Salterns Stag 28
Sailing Yacht

Owners Manual
for
Flying Fox

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Hull

The Concept

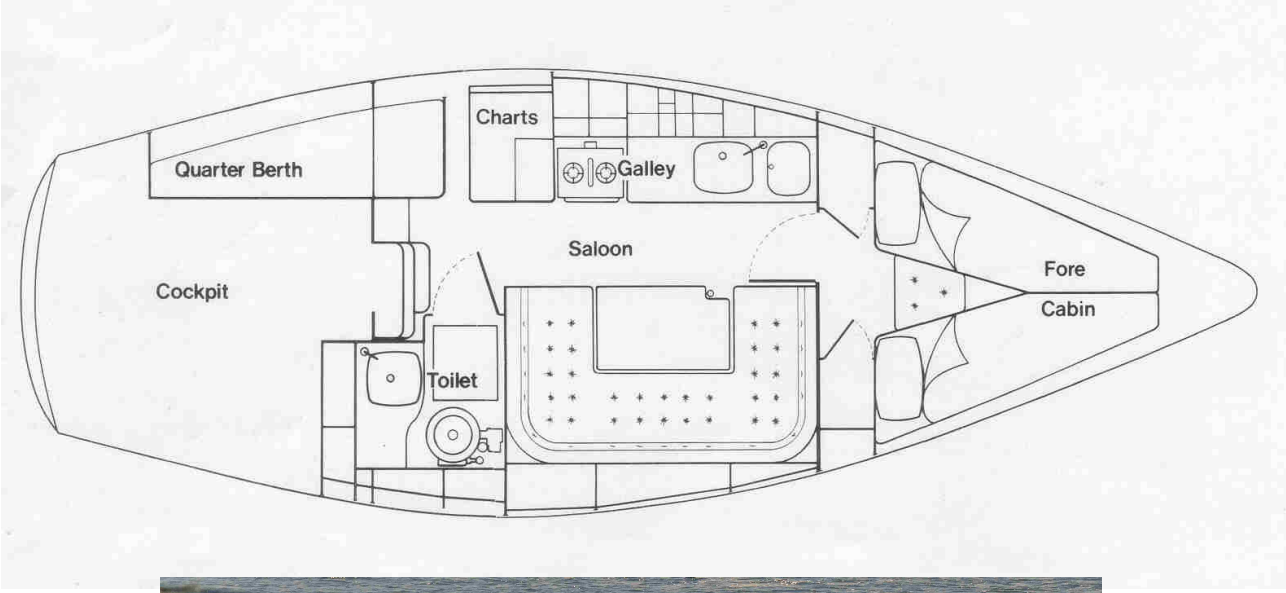
The Stag 28 was designed for Salterns Yacht Agency in 1976.

Peter Milne, well known at the time for the Fireball and other dinghies, was commissioned as the designer.

The interior designer was Edwin Meayers who also worked on the interior design of many superyachts and buildings of the time.

The yachts were built by Emsworth Shipyard.

The design brief included family cruiser, shoal draught, good performance, and over 6 feet 2 inches of headroom.



Construction

The main hull and deck is manufactured using Glass Reinforced Plastic (GRP). GRP matting and a polyester resin are laminated in moulds to produce the hull and deck shapes. The outer surfaces have a gelcoat layer approximately 1mm thick which provides a cosmetic finish and water resistant skin.

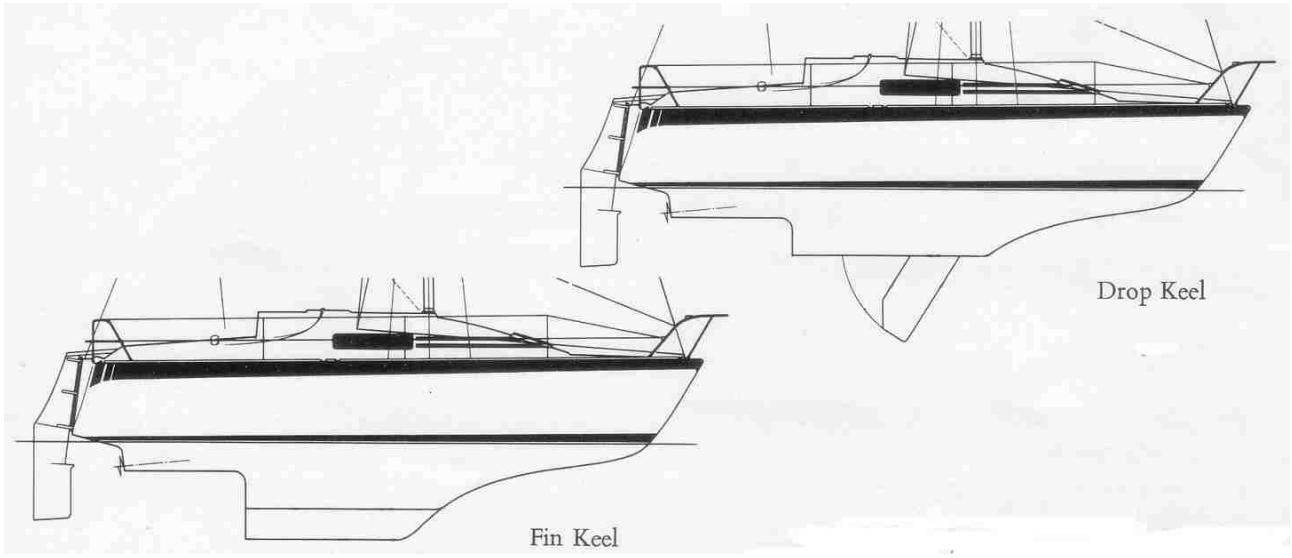
The hull/deck assembly is strengthened using bulkheads and stringers. Bulkheads are mainly plywood.
Stringers are formed by glassing over a former on the inside of the hull and deck.

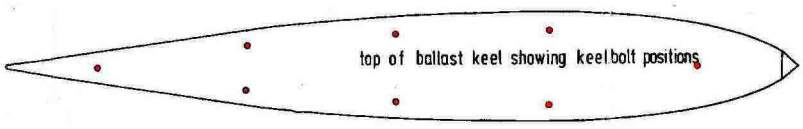
The deck moulding sits on a 'shelf' which is formed by a return on the hull moulding. The joint is filled with a non-setting mastic and through bolted.

Keel

The Stag 28 has two keel configurations, shallow draft with lifting centreplate or Fixed fin keel.

Flying Fox is the Drop Keel variant.





The Ballast keel is a steel casting fitted to the underside of the Keel stub with 8 x 18mm bolts.

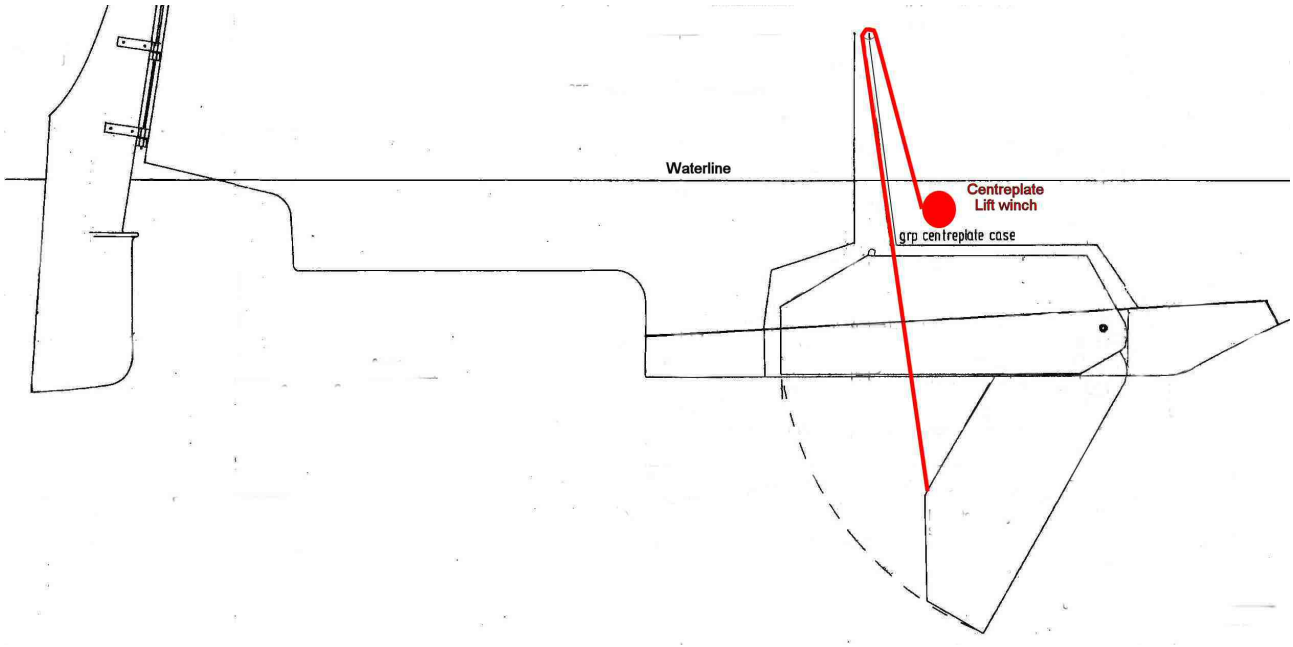
The centreplate is cut from 20mm steel plate. It is pivoted on a 24mm stainless pin, threaded at both ends, with nylon spacers and bushing.

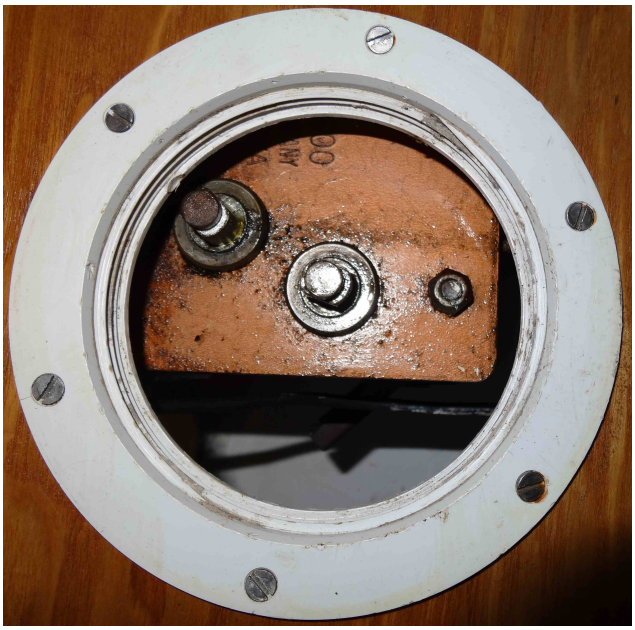
The pivot is fitted through the ballast keel with a nut at each end buried in the keel and faired over with epoxy filler.

When retracted, the centreplate pivots completely into the ballast keel and the upper edge is housed inside the hull moulding below the floors.

The centreplate is lowered/raised via a wire from its trailing edge which travels vertically up a moulded tube to a turning block, at waist height, in the cabin, then down to a trailer type ratcheted wire winch fitted inside the aft table seat on the centreline.

The winch handle takes approximately 45 turns fully up to fully down.

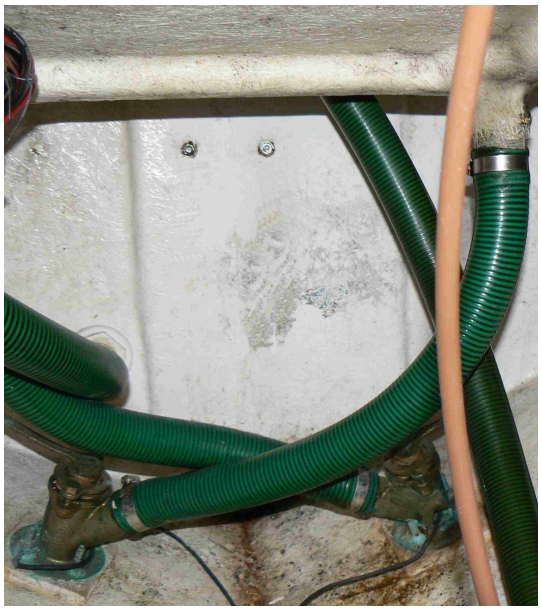


	
Centreplate wire attachment	Centreplate wire turning block
	
Centreplate wire winch under rear settee seat	Centreplate winch handle attachment point

Skin Fittings and Seacocks

There are 7 seacocks in total:

Cockpit drains:



Cockpit Drains

Under the rear of the cockpit, access is via the rear cockpit locker and involves climbing into the under cockpit area. These are Blakes seacocks mounted port and starboard direct to the hull with a plywood backing pad. To open, the handle should point directly away from the hose attachment point. To close, the handle should be turned through approximately 120 degrees in either direction to lie alongside the hose attachment point. They are normally left open in order to clear spray and rainwater but should be exercised at least annually to prevent binding. Re-grease every couple of years.

Lavac Sea Toilet inlet/outlet:

Heads sink outlet – Lavac outlet

Inside the locker under the heads sink. The outlet is a Blakes seacock mounted direct to the hull with a plywood backing pad. To open, the handle should point directly away from the hose attachment point. To close, the handle should be turned through approximately 120 degrees in either direction to lie alongside the hose attachment point.

The inlet is a DZR ball valve mounted on a threaded DZR through hull fitting with a plywood backing pad. To open, the handle should line up with the hose attachment. To close, the handle should be at 90 degrees to the hose attachment.

Heads Sink Drain:

Inside the locker under the heads sink. The sink outlet is a DZR ball valve mounted on a threaded DZR through hull fitting with a plywood backing pad. To open, the handle should line up with the hose attachment. To close, the handle should be at 90 degrees to the hose attachment.

Galley Sink Drain:

Inside the locker under the galley sink. The sink outlet is a DZR ball valve mounted on a threaded DZR through hull fitting with a plywood backing pad. To open, the handle should line up with the hose attachment. To close, the handle should be at 90 degrees to the hose attachment.

Engine Cooling Water Inlet:

Inside the hanging locker to the port of the cabin steps/engine access. The cooling water inlet is a DZR ball valve mounted on a threaded DZR

through hull fitting with a plywood backing pad. To open, the handle should line up with the hose attachment. To close, the handle should be at 90 degrees to the hose attachment. Mounted on the valve is a bronze water filter with a screw top.

Other Through Hull Fittings:

There are 5 other through hull fittings without seacocks:

The engine exhaust exits the transom on the lower port side, it is protected from water ingress by a 'swan neck' fitting on the inside face of the transom. The exhaust should have a steady stream of water whenever the engine is running.

Cooling water telltale (bottom) – Exhaust swan neck

The engine cooling water 'tell tale' exits the transom next to the exhaust outlet, a small bore pipe runs from the anti syphon loop near the engine. The 'tell tale' should have a steady stream of water whenever the engine is running.

The Gas locker drain, a pipe runs from the bottom of the gas locker to a DZR skin fitting which exits the hull just above the waterline on the port side.

Gas locker drain

The bilge pump exits via the transom on the lower starboard side.

The Heater exhaust fitting is near the top of the transom on the starboard side. It has a cowl to prevent spray/rain from entering.

Leaving the vessel: Remember there are 5 seacocks that should be closed before leaving the vessel: Heads inlet and outlet, Heads sink outlet, Galley sink outlet, Engine cooling water inlet.

Joining the Vessel: A matter of choice, but always the engine cooling water inlet. I, personally, always open all 5 seacocks on joining.

Cathodic Protection

The yacht is fitted with a hull mounted sacrificial pear anode (M G Duff ZD77 or equivalent 2.1Kg zinc anode) attached via 2 studs on the starboard hull at the rear of the engine compartment. Bonding wires are attached to the stud inside the hull and are attached to the engine and the seacocks. There is an electrical link across the flexible coupling in the prop shaft such that the propeller is protected. This should be tested each year to ensure propeller protection. A continuity test between the anode and the propeller should show a low resistance.

Note: Current thinking is that the seacocks should NOT be bonded. As there has not been any sign of a problem in the life of the vessel I have NOT de-coupled the seacocks.

Antifouling

The major part of the hull is painted with an erodible antifouling paint, currently Hempel Tiger Extra in dark blue. A 2.5 Litre can is enough for a complete coat plus an extra coat around the waterline, on the rudder and on the leading edges. I use a small diameter roller (radiator roller) to apply.

The boot top is a harder, scrubbable antifouling, International Trilux 33 in Red. A 375 ml can is sufficient for a full coat. I normally only touch up so a can lasts for several seasons.

