



INSTRUCTION MANUAL  
AND PARTS LIST

for

MK. I SEA WOLF  
SEA OTTER  
MK. I SEA TIGER

WATERMOTA LTD., NEWTON ABBOT, DEVON TQ12 5NF

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## INTRODUCTION

The equipment dealt with in this book, like all Watermota products, is precision built, every part conforming rigidly to a standard of the highest quality. Providing proper care and attention is given to the simple routine maintenance recommended in this book, your Watermota Marine Engine will give long and trouble free service. Keep this book for consultation when needed.

### Engine Data

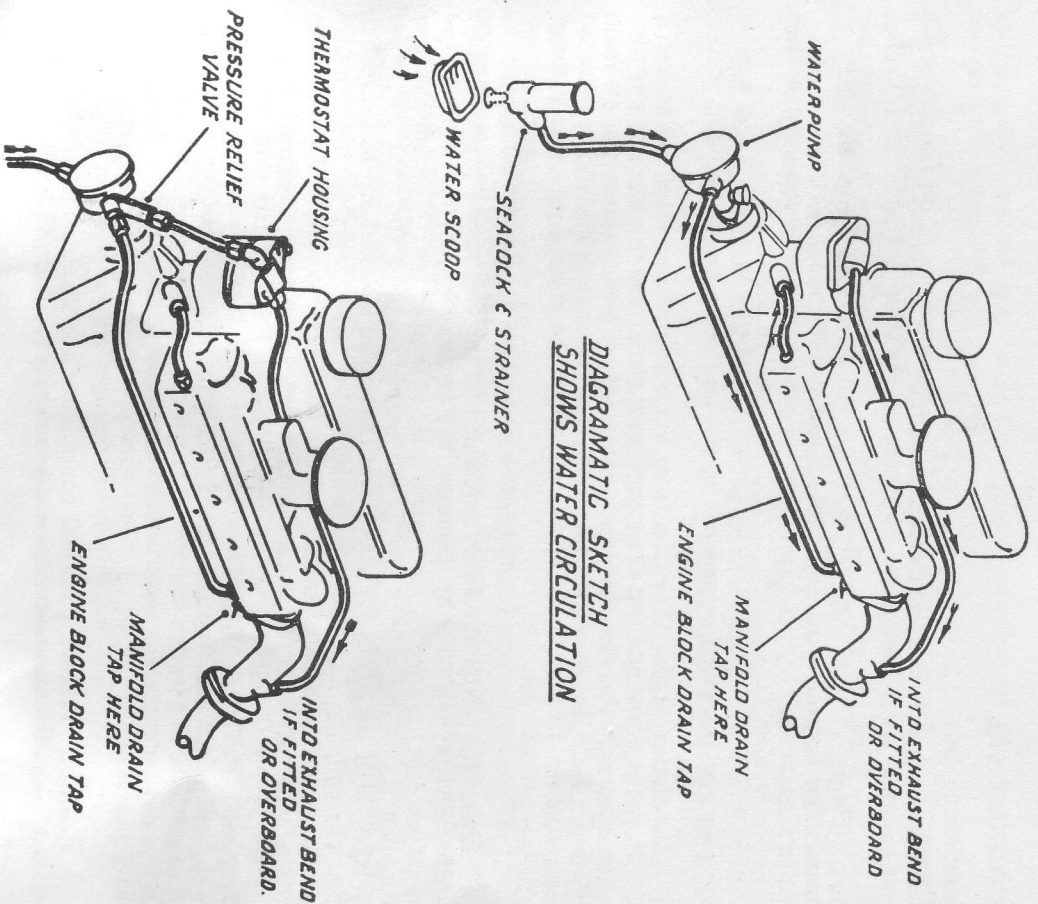
Engine Type .....	Your engine and gearbox are known
Engine No. ....	at this factory by these numbers, fill
Gearbox No. ....	in from your engine and always refer
Hydraulic No. ....	to the number when writing to us.

The Ford ENGINE NUMBER is stamped on the cylinder block above the forward engine bearer to starboard.

The GEARBOX NUMBER is stamped on the gearbox case to port just above the oil level dip-stick.

The data given in this book applies to all three models, viz Sea Wolf, Sea Otter, Sea Tiger.

Please note that the Sea Wolf is based on the Ford 105E engine, the Sea Otter on the Ford 115E engine, the Sea Tiger on the Ford 122E engine.



## ENGINE DATA

Lubricating Oil	.....	S.A.E. 20/30
Grease	.....	Shell Retinax A, BP Energrease C3 Vacuum Mobil Grease No. 4
Spark Plugs	.....	14 m/m Champion No. N5
Spark Plug Gap	.....	23—28 thou.
Valve Clearance	.....	10 thou. inlet, 17 thou. outlet—hot
Contact Breaker Gap	.....	14—16 thou.

## NOTES ON INSTALLATION

**Installation Angle.** The maximum angle of installation of this model is 15° from the horizontal and the engine must not exceed this angle at any time when running, otherwise there is a danger of oil leakage from the aft main bearing. If the design of the boat is such that this angle is likely to be exceeded we recommend fitting a universal joint aft of the reverse gear and a thrust bearing aft of this.

**Lining Up.** It is absolutely essential that the engine and propeller shaft are correctly aligned. Faulty alignment will cause vibration, loss of power and rapid wear or damage to the reverse gear and stern gear. The tailshaft half coupling should be offered up to the engine coupling for final alignment WHEN THE BOAT IS AFLOAT and the engine adjusted on the bearings so that the coupling flanges engage correctly; a feeler gauge not thicker than .002in. should be used to ensure that the flanges are correctly aligned. When the two halves of the coupling are split they should come together without deflection, either sideways or up and down, and should grip three pieces of thin paper or feelers .002in. thick spaced equally around between the flanges when these are held together merely by gripping them equally at opposite sides with the fingers and thumbs. A check on alignment should be made after a few days of running, since further settlement of the engine and boat may have occurred.

