

S195、S1100、S1105 DIESEL ENGINE

OPERATION INSTRUCTION

PART TWO PARTS CATALOG

THE PEOPLE'S REPUBLIC OF CHINA

PART ONE
SERVICE INSTRUCTIONS
CONTENTS
PART ONE SERVICE INSTRUCTIONS

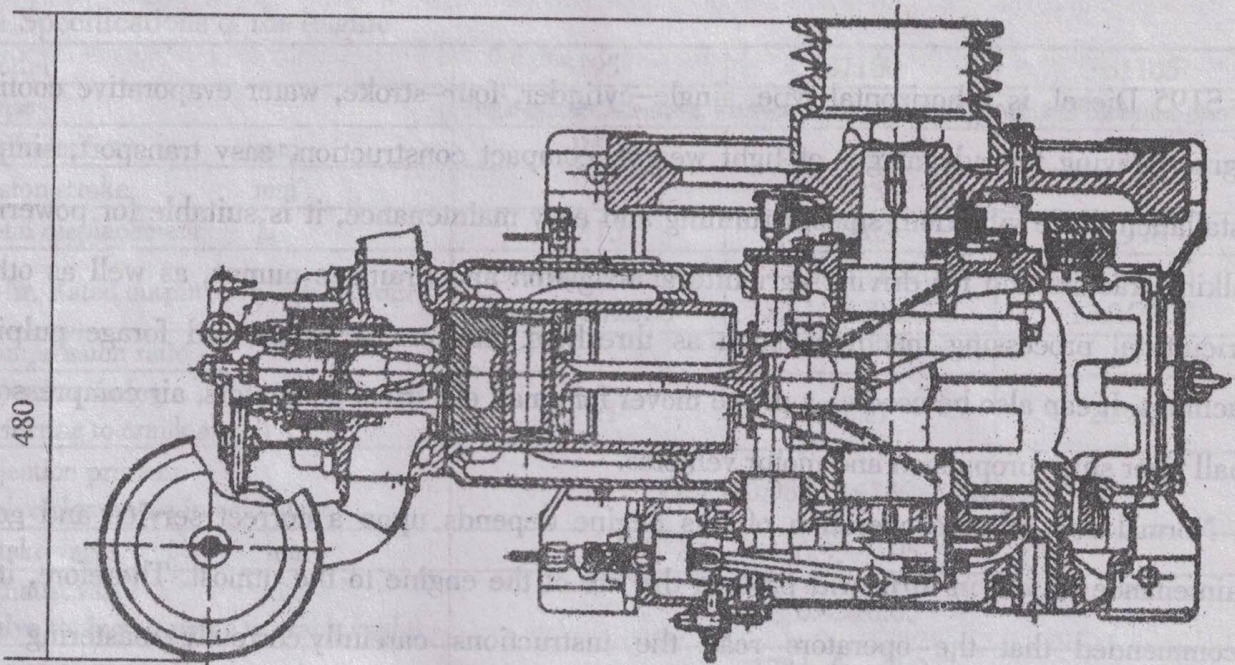
Longitudinal Section of the Engine	1
Cross Section of the Engine	1
Section I General Description	2
Section II Principal Technical Specifications	3
Section III Selection of the Size of Pulleys	4
Section IV Operation of Engine	4
Section V Defects and Elimination	12
Section VI Dismounting and Re-assembly of the Engine	15
Section VII Fitting Clearances and Wear Limits of the Main Moving Parts	19
Section VIII Maintenance of the Engine	20
Section IX Preservation and Storage of the Engine	22

PART TWO PARTS CATALOG

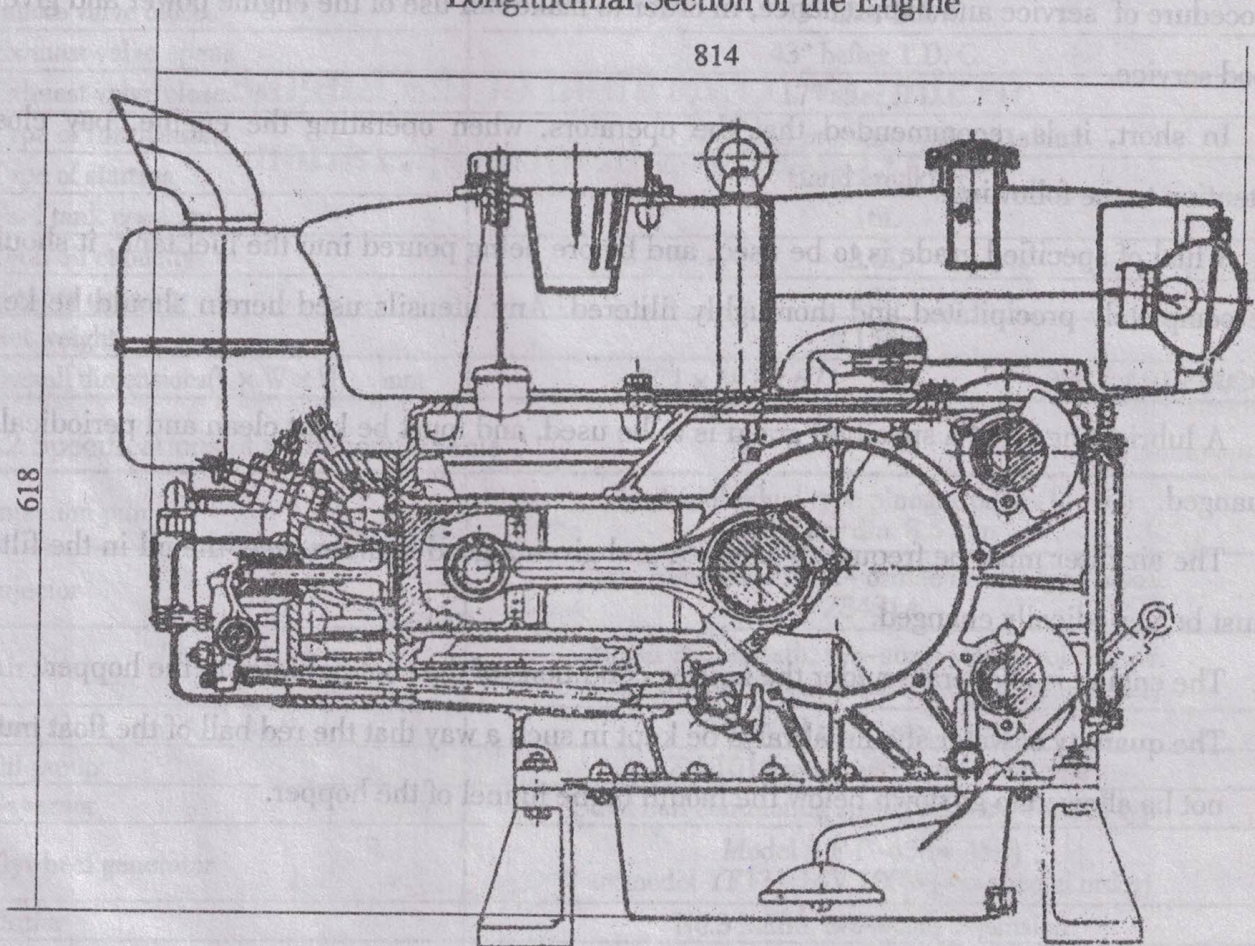
Fig. I Cylinder Block Assembly-1	23
Fig. II Cylinder Block Assembly-2	24
Fig. III Cylinder Head Assembly	25
Fig. IV Piston and Connecting Rod assembly	27
Fig. V Flywheel, Crankshaft and Balancing Mechanism	28
Fig. VI Hopper Assembly	29
Fig. VII Fuel System	30
Fig. VIII Lubrication System	32
Fig. IX Camshaft Assembly	33
Fig. X Gear Casing Assembly	33
Fig. XI Engine Intake System	35
Fig. XII Engine Exhaust System	35
Fig. XIII Fuel Injection Pump	36
Fig. XIV Fuel Injector	37
Fig. XV Alternator and Headlamp Bracket	37

PART ONE

SERVICE INSTRUCTIONS



Longitudinal Section of the Engine



Cross Section of the Engine

Section I. General Description

S195 Diesel, is a horizontal type, single-cylinder, four-stroke, water evaporative cooling engine. Having the advantages of light weight, compact construction, easy transport, simple installation, little vibration, smooth running and easy maintenance, it is suitable for powering walking tractors and for driving agricultural irrigation and drainage pumps, as well as other agricultural processing machines such as threshers, huskers, grinders and forage pulping machines. It can also be used as a prime mover for small electrical generators, air compressors, small river ship-propulsion and motor vehicles.

Normal and reliable operation of this engine depends upon a correct service and good maintenance which, in turn, will prolong the life of the engine to the utmost. Therefore, it is recommended that the operators read the instructions carefully, correctly mastering the procedure of service and maintenance, in order to make full use of the engine power and give a good service.

In short, it is recommended that the operators, when operating the engine, pay close attention to the following:

1. A fuel of specified grade is to be used, and before being poured into the fuel tank, it should be completely precipitated and thoroughly filtered. Any utensils used herein should be kept clean.
2. A lubricating oil of a specified grade is to be used, and must be kept clean and periodically changed.
3. The air filter must be frequently cleaned and given a good maintenance, the oil in the filter must be periodically changed.
4. The engine is to operate under the boiling conditions of the cooling water in the hopper.

The quantity of water should always be kept in such a way that the red ball of the float must not be allowed to go down below the mouth of the funnel of the hopper.

Section II. Principal Technical Specifications

1. Principal Technical Specifications

1.1 Specifications of the engine

Model	S195	S1100	ZS1105
Type	Single-cylinder, four-stroke, Water-evaporative, horizontal type with swirl combustion chamber.		
Cylinder bore	mm 95	100	105
Piston stroke	mm 115		
Total displacement	L 0.815	0.903	0.996
1-hr. Rated output	kW(HP)/r/min 9.7(13.2)/2200 8.82(12)/2200	11.03(15)/2200 12.1(16.3)/2200	12.1/2200 13.2/2200
Compression ratio	20		17
Injection timing (referring to crank angle)	18°±1°	20°±1°	20°±2°
Injection pressure	12.75+0.98 MPa(130+10kgf/cm ²)		
Valve clearances in cold state			
Intake valve	mm	0.35±0.05	
Exhaust valve	mm	0.45±0.05	
Valve timing(referring to crank angle)			
Intake valve opens	17° before T.D.C.		
Intake valve closes	43° after B.D.C.		
Exhaust valve opens	43° before T.D.C.		
Exhaust valve closes	17° after B.D.C.		
Type of lubrication	Combined pressure with splashing		
Type of starting	Hand cranking		
Fuel tank capacity	16L		
Total oil capacity	3.6L		
Hopper capacity	18L		
Net weight	≤155kg		
Overall dimensions(L × W × H)	mm	821 × 497 × 671	880 × 450 × 660

1.2 Specifications of main components

Injection pump	No.1 individual type plunger pump(11-00) plunger dia. 8.5 mm
Injector	plate-clamped, single-orifice needle type nozzle ZS4S1A
Air filter	Model 80, oil bath, two-stage steel wool type or model S1100 three-stage type(for special order)
Fuel filter	C0506 B page-element type
Oil pump	JZX 1014 inner and outer rotor type
Governor	Steel ball contracting spring full range speed type
Flywheel generator	Model S F F-45(6v,45w) or model YF131(14V,100W)(for special order)
Muffler	No.3 baffle, two-stage expansion
Fuel corrector(fuel limiter) (for special order)	Automatically densified, two-spring in series

Section III. Selection of the Size of Pulleys

The selection of the size of pulleys, when the engine is used to drive working machines other than walking tractors, directly affects the operating conditions of the engine and the productivity of the driven machine.

The size of pulleys may be calculated according to the following formulas:

$$D_1 = \frac{D_2 \times N_2}{N_1}$$

$$D_2 = \frac{D_1 \times N_1}{N_2}$$

Where D_1 is the diameter of the pulley on the engine shaft (use pitch diameter in case V-belt pulley is used);

D_2 the diameter of the pulley on the shaft of the driven machine;

N_1 the rotative speed of the engine;

N_2 the rotative speed of the driven machine.

One piece of V-belt pulley with a pitch diameter of 125 mm is attached to the engine on its delivery from the factory. (The flat belt pulley with a diameter of 130 mm is available for special order through negotiation).

Section IV. Operation of the Engine

A. Preparations before Operation

1. Use lubricating oil of grade HC-11 in summer, HC-8 in winter.
2. Take the dipstick out of the crankcase and pour clean oil into it (Fig. 1). The quantity of oil added is about 2.5 kg so that the oil level in the crankcase will lie between the two marked lines on the dipstick (Fig. 2).
Caution: The oil level must not go over the upper line, nor fall down below the lower one, when the engine is in operation.

