

SHOP MANUAL

KOMATSU

155-4 SERIES

DIESEL ENGINE

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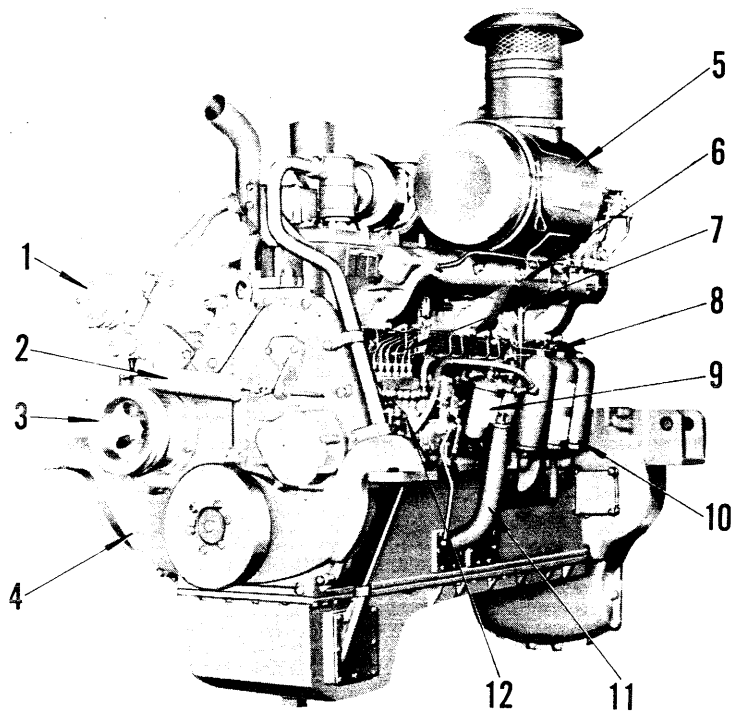
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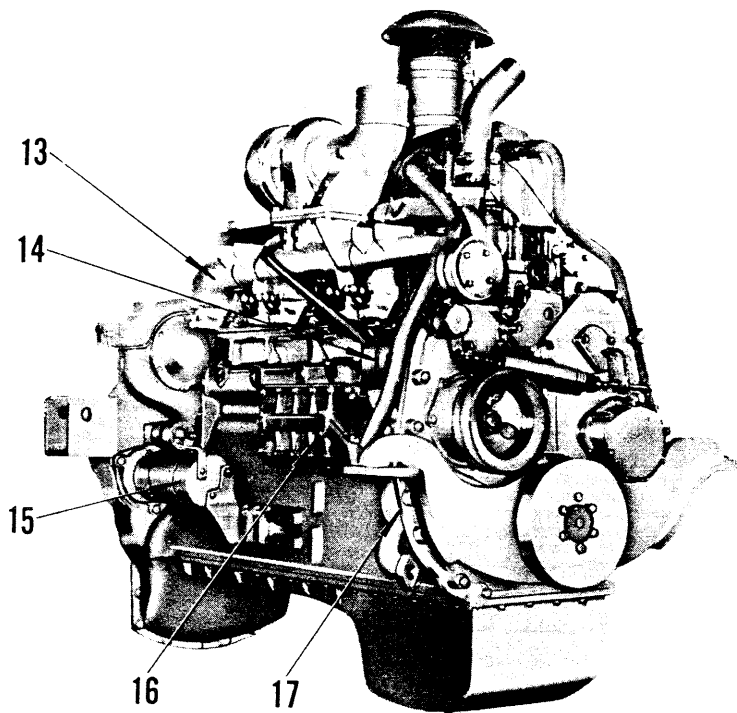
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S6D155-4 (WITH STARTING MOTOR)
ENGINE SERIAL No. 10011 ~ 19999



- 1. Tension pulley
- 2. Tension spring
- 3. Accessory drive pulley
- 4. Front support
- 5. Air cleaner
- 6. Thermostat
- 7. Fuel pipe
- 8. Cam lubricating pipe
- 9. Fuel filter
- 10. Fullflow filter
- 11. Oil filler
- 12. Fuel injection pump

6127P003



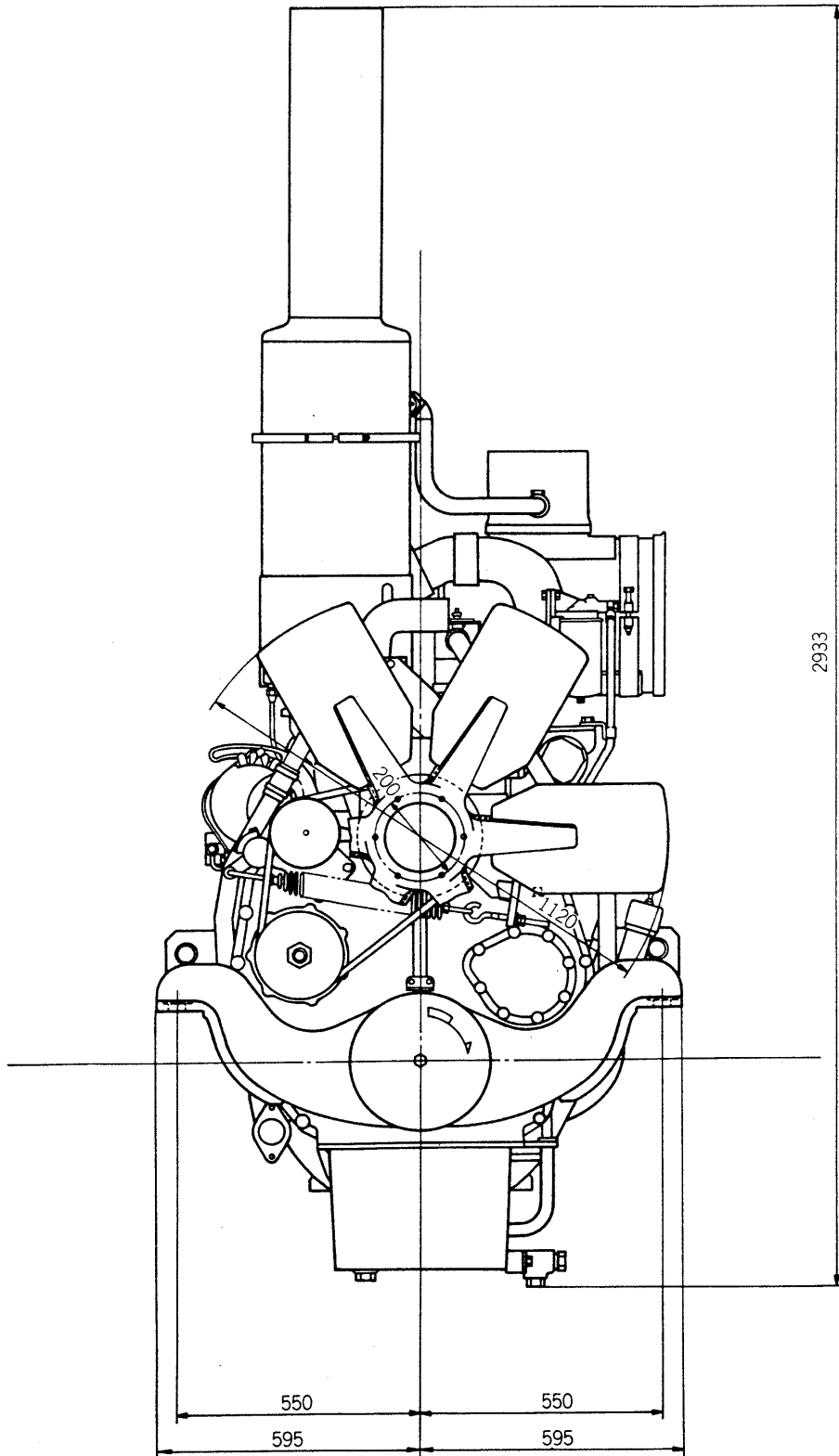
- 13. Exhaust manifold
- 14. Generator
- 15. Starting motor
- 16. Oil cooler
- 17. Water pump

6127P004

Engine model		S6D155-4		
Machine		D155A-2 (Eng. Serial No. 52707 and up)	D355A-1 (Eng. No. 10101 – 11708) (with starting Eng. 2G84)	D355A-1 (Eng. No. 11709 – 20337)
Number of cylinders – Bore x Stroke (mm)		6 – 155 x 170		
Total piston displacement (cc)		19,260		
Firing order		1 – 5 – 3 – 6 – 2 – 4		
Dimensions	Overall length (mm)	1,880	1,998	1,880
	Overall width (mm)	1,190	1,280	1,280
	Overall height (Excluding exhaust pipe) (mm)	1,931	–	–
	Overall height (Including exhaust pipe) (mm)	2,914	2,852	2,844
Performance	Flywheel horsepower (HP/rpm)	320/2,000	410/2,000	410/2,000
	Maximum torque (kgm/rpm)	144/1,400	163/1,400	163/1,400
	No-load maximum engine speed (rpm)	2,240 ± 40	2,240 ± 40	2,240 ± 40
	No-load minimum engine speed (rpm)	600 ± 50	600 ± 50	600 ± 50
	Minimum fuel consumption ratio (g/HPh)	180	180	180
Dry weight (kg)	2,580	2,670	2,520	
Fuel pump	BOSCH PES-PD type			
Governor	BOSCH RSUV centrifugal all speed governor			
Lubricating oil amount (Refill capacity) (ℓ)	75 (55)	63 (56)	63 (56)	
Coolant amount (ℓ)	160	170		
Alternator	24V, 35A	24V, 20A (Generator)	24V, 20A (Generator)	
Starting motor	24V, 11 kW	–	24V, 11 kW	
Battery	12V 200Ah x 2	12V 200Ah x 2	12V 200Ah x 2	
Turbocharger	KTR130	RH1521		
Air compressor	–	–		
After cooler	–	–		

* Change the oil every 250 hours service.
Add another 12ℓ for by-pass filter every 500 hours service.

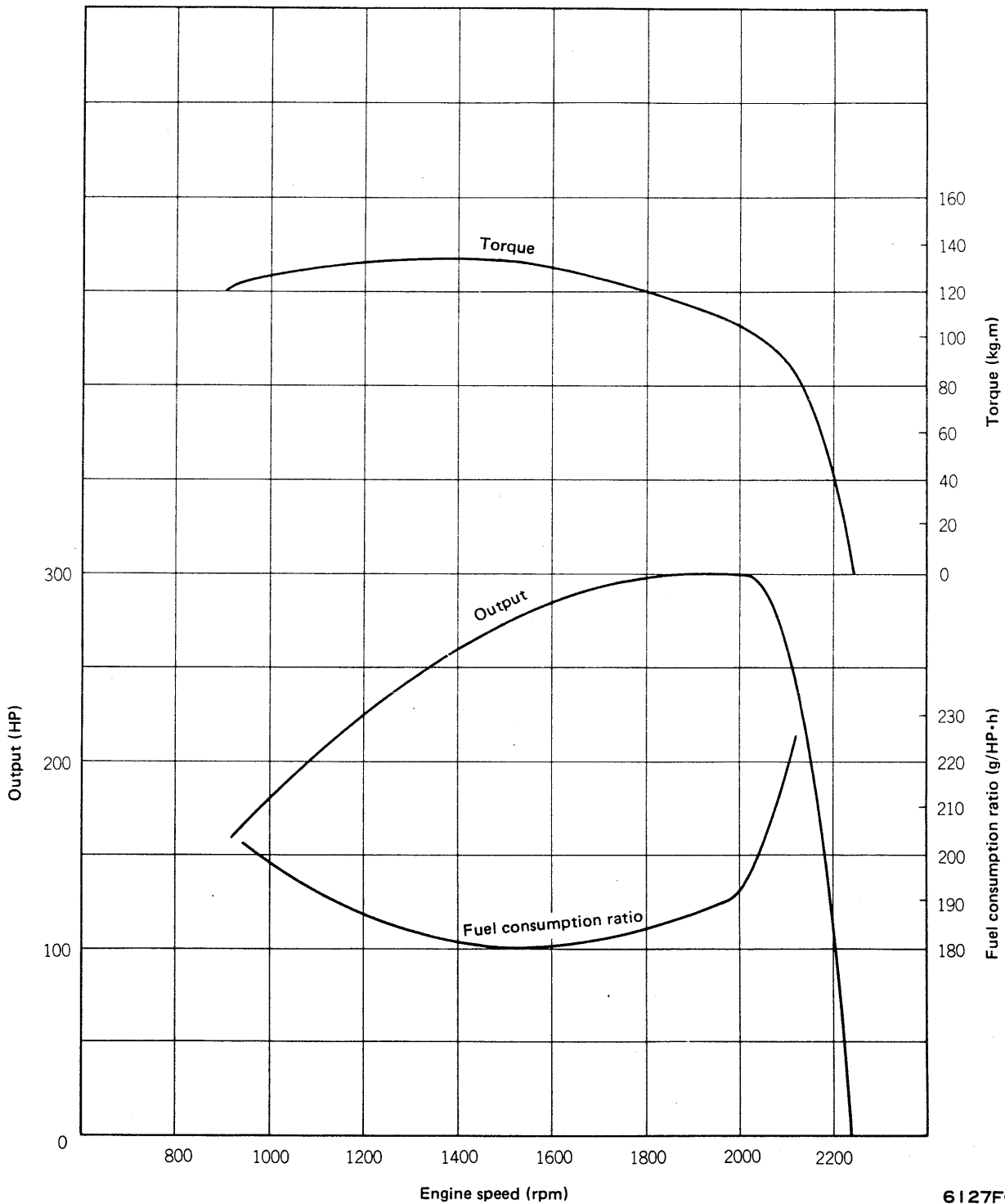
S6D155-4 (D150, 155A-1)



6127F007

S6D155-4 (D150A-1, Engine Serial No. 20000 and up)