**Controls.** Flexible push-pull controls for the throttle and choke are included with the standard engine equipment.

**Remote Reverse Gear Controls.** Do NOT use flimsy rods that will buckle or bend. Use  $\frac{3}{16}$ in. gas barrel for long rods or not less than  $\frac{1}{2}$ in. rod for short connections only. Do NOT use long levers which may drag on the gear shift by reason of their weight and thus cause the reverse brake band to bind in neutral and also impose a constant load on the operating collar inside the gear. The ahead clutch is self-locking when pushed home and on NO account must a constant thrust be imposed on the operating collar otherwise it will heat and wear from undue friction when running in ahead. We can supply

hydraulically operated gear levers for remote mounting on the side of the cockpit and for bulkhead mounting.

**Hydraulic Control.** If a Watermota manufactured and patented hydraulic control is used the following points should be considered when planning the installation:

1. Try and avoid installing the control unit in such a position that people will walk on it, trip over it or allow ropes to become entangled, etc.
2. Avoid a vertical installation of the control unit in the sole of a self-draining cockpit as the unit will be continually submerged in sea water.
3. If possible install the control unit inside the sail locker or suitable inside space to give some protection from the weather, and be certain that the three adjusting screws are easily accessible. Remember that the unit works equally well in any position, vertical, horizontal or up-side down.

**Instrument Panel.** A small panel with combined ignition and start key, oil pressure warning light and ammeter is supplied as standard with each engine.

**Special Instrument Panel.** An alternative panel can be supplied in lieu of the standard at extra cost. This includes an oil gauge, temperature gauge, rev. counter, ignition switch with 2 keys, ammeter and ignition warning light. This panel is recommended for auxiliary installations.

**Oil Gauge.** This is not really necessary and is only supplied with the special panel. To connect to engine remove the oil pressure warning light unit screwed into crankcase forward of the distributor on the starboard side and substitute sender supplied with oil gauge.

**Ignition.** The standard engine has full electrical equipment with coil ignition and distributor (wiring diagrams pages 7 and 8). We can supply a vertical type magneto which replaces the distributor coil.

**Raised Hand Starting.** This is not fitted as standard but can be fitted at extra cost.

**Cooling Water.** Should a 2-way cock be fitted to divert the water used to cool the exhaust, make quite certain that the cock cannot restrict the flow of water in any position or a cracked cylinder may result. If a water injector silencer is used in the exhaust system make certain that the silencer is given sufficient fall to ensure that the outlet is below the level of the water injection point, to prevent the possibility of the silencer filling with water and draining back to the engine, or causing severe back pressure in the exhaust system.

## FUEL SYSTEM

The engine is equipped with a fuel lift pump as standard and it is recommended that the fuel tank be installed at a lower level than the float chamber of the carburettor. If this is not possible the firm or person carrying out the installation should contact Watermota for advice.

