

OWNER'S MANUAL

SWAN 41

This manual is intended to give some general maintenance hints and as a guide to the proper use of the equipment.

Sections

1. HULL
2. DECK
3. INTERIOR
4. PROPULSION
5. PLUMBING
6. ELECTRICAL
7. INSTRUMENTS
8. RIG
9. HAULING + STORAGE
10. SPARES
11. TOOLS
12. DRAWINGS AND MANUALS IN POCKET AT END OF MANUAL

Note: The manual has been written to cover the whole series of SWAN 41's. Individual boats may differ in detail from one another and all variations cannot be covered. No attempt is made to cover owner supplied items.

Amended March 1976

contain toxic chemicals which can harm eyes and lungs. Never

dry grind old antifoulings. Wear appropriate goggles and a respirator even when wet scrubbing or sanding. Never use paint removers on glassfibre surfaces. Nautor boats have uncoloured gelcoat below the water line for providing a better grip for the antifouling.

Keel

Often on hauling, it will be noticed that along the joint between the hull and the lead keel there is a crack in the paint. This is caused by different thermal expansion in the materials and should cause no problems. If the crack gets too large, it can be filled with micro balloons and faired.

Steering gear

Assembly drawing 1-15-237

Steering cables should be hand tight. The adjusting screws are located on each side of the quadrant. Check the cables regularly for wear. If there are any broken strands, change cables at the earliest opportunity.

The steering gear has nylon bearings needing no lubricant. Remember that the emergency tiller must always be easily available. Practice its installation, which can save very vital time should it ever be required.

Mark and center king spoke, then center quadrant with adjusting nuts. Always lock securely when centered with correct tension. It is advisable to carry spare cables and best to have a complete assembly including chain marked at center with cables attached.

Flotation reference marks

At bow and stern there are reference marks twelve inches above datum water line. With the aid of these the exact flotation can be determined. Note: Normal flotation is heavy of the DWL - this is provided as a reference only.

2. DECK

Deck arrangement 0-20-029

Drawing of single laminate areas 0-21-024

Glassfibre deck

Maintenance directions for the glassfibre decks are the same as those given in the hull section (Section 1).

Winches

Winches should be rinsed with fresh water periodically and after rough passages. Grease bearings and gears lightly with a marine lubricant grease at least twice a year and before and after long passages.

OPTIONALS

Teak deck

The teak decking is imbedded in Formflex mastic when layed. The teak is screwed to the fibreglass deck and the screwholes are then plugged. All seams are payed with the same Formflex mastic. Prior to delivery all decks are treated with Pinotex Preservative. To maintain the appearance of the deck, regular cleaning and treatment with this preservative is recommended.

If the grey, weathered look is preferred, allow the deck to weather and then clean, as necessary, with soap and water. Do not use bleaching solutions as they will destroy the mastic.

Note: Do not use bronze wool in cleaning teak as it will react with the aluminium toe rails.

3. INTERIOR

Cabin arrangement plan 0-30-028

General

Take care of the interior, keep the boat well ventilated at all times.

All teak surfaces are varnished with several coats of Sadolux varnish. If any damage should occur, sand smooth with light sandpaper and apply Sadolux varnish or equivalent. Sadolux varnish is available from Nautor.

Floorboards

All floorboards are treated with Pinotex preservative, which can be obtained from Nautor. If the floorboard should stick, plane the edges with a 10° under bevel to restore easy fit.

Overhead covering

The overhead covering may be removed if necessary. First remove the teak strips which are held in place with an adhesive backing. This will expose the screws holding up the panels, which can be taken out to release the covering.

Table

The main cabin table can be removed while the mast is in place. Simply remove the starboard leaf, then take out the panel around the mast hole and undo the bolts holding it to the floor. On some boats, the tie rod forward of the mast must also be removed.

Head door

Should the door inadvertently become locked with no-one inside, it can be unlocked by pushing an ice pick or similar device through the hole in the center of the knob.

When the head is unoccupied, the doors should be left open to facilitate ventilation.

Leeboards, canvas

To install leeboards, the edge under the mattress should be stretched as tightly as possible between the eyes provided. When needed, tie one end of the upper edge through the eye at the foot of the bunk, then tie in the head end, again as tightly as possible, after entering the bunk.

When not in use, the canvas should be stowed flat under the mattress.

