PETTER DIESELS

PH OPERATORS HANDBOOK

Publication No. 355764 Issue 19

OPERATION

Preparing to start a new or overhauled engine

Fill the sump with lubricating oil to the high level mark on the dipstick. If an oil-bath air cleaner is fitted, fill the bowl to the level indicated. If a clutch (Ref. HJG73) is fitted, pour 300 ml into the housing. Lubricate the control linkages.

Lift the decompressor levers (A) and crank the engine fifteen revolutions to help circulate the oil.

Fill the fuel tank and bleed the fuel system.

ALWAYS ENSURE FUEL AND OIL CONTAINERS, FUNNELS, ETC. ARE CLEAN BEFORE USE.

To bleed the fuel system

Loosen the two vent screws (B) on the fuel filter and tighten when bubble-free fuel leaks

FONCTIONNEMENT

Préparation d'un moteur neuf ou révisé pour la mise en marche

Remplir le carter d'huile de graissage jusqu'au repère supérieur sur la jauge d'huile. Si un filtre à air à bain d'huile est installé, remplir la cuve jusqu'au niveau indiqué. Si un embrayage (HJG73) est installé, verser 300 ml dans le carter. Graisser les tringles de commande.

Soulever les leviers de décompression (A) et faire tourner le moteur quinze fois pour aider à faire circuler l'huile.

Remplir le réservoir à carburant et purger le circuit d'alimentation en carburant.

VEILLER TOUJOURS A CE QUE LES RECIPIENTS, ENTONNOIRS, ETC., EMPLOYES POUR LE CARBURANT ET L'HUILE SOIENT PROPRES AVANT USAGE.

FUNCIONAMIENTO

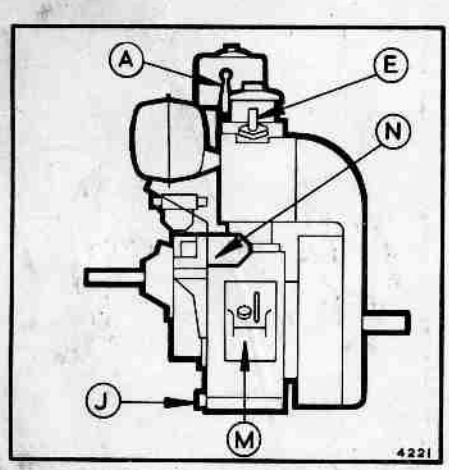
Preparación de un motor nuevo o reacondicionado para la puesta en marcha

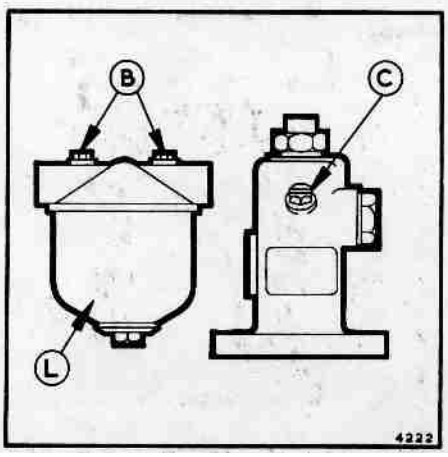
Llenar el cárter de aceite de lubricación hasta el nivel alto marcado en la varilla indicadora. Si hay instalado filtro de aire con baño de aceite, llenar el recipiente hasta el nivel indicado. Si hay instalado embrague (HJG73), echar 300 ml en el cárter del embrague. Lubricar las articulaciones del varillaje de mando.

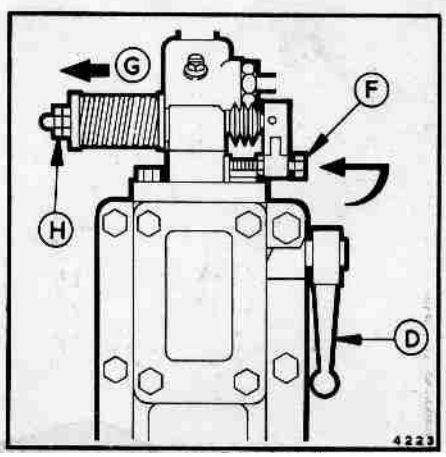
Levantar las palancas del descompresor (A) y hacer girar el motor quince vueltas para que circule el aceite.

Llenar el depósito del combustible y purgar este sistema.

ANTES DE USAR ENVASES DE COMBUSTIBLE Y ACEITE, EMBUDOS, ETC., CERCIORARSE DE QUE ESTAN LIMPIOS.







FUNZIONAMENTO

Preparativi per l'avviamento di un motore nuovo o revisionato

Riempire la coppa di olio lubrificante sino al contrassegno d'alto livello sulla stecca. Se è previsto un filtro d'aria in bagno d'olio, riempire la coppa sino al livello indicato. Se è prevista una frizione (HJG73), versare 300 ml nella sede. Lubrificare i leveraggi di comando.

Sollevare le leve di decompressione (A) e impartire a mano quindici giri al motore per facilitare la circolazione dell'olio.

Riempire il serbatoio di combustibile e spurgare l'impianto d'alimentazione.

ACCERTARSI SEMPRE CHE I CONTENITORI COMBUSTIBILE ED OLIO, IMBUTI, ECC. SIANO PULITI PRIMA DELL'USO.

BEDIENUNGSANLEITUNG

Vorbereitung zum Anlassen eines neuen oder überholten Motors

Den Sumpf bis zur Hochstandsmarke des Peilstabs mit Schmieröl auffüllen. Falls ein Ölbad-Luftreiniger vorhanden ist, den Topf bis zur angedeuteten Höhe auffüllen. Falls eine Kupplung (HJG73) vorhanden ist, 300 ml in das Gehäuse gießen. Regelstangen schmieren.

Die Dekompressorhebel (A) anheben, und den Motor fünfzehnmal durchdrehen, damit das Öl umlaufen kann.

Den Kraftstofftank füllen, und die Luft aus dem Kraftstofftank ablassen.

STETS DARAUF ACHTEN, DASS KRAFTSTOFF- UND ÖLBEHÄLTER, TRICHTER USW. BEI INBETRIEBNAHME SAUBER SIND.

BEDIENING

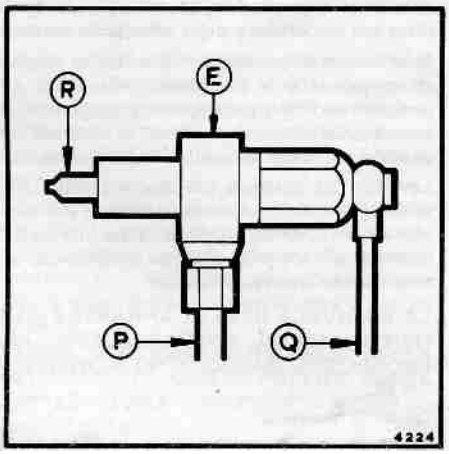
Voor het starten gereedmaken van een nieuwe of gerevideerde motor

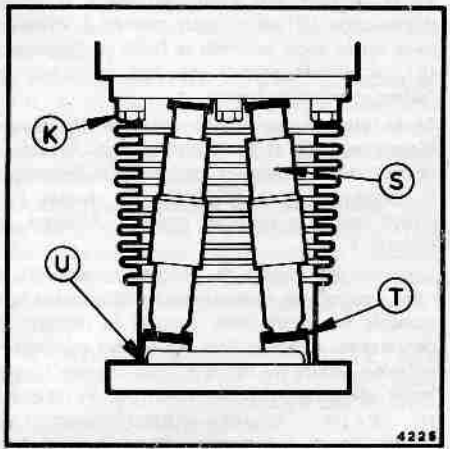
Het carter met smeerolie vullen tot aan de bovenste streep op de oliepeilstok. Als een oliebad-luchtfilter is aangebracht, de kom tot het aangegeven niveau vullen. Indien een koppeling (HJG73) is aangebouwd 300 ml in het huis gieten. Smeer de scharnierpunten van de bedieningsstangen.

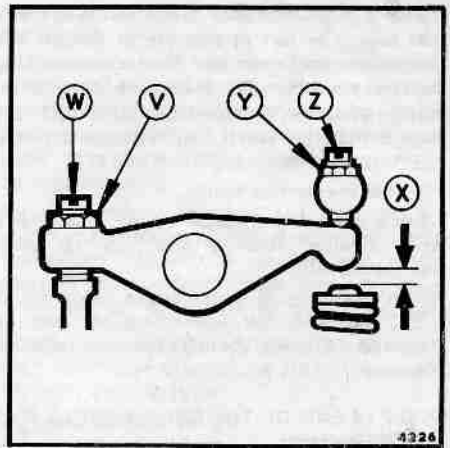
De decompressor hefbomen (A) omhoog trekken en de motor vijftien maal draaien om de oliecirculatie aan de gang te krijgen.

Brandstoftank vullen en het brandstofsysteem ontluchten.

ZORG ER ALTIJD VOOR DAT BRANDSTOF- EN OLIEBUSSEN, TRECHTERS, ENZ. VOOR HET GEBRUIK GEREINIGD ZIJN.







out. Loosen the vent screw (C) on each injection pump and tighten when bubble-free fuel leaks out. Operate each injection pump priming lever (D) until the injector (E) is heard to operate.

To start the engine

Check that the air cleaner, fan inlet and all ventilation openings are clear of obstruction. Make sure that all guards are in position.

Top up with lubricating oil and fuel and if possible remove the load from the engine. Lift the overload stop control (F) (painted red) and if applicable set the speed control to full speed (G).

If the engine is cold – operate each injection pump priming lever (D) and when the injector (E) is heard to operate give a further six strokes and leave the levers down.

If the engine is hot – raise the priming and decompressor levers (D & A) to the vertical position and slowly crank the engine for fifteen revolutions to expel hot air before starting. Lower the levers.

Raise the decompressor levers (A) and crank the engine as fast as possible or operate the starter motor. Lower one lever while cranking fast and the other when the engine fires.

THE STARTING HANDLE SHOULD BE HELD FIRMLY WITH THE THUMB ON TOP OF THE GRIP AND NOT ROUND IT.

Remove the starting handle.

With a new or overhauled engine, stop after a few minutes running and top up with lubricating oil.

When operating in temperatures below about –5°C an SAE 5W lubricating oil may be required. A cold starting aid may also be required.

KEEP CLEAR OF THE ENGINE WHILE IT IS IN OPERATION.

To stop the engine

If possible, run on light load for a few minutes and then either raise the injection pump priming levers (D) or move the fuel pump rack (H) to the right until the engine stops.

DO NOT SHUT OFF THE FUEL SUPPLY OR USE THE DECOMPRESSOR LEVERS TO STOP ENGINE.

