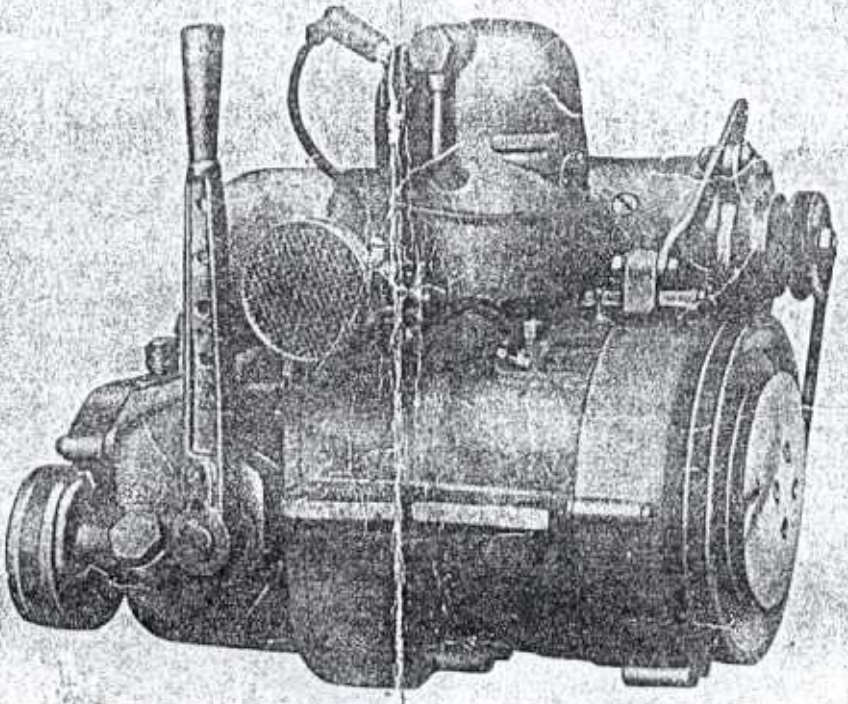
VIBROPLUS

Operator's manual
Spares List



VIRE BVR

Operator's manual
Spares List

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CONTENTS

TECHNICAL DATA

Engine

– Number of cylinders	1
– Type	2-stroke
– Bore	69,85 mm
– Stroke	70,00 mm
– Swept volume	268 c.c.
– Compression ratio	6:1
– Power	5.5 h.p. a 2000 r.p.m. 6.5 h.p. a 2800 r.p.m.
– Cooling	Sea water through a gear type pump
– Fuel pump	Diaphragm type, integral with carburettor, operated by pressure fluctuations in crankcase
– Carburettor	Tillotson HL 188A, Floatless
– Fuel	Mixture of gasoline and 5 % oil by volume i.e. 1 part oil to 20 parts gasoline
Lubrication oil engine	Any good grade 2-stroke fuel or if not available normal engine SAE 30 lubricating oil properly mixed with correct proportion of gasoline.
– BVR-marine gear	Gear oil SAE 140 during the first 50 running hours, later gear oil SAE 90
– Fuel consumption	1.7–2.5 l/h (½ gph)
– Spark plugs	Bosch W145 TI; KLG F 70; Bosch W240 P11Z Champion L-10 or J-8, AC F10, Autolite AE 6
– Spark plug gap	0.5 mm (0.020 inches)
– Flywheel magneto auxiliary output for lighting	Bosch 6V, 16W
– Magneto breaker gap	0.45 mm (0.016 inches)
– Ignition timing	30° b.t.d.c.
– Starter generator	Bosch 12V/90W
– Engine rotation	Anti-clockwise – viewing from rear
– Propeller rotation	Clockwise – viewing from rear

