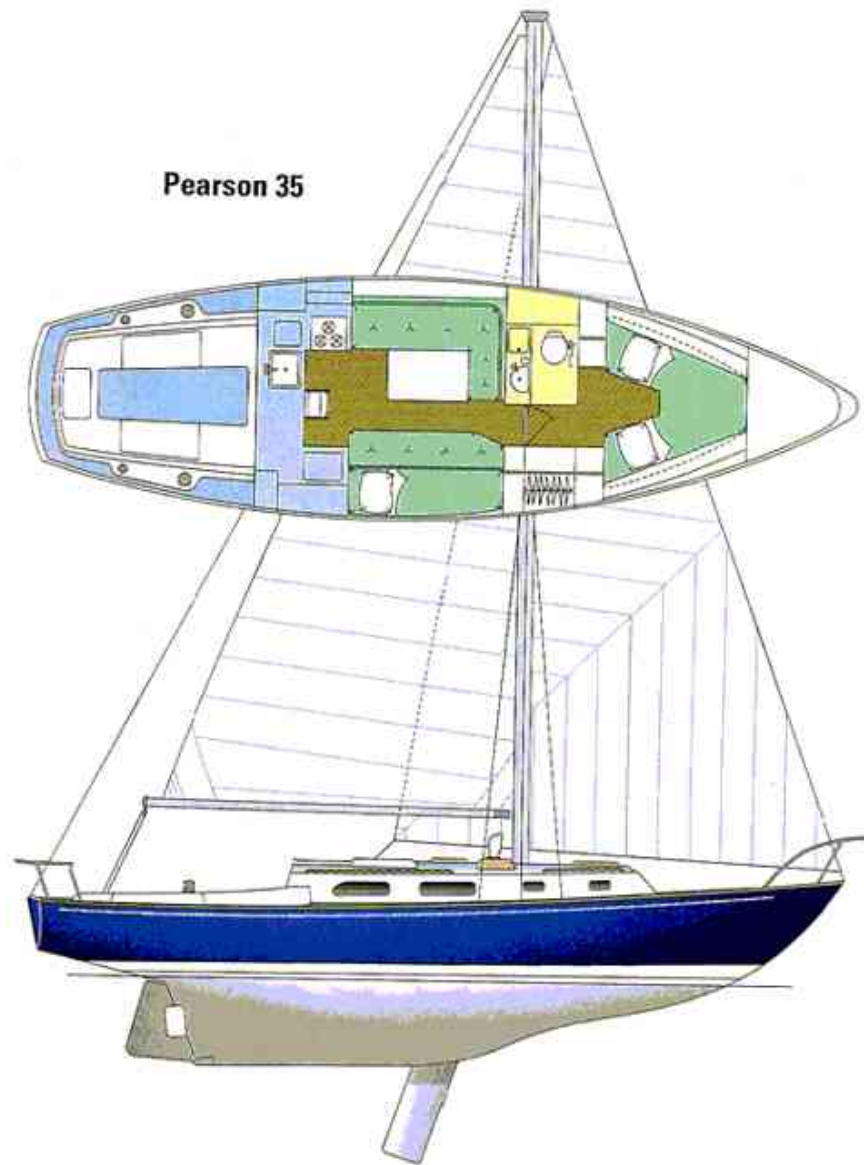


Ptarmigan Standard Operating Procedure (SOP)



Pearson 35 Hull #165

Quick Reference

PTARMIGAN

Papa

Tango

Alfa

Romeo

Mike

India

Golf

Alfa

November

USCG Documentation No **524953** 10 Net Tons

MMSI **338066842**

Navigation masthead height **46** feet

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What is a PTARMIGAN? What is her history?

It is the state bird of Alaska.

Ptarmigan, close relatives of forest and prairie grouse, live in alpine and arctic tundras throughout the northern hemisphere. There are three kinds of ptarmigan, and all are found in Alaska. **Willow Ptarmigan** (*Lagopus lagopus*) are found nearly everywhere in Alaska's high, treeless country. They occupy a broad range throughout Canada, Scandinavia, Finland and Russia. The famous Red Grouse of Scotland is a race of the Willow Ptarmigan. **Rock Ptarmigan** (*Lagopus mutus*) also live in Canada, Scandinavia, Scotland, and northern Eurasia. They range through most of Greenland and Iceland and have scattered southern outposts in Japan, Switzerland, and Spain. In Alaska, Rock Ptarmigan live in all major treeless areas except the flat tundras of the western and northern coasts. **White-tailed Ptarmigan** (*Lagopus leucurus*) are strictly North American. They occupy rugged uplands from the Alaska Range and central Yukon southward to Washington and northern New Mexico.

PTARMIGAN was built in 1970 as hull #165 and delivered to Ralph D. Jr and Lois N. Pass of 6 Yorkview Drive, Timonium MD, who named it WINDSONG and documented the vessel under USCG Documentation No 524953 10 Net Tons. The Pass's sold WINDSONG to the Ward and Bernie Rosenbury's in 1982, who renamed it PTARMIGAN. The documentation number remains the same to this day. (As mentioned under the section on hull, we found evidence in the paint layers that the registration port was originally Wilmington DE rather than the current Annapolis MD).

The second owners of the vessel (Ward and Bernie Rosenbury--from 1982 to 2005) were mountaineers in their youth and saw Ptarmigans in various high and cold climates. The white underwings when the birds flew reminded them of a sloop. Not only is renaming a boat bad luck, but renaming the object that was shared as a passion by a loving couple for 23 years must be doubly unlucky, so the third owners stuck with the name PTARMIGAN. Bernie passed away in 2006.

Mark and Theresa Mulligan of 1926 Baltimore Annapolis Blvd, Annapolis MD, 21409 bought PTRARMIGAN in September 2005. When they re-documented in 2005, a review of U.S. Flag Vessels showed 14 PTARMIGANs—eight Sailing Yachts (two East Coast, Six West Coast) and six fishing vessels (all West Coast).