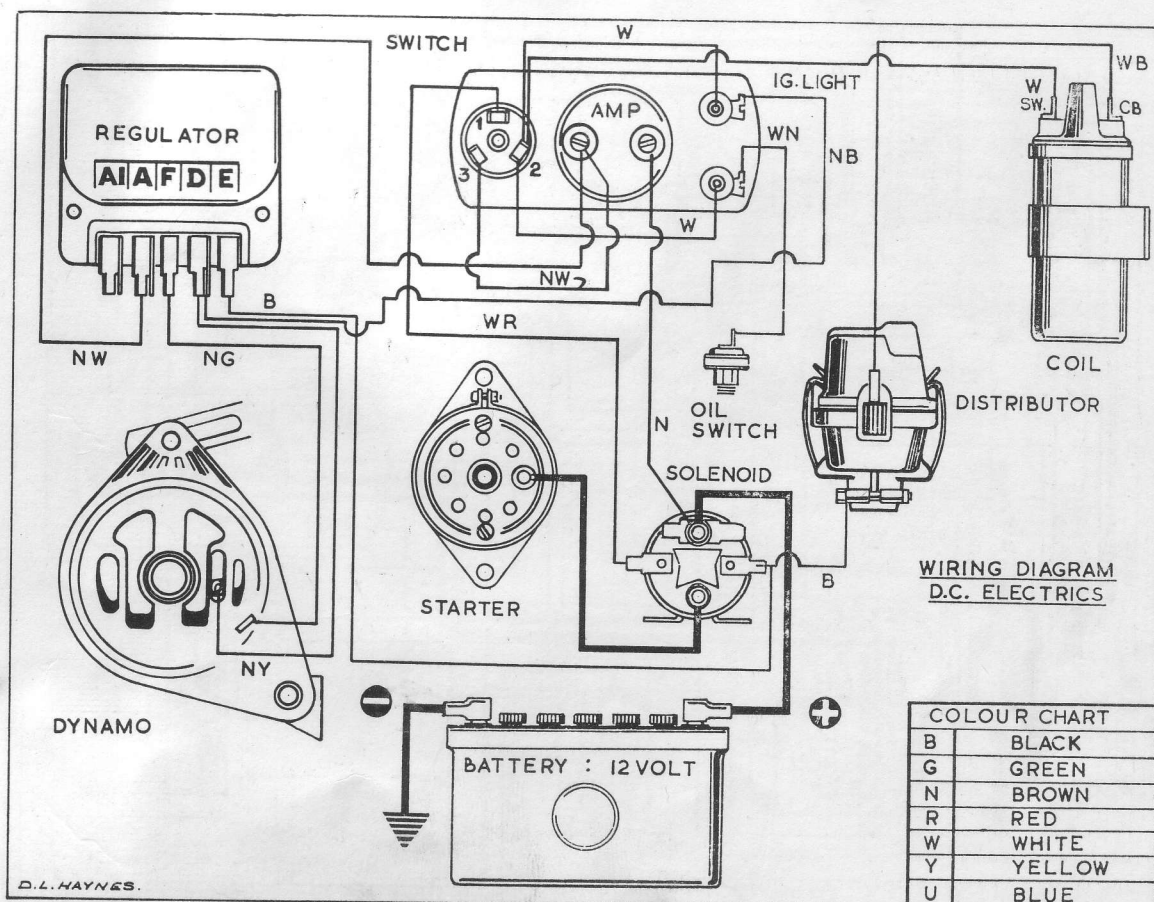
### Starting and Running Instructions

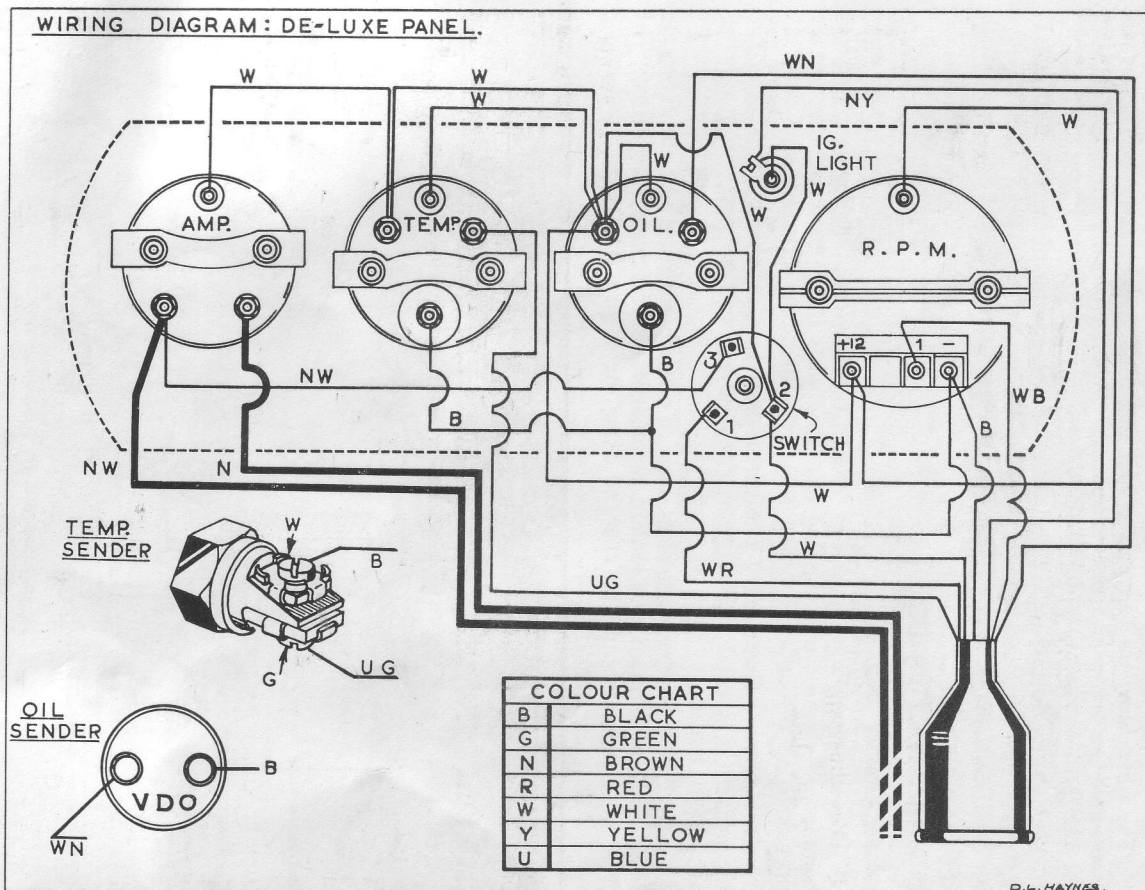
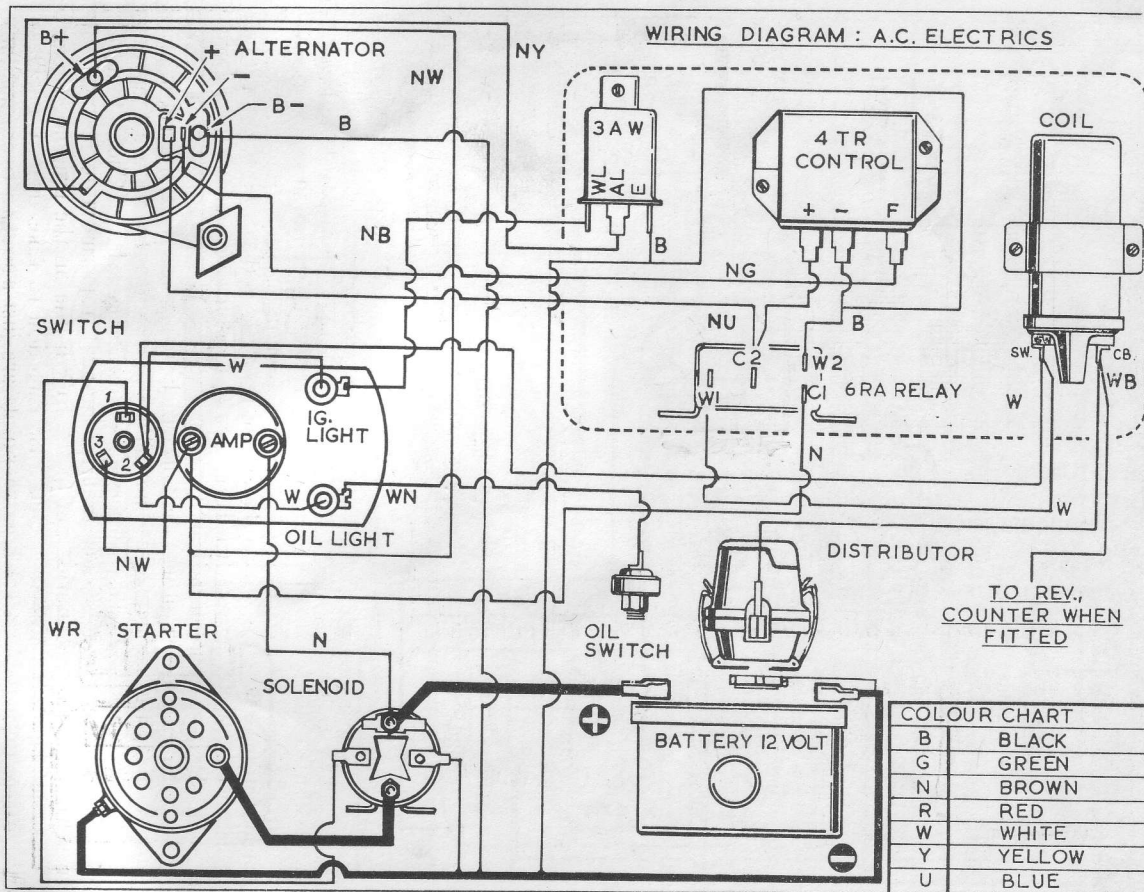
1. Fill engine sump by pouring approx.  $4\frac{1}{2}$  pints for Sea Wolf and Otter,  $5\frac{1}{2}$  pints for Sea Tiger of high grade oil through filler which is mounted on top forward end of the engine. Use one of the following grades: B.P. ENERGOL SAE 30, CASTROL XL, VACUUM MOBIL OIL A, SHELL X100 30, ESSOLUBE 30. Keep to "FULL" mark on dip-stick.
2. Fill gearbox as outlined in Supplement.
3. Pour petrol into petrol tank and operate hand priming lever on the petrol pump in order to fill float chamber of carburettor.
4. See that the throttle is closed.
5. Check that seacock is open.
6. Pull choke out as far as it will come. In warm weather the intermediate stop may be used.
7. Ensure gearbox is in neutral.
8. Switch on ignition and press starter button. The engine should fire and continue to run. Release button when engine fires. Do not open throttle when starting as this makes choke inoperative.
9. Release the choke control as soon as engine shows signs of erratic running caused by rich mixture. This should be done gradually so that the transfer from the special starting device is made smoothly and without danger of stalling the engine.
10. When the engine is warm, engage ahead or astern by pushing forward or pulling backwards reverse gear lever. Do this gently so as to avoid stalling engine and open throttle enough to compensate for extra load on engine.

