

SHOP MANUAL

KOMATSU **6D125 SERIES** **DIESEL ENGINE**

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SAFETY

SAFETY NOTICE

IMPORTANT SAFETY NOTICE

Proper service and repair is extremely important for safe machine operation. The service and repair techniques recommended by Komatsu and described in this manual are both effective and safe. Some of these techniques require the use of tools specially designed by Komatsu for the specific purpose.

To prevent injury to workers, the symbol  is used to mark safety precautions in this manual. The cautions accompanying these symbols should always be followed carefully. If any dangerous situation arises or may possibly arise, first consider safety, and take the necessary actions to deal with the situation.

GENERAL PRECAUTIONS

Mistakes in operation are extremely dangerous. Read the Operation and Maintenance Manual carefully BEFORE operating the machine.

1. Before carrying out any greasing or repairs, read all the precautions given on the decals which are fixed to the machine.
2. When carrying out any operation, always wear safety shoes and helmet. Do not wear loose work clothes, or clothes with buttons missing.
 - Always wear safety glasses when hitting parts with a hammer.
 - Always wear safety glasses when grinding parts with a grinder, etc.
3. If welding repairs are needed, always have a trained, experienced welder carry out the work. When carrying out welding work, always wear welding gloves, apron, hand shield, cap and other clothes suited for welding work.
4. When carrying out any operation with two or more workers, always agree on the operating procedure before starting. Always inform your fellow workers before starting any step of the operation. Before starting work, hang UNDER REPAIR signs on the controls in the operator's compartment.
5. Keep all tools in good condition and learn the correct way to use them.

6. Decide a place in the repair workshop to keep tools and removed parts. Always keep the tools and parts in their correct places. Always keep the work area clean and make sure that there is no dirt or oil on the floor. Smoke only in the areas provided for smoking. Never smoke while working.

PREPARATIONS FOR WORK

7. Before adding oil or making any repairs, park the machine on hard, level ground, and block the wheels or tracks to prevent the machine from moving.
8. Before starting work, lower blade, ripper, bucket or any other work equipment to the ground. If this is not possible, insert the safety pin or use blocks to prevent the work equipment from falling. In addition, be sure to lock all the control levers and hang warning signs on them.
9. When disassembling or assembling, support the machine with blocks, jacks or stands before starting work.
10. Remove all mud and oil from the steps or other places used to get on and off the machine. Always use the handrails, ladders or steps when getting on or off the machine. Never jump on or off the machine. If it is impossible to use the handrails, ladders or steps, use a stand to provide safe footing.

PRECAUTIONS DURING WORK

11. When removing the oil filler cap, drain plug or hydraulic pressure measuring plugs, loosen them slowly to prevent the oil from spurting out.
Before disconnecting or removing components of the oil, water or air circuits, first remove the pressure completely from the circuit.
12. The water and oil in the circuits are hot when the engine is stopped, so be careful not to get burned.
Wait for the oil and water to cool before carrying out any work on the oil or water circuits.
13. Before starting work, remove the leads from the battery. Always remove the lead from the negative (-) terminal first.
14. When raising heavy components, use a hoist or crane.
Check that the wire rope, chains and hooks are free from damage.
Always use lifting equipment which has ample capacity.
Install the lifting equipment at the correct places. Use a hoist or crane and operate slowly to prevent the component from hitting any other part. Do not work with any part still raised by the hoist or crane.
15. When removing covers which are under internal pressure or under pressure from a spring, always leave two bolts in position on opposite sides. Slowly release the pressure, then slowly loosen the bolts to remove.
16. When removing components, be careful not to break or damage the wiring. Damaged wiring may cause electrical fires.
17. When removing piping, stop the fuel or oil from spilling out. If any fuel or oil drips onto the floor, wipe it up immediately. Fuel or oil on the floor can cause you to slip, or can even start fires.
18. As a general rule, do not use gasoline to wash parts. In particular, use only the minimum of gasoline when washing electrical parts.
19. Be sure to assemble all parts again in their original places.
Replace any damaged parts with new parts.
 - When installing hoses and wires, be sure that they will not be damaged by contact with other parts when the machine is being operated.
20. When installing high pressure hoses, make sure that they are not twisted. Damaged tubes are dangerous, so be extremely careful when installing tubes for high pressure circuits. Also, check that connecting parts are correctly installed.
21. When assembling or installing parts, always use the specified tightening torques. When installing protective parts such as guards, or parts which vibrate violently or rotate at high speed, be particularly careful to check that they are installed correctly.
22. When aligning two holes, never insert your fingers or hand. Be careful not to get your fingers caught in a hole.
23. When measuring hydraulic pressure, check that the measuring tool is correctly assembled before taking any measurements.
24. Take care when removing or installing the tracks of track-type machines.
When removing the track, the track separates suddenly, so never let anyone stand at either end of the track.

FOREWORD

GENERAL

This shop manual has been prepared as an aid to improve the quality of repairs by giving the serviceman an accurate understanding of the product and by showing him the correct way to perform repairs and make judgements. Make sure you understand the contents of this manual and use it to full effect at every opportunity.

This shop manual mainly contains the necessary technical information for operations performed in a service workshop. For ease of understanding, the manual is divided into the following chapters; these chapters are further divided into the each main group of components.

STRUCTURE AND FUNCTION

This section explains the structure and function of each component. It serves not only to give an understanding of the structure, but also serves as reference material for troubleshooting.

TESTING AND ADJUSTING

This section explains checks to be made before and after performing repairs, as well as adjustments to be made at completion of the checks and repairs.

Troubleshooting charts correlating "Problems" to "Causes" are also included in this section.

DISASSEMBLY AND ASSEMBLY

This section explains the order to be followed when removing, installing, disassembling or assembling each component, as well as precautions to be taken for these operations.

MAINTENANCE STANDARD

This section gives the judgement standards when inspecting disassembled parts.

NOTICE

The specifications contained in this shop manual are subject to change at any time and without any advance notice. Use the specifications given in the book with the latest date.

VOLUMES

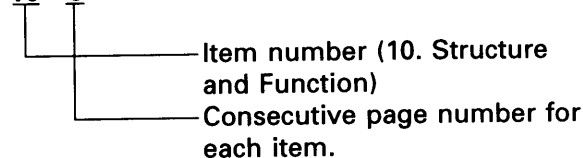
Electrical volume:
Attachments volume: } Each issued as one volume to cover all models

DISTRIBUTION AND UPDATING

FILING METHOD

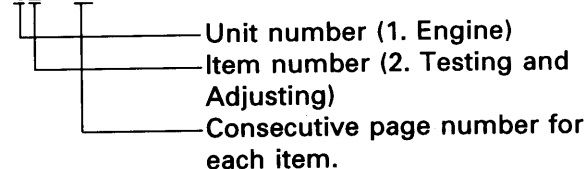
- Example 1 (Chassis volume):**

10 - 3



Example 2 (Engine volume):

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- Example:**

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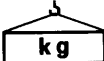
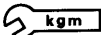
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REVISIONS

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SYMBOLS

So that the shop manual can be of ample practical use, important safety and quality portions are marked with the following symbols.

Symbol	Item	Remarks
	Safety	Special safety precautions are necessary when performing the work.
	Caution	Special technical precautions or other precautions for preserving standards are necessary when performing the work.
	Weight	Weight of parts of systems. Caution necessary when selecting hoisting wire, or when working posture is important, etc.
	Tightening torque	Places that require special attention for the tightening torque during assembly.
	Coat	Places to be coated with adhesives and lubricants, etc.
	Oil, water	Places where oil, water or fuel must be added, and the capacity.
	Drain	Places where oil or water must be drained, and quantity to be drained.

HOISTING INSTRUCTIONS

HOISTING

Heavy parts (25 kg or more) must be lifted with a hoist, etc. In the **DISASSEMBLY AND ASSEMBLY** section, every part weighing 25 kg or more is indicated clearly with the symbol .

- If a part cannot be smoothly removed from the machine by hoisting, the following checks should be made:
 - 1) Check for removal of all bolts fastening the part to the relative parts.
 - 2) Check for existence of another part causing interference with the part to be removed.

WIRE ROPES

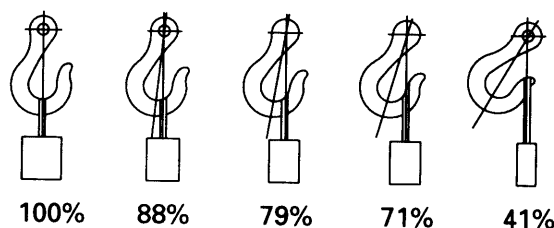
- 1) Use adequate ropes depending on the weight of parts to be hoisted, referring to the table below:

Wire ropes (Standard "Z" or "S" twist ropes without galvanizing)		
Rope diameter	Allowable load	
mm	kN	tons
10	9.8	1.0
11.2	13.7	1.4
12.5	15.7	1.6
14	21.6	2.2
16	27.5	2.8
18	35.3	3.6
20	43.1	4.4
22.4	54.9	5.6
30	98.1	10.0
40	176.5	18.0
50	274.6	28.0
60	392.2	40.0

★ The allowable load value is estimated to be one-sixth or one-seventh of the breaking strength of the rope used.

- 2) Sling wire ropes from the middle portion of the hook.

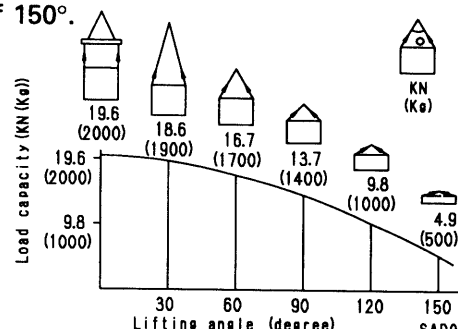
Slinging near the edge of the hook may cause the rope to slip off the hook during hoisting, and a serious accident can result. Hooks have maximum strength at the middle portion.



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- 3) Do not sling a heavy load with one rope alone, but sling with two or more ropes symmetrically wound onto the load.
 - ⚠ Slinging with one rope may cause turning of the load during hoisting, untwisting of the rope, or slipping of the rope from its original winding position on the load, which can result in a dangerous accident.

- 4) Do not sling a heavy load with ropes forming a wide hanging angle from the hook. When hoisting a load with two or more ropes, the force subjected to each rope will increase with the hanging angles. The table below shows the variation of allowable load kN {kg} when hoisting is made with two ropes, each of which is allowed to sling up to 9.8 kN {1000 kg} vertically, at various hanging angles. When two ropes sling a load vertically, up to 19.6 kN {2000 kg} of total weight can be suspended. This weight becomes 9.8 kN {1000 kg} when two ropes make a 120° hanging angle. On the other hand, two ropes are subjected to an excessive force as large as 39.2 kN {4000 kg} if they sling a 19.6 kN {2000 kg} load at a lifting angle of 150°.



COATING MATERIALS

- ★ The recommended coating materials such as adhesives, gasket sealants and greases used for disassembly and assembly are listed below.
- ★ For coating materials not listed below, use the equivalent of products shown in this list.

Category	Komatsu code	Part No.	Q'ty	Container	Main applications, features
Adhesives	LT-1A	790-129-9030	150 g	Tube	Used to prevent rubber gaskets, rubber cushions, and cock plug from coming out.
	LT-1B	790-129-9050	20 g (2 pes.)	Polyethylene container	Used in places requiring an immediately effective, strong adhesive. Used for plastics (except polyethylene, polypropylene, tetrafluoroethylene and vinyl chloride), rubber, metal and non-metal.
	LT-2	09940-00030	50 g	Polyethylene container	- Features: Resistance to heat and chemicals - Used for anti-loosening and sealant purpose for bolts and plugs.
	LT-3	790-129-9060 (Set of adhesive and hardening agent)	Adhesive: 1 kg Hardening agent: 500 g	Can	Used as adhesive or sealant for metal, glass and plastic.
	LT-4	790-129-9040	250 g	Polyethylene container	Used as sealant for machined holes.
	Holtz MH 705	790-126-9120	75 g	Tube	Used as heat-resisting sealant for repairing engine.
	Three bond 1735	790-129-9140	50 g	Polyethylene container	- Quick hardening type adhesive - Cure time: within 5 sec. to 3 min. - Used mainly for adhesion of metals, rubbers, plastics and woods.
	Aron-alpha 201	790-129-9130	2 g	Polyethylene container	- Quick hardening type adhesive - Quick cure type (max. strength after 30 minutes) - Used mainly for adhesion of rubbers, plastics and metals.
	Loctite 648-50	79A-129-9110	50 cc	Polyethylene container	- Features: Resistance to heat, chemicals - Used at joint portions subject to high temperatures.
Gasket sealant	LG-1	790-129-9010	200 g	Tube	Used as adhesive or sealant for gaskets and packing of power train case, etc.
	LG-3	790-129-9070	1 kg	Can	- Features: Resistance to heat - Used as sealant for flange surfaces and bolts at high temperature locations, used to prevent seizure. - Used as sealant for heat resistance gasket for high temperature locations such as engine precombustion chamber, exhaust pipe, etc.

Category	Komatsu code	Part No.	Q'ty	Container	Main applications, features
Gasket sealant	LG-4	790-129-9020	200 g	Tube	• Features: Resistance to water, oil • Used as sealant for flange surface, thread. • Also possible to use as sealant for flanges with large clearance. • Used as sealant for mating surfaces of final drive case, transmission case.
	LG-5	790-129-9080	1 kg	Polyethylene container	• Used as sealant for various threads, pipe joints, flanges. • Used as sealant for tapered plugs, elbows, nipples of hydraulic piping.
	LG-6	09940-00011	250 g	Tube	• Features: Silicon based, resistance to heat, cold • Used as sealant for flange surface, tread. • Used as sealant for oil pan, final drive case, etc.
	LG-7	09920-00150	150 g	Tube	• Features: Silicon based, quick hardening type • Used as sealant for flywheel housing, intake manifold, oil an, thermostat housing, etc.
	Three bond 1211	790-129-9090	100 g	Tube	• Used as heat-resisting sealant for repairing engine.
Molybdenum disulphide lubricant	LM-G	09940-00051	60 g	Can	• Used as lubricant for sliding portion (to prevent from squeaking).
	LM-P	09940-00040	200 g	Tube	• Used to prevent seizure or scuffing of the thread when press fitting or shrink fitting. • Used as lubricant for linkage, bearings, etc.
Grease	G2-LI	SYG2-400LI SYG2-350LI SYG2-400LI-A SYG2-160LI SYGA-160CNLI	Various	Various	• General purpose type
	G2-CA	SYG2-400CA SYG2-350CA SYG2-400CA-A SYG2-160CA SYGA-160CNCA	Various	Various	• Used for normal temperature, light load bearing at places in contact with water or steam.
	Molybdenum disulphide lubricant	SYG2-400M	400 g (10 per case)	Belows type	• Used for places with heavy load

STANDARD TIGHTENING TORQUE

STANDARD TIGHTENING TORQUE TABLE (WHEN USING TORQUE WRENCH)

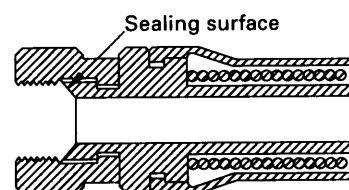
- ★ In the case of metric nuts and bolts for which there is no special instruction, tighten to the torque given in the table below.

Thread diameter of bolt	Width across flats						CDL00372
mm	mm	Nm		kgm			
6	10	13.2 ± 1.4		1.35 ± 0.15			
8	13	31 ± 3		3.2 ± 0.3			
10	17	66 ± 7		6.7 ± 0.7			
12	19	113 ± 10		11.5 ± 1			
14	22	177 ± 19		18 ± 2			
16	24	279 ± 30		28.5 ± 3			
18	27	382 ± 39		39 ± 4			
20	30	549 ± 59		56 ± 6			
22	32	745 ± 83		76 ± 8.5			
24	36	927 ± 103		94.5 ± 10.5			
27	41	1320 ± 140		135 ± 15			
30	46	1720 ± 190		175 ± 20			
33	50	2210 ± 240		225 ± 25			
36	55	2750 ± 290		280 ± 30			
39	60	3290 ± 340		335 ± 35			

Thread diameter of bolt	Width across flats		CDL00373
mm	mm	Nm	kgm
6	10	7.85 ± 1.95	0.8 ± 0.2
8	13	18.6 ± 4.9	1.9 ± 0.5
10	14	40.2 ± 5.9	4.1 ± 0.6
12	27	82.35 ± 7.85	8.4 ± 0.8

TABLE OF TIGHTENING TORQUES FOR FLARED NUTS

- ★ In the case of flared nuts for which there is no special instruction, tighten to the torque given in the table below.



SAD00483

Thread diameter	Width across flat	Tightening torque	
mm	mm	Nm	kgm
14	19	24.5 ± 4.9	2.5 ± 0.5
18	24	49 ± 19.6	5 ± 2
22	27	78.5 ± 19.6	8 ± 2
24	32	137.3 ± 29.4	14 ± 3
30	36	176.5 ± 29.4	18 ± 3
33	41	196.1 ± 49	20 ± 5
36	46	245.2 ± 49	25 ± 5
42	55	294.2 ± 49	30 ± 5

TABLE OF TIGHTENING TORQUES FOR SPLIT FLANGE BOLTS

- ★ In the case of split flange bolts for which there is no special instruction, tighten to the torque given in the table below.

Thread diameter	Width across flat	Tightening torque	
mm	mm	Nm	kgm
10	14	65.7 ± 6.8	6.7 ± 0.7
12	17	112 ± 9.8	11.5 ± 1
16	22	279 ± 29	28.5 ± 3

TABLE OF TIGHTENING TORQUES FOR O-RING BOSS PIPING JOINTS

- ★ Unless there are special instructions, tighten the O-ring boss piping joints to the torque below.

Nominal No.	Thread diameter	Width across flat	Tightening torque	
	mm	mm	Nm	kgm
02	14	Varies depending on type of connector.	34.3 ± 4.9	3.5 ± 0.5
03, 04	20		93.1 ± 9.8	9.5 ± 1
05, 06	24		142.1 ± 19.6	14.5 ± 2
10, 12	33		421.4 ± 58.8	43 ± 6
14	42		877.1 ± 132.3	89.5 ± 13.5

TABLE OF TIGHTENING TORQUES FOR O-RING BOSS PLUGS

- ★ Unless there are special instructions, tighten the O-ring boss plugs to the torque below.

Nominal No.	Thread diameter	Width across flat	Tightening torque	
	mm	mm	Nm	kgm
08	8	14	7.35 ± 1.47	0.75 ± 0.15
10	10	17	11.27 ± 1.47	1.15 ± 0.15
12	12	19	17.64 ± 1.96	1.8 ± 0.2
14	14	22	22.54 ± 1.96	2.3 ± 0.2
16	16	24	29.4 ± 4.9	3 ± 0.5
18	18	27	39.2 ± 4.9	4 ± 0.5
20	20	30	49 ± 4.9	5 ± 0.5
24	24	32	68.6 ± 9.8	7 ± 1
30	30	32	107.8 ± 14.7	11 ± 1.5
33	33	—	127.4 ± 19.6	13 ± 2
36	36	36	151.9 ± 24.5	15.5 ± 2.5
42	42	—	210.7 ± 29.4	21.5 ± 3
52	52	—	323.4 ± 44.1	33 ± 4.5

FOREWORD**TIGHTENING TORQUE FOR 102 ENGINE SERIES (BOLT AND NUTS)**

Use these torques for bolts and nuts (unit: mm) of Cummins Engine.

Thread diameter	Tightening torque	
mm	Nm	kgm
6	10 ± 2	1.02 ± 0.20
8	24 ± 4	2.45 ± 0.41
10	43 ± 6	4.38 ± 0.61
12	77 ± 12	7.85 ± 1.22

TIGHTENING TORQUE FOR 102 ENGINE SERIES (EYE JOINTS)

Use these torques for eye joints (unit: mm) of Cummins Engine.

Thread diameter	Tightening torque	
mm	Nm	kgm
6	8 ± 2	0.81 ± 0.20
8	10 ± 2	1.02 ± 0.20
10	12 ± 2	1.22 ± 0.20
12	24 ± 4	2.45 ± 0.41
14	36 ± 5	3.67 ± 0.51

TIGHTENING TORQUE FOR 102 ENGINE SERIES (TAPERED SCREWS)

Use these torques for tapered screws (unit: inch) of Cummins Engine.

Thread diameter	Tightening torque	
inch	Nm	kgm
1 / 16	3 ± 1	0.31 ± 0.10
1 / 8	8 ± 2	0.81 ± 0.20
1 / 4	12 ± 2	1.22 ± 0.20
3 / 8	15 ± 2	1.53 ± 0.41
1 / 2	24 ± 4	2.45 ± 0.41
3 / 4	36 ± 5	3.67 ± 0.51
1	60 ± 9	6.12 ± 0.92

ELECTRIC WIRE CODE

In the wiring diagrams, various colors and symbols are employed to indicate the thickness of wires. This wire code table will help you understand WIRING DIAGRAMS.

Example: 5WB indicates a cable having a nominal number 5 and white coating with black stripe.

CLASSIFICATION BY THICKNESS

Nominal number	Copper wire			Cable O.D. (mm)	Current rating (A)	Applicable circuit
	Number of strands	Dia. of strands (mm)	Cross section (mm ²)			
0.85	11	0.32	0.88	2.4	12	Starting, lighting, signal etc.
2	26	0.32	2.09	3.1	20	Lighting, signal etc.
5	65	0.32	5.23	4.6	37	Charging and signal
15	84	0.45	13.36	7.0	59	Starting (Glow plug)
40	85	0.80	42.73	11.4	135	Starting
60	127	0.80	63.84	13.6	178	Starting
100	217	0.80	109.1	17.6	230	Starting

CLASSIFICATION BY COLOR AND CODE

Priority	Circuits		Charging	Ground	Starting	Lighting	Instrument	Signal	Other
	Classi- fication								
1	Pri- mary	Code	W	B	B	R	Y	G	L
		Color	White	Black	Black	Red	Yellow	Green	Blue
2	Auxi- liary	Code	WR	—	BW	RW	YR	GW	LW
		Color	White & Red	—	Black & White	Red & White	Yellow & Red	Green & White	Blue & White
Code		WB	—	BY	RB	YB	GR	LR	
Color		White & Black	—	Black & Yellow	Red & Black	Yellow & Black	Green & Red	Blue & Red	
Code		WL	—	BR	RY	YG	GY	LY	
Color		White & Blue	—	Black & Red	Red & Yellow	Yellow & Green	Green & Yellow	Blue & Yellow	
5		Code	WG	—	—	RG	YL	GB	LB
		Color	White & Green	—	—	Red & Green	Yellow & Blue	Green & Black	Blue & Black
6		Code	—	—	—	RL	YW	GL	—
		Color	—	—	—	Red & Blue	Yellow & White	Green & Blue	—

CONVERSION TABLE

METHOD OF USING THE CONVERSION TABLE

The Conversion Table in this section is provided to enable simple conversion of figures. For details of the method of using the Conversion Table, see the example given below.

EXAMPLE

- Method of using the Conversion Table to convert from millimeters to inches

1. Convert 55 mm into inches.

- Locate the number 50 in the vertical column at the left side, take this as (A), then draw a horizontal line from (A).
- Locate the number 5 in the row across the top, take this as (B), then draw a perpendicular line down from (B).
- Take the point where the two lines cross as (C). This point (C) gives the value when converting from millimeters to inches. Therefore, 55 mm = 2.165 inches.

2. Convert 550 mm into inches.

- The number 550 does not appear in the table, so divide by 10 (move the decimal point one place to the left) to convert it to 55 mm.
- Carry out the same procedure as above to convert 55 mm to 2.165 inches.
- The original value (550 mm) was divided by 10, so multiply 2.165 inches by 10 (move the decimal point one place to the right) to return to the original value. This gives 550 mm = 21.65 inches.

Millimeters to inches

1 mm = 0.03937 in

	0	1	2	3	4	5	6	7	8	9
0	0	0.039	0.079	0.118	0.157	0.197	0.236	0.276	0.315	0.354
10	0.394	0.433	0.472	0.512	0.551	0.591	0.630	0.669	0.709	0.748
20	0.787	0.827	0.866	0.906	0.945	0.984	1.024	1.063	1.102	1.142
30	1.181	1.220	1.260	1.299	1.339	1.378	1.417	1.457	1.496	1.536
40	1.575	1.614	1.654	1.693	1.732	1.772	1.811	1.850	1.890	1.929
(A) 50	1.969	2.008	2.047	2.087	2.126	2.165	2.205	2.244	2.283	2.323
60	2.362	2.402	2.441	2.480	2.520	2.559	2.598	2.638	2.677	2.717
70	2.756	2.795	2.835	2.874	2.913	2.953	2.992	3.032	3.071	3.110
80	3.150	3.189	3.228	3.268	3.307	3.346	3.386	3.425	3.465	3.504
90	3.543	3.583	3.622	3.661	3.701	3.740	3.780	3.819	3.858	3.898

Millimeters to Inches

1 mm = 0.03937 in

	0	1	2	3	4	5	6	7	8	9
0	0	0.039	0.079	0.118	0.157	0.197	0.236	0.276	0.315	0.354
10	0.394	0.433	0.472	0.512	0.551	0.591	0.630	0.669	0.709	0.748
20	0.787	0.827	0.866	0.906	0.945	0.984	1.024	1.063	1.102	1.142
30	1.181	1.220	1.260	1.299	1.339	1.378	1.417	1.457	1.496	1.536
40	1.575	1.614	1.654	1.693	1.732	1.772	1.811	1.850	1.890	1.929
50	1.969	2.008	2.047	2.087	2.126	2.165	2.205	2.244	2.283	2.323
60	2.362	2.402	2.441	2.480	2.520	2.559	2.598	2.638	2.677	2.717
70	2.756	2.795	2.835	2.874	2.913	2.953	2.992	3.032	3.071	3.110
80	3.150	3.189	3.228	3.268	3.307	3.346	3.386	3.425	3.465	3.504
90	3.543	3.583	3.622	3.661	3.701	3.740	3.780	3.819	3.858	3.898

Kilogram to Pound

1 kg = 2.2046 lb

	0	1	2	3	4	5	6	7	8	9
0	0	2.20	4.41	6.61	8.82	11.02	13.23	15.43	17.64	19.84
10	22.05	24.25	26.46	28.66	30.86	33.07	35.27	37.48	39.68	41.89
20	44.09	46.30	48.50	50.71	51.91	55.12	57.32	59.53	61.73	63.93
30	66.14	68.34	70.55	72.75	74.96	77.16	79.37	81.57	83.78	85.98
40	88.18	90.39	92.59	94.80	97.00	99.21	101.41	103.62	105.82	108.03
50	110.23	112.44	114.64	116.85	119.05	121.25	123.46	125.66	127.87	130.07
60	132.28	134.48	136.69	138.89	141.10	143.30	145.51	147.71	149.91	152.12
70	154.32	156.53	158.73	160.94	163.14	165.35	167.55	169.76	171.96	174.17
80	176.37	178.57	180.78	182.98	185.19	187.39	189.60	191.80	194.01	196.21
90	198.42	200.62	202.83	205.03	207.24	209.44	211.64	213.85	216.05	218.26

FOREWORD**CONVERSION TABLE****Liter to U.S. Gallon**

1ℓ = 0.2642 U.S. Gal

	0	1	2	3	4	5	6	7	8	9
0	0	0.264	0.528	0.793	1.057	1.321	1.585	1.849	2.113	2.378
10	2.642	2.906	3.170	3.434	3.698	3.963	4.227	4.491	4.755	5.019
20	5.283	5.548	5.812	6.076	6.340	6.604	6.869	7.133	7.397	7.661
30	7.925	8.189	8.454	8.718	8.982	9.246	9.510	9.774	10.039	10.303
40	10.567	10.831	11.095	11.359	11.624	11.888	12.152	12.416	12.680	12.944
50	13.209	13.473	13.737	14.001	14.265	14.529	14.795	15.058	15.322	15.586
60	15.850	16.115	16.379	16.643	16.907	17.171	17.435	17.700	17.964	18.228
70	18.492	18.756	19.020	19.285	19.549	19.813	20.077	20.341	20.605	20.870
80	21.134	21.398	21.662	21.926	22.190	22.455	22.719	22.983	23.247	23.511
90	23.775	24.040	24.304	24.568	24.832	25.096	25.361	25.625	25.889	26.153

Liter to U.K. Gallon

1ℓ = 0.21997 U.K. Gal

	0	1	2	3	4	5	6	7	8	9
0	0	0.220	0.440	0.660	0.880	1.100	1.320	1.540	1.760	1.980
10	2.200	2.420	2.640	2.860	3.080	3.300	3.520	3.740	3.950	4.179
20	4.399	4.619	4.839	5.059	5.279	5.499	5.719	5.939	6.159	6.379
30	6.599	6.819	7.039	7.259	7.479	7.699	7.919	8.139	8.359	8.579
40	8.799	9.019	9.239	9.459	9.679	9.899	10.119	10.339	10.559	10.778
50	10.998	11.281	11.438	11.658	11.878	12.098	12.318	12.528	12.758	12.978
60	13.198	13.418	13.638	13.858	14.078	14.298	14.518	14.738	14.958	15.178
70	15.398	15.618	15.838	16.058	16.278	16.498	16.718	16.938	17.158	17.378
80	17.598	17.818	18.037	18.257	18.477	18.697	18.917	19.137	19.357	19.577
90	19.797	20.017	20.237	20.457	20.677	20.897	21.117	21.337	21.557	21.777

kgm to ft. lb

1 kgm = 7.233 ft. lb

	0	1	2	3	4	5	6	7	8	9
0	0	7.2	14.5	21.7	28.9	36.2	43.4	50.6	57.9	65.1
10	72.3	79.6	86.8	94.0	101.3	108.5	115.7	123.0	130.2	137.4
20	144.7	151.9	159.1	166.4	173.6	180.8	188.1	195.3	202.5	209.8
30	217.0	224.2	231.5	238.7	245.9	253.2	260.4	267.6	274.9	282.1
40	289.3	296.6	303.8	311.0	318.3	325.5	332.7	340.0	347.2	354.4
50	361.7	368.9	376.1	383.4	390.6	397.8	405.1	412.3	419.5	426.8
60	434.0	441.2	448.5	455.7	462.9	470.2	477.4	484.6	491.8	499.1
70	506.3	513.5	520.8	528.0	535.2	542.5	549.7	556.9	564.2	571.4
80	578.6	585.9	593.1	600.3	607.6	614.8	622.0	629.3	636.5	643.7
90	651.0	658.2	665.4	672.7	679.9	687.1	694.4	701.6	708.8	716.1
100	723.3	730.5	737.8	745.0	752.2	759.5	766.7	773.9	781.2	788.4
110	795.6	802.9	810.1	817.3	824.6	831.8	839.0	846.3	853.5	860.7
120	868.0	875.2	882.4	889.7	896.9	904.1	911.4	918.6	925.8	933.1
130	940.3	947.5	954.8	962.0	969.2	976.5	983.7	990.9	998.2	1005.4
140	1012.6	1019.9	1027.1	1034.3	1041.5	1048.8	1056.0	1063.2	1070.5	1077.7
150	1084.9	1092.2	1099.4	1106.6	1113.9	1121.1	1128.3	1135.6	1142.8	1150.0
160	1157.3	1164.5	1171.7	1179.0	1186.2	1193.4	1200.7	1207.9	1215.1	1222.4
170	1129.6	1236.8	1244.1	1251.3	1258.5	1265.8	1273.0	1280.1	1287.5	1294.7
180	1301.9	1309.2	1316.4	1323.6	1330.9	1338.1	1345.3	1352.6	1359.8	1367.0
190	1374.3	1381.5	1388.7	1396.0	1403.2	1410.4	1417.7	1424.9	1432.1	1439.4

kg/cm² to lb/in²

1kg/cm² = 14.2233 lb/in²

	0	1	2	3	4	5	6	7	8	9
0	0	14.2	28.4	42.7	56.9	71.1	85.3	99.6	113.8	128.0
10	142.2	156.5	170.7	184.9	199.1	213.4	227.6	241.8	256.0	270.2
20	284.5	298.7	312.9	327.1	341.4	355.6	369.8	384.0	398.3	412.5
30	426.7	440.9	455.1	469.4	483.6	497.8	512.0	526.3	540.5	554.7
40	568.9	583.2	597.4	611.6	625.8	640.1	654.3	668.5	682.7	696.9
50	711.2	725.4	739.6	753.8	768.1	782.3	796.5	810.7	825.0	839.2
60	853.4	867.6	881.8	896.1	910.3	924.5	938.7	953.0	967.2	981.4
70	995.6	1010	1024	1038	1053	1067	1081	1095	1109	1124
80	1138	1152	1166	1181	1195	1209	1223	1237	1252	1266
90	1280	1294	1309	1323	1337	1351	1365	1380	1394	1408
100	1422	1437	1451	1465	1479	1493	1508	1522	1536	1550
110	1565	1579	1593	1607	1621	1636	1650	1664	1678	1693
120	1707	1721	1735	1749	1764	1778	1792	1806	1821	1835
130	1849	1863	1877	1892	1906	1920	1934	1949	1963	1977
140	1991	2005	2020	2034	2048	2062	2077	2091	2105	2119
150	2134	2148	2162	2176	2190	2205	2219	2233	2247	2262
160	2276	2290	2304	2318	2333	2347	2361	2375	2389	2404
170	2418	2432	2446	2460	2475	2489	2503	2518	2532	2546
180	2560	2574	2589	2603	2617	2631	2646	2660	2674	2688
190	2702	2717	2731	2745	2759	2773	2788	2802	2816	2830
200	2845	2859	2873	2887	2901	2916	2930	2944	2958	2973
210	2987	3001	3015	3030	3044	3058	3072	3086	3101	3115
220	3129	3143	3158	3172	3186	3200	3214	3229	3243	3257
230	3271	3286	3300	3314	3328	3343	3357	3371	3385	3399
240	3414	3428	3442	3456	3470	3485	3499	3513	3527	3542

Temperature

Fahrenheit-Centigrade Conversion ; a simple way to convert a Fahrenheit temperature reading into a Centigrade temperature reading or vice versa is to enter the accompanying table in the center or boldface column of figures.

These figures refer to the temperature in either Fahrenheit or Centigrade degrees.

If it is desired to convert from Fahrenheit to Centigrade degrees, consider the center column as a table of Fahrenheit temperatures and read the corresponding Centigrade temperature in the column at the left.

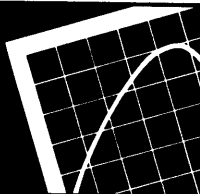
If it is desired to convert from Centigrade to Fahrenheit degrees, consider the center column as a table of Centigrade values, and read the corresponding Fahrenheit temperature on the right.

$$1^{\circ}\text{C} = 33.8^{\circ}\text{F}$$

°C		°F	°C		°F	°C		°F	°C		°F
-40.4	-40	-40.0	-11.7	11	51.8	7.8	46	114.8	27.2	81	117.8
-37.2	-35	-31.0	-11.1	12	53.6	8.3	47	116.6	27.8	82	179.6
-34.4	-30	-22.0	-10.6	13	55.4	8.9	48	118.4	28.3	83	181.4
-31.7	-25	-13.0	-10.0	14	57.2	9.4	49	120.2	28.9	84	183.2
-28.9	-20	-4.0	-9.4	15	59.0	10.0	50	122.0	29.4	85	185.0
-28.3	-19	-2.2	-8.9	16	60.8	10.6	51	123.8	30.0	86	186.8
-27.8	-18	-0.4	-8.3	17	62.6	11.1	52	125.6	30.6	87	188.6
-27.2	-17	1.4	-7.8	18	64.4	11.7	53	127.4	31.1	88	190.4
-26.7	-16	3.2	-7.2	19	66.2	12.2	54	129.2	31.7	89	192.2
-26.1	-15	5.0	-6.7	20	68.0	12.8	55	131.0	32.2	90	194.0
-25.6	-14	6.8	-6.1	21	69.8	13.3	56	132.8	32.8	91	195.8
-25.0	-13	8.6	-5.6	22	71.6	13.9	57	134.6	33.3	92	197.6
-24.4	-12	10.4	-5.0	23	73.4	14.4	58	136.4	33.9	93	199.4
-23.9	-11	12.2	-4.4	24	75.2	15.0	59	138.2	34.4	94	201.2
-23.3	-10	14.0	-3.9	25	77.0	15.6	60	140.0	35.0	95	203.0
-22.8	-9	15.8	-3.3	26	78.8	16.1	61	141.8	35.6	96	204.8
-22.2	-8	17.6	-2.8	27	80.6	16.7	62	143.6	36.1	97	206.6
-21.7	-7	19.4	-2.2	28	82.4	17.2	63	145.4	36.7	98	208.4
-21.1	-6	21.2	-1.7	29	84.2	17.8	64	147.2	37.2	99	210.2
-20.6	-5	23.0	-1.1	30	86.0	18.3	65	149.0	37.8	100	212.0
-20.0	-4	24.8	-0.6	31	87.8	18.9	66	150.8	40.6	105	221.0
-19.4	-3	26.6	0	32	89.6	19.4	67	152.6	43.3	110	230.0
-18.9	-2	28.4	0.6	33	91.4	20.0	68	154.4	46.1	115	239.0
-18.3	-1	30.2	1.1	34	93.2	20.6	69	156.2	48.9	120	248.0
-17.8	0	32.0	1.7	35	95.0	21.1	70	158.0	51.7	125	257.0
-17.2	1	33.8	2.2	36	96.8	21.7	71	159.8	54.4	130	266.0
-16.7	2	35.6	2.8	37	98.6	22.2	72	161.6	57.2	135	275.0
-16.1	3	37.4	3.3	38	100.4	22.8	73	163.4	60.0	140	284.0
-15.6	4	39.2	3.9	39	102.2	23.3	74	165.2	62.7	145	293.0
-15.0	5	41.0	4.4	40	104.0	23.9	75	167.0	65.6	150	302.0
-14.4	6	42.8	5.0	41	105.8	24.4	76	168.8	68.3	155	311.0
-13.9	7	44.6	5.6	42	107.6	25.0	77	170.6	71.1	160	320.0
-13.3	8	46.4	6.1	43	109.4	25.6	78	172.4	73.9	165	329.0
-12.8	9	48.2	6.7	44	111.2	26.1	79	174.2	76.7	170	338.0
-12.2	10	50.0	7.2	45	113.0	26.7	80	176.0	79.4	175	347.0

ENGINE

01 GENERAL

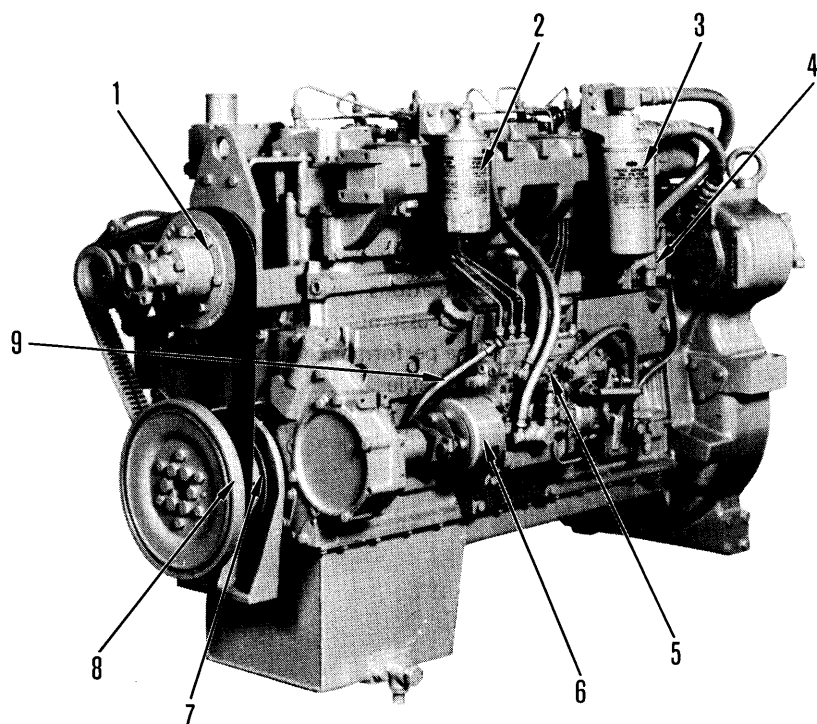


General view	01-002
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Engine performance curve	01-018
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GENERAL VIEW

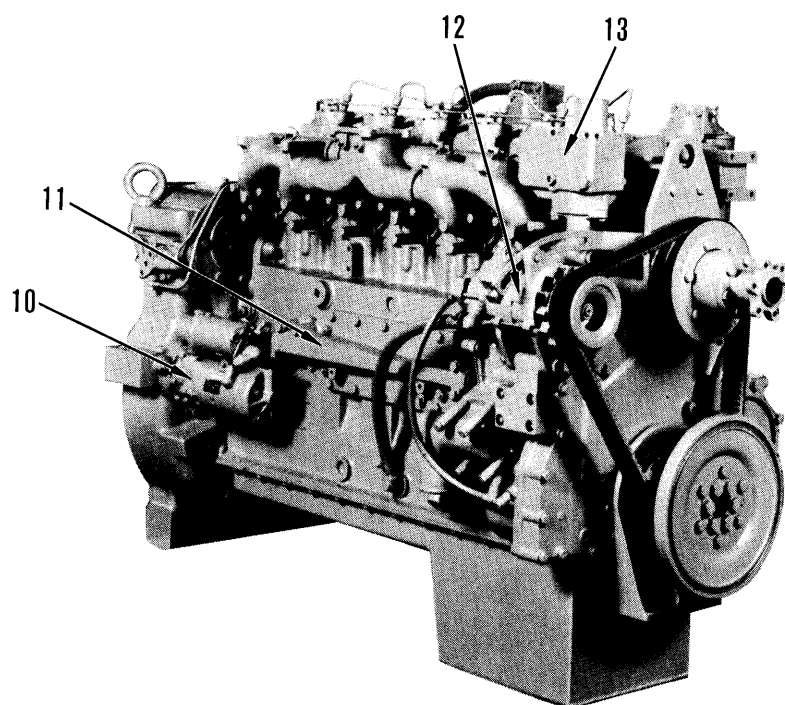
6D125-1

★ The configuration may differ depending on the product on which the engine is mounted.



1. Fan pulley
2. Fuel filter
3. Oil filter
4. Adapter
5. Fuel injection pump
6. Automatic timer
7. Crankshaft pulley
8. Vibration damper
9. Dipstick

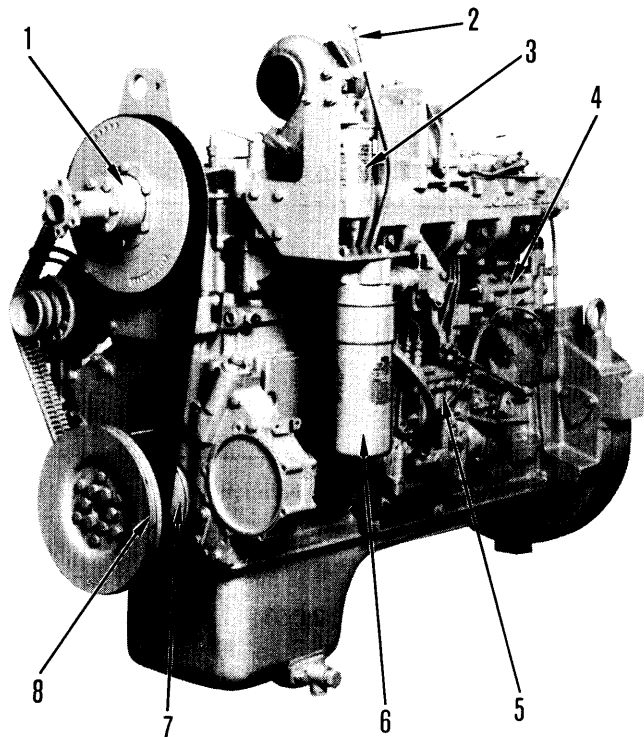
6150P001



10. Starting motor
11. Oil cooler
12. Alternator
13. Thermostat housing

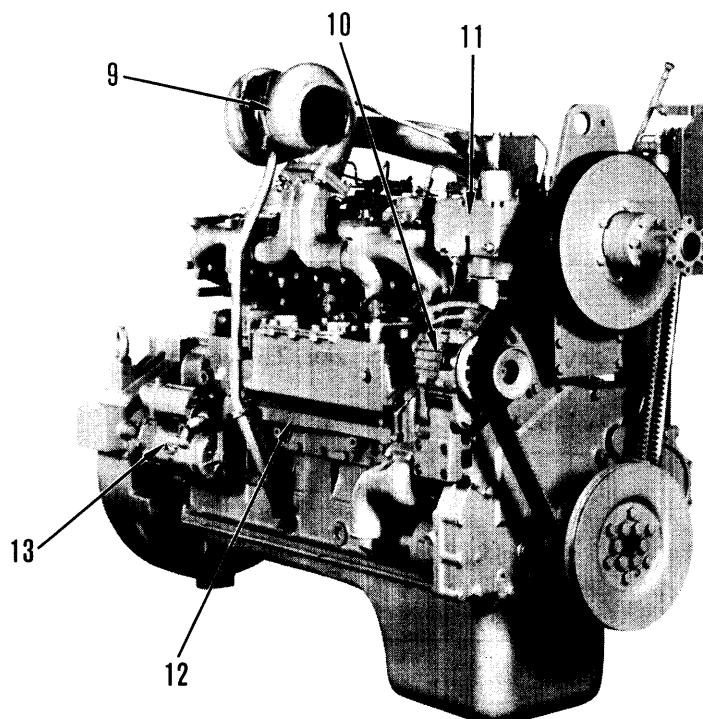
6150P002

S6D125-1



- 1. Fan pulley
- 2. Dipstick
- 3. Fuel filter
- 4. Adapter
- 5. Fuel injection pump
- 6. Oil filter
- 7. Crankshaft pulley
- 8. Vibration damper

6150P003



- 9. Turbocharger
- 10. Alternator
- 11. Thermostat housing
- 12. Oil cooler
- 13. Starting motor

6150P004

SPECIFICATIONS

Engine model		6D125-1		
Applicable machine		D50A-17 D50P-17	D50F-17	D53A-17 D53P-17
Number of cylinder – Bore x Stroke (mm)		6 – 125 x 150		
Total piston displacement (cc)		11,040		
Firing order		1 – 5 – 3 – 6 – 2 – 4		
Dimensions	Overall length (mm)	1,533	1,532	1,440
	Overall width (mm)	850	850	850
	Overall height (excluding exhaust pipe) (mm)	1,555	1,555	1,555
	Overall height (including exhaust pipe) (mm)	–	–	–
Performance	Flywheel horsepower (HP/rpm)	120/1,750	138/1,900	124/1,900
	Maximum torque (kgm/rpm)	65.5/1,100	66/1,300	62.5/1,300
	High idling speed (rpm)	1,875 – 1,975	2,050 – 2,150	2,050 – 2,150
	Low idling speed (rpm)	650 – 700	650 – 700	600 – 650
	Minimum fuel consumption ratio (g/HPh)	155	155	156
Dry weight (kg)		1,090	1,090	970
Fuel pump		Bosch PE – NB type		
Governor		Bosch RSV Centrifugal, all-speed type		
Lubricating oil amount (refill capacity) (ℓ)		30 (26)	30 (26)	30 (26)
Coolant amount (engine only) (ℓ)		21	21	21
Alternator		24V, 13A	24V, 13A	24V, 13A
Starting motor		24V, 7.5 kw	24V, 7.5 kw	24V, 7.5 kw
Battery		12V 150Ah x 2	12V 150Ah x 2	12V 150Ah x 2
Turbocharger		–	–	–
Air compressor		–	–	–
Others		–	–	–

6D125-1				
D58E-1 D58P-1	D60A-8	D60E-8	D60P-8 D60PL-8	D60S-8
6 — 125 x 150				
11,040				
1 — 5 — 3 — 6 — 2 — 4				
1,440	1,704	1,704	1,704	1,692
850	930	930	930	794
1,555	1,776	1,776	1,776	1,851
—	—	—	—	—
130/1,900	155/1,850 1,850	170/1,850	165/1,850	160/1,750
64.8/1,300	78/1,100	81/1,100	78/1,000	78/1,000
2,050 — 2,150	2,050 — 2,150	2,050 — 2,150	2,050 — 2,150	1,950 — 2,050
800 — 850	600 — 630	600 — 630	600 — 630	600 — 630
156	155	155	155	155
970	1,250	1,250	1,250	1,250
NIPPON DENSO NB (EP9) type RVS centrifugal, all-speed type	Bosch PE — NB type			
	Bosch RSV centrifugal, all-speed type			
32 (28)	30 (26)	30 (26)	30 (26)	30 (26)
21	24	24	24	24
24V, 13A	24V, 13A	24V, 13A	24V, 13A	24V, 13A
24V, 7.5 kW	24V, 7.5 kW	24V, 7.5 kW	24V, 7.5 kW	24V, 7.5 kW
12V, 150Ah x 2	12V, 170Ah x 2	12V, 170Ah x 2	12V, 170Ah x 2	12V, 170Ah x 2
—	—	—	—	—
—	—	—	—	—
—	—	—	—	—

GENERAL

SPECIFICATIONS

Engine model		6D125-1		
Applicable machine		D63E-1	D65A-8	D65E-8
Number of cylinder — Bore x Stroke (mm)		6 — 125 x 150		
Total piston displacement (cc)		11,040		
Firing order		1 — 5 — 3 — 6 — 2 — 4		
Dimensions	Overall length (mm)	1,440	1,704	1,704
	Overall width (mm)	850	930	930
	Overall height (excluding exhaust pipe) (mm)	555	1,776	1,776
	Overall height (including exhaust pipe) (mm)	—	—	—
Performance	Flywheel horsepower (HP/rpm)	140/1,900	155/1,850	165/1,850
	Maximum torque (kgm/rpm)	68/1,300	78/1,100	78/1,000
	High idling speed (rpm)	2,050 — 2,150	2,050 — 2,150	2,050 — 2,150
	Low idling speed (rpm)	800 — 850	600 — 630	600 — 630
	Minimum fuel consumption ratio (g/HPh)	156	155	155
Dry weight (kg)		970	1,250	1,250
Fuel pump		NIPPON DENSO NB (EP9) type	Bosch PE — NB type	
Governor		RSV centrifugal, all-speed type	Bosch RSV centrifugal, all-speed type	
Lubricating oil amount (refill capacity) (ℓ)		32 (28)	30 (26)	30 (26)
Coolant amount (engine only) (ℓ)		21	24	24
Alternator		24V, 13A	24V, 13A	24V, 13A
Starting motor		24V, 7.5 kW	24V, 7.5 kW	24V, 7.5 kW
Battery		12V, 150Ah x 2	12V, 170Ah x 2	12V, 170Ah x 2
Turbocharger		—	—	—
Air compressor		—	—	—
Others		—	—	—

6D125-1				
D65P-8	D65S-8	D65E-12	D68E-1 D68P-1	D70LE-1
6 — 125 x 150				
11,040				
1 — 5 — 3 — 6 — 2 — 4				
1,704	1,692	1,482.7	1,704	1,704
930	794	906	930	930
1,776	1,851	1,565.7	1,776	1,776
—	—	—	—	—
165/1,850	160/1,850	180/1,950	180/1,850	177.5/1,850
78/1,000	78/1,100	81.5/1,100	81.5/1,100	81.5/1,100
2,050 — 2,150	2,050 — 2,150	2,050 — 2,150	2,050 — 2,150	2,050 — 2,150
600 — 630	600 — 630	800 — 850	600 — 630	600 — 630
155	155	161	155	155
1,250	1,250	1,150	1,165	1,250
Bosch PE-NB type		NIPPON DENSO NB (EP9) type		
Bosch RSV centrifugal, all speed type		RSV centrifugal, all-speed type		
30 (26)	30 (26)	44 (38)	32 (28)	32 (28)
24	24	21	24.5	24.5
24V, 13A	24V, 13A	24V, 13A	24V, 13A	24V, 13A
24V, 7.5kW	24V, 7.5kW	24V, 7.5kW	24V, 7.5kW	24V, 7.5kW
12V, 170 Ah x 2	12V, 170Ah x 2	12V, 170Ah x 2	12V, 170Ah x 2	12V, 170Ah x 2
—	—	—	—	—
—	—	—	—	—
—	—	—	—	—

Engine model		6D125-1		
Applicable machine		GD600R-3 GD605R-3	GD650R-3 GD655R-3	
Number of cylinder — Bore x Stroke (mm)		6 — 125 x 150		
Total piston displacement (cc)		11,040		
Firing order		1 — 5 — 3 — 6 — 2 — 4		
Dimensions	Overall length (mm)	1,549	1,549	
	Overall width (mm)	805	805	
	Overall height (excluding exhaust pipe) (mm)	1,532	1,532	
	Overall height (including exhaust pipe) (mm)	—	—	
Performance	Flywheel horsepower (HP/rpm)	146/1,800	165/1,800	
	Maximum torque (kgm/rpm)	74/1,100	78/1,100	
	High idling speed (rpm)	2,000 — 2,100	2,000 — 2,100	
	Low idling speed (rpm)	650 — 700	650 — 700	
	Minimum fuel consumption ratio (g/HPh)	159	159	
Dry weight (kg)		1,130	1,130	
Fuel pump		Bosch PE-NB type		
Governor		Bosch RSV centrifugal, all speed type		
Lubricating oil amount (refill capacity) (ℓ)		30 (26)	30 (26)	
Coolant amount (engine only) (ℓ)		19 (GD600R-3) 24 (GD605R-3)	24	
Alternator		24V, 25A	24V, 25A	
Starting motor		24V, 7.5 kW	24V, 7.5kW	
Battery		12V, 150Ah x 2	12V, 150Ah x 2	
Turbocharger		—	—	
Air compressor		—	—	
Others		—	—	

6D125-1				
GD605A-3 with 146HP engine	GD605A-3 with 155HP engine	GD613A-1 GD623A-1	GD622A-1	
6 — 125 x 150				
11,040				
1 — 5 — 3 — 6 — 2 — 4				
1,549	1,549	1,471	1,471	
805	805	822	822	
1,532	1,532	1,465	1,465	
—	—	—	—	
146/1,800	155/1,800	155/2,200	155/2,200	
74/1,100	77/1,100	67/1,350	67/1,350	
2,000 — 2,100	2,000 — 2,100	2,350 — 2,450	2,350 — 2,450	
650 — 700	650 — 700	650 — 700	650 — 700	
159	163	153	153	
1,130	1,130	1,050	1,050	
Bosch PE-NB type		NIPPON DENSO NB (EP9) type		
Bosch RSV centrifugal, all speed type		Bosch RSV centrifugal, all-speed type		
30 (26)	30 (26)	30 (26)	30 (26)	
24	24	19	19	
24V, 25A	24V, 25A	24V, 25A	24V, 35A	
24V, 7.5kW	24V, 7.5kW	24V, 7.5kW	24V, 7.5kW	
12V, 150Ah x 2	12V, 150Ah x 2	12V, 140Ah x 2	12V, 140Ah x 2	
—	—	—	—	
—	—	—	—	
—	—	—	—	

Engine model			6D125-1		
Applicable machine			GD625A-1	GD625A-1C	GD655A-3
Number of cylinder — Bore x Stroke (mm)			6 — 125 x 150		
Total piston displacement (cc)			11,040		
Firing order			1 — 5 — 3 — 6 — 2 — 4		
Dimensions	Overall length (mm)		1,471	1,471	1,549
	Overall width (mm)		822	822	805
	Overall height (excluding exhaust pipe) (mm)		1,465	1,465	1,532
	Overall height (including exhaust pipe) (mm)		—	—	—
Performance	Flywheel horsepower (HP/rpm)		155/2,200	155/2,200	165/1,800
	Maximum torque (kgm/rpm)		67/1,350	67/1,350	78/1,100
	High idling speed (rpm)		2,350 — 2,450	2,350 — 2,450	2,000 — 2,100
	Low idling speed (rpm)		650 — 700	650 — 700	650 — 700
	Minimum fuel consumption ratio (g/HPh)		153	153	159
Dry weight (kg)			960	960	1,100
Fuel pump			Bosch PE-NB type		
Governor			Bosch RSV centrifugal, all-speed type		
Lubricating oil amount (refill capacity) (ℓ)			30 (26)	30 (26)	30 (26)
Coolant amount (engine only) (ℓ)			19	19	55
Alternator			24V, 50A	24V, 35A	24V, 25A
Starting motor			24V, 11kW	24V, 11kW	24V, 7.5 kW
Battery			12V, 200Ah x 2	12V, 200Ah x 2	12V, 150Ah x 2
Turbocharger			—	—	—
Air compressor			Made by DIESEL KIKI	Made by DIESEL KIKI	—
Others			—	—	—

6D125-11				
GD633A-1	GD705R-3 GD705R-4			
6 — 125 x 150				
11,040				
1 — 5 — 3 — 6 — 2 — 4				
1,471	1,563			
822	881			
1,465	1,507			
—	—			
180/2,200	180/1,850			
67/1,350	80/1,100			
2,350 — 2,450	2,050 — 2,150			
650 — 700	650 — 700			
160	158			
1,060	1,300 (R-3) 1,100 (R-4)			
NIPPON DENSO NB (EP9) type Bosch RSV centrifugal, all-speed type	Bosch PE-P type Bosch RSV centrifugal, all-speed type			
30 (24)	30 (26)			
50	52 (R-3) 55 (R-4)			
24V, 25A	24V, 12A (R-3) 24V, 25A (R-4)			
24V, 7.5kW	24V, 7.5kW			
12V, 140Ah x 2	12V, 150Ah x 2 (R-3) 12V, 140Ah x 2 (R-4)			
—	—			
—	Made by DIESEL KIKI			
—	—			

GENERAL

SPECIFICATION

Engine model		S6D125-1		
Applicable machine		D60F-8	D60F-8A	D65EX-12 D65P, PX-12
Number of cylinder — Bore x Stroke (mm)		6 — 125 x 150		
Total piston displacement (cc)		11,040		
Firing order		1 — 5 — 3 — 6 — 2 — 4		
Dimensions	Overall length (mm)	1,704	1,704	1,482.7
	Overall width (mm)	930	930	906
	Overall height (excluding exhaust pipe) (mm)	1,963	1,963	1,544.7
	Overall height (including exhaust pipe) (mm)	—	—	—
Performance	Flywheel horsepower (HP/rpm)	182/1,850	219/2,000	190/1,950
	Maximum torque (kgm/rpm)	85/1,100	92/1,500	100/1,200
	High idling speed (rpm)	2,050 — 2,150	2,200 — 2,300	2,050 — 2,150
	Low idling speed (rpm)	600 — 630	600 — 630	800 — 850
	Minimum fuel consumption ratio (g/HPh)	150	150	155
Dry weight (kg)		1,275	1,275	1,200
Fuel pump		Bosch PE-P type		NIPPON DENSO NB (EP9) type
Governor		Bosch RSV centrifugal, all-speed type		RSV centrifugal, all-speed type
Lubricating oil amount (refill capacity) (ℓ)		32 (26)	32 (26)	44 (38)
Coolant amount (engine only) (ℓ)		63	63	—
Alternator		24V, 13A	24V, 13A	24V, 35A
Starting motor		24V, 7.5kW	24V, 7.5kW	24V, 7.5kW
Battery		12V, 200Ah x 2	12V, 200Ah x 2	12V, 140Ah x 2
Turbocharger		GARRETT CO. TV77-05	GARRETT CO. TV77-05	GARRETT CO. TO4E
Air compressor		—	—	—
Others		—	—	—

S6D125-1				
D75A-1	D75S-5 Serial No. 10001-23192	D75S-5 Serial No. 23193 and up	D83E-1 D83P-1	D85A-21
6 – 125 x 150				
11,040				
1 – 5 – 3 – 6 – 2 – 4				
—	1,603	1,603	1,704	1,451
—	900	900	930	876
—	1,445	1,445	1,365	1,926
—	—	—	—	—
200/2,000	200/2,000	200/2,000	215/2,000	225/2,000
89/1,300	88/1,500	88/1,500	89/1,300	102/1,400
2,150 – 2,250	2,150 – 2,250	2,150 – 2,250	2,200 – 2,300	2,150 – 2,250
600 – 630	550 – 650	550 – 650	600 – 630	650 – 700
161	150	150	150	152
1,195	1,145	1,145	1,190	1,400
Bosch PE-P type		NIPPON DENSO NB (EP9) type	Bosch PE-P type	
Bosch RSV centrifugal, all-speed type		Bosch RSV centrifugal, all-speed type	Bosch RSV centrifugal, all-speed type	
30 (26)	32 (26)	32 (26)	30 (26)	30 (24)
63	65	65	54.5	79
24V, 35A	24V, 13A	24V, 13A	24V, 13A	24V, 35A
24V, 11 kW	24V, 7.5 kW (STD) 24V, 11 kW (OP)	24V, 7.5 kW	24V, 7.5 kW	24V, 7.5 kW
12V, 200Ah x 2	12V 170Ah x 2	12V, 170Ah x 2	12V 200Ah x 2	12V, 170Ah x 2
GARRETT CO. TV77-05	GARRETT CO. TV77-05	GARRETT CO. T45	GARRETT CO. TV77	GARRETT CO. T45
—	Made by DIESEL KIKI	—	—	—
—	—	—	—	—

Engine model		S6D125-1		
Applicable machine		D85E-21 (B) D85P-21	PC300-3 Serial No. 10001-20727	PC300-3 Serial No. 20728-23688
Number of cylinder — Bore x Stroke (mm)		6 — 125 x 150		
Total piston displacement (cc)		11,040		
Firing order		1 — 5 — 3 — 6 — 2 — 4		
Dimensions	Overall length (mm)	1,451	1,723	1,723
	Overall width (mm)	876	1,043	1,043
	Overall height (excluding exhaust pipe) (mm)	1,926	1,130	1,130
	Overall height (including exhaust pipe) (mm)	—	—	—
Performance	Flywheel horsepower (HP/rpm)	225/2,000	197/1,550	197/1,550
	Maximum torque (kgm/rpm)	102/1,400	105/1,200	105/1,200
	High idling speed (rpm)	2,150 — 2,250	1,675 — 1,725	1,675 — 1,725
	Low idling speed (rpm)	650 — 700	625 — 675	725 — 745
	Minimum fuel consumption ratio (g/HPh)	152	154	148
Dry weight (kg)		1,400	1,050	1,050
Fuel pump		Bosch PE-P type	NIPPON DENSO NB (EP9) type	
Governor		Bosch RSV centrifugal, all-speed type	Bosch RSV centrifugal, all-speed type	
Lubricating oil amount (refill capacity) (ℓ)		30 (24)	32 (28)	30 (26)
Coolant amount (engine only) (ℓ)		79	52	52
Alternator		24V, 35A	24V, 25A	24V, 25A
Starting motor		24V, 7.5 kW	24V, 7.5 kW	24V, 7.5 kW
Battery		12V, 170Ah x 2	12V, 150Ah x 2	12V, 150Ah x 2
Turbocharger		GARRETT CO. T45	GARRETT CO. T04B NV	GARRETT CO. T04B NV
Air compressor		—	—	—
Others		—	—	—

S6D125-1				
PC300-3 Serial No. 23689 and up	PC300LC-3 PC300NLC-3	PC360LC-3	PC400-3 Serial No. 10001-23750	PC400-3 Serial No. 23751 and up
6 — 125 x 150				
11,040				
1 — 5 — 3 — 6 — 2 — 4				
1,723	1,723	1,723	1,723	1,723
1,043	1,043	1,043	1,043	1,043
1,130	1,130	1,130	1,130	1,130
—	—	—	—	—
197/1,550	197/1,550	202/1,550	266/2,000	266/2,000
105/1,200	105/1,200	107.6/1,200	110/1,400	110/1,400
1,675 — 1,725	1,675 — 1,725	1,650 — 1,750	2,150 — 2,250	2,150 — 2,250
725 — 745	625 — 675	650 — 700	650 — 700	650 — 700
148	145	148	152	152
1,050	1,050	1,050	1,090	1,090
NIPPON DENSO NB (EP9) type Bosch RSV centrifugal, all-speed type		Bosch PE-NB type Bosch RSV centrifugal, all-speed type	Bosch PE-P type Bosch RSV centrifugal, all-speed type	
30 (26)	32 (28)	30 (26)	32 (28)	32 (28)
52	52	52	55	55
24V, 25A	24V, 25A	24V, 25A	24V, 25A	24V, 25A
24V, 7.5 kW	24V, 7.5 kW	24V, 7.5 kW	24V, 7.5 kW	24V, 7.5 kW
12V, 150Ah x 2	12V, 150Ah x 2	12V, 150Ah x 2	12V, 150Ah x 2	12V, 150Ah x 2
GARRETT CO. T45	GARRETT CO. T04B NV	GARRETT CO. T04B NV	GARRETT CO. TV77-05	GARRETT CO. T45
—	—	—	—	—
—	—	—	—	—

Engine model			S6D125-1		
Applicable machine			PC400LC-3	PC400-5 PC400LC-5	HD200D-3
Number of cylinder — Bore x Stroke (mm)			6 — 125 x 150		
Total piston displacement (cc)			11,040		
Firing order			1 — 5 — 3 — 6 — 2 — 4		
Dimensions	Overall length (mm)		1,723	1,708	1,635
	Overall width (mm)		1,043	1,010	813.5
	Overall height (excluding exhaust pipe) (mm)		1,130	1,177	1,268.5
	Overall height (including exhaust pipe) (mm)		—	—	—
Performance	Flywheel horsepower (HP/rpm)		266/2,000	276/2,000	276/2,100
	Maximum torque (kgm/rpm)		110/1,400	115/1,400	115/1,400
	High idling speed (rpm)		2,150 — 2,250	2,150 — 2,250	2,350 — 2,450
	Low idling speed (rpm)		600 — 700	600 — 700	650 — 700
	Minimum fuel consumption ratio (g/HPh)		152	152	149
Dry weight (kg)			1,090	1,090	1,050
Fuel pump			Bosch PE-P type	NIPPON DENSO NB (EP9) type	Bosch PE-P type
Governor			Bosch RSV centrifugal, all-speed type	RSV centrifugal, all-speed type	Bosch RFD centrifugal, max. and min. speed type
Lubricating oil amount (refill capacity) (ℓ)			30 (26)	38 (32)	27 (25)
Coolant amount (engine only) (ℓ)			54.1	34	40
Alternator			24V, 25A	24V, 25A	24V, 35A
Starting motor			24V, 7.5 kW	24V, 7.5 kW	24V, 7.5 kW
Battery			12V, 150Ah x 2	12V, 150Ah x 2	12V, 150Ah x 2
Turbocharger			GARRETT CO. TV77-05	GARRETT CO. T45	GARRETT CO. TV77-05
Air compressor			—	—	Made by DIESEL KIKI
Others			—	—	—

S6D125-1				
HD205-3	WA450-1	WA470-1	WF450T-1	GD705A-4 Serial No. 10001-23598
6 — 125 x 150				
11,040				
1 — 5 — 3 — 6 — 2 — 4				
1,620	1,452	1,452	1,480	1,556
813.5	900	900	869	877
1,234	1,501	1,501	1,532	1,703
—	—	—	—	—
296/2,100	237/2,200	260/2,200	237/2,200	200/2,000
124/1,400	105/1,400	107/1,400	105/1,400	92/1,300
2,350 — 2,450	2,350 — 2,450	2,350 — 2,450	2,400 — 2,450	2,150 — 2,250
700 — 750	700 — 750	700 — 750	700 — 750	775 — 800
149	148	148	148	152
1,100	1,040	1,040	1,060	1,175
Bosch PE-P type Bosch RFD centrifugal, max.and min.speed type	Bosch PE-P type Bosch RSV centrifugal, all-speed type			
27 (25)	32 (26)	32 (26)	32 (26)	32 (26)
40	66	66	66	55
24V, 35A	24V, 50A	24V, 50A	24V, 50A	24V, 35A
24V, 7.5kW	24V, 7.5kW	24V, 7.5kW	24V, 7.5kW	24V, 7.5kW
12V, 150Ah x 2	12V, 170 Ah x 2	12V, 170Ah x 2	12V, 150Ah x 2	12V, 150Ah x 2
GARRETT CO. TV77-05	GARRETT CO. TV77-05	GARRETT CO. TV77-05	GARRETT CO. T45	GARRETT CO. TV77-05
Made by DIESEL KIKI	Made by DIESEL KIKI	Made by DIESEL KIKI	Made by ZEXEL (DIESEL KIKI)	Made by DIESEL KIKI
—	—	—	—	—

GENERAL

SPECIFICATION

Engine			S6D125-1		
Applicable machine			GD705A-4 Serial No. 23599 and up	EC260Z-1	EG200-3
Number of cylinder — Bore x Stroke (mm)			6 — 125 x 150		
Total piston displacement (cc)			11,040		
Firing order			1 — 5 — 3 — 6 — 2 — 4		
Dimensions	Overall length (mm)		1,556	1,464	1,715
	Overall width (mm)		877	850	834
	Overall height (excluding exhaust pipe) (mm)		1,703	1,229	1,571
	Overall height (including exhaust pipe) (mm)		—	—	1,808
Performance	Flywheel horsepower (HP/rpm)		200/2,000	232/2,150	229/1,500 (50 Hz) 253/1,800 (60 Hz)
	Maximum torque (kgm/rpm)		92/1,300	96/1,500	—
	High idling speed (rpm)		2,150 — 2,250	2,250 — 2,350	Max. 1,560 (50 Hz) Max. 1,872 (60 Hz)
	Low idling speed (rpm)		775 — 800	975 — 1,025	725 — 775
	Minimum fuel consumption ratio (g/HPh)		152	149	150
Dry weight (kg)			1,175	980	1,050
Fuel pump			NIPPON DENSO NB (EP9) type RSV centrifugal, all-speed type	Bosch PE-P type	
Governor				Bosch RSV centrifugal, all-speed type	
Lubricating oil amount (refill capacity) (ℓ)			32 (26)	32 (26)	32 (26)
Coolant amount (engine only) (ℓ)			19	60	46
Alternator			24V, 35 A	24V, 25 A	24V, 13A
Starting motor			24V, 7.5kW	24V, 7.5 kW	24V, 7.5 kW
Battery			12V, 150Ah x 2	12V, 150Ah x 2	12V, 140Ah x 2
Turbocharger			GARRETT CO. T45	GARRETT CO. TV77-05	GARRETT CO. TV77-05
Air compressor			Made by DIESEL KIKI	—	—
Others			—	—	—

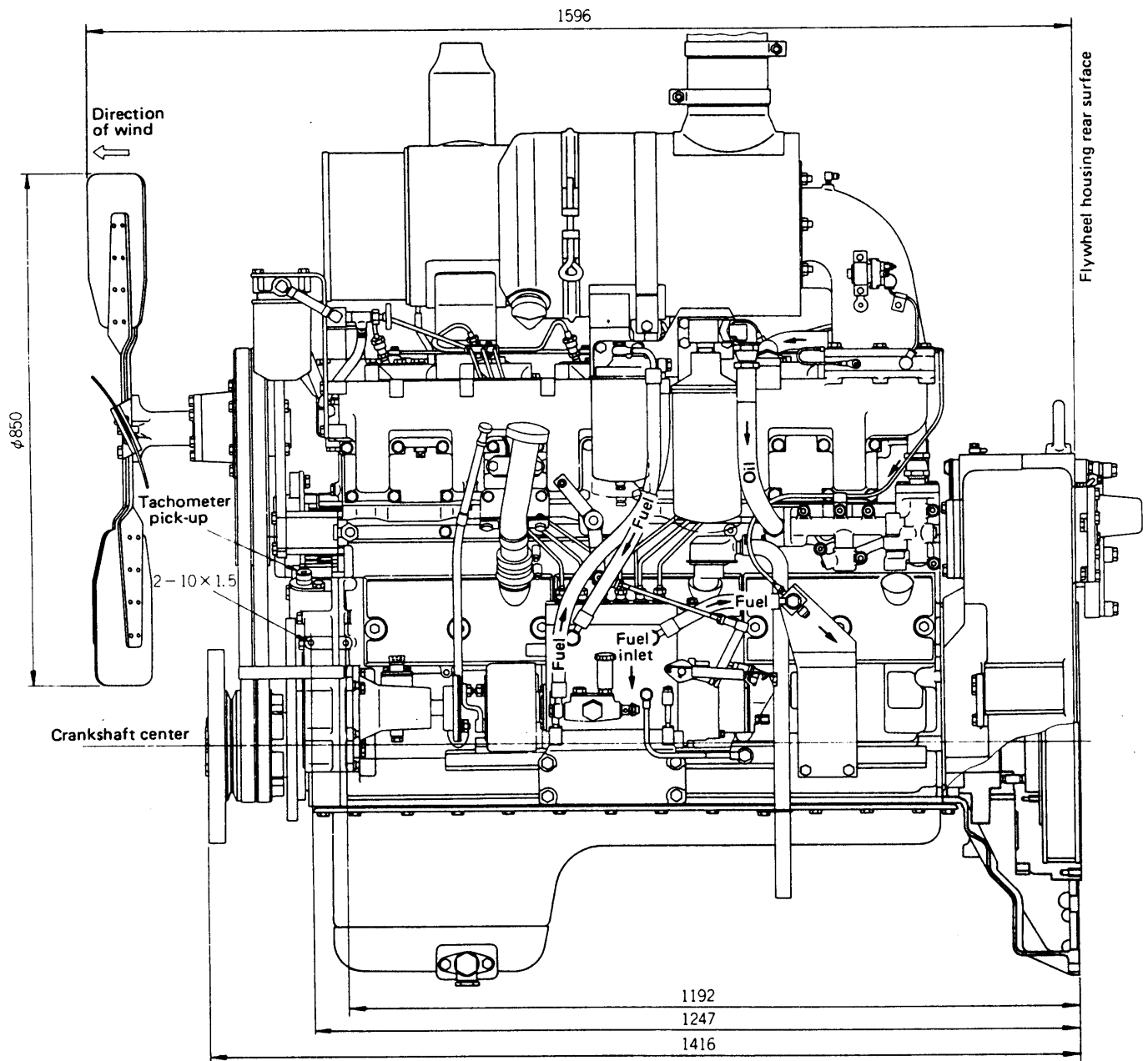
S6D125-1				
EG220, B, BS-1	EG220, B-2	EG220BS-2	HA250 HA270	
6 – 125 x 150				
11,040				
1 – 5 – 3 – 6 – 2 – 4				
1,725	1,725	1,725	1,455	
850	800	850	756	
1,472 1,345 (B, BS)	1,295	1,472	1,129	
—	—	—	—	
230/1,500 (50 Hz) 255/1,800 (60 Hz)	230/1,500 (50 Hz) 255/1,800 (60 Hz)	230/1,500 (50 Hz) 255/1,800 (60 Hz)	240/2,200	
—	—	—	98.8/1,400	
Max. 1,560 (50 Hz) Max. 1,872 (60 Hz)	Max. 1,560 (50 Hz) Max. 1,872 (60 Hz)	Max. 1,560 (50 Hz) Max. 1,872 (60 Hz)	2,550 – 2,650	
700 – 800	725 – 775	725 – 775	650 – 700	
153 (50 Hz) 154 (60 Hz)	153 (50 Hz) 154 (60 Hz)	153 (50 Hz) 154 (60 Hz)	155	
1,050	1,050	1,050	1,025	
Bosch PE-P type			Bosch PE-P type	
Bosch RSV centrifugal, all-speed type			Bosch RED centrifugal max. and min. speed type	
36 (30)	36 (30)	36 (30)	32 (26)	
45	30	42	43	
24V, 13A 24V, 25A (BS)	24V, 13A	24V, 25A	24V, 35A	
24V, 7.5kW	24V, 5.5kW	24V, 5.5kW	24V, 7.5kW	
12V, 150Ah x 2	12V, 150Ah x 2	12V, 150Ah x 2	12V, 150Ah x 2	
GARRETT CO. TV77-05	GARRETT CO. T45	GARRETT CO. T45	GARRETT CO. TV77	
—	—	—	Made by ZEXEL (DIESEL KIKI)	
—	—	—	with exhaust brake (butterfly type)	

Engine			SA6D125-1		
Applicable machine			D135A-1	EG275, B, BS-1	EG275, B, BS-2
Number of cylinder — Bore x Stroke (mm)			6 — 125 x 150		
Total piston displacement (cc)			11,040		
Firing order			1 — 5 — 3 — 6 — 2 — 4		
Dimensions	Overall length (mm)	(mm)	—	1,725	1,725
	Overall width (mm)	(mm)	—	972	800 850 (BS)
	Overall height (excluding exhaust pipe) (mm)	(mm)	—	1,472 1,345 (B, BS)	1,295 1,472 (BS)
	Overall height (including exhaust pipe) (mm)	(mm)	—	—	—
Performance	Flywheel horsepower (HP/rpm)	(HP/rpm)	275/2,000	269/1,500 (50 Hz) 321/1,800 (60 Hz)	269/1,500 (50 Hz) 321/1,800 (60 Hz)
	Maximum torque (kgm/rpm)	(kgm/rpm)	128/1,400	—	—
	High idling speed (rpm)	(rpm)	2,150 — 2,250	Max. 1,560 (50 Hz) Max. 1,872 (60 Hz)	Max. 1,560 (50 Hz) Max. 1,872 (60 Hz)
	Low idling speed (rpm)	(rpm)	650 — 700	700 — 800	700 — 800
	Minimum fuel consumption ratio (g/HPh)	(g/HPh)	160	153 (50 Hz) 155 (60 Hz)	153 (50 Hz) 155 (60 Hz)
Dry weight (kg)			1,350	1,080	1,080
Fuel pump			Bosch PE-P type		
Governor			Bosch RSV centrifugal, all-speed type		
Lubricating oil amount (refill capacity) (ℓ)			30 (27)	32 (26)	32 (26)
Coolant amount (engine only) (ℓ)			90	46	40 42 (BS)
Alternator			24V, 35A	24V, 13A 24V, 25A (BS)	24V, 13A 24V, 25A (BS)
Starting motor			24V, 7.5kW	24V, 7.5kW	24V, 5.5 kW
Battery			12V, 170Ah x 2	12V, 150Ah x 2	12V, 150Ah x 2
Turbocharger			GARRETT CO. TV77	GARRETT CO. TV77-05	GARRETT CO. TV77
Air compressor			—	—	—
Others			with after cooler	with after cooler	with after cooler

Engine model			SA6D125-1		
Applicable machine			SA6D125-M-1		
Number of cylinder – Bore x Stroke		(mm)	6 – 125 x 150		
Total piston displacement		(cc)	11,040		
Firing order			1 – 5 – 3 – 6 – 2 – 4		
Dimensions	Overall length	(mm)	1,340		
	Overall width	(mm)	784		
	Overall height (excluding exhaust pipe)	(mm)	1,105		
	Overall height (including exhaust pipe)	(mm)	–		
Performance	Flywheel horsepower	(HP/rpm)	440/2,300		
	Maximum torque	(kgm/rpm)	–		
	High idling speed	(rpm)	2,450 – 2,550		
	Low idling speed	(rpm)	650 – 700		
	Minimum fuel consumption ratio	(g/HPh)	–		
Dry weight		(kg)	920		
Fuel pump			Bosch PE-P type		
Governor			Bosch RSV centrifugal, all-speed type		
Lubricating oil amount (refill capacity)		(ℓ)	26		
Coolant amount (engine only)		(ℓ)	20 (engine only)		
Alternator		} Selected by A.D.E.			
Starting motor					
Battery					
Turbocharger		} Selected by A.D.E.			
Air compressor					
Others					

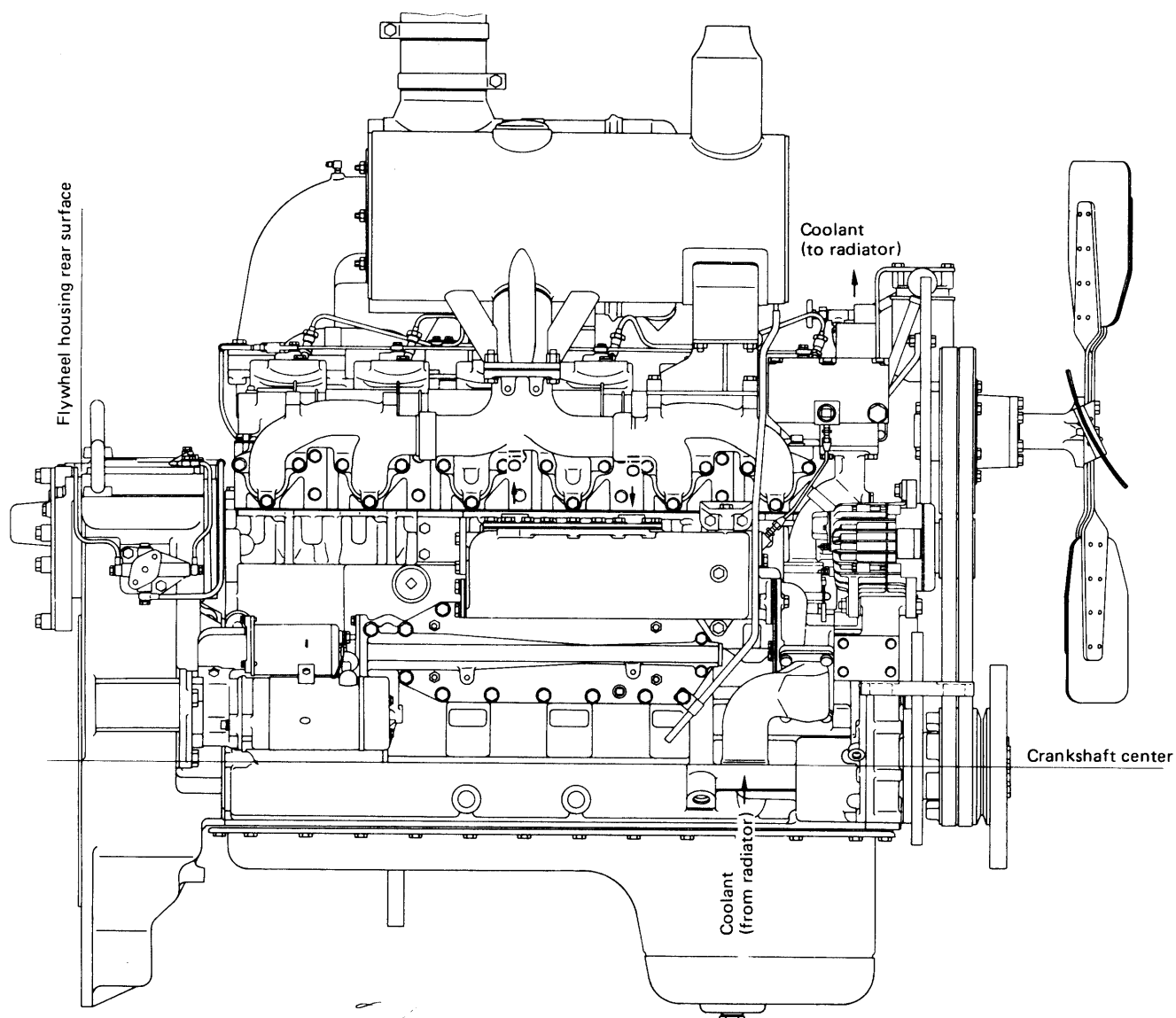
GENERAL ASSEMBLY DRAWING

6D125-1 LEFT SIDE VIEW (For D60A-8)



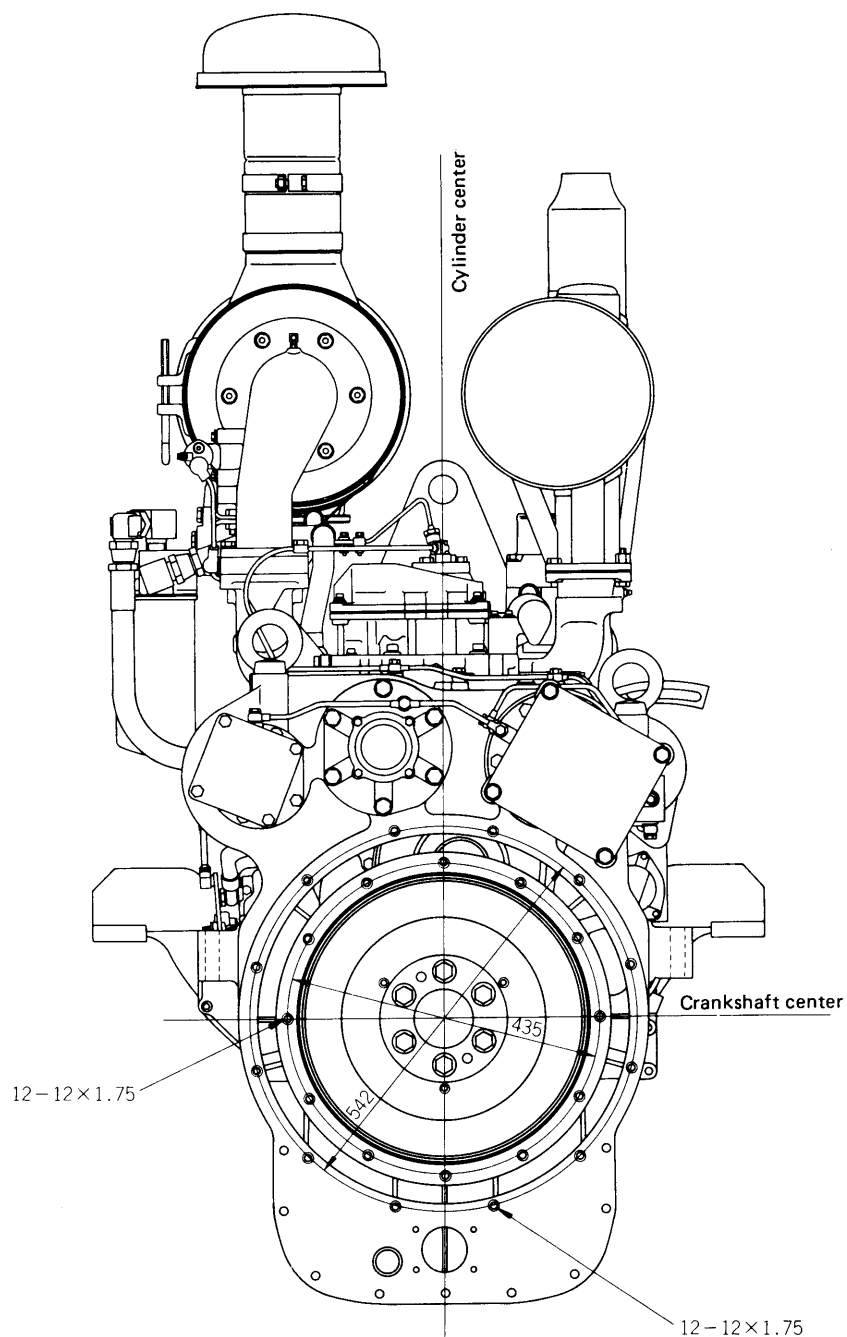
6150F001

6D125-1 RIGHT SIDE VIEW (For D60A-8)



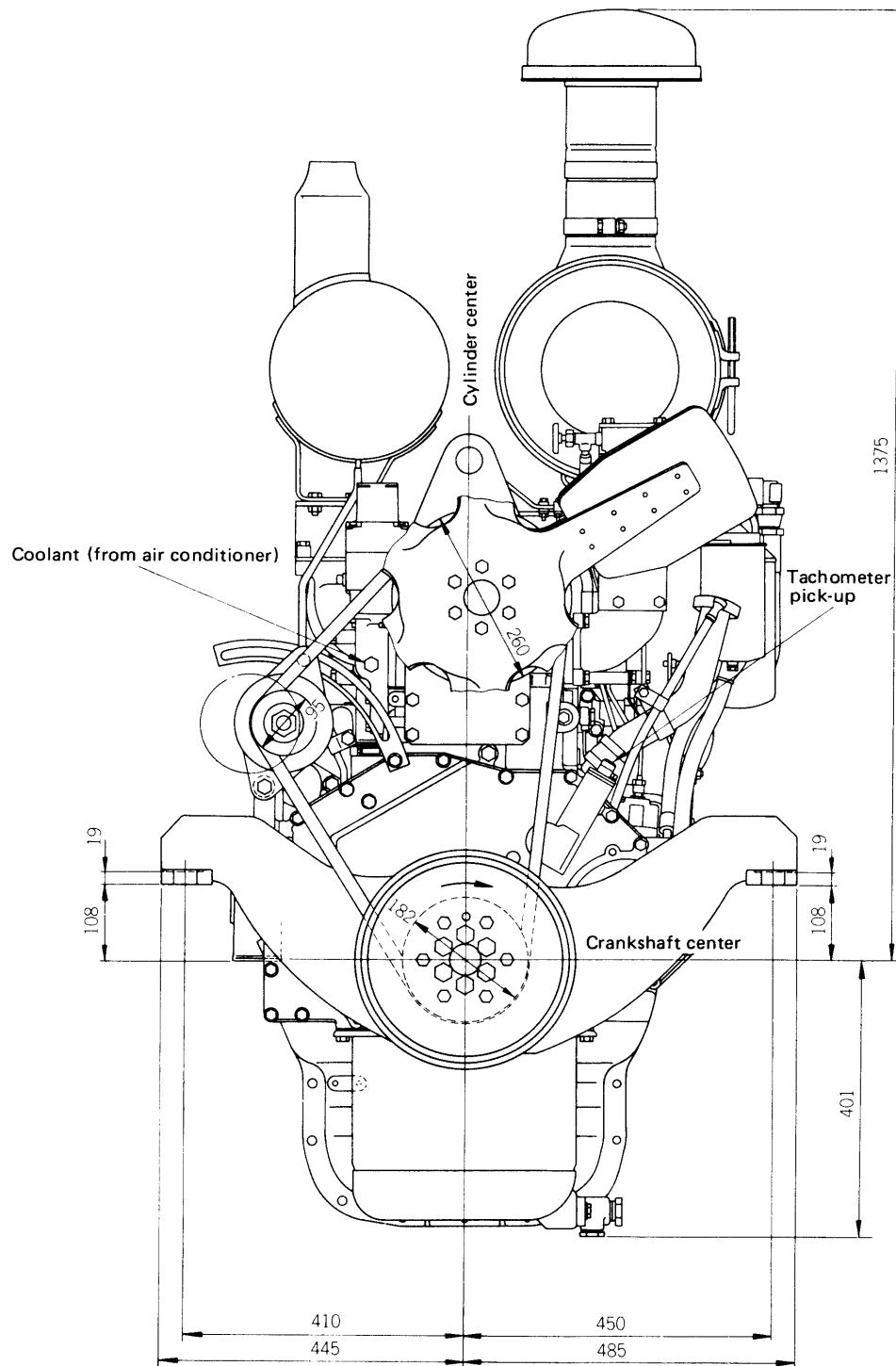
6150F002

6D125-1 REAR VIEW (For D60A-8)



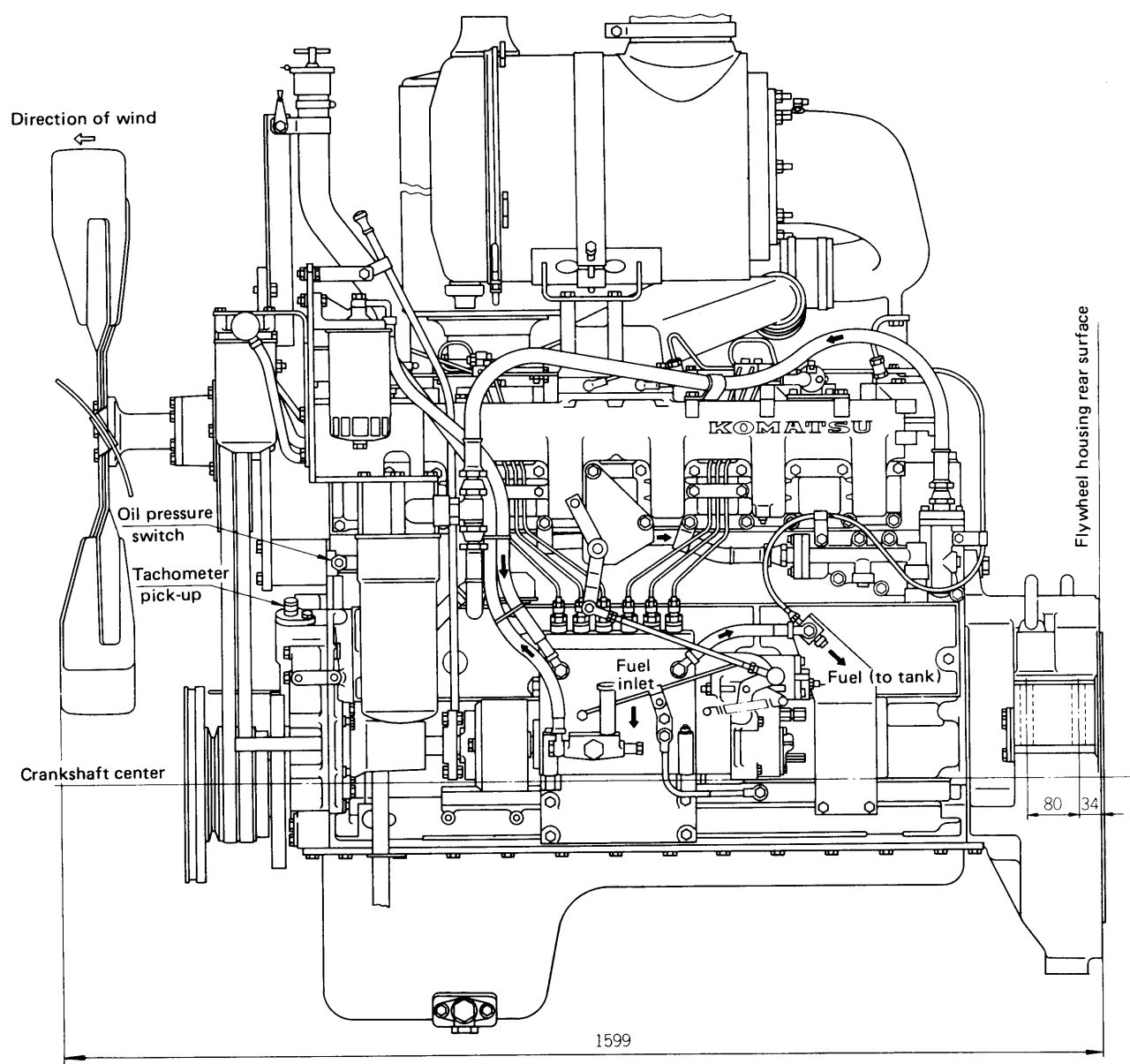
6150F004

6D125-1 FRONT VIEW (For D60A-8)



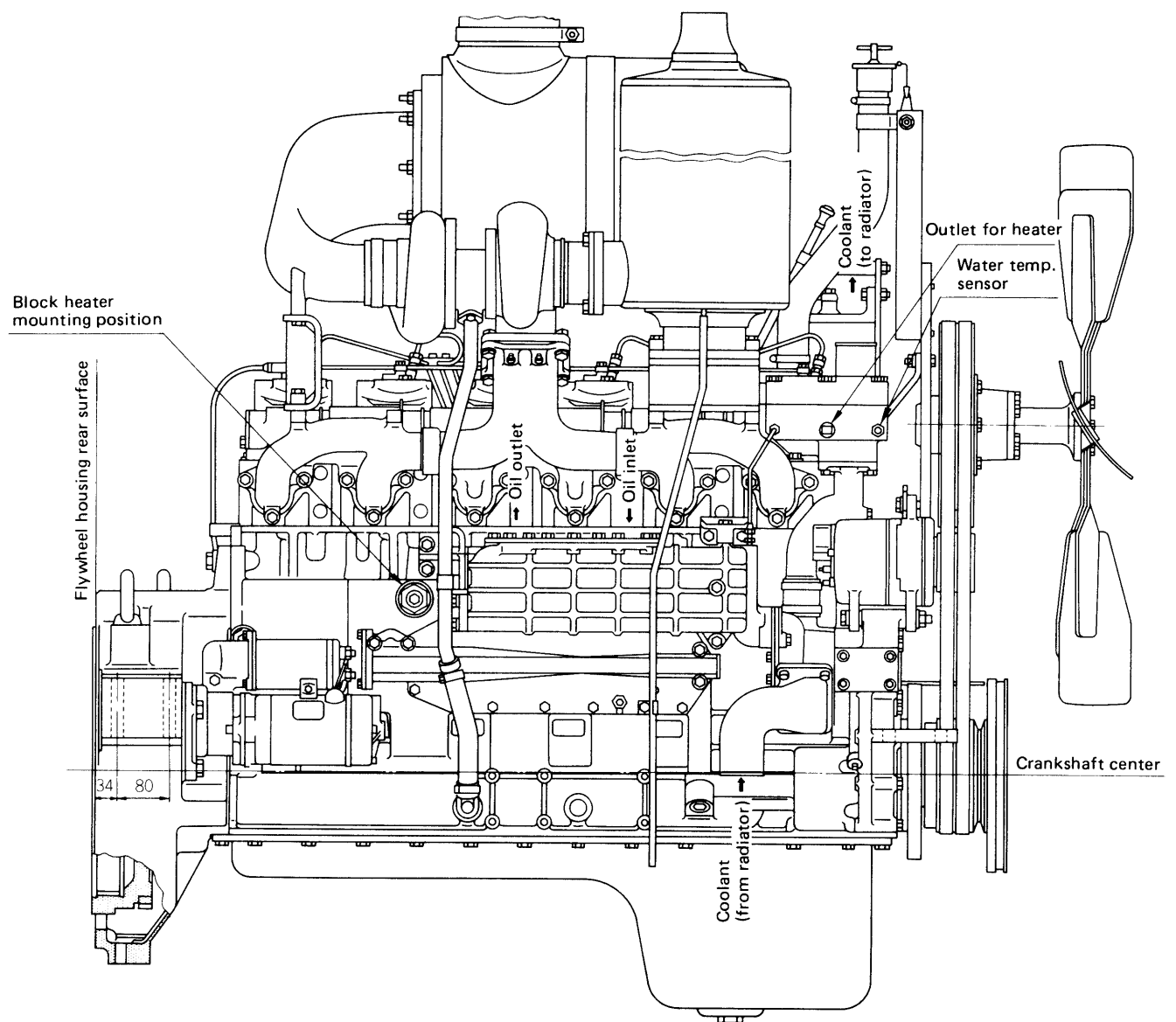
6150F003

S6D125-1 LEFT SIDE VIEW (For D75S-5)



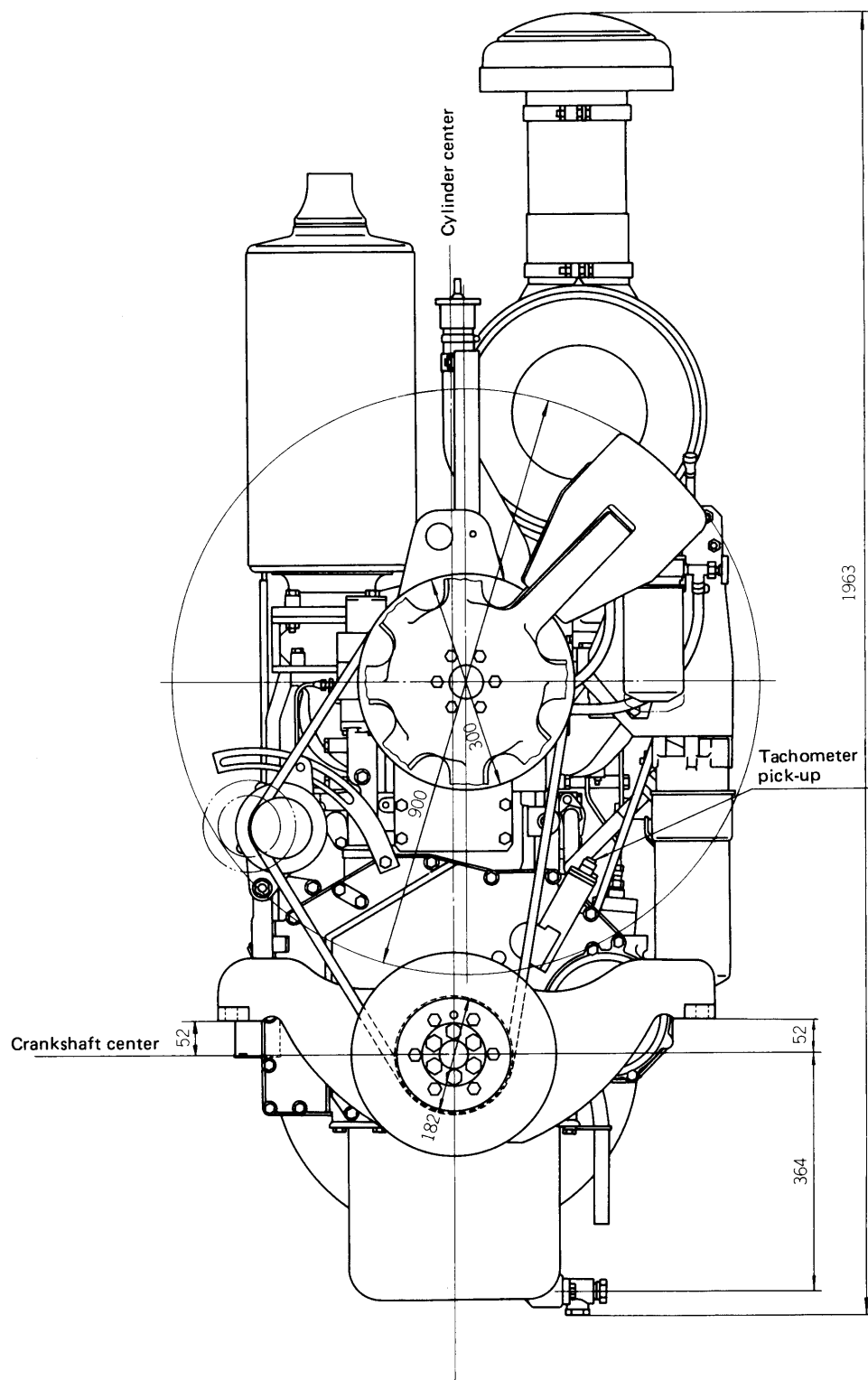
6150F005

S6D125-1 RIGHT SIDE VIEW (For D75S-5)



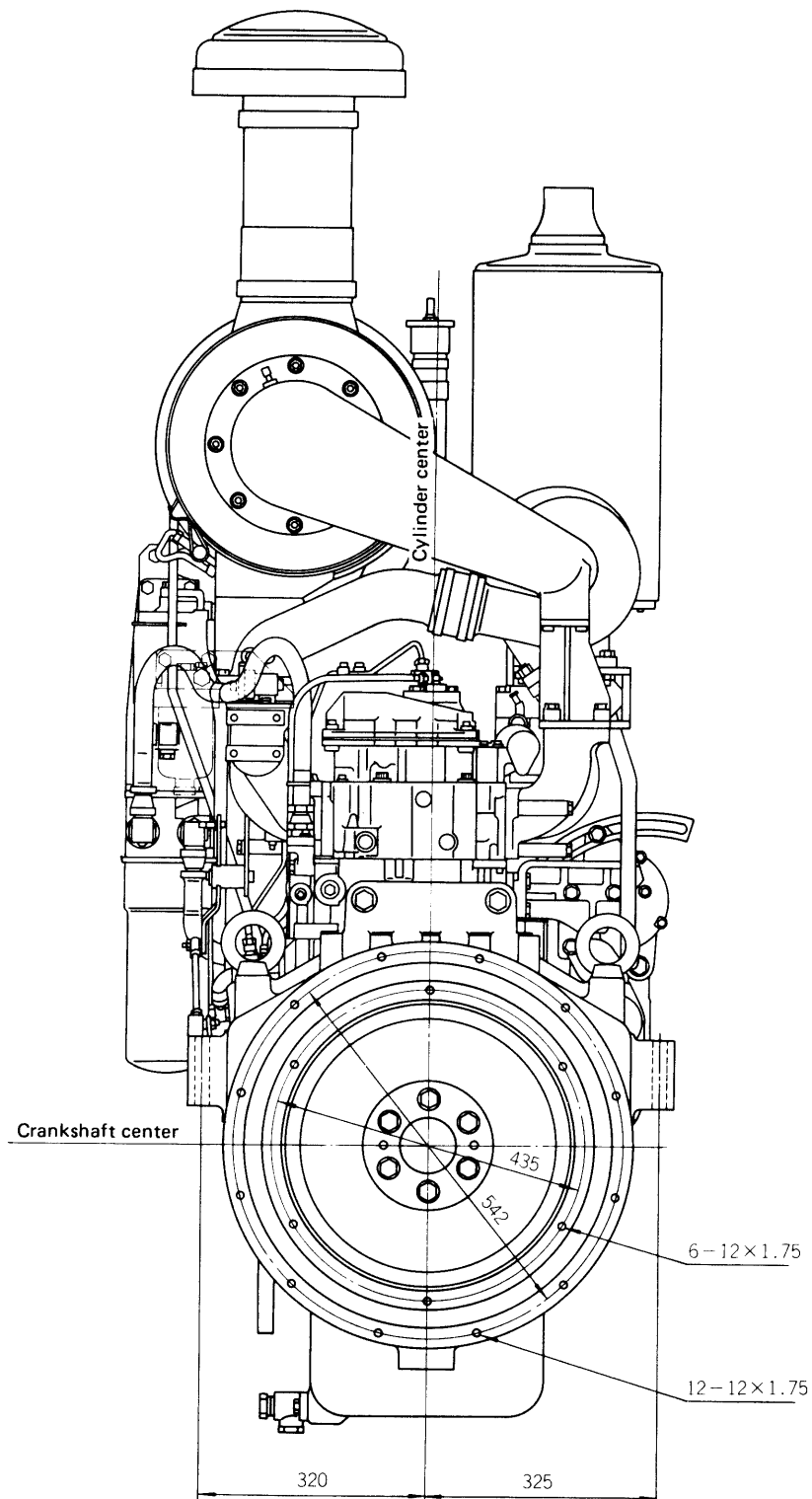
6150F006

S6D125-1 FRONT VIEW (For D75S-5)



6150F007

S6D125-1 REAR VIEW (For D75S-5)

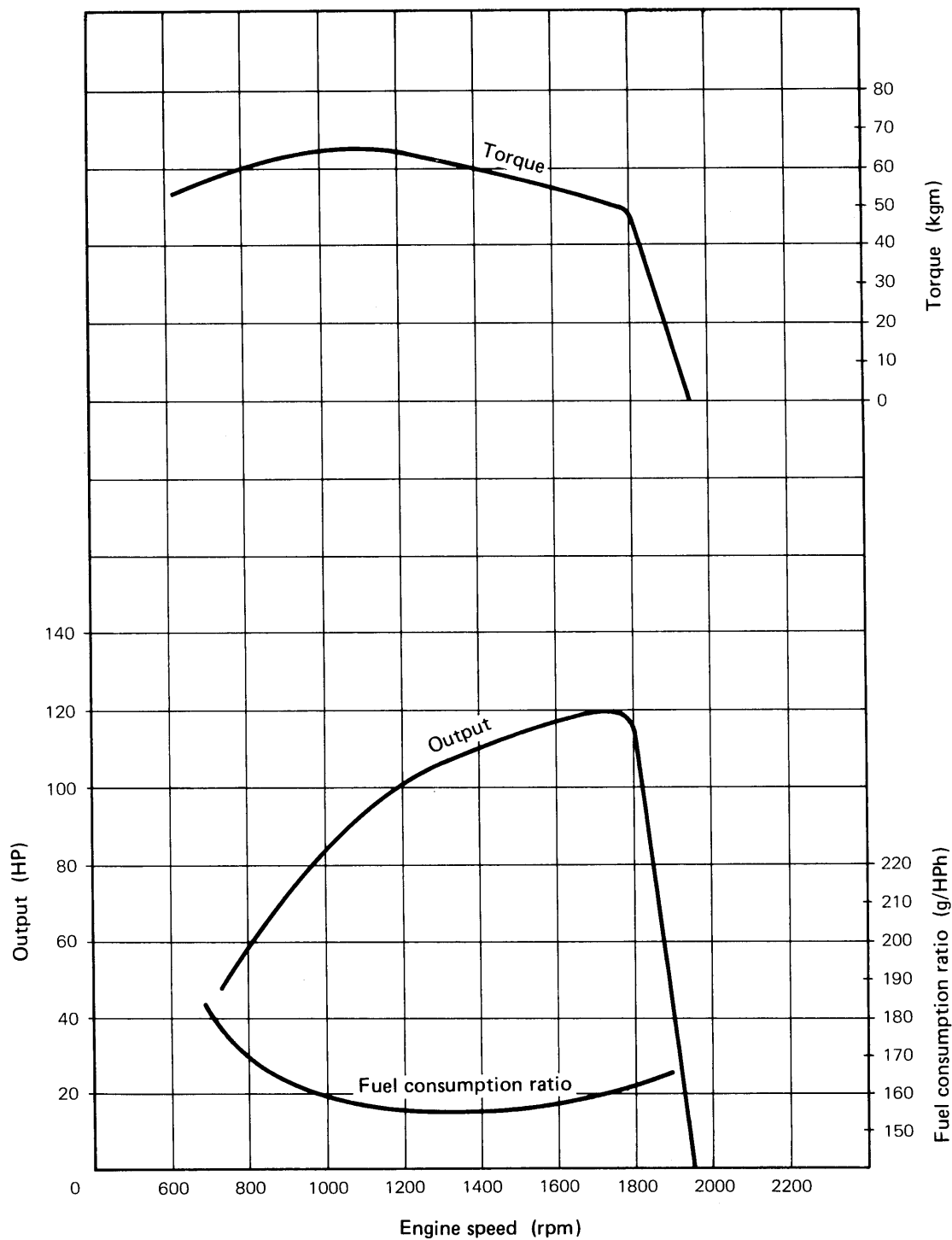


6150F008

ENGINE PERFORMANCE CURVE

6D125-1 (For D50A-17, D50P-17)

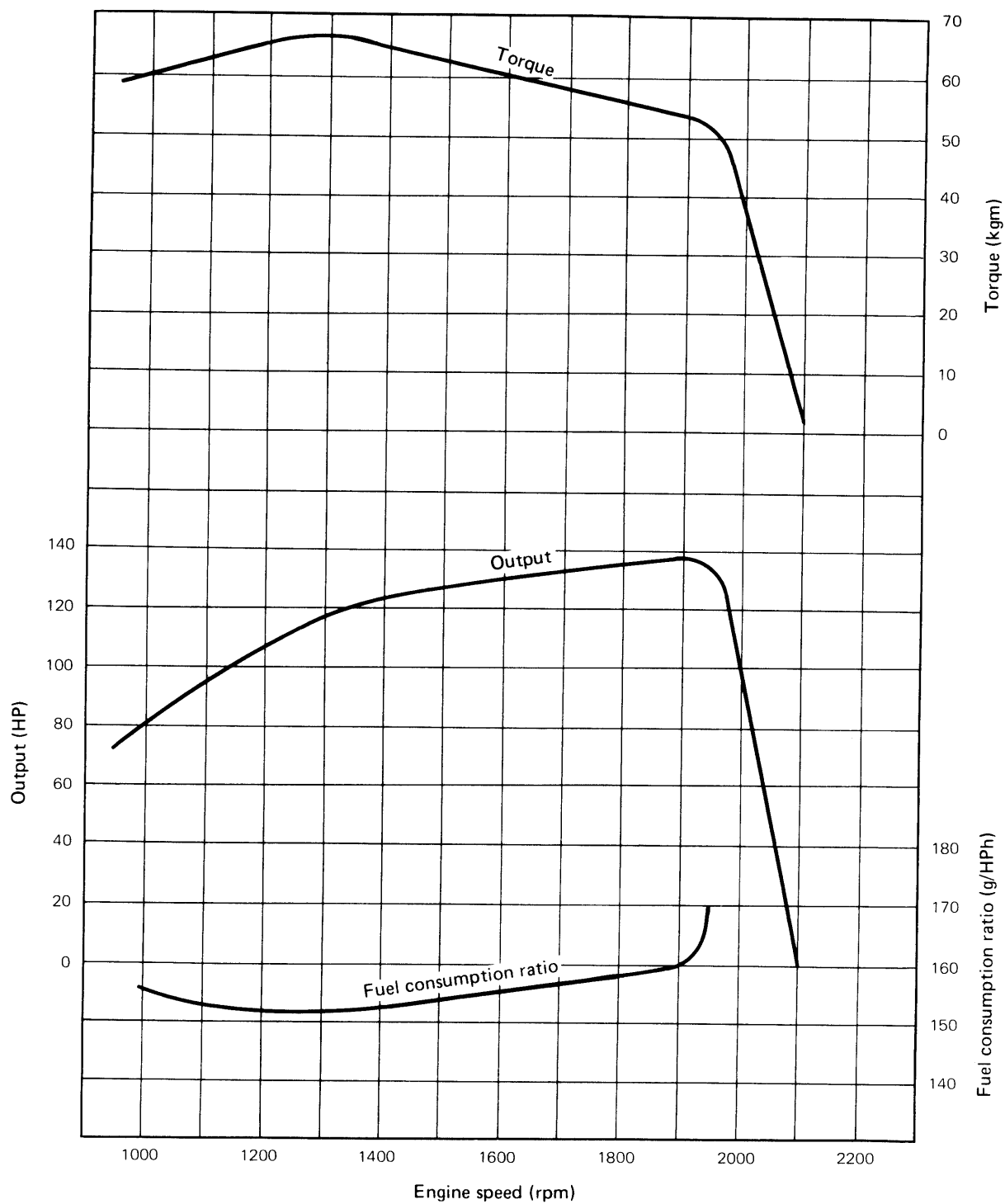
Flywheel horsepower: 120HP/1,750 rpm
Maximum torque: 65.5 kgm/1,100 rpm
Minimum fuel consumption ratio: 155 g/HPh



F615001001

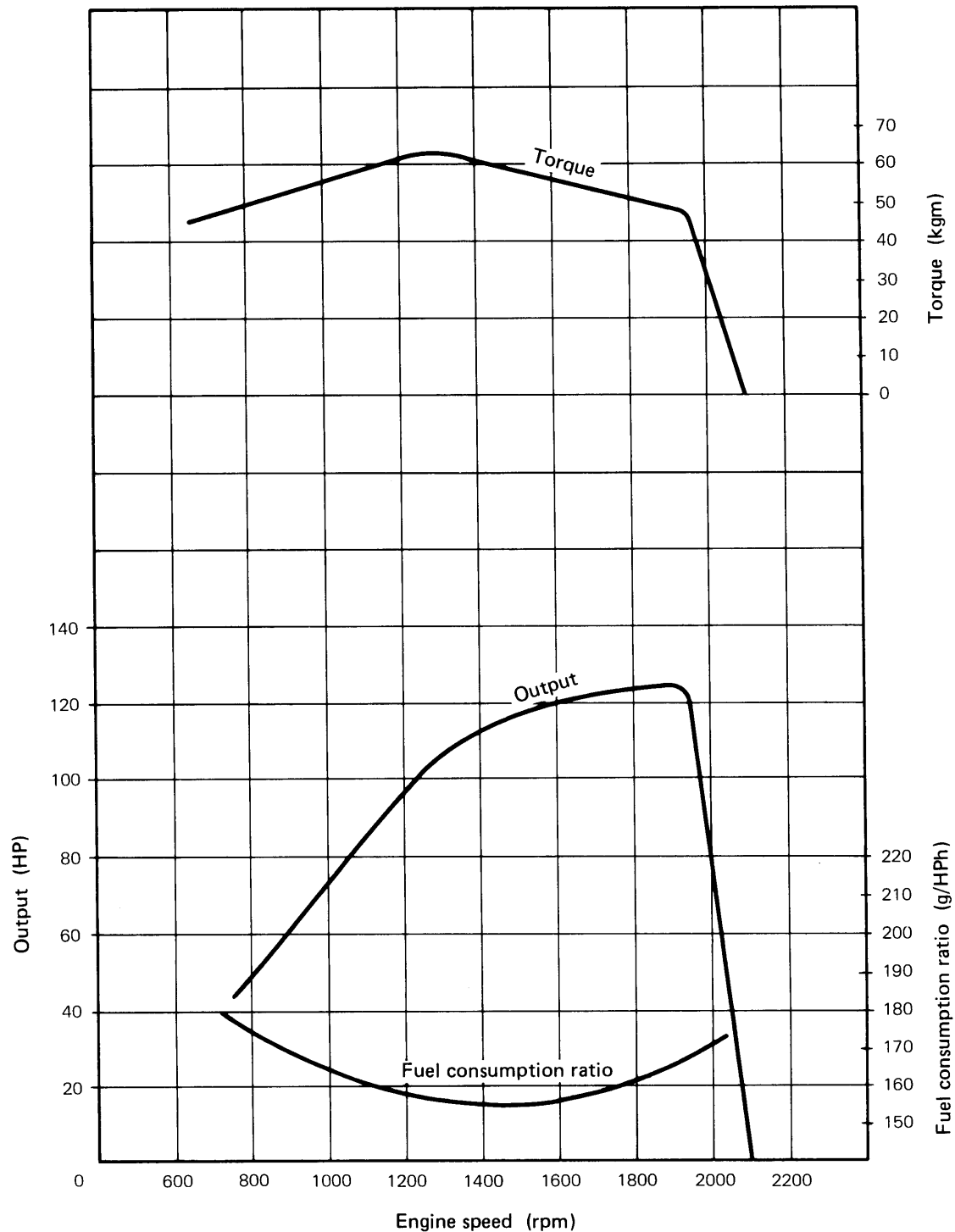
6D125-1 (For D50F-17)

Flywheel horsepower: 138HP/1,900 rpm
Maximum torque: 66 kgm/1,300 rpm
Minimum fuel consumption ratio: 155 g/HPh



6D125-1 (For D53A-17, D53P-17)

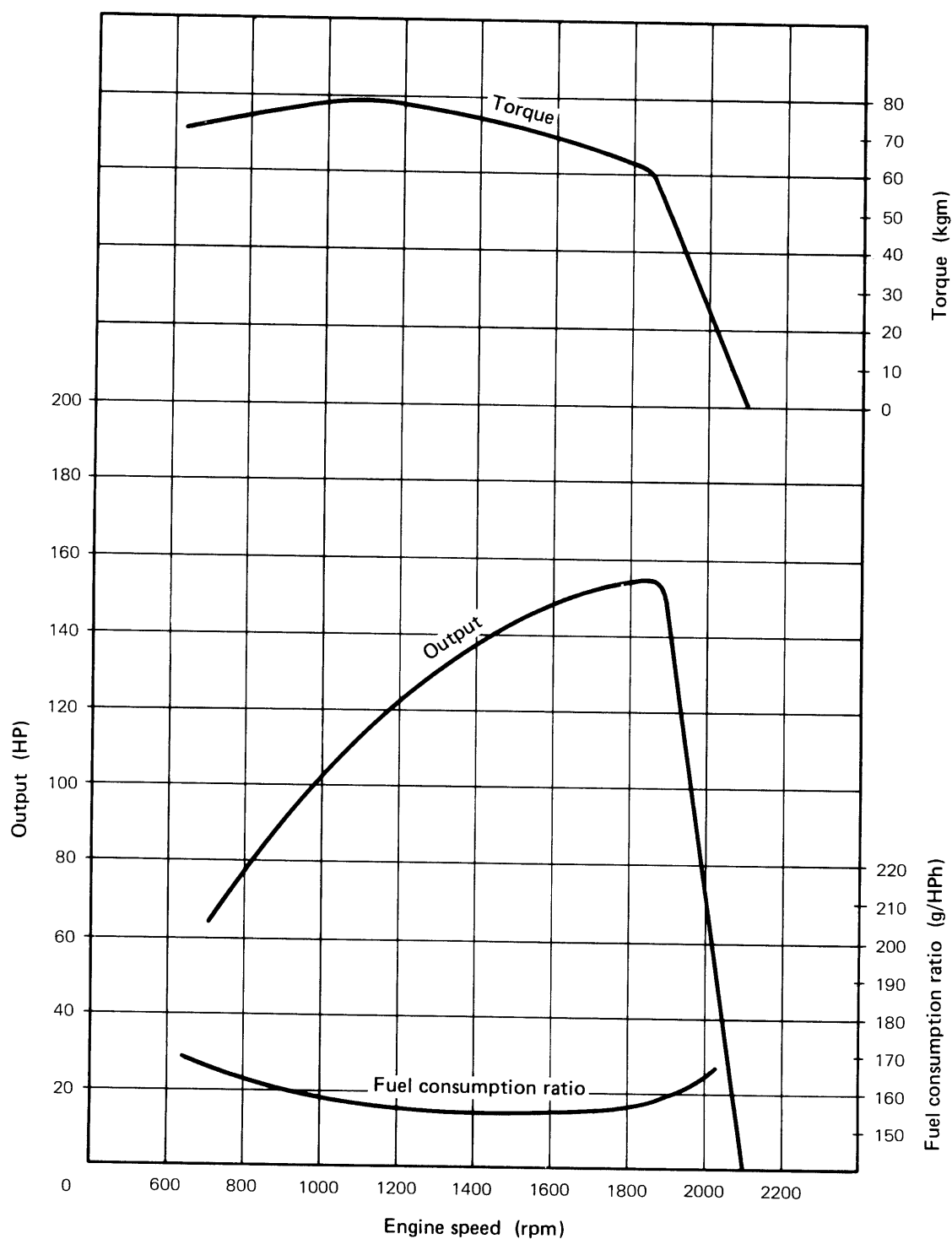
Flywheel horsepower: 124HP/1,900 rpm
Maximum torque: 62.5 kgm/1,300 rpm
Minimum fuel consumption ratio: 156 g/HPh



F615001002

6D125-1 (For D60A-8)

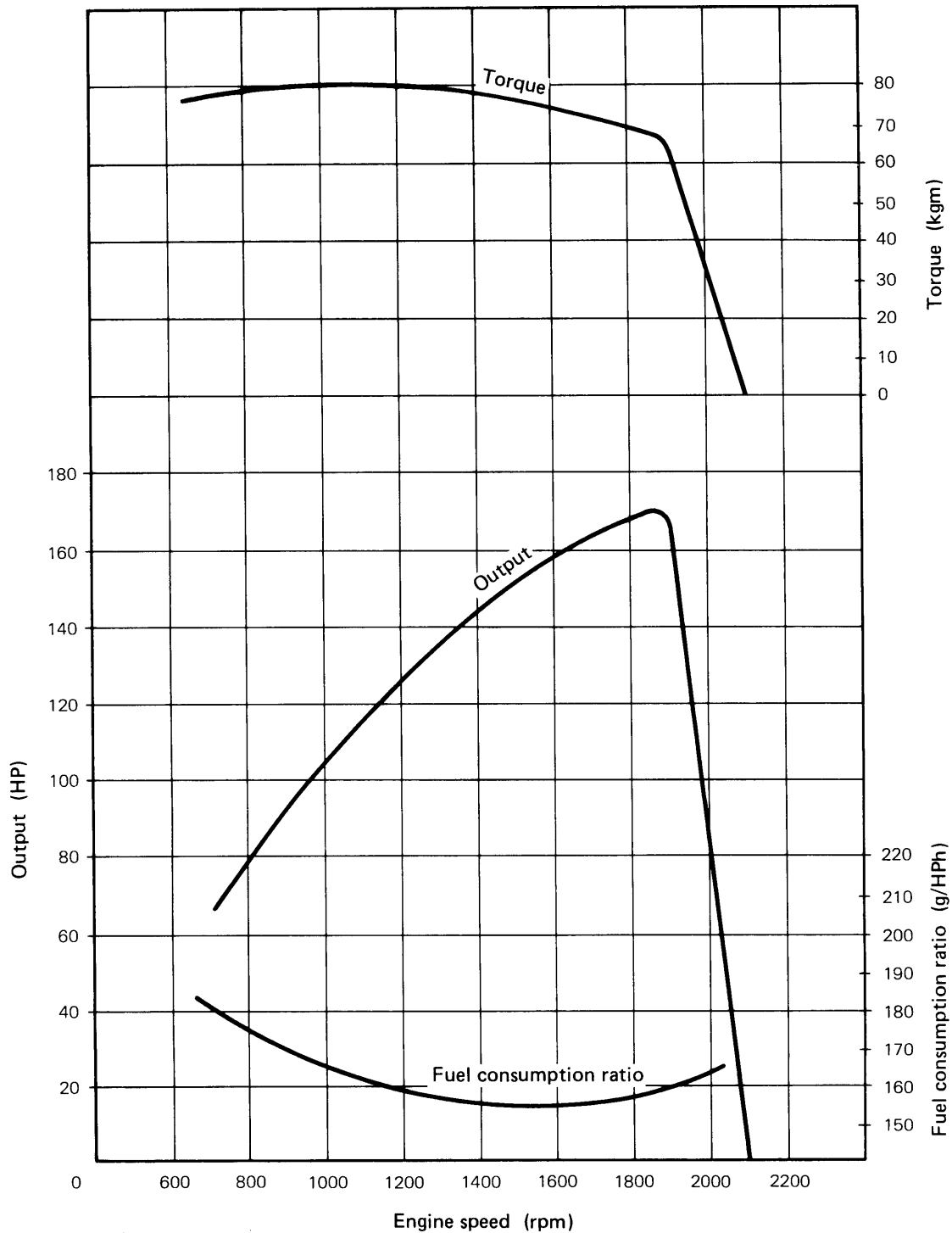
Flywheel horsepower: 155HP/1,850 rpm
Maximum torque: 78 kgm/1,100 rpm
Minimum fuel consumption ratio: 155 g/HPh



F615001003

6D125-1 (For D60E-8)