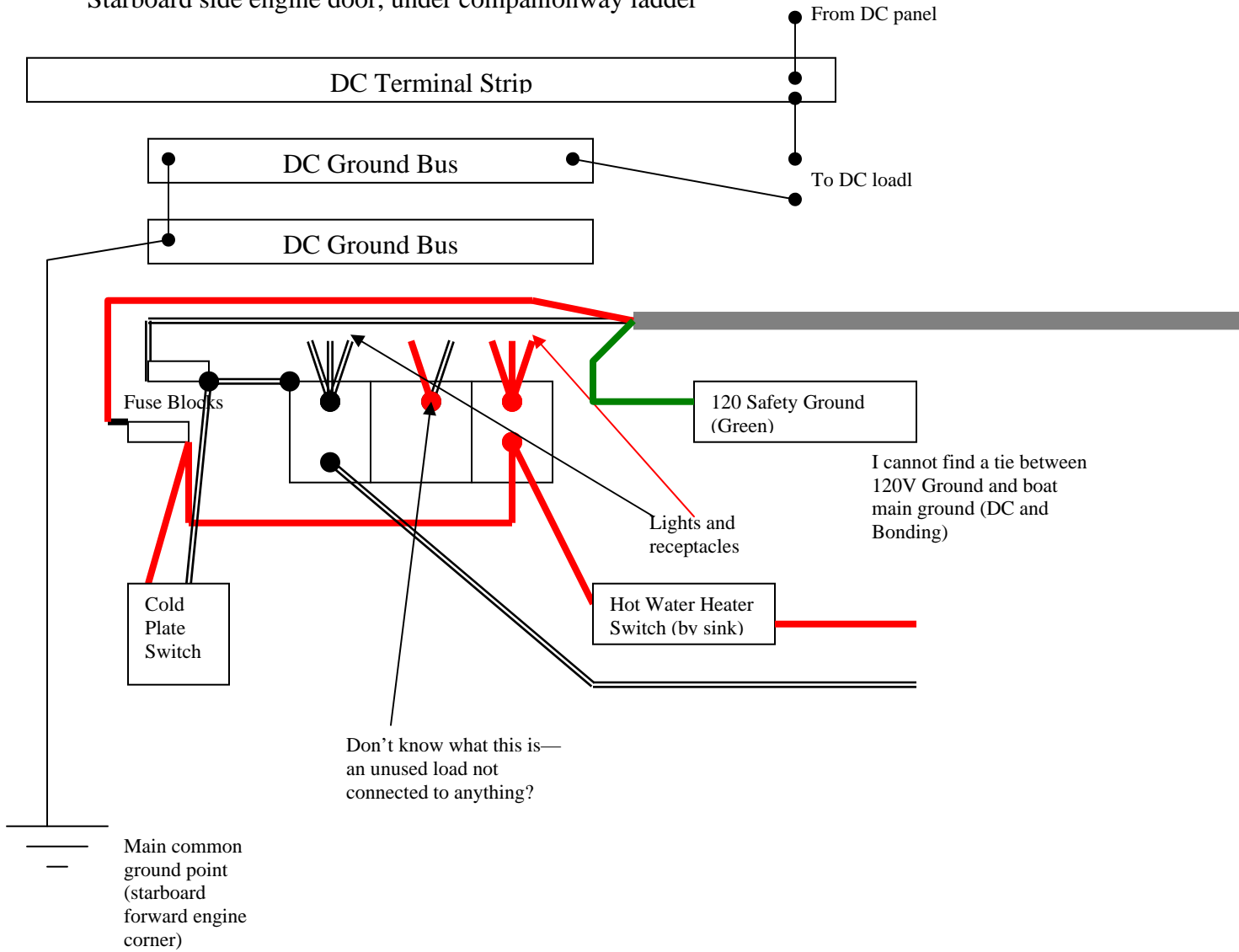
Electrical

120VAC System

The 120VAC system was installed when built, and the chill box condenser was added in 1973. It does not meet ABYC standards and is being upgraded.

PTARMIGAN current wiring

Starboard side engine door, under companionway ladder



120VAC Loads

General Thermatics Refer Compressor

15 Amps

4oz of R12 refrigerant

Installed 1973

Raritan Engineering Company

6 gal hot water heater

15 amps

Installed April 18, 1985

12VDC Charging Underway

When on shore power, the 120VAC battery charger charges both batteries regardless of battery switch position.

The alternator on the engine charges to the starboard (#1) bank. To charge the #2 bank, you have to parallel the two banks by selecting “both” on the battery selector switch under the companionway ladder. The time the batteries are in parallel should be minimized, as you have no isolated battery to restart the engine in case of a short circuit running down the battery. For normal day-sailing, with both batteries fully charged at the start from shore power, you should start the engine on #1 battery and leave the selector on #1 for the day, retaining the fully charged #2 bank in reserve.

NOTE: You can run the engine with the battery selector switch in either #1 or both. You should not run it with the switch in the #2 position. In this position, all loads will come off the #2 battery but only the #1 battery will be charged.

Engine and Shaft

Engine

Marinized Version

Universal Atomic Diesel Model 5424. 3 cylinder, 68 CI.

AKA Universal Diesel M30

AKA Universal Diesel M30-5424

Un-marinized Version

Kubota Tractor D-1101 (#reportedly stamped on oil dipstick of even the marinized versions.)

Parts

Oberdorf Raw Water Pump Oberdorf #202M-7 or M-3 (unsure which)

Oberdorf Raw water pump impeller:
Universal Marine Power #295628
ONAN 132-0316 (not verified)
Gasket for Oberdorf Raw water pump
Universal Marine Power # 295626

Shaft

The shaft in 7/8" diameter stainless steel (Aquamet). It was renewed in August 2006 because the old coupling could not be removed as required to install a new shaft seal.

Shaft Seal

Drip less shaft seal—PYI PSS 7/8" shaft, 1 1/2" shaft tube. Installed August 2006. Service life of rubber bellows is six years (replace August 2012).

When launching the boat, the shaft seal must be "burped." The Shaft seal has three main parts—a stainless steel collar attached to the shaft, a carbon block the shaft passes through, and a bellows (hose) attaching the carbon block to the stern tube. The seal works by the rotating collar making a perfectly smooth seal on the stationary carbon block. To get this seal right, it has to be initially wet (i.e., there has to be some water between the two). After launching, one needs to grab the carbon block and pull it aft about 1" away from the collar until water flow in, then release and allow it to reseat. (The bellows is springy to maintain pressure of the carbon block against the collar).

Since the entire shaft seal is hidden from view beneath the fuel tank, this is accomplished by removing the aft compartment longitudinal divider bulkheads, lying down facing forward with your shoulders near the rudder post (you will be challenged to find a place to put your legs). Reach down between the rudder post and the aft end of the fuel tank. You will touch the stern tube and bellows. Slide your hand forward along the bellows to the carbon block. You can identify the block by the vent line coming out of the top of it. Grasp the sides of the block and pull it aft—feel the water spray in for a few seconds—ease it forward to reseat. (Do not pull on the vent line). The water should slow down or stop. The shaft may have to turn for a few minutes to get the seal correct and stop virtually all flow.

Fluid Changes

SAE 30 HD (CD) or 10W40 heavy duty diesel oil
5.6 qts (notional—about 5 qts due to residual left behind when sucking out of dipstick hole. Fill to 4 qts then check level with dipstick periodically while topping off)
Filter original 298852 changed to Universal 299381
Equivalent Kubota 70000-32431 (not verified)
Equivalent Fram - PH3614.

1.3 pts ~~Type A~~ DEXRON II automatic transmission fluid (see discussion of fluid under Transmission below)

Fuel Filter 298854 Equivalents

Fuel filters, Universal 298854
Kubota 7000-43081, Hastings 847, NAPA 3390, WIX 33390,
Fleetguard FF5226, PUROLATOR PER 262F

Fuel Filter 2 _____

6 quarts of 50/50 antifreeze mix

Fuel System Bleed

Bleeding the Universal Diesel is very easy due to the electric lift pump, which comes on when you turn the key to the run position. To bleed, turn the key to start the lift pump and loosen the single 9/16 inch bleed plug on the top of the injection pump. Bleed until no air is included in the fuel stream—that's it.

Fuel System Safety Issue

Because the Universal Diesel lift pump is on when ever the key is on, and the engine kill is NOT done electrically by the key (it is done by pulling the throttle all the way back past idle and holding it there), if you stop the engine, secure the boat and walk away with the key in the run position, the lift pump will run continuously and the low pressure side of the fuel system will remain pressurized—a potential fire hazard.

Engine Heat Exchange SW Side Back Flush

This is a two person job.

One person enters the port cockpit locker with a fresh water hose. Remove the forward section of the longitudinal divider bulkhead to gain access to the engine compartment. Above the port (#2) battery box you will find the vacuum breaker for the saltwater cooling circuit. Remove the hose that goes to heat exchanger on the back of the engine. This is where you will place the nozzle of the garden hose to flush.

The second person is in the cabin. Ensure the engine raw water through hull is shut. Remove the output hose from the engine saltwater pump. Have a bucket to collect the initial flush water (you want to know if there was stuff in there).

The first person uses the freshwater hose to backflush the system.

Reassemble the system. Then remove the engine raw water intake hose from the through hull. Bring in the garden hose, open the through hull and back flush the sea chest to remove mud and organics. Reassemble.

Engine Heat Exchange FW Side Flush

This is actually the more important of the two flushes. When we purchased Ptarmigan, she was having overheat problems and this rapidly solved them.

- 1) Drain FW coolant. Drain point is low forward port side of engine near motor mount—a very slow and inefficient drain.
- 2) When you have some out, remove heat exchanger cap to vent. Be careful, there is no loop seal in the plastic expansion tank and it will all run down and overflow when you open the heat exchanger cap.
- 3) Since the drain point will not get all of the cleaner out, remove the two engine FW connections to the Hot Water heater. Flush with a garden hose until clear (flush into a waste water container that you will take to an anti-freeze turn it site).
- 4) When clear, drain again. Add antifreeze, using concentrate not premix as you will leave some flush water behind in the system.

This appears to be an annually required maintenance. Perform around July 15 to restore peak heat exchanger performance prior to bay waters heating up.