4. PROPULSION MACHINERY

Perkins engine handbook contains:

- Engine photographs
- Engine identification
- Data
- Operating instructions
- Instruments
- Preventive maintenance instructions
- Post delivery checkover
- Preservation of laid up engine
- Frost precautions
- Fuel system
- Cooling system
- Lubricating system
- Gearboxes
- Checking tappet clearances
- Electrics
- Emergency measures
- Fault finding

Engine controls:

At chart table:

- Warning light for low oil pressure/high coolant temperature

In cockpit:

- ON/OFF switch for engine controls
- Buzzer warning for low oil pressure/high coolant temperature
- Tachometer
- Coolant temperature gauge
- Oil pressure gauge
- Charging control lamp
- Starting button
- Button for operation of the glow plug ("cold starting aid")
- Engine control lever with combined throttle and gear shift (For starting up, the gear shift is disengaged by pulling out the "neutral throttle knob" which allows changing engine speed without engaging propeller).
- Stopping handle

Check before starting

- Fuel tank level
- Cooling water intake seacock open (Positioned under galley floorboards)
- Engine lubricating oil level
- Reduction gear oil level
- No water in fuel line water separator (Positioned under galley floorboards)
- Fuel shut off valve open (Position same as above)
- Cooling water strainer not choked up (to be cleaned every 100 hours of running). Located on the aft bulkhead inside the engine box. Check for air pockets after rough weather sailing and bleed.

Starting

- Turn on main switch, turn on engine control switch on main switchboard, and turn on cockpit switch. Charging control lamp will light up.
- Pull out the neutral throttle knob with lever in neutral, then advance throttle to starting position.

- Push start button, (not more than 10...15 secs continuously) with throttle half open.

Cold starting procedure

- Press the heater button for fifteen to twenty seconds and then, with the heater button still pressed, press the starting button. As soon as the engine starts, release both starter and heater buttons.

Running

- After engine has started, set revolutions to idling, 700-800 rpm
- Check oil pressure, normally 2,1...4,2 kp/cm²
- Check that charging control lamp switches off
- With control lever in neutral, push in the "neutral throttle knob". Now throttle and gear shift are coupled together.

CAUTION - Engine should not be run, either for power or charging batteries, at excessive heel angles. When running at angles of more than 20°, temperature and oil pressure should be watched carefully. Do not run engine continuously at full throttle. Full throttle operation should be for emergency use only. For normal use back off throttle slightly, 150 r/min below maximum attainable engine speed.

Stopping

Slow engine to idling speed and shift into neutral. Pull out black handle under control lever until engine is stopped. Turn off engine control switches.

Folding propeller operation

The folding propeller will give good service as long as it is used with reasonable care. The following points should be kept in mind.

1. Avoid shifting to "forward" at more than idle engine speed. Excessively rapid forward engagement can damage the propeller. Be especially careful after going astern and always avoid excessive speeds when going astern.

Note: If propeller fails to open on shifting into forward, shift to reverse and back to forward and it should open.

2. When starting to sail, after running under power, to insure propeller folding correctly, momentary use of reverse before stopping the engine will help. Otherwise the normal spinning of the propeller in "ahead" can keep blades open and shafts spinning after shutting down the engine. Temporary friction to stop shaft rotation should cause a spinning propeller to fold.
3. If after following this procedure the propeller persists in spinning when under sail, this indicates that there is some propeller damage preventing the normal folding of the propeller.

Shaft lock

To permit use of the engine to charge the batteries while racing, there is a shearable shaft lock pin provided. This is inserted to engage the reduction gear coupling in one of two positions 180° apart, which will lock the propeller with the blades in the vertical position. While locked, the engine can be run in neutral. An accidental gear shift will cause no damage other than shearing this pin. Extra pins are provided in case this should occur.

Note: Do not allow the shaft to rotate while sailing, as there is no lubrication in the gearbox with the engine stopped.

Strut bearing

The shaft strut has a replaceable Cutless Rubber Bearing (TB 2 Ø 30/45 x 120).

This bearing should be checked whenever the boat is hauled.

If worn so that there is visible clearance around the shaft, the bearing should be replaced.

Fuel system

The fuel tank is located under the aft end of the saloon settee, stb side, and filled through a deck plate on the stb side marked "FUEL".

The fuel supply can be checked by putting the sounding rod, stowed in the oilskin locker, through a small hole in the inspection plate on the tank, which is covered by a screw cap. Refer to the table in Plumbing section for conversion.