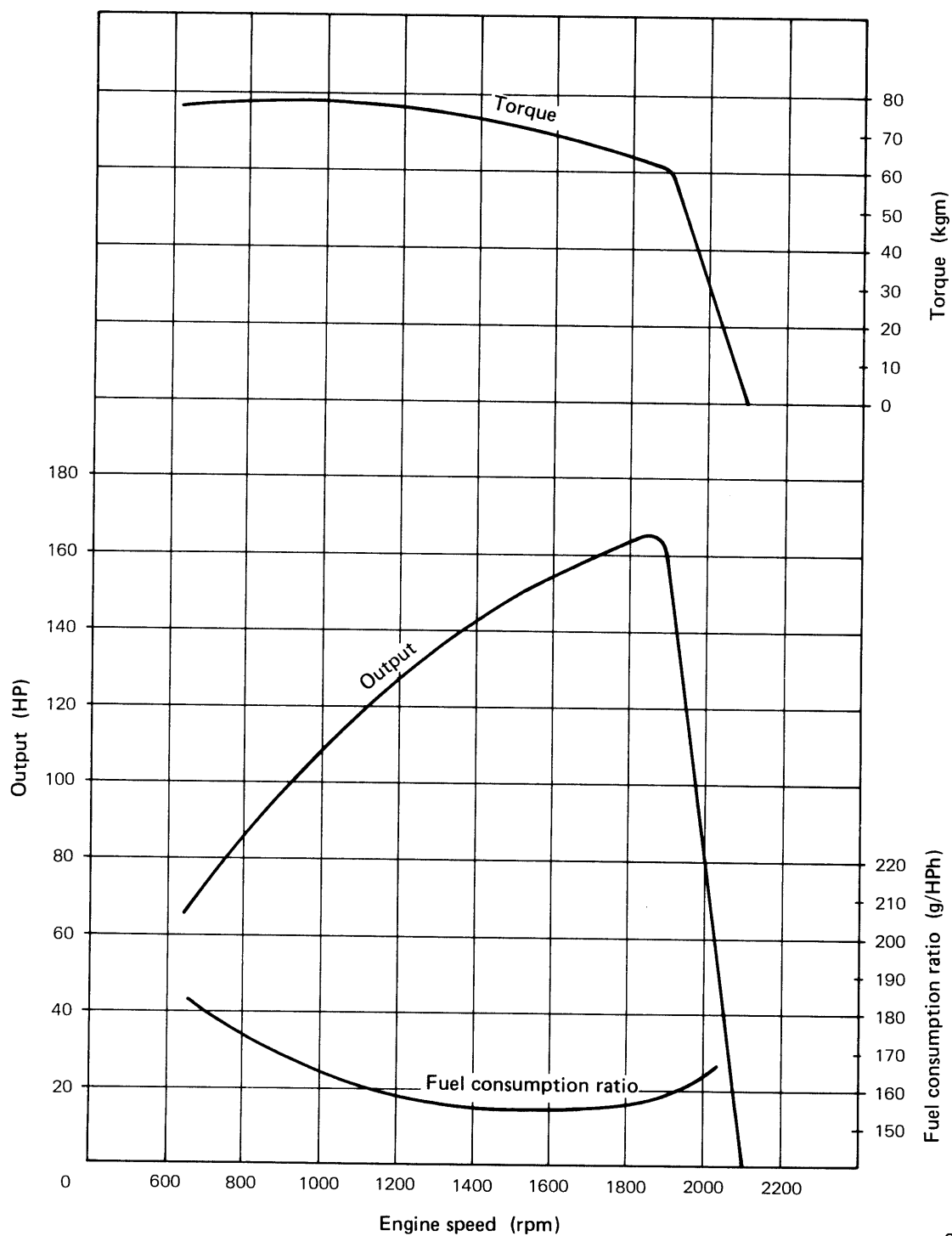
Flywheel horsepower: 170HP/1,850 rpm
Maximum torque: 81 kgm/1,100 rpm
Minimum fuel consumption ratio: 155 g/HPh



F615001004

6D125-1 (For D60P-8 and D60PL-8)

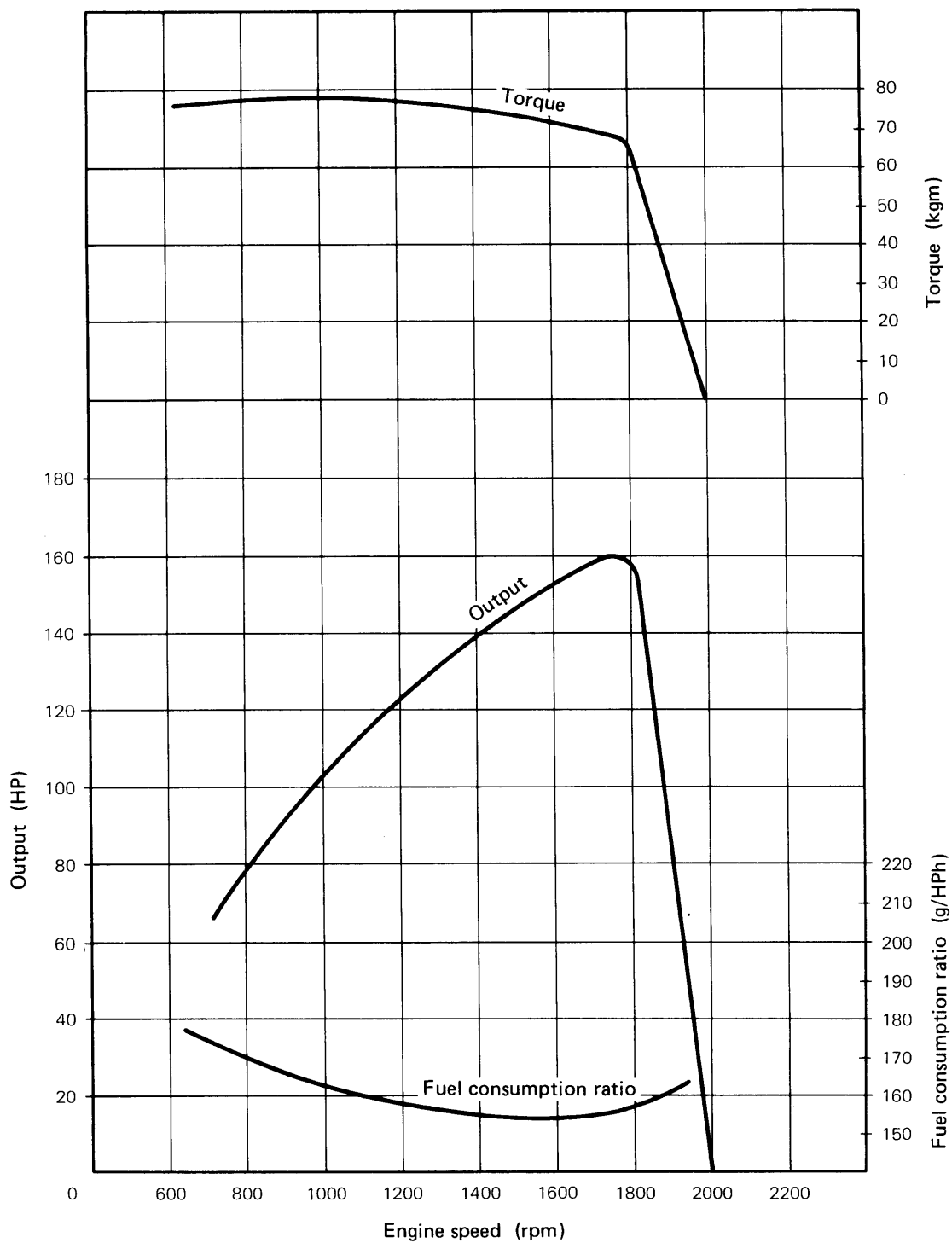
Flywheel horsepower: 165HP/1,850 rpm
Maximum torque: 78 kgm/1,000 rpm
Minimum fuel consumption ratio: 155 g/HPh



6150F012

6D125-1 (For D60S-8)

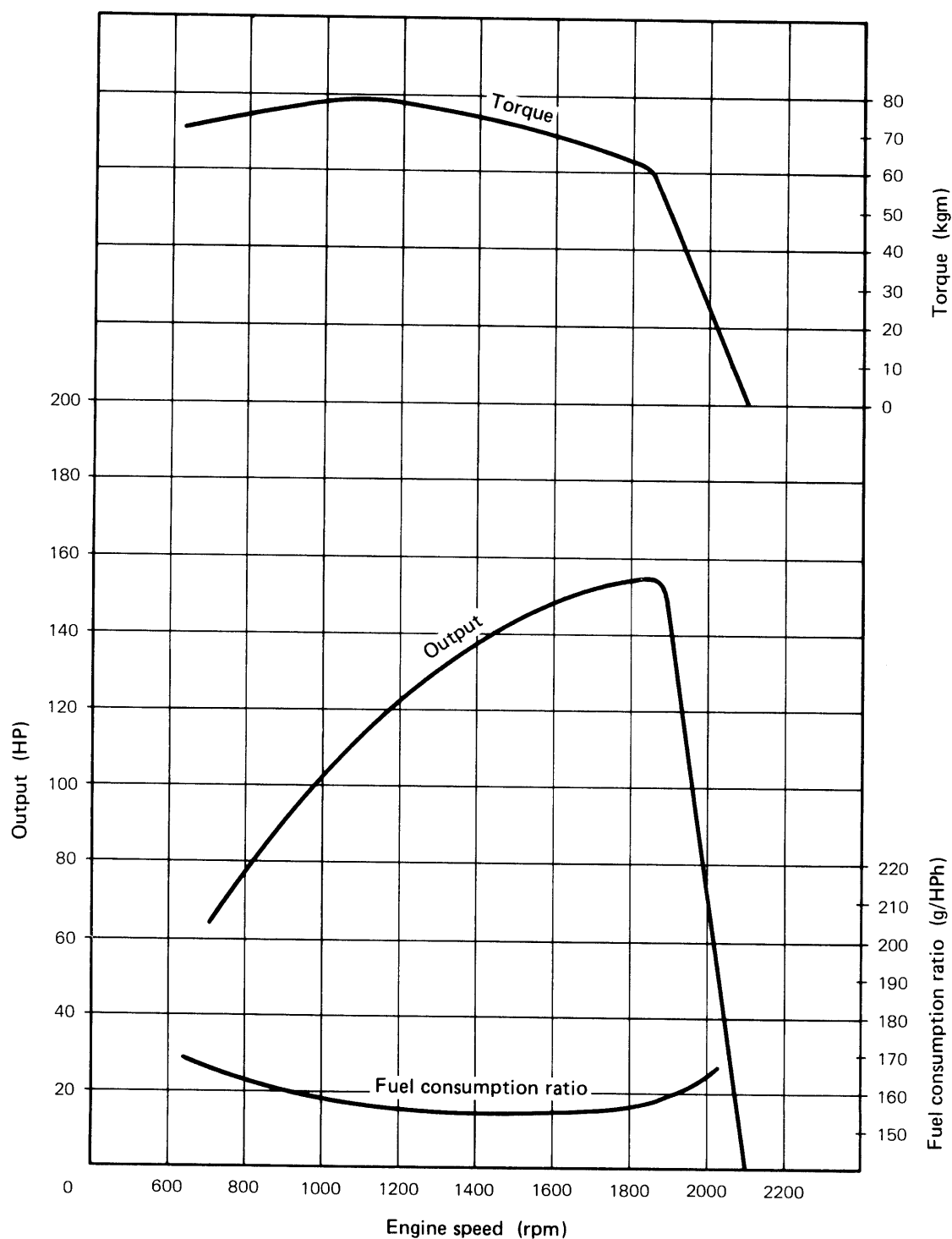
Flywheel horsepower: 160HP/1,750 rpm
Maximum torque: 78 kgm/1,000 rpm
Minimum fuel consumption ratio: 155 g/HPh



F615001005

6D125-1 (For D65A-8)

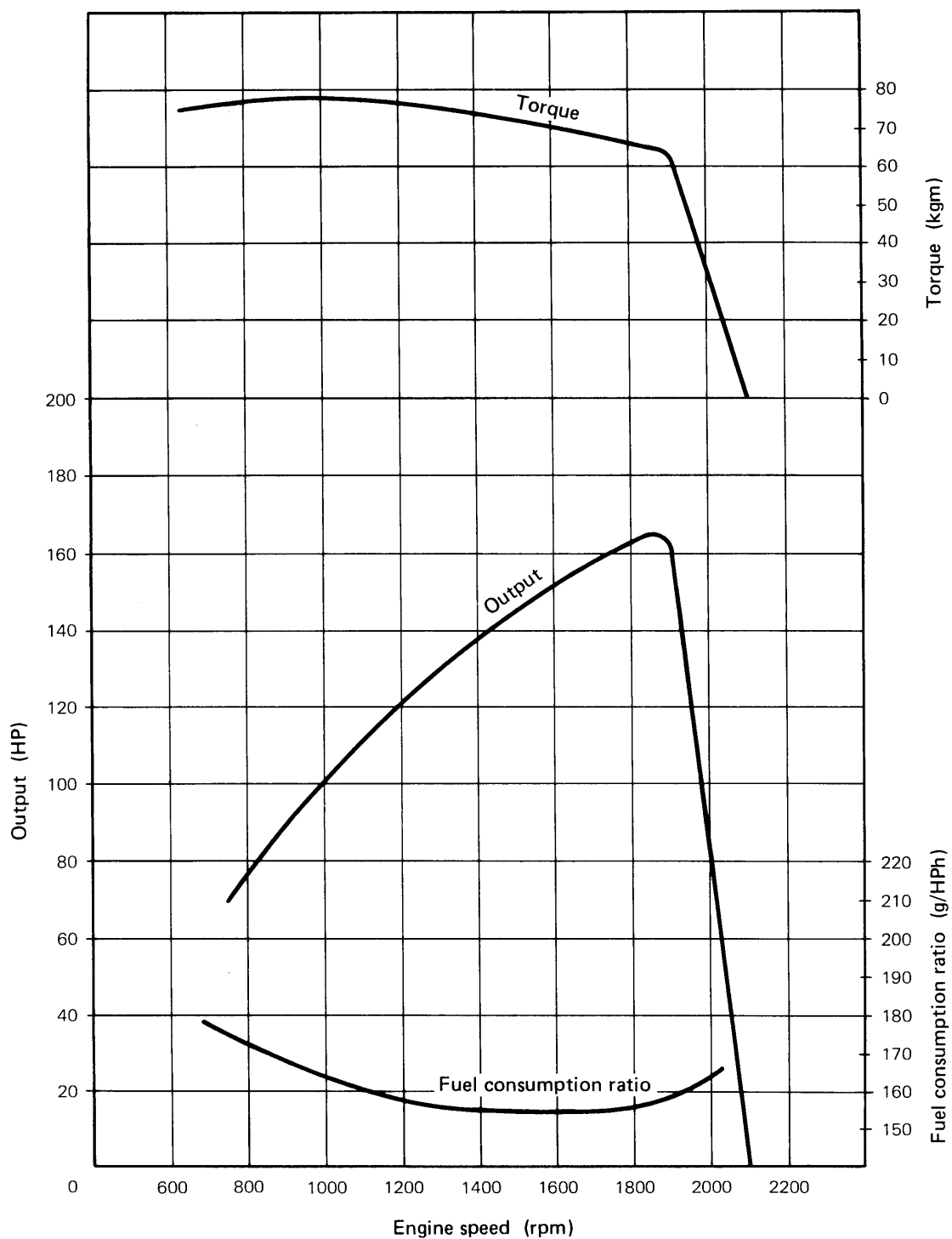
Flywheel horsepower: 155HP/1,850 rpm
Maximum torque: 78 kgm/1,100 rpm
Minimum fuel consumption ratio: 155 g/HPh



F615001003

6D125-1 (For D65E-8, D65P-8)

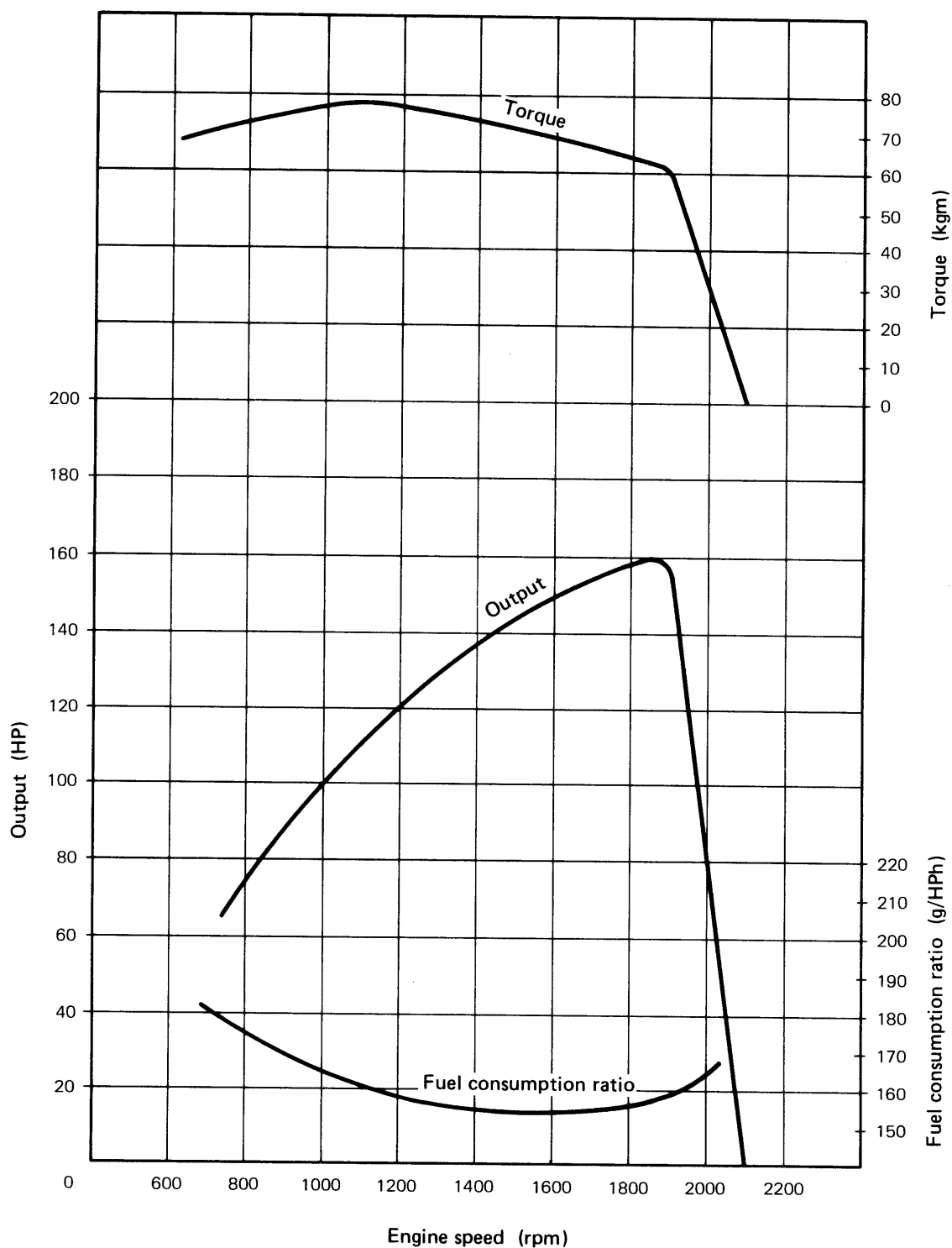
Flywheel horsepower: 165HP/1,850 rpm
Maximum torque: 78 kgm/1,000 rpm
Minimum fuel consumption ratio: 155 g/HPh



F615001006

6D125-1 (For D65S-8)

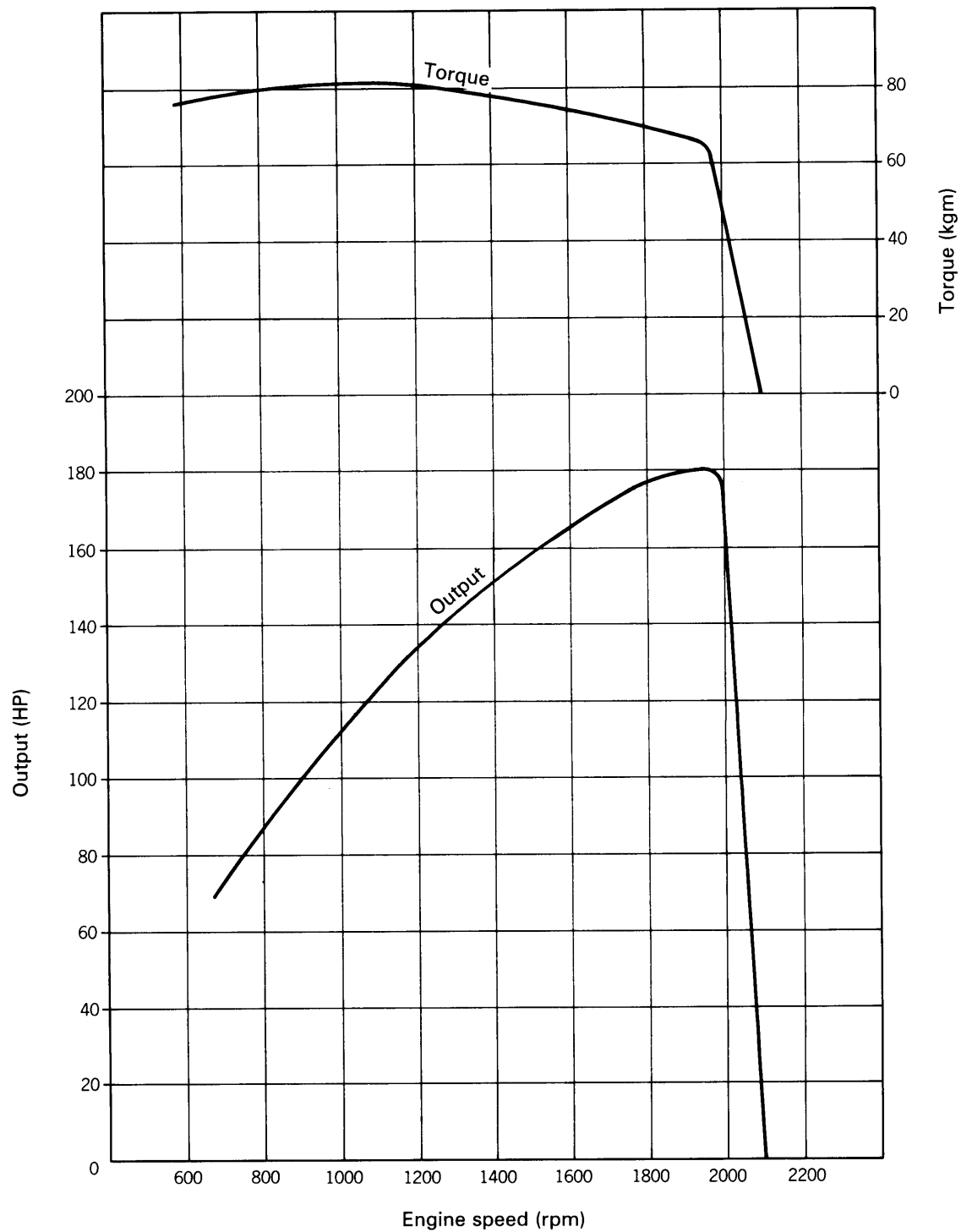
Flywheel horsepower: 160HP/1,850 rpm
Maximum torque: 78 kgm/1,100 rpm
Minimum fuel consumption ratio: 155 g/HPh



F615001007

6D125-1 (For D65E-12)

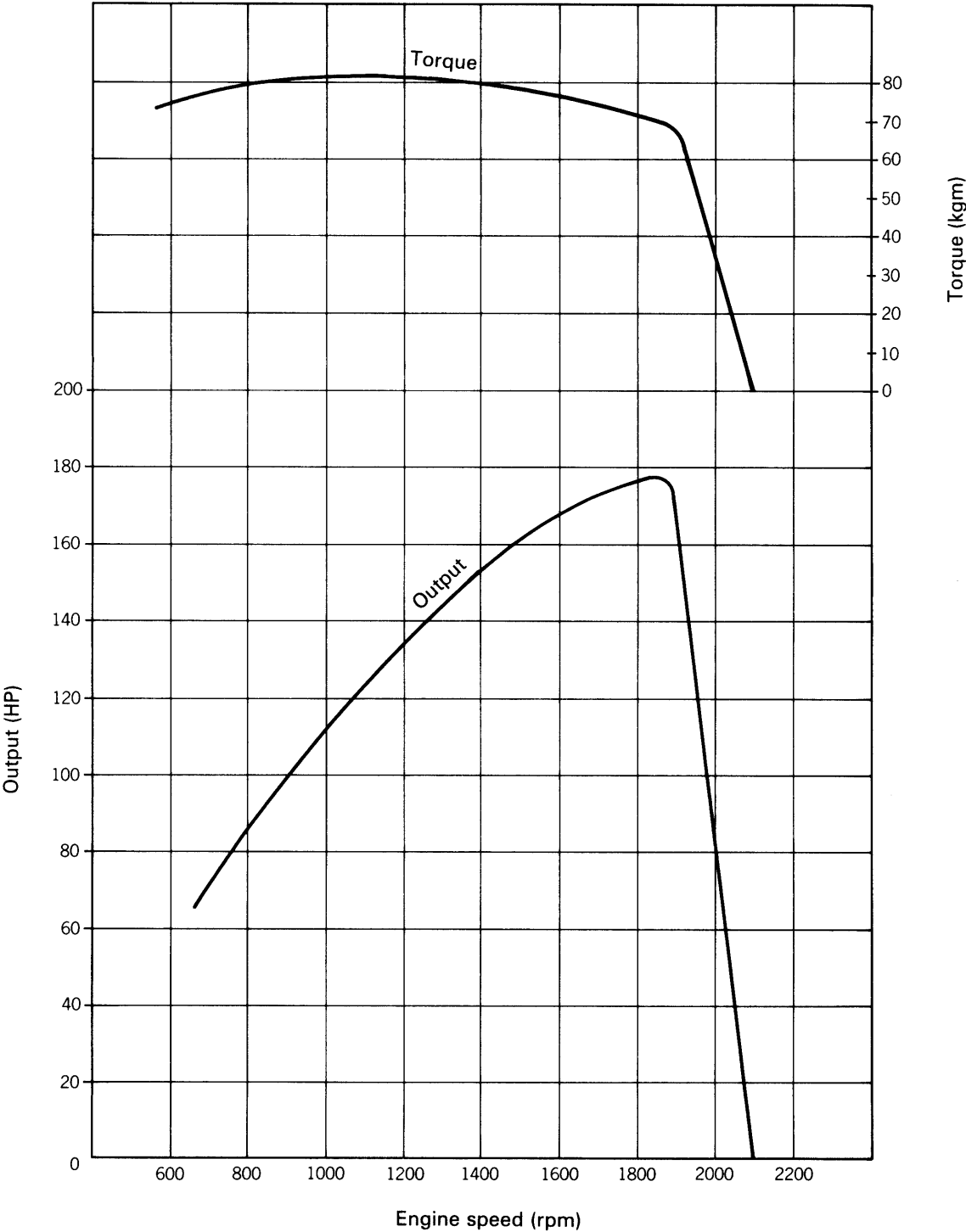
Flywheel horsepower: 180 HP/1,950 rpm
Maximum torque: 81.5 kgm/1,100 rpm
Minimum fuel consumption ratio: 161 g/HPh



6150F061

6D125-1 (For D70LE-1)

Flywheel horsepower: 177.5 HP/1,850 rpm
Maximum torque: 81.5 kgm/1,100 rpm
Minimum fuel consumption ratio: 155 g/HPh

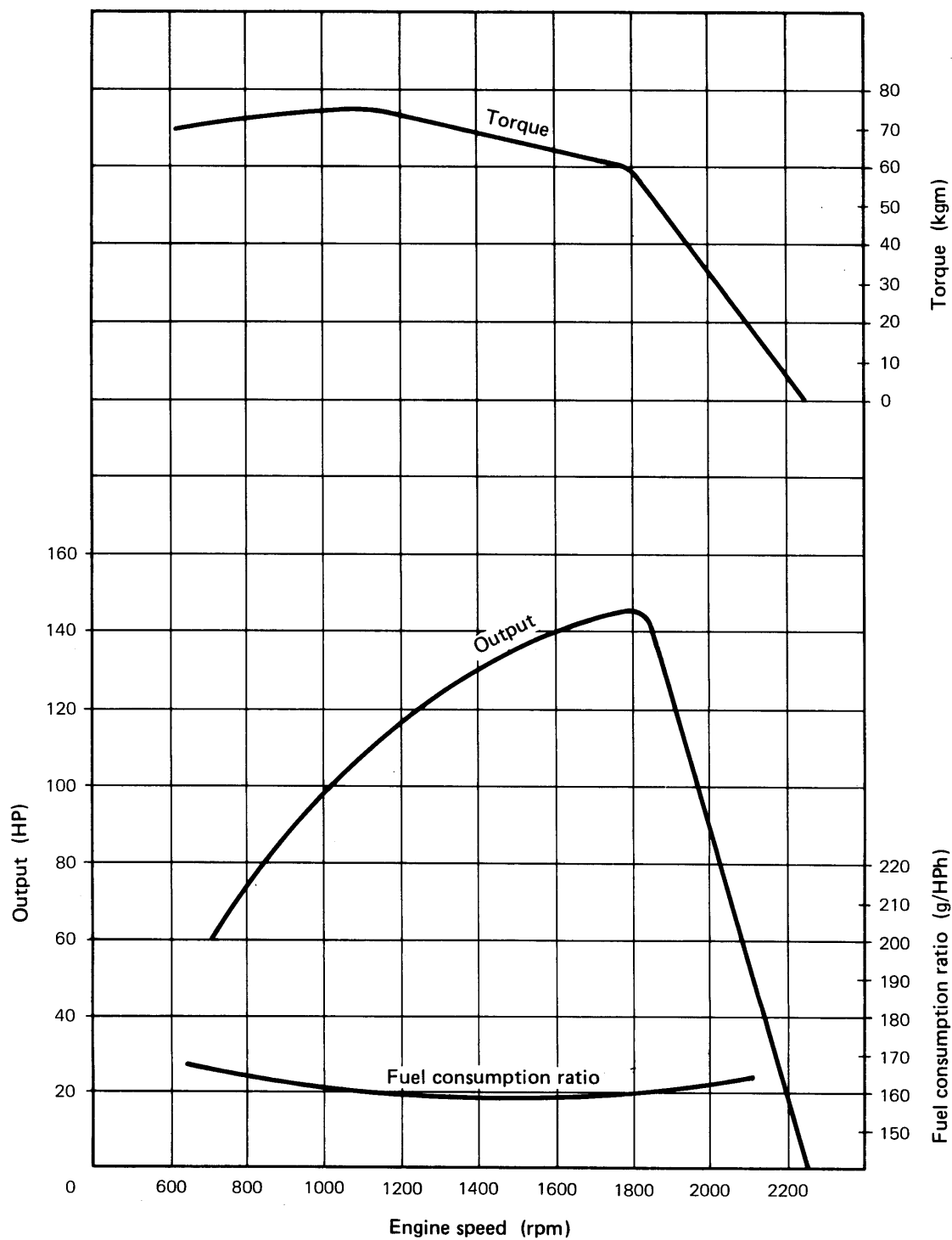


6D125-1 (For GD600R-3, GD605R-3, GD605A-3 with 146 HP engine)

Flywheel horsepower: 146HP/1,800 rpm

Maximum torque: 74 kgm/1,100 rpm

Minimum fuel consumption ratio: 159 g/HPh



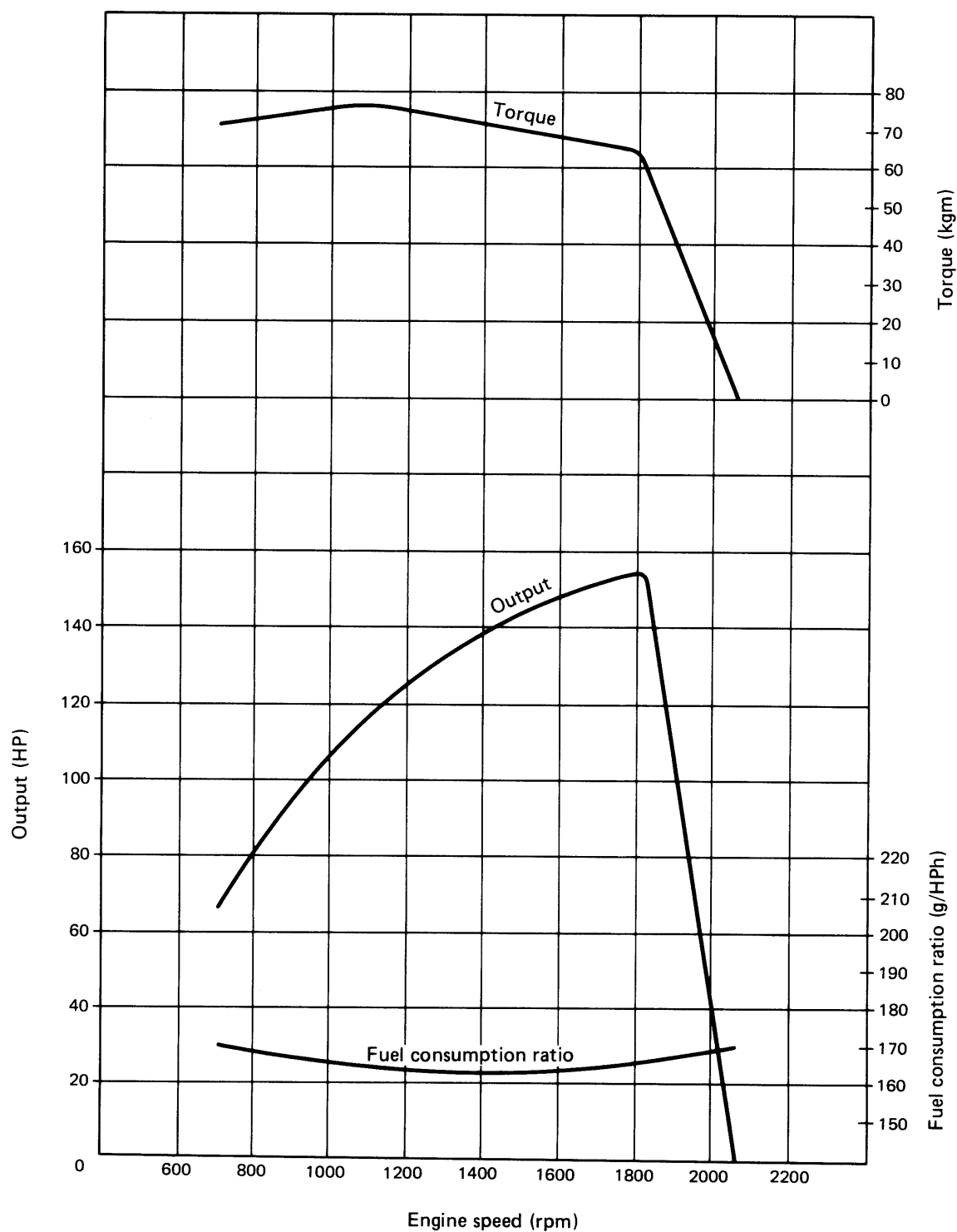
F615001008

6D125-1 (For GD605A-3 with 155HP engine)

Flywheel horsepower: 155HP/1,800 rpm

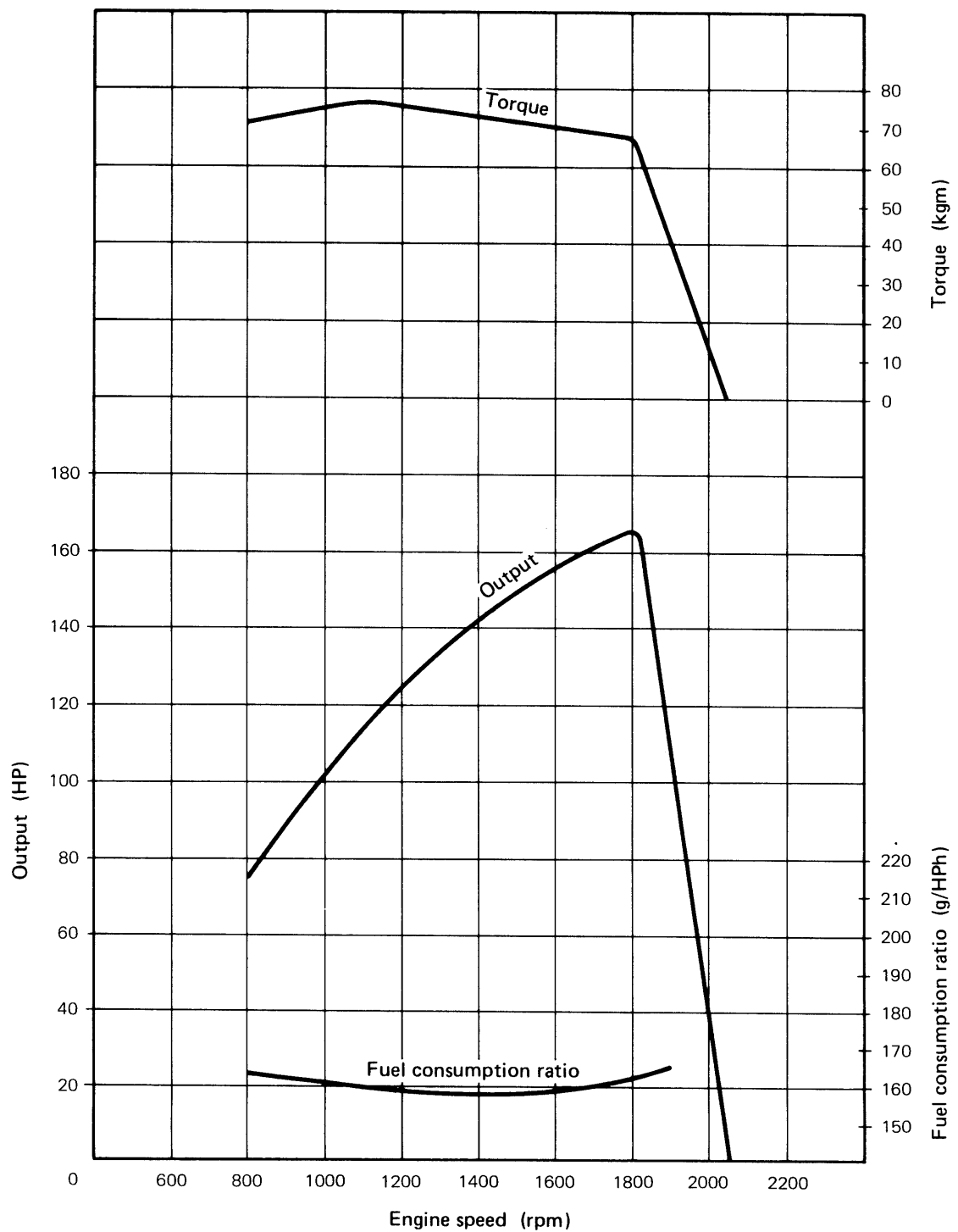
Maximum torque: 77 kgm/1,100 rpm

Minimum fuel consumption ratio: 163 g/HPH



6D125-1 (For GD650R-3, GD655R-3, GD655A-3)

Flywheel horsepower: 165HP/1,800 rpm
Maximum torque: 78 kgm/1,100 rpm
Minimum fuel consumption ratio: 159 g/HPh



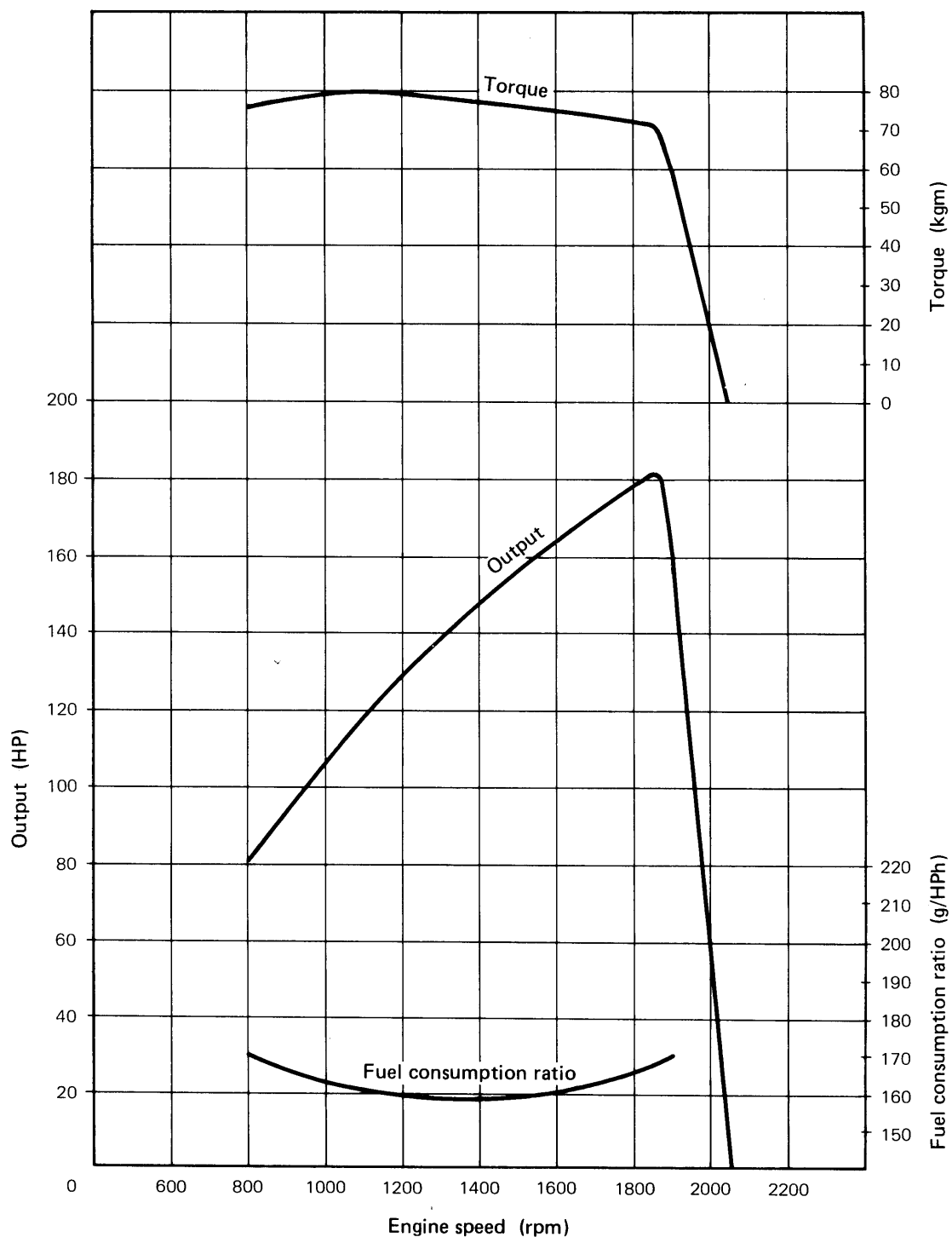
F615001009

6D125-1 (For GD705R-3, GD705R-4)

Flywheel horsepower: 182HP/1,850 rpm

Maximum torque: 80 kgm/1,100 rpm

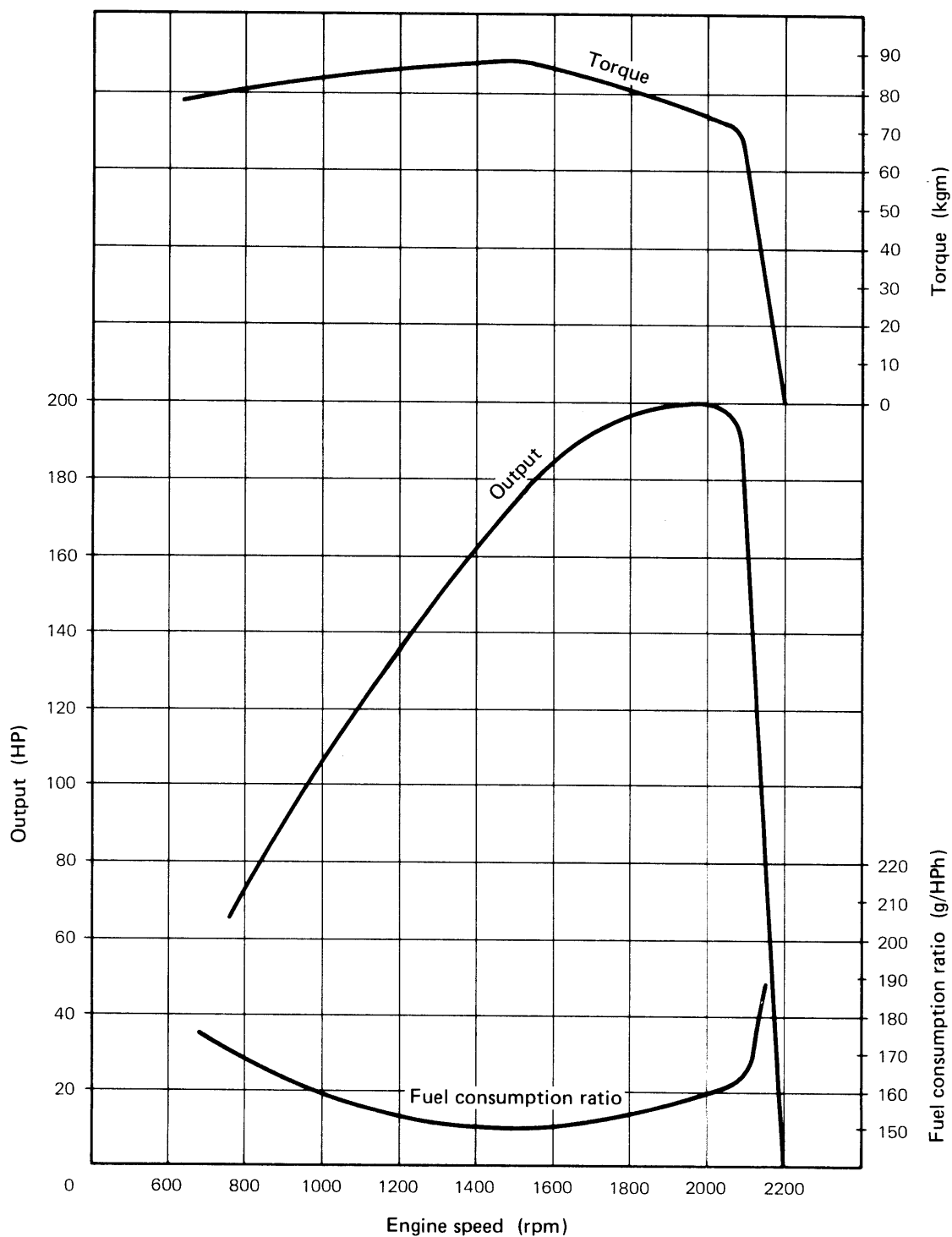
Minimum fuel consumption ratio: 158 g/HPh



F615001010

S6D125-1 (For D75S-5)

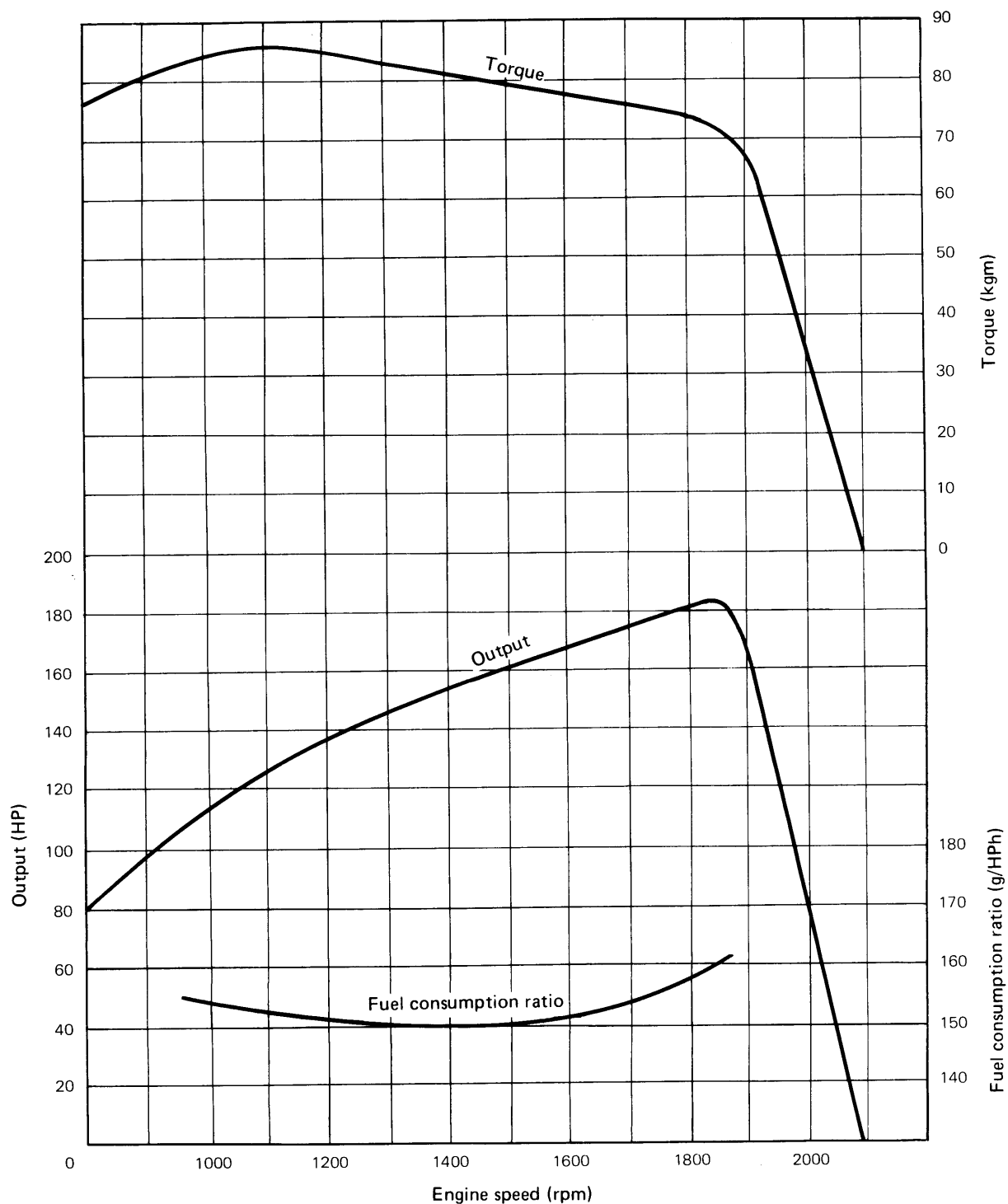
Flywheel horsepower: 200HP/2,000 rpm
Maximum torque: 88 kgm/1,500 rpm
Minimum fuel consumption ratio: 152 g/HPh



F615001011

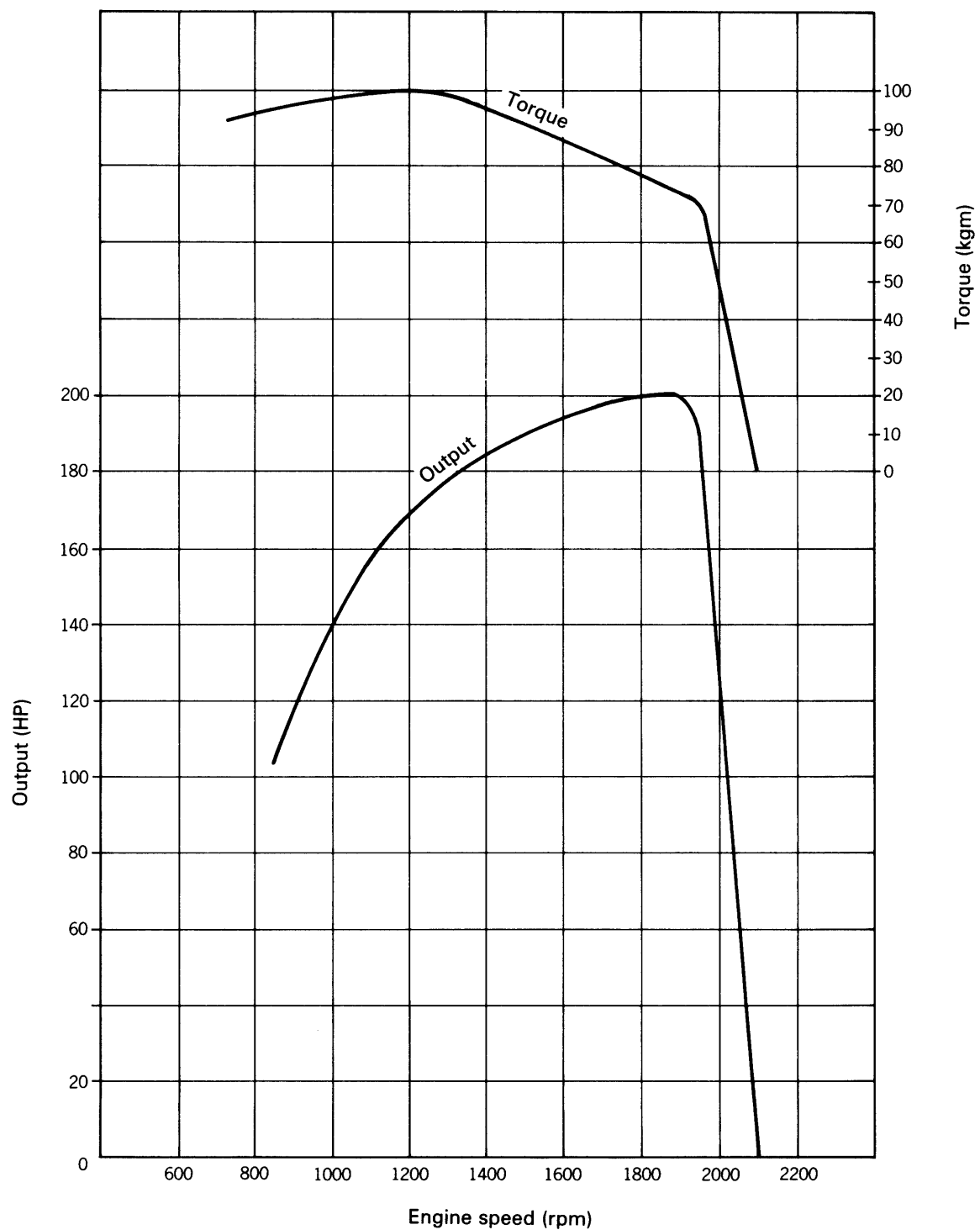
S6D125-1 (For D60F-8)

Flywheel horsepower: 182HP/1,850 rpm
Maximum torque: 85 kgm/1,100 rpm
Minimum fuel consumption ratio: 150 g/HPh



S6D125-1 (For D65EX-12, D65P, PX-12)

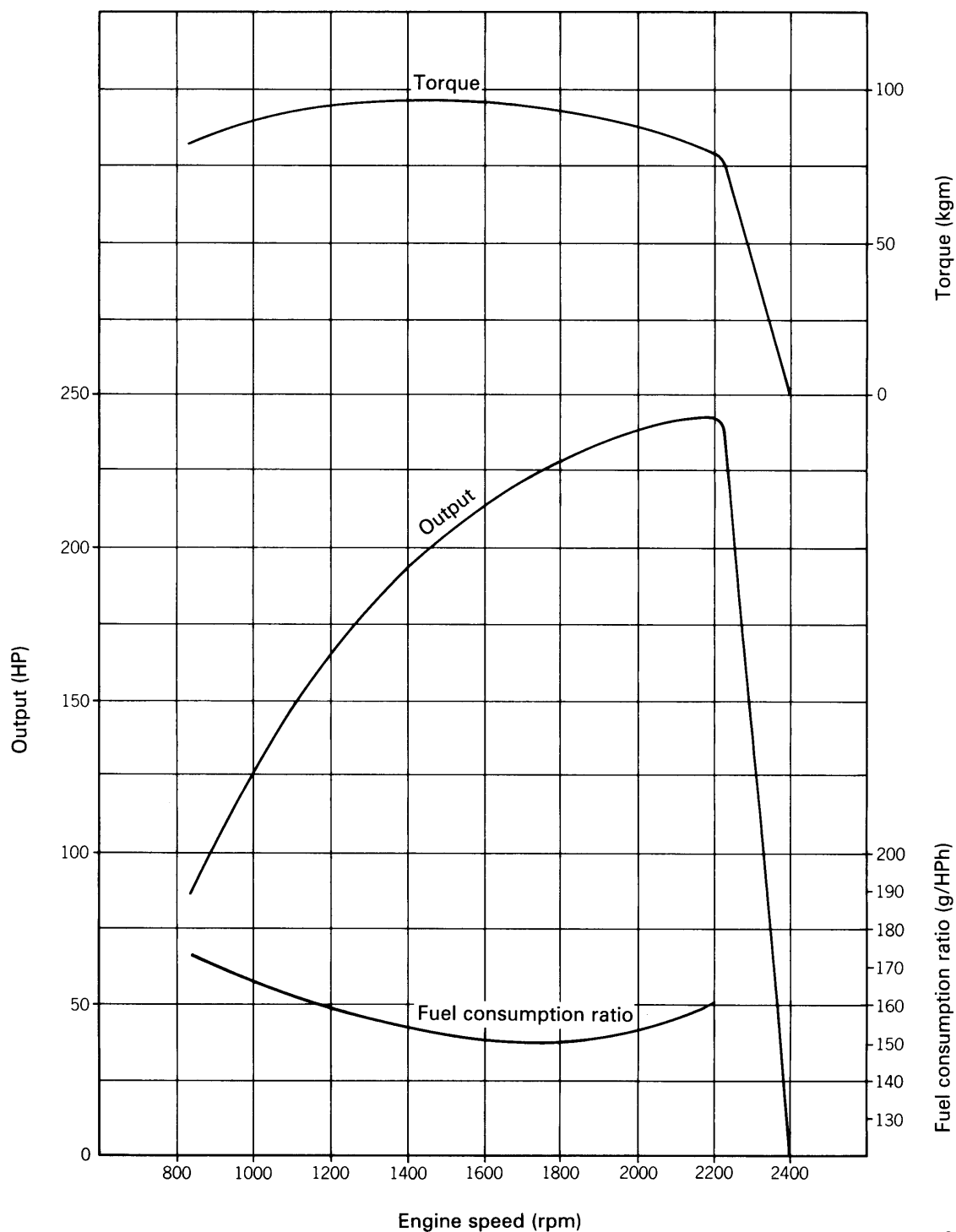
Flywheel horsepower: 190 HP/1,950 rpm
Maximum torque: 100 kgm/1,200 rpm
Minimum fuel consumption ratio: 155 g/HPh



6150F062

S6D125-1 (For HA250, HA270)

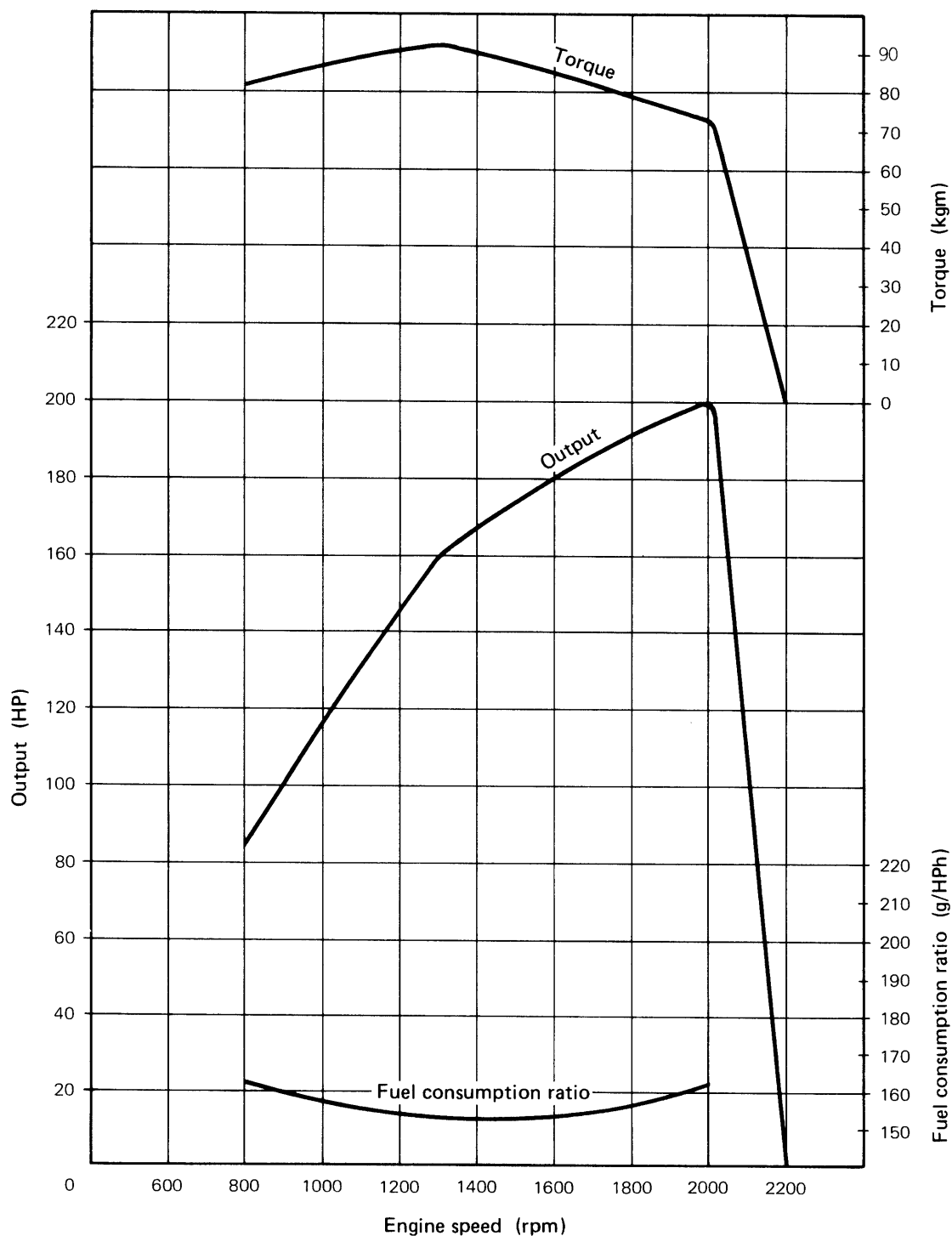
Flywheel horsepower: 240 HP/2,200 rpm
Maximum torque: 98.8 kgm/1,400 rpm
Minimum fuel consumption ratio: 155 g/HPh



6150F052

S6D125-1 (For GD705A-4)

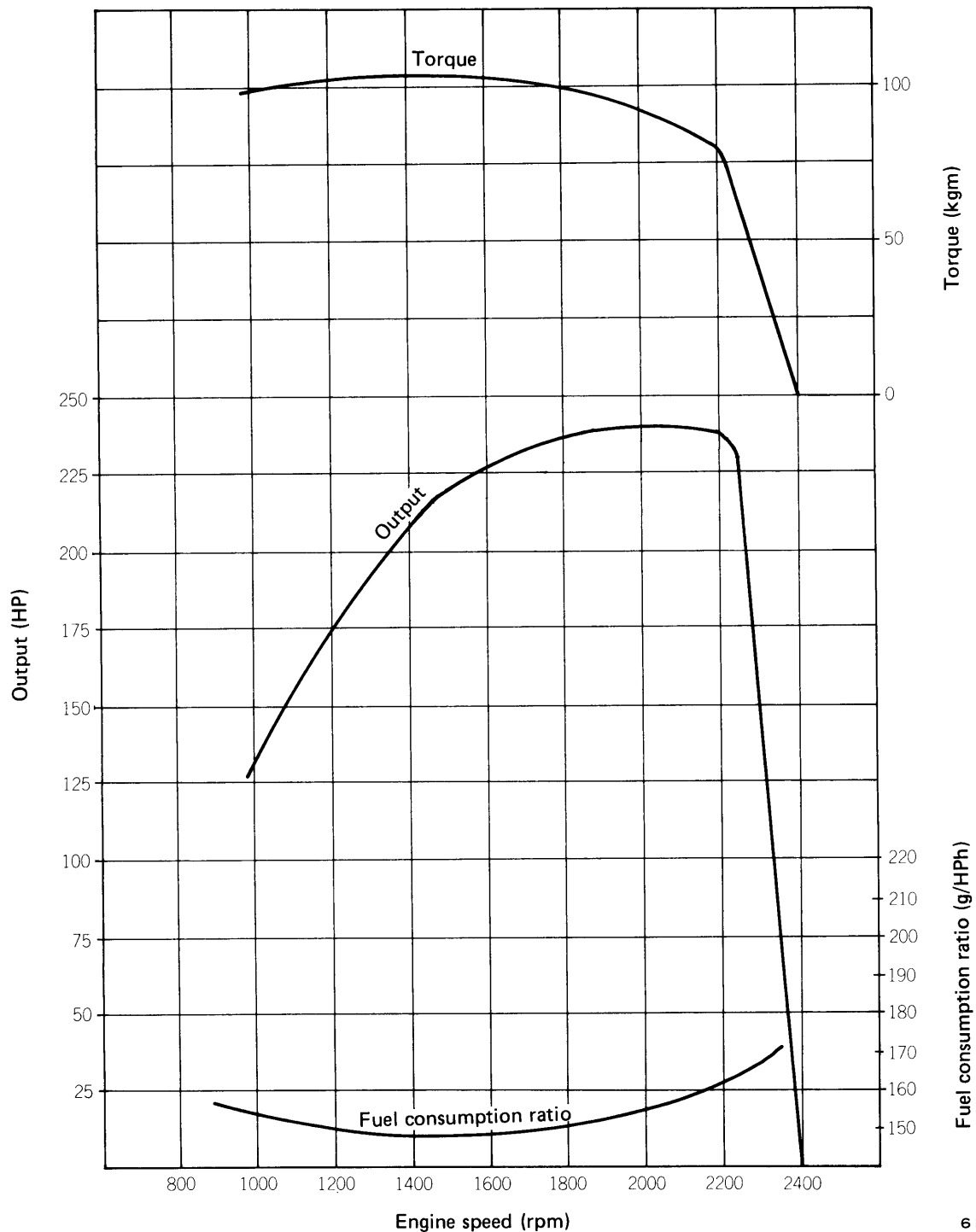
Flywheel horsepower: 200HP/2,000 rpm
Maximum torque: 92 kgm/1,300 rpm
Minimum fuel consumption ratio: 152 g/HPh



F615001012

S6D125-1 (For WA450-1)

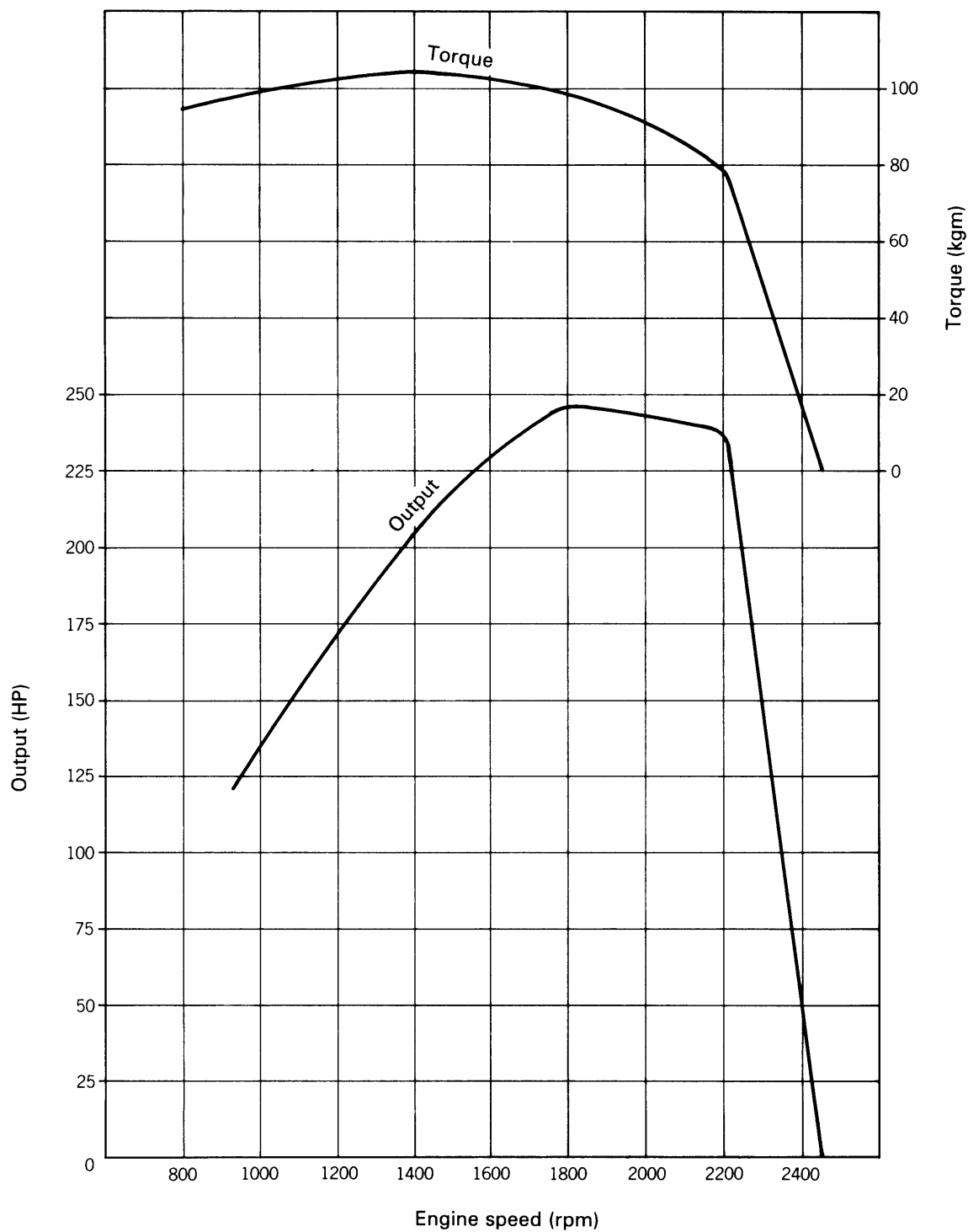
Flywheel horsepower: 237HP/2,200 rpm
Maximum torque: 105 kgm/1,400 rpm
Minimum fuel consumption ratio: 148 g/HPh



6150F021

S6D125-1 (For WF450T-1)

Flywheel horsepower: 237 HP/2,200 rpm
Maximum torque: 105 kgm/1,400 rpm
Minimum fuel consumption ratio: 148 g/HPh



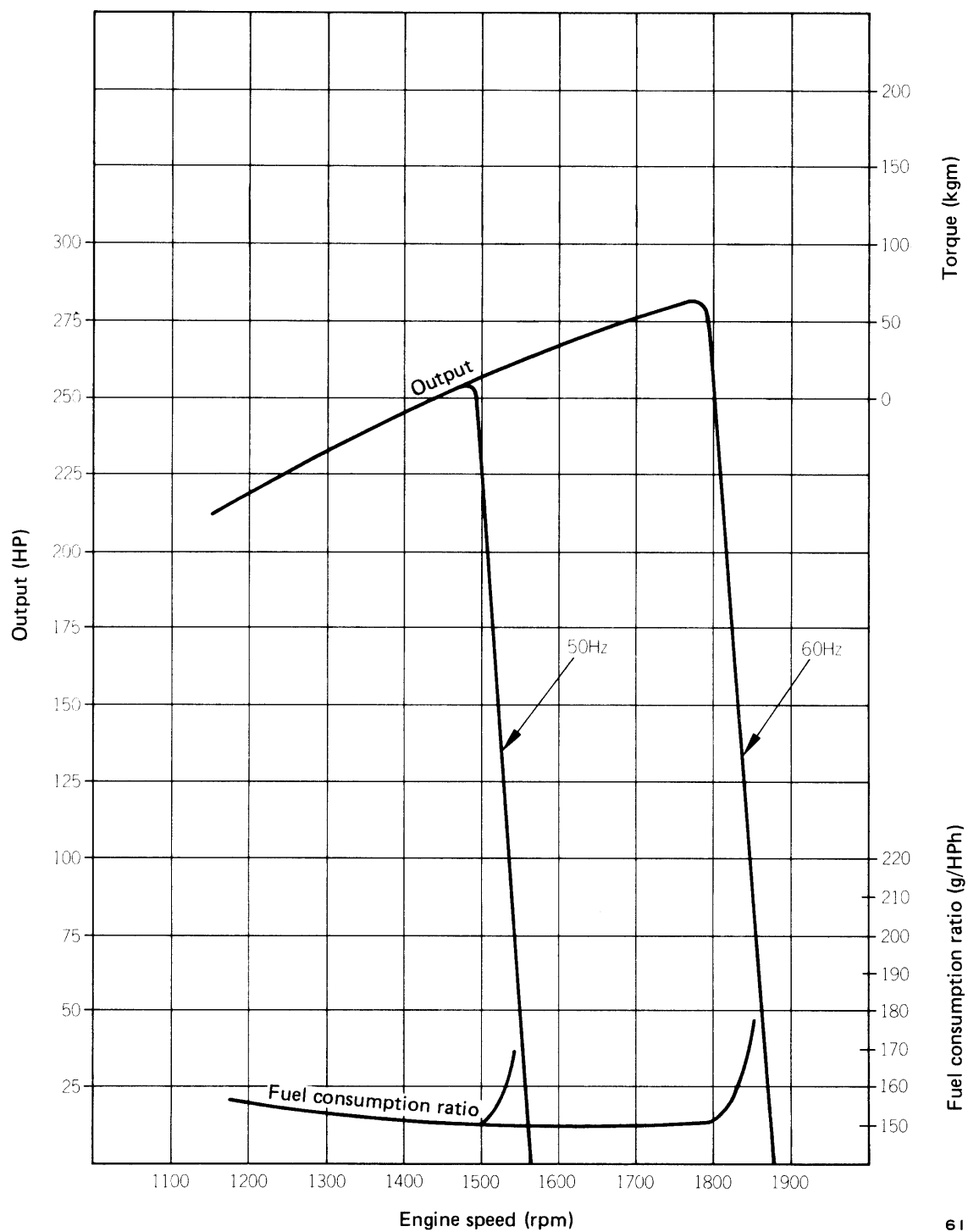
6150F063

S6D125-1 (For EG200-3)

Flywheel horsepower: 229HP/1,500 rpm (50 Hz)

253HP/1,800 rpm (60 Hz)

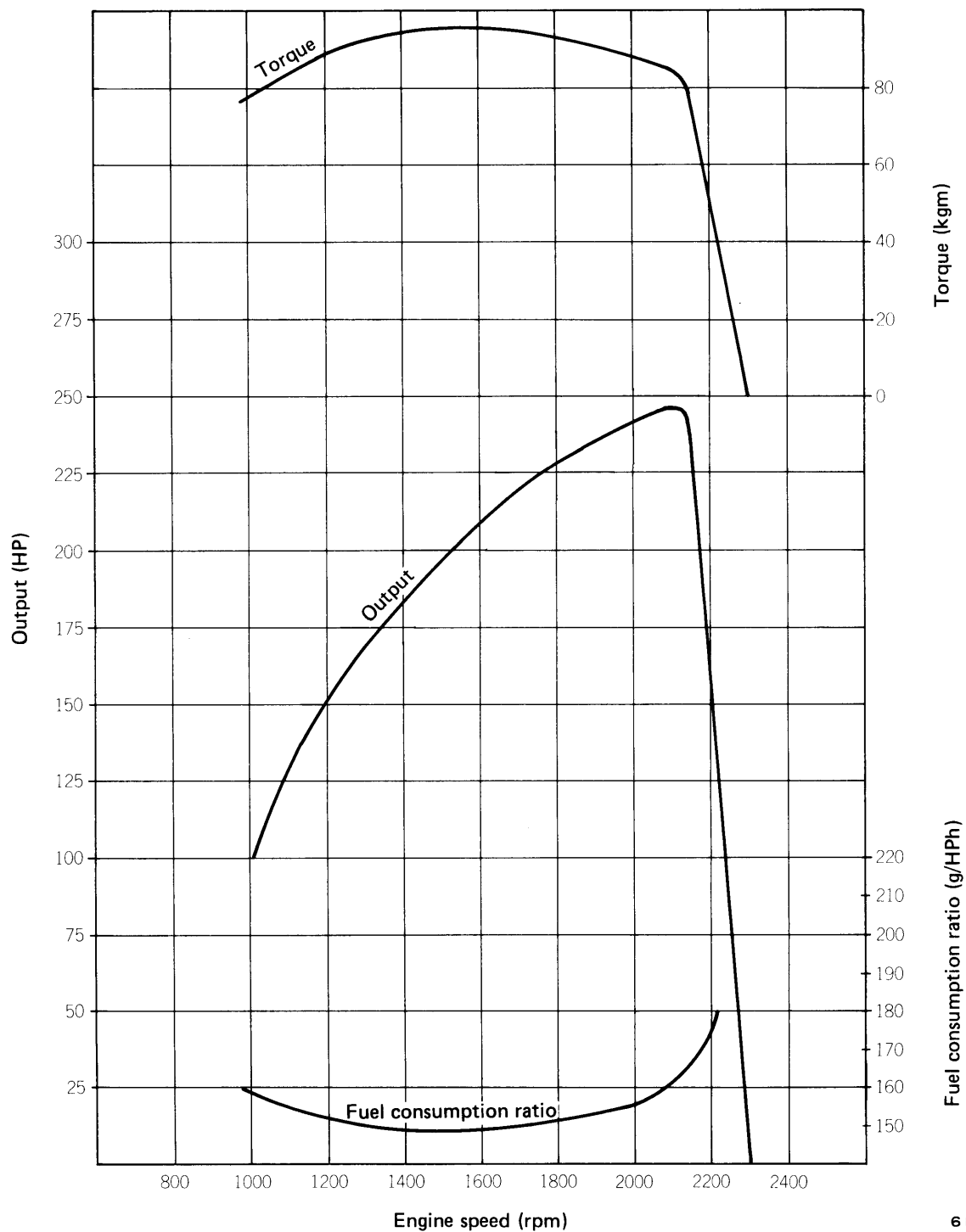
Minimum fuel consumption ratio: 150 g/HPh



6150F024

S6D125-1 (For EC260Z-1)

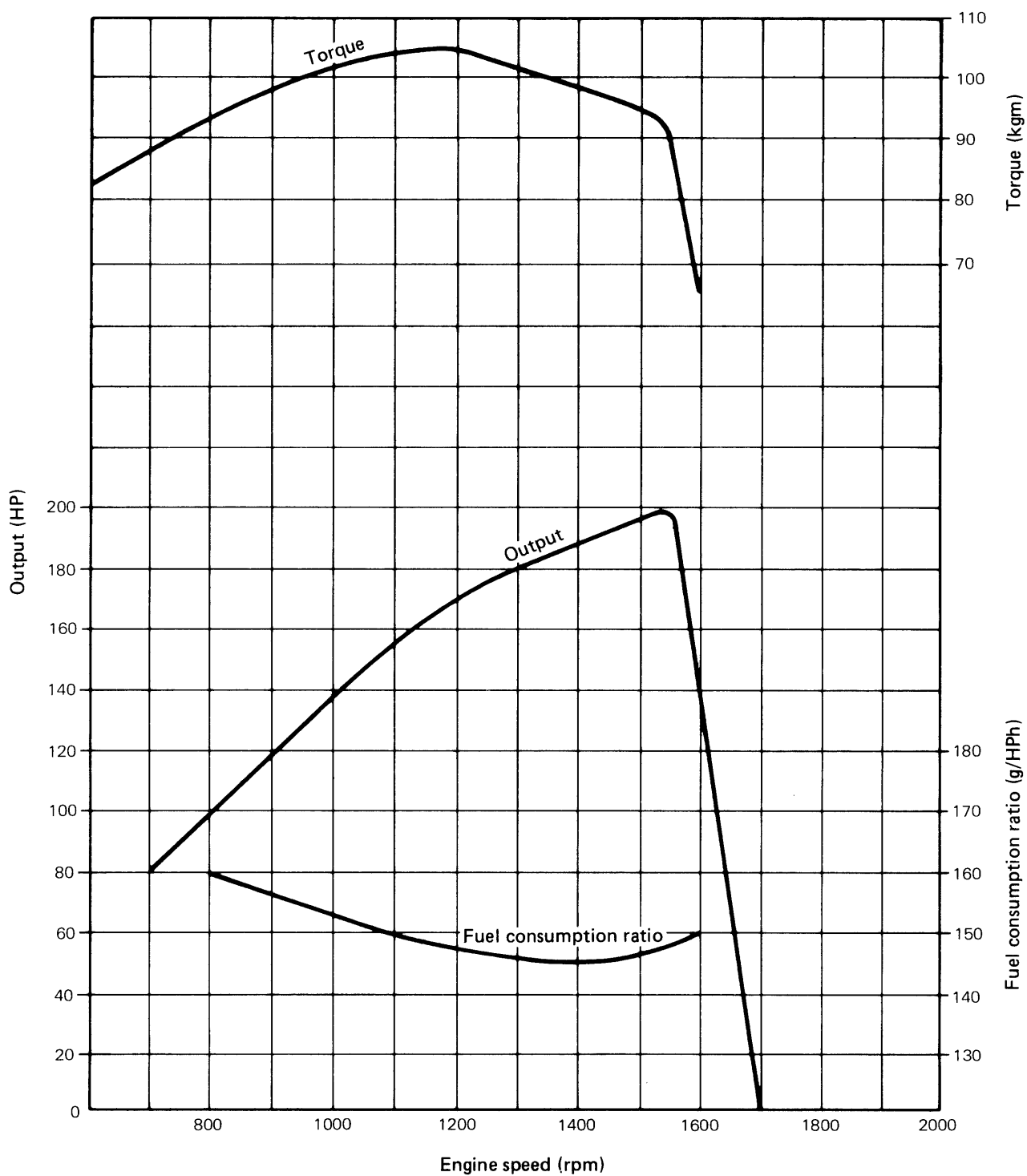
Flywheel horsepower: 232HP/2,150 rpm
Maximum torque: 96 kgm/1,500 rpm
Minimum fuel consumption ratio: 149 g/HPh



6150F023

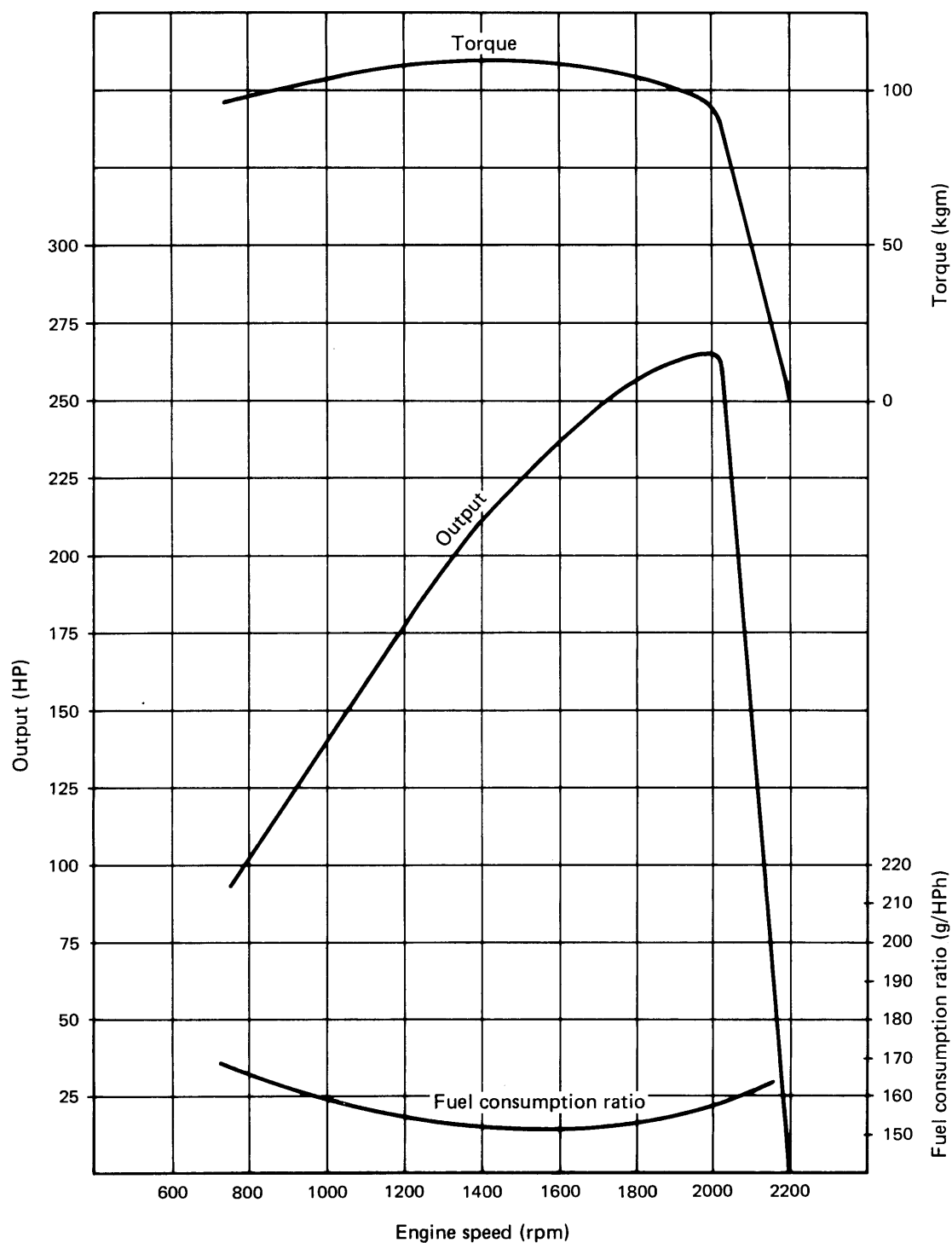
S6D125-1 (For PC300-3 and PC300LC-3)

Flywheel horsepower: 197HP/1,550 rpm
Maximum torque: 105 kgm/1,200 rpm
Minimum fuel consumption ratio: 145 g/HPh



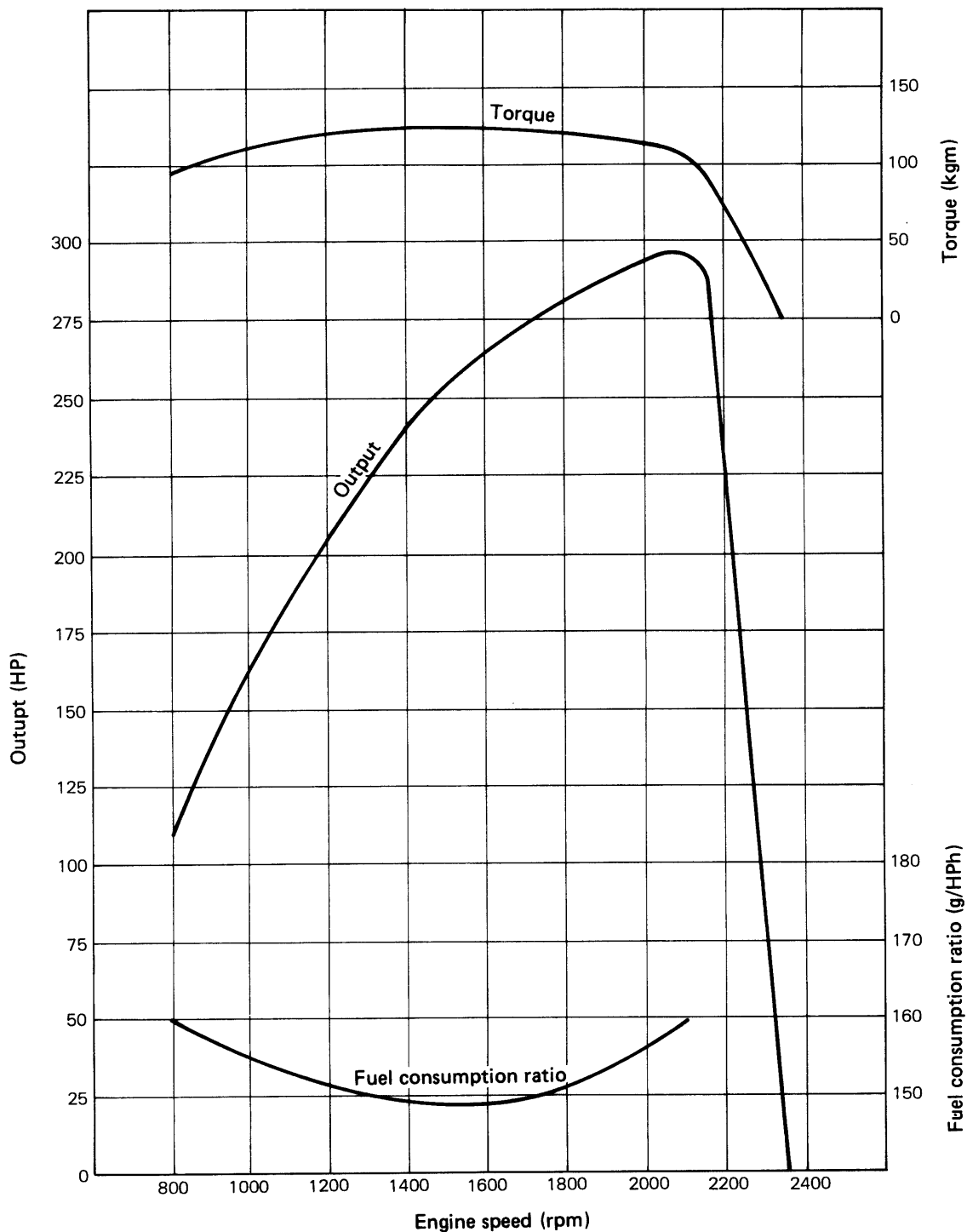
S6D125-1 (For PC400-3 and PC400LC-3)

Flywheel horsepower: 266 HP/2,000 rpm
Maximum torque: 110 kgm/1,400 rpm
Minimum fuel consumption ratio: 152 g/HPh



S6D125-1 (For HD205-3)

Flywheel horsepower: 296 HP/2,100 rpm
 Maximum torque: 124 kgm/1,400 rpm
 Minimum fuel consumption ratio: 149 g/HPh



WEIGHT TABLE



This weight table is a guide for use when transporting or handling components.

No.	Item	Components	6D125-1	S6D125-1
1	Turbocharger	GARRETT CO. TV77-05	—	17
		GARRETT CO. T04B NV	—	7
		GARRETT CO. T45	—	15
2	Cylinder head assembly	Cylinder head, valve, valve spring	16 x 6	16 x 6
3	Cylinder block assembly	Cylinder block, main bearing cap, cylinder liner	223: Except D50F-17	223: Except D60F-8, 8A
			275: D50F-17	264: HD205-3 280: D60F-8, 8A
4	Front cover		19: Except D50F-17	19: Except D60F-8, 8A
			20: D50F-17	21: D60F-8, 8A
5	Oil pan		14	14: Except EC260Z-1, EG220BS and D60F-8, 8A 20: EC260Z-1, EG220BS, D85A-21 21: D60F-8, 8A
6	Flywheel assembly	Flywheel, ring gear	35: Except D50F-17	30: HD205-3 33: WA450-1 35: Except WA450-1 EC260Z-1, D60F-8, 8A PC300-3, PC300LC-3 PC400-3, PC400LC-3
			65: D50F-17	38: EC260Z-1 45: PC300-3, PC300LC-3 PC400-3, PC400LC-3 59: HD200D-3, D85A-21 75: D60F-8, 8A
7	Flywheel housing		25: Except D50F-17	24: EC260Z-1, 25: Except EC260Z-1, WA450-1, D60F-8, 8A PC300-3, PC300LC-3, PC400-3, PC400LC-3 29: WA450-1 50: PC300-3, PC300LC-3 PC400-3, PC400LC-3
			130: D50F-17	57: HD200D-3 85: HD205-3 130: D60F-8, 8A 139: D85A-21
8	Crankshaft assembly	Crankshaft, crankshaft gear	104	104
9	Camshaft assembly	Camshaft, camshaft gear thrust plate	16	13: HD200D-3, HD205-3 16: Except HD200D, 205-3
10	Piston, connecting rod assembly	Piston, piston ring, piston pin connecting rod	6.8 x 6	7.6 x 6
11	Oil pump		5	5
12	Fuel injection pump		26	23: HD200D-3, HD205-3 26: PC300-3, PC300LC-3 27: Except PC300-3, PC300LC-3

GENERAL

WEIGHT TABLE

Unit: kg	
SA6D125-1	
17	
—	
—	
16 x 6	
264	
—	
19	
—	
15:	EG275, B
20:	EG275BS
56.6	
41.6	
104	
16	
7.6 x 6	
5	
27	

No.	Item	Components	6D125-1	S6D125-1
13	Water pump		8.5	9.5
14	Alternator	Without vacuum pump (24V, 13A)	7.5	7.5
		With vacuum pump (24V, 25A)	11	11
		24V, 35A	—	10.5
15	Starting motor		18 (STD), 20 (OP)	18
16	Air compressor		10	10

Unit: kg
SA6D125-1
9.5
7.6
—
—
18
—

ENGINE

11 STRUCTURE AND FUNCTION



GENERAL STRUCTURE 11-002

INTAKE AND EXHAUST SYSTEM

Intake and exhaust system 11-004
Turbocharger 11-008

ENGINE BODY

Cylinder head 11-010
Valve system 11-012
Cylinder block 11-014
Main circulation part 11-016
Timing gear 11-018
Flywheel and flywheel housing 11-020

LUBRICATION SYSTEM

Lubrication system chart 11-025
Oil pump 11-026
Regulator valve 11-028
Oil filter 11-029
Oil cooler 11-030

FUEL SYSTEM

Fuel system chart 11-031
Fuel injection pump 11-032
Fuel injection nozzle 11-036
Fuel filter 11-037
Magnetic switch (fuel cut solenoid) 11-038

COOLING SYSTEM

Cooling system chart 11-039
Water pump 11-040
Thermostat 11-042
Corrosion resistor 11-043

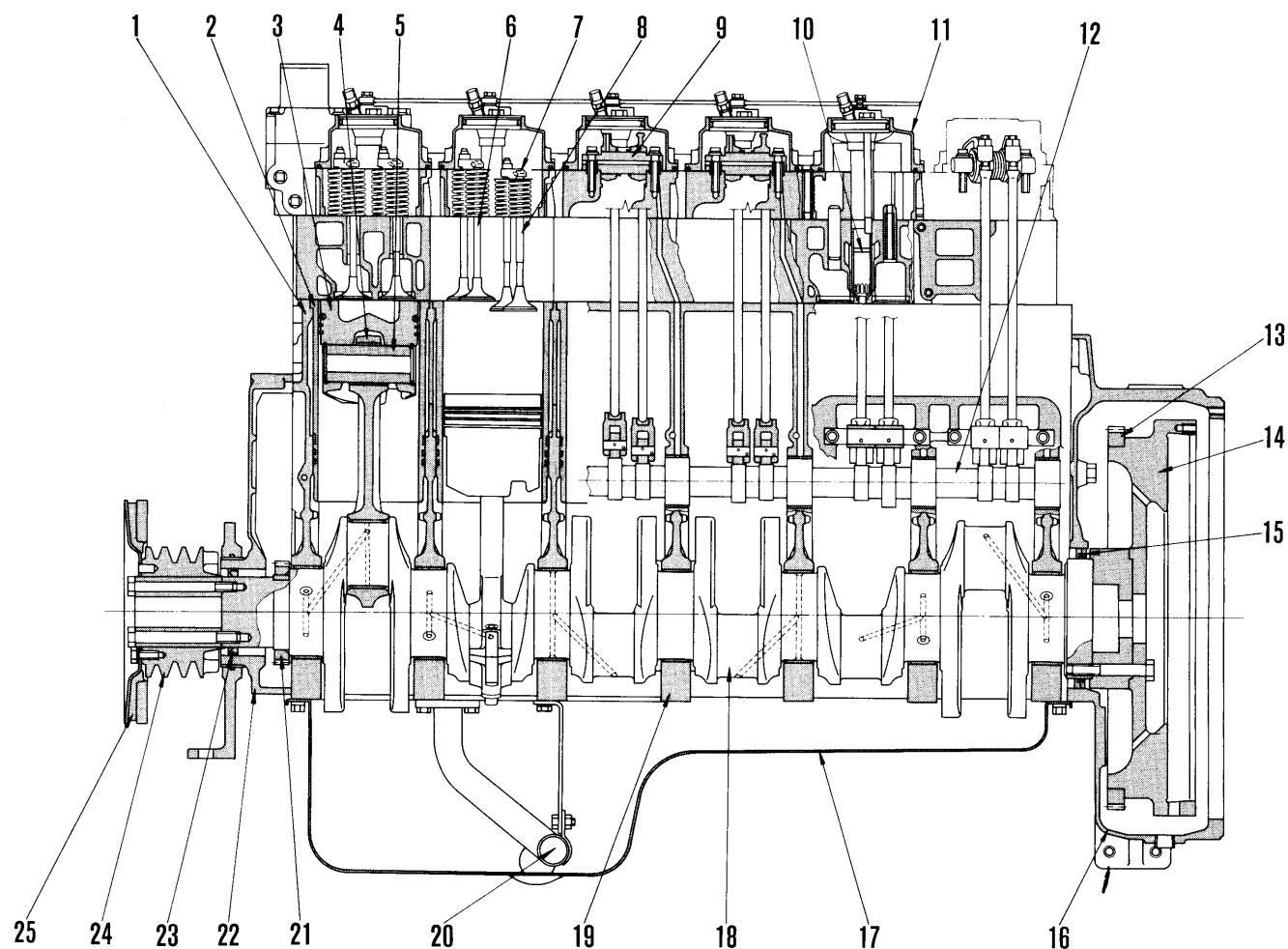
ELECTRICAL SYSTEM

Alternator 11-045
Starting motor 11-048
Electrical intake air heater 11-049

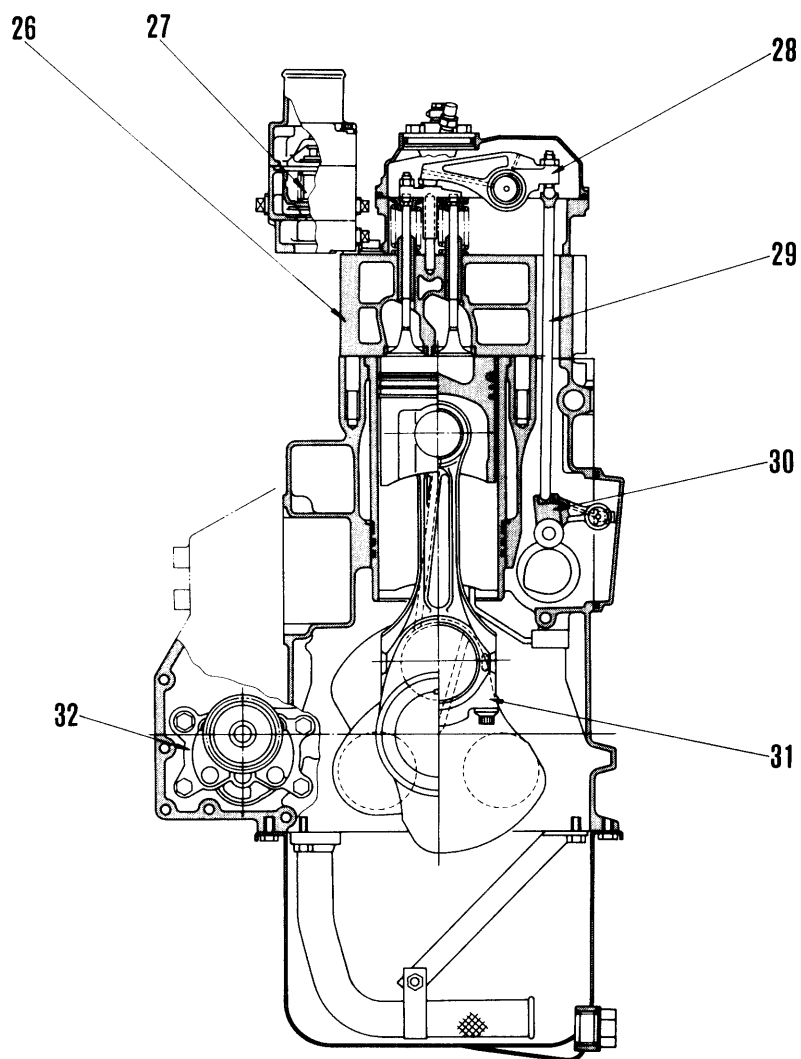
ACCESSORY

Air compressor 11-050
Exhaust brake 11-053

GENERAL STRUCTURE



- | | | |
|---------------------|---------------------------|-----------------------|
| 1. Cylinder block | 10. Fuel injection nozzle | 19. Main bearing cap |
| 2. Cylinder liner | 11. Cylinder head cover | 20. Oil strainer |
| 3. Piston | 12. Camshaft | 21. Crankshaft gear |
| 4. Connecting rod | 13. Ring gear | 22. Front cover |
| 5. Piston pin | 14. Flywheel | 23. Front seal |
| 6. Intake valve | 15. Rear seal | 24. Crankshaft pulley |
| 7. Crosshead | 16. Flywheel housing | 25. Vibration damper |
| 8. Exhaust valve | 17. Oil pan | |
| 9. Rocker arm shaft | 18. Crankshaft | |



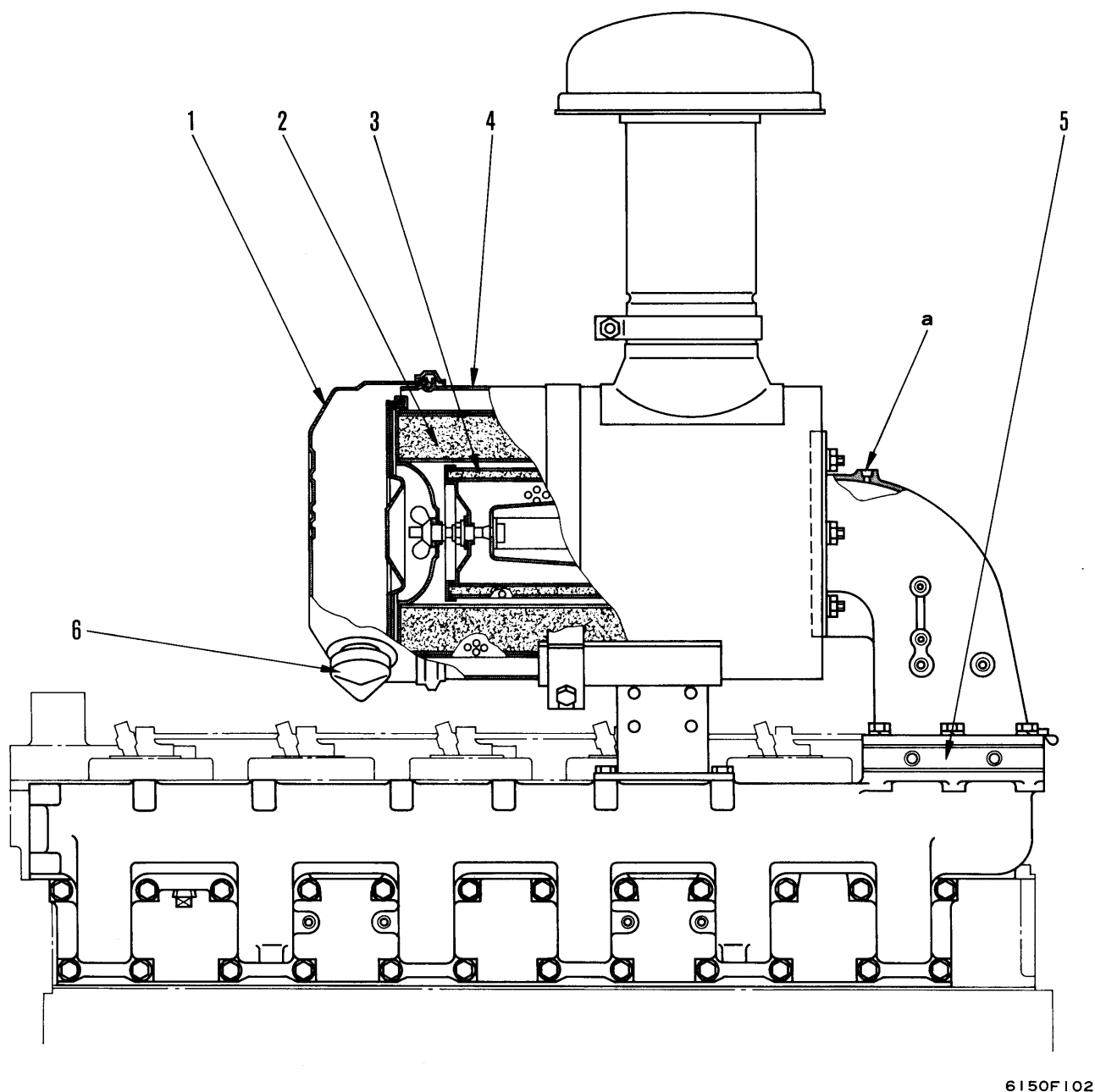
6150F101

- 26. Cylinder head
- 27. Thermostat
- 28. Rocker arm
- 29. Push rod
- 30. Cam follower
- 31. Connecting rod cap
- 32. Oil pump

Engine: 6D125-1
 S6D125-1 (with turbocharger)
 SA6D125-1 (with turbocharger
 and after-cooler)
 Type: In-line, 6-cylinders, water-
 cooled, direct fuel injection,
 4-cycle diesel engine.

INTAKE AND EXHAUST SYSTEM

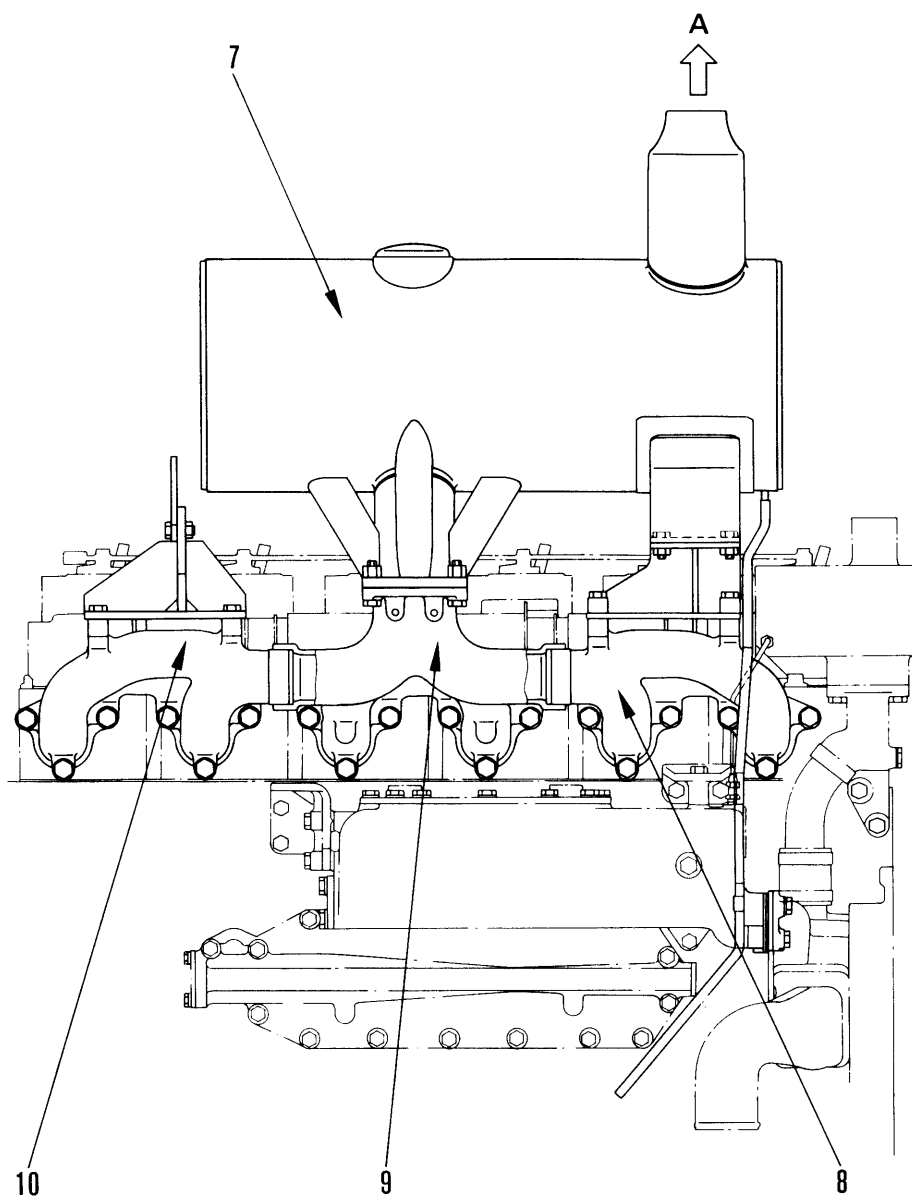
6D125-1 (For D60-65A,E,P-8)



6150F102

- 1. Dust cap
- 2. Outer element
- 3. Inner element

- 4. Air cleaner body
- 5. Electrical intake air heater
- 6. Evacuator valve

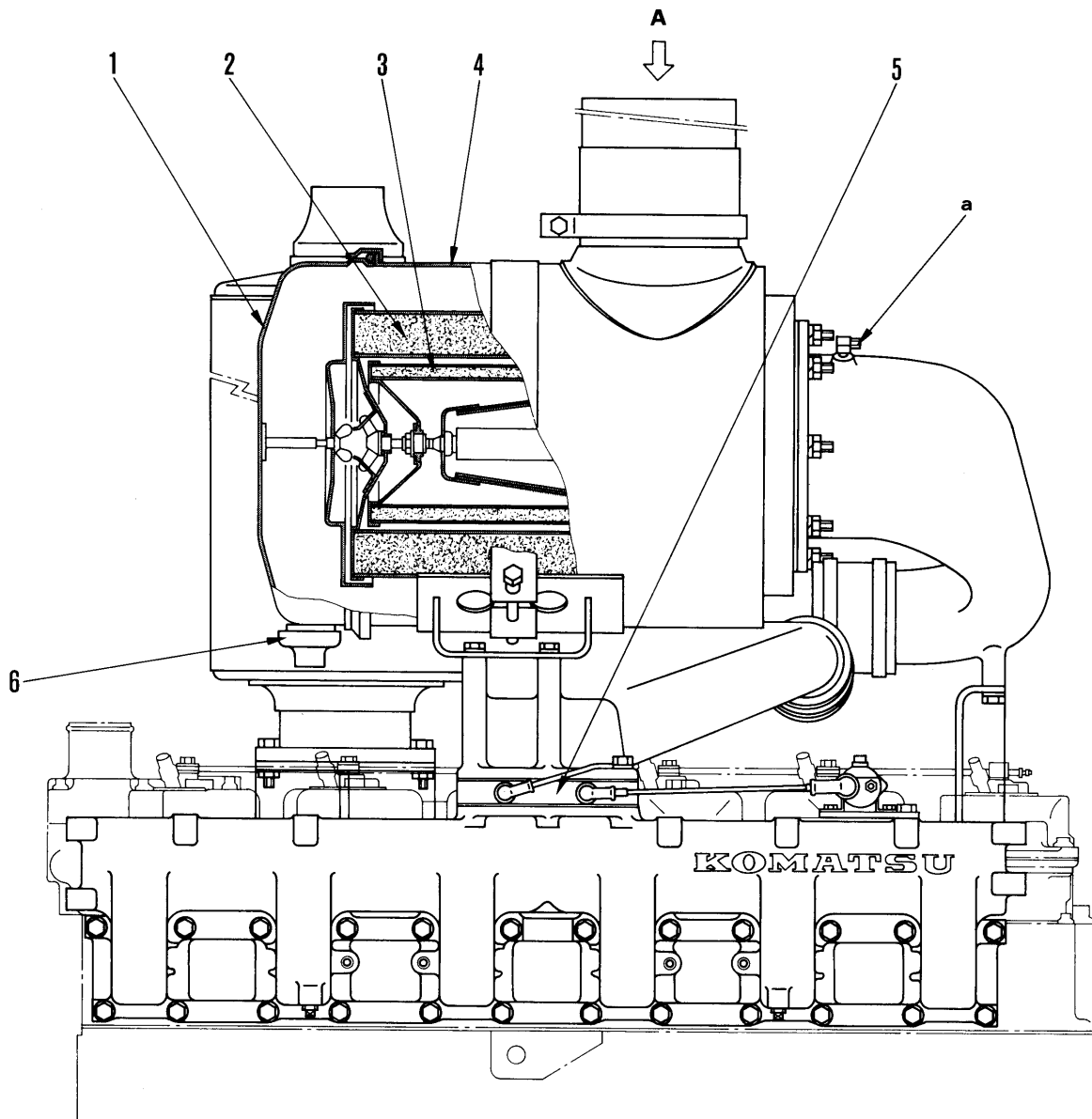


6150F103

- 7. Muffler
- 8. Exhaust manifold (Front)
- 9. Exhaust manifold (Center)
- 10. Exhaust manifold (Rear)

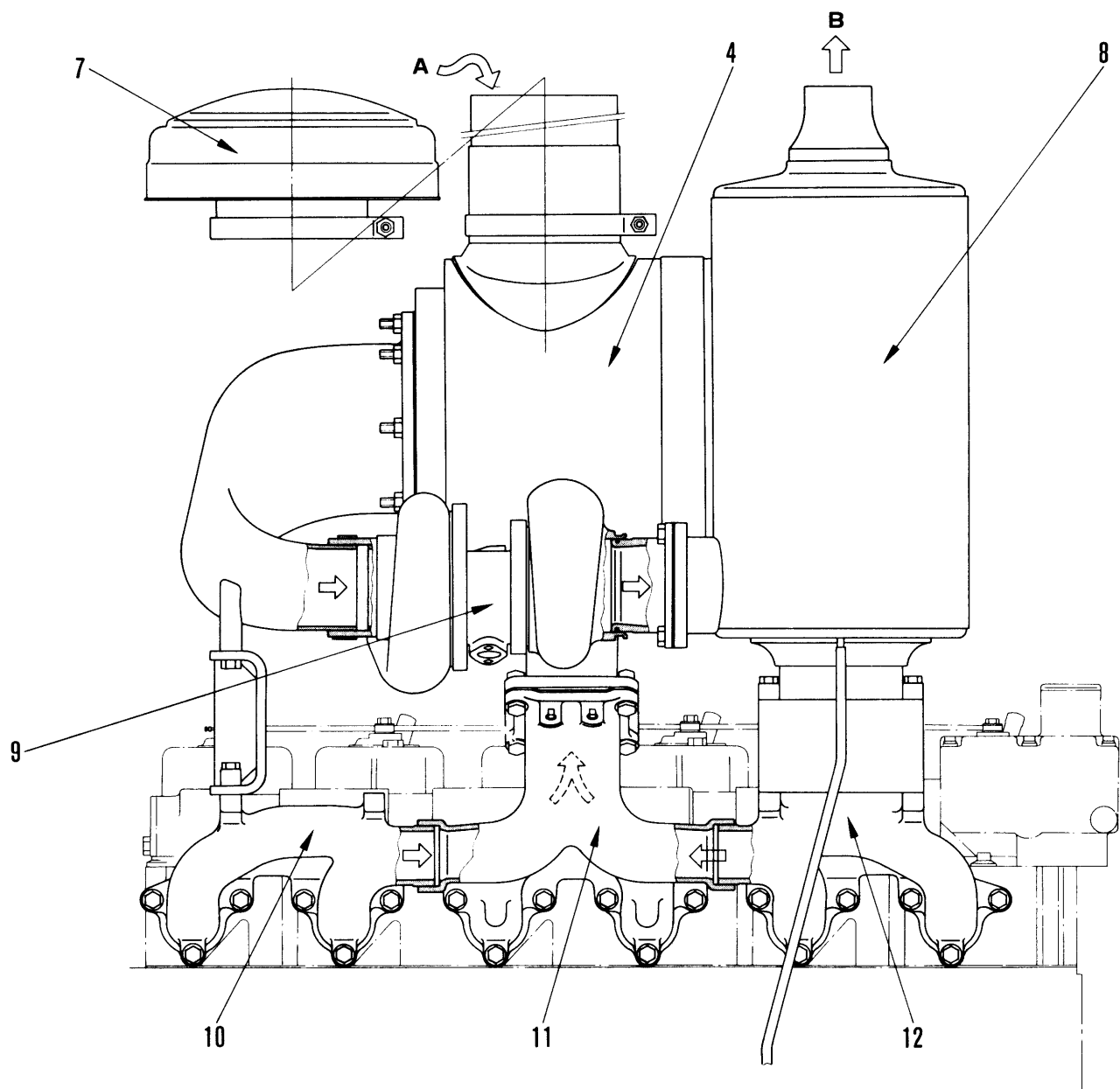
- A. Gas exhaust
- a. Intake air pressure pick-up for dust indicator

S6D125-1 (For D75S-5)



6150F104

- | | |
|------------------|---------------------------------|
| 1. Dust cap | 4. Air cleaner body |
| 2. Outer element | 5. Electrical intake air heater |
| 3. Inner element | 6. Evacuator valve |



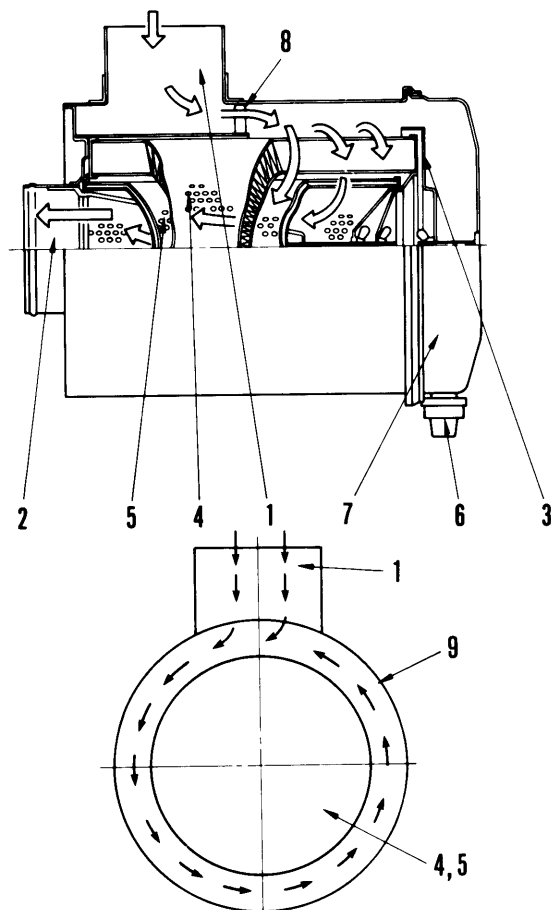
6150F105

- 7. Air cleaner cover
- 8. Muffler
- 9. Turbocharger
- 10. Exhaust manifold (Front)
- 11. Exhaust manifold (Center)
- 12. Exhaust manifold (Rear)

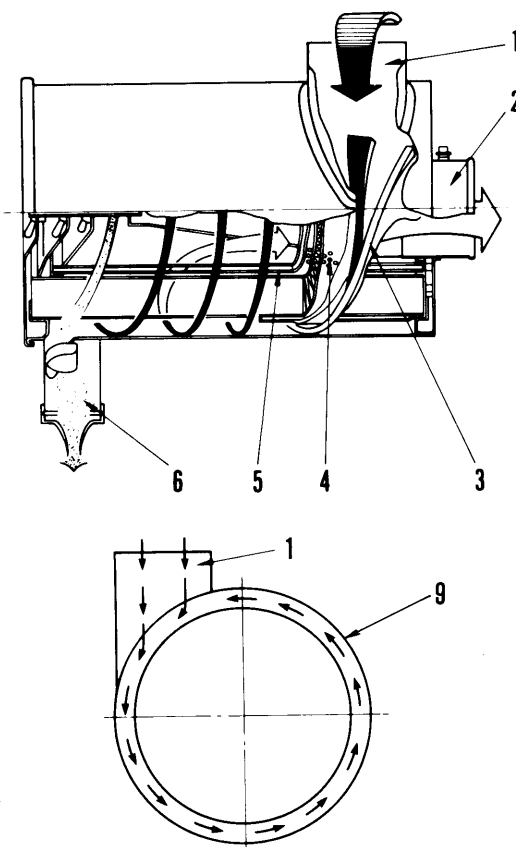
- A. Air intake
- B. Gas exhaust
- a. Intake air pressure pick-up for dust indicator

FTG AIR CLEANER (WA450-1, WA470-1)

Current type (FHG)



FTG type



6137F009-10

- | | | |
|---------------|--------------------|----------------------------|
| 1. Inlet | 4. Primary element | 7. Dust pan |
| 2. Outlet | 5. Safety element | 8. Diffusion vane (sleeve) |
| 3. Guide vane | 6. Vacuator | 9. Body |

ADVANTAGES

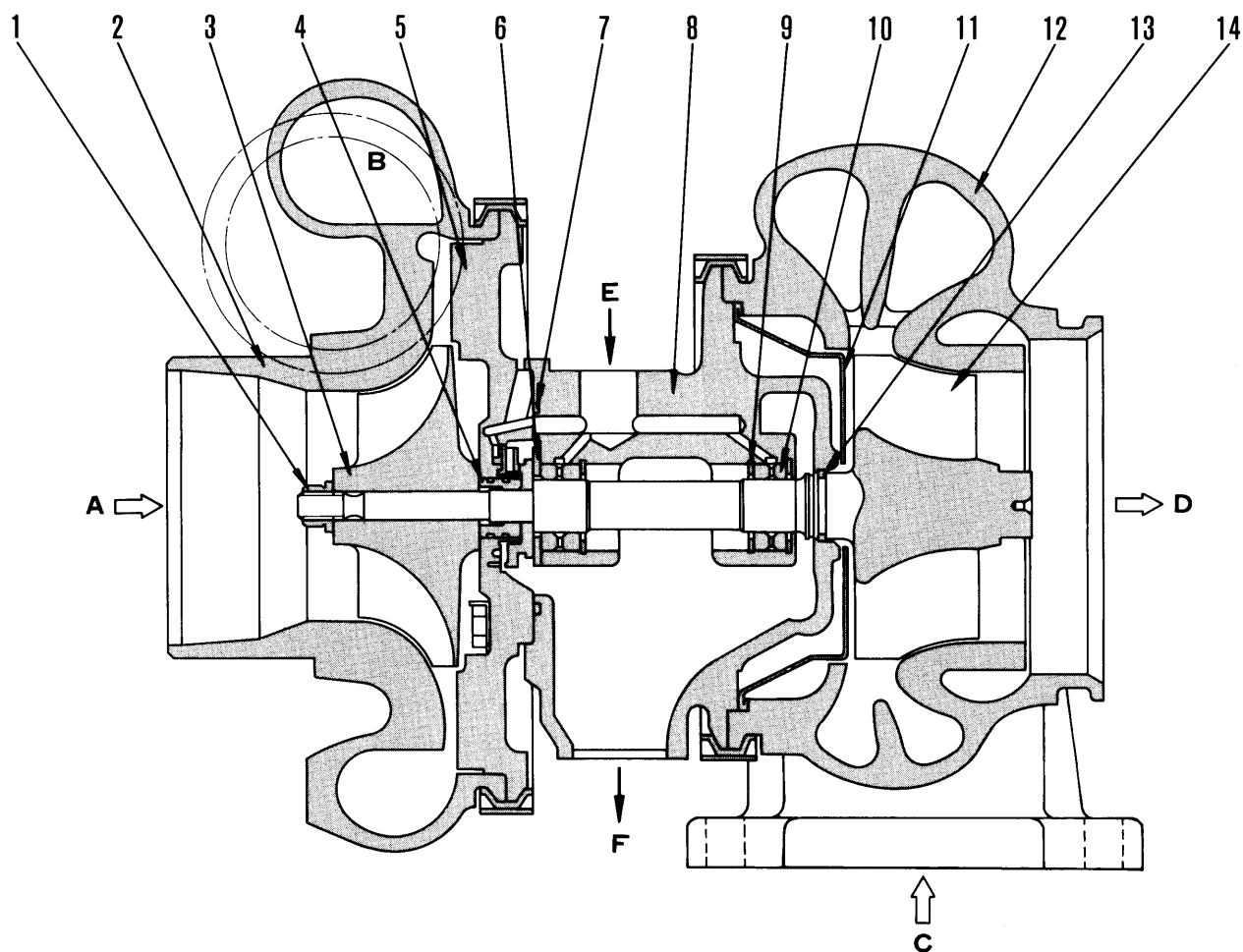
- The diameter of the element is the same but the outside diameter of the body is smaller. The inlet is placed in the direction of connection, so ample centrifugal force can be obtained from a simple spiral guide vane, without using a diffusion vane.
- There is no dust pan or diffusion vane, so the structure is simple.

STRUCTURE

- Air containing dust is sucked in from inlet (1) at a tangent, and the dust is separated by the centrifugal force of guide vane (3). More than 99.9% of the remaining dust is removed by primary element (4), and the cleaned air then passes through safety element (5) and outlet (2), and is sucked into the engine. The dust and moisture that is separated by the guide vane (3) rotates around the inside wall of body (9), and goes inside vacuator (6), where it is discharged automatically to the outside.