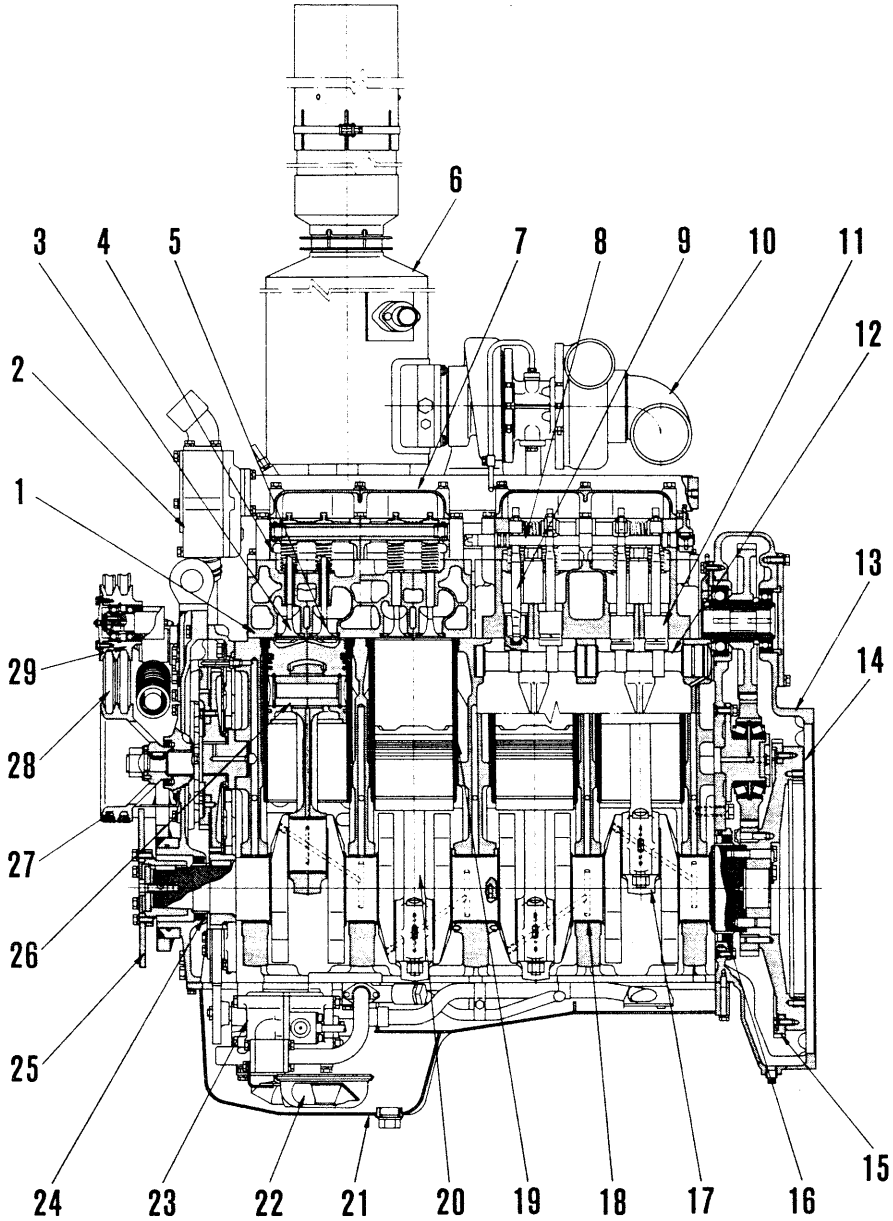
Rated horse power : 300HP/2,000rpm
 Maximum torque : 134kgm/1,400rpm
 Minimum fuel consumption ratio : 180g/HP·h



6127F016

GENERAL STRUCTURE

S4D155-4

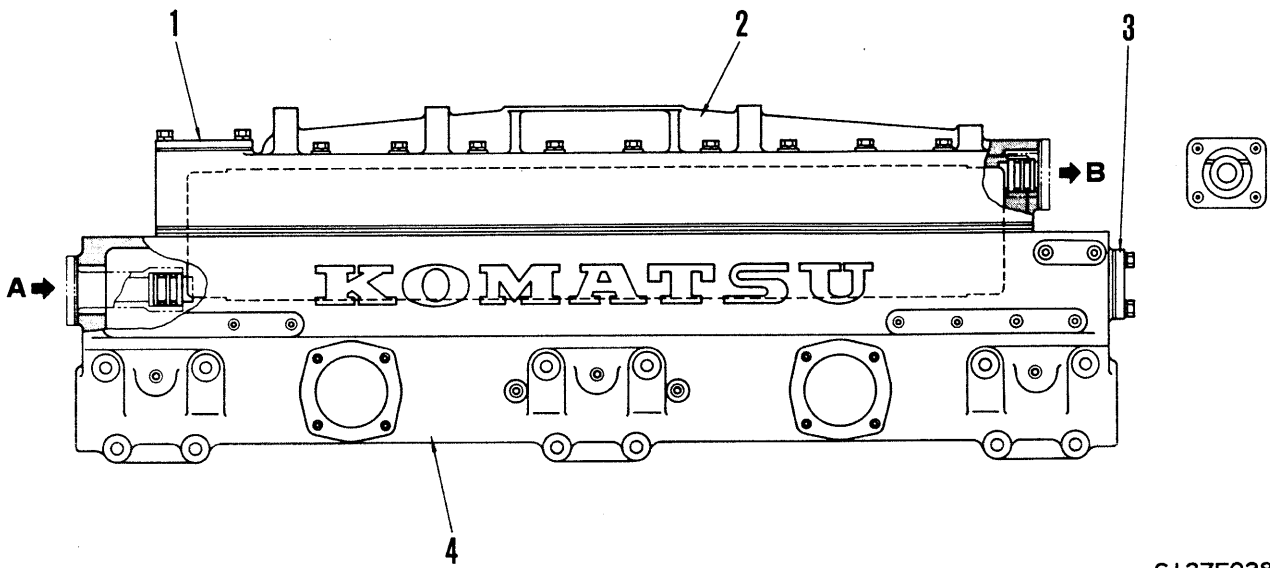


6127F024

- | | | |
|---|----------------------|-------------------------|
| 1. Cylinder head | 9. Push rod | 17. Connecting rod gear |
| 2. Thermostat | 10. Turbocharger | 18. Crankshaft |
| 3. Intake valve | 11. Tappet | 19. Cylinder liner |
| 4. Rocker arm housing | 12. Camshaft | 20. Connecting rod |
| 5. Exhaust valve | 13. Flywheel housing | 21. Oil pan |
| 6. Exhaust muffler | 14. Flywheel | 22. Strainer |
| 7. Rocker housing cover | 15. Ring gear | 23. Oil pump |
| 8. Compression release lever <i>5/12/14</i> | 16. Rear seal | 24. Front seal |

AFTER COOLER

SA6D155-4



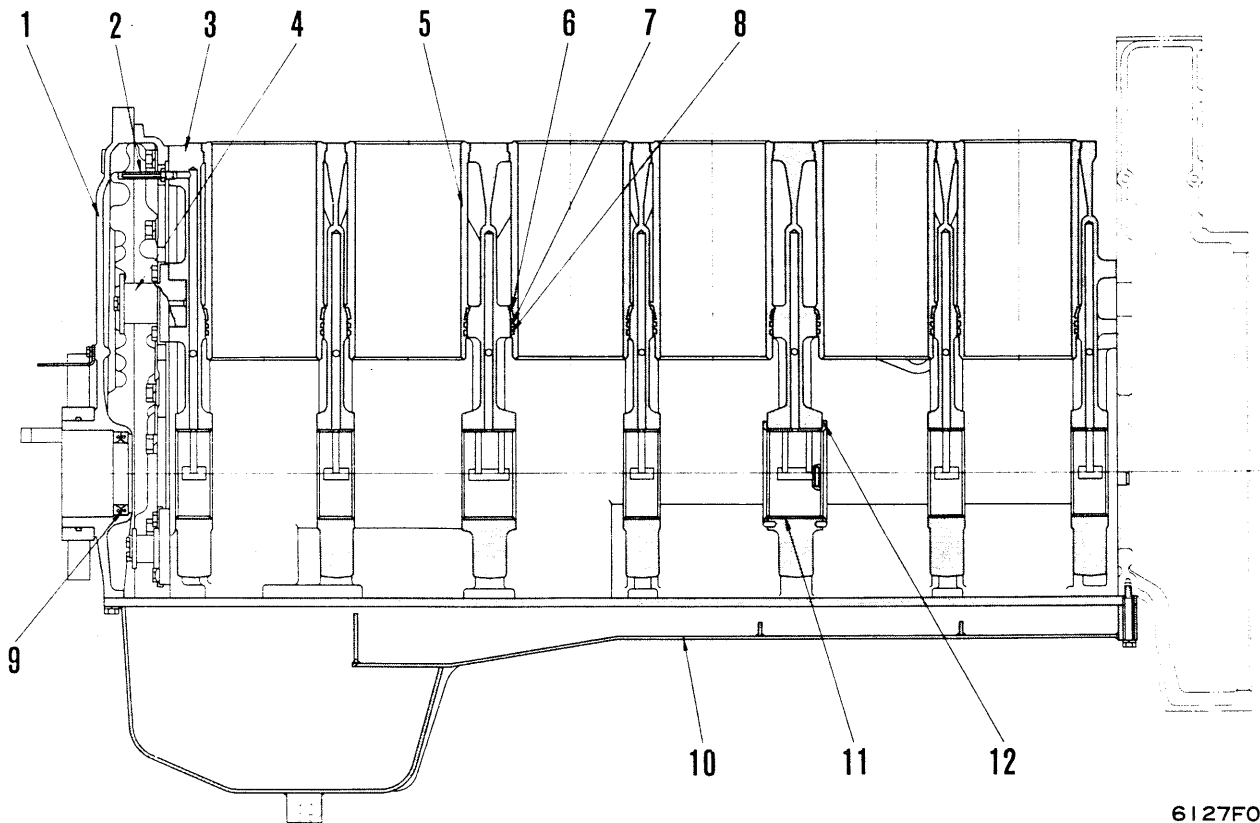
6127F038

此圖圖100-77975-0
 目的也證明好也

- 1. Cover plate
- 2. Cover
- 3. Cover plate
- 4. Body

- A. From water pump
- B. To water manifold

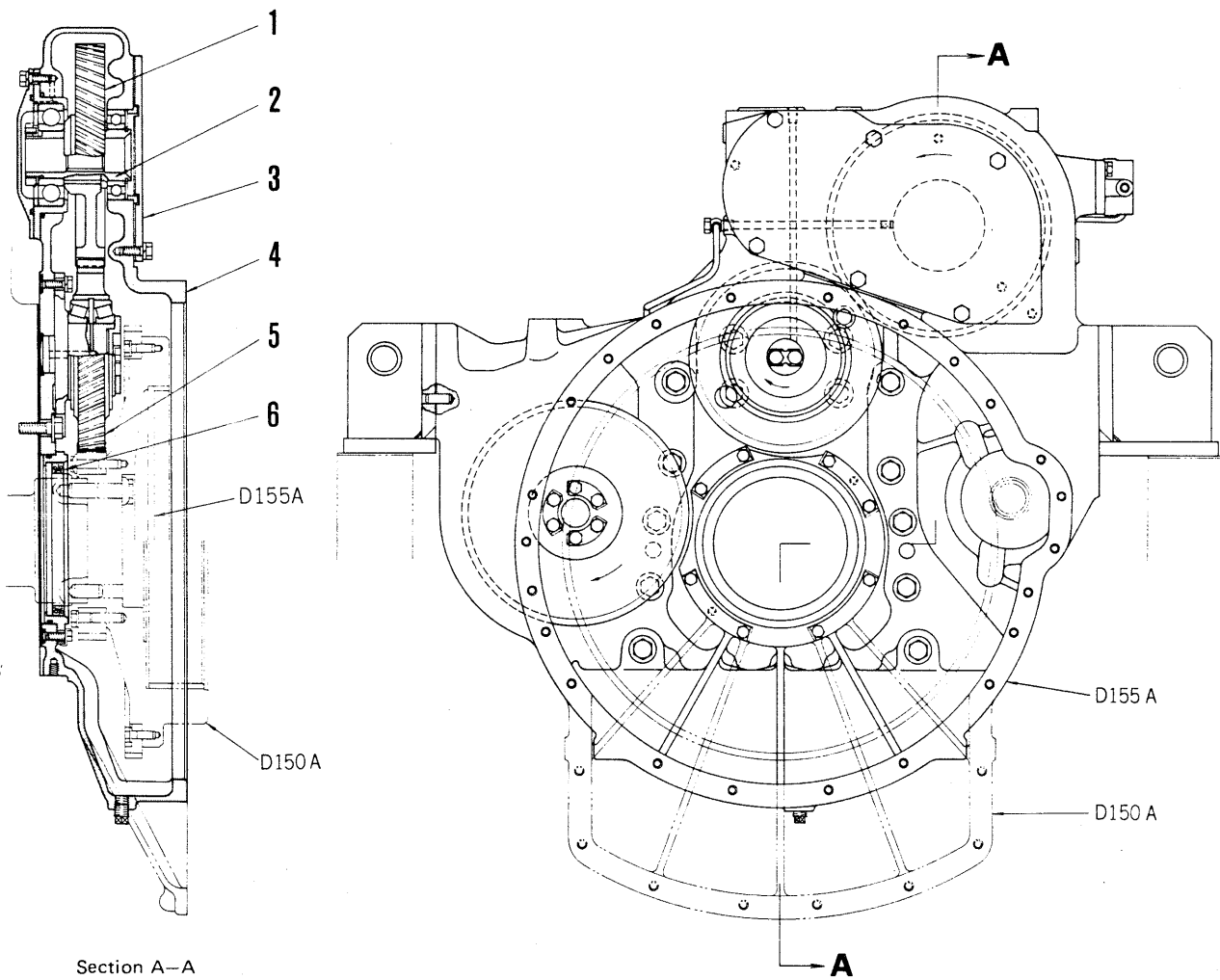
S6D155-4, SA6D155-4



6127F050

- | | |
|-----------------------|---------------------------|
| 1. Front cover | 11. Main metal |
| 2. Lubrication nozzle | 12. Thrust metal |
| 3. Cylinder block | 13. Cam bushing |
| 4. Idler shaft | 14. Piston cooling nozzle |
| 5. Cylinder liner | 15. Oil level gauge |
| 6. Crevice seal | 16. Oil filler |
| 7. O-ring | 17. Drain plug |
| 8. O-ring | 18. Main metal bolt |
| 9. Front seal | 19. Main metal cap |
| 10. Oil pan | |

S6D155-4 (D150, 155A-1)



