



CHANG FA

Please read this
operation Instructions,
before operating

185 SERIES

DIESEL ENGINE

OPERATION MANUAL

Changfa Power Machinery Co.,Ltd

Changzhou, Jiangsu P.R. China

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Assurance System by authentication**

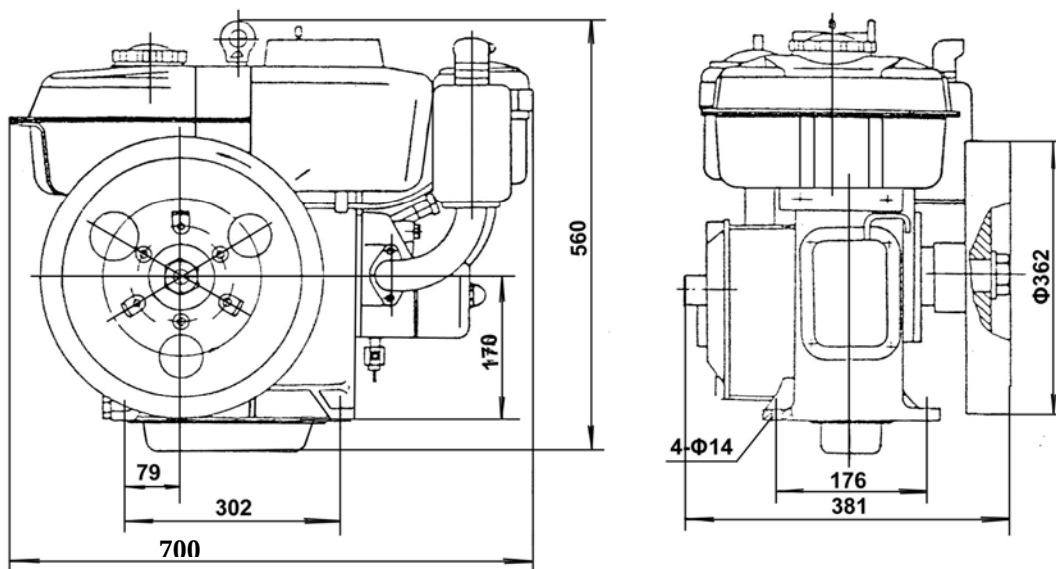
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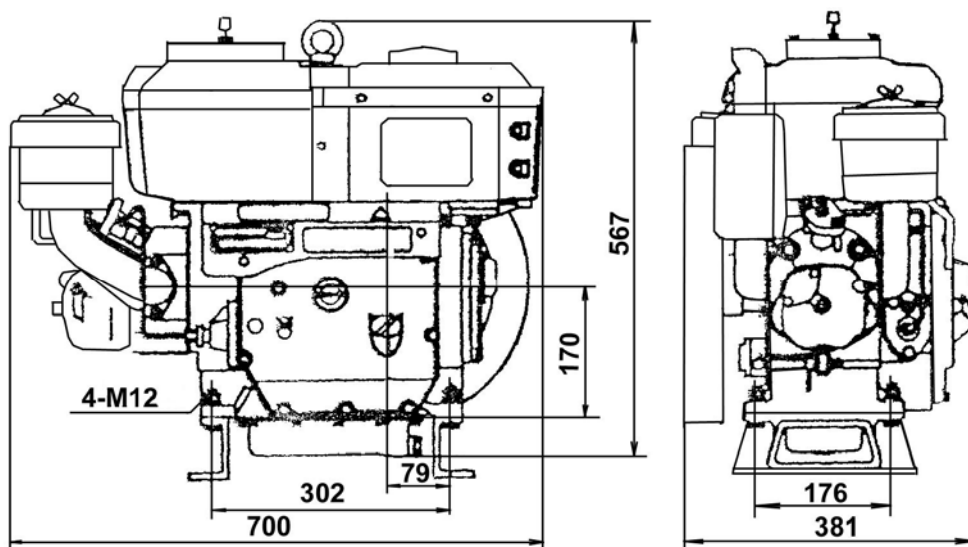
Precautions

1. Don't touch the heating and turning parts.
2. Don't let those people enter into the operating place, for the children, slow-action old man, epileptic or the man who has no disposing capacity.
3. Don't make the engine operate for a long time without operator.
4. As for the performance, please read the performance specification attached for reference Don't operate the engine in over-speed and over-load.
5. After starting, allow the engine idle operating in 3~5minutes and it is prohibited to run the engine in high speed and over-load.
6. Don't set the adjusting screw of governor system to make the engine operate in over speed.
7. Don't shutdown the engine by means of push down decompression lever unless heavy accident happens
8. Don't feed the salt-water or dirty water into water tank.
9. Feed and replace the fuel and lubricating oil stipulated in Operation Manual.
10. Feed the lubricating oil in air filter according to the requirement of Operation Manual.
11. Ensure that the red(blue) floater is not below the hopper of water tank during its boiling water operation.
12. As soon as engine starts, starting handle leave off automatically. It is necessary to hold the starting handle to avoid it to fly out.
13. In the climate below 0℃, to prevent the cylinder block and head from breaking, the cooling water should be drained in good time.
14. Firmly fasten the connections between the engine and the working machine and take the necessary protecting measure in pulley belt area.
15. If there are some trouble occurring, keep the damaged site in original situation and settle it after consultation between sales agent and repairman.
16. Run in and maintain the engine according to the requirements of Operation Manual.

As the diesel engine is now improving constantly, and there maybe some difference between the manual and the diesel engine, and we will correct it when we revise the manual, Please forgive us for this matter.



Overall and Mounting Dimensions of R185 Diesel Engine



Overall and Mounting Dimensions of CF185 Diesel Engine

Section.one. Principal Technical Specifications

Model		R185 (M) , CF185 (M) , JM185 (M)	R185N,CF185N, JM185N
Type		Single-cylinder, horizontal, four-stroke, Water cooling	
Cylinder bore		85mm	
Piston stroke		90mm	
Piston displacement		0.51L	
12-hour power		5.88 kW	
1-hour power		6.47kW	
Rating rotation speed		2200r/min	
Compression ratio		21	
B. M. E. P.		628kPa	
Specific Fuel consumption		$\leq 274.7 \text{g/kW} \cdot \text{h}$	$\leq 281.5 \text{g/kW} \cdot \text{h}$
Injection pressure		$13.5 \pm 0.5 \text{ MPa}$	
Cooling method		Water-evaporative	Water-radiator
Starting method		Hand starting (motor starting)	Hand starting
Net. Weight		$\leq 95 \text{kg}$	$\leq 98 \text{kg}$
Overall dimensions		$700 \times 390 \times 570$	$730 \times 390 \times 570$
Valve clearance (cold engine)		Intake valve $0.25 \pm 0.05 \text{mm}$	
		Exhaust valve $0.25 \pm 0.05 \text{mm}$	
Torque of cylinder head nut		190 N · m 210N · m	
Torque of flywheel nut		260N · m ~ 300 N · m	
Torque of connecting rod bolts		70 N · m ~ 90 N · m	
Fuel injector type		P664	
Fuel injector nozzle		ZS4S1A	
Fuel injection pump type		B11-02A fuel injection pump	
Generator		Flywheel AC generator	
Valve Timing	Intake valve open	16° before T. D. C.	
	Intake valve close	38° after B. D. C.	
	Exhaust valve open	50° before B. D. C.	
	Exhaust valve close	14° after T. D. C.	
Fuel injection timing		$16^\circ \pm 1^\circ$ before T. D. C.	

Section Two Operation of Diesel Engine

1. Preparation before Operation

1.1 Check the bolt of engine bed and tension of pulley belt.

1.2 Remove the exhaust pipes. Put the starting crank in the starting shaft, turn the De-compression lever with your left-hand and crank the engine to expel out the anti-rusting oil applied in the cylinder until no oil flows out from the exhaust port. Then reinstate the exhaust pipe (see Fig.1.)

1.3 Diesel fuel

Use light diesel fuel #0 in summer, # -10 or # -20 in winter.

Caution: Pour clean diesel fuel into fuel tank. Do not get into any dust.

1.4 Lubricating oil

Use lubricating oil # CC15W/40 in summer or #CC15W/30 in winter.

Caution : The level must not go over the upper line, nor fall down below the lower one on the dipstick, when the engine is in operation.

1.5 Let the engine run in for 20 hours, subject to light load. After running fore a period, retighten any bolts and nuts that are loose.

Renew the lubricating oil after 40 hours of operation. Renew again after 60 hours and thereafter once every 100 hours.

2. Examination before Start-up

2.1 Cooling system

(1) Cooling water

① In high temperature operation, hard water and dirt water shall about the sediments, which are stuck on the parts in the cooling system. They are low in diathermancy and block the pipes resulting in bad cooling effect. The clean soft water shall be used in cooling system.

(2) Water Tank

Pour the cooling water into the water tank
Below the bottom of hopper.

(2) Condenser

① Unscrew the water-filling cover.

② Fill cooling water fully.

③ Screw the water filling cover again.

④ Check the tension of fan belt and adjust by changing the position of tension pulley. When adjusting , a force of 19.6N.m~

29.4N.m is exerted on the middle of belt with finger. It is

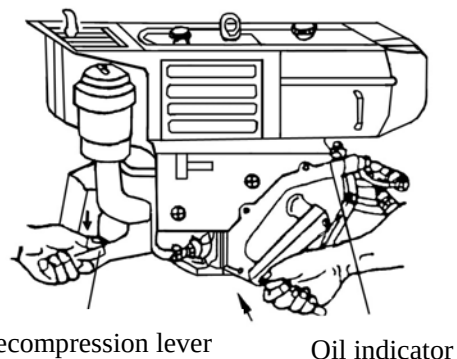


Fig.1 Expelling antirust oil

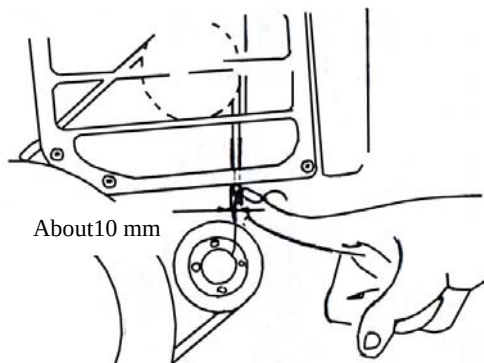


Fig.2. Adjusting the

tension of belt

appropriate tensinty for belt to leave away 10 mm distance from original position(See Fig.. 2).

2.2 Lubricant oil

(1) Check the oil level in engine oil tank with oil dipstick, nearly close to the upper scale line on oil dipstick (See Fig.. 3).

(2) When checking ,do not make the oil dipstick enter into screw hole and keep the diesel engine in horizontal position.

(3) Check the lubricant flow in circulation. Hold the relief handle with left hand and slowly crank the starting until the cap of oil indicator rises (See Fig .4) . if it does not rise , it means there some faulty in lubricating system. Model CF185N or JM185N engine adopts a diaphragm oil-indicator, it means the pipeline works normally.

2.3 Fuel

(1) Fill he cleaning diesel fuel in fuel tank as required according to the ambient temperature. When filling, the tools for filling should be clean. Don't allow dust or dirt gets into the tank.

(2) Open the fuel switch on.

2.4 Air cleaner

Unscrew the cap of air cleaner and add the engine oil to the level shown in Fig.5 (or depending on the nameplate on housing) .

