MOTOSACOCHE SA

WORKSHOP MANUAL

1023-SRL
1035-SRL
1040-SRL
1045-SRL

75p

MAG

PETROL ENGINES

FOREWORD

The purpose of this workshop manual is to increase the technical knowledge of the mechanic and should help to carry out properly all engine repairs.

However, this manual does not replace the practical and theoretical training that should be acquired on service courses.

As a reference book it will be of great assistance at all times in the workshop. We would also recommend that reference be made to the illustrated list of parts, which shows the assembly of the engines. In order to assure complete and efficient repair and inspection service to owners of MAG engines, it is essential to have a workshop equipped with all the special service tools and, of course, a well trained staff.

This workshop manual and all other service bulletins that may contain information about technical alterations are intended for the personnel who carry out the repairs.

These publications belong to the workshop and should not be filed in the office.

We trust that the publishing of this manual will be of great assistance to every owner of a MAG engine.

MOTOSACOCHE S.A.
Geneva

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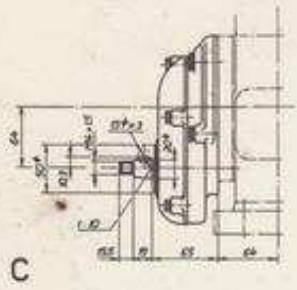

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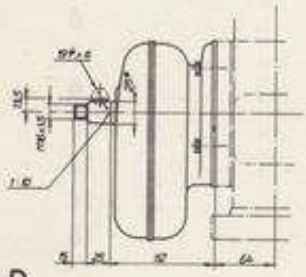

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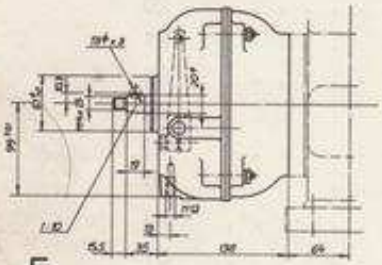

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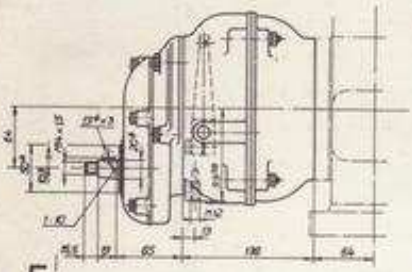

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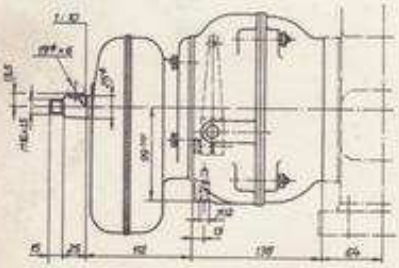

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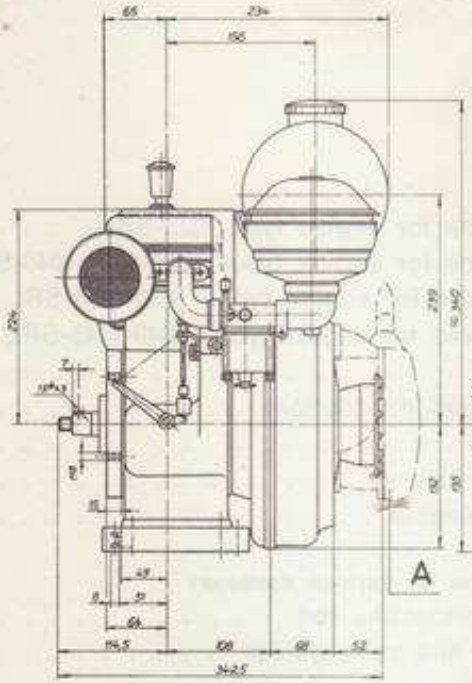

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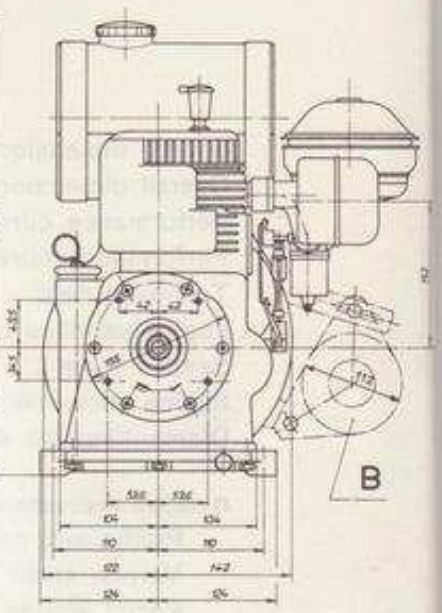

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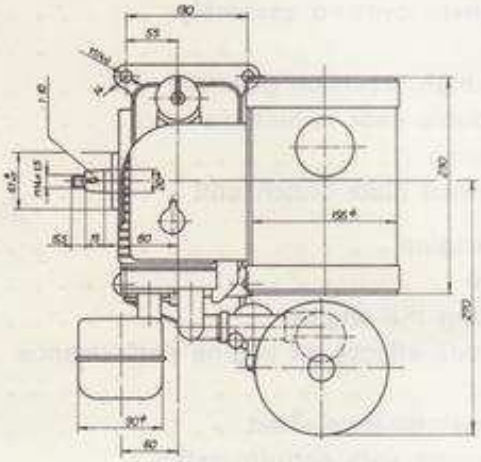

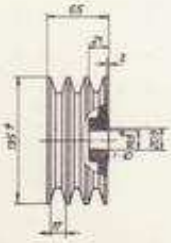

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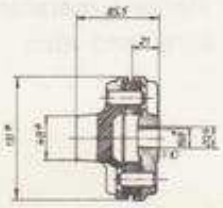


J

A = Recoil starter

B = Electric starter

C = Single gear reduction

D = Double gear reduction

E = Built-in lever operated plate clutch, or built-in centrifugal clutch, without gear reduction

F = Built-in lever operated plate clutch, or built-in centrifugal clutch with single gear reducton

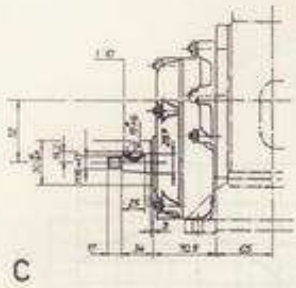
G = Built-in lever operated plate clutch, or built-in centrifugal clutch with double gear reduction

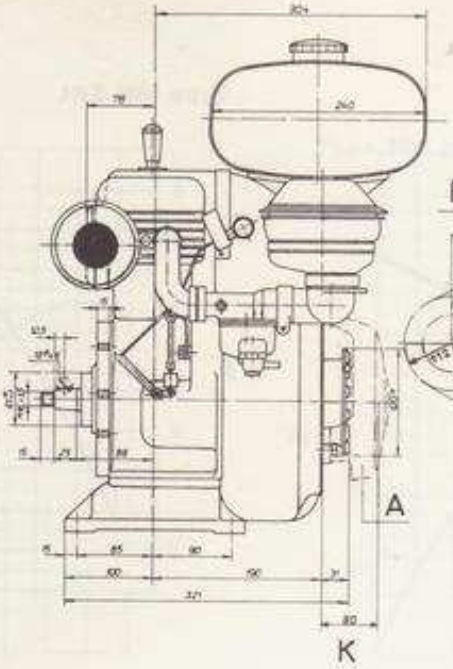
H = V-belt pulley

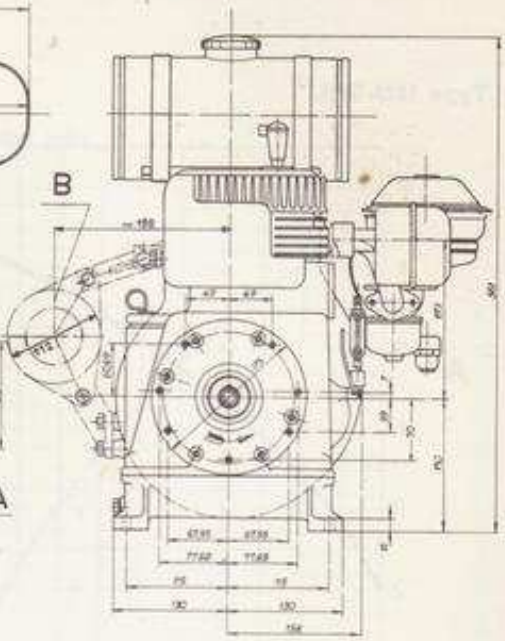
J = Flexible coupling

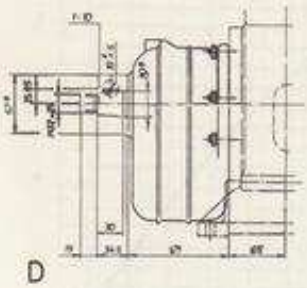
All dimensions shown are in mm. We reserve the right to make modifications in the interest of further developments.

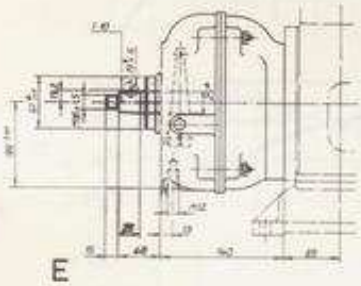
OVERALL DIMENSIONS FOR ENGINE TYPES 1035 - 1040 - 1045 - SRL

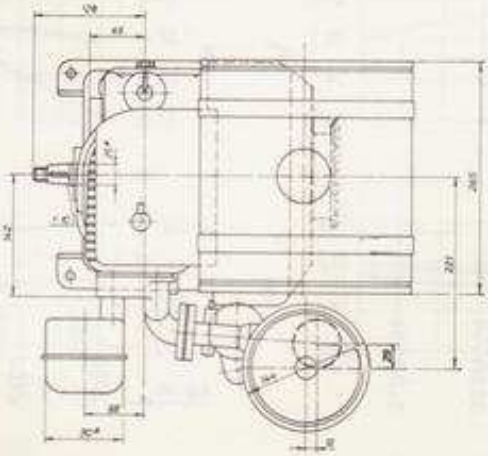


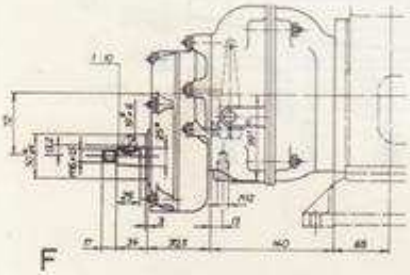


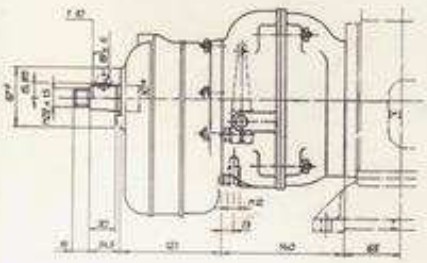


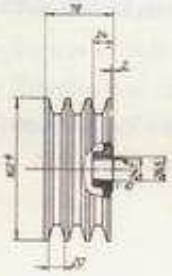


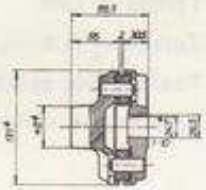












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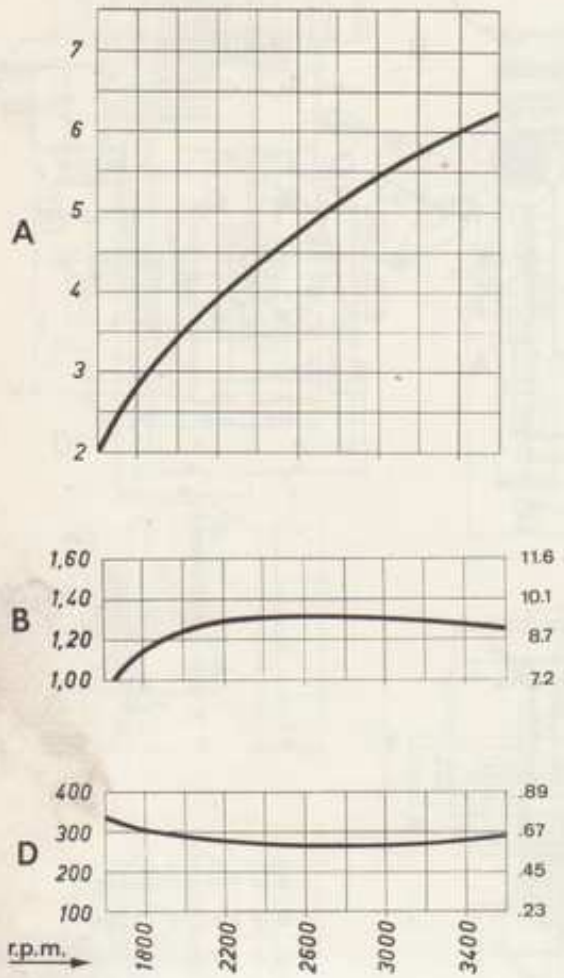
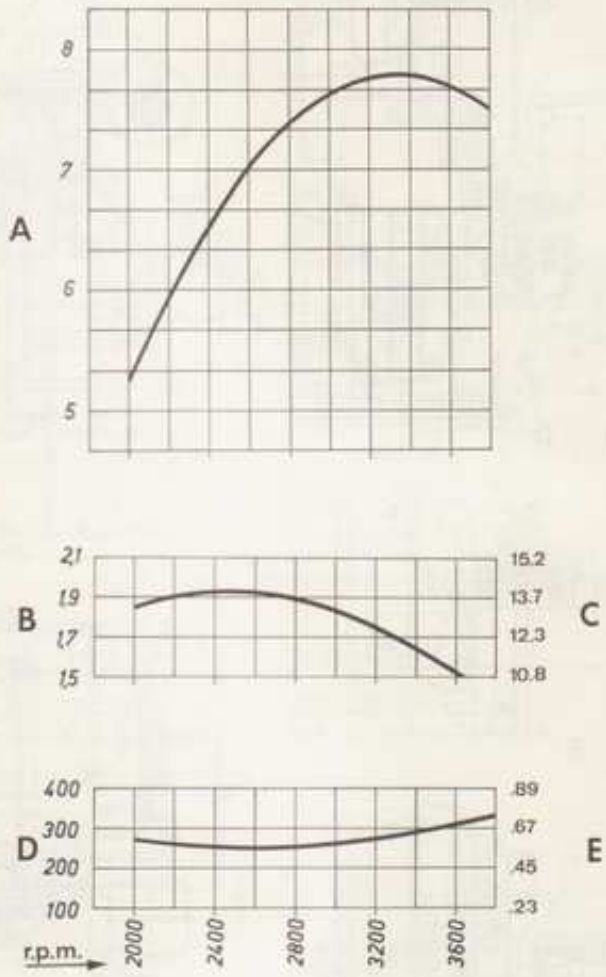
PERFORMANCE CURVES

Type 1023-SRL



Type 1035-SRL



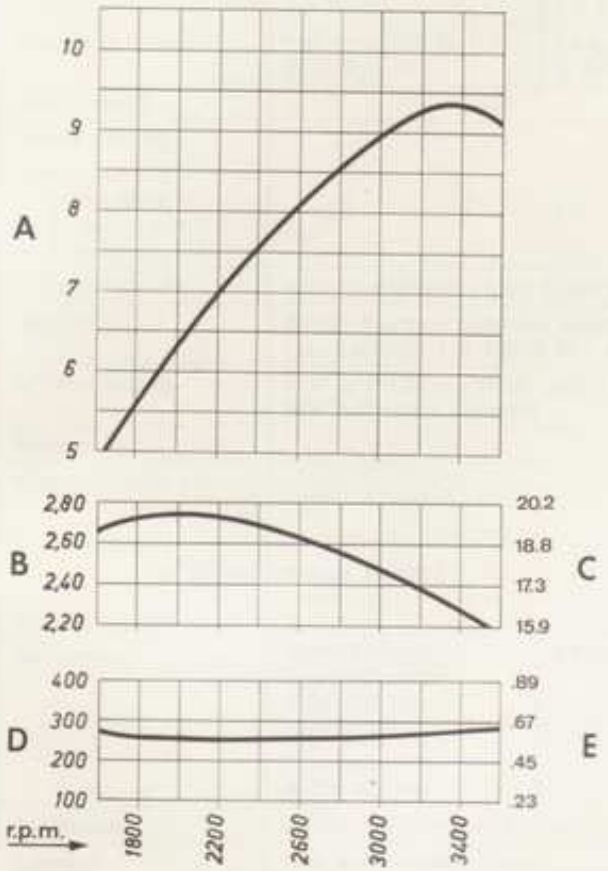
A = Output in B.H.P. according to DIN 70020
B = Torque in kpm
C = Torque in lb.ft.
D = Specific fuel comsumption in grammes/H.P. hr.
E = Specific fuel comsumption in lb/H.P. hr.

Variations to standard specification:

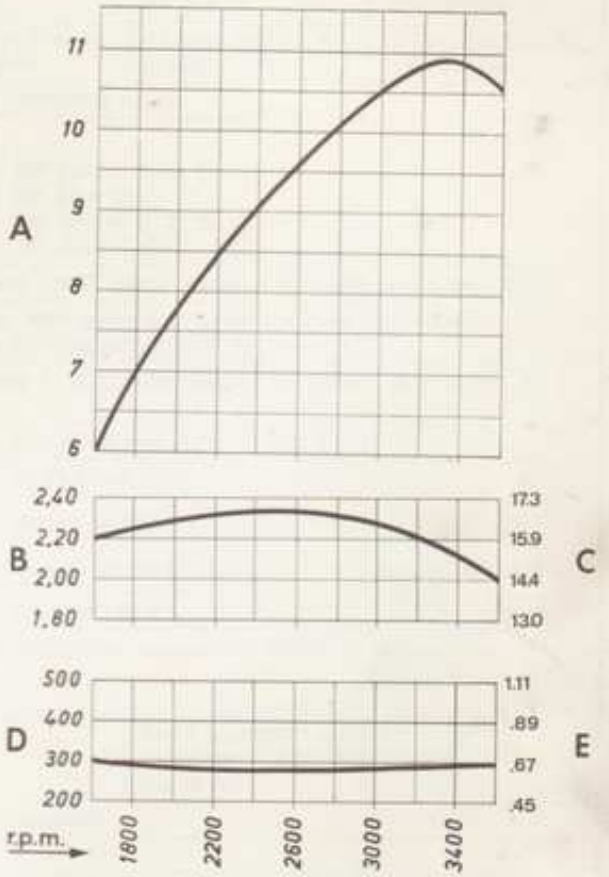
1. Radio and T.V. interferences fully suppressed on ignition circuit.
2. Equipment for running with petroleum or kerosens with double compartment fuel tank and three-way tap.
3. Oil filling plug and dipstick on the carburettor side.
4. Various flanges for special applications, on request.

PERFORMANCE CURVES

Type 1040-SRL



Type 1045-SRL



A = Output in B.H.P. according to DIN 70020
B = Torque in kpm
C = Torque in lb.ft.
D = Specific fuel consumption in grammes/H.P.hr.
E = Specific fuel consumption in lb/H.P.hr.

The stated engine power is valid for a barometer reading b_o = 760 mm Hg and an air temperature t_l = 20° C and for the fully run-in engine with a tolerance of approximately ±5%.

To convert power curves to standard conditions with specifications DIN 6270 (b_o = 736 mm Hg and t_l = 20° C), multiply the above mentioned capacity by the correction factor 0,97.

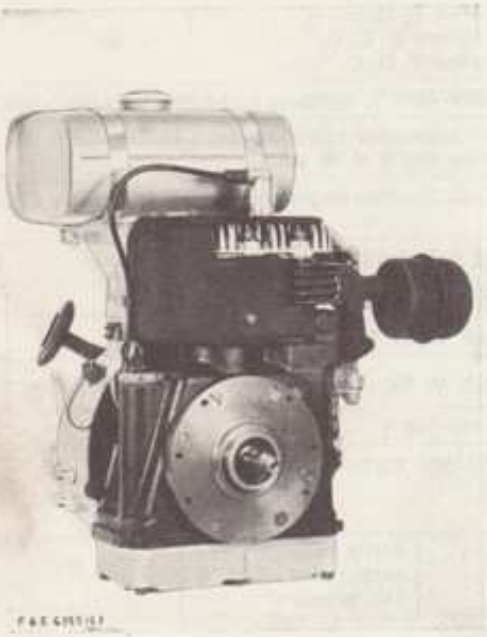
We reserve the right to make modifications in the interest of further developments.