Section A-A

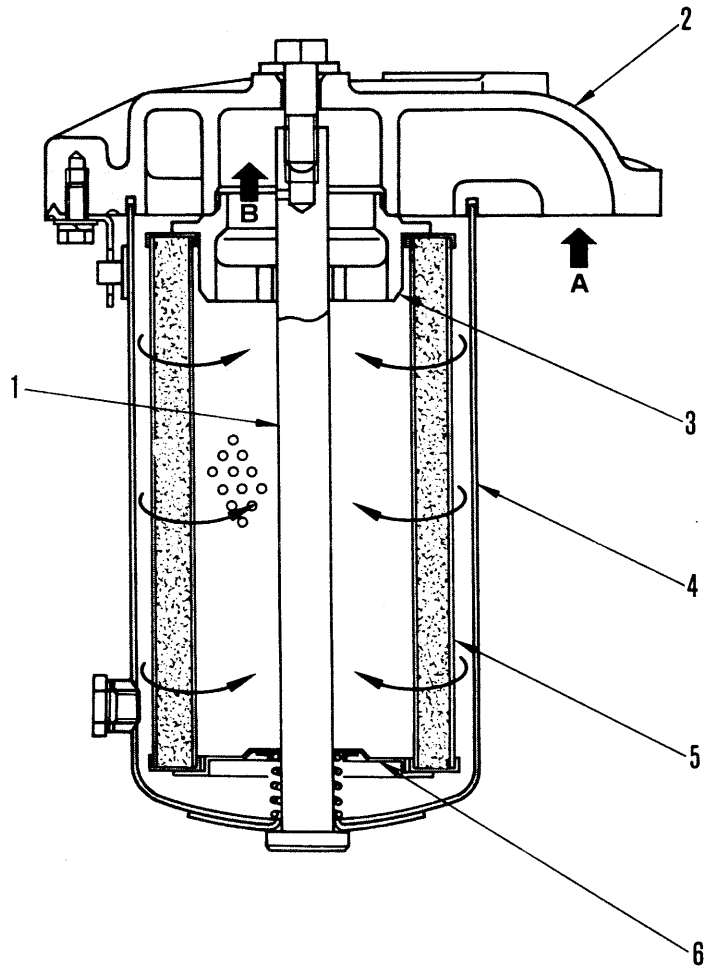
6127F061

1. PTO gear (number of teeth 51)
2. PTO gear shaft
3. PTO cover
4. Flywheel housing
5. Idler gear (number of teeth 43)
6. Rear seal

HANGING TYPE

S6D155-4 (Engine Serial No. 20000 ~ 24804)

SA6D155-4 (Engine Serial No. 20338 ~ 25899)



6127F073A

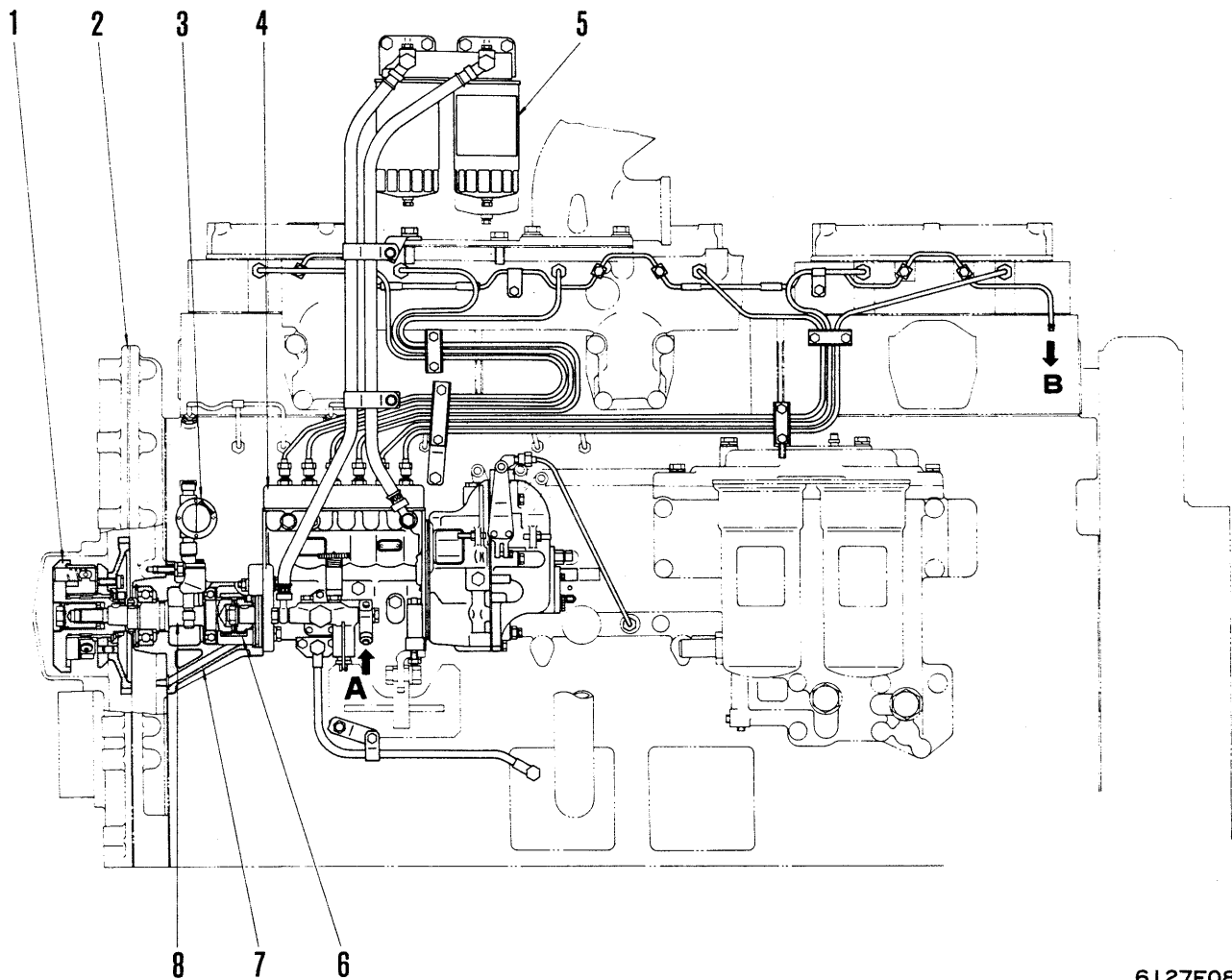
- 1. Center bolt
- 2. Filter cover
- 3. Retainer
- 4. Filter case
- 5. Element
- 6. Lower seat

- A. Oil inlet
- B. Oil outlet

Filter

Filtration area : 0.67m² x 3

S6D155-4



6127F085

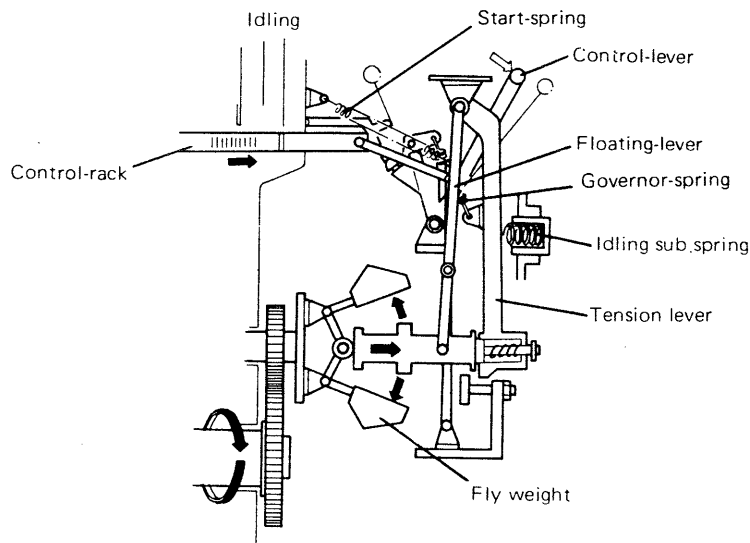
- | | |
|-----------------------------------|-------------------|
| 1. Automatic timer | A. From fuel tank |
| 2. Fuel injection pump drive gear | B. To fuel tank |
| 3. Service meter | |
| 4. Fuel injection pump | |
| 5. Fuel filter | |
| 6. Coupling | |
| 7. Housing | |
| 8. Shaft | |

2) ENGINE IDLING

Soon after the engine fires up, the operator will pull his fuel control lever to make the governor control lever come to the position indicated. Thereupon, the governor begins to control engine speed. With the control lever in "IDLING" position, governor spring is in completely relaxed state, so that tension lever is in free floating condition.

The thrust of shifter is counteracted by idling sub-spring through tension lever: Floating lever keeps control rack pulled out to the position "IDLING". This position gives an injection quantity necessary for proper idling speed.

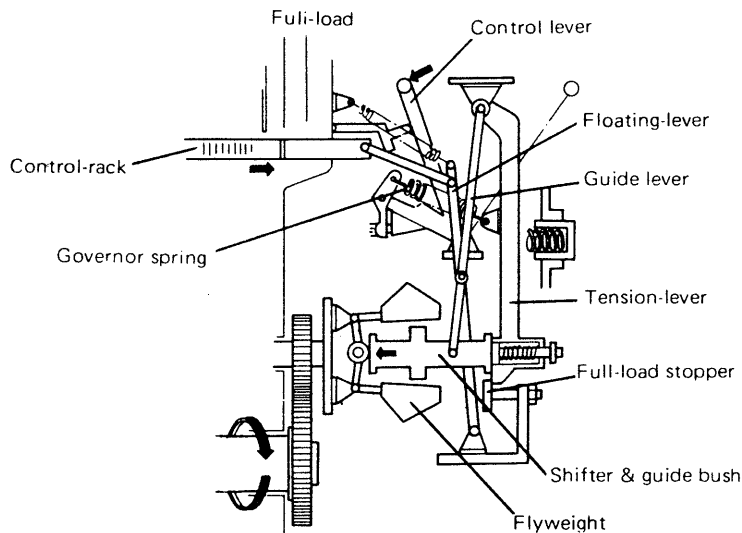
Should the engine speed drop for some reason, shifter would move inward, allowing the floating lever to push the control rack inward to increase the injection quantity.



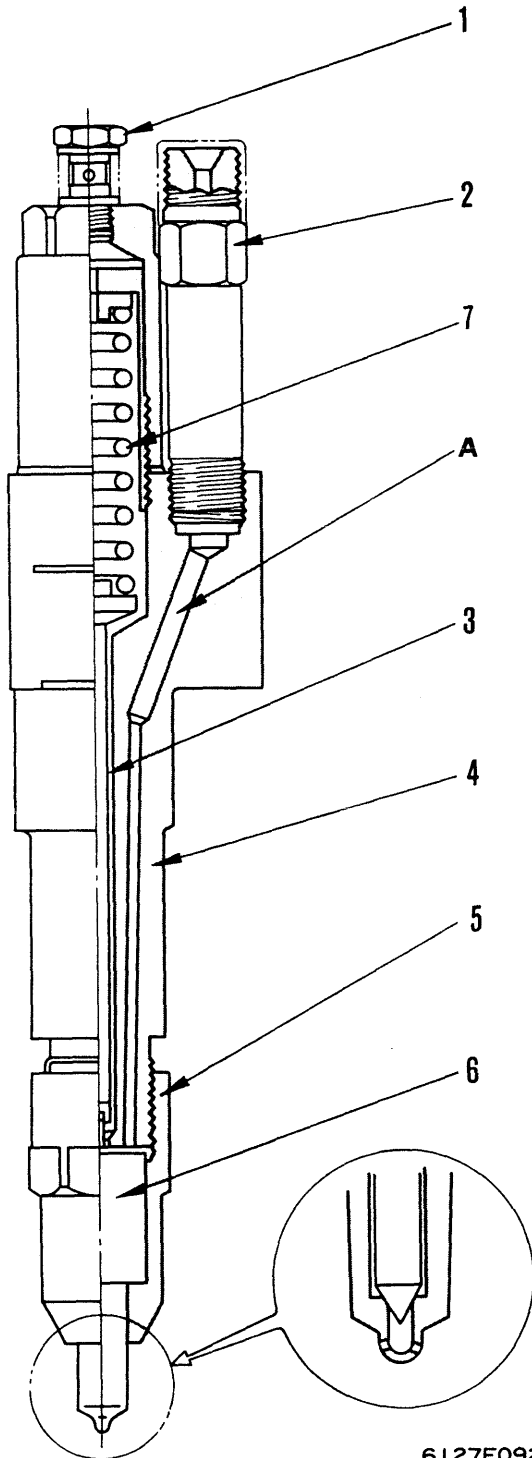
3) FULL-LOAD RUNNING

Pushing the control lever to maximum speed stopper will stretch the governor spring fully and pull tension lever up against full-load stopper. The tension lever, in turn, pushes on shifter, marking the floating lever push in control rack.

Under the condition shown, the centrifugal force will be counteracted mostly by the governor spring through the tension lever, and the governor will maintain the speed determined by the load on the engine.