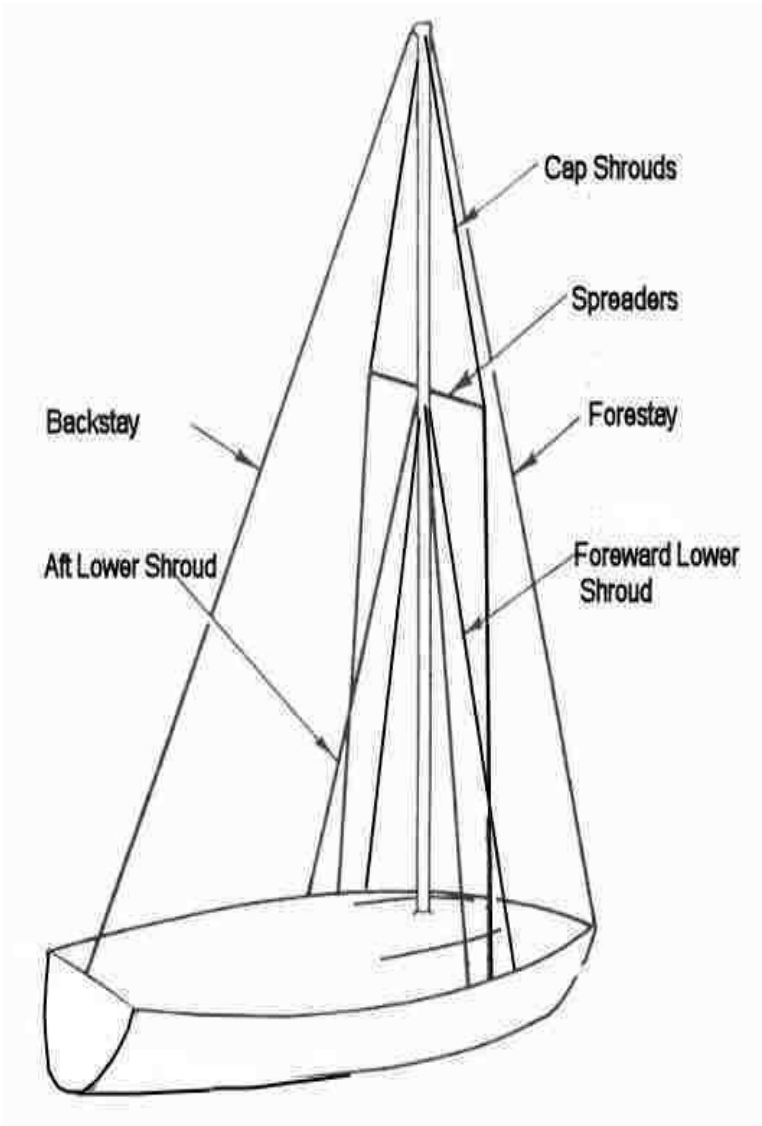
I antifoul the propeller with the Trilux 33.

The underwater wetted area is approx. 22 sq. m.

Sails and Rigging

Type of Rig

The Stag 28 is rigged as a masthead Bermudan sloop.



Mast & Boom

The mast and boom are black anodised alloy provided by SS Spars, now sadly long gone.

The boom is 3200 mm long and approx. 72 mm diameter.

The mast is 10500 mm long and approx. 140 mm fore/aft and 110 mm athwartship.

Spreaders are circular cross section 15 mm diameter.

The boom is supported in the horizontal position by a Barton Boomstrut, no topping lift is used.

The 4 part kicking strap controls the angle of the boom against the lift of the boomstrut.

2 Mainsail leech reefing lines are permanently rigged through a double clutch at the forward end of the boom.

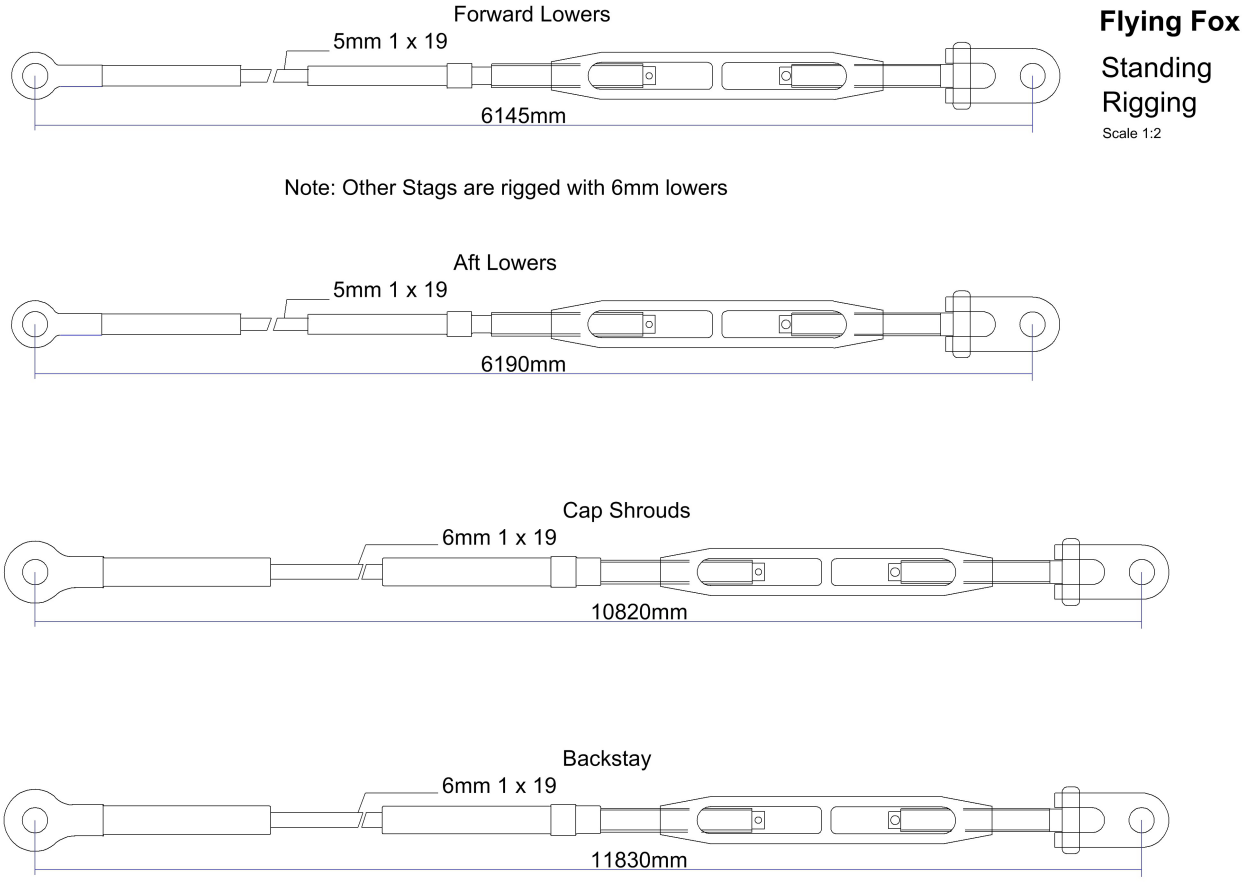
Reefing horns are close to the gooseneck fitting.

2 rope halyard winches are fitted either side of the mast.

Standing rigging

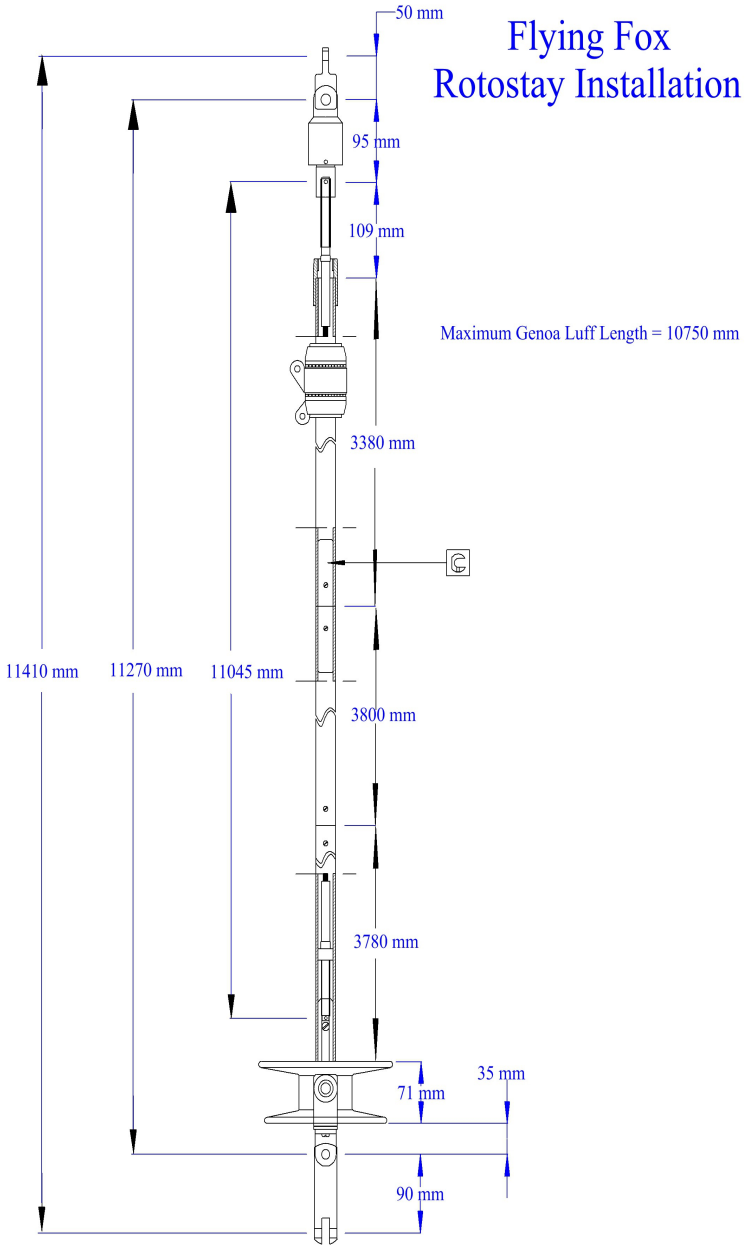
The mast is rigged with masthead forestay, inline masthead shrouds, fore and aft lowers from the spreaders and a masthead backstay offset slightly to port at the deck fitting.

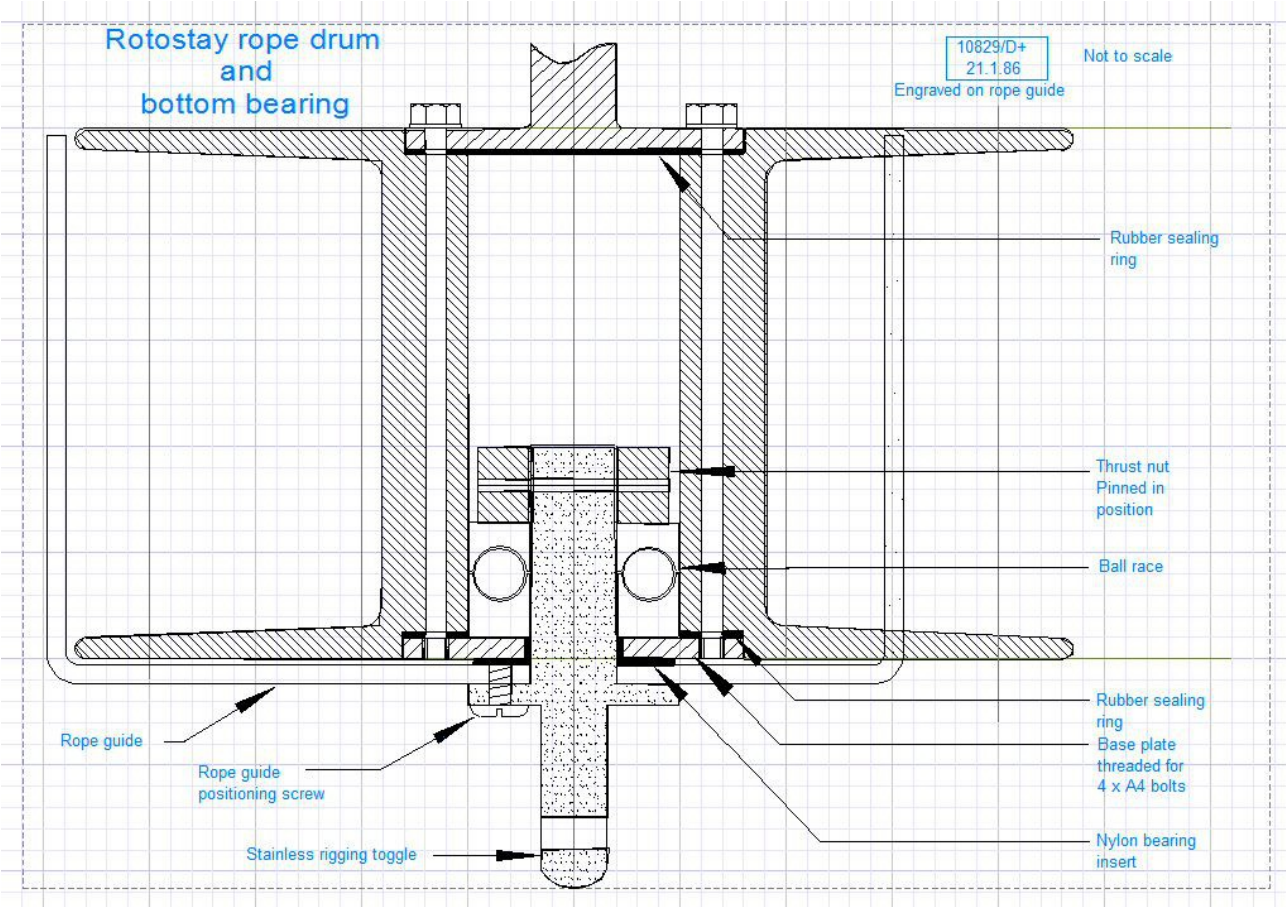
All wires are 1 x 19 stainless steel. Rigging screws are StaLok chromed bronze.



Forestay and Roller reefing

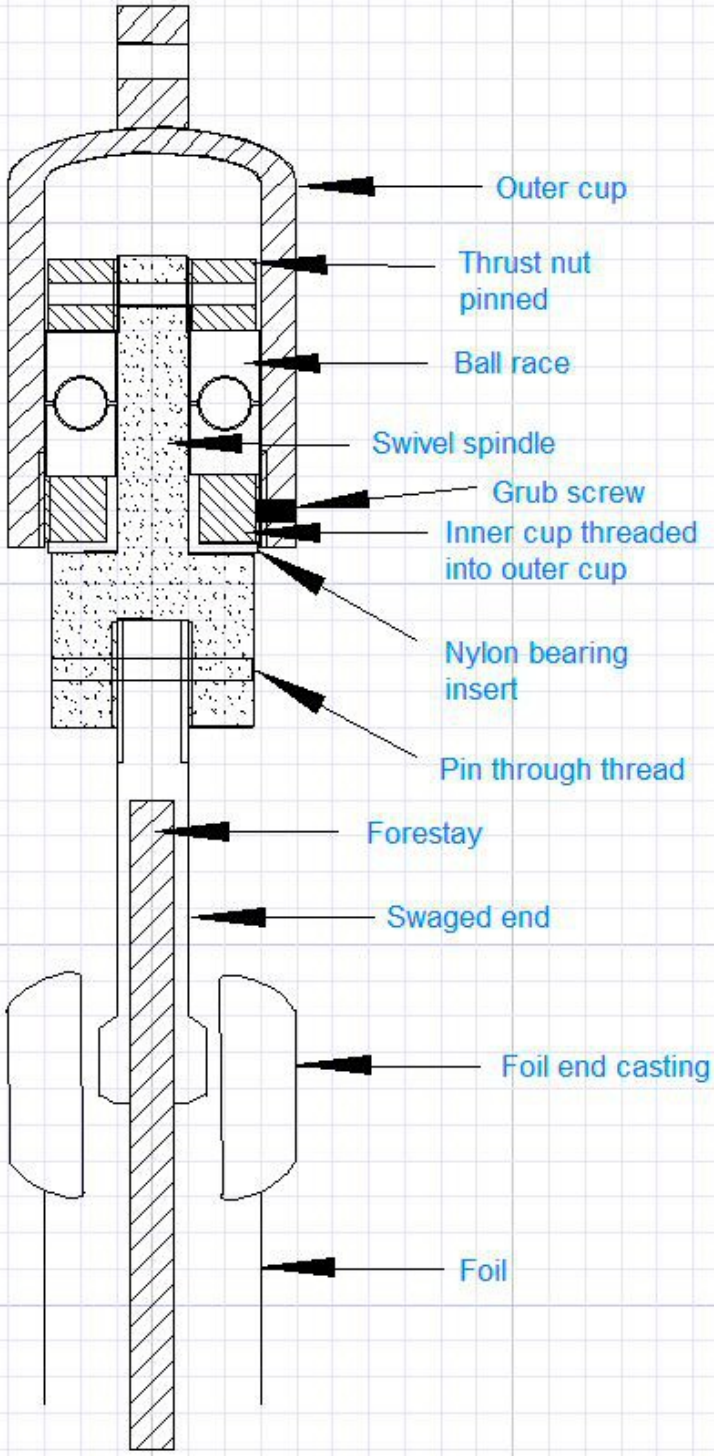
The roller reefing is a Rotostay Type D+ dating to 1986. It is unusual in that the forestay rotates with the foil, the rigging loads are taken through thrust bearings at head and foot. The slot for the sail luff rope is 7mm.




