



X Dimension
Manual
Of Useful Information

August 2011

Background

This boat is a custom cruiser/racer designed by Cuthbertson & Cassian (C&C) and built by Bruckmann Yachts, Canada, in 1973. This is number 10 of fourteen 43s built between 1970 and 1974. It was launched as Night Train and sailed for many years on Lake Michigan. Then the boat moved to Marion, MA in 1992 and has sailed New England waters since.

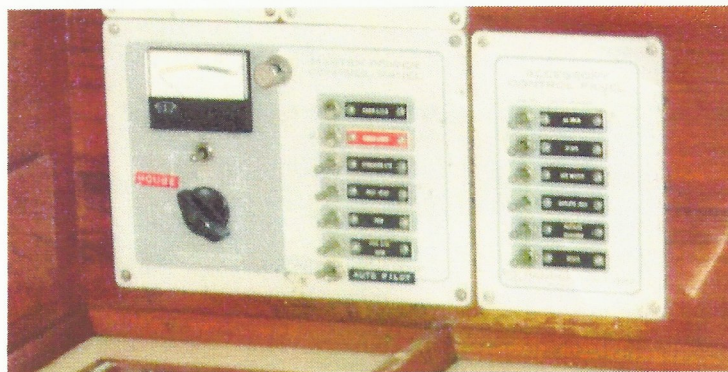
Specifications

- LOA 43.4'
- Length WL 35.9'
- Max Beam 13.0'
- Draft 7.75'
- Displacement 22,000
- Sail Area 931 sq '
- PHRF/NE 72 base – 87 as sailed
- Diesel Perkins 4-108 50 hp (new in 1989)
- Mast & rig Sparcraft tapered 2 spreader/discontinuous rod (new in 2007)
- Fuel 40 gal.
- Water 80 gal
- Sail control Harken furler (new 2007) and Lazy jacks (retracting)
- Sail control Navtec backstay, 14 winches, Hall boom vang, carbon pole

Boarding Boat

Come aboard:

- Unlock top hatch board with key and remove hatch boards
- Place companionway hatch board in slots next to winch handle tray in the starboard cockpit locker
- Go below and turn the main switch behind the sink from 9 o'clock up one notch (clockwise) to first battery bank (red marker) – not to both



Starting, Stopping and Motoring

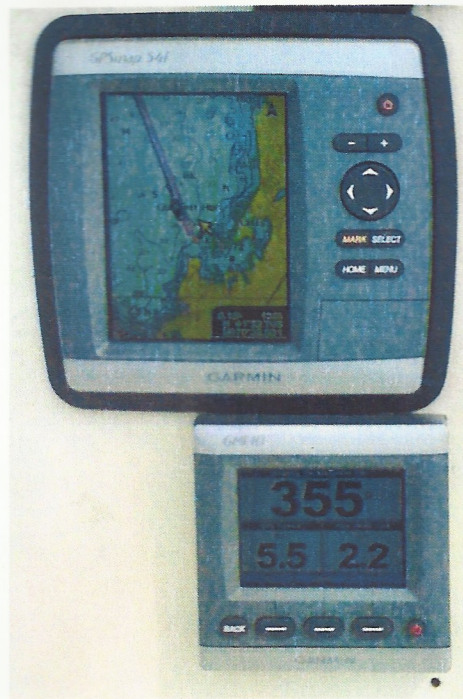
Starting engine:

- Lift starboard cockpit hatch cover and near the bulkhead to starboard (not visible unless kneeling down) is a black battery switch that should be at 9 o'clock. Turn this switch to 12 o'clock. You should now hear a buzzer from the engine panel that sounds warning of engine overheat or low engine pressure. In this case it's low engine pressure since the engine is not running yet. NOTE – if the buzzer does not sound it means the fuel pump is not turned on at the switch panel behind the sink. Go below and check. The fuel pump switch should ALWAYS be left on.
- From behind the wheel facing forward, raise the starboard control handle an inch or so from full down to allow fuel flow. Then be sure the port control handle is in the middle of its up/down range (neutral). Up is reverse and down is forward.
- Press rubber covered button on starboard side of wheel stand to turn engine over. It should start immediately. Adjust throttle to 900-1000 rpm to warm up.
- Be sure not to let alternator belt slip (high pitched squeak) and back speed down until it stops. This initial alternator drag is related to the high output asked when the battery voltage drops a bit. A few minutes of running at 1000/1200 rpm charges enough to allow increase in engine revs without belt slipping.