TURBOCHARGER

TV77



6150F106-1

1. Locknut
2. Blower housing
3. Blower impeller
4. Thrust collar
5. Back plate
6. Thrust bearing
7. Seal ring
8. Center housing
9. Retaining ring
10. Journal bearing
11. Shroud

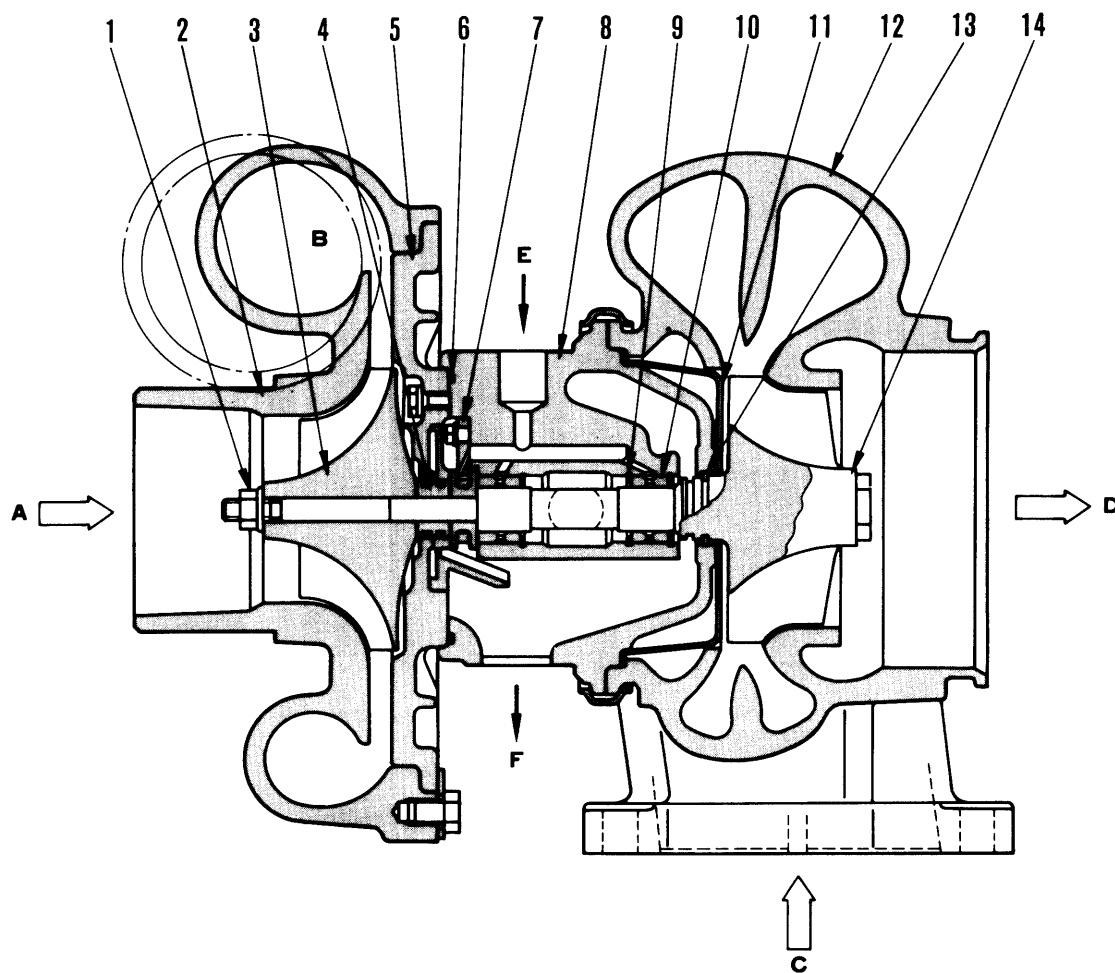
12. Turbine housing
13. Piston ring
14. Turbine impeller

- A. Air inlet
 B. Air outlet
 C. Gas inlet
 D. Gas outlet
 E. Oil inlet
 F. Oil outlet

Turbocharger

Type	GARRETT CO. TV77
Overall length	275 mm
Overall width	284 mm
Overall height	264 mm
Weight	17 kg
Continuous speed	90,000 rpm
Max. air supply	0.43 kg/sec
Compression ratio	3.4
Applicable exhaust temp.	Max. 700° C
Direction of rotation	Clockwise (see from the blower side)

T45



6150F150

1. Locknut
2. Blower housing
3. Blower impeller
4. Thrust collar
5. Back plate
6. Seal ring
7. Thrust bearing
8. Center housing
9. Retaining ring
10. Journal bearing
11. Shroud

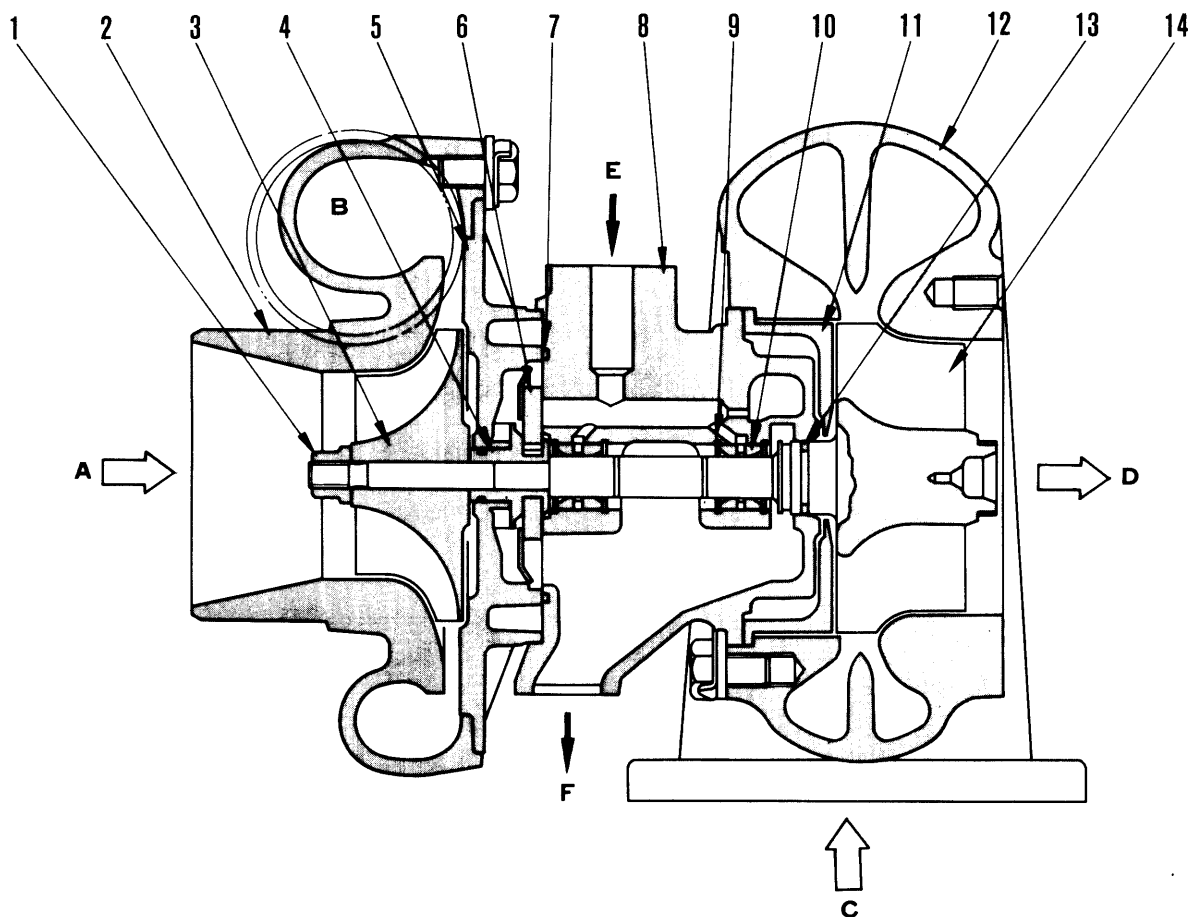
12. Turbine housing
13. Piston ring
14. Turbine impeller

- A. Air inlet
 B. Air outlet
 C. Gas inlet
 D. Gas outlet
 E. Oil inlet
 F. Oil outlet

Turbocharger

Type	GARRETT CO. T45
Overall length	275 mm
Overall width	284 mm
Overall height	264 mm
Weight	14.6 kg
Continuous speed	127,000 rpm
Applicable exhaust temp.	Max. 700°C
Direction of rotation	Clockwise (see from the blower side)

TO4B, E



14F036

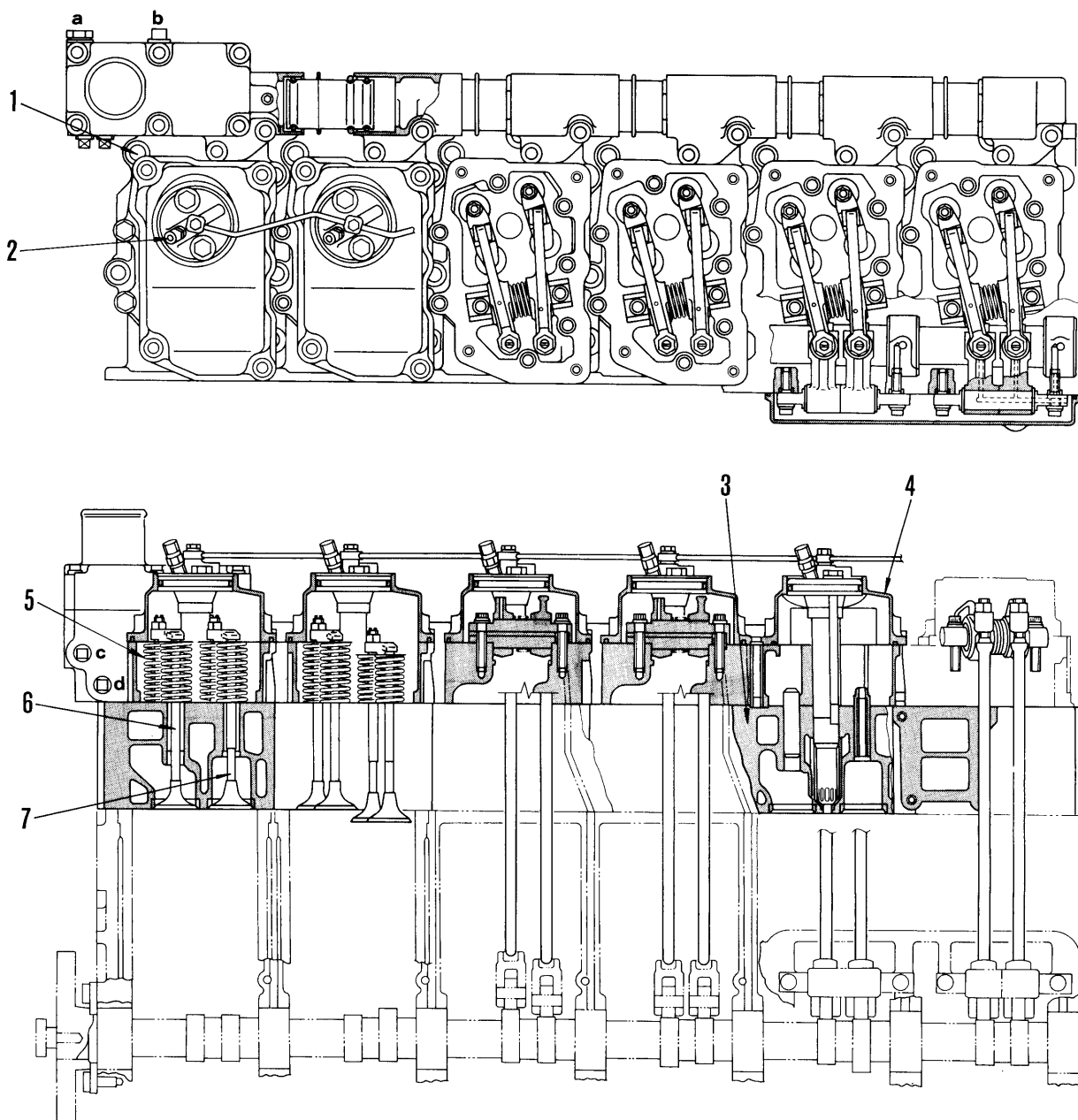
- | | |
|---------------------|----------------------|
| 1. Locknut | 12. Turbine housing |
| 2. Blower housing | 13. Piston ring |
| 3. Blower impeller | 14. Turbine impeller |
| 4. Thrust collar | |
| 5. Back plate | A. Air inlet |
| 6. Thrust bearing | B. Air outlet |
| 7. Seal ring | C. Gas inlet |
| 8. Center housing | D. Gas outlet |
| 9. Retaining ring | E. Oil inlet |
| 10. Journal bearing | F. Oil outlet |
| 11. Shroud | |

Turbocharger

Type	GARRETT CO. TO4B, E
Overall length	229 mm
Overall width	222 mm
Overall height	185 mm
Weight	TO4B: 7 kg TO4E: 9 kg
Continuous speed	125,000 rpm
Applicable exhaust temp.	Max. 700° C
Direction of rotation	Clockwise (see from the blower side)

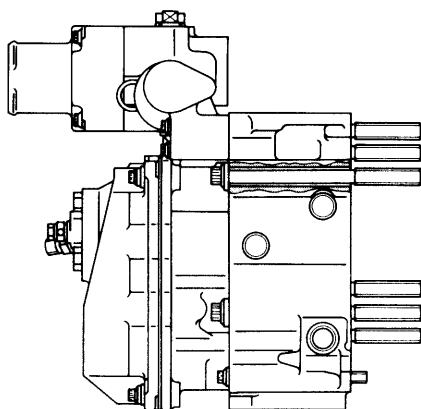
ENGINE BODY

CYLINDER HEAD



1. Cylinder head bolt
2. Nozzle holder
3. Cylinder head
4. Cylinder head cover

5. Valve spring
6. Intake valve
7. Exhaust valve

**CYLINDER HEAD**

- Direct fuel injection
- 4 valve
- Injection nozzle assembled in cylinder head
- Divided type
(1 cylinder head for 1 cylinder)

VALVE SEAT

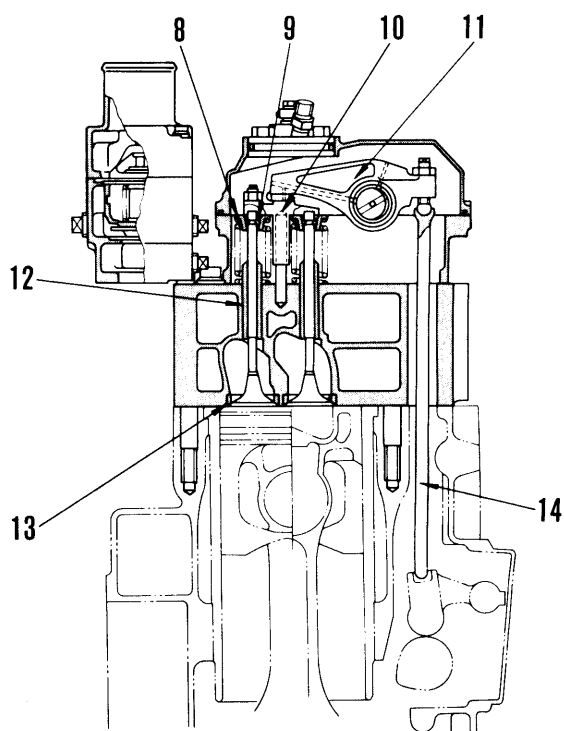
- Press-fitted insert for intake and exhaust

CYLINDER HEAD COVER

- Floating type seal

VALVE ROTATOR

- Installed S6D125, SA6D125



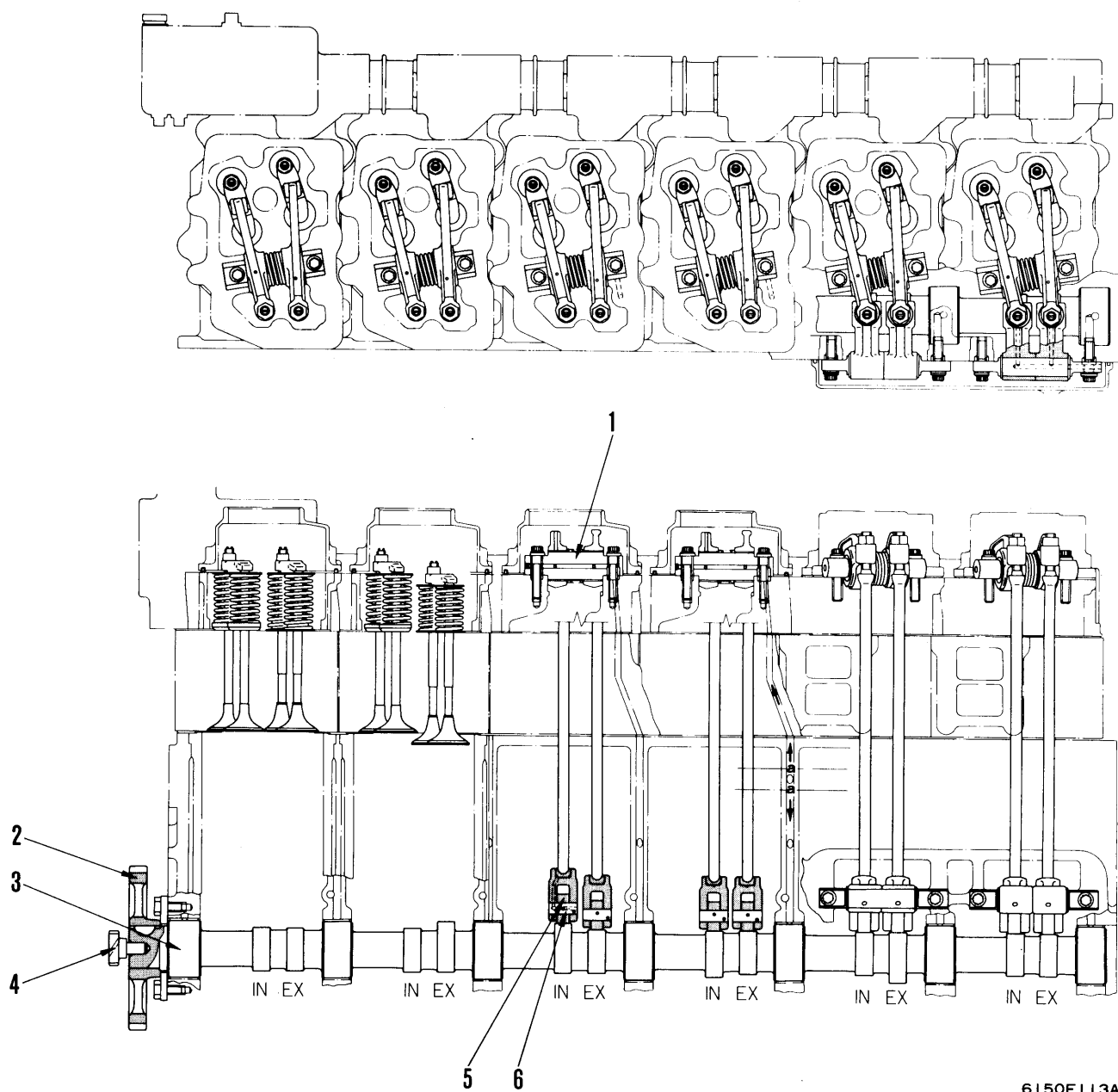
6150F107A

- 8. Valve spring seat
- 9. Valve cotter
- 10. Crosshead
- 11. Rocker arm
- 12. Valve guide
- 13. Valve seat insert

- 14. Push rod

- a Water temperature pick-up
- b Outlet for heater
- c Outlet for corrosion resistor
- d Inlet for corrosion resistor

VALVE SYSTEM

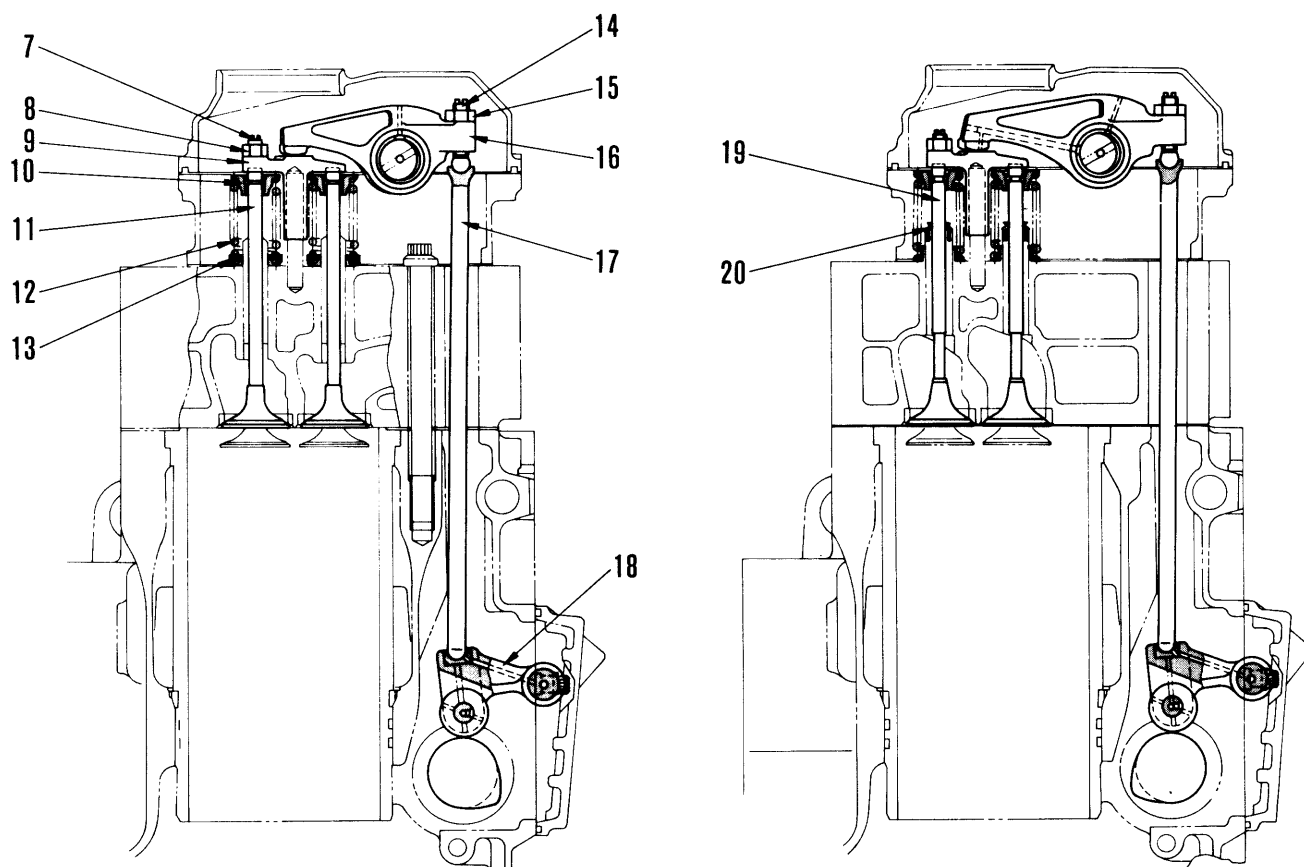


6150F113A

1. Rocker arm shaft
2. Camshaft gear (No. of teeth: 44)
3. Camshaft
4. Air compressor drive gear (No. of teeth: 14)
5. Cam roller
6. Cam roller pin
7. Adjustment screw
8. Locknut

9. Crosshead
10. Upper valve spring seat
11. Intake valve
12. Valve spring
13. Lower valve spring seat
6D125-1: Intake and exhaust
S6D125-1, SA6D125-1: Exhaust only

13. Valve rotator
(S6D125-1, SA6D125-1: Intake only)
14. Adjustment screw
15. Locknut
16. Rocker arm
17. Push rod
18. Cam follower
19. Exhaust valve
20. Valve seal (Exhaust only)



a. Oil

6150F114A

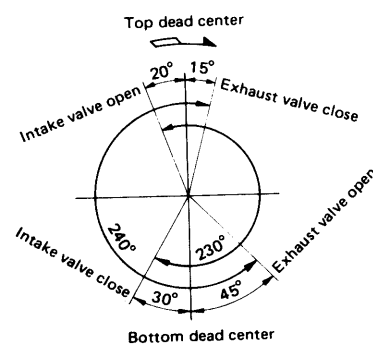
CAMSHAFT

- Stamp forging
- Journal portion, cam portion:
Induction hardening

List of part (related to valve) to be set in place

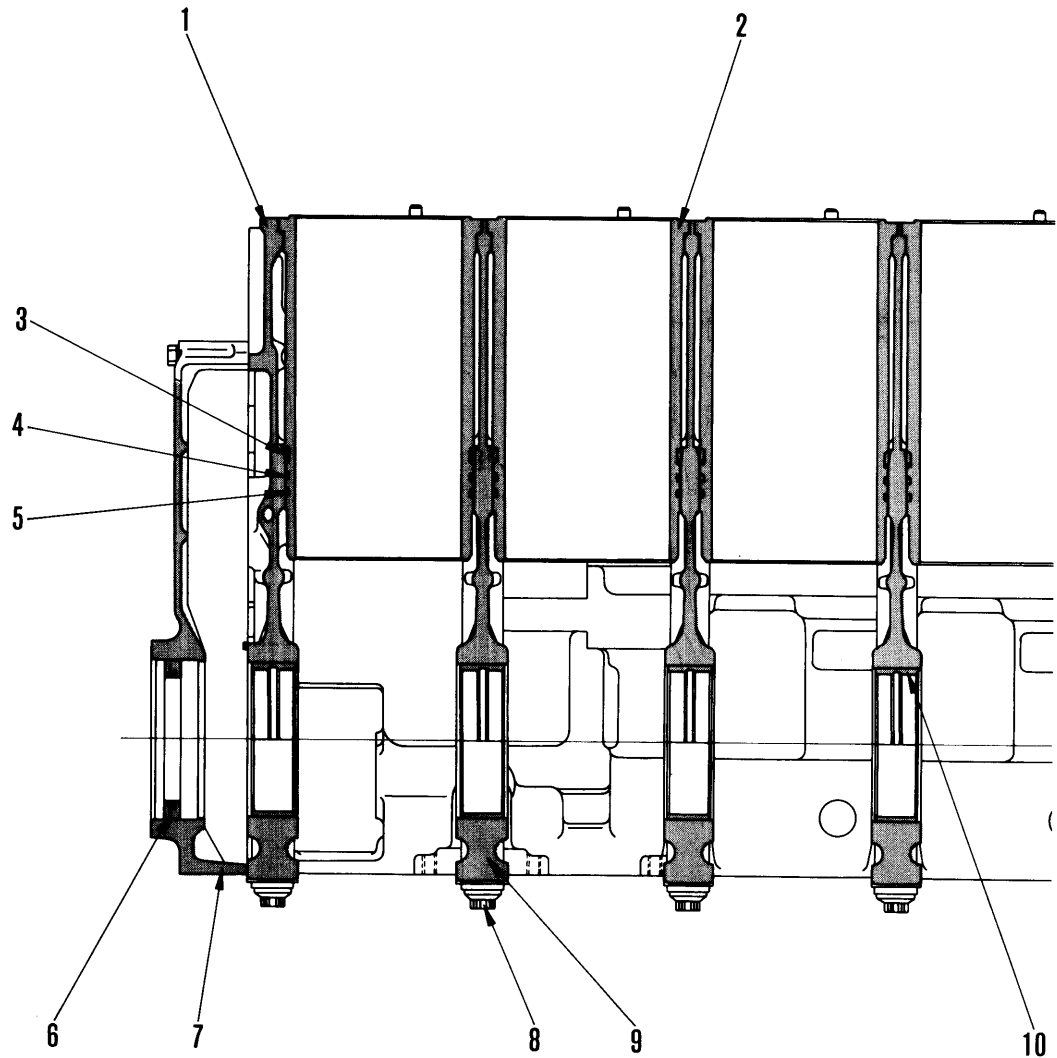
Engine	6D125-1		S6D125-1, SA6D125-1	
	IN	EX	IN	EX
Parts set in				
Crosshead	6150-41-5611	6150-41-5611	6150-41-5611	6150-41-5611 ※6150-41-5710
Valve	6150-41-4120	6150-41-4210	6150-41-4120	6150-41-4210 ※6150-41-4230
Valve spring (Color code)	6150-41-4411 (Yellow)	6150-41-4411 (Yellow)	6150-41-4420 (Purple)	6150-41-4411 (Yellow) ※6150-41-4450 (White)
Spring seat (Lower)	6150-41-4430	6150-41-4430	—	6150-41-4430
Valve rotator	—	—	6150-41-4540	—
Valve guide	6150-11-1341	6150-11-1351	6150-11-1341	6150-11-1351
Stem seal	—	6140-41-4540	—	6140-41-4540

Parts marked ※ are applicable only to an engine equipped with a exhaust brake (side and butterfly types).

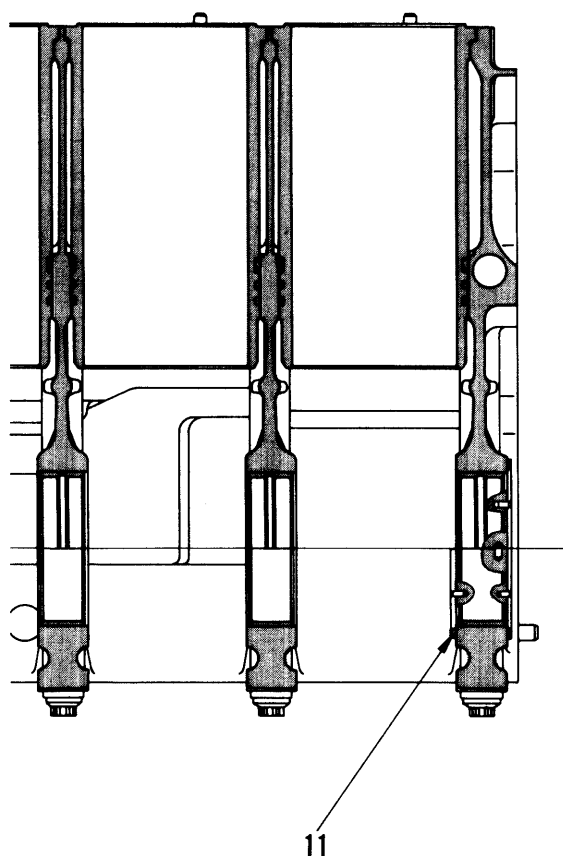
VALVE TIMING

6150F115

CYLINDER BLOCK



- | | |
|---|---|
| 1. Cylinder block | 7. Front cover |
| 2. Cylinder liner | 8. Main bearing cap bolt |
| 3. Crevice seal | 9. Main bearing cap |
| 4. Liner seal (Ethylene propylene rubber) | 10. Main bearing |
| 5. Liner seal (Silicon rubber) | 11. Thrust bearing |
| 6. Front seal | 12. Piston cooling nozzle (S6D125, SA6D125) |



6150F108

CYLINDER BLOCK

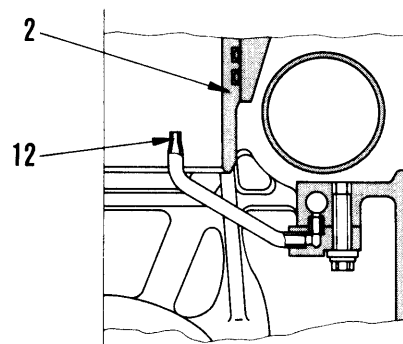
- Crankshaft: 7 bearings
- Camshaft: 7 bearings

FRONT SEAL

- Single lip with dust seal

PISTON COOLING

- With piston cooling nozzle (S6D125, SA6D125)



6150F109A

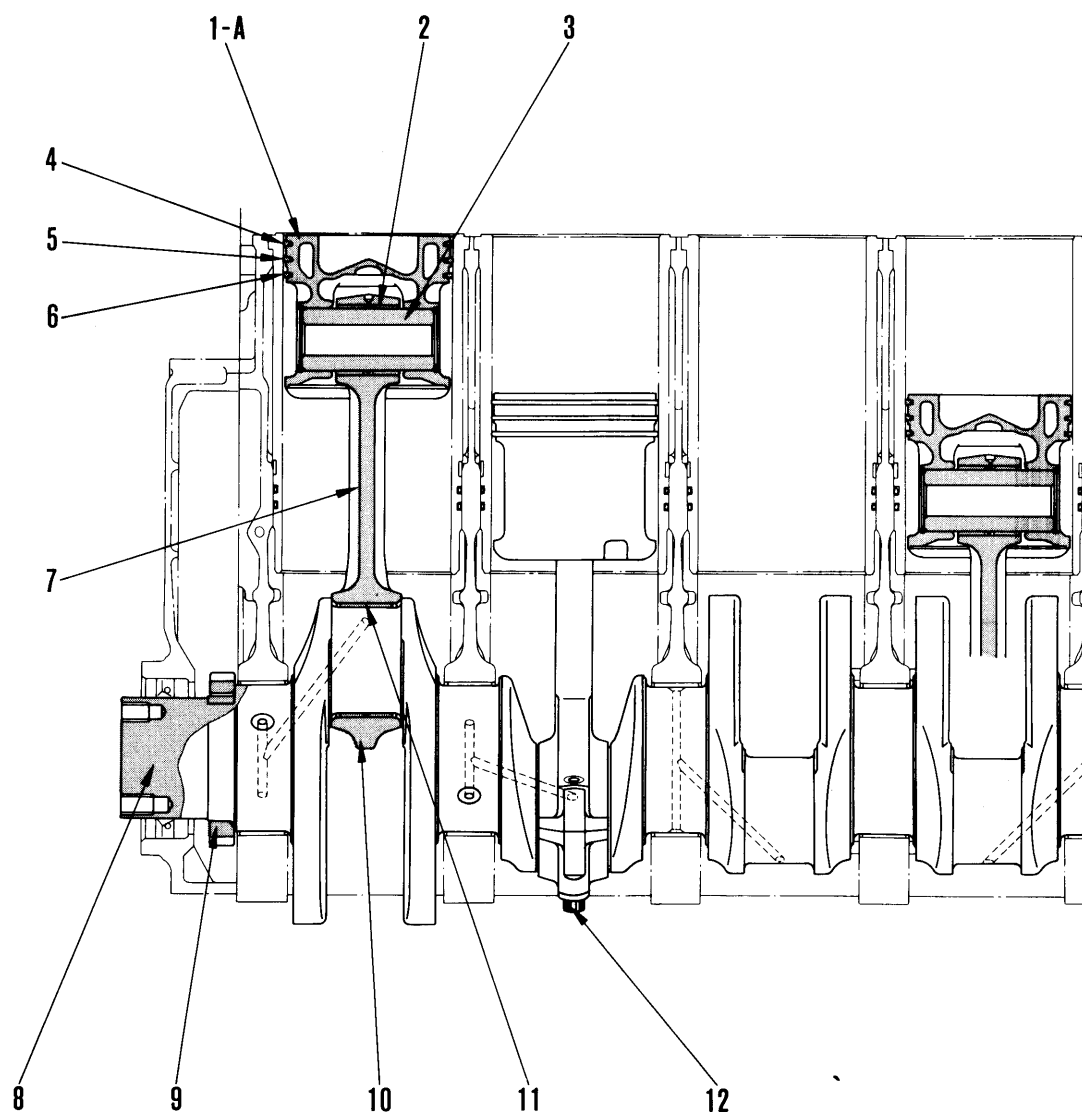
CYLINDER LINER

- Wet type
- Treatment: Plateau honing finish
Tufftride treated (S6D125, SA6D125)

LINER SEAL

- Top: Clevis seal
- Middle: O-ring (Ethylene propylene rubber)
- Bottom: O-ring (Silicon rubber)

MAIN CIRCULATION PART



1-A. Piston (S6D125, SA6D125)

1-B. Piston (6D125, S6D125)

2. Connecting rod bushing

3. Piston pin

4. Top ring

5. Second ring

6. Oil ring

7. Connecting rod

8. Crankshaft

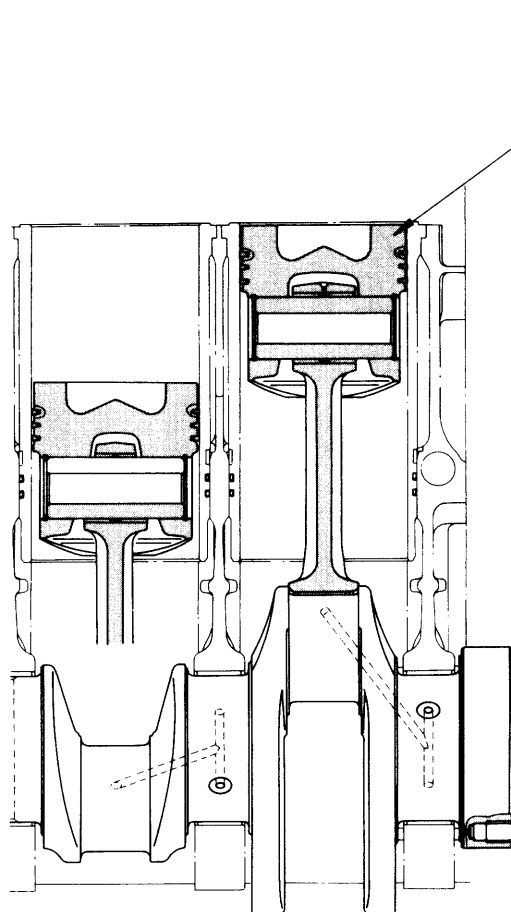
9. Crankshaft gear

10. Connecting rod cap

11. Connecting rod bearing

12. Connecting rod cap bolt

★ The above is a composite sectional drawing for 6D125-1, S6D125-1 and SA6D125-1.



6150F110A

CRANKSHAFT: Stamp forging

6D125-1: Induction hardening on journal portion

S(A)6D125-1: Induction hardening on journal portion and filet portion.

PISTON**Material**

S(A)6D125-1 (No.1-A): Ductile cast iron (FCD).

(S)6D125-1 (No.1-B): Aluminum alloy

Type: Elliptical taper profile thermal flow,
MTCC combustion chamber**PISTON RING**

Top ring	Second ring	Oil ring
		
Both faces keystone Barrel face Hard chrome plating	Keystone inner cut Tapered face Hard chrome plating	Hard chrome plating with coil expander

6150F111

CONNECTING ROD

Connecting rod lube oil holes

not provided: 6D125-1

provided: S6D125-1, SA6D125-1

Piston cooling from the connecting rod tip

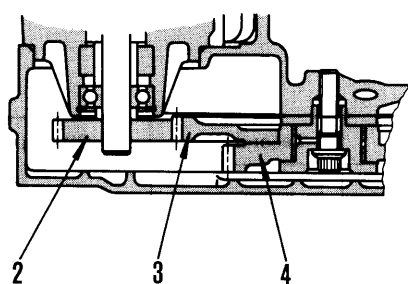
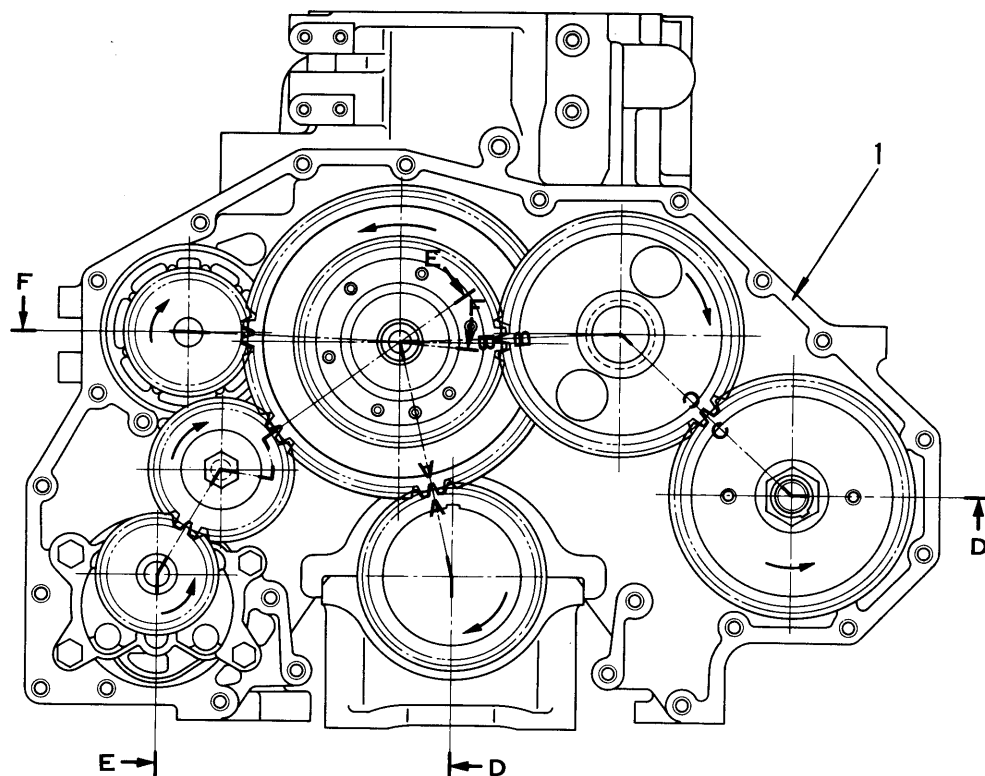
not provided: 6D125-1, S6D125-1

(with aluminum alloy pistons)

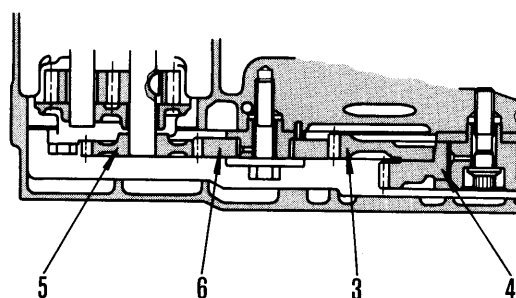
provided: 6D125-1, SA6D125-1

(with FCD pistons)

TIMING GEAR



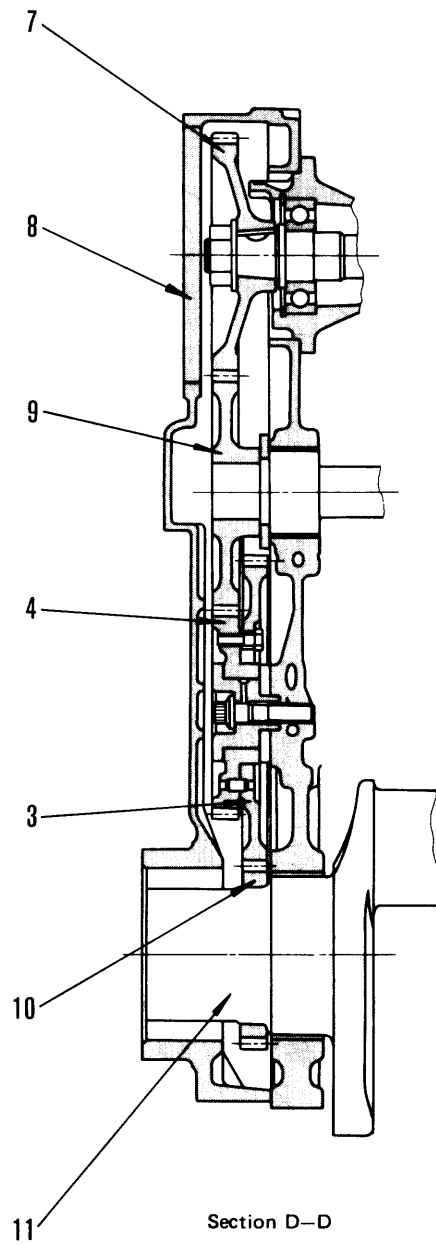
Section F—F



Section E—E

- | | | |
|---|--|---|
| 1. Cylinder block | | 7. Injection pump drive gear (No. of teeth: 44) |
| 2. Water pump drive gear (No. of teeth: 22) | | 8. Timing gear cover |
| 3. Main idler gear (No. of teeth: 57) | | 9. Camshaft gear (No. of teeth: 44) |
| 4. Main idler gear (No. of teeth: 38) | | 10. Crankshaft gear (No. of teeth: 33) |
| 5. Oil pump drive gear (No. of teeth: 21) | | 11. Crankshaft |
| 6. Idler gear for oil pump (No. of teeth: 25) | | |

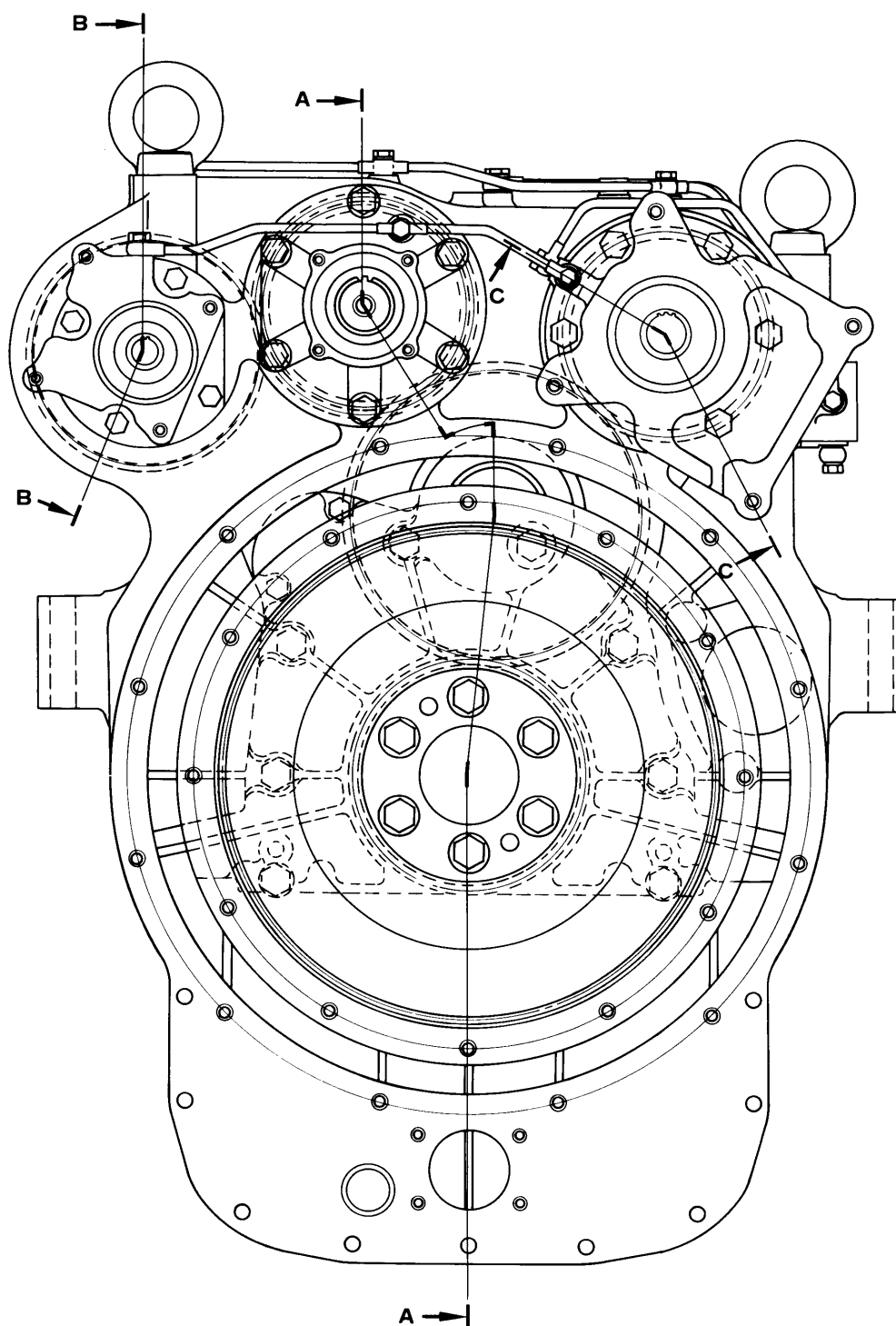
A,B,C: Match marks for timing gears



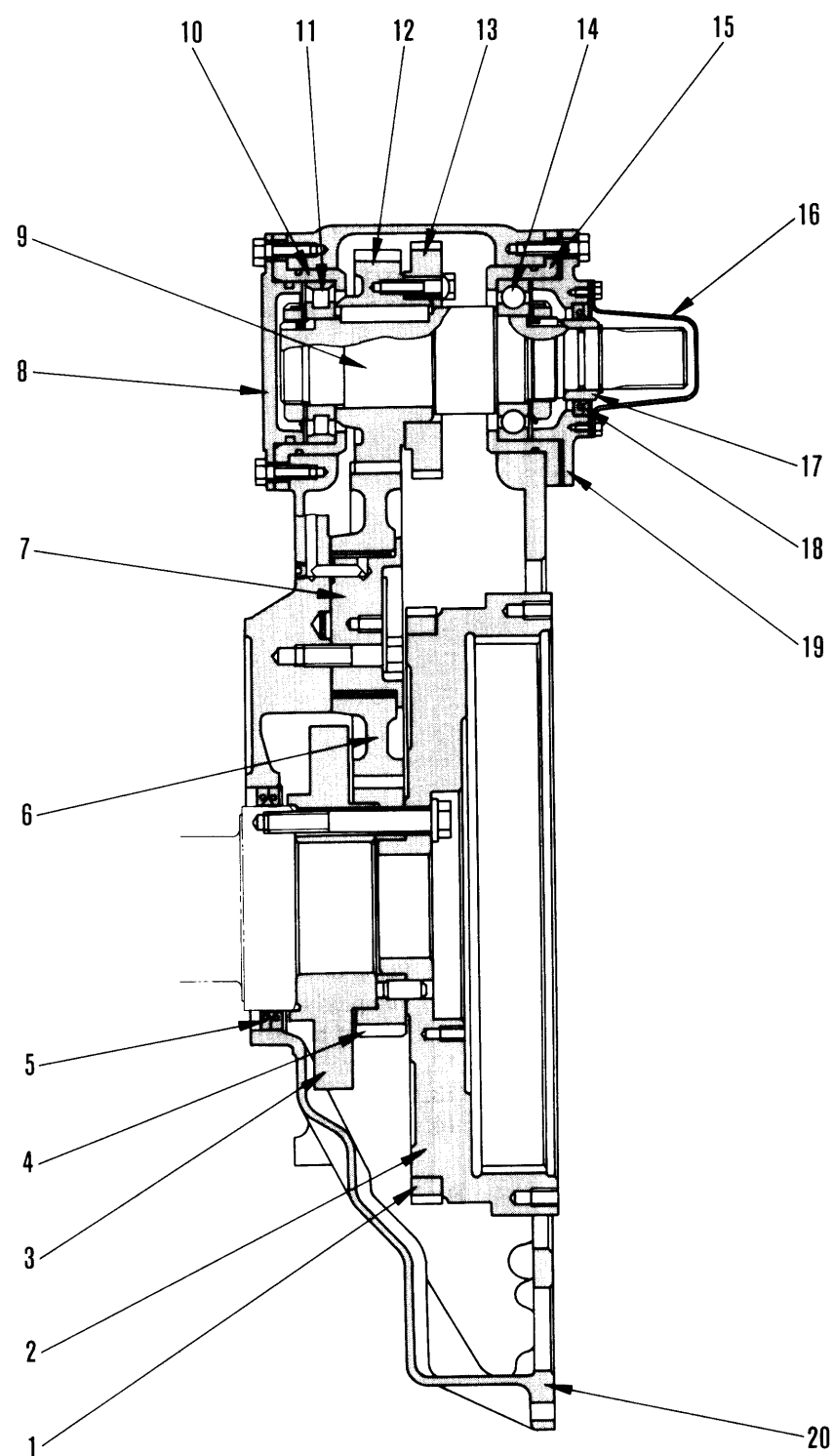
6150F112A

FLYWHEEL AND FLYWHEEL HOUSING

With PTO type (For D60·65A,E,P-8, 11, HD200·205)



6150F116

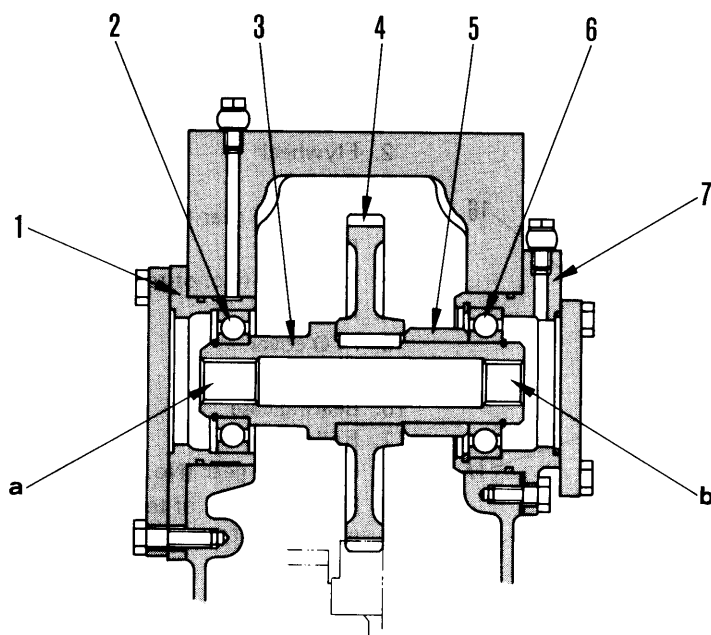


Section A-A

1. Ring gear
No. of teeth
137: D60 · 65A, P-8, 11
131: HD200 · 205
2. Flywheel
3. Spacer
4. PTO drive gear (No. of teeth: 41)
5. Rear seal
6. Idler gear (No. of teeth: 52)
7. Idler shaft
8. PTO cover
9. PTO drive shaft
10. Bearing case
11. Roller bearing
12. PTO drive gear (No. of teeth: 35)
13. PTO gear (No. of teeth: 57)
(Without PTO gear for HD200 · 205)
14. Ball bearing
15. Bearing case
16. Cover
17. Bushing
18. Oil seal
19. Cover
20. Flywheel housing

6150F118

(D60·65A, P-8, 11)

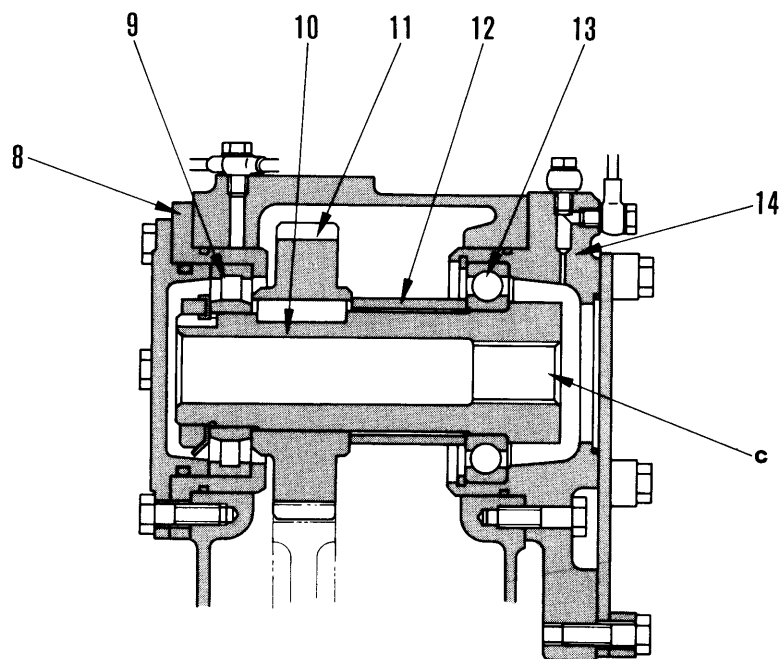


Section B—B

1. Bearing case
2. Ball bearing
3. Pump drive shaft
4. Pump drive gear (No. of teeth: 61)
5. Spacer
6. Ball bearing
7. Bearing case

- a. PTO for steering pump
- b. PTO for torque converter pump

(D60·65A, P-8, 11, HD200·205)



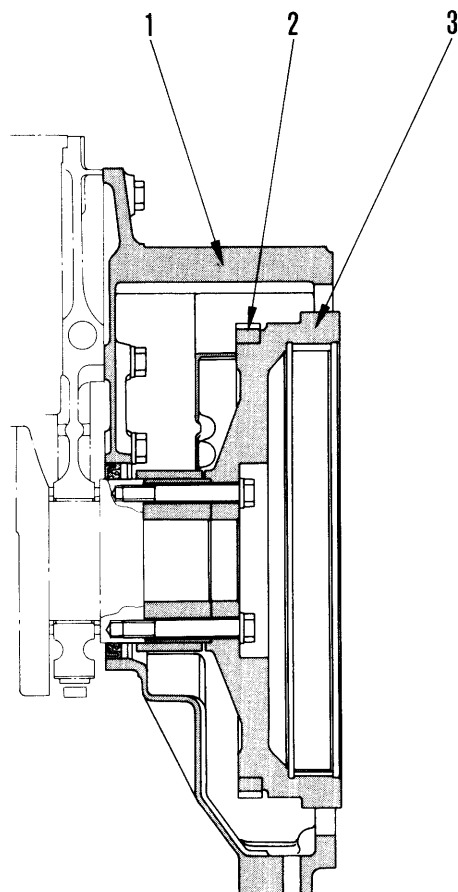
Section C—C

8. Bearing case
9. Roller bearing
10. Pump drive shaft
11. Pump drive gear (No. of teeth: 35)
12. Spacer
13. Ball bearing
14. Bearing case

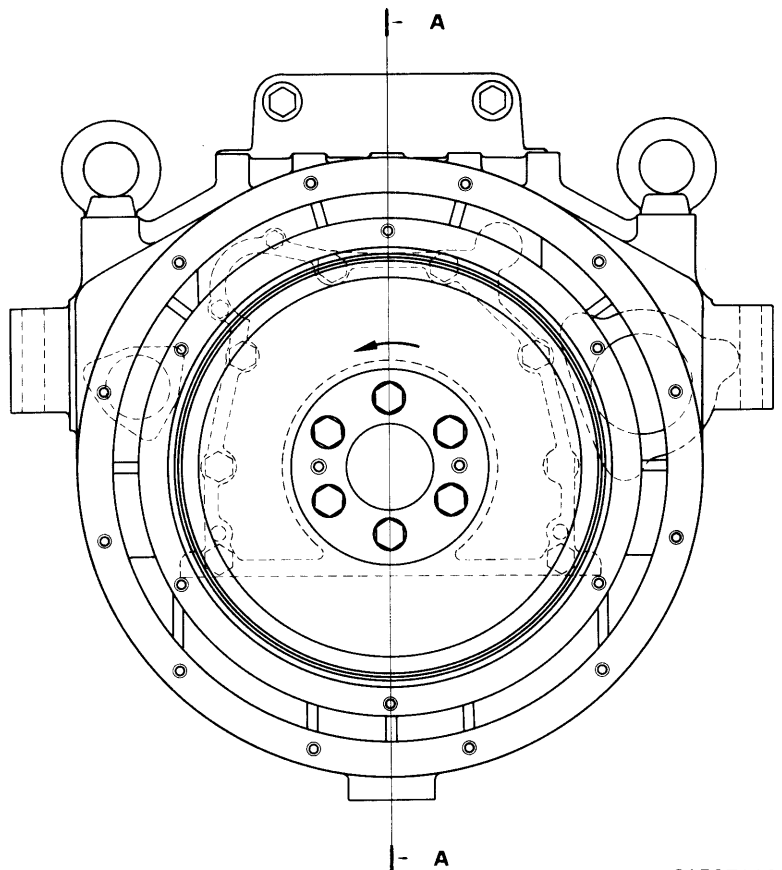
- c. PTO for work equipment pump

6150F117

Without PTO type (For D75S-5, PC300-3, PC300LC-3, PC400-3, PC400LC-3)



Section A—A



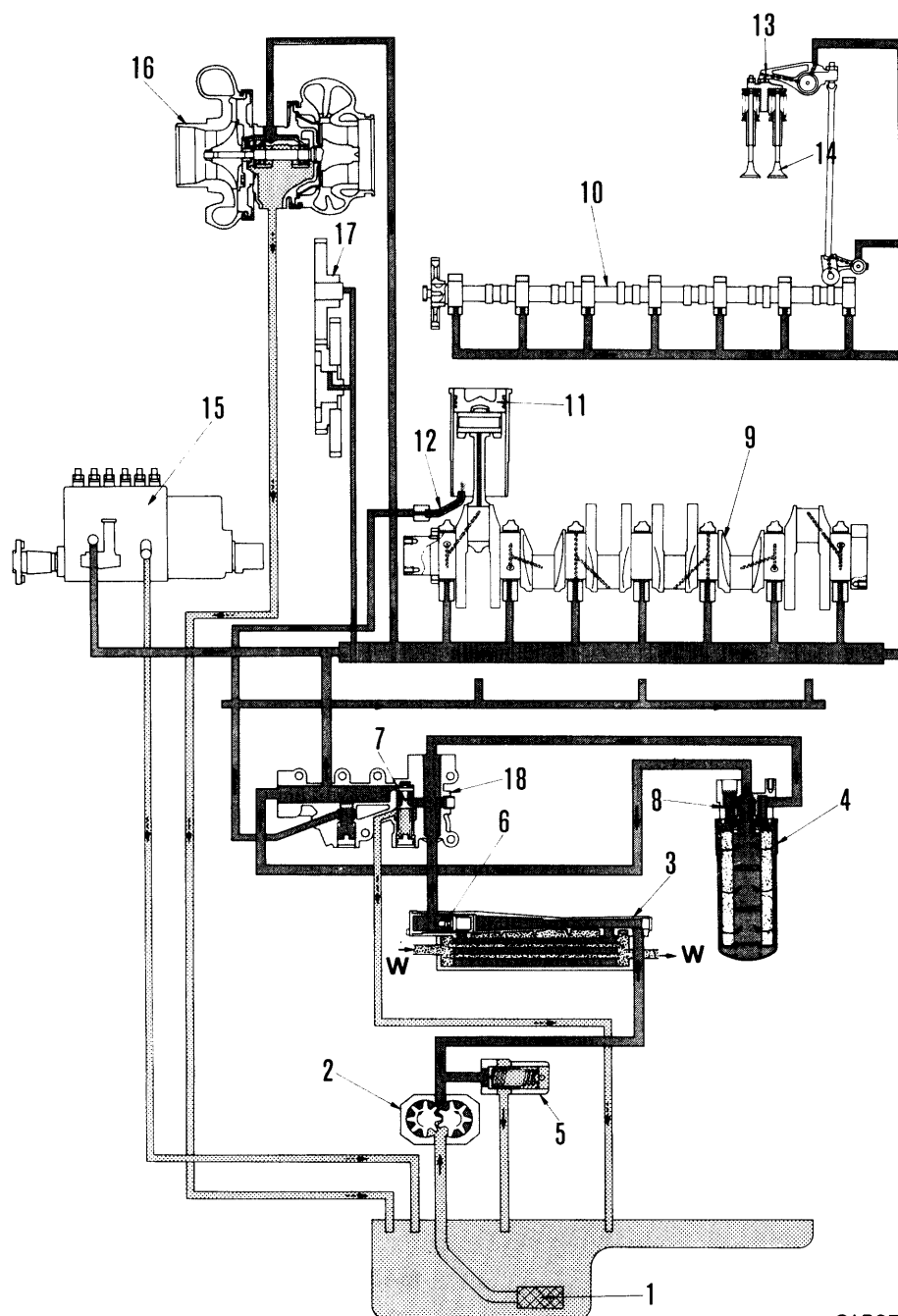
6150F119

1. Flywheel housing
2. Ring gear
3. Flywheel

Applicable machine	No. of teeth	
	Ring gear	Flywheel inner gear
D75S-5	137	131
PC300-3 PC300LC-3 PC400-3 PC400LC-3	148	—

LUBRICATION SYSTEM

LUBRICATION SYSTEM CHART

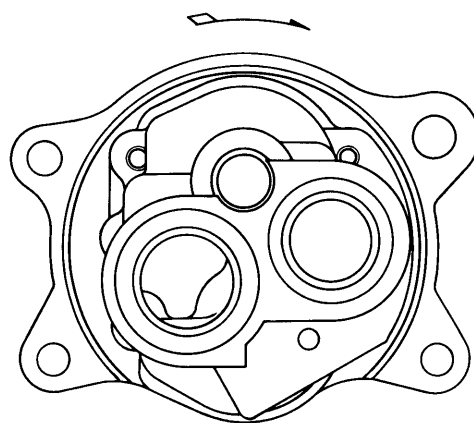
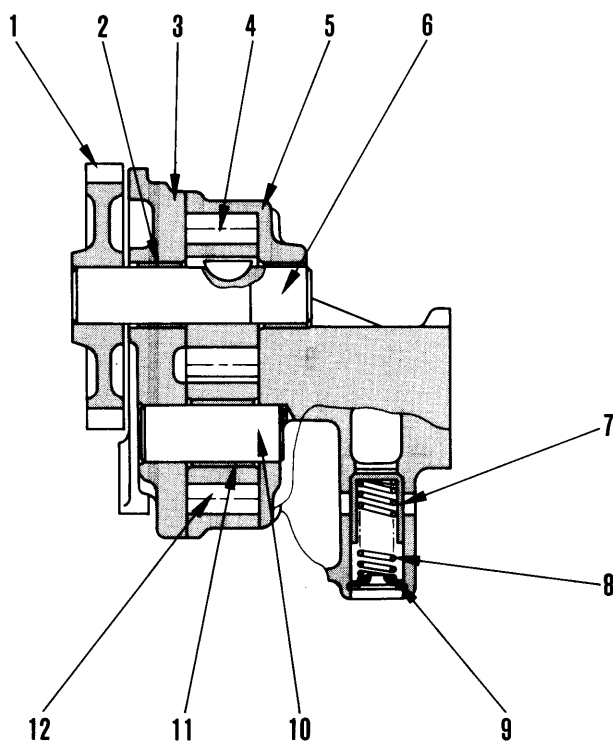


6150F120A

- | | | |
|----------------------|---|--------------------------------|
| 1. Oil strainer | 8. Safety valve | 14. Intake and exhaust valve |
| 2. Oil pump | 9. Crankshaft | 15. Fuel injection pump |
| 3. Oil cooler | 10. Camshaft | 16. Turbocharger (S(A)6D125-1) |
| 4. Oil filter | 11. Piston | 17. Timing gear |
| 5. Main relief valve | 12. Piston cooling nozzle (S(A)6D125-1) | 18. Adapter |
| 6. Thermostat | 13. Rocker arm | |
| 7. Regulator valve | | W: Cooling water |

OIL PUMP

6D125-1



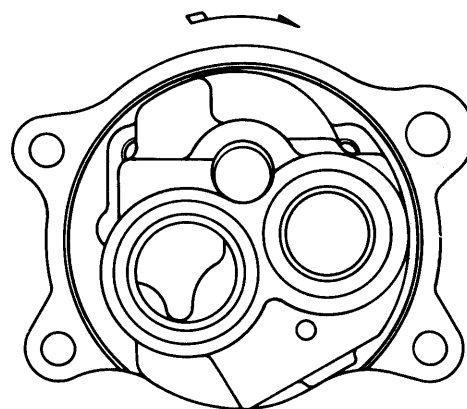
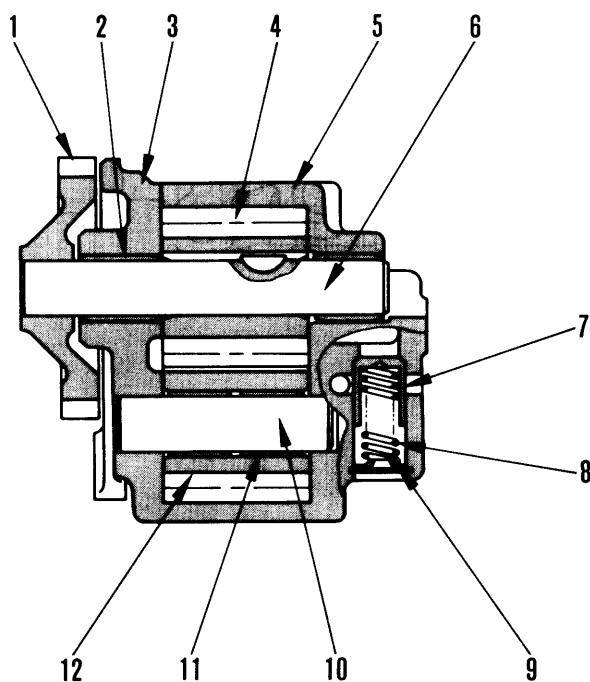
1. Pump drive gear (No. of teeth: 21)
2. Bushing
3. Pump cover
4. Drive gear
5. Pump body
6. Drive shaft
7. Main relief valve
8. Valve spring
9. Retainer
10. Driven shaft
11. Bushing
12. Driven gear

OIL PUMP

- Type: Gear type
- Pump speed: Engine speed x 1.571

MAIN RELIEF VALVE

- Set pressure: 7^{+1}_0 kg/cm²

S6D125-1, SA6D125-1

6150F122

1. Pump drive gear (No. of teeth: 21)
2. Bushing
3. Pump cover
4. Drive gear
5. Pump body
6. Drive shaft
7. Main relief valve
8. Valve spring
9. Retainer
10. Driven shaft
11. Bushing
12. Driven gear

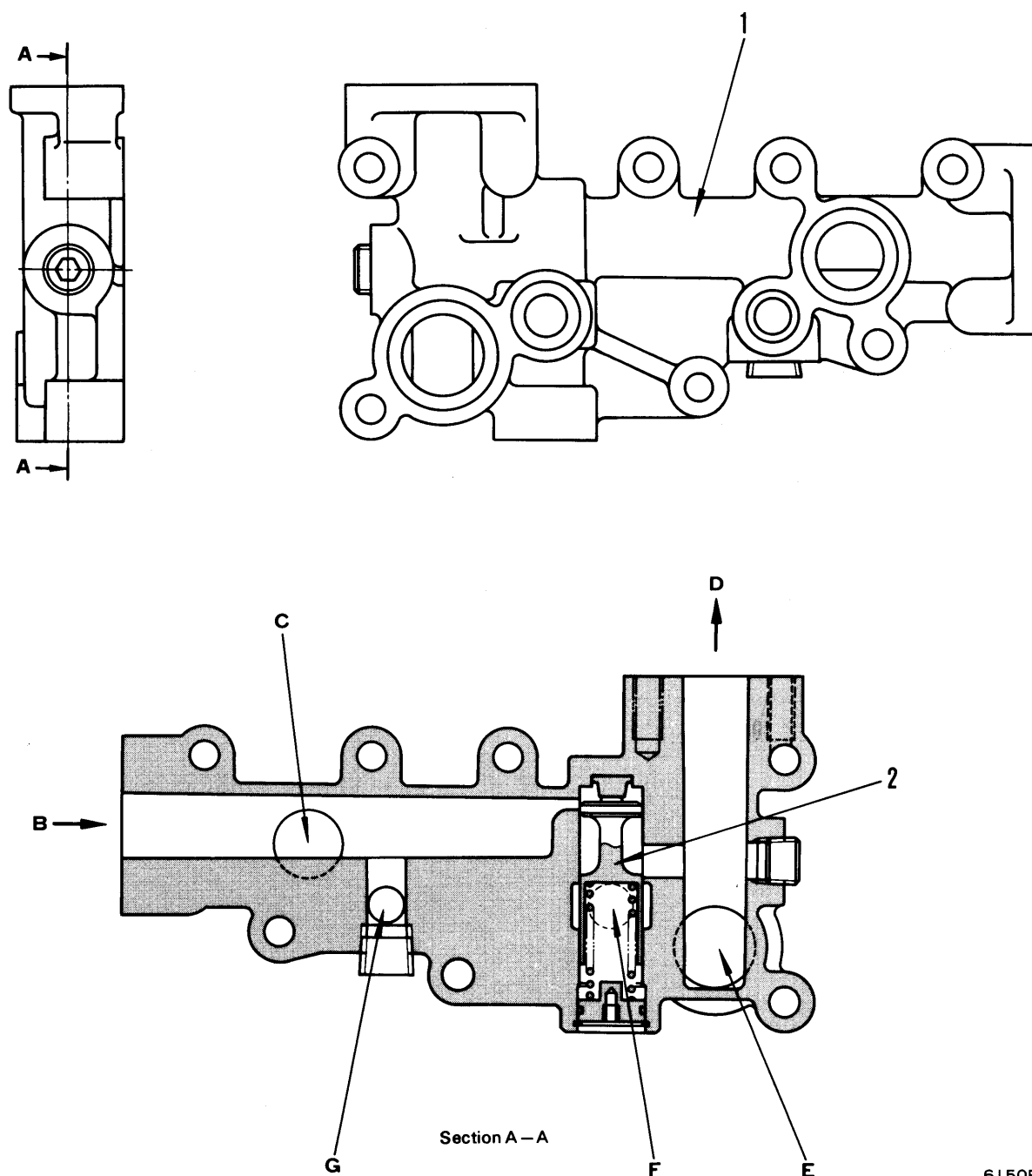
OIL PUMP

- Type: Gear type
- Pump speed: Engine speed x 1.571

MAIN RELIEF VALVE

- Set pressure: 7^{+1}_0 kg/cm²

REGULATOR VALVE



6150F123A

1. Adapter
2. Regulator valve

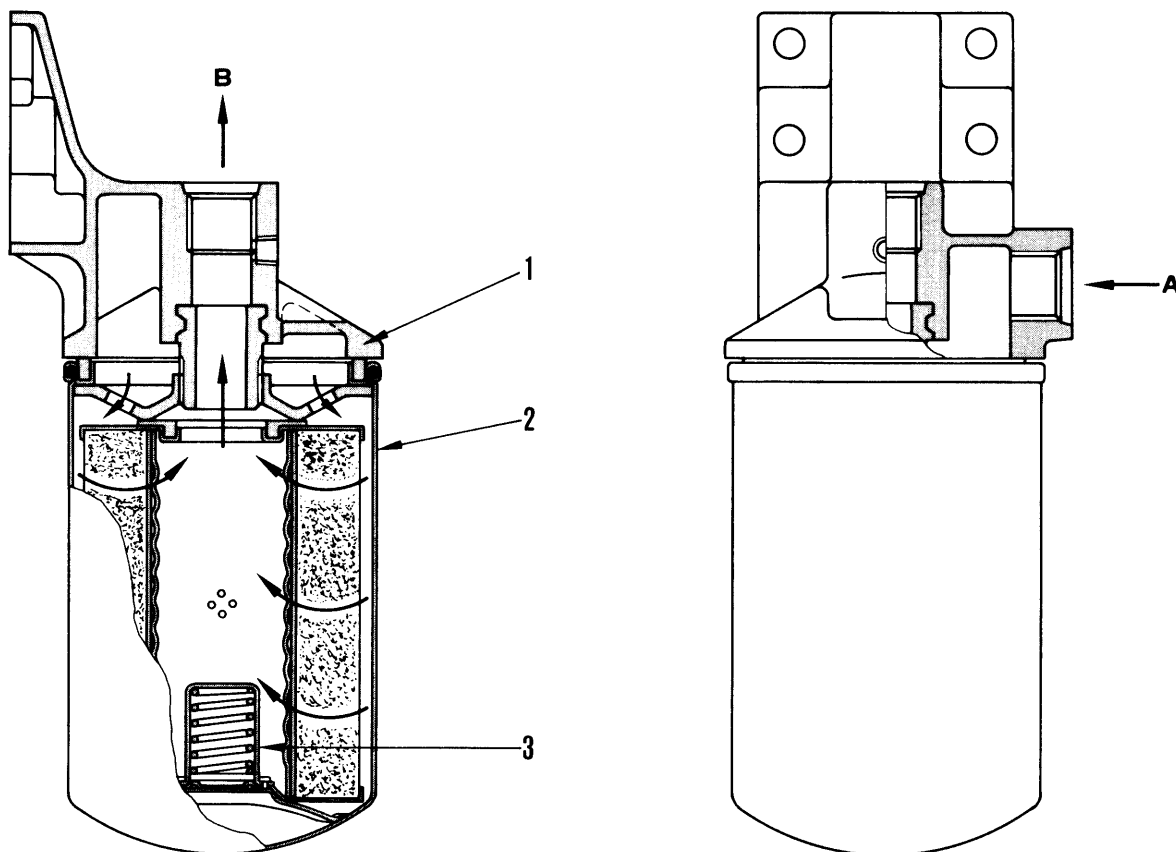
- B. From oil filter
C. To engine each part
D. To oil filter
E. From oil pump
F. To oil pan
G. To piston cooling nozzle (S6D125-1)

REGULATOR VALVE

- Set pressure: $3 \begin{smallmatrix} +0.1 \\ -0.2 \end{smallmatrix} \text{ kg/cm}^2$ (6D125-1)
- Set pressure: $3.75 \pm 0.15 \text{ kg/cm}^2$ (S6D125-1)
(SA6D125-1)

OIL FILTER

6D125-1



6150F431

1. Bracket
2. Cartridge
3. Safety valve

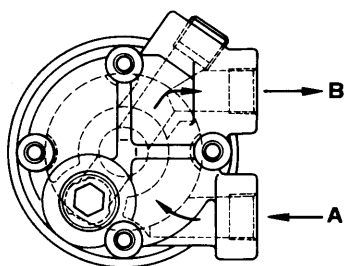
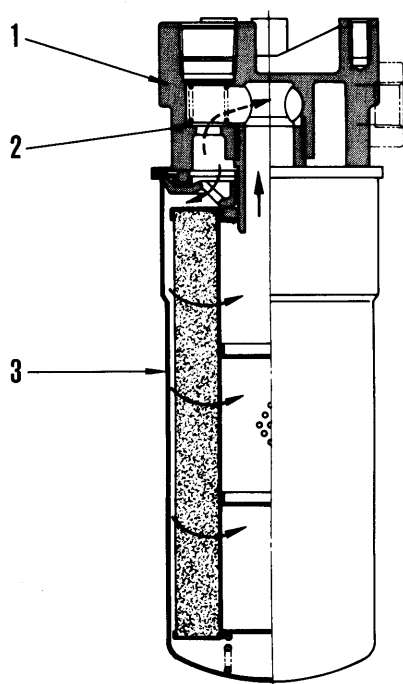
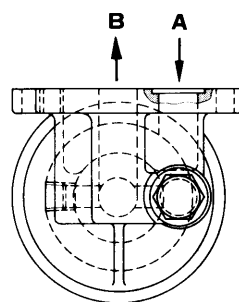
- A. Oil inlet
B. Oil outlet

OIL FILTER

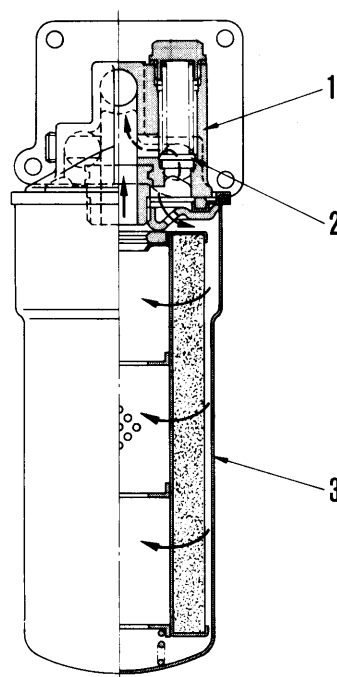
- Filtration area: 0.53 m²

SAFETY VALVE

- Set pressure: 2.0 ± 0.2 kg/cm²

S6D125-1, SA6D125-1**Remote mounting type****Direct mounting type**

6150F124



6150F124-1

1. Bracket
2. Safety valve
3. Cartridge

- A Oil inlet
B Oil outlet

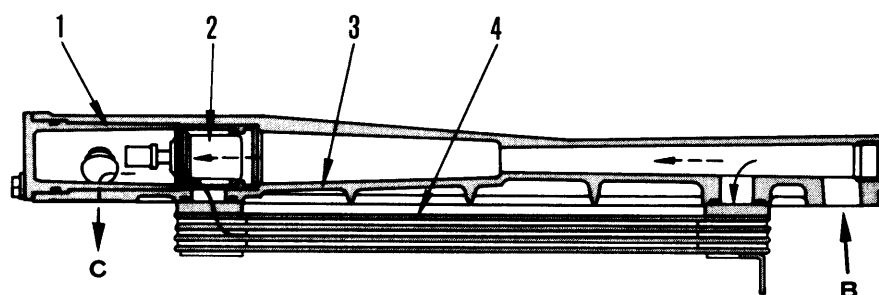
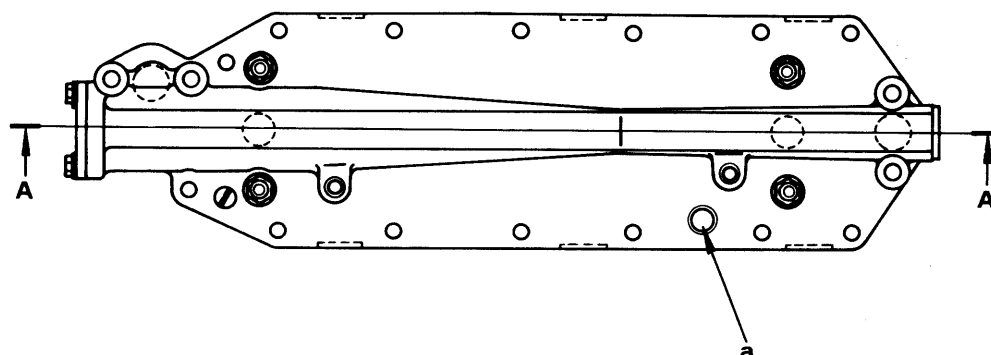
OIL FILTER

- Filtration area: 0.84 m²

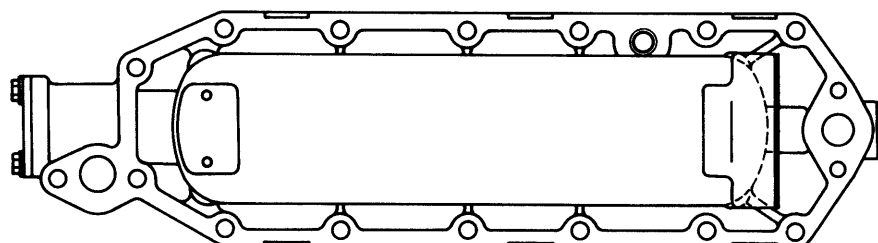
SAFETY VALVE

- Set pressure: 2.0 ± 0.2 kg/cm²

OIL COOLER



Section A—A



6150F125A

1. Thermostat housing
2. Thermostat
3. Cooler cover
4. Cooler element
6D125-1: 4 cores
S6D125-1: 7 cores
SA6D125-1: 10 cores

- a. Water drain port
- B. Oil inlet
- C. To engine each part

THERMOSTAT FUNCTION

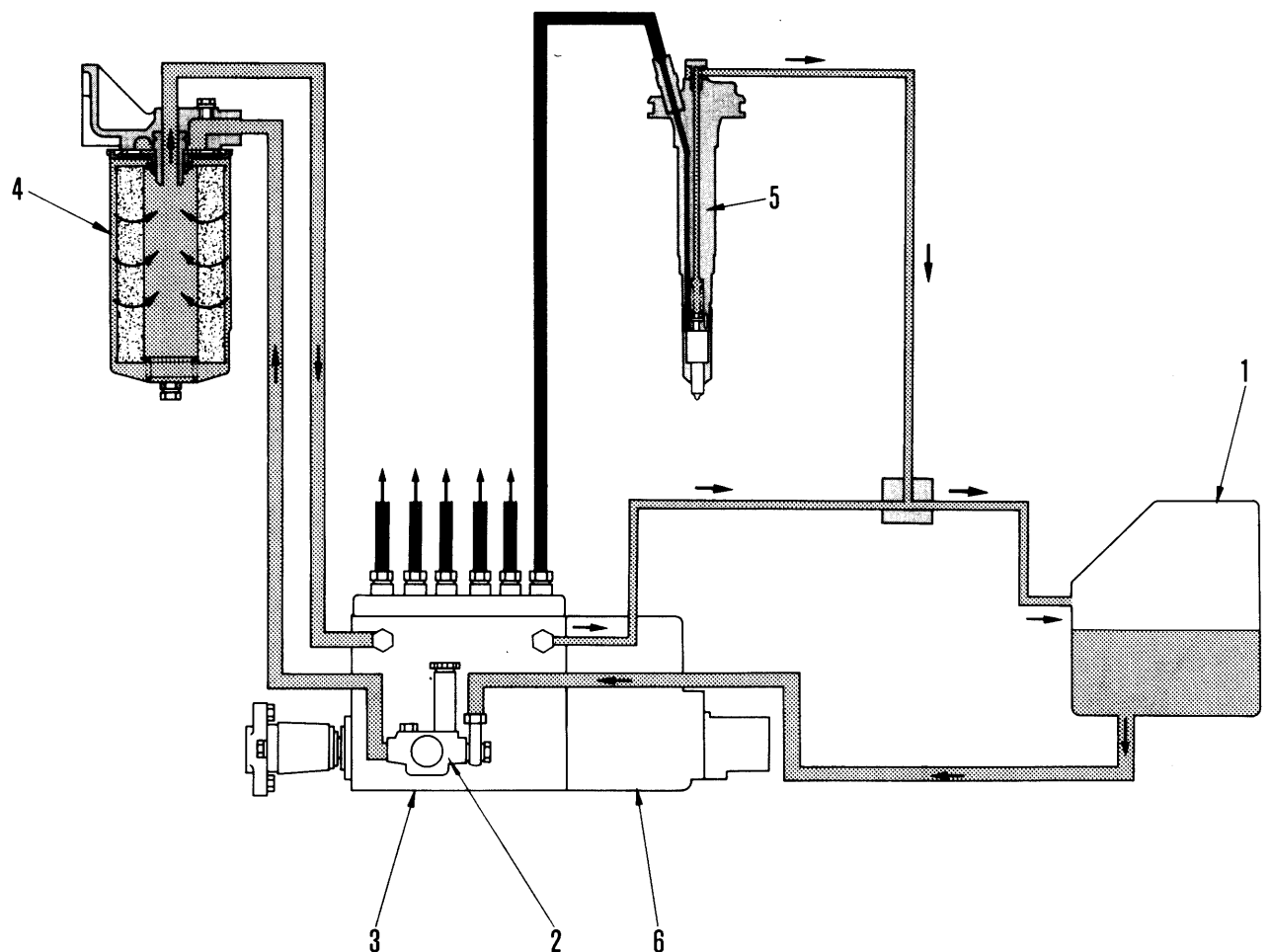
- Valve cracking temperature: $104 \pm 1.5^{\circ}\text{C}$
- Full opening temperature: 115°C
- Full opening lift: Min. 8 mm (6D125-1, S6D125-1)
Min. 11 mm (SA6D125-1)

OIL COOLER

- Effective area 6D125-1: 0.289 m^2
S6D125-1: 0.504 m^2
SA6D125-1: 0.781 m^2

FUEL SYSTEM

FUEL SYSTEM CHART

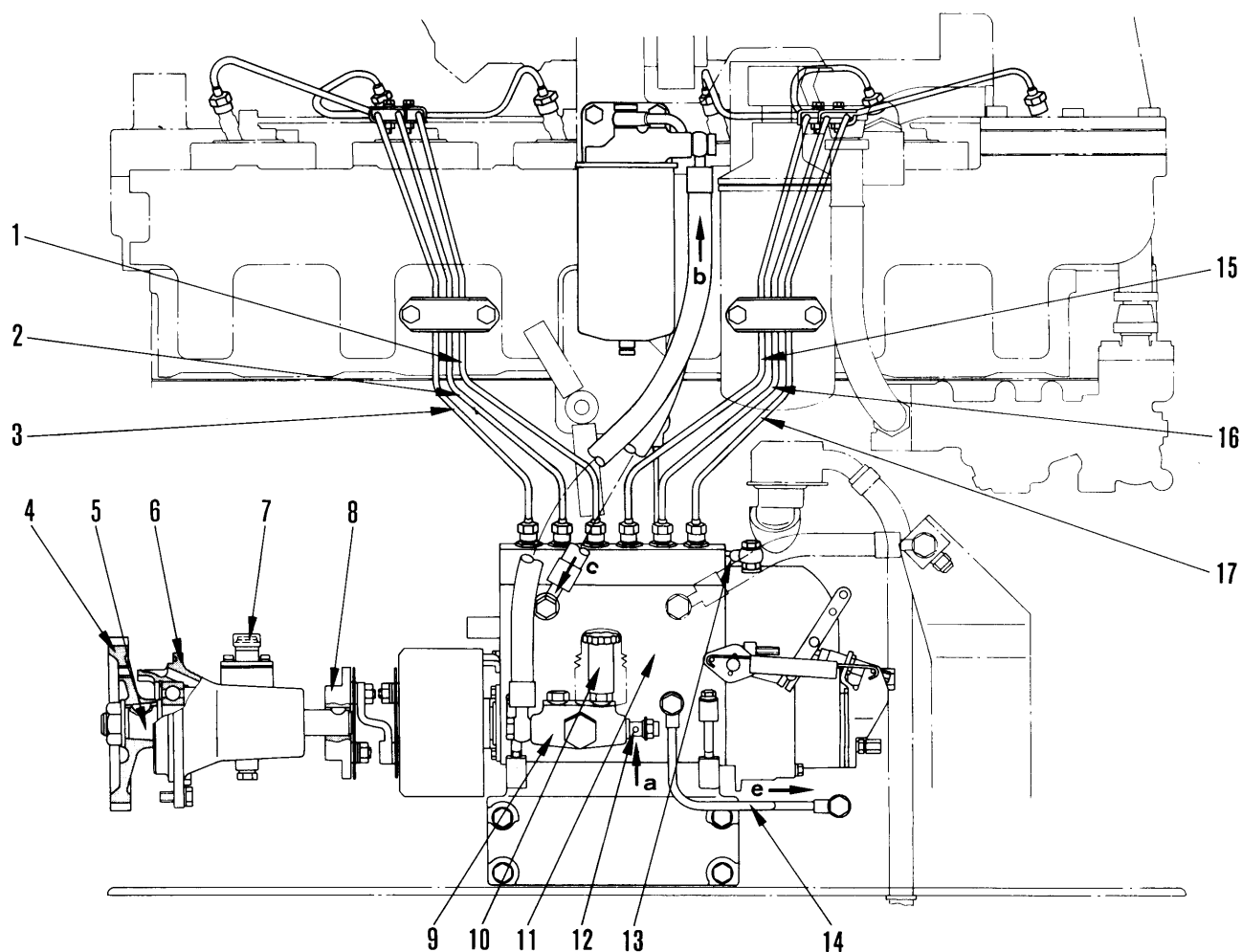


6150F126A

1. Fuel tank
2. Feed pump
3. Fuel injection pump
4. Fuel filter
5. Fuel injection nozzle
6. Governor

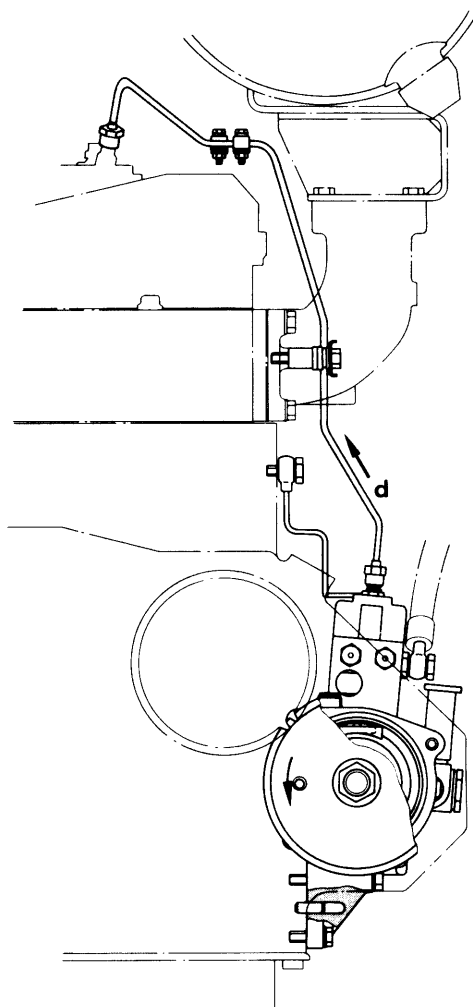
FUEL INJECTION PUMP

6D125-1 (For D60·65A,E,P-8)



6I50F127A

- | | |
|---|---------------------------------|
| 1. Fuel injection pipe (No. 3) | 9. Feed pump |
| 2. Fuel injection pipe (No. 2) | 10. Priming pump |
| 3. Fuel injection pipe (No. 1) | 11. Fuel injection pump |
| 4. Fuel injection pump drive gear
(No. of teeth: 44) | 12. Gauze filter |
| 5. Drive shaft | 13. Oil tube (inlet) |
| 6. Drive case | 14. Oil tube (outlet) |
| 7. Tachometer pick-up | 15. Fuel injection pipe (No. 4) |
| 8. Coupling | 16. Fuel injection pipe (No. 5) |
| | 17. Fuel injection pipe (No. 6) |



6150F128A

- a. Fuel inlet
- b. To fuel filter
- c. From fuel filter
- d. To fuel injection nozzle
- e. To oil pan (oil)

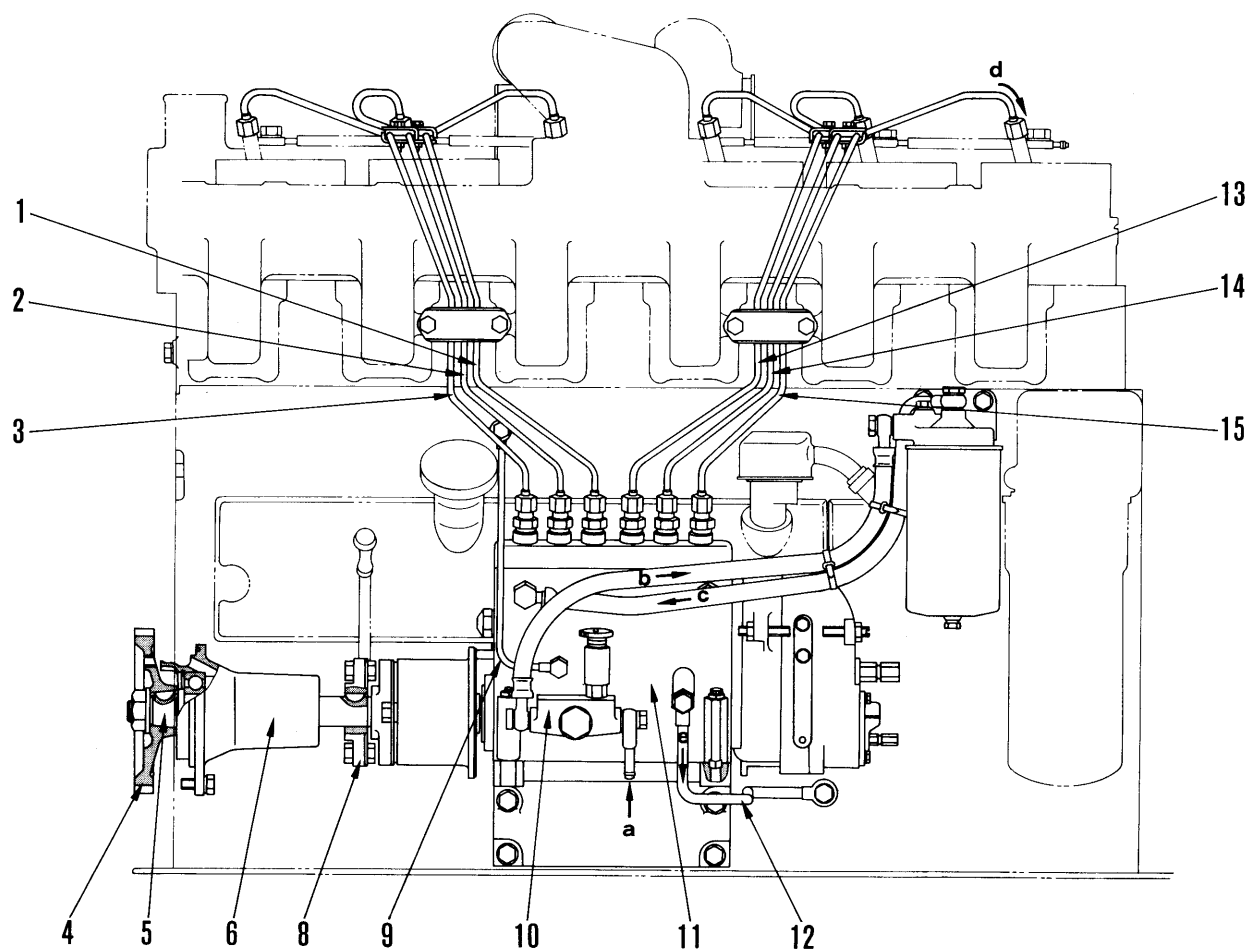
FUEL INJECTION PUMP

- Maker: NIPPON DENSO
- Type: Bosch PE-NB
- Lubrication method: Forced lubrication with engine oil.

GOVERNOR

- Type: RSV Centrifugal, all-speed type.

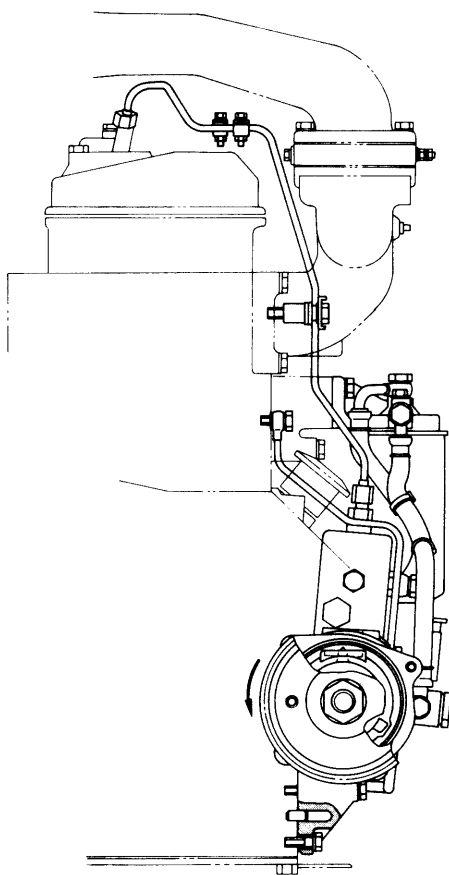
S6D125-1 (For D75S-5)



6150F129A

1. Fuel injection pipe (No. 3)
2. Fuel injection pipe (No. 2)
3. Fuel injection pipe (No. 1)
4. Fuel injection pump drive gear
(No. of teeth: 44)
5. Drive shaft
6. Drive case
8. Coupling

9. Oil tube (inlet)
10. Feed pump
11. Fuel injection pump
12. Oil tube (outlet)
13. Fuel injection pipe (No. 4)
14. Fuel injection pipe (No. 5)
15. Fuel injection pipe (No. 6)



- a. Fuel inlet
- b. To fuel filter
- c. From fuel filter
- d. To fuel injection nozzle
- e. To oil pan (oil)

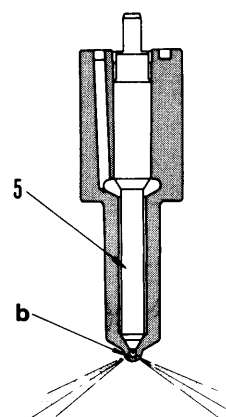
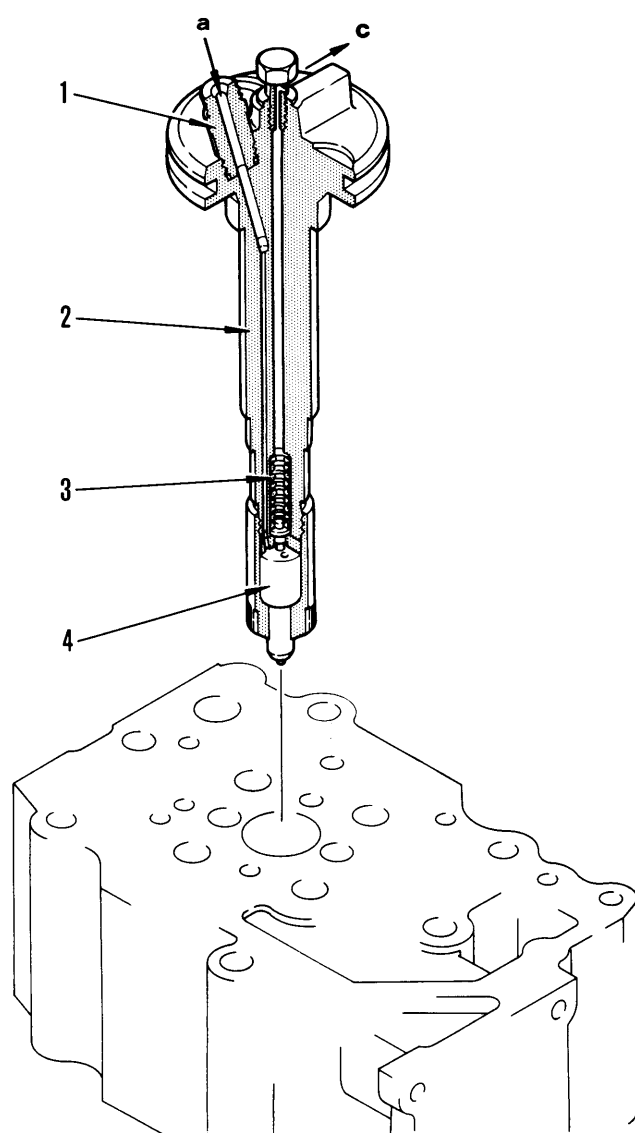
FUEL INJECT PUMP

- Maker: DIESEL KIKI NIPPON DENSO
- Type: Bosch PE-P NB (EP9)
- Lubrication method: Forced lubrication with engine oil

GOVERNOR

- Type: RSV Centrifugal, all-speed type

FUEL INJECTION NOZZLE



6150F132

6150F131B

1. Inlet connector
 2. Nozzle holder
 3. Nozzle spring
 4. Nozzle
 5. Needle valve
- a. From injection pump
b. Nozzle hole
c. To fuel tank

FUEL INJECTION NOZZLE

• Type

6D125-1, S6D125-1:

Made by NIPPON DENSO

Multi-hole type.

S6D125-1, SA6D125-1:

Made by DIESEL KIKI

Multi-hole type

• Injection pressure

6D125-1: 225 kg/cm²S6D125-1: 225 kg/cm²(For PC300-3 Engine No.
23689 and up)S6D125-1: 250 kg/cm²SA6D125-1: 250 kg/cm²

• Adjusting injection pressure:

Shim adjusting type

Adjusting value (per shim thickness 0.1 mm)

6D125-1: Approx. 16 kg/cm²S6D125-1: Approx. 16 kg/cm²

(For PC300-3

Engine No. 23689 and up.)

S6D125-1: Approx. 14 kg/cm²SA6D125-1: Approx. 14 kg/cm²

Adjusting shims (at intervals of 0.025 mm)

6D125-1: 0.7 to 1.5 mm

S6D125-1: 0.7 to 1.5 mm

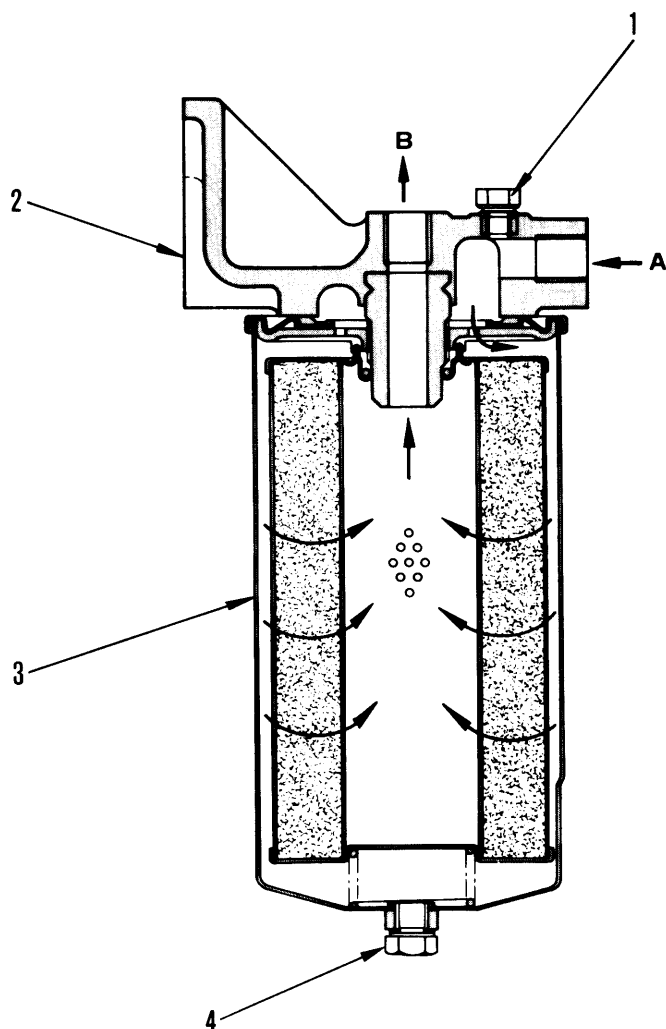
(For PC300-3

Engine No. 23689 and up.)

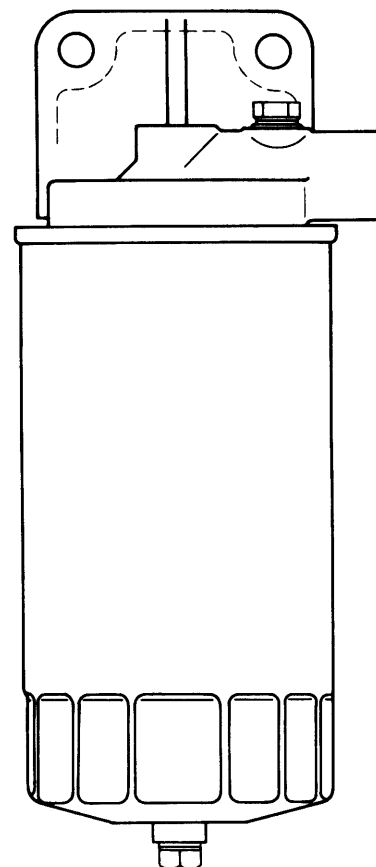
S6D125-1: 0.5 to 1.975 mm

SA6D125-1: 0.5 to 1.975 mm

FUEL FILTER



- 1. Air bleed plug
- 2. Bracket
- 3. Cartridge
- 4. Water drain plug
- A. Fuel inlet
- B. Fuel outlet



6150F133

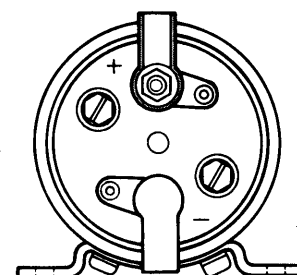
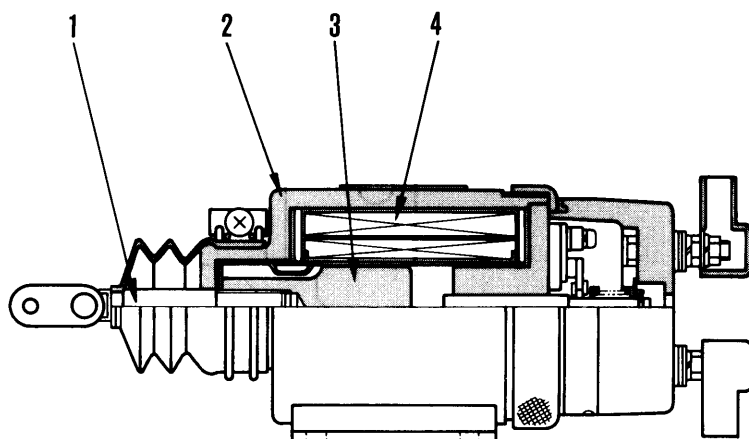
FUEL FILTER

• Filtration area: 0.3 m²

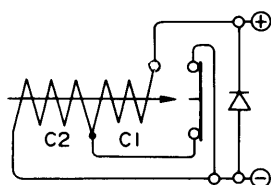
MAGNETIC SWITCH AND FUEL SOLENOID

MAGNETIC SWITCH

B contact (electricity flows in ordinary operations) method



6150F134



Inner wiring

C1: Pull-in coil
C2: Holding coil

- | | |
|-----------|-----------------------|
| 1. Shaft | 5. Stop lever |
| 2. Case | 6. Return spring |
| 3. Piston | 7. Solenoid |
| 4. Coil | 8. Fuel control lever |

MAGNETIC SWITCH

- Maker: NIKKO DENKI
- Type: Sealed
- Rated voltage: DC24V
- Operating current: Maximum: 35A max.
Continuity: 0.5A max.
- Stroke: 12 ± 0.3 mm
- Weight: 3.3 kg

FUNCTION

• Starting engine

When the starting key is turned on, the solenoid is energized.

Solenoid shaft (1) is electrically attracted, pulling injection pump stop lever (5) and fixing it in the RUN position.

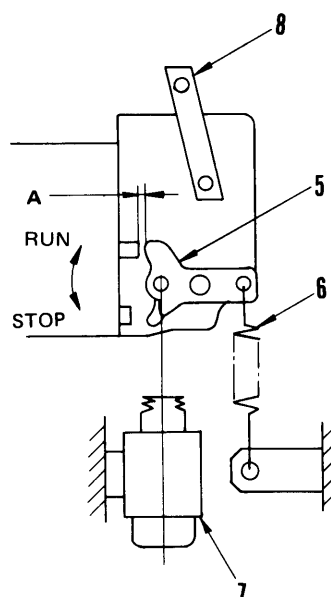
• Stopping engine

When the starting key is turned off, the solenoid is de-energized.

Injection pump stop lever (5) is returned to STOP position (non-injection position) by return spring (6).

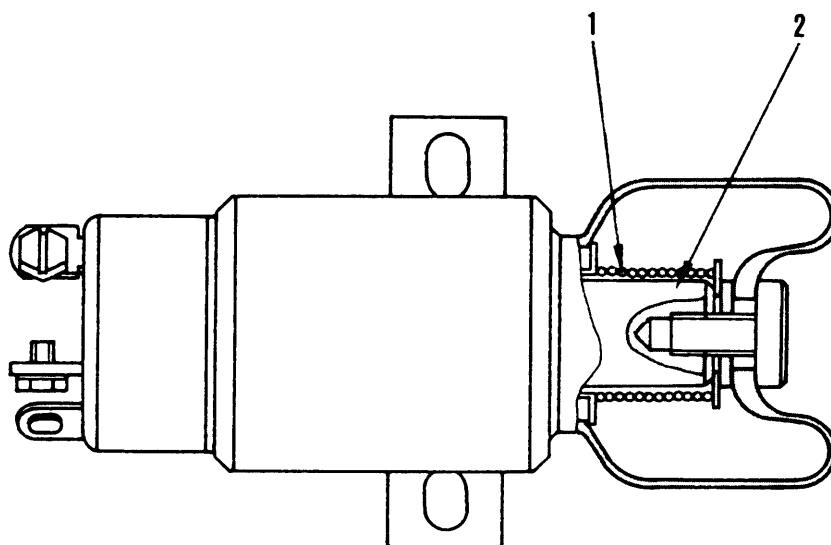
• During operation, the amount of fuel injection is controlled by fuel control lever (8).

• When installing the fuel solenoid, adjust clearance A referring to TESTING AND ADJUSTING.



6162F151

A contact (electricity flows when stopped) method



6150F191

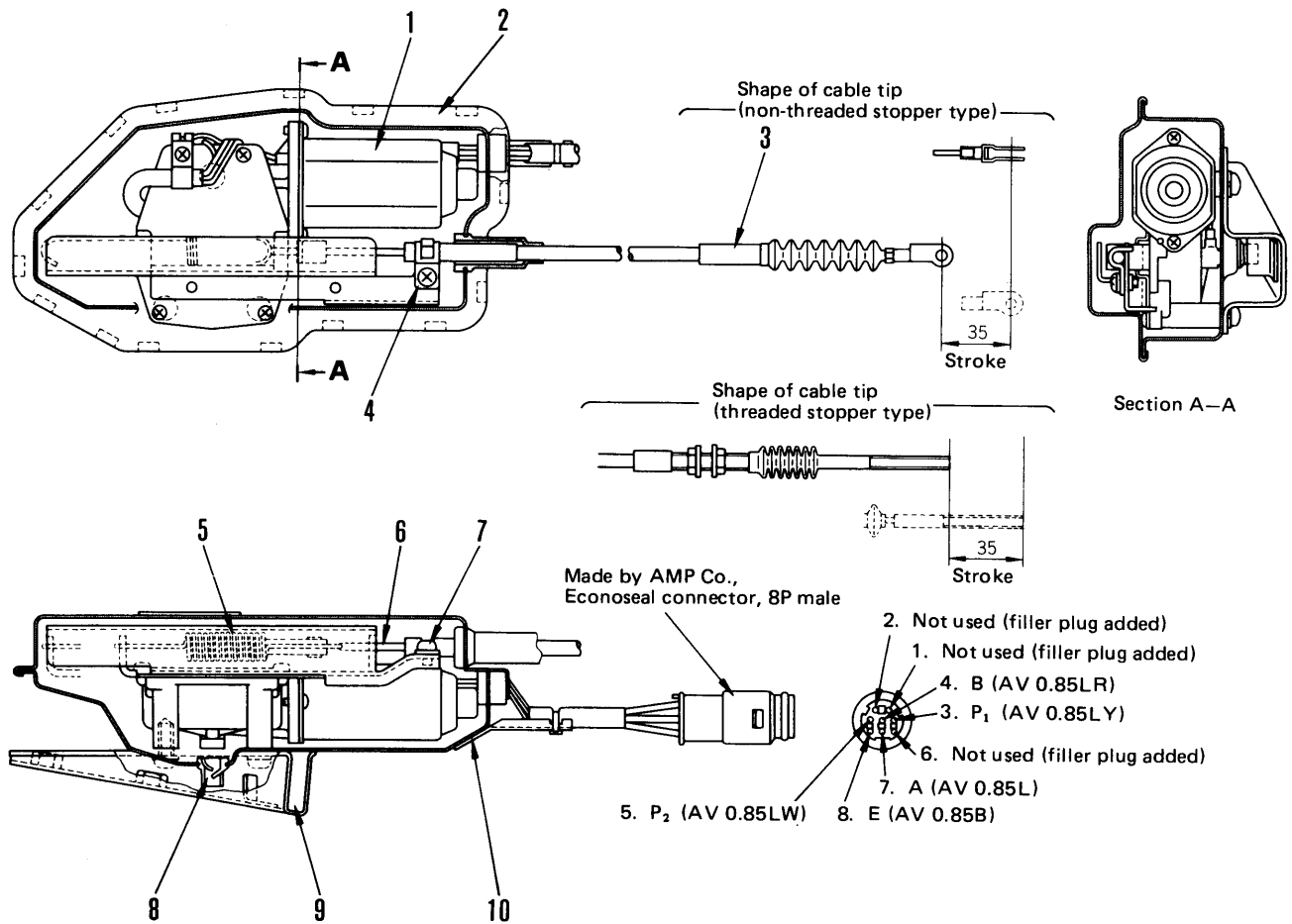
FUNCTION

- When stopping the engine, the solenoid is energized, the solenoid plunger is electrically attracted, and the stop lever of the injection pump is moved by a rod to the stop (non-injection) position. As a result, the fuel is cut off and the engine is brought to a stop. Accordingly, this solenoid is used only when the engine is being stopped; it is in free condition during ordinary operations.
- No electricity goes to the solenoid when the engine is running. The solenoid has no magnetic force, so the shaft of the solenoid is pulled back by the return spring.

FUEL SOLENOID

- | | |
|---------------------|--------------|
| • Maker: | SYNCHROSTART |
| • Type: | Sealed |
| • Rated voltage: | DC24 V |
| • Operating current | |
| Pull-in coil: | 25 A max. |
| Holding coil: | 0.5 A max. |
| • Stroke: | 25.4 mm |

ENGINE STOP MOTOR



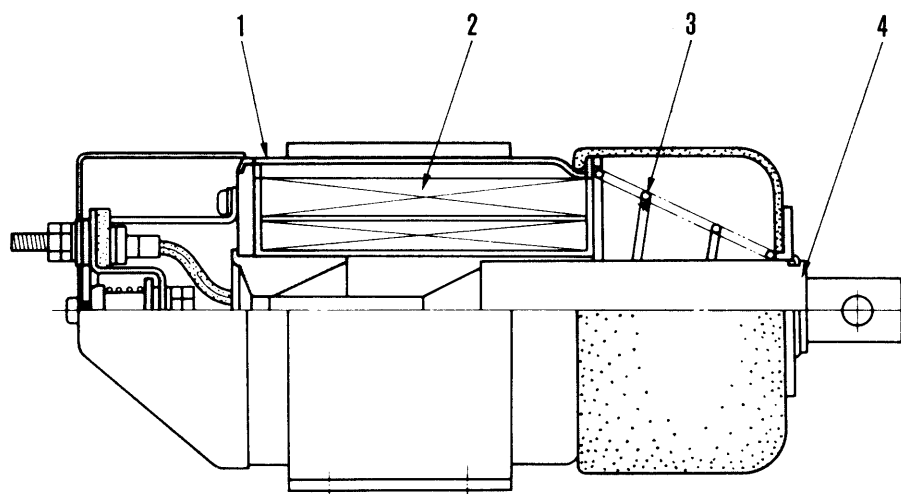
1. Motor assembly
2. Cover
3. Cable assembly
4. Cable clamp
5. Coil spring
6. Cable
7. Screw
8. Breather
9. Bracket assembly
10. Cover assembly

ENGINE STOP MOTOR

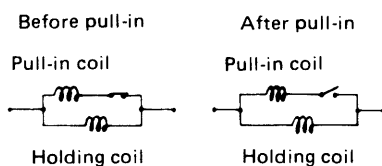
- **Maker:** Jidosha Denki Kogyo Co. Ltd
- **Rated voltage:** DC24V
- **Operating force:** 15 kg min.
- **Stroke:** $35^{+1.0}_{-0.4}$ mm
- **Weight:** 1.2 kg

FUEL SOLENOID

A contact (electricity flows when stopped) method



02F082



Inner wiring

02F081

1. Case
2. Coil
3. Return spring
4. Plunger

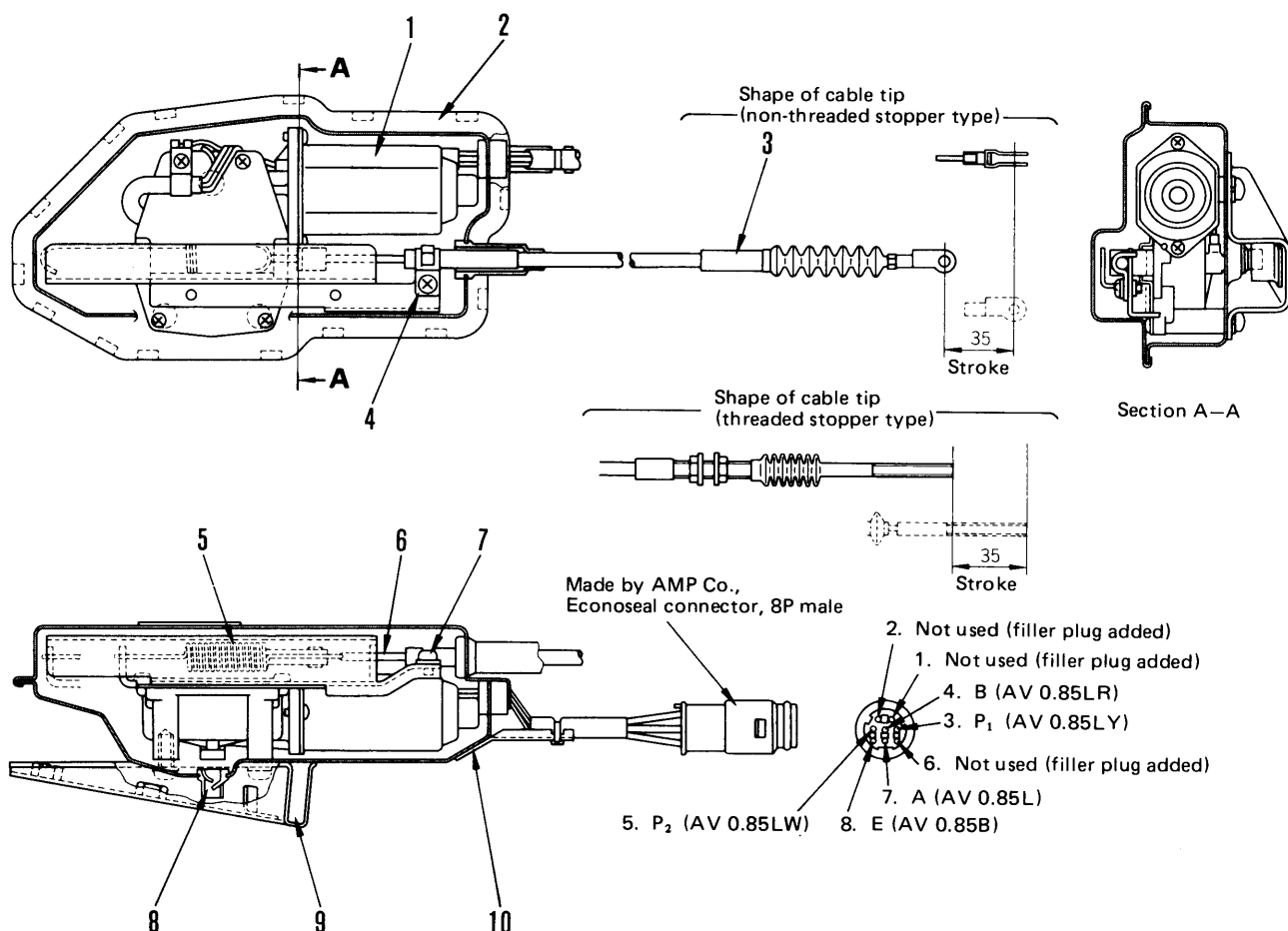
FUNCTION

When stopping the engine, the solenoid is energized, the solenoid plunger is electrically attracted, and the stop lever of the injection pump is moved by a rod to the stop (non-injection) position. As a result, the fuel is cut off and the engine is brought to a stop. Accordingly, this solenoid is used only when the engine is being stopped; it is in free condition during ordinary operations.

FUEL SOLENOID

- Maker: NIPPON DENSO
- Type: Sealed
- Rated voltage: DC24V
- Operating current
 - Pull-in coil: 20A max.
 - Holding coil: 5A max.
- Stroke: 27 mm

ENGINE STOP MOTOR

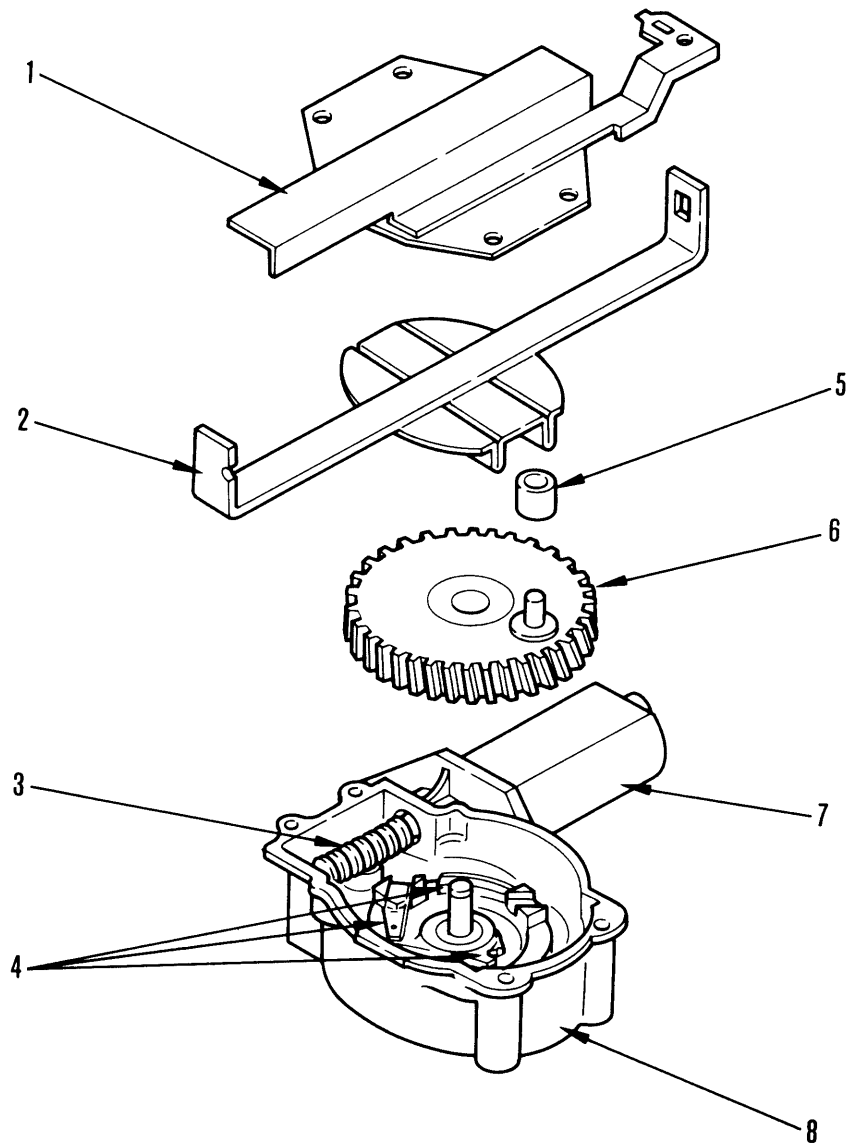


1. Motor assembly
2. Cover
3. Cable assembly
4. Cable clamp
5. Coil spring
6. Cable
7. Screw
8. Breather
9. Bracket assembly
10. Cover assembly

ENGINE STOP MOTOR

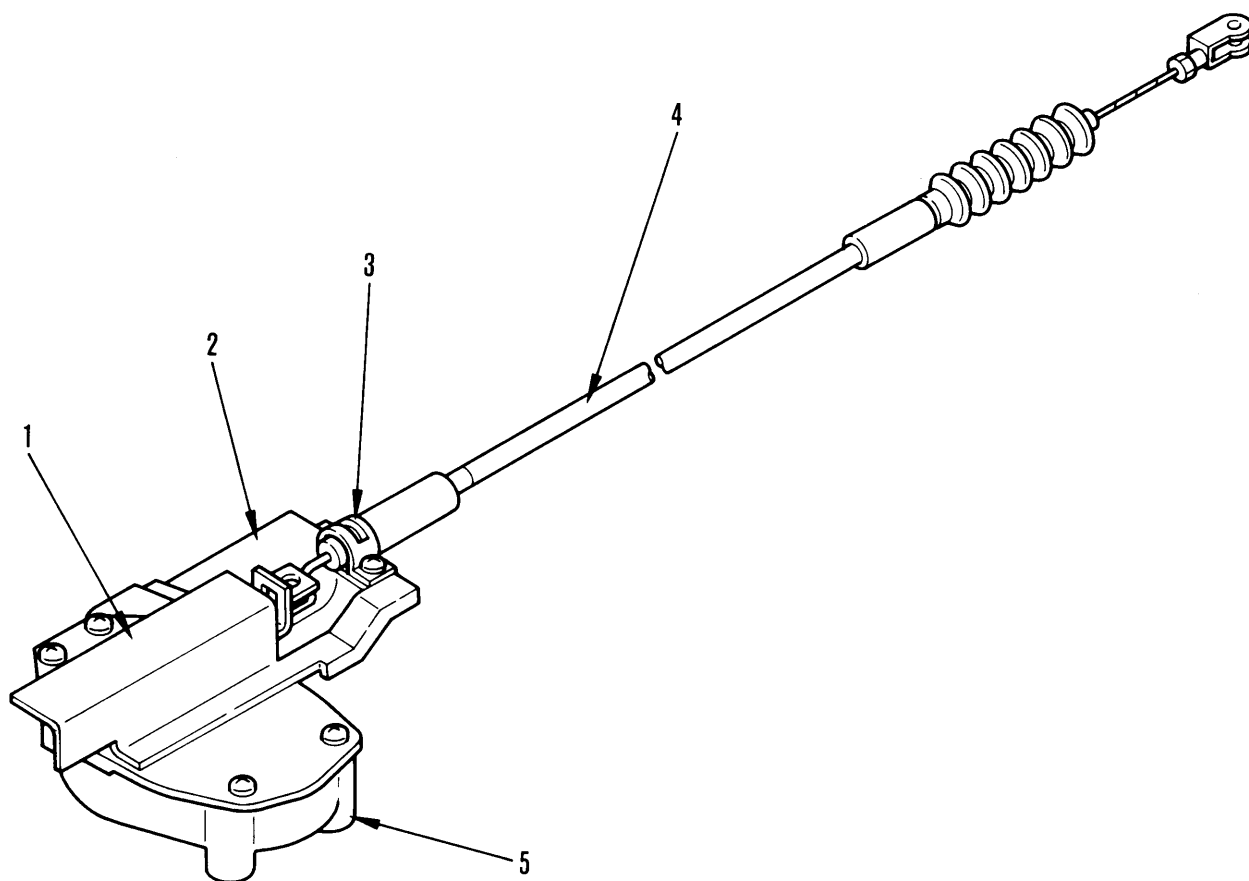
- Maker: Jidosha Denki Kogyo Co. Ltd
- Rated voltage: DC24V
- Operating force: 15 kg min.
- Stroke: $35^{+1.0}_{-0.4}$ mm
- Weight: 1.2 kg

STRUCTURAL DRAWING (1)



1. Gear cover assembly
2. Slider assembly
3. Armature shaft
4. Contactor assembly
5. Roller
6. Worm wheel assembly
7. Motor assembly
8. Gear case assembly

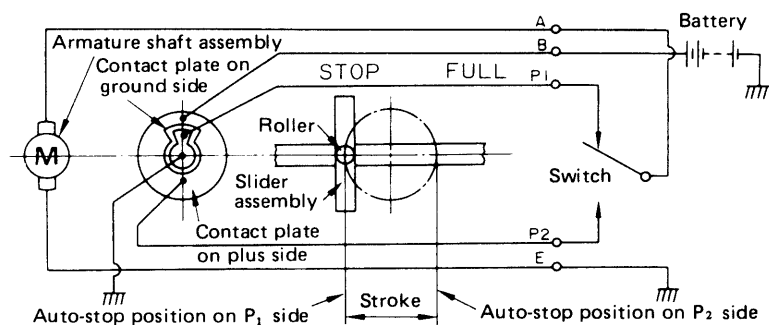
STRUCTURAL DRAWING (2)



1. Gear cover assembly
2. Motor assembly
3. Cable clamp
4. Cable assembly
5. Gear case assembly

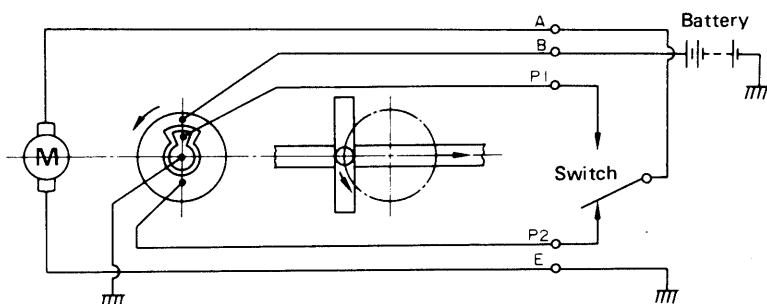
DESCRIPTION OF OPERATION AND CIRCUITS

1. Stop Condition (0° or 360°)



The above drawing shows the stopped condition when a closed circuit has been formed. The slider assembly is stopped at the auto-stop position on the P₁ side.