3. START

3.1 Start-up diesel engine with the starting handle (See Fig.6).



Fig.3Checking engine oil

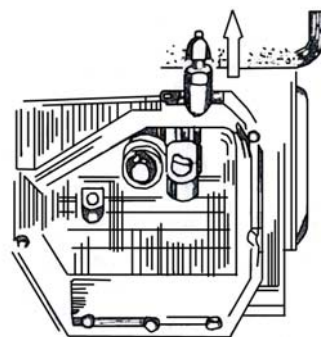


Fig .4 Indicator cap rising

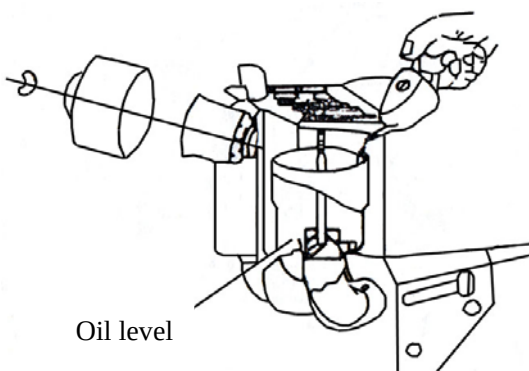


Fig.5 Oil Level in Air cleaner

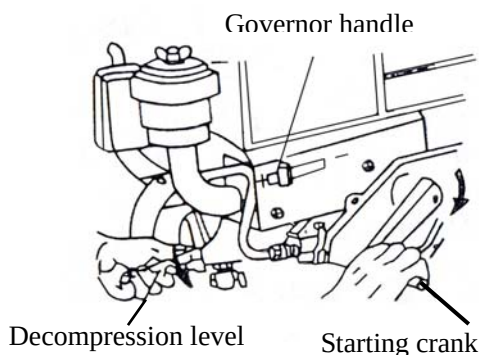


Fig.6 Starting engine with handle

(1) Insert the starting handle on starting shaft.

(2) Crank the starting handle and engine oil circulating.

(3) Pull the governor handle to “run” position. Move the Decompression lever and crank the starting shaft at same time, hearing the injecting sound from the injector. If no injecting sound

heard, it is necessary to drain the air form oil pipeline.

(4) When normally injecting, speed up rotation of starting shaft and Suddenly release the compression lever to no-relief position, and then crank the starting handle two or three revolution, the diesel engine can start.

(5) when the diesel engine has just started, it is necessary to continue to hold the starting handle until it is pushed naturally from starting shaft.

3.2 Pull the governor handle to middle position and operate the engine for several minutes with no load.

4. Examination during Operation

4.1 Cooling water

Check the amount in water tank and add the water if necessary.

As for the condensing engine, it is not necessary to add the water in condenser. Don't open the cover to avoid during.

4.2 Lubricating oil

Check the indicator cat rising up in normal condition, if not, shut off the engine for checking (see Fig.7).

4.3 Exhausting

If the engine exhausts the black smoke, it means overload (See Fig.8).

4.4 Abnormal noise

If an abnormal noise is heard during the operation of engine, shut off the engine immediately and check for remedy of trouble

5 Shut off of engine

5.1 Unload engine and pull the governor handle to right to allow the engine to idle several minutes in unloading.

5.2 Pull the governor handle to "STOP" and engine stops(See Fig.9)

5.3 Turn the fuel cock to "OFF"(See Fig .10)

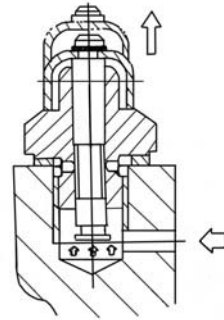


Fig.7 Engine oil indicator



Fig.8 Engine exhausting black smoke

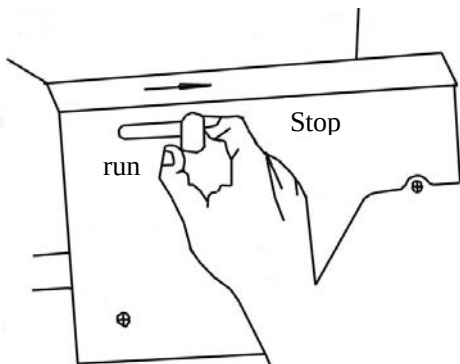


Fig.9 Governor handle

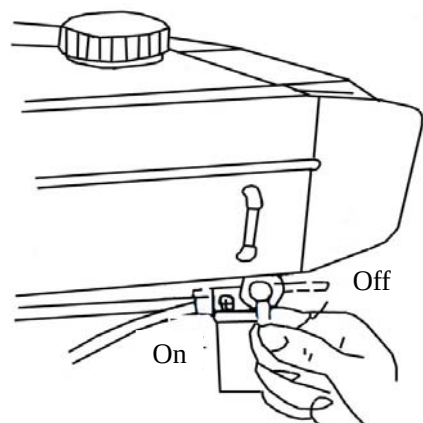


Fig.10 Fuel cock

5.4 If it is forecast that the frozen climate shall be, drain out the cooling water in water tank, even for several hours (See Fig 11).

5.5 When the engine has just stopped, Don't open the cap of condenser to avoid hurting by hot water.



Fig.11 Draining out cooling water

Section Three Preservation and Storage

1. Drain out the cooling water, Lubricating oil and diesel Fuel (See Fig.12)

2. Clean the certain parts and components.

3. Shut off intake and exhaust valves:

(1) Turn the flywheel slowly with hand until you feel dragging.

(2) Turn the decompression lever to pull the compressed air out turn the flywheel a further quarter revolution until its TDC mark is in line with the pointer on the hopper or fan cover, it denotes that two valves are closed (See Fig. 13).

4 A dust cover is put over the engine, which is cooled. The diesel engine should be stored in clean and dry place.

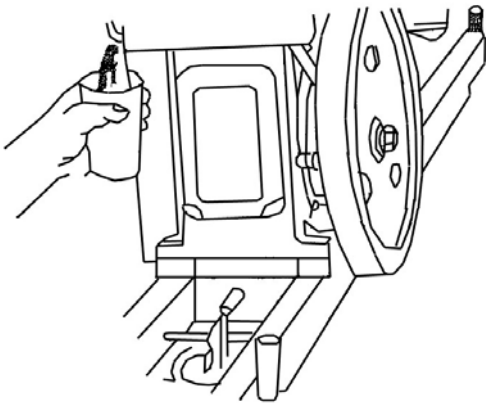


Fig.12 Draining lubrication oil and

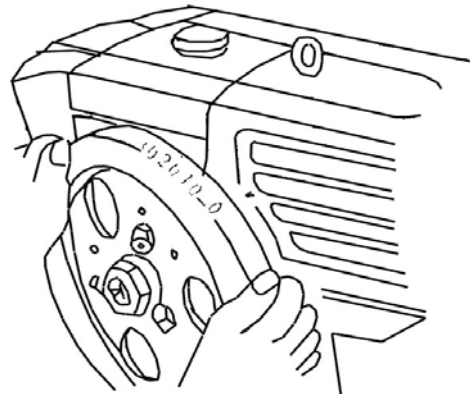


Fig 13 Piston located in top dead center

Section four: Maintenance and service

Item		Daily	100 hours	500 hours
1.Fuel system	(1) Check and fill fuel	•	•	•
	(2) Clean fuel filter		•	•
	(3) Clean fuel tank and pipeline			•
	(4) Check injection pump and injector			•
2. Lubricating oil	(1) Check and add oil	•	•	•
	(2) Clean oil Strainer and sump		•	•
	(3) Clean oil bath and pipeline			•
	(4) Replace Lubricating oil		•	•
3.Exhaust and intake	(1) Clean intake pipe and air filter	•	•	•
	(2) Clean exhaust pipe and silencer			•
	(3)Check valve Clearance	※		•
	(4) Check valve leak tightness			•
4.Cooling water	(1) Check and add water	•	•	•
	(2) keep cooling water running smoothly		•	•
	(3) replace cooling water	※	•	•
	(4)check fan-belt tightness	•	•	•
5.Others	(1)Check all important bolts and nuts			•
	(2) check piston ring			•
	(3) Clean carbon deposits of piston			•

Note: ※Daily check shall be made if required.

Section Five Matters Needing Attention in Operation

1 Condenser

1.1 Open the drain plug below cylinder head. unscrew the filling cap, crank the starting handle and drain the cooling water in condenser.

1.2 Remove the guard net and clean up the dust and dirt form condenser and guard net with brush or compressed.

2 Filter element

2.1 De-dust strainer element of paper air cleaner with soft brush.

2.2 Clean up the fuel element and engine oil filter element with brush and diesel oil or kerosene.

3 Injection nozzle

3.1 Remove the couple parts of nozzle, draw out the needle valve and put them into the diesel oil for cleaning.

3.2 Clean up the carbon deposit on needle couples with sharp wood stick or copper wire brush and diesel fuel (See Fig.14 and Fig. 15).

3.3 Put the nozzle couples into cleaning diesel oil with rotating and drawing backward and forward in needle valve body (See Fig. 16) .



Fig. 14 Cleaning up the carbon on

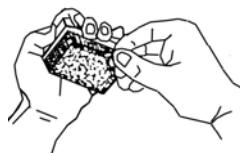


Fig. 15 brush out the carbon deposit on needle valve

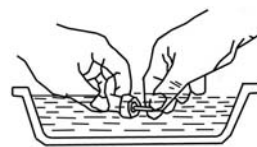


Fig.16 Cleaning needle valve and body

3.4 Draw out the needle valve body, coat a little engine oil on the needle valve and insert it into valve body again and polish several time, and then clean them with cleaning diesel fuel.

3.5 Check the spraying quality of injector that the injector has a Fine atomized spraying and no oil drops exist around the nozzle (See Fig. 17).

4 Inlet air valve and exhaust air valves

The clearance of inlet air valve and exhaust air valve is 0.25mm when the engine is cold.

5 Piston Ring

When the piston ring is fixed on piston, the sharp surface of ring is directed to piston skirt and the marked with “ T ” is faced to piston top.

6 rocker arms

The exhaust air valve rocker has no oil spit orifice, So don't make wrong in mounting.

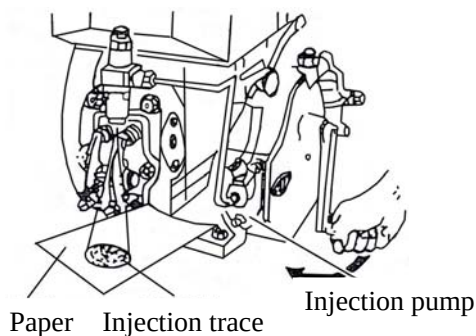


Fig.17 Checking the spraying

7 Diesel fuel filter

The hook-on fuel filter has a hand-operated air-bleed function. Turn the rod to dead point in clockwise for 30 seconds to release the air. In addition, a red floating below fuller bowl indicates the level of water depositing in filter bowl in order to remove the bowl for draining out water.

Section Six: dismantling and re-assembly

Dismount the diesel engine according to the following orderly sequence.

1 Open the drain cock and drain out the cooling water.

2 Dismount cylinder head:

(1) At first, disassemble and remove the fuel return pipe, lubricating oil pipe, high pressure fuel pipe, the air cleaner and silencer.

(2) Disassemble and remove the cover of cylinder head.

(3) Unscrew the nuts on cylinder head and remove the cylinder head.

When re- assembling, the fastening torque for the nuts of cylinder head is 190N.m~210N.m. Tighten them step by step in a diagonal sequence with a torque wrench.

(4) Remove the cylinder head gasket.