Engine Overheat Protection

There is no installed overheat alarm. I prefer to operate as much as possible with one of the two galley drawers removed to let the engine compartment heat out while the engine is running. Since the engine freshwater expansion tank is right next to the drawers, an engine overheat will be evidenced by steam—boil over like a car radiator. If it happens, you will both see it and smell it (antifreeze smell) in the cockpit. This won't cause damage if you reduce engine RPM to clear the condition and you don't boil the tank dry.

Remember, overheat is more likely in bad weather when the engine is loading and unloading on waves.

In an emergency, remember you can remove heat from the engine by running hot potable water down the galley drain (as long as you have potable water). The potable freshwater is heated by heat exchange with hot engine freshwater—so adding cold water to the potable hot water heater tank by drawing off hot potable water cools the engine.

Transmission

The Atomic Diesel Manual specifies Type A Automatic Transmission Fluid. This was replaced by the original DEXRON.

The Universal Diesel website for the M30 engine, which is the updated version of the 5424 (same basic specs) specifies Type A or DEXRON II. Review of the online catalog shows that the M30 and 5424 are the same engine and specifically the transmission has the same nomenclature and parts. Based on availability, I am using DEXRON II.

Fresh Water System

Pressure system operation

Pressure system operation is straight forward. Shut all faucet valves, open one or more of the tank suction valves under the middle deck plate in the cabin, open the port engine access under the sink and push the red priming button on the pressure pump. Hold the button for 10 secs or until the pump stops.

The pressure system breaker should be off when not actually using the system. This is because of a design mismatch between the Raritan hot water heater (after starboard cockpit hatch) and the Universal Diesel. The diesel has a 195F thermostat setting and that is high enough, with the engine coolant used to heat the hot freshwater to lift the relief valve on the Raritan. While is an effective way to clean the bilges (hot water flush) it wastes fresh water. When the pressure pump is off, the Raritan relief valve just “burps” with little total loss of fresh water.

Head

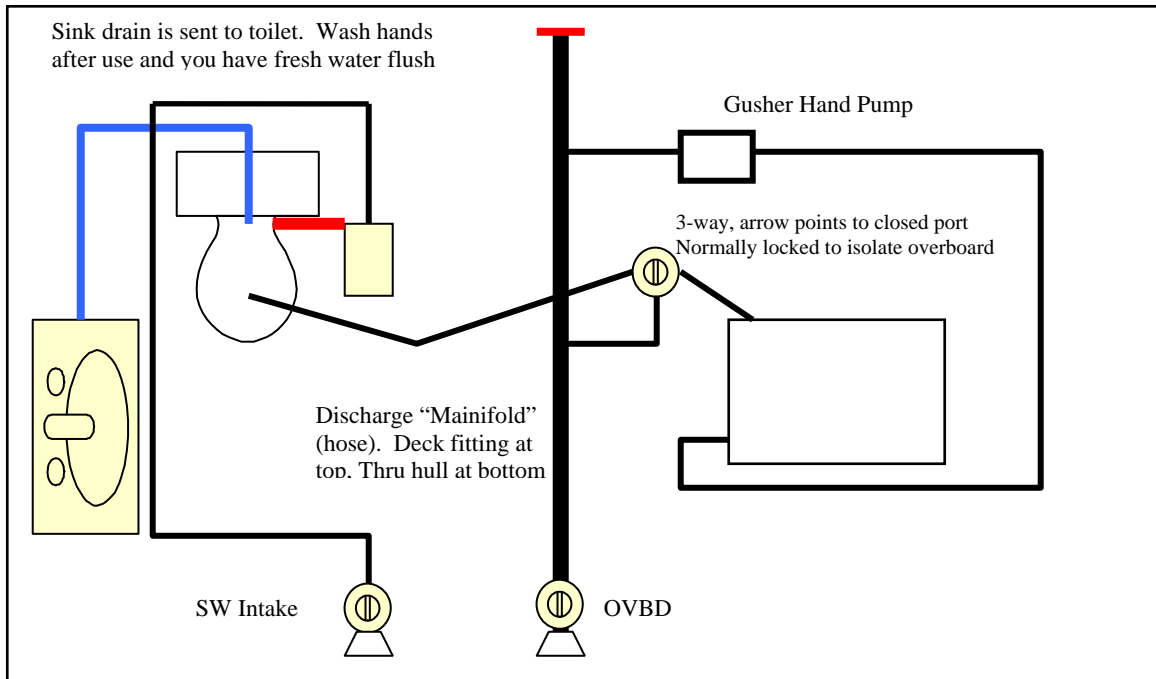
Nomenclature

The head is a Wilcox-Crittenden “Head-Mate” attached to a Mansfield Model TDX-S Type 1 (macerator/chlorinator) MSD holding tanks system. The MSD system is circa 1980 by documentation—it was installed between 1980 and 1984 when SeaLand took over the TDX system.

From the internet 2007 boatbuilding.com:

“The SeaLand SanX (originally the Mansfield TDX and after 1984 the SeaLand TDX) consists of a 10 gallon tank equipped with an internal macerator and a chemical pump. It can be plumbed for both pumpout and/or overboard discharge, making it both a Type III MSD as well as a Type I, and legal for use in all waters. The toilet is plumbed to the SanX tank and sewage is held without treatment until a decision is made to either "treat and discharge" or have the tank pumped out. The "treat and discharge" mode is manually activated by a switch, so it uses no power except during this cycle, which lasts for 20 minutes. It begins by automatically injecting a formaldehyde-based chemical called TDX...the macerator mixes the chemical and liquefies the tank contents, after which the tank may either be pumped overboard automatically by the SeaLand "T-Pump" or by using a manual pump. When used as a Type III (pumpout only), it is not necessary to activate the treatment cycle. The current list price of the SanX is around \$1400; the T-Pump around \$275.”

Schematic



Valve and MSD Operation

- Use and Hold—three way valve arrow under port fwd V-berth points away from holding tank (flow into holding tank not blocked, overboard flow blocked). Open SW intake. Ensure OVBD shut. The three-way valve is normally wire tied in this position to comply with law inside US coastal waters.
- Untreated Overboard—for use outside of US coastal waters only. Change 3way valve to point at tank. Tank is now isolated. Open intake and OVBD
- Treat and Hold—this is a cycle on the MSD system and a position for the MSD switch. Establish Use and Hold valve line up. Mark the level in the treatment chemical bottle with a sharpie marker. Turn on “Head” breaker at 12 VDC fuse panel (it is normally off). Turn MSD control switch to treat and hold. You must verify the treatment chemical bottle level to verify the injection of about 1 pint of chemical. (The operator should always verify chemical injection—if for some reason the chemicals are not added, then treatment does not occur). The macerator will run for 20mins and then stop. (The operator should verify agitation is taking place by shining a flashlight into the translucent tank). Unlike the Treat and Discharge operation, the MSD will not automatically prime the tank with chemicals because it cannot sense when you pump out. After pumping the tank out (either to a shore facility or overboard) manually charge chemicals to the tank by starting the Treat and Hold cycle, but turning it off after chemical injection as the macerator starts (in high ambient noise, after 30 secs). As with the basic Treat and Hold cycle, you should mark the level on the chemical bottle with a sharpie marker prior to charging to verify chemicals are added.