The fuel system has a shut-off valve and a water separator, both positioned under the floorboards forward of engine box. The fuel tank vent outlet is in the cockpit coaming aft.

Morse stuffing box

CAUTION: TIGHTEN BY HAND ONLY

When the shaft is first operated by the boat engine, tighten packing gland until it almost stops leaking (about one drop per second) but do not stop leak entirely. After the shaft has run for a few hours it is permissible to further take up (by hand only) the packing gland to reduce leakage to a minimum. For maximum service life from the packing and to avoid the possibility of scoring the shaft, always allow the packing to leak just a slight amount. If the stuffing box feels hot when running, it is overtightened and should be loosened slightly to allow lubrication. Be sure to install the locking cotter pin after adjusting.

Exhaust system

This is of the water-jacketed type, with the jackets on the engine manifold and the mixing chamber connected with flexible piping. From the mixing chamber the mixture of water and exhaust gases is led through a muffler to the opening in the hull topside.

Cathodic protection

There is a zinc anode on the propeller shaft right in front of the shaft strut which should be checked visually whenever the boat is hauled or at least 2 or 3 times/season.

If this is more than 50 % eaten away it should be replaced. If the deterioration is rapid, it indicates a leak in the electrical system and the whole system should be checked by a competent marine electrician.

5. PLUMBING

Plumbing diagram 2-51-049
Blake owner's manual
Table cooker manual
Sounding table 4-51-098

Sounding tables

The tank positions and capacities are shown on this table (capacity is related to sounding measurement by the table). There are two marked sounding rods located in the oilskin locker, one for water and one for fuel.

Fresh water system

There are three water tanks, one stb side and two port side under the saloon settees. They are all filled through a deck plate marked "WATER" on the stb side. When filling the tanks all tank shut off valves under saloon floorboards must be open. Then fill through the deck plate until water flows out through all vent pipes into the galley sink.

When using tanks, water should only be taken from one tank at a time. This will give you a warning when you are running low on water. When the first tank is empty, close it and open the second tank and so on. When the second tank is empty, is a good time to start looking for more water as there will be no further warning before running out. Note: If the boat has a list with the tanks full, you should use the tank on the low side first to straighten her up. Water supply can be checked at any time using the sounding rod (inserted through hole in inspection plate on top of tank after removing screw cap) and the sounding table. The wash basin and the galley sink are both connected to the fresh water system.

Sea water system

The galley sink has a sea water spout connected to a foot pump. The seacock is under the galley floorboards. Maintain the markings and use only when underway in clean water.

Bilge and drainage system

There are two hand operated bilge pumps, one in the cockpit, the second under seat in the aft cabin. The screened intakes are located in the galley under the floorboards. The pumps discharge under the counter, one into each of the cockpit scuppers.

The galley sink drains through a seacock placed under galley floorboards. The wash basin and shower drain into a sump tank, which can be emptied by a pump placed in the head. Outlet to cockpit scupper above water line.

Note: Each time the sump tank pump is used, the pumping must go on until the pump sucks air. This will break any water siphon in the outlet loop, and prevent sea water from flowing back and flooding the tank.

The icebox drains into a translucent tank in the bilge under the floorboards, which should be emptied regularly.

Head

Instructions for the maintenance of the toilet are given in the Baby Blake manual.

The intake sea cock for the toilet is located under galley floorboards and the outlet sea cock in the locker underneath the wash basin.

Note. When pumping out the toilet, always go on until the pump sucks air. This will break any water siphon in the outlet loop, and prevent sea water from flowing back and flooding the toilet.

Gas stove

Use and maintenance of the stove is explained in Table Cooker Manual. A 3 kg gas bottle is located in a separate, drained locker under the lazarette hatch.

On the gas supply line near the stove there is a shut off valve which should be kept closed except when cooking. Never leave a lighted stove unattended.

Ventilation

The cabins have natural ventilation.

Fresh air is provided through Dorade vents. They should be trimmed to face the wind except in heavy weather when they should be turned 180° from the wind.

There is an exhaust blower for the engine box, discharging through cockpit coaming aft. The blower works whenever the engine instrument cockpit switch is in ON-position, and can be used without the engine running.

Hatch covers

Hatch covers should be used in heavy weather and can be used in rain or light spray when without covers it would be impossible to have any hatches open.