TECHNICAL DATA

Description	Type 1023-SRL	Type 1035-SRL	Type 1040-SRL	Type 1045-SRL
Specification	air-cooled, single cylinder, 4-stroke, side valve petrol engine			
Capacity	232 cc (14.15 cu. in.)	353 cc (21.53 cu. in.)	391 cc (23.85 cu. in.)	450 cc (27.45 cu. in.)
Bore	70 mm (2.75")	78 mm (3.07")	82 mm (3.23")	88 mm (3.46")
Stroke	60 mm (2.36")	74 mm (2.91")	74 mm (2.91")	74 mm (2.91")
Compression ratio	6,5: 1	6,2: 1	6,35: 1	6,3: 1
Output	5-6 B.H.P.	7-8 B.H.P.	8-9 B.H.P.	10-12 B.H.P.
Maximum torque	1,25 kpm (9.05 lb. ft.) at 2600 r.p.m.	2,0 kpm (14.5 lb. ft.) at 2400 r.p.m.	2,1 kpm (15.2 lb. ft.) at 2200 r.p.m.	2,8 kpm (20.1 lb. ft.) at 2000 r.p.m.
Speed range	1800/3600 r.p.m.			
Valve timing: — Inlet opens — Inlet closes — Exhaust opens — Exhaust closes	25° before T. D. C. 65° after B. D. C. 64° before B. D. C. 18° after T. D. C.			
Valve clearance	with cold engine: inlet 0,10-0,15 mm (.004"-.006"); exhaust 0,15-0,20 mm (.006"-.008")			
Ignition	Bosch flywheel magneto assembly, with automatic spark advance mechanism, type LM/USB 1 V 143/16 R 1 with lighting coil 6 V 16 W			
Ignition timing	4° = 0,15-0,20 mm (0.06"-.008") before T. D. C. when engine is stopped, 22° before T. D. C. with full spark advance			
Breaker gap	0,4 ± 0,05 mm (.016" ± .002")			
Magneto edge gap	32-35,5 mm (1.26"-1.40")			
Spark plug: for partial load	Bosch W 95 T 1			
Spark plug: for full load	Bosch W 190 T 1	Bosch W 190 M 11 S		Bosch W 225 T 1
Spark plug gap	0,5 mm (.02")			
Carburettor	BING butterfly type carburettor 8/25/33-18 mm	AMAL butterfly type carburettor 348/21 ⌀ 22 mm		
	OBA butterfly type carburettor 26-CH 20 mm		BING butterfly type carburettor 8/25 S 119-18 mm	
Air cleaner	Oil bath air cleaner with washable element			
Silencer	Low back pressure type			
Starter	Rope start, recoil starter or electric starter (starter-generator) 12 Volt, 90 Watt			
Governor	Standard type governor, regulating accuracy = ± 7,5%; on request, precision governor, regulating accuracy = ± 2,5%			
Lubrication	Splash lubrication system, HD oil SAE 20-30 is recommended			
Oil sump capacity	approx. 0,8 litre (1.40 Imp. pint)	approx. 1,2 litre (2.1 Imp. pints)		
Fuel tank capacity	approx. 3,5 litres (6.16 Imp. pints)	approx. 7,0 litres (1.54 Imp. gallon)		
Extra available fittings	Lever operated plate clutch, built-in centrifugal clutch, flexible coupling, V-belt pulley			
Speed range for an engine speed of 3000 r.p.m. — Single gear	i = 1,5 (n = 2000 r.p.m.) i = 1,8 (n = 1670 r.p.m.) i = 2,0 (n = 1500 r.p.m.) i = 2,8 (n = 1070 r.p.m.)	i = 1,5 (n = 2000 r.p.m.) i = 1,8 (n = 1670 r.p.m.) i = 2,1 (n = 1430 r.p.m.) i = 2,8 (n = 1070 r.p.m.)		
Speed range for an engine speed of 3000 r.p.m. — Double gear reduction	i = 5,6 (n = 535 r.p.m.) i = 6,9 (n = 440 r.p.m.) i = 7,8 (n = 380 r.p.m.) i = 10,6 (n = 280 r.p.m.)	i = 5,6 (n = 535 r.p.m.) i = 6,6 (n = 460 r.p.m.) i = 7,9 (n = 380 r.p.m.) i = 10,4 (n = 290 r.p.m.)		
Weight: Engine fitted with fixing flange	34 kg (75 lbs.)	44 kg (97,1 lbs.)		48 kg (106 lbs.)
Weight: Engine fitted with base plate	35 kg (77,2 lbs.)	47 kg (104 lbs.)		51 kg (112,5 lbs.)

ENGINE VARIETIES AND DESCRIPTIONS

The MAG engine types 1023-1035-1040-1045-SRL have been found to be very successful due to the specific design for heavy duty operation on powered agricultural implements, construction equipment, garden tools, lawn mowers, etc. In consideration of the versatility of application, the engines should be equipped so that they are most suitable for their various jobs. The following photographs show the engines fitted with accessories, which are most commonly supplied.



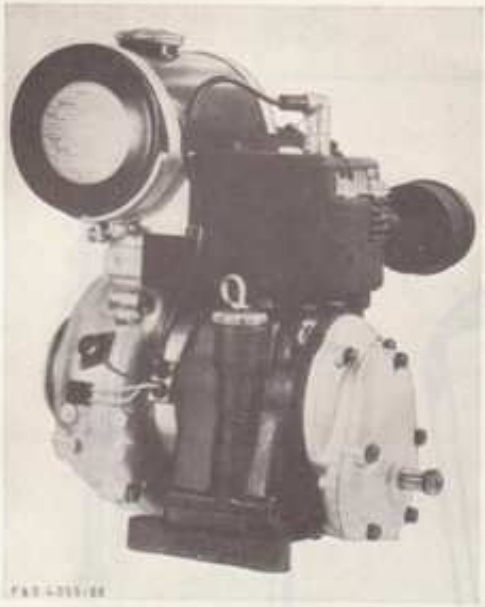
Engine fitted with fixing flange

For close coupled applications, the engine types 1023-1035-1040-1045-SRL, are equipped with a machined fixing flange.

Engine for running with petrol/paraffin

For this kind of operation, the engine is fitted with a double compartment fuel tank and a three-way tap. For these operating conditions the compression ratio must be altered by fitting a cylinder head, giving a lower compression ratio.

The carburettor setting is shown on the setting chart on page 52. The engine running with paraffin will lose approx. 10% of its power.



Engine with single, or double gear reduction

The engine types 1023-1035-1040-1045-SRL, can on request, be fitted with single or double gear reduction. The corresponding speed range is given at page 9 under "Technical Data".

Engine with centrifugal clutch

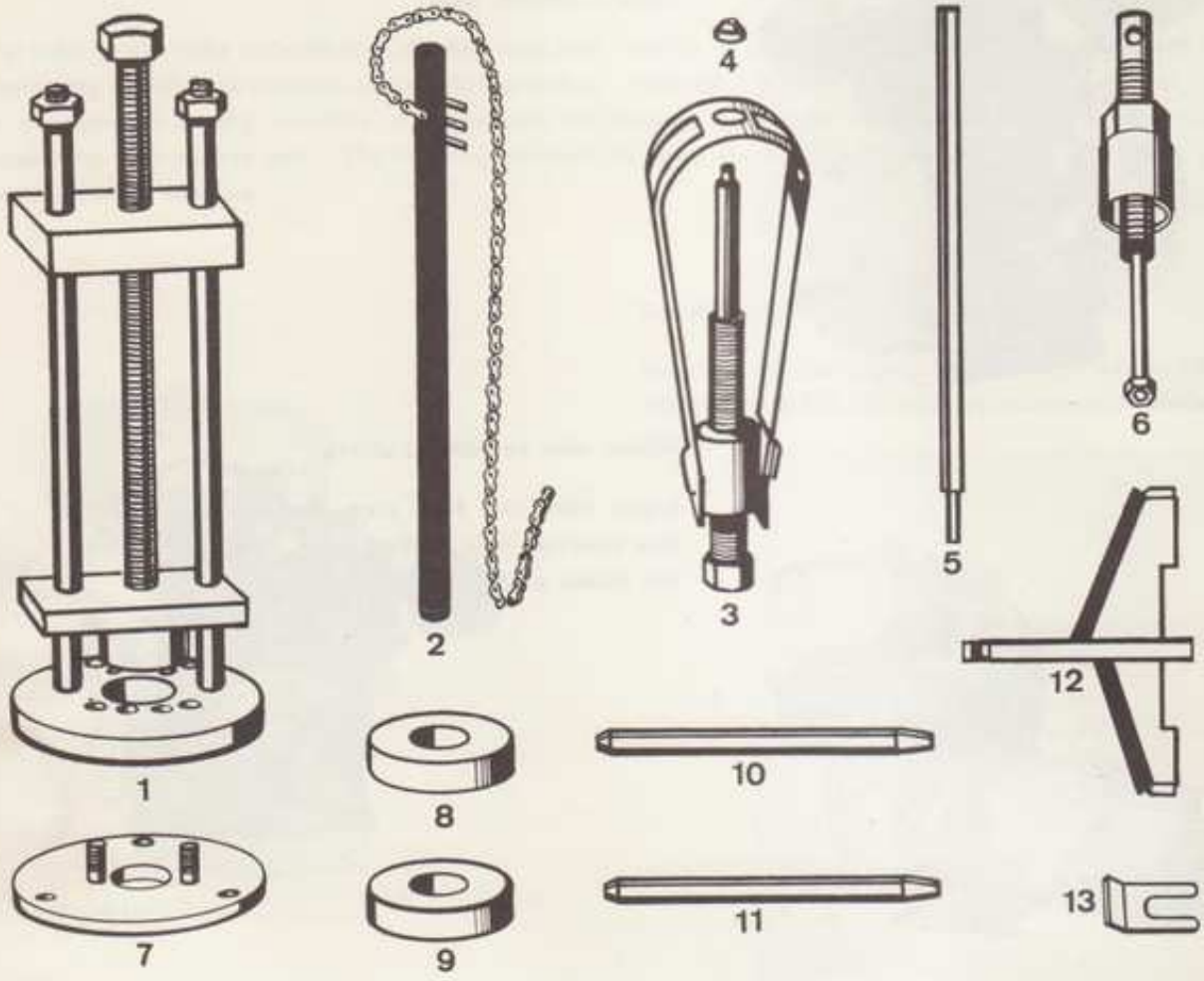
Engine fitted with base plate, precision or standard type governor, rope starting pulley, centrifugal clutch and double gear reduction.

Engine with lever operated plate clutch

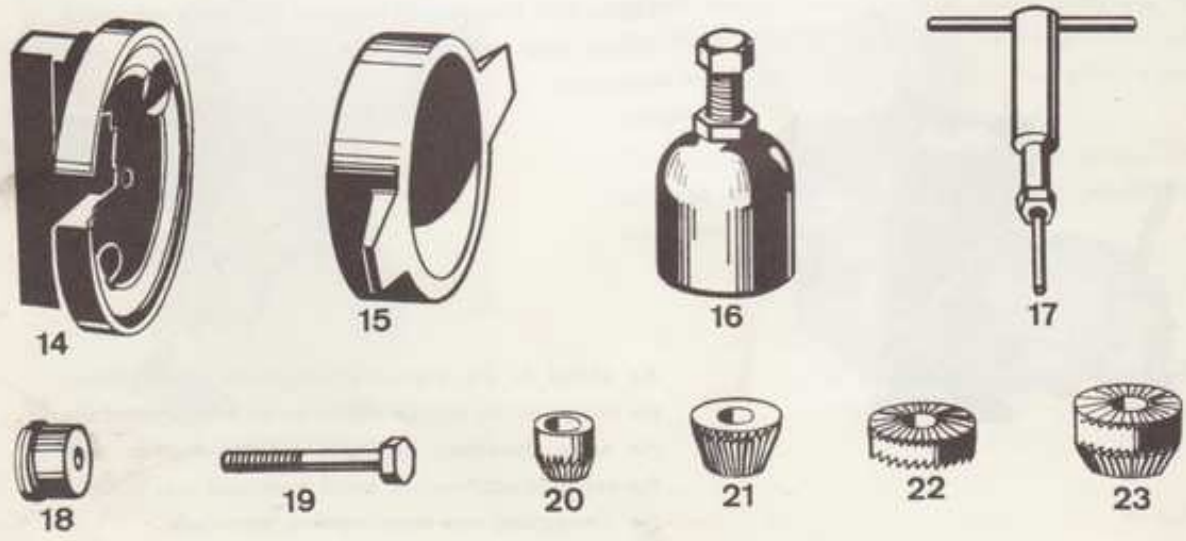
Engine with precision or standard type governor, recoil starter, lever operated plate clutch and single gear reduction.

As stated in the preceding adaptation descriptions, the design of the various engine types is fundamentally the same. However, by fitting out the engines with the available accessories, small deviations may arise in the dismantling and re-assembling procedure.

SERVICE TOOLS

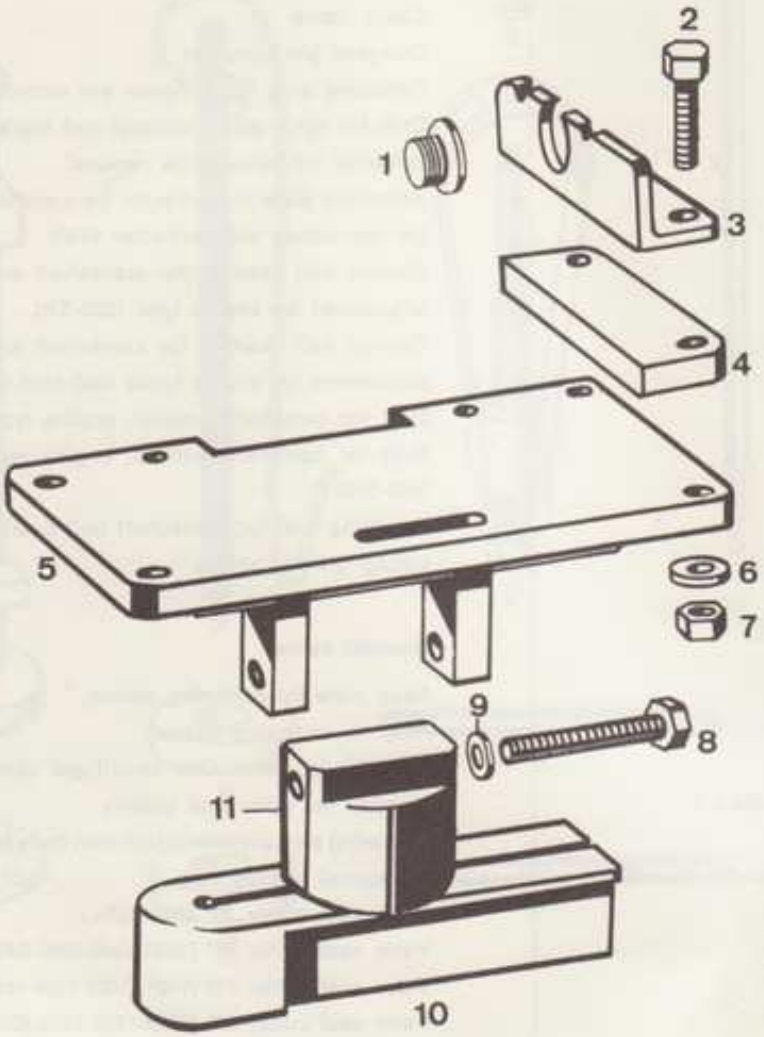


SPECIAL TOOLS



Ref. No.	Tool No.	Description
	6856	**Service tools - complete set**
1	6790	Flywheel extractor
2	6725	Chain clamp
3	6853	Gudgeon pin extractor
4	6860	Centering plug for gudgeon pin extractor
5	6842	Drift for valve guide removal and replacement
6	6852	Extractor for valve guide removal
7	6847	Attaching plate for extractor for crankshaft removal (in connection with extractor 6790)
8	6857	Dummy ball bearing, for crankshaft end clearance adjustment for engine type 1023-SRL
9	6858	Dummy ball bearing, for crankshaft end clearance adjustment for engine types 1035-1040-1045-SRL
10	6844	Drift for camshaft removal, engine type 1023-SRL
11	6859	Drift for camshaft removal, engine types 1035-1040-1045-SRL
12	6795	Retaining tool for crankshaft ball bearing
13	6792	Lifting tool for valves
		Special tools
14	6868	Base plate for centering device
15	6867	Ring for centering device
16	6873	Extractor for Scheuffele centrifugal clutch
17	DP 14699 x 1	Mandrel for valve seat cutters
18	6866	Centering plug (in connection with tools 6868 and 6867)
19	DIN 933-8G M8 x 60	Hexagonal headed bolt
20	368-26	Valve seat cutter 70° (1023-SRL)
21	368-35	Valve seat cutter 70° (1035-1040-1045-SRL)
22	367-38	Valve seat cutter 120°/140° (1023-1035-1045-SRL)
23	366-38	Valve seat cutter 90° (1023-1035-1040-1045-SRL)

ENGINE ASSEMBLY FIXTURE



Ref. No.	Tool No.	Description
	6864	**Engine assembly fixture** (complete)
1	DIN 910 M 30 x 1,5	Threaded fastening plug
2	DIN 931-8G M 10 x 35	Hexagonal headed screw
3	6861	Mounting bracket
4	6862	Spacer plate
5	6863	Main base plate
6	DIN 127 B 10	Washer
7	DIN 934-6S M 10	Hexagon nut
8	DIN 931-8G M 12 x 80	Clamping screw
9	DIN 125-St B 12	Washer
10	6865	Clamping device
11	6869	Hinge block

DISMANTLING THE ENGINE

Remove the engine from the machine and clean off all external oil and dirt. Drain the oil sump by removing the drain plug. Remove the sparking plug.

If the engine requires a general overhaul, dismantling should be carried out in the following sequence.

Fig. 1

Fuel tank - Oil bath air cleaner - Recoil starter

Fig. 1

Unscrew and remove the oil filler cap together with the dipstick. Pull off the fuel pipe from the carburettor fuel inlet banjo. Loosen the fuel tank straps and slip them off sideways. Remove the fuel tank (a) and the cork insulations. Be careful not to damage the fuel filter glass bowl.

Take off the oil bath air cleaner (b) and the elbow (e) with the support bracket. Unscrew and remove the recoil starter (c).

Silencer - Carburettor

Fig. 2

Remove the silencer (d) and, on the engine type 1045-SRL remove also the gasket. Loosen the throttle lever (e) which is fitted on the throttle butterfly shaft. Unscrew the inlet manifold (f) and remove it with the carburettor

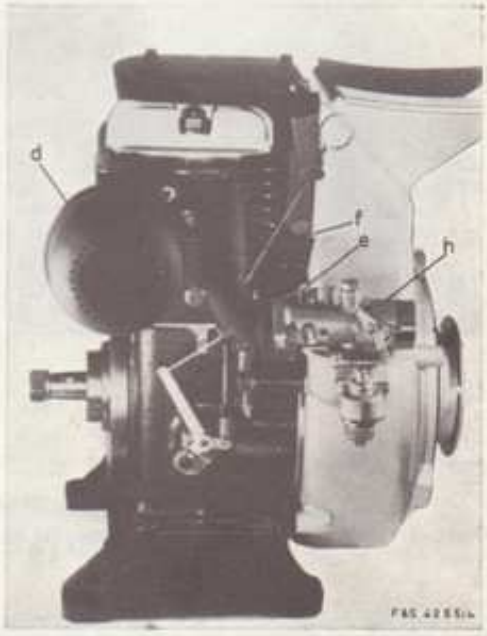


Fig. 2

(h), pulling off the throttle lever from the throttle butterfly shaft.

Take off the gasket and on the engine types 1035-SRL and 1040-SRL, remove also the centering ring.

Speed control mechanism - Cooling air baffle plates

Fig. 3

Loosen the clamping screw (a) and pull off the speed control cable from the cable connector.

Loosen the governor lever (x) and remove it from the governor cross shaft, together with the linkage rod, the governor spring, the cable connector and the cable return spring.

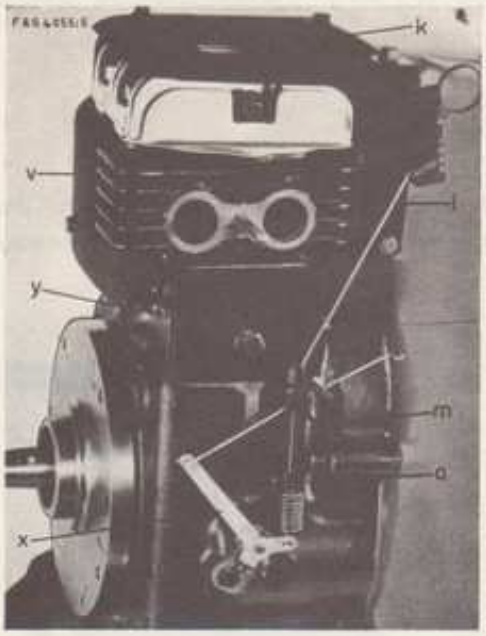


Fig. 3

Unscrew and remove the support bracket (m). Where fitted, remove the grooved speed control bracket (i), and then unscrew and remove the baffle plates (k) and (v).

Starting pulley - Screen for cooling air intake - Fan case

Fig. 4

Disconnect the lighting cables and the earthing wire from the junction box, and from the switch.

Fig. 4

Remove the rubber grommets for high tension lead, and for lighting cables and earthing wire.

Attach the chain clamp tool (x) to the starting pulley to prevent it from moving and then unscrew and remove the starting pulley (l).

Remove the screen (s) for cooling air intake.

Note:

Rotating or fixed screens are available for the engine types 1023-1035-1040-1045-SRL.

Unscrew and remove the fan case.

To attach the engine assembly fixture

Fig. 5

For the engine types 1035-SRL and 1040-SRL, insert the spacer (k) between the mounting bracket (b) and the base plate of the assembly fixture.

For the engine types 1023-SRL and 1045-SRL, fit the mounting bracket (b) to the base plate, leaving off the spacer plate (k).