Starting and running problems

If the engine fails to start after successive attempts, check for:

- Excessive drag caused by incorrect grade of lubricating oil.
- Lack of compression*.
- Faulty fuel supply**.

If the engine lacks power, surges, overheats or stops, check for:

- Overheating*** and/or seizure.
- Choked air cleaner or faulty fuel supply**.
- Lack of compression*.

If the engine suffers from heavy vibration or knocking, check for:

- Overheating***.
- Excessive bearing, piston ring or cylinder bore wear, sticking valves, insufficient bumping clearance, excessive carbon deposit or incorrect timing.
- Misalignment, loose coupling or mounting bolts, or unstable mounting framework.

* Caused by valves leaking or incorrectly set, leaking cylinder head gasket or injector seating, or excessive piston ring and cylinder bore wear.

** Caused by air or water in the fuel supply, blocked fuel tank cap vent, faulty injector or pump, or incorrect timing.

*** Caused by lack of ventilation, too much load, lack of engine oil, excessive wear, or choked exhaust.

ROUTINE MAINTENANCE

Under very dusty conditions or when the engine is run on light loads for long periods, servicing may be required more frequently.

After the first 20 hours

Drain and refill the sump (J).

Check the tightness of all nuts and bolts when the engine is cold. Use a torque spanner where applicable (K).

Check the valve and decompressor settings.

Clean the fuel filter bowl (L) and bleed the system.

Every 50 hours

Clean and check the air cleaner.

Every 250 hours

Drain and flush the sump (J).

Wash oil pump strainer (accessible through the crankcase inspection cover (M)) and refill the sump (J).

If an oil filter (N) is fitted, change the element.

Clean carbon from the exhaust system.

Clean the fuel filter bowl (L), the vent hole in the fuel tank cap and bleed the fuel system.

Clean and test the fuel injector (E).

Check the tightness of all nuts and bolts when the engine is cold. Use a torque spanner where applicable (K).

Check the valve and decompressor settings.

Lubricate the control linkages.

Check, clean and lubricate the handle starting equipment.

Every 500 hours

Change the fuel filter element and paper air-cleaner element.

Every 2000 hours

Wash out the fuel tank.

Decarbonise and fit a new cylinder head gasket.

Depending on how the engine has been used and maintained it may be necessary to check the large end and main bearings and the piston rings.

To adjust the valve clearances

With the engine cold and the valves closed, loosen the locknut (V) and turn the rocker adjusting screw (W) to set the gap (X) to 0.1 mm. Tighten the locknut and re-check the gap.

To set the decompressor, move the lever to the vertical position, loosen the locknut (Y) and turn the adjusting screw (Z) until it just touches the exhaust valve rocker. Screw down another half turn and tighten the locknut.

GENERAL MAINTENANCE

To test the fuel injector

Absolute cleanliness is essential when handling injection equipment.

Disconnect the pipe fittings (P & Q) at the injector (E), remove the flange nuts and carefully lever the injector out of its cooling sleeve.

Reconnect the high pressure fuel pipe (P) and point the injector nozzle (R) away from both the engine and the operator. The exterior of the injector can be cleaned with a brass wire brush and the spray holes cleared of soft carbon with the pricker supplied.

Operate the injection pump priming lever (D) and check that three fine mist sprays are ejected from the nozzle (R) and stop suddenly. If the nozzle does not spray, emits squirts of fuel or dribbles, change the injector.

THE SPRAY IS EMITTED WITH CONSIDERABLE FORCE AND MUST NOT BE DIRECTED AT ANY EXPOSED PART OF THE BODY, AS IT WILL PENETRATE THE SKIN.

Replace the injector and loosely fit the flange nuts. Fit the high pressure fuel pipe (P) and tighten the union nut finger tight plus one third of a turn with a spanner. Tighten the injector flange nuts evenly and reconnect the leak-off pipe (Q).

Decarbonising

Remove and store all components in sequence so that they can be refitted in their original location.

Remove the cylinder cowling, the inlet and exhaust manifolds and disconnect the oil and fuel pipes. Carefully remove the fuel injector, the rocker box cover and the complete rocker box assembly. Withdraw the push rods and remove the pushrod tubes (S). The cylinder head can then be removed.

Clean the manifolds. With the piston at TDC remove any carbon from the piston crown. Remove the valves and clean the cylinder head, the exhaust and inlet ports and the valve guide recesses. Badly pitted or distorted valves should be changed. Grind in the valves.

When replacing the cylinder head fit a new cylinder head gasket. Make sure the push rod tubes (S) are fitted with the stepped end down and the oil seals (T) and joint washers (U) are in good condition and seating properly. On twin cylinder engines, ensure that the manifold mounting faces are square and in line.

Screw down the nuts finger tight, then using a torque spanner set to 83 N m tighten in a diagonal sequence until all the nuts are tight. After completing re-assembly, check the valve clearances and the decompressor setting.

Recheck the cylinder head nuts for tightness when the engine has run for about 20 hours and is cold.

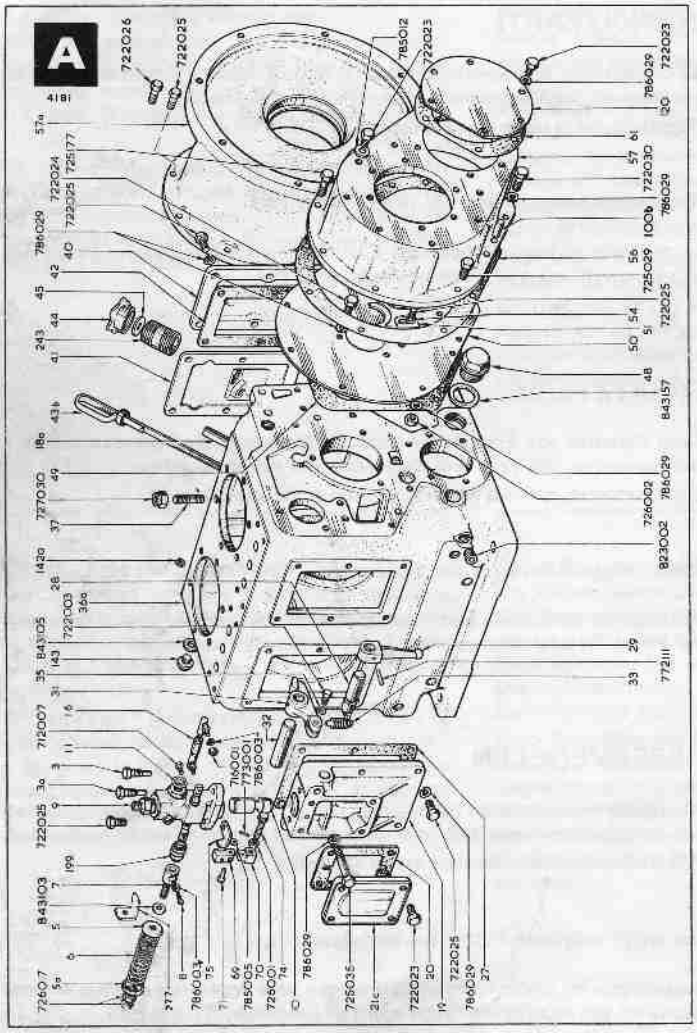


PLATE A–CRANKCASE AND FUEL PUMP

Ref. No.	Description	1 Cyl	2 Cyl
JA3	Setscrew–Fuel Pump	–	1
JA3a	Setscrew–Fuel Pump (Overload Stop)	1	1
JA5	Collar–Speeder Spring	1	1
JA5a	Collar–Speeder Spring	1	1
JA6	Spring–Speeder (for details see separate list)	1	1
JA7	Rod–Fuel Pump Rack Extension	1	1
JA8	Screw–Extension Rod Locating	1	1
HJA9	Pump–Fuel Injection	1	2
JA10	Tappet–Fuel Pump	1	2
JA11	Joint Washer–Fuel Pump	1	2
JA16	Link–Fuel Pump Racks	–	1
AJA18a	Tube–Dipstick	1	1
JA19	Bracket–Fuel Pump	1	2
JA20	Joint–Fuel Pump Bracket Cover	1	2
JA21c	Cover–Fuel Pump Bracket	1	2
JA27	Joint–Fuel Pump Bracket	1	2
JA28	Shaft–Fuel Pump Priming	1	2
JA29	Handle–Fuel Pump Priming	1	2
HJA31	Rocker–Fuel Pump	1	2
JA32	Spindle–Fuel Pump Rocker	1	2
JA33	Screw–Fuel Pump Rocker Adjusting	1	2
JA35	Shakeproof Washer	1	2
*AJA36	Crankcase	1	–
AJA36a	Crankcase	–	1
HJA37	Stud–Cylinder	6	12
JA40	Cover–Crankcase Inspection	–	1
JA41	Cover–Crankcase Inspection and Oil Filler	1	1
*CMA41	Cover–Crankcase Inspection and Oil Filler (Electric Starting)	1	1
JA42	Joint–Inspection and Oil Filler Covers	1	2
AJA43b	Dipstick	1	1
AJA44	Cap–Oil Filler	1	1
JA45	Joint–Oil Filler Cap	1	1
HJA48	Plug–Sump Drain, Rpl.	1	1
JA49	Joint–Gear Cover Plate	1	1
JA50	Plate–Gear Cover	1	1
JA51	Plate–Camshaft Thrust	1	1
TA54	Shakeproof Washer	2	2
JA56	Joint–Gear Cover	1	1

Ref. No.	Description	1 Cyl	2 Cyl
JA57	Cover–Gear	1	1
JA57a	Cover–Gear (SAE 5 Adaptor)	1	1
JA61	Joint–Gear Cover Blanking Plate	1	1
JA69	Fork–Fuel Pump Rack Extension	1	1
JA70	Pawl–Fuel Pump Rack Extension	1	1
JA71	Pin–Fuel Pump Rack Extension Pawl	1	1
JA74	Screw–Overload Adjusting	1	1
JA75	Stop–Overload	1	1
CA100b	Dowel–Gear Cover	2	2
PA120	Plate–Gear Cover Blanking	1	1
JA142a	Plug–Crankcase	2	2
JA143	Plug–Oilway	1	1
*JA197	Seal–Overload Adjusting Screw	1	1
*JA198	Wire–Overload Adjusting Screw Locking	1	1
JA199	Cover–Fuel Pump Rack	2	4
AJA243	Extension–Oil Filler	1	1
JA277	Stop–Fuel Pump Rack	1	1