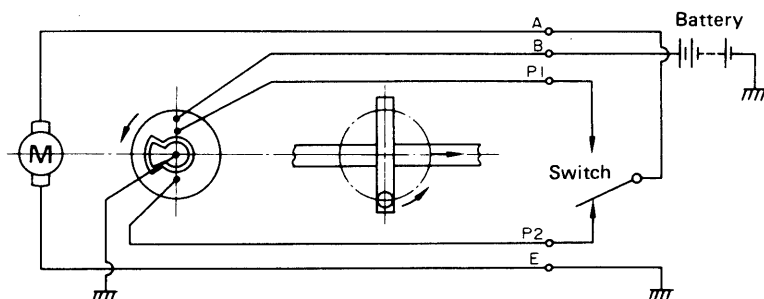
2. When switch is turned (when starting the motor)



When the switch is moved to the P₂ side (starting switch ON), an electric current flows from the plus side contact plate through the P₂ auto-stop terminal and switch and into the armature shaft assembly, thereby

starting the motor. The slider assembly starts to move in the direction of the arrow at the same time as the roller starts to move.

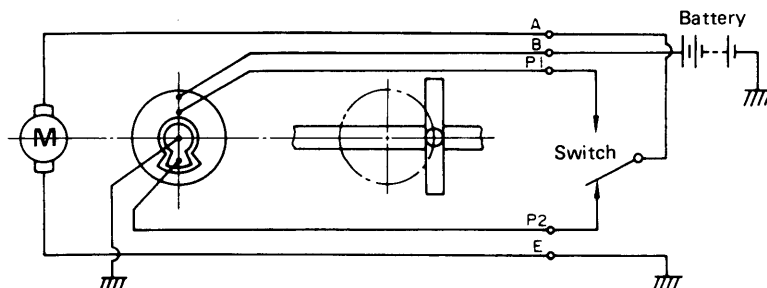
3. Turning Condition (90° in the drawing)



Electric current continues to pass through the armature assembly and the motor continues to turn. Because of

the rotation of the roller, the slider assembly also continues to move in the direction of the arrow.

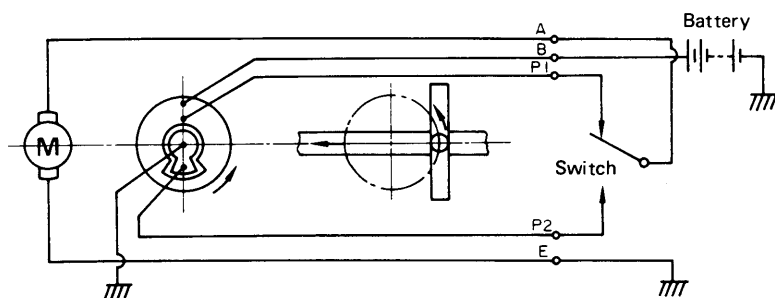
4. When stopped (180°)



A closed circuit is formed when the P2 auto-stop terminal rides on the minus-side contactor plate, and the

motor comes to a sudden stop. The slider assembly also stops.

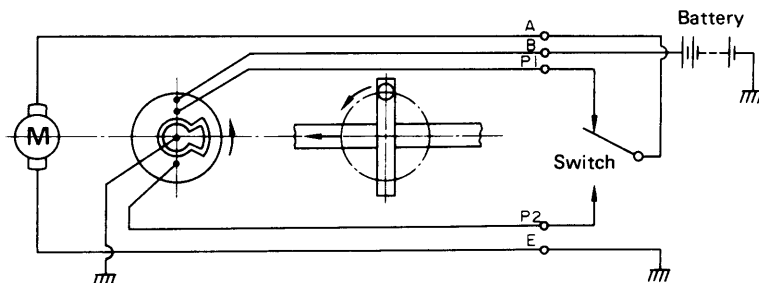
5. When switch is turned (when starting the motor)



When the switch is moved to the P1 side (starting switch OFF), an electric current flows from the plus contactor plate through the P1 auto-stop terminal and switch and into the armature shaft assembly, thereby starting the

motor. The slider assembly starts to move in the direction of the arrow at the same time as the roller starts to move.

6. Turning condition (270° in the drawing)

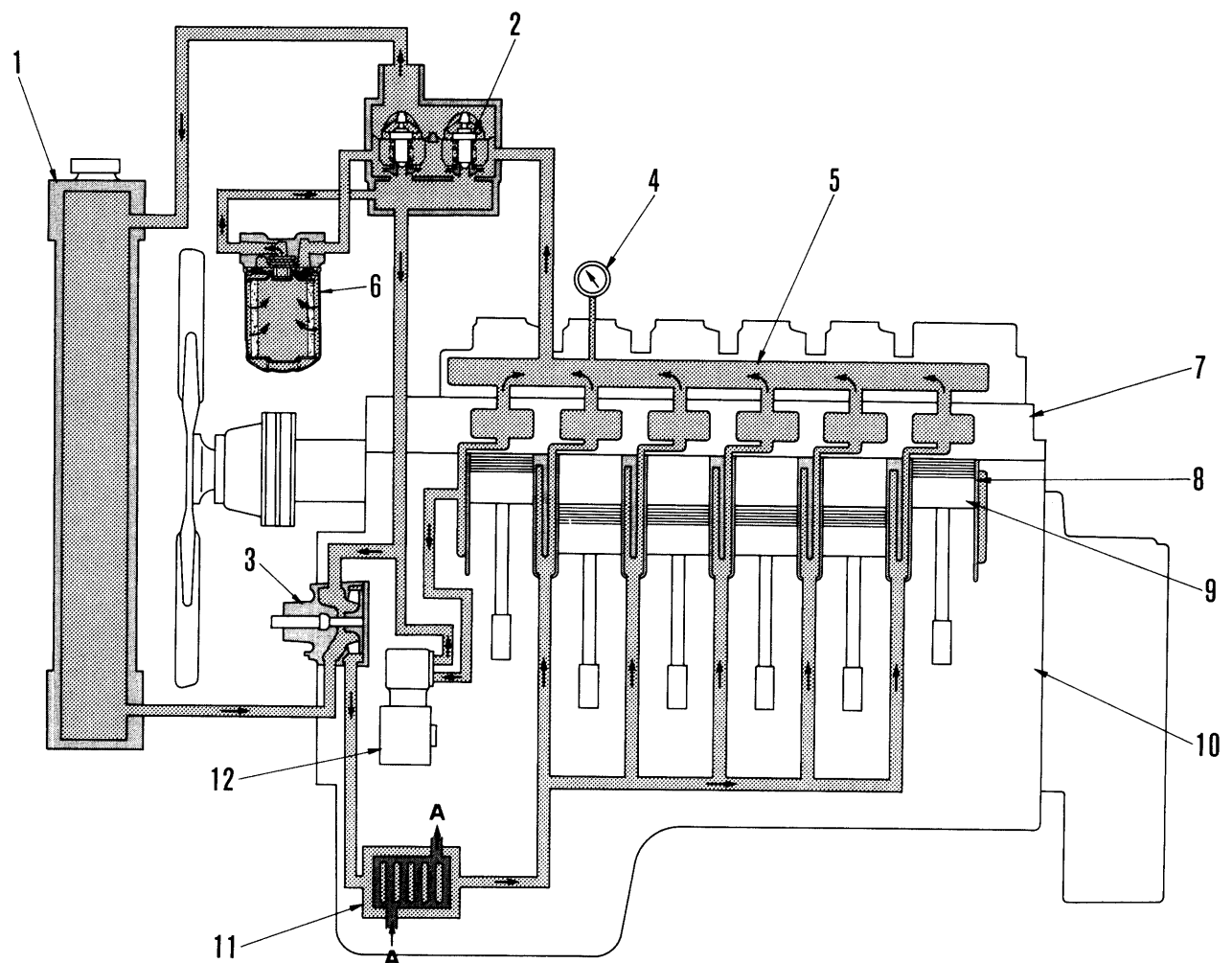


Electric current continues to pass through the armature shaft assembly and the motor continues to turn. The slider assembly also continues to move in the direction

of the arrow. Then the circuit returns to stop condition 1.

COOLING SYSTEM

COOLING SYSTEM CHART

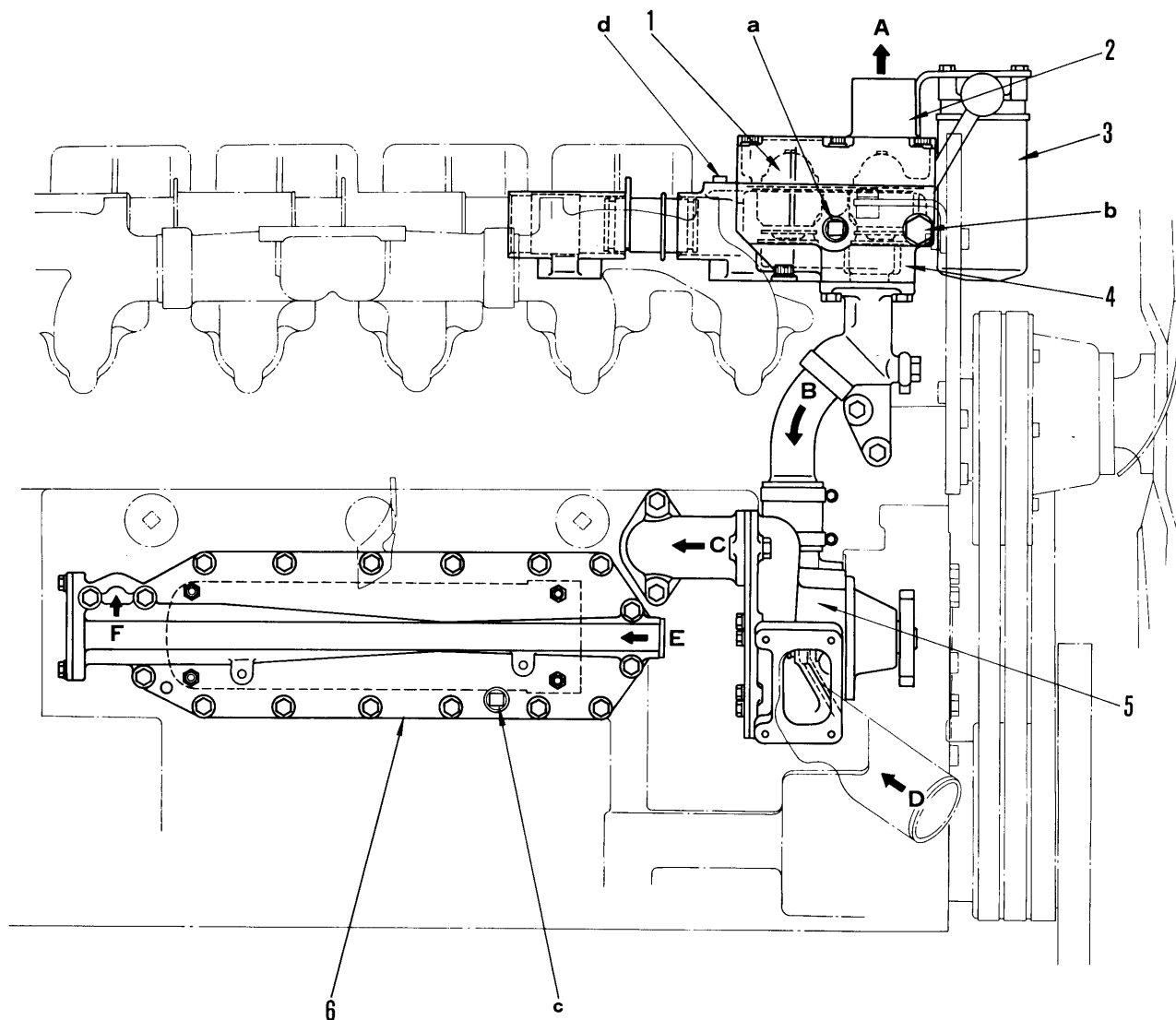


6150F135A

- | | |
|-------------------------------------|---|
| 1. Radiator | 8. Cylinder liner |
| 2. Thermostat | 9. Piston |
| 3. Water pump | 10. Cylinder block |
| 4. Water temperature gauge | 11. Oil cooler |
| 5. Water manifold | 12. Air compressor (GD705R-3, GD705A-4) |
| 6. Corrosion resistor (if equipped) | |
| 7. Cylinder head | A. Lubrication oil |

WATER PUMP

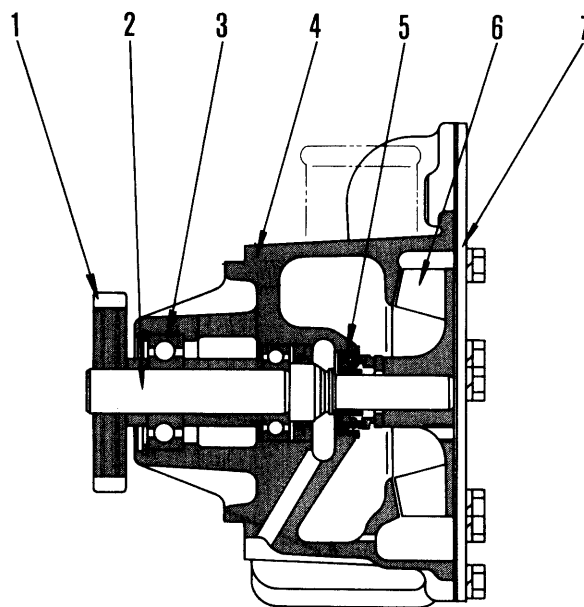
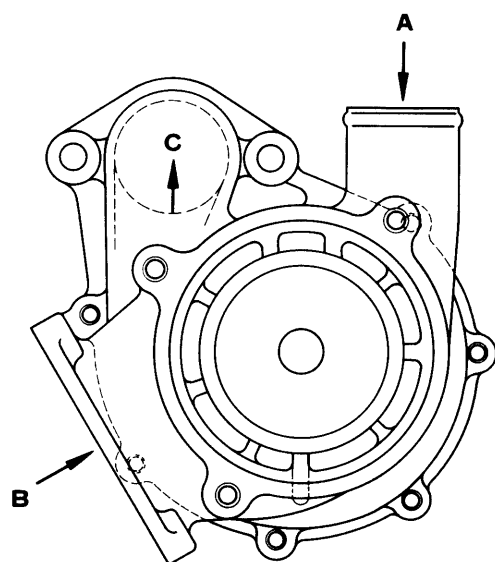
MOUNTING



6150F136A

1. Thermostat
2. Housing cover
3. Corrosion resistor
4. Thermostat housing
5. Water pump
6. Oil cooler

- A. To radiator (coolant)
- B. From engine each part (coolant)
- C. To engine each part thru oil cooler (coolant)
- D. From radiator (coolant)
- E. From oil pump (oil)
- F. To engine each part (oil)
- a. Outlet for heater
- b. Water temperature gauge pick-up
- c. Coolant drain plug
- d. Outlet for air bleed tube

WATER PUMP

6150F137A

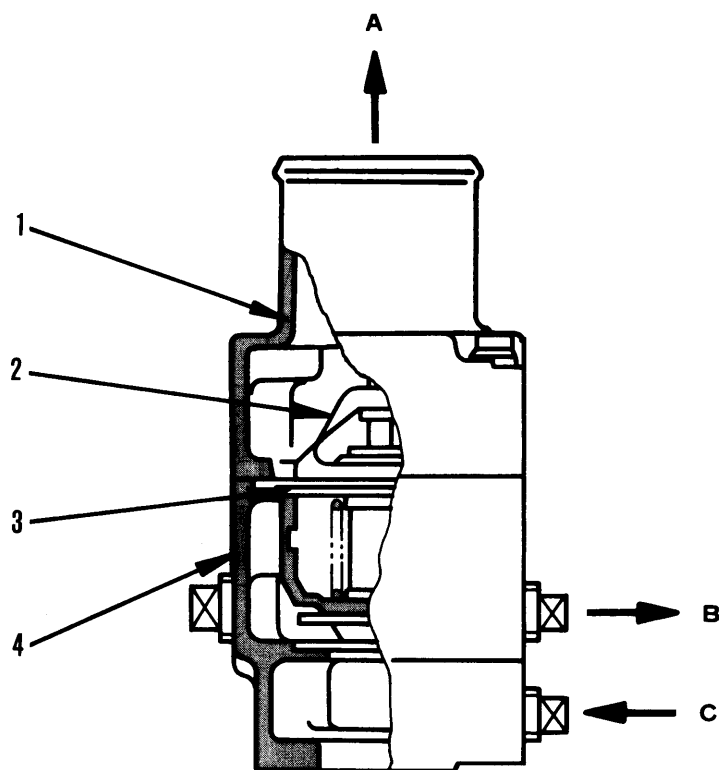
1. Water pump drive gear
(No. of teeth: 22)
2. Pump shaft
3. Ball bearing
4. Pump body
5. Water seal
6. Impeller
7. Pump cover

- A. From thermostat
- B. From radiator
- C. To engine each part

WATER PUMP

- Type: Centrifugal gear drive.
- Pump speed: Engine speed x 1.5

THERMOSTAT



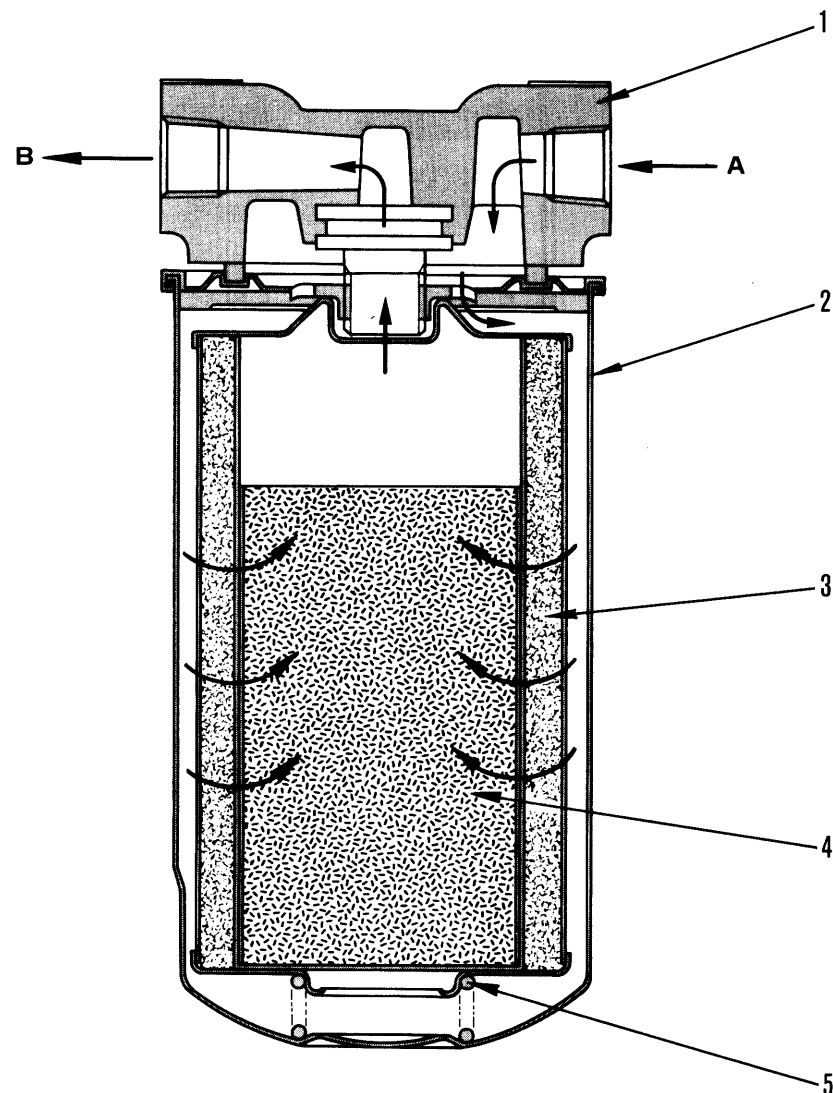
6150F138A

1. Housing cover
2. Thermostat
3. Gasket
4. Thermostat housing

- A. To radiator
B. To corrosion resistor (S6D125-1, SA6D125-1)
C. From corrosion resistor (S6D125-1, SA6D125-1)

THERMOSTAT

- Valve cracking temperature: 74.5 – 78.5°C
- Full open temperature: 90°C
- Full open lift: Min. 10 mm

CORROSION RESISTOR**(If equipped)**

6150F139

1. Head
2. Cartridge
3. Element (Paper)
4. Element (Chemicals)
5. Spring

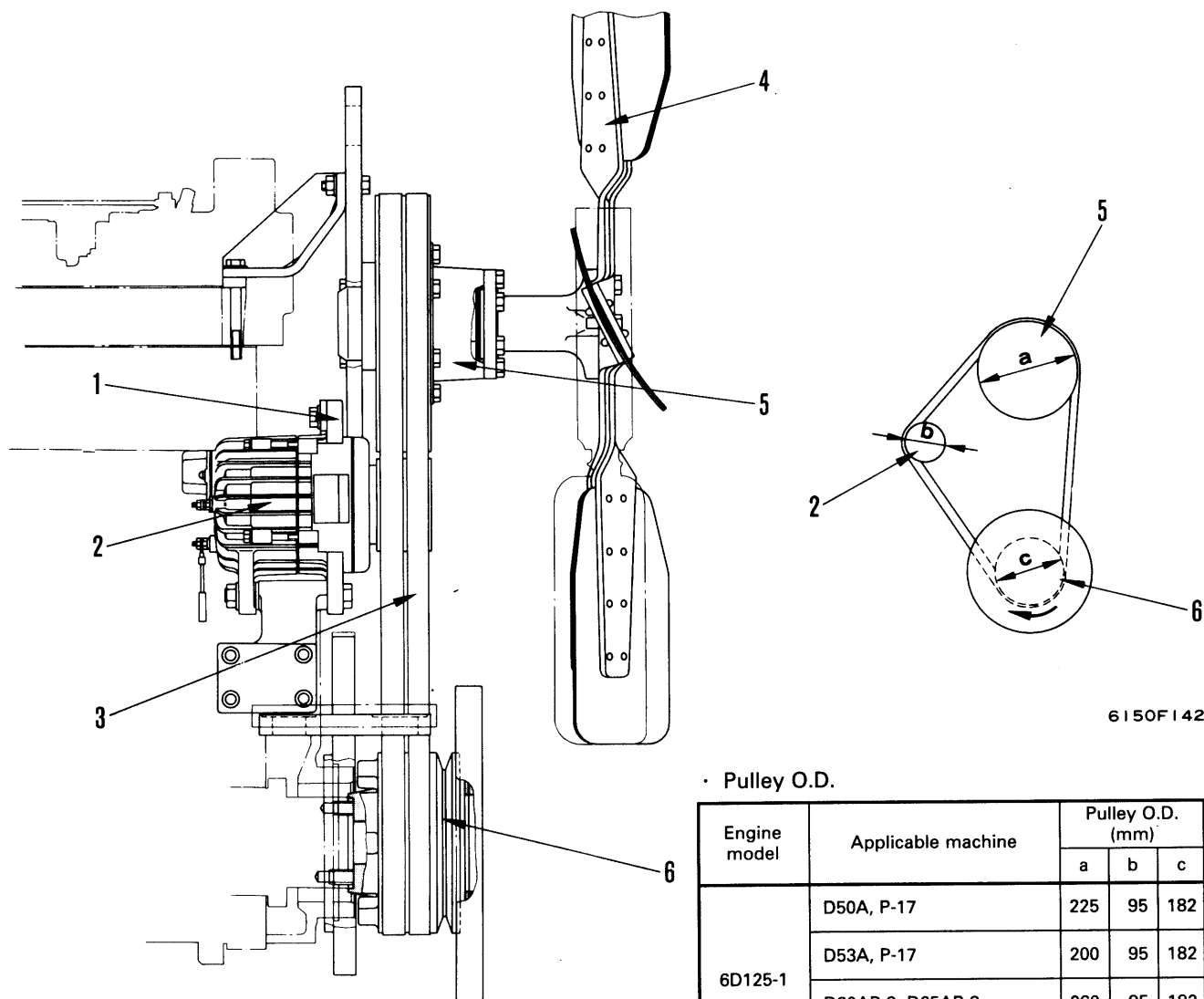
CORROSION RESISTOR• Filtration area: 0.5 m²

- A. Water inlet
B. Water outlet

ELECTRICAL SYSTEM

ALTERNATOR

MOUNTING



6150F142

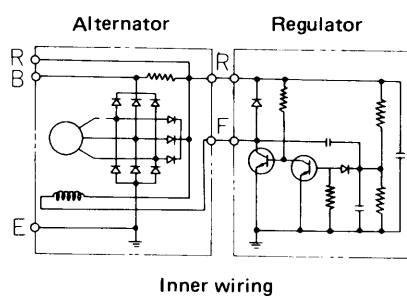
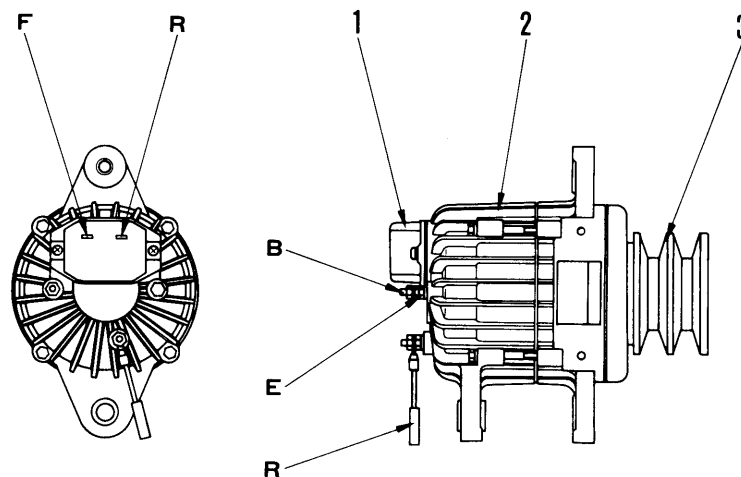
• Pulley O.D.

Engine model	Applicable machine	Pulley O.D. (mm)		
		a	b	c
6D125-1	D50A, P-17	225	95	182
	D53A, P-17	200	95	182
	D60AP-8, D65AP-8	260	95	182
	GD600R-3, GD605A-3	214	120	182
S6D125-1	D75S-5	300	95	182
	PC300-3, PC300LC-3	214	95	182
	PC400-3, PC400LC-3	228	95	182
	GD705-4	214	120	182
	WA450-1	300	95	182
	EG200-3	214	95	182
	HD200-3 · 200D-3	300	95	192
	HD205-3	280	95	182

1. Adjustment plate
2. Alternator
3. Fan belt
4. Fan
5. Fan pulley
6. Crankshaft pulley

- a. Fan pulley O.D.
- b. Alternator pulley O.D.
- c. Crankshaft pulley O.D.

ALTERNATOR WITH REGULATOR



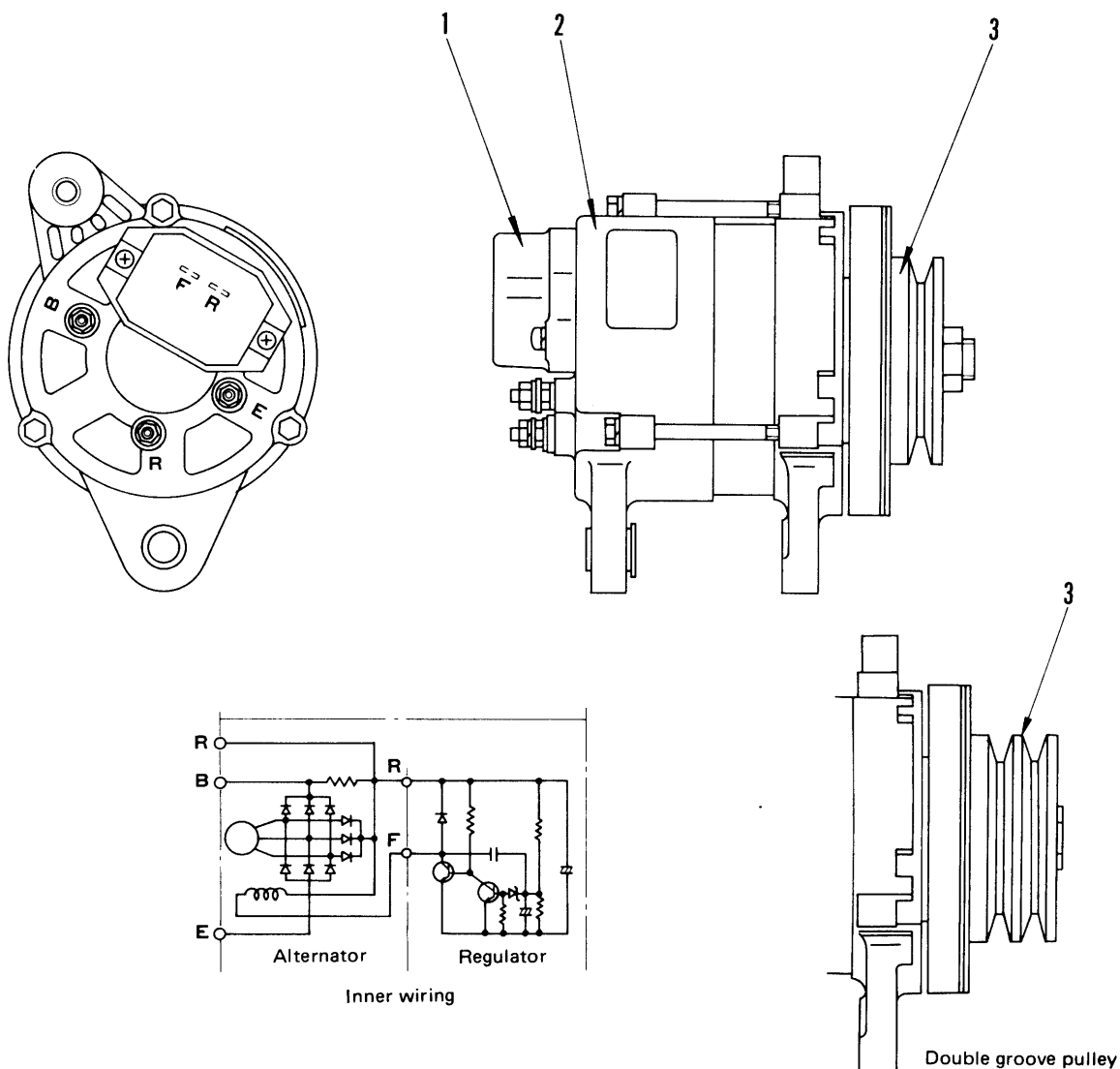
6150F143

1. Regulator
2. Alternator
3. Alternator pulley

B, E, F, R: Terminals

Engine model	Applicable machine	Type	Specification		Pulley O.D. (mm)	Weight (kg)
6D125-1	D50A, P-17 D50F-17 D53A, P-17 D60A, E, P-8 D60S-8 D65A, E, P-8 D65S-8 GD705R-3, GD705R-4	Maker: NIKKO DENKI Type: Sealed	24V, 13A		95	7.6
S6D125-1	D60F-8 D60F-8A D75S-5 EG220, B-1	Maker: NIKKO DENKI Type: Sealed	24V	13A	95	7.6
	WA450-1			25A		
	EG200-3 EC260Z-1			35A		
	GD705A-4			50A		
SA6D125-1	EG275, B-1	Maker: NIKKO DENKI Type: Sealed	24V, 13A		95	7.6

ALTERNATOR WITH REGULATOR (Open type)



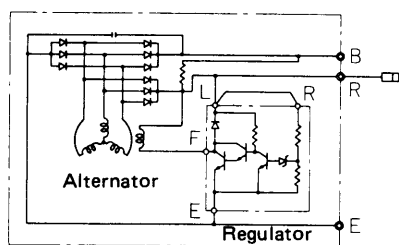
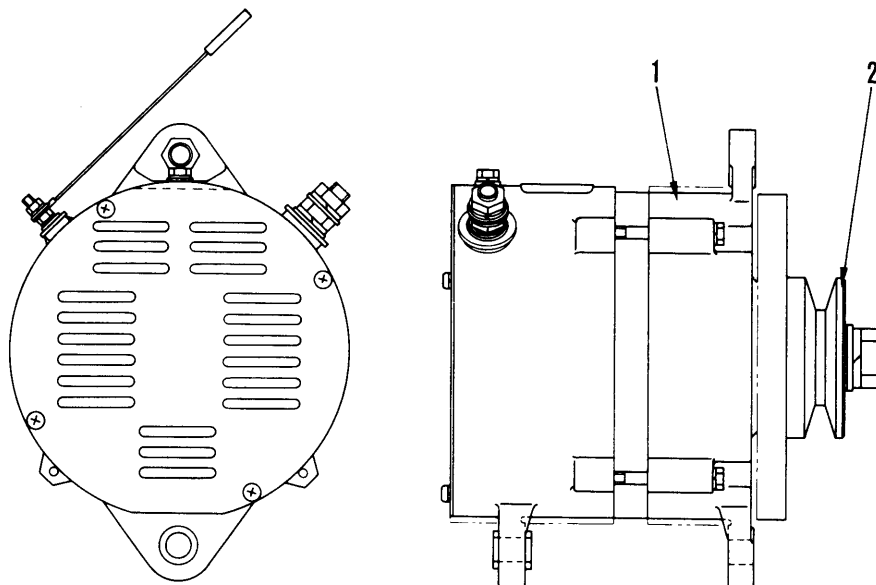
1. Regulator
2. Alternator
3. Alternator pulley

B, E, F, R: Terminals

6136F024-2

Engine model	Applicable machine	Type	Specification	Pulley O.D. (mm)	Weight (kg)
S6D125-1	PC300-3 PC300LC-3 PC400-3 PC400LC-3 GD613A-1 GD623A-1 GD663A-1 EG220BS-1	Maker: NIKKO DENKI Type: Opened	24V, 25A	95	7.5
	HD200D-3 HD205-3	Maker: NIKKO DENKI Type: Opened	24V, 35A	95	10.5
SA6D125-1	EG275BS-1	Maker: NIKKO DENKI Type: Opened	24V, 25A	95	7.5

ALTERNATOR WITH REGULATOR (Open type)



Inner wiring

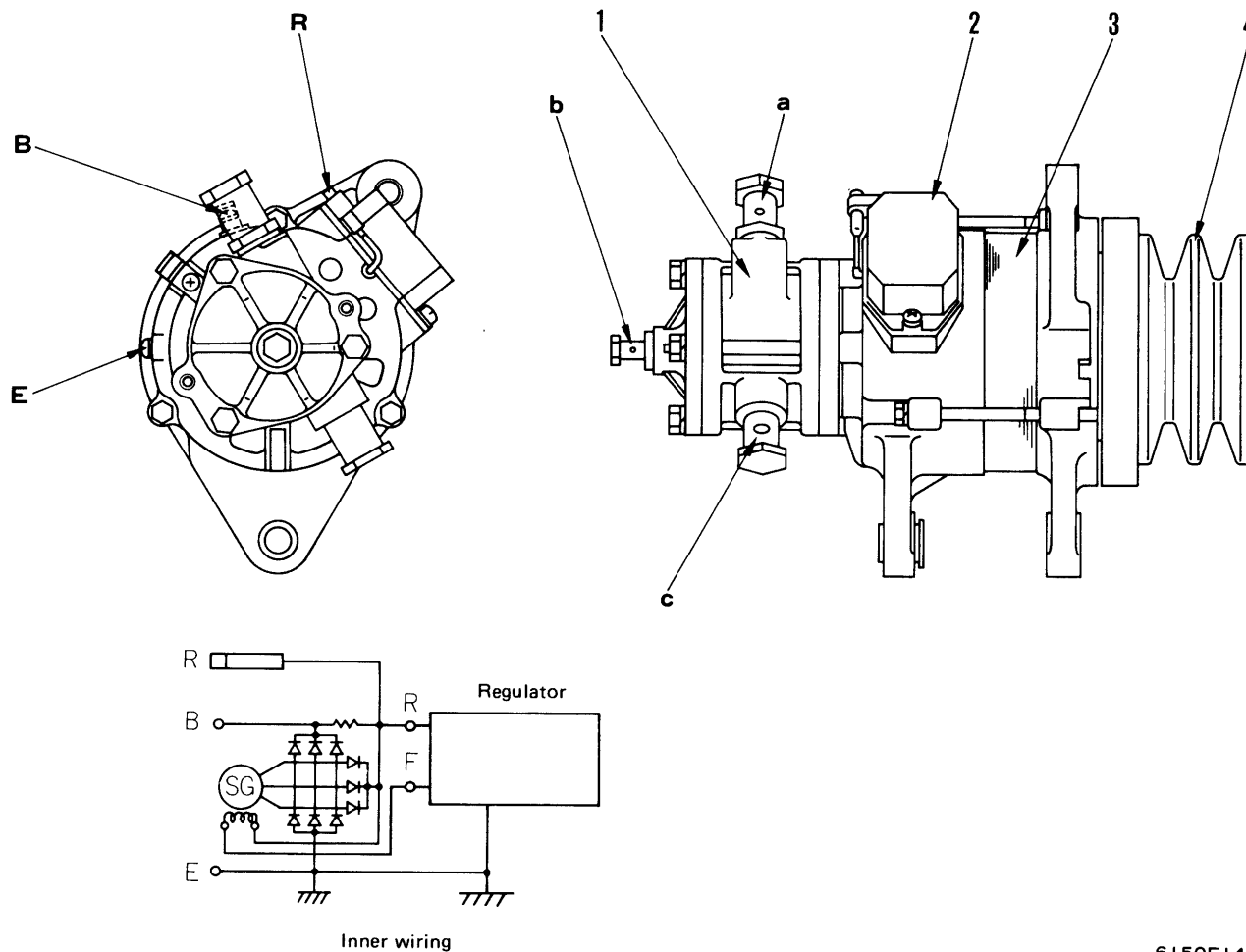
6210F116

1. Alternator
2. Alternator pulley

B, E, R: Terminals

Engine model	Applicable machine	Type	Specification	Pulley O.D. (mm)	Weight (kg)
6D125-1	GD625A-1	Maker: NIKKO DENKI Type: Opened	24V, 50A	95	13

ALTERNATOR WITH REGULATOR AND VACUUM PUMP



6150F144

- | | |
|----------------------|-----------------------|
| 1. Vacuum pump | a. Air inlet |
| 2. Regulator | b. Oil inlet |
| 3. Alternator | c. Air and oil outlet |
| 4. Alternator pulley | |

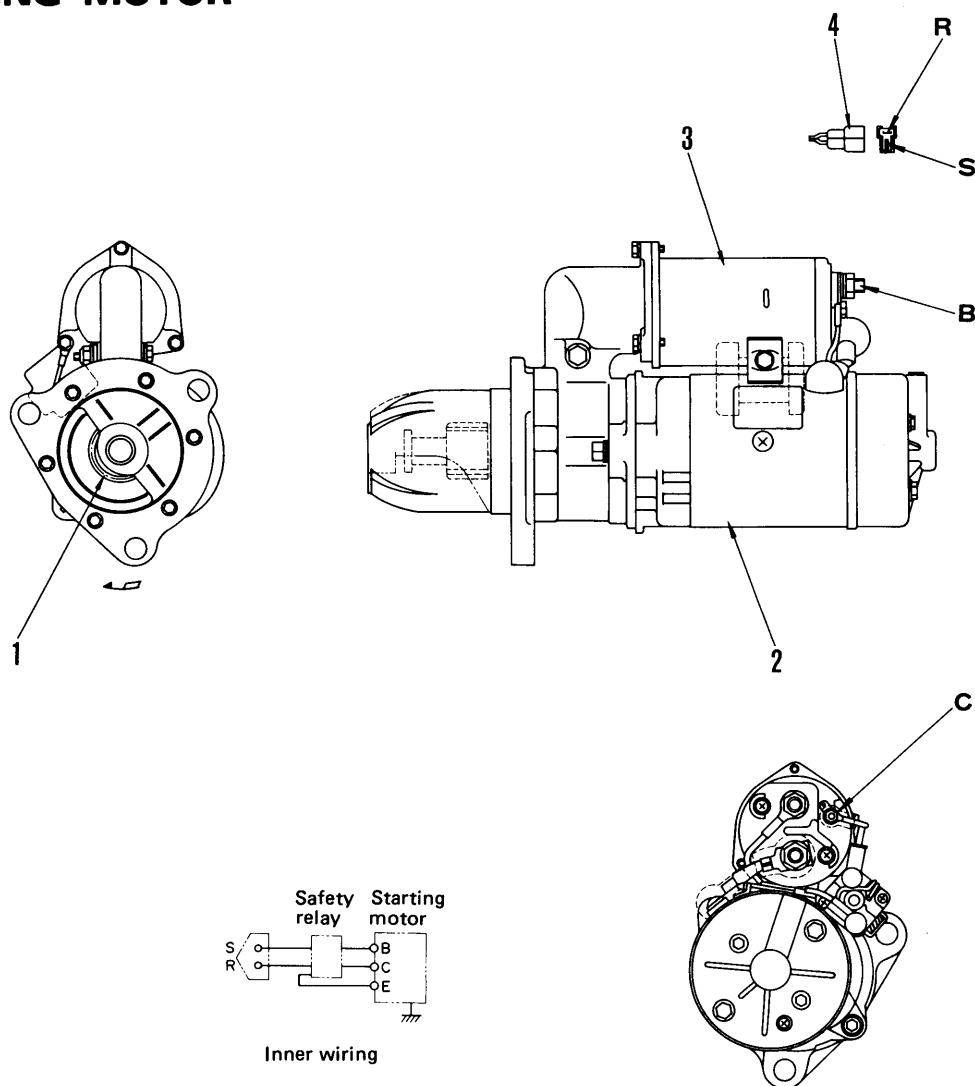
VACUUM PUMP

• Discharge volume: 110 cc/rev.

B, E, R: Terminals

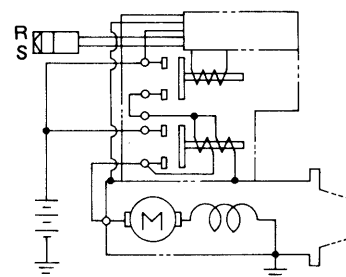
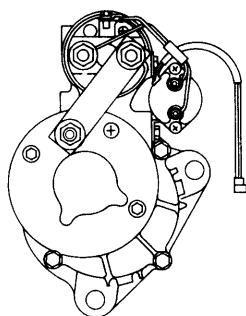
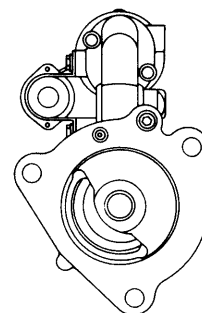
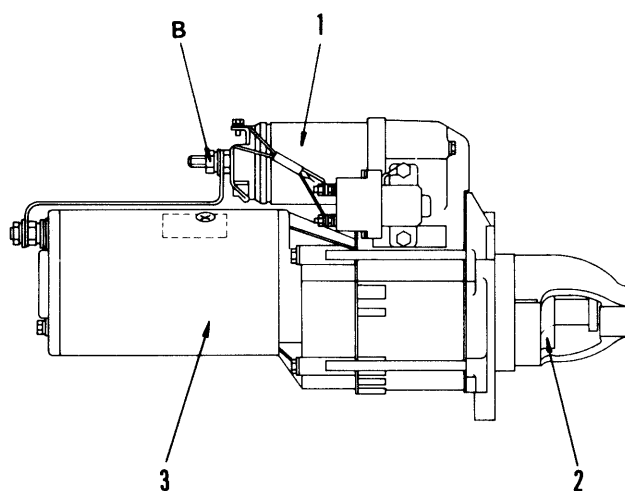
Engine model	Applicable machine	Type	Specification	Pulley O. D. (mm)	Weight (kg)
6D125-1	GD600•650 R-3 GD605•655R-3 GD605•655A-3	Maker: NIKKO DENKI Type: Opened	24V, 25A	120	11

STARTING MOTOR



6150F145

Engine model	Applicable machine	Type	Specifications	Number of pinion teeth	Weight (kg)
6D125-1	Standard (All machine)	Maker: NIKKO DENKI Type: Sealed	24V, 7.5 kw	12	18
	Option	Maker: SAWAFUJI DENKI Type: Sealed	24V, 11 kw	12	20
S6D125-1	Standard (All machine)	Maker: NIKKO DENKI Type: Sealed	24V, 7.5 kw	12	18
	Option	Maker: SAWAFUJI DENKI Type: Sealed	24V, 11 kw	12	20
SA6D125-1	Standard	Maker: NIKKO DENKI Type: Sealed	24V, 7.5 kw	12	19



Inner wiring

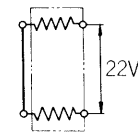
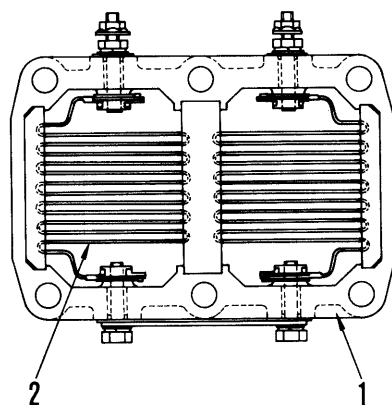
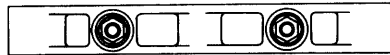
1. Magnetic switch
2. Pinion gear
3. Body

B, R, S: Terminals

Engine model	Applicable machine	Type	Specifications	Number of pinion teeth	Weight (kg)
6D125-1	GD625A-1	Maker: SAWAFUJI DENKI Type: Sealed	24V, 11 kw	12	20

ELECTRICAL INTAKE AIR HEATER

RIBBON TYPE



Inner wiring

1. Body
2. Heater coil

ELECTRICAL INTAKE AIR HEATER

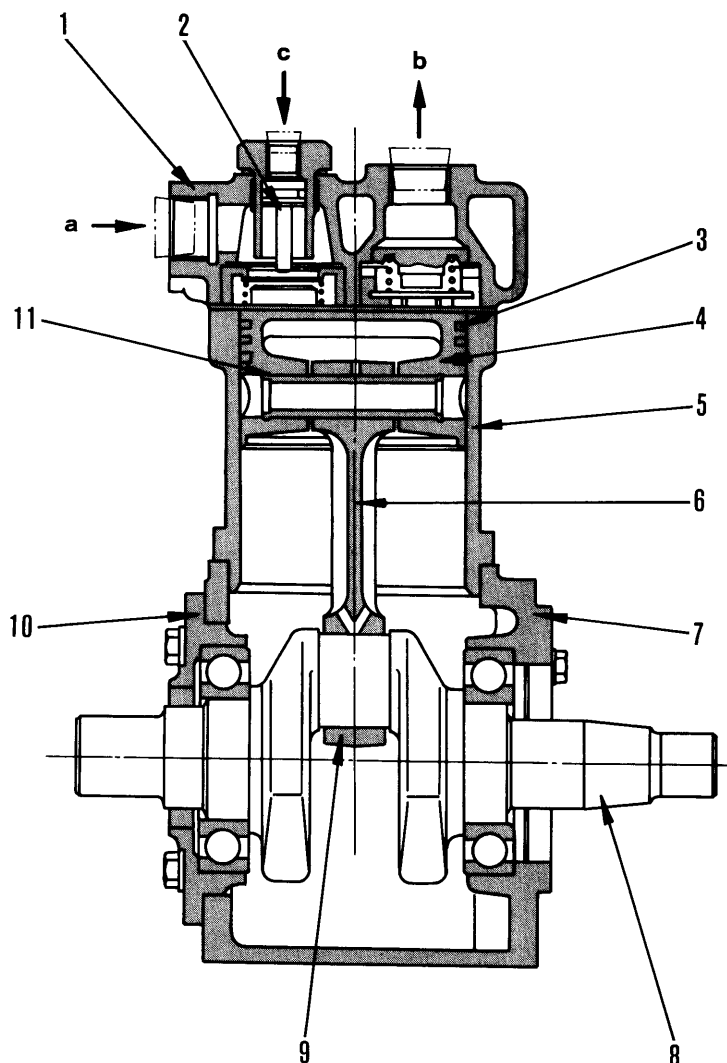
- Rated voltage: DC24V
- Rated current: 111A

6150F146

ACCESSORY

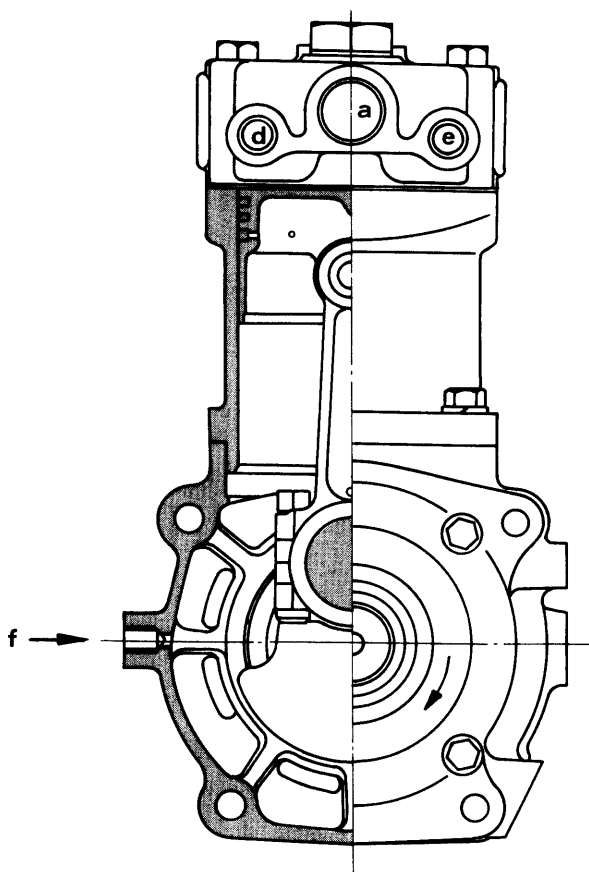
AIR COMPRESSOR

For GD705R-3, GD705A-4, GD705R-4



6150F140

- | | |
|-----------------------|-------------------------|
| 1. Cylinder head | 10. Bearing cover |
| 2. Unloader valve | 11. Piston pin |
| 3. Piston ring | |
| 4. Piston | a. Air intake |
| 5. Cylinder block | b. Air exhaust |
| 6. Connecting rod | c. Unloader |
| 7. Crankcase | d. Cooling water inlet |
| 8. Crankshaft | e. Cooling water outlet |
| 9. Connecting rod cap | f. Oil inlet |



6150F141

AIR COMPRESSOR

- Maker: DIESEL KIKI
- Type: Single cylinder, double acting
- Discharge volume: 340 cc/rev.
- Air pressure: 8.5 kg/cm² (at full load)
- Weight: 11 kg

UNLOADER VALVE

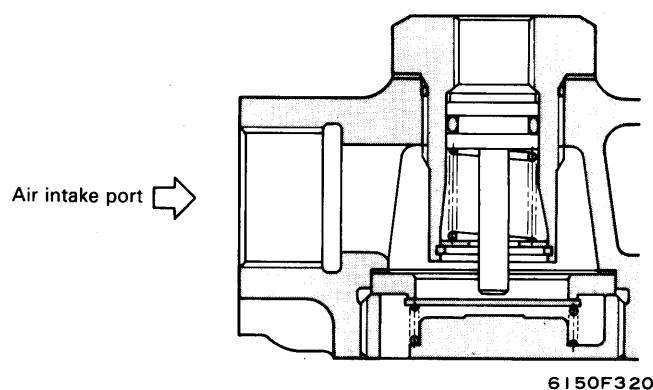
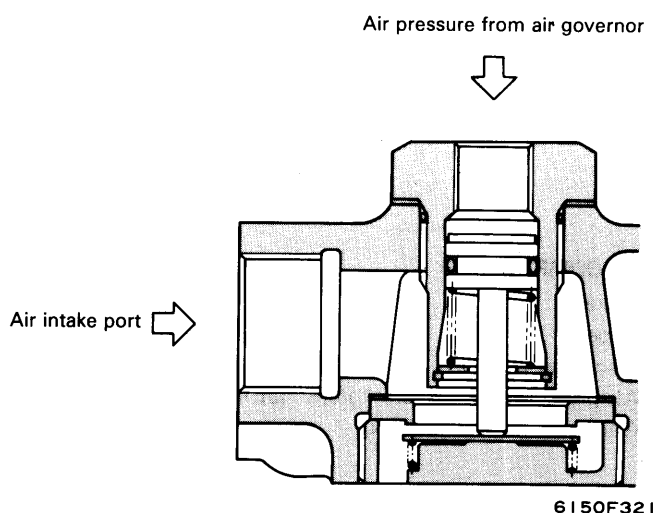
- Valve opening pressure: 6.3 kg/cm²
- Valve shutting pressure: 5.4 kg/cm²

OUTLINE

The air compressor is installed between the engine timing gear and fuel injection pump, and is driven by the timing gear. It is connected directly to the engine, so the air compressor always rotates when the engine is rotating.

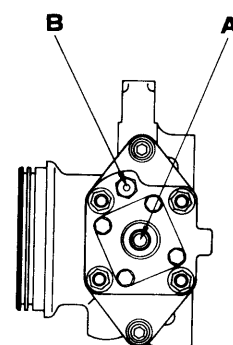
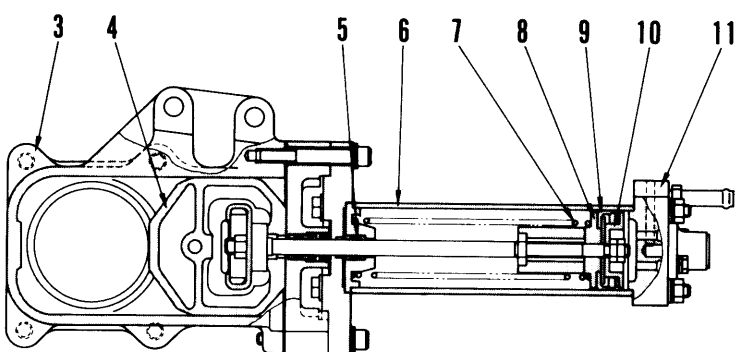
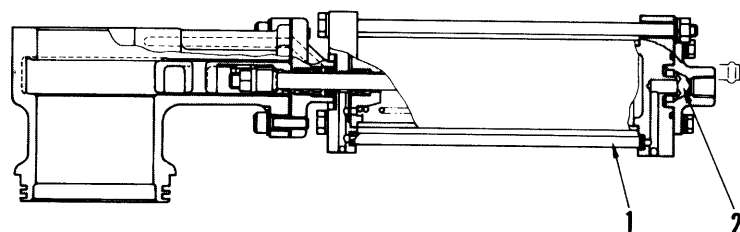
ACTION OF UNLOADER VALVE

- 1) The intake valve and delivery valve automatically open and close according to the pressure inside the cylinder. During the piston up-stroke, the air inside the cylinder is compressed, the intake valve is closed, and the delivery valve opens to discharge the compressed air. On the down-stroke, the delivery valve closes and the intake valve opens to suck in air from the air cleaner.
- 2) An air governor is installed to control the amount of air inside the air tank. When the air pressure inside the air tank reaches the specified pressure, the compressed air inside the tank passes through the air governor, and pushes down the rod of the unloader valve to keep the intake valve open. As a result, while the unloader valve is being actuated, the intake air is not compressed.
- 3) If the air pressure inside the air tank goes below the specified pressure of the air governor, the rod of the unloader valve returns to its original position. The intake valve then returns to its normal operation, and starts to send compressed air again.

**When intake valve is actuated****When intake valve is kept open**

EXHAUST BRAKE

For HD200D-3, HD205-3



F567D03005A

- | | |
|------------------|------------------------|
| 1. Pipe | 8. Piston |
| 2. Poppet | 9. Piston packing |
| 3. Valve housing | 10. Retainer |
| 4. Gate valve | 11. Head cover |
| 5. Guide bushing | A. From solenoid valve |
| 6. Cylinder | B. Exhaust gas exist |
| 7. Spring | |

OUTLINE

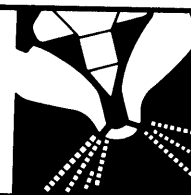
- Exhaust brake mounting between engine turbo-charger and muffler works due to air pressure from solenoid valve.

The exhaust brake throttles exhaust passage between turbocharger and muffler, and reduces engine speed.

The exhaust brake consists of valve mechanism and air cylinder which operates a valve.

ENGINE

12 TESTING AND ADJUSTING



ENGINE BODY

Adjusting valve clearance	12-002
Measuring compression pressure	12-003

FUEL SYSTEM

Checking and adjusting fuel injection timing	12-004
Testing and adjusting fuel cut solenoid ...	12-006
Adjusting engine stop motor cable	12-006-1
Fuel injection pump calibration data	12-007

PERFORMANCE TEST

Run-in standard	12-021
Performance test criteria	12-024
Testing and adjusting tool list	12-030
Testing and adjusting data	12-031

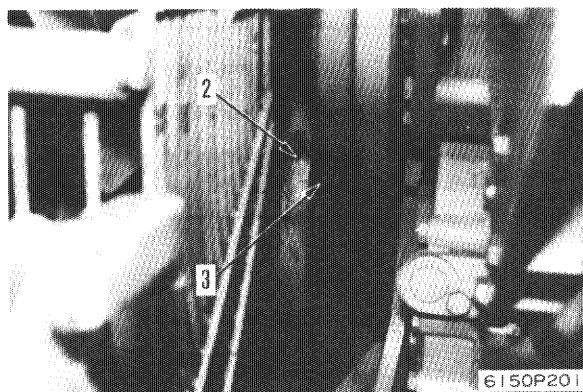
TROUBLESHOOTING	12-045
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ENGINE BODY

ADJUSTING VALVE CLEARANCE

ADJUSTMENT PROCEDURE

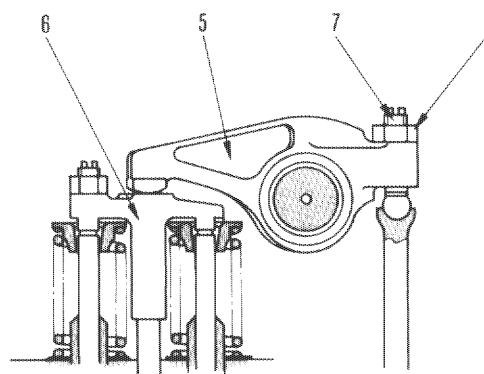
1. Remove the cylinder head cover.
2. Rotate the crankshaft in the normal direction. While watching the movement of the intake valve of the No. 6 cylinder, bring the No. 1 cylinder into the top dead center position of the compression stroke and align the "1.6 TOP" mark on vibration damper (2) with pointer (3).
 - ★ When the No. 1 cylinder comes near the top dead center of the compression stroke, the No. 6 intake valve will start to move (open).
3. Adjust the valve clearance for valves marked ● in the valve arrangement chart.
4. Rotate the crankshaft in the normal direction by one revolution and adjust the valve clearance for the remaining valves marked ○.



★ Valve arrangement chart

Cylinder No.	1	2	3	4	5	6
Exhaust valve	●	○	●	○	●	○
Intake valve	○	●	○	●	○	●

- ★ To adjust the valve clearance, loosen lock nut (8) on adjustment screw (7), insert Feeler gauge A corresponding to the specified clearance between crosshead (6) and rocker arm (5), and adjust the clearance with the adjustment screw until the thickness gauge can slide lightly.

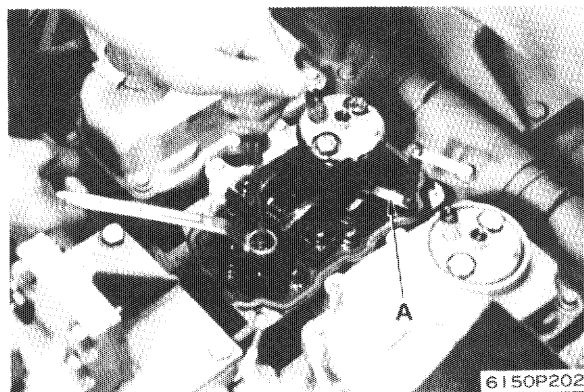


6150F201

5. After the clearance is properly adjusted, tighten the lock nut to secure the adjustment screw.

Lock nut: 7 ± 0.5 kgm

- ★ The engine firing order is 1—5—3—6—2—4.
- ★ Intake and exhaust valve clearances may be adjusted for each cylinder in the firing order by rotating the crankshaft 120° at a time in the normal direction.
- ★ For details about valve clearance, see TESTING AND ADJUSTING DATA.



MEASURING COMPRESSION PRESSURE

MEASUREMENT PROCEDURE



While measuring the compression pressure, take care not to burn yourself on the exhaust manifold or muffler, and be careful not to get caught in any revolving part of the engine.

- ★ Measure the compression pressure while the engine is warm.

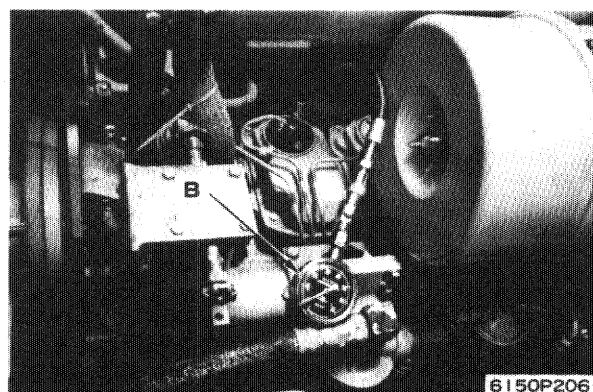
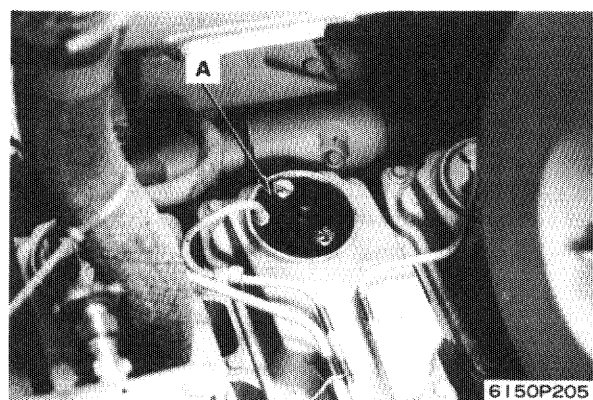
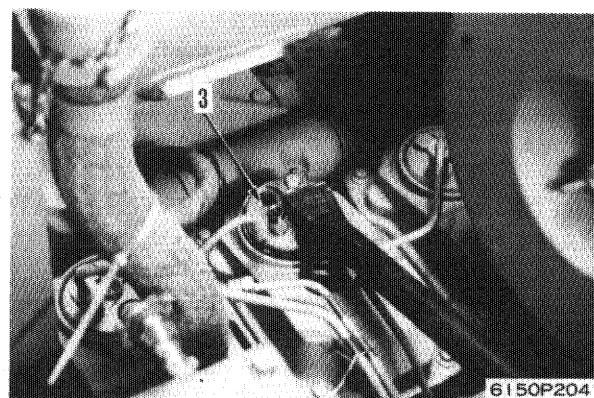
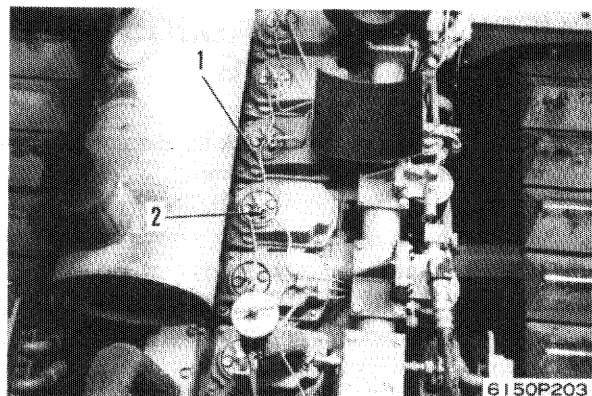
(Oil temperature: 40 – 60°C)

1. Adjust the valve clearance properly. For details, see ADJUSTING VALVE CLEARANCE.
2. Remove spill tube (1) and disconnect fuel injection pipe (2).
3. Remove nozzle holder assembly (3) for each cylinder.
 - ★ Remove the nozzle holder assembly by prying it with two mounting bolts.
 - ★ Take care not to let any dirt or foreign matter get into the cylinder.
4. Install adapter **A** to the nozzle holder mounting section of the cylinder to be measured, and tighten the adapter to the specified torque.
5. Connect compression gauge **B** to the adapter.
6. Place the fuel control lever in NO INJECTION position, crank the engine with the starting motor, and read the gauge when the pointer is stabilized.



If you do not put the fuel control lever in NO INJECTION position, fuel will blow out.

- ★ Most compression leakage can be prevented by applying a small amount of oil to the mounting section of the adapter.
- ★ For the reference values of the compression pressure, see TESTING AND ADJUSTING DATA.



FUEL SYSTEM

CHECKING AND ADJUSTING FUEL INJECTION TIMING

There are two methods for checking and adjusting the fuel injection timing of an injection pump.

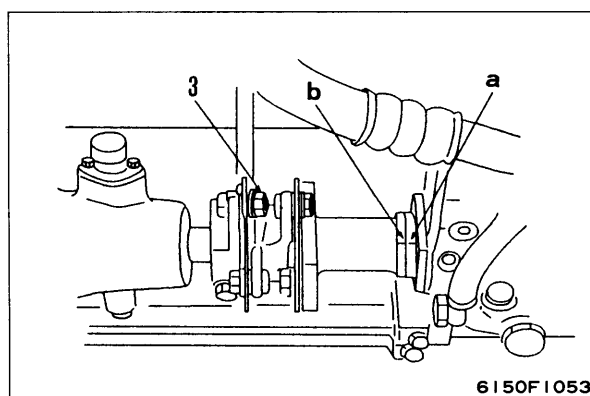
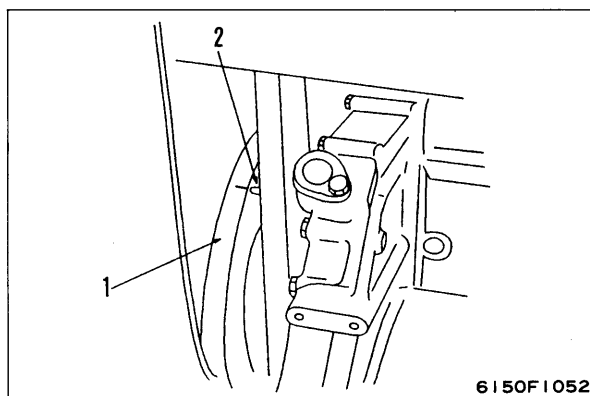
- The "MATCH MARK ALIGNMENT" method, which is used when the injection pump is installed to the original engine and the pump is not being repaired.
- The "DELIVERY VALVE" method, which is used when a repaired or replaced injection pump is installed to the engine.
- ★ When using the DELIVERY VALVE method, make preparations to replace the delivery valve copper gasket and O-ring with new parts.
- ★ Before inspecting and adjusting the fuel injection timing, bring the No. 1 cylinder piston to the top dead center of the compression stroke. For details, see 12 ADJUSTING VALVE CLEARANCE.

CHECKING AND ADJUSTING BY THE MATCH MARK ALIGNMENT METHOD

1. With No. 1 cylinder piston at TOP position, rotate the crankshaft 30° to 40° in the reverse direction.
2. Align the injection timing stamp line on crankshaft damper (1) with pointer (2) by slowly rotating the crankshaft in the normal direction.
3. Confirm that stamp line a on the injection pump is aligned with stamp line b on the coupling.

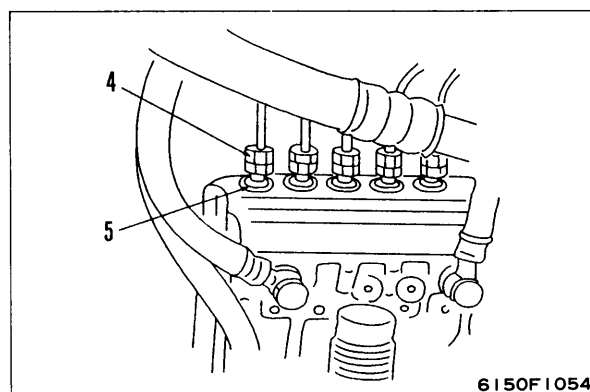
- ★ If the stamp lines are out of alignment, loosen nut (3), align the stamp lines by shifting the coupling, and tighten the nut.

 Nut: 6.2 ± 0.2 kgm

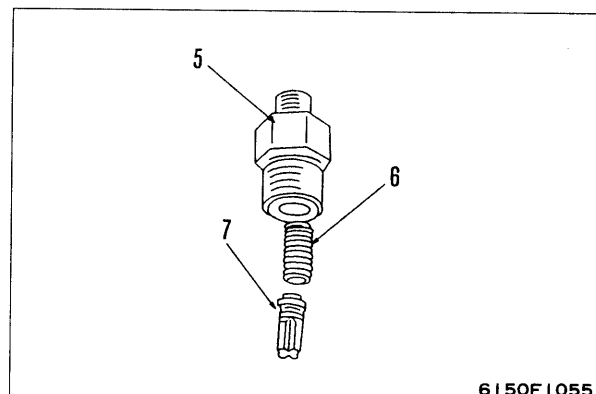


CHECKING AND ADJUSTING BY THE DELIVERY VALVE METHOD

1. Disconnect fuel injection pipe (4) for the No. 1 cylinder.
2. Remove delivery valve holder (5).

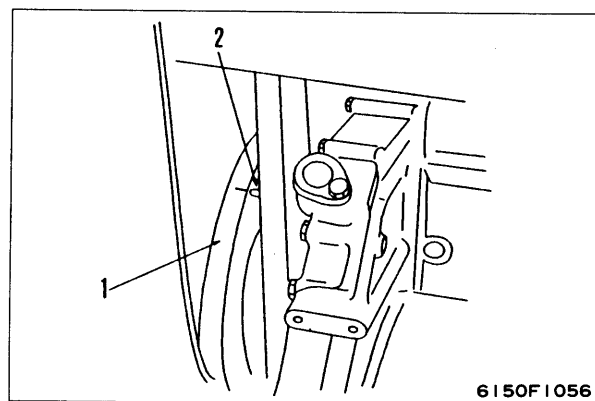


3. Remove spring (6) and delivery valve (7) from the delivery valve holder, and reassemble the delivery valve holder.
4. With No. 1 cylinder piston at TOP position, rotate the crankshaft 30° to 40° in the reverse direction.
5. Place the fuel control lever in FULL position, slowly rotate the crankshaft in the normal direction while operating the priming pump, and observe the position when the fuel stops flowing out of the delivery valve holder.
6. In the position where the outflow of fuel stops, check the injection timing stamp line on the crankshaft damper to see if it is aligned with the pointer.
 - ★ If the injection timing stamp line passed through the pointer: The injection timing is late.
 - ★ If the injection timing stamp line did not reach the pointer: The injection timing is advanced.
- ★ If the inspection shows that the injection timing is out of adjustment, adjust the fuel injection timing in the following manner.



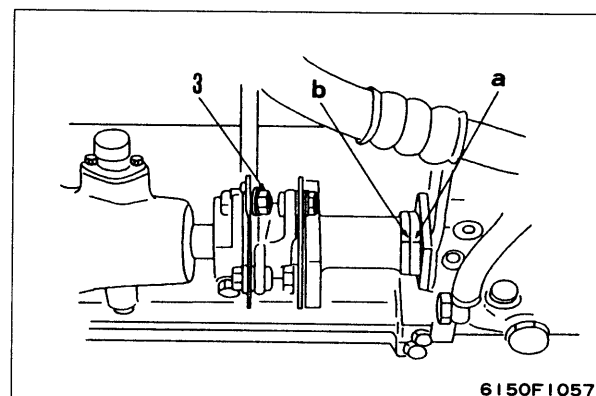
6150F1055

- 1) Rotate the crankshaft 30° to 40° in the reverse direction, starting from TOP position in No. 1 cylinder.
- 2) Align the injection timing stamp line on damper (1) with pointer (2) by slowly rotating the crankshaft in the normal direction.
- 3) Loosen nut (3) on the injection pump mounting flange slot, and rotate the flange on the pump side little by little by operating the priming pump until no fuel flows out of the delivery valve holder.
- 4) Tighten the nut on the injection pump mounting flange slot.
 - ★ Recheck the injection timing to see if it is properly adjusted.
- 5) Align match mark a with mark b and stamp the marks.



6150F1056

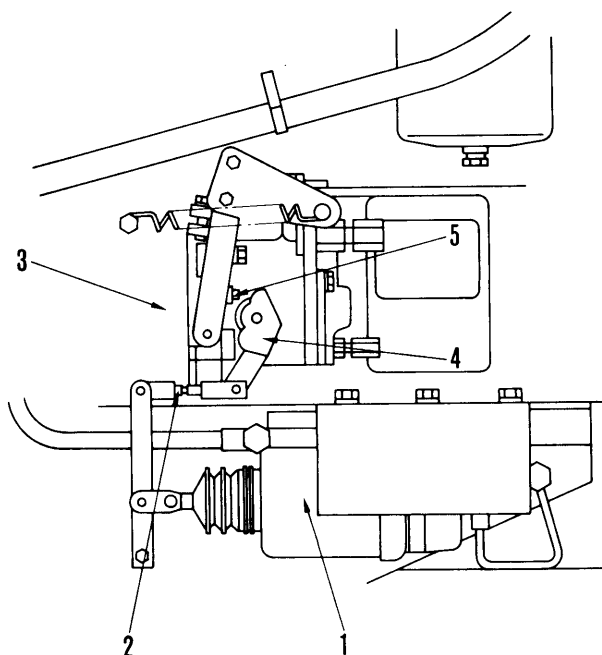
- ★ After the checking and adjusting, be sure to reassemble the spring and the delivery valve.
- ★ Always replace the delivery valve copper gasket and O-rings with new parts.



6150F1057

TESTING AND ADJUSTING FUEL CUT SOLENOID

1. Adjust rod (2) so that there is clearance of 0.4 ± 0.1 mm between stop lever (4) and stopper (5), while pulling rod (2) to the running direction.
2. Turn on the engine starting key and confirm that the solenoid has a stroke of 12 mm and the clearance of 0.4 ± 0.1 mm.
3. After turning on and off the key two or three times, reconfirm that solenoid works smoothly and engine runs or stops completely.
 - ★ If the solenoid does not work smoothly, solenoid coil burns in the cause of excessive current or flywheel horsepower downs in the cause of dropping fuel injection volume.



6150F208-1

S6D125-1 (EG220), SA6D125-1 (EG275)

1. A rod forms a link between the solenoid and injection pump. At this time, when the stop lever returns 0.5 – 1.0 mm from the stop pin on the RUN side and the solenoid shaft is pushed by hand, the stop lever of the pump will be set in a position in which it has returned 0.5 – 1.0 mm from the stop pin.
2. Next, energize the solenoid and see if its movement is smooth. Turn the starting switch ON and OFF two to three times and confirm that the operation condition does not change. If the operation is not smooth, adjust the linkage and carefully observe the movement.
3. Confirmation of Functions
After confirming that the operation is smooth, start the engine and confirm that the rated output can be obtained. Next, energize the solenoid and confirm that the engine stops. (The engine should stop within 10 sec.)

- | | |
|------------------------|---------------|
| 1. Solenoid valve | 4. Stop lever |
| 2. Rod | 5. Stopper |
| 3. Fuel injection pump | |

★ Failures caused by faulty adjustment of solenoid

• If the clearance between the stop bolt and lever is 0 when the solenoid is energized	• Burning of the solenoid core (when solenoid is only partially pulled) • Breakage or scuffing of the injection pump governor (an undue force will be applied to the lever)
• When there is a large clearance between the stop lever and RUN side bolt when the lever is free (faulty linkage)	• Engine power will not be generated because of a decline in amount of fuel injection

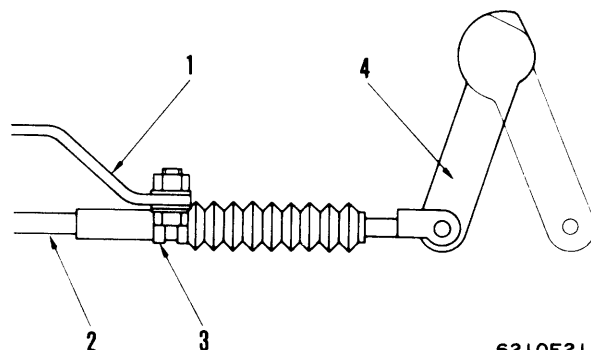
ADJUSTING ENGINE STOP MOTOR CABLE

HD200D-3, HD205-3

When the cable is pulled and stop lever (4) of the fuel injection pump is aligned with the STOP position, the cable will be fastened to bracket (1) with clamp (3).

To give some play to the cable, remove the ball joint, turn the ball joint one revolution in the opposite (extension) direction, then reinstall it to the stop lever of the fuel injection pump.

(Note that it is also acceptable to install the ball joint from the beginning after estimating how much play the cable needs.)



1. Bracket
2. Wire
3. Clamp
4. Injection pump stop lever

WA450-1

1. Stop the engine.
2. Install a ball joint to the injection pump stop lever, then temporarily fit the cable connecting the wiper motor and injection pumps.
3. Pull the injection pump stop lever by hand to the NO INJECTION position, and temporarily fix the cable to the bracket.
When doing this, temporarily fit the cable to the bracket using the holding nut with the stop lever contacting the ENGINE STOP stopper.
- ★ The engine stop motor is delivered with the cable pulled (engine stopped).
- ★ The stop lever of the fuel injection pump is at the RUN position when the lever is free. (It is pulled to the RUN position by a spring.)
4. When the wiper motor is installed (engine stopped), adjust so that the clearance between the stop lever of the fuel injection pump and the STOP stopper is 0.5 – 2.5 mm. Carry out the adjustment with the nut holding the cable to the bracket, or make fine adjustments by changing the amount the ball joint is screwed in.
5. Tighten all bolts and nuts.
6. Turn the engine starting switch ON and OFF repeatedly, and check that the engine stop motor and cable move smoothly. Then check the following points again.
 - (1) When the engine is running, check visually that there is slack in the engine stop motor cable, and that the stop lever of the fuel injection pump is fully returned to the RUN position.
 - (2) Check again that the clearance between the stop lever and STOP stopper is 0.5 – 2.5 mm when the engine is stopped.

- ★ The engine stop motor has limit switches built in on both sides of the cable stroke.
- ★ Engine stop motor stroke: 35 mm
Fuel injection pump stop lever stroke: 30 mm
- ★ When the engine is running, there is slack in the engine stop motor cable, and the RUN position is maintained by the action of a spring (this is frequently built into the fuel injection pump.)
- ★ There is a loose spring inside the engine stop motor, and this absorbs the tolerance of the stop motor when the engine is stopped.
However, if it is absorbed by the loose spring of the engine stop motor, force is applied to the injection pump, so depending on the model, this may be impossible.
With such models, if the clearance between the stop lever and STOP stopper is made 0 when the engine is stopped, there is a risk that problems may occur with the injection pump.
- ★ Problems caused by defective adjustment of the engine stop motor cable.

When the clearance between the stop lever and STOP stopper is excessive with the engine stop motor cable pulled	Engine does not stop
When the clearance between the stop lever and the RUN stopper is excessive at the free position	Fuel injection amount drops, causing loss of engine output power

FUEL INJECTION PUMP CALIBRATION DATA

Engine model	Applicable machine	Pump assembly No.	Engine serial No.	Page
6D125-1	D50A, P-17	6150-71-1111		12-007-7
		6150-71-1112		12-008
		6150-71-1113		12-008
	D50A, P-18	6150-71-1210		12-008-1
		6150-71-1211		12-008-1
	D50F-17	6150-71-1131		12-009
		6150-71-1132		12-009
	D53A, P-17	6150-71-1121		12-009-1
		6150-71-1122		12-009-2
		6150-71-1123		12-009-2
	D58E, P-1	6150-71-1220	29472 and up	12-010-1
		6150-71-1221		12-010-1
		6150-71-1222		12-010-2
	D58E, P-1	6150-71-1460	up to 29456	12-010-3
	D60A-8	6150-71-1341		12-010-4
		6150-71-1342		12-010-5
		6150-71-1343		12-010-5
	D60E-8 D60P, PL-8	6150-71-1321		12-010-6
		6150-71-1322		12-010-7
		6150-71-1323		12-010-7
	D60P, PL-8	6150-71-1342		12-010-5
		6150-71-1343		12-010-5
	D60P-11	6150-71-1312		12-010-8
		6150-71-1313		12-010-8
	D60S-8	6150-71-1331	10001 and up	12-011
		6150-71-1332		12-011-1
		6150-71-1333		12-011-1
	D63E-1	6150-71-1470		12-012
		6150-71-1471		12-012
		6150-71-1270		12-012-1
		6150-71-1271		12-012-2
	D65A-8	6150-71-1331		12-011
		6150-71-1341		12-010-4
	D65E, P-8	6150-71-1321		12-010-6
		6150-71-1322		12-010-7
		6150-71-1323		12-010-7
		6150-71-1331		12-011

Engine model	Applicable machine	Pump assembly No.	Engine serial No.	Page
6D125-1	D65S-8	6150-71-1341		12-010-4
		6150-71-1342		12-010-5
		6150-71-1343		12-010-5
	D65A-8 (for France)	6150-71-1411		12-012-3
		6150-71-1412		12-012-3
	D65E-12	6150-71-1170		12-012-4
	D68E, P-1	6150-71-1490		12-012-5
		6150-71-1491		12-012-5
	PC300-3C	6150-71-1810		12-012-6
	GD600R-3 GD605R-3	6150-71-1511		12-013
		6150-71-1513		12-013-1
		6150-71-1514		12-013-1
	GD605A-3	6150-71-1581		12-014
		6150-71-1583		12-014-1
		6150-71-1584		12-014-1
	GD650R-3 GD655A-3 GD655R-3	6150-71-1521		12-015
		6150-71-1522		12-015-1
		6150-71-1523		12-015-1
		6150-71-1524		12-015-1
		6150-71-1590		12-015
		6150-71-1592		12-015-1
		6150-71-1593		12-015-1
	GD613A-1 GD622A-1 GD623A-1	6150-71-1550	19761 – •	12-012-7
		6150-71-1551	• – 26169	12-012-7
		6150-71-2720	26170 – •	12-012-8
		6150-71-2721	• and up	12-012-8
	GD625A-1	6150-71-1570		12-014-2
		6150-71-1571		12-014-3
	GD625A-1C	6150-71-2710		12-014-4
		6150-71-2711		12-014-4
	GD663A-1	6150-71-1560		12-014-5
		6150-71-1561		12-014-5
		6150-71-1660		12-014-5
		6150-71-1661		12-010-5

Engine model	Applicable machine	Pump assembly No.	Engine serial No.	Page
6D125-1	GD705R-3 GD705R-4	6150-71-1531		12-016
		6150-71-1533		12-016-1
		6150-71-1534		12-016-1
		6150-71-1542		12-016-1
		6150-71-1543		12-016-1

Engine model	Applicable machine	Pump assembly No.	Engine serial No.	Page
S6D125-1	D60F-8A	6151-71-1721	10001 – 12582	12-017
		6151-71-1722	12583 – •	12-017
		6151-71-1723	• and up	12-017
	D60P-12	6151-71-1190		12-017-1
	D65EX-12	6151-71-1180		12-017-2
	D75S-5	6151-71-1731	10001 – 12014	12-017-3
		6151-71-1732	12015 – •	12-017-4
		6151-71-1733	• – 23192	12-017-4
		6151-71-1640	23193 – •	12-017-5
		6151-71-1641	• and up	12-017-5
	D83E, P-1 D85E, SS-1	6151-71-1621	26263 – •	12-017-6
		6151-71-1622	• and up	12-017-6
	D85A, P-21 D85E-21	6151-71-1770		12-017-7
		6151-71-1771		12-017-7
	PC300-3, PC300LC-3 PC300NLC-3 PC360LC-3	6151-71-1210	13137 – 23688	12-017-8
	PC300-3 (for Sweden)	6151-71-1230		12-017-8
	PC300-3, PC300LC-3 PC300NLC-3 PC360LC-3	6151-71-1211	23689 – •	12-017-9
		6151-71-1212	• and up	12-017-9
	PC300-3 (for cold weather)	6151-71-1250		12-017-9
	PC300-3 (for Sweden)	6151-71-1231		12-017-10
	PC360-3	6151-71-1270		12-017-11
	PC400-3 PC400LC-3	6151-71-1220	13444 – 26690	12-017-12
	PC400-3 (for Sweden)	6151-71-1240		12-017-12
	PC400-3 (for cold weather)	6150-71-1260		12-017-12
	PC400-3 PC400LC-3	6151-71-1221	26691 and up	12-017-13
		6151-71-1222		12-017-13

Engine model	Applicable machine	Pump assembly No.	Engine serial No.	Page
S6D125-1	PC400-3 (for Sweden)	6151-71-1241		12-017-13
		6151-71-1242		12-017-13
	PC400-3 (for cold weather)	6151-71-1261		12-017-13
	PC400-5, PC400LC-5	6151-73-1210		12-017-14
	PC400-5 (for Sweden)	6151-73-1220		12-017-14
	PC400-5 (for cold weather)	6151-73-1230		12-017-14
	PC400-5C	6151-73-1240		12-017-14
	HD200D-3	6151-71-1362	19950 – 21454	12-017-15
		6151-71-1363	21455 – •	12-017-15
		6151-71-1364	• and up	12-017-15
	HD205-3	6151-71-1322	16790 – 21668	12-017-16
		6151-71-1323	21669 – •	12-017-17
		6151-71-1324	• and up	12-017-18
	WA450-1	6151-71-1112	15805 – 23903	12-017-19
		6151-71-1113	23904 – 26687	12-017-19
		6151-71-1114	26688 – and up	12-017-20
		6151-73-1115	• – 35041	12-017-21
		6151-71-1116	35042 and up	12-017-21
	WA450-1C	6151-71-1121		12-017-22
		6151-71-1122		12-017-22
	WA450-3	6151-71-1440		12-017-23
	D65EX-12 D65P, PX-12	6151-71-1180		12-017-24
	HA250, HA270	6151-71-2720		12-017-25

Engine model	Applicable machine	Pump assembly No.	Engine serial No.	Page
S6D125-1	WA470-1	6151-71-1151	23333 – 26687	12-017-26
		6151-71-1153	26688 – •	12-017-26
		6151-71-1154	• and up	12-017-26
		6151-71-1450		12-017-26
	WA470-1	6151-71-1152		12-017-27
	GD705A-4	6151-71-1511		12-017-28
		6151-71-1513		12-017-28
		6151-71-1531		12-017-28
		6151-71-1550		12-017-29
		6151-71-1551		12-017-29
	EC260Z-1	6151-71-1821		12-017-30
		6151-71-1822		12-017-31
		6151-71-1823		12-017-31
	EG200-3	6151-71-1930		12-017-32
		6151-71-1931		12-018
		6151-71-1932		12-018

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Jahan Compressor Machine Model	Engine Model	Injection Pump Type	Pump Manufacturer
D50A-17 D50P-17	6D125-1	PE-6NB	NIPPON DENSO

Pump Assembly Number

6150-71-1111 (190000-9050)...0

Injection Timing

	Unit	Basis	Allowance
Rotating direction		Counterclockwise viewed from drive end	
Injection order		1-5-3-6-2-4	
Injection interval		60°	59°30' to 60°30'
Plunger pre-stroke	mm	4.7	
Delivery valve retraction volume	mm ³	90	

Specification for engine with fan (reference only)

Rated horsepower:	HP/rpm	120/1750
Maximum torque:	kgm/rpm	65.7/1100
High idling:	rpm	1875 to 1975
Low idling:	rpm	650 to 700

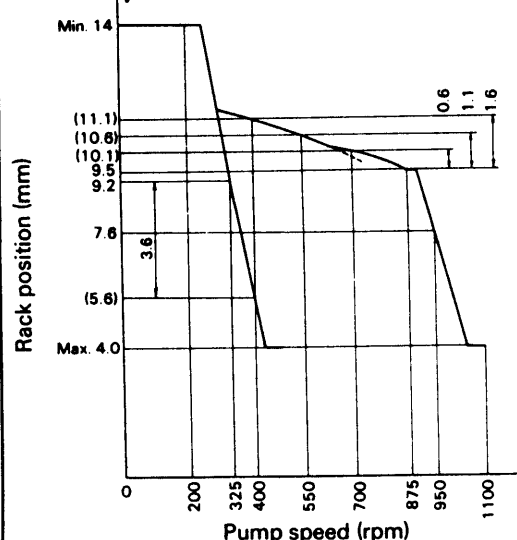
Calibration Standard

Conditions	Unit	Manufacturer standard (with nearly the same actual machine parts)	Service standard (with calibration test parts)
Nozzle part no.		(093400-0540)	(DN12SD12)
Nozzle holder part no.		(093100-0190)	(EF8511/9A)
Injection pipe (O/D x I/D x length)	mm	6 x 2 x 600	6 x 2 x 600
Test oil		ASTM D975 No. 2 diesel fuel or equivalent	
Oil temperature	°C	40 to 45	40 to 45
Nozzle opening pressure	kg/cm ²	175	175
Transfer pump pressure	kg/cm ²	1.6	1.6

Specifications

			Injection volume (cc/1000st) for manufacturer standard			Injection volume (cc/1000st) for service standard		
	Rack position (mm)	Pump speed (rpm)	Basis	Allowance	Maximum variance between cylinder	Basis	Allowance	Maximum variance between cylinder
Calibration basic point	9.4	875	74.5	Each cyl. 71.5 to 77.5	max. 6.0	72.0	Each cyl. 69.0 to 75.0	max. 6.0
• Rack positions B to E are the reference volume when adjusting the injection volume.	B 10.5	550	94.5	★ 91.5 to 97.5	max. 6.0	94.5	★ 91.5 to 97.5	max. 6.0
• Marks ★ are average volumes.	C 9.2	325	26.0	★ 24.0 to 28.0	max. 5.0	24.5	★ 22.5 to 26.5	max. 5.0
	D			★			★	
	E			★			★	

Governor performance



Machine Model	Engine Model	Injection Pump Type	Pump Manufacturer
D50A, P-17	6D125-1	PE-6NB	NIPPON DENSO

Pump Assembly Number

6150-71-1112 (190000-9052) ... 3
6150-71-1113 (190000-9053)

Injection Timing

	Unit	Basis	Allowance
Rotating direction		Counterclockwise viewed from drive end	
Injection order		1 - 5 - 3 - 6 - 2 - 4	
Injection interval		60°	59°30' to 60°30'
Plunger pre-stroke	mm	4.7	
Delivery valve retraction volume	mm ³	90	

Specification for engine with fan (reference only)

Rated horsepower:	HP/rpm	120/1750
Maximum torque:	kgm/rpm	65.5/1100
High idling:	rpm	1875 to 1975
Low idling:	rpm	650 to 700

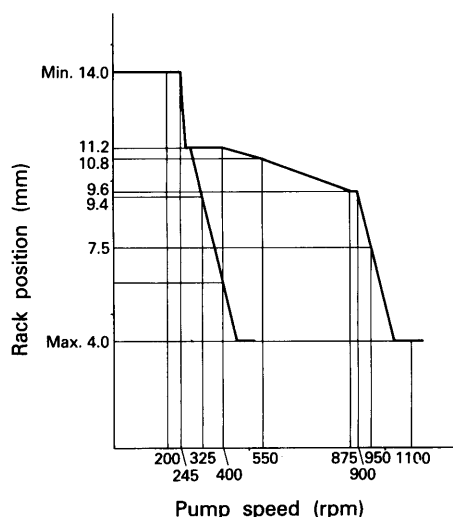
Calibration Standard

Conditions	Unit	Manufacturer standard (with nearly the same actual machine parts)	Service standard (with calibration test parts)
Nozzle part no.			093400-0540 (DN12SD12A)
Nozzle holder part no.			093100-0190 (EF8511/9A)
Injection pipe (O/D x I/D x length)	mm		6 x 2 x 600
Test oil		ASTM D975 No. 2 diesel fuel or equivalent	
Oil temperature	°C		40 to 45
Nozzle opening pressure	kg/cm ²		175
Transfer pump pressure	kg/cm ²		1.6

Specifications

				Injection volume (mm ³ /st) for manufacturer standard			Injection volume (mm ³ /st) for service standard		
	Rack position (mm)	Pump speed (rpm)		Basis	Allowance	Maximum variance between cylinder	Basis	Allowance	Maximum variance between cylinder
	Calibration basic point	9.6	875	75.5	Each cyl.		75.5	Each cyl. 72.5 to 78.5	max. 6.0
- Rack positions B to E are the reference volume when adjusting the injection volume. - Marks ★ are average volumes.	B	10.8	550	87.5	★		87.5	★ 84.5 to 90.5	max. 8.0
	C	9.4	325	21.0	★		21.0	★ 19.0 to 23.0	max. 5.0
	D				★			★	
	E				★			★	

Governor performance



Injection Compressor

Pump Assembly Number

6150-71-1210 (191000-4130)

6150-71-1211 (191000-4131)

(): Manufacturer's part No.

Injection Pump Type	Pump Manufacturer
PE-6NB	NIPPON DENSO

Applicable Machine		Applicable Engine	
Model	Serial No.	Model	Serial No.
D50A, P-18		6D125-1	

Injection Timing

Rotating direction	Counterclockwise viewed from drive end
Injection order	1 - 5 - 3 - 6 - 2 - 4
Injection interval	60° (59°30' - 60°30')
Plunger pre-stroke (mm)	3.0
Delivery valve retraction volume (mm ³ /st)	59

Engine Specification

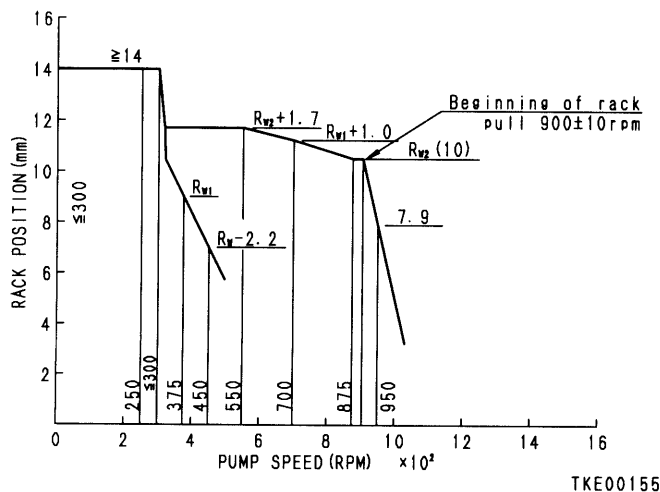
Rated horsepower (kW[HP] / rpm)	91.2 [122.3] / 1,750
Maximum torque (Nm[kgm] / rpm)	671.76 [68.5] / 1,100
High idling (rpm)	1,850 - 1,950
Low idling (rpm)	600 - 700
Pump tester capacity for Service standard	Motor 7.5 kW

Calibration Standard

(): Pump manufacturer's part No.

Conditions				Service standard		Manufacturer standard	
• Service standard indicates data using calibration test parts. • Manufacturer standard is data for factory test.	Nozzle part no.			(093400-0540)			
	Nozzle holder part no.			(093100-0190)			
	Injection pipe (O/D x I/D x length) mm			6 x 2 x 600			
	Test oil			ASTM D975 No.2 diesel fuel or equivalent			
	Oil temperature °C			40 to 45			
	Nozzle opening pressure (MPa[kg/cm ²])			17.16 [175]			
	Transfer pump pressure (kPa[kg/cm ²])			156.91 [1.6]			
Injection volume				Service standard		Manufacturer standard	
• Rack positions B to E are the reference volume when adjusting the injection volume.	Rack point	Rack position (mm)	Pump speed (rpm)	Injection volume (cc/1000 st)	Maximam variance between cylinder (%)	Injection volume (cc/1000 st)	Maximam variance between cylinder (%)
	A (Basic point)	10.0	875	66 – 72	8.7		
	B	11.7	550	98 – 104	7.9		
	C	9.0	375	15 – 19	29.4		
	D						
	E						

Governor performance



Machine Model Jahon Compressor	Engine Model	Injection Pump Type	Pump Manufacturer
D50F-17	6D125-1	PE-6NB	NIPPON DENSO

Pump Assembly Number

6150-71-1131 (190000-8862) ... 2
6150-71-1132 (190000-8863) ... 0

Injection Timing

	Unit	Basis	Allowance
Rotating direction		Counterclockwise viewed from drive end	
Injection order		1 - 5 - 3 - 6 - 2 - 4	
Injection interval		60°	59°30' to 60°30'
Plunger pre-stroke	mm	4.7	
Delivery valve retraction volume	mm ³	90	

Specification for engine with fan (reference only)

Rated horsepower:	HP/rpm	138/1900
Maximum torque:	kgm/rpm	66/1300
High idling:	rpm	2050 to 2150
Low idling:	rpm	625 to 675

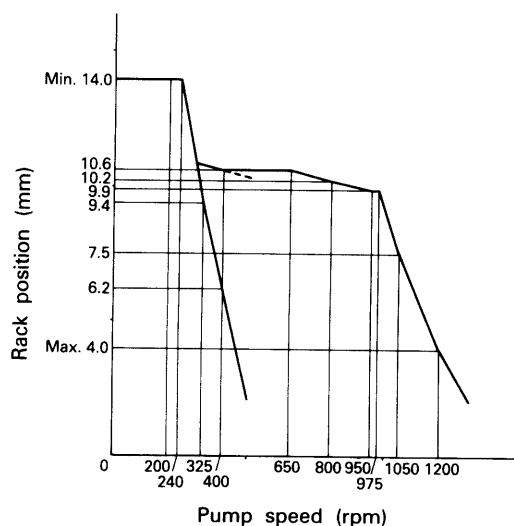
Calibration Standard

Conditions	Unit	Manufacturer standard (with nearly the same actual machine parts)	Service standard (with calibration test parts)
Nozzle part no.			093400-0540 (DN12SD12A)
Nozzle holder part no.			093100-0190 (EF8511/9A)
Injection pipe (O/D x I/D x length)	mm		6 x 2 x 600
Test oil		ASTM D975 No. 2 diesel	fuel or equivalent
Oil temperature	°C		40 to 45
Nozzle opening pressure	kg/cm ²		175
Transfer pump pressure	kg/cm ²		1.6

Specifications

				Injection volume (mm ³ /st) for manufacturer standard			Injection volume (mm ³ /st) for service standard		
	Rack position (mm)	Pump speed (rpm)		Basis	Allowance	Maximum variance between cylinder	Basis	Allowance	Maximum variance between cylinder
Calibration basic point	9.9	950		78.0	Each cyl.		78.0	Each cyl. 75.0 to 81.0	max. 6.0
• Rack positions B to E are the reference volume when adjusting the injection volume.	B 10.6	650		85.0	★		85.0	★ 82.0 to 88.0	max. 6.0
	C 9.4	325		21.0	★		21.0	★ 19.0 to 23.0	max. 5.0
	D				★			★	
• Marks ★ are average volumes.	E				★			★	

Governor performance



Machine Model	Injection Pump Type	Pump Manufacturer
D53A-17 D53P-17	PE-6NB	NIPPON DENSO

Pump Assembly Number

6150-71-1121 (190000-9060)...0

Injection Timing

Unit	Basis	Allowance
Rotating direction	Counterclockwise viewed from drive end	
Injection order	1-5-3-6-2-4	
Injection interval	60°	59°30' to 60°30'
Plunger pre-stroke	mm	4.7
Delivery valve retraction volume	mm ³	90

Specification for engine with fan (reference only)

Rated horsepower:	HP/rpm	124/1900
Maximum torque:	kgm/rpm	62.5/1300
High idling:	rpm	2050 to 2150
Low idling:	rpm	600 to 650

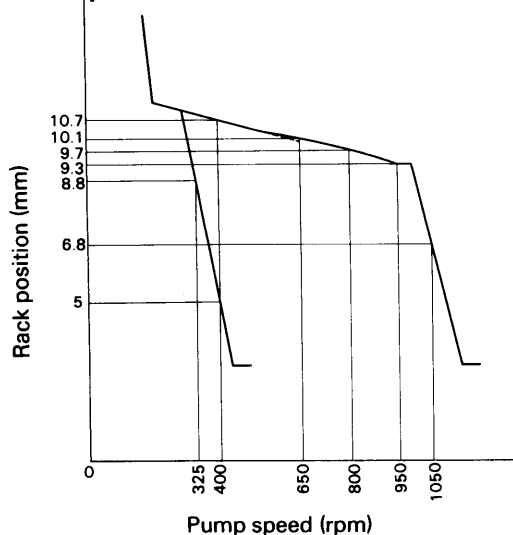
Calibration Standard

Conditions	Unit	Manufacturer standard (with nearly the same actual machine parts)	Service standard (with calibration test parts)
Nozzle part no.		(093400-1600)	(DN12SD12)
Nozzle holder part no.		(093100-2710)	(EF8511/9A)
Injection pipe (O/D x I/D x length)	mm	6 x 2 x 600	6 x 2 x 600
Test oil		ASTM D975 No. 2 diesel fuel or equivalent	
Oil temperature	°C	40 to 45	40 to 45
Nozzle opening pressure	kg/cm ²	175	175
Transfer pump pressure	kg/cm ²	1.6	1.6

Specifications

				Injection volume (cc/500st) for manufacturer standard				Injection volume (cc/500st) for service standard			
				Basis	Allowance	Maximum variance between cylinder		Basis	Allowance	Maximum variance between cylinder	
Calibration basic point											
		9.3	950	36.0	Each cyl. 34.5 to 37.5	max. 3.0		35.5	Each cyl. 34.0 to 37.0	max. 3.0	
• Rack positions B to E are the reference volume when adjusting the injection volume. • Marks ★ are average volumes.	B	10.1	650	39.0	★ 37.5 to 40.5	max. 3.0		39.0	★ 37.5 to 40.5	max. 3.0	
	C	8.8	325	7.3	★ 6.3 to 8.3	max. 2.5		7.5	★ 6.5 to 8.5	max. 2.5	
	D				★				★		
	E				★				★		

Governor performance



Jahan Compressor

Pump Assembly Number

6150-71-1122 (190000-9062)

6150-71-1123 (190000-9063)

(): Manufacturer's part No.

Injection Pump Type	Pump Manufacturer
PE-6NB	NIPPON DENSO

Applicable Machine		Applicable Engine	
Model	Serial No.	Model	Serial No.
D53A, P-17		6D125-1	

Injection Timing

Rotating direction	Counterclockwise viewed from drive end
Injection order	1 - 5 - 3 - 6 - 2 - 4
Injection interval	60° (59°30' - 60°30')
Plunger pre-stroke (mm)	4.7
Delivery valve retraction volume (mm ³ /st)	90

Engine Specification

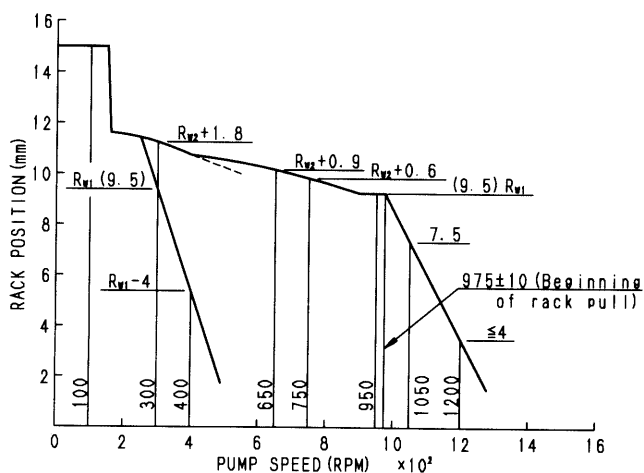
Rated horsepower (kW[HP] / rpm)	94.14 [126.2] / 1,900
Maximum torque (Nm[kgm] / rpm)	612.92 [62.5] / 1,300
High idling (rpm)	2,050 - 2,150
Low idling (rpm)	600 - 650
Pump tester capacity for Service standard	Motor 7.5 kW

Calibration Standard

(): Pump manufacturer's part No.

Conditions				Service standard		Manufacturer standard	
● Service standard indicates data using calibration test parts. ● Manufacturer standard is data for factory test.	Nozzle part no.			(093400-0540)			
	Nozzle holder part no.			(093100-0190)			
	Injection pipe (O/D x I/D x length) mm			6 x 2 x 600			
	Test oil			ASTM D975 No.2 diesel fuel or equivalent			
	Oil temperature °C			40 to 45			
	Nozzle opening pressure (MPa(kg/cm ²))			17.16 [175]			
	Transfer pump pressure (kPa(kg/cm ²))			156.91 [1.6]			
Injection volume	Rack point	Rack position (mm)	Pump speed (rpm)	Service standard		Manufacturer standard	
				Injection volume (cc/1000 st)	Maximum variance between cylinder (%)	Injection volume (cc/1000 st)	Maximum variance between cylinder (%)
	A (Basic point)	9.5	950	70 – 76	8.2		
	B	10.4	650	78 – 84	9.9		
	C	9.5	300	19 – 23	23.8		
	D						
	E						
● Rack positions B to E are the reference volume when adjusting the injection volume.							

Governor performance



TKE00156

Machine Model Injection Compressor	Engine Model	Injection Pump Type	Pump Manufacturer
D58E-1 D58P-1	6D125-1	NB (EP9)	NIPPON DENSO

Pump Assembly Number

6150-71-1220 (191000-5230) ... 1
6150-71-1221 (191000-5231) ... 0

Injection Timing

	Unit	Basis	Allowance
Rotating direction		Counterclockwise viewed from drive end	
Injection order		1 - 5 - 3 - 6 - 2 - 4	
Injection interval		60°	59°30' to 60°30'
Plunger pre-stroke	mm	3.0	
Delivery valve retraction volume	mm ³	59	

Specification for engine with fan (reference only)

Rated horsepower:	HP/rpm	130/1900
Maximum torque:	kgm/rpm	64.8/1300
High idling:	rpm	2050 to 2150
Low idling:	rpm	775 to 875

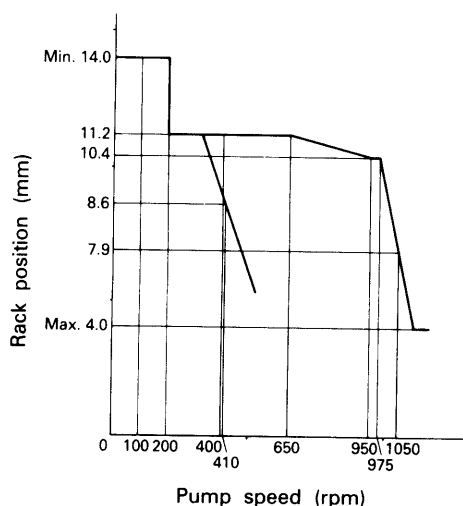
Calibration Standard

Conditions	Unit	Manufacturer standard (with nearly the same actual machine parts)	Service standard (with calibration test parts)
Nozzle part no.			093400-0540 (DN12SD12A)
Nozzle holder part no.			093100-0190 (EF8511/9A)
Injection pipe (O/D x I/D x length)	mm		6 x 2 x 600
Test oil		ASTM D975 No. 2 diesel fuel or equivalent	
Oil temperature	°C		40 to 45
Nozzle opening pressure	kg/cm ²		175
Transfer pump pressure	kg/cm ²		1.6

Specifications

				Injection volume (mm ³ /st) for manufacturer standard			Injection volume (mm ³ /st) for service standard		
		Rack position (mm)	Pump speed (rpm)	Basis	Allowance	Maximum variance between cylinder	Basis	Allowance	Maximum variance between cylinder
	Calibration basic point	10.4	950	79.0	Each cyl.		79.0	Each cyl. 76.0 to 82.0	max. 6.0
- Rack positions B to E are the reference volume when adjusting the injection volume. - Marks ★ are average volumes.	B	11.2	650	94.0	★		94.0	★ 91.0 to 97.0	max. 8.0
	C	8.6	410	17.0	★		17.0	★ 15.0 to 19.0	max. 5.0
	D				★			★	
	E				★			★	

Governor performance



Pump Assembly Number
6150-71-1222 (191000-5232)

(): Manufacturer's part No.

Injection Pump Type	Pump Manufacturer
PE-6NB	NIPPON DENSO

Applicable Machine		Applicable Engine	
Model	Serial No.	Model	Serial No.
D58E, P-1		6D125-1	

Injection Timing

Rotating direction	Counterclockwise viewed from drive end
Injection order	1 – 5 – 3 – 6 – 2 – 4
Injection interval	60° (59°30' – 60°30')
Plunger pre-stroke (mm)	3.0
Delivery valve retraction volume (mm ³ /st)	59

Engine Specification

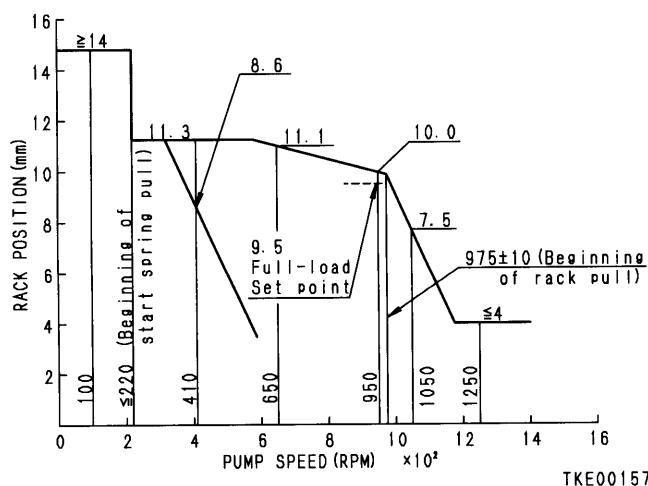
Rated horsepower (kW[HP] / rpm)	92.5 [124.0] / 1,900
Maximum torque (Nm[kgm] / rpm)	612.92 [62.5] / 1,300
High idling (rpm)	2,050 – 2,150
Low idling (rpm)	600 – 650
Pump tester capacity for Service standard	Motor 7.5 kW

Calibration Standard

(): Pump manufacturer's part No.

Calibration Standard				Injection pump manufacturer's part No.			
Conditions				Service standard		Manufacturer standard	
● Service standard indicates data using calibration test parts. ● Manufacturer standard is data for factory test.	Nozzle part no.			(093400-0540)			
	Nozzle holder part no.			(093100-0190)			
	Injection pipe (O/D × I/D × length) mm			6 × 2 × 600			
	Test oil			ASTM D975 No.2 diesel fuel or equivalent			
	Oil temperature °C			40 to 45			
	Nozzle opening pressure (MPa[kg/cm ²])			17.16 [175]			
	Transfer pump pressure (kPa[kg/cm ²])			156.91 [1.6]			
Injection volume				Service standard		Manufacturer standard	
● Rack positions B to E are the reference volume when adjusting the injection volume.	Rack point	Rack position (mm)	Pump speed (rpm)	Injection volume (cc/1000 st)	Maximum variance between cylinder (%)	Injection volume (cc/1000 st)	Maximum variance between cylinder (%)
	A (Basic point)	10.0	950	69 – 75	8.3		
	B	11.1	650	90 – 96	8.6		
	C	8.6	410	15 – 19	29.4		
	D						
	E						

Governor performance



Pump Assembly Number

6150-71-1460 (191000-4051)

Injection Pump (191000-4052)

(): Manufacturer's part No.

Injection Pump Type	Pump Manufacturer
NB(EP9)	NIPPON DENSO

Applicable Machine		Applicable Engine	
Model	Serial No.	Model	Serial No.
D58E-1		6D125-1	Up to 29456
D58P-1		6D125-1	Up to 29471

Injection Timing

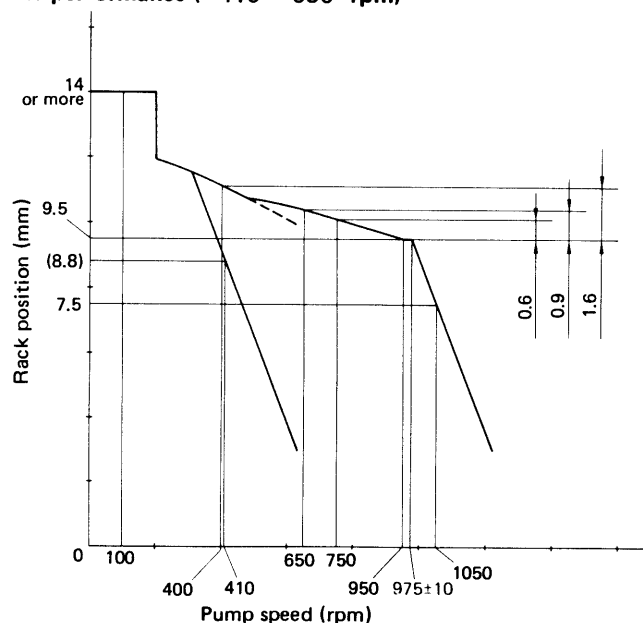
Rotating direction	Counterclockwise viewed from drive end
Injection order	1-5-3-6-2-4
Injection interval	60° ± 30'
Plunger pre-stroke mm	4.7
Delivery valve retraction volume mm ³ /st	90

Engine specification

Rated horsepower HP/rpm	130/1900
Maximum torque kgm/rpm	64.3/1300
High idling rpm	2050 to 2150
Low idling rpm	800 to 850
Pump tester capacity for Service standard	Motor 7.5 KW

Calibration Standard

Conditions				Service standard			Manufacturer standard		
• Service standard indicates data using calibration test parts. • Manufacturer standard is data for factory test.				Nozzle part no.			(093400-0540)(ND-DN12SD12A)		
				Nozzle holder part no.			(093100-0190)(EF8511/9A)		
				Injection pipe (O/D x I/D x length) mm			6 x 2 x 600		
				Test oil			ASTM D975 No. 2 diesel fuel or equivalent		
				Oil temperature °C			40 to 45		
				Nozzle opening pressure kg/cm ²			175		
				Transfer pump pressure kg/cm ²			1.6		
Injection volume				Service standard (cc/500 st)			Manufacturer standard (cc/500 st)		
• Rack positions B to E are the reference volume when adjusting the injection volume. • Marks ★ are average volumes.	Rack point	Rack position (mm)	Pump speed (rpm)	Basis	Allowance	Maximum variance between cylinder	Basis	Allowance	Maximum variance between cylinder
	Basic point	9.5	950	36.75	Each cyl. 35.25 to 38.25	Max. 3	36.75	Each cyl.	
	B	10.4	650	(44.5)	★(43.0 to 46.0)	Max. 4	(44.5)	★	
	C	(8.8)	410	10.5	★ 9.5 to 11.5	Max. 2.5	10.5	★	
	D				★			★	
	E				★			★	

Governor performance (410 – 950 rpm)

SEBH4540-01

6D125 SERIES

12-010-3

6150-71-1341 (190000-9100)...0

Machine Model Inan Compressor	Engine Model	Injection Pump Type	Pump Manufacturer
D60A,P, PL-8 D65S-8	6D125-1	PE-6NB	NIPPON DENSO

Pump Assembly Number

6150-71-1342 (190000-9102) ... 3
6150-71-1343 (190000-9103)

Injection Timing

	Unit	Basis	Allowance
Rotating direction		Counterclockwise viewed from drive end	
Injection order		1 - 5 - 3 - 6 - 2 - 4	
Injection interval		60°	59°30' to 60°30'
Plunger pre-stroke	mm	4.7	
Delivery valve retraction volume	mm ³	90	

Specification for engine with fan (reference only)

Rated horsepower:	HP/rpm
Maximum torque:	kgm/rpm
High idling:	rpm
Low idling:	rpm

Calibration Standard

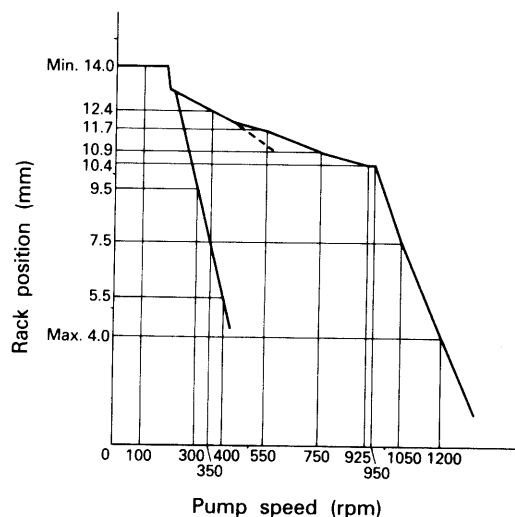
Conditions	Unit	Manufacturer standard (with nearly the same actual machine parts)	Service standard (with calibration test parts)
Nozzle part no.			093400-0540 (DN12SD12A)
Nozzle holder part no.			093100-0190 (EF8511/9A)
Injection pipe (O/D x I/D x length)	mm		6 x 2 x 600
Test oil		ASTM D975 No. 2 diesel fuel or equivalent	
Oil temperature	°C		40 to 45
Nozzle opening pressure	kg/cm ²		175
Transfer pump pressure	kg/cm ²		1.6

Specifications

Specifications

			Injection volume (mm ³ /st) for manufacturer standard			Injection volume (mm ³ /st) for service standard		
	Rack position (mm)	Pump speed (rpm)	Basis	Allowance	Maximum variance between cylinder	Basis	Allowance	Maximum variance between cylinder
	Calibration basic point	10.4	925	86.0	Each cyl.	86.0	Each cyl. 83.0 to 89.0	max. 8.0
• Rack positions B to E are the reference volume when adjusting the injection volume. • Marks ★ are average volumes.	B	11.7	550	120.5	★	120.5	★ 117.5 to 123.5	max. 8.0
	C	9.5	300	21.0	★	21.0	★ 19.0 to 23.0	max. 5.0
	D				★		★	
	E				★		★	

Governor performance



Machine Model	Injection Pump Type	Pump Manufacturer
D60E,P-8 D65E,P-8	PE-6NB	NIPPON DENSO

Pump Assembly Number

6150-71-1321 (190000-9080)...0

Injection Timing

Unit	Basis	Allowance
Rotating direction	Counterclockwise viewed from drive end	
Injection order	1-5-3-6-2-4	
Injection interval	60°	59°30' to 60°30'
Plunger pre-stroke	mm	4.7
Delivery valve retraction volume	mm ³	90

Specification for engine with fan (reference only)

Rated horsepower: HP/rpm		
Maximum torque: kgm/rpm		
High idling:	rpm	2050 to 2150
Low idling:	rpm	570 to 630

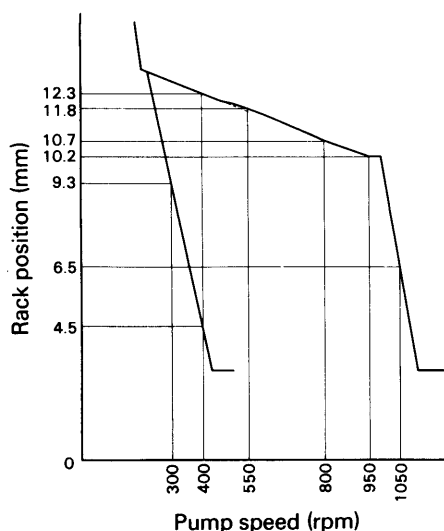
Calibration Standard

Conditions	Unit	Manufacturer standard (with nearly the same actual machine parts)	Service standard (with calibration test parts)
Nozzle part no.		(093400-0540)	(DN12SD12)
Nozzle holder part no.		(093100-0190)	(EF8511/9A)
Injection pipe (O/D x I/D x length)	mm	6 x 2 x 600	6 x 2 x 600
Test oil		ASTM D975 No. 2 diesel fuel or equivalent	
Oil temperature	°C	40 to 45	40 to 45
Nozzle opening pressure	kg/cm ²	175	175
Transfer pump pressure	kg/cm ²	1.6	1.6

Specifications

Specifications				Injection volume (cc/500st) for manufacturer standard					Injection volume (cc/500st) for service standard				
		Rack position (mm)	Pump speed (rpm)	Basis	Allowance			Maximum variance between cylinder	Basis	Allowance			Maximum variance between cylinder
	Calibration basic point	10.2	950	45.0	Each cyl. 43.5	to 46.5	max. 4.0		44.5	Each cyl. 43.0	to 46.0	max. 4.0	
• Rack positions B to E are the refer- ence volume when adjusting the injec- tion volume.	B	11.8	550	67.5	★	66.0	to 69.0	max. 4.0	67.5	★	66.0	to 69.0	max. 4.0
	C	9.3	300	11.0	★	10.0	to 12.0	max. 2.5	10.7	★	9.7	to 11.7	max. 2.5
• Marks ★ are aver- age volumes.	D				★					★			
	E				★					★			

Governor performance



Pump Assembly Number

6150-71-1322 (190000-9081, 9082)
 6150-71-1323 (190000-9083)

(): Manufacturer's part No.