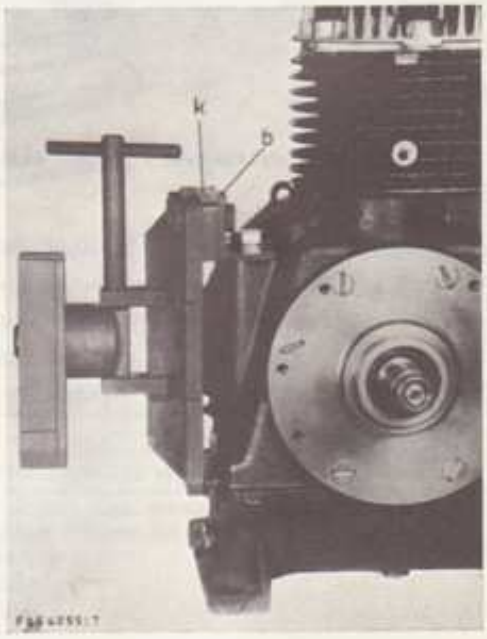


Fig. 5

Then fit the assembly fixture to the crankcase as illustrated in fig. 5. Make sure that the base plate touches the crankcase squarely, before tightening the threaded fastening plug.

Flywheel
Fig. 6

The engine can now be held in a vice as illustrated in fig. 6.

Unscrew and remove the flywheel cover ring.

Attach the chain clamp tool (x) to the flywheel to prevent the crankshaft from moving, as illustrated. Then loosen

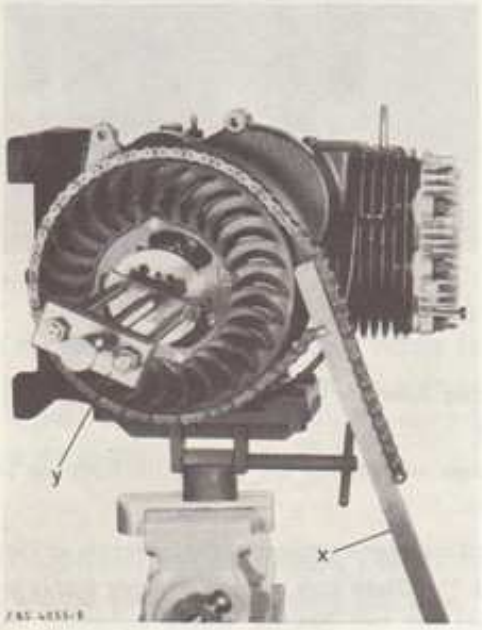


Fig. 6

and remove the nut and the plain washer, which are holding the flywheel to the crankshaft. Now remove the flywheel with the aid of the extractor (y) from the service tool kit and remove the flywheel key from the crankshaft.

Note:

Use M 8 x 25 screws for fixing the extractor (y).

Dust retaining ring – Stator plate – Cylinder head - Oil sump
Fig. 7

Unscrew and remove the dust retaining ring (o). That ring is not fitted on the engine types 1023-SRL and 1045-SRL. Then remove the plug connector from the high tension lead.

To assist when re-assembling, make sure that the location mark (k) exists, and then unscrew and remove the stator plate complete with coils and cables.

Remove the cylinder head (x) and the gasket. Remove the oil sump (h) and the gasket.

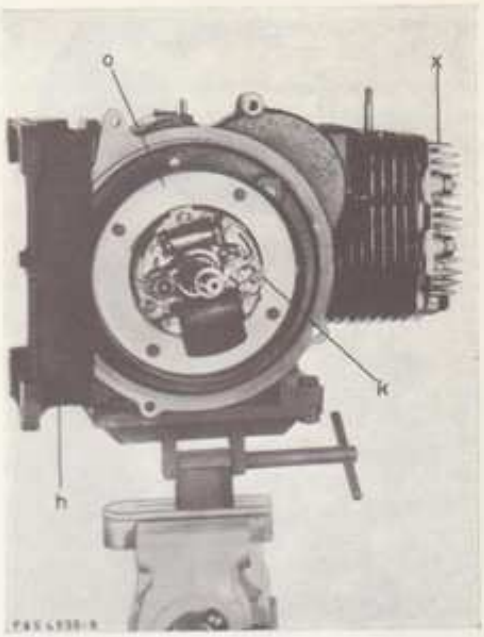


Fig. 7

To remove the valves
Fig. 8

Remove the inlet and exhaust valves as follows:

Remove the tappet chest cover (y, fig. 3) and the gasket.

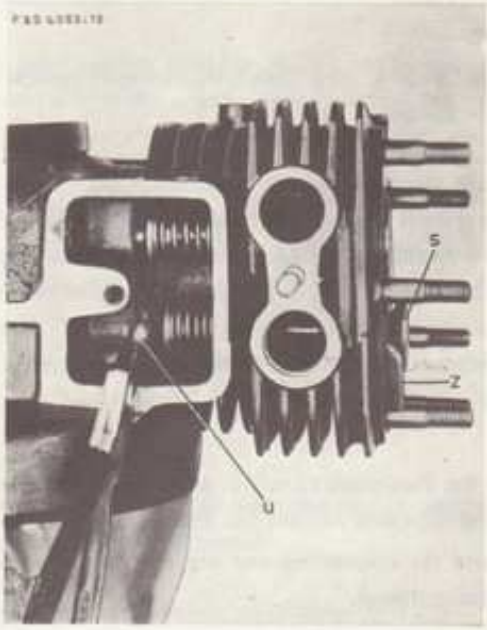


Fig. 8

Open the valve (s) and slip the lifting tool (z) under the valve head. Then turn the camshaft until the tappet is fully down and remove the adjusting cap (u) and any shims, which may be fitted, using long nose pliers (for instance Belzer No. 2461–210 mm).

Then lift the valve (s) slightly and take off the lifting tool (z).

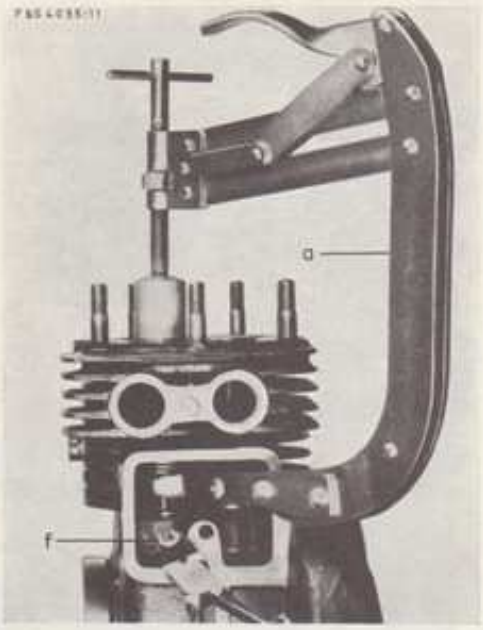


Fig. 9

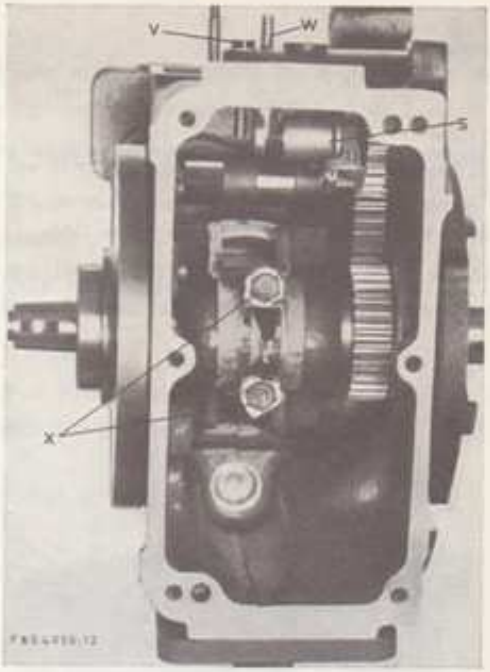


Fig. 10

Compress the valve spring, using a standard tool, one type of which is shown in fig. 9, item (a). Then remove the valve collet (f), using the previously mentioned long nose pliers.

Note:

On the engine type 1045-SRL, two split conical valve collets are used.

Remove the valve spring compressor (a).
Then remove the valve, the valve spring and the spring retainer, with the aid of a screw driver.

Piston – Governor assembly

Fig. 10

Turn the crankshaft to B.D.C. position. Bend back the locking tabs and remove the bolts (x).

Remove the connecting rod big end cap with the oil splashing dipper.

Turn the crankshaft to T.D.C. position. Now the piston and connecting rod can be pushed up the cylinder and taken out through the top.

Unscrew and remove the governor stop screw (v). Remove the circlip from the governor cross shaft (w) and remove the governor cross shaft.

Remove the governor gear assembly (s).

Bearing flange – Crankshaft

Fig. 11

Unscrew and remove the screws (u) from the bearing flange.

Attach the retaining tool (x) to the crankcase as illustrated in fig. 11. Make sure that the retaining tool is pressed against the ball bearing, before tightening the two fixing screws.

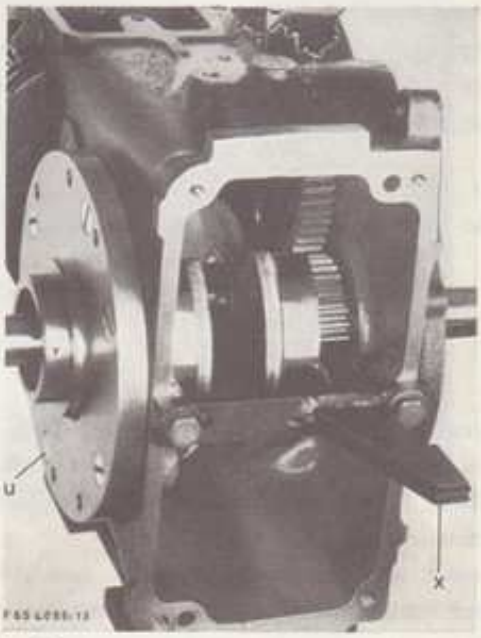


Fig. 11

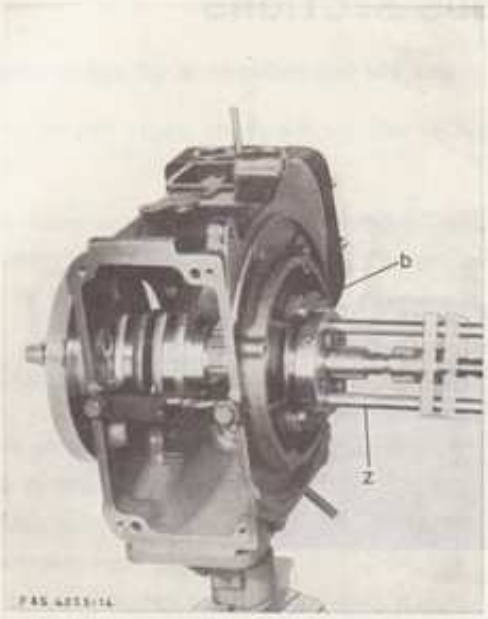


Fig. 12

Install the attaching-plate (b), using 3 M 5x20 screws. Then attach the extractor tool (z) to the plate (b) and press out the crankshaft complete with the bearing flange. Remove the gasket.

Note:

On the engine type 1023-SRL, remove now the bearing flange and the gasket, on the timing gear side.

Camshaft - Valve tappets - Valve guides

Fig. 13a and 13b

While the pin (o) is a tight fit at the flywheel end of the crankcase, a light fit is necessary at the bearing plate end. Therefore drive out the pin (o) to the bearing plate side, using the special drift, supplied with the service tool kit, and a heavy hammer. Then remove the camshaft and the tappets.

Press out the valve guides, using the drift (a) supplied with the service tool kit. Then remove the engine assembly fixture from the crankcase.

Fig. 13a

Fig. 13b

To press out the ball bearings

Fig. 14

Press out the crankshaft from the bearing flange. Then press out the ball bearing (r, fig. 13b) from the crankcase, and from the bearing flange, together with the oil seal.

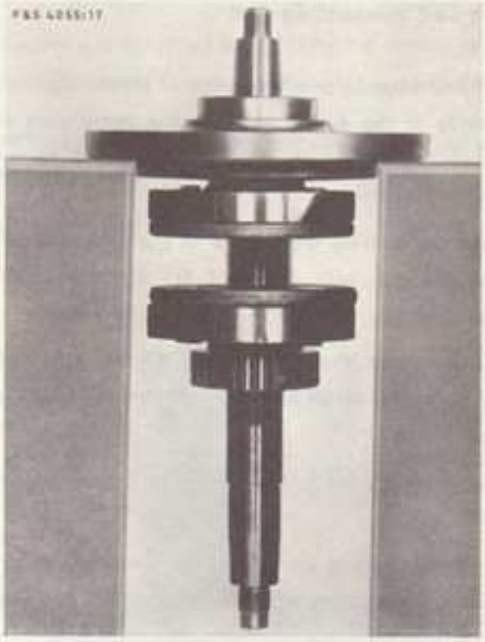


Fig. 14

If the ball bearing remains on the crankshaft when removing it from the bearing flange, remove the bearing from the crankshaft with the aid of a standard extractor tool.

Timing gear on crankshaft

If inspection of the timing gear reveals broken, excessively worn or otherwise damaged teeth, the gear must be replaced. To remove the gear, use a standard extractor tool. Replacement crankshafts are not fitted with timing gear.

Note:

On the latest engine models, the timing gear of the crankshaft is not replaceable.

Cylinder and crankcase assembly

On all engine types the cylinder can be rebored 4 times.

Now clean thoroughly and check for wear, all the parts.

For replacement, use only genuine parts manufactured by Motosacoche S.A.

Piston and connecting rod

Fig. 15

If it is intended to use the original piston again, mark the inside of the piston skirt on the same side as the numbers on the connecting rod big end to ensure correct re-assembly.

Remove the circlips from ends of the gudgeon pin and extract the pin with the tool (x) supplied with the service tool kit.

Check for wear the piston, the piston pin and the connecting rod small and big end bores, and replace the worn parts.

For re-assembly warm the piston in hot oil to approx. 40–50° C.

After re-assembling lock the pin with new circlips. Make sure that the circlips are fully engaged in the grooves.

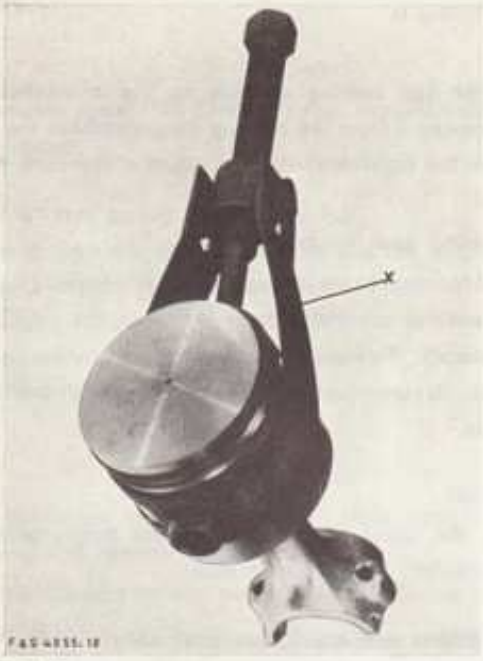


Fig. 15

Piston rings

If the cylinder does not need reboring and if the old piston can be re-used, always fit new piston rings.

Fig. 16a

Before installing new rings on the piston, check the ring end gap.

Fig. 16a

Fig. 16b

Insert the rings one at time in the cylinder bore and use the top of the piston to push them squarely into the bore, and measure the gap as illustrated in Fig. 16a.

Fig. 16b

Then measure the side clearance of each ring, in its corresponding groove.

Note:

The end gap should not exceed 0,8 mm (.032″), and the maximum admissible side clearance is 0,15 mm (.006″).

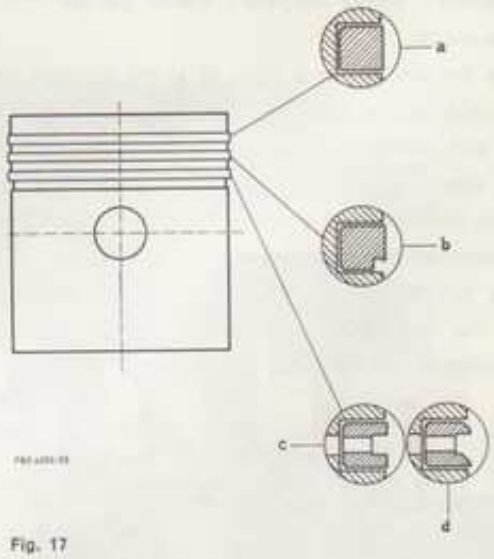


Fig. 17

Figure 17 shows how the rings must be fitted to the piston.

a = compression ring
b = oil scraper ring
c = oil control ring (first type)
d = oil control ring (second type)

Shell-bearings for connecting rod big end

On all engine types, the crank-pin can be reground 4 times.

When fitting replacement shell-bearings, ensure that they are correctly mounted in relation to the location tags and the oil holes.

Valves, seats and valve guides

Figure 18 illustrates the earlier type of valve guides as used on engine models 1035-1040-1045-SRL

a = inlet valve guide

b = exhaust valve guide

The arrow indicates the distinguishing features of the exhaust valve guide.

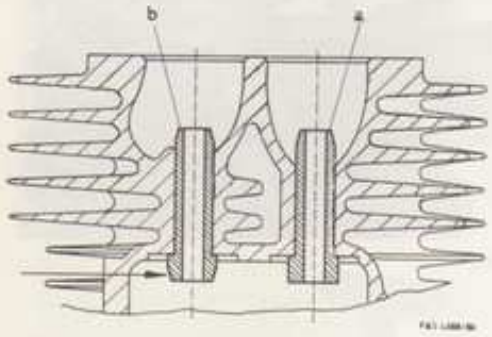


Fig. 18

Figure 19 illustrates the type of valve guides used on engine model 1023-SRL. These later valve guides may also be used on engine models 1035-1040-1045-SRL if the older guides (see fig. 18) are no longer obtainable.

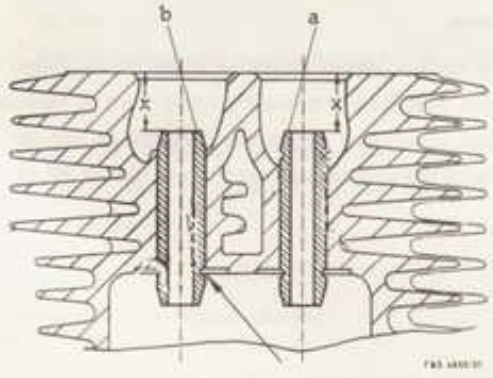


Fig. 19

To withdraw the valve guides

Fig. 20

The valve guides illustrated in fig. 18 can only be changed if the engine is dismantled completely.

If the valve guides fitted are of the type shown in fig. 19 it is not necessary to completely dismantle the engine.

To withdraw them use the extractor (x) as shown in fig. 20.

Fig. 20

To fit the valve guides

When fitting the valve guides the distance (x, fig. 19) must be adhered to. On engine type 1023-SRL this distance must be 13,5 ± 0,5 mm and, on the engine types 1035-1040-1045-SRL it must be 22,5 ± 0,5 mm (use the special drift from the service tool kit).

Note:

Even if the valve guides have previously been secured by circlips, it is not necessary to refit them to the new valve guides.

To recut the valve seats – To grind-in the valves

Fig. 21

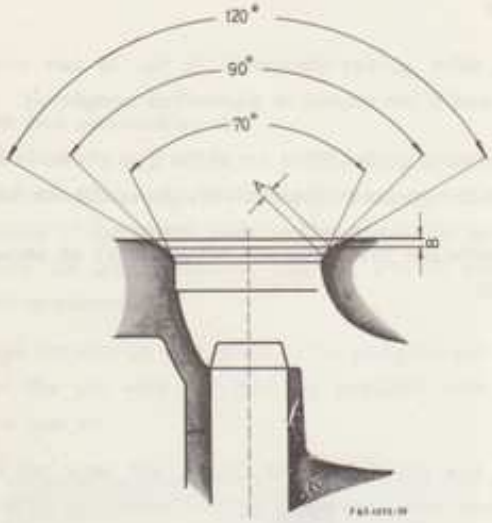


Fig. 21

When recutting valve seats it should be carefully noted that the distance (B) as illustrated does not exceed 1,5 mm.

If this distance is exceeded, the engine must be sent to the works or an appointed dealer for fitting of valve seat inserts.

The width of the valve seat (A) should be 1,0 to 1,5 mm.

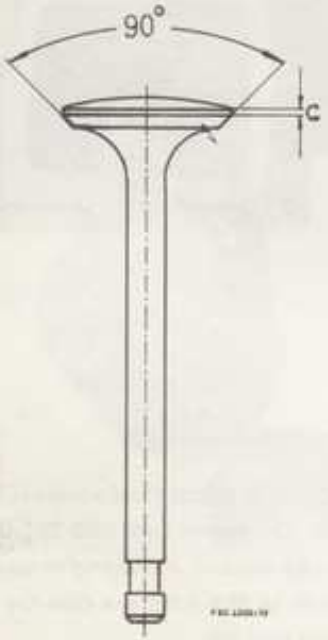


Fig. 22

If a valve has to be reground, first remove all carbon deposits.

Regrind the seating face of the valve on a valve grinding machine to an angle of 90°.

The depth (c) should be at least 0,8 mm.