OPTIONALS

Pressure water system

An electrical membrane pump is located under the stb side main cabin settee starting automatically when the sink valve is opened. The system is controlled by a switch marked WATER PRESS on the electrical panel. With the pressure system off, the foot pump can be used, but remember to open the sink valve first, otherwise no water will come out.

Holding tank system

The sewage from the toilet is first pumped into the holding tank. The holding tank can be emptied either by suction from shore through a special deck connection, or overboard by hand pump.

Water heater

The water is heated by means of:

- 1) Engine cooling water, flowing through a built-in coiled pipe
- 2) Built-in 110V AC or 220V AC heating resistor element (only with shore power)

Note: Before using shore power for the water heater, first make sure that it is filled up with water. This is checked by opening the hot water tap, letting a little water out.

6. ELECTRICAL

Service wiring diagram 3-64-068

Engine wiring diagram 3-66-022

There are two independent electrical systems - the service circuit for lighting, instruments, pumps, etc. and the engine circuit for starting and charging.

Main switch

This cuts out all electricity in the boat and should be turned off when the boat is left unattended, or when making repairs on the electrical system. The main switch is located on the forward side of the navigator's seat and is actuated by a special handle. Push in and turn clockwise to ON-position, turn anticlockwise for OFF-position.

Warning! Never turn the main switch off with the engine running as this will destroy the alternator!

Master switch

This cuts out the service circuit, and is located on the switchboard to the far right.

Service switches

There are normally 17 switches of the trip circuit type, which will switch off automatically if overloaded. If, when a switch is pushed upward (ON-position) it immediately drops back down, (OFF-position), this means that there is a fault causing excessive current. The fault must be found and remedied before the switch can be used normally. Warning! Never try to force the toggle to stay in the ON-position.

Engine instrument switch

This will also switch off automatically if overloaded.

If the toggle drops down, this means that there is a fault in the engine circuit.

As for the service switches, the toggle must not be forced to stay in ON-position, instead the fault must first be found.

Dials on main switchboard

To the left is the engine battery Ammeter, indicating the amount of charging or discharging. Next is the warning light for low oil pressure/high coolant temperature. Then there is a volt-meter for checking service or starting battery voltage by turning the switch marked BAT. TEST into the appropriate position. To the right is the service battery Ammeter.

Battery charging

Batteries should be checked regularly. If voltage in either battery is below 12 volts, they should be charged. One to three hours charging per day is recommended, depending on usage.

An engine alternator charges both service and starting batteries through battery isolation diodes, fitted on the rear of the alternator. At engine revolutions over 20 rps (1200 rpm), both Ammeters should display positive charging, recommended charging rpm is 27 rps (1600 rpm). The charging current reaches its maximum immediately after starting, and is about 25 A for a discharged service battery, and about 10 A for a discharged starting battery. The charging current gradually decreases as the batteries become charged, and approaches zero when they are fully loaded. If both Ammeters do not

display any charging after starting, the vee-belt drive for the alternator must be checked for correct tension. The tension should be checked after the first 5 hours of engine running, and after that every 50 hours.

Battery maintenance

There are normally three 12 V 95 Ah batteries in a GRP box under the seat in owner's cabin. Two of them are for service and one for starting systems.

Check the state of charging at least once every month with a hydrometer. The specific gravity of the acid should be 1,26 ... 1,28 for a fully loaded battery. If lower, charge the batteries. The acid level for a fully loaded battery should be 3...8 mm over the plates. If too low, add distilled water.

Note: Never add water to a discharged battery, because the process of charging may cause an overflow, which will weaken the acid concentration. This results in an appreciably shorter battery life. Never use open fire nearby when the batteries are checked. Never move acid from one cell to another. Before the cell caps are screwed down, check that the air holes are open.

Check and grease the battery cable connections with vaseline monthly.

Check that the ventilation pipes from the battery box are properly connected.

Important! If the batteries are removed, make sure that the main switch is turned off, and that the cables are properly marked before they are disconnected.

Fuses

If the battery cables are connected with the wrong polarity, the fuses will blow when running the engine. There are three fuses, two 80 Amp, Bosch No. 1191 017 003 and one 100 Amp, Bosch No. 1191 017 006, located in a black box under the navigator's seat. The two 80 Amp fuses are for the service and starting system, the 100 Amp is spare.

Navigation lights

Navigation lights are constantly exposed to the weather and must be cared for. At the beginning of the season take the bulbs out, clean the contacts and spray with a cleaner-preservative (such as WD-40 or CRC 6-66). This treatment should be repeated periodically (especially after rough weather or hard rain) and again at lay-up time.