PLATE B–CYLINDER AND CYLINDER HEAD

Ref. No.	Description	1 Cyl	2 Cyl
JB1	Nut–Rocker Box Cover	1	2
JB2	Stud–Rocker Box Cover	1	2
JB3	Cover–Rocker Box	1	2
JB4	Joint–Rocker Box Cover	1	2
JB7	Washer–Decompressor Shaft	2	4
JB9	Pin–Decompressor	1	2
JB11	Shaft–Decompressor	1	2
*JB11a	Shaft–Decompressor (Linked Decompressors)	–	1
JB12	Lever–Decompressor	1	2
*JB12a	Lever–Decompressor (Linked Decompressors)	–	1
CB14	Screw–Valve Rocker Adjusting	2	4
JB15	Rocker–Exhaust Valve	1	2
JB16	Bush–Valve Rocker	2	4
JB17	Shaft–Valve Rocker	1	2
JB18	Banjo Bolt–Rocker Shaft	1	2
JB20	Rocker–Inlet Valve	1	2
*JB23	Rocker Box (Gear end)	–	1
JB23a	Rocker Box	1	1
JB27	Joint–Rocker Box	1	2
JB30	Washer–Rocker Shaft	1	2
JB31	Washer–Rocker Shaft	2	4
HJB39a	Cylinder Head and Nozzle Sleeve	1	2
HJB40	Guide–Valve	2	4
HJB40a	Spring Plate–Valve Guide	2	4
JB47	Gasket–Exhaust and Inlet Manifold	2	4
JB53	Valve–Exhaust and Inlet	2	4
TB54	Collet–Valve	2 prs.	4 prs.
JB55	Cup–Valve	2	4
JB56	Spring–Valve (Inner)	2	4
JB57	Spring–Valve (Outer)	2	4
AJB58a	Gasket–Cylinder Head	1	2
BAB59	Holder–Fuel Injector Nozzle	1	2
JB60	Nozzle–Fuel Injector	1	2
AJB65	Stud–Cylinder Head	6	12

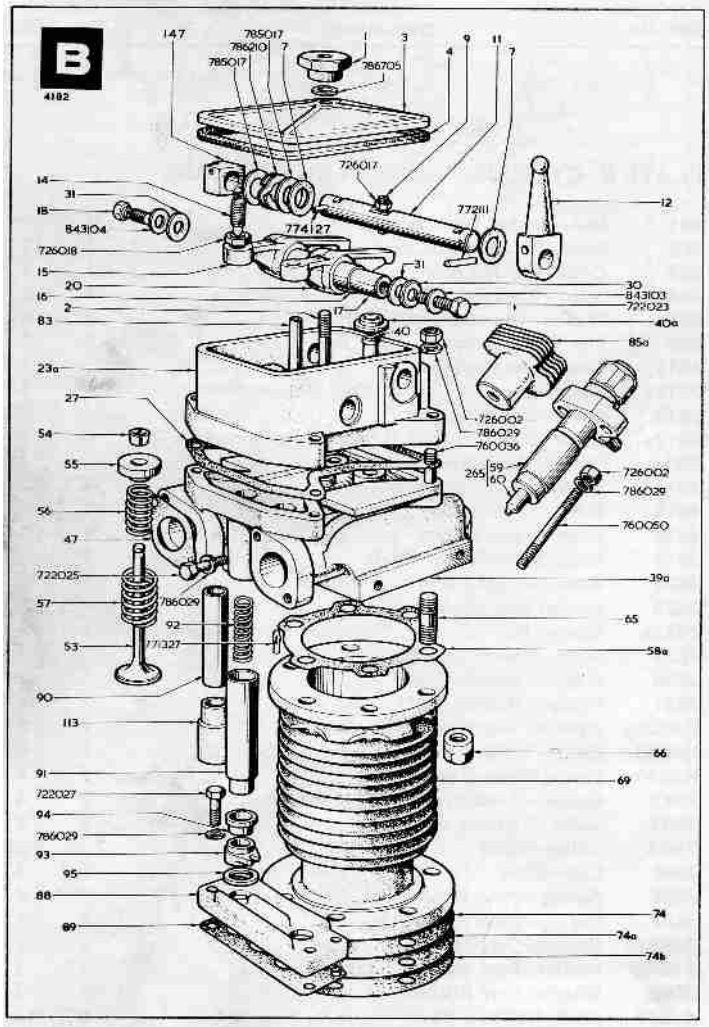


PLATE B – continued

Ref. No.	Description	1 Cyl	2 Cyl
HJB66	Nut	6	12
HJB69	Cylinder	1	2
AJB74	Joint—Cylinder (0.38mm)	As required	
AJB74a	Joint—Cylinder (0.13mm)	As required	
AJB74b	Joint—Cylinder (0.08mm)	As required	
JB83	Tube—Breather	1	2
HJB85a	Sleeve—Nozzle	1	2
CB88	Base—Push Rod Tube	1	2
CB89	Joint—Push Rod Tube Base	1	2
AJB90	Tube—Push Rod (Upper)	2	4
CB91	Tube—Push Rod (Lower)	2	4
AJB92	Spring—Push Rod Tube	2	4
AJB93	Adaptor—Push Rod Tube	4	8
AJB94	Oil Seal—Push Rod Rube	4	8
CB95	Joint Washer—Push Rod Tube Adaptor	4	8
CB113	Cover—Push Rod Tube	2	4
MJB147	Dog—Decompressor (Linked Decompressors) ...	—	2
HJB265	Injector—Fuel (including Nozzle and Holder) ...	1	2
*HJB265a	Injector—Fuel (including Nozzle and Holder) ... (900-1000 r/min)	1	2

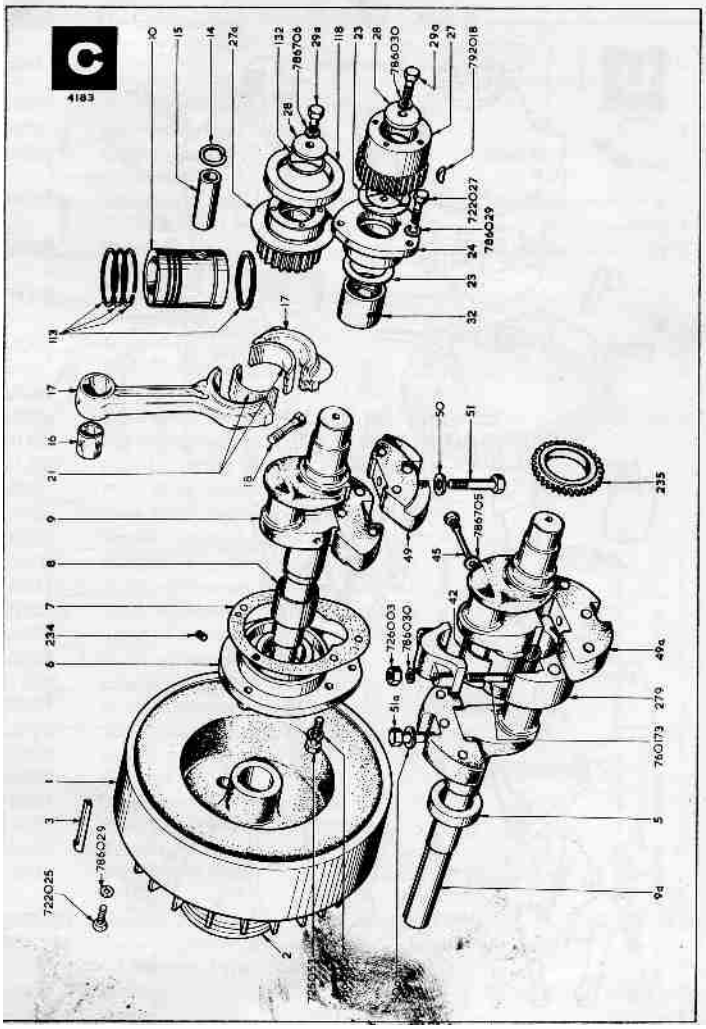


PLATE C—CRANKSHAFT AND PISTON

Ref. No.	Description	1 Cyl	2 Cyl
AJC1	Flywheel (Up to 1650 r/min)	1	1
*AJC1c	Flywheel (1651 to 2000 r/min)	1	1
HJC2	Pulley—Dynamo Driving	1	1
AJC3	Key—Flywheel	1	1
JC5	Oil Seal	1	1
HJC6	Housing—Main Bearing (Flywheel end)	1	1
JC7	Joint—Main Bearing Housing	1	1
HJC8	Bearing—Main (Flywheel end) (Standard) ...	1	1
*HJC8a	Bearing—Main (Flywheel end) (0.25mm Undersize)	1	1
*HJC8b	Bearing—Main (Flywheel end) (0.51mm Undersize)	1	1
*HJC8c	Bearing—Main (Flywheel end) (0.76mm Undersize)	1	1
*HJC8d	Bearing—Main (Flywheel end) (1.02mm Undersize)	1	1
HJC9	Crankshaft	1	—
HJC9a	Crankshaft	—	1
HJC10	Piston Assembly, complete with Rings, Pin and Circlips (Standard)	1	2
*HJC10b	Piston Assembly, complete with Rings, Pin and Circlips (0.51mm Oversize)	1	2
*HJC10d	Piston Assembly, complete with Rings, Pin and Circlips (1.02mm Oversize)	1	2
JC14	Circlip—Gudgeon Pin	2	4
HJC15	Gudgeon Pin	1	2
CC16	Bush—Small End	1	2
WJC17	Connecting Rod Assembly, complete with Small End Bush, Large End Bearing and Bolts ...	1	2
HJC18	Bolt—Large End	2	4
CC21	Bearing—Large End	1 pr.	2 prs.
*CC21a	Bearing—Large End (0.25mm Undersize)	1 pr.	2 prs.
*CC21b	Bearing—Large End (0.51mm Undersize)	1 pr.	2 prs.
*CC21c	Bearing—Large End (0.76mm Undersize)	1 pr.	2 prs.
*CC21d	Bearing—Large End (1.02mm Undersize)	1 pr.	2 prs.
HJC23	Washer—Crankshaft Thrust	2	2
HJC24	Housing—Main Bearing (Gear end)	1	1
JC27	Gearwheel—Crankshaft	1	—
*HJC27	Gearwheel—Crankshaft	—	1
JC27a	Gearwheel and Oil Thrower (SAE 5 Adaptor) ...	1	—
*HJC27a	Gearwheel and Oil Thrower (SAE 5 Adaptor) ...	—	1
JC28	Plate—Gearwheel Retaining	1	1
HJC28	Plate—Gearwheel Retaining (SAE 5 Adaptor) ...	1	1