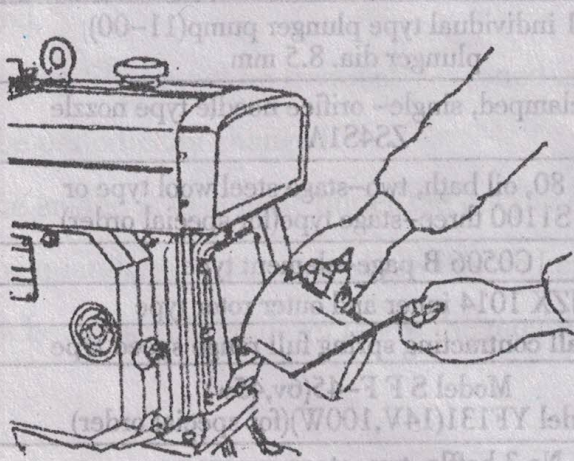


Fig. 1 Pouring oil into the crankcase

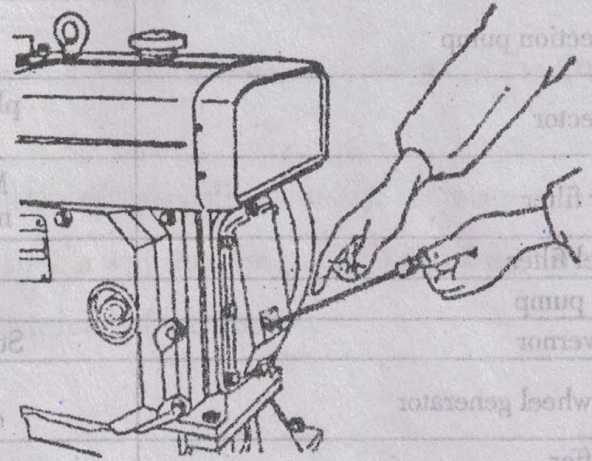


Fig. 2 Measuring oil level in the crankcase by means of a dipstick

3. Set the speed-control lever knob at the STOP position. Turn clockwise the decompression lever with your left hand, so as to make sure that the engine is in the decompressed state. At the same time, crank the engine by means of the starting handle inserted into the starting shaft, gradually speed up and observe whether the red float in the oil indicator rises up. The rising-up of the red float means normal operation of the lubricating oil pump with sufficient quantity of oil. Otherwise, the quantity of oil may be insufficient in the sump, or there may be some defects or troubles in the lubricating oil pump itself. In that case, carefully check and take appropriate measure.

4. Use light diesel fuel No. 0 in summer, No. -10 or No. -20 in winter.

5. Open the fuel tank and pour into it clean diesel fuel already thoroughly precipitated and filtered (Fig. 3). The quantity of fuel added is about 10 liters. Be careful not to let any dust get into the tank while pouring.

6. Open the fuel cock. Then the fuel will flow through a fuel filter to the injection pump (Fig. 4).



Fig. 3 Pouring fuel into the tank

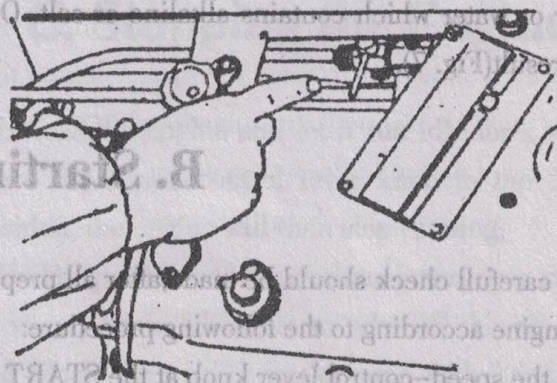


Fig. 4 Showing the location of the fuel cock

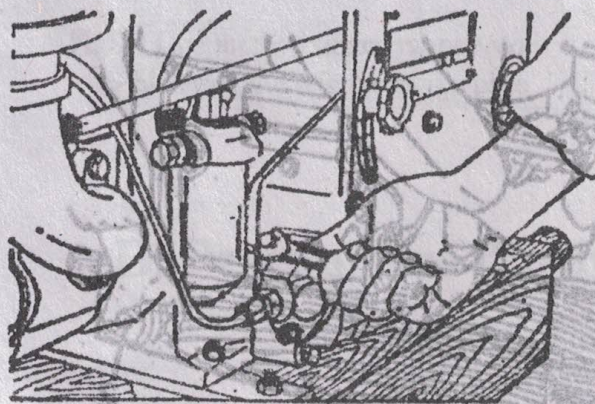


Fig. 5 Loosening the vent screw on the fuel injection pump so as to let air get out, if any

7. Loosen the vent screw on the fuel injection pump or loosea pipe connections, in order that air, if any, in the fuel pipe line may get out. When it is noted that fuel without air bubbles flows out, re-tighten the vent screw (Fig. 5).

8. Set the speed-control lever knob at the START position indicated on the panel. Screw off the plug on the gear casing, insert the fuel priming handle through the hole and move it to and fro until a "chattering" action of the fuel injector is noted. Then take off fuel priming handle and re-screw on the plug (Fig. 6).

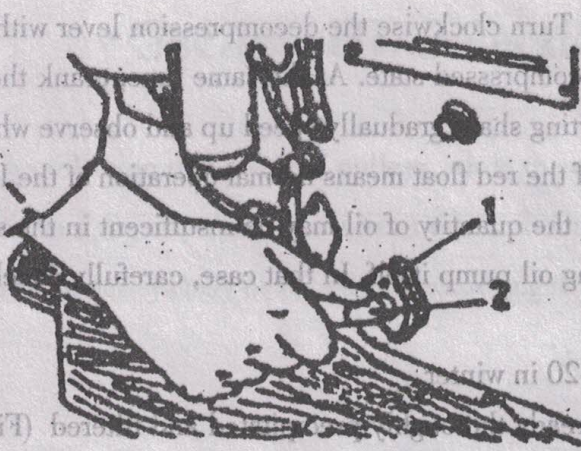


Fig. 6 Priming the fuel injection system

- 1-Priming handle bushing
- 2-Priming handle

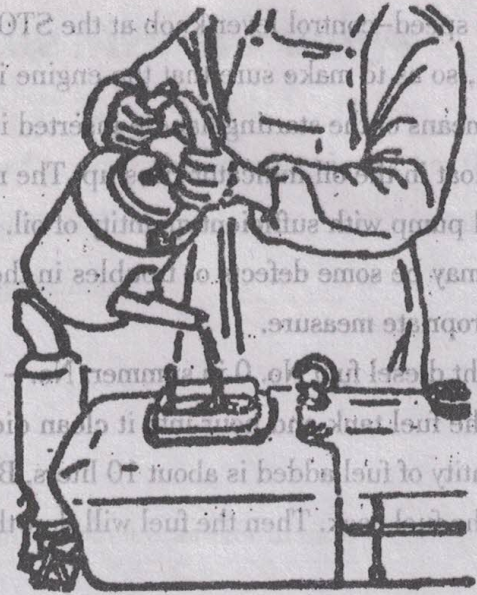


Fig. 7 Pouring clean water into the hopper

9. Pour clean water into the hopper, until the red ball of the float rises up to the highest position. Do not use dirty water or water which contains alkaline or salt. Otherwise, blockage of water duct or erosion of the hopper may result (Fig. 7).

B. Starting the Engine

A careful check should be made, after all preparations mentioned above have been completed. Then start the engine according to the following procedure:

1. Set the speed-control lever knob at the START position indicated on the panel.
2. Move the decompression lever towards the right with your left hand and hold it. Crank the engine with your right hand by means of the starting handle and gradually speed up. When the cranking speed attains its maximum, suddenly release the decompression lever so as to let the air in the engine cylinder now subject to compression, but continue to crank the engine with effort. Then the engine will start up running itself (Fig. 8). Cautino, Once the engine starts up running, the starting handle, because of the action of the spiral-jaws on its clutching end, will disengage and jerk out of itself, and therefore the operator must keep on holding it firmly in order to prevent any incident.
3. After starting, check again the red float in the oil indicator and see if it rises up, and listen to the engine whether there is any abnormal sound.

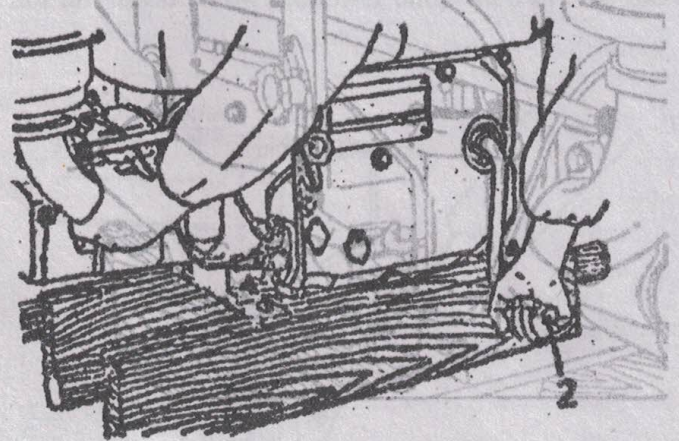


Fig. 8 Starting the engine by means of the starting handle

- 1-Decompression lever
- 2-Starting handle

4. Allow the engine to run for 3~5 minutes at low speed without any load just after its being started. Then increase the speed gradually and load the engine. Running the engine at high speed or with heavy load immediately after start is strictly forbidden.

5. The engine speed under normal running conditions is 2000r/min. Any higher speed may affect the service life of the engine, and any lower speed may make it develop insufficient power.

6. In cold weather, to assist starting, a soft paper roll may be inserted into the centerhole of the starting-aid plug screwed off from the cylinder head. After the paper roll has been ignited, the plug is then screwed back on the cylinder head (Fig. 9).

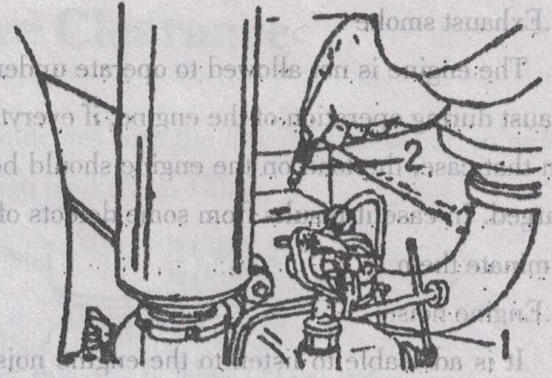


Fig.9 Inserting ignited paper roll to assist starting

- 1—Oil indicator
- 2—Starting-aid plug

C. Stopping the Engine

1. Unload the engine and let it run idle for a while.

Move the speed-control lever knob to the STOP position; the engine will then stop running.

2. Under special conditions where emergency stop is necessary, it is advisable to take off the air filter and block the engine intake pipe with hand (Fig. 10), or loosen any of the connections of the high pressure fuel pipe, the engine will then immediately stop. The engine can also be stopped by putting the decompression device into action.

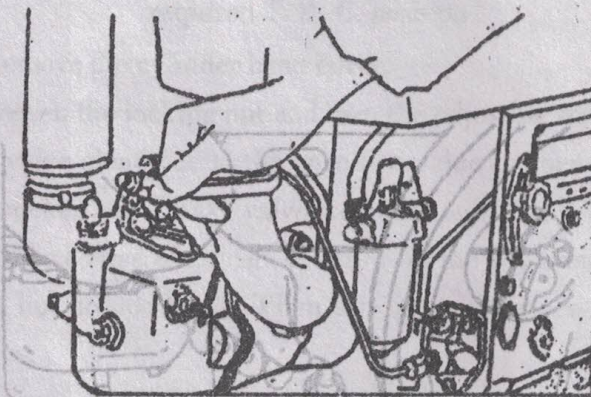


Fig.10 One method of emergency stop—blocking the engine intake pipe

D. Precautions during Operation of the Engine

1. Cooling water

The engine cooling system is of water-evaporative type, the water in the hopper keeps boiling during the operation of the engine. Do not feed fresh water as soon as boiling is noted. However, sufficient quantity of fresh water must be fed in at once when the water in the hopper decreases in quantity due to its continuous evaporating, to such an extent that the red ball of the float goes down to the mouth of the funnel of the hopper.

2. Lubricating oil

Frequent observation should be made on the red float of the oil indicator to see if it rises up. In case it drops down, stop the engine at once for examination and check.

3. Exhaust smoke

The engine is not allowed to operate under black smoke exhaust conditions. Any black smoke in the exhaust during operation of the engine, if everything else is normal, will indicate that the engine is overloaded. In that case, the load on the engine should be reduced, or the pulley on the driven machine should be enlarged. In case it results from some defects of the engine, then it is necessary to find out the defects and eliminate them.

4. Engine noise

It is advisable to listen to the engine noise frequently, and if any abnormal sound is heard, the engine should be immediately stopped, inspected and checked.

E. Precautions after Stopping the Engine

1. If the engine is to be put out of service for a long period of time, it is then necessary to drain out the cooling water completely through the drain cock on the cylinder block (Fig. 11). Especially, in winter, the cooling water must be drained out immediately after the engine has been stopped, in order to prevent subsequent cracking of cylinder block because of freezing.

2. It is necessary to turn the engine until the mark-line T. D. C. on the periphery of the flywheel coincides with the mark-line on the hopper, so that the piston is set at the top dead center position in the compression stroke, in order to prevent any dust from getting into the cylinder, in case the engine is to be put out of service for a comparatively long period of time.

3. Close the fuel cock.

4. Examine the oil in the air filter. If it becomes either dirty or diluted, it should be changed with clean oil, after both the filter cartridge and the filter body have been cleaned and wiped. The quantity of oil is such that its level is just up to the marked line inside the body. Caution: Special attention

should be paid, if or when the engine has been operated under dusty conditions.

5. Check frequently the connecting bolts between the engine and its bed for reliability. When a new cylinder head gasket is replaced, it is necessary to re-tighten the nuts once again after the engine has been running for a few hours. When a hopper packing is replaced, or the fixing bolts become loose, they should be tightened duly.