### MAINTENANCE AND ADJUSTMENTS

See that oil level is maintained in the engine sump and reverse gear; also reduction drive, if fitted. See Gearbox Supplement, page 2. Drain the engine sump with special sump pump regularly every 50 hours running and refill with one of the recommended grades of oil. It is recommended to do this after 20 hours running when the engine is new. Change filter element once per season.

**Keep grease cup on water pump filled with good yellow grease.** Screw down a turn or so before starting up and every few hours during a run. On NO account should hard grease for motor car water pumps be used. Check water drain hole on pump does not become blocked with surplus grease.





The dynamo bearing at the aft end should be lubricated with a few drops of engine oil once or twice per season.

The filter bowl on top of the fuel pump should be removed once per season and the pump and screen cleaned. When replacing the screen ensure that the reinforcement is upwards.

If raised hand starting is fitted, screw down greaser in front end of crankshaft and oil overhead spindle bearing before starting up. Check valve clearance once per season. These are 0.010in. inlet and 0.017in. outlet with engine warm.

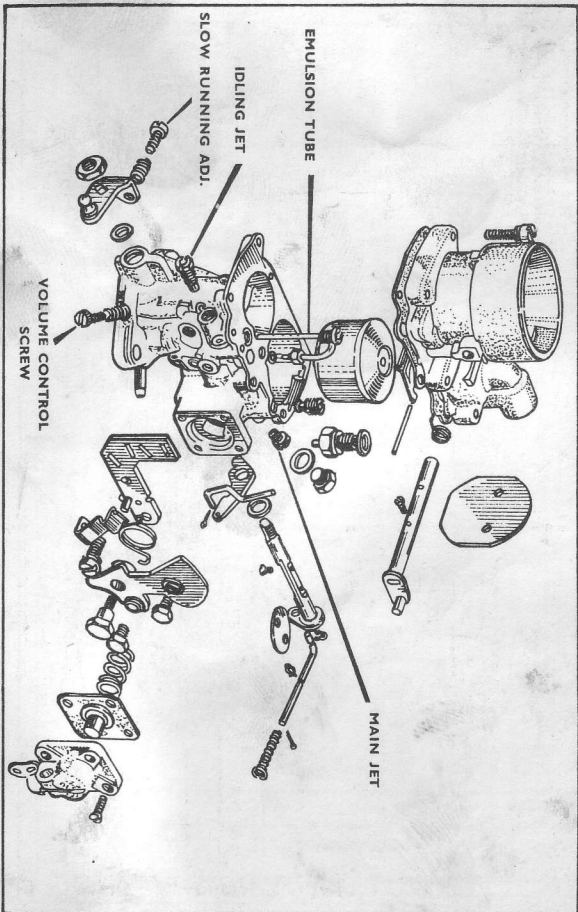
### ENGINE FAULT FINDING

#### Jammed Starter Dog

The symptom is that starter motor turns without engaging. Remove grommet on dome enclosing dog and free with sharp blow on dog in an anti-clockwise direction (looking aft) with drift or screwdriver.