- Pump Out-ashore. Complete the Treat and Hold cycle prior to arriving at pump out station. Look at the schematic. Close overboard. Align 3 way to point to (isolate) tank (you must cut the wire tie locking the 3 way valve to do this). Suction applied at the deck fitting will now pull effluent from tank bottom through the gusher pump. When complete, reestablish Use and Hold line-up and wire tie the 3 way valve isolating the overboard path (arrow points away from holding tank). See the discussion under Treat and Hold on how to recharge the tank with chemicals.
- Pump Out-underway. This is legal after the 20 minute treatment cycle. From the Use and Hold line up, all that is necessary is to open the through hull and pump out with the gusher pump. When complete, reestablish Use and Hold line-up (Shut the overboard valve). See the discussion under Treat and Hold on how to recharge the tank with chemicals.
- Tank Flushing. On many other boats, owners “flush” the holding tank during pump out by directing a garden hose down the sewage deck fitting and then pump it again. That will not work on this set up. Note that the discharge manifold arrangement does not allow you to send water from the deck fitting to the tank. Check valves in the Gusher pump prevent back flow and the 3way value ties the head to discharge manifold or the head to tank, but never tank to discharge manifold. If want to flush the tank will have put the deck cap back on and establish the use and hold line up and pump sea water into the tank by continuous flushing. After that, you can repeat the pump out.
- Treat and Discharge—(NOT Recommended) this is a cycle on the MSD system and a position for the MSDS switch. Ensure OVBD is open. Move three way value to point to tank (isolate tank). This will prevent slop over into the discharge manifold before treatment is complete and isolate the tank top from the discharge manifold. Turn on “Head” breaker at 12 VDC fuse panel (it is normally off). Turn MSD control switch to treat and Discharge. You should watch the treatment chemical bottle level (use flashlight or test the weight of it before and after cycle) to verify the injection of about 1 pint of chemical. The macerator will run for 20mins and then stop. The pump out light will light—you then have five minutes to complete the following. Change 3 way valve to point away from tank. Verify overboard valve still open. Use gusher pump to pump tank overboard (This is why the 3way valve has to be positioned to isolate the tank—otherwise you pump from tank bottom to the discharge manifold and back in the tank top. No very helpful). At the end of the five minute cycle, the chemical pump will inject a pint into the system to prepare it for operation. Realign for use and hold.
 - (This is not recommended because of the five minute time to complete pumping the MSFD tank overboard, after which the tank is automatically recharged with chemicals. This results in both wasted chemicals and more chemicals discharge is you miss the 5 minute timer—It is better to use the Treat and Hold method, and manually charge chemicals to the tank after it is discharged. You do this by starting the Treat and Hold cycle, but turning it off after chemical injection as the macerator starts (in high ambient noise, after 30 secs). See discussion in Treat and Hold.

- Secure when leaving boat. Shut SW intake and OVBD. Ensure 3way valve points away from holding tank (flow into holding tank not blocked, overboard flow blocked).
- Legal Requirement. The 3 way valve is to be wire tied to isolate the head to overboard path (point toward overboard) when within 3 miles of the US coast. It may be operated to discharge treated effluent, but then must be again locked.

Head Operation

- Turn on and prime freshwater system so you can wash up when done.
- Establish the proper valve line-up shown in the previous section (normally, this is “Use and Hold.”)
- The head hand pump is to the right of the bowl. Lift the selector lever and pump water in until bowl is about 1/3 full.
- Place only human waste and toilet paper in the head—anything else will break the system.
- Pump some more water in then lower the selector to pump dry. Pump dry.
- Wash hands. The sink will drain back to the bowl. Pump excess water out leaving a small amount in bottom to keep fumes in.
 - Note: with a large heel to port, the sink drain to the head may flow backwards over the rim rather than into the bowl.
- Realign valves to “Use and Hold.”
- Turn off freshwater system.

MSD Chemical Spill

The treatment chemicals are toxic and fuming. If you break a treatment chemical bottle ventilate space and get out. Come back with a hose or bucket and flush the chemicals to bilge with copious amounts of water. Wash hands and remove and clothing with chemicals on them. Extra chemical jugs stored for a long period are subject to breakage as they move around when the boat heels. Read safety label on chemical jug for more information.

No-Discharge Zones

Maryland--All parts of Herring Bay and Northern Coastal Bays on the Atlantic.

Virginia—Lynhaven River

Delaware—None

New Jersey—some Rivers off the Atlantic Coast. No restriction on Delaware River and Bay

Check www.epa.gov for updated information.

Sulfur Odors

Before spending a lot of time troubleshooting the head for sulfur odors, do the following to test for sulfur off-gassing from the fresh water system.

Either fill the FW tanks, let them sit a week or more, and then run the FW pressure system to run several gallons into the galley sink, or fill and cap a bottle with FW from the area you fill the boat tanks. Let the bottle sit a day or so, then shake and open and smell.

Many of the well fed FW sources around the Chesapeake are high in sulfur. If you are in one of these areas, change out your FW frequently. Remember—the sewage holding tank vents overboard, but the FW tanks vent into the chain locker, aft starboard bulkhead, high under the deck. Sulfur fumes are likely to come from the FW system.

Heavy Weather Procedures/Precautions

Specific Heavy Weather Precautions for PTARMIGAN

- Reefing. First reef at about 18 knots wind, second reef about 25 knots of wind for up wind courses. Use a bowline around the standing part of the reef line rather than a timber hitch, which can come out when lines flog about during the reefing process.
- Reef Points—1st reef points are twist, 2nd reef points are double braid to allow them to be differentiated by feel. Tie both when setting second reef to allow you to shake back to first reef easily.
- The turning block for the jib reef/furl line is very small and subjected to great pressures in heavy air. PTARMIGANs unusual headsail set up allows the roller furling gear to be lowered and stowed, and a smaller hanked jib to be used. Until this is done, consider passing a stopper from the port quarter mooring cleat to the reef/furl line to back up the small block. (A stopper is a short piece of line tied to the cleat and then tied to the reef/furl line with a rolling hitch. Easing the reef/furl line very slightly after the stopper is passed will shift some of the strain from the turning block to the cleat).

Hull

Fiberglass Condition and Repair

During the summer of 2006, the topsides were sanded and AWLGRIPed in Aristo blue. The owner did the sanding and MWR Marina, Naval Station Annapolis did the painting. The following observations were made during the hull preparation.

- There was almost no blistering. A few minor pits not extending past the gelcoat were found +/- 5 inches from the water line. The vast majority of these were sanded out. A few were filled with the AWLGRIP primer.
- After AWLGRIP application, when sanding the topsides for repairs you will pass through these layers
 - Blue AWLGRIP
 - Gray AWLGRIP primer (also a yellow penetrating primer to seal off and remaining small cracks)

- Thin White Gelcoat layer—the original color of the boat when first made. This was sanded completely through in a number of spots to remove surface cracks.
- A thicker blue Gelcoat layer—some of this was also sanded through to remove cracks (less so that the white layer, however).
- The straw colored outer layer of polyester mat in the hull construction.
- Below the boot top line, when sanding the hull for repairs you will find:
 - Red bottom paint
 - A thin barrier coat paint layer
 - A thicker blue Gelcoat layer.
 - The straw colored outer layer of polyester mat in the hull construction.
- The owner did over 110 hours of sanding using both disc and long board sanders. The vast majority of gelcoat cracks were removed, however, during the final preparation process we found were several cracks on or near the extreme beam on both sides that may be expected to propagate through the color coat in four to six years. The special yellow penetrating primer was recommended by the Awl Grip deal to minimize the chances of this happening.

Name Lettering

The name and hailing port on the stern were made by West Marine.

Four inch block name, white with cardinal color outline.

Hailing port 3 inch block, white with cardinal color outline.

Length is 42.”

Comment—on seeing the letters installed, I think they are a little too bunched up. Next time I would go to 3.5” name, 2” hailing port. I would give both a percentage stretch option that would make the 3.5” name letters fill the same 42” width as the 4” letters. This would give better spacing between letters.

Comment on installation—there is a wrinkle in one of the center letters (the M of Ptarmigan, I believe). While it is not really noticeable, here is how to avoid it if the name decal is ever remade. On installation, cut vertical slits between the lower letters (of the ANNAPOLIS, MD) at 1/3 length intervals along the bottom of the decal. The wrinkles will come out as very slight overlaps of these slits.

When sanding the hull, we found that the vessel had held the name PTARMIGAN since 1982, but with two different hailing ports. Wilmington DE was clearly visible in the paint layers beneath Annapolis, MD.