FUEL INJECTION NOZZLE



- 1. Joint bolt
- 2. Inlet connector
- 3. Push rod
- 4. Nozzle holder body
- 5. Nozzle nut
- 6. Nozzle
- 7. Spring
- A. Inlet port

Fuel injection nozzle

Type: Made by DIESEL KIKI Multi-hole type

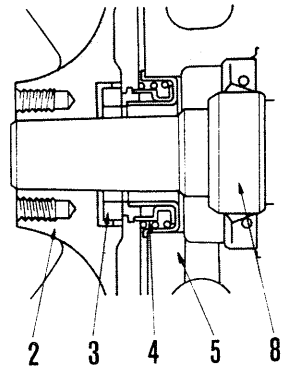
Fuel injection pressure

Unit: kg/cm²

Engine	Serial No.	Pressure
S4D155-4	10011~14256	175
	14257~	220
S6D155-4	10011~14256	175
	14257~	220
SA6D155-4	20001~	220

WATER PUMP SEAL

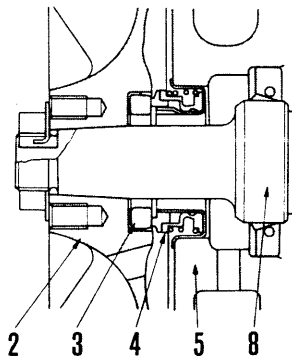
S6D155-4 (Engine Serial No. 10011 ~ 10100)



- 2. Impeller
- 3. Floating seal
- 4. Water seal
- 5. Water pump body
- 8. Pump shaft
- 9. V-ring

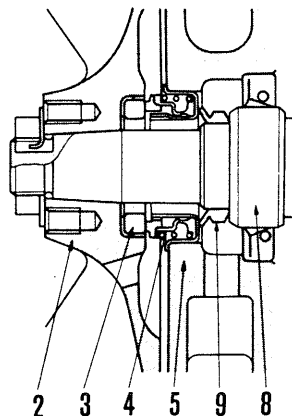
6127F099-1

S6D155-4 (Engine Serial No. 10101 ~ 15313)



6127F100A

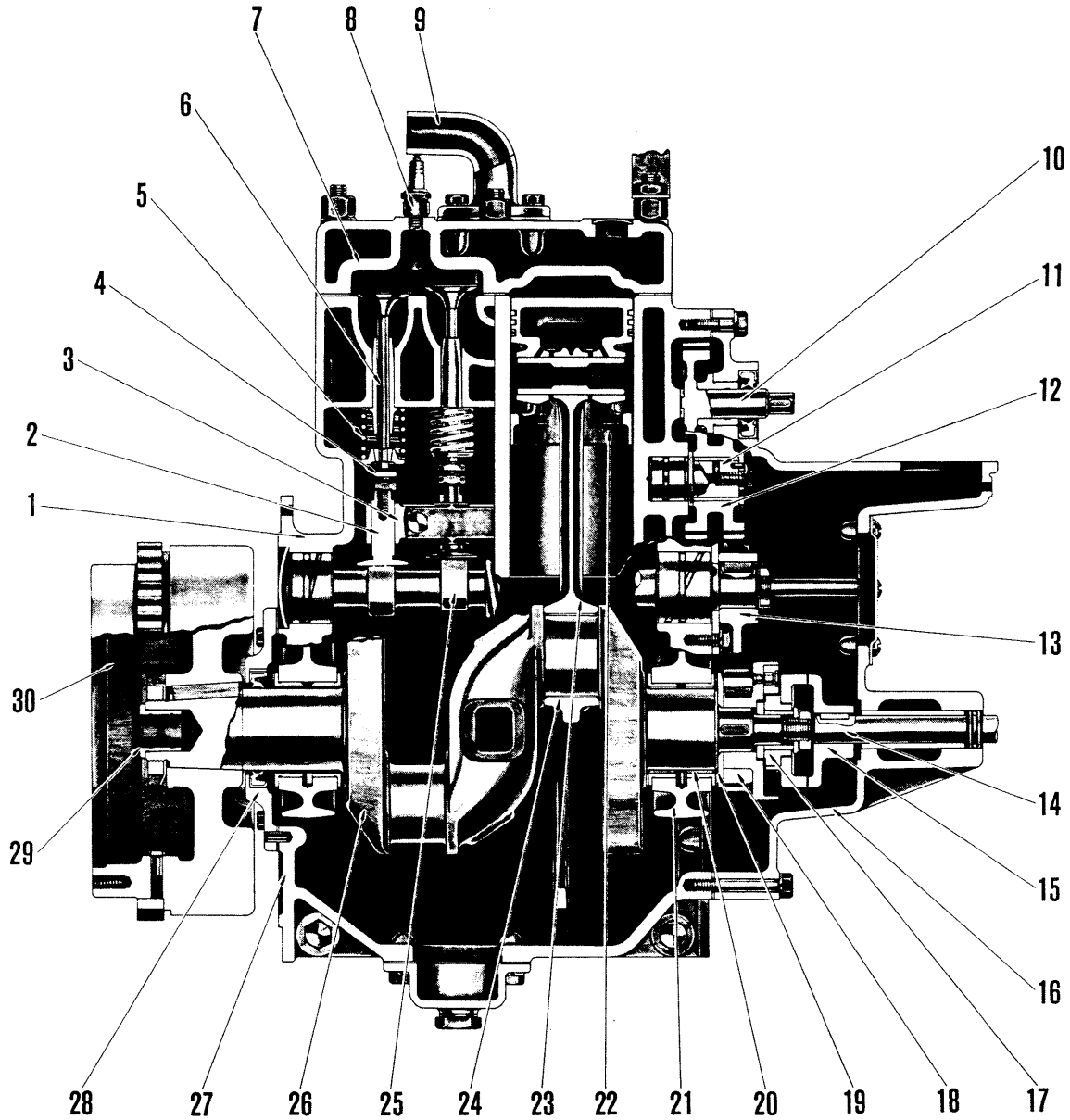
S6D155-4 (Engine Serial No. 15314 and up)
SA6D155-4 (Engine Serial No. 20338 and up)



6127F101A

STARTING ENGINE (2G84)

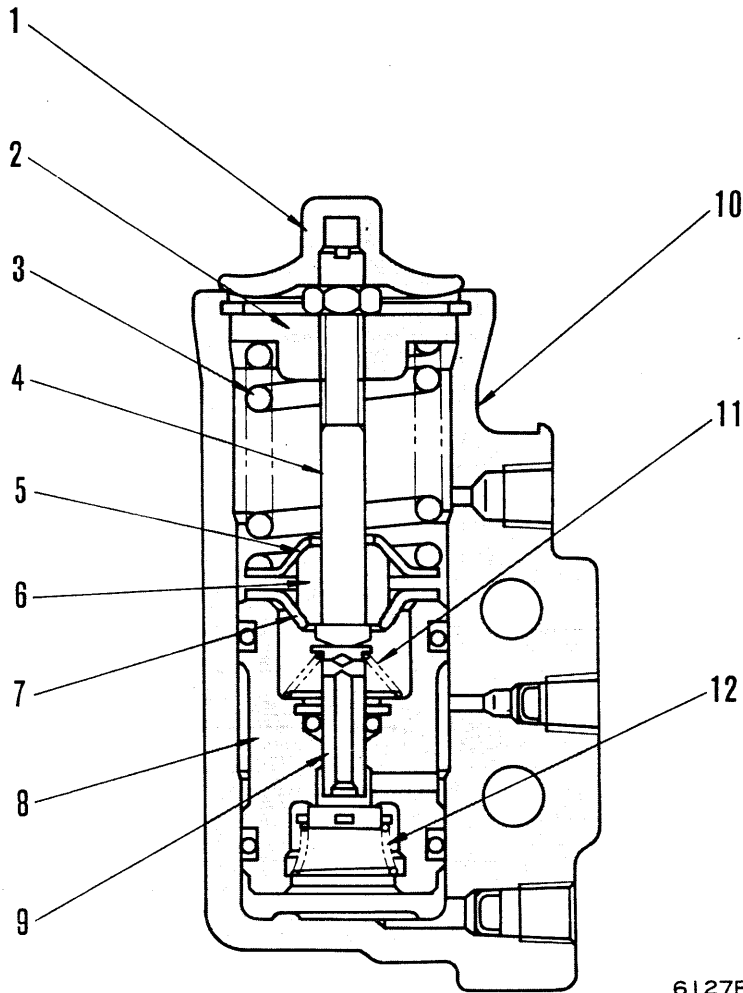
STRUCTURE



6127P009

- | | | |
|--------------------|-------------------------|------------------------|
| 1. Cylinder block | 9. Water pipe | 17. Crankshaft gear |
| 2. Tappet | 10. Magnet drive shaft | 18. Side race |
| 3. Tappet guide | 11. Idler shaft | 19. Thrust metal |
| 4. Adjusting screw | 12. Idler gear | 20. Main metal |
| 5. Valve spring | 13. Camshaft gear | 21. Main metal cap |
| 6. Valve | 14. Starting crankshaft | 22. Piston |
| 7. Cylinder head | 15. Coupling | 23. Connecting rod |
| 8. Spark plug | 16. Timing gear case | 24. Connecting rod cap |

AIR GOVERNOR (For air compressor)



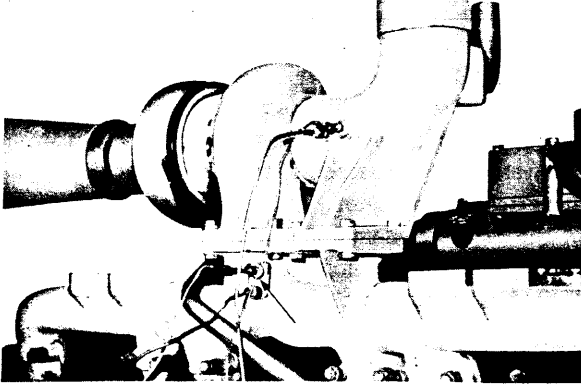
6127F111-3

1. Governor cover
2. Upper spring seat
3. Governor spring
4. Adjustment screw
5. Lower spring seat
6. Spring guide
7. Spring seat
8. Piston
9. Exhaust stem
10. Governor body
11. Exhaust stem spring
12. Valve spring

Air governor

- Operating pressure
 - Unloading pressure: 8.3 ~ 8.8 kg/cm²
 - Loading pressure: 6.9 ~ 7.3 kg/cm²

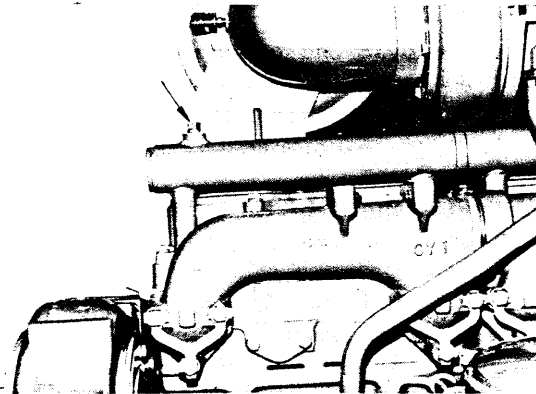
- Exhaust Thermometer



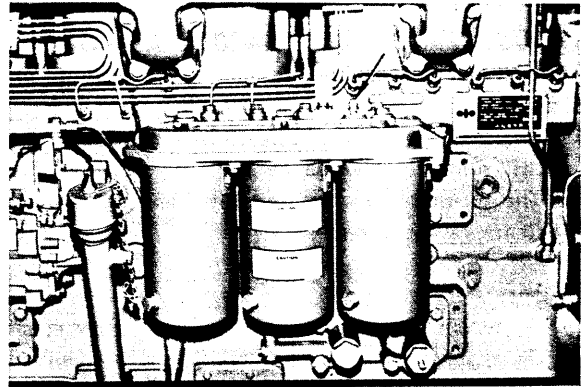
- Oil Pressure Gauge



- Cooling Water Thermometer



- Dangled type



- Oil Thermometer

2. PERFORMANCE TEST STANDARD

Engine	Applica- tion	Check point	Specified value (fully equipped)	Engine speed (rpm)	Dynamometer (kg)		
					Arm length 716 mm	Arm length 895 mm	Arm length 1,023 mm
S4D155-4	D80A-17 D85A-17	Flywheel horsepower	210 HP/1,850 rpm	1,850 ± 5	120.6 – 127.7	96.5 – 102.1	84.4 – 89.4
		Max. torque	98 kgm/1,200 rpm	1,200 ± 100	139.7 – 148.0	111.8 – 118.4	97.8 – 103.6
		High idling speed	2,100 rpm max.	2,050 ± 50	0	0	0
		Low idling speed	450 – 650 rpm	625 ± 25	0	0	0
	D95S-1	Flywheel horsepower	240 HP/1,850 rpm	1,850 ± 5	136.7 – 144.5	109.3 – 115.6	95.7 – 101.2
		Max. torque	112 kgm/1,200 rpm	1,200 ± 100	160.5 – 170.0	128.4 – 136.0	112.3 – 118.9
		High idling speed	2,100 rpm max.	2,050 ± 50	0	0	0
		Low idling speed	450 – 650 rpm	625 ± 25	0	0	0
S6D155-4 No. 10011 – 14280	D150A-1	Flywheel horsepower	300 HP/2,000 rpm	2,000 ± 5	158.5 – 168.0	126.8 – 134.4	111.0 – 117.6
		Max. torque	134 kgm/1,400 rpm	1,400 ± 100	190.8 – 202.2	152.6 – 161.8	133.5 – 141.5
		High idling speed	2,280 rpm max.	2,230 ± 50	0	0	0
		Low idling speed	450 – 650 rpm	625 ± 25	0	0	0
S6D155-4 No. 14281 and up	D150A-1	Flywheel horsepower	300 HP/2,000 rpm	2,000 ± 5	164.0 – 173.0	131.2 – 138.4	114.8 – 121.1
		Max. torque	134 kgm/1,400 rpm	1,400 ± 100	192.7 – 203.9	154.2 – 163.1	134.9 – 142.7
		High idling speed	2,280 rpm max.	2,230 ± 50	0	0	0
		Low idling speed	550 – 650 rpm	600 ± 50	0	0	0
S6D155-4 No. 10011 – 12297	D155A-1	Flywheel horsepower	300 HP/2,000 rpm	2,000 ± 5	158.5 – 168.0	126.8 – 134.4	111.0 – 117.6
		Max. torque	134 kgm/1,400 rpm	1,400 ± 100	190.8 – 202.2	152.6 – 161.8	133.5 – 141.5
		High idling speed	2,280 rpm max.	2,230 ± 50	0	0	0
		Low idling speed	450 – 650 rpm	600 ± 50	0	0	0
S6D155-4 No. 12298 – 14256	D155A-1	Flywheel horsepower	320 HP/2,000 rpm	2,000 ± 5	170.5 ± 180.3	136.3 – 144.1	119.4 – 126.1
		Max. torque	144 kgm/1,400 rpm	1,400 ± 100	205.2 – 217.3	164.1 – 173.9	143.6 – 152.1
		High idling speed	2,280 rpm max.	2,230 ± 50	0	0	0
		Low idling speed	450 – 650 rpm	600 ± 50	0	0	0
S6D155-4 No. 14257 and up	D155A-1	Flywheel horsepower	320 HP/2,000 rpm	2,000 ± 5	174.0 – 183.6	139.2 – 146.9	121.8 – 128.5
		Max. torque	144 kgm/1,400 rpm	1,400 ± 100	206.7 – 218.7	165.4 – 175.0	144.7 – 153.1
		High idling speed	2,280 rpm max.	2,230 ± 50	0	0	0
		Low idling speed	550 – 650 rpm	600 ± 50	0	0	0

★ Values in table are standard values corrected by jis.