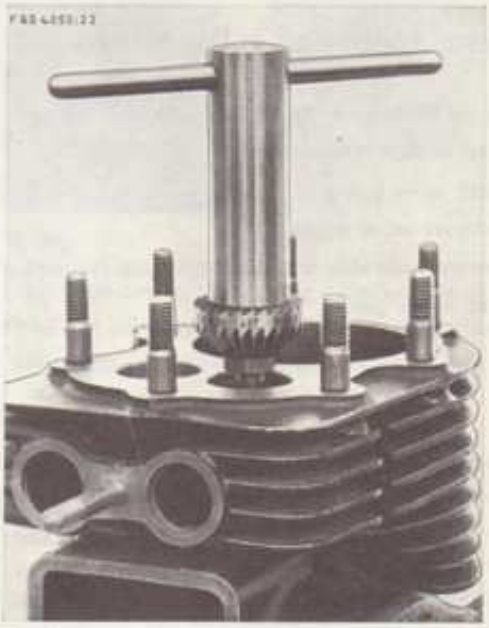


Fig. 23

When recutting, a satisfactory valve seat can only be obtained with an unworn valve guide.

To obtain good valve seats use a 90° cutter. To position the shape of the valve seat correctly use finally a 70° and 120° cutter.

If the valve is either new or is the original which has been reground it will be necessary to grind-in the valve face with the seat face, using a small quantity of grinding paste.

Make a further visual check in order to establish that the valve seat face is correctly positioned in relation to the valve face. Any necessary corrections can then be made with the appropriate cutters i.e. 120° or 70° cutters.

RECOIL STARTER

The recoil starter is supplied without or with overload clutch, which is fitted on the rope pulley.

Fig. 24a
Recoil starter without overload clutch

Fig. 24b
Recoil starter with overload clutch

If, during the starting process, this clutch slips excessively, it can be repaired at our factory, or at an appointed dealer.

To dismantle the recoil starter
Fig. 25

First remove the split pin from the centre spindle.

Fig. 25

The following parts should then be removed in this sequence:

1) the upper locking washer
2) the small coil spring
3) the lower locking washer
4) the upper braking washer
5) the braking lever
6) the lower braking washer
7) the lowest locking washer
8) the spacer washer.

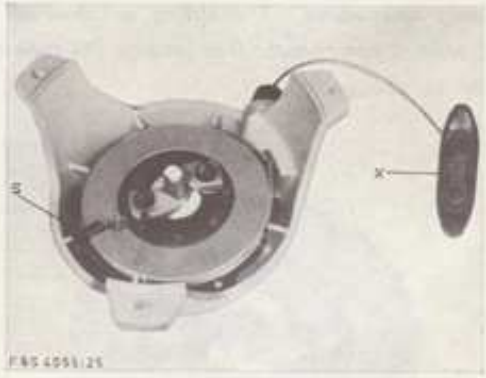


Fig. 26

Pull out the rope approx. 20 cm and prevent the rope pulley from turning back by inserting a steel wedge (s) as shown on fig. 26. Unscrew the clamp plate (x) and remove the starter hand grip. Take the steel wedge (s) out and allow the rope pulley to return, so that the rope can rewind on the pulley and the spring return to an untensioned position.

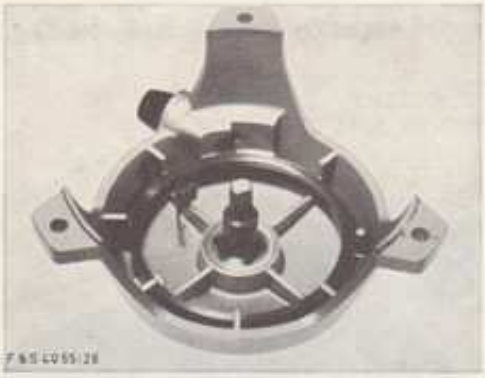


Fig. 27

Then draw off the rope pulley from the centre spindle and leave the recoil spring in position. Be careful the spring does not jump out of the housing. If it is in good condition do not remove the spring from the housing.

Fig. 28

If a defective spring has to be removed it is best to tap the starter-housing firmly on a flat surface, with the open side downwards. The spring will thus be controlled when it comes out. If necessary, the rope guide (m) can be changed.

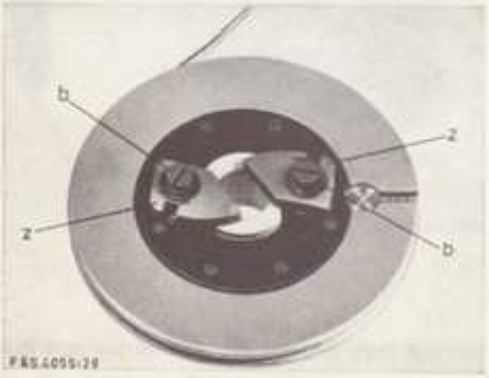


Fig. 29

Remove the rope from the pulley. If the pawls have to be renewed, remove the pivot screws (b) and withdraw the toothed-lock washers and plain washers.

Lift off the pawls (z) complete with torsion springs.

Reassembling the recoil starter

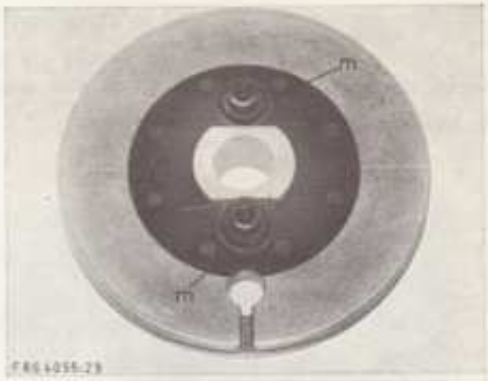


Fig. 30

Place the pawl springs (m) in the position as illustrated, so that their straight ends lie against the flat edge of the boss.

Place the pawls (z) on the pivots, ensuring that they are anchored on the cranked part of the spring end in the correct position on the pawls. Replace the pivot screws, complete with toothed lock washers and plain washers and tighten.

Ensure that the springs are not jammed and that the pawls pivot freely.

Fig. 31

Smear a little petroleum jelly on the whole length of the recoil spring and place it into the housing, anchoring the outer end over the pin, the spring windings pointing in the direction of the rope outlet. Lightly coat the centre spindle with Molyslip oil. Raise the recoil

spring slightly within its housing, and attach the inner end of the spring to the rope pulley, sliding this into position over the centre spindle with the pawls turned outwards.

Fig. 32

Lightly grease the rope with Molyslip Oil and slide it through the rope bush (m, fig. 28).

Thread the rope through the starter hand grip, place the rope in the recess as shown on fig. 33 and screw the clamp plate into position.

Turn the pulley counter-clockwise and fully wind the recoil spring.

Then let the pulley run back one turn and stop it in that position with a metal wedge.

Remove the metal wedge and turn the rope pulley so that the rope anchorage is positioned between the rope bush and the web (x).

Place the end of the rope into the pulley anchorage and allow the rope to be withdrawn slowly into its housing.

Fig. 33

Then reassemble the recoil starter replacing the components in the opposite sequence to that in which they were removed.

Place the split-pin through the hole in the centre spindle and splay the ends.

RECOIL STARTER (alternative type)

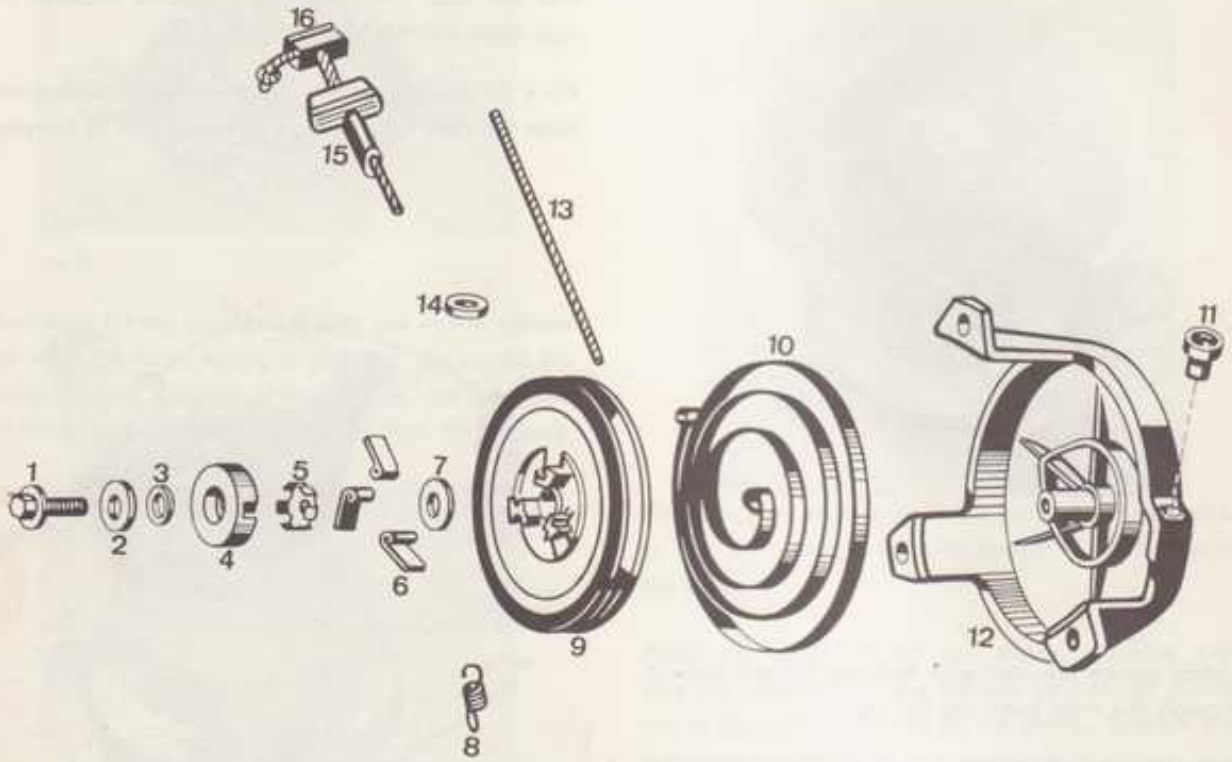


Fig. 34

To dismantle the recoil starter

Note:

All numbers appearing in this description refer to the exploded view of fig. 34.

To dismantle the recoil starter proceed as follows:

Remove the pawl retainer screw (1) and washers (2 and 3), the larger washer being on top.

Remove the pawl retainer (4) together with the braking spider (5), avoiding damage to the small spring (8) which is fastened to the retainer (4) and looped over the cast-in anchor pin on the pulley (9).

Remove the three pawls (6), and the large washer (7) which retains the sheave pulley assembly (9).

Pull approx. 20 cm (8") of rope from the starter housing (12) and knot at this point.

Insert blade of screwdriver under rope retainer (16) in the rubber handle (15).

When the retainer (16) has been freed from the handle (15) it can then be slid away from the knot concealed in the retainer enabling this knot to be unfastened and the handle (15), and retainer (16), to be removed.

Unfasten the remaining knot in the starter rope and, carefully controlling the speed of the rope's return by means of thumb pressure on the pulley assembly (9) allow the pulley to revolve.

Caution should be exercised here as the rewind spring (10) could fly out.

When fully unwound, the spring (10) will be in an untensioned state.

The sheave pulley (9) is raised and the rewind spring (10) should then be disengaged from its slot in the pulley.

Remove spring (10) from the housing (12).

Remove rope (13) from the sheave pulley.

Now clean thoroughly all the parts and check them for wear and damage.

Use only genuine Motosacoche parts for replacement purposes.

To reassemble the recoil starter

Assuming that the bush (11, fig. 34) is worn and requires replacing, the old bush must be drilled out using a 9,5 mm (3/8") drill.

Fig. 35

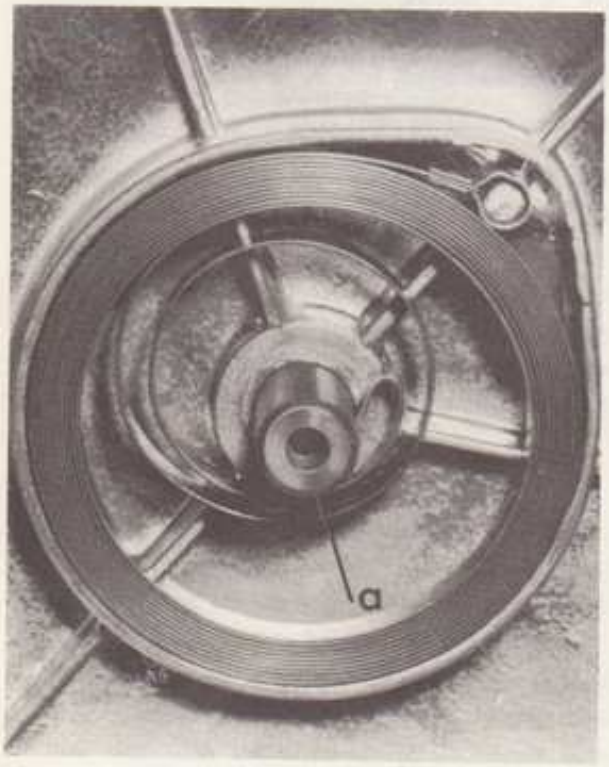


Fig. 36

After the new bush has been pushed home, splay the end within the housing, using a round nose drift, as shown in fig. 35.

Now smear petroleum jelly on to the spring (10, fig. 34) for its entire length.

Then the rewind spring can be fitted into the housing as shown in fig. 36.

Make sure that the pin (a, fig. 36) is in the centre of the spring coil, otherwise the pulley cannot be pushed fully home.

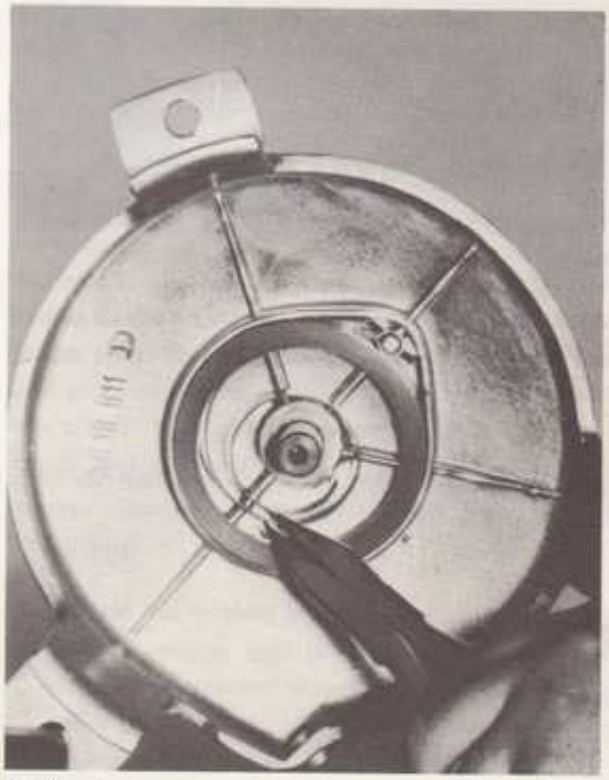


Fig. 37

It may be necessary to bend the spring **slightly** as shown in fig. 37.

Then smear a little petroleum jelly on the centre pin (a, fig. 36).

Next, replace the pulley making sure that the slot for the spring faces the "hook" of the spring in order that they can engage.

Once the spring is engaged in the pulley, rotate the pulley in an anticlockwise direction until it cannot be rotated further, this means until the spring is fully wound. Reduce the tension a little by allowing the pulley to turn back 1/2 a turn, controlling the rotation with thumb pressure.

In order to bring the two holes (a and b, fig. 38) into alignment, the pulley may have to be rotated back a little further.

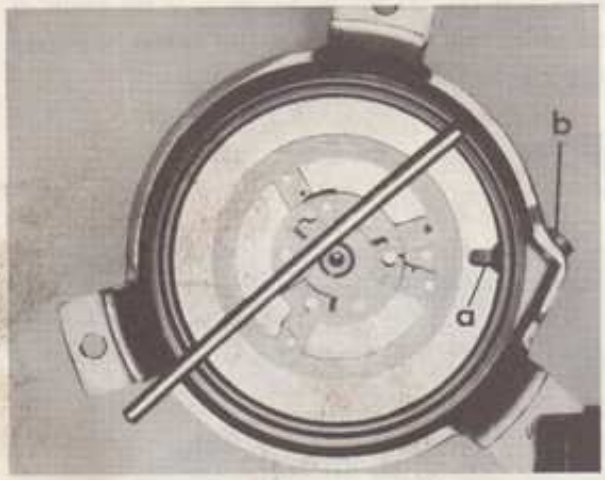


Fig. 38

At this juncture a tommy-bar should be placed across the pawl housing and the fixing bracket of the starter body.

This prevents the pulley rotating further.

Now make a knot at the end of the rope that has been heat sealed.

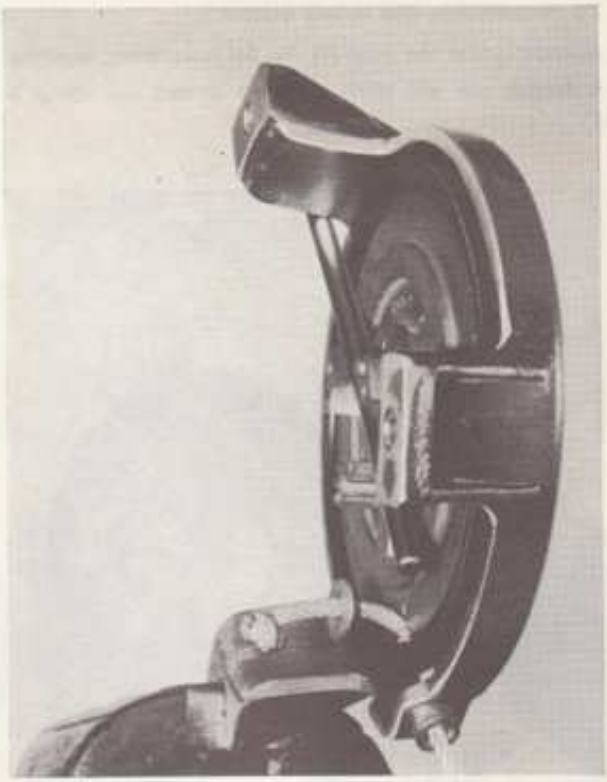


Fig. 39

Then thread the washer (14, fig. 34), on to the rope. The other end is then heated with a match to prevent fraying and to facilitate threading.

Next, insert the rope through the holes (a and b, fig. 38).

The replacement of the handle (15, fig. 34) and the retainer (16, fig. 34) follows.

Finally remove the tommy-bar and allow the rope to be withdrawn slowly into its housing.

Refit the remaining parts (1 to 8, fig. 34).

FLYWHEEL MAGNETO DYNAMO ASSEMBLY

To replace the ignition coil and the lighting coil

Fig. 40

1) Thread all wires through the hole in the base of the centering device and place the armature plate on to it.
2) The cylindrical shaped part of the centering device is then placed into position and fixed with the hexagon headed bolt. Finger pressure only is required to tighten the bolt, as excessive tightening will distort the armature plate and make it impossible to obtain correct breaker gap adjustment.
3) If the coils are faulty, fit replacements.
4) Place the centering ring into the centering device and press the new coils into position on the armature plate, locking them by tightening their fixing screws. The coils should be pressed against the inside of the centering ring. After removal of the centering ring, the correct air gap, i.e. the space between the coil armature and the flywheel magneto will be correct.

To replace the contact breaker assembly

If any of the following parts are damaged or worn they must be changed: the contact breakers, the pivot spindle, the pivot spindle bush, the breaker arm spring, the rubbing block (sliding heel) of the breaker arm.

1) Undo and remove the nut, which secures the contact breaker wire, remove the breaker arm retaining clips thus permitting the withdrawl of the breaker arm from its pivot spindle. It is important to notice the sequence in which the insulating washers are removed and to adhere to this sequence when replacing them. The same observation applies to the spacers washers on the pivot spindle.
2) Remove the contact carrier fixing screw and withdraw the contact carrier.
3) Unscrew the pivot spindle from the armature plate.

Fit new parts if necessary, and re-assemble, observing the following hints.

After being screwed tightly into position, the pivot spindle is locked, by placing a centre punch against it where it emerges from the underside of the armature plate, then striking the centre punch with a hammer.

Use only the recommended contact breaker set.

The two faces of the contact breakers should be in perfect alignment one with the other.
Before fitting, smear a little Bosch Ft 1 v 8 grease on to the breaker arm bush.
Smear some Bosch Ft 1 v 4 grease on to the felt pad and place a quantity of grease on the sliding heel of the breaker arm (Bosch grease is available from the Bosch Service organisation).

Always keep the contact points clean and free from oil and grease.

To adjust the contact breaker set

1) Make the sliding heel of the contact breaker arm touch the cylindrical shaped part of the centering device (the diameter of this device corresponds to the cam width).
2) Adjust contact carrier so that the contact breaker gap reads 0,4 $\pm$ 0,05 mm (.016" $\pm$ .002").

To change the condenser

1) Unsolder both wires attached to the condenser.
2) Push the condensor out of its socket in the armature plate.
3) Remove the locking burrs from the rim of the condensor socket.
4) Fit the new condensor into the socket and lock it into position by re-burring at three equidistant points.
5) Solder the two wires to the top of the condenser.

CARBURETTOR

Sizes of the jets and carburettor types have been determined during development at our works, and these settings give the most efficient and economic operation of the engine. It is inadvisable to alter these settings.

Providing the engine runs smoothly and quietly at low speed (without load) and progressively increases speed as the throttle is opened without choking or faltering, carburettor settings should not be altered. If the engine misfires or "knocks" or emits black smoke from the exhaust the mixture is too rich.

If the engine is difficult to start and, when running it blows back through the carburettor which may emit a blue flame this indicates a weak mixture.