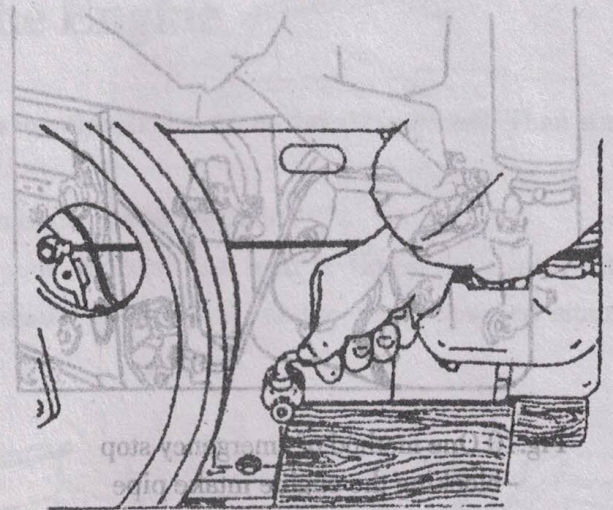


Fig. 11 Draining out cooling water

6. Adjusting the valve clearance to the specified value is a primary factor to ensure normal operation of the engine (Intake valve clearance-0.35mm, exhaust valve clearance-0.45mm).

F. Adjustment of Valve Clearance

1. Turn the flywheel until the mark T. D. C. on its periphery coincides with the line on the hopper, in order to set the piston at its top dead center position in the compression stroke (Fig. 12).

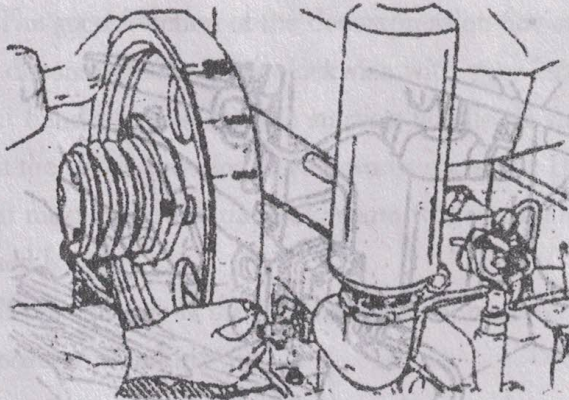


Fig. 12 Turning the flywheel to the required T. D. C. position

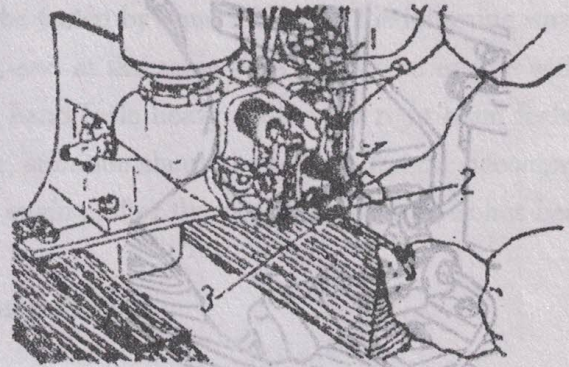


Fig. 13 Adjusting the valve clearance

- 1-Feeler gauge
- 2-Locking nut
- 3-Adjusting screw

2. Remove the cylinder head cover.

3. Loosen the locking nut and turn the adjusting screw on the rocker arm with a screw driver (Fig. 13), to set the valve clearance to the specified value by means of a feeler gauge inserted between the valve stem and the rocker arm. (Intake valve clearance is 0.35mm. and exhaust valve clearance 0.45mm).

4. In the course of adjusting, screw-in the adjusting screw to such an extent that the push rod is just free to turn but not too loose. When this is done, tighten the locking nut in order to prevent any loosening afterwards.

5. Remove the feeler gauge and check the clearance once again.

G. Adjustment of Fuel Injection Timing

1. Disconnect the high pressure fuel pipe from the injector.

2. Loosen the nut which connects the high pressure fuel pipe to the injection pump, turn the pipe around so that the open end of the pipe is upwards, and re-tighten the nut as shown on Fig. 14. Then fill up the high pressure fuel pipe with fuel by means of the fuel priming handle.

3. Turn the flywheel slowly until the fuel just begins to flow out of the open end of the pipe. Stop turning and check whether the fuel injection timing mark-line on the periphery of the flywheel coincides with the mark-line on the hopper. In case they do not coincide with each other (record down whether the fuel injection timing is too advanced or too lagging behind), adjustment is then necessary and made according to the following procedure:

- (1) Shut of the fuel cock of the low pressure fuel pipe.
- (2) Remove the inspection hole cover on the gear casing, and set the speed-control lever knob at the middle position.
- (3) Disconnect the fuel inlet pipe from the injection pump.
- (4) Screw off the pump fixing nuts, and take off the pump.
- (5) Increase or decrease the number of shims between the pump flange and the mounting surface of the gear casing, according to whether the injection timing is to be delayed or advanced (Fig. 15).

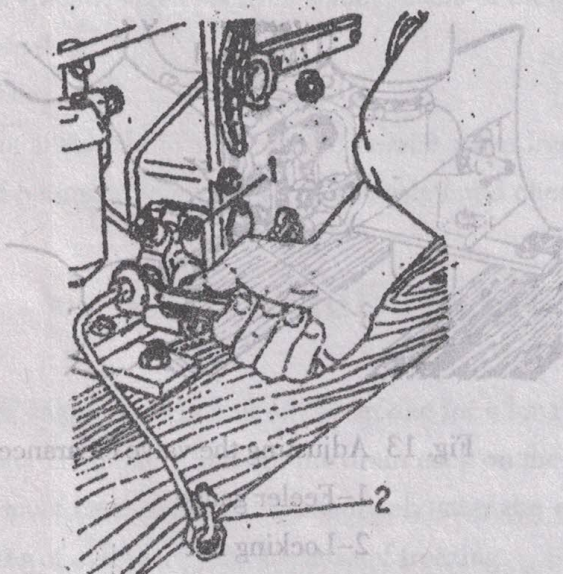


Fig. 14 Turning the high pressure fuel pipe with its open end upwards

- 1-Injection pump
- 2-High pressure fuel pipe

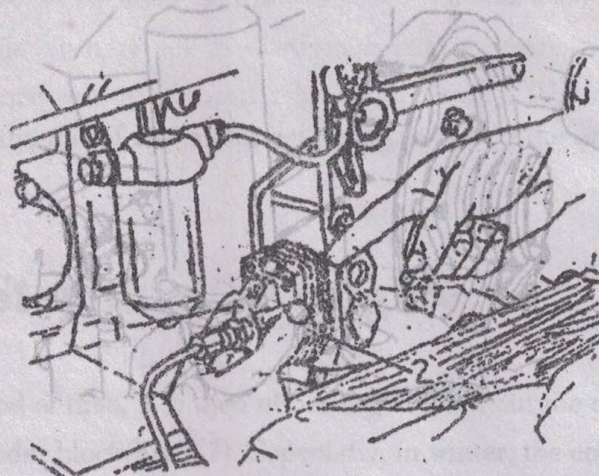


Fig. 15 Adjusting the fuel injection timing by means of increasing or decreasing the number of shims

- 1-Injection pump
- 2-Shim

- (6) Mount back the injection pump and tighten the fixing nuts. While doing so, it is necessary to pay special attention to that the ball of the plunger adjusting arm must be engaged with the slot in the speed-governing

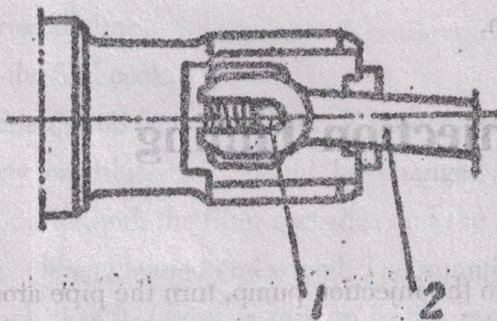


Fig. 16 1-Ball of the plunger adjusting arm
2-Speed-governing fork

fork (Fig. 16) inside the gear casing. This should be checked once again through the inspection hole, after the pump has been mounted back, in order to prevent the engine from "running away" resulting from possible mis-mounting.

After adjustment, it is advisable to make a check according to the above-mentioned item 3. Re-adjustment must be made if something is found incorrect.

The fuel injection timing of the injection pump, whose adjustment is effected by means of increasing or decreasing the number of shims

located between the pump flange and the mounting surface of the gear casing, is already carefully adjusted by the engine manufacturer on delivery of the engine and will not change of itself. Therefore, it is not recommended that the engine operators increase or decrease the number of shims at option, which would affect the normal operation of the engine.

H. Adjustment of Decompression Device

The good function of the decompression device may be tested by hand feeling in the following way: Turn the decompression lever clockwise with your left hand, and at the same time, crank the engine with your right hand by means of the starting handle. If your left hand feels heavy while your right hand feels light, then the decompression device works correctly. However, attention should be paid to that the decompression shaft must not touch the rocker arm while cranking the engine, after the decompression lever has been released back.

If the contrary is the case, adjustment must be made as follows:

1. Loosen the locking nut.
2. Turn the eccentric bushing through an angle to effect the adjustment. Clockwise turning is made if the decompression is too little, anti-clockwise turning is necessary if the decompression is too much (Fig. 17).

Clockwise turning to increase
the decompression effect

Eccentricity 1.5



Anti-clockwise turning to decrease
the decompression effect

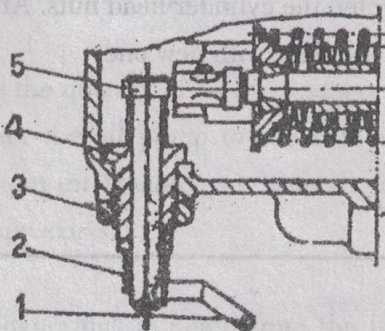


Fig. 17 1. Decompression lever
2. Decompression lever spring
3. Locking nut
4. Eccentric bushing
5. Decompression shaft

Section V. Defects and Elimination

A. Engine Fails to Start

Cause	Remedy
1. Unsteady fuel flow	Check the fuel tank and the cartridge of the fuel filter whether there is any water or dirt. Clean the cartridge in clean fuel if it is choked with dirt, or clean the fuel tank and fill it with clean fuel of recommended grade if any water is found in the tank.
2. Air in the fuel pipe line	Vent and then tighten all fuel pipe connections.
3. Fuel injection timing incorrect	Adjust according to the recommended procedure.
4. Valve clearance incorrect	Adjust according to the recommended procedure.
5. In cold weather, lubricating oil becomes too viscous, difficult to crank the engine	In addition to inserting an ignited paper roll into the combustion chamber by means of the starting-aid plug to assist cold weather starting, pour hot water into the hopper, or preheat the lubricating oil before pouring it into the oil sump. but do not heat the oil sump with external fire. It is also advisable to disconnect the engine from the driven machine by pulling off the belt, then start the engine. Stop it after the engine has been warmed up, repute the belt on and start the engine again.
6. Insufficient compression in the cylinder	The wearing-out of intake and exhaust valves, as well as of piston, piston rings and cylinder liner is the main factor to give rise to insufficient compression. Pouring about 25 grams of lubricating oil into the intake manifold will be of some assistance to increasing the compression pressure in the cylinder. If leakage at the cylinder head gasket occurs, it is then necessary to tighten the cylinder head nuts. Any worn gasket should be replaced.
7. Pumping element (plunger and barrel) of the injection pump or injection nozzle worn-out	Replace with new one.

B. Engine Does Not Develop Full Power

Cause	Remedy
1. Insufficient compression in the cylinder	Proceed as item 6 under "Engine Fails to Start." If parts are worn in excess of the specified wear limit, then replacement should be made.
2. Fuel injection timing incorrect	Adjust according to the recommended procedure.
3. Valve clearance incorrect	Adjust according to the recommended procedure.
4. Air filter choked	Clean it in clean fuel or kerosene.
5. Engine speed too low or too high	Adjust the speed-control lever knob to make the speed attaining its rated value.
6. Pumping element (plunger and barrel) of the injection pump, or injection nozzle worn out or opening pressure of the injector incorrect	Replace them, or adjust the opening pressure of the injector to 12.75+0.98MPa(130+10kgf/cm ²)

C. Engine Stalls

Cause	Remedy
1. Flow of fuel interrupted	Supply with sufficient quantity of fuel to the fuel tank if it is exhausted. If there is air in the fuel pipe line or the filter is choked, vent and remove all dirt.
2. Quantity of lubricating oil insufficient, or some parts burnt due to faults in lubrication system	Examine the quantity of oil by means of the dipstick, replenish if insufficient. Inspect the oil pump to see if it works normally and check all oil ducts. Find out the troubles and remedy them. Replace the burnt part with new one if any exists.
3. Sticking of the needle valve with the nozzle body of the injector	If no "chattering" is heard from the injector while turning the starting shaft of the engine, it will often indicate that the needle valve is stuck or seized. In that case, clean it in clean fuel and lap it a little with the nozzle body. Replace it if necessary.

D. Engine Exhausts Dense Black Smoke

Cause	Remedy
1.Engine overloaded	Reduce the load appropriately. If the belting or coupling with the driven machine is not right, correct it.
2.Faulty injector	Check the opening pressure of the injector and the atomization of the fuel spray. Correct it if necessary, or replace it if worn.
3.Incomplete combustion	This results mainly from faulty injector, incorrect fuel injection timing, leakage through the cylinder head gasket and from insufficient compression, ect. Remedy whatever the real cause may be.

E. Other Defects

(If any of the following conditions arises, it is necessary to stop the engine immediately)

Cause	Remedy
1.Engine speed "hunting"	Check the sensitivity of the governor system, and vent the fuel supply line if there is any air in it.
2.Abnormal engine noise suddenly arises	Make a careful check for every moving part.
3.Engine suddenly exhausts black smoke	Examine the fuel injection system, especially the injector.
4.Red float in the oil indicator suddenly drops down	Examine the lubrication system to see if the oil strainer screen and other oil duct are choked and to observe whether the oil pump operates normally.