★ The values given for the shaft horsepower and torque are with the fan removed, so that differ from those of the specification.

★ Values are standardized under the following conditions: Air cleaner installed; alternator idling; and air compressor (if installed) open.

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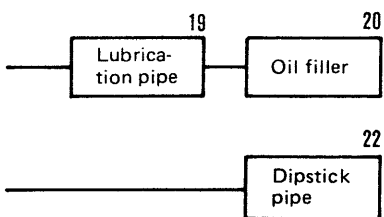
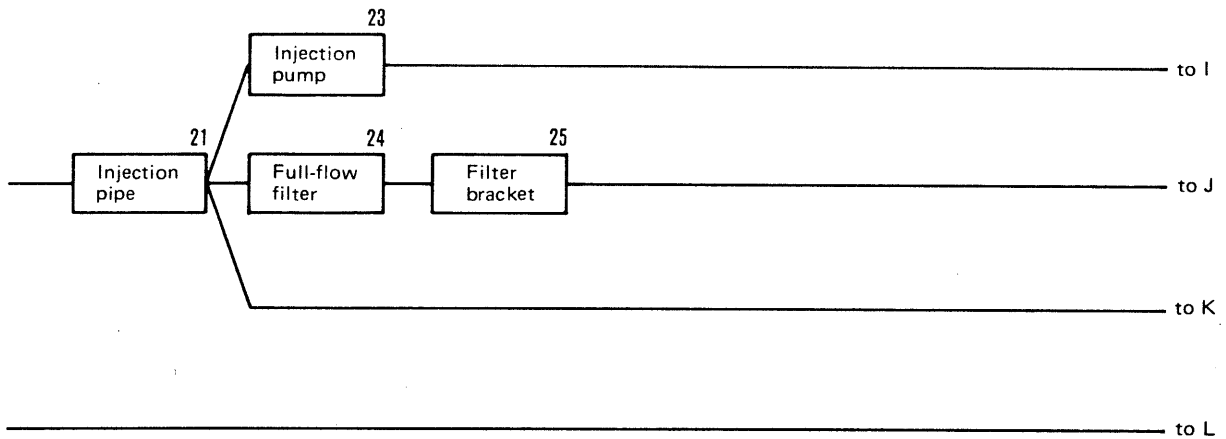
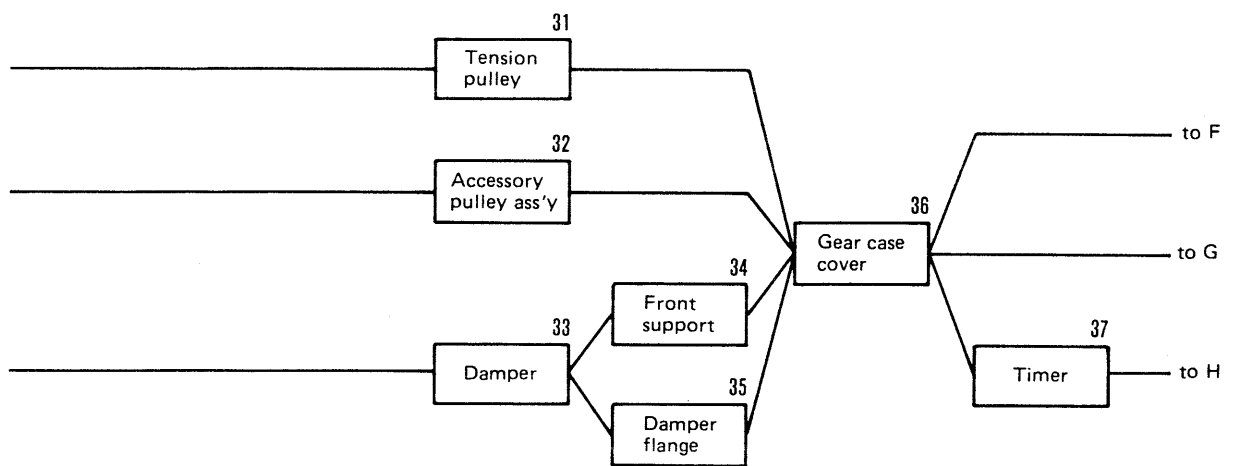
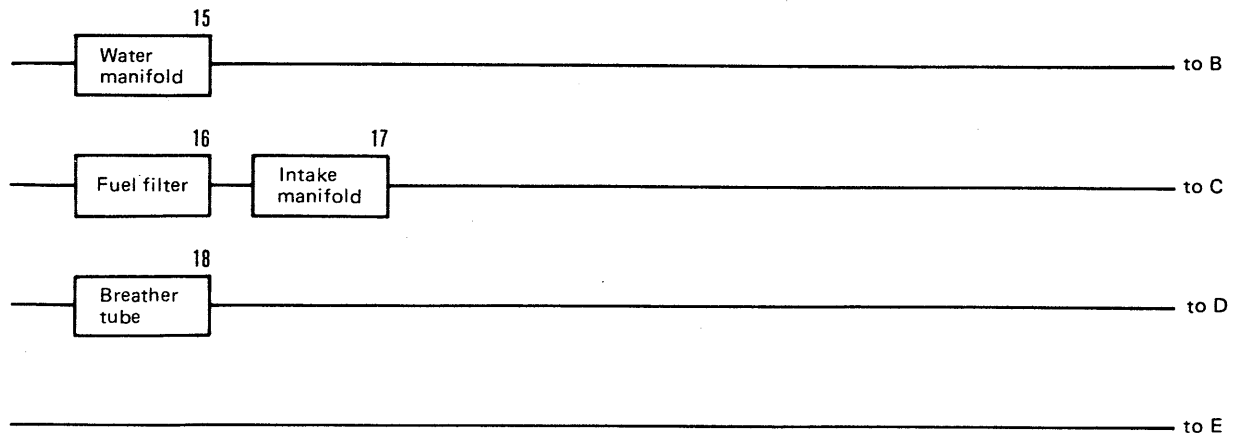
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S6D155-4

D155A-1 (Engine Serial No. 10011 – 14280)		D150A-1 (Engine Serial No. 14281 and up)		D155A-1 (Engine Serial No. 10011 – 12297)		D155A-1 (Engine Serial No. 12298 – 14256)	
Standard	Tolerance	Standard	Tolerance	Standard	Tolerance	Standard	Tolerance
2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000
2,230 ± 50	2,230 ± 50	2,230 ± 50	2,230 ± 50	2,230 ± 50	2,230 ± 50	2,230 ± 50	2,230 ± 50
600 ± 50	600 ± 50	600 ± 50	600 ± 50	600 ± 50	600 ± 50	600 ± 50	600 ± 50
150 min.	—	150 min.	—	150 min.	—	150 min.	—
100 min.	—	100 min.	—	100 min.	—	100 min.	—
380 max.	762	380 max.	762	380 max.	762	380 max.	762
550 – 700	—	550 – 700	—	550 – 700	—	650 – 800	—
500 – 600	700	500 – 600	—	500 – 600	—	500 – 600	—
650 max.	700	650 max.	700	650 max.	700	650 max.	700
7.0 max.	7.0 max.	7.0 max.	7.0 max.	7.0 max.	7.0 max.	7.0 max.	7.0 max.
3.5 max.	3.5 max.	3.5 max.	3.5 max.	3.5 max.	3.5 max.	3.5 max.	3.5 max.
0.3 (No. – 11745) 0.4 (No. 11746 –)	—	0.4	—	0.3 (No. – 11745) 0.4 (No. 11746 –)	—	0.4	—
0.3 (No. – 11745) 0.6 (No. 11746 –)	—	0.6	—	0.3 (No. – 11745) 0.6 (No. 11746 –)	—	0.6	—
27 min. (No. – 14256) 24 min. (No. 14257 –) (180 – 210)	27 min. (No. – 14256) 24 min. (No. 14257 –) (180 – 210)	24 min. (180 – 210)	24 min. (180 – 210)	27 min. (180 – 210)	27 min. (180 – 210)	27 min. (180 – 210)	27 min. (180 – 210)
200 max.	400	200 max.	400	200 max.	400	200 max.	400
3.5 – 4.5 (3.0 – 4.0) 1.5 min. (1.0 min.)	2.5 (2.1) 0.7 (0.7)	3.5 – 4.5 (3.0 – 4.0) 1.5 min. (1.0 min.)	2.5 (2.1) 0.7 (0.7)	3.5 – 4.5 (3.0 – 4.0) 1.5 min. (1.0 min.)	2.5 (2.1) 0.7 (0.7)	3.5 – 4.5 (3.0 – 4.0) 1.5 min. (1.0 min.)	2.5 (2.1) 0.7 (0.7)
80 – 100	120	80 – 100	120	80 – 100	120	80 – 100	120
0.5 max.	1.0 max.	0.5 max.	1.0 max.	0.5 max.	1.0 max.	0.5 max.	1.0 max.
175	—	200	175	175	—	175	—
37 (No. 10011 – 14256) 33 (No. 14257 – 19999)	—	33 (No. 14257 – 19999) 40 (No. 20001 – 20597) 38 (No. 20598 –)	—	37	—	33 (No. 12298 – 19999)	—
70 – 90	100	70 – 90	100	70 – 90	100	70 – 90	100
74.5 – 78.5	74.5 – 78.5	74.5 – 78.5	74.5 – 78.5	74.5 – 78.5	74.5 – 78.5	74.5 – 78.5	74.5 – 78.5
90	—	90	—	90	—	90	—
—	10 min.	—	10 min.	—	10 min.	—	10 min.
0.75	—	0.75	—	0.75	—	0.75	—
—	—	—	—	—	—	—	—

See attached sheet

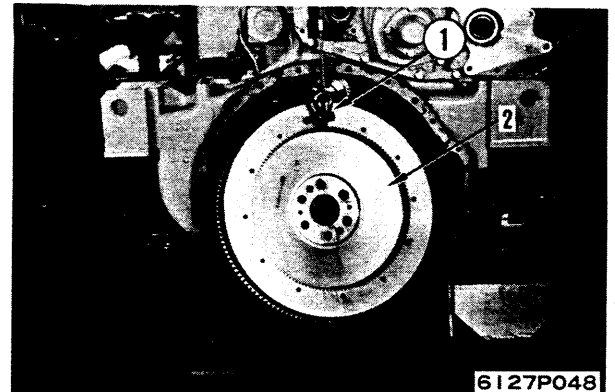


- 2) Fit sling bolts ① (12 mm, P = 1.75) to flywheel (2), then lift out the flywheel.

★ If the dowel pin part is stiff, extract it using extraction bolts (12 mm, P = 1.75).



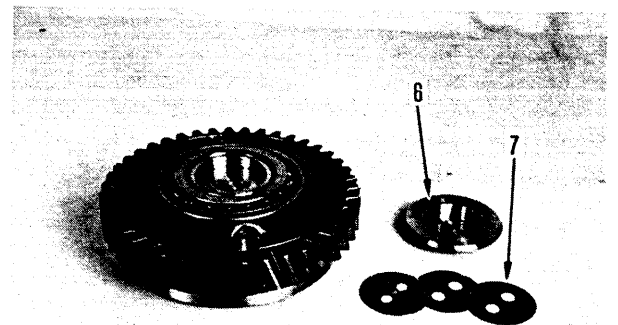
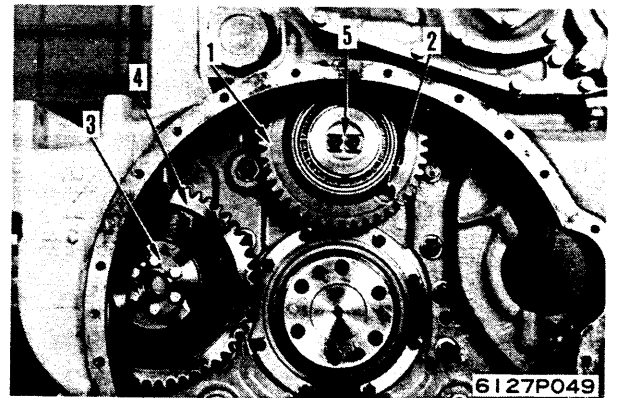
Flywheel: 86 kg



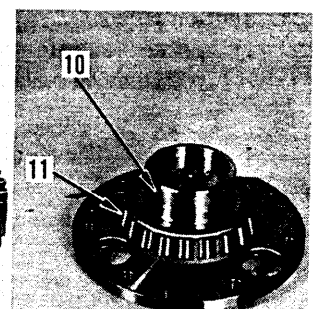
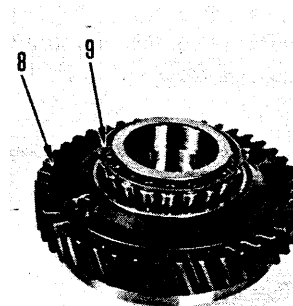
27. Idle gear

28. Steering pump gear

- 1) Remove bolt (2) from the hole in idle gear (1), then dismount the idle gear.
- 2) Push up lock plate (3) and remove the mounting bolt, then extract steering pump gear (4) using extraction bolts (10 mm, P = 1.5).
- 3) Extract the bearing cage from the rear.
- 4) Disassembling idle gear ass'y
 - i) Push up lock plate (5) and remove bearing retainer (6) and shim (7).




- ii) Lift up gear (8) and extract it together with bearing (9).
- iii) Dismount bearing (11) from shaft (10).