3. Dismount the cover of gearbox, balance shaft, camshaft

3.1 Unscrew the forcing screws of injection pump and remove injection pump its adjusting shims.

3.2 Disassemble and remove cover of gearbox.

3.3 Unscrew the fixing screws with screwdriver and remove the components of balance shaft.

3.4 Disassemble and remove the flyweight component of crankshaft and gear of balance shaft.

3.5 Unscrew affixing screw below and remove the components of camshaft.

When re-assembling, pay attention to the arcs of engagement for driving gears in alignment(See Fig.18).

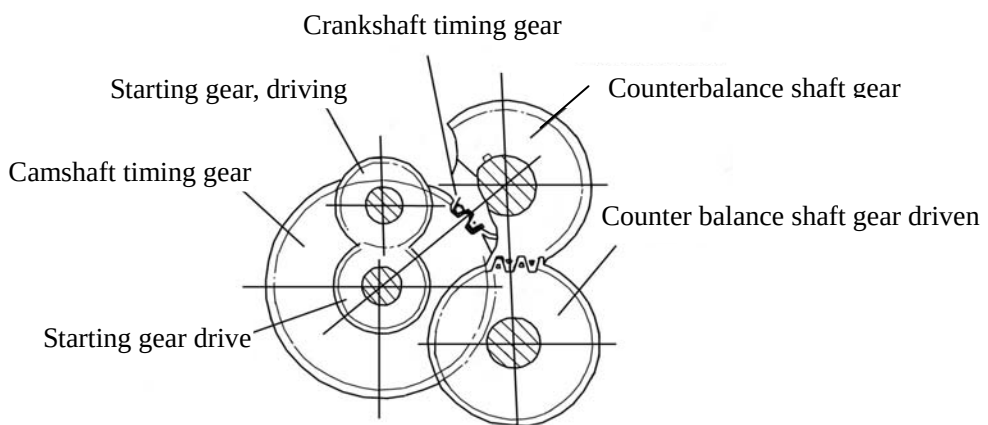


Fig.18 Gear engagement marks

4 Dismount and remove rear cover of engine block.

5 Dismount the piston connecting rod assembly

5.1 Turn the flywheel to make the big end of connection rod in the window of rear cover.

5.2 Flat the safety pad with screwdriver.

5.3 Unscrew the connecting rod bolts with special wrench.

5.4 Remove cover of connecting rod. Pay attention to the protection of rod bush.

5.5 Slowly turn the flywheel and push the piston to top dead center. Push out the connecting rod against the big end with wood.

When re-assembling, the opening of each piston ring should be put in alternate position(See Fig.19). The fastening torque of connecting rod bolt is 70N.m~90N.m. The shaft neck ,rod bush, the surface of piston, cylinder jacket and oil holes of small rod end should be coated with a little oil. The oil hole of rod small end is upward.

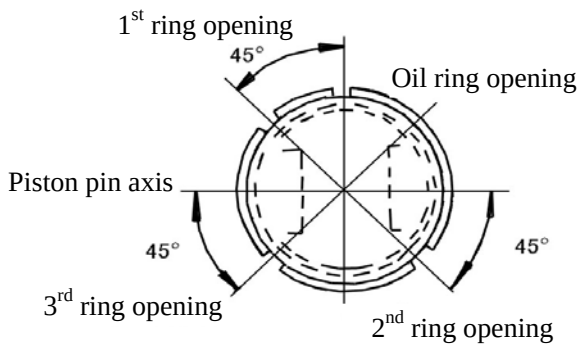


Fig.19 Mounting the opening of piston ring

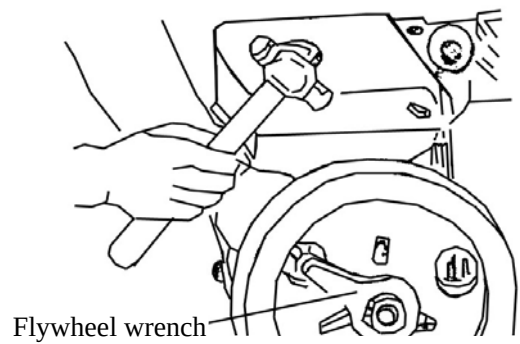


Fig.20 Unscrewing bolts of flywheel

6 Dismount flywheel

Loose the nuts of flywheel with special wrench and knock the wrench with hammer (See Fig.20). and then , remove the flywheel with puller (See Fig. 21).

7 Dismount crankshaft

7.1 Disassemble and remove the timing gear of crankshaft from the end of gearbox.

7.2 Unscrew and remove all the fixing bolts from the bearing cover of crankshaft.

7.3 Turn the crankshaft to make the counterbalance direct to notch of engine block, under the which the flywheel key on cone surface of crankshaft just is against the V-type bar above the bearing cover of crankshaft from viewing outside.

7.4 Screw two bolts of M8×35 simultaneously into the screw holes of crankshaft bearing cover to push the cover and crankshaft out from engine block(See Fig. 22).

Caution: The neck of crankshaft should be protect seriously from knocking, scaling and polluting.

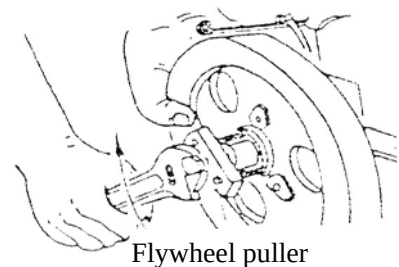


Fig. 21 Dismounting flywheel

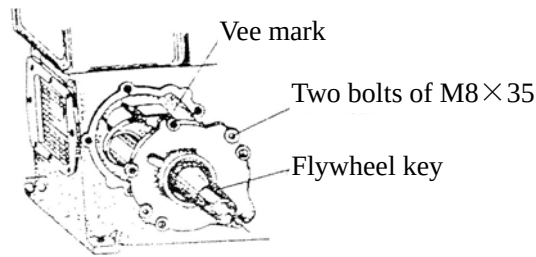


Fig.22 Dismounting crankshaft

Section Seven Lighting Generator and Circuit

There are two kinds of lighting generator. One is micro-generator, another is flywheel generator. The micro-generator is mounted in cooling fan seat with output voltage 12V and power 25W. The rotor of flywheel generator is fixed in inside of flywheel and its stator winding is fixed on the main bearing cover. The flywheel generator has two type one with one 30 W and voltage and one with power 90W and voltage 12V . They can be ordered according to the user's requirements. The lighting circuit is shown in Fig.23 and Fig.24. The rating voltage and power of light bulb should be in accordance with those of generator. The intermediate tapping of the winding of 90 W flywheel generator has been grounded, two lead-out wires are the ones under voltage. 30W Flywheel generator has no intermediate tapping, the wiring way is same as that of micro-generator.

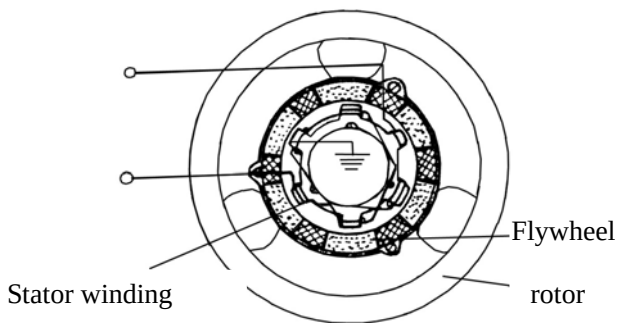


Fig.23 90W flywheel generator

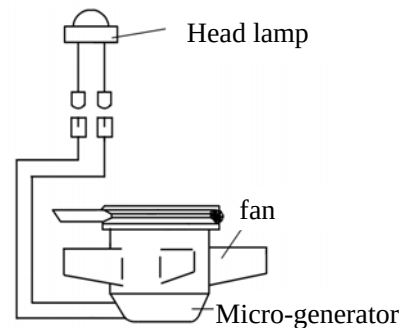
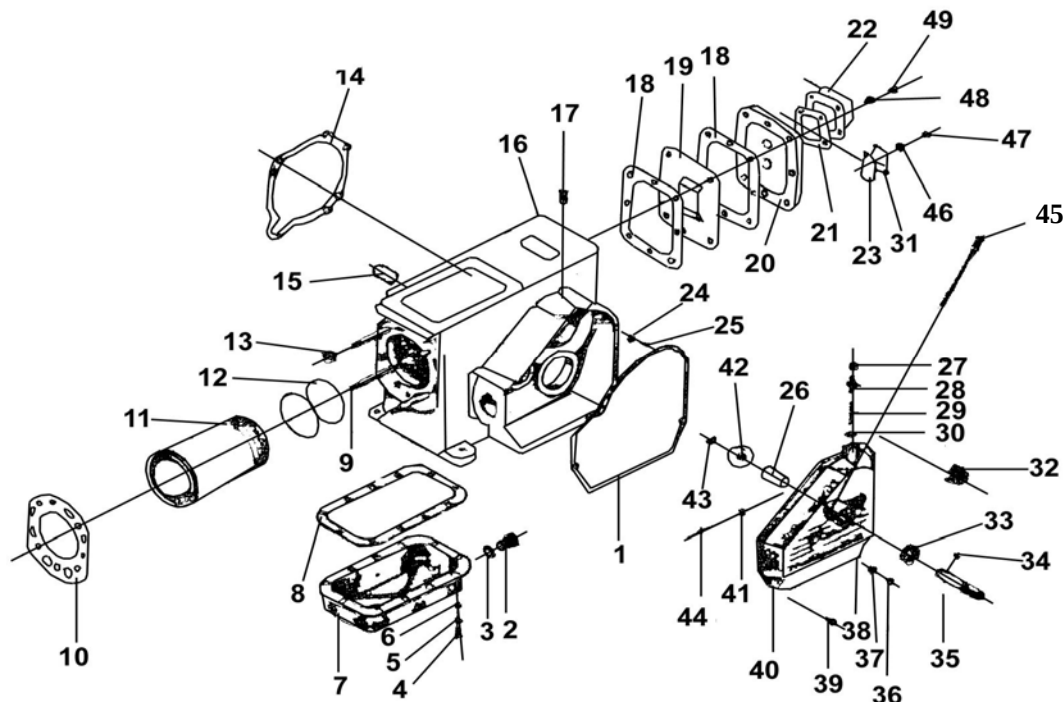


Fig.24 Micro-generator

Section Eight Main parts Catalog

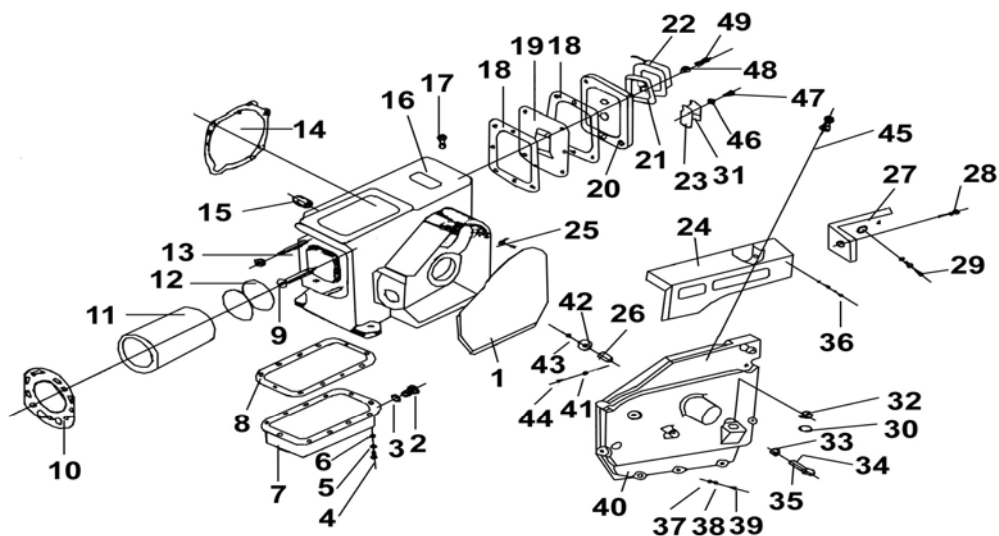
Model 185 Series Engine Diesel had been improving .The modification of this Main parts Catalog shall be made in reprint. Please pay more attention to purchased the parts and components.