Rotostay rope drum
and
bottom bearing
10829/D+
21.1.86
Engraved on rope guide
Not to scale
Rubber sealing ring
Thrust nut Pinned in position
Ball race
Rubber sealing ring
Base plate threaded for 4 x A4 bolts
Nylon bearing insert
Rope guide
Rope guide positioning screw
Stainless rigging toggle

Rotostay
Top bearing

Not to scale

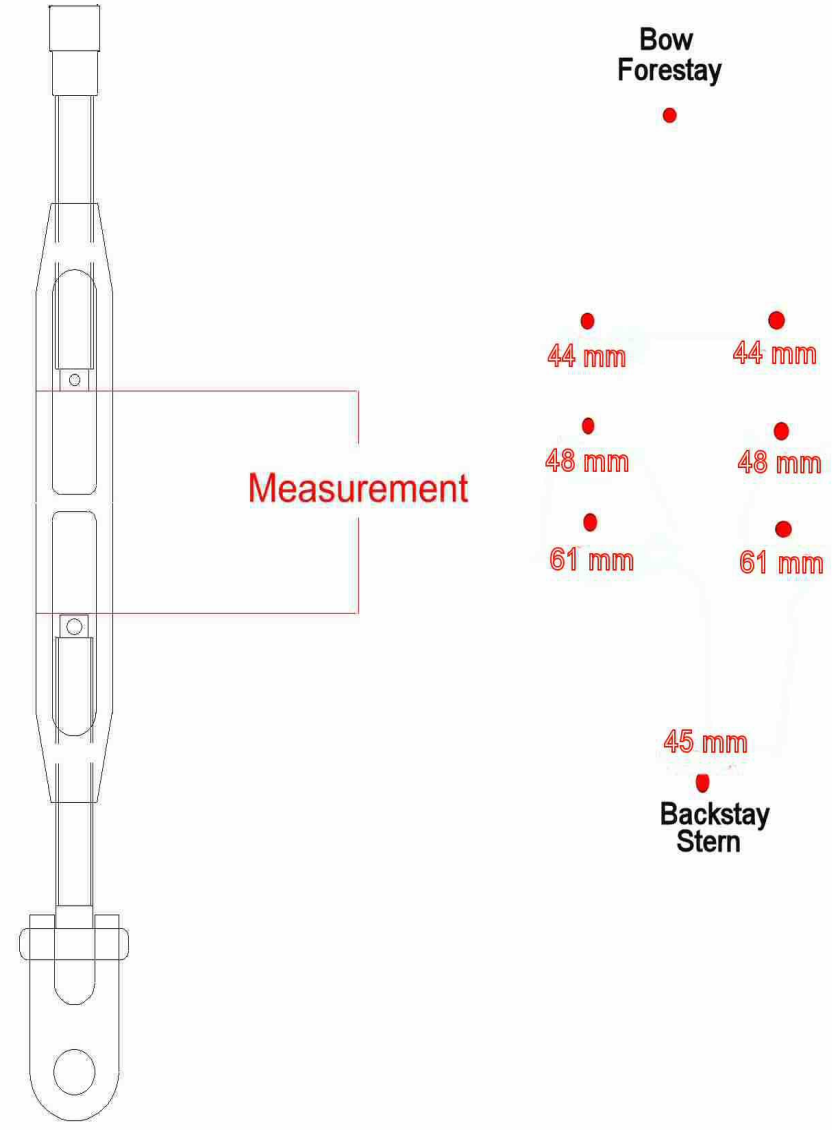


Rig Setup

In order to reset the rig tension, after removing the mast for winter storage, without the requirement for sailing tests and adjustment:

Measure the distances at each rigging screw, as shown in the diagram, for each screw before loosening or removing the rig. Use of a cheap digital caliper makes the task easy and accurate.

These are the settings for Flying Fox



Sail Inventory – Flying Fox

According to sailmakers...
I = 11.1 mtr 36.4 ft
J = 3.24 mtr 10.62 ft Area of Foretriangle = 18 m2 193 ft2
P = 9.4 mtr 30.83 ft
E = 3.14 mtr 10.29 ft

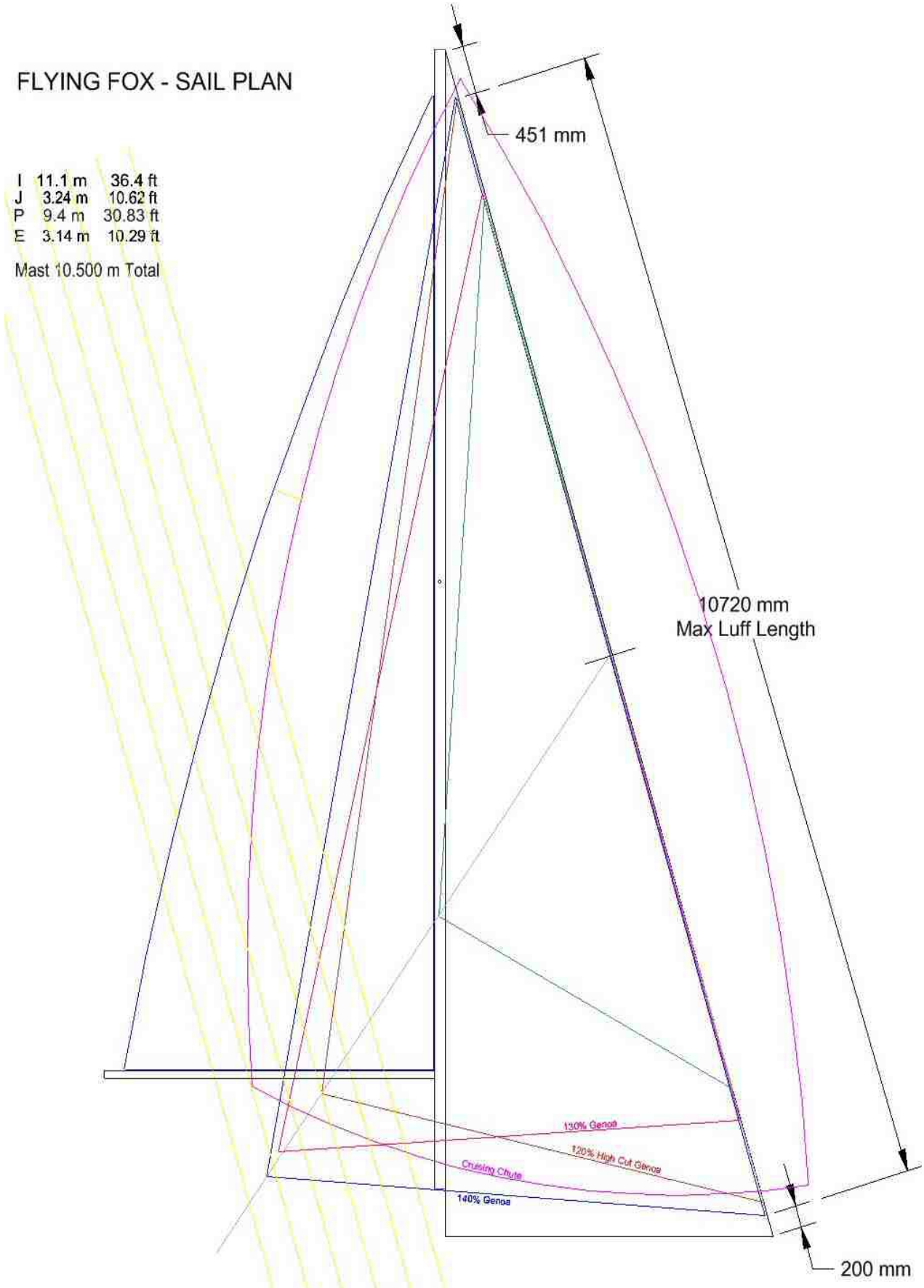
Sail	Luff	Leech	Foot	Area	Notes
Main	9300	9560	3050	13.45 145	Sanders Sails, White Vectron 062, Loose footed, 2 reefs at 1210, 2440 of Luff, 4 Full Battens.New 2022
High Cut Genoa	10600	9200	4400	20.67 222	Sanders Sails, White Vectron 062, Navy UV on port, 7mm Luff Rope, Foam strips (120%) New 2020
Genoa	10720	10100	4850	24.35 262	Southern Sails, Blue UV on Port, White, 7mm Luff Rope (140%)
Small Genoa	8900	9050	4500	19.54 210	SeaTeach, Blue UV on Port, Cream, 7mm Luff Rope (130%)
Small Jib	8530	6620	3250	13.34 144	Rockall, No UV, No Foam, White, 7mm Luff Rope (70%)
Cruising Chute	10850	9950	5410	35 380	Crusader. Crosscut. Orange/Red (200%)

Sheets

Main	14m x 1	12mm	Braid-on-Braid Matt
Genoa	20m x 1	14mm	Braid-on-Braid Matt
Genoa Furling Line	17m x 1	8mm	Braid-on-Braid Matt
Spinnaker	18m x 2	8mm	Double Braid

Halyards

Main	21m min	10mm	Braid-on-Braid
Genoa	21m min	10mm	Braid-on-Braid
Genoa Furling Line	16m min	8mm	Braid-on-Braid Matt
Spinnaker	21m min	10mm	Braid-on-Braid



The boom is fitted with a StackPack and lazyjacks to collect, tidy and cover the mainsail when lowered.

Steering System

Rudder and tiller

The Stag 28 is fitted with a partially balanced transom hung rudder. There are a few Stags with an underslung rudder fitted as a modification either at build or later.

There have been a few cases of the transom hung rudder cracking and/or breaking off near to the waterline. Many (most?) Stags have now had the rudder strengthened in this area.

On versions with a centreplate the rudder extends below the ballast keel and is therefore able to lift in order for the vessel to dry out. The lifting mechanism shifts the whole rudder/tiller assembly vertically on the pintles by means of a multipart rope and tackle.

The rudder is fitted with stops to prevent it from turning too far and generating huge lateral forces liable to damage it.

The tiller tilts vertically when not in use to clear the cockpit.

Engine System

Engine

Flying Fox is fitted with a Beta BZ482 13.5HP normally aspirated diesel engine. The base engine is a Kubota Z482 industrial engine marinised by Beta.

The engine was fitted in January 2005.

Fuel System

The engine runs on diesel fuel. The filler cap is on top of the port cockpit coaming, the tank air vent is on the outside of the port cockpit coaming.

The tank holds approximately 75 Ltrs (17 gals) and is situated below the port cockpit seat, alongside the port quarter berth. It can be accessed by removing a trim panel from the quarter berth.

The fuel stopcock is fitted to the port face of the engine bay behind the engine. It would normally be left open unless working on the fuel system (changing filter etc.). Running the engine with the stopcock off can cause an airlock which will necessitate bleeding the system.

Ahead of the stopcock and next in the fuel line is a fuel priming bulb. This is a very easy way of bleeding the fuel system after a filter change rather than trying to use the manual fuel lever on the fuel pump. Next is a fuel filter/water separator unit (Racor R12T clone). When winterising, the drain tap on the underside of the unit should be loosened and some fuel drained off to check for water in the system. The spin-on filter element is also replaced.

The fuel line then crosses to the engine mounted fuel pump and on to the engine mounted fuel filter on the starboard side. The engine mounted fuel filter should be changed annually at winterisation.

Fuel then flows to the high pressure pump and hence to the injectors.

The excess fuel return line is led back to the top of the fuel tank.

NOTE that there is no fuel gauge and it is not possible to use a dipstick in the tank. Fuel is monitored by keeping a log of engine hours and of fuel added to the tank. Over several years the usage has averaged 1Ltr/hour. For planning purposes I estimate at 1.5Ltr/hour. 1 or 2 spare 10 Ltr fuel cans are carried.

Cooling System

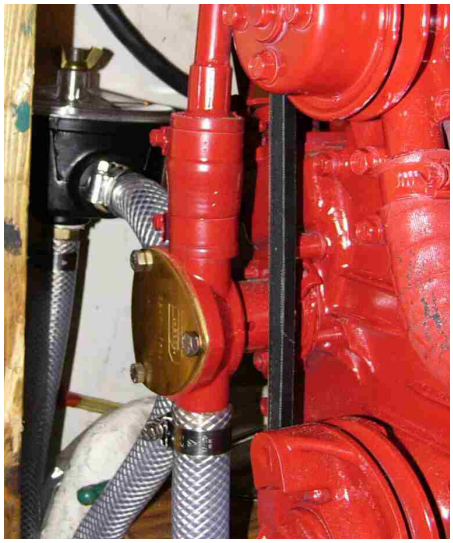
The engine is freshwater cooled so a coolant mixture circulates within the engine and via a heat exchanger in a closed and pressurised circuit. As it flows through the heat exchanger body, the heat is absorbed by sea water flowing through the tubes of the exchanger. The seawater is then injected into the exhaust system and is discharged.

The coolant mixture in the engine is a 50/50 mix of fresh water and an ethylene glycol with silicate inhibitors antifreeze ie an 'old' style of antifreeze. The mixture should be drained and replaced every couple of years.

Seawater is drawn inside the boat via a skin fitting and ball valve situated in the hanging locker alongside the engine bay. Atop the ball valve is a bronze water filter. With the ball valve closed, the top of the water filter can be unscrewed and the filter gauze removed for cleaning. If the ball valve itself becomes blocked it can be opened and a long stick/screwdriver used to 'poke' it clear. Close the valve as soon as it is clear. This can be done without getting too much water into the boat.

The seawater is then drawn via a clear hose to the starboard side of the engine bay where a second water filter is situated on the wall. This is above the waterline so can be opened without problem, the basket can be removed for cleaning. When refitting the lid, care should be taken to ensure it is airtight or the pump will be unable to maintain a flow.

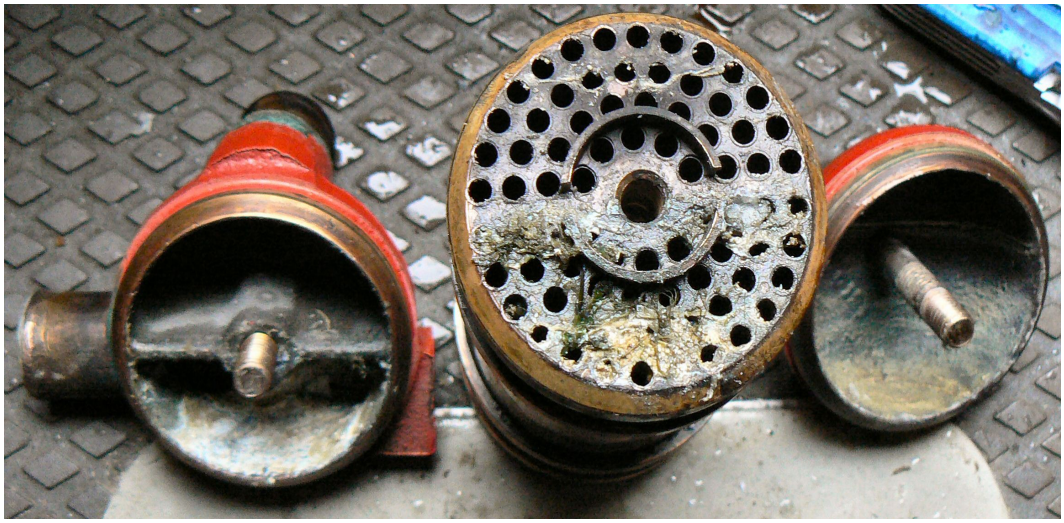
From the second filter the water is drawn into the Jabsco cooling water pump. The pump contains an impeller which should be checked on an annual basis for lost vanes, cracks etc. A spare impeller should be carried.



The water is then pumped to the heat exchanger.

The water enters the end cap of the exchanger and flows through half the tubes of the exchanger stack to the other end cap. The water returns via the other half of the exchanger stack tubes.

The tube stack should be removed and cleaned annually to ensure free water flow. The inlet/outlet cap contains an anode which should be checked and replaced as necessary.



Inlet/Outlet cap, Tube stack (before cleaning), end cap.

From the heat exchanger the water flows through an anti-syphon device attached to the port wall of the engine enclosure before being injected into the exhaust system at the exhaust elbow.

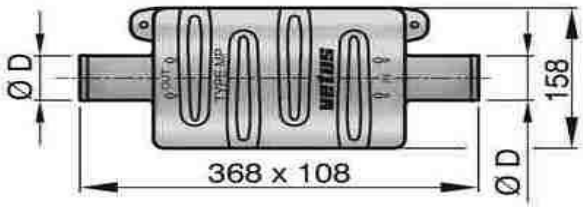
Important: If the anti-syphon device is defective it is possible for water to syphon from the cooling water inlet, through the engine and into the exhaust pipe. If the exhaust pipe fills with water it may back up through the engine exhaust elbow and into the engine via the exhaust valves. This is likely to be terminal for the engine. Therefore always check that water is flowing out of the engine cooling water 'tell tale' which exits the transom next to the exhaust outlet when the engine is running.

On the exhaust elbow there is a temperature probe. When the engine is running, if the cooling water stops running, the temperature of the exhaust elbow will rise rapidly. The temperature is monitored by an adjustable unit on the starboard bulkhead just inside the cabin. If the temperature rises above the set limit a loud electronic alarm will sound. The monitor is switched on when the engine ignition switch is in the 'Run' position.

Exhaust System

The Beta engine utilises a wet exhaust system meaning that cooling water is injected at the exhaust elbow. The injection of water cools the exhaust gases and allows the use of a rubber exhaust pipe and plastic components.

Incorporated into the exhaust pipe and situated at the rear of the engine compartment is a Vetus plastic muffler/water trap. The trap reduces the exhaust noise and retains water left in the pipe when the engine is stopped.



On the inner face of the transom is a Vetus Swan neck which prevents water being forced into the exhaust system by waves striking the transom mounted exhaust outlet.