PLATE C — continued

Ref. No.	Description	1 Cyl	2 Cyl
JC29a	Bolt—Retaining Plate	1	1
CC32	Bearing—Main (Gear end) (Standard)	1	1
*CC32a	Bearing—Main (Gear end) (0.25mm Undersize) ...	1	1
*CC32b	Bearing—Main (Gear end) (0.51mm Undersize) ...	1	1
*CC32c	Bearing—Main (Gear end) (0.76mm Undersize) ...	1	1
*CC32d	Bearing—Main (Gear end) (1.02mm Undersize) ...	1	1
CC42	Bearing—Main (Intermediate) (Standard)	—	1 pr.
*CC42a	Bearing—Main (Intermediate) (0.25mm Undersize)	—	1 pr.
*CC42b	Bearing—Main (Intermediate) (0.51mm Undersize)	—	1 pr.
*CC42c	Bearing—Main (Intermediate) (0.76mm Undersize)	—	1 pr.
*CC42d	Bearing—Main (Intermediate) (1.02mm Undersize)	—	1 pr.
JC45	Screw—Main Bearing Housing Locking (Intermediate	—	1
HJC49	Balance Weight	2	—
HJC49a	Balance Weight	—	2
CC50	Washer—Balance Weight	2	—
HJC50a	Washer—Balance Weight	—	2
HJC51	Bolt—Balance Weight	2	—
HJC51a	Bolt—Balance Weight	—	2
HJC113	Piston Ring Set (Standard)	1	2
*HJC113b	Piston Ring Set (0.51mm Oversize)	1	2
*HJC113d	Piston Ring Set (1.02mm Oversize)	1	2
JC118	Oil Seal (SAE 5 Adaptor)	1	1
HJC132	Seal—Gearwheel Retaining Plate (SAE 5 Adaptor)	1	1
JC234	Plug—Main Bearing Housing (Flywheel end) ...	1	1
JC235	Gearwheel—Oil Pump Driving	1	1
HJC279	Housing—Main Bearing (Intermediate) (Supplied with 760173, 786030 and 726003)	—	1

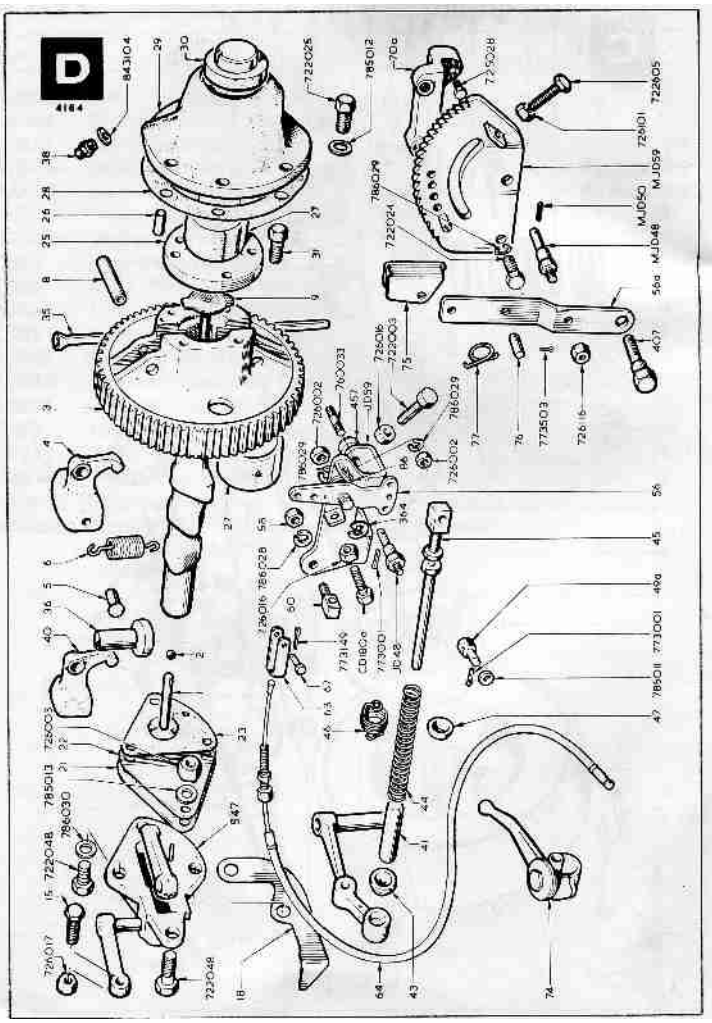


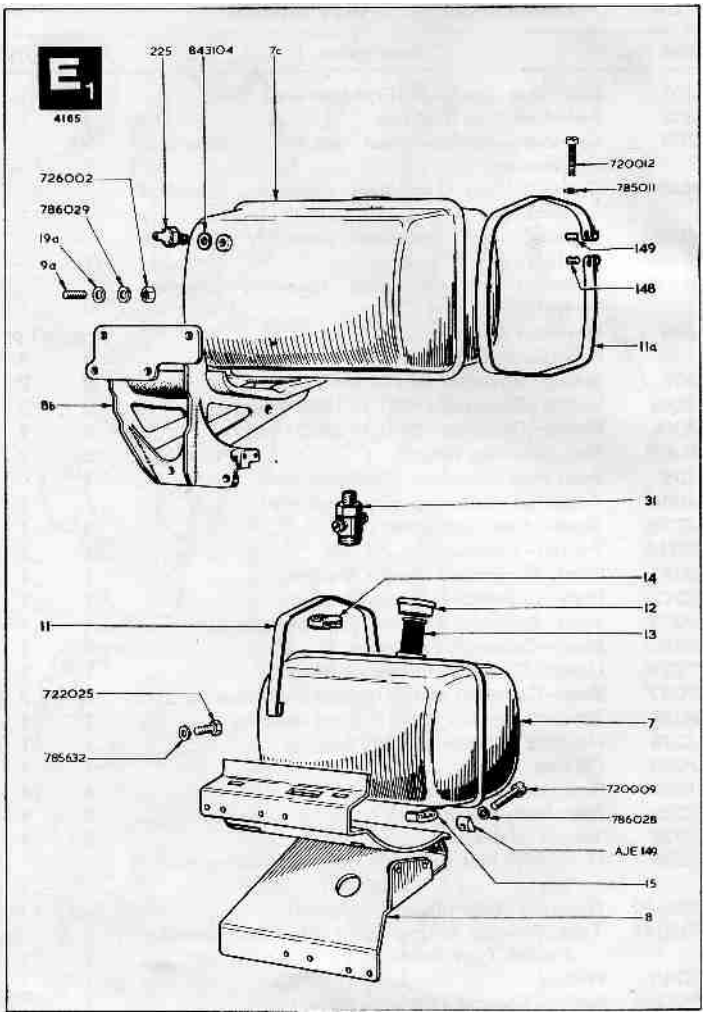
PLATE D—CAMSHAFT AND GOVERNOR

Ref. No.	Description	1 Cyl	2 Cyl
JD1	Push Rod—Governor (Flywheel end)	1	1
JD2	Ball—Push Rod 0.64mm	1	1
JD3	Camshaft and Gearwheel Assembly (Standard Rotation)	1	—
*HJD3a	Camshaft and Gearwheel Assembly (Standard Rotation)	—	1
*JD3b	Camshaft and Gearwheel Assembly (Reverse Rotation)	1	—
*HJD3c	Camshaft and Gearwheel Assembly (Reverse Rotation)	—	1
JD4	Governor Weight	1 pr	1 pr.
JD5	Pin—Governor Spring	4	4
JD6	Spring—Governor (Up to 1650 r/min) ...	2	2
*JD6a	Spring—Governor (1651 to 1800 r/min) ...	2	2
*JD6b	Spring—Governor (1801 to 2000 r/min) ...	2	2
HJD8	Pin—Governor Weight	2	2
JD9	Push Rod—Governor (Governor end)	1	—
*JD9a	Push Rod—Governor (Governor end)	—	1
JD15	Screw—Lever Adjusting	1	1
CD18	Pointer—Flywheel	1	1
JD21	Joint—Governor Fulcrum Bracket	1	1
JD22	Plate—Governor Fulcrum Bracket	1	1
JD23	Joint—Governor Fulcrum Bracket Plate	1	1
JD25	Shaft—Camshaft Extension	1	1
TD26	Dowel—Camshaft Extension Shaft	1	1
PD27	Bush—Camshaft and Extension Shaft Bearing ...	2	3
JD28	Joint—Extension Shaft Bearing Housing	1	1
JD29	Housing—Extension Shaft Bearing...	1	1
JD30	Oil Seal	1	1
JD31	Setscrew—Extension Shaft	4	4
JD35	Push Rod—Valve	2	4
JD36	Tappet—Valve	2	4
JD38	Union—Oil Pipe to Extension Shaft Bearing Housing	1	1
MDJ40	Governor Weight (Variable Speed)	1 pr.	1 pr.
MJD41	Tube—Speeder Spring Guide (Variable Speed—Rachet Type Control)	1	1
JD43	Washer	1	1
MJD44	Spring—Speeder (Variable Speed)	1	1

Ref. No.	Description	1 Cyl	2 Cyl
*CD45	Spindle Assembly—Speeder Spring, complete with Bracket and Locknuts (Variable Fixed Speed)	1	1
JD45	Spindle Assembly—Speeder Spring (Variable Speed)	1	1
*MJD45	Spindle Assembly—Speeder Spring (Variable Speed—Ratchet Type Control)	1	1
MJD46	Spring—Fuel Pump Rack (Variable Speed) ...	1	1
JD47	Cup—Speeder Spring (Variable Speed)	1	1
*MJD47	Cup—Speeder Spring (Variable Speed—Ratchet Type Control)	1	1
JD48	Pin—Speeder Spring Spindle (Variable Speed) ...	1	1
MJD48	Pin—Speeder Spring Spindle (Variable Speed—Ratchet Type Control)	1	1
JD49a	Connection	1	1
MJD50	Split Pin (Ratchet Type Control)	1	1
JD56	Lever—Variable Speed	1	1
JD56a	Lever—Variable Speed (Ratchet Type Control) ...	1	1
JD58	Locknut—Cable Adjusting Stop	1	1
JD59	Bracket and Lever Assembly (Variable Speed Control)	1	1
MJD59	Plate—Variable Speed (Ratchet Type Control) (Quote engine speed)	1	1
*JD59b	Bracket and Lever Assembly (Variable Speed—Rod Type Operation)	1	1
JD60	Stop—Cable Adjusting	1	1
JD63	Shackle—Cable	1	1
JD64	Cable—Operating (Variable Speed) (To length required)	1	1
JD67	Pin—Cable Shackle	1	1
JD70a	Bracket—Variable Speed (Ratchet Type Control)	1	1
TD74	Lever—Cable Control	1	1
JD75	Pawl (Variable Speed—Ratchet Type Control) ...	1	1
JD76	Pin—Pawl	1	1
JD77	Spring—Pawl	1	1
JD86	Spring—Lever Return (Variable Speed)	1	1
CD180a	Screw—Adjusting (Variable Speed)	1	1
*JD297	Seal—Adjusting Screws JD15 and CD180a ...	2	2
*JD298	Wire—Adjusting Screw Locking	2	2
JD364	Circlip—Lever Pin (Variable Speed)	1	1