With the recommended type of spark plug fitted, the correct carburettor setting and a clean air filter, the spark plug insulator should be a brown colour.

If the plug insulators and electrodes are wet and coated with carbon this indicates that the oil consumption is too high and the mixture is too rich. Conversely if the plug insulators are white coloured the mixture is too weak. The above comments are only valid if the correct type of spark plug is being used.

Only by observing the foregoing instructions can economical operation and perfect running be achieved from the engine.

Carburettor adjustment to compensate for differencies in altitude and climate

When the engine is being operated in regions with an altitude in excess of 1000 metres or in regions with tropical climate the carburettor setting will have to be varied to compensate for these respective atmospheric conditions. At high altitudes the oxygen content in the air is reduced, therefore this must be compensated by altering the carburettor main jet. In tropical regions the proportion of fuel to air must be reduced in order to suit the prevailing atmospheric conditions.

Carburettor setting

The carburettor setting should be in accordance with the engines' designed operating speed, and is obtained by the use of the correctly sized main jet. The setting can only be altered by changing this jet for either a larger or a smaller one.

At idling speed, the correct fuel-air ratio can only be obtained by adjustment of the idling mixture screw (see the settings for butterfly type carburettors under normal operating conditions on page 52).

The choke

The choke valve is designed to assist in the starting of a cold engine. Therefore, when starting an engine in warm weather, or re-starting an already warm engine, the choke should not be used. When the choke is closed, a vacuum is created in the mixing chamber and a rich mixture is obtained. When the engine is running the choke should be opened slowly.

On the BING type carburettor a "tickler" is fitted and by depressing this the float chamber can be flooded to facilitate easy starting of the cold engine.

Carburettor specifications

The following three sectional views show details of the types of carburettors fitted to the engine models 1023–1035–1040 and 1045-SRL. All three carburettors are of the "butterfly" type and consist basically of a mixing and a float chamber. The throttle valve controls the amount of the air-fuel mixture, which is needed to enable the engine to give a required power output. The choke is situated at the front of the mixing chamber and is only used when starting a cold engine.

The needle valve, which is operated by the float action in accordance with the fuel level, regulates the supply of petrol entering the float chamber. The BING or OBA butterfly type carburettor is fixed by a circular clamp and securely fastened with a locking bolt. These types of carburettor are only fitted to the engine models 1023-SRL. The AMAL butterfly type carburettor is fitted with a flange connection for attaching to engine models 1035–1040 and 1045-SRL.

In all cases the fuel is supplied through a flexible pipe leading from the fuel tank to the carburettor. The height of the fuel tank outlet in relation to the carburettor inlet must not be more than 100 mm.

BING butterfly type carburettor 8/25/33 for engine type 1023-SRL

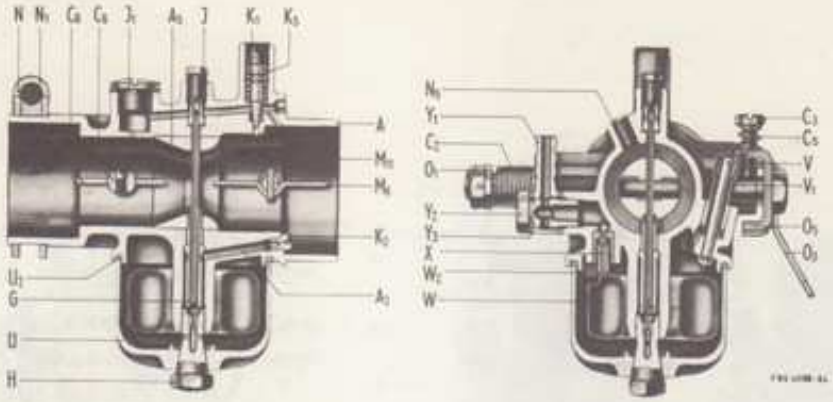


Fig. 41

A	Carburettor body	K_1	Air regulating screw	U	Float chamber
A_2	Compensating air passage	K_2	Compensating jet	U_2	Sealing ring
A_5	Venturi	K_3	Spring	V	Tickler
C_2	Return spring	M_6	Choke flap	V_1	Tickler spring
C_3	Throttle adjuster screw	M_{11}	Choke flap spindle	W	Float
C_5	Coil spring	N	Ring clamp	W_2	Hinge pin
C_8	Butterfly valve	N_1	Clamping screw	X	Needle valve
C_9	Butterfly valve spindle	N_5	Locating screw	Y_1	Fuel pipe connection
G	Mixing tube	O_1	Throttle lever	Y_2	Banjo screw
H	Main jet	O_3	Choke lever	Y_3	Sealing washer
J	Idling jet	O_5	Stop screw bracket		

OBA butterfly carburettor 26/CH for engine type 1023-SRL

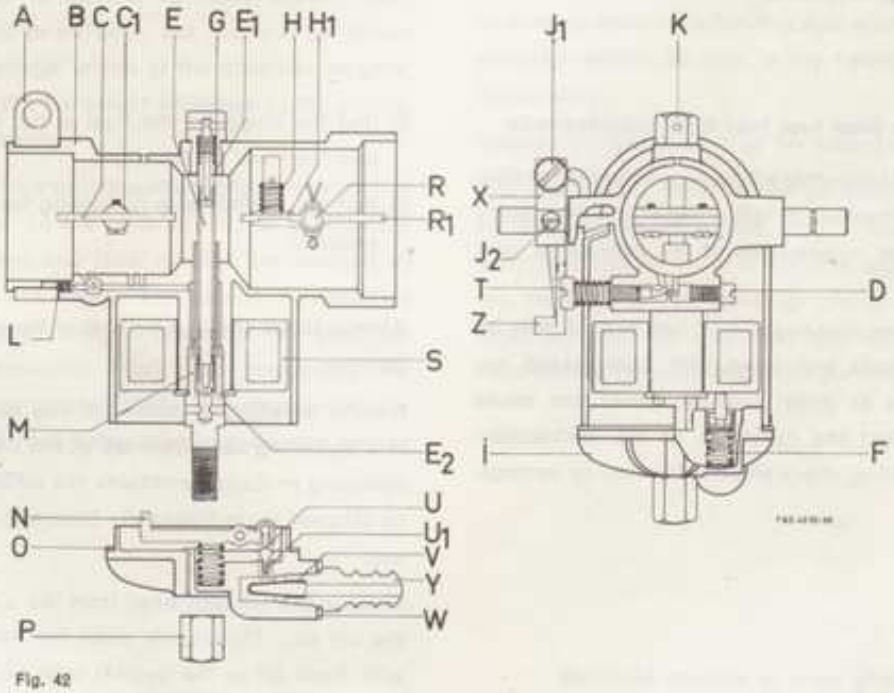


Fig. 42

A	Clamping ring	I	Float chamber cover	T	Air regulator screw
B	Carburettor body	J_1	Throttle stop screw	U	Float needle
C	Butterfly valve	J_2	Clamp screw	U_1	Float needle seating
C_1	Butterfly valve spindle	K	Jet tube top plug	V	Fuel filter gauze
D	Sealing screw	L	Set screw	W	Washer
E	Jet tube	M	Mixing tube	X	Stop screw bracket
E_1	Air corrector jet	N	Float lever	Y	Pipe connector
E_2	Main jet	O	Gasket	Z	Choke lever
F	Spring for float lever	P	Cap nut		
G	Spring for jet tube	R	Choke flap spindle		
H	Spring for choke valve	R_1	Choke flap		
H_1	Choke valve	S	Float		

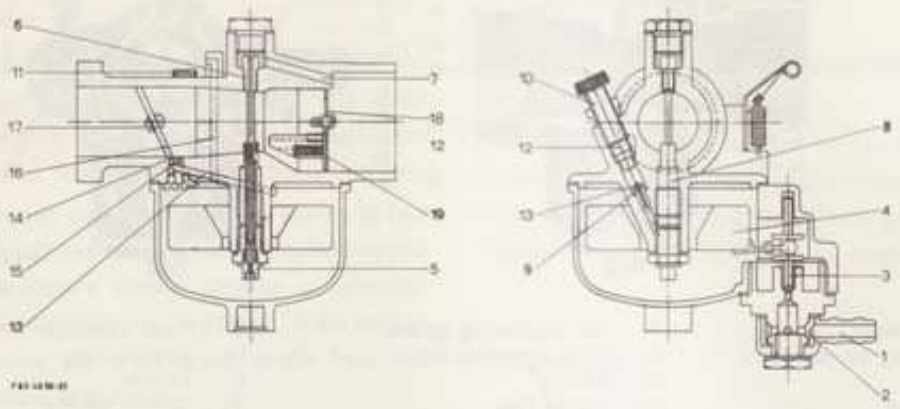


Fig. 43

1 Pipe connection
2 Fuel filter
3 Float needle
4 Float
5 Main jet
6 Emulsion tube
7 Compensating air passage
8 Mixing tube
9 Pilot jet
10 Air mixture screw
11 Throttle stop screw
12 Pilot air passage
13 Pilot mixture passage
14 Pilot mixture-outlet hole
15 Transfer hole
16 Float chamber air vent
17 Butterfly valve
18 Choke flap
19 Choke valve

Carburettor, air filter and fuel filter maintenance

Periodically the carburettor will require to be dismantled, cleaned and overhauled. Before dismantling, thoroughly clean the external components of the carburettor with petrol.

All holes, grooves, passages and jets should only be cleaned with petrol and dried with compressed air. Never use wires or drills, because these can cause damage and affect the operation of the carburettor. Before reassembling, check all parts for wear or damage.

Note:

Ensure:

1) that the butterfly valve is working smoothly.
2) that the hinge for the float is not bent because the fuel level will be incorrect.
3) that the needle valve is working freely and is seating properly.

Always follow the instructions of the carburettor manufacturer.

Regular cleaning of both fuel and air filter will assist in maintaining the efficiency of the carburettor. When operating in dusty conditions the oil bath air filter must be cleaned more frequently than specified for ordinary use.

Remove the oil bath bowl from the air filter and empty the old oil. Thoroughly clean the filter, refill the bowl with fresh oil to the correct level and refit.

STANDARD AND HIGH PRECISION GOVERNOR

Method of operation

Engines which need a high degree of accuracy in operation speed, require a high precision speed governor.

This type of governor has an accuracy of ± 2,5% e.g. for a governed speed of 3000 r.p.m. the actual speed could be between 2925 r.p.m. and 3075 r.p.m.

Engines for an application which does not require a high degree of accuracy for normal operation are fitted with a standard governor which has a precision of ± 7,5% e.g. for a governor speed of 3000 r.p.m. the actual speed could be between 2775 and 3225 r.p.m.

Both the high precision and standard governor are driven by the camshaft gear. The governor weights are hinged to the governor gear, and activate the movement of the governor plunger as the engine speed increases.

When the engine is started, normally without load, its speed will tend to increase, but this will be limited through the centrifugal action of the governor weights, which operate to the full extent permitted by the setting of the governor spring.

The movement of the centrifugal weights is transmitted via a lever system on the governor rod to the throttle valve, which closes and thus reduces the amount of mixture drawn into the engine. This results in a reduction of the engine speed and consequently the governor spring tension reasserts itself thus compelling the governor weights to close slightly. This means that the throttle valve will now automatically open and engine speed will increase.

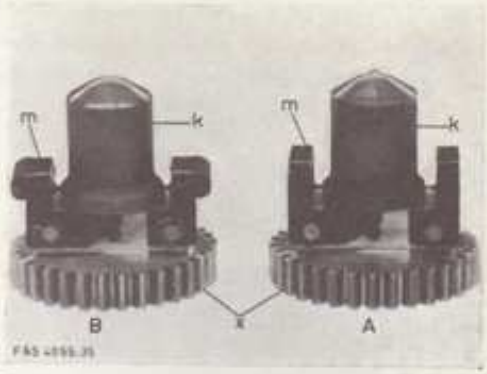


Fig. 44

Standard and high precision governor
Fig. 44

The high precision governor (A) distinguishes itself from the standard governor (B) only by the shape of the centrifugal weights (m) and the governor plunger (k).

In order to ensure trouble-free operation of the governor, attention should be paid to the following points when assembling:

Inspect the governor gear for damage or wear.

The attachment holes in the governor weights should be checked for excessive wear. Ideally they should operate smoothly without sticking and without having too much play. The governor plunger should operate smoothly upon its shaft and the face should be free from wear at the point where the governor weights touch.

SINGLE, AND DOUBLE REDUCTION GEARS

Removal and replacement of single, and double reduction gears

Fig. 45

On engine type 1023-SRL:

remove the 4 nuts (a) and, on engine types 1035–1045-SRL: remove 6 nuts and withdraw the single and/or double reduction gear. Remove also the gasket.

Fig. 46

Remove the recoil starter (c, fig. 1). Keeping the starter pulley in position with a chain clamp (x), unscrew the nut that holds the driving gear on the crankshaft. Withdraw the pinion with a standard extractor tool.

Note:

Before re-fitting the driving gear, degrease the taper bore and the crankshaft taper.

Replace the single and/or double reduction gear in the reverse sequence.

Dismantling of the single reduction gear

Fig. 47

Unscrew the nuts, removing them with the spring washers from the gear cover.

Warm the gear housing (g) and separate the 2 halves with the two M 8 bolts. Take off the gasket.

Then remove the main shaft complete with gear from the gear cover.

It may be necessary to free the main shaft by tapping it carefully with a light soft faced hammer.

Fig. 48

Remove the shim washers (m) from the main shaft. Warm the gear cover (d) and the gear housing (g). Remove both ball bearings (r) and gasket from the gear cover.

Care should be taken to avoid losing the dowel pins (h).

Fig. 47

Note:

Replacement main shafts are only supplied complete with gears.

Clean and check, replacing where necessary defective components.

To reassemble the single reduction gear

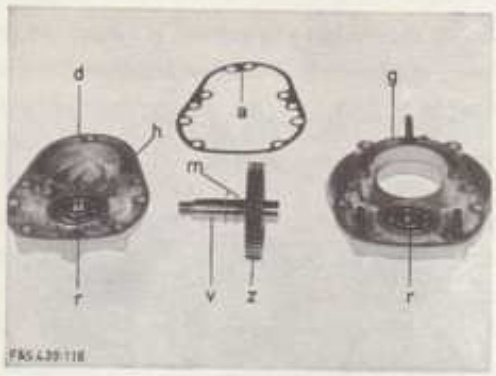


Fig. 48

Warm the gear housing (g) and the gear cover (d). Press the oil seal into the gear cover (d). Use a hand-press to fit the ball bearings (r) in the gear housing (g) and the gear cover (d).

It is recommended that the ball bearings are pressed in with the part number uppermost, so that it is readable.

Measuring the axial play of the main shaft
(The following letters refer to fig. 48)

Example:

Distance from flange of the gear housing (g) to the face of the ball bearing (r)	11,1 mm
Distance from the flange of the gear cover (d) to the face of the ball bearing (r)	+ 6,0 mm
	17,1 mm
width of the gear (z)	—16,0 mm
difference	1,1 mm

This difference is controlled by the use of shim washers (m) of 1,1 mm thickness fitted on the taper side of the main shaft. The correct axial play of the main shaft is obtained when the gasket (a) of 0,2 mm thickness is fitted between the gear housing (g) and the gear cover (d).

Warm the gear housing (g) complete with ball bearing (r), which has already been fitted, and press the main shaft (v) into the ball bearing. Fit dowel pins (h) and the gasket (a).

Warm the gear cover (d) in which the ball bearing (r) is already fitted, slide over the main shaft (v) and, using three M 8 nuts complete with spring washers, fasten together the gear housing and gear cover. Fill the gear box with the recommended lubricant (see lubrication chart on page 51).

To dismantle the double reduction gear
Fig. 49

Remove the nuts and spring washers which hold the three sections of the gearbox together.

Warm the complete gearbox unit, before separating the centre section from the two external sections. To do this use two M 6 bolts (if the gear box is of the type fitted to the 1023-SRL two bolts M 8 should be used).

Remove the gasket.

Fig. 49

Withdraw the main shaft from the centre portion of the gearbox and, if necessary, re-heat the gearbox unit to perform this operation.

Fig. 50

If the gearbox is of the type fitted to the 1023-SRL the nut M 8 (x) should be unscrewed and removed together with the spring washer. The inner housing should be separated from the centre section of the gearbox by using the appropriate bolts previously mentioned which are actually screwed in the inner housing.

Remove the gasket.

Fig. 50

Remove the layshaft complete with gears from the inner gear box housing, if necessary, reheat the housing.

Assuming that the ball bearings remain in the gearbox sections during the dismantling process. To remove the ball bearings, reheat the gearbox and firmly tap the inside surface with a soft faced hammer.

Remove the oil seal. Withdraw the ball bearings from both the layshaft and the main shaft with the appropriate extractor.

Note:

Replacement main shafts are only supplied complete with gears.

Clean and check, replacing, where necessary, defective components.

To reassemble the double reduction gear

Fig. 51

Warm the outer cover (d), the centre section (m) and the inner housing (g) of the gearbox.

Fit the oil seal and ball bearings (r1, r2, r3, r4) into the three sections of the gear box by using a handpress.

The ball bearings should be fitted so that the identification mark is visible.

Press the layshaft (u) into the bearing of the inner housing (g) of the gearbox.

Fit the 2 hollow dowel pins (h) and the gasket (a).

Then fit the centre section (m) on to the inner housing of the gearbox. Refitting, and tightening the nut (x, fig. 50).

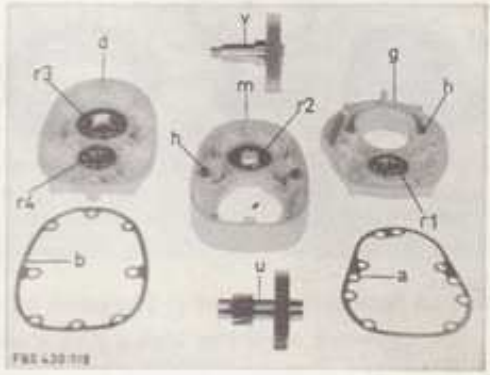


Fig. 51

Place a shim washer of 0,6 mm thickness on to the ball bearing (r2) in the centre section and press in the gear shaft (v).

(If the double reduction gear is of the type fitted to the engine models 1035-1045-SRL, press the gear shaft into the ball bearing of the centre section, then refit the complete centre section on to the inner housing of the gearbox. Fit the shim washers of 0,6 mm thickness).

The fitting of the second gasket (b) determines the axial play of the reduction gear and the main shaft.

Fit the two hollow dowel pins (h) and slide the outer cover (d) over the main shaft (v) and press firmly into position by using a suitable hand press.

The gear box sections can then be finally bolted together.

Fill the gearbox with the recommended lubricant (see the lubrication chart on page 51).

CENTRIFUGAL CLUTCH

For certain applications where engines are subject to a heavy starting load, or are likely to encounter "shock" loading when working, it is advisable to have an automatic type of clutch.

This type of clutch operates with spring loaded centrifugal weights which are controlled by the engine speed.

Whilst the engine is running at a low speed, the springs retain the centrifugal weights in a disengaged position. The clutch driven member on the output shaft therefore remains stationary.

As the engine speed increases, the centrifugal weights are thrown outwards and press against the clutch driven member causing movement to be transmitted to the driven shaft, operating the equipment to which the engine is attached. The clutch weights and the tension springs are designed so that the clutch does not operate when the engine idles.

Above idling speed, the clutch commences to engage and when 4/5 of the max. governed speed is reached, the full torque loading is transmitted.

To dismantle the centrifugal clutch

Fig. 52

Remove any external attachments (e.g. single-or double reduction gear, flat belt pulley or V-belt pulley).

By rotating the output shaft, line up the holes in the clutch housing and clutch driven member.

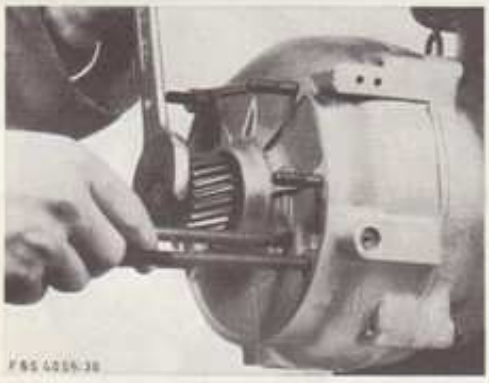


Fig. 52

Insert a 10 mm ⌀ rod through the holes so that the unit is locked.

Unscrew and remove the centre nut and spring washer.

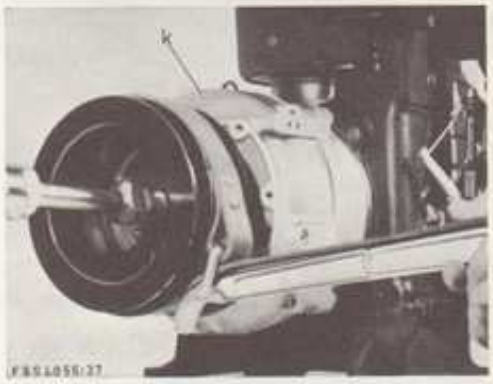


Fig. 53

If a flat belt pulley or V-belt pulley is fitted to the output shaft, it is recommended that a strap clamp be used to hold the pulley in position when unscrewing the centre nut.

Use a standard extractor tool for withdrawing the pulley. Remove the P.T.O. section of the clutch housing (k).

Fig. 54

Hold the output shaft in a vice fitted with protective vice clamps. Unscrew and remove the centre nut with the spring washer.