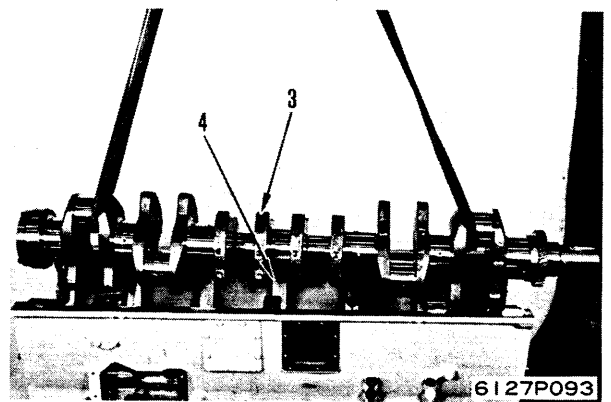
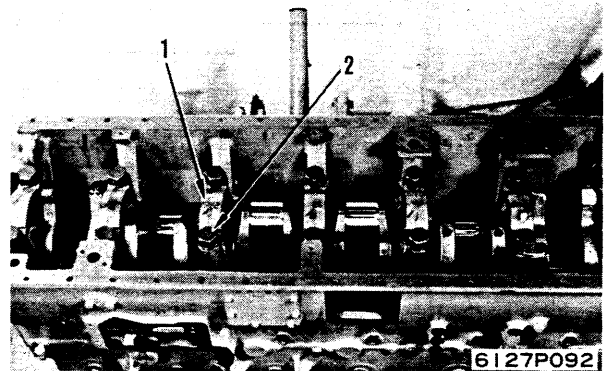


57. Crankshaft

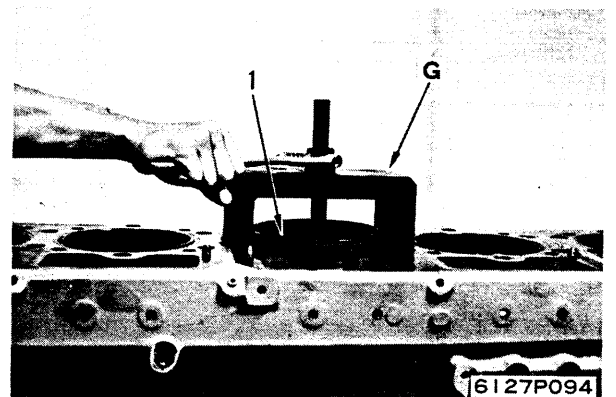
- ★ Before loosening the main cap, measure the end play of the crankshaft.
- 1) Remove mounting bolt (2) of main bearing cap (1).
- 2) Insert the bolt into the cap hole, then dismount main bearing cap (1) together with the lower bearing while rocking the cap.
 - ★ There are four bearings fitted to both ends of No. 5 cap. After removing them, mark the respective mounting positions.
- 3) Lift up crankshaft (3) using a nylon sling.

 Crankshaft: 242 kg

- 4) Dismount upper main bearing (4).
 - ★ Mark the mounting position of the upper main bearing and arrange it so that there is no risk of it being fitted incorrectly.

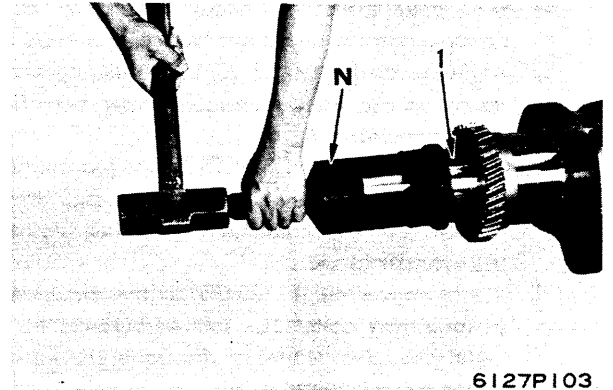
**59. Cylinder liner**

- ★ Before removing the cylinder liner, measure the liner protrusion. Set liner puller G, then remove cylinder liner (1).



- v) Shrink-fit front sleeve (1) and drive it on using tool N.

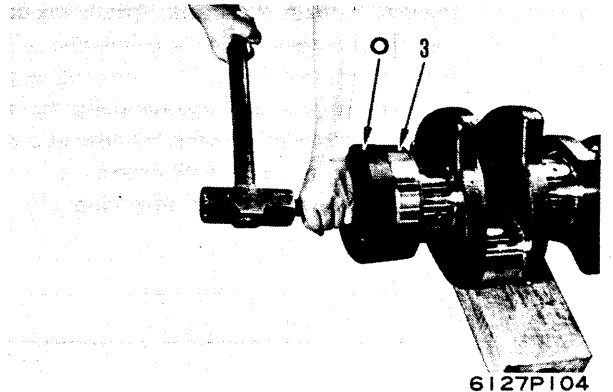
★ Shrink-fit temperature: 230 to 250°C for 15 minutes



6127P103

- vi) Shrink-fit rear sleeve (3) and drive it on using tool O.

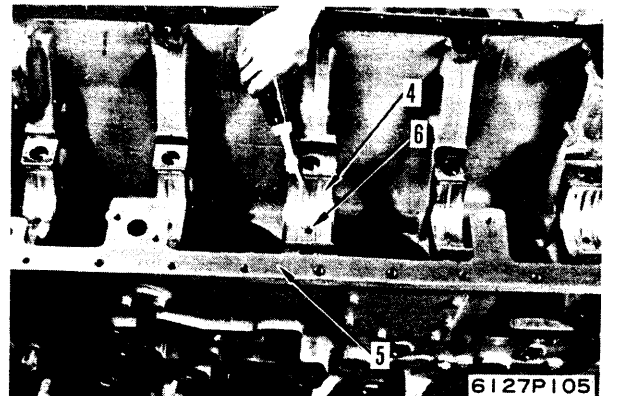
★ Shrink-fit temperature: 230 to 250°C for 15 minutes



6127P104

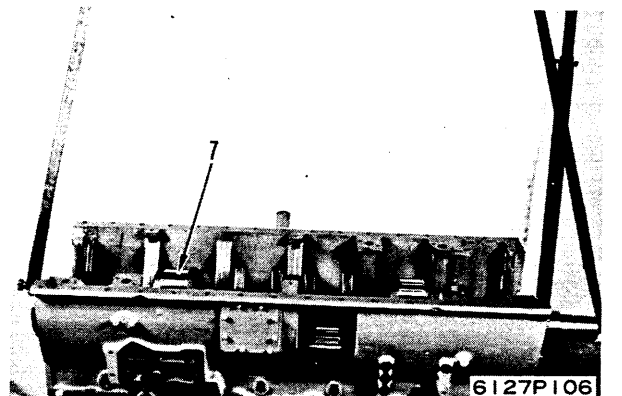
- 2) Align the projection of upper metal (4) with the notch in the cylinder block and install cylinder block (5), then apply engine oil (EO30-CD) to the inside surface of the metal.

★ After installing the upper metal, check that oil holes (6) of the cylinder block and metal are in line with each other.




6127P105

- 3) Raise crankshaft (7) using a nylon sling, then install it in such a way that it does not strike the cylinder block.



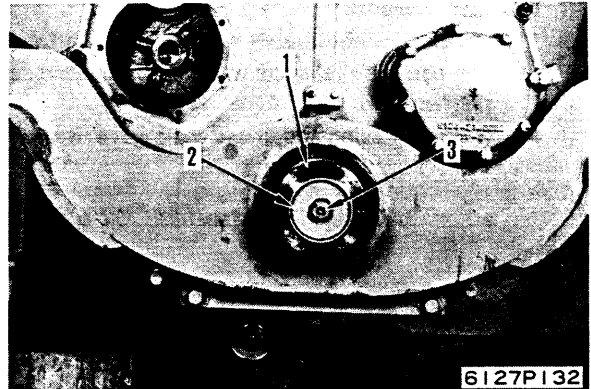
6127P106

17. Damper flange

- 1) Fit the key on the crankshaft, then mount damper flange (1) on the crankshaft after aligning the key groove of the flange with the key on the crankshaft.
 - 2) Mount holder (2) using mounting bolts (3).
-  Holder mounting bolts: 16 ± 1 kg.m

★ Indicator plate (S4D155-4)

Position the No.1 cylinder piston at TDC on the compression stroke and align the 1.4 TOP mark on the indicator plate with the pointer.



6127P132

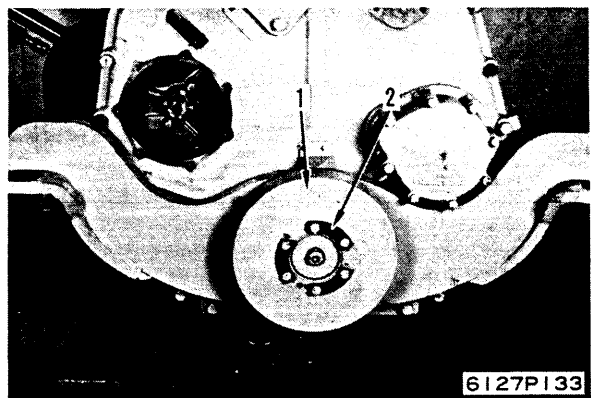
18. Damper

Mount damper (1) and lock the mounting bolts using lock plate (2).

- ★ Position the No.1 cylinder piston at TDC on the compression stroke and align the 1.6 TOP mark on the damper with the pointer.
- ★ After installation, check the damper for face runout and radial runout.

Damper face runout and radial runout:
Within 0.25 mm

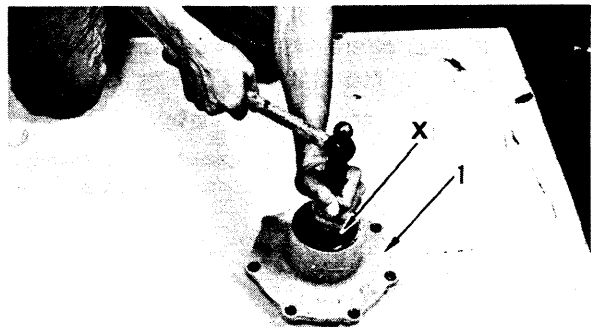
 Damper mounting bolts: 11 ± 1 kg.m



6127P133


19. Accessory pulley ass'y

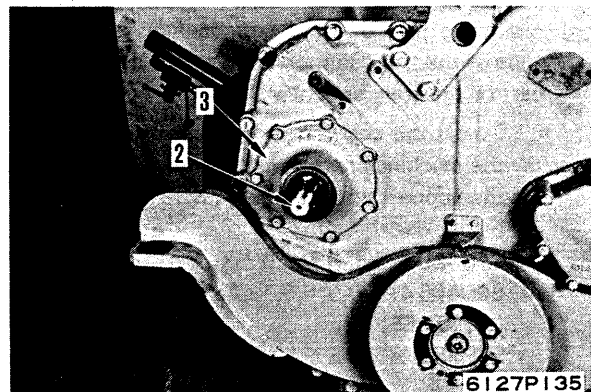
- 1) When replacing the bushing of cover (1), drive in the new bushing using tool X.



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- 2) Apply engine oil (EO10-CD) to the inside surface of the bushing, then fit the thrust washer to shaft (2) and install cover (1).
- 3) Fit an O-ring to drive shaft ass'y (3), then engage the gear with the gear case cover and install the gear.
- ★ Orient the thrust washer so that its oil groove is facing the gear side.

 Drive shaft ass'y mounting bolts:
 3.7 ± 0.6 kg.m




6127P135

38. Injection pipe


1) Wrap sealing tape around the nipple of cam lubricating pipe (1) and mount the pipe on the cylinder block.

★ Note that the nipples fitted with nozzles are cam lubricating (total of 12 nipples on lower side) nipples.

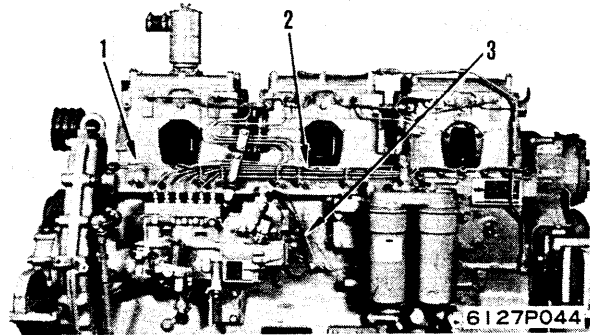
2) Install injection pipe (2) on the rocker housing and injection pump.

 Injection pipe sleeve nut: 2.4±0.1 kg.m

3) Install cam lubricating pipes (1) (six pipes) on the cylinder block.

 Cam lubricating pipe sleeve nut:
2.4 ± 0.1 kg.m

4) Install lubricating pipe (3) on the cylinder block and injection pump.

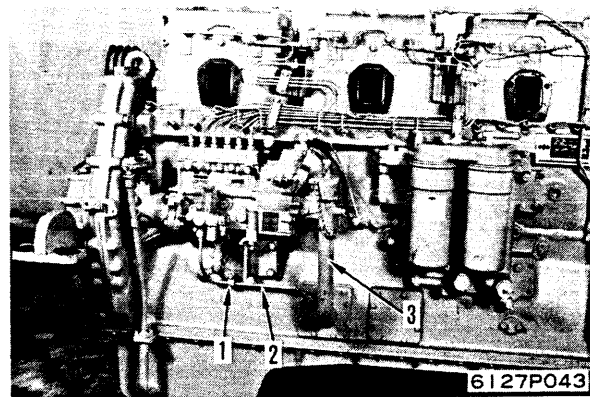


39. Oil filler

Fit a gasket to the flange end face of oil filler (3) and install the oil filler on the cylinder block.

40. Lubricating pipe

Install lubricating pipe (2) on the injection pump and the oil filler flange, and fix it in position using clamp (1).




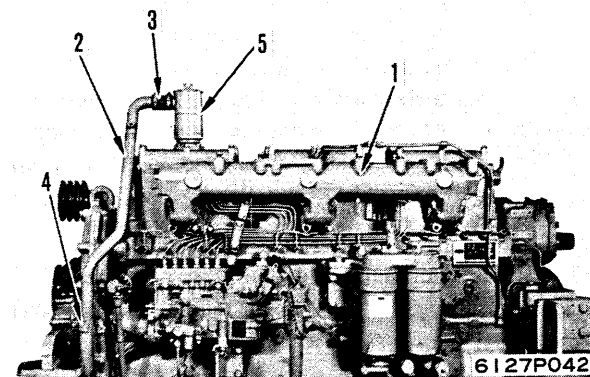
41. Breather tube

Connect breather tube (2) to breather (5), then tighten up hose clamp (3) and install tube clamp (4).

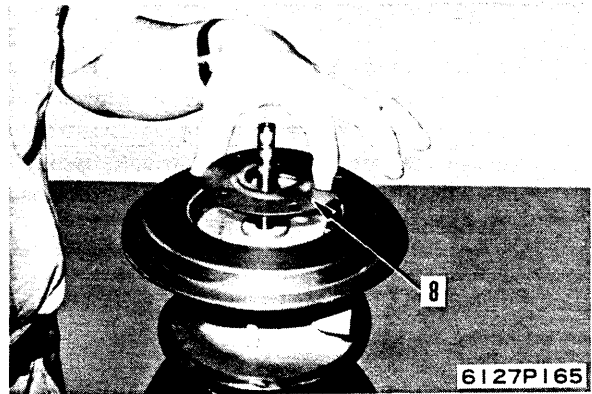
42. Intake manifold

Fit a gasket to intake manifold (1) and mount the intake manifold in the cylinder head.