OPTIONALS

Webasto cabin heater

Wiring diagram 2144-67009 A

The manufacturer's operating instructions are appended.

The heater can be run on fan only for ventilation merely by switching to "VENT"-position at the circuit breaker.

The heater is installed under deck against the transom, with the removable funnel aft of the cockpit coaming. The funnel is not waterproof and should be removed and the screw cap put in for heavy weather. On the main switchboard there is a three-position switch for OFF, HEAT, and VENT, and a small control light nearby, showing when the heater has ignited and is operating properly.

The heater uses fuel from the engine fuel tank, and has a separate shut-off cock with water separator and fuel pump, located under the floorboards forward of the engine box. Before starting heater, check the service battery voltage. This must be at least 12V, otherwise charge the battery first. The heater is started by turning the thermostat to the desired temperature and then switching to HEAT position. This energizes the glow plug, and can be verified by a negative reading on the service A-meter. After about one to two minutes, the control light on the switchboard should light up, indicating that the heater has ignited. If the control light does not light up within a reasonable time, the heater has not ignited and will stop automatically after about 5 minutes, shutting down the glow plug also. Wait for a few minutes, push in the red reset button on the relay plate under the navigator's seat, which will start the heater again. If the red button comes out immediately, wait a little more before pushing it again. If the unit does not start after 3 or 4 attempts it should be checked by an electrician. The heater fuses are located in a small black box on the mentioned relay plate. The red fuse is 16A and the blue one 25A.

Note: It is recommended not to start and stop the heater repeatedly, either by using the thermostat or the HEAT-switch, as this will interrupt the normal airing procedure, and cause smoking.

Refrigerator

A Mobilfroster 120 l unit is installed with the air-cooled compressor under the drawers to the left of the gas stove, powered from the service battery. With the switch marked FRIDGE in ON-position, the unit operates automatically, controlled by a thermostat inside the fridge. The cooling plates should be defrosted regularly for best efficiency.

Shore power

This is an independent electrical circuit, including a separate switchboard with polarity alarm, Ammeter and main switch, a 30 A battery charger located on the lazarette forward bulkhead, P side, outlets, and 15 m connection cable with plug-in on the boat.

Important! Make sure that the shore voltage matches with the boat installation, 110 and 220 V must not be mixed up.

To plug in the cable to the boat, push hard and simultaneously turn clockwise until a stop is felt. Then tighten the screw ring. If the polarity alarm - a buzzer behind the switchboard - starts ringing when the land end of the cable is connected, an electrician must be called to sort things out.

When the switch marked BATTERY CHARGER is turned on, the Ammeter should display positive charging. An empty service battery will at first draw about 20 A charging current, the value will decrease as the battery gets charged, and at last approaches zero.

The battery charger can be left on for an indefinite period, as it has automatic regulation of current and voltage.

7. INSTRUMENTS

All navigating instruments except the compass are optional. Therefore, only a few general hints are given, and the owner is advised to consult the manufacturers' detailed instructions, which are worthwhile reading carefully and in a devotional spirit with proper reverence.

Compass

Keep portable radios and cameras with exposure meters away from the compass, because they are strongly magnetic.

Maintain exact alignment of compass so that when sighting across it the fore and aft lubber lines line up exactly with the center of the mast.

The correctors are removed from the compass, and are stowed in the chart table drawer.

OPTIONALS

Log

The transducer housings are located under the fo'c'sle floorboards at stn 2,7. When not in use, the transducer(s) should be retracted to avoid damage from floating objects.

Do not force a B & G transducer down into working position. There is an alignment slot and if the transducer will not go down easily it should be turned until it does.

Note: Calibration instructions are given in service manuals.

Echo sounder

The transducer housings are located under the forward end of the main cabin settee berths at stn 3,25. Normally there is no maintenance except for the winter overhaul.

Navigation instruments

The switch marked NAV. INSTR. on the main switchboard controls the power to all instruments, repeaters and the lighting. The lighting, if fitted, is always on but consumes only 40 m A for each repeater. Important! On B & G instruments there is a desiccator plug which should be checked once every month. Normal colour is blue; if it has turned red, proceed as per manufacturer's instructions.

If there is moisture condensing inside the repeaters, also see the instructions.

For the connection of instrument mast wiring, see section 8, stepping the mast.

Radiotelephones, direction finders etc.