Remove the clutch driven member (t) using an extractor (z).

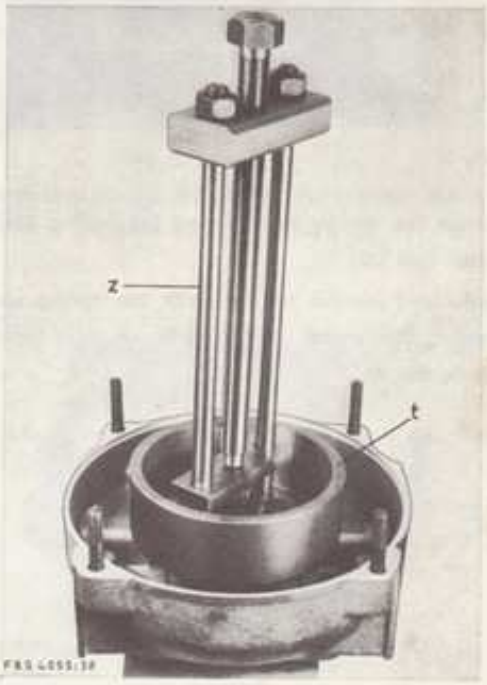


Fig. 54

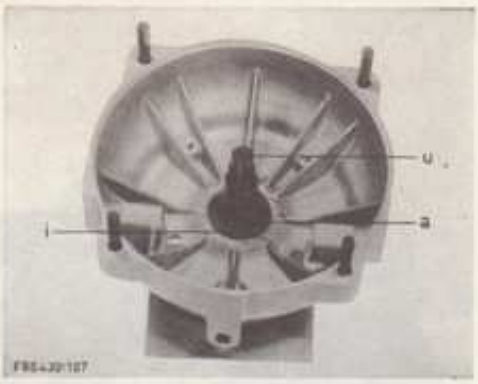


Fig. 56

Remove circlip (a). Withdraw washer (i).

Press out shaft (u). Lift off the oil deflector washer.

Remove circlip which retains the ball bearing.

Warm the housing and press out the ball bearing.

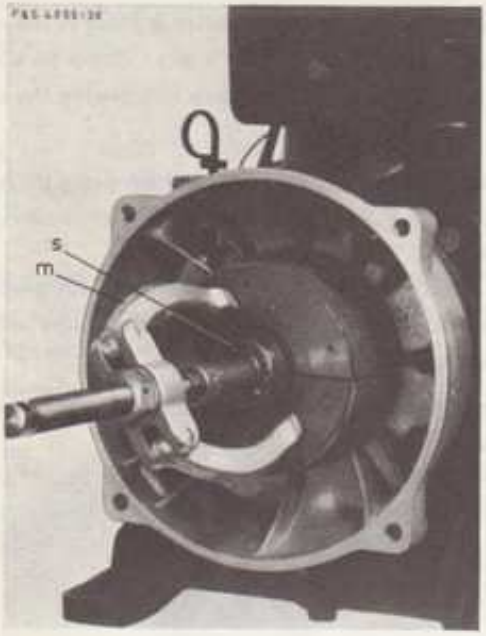


Fig. 55

Withdraw the centre ball bearing (s) with a standard extractor tool (m).

Unscrew and remove the nut with the spring washer, by holding the starter pulley (l, fig. 4) with the chain clamp (x, fig. 4).

Use the extractor for removing the centrifugal clutch (see service tool kit).

Remove clutch housing, engine side.

Clean and check, replacing where necessary, defective components.

To reassemble the centrifugal clutch

If the engine has been reassembled to the stage where the centrifugal clutch can be attached, proceed as follows:

On engine types 1035-1040-1045-SRL, attach the clutch housing engine side with six socket headed screws M 8 x 45 (for engine type 1023-SRL fit with four hexagon head screws M 8 x 25).

First remove all grease and oil from the taper shaft.

Then fit the centrifugal clutch using the hexagonal nut and spring washer.

Refit the centre bearing of the clutch.

Warm the drive side clutch housing and press in the ball bearing.

Note:

This bearing is lubricated with a special bearing grease and this must not be washed out before or after re-assembling.

Refit the circlip, which secures the ball bearing.

Refit the shaft complete with its oil deflector washer.

The cover washer and, if necessary, the appropriate number of shim washers are refitted, the circlip finally being fitted.

At this juncture, the taper shaft should be cleaned to remove all oil and grease, then the clutch driven member can be refitted and locked into position using the nut M 8 x 1,5 and spring washer.

The drive side housing is then fitted to the engine side clutch housing and secured with nuts M 8 and spring washers.

Replacement of the gear pinion, or pulley follows.

MANUALLY OPERATED PLATE CLUTCH UNIT

If the engine is fitted witht his assembly, the following procedure should be adopted when dismantling and reassembling.

Dismantling

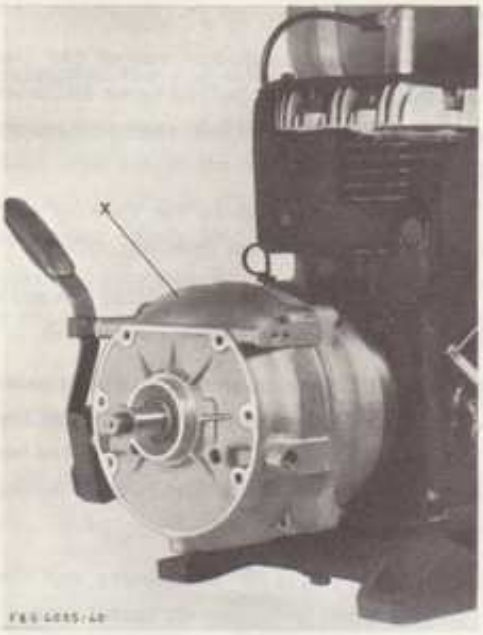


Fig. 57

Remove any external attachments (e.g. single or double reduction gear, flat belt pulley or V-belt pulley).

Unscrew and remove the four nuts M 8 and spring washers.

This allows the drive side clutch housing (x) to be withdrawn.

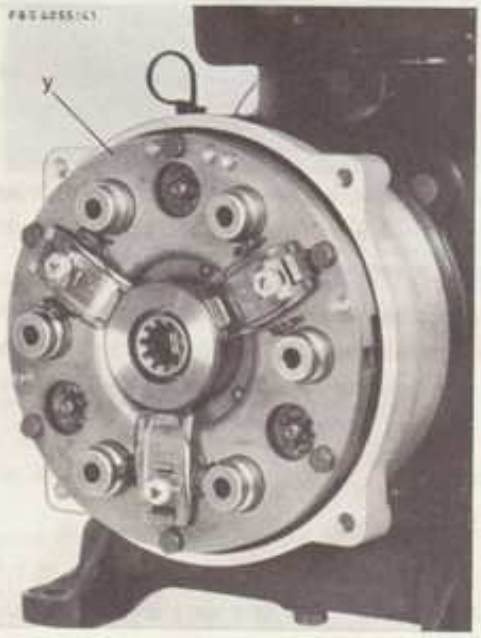


Fig. 58

Fig. 58

Unscrew the clutch cover assembly (y).

Remove driven plate.

Withdraw the ball bearing from the clutch flywheel-drive plate with a standard extractor.

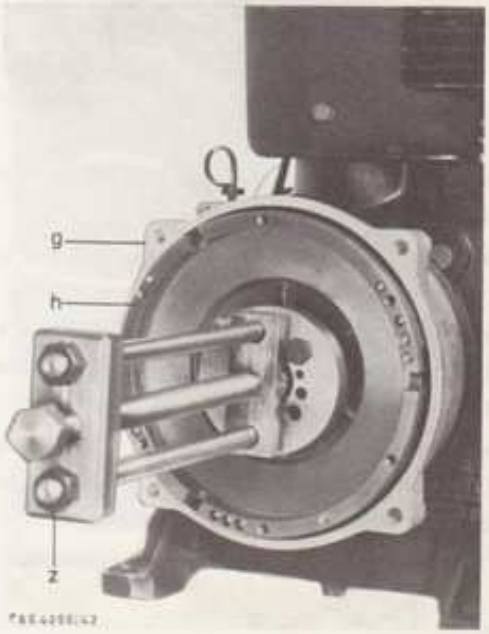


Fig. 59

Unscrew the nut holding the clutch flywheel-drive plate (h), fit protector cap over thread before attaching the extractor (z) as shown, and withdraw the clutch flywheel-drive plate. Unscrew the clutch housing-engine side (g).

To dismantle the clutch housing - P.T.O. side

Fig. 60

Remove the spring (k) with roundnosed pliers and remove the thrust bearing assembly (x).

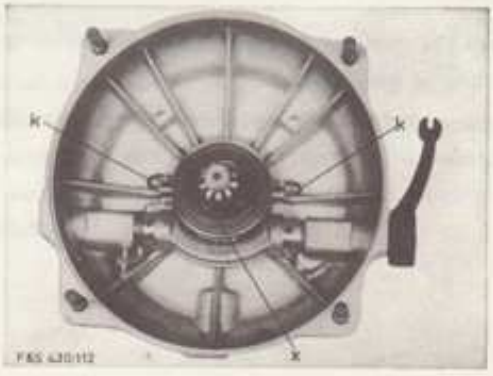


Fig. 60

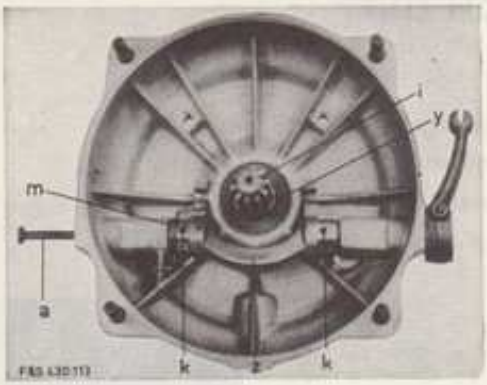


Fig. 61

Remove circlip (y) and the washer from the splined end of the shaft.

Press out the P.T.O. - shaft (i) exerting pressure outwards from the inside.

Remove the oil deflector washer. Disconnect the return spring (m). Remove the locking pins (k). Remove the shaft for the disengaging fork (z) with clutch lever. Fit into the abutment shaft a bolt M 5 (a). The bolt head is then placed in a vice and by pulling on the housing the abutment shaft is withdrawn.

The fork and return spring are then removed.

Note:

Care should be taken to avoid losing the shim washers.

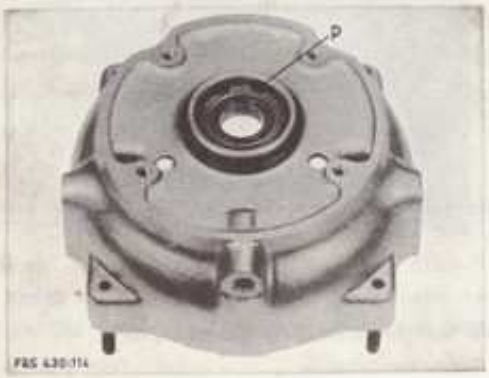


Fig. 62

Remove the circlip (p), warm the clutch housing and withdraw the ball bearing.

Clean and check, replacing where necessary defective components.

To reassemble the plate clutch unit

Warm the P.T.O. - section of the clutch housing and refit the ball bearing. Allow the housing to cool and then, by using a hand press, ensure that the bearing is correctly seated.

Refit the retaining circlip ensuring that it is correctly located.

The refitting of the oil deflector washer can then be made and the P.T.O. - shaft pushed home. Fit the washer on the splined end of the P.T.O.-shaft and replace the circlip.

Refit the thrust bearing on to the drive release fork and locate it finally with the retaining springs.

Place the return spring on the drive release fork and insert the abutment shaft into the drive release folk.

Reposition the disengaging shaft, centering it accurately in relation to the splined end of the P.T.O. - shaft by using the requisite number of shim washers. The locating pins can then be installed and the return spring can now be finally positioned.

The engine side of the clutch housing can then be bolted into position using the six socket headed bolts M 8 x 45. This applies only to engines types 1035–1045-SRL and if the engine is of the type 1023-SRL four hexagon head bolts M 8 x 25 will be used.

The tapered bore of the clutch flywheel drive plate should be thoroughly cleaned to remove grease and oil before fitting to the P.T.O. shaft and being locked into position by the hexagonal head nut and spring washer.

Insert the centre bearing into the clutch flywheel drive plate.

Refit the driven plate, then the clutch cover assembly, fastening this into position with the six hexagon head bolts and spring washers.

When doing this, alignment of the centre bearing with the driven plate and the clutch shaft can only be obtained by using a centering shaft.

The clutch housing P.T.O.-section is then fastened to the engine side housing section thus forming the complete unit which is bolted together with four hexagonal nuts M 8 and spring washers.

REASSEMBLY OF THE ENGINE

Attach the engine assembly fixture to the crankcase as shown in fig. 5.

To determine the end clearance of the crankshaft

If the engine is of the type 1023-SRL, fit the bearing plate (flywheel side) on to the crankcase with the gasket, using the four nuts M 8 and the lock washers. The torque loading should be 2,4 kpm (17.3 lb. ft.).

Then the end clearance of the crankshaft for all engine types should be determined as follows.

The specified end clearance of the crankshaft is 0,10 - 0,20 mm (.004" - .008")

Fig. 63

Place the dummy ball bearing into the bearing seating in the crankcase, and fit the crankshaft into it (fig. 63).

Example:

Measured distance from the crankshaft collar to the bearing plate (P.T.O. side) surface of the crankcase.	9,50 mm
Measured distance from dummy ball bearing (P.T.O. side) to the surface of the gasket fitted to the bearing plate (fig. 64)	— 8.90 mm
Difference (total measured end clearance)	0.60 mm

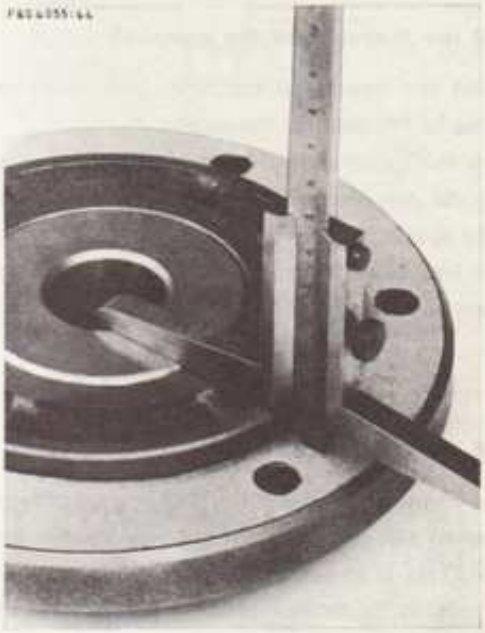


Fig. 64

To determine the number of shims, the specified end clearance, i.e. .006" is deducted from the total measured end clearance.

The result gives the total thickness of the shims required.

To press in the oil seals and ball bearings

Note:

If necessary de-burr the seatings for the oil seals, and then press the ball bearings into their housings.

Smear a little H.M.P. grease on the outside diameter and the sealing lips of the oil seals.

The oil seals are fitted to the bearing plate and the crankcase so that their lips are towards the inside of the crankcase and their outer surfaces are flush with the surface of the crankcase and the bearing plate respectively.

Note:

For the engine types 1023-1035-1040-1045-SRL only ball bearings type C 3 must be used. These bearings have the specified clearance required.

To fit the tappets and the camshaft

Position the tappets so that their plain surfaces are pointing to the base of the engine.

Locate the camshaft within the crankcase, centering it with the drift (see tool kit). Then place the camshaft spindle against the end of the drift, tapping the spindle with a soft faced hammer, so that the drift is pushed out and the spindle is finally located within the camshaft.

To fit the crankshaft

On the engine type 1023-SRL the fixed position of two of the crankshaft gear teeth are marked on the counter balance weight. This is to enable the market tooth of the camshaft gear to be located between these two marks.

On the engine types 1035-1040-1045-SRL the same principle applies except that the two marks are on the camshaft gear teeth and the corresponding single mark is on the balance weight.

The crankshaft can now be fitted, bearing in mind the above procedure for obtaining the correct timing position of the engine.

Press the bearing plate with its gasket into position and tighten. For the engine type 1023-SRL, the torque reading should be 2,4 kpm (17.3 lb.ft.). For the engine types 1035-1040-1045-SRL, the torque reading should be 4,4 kpm (31.8 lb.ft.).

To fit the piston and the connecting rod

Fig. 65

Set the crankshaft on T.D.C. Locate the piston rings so that the gap on the top ring is at the valve side, and the gaps on the lower two rings are positioned at 120 degrees on either side of the upper ring gap.

Oil the piston skirt and the connecting rod big end bearing, fit the piston ring clamp (x) and push the assembly into the cylinder so that the number stamped on the connecting rod big end is nearer to the valve side.

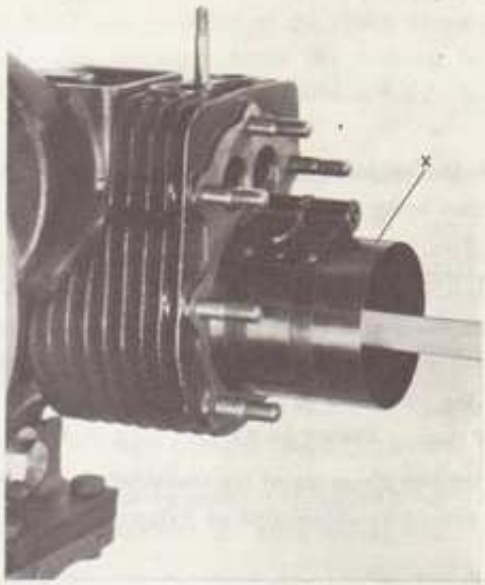


Fig. 65

To fit the connecting rod big end cap and the oil dipper

Rotate the crankshaft until it reaches B.D.C. pushing down the piston whilst doing so. Then fit the connecting rod big end cap with its number towards the camshaft.

Always fit a new oil dipper and new tab washers.

Lock the oil dipper into position using the original bolts M 8 x 48.

The torque reading for tightening these bolts is 2,5 kpm (18.1 lb.ft.).

Governor – Oil sump

Fig. 66

Test the governor plunger and centrifugal weights for smooth operation.

Slide the governor (s) with gear pinion on to the spindle.

Screw in the governor stop screw (v) and fit the governor lever (w) so that it is placed between the governor plunger and the governor stop screw.

Secure the internal governor lever with the circlip.

Fit the oil sump, or base plate and gasket so that the oil drain plug is on the same side as the oil filler hole.

Tighten the bolts to a torque reading of 2,4 kpm (17.3 lb. ft.).

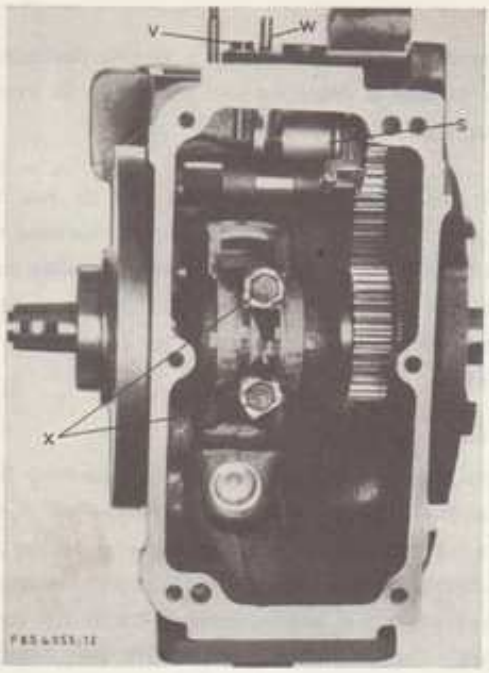


Fig. 66

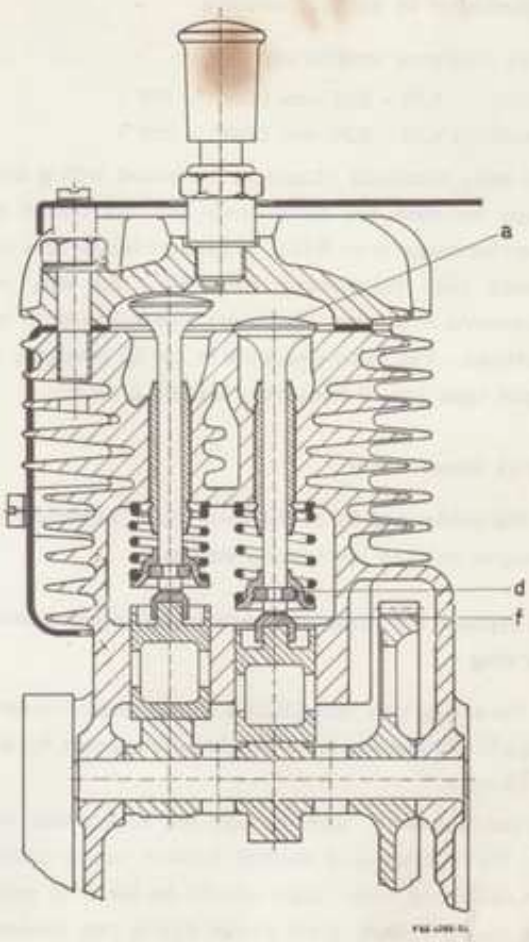


Fig. 67

To fit the valves

Fig. 67

When fitting valves which have been already used, it is important to replace them in their original guides.

Replace the inlet- and exhaust valves as follows:

Fit the valve spring.