PLATE D – continued

Ref. No.	Description	1 Cyl	2 Cyl
MJD407	Bolt—Variable Speed (Ratchet Type Control) ...	1	1
JD457	Collar (Variable Speed)	2	2
HJD547	Lever Assembly—Fuel Pump Rack Operating ...	1	1
*HJD547a	Lever Assembly—Fuel Pump Rack Operating (Variable Speed)	1	1



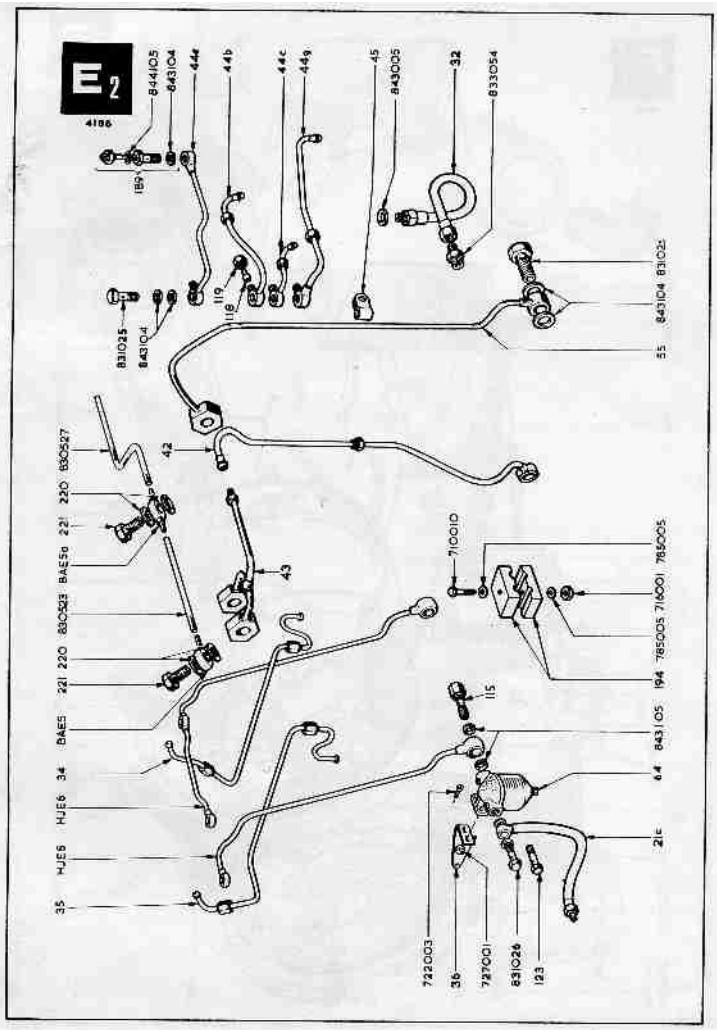
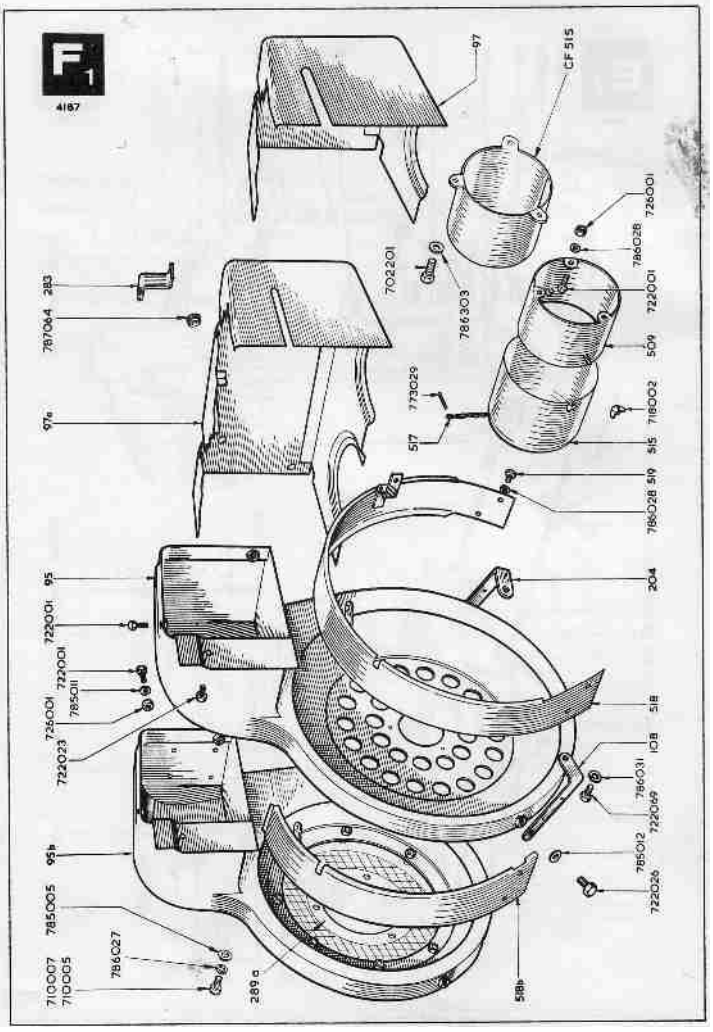


PLATE E—FUEL TANK, FUEL FILTER AND PIPES

Ref. No.	Description	1 Cyl	2 Cyl
BAE5	Pipe—Injector Leak-off	1	1
HJE5	Pipe—Injector Leak-off (For use with engine having separately mounted Fuel Tank)	1	–
BAE5a	Tee—Injector Leak-off	–	1
HJE6	Pipe—Injector Leak-off (For use with engine having separately mounted Fuel Tank)	–	1
JE7	Tank—Fuel (6.8 litres)	1	1
JE7c	Tank—Fuel (18 litres)	1	1
AJE8	Bracket—Fuel Tank (6.8 litres)	1	1
JE8b	Bracket—Fuel Tank (18 litres)	1	1
JE9a	Stud—Bracket (18 litres Fuel Tank).	2	2
HJE11	Strap—Fuel Tank (6.8 litres)	2	2
JE11a	Strap—Fuel Tank (18 litres)	2	2
CE12	Cap—Fuel Tank	1	1
JE13	Strainer—Fuel Tank	1	1
JE14	Packing—Fuel Tank Strap (Top)	2	2
JE15	Packing—Fuel Tank Strap (Bottom)	2	2
AJE19a	Collar—Fuel Tank Bracket (18 litres)	2	2
*CE21	Pipe—Fuel (Flexible) (Filter to Pump)	–	2
JE21c	Pipe—Fuel (Flexible) (Filter to Pump)	1	–
JE21c	Pipe—Fuel (Flexible) (Filter to Pump) (18 litres Fuel Tank)	–	2
JE31	Tap—Fuel Tank (18 litres)	1	1
JE32	Pipe—Fuel (241mm flexible)	1	1
*JE32d	Pipe—Fuel (457mm flexible)	1	1
HJE34	Pipe—Fuel (Pump to Injector)	1	1
HJE35	Pipe—Fuel (Pump to Injector) (Flywheel end) ...	–	1
JE36	Bracket—Fuel Filter (For use with engine having separately mounted Fuel Tank)	1	1
AJE42	Pipe—Oil (Relief Valve to Rocker Union) ...	–	1
JE43	Pipe—Oil (Rocker Union to Rocker Shaft) ...	–	1
JE44b	Pipe—Oil (To Extension Shaft Bearing, Mks I & V)	1	1
JE44c	Pipe—Oil (To Extension Shaft Bearing. Mk II) ...	1	1
JE44e	Pipe—Oil (To Clutch. Mk IV)	1	1
*JE44f	Pipe—Oil (To Clutch. Mk III)	1	1
JE44g	Pipe—Oil (To Speed Increasing Gear)	1	1
JE45	Clip—Oil Pipe	3	3
*CE46a	Clip—Oil Pipe	1	–
*ZPE46	Clip—Oil Pipe	–	1

PLATE E — Continued

Ref. No.	Description	1 Cyl	2 Cyl
AJE55	Pipe—Oil (Relief Valve to Rocker Shaft)	1	—
ASE64	Filter—Fuel (for details see separate list)	1	1
CE115	Adaptor—Fuel Filter	1	1
MJE118	Seal—Union Nut	1	1
MJE119	Union Nut	1	1
JE123	Banjo Bolt—Fuel Filter	—	1
PE148	Boss—Strap (18 litres Fuel Tank)	2	2
PE149	Boss—Strap (18 litres Fuel Tank)	2	2
AJE149	Boss—Strap (6.8 litres Fuel Tank)	2	2
ZPE189	Restrictor—Clutch	1	1
AJE194	Damper—Fuel Pipe	—	2
AAE220	Joint Washer—Injector Leak-off	2	4
AAE221	Banjo Bolt—Injector Leak-off	1	2
JE225	Screw—Adaptor (18 litres Fuel Tank)	1	1