Instruments

Airguide Clock

The labeling on the clock face “7 Jewel 8 day” and the keyhole at the bottom make it appear to be a wind up clock, but it is actually has a quartz insert. To set or replace battery, remove from bulkhead (three screws), then remove from part from rear/base (two screws). Then remove the backing plate to expose the mechanism, including battery and setting knob. Battery 1.5V/LR1

Man Overboard Procedure

- 1) Yell “man overboard” while throwing life sling and horseshoe ring. (You throw both because the life sling will tow away from the MOB if the line fouls and does not pay out properly.
- 2) Turn boat up sharply into the wind and an immediately tack.
- 3) While the boat is turning, push and hold the MOB button on the GPS for three seconds until a dialogue box appears. Press enter to say yes and have the GPS display bearing and range to the man. Start the engine in neutral while in the turn. (NOTE: The act of starting the engine frequently causes sufficient DC voltage drop to shut down the GPS. Simply push the GPS power button after engine start—the GPS will start up with the MOB waypoint still displayed).
- 4) Do not handle sails unless the boat was off the wind prior to man overboard. If you were off the wind, sheet in to about the position for a close reach when you can during the tack. Allow the headsail to back as you come around.
- 5) Sail around the MOB. A continuous turn started immediately should take you around the man and cause the life sling line to cross the MOB so he/she can grasp it. If you delayed starting the turn, you may need to run a little down wind prior to rounding up again to ensure you circle the MOB.
- 6) When the life sling line touches the man, immediately round up, tack, and heave to. To heave to, take without “breaking” the jib sheet. As soon as the jib backs, shift (reverse) your rudder until it is hard over toward the wind and lock it with the locking knob on the right side of the rudder pedestal.
- 7) Drop the swim ladder and pull the MOB to the boat with the life sling line. If the MOB cannot board on his/her own, do the following:
 - a. Drop the jib first, then the mainsail. Don’t be neat, just drop them in a ball on the deck. Drop the jib with the halyard—don’t attempt to wind it up with the roller reefers.
 - b. Bring the man alongside the mast. Hook the preventer block and tackle onto the end of main halyard and use the halyard to lift the sling, with the MOB in it, aboard.
- 8) To commence sailing again from the hove-to position (assumes you did not do steps 7A and 7B), simply unlock the wheel and turn down wind. Gybe to get the jib and main working together and then adjust to the desired point of sail.

Splitting Man Overboard Duties Among the Crew.

- One crewmember remaining onboard. The life sling MOB recovery was specifically designed to be done by a single person.
- Two crewmembers remaining aboard. The helmsman does the whole procedure except the 2nd crewman throws life sling and horseshoe bouy to allow the helmsman to start the turn sooner. Obviously, if the 2nd crewman is not in the cockpit, the helmsman does the whole procedure. In either case, once the life sling and horseshoe is in the water, the 2nd crewmember watches the MOB and lets the helmsman do the rest of the procedere
- Three crewmembers onboard. The helmsman does the whole procedure except the 2nd crewman throws life sling and horseshoe bouy to allow the helmsman to start the turn sooner and the third crewmember works the GPS and starts the engine. Obviously, if the helmsman is alone in the cockpit, he/she has to throw the life sling and horseshoe. Once the life sling and horseshoe is in the water, the 2nd crewmember watches the MOB and third crewmember stands by to assist the helmsman as needed.

Radio

MMSI

Boat US MMSI registration

Login name is: Ptarmigan

MMSI number is: 338066842

WARNING: If you sell or trade this boat and radio with the above number programmed into it, please be sure to cancel this account to make the number available to the new buyer. Do not use the above number with a new boat & radio as it is still tied to the one you have sold! Instead, you will need to register for a new MMSI number for the new radio.

DSC Mayday Availability Check

Install the GPS and turn on. Turn on radio. If the GPS signal is available to support the distress button mayday on the VHF, the position will show on the bottom of the VHF screen when the VHF “select” button is pushed. If you do not see the Lat Long after pushing the “select”button, the automated Mayday function is not available. Investigate and correct.

Receipt of DSC Mayday Alarm From Another Vessel

The alarm is very loud and sounds continuously. It shifts the radio to CH70 on receipt.

To clear the alarm

- 1) note and information shown on the VHF screen. I am unsure if the screen will shown the MMSI of the craft sending the alarm. If it does, log this number—

you will use this to relay the distress call to USCG on CH16, if necessary. See below. PTARMIGAN's MMSI code is **338066842**. Ensure the code you record off the VHF is different (don't inadvertently report a MAYDAY on your self).

- 2) Push tri-scan or select CH16 to clear the alarm tone and listen for a verbal Mayday. (Note-this does not acknowledge the CH70 auto distress tone. It simply defeats the VHF's dual watch feature—forcing it back to CH16. It will only jump to CH70 on first receipt of a distress tone)

From <http://www.navcen.uscg.gov/marcomms/gmdss/dscproc.htm#Distress>

Actions on receipt of a distress alert

Ships receiving a DSC distress alert from another ship should normally not acknowledge the alert by DSC since acknowledgment of a DSC distress alert by use of DSC is normally made by coast stations only.

Only if no other station seems to have received the DSC distress alert, and the transmission of the DSC distress alert continues, the ship should acknowledge the DSC distress alert by use of DSC to terminate the call. The ship should then, in addition, inform a coast station or a coast earth station by any practicable means.

Ships receiving a DSC distress alert from another ship should also defer the acknowledgment of the distress alert by radiotelephony for a short interval, if the ship is within an area covered by one or more coast stations, in order to give the coast station time to acknowledge the DSC distress alert first.

Ships receiving a DSC distress alert from another ship shall:

- 1) watch for the reception of a distress acknowledgment on the distress channel (2187.5 kHz on MF and channel 70 on VHF);
- 2) prepare for receiving the subsequent distress communication by tuning the radiotelephony receiver to the distress traffic frequency in the same band in which the DSC distress alert was received, i.e. 2182 kHz on MF , channel 16 on VHF;
- 3) acknowledge the receipt of the distress alert by transmitting the following by radiotelephony on the distress traffic frequency in the same band in which the DSC distress alert was received, i.e. 2182 kHz on MF, channel 16 on VHF:

"MAYDAY",
the 9-digit identity of the ship in distress, repeated 3 times,
"this is",
the 9-digit identity or the call sign or other identification of own ship, repeated 3 times,
"RECEIVED MAYDAY".

NOTE - Ships out of range of a distress event or not able to assist should only acknowledge if no other station appears to acknowledge the receipt of the DSC distress alert.

Rigging

Standing Rigging

- Turnbuckles 6.25” barrel. Lengths with current rig when tensioned
 - Forestay (Turnbuckle replaced June 2006)_____
 - Backstay (Turnbuckle replaced June 2006)_____

Running Rigging

- Jib Sheets
- Furling line—renewed April 2006
- Reefing lines—first reef line is 28 feet long and second reef line is 37 feet long

Halyard Winch (Barient #3)

Maintenance instructions from <http://www.cncphotoalbum.com/winches/winches10.htm>

(Picture unavailable)

1. Remove screw (#15) from inside top of drum (#13).
2. Remove drum (#13) from base (#1).
3. Remove brake screw (#4), swivel pin (#5), brake handle assembly (#6) by unscrewing from base (#1).
4. Remove anchor pin (#7) from base (#1) using small pointed object.
5. Remove brake band (#3) and ratchet ring (#8) from base (#1).
6. Inspect 2 pawls (#11) and 3 pawl springs (#12) on drum (#13). (Do not remove unless broken.)
7. Carefully wash all parts including inside of drum (#13).
8. Grease inside of drum (#13).
9. Oil 2 pawls (#11) on drum (#13).
10. Assemble brake band (#3) to base (#1).
11. Assemble anchor pin (#7) through brake band (#3) and onto base (#1), checking alignment of anchor pin hole with brake band hole.
12. Assemble brake screw (#4), swivel pin (#5), brake handle assembly (#6) through brake band (#3). (Do not tighten securely until winch assembly completed.)
13. Assemble ratchet ring (#8) onto drum (#13) noting correct position of pawls.
14. Assemble drum (#13), ratchet ring assembly (#8) to base (#1) noting the fitting of roll pin (#2) on top of base (#1) to hole in drum retainer (#10).
15. Assemble screw (#15) inside top of drum (#13) and tighten.

Center Board Pendant

I have not replaced the pendant yet. The previous owner indicated it was replaced last around 1990. From the website www.pearson35.com discussing a replacement on a 1979 P-35.

“The original cable was about 5/32" SS and 12'-3 1/2" long. The new centerboard cable is a 3/16" SS cable with a crimped SS tumble providing a total length of 15'. You can get by with less than 15' however it was nice to know that I had more than I needed when it came time to secure the take up real.