Slide the valve (a) into its valve guide, then into its valve spring cap and center the valve spring cap.

Turn the crankshaft until the tappet is visible, then rotate the tappet until the valve spring compression tool can be inserted between the tappet and the valve spring cap.

Compress the valve spring and fit the valve collet (d), or the split conical valve collets. (Ensure that the valve collet is seating correctly).

Note:

Grease the valve collets before fitting.

Remove valve spring compression tool, raise the valve and push the lifting tool (see fig. 8) under the valve head. Set the camshaft and tappet to B.D.C. and fit the tappet cap (f).

Turn the crankshaft until the tappet cap contacts the valve stem.

Lift the valve and remove the tool.

Valve spring data

The valve springs should be checked according to the following data

Engine type	1023-SRL	1035-SRL	1040-SRL	1045-SRL
Diameter of wire	2,64 mm			
Outside diameter	25 ± 0,5 mm			
Free length	40 mm	44 mm		
Free length, if fitted with split conical valve collets				40 mm
Length loaded to 16 ± 1 kg (= 35,2 ± 2.2 lb)	24 mm			

Adjustment of valve clearance

Valve clearance (engine cold):

inlet 0,10 – 0,15 mm (.004" – .006")
exhaust 0,15 – 0,20 mm (.006" – .008")

The valve clearance should be measured with a feeler gauge between the valve stem and the tappet cap when the tappet is on B.D.C. There are tappet caps with various base thicknesses, from 3,0 – 5,2 mm, with increments of 0,2 mm. There are also shims of 0,1 mm thickness. The valve clearance is set by changing the tappet caps and, if necessary, adding a shim.

Valve chest cover

Fit the gasket and fix on the valve chest cover with the hexagon nut and the locking washer.

To replace the armature base plate and the covering ring

On the engine type 1023-SRL the ignition cable insulating strips in the bearing plate should be inspected for wear or damage.

Thread the H. T. lead through the appropriate hole, and the lighting and contact breaker cables through the remaining hole. Care should be taken to ensure that the H. T. lead is not kinked during this operation.

The armature base plate is fitted so that its locating mark corresponds to the mark on the crankcase. It is then fixed into position using the three round headed screws M 6 x 12 and washers.

On engine types 1035-SRL and 1040-SRL the covering ring should now be fixed using the hexagon bolts M 6 x 12 and the spring washers. Care should be taken that the opening for the H. T. lead is correctly positioned.

To fit the flywheel fan

Fit the locating key into the crankshaft, and, using H. M. P. grease smear the cam bush in the flywheel, and the ring groove within the cam. Check the centrifugal weight to ensure that it moves freely. Degrease the taper of the crankshaft and the bore of the flywheel fan.

Replace the flywheel fan and ensure that the locating key is correctly fitted in its groove.

Replace the washer, (not used on engine type 1023-SRL) holding the flywheel fan in position with the chain clamp (x, fig. 6), and lock the flywheel fan into position with the nut. Note that on engine type 1023-SRL the nut should be replaced with its plain side against the flywheel. The torque reading is 12 kpm (86.7 lb.ft.).

Note:

The rope start pulley acts as a retainer because its center portion is designed and shaped to fit over the nut and lock it into position.

Fit the rope start pulley ensuring that its two fixing holes are in line with the corresponding threaded holes of the flywheel fan. If these two sets of holes do not correspond exactly the lock nut should be tightened the requisite amount necessary to bring them into alignment.

To fit the fan case

Remove the engine from the engine assembly fixture and screw in the oil filler plug. Fit the oil dipstick. Fasten the fan case to the engine using on the valve side a hexagonal headed bolt M 8 x 30 and on the opposite side two hexagonal headed bolts M 8 x 25 with locking washers. On the engine type 1023-SRL four hexagonal bolts M 8 x 25 are used for fixing the fan case. The torque reading for tightening these bolts is 2,4 kpm (17.3 lb.ft.).

Adjustment of ignition timing

Ignition setting: 4° = 0,15 – 0,20 mm (.006" – .008") before T. D. C.

Contact breaker gap: 0,4 ± 0,05 mm (.016") (d, fig. 69)

Magneto edge gap: 32...35,5 mm (1.26" – 1.40") (a, fig. 69)

To obtain these settings a timing dial or a dial clock gauge should be used.

On the fan case there are two marks.

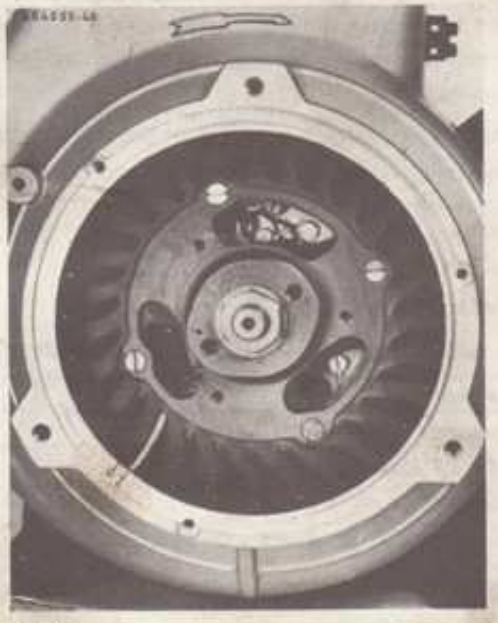


Fig. 68

When the mark "O" is in alignment with the red coloured blade of the flywheel fan, the piston is in T. D. C. position. When the mark "Z" is aligned with the red coloured blade of the flywheel fan the spark occurs.

In this position the contact breaker points should just begin to open. The ignition timing should be adjusted as follows:

a) When the cam is on the top, the contact breaker gap should be 0,4 ± 0,05 mm (.016" ± .002").

b) Rotate the flywheel fan in the reversed direction to that, in which the engine runs, to the point where the red coloured blade of the flywheel is in alignment with the mark "Z" on the fan case (fig. 68).

c) In this position the contact breaker points should just begin to open. If they do not, then the ignition timing can only be corrected by rotating the armature base plate. To advance the ignition rotate the armature base plate in the opposite direction to which the engine runs, and to retard the ignition rotate the armature base plate in the same direction to which the engine runs.
When the adjustments have been carried out, the fixing screw of the armature base plate should be firmly tightened.

d) When the ignition timing is correctly adjusted the magneto edge gap(a, fig. 69) is 32 – 35,5 mm (1.26" – 1.40").

If the magneto edge gap (a, fig. 69) is incorrect this can be adjusted by making a slight alteration to the setting of the contact breaker points.

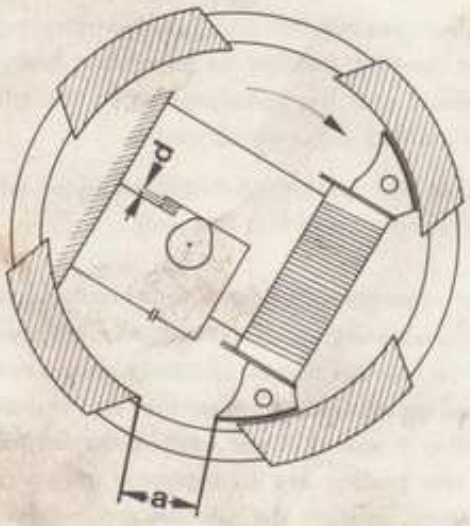


Fig. 69

If a new fan case or a new flywheel fan has been fitted, a clock gauge or a timing dial should be used to establish the position of the timing markings because these markings are not shown on replacement components.

After any adjustment has been made to the ignition the sparking distance should be checked. The correct spark length being 6 mm.
It is recommended that the ignition setting be checked each time the engine is serviced. The efficient operation of the engine depends largely upon the correct functioning of the ignition system. Faults in the ignition system can also in some cases affect the output of the lighting system. Care should also be taken to obtain the correct spark plug gap of 0,5 mm (.02").

To fit the cylinder head
Fig. 70

Fit the cylinder head gasket and place the cylinder head into position, fixing it with 6 nuts M 10 and one reducing nut M 10/M 6 with the washers. The torque reading for tightening the nuts is ~~4,4 kpm (31.8 lb.ft.)~~ 37.5 lb. ST.

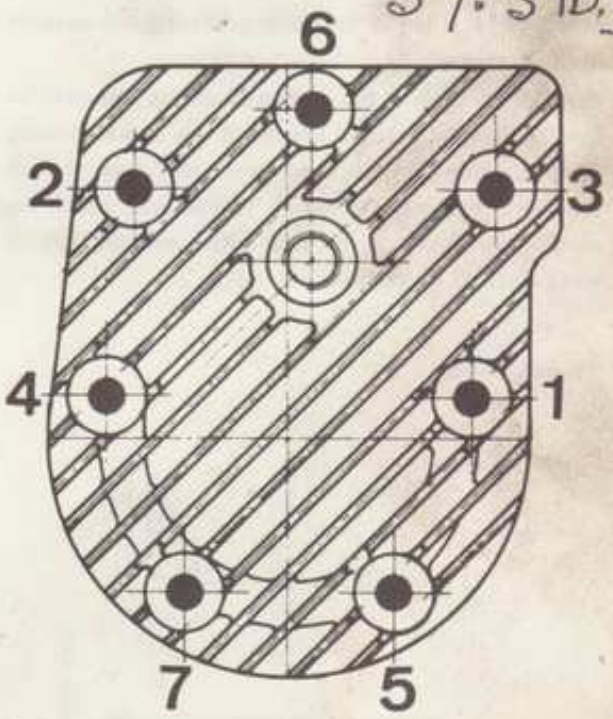


Fig. 70

Note:
On the engine type 1023-SRL fit the reducing nut at position 3, and on engine type 1035-1040-1045-SRL at position 7.

The cylinder head nuts should be tightened in the sequence illustrated on fig. 70.

When 25 working hours have been completed the nuts should be tightened again in the same sequence. The engine must be cold for this operation.

To fit the cover plate, the cooling air inlet screen, and the rope starter pulley

Fix the cover plate on to the flywheel fan using the three round headed screws M 6 x 8 and the spring washers. On all types of engines the fixed cooling air inlet screen is attached with three hexagonal headed bolts M 6 x 12 and their spring washers.

On engine type 1035-1045-SRL the starter pulley should be attached and locked into position with 2 socket screws type M 8 x 28 and serrated washers.
For all types of engines the rotating cooling air inlet screen should be assembled together with the starter pulley.

To fit the cooling air casing and the notched bracket

Apply a little tallow to the rubber grommets through which are threaded the H. T. lead and the lighting and switch wires. Then fit the rubber grommets into position in the fan case.
Bolt the two parts of the cooling air casing into position then replace the notched bracket, if this was previously fitted, and also the cable strap for the H. T. lead. Attach the spark plug cover to the H. T. lead, and attach the switch wire (black) to the stop button and the lighting wires (yellow) to the terminal block.

Throttle lever

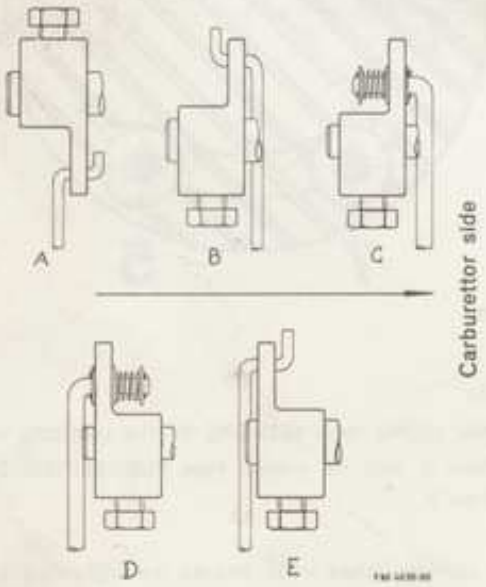


Fig. 71

Depending upon the type of the carburettor used and the engine specification, the appropriate type of throttle lever and rod, is fitted on to the butterfly spindle. The lever is clamped tightly in a vertical position while the throttle is closed. See fig. 71.

Note:
For the engine type 1023-SRL fitted with the BING carburettor the throttle valve should be half open.

A = engine type 1023-SRL with BING carburettor (high precision and standard governor)
B = engine type 1023-SRL with OBA carburettor (standard governor)
C = engine type 1023-SRL with OBA carburettor (high precision governor)
D = engine type 1035-1040-1045-SRL with AMAL carburettor (high precision governor)
E = engine type 1035-1040-1045-SRL with AMAL carburettor (standard govarnor).

To fit the manifold, carburettor and the silencer

On the engine type 1023-SRL replace the manifold gasket and the manifold which has the carburettor already attached.

Then position the exhaust silencer, tightening it securely by using two of the nuts M 8 (SW 12) and then tightening the third nut thus ensuring the firm attachment of the manifold to the cylinder. The torque reading is 2,4 kpm (17.3 lb.ft.).

Note:
Two brass nuts only should be used to attach the exhaust silencer.

On engine types 1035-1040-SRL fit the centering ring into the inlet manifold, position the gasket and finally bolt the manifold with the carburettor on to the cylinder using a nut M 8 and a spring washer.

The torque reading is 2,4 kpm (17.3 lb.ft.). Fit the exhaust silencer using 2 brass nuts M 6 only.

On engine type 1045-SRL position the 2 manifold gaskets. The carburettor with its gasket is fitted to the manifold first. The manifold is then positioned on the cylinder studs and the exhaust silencer can then also be positioned. Using 2 nuts M 8 and washers the manifold is locked into position and by tightening the two brass nuts without washers the silencer and manifold are secured.

To fit the governor bracket and the governor lever

Fit the governor bracket (m, fig. 3) complete with the adjusting screw, using a hexagonal threaded bolt M 8 x 60 and a spring washer. On the engine type 1023-SRL this bolt should be of the type M 8 x 12.

The free end of the governor control rod is inserted into the hole in the governor lever, which is then slid over the governor spindle.

Using a screwdriver rotate the governor spindle as far as possible to the left. Keep the spindle in this position with the screwdriver, and rotate the crankshaft to ensure that the governor mechanism is correctly located in a neutral setting.

Fully open the throttle valve and lock the governor lever on to its spindle.

To fit the governor control assembly

Fig. 72

Anchor the hooked end of the governor spring into the outer hole of the governor lever. Thread the control wire (a) through the adjuster screw (in the governor bracket) and the return spring (b).

Slide the cable connector (i) on to the control wire and insert the straight extension of the governor spring into the cable connector. The connector is now tightened locking the spring and the control wire together. The control wire should have a free play of 0,5 – 1,0 mm when the throttle valve is fully closed.

Note:

The length of the standard governor spring (d) is 15 mm, and that of the high precision governor spring is 21,5 mm.

If the engine is not required to operate at more than 3350 r.p.m. then the governor spring (d) should be anchored in the inner hole of the governor lever, thus ensuring that the stipulated governor accuracy is obtained.

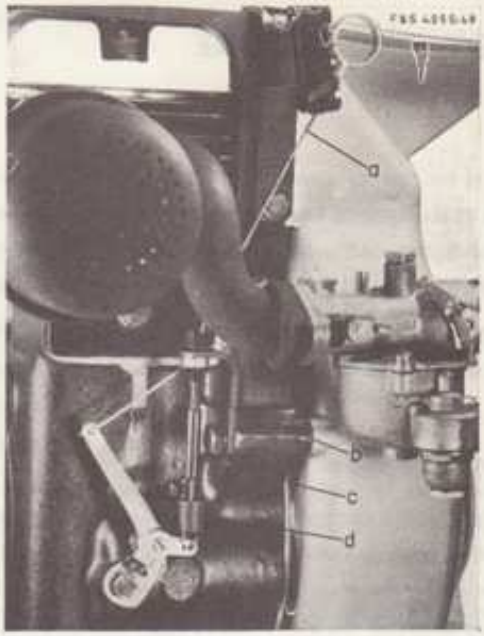


Fig. 72

To fit the fuel tank

Place the cork pads on to the tank supports and position the fuel tank securing it with the tank straps. Torque loading for the strap nuts is 0,5 kpm. Connect the fuel pipe to the carburettor.

To fit the oil bath air cleaner

The filter elbow (e, fig. 1) is pushed on to the carburettor

On engine types 1035-1040-1045-SRL the air filter support is fixed with two hexagonal headed bolts M 6 x 15 and M 8 x 15 with spring washers.

On engine type 1023-SRL two hexagonal headed bolts M 8 x 15 are used for fixing the air filter support. Tighten the clamp of the filter elbow (e, fig. 1) on to the carburettor.

Fit the oil bath air filter on the filter elbow and tighten it.

To fit the recoil starter

Attach the recoil starter on to the surface with 3 hexagonal headed bolts M 8 x 25 and spring washers.

To fill the engine with oil, see the lubrication chart on page 51.

TEST PROCEDURE

When the engine is assembled and filled with oil a test should be carried out on governed engines to check that the idling and the max. governed speeds are correct.

To conduct these tests accurately the engine must be at its correct operating temperature.

Idle running speed adjustments

Set the throttle control into closed position, then adjust the idle running speed with the idle running adjuster screw and regulate the fuel air mixture with the idle mixture adjuster screw. The control wire should have 0,5–1,0 mm play when the looped handle is located in the lowest or "idling" notch. On engines fitted with a throttle lever the control wire should have 1 mm free movement when the lever is in the closed or "idling" position. The correct idle speed setting is vital to obtain smooth operation, particularly in applications where frequent changes in engine loading are made, and also in order to obtain fuel economy.

Note:

The lowest possible idle running speed is necessary for all engines fitted with the centrifugal clutch, if wear of the clutch is to be kept to a minimum. At a fast idling speed the centrifugal weights will partially engage on the clutch driven member thus causing friction and heat and unnecessary wear.

Max. governed speed adjustment

Fig. 73

The revolution counter is applied to the P.T.O. shaft and, in this instance, the looped handle of the throttle control is located in the notched bracket below the fuel tank. This will ensure that the stipulated r.p.m. is obtained. It should be noted however, that this principle can be applied to engine models where the throttle control is of a different type e.g. lever type.

If the required r.p.m. cannot be obtained then the adjusting screw (x) should be unscrewed further.

If the r.p.m. is correct the adjusting screw (x) must touch the cable connector (o). It should then be locked in this position with the lock nut. This ensures that the max. governed speed cannot be exceeded.

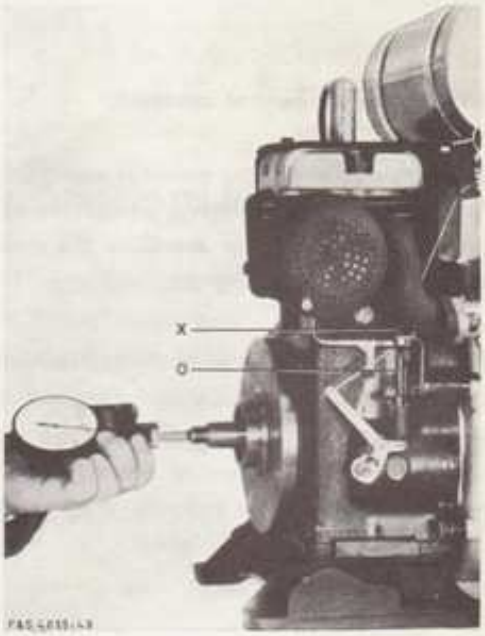


Fig. 73

Note:

If it is not possible to test the engine whilst it is actually being used to power the equipment for which it has been designed the max. governed speed under load cannot be set. The max. governed engine speed unloaded must therefore be set at approximately 300 r.p.m. higher with the standard governor or 150 r.p.m. higher when fitted with a high precision governor.

MOUNTING AND FITTING THE ENGINE

All these engine types have been designed for use as stationary or built-in power units. They are particularly suitable for powering electrical generating sets, water pumps and civil engineering equipment.

The fitting specifications required for each type of engine should be considered by the manufacturer of the equipment on which the engine is to be installed.

Assuming that an engine is designed for a special application the following points must be observed:

1) Sufficient cool air must circulate over the engine. Also the warm air must be able to disperse freely.
2) The engine is capable of operating in an inclined position (up to 15 degrees). More steeply inclined positions (up to 30 degrees) are permissible for brief periods only.

   The oil level can only be checked with the dipstick when the engine is stopped and on a level plane.
3) It is important, that all components needing frequent attention are easily accessible.
4) The cool air circulating over the engine should be as free from dust as possible. Engines running in open air need protection from the weather.

   Particles of dust or dirt which enter an engine can cause serious internal damage. Therefore to reduce the risk of this happening when an engine is used in a application where dirt could be thrown on to the engine and possibly enter it, it is recommended that shields be fitted to prevent this occuring.
5) If the engine is running in a totally enclosed area the exhaust must be directed outside through a tube of at least 40 mm diameter. This should be as straight as possible.

   If there is a longer outlet pipe, a condensation collector should be fitted to prevent moisture flowing towards the exhaust silencer.

   Adequate ventilation should be provided to reduce the possibility of condensation in conditions of humidity.
6) There must be sufficient room to start the engine by means of either a rope or if fitted a recoil starter.

It should be noted that it is necessary for the engine to be mounted upon a level rigid frame which cannot distort. The P.T.O. shaft of the engine must be in alignment with the driven shaft of the machine to which the engine is coupled. Rubber mounting blocs should be inserted between the engine mounting frame and the engine bed.

CLIMATIC AND ALTITUDE EFFECTS ON ENGINE PERFORMANCE

Where engines are used in tropical regions or in areas which have a high altitude the performance of the engine will be adversely affected due to the prevailing conditions inherent in these two types of climate.