Navigation Instruments

Nav equipment:

- The Garmin map system and sensors (port side of companionway) are very good and have been reliable. The Navman instruments were a reliability problem and are only filling the bulkhead holes (starboard side of companionway).
- The manuals for programming and calibration are in the documentation package and downloadable on-line, too. You can create screens to tell you almost anything in digital, analog or graph.
- The Garmin network is basically NMEA 2000, with NMEA 0183 interface to the map.
- NMEA protocol explanation can be found on-line.
- Network connections are in the hanging/storage closet below, to the port side of the companionway under the instrument doors.



Sail Control

The boat has 16 winches, though only about 4 are typically used for day sailing. The mainsheet control is on deck to the immediate right of the companionway. The matching winch on the left of the companionway can be used for the main halyard or the main halyard can be led to the winch at the base of the mast to starboard. The jib sheet and spinnaker sheet winches are on the coaming in the cockpit. The largest winch at the mast base portside is for the genoa halyard and the winch just forward of that is the spinnaker halyard winch. Mid-deck to starboard is the winch for the asym spinnaker tack line or pole downhaul if a traditional spinnaker is used. In that case, a cluster of winches to starboard of the mast base are available for pole control. The locking reel winch is never used.

Double handed sailing can be quite easy on X Dimension, in spite of all the intimidating lines and winches. Just unroll the #3 genny, raise the main and go. After sailing, raise the lazy jacks (they secure on the two horns forward on the boom), drop the main into the cradle formed by the jacks, and straighten out and secure with sail ties. Then lead the lazy jacks back to the horns and put on the main cover. Takes 5 minutes at most.

When rolling up the jib or genny, it might be best to send someone forward to haul the roller line near the bow. This is pretty easy. It's tempting to sit in the cockpit and winch it in from there, but those winches are so powerful that if something is fouled somewhere, you'll break a line or fitting before you realize you have a problem.

The #3 genny is the go-anywhere sail and can be led to the inner track for max upwind pointing or to blocks on the rail where it's less likely to contact the shrouds. The main has reef controls, but has never been reefed. It can be carried in winds up to 30, but frankly if it's windy enough to reef it's better off down. The boat will be doing 8-9 knots

so what's another half a knot, after all. The boat will always balance at the wheel, in all winds, unless the main traveler is too high. If there's weather helm, lower the traveler or ease the mainsheet. A bubble in the main upwind in a blow looks funny but it's fast.

A Sailtec hydraulic backstay adjuster deals with varying backstay tension. Upwind, the piston should be about 2 inches below the white gauge on the rod. Be careful not to adjust halyards with sails under load. Again, the power of the winches can cause turning block stress.

Stove and Cooking

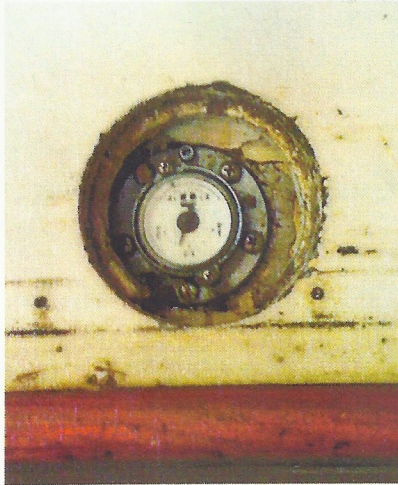
The stove uses propane fed from the cockpit locker to port. No need to touch the tee valves, just open the propane source from the tank top. Below, there is a switch on the main circuit breaker panel marked "stove" that must now be turned on. Then, flip the switch on above the stove to the right, and gas is allowed to flow. To light any burner, turn the knob slightly to the lighting position and use a standard propane lighting extended flame source. Then hold the knob in for 10 or 20 seconds for the thermocouple to heat and open, or the flame will go out. Remember, it's been said, "the most dangerous thing you can do on a boat is light the stove." There is an ignition "sparker" on the stove but these don't work very well in damp conditions, so ignore it.