1. I slackened and pulled the old cable down enough to cut off the woven eye at the cb connection.
2. I unraveled the end of the old cable just enough to insert the NEW cable in between the wire stands and rewrapped.
3. I cleaned both ends of the wire good with alcohol and used duck tape (you knew there had to be some in here somewhere) and made a long taped connection.
4. With a friend up top, he pulled from the counter top while I fed the cable from below. WORKED GREAT! That was a sweet sound when he said OK!
5. The end of the cable was inserted into the hole of the take-up-real and pulled out the side. I hand cranked up the board then first time thinking that I would have to cut some length off but it all wound up nicely. I dropped it down and cranked it up two more times to fully check it out.”
6. I installed a make-shift "copper stop," on the cable end. Will crimp this off later.

”

Sails

MAINSAIL (White Sail Bag w/Blue Strip)

Batten #	Length	Width
1 (top)	23	1 5/8
2	33	1 5/8
3	33	1 5/8
4 (bottom)	30	1 5/8

. (Need to verify sizes on installation)

Roller Furling Rig on Ptarmigan

(From Lessons From My Good Old Boot, Donald Launer and Karen Larson, 2007)

The first roller-furling headsails were rolled up on their own luff-wire, just behind the forestay, and were not, technically, a staysail. With this roller-furling system, the foot of the luff is attached to a deck mounted drum and the head is attached to the halyard, through a swivel aft of the forestay. Thus, the headsail can be furled from the cockpit, without going onto the foredeck. But the tension required on the halyard to reduce unwanted sagging of the center of the headsail is enormous. This sag also creates a poor sail-shape, and that early system was shunned by racing sailors. In addition, the furling line on the roller drum had to be wound in one direction so that the forces that would cause twisting of the wire would tighten the lay of the wire rather than open up the lay. Also, a fitting usually has to be installed that prevents the head of the sail from wrapping itself around the forestay. With this type of furling, reefing is not practical, except in very light winds, or for a short time when approaching a mooring, dock or slip. Although this system is seldom used today, roller gear is still available.

(Comment) This is the system on Ptarmigan. Some old timers have told me it is a Schaffer system. I am not sure why the author considered reefing not to be practical. I have reefed (by heading up into the wind momentarily) in excess of 25 knots of wind with no problems. I am concerned whether this system can be retained when I eventually shift away from wire halyards—as the wire halyard winch does a great job of loading the luff wire.

In support of the comment in the book that this system should not be used for furling, Ptarmigan is outfitted with a hank-on #3 which appears proper to fly with 1 or 2 reefs in the main, after lowering the roller furling Genoa. This sail, however, needs some repair before use.

Storm Sails (Yellow sail bags)

The storm jib is hanked on with the permanently attached hoist wire at its head. You need a pair of pliers to remove the Genoa from the roller furler after lowering it, and you

need a shackle to attach the jib foot to the short wire at the base of the head stay. Normal jib sheets are used, but they are set so the jib (which comes aft short of the mast just above the fore hatch) is self-tacking.

The storm mainsail has a line attached at its tack, and the foot is longer than the luff. It appears that the best sheet angle would use a mooring line as a sheet led to the aft mooring cleat inboard of the life-lines. This lead will work for the active sheet, but this would lead the lazy sheet literally in the helmsman's face. I am not sure you can easily make the main self—tacking—the normal goal for a storm sail.

Normally with storm sails up, you lower the boom on deck and secure it. The topping lift is long enough to support this although the long boom comes down so you wind up lashing it against one of the main winches. An alternative might be to leave it up, immobilized by the attaching the wire boom pendant to the back stay with the boom sheet (cause it's not the main sheet any more, right) pulling to one side while the preventer block and tackle pulls to the other.

Orange Sail Bag

The orange bag contains the #3 Genoa—a 105% jib. It is hanked on after the #1 Genoa is lowered and removed from the furler (see discussion under storm sails).

Green Sail Bag

The green “sail bag” does not include a sail at all, but rather a cockpit tent.

Securing Checklist

When leaving the boat, do the following:

- Install sail cover and wire boom pendant.
- Ensure at least three wraps on jib to avoid unfurling. Ensure both jib sheets and furling line tied off.
- Check all mooring lines for correct adjustment and good condition.
- Place sun covers on Dodger windows.
- Place Life Sling below.
- Shut all through hulls.
 - Optional Exception—leave through hull #4 shower drain open. Remove shower sump to bilge drain plug and turn shower drain pump on (auto).
 - This line up will make the shower pump a back up bilge pump.
- Latch all the deck hatches from the inside.
- Connect shore power.
- Plug in battery charger to 120VAC. Verify 120VAC available by battery charger on light.
- Drain muffler
- Pump bilge until top of bilge pump is just visible. Align bilge pump for float switch operation.

- Take GPS off boat. Take out trash. Ensure all food is off boat or properly stowed.
- Ensure all 12VDC switches off except “bilge pump.”
- If using the shower pump as a back up bilge pump, turn on port cabin lights switch and make sure all loads other than the shower pump on that circuit are off
- Car keys, wallet, cell phone in pocket. **Sun glass on head.** Lock companion way slide and leave.

Steering

Autopilot

The NAVICO (later SIMRAD) 5000 auto helm is stowed in a blue bag behind the port setee in the cabin. It is mounted as follows. The motor unit is attached to the yoke just below and to the right of the steering wheel using the silver pin. The motor is mounted with the drive gear facing aft. The drive belt is slid over the steering wheel (without removing it), and attached over the black drive ring on the wheel and the drive gear on the motor. The lever on the motor mount adjusts tension—up is untensioned, down is tensioned. Note that the deck gratings must be bolted down or you will lift the gratin instead of tensioning the drive belt.

The control box slides over the black tab on the starboard side cockpit coaming beside the helm. The power lead goes through the gray tube just aft of the engine panel and connects to a connector stored behind it in the starboard cockpit hatch (white two strand cable). The on-off switch for the autopilot is on the very top of the engine panel.

There is a separate manual for the auto-helm. Quick reference follows:

- 1) When properly plugged in and energized, left light will be blinking. Press middle button (set auto) and light goes on steady for compass mode
- 2) While in compass mode, push left or right button to change course 1degree. Hold key and move in that direction 10 degrees for each double beep heard
- 3) Press middle (set) button and either left or right button—executes a 100degree tack in that direct
- 4) Moving past the helm station, even on the side away from the auto helm box with a cell phone OR having a cell phone in your pocket and then leaving the helm station will change the magnetic flux sensed by the auto helm flux compass and result in a flashing left light—going back to ready with no helm input. If this happens, immediately press set auto as in step one. Keep cell phones out of the cockpit.

Surveys and Inspections

2005 Survey

Attached as an Appendix to this SOP.

2006 Hull Moisture Inspection

In August 2006, the Annapolis Naval Station MWR marina rented a moisture meter to check some boat hulls. I got the Marina Manager to check Ptarmigan. At about eight equally spaced* locations on the starboard side, just below the waterline and lower near the keel, we found not evidence of water intrusion. (Green on the meter—same reading as above the waterline).

Checked the rudder—the only water intrusion found was near the top rudder post to rudder joint—the rest was dry. We checked about four spots on the port side with similar results. (*For valid readings you have to remove the bottom paint at the test points).

2007 Head Function Inspection

The head function matched all specs in the instruction book.

Tankage

Fuel Tank Removal and Installation

In the summer of 2006, the fuel tank was removed to allow installation of a drip-less shaft seal. Removal procedure as follows:

- 1) Remove peg board partition bulkheads on both sides to get full access to tank.
- 2) Break three fuel lines (supply, return, and vent). You can leave the elbows on the tank and still get it out. Dust seal the lines by covering with a small plastic bag and taping shut.
- 3) Bend fuel lines out of the way. NOTE: cold working the copper fuel lines to bend them in and out of position when moving the tank will eventually wear them out. Leak check after replacing tank
- 4) Remove fill pipe—you cannot get the tank out with the fill pipe in place.
- 5) Remove two hold down straps and bonding wire.
- 6) Slide tank out to port. It will come out of the port locker cleanly. If you leave the elbows on the tank, you will have to pull slightly on the front of the port locker and bend in out to get the larger (vent and return) elbow to pass. This is easy to do.