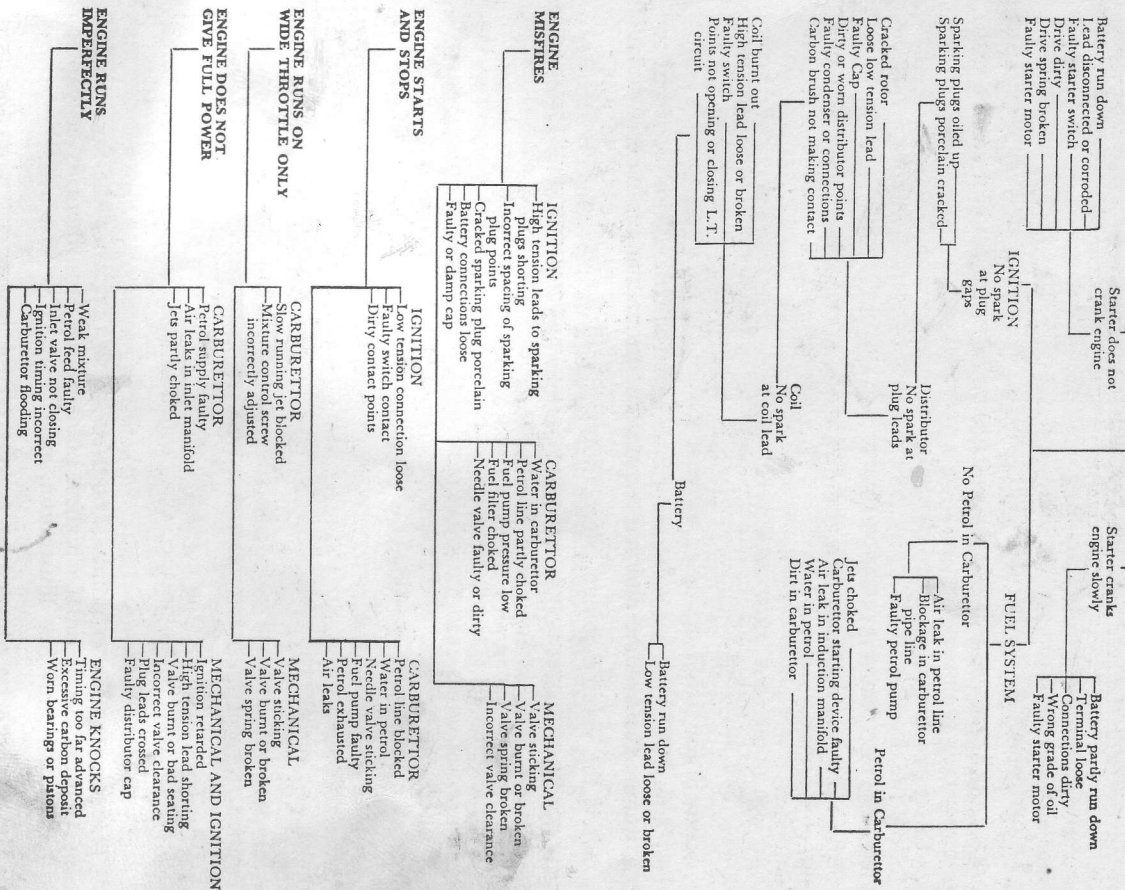
**Carburettor Adjustment.** The carburettor is of a downdraught type and incorporates a special two-stage starting device on the port side of the carburettor body.

All adjustments are made at the time of manufacture and with the exception of the idling adjustment, will remain permanently correct unless disturbed. The idling adjustment should be checked after the engine has been "run-in."



### ENGINE FAULT FINDING CHART

ENGINE WILL NOT START



Reproduced by courtesy of Ford Motor Company Ltd.

All petrol jets are accessible from the outside of the carburettor and they should be removed and cleaned periodically. Obstructions should be cleared by blowing through the jets and passages with a tyre pump. See illustration.

On no account use wire or anything which could enlarge the jet orifices, as the jets are calibrated to very fine limits and not only economy but also general engine performance can be upset by enlarging the jets in this manner.

The special starting device on the side of the main body must be used with care, as it is designed to provide a very rich mixture for cold starting, when the choke control is pulled right out. Great care must therefore be taken to follow the starting instructions, otherwise excess petrol will pass into the engine and may cause premature engine wear.

The only adjustments required are to the volume control screw and slow running adjustment screw.

Idling adjustment must be carried out when the engine is warm, as follows. See illustration.

Screw in the slow running adjustment screw until the idling speed is a little faster than normal.

Unscrew the volume control screw until the engine begins to "hunt."

Screw the volume control screw in again until the engine runs evenly. If the engine speed is then too high, unscrew the slow running screw until a reasonably slow idling speed is obtained.

This may cause a slight resumption of "hunting." If so, screw in the volume control screw until the idling is perfect. Note that the volume control screw alters the volume of mixture passing into the engine. Screwing it in reduces the volume of mixture and screwing it out increases the volume.