Reverse these steps to shut off the stove.

Engine and Drive

The boat is powered by a Perkins 4-108 diesel – a legendary workhorse of boats, taxis and farm equipment. It was new in 1989 and has about 2000 hours on it by my best estimate. It drives a Newage gearbox that's 10 or so years old and has a two blade Max-Prop at the end of the shaft. The whole system has been great and the prop streams when sailing for performance. However, to properly feather the prop, the boat should be moving about 5 knots, and the engine shut down while in gear. Be sure to put the gearshift into neutral later when you restart the engine. The Max-prop is the best for sailing because of the positive bite you get when backing down at a mooring or dockside. Folding props need high revs in stopping to achieve the same effect.

The engine seems to use about 0.9 gallons of fuel per hour at about 2000 rpm (6.5 knots). With a 40 gallon fuel tank, this means a sailor can keep up with fuel use by bringing a 5 gallon jug aboard from time to time, without the hassle of going to a fuel dock. Engine gauges are in the cockpit to starboard, but not easy to see. Only the temp and oil pressure tell you anything of importance. There is a buzzer and red light when either temp or oil has a problem. The fuel gauge is above the tank and can be checked easily by lifting the cushion on the port settee below.



For all the virtues of the Perkins, it comes with a down side. The engine oil seeps at the seal with the transmission (I think) and always has. The rate seems to be about a quart per 10 or fifteen gallons of fuel. Check the dipstick every 5 gallons or so of use. This oil can be caught with the white oil absorb rags between the engine and the bilge and is not as irritating as one might think. Several times I've asked my yard if I should get a new engine and the answer has always been to treasure the Perkins as a legend.

Head and Shower

Hot water is created by heat exchange with the engine cooling system. About 20 minutes of engine use should produce enough hot water to take 2 quick showers. Mix hot and cold to suit.

The head is standard. A small holding tank is under the vanity in the forward cabin. The valve for holding/overboard is under the vanity, too. The on deck holding tank hose is not connected so pump out requires reaching into the compartment by the vanity.

Water is stored in an 80 gallon tank under the starboard settee in the main saloon. It lasts a long time. There is no gauge on the water tank.

Batteries and Electrical

The boat has a standard 12-volt system – two house batteries and one isolated starting battery. The paragraph above re starting the engine explains the need to turn a switch in the locker to connect the starting bank. Also, just turn the master switch up one notch clockwise from 9 o'clock to 10:30 to turn on the house bank. Nav switches are on the panel next to the nav table. Some minor mis-naming has crept in over the years so it might be less confusing if some new dymo marker labels were created here and there.

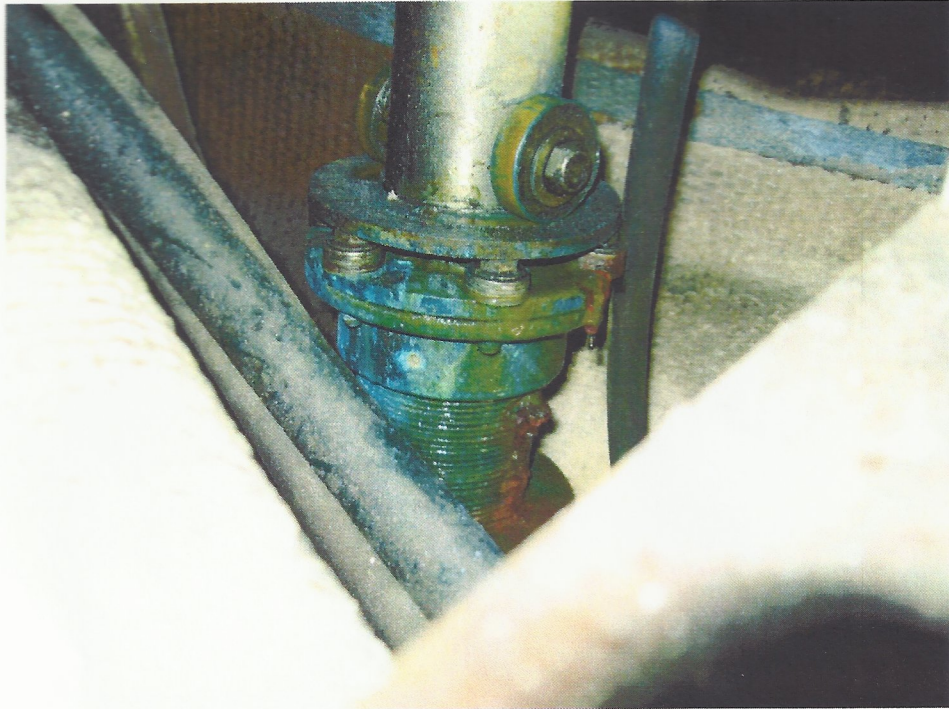
A 120-volt inverter is mounted on the bulkhead above the batteries under the starboard locker in the cockpit. This is quite handy in allowing use of normal small electrical tools, charging PC's etc. An orange extension cord leads from one of the inverter plugs to the nav station under the bunk cushion. The inverter should be off (slide switch on the inverter) unless in use. There's some current draw when on and in standby.