Fits and Clearances

– Piston – cylinder	between	0.06 & 0.09	mm (.002"/.0035")
– End gap of piston ring	„	0.15 & 0.35	mm (.006"/.014")
– Side clearance of upper piston ring	„	0.06 & 0.085	mm (.002"/.003")
– Side clearance of other rings	„	0.05 & 0.075	mm (.002"/.003")
– Pressure fit of guogeon pin to piston	„	0.007 & 0.002	mm (.0003"/.00008
– Piston pin clearance into bush	„	0.006 & 0.028	mm (.0002"/.001")
– Side play of connecting rod	„	0.20 & 0.30	mm (.008"/.012")
– End play of screw shaft (reverse gear)		0.1 mm	(.004")

Construction

The Vire BVR is designed and built for marine use. The engine is supplied with a reverse gear. he three position hand lever operates the gear to give ahead, neutral or astern action. The reduction gear is 2:1 and the propeller rotates in the opposite direction to that of the engine. The water pump is driven by the primary shaft of the reverse gear.

Standard equipment of the engine

The engine is delivered by the factory in complete running condition, tested and painted. With every engine are installation accessories, normally consisting of a propeller, starter cord, bottom strainer for the cooling water, a sea water inlet skin fitting, a cooling water discharge skin fitting and 1.5 m of plastic tube for the cooling water. The following tools are included; a spanner 12x4 mm, and flywheel extractor which also can be used for removing the coupling flanges.

MOUNTING THE ENGINE IN THE BOAT

When the engine is installed in the boat, great care must be taken to ensure perfect operation of the engine and associated equipment.

Engine Bed requirements

The engine bed should be sturdy and of solid construction. It is also advisable to make the fore and aft bearers as long as possible, so that thrust will be transmitted through frames or ribs or ribs. The bed must also be firmly rixed to the transverse members.

It is advisable to arrange the height of the engine bed so that shims or thin packing pieces can be inserted under the engine bearers. It will then be possible to obtain accurate alignment by removing or increasing the number of shims. Alignment should be checked at the beginning of, and at least once during each season as it is common for some craft to undergo slight changes in shape according to weather and drying out due to laying up onditions.

Installation of the engine and propeller shaft

It is most important that the engine shaft and propeller shaft are in accurate alignment. The Propeller shaft does not need any extra thrust bearing, as the rear bearing of the engine is capable of taking the thrust. The propeller shaft system and the engine should be first assembled approximately in line. The exact centralization and lining up is carried out by moving the engine little by little, after the propeller shaft system has been finnally installed.
When checking the final alignment of the engine, the fixing bolts of the engine should first be tightened, then remove the screws and the flexible disc of the coupling. The position of the engine is correct when the coupling flanges are completely parallel in all directions and centralized. The parallellism of the flanges can be confirmed by means of a feeler gauge. If the distance between the flanges varies in any direction, the engine has to be moved sufficiently to correct any misalignment. When correct alignment is achieved reconnect the coupling. Remove spark plug and turn the shaft by hand. If the shaft rotates freely and evenly the engine/propeller haft alignment is correct.
When using a stern-tube provided with a rubber sleeve mounted front bearing, the front end of the propeller shaft has to be centralized carefully to the stern tube, before final checking is made. The centralization is best achieved by disconnecting the sleeve, sliding the bearing assembly forward and locating the shaft in the tube with small wedges.

EXHAUST AND COOLING SYSTEMS

Exhaust pipe

Use exhaust piping having an inside bore of 32 mm ($1^1/_4$"). The exhaust outlet must be situated well above the waterline and the exhaust pipe should slope towards the outlet from a point as high as possible in the craft. The highest point should be in the form of a "swan neck" (see h2 fig. 1.)
The exhaust expansion chamber on the engine gives no silencing effect and should added silencing be required a metal silencer of approximately 3–4

litre can be installed close to the exhaust outlet in such a way that water always drains from it away from the engine. Alternatively a neoprene type silencer can be used (Elastomuffle or similar) in the same position but sufficient cooling water must be provided in the exhaust to prevent the exhaust gases exceeding 200°F.

Cooling of exhaust gas

The exhaust pipe to the expansion chamber is fitted with a water cooling pipe connected to a control cock on the cylinder jacket inlet union. The cooling water will reduce the temperature of the exhaust to 50/60°c (120/150°F.) In operation the control cock should be opened $^1/_2 - ^3/_4$ turn. Where the engine is installed below the waterline it is recommended that the control cock should only be opened after the engine has been started and closed a few seconds before stopping.