Section VI. Dismounting and Re-assembly of the Engine

If it is necessary to dismount the engine for maintenance and repair, it is recommended to proceed in the following order:

A. Draining out the cooling water by opening the drain cock

B. Removing the cylinder head cover and the cylinder head

1. Turn off the pipe connection bolt from the inlet of the oil indicator and the fixing nut on the cylinder head cover. Then the cylinder head cover may be removed.

2. Close the fuel cock on the fuel tank, and then disconnect the fuel-leak-off connecting pipe of the injector from the fuel filter.

3. Screw off the bolts which connect the air filter with the intake pipe, and remove the air filter.

4. Screw off the two bolts which connect the exhaust silencer with the cylinder head and remove the silencer as a whole.

5. Turn off the two nuts which hold down the rocker-arm shaft support on the cylinder head, remove the support and draw out the two valve push rods.

6. Remove the high pressure fuel pipe.

While re-installing the high pressure fuel pipe, it is necessary to turn but not to tighten the connecting nuts on both ends of the pipe simultaneously, and first tighten the one which connects the pipe with the injection pump. Operate the pump with the fuel priming handle until fuel flows out of the other end of the pipe which is connected with the injector. Then tighten the nut on this end.

7. Screw off the nuts holding down the injector clamping plate, then remove the injector and the clamping plate.

While re-installing the injector, the sealing copper washer should be slipped on to the nozzle before it is put back into its place. The two nuts are to be tightened evenly.

8. Turn off the cylinder head nuts, and remove the cylinder head. While reinstalling, the cylinder head nuts are to be tightened one by one in a diagonal order and with a torque of about 25 kgf·m.

9. Remove the cylinder head gasket.

C. Removing the fuel tank and the hopper

1. Close the fuel cock in the fuel supply pipe.

2. Remove the lifting eye-nut.

3. Disconnect the fuel supply pipe from the fuel filter.

4. Screw off the two bolts located above the rear cover of the cylinder block, which fix the fuel tank on the eblock, and also screw off the bolt connecting the fuel tank and the hopper together. Then remove the fuel tank.

5. Remove the funnel assembly from the hopper.
6. Screw off the four bolts inside the hopper, which fix the hopper on the cylinder block. Then take off the hopper and remove the hopper gasket.
7. Remove the upper cover of the cylinder block and its gasket.

D. Dismounting the gear casing.

1. Screw off the bolts which connect the gear casing with the cylinder block, and take off the gear casing.
2. Draw out the camshaft, and take off the starting gear.
3. Dismantle the speed-governor gear, sliding ball-race and steel balls. While assembling it is absolutely necessary that the tooth-mesh-marks on all the gears must be respectively lined up with one another as they were before dismantling (Fig. 18).

E. Removing the rear cover of the cylinder block

1. Take out the oil dipstick.
2. Unscrew the bolts which fix the rear cover on the cylinder block, then remove the rear cover and its packing.

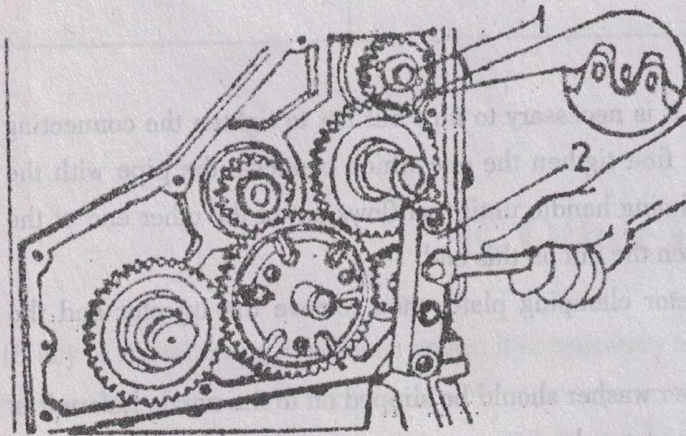


Fig. 18 Arrangement of gear train (tooth-mesh-marks must be lined up) and dismantling of balancing shaft gear by means of a puller

1. Fixing bolt
2. Puller

carbon deposit on the wall of the cylinder liner should be pre-removed). Then push slowly the piston-connecting rod assembly out of the cylinder bore by means of a wooden rod against the big end of the connecting rod through the rear opening of the cylinder block. Caution: Be careful of this operation not to damage the crankpin, the cylinder liner and the piston.

F. Dismantling and re-installing the piston-connecting rod assembly

1. Turn the flywheel until the big end of the connecting rod is in the position nearest to the rear opening of the cylinder block, in order to facilitate the removing of the connecting rod bolts.

2. Cut off by means of a pair of pliers the steel wire which locks the connecting rod bolt, and remove it. While re-installing, new wires should be used and twisted tight.

3. Unscrew the connecting rod bolts by means of the special wrench supplied with the engine.

4. Take off the connecting rod cap. Caution: The connecting rod bearing shells must be well protected while taking off the cap.

5. Turn the flywheel slowly until the piston is at the top dead center position (Any

While re-installing, the 45° parting surface of the big end of the connecting rod must be kept downwards, the cap must be fitted on in such a way that the matching marks on both the cap and the rod should be on the same side. The piston rings are to be so fitted on to the piston that the gaps are spaced 120° apart from one another and the ends of second and third compression rings on which there is a mark "T" are kept upwards (towards the cylinder head). The connecting rod bolts are tightened with a torque of about $8 \text{ kgf}\cdot\text{m}$ but before being completely tightened, it is necessary to turn the flywheel to see if the moving parts move freely, and then tighten the bolts evenly and completely. Further more, while re-installing, the crankpin, the connecting rod bearing shells, the piston and the piston rings are all to be smeared with a little clean lubricating oil. If it is necessary to replace the small end bushing of the connecting rod, then after replacement, the connecting rod should be so assembled back with the piston as it was before.

G. Dismantling the flywheel

1. Remove the pulley.
2. Unlock the lock washer of the flywheel nut.
3. Loosen the flywheel nut by means of a special wrench (knock the handle of the wrench with a hammer counter-clockwise, if necessary.), but do not screw it off (Fig. 19).

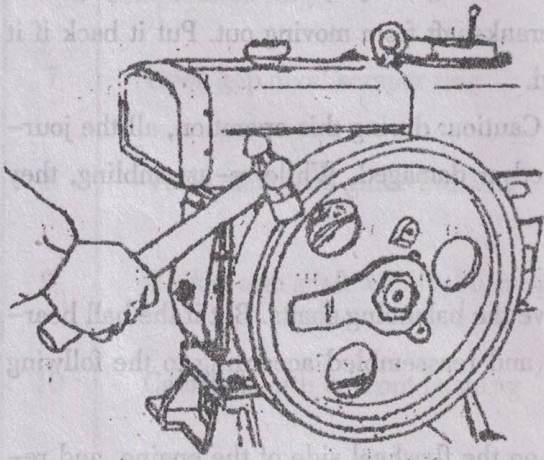


Fig. 19 Loosening the flywheel nut by knocking the handle of the wrench with a hammer

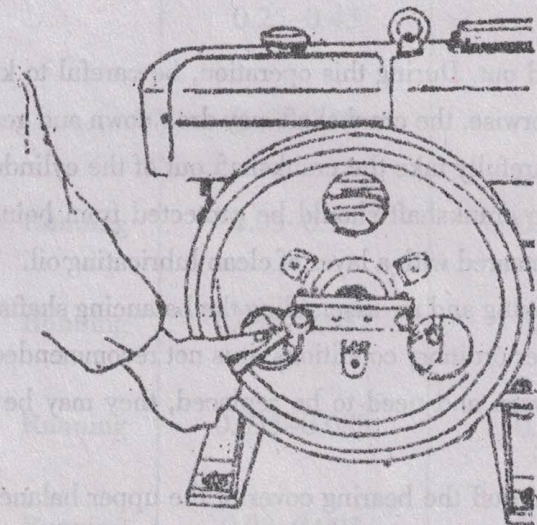


Fig. 20 Removing the flywheel by means of the puller

4. Pull out the flywheel by means of the puller. A hammer may be used to knock the center of the bridge of the puller if the flywheel is difficult to pull out (Fig. 20, Fig. 21).

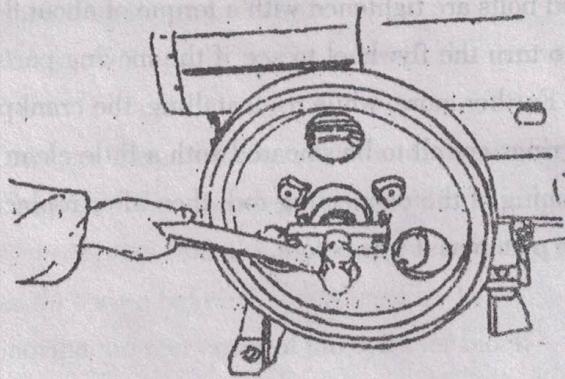


Fig. 21 Knocking the center of the bridge of the puller by means of a hammer

it is pulled out. During this operation, be careful to keep the crankshaft from moving out. Put it back if it does. Otherwise, the crankshaft may drop down and get damaged.

4. Carefully take the crankshaft out of the cylinder block. Caution: during this operation, all the journals of the crankshaft should be protected from being scratched or damaged. While re-assembling, they must be smeared with a layer of clean lubricating oil.

I. Removing and re-assembling the balancing shafts

Under ordinary conditions, it is not recommended to remove the balancing shafts. But if the ball bearings are worn and need to be replaced, they may be removed and reassembled according to the following procedure:

1. Take off the bearing cover of the upper balancing shaft on the flywheel side of the engine, and remove the lubricating oil pump from the lower balancing shaft on the same side.

2. Screw off the bolts on the gear end of both the balancing shafts and remove the gears by means of the puller.

3. Remove the circlips from the block.

4. Tap the balancing shafts from the flywheel side of the engine by means of a wooden hammer or a copper rod, until the ball bearings on the other end of the shafts come out of the cylinder block, and then remove the ball bearings.

5. Similarly, push the balancing shafts towards the flywheel side and remove the ball bearings on this end of the shafts.

6. After removing the ball bearings, carefully take out the balancing shafts from the cylinder block.

5. Screw off the flywheel nut and take off the flywheel. Be careful not to damage the thread on the end of the crankshaft while taking off the flywheel, and do it with safety since the flywheel is heavy.

6. Remove the flat key from the crankshaft by means of a M6 cap screw.

H. Removing and re-assembling the crankshaft

1. Take off the oil pipe which connects the main bearing housing with the oil indicator by screwing off the pipe connection from the housing.

2. Remove all the fixing bolts of the main bearing housing.

3. Pull out the main bearing housing by screwing the two M8 bolts simultaneously and slowly into the two holes which are diagonally spaced on the housing until

Section VII. Fitting Clearances and Wear Limits of the Main Moving Parts

No.	Fitting Parts	Kind of Fits	Recommended Clearance mm.	Limits of wear mm.
1	Main journal of crankshaft with main bearing	Running	0.08~0.12	0.25
2	Crankpin of crankshaft with connecting rod bearing	Running	0.06~0.118	0.25
3	Piston pin with connecting rod small end bushing	Running	0.020~0.056	0.12
4	Piston skirt with cylinder liner	Running	0.06~0.225	0.42
5	Open gap of the first piston compression ring		0.30~0.50	2
6	Open gap of the second and third piston compression ring		0.25~0.45	2
7	Open gap of oil scraper ring		0.25~0.40	2
8	Valve stem with guide bushing	Running	0.05~0.10	0.30
9	Rocker arm shaft with its bushing	Running	0.016~0.052	0.20
10	Camshaft with its front bushing	Running	0.035~0.089	0.25
11	Camshaft with its rear bushing	Running	0.03~0.093	0.25
12	Speed-governing gear shaft with its bushing	Running	0.02~0.066	0.25
13	Starting shaft with its bushing(A)	Running	0.04~0.088	0.25
14	Starting shaft with its bushing(B)	Running	0.04~0.12	0.25
15	Axial clearance of crankshaft		0.15~0.28	adjust with shims

Section VIII. Maintenance of the Engine

Item	Maintenance	Period
1. Cooling water	As soon as the red ball of the float in the hopper goes down near the mouth of the funnel, replenish water	as required
2. Lubricating oil	As soon as the oil level in the sump drops down near the lower marked line on the dipstick, replenish oil.	Everyday
	After the first 100 hours of operation of a new engine, it is necessary to clean the crankcase and the oil sump once, and renew the oil	First 100 hours
	Hereafter, the oil must be changed for every 200 hours of operation	200 hours
3. Lubricating oil strainer	After the first 100 hours of operation of a new engine, it is necessary to dismantle the strainer and clean it.	First 100 hours
	Hereafter, the strainer must be cleaned for every 200 hours of operation	200 hours
4. Air filter	Ordinarily, the filter is to be cleaned and the oil inside is to be changed once every 100 hours of engine operation, when the environment air condition is comparatively clean.	100 hours
	But when the engine is used to power a walking tractor, the cleaning of the filter and the change of oil are to be done every 50 hours of operation.	50 hours
	In case the engine is operating in a dusty atmosphere, it is necessary to clean the filter and change the oil inside every shift of work.	Every shift
5. Filtering cartridge of fuel filter	Clean the paper cartridge of the filter with clean fuel or kerosene and blow it from inside out. Replace it if the cartridge is worn.	200 hours

Item	Maintenance	Period
6. Fuel tank and filling screen	Remove the screen from the inlet of the fuel tank and clean it in fresh fuel.	50 hours
	Clean the inside of the fuel tank with clean fuel.	500 hours
7. Lapping of valve	Smear the valve seats with a little bit of lapping paste and lap them together with the valves carefully (Caution: do not let the lapping paste get into the valve guides). After lapping, wash the valves and the valve seats with fresh fuel and wipe them dry. Checking the valve for tightness may be done by pouring into the intake and exhaust ports a small quantity of fuel and observe whether they leak out around the valve seats.	500 hours
8. Valve clearance	Adjust according to the recommended procedure.	100 hours
9. Cylinder head, cylinder liner and piston-connecting rod assembly	Remove carbon deposit if any, and clean them with fresh fuel. It may not be necessary to dismantle them for cleaning if the engine operates normally.	1000 hours
10. Oil ducts in the crankshaft	Screw off the oil duct plug from the crankshaft. Clean the center hole of the crankpin and the two oil passages in the crankshaft with fresh fuel.	200 hours
	Pour into the water passages a solution of hydrochloric acid (HCL) of 25% concentration, keep it for about 10 minutes and then blow-wash with fresh water. Repeat it again if not thoroughly cleaned. Note: the hopper must be removed from the engine before cleaning.	500 hours

Section IX. Preservation and Storage of the Engine

If the engine is to be put out of service for a comparatively long period of time, it is necessary to preserve it according to the following procedure, in order to prevent any corrosion and erosion.