The boat has a Hehr high output alternator. It's overkill for the boat and was installed by a yard about 10 years ago when a smaller alternator was requested. It works well, but as a three stage charging system, when it thinks the batteries need a quick "kick" it works so hard it loads the diesel engine and the belt can slip. Tightening the belt at the alternator bracket cures this, but diesels vibrate and eventually it needs tightening again. Some bright ME could probably devise a positive tensioning gadget to keep the tension in balance. When the belt slips, no significant charge reaches the batteries at all. If the battery voltage is somewhat low, the signal that the belt is slipping is the squeak that's clearly audible. The helmsman should back the revs down and motor slowly for five minutes or so. Then the battery voltage builds up and normal motor speeds are fine without the slippage.

Bilge Pumps

The principal bilge pump is located under the nav table in a locker. It's high output, and actuated by a switch above the sink. It has a strainer on the end of the hose but sometime tiny bits will get by and work into the check valves in the pump. Then the pump will not suck. Removing that section of the pump is easy and finding the offending item in the pump is straightforward. The pump is not anchored in the cabinet, but this does not matter. In fact it makes it easier to fix the pump if a problem arises.

There is a drip from the junction of the rudder post with the through hull tube. This could be attacked directly with some external barrier held in place, perhaps, by a large hose clamp. I considered packing clay in the junction of the flanges and holding that in place with the hose clamp, but never got around to it. There is an automatic bilge pump in a damned zone between the engine and the bilge sump that activates every 2 ½ minutes (whether there's water there or not) and is directly connected to the house bank (fused). This keeps the drip water from reaching the bilge. However, if the automatic sump pump failed, water could accumulate.



The only bilge water to deal with, typically, is gray water from the shower, and rainwater that comes down inside the mast. A summer squall with several inches of wind-blown rain can produce a fair amount of water in the bilge. There are many mast openings for internal halyards and the whole system can act like a big funnel in some situations.

Varnishes and Paints

The external wood trim has a mix of gloss varnish (dorade boxes) and Cetol finish everywhere else. There's lots of teak below and usually some that can benefit from spot touching up, for best appearance. Use Interlux satin varnish anywhere that's needy. Give some light pre-sanding to an area of concern and the new varnish will blend with the rest quite well. Of course satin varnish has to be stirred before use.

The aluminum tow rail is fastened with stainless bolts, which creates some oxidation. This will stain the Awlgrip claret finish here and there. The only product that seems to remove this is a liquid called "On and Off" available at West Marine. It's advertised as "aggressive" so just brush on the area where it's required and wash off shortly afterward. It seems to work quite well. The Awlgrip manufacturer suggests that abrasive cleaners not be used on the topsides.

Screens

A hatchboard screen is on the boat. If additional screens are needed, there are fabric screens in the forward cabin storage areas.

Docs

Many included with this manual. Other references can be viewed through the web.