When the indicated power output of an engine is calculated it is understood that the engine is to be operated at sea level with a prevailing air humidity of 60% and the temperature of the intake air at 20° C. If there is much variation in any of all these factors the result will be an effect upon the power output of the engine and will necessitate adjustment to the carburettor setting.

If therefore the engine is to be operated in regions where one or all of the above conditions exist the expected output should be calculated as follows.

1) Power will decrease 1,4% for each 100 m (325 ft.) above sea level.
2) Power will decrease 4% for each 10° C (18° F) above the standard temperature of 20° C (68° F).
3) Power will further decrease 1,5 – 2% for each 10° C (18° F) above the standard temperature of 20° C (68° F) if the air humidity content is extremely high (90 – 100%).

Example:
The engine is to be operated at 1200 m above sea level at an air temperature of 30° C and an air humidity relative of 95%.

The output of the engine decreases therefore as follows:

1) Change of altitude to 1200 m	12 x 1,4%	= 16,8%
2) Air temp. 30° C – 20° C = 10° C	1 x 4%	= 4,0%
3) Moisture content (95% at 30° C)	1 x 2%	= 2,0%
		22,8%

The total decrease of output is approx. 23% which means the original stated output, for example engine type 1023-SRL of 5 B.H.P. will decrease to 3,9 B.H.P.

Other influences

1. Dusty conditions:

   Check that the air filter is clean. A more frequent filter check is essential.

2. Heat:

   The engine must be protected against hot air flowing in or surrounding the cooling system. The engine should be protected from extremely hot sun.

   Ensure the cooling air screen is kept clear and clean and also clean regularly the fan blades and cylinder and cylinder head cooling fans.

RUNNING-IN THE ENGINE

The finest machined surfaces on cylinder and piston of an engine are still rough in comparison to parts, which have been moving against each other at speed for a period of time. Therefore any new engine must be run-in.
Exaggerated attention is not needed. Be careful not to run the engine to the absolute limit of its capacity during the first 20–30 operating hours.
The normal recommended engine oil will be sufficient for the running-in period.

Instructions regarding our stationary petrol engines which are fitted to agricultural implements

Customers using agricultural implements, to which our stationary petrol engines are fitted, must pay attention to the following points:

1) The engine must operate only within the speed range for which it has been designed. The engine cannot be operated above the governed speed due to the built-in governor.

2) Racing of the engine, especially after starting, is very harmful and should be avoided, this can damage both cylinder and piston.

3) If driving down steep slopes the brakes should be used to prevent racing the engine.

In such cases, where the customer has damaged the engine by improper operation we are not deemed to be bound by the terms of the guarantee.

Lubrication and maintenance chart for engine types 1023 - 1035 - 1040 - 1045-SRL

Components requiring lubrication and maintenance	Lubrication and maintenance work	Maintenance periods: daily	every 40 working hours	every 100 working hours	every 250 working hours	every 2000 working hours	if needed	when assembling
Oil bath air filter	When the oil is dirty, the filter should be cleaned and refilled to the correct oil level with engine oil. The air filter should be cleaned with petrol. In dusty conditions a more frequent cleaning of the filter is necessary.	X		X				
All moving components of the engine	Engine oil SAE 20...30 in winter and SAE 30...40 in summer. The oil capacity of engine type 1023-SRL is 0,8 litre, and 1,2 litres for engine types 1035-1040-1045-SRL. The oil quantity should be maintained at a level between the max. and min. marks shown on the dipstick. On new or overhauled engines the first oil change should be done after 10 hours and the second after 25 hours (see page 9 for Imp. pints).	oil check	oil change					
Governor linkage	Oil the pivot points.		X					
Cylinder, cylinder head and cooling air inlet screen	When the cooling fins of the cylinder, and the cylinder head become dirty they should be cleaned. The cooling air inlet screen must also be cleaned, as necessary.			X				
Battery	When a starter generator is fitted to the engine, the battery must be serviced.			X				
Valve clearance	Depending upon the application the valve clearances should be checked and, if necessary, be adjusted every 50...100 hours of operation.			X				
Spark plug and ignition system	Check, clean and, if necessary, re-set. Smear some Bosch Ft 1 v 4 grease on the lubricating felt pad of the contact breaker.				X			
Valves and valve seats	Check the compression pressure (6,5 - 7,5 kg/cm² = 95 - 105 lb./sq. in.) and, if necessary, regrind valves and valve seats.				X			
Cylinder head	While the engine is cold, retighten the nuts of the cylinder head to a torque reading of 4,4 kpm (31.8 lb.ft.). On new or overhauled engines the nuts should be retightened after the first 25 operating hours.				X			
Fuel tank, fuel cock, fuel lines	Clean at least every 250 working hours. Change the fuel filter, if necessary.				X			
Starter generator	Check the carbon brushes, and the ball bearings. If necessary, refill the bearings with grease (Bosch Ft 1 v 26). If either the carbon bushes or bearings are badly worn they should be replaced.					X		
Carburettor	The carburettor should be cleaned periodically and, if necessary, reset. Care being taken that the throttle valve and governor rod do not stick.						X	
Recoil starter	Lightly smear the centre spindle and the rope with molyslip-oil mixture.							X
Crankshaft oil seals	Pack the seals with H.M.P. grease.							X
Manual plate clutch (drive shaft spline)	Smear a little H.M.P. grease.							X
Single reduction gear: Engine type 1023-SRL	**Gear box oil SAE 80** — **Gear box** / **Original filling** / **Refilling**: Normal mounting: 100 ccm (3.5 ozs.) up to level of oil plug; Rotated through an angle of 180°: 100 ccm (3.5 ozs.) up to level of oil plug	oil check			oil change			
Single reduction gear: Engine types 1035-1040-1045-SRL	Normal mounting: 180 ccm (6.5 ozs.) up to level of oil plug							
Double reduction gear: Engine type 1023-SRL	**Gear box oil SAE 80** — **Gear box** / **Original filling** / **Refilling**: Normal mounting: 200 ccm (7.0 ozs.) up to level of oil plug; Rotated through an angle of 180°: 300 ccm (10.5 ozs.) up to level of oil plug							
Double reduction gear: Engine types 1035-1040-1045-SRL	Normal mounting: 300 ccm (10.5 ozs.) up to level of oil plug							

Only Castrol engine oil is recommended

INSTRUCTIONS FOR RUNNING WITH PETROL OR PARAFFIN

On request all engines can be equipped for operation on petrol or paraffin. This equipment consists of a dual compartment fuel tank, additional fuel lines and a three way fuel cock. The smaller compartment of the fuel tank is for petrol, the larger is for paraffin. Because of the low octane value of paraffin, the compression ratio, which is 6,5 : 1 for petrol, must be reduced 5,5 : 1 for paraffin operation. This is obtained by fitting a cylinder head having a larger combustion chamber.

The ignition advance setting remains unchanged at 4 degrees before T. D. C. when the engine is stopped = 0,15 – 0,20 mm (.006" – .008"). In the bottom of the carburettor float chamber there is fitted a drain cock.

The carburettor setting (i.e. jet sizes) is changed in accordance with the chart below.

Paraffin operation results in a reduced power output from the engine. This reduction is approximately 10–12%.

It is inadvisable to use paraffin fueled engines for long periods of operation at idling speed.

The engine should not be operated below 40–50% of its max. power.

Periods of operation below this point will result in excessive carbon formation because it cannot reach its correct operating temperature.

The following points should be observed before starting the engine:

Before starting the cold engine, the cock in the float chamber of the carburettor should be opened in order to allow the residual paraffin to drain. The three way fuel cock must be set for petrol operation. The engine should operate on petrol for 3–5 minutes, under load, to reach the normal operating temperature. The fuel cock should then be set for paraffin operation.

SETTING DATA FOR BUTTERFLY TYPE CARBURETTORS

Engine type	Carburettor	Carburettor venturi size in mm	Main jet	Idling jet	Slow running air screw opening in number of turns	Compensating jet	Mixture tube	Remarks
1023-SRL	BING carburettor 8/25/33	18	100	70	1	100	3,2 mm	Normal setting
1023-SRL Petrol-paraffin	BING carburettor 8/25/...	18	125	45	1	100	No. 4	Normal setting
1023-SRL	OBA carburettor 26/CH	20	85	45 in mixture tube	1/3	75	349/33B	Normal setting
1023-SRL Petrol-paraffin	OBA carburettor 26/CH	20	85	45 in mixture tube	1/3	75	349/33P	Normal setting
1035-SRL 1040-SRL 1045-SRL	AMAL carburettor 348/21	22	140	40	1/4...1/2	348/079	348/010	Normal setting
1035-SRL 1040-SRL 1045-SRL Petrol-paraffin	AMAL carburettor 348/22	22	140	40	1/4...1/2	348/079	348/010	Normal setting
1040-SRL	BING-carburettor 8/25/...	18	115	50	1/2	100	18	Normal setting

Instructions regarding the wiring diagram of the flywheel magneto dynamo system

The flywheel magneto dynamo system as fitted to the engine types 1023-1035-1040-1045-SRL produces an alternating current with a lighting power of 16 W and 6 Volts.

All equipment which relies on electrical current as its motive power is connected to a battery with a capacity of 6,7 – 9 AH and 6 Volts. This battery is charged via a dry rectifier with a choking coil.

For all tractor lighting purposes special tractor light bulbs of 7 Volts 3 Watt should be used. These are standard tractor light bulbs.

If for some reason the battery is taken out of circuit driving may continue in an emergency until the trouble is cured. It is important that during this period the engine is not operated at full speed because the bulbs will blow due to the high voltage produced by the flywheel magneto dynamo system.

Ensure that the earthing connections to the vehicle frame are correct.

Instructions regarding the wiring diagram of the starter-generator

On request the engine types 1023-1035-1040-1045-SRL can be supplied with a starter-generator.

The starter-generator starts the engine and also produces the current for operating other electrical equipment.

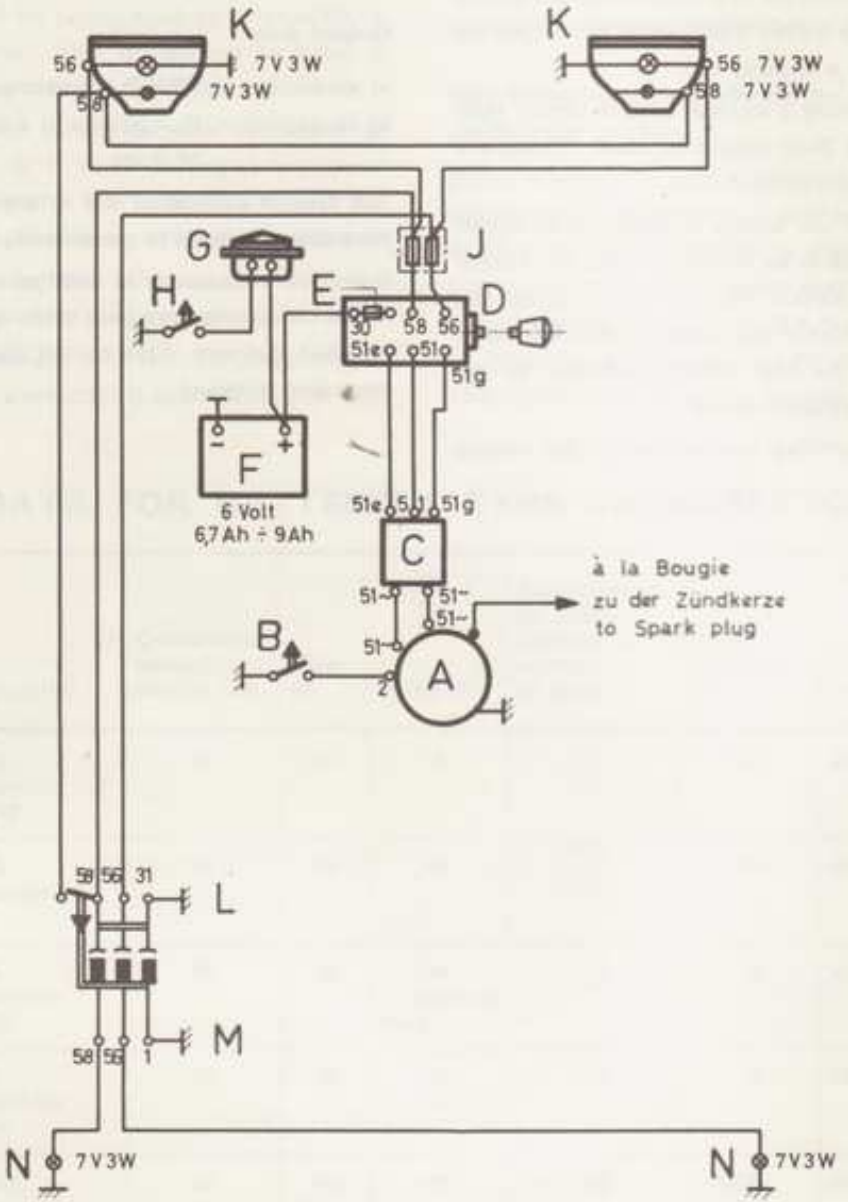
Output data:

a) as starter: 1 B.H.P. at a nominal voltage of 12 Volts
b) as generator: 11 Amperes at a generator voltage of 14 Volts.

The type of application will determine the capacity of the battery. This will be generally 24 – 56 AH and 12 Volts.

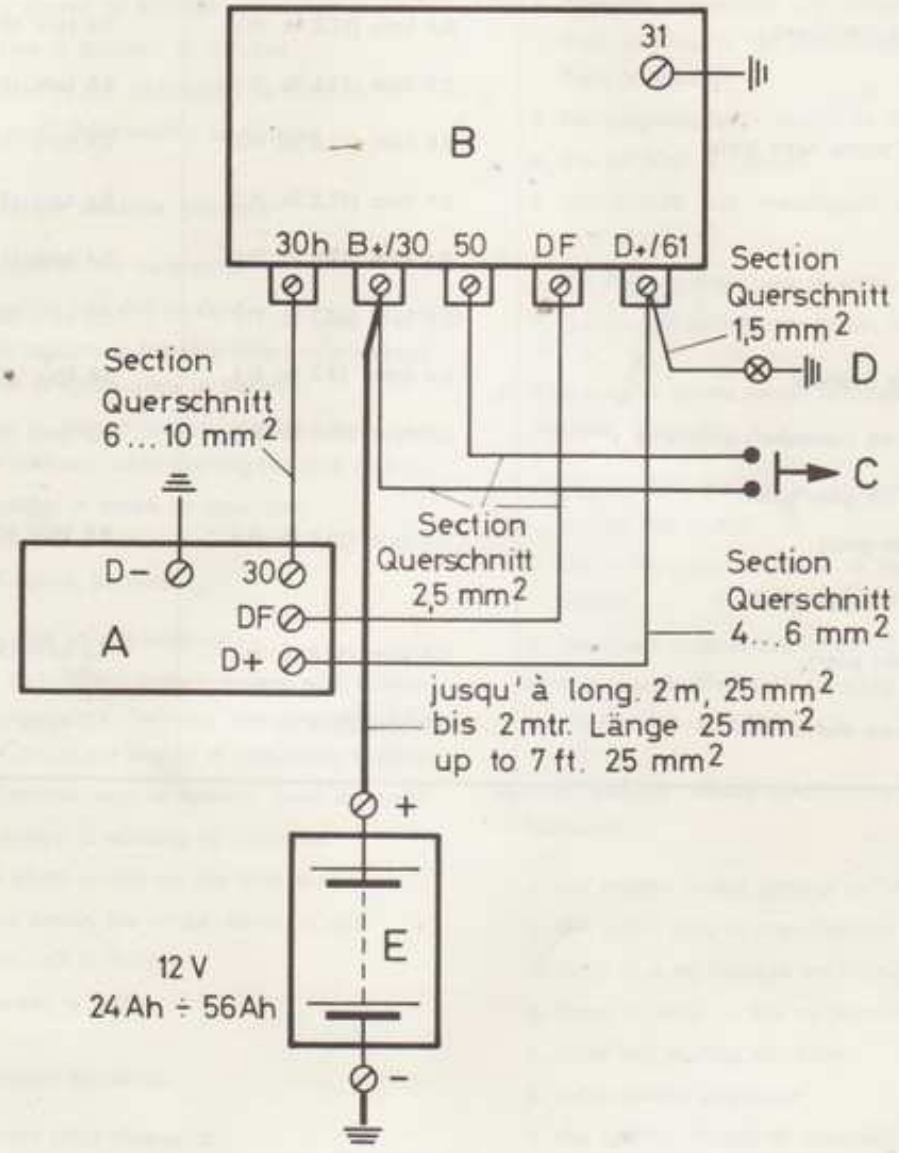
If the starter-generator is fitted as an additional extra, or the connecting wires have to be replaced, care should be taken that wire of the correct diameter is used (see the wiring diagram).

WIRING DIAGRAM FOR IGNITION AND LIGHTING SYSTEM



A = Flywheel – Magneto
B = Stop button
C = Rectifier
D = Lighting switch
E = Fuse 2,5 A
F = Battery
G = Horn
H = Horn button
J = Fuse Box (2 x 2,5 A)
K = Head lamp
L = Coupling bush
M = Coupling connector
N = Tail lamp

WIRING DIAGRAM FOR STARTER-GENERATOR



A = Starter-generator
B = Voltage regulator
C = Start button
D = Generator warning light
E = Battery

TORQUE WRENCH SETTINGS FOR THE MOST IMPORTANT BOLTS AND NUTS

Engine part	1023-SRL	1035-1040-1045-SRL
Cylinder head	4,4 kpm (31.8 lb. ft.)	4,4 kpm (31.8 lb. ft.)
Bearing plate on crankcase	2,4 kpm (17.3 lb. ft.)	4,4 kpm (31.8 lb. ft.)
Connecting rod	2,5 kpm (18.1 lb. ft.)	2,5 kpm (18.1 lb. ft.)
Oil sump or oil sump base plate	2,4 kpm (17.3 lb. ft.)	2,4 kpm (17.3 lb. ft.)
Fan case	2,4 kpm (17.3 lb. ft.)	2,4 kpm (17.3 lb. ft.)
Intake manifold	2,4 kpm (17.3 lb. ft.)	2,4 kpm (17.3 lb. ft.)
Flywheel	12,0 kpm (86.7 lb. ft.)	12,0 kpm (86.7 lb. ft.)
Magnetic ring in flywheel	0,6 kpm (4.7 lb. ft.)	0,6 kpm (4.7 lb. ft.)
Attached parts on crankshaft-drive-side	5,5 kpm (39.8 lb. ft.)	6,5 kpm (47.0 lb. ft.)
Attached parts on gear shaft (single reduction gear)	5,5 kpm (39.8 lb. ft.)	6,5 kpm (47.0 lb. ft.)
Attached parts on gear shaft (double reduction gear)	7,0 kpm (50.6 lb. ft.)	7,5 kpm (54.2 lb. ft.)
Attached parts on clutch shaft	5,5 kpm (39.8 lb. ft.)	7,5 kpm (54.2 lb. ft.)

FAULT-FINDING CHART

A) Engine will not start

a) Fuel starvation, because

1. the fuel tank is empty
2. the vent hole in tank filler cap is blocked
3. fuel tap is closed or blocked
4. the fuel pipe is pinched or blocked
5. the fuel filter in the carburettor is blocked
6. the carburettor inlet needle is sticking

b) Incorrect fuel-air mixture because

1. there is water in the carburettor
2. the carburettor jets are blocked
3. the fuel-air mixture is too rich (there is a leakage in the float or carburettor is flooded)
4. the choke is closed (when starting the warm engine) or opened (when starting the cold engine)
5. the carburettor is loose on manifolds

c) No ignition spark because

1. the spark plug is wet externally
2. the spark plug is wet, heavily coated with carbon deposits causing a "whisker" between the two points, the points are broken or incorrectly gapped
3. the high tension lead is broken, worn or loose
4. the stop button is sticking or damaged
5. there is a short circuit on the stop button
6. the breaker points are pitted, damp or oily
7. the ignition coil is faulty
8. the condenser is faulty

d) No compression because

1. not sufficient valve clearance
2. the valves are sticking in the guides
3. valve not seating correctly
4. valve spring broken
5. the cylinder head is not sufficiently tightened or the cylinder head gasket has "blown"
6. the piston rings are broken
7. the piston and the cylinder are badly worn

B) Other engine troubles

a) The engine does not run evenly, because

1. the choke is closed
2. the carburettor is flooding (there is dirt or foreign particles preventing the carburettor inlet needle from seating, or the inlet needle is worn, or the float is leaking)
3. the governor lever system is sticking
4. the air filter is choked
5. the engine has insufficient compression (see A/d above)
6. the high tension lead is worn or loose
7. the breaker points are damp, pitted or oily

b) The engine pinks under full load at fully opened throttle, because

1. the ignition timing is incorrect (ignition spark occurs too early)
2. the combustion chamber is heavily coated with carbon
3. the spark plug is the incorrect type
4. the engine overheats (cooling air circulation is insufficient - see B/d)

c) The engine blows back into the carburettor, because

1. the engine is not getting sufficient fuel
2. the spark plug is the incorrect type
3. there is a air leakage on inlet manifolds
4. there is water in the carburettor
5. valve not seating correctly
6. valve spring weakened
7. the ignition timing is incorrect

d) The engine overheats, because

1. the cooling air circulation is insufficient
2. the fins of cylinder and cylinder head are very dirty or choked
3. the ignition timing is incorrect
4. the engine is not getting sufficient fuel