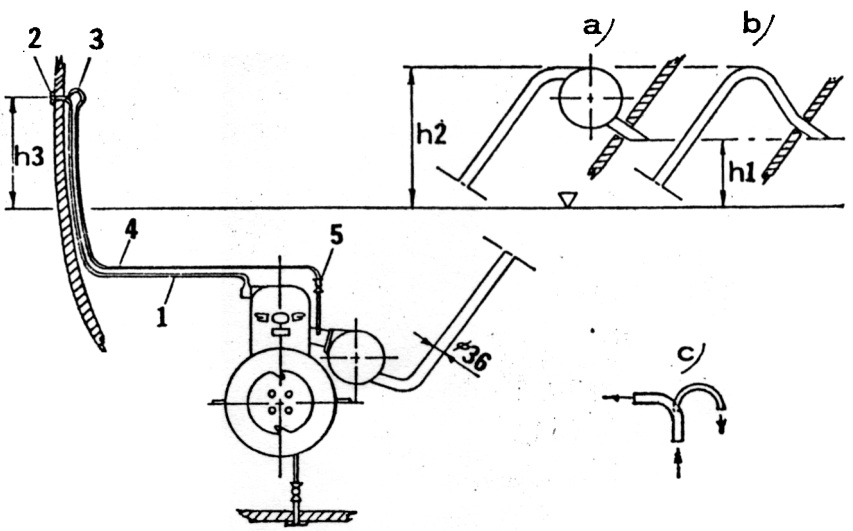

Figure 1 Cooling system

Alternative system for below waterline installation

With reference to fig. 1. the control cock is disconnected from the cylinder jacket inlet union and connected to the discharge water skin fitting (2) via a branch piece (3) above the waterline (h3). Then should the control valve be left open, on stopping the engine, no flooding can occur.

Note The hole left in the cylinder jacket inlet union should be closed by means of a soldered plug.

Installing the cooling water piping

The water inlet skin fitting should be fixed near the keel and as near the engine as convenient. Drill a hole 17 mm ($^{11}/_{16}$") through the hull and push in the skin fitting from outside. Sealing is effected by means of a rubber washer. In a wooden craft, to protect the wood against rot, the hole in the hull should be painted or varnished before the fitting in inserted. The bottom strainer is fixed over the suction opening so that the slots lie fore and aft, using brass countersunk screws.

To use the standard side water outlet fitting a 10 mm ($^{3}/_{8}$") inner diameter hole is required, well above the waterline. Some users prefer to use the inlet skin fitting at this point and to install a combined sea cock and skin fitting on the inlet side.

Cut off sufficient of the plastic hose and connect inlet fitting to the water pump. Connect also the water outlet pipe on the cylinder to the outlat skin fitting. To ease fitting the plastic tube over copper pipe, first warm it in hot water.

Additional installation notes

$^{1}/_{4}$" plastic hose is suitable as a fuel line but it must be clean. The ignition cables and fuel pipes must not come into contact with the hot parts of the engine.

In all engines a black cable approximately 25 cm long somes away from the magneto with the ignition cable from the same hole. This cable end can be connected to an erthing switch on the instrument panel to provide a remote stop switch. The second pole of the earthing swich must be connected to the metal frame of the engine.

When using an additional earthing switch, the standard switch on the engine should be kept in the running position.

If the engine is installed in an enclosed space, for instance in a sail boat, the ventilation of this space is most important particularly in regard to exhaust heat and fuel pipes (fire risk).

PRELIMINARY MEASURES BEFORE PUTTING INTO SERVICE

Fuel and Lubricants

Any regular grade of gasoline may be used. It is not necessary to use high octane or super grade fuel. The gasoline should always be mixed with suitable engine oil, to the proportion of 1 part oil to 20 parts gasoline, (1 part to 16 for the first 10 running hours). When filling the tank with fuel, use a fine mesh

or chamois leather filter. The gearbox should be filled to the level of the filler plug hole. Use gear oil SAE 140 for the initial 50 hours, thereafter use SAE 90 gear oil. Capacity 1½ imperial pints. (1¾ us pints). The grease cups on water pumps and inboard sterntube bearing should be filled with good quality water pump grease.