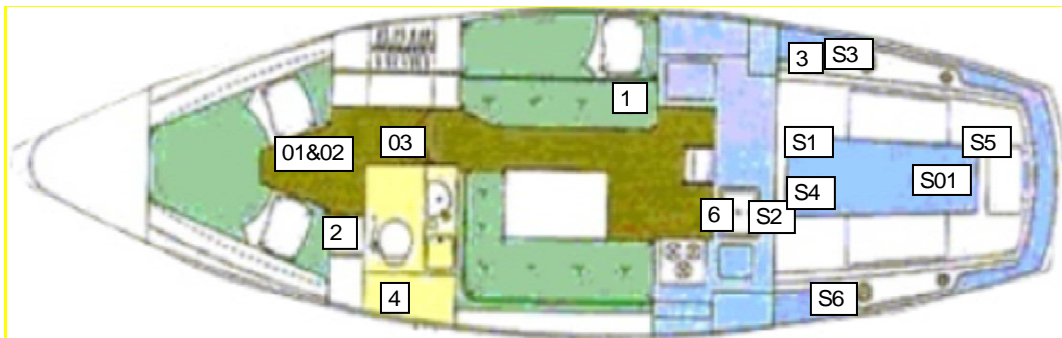
Towing

Boat US unlimited. Member # **10205610**

Call TowBoatU.S. Dispatch, 1-800-391-4869.

Valves and Through Hulls

Thru Hull	Location	Last Maint Date	Maintenance
01	depthfinder		
02	speedo		
2	head overboard	9/20/05	freed up
03	head intake	9/21/05	freed up--still needs work
na	head intake line at head pump	8/15/07	the single hose clamp here (only one will fit on head pump) is below the waterline and should be treated as a potential flooding path
4	shower drain ovbd	9/22/05	replaced gate vale with ball valve. New hose clamps
S2	Galley Drain Stand Pipe	9/25/05	new hose clamps
1	unused fwd of ice box	9/21/05	inspected. Capped globe valve.
6	Raw water intake	10/5/05	inspected. Current hose clamps are good
S1	Starboard Cockpit Drain Standpipe	9/22/05	new hose clamps
S4	Port Cockpit Drain Standpipe	9/22/05	new hose clamps
S3	Starboard Standpipe (seat drain)	9/22/05	new hose section and hose clamps
S6	Port Standpipe (seat drain and bilge pump)	9/22/05	new hose clamps
S01	Rudder Post Standpipe with Packing Gland	9/22/05	Inspected hose. New hose clamps.
S5	Exhaust ovbd	9/22/05	new hose clamps. No valve, but exhaust points straight down.
3	unused stbd cockpit lkr fwd	9/24/05	replaced broken through hull and sealed with pipe cap



Paint and Varnish

Hull topsides—AWLGRIP Aristo Blue applied 2006

Deck—AWLGRIP—white (exact color unknown) 1994

Varnish—CETOL light

Winterizing the Boat

Three Weeks Prior to Hauling

- Clean any oil or sludge from bilges
- Add bilge cleaner to emulsify residual

One Week Prior to Hauling

- Annual Oil Filter change
- Check Engine Freshwater Antifreeze with hygrometer.
 - Drain and fill antifreeze until a minimum of -30F protection is achieved.
 - Remember, this is different that the non-toxic antifreezes used elsewhere in this procedure for winterizing.

Hauling Day

- Break fresh water supply line at hose section aft of three valve manifold, second bilge hand hole from aft in main cabin. Open manifold valves and allow to drain to bilge. Leave disconnected.
- Pump Bilges as much as possible
- Pump out MSFD holding tank
- Remove all sails from spars and stow for winter

Purchase Supplies

- Red (-50F) non-toxic antifreeze (for potable water systems)—8 gals
- Green (-100F) non-toxic antifreeze (for saltwater side of engine)—4 gals

Fresh Water—Pressurized Side (two people required)

- Ensure hot water heater drain is closed
- Rig funnel with hose to copper pipe aft of the connection previously broken aft of three valve manifold.
- Add Red antifreeze to funnel while running pressure pump.
- Turn on faucet at galley sink until red color shows. Do both hot and cold. Shut valves
- Turn on faucets in heat until red color shows. Do both hot and cold.
 - Remember that head sink drains to commode.
 - Pump water over board
 - When red antifreeze fills in bowl, retain that for winterizing head
- Stop
- Open drain on hot water heater

- Add water to funnel and run. Open only hot water valve at galley sink. Stop when red fluid appears.
- Add no more anti freeze.
- Open all four faucets. Run pump until no more water comes out.
- Leave all four faucets and drain on hot water heater open.
- Expect to use four gallons of red antifreeze total.

MSFD System

- Placed here after winterizing Fresh Water Pressurized side because it will use the antifreeze you have drained into the commode bowl during that procedure
- If bowl is not full, add red antifreeze until nearly full.
- Pump half of bowl to holding tank
- Pump other half overboard.
- Add a couple of capfuls of simple green to empty bowl for deodorizing
- Over the next few minutes, some antifreeze will drain back to give a low level in the bowl.
- Expect to use no additional antifreeze.
- Final valve lineup—head to overboard, overhead valve open (if boat out of water) close if in water.

Bilge

- Bilge should have been nearly dry prior to winterizing FW Pressurized side.
- The hot water heater drain will have added a gallon or two of red antifreeze to the bilge.
- Pump bilge
- Add one gallon of red antifreeze to the bilge. Do not pump again.

Fresh Water—Non-Pressurized Side

- Previously (hauling day checklist)--Break fresh water supply line at hose section aft of three valve manifold, second bilge hand hole from aft in main cabin. Open manifold valves and allow to drain to bilge. Leave disconnected.
- Shut all three fresh water manifold valves in the second bilge hand hold forward from aft main cabin.
- Pour three gallons of red antifreeze into potable water deck fill
- Open forward valve on three valve manifold. Close when red liquid comes out.
- Plug end of copper pipe running aft from three valve manifold (fingers work). Open forward valve and either starboard or port valve for 45 secs. Close both valves.
- Let copper pipe drain. Open the starboard (or port) valve you opened in the previous step and see if red liquid runs out. If it does, close valve, if not, repeat
- When you successfully get red liquid out of the first side tank, repeat the previous two steps with the opposite port tank.

- If you run out of red liquid in forward tank before you can get liquid into and out of side tanks, add more at deck connection while all three valves are closed. Then repeat appropriate steps above.
- Expect to use three gallons of red antifreeze total.

Engine Saltwater side (two people required).

- Drain muffler. Close drain valve when empty.
- Close sea water sea cock. Remove sea water pump suction hose from through hull and place in a bucket
- Run a freshwater hose to the bucket.
- Start engine and run for ten minutes flushing the sea water system by adding fresh water to the bucket as the engine salt water pump sucks out of it.
- Pump all water out of bucket. As it goes dry, add three gallons of green antifreeze to the bucket, looking for color change in discharge.
- If at least three gallons of antifreeze are added and color change is seen, stop adding antifreeze. If it is not seen, add a fourth gallon and then shut down engine when it is all sucked through. (NOTE: the color change is difficult to see against the blue hull. When this was done as a test with RED antifreeze, two and ½ gallons brought antifreeze out the stern exhaust, so four gallons is excess enough to ensure winterization. RED antifreeze is insufficient protection for the engine, however).
- Drain muffler and leave drain open.
- Expect to use four gallons of Green Antifreeze.