1. Drain out the lubricating oil from the oil sump by screwing off the oil-drain plug. Screw back the plug after draining. This operation may better be performed immediately after the engine stops running when the oil temperature is comparatively high (Fig. 22).

2. Drain out completely the cooling water by opening the water-drain cock.

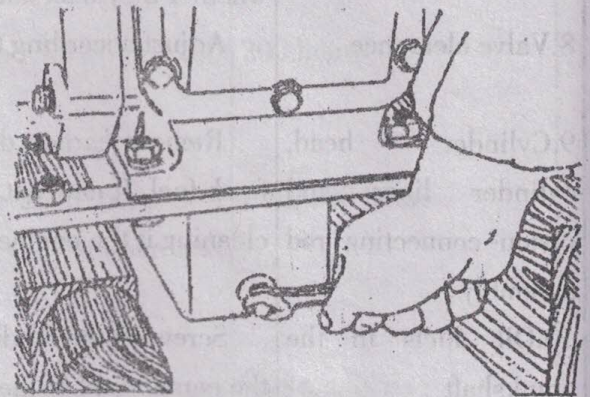
3. Drain out the fuel from the fuel tank.

4. Remove the rear cover of the cylinder block. Take out the oil strainer, dismount and clean it.

5. Clean the crankcase, and then reinstall the oil strainer.

6. Clean the filtering cartridge and the inside of the air filter.

7. Take 1.8kg of filtered lubricating oil of grade HC-8 and give it a dehydration treatment (Heat it to 110~150°C, until all bubbles on the surface of the oil disappear). Pour into the crankcase about 1kg of this treated oil, and turn the engine until the float in the oil indicator rises up, so as to make sure that the lubricating system is completely filled up with this oil.



8. Pour into the intake pipe about 0.3kg of this dehydrated oil, turn the engine to make sure that the piston, the cylinder liner and the valve seat are all covered with a layer of this oil. Then set the piston at its top dead center position in the compression stroke by turning the engine slowly, in order to isolate the inside of the cylinder from outside.

9. Add about 0.2kg of industrial vaseline to the remains of the dehydrated oil and heat it with agitation until the mixing is homogeneous.

10. Remove the cylinder head cover and clean it. Smear the rocker arm, the rocker arm shaft and other parts with the treated mixture by brushing evenly.

11. Install all the parts that have been dismantled. Clean all the outside surfaces of the engine.

12. Wrap up properly the air filter, the exhaust pipe outlet and the funnel mouth of the hopper with any kind of preservative paper in order to prevent any dust from getting in.

13. Smear with the above-mentioned mixture all the exposed surfaces of the engine which have not been painted (such as flywheel, oil pipe, etc.).

14. It is advisable not to smear the mixture on the surfaces of any parts made of rubber or plastics.

15. The engine so preserved should be stored in room of good ventilation and low humidity but without any dust. It is strictly forbidden to store the engine wherever there are chemicals (such as synthetic fertilizer, agricultural insecticide, etc.).

The preservation according to the above procedure may be good for six months. Over this period, repeat this procedure.

PART TWO PARTS CATALOG

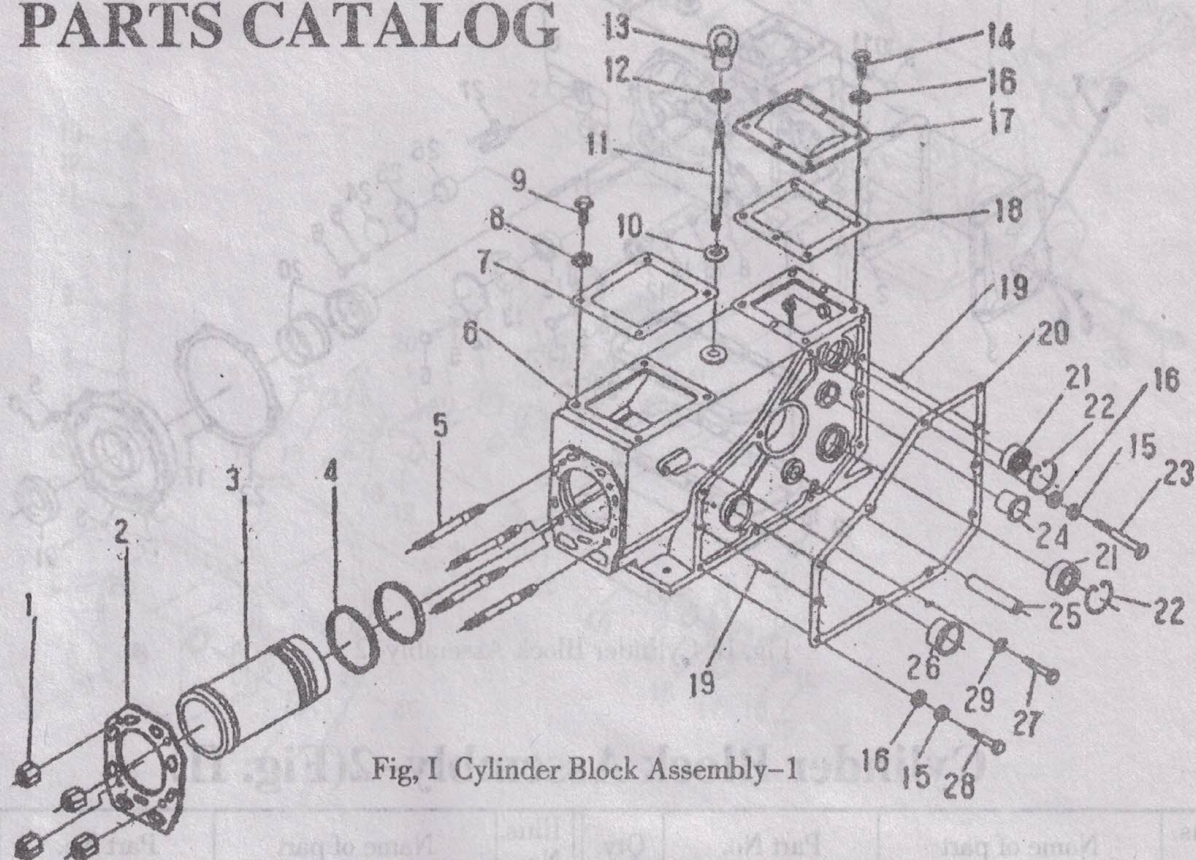


Fig. I Cylinder Block Assembly-1

Cylinder Block Assembly-1(Fig. I)

Illus. No.	Name of part	Part No.	Qty.	Illus. No.	Name of part	Part No.	Qty.
1	Cylinder head nut	195-01001	4	17	Upper cover of the cylinder block	195-01011	1
2	Cylinder head gasket	195-01002-1	1	18	Packing sheet of upper cover	195-01012	1
3	Cylinder liner	195-01003-1	1	19	Locating pin A5 × 12	GB119-86	2
4	Cylinder liner water seal ring	195-01004-2	2	20	Gear casing packing	195-01014	1
5	Cylinder head stud	195-01005-1	4	21	Single row self-centering ball bearing	205 GB276-64	2
6	Cylinder block	195-01006-2	1	22	Circlip	195-01015-1	2
7	Hopper packing	195-01007	1	23	Hexagon bolt	Blot M8 × 95 GB5783-86	3
8	Washer 10-140HV	GB97.1-85	4	24	Starting shaft bushing (A)	195-01016	1
9	Hexagon bolt	Blot M10 × 25 GB5783-86	4	25	Speed-governing gear shaft	195-01017	1
10	Washer	195-01008		26	Camshaft front bushing	195-01018	1
11	Lifting stud	195-01009	1	27	Hexagon bolt	Blot M10 × 25 GB5783-86	1
12	Washer 12-140HV	GB97.1-85	1	28	Hexagon bolt	Blot M8 × 55 GB5782-86	6
13	Lifting eye-nut	195-01010	1	29	Spring washer	Washer 10 GB93-87	1
14	Hexagon bolt	Blot M8 × 18 GB5783-86	6				
15	Spring washer	Washer 8 GB93-87	9				
16	Washer 8-140HV	GB97.1-85	15				

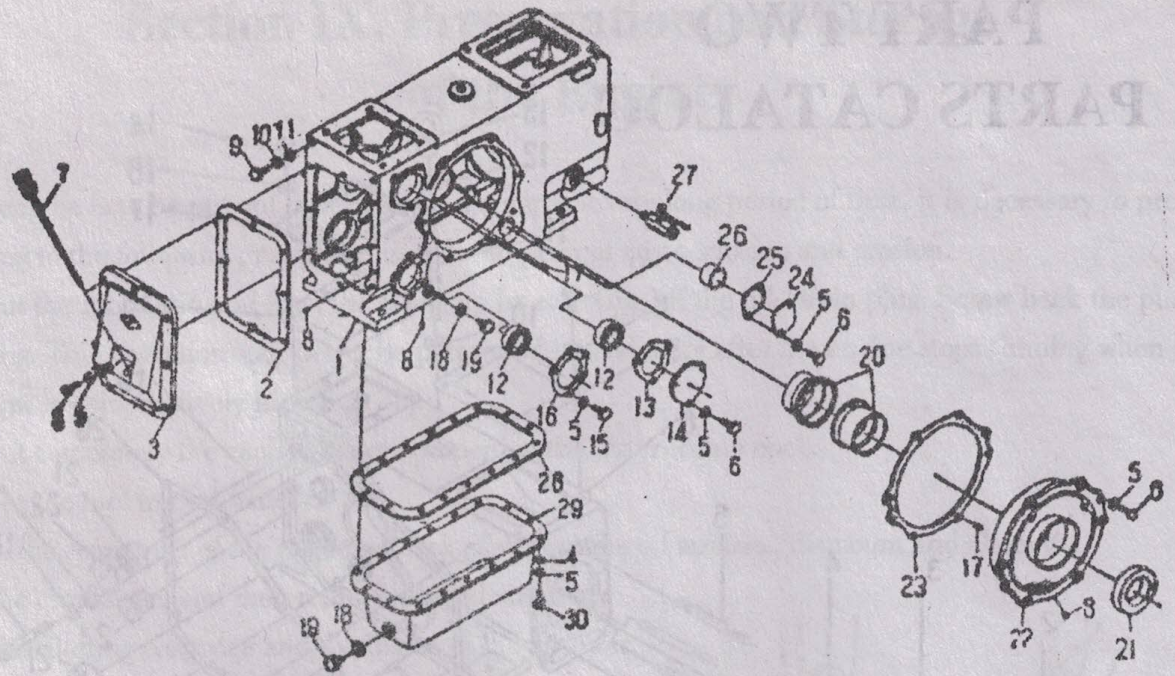


Fig. II Cylinder Block Assembly-2

Cylinder Block Assembly-2(Fig. II)

Illus. No.	Name of part	Part No.	Qty.	Illus. No.	Name of part	Part No.	Qty.
1	Cylinder block	195-01006-2	1	14	Balancing shaft cover	195-01023	1
2	Packing of the rear cover	195-01019-1	1	15	Hexagon bolt	Bolt M × 40	3
3	Rear cover	195-01020-2	1			GB5782-86	
4	Washer 8-140HV	GB97.1-85	16	16	Packing for lubricating oil pump	195-01024	3
5	Spring washer	Washer 8	40	17	Locating pin A5 × 12	GB119-86	2
		GB93-87		18	Washer	195-01025	2
6	Hexagon bolt	Bolt M8 × 25	18	19	Plug	195-01026	2
		GB5783-86		20	Main bearing	195-01027-1	2
7	Oil dipstick	195-01100-4	1	21	Oil seal for crankshaft	φ 50 × φ 80 × 12	1
8	Oil hole plug on the block	195-01021	3	22	Main bearing housing	195-01028-2	1
9	Hexagon bolt	Bolt M10 × 20	2	23	Main bearing housing mounting shim	195-01029	as required
		GB5783-86		24	Camshaft cover	195-01030	1
10	Spring washer	Washer 10	2	25	Packing for camshaft cover	195-01031	1
		GB93-87		26	Camshaft rear bushing	195-01032	1
11	Washer 10-140HV	GB97.1-85	2	27	Water drain cock	R3/8	1
12	Single row self-centering ball bearing	205	2	28	Packing for oil sump	195-01033	1
		GB276-64		29	Oil sump	195-01200-1	1
13	Packing for balancing shaft cover	195-01022	3	30	Hexagon bolt	Bolt M8 × 18	16
						GB5783-86	