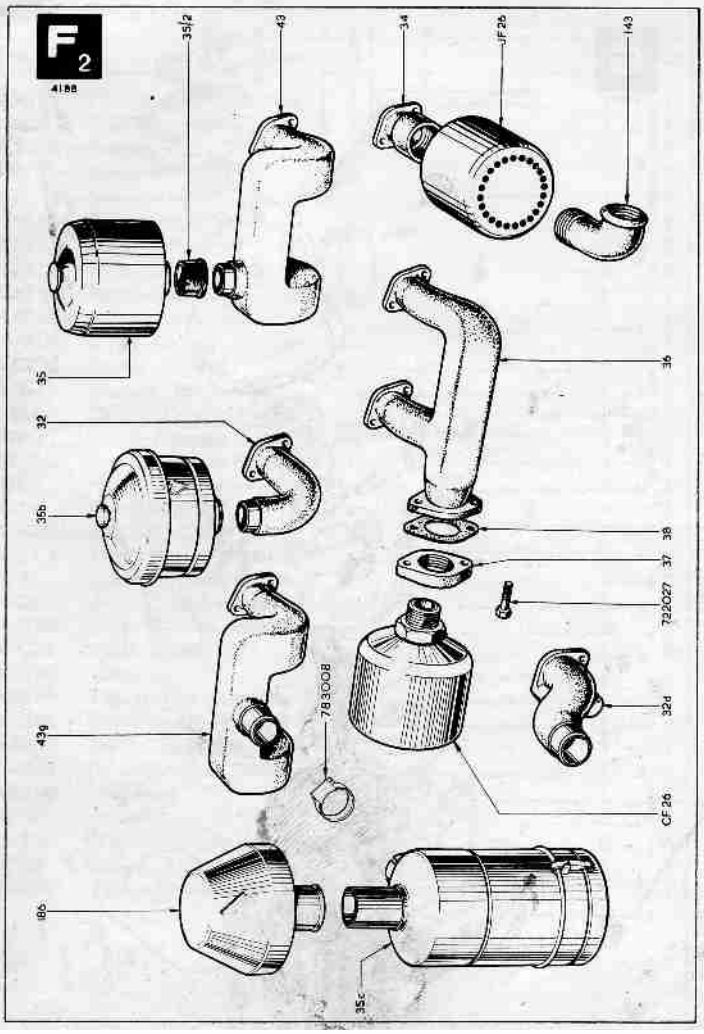


PLATE F—MANIFOLDS, AIR CLEANER AND SILENCER

Ref. No.	Description	1 Cyl	2 Cyl
CF26	Silencer—Exhaust	—	1
JF26	Silencer—Exhaust	1	—
AJF32	Manifold—Inlet	1	—
*JF32a	Manifold—Inlet (18 litres Fuel Tank) ...	1	—
*JF32c	Manifold—Inlet (with Horizontal Fitting) ...	1	—
JF32d	Manifold—Inlet (Oil Bath Air Cleaner)	1	—
JF34	Manifold—Exhaust	1	—
HJF35	Air Cleaner	1	1
JF35/2	Seal—Air Cleaner	1	1
*JF35/6	Element—Air Cleaner	1	1
JF35b	Air Cleaner (Oil Bath) (Cooper)	1	1
JF35c	Air Cleaner (Oil Bath) (Burgess)	1	1
JF36	Manifold—Exhaust	—	1
JF37	Flange—Silencer	—	1
JF38	Joint—Silencer Flange	—	1
JF43	Manifold—Inlet	—	1
*JF43f	Manifold—Inlet (with Horizontal Fitting) ...	—	1
JF43g	Manifold—Inlet (Oil Bath) (Burgess)	—	1
AJF95	Cowling—Fan (Standard Rotation)	1	1
*AJF95a	Cowling—Fan (Reverse Rotation)	1	1
AJF95b	Cowling—Fan (Standard Rotation) ... ... (For use with (a) Mk V engine fitted with a pulley, (b) Electric Starting, (c) Rotary Screen, (d) Inlet Ducting)	1	1
*AJF95c	Cowling—Fan (Reverse Rotation) (For use with same units as AJF95b)	1	1
AJF97	Cowling—Cylinder	1	—
AJF97a	Cowling—Cylinder	—	1
AJF108	Bracket—Fan Cowling (Standard Rotation) ...	1	1
*AJF108a	Bracket—Fan Cowling (Reverse Rotation) ...	1	1
JF143	Elbow—Exhaust	1	—
JF186	Pre-Cleaner—Air Cleaner (Oil Bath) (Burgess) ...	1	1
AJF204	Bracket—Fan Cowling (Standard Rotation) ...	1	1
*AJF204a	Bracket—Fan Cowling (Reverse Rotation) ...	1	1
AJF283	Bracket—Cylinder Cowling	—	1
HJF289	Guard—Dynamo Belt	1	1
HJF289a	Guard—Fan (Electric Starting)	1	1
AJF509	Sleeve—Starting Shaft Guard	1	1
AJF509a	Guard—Crankshaft (Flywheel end)	1	1

PLATE F – continued

Ref. No.	Description	1 Cyl	2 Cyl
CF515	Guard–Shaft (Electric Starting)	1	1
ZPF515	Guard–Starting Shaft (Flywheel end)	1	1
ZPF517	Chain–Guard	1	1
AJF518	Guard–Flywheel (Standard Rotation)	1	1
*AJF518a	Guard–Flywheel (Reverse Rotation)	1	1
AJF518b	Guard–Flywheel (Electric Starting–Standard Rotation	1	1
AJF519	Setscrew–Flywheel Guard	4	4
AJF519	Setscrew–Flywheel Guard (Electric Starting) ...	2	2
702201	Screw, phosphated, M5 x 12mm		

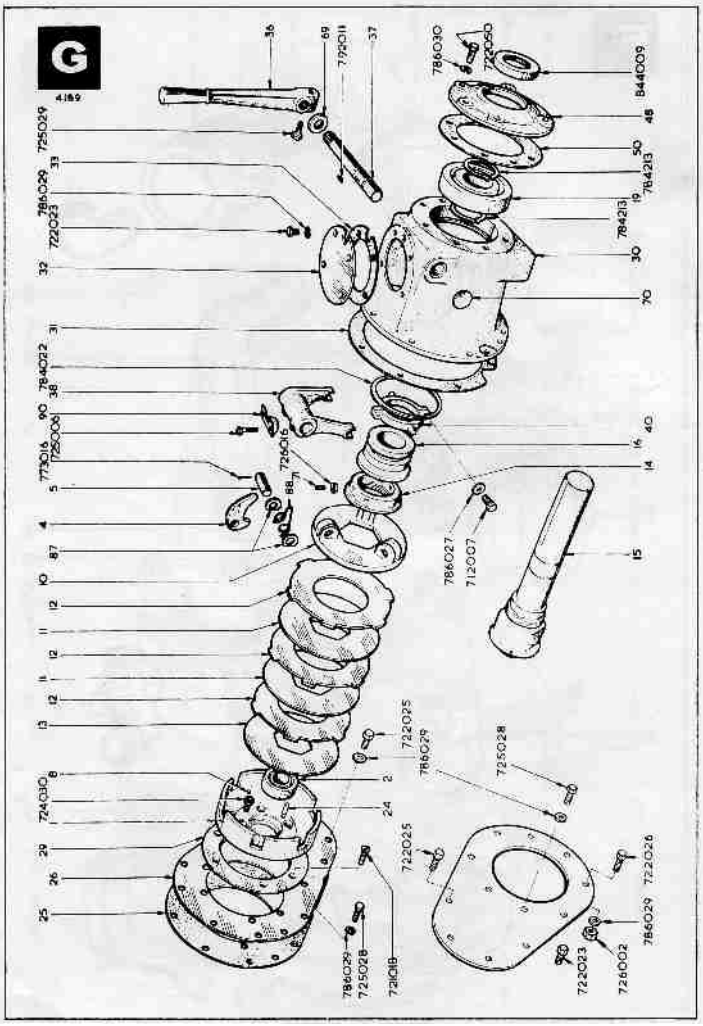


PLATE G–CLUTCH

Ref. No.	Description	1 Cyl	2 Cyl
AJG1	Flange–Clutch Driving	1	1
AJG2	Bearing–Roller	1	1
AJG4	Toggle	3	3
JG5	Pin–Toggle	3	3
JG8	Seal–Driving Flange Screw	4	4
AJG10	Plate–Outer	1	1
AJG11	Plate–Driven	2	2
AJG12	Plate–Driving	3	3
AJG13	Plate–Inner	1	1
AJG14	Ring–Adjusting	1	1
AJG15	Shaft–Clutch	1	1
AJG16	Sleeve–Sliding	1	1
AJG19	Bearing–Ball	1	1
JG24	Dowel–Driving Flange	1	1
JG25	Joint–Adaptor Plate (Mk IV)	1	1
*JG25a	Joint–Adaptor Plate (Mk III)	1	1
JG26	Plate–Adaptor	1	1
JG29	Plate–Spigot	1	1
AJG30	Housing–Clutch	1	1
JG31	Joint–Clutch Housing	1	1
JG32	Cover–Clutch Housing	1	1
JG33	Joint–Clutch Housing Cover	1	1
AJG36	Lever–Clutch Operating	1	1
AJG37	Shaft–Yoke	1	1
AJG38	Yoke	1	1
AJG40	Thrust Ring Assembly	1	1
AJG48	Housing–Oil Seal	1	1
AJG50	Joint–Oil Seal Housing	1	1
AJG69	Oil Seal–Yoke Shaft	1	1
AJG70	Core Plug	1	1
JG71	Grubscrew	1	1
JG87	Washer–Toggle Pin	6	6
JG88	Spring–Toggle	3	3
AJG90	Tabwasher–Yoke Bolt	1	1

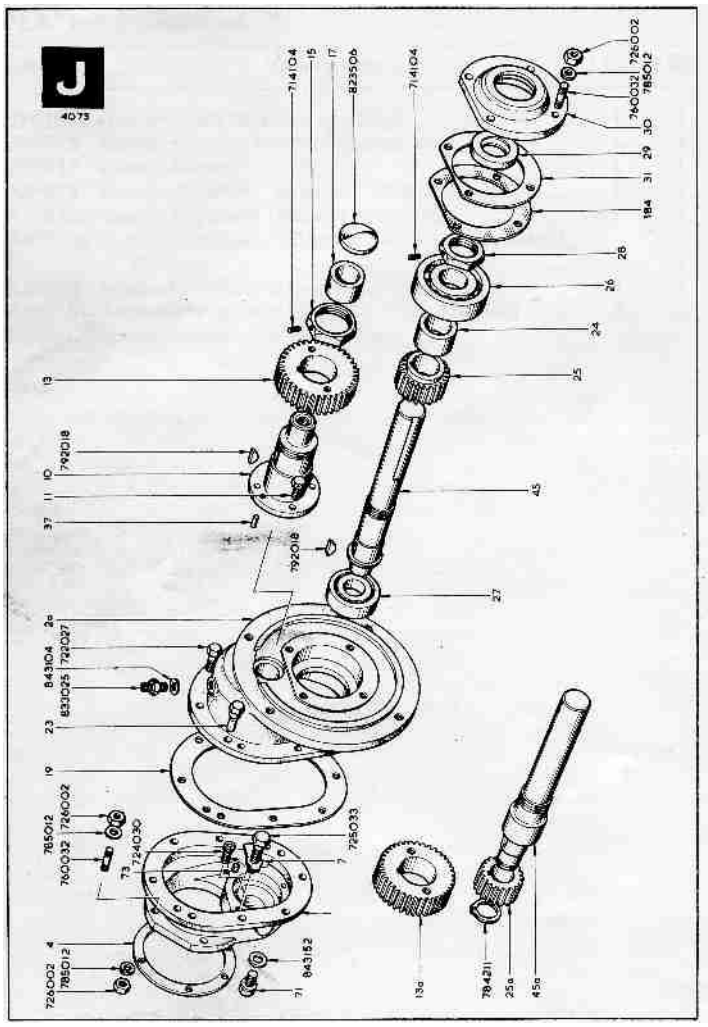


PLATE J—SPEED INCREASING GEAR

Ref. No.	Description	1 Cyl	2 Cyl
JJ1	Housing—Speed Increasing Gear (Engine half) ...	1	1
*JJ2	Housing—Speed Increasing Gear (Power take-off half)	1	—
JJ2a	Housing—Speed Increasing Gear (Power take-off half)	—	1
JJ4	Joint—Housing (Engine half)	1	1
JJ7	Tabwasher	1	1
JJ10	Shaft—Crankshaft Extension	1	1
JJ11	Setscrew—Extension Shaft	4	4
JJ13	Gearwheel—Driving (1.61:1 Ratio)	1	1
JJ13a	Gearwheel—Driving (1.86:1 Ratio)	1	1
JJ15	Locknut—Driving Gearwheel	1	1
JJ17	Bush—Extension Shaft	1	1
JJ19	Joint—Housing (Power take-off half)	1	1
JJ23	Dowel—Housing (Power take-off half)	4	4
JJ24	Collar (1.6:1 Ratio)	1	1
JJ25	Gearwheel—Driven (1.61:1 Ratio)	1	1
JJ25a	Gearwheel—Driven (1.86:1 Ratio)	1	1
JJ26	Bearing—Ball	1	1
JJ27	Bearing—Roller	1	1
JJ28	Locknut—Ball Bearing	1	1
JJ29	Oil Seal	1	1
JJ30	Housing—Oil Seal	1	1
JJ31	Joint—Oil Seal Housing	1	1
JJ37	Dowel—Extension Shaft	1	1
JJ45	Shaft—Power Take-off (1.61:1 Ratio)	1	1
JJ45a	Shaft—Power Take-off (1.86:1 Ratio)	1	1
PJ71	Plug—Housing (Engine half)	1	1
JJ73	Seal—Housing Screw	1	1
JJ184	Shim—Oil Seal Housing (0.13mm)	As required	