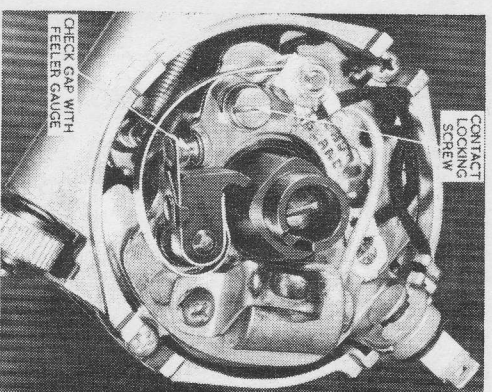
It may also be necessary to make an alteration to the distributor timing, in order to obtain satisfactory idling. See illustration, page 13. This can be done by the vernier adjusting screw on the side of the distributor.

Do not expect a new engine to idle perfectly at low speeds until various machined surfaces have had a chance to "run themselves in."

**Distributor.** Check the contact breaker points gap and adjust to compensate for wear on the breaker arm, which is sometimes indicated by misfiring at low speeds.

The contact breaker points should be set so that when the fibre arm of the moving contact is on the highest point of the cam, there is a gap of 0.014in. to 0.016in. See illustration, page 13.

This gap can be adjusted by moving off the locking screw on the fixed contact point and moving the contact point until the gap is within the above



**Ignition Timing.** Badly burnt points are often an indication of a faulty condenser or oil on the points. Plug type Champion N5 14 m/m. Gap 23 to 28 thou. is used.

Ignition timing can be checked and corrected if necessary by an Authorised Ford Dealer.

Firing order is 1 2 4 3.

Remember that if the distributor has been removed from the engine for any reason it is essential that it is refitted in its original position. However, if circumstances prevent your having the ignition timing checked by a Dealer proceed in the following manner:

Remove No. 1 cylinder spark plug, partially cover the orifice with the thumb and rotate the engine until No. 1 piston is on the compression stroke. You will feel the air pressure on your thumb increase as the piston rises on compression stroke, and stop rotating the engine when the notch on the rim of the crankshaft pulley and the pointer on the timing chain cover are in line. Before refitting the distributor to the engine hold the body so that the vacuum control unit spindle is parallel to the engine and set the rotor metal contact in line with the low tension terminal.

Now refit the distributor, when it will be observed that the rotor arm rotates towards the condenser as the helical gears engage. Secure the body clamp to the block by means of the screw and lockwasher. Check that the advance adjustment nut is such that the manual adjustment scale is at the zero setting, i.e. set the knurled nut to the fourth line on the graduated scale. Rotate the distributor in a clockwise direction to take up any backlash in the drive, until the contact breaker points are just about to open and lock the distributor body clamp by tightening the nuts and bolts.

limits. The fixed contact point can be moved by inserting a screwdriver blade in the recess provided and twisting slightly.

Tighten the lock screw securely and recheck the gap, as it may have altered slightly when tightening up the screw.

If the contact points are worn, pitted or badly burnt, they should be dressed flat with an oilstone.

Periodically release the two spring clips and remove the distributor cap and rotor. Apply one or two drops of engine oil on the cam retaining screw to lubricate the distributor shaft bearings. Apply a thin film of petroleum jelly to the contact breaker cam. See illustration.

To check that the distributor has been correctly refitted, when replacing the cap ascertain that the rotor arm is facing No. 1 cylinder contact in the cap.

**Instructions for Draining Engine Sump.** This is most conveniently drained by means of a sump pump. We make a special pump which can be supplied to order. To use the pump, first draw out the dip-stick which fits into a copper tube connected to the sump drain plug, then slip the rubber tube over the end of this tube and operate the pump, at the same time collecting the oil in a suitable receptacle.

**Battery.** Ensure that the level of electrolyte is kept topped up with distilled water and wipe outside occasionally with an ammonia moistened rag to counteract acid. Coat terminals with petroleum jelly.

## OVERHAULS AND SERVICE

The power unit of this Watermota Marine Engine is a Ford Industrial Unit and is best serviced by an Authorised Ford Agent from whom all engine spares are readily obtainable, including Exchange Engine Unit and reconditioned items such as Distributors, Carburettor, Petrol Pump, Dynamo and Starter.

The Marine Reverse Gear, water pump and all marine equipment as listed in our Spare Parts List are of our own manufacture and are only serviced by us or our own Agents.

Reconditioned Reverse Gears and water pumps are obtainable from us and if the old assemblies are returned at the time of order will be supplied on the exchange plan. Spare parts are stocked for immediate despatch and under normal conditions will be sent by return of post.

When ordering spare parts it will greatly assist us to give prompt service if the Plate No., Part No. and description of the part are quoted, but always be sure to include the prefix letter of the Plate No. Send sufficient cash with order to cover postage or carriage if you do not have an approved ledger account.

Goods cannot always be sent Cash on Delivery as the Railway will not accept such traffic.

A pro-forma invoice will otherwise be sent.

## LAYING UP

The engine should be drained of all cooling water by releasing unions as necessary; retighten or reconnect unions after draining. Prior flushing with fresh water is advantageous. Where practical remove electric equipment, clean and place in a dry storage place.

Wash the exterior of the engine down to remove salt.

Use the engine with Redex or similar additive in the petrol for its final run. Remove the sparking plugs and pour a small quantity of Redex on to each piston and crank the engine over. After completing the last run, it is a good opportunity for changing the engine oil; a sump pump should be used as outlined above.

All parts which appear liable to rust should be oiled or greased to give added protection.

The battery should be removed and stored in a fully charged condition. Turn engine over approximately once per month.

## MAINTENANCE ROUTINE SUMMARY

### 1. Each Time of Using, check:

- Petrol level.
- Oil levels. For details see page 6 for engine; page 6 for gearbox.
- Adequate cooling water flow.
- Screw pump, stern gear and raised hand start greaser (if fitted) one turn approx.
- Oil raised hand start top bearing (if fitted).