Preparation of a new or stored engine

After storage before the engine is put into service, the preserving oil (see laying up para. 2) must be drained from the crankcase. This is simplified by pouring a coffee cup full of 2-stroke fuel into the crank case and then swinging the engine several times to and fro. The mixture is then drained out through the draining screw hole at the bottom of the crankcase.
The preserving oil in the cylinder is removed in a similar manner, by pouring through the sparking plug hole a spoonful of fuel when the piston is in ½-way position. The engine should be rotated rapidly by the start cord, the mixture blowing out through the spark plug opening.

STARTING PROCEDURE

For a cold engine

1. Check for sufficient fuel in the fuel tank.
2. Check that the gear lever is in neutral.
3. Turn on the fuel. When using the portable tank, the air vent should be opened.
4. When using the portable tank, give several pumps of the priming bulb until resistance is felt indicating carburettor fully primed.
5. Put the choke lever (fig. 2 part 3) to the position shown in the figure, that is the "full choke position".
6. Set throttle (part 1) to about one third open.
7. Open the needle valve of the carburettor (part 5 fig. 2) 1¼ turns to the left. When the engine is warm the needle valve should be adjusted to achieve the best running position for power and for fuel consumption. CAUTION. Never turn the needle valve tight. This may cause damage to the point of the needle valve.
8. Wrap starter cord on pulley.
9. Check that the earthing switch is in running position.
10. The engine is started by pulling the starter cord firmly and swiftly. It is very important that the starter cord is pulled clear of the pulley in

one attempt. If the cord end is left in the groove of the starting pulley, a "back fire" may cause a dangerous jerk on the starter cord and this can be not only painful but dangerous.

11. When the engine is running, the choke lever should be moved (fig. 2 part 3) gradually back from the starting position and the speed of engine set as desired by the throttle lever.
12. The cooling water cock of the outlet pipe should be opened about ½ turn.