Injection Pump Type	Pump Manufacturer
NB (EP-9)	NIPPON DENSO

Applicable Machine		Applicable Engine	
Model	Serial No.	Model	Serial No.
D60, 65E-8		6D125-1	
D60, 65P-8			
D65P, PL-11			

Injection Timing

Rotating direction	Counterclockwise viewed from drive end
Injection order	1 — 5 — 3 — 6 — 2 — 4
Injection interval	$60^\circ \pm 30'$
Plunger pre-stroke mm	4.7 ± 0.05
Delivery valve retraction volume mm ³ /st	90

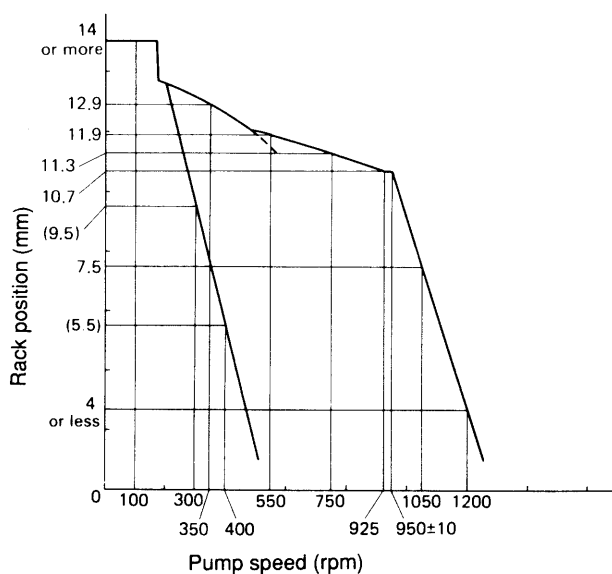
Engine Specification

Rated horsepower HP/rpm	165/1850
Maximum torque kgm/rpm	78/1100
High idling rpm	2050 to 2150
Low idling rpm	600 to 630
Pump tester capacity for Service standard	Motor 7.5 KW

Calibration Standard

Conditions				Service standard			Manufacturer standard		
· Service standard indicates data using calibration test parts. · Manufacture standard is data for factory test.	Nozzle part no.			(093400-0540) (ND-DN 12SD12A)			(093400-0540) (ND-DN 12SD12A)		
	Nozzle holder part no.			(093100-0190) (EF8511/9A)			(093100-0190) (EF8511/9A)		
	Injection pipe (O/D × I/D × length)		mm	6 × 2 × 600			6 × 2 × 600		
	Test oil			ASTM D975 No.2 diesel fuel or equivalent					
	Oil temperature °C			40 to 45					
	Nozzle opening pressure kg/cm ²			175			175		
	Transfer pump pressure kg/cm ²			1.6			1.6		
Injection volume				Service standard (cc/ 500st)			Manufacturer standard (cc/ 500st)		
· Rack positions B to E are the reference volume when adjusting the injection volume. · Marks ★ are average volumes.	Rack point	Rack position (mm)	Pump speed (rpm)						
				Basis	Allowance	Maximum variance between cylinder	Basis	Allowance	Maximum variance between cylinder
	Basic point	10.7	925	47.75	Each cyl. 46.25 to 49.25	Max 4	47.75	Each cyl.	
	B	11.9	550	63.0	★61.5 to 64.5	Max 4	63.0	★	
	C	(9.5)	300	10.5	★ 9.5 to 11.5	Max 2.5	10.5	★	
	D				★			★	
	E				★			★	

Governor performance (300 — 925 rpm)



SEBH 4542-01

6D125 SERIES

12-010-7

(): Manufacturer's part No.

Injection Pump Type	Pump Manufacturer
PE-6NB	NIPPON DENSO

Applicable Machine		Applicable Engine	
Model	Serial No.	Model	Serial No.
D60P-11		6D125-1	

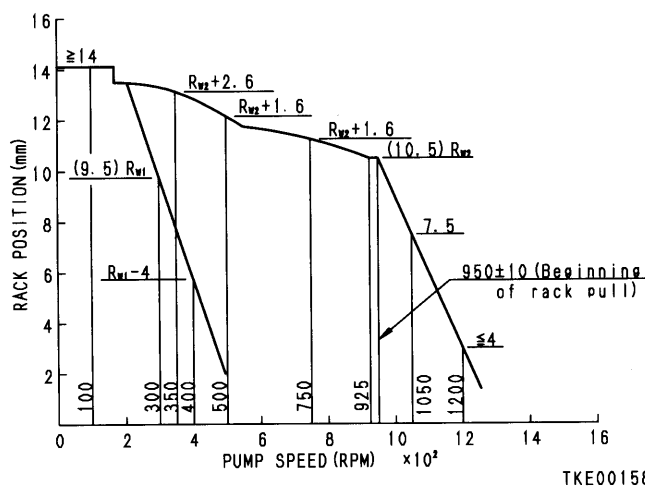
Engine Specification

Rotating direction	Counterclockwise viewed from drive end
Injection order	1 – 5 – 3 – 6 – 2 – 4
Injection interval	60° (59°30' – 60°30')
Plunger pre-stroke (mm)	4.7
Delivery valve retraction volume (mm ³ /st)	90

Rated horsepower (kW[HP] / rpm)	126.5 [169.6] / 1,850
Maximum torque (Nm[kgm] / rpm)	799.24 [81.5] / 1,100
High idling (rpm)	2,050 – 2,150
Low idling (rpm)	600 – 630
Pump tester capacity for Service standard	Motor 7.5 kW

(): Pump manufacturer's part No.

Calibration Standard							
Conditions ● Service standard indicates data using calibration test parts. ● Manufacturer standard is data for factory test.				Service standard		Manufacturer standard	
	Nozzle part no.			(093400-0540)			
	Nozzle holder part no.			(093100-0190)			
	Injection pipe (O/D x I/D x length) mm			6 x 2 x 600			
	Test oil			ASTM D975 No.2 diesel fuel or equivalent			
	Oil temperature °C			40 to 45			
	Nozzle opening pressure (MPa[kg/cm ²])			17.16 [175]			
Transfer pump pressure (kPa[kg/cm ²])			156.91 [1.6]				
Injection volume ● Rack positions B to E are the reference volume when adjusting the injection volume.	Rack point	Rack position (mm)	Pump speed (rpm)	Service standard		Manufacturer standard	
				Injection volume (cc/1000 st)	Maximum variance between cylinder (%)	Injection volume (cc/1000 st)	Maximum variance between cylinder (%)
	A (Basic point)	10.5	925	86 – 92	9.0		
	B	12.1	500	131 – 137	6.0		
	C	9.5	300	19 – 23	23.8		
	D						
	E						



Machine Model Injection Compressor	Engine Model	Injection Pump Type	Pump Manufacturer
D60S-8 D65A-8 D65P-8 D65E-8	6D125-1	PE-6NB	NIPPON DENSO

Pump Assembly Number

6150-71-1331 (190000-9090)... 0

Injection Timing

	Unit	Basis	Allowance
Rotating direction		Counterclockwise viewed from drive end	
Injection order		1-5-3-6-2-4	
Injection interval		60°	59°30' to 60°30'
Plunger pre-stroke	mm	4.7	
Delivery valve retraction volume	mm ³	90	

Specification for engine with fan (reference only)

Rated horsepower:	HP/rpm
Maximum torque:	kgm/rpm
High idling:	rpm
Low idling:	rpm

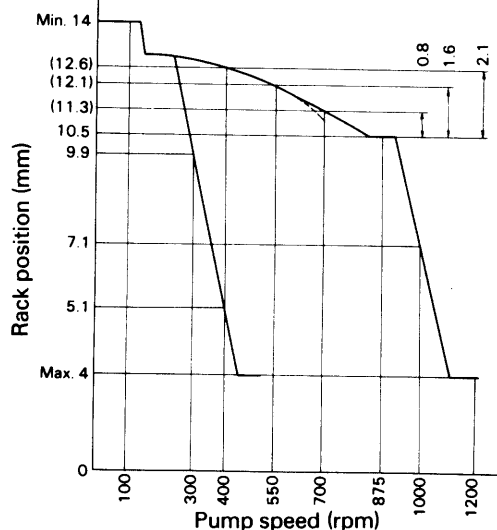
Calibration Standard

Conditions	Unit	Manufacturer standard (with nearly the same actual machine parts)	Service standard (with calibration test parts)
Nozzle part no.		(093400-0540)	(DN12SD12)
Nozzle holder part no.		(093100-0190)	(EF8511/9A)
Injection pipe (O/D x I/D x length)	mm	6 x 2 x 600	6 x 2 x 600
Test oil		ASTM D975 No. 2 diesel fuel or equivalent	
Oil temperature	°C	40 to 45	40 to 45
Nozzle opening pressure	kg/cm ²	175	175
Transfer pump pressure	kg/cm ²	1.6	1.6

Specifications

			Injection volume (cc/500st) for manufacturer standard				Injection volume (cc/500st) for service standard			
	Rack position (mm)	Pump speed (rpm)	Basis	Allowance		Maximum variance between cylinder	Basis	Allowance		Maximum variance between cylinder
	Calibration basic point	10.5 875	47.0	Each cyl. 45.5 to 48.5		max. 4.0	46.5	Each cyl. 45.0 to 48.0		max. 4.0
• Rack positions B to E are the reference volume when adjusting the injection volume.	B	11.8 550	65.8	★	64.3 to 67.3	max. 4.0	66.3	★	64.8 to 67.8	max. 4.0
• Marks ★ are average volumes.	C	9.9 300	19.0	★	18.0 to 20.0	max. 2.5	18.0	★	17.0 to 19.0	max. 2.5
	D			★				★		
	E			★				★		

Governor performance



Machine Model Canal Compactor	Engine Model	Injection Pump Type	Pump Manufacturer
D63E-1	6D125-1	NB (EP9)	NIPPON DENSO

Pump Assembly Number

6150-71-1470 (191000-3481) ... 2
6150-71-1471 (191000-3482)

Injection Timing

	Unit	Basis	Allowance
Rotating direction		Counterclockwise viewed from drive end	
Injection order		1 - 5 - 3 - 6 - 2 - 4	
Injection interval		60°	59°30' to 60°30'
Plunger pre-stroke	mm	4.7	
Delivery valve retraction volume	mm ³	90	

Specification for engine with fan (reference only)

Rated horsepower:	HP/rpm	140/1900
Maximum torque:	kgm/rpm	68/1300
High idling:	rpm	2050 to 2150
Low idling:	rpm	800 to 850

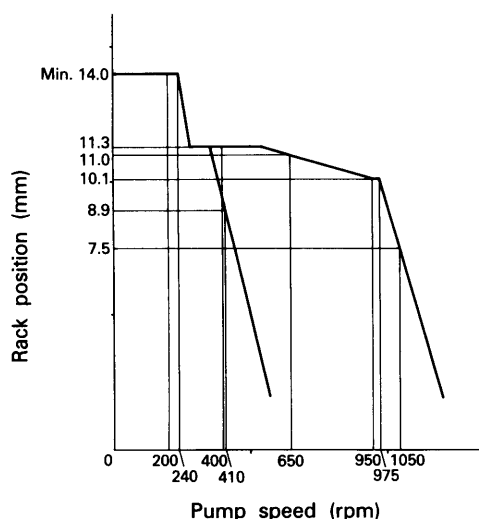
Calibration Standard

Conditions	Unit	Manufacturer standard (with nearly the same actual machine parts)	Service standard (with calibration test parts)
Nozzle part no.			093400-0540 (DN12SD12A)
Nozzle holder part no.			093100-0190 (EF8511/9A)
Injection pipe (O/D x I/D x length)	mm		6 x 2 x 600
Test oil		ASTM D975 No. 2 diesel fuel or equivalent	
Oil temperature	°C		40 to 45
Nozzle opening pressure	kg/cm ²		175
Transfer pump pressure	kg/cm ²		1.6

Specifications

				Injection volume (mm ³ /st) for manufacturer standard			Injection volume (mm ³ /st) for service standard		
	Rack position (mm)	Pump speed (rpm)		Basis	Allowance	Maximum variance between cylinder	Basis	Allowance	Maximum variance between cylinder
	Calibration basic point	10.1	950	82.5	Each cyl.		82.5	Each cyl. 79.5 to 85.5	max. 6.0
• Rack positions B to E are the reference volume when adjusting the injection volume.	B	11.0	650	103.0	★		103.0	★ 100.0 to 106.0	max. 8.0
	C	8.9	410	21.0	★		21.0	★ 19.0 to 23.0	max. 5.0
	D				★			★	
• Marks ★ are average volumes.	E				★			★	

Governor performance



Machine Model Jahari Compressor	Engine Model	Injection Pump Type	Pump Manufacturer
D63E-1	6D125-1	NB (EP9)	NIPPON DENSO

Pump Assembly Number

6150-71-1270 (191000-6420) ... 1

Injection Timing

	Unit	Basis	Allowance
Rotating direction		Counterclockwise viewed from drive end	
Injection order		1 - 5 - 3 - 6 - 2 - 4	
Injection interval		60°	59°30' to 60°30'
Plunger pre-stroke	mm	3.0	
Delivery valve retraction volume	mm ³	59	

Specification for engine with fan (reference only)

Rated horsepower:	HP/rpm	140/1900
Maximum torque:	kgm/rpm	68/1300
High idling:	rpm	2050 to 2150
Low idling:	rpm	800 to 850

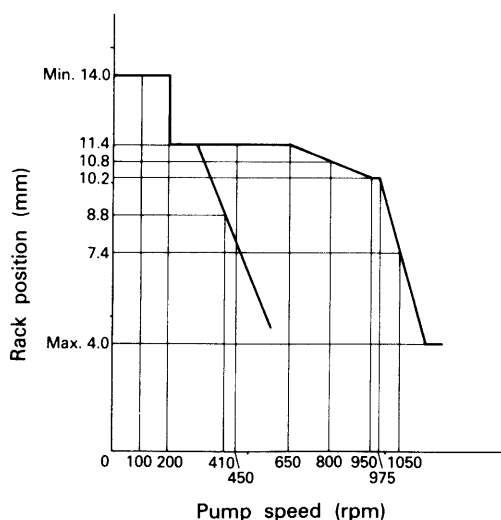
Calibration Standard

Conditions	Unit	Manufacturer standard (with nearly the same actual machine parts)	Service standard (with calibration test parts)
Nozzle part no.			093400-0540 (DN12SD12A)
Nozzle holder part no.			093100-0190 (EF8511/9A)
Injection pipe (O/D x I/D x length)	mm		6 x 2 x 600
Test oil		ASTM D975 No. 2 diesel fuel or equivalent	
Oil temperature	°C		40 to 45
Nozzle opening pressure	kg/cm ²		175
Transfer pump pressure	kg/cm ²		1.6

Specifications

			Injection volume (mm ³ /st) for manufacturer standard			Injection volume (mm ³ /st) for service standard		
	Rack position (mm)	Pump speed (rpm)	Basis	Allowance	Maximum variance between cylinder	Basis	Allowance	Maximum variance between cylinder
	Calibration basic point	10.2	950	73.0	Each cyl.	73.0	Each cyl. 70.0 to 76.0	max. 6.0
• Rack positions B to E are the reference volume when adjusting the injection volume.	B	11.4	650	103.0	★	103.0	★ 100.0 to 106.0	max. 8.0
	C	8.8	410	16.0	★	16.0	★ 14.0 to 16.0	max. 5.0
• Marks ★ are average volumes.	D			★		★		
	E			★		★		

Governor performance



Machine Model	Engine Model	Injection Pump Type	Pump Manufacturer
D63E-1	6D125-1	NB (EP9)	NIPPON DENSO

Pump Assembly Number

6150-71-1271 (191000-6421) ... 1

Injection Timing

	Unit	Basis	Allowance
Rotating direction		Counterclockwise viewed from drive end	
Injection order		1 – 5 – 3 – 6 – 2 – 4	
Injection interval		60°	59°30' to 60°30'
Plunger pre-stroke	mm	3.0	
Delivery valve retraction volume	mm ³	59	

Specification for engine with fan (reference only)

Rated horsepower:	HP/rpm	140/1900
Maximum torque:	kgm/rpm	68/1300
High idling:	rpm	2050 to 2150
Low idling:	rpm	800 to 850

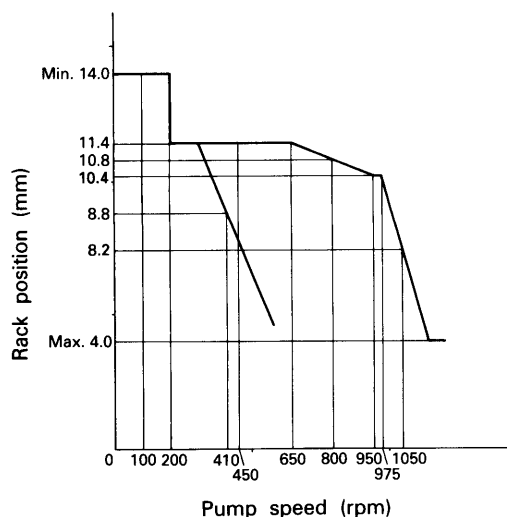
Calibration Standard

Conditions	Unit	Manufacturer standard (with nearly the same actual machine parts)	Service standard (with calibration test parts)
Nozzle part no.			093400-0540 (DN12SD12A)
Nozzle holder part no.			093100-0190 (EF8511/9A)
Injection pipe (O/D x I/D x length)	mm		6 x 2 x 600
Test oil		ASTM D975 No. 2 diesel fuel or equivalent	
Oil temperature	°C		40 to 45
Nozzle opening pressure	kg/cm ²		175
Transfer pump pressure	kg/cm ²		1.6

Specifications

Specifications				Injection volume (mm ³ /st) for manufacturer standard			Injection volume (mm ³ /st) for service standard			
		Rack position (mm)	Pump speed (rpm)	Basis	Allowance	Maximum variance between cylinder	Basis	Allowance	Maximum variance between cylinder	
		Calibration basic point	10.4	950	Each cyl.			77	Each cyl. 74 – 80	max. 6
• Rack positions B to E are the reference volume when adjusting the injection volume.	B	11.4	650		★		99	★ 96 – 102	max. 8	
	C	8.8	410		★		16	★ 14 – 18	max. 5	
	D				★			★		
	E				★			★		
• Marks ★ are average volumes.										

Governor performance



Jahan Compressor
Pump Assembly Number
 6150-71-1411 (190000-8882)
 6150-71-1412 (190000-8883)

(): Manufacturer's part No.

Injection Pump Type	Pump Manufacturer
PE-6NB	NIPPON DENSO

Applicable Machine		Applicable Engine	
Model	Serial No.	Model	Serial No.
D65A-8 (for France)		6D125-1	

Injection Timing

Rotating direction	Counterclockwise viewed from drive end
Injection order	1 - 5 - 3 - 6 - 2 - 4
Injection interval	60° (59°30' - 60°30')
Plunger pre-stroke (mm)	4.7
Delivery valve retraction volume (mm ³ /st)	90

Engine Specification

Rated horsepower (kW[HP] / rpm)	117.7 [157.8] / 1,750
Maximum torque (Nm[kgm] / rpm)	764.9 [78] / 1,100
High idling (rpm)	1,900 - 2,000
Low idling (rpm)	600 - 630

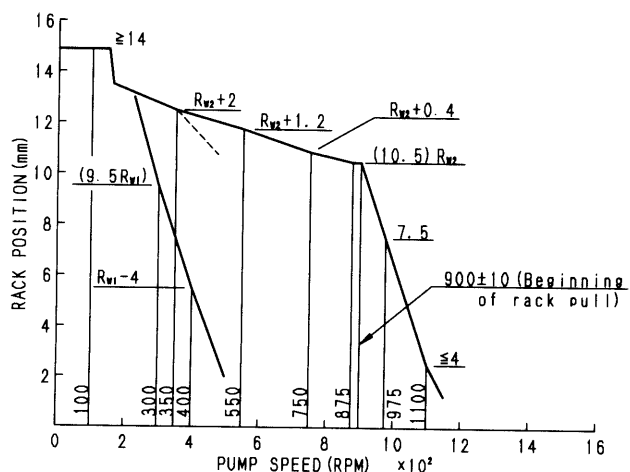
Pump tester capacity for Service standard	Motor 7.5 kW
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Calibration Standard

(): Pump manufacturer's part No.

Conditions				Service standard		Manufacturer standard	
● Service standard indicates data using calibration test parts. ● Manufacturer standard is data for factory test.	Nozzle part no.			(093400-0540)			
	Nozzle holder part no.			(093100-0190)			
	Injection pipe (O/D x I/D x length) mm			6 x 2 x 600			
	Test oil			ASTM D975 No.2 diesel fuel or equivalent			
	Oil temperature °C			40 to 45			
	Nozzle opening pressure (MPa[kg/cm ²])			17.16 [175]			
	Transfer pump pressure (kPa[kg/cm ²])			156.91 [1.6]			
Injection volume				Service standard		Manufacturer standard	
● Rack positions B to E are the reference volume when adjusting the injection volume.	Rack point	Rack position (mm)	Pump speed (rpm)	Injection volume (cc/1000 st)	Maximam variance between cylinder (%)	Injection volume (cc/1000 st)	Maximam variance between cylinder (%)
	A (Basic point)	10.5	875	85 – 91	9.1		
	B	11.8	550	117.5 – 123.5	6.6		
	C	9.5	300	19 – 23	23.8		
	D						
	E						

Governor performance



TKE00160

Pump Assembly Number

6150-71-1170 (191000-9780)

(): Manufacturer's part No.

Injection Pump Type	Pump Manufacturer
NB (EP-9)	NIPPON DENSO

Applicable Machine		Applicable Engine	
Model	Serial No.	Model	Serial No.
D65E-12		6D125-1	

Injection Timing

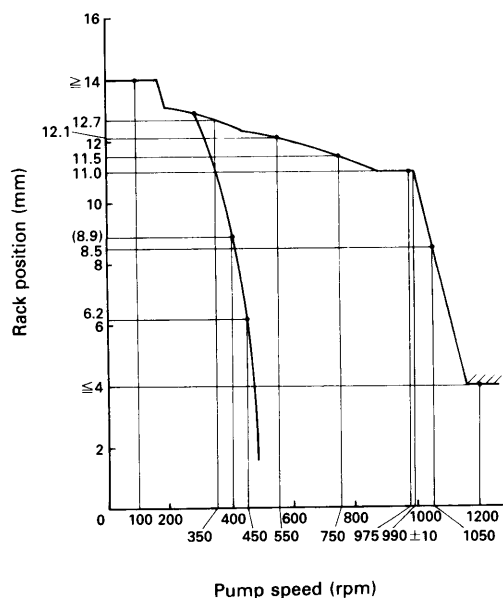
Rotating direction	Counterclockwise viewed from drive end
Injection order	1—5—3—6—2—4
Injection interval	60° ± 30'
Plunger pre-stroke mm	4.7 ± 0.05
Delivery valve retraction volume mm ³ /st	90

Engine specification

Rated horsepower	HP/rpm	180/1950
Maximum torque	kgm/rpm	81.5/1100
High idling	rpm	2050 to 2150
Low idling	rpm	800 to 825
Pump tester capacity for Service standard		Motor 7.5 KW

Calibration Standard

Conditions				Service standard			Manufacturer standard			
• Service standard indicates data using calibration test parts (Nozzle, Nozzle holder and injection pipe) • Manufacturer standard is data using factory test parts (For reference)	Nozzle part no.			(093400-0540) (ND-DN12SD12A)			(093400-0540) (ND-DN12SD12A)			
	Nozzle holder part no.			(093100-0190) (EF8511/9A)			(093100-0190) (EF8511/9A)			
	Injection pipe (O/D x I/D x length) mm			6 x 2 x 600			6 x 2 x 600			
	Test oil			ASTM D975 No. 2 diesel fuel or equivalent						
	Oil temperature °C			40 to 45						
	Nozzle opening pressure kg/cm²			175			175			
	Transfer pump pressure kg/cm²			1.6			1.6			
Injection volume	Rack point	Rack position (mm)	Pump speed (rpm)	Service standard (cc/ 500 st)			Manufacturer standard (cc/ 500 st)			
				Basis	Allowance		Maximum variance between cylinder	Basis	Allowance	
	Basic point	11.0	975	48.5	Each cyl. 47.0 to 50.0		Max. 4	48.5	Each cyl.	
	B	(8.9)	400	6.5	★	5.5 to 7.5	Max. 2.5	6.5	★	
	C				★				★	
	D				★				★	
	E				★				★	
• Rack positions B to E are the reference volume when adjusting the injection volume. • Marks ★ are average volumes.										

Governor performance (400 – 975 rpm)

SEBH

Machine Model Jahon Compressor	Engine Model	Injection Pump Type	Pump Manufacturer
D68E-1 D68P-1	6D125-1	NB (EP9)	NIPPON DENSO

Pump Assembly Number

6150-71-1490 (191000-4061) ... 2
6150-71-1491 (191000-4062)

Injection Timing

	Unit	Basis	Allowance
Rotating direction		Counterclockwise viewed from drive end	
Injection order		1 - 5 - 3 - 6 - 2 - 4	
Injection interval		60°	59°30' to 60°30'
Plunger pre-stroke	mm	4.7	
Delivery valve retraction volume	mm ³	90	

Specification for engine with fan (reference only)

Rated horsepower:	HP/rpm	180/1850
Maximum torque:	kgm/rpm	81.5/1100
High idling:	rpm	2050 to 2150
Low idling:	rpm	600 to 630

Calibration Standard

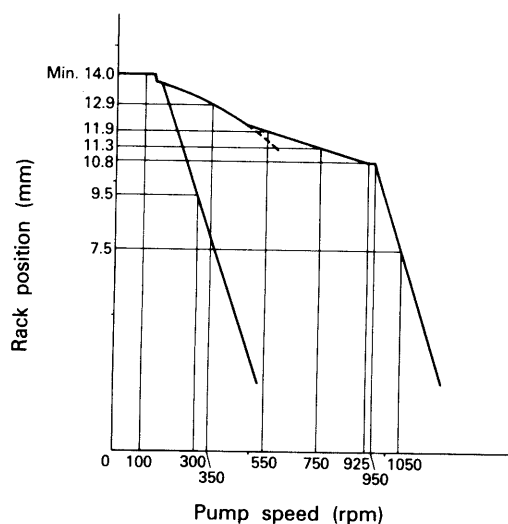
Conditions	Unit	Manufacturer standard (with nearly the same actual machine parts)	Service standard (with calibration test parts)
Nozzle part no.			093400-0540 (DN12SD12A)
Nozzle holder part no.			093100-0190 (EF8511/9A)
Injection pipe (O/D x I/D x length)	mm		6 x 2 x 600
Test oil		ASTM D975 No. 2 diesel fuel or equivalent	
Oil temperature	°C		40 to 45
Nozzle opening pressure	kg/cm ²		175
Transfer pump pressure	kg/cm ²		1.6

Specifications

Specifications

			Injection volume (mm ³ /st) for manufacturer standard			Injection volume (mm ³ /st) for service standard		
	Rack position (mm)	Pump speed (rpm)	Basis	Allowance	Maximum variance between cylinder	Basis	Allowance	Maximum variance between cylinder
	Calibration basic point	10.8	925	99.0	Each cyl.	99.0	Each cyl. 96.0 to 102.0	max. 8.0
• Rack positions B to E are the reference volume when adjusting the injection volume.	B	11.9	550	126.0	★	126.0	★ 123.0 to 129.0	max. 8.0
	C	9.5	300	21.0	★	21.0	★ 19.0 to 23.0	max. 5.0
	D				★		★	
	E				★		★	
• Marks ★ are average volumes.								

Governor performance



(): Manufacturer's part No.

Injection Pump Type	Pump Manufacturer
PE-6NB	NIPPON DENSO

Applicable Machine		Applicable Engine	
Model	Serial No.	Model	Serial No.
PC300-3C		6D125-1	

Injection Timing

Rotating direction	Counterclockwise viewed from drive end
Injection order	1 - 5 - 3 - 6 - 2 - 4
Injection interval	60° (59°30' - 60°30')
Plunger pre-stroke (mm)	4.7
Delivery valve retraction volume (mm ³ /st)	90

Engine Specification

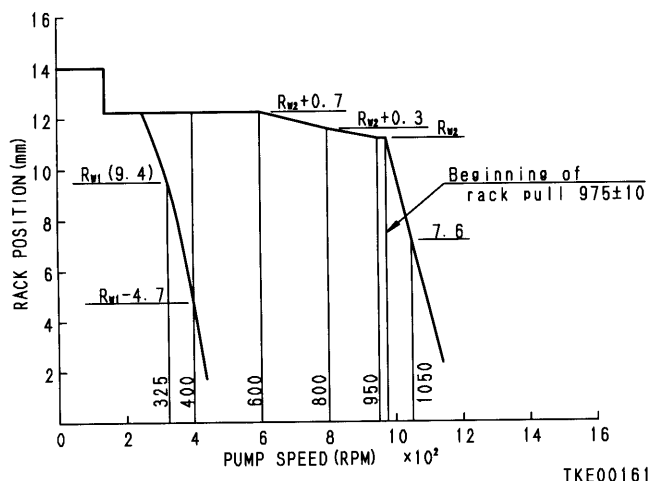
Rated horsepower (kW[HP] / rpm)	136.1 [182.4] / 1,900
Maximum torque (Nm[kgm] / rpm)	804.1 [82] / 1,200
High idling (rpm)	2,050 - 2,150
Low idling (rpm)	600 - 700
Pump tester capacity for Service standard	Motor 7.5 kW

(): Pump manufacturer's part No.

Calibration Standard

Calibration standard				Service standard		Manufacturer standard	
Conditions ● Service standard indicates data using calibration test parts. ● Manufacturer standard is data for factory test.	Nozzle part no.			(093400-0540)			
	Nozzle holder part no.			(093100-0190)			
	Injection pipe (O/D x I/D x length) mm			6 x 2 x 600			
	Test oil			ASTM D975 No.2 diesel fuel or equivalent			
	Oil temperature °C			40 to 45			
	Nozzle opening pressure (MPa[kg/cm ²])			17.16 [175]			
	Transfer pump pressure (kPa[kg/cm ²])			156.91 [1.6]			
Injection volume ● Rack positions B to E are the reference volume when adjusting the injection volume.	Rack point	Rack position (mm)	Pump speed (rpm)	Service standard		Manufacturer standard	
				Injection volume (cc/1000 st)	Maximam variance between cylinder (%)	Injection volume (cc/1000 st)	Maximam variance between cylinder (%)
	A (Basic point)	11.3	950	108 – 114	7.2		
	B	12	600	129.5 – 135.5	6.0		
	C	9.4	325	19 – 23	23.8		
	D						
	E						

Governor performance



Machine Model Jahan Compressor	Engine Model	Injection Pump Type	Pump Manufacturer
GD613A-1 GD622A-1 GD623A-1	6D125-1	NB (EP9)	NIPPON DENSO

Pump Assembly Number

6150-71-1550 (191000-2071) ... 3
6150-71-1551 (191000-2702)

Injection Timing

	Unit	Basis	Allowance
Rotating direction		Counterclockwise viewed from drive end	
Injection order		1 - 5 - 3 - 6 - 2 - 4	
Injection interval		60°	59°30' to 60°30'
Plunger pre-stroke	mm	4.7	
Delivery valve retraction volume	mm ³	90	

Specification for engine with fan (reference only)

Rated horsepower:	HP/rpm	155/2200
Maximum torque:	kgm/rpm	67/1350
High idling:	rpm	2350 to 2450
Low idling:	rpm	650 to 700

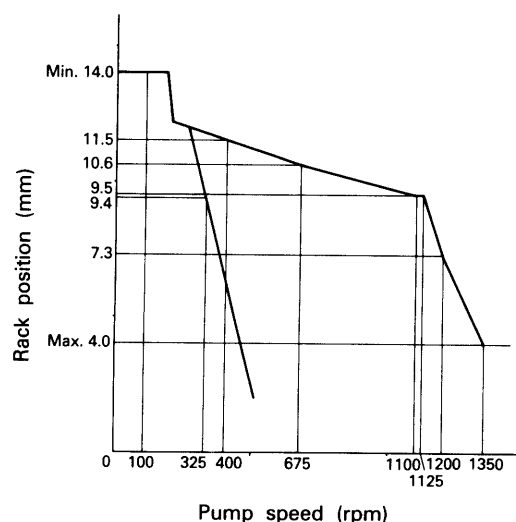
Calibration Standard

Conditions	Unit	Manufacturer standard (with nearly the same actual machine parts)	Service standard (with calibration test parts)
Nozzle part no.			093400-0540 (ND-DN12SD12A)
Nozzle holder part no.			093100-0190 (EF8511/9A)
Injection pipe (O/D x I/D x length)	mm		6 x 2 x 600
Test oil		ASTM D975 No. 2 diesel fuel or equivalent	
Oil temperature	°C		40 to 45
Nozzle opening pressure	kg/cm ²		175
Transfer pump pressure	kg/cm ²		1.6

Specifications

			Injection volume (mm ³ /st) for manufacturer standard			Injection volume (mm ³ /st) for service standard		
	Rack position (mm)	Pump speed (rpm)	Basis	Allowance	Maximum variance between cylinder	Basis	Allowance	Maximum variance between cylinder
	Calibration basic point	9.5	1100	78.0	Each cyl.	78.0	Each cyl. 75.0 to 81.0	max. 8.0
- Rack positions B to E are the reference volume when adjusting the injection volume. - Marks ★ are average volumes.	B	10.6	675	90.0	★	90.0	★ 87.0 to 93.0	max. 8.0
	C	9.4	325	21.0	★	21.0	★ 19.0 to 23.0	max. 5.0
	D			★			★	
	E			★			★	

Governor performance



Machine Model	Engine Model	Injection Pump Type	Pump Manufacturer
GD613A-1 GD622A-1 GD623A-1	6D125-1	NB (EP9)	NIPPON DENSO

Pump Assembly Number

6150-71-2720 (191000-5510) ... 0
6150-71-2721 (191000-5511)

Injection Timing

	Unit	Basis	Allowance
Rotating direction		Counterclockwise viewed from drive end	
Injection order		1 - 5 - 3 - 6 - 2 - 4	
Injection interval		60°	59°30' to 60°30'
Plunger pre-stroke	mm	3.0	
Delivery valve retraction volume	mm ³	59	

Specification for engine with fan (reference only)

Rated horsepower:	HP/rpm	
Maximum torque:	kgm/rpm	
High idling:	rpm	2350 to 2450
Low idling:	rpm	650 to 700

Calibration Standard

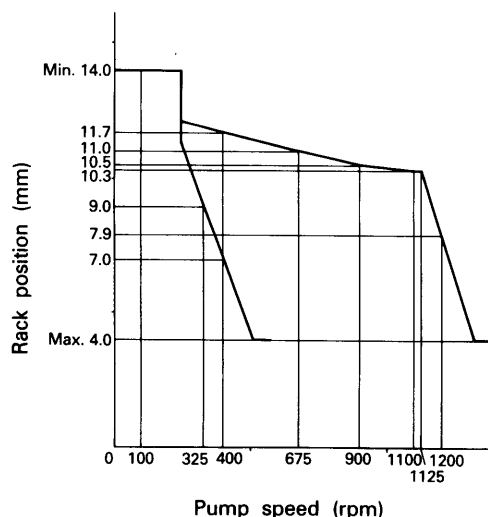
Conditions	Unit	Manufacturer standard (with nearly the same actual machine parts)	Service standard (with calibration test parts)
Nozzle part no.			093400-0540 (DN12SD12A)
Nozzle holder part no.			093100-0190 (EF8511/9A)
Injection pipe (O/D x I/D x length)	mm		6 x 2 x 600
Test oil		ASTM D975 No. 2 diesel fuel or equivalent	
Oil temperature	°C		40 to 45
Nozzle opening pressure	kg/cm ²		175
Transfer pump pressure	kg/cm ²		1.6

Specifications

Specifications

				Injection volume (mm ³ /st) for manufacturer standard			Injection volume (mm ³ /st) for service standard		
				Basis	Allowance	Maximum variance between cylinder	Basis	Allowance	Maximum variance between cylinder
				Calibration basic point	10.3	1100	82.0	Each cyl. 79.0 to 85.0	max. 6.0
• Rack positions B to E are the reference volume when adjusting the injection volume.	B	11.0	675	91.0	★		91.0	★ 88.0 to 94.0	max. 8.0
	C	9.0	325	17.0	★		17.0	★ 15.0 to 19.0	max. 5.0
	D				★			★	
• Marks ★ are average volumes.	E				★			★	

Governor performance



Machine Model Injection Compressor	Engine Model	Injection Pump Type	Pump Manufacturer
GD600R-3 GD605R-3	6D125-1	PE-6NB	NIPPON DENSO

Pump Assembly Number

6150-71-1511 (190000-9110)....
6150-71-1581 ()....

Injection Timing

	Unit	Basis	Allowance
Rotating direction		Counterclockwise viewed from drive end	
Injection order		1 - 5 - 3 - 6 - 2 - 4	
Injection interval		60°	59°30' to 60°30'
Plunger pre-stroke	mm	4.7	
Delivery valve retraction volume	mm ³	90	

Specification for engine with fan (reference only)

Rated horsepower:	HP/rpm	146/1800
Maximum torque:	kgm/rpm	74/1100
High idling:	rpm	2000 to 2100
Low idling:	rpm	650 to 700

Calibration Standard

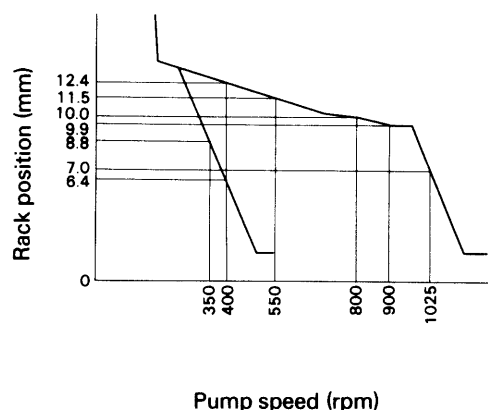
Conditions	Unit	Manufacturer standard (with nearly the same actual machine parts)	Service standard (with calibration test parts)
Nozzle part no.		(093400-0540)	(DN12SD12)
Nozzle holder part no.		(093100-0190)	(EF8511/9A)
Injection pipe (O/D x I/D x length)	mm	6 x 2 x 600	6 x 2 x 600
Test oil		ASTM D975 No. 2 diesel fuel or equivalent	
Oil temperature	°C	40 to 45	40 to 45
Nozzle opening pressure	kg/cm ²	175	175
Transfer pump pressure	kg/cm ²	1.6	1.6

Specifications

Specifications

			Injection volume (cc/500st) for manufacturer standard				Injection volume(cc/500st) for service standard							
			Basis	Allowance			Maximum variance between cylinder	Basis	Allowance			Maximum variance between cylinder		
Calibration basic point			9.9	900	40.0	Each cyl. 38.5 to 41.5			max. 4.0	39.75	Each cyl. 38.25 to 41.25			max. 4.0
• Rack positions B to E are the refer- ence volume when adjusting the injection volume.	B	11.5	550	64.25	★	62.75 to 65.75	max. 4.0		64.25	★	62.75 to 65.75	max. 4.0		
	C	8.8	350	7.25	★	6.25 to 8.25	max. 2.5		6.75	★	5.75 to 7.75	max. 2.5		
• Marks ★ are aver- age volumes.	D				★					★				
	E				★					★				

Governor performance



Pump Assembly Number

6150-71-1513 (190000-9113)

6150-71-1514 (190000-9114)

(): Manufacturer's part No.

Injection Pump Type	Pump Manufacturer
PE-6NB	NIPPON DENSO

Applicable Machine		Applicable Engine	
Model	Serial No.	Model	Serial No.
GD600R-3		6D125-1	
GD605R-3		6D125-1	

Injection Timing

Rotating direction	Counterclockwise viewed from drive end
Injection order	1 - 5 - 3 - 6 - 2 - 4
Injection interval	60° (59°30' - 60°30')
Plunger pre-stroke (mm)	4.7
Delivery valve retraction volume (mm ³ /st)	90

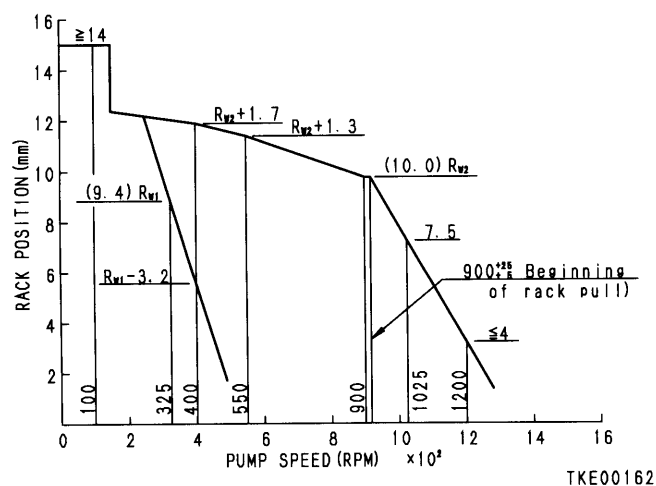
Engine Specification

Rated horsepower (kW[HP] / rpm)	110.3 [147.9] / 1,800
Maximum torque (Nm[kgm] / rpm)	725.7 [74] / 1,100
High idling (rpm)	2,000 - 2,100
Low idling (rpm)	650 - 700
Pump tester capacity for Service standard	Motor 7.5 kW

Calibration Standard

(): Pump manufacturer's part No.

Conditions				Service standard		Manufacturer standard	
• Service standard indicates data using calibration test parts. • Manufacturer standard is data for factory test.	Nozzle part no.			(093400-0540)			
	Nozzle holder part no.			(093100-0190)			
	Injection pipe (O/D x I/D x length) mm			6 x 2 x 600			
	Test oil			ASTM D975 No.2 diesel fuel or equivalent			
	Oil temperature °C			40 to 45			
	Nozzle opening pressure (MPa[kg/cm ²])			17.16 [175]			
	Transfer pump pressure (kPa[kg/cm ²])			156.91 [1.6]			
Injection volume	Rack point	Rack position (mm)	Pump speed (rpm)	Service standard		Manufacturer standard	
				Injection volume (cc/1000 st)	Maximum variance between cylinder (%)	Injection volume (cc/1000 st)	Maximum variance between cylinder (%)
	A (Basic point)	10.0	900	77 - 83	10		
	B	11.3	550	110 - 116	7.0		
	C	9.4	325	19 - 23	23.8		
	D						
	E						

Governor performance

Machine Model	Injection Pump Type	Pump Manufacturer
GD605A-3	PE-6NB	NIPPON DENSO

Pump Assembly Number

6150-71-1581 (190000-9140)...1

Injection Timing

Unit	Basis	Allowance
Rotating direction	Counterclockwise viewed from drive end	
Injection order	1-5-3-6-2-4	
Injection interval	60°	59°30' to 60°30'
Plunger pre-stroke	mm	4.7
Delivery valve retraction volume	mm ³	90

Specification for engine with fan (reference only)

Rated horsepower: HP/rpm	146/1800
Maximum torque: kgm/rpm	74/1100
High idling: rpm	2000 to 2100
Low idling: rpm	650 to 700

Calibration Standard

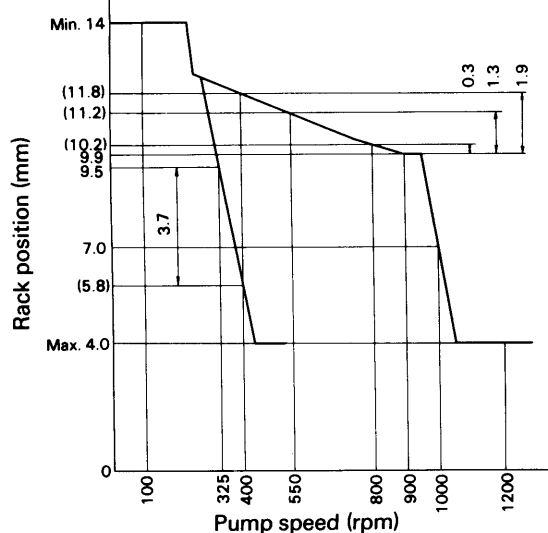
Conditions	Unit	Manufacturer standard (with nearly the same actual machine parts)	Service standard (with calibration test parts)
Nozzle part no.		(093400-0540)	(DN12SD12)
Nozzle holder part no.		(093100-0190)	(EF8511/9A)
Injection pipe (O/D x I/D x length)	mm	6 x 2 x 600	6 x 2 x 600
Test oil		ASTM D975 No. 2 diesel fuel or equivalent	
Oil temperature	°C	40 to 45	40 to 45
Nozzle opening pressure	kg/cm ²	175	175
Transfer pump pressure	kg/cm ²	1.6	1.6

Specifications

Specifications

		Injection volume (cc/500st) for manufacturer standard							Injection volume(cc/500st) for service standard						
		Rack position (mm)	Pump speed (rpm)	Basis	Allowance			Maximum variance between cylinder	Basis	Allowance			Maximum variance between cylinder		
		Calibration basic point	9.9	900	40.0	Each cyl. 38.5 to 41.5			max. 4.0	38.8	Each cyl. 37.3 to 40.3			max. 4.0	
• Rack positions B to E are the refer- ence volume when adjusting the injec- tion volume.	B	11.2	550	56.8	★	55.3	to 58.3	max. 4.0	56.0	★	54.5	to 57.5	max. 4.0		
	C	9.5	325	12.8	★	11.8	to 13.8	max. 2.5	11.3	★	10.3	to 12.3	max. 2.5		
• Marks ★ are aver- age volumes.	D				★					★					
	E				★					★					

Governor performance



Pump Assembly Number
 6150-71-1583 (190000-9143)
 6150-71-1584 (190000-9144)

(): Manufacturer's part No.

Injection Pump Type	Pump Manufacturer
PE-6NB	NIPPON DENSO

Applicable Machine		Applicable Engine	
Model	Serial No.	Model	Serial No.
GD605A-3		6D125-1	

Injection Timing

Rotating direction	Counterclockwise viewed from drive end
Injection order	1 - 5 - 3 - 6 - 2 - 4
Injection interval	60° (59°30' - 60°30')
Plunger pre-stroke (mm)	4.7
Delivery valve retraction volume (mm ³ /st)	90

Engine Specification

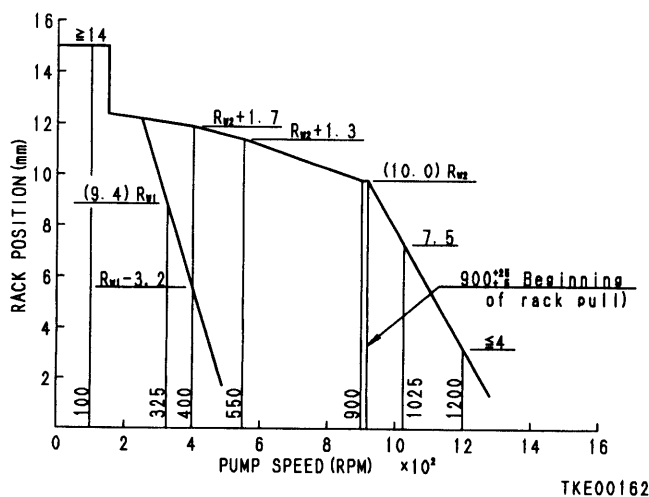
Rated horsepower (kW[HP] / rpm)	110.3 [147.9] / 1,800
Maximum torque (Nm[kgm] / rpm)	729.6 [74.4] / 1,100
High idling (rpm)	2,000 - 2,100
Low idling (rpm)	650 - 700
Pump tester capacity for Service standard	Motor 7.5 kW

Calibration Standard

(): Pump manufacturer's part No.

Conditions				Service standard		Manufacturer standard	
• Service standard indicates data using calibration test parts. • Manufacturer standard is data for factory test.	Nozzle part no.			(093400-0540)			
	Nozzle holder part no.			(093100-0190)			
	Injection pipe (O/D x I/D x length) mm			6 x 2 x 600			
	Test oil			ASTM D975 No.2 diesel fuel or equivalent			
	Oil temperature °C			40 to 45			
	Nozzle opening pressure (MPa[kg/cm ²])			17.16 [175]			
Transfer pump pressure (kPa[kg/cm ²])				156.91 [1.6]			
Injection volume	Rack point	Rack position (mm)	Pump speed (rpm)	Service standard		Manufacturer standard	
				Injection volume (cc/1000 st)	Maximum variance between cylinder (%)	Injection volume (cc/1000 st)	Maximum variance between cylinder (%)
	A (Basic point)	10.0	900	77 - 83	10		
	B	11.3	550	110 - 116	7.1		
	C	9.4	325	19 - 23	23.8		
	D						
	E						

Governor performance



Machining Model Injection Compressor	Engine Model	Injection Pump Type	Pump Manufacturer
GD625A-1	6D125-1	PE-6NB	NIPPON DENSO

Pump Assembly Number

6150-71-1570 (191000-2721) ... 3

Injection Timing

	Unit	Basis	Allowance
Rotating direction		Counterclockwise viewed from drive end	
Injection order		1 - 5 - 3 - 6 - 2 - 4	
Injection interval		60°	59°30' to 60°30'
Plunger pre-stroke	mm	4.7	
Delivery valve retraction volume	mm ³	90	

Specification for engine with fan (reference only)

Rated horsepower:	HP/rpm	155/2200
Maximum torque:	kgm/rpm	67/1350
High idling:	rpm	2350 to 2450
Low idling:	rpm	650 to 700

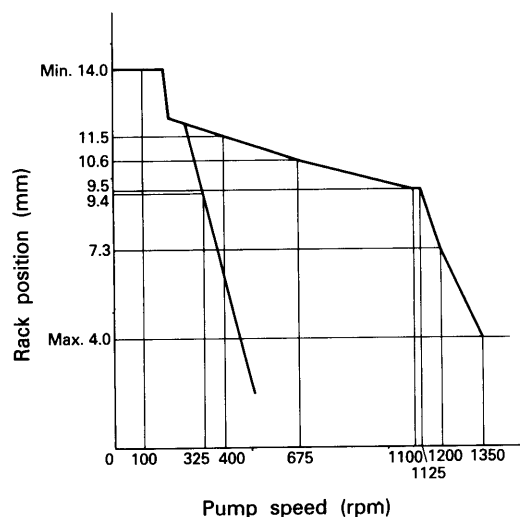
Calibration Standard

Conditions	Unit	Manufacturer standard (with nearly the same actual machine parts)	Service standard (with calibration test parts)
Nozzle part no.			093400-0540 (DN12SD12A)
Nozzle holder part no.			093100-0190 (EF8511/9A)
Injection pipe (O/D x I/D x length)	mm		6 x 2 x 600
Test oil		ASTM D975 No. 2 diesel fuel or equivalent	
Oil temperature	°C		40 to 45
Nozzle opening pressure	kg/cm ²		175
Transfer pump pressure	kg/cm ²		1.6

Specifications

			Injection volume (mm ³ /st) for manufacturer standard			Injection volume (mm ³ /st) for service standard		
	Rack position (mm)	Pump speed (rpm)	Basis	Allowance	Maximum variance between cylinder	Basis	Allowance	Maximum variance between cylinder
Calibration basic point	9.5	1100	78.0	Each cyl.		78.0	Each cyl. 75.0 to 81.0	max. 8.0
• Rack positions B to E are the reference volume when adjusting the injection volume.	B 10.6	675	90.0	★		90.0	★ 87.0 to 93.0	max. 8.0
	C 9.4	325	21.0	★		21.0	★ 19.0 to 23.0	max. 5.0
	D			★			★	
• Marks ★ are average volumes.	E			★			★	

Governor performance



Machine Model	Engine Model	Injection Pump Type	Pump Manufacturer
Jahon Compressor GD625A-1	6D125-1	NB (EP9)	NIPPON DENSO

Pump Assembly Number

6150-71-1571 (191000-2722)

Injection Timing

	Unit	Basis	Allowance
Rotating direction		Counterclockwise viewed from drive end	
Injection order		1 - 5 - 3 - 6 - 2 - 4	
Injection interval		60°	59°30' to 60°30'
Plunger pre-stroke	mm	4.7	
Delivery valve retraction volume	mm ³	90	

Specification for engine with fan (reference only)

Rated horsepower:	HP/rpm	155/2200
Maximum torque:	kgm/rpm	67/1350
High idling:	rpm	2350 to 2450
Low idling:	rpm	650 to 700

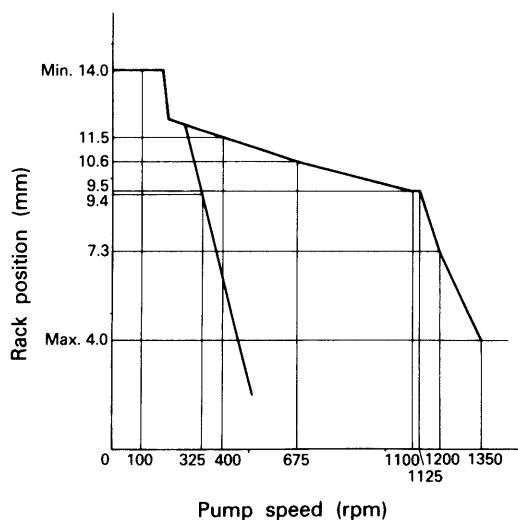
Calibration Standard

Conditions	Unit	Manufacturer standard (with nearly the same actual machine parts)	Service standard (with calibration test parts)
Nozzle part no.			093400-0540 (ND-DN12SD12A)
Nozzle holder part no.			093100-0190 (EF8511/9A)
Injection pipe (O/D x I/D x length)	mm		6 x 2 x 600
Test oil		ASTM D975 No. 2 diesel fuel or equivalent	
Oil temperature	°C		40 to 45
Nozzle opening pressure	kg/cm ²		175
Transfer pump pressure	kg/cm ²		1.6

Specifications

			Injection volume (mm ³ /st) for manufacturer standard			Injection volume (mm ³ /st) for service standard		
	Rack position (mm)	Pump speed (rpm)	Basis	Allowance	Maximum variance between cylinder	Basis	Allowance	Maximum variance between cylinder
Calibration basic point	9.5	1100	78.0	Each cyl.		78.0	Each cyl. 75.0 to 81.0	max. 8.0
- Rack positions B to E are the reference volume when adjusting the injection volume. - Marks ★ are average volumes.	B	10.6	675	90.0	★	90.0	★ 87.0 to 93.0	max. 8.0
	C	9.4	325	21.0	★	21.0	★ 19.0 to 23.0	max. 5.0
	D				★		★	
	E				★		★	

Governor performance



Machine Model	Engine Model	Injection Pump Type	Pump Manufacturer
GD625A-1C	6D125-1	PE-6NB	NIPPON DENSO

Pump Assembly Number

6150-71-2710 (191000-5420) ... 1
6150-71-2711 (191000-5421)

Injection Timing

	Unit	Basis	Allowance
Rotating direction		Counterclockwise viewed from drive end	
Injection order		1 — 5 — 3 — 6 — 2 — 4	
Injection interval		60°	59°30' to 60°30'
Plunger pre-stroke	mm	3.0	
Delivery valve retraction volume	mm ³	59	

Specification for engine with fan (reference only)

Rated horsepower: HP/rpm		
Maximum torque: kgm/rpm		
High idling:	rpm	2350 to 2450
Low idling:	rpm	650 to 700

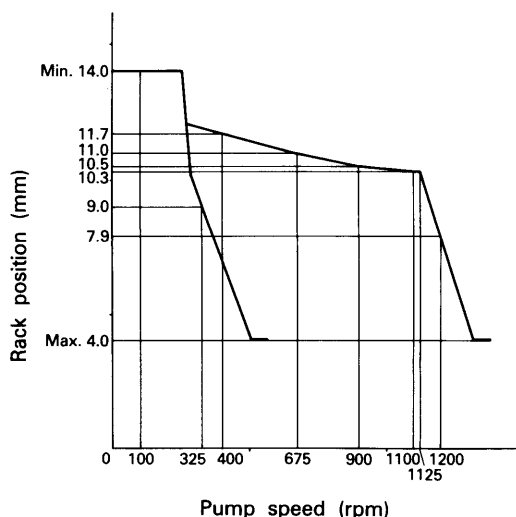
Calibration Standard

Conditions	Unit	Manufacturer standard (with nearly the same actual machine parts)	Service standard (with calibration test parts)
Nozzle part no.			093400-0540 (DN12SD12A)
Nozzle holder part no.			093100-0190 (EF8511/9A)
Injection pipe (O/D x I/D x length)	mm		6 x 2 x 600
Test oil		ASTM D975 No. 2 diesel fuel or equivalent	
Oil temperature	°C		40 to 45
Nozzle opening pressure	kg/cm ²		175
Transfer pump pressure	kg/cm ²		1.6

Specifications

Specifications				Injection volume (mm ³ /st) for manufacturer standard			Injection volume (mm ³ /st) for service standard		
		Rack position (mm)	Pump speed (rpm)	Basis	Allowance	Maximum variance between cylinder	Basis	Allowance	Maximum variance between cylinder
	Calibration basic point	10.3	1100	82.0	Each cyl.		82.0	Each cyl. 79.0 to 85.0	max. 6.0
• Rack positions B to E are the reference volume when adjusting the injection volume. • Marks ★ are average volumes.	B	11.0	675	91.0	★		91.0	★ 88.0 to 94.0	max. 8.0
	C	8.7	325	17.0	★		17.0	★ 15.0 to 19.0	max. 5.0
	D				★			★	
	E				★			★	

Governor performance



12-014-4

Numbers in parentheses are pump manufacturer part numbers.

6D125 SERIES

Machine Model Injection Compressor	Engine Model	Injection Pump Type	Pump Manufacturer
GD663A-1	6D125-1	NB (EP9)	NIPPON DENSO

Pump Assembly Number

6150-71-1560 (191000-2711) ... 2
6150-71-1561 (191000-2712)
6150-71-1660 (191000-3970)
6150-71-1661 (191000-3971)

Injection Timing

	Unit	Basis	Allowance
Rotating direction		Counterclockwise viewed from drive end	
Injection order		1 - 5 - 3 - 6 - 2 - 4	
Injection interval		60°	59°30' to 60°30'
Plunger pre-stroke	mm	4.7	
Delivery valve retraction volume	mm ³	90	

Specification for engine with fan (reference only)

Rated horsepower:	HP/rpm	180/2200
Maximum torque:	kgm/rpm	67/1350
High idling:	rpm	2350 to 2450
Low idling:	rpm	650 to 700

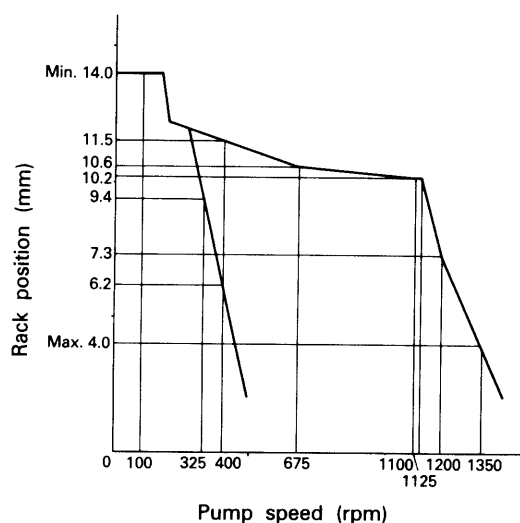
Calibration Standard

Conditions	Unit	Manufacturer standard (with nearly the same actual machine parts)	Service standard (with calibration test parts)
Nozzle part no.			093400-0540 (DN12SD12A)
Nozzle holder part no.			093100-0190 (EF8511/9A)
Injection pipe (O/D x I/D x length)	mm		6 x 2 x 600
Test oil		ASTM D975 No. 2 diesel fuel or equivalent	
Oil temperature	°C		40 to 45
Nozzle opening pressure	kg/cm ²		175
Transfer pump pressure	kg/cm ²		1.6

Specifications

			Injection volume (mm ³ /st) for manufacturer standard			Injection volume (mm ³ /st) for service standard		
	Rack position (mm)	Pump speed (rpm)	Basis	Allowance	Maximum variance between cylinder	Basis	Allowance	Maximum variance between cylinder
	Calibration basic point	10.2	1100	90.0	Each cyl.	90.0	Each cyl. 87.0 to 93.0	max. 8.0
- Rack positions B to E are the reference volume when adjusting the injection volume. - Marks ★ are average volumes.	B	10.6	675	90.0	★	90.0	★ 87.0 to 93.0	max. 8.0
	C	9.4	325	21.0	★	21.0	★ 19.0 to 23.0	max. 5.0
	D				★		★	
	E				★		★	

Governor performance



Machine Model Injection Compressor	Engine Model	Injection Pump Type	Pump Manufacturer
GD650R-3 GD655A-3 GD655R-3	6D125-1	PE-6NB	NIPPON DENSO

Pump Assembly Number

6150-71-1521 (190000-9120)...0
6150-71-1590 (190000-9160)...0

Injection Timing

	Unit	Basis	Allowance
Rotating direction		Counterclockwise viewed from drive end	
Injection order		1 - 5 - 3 - 6 - 2 - 4	
Injection interval		60°	59°30' to 60°30'
Plunger pre-stroke	mm	4.7	
Delivery valve retraction volume	mm ³	90	

Specification for engine with fan (reference only)

Rated horsepower:	HP/rpm	165/1800
Maximum torque:	kgm/rpm	78.3/1100
High idling:	rpm	2000 to 2100
Low idling:	rpm	650 to 700

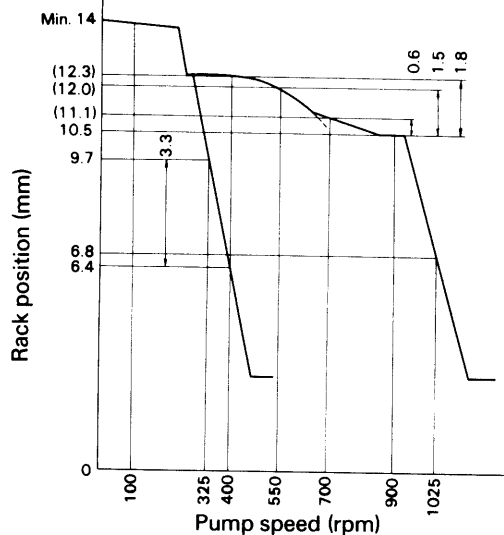
Calibration Standard

Conditions	Unit	Manufacturer standard (with nearly the same actual machine parts)	Service standard (with calibration test parts)
Nozzle part no.		(093400-0540)	(DN12SD12)
Nozzle holder part no.		(093100-0190)	(EF8511/9A)
Injection pipe (O/D x I/D x length)	mm	6 x 2 x 600	6 x 2 x 600
Test oil		ASTM D975 No. 2 diesel fuel or equivalent	
Oil temperature	°C	40 to 45	40 to 45
Nozzle opening pressure	kg/cm ²	175	175
Transfer pump pressure	kg/cm ²	1.6	1.6

Specifications

				Injection volume (cc/500st) for manufacturer standard			Injection volume (cc/500st) for service standard				
				Basis	Allowance		Maximum variance between cylinder	Basis	Allowance		Maximum variance between cylinder
Calibration basic point				10.5	900	45.75	Each cyl. 44.25 to 47.25	max. 4.0	45.0	Each cyl. 43.5 to 46.5	max. 4.0
• Rack positions B to E are the refer- ence volume when adjusting the injec- tion volume.	B	11.8	550	66.0	★ 64.5	to 67.5	max. 4.0	66.0	★ 64.5	to 67.5	max. 4.0
	C	9.7	325	16.0	★ 15.0	to 17.0	max. 2.5	17.5	★ 16.5	to 18.5	max. 2.5
• Marks ★ are aver- age volumes.	D				★				★		
	E				★				★		

Governor performance



Pump Assembly Number

6150-71-1522 (190000-9122)

6150-71-1523 (190000-9123)

6150-71-1592 (190000-9163)

6150-71-1593 (190000-9164)

(): Manufacturer's part No.

Injection Pump Type	Pump Manufacturer
PE-6NB	NIPPON DENSO

Applicable Machine		Applicable Engine	
Model	Serial No.	Model	Serial No.
GD650R-3		6D125-1	
GD655A-3			
GD655R-3			

Injection Timing

Rotating direction	Counterclockwise viewed from drive end
Injection order	1 - 5 - 3 - 6 - 2 - 4
Injection interval	60° (59°30' - 60°30')
Plunger pre-stroke (mm)	4.7
Delivery valve retraction volume (mm ³ /st)	90

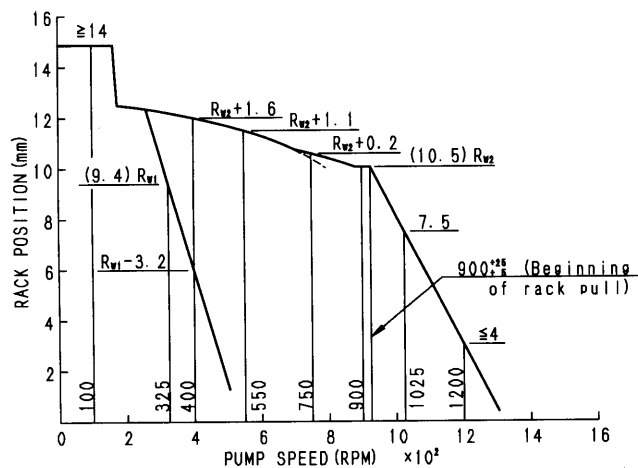
Engine Specification

Rated horsepower (kW[HP] / rpm)	125 [167.6] / 1,800
Maximum torque (Nm[kgm] / rpm)	767.8 [78.3] / 1,100
High idling (rpm)	2,000 - 2,100
Low idling (rpm)	650 - 700
Pump tester capacity for Service standard	Motor 7.5 kW

Calibration Standard

(): Pump manufacturer's part No.

Calibration standard							
Conditions			Service standard		Manufacturer standard		
● Service standard indicates data using calibration test parts. ● Manufacturer standard is data for factory test.	Nozzle part no.			(093400-0540)			
	Nozzle holder part no.			(093100-0190)			
	Injection pipe (O/D x I/D x length) mm			6 x 2 x 600			
	Test oil			ASTM D975 No.2 diesel fuel or equivalent			
	Oil temperature °C			40 to 45			
	Nozzle opening pressure (MPa[kg/cm ²])			17.16 [175]			
	Transfer pump pressure (kPa[kg/cm ²])			156.91 [1.6]			
Injection volume ● Rack positions B to E are the reference volume when adjusting the injection volume.	Rack point	Rack position (mm)	Pump speed (rpm)	Service standard		Manufacturer standard	
				Injection volume (cc/1000 st)	Maximum variance between cylinder (%)	Injection volume (cc/1000 st)	Maximum variance between cylinder (%)
	A (Basic point)	10.5	900	86 – 92	9.0		
	B	11.6	550	115 – 121	6.8		
	C	9.4	325	19 – 23	23.8		
	D						
	E						

Governor performance

TKE00164

Machine Model	Engine Model	Injection Pump Type	Pump Manufacturer
GD705R-3	6D125-1	PE-6NB	NIPPON DENSO

Pump Assembly Number

6150-71-1531 (190000-9130)...0

Injection Timing

	Unit	Basis	Allowance
Rotating direction		Counterclockwise viewed from drive end	
Injection order		1-5-3-6-2-4	
Injection interval		60°	59°30' to 60°30'
Plunger pre-stroke	mm	4.7	
Delivery valve retraction volume	mm ³	90	

Specification for engine with fan (reference only)

Rated horsepower: HP/rpm	180/1850
Maximum torque: kgm/rpm	80 /1100
High idling: rpm	2050 to 2150
Low idling: rpm	650 to 700

Calibration Standard

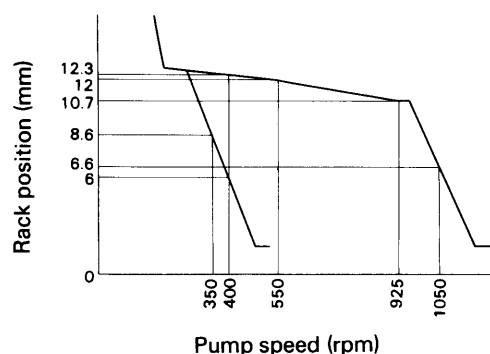
Conditions	Unit	Manufacturer standard (with nearly the same actual machine parts)	Service standard (with calibration test parts)
Nozzle part no.		(093400-0540)	(DN12SD12)
Nozzle holder part no.		(093100-0190)	(EF8511/9A)
Injection pipe (O/D x I/D x length)	mm	6 x 2 x 600	6 x 2 x 600
Test oil		ASTM D975 No. 2 diesel fuel or equivalent	
Oil temperature	°C	40 to 45	40 to 45
Nozzle opening pressure	kg/cm ²	175	175
Transfer pump pressure	kg/cm ²	1.6	1.6

Specifications

Specifications

		Injection volume (cc/500st) for manufacturer standard					Injection volume (cc/500st) for service standard				
		Rack position (mm)	Pump speed (rpm)	Basis	Allowance		Maximum variance between cylinder	Basis	Allowance		Maximum variance between cylinder
		Calibration basic point	10.7	925	52.25	Each cyl. 50.75 to 53.75	max. 4.0	51.0	Each cyl. 49.5 to 52.5	max. 4.0	
• Rack positions B to E are the refer- ence volume when adjusting the injec- tion volume.	B	11.2	550	69.75	★ 68.25 to 71.25	max. 4.0	70.25	★ 68.75 to 71.75	max. 4.0		
	C	8.6	350	6.75	★ 5.75 to 7.75	max. 2.5	6.0	★ 5.0 to 7.0	max. 2.5		
	D				★			★			
	E				★			★			
• Marks ★ are aver- age volumes.											

Governor performance



Pump Assembly Number
 6150-71-1534 (190000-9134)
 6150-71-1542 (190000-8903)
 6150-71-1543 (190000-8904)

(): Manufacturer's part No.

Injection Pump Type	Pump Manufacturer
PE-6NB	NIPPON DENSO

Applicable Machine		Applicable Engine	
Model	Serial No.	Model	Serial No.
GD705R-3		6D125-1	
GD705R-4			

Injection Timing

Rotating direction	Counterclockwise viewed from drive end
Injection order	1 - 5 - 3 - 6 - 2 - 4
Injection interval	60° (59°30' - 60°30')
Plunger pre-stroke (mm)	4.7
Delivery valve retraction volume (mm ³ /st)	90

Engine Specification

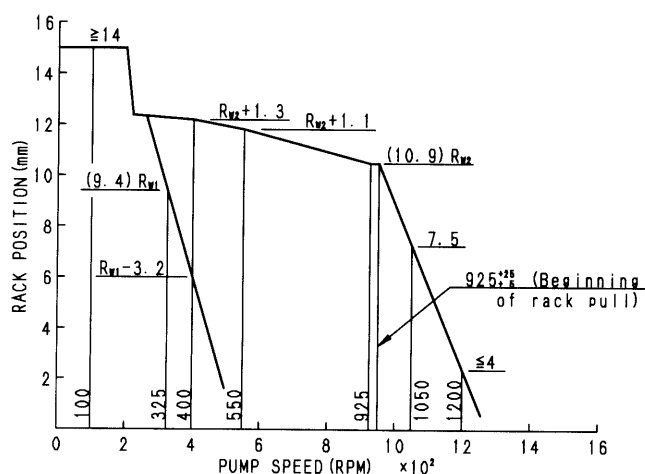
Rated horsepower (kW[HP] / rpm)	136.1 [182.4] / 1,850
Maximum torque (Nm[kgm] / rpm)	784 [80] / 1,100
High idling (rpm)	2,050 - 2,150
Low idling (rpm)	650 - 700
Pump tester capacity for Service standard	Motor 7.5 kW

Calibration Standard

(): Pump manufacturer's part No.

Conditions				Service standard		Manufacturer standard	
● Service standard indicates data using calibration test parts. ● Manufacturer standard is data for factory test.	Nozzle part no.			(093400-0540)			
	Nozzle holder part no.			(093100-0190)			
	Injection pipe (O/D x I/D x length) mm			6 x 2 x 600			
	Test oil			ASTM D975 No.2 diesel fuel or equivalent			
	Oil temperature °C			40 to 45			
	Nozzle opening pressure (MPa[kg/cm ²])			17.16 [175]			
	Transfer pump pressure (kPa[kg/cm ²])			156.91 [1.6]			
Injection volume ● Rack positions B to E are the reference volume when adjusting the injection volume.	Rack point	Rack position (mm)	Pump speed (rpm)	Service standard		Manufacturer standard	
				Injection volume (cc/1000 st)	Maximam variance between cylinder (%)	Injection volume (cc/1000 st)	Maximam variance between cylinder (%)
	A (Basic point)	10.9	925	96.5 – 102.5	8		
	B	12.0	550	127.5 – 133.5	6.1		
	C	9.4	325	19 – 23	23.8		
	D						
	E						

Governor performance



TKE00165

Machine Model Jahon Compressor	Engine Model	Injection Pump Type	Pump Manufacturer
D60F-8A	S6D125-1	PE-6P	DIESEL KIKI

Pump Assembly Number

6151-71-1721 (106692-4100) ... 0
6151-71-1722 (106692-4102) ... 1
6151-71-1723 (106692-4103)

Injection Timing

	Unit	Basis	Allowance
Rotating direction		Counterclockwise viewed from drive end	
Injection order		1 - 5 - 3 - 6 - 2 - 4	
Injection interval		60°	59°30' to 60°30'
Plunger pre-stroke	mm	3.75	3.70 to 3.80
Delivery valve retraction volume	mm ³	60	

Specification for engine with fan (reference only)

Rated horsepower:	HP/rpm	219/2000
Maximum torque:	kgm/rpm	92/1500
High idling:	rpm	2200 to 2300
Low idling:	rpm	600 to 630

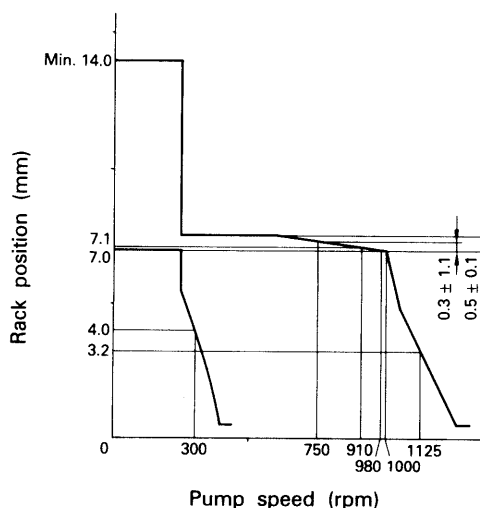
Calibration Standard

Conditions	Unit	Manufacturer standard (with nearly the same actual machine parts)	Service standard (with calibration test parts)
Nozzle part no.		(105015-5370)	
Nozzle holder part no.		(105041-7030)	
Injection pipe (O/D x I/D x length)	mm	6 x 2.2 x 710	
Test oil		ASTM D975 No. 2 diesel fuel or equivalent	
Oil temperature	°C	43 to 47	
Nozzle opening pressure	kg/cm ²	250	
Transfer pump pressure	kg/cm ²	1.6	

Specifications

			Injection volume (mm ³ /st) for manufacturer standard			Injection volume (mm ³ /st) for service standard		
	Rack position (mm)	Pump speed (rpm)	Basis	Allowance	Maximum variance between cylinder	Basis	Allowance	Maximum variance between cylinder
Calibration basic point	7	1000	126.5	Each cyl. 124.5 to 128.5	± 3	Each cyl.		
• Rack positions B to E are the reference volume when adjusting the injection volume.	B 7.3	750	132.5	★ 130.5 to 134.5	± 4	★		
• Marks ★ are average volumes.	C 4	300	15	★ 13.5 to 16.5	± 15	★		
	D			★		★		
	E			★		★		

Governor performance



(): Manufacturer's part No.

Injection Pump Type	Pump Manufacturer
PE-6NB	NIPPON DENSO

Applicable Machine		Applicable Engine	
Model	Serial No.	Model	Serial No.
D60P-12		S6D125-1	

Injection Timing

Rotating direction	Counterclockwise viewed from drive end
Injection order	1 - 5 - 3 - 6 - 2 - 4
Injection interval	60° (59°30' - 60°30')
Plunger pre-stroke (mm)	4.7
Delivery valve retraction volume (mm ³ /st)	90

Engine Specification

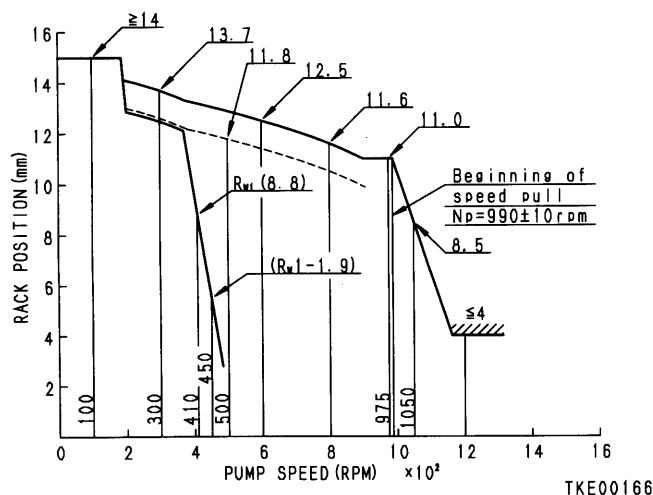
Rated horsepower (kW[HP] / rpm)	139.7 [187.3] / 1,950
Maximum torque (Nm[kgm] / rpm)	980.7 [100] / 1,200
High idling (rpm)	2,050 - 2,150
Low idling (rpm)	800 - 850
Pump tester capacity for Service standard	Motor 7.5 kW

Calibration Standard

(): Pump manufacturer's part No.

Calibration standard				Service standard		Manufacturer standard	
Conditions ● Service standard indicates data using calibration test parts. ● Manufacturer standard is data for factory test.	Nozzle part no.			(093400-0540)			
	Nozzle holder part no.			(093100-0190)			
	Injection pipe (O/D x I/D x length) mm			6 x 2 x 600			
	Test oil			ASTM D975 No.2 diesel fuel or equivalent			
	Oil temperature °C			40 to 45			
	Nozzle opening pressure (MPa[kg/cm ²])			17.16 [175]			
	Transfer pump pressure (kPa[kg/cm ²])			156.91 [1.6]			
Injection volume ● Rack positions B to E are the reference volume when adjusting the injection volume.	Rack point	Rack position (mm)	Pump speed (rpm)	Service standard		Manufacturer standard	
				Injection volume (cc/1000 st)	Maximam variance between cylinder (%)	Injection volume (cc/1000 st)	Maximam variance between cylinder (%)
	A (Basic point)	11.0	975	111 ± 3	7.2		
	B	11.8	500	134 ± 3	6.0		
	C	8.8	410	24 ± 2	20.8		
	D						
	E						

Governor performance



Machine Model Jahai Compressor	Engine Model	Injection Pump Type	Pump Manufacturer
D65EX-12	S6D125-1	PE-6NB	NIPPON DENSO

Pump Assembly Number

6151-71-1180 (191000-9790)

Injection Timing

	Unit	Basis	Allowance
Rotating direction		Counterclockwise viewed from drive end	
Injection order		1-5-3-6-2-4	
Injection interval		60°	59°30' to 60°30'
Plunger pre-stroke	mm	4.7	
Delivery valve retraction volume	mm ³	90	

Specification for engine with fan (reference only)

Rated horsepower:	HP/rpm
Maximum torque:	kgm/rpm
High idling:	rpm
Low idling:	rpm

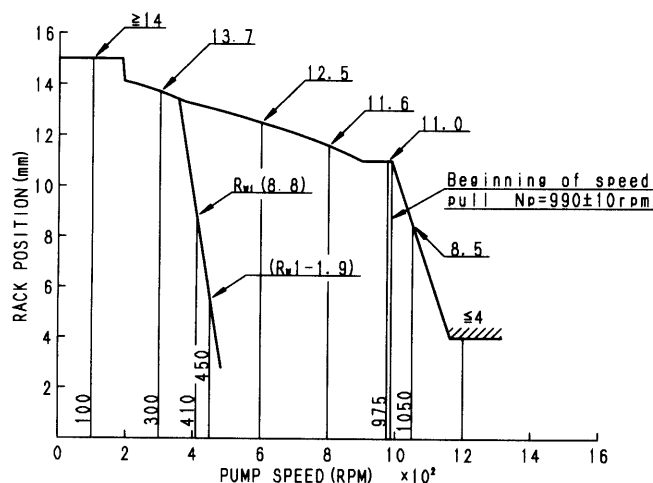
Calibration Standard

Conditions	Unit	Manufacturer standard (with nearly the same actual machine parts)	Service standard (with calibration test parts)
Nozzle part no.		(093400-1600)	(093400-0540) (DN12SD12)
Nozzle holder part no.		(093100-2710)	(093100-0190) (EF8511/9A)
Injection pipe (O/D x I/D x length)	mm	6 x 2 x 600	6 x 2 x 600
Test oil		ASTM D975 No. 2 diesel fuel or equivalent	
Oil temperature	°C	40 to 45	40 to 45
Nozzle opening pressure	kg/cm ²	175	175
Transfer pump pressure	kg/cm ²	1.6	1.6

Specifications

			Injection volume (mm ³ /st) for manufacturer standard			Injection volume (mm ³ /st) for service standard		
	Rack position (mm)	Pump speed (rpm)	Basis	Allowance	Maximum variance between cylinder	Basis	Allowance	Maximum variance between cylinder
	Calibration basic point			Each cyl.	max.		Each cyl.	max.
• Rack positions B to E are the refer- ence volume when adjusting the injec- tion volume.	B		★	max.	max.	★	max.	max.
	C		★	max.	max.	★	max.	max.
• Marks ★ are aver- age volumes.	D		★			★		
	E		★			★		

Governor performance



TKE00167

Machine Model	Engine Model	Injection Pump Type	Pump Manufacturer
D75S-5	S6D125-1	PE-6P	DIESEL KIKI

Pump Assembly Number

6151-71-1731 (106692-4090)...0

Injection Timing

	Unit	Basis	Allowance
Rotating direction		Counterclockwise viewed from drive end	
Injection order		1 – 5 – 3 – 6 – 2 – 4	
Injection interval		60°	59°30' to 60°30'
Plunger pre-stroke	mm	3.75	3.7 to 3.8
Delivery valve retraction volume	mm ³	60	

Specification for engine with fan (reference only)

Rated horsepower:	HP/rpm	200/2000
Maximum torque:	kgm/rpm	88/1500
High idling:	rpm	2150 to 2250
Low idling:	rpm	550 to 650

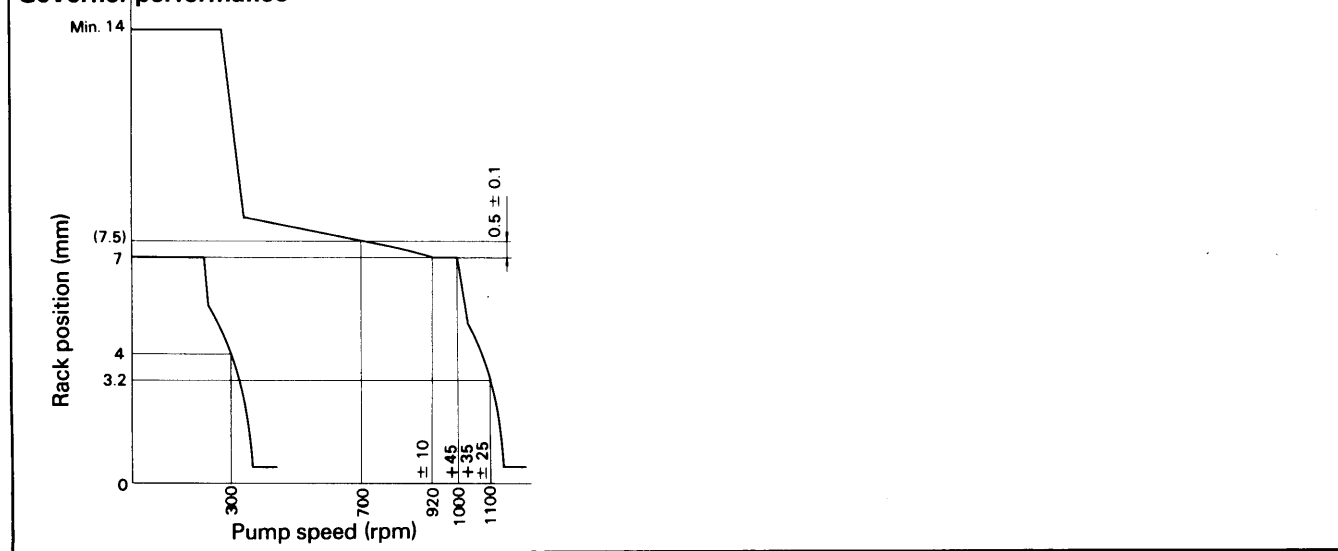
Calibration Standard

Conditions	Unit	Manufacturer standard (with nearly the same actual machine parts)	Service standard (with calibration test parts)
Nozzle part no.		(105015-5370)	()
Nozzle holder part no.		(105041-7030)	()
Injection pipe (O/D x I/D x length)	mm	6 x 2.2 x 710	
Test oil		ASTM D975 No. 2 diesel fuel or equivalent	
Oil temperature	°C	43 to 47	
Nozzle opening pressure	kg/cm ²	250	
Transfer pump pressure	kg/cm ²	1.6	

Specifications

				Injection volume (cc/500st) for manufacturer standard				Injection volume (cc/500st) for service standard						
				Basis	Allowance			Maximum variance between cylinder	Basis	Allowance			Maximum variance between cylinder	
				Calibration basic point	7.0	1000	58.5	Each cyl. 57.5 to 59.5	± 1.76					Each cyl.
• Rack positions B to E are the refer- ence volume when adjusting the injec- tion volume.	B	7.5	700	64.0	★	63.0	to 65.0	± 2.56					★	
	C	4.0	300	7.0	★	6.75	to 8.25	± 1.13					★	
	D				★								★	
• Marks ★ are aver- age volumes.	E				★								★	

Governor performance



Machine Model Injection Compressor	Engine Model	Injection Pump Type	Pump Manufacturer
D75S-5	S6D125-1	PE-6P	DIESEL KIKI

Pump Assembly Number

6151-71-1732 (106692-4092) ... 2
6151-71-1733 (106692-4093)

Injection Timing

	Unit	Basis	Allowance
Rotating direction		Counterclockwise viewed from drive end	
Injection order		1 - 5 - 3 - 6 - 2 - 4	
Injection interval		60°	59°30' to 60°30'
Plunger pre-stroke	mm	3.75	3.7 to 3.8
Delivery valve retraction volume	mm ³	60	

Specification for engine with fan (reference only)

Rated horsepower:	HP/rpm	200/2000
Maximum torque:	kgm/rpm	88/1500
High idling:	rpm	2150 to 2250
Low idling:	rpm	550 to 650

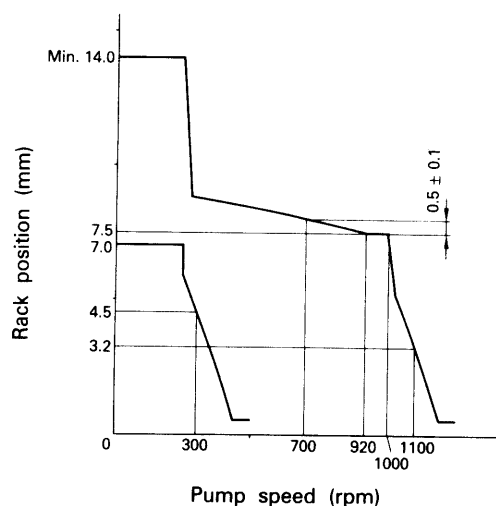
Calibration Standard

Conditions	Unit	Manufacturer standard (with nearly the same actual machine parts)	Service standard (with calibration test parts)
Nozzle part no.		(105015-5370)	(105780-0000)
Nozzle holder part no.		(105041-7030)	(105780-2080)
Injection pipe (O/D x I/D x length)	mm	6 x 2.2 x 720	8 x 3 x 600
Test oil		ASTM D975 No. 2 diesel fuel or equivalent	
Oil temperature	°C	43 to 47	43 to 47
Nozzle opening pressure	kg/cm ²	250	175
Transfer pump pressure	kg/cm ²	1.6	1.6

Specifications

			Injection volume (mm ³ /st) for manufacturer standard			Injection volume (mm ³ /st) for service standard		
	Rack position (mm)	Pump speed (rpm)	Basis	Allowance	Maximum variance between cylinder	Basis	Allowance	Maximum variance between cylinder
Calibration basic point	7.5	1000	117	Each cyl.		104.5	Each cyl. 102.5 to 106.5	± 3
• Rack positions B to E are the reference volume when adjusting the injection volume.	B 8.0	700	128	★		115.9	★ 113.9 to 117.9	± 4
• Marks ★ are average volumes.	C 4.5	300	15	★		11.7	★ 10.2 to 13.2	± 15
	D			★			★	
	E			★			★	

Governor performance



Machine Model	Engine Model	Injection Pump Type	Pump Manufacturer
D75S-5	S6D125-1	NB (EP9)	NIPPON DENSO

Pump Assembly Number

6151-71-1640 (191000-3360) ... 2
6151-71-1641 (191000-3361)

Injection Timing

	Unit	Basis	Allowance
Rotating direction		Counterclockwise viewed from drive end	
Injection order		1 - 5 - 3 - 6 - 2 - 4	
Injection interval		60°	59°30' to 60°30'
Plunger pre-stroke	mm	4.7	
Delivery valve retraction volume	mm ³	90	

Specification for engine with fan (reference only)

Rated horsepower:	HP/rpm	200/2000
Maximum torque:	kgm/rpm	88/1500
High idling:	rpm	2150 to 2250
Low idling:	rpm	550 to 650

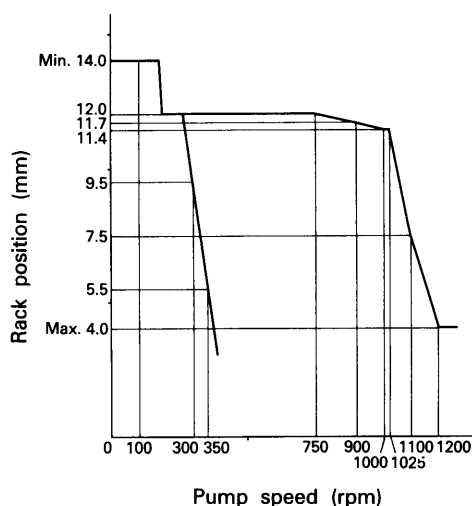
Calibration Standard

Conditions	Unit	Manufacturer standard (with nearly the same actual machine parts)	Service standard (with calibration test parts)
Nozzle part no.			093400-0540 (DN12SD12A)
Nozzle holder part no.			093100-0190 (EF8511/9A)
Injection pipe (O/D x I/D x length)	mm		6 x 2 x 600
Test oil		ASTM D975 No. 2 diesel fuel or equivalent	
Oil temperature	°C		40 to 45
Nozzle opening pressure	kg/cm ²		175
Transfer pump pressure	kg/cm ²		1.6

Specifications

			Injection volume (mm ³ /st) for manufacturer standard			Injection volume (mm ³ /st) for service standard		
	Rack position (mm)	Pump speed (rpm)	Basis	Allowance	Maximum variance between cylinder	Basis	Allowance	Maximum variance between cylinder
	Calibration basic point	11.4	1000	114.0	Each cyl.	114.0	Each cyl. 112.0 to 116.0	max. 8.0
- Rack positions B to E are the reference volume when adjusting the injection volume. - Marks ★ are average volumes.	B	12.0	750	130.5	★	130.5	★ 127.5 to 133.5	max. 8.0
	C	9.2	300	21.0	★	21.0	★ 19.0 to 23.0	max. 5.0
	D				★		★	
	E				★		★	

Governor performance



Pump Assembly Number

6151-71-1621 (191000-5500)
 6151-71-1621 (191000-5501)

() : Manufacturer's part No.

Injection Pump Type	Pump Manufacturer
NB (EP9)	NIPPON DENSO

Applicable Machine		Applicable Engine	
Model	Serial No.	Model	Serial No.
D83E, P-1		S6D125-1	25851 and up
D85E-SS-1			

Injection Timing

Rotating direction	Counterclockwise viewed from drive end
Injection order	1 — 5 — 3 — 6 — 2 — 4
Injection interval	60° ± 30'
Plunger pre-stroke mm	4.7 ± 0.05
Delivery valve retraction volume mm ³ /st	90

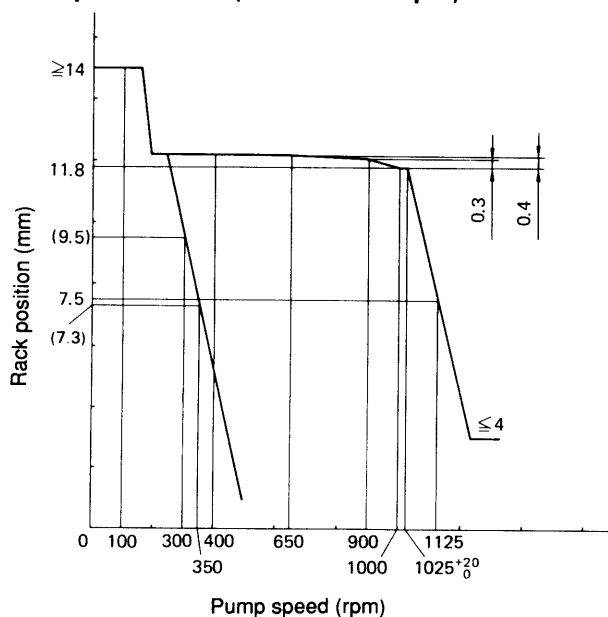
Engine Specification

Rated horsepower HP/rpm	205/2000
Maximum torque kgm/rpm	89/1300
High idling rpm	2200 to 2300
Low idling rpm	600 to 630
Pump tester capacity for Service standard	Motor 7.5 KW

Calibration Standard

Conditions				Service standard			Manufacturer standard		
· Service standard indicates data using calibration test parts. · Manufacture standard is data for factory test.				Nozzle part no.			(093400-0540) (ND-DN12SD12A)		
				Nozzle holder part no.			(093100-0190) (EF8511/9A)		
				Injection pipe (O/D × I/D × length) mm			6 × 2 × 600		
				Test oil			ASTM D975 No.2 diesel fuel or equivalent		
				Oil temperature °C			40 to 45		
				Nozzle opening pressure kg/cm ²			175		
				Transfer pump pressure kg/cm ²			1.6		
Injection volume				Service standard (cc/ 500st)			Manufacturer standard (cc/ 500st)		
· Rack positions B to E are the reference volume when adjusting the injection volume. · Marks ★ are average volumes.	Rack point	Rack position (mm)	Pump speed (rpm)	Basis	Allowance	Maximum variance between cylinder	Basis	Allowance	Maximum variance between cylinder
	Basic point	11.8	1000	60.5	Each cyl. 59.0 to 62.0	Max 4	60.5	Each cyl.	
	B	12.2	650	66.75	★65.25 to 68.25	Max 4	66.75	★	
	C	[9.5]	300	10.5	★ 9.5 to 11.5	Max 2.5	10.5	★	
	D				★			★	
	E				★			★	

Governor performance (300 — 1000 rpm)



SEBH 4608-01

Machine Model	Engine Model	Injection Pump Type	Pump Manufacturer
D85A, P-21 D85E-21 (B)	S6D125-1	PE-6P	DIESEL KIKI

Pump Assembly Number

6151-71-1770 (106692-4691) ... 2
6151-71-1771 (106692-4692)

Injection Timing

	Unit	Basis	Allowance
Rotating direction		Counterclockwise viewed from drive end	
Injection order		1 - 5 - 3 - 6 - 2 - 4	
Injection interval		60°	59°30' to 60°30'
Plunger pre-stroke	mm	3.75	3.7 to 3.8
Delivery valve retraction volume	mm ³	60	

Specification for engine with fan (reference only)

Rated horsepower:	HP/rpm	225/2000
Maximum torque:	kgm/rpm	102/1400
High idling:	rpm	2150 to 2250
Low idling:	rpm	650 to 700

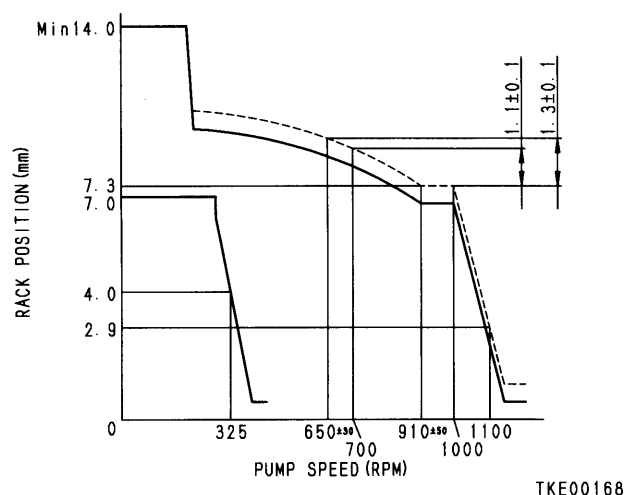
Calibration Standard

Conditions	Unit	Manufacturer standard (with nearly the same actual machine parts)	Service standard (with calibration test parts)
Nozzle part no.		(105015-5370)	(105780-0000)
Nozzle holder part no.		(105041-7030)	(105780-2080)
Injection pipe (O/D x I/D x length)	mm	6 x 2.2 x 70	8 x 3 x 600
Test oil		ASTM D975 No. 2 diesel fuel or equivalent	
Oil temperature	°C	43 to 47	43 to 47
Nozzle opening pressure	kg/cm ²	250	175
Transfer pump pressure	kg/cm ²	1.6	1.6

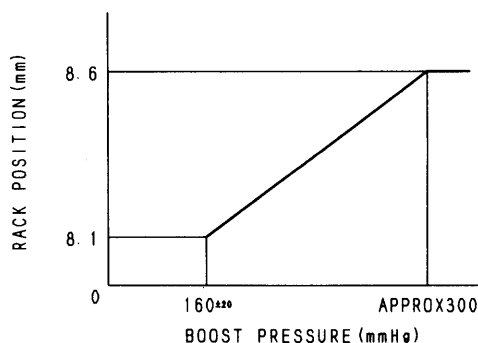
Specifications

			Injection volume (mm ³ /st) for manufacturer standard			Injection volume (mm ³ /st) for service standard		
	Rack position (mm)	Pump speed (rpm)	Basis	Allowance	Maximum variance between cylinder	Basis	Allowance	Maximum variance between cylinder
	Calibration basic point	7.3	1000	125.7	Each cyl. 123.7 to 127.7	122.3	Each cyl. 120.3 to 124.3	± 3
- Rack positions B to E are the reference volume when adjusting the injection volume. - Marks ★ are average volumes.	B	8.4	700	150.7	★ 148.7 to 152.7	148.0	★ 146.0 to 150.0	± 4
	C	4.0	325	15.0	★ 13.5 to 16.5	13.4	★ 11.9 to 14.9	± 15
	D			★		★		
	E			★		★		

Governor performance



Boost compensator performance



Machine Model	Engine Model	Injection Pump Type	Pump Manufacturer
Jahon Compressor PC300-3 PC300LC-3 PC300NLC-3 PC360LC-3, PC300-3 for Sweden	S6D125-1	NB-(EP9)	NIPPON DENSO

Pump Assembly Number

6151-71-1210 (191000-0061) ... 4

6151-71-1230 (191000-1221) ... 4

Injection Timing

	Unit	Basis	Allowance
Rotating direction		Counterclockwise viewed from drive end	
Injection order		1 - 5 - 3 - 6 - 2 - 4	
Injection interval		60°	59°30' to 60°30'
Plunger pre-stroke	mm	4.7	
Delivery valve retraction volume	mm ³	90	

Specification for engine with fan (reference only)

Rated horsepower:	HP/rpm	197/1550 (200 PS)
Maximum torque:	kgm/rpm	105/1200
High idling:	rpm	1675 to 1725
Low idling:	rpm	650 to 675

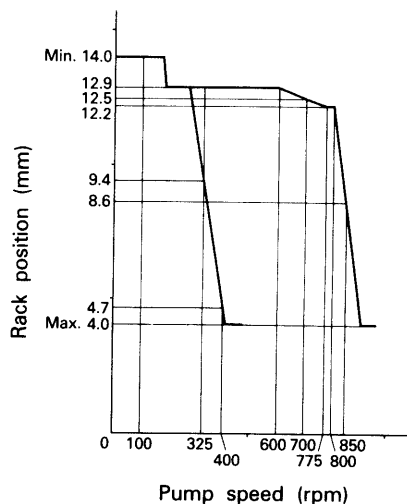
Calibration Standard

Conditions	Unit	Manufacturer standard (with nearly the same actual machine parts)	Service standard (with calibration test parts)
Nozzle part no.			093400-0540 (DN12SD12A)
Nozzle holder part no.			093100-0190 (EF8511/9A)
Injection pipe (O/D x I/D x length)	mm		6 x 2 x 600
Test oil		ASTM D975 No. 2 diesel fuel or equivalent	
Oil temperature	°C		40 to 45
Nozzle opening pressure	kg/cm ²		175
Transfer pump pressure	kg/cm ²		1.6

Specifications

				Injection volume (mm ³ /st) for manufacturer standard			Injection volume (mm ³ /st) for service standard		
	Rack position (mm)	Pump speed (rpm)		Basis	Allowance	Maximum variance between cylinder	Basis	Allowance	Maximum variance between cylinder
	Calibration basic point	12.2	775	133.0	Each cyl.		133.0	Each cyl. 130.0 to 136.0	max. 8.0
- Rack positions B to E are the reference volume when adjusting the injection volume. - Marks ★ are average volumes.	B	12.9	600	154.0	★		154.0	★ 151.0 to 157.0	max. 8.0
	C	9.4	325	21.0	★		21.0	★ 19.0 to 23.0	max. 5.0
	D				★			★	
	E				★			★	

Governor performance



Machine Model	Engine Model	Injection Pump Type	Pump Manufacturer
PC300-3 PC300LC-3 PC300NLC-3 PC360LC-3 PC300-3 for cold weather	S6D125-1	NB (EP9)	NIPPON DENSO

Pump Assembly Number

6151-71-1211 (191000-0062) ... 2
6151-71-1212 (191000-0063) ... 0
6151-71-1250

Injection Timing

	Unit	Basis	Allowance
Rotating direction		Counterclockwise viewed from drive end	
Injection order		1 - 5 - 3 - 6 - 2 - 4	
Injection interval		60°	59°30' to 60°30'
Plunger pre-stroke	mm	4.7	
Delivery valve retraction volume	mm ³	90	

Specification for engine with fan (reference only)

Rated horsepower:	HP/rpm	197/1550
Maximum torque:	kgm/rpm	105/1200
High idling:	rpm	1675 to 1725
Low idling:	rpm	700 to 750

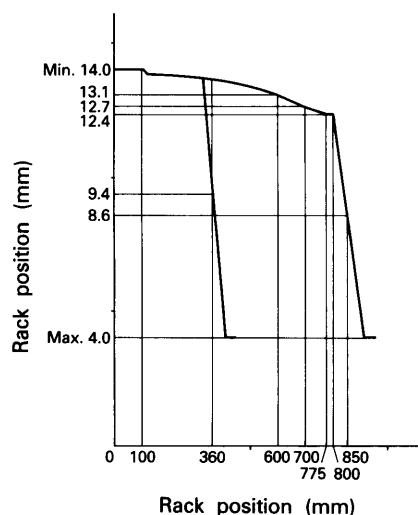
Calibration Standard

Conditions	Unit	Manufacturer standard (with nearly the same actual machine parts)	Service standard (with calibration test parts)
Nozzle part no.			093400-0540 (DN12SD12A)
Nozzle holder part no.			093100-0190 (EF8511/9A)
Injection pipe (O/D x I/D x length)	mm		6 x 2 x 600
Test oil		ASTM D975 No. 2 diesel fuel or equivalent	
Oil temperature	°C		40 to 45
Nozzle opening pressure	kg/cm ²		175
Transfer pump pressure	kg/cm ²		1.6

Specifications

			Injection volume (mm ³ /st) for manufacturer standard			Injection volume (mm ³ /st) for service standard		
	Rack position (mm)	Pump speed (rpm)	Basis	Allowance	Maximum variance between cylinder	Basis	Allowance	Maximum variance between cylinder
	Calibration basic point	12.4	775	138.0	Each cyl.	138.0	Each cyl. 135.0 to 141.0	max. 8.0
- Rack positions B to E are the reference volume when adjusting the injection volume. - Marks ★ are average volumes.	B	13.1	600	154.0	★	154.0	★ 151.0 to 157.0	max. 8.0
	C	9.4	360	21.0	★	21.0	★ 19.0 to 23.0	max. 5.0
	D				★		★	
	E				★		★	

Governor performance



Machine Model	Engine Model	Injection Pump Type	Pump Manufacturer
Jahan Compressor			
PC300-3 for Sweden	S6D125-1	NB (EP9)	NIPPON DENSO

Pump Assembly Number

6151-71-1231 (191000-1222) ... 1

Injection Timing

	Unit	Basis	Allowance
Rotating direction		Counterclockwise viewed from drive end	
Injection order		1 - 5 - 3 - 6 - 2 - 4	
Injection interval		60°	59°30' to 60°30'
Plunger pre-stroke	mm	4.7	
Delivery valve retraction volume	mm ³	90	

Specification for engine with fan (reference only)

Rated horsepower:	HP/rpm	197/1550
Maximum torque:	kgm/rpm	105/1200
High idling:	rpm	1675 to 1725
Low idling:	rpm	700 to 750

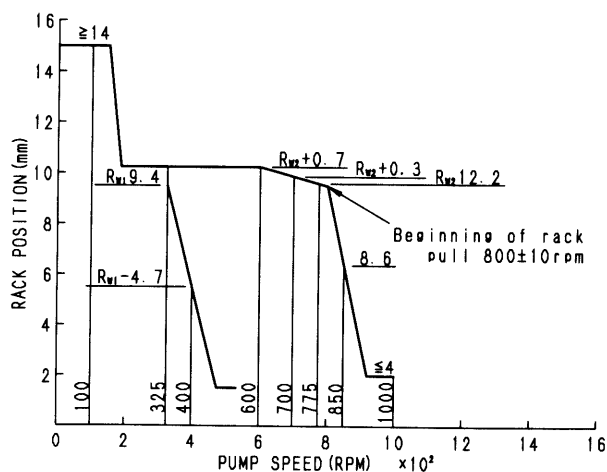
Calibration Standard

Conditions	Unit	Manufacturer standard (with nearly the same actual machine parts)	Service standard (with calibration test parts)
Nozzle part no.			093400-0540 (DN12SD12A)
Nozzle holder part no.			093100-0190 (EF8511/9A)
Injection pipe (O/D x I/D x length)	mm		6 x 2 x 600
Test oil		ASTM D975 No. 2 diesel fuel or equivalent	
Oil temperature	°C		40 to 45
Nozzle opening pressure	kg/cm ²		175
Transfer pump pressure	kg/cm ²		1.6

Specifications

			Injection volume (mm ³ /st) for manufacturer standard			Injection volume (mm ³ /st) for service standard		
	Rack position (mm)	Pump speed (rpm)	Basis	Allowance	Maximum variance between cylinder	Basis	Allowance	Maximum variance between cylinder
Calibration basic point	12.2	775		Each cyl.		133	Each cyl. 131 - 135	8
- Rack positions B to E are the reference volume when adjusting the injection volume. - Marks ★ are average volumes.	B	12.9	600	★		154	★ 151 - 157	8
	C	12.9	325	★		Min. 150	★	
	D	9.4	325	★		21	★ 19 - 23	5
	E			★			★	

Governor performance



TKE00169

Machine Model Inan Compressor	Engine Model	Injection Pump Type	Pump Manufacturer
PC400, 400LC-3 PC400-3 for Sweden PC400-3 for cold weather	S6D125-1	PE-6P	DIESEL KIKI

Pump Assembly Number

6151-71-1220 (106692-4323) ... 3
6151-71-1240 (106692-4441) ... 1
6151-71-1260 (106692-4471) ... 1

Injection Timing

	Unit	Basis	Allowance
Rotating direction		Counterclockwise viewed from drive end	
Injection order		1 - 5 - 3 - 6 - 2 - 4	
Injection interval		60°	59°30' to 60°30'
Plunger pre-stroke	mm	3.75	3.7 to 3.8
Delivery valve retraction volume	mm ³	60	

Specification for engine with fan (reference only)

Rated horsepower:	HP/rpm	266/2000 (270 PS)
Maximum torque:	kgm/rpm	110/1400
High idling:	rpm	2150 to 2250
Low idling:	rpm	600 to 700

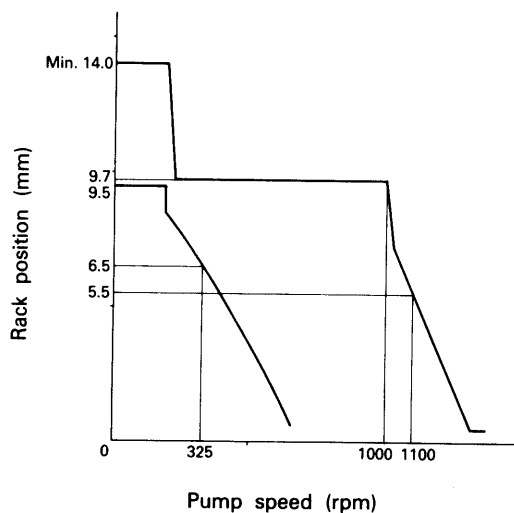
Calibration Standard

Conditions	Unit	Manufacturer standard (with nearly the same actual machine parts)	Service standard (with calibration test parts)
Nozzle part no.		(105015-5370)	(105780-0000)
Nozzle holder part no.		(105041-7030)	(105780-2080)
Injection pipe (O/D x I/D x length)	mm	6 x 2.2 x 710	8 x 3 x 600
Test oil		ASTM D975 No. 2 diesel fuel or equivalent	
Oil temperature	°C	43 to 47	43 to 47
Nozzle opening pressure	kg/cm ²	250	175
Transfer pump pressure	kg/cm ²	1.6	1.6

Specifications

			Injection volume (mm ³ /st) for manufacturer standard			Injection volume (mm ³ /st) for service standard		
	Rack position (mm)	Pump speed (rpm)	Basis	Allowance	Maximum variance between cylinder	Basis	Allowance	Maximum variance between cylinder
Calibration basic point	9.7	1000	146.0	Each cyl. 144.0 to 148.0	± 3	141.8	Each cyl. 139.8 - 143.8	± 4.3
• Rack positions B to E are the reference volume when adjusting the injection volume.	B 6.5	325	15.0	★ 13.5 to 16.5	± 15	11	★ 9.5 - 12.5	± 1.7
• Marks ★ are average volumes.	C			★			★	
	D			★			★	
	E			★			★	

Governor performance



Machine Model	Engine Model	Injection Pump Type	Pump Manufacturer
PC400, 400LC-3 PC400-3 for Sweden PC400-3 for cold weather	S6D125-1	EP-6P	NIPPON DENSO

Pump Assembly Number

6151-71-1221 (191000-5400) ... 1
6151-71-1222 (191000-5401)
6151-71-1241 (191000-5720) ... 0
6151-71-1242 (191000-5721) ... 1
6151-71-1261 1

Injection Timing

	Unit	Basis	Allowance
Rotating direction		Counterclockwise viewed from drive end	
Injection order		1 - 5 - 3 - 6 - 2 - 4	
Injection interval		60°	59°30' to 60°30'
Plunger pre-stroke	mm	4.7	
Delivery valve retraction volume	mm ³	90	

Specification for engine with fan (reference only)

Rated horsepower:	HP/rpm	266/2000 (270 PS)
Maximum torque:	kgm/rpm	110/1400
High idling:	rpm	2150 to 2250
Low idling:	rpm	650 to 700

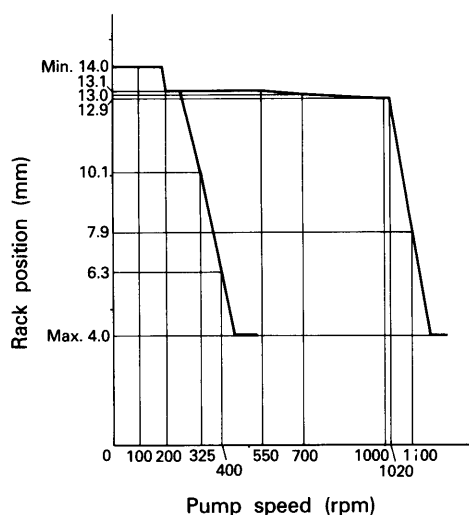
Calibration Standard

Conditions	Unit	Manufacturer standard (with nearly the same actual machine parts)	Service standard (with calibration test parts)
Nozzle part no.			093400-0540 (DN12SD12A)
Nozzle holder part no.			093100-0190 (EF8511/9A)
Injection pipe (O/D x I/D x length)	mm		6 x 2 x 600
Test oil		ASTM D975 No. 2 diesel fuel or equivalent	
Oil temperature	°C		40 to 45
Nozzle opening pressure	kg/cm ²		175
Transfer pump pressure	kg/cm ²		1.6

Specifications

			Injection volume (mm ³ /st) for manufacturer standard			Injection volume (mm ³ /st) for service standard		
	Rack position (mm)	Pump speed (rpm)	Basis	Allowance	Maximum variance between cylinder	Basis	Allowance	Maximum variance between cylinder
	Calibration basic point	12.9	1000	143.0	Each cyl.	143.0	Each cyl. 140.0 to 146.0	max. 8.0
- Rack positions B to E are the reference volume when adjusting the injection volume. - Marks ★ are average volumes.	B	13.0	700	150.0	★	150.0	★ 147.0 to 153.0	max. 8.0
	C	10.1	325	21.0	★	21.0	★ 19.0 to 23.0	max. 5.0
	D			★		★		
	E			★		★		

Governor performance



Machine Model	Engine Model	Injection Pump Type	Pump Manufacturer
Jahan Compressor PC400, 400LC-5 PC400-5 for Sweden PC400-5 for cold weather PC400-5C	S6D125-1	NB (EP9)	NIPPON DENSO

Pump Assembly Number

6151-73-1210 (191000-7350) ... 1
6151-73-1220 (191000-7903)
6151-73-1230 (191000-9666) ... 1
6151-73-1240 (191000-9623) ... 1

Injection Timing

	Unit	Basis	Allowance
Rotating direction		Counterclockwise viewed from drive end	
Injection order		1 - 5 - 3 - 6 - 2 - 4	
Injection interval		60°	59°30' to 60°30'
Plunger pre-stroke	mm	4.7	
Delivery valve retraction volume	mm ³	90	

Specification for engine with fan (reference only)

Rated horsepower:	HP/rpm	276/2000
Maximum torque:	kgm/rpm	115/1400
High idling:	rpm	2150 to 2250
Low idling:	rpm	600 to 700

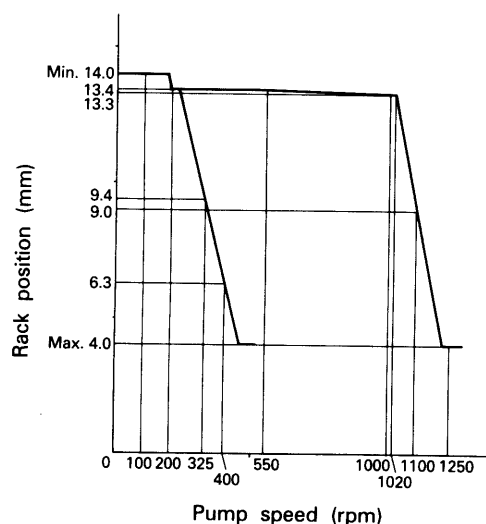
Calibration Standard

Conditions	Unit	Manufacturer standard (with nearly the same actual machine parts)	Service standard (with calibration test parts)
Nozzle part no.			093400-0540 (DN12SD12A)
Nozzle holder part no.			093100-0190 (EF8511/9A)
Injection pipe (O/D x I/D x length)	mm		6 x 2 x 600
Test oil		ASTM D975 No. 2 diesel	fuel or equivalent
Oil temperature	°C		40 to 45
Nozzle opening pressure	kg/cm ²		175
Transfer pump pressure	kg/cm ²		1.6

Specifications

			Injection volume (mm ³ /st) for manufacturer standard			Injection volume (mm ³ /st) for service standard		
	Rack position (mm)	Pump speed (rpm)	Basis	Allowance	Maximum variance between cylinder	Basis	Allowance	Maximum variance between cylinder
	Calibration basic point	13.3	1000	154	Each cyl.	154	Each cyl. 151 to 157	max. 8.0
- Rack positions B to E are the reference volume when adjusting the injection volume. - Marks ★ are average volumes.	B	9.4	325	15	★	15	★ 13 to 17	max. 5.0
	C			★			★	
	D			★			★	
	E			★			★	

Governor performance



Machine Model Canal Compressor	Engine Model	Injection Pump Type	Pump Manufacturer
HD200D-3	S6D125-1	PE-6P	DIESEL KIKI

Pump Assembly Number

6151-71-1362 (106692-4451) ... 0
6151-71-1363 (106692-4452) ... 1
6151-71-1364 (106692-4910)

Injection Timing

	Unit	Basis	Allowance
Rotating direction		Counterclockwise viewed from drive end	
Injection order		1 - 5 - 3 - 6 - 2 - 4	
Injection interval		60°	59°30' to 60°30'
Plunger pre-stroke	mm	3.75	3.7 to 3.8
Delivery valve retraction volume	mm ³	60	

Specification for engine with fan (reference only)

Rated horsepower:	HP/rpm	276/2100
Maximum torque:	kgm/rpm	115/1400
High idling:	rpm	2350 to 2450
Low idling:	rpm	650 to 700

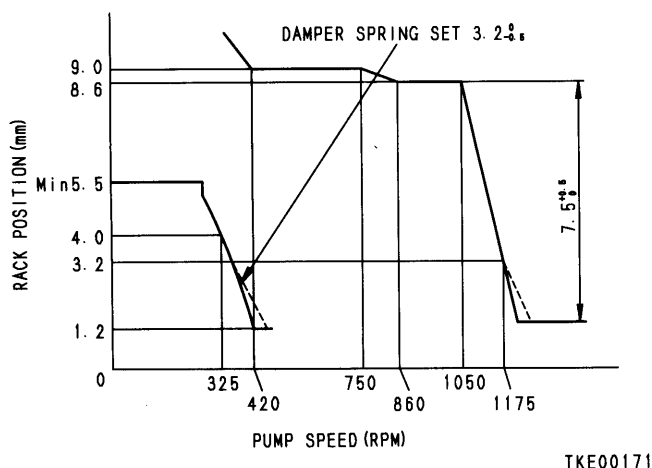
Calibration Standard

Conditions	Unit	Manufacturer standard (with nearly the same actual machine parts)	Service standard (with calibration test parts)
Nozzle part no.		(105015-5370)	
Nozzle holder part no.		(105041-7030)	
Injection pipe (O/D x I/D x length)	mm	6 x 2.2 x 710	
Test oil		ASTM D975 No. 2 diesel fuel or equivalent	
Oil temperature	°C	43 to 47	
Nozzle opening pressure	kg/cm ²	250	
Transfer pump pressure	kg/cm ²	1.6	

Specifications

			Injection volume (mm ³ /st) for manufacturer standard			Injection volume (mm ³ /st) for service standard		
	Rack position (mm)	Pump speed (rpm)	Basis	Allowance	Maximum variance between cylinder	Basis	Allowance	Maximum variance between cylinder
	Calibration basic point	8.6	1050	158.5	Each cyl. 156.5 to 160.5	± 3	Each cyl.	
- Rack positions B to E are the reference volume when adjusting the injection volume. - Marks ★ are average volumes.	B	9.0	700	172.0	★	170.0 to 174.0	± 4	★
	C	4.0	325	15.0	★	13.5 to 16.5	± 15	★
	D			★				★
	E			★				★

Governor performance



Machine Model Jahan Compressor	Engine Model	Injection Pump Type	Pump Manufacturer
HD205-3	S6D125-1	PE-6P	DIESEL KIKI

Pump Assembly Number

6151-71-1322 (106672-9301) ... 1

Injection Timing

	Unit	Basis	Allowance
Rotating direction		Counterclockwise viewed from drive end	
Injection order		1 - 5 - 3 - 6 - 2 - 4	
Injection interval		60°	59°30' to 60°30'
Plunger pre-stroke	mm	3.8	3.75 to 3.85
Delivery valve retraction volume	mm ³	80	

Specification for engine with fan (reference only)

Rated horsepower:	HP/rpm	296/2100
Maximum torque:	kgm/rpm	124/1400
High idling:	rpm	2350 to 2450
Low idling:	rpm	750 to 800

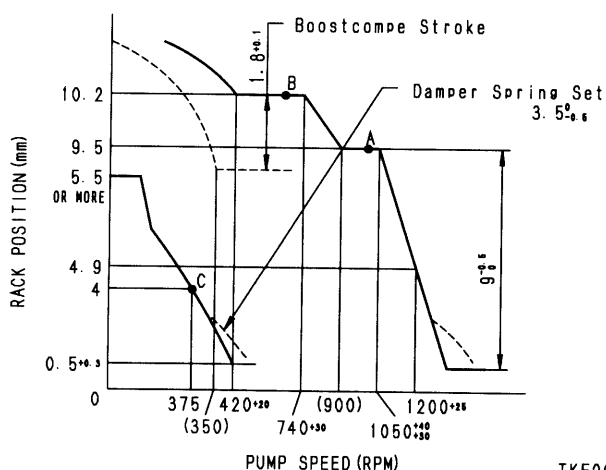
Calibration Standard

Conditions	Unit	Manufacturer standard (with nearly the same actual machine parts)	Service standard (with calibration test parts)
Nozzle part no.		6151-11-3121 (105015-5950)	
Nozzle holder part no.		6151-11-3111 (105041-7040)	
Injection pipe (O/D x I/D x length)	mm	6 x 2.2 x 720	
Test oil		ASTM D975 No. 2 diesel fuel or equivalent	
Oil temperature	°C	43 to 47	
Nozzle opening pressure	kg/cm ²	250	
Transfer pump pressure	kg/cm ²	1.6	

Specifications

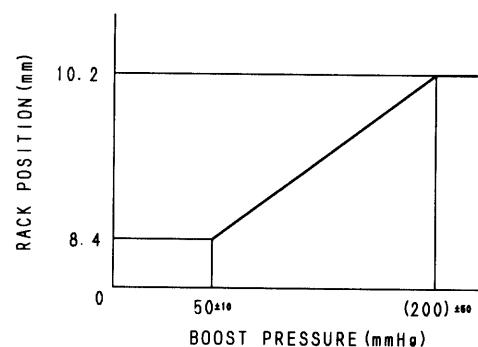
			Injection volume (mm ³ /st) for manufacturer standard			Injection volume (mm ³ /st) for service standard		
	Rack position (mm)	Pump speed (rpm)	Basis	Allowance	Maximum variance between cylinder	Basis	Allowance	Maximum variance between cylinder
Calibration basic point	9.5	1050	148.2	Each cyl. 146.2 to 150.2	± 3	Each cyl.		
• Rack positions B to E are the reference volume when adjusting the injection volume.	B 10.2	700	168.5	★ 166.5 to 170.5	± 4	★		
• Marks ★ are average volumes.	C 4.0	375	15.0	★ 13.5 to 16.5	± 15	★		
	D			★		★		
	E			★		★		

Governor performance



TKE00172

Boost compensator performance



TKE00173

Machine Model	Engine Model	Injection Pump Type	Pump Manufacturer
HD205-3	S6D125-1	PE-6P	DIESEL KIKI

Pump Assembly Number

6151-71-1323 (106672-9303) ... 3

Injection Timing

	Unit	Basis	Allowance
Rotating direction		Counterclockwise viewed from drive end	
Injection order		1 - 5 - 3 - 6 - 2 - 4	
Injection interval		60°	59°30' to 60°30'
Plunger pre-stroke	mm	3.8	3.75 to 3.85
Delivery valve retraction volume	mm ³	80	

Specification for engine with fan (reference only)

Rated horsepower:	HP/rpm	296/2100
Maximum torque:	kgm/rpm	124/1400
High idling:	rpm	2350 to 2450
Low idling:	rpm	750 to 800

Calibration Standard

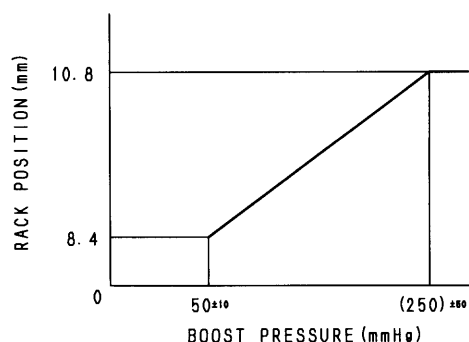
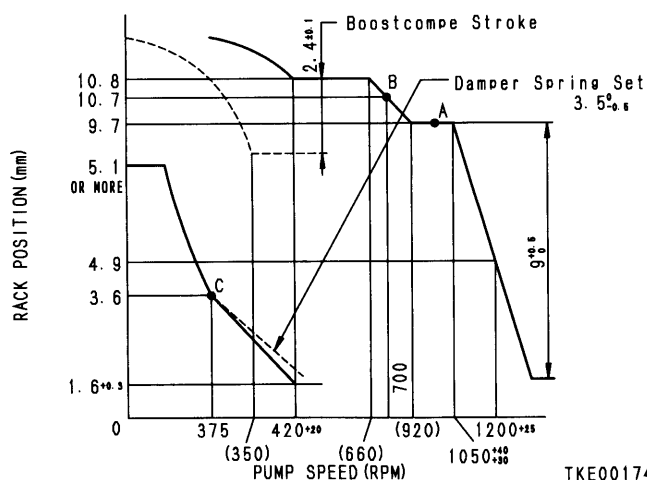
Conditions	Unit	Manufacturer standard (with nearly the same actual machine parts)	Service standard (with calibration test parts)
Nozzle part no.		6151-11-3121 (105015-5950)	(105780-0000)
Nozzle holder part no.		6151-11-3111 (105041-7040)	(105780-2080)
Injection pipe (O/D x I/D x length)	mm	6 x 2.2 x 720	8 x 3 x 600
Test oil		ASTM D975 No. 2 diesel fuel or equivalent	
Oil temperature	°C	43 to 47	43 to 47
Nozzle opening pressure	kg/cm ²	250	175
Transfer pump pressure	kg/cm ²	1.6	1.6

Specifications

			Injection volume (mm ³ /st) for manufacturer standard			Injection volume (mm ³ /st) for service standard		
	Rack position (mm)	Pump speed (rpm)	Basis	Allowance	Maximum variance between cylinder	Basis	Allowance	Maximum variance between cylinder
	Calibration basic point	9.7	1050	152.2	Each cyl.	150.7	Each cyl. 148.7 to 152.7	± 3
- Rack positions B to E are the reference volume when adjusting the injection volume. - Marks ★ are average volumes.	B	10.7	700	185.6		176.8 ★	174.8 to 178.8	± 4
	C	3.6	375	15		10.8 ★	9.3 to 12.3	± 15
	D			★		★		
	E			★		★		

Governor performance

Boost compensator performance



Machine Model Jahan Compressor	Engine Model	Injection Pump Type	Pump Manufacturer
HD205-3	S6D125-1	PE-6P	DIESEL KIKI

Pump Assembly Number

6151-71-1324 (106672-9740)

Injection Timing

	Unit	Basis	Allowance
Rotating direction		Counterclockwise viewed from drive end	
Injection order		1 - 5 - 3 - 6 - 2 - 4	
Injection interval		60°	59°30' to 60°30'
Plunger pre-stroke	mm	3.8	3.75 to 3.85
Delivery valve retraction volume	mm ³	80	

Specification for engine with fan (reference only)

Rated horsepower:	HP/rpm	296/2100
Maximum torque:	kgm/rpm	124/1400
High idling:	rpm	2350 to 2450
Low idling:	rpm	750 to 800

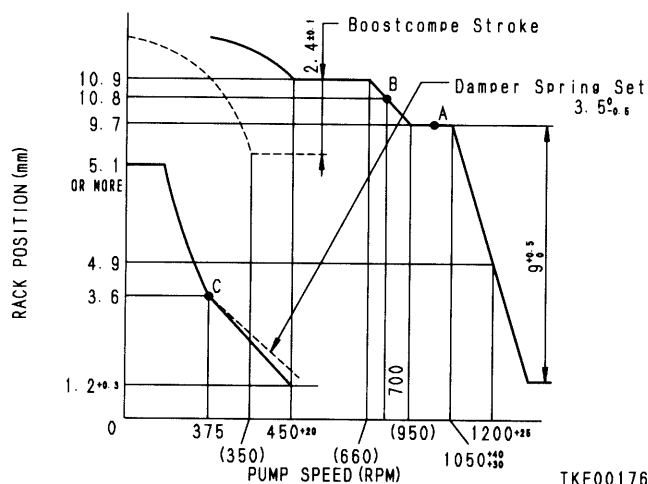
Calibration Standard

Conditions	Unit	Manufacturer standard (with nearly the same actual machine parts)	Service standard (with calibration test parts)
Nozzle part no.		6151-11-3121 (105015-5950)	(105780-0000)
Nozzle holder part no.		6151-11-3111 (105041-7040)	(105780-2080)
Injection pipe (O/D x I/D x length)	mm	6 x 2.2 x 720	8 x 3 x 600
Test oil		ASTM D975 No. 2 diesel fuel or equivalent	
Oil temperature	°C	43 to 47	43 to 47
Nozzle opening pressure	kg/cm ²	250	175
Transfer pump pressure	kg/cm ²	1.6	1.6

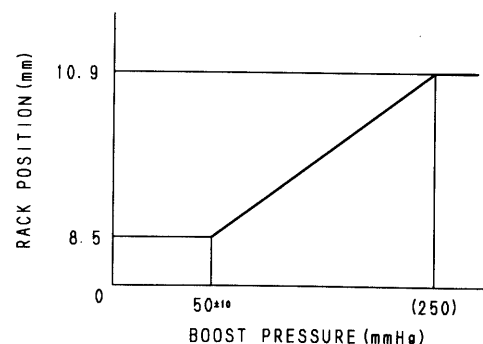
Specifications

			Injection volume (mm ³ /st) for manufacturer standard			Injection volume (mm ³ /st) for service standard		
	Rack position (mm)	Pump speed (rpm)	Basis	Allowance	Maximum variance between cylinder	Basis	Allowance	Maximum variance between cylinder
Calibration basic point	9.7	1050	152.2	Each cyl.		146	Each cyl. 144 - 148	± 3
• Rack positions B to E are the reference volume when adjusting the injection volume.	B 10.8	700	185.6	★		175.3	★ 173.3 - 177.3	± 4
• Marks ★ are average volumes.	C 3.6	375	15	★		13.3	★ 11.8 - 14.8	± 15
	D			★			★	
	E			★			★	

Governor performance



Boost compensator performance



Machine Model	Engine Model	Injection Pump Type	Pump Manufacturer
WA450-1	S6D125-1	PE-6P	DIESEL KIKI

Pump Assembly Number

6151-71-1112 (106692-4402) ... 2
6151-71-1113 (106692-4591) ... 2

Injection Timing

	Unit	Basis	Allowance
Rotating direction		Counterclockwise viewed from drive end	
Injection order		1 — 5 — 3 — 6 — 2 — 4	
Injection interval		60°	59°30' to 60°30'
Plunger pre-stroke	mm	3.75	3.7 to 3.8
Delivery valve retraction volume	mm ³	60	

Specification for engine with fan (reference only)

Rated horsepower:	HP/rpm	237/2200
Maximum torque:	kgm/rpm	105/1400
High idling:	rpm	2350 to 2450
Low idling:	rpm	700 to 750

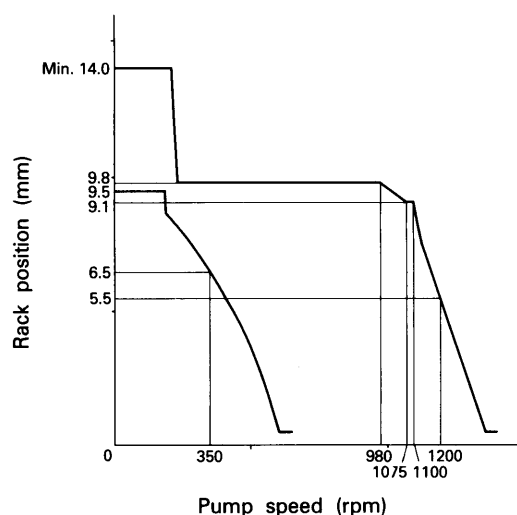
Calibration Standard

Conditions	Unit	Manufacturer standard (with nearly the same actual machine parts)	Service standard (with calibration test parts)
Nozzle part no.		(105015-5370)	(105780-0000)
Nozzle holder part no.		(105041-7030)	(105780-2080)
Injection pipe (O/D x I/D x length)	mm	6 x 2.2 x 710	8 x 3 x 600
Test oil		ASTM D975 No. 2 diesel fuel or equivalent	
Oil temperature	°C	43 to 47	43 to 47
Nozzle opening pressure	kg/cm ²	250	175
Transfer pump pressure	kg/cm ²	1.6	1.6

Specifications

			Injection volume (mm ³ /st) for manufacturer standard			Injection volume (mm ³ /st) for service standard		
	Rack position (mm)	Pump speed (rpm)	Basis	Allowance	Maximum variance between cylinder	Basis	Allowance	Maximum variance between cylinder
	Calibration basic point	9.1	1100	130.5	Each cyl.	120.8	Each cyl. 118.8 to 122.8	± 3
- Rack positions B to E are the reference volume when adjusting the injection volume. - Marks ★ are average volumes.	B	6.5	350	15.0	12.3	★	10.8 to 13.8	± 15
	C			★			★	
	D			★			★	
	E			★			★	

Governor performance



Machine Model Jahan Compressor	Engine Model	Injection Pump Type	Pump Manufacturer
WA450-1	6D125-1	PE-6NB	NIPPON DENSO

Pump Assembly Number

6151-71-1114 (191000-5280)

Injection Timing

	Unit	Basis	Allowance
Rotating direction		Counterclockwise viewed from drive end	
Injection order		1-5-3-6-2-4	
Injection interval		60°	59°30' to 60°30'
Plunger pre-stroke	mm	4.7	
Delivery valve retraction volume	mm ³	90	

Specification for engine with fan (reference only)

Rated horsepower:	HP/rpm	237/2200
Maximum torque:	kgm/rpm	105/1400
High idling:	rpm	2350 - 2450
Low idling:	rpm	700 - 750

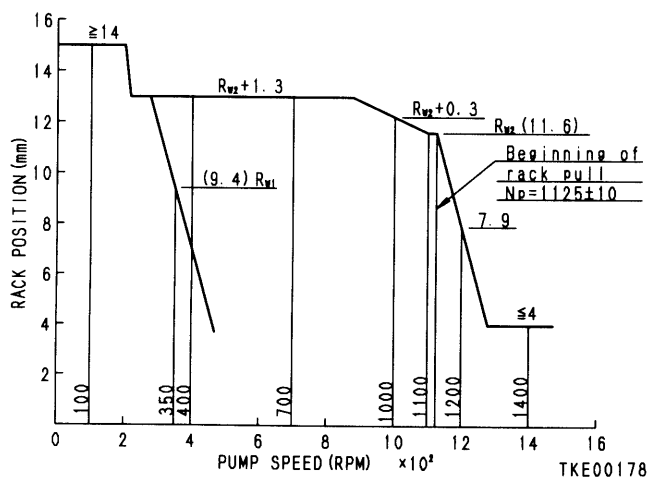
Calibration Standard

Conditions	Unit	Manufacturer standard (with nearly the same actual machine parts)	Service standard (with calibration test parts)
Nozzle part no.		(093400-1600)	(093400-0540) (DN12SD12)
Nozzle holder part no.		(093100-2710)	(093100-0190) (EF8511/9A)
Injection pipe (O/D x I/D x length)	mm	6 x 2 x 600	6 x 2 x 600
Test oil		ASTM D975 No. 2 diesel fuel or equivalent	
Oil temperature	°C	40 to 45	40 to 45
Nozzle opening pressure	kg/cm ²	175	175
Transfer pump pressure	kg/cm ²	1.6	1.6

Specifications

	Rack position (mm)	Pump speed (rpm)	Injection volume (mm ³ /st) for manufacturer standard			Injection volume (mm ³ /st) for service standard		
			Basis	Allowance	Maximum variance between cylinder	Basis	Allowance	Maximum variance between cylinder
	Calibration basic point	11.6	1100	Each cyl.	max.	117.5	Each cyl. 114.5 - 120.5	max. 8
- Rack positions B to E are the reference volume when adjusting the injection volume. - Marks ★ are average volumes.	B	12.9	700	★	max.	149.5	★ 146.5 - 152.5	max. 8
	C	9.4	350	★	max.	21	★ 19 - 23	max. 5
	D			★			★	
	E			★			★	

Governor performance



Machine Model	Engine Model	Injection Pump Type	Pump Manufacturer
WA450-1	S6D125-1	PE-6P	DIESEL KIKI

Pump Assembly Number

6151-71-1115 (106692-4820) ... 1
6151-71-1116 (106692-4822) ... 0

Injection Timing

	Unit	Basis	Allowance
Rotating direction		Counterclockwise viewed from drive end	
Injection order		1 — 5 — 3 — 6 — 2 — 4	
Injection interval		60°	59°30' to 60°30'
Plunger pre-stroke	mm	3.75	3.7 to 3.8
Delivery valve retraction volume	mm ³	60	

Specification for engine with fan (reference only)

Rated horsepower:	HP/rpm	237/2200
Maximum torque:	kgm/rpm	105/1400
High idling:	rpm	2350 to 2450
Low idling:	rpm	700 to 750

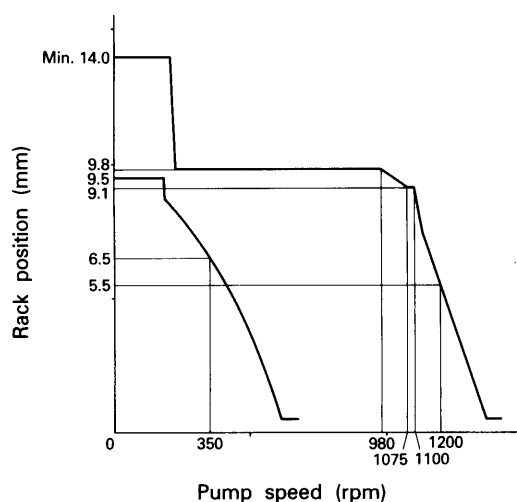
Calibration Standard

Conditions	Unit	Manufacturer standard (with nearly the same actual machine parts)	Service standard (with calibration test parts)
Nozzle part no.		6151-11-3121 (105015-5950)	(105780-0000)
Nozzle holder part no.		6151-11-3111 (105041-7040)	(105780-2080)
Injection pipe (O/D x I/D x length)	mm	6 x 2 x 720	8 x 3 x 600
Test oil		ASTM D975 No. 2 diesel fuel or equivalent	
Oil temperature	°C	43 to 47	43 to 47
Nozzle opening pressure	kg/cm ²	250	175
Transfer pump pressure	kg/cm ²	1.6	1.6

Specifications

			Injection volume (mm ³ /st) for manufacturer standard			Injection volume (mm ³ /st) for service standard		
	Rack position (mm)	Pump speed (rpm)	Basis	Allowance	Maximum variance between cylinder	Basis	Allowance	Maximum variance between cylinder
Calibration basic point	9.1	1100	130.5	Each cyl.		120.8	Each cyl. 118.8 to 122.8	± 3
- Rack positions B to E are the reference volume when adjusting the injection volume. - Marks ★ are average volumes.	B	6.5	350	15.0		12.3	★ 10.8 to 13.8	± 15
	C			★			★	
	D			★			★	
	E			★			★	

Governor performance



Pump Assembly Number

6151-71-1115 (106692-4820)

6151-71-1116 (106692-4822)

6151-71-1121 (106692-4301)

6151-71-1122 (106692-4303)

() : Manufacturer's part No.