The aerial and earth connections should be checked a couple of times every season for possible corrosion and looseness. Faults on these points may cause a severe reduction in performance. Especially troublesome are all plugs and connections to isolated stays. Corroded surfaces should be thoroughly cleaned, and then sprayed with a contact-cleaner. Let the cleaner work for at least half an hour, wipe off the surfaces carefully, and apply a new layer of cleaner before assembling.

8. RIG

Sail plan 1-81-093, 291
Mast wedging drawing 3-23-260
Slab reefing drawing 3-82-247

Spars

The spars are anodized aluminium extrusions. They should be washed and waxed as necessary to preserve their appearance. If the spars get scratched, clean the scratches and cover them with metal laquer or wax.

Recommended sail setting

On the sail plan there are indicated sail settings for various wind strengths.

For best performance the boat should not be allowed to heel more than about 25 degrees.

Stepping the mast

The weight of the mast, including rigging, is about 300 kilogrammes. When inserting the mast heel through the deck opening, be careful not to damage the cables emerging from the mast. On boats with a glassfibre ceiling collar, this must be put on inside before the mast goes down. Be sure to clear the electrical cables under the foot of the mast as it goes into the step. The cables lead to starboard under the floorboards, coming up in the small locker under the after hanging locker. Connection points will be found on the inside of this small locker door.

Do not set up the rigging tight before wedging is done.

Wedging of partners

It is very important for the mast to be held securely at the partners, allowing for a slight athwartships movement under load. This is achieved with the system shown using rubber wedges. The rubber should be "tan pure gum floating stock rubber" of 35...45 shore hardness. Rubber thickness should be 1,25 times the space between mast and collar.

The first wedge is easy to slip into position, but for the second a very strong tackle is needed. The end result should be that the wedges are under considerable pressure. A hose clamp is used to hold bottom edge of the wedges against the mast.

After wedging is done the rubber boot provided is tightened around the mast and the collar to stop leakage. Make sure it is properly installed with large hose clamps to hold it in place and silicone around the top to seal it. The rubber is quite quickly destroyed by sunlight, so it must be covered by the canvas boot provided as well. Make sure this goes all the way around and covers the rubber completely.

Designer's note: Rod versus wire rigging

1 x 19 stainless steel wire is the most dependable rigging available, however, rods have two advantages - they stretch less under load, and have less tendency to foul a spinnaker that has wrapped around. The first point means that there is less to take up in a backstay before the headstay is tight. Note that you cannot set up a rod any harder than a wire, because for the same diameter their strength is about equivalent. For headstays rod should only be installed if standard hanks are to be used, not under a foil system. For shrouds, the only place where rods should be considered is for the top shrouds. Rods are more vulnerable

and difficult to handle and install.

Maximum backstay tension

Never apply more tension to the backstay than 25 % of its breaking strength. With a hydraulic backstay tensioner this is easy to control.

Wire diameter	Breaking strength	25 % breaking strength	
8 mm	11500 lbs 5200 kgs	2900 lbs	1300 kgs
9 mm	15000 lbs 6800 kgs	3800 lbs	1700 kgs
10 mm	17600 lbs 8000 kgs	4400 lbs	2000 kgs
12 mm	26000 lbs 11800 kgs	6500 lbs	3000 kgs

Downwind the backstay should be kept rather slack, as well as in harbour.

Mast rake

With the backstay slack the mast should stand vertically. With maximum tension applied (see preceding paragraph) the top of the mast should rake aft as given on the sail plan. If rake is not correct, headstay length must be adjusted.

Mast curvature

Normally the mast heel should be positioned so that the lower portion of the mast stands vertical or perpendicular to the designed plane of flotation. Then with the rake mentioned above there should be a gentle curve or hollow in the after side of the mast. This curvature should be controlled with the mast heel position rather than by adjustment of the forestay or midstay, moving the heel aft to increase, or forward to decrease, the curvature (assuming that the headstay is adjusted as desired for balance and performance).

Note: The mast heel is not designed to be moved while underway. If it must be moved it should be done in harbour with the rigging slackened off and no load on the rig.

Spreaders

The spreaders should bisect the angle between the upper and lower parts of their shrouds.

This means they should be angled abt 4 degrees above horizontal. Make sure that the spreader tips are securely supported on the shrouds. If the tips can slip down, this could cause the loss of the rig. It is recommended that spreader tips be covered with a soft material, or taped, to prevent chafing genoas.