Important: Because the top of the swan neck fitting is higher than the engine exhaust outlet it is possible to fill the exhaust system with water, if that happens then water will enter the engine via the exhaust elbow and exhaust valves, this could be terminal to the engine. The most likely cause of this scenario is repeated cranking of a non-starting engine, the starter motor will be operating the cooling water pump which will cause the exhaust to fill with water. Therefore, if the engine won't start after 2 or 3 attempts, close the cooling water inlet ball valve. As soon as the engine is started re-open the valve.

When starting an engine, check that water is being ejected through the exhaust within 30 seconds. If not, switch off and investigate, first check that the inlet stopcock is open.

Engine Controls & Instruments

Flying Fox is fitted with a TX Controls (B700SS) throttle and gear change lever on the face of the port side cockpit seat.

Moving the lever to the Forward or Reverse position will engage the relevant gear without increasing the engine speed. Further movement of the lever increases engine speed to a maximum of approx 3400rpm.

Cruising speed is normally approx 2400rpm.

The engine speed can be increased without engaging gear by pressing in the disengage gear button whilst moving the lever through forward or reverse.

The lever mechanism can be found behind the trim panel in the port quarterberth just above the fuel tank. It operates via standard Type 33C cables.

The engine is stopped by pressing the 'Stop' button on the engine control panel situated under the companion way step.

Starting the engine

Ensure:
Engine oil level is satisfactory.
Gearbox oil level is satisfactory.
Coolant level is satisfactory.
Fuel stopcock is open.
Water inlet ball valve is open.
Engine battery master switch is ON.

Set the throttle to 1/8 to ¼ open without engaging gear.

Turn the ignition key anti-clockwise for about 6 seconds to turn on the heater plugs. (This step can be bypassed for a warm engine).

Turn the ignition key clockwise to the 'Start' position. This will engage the starter motor and the engine should start within a couple of seconds. Once the engine starts release the ignition key and it will return to the 'Run' position.
If the engine does not start within 2 – 3 attempts, turn off the cooling water inlet valve before any further attempts. Failure to do this can cause terminal damage to the engine.

Re-open the valve as soon as the engine starts to run.
Immediately after starting, check:
All warning lights on the engine control panel are extinguished.
Water is being emitted from exhaust.
Water is being emitted from the anti-syphon device telltale.
Gear lever is returned to the Neutral position.
Avoid high revs in Neutral.
Do not allow engine to run at a low idle for long periods.

During running, check the instrumentation, ie. engine temperature warning light, oil pressure warning light, etc.
Prior to stopping engine, allow engine to idle for a few minutes with the gear lever in neutral.

Stop the engine by pressing the 'Stop' button on the engine control panel. Pressing the 'Stop' button triggers an actuator on the engine which temporarily cuts off the fuel supply.
Turn the ignition key to the 'Stop' position. Never turn the key to the 'Stop' position whilst the engine is running, it risks damage to the alternator regulator.

Stern Gear

The gearbox output is connected via an R&D flexible coupling to the propeller shaft.

The shaft passes into the stern tube at the aft end of the engine compartment via a conventional stuffing gland. The stuffing gland should be tightened as necessary to prevent excessive water entry. The stuffing is 8mm square.

The hose clamp on the prop shaft is intended to prevent the whole shaft from exiting the boat, leaving a 1” hole, if the shaft coupling should fail.

The stern gland is greased from a grease cup on the aft face of the forward bulkhead in the cockpit locker.

The cup should be given a turn each time the engine is stopped and every hour whilst the engine is running.

The stern tube is screwed into the stern fitting and the shaft exits the stern tube and boat via the outboard cutless bearing holder.

The cutless bearing is a brass shelled rubber bearing, 1"id x 1 1/4"od from T Norris. The outer shell needs to be skimmed by a few 10ths of a millimetre to a slide fit. Fixed in place with epoxy glue.

The bearing is shortened but allow 5mm to extend outside housing to enable easier later removal. A hot air gun will soften the epoxy glue for removal.

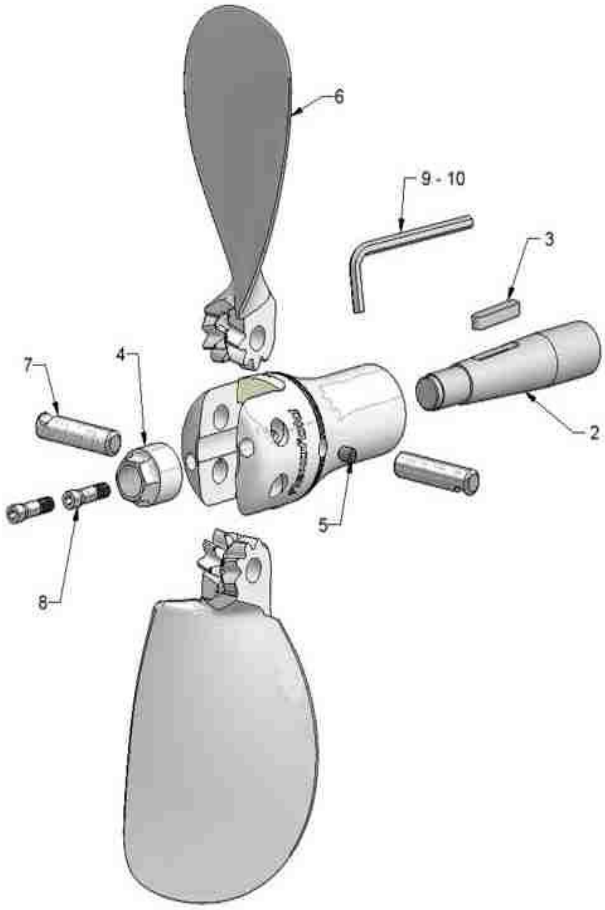
The current propeller is a Right hand 13 x 8 Flex-o-fold prop (cut down from a 14 x 8)

The prop is dismantled and removed each winter, cleaned and anti-fouled.

No grease is used on the gears as it can hold sand/grit which will wear the teeth.

Blue Loctite is used on the three lock screws (part 5 and 8) when re-assembling.

To disassemble: remove the 3 lock screws. Push out the 2 pivot pins. Remove the blades. Use a socket to remove the Shaft Nut. Tap lightly to remove Hub from shaft. Remove Key.



2-Blade Shaft - Parts List

1. Hub
2. Shaft (not supplied)
3. Key (not supplied)
4. Shaft nut
5. Shaft nut locking screw (M8x10mm)
6. Blade (2 ea.)
7. Pivot pin (2 ea.)
8. Tapered pivot pin locking screw (2 ea. M8x30mm)
9. Allen wrench 4mm
10. Allen wrench 6mm

Gas System

Flying Fox is fitted with a butane gas system that utilises a Calor 4.5Kg bottle. The bottle is stowed in a gas tight cockpit locker (port, aft) with a drain pipe to the outside of the hull above the waterline.

The regulator is a bulkhead mounted marine 30mbar dual fuel (butane/propane) type. It is attached to the bottle via a 'pigtail'. The pigtail attaches to the butane gas bottle with a **left-hand thread**.

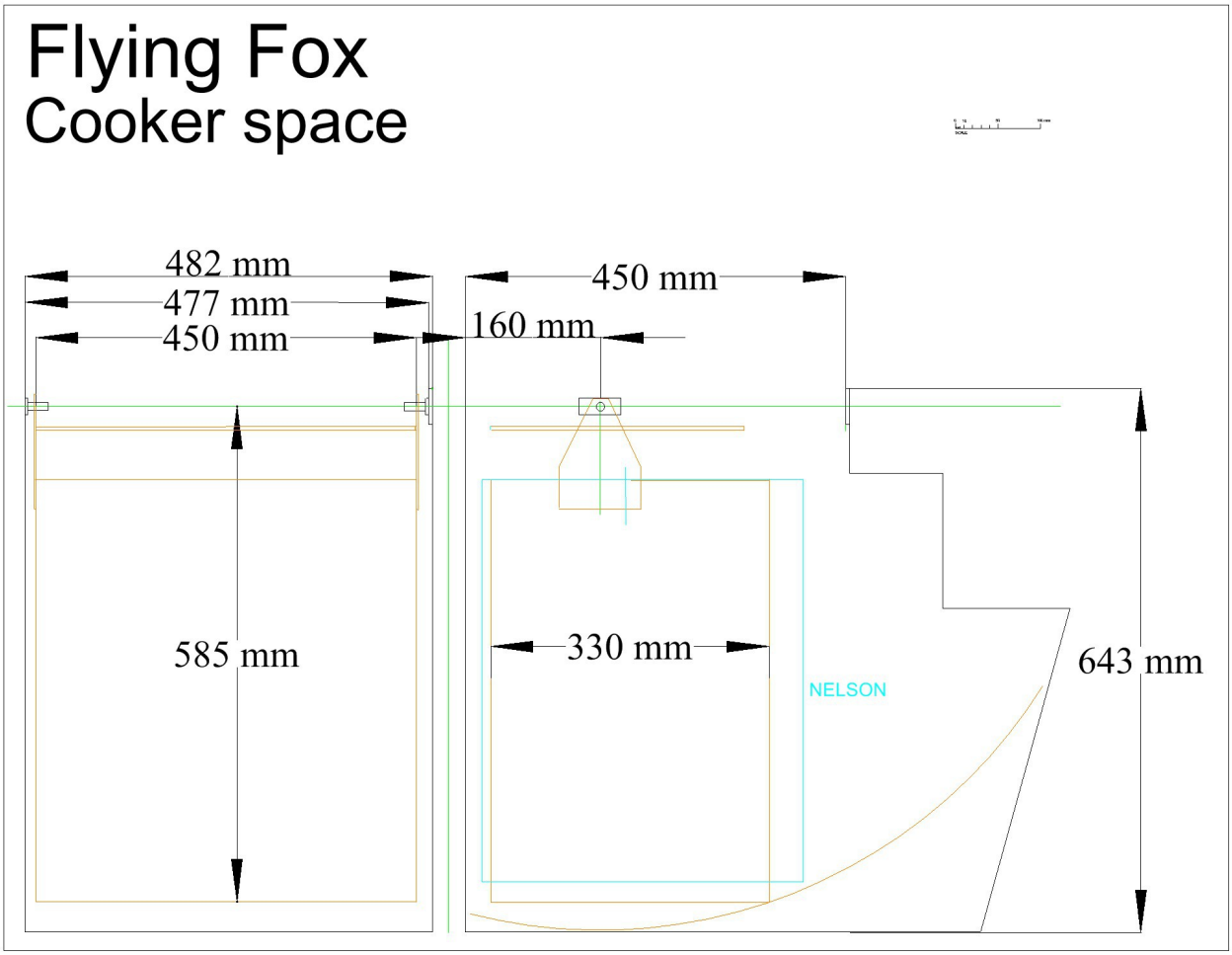
The pigtail can be replaced to utilise a Calor propane bottle.

The gas is piped via copper tube to the galley where it passes via a re-inforced flexible hose to the cooker.

There is a gas cock under the chart table.

The cooker is a gimballed Spinflo Nelson dual burner, oven and grill.

There is a slide bolt at the base of the oven to lock the cooker horizontal.



There are no other gas fuelled devices on board.

Water & Waste Systems

Water System

Flying Fox is fitted with a 100Ltr Tek Tanks Series A (85-40-32) water tank under the forward starboard berth.

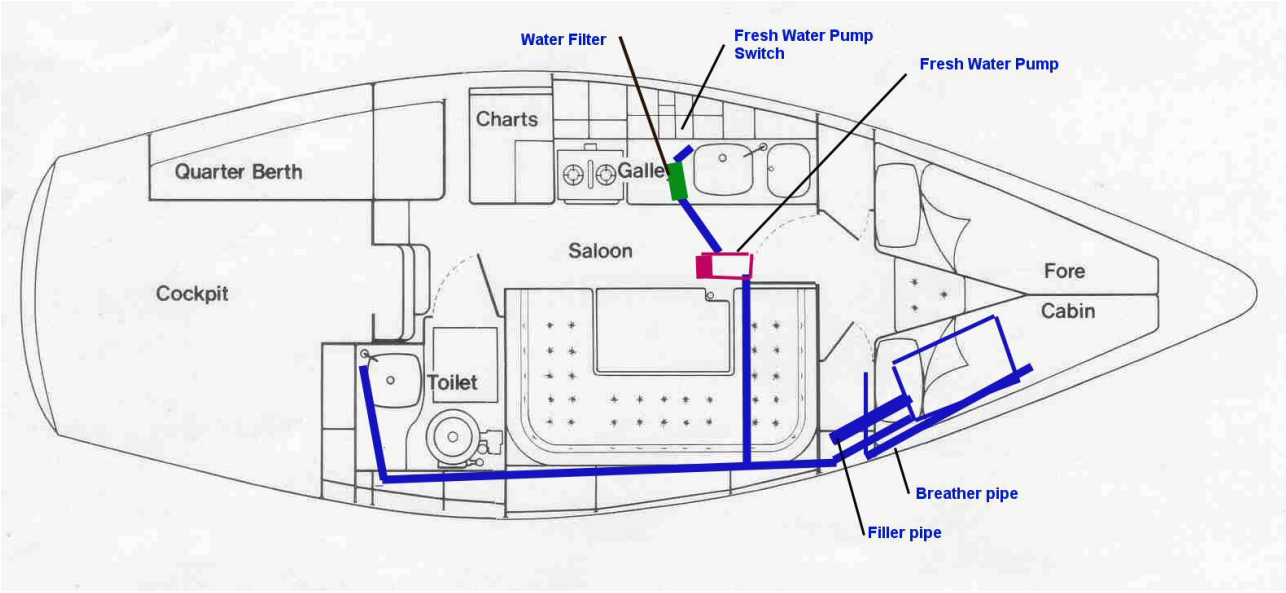
The water filler is on the starboard side deck, close to the forward lower shroud. A 2 prong key is required to unscrew the filler cap.

The water tank has one inlet, breather pipe to the cabin side above the inlet, and one outlet.

Beneath the settee berth the pipe has a 'T' joint; one pipe leads through to the heads sink, the other crosses the boat, beneath the cabin sole to the galley sink. Both sinks are fitted with Whale 'Flipper' manual pumps.

In addition to the Flipper pumps there is an electric diaphragm pump to the galley. The push/pull switch is located on the underside of the curtain retainer shelf immediately above the sink. The pump itself is located under the cabin sole below the sink.

The galley pipe connects to a push fit refrigerator type filter cartridge situated below the galley sink. This is normally replaced annually.



Lavac Marine Toilet

The toilet is a Lavac Popular which works on a vacuum principle.

Inlet and outlet valves are located in the locker under the heads sink.

Inlet and outlet pipes describe a swan neck loop attached to the bulkhead in the forward cockpit locker.

The pump is attached behind the face of the under-sink locker.

Operation

Ensure both seacocks are open.

After use close the seat and lid to complete the seal.

Operate the pump approx 20 - 30 times. As waste is pumped out the vacuum formed draws in replacement flushing water.

DO NOT immediately try to open the lid to check that all is well. The vacuum remains in the pan for a period, if you try to open the lid against the vacuum you are likely to tear the rubber sealing ring.

The vacuum is slowly released via a pinhole plug at the peak of the swan neck in the inlet hose (Starboard forward cockpit locker). This also acts as an anti syphon device. If the vacuum does not release after 1 – 2 minutes check that the pinhole is open ie poke it with a bit of wire.

The seat and lid seals do deteriorate over time. It is worth carrying a spare set.

The Henderson Mk V pump should be removed, cleaned and checked occasionally. I usually do it every winter. The internal flap and joker valves and the diaphragm are all available as spares.

Electrical Systems

Basics

Flying Fox has a 12 volt, 2 battery system charging from the engine alternator and a 30W solar panel. One battery is dedicated to the engine electrics the other to the house electrics.

Batteries

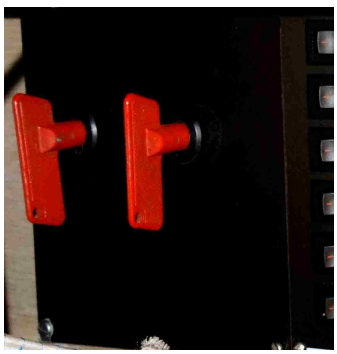
The two batteries are 12V 100Ah/85Ah sealed lead acid 'leisure' type. They require no maintenance other than to ensure connection posts are greased and secure.

The House battery is a Type 31 (330mm L x 172mm W x 240mm H).

The Engine battery is a Type 24 (260mm L x 175mm W x 220mm H.

The batteries are mounted in a tray below the port quarter berth.

The batteries are wired directly to individual battery isolation master switches mounted next to the main switch panel under the companion way step.