Injection Pump Type	Pump Manufacturer
PE-6P	ZEXEL (DIESEL KIKI)

Applicable Machine		Applicable Engine	
Model	Serial No.	Model	Serial No.
WA450-1		S6D125-1	
WF450T-1A			
WA450-1C			

Injection Timing

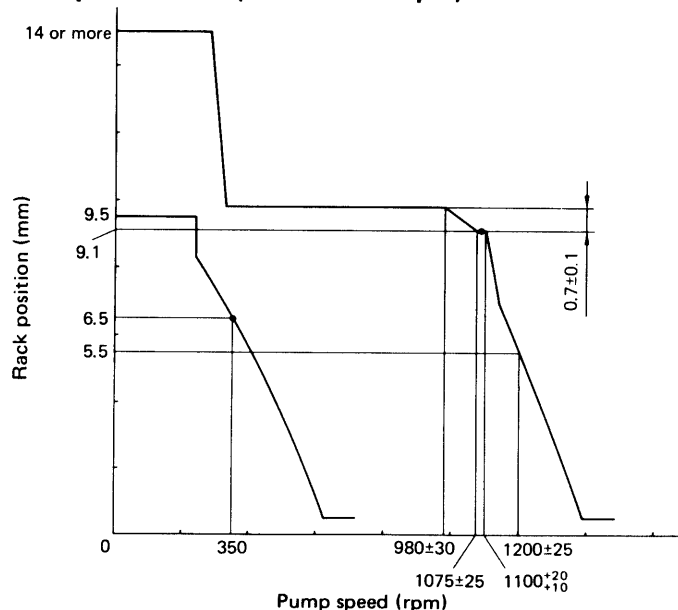
Rotating direction	Counterclockwise viewed from drive end
Injection order	1 — 5 — 3 — 6 — 2 — 4
Injection interval	60° ± 30'
Plunger pre-stroke mm	3.75 ± 0.05
Delivery valve retraction volume mm ³ /st	60

Engine Specification

Rated horsepower HP/rpm	237/2200
Maximum torque kgm/rpm	105/1400
High idling rpm	2350 to 2450
Low idling rpm	700 to 750
Pump tester capacity for Service standard	Motor 7.5 KW

Calibration Standard

Conditions				Service standard			Manufacturer standard		
• Service standard indicates data using calibration test parts. • Manufacture standard is data for factory test.	Nozzle part no.			(105780-0000)			6151-11-3120 (105015-5370)		
	Nozzle holder part no.			(105780-2080)			6151-11-3110 (105041-7030)		
	Injection pipe (O/D × I/D × length) mm			8 × 3 × 600			6 × 2.2 × 710		
	Test oil			ASTM D975 No.2 diesel fuel or equivalent					
	Oil temperature °C			40 to 45					
	Nozzle opening pressure kg/cm ²			175			250		
Transfer pump pressure kg/cm ²				1.6			1.6		
Injection volume	Rack point	Rack position (mm)	Pump speed (rpm)	Service standard (cc/500st)			Manufacturer standard (cc/500st)		
				Basis	Allowance	Maximum variance between cylinder	Basis	Allowance	Maximum variance between cylinder
	Basic point	9.1	1100	60.4	Each cyl. 59.4 to 61.4	±1.812	65.25	Each cyl.	
	B	Approx. 6.5	350	6.15	★ 5.4 to 6.9	±0.9225	7.5	★	
	C				★			★	
	D				★			★	
	E				★			★	

Governor performance (350 — 1100 rpm)

SEBH4858

(): Manufacturer's part No.

Injection Pump Type	Pump Manufacturer
PE-6P	ZEXEL

Applicable Machine		Applicable Engine	
Model	Serial No.	Model	Serial No.
WA450-3		S6D125-1	

Injection Timing

Rotating direction	Counterclockwise viewed from drive end
Injection order	1 - 5 - 3 - 6 - 2 - 4
Injection interval	59°31' - 60°30'
Plunger pre-stroke (mm)	3.75 ± 0.05
Delivery valve retraction volume (mm ³ /st)	60

Engine Specification

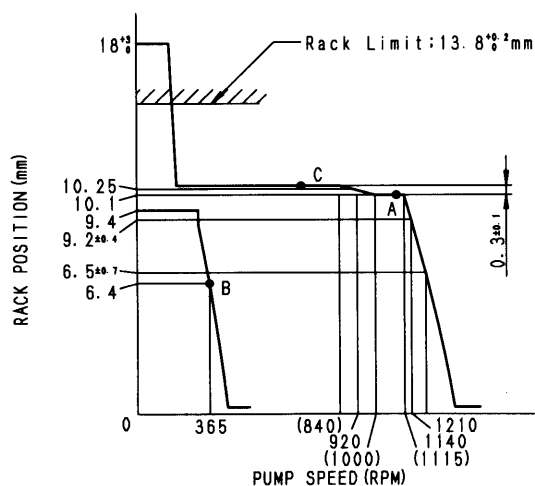
Rated horsepower (kW[HP] / rpm)	193.4 [259.3] / 2,200
Maximum torque (Nm[kgm] / rpm)	1048.6 [107] / 1,400
High idling (rpm)	2,350 - 2,450
Low idling (rpm)	700 - 750
Pump tester capacity for Service standard	Motor 7.5 kW

Calibration Standard

(): Pump manufacturer's part No.

Conditions				Service standard		Manufacturer standard	
• Service standard indicates data using calibration test parts. • Manufacturer standard is data for factory test.	Nozzle part no.			(105780-0000)		6151-11-3121 (105015-5950)	
	Nozzle holder part no.			(105780-2080)		6151-11-3111 (105041-7040)	
	Injection pipe (O/D x I/D x length)	mm		8 x 3 x 600		6 x 2.2 x 720	
	Test oil			ASTM D975 No.2 diesel fuel or equivalent			
	Oil temperature	°C		43 to 47			
	Nozzle opening pressure (MPa[kg/cm ²])			17.16 [175]		24.52 [250]	
	Transfer pump pressure (kPa[kg/cm ²])			156.91 [1.6]		156.91 [1.6]	
Injection volume	Rack point	Rack position (mm)	Pump speed (rpm)	Service standard		Manufacturer standard	
				Injection volume (cc/1000 st)	Maximum variance between cylinder (%)	Injection volume (cc/1000 st)	Maximum variance between cylinder (%)
	A (Basic point)	10.1	1100	159 ± 2	± 3	150.4	
	B	6.4	365	13 ± 1.5	± 15	15	
	C	10.4	700	166.6 ± 3	—	169.6	
	D						
	E						

Governor performance



TKE00179

Pump Assembly Number

6151-71-1180 (191000-9790)
Jalan Compressor

(): Manufacturer's part No.

Injection Pump Type	Pump Manufacturer
NB (EP-9)	NIPPON DENSO

Applicable Machine		Applicable Engine	
Model	Serial No.	Model	Serial No.
D65EX-12		S6D125-1	
D65P, PX-12			

Injection Timing

Rotating direction	Counterclockwise viewed from drive end
Injection order	1 — 5 — 3 — 6 — 2 — 4
Injection interval	$60^\circ \pm 30'$
Plunger pre-stroke mm	4.7 ± 0.05
Delivery valve retraction volume mm ³ /st	90

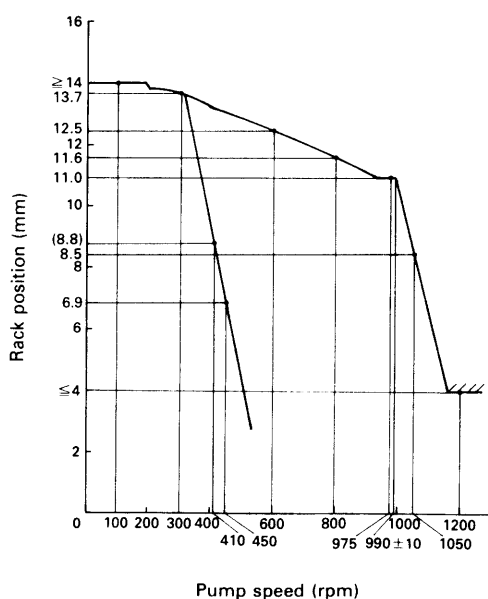
Engine specification

Rated horsepower HP/rpm	190/1950
Maximum torque kgm/rpm	100/1200
High idling rpm	2050 to 2150
Low idling rpm	800 to 825
Pump tester capacity for Service standard	Motor 7.5 KW

Calibration Standard

Conditions				Service standard			Manufacturer standard		
• Service standard indicates data using calibration test parts (Nozzle, Nozzle holder and injection pipe) • Manufacture standard is data using factory test parts (For reference)	Nozzle part no.			(093400-0540) (ND-DN12SD12A)			(093400-0540) (ND-DN12SD12A)		
	Nozzle holder part no.			(093100-0190) (EF8511/9A)			(093100-0190) (EF8511/9A)		
	Injection pipe (O/D x I/D x length)		mm	6 x 2 x 600			6 x 2 x 600		
	Test oil			ASTM D975 No. 2 diesel fuel or equivalent					
	Oil temperature		°C	40 to 45					
	Nozzle opening pressure		kg/cm²	175			175		
Transfer pump pressure		kg/cm²	1.6			1.6			
Injection volume				Service standard (cc/ 500 st)			Manufacturer standard (cc/ 500 st)		
• Rack positions B to E are the reference volume when adjusting the injection volume. • Marks ★ are average volumes.	Rack point	Rack position (mm)	Pump speed (rpm)	Basis	Allowance	Maximum variance between cylinder	Basis	Allowance	Maximum variance between cylinder
	Basic point	11.0	975	55.5	Each cyl. 54.0 to 57.0	Max. 4	55.5	Each cyl.	
	B	11.8	500	67.0	★ 65.5 to 68.5	Max. 4	67.0	★	
	C	(8.8)	410	12.0	★ 11.0 to 13.0	Max. 2.5	12.0	★	
	D				★			★	
	E				★			★	

Governor performance (410 — 975 rpm)



SEBH

Pump Assembly Number

6151-71-2720 (106691-4031)

Injection Compressor

(): Manufacturer's part No.

Injection Pump Type	Pump Manufacturer
PE-6P	DIESEL KIKI

Applicable Machine		Applicable Engine	
Model	Serial No.	Model	Serial No.
HA250		S6D125-1	
HA270			

Injection Timing

Rotating direction	Counterclockwise viewed from drive end
Injection order	1-5-3-6-2-4
Injection interval	$60^{\circ} \pm 30'$
Plunger pre-stroke mm	3.75 ± 0.05
Delivery valve retraction volume mm ³ /st	60

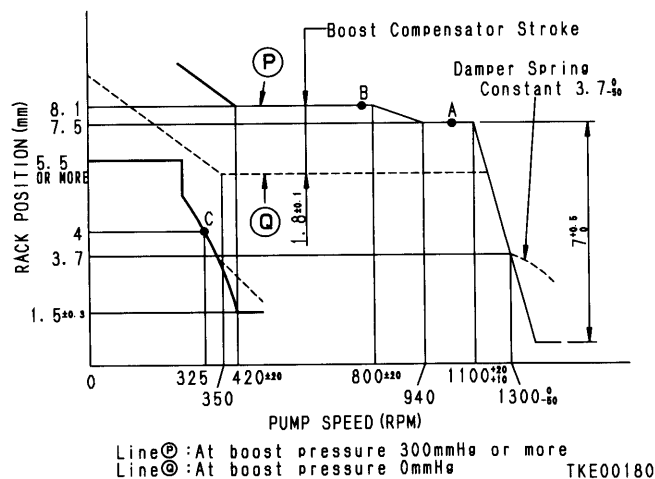
Engine specification

Rated horsepower HP/rpm	239.5/2,200
Maximum torque kgm/rpm	98.8/1,400
High idling rpm	2,550 to 2,650
Low idling rpm	650 to 700
Pump tester capacity for Service standard	Motor 7.5 KW

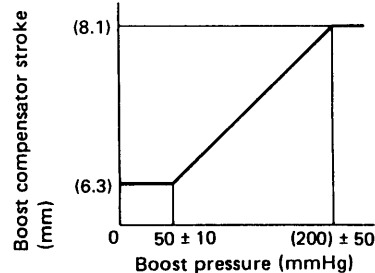
Calibration Standard

Conditions				Service standard			Manufacturer standard		
• Service standard indicates data using calibration test parts. • Manufacture standard is data for factory test.	Nozzle part no.			(105780-0000)			6151-11-3121 (105015-5950)		
	Nozzle holder part no.			(105780-2080)			6151-11-3111 (105041-7040)		
	Injection pipe (O/D x I/D x length) mm			8 x 3 x 600			6 x 2.2 x 720		
	Test oil			ASTM D975 No. 2 diesel fuel or equivalent					
	Oil temperature °C			43 to 47					
	Nozzle opening pressure kg/cm ²			175			250		
	Transfer pump pressure kg/cm ²			1.6			1.6		
Injection volume • Rack positions B to E are the reference volume when adjusting the injection volume. • Marks ★ are average volumes.	Rack point	Rack position (mm)	Pump speed (rpm)	Service standard (cc/ 500 st)			Manufacturer standard (cc/500 st)		
				Basis	Allowance	Maximum variance between cylinder	Basis	Allowance	Maximum variance between cylinder
	Basic point	7.5	1100	[58.65]	Each cyl. [57.65 to 59.65]		63.35	Each cyl.	
	B	8.1	700	[71.70]	★[71.7 to 72.7]		73.00	★	
	C	Approx. 4.0	325	[6.70]	★[5.95 to 7.45]		7.5	★	
	D				★			★	
	E				★			★	

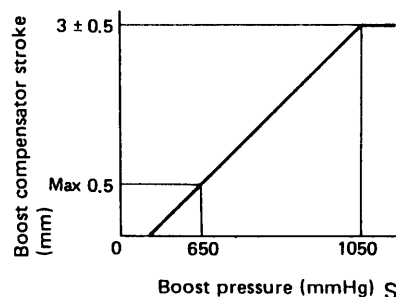
Governor performance (325 – 1100 rpm)



Boost compensator performance (650rpm)



Automatic timer performance



Machine Model	Engine Model	Injection Pump Type	Pump Manufacturer
WA470-1	S6D125-1	PE-6P	DIESEL KIKI

Pump Assembly Number

6151-71-1151 (106692-4750) ... 0
6151-71-1153 (106692-4830) ... 1
6151-71-1154 (106692-4833) ... 1
6151-71-1450 (106692-4753) ... 1

Injection Timing

	Unit	Basis	Allowance
Rotating direction		Counterclockwise viewed from drive end	
Injection order		1 - 5 - 3 - 6 - 2 - 4	
Injection interval		60°	59°30' to 60°30'
Plunger pre-stroke	mm	3.75	3.7 to 3.8
Delivery valve retraction volume	mm ³	60	

Specification for engine with fan (reference only)

Rated horsepower:	HP/rpm	260/2200
Maximum torque:	kgm/rpm	107/1400
High idling:	rpm	2350 to 2450
Low idling:	rpm	650 to 750

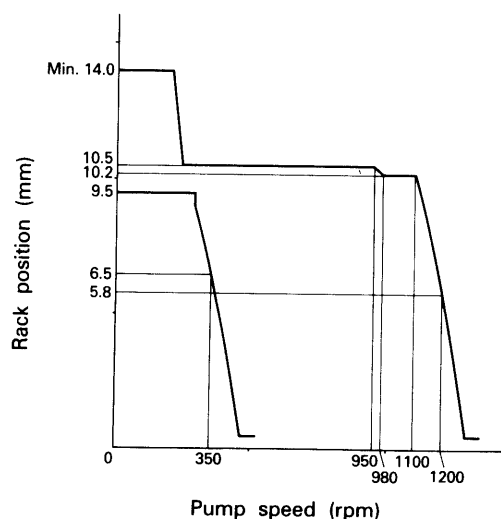
Calibration Standard

Conditions	Unit	Manufacturer standard (with nearly the same actual machine parts)	Service standard (with calibration test parts)
Nozzle part no.		6151-11-3121 (105015-5950)	(105780-0000)
Nozzle holder part no.		6151-11-3111 (105041-7040)	(105780-2080)
Injection pipe (O/D x I/D x length)	mm	6 x 2.2 x 720	8 x 3 x 600
Test oil		ASTM D975 No. 2 diesel fuel or equivalent	
Oil temperature	°C	43 to 47	43 to 47
Nozzle opening pressure	kg/cm ²	250	175
Transfer pump pressure	kg/cm ²	1.6	1.6

Specifications

			Injection volume (mm ³ /st) for manufacturer standard			Injection volume (mm ³ /st) for service standard		
	Rack position (mm)	Pump speed (rpm)	Basis	Allowance	Maximum variance between cylinder	Basis	Allowance	Maximum variance between cylinder
Calibration basic point	10.2	1100	148.4	Each cyl.		152.7	Each cyl. 150.7 to 154.7	± 3
- Rack positions B to E are the reference volume when adjusting the injection volume. - Marks ★ are average volumes.	B	6.5	350	15.0		12.0 ★	10.5 to 13.5	± 15
	C			★			★	
	D			★			★	
	E			★			★	

Governor performance



Machine Model	Engine Model	Injection Pump Type	Pump Manufacturer
WA470-1	S6D125-1	PE-6NB	NIPPON DENSO

Pump Assembly Number

6151-71-1152 (191000-5390)

Injection Timing

	Unit	Basis	Allowance
Rotating direction		Counterclockwise viewed from drive end	
Injection order		1 – 5 – 3 – 6 – 2 – 4	
Injection interval		60°	59°30' to 60°30'
Plunger pre-stroke	mm	4.7	
Delivery valve retraction volume	mm ³	90	

Specification for engine with fan (reference only)

Rated horsepower:	HP/rpm	
Maximum torque:	kgm/rpm	
High idling:	rpm	2350 – 2450
Low idling:	rpm	700 – 750

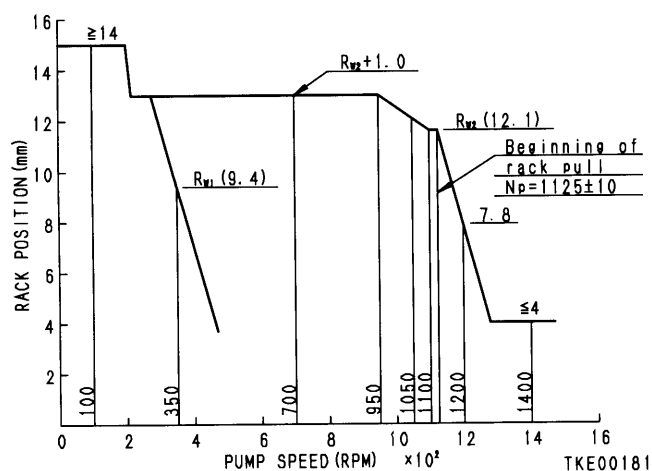
Calibration Standard

Conditions	Unit	Manufacturer standard (with nearly the same actual machine parts)	Service standard (with calibration test parts)
Nozzle part no.		(093400-1600)	(093400-0540) (DN12SD12)
Nozzle holder part no.		(093100-2710)	(093100-0190) (EF8511/9A)
Injection pipe (O/D x I/D x length)	mm	6 x 2 x 600	6 x 2 x 600
Test oil		ASTM D975 No. 2 diesel fuel or equivalent	
Oil temperature	°C	40 to 45	40 to 45
Nozzle opening pressure	kg/cm ²	175	175
Transfer pump pressure	kg/cm ²	1.6	1.6

Specifications

		Rack position (mm)	Pump speed (rpm)	Injection volume (mm ³ /st) for manufacturer standard			Injection volume (mm ³ /st) for service standard		
				Basis	Allowance	Maximum variance between cylinder	Basis	Allowance	Maximum variance between cylinder
	Calibration basic point	12.1	1100		Each cyl.	max.	125	Each cyl. 122 – 128	max. ± 8
• Rack positions B to E are the reference volume when adjusting the injection volume.	B	13.1	700	★		max.	146	★ 143 – 149	max. ± 6
	C	9.4	350	★		max.	21	★ 19 – 23	max. ± 5
• Marks ★ are average volumes.	D			★				★	
	E			★				★	

Governor performance



Numbers in parentheses are pump manufacturer part numbers.

Machine Model Jalan Compressor	Engine Model	Injection Pump Type	Pump Manufacturer
GD705A-4	S6D125-1	PE-6P	DIESEL KIKI

Pump Assembly Number

6151-71-1511 (106692-4070) ... 0
6151-71-1513 (106692-4083)
6151-71-1531 (106692-4423)

Injection Timing

	Unit	Basis	Allowance
Rotating direction		Counterclockwise viewed from drive end	
Injection order		1-5-3-6-2-4	
Injection interval		60°	59°30' to 60°30'
Plunger pre-stroke	mm	3.75	3.7 to 3.8
Delivery valve retraction volume	mm ³	60	

Specification for engine with fan (reference only)

Rated horsepower:	HP/rpm	200/2000
Maximum torque:	kgm/rpm	92 /1300
High idling:	rpm	2150 to 2250
Low idling:	rpm	600 to 700

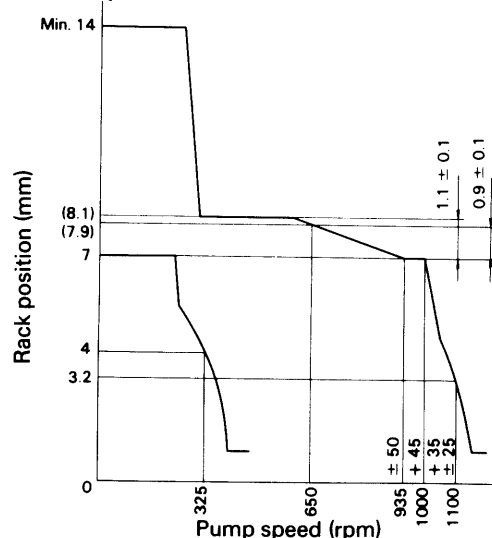
Calibration Standard

Conditions	Unit	Manufacturer standard (with nearly the same actual machine parts)	Service standard (with calibration test parts)
Nozzle part no.		(105015-5370)	()
Nozzle holder part no.		(105041-7030)	()
Injection pipe (O/D x I/D x length)	mm	6 x 2.2 x 710	
Test oil		ASTM D975 No. 2 diesel fuel or equivalent	
Oil temperature	°C	43 to 47	
Nozzle opening pressure	kg/cm ²	250	
Transfer pump pressure	kg/cm ²	1.6	

Specifications

			Injection volume (cc/500st) for manufacturer standard			Injection volume(cc/500st) for service standard		
	Rack position (mm)	Pump speed (rpm)	Basis	Allowance	Maximum variance between cylinder	Basis	Allowance	Maximum variance between cylinder
Calibration basic point	7.0	1000	58.5	Each cyl. 57.5 to 59.5	± 1.76	Each cyl.		
• Rack positions B to E are the reference volume when adjusting the injection volume.	B 7.9	650	66.0	★ 65.0 to 67.0	± 2.64	★		
• Marks ★ are average volumes.	C 4.0	325	7.5	★ 6.75 to 8.25	± 1.13	★		
	D			★		★		
	E			★		★		

Governor performance



Jahan Compressor
Pump Assembly Number
 6151-71-1550 (191000-3340) ... 1
 6151-71-1551 (191000-3341) ... 0

(): Manufacturer's part No.

Injection Pump Type	Pump Manufacturer
PE-6NB	NIPPON DENSO

Applicable Machine		Applicable Engine	
Model	Serial No.	Model	Serial No.
GD705A-4		S6D125-1	

Injection Timing

Rotating direction	Counterclockwise viewed from drive end
Injection order	1 - 5 - 3 - 6 - 2 - 4
Injection interval	60 (59°30' - 60°30')
Plunger pre-stroke (mm)	4.7
Delivery valve retraction volume (mm ³ /st)	90

Engine Specification

Rated horsepower (kW[HP] / rpm)	149.2 [200] / 2,000
Maximum torque (Nm[kgm] / rpm)	901.6 [92] / 1,300
High idling (rpm)	2,150 - 2,250
Low idling (rpm)	600 - 700
Pump tester capacity for Service standard	Motor 7.5 kW

Calibration Standard

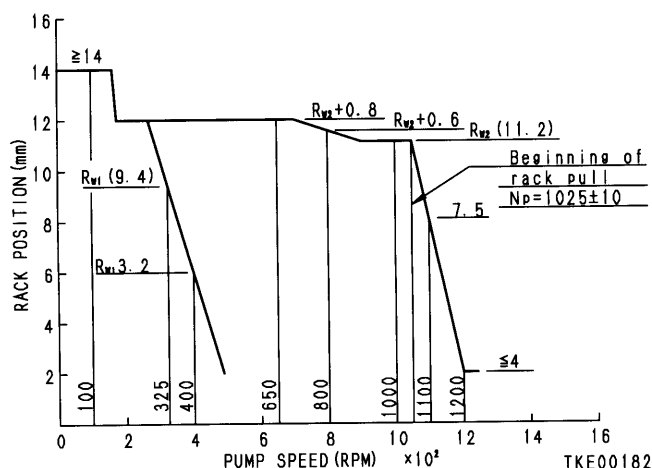
(): Pump manufacturer's part No.

Calibration Standard

Conditions				Service standard		Manufacturer standard	
• Service standard indicates data using calibration test parts. • Manufacturer standard is data for factory test.	Nozzle part no.			(093400-0540)			
	Nozzle holder part no.			(093100-0190)			
	Injection pipe (O/D x I/D x length) mm			6 x 2 x 600			
	Test oil			ASTM D975 No.2 diesel fuel or equivalent			
	Oil temperature °C			40 to 45			
	Nozzle opening pressure (MPa[kg/cm ²])			17.16 [175]			
	Transfer pump pressure (kPa[kg/cm ²])			156.91 [1.6]			
Injection volume	Rack point	Rack position (mm)	Pump speed (rpm)	Service standard		Manufacturer standard	
				Injection volume (cc/1000 st)	Maximum variance between cylinder (%)	Injection volume (cc/1000 st)	Maximum variance between cylinder (%)
	A (Basic point)	11.2	1000	109 ± 2	8		
	B	12	650	130 ± 3	8		
	C	9.4	325	21 ± 2	5		
	D						
	E						

- **Rack positions** B to E are the reference volume when adjusting the injection volume.

Governor performance



Machine Model Jahan Compressor	Engine Model	Injection Pump Type	Pump Manufacturer
EC260Z-1	S6D125-1	PE6P	DIESEL KIKI

Pump Assembly Number

6151-71-1821 (106692-4260)... 0

Injection Timing

	Unit	Basis	Allowance
Rotating direction		Counterclockwise viewed from drive end	
Injection order		1 – 5 – 3 – 6 – 2 – 4	
Injection interval		60°	59°30' to 60°30'
Plunger pre-stroke	mm	3.75	3.7 to 3.8
Delivery valve retraction volume	mm ³	60	

Specification for engine with fan (reference only)

Rated horsepower:	HP/rpm	232/2150
Maximum torque:	kgm/rpm	96 /1500
High idling:	rpm	2250 to 2350
Low idling:	rpm	975 to 1025

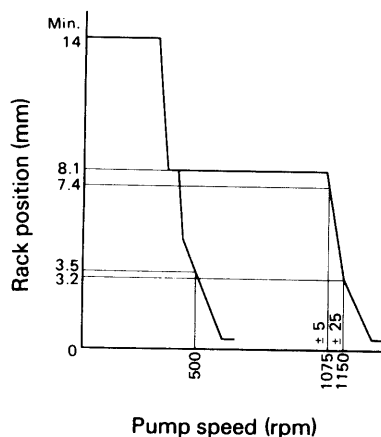
Calibration Standard

Conditions	Unit	Manufacturer standard (with nearly the same actual machine parts)	Service standard (with calibration test parts)
Nozzle part no.		(105015-5370)	()
Nozzle holder part no.		(105041-7030)	()
Injection pipe (O/D x I/D x length)	mm	6 x 2.2 x 710	
Test oil		ASTM D975 No. 2 diesel fuel or equivalent	
Oil temperature	°C	43 to 47	
Nozzle opening pressure	kg/cm ²	250	
Transfer pump pressure	kg/cm ²	1.6	

Specifications

				Injection volume (cc/1000st) for manufacturer standard			Injection volume (cc/ for service standard		
	Rack position (mm)	Pump speed (rpm)		Basis	Allowance	Maximum variance between cylinder	Basis	Allowance	Maximum variance between cylinder
	Calibration basic point	7.4	1075	125.0	Each cyl. 123.0 to 127.0	± 3.75		Each cyl.	
• Rack positions B to E are the reference volume when adjusting the injection volume.	B	3.5	500	15.0	★ 13.5 to 16.5	± 2.25		★	
• Marks ★ are average volumes.	C	8.1	1050	142.0	★ 140.0 to 144.0	± 5.68		★	
	D				★			★	
	E				★			★	

Governor performance



Machine Model JCBH Compressor	Engine Model	Injection Pump Type	Pump Manufacturer
EC260Z-1	S6D125-1	PE6P	DIESEL KIKI

Pump Assembly Number

6151-71-1822 (106692-4263)
6151-71-1823 (106692-4264)

Injection Timing

	Unit	Basis	Allowance
Rotating direction		Counterclockwise viewed from drive end	
Injection order		1 – 5 – 3 – 6 – 2 – 4	
Injection interval		60°	59°30' to 60°30'
Plunger pre-stroke	mm	3.75	3.7 to 3.8
Delivery valve retraction volume	mm ³	60	

Specification for engine with fan (reference only)

Rated horsepower:	HP/rpm	232/2150
Maximum torque:	kgm/rpm	96 /1500
High idling:	rpm	2250 to 2350
Low idling:	rpm	975 to 1025

Calibration Standard

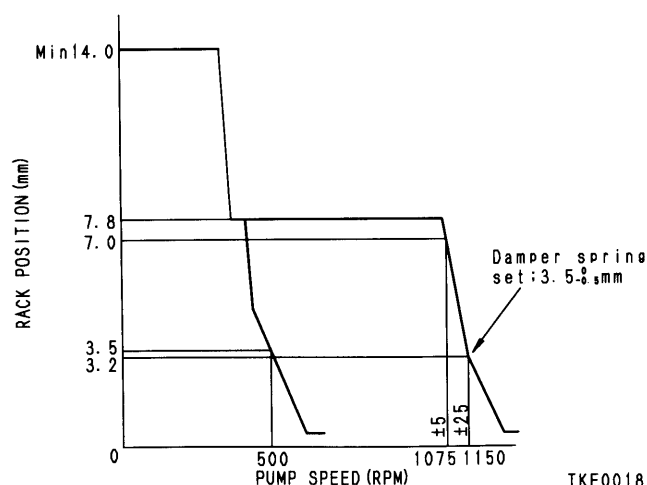
Conditions	Unit	Manufacturer standard (with nearly the same actual machine parts)	Service standard (with calibration test parts)
Nozzle part no.		(105015-5370)	(105780-0000)
Nozzle holder part no.		(105041-7030)	(105780-2080)
Injection pipe (O/D x I/D x length)	mm	6 x 2.2 x 710	8 x 3 x 600
Test oil		ASTM D975 No. 2 diesel fuel or equivalent	
Oil temperature	°C	43 to 47	43 to 47
Nozzle opening pressure	kg/cm ²	250	175
Transfer pump pressure	kg/cm ²	1.6	106

Specifications

Specifications

			Injection volume (cc/1000st) for manufacturer standard				Injection volume (cc/ for service standard				st)	
			Basis	Allowance			Maximum variance between cylinder	Basis	Allowance			Maximum variance between cylinder
			Rack position (mm)	Pump speed (rpm)								
			Calibration basic point	7.0	1075	125.0	Each cyl. 123.0 to 127.0	± 3.75	120	Each cyl. 118 – 122	± 3.6	
• Rack positions B to E are the reference volume when adjusting the injection volume.	B	3.5	500	15.0	★ 13.5 to 16.5	± 2.25		13	★ 11.5 – 14.5	± 1.2		
	C	7.8	1050	142.0	★ 140.0 to 144.0	± 5.68		137	★ 135 – 139	± 5.5		
• Marks ★ are average volumes.	D				★				★			
	E				★				★			

Governor performance



Machine Model Jahan Compressor	Engine Model	Injection Pump Type	Pump Manufacturer
EG200-3	S6D125	PE6P	DIESEL KIKI

Pump Assembly Number

6151-71-1930 (106692-4130)... 1

Injection Timing

	Unit	Basis	Allowance
Rotating direction		Counterclockwise viewed from drive end	
Injection order		1 – 5 – 3 – 6 – 2 – 4	
Injection interval		60°	59°30' to 60°30'
Plunger pre-stroke	mm	3.75	3.7 to 3.8
Delivery valve retraction volume	mm ³	60	

Specification for engine with fan (reference only)

Rated horsepower: HP/rpm	225/1500 (50Hz) 249/1800 (60Hz)
Maximum torque: kgm/rpm	
High idling: rpm	Max. 1560 (50Hz) Max. 1872 (60Hz)
Low idling: rpm	950 to 1000

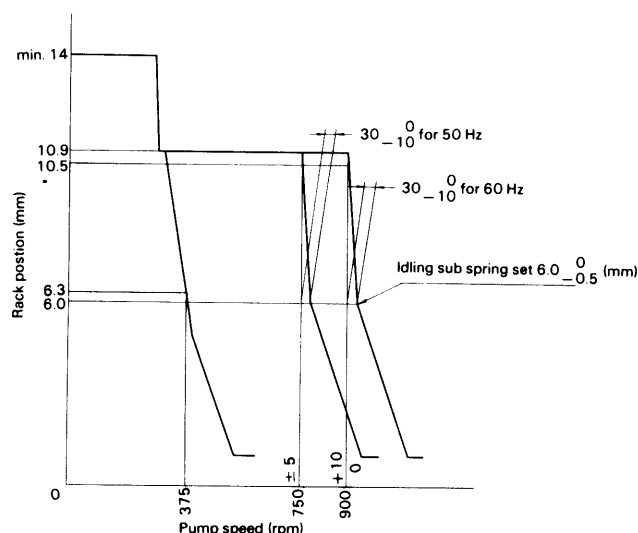
Calibration Standard

Conditions	Unit	Manufacturer standard (with nearly the same actual machine parts)	Service standard (with calibration test parts)
Nozzle part no.		(105015-5370)	()
Nozzle holder part no.		(105041-7030)	()
Injection pipe (O/D x I/D x length)	mm	6 x 2.2 x 710	
Test oil		ASTM D975 No. 2 diesel fuel or equivalent	
Oil temperature	°C	43 to 47	
Nozzle opening pressure	kg/cm ²	250	
Transfer pump pressure	kg/cm ²	1.6	

Specifications

			Injection volume (cc/500st) for manufacturer standard			Injection volume (cc/500st) for service standard		
	Rack position (mm)	Pump speed (rpm)	Basis	Allowance	Maximum variance between cylinder	Basis	Allowance	Maximum variance between cylinder
Calibration basic point	10.9	900	93.5	Each cyl. 92.5 to 94.5	± 2.81		Each cyl.	
• Rack positions B to E are the reference volume when adjusting the injection volume.	B 10.5	750	87.5	★ 86.5 to 88.5	± 3.50	★		
• Marks ★ are average volumes.	C 6.3	375	7.5	★ 6.8 to 8.3	± 1.13	★		
	D			★		★		
	E			★		★		

Governor performance



Numbers in parentheses are pump manufacturer part numbers.

Machine Model	Engine Model	Injection Pump Type	Pump Manufacturer
EG200-3	S6D125	PE6P	DIESEL KIKI

Pump Assembly Number

6151-71-1931 (106692-4133)
6151-71-1932 (106692-4134)

Injection Timing

Unit	Basis	Allowance
Rotating direction	Counterclockwise viewed from drive end	
Injection order	1 – 5 – 3 – 6 – 2 – 4	
Injection interval	60°	59°30' to 60°30'
Plunger pre-stroke mm	3.75	3.7 to 3.8
Delivery valve retraction volume mm ³	60	

Specification for engine with fan (reference only)

Rated horsepower: HP/rpm	225/1500 (50Hz) 249/1800 (60Hz)
Maximum torque: kgm/rpm	
High idling: rpm	Max. 1560 (50Hz) Max. 1872 (60Hz)
Low idling: rpm	950 to 1000

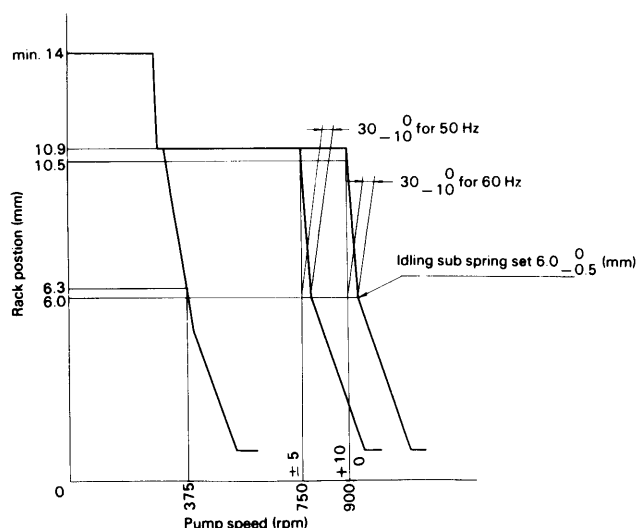
Calibration Standard

Conditions	Unit	Manufacturer standard (with nearly the same actual machine parts)	Service standard (with calibration test parts)
Nozzle part no.		(105015-5370)	(105780-0000)
Nozzle holder part no.		(105041-7030)	(105780-2080)
Injection pipe (O/D x I/D x length)	mm	6 x 2.2 x 710	8 x 3 x 600
Test oil		ASTM D975 No. 2 diesel fuel or equivalent	
Oil temperature	°C	43 to 47	43 to 47
Nozzle opening pressure	kg/cm ²	250	175
Transfer pump pressure	kg/cm ²	1.6	1.6

Specifications

			Injection volume (cc/500st) for manufacturer standard			Injection volume (cc/500st) for service standard		
	Rack position (mm)	Pump speed (rpm)	Basis	Allowance	Maximum variance between cylinder	Basis	Allowance	Maximum variance between cylinder
	Calibration basic point	10.9 900	93.5	Each cyl. 92.5 to 94.5	± 2.81	94.75	Each cyl.	
• Rack positions B to E are the reference volume when adjusting the injection volume.	B	10.5 750	87.5	★ 86.5 to 88.5	± 3.50	86.4	★ 85.4 – 87.4	± 3.5
• Marks ★ are average volumes.	C	6.3 375	7.5	★ 6.8 to 8.3	± 1.13	6.5	★ 5.75 – 7.25	± 1.0
	D			★			★	
	E			★			★	

Governor performance



Numbers in parentheses are pump manufacturer part numbers.

Machine Model	Engine Model	Injection Pump Type	Pump Manufacturer
D135A-1	SA6D125-1	PE-6P	DIESEL KIKI

Pump Assembly Number

6152-71-1730 (106672-9602) ... 2
6152-71-1731 (106672-9604)

Injection Timing

	Unit	Basis	Allowance
Rotating direction		Counterclockwise viewed from drive end	
Injection order		1 - 5 - 3 - 6 - 2 - 4	
Injection interval		60°	59°30' to 60°30'
Plunger pre-stroke	mm	3.8	3.75 to 3.85
Delivery valve retraction volume	mm ³	80	

Specification for engine with fan (reference only)

Rated horsepower:	HP/rpm	275/2000
Maximum torque:	kgm/rpm	128/1400
High idling:	rpm	2150 to 2250
Low idling:	rpm	650 to 700

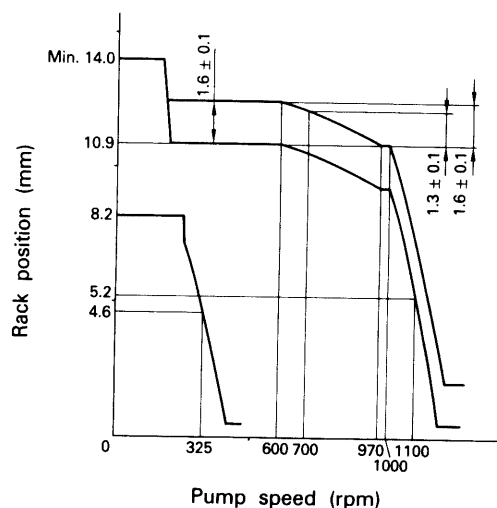
Calibration Standard

Conditions	Unit	Manufacturer standard (with nearly the same actual machine parts)	Service standard (with calibration test parts)
Nozzle part no.		6152-11-3220 (105015-6770)	(105780-0000)
Nozzle holder part no.		6152-11-3210 (105041-7080)	(105780-2080)
Injection pipe (O/D x I/D x length)	mm	6 x 2.2 x 720	8 x 3 x 600
Test oil		ASTM D975 No. 2 diesel fuel or equivalent	
Oil temperature	°C	43 to 47	43 to 47
Nozzle opening pressure	kg/cm ²	250	175
Transfer pump pressure	kg/cm ²	1.6	1.6

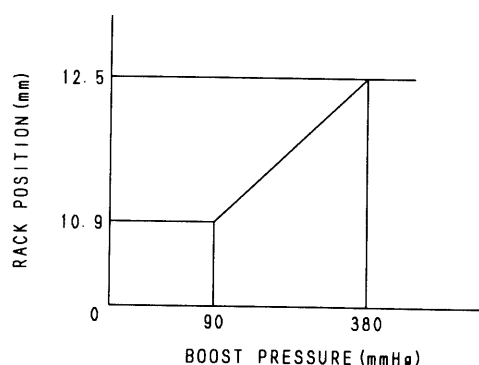
Specifications

			Injection volume (mm ³ /st) for manufacturer standard			Injection volume (mm ³ /st) for service standard		
	Rack position (mm)	Pump speed (rpm)	Basis	Allowance	Maximum variance between cylinder	Basis	Allowance	Maximum variance between cylinder
	Calibration basic point	10.9	1000	158.6	Each cyl.	145.8	Each cyl. 143.8 to 147.8	± 3
• Rack positions B to E are the reference volume when adjusting the injection volume.	B	12.2	700	188.4		174.6	★ 172.6 to 176.6	± 4
• Marks ★ are average volumes.	C	5.2	325	15.0		13.3	★ 11.8 to 14.8	± 15
	D			★			★	
	E			★			★	

Governor performance



Boost compensator performance



TKE00184

Jahan Compressor
Pump Assembly Number
 6152-71-1170 (106671-4052)
 6152-71-1171 (106671-4053)

(): Manufacturer's part No.

Injection Pump Type	Pump Manufacturer
PE-6P	ZEXEL

Applicable Machine		Applicable Engine	
Model	Serial No.	Model	Serial No.
EP		SA6D125-1	
(Power unit)			

Injection Timing

Rotating direction	Counterclockwise viewed from drive end
Injection order	1 - 5 - 3 - 6 - 2 - 4
Injection interval	59°31' - 60°30'
Plunger pre-stroke (mm)	3.8 ± 0.05
Delivery valve retraction volume (mm ³ /st)	80

Engine Specification

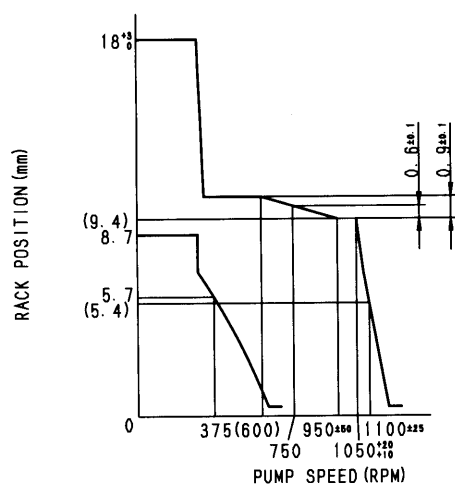
Rated horsepower (kW[HP] / rpm)	203 [272.1] / 2,100
Maximum torque (Nm[kgm] / rpm)	—
High idling (rpm)	2,150 - 2,250
Low idling (rpm)	750 - 800
Pump tester capacity for Service standard	Motor 7.5 kW

Calibration Standard

(): Pump manufacturer's part No.

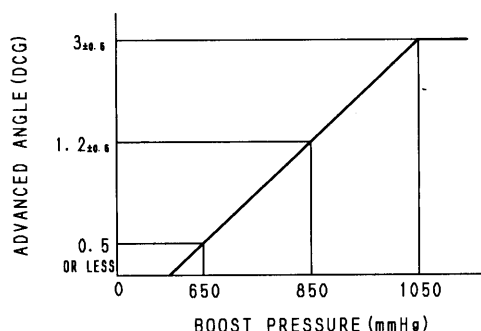
Calibration standard				Service standard		Manufacturer standard	
Conditions ● Service standard indicates data using calibration test parts. ● Manufacturer standard is data for factory test.	Nozzle part no.			(105780-0050)		6152-11-3120 (105015-5380)	
	Nozzle holder part no.			(105780-2090)		6151-11-3110 (105041-7030)	
	Injection pipe (O/D x I/D x length) mm			8 x 3 x 600		6 x 2.2 x 710	
	Test oil			ASTM D975 No.2 diesel fuel or equivalent			
	Oil temperature °C			43 to 47			
	Nozzle opening pressure (MPa[kg/cm ²])			17.16 [175]		24.52 [250]	
	Transfer pump pressure (kPa[kg/cm ²])			156.91 [1.6]		156.91 [1.6]	
Injection volume ● Rack positions B to E are the reference volume when adjusting the injection volume.	Rack point	Rack position (mm)	Pump speed (rpm)	Service standard		Manufacturer standard	
				Injection volume (cc/1000 st)	Maximum variance between cylinder (%)	Injection volume (cc/1000 st)	Maximum variance between cylinder (%)
	A (Basic point)	9.4	1050			153 ± 2	± 3
	B	5.7	375			15 ± 1.5	± 15
	C						
	D						
	E						

Governor performance



TKE00185

Boost compensator performance



TKE00186

Jahan Compressor
Pump Assembly Number
 6152-71-1220 (106672-9520)

(): Manufacturer's part No.

Injection Pump Type	Pump Manufacturer
PE-6P	ZEXEL

Applicable Machine		Applicable Engine	
Model	Serial No.	Model	Serial No.
Alaska diesel		SA6D125-1	
(OEM use)			

Injection Timing

Rotating direction	Counterclockwise viewed from drive end
Injection order	1 - 5 - 3 - 6 - 2 - 4
Injection interval	59°31' - 60°30'
Plunger pre-stroke (mm)	3.8 ± 0.05
Delivery valve retraction volume (mm ³ /st)	80

Engine Specification

Rated horsepower (kW[HP] / rpm)	328 [439.8] / 2,300
Maximum torque (Nm[kgm] / rpm)	1,490.6 [152] / 1,400
High idling (rpm)	2,450 - 2,550
Low idling (rpm)	650 - 700

Pump tester capacity for Service standard	Motor 7.5 kW
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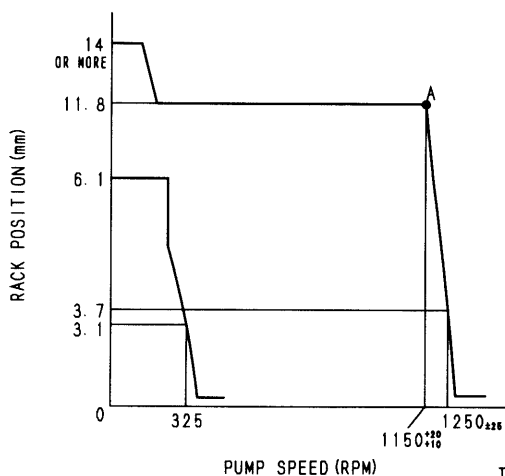
Calibration Standard

(): Pump manufacturer's part No.

Conditions	Service standard		Manufacturer standard
• Service standard indicates data using calibration test parts. • Manufacturer standard is data for factory test.	Nozzle part no.	(105780-0050)	6152-11-3620 (105015-7600)
	Nozzle holder part no.	(105780-2090)	6152-11-3210 (105041-7080)
	Injection pipe (O/D x I/D x length) mm	8 x 3 x 600	6 x 2.2 x 720
	Test oil	ASTM D975 No.2 diesel fuel or equivalent	
	Oil temperature °C	43 to 47	
	Nozzle opening pressure (MPa[kg/cm ²])	17.16 [175]	24.52 [250]
	Transfer pump pressure (kPa[kg/cm ²])	156.91 [1.6]	156.91 [1.6]

Injection volume	Rack point	Rack position (mm)	Pump speed (rpm)	Service standard		Manufacturer standard	
				Injection volume (cc/1000 st)	Maximam variance between cylinder (%)	Injection volume (cc/1000 st)	Maximam variance between cylinder (%)
• Rack positions B to E are the reference volume when adjusting the injection volume.	A (Basic point)	11.8	1150	283.8 ± 2	± 3	228	
	B	3.1	325	14.1 ± 1.5	± 15	15	
	C						
	D						
	E						

Governor performance



TKE00187

Jahan Compressor
Pump Assembly Number
 6152-71-1221 (106672-9521)

(): Manufacturer's part No.

Injection Pump Type	Pump Manufacturer
PE-6P	ZEXEL

Applicable Machine		Applicable Engine	
Model	Serial No.	Model	Serial No.
Alaska diesel		SA6D125-1	
(OEM use)			

Injection Timing

Rotating direction	Counterclockwise viewed from drive end
Injection order	1 - 5 - 3 - 6 - 2 - 4
Injection interval	59°31' - 60°30'
Plunger pre-stroke (mm)	3.8 ± 0.05
Delivery valve retraction volume (mm ³ /st)	80

Engine Specification

Rated horsepower (kW[HP] / rpm)	298.6 [400.3] / 2,300
Maximum torque (Nm[kgm] / rpm)	1,490.6 [152] / 1,400
High idling (rpm)	2,450 - 2,550
Low idling (rpm)	650 - 700

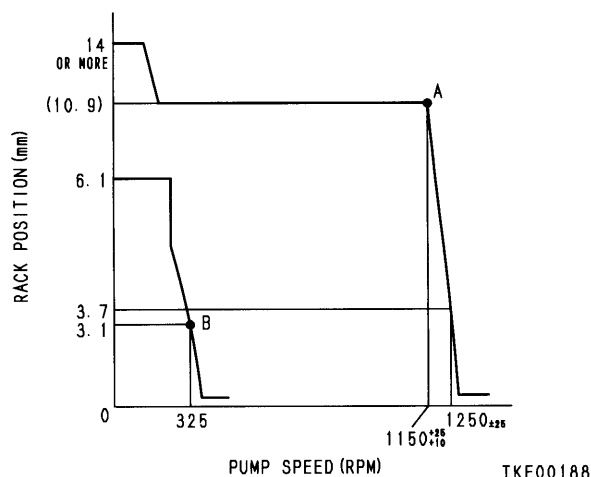
Pump tester capacity for Service standard	Motor 7.5 kW
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Calibration Standard

(): Pump manufacturer's part No.

Conditions				Service standard		Manufacturer standard	
• Service standard indicates data using calibration test parts. • Manufacturer standard is data for factory test.	Nozzle part no.			(105780-0050)		6152-11-3620 (105015-7600)	
	Nozzle holder part no.			(105780-2090)		6152-11-3210 (105041-7080)	
	Injection pipe (O/D x I/D x length)	mm		8 x 3 x 600		6 x 2.2 x 710	
	Test oil			ASTM D975 No.2 diesel fuel or equivalent			
	Oil temperature	°C		43 to 47			
	Nozzle opening pressure (MPa[kg/cm ²])			17.16 [175]		24.52 [250]	
	Transfer pump pressure (kPa[kg/cm ²])			156.91 [1.6]		156.91 [1.6]	
Injection volume	Rack point	Rack position (mm)	Pump speed (rpm)	Service standard		Manufacturer standard	
				Injection volume (cc/1000 st)	Maximum variance between cylinder (%)	Injection volume (cc/1000 st)	Maximum variance between cylinder (%)
	A (Basic point)	10.9	1150	251 ± 2	± 3	202	
	B	3.1	325	14.1 ± 1.5	± 15	15	
	C						
	D						
	E						

Governor performance



Pump Assembly Number
 6152-71-1230 (106671-4151) ... 2
 6152-71-1231 (106671-4152) ... 0

(): Manufacturer's part No.

Injection Pump Type	Pump Manufacturer
PE-6P	ZEXEL

Applicable Machine		Applicable Engine	
Model	Serial No.	Model	Serial No.
Big Bud		SA6D125-1	
(OEM use)			

Injection Timing

Rotating direction	Counterclockwise viewed from drive end
Injection order	1 - 5 - 3 - 6 - 2 - 4
Injection interval	59°31' - 60°30'
Plunger pre-stroke (mm)	3.8 ± 0.05
Delivery valve retraction volume (mm ³ /st)	80

Engine Specification

Rated horsepower (kW[HP] / rpm)	275.8 [369.8] / 2,200
Maximum torque (Nm[kgm] / rpm)	1,372 [140] / 1,400
High idling (rpm)	2,350 - 2,450
Low idling (rpm)	600 - 650

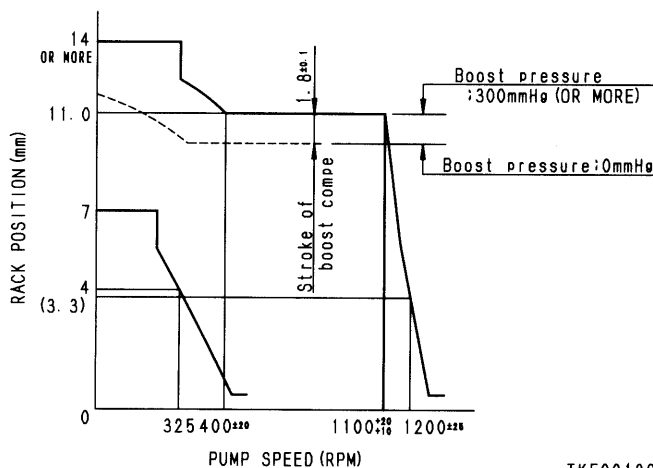
Pump tester capacity for Service standard	Motor 7.5 kW
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Calibration Standard

(): Pump manufacturer's part No.

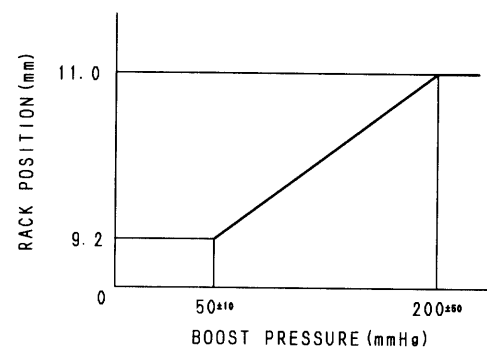
Conditions				Service standard		Manufacturer standard	
● Service standard indicates data using calibration test parts. ● Manufacturer standard is data for factory test.	Nozzle part no.			(105780-0050)		6152-11-3620 (105015-5380)	
	Nozzle holder part no.			(105780-2090)		6151-11-3110 (105041-7030)	
	Injection pipe (O/D x I/D x length) mm			8 x 3 x 600		6 x 2.2 x 710	
	Test oil			ASTM D975 No.2 diesel fuel or equivalent			
	Oil temperature °C			43 to 47			
	Nozzle opening pressure (MPa[kg/cm ²])			17.16 [175]		24.52 [250]	
	Transfer pump pressure (kPa[kg/cm ²])			156.91 [1.6]		156.91 [1.6]	
Injection volume				Service standard		Manufacturer standard	
● Rack positions B to E are the reference volume when adjusting the injection volume.	Rack point	Rack position (mm)	Pump speed (rpm)	Injection volume (cc/1000 st)	Maximum variance between cylinder (%)	Injection volume (cc/1000 st)	Maximum variance between cylinder (%)
	A (Basic point)	11.0	1100			185 ± 2	3
	B	4.0	32.5			15 ± 1.5	± 15
	C	—	100			(125)	—
	D						
	E						

Governor performance



TKE00189

Boost compensator performance



TKE00190

Jahan Compressor
Pump Assembly Number
 6152-71-1760 (106672-9432) ... 2
 6152-71-1761 (106672-9434) ... 1

(): Manufacturer's part No.

Injection Pump Type	Pump Manufacturer
PE-6P	ZEXEL

Applicable Machine		Applicable Engine	
Model	Serial No.	Model	Serial No.
D85A (for Indonesia)		SA6D125-1	

Injection Timing

Rotating direction	Counterclockwise viewed from drive end
Injection order	1 - 5 - 3 - 6 - 2 - 4
Injection interval	59°31' - 60°30'
Plunger pre-stroke (mm)	3.8 ± 0.05
Delivery valve retraction volume (mm ³ /st)	80

Engine Specification

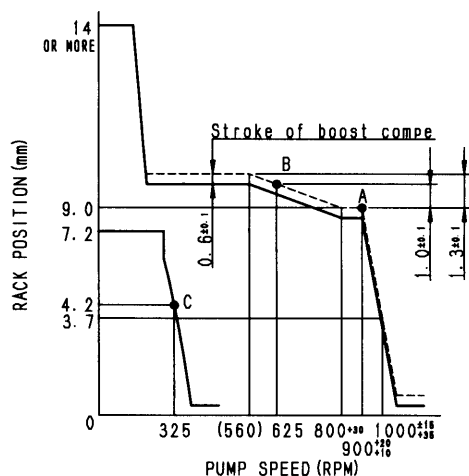
Rated horsepower (kW[HP] / rpm)	161.8 [216.9] / 1,800
Maximum torque (Nm[kgm] / rpm)	1,029 [105] / 1,250
High idling (rpm)	2,000 ⁺³⁰ ₋₇₀
Low idling (rpm)	650 - 700
Pump tester capacity for Service standard	Motor 7.5 kW

Calibration Standard

(): Pump manufacturer's part No.

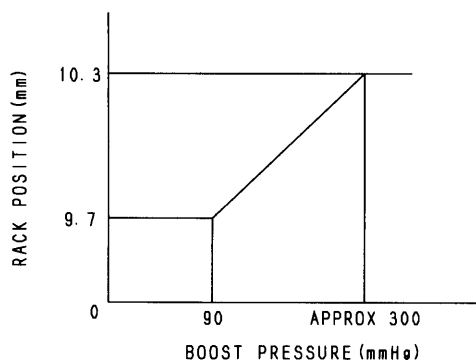
Conditions				Service standard		Manufacturer standard	
• Service standard indicates data using calibration test parts. • Manufacturer standard is data for factory test.	Nozzle part no.			(105780-0050)		6152-11-3220 (105015-6770)	
	Nozzle holder part no.			(105780-2090)		6152-11-3210 (105041-7080)	
	Injection pipe (O/D x I/D x length)	mm		8 x 3 x 600		6 x 2.2 x 710	
	Test oil			ASTM D975 No.2 diesel fuel or equivalent			
	Oil temperature	°C		43 to 47			
	Nozzle opening pressure (MPa[kg/cm ²])			17.16 [175]		24.52 [250]	
	Transfer pump pressure (kPa[kg/cm ²])			156.91 [1.6]		156.91 [1.6]	
Injection volume				Service standard		Manufacturer standard	
• Rack positions B to E are the reference volume when adjusting the injection volume.	Rack point	Rack position (mm)	Pump speed (rpm)	Injection volume (cc/1000 st)	Maximum variance between cylinder (%)	Injection volume (cc/1000 st)	Maximum variance between cylinder (%)
	A (Basic point)	9.0	900			145 ± 2	± 3
	B	10.0	625			163 ± 2	± 4
	C	4.2	325			15 ± 1.5	± 15
	D						
	E						

Governor performance



TKE00191

Boost compensator performance



TKE00192

Injection Pump Assembly Number
6152-71-1221 (106672-9521)

(): Injection pump manufacturer's part No.

Injection Pump Type	Injection Pump Manufacturer
S3S	ZEXEL

Applicable Machine		Applicable Engine	
Model	Serial No.	Model	Serial No.
SA6D125-M-1		SA6D125-1	

Injection Timing

Rotating direction	Anticlock wise
Injection order	1 – 5 – 3 – 6 – 2 – 4
Injection interval	59°30' – 60°30'
Plunger pre-stroke (mm)	3.75 – 3.85
Delivery valve (mm ³ /st) retraction volume	80

Engine Specification

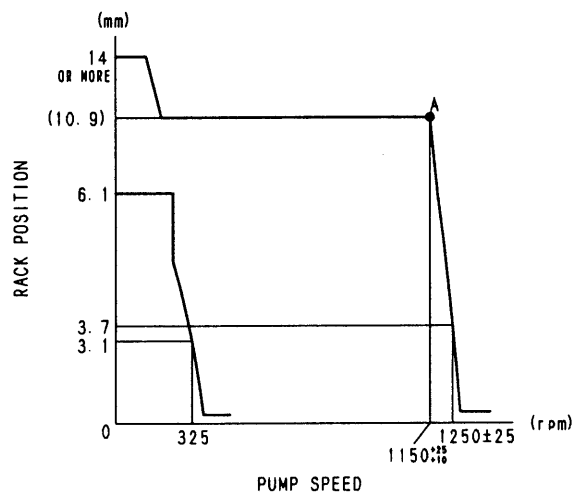
Flywheel horsepower (kW {HP}) / rpm	324 {440}/2,300
Maximum torque (Nm {kgm})/ rpm	–
High idling speed (rpm)	2,450 – 2,550
Low idling speed (rpm)	650 – 700
Pump tester capacity for service standard	

Calibration Standard

(): Injection pump manufacturer's part number

Conditions				Service standard		Manufacturer standard	
● Service standard indicates data using calibration test parts. ● Manufacturer standard is data for factory test.	Nozzle & nozzle holder part No.						
	Nozzle part No.			(105780-0050)			
	Nozzle holder part No.			(105780-2090)			
	Injection pipe (mm) (Outside dia. x inside dia. x length)			8 x 3 x 600			
	Test oil			ASTM D975 No. 2 diesel fuel or equivalent			
	Oil temperature (°C)			40 to 45			
	Nozzle opening pressure (MPa(kg/cm ²))			17.2 {175}			
Transfer pump pressure (kPa(kg/cm ²))			157 {1.6}				
Injection volume ● Rack positions B to E are the reference volume when adjusting the injection volume. ● Marks ★ are average volumes.	Rack point	Rack position (mm)	Pump speed (rpm)	Service standard (cc/1000 st.)		Manufacturer standard (cc/1000 st.)	
				Injection volume	Maximum variance between cylinder	Injection volume	Maximum variance between cylinder
	A (Basic point)	(10.9)	1,150	249 – 253	max. 7.5		
	B	Approx. 3.1	325	12.6 – 15.6	max. 2.1		
	C						
	D						
	E						

Governor performance curve



TVE00768

PERFORMANCE TEST

RUN-IN STANDARD

- Load are given for the case of the dynamometer arm length is 716 mm.
This list shows the standard on condition that the fan is removed.

Engine model	Applicable machine	Item		Order					
				1	2	3	4	5	6
6D125-1	D50A-17 D50P-17	Running time	min.	5	10	10	15	15	5
		Engine speed	rpm	650 — 700	880	1,100	1,380	1,590	1,750
		Load	kg	0	18	29	46	61	73.5
		Output	HP	0	15.5	31	62	94	125
	D50F-17	Running time	min.	5	10	10	15	15	5
		Engine speed	rpm	650 — 700	950	1,200	1,500	1,750	1,900
		Load	kg	0	19	30.5	48.5	63	77
		Output	HP	0	17.7	36	72	108.5	144
	D53A-17 D53P-17	Running time	min.	5	10	10	15	15	5
		Engine speed	rpm	600 — 650	950	1,200	1,500	1,730	1,900
		Load	kg	0	18	28	45	59	72
		Output	HP	0	16.5	33	66	100	132.4
	D58E-1 D58P-1	Running time	min.	4	8	2	2	9	35
		Engine speed	rpm	800 — 850	1,000	1,200	1,200	1,500	1,900
		Load	kg	0	20	36	63	80	70
		Output	HP	0	19.7	42.6	74.5	118	131
	D60A-8	Running time	min.	5	10	10	15	15	5
		Engine speed	rpm	600 — 630	950	1,200	1,500	1,700	1,850
		Load	kg	0	22	35	56	74	91
		Output	HP	0	20.5	41	81.5	122	163
	D60E-8	Running time	min.	5	10	10	15	15	5
		Engine speed	rpm	600 — 630	950	1,200	1,500	1,700	1,850
		Load	kg	0	23.5	37.5	60	79.5	97.5
		Output	HP	0	22	43.5	83.5	130	174.5
	D60P-8 D60PL-8	Running time	min.	5	10	10	15	15	5
		Engine speed	rpm	600 — 630	950	1,200	1,500	1,700	1,850
		Load	kg	0	23.5	37	59.5	78.5	96
		Output	HP	0	22	43	86.5	129.5	172.5
	D60S-8	Running time	min.	5	10	10	15	15	5
		Engine speed	rpm	600 — 630	900	1,100	1,400	1,600	1,750
		Load	kg	0	24	38.5	60.5	79.5	97
		Output	HP	0	21	41	82.5	123.5	165

- ★ Load are given for the case of the dynamometer arm length is 716 mm.
This list shows the standard on condition that the fan is removed.

Engine model	Applicable machine	Item		Order					
				1	2	3	4	5	6
6D125-1	D63E-1	Running time	min.	4	8	2	2	9	35
		Engine speed	rpm	800 – 850	1,000	1,200	1,200	1,500	1,900
		Load	kg	0	20	36	63	84	80
		Output	HP	0	19.7	42.6	74.5	124	150
	D65A-8	Running time	min.	5	10	10	15	15	5
		Engine speed	rpm	600 – 630	950	1,200	1,500	1,700	1,850
		Load	kg	0	22	35	56	74	91
		Output	HP	0	20.5	41	81.5	122	163
	D65E-8 D65P-8	Running time	min.	5	10	10	15	15	5
		Engine speed	rpm	600 – 630	950	1,200	1,500	1,700	1,850
		Load	kg	0	22.3	37	59.5	78.5	96
		Output	HP	0	22	43	86.5	129.5	172.5
	D65S-8	Running time	min.	5	10	10	15	15	5
		Engine speed	rpm	600 – 630	950	1,200	1,500	1,700	1,800
		Load	kg	0	22.5	36	57	75.5	92.5
		Output	HP	0	21	41.5	83	124.5	166
	D65E-12	Running time	min.	4	8	2	2	9	35
		Engine speed	rpm	825	1,000	1,200	1,200	1,500	1,950
		Load	kg	0	20	35	60	90	100
		Output	HP	0	19.7	41.4	71	133.1	192.3
	D68E-1 D68P-1	Running time	min.	4	8	2	2	9	35
		Engine speed	rpm	600 – 630	1,000	1,200	1,200	1,500	1,850
		Load	kg	0	25	45	80	110	100
		Output	HP	0	24.7	53.2	94.6	162.7	182.4
	D70LE-1	Running time	min.	4	8	2	2	9	35
		Engine speed	rpm	620	1,000	1,200	1,200	1,500	1,850
		Load	kg	0	20	36	63	94	96
		Output	HP	0	19.7	42.6	74.5	139	175.1
		Running time	min.						
		Engine speed	rpm						
		Load	kg						
		Output	HP						

- ★ Load are given for the case of the dynamometer arm length is 716 mm.
This list shows the standard on condition that the fan is removed.

Engine model	Applicable machine	Item		Order					
				1	2	3	4	5	6
6D125-1	GD600R-3 GD605R-3 GD605A-3 with 146 HP engine	Running time	min.	5	10	10	15	15	5
		Engine speed	rpm	650 — 700	900	1,150	1,450	1,600	1,800
		Load	kg	0	105.5	104.4	98	91.5	86.1
		Output	HP	0	92	116.5	137.5	146.5	150.5
	GD605A-3 with 155 HP engine	Running time	min.	5	10	10	15	15	5
		Engine speed	rpm	650 — 700	900	1,150	1,450	1,650	1,800
		Load	kg	0	100	111	104.5	97.5	92
		Output	HP	0	88.5	126	150	158.5	163.5
	GD613A-1 GD622A-1 GD623A-1 GD625A-1 GD625A-1C	Running time	min.	4	8	2	2	9	35
		Engine speed	rpm	650 — 700	1,000	1,200	1,200	1,500	2,200
		Load	kg	0	20	36	63	94	75
		Output	HP	0	19.7	42.6	74.5	139	162.7
	GD650R-3 GD655R-3 GD655A-3	Running time	min.	5	10	10	15	15	5
		Engine speed	rpm	650 — 700	900	1,150	1,450	1,650	1,800
		Load	kg	0	105.5	109.6	106.2	101.8	97.2
		Output	HP	0	92	122	149.5	163	170
	GD663A-1	Running time	min.	5	10	10	15	15	5
		Engine speed	rpm	650 — 700	1,100	1,390	1,740	2,000	2,200
		Load	kg	0	21	33	52	68	83
		Output	HP	0	22.7	45	89	134	180
	GD705R-3 GD705R-4	Running time	min.	5	10	10	15	15	5
		Engine speed	rpm	650 — 700	900	1,150	1,450	1,700	1,850
		Load	kg	0	117.9	110.7	112.2	107.1	104.9
		Output	HP	0	104.5	125.5	160.5	179.5	191
		Running time	min.						
		Engine speed	rpm						
		Load	kg						
		Output	HP						
		Running time	min.						
		Engine speed	rpm						
		Load	kg						
		Output	HP						

- ★ Load are given for the case of the dynamometer arm length is 716 mm.
This list shows the standard on condition that the fan is removed.

Engine model	Applicable machine	Item		Order					
				1	2	3	4	5	6
S6D125-1	D60F-8	Running time	min.	5	10	10	15	15	5
		Engine speed	rpm	600 – 630	950	1,200	1,500	1,700	1,850
		Load	kg	0	13	26	52.5	79	105
		Output	HP	0	23.7	27	95.5	144	191
	D60F-8A	Running time	min.	5	10	10	15	15	5
		Engine speed	rpm	600 – 630	1,000	1,300	1,600	1,800	2,000
		Load	kg	0	14.5	29	58.5	87.5	116.5
		Output	HP	0	28.6	57.2	115	173	230
	D65EX-12 D65P, PX-12	Running time	min.	4	8	2	2	9	35
		Engine speed	rpm	825	1,000	1,200	1,200	1,400	1,950
		Load	kg	0	21	37	63	95	105
		Output	HP	0	20.7	43.8	74.5	131.1	201.9
	D75A-1	Running time	min.	5	10	10	15	15	5
		Engine speed	rpm	600 – 630	1,000	1,260	1,580	1,820	2,000
		Load	kg	0	27.5	43.5	69	90	109
		Output	HP	0	27	53.7	107.5	102	215
	D75S-5	Running time	min.	5	10	10	15	15	5
		Engine speed	rpm	550 – 650	1,000	1,260	1,580	1,820	2,000
		Load	kg	0	27.3	43.3	69.0	89.8	109
		Output	HP	0	26.3	53	105.5	158.5	211.5
	D83E-1 D83P-1	Running time	min.	5	10	10	15	15	5
		Engine speed	rpm	550 – 650	1,000	1,260	1,580	1,820	2,000
		Load	kg	0	27.5	43.5	69	90	112.8
		Output	HP	0	27	53.7	107.5	102	222.4
	D85A-21 D85E-21 (B) D85P-21	Running time	min.	5	10	10	15	15	5
		Engine speed	rpm	650 – 700	1,000	1,200	1,200	1,400	2,000
		Load	kg	0	20	60	90	145	120
		Output	HP	0	19.7	71	106.5	200	236.6
	SA6D125-M-1	Running time	min.	- - - - - (The performance test is not done at factory.)					
		Engine speed	rpm						
		Load	kg						
		Output	HP						

TESTING AND ADJUSTING

PERFORMANCE TEST

- ★ Load are given for the case of the dynamometer arm length is 716 mm.
This list shows the standard on condition that the fan is removed.

Engine model	Applicable machine	Item		Order					
				1	2	3	4	5	6
S6D125-1	PC300-3 PC300LC-3 PC300NLC-3	Running time	min.	5	10	10	15	15	5
		Engine speed	rpm	630 — 670	1,000	1,200	1,200	1,400	1,550
		Load	kg	0	20	52	83	133	133
		Output	HP	0	20	62	99	183	203
	PC360LC-3	Running time	min.	4	8	2	2	9	—
		Engine speed	rpm	700	1,000	1,200	1,200	1,550	—
		Load	kg	0	20	56	87	140	—
		Output	HP	0	19.7	66.3	103	214	—
	PC400-3 PC400LC-3	Running time	min.	5	10	10	15	15	5
		Engine speed	rpm	630 — 670	1,300	1,500	1,500	1,800	2,000
		Load	kg	0	20	53	85	135	135
		Output	HP	0	26	78	126	240	266
	PC400-5 PC400LC-5	Running time	min.	4	8	2	2	9	35
		Engine speed	rpm	600 — 700	1,000	1,200	1,200	1,400	2,000
		Load	kg	0	22	61	95	147	145
		Output	HP	0	21.7	72.2	112	203	286
	HA250 HA270	Running time	min.	4	8	2	2	9	35
		Engine speed	rpm	650	1,000	1,200	1,200	1,400	2,200
		Load	kg	0	20	52	83	143	115
		Output	HP	0	20	62	100	200	253
	HD200D-3 HD205-3	Running time	min.	4	8	2	2	9	35
		Engine speed	rpm	650 — 700	1,000	1,200	1,200	1,400	2,100
		Load	kg	0	20	52	83	143	133
		Output	HP	0	19.7	61.5	98	197	275
	WA450 WF450T-1	Running time	min.	4	8	2	2	9	35
		Engine speed	rpm	695 — 745	1,000	1,200	1,200	1,400	2,200
		Load	kg	0	20	52	83	143	115
		Output	HP	0	19.7	61.5	98	197.5	249.5
	WA470-1	Running time	min.	4	8	2	2	9	35
		Engine speed	rpm	695 — 745	1,000	1,200	1,200	1,400	2,200
		Load	kg	0	20	52	83	143	125
		Output	HP	0	19.7	61.6	98	197	271

- Load are given for the case of the dynamometer arm length is 716 mm.
This list shows the standard on condition that the fan is removed.

Engine model	Applicable machine	Item		Order					
				1	2	3	4	5	6
S6D125-1	GD705A-4	Running time	min.	5	10	10	15	15	5
		Engine speed	rpm	650 – 700	1,000	1,300	1,600	1,800	2,000
		Load	kg	0	124.4	131.7	120	114.1	108.8
		Output	HP	0	120.5	166	186	199	211
	EC260Z-1	Running time	min.	5	10	10	15	15	5
		Engine speed	rpm	975 – 1,015	1,080	1,510	1,720	1,940	2,150
		Load	kg	0	57	81	92	104	116
		Output	HP	0	61.1	120	157	199	245.5
	EG200-3	Running time	min.	5	10	10	15	15	5
		Engine speed	rpm	700 – 800	1,000	1,200	1,500	1,700	1,800
		Load	kg	0	37	61	98	129.5	163
		Output	HP	0	36.4	72	145	217	289
	EG220-1,2 EG220B-1,2 EG220BS-1,2 (Prime Stand-by)	Running time	min.	4	8	2	2	9	35
		Engine speed	rpm	900 – 1,000	1,000	1,200	1,200	1,400	1,800
		Load	kg	0	20	52	83	143	160
		Output	HP	0	19.7	61.5	98	197	284
SA6D125-1	D135A-1	Running time	min.	4	8	2	2	9	35
		Engine speed	rpm	600 – 650	1,000	1,200	1,200	1,400	2,000
		Load	kg	0	20	52	83	143	148
		Output	HP	0	19.7	61.5	98	197	292
	EG275-1,2 EG275B-1,2 EG275BS-1,2 (Prime Stand-by)	Running time	min.	4	8	2	2	9	35
		Engine speed	rpm	700 – 800	1,000	1,200	1,200	1,400	1,800
		Load	kg	0	26	67	107	183	204
		Output	HP	0	25.6	79	126.6	252.6	362
		Running time	min.						
		Engine speed	rpm						
		Load	kg						
		Output	HP						
		Running time	min.						
		Engine speed	rpm						
		Load	kg						
		Output	HP						

PERFORMANCE TEST CRITERIA

Engine model	Applicable machine	Test item	Specified value (fully equipped)	Engine speed (rpm)	Dynamometer (kg)
6D125-1	D50A-17 D50P-17	Flywheel horsepower	120 HP/1,750 rpm	1,745 – 1,755	71.4 – 75.7
		Maximum torque	65.5 kgm/1,100 rpm	1,000 – 1,200	89.8 – 95.3
		High idling speed	1,875 – 1,975 rpm	1,875 – 1,975	0
		Low idling speed	650 – 700 rpm	650 – 700	0
	D50F-17	Flywheel horsepower	138 HP/1,900 rpm	1,895 – 1,905	74.6 – 79.1
		Maximum torque	66 kgm/1,300 rpm	1,200 – 1,400	90.9 – 96.5
		High idling speed	2,050 – 2,150 rpm	2,050 – 2,150	0
		Low idling speed	600 – 650 rpm	600 – 650	0
	D53A-17 D53P-17	Flywheel horsepower	124 HP/1,750 rpm	1,895 – 1,905	69.8 – 73.8
		Maximum torque	62.5 kgm/1,300 rpm	1,200 – 1,400	86.9 – 91.9
		High idling speed	2,050 – 2,150 rpm	2,050 – 2,150	0
		Low idling speed	600 – 650 rpm	600 – 650	0
	D58E-1 D58P-1	Flywheel horsepower	130 HP/1,900 rpm	1,895 – 1,905	70.4 – 74.4
		Maximum torque	64.8 kgm/1,300 rpm	1,200 – 1,400	87.5 – 92.6
		High idling speed	2,050 – 2,150 rpm	2,050 – 2,150	0
		Low idling speed	800 – 850 rpm	800 – 850	0
	D60A-8	Flywheel horsepower	155 HP/1,850 rpm	1,845 – 1,855	88.3 – 93.4
		Maximum torque	78 kgm/1,100 rpm	900 – 1,100	107.5 – 113.8
		High idling speed	2,050 – 2,150 rpm	2,050 – 2,150	0
		Low idling speed	600 – 650 rpm	600 – 650	0
	D60E-8	Flywheel horsepower	170 HP/1,850 rpm	1,845 – 1,855	94.9 – 99.7
		Maximum torque	81 kgm/1,100 rpm	1,000 – 1,200	110.3 – 115.8
		High idling speed	2,050 – 2,150 rpm	2,050 – 2,150	0
		Low idling speed	600 – 630 rpm	600 – 630	0
	D60P-8 D60PL-8	Flywheel horsepower	165 HP/1,850 rpm	1,845 – 1,855	93.8 – 99.1
		Maximum torque	78 kgm/1,000 rpm	900 – 1,100	110.2 – 115.6
		High idling speed	2,050 – 2,150 rpm	2,050 – 2,150	0
		Low idling speed	600 – 630 rpm	600 – 630	0
	D60S-8	Flywheel horsepower	160 HP/1,750 rpm	1,745 – 1,755	94.2 – 99.8
		Maximum torque	78 kgm/1,000 rpm	900 – 1,100	110.6 – 116.1
		High idling speed	1,950 – 2,050 rpm	1,950 – 2,050	0
		Low idling speed	600 – 630 rpm	600 – 630	0

- ★ The values in the table are indicated at standard conditions (atmospheric temperature 25°C, atmospheric pressure 750 mmHg).
- ★ The values given for the dynamometer loads, output and torque are with the fan removed, so they differ from those of the specification.
- ★ Values are standardized under the following conditions: Muffler and air cleaner installed; alternator idling; and air compressor (if installed) open.
- ★ Dynamometer loads are given for the case of the arm length is 716 mm.
- ★ Fuel used: ASTM D975 No. 1 or No. 2 diesel fuel.
- ★ Lubrication oil used: CLASS-CD SAE30.
- ★ Exhaust temperature column t: Intake temperature –25°C.

Output (HP)	Torque (kgm)	Fuel consumption (sec./200 cc)	Coolant temperature (°C)	Lubrication oil temperature (°C)	Lubrication oil pressure (kg/cm ²)	Exhaust temperature (°C) (t = Intake temp. –25°C)
121 – 128.5	—	Min. 29.8	70 – 95	80 – 115	2.5 – 5.0	Max. 650 + 3t
—	64.4 – 68.2	—	70 – 95	80 – 115	—	Max. 650 + 3t
0	0	—	70 – 95	80 – 115	—	—
0	0	—	70 – 95	Min. 80	Min. 1.0	—
139.8 – 148.1	—	Min. 26	70 – 95	90 – 115	2.5 – 5.5	Max. 500 + 3t
—	65.1 – 69.1	—	70 – 95	90 – 115	—	Max. 600 + 3t
0	0	—	70 – 95	90 – 115	—	—
0	0	—	70 – 95	Min. 80	Min. 1.0	—
128.5 – 136	—	Min. 28	70 – 95	80 – 115	2.5 – 5.0	Max. 650 + 3t
—	62.2 – 65.8	—	70 – 95	80 – 115	—	Max. 650 + 3t
0	0	—	70 – 95	80 – 115	—	—
0	0	—	70 – 95	Min. 80	Min. 1.0	—
131.8 – 139.3	—	Min. 27.6	70 – 95	80 – 115	3.0 – 5.0	Max. 550 + 3t
—	62.7 – 66.3	—	70 – 95	80 – 115	—	Max. 550 + 3t
0	0	—	70 – 95	80 – 115	—	—
0	0	—	70 – 95	Min. 80	Min. 1.0	—
158.5 – 167.5	—	Min. 22	70 – 95	90 – 115	2.5 – 5.5	Max. 500 + 3t
—	77 – 81.5	—	70 – 95	90 – 115	—	Max. 600 + 3t
0	0	—	70 – 95	90 – 115	—	—
0	0	—	70 – 95	Min. 80	Min. 1.0	—
169.5 – 179	—	Min. 20	70 – 95	90 – 115	2.5 – 5.5	Max. 500 + 3t
—	79 – 82.9	—	70 – 95	90 – 115	—	Max. 600 + 3t
0	0	—	70 – 95	90 – 115	—	—
0	0	—	70 – 95	Min. 80	Min. 1.0	—
168 – 178	—	Min. 20	70 – 95	90 – 115	2.5 – 5.5	Max. 500 + 3t
—	78.9 – 82.8	—	70 – 95	90 – 115	—	Max. 600 + 3t
0	0	—	70 – 95	90 – 115	—	—
0	0	—	70 – 95	Min. 80	Min. 1.0	—
160 – 169.5	—	Min. 22	70 – 95	90 – 115	2.5 – 5.5	Max. 500 + 3t
—	79.2 – 83.1	—	70 – 95	90 – 115	—	Max. 600 + 3t
0	0	—	70 – 95	90 – 115	—	—
0	0	—	70 – 95	Min. 80	Min. 1.0	—

Engine model	Applicable machine	Test item	Specified value (fully equipped)	Engine speed (rpm)	Dynamometer (kg)
6D125-1	D63E-1	Flywheel horsepower	140 HP/1,900 rpm	1,895 — 1,905	77.0 — 81.4
		Maximum torque	68 kgm/1,300 rpm	1,200 — 1,400	94.3 — 99.8
		High idling speed	2,050 — 2,150 rpm	2,050 — 2,150	0
		Low idling speed	800 — 850 rpm	800 — 850	0
	D65A-8	Flywheel horsepower	155 HP/1,850 rpm	1,845 — 1,855	88.3 — 93.4
		Maximum torque	78 kgm/1,100 rpm	1,000 — 1,200	107.5 — 113.8
		High idling speed	2,050 — 2,150 rpm	2,050 — 2,150	0
		Low idling speed	600 — 630 rpm	600 — 630	0
	D65E-8 D65P-8	Flywheel horsepower	165 HP/1,850 rpm	1,845 — 1,855	93.8 — 99.1
		Maximum torque	78 kgm/1,100 rpm	900 — 1,100	110.2 — 115.6
		High idling speed	2,050 — 2,150 rpm	2,050 — 2,150	0
		Low idling speed	600 — 630 rpm	600 — 630	0
	D65S-8	Flywheel horsepower	160 HP/1,850 rpm	1,845 — 1,855	89.9 — 95.2
		Maximum torque	78 kgm/1,100 rpm	1,000 — 1,200	107.8 — 115.2
		High idling speed	2,050 — 2,150 rpm	2,050 — 2,150	0
		Low idling speed	600 — 630 rpm	600 — 630	0
	D65E-12	Flywheel horsepower	180 HP/1,950 rpm	1,945 — 1,955	98.5 — 103.5
		Maximum torque	81.5 kgm/1,100 rpm	1,000 — 1,200	113.4 — 119.0
		High idling speed	2,050 — 2,150 rpm	2,050 — 2,150	—
		Low idling speed	800 — 850 rpm	800 — 850	—
	D68E-1 D68P-1	Flywheel horsepower	180 HP/1,850 rpm	1,845 — 1,855	—
		Maximum torque	81.5 kgm/1,100 rpm	1,000 — 1,200	111.2 — 116.6
		High idling speed	2,050 — 2,150 rpm	2,050 — 2,150	0
		Low idling speed	600 — 630 rpm	600 — 630	0
	D70LE-1	Flywheel horsepower	177.5 HP/1,850 rpm	1,845 — 1,855	97.1 — 102.4
		Maximum torque	81.5 kgm/1,100 rpm	1,000 — 1,200	110.3 — 115.7
		High idling speed	2,050 — 2,150 rpm	2,050 — 2,150	0
		Low idling speed	600 — 630 rpm	600 — 630	0
		Flywheel horsepower			
		Maximum torque			
		High idling speed			
		Low idling speed			

TESTING AND ADJUSTING**PERFORMANCE TEST**

- ★ The values in the table are indicated at standard conditions (atmospheric temperature 25°C, atmospheric pressure 750 mmHg).
- ★ The values given for the dynamometer loads, output and torque are with the fan removed, so they differ from those of the specification.
- ★ Values are standardized under the following conditions: Muffler and air cleaner installed; alternator idling; and air compressor (if installed) open.
- ★ Dynamometer loads are given for the case of the arm length is 716 mm.
- ★ Fuel used: ASTM D975 No. 1 or No. 2 diesel fuel.
- ★ Lubrication oil used: CLASS-CD SAE30.
- ★ Exhaust temperature column t: Intake temperature – 25°C.

Output (HP)	Torque (kgm)	Fuel consumption (sec./200 cc)	Coolant temperature (°C)	Lubrication oil temperature (°C)	Lubrication oil pressure (kg/cm ²)	Exhaust temperature (°C) (t=Intake temp. – 25°C)
144.2 – 152.6	—	Min. 25.2	70 – 95	80 – 115	3.0 – 5.0	Max. 550 + 3t
—	67.5 – 71.5	—	70 – 95	80 – 115	—	Max. 550 + 3t
0	0	—	70 – 95	80 – 115	—	—
0	0	—	70 – 95	Min. 1.5	Min. 1.5	—
158.5 – 167.5	—	Min. 22	70 – 95	90 – 115	2.5 – 5.5	Max. 500 + 3t
—	77 – 81.5	—	70 – 95	90 – 115	—	Max. 600 + 3t
0	0	—	70 – 95	90 – 115	—	—
0	0	—	70 – 95	Min. 80	Min. 1.0	—
166 – 178	—	Min. 20	70 – 95	90 – 115	2.5 – 5.5	Max. 500 + 3t
—	78.9 – 82.8	—	70 – 95	90 – 115	—	Max. 600 + 3t
0	0	—	70 – 95	90 – 115	—	—
0	0	—	70 – 95	Min. 80	Min. 1.0	—
161.5 – 171	—	Min. 22	70 – 95	90 – 115	2.5 – 5.5	Max. 500 + 3t
—	77.2 – 82.5	—	70 – 95	90 – 115	—	Max. 600 + 3t
0	0	—	70 – 95	90 – 115	—	—
0	0	—	70 – 95	Min. 80	Min. 1.0	—
189.3 – 199.2	—	Min. 18.4	70 – 85	90 – 110	3.0 – 5.0	Max. 650 + 3t
—	81.2 – 85.2	—	70 – 85	90 – 110	—	Max. 650 + 3t
—	—	—	70 – 85	90 – 110	—	—
—	—	—	70 – 85	Min. 80	Min. 1.5	—
184.3 – 193.8	—	Min. 19.5	70 – 95	90 – 115	3.0 – 5.0	Max. 550 + 3t
—	79.6 – 83.5	—	70 – 95	90 – 115	—	Max. 550 + 3t
0	0	—	70 – 95	90 – 115	—	—
0	0	—	70 – 95	Min. 80	Min. 1.0	—
177.1 – 186.8	—	Min. 20.0	70 – 95	80 – 110	3.0 – 5.0	Max. 560 + 3t
—	79.0 – 82.9	—	70 – 95	80 – 110	—	Max. 620 + 3t
0	0	—	70 – 95	80 – 110	—	—
0	0	—	70 – 95	Min. 80	Min. 1.0	—

Engine model	Applicable machine	Test item	Specified value (fully equipped)	Engine speed (rpm)	Dynamometer (kg)
6D125-1	GD600R-3 GD605R-3 GD605A-3 with 146 HP engine	Flywheel horsepower	146 HP/1,800 rpm	1,795 – 1,805	84.2 – 89.2
		Maximum torque	74.4 kgm/1,100 rpm	1,000 – 1,200	101.8 – 108.0
		High idling speed	2,000 – 2,100 rpm	2,000 – 2,100	0
		Low idling speed	650 – 700 rpm	650 – 700	0
	GD605A-3 with 155 HP engine	Flywheel horsepower	155 HP/1,800 rpm	1,795 – 1,805	89 – 94.3
		Maximum torque	77 kgm/1,100 rpm	1,000 – 1,200	107.5 – 114
		High idling speed	2,000 – 2,100 rpm	2,000 – 2,100	0
		Low idling speed	650 – 700 rpm	650 – 700	0
	GD613A-1 GD622A-1 GD623A-1 GD625A-1 GD625A-1C	Flywheel horsepower	155 HP/2,200 rpm	2,195 – 2,205	73.2 – 77.7
		Maximum torque	67 kgm/1,350 rpm	1,250 – 1,450	92.3 – 97.9
		High idling speed	2,350 – 2,450 rpm	2,350 – 2,450	0
		Low idling speed	650 – 700 rpm	650 – 700	0
	GD650R-3 GD655R-3 GD655A-3	Flywheel horsepower	165 HP/1,800 rpm	1,795 – 1,805	94.4 – 100.1
		Maximum torque	78.3 kgm/1,100 rpm	1,000 – 1,200	107.1 – 113.6
		High idling speed	2,000 – 2,100 rpm	2,000 – 2,100	0
		Low idling speed	650 – 700 rpm	650 – 700	0
	GD663A-1	Flywheel horsepower	180 HP/2,200 rpm	2,195 – 2,205	84.5 – 89.5
		Maximum torque	67 kgm/1,350 rpm	1,250 – 1,450	92.3 – 97.9
		High idling speed	2,350 – 2,450 rpm	2,350 – 2,450	0
		Low idling speed	650 – 700 rpm	650 – 700	0
	GD705R-3 GD705R-4	Flywheel horsepower	180 HP/1,850 rpm	1,845 – 1,855	101.9 – 107.9
		Maximum torque	80 kgm/1,100 rpm	1,000 – 1,200	110.1 – 116.8
		High idling speed	2,050 – 2,150 rpm	2,050 – 2,150	—
		Low idling speed	650 – 700 rpm	650 – 700	—
		Flywheel horsepower			
		Maximum torque			
		High idling speed			
		Low idling speed			
		Flywheel horsepower			
		Maximum torque			
		High idling speed			
		Low idling speed			

- ★ The values in the table are indicated at standard conditions (atmospheric temperature 25°C, atmospheric pressure 750 mmHg).
- ★ The values given for the dynamometer loads, output and torque are with the fan removed, so they differ from those of the specification.
- ★ Values are standardized under the following conditions: Muffler and air cleaner installed; alternator idling; and air compressor (if installed) open.
- ★ Dynamometer loads are given for the case of the arm length is 716 mm.
- ★ Fuel used: ASTM D975 No. 1 or No. 2 diesel fuel.
- ★ Lubrication oil used: CLASS-CD SAE30.
- ★ Exhaust temperature column t: Intake temperature – 25°C.

Output (HP)	Torque (kgm)	Fuel consumption (sec./200 cc)	Coolant temperature (°C)	Lubrication oil temperature (°C)	Lubrication oil pressure (kg/cm ²)	Exhaust temperature (°C) (t=Intake temp. – 25°C)
146 – 154.5	—	24.0 – 25.5	70 – 95	90 – 115	2.5 – 5.5	Max. 500 + 3t
—	72.9 – 77.3	—	70 – 95	90 – 115	—	Max. 600 + 3t
0	0	—	70 – 95	90 – 115	—	—
0	0	—	70 – 95	Min. 80	Min. 1.0	—
158 – 167.5	—	Min. 22.4	70 – 95	90 – 115	2.5 – 5.5	Max. 500 + 3t
—	77 – 81.6	—	70 – 95	90 – 115	—	Max. 600 + 3t
0	0	—	70 – 95	90 – 115	—	—
0	0	—	70 – 95	Min. 80	Min. 1.0	—
158.7 – 168.5	—	20.6 – 23.2	70 – 95	80 – 110	3.0 – 5.0	Max. 650 + 3t
—	66 – 70	—	70 – 95	80 – 110	—	Max. 650 + 3t
0	0	—	—	80 – 110	—	—
0	0	—	—	Min. 80	Min. 1.5	—
160 – 174.5	—	21.3 – 22.5	70 – 95	90 – 115	2.5 – 5.5	Max. 500 + 3t
—	76.7 – 81.3	—	70 – 95	90 – 115	—	Max. 600 + 3t
0	0	—	70 – 95	90 – 115	—	—
0	0	—	70 – 95	Min. 80	Min. 1.0	—
183.2 – 194	—	17.6 – 19.3	70 – 95	80 – 110	3.0 – 5.0	Max. 650 + 3t
—	66 – 70	—	70 – 95	80 – 110	—	Max. 650 + 3t
0	0	—	—	80 – 110	—	—
0	0	—	—	Min. 80	Min. 1.5	—
186 – 196	—	18.0 – 19.1	70 – 95	90 – 115	2.5 – 5.5	Max. 500 + 3t
—	78.8 – 83.6	—	70 – 95	90 – 115	—	Max. 600 + 3t
0	0	—	70 – 95	90 – 115	—	—
0	0	—	70 – 95	Min. 80	Min. 1.0	—

Engine model	Applicable machine	Test item	Specified value (fully equipped)	Engine speed (rpm)	Dynamometer (kg)
S6D125-1	D60F-8	Flywheel horsepower	182 HP/1,850 rpm	1,845 — 1,855	101.7 — 107.7
		Maximum torque	85 kgm/1,100 rpm	1,000 — 1,200	116.8 — 124.0
		High idling speed	2,050 — 2,150 rpm	2,050 — 2,150	0
		Low idling speed	600 — 603 rpm	600 — 630	0
	D60F-8A	Flywheel horsepower	219 HP/2,000 rpm	1,995 — 2,005	113.2 — 119.8
		Maximum torque	92 kgm/1,500 rpm	1,400 — 1,600	127.7 — 135.5
		High idling speed	2,200 — 2,300 rpm	2,200 — 2,300	0
		Low idling speed	600 — 640 rpm	600 — 630	0
	D65EX-12 D65P, PX-12	Flywheel horsepower	190 HP/1,950 rpm	1,945 — 1,955	104.7 — 110.7
		Maximum torque	100 kgm/1,200 rpm	1,100 — 1,300	138.9 — 147.2
		High idling speed	2,050 — 2,150 rpm	2,050 — 2,150	—
		Low idling speed	800 — 850 rpm	800 — 850	—
	D75A-1	Flywheel horsepower	200 HP/2,000 rpm	1,995 — 2,005	107 — 113
		Maximum torque	89 kgm/1,300 rpm	1,200 — 1,400	123.4 — 130.7
		High idling speed	2,150 — 2,250 rpm	2,150 — 2,250	0
		Low idling speed	600 — 630 rpm	600 — 630	0
	D75S-5	Flywheel horsepower	200 HP/2,000 rpm	1,995 — 2,005	106.0 — 112.0
		Maximum torque	88 kgm/1,500 rpm	1,400 — 1,600	125.3 — 132.8
		High idling speed	2,150 — 2,250 rpm	2,150 — 2,250	0
		Low idling speed	550 — 650 rpm	550 — 650	0
	D83E-1 D83P-1	Flywheel horsepower	215 HP/2,000 rpm	1,995 — 2,005	111.9 — 117.0
		Maximum torque	89 kgm/1,300 rpm	1,200 — 1,400	123.8 — 131.4
		High idling speed	2,200 — 2,300 rpm	2,200 — 2,300	0
		Low idling speed	600 — 630 rpm	600 — 630	0
		Flywheel horsepower			
		Maximum torque			
		High idling speed			
		Low idling speed			
		Flywheel horsepower			
		Maximum torque			
		High idling speed			
		Low idling speed			

- ★ The values in the table are indicated at standard conditions (atmospheric temperature 25°C, atmospheric pressure 750 mmHg).
- ★ The values given for the dynamometer loads, output and torque are with the fan removed, so they differ from those of the specification.
- ★ Values are standardized under the following conditions: Muffler and air cleaner installed; alternator idling; and air compressor (if installed) open.
- ★ Dynamometer loads are given for the case of the arm length is 716 mm.
- ★ Fuel used: ASTM D975 No. 1 or No. 2 diesel fuel.
- ★ Lubrication oil used: CLASS-CD SAE30.
- ★ Exhaust temperature column t: Intake temperature – 25°C.

Output (HP)	Torque (kgm)	Fuel consumption (sec./200 cc)	Coolant temperature (°C)	Lubrication oil temperature (°C)	Lubrication oil pressure (kg/cm ²)	Exhaust temperature (°C) (t=Intake temp. – 25°C)
195.5 – 196.4	—	19 – 21	70 – 95	90 – 115	2.5 – 5.5	Max. 500 + 3t
—	83.6 – 88.8	—	70 – 95	90 – 115	—	Max. 600 + 3t
0	0	—	70 – 95	90 – 115	—	—
0	0	—	70 – 95	Min. 80	Min. 1.0	—
223.2 – 236.2	—	16 – 17.5	70 – 95	90 – 115	2.5 – 5.5	Max. 500 + 3t
—	91.4 – 97.0	—	70 – 95	90 – 115	—	Max. 600 + 3t
0	0	—	70 – 95	90 – 115	—	—
0	0	—	70 – 95	Min. 80	Min. 1.0	—
201.2 – 213	—	Min. 16.9	70 – 85	90 – 110	3.0 – 5.0	Max. 550 + 3t
—	99.4 – 105.4	—	70 – 85	90 – 110	—	Max. 630 + 3t
—	—	—	70 – 85	90 – 110	—	—
—	—	—	70 – 85	Min. 80	Min. 1.5	—
211 – 222.8	—	Min. 16.7	70 – 95	95 – 115	3.0 – 5.5	Max. 550 + 3t
—	88.4 – 93.6	—	70 – 95	95 – 115	—	Max. 600 + 3t
0	0	—	70 – 95	95 – 115	—	—
0	0	—	70 – 95	Min. 80	Min. 1.0	—
209 – 220.1	—	17.0 – 18.3	70 – 95	95 – 115	3.0 – 5.0	Max. 550 + 3t
—	89.7 – 95.1	—	70 – 95	95 – 115	—	Max. 600 + 3t
0	—	—	70 – 95	95 – 115	—	—
0	—	—	70 – 95	Min. 80	Min. 1.0	—
220.7 – 230.7	—	Min. 16.0	70 – 80	90 – 115	3.0 – 5.0	Max. 650 + 3t
—	88.6 – 94.0	—	70 – 80	90 – 115	—	Max. 650 + 3t
0	—	—	70 – 80	90 – 115	—	—
0	—	—	70 – 80	Min. 80	Min. 1.0	—

Engine model	Applicable machine	Test item	Specified value (fully equipped)	Engine speed (rpm)	Dynamometer (kg)
S6D125-1	D85A-21 D85E-21 (B) D85P-21	Flywheel horsepower	225 HP/2,000 rpm	1,995 – 2,005	115.6 – 122.4
		Maximum torque	102 kgm/1,400 rpm	1,300 – 1,500	140.5 – 149.1
		High idling speed	2,150 – 2,250 rpm	2,150 – 2,250	0
		Low idling speed	650 – 700 rpm	650 – 700	0
	PC300-3 PC300LC-3 PC300NLC-3 (Serial No. 10001 – 20727)	Flywheel horsepower	197 HP/1,550 rpm	1,545 – 1,555	130.0 – 137.7
		Maximum torque	105 kgm/1,200 rpm	1,100 – 1,300	145.0 – 153.9
		High idling speed	1,675 – 1,725 rpm	1,675 – 1,725	0
		Low idling speed	625 – 675 rpm	625 – 675	0
	PC300-3 PC300LC-3 PC300NLC-3 (Serial No. 20728 and up)	Flywheel horsepower	197 HP/1,550 rpm	1,545 – 1,555	130.0 – 137.7
		Maximum torque	105 kgm/1,200 rpm	1,100 – 1,300	145.0 – 153.9
		High idling speed	1,657 – 1,725 rpm	1,675 – 1,725	0
		Low idling speed	725 – 745 rpm	725 – 745	0
	PC360LC-3	Flywheel horsepower	202 HP/1,550 rpm	1,545 – 1,555	130.0 – 137.7
		Maximum torque	108 kgm/1,200 rpm	1,100 – 1,300	144.9 – 153.9
		High idling speed	1,650 – 1,750 rpm	1,650 – 1,750	0
		Low idling speed	650 – 670 rpm	650 – 670	0
	PC400-3 PC400LC-3	Flywheel horsepower	266 HP/2,000 rpm	1,995 – 2,005	137 – 145
		Maximum torque	110 kgm/1,400 rpm	1,300 – 1,400	151.9 – 161.0
		High idling speed	2,150 – 2,250 rpm	2,150 – 2,250	0
		Low idling speed	600 – 700 rpm	600 – 700	0
	PC400-5 PC400LC-5	Flywheel horsepower	276 HP/2,000 rpm	1,995 – 2,005	142.5 – 150.5
		Maximum torque	115 kgm/1,400 rpm	1,300 – 1,500	159.1 – 168.5
		High idling speed	2,150 – 2,250 rpm	2,150 – 2,250	0
		Low idling speed	600 – 700 rpm	600 – 700	0
	HA250 HA270	Flywheel horsepower	240 HP/2,200 rpm	2,195 – 2,205	114.6 – 118.0
		Maximum torque	98.8 kgm/1,400 rpm	1,200 – 1,400	139.7 – 143.8
		High idling speed	2,600 rpm	2,550 – 2,650	0
		Low idling speed	650 rpm	650 – 700	0
	HD200-3	Flywheel horsepower	276 HP/2,100 rpm	2,095 – 2,105	133.2 – 141.2
		Maximum torque	115 kgm/1,400 rpm	1,300 – 1,500	157.4 – 167.2
		High idling speed	2,350 – 2,450 rpm	2,350 – 2,450	0
		Low idling speed	650 – 700 rpm	650 – 700	0

- ★ The values in the table are indicated at standard conditions (atmospheric temperature 25°C, atmospheric pressure 750 mmHg).
- ★ The values given for the dynamometer loads, output and torque are with the fan removed, so they differ from those of the specification.
- ★ Values are standardized under the following conditions: Muffler and air cleaner installed; alternator idling; and air compressor (if installed) open.
- ★ Dynamometer loads are given for the case of the arm length is 716 mm.
- ★ Fuel used: ASTM D975 No. 1 or No. 2 diesel fuel.
- ★ Lubrication oil used: CLASS-CD SAE30.
- ★ Exhaust temperature column t: Intake temperature -25°C.

Output (HP)	Torque (kgm)	Fuel consumption (sec./200 cc)	Coolant temperature (°C)	Lubrication oil temperature (°C)	Lubrication oil pressure (kg/cm ²)	Exhaust temperature (°C) (t=Intake temp. - 25°C)
228 - 241.4	—	Min. 15.3	70 - 95	95 - 115	3.0 - 5.0	Max. 650 + 3t
—	100.6 - 106.8	—	70 - 95	95 - 115	—	Max. 650 + 3t
0	0	—	70 - 95	90 - 115	—	—
0	0	—	70 - 95	Min. 80	Min. 1.0	—
198.7 - 210.5	—	18.9 - 20.5	70 - 95	95 - 115	2.7 - 5.0	Max. 550 + 3t
—	103.8 - 110.2	—	70 - 95	95 - 115	—	Max. 650 + 3t
0	0	—	70 - 95	95 - 115	—	—
0	0	—	70 - 95	Min. 80	Min. 1.0	—
198.7 - 210.5	—	18.9 - 20.5	70 - 95	95 - 115	2.7 - 5.0	Max. 550 + 3t
—	103.8 - 110.2	—	70 - 95	95 - 115	—	Max. 650 + 3t
0	0	—	70 - 95	95 - 115	—	—
0	0	—	70 - 95	Min. 80	Min. 1.0	—
198.7 - 210.5	—	Min. 18.9	70 - 95	95 - 115	2.5 - 5.5	Max. 550 + 3t
—	103.8 - 110.2	—	70 - 95	95 - 115	—	Max. 650 + 3t
0	0	—	70 - 95	95 - 115	—	—
0	0	—	70 - 95	Min. 80	Min. 1.0	—
270 - 286	—	13.5 - 14.3	70 - 95	95 - 115	3.0 - 5.0	Max. 550 + 3t
—	108.7 - 115.3	—	70 - 95	95 - 115	—	Max. 650 + 3t
0	0	—	70 - 95	95 - 115	—	—
0	0	—	70 - 95	Min. 80	Min. 1.0	—
281 - 296.8	—	Min. 13.1	70 - 90	95 - 115	3.5 - 5.0	Max. 550 + 3t
—	113.9 - 120.7	—	70 - 90	95 - 115	—	Max. 650 + 3t
0	0	—	70 - 90	90 - 115	—	—
0	0	—	70 - 89	Min. 80	Min. 1.0	—
248.5 - 255.9	—	Min. 13.9	70 - 80	90 - 115	3.5 - 5.0	Max. 650 + 3t
—	100.0 - 103.0	—	70 - 80	90 - 115	—	Max. 650 + 3t
0	0	—	70 - 80	90 - 115	—	—
0	0	—	70 - 80	Min. 80	Min. 1.5	—
275.8 - 292.3	—	13.0 - 14.1	70 - 95	90 - 115	3.5 - 5.5	Max. 650 + 3t
—	112.6 - 119.7	17.4 - 18.8	70 - 95	90 - 115	—	Max. 650 + 3t
0	0	—	—	—	—	—
0	0	—	—	Min. 80	Min. 1.0	—

Engine model	Applicable machine	Test item	Specified value (fully equipped)	Engine speed (rpm)	Dynamometer (kg)
S6D125-1	HD205-3	Flywheel horsepower	296 HP/2,100 rpm	2,095 – 2,105	142.4 – 151
		Maximum torque	124 kgm/1,400 rpm	1,300 – 1,400	169.4 – 179.7
		High idling speed	2,350 – 2,450 rpm	2,350 – 2,450	0
		Low idling speed	700 – 750 rpm	700 – 750	0
	WA450-1	Flywheel horsepower	237 HP/2,200 rpm	2,195 – 2,205	111.3 – 117.8
		Maximum torque	105 kgm/1,400 rpm	1,300 – 1,500	148.9 – 157.8
		High idling speed	2,350 – 2,450 rpm	2,350 – 2,450	0
		Low idling speed	700 – 750 rpm	700 – 750	0
	WA470-1	Flywheel horsepower	260 HP/2,200 rpm	2,195 – 2,205	121.9 – 129.0
		Maximum torque	107 kgm/1,400 rpm	1,300 – 1,500	151.7 – 160.6
		High idling speed	2,350 – 2,450 rpm	2,350 – 2,450	0
		Low idling speed	700 – 750 rpm	700 – 750	0
	WF450T-1	Flywheel horsepower	237 HP/2,200 rpm	2,195 – 2,205	111.3 – 117.8
		Maximum torque	105 kgm/1,400 rpm	1,300 – 1,500	148.9 – 157.8
		High idling speed	2,400 – 2,450 rpm	2,400 – 2,450	0
		Low idling speed	700 – 750 rpm	700 – 750	0
	GD705A-4	Flywheel horsepower	200 HP/2,000 rpm	1,995 – 2,005	105.7 – 111.8
		Maximum torque	92 kgm/1,300 rpm	1,200 – 1,400	127 – 134.6
		High idling speed	2,150 – 2,250 rpm	2,150 – 2,250	0
		Low idling speed	775 – 800 rpm	775 – 800	0
	EC260Z-1	Flywheel horsepower	232 HP/2,150 rpm	2,145 – 2,155	112.6 – 119.1
		Maximum torque	96 kgm/1,500 rpm	1,400 – 1,600	–
		High idling speed	2,250 – 2,350 rpm	2,250 – 2,350	0
		Low idling speed	975 – 1,025 rpm	975 – 1,025	0
	EG200-3	Flywheel horsepower (50 Hz)	229 HP/1,500 rpm	1,495 – 1,505	153 – 162
		(60 Hz)	253 HP/1,800 rpm	1,795 – 1,805	142 – 151
		High idling (50 Hz)	Max. 1,560 rpm	Max. 1,560	0
		(60 Hz)	Max. 1,872 rpm	Max. 1,872	0
	EG220-1, -2 EG220B-1, -2 EG220BS-1, -2 Prime	Flywheel horsepower (50 Hz)	230 HP/1,500 rpm	1,495 – 1,505	155.3 – 164.6
		(60 Hz)	255 HP/1,800 rpm	1,795 – 1,805	143.9 – 152.5
		High idling speed (50 Hz)	Max. 1,560 rpm	Max. 1,560	0
		(60 Hz)	Max. 1,872 rpm	Max. 1,872	0
		Low idling speed	700 – 800 rpm	700 – 800	0

TESTING AND ADJUSTING

PERFORMANCE TEST

- ★ The values in the table are indicated at standard conditions (atmospheric temperature 25°C, atmospheric pressure 750 mmHg).
- ★ The values given for the dynamometer loads, output and torque are with the fan removed, so they differ from those of the specification.
- ★ Values are standardized under the following conditions: Muffler and air cleaner installed; alternator idling; and air compressor (if installed) open.
- ★ Dynamometer loads are given for the case of the arm length is 716 mm.
- ★ Fuel used: ASTM D975 No. 1 or No. 2 diesel fuel.
- ★ Lubrication oil used: CLASS-CD SAE30.
- ★ Exhaust temperature column t: Intake temperature –25°C.