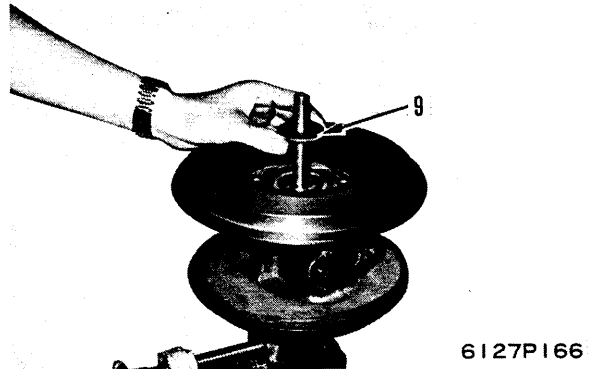
 Intake manifold mounting bolts:
6.5 ± 1 kg.m



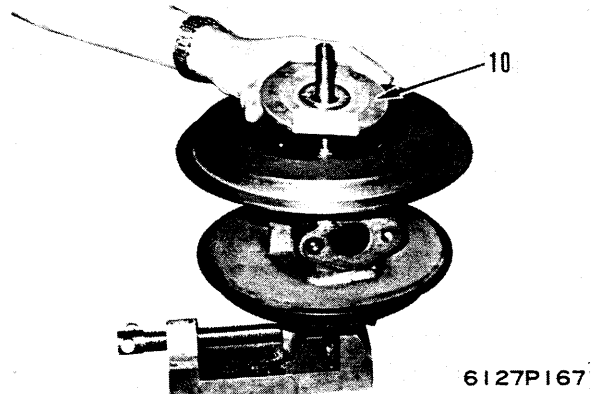
4. **Cover**
Extract cover (8).



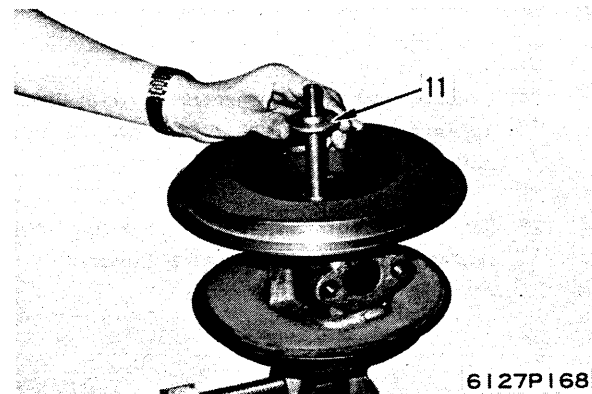
5. **Collar**
Extract collar (9).




6. **Thrust bearing**
Extract thrust bearing (10).



7. **Spacer and thrust collar**
Extract spacer and thrust collar (11).




8. Blower housing

 Mounting bolts: 1.3 kg.m

9. Turbine housing

Because the turbine housing operates at red heat, it employs stainless steel nuts and bolts. Be careful not to mix ordinary nuts and bolts with them.

Assemble the following components after applying thread seizure prevention paint to the threaded parts thereof.

 Painting point

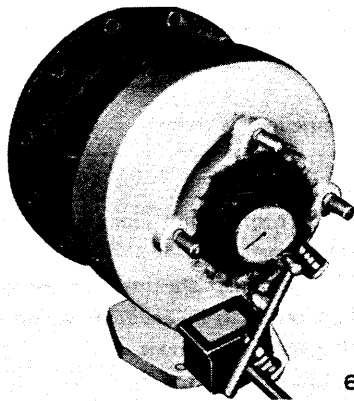
- Mounting nuts for connecting exhaust pipe and turbine housing
- Mounting nuts for connecting turbine housing and center housing

10. Inspection

After completely assembling the turbocharger, gently rotate the rotating part with the fingers and also push it backward and forward and left and right while rotating it in order to ensure that it does not strike any other parts. Subsequently measure the amount of play of the rotating part.

1) Total end play

Move the rotor in the axial direction and measure the clearance using a dial gauge. The clearance for a new assembly should be 0.05 to 0.09 mm. If the measured clearance becomes greater than 0.19 mm, check the dimensions of the components related to the thrust bearing and replace any worn parts.

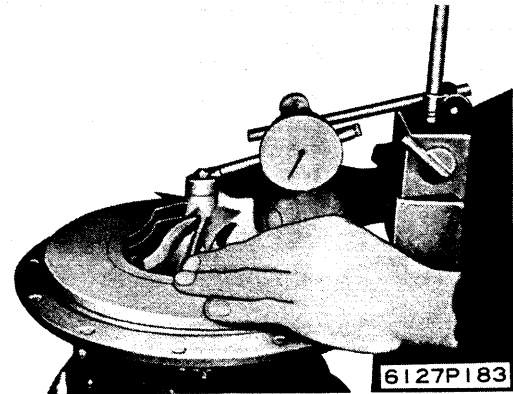


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2) Radial play

Before installing the blower housing, measure the radial clearance at the boss on the shaft end, at the blower side.

The clearance for the assembly should be 0.43 to 0.67 mm.

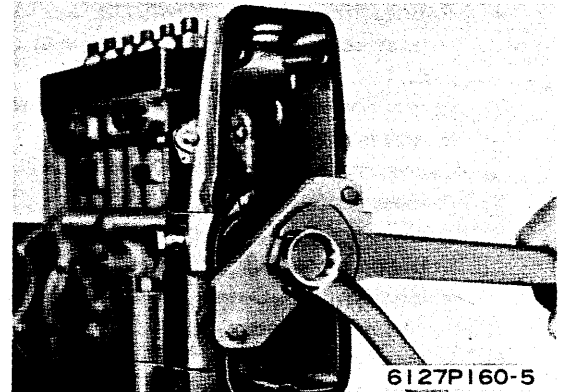


Next, install the blower housing, then push the rotor in the radial direction with the tip of the finger and measure the clearance between the blower impeller and the blower housing using a thickness gauge.

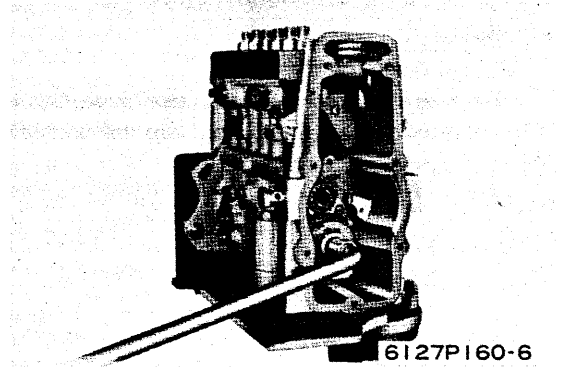
The clearance for the assembly should be 0.10 to 0.15 mm. If it is less than 0.05 mm, check the dimensions of the shaft bearing. As opposed to the case where an ordinary flat bearing is used, there are clearances between the rotor and the floating bearing and also between the rotor and sleeve. Consequently, the overall clearance appears larger than in the case where a conventional shaft bearing is employed. Be sure to measure the clearances and to indicate them as numerical values.

6. Driven gear

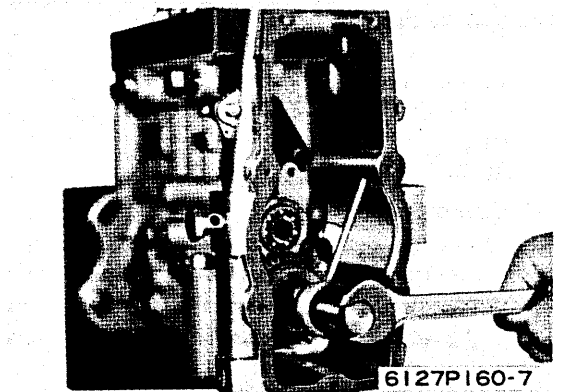
Remove three bolts holding bearing cover. Screw extractor F into driven gear, and remove driven gear and bearing cover.

**7. Drive gear**

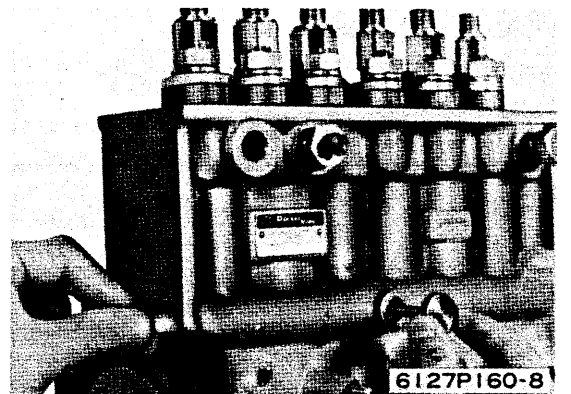
1) Using special wrench D, remove nut holding drive gear.



2) Screw extractor E into drive gear, and remove drive gear from camshaft.

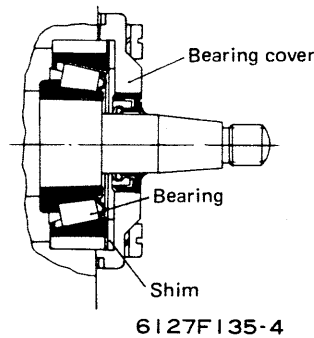
**8. Bearing****9. Upper cover****10. Control rack cap, rack guide screw****11. Plunger block assembly**

1) Using rack stopper, hold control rack 1 mm below end face of pump.



1. **Governor housing**
Using adhesive and craft paper M, stick governor housing to pump, then tighten seven set screws.
2. **Camshaft, center bearing**
 - 1) Fit center bearing in close contact with camshaft, then assemble in pump housing from drive side. Fix center bearing in position with two set screws.
 - 2) Install measuring plate N on tapered part on drive side of camshaft. Using shims, center cam by adjusting dimension "a" from end face of pump housing to end face of measuring plate.
 - ★ Dimension "a": 13.5 ± 0.5 mm
 - ★ Shims for centering cam

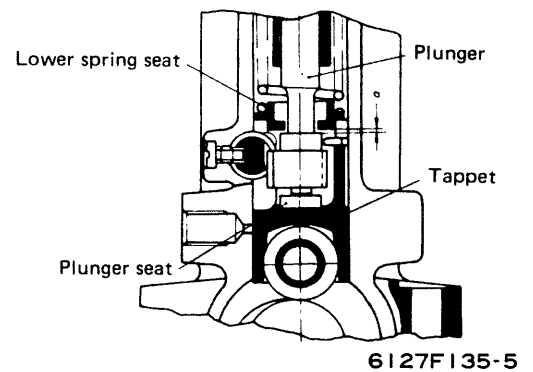
Part No.	Thickness (mm)
1343003-0000	1.2
1343003-0100	1.5
1343003-0200	1.8
1343003-0300	2.0

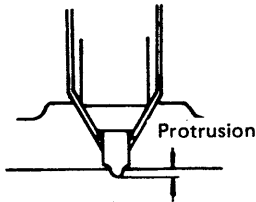


- 3) Tighten bearing cover.
- 4) Using adjusting shims, adjust axial play of camshaft.
 - ★ Axial play of camshaft: $0.02 - 0.06$ mm
 - ★ Adjusting shims

Part No.	Thickness (mm)
134314-0000	0.10
134314-0100	0.12
134314-0200	0.14
134314-0300	0.16
134314-0400	0.18
134314-0500	0.30
134314-0600	0.50

3. **Center bearing set screw**
4. **Bearing cover**
5. **Tappet**
Hold tappet vertically and install in pump housing.
 - ★ Make sure that the guide pin of the tappet is at the center of the back face of the pump (window side of tappet body on control rack side).
6. **Control rack**
Using nozzle and rack stopper, fix control rack at center of pump housing.
7. **Plunger block assembly**
 - 1) Hold plunger block assembly vertically and install in pump housing.
 - ★ Align the line on the flange of the flange sleeve with the line on the top face of the pump housing.
 - ★ To assemble the plunger correctly, hold the control rack in the center position and align the pinion guide groove of the plunger with the guide pin of the tappet. If they are not aligned and the plunger is forced in, the pin will be bent or broken.
 - 2) Before assembling, measure clearance "a" with a feeler gauge. Choose a plunger seat to adjust the clearance.
 - ★ Clearance "a": $0.1 - 0.16$ mm





Detail 2

Unit: mm

No.	Check item	Criteria			Remedy
		Tolerance	Repair limit		
1	Strain of cylinder head	0.06 max.	0.1		Replace
2	Protrusion of nozzle	Standard	Repair limit		
		2.9~3.6	3.8		
3	Nozzle injection pressure	Refer to the section TESTING AND ADJUSTING; TROUBLE SHOOTING CRITERIA			Adjust
4	Nozzle holder mounting bolt tightening torque	3.25±0.25kg/cm ²			Retighten
5	Injection nozzle inlet tightening torque	4.25±0.25kg.m			
6	Injection nozzle outlet tightening torque	1.75±0.25kg.m			
7	Outlet pipe tightening torque	1.75±0.25kg.m			
8	Inlet pipe tightening torque	4.25±0.25kg.m			
9	Cylinder head bolt tightening torque	Sequence	Target value (kg.m)	Range (kg.m)	Retighten
		1st	29	25.5~32.5	
		2nd	44	40.5~47.5	
		3rd	55	53.5~56.5	

Unit: mm

No.	Check item	Criteria			Remedy
		Serial No.	Standard	Tolerance	
5	Cylinder liner O.D (O-ring part)	S4D155-4 No. ~ 50000 S6D155-4 No. ~ 11703	176	-0.03 -0.08	Replace
		S4D155-4 No. 50001 ~ 50472 S6D155-4 No. 11704 ~ 27128 SA6D155-4 No. ~ 26690	176	-0.03 -0.13	
		S4D155-4 No. 50473 ~ S6D155-4 No. 27129 ~ SA6D155-4 No. 26691 ~	176	-0.03 -0.10	