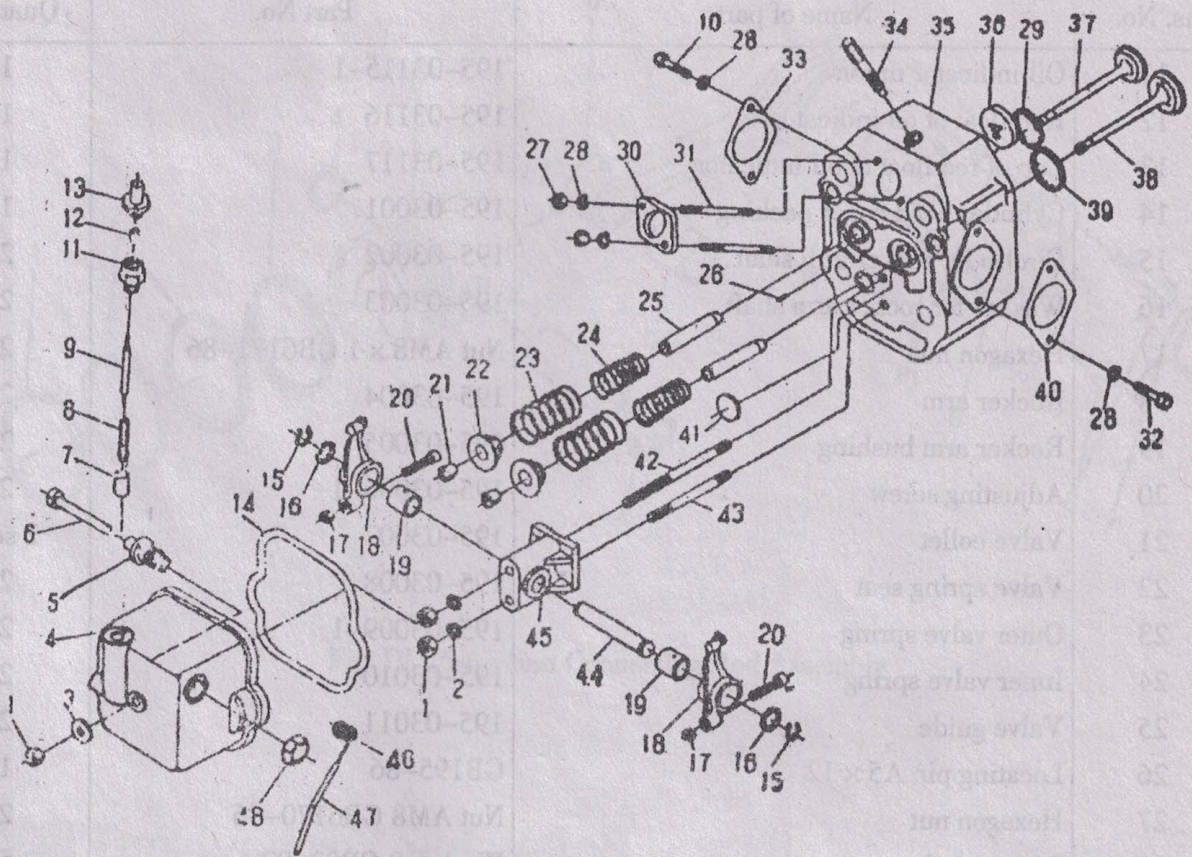


Fig. III Cylinder Head Assembly

Cylinder Head Assembly(Fig. III)

Illus. No.	Name of part	Part No.	Quantity
1	Hexagon nut	Nut AM 10 GB6170-86	1
2	Spring washer	Washer 10 GB93-87	2
3	Plain washer 10-140HV	GB97.1-85	1
4	Cylinder head cover	195-03101	1
5	Decompression shaft bushing	195-03102	1
6	Decompression shaft	195-03103	1
7	Oil indicator piston	195-03111-1	1
8	Oil indicator spring	195-03112	1
9	Oil indicator spindle	195-03113	1
10	Hexagon bolt	Blot M8 x 28 GB5783-86	2

Illus. No.	Name of part	Part No.	Quantity
11	Oil indicator union	195-03115-1	1
12	Red float of oil indicator	195-03116	1
13	Cap of red float of oil indicator	195-03117	1
14	Cylinder head cover packing	195-03001	1
15	Circlip for rocker arm shaft	195-03002	2
16	Washer for rocker arm shaft	195-03003	2
17	Hexagon nut	Nut AM8 × 1 GB6171-86	2
18	Rocker arm	195-03004	2
19	Rocker arm bushing	195-03005	2
20	Adjusting screw	195-03006-1	2
21	Valve collet	195-03007	2 sets
22	Valve spring seat	195-03008	2
23	Outer valve spring	195-03009-1	2
24	Inner valve spring	195-03010	2
25	Valve guide	195-03011	2
26	Locating pin A5 × 12	GB195-86	1
27	Hexagon nut	Nut AM8 GB6170-86	2
28	Spring washer	Washer 8 GB93-87	5
29	Exhaust valve seat	195-03028-1	1
30	Clamping plate for injector	195-03013	1
31	Stud for injector clamping plate	195-03014	2
32	Hexagon bolt	Bolt M8 × 30 GB5783-86	2
33	Exhaust pipe packing	195-03015	1
34	Starting-aid plug	195-03016-1	1
35	Cylinder head	195-03017-2	1
36	Turbulance combustion chamber insert	195-03018	1
37	Exhaust valve	195-03019-1	1
38	Intake valve	195-03020-1	1
39	Intake valve seat	195-03021-1	1
40	Intake pipe packing	195-03022	1
41	Plug	195-03023	3
42	Long stud for rocker arm shaft support	195-03024	1
43	Short stud for rocker arm shaft support	195-03025	1
44	Rocker arm shaft	195-03026	1
45	Rocker arm shaft support	195-03027	1
46	Decompression lever spring	195-03104	1
47	Decompression lever	195-03105	1
48	Set nut	195-03106	1

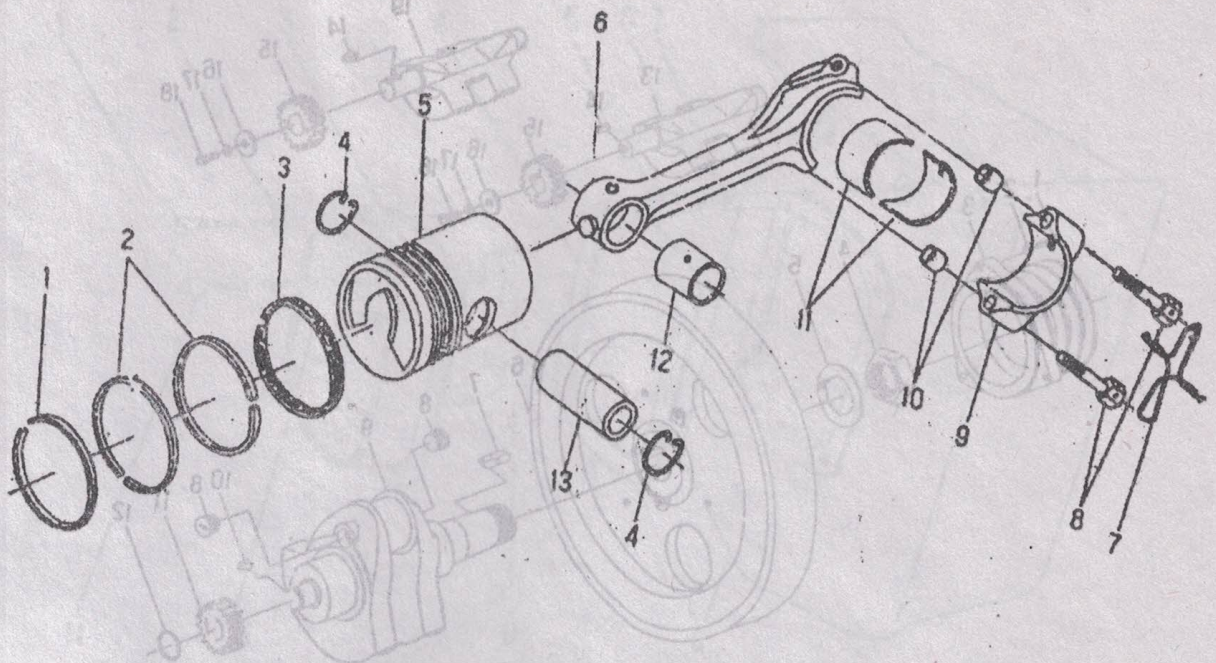


Fig. IV Piston and Connecting Rod Assembly

Piston and Connecting Rod Assembly(Fig. IV)

Illus. No.	Name of part	Part No.	Quantity
1	Compression ring(1)	195-04001-1	1
2	Compression ring(2,3)	195-04002-1	2
3	Oil scrapet ring	195-04003-0	1
4	Circlip for piston pin	195-04004-1	2
5	Piston	195-04005-3	1
6	Connecting rod	195-04006	1
7	Locking wire	galvanized wire $\phi 1.8 \times \phi 180$	2
8	Connecting rod bolt	195-04008	2
9	Connecting rod cap	195-04009	1
10	Guide bushing	195-04010	2
11	Connecting rod bearing shell	195-04011	1 set
12	Connecting rod bushing	195-04012-1	1
13	Piston pin	195-04013	1

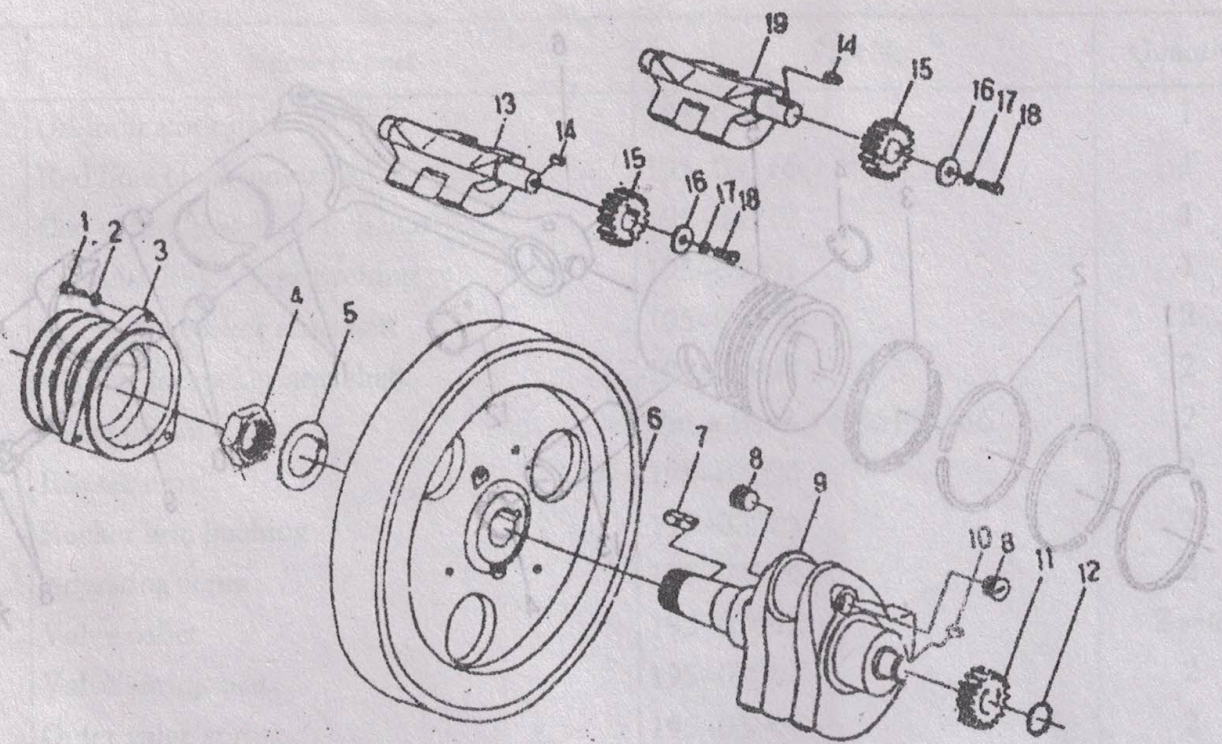


Fig. V Flywheel, Crankshaft and Balancing Mechanism

Flywheel, Crankshaft and Balancing Mechanism(Fig. V)

Illus. No.	Name of part	Part No.	Quantity
1	Hexagon bolt	Bolt M10 × 5 GB5782-86	3
2	Spring washer	Washer 10 GB93-87	2
3	V-belt pulley	195-05001-2	1
4	Flywheel nut	195-05002-1	1
5	Lock washer	195-05003-1	1
6	Flywheel	195-05004-1	1
7	Flat key 12 × 14	GB1096-79	1
8	Crankshaft screw plug	195-05007-1	2
9	Crankshaft	195-05006	1
10	Flat key 8 × 6	GB1096-79	1
11	Crankshaft timing gear	195-05009	1
12	Cirelip	30 GB894.1-86	1
13	Upper balancing shaft	195-05010-1	1
14	Flat key C6 × 16	GB1096-79	2
15	Balancing shaft gear	195-05012	2
16	Washer	195-05013	2
17	Spring washer	Washer 8 GB93-87	2
18	Hexagon bolt	Bolt M8 × 18 GB5783-86	2
19	Lower balancing shaft	195-05014-1	1