Output (HP)	Torque (kgm)	Fuel consumption (sec./200 cc)	Coolant temperature (°C)	Lubrication oil temperature (°C)	Lubrication oil pressure (kg/cm ²)	Exhaust temperature (°C) (t=Intake temp. – 25°C)
294.8 – 312.6	—	13.0 – 14.1	70 – 95	90 – 115	3.5 – 5.5	Max. 650 + 3t
—	121.2 – 128.6	17.4 – 18.8	70 – 95	90 – 115	—	Max. 650 + 3t
0	0	—	—	—	—	—
0	0	—	—	Min. 80	Min. 1.0	—
241.4 – 255.6	—	Min. 14.5	70 – 90	80 – 110	3.0 – 5.0	Max. 550 + 3t
—	106.6 – 113	—	70 – 90	80 – 110	—	Max. 630 + 3t
0	0	—	70 – 90	80 – 110	—	—
0	0	—	70 – 90	Min. 80	Min. 1.5	—
264.3 – 279.9	—	Min. 13.0	70 – 90	90 – 110	3.0 – 5.0	Max. 600 + 3t
—	108.6 – 115.0	—	70 – 90	90 – 110	—	Max. 630 + 3t
0	0	—	70 – 90	90 – 110	—	—
0	0	—	70 – 90	Min. 80	Min. 1.5	—
241.4 – 255.6	—	Min. 14.5	70 – 90	90 – 110	3.0 – 5.0	Max. 550 + 3t
—	106.6 – 113	—	70 – 90	90 – 110	—	Max. 630 + 3t
0	0	—	70 – 90	90 – 110	—	—
0	0	—	70 – 90	Min. 80	Min. 1.5	—
208.4 – 220.5	—	17.7 – 18.5	70 – 95	90 – 115	3.0 – 5.0	Max. 550 + 3t
—	91.0 – 96.4	—	70 – 95	90 – 115	—	Max. 600 + 3t
0	0	—	70 – 95	90 – 115	—	—
0	0	—	70 – 95	Min. 80	Min. 1.5	—
238.6 – 252.4	—	14.9 – 16.5	70 – 95	90 – 115	2.5 – 5.5	Max. 500 + 3t
—	91 – 101	19.1 – 21.1	70 – 95	90 – 115	—	Max. 600 + 3t
0	0	—	70 – 95	90 – 115	—	—
0	0	—	70 – 95	Min. 80	Min. 1.0	—
225.8 – 239.6	—	Min. 15.9	70 – 95	90 – 115	2.5 – 5.5	Max. 600 + 3t
252.4 – 268.2	—	Min. 14.2	70 – 95	90 – 115	2.5 – 5.5	Max. 600 + 3t
0	0	—	—	90 – 115	—	—
0	0	—	—	90 – 115	—	—
229.6 – 243.4	—	Min. 15.8	70 – 85	80 – 120	3.0 – 5.0	Max. 650 + 3t
255.3 – 270	—	Min. 14.1	70 – 85	80 – 120	3.0 – 5.0	Max. 650 + 3t
0	0	—	70 – 85	80 – 120	—	—
0	0	—	70 – 85	80 – 120	—	—
0	0	—	70 – 85	Min. 80	Min. 1.5	—

Engine model	Applicable machine	Test item	Specified value (fully equipped)	Engine speed (rpm)	Dynamometer (kg)
SA6D125-1	EG220-1, -2 EG220B-1, -2 EG220BS-1, -2 Stand-by	Flywheel horsepower (50 Hz) (60 Hz)	253 HP/1,500 rpm 281 HP/1,800 rpm	1,495 – 1,505 1,795 – 1,805	168.7 – 179.3 157.8 – 166.6
		High idling speed (50 Hz) (60 Hz)	Max. 1,575 rpm Max. 1,890 rpm	Max. 1,575 Max. 1,890	0 0
		Low idling speed	700 – 800 rpm	700 – 800	0
	D135A-1	Flywheel horsepower	275 HP/2,000 rpm	1,995 – 2,005	143.8 – 152.2
		Maximum torque	128 kg/1,400 rpm	1,300 – 1,500	177.9 – 188.5
		High idling speed	2,150 – 2,250 rpm	2,150 – 2,250	0
		Low idling speed	650 – 700 rpm	650 – 700	0
	EG275-1, -2 EG275B-1, -2 EG275BS-1, -2 Prime	Flywheel horsepower (50 Hz) (60 Hz)	269 HP/1,500 rpm 321 HP/1,800 rpm	1,495 – 1,505 1,795 – 1,805	182 – 192.9 181.1 – 192
		High idling speed (50 Hz) (60 Hz)	Max. 1,560 rpm Max. 1,872 rpm	Max. 1,560 Max. 1,872	0 0
		Low idling speed	700 – 800 rpm	700 – 800	0
	EG275-1, -2 EG275B-1, -2 EG275BS-1, -2 Stand-by	Flywheel horsepower (50 Hz) (60 Hz)	296 HP/1,500 rpm 353 HP/1,800 rpm	1,495 – 1,505 1,795 – 1,805	198 – 216 198.3 – 210.6
		High idling speed (50 Hz) (60 Hz)	Max. 1,757 rpm Max. 1,890 rpm	Max. 1,575 Max. 1,890	0 0
		Low idling speed	700 – 800 rpm	700 – 800	0
	SA6D125-M-1	Maximum flywheel horsepower	418 – 440 HP/2,300 rpm	2,300	–
		High idling speed	Max. 2,550 rpm	Max. 2,550	–
		Low idling speed	650 – 700 rpm	650 – 700	–

- ★ The values in the table are indicated at standard conditions (atmospheric temperature 25°C, atmospheric pressure 750 mmHg).
- ★ The values given for the dynamometer loads, output and torque are with the fan removed, so they differ from those of the specification.
- ★ Values are standardized under the following conditions: Muffler and air cleaner installed; alternator idling; and air compressor (if installed) open.
- ★ Dynamometer loads are given for the case of the arm length is 716 mm.
- ★ Fuel used: ASTM D975 No. 1 or No. 2 diesel fuel.
- ★ Lubrication oil used: CLASS-CD SAE30.
- ★ Exhaust temperature column t: Intake temperature -25°C.

Output (HP)	Torque (kgm)	Fuel consumption (sec./200 cc)	Coolant temperature (°C)	Lubrication oil temperature (°C)	Lubrication oil pressure (kg/cm ²)	Exhaust pressure (°C) (t=Intake temp. -25°C)
249.5 – 265 280 – 295.6	– –	Min. 14.4 Min. 12.7	70 – 85 70 – 85	80 – 120 80 – 120	3.0 – 5.0 3.0 – 5.0	Max. 700 + 3t Max. 700 + 3t
0 0 0	0 0 0	– – –	70 – 85 70 – 85 70 – 85	80 – 120 80 – 120 Min. 80	– – Min. 1.5	– – –
283.6 – 300.1	–	Min. 12.3	70 – 95	90 – 110	3.0 – 5.0	Max. 650 + 3t
–	127.4 – 135.0	–	70 – 95	90 – 110	–	Max. 650 + 3t
0 0	0 0	– –	70 – 95 70 – 95	90 – 110 Min. 80	– Min. 1.5	– –
269 – 285.2 321.4 – 340.7	– –	Min. 13.5 Min. 11.1	70 – 85 70 – 85	80 – 120 80 – 120	3.0 – 5.0 3.0 – 5.0	Max. 700 + 3t Max. 700 + 3t
0 0 0	0 0 0	– – –	70 – 85 70 – 85 70 – 85	80 – 120 80 – 120 Min. 80	– – Min. 1.5	– – –
292.8 – 319.4 352.0 – 373.6	– –	Min. 11.9 Min. 10.1	70 – 85 70 – 85	80 – 120 80 – 120	3.0 – 5.0 3.0 – 5.0	Max. 700 + 3t Max. 700 + 3t
0 0 0	0 0 0	– – –	70 – 85 70 – 85 70 – 85	80 – 120 80 – 120 Min. 80	– – Min. 1.5	– – –
418 – 440	–	–	75 – 100	80 – 120	3.0 – 5.0	Max. 700
–	–	Min. 8.0 (Rated fuel consumption)	75 – 100	80 – 120	3.0 – 5.0	–
–	–	–	75 – 100	Min. 80	Min. 1.0	–

TESTING AND ADJUSTING TOOL LIST

No.	Testing and measuring item	Fault finding tool	Part No.	Remarks
1	Engine speed	Multi-tachometer	799-203-8001	Digital reading, pressure sensing type 60 – 19,999 rpm
2	Battery S.G.	Battery coolant tester	795-500-1001	1,100 – 1,300
3	Freezing temperature of cooling water			–5 – 50°C
4	Water temperature, oil temperature air intake temperature, exhaust temperature	Digital temperature gauge	799-101-1501	–99.9 – –1,299°C
5	Lubrication oil pressure	Engine pressure measuring kit	799-203-2002	0 – 20 kg/cm ²
6	Fuel pressure			0 – 50 kg/cm ²
7	Intake pressure, exhaust pressure			0 – 1,000 mmHg
8	Blow-by pressure			0 – 500 mmH ₂ O
9	Intake resistance			–1,000 – 0 mmH ₂ O
10	Compression pressure	Compression gauge	795-502-1205	0 – 70 kg/cm ²
			795-502-1360	Adaptor
11	Blow-by pressure	Blow-by checker	799-201-1504	0 – 500 mm ₂ O
12	Valve clearance	Feeler gauge	795-125-1360	0.33, 0.71 mm
13	Exhaust gas color	Handy smoke tester	799-201-9000	Dirtiness 0 – 70% with standard color (Dirtiness % x 1/10 ≈ Bosch scale)
14	Water and fuel content in oil	Engine oil checker	799-201-6000	Provided with 0.1 and 0.2 water content standard samples
15	Fuel injection pressure	Nozzle tester	Commercially available	0 – 300 kg/cm ²
16	Fuel injection nozzle spray condition			
17	Coolant quality	Water quality tester	799-202-7001	PH, nitrite ion concentration
18	Pressure valve performance	Radiator cap tester	799-202-9001	0 – 2 kg/cm ²
19	Leakage in cooling water system			
20	Radiator blockage (with speed)	Anemometer (Air speed gauge)	799-202-2001	0 – 40 m/s
21	Engine cranking	Cranking kit	795-610-1000	DC24V with starting motor
		Barring tool	795-215-1600	
22	Electrical circuits	Circuit tester	Commercially available	Current, voltage, resistance

TESTING AND ADJUSTING DATA

Engine model				6D125-1			
Applicable machine model				D50A-17 D50P-17		D50F-17	
Classification	Item	Condition, etc.	Unit	Standard value	Permissible value	Standard value	Permissible value
Performance	Engine speed	High idling speed	rpm	1,875 – 1,975	1,875 – 1,975	2,050 – 2,150	2,050 – 2,150
		Low idling speed	rpm	650 – 700	650 – 700	650 – 700	650 – 700
	Necessary starting speed	0° C	rpm	Min. 100	—	Min. 100	—
		–20° C (with starting aid)	rpm	Min. 85	—	Min. 85	—
Intake and exhaust system	Intake resistance	At all speed	mmH ₂ O	Max. 300	635	Max. 380	635
	Intake pressure	At rated output	mmHg	—	—	—	—
	Exhaust pressure (Turbine inlet press.)	At rated output	mmHg	—	—	—	—
	Exhaust temperature (Turbine inlet temp.)	All speed (20° C)	° C	Max. 650	Max. 650	Max. 500	Max. 600
	Exhaust gas color	Quick acceleration (Low idle → high idle)	Bosch scale	Max. 3.0	4.0	Max. 3.0	4.5
		At rated output		Max. 1.0	2.0	Max. 1.0	2.0
Engine body	Valve clearance (When engine is hot or cold)	Intake valve	mm	0.33	—	0.33	—
		Exhaust valve	mm	0.71	—	0.71	—
	Compression pressure (SAE 30)	Oil temperature: 40 – 60° C (Engine speed)	kg/cm ² (rpm)	Min. 34 (200 – 250)	24 (200 – 250)	Min. 36 (200 – 250)	24 (200 – 250)
	Blow-by pressure (SAE30)	At rated output (Water temp.: 70° C min.)	mmH ₂ O	Max. 100	200	Max. 50	100
Lubrication system	Oil pressure (Oil temperature: 80° C min.)	At rated output SAE30 oil	kg/cm ²	3.0 – 5.0	2.1	2.5 – 5.0	2.5 – 5.0
		SAE10W oil	kg/cm ²	2.5 – 4.5	1.8		
		At low idling SAE30 oil	kg/cm ²	Min. 1.5	0.7	Min. 1.3	0.7
		SAE10W oil	kg/cm ²	Min. 1.0	0.7		
	Oil temperature	All speed (Oil in oil pan)	° C	80 – 110	120	90 – 115	120
Fuel system	Oil consumption ratio	At continuous rated output (Ratio to fuel consumption)	%	Max. 0.5	1.0	Max. 0.5	1.0
	Fuel injection pressure	Nozzle tester	kg/cm ²	225 $\pm$ $\frac{10}{5}$	186	225	180
	Fuel injection timing	B.T.D.C.	degree	22 ± 1	22 ± 1	22 ± 1	22 ± 1
Cooling system	Radiator pressure valve	Opening pressure (Differential pressure)	kg/cm ²	0.75 ± 0.1	0.75 ± 0.1	0.75 ± 0.1	0.75 ± 0.1
	Fan speed	At rated engine speed	rpm				
	Fan belt tension	Deflects when pushed with a force of 6 kg	mm	13	10 – 16	13	10 – 16

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Do not use these values as a guide to change the setting of the fuel injection pump.

Engine model				6D125-1			
Applicable machine model				D53A-17 D53P-17		D58E-1 D58P-1	
Classification	Item	Condition, etc.	Unit	Standard value	Permissible value	Standard value	Permissible value
Performance	Engine speed	High idling speed	rpm	2,050 – 2,150	2,050 – 2,150	2,050 – 2,150	2,050 – 2,150
		Low idling speed	rpm	600 – 650	600 – 650	800 – 850	800 – 850
	Necessary starting speed	0°C	rpm	Min. 100	—	Min. 100	—
		–20°C (with starting aid)	rpm	Min. 85	—	Min. 85	—
Intake and exhaust system	Intake resistance	At all speed	mmH ₂ O	Max. 300	635	Max. 300	762
	Intake pressure	At rated output	mmHg	—	—	—	—
	Exhaust pressure (Turbine inlet pressure)	At rated output	mmHg	—	—	—	—
	Exhaust temperature (Turbine inlet temp.)	All speed (20°C)	°C	Max. 650	Max. 650	Max. 650	Max. 650
	Exhaust gas color	Quick acceleration (Low idling → High idling)	Bosch scale	Max. 3.0	—	Max. 3.0	5.0
		At rated output		—	—	Max. 2.5	3.5
		At high idling		Max. 1.0	—	Max. 1.0	2.0
Engine body	Valve clearance (When engine is hot or cold.)	Intake valve	mm	0.33	—	0.33	—
		Exhaust valve	mm	0.71	—	0.71	—
Engine body	Compression pressure (SAE30 oil)	Oil temperature: 40 – 60°C (Engine speed)	kg/cm ² (rpm)	Min. 36 (200 – 250)	Min. 36 (200 – 250)	Min. 34 (200 – 250)	24 (200 – 250)
	Blow-by pressure (SAE30 oil)	At rated output (Water temperature: Min. 70°C)	mmH ₂ O	Max. 100	200	Max. 80	160
Lubrication system	Oil pressure (Oil temperature: Min. 80°C)	At rated output SAE30 oil	kg/cm ²	2.5 – 5.5	2.5 – 5.5	3.0 – 5.0	2.1
		SAE10W oil	kg/cm ²	—	—	2.5 – 4.5	1.8
	Oil temperature	At low idling SAE30 oil	kg/cm ²	Min. 1.0	0.7	Min. 1.5	0.7
		SAE10W oil	kg/cm ²	—	—	Min. 1.0	0.7
Lubrication system	Oil temperature	All speed (oil in oil pan)	°C	80 – 110	120	80 – 110	120
	Oil consumption ratio	At continuous rated output (Ratio of fuel consumption)	%	Max. 0.5	1.0	Max. 0.5	1.0
Fuel system	Fuel injection pressure	Nozzle tester	kg/cm ²	225 ⁺¹⁰ _{–5}	186	225 ⁺¹⁰ _{–5}	200
	Fuel injection timing	B.T.D.C	degree	22 ± 1	22 ± 1	※ 22 ± 1	22 ± 1
Cooling system	Radiator pressure valve	Opening pressure (Differential pressure)	kg/cm ²	0.75 ± 0.1	0.75 ± 0.1	0.75 ± 0.1	0.75 ± 0.1
	Fan speed	At rated engine speed	rpm			1,682 – 1,772	1,682 – 1,772
	Fan belt tension	Deflects when pushed with a force of 6 kg	mm	7.5	5 – 10	13	10 – 16

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※ 26 ± 1 (No. 29457 and up)

6D125-1

D60A-8		D60E-8		D60P-8 D60PL-8		D60S-8	
Standard value	Permissible value	Standard value	Permissible value	Standard value	Permissible value	Standard value	Permissible value
2,050 — 2,100	2,050 — 2,150	2,050 — 2,150	2,050 — 2,150	2,050 — 2,150	2,050 — 2,150	1,950 — 2,050	1,950 — 2,050
600 — 630	600 — 630	600 — 630	600 — 630	600 — 630	600 — 630	600 — 630	600 — 630
Min. 100	—	Min. 100	—	Min. 100	—	Min. 100	—
Min. 85	—	Min. 85	—	Min. 85	—	Min. 85	—
Max. 300	635	Max. 300	635	Max. 300	635	Max. 300	635
—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—
Max. 600	Max. 650	Max. 600	650	Max. 600	650	Max. 600	650
Max. 4.5	5.5	Max. 4.5	5.5	Max. 4.5	5.5	Max. 4.5	5.5
—	—	—	—	—	—	—	—
Max. 1.0	2.0	Max. 1.0	2.0	Max. 1.0	2.0	Max. 1.0	2.0
0.33	—	0.33	—	0.33	—	0.33	—
0.71	—	0.71	—	0.71	—	0.71	—
Min. 34	24	Min. 34	24	Min. 34	24	Min. 34	24
(200 — 250)	(200 — 250)	(200 — 250)	(200 — 250)	(200 — 250)	(200 — 250)	(200 — 250)	(200 — 250)
Max. 100	200	Max. 100	200	Max. 100	200	Max. 100	200
2.5 — 5.5	2.5 — 5.5	2.5 — 5.5	2.5 — 5.5	2.5 — 5.5	2.5 — 5.5	2.5 — 5.5	2.5 — 5.5
—	—	—	—	—	—	—	—
Min. 1.0	0.7	Min. 1.0	0.7	Min. 1.0	0.7	Min. 1.0	0.7
—	—	—	—	—	—	—	—
80 — 110	120	80 — 110	120	80 — 110	120	80 — 110	120
Max. 0.5	1.0	Max. 0.5	1.0	Max. 0.5	1.0	Max. 0.5	1.0
225^{+10}_{-5}	186	225 ± 10	180	225^{+10}_{-5}	186	225^{+10}_{-5}	186
22 ± 1	22 ± 1	22 ± 1	22 ± 1	22 ± 1	22 ± 1	22 ± 1	22 ± 1
0.75 ± 0.1	0.75 ± 0.1	0.75 ± 0.1	0.75 ± 0.1	0.75 ± 0.1	0.75 ± 0.1	0.75 ± 0.1	0.75 ± 1
13	10 — 16	13	10 — 16	13	10 — 16	13	10 — 16

Engine model				6D125-1			
Applicable machine model				D63E-1		D65A-8	
Classification	Item	Condition, etc.	Unit	Standard value	Permissible value	Standard value	Permissible value
Performance	Engine speed	High idling speed	rpm	2,050 – 2,150	2,050 – 2,150	2,050 – 2,150	2,050 – 2,150
		Low idling speed	rpm	800 – 850	800 – 850	600 – 630	600 – 630
	Necessary starting speed	0°C	rpm	Min. 110	—	Min. 100	—
		–20°C (with starting aid)	rpm	Min. 85	—	Min. 85	—
Intake and exhaust system	Intake resistance	At all speed	mmH ₂ O	Max. 300	762	Max. 300	635
	Intake pressure	At rated output	mmHg	—	—	—	—
	Exhaust pressure (Turbine inlet pressure)	At rated output	mmHg	—	—	—	—
	Exhaust temperature (Turbine inlet temp.)	All speed (20°C)	°C	Max. 550	650	Max. 600	650
	Exhaust gas color	Quick acceleration (Low idling → High idling)	Bosch scale	Max. 3.0	5.0	Max. 4.5	5.5
		At rated output		Max. 1.0	2.0	—	—
		At high idling		Max. 1.0	2.0	Max. 1.0	2.0
Engine body	Compression pressure (SAE30 oil)	Oil temperature: 40 – 60°C	kg/cm ²	Min. 34	24	Min. 34	24
		(Engine speed)	(rpm)	(200 – 250)	(200 – 250)	(200 – 250)	(200 – 250)
	Blow-by pressure (SAE30 oil)	At rated output (Water temperature: Min. 70°C)	mmH ₂ O	Max. 80	160	Max. 100	200
Lubrication system	Oil pressure (Oil temperature: Min. 80°C)	At rated output SAE30 oil	kg/cm ²	3.0 – 5.0	2.1	2.5 – 5.5	2.5 – 5.5
		SAE10W oil	kg/cm ²	2.5 – 4.5	1.8	—	—
	Oil temperature	At low idling SAE30 oil	kg/cm ²	Min. 1.5	0.7	Min. 1.0	0.7
		SAE10W oil	kg/cm ²	Min. 1.0	0.7	—	—
Fuel system	Oil consumption ratio	All speed (oil in oil pan)	°C	80 – 110	120	80 – 110	120
	Fuel injection pressure	At continuous rated output (Ratio of fuel consumption)	%	Max. 0.5	1.0	Max. 0.5	1.0
	Fuel injection timing	Nozzle tester	kg/cm ²	225 $\pm$ ⁺¹⁰ ₅	200	225 $\pm$ ⁺¹⁰ ₅	186
Cooling system	Radiator pressure valve	B.T.D.C	degree	22 ± 1	22 ± 1	22 ± 1	22 ± 1
	Fan speed	Opening pressure (Differential pressure)	kg/cm ²	0.75 ± 0.1	0.75 ± 0.1	0.75 ± 0.1	0.75 ± 0.1
	Fan belt tension	At rated engine speed	rpm	1,682 – 1,772	1,682 – 1,772		
		Deflects when pushed with a force of 6 kg	mm	13	10 – 16	13	10 – 16

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6D125-1							
D65E-8 D65P-8		D65S-8		D65E-12		D68E-1 D68P-1	
Standard value	Permissible value	Standard value	Permissible value	Standard value	Permissible value	Standard value	Permissible value
2,050 – 2,150	2,050 – 2,150	2,050 – 2,150	2,050 – 2,150	2,050 – 2,150	2,050 – 2,150	2,050 – 2,150	2,050 – 2,150
600 – 630	600 – 630	600 – 630	600 – 630	800 – 850	800 – 850	600 – 630	600 – 630
Min. 100	—	Min. 100	—	Min. 100	—	Min. 100	—
Min. 85	—	Min. 85	—	Min. 85	—	Min. 85	—
Max. 300	762	Max. 300	635	Max. 300	762	Max. 300	762
—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—
Max. 550	650	Max. 600	Max. 650	Max. 650	700	Max. 550	650
Max. 4.5	6.5	Max. 4.5	5.5	Max. 5.0	6.0	Max. 4.5	6.5
Max. 1.5	2.5	—	—	Max. 2.0	3.0	Max. 3.5	4.5
Max. 1.5	2.5	Max. 1.0	2.0	Max. 1.0	2.0	Max. 1.5	2.5
0.33	—	0.33	—	0.33	—	0.33	—
0.71	—	0.71	—	0.71	—	0.71	—
Min. 34	24	Min. 34	24	Min. 34	24	Min. 34	24
(200 – 250)	(200 – 250)	(200 – 250)	(200 – 250)	(200 – 250)	(200 – 250)	(200 – 250)	(200 – 250)
Max. 80	160	Max. 100	200	Max. 50	100	Max. 80	160
3.0 – 5.0	2.1	2.5 – 5.5	2.5 – 5.5	3.0 – 5.0	2.1	3.0 – 5.0	2.1
2.5 – 5.0	1.8	—	—	2.5 – 4.5	1.8	2.5 – 5.0	1.8
Min. 1.5	0.7	Min. 1.0	0.7	1.5 – 2.5	0.7	Min. 1.5	0.7
Min. 1.0	0.7	—	—	1.0 – 2.0	0.7	Min. 1.0	0.7
80 – 110	120	80 – 110	120	90 – 110	120	80 – 110	120
Max. 0.5	1.0	Max. 0.5	1.0	Max. 0.5	1.0	Max. 0.5	1.0
225^{+10}_{-5}	200	225^{+10}_{-5}	186	225^{+10}_{-5}	186	225^{+10}_{-5}	200
22 ± 1	22 ± 1	22 ± 1	22 ± 1	22 ± 1	22 ± 1	22 ± 1	22 ± 1
0.75 ± 0.1	0.75 ± 0.1	0.75 ± 0.1	0.75 ± 0.1	0.9 ± 0.15	0.9 ± 0.15	0.75 ± 0.1	0.75 ± 0.1
1,440 – 1,520	1,440 – 1,520			1,605 – 1,705	1,605 – 1,705	1,530 – 1,610	1,530 – 1,610
13	10 – 16	13	10 – 16	10	8 – 12	13	10 – 16

Engine model				6D125-1			
Applicable machine model				D70LE-1		GD600R-3 GD605R-3 GD605A-3	
Classification	Item	Condition, etc.	Unit	Standard value	Permissible value	Standard value	Permissible value
Performance	Engine speed	High idling speed	rpm	2,050 — 2,150	—	2,000 — 2,100	2,000 — 2,100
		Low idling speed	rpm	600 — 630	—	650 — 700	650 — 700
	Necessary starting speed	0°C	rpm	Min. 100	—	Min. 100	—
		—20°C (with starting aid)	rpm	Min. 85	—	Min. 85	—
Intake and exhaust system	Intake resistance	At all speed	mmH ₂ O	Max. 300	762	Max. 300	635
	Intake pressure	At rated output	mmHg	—	—	—	—
	Exhaust pressure (Turbine inlet pressure)	At rated output	mmHg	—	—	—	—
	Exhaust temperature (Turbine inlet temp.)	All speed (20°C)	°C	Max. 620	Max. 700	Max. 600	Max. 650
	Exhaust gas color	Quick acceleration (Low idling → High idling)	Bosch scale	Max. 4.5	6.5	Max. 4.5	5.5
		At rated output		Max. 4.5	5.5	—	—
		At high idling		Max. 2.5	3.5	Max. 1.0	2.0
Engine body	Valve clearance (When engine is hot or cold.)	Intake valve	mm	0.33	—	0.33	—
		Exhaust valve	mm	0.71	—	0.71	—
	Compression pressure (SAE30 oil)	Oil temperature: 40 — 60°C (Engine speed)	kg/cm ² (rpm)	Min. 34 (200 — 250)	24 (200 — 250)	Min. 34 (200 — 250)	24 (200 — 250)
Lubrication system	Blow-by pressure (SAE30 oil)	At rated output (Water temperature: Min. 70°C)	mmH ₂ O	Max. 80	160	Max. 100	200
	Oil pressure (Oil temperature: Min. 80°C)	At rated output SAE30 oil	kg/cm ²	3.0 — 5.0	2.1	2.5 — 5.5	2.5 — 5.5
		SAE10W oil	kg/cm ²	2.5 — 4.5	1.8	—	—
		At low idling SAE30 oil	kg/cm ²	Min. 1.5	0.7	Min. 1.0	0.7
		SAE10W oil	kg/cm ²	Min. 1.0	0.7	—	—
Fuel system	Oil temperature	All speed (oil in oil pan)	°C	80 — 110	120	80 — 110	120
	Oil consumption ratio	At continuous rated output (Ratio of fuel consumption)	%	Max. 0.5	1.0	Max. 0.5	1.0
	Fuel injection pressure	Nozzle tester	kg/cm ²	225 $\pm$ 10	200	225 $\pm$ 10	186
Cooling system	Fuel injection timing	B.T.D.C.	degree	22 ± 10	22 ± 1	22 ± 1	22 ± 1
	Radiator pressure valve	Opening pressure (Differential pressure)	kg/cm ²	0.7 ± 0.10	0.7 ± 0.1	0.75 ± 0.1	0.75 ± 0.1
	Fan speed	At rated engine speed	rpm	1,360 — 1,440	—		
	Fan belt tension	Deflects when pushed with a force of 6 kg	mm	13	10 — 16	13	10 — 16

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6D125-1

GD613A-1, GD625A-1 GD622A-1, GD625A-1C GD623A-1, GD663A-1		GD650R-3 GD655R-3 GD655A-3		GD705R-3 GD705R-4			
Standard value	Permissible value	Standard value	Permissible value	Standard value	Permissible value	Standard value	Permissible value
2,350 – 2,450	2,350 – 2,450	2,000 – 2,100	2,000 – 2,100	2,050 – 2,150	2,050 – 2,150		
650 – 700	650 – 700	650 – 700	650 – 700	650 – 700	650 – 700		
Min. 100	—	Min. 100	—	Min. 110	—		
Min. 85	—	Min. 85	—	Min. 85	—		
Max. 300	762	Max. 300	635	Max. 300	635		
—	—	—	—	—	—		
—	—	—	—	—	—		
Max. 650	Max. 700	Max. 600	Max. 650	Max. 600	Max. 650		
Max. 4.5	6.5	Max. 4.5	5.5	Max. 4.5	5.5		
Max. 3.0	4.0	—	—	—	—		
Max. 2.0	3.0	Max. 1.0	2.0	Max. 1.0	2.0		
0.33	—	0.33	—	0.33	—		
0.71	—	0.71	—	0.71	—		
Min. 34	24	Min. 34	24	Min. 34	24		
(200 – 250)	(200 – 250)	(200 – 250)	(200 – 250)	(200 – 250)	(200 – 250)		
Max. 80	160	Max. 100	200	Max. 100	200		
3.0 – 5.0	2.1	2.5 – 5.5	2.5 – 5.5	2.5 – 5.5	2.5 – 5.5		
2.5 – 4.5	1.8	—	—	—	—		
Min. 1.5	0.7	Min. 1.0	0.7	Min. 1.0	0.7		
Min. 1.0	0.7	—	—	—	—		
80 – 110	120	80 – 110	120	80 – 110	120		
Max. 0.5	1.0	Max. 0.5	1.0	Max. 0.5	1.0		
225^{+10}_{-5}	200	225 ± 10	180	225 ± 10	180		
22 ± 1	22 ± 1	22 ± 1	22 ± 1	22 ± 1	22 ± 1		
0.7 ± 0.15	0.7 ± 0.15	0.75 ± 0.1	0.75 ± 0.1	0.75 ± 0.1	0.75 ± 0.1		
1,820 – 1,914	—						
10	8 – 12	13	10 – 16	13	10 – 16		

Engine model				S6D125-1			
Applicable machine model				D60F08		D60F-8A	
Classification	Item	Condition, etc.	Unit	Standard value	Permissible value	Standard value	Permissible value
Performance	Engine speed	High idling speed	rpm	2,050 – 2,150	2,050 – 2,150	2,200 – 2,300	2,200 – 2,300
		Low idling speed	rpm	600 – 630	600 – 630	600 – 630	600 – 630
	Necessary starting speed	0°C	rpm	Min. 100	—	Min. 110	—
		–20°C (with starting aid)	rpm	Min. 85	—	Min. 85	—
Intake and exhaust system	Intake resistance	At all speed	mmH ₂ O	Max. 300	635	Max. 300	635
	Intake pressure	At rated output	mmHg	—	—	—	—
	Exhaust pressure (Turbine inlet pressure)	At rated output	mmHg	—	—	—	—
	Exhaust temperature (Turbine inlet temp.)	All speed (20°C)	°C	Max. 600	Max. 650	Max. 600	Max. 650
	Exhaust gas color	Quick acceleration (Low idling → High idling)	Bosch scale	Max. 4.5	5.5	Max. 4.5	5.5
		At rated output		—	—	—	—
		At high idling		Max. 1.0	2.0	Max. 1.0	2.0
Engine body	Valve clearance (When engine is hot or cold.)	Intake valve	mm	0.33	—	0.33	—
		Exhaust valve	mm	0.71	—	0.71	—
	Compression pressure (SAE30 oil)	Oil temperature: 40 – 60°C	kg/cm ²	Min. 32	22	Min. 32	22
		(Engine speed)	(rpm)	(200 – 250)	(200 – 250)	(200 – 250)	(200 – 250)
Lubrication system	Blow-by pressure (SAE30 oil)	At rated output (Water temperature: Min. 70°C)	mmH ₂ O	Max. 100	200	Max. 100	200
	Oil pressure (Oil temperature: Min. 80°C)	At rated output SAE30 oil	kg/cm ²	3.0 – 5.0	2.1	3.0 – 5.0	2.5 – 5.5
		SAE10W oil	kg/cm ²	—	—	—	—
		At low idling SAE30 oil	kg/cm ²	Min. 1.0	0.7	Min. 1.5	0.7
		SAE10W oil	kg/cm ²	—	—	—	—
Cooling system	Oil temperature	All speed (oil in oil pan)	°C	80 – 110	120	80 – 110	120
	Oil consumption ratio	At continuous rated output (Ratio of fuel consumption)	%	Max. 0.5	1.0	Max. 0.5	1.0
	Fuel injection pressure	Nozzle tester	kg/cm ²	250 $\pm$ $\frac{10}{3}$	225	250 $\pm$ $\frac{10}{3}$	225
	Fuel injection timing	B.T.D.C.	degree	26 $\pm$ 1	26 $\pm$ 1	26 $\pm$ 1	26 $\pm$ 1
Cooling system	Radiator pressure valve	Opening pressure (Differential pressure)	kg/cm ²	—	—	—	—
	Fan speed	At rated engine speed	rpm	1,385	1,310	1,500	1,420
	Fan belt tension	Deflects when pushed with a force of 6 kg	mm	13	10 – 16	13	10 – 16

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S6D125-1

D65EX-12 D65P, PX-12		D75A-1					
Standard value	Permissible value	Standard value	Permissible value	Standard value	Permissible value	Standard value	Permissible value
2,050 – 2,150	2,050 – 2,150	2,150 – 2,250	2,150 – 2,250				
800 – 850	800 – 850	600 – 630	600 – 630				
Min. 100	—	Min. 100	—				
Min. 85	—	Min. 85	—				
Max. 300	762	Max. 300	635				
Min. 600	Max. 480	Min. 650	—				
Min. 500	Max. 400	Min. 700	—				
Max. 630	Max. 700	Max. 600	650				
Max. 5.0	6.0	Max. 4.5	6.5				
Max. 1.5	2.5	Max. 1.5	2.5				
Max. 1.0	2.0	Max. 1.0	2.0				
0.33	—	0.33	—				
0.71	—	0.71	—				
Min. 32	22	Min. 32	22				
(200 – 250)	(200 – 250)	(200 – 250)	(200 – 250)				
Max. 50	100	Max. 100	200				
3.0 – 5.0	2.1	3.0 – 5.5	2.1				
2.5 – 4.5	1.8	2.5 – 5.5	1.8				
Min. 1.5	0.7	Min. 1.3	0.7				
Min. 1.0	0.7	Min. 0.8	0.7				
90 – 110	120	80 – 110	120				
Max. 0.5	1.0	Max. 0.5	1.0				
225^{+10}_{-5}	186	250 ± 10	200				
24 ± 1	—	26 ± 1	26 ± 1				
0.9 ± 0.15	0.9 ± 0.15	0.75 ± 0.1	0.75 ± 0.1				
1,722 – 1,828	1,722 – 1,828	1,715 – 1,805	1,715 – 1,805				
10	8 – 12	13	10 – 16				

Engine model				S6D125-1			
Applicable machine model				D75S-5		D83E-1 D83P-1	
Classification	Item	Condition, etc.	Unit	Standard value	Permissible value	Standard value	Permissible value
Performance	Engine speed	High idling speed	rpm	2,150 — 2,250	2,150 — 2,250	2,200 — 2,300	2,200 — 2,300
		Low idling speed	rpm	600 — 650	600 — 650	600 — 630	600 — 630
	Necessary starting speed	0°C	rpm	Min. 100	—	Min. 100	—
		—20°C (with starting aid)	rpm	Min. 85	—	Min. 85	—
Intake and exhaust system	Intake resistance	At all speed	mmH ₂ O	Max. 300	635	Max. 300	762
	Intake pressure	At rated output	mmHg	Min. 650	—	Min. 550	350
	Exhaust pressure (Turbine inlet pressure)	At rated output	mmHg	Min. 700	—	Min. 500	300
	Exhaust temperature (Turbine inlet temp.)	All speed (20°C)	°C	Max. 600	Max. 650	Max. 650	700
	Exhaust gas color	Quick acceleration (Low idling → High idling)	Bosch scale	Max. 4.5	6.5	Max. 4.5	6.5
		At rated output		Max. 2.0	3.0	Max. 2.5	3.5
		At high idling		Max. 1.0	2.0	Max. 2.0	3.0
Valve clearance (When engine is hot or cold.)	Intake valve	mm	0.33	—	0.33	—	
	Exhaust valve	mm	0.71	—	0.71	—	
Engine body	Compression pressure (SAE30 oil)	Oil temperature: 40 — 60°C (Engine speed)	kg/cm ² (rpm)	Min. 32 (200 — 250)	22 (200 — 250)	Min. 32 (200 — 250)	22 (200 — 250)
	Blow-by pressure (SAE30 oil)	At rated output (Water temperature: Min. 70°C)	mmH ₂ O	Max. 150	200	Max. 150	300
Lubrication system	Oil pressure (Oil temperature: Min. 80°C)	At rated output SAE30 oil	kg/cm ²	3.0 — 5.0	2.1	3.0 — 5.0	2.1
		SAE10W oil	kg/cm ²	2.5 — 4.5	1.8	2.5 — 4.5	1.8
	Oil temperature	At low idling SAE30 oil	kg/cm ²	Min. 1.3	0.7	1.5 — 2.5	0.7
		SAE10W oil	kg/cm ²	Min. 0.8	0.7	1.0 — 2.0	0.7
Oil consumption ratio	Oil temperature	All speed (oil in oil pan)	°C	80 — 110	120	90 — 115	120
	Oil consumption ratio	At continuous rated output (Ratio of fuel consumption)	%	Max. 0.5	1.0	Max. 0.5	1.0
Fuel system	Fuel injection pressure	Nozzle tester	kg/cm ²	250 ⁺¹⁰ _{–5}	205	250 ⁺¹⁰ _{–5}	225
	Fuel injection timing	B.T.D.C	degree	26 ± 1	26 ± 1	26 ± 1	26 ± 1
Cooling system	Radiator pressure valve	Opening pressure (Differential pressure)	kg/cm ²	0.75 ± 0.1	0.75 ± 0.1	0.75 ± 0.1	0.75 ± 0.1
	Fan speed	At rated engine speed	rpm	1,170 — 1,230	1,170 — 1,230	1,648 — 1,748	1,648 — 1,748
	Fan belt tension	Deflects when pushed with a force of 6 kg	mm	13	10 — 16	13	10 — 16

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S6D125-1

D85A-21, D85P-21 D85E-21 (B)		PC300-3, PC300NLC-3 PC300LC-3 (Serial No. 10001 – 20727)		PC300-3, PC300NLC-3 PC300LC-3 (Serial No. 20728 and up)		PC360LC-3	
Standard value	Permissible value	Standard value	Permissible value	Standard value	Permissible value	Standard value	Permissible value
2,150 – 2,250	2,150 – 2,250	1,675 – 1,725	1,675 – 1,725	1,675 – 1,725	1,675 – 1,725	1,650 – 1,750	1,650 – 1,750
650 – 700	650 – 700	625 – 675	625 – 675	725 – 745	725 – 745	650 – 700	650 – 700
Min. 100	—	Min. 100	—	Min. 100	—	Min. 100	—
Min. 85	—	Min. 85	—	Min. 85	—	Min. 85	—
Max. 300	635	Max. 300	635	Max. 300	635	Max. 300	635
Min. 550	350	Min. 710	—	Min. 710	—	Min. 710	—
Min. 500	300	Min. 530	—	Min. 530	—	Min. 530	—
Max. 650	Max. 650	Max. 650	Max. 650	Max. 650	Max. 650	Max. 650	—
Max. 5.0	7.0	Max. 4.5	5.5	Max. 4.5	5.5	Max. 4.5	5.5
Max. 2.0	3.0	Max. 1.5	2.5	Max. 1.5	2.5	—	—
Max. 1.0	2.0	Max. 1.0	2.0	Max. 1.0	2.0	Max. 1.0	2.0
0.33	—	0.33	—	0.33	—	0.33	—
0.71	—	0.71	—	0.71	—	0.71	—
Min. 32	22	Min. 32	22	Min. 32	22	Min. 32	22
(200 – 250)	(200 – 250)	(200 – 250)	(200 – 250)	(200 – 250)	(200 – 250)	(200 – 250)	(200 – 250)
Max. 150	300	Max. 150	300	Max. 150	300	Max. 150	300
3.0 – 5.0	2.1	2.7 – 5.0	1.9	2.7 – 5.0	1.9	2.7 – 5.0	1.9
2.5 – 4.5	1.8	2.5 – 4.5	1.8	2.5 – 4.5	1.8	2.5 – 5.5	1.8
Min. 1.5	0.7	Min. 1.2	0.7	Min. 1.2	0.7	Min. 1.2	0.7
Min. 1.0	0.7	Min. 1.0	0.7	Min. 1.0	0.7	Min. 1.0	0.7
80 – 110	120	80 – 110	120	80 – 110	120	80 – 110	120
Max. 0.5	1.0	Max. 0.5	1.0	Max. 0.5	1.0	Max. 0.5	1.0
250^{+10}_{-5}	205	250^{+10}_{-5}	205	250^{+10}_{-5}	205	250 ± 10	200
24 ± 1	24 ± 1	20 ± 1	22 ± 1	22 ± 1	22 ± 1	20 ± 1	20 ± 1
0.75 ± 0.1	0.75 ± 0.1	0.75 ± 0.1	0.75 ± 0.1	0.75 ± 0.1	0.75 ± 0.1	0.75 ± 0.1	0.75 ± 1
925 – 975	925 – 975	$1,315 \pm 35$	$1,315 \pm 35$	1,287 – 1,347	1,287 – 1,347		
13	10 – 16	6.5	5 – 8.5	6.5	5 – 8.5	6.5	5 – 8.5

Engine model				S6D125-1			
Applicable machine model				PC400-3 PC400LC-3		PC400-5 PC400LC-5	
Classification	Item	Condition, etc.	Unit	Standard value	Permissible value	Standard value	Permissible value
Performance	Engine speed	High idling speed	rpm	2,150 – 2,250	2,150 – 2,250	2,150 – 2,250	2,150 – 2,250
		Low idling speed	rpm	600 – 700	600 – 700	600 – 700	600 – 700
	Necessary starting speed	0°C	rpm	Min. 100	—	Min. 100	—
		–20°C (with starting aid)	rpm	Min. 85	—	Min. 85	—
Intake and exhaust system	Intake resistance	At all speed	mmH ₂ O	Max. 300	635	Max. 300	762
	Intake pressure	At rated output	mmHg	Min. 800	—	Min. 800	—
	Exhaust pressure (Turbine inlet pressure)	At rated output	mmHg	Min. 600	—	Min. 600	—
	Exhaust temperature (Turbine inlet temp.)	All speed (20°C)	°C	Max. 650	Max. 650	Max. 650	700
	Exhaust gas color	Quick acceleration (Low idling → High idling)	Bosch scale	Max. 5.0	6.0	Max. 5.0	7.0
		At rated output		Max. 1.5	—	Max. 1.5	2.5
		At high idling		Max. 1.0	2.0	Max. 1.0	2.0
Engine body	Valve clearance (When engine is hot or cold.)	Intake valve	mm	0.33	—	0.33	—
		Exhaust valve	mm	0.71	—	0.71	—
	Compression pressure (SAE30 oil)	Oil temperature: 40 – 60°C (Engine speed)	kg/cm ² (rpm)	Min. 32 (200 – 250)	22 (200 – 250)	Min. 32 (200 – 250)	22 (200 – 250)
Lubrication system	Blow-by pressure (SAE30 oil)	At rated output (Water temperature: Min. 70°C)	mmH ₂ O	Max. 150	300	Max. 80	160
	Oil pressure (Oil temperature: Min. 80°C)	At rated output SAE30 oil	kg/cm ²	3.0 – 5.0	2.1	3.0 – 5.0	2.1
		SAE10W oil	kg/cm ²	2.5 – 4.5	1.8	2.5 – 4.5	1.8
		At low idling SAE30 oil	kg/cm ²	Min. 1.2	0.7	Min. 1.5	0.7
		SAE10W oil	kg/cm ²	Min. 1.0	0.7	Min. 1.0	0.7
Fuel system	Oil temperature	All speed (oil in oil pan)	°C	80 – 110	120	80 – 110	120
	Oil consumption ratio	At continuous rated output (Ratio of fuel consumption)	%	Max. 0.5	1.0	Max. 0.5	1.0
	Fuel injection pressure	Nozzle tester	kg/cm ²	250 $\pm$ $\frac{10}{5}$	205	250 $\pm$ $\frac{10}{5}$	205
Cooling system	Fuel injection timing	B.T.D.C.	degree	22 $\pm$ 1	22 $\pm$ 1	24 $\pm$ 1	24 $\pm$ 1
	Radiator pressure valve	Opening pressure (Differential pressure)	kg/cm ²	0.75 $\pm$ 0.1	0.75 $\pm$ 0.1	0.5 $\pm$ 0.1	0.5 $\pm$ 0.1
	Fan speed	At rated engine speed	rpm	1,460 – 1,540	1,460 – 1,540	1,460 – 1,540	1,460 – 1,540
	Fan belt tension	Deflects when pushed with a force of 6 kg	mm	6.5	4.5 – 8.5	6.5	4.5 – 8.5

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S6D125-1

HA250 HA270							
Standard value	Permissible value	Standard value	Permissible value	Standard value	Permissible value	Standard value	Permissible value
2,550 – 2,650	2,550 – 2,650						
650 – 700	650 – 700						
Min. 100	—						
Min. 85	—						
Max. 300	762						
—	—						
—	—						
Max. 650	Max. 700						
Max. 6.0	8.0						
Max. 1.5	2.5						
Max. 1.0	2.0						
0.33	—						
0.71	—						
Min. 32	22						
(200 – 250)	(200 – 250)						
Max. 100	160						
3.0 – 5.0	2.1						
2.5 – 4.5	1.8						
Min. 1.5	0.7						
Min. 1.0	0.7						
80 – 110	120						
Max. 0.5	1.0						
250^{+10}_{-5}	205						
20 ± 1	20 ± 1						
0.5 ± 0.1	0.5 ± 0.1						
2,160 – 2,240	—						
13	10 – 16						

Engine model							
Applicable machine model							
Classification	Item	Condition, etc.	Unit	Standard value	Permissible value	Standard value	Permissible value
Performance	Engine speed	High idling speed	rpm				
		Low idling speed	rpm				
	Necessary starting speed	0°C	rpm				
		−20°C (with starting aid)	rpm				
Intake and exhaust system	Intake resistance	At all speed	mmH ₂ O				
	Intake pressure	At rated output	mmHg				
	Exhaust pressure (Turbine inlet pressure)	At rated output	mmHg				
	Exhaust temperature (Turbine inlet temp.)	All speed (20°C)	°C				
	Exhaust gas color	Quick acceleration (Low idling → High idling)	Bosch scale				
		At rated output At high idling					
Valve clearance (When engine is hot or cold.)	Intake valve	mm					
	Exhaust valve	mm					
Engine body	Compression pressure (SAE30 oil)	Oil temperature: 40 — 60°C	kg/cm ²				
		(Engine speed)	(rpm)				
	Blow-by pressure (SAE30 oil)	At rated output (Water temperature: Min. 70°C)	mmH ₂ O				
Lubrication system	Oil pressure (Oil temperature: Min. 80°C)	At rated output SAE30 oil	kg/cm ²				
		SAE10W oil	kg/cm ²				
	At low idling	SAE30 oil	kg/cm ²				
		SAE10W oil	kg/cm ²				
Oil temperature	All speed (oil in oil pan)	°C					
Oil consumption ratio	At continuous rated output (Ratio of fuel consumption)	%					
Fuel system	Fuel injection pressure	Nozzle tester	kg/cm ²				
	Fuel injection timing	B.T.D.C.	degree				
Cooling system	Radiator pressure valve	Opening pressure (Differential pressure)	kg/cm ²				
	Fan speed	At rated engine speed	rpm				
	Fan belt tension	Deflects when pushed with a force of 6 kg	mm				

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S6D125-1							
HD200D-3		HD205-3		WA450-1		WA470-1	
Standard value	Permissible value	Standard value	Permissible value	Standard value	Permissible value	Standard value	Permissible value
2,350 – 2,450	2,350 – 2,450	2,350 – 2,450	2,350 – 2,450	2,350 – 2,450	2,350 – 2,450	2,350 – 2,450	2,350 – 2,450
650 – 700	650 – 700	700 – 750	700 – 750	700 – 750	700 – 750	700 – 750	700 – 750
Min. 100	—	Min. 100	—	Min. 100	—	Min. 100	—
Min. 85	—	Min. 85	—	Min. 85	—	Min. 85	—
Max. 300	635	Max. 300	635	Max. 200	635	Max. 300	762
Min. 800	600	Min. 800	600	Min. 600	550	Min. 800	—
Min. 750	550	Min. 750	550	Min. 550	500	Min. 750	—
Max. 650	Max. 650	Max. 650	Max. 650	Max. 630	650	Max. 630	700
Max. 7.0	8.0	Max. 4.5	5.5	Max. 5.0	5.5	Max. 6.0	8.0
Max. 2.0	3.0	Max. 2.0	3.0	—	—	Max. 2.5	3.5
Max. 2.0	2.5	Max. 2.0	2.5	Max. 1.0	2.0	Max. 1.5	2.5
0.33	—	0.33	—	0.33	—	0.33	—
0.71	—	0.71	—	0.71	—	0.71	—
Min. 32	22	Min. 32	22	Min. 32	22	Min. 32	22
(200 – 250)	(200 – 250)	(200 – 250)	(200 – 250)	(200 – 250)	(200 – 250)	(200 – 250)	(200 – 250)
Max. 100	200	Max. 100	200	Max. 150	300	Max. 80	160
3.0 – 5.0	2.1	3.5 – 5.5	2.4	3.0 – 5.0	2.1	3.0 – 5.0	2.1
2.5 – 4.5	1.8	—	—	—	—	2.5 – 4.5	1.8
Min. 1.5	0.7	Min. 1.5	0.7	Min. 1.5	0.7	Min. 1.5	0.7
Min. 1.0	0.7	Min. 1.0	0.7	—	—	Min. 1.0	0.7
80 – 110	120	80 – 110	120	80 – 110	120	90 – 110	120
Max. 0.5	1.0	Max. 0.5	1.0	Max. 0.5	1.0	Max. 0.5	1.0
250^{+10}_{-5}	205	250^{+10}_{-5}	205	250^{+10}_{-5}	205	250^{+10}_{-5}	225
24 ± 1	24 ± 1	24 ± 1	24 ± 1	24 ± 1	24 ± 1	24 ± 1	24 ± 1
0.49 ± 0.1	0.49 ± 0.1	0.49 ± 0.1	0.49 ± 0.1	0.75 ± 0.1	0.75 ± 0.1	0.75 ± 0.1	0.75 ± 0.1
1,304 – 1,384	—	1,344 $\pm$ 40	1,344 $\pm$ 40	1,320 $\pm$ 35	1,320 $\pm$ 35	1,395 – 1,465	1,395 – 1,465
10	8 – 12	10	8 – 12	10	7 – 13	10	7 – 13

Engine model				S6D125-1			
Applicable machine model				WF450T-1		GD705A-4	
Classification	Item	Condition, etc.	Unit	Standard value	Permissible value	Standard value	Permissible value
Performance	Engine speed	High idling speed	rpm	2,400 – 2,450	2,400 – 2,450	2,150 – 2,250	2,150 – 2,250
		Low idling speed	rpm	700 – 750	700 – 750	775 – 800	775 – 800
	Necessary starting speed	0°C	rpm	Min. 100	—	Min. 100	—
		–20°C (with starting aid)	rpm	Min. 85	—	Min. 85	—
Intake and exhaust system	Intake resistance	At all speed	mmH ₂ O	Max. 300	762	Max. 300	635
	Intake pressure	At rated output	mmHg	Min. 600	550	Min. 650	—
	Exhaust pressure (Turbine inlet pressure)	At rated output	mmHg	Min. 550	—	Min. 700	—
	Exhaust temperature (Turbine inlet temp.)	All speed (20°C)	°C	Max. 630	Max. 700	Max. 600	Max. 650
	Exhaust gas color	Quick acceleration (Low idling → High idling)	Bosch scale	Max. 5.5	7.5	Max. 3.0	5.5
		At rated output		Max. 2.5	3.5	—	—
		At high idling		Max. 1.0	2.0	Max. 1.0	2.0
Engine body	Valve clearance (When engine is hot or cold.)	Intake valve	mm	0.33	—	0.33	—
		Exhaust valve	mm	0.71	—	0.71	—
	Compression pressure (SAE30 oil)	Oil temperature: 40 – 60°C (Engine speed)	kg/cm ² (rpm)	Min. 32 (240 – 260)	22 (240 – 260)	Min. 32 (240 – 260)	22 (240 – 260)
Lubrication system	Blow-by pressure (SAE30 oil)	At rated output (Water temperature: Min. 70°C)	mmH ₂ O	Max. 80	160	Max. 150	200
	Oil pressure (Oil temperature: Min. 80°C)	At rated output SAE30 oil	kg/cm ²	3.0 – 5.0	2.1	3.0 – 5.0	2.1
		SAE10W oil	kg/cm ²	2.5 – 4.5	1.8	—	—
		At low idling SAE30 oil	kg/cm ²	Min. 1.5	0.7	Min. 1.5	0.7
		SAE10W oil	kg/cm ²	Min. 1.0	0.7	—	—
Cooling system	Oil temperature	All speed (oil in oil pan)	°C	80 – 110	120	80 – 110	120
	Oil consumption ratio	At continuous rated output (Ratio of fuel consumption)	%	Max. 0.5	1.0	Max. 0.5	1.0
	Fuel injection pressure	Nozzle tester	kg/cm ²	250 ⁺¹⁰ _{–5}	205	250 ⁺¹⁰ _{–3}	225
Fuel system	Fuel injection timing	B.T.D.C.	degree	24 ± 1	24 ± 1	26 ± 1	26 ± 1
	Radiator pressure valve	Opening pressure (Differential pressure)	kg/cm ²	0.7 ± 0.1	0.7 ± 0.1	0.75 ± 0.1	0.75 ± 0.1
	Fan speed	At rated engine speed	rpm	1,720 – 1,800	1,720 – 1,800	1,950 – 2,050	1,950 – 2,050
Cooling system	Fan belt tension	Deflects when pushed with a force of 6 kg	mm	10	8 – 12	13	10 – 16

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S6D125-1

EC260Z-1		EG200-3		EG220-1,2 EG220B-1,2 EG220BS-1,2			
Standard value	Permissible value	Standard value	Permissible value	Standard value	Permissible value	Standard value	Permissible value
2,250 — 2,350	2,250 — 2,350	Max. 1,560 (50 Hz) Max. 1,872 (60 Hz)	Max. 1,575 (50 Hz) Max. 1,890 (60 Hz)	Max. 1,560 (50 Hz) Max. 1,872 (60 Hz)	Max. 1,560 (50 Hz) Max. 1,872 (60 Hz)		
975 — 1,025	975 — 1,025	—	—	700 — 800	700 — 800		
Min. 100	—	Min. 100	—	Min. 100	—		
Min. 85	—	Min. 85	—	Min. 85	—		
Max. 300	635	Max. 300	762	Max. 300	762		
—	—	—	—	Min. 570 (50 Hz) Min. 740 (60 Hz)	—		
—	—	—	—	Min. 410 (50 Hz) Min. 590 (60 Hz)	—		
Max. 600	Max. 650	Max. 600	700	Max. 650	700		
Max. 4.5	5.5	Max. 4.5	5.5				
—	—	—	—	Max. 2.5	3.5		
Max. 1.0	2.0	Max. 1.0	2.0	—	—		
0.33	—	0.33	—	0.33	—		
0.71	—	0.71	—	0.71	—		
Min. 32	22	Min. 32	22	Min. 32	22		
(200 — 250)	(200 — 250)	(200 — 250)	(200 — 250)	(200 — 250)	(200 — 250)		
Max. 150	300	Max. 80	160	Max. 80	160		
2.5 — 5.5	2.5 — 5.5	3.0 — 5.0	2.1	2.5 — 4.5 (50 Hz) 3.0 — 5.0 (60 Hz)	1.8 2.1		
—	—	2.5 — 4.5	1.8	2.0 — 4.0 (50 Hz) 2.5 — 4.5 (60 Hz)	1.4 1.8		
Min. 1.0	0.7	Min. 1.5	0.7	Min. 1.5	0.7		
—	—	Min. 1.0	0.7	Min. 1.0	0.7		
80 — 110	120	80 — 110	120	80 — 110	120		
Max. 0.5	1.0	Max. 0.5	1.0	Max. 0.5	1.0		
250^{+10}_{-5}	205	250^{+10}_{-5}	205	250^{+10}_{-5}	205		
26 ± 1	—	22 ± 1	—	22 ± 1	22 ± 1		
0.75 ± 0.1	0.5 ± 0.1	0.4 ± 0.1	0.4 ± 0.1	0.7 ± 0.1 0.39 ± 0.1 (BS)	0.7 ± 0.1 0.39 ± 0.1 (BS)		
$1,620 \pm 40$	$1,620 \pm 40$	$1,275 \pm 30$ (50 Hz) $1,530 \pm 35$ (60 Hz)	—	$1,215 \pm 30$ (50 Hz) $1,458 \pm 36$ (60 Hz)	—		
10	7 — 13	13	10 — 16	10	8 — 12		

Engine model				SA6D125-1			
Applicable machine model				D135A-1		EG275-1,2 EG275B-1,2 EG275BS-1,2	
Classification	Item	Condition, etc.	Unit	Standard value	Permissible value	Standard value	Permissible value
Performance	Engine speed	High idling speed	rpm	2,150 — 2,250	2,150 — 2,250	Max. 1,560 (50 Hz) Max. 1,872 (60 Hz)	Max. 1,560 (50 Hz) Max. 1,872 (60 Hz)
		Low idling speed	rpm	650 — 700	650 — 700	700 — 800	700 — 800
	Necessary starting speed	0°C	rpm	Min. 100	—	Min. 100	—
		−20°C (with starting aid)	rpm	Min. 85	—	Min. 85	—
Intake and exhaust system	Intake resistance	At all speed	mmH ₂ O	Max. 300	762	Max. 300	762
	Intake pressure	At rated output	mmHg	Min. 750	600	Min. 800 (50 Hz) Min. 1,020 (60 Hz)	—
	Exhaust pressure (Turbine inlet pressure)	At rated output	mmHg	Min. 600	480	Min. 530 (50 Hz) Min. 770 (60 Hz)	—
	Exhaust temperature (Turbine inlet temp.)	All speed (20°C)	°C	Max. 650	700	Max. 650	700
	Exhaust gas color	Quick acceleration (Low idling → High idling)	Bosch scale	Max. 5.0	7.0	Max. 9.0	—
		At rated output		Max. 2.0	3.0	Max. 2.5	3.5
		At high idling		Max. 1.5	2.5	Max. 2.0	3.0
Engine body	Valve clearance (When engine is hot or cold.)	Intake valve	mm	0.33	—	0.33	—
		Exhaust valve	mm	0.71	—	0.71	—
	Compression pressure (SAE30 oil)	Oil temperature: 40 — 60°C (Engine speed)	kg/cm ² (rpm)	Min. 30 (200 — 250)	21 (200 — 250)	Min. 32 (200 — 250)	22 (200 — 250)
Lubrication system	Blow-by pressure (SAE30 oil)	At rated output (Water temperature: Min. 70°C)	mmH ₂ O	Max. 100	200	Max. 100	200
	Oil pressure (Oil temperature: Min. 80°C)	At rated output SAE30 oil	kg/cm ²	3.0 — 5.0	2.1	2.5 — 4.5 (50 Hz) 3.0 — 5.0 (60 Hz)	1.8 2.1
		SAE10W oil	kg/cm ²	2.5 — 4.5	1.8	2.0 — 4.0 (50 Hz) 2.5 — 4.5 (60 Hz)	1.4 1.8
		At low idling SAE30 oil	kg/cm ²	Min. 1.5	0.7	Min. 1.0	0.7
		SAE10W oil	kg/cm ²	Min. 1.0	0.7	Min. 1.0	0.7
	Oil temperature	All speed (oil in oil pan)	°C	80 — 110	120	80 — 110	120
Fuel system	Oil consumption ratio	At continuous rated output (Ratio of fuel consumption)	%	Max. 0.5	1.0	Max. 0.5	1.0
	Fuel injection pressure	Nozzle tester	kg/cm ²	250 $\pm$ $\frac{10}{5}$	225	250 $\pm$ $\frac{10}{5}$	205
Cooling system	Fuel injection timing	B.T.D.C.	degree	22 $\pm$ 1	22 $\pm$ 1	22 $\pm$ 1	22 $\pm$ 1
	Radiator pressure valve	Opening pressure (Differential pressure)	kg/cm ²	1.0 $\pm$ 0.15	1.0 $\pm$ 0.15	0.7 $\pm$ 0.1 0.39 $\pm$ 0.1 (BS)	0.7 $\pm$ 0.1 0.39 $\pm$ 0.1 (BS)
	Fan speed	At rated engine speed	rpm	1,072 — 1,138	1,072 — 1,138	1,365 $\pm$ 34 (50 Hz) 1,638 $\pm$ 40 (60 Hz)	—
	Fan belt tension	Deflects when pushed with a force of 6 kg	mm	10	8 — 12	10	8 — 12

★ The values given in the Testing and Adjusting data are NOT for adjustment of the output.
Do not use these values as a guide to change the setting of the fuel injection pump.

Engine model				SA6D125-1			
Applicable machine model				SA6D125-M-1			
Classification	Item	Condition, etc.	Unit	Standard value	Permissible value	Standard value	Permissible value
Performance	Engine speed	High idling speed	rpm	2,450 – 2,550	2,450 – 2,550		
		Low idling speed	rpm	650 – 700	650 – 700		
	Necessary starting speed	0°C	rpm	Min. 100	–		
		–20°C (with starting aid)	rpm	–	–		
Intake and exhaust system	Intake resistance	At all speed	mmH ₂ O	Max. 300	635		
	Intake pressure	At rated output	mmHg	Max. 23	–		
	Exhaust pressure (Turbine inlet pressure)	At rated output	mmHg	–	–		
	Exhaust temperature (Turbine inlet temp.)	All speed (20°C)	°C	Max. 650	700		
	Exhaust gas color	Quick acceleration (Low idling → High idling)	Bosch scale	Turbocharger selection is done by A.D.E., so there is no criteria value.			
		At rated output					
		At high idling					
	Valve clearance (When engine is hot or cold)	Intake valve	mm	0.33	–		
		Exhaust valve	mm	0.71	–		
Engine body	Compression pressure (SAE30 oil)	Oil temperature: 40 – 60°C	kg/cm ²	Min. 32	22		
		(Engine speed)	(rpm)	(200 – 250)	(200 – 250)		
	Blow-by pressure (SAE30 oil)	At rated output (Water temperature: Min. 70°C)	mmH ₂ O	Max. 100	200		
Lubrication system	Oil pressure (Oil temperature: Min. 80°C)	At rated output SAE30 oil SAE15-40 oil SAE10W oil	kg/cm ²	3.0 – 5.0	2.1		
		At low idling SAE30 oil SAE15-40 oil SAE10W oil	kg/cm ²	Min. 1.0	0.7		
	Oil temperature	All speed (oil in oil pan)	°C	80 – 110	120		
	Oil consumption ratio	At continuous rated output (Ratio to fuel consumption)	%	Max. 0.5	1.0		
Fuel system	Fuel injection pressure	Nozzle tester	kg/cm ²	250 ⁺¹⁰ ₊₅	205		
	Fuel injection timing	B.T.D.C.	degree	26 ± 1	26 ± 1		
Cooling system	Radiator pressure valve	Opening pressure (Differential pressure)	kg/cm ²	–	–		
	Fan speed	At rated engine speed	rpm	–	–		
	Fan belt tension	Deflects when pushed with a force of 6 kg	mm	–	–		

- ★ The values given in the Testing and Adjusting data are NOT for adjustment of the output.
Do not use these values as a guide to change the setting of the fuel injection pump.

TROUBLESHOOTING

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② Engine turns but no exhaust gas comes out (Fuel is not being injected)	12-054
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S-7 Exhaust gas is black (incomplete combustion)	12-060
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S-16 Vibration is excessive	12-069

-  When carrying out testing and adjusting, or troubleshooting, stop the machine on level ground, fit safety pins, block the wheels, and apply the parking brake.
-  When carrying out operations with two or more workers, always use signals, and do not allow any unauthorized person near the machine.
-  When checking the water level, if the radiator cap is removed when the engine is hot, boiling water will spurt out and may cause burns, so always wait for the engine to cool down before checking the water level.
-  Be extremely careful not to touch any hot parts.
-  Be extremely careful not to get caught in the fan or any other rotating parts.
-  When removing the plugs or caps from places under hydraulic pressure, water pressure, or air pressure, release the internal pressure first. Fit the measuring tools securely before carrying out any testing, adjusting, or troubleshooting.
- ★ When using the standard values table for judgement in testing, adjusting, or troubleshooting, it is necessary to be careful of the following points.
 1. The standard values for the new machines in the standard values table are values given as reference from the standards for new machines and machines shipped from the factory. They should be used as values for estimating wear during operation or as target values when carrying out repairs.
 2. The failure judgement standard values in the standard value table are values using estimated values based on the results of various tests and standard values for machines shipped from the factory. Use these values for reference together with the repair and operation history of the machine when judging failures.
 3. Do not use this standard values table as a standard for judging claims.

POINTS TO REMEMBER WHEN TROUBLESHOOTING

Troubleshooting means locating the basic cause of the failure, and carrying out swift repairs, and ensuring that the failure does not occur again.

When carrying out troubleshooting, it is of course important to understand the structure and function. But to carry out the troubleshooting effectively, a quick method is to carry out troubleshooting using the problems mentioned by the operator as a guide in locating the cause.

1. Do not disassemble the machine simply because there is a failure

If the machine is disassembled immediately just because there is a failure:

- Unrelated or unnecessary places are also disassembled
- It becomes difficult to locate the cause of the failure

This means that there is not only a waste of time and money on replacement parts, oil, and grease, but this action will also lose the confidence of the user and operator.

For this reason also, it is important to carry out troubleshooting based on full investigation before starting and troubleshooting following the correct order.

2. Questions to ask the user and operator

- 1) Are there any problems other than those already reported?
- 2) Did anything unusual happen before the failure occurred?
- 3) Did the failure occur suddenly, or had the condition of the machine been poor before the failure occurred?
- 4) What were the conditions when the failure occurred?
- 5) Had any repairs been carried out before the failure occurred?
- 6) Had any similar failure occurred before?

3. Checks before troubleshooting

- 1) Check the oil level.
- 2) Check for any external leakage of oil from the piping and hydraulic equipment.
- 3) Check the travel of the control levers.
- 4) Other maintenance items can also be carried out visually, so carry out any check that is considered necessary.

4. Confirming failure

Check the degree of the problem to judge for yourself if it is really a failure, or if there is some problem in the handling or operation of the machine.

- ★ When driving the machine and re-enacting the failure, be sure that the investigation or measurement does not make the failure worse.

5. Troubleshooting

Narrow down the causes of the failure from the results of the questions and checks in the above Items 2 – 4, then follow the troubleshooting flow chart to locate the failure.

- ★ Basic procedure for troubleshooting
 - 1) Start from the simple places.
 - 2) Start from the most probable places.
 - 3) Investigate related parts also.

6. Basic action to remedy cause of failure

Even if the failure is repaired, if the root cause of the failure is not repaired, the same failure will occur again.

To prevent this, it is necessary to investigate why the failure occurred, and to remove the root cause of the failure.

METHOD OF USING TROUBLESHOOTING CHART

This troubleshooting chart is divided into three sections: **questions, check items, and troubleshooting**. The questions and check items are used to pinpoint high probability causes that can be located from the failure symptoms or simple inspection without using troubleshooting tools.

Next, troubleshooting tools or direct inspection are used to check the high probability causes to make final confirmation.

[Questions]

Sections **A** + **B** in the chart on the right corresponds to the items where answers can be obtained from the user. The items in **B** are items that can be obtained from the user, depending on the user's level.

[Check items]

The serviceman carries out simple inspection to narrow down the causes. The items under **C** in the chart on the right correspond to this.

The serviceman narrows down the causes from information **A** that he has obtained from the user and the results of **C** that he has obtained from his own inspection.

[Troubleshooting]

Troubleshooting is carried out in the order of probability, starting with the causes that have been marked as having the highest probability from information gained from **[Questions]** and **[Check items]**.

		Causes		
		(1)	(2)	(3)
Questions	(a)	⊙		
	(b)			⊙
	(c)		⊙	
	(d)	○		
	(e)			○
Check items				
Troubleshooting	i	●		
	ii		●	
	iii			●

The basic method of using the troubleshooting chart is as follows.

Items listed for **[Questions]** and **[Check items]** that have a relationship with the Cause items are marked with ○, and of these, causes that have a high probability are marked with ⊙.

Check each of the **[Questions]** and **[Check items]** in turn, and marked the ○ or ⊙ in the chart for items where the problem appeared. The vertical column (Causes) that has the highest number of points is the most probable cause, so start troubleshooting for that item to make final confirmation of the cause.

- ※1. For **[Confirm recent repair history]** in the **[Questions]** Section, ask the user, and mark the Cause column with △ to use as reference for locating the cause of the failure. However, do not use this when making calculations to narrow down the causes.
- ※2. Use the △ in the Cause column as reference for **[Degree of use (Operated for long period)]** in the **[Questions]** section as reference. As a rule, do not use it when calculating the points for locating the cause, but it can be included if necessary to determine the order for troubleshooting.

			Causes					
			Seized turbocharger, interference	Clogged air cleaner element	Worn piston ring, cylinder	Clogged, seized injection nozzle	Improper injection timing	Defective injection pump (excessive injection)
※1	Confirm recent repair history							
※2	Degree of use	Operated for long period		△	△	△		

• **Example of troubleshooting when exhaust gas is black**

Let us assume that [Clogged air cleaner] is taken to be the cause of black exhaust gas. Three symptoms have causal relationship with this problem: [Exhaust gas slowly became black], [Power slowly became weaker], and [Dust indicator is red].

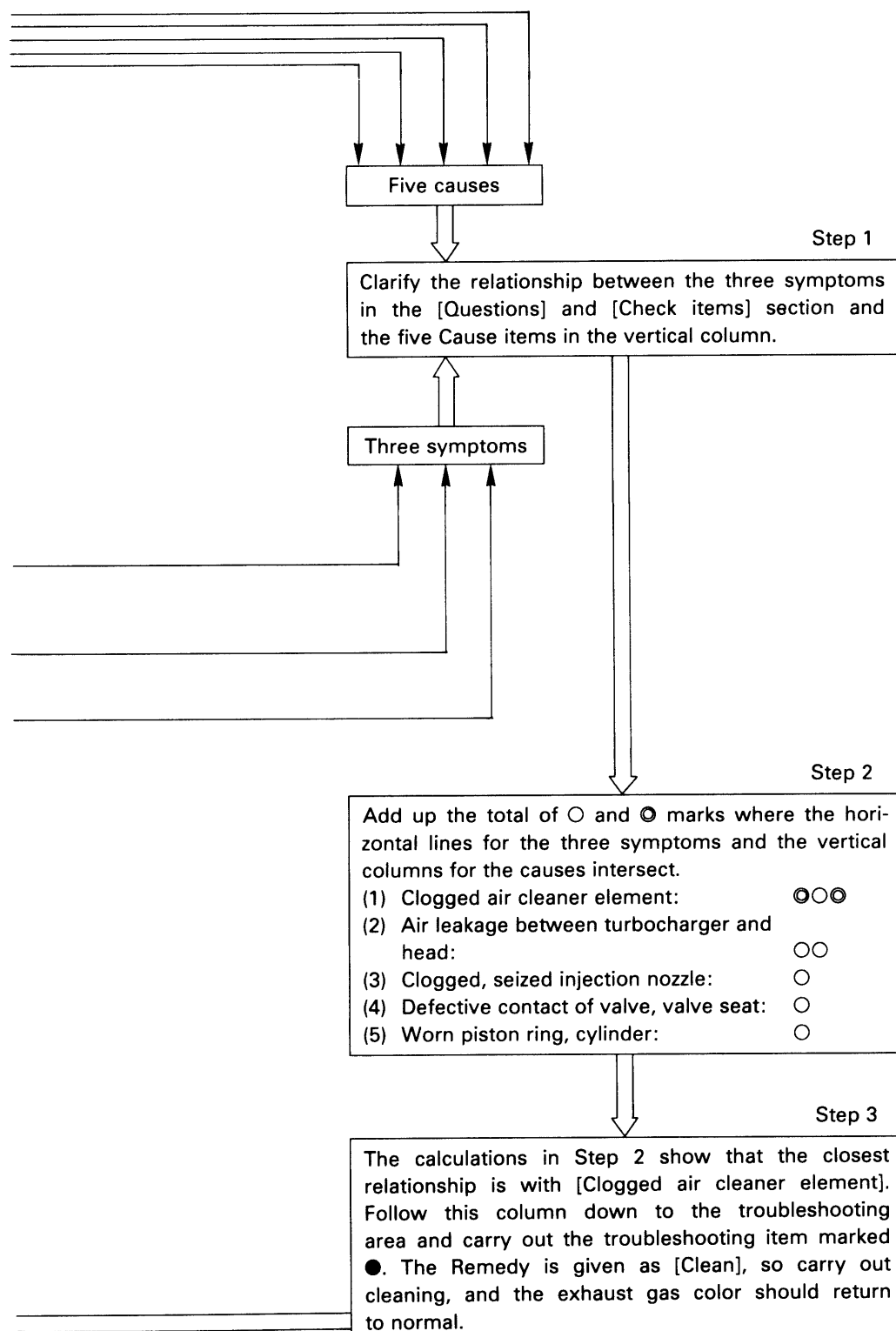
If we look from these three symptoms to find the causes, we find that there is a relationship with five causes. Let us explain here the method of using this causal relationship to pinpoint the most probable cause.

S-7 Exhaust gas is black (incomplete combustion)

General causes why exhaust gas is black

- Insufficient intake of air
- Improper condition of fuel injection
- Excessive injection of fuel

		Causes									
		Sleazed turbocharger, interference	Worn piston ring, cylinder	Clogged, seized injection nozzle	Improper injection timing	Defective injection pump	Improper valve clearance	Crushed, clogged muffler	Leakage of air between turbocharger and head	Defective contact of valve, valve seat	Defective injection pump (rack, plunger seized)
Questions	Confirm recent repair history										
	Degree of use	Operated for long period	△	△						△	
	Color of exhaust gas	Suddenly became black	○								○
		Blue under light load		○							
	Engine oil must be added more frequently		○								
	Power was lost	Suddenly	○				○				○
	Non-specified fuel has been used			○							○
	Noise of interference is heard from around turbocharger	○									
	Blow-by gas is excessive		○								
	Engine pickup is poor and combustion is irregular	○		○			○	○			○
Check items	When exhaust manifold is touched immediately after starting engine, temperature of some cylinders is low		○								○
	Match marks on fuel injection pump are out of alignment			○							
	Seal on injection pump has come off				○						
	Clanging sound is heard from around cylinder head					○					
	Exhaust noise is abnormal	○	○				○				
	Muffler is crushed						○				
	Leakage of air between turbocharger and head, loose clamp							○			
									○		
Troubleshooting	When turbocharger is rotated by hand, it is found to be heavy	●									
	When air cleaner is inspected directly, it is found to be clogged		●								
	When compression pressure is measured, it is found to be low								●		
	Speed of some cylinders does not change when operating on reduced cylinders		●								
	When check is made using delivery method, injection timing is found to be incorrect				●						
	Injection pump test shows that injection amount is incorrect					●					
	When valve clearance is checked directly it is found to be outside standard value						●				
	When muffler is removed, exhaust gas color returns to normal							●			
	When control rack is pushed, it is found to be heavy or does not return										●
Remedy		Replace	Replace	Replace	Adjust	Adjust	Adjust	Replace	Repair	Replace	Replace



S-1 Starting performance is poor (Starting always takes time)

General causes why starting performance is poor

- Defective electrical system
- Insufficient supply of fuel
- Insufficient intake of air
- Improper selection of fuel

(At ambient temperature of -10°C or below, use ASTM D975 No. 1, and -10°C or above, use ASTM D975 No. 2 diesel fuel.)

★ Battery charging rate.

Charging rate Ambient temperature	100%	90%	80%	75%	70%
20°C	1.28	1.26	1.24	1.23	1.22
0°C	1.29	1.27	1.25	1.24	1.23
-10°C	1.30	1.28	1.26	1.25	1.24

- The specific gravity should exceed the value for the charging rate of 70% in the above table.
- In cold weather the specific gravity must exceed the value for the charging rate of 75% in the above table.

Legend

- : Possible causes (judging from Questions and check items)
- ⊙ : Most probable causes (judging from Questions and Check items)
- △ : Possible causes due to length of use (used for a long period)
- : Items to confirm the cause.

		Causes												
		Worn piston ring, cylinder	Defective contact of valve, valve seat	Clogged air cleaner element	Clogged fuel filter, strainer	Clogged feed pump strainer	Defective intake heater (ribbon type)	Defective regulator	Defective alternator	Defective or deteriorated battery	Defective injection nozzle	Defective injection timing	Leakage, clogging, air in fuel system	Clogged fuel tank air breather hole
Questions	Confirm recent repair history													
	Degree of use													
	Ease of starting													
	Indicator lamp does not light up													
	Engine oil must be added more frequently													
	Replacement of filters has not been carried out according to operation manual													
	Dust indicator is red													
	Non-specified fuel has been used													
	Battery charge lamp is ON													
	Starting motor cranks engine slowly													
	When exhaust manifold is touched immediately after starting engine, temperature of some cylinders is low													
	Engine does not pick up smoothly, and combustion is irregular													
	Blow-by gas is excessive													
	Match marks on fuel injection pump are out of alignment													
Check items	Mud is stuck to fuel tank cap													
	When engine is cranked with starting motor,													
	1) Little fuel comes out even when injection pump sleeve nut is loosened													
	2) Little fuel comes out even when fuel filter air bleed plug is loosened													
	Leakage from fuel piping													
	There is hunting from engine (rotation is irregular)													
Troubleshooting	When compression pressure is measured, it is found to be low													
	When air element is inspected directly, it is found to be clogged													
	When fuel filter, strainer are inspected directly, they are found to be clogged													
	When feed pump strainer is inspected directly, it is found to be clogged													
	Heater mount does not become warm													
	Voltage is 26 — 30V between alternator terminal B and terminal E with engine at low idling													
	Either specific gravity of electrolyte or voltage of battery is low													
	Speed of some cylinders does not change when operating on reduced cylinders													
	When check is made using delivery method, injection timing is found to be incorrect													
	When control rack is pushed, it is found to be heavy or does not return (when blind plug at rear of pump is removed, it can be seen that plunger control sleeve does not move)													
	When fuel cap is inspected directly, it is found to be clogged													
Remedy		Replace	Repair	Clean	Clean	Clean	Replace	Replace	Replace	Replace	Adjust	Replace	Repair	Clean

S-2 Engine does not start**① Engine does not turn**

General causes why engine does not turn

- Internal parts of engine seized
 - ★ If internal parts of the engine are seized, carry out troubleshooting for "Engine stops during operations".
- Failure in power train
- Defective electrical system

Legend

- : Possible causes (judging from Questions and check items)
 ⊗ : Most probable causes (judging from Questions and Check items)
 △ : Possible causes due to length of use (used for a long period)
 ● : Items to confirm the cause.

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**② Engine turns but no exhaust gas comes out
(Fuel is not being injected)**

General causes why engine turns but no exhaust gas comes out

- Supply of fuel impossible
- Supply of fuel is extremely small
- Improper selection of fuel (particularly in winter)

Standards for use of fuel

Type of fuel	Ambient temperature									
	-22	-4	14	32	50	68	86	104	122°F	
	-30	-20	-10	0	10	20	30	40	50°C	
Diesel fuel										
				ASTM D975 No. 2						
				ASTM D975 No. 1						

Causes	
Broken injection pump drive shaft, key	
Defective injection pump (rack, plunger seized)	
Seized, broken feed pump piston	
Clogged fuel filter, strainer	
Clogged feed pump strainer	
Lack of fuel	
Clogged, leaking fuel piping	
Clogged fuel tank air breather hole	
Defective fuel cut solenoid	
Defective engine stop motor	
Improper fuel used	

Legend

- : Possible causes (judging from Questions and check items)
- ◎ : Most probable causes (judging from Questions and Check items)
- △ : Possible causes due to length of use (used for a long period)
- : Items to confirm the cause.

Questions		1	2	3	4	5	6	7	8	9	10	11	12
Questions	Confirm recent repair history												
	Degree of use					△	△			△			
	Exhaust gas suddenly stops coming out (when starting again)	⊙	⊙	⊙									
	Replacement of filters has not been carried out according to operation manual					⊙	⊙						
	Fuel tank is found to be empty							⊙					
	There is leakage from fuel piping								⊙				
	Mud is stuck to fuel tank cap									⊙			
Check items	When starting switch is turned ON, linkage does not move									⊙	⊙		
	When fuel filter is drained, fuel does not come out											⊙	
	When engine is cranked with starting motor,												
	1) Injection pump coupling does not rotate	⊙											
	2) No fuel comes out even when fuel filter air bleed plug is loosened	⊙				○	○					○	
	3) No fuel spurts out even when injection pipe sleeve nut is loosened	⊙	⊙	⊙									
	Rust and water are found when fuel is drained						○	○					

Troubleshooting		●															
Check injection pump directly		●															
When control rack is pushed, it is found to be heavy, or does not return			●														
Check feed pump directly				●													
When fuel filter, strainer are inspected directly, they are found to be clogged					●											●	
When feed pump strainer is inspected directly, it is found to be clogged						●											
When fuel cap is inspected directly, it is found to be clogged										●							
Does not move even when fuel cut solenoid linkage is disconnected												●					
Does not move even when engine stop motor linkage is disconnected														●			
	Remedy	Replace	Replace	Replace	Clean	Clean	Add	Repair	Repair	Replace	Replace	Replace					

③ Exhaust gas comes out but engine does not start (Fuel is being injected)

General causes why exhaust gas comes out but engine does not start

- Lack of rotating force due to defective electrical system
- Insufficient supply of fuel
- Insufficient intake of air
- Improper selection of fuel

Legend

- : Possible causes (judging from Questions and check items)
- ⊗ : Most probable causes (judging from Questions and Check items)
- △ : Possible causes due to length of use (used for a long period)
- : Items to confirm the cause.

		Causes											
		Defective, broken valve system (valve, rocker lever, etc.) Defective injection pump (rack, plunger stuck) Worn piston ring, cylinder Clogged fuel filter, strainer Clogged feed pump strainer Clogged air cleaner element Defective intake heater (ribbon type) Defective or deteriorated battery Leakage, clogging, air in fuel system Clogged injection nozzle, defective spray Clogged fuel tank air breather hole Improper fuel used											
Questions	Confirm recent repair history												
	Degree of use												
	Operated for long period			△	△	△						△	
	Suddenly failed to start	⊗	⊗										
	When engine is cranked, abnormal noise is heard from around head	⊗											
	Engine oil must be added more frequently			⊗									
	Non-specified fuel has been used		○									○	
	Replacement of filters has not been carried out according to operation manual				⊗	⊗	⊗						
	Rust is found when fuel is drained				⊗	⊗							
	Dust indicator is red						⊗						
	Indicator lamp does not light up							⊗					
	Starting motor cranks engine slowly								⊗				
	Mud is stuck to fuel tank cap											○	
Check items	When fuel lever is placed at FULL position, it does not contact stopper		○										
	When engine is cranked with starting motor,												
	1) Little fuel comes out even when injection pump sleeve nut is loosened		⊗										
	2) Little fuel comes out even when fuel filter air bleed plug is loosened				⊗	⊗							○
	There is leakage from fuel piping									⊗			
	When exhaust manifold is touched immediately after starting engine, temperature of some cylinder is low										⊗		
	When fuel filter is drained, no fuel comes out												⊗
Troubleshooting	Remove head cover and check directly	●											
	When control rack is pushed, it is found to be heavy, or does not return		●										
	When compression pressure is measured, it is found to be low			●									
	When fuel filter, strainer are inspected directly, they are found to be clogged				●								●
	When feed pump strainer is inspected directly, it is found to be clogged					●							
	When air element is inspected directly, it is found to be clogged						●						
	Heater mount does not become warm							●					
	Either specific gravity of electrolyte or voltage of battery is low								●				
	When feed pump is operated, there is no response, or pump is heavy									●			
	Speed of some cylinders does not change when operating on reduced cylinders										●		
	When fuel cap is inspected directly, it is found to be clogged											●	
Remedy		Replace	Replace	Replace	Clean	Clean	Clean	Repair	Replace	Repair	Clean	Clean	—

S-3 Engine does not pick up smoothly (Follow-up is poor)

General causes why engine does not pick up smoothly

- Insufficient intake of air
- Insufficient supply of fuel
- Improper condition of fuel injection
- Improper fuel used

Legend

- : Possible causes (judging from Questions and check items)
- ◎ : Most probable causes (judging from Questions and Check items)
- △ : Possible causes due to length of use (used for a long period)
- : Items to confirm the cause.

			Causes											
			Clogged air cleaner element	Clogged fuel filter, strainer	Clogged feed pump strainer	Clogged injection nozzle, defective spray	Worn piston ring, cylinder	Seized turbocharger, interference	Improper valve clearance	Clogged fuel tank air breather hole	Clogged, leaking fuel piping	Defective contact of valve, valve seat		
Questions	Confirm recent repair history													
	Degree of use	Operated for long period	△	△	△			△					△	
	Replacement of filters has not been carried out according to operation manual		◎	◎	◎									
	Non-specified fuel is being used			◎	◎	◎								
	Engine oil must be added more frequently						◎							
	Rust and water are found when fuel is drained			◎	◎									
	Dust indicator is red		◎											
	Noise of interference is heard from around turbocharger							◎						
	Engine pick-up suddenly became poor					○		◎		○	○			
	Check items	Color of exhaust gas	Blue under light load					◎						
Black			◎			◎		◎					○	
Clanging sound is heard from around cylinder head								◎						
Mud is stuck to fuel tank cap									◎					
There is leakage from fuel piping										◎				
High idling speed under no load is normal, but speed suddenly drops when load is applied			◎	◎					○					
There is hunting from engine (rotation is irregular)			○	◎	○				○					
When exhaust manifold is touched immediately after starting engine, temperature of some cylinders is low					◎	○								
Blow-by gas is excessive						◎								
Troubleshooting		When air element is inspected directly, it is found to be clogged		●										
	When fuel filter, strainer are inspected directly, they are found to be clogged			●										
	When feed pump strainer is inspected directly, it is found to be clogged				●									
	Speed of some cylinders does not change when operating on reduced cylinders					●								
	When control rack is pushed, it is found to be heavy, or does not return						●							
	When compression pressure is measured, it is found to be low							●					●	
	When turbocharger is rotated by hand, it is found to be heavy								●					
	When valve clearance is checked directly, it is found to be outside standard value									●				
	When fuel cap is inspected directly, it is found to be clogged										●			
	When feed pump is operated, operation is too light or too heavy											●		
		Remedy	Clean	Clean	Clean	Repair	Replace	Replace	Replace	Adjust	Clean	Repair	Replace	

S-4 Engine stops during operations

General causes why engine stops during operations

- Seized parts inside engine
- Insufficient supply of fuel
- Overheating
 - ★ If there is overheating and insufficient output, carry out troubleshooting for overheating.
- Failure in power train
 - ★ If the engine stops because of a failure in the power train, carry out troubleshooting for the chassis.

Legend

- : Possible causes (judging from Questions and check items)
- ⊙ : Most probable causes (judging from Questions and Check items)
- △ : Possible causes due to length of use (used for a long period)
- : Items to confirm the cause.

• Seized parts inside engine • Insufficient supply of fuel • Overheating ★ If there is overheating and insufficient output, carry out troubleshooting for overheating. • Failure in power train ★ If the engine stops because of a failure in the power train, carry out troubleshooting for the chassis.			Causes Broken, seized piston, connecting rod Broken, seized crankshaft bearing Broken valve system (valve, rocker lever, etc.) Broken, seized gear train Broken pump auxiliary equipment Broken fuel pump drive shaft, key Lack of fuel Clogged fuel filter, strainer Clogged feed pump strainer Broken, seized feed pump piston Clogged, leaking fuel piping Clogged fuel tank air breather hole Defective injection pump (rack, plunger stuck) Failure in chassis power train																	
Legend																				
○ : Possible causes (judging from Questions and check items)																				
⊙ : Most probable causes (judging from Questions and Check items)																				
△ : Possible causes due to length of use (used for a long period)																				
● : Items to confirm the cause.																				
Questions	Confirm recent repair history																			
	Degree of use	Operated for long period									△	△								
	Condition when engine stopped	Abnormal noise was heard and engine stopped suddenly	⊙	⊙	⊙	⊙	⊙	⊙				○					○	⊙		
		Engine overheated and stopped	⊙	○			○													
		Engine stopped slowly							⊙	○	○									
		There was hunting and engine stopped								⊙	○	○				○				
	Fuel gauge lamp lights up									⊙										
	Fuel tank is found to be empty									⊙										
	Replacement of filters has not been carried out according to operation manual										⊙	⊙								
	Non-specified fuel is being used										○	○	○				○			
	When feed pump is operated, there is no response or it is heavy										○	○		⊙						
	Mud is stuck to fuel tank cap																⊙			
	Engine turns, but stops when transmission control lever is operated																		⊙	
	Check items	Try to turn by hand using barring tool	Does not turn at all	⊙	⊙															
			Turns in opposite direction			⊙														
			Moves amount of backlash				⊙	⊙												
			Shaft does not turn						⊙											
Rust and water are found when fuel is drained										⊙	⊙									
Metal particles are found when oil is drained		⊙	⊙							○	○									
Troubleshooting	Remove oil pan and check directly			●	●															
	Remove head cover and check directly					●														
	When gear train is inspected, it does not turn						●													
	Turns when pump auxiliary equipment is removed							●												
	When fuel filter, strainer are inspected directly, they are found to be clogged										●									
	When feed pump strainer is inspected directly, it is found to be clogged											●								
	Check feed pump directly												●							
	When control rack is pushed, it is found to be heavy or does not return																●			
			Carry out troubleshooting in chassis volume																	
Remedy		Replace	Replace	Replace	Replace	Replace	Replace	Add	Clean	Clean	Replace	Repair	Clean	Replace						

S-5 Engine does not rotate smoothly (hunting)

General causes why engine does not rotate smoothly

- Air in fuel system
- Defective governor mechanism
- Defective engine throttle controller mechanism (engine throttle controller type)
- ★ If there is no hunting when the engine throttle controller rod is disconnected, carry out troubleshooting for the electrical system.

Legend

- : Possible causes (judging from Questions and check items)
- ◎ : Most probable causes (judging from Questions and Check items)
- △ : Possible causes due to length of use (used for a long period)
- : Items to confirm the cause.

			Causes										
			Defective operation of governor	Defective adjustment of governor	Defective operation of control rack	Low speed is too low	Lack of fuel	Clogged feed pump strainer	Clogged fuel filter, strainer	Clogged, air in circuit between fuel tank and feed pump	Clogged, air in circuit between feed pump and nozzle	Clogged fuel tank air breather hole	
Questions	Confirm recent repair history												
	Degree of use	Operated for long period					△	△					
	Condition of hunting	Occurs at certain speed range	◎	◎	◎	○							
		Occurs at low idling	○		◎		○	○	○	○			
		Occurs even when speed is raised	○	○	○							○	
		Occurs on slopes				◎							
	Fuel tank is found to be empty						◎						
	Replacement of filters has not been carried out according to operation manual							◎	◎				
	Rust is found when fuel is drained						○	○					
	Leakage from fuel piping									◎	◎		
Check items	When feed pump is operated,												
	1) No response, light, return is quick								◎	◎			
	2) No response, light, return is normal								◎				
	Engine speed sometimes rises too high		◎	◎									
	Engine is sometimes difficult to stop		◎		◎								
	Seal on injection pump has come off			◎		◎							
	Troubleshooting	When governor lever is moved it is found to be stiff		●		●							
When injection pump is tested, governor is found to be improperly adjusted			●										
When control rack is pushed, it is found to be heavy, or does not return				●									
When fuel cap is inspected directly, it is found to be clogged					●					●			
When feed pump strainer is inspected directly, it is found to be clogged						●							
When fuel filter, strainer are inspected directly, they are found to be clogged							●						
			Remedy	Adjust	Adjust	Adjust	Adjust	Add	Claen	Clean	Repair	Repair	Clean

S-6 Engine lacks output (no power)

General causes why engine lacks output

- Insufficient intake of air
- Insufficient supply of fuel
- Improper condition of fuel injection
- Improper fuel used
(if non-specified fuel is used, output drops)
- Lack of output due to overheating
 - ★ If there is overheating and insufficient output, carry out troubleshooting for overheating.

Legend

- : Possible causes (judging from Questions and check items)
 ◎ : Most probable causes (judging from Questions and Check items)
 △ : Possible causes due to length of use (used for a long period)
 ● : Items to confirm the cause.

		Causes											
		Clogged air cleaner element	Seized turbocharger, interference	Worn piston ring, cylinder	Clogged fuel filter, strainer	Clogged feed pump strainer	Clogged injection nozzle, defective spray	Seized injection pump plunger	Improper valve clearance	Defective contact of valve, valve seat	Bent fuel lever linkage, defective adjustment	Clogged, leaking fuel piping	Clogged fuel tank air breather hole
Questions	Confirm recent repair history												
	Degree of use												
	Operated for long period	△		△	△	△				△			
	Power was lost												
	Suddenly	◎		◎	◎	◎				◎			
	Gradually	○		○	○	○				○			
	Engine oil must be added more frequently			◎									
	Replacement of filters has not been carried out according to operation manual	◎			◎	◎							
	Non-specified fuel is being used				◎	◎	◎	◎					
	Dust indicator is red	◎											
Check items	Color of exhaust gas												
	Black	◎	◎										
	Blue under light load			◎									
	Noise of interference is heard from around turbocharger		◎										
	Blow-by gas is excessive			◎									
	Engine pickup is poor and combustion is irregular		◎			○					○	○	
	High idling speed under no load is normal, but speed suddenly drops when load is applied				◎	◎						○	
	When exhaust manifold is touched immediately after starting engine, temperature of some cylinders is low					◎	○						
	There is hunting from engine (rotation is irregular)				○	○					○	○	
	Clanging sound is heard from around cylinder head							◎					
	High idling speed of engine is low						○			◎			
	Leakage from fuel piping										◎		
Troubleshooting	When air element is inspected directly, it is found to be clogged	●											
	When turbocharger is rotated by hand, it is found to be heavy		●										
	When compression pressure is measured, it is found to be low			●						●			
	When fuel filter, strainer are inspected directly, they are found to be clogged				●								
	When feed pump strainer is inspected directly, it is found to be clogged					●							
	Speed of some cylinders does not change when operating on reduced cylinders						●						
	When control rack is pushed, it is found to be heavy, or does not return							●					
	When valve clearance is checked directly, it is found to be outside standard value								●				
	When lever is placed at FULL position, it does not contact stopper										●		
	When feed pump is operated, operation is too light or too heavy											●	
	When fuel cap is inspected directly, it is found to be clogged												●
Remedy		Clean	Replace	Replace	Clean	Clean	Repair	Replace	Adjust	Replace	Adjust	Repair	Clean

S-7 Exhaust gas is black (incomplete combustion)

General causes why exhaust gas is black

- Insufficient intake of air
- Improper condition of fuel injection
- Excessive injection of fuel

Legend

- : Possible causes (judging from Questions and check items)
- ◎ : Most probable causes (judging from Questions and Check items)
- △ : Possible causes due to length of use (used for a long period)
- : Items to confirm the cause.

			Causes											
			Seized turbocharger, interference	Clogged air cleaner element	Worn piston ring, cylinder	Clogged, seized injection nozzle	Improper injection timing	Defective injection pump	Improper injection pump (excessive injection)	Crushed, clogged muffler	Leakage of air between turbocharger and head	Defective contact of valve, valve seat	Defective injection pump (rack, plunger seized)	
Questions	Confirm recent repair history													
	Degree of use	Operated for long period		△	△	△						△		
	Color of exhaust gas	Suddenly became black	◎			○							○	
		Gradually became black		◎		○				○				
		Blue under light load			◎									
	Engine oil must be added more frequently				◎									
	Power was lost	Suddenly	◎			○				○			○	
		Gradually		○	○						○	○		
	Non-specified fuel is being used					○							○	
	Noise of interference is heard from around turbocharger		◎											
	Dust indicator is red			◎										
	Blow-by gas is excessive				◎									
	Engine pickup is poor and combustion is irregular		○			◎		○	○	○			○	
	Check items	When exhaust manifold is touched immediately after starting engine, temperature of some cylinders is low					◎						○	
Match marks on fuel injection pump are out of alignment						◎								
Seal on injection pump has come off							◎							
Clanging sound is heard from around cylinder head								◎						
Exhaust noise is abnormal		○			○				◎					
Muffler is crushed										◎				
Leakage of air between trubocharger and head, loose clamp											◎			
Troubleshooting	When turbocharger is rotated by hand, it is found to be heavy		●											
	When air cleaner is inspected directly, it is found to be clogged			●										
	When compression pressure is measured, it is found to be low				●							●		
	Speed of some cylinders does not change when operating on reduced cylinders					●								
	When check is made using delivery method, injection timing is found to be incorrect						●							
	Injection pump test shows that injection amount is incorrect							●						
	When valve clearance is checked directly it is found to be outside standard value								●					
	When muffler is removed, exhaust gas color returns to normal									●				
	When control rack is pushed, it is found to be heavy, or does not return												●	
		Remedy	Replace	Clean	Replace	Replace	Adjust	Adjust	Adjust	Replace	Repair	Replace	Replace	

S-8 Oil consumption is excessive (or exhaust gas is blue)

- ★ Do not run the engine at idling for more than 20 minutes continuously. (Both low and high idling)

General causes why oil consumption is excessive

- Abnormal combustion of oil
- External leakage of oil
- Wear of lubrication system

			Causes													
			Broken piston ring	Worn piston ring, cylinder liner	Clogged breather or breather hose	Leakage from oil filter, oil cooler	Leakage from oil piping	Leakage from oil drain plug	Broken oil pan, cylinder head, etc.	Worn oil cooler	Worn seal at turbine end	Worn seal at blower end	Worn, broken rear seal, seal surface	Turbocharger		
Questions	Confirm recent repair history															
	Degree of use	Operated for long period		△						△	△			△		
	Oil consumption suddenly increased		⊙							○						
	Engine oil must be added more frequently			⊙						○						
	Engine oil becomes contaminated quickly		○	⊙	○											
	Exhaust gas is blue under light load		⊙	⊙												
	Amount of blow-by gas	Abnormally excessive	⊙	⊙							○			○		
		None			⊙											
	Area around engine is dirty with oil					⊙	⊙	⊙	⊙							
	There is oil in engine cooling water								⊙							
	When exhaust pipe is removed, inside is found to be dirty with oil										⊙			○		
	Inside of turbocharger intake pipe is dirty with oil											⊙				
	Oil level in clutch or TORQFLOW transmission damper chamber rises												⊙			
	Clamps for intake system are loose													⊙		
Troubleshooting	When compression pressure is measured, it is found to be low		●	●												
	When breather element is inspected, it is found to be clogged with dirty oil				●											
	There is external leakage of oil from engine					●	●	●	●							
	Pressure-tightness test of oil cooler shows there is leakage									●						
	Excessive play of turbocharger shaft										●	●				
	Check rear seal directly												●			
	When intake manifold is removed, dust is found inside													●		
	When intake manifold is removed, inside is found to be dirty with oil													●		
			Remedy	Replace	Replace	Clean	Repair	Repair	Repair	Repair	Replace	Replace	Replace	Repair	Repair	Repair

S-9 Oil becomes contaminated quickly

General causes why oil becomes contaminated quickly

- Intake of exhaust gas due to internal wear
- Clogging of lubrication passage
- Improper combustion
- Improper oil used
- Operation under excessive load

			Causes									
			Worn piston ring, cylinder	Clogged breather, breather tube	Clogged oil filter	Worn valve, valve guide	Clogged oil cooler	Clogged turbocharger drain pipe	Defective seal at turbocharger turbine end	Defective safety valve	Exhaust gas is black	
Questions	Confirm recent repair history											
	Degree of use	Operated for long period	△			△			△			
	Engine oil must be added more frequently		⊙									
	Non-specified fuel is being used					○						
	Color of exhaust gas	Blue under light load	⊙									
		Black									⊙	
	Amount of blow-by gas	Abnormally excessive	⊙			○		○	○			
		None		⊙								
	Oil filter caution lamp stays on even when oil pressure rises					⊙				○		
	When oil filter is inspected, metal particles are found		○			⊙	○					
Check items	When exhaust pipe is removed, inside is found to be dirty with oil					⊙						
	Engine oil temperature rises quickly						⊙					
	When compression pressure is measured, it is found to be low		●			●						
	When breather element is inspected directly, it is found to be clogged with dirty oil, or hose is broken			●								
	When oil filter is inspected directly, it is found to be clogged				●							
	When oil cooler is inspected directly, it is found to be clogged						●					
	Turbocharger drain tube is clogged							●				
	Excessive play of turbocharger shaft								●			
Troubleshooting	When safety valve is directly inspected, spring is found to be catching or broken									●		
			Carry out troubleshooting for "Exhaust is black".									
Remedy			Replace	Clean	Replace	Replace	Clean	Clean	Replace	Replace	—	

S-10 Fuel consumption is excessive

General causes why fuel consumption is excessive

- Leakage of fuel
- Improper condition of fuel injection
- Excessive injection of fuel

Legend

- : Possible causes (judging from Questions and check items)
 ⊙ : Most probable causes (judging from Questions and Check items)
 △ : Possible causes due to length of use (used for a long period)
 ● : Items to confirm the cause.

		Causes									
Questions	Confirm recent repair history										
	Degree of use	Operated for long period		△	△					△	
	Condition of fuel consumption	More than for other machines of same model	⊙			○					
		Gradually increased		○	○						
		Suddenly increased					○	○			
	Exhaust gas color	Black	⊙	○		○				○	
		White						○			
	Seal on injection pump has come off		⊙								
	There is irregular combustion			⊙							
	When exhaust manifold is touched immediately after starting engine, temperature of some cylinders is low			⊙	○						
Check items	Match mark on injection pump is misaligned					⊙					
	There is external leakage of fuel from engine						⊙				
	Engine oil level rises and smells of diesel fuel		○						⊙	⊙	
	Engine low idling speed is high		○								⊙

Troubleshooting	Injection pump test shows that injection amount is excessive	●								
	Speed of some cylinders does not change when operating on reduced cylinders		●							
	When control rack is pushed, it is found to be heavy, or does not return			●						
	When check is made using delivery method, injection timing is found to be incorrect				●					
	Remove head cover and check directly						●			
	Remove feed pump and check directly							●		
	When engine speed is measured, low idling speed is found to be high									●
Remedy		Adjust	Replace	Replace	Adjust	Repair	Repair	Repair	Adjust	

S-11 Oil is in cooling water, or water spurts back, or water level goes down

General causes why oil is in cooling water

- Internal leakage in lubrication system
- Internal leakage in cooling system

Legend

- : Possible causes (judging from Questions and check items)
 ◎ : Most probable causes (judging from Questions and Check items)
 △ : Possible causes due to length of use (used for a long period)
 ● : Items to confirm the cause.

			Causes						
Questions			Broken oil cooler core, O-ring	Broken head, head gasket	Insufficient protrusion of liner	Broken oil cooler for power train	Broken liner O-ring, holes caused by pitting	Internal cracks in cylinder block	
Check items	Confirm recent repair history								
	Degree of use	Operated for long period	△				△		
	Oil level	Suddenly increased	○	○		○			
		Gradually increased					○	○	
	Hard water is being used as cooling water		○				○		
	Engine oil level has risen, oil is cloudy white		◎				○	○	
	Excessive air bubbles inside radiator, spurts back			◎	◎				
	Hydraulic oil, torque converter, transmission oil is cloudy white					◎			
Trouble-shooting	When hydraulic oil, torque converter, transmission oil is drained, water is found					◎			

Trouble-shooting	Pressure-tightness test of oil cooler shows there is leakage		●			●		
	Pressure-tightness test of cylinder head shows there is leakage			●				
	Remove cylinder head and check directly				●			
	Remove oil pan and check directly						●	●
	Remedy	Replace	Replace	Replace	Replace	Replace	Replace	

S-12 Oil pressure lamp lights up (drop in oil pressure)

General causes why oil pressure lamp lights up

- Leakage, clogging, wear of lubricating system
- Defective oil pressure control
- Improper oil used (improper viscosity)
- Deterioration of oil due to overheating

★ Standards for ~~use of fuel~~

engine oil selection

Type of oil	Selection of oil SAE number according to ambient temperature									
	-22	-4	14	32	50	68	86	104	122°F	
	-30	-20	-10	0	10	20	30	40	50°C	
Engine oil										
										SAE 30
										SAE 10W
										SAE 10W-30
										SAE 15W-40

Legend

- : Possible causes (judging from Questions and check items)
- ⊙ : Most probable causes (judging from Questions and Check items)
- △ : Possible causes due to length of use (used for a long period)
- : Items to confirm the cause.

		Causes											
		Clogged oil filter	Worn bearing journal	Clogged strainer inside oil pan	Clogged, broken oil pipe inside oil pan	Broken suction pipe brazing	Defective oil pump	Insufficient oil in oil pan	Defective regulator valve	Defective relief valve	Leaking, crushed hydraulic piping	Defective oil level sensor	Defective oil pressure sensor
Questions	Confirm recent repair history												
	Degree of use												
	Operated for long period	△	△				△						
	Replacement of filters has not been carried out according to operation manual	⊙											
	Caution lamp lights up	⊙							○				
	Non-specified fuel has been used	○											
	Condition when oil pressure lamp lights up												
	Lights up at low idling	⊙							○				
	Lights up at low, high idling		⊙	⊙	⊙	⊙	○	○	○				
	Lights up on slopes						⊙		⊙	⊙		○	○
Check items	Sometimes lights up							⊙	⊙				
	There is clogging, leakage from hydraulic piping (external)									⊙			
	Oil level sensor lamp lights up						⊙				⊙		
	When oil level in oil pan is checked, it is found to be low						⊙						
	Metal particles are found when oil is drained		⊙										
	Metal particles are stuck to oil filter element		⊙			○							
	Oil is cloudy white or smells of diesel oil												⊙
Troubleshooting	When oil filter is inspected directly, it is found to be clogged	●	●										
	Remove oil pan and check directly			●	●	●							
	Oil pump rotation is heavy, there is play						●						
	There is catching of relief valve or regulator valve, spring or valve guide is broken							●	●				
	When oil level sensor is replaced, oil pressure sensor lamp goes out										●		
	When oil pressure is measured, it is found to be within standard value											●	
Remedy		Clean	Clean	Clean	Clean	Repair	Replace	Add	Adjust	Adjust	Repair	Replace	Replace

Carry out troubleshooting for "Oil level rises"

S-13 Oil level rises

- ★ If there is oil in the cooling water, carry out troubleshooting for "Oil is in cooling water".

General causes why oil level rises

- Water in oil (cloudy white)
- Fuel in oil (diluted, and smells of diesel fuel)
- Entry of oil from other component

Legend

- : Possible causes (judging from Questions and check items)
 ◎ : Most probable causes (judging from Questions and Check items)
 △ : Possible causes due to length of use (used for a long period)
 ● : Items to confirm the cause.

			Causes											
			Broken oil cooler core, O-ring	Defective nozzle holder sleeve	Broken head, head gasket (including precombustion chamber)	Clogged water pump breather hole, defective seal	Worn, damaged rear seal surface	Leakage of fuel from pump or auxiliary equipment	Defective part inside injection pump	Defective thermostat seat	Damaged liner O-ring, holes made by pitting	Cracks inside cylinder block		
Questions	Confirm recent repair history													
	Degree of use	Operated for long period		△		△	△				△			
	There is oil in radiator cooling water		◎	○	○						○	○		
	Exhaust gas is white			◎				○		○				
	When engine is first started, drops of water come from muffler			◎										
	Leave radiator cap open. When engine is run at idling, an abnormal number of bubbles appear, or water spurts back				◎					○				
	Water pump breather hole is clogged with mud					◎								
	When water pump breather hole is clean, water comes out					◎								
	Oil level goes down in clutch, TORQFLOW transmission, or damper chamber						◎							
	Oil level goes down in hydraulic tank							◎						
	Engine oil smells of diesel fuel								◎	◎	◎			
	Fuel is added more frequently								◎	◎	◎			

Troubleshooting	Pressure-tightness test of oil cooler shows there is leakage	●										
	Pressure-tightness test of cylinder head shows there is leakage		●									
	When compression pressure is measured, it is found to be low			●								
	Remove water pump and check directly				●							
	Check rear seal directly					●						
	When pump auxiliary equipment is removed, seal is found to be broken						●					
	Remove head cover and check directly							●				
	Remove injection pump and check directly								●			
	There is improper contact of thermostat seat valve									●		
	Remove oil pan and check directly										●	●
	Remedy	Replace	Replace	Replace	Replace	Repair	Replace	Repair	Replace	Repair	Replace	Replace

S-14 Water temperature becomes too high (overheating)

General causes why water temperature becomes too high

- Lack of cooling water (deformation, damage of fan)
- Drop in heat dissipation efficiency
- Defective cooling circulation system
- Rise in oil temperature of power train
- ★ Carry out troubleshooting for chassis.

Legend

- : Possible causes (judging from Questions and check items)
 ⊗ : Most probable causes (judging from Questions and Check items)
 △ : Possible causes due to length of use (used for a long period)
 ● : Items to confirm the cause.

		Causes										
		Broken water pump	Clogged, crushed radiator fin	Clogged radiator core	Defective thermostat (does not open)	Defective water temperature gauge	Insufficient cooling water	Fan belt slipping, worn fan pulley	Clogged, broken oil cooler	Defective pressure valve	Broken head, head gasket	Rise in torque converter oil temperature
Questions	Confirm recent repair history											
	Degree of use											
	Operated for long period		△	△							△	△
	Condition of overheating											
	Suddenly overheated	⊗				○	○					
	Always tends to overheat		⊗	⊗	○		○					
	Water temperature gauge											
	Rises quickly			⊗		○						
	Does not go down from red range				⊗							
	Radiator water level sensor lights up					⊗						
	Fan belt whines under sudden load						⊗					
	Cloudy white oil is floating on cooling water							⊗				
	Cooling water flows out from overflow hose								⊗			
Check items	Excessive air bubbles inside radiator, water spurts back									⊗		
	Engine oil level has risen, oil is cloudy white							○			⊗	
	There is play when fan pulley is rotated	⊗										
	Radiator shroud, inside of underguard are clogged with dirt or mud		⊗				⊗					
	When light bulb is held behind radiator, no light passes through		⊗									
	Water is leaking because of cracks in hose or loose clamps					⊗						
	Belt tension is found to be slack						⊗					
	Power train oil level enters red range before engine water temperature											⊗
	Temperature difference between top and bottom radiator tanks is excessive	●										
	Temperature difference between top and bottom radiator tanks is slight		●									
	When water filler port is inspected, the core is found to be clogged			●								
	When a function test is carried out on the thermostat, it does not open even at the cracking temperature				●							
	When water temperature is measured, it is found to be normal					●						
	When oil cooler is inspected directly, it is found to be clogged							●				
Troubleshooting	When measurement is made with radiator cap tester, set pressure is found to be low								●			
	When compression pressure is measured, it is found to be low									●		
	Remove oil pan and check directly										●	
		Remedy	Replace	Repair	Repair	Replace	Replace	Add	Repair	Replace	Replace	Replace

S-16 Vibration is excessive

- ★ If there is abnormal noise together with the vibration, carry out troubleshooting for "Abnormal noise is made".

General causes why vibration is excessive

- Defective parts (abnormal wear, breakage)
- Improper alignment
- Abnormal combustion

Legend

- : Possible causes (judging from Questions and check items)
 ◎ : Most probable causes (judging from Questions and Check items)
 △ : Possible causes due to length of use (used for a long period)
 ● : Items to confirm the cause.

			Causes										
Questions			Worn connecting rod, main bearing	Worn balancer, cam bushing	Worn support pilot	Loose engine mounting bolts, broken cushion	Broken part inside output shaft (damper)	Misalignment between engine and power train	Improper gear train backlash	Valve system (valve, rocker lever, etc.) stuck	Defective injection pump (excessive injection)		
Check items	Confirm recent repair history												
	Degree of use	Operated for long period	△	△	△	△							
	Condition of vibration	Suddenly increased				○				○			
		Gradually increased	○	○	○	○							
	Non-specified fuel has been used		○	○									
	Metal particles are found in oil filter		◎	◎									
	Metal particles are found when oil is drained		◎	◎									
	Oil pressure is low at low idling		○	○									
	Vibration occurs at mid-range speed					○	○						
	Vibration follows engine speed				○	○	○	○	○				
	Exhaust gas is black									◎	○		
	Seal on injection pump has come off										◎		

Troubleshooting	Remove oil pan and check directly	●									
	Remove side cover and check directly		●								
	Check directly for worn support pilot, play			●							
	Check directly for loose engine mounting bolts, broken cushion				●						
	Check inside of output shaft (damper) directly					●					
	When radial runout, face runout are measured, they are found to be outside standard value						●				
	Remove front cover and check directly							●			
	Remove head cover and check directly								●		
	Injection pump test shows that injection amount is incorrect									●	
	Remedy	Replace	Replace	Replace	Replace	Replace	Repair	Repair	Replace	Adjust	

ENGINE

13 DISASSEMBLY AND ASSEMBLY



GENERAL

Disassembly	13-002
Assembly	13-018

AIR COMPRESSOR

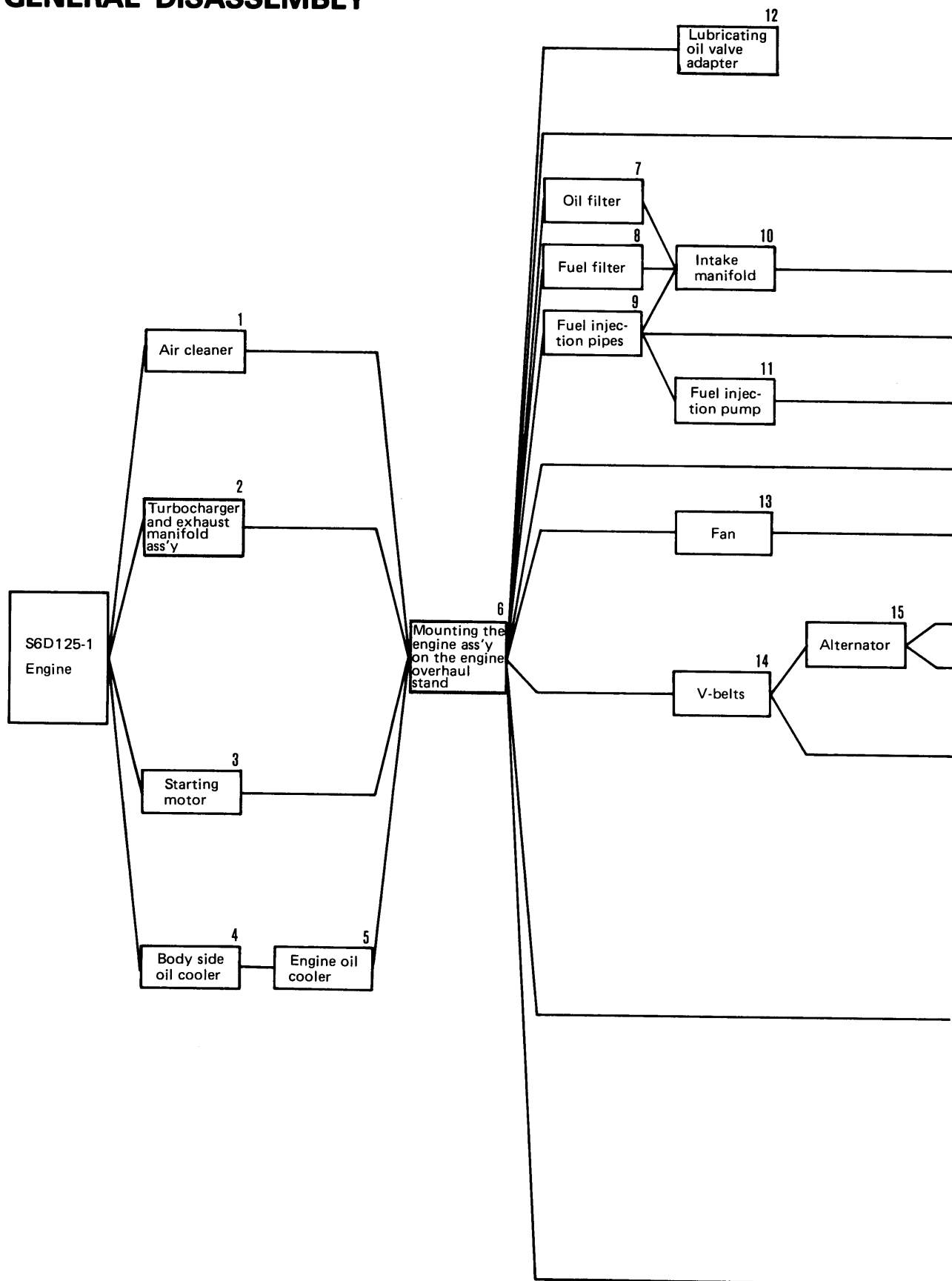
Disassembly	13-044
Assembly	13-046

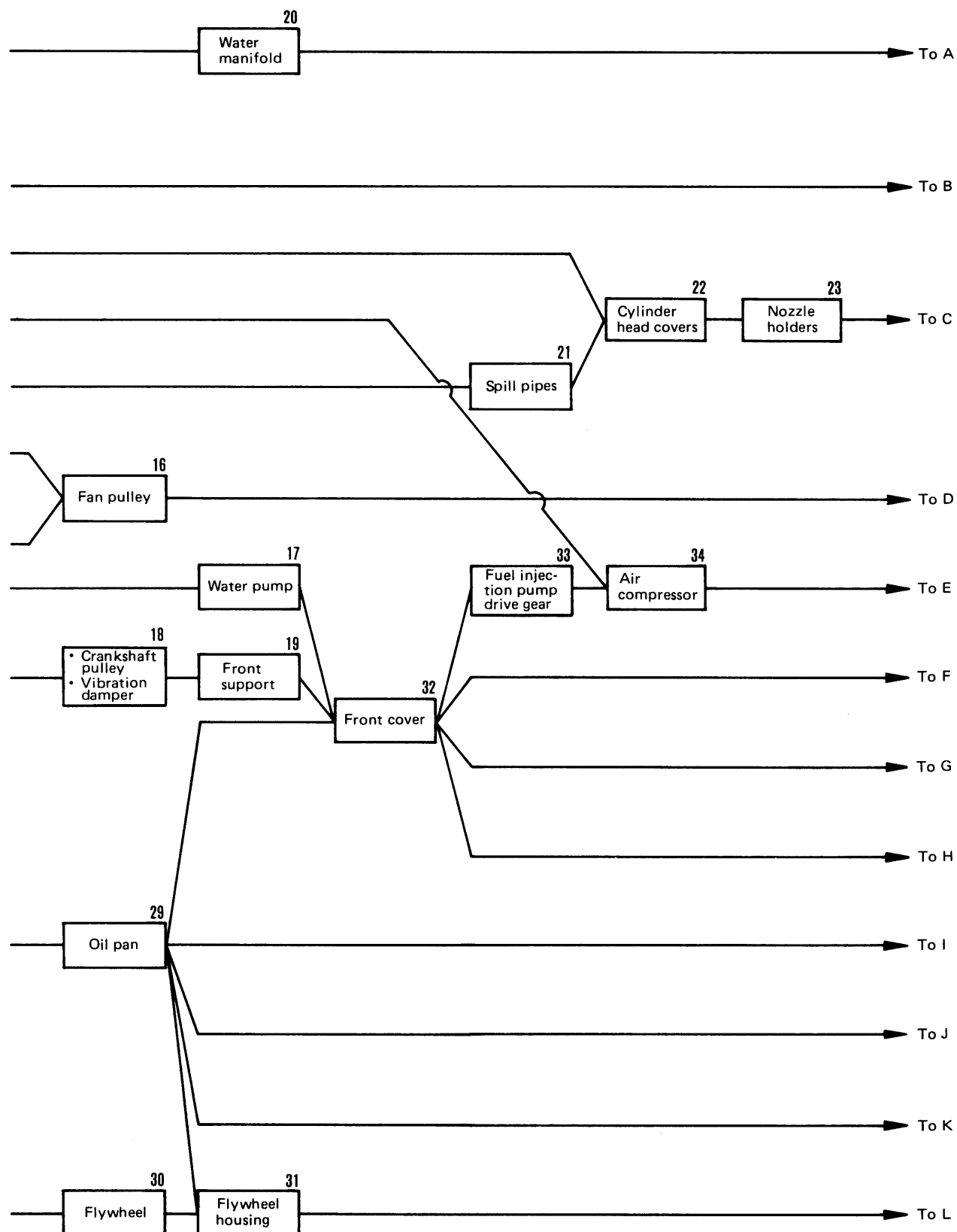
EXHAUST BRAKE

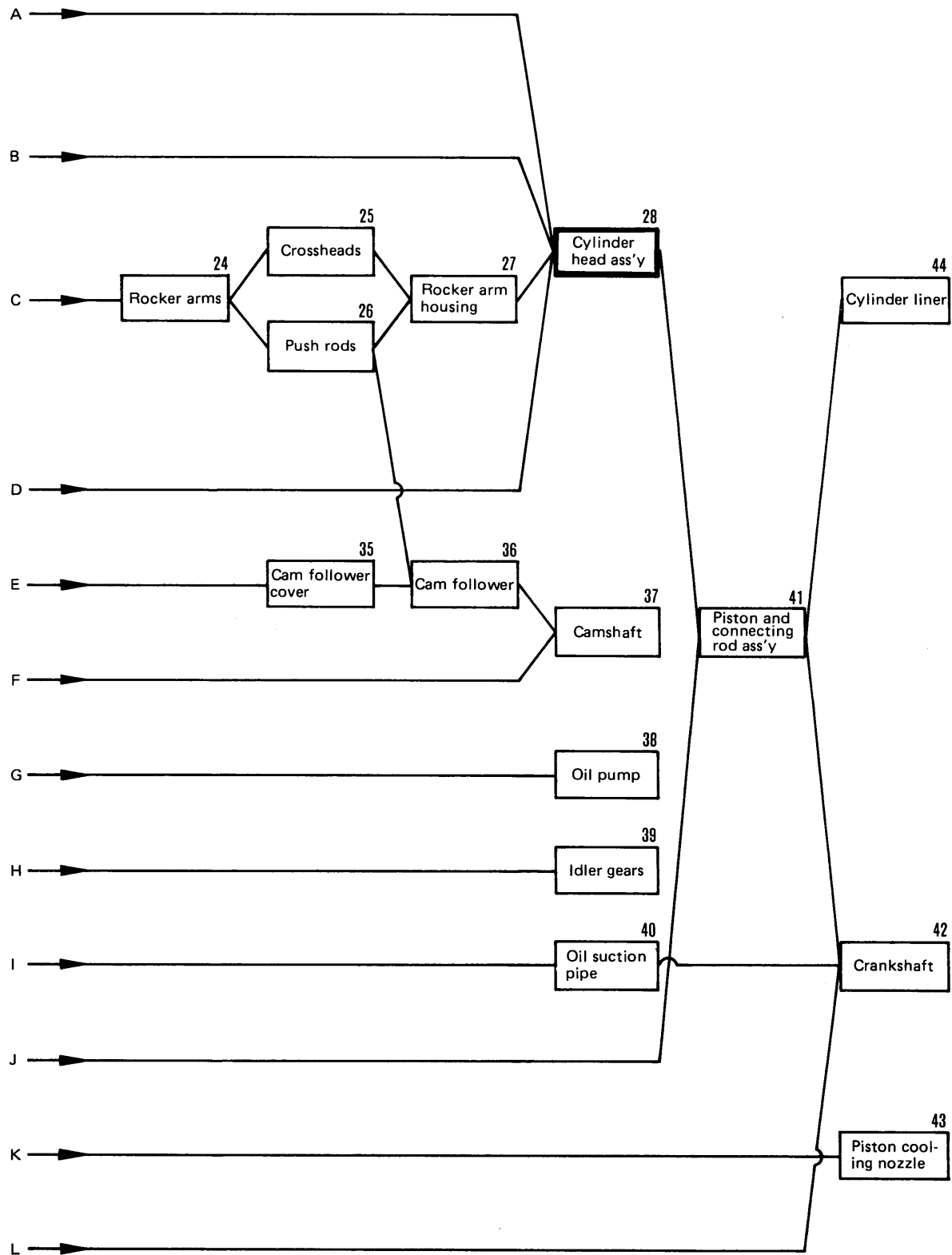
Disassembly and Assembly	13-048
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- ★ The description of overall engine disassembly and assembly given in this section is based on the S6D125-1 engine, assuming the use of an overhaul stand.
- ★ The work procedure may differ slightly from that given here depending upon the machine in which the engine is mounted and also the particular stand used, however it is fundamentally the same.
- ★ Use the correct service tools when performing disassembly and assembly.

GENERAL DISASSEMBLY







6150F301

Special tools

	Part number	Part name	Q'ty
A	790-901-1240	Adapter	1
B	790-501-2000	Engine overhaul stand	1
C	795-102-2102	Spring pusher	1
D	795-100-1191	Piston ring tool	1
E	795-220-1000	Liner puller	1

Preparation work

- 1) Clean the engine by washing the mud and dirt off.
- 2) Drain the engine coolant and the engine oil.



Engine oil: approx. 30ℓ

- 3) Mount the engine assembly on a stable engine stand so that it won't fall down.

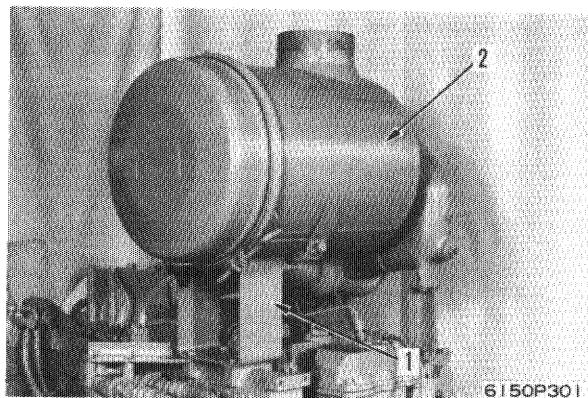


Engine assembly: approx. 1,175 kg
(The engine weight differs according to the machine model.)

1. Air cleaner

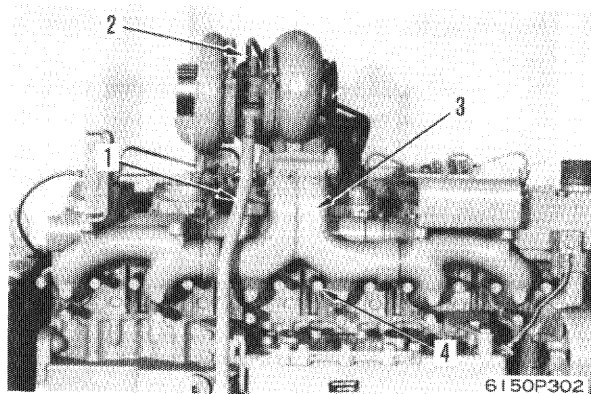
- 1) Disconnect the connecting hose to the turbocharger.
- 2) Remove the mounting bolts, and lift off air cleaner (2) together with bracket (1).