1.Engine Body Assembly (Model R185)



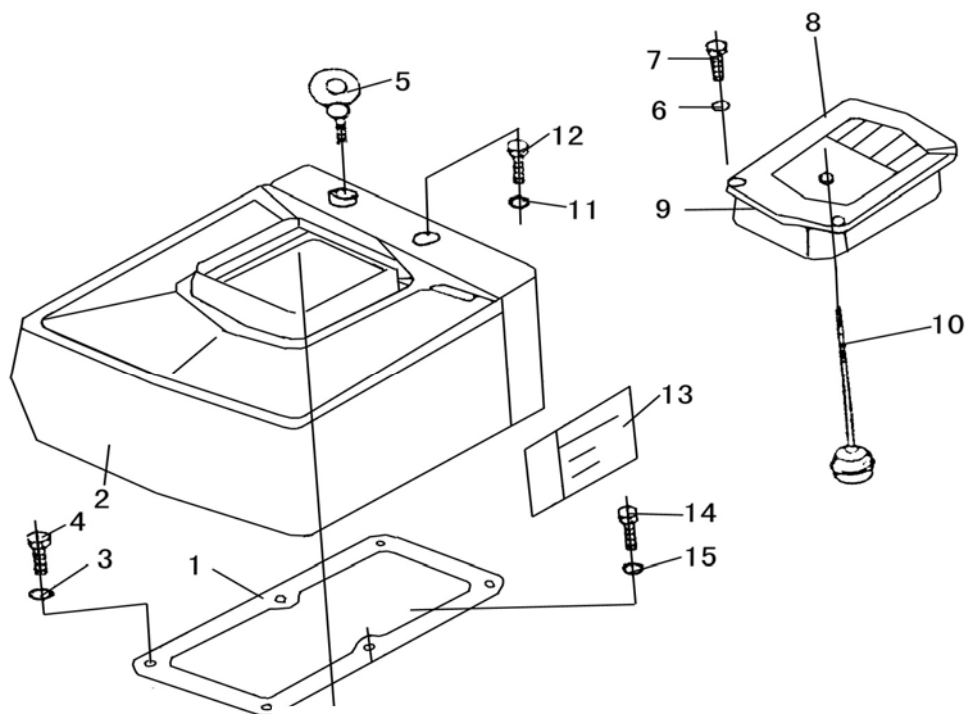
Ref. No.	Part name	Part Number	Req.	Ref. No.	Part name	Part Number	Req.
1	Pad Timing gearbox	R185—01018	1	26	Bush for starting shaft	R185—01203	1
2	Screw plug	R185—01012	1	27	Cap Indicator	R175—09204	1
3	Washer	R185—01013	1	28	Seat. Indicator	R175—09203	1
4	Bolt foroil sump M6×14	GB/T5781	11	29	Pin. Indicator	R175—09201	1
5	Washer 8	GB/T93	11	30	Washer	R175—09202	1
6	Washer 8	GB/T848	11	31	Clamping plate for breather	R185—01203	1
7	Oil sump	R185—01300	1	32	Oil filter cap	R185—01204	1
8	Pad for oil sump	R185—01024	1	34	Key 5×6	GB/T1096	1
9	Cylinder head stud	R185—01002	4	35	Parts for start shaft	R185—01220	1
10	Cylinder head gasket	R185—01003	1	36	Bolt M6×12	GB/T5782	4
11	Cylinder liner	R185—010.07	1	37	Washer 6	GB/T859	8
12	Cylinder liner O-ring	R185—01008	2	38	Washer 6	GB/T848	8
13	Cylinder head nut	R185—01001	4	39	Bolt M6×22	GB/T5783	8
14	Pad. crankshaft bearing	R185—01023	1	40	Timing gear case cover	R185—01201	1
15	Bearing Balance shaft	R185—01022	1	41	Washer 6	GB/T859	1
16	Cylinder block	R185—01004	1	42	Main driving gear	R185—01202	1
17	Bush	R185—01014	1	43	Baffle 20	GB/T894.1	1
18	Breather packing	R185—01009	2	44	screw M6×16	GB/T65	1
19	Oil deflector part	R185—01102	1	45	Part Oil stick	R185—01206	1
20	Rear cover for breather	R185—01120	1	46	Washer 4	GB/T859	6
21	Pad	R185—01101	1	47	Bolt M4×16	GB/T5783	6
22	Cover part	R185—01110	1	48	Washer 6	GB/T93	8
23	Breather piece	R185—01114	1	49	Bolt M6×20	GB/T5781	8
24	O-ring 10×1.8	GB/T3452.1	1				
25	Sleeve barrel	R185—01017	1				

2.Engine Body Assembly (Model CF185N and JM185N)



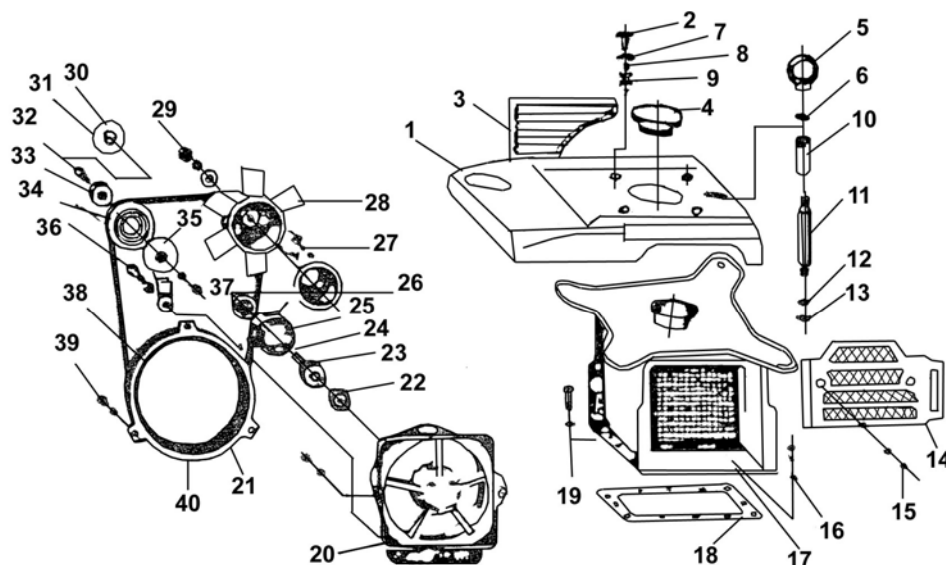
Ref. No.	Part name	Part Number	Req.	Ref. No.	Part name	Part Number	Req.
1	Pad Timing gearbox	R185—01018	1	26	Bush for starting shaft	R175—01203	1
2	Screw plug	R185—01012	1	27	Dead plate, fuel fitter	JM185N—01206	1
3	Washer	R185—01013	1	28	Bolt M8×20	GB/T5783	1
4	Bolt for oil sump M6×14	GB/T5781	11	29	Bolt M6×12	GB/T5783	2
5	Washer 8	GB/T93	11	30	Washer	R175—09202	1
6	Washer 8	GB/T848	11	31	Clamping plate for breather	R175—01203	1
7	Oil sump	R185—01300	1	32	Oil filter cap	R175—01305	1
9	Cylinder head stud	R185—02002	4	34	Key 5×6	GB/T1096	1
10	Cylinder head gasket	R185—01003	1	35	Parts for start shaft	R185—01220	1
11	Cylinder liner	R185—010 07	1	36	Bolt M6×12	GB/T5782	4
12	Cylinder liner O-ring	R185—01008	2	37	Washer 6	GB/T859	8
13	Cylinder head nut	R185—01001	4	38	Washer 6	GB/T848	8
14	Pad, crankshaft bearing	R185—01023	1	39	Bolt M6×22	GB/T5783	4
15	Bearing Balance shaft	R185—01022	1	40	Timing gear case cover	R185—01201	1
16	Cylinder block	R185—01004	1	41	Washer 6	GB/T859	1
17	Bush	R185—01014	1	42	Main driving gear	R185—01202	1
18	Breather packing	R185—01009	2	43	Baffle 20	GB/T894.1	1
19	Oil deflector part	R185—01110	1	44	Setting screw M6×16	GB/T65	1
20	Rear cover for breather	R185—01101	1	45	Part Oil stick	JM185N—01203	1
21	Pad	R185—01105	1	46	Washer 4	GB/T859	6
22	Cover part	R185—01120	1	47	Bolt M4×16	GB/T5783	6
23	Breather piece	R185—01104	1	48	Washer 6	GB/T93	8
24	Decoration plate	CFZS1100—10002	1	49	Bolt M6×20	GB/T5781	8
25	Sleeve barrel	R185—01017	1				

3. Condensing Cooling System (Model R185)



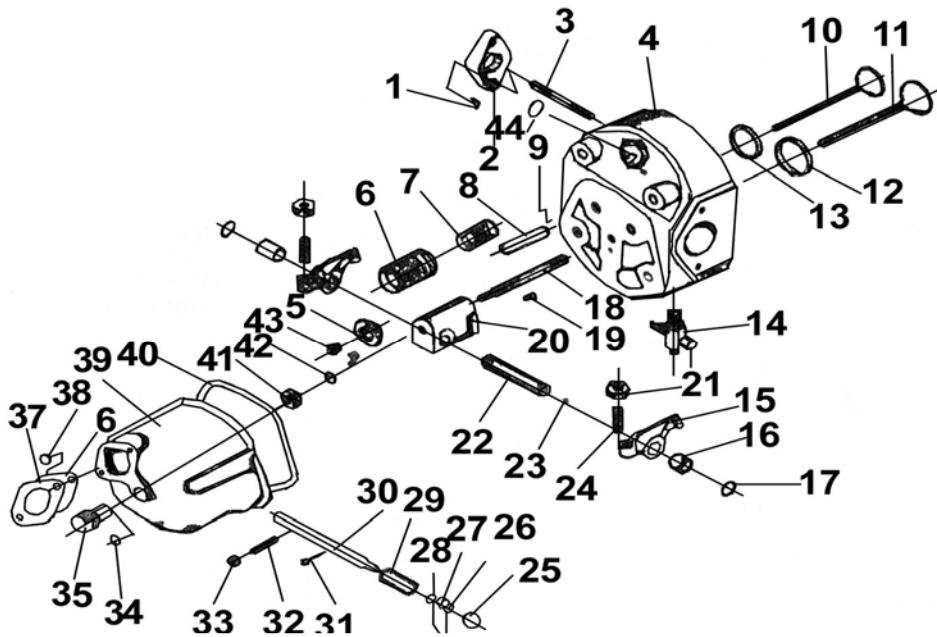
Ref. No.	Part name	Part Number	Req.
1	Pad. Water tank	R185—02002	1
2	Water tank	R185—02003B	1
3	Washer 8	GB/T97.1	4
4	Bolt M8×30	GB/T5783	4
5	Bolt .lift eye M10	GB/T825	1
6	Washer 6	GB/T97.1	4
7	Bolt M6×6	GB/T5782	4
8	Red indicator ball	R185—02004	1
9	Funnel	R185—02100	1
10	Float stem	R185—02005	1
11	Washer 8	GB/T97.1	1
12	Bolt M8×16	GB/T5783	1
13	Nameplate	R185—02001	1
14	Bolt M6×25	GB/T5781	2
15	Washer 6	GB/T97.1	2