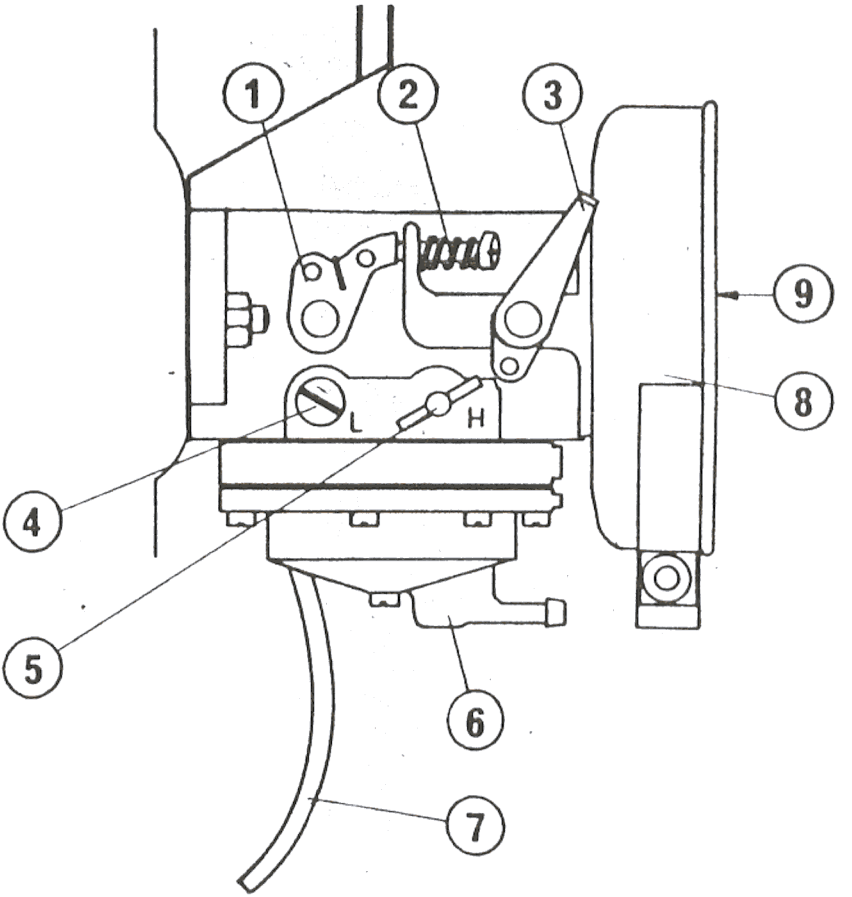

Figure 2 Carburettor

1. Throttle lever 2. Idling speed setting screw 3. Choke lever 4. Mixture setting screw for idling 5. Mixture setting for power running 6. Strainer cover 7. Pressure fluctuation pipe 8. Filter body 9. Airfilter

Starting a warm engine

Starting is generally the same as for a cold engine, but the choke lever (fig. 2 part 3) should be left in the run position. No choke is used, because the mixture will be too rich, and the engine will not start.
If the engine has been 'flooded' or 'over-primed' the engine will not start. Proceed as follows: —
Check that the choke is off (i.e. not in the position shown in figure 2), close the needle valve (part 5) and rotate the engine several times vigorously while the throttle valve is completely open. As soon as the engine starts set the needle valve (part 5) to the best position, and adjust speed of the engine by means of throttle.

A very hot engine may refuse to start, even if not "flooded". In this case the best thing is to open the throttle valve (part 1) fully open, turn off the fuel and give the engine several vigorous false starts. The engine normally will start, after which, close throttle to desired speed and turn on fuel.

Electric starting

Engines provided with starter generator, can be started in much the same way as above, but cold engines will need less choke and remember "NO CHOKE WHEN ENGINE IS HOT".

ENGINE OPERATION

Engine speed and gearbox control

1. Open the throttle lever to a "fast idle" speed.
2. Move the gear lever in the required direction (movement is "instinctive"). WARNING. Seizure of and serious damage to the taper drive cone faces in the Vire gear box can take place if either forward or astern gear is selected with the engine running too fast. Set engine speed just high enough to prevent stalling of the engine when the gear is engaged.
   The speed of the boat is adjusted by means of the throttle lever. Carburettor idling set screw should be positioned so that a hot engine will not "cut-out" when the throttle is closed with the engine in gear.

Running in period

Careful use during the first 10 hours will increase the life of the engine. For the first five hours use a of half throttle, after which the throttle opening can

be gradually increased, until at 10 hours it is safe to use full throttle. The engine will not develop its full power for about 50 running hours when all bearing surfaces will have become properly bedded in.
For the first 10 hours it is advisable to use a slightly higher oil content in the fuel i.e. 1:16. After the 10 hours running in period, change to the normal 1:20 oil fuel ratio. When running, check the flow of cooling water overboard and through the exhaust.
During a long run, give an occasional turn to the grease cups of the water pump and the stern tube bearing.

CARBURETTOR ADJUSTMENT

Idle

Clean and check gap of spark plug.
Run engine until warm.
Set engine speed to fast-idle by screwing in adjusting screw (part 2). Turn idling jet screw (part 4) to the left a few degrees at a time until the engine runs unevenly. Turn screw a little to the right until engine runs smoothly. Normal setting is $^3/_4$ turn open. Re-set engine speed at screw (part 2) to ensure against engine stalling when gear engaged.

Idling Speed

Please note that idling speed is about 900 RPM off load, and at this speed the engine will "four-stroke". FOUR-STROKING is an essential feature for any two-stroke engine running light. (Proper scavenging depends on this.)

Full power

With the gear engaged and throttle nearly full open, the main jet can be set to give maximum power with smooth running and fuel economy. The normal setting is $1-1^1/_4$ turns open of adjusting screw (part 5). Turning this screw to left will cause engine to run unevenly and produce black exhaust, turning to the right will cause power to fall off.

Notes

Poor engine response and lack of power can result from the idle mixture being set too lean.