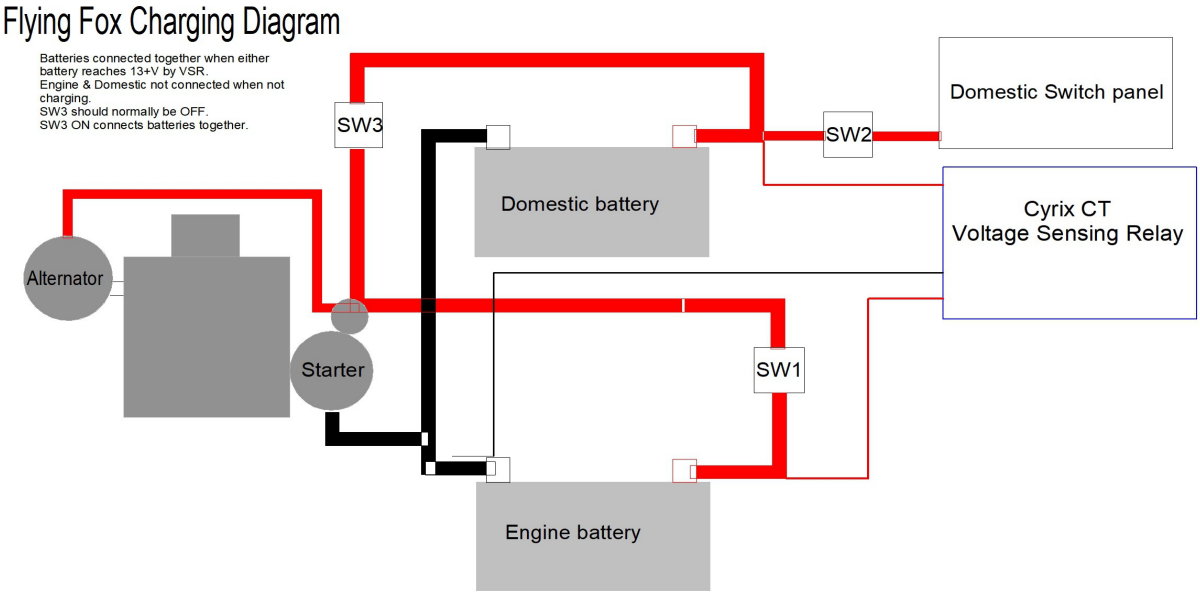


Battery voltages can be measured on the switched meter mounted to starboard of the companion way when the isolation switches are ON.

Charging System

The alternator produces charging current when the engine is running.

Flying Fox has an automatic VSR split charging system to ensure both batteries are charged. Essentially, the VSR senses the voltage of each battery, when one of the batteries reaches a charging voltage (approx 13V) a relay is activated which electrically connects the two batteries thus allowing both to be charged. When the voltage of the batteries falls below 13V, i.e. charging has stopped, the two batteries are disconnected from each other ensuring neither can discharge into the other.



The VSR is located on the forward bulkhead of the battery compartment.

There is a manual override battery-combining switch (port side of engine bay entrance, SW3 in the diagram) for emergency use if, for example, there is not enough charge in the engine battery to start the engine. This switch would normally be kept in the 'Off' position.

Solar Charging

The solar panel mounted on the main hatch garage produces a charging current when in sunlight.

The output from the solar panel is fed to a PWM solar charge controller mounted on the wall of the hanging space alongside the engine compartment.

The charging output from the controller is then fed to the House battery via an inline fuse.

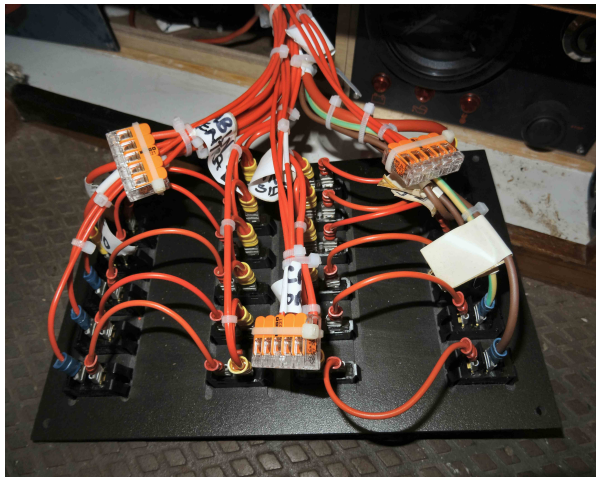
This system is permanently 'ON' so the house battery voltage is maintained even when the vessel is not in use.

Switch Panel

The switch panel is connected directly from the House battery isolation switch.

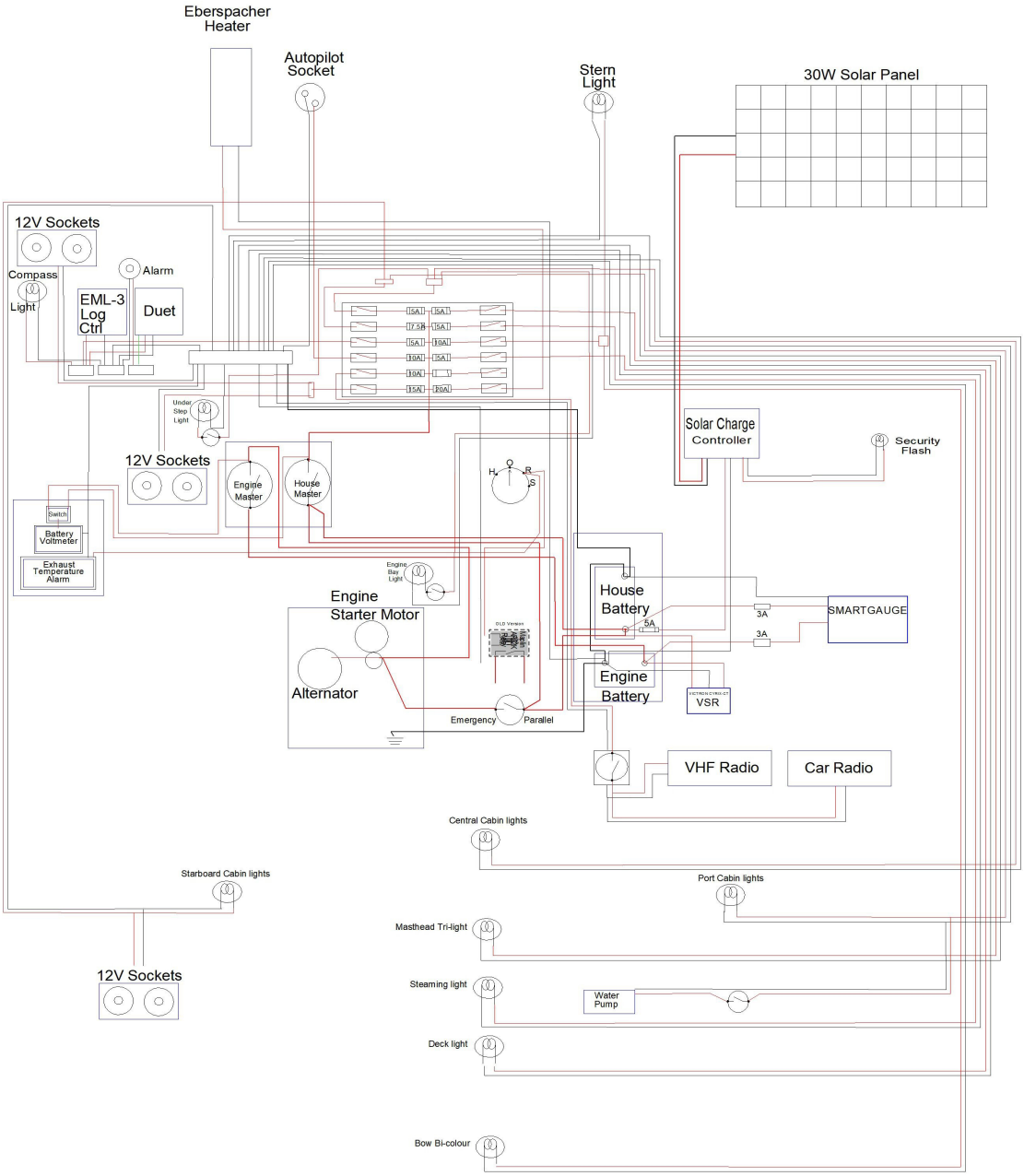
The switch panel utilises rocker switches and standard automotive type blade fuses.

Switch functions are as per the legend alongside each switch.



Wiring Schematic

Flying Fox - 12V Wiring Schematic

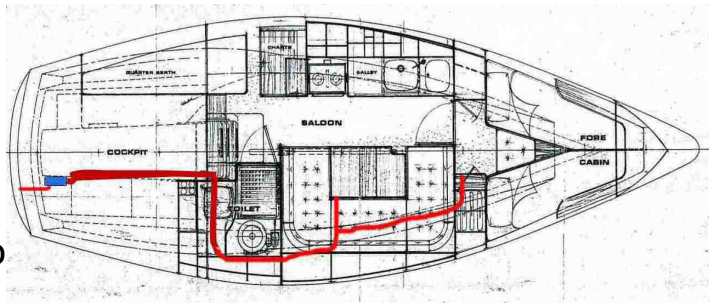


Heating

Flying Fox is fitted with an Eberspacher D1LC diesel blown air heater.

The heater is fitted to the cockpit side in the aft cockpit locker.

and has a separate fuel tank in the same locker. This heater has only ever been run on paraffin (kerosene) but will also run on diesel.



Combustion and heater air is taken from inside the cockpit locker. The exhaust gas is expelled via a lagged exhaust pipe and skin fitting through the transom. Heated air is trunked to the main and forward cabins.

The controller is to starboard of the companionway.

Important: Although lagged, the exhaust pipe in the cockpit locker still gets very hot (enough to melt fenders). Be aware when stowing items in the area.

Maintenance

List

The following list forms a basis for annual maintenance tasks. Jobs are added and subtracted as required:

ENGINE etc.	Flush through raw water side + winterise	Engine hours =
	Engine Oil change	
	Oil Filter change	√ + spare filter
	Fuel Filter change + bleed system	√ + spare filter
	Heat exchanger clean bores	√ + spare 'O' rings
	Internal anode check/replace	√ + spare anodes
	Check and clean air filter	
	Top-up cooling water/anti-freeze (Drain & Refill)	
	Check & top up gear box oil (Drain & Refill)	
	Check/adjust fan belt	√ + spare Fan belt
	Replace hull anode & check bonding to engine etc.	
	Clean & rustproof engine feet.	
	Check engine alignment, tighten bolts etc.	
	Check/tighten stuffing box – Refill greaser	
	Loose and re-tighten exhaust elbow bolts	
	Service 2HP Outboard	
RIGGING	Check/Maintain Head-sail reefing gear bearings. Lift foil.	
	Clean and grease bottle-screws	
	Clean and polish mast.	
	Check/Wash/Replace Halyards	
SAILS/COVERS	Wash & Fold sails properly	
	Check mainsail cover stitching/zip	
	Check sprayhood/dodgers stitching etc	
VARNISH etc.	Varnish deck woodwork	
	Internal varnish	
	Tiller varnish	
HEADLINING/CARPET	Clean up/Re-stick as necessary	
HULL	Power scrub bottom	
	Rub down old anti-fouling	
	Apply Anti-fouling + Boot Top	
	Polish Hull Wash - Rub down - Polish	
	Check keel lifting cable	
	Remove & check keel swivel pin?	

	Clean up keel & epoxy fill etc.	
	Remove Prop Clean, Antifoul	
VARIOUS	Maintain Genoa Winches	
	Maintain Mast winches	
	Maintain Anchor windlass. Ensure faceplate bolts move.	
	Clean/antifoul log impeller	
	Remove all gear, cushions etc.	
	Maintain and charge Batteries	
	Remove fresh water pump for winter	
	Clean bilges	
	Replace water filter	
	Grease Sea-cocks - Loo,Cockpit drains	
	Clean Loo Pump	
	Clean & flush Water tank	
WISH LIST	Paintwork round gunwales	
	Check keel bolt(s)	

Before Launch Replace PROP, LOG IMPELLER, ENGINE IMPELLER, WINDVANE, Aerial.

Tips/Products

Use oxalic acid to remove the brown staining along the waterline above the boot top (also removes rust weeps/stains). Buy crystals from e-bay. Ensure eyes and skin are covered. Make up 750ml of a saturated solution with warm water. Make up to 1L with water and add a few drops of washing up liquid. Wait until the ambient temperature is above 10 degC. Paint on around the waterline, keep walking around and keeping it damp until the stain has gone (usually about 15 – 20 mins). Wash/hose off.

Keel/centreplate rust is treated with Fertan rust converter.

Use 3M Blue masking tape, it will stay stuck but come off cleanly even if left for several days.

Boot top... Use masking tape along the top edge of the boot top. Paint the boot top by hand, don't worry about a small overlap onto the old antifouling below it.

Antifouling...Use masking tape along the top edge of the antifouling, ie applied onto the boot top, this will give a sharp line to the bottom edge of the boot top and the top of the antifoul.

I use a long handled 'radiator' roller.

Start painting at the keel and work upwards, it helps to stop you getting paint in your hair/hat and on your back.

Hull topsides/cockpit etc polished with Farecla G10, waxed with 3M Scotchguard Liquid Marine Wax. Two coats of wax last longer.

Grey deck paint is Valspar smooth masonry paint with a pack of non-slip granules stirred in. Colour is 'Howl at the Moon'(!).

Exterior varnish is Sikkens Cetol Filter 7. Colour is Deal. This is the same as International Woodskin.

Lockers/bilge etc are painted with white Danboline bilge paint.

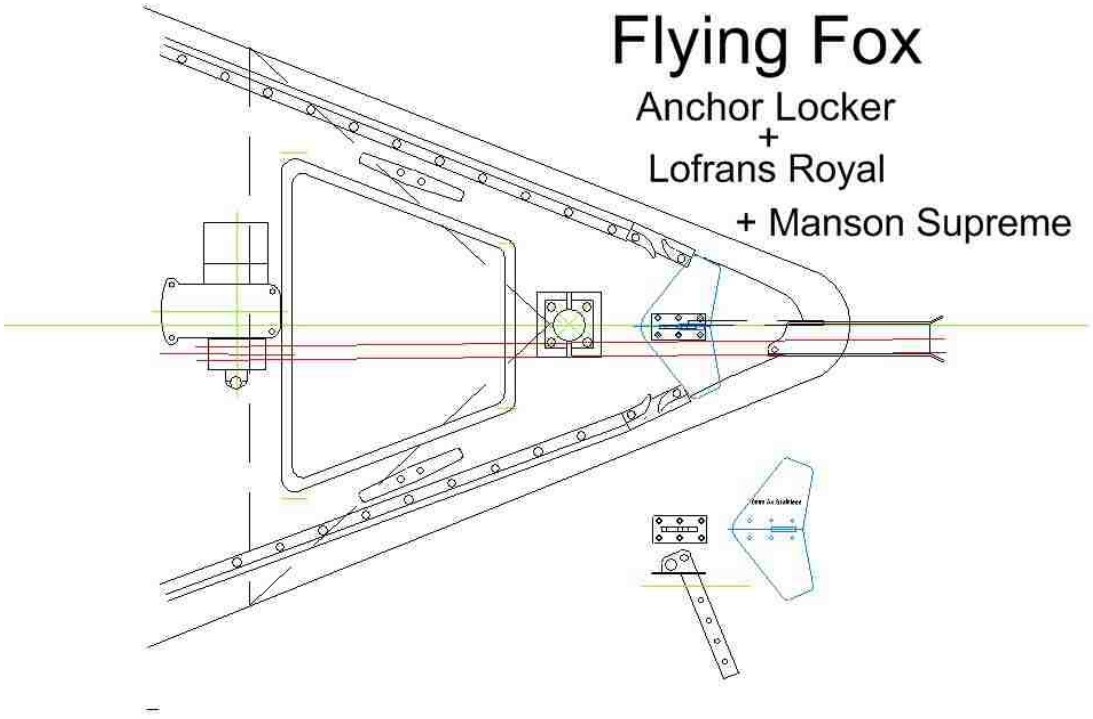
Specifications

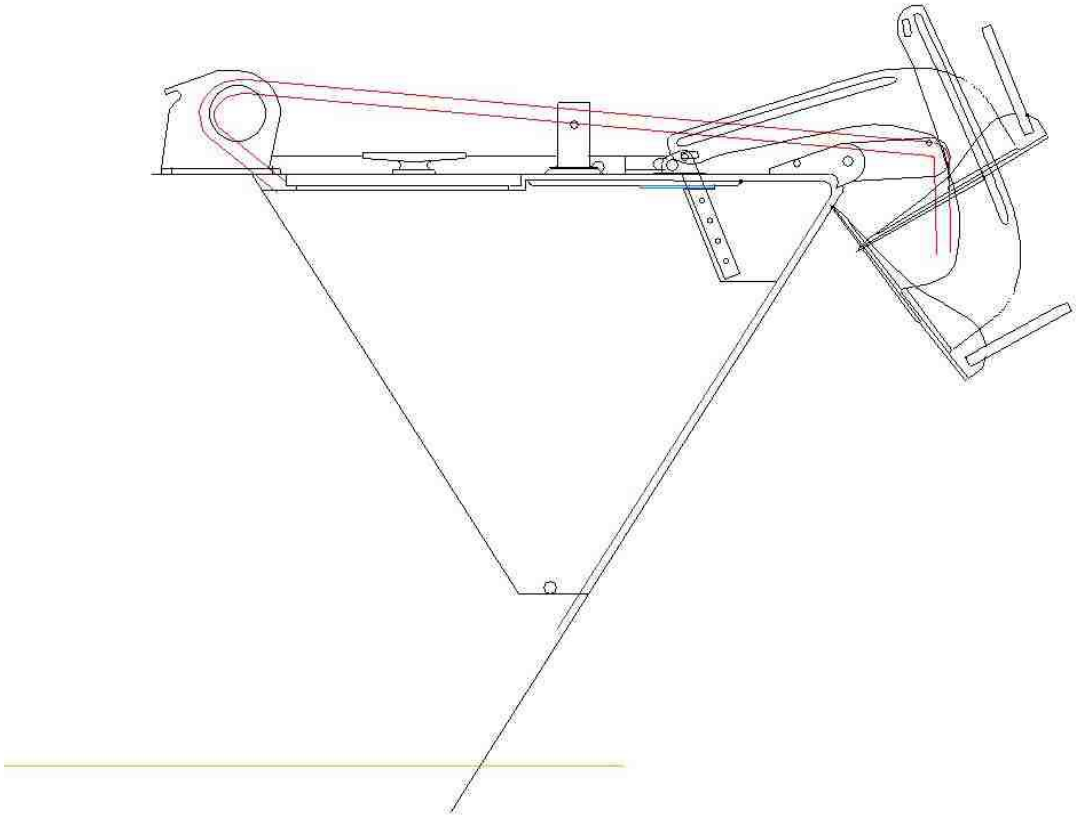
Vital Statistics

Type	**Salterns Stag 28**		Designer	**Peter Milne - 1976**	
Hull No.	**49**		Built	**Emsworth Shipyard**	
Launch Date	**1978**		Registered	**SSR03498**	
Call sign	**MCBQ6**				
Length	**28ft**	**8.53m**	LWL	**24.6ft**	**7.50m**
Beam	**9ft 10ins**	**3.00m**			
Draft - down	**6ft 10ins**	**2.05m**	Draft – up	**3ft**	**0.90m**
Air Draft	**40ft**	**12.2m**	With aerial	**42ft 6in**	**13m**
Keel base	**2.6m**		Wetted Area	**22 sq. m.**	
Displacement	**7500lbs**	**3400Kg**	Laden	**3900Kg – by crane**	
			Ballast	**2800lbs**	**1270Kg**
Sail Area	**360 sq ft**	**33.5 sq m**	Main	**145 sq ft**	**13.45 sq m**
Engine	**Beta BZ482**	**13.5HP**	Propeller	**RH 13 x 8 Flex-o-fold**	
Fuel	**Diesel 16gal**	**80Ltr**	Average	**1Ltr/hr (40-80 hour range)**	
			Plan at	**1.5Ltr/hr @ 5Kn (50 hrs)**	
Water	**150Ltr**				
Mooring	**Portchester Sailing Club**		Mooring No.	**161**	
			Membership No	**1691**	
Insurance	**Traffords**		Dates	**01/05 to 30/04**	
Value	**£xxxxxxx**				
Policy	**xxxxxxxxxxx**		Premium	**£xxx.xx**	
Tender	**Bobbin sailing dinghy**				
Outboard	**Mariner 2M**	**1982**	Serial No.	**6A1-046338**	
	50:1 100ml/5Ltrs fuel				