4. Condensing Cooling System (Model CF185 and JM185N)



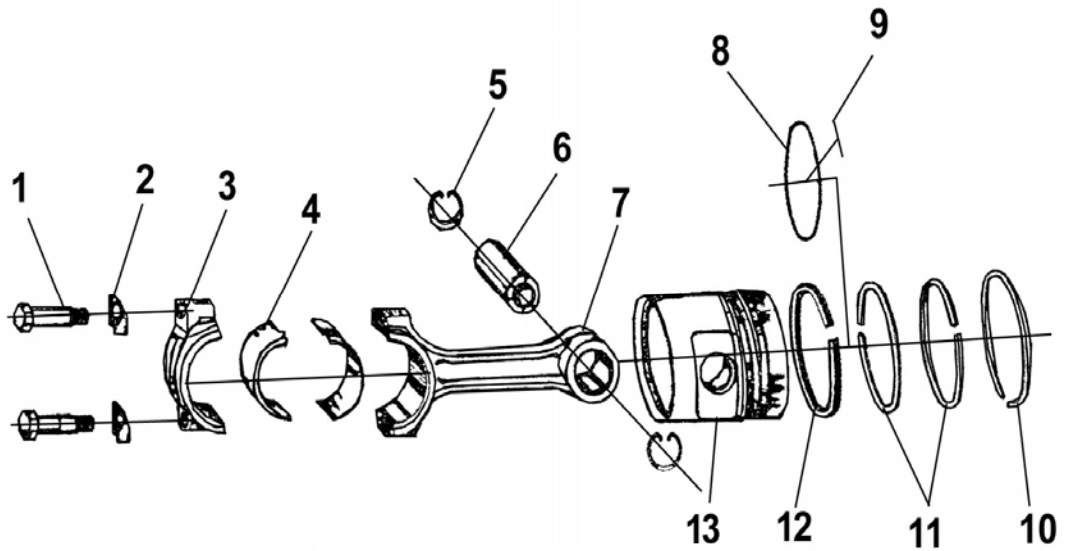
Ref. No.	Part name	Part Number	Req.	Ref. No.	Part name	Part Number	Req.
1	Cover	JM185N-02601	1	22	Bearing 80201	GB/T276	2
2	Plastic head Screw	JM185N-02202	4	23	Part. Rotor	WF25-100	1
3	Weldments. fan cover	JM185N-02100	1	24	Pin B3×8	GB/T119	1
4	Cap parts for condenser	JM185N-02300	1	25	Stator	WF25-200	1
5	Lift eye screw M10×20	GB/T825	1	26	Support body	WF25-001	1
6	Washer 10	GB/T97.1	1	27	Screw M6×25	GB/T67	2
7	Major washer 6	GB/T96	4		Washer 6	GB/T93	2
8	Bush	JM185N-02604	4	28	Fan	JM185N-02201	1
9	Damping washer	JM185N-02603	4	29	Nut M12	GB/T6170	1
10	Connecting bolt II	JM185N-02006	1		Washer 12	GB/T93	1
11	Connecting bolt III	JM185N-02007	1		Washer 12	GB/T97.1	1
12	Washer 10	GB/T93	1	30	Sealing cover	JM185N-02501	1
13	Washer 10	GB/T848	1	31	Screw M4×6	GB/T67	1
14	Weldments Radiator	JM185N-02400	1	32	Shaft Tension pulley	JM185N-02503	1
15	Bolt M6×20	GB/T5783	5	33	Bearing 6201	GB/T276	1
	Washer 6	GB/T93	5	34	Tension pulley	JM185N-02504	1
	Washer 6	GB/T97.1	5	35	Bracket Tension pulley	JM185N-02501	1
16	Bolt M6×20	GB/T5783	1	36	Bolt M10×40	GB/T5783	1
	Washer 6	GB/T93	1	37	Nut M8	GB/T6170	1
17	Part Condenser	JM185N-02300	1	38	Belt Fan 10×7×900	HG401	1
18	Pad water tankr	R185-02002	1	39	Bolt M8×20	GB/T5783	1
19	Bolts M8×25	GB/T5783	1		Washer 8	GB/T93	1
	Washer 8	GB/T93	1	40	Pulley	JM185N-02005	1
20	Fan seat	JM185N-02200	1				
21	Bolt M8×25	GB/T5783	2				
	Washer	GB/T119	2				

5. Cylinder Head Assembly



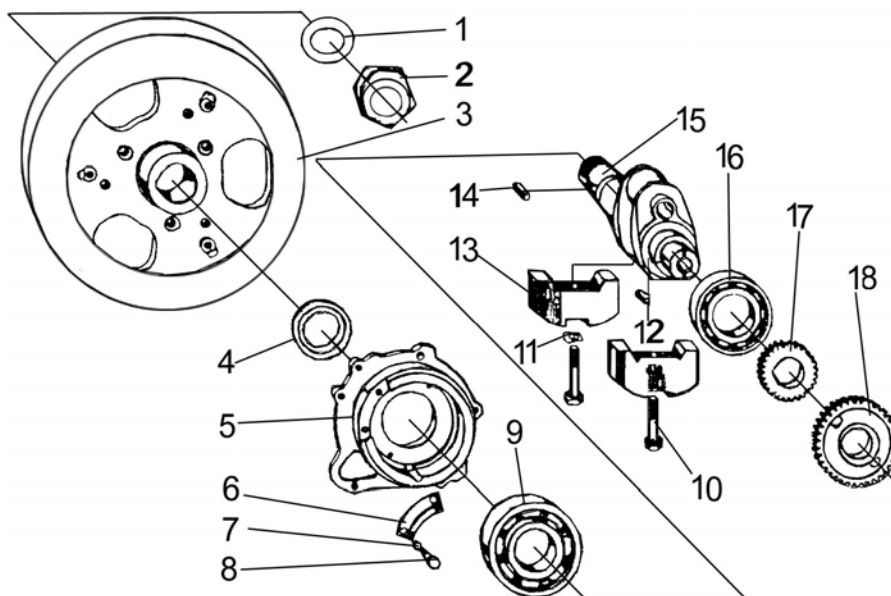
Ref. No.	Part name	Part Number	Req.	Ref. No.	Part name	Part Number	Req.
1	Nut M8	GB/T6175	2	23	Steel ball $\phi 6$	GB/T308	1
2	Claming plate	S195—03013	1	24	Adjusting screw	R185—03009	2
3	Stud AM8×70	GB/T898	2	25	Nut M8	GB/T802	1
4	Cylinder head	R185—03001	1	26	Washer 8	GB/T93	1
5	Valve spring seat	R185—03004	2	27	Decompression lever	R185—03107	1
6	Outer valve spring	R185—03008	2	28	Oil seal ring 9×1.6		1
7	Inner valve spring	R185—03007	2	29	Decompression torsion spring	R185—03103	1
8	Valve guide	R185—0302	2	30	Decompression lever shaft	R185—03104	1
9	Pin B3×8	GB/T119	1	31	Pin 3.2×1.6	GB/T91	1
10	Exhaust Valve	R185—03005	1	32	Adjusting screw	R185—03108	1
11	Inlet valve	R185—03006	1	33	Nut M6	GB/T6170	1
12	Seat for inlet valve	R185—03501	1	34	Oil seal ring 10.6×1.8		1
13	Seat for exhaust valve	R185—03503	1	35	Nut M8	GB/T923	1
14	Drain cock	R185—03400	1	36	Pad	R185—03106	1
15	Rocker arm	R185—03201	1	37	Small cover	R185—03105	1
16	Bush for rocker arm	R185—03202	2	38	Bolt M6×12	GB/T5781	2
17	Snap ring 14	GB/T894.1	2	39	Cylinder head cover	R185—03101	1
18	Stud	R185—03011B	1	40	Pad cover	R185—03002	1
19	Set Pin	R185—03103	1	41	Nut M10	GB/T6170	1
20	Rocker arm shaft bracker	R185—03301	1	42	Washer 10	GB/T859	1
21	Nut M10×1	GB/T6173	2	43	Valve retainer lock	R185—03003	2
22	Rocker arm shaft	R185—03302	1	44	Washer	R185—0312	1

6. Piston Rod Assembly



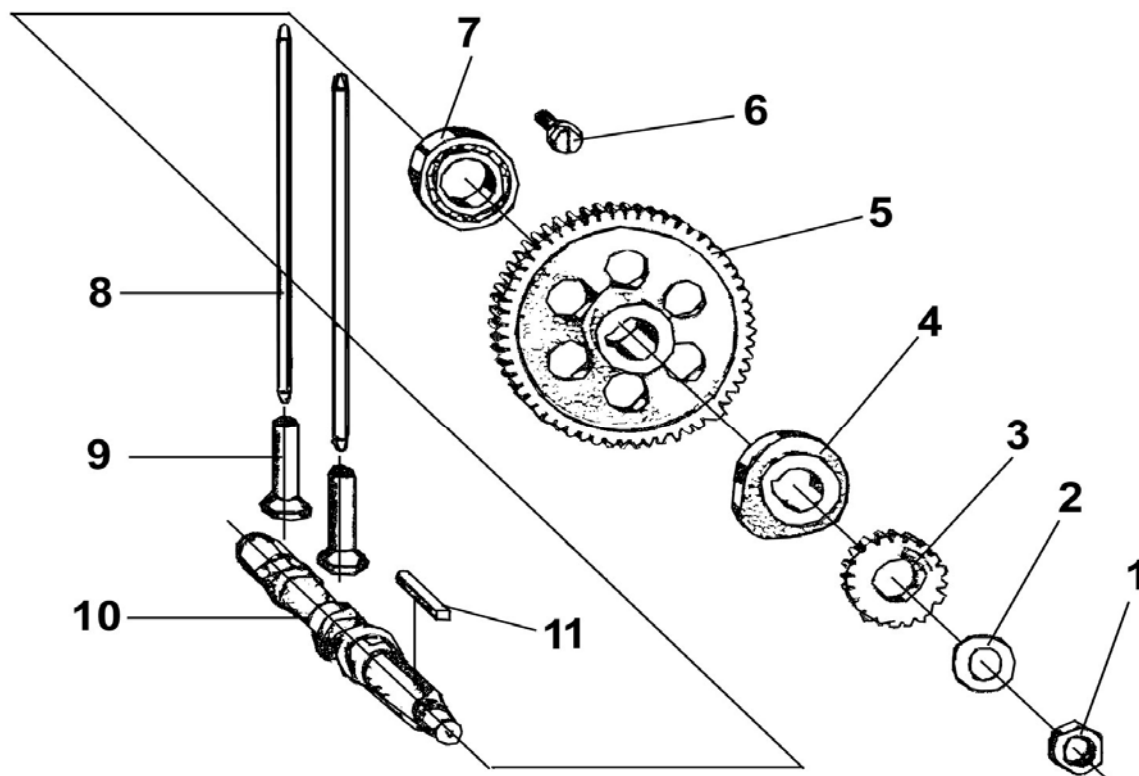
Ref. No.	Part name	Part Number	Req.
1	Bolt, connecting rod	R185—04006	2
2	Locker, connecting rod bolt	R185—04007	2
3	Connecting rod cap	R185—04011	1
4	Connecting rod bearing shell	R185—04009	2
5	Snap ring for piston pin	R185—04004	2
6	Piston pin	R185—04012	1
7	Connecting rod	R185—04005	1
8	Support spring for oil ring	R185—04102	1
9	Latch	R185—04103	1
10	1 st . air ring	R185—04001	1
11	2 ND , 3 RD air ring	R185—04002	2
12	Oil ring body	R185—04101	1
13	Piston	R185—04008	1