### 2. After First 20 Hours Running

- Drain engine and gearbox oil. For details see page 14 for engine; for gearbox see Supplement.
- Check alignment. See page 6 for details.
- Check security of all nuts and bolts.
- Adjust slow running. See page 12 for details.
- Check for water or oil leaks.
- Check level of electrolyte in battery.
- Adjust gearbox. See page 6 for details.

### 3. Every 50 Hours Running

- Clear seacock filter.
- Clear condensation and sediment in filter at base of petrol tank or in petrol line.
- Oil distributor. For details see page 13.
- Oil generator bearing. For details see page 10.
- Wipe down battery and check electrolyte level.
- Adjust gearbox if necessary.

### 4. Once per season

- Check valve clearance. For details see page 4.
- Change engine and gearbox oil. For details see page 6.
- Change engine filter element.
- Clear petrol pump filter. For details see page 6.
- Clear petrol jets. For details see page 10.
- Set idling adjustment. For details see page 12.
- Set timing adjustment. For details see page 13.
- Set distributor gap.
- Check plugs. For details see page 13.

ATTENTION TO THE ABOVE ROUTINES WILL ENSURE THE RELIABLE STARTING AND QUIET RUNNING FOR WHICH YOUR UNIT IS JUSTLY RENOWNED.



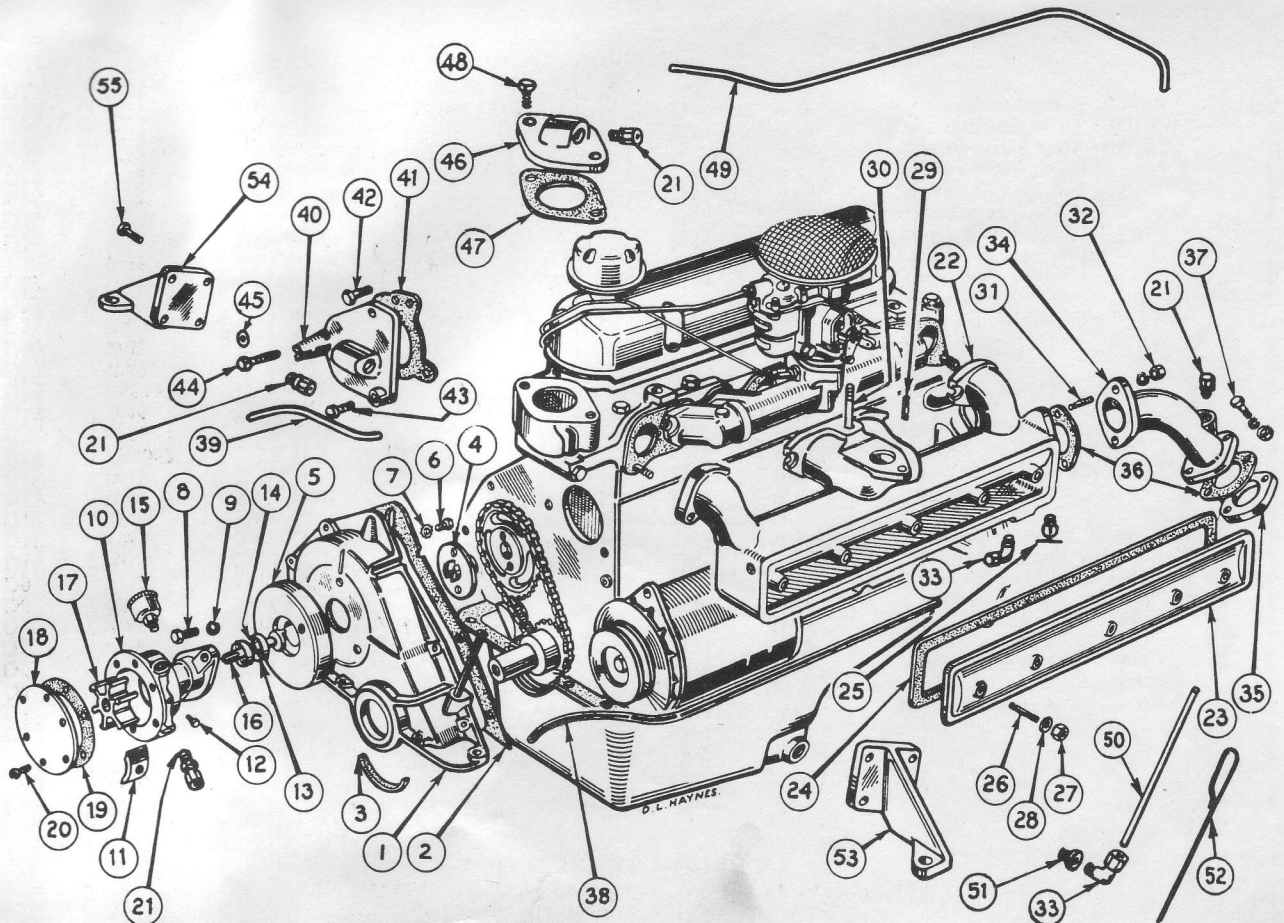
**SPARE PARTS LIST FOR  
WATER PUMP FITTINGS AND EXHAUST MAINFOLD**

Plate No.	Part No.	Description of Part	Quantity	Plate No.	Part No.	Description of Part	Quantity
WA1	FS9506R	Timing cover	1	WA30	FS62588	Stud long	1
WA2	FJ0206	Joint for timing cover	1	WA31	W15	Stud, manifold to flange, bend or block	6
WA3	FJ12E	Packing, front cover to sump	1	WA32	5/16W	Nut for stud	6
WA4	W1	Pump drive flange	1	WA33	W16	Elbow union body, inlet to manifold	2
WA5	W2	Adaptor, pump to timing cover	1	WA34	W17	Exhaust outlet bend	1
WA6	FS42302	Set screw, adaptor to cover	3	WA35	FD41B	Exhaust outlet flange, brazing	1
WA7	FS54843	Shakeproof washer	1	WA36	FD41J	Joints for bend and flange	2
*	W3	Water pump assembly	1	WA37	P102AL	Bolt for flange to bend	2
*	W4	Water pump assembly, reconditioned	1	*	W13C	Exhaust manifold assembly (less bend)	1
WA8	FD422G	Set screw, pump to adaptor	2	WA38	W18	Water pipe, pump to manifold	1
WA9	5W	Spring washer	16	WA39	W19	Water pipe, manifold to block	1
WA10	W5	Water pump body	1	WA40	W20	Flange, water inlet to block	1
WA11	W6	Crescent cam for body	1	WA41	FJ7058	Joint for flange	1
WA12	W6A	Screw for cam	1	WA42	J24A	Set screw, flange to block—short	1
WA13	W7	Grease seal for body	2	WA43	FS42402	Set screw, flange to block—medium	1
WA14	W8	O seal for body	1	WA44	FS44302	Set screw, flange to block—long	1
WA15	W22C	Grease lubricator for pump	1	WA45	W28	Plain washer	1
WA16	W9	Drive spindle for water pump	1	WA46	W22	Flange, water outlet from cylinder head	1
WA17	W10	Impeller with screw pin	1	WA47	FJ5528	Joint for flange	1