Shroud tension

All shrouds should first be set up so they are just tight but under no tension. The sail track must be straight. Both top shrouds should then be tightened up three full turns.

For adjusting the lower and intermediate shrouds, the boat should be heeled 25 degrees with No. 2 genoa and full mainsail, and the backstay set to maximum tension. Adjust the shrouds so that the mast at the gooseneck, spreaders and top shrouds attachment point is in a straight line athwartships.

A good starting point for double lowers is to have the forward ones one turn tighter than just tight, and the after ones one turn less. The intermediate shrouds should have one turn less than just tight.

Use of midstay, forestay and runners

The purpose of these is to minimize panting or pumping in the mast. In smooth water in light air none of these should be necessary. As the breeze builds and the sea increases, the mast may begin to pump slightly. The first step is to set up the midstay. If the pumping does not stop, or the breeze builds even further, the next step should be to set up the runners, but put on just enough tension to stop the panting, do not induce any reverse curvature in the spar, which could lead to mast damage or failure. The final step is to set up the forestay, but only moderately tight, still retaining the desired curvature.

When a double head rig is used in heavy weather, the runners should be used to counteract increased bending caused by the loads imposed by the forestaysail.

Halyards

Halyard eyes are made with a nico-press so that maximum hoisting can be achieved. With nico-presses it is important not to overhoist, as the halyard will then fatigue at the edge of the sleeve and break very quickly. Make sure that all halyards are marked so that the nico-press sleeves are not hoisted high enough to touch the sheaves.

Broken halyard

Inside the mast, there is a messenger line fastened to a little oval plate near the gooseneck. This messenger runs over the unoccupied sheave at the masthead, coming down the aft side of the mast. By fishing the messenger out through the halyard exit, a new mainsail halyard can easily be pulled through.

For replacing a genoa halyard at sea it is necessary to go to the mast head, peeling off the tape on the messenger on the way up. Then using a hook fashioned from a wire coat hanger, fish the messenger out over the forward sheave and pull it through, letting the end down on the forward side of the mast. The hauling part must then be fished out from inside the mast through the normal genoa halyard exit, after which the replacement halyard can be pulled through. Great care is necessary when fishing out the hauling part to avoid crossing the messenger with any of the other halyards.

When replacement can wait until the boat is moored in smooth water, then a lead weight on a light messenger should be fed in over the sheave at the mast head, while the boat is heeled over to the side that the replacement halyard sheave is on and all other halyards held out of the way by working through the halyard exit holes with the wire hooks. Then the weight can slide down the low side of the mast and be fished out through the correct exit hole. When done in smooth water with the correct heel the messenger should be clear, but check that it runs freely before hauling the replacement halyard through. This same method can be used to replace the main halyard messenger when it has been used. Note: After replacement of any halyard, when possible it should be rerun over the original sheave (which should be first checked to ascertain what caused the breakage) and the messenger replaced in its original position to avoid later cross-ups.

Spinnaker aft guy

An aft guy taken straight to the footblock will bend the lifeline stanchions. The aft guy should therefore be led through a block attached to the toerail about station 5,5. For hard downwind running also the spinnaker sheet should be led through a block in the same area. This will make the spinnaker easier to control and minimize rhythmic rolling.

OPTIONALSSlab reefing

The correct way to rig the reefing lines is:

From the sheave at the boom outward end, the line is taken up through the cringle in the sail and down through the adjustable eye on the opposite side. Make a figure eight knot at the end as a stopper.

The eye should be positioned a little aft of the cringle when the sail is reefed, which means it should be aft of a perpendicular down from the cringle to the boom, as a starting point. Over the gooseneck sheave the line is taken through a lead block at the mast collar to a deck winch.

It is recommended that reefing be practiced in the harbour so that the optimal positions and methods can be found.

When reefing always hook in the tack cringle and tighten the halyard before taking up the last bit on the clew to avoid pulling the luff of the sail away from the mast.

Note: Do not use eyes in aluminium mast collar for slab reefing. Deck blocks are provided for this. These eyes are only for dead ending lazy halyards and not strong enough for reefing.

Lock off cams

The lock off cams in the boom for slab reefing are provided with short handles for a reason. If there is too much load on them to allow easy release, do not force or kick them as this will probably bend or break the handles. Lead the line to the nearest free winch and momentarily take the load on it, allowing the cam to release easily.