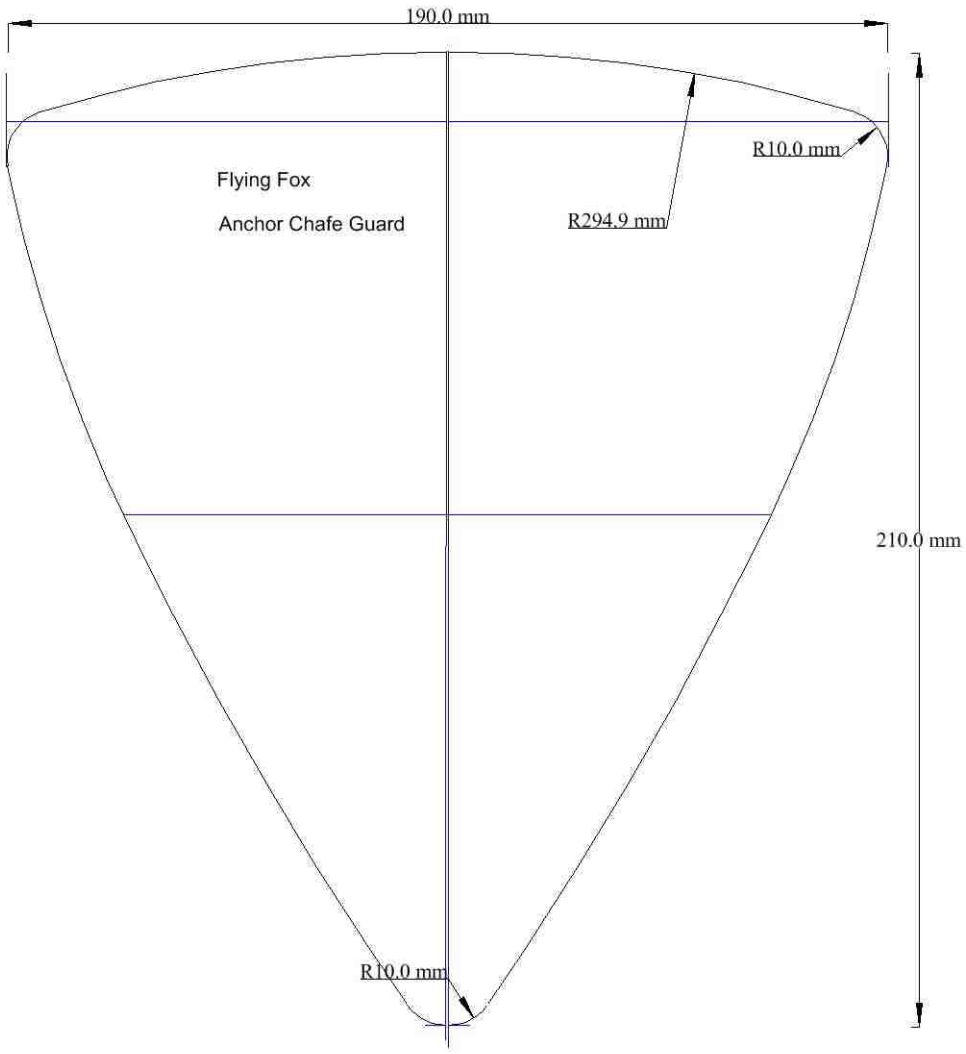
Drawings

Anchor Locker

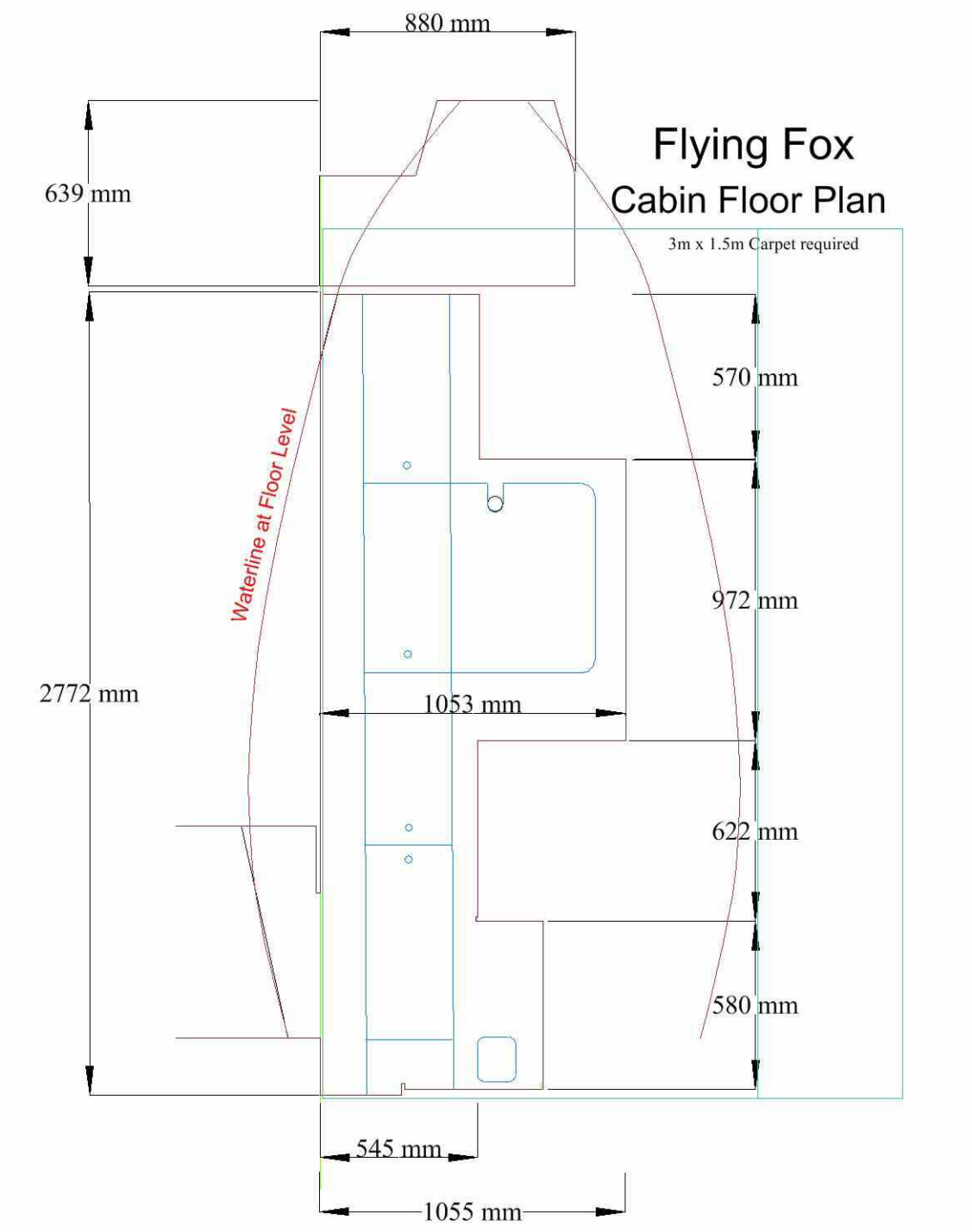




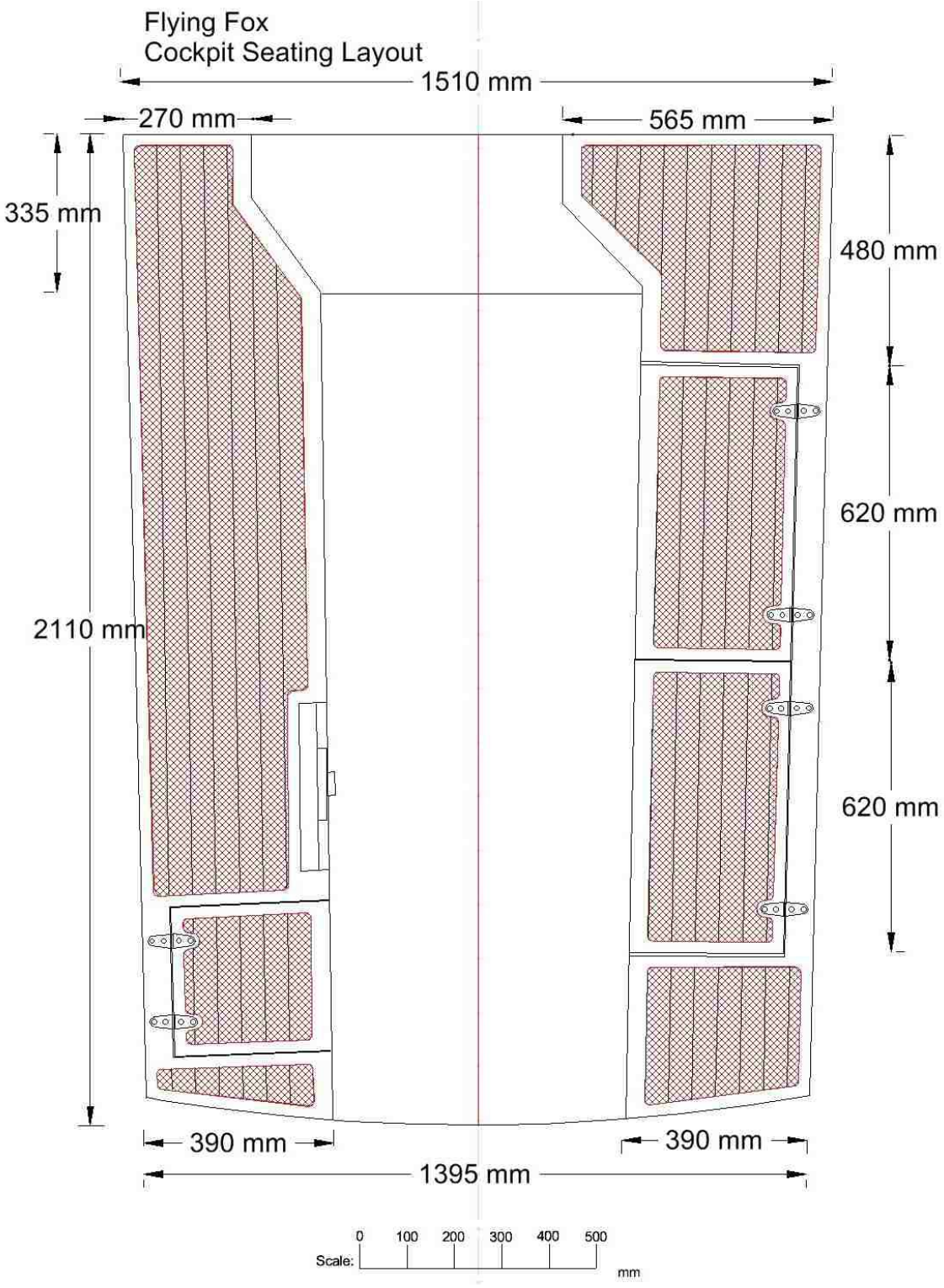
Anchor Chafe Guard



Cabin Floor Plan

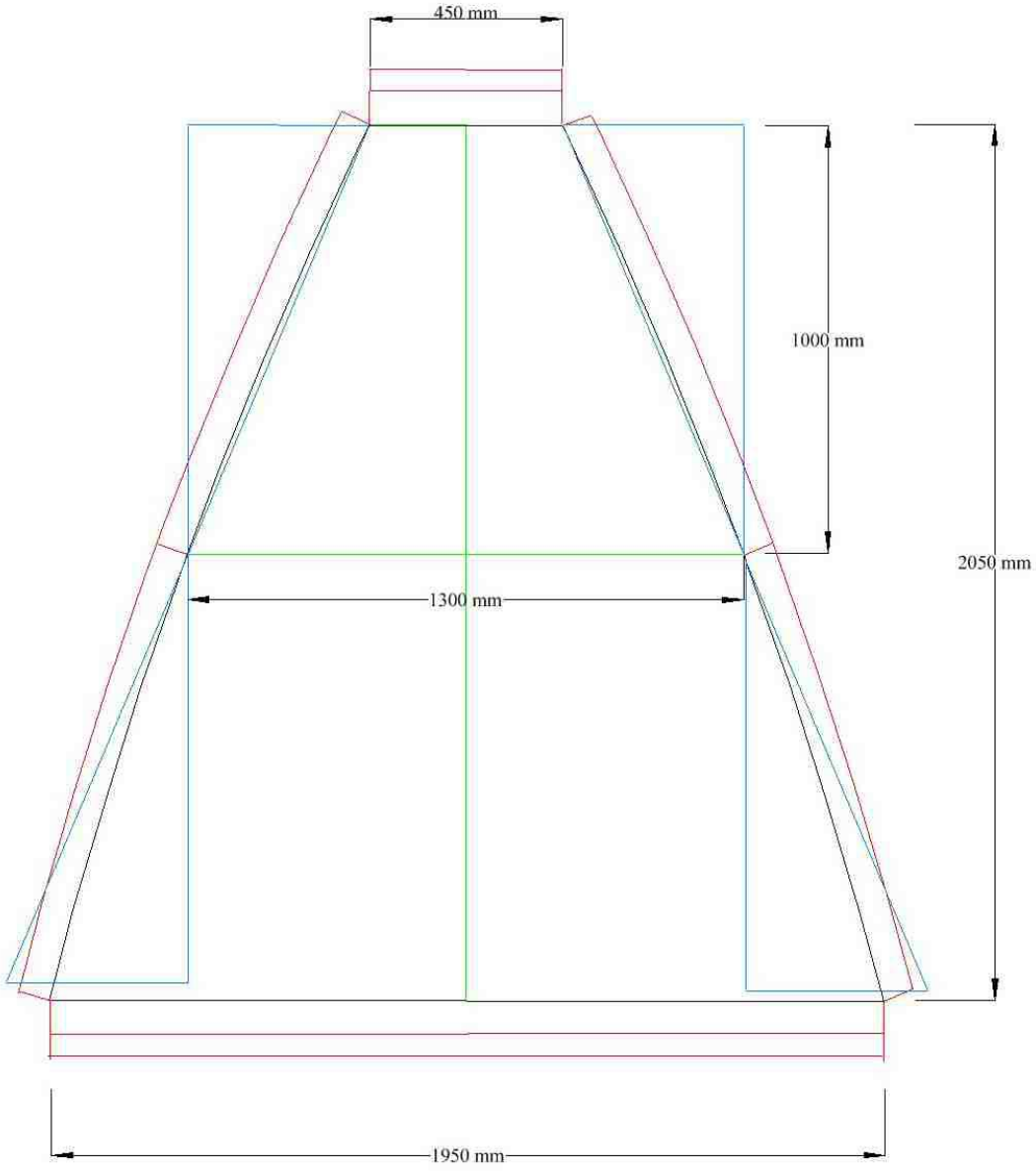


Cockpit Plan



Forecabin Berth

Flying Fox Fore Cabin Berth Mattress



Cushions 10cm thick

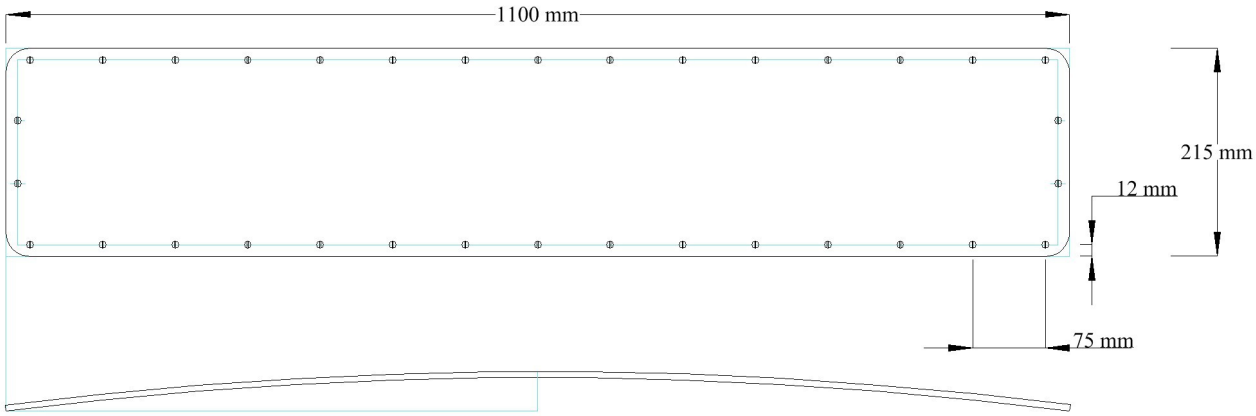
Mattress - top side

Mattress cover

Cutouts to create mattress
Could be cut from standard King size mattress

Flying Fox

Main Cabin Windows



6mm Grey Smoked Acrylic Sheet

Polished edges, Corners 25mm radius