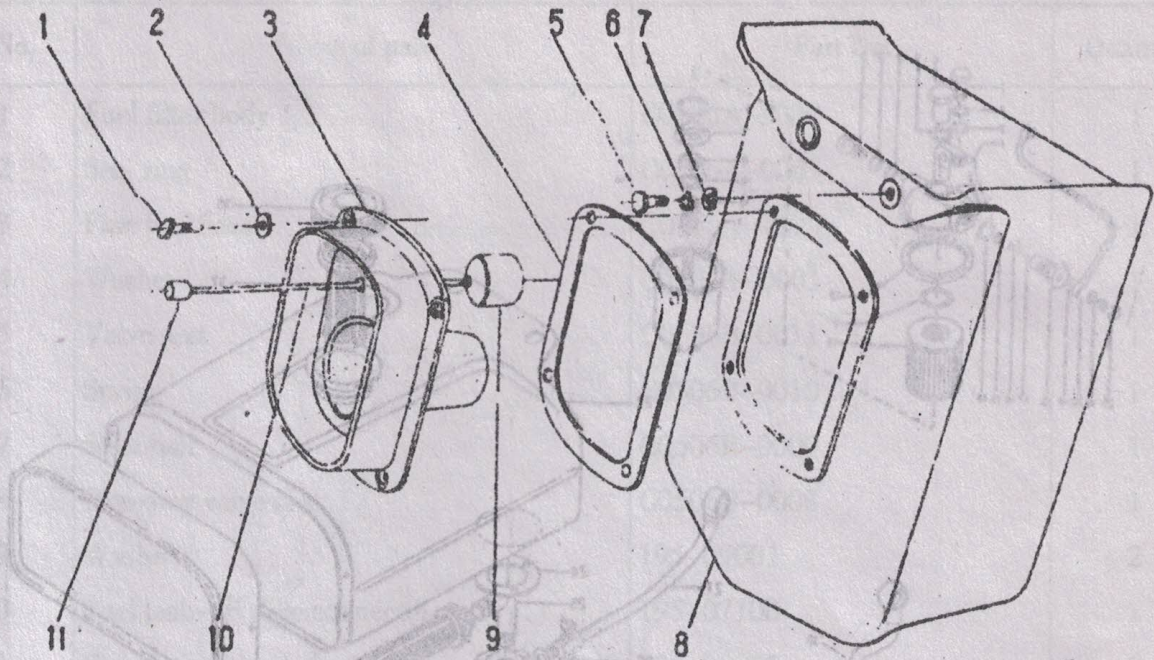


Fig. VI Hopper Assembly

Hopper Assembly(Fig. VI)

Illus. No.	Name of part	Part No.	Quantity
1	Hexagon bolt	Bolt M8 × 22 GB5783-86	4
2	Washer 8-140HV	GB97.1-85	4
3	Funnel	195-06103-4	1
4	Packing for funnel	195-06001	1
5	Hexagon bolt	Bolt M8 × 18 GB5783-86	1
6	Spring washer	Washer 8 GB93-87	1
7	Washer	195-05013	1
8	Hopper	195-06002	1
9	Float	195-06203	1
10	Float stem	195-06201-2	1
11	Red indicating ball	195-06202	1

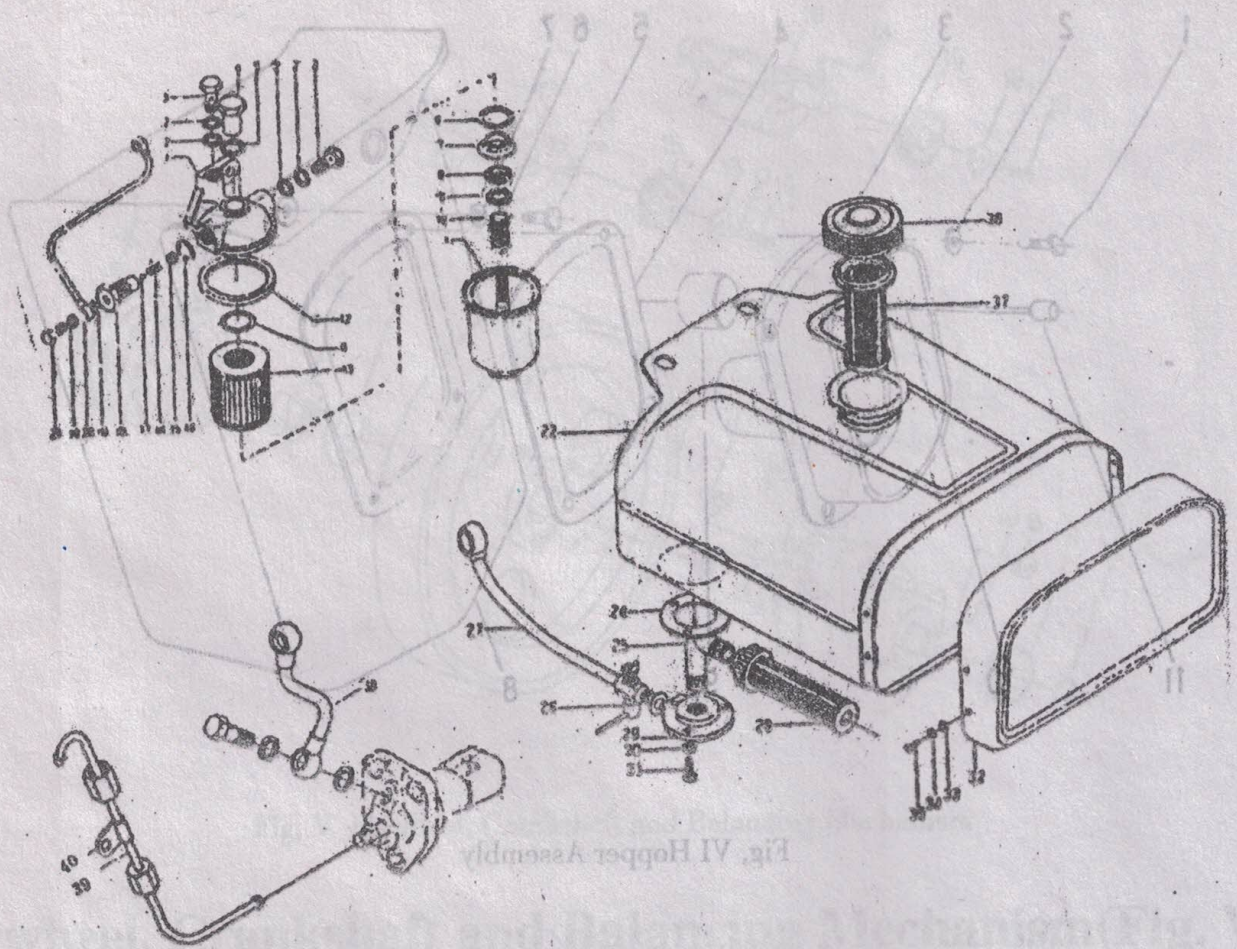


Fig. VII Fuel System

Fuel System(Fig. VII)

Illus. No.	Name of part	Part No.	Quantity
1	Fuel filter cover	C0506B-002	1
2	Washer	195-1117009	4
3	Pipe connection bolt	195-1117006	2
4	Holding nut	0506A-0004A	1
5	Seal ring	495A-12016	1
6	Seal ring	C0506A-0005	1
7	Fuel filter holder	C0506A-0006	1
8	Rubber ring	C0506A-0013	1
9	Washer	C0506A-10015	1
10	Spring	C0506A-0016	1

Illus. No.	Name of part	Part No.	Quantity
11	Fuel filter body	C0506A-3000	1
12	Seal ring	C0506A-0003	1
13	Fine fuel filter	C0506A-1000	1
14	Washer	C0505A-0001	1
15	Valve seat	C0506B-0011	1
16	Spring	C0506B-0010	1
17	Steel ball	C0506B-0009	1
18	One-way valve seat	C0506B-0008	1
19	Washer	195-09001	2
20	Fuel leak-off pipe connecting	195-07100	1
21	Pipe connecting bolt	195-09002	1
22	Fuel tank	195-07500	1
23			
24	Packing	195-07004	1
25	Fuel outlet pipe	195-07005	1
26	Fuel cock	195-07700	1
27	Fuel pipe assembly	195-07900	1
28	Primary fuel filter	195-07600	1
29	Fuel cock connecting flange	195-07006	1
30	Spring washer	Washer 6 GB93-87	3
31	Hexagon bolt	Bolt M6 x 16 GB5783-86	3
32	Washer 5-140HV	195-07009A	1
33	Spring washer	GB97.1-85	4
34	Button head cap screw	Washer 5GB93-87	4
35	Fuel tank cap	Bolt M5 x 12 GB67-85	4
36	Fuel filling screen	195-07300	1
37	Fuel pipe	195-07400	1
38	High pressure fuel pipe and its	195-07800-2	1
39	accessories	195-07200	1
40	Pipe clip	195-07205-1	1

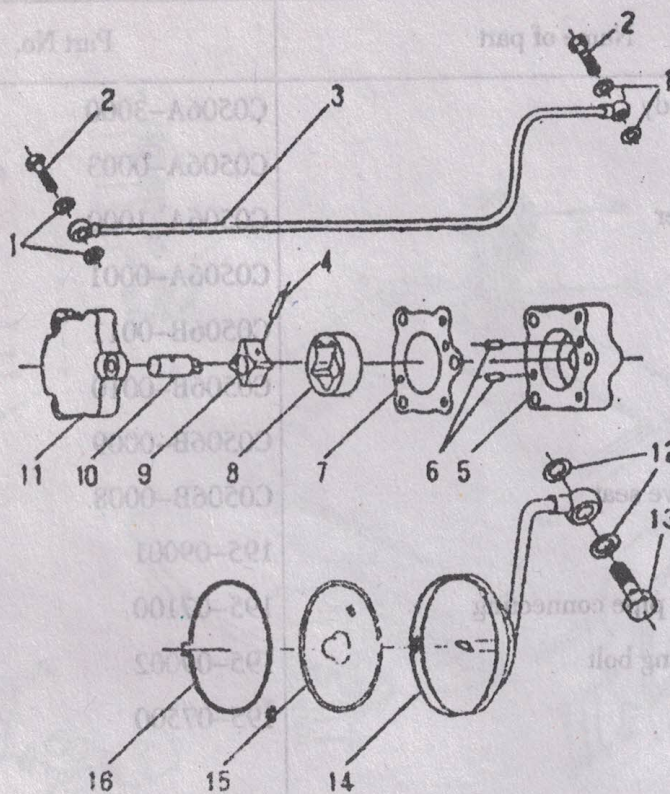


Fig. VIII Lubrication System

Lubrication System(Fig. VIII)

Illus. No.	Name of part	Part No.	Quantity
1	Washer	195-09001-1	4
2	Pipe connecting bolt	195-09002	2
3	Oil pipe	195-09100	1
4	Cylindrical pin	195-09201	1
5	Lubricating oil pump body	195-09202-1	1
6	Locating pin A5 x 12	GB119-86	1
7	Lubricating oil pump packing shim	195-09203-1	as required
8	Outer rotor	195-09204	1
9	Inner rotor	195-09205	1
10	Oil pump shaft	195-09206	1
11	Oil pump cover	195-09207-1	1
12	Washer	195-01025	2
13	Pipe connection bolt	195-09003	1
14	Oil strainer body with suction pipe	195-09310	1
15	Oil strainer screen	195-09320	1
16	Circlip	195-09301	1

Camshaft Assembly(Fig. IX)

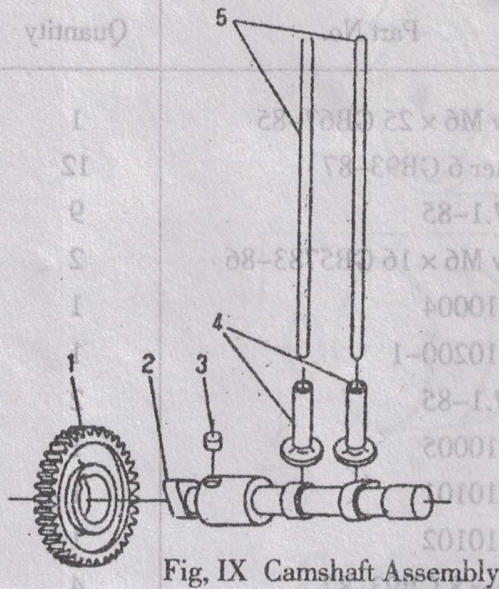


Fig. IX Camshaft Assembly

Illus. No.	Name of part	Part No.	Quantity
1	Camshaft gear	195-02001	1
2	Camshaft	195-02002	1
3	Flat key 10 × 16	GB1096-79	1
4	Valve tappet	195-02004	2
5	Valve push rod	195-02005	2