WA18	W11	Cover plate for body	1	WA48	FS66302	Screw for flange	1
WA19	W11J	Joint for cover plate	1	WA49	W23	Water pipe, cylinder head to exhaust bend	1
WA20	W11A	Screw for cover plate	6	WA50	W24	Sump drain pipe	1
WA21	W12	Water union bodies assembly	6	WA51	W25	Sump plug	1
*	W21	Timing cover and water pump assembly	1	WA52	FD2576R	Dip-stick, sump oil level	1
WA22	W13	Exhaust manifold, bare	1	*	FJ47IE	Kit, gaskets for pump	1
WA23	W13A	Cover plate for exhaust manifold jacket	1	WA53	W26	Engine bearer, port	1
WA24	W13J	Joint for cover plate	1	WA54	W27	Engine bearer, starboard	1
WA25	W13T	Drain tap	1	WA55	74B	Bolts for engine bearers	8
WA26	W13S	Stud for manifold to cover plate	5	*	FJ371E	Kit, engine decarbonising gaskets	1
WA27	5/16SLW	Nut for stud, self-locking	5	*	FJ8006	Kit, engine overhaul gaskets	1
WA28	S34B	Fibre washer for nut	5				
WA29	W14	Stud, exhaust manifold to induction	1				

\* Not illustrated

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### ELECTRICAL PARTS LIST

Plate No.	Part No.	Description of Part	Quantity	Plate No.	Part No.	Description of Part	Quantity
D1	W40	Adaptor gearbox	1	D32	W60	Ignition switch	1
D2	W41	Bolts $\frac{3}{8}$ in. $\times$ $1\frac{1}{2}$ in.	4	D33	W61	Solencid	1
D3	3/8F	Nut	4	D34	W62	Throttle control	1
D4	6W	Spring washer	4	D35	81/002	Ball joint assembly	1
D5	W42	Bolt $\frac{3}{8}$ in. $\times$ $1\frac{1}{2}$ in.	2	D36	W63	Choke control	1
D6	W28	Screw $\frac{1}{4}$ in. $\times$ $\frac{3}{4}$ in.	3	D37	W64	Starter motor	1
D7	W43	Nut $\frac{1}{4}$ in. Whitworth	3	D38	W65	Battery with cables, etc.	1
D8	4W	Washer $\frac{1}{4}$ in.	3	D39	W66	Cranking handle	1
D9	FD23	Oil seal	1	D40	W67	Forward bracket raised hand start	1
D10	601A	Studs	4	D41	W67B	Forward bracket bush	1
D11	6W	Spring washer	4	D42	W67S	Forward bracket bush screw	1
D12	$\frac{3}{8}$ F	Nuts	4	D43	W68	Shaft $\frac{3}{8}$ in. m/s	1
D13	W44	Stub shaft	1	D44	W69	Top sprocket	1
D14	W45	Bolts	4	D45	W70	Transax pin for sprocket	1
D15	FS9067	Lock tab	1	D46	W71	Circlip for shaft/handle	2
D16	413E	Stub shaft key	2	D47	W72	Handle assembly	1
D17	W46	Dynamo	1	D48	W73	Drive pin	1
D18	FS013101	Dynamo pulley	1	D49	W74	Sprocket freewheel	1
D19	W47	Dynamo belt	1	D50	W75	Pawl	3
D20	W48	Regulator	1	D51	W76	Pawl pin	3
D21	W49	Coil	1	D52	W77	Stop pin (transax)	3
D22	W50	Plugs	4	D53	W78	Starter plate	1
D23	W51	Contact set	1	D54	W79	Bush	1
	W52A	Instrument panel assembly	1		W80	Assembly free clutch	1
D24	W52	Instrument panel	1	D55	W81	Shaft adaptor	1
D25	W53	Ammeter	1	D56	422C	Lubricator	1
D26	W54	Ignition switch	1	D57	W82	Chain with spring link	1
D27	W55	Oil warning light	1	D58	W83	Spring link only	1
D28	W56	Larger panel assembly	1		W84	Raised hand start assembly	1
D29	W57	Oil gauge	1	D59	W85	Air cleaner	1
D30	W58	Pipe, 6ft. for oil gauge	1	D60	W86	Air cleaner clip	1
D31	W59	Connection for oil gauge	1	D61	W87	Fuel pump	1