Having obtained the optimum settings, no further alterations are necessary or to be recommended.
Undue force when screwing jets on to their seatings will result in damage – treat carefully and gently.

STOPPING THE ENGINE

1. Shut the water injection control cock.
2. Put the throttle lever into idling position.
3. Set the gear lever in neutral position.
4. Move earthing switch into stop-position.
5. Shut fuel cock (gravity feed).

If the boat lays idle for some time, it is advisable to rotate the engine by means of the flywheel until compression is to be felt. When the piston is in this position, it closes the ports in the cylinder wall. When so, no humidity can get into the engine.

REGULAR SERVICING

At the beginning of the running season, or with a new engine

- remove preserving oil from the crankcase and the cylinder
- remove the external protecting grease
- clean the carburettor and the fuel pump
- clean the spark plug and check the spark plug gap
- check the breaker point gap and oil the felt for lubricating the cam
- fill the gearbox with the new oil to level of filler plug
- fill the stern-tube greaser with grease
- fill the grease cup on water pump

Before starting

- check the amount of fuel in the tank
- (don't use last season's fuel).
- check the amount of grease in the stern-tube bearing grease and water pump grease cup.

Every 50 running hours

- clean the spark plug and check the spark plug gap
- clean the strainer in the diaphragm fuel pump

– in a new engine, change oil in the gearbox and clean the magnetic plug after the first 50 hours

At intervals of 100 running hours

– in addition to aforementioned servicing steps, change the oil in the gearbox

At intervals of 300 running hours

– in addition to aforementioned servicing steps, check breaker point gap
– clean the carburettor

SPARKING PLUG TROUBLES

About 99 % of running and starting difficulties in 2 stroke engines originate at the plug. If your engine has been running well, and for some unexplained reason suddenly develops starting or running faults – ALWAYS check the plug first – Better still, fit a known serviceable plug and have the other cleaned and re-gapped.
Always keep with you at least one serviceable plug wrapped in a plastic bag. Don't leave it in the boat. Take it from your dry and warm home to the boat for each trip.
If you know that there is fuel and compression – that the engine is not flooded or over or under choked – and yet it still will not start after four or five attempts – save yourself a lot of wasted effort by checking the plug. In nine cases out of ten – cleaning the plug will effect the cure and the other ten per cent will almost certainly be corrected by a change of plug.
Laying the plug on the cylinder head with H. T. lead connected, and engine rotated will tell you if the plug is sparking, but one should look for a good "fat" blue spark. A plug which gives a thin or white spark may not in fact spark at all when under compression in the cylinder.
The best rule with sparking plugs in "WHEN IN DOUBT – HEAVE IT OUT!

ADJUSTMENTS AND SERVICING

Adjustment of the ignition timing

The ignition timing has been set by the manufacturer to give the greatest efficiency and starting characteristics of the engine. For this reason there

oval shaped slots. This will ensure correct ignition timing.

Adjustment of the magneto breaker point gap

The breaker point gap in a new engine is adjusted at the factory to its proper

possibly re-adjust it. This adjustment is carried out as follows.
Remove rope start pulley and flywheel cover. Rotate the crankshaft by the flywheel until the gap between the breaker points is at the maximum. This can be seen through the oval shaped holes in the flywheel. The breaker point gap is measured by means of a feeler gauge. By loosening the screw 314 in figure 7 and by turning the point from notch A the breaker point gap gan be adjusted to 0.45 mm. (.016"). After this the screw 314 is to be tightened.
If the points are dirty and pitted, smooth with a suitable file or fit new ones.