7. Crankshaft Assembly



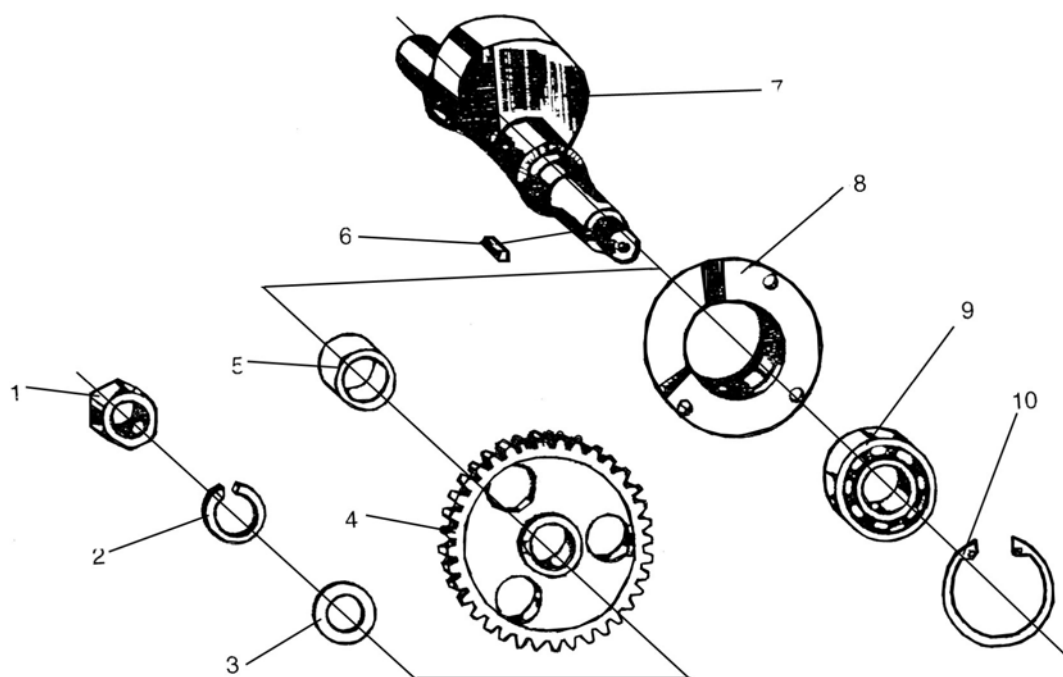
Ref. No.	Part name	Part Number	Req.
1	Lock washer	R185—05003	1
2	Flywheel nut	R185—05001	1
3	Flywheel	R185—05002	1
4	Crankshaft seal 50×75×12		1
5	Bearing housing	R185—05004	1
6	Clamping plate	R185—05012	1
7	Washer 6	GB/T859	2
8	Bolt M6×14	GB/T5783	2
9	Roll bearing 6311	GB/T276	1
10	Counter –balance bolt	R185—05009	2
11	Lock washer	R185—05011	2
12	Key C8×28	GB/T1096	1
13	Main counter –balance	R185—05008	2
14	Flat key flywheel	R185—05013	1
15	Crankshaft	R185—05005	1
16	Roll bearing NJ211E	GB/T283	1
17	Timing gear crank shaft	R185—05006	1
18	Balancing gear crankshaft	R185—05007	1

8. Camshaft Assembly



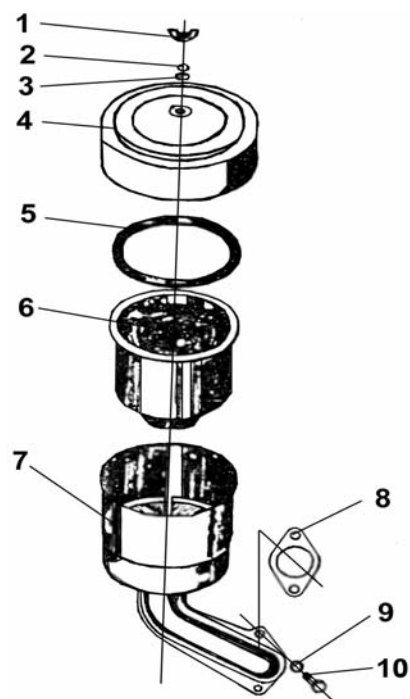
Ref. No.	Part name	Part Number	Req.
1	Nut M18×1.5	GB/T	1
2	Washer	R185—06008	1
3	Starting driven gear	R185—06001	1
4	Cam for Injection pump	R185—06002	1
5	Timing gear for camshaft	R185—06003	1
6	Thrust screw, camshaft	R185—06007	1
7	Roll bearing 6106	GB/T276	1
8	Push rod	R185—06004	2
9	Valve taped	R185—06005	2
10	Camshaft	R185—06006	1
11	Key C8×50	GB/T1096	1

9.Balance System



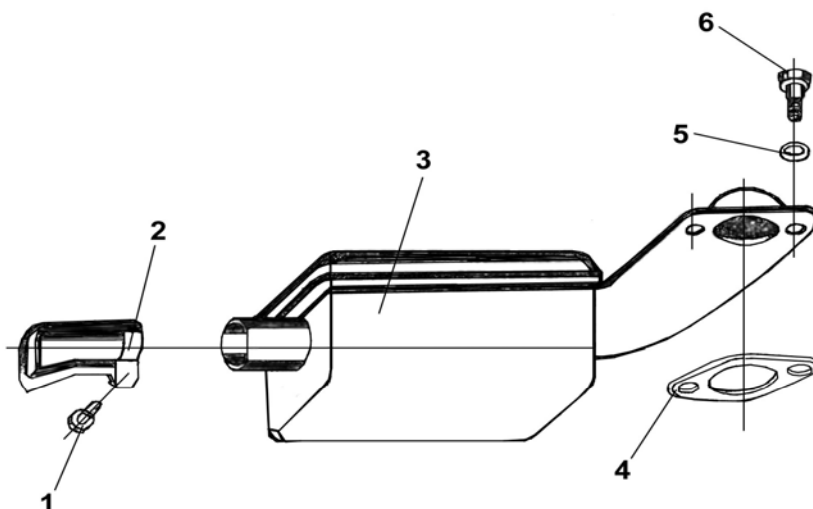
Ref. No.	Part name	Part Number	Req.
1	Nut M18×1.5	GB/T6173	1
2	Washer 18	GB/T859	1
3	Washer	R185—07005	1
4	Driven gear , balance shaft	R185—07003	1
5	Set sleeve	R185—07002	1
6	Key B6×12	GB/T1096	1
7	Balance shaft	R185—07001	1
8	Bearing seat, Balance shaft	R185—07004	1
9	Roll bearing 6205	GB/T276	1
10	Hole Circlip 52	GB/T893.1	1

10. Intake System



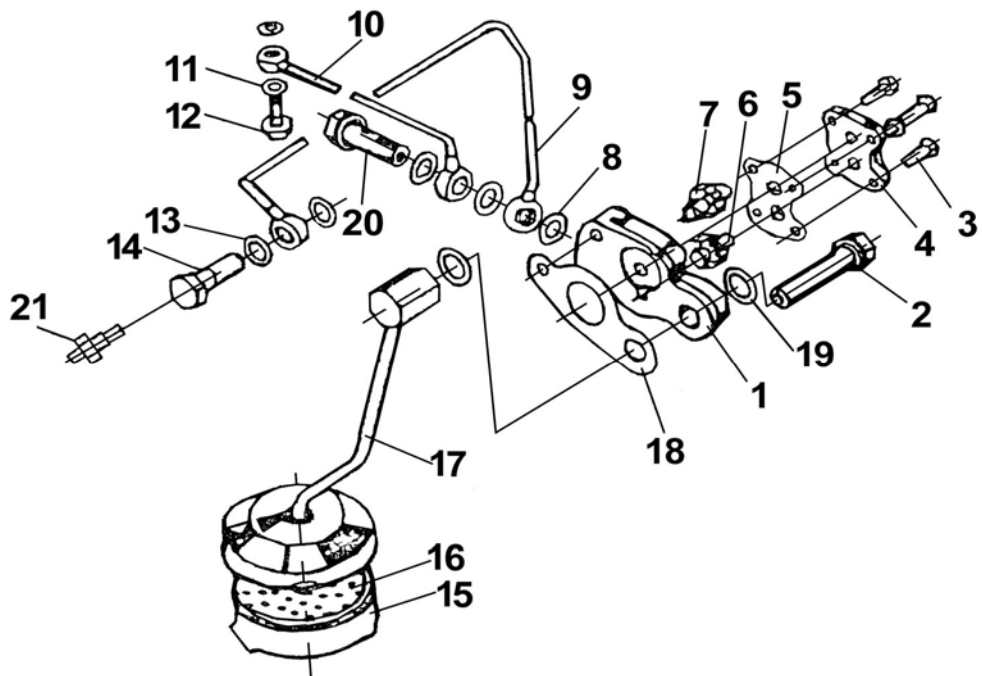
Ref. No.	Part name	Part Number	Req.
1	Butterfly nut	R185—08001	1
2	Spring washer 6	GB/T89	1
3	Washer 6	GB/T848	1
4	Cover	R185—08003	1
5	Rubber packing	R185—08002	1
6	Filter element	R185—08100	1
7	Filter body and welded unit	R185—08200	1
8	Intake pipe packing	R185—08004	1
9	Washer 8	GB/T93	2
10	Bolt M8×16	GB/T5783	2

11.Exhaust System



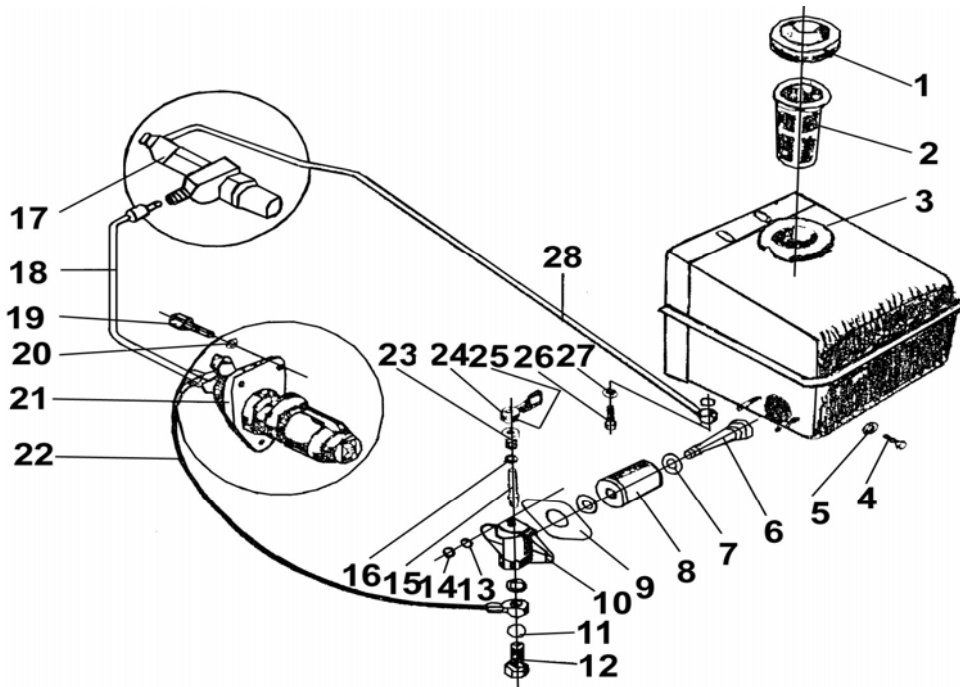
Ref. No.	Part name	Part Number	Req.
1	Screw M6×12	GB/T	1
2	Upper welded unit of exhaust pipe	R185—09100	1
3	Silencer welded unit		1
4	Exhaust pipe packing	R185—09006	1
5	Washer 8	GB/T93	2
6	Bolt M8×16	GB/T5783	2