Unit: mm

No.	Check item	Criteria				Remedy	
1	Clearance between connecting rod bushing and piston pin	Standard	Tolerance		Standard clearance	Repair limit	
			Shaft	Hole			
		60	-0.010 -0.015	+0.050 +0.030	0.040~0.065	0.095	
2	Connecting rod big end I.D	Standard		Tolerance			
		109		+0.020 0			
3	Clearance between connecting rod big end I.D and crankshaft journal	Standard		Repair limit			
		0.050~0.130		0.35			
4	Metal thickness	Size	Standard	Tolerance	Repair limit	Replace	
		S.T.D	3.500	0 -0.015	3.45		
		0.125US	3.625	0 -0.015	3.55		
		0.250US	3.750	0 -0.015	3.70		
		0.375US	3.875	0 -0.015	3.80		
		0.500US	4.000	0 -0.015	3.95		
5	Bend or twist	Repair limit of bend : 0.10 Repair limit of twist : 0.25					
6	Connecting rod weight	9.174±25g					
7	Connecting rod cap tightening torque	Order	Target (kg.m)		Range (kg.m)		Retighten
		1st	21		20~22		
		2nd	41.5		40~43		
		3rd	0		Loosen		
		4th	8		7~9		
		5th	21		20~22		
		6th	28.5		27~30		
		7th	41.5		40~43		

(6) Piston, piston rings and piston pin

Unit: mm

No.	Check item	Criteria			Remedy
1	Clearance between piston and cylinder	Standard size	Standard clearance	Clearance limit	Replace piston
		83.9	0.025~0.275	—	
2	Weight of piston	Standard weight		Tolerance	Replace
		410 g		±10 g	
3	Clearance between piston ring groove and new piston ring		Standard clearance	Clearance limit	Replace piston
		Compression ring	0.04~0.08	0.2	
		Oil control ring	0.02~0.06		
4	Piston ring gap (inside cylinder)	Standard gap		Clearance limit	Replace
		0.1~0.3		1.2	
5	Piston to piston pin clearance	Standard size	Standard clearance	Clearance limit	Replace piston or piston pin
		25.15	0.010~0.045	0.05	

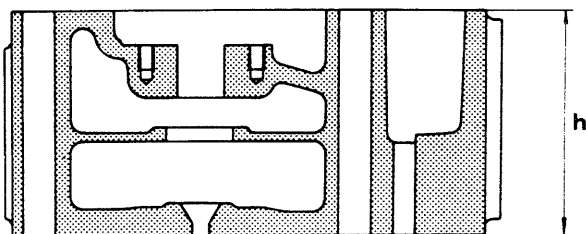
(7) Clutch

Unit: mm

No.	Check item	Criteria			Remedy
1	Thickness of drive plate lining	Standard size		Repair limit	Replace lining
		4.0		3.2	
2	Clearance between cam link and pin	Standard size	Standard clearance	Clearance limit	Replace pin
		8.0	0.11~0.20	0.40	
3	Clearance between clutch shaft and sleeve	38.0	0.28~0.50	0.80	Replace sleeve
4	Clearance between sleeve and shifter groove	8.0	0.07~0.15	0.30	Replace sleeve or shifter
5	Clearance between clutch shaft and flywheel bushing	22.0	0.020~0.070	0.20	Replace bushing

3. GRINDING CYLINDER HEAD MOUNTING FACE

- ★ Grind cylinder head to remove deformation or rust. Do not exceed repair limit of cylinder head height (h).
- ★ Repair limit of cylinder head height: **154.0 mm**
- ★ Amount to remove per grinding: **0.10 – 0.15 mm**
- ★ Surface roughness of grinding surface: **Within 6S**
- ★ Flatness (deformation): **Within 0.06 mm**
- ★ Grinding limit: **0.3 mm**
- ★ Difference in head height per unit: **Within 0.15**



6127F201

1. Machining

There are two types of cylinder head: one type has a press-fitted valve seat; the other has no valve seat.

- 1) Remove valve seat.
For details, see REPLACING OR GRINDING VALVE SEAT.
- 2) Machine with a milling machine or surface grinder.
 - ★ Amount to remove per grinding: **0.10 – 0.15 mm**
 - ★ Finish so that surface roughness and flatness (deformation) are within the standard value.
- 3) Press fit next oversize valve seat.
For details, see REPLACING VALVE SEAT.

2. Checking after grinding

- 1) Check that protrusion depth of valve and protrusion of nozzle are within standard value.
 - ★ Protrusion of valve
Standard: 3.15 – 3.41 mm
 - ★ Protrusion of nozzle
Allowed range: 2.9 – 3.6 mm
- 2) If protrusion of nozzle is not within standard value, replace nozzle holder sleeve.

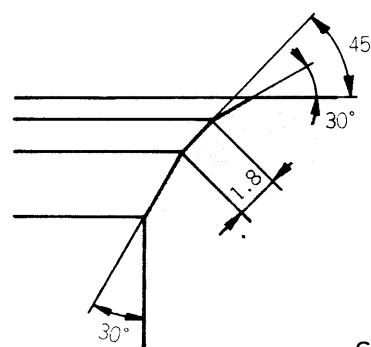
4. REPAIRING OR REPLACING VALVE SEAT

Special tools

	Part number	Part name	Q'ty
A	795-100-3002	Valve seat cutter	1
B	795-600-1310	Seat push tool (intake)	1
B	795-600-1320	Seat push tool (exhaust)	1
C	795-125-1400	Caulking tool	1

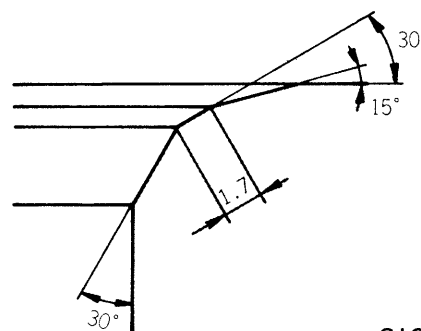
- ★ If the damage or wear is small, do not replace the valve seat but repair the seat surface.
When repairing the valve seat, see the diagram below.

- Intake valve



6127F202

- Exhaust valve



6127F203

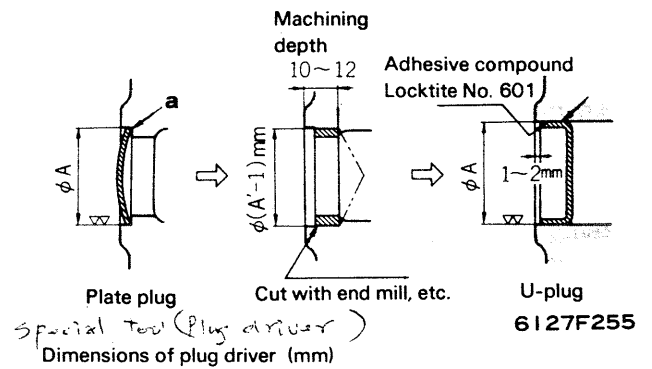
Replacing plug in cylinder head

Method for replacing plate plug with U-plug.

- ★ The cylinder head plug has been changed from a plate plug to an U-shaped plug for the following serial numbers.
 - S6D155-4: Engine No. 32236 and up
 - SA6D155-4: Engine No. 32694 and up
- If the plate plug leaks water and is replaced with an U-plug, use the following method.
 - 1) Remove plate plug.
 - 2) Machine plug hole with reamer as shown in diagram.
 - ★ Remove burrs from plug hole.
 - ★ Clean inside of cylinder head thoroughly to remove all metal chips.
 - 3) Coat mounting hole of U-plug with adhesive compound (Loctite No. 601).
 - 4) Using a plug driver (see figure on right), knock in U-plug.
 - ★ Be careful not to bend the plug.
 - 5) Using water pressure test (4 kg/cm²), check that there is no leakage.

★ Replace plugs as follows.

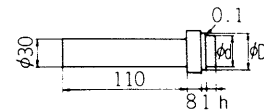
Plate plug	→	U-plug
07046-13020 (φA = 30.000 – 30.085)	→	6710-11-1431 (φA = 31.800 – 31.875)
07046-12520 (φA = 25.000 – 25.085)	→	6710-11-1421 (φA = 25.450 – 25.525)



Replacing rocker arm housing plug

Special tool

	Part number	Part name	Q'ty
A	795-100-1320	Plug driver	1
A	795-100-1321	Plug driver	1



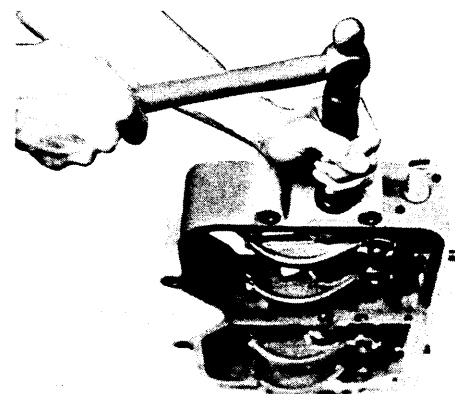
6127F256

Part No.	φD	φd	h
6710-11-1431 795-100-1320	31.6	28.8	6
6710-11-1421 795-100-1320	25.2	22.4	5

Applicable engines (Serial No.)

Engine	795-100-1320	795-100-1321
S4D155-4	10287 – 50198	50199 and up
S6D155-4 (D150A)	10011 – 20598	20599 and up
SA6D155-4	–	20338 and up

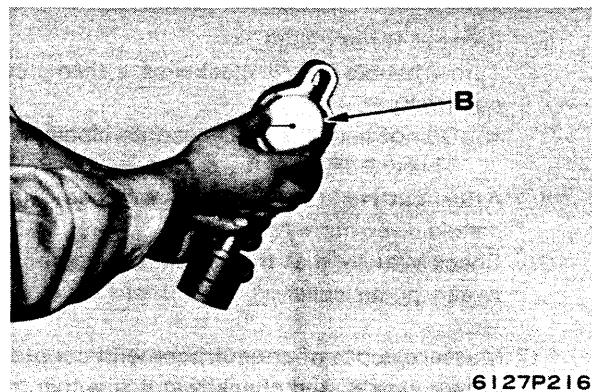
- Put the plug driver in contact with the plug and tap with a hammer.



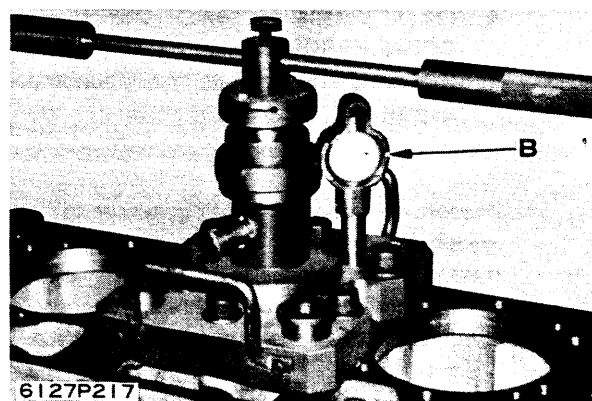
6127P202

5. Measuring depth of counterbore

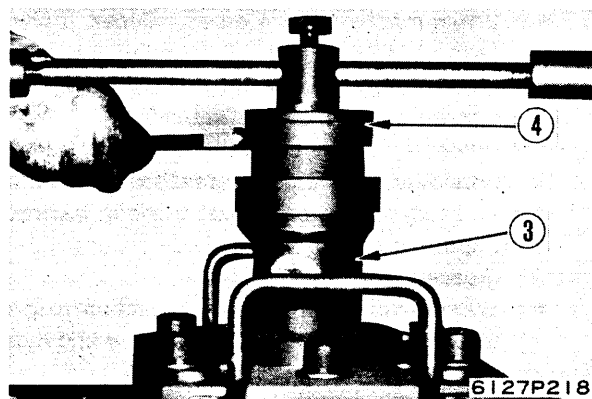
- 1) Set counterbore gauge B on master gauge, and set dial gauge scale to "0".



- 2) Check that there is no dirt or damage in the counterbore gauge mounting holes.
- 3) Insert counterbore gauge B in holes (4 places) for measuring depth of counterbore tool, and read measurement.
- 4) Measure depth at four places, and take average value.
 - ★ Machine the difference between the measured dimension (average value) and the finished dimension (14.5mm).

**6. Cutting**

- 1) Prepare feeler gauge of same thickness as amount to cut from counterbore.
- 2) Insert the feeler gauge between depth set collar ④ and guide collar ③ of counterbore tool.
 - ★ Check that there is no dirt between the guide collar and the set screw ④.
- 3) Tighten depth set screw until feeler gauge is a sliding fit.
- 4) Insert feeler gauge at several places around circumference of guide collar to check that clearance is the same.
 - ★ If the clearance is not the same, repeat from step 3).
 - ★ Step 4) sets the amount of cutting of the counterbore depth.
- 5) Tighten depth set screw ⑥ to fix depth set collar ④ securely in position.
 - ★ Tighten with the feeler gauge still installed.

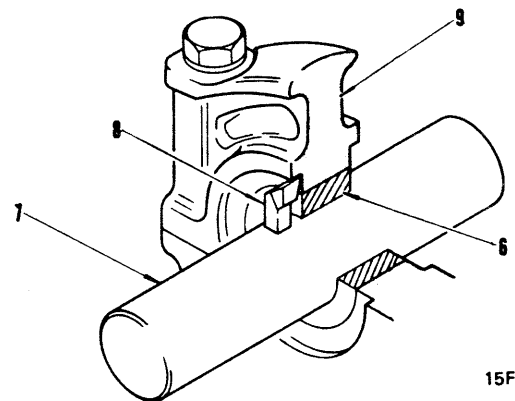


- C. Machining with boring tool
- ★ The reaming bar is a special tool and is not available for all engines.
- 5) Check that radial runout (main bore misalignment) of main bearing mounting hole is within repair limit.
 - 6) Measure inside diameter of main bearing mounting hole and check that it is within the repair limit.

2. Machining width of main bearing cap

- 1) Insert cast iron bushing (6) supporting arbor (7) through it.
- 2) Install facing tool (8) on arbor (7)
Cut main bearing cap (9) until arbor facing bit reaches bearing contact face of cylinder block side.
- 3) Cut the other side of the cap in the same way.
 - ★ Width of main cap Tolerance:

$$81 \begin{matrix} 0 \\ +0.035 \end{matrix} \text{ mm}$$
 - ★ Roughness of thrust bearing mounting surface: Within 12.5S
 - ★ Never cut cylinder block side.



15F020

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