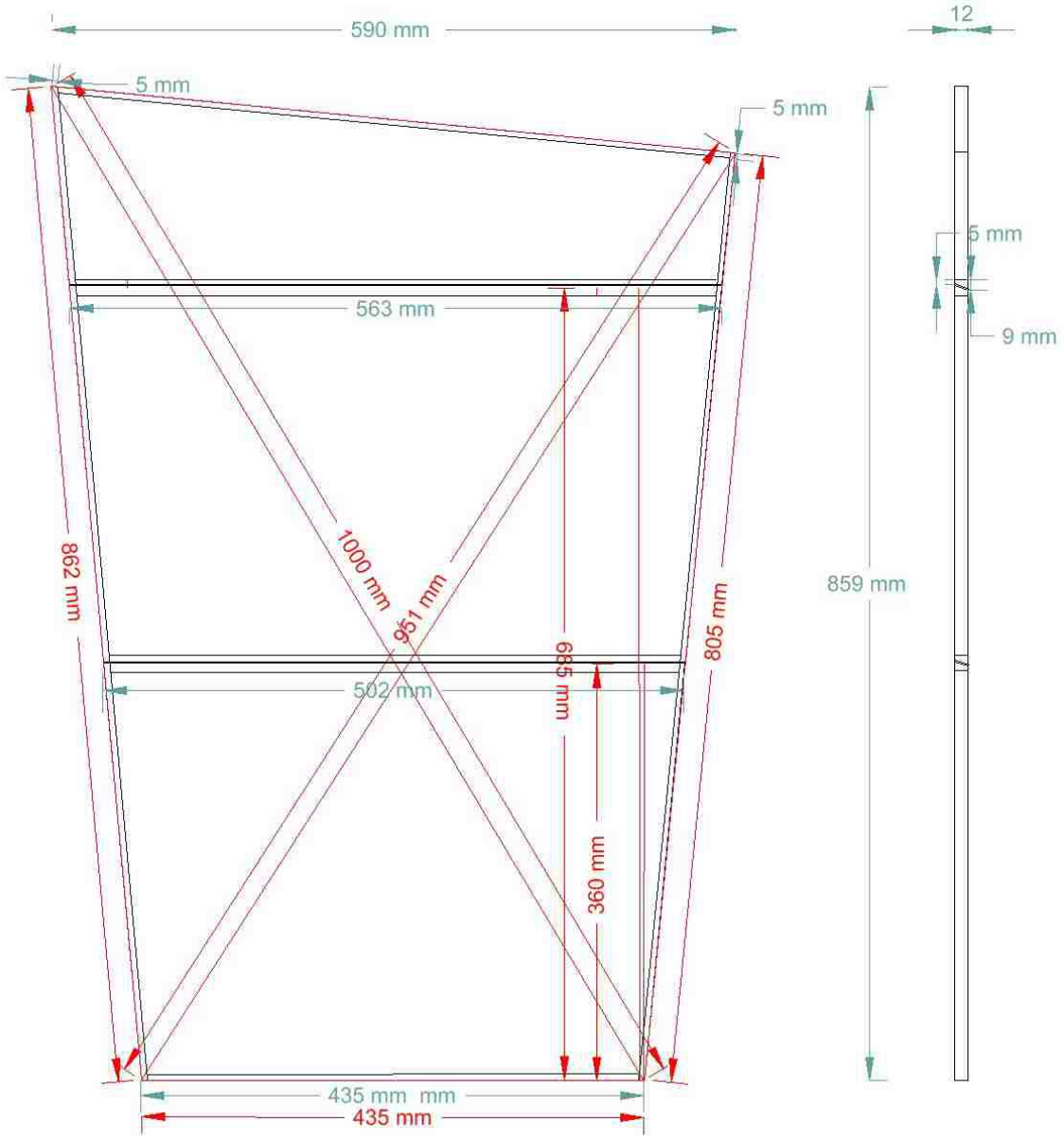
M4 Stainless Pan head machine screws

Washboards

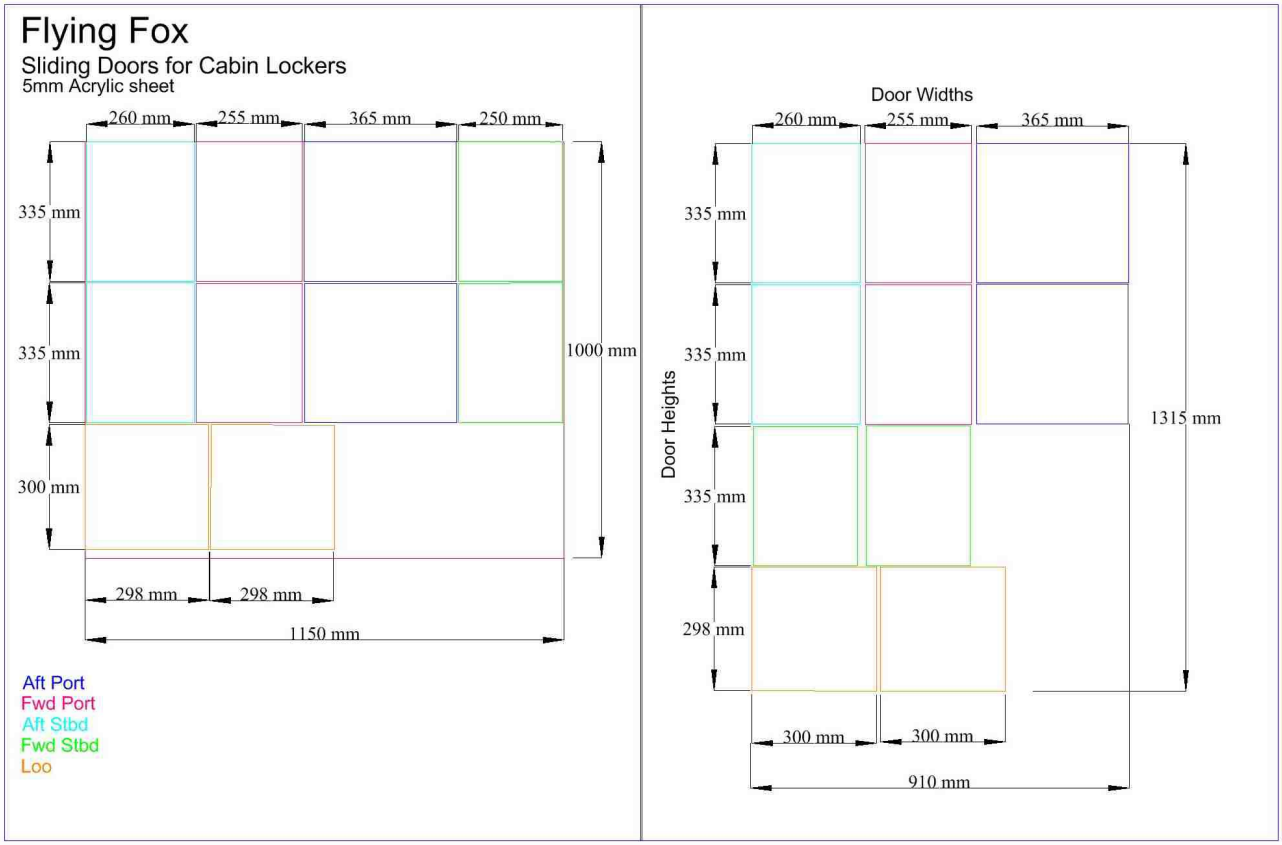
FLYING FOX WASHBOARDS

Viewed from inside

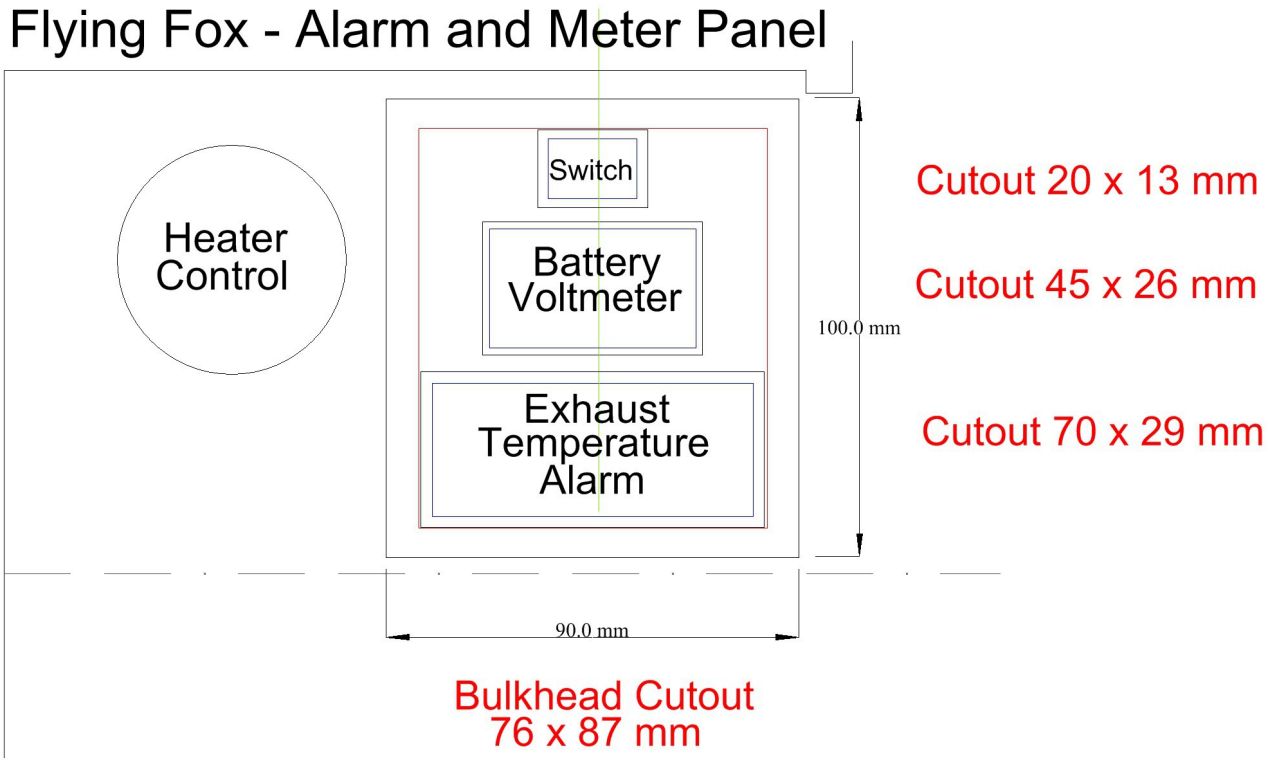
Dimensions in mm



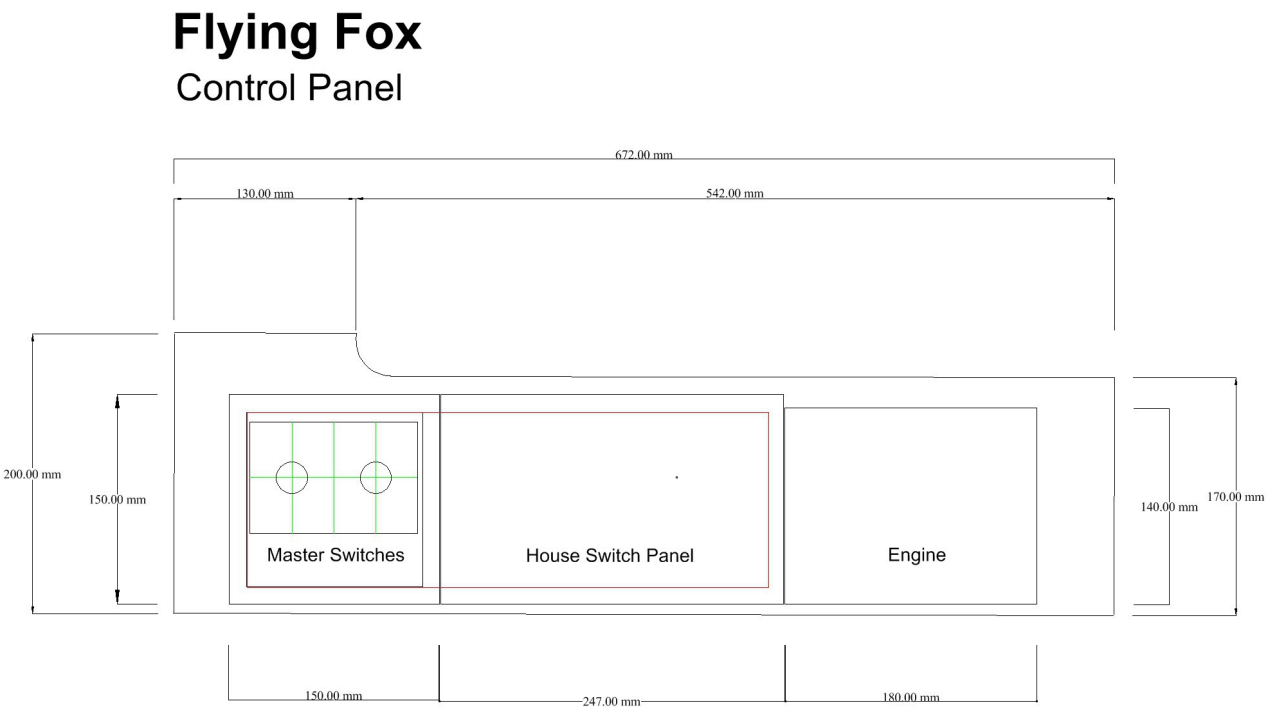
Cupboard Sliding Doors



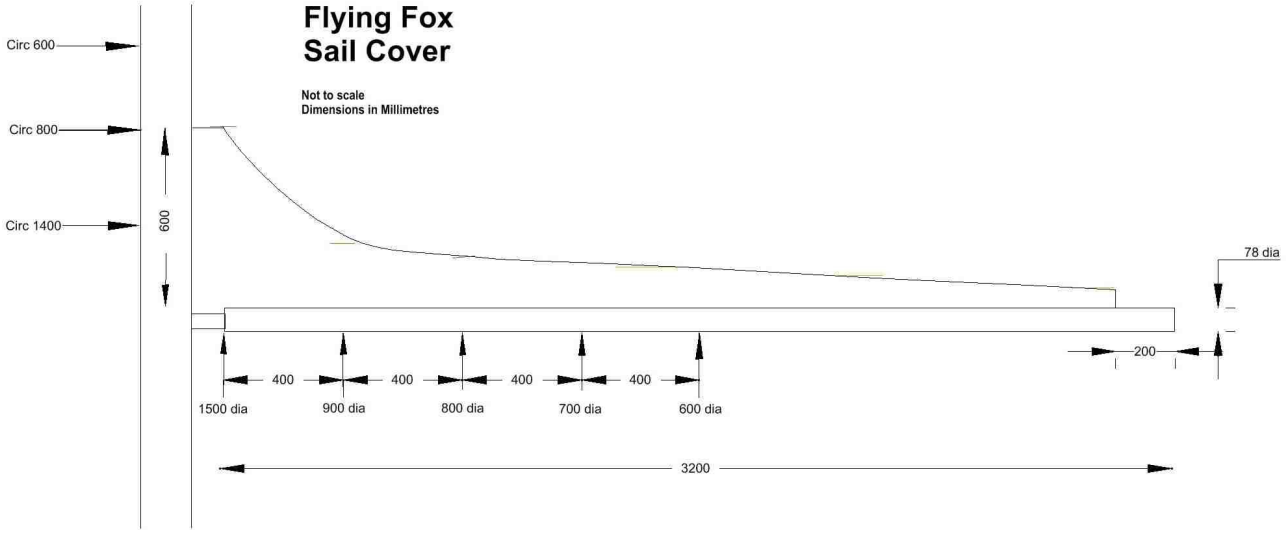
Alarm Panel


Flying Fox - Alarm and Meter Panel
Heater Control
Switch
Battery Voltmeter
Exhaust Temperature Alarm
100.0 mm
90.0 mm
Cutout 20 x 13 mm
Cutout 45 x 26 mm
Cutout 70 x 29 mm
Bulkhead Cutout
76 x 87 mm