Snatch blocks

The snatch blocks provided should be the proper sizes. Use the correct ones in the correct places and they will give no trouble. Make sure that the sheaves turn freely. Clean blocks periodically and spray with WD-40 or equivalent.

9. HAULING & STORAGE

Docking plan 2-98-018

Hauling

If the boat is equipped with a lifting strop, be careful not to damage the hatch edges in deck. If slings are used, they should preferably have a frame spreading the slings so they come down to the deck edge vertically. Otherwise they must be long enough to avoid excessive pressure at deck edge. The slings must be securely fastened so they cannot slip, and be carefully positioned not to damage propeller shafting or any protruding fittings. Be sure that the slings are clean on the inside surface to avoid scratching the hull under the heavy loading.

Storing on a cradle

The greatest part of the weight must be taken by the keel, with well padded supporting struts at bulkheads or stringers. There must be a stopper aft of the keel toe, preventing the boat from slipping backwards.

Winter storage

- Remove the cushions and curtains, and preferably all loose gear.
- Clean the boat throughout, and leave the floorboards and doors open for airing.
- For cleaning the bilge, a drain plug is provided at the deepest point.
- If freezing temperatures are expected, empty all tanks, piping, and pumps containing water.
- Fuel tanks should preferably be empty.
- Take out the batteries and have them charged regularly.
- The winter is the best time for curing any faults. Carry a notebook onboard and record jobs needed when fresh in your mind.

10. SPARES

The following spares are included with each boat:

Engine spares

0560248	Olive fuel inj pipe	4
35351134	Pipe fuel inj. assy	1
	comprising:	
	pipe	1
	0571397 nut	2
	0560248 olive	2
36862179	Joint fuel lift pump to tappet	
	insp. cover	1
2645559	Atomiser and holder assy symbol "bg"	1
	comprising:	
	2646522 holder fuel oil atomiser	1
	33435 atomiser fuel oil	1
	36173452 flange, fuel oil atomiser	1
0920113	Washer, atomiser spring	1
31744129	Spring, exh and inlet valve-inner	2
31745118	Spring, exh and inlet valve-outer	2
36812132	Gasket cyl. head	1
36846412	Joint cyl. blk. to tappet insp. cover	1
36862517	Joint cyl. blk. to l.o. filter brkt.	1
0490656	Gasket, exh man to cyl. head	2
36847702	Joint exh man. to outlet flange	1
0490724	Joint cyl. head cover	1
2654403	Filter l.o.	1
2488395	Kit, sea water pump spare parts assy	1
	comprising:	
	0460038 impellor s/water pump	1
	0730086 seal, sea water pump	1
	0640069 "O" ring, s/water pump	1
	0490785 gasket, s/water pump	1
	24880103 plate water pump wear	1
	0240835 cover, water pump end	1
	0720866 screw, sea water pump	1

Electrical spares

4 Philips bulbs	PN 12866	Overhead dome lights
2 " "	PN 12844	Bunk lights
2 " "	PN 12913	Engine instruments
2 " "	PN 12829	Engine instruments
2 " "	PN 12929	Chart table light
2 " "	PN 12875	Windex light
2 " "	PN 12422	Flood light
2 Hella " 10W 12V		Stern light
4 " " 25W 12V		Running or bow lights
2 ea 8 amp fuses, porcelain		
2 ea 80 amp fuses, Bosch		
1 tool for removing small bulbs		
1 Fluorescent bulb TL 8W		Fluorescent light in toilet

11. TOOLS

Engine tool kit

Screwdrivers, regular, two sizes

Open end wrenches 5/8", 3/4", 9/16", 1/2", 7/16", 3/8", 5/16", 1/4".

Pliers 6"

Utility pliers 10"

6" adjustable wrench

Except engine tool kit, there are no tools supplied with the boat. We recommend purchase of at least the following:

Screwdrivers of various sizes, both Philips and regular

A hammer

A hand drill with bits

Several pairs of pliers

A set of open end wrenches

A set of socket wrenches

Several adjustable (Crescent type) wrenches

Several files

Wire cutters large and small

A center punch

A hack saw with spare blades

A keyhole saw

Some knives

A tape measure

A folding rule

A wall scraper

Grease for winches

Winch tools

Lubricants and corrosion preventers

We consider this list to be a bare minimum.

Note: Nautor carries as an optional extra two tool kits, set A for cruising and set B for offshore racing, which contain many of these items and some others.