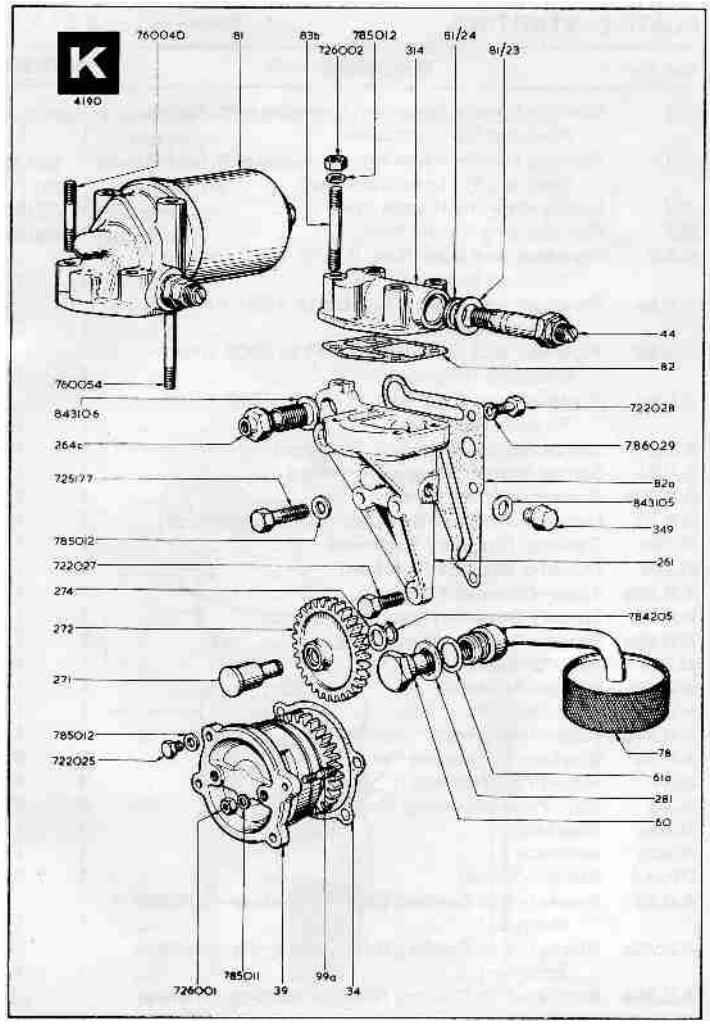


PLATE K—LUBRICATING OIL PUMP AND FILTER

Ref. No.	Description	1 Cyl	2 Cyl
CK34	Joint—Oil Pump	1	1
JK39	Pump—Lubricating Oil	1	1
JK44	Valve—Relief	1	1
JK60	Banjo Bolt	1	1
JK61a	Oil Seal—Oil Pump Strainer	1	1
JK78	Strainer-Oil Pump	1	1
HK81	Filter—Lubricating Oil (for details see separate list)	1	—
*HK81a	Filter—Lubricating Oil (for details see separate list)	—	1
HK81/23	Washer—Relief Valve	1	1
HK81/24	Seal—Relief Valve	1	1
JK82	Joint—Relief Valve Adaptor	1	1
CK82a	Joint—Oil Distribution Bracket	1	1
JK83b	Stud—Relief Valve Adaptor	4	4
JK99a	Stud—Oil Pump	1	1
CK261	Bracket—Oil Distribution, complete with Plug and Joint Washer	1	1
JK264c	Banjo Bolt—Rocker Oil Restrictor	1	1
JK271	Spigot—Idler Gear	1	1
JK272	Idler Gear—Oil Pump	1	1
JK274	Washer—Oil Pump Idler Gear	1	1
JK281	Joint Washer	1	1
JK314	Adaptor—Relief Valve	1	1
CK349	Plug—Oil Distribution Bracket	1	1

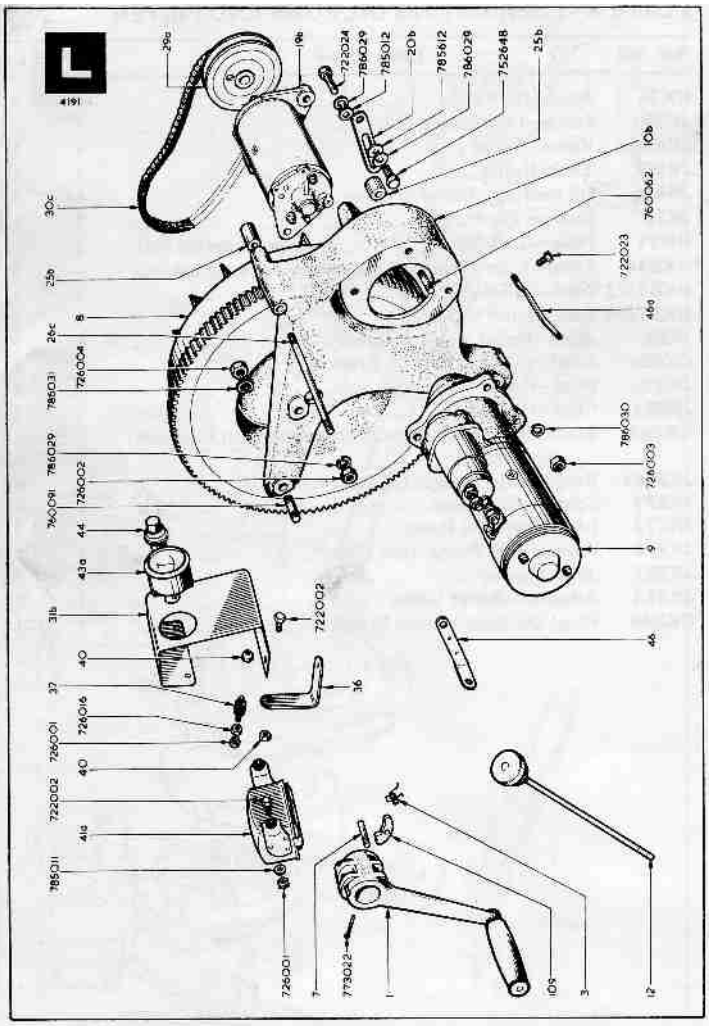
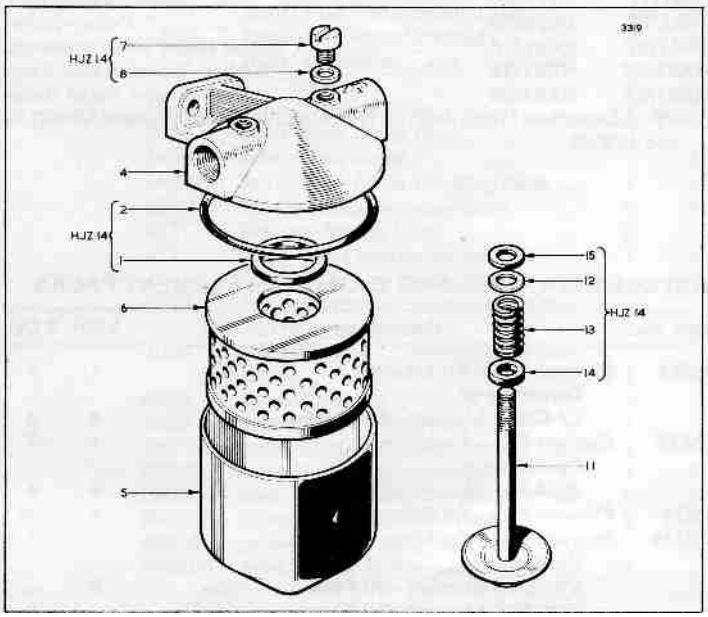


PLATE L–STARTING

Ref. No.	Description	1 Cyl	2 Cyl
JL1	Starting Handle Assembly, complete with Spring, Pawl and Pin (Clockwise)	1	1
*JL1a	Starting Handle Assembly, complete with Spring, Pawl and Pin (Anticlockwise)	1	1
JL3	Spring–Starting Handle Pawl	1	1
JL7	Pin–Starting Handle Pawl	1	1
AJL8	Flywheel and Gear Ring (Up to 1650 r/min–Standard Rotation)	1	1
*AJL8a	Flywheel and Gear Ring (Up to 1650 r/min–Reverse Rotation)	1	1
*AJL8d	Flywheel and Gear Ring (1651 to 2000 r/min–Standard Rotation)	1	1
*AJL8e	Flywheel and Gear Ring (1651 to 2000 r/min–Reverse Rotation)	1	1
AJL9	Starter Motor (Standard Rotation)	1	1
*AJL9a	Starter Motor (Reverse Rotation)	1	1
AJL10b	Bracket–Starter Motor	1	1
AJL12	Dipstick and Oil Filler Cap (Electric Starting) ...	1	1
JL19b	Dynamo (Standard Rotation)	1	1
*JL19c	Dynamo (Reverse Rotation)	1	1
AJL20b	Strap–Dynamo Adjusting	1	1
HJL25	Spacer–Dynamo Hinge (Belt Guard)	1	1
AJL25b	Spacer–Dynamo Hinge	2	2
JL26c	Rod–Dynamo Hinge	1	1
WCL29	Pulley–Dynamo	1	1
HJL30a	Belt–Dynamo	1	1
AJL31b	Panel–Instrument	1	1
AJL36	Bracket–Instrument Panel	2	2
JL37	Mounting–Instrument Panel	4	4
JL40	Nut–Panel Mounting (Self-locking)	6	6
JL41a	Regulator	1	1
JL43a	Ammeter	1	1
VPL44	Switch–Starter	1	1
AJL46	Bracket–Fan Cowling (Electric Starting–Standard Rotation)	1	1
AJL46a	Bracket–Fan Cowling (Electric Starting–Standard Rotation)	1	1
*AJL46b	Bracket–Fan Cowling (Electric Starting–Reverse Rotation)	1	1