12. Lubrication System



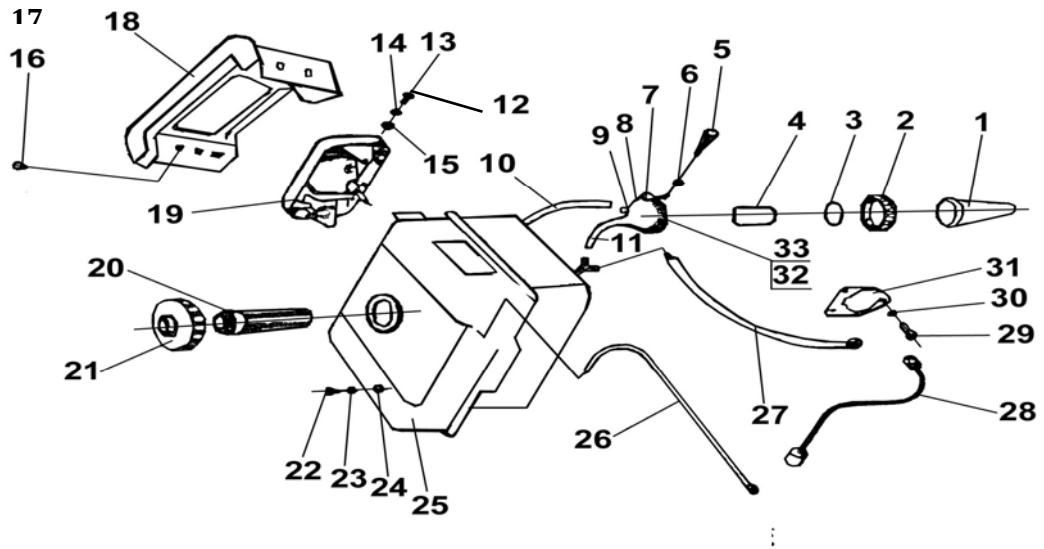
Ref. No.	Part name	Part Number	Req.
1	Body for oil pump	R185-10501	1
2	Hollow bolt	R185-10004	1
3	Bolt M6×16	GB/T5783	4
4	Cover for oil pump	R185-10504	1
5	Packing for oil pump	R185-10505	1
6	Oil pump for driven gear	R185-10502	1
7	Oil pump driving gear	R185-10503	1
8	Copper washer	R185-10001	3
9	Main oil pipe	R185-10200	1
10	Fine oil pipe	R185-10100	1
11	Copper washer	R185-10001	2
12	Return Joint	R175A-10004	1
13	Copper washer	R185-10001	2
14	Hollow bolt (for JM185N)	R185-10005(or JM185N-10001)	1
15	Snap ring	R185-09102	1
16	Oil filter element	R185-10402	1
17	Oil strainer welded	R185-10410	1
18	Packing for oil pump	R185-10002	1
19	Copper washer	R185-10001	2
20	Long hollow bolt	R185-10003	1
21	Oil Indicator (for R185)	CFZS1100-03110 (R175A-09200)	1

13. Fuel System (Model R185)



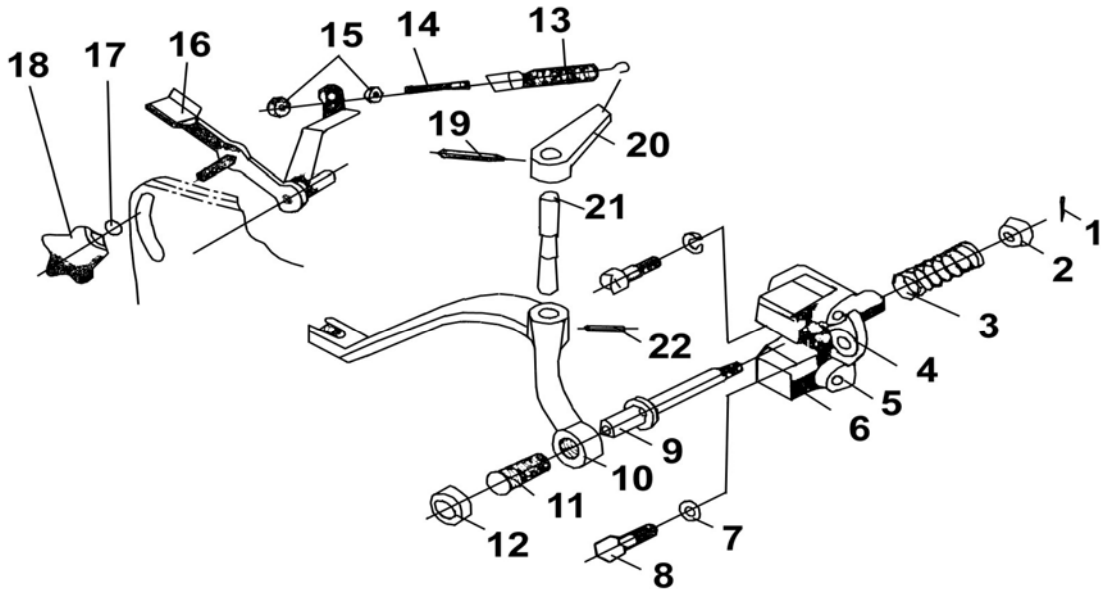
Ref. No.	Part name	Part Number	Req.	Ref. No.	Part name	Part Number	Req.
1	Fuel tank cap	S195—07300		15	Cock element	R175A—10303	
2	Fuel filling screen	S195—07400		16	washer	R175A—10302	
3	Fuel tank	R185—11200		17	Injector assembly	P664—00A	
4	Washer 8	GB/T97.1		18	High pressure fuel pipe	R185—11500	
5	Bolt M8×16	GB/T5783		19	Bolt M8×25	GB/T5783	
6	Bolt	R175A—10301		20	Washer 8	GB/T93	
7	Washer	R175A—10308		21	Injector pump assembly	B11-02A	
8	Fuel filter element	R175A—10330		22	Fuel feed hose	R185—11400	
9	Washer	R175A—10003		23	Nut	R175A—10305	
10	Filter seat	R175A—10307		24	Cock handle shaft	R175A—10306	
11	Washer	R175A—10311		25	Pin 2×17	GB/T117	
12	Hollow bolt	R175A—10309		26	Hollow bolt	R175A—10006	
13	Washer 6	GB/T97.1		27	Washer	R175A—10007	
14	Nut M6	GB/T6170		28	Return pipe	R185—11600	

14. Fuel System (Model CF185N and JM185N)



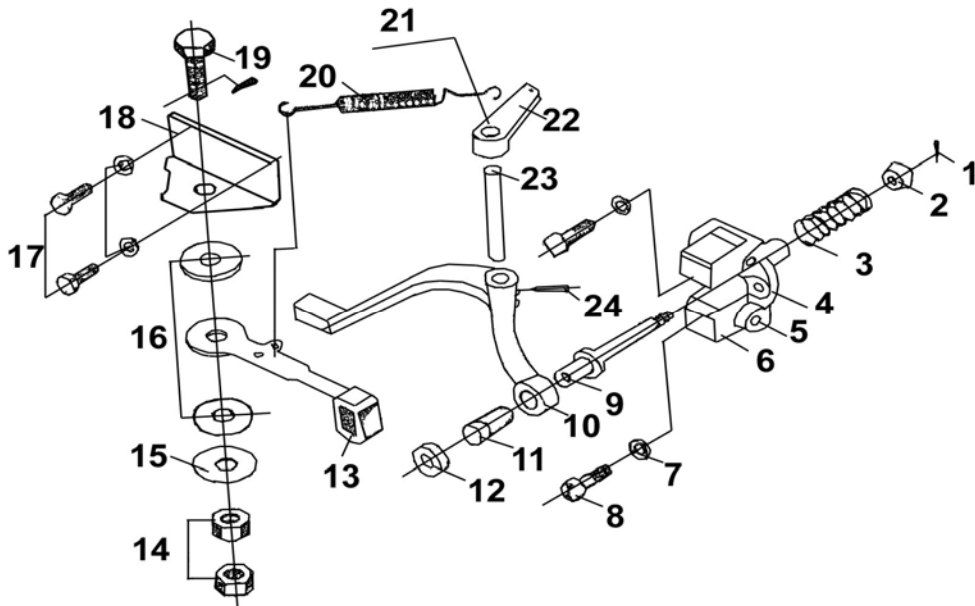
Ref. No.	Part name	Part Number	Req.	Ref. No.	Part name	Part Number	Req.
1	Filter bowl	JM185N—11508	1	19	Rectangular front lamp	JM185M—11700	1
2	Straining ring	JM185N—11507	1	20	Fuel oil filter screen	CFZS195N—07400	1
3	Seal O-ring 7×3.55	GB/T3452.1	1	21	Fuel tank cap	CFZS195N—07300	1
4	Fuel filter element	JM185N—11520	1	22	Bolt M8×16	GB/T5782	2
5	Bolt M8×40	GB/T5782	1	23	Washer 8	GB/T848	2
6	Washer 8	GB/T93	1	24	Washer 8	GB/T93	2
7	Cock handle shaft	JM185N—11505	1	25	Fuel tank	JM185M—11200	1
8	Locating screw M4×5	GB/T828	1	26	Return pipe	R185—10600	1
9	Filter seat	JN185N—11501	1	27	Fuel feed hose	JM185M—11400	1
10	Inlet oil pipe	JM185M—11009	1	28	High pressure fuel pipe	R185—11500	1
11	Outlet oil pipe	JM185M—11006	1	29	Bolt M8×25	GB/T5782	3
12	Bolt M8×16	GB/T5782	2	30	Washer 8	GB/T93	3
13	Washer 8	GB/T93	2	31	Shim for fuel pump(0.1, 0.2,0.3,0.4and 1mm)	R175A—10003	Selection
14	Washer 8	GB/T848	2	32	Bolt M8×25	GB/T783	5
15	Washer 6	GB/T93	2	33	Washer 8	GB/T93	5
16	Washer 6	GB/T97.1	2				
17	Bolt M6×8	GB/T5782	2				
18	Lamp cover	JM185N—11300	1				