Cleaning the carburettor

The carburettor can become clogged by particles of dirt passing with the

The jet adjustment screws 4 and 5 should be removed from their housings. Having placed a suitable vessel underneath the carburettor make several quick pumping actions by means of the hand pump, so that the fuel flows freely out througt the jet screw holes. (If the hand pump is not available, the engine can be rotated by means of the starter cord and with the earthing switch in the stop position).
If the carburettor still fails to operate after this procedure it must be removed from the engine and stripped.
Stripping and cleaning should be carried out with great care. Damage to diaphragms and points must be avoided, because even the slightest interior leak will cause malfunctioning. The interior bores of the carburettor can be cleaned by means of compressed air sprays or by letting the carburettor lie in fuel.
Do not use steel tools, needles or the like when cleaning the carburettor.
During prolonged periods when the engine is not in use, for instance in the Winter, the fuel mixture may, after petrol has evaporated, take the form of an oily, viscous layer on the diaphragm of the carburettor, valves etc. and in such a way prevent the proper function of the carburettor.
By pumping with the hand pump or by letting the carburettor lie in fresh fuel the oil layer is removed.

To dry a wet magneto

If there is reason to believe that water has penetrated into the magneto, remove the flywheel cover. Water can now be easily removed. If the engine still will not start, the flywheel must be removed and also the magneta plate, both of which can then be dried carefully in a warm atmosphere.

Removal of the flywheel

1. Remove the rope pulley and dynastart belt pulley (if fitted).
2. Remove the flywheel housing.
3. Remove the flywheel nut.
4. Fix the extractor to the flywheel by means of the screws provided. Tighten the extractor screw against the end of the crank shaft.
5. Tap the extractor screw head sharply with a hammer to loosen the flywheel, and remove.

Mounting the flywheel

1. Offer up the flywheel to the crankshaft ensuring that the key enters into its key-way.
2. Tighten the nut by hand using 10" ring spanner or suitable socket wrench, as tight as possible, bolding the flywheel with the other hand.
3. Finally tighten by tapping the end of the spanner with a hammer turning the nut a few degrees at a time.

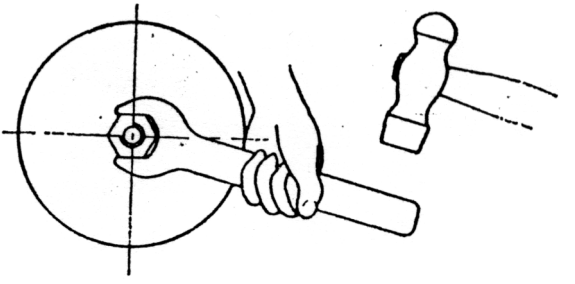

Figure 3. Tigtening of flywheel

The flywheel nut is locked by the rope pulley and should the holes in the pulley not line up with the corresponding holes in the flywheel, the nut must be tightened still further until the pulley bolt holes are lined up with the flywheel holes.

On no account must the nut be loosened to line up the bolt holes.

LAYING UP FOR THE WINTER

This should only be carried out by persons having some degree of mechanical knowledge and skill.

To remove the cylinder

1. Disconnect and remove the exhaust pipe and expansion chamber complete with small water injection pipe.
2. Disconnect and remove starter generator and drive belt.
3. Disconnect water pipe from cylinder and water pump.
4. Remove carburettor.
5. Loosen and remove the cylinder holding down nuts and lift off cylinder.

The carbon in the cylinder and on the piston crown can be carefully scraped off taking care not to scratch or damage the piston or the cylinder bore. Use an aluminium, fibre or plastic scraper. The exhaust port should also be cleaned of carbon. Examine the piston for broken or sticking rings, replacing these if necessary.

To refit the cylinder

1. Ensure faces of cylinder base and top of crankcase are clean and use new joint washer lightly smeared with grease.
2. With exhaust port facing the gearbox, gently lower the cylinder over the piston, ensuring each piston ring engages with its locating peg in the ring groove.
3. Replace and evenly tighten the holding down nuts.
4. Refit carburettor, water pipe, and exhaust pipe with expansion chamber.
5. Refit starter generator. The correct drive belt tension is obtained when slight slip occurs on engine compression stroke when starting electrically.
6. Clean and reset the spark plug.

DECARBONISING THE ENGINE

During the Winter lay up, the engine should be carefully stored. If possible it should be removed from the boat and kept stored in a dry and cool place. The preparations steps are as follows:

1. Remove the carburettor.
2. With the piston in its upper position pour a coffee cup size of oil (Use Shell Ensis oil or equivalent; if unobtainable, use engine oil) into the crankcase.