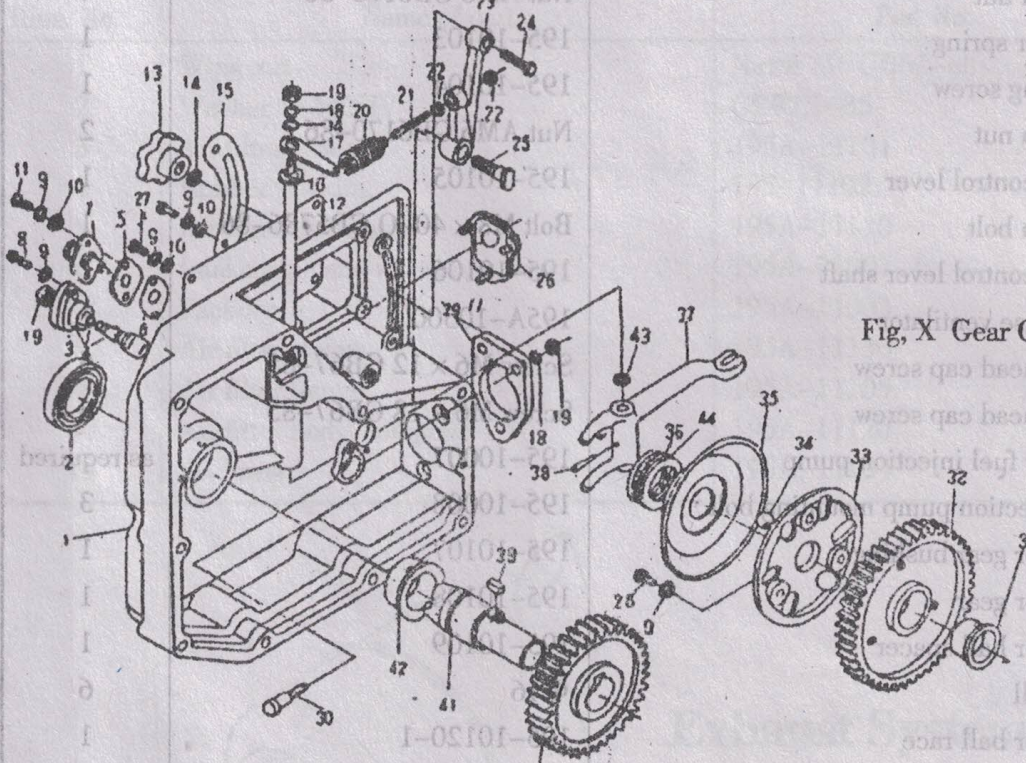


Fig. X Gear Casing Assembly

Gear Casing Assembly(Fig. X)

Illus. No.	Name of part	Part No.	Quantity
1	Gear casing	195-10001-2	1
2	Oil seal ring	$\phi 35 \times \phi 58 \times 12$	1
3	Packing for fuel priming handle bushing	195-10404	1
4	Fuel priming handle bushing	195-10400-2	1
5	Plug	195-10003	1
6	Fuel limiter packing	195-10002	1
7	Fuel limiter	195-10600	1

Illus. No.	Name of part	Part No.	Quantity
8	Button head cap screw	Screw M6 x 25 GB67-85	1
9	Spring washer	Washer 6 GB93-87	12
10	Washer 6-140HV	GB97.1-85	9
11	Button head cap screw	Screw M6 x 16 GB5783-86	2
12	Name plate	195-10004	1
13	Speed-control lever knob	195-10200-1	1
14	Washer 8-140HV	GB97.1-85	2
15	Speed indicating panel	195-10005	1
16	Governor fork shaft	195-10101	1
17	Governor arm	195-10102	1
18	Spring washer	Washer 8 GB93-87	4
19	Hexagon nut	Nut AM8 GB6170-86	4
20	Governor spring	195-10103	1
21	Adjusting screw	195-10104	1
22	Hexagon nut	Nut AM6 GB6170-86	2
23	Speed-control lever	195-10105	1
24	Hexagon bolt	Bolt M8 x 40-Q GB5786-86	1
25	Speed-control lever shaft	195-10106	1
26	Crankcase ventilator	195A-10500	1
27	Button head cap screw	Screw M6 x 12 GB67-85	6
28	Button head cap screw	Screw M6 x 18 GB67-85	6
29	Shim for fuel injection pump	195-10007	as required
30	Fuel injection pump mounting bolt	195-10008	3
31	Governor gear bushing	195-10107	1
32	Governor gear	195-10108	1
33	Governor ball spacer	195-10109	1
34	Steel ball	Φ 16	6
35	Governor ball race	195-10120-1	1
36	Single direction thrust ball bearing	8106 GB301-64	1
37	Governor fork	195-10111A	1
38	Taper pin 4 x 25	GB117-86	1
39	Flat key 8 x 6	GB1096-79	1
40	Starting gear	195-10302	1
41	Starting gear shaft	195-10303-1	1
42	Starting gear shaft bushing(B)	195-10010	1
43	Adjusting washer	195-10113	as required
44	Packing for governor ball race	195-10031	as required

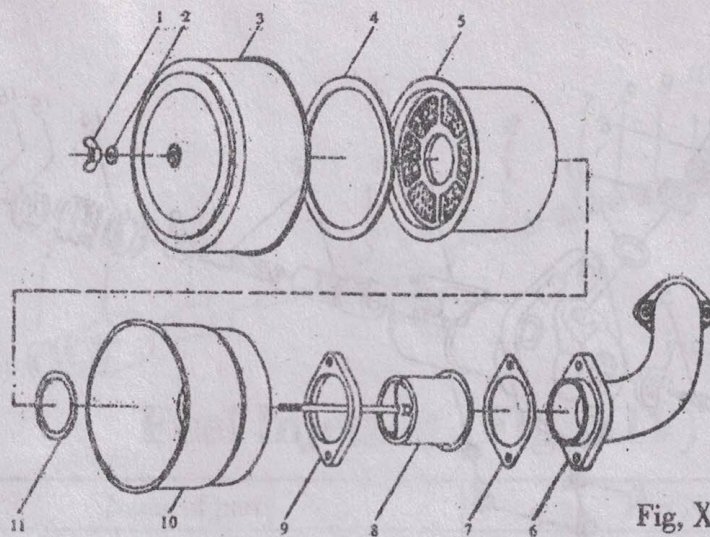


Fig. XI Engine Intake System

Engine Intake System (Fig. XI)

Illus. No.	Name of part	Part No.	Quantity
1	Wing nut	Nut A M6 GB62-88	1
2	Washer 6-140HV	GB97.1-85	1
3	Air filter cover	195A-11101	1
4	Rubber packing	195-11102	1
5	Air filter cartridge	195A-11110	1
6	Intake pipe and its accessories	195A-11002-1	1
7	Packing	195A-11003	1
8	Air filter sleeve	195A-11130	1
9	Air filter flange	195A-11105	1
10	Air filter body, complete	195A-11120	1
11	Seal ring	195A-11104	1

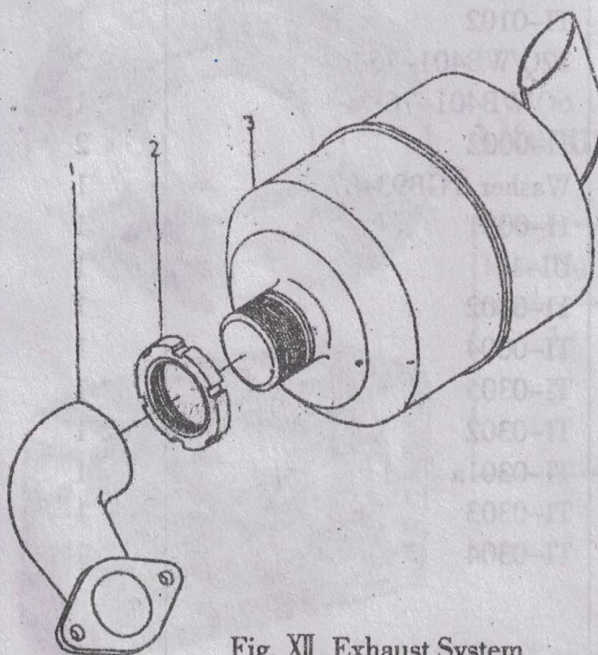


Fig. XII Exhaust System

Exhaust System (Fig. XII)

Illus. No.	Name of part	Part No.	Quantity
1	Exhaust pipe	195-08002-2	1
2	Lock nut	195-08001	1
3	Silencer	195-08100-1	1

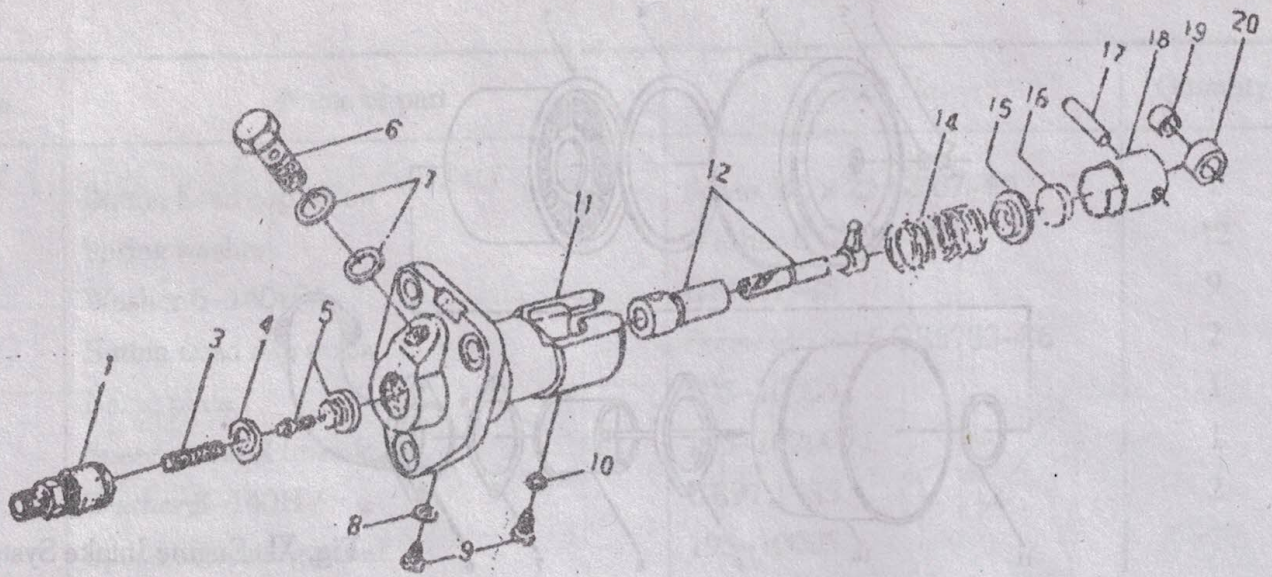
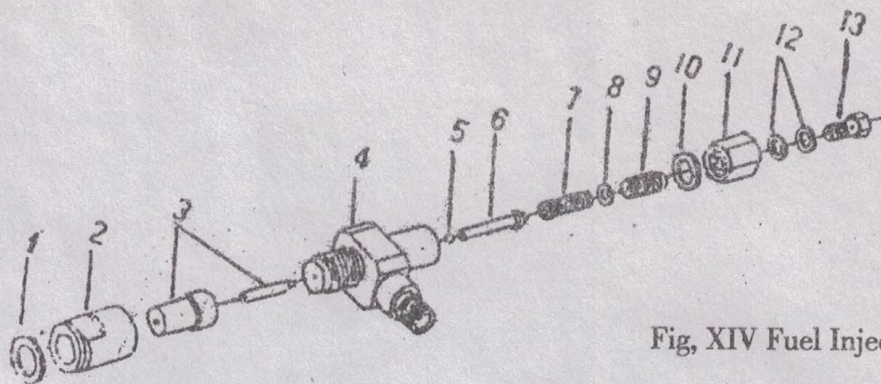


Fig. XIII Fuel Injection Pump

Fuel Injection Pump (Fig. XIII)

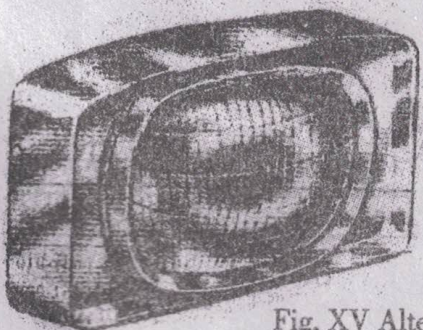
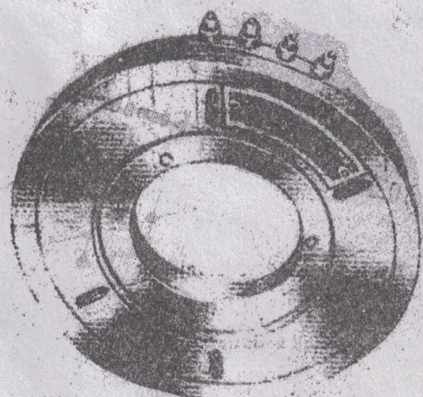
Illus. No.	Name of part	Part No.	Quantity
1	Delivery valve holder	TI-0010	1
3	Delivery valve spring	TI-0012	1
4	Delivery valve holder packing ring	TI-0011	1
5	Delivery valve with seat	FI5-00	1
6	Fuel inlet pipe connecting screw	TI-0102	1
7	Sealing washer	12Q/WB401-76	2
8	Washer	6Q/WB401-76	1
9	Retaining screw	1I-0002	2
10	Spring washer	Washer 6 GB93-87	1
11	Pump body	1I-0001	1
12	Pump element(plunger and barrel)	UI-11	1
14	Plunger spring	TI-0002	1
15	Lower spring seat	TI-0004	1
16	Adjusting packing block	TI-0305	1
17	Roller pin	TI-0302	1
18	Tappet	TI-0301a	1
19	Roller bushing	TI-0303	1
20	Roller	TI-0304	1



Fig, XIV Fuel Injector

Fuel Injector (Fig. XIV)

Illus. No.	Name of part	Part No.	Quantity
1	Washer	P661-010	1
2	Cap nut	P661-009	1
3	Nozzle body(with needle valve)	U4-3	1
4	Nozzle holder	P662-001	1
5	Steel ball	P661-0101	1
6	Needle valve spindle	P661-0102	1
7	Opening pressure adjusting spring	P661-002	1
8	Washer	P661-003	1
9	Opening pressure adjusting screw	P661-005	1
10	Sealing washer	P661-004	1
11	Lock nut	P661-006	1
12	Sealing washer	P661-007	2
13	Fuel leak-off connecting bolt	P661-008	1



Alternator & Headlamp Bracket (Fig. XV)

Illus. No.	Name of part	Part No.	Quantity
1	Flywheel type alternator	SFF-45	1
2	Headlamp assembly	12-48001	1

Fig, XV Alternator & Headlamp Bracket