15. Governor System (Model R185)



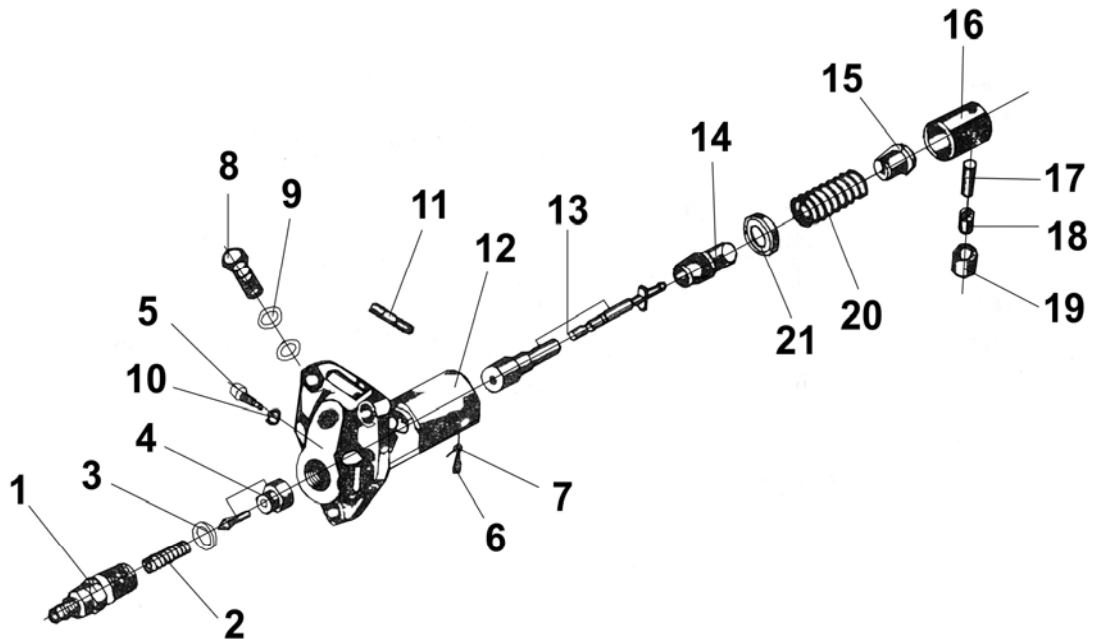
Ref.	Part name	Part Number	Req.
1	Pin 1.6×12	GB/T91	1
2	Governing spring seat	R!85—12304	1
3	Governing spring	R!85—12303	1
4	Bracket, flyweight	R!85—12306	1
5	Pin, flyweight	R!85—12305	2
6	Flyweight	R!85—12301	2
7	Washer 6	GB/T93	4
8	Hexagonal screw with slot	R1 75A—11001	2
9	Governing shaft unit	R!85—12302	1
10	Bent lever	R!85—12203	1
11	Adjusting screw	R!85—11204	1
12	Nut M12×1.25	GB/T6173	1
13	Governor spring unit	R185—12001	1
14	Adjusting screw	S195 —10104	1
15	Nut M6	GB/T6170	1
16	Governor handle	R175A—11100	1
17	Washer 8	GB/T97.1	1
18	Handle	R175A—11110	1
19	Pin A3×30	GB/T117	1
20	Pull rod	R185—12201	1
21	Governing lever shaft	R185—12302	1
22	Pin A3×20	GB/T117	12

16. Governor System (Model CF185 N and JM185N)



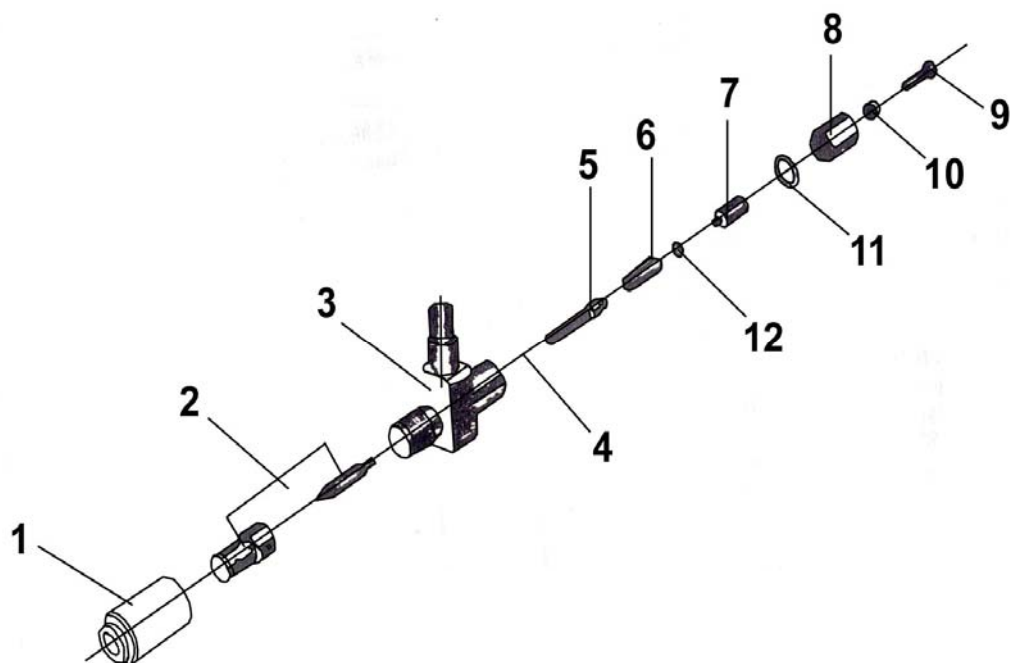
Ref.	Part name	Part Number	Req.
1	Pin 1.6×12	GB/T91	1
2	Governing spring seat	R!85—12304	1
3	Governing spring	R!85—12303	1
4	Bracket, flyweight	R!85—12306	1
5	Pin, flyweight	R!85—12305	2
6	Flyweight	R!85—12301	2
7	Washer 6	GB/T93	4
8	Hexagonal screw with slot	R1 75A—11001	2
9	Governing shaft unit	R!85—12302	1
10	Bent lever	R!85—12203	1
11	Adjusting screw	R!85—11204	1
12	Nut M12×1.25	GB/T6173	1
13	Governor handle	JM185N—12110	1
14	Nut M10	GB/T6170	1
15	Adjusting plate	JM185N—12104	1
16	Friction piece	JM185N—12103	1
17	Bolt M6×6	GB/T5781	1
18	Fixing plate	JM185N—12101	1
19	Bolt	JM185N—12102	1
	Pin A2×16	GB/T117	1
20	Governor spring unit	JM185N—12200	1
21	Pin A3×30	GB/T117	1
22	Pull rod	R185—12201	1
23	Governing lever shaft	R185—12202	1
24	Pin A3×20	GB/T117	1

17. Injection pump Assembly (model B11-02A)



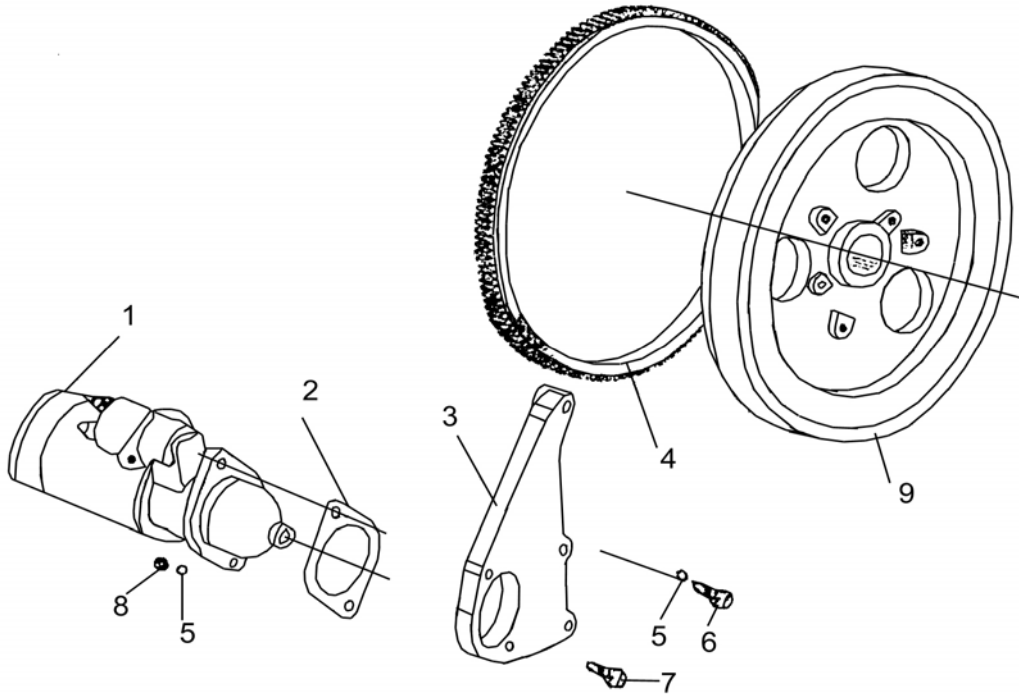
Ref.	Part name	Part Number	Req.
1	Delivery valve holder	B11—0212A	1
2	Delivery valve spring	B11—0213A	1
3	Seal washer	B11—0215A	1
4	Delivery valve with seat	U11—2A	1
5	Locating screw, plunger sleeve	B11—0209A	1
6	Guide screw	B11—0206A	1
7	Washer 5	Gb/T93	1
8	Union bolt ,inlet pipe	B11—0214A	1
9	Sealing washer	B11—0202A	2
10		B11—0208A	1
11	Washer	B11—05A	1
12	Rack unit	B11—0303A	1
13	Couple plunger $\phi 7$ or $\phi 7.5$	U1 1—1A	1
14	Adjusting pinion	B11—0211A	1
15	Spring lower seat	B11—0205A	1
16	Body, Tappet	B11—0401A	1
17	Pin, roller	B11—0404A	1
18	Inner ring , roller	B11—0403A	1
19	Outer ring, roller	B11—0402A	1
20	Spring	B11—0204a	1
21	Spring upper seat	B11—0203A	1

18 injector Assembly (Model 664—00A)



Ref. No.	Part name	Part Number	Req.
1	Injector cap	P661—001A	1
2	Couple, injector nozzle	ZS 4S1A	1
3	Injector body	P661—001	1
4	Steel ball 3.000G200b	GB/T308/	1
5	Needle valve spindle	P661—0101	1
6	Adjusting spring	P661—002	1
7	Adjusting	P661—005	1
8	Nut	P661—006	1
9	Fuel leak off connecting bolt	P661—008	1
10	Washer	P661—007	2
11	Washer	P661—004	1
12	Washer	P661—003	1

19.The part of Motor starting engine for R185M、CF185M and JM185M



Ref. No.	Part name	Part Number	No. of R190,CF190 Replaced	Req.
1	Starter	QD1293	—	1
2	Starter packing	R185M—01026	—	As required
3	Plate for starter support	R185M—01025	—	1
4	Ring gear	R185M—05014	—	1
5	Washer 10	GB/T 93		5
6	Bolt M10×35	GB/T5283		3
7	Bolt M10×40	GB/T5283		2
8	Nut M10	GB/T6170		5
9	Flywheel	R185M—05014	R185—05002	1

Attachment: list of Spares Parts Supplied with the engine shipmen

Ref.	Part name	Req.
1	Piston ring	1
2	Cylinder head gasket	1
3	Cylinder liner water seal ring	2
4	Special wrench for flywheel nut	1
5	Special wrench for connecting rod bolts	2
6	Feeler gauge	1
7	Starting handle	1
8	V—belt pulley	1
9	Bolt M12×35	3
10	Washer 12	3
11	Operation manual	1
12	Tool box	1
13	Shaft	1
14	Bridge of puller	1



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