3. Turn the piston down and tilt the engine so that the oil can flow into the bearings.
4. Turn the piston to its upper position, and pour a spoonful of oil through the spark plug hole.
5. Rotate the crankshaft by means of the flywheel several times, then leave in the half stroke position, so that the ports are closed during the storage period.
6. Replace the spark plug.
7. Clean the outside of the engine and wipe over with oil or grease to prevent rusting.
8. Tape up inlet and exhaust ports to prevent ingress of dampness and dirt.

STARTER GENERATOR

A starter generator can be supplied factory installed. A conversion kit with fitting instructions is available for rope start engines already in service. After the engine has been started, the starter generator will re-charge the battery.
The electrical system comprises the parts shown in picture 4.

B. Battery (25 amp.hour capacity or larger)
G. Starter generator
R. Voltage regulator
T. Instrument panel
C. Charging lamp
S. Key operated switch
F. Fuse box
K. Load switch
L. Load

The load is connected between the terminals (x)
The cross sections of the cables (in the picture the cables are indicated by thin broken lines) should be 2.5 mm^2 (0,39 sq in). The cross section of those indicated with thicker broken lines is 16 mm^2 (2,5 sq in).
Equipment such as lamps, switches, etc. which in the diagrams have been indicated with the letters L and K are not supplied by the makers of the Vire engine, since the demands of customers are individual.
The rest of the equipment belonging to the system, excluding the battery (B) of 12V 25 Ah minimum, is included with the electric start engines. See picture 4.
ATT: Equipment and cables should be mounted to the boat in such a way that damage cannot be caused by damp and vibration, or heat from exhaust.

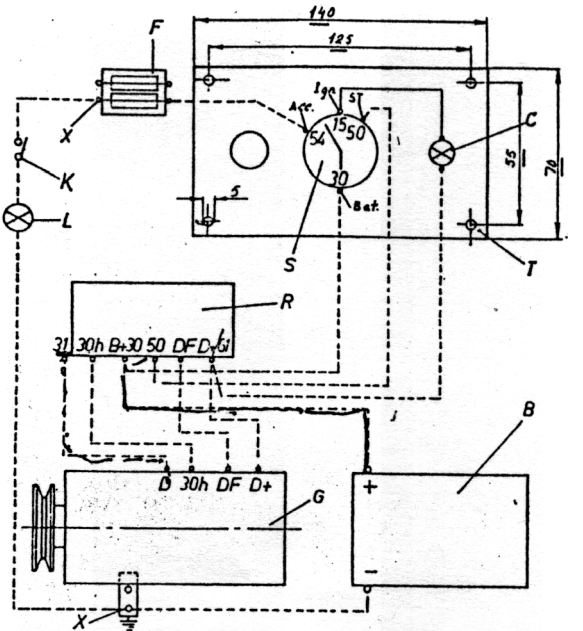

Figure 4. Wiring diagram for generator starter

a) AC-system

b) DC-system

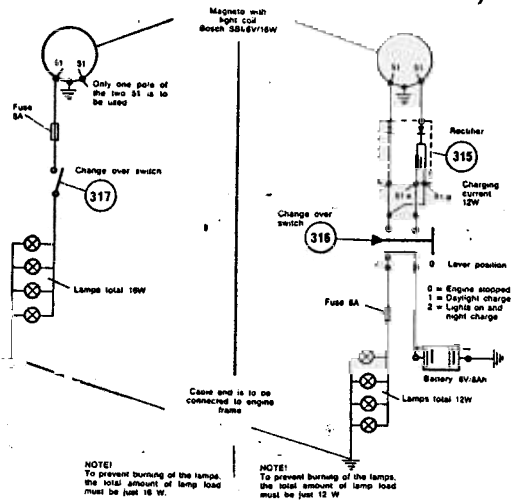

Figure 5

Vire eletric system when using the magneto Light coil

315 Rectifier Bosch LJWJ IZ 20 Z

316 Change over switch Bosch 0 343 008 002

317 Change over switch Marquardt 100 NT