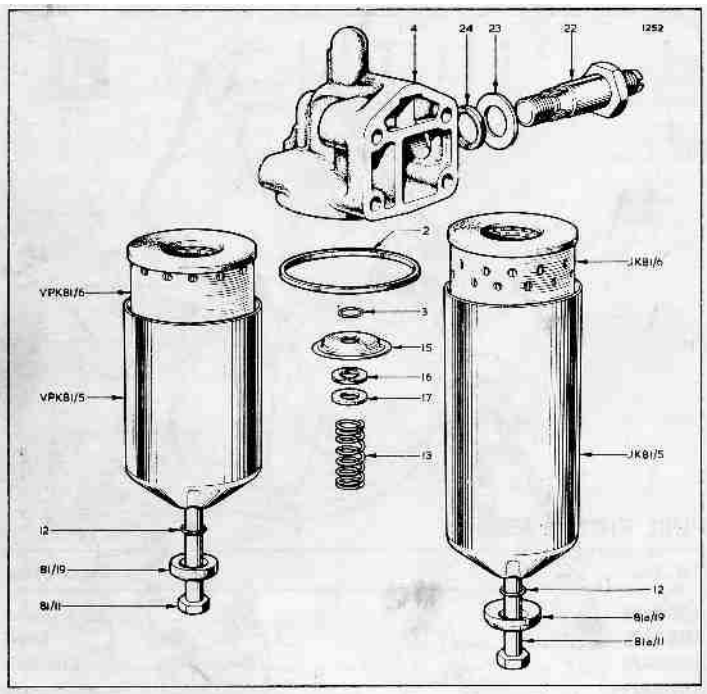
PLATE L – continued

Ref. No.	Description	1 Cyl	2 Cyl
*AJL46c	Bracket–Fan Cowling (Electric Starting–Reverse Rotation)	1	1
JL109	Pawl–Starting Handle	1	1
*HL159	Cable Harness	1	1
*JL163	Grommet	1	1
*JL163a	Grommet	1	1



FUEL FILTER ASE64

Ref. No.	Description
ASE64/4	Head
ASE64/5	Bowl
ASE64/6	Element
ASE64/11	Bolt–Centre
HJZ14	Spare Parts Pack, consisting of:
ASE64/1	Joint Washer–Element
ASE64/2	Seal–Bowl
ASE64/7	Screw–Vent
ASE64/8	Washer–Vent Screw
ASE64/12	Washer–Centre Bolt
ASE64/13	Spring–Centre Bolt
ASE64/14	Seal–Centre Bolt (Lower)
ASE64/15	Seal–Centre Bolt (Upper)



OIL FILTER HK81 & HK81a

Ref. No.		Description
One-cylinder engine	Two-cylinder engine	
JK81/2	JK81/2	Seal—Sump (Top)
HK81/3	HK81/3	Circlip—Centre Bolt
HK81/4	HK81/4	Head
VPK81/5	JK81/5	Sump
VPK81/6	JK81/6	Element
HK81/11	HK81a/11	Bolt—Centre
VPK81/12	VPK81/12	Seal—Sump (Bottom)
JK81/13	JK81/13	Spring—Centre Bolt
JK81/15	JK81/15	Guide—Element
JK81/16	JK81/16	Seal—Centre Bolt
JK81/17	JK81/17	Washer—Centre Bolt
JK81/19	JK81a/19	Collar—Sump
CK81/22	CK81/22	Engine Relief Valve Assembly
HK81/23	HK81/23	Washer—Engine Relief Valve
HK81/24	HK81/24	Seal—Engine Relief Valve

NOTE: A Sump Seal (Top), JK81/2, is included with each Element VPK81/6 and JK81/6

AIR CLEANER, FUEL AND OIL FILTER ELEMENT PACKS

Ref. No.	Description	1 Cyl	2 Cyl
CZ12	Element Pack—Air Cleaner	1	1
	Consisting of:		
	CF423 Element—Air Cleaner	4	4
HZ10	Element Pack—Fuel Filter	1	1
	Consisting of:		
	JE64/6a Element—Fuel Filter	4	4
JZ11	Element Pack—Oil Filter	1	—
JZ11b	Element Pack—Oil Filter	—	1
	Consisting of:		
	VPK81/6 Element—Oil Filter	8	—
	JK81/6 Element—Oil Filter	—	8

SETS OF JOINTS

Ref. No.	Description	1 Cyl	2 Cyl
AJZ2	Decarbonising Set of Joints	1	2
	Consisting of: (See Plates B and F)		
	JB4 Joint—Rocker Box Cover	1	2
	JB27 Joint—Rocker Box	1	2
	JB47 Gasket—Exhaust and Inlet Manifold	2	4
	AJB58a Gasket—Cylinder Head	1	2
	CB89 Joint—Push Rod Tube Base	1	2
	AJB94 Oil Seal—Push Rod Tube	4	8
	CB95 Joint Washer—Push Rod Tube Adaptor	4	8
	JF38 Joint—Silencer Flange	1	2
HJZ3	Conversion Set of Joints	1	1
	Consisting of (See Plates A, B, C, D, E and K)		
	JA20 Joint—Fuel Pump Bracket Cover	2	2
	JA27 Joint—Fuel Pump Bracket	2	2
	JA42 Joint—Inspection and Oil Filler Covers	2	2
	JA45 Joint—Oil Filler Cup	1	1
	JA49 Joint—Gear Cover Plate	1	1
	JA56 Joint—Gear Cover	1	1
	JA61 Joint—Gear Cover Blanking Plate	1	1
	JB7 Washer—Decompressor Shaft	4	4
	JB31 Washer—Rocker Shift	5	5
	JC7 Joint—Main Bearing Housing	1	1
	JD21 Joint—Governor Fulcrum Bracket	1	1
	JD23 Joint—Governor Fulcrum Bracket Plate	1	1
	JD28 Joint—Extension Shaft Bearing Housing	1	1
	CK34 Joint—Oil Pump	1	1
	JK82 Joint—Relief Valve Adaptor	1	1
	CK82a Joint—Oil Distribution Bracket	1	1
	843003 Joint Washer 7.9mm (Fibre)	1	1
	843004 Joint Washer 9.5mm (Fibre)	3	3
	843005 Joint Washer 12.7mm (Fibre)	5	5
	843104 Joint Washer 9.5mm (Copper)	14	14
	843106 Joint Washer 15.9mm (Copper)	1	1

SPEEDER SPRING DETAILS

Ref. No.	Colour	Position	Engine Speed
JA6e	Red/Aluminium	Bands	900—1000
JA6c	Red/Yellow	Bands	1100—1250
JA6	Red/Orange	Bands	1400—1550
JA6f	Red/Black	Bands	1551—1650
†JA6	Red/Orange	Bands	1741—1800
†JA6j	Blue/Brown	Ends	1901—2000
MJD44	Yellow/Black	Bands	Variable Speed

†For speeds between 1651 and 2000 rev/min a High Speed Flywheel (see Plates C and L) and Governor Springs, JD6a (1651 to 1800 r/min) or JD6b (1801 to 2000 r/min) must be used.

HEALTH AND SAFETY

TO PROMOTE SAFETY AND TO AVOID RISK TO HEALTH, USERS OF PETTER DIESEL ENGINES SHOULD OBSERVE THE FOLLOWING PRECAUTIONS:

ENSURE THAT THE ENGINE IS CORRECTLY INSTALLED, OPERATED AND MAINTAINED. ALWAYS FOLLOW MAKERS' INSTRUCTIONS.

BEFORE STARTING THE ENGINE, REMOVE AS MUCH OF THE LOAD AS POSSIBLE.

WHEN USING A STARTING ROPE, DO NOT WIND THE ROPE ROUND HAND OR WRIST. MAKE SURE THE ROPE IS NOT TANGLED OR FRAYED.

WHEN USING A STARTING HANDLE, HOLD THE HANDLE FIRMLY WITH THE THUMB ON TOP OF THE GRIP AND NOT ROUND IT. KEEP THE HANDLE AND SHAFT CLEAN AND LUBRICATED TO ENSURE EASY WITHDRAWAL OF HANDLE.

DO NOT REMOVE GUARDS.

KEEP CLEAR OF HOT, MOVING OR ELECTRICAL PARTS.

IF THE ENGINE IS INSTALLED IN AN ENCLOSED SPACE, VENT THE EXHAUST FUMES TO ATMOSPHERE.

WHEN TESTING FUEL INJECTORS, DO NOT DIRECT THE SPRAY AT ANY EXPOSED PART OF THE BODY – IT CAN PENETRATE THE SKIN.

Publication No. 355791

GENERAL INFORMATION

Engine rotation (standard)	... ...	Clockwise looking on the flywheel
Fuel	... ...	Light distillate diesel fuel, gas oil or DERV to BS 2869 Class A1 or A2
Fuel tank capacity (standard)	... ...	6.8 litre
Injector release pressure	900–1099 r/min ...	155 bar ± 2%
	1100–2000 r/min ...	217 bar ± 2%
Lubricating oil	... ...	Heavy duty to API : CC
Below 5°C	... ...	SAE 10W or 10W/30
5°C to 30°C	... ...	SAE 20W/20
Above 30°C	... ...	SAE 30
Lubricating oil capacity	PH1	2.8 litre
	PH1 with filter	3.4 litre
	PH2	5.7 litre
	PH2 with filter	6.5 litre
Lubricating oil pressure at full speed	... ...	2.4 bar minimum
Cylinder bore diameter (standard)	... ...	87.465/87.491 mm
Cylinder reboring diameters	... ...	0.51 mm oversize 1.02 mm oversize
Crankshaft journal diameters (standard)		
Main journal	... ...	60.287/60.274 mm
Crankpin and intermediate journal	... ...	60.325/60.312 mm
Crankshaft journal regrinding diameters (Main journal, crankpin and intermediate journal)	...	0.25 mm undersize 0.51 mm undersize 0.76 mm undersize 1.02 mm undersize
Bumping clearance	... ...	0.91/1.07 mm
Valve clearance (cold)	... ...	0.1 mm

Petter policy is one of continuous improvement and accordingly the company reserves the right to alter the specification and information given in this book without prior notice. In compiling this book every care has been taken but the information it contains must not be regarded as binding.

HAWKER SIDDELEY

PETTER DIESELS

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