Appendix A—Status of 2005 Survey

Survey Ref #	Issue	Completed date	comment
2.03	2.03 Renew fuel delivery and return hoses.	9/1/2005	
2.04	2.04 Renew fuel fill hose.	9/20/2006	
2.05	2.05 Install remote valve shutoffs for fuel system.		
3.01	3.01 Replace automotive battery charger with appropriate marine battery charger. Determine whether to use installed or portable when designing 120VAC upgrade.	Sep-05	
3.04	Inspect battery cables that are chaffing. Replace if excessive wear or if they need to be lengthened to rerun without chaffing. Provide chaffing protection as appropriate.		
3.07	3.07 Upgrade AC system in steps		
3.07	Step 1—new AC panel to ABYC standard E-11 with proper wiring to shore power jack and single operable AC socket of proper design. All other AC services disconnected onboard		
3.07	Step 2—restore AC loads one at a time to the new panel, upgrading wire runs and sockets, lights, etc. as required .		
3.08	Insulate all exposed 12VDC terminals as listed, and an others identified during work (e.g., the engine start panel in the cockpit—reverse side in starboard cockpit locker—may have similar problems).		
4.04	4.04 Cockpit seat locker lids hold open device.		
5.03	5.03 Replace cockpit drain hoses	new clamps installed. Hoses are wire-reinforced and in good condition	
5.04	Replace hose clamps on rudder post packing gland.	Sep-05	
5.04	5.04 Replace old hose clamps throughout boat with new stainless hose clamps.	9/1/2005	
5.05	Verify installed manual bilge pump operation. If not acceptable, add repair to list prior to re-launching boat in 2006. (note—electric and portable hand bilge pumps are operable)	works, but suction hose may be jarred loose and must be checked priors to use	
6.02	Make freshwater system operable in all respects or develop further repair list for winter.	Oct-05	
7.01	Make head, macerator, and holding tank system operable or develop further repair list for winter.	Oct-05	
10.02	Repair port running light.	Sep-05	
10.04	Place new flare kit aboard.	Dec 05	

11.02	11.02 Replace VHF.	July -07	New GPS and DSC rador
11.04	11.04 Replace LORAN with modern GPS. Will place two hand held GPS onboard pending purchase of a larger installed unit.	Mar-07	New GPS
11.05	Verify depthfinder operation. Believe it was operating—need to find manual for proper turn on, alarm set, and sensitivity setting. Replace if necessary.	works intermittently. Alarm very reliable	
13.01	Repaint upper hull	Awl Grip Oct 2006	
13.05	Clean Bilges	Oct-05	
16.11	16.11 Repair sail cover. Main sail to be removed after each use and stowed below until sail cover is repaired.	5/6/2006	
16.12	16.12 Replace wire centerboard pendant. This needs to be done in the travel lift either during hauling or re-launch.	deferred--marina used trailer vice travel lift	
1.01	Inspect/replace seawater pump impeller and clean seawater strainer. Retest engine for overheating dockside. Operate at reduced RPM if overheats prior to full operating RPM.	Operates in Specs Sept 2005	
1.01	Have engine inspected by a qualified mechanic. Develop an engine improvement list. Clean bilges, maintain engine wiped and start repairing minor oil leaks. Note--I observed three reliable cold starts (each less than five seconds of cranking). The need to move the boat to the haul out location for hull inspection, and to move out of the travel-lift slip immediately after inspection did not allow surveyor to observe a true cold start.	Oct-05	
1.01	Service engine heat exchanger if necessary.	OK as is	
1.02	Install high temperature wrap on dry exhaust pipe section.	Sep-05	
1.03	B Install low oil pressure alarm		
1.03A	Repair engine tachometer. Defer to winter if alternator replacement is warranted. (Pickup on alternator provides tach input)	Oct-05	
1.10	Service propeller packing gland/replace hose. (I would do this sooner, but it is not readily accessible and will require some significant disassembly of partition bulkheads and or unshipping and moving a currently full fuel tank to reach it).	Replaced with PYI PSS Aug-05	
13.06 A	Repaint bottom	Oct-06	
13.06 B	Repair hull gelcoat.	AWLGRIP Oct 2006	

16.06 B	16.06B Replace galvanized forestay turnbuckle with stainless.	5/15/2006	
3.01	Replace battery in engine compartment.	Sep-05	
3.02	Remove automotive type battery charger from boat.	Dec-06	
4.02 A	4.02A Install additional lifeline stanchions.		
4.02 B	Tape wrap lifeline clevis pins to prevent tearing sails.	Jun 05	
4.02 C	Repair forward starboard lifeline stanchion.	July 08	
5.02 A	5.02A Replace gate valve on through hull fitting with ball valve.	Sep-05	
5.02 B	Service or replace head through hull valves.		
A	A. Rebed stanchions and deckplates.		
B	Repair broke fiberglass tabbing on composite knee for port aft lower shroud.	Aug 08	
C	C Replace DC outlets. (So they do not used 120VAC style outlets)		
D	D Replace hinge on port settee in salon.		
E	Re-fasten stainless rub strake on port hull.	6/5/2006	
X	(no number) Replace emergency tiller	12/5/2006	

Appendix B—Measurements

HULL		
LOA	35' 2''	
DWL	25' 2''	
L fwd of mast	14'	
L aft of mast	21'	
Beam	10' 0''	
Draft	7' 6''	CB up 3' 9''
Cockpit	9' 7''	
RIG		
Mast above deck	39' 4''	
Mast above waterline	44' 6''	Use 46' for antennae
Boom length	16' 6'' ?	15' 3'' sail length on boom

Design Analysis Ratios

(As measured or calculated for *Mikihaya*)

LOA or LOH Length Overall/Length of Hull	35'-2"
LWL Length at Waterline	25'-2"
DWL Design Waterline (designer estimate)	25'
B _{max} Beam at it's maximum width	10'-0"
BWL Approximate Water line Beam (B _{max} x 0.9)	9'-0"
Draft (Center Board Up)	3'-9"
Draft (Center Board down)	7'-6"
Displacement (Pearson Published light ship weight)	13,000 lbs.
D _{total} Displacement _{total} includes payload	13,000 + 2000 = 15,000 lbs.
B Ballast as built (Lead enchased in Fiberglass)	5,400 lbs.
SA Sail area (as published)	550 sq/ft
SA Sail area (calculated) Fore-triangle ($[\text{I} \times \text{J}] / 2$) + Main ($[\text{P} \times \text{E}] / 2$)	279.5' + 269' = 548.5 sq/ft
MH Mast Height Above LWL (DWL)	44'-6"
Headroom (Main Salon Area)	6'-3"
Cockpit Length	9'5"
Power	30hp Diesel

Fuel	18 gal
Fresh Water Capacity (Bow-45, Starb-25, Port-25)	78 gal
J Dimension (ft) (Measured from head stay sail shackle with a straight line to the mast clearing the deck)	13'-9"
E/B Dimension (ft) (Measured from aft side of the mast to the end of the boom sail attachment)	15'-2"
I Dimension (ft)	40'-8"
P Dimension (ft) (Measured from top of boom/mast junction to the mast head attachment for the mainsail)	35'-6"
HS Hull Speed ($1.34 \times \sqrt{\text{LWL}}$) (knots)	6.72 knots
HS (measured) Know meter compared to GPS	7.2 knots
Speed under Power (sustained)	5.8 to 6.0 knots
SA/D Sail Area Displacement Ratio ($\text{SA}/[\text{Disp}/64]^{0.667}$) (15.8
LBR Length-Beam Ratio ($\text{LOH}/\text{B}_{\text{max}}$)	3.52
BR Ballast Ratio % (Ballast wt/displacement x 100)	42
DLR Displacement-Length Ratio ($\text{Displacement}/2240)/(0.01 \times \text{LWL})^3$	364
MCR Motion Comfort Factor ($\text{Disp}/0.65 \times (0.7 \text{ LWL} + 0.3 \text{ LOA}) \times \text{Beam}^{1.33}$)	33.41
CSV Capsize Screening Value = $\text{B}_{\text{max}}/(\text{Displacement}/64.2)^{0.334}$	1.69
Yacht Class for IMS	PSN35
PHRF (general)	174

Appendix C—Sizes of Miscellaneous Item

Swim Ladder Rubber feet fit 1" pipe

Slats (7) in bottom of Seaworthy rubber inflatable—3/8" x 6.5" x 27 1/8"

Window frame screws—# 8 sheet metal screw 5/8 inch long

Handrail bolts original 10-32 stainless 4 3/4 inch long

Replacement when re-bedding 10-24 stainless 5 inch cut to 4 3/4 inches

Available www.boltdepot.com