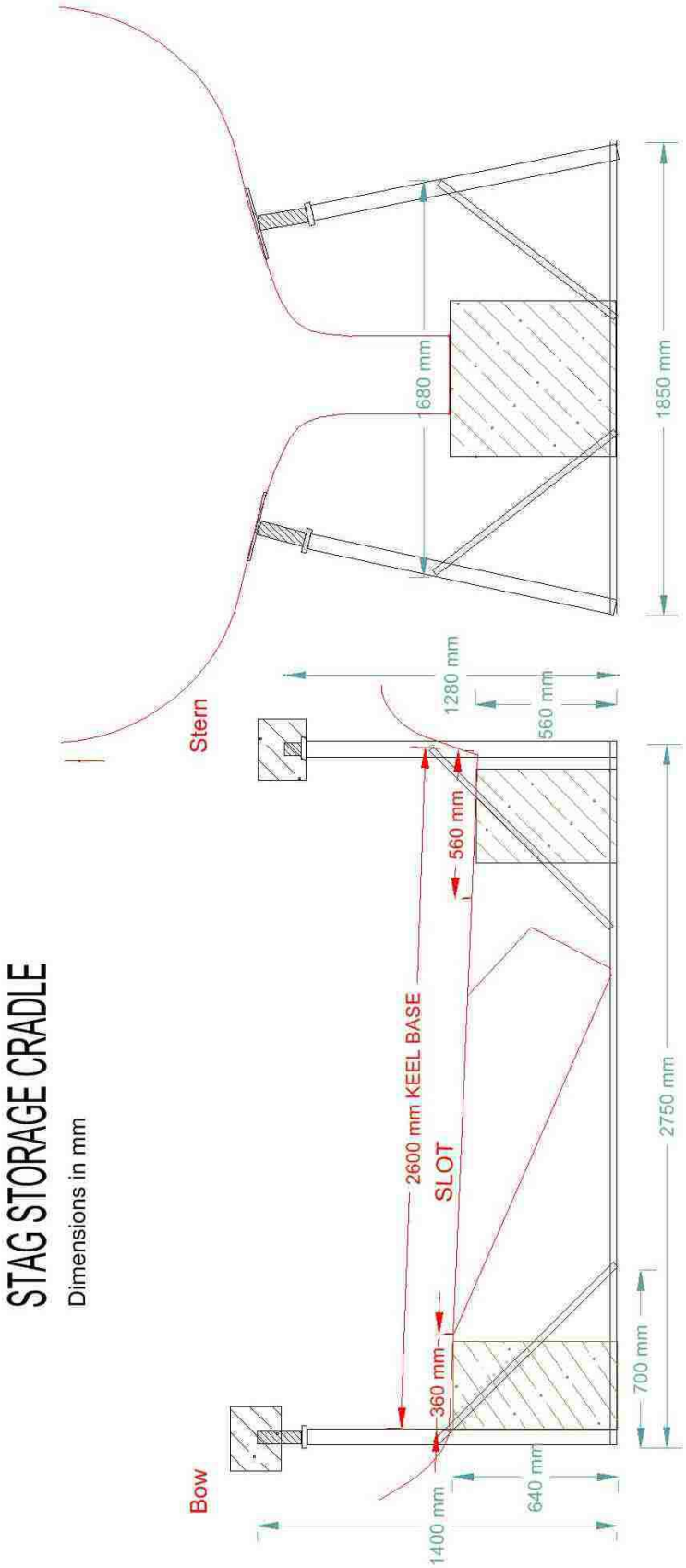
Instrument Panel



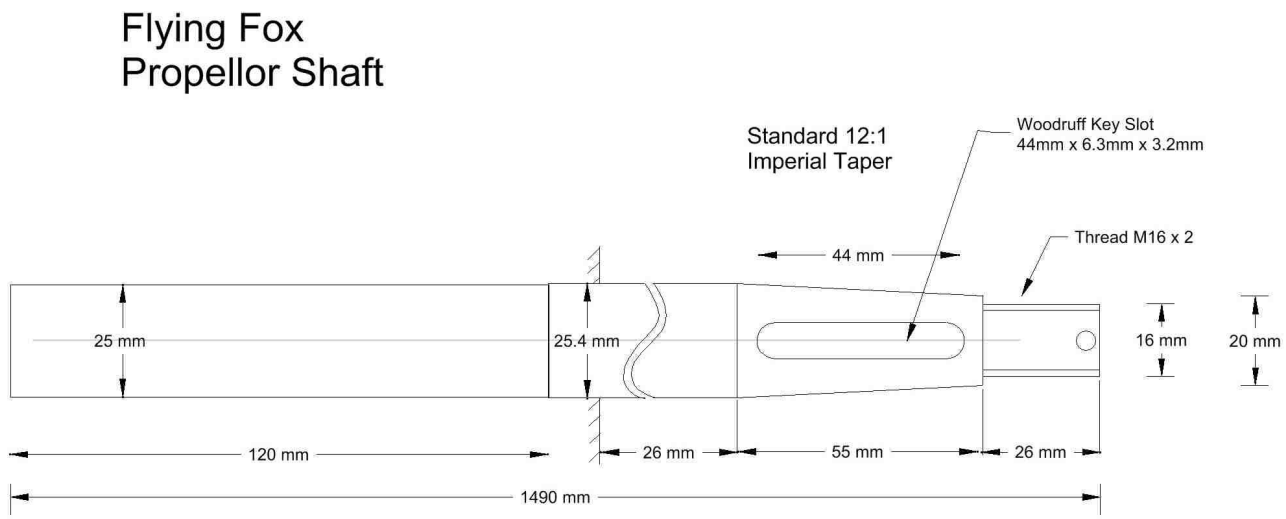
Sail Cover


Flying Fox
Sail Cover
Not to scale
Dimensions in Millimetres
Circ 600
Circ 800
Circ 1400
600
78 dia
200
400
400
400
400
1500 dia
900 dia
800 dia
700 dia
600 dia
3200

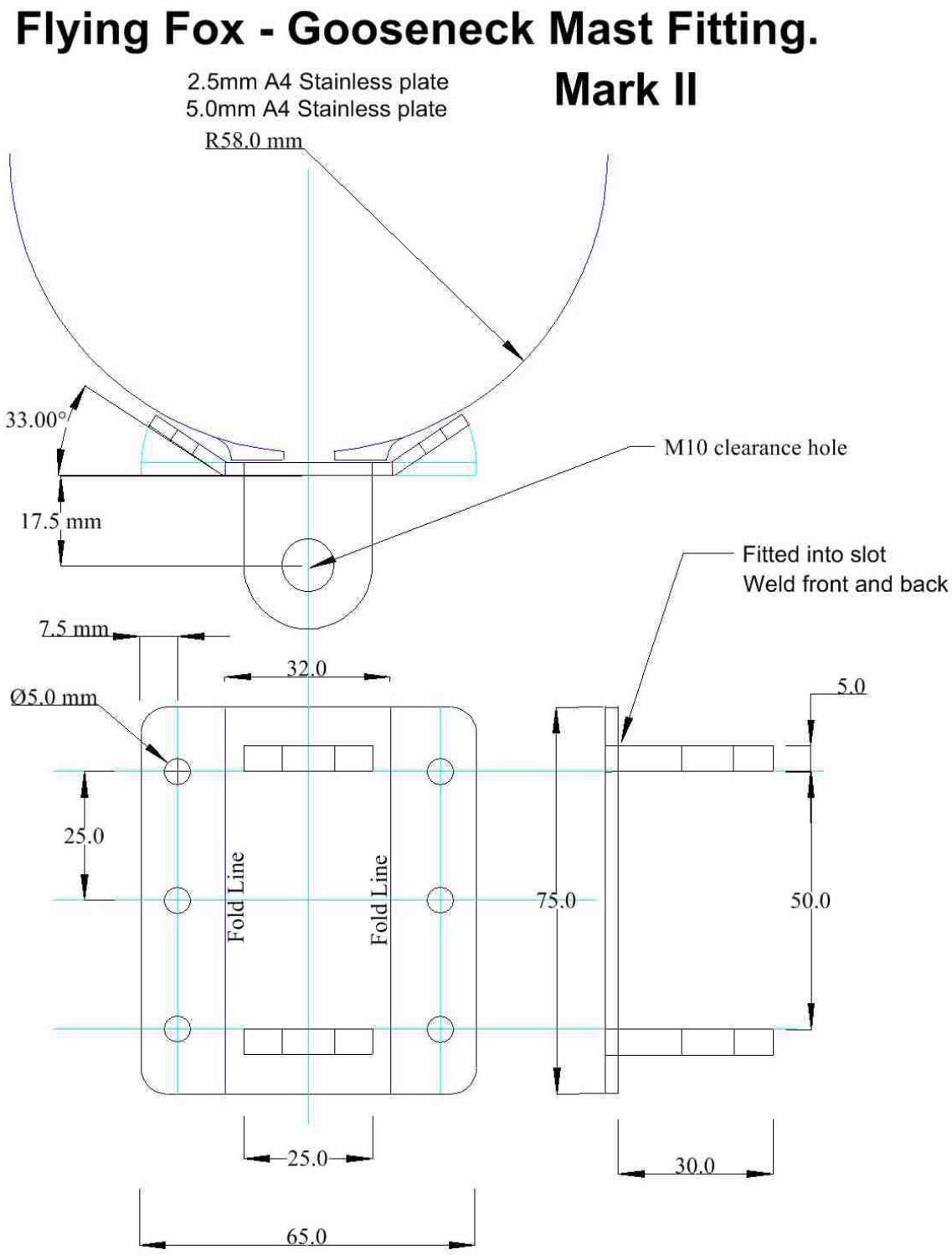
Storage Cradle



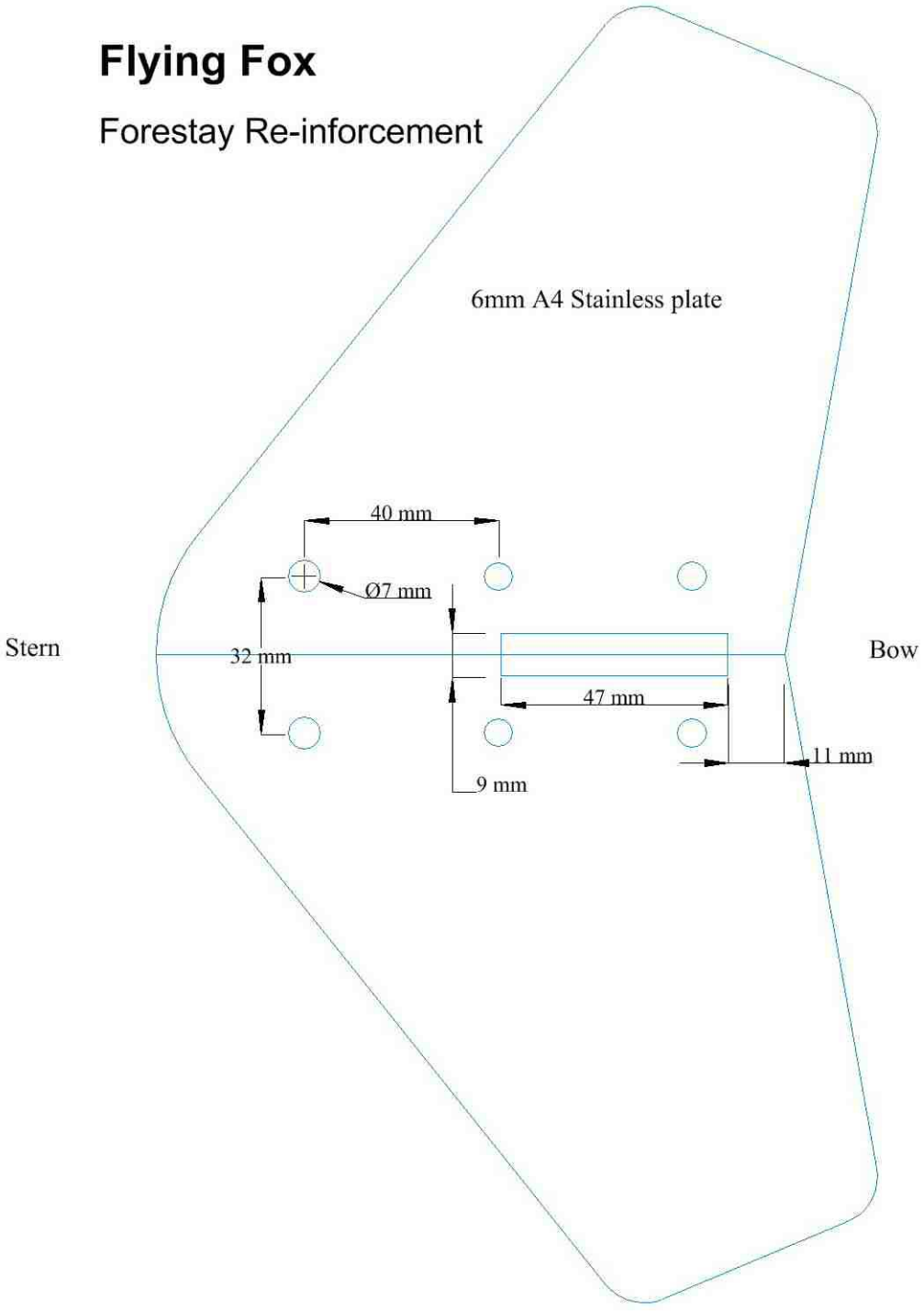
Propeller Shaft



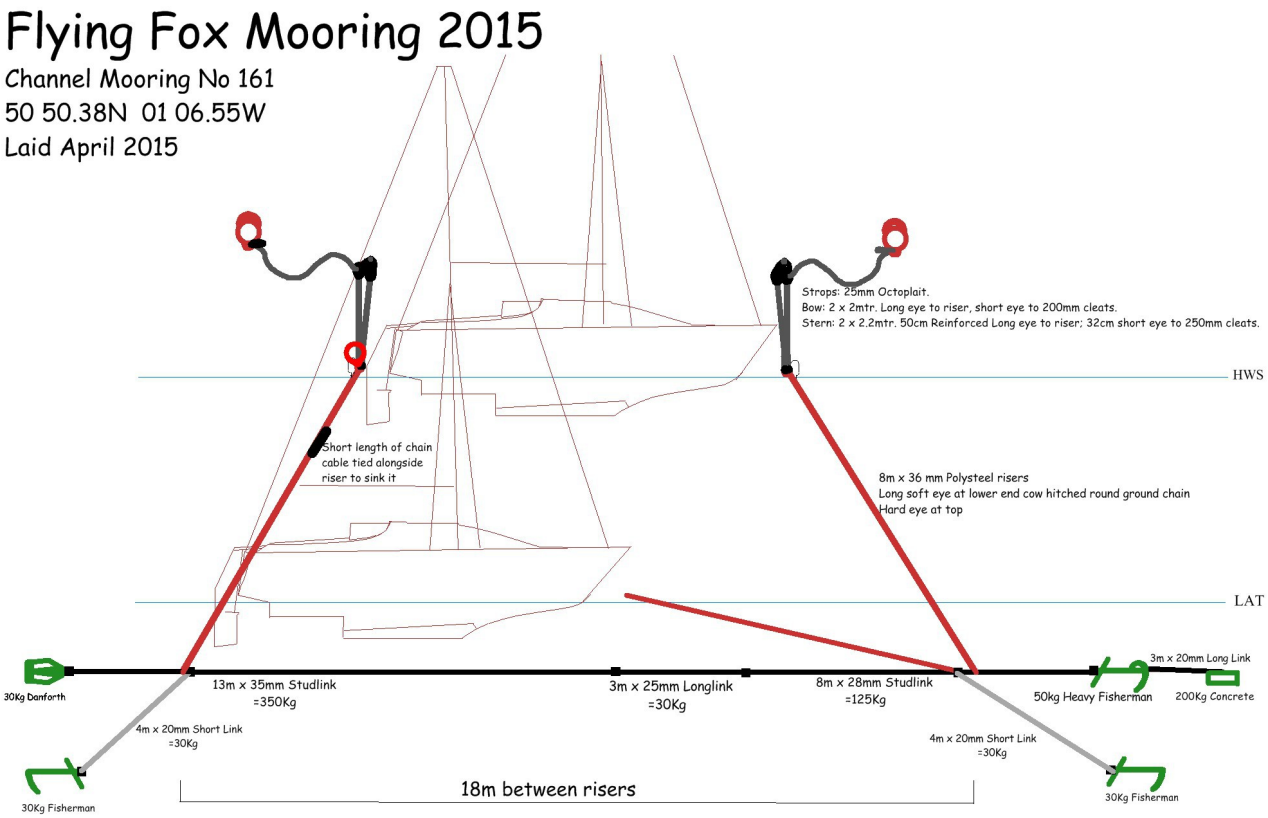
Gooseneck Fitting



Forestay Reinforcement



Mooring arrangement



North Total weight of anchors, ground chain and sinkers = Approx 900Kg South

Stag 28 Sail Insignia