★ The air cleaner and the bracket may be disconnected depending upon the machine models.



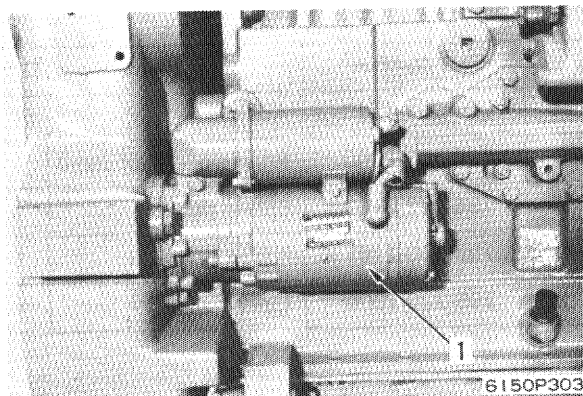
2. Turbocharger and exhaust manifold assembly

- 1) Remove turbocharger outlet tube (1) and inlet tube (2).
- 2) Disconnect the intake connector connecting hose from the turbocharger.
- 3) Suspend the turbocharger and exhaust manifold assembly (3), and dismount them after removing 18 mounting bolts (4).

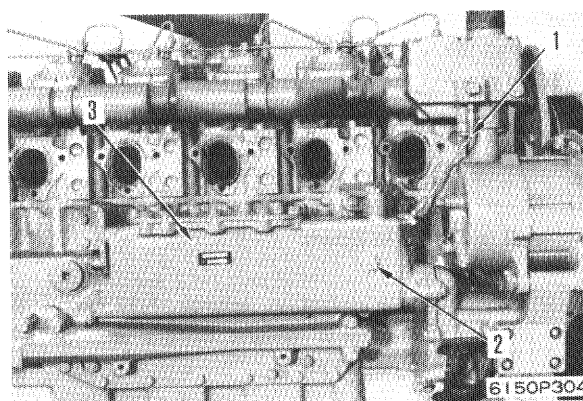


3. Starting motor

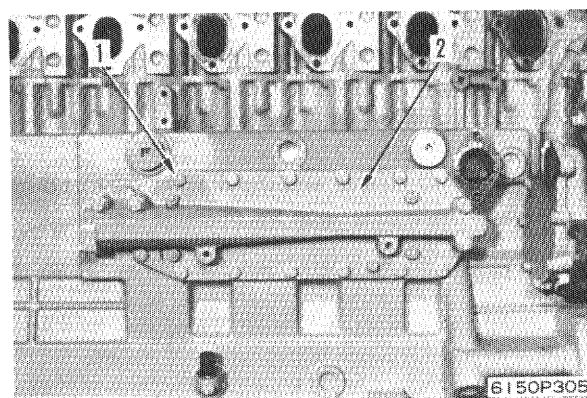
Remove starting motor (1).

**4. Body side oil cooler**

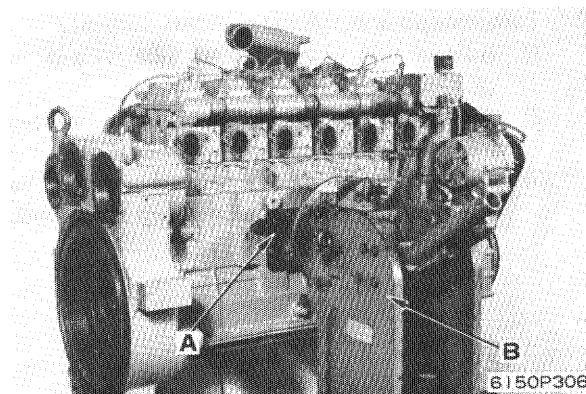
- 1) Remove aeration pipe (1).
- 2) Remove 8 mounting bolts (2) and engine side oil cooler (3).

**5. Engine oil cooler**

Remove 17 mounting bolts (1) and engine oil cooler (2).

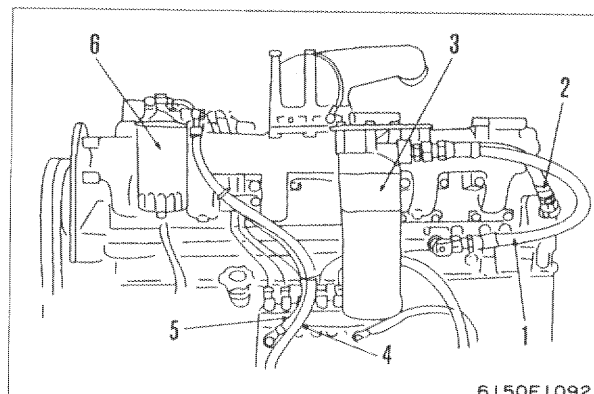
**6. Mounting the engine assembly on the engine overhaul stand**

- 1) Install adapter A to the mounting section of the engine oil cooler.
- 2) Sling the engine assembly, align engine overhaul stand B with the adapter, and secure the engine assembly to the stand.



7. Oil filter

- 1) Disconnect hoses (1) and (2) between the oil filter and the adapter from the oil filter.
- 2) Remove 4 mounting bolts, and dismount engine oil filter (3) together with the bracket.



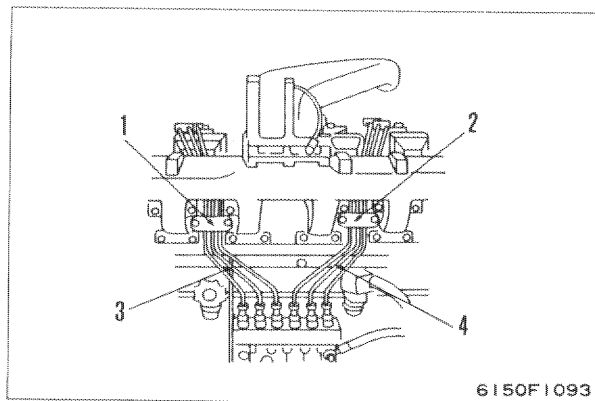
6150F1092

8. Fuel filter

- 1) Disconnect hoses (4) and (5) between the fuel filter and the injection pump from the injection pump.
- 2) Remove 4 mounting bolts, and disconnect fuel filter (6) together with the bracket.

9. Fuel injection pipes

- 1) Remove clamps (1) and (2).
- 2) Remove 6 fuel injection pipes (3) and (4).



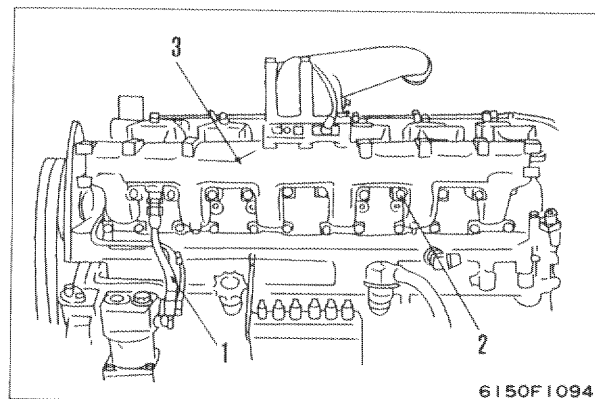
6150F1093

10. Intake manifold

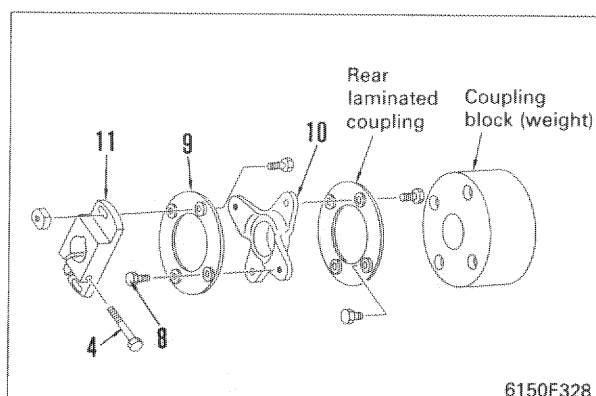
- 1) Remove tube (1) between the intake manifold and the air compressor.
- 2) Remove 24 mounting bolts (2) and intake manifold (3).

11. Fuel injection pump

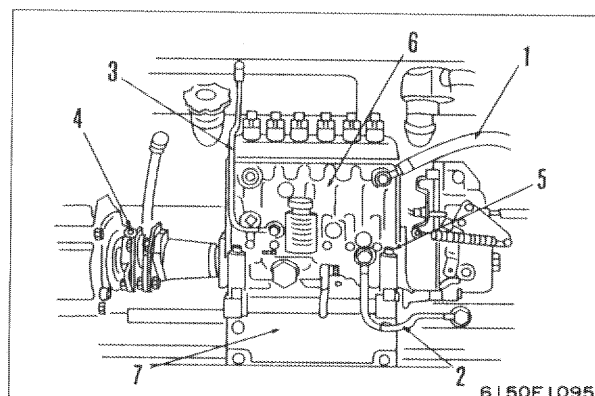
- 1) Disconnect overflow hose (1) at adapter end.
- 2) Remove lubrication tubes (2) and (3).
- 3) Remove 2 bolts (8) holding front laminated coupling (9) and cross coupling (10).
- 4) Remove 4 mounting bolts (5) of fuel injection pump.
- 5) Move fuel injection pump assembly (6) to rear and remove. When doing this, leave flange coupling (11) and front laminated coupling (9) on drive shaft.
- 6) Remove bolt (4) connecting coupling and drive shaft, then remove flange coupling (11) and front laminated coupling (9).
- 7) Remove bracket (7).



6150F1094



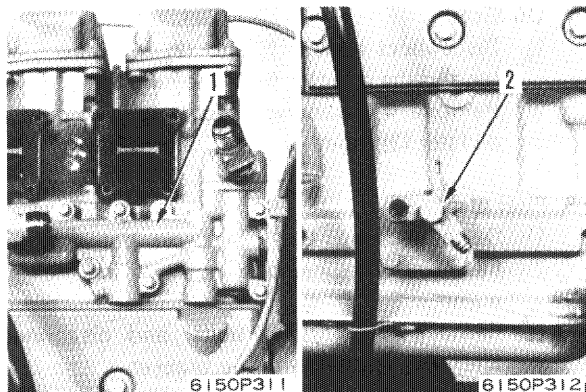
6150F328



6150F1095

12. Lubricating oil valve adapter

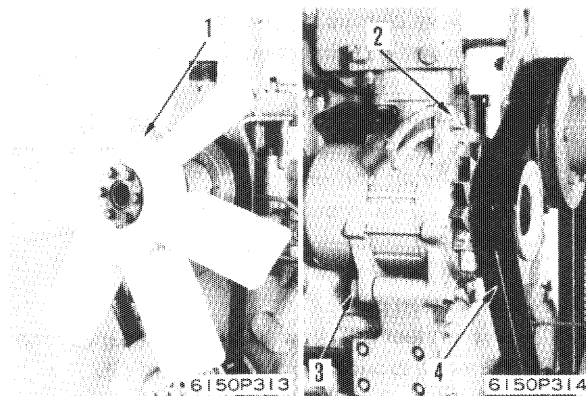
- 1) Remove lubricating oil valve adapter (1).
- 2) Disconnect the spill hose and remove fuel overflow adapter (2).

**13. Fan**

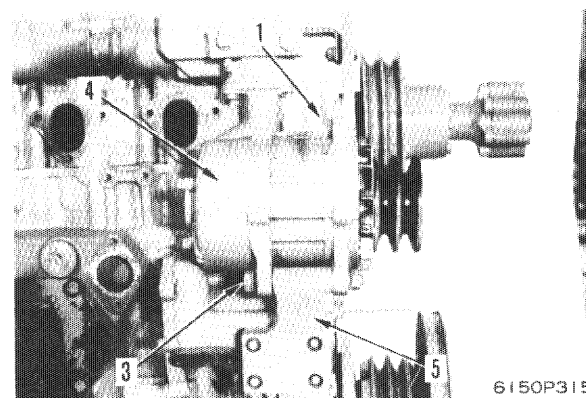
- Remove fan (1).

14. V-belts

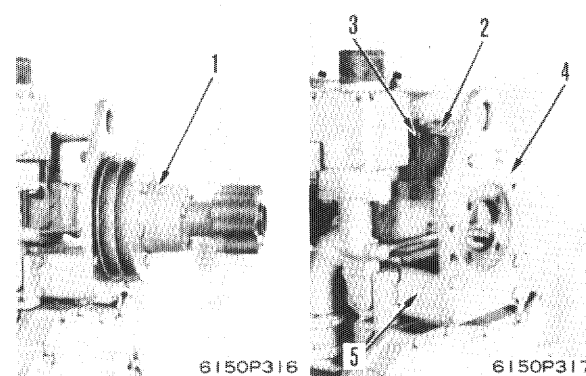
- 1) Remove belt tension adjustment bolt (2).
- 2) Loosen alternator fastening bolt (3), and remove V-belts (4) by pushing the alternator inward.

**15. Alternator**

- 1) Remove the fastening bolts for plate (1) and alternator (4).
- 2) Remove fastening bolt (3) and alternator (4).
- 3) Remove bracket (5).

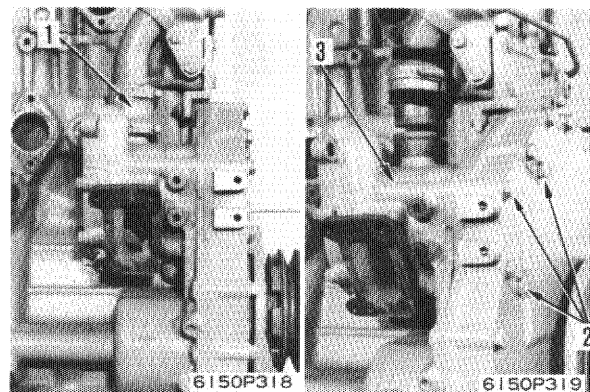
**16. Fan pulley**

- 1) Remove 4 mounting bolts and fan pulley (1).
- 2) Remove bracket (2) and 2 spacers (3).
- 3) Remove hanger (4) and spacer (5).



17. Water pump

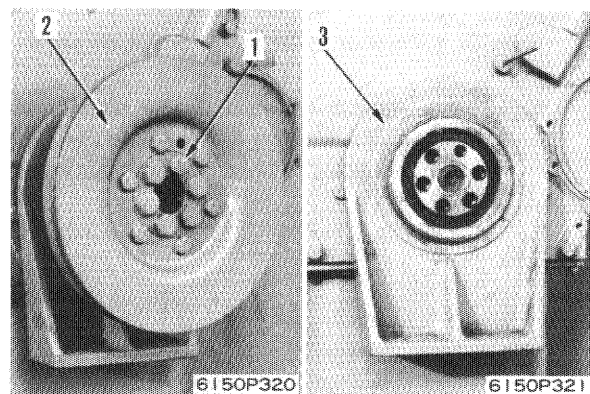
- 1) Disconnect connecting hose (1) between the water pump and the thermostat housing connector, and shift the hose towards the connector.
- 2) Remove 3 mounting bolts (2) and water pump (3).

**18. Crankshaft pulley • Vibration damper**

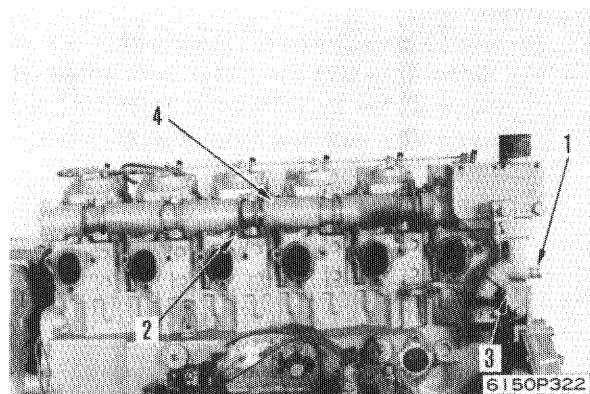
Remove 6 mounting bolts (1) and crankshaft pulley • vibration damper (2).

19. Front support

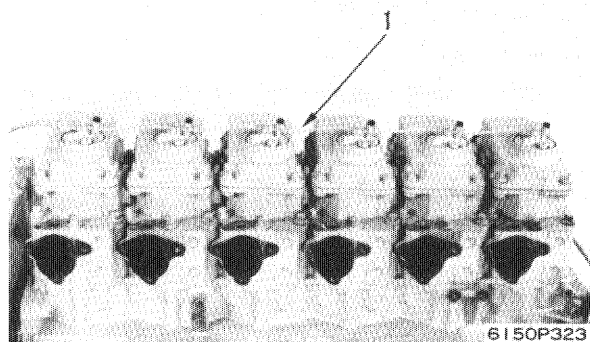
Remove front support (3).

**20. Water manifold**

- 1) Disconnect tube (1) between the air compressor and the connector.
- 2) Remove 12 mounting bolts (2), 2 bolts (3), and water manifold (4).

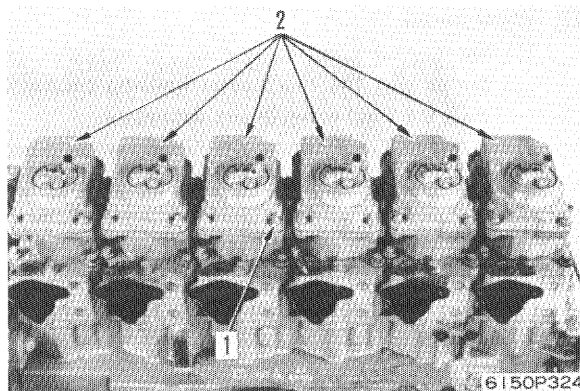
**21. Spill pipes**

Remove spill pipes (1).



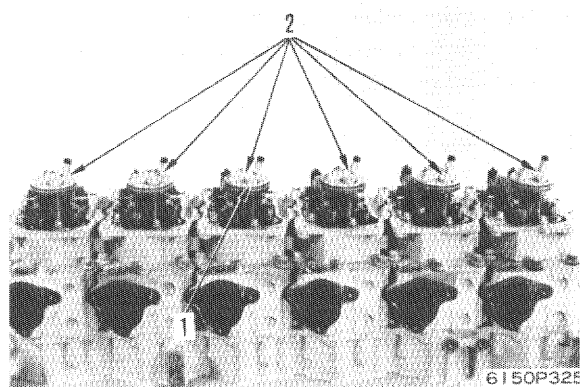
22. Cylinder head covers

Remove 24 mounting bolts (1) and each head cover (2).

**23. Nozzle holders**

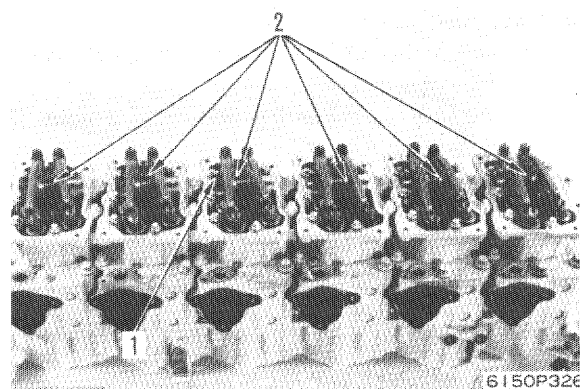
Remove 12 mounting bolts (1) and each nozzle holder (2).

- ★ Give a number to each nozzle holder before removing it and store all nozzle holders together in an appropriate place to protect them from damage.

**24. Rocker arms**

Remove 12 mounting bolts (1) and each rocker arm (2).

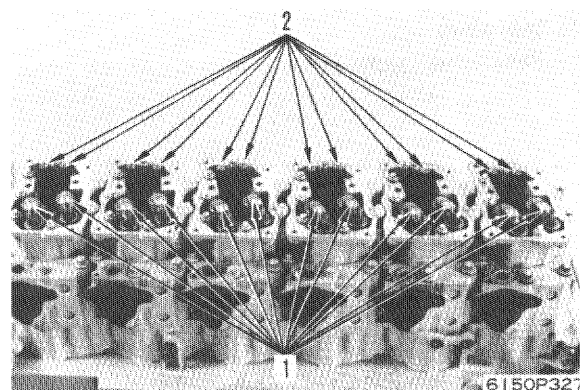
- ★ Before installing the rocker arms, loosen the lock nut and then the adjustment screw by 2 to 3 turns so that the push rod will not be subjected to undue force.

**25. Crossheads**

Remove crossheads (1).

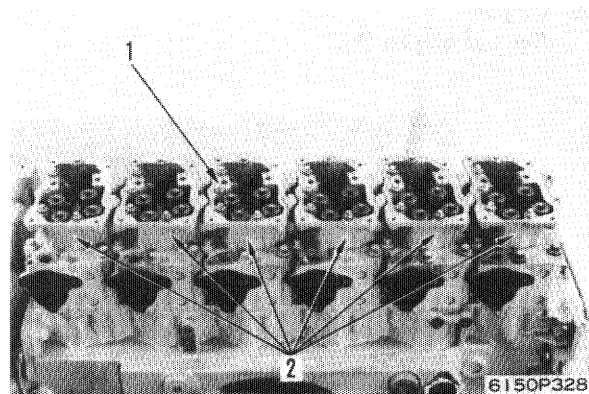
26. Push rods

Remove push rods (2).

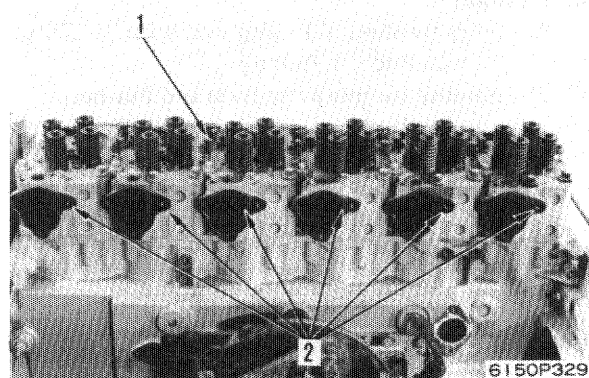


27. Rocker arm housing

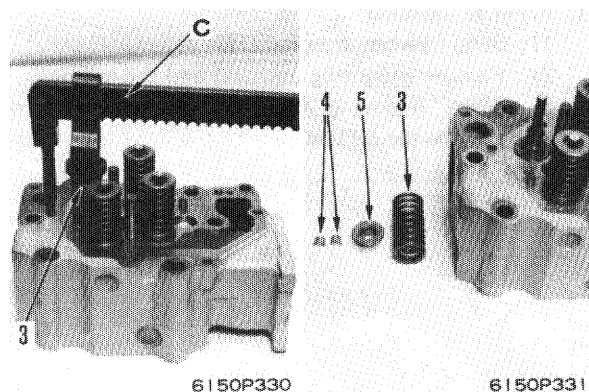
Remove 42 mounting bolts (1) and each rocker arm housing (2).

**28. Cylinder head assembly**

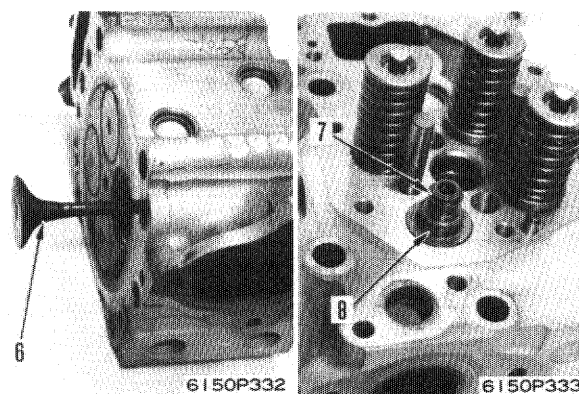
- 1) Remove 42 mounting bolts (1) and each cylinder head (2).
- 2) Remove each cylinder head gasket.



- Disassemble the cylinder head assembly as follows.
 - i) Compress valve spring (3) using spring pusher C and remove valve cotters (4).
 - ii) Remove upper seat (5) and valve spring (3).

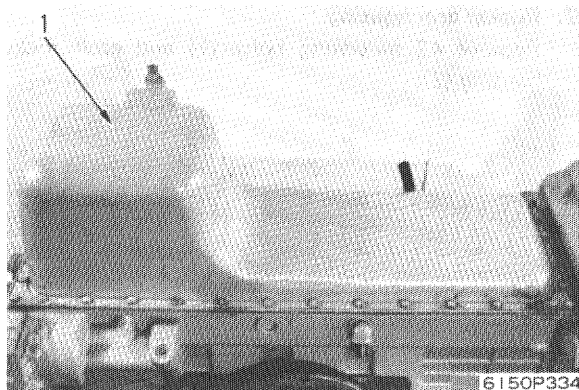


- iii) Remove seal (7) and lower seat (8).
- iv) Set up the cylinder head upright and remove valve (6).
 - ★ The seals are provided on the exhaust side only.
 - ★ Mark the valves with tags to show the place of installation and keep in a safe place.

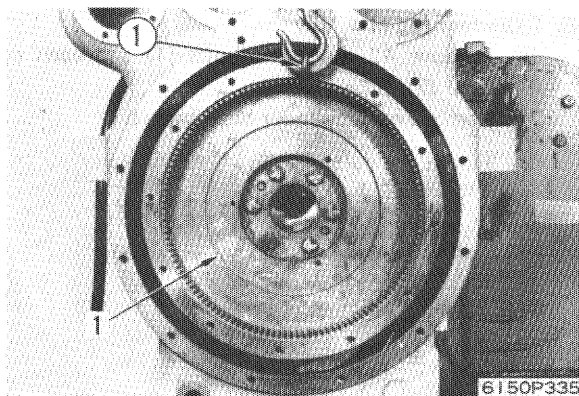


29. Oil pan

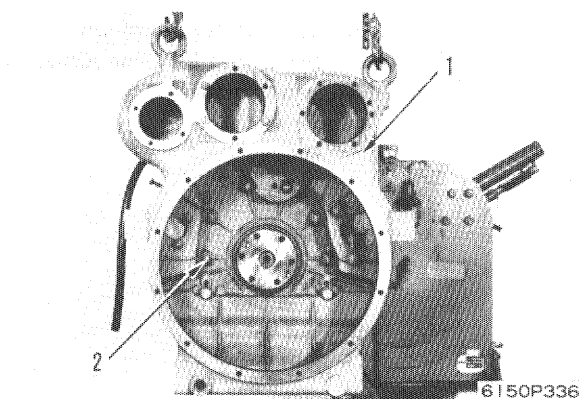
Remove oil pan (1).

**30. Flywheel**

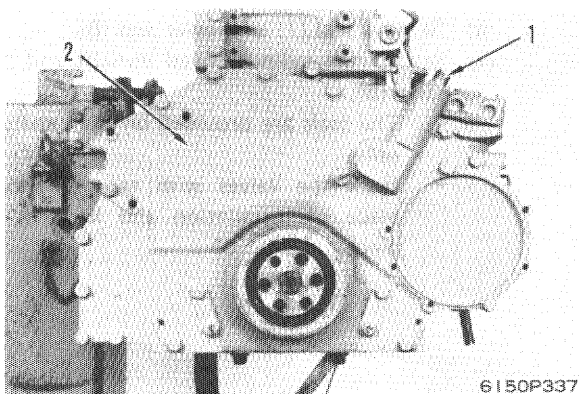
- 1) Sling flywheel (1) using eye bolt ① (Thread dia.: 12 mm, Pitch: 1.75 mm).
- 2) Remove the mounting bolts and flywheel.

**31. Flywheel housing**

- 1) Sling flywheel housing (1).
 - 2) Remove mounting bolts (2) and the housing.
- ★ When removing the housing, take care not to damage the oil seal.

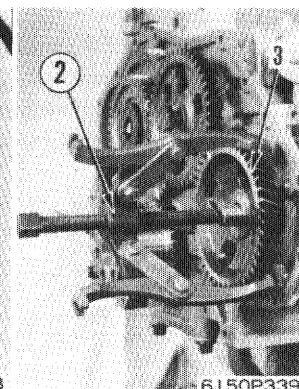
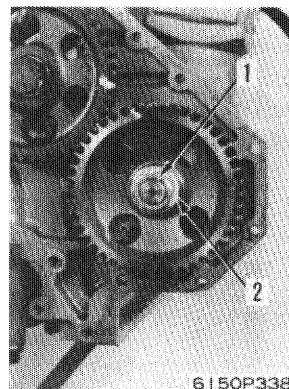
**32. Front cover**

- 1) Remove tachometer drive assembly (1).
 - 2) Remove front cover (2).
- ★ When removing the front cover, take care not to damage the oil seal.

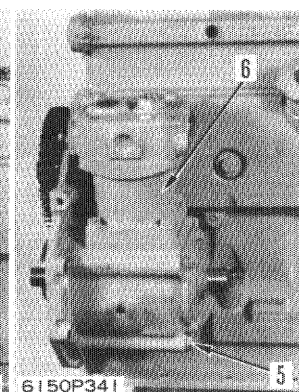
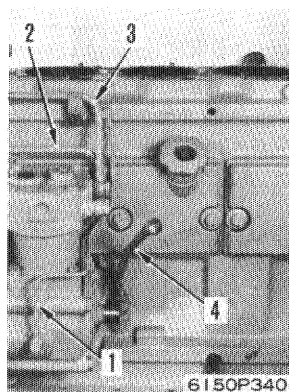


33. Fuel injection pump drive gear

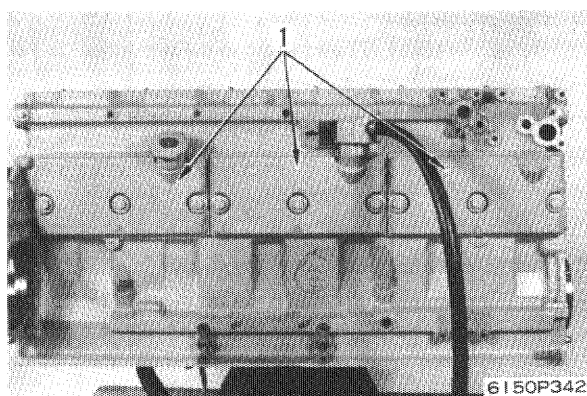
- 1) Remove nut (1) and washer (2).
 - ★ Loosen the nut while holding the gear with a screwdriver.
- 2) Pull out fuel injection pump drive gear (3) using puller (2).

**34. Air compressor**

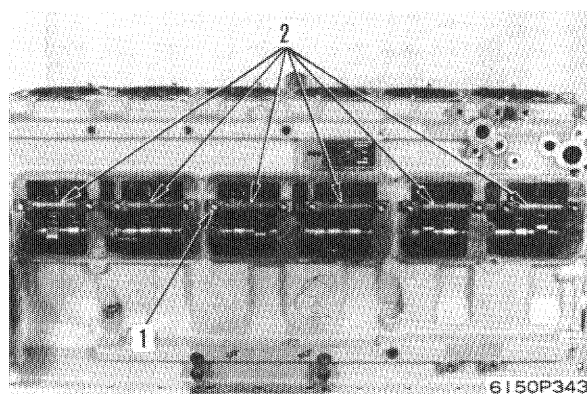
- 1) Remove air compressor tubes (1) and (2).
- 2) Remove dipstick guide (4).
- 3) Remove 4 mounting bolts (5) and air compressor (6).

**35. Cam follower cover**

Remove cam follower cover (1).

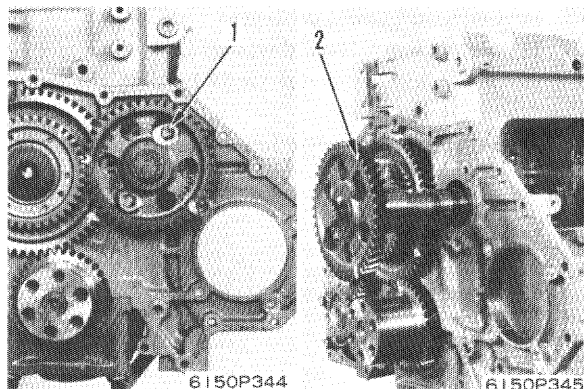
**36. Cam follower**

Remove 12 mounting bolts (1) and each cam follower (2).



37. Camshaft

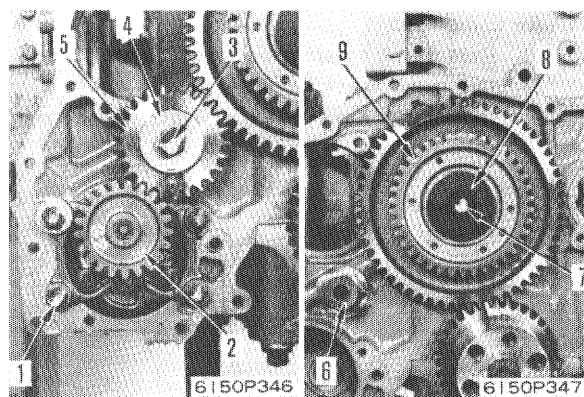
- 1) Remove 2 mounting bolts (1).
 - 2) Remove camshaft (2).
- ★ When pulling out the camshaft, turn it slowly to protect the cam bushing from damage.

**38. Oil pump**

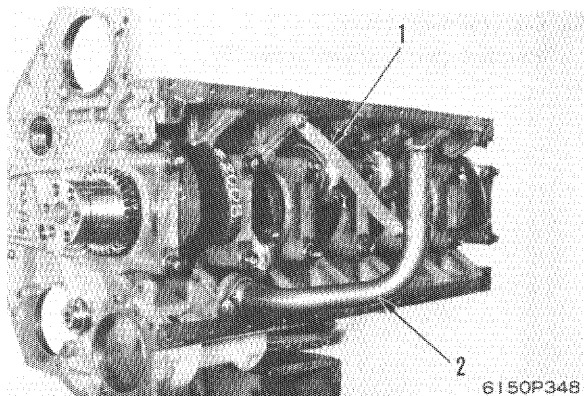
Remove 4 mounting bolts (1) and oil pump (2).

39. Idler gears

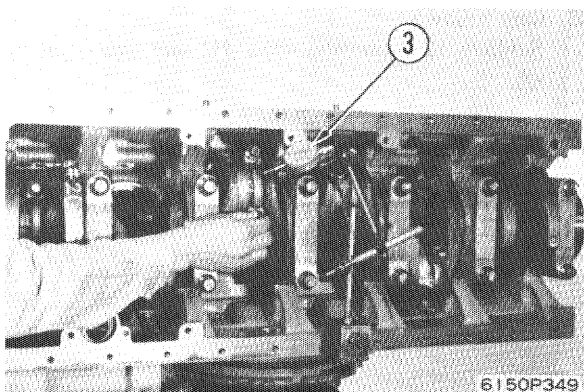
- 1) Remove mounting bolt (3), plate (4), and oil pump idler gear (5).
- 2) Remove shaft (6).
- 3) Remove mounting bolt (7), shaft (8), and main idler gear (9).

**40. Oil suction pipe**

Detach bracket (1) and remove oil suction pipe (2).

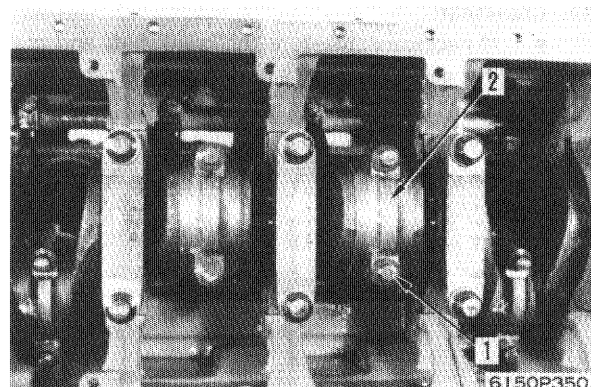
**41. Piston and connecting rod assembly**

- 1) Check stamp numbers on connecting rod caps.
(Make sure the cap number coincides with the cylinder number and also that the number is stamped on the cam side)
- ★ If there is no stamp number, stamp the number before the cap is removed.
- 2) Rotate the crankshaft so that the piston to be removed is placed in bottom dead center.
- 3) Remove the carbon from the liner wall using a fine sand paper.
- ★ If necessary, measure the end play of the connecting rod using dial gauge (3) before removing the piston and connecting rod assembly.



- 4) Remove bolt (1) from the connecting rod cap.
- 5) Remove connecting rod cap (2) and the connecting rod bearing as a unit by tapping the connecting rod bolt with a plastic hammer.

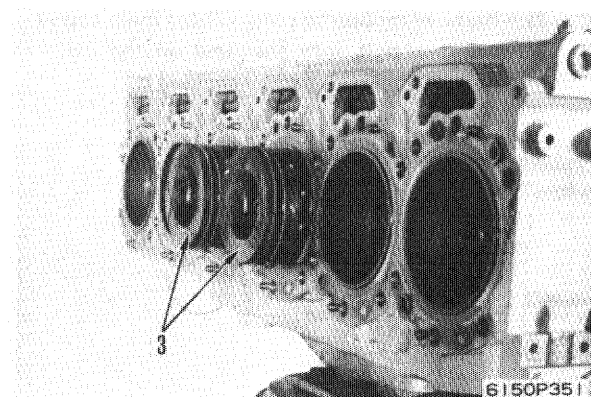
★ Take care not to damage the screw.



- 6) Push the piston and connecting rod assembly from the oil pan side with a wooden stick. Hold piston (3) in your hand and remove it from the cylinder head side.

★ Take care not to damage the piston cooling nozzle. (S6D125-1, SA6D125-1)

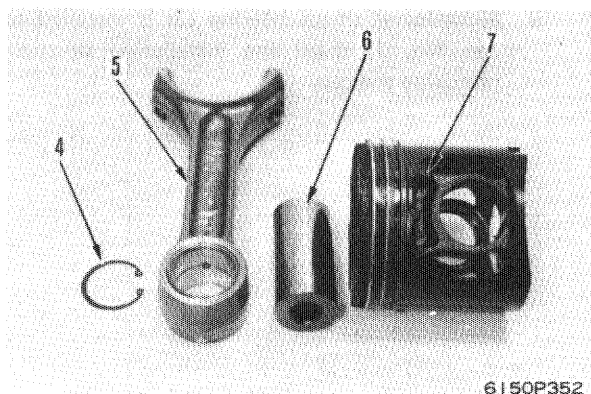
★ During removal, take care not to damage the inner surface of the liner with the connecting rod.



- 7) Remove the remaining piston and connecting rod assemblies in the same manner.

★ When storing the pistons and connecting rods, take care not to damage sliding portions of the piston and the bearing.

★ Keep the connecting rods and caps together, then store them with their corresponding bearings in order to avoid confusion during reassembly.

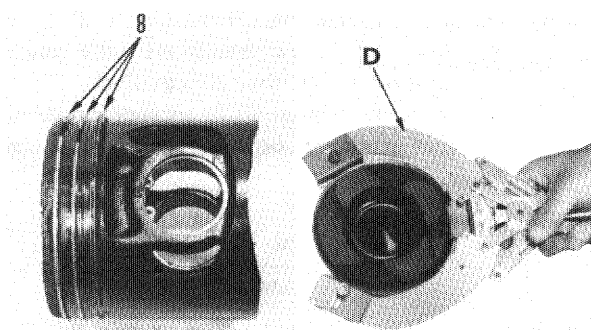


- Disassemble the piston and connecting rod assembly as follows.

- i) Remove snap ring (4).
- ii) Pull out piston pin (6) while holding connecting rod (5) in your hand, and separate connecting rod from piston (7).
- iii) Remove the snap ring on the opposite side.

- iv) Remove piston rings (8) using piston ring tool D.

★ Store the piston, connecting rod, connecting rod bearings, piston rings, and piston pin for every cylinder.

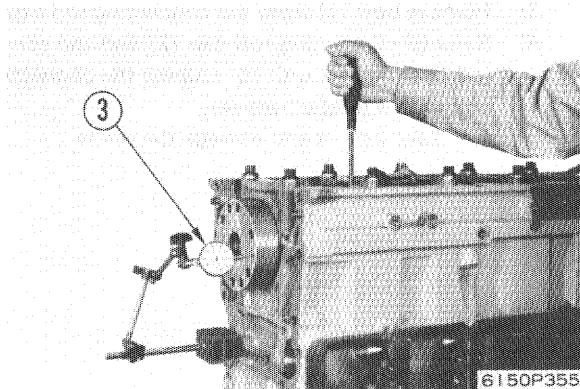


6150P353

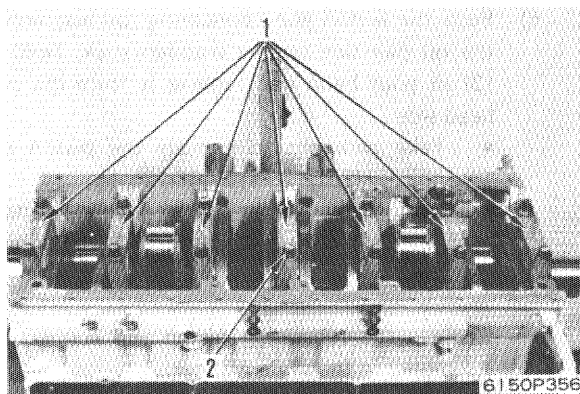
6150P354

42. Crankshaft

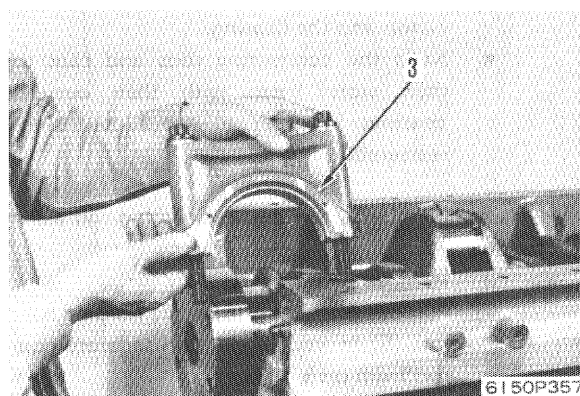
- ★ If necessary, measure the crankshaft end play using dial gauge ③ before removing the crankshaft.



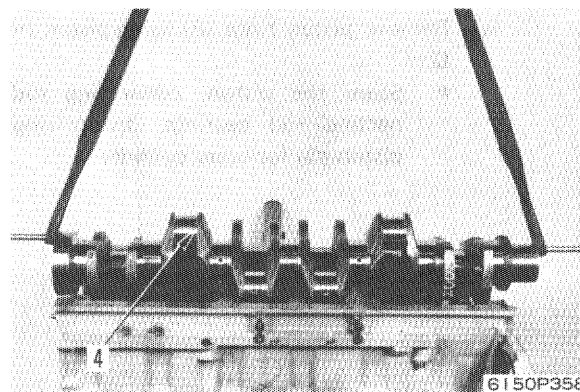
- 1) Remove mounting bolts (2) for main cap (1).
- 2) Insert a bolt into the hole on the main cap, and remove the main cap by shaking it.



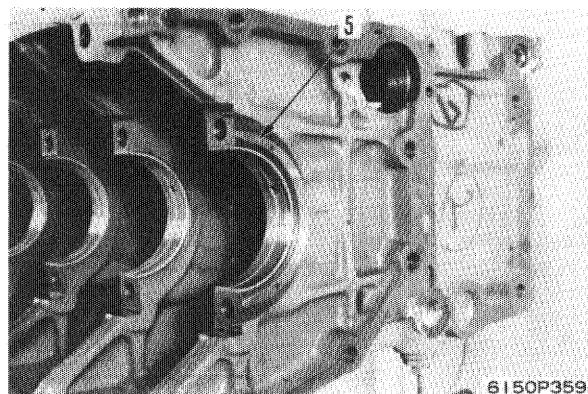
- 3) Since lower thrust bearing (3) is installed to main cap No. 7, mark the installation position after removing the cap.



- 4) Using nylon slings, lift off crankshaft (4).
 - ★ When lifting the crankshaft, take care not to let it hit against the cylinder block.
 - ★ Store the crankshaft in an appropriate place so that its sliding portions do not get damaged.

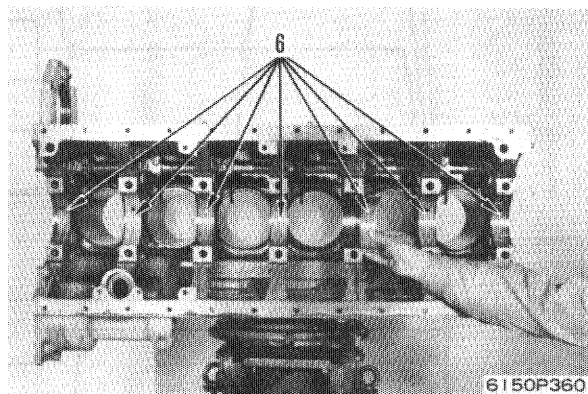


- 5) Remove upper thrust bearing (5).



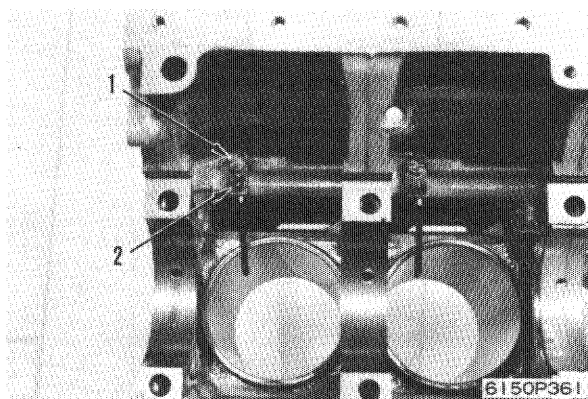
- 6) Remove upper bearing (6).

- ★ Put identification tags on the main caps, main bearings, and thrust bearings or mark their installation positions with a felt-tip pen, segregate them for each cap, and store them properly to protect them from damage.



43. Piston cooling nozzle (S6D125-1, SA6D125-1)

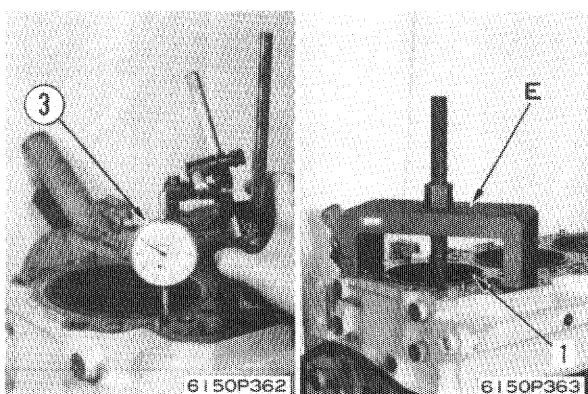
Remove mounting bolts (1) and each piston cooling nozzle (2).



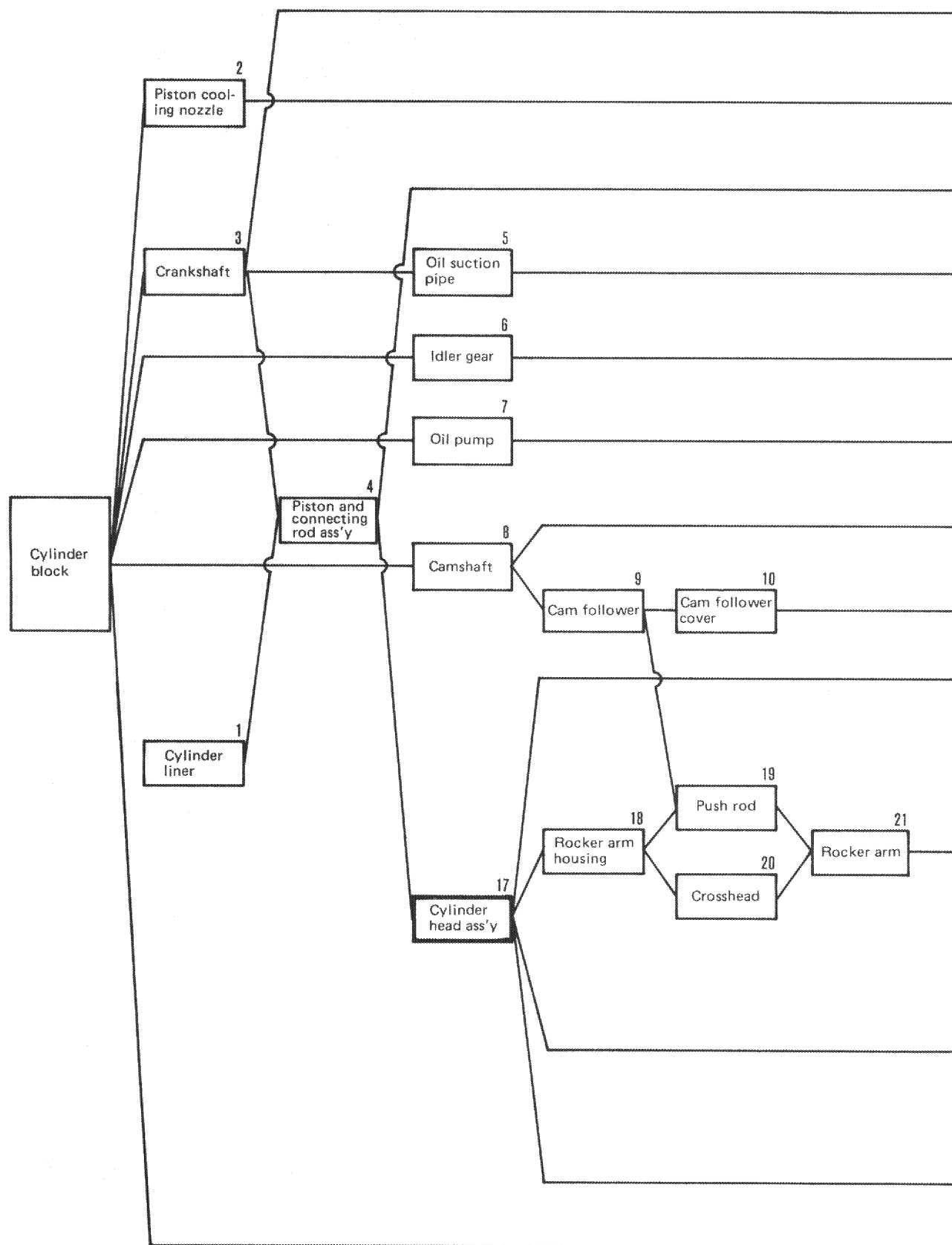
44. Cylinder liner

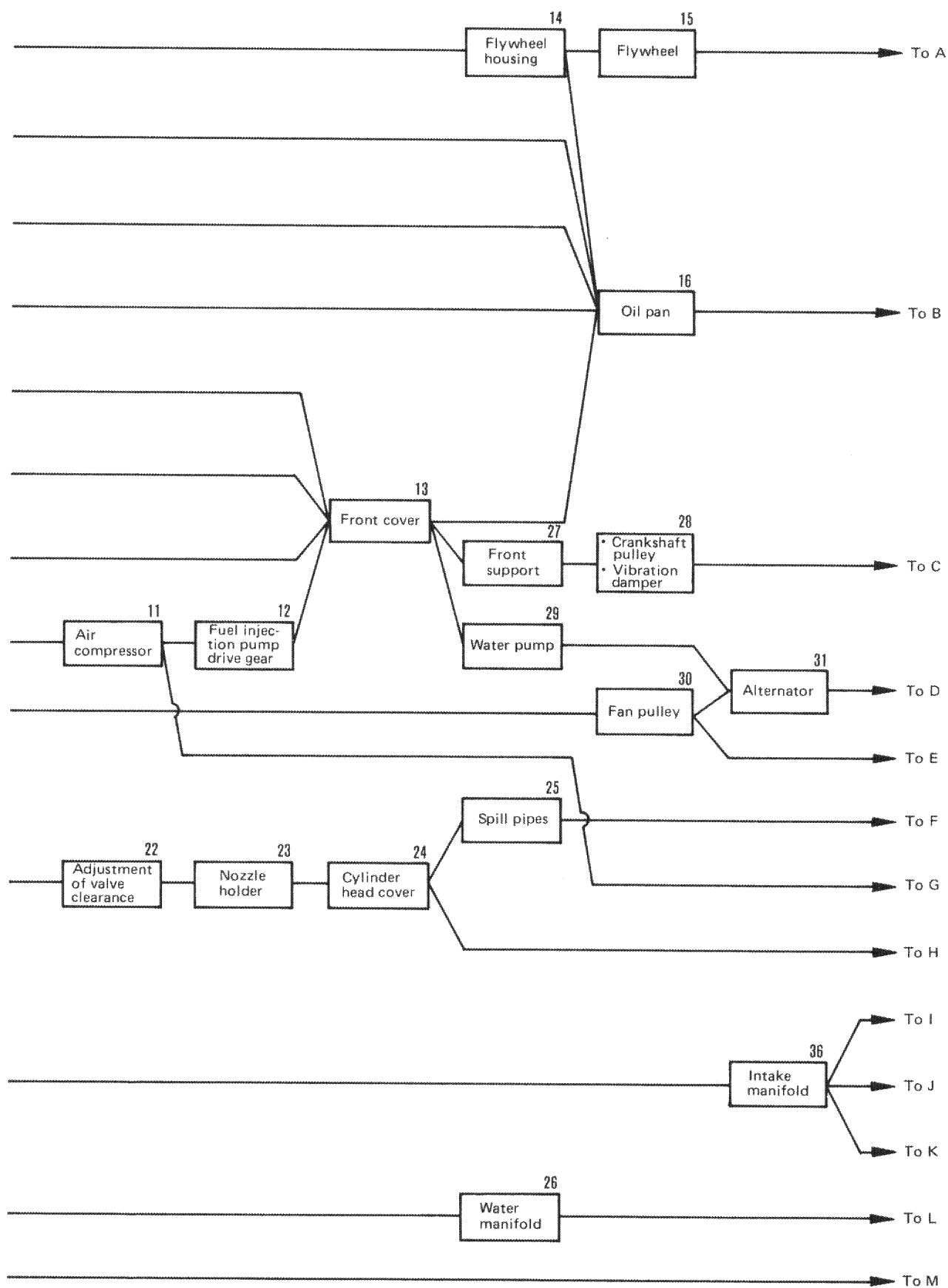
- ★ If necessary, measure the cylinder liner protrusion using dial gauge ③ before removing the cylinder liners.

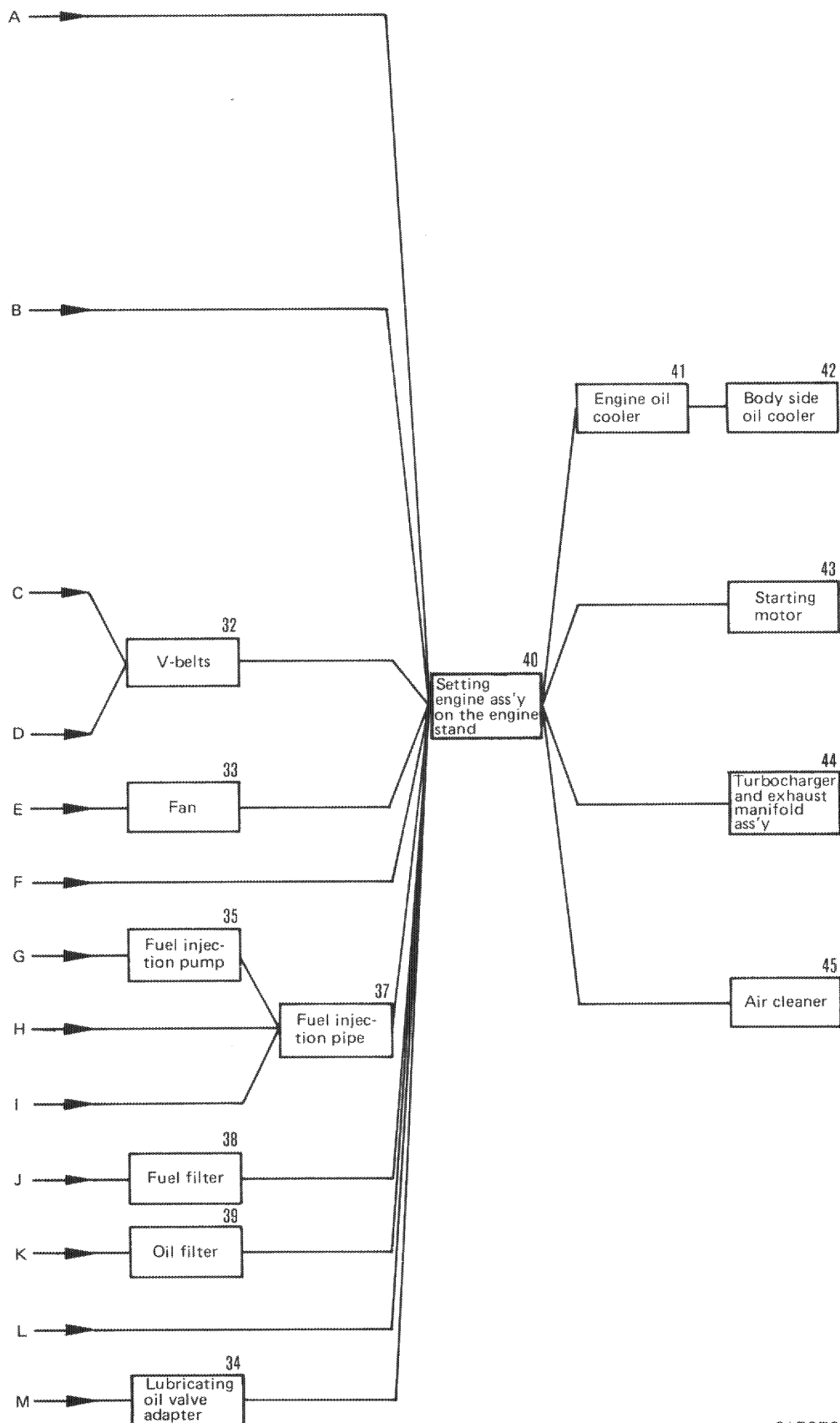
Pull out cylinder liners (1) using liner puller E.



GENERAL ASSEMBLY



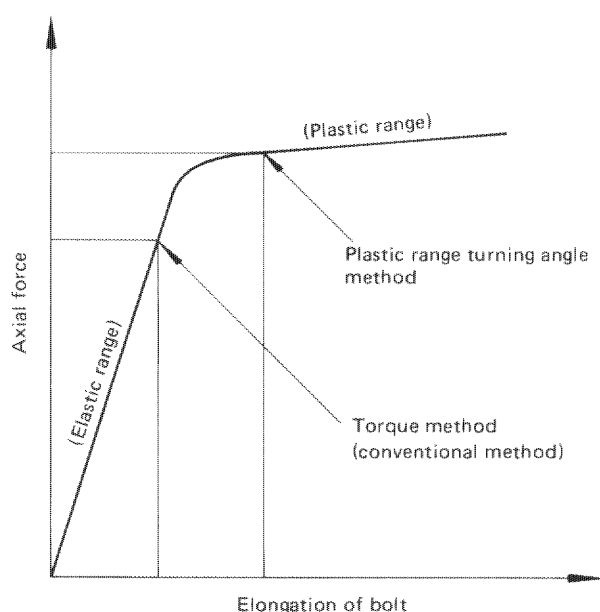




6150F302

TIGHTENING BOLTS BY THE PLASTIC RANGE TURNING ANGLE METHOD

- Important bolts in the 125 Series engines are tightened by the plastic range turning angle method. In this method, special bolts are used. By being tightened to the load (plastic range) at which they begin to be permanently deformed, accurate and high tightening force can be obtained. The most common method for tightening bolts is the torque control method. In this method, however, it is difficult to accurately control the tightening force because of the coefficient of friction.
- The plastic range turning angle method is based on the initial tightening torque and the turning angle.



6150F302-1

- ★ Elongation exceeding the elastic range results in permanent deformation.
- Bolts to be tightened by the plastic range turning angle method in the 125 Series engines.
 - 1) Cylinder head mounting bolts
 - 2) Main cap mounting bolts
 - 3) Connecting rod cap mounting bolts
 - 4) Crank pulley mounting bolts (only in D60P, S-8 machines)
- ★ In the plastic range turning angle method, the permanent strain remains in bolts after they are tightened. Therefore, the number of times that each bolt can be reused is limited. Observe the following precautions.
 - 1) After tightening, put one punch mark on the bolt. Do not reuse any bolt which has 5 or more punch marks.
 - 2) If a bolt has been tightened in excess of the specified turning angle, loosen the bolt completely and retighten it. (In this case, put two punch marks on the bolt.)
 - 3) The tightening angle should be targeted at the standard value plus or minus tolerance.

Special tools

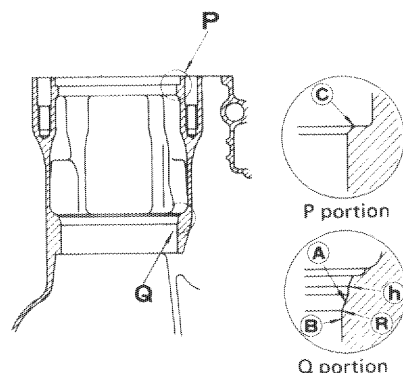
	Part number	Part name	Q'ty
A	790-901-1240	Adapter	1
B	790-501-2000	Engine overhaul stand	1
C	795-102-2102	Spring pusher	1
D	795-100-1191	Piston ring tool	1
F	795-225-1520	Liner driver	1
G	795-102-3900	Piston holder	1
H	795-502-1121	Gauge	1
I	795-125-1360	Feeler gauge	1

- ★ Clean every part thoroughly and check the part for dents, flaws, and blowholes. When assembling the parts, make sure that none of the oil and water passages are blocked.

Preparation work

- Install adapter **A** to the cylinder block, then raise it and place it on engine overhaul stand **B**.
- Repair the cylinder block as follows before inserting the cylinder liners.
 - 1) Remove rust and scale from surfaces **(A)** and **(B)** with sandpaper until the machined surface is exposed.
 - 2) Polish portion **(R)** with No. 60 sandpaper to make surface **(R)** smooth.
 - 3) Polish portions **(R)** and **(h)** with No. 60 sandpaper to make them smooth. If portion **(R)** is square or burred, polish it with sandpaper or a scraper. Finish this portion to an especially smooth surface to protect the O-ring from damage.
 - 4) If the pitting in surface **(B)** is so rough that it cannot be repaired, replace the cylinder block.

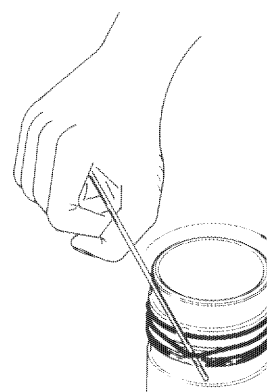
- 5) If surface (A) and portion (R) are roughened with pitting, finish them smooth.
- 6) Inspect the counterbore section and remove any burrs. Chips and dirt on surface (C) will cause poor contact of the liner, which will lead to water leakage or improper liner projection.
- ★ Repair the counterbore section if there is any drooping, corrosion, or pitting.



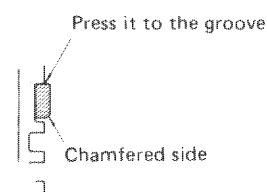
6150F304

1. Cylinder liner

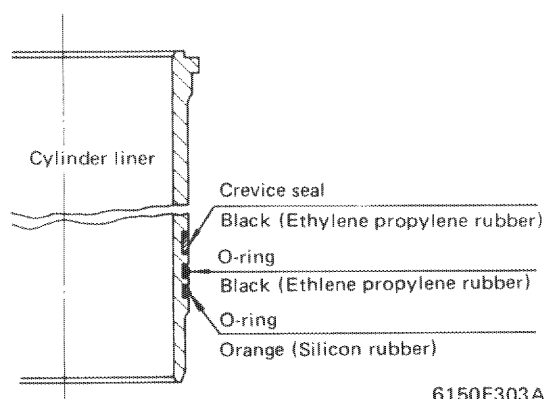
- ★ Replace the liner O-ring and clevis seal with new parts just before assembling the liner.
- Method of installing liner O-rings and clevis seal
 - 1) Confirm that the cylinder liner O-ring grooves and the circumference of the liner are free from rust and pitting.
 - ★ If these surfaces are roughened with pitting, replace the liner to remove the cause of water leakage.
 - 2) Coat liner O-rings and clevis seals with SAE No. 30 engine oil.
 - ★ The clevis seal and black O-ring will become swollen and degraded because of oil. To prevent this, do not leave these parts immersed in oil.
 - ★ Apply a little oil with a brush just before assembling the parts.
 - 3) After fitting the O-ring on the cylinder liner, check that it is not twisted. If it is twisted, use a smooth bar (approx. 10 mm O.D.) to remove the twist from the O-ring.
 - 4) To prevent the clevis seal from twisting, continue to press the whole circumference until it is installed properly in the groove.
 - 5) Install the liner O-ring and clevis seal as shown in the diagram.
 - ★ Install the clevis seal with the chamfered side down.



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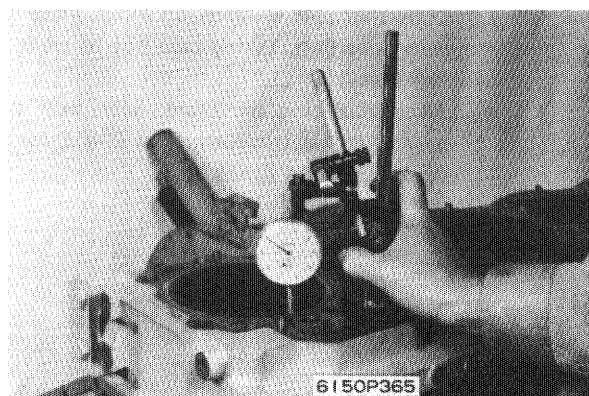
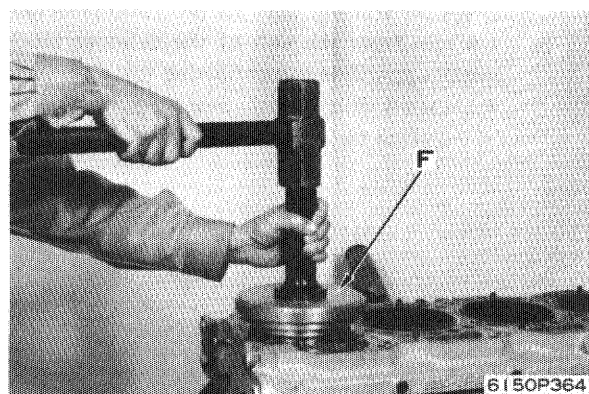


6136F029

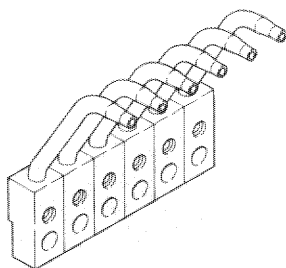


6150F303A

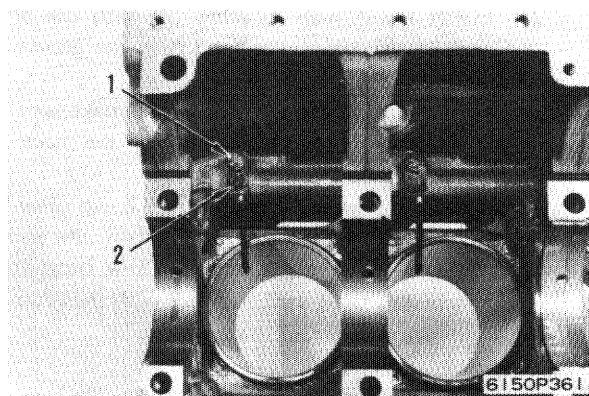
- 2) Insert the cylinder liners
 - i) Coat the liner O-rings and cylinder block O-ring grooves with SAE No. 30 engine oil, just before assembling the liner.
 - ii) Insert the liner into the cylinder block with mark **A** or **B** stamped on the liner top facing the front, taking care not to damage the O-ring.
 - iii) Insert the liner by pushing with both hands and all your weight.
 - ★ If the liner fails to go into the cylinder block smoothly when pushed with your weight, the O-ring may get damaged. Confirm that there are no burrs on the cylinder block.
 - iv) Press-fit cylinder liners (1) into the cylinder block using liner driver **F**.
 - v) Measure the cylinder liner protrusion using dial gauge (3) after press-fitting the cylinder liner.
 - ★ Before measuring the liner protrusion, press the liner with a plate to eliminate the raising of the liner caused by the O-ring.
 - ★ Cylinder liner protrusion:
0.07 – 0.15 mm



2. Piston cooling nozzle (S6D125, SA6D125-1)
Install each piston cooling nozzle (2) and tighten mounting bolts (1).
- ★ Before setting nozzles in place, put them side by side and make sure that they are free from bends and other defects.

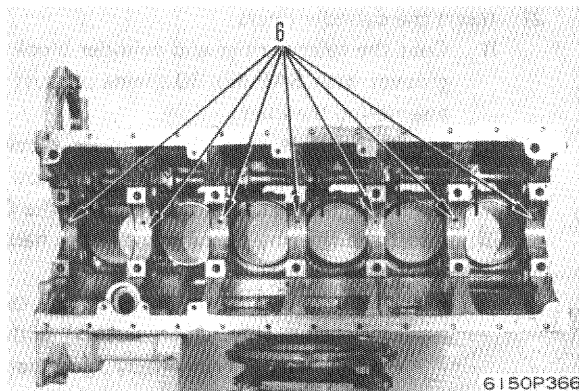


- ★ After the piston and connecting rod assembly is installed, recheck the mounting position.

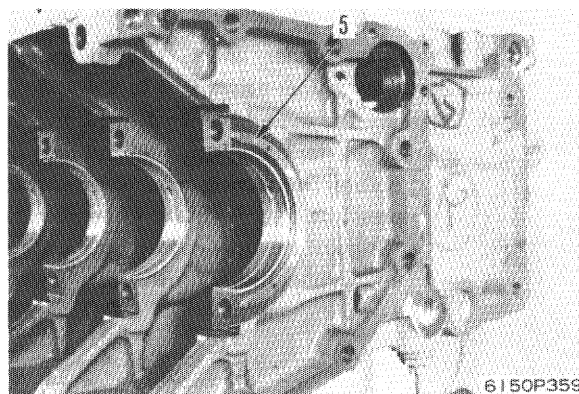


3. Crankshaft

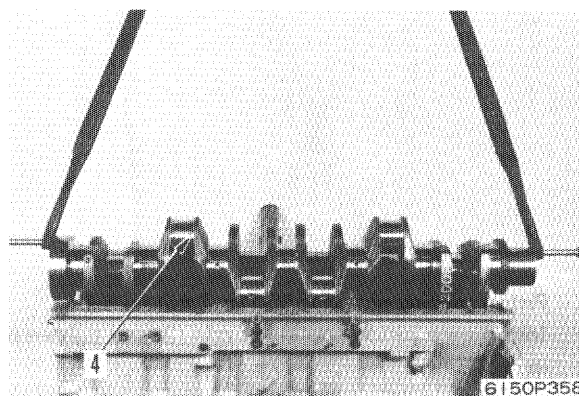
- 1) Install upper main bearing (6) to the cylinder block with the projected part of the bearing aligned with the groove on the cylinder block.
 - ★ Before installing the bearing, see if any foreign matter is adhering to the back of the bearing. Coat the inner surface of the bearing with SAE No. 30 engine oil.



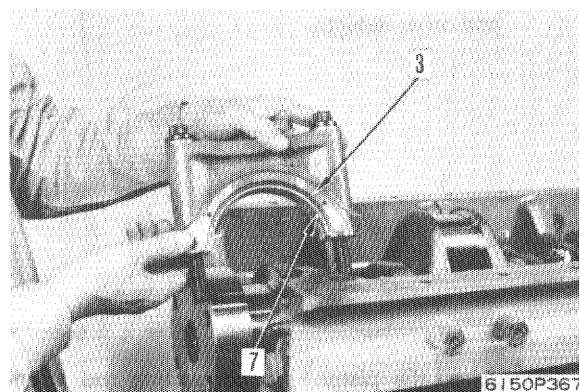
- 2) Drive the roll pin until its protrusion reaches 1.5 to 1.9 mm from the end of the cylinder block, then install upper side thrust bearing (5).
 - ★ Install the thrust bearing with the grooved surface facing the crankshaft.



- 3) Lift crankshaft (4) using nylon slings. Place it in the mounting position, taking care not to let it hit the cylinder block.
 - ★ When replacing the crank gear, heat the new gear in an electric furnace at 200°C for at least 30 minutes and shrink fit it.



- 4) Install lower main bearing (7) with the projected part of the bearing aligned with the groove on the main cap.
 - ★ Before installing the bearing, make sure that no foreign matter is stuck on the back of the bearing.
- 5) Drive the roll pin into the No. 7 cap until its protrusion reaches 1.5 to 1.9 mm from the end of the cap, and install thrust bearings (3) to both sides.
 - ★ Install the thrust bearings with the grooved side facing the crankshaft.



- 6) Coat the crankshaft journal with SAE No. 30 engine oil, confirm that the stamp No. on main cap (1) coincides with the number on the cylinder block, and install the main cap.

★ Install the main cap with the cast number facing the engine front.

- 7) Coat the threads of the mounting bolts and the washers for the main cap with SAE No. 30 engine oil and secure the main cap by tightening the bolts.

- 8) Tighten main bearing cap mounting bolts (2) as follows.

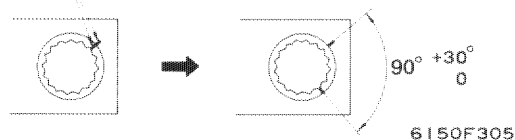
★ Starting from the center to the outside, tighten the bolts to the specified tightening torque as follows.

 Main bearing cap mounting bolts

Unit: kgm

Order	Target	Range
1st step	10	9 – 11
2nd step	20	19.5 – 20.5
3rd step	Mark the bolts and the cap with a felt-tip pen, and turn the bolts with following degrees.	
	90°	90° – 120°

Mark the bolt and the cap



- ★ After tightening the bolts, put one punch mark on the head of each bolt. Do not reuse a bolt which has 5 punch marks. Replace it with a new one.

- 9) After tightening the bolts, confirm that the crankshaft rotates smoothly.

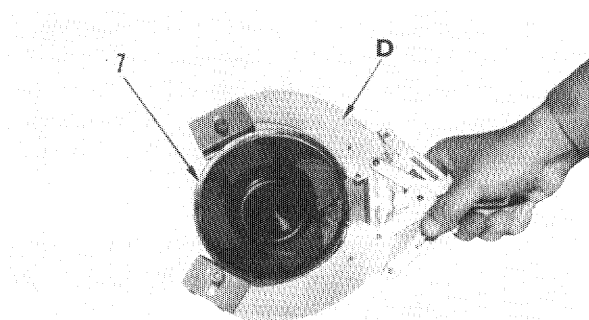
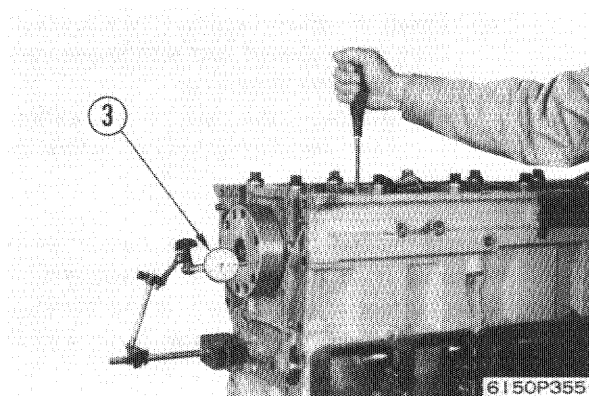
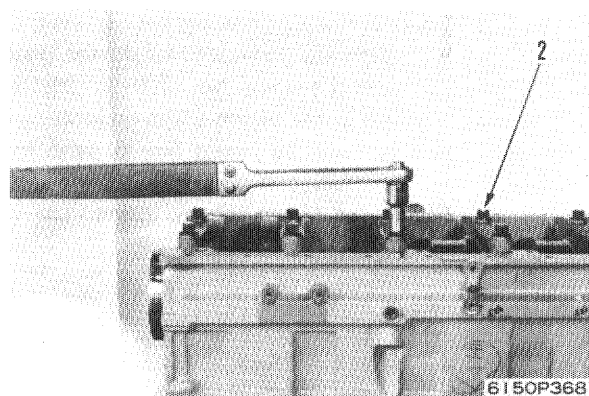
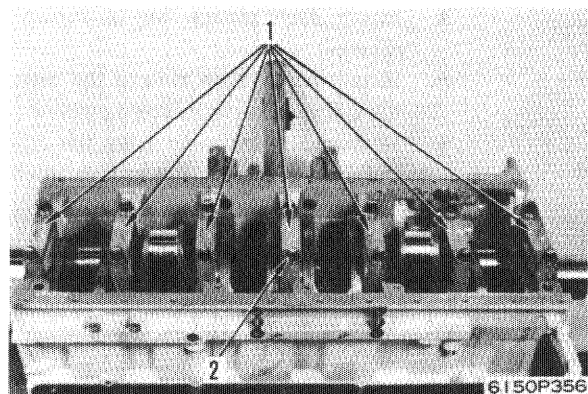
- 10) Measure the end play of the crankshaft using dial gauge ③.

★ End play: 0.14 – 0.315 mm

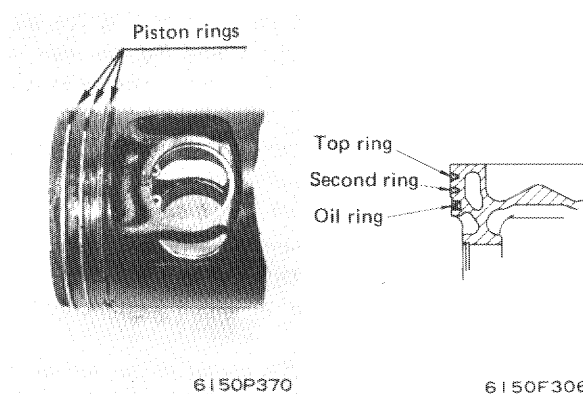
4. Piston and connecting rod assembly

- 1) Assemble the piston and connecting rod assembly as follows.

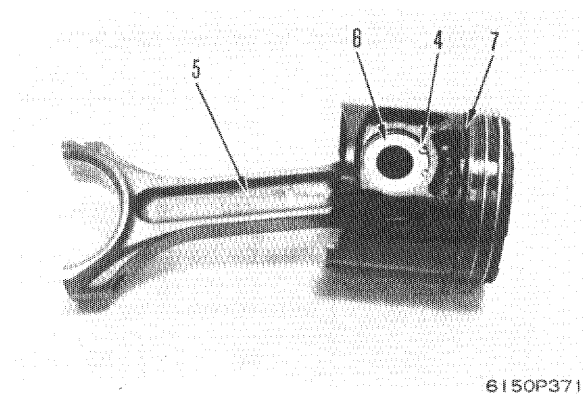
- i) Install piston rings (7) to the piston using piston ring tool D.



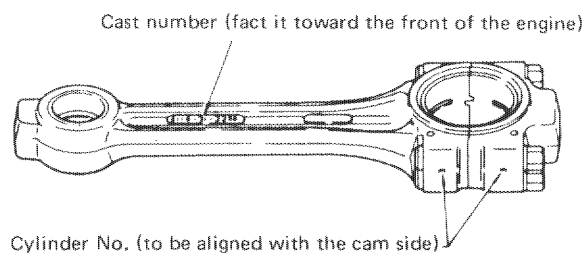
- ★ Install each piston ring as shown in the drawing.
- ★ Install each piston ring to the piston with the stamped surface facing upward.
- ★ Remove the expander from the oil ring, fit the expander into the groove, then install the oil ring. Make sure that the expander fits snugly into the ring groove.



- ii) Connect the piston to the connecting rod.
 - ★ Align the cylinder No. on the piston top with the stamp No. on the connecting rod, and install piston (7) to connecting rod (5) by inserting piston pin (6) with the numbers facing in the same direction.
- iii) Secure the piston pin by fitting snap rings (4) on both sides.



- iv) Install the upper bearing to the connecting rod with the projected part on the bearing aligned with the notch on the rod.
 - ★ Make sure the back of the bearing is free from any foreign matter before installing the bearing.

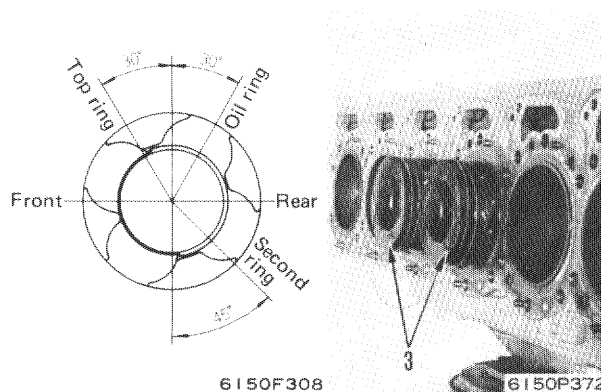


- 2) Rotate the crankshaft of the cylinder to be installed to bring it to bottom dead center, and coat the inner surface of the connecting rod bearing and the inner surface of the cylinder with SAE No. 30 engine oil.

6150F307

- 3) Insert piston and connecting rod assembly (3) into the cylinder with the cast number on the rod facing the engine front (the stamp No. should be on the camshaft side), and with the relative position of the piston ring openings arranged as shown in the drawing.

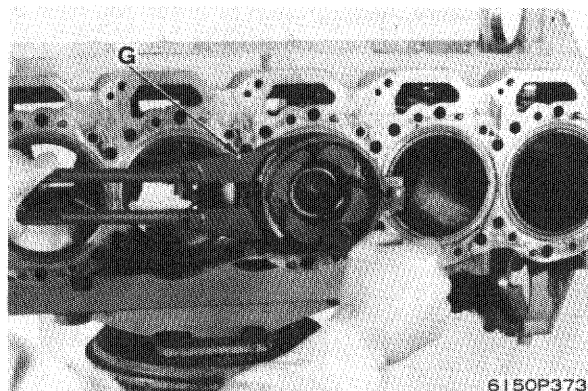
- ★ For S6D125-1
Take care not to damage the piston cooling nozzle when inserting the piston and connecting rod assembly.



- 4) Contract the piston rings using piston holder **G**, and push the piston head into the cylinder with a wooden stick.

★ For S6D125-1

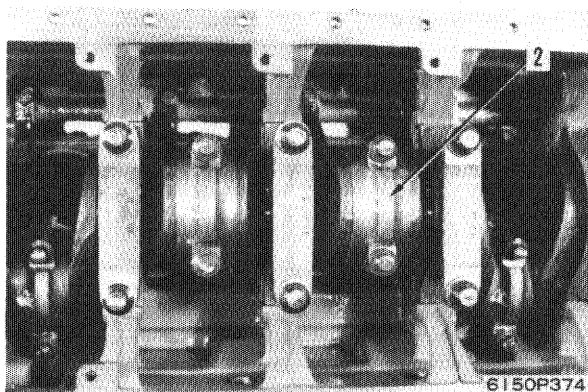
Take care not to damage the piston cooling nozzle when inserting the piston. Make sure also that the nozzle is located in the center of the notched part on the piston.



- 5) Install the lower bearing to the connecting rod cap with the projected part on the bearing aligned with the notch on the cap, and install connecting rod cap (2) in alignment with the stamped mark on the connecting rod.

★ Make sure the back of the bearing is free from any foreign matter before installing it.

★ Coat the sliding surface of the connecting rod with SAE No. 30 engine oil.



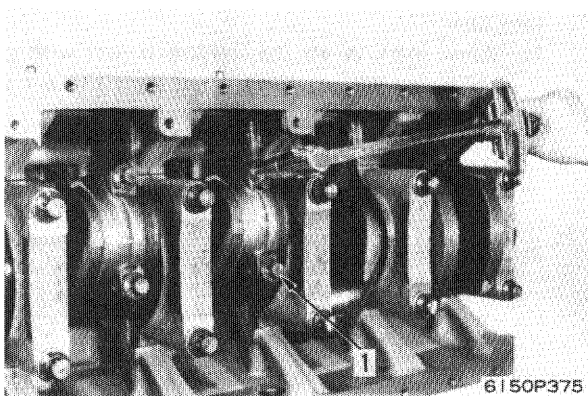
- 6) Coat the threads and seating surface of connecting rod bolts (1) with SAE No. 30 engine oil and tighten them as follows.



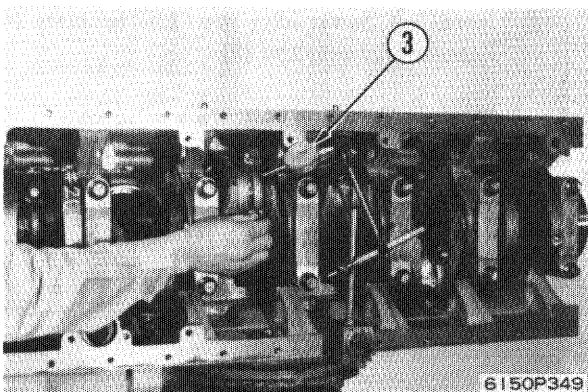
Connecting rod cap mounting bolts

Unit: kgm

Order	Target	Range
1st step	10	9.5 – 10.5
2nd step	Mark the bolts and the cap with a felt-tip pen and turn the bolts with following degrees.	
	90°	90° – 120°



- ★ After tightening the bolts, put one punch mark on the head of each bolt. Do not reuse a bolt which has 5 punch marks. Replace it with a new one.
- 7) After the piston and connecting rod assembly is installed, make sure the crankshaft rotates smoothly.
- 8) Measure the side clearance of the connecting rod with dial gauge (3).
- ★ Standard side clearance: 0.20 – 0.375 mm

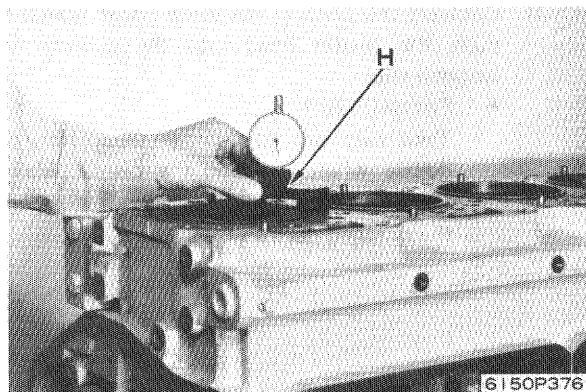


- 9) Measure the protrusion of piston top from cylinder block top face using gauge H.

★ Protrusion of piston:

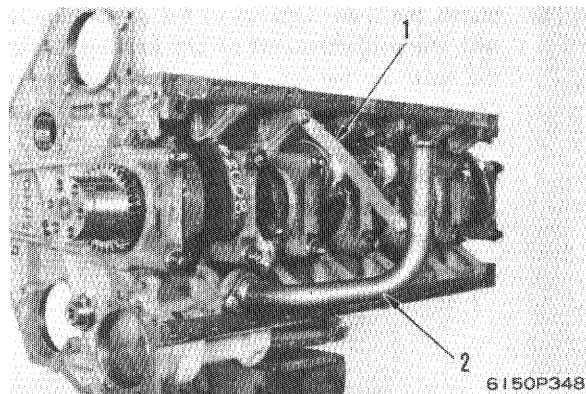
Unit: mm

6D125, S6D125 (Aluminum piston)	S6D125, SA6D125 (FCD piston)
0.806 – 1.151	0.984 – 1.335



5. Oil suction pipe

- 1) Fit an O-ring and install oil suction pipe (2).
- 2) Install bracket (1) to secure the pipe.



6. Idler gear

- 1) Align mark A on the crankshaft gear with mark A on main idler gear (9), install shaft (8), and tighten mounting bolt (7).

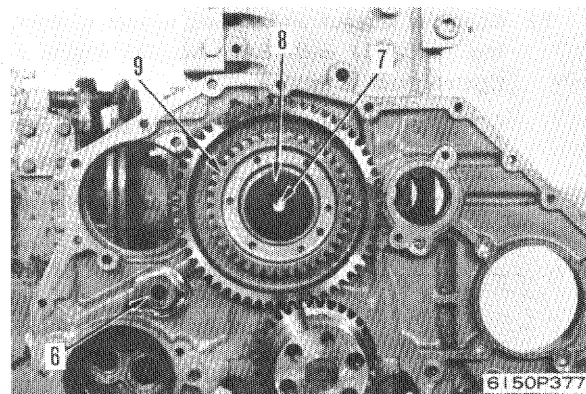


Mounting bolt:

16.5 ± 1.5 kgm (For M: 14 mm)

27.5 ± 2.5 kgm (For M: 16 mm)

- 2) Drive in the pin and install shaft (6).



- 3) Install oil pump idler gear (5), fit plate (4), and tighten mounting bolt (3).



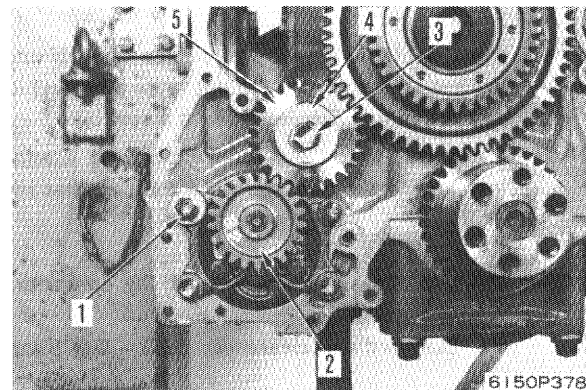
Mounting bolt: 16.5 ± 1.5 kgm

7. Oil pump

- 1) Fit O-ring and install oil pump (2).
- 2) Tighten 4 mounting bolts (1).



Mounting bolt: 7 ± 0.5 kgm

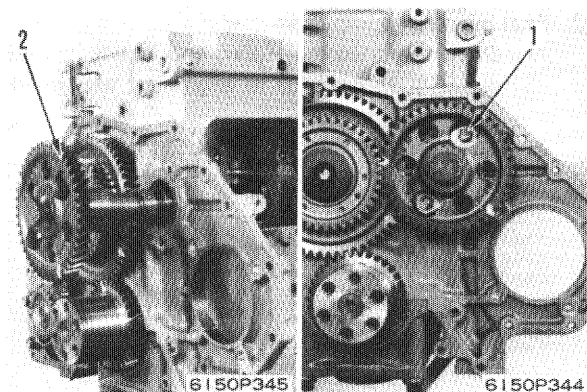


8. Camshaft

- 1) Coat the camshaft journal with SAE No. 30 engine oil.
- 2) Install camshaft (2) by aligning mark **B** on the camshaft gear with mark **B** on the main idler gear.
- 3) Tighten mounting bolts (1).

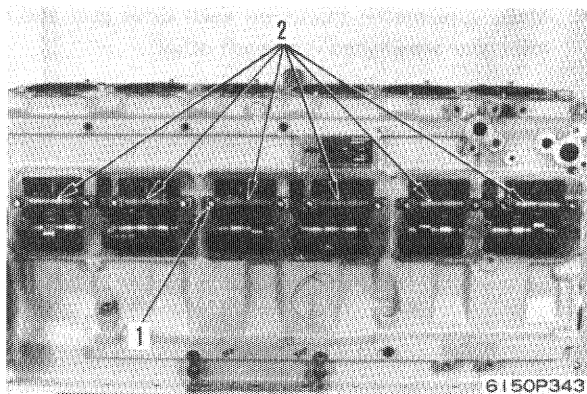
 Plate mounting bolts: 6.75 ± 0.75 kgm

- ★ When installing the camshaft, turn it to prevent damage to the cambushing.
- ★ When replacing the cam gear, heat the gear in an electric furnace at $200 - 240^{\circ}\text{C}$ for 30 minutes and shrink fit it.

**9. Cam follower**

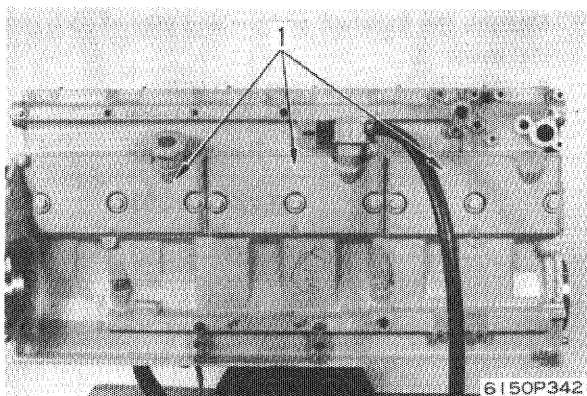
Install cam follower (2) in alignment with the pin, and tighten mounting bolts (1).

 Mounting bolts: 5.25 ± 0.75 kgm

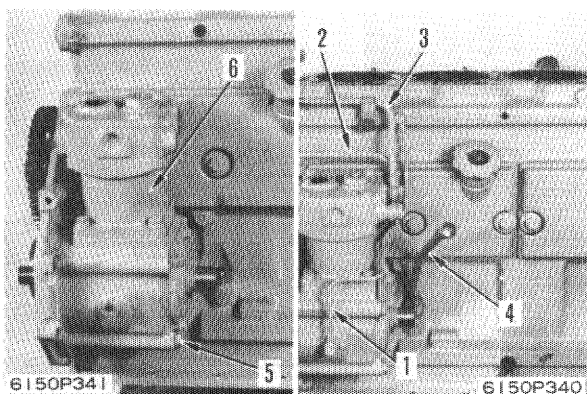
**10. Cam follower cover**

Fit an O-ring and install cam follower cover (1).

 Mounting bolt: 1.15 ± 0.15 kgm

**11. Air compressor**

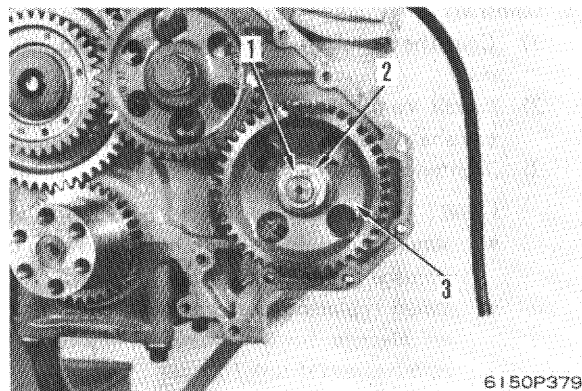
- 1) Fit an O-ring and install air compressor (6), and tighten 4 bolts (5).
- 2) Install dipstick guide (4).
- 3) Fit gasket on both sides and install air compressor tubes (3), (2), and (1).



12. Fuel injection pump drive gear

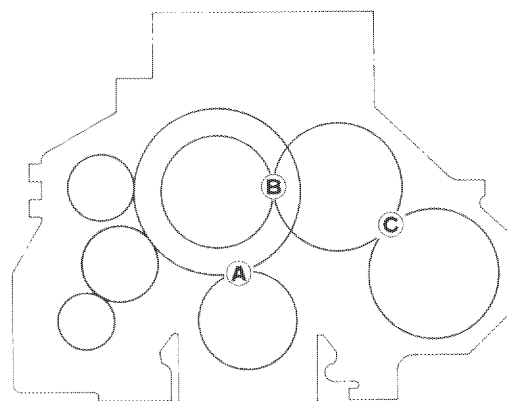
- 1) Drive the drive shaft gear, and install fuel injection pump drive gear (3) in alignment with mark **C** on the cam shaft gear.
- 2) Fit washer (2) and tighten nut (1).
- ★ Tighten the nut while holding the gear with a screwdriver.

 Nut: 24.5 ± 1.5 kgm



6150P379

- ★ Make sure match marks on each drive gear and on the idler gear are aligned with each other.

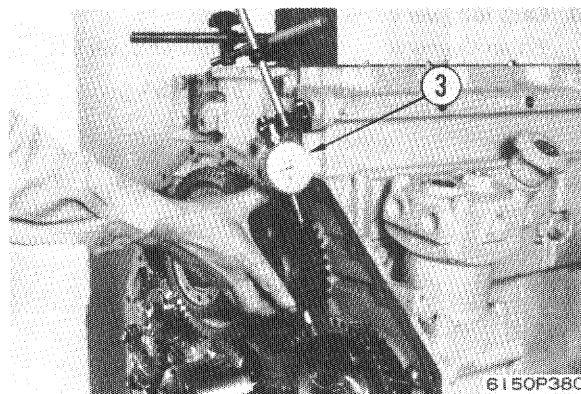


6150F309

- ★ Measure the backlash and the end play of each gear with dial gauge ③.

- Standard value of gear backlash

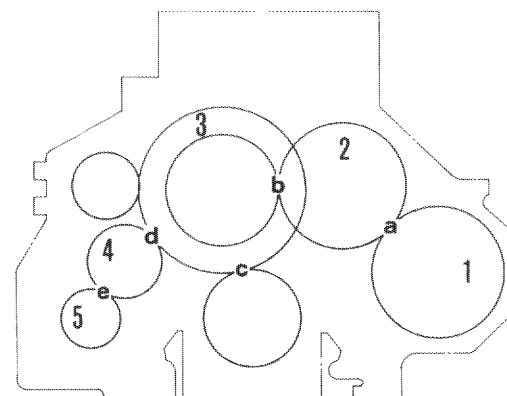
Position	Range (mm)
a	0.127 – 0.393
b	0.127 – 0.393
c	0.139 – 0.427
d	0.128 – 0.405
e	0.082 – 0.389



6150P380

- Standard value of gear end play

Position	Range (mm)
1	0.09 – 0.48
2	0.10 – 0.25
3	0.05 – 0.17
4	0.05 – 0.21
5	0.03 – 0.09



6150F310

13. Front cover

- 1) Press fit oil seal (3) into the cover using a push tool (outside diameter: 120 mm).

★ Insertion allowance (a) for oil seal: 11^{+1}_0 mm

 Oil seal lip: G2-L1 (Coat 50 to 80% of the lip clearance)

- 2) Coat the mounting surface with liquid gasket and install front cover (2).

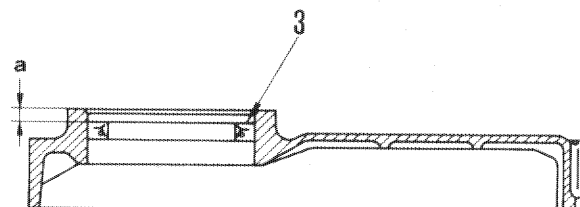
★ Take care not to damage the oil seal when installing the cover.

 Mounting surface: Liquid gasket (LG-7)

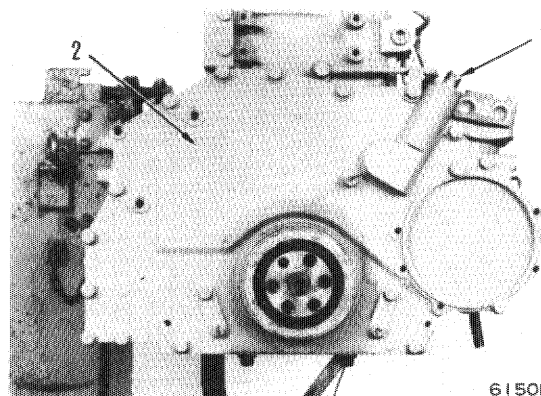
- 3) Fit an O-ring and install tachometer drive assembly (1).

- 4) Measure the difference between the cylinder block lower face and the front cover using dial gauge.

★ Difference: 0 – 0.275 mm



6150F311

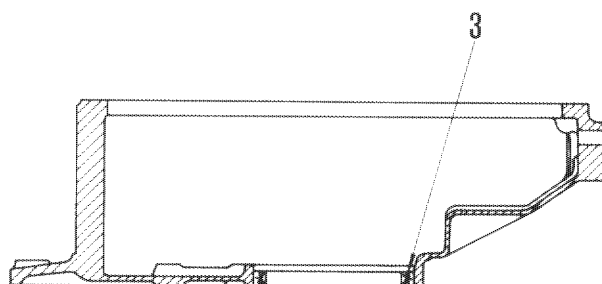


6150P337

14. Flywheel housing

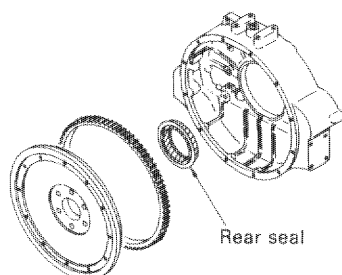
- 1) Press fit oil seal (3) into the housing using a push tool (outside diameter: 180 mm).

 Oil seal lip: Engine oil

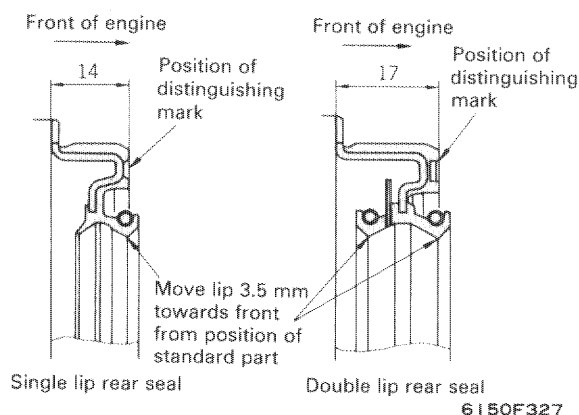


6150F312

- ★ If the oil seal lip contact surface of the crankshaft is worn (enough for your fingernail to catch: 0.1 mm or more), assemble a rear seal to correct the wear (assemble it 3.5 mm to the front of the engine from the lip position).



6150F326



6150F327

- 2) Coat mounting surface of cylinder block with re-
quid gasket.

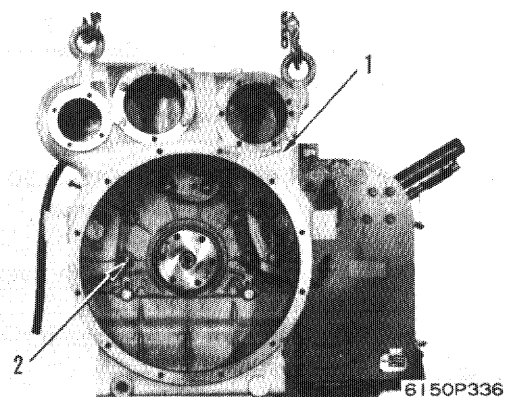
 Mounting surface: Liquid gasket (LG-7)

- 3) Sling flywheel housing (1), install the housing to
cylinder block and tighten mounting bolts (2).

★ Take care not to damage the oil seal when
installing the housing.

 Bolt thread and washer:

SAE No. 30 engine oil



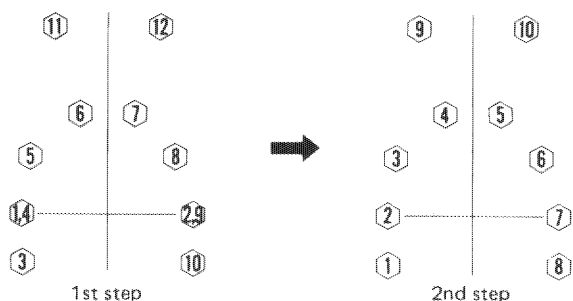
- ★ Tighten flywheel housing mounting bolts as follows and in the order shown in the drawing.

 kgm Flywheel housing mounting bolts

Unit: kgm

Order	Target	Range
1st step	19	15 – 24
2nd step	28	25 – 31.5

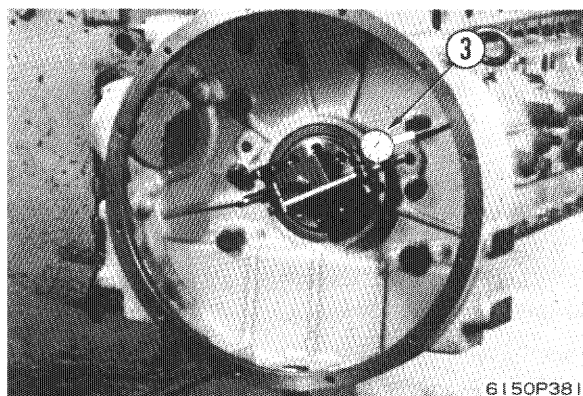
Tightening order



6150F313

- 3) After flywheel housing is installed, measure the face runout and radial runout using dial gauge ③.

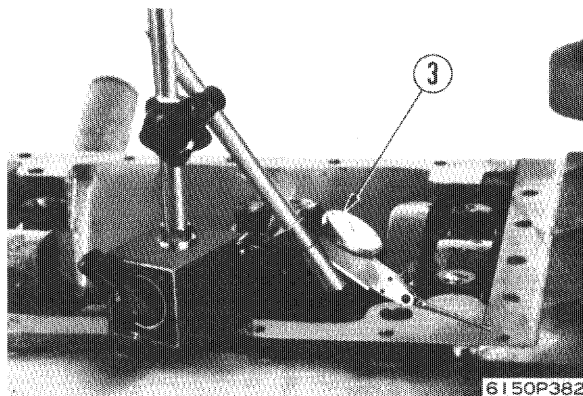
- ★ Radial runout: 0.20 mm max.
★ Face runout: 0.20 mm max.



6150P381

- 4) Measure the difference between the cylinder block and the flywheel housing using dial gauge ③.

- ★ Difference: 0 – 0.35 mm



6150P382

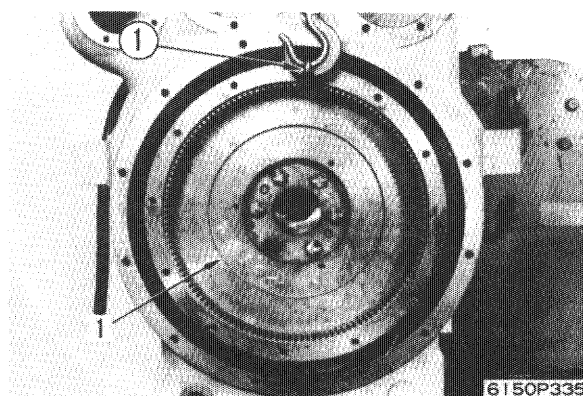
15. Flywheel

- 1) Sling flywheel (1) with eye bolt ① (Thread dia.: 12 mm, Pitch: 1.75 mm), install the flywheel to the crankshaft, and tighten the mounting bolts.



Bolt threads and washers:

SAE No. 30 engine oil



6150P335

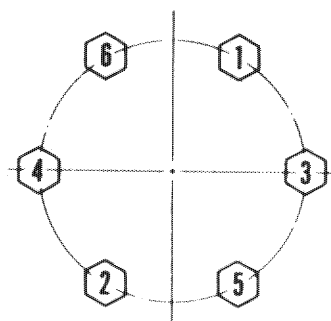
- ★ Tighten the flywheel mounting bolts as follows and in the order shown in the drawing.

 Flywheel mounting bolts

Unit: kgm

Order	Target	Range
1st step	15	13 – 17
2nd step	29.5	27.5 – 31.5

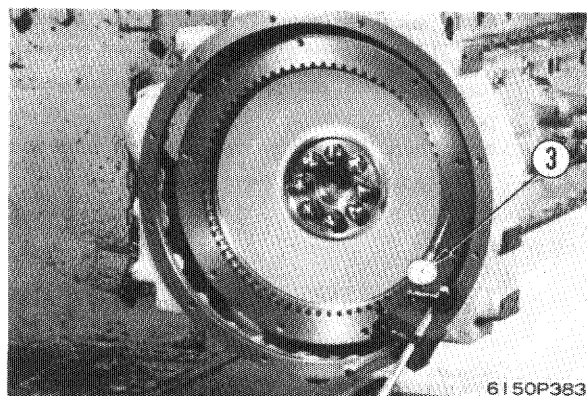
Tightening order



6150F314

- After the flywheel is installed, measure the face runout and radial runout using dial gauge ③.

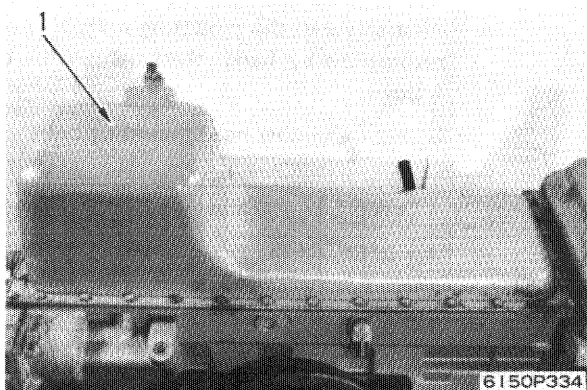
- ★ Face runout: 0.20 mm max.
- ★ Radial runout: 0.15 mm max.



6150P383

16. Oil pan

Fit a gasket and install oil pan (1).

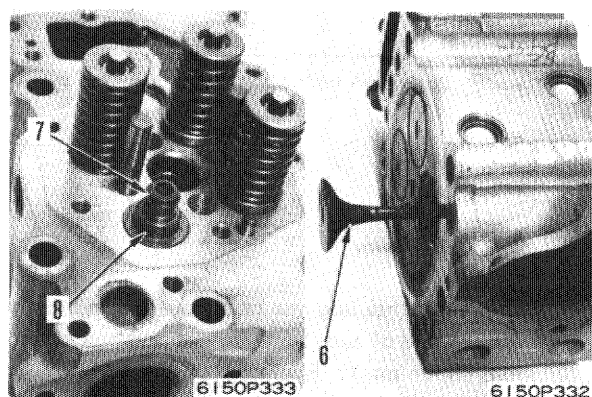


6150P334

17. Cylinder head assembly

- Assemble the cylinder head assembly as follows.
 - Fit lower seat (8) and install seal (7).
 - ★ The seals are provided on the exhaust side only.
 - Coat the valve stems and the inner surface of valve guides with SAE No. 30 engine oil and install valve (6).

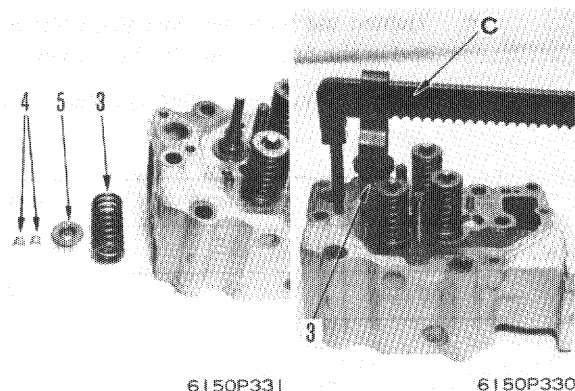
- ★ The valve rotator is installed in S6D125, SA6D125 engine, instead of the lower seat.
- ★ The free length of the valve springs are different between 6D125 and S6D125, SA6D125.
- ★ The engine equipped with the exhaust brake (slide and butterfly type) is different in the exhaust valve springs (New valve springs are coated with the white paint).
- ★ Exhaust valves in the engine equipped with the exhaust brake (slide and butterfly type) is different only in the valve stem length. (Mark "B" is stamped in the spare area of each valve.)



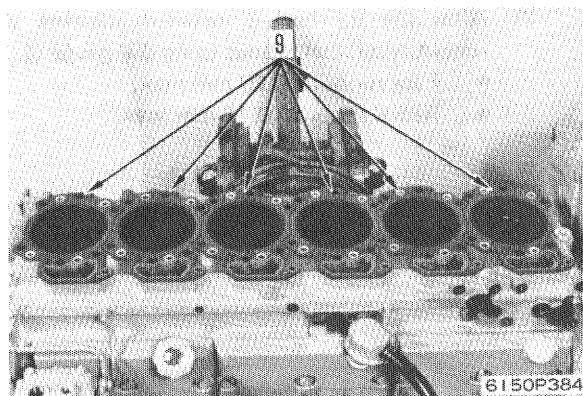
6150P333

6150P332

- iii) Set the cylinder head upright, and install valve spring (3) and upper seat (5).
- iv) Contract the valve spring using spring pusher C, and install valve cotters (4).
- ★ Tap the valve stem lightly with a plastic hammer to make sure the cotters are securely installed in the valve stem groove.



- 2) Make sure the mounting surface of cylinder head and the inside of cylinders are free from dust and foreign matter, and place cylinder head gasket (9) in position.
- ★ When installing the gasket, make sure the grommet is not loose.



- 3) Install each cylinder head assembly (2) and tighten mounting bolts (1).

 Coat the threads and lower side of the bolt head before tightening the mounting bolts with lubricant (LM-P).

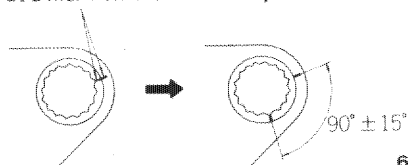
- ★ First screw in the mounting bolts two or three revolutions by hand, then tighten the bolts as follows.

 Cylinder head mounting bolts

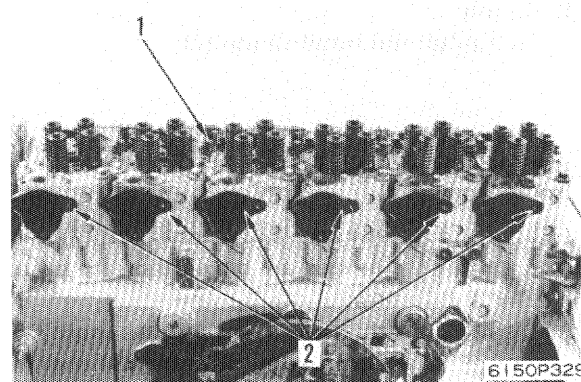
Unit: kgm

Bolt No.	Order	Target	Range
① ⑥	1st step	10	9 – 11
	2nd step	14	13.5 – 14.5
	3rd step	Mark the bolts and the cylinder head with a felt-tip pen, and turn the bolts with following degrees.	
		90°	75° – 105°
⑦	—	6.75	6.0 – 7.5

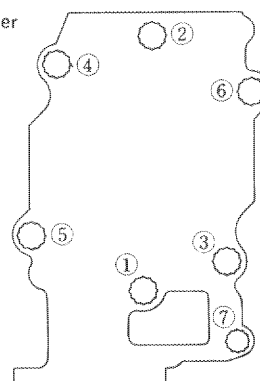
Put a mark on the bolt and cylinder head



- ★ After tightening the bolts, put one punch mark on the head of each bolt. Do not reuse a bolt which has 5 punch marks. Replace it with a new one.



Tightening order

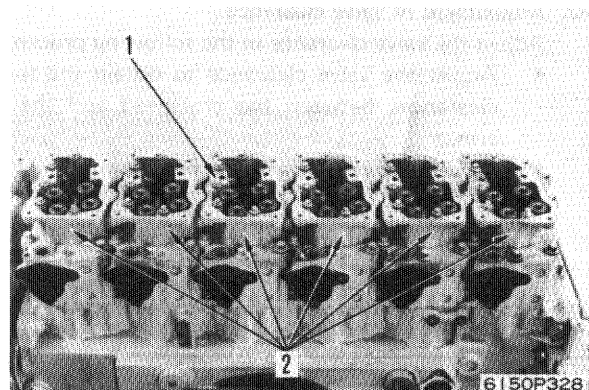


6150F316

18. Rocker arm housing

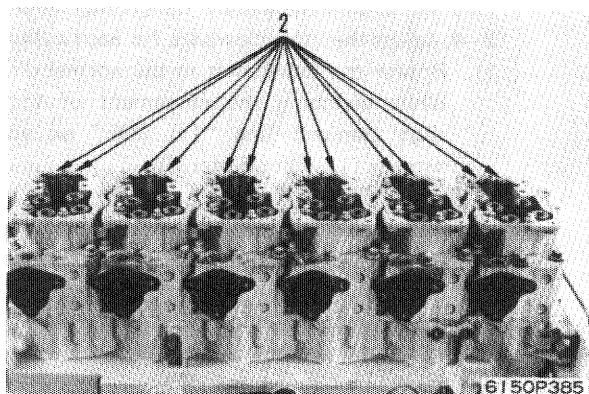
Fit gaskets and install rocker arm housings (2) to the cylinder heads, then tighten 42 mounting bolts (1).

 Mounting bolts: 6.75 ± 0.75 kgm

**19. Push rod**

Install push rods (2).

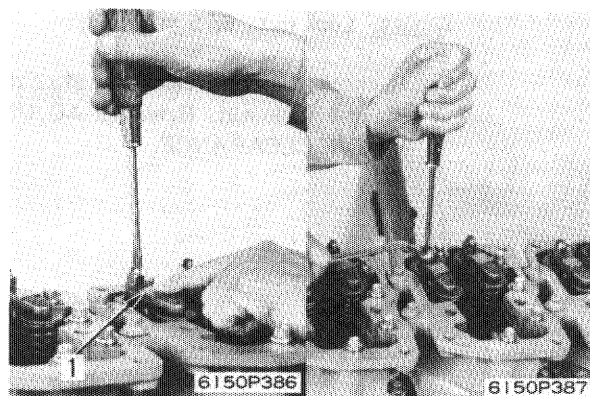
- ★ Make sure the push rods are securely positioned in the cam follower lever holes.

**20. Crosshead**

Install crosshead (1).

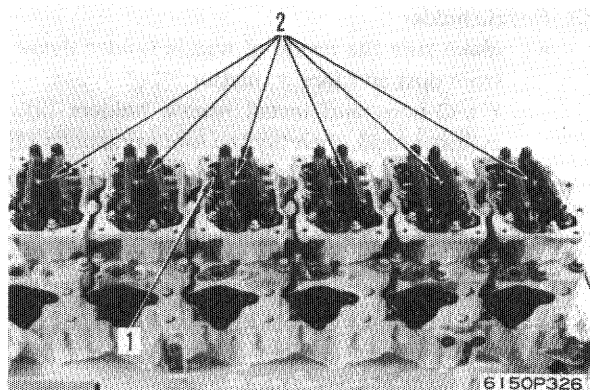
- ★ The exhaust crosshead in the engine equipped with the exhaust brake (slide and butterfly type) is different only in the pocket depth.
- ★ Adjust the crosshead as follows.
 - i) Loosen the lock nut and the adjustment screw.
 - ii) Hold down the upper surface of the crosshead lightly with a finger, and screw the adjustment screw.
 - iii) After the adjustment screw comes into contact with the valve stem, screw the adjustment screw 20 degrees.
 - iv) Tighten the lock nut in this position.

 Lock nut: 6.75 ± 0.75 kgm

**21. Rocker arm**

Fit gaskets and install rocker arms (2), then tighten 12 mounting bolts (1).

- ★ Make sure the ball portion of the adjustment screws are securely placed in the socket portion of the push rods before tightening the bolts.
 - ★ Clean oil holes on the bolts and tighten the bolts.
-  Mounting bolt: 6.75 ± 0.75 kgm
- ★ Set a rocker arm shaft in place so that the portion having a large hole (13 mm dia.) is on the lower side and that having a blind ball plug is on the front side.



22. Adjustment of valve clearance

Adjust the valve clearance in the following procedure.

- ★ Adjust the valve clearance to obtain the following clearances between the crosshead and the rocker arm.
- ★ Valve clearances (when engine is cold)

Unit: mm	
Intake valve	Exhaust valve
0.33	0.71

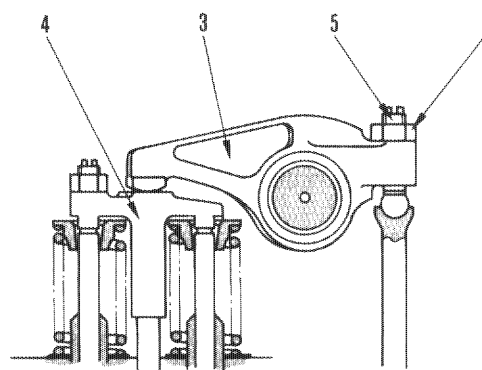
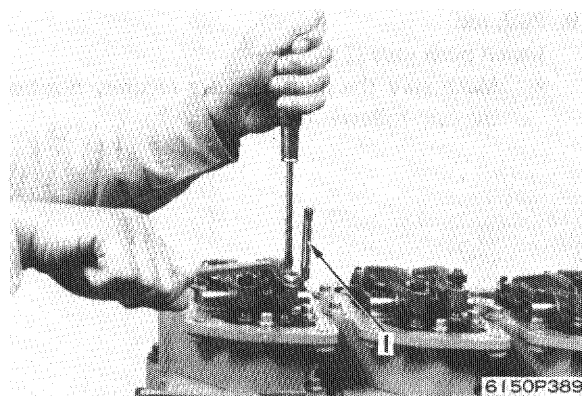
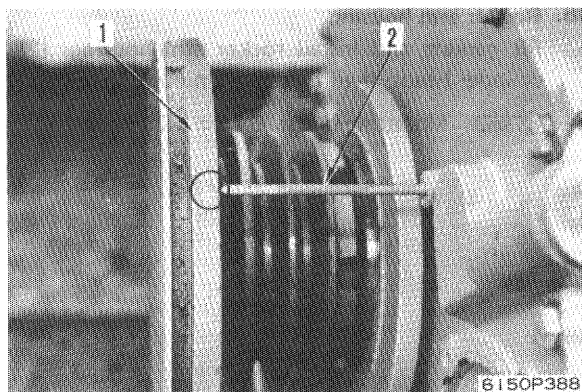
- ★ With the engine cranking in firing order 1—5—3—6—2—4, adjust the valve clearance for each cylinder.
- 1) Rotate the crankshaft in the normal direction. While watching the movement of the valve, align stamped line "1.6 TOP" on vibration damper (1) with pointer (2).

- 2) Insert a Feeler gauge (3) between rocker arm (4) and crosshead (5), and adjust the clearance with adjustment screw (6) until the gauge can slide lightly.

- 3) Tighten lock nut (8) to secure the adjustment screw.

 Lock nut: 6.75 ± 0.75 kgm

- ★ Recheck the valve clearance after tightening the lock nut. Refer 12 ADJUSTING VALVE CLEARANCE.

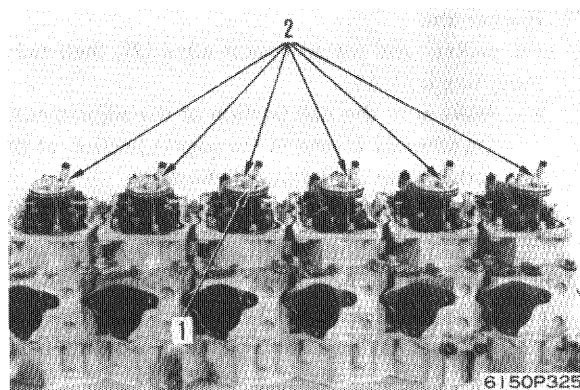


6150F317

23. Nozzle holder

- ★ Make sure the inside of nozzle holder sleeve is free from dust and foreign matter. Fit O-rings and install nozzle holders (2) to the cylinder head, then tighten mounting bolts (1).
- ★ Tighten the nozzle holder mounting bolts equally to achieve even tightening.

 Mounting bolt: 2.2 ± 0.3 kgm

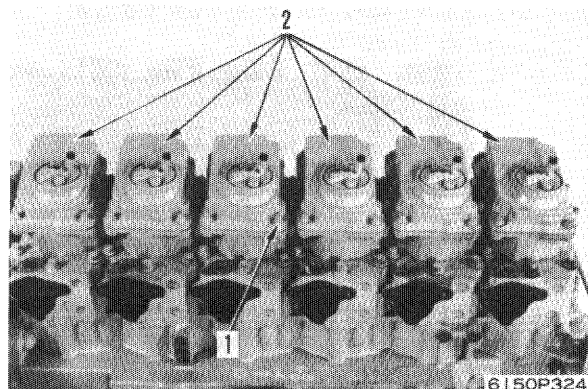


24. Cylinder head cover

Fit O-rings and install cylinder head covers (2), then tighten 24 mounting bolts (1).

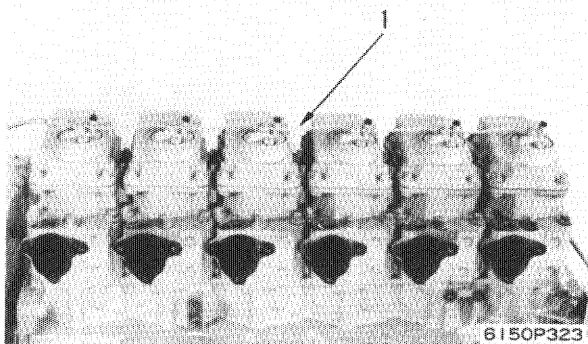
- ★ Apply adhesive to the O-rings so that they can be installed without causing twisting.

 Cylinder head cover mounting bolts: 1 ± 0.1 kgm

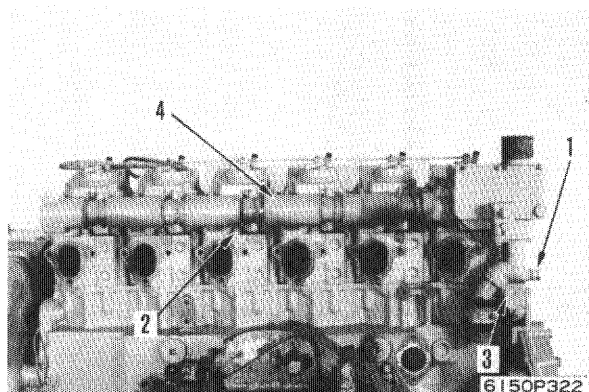
**25. Spill pipes**

Fit gaskets on both sides and install spill pipes (1).

 Joint bolt: 1.25 ± 0.25 kgm

**26. Water manifold**

- 1) Fit gaskets and install water manifold (4), then tighten 12 bolts (2) and 2 bolts (3).
- 2) Fit gaskets on both sides, and connect tube (1) between the air compressor and connector.

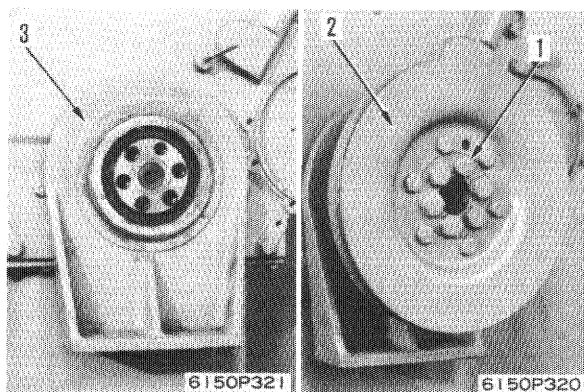
**27. Front support**

Install front support (3).

28. Crankshaft pulley and vibration damper

Install crankshaft pulley and vibration damper (2), then tighten 6 mounting bolts (1).

 Mounting bolts: 28 ± 3 kgm
(Thread dia.: 16 mm, Pitch: 1.5 mm)
 18 ± 2 kgm
(Thread dia.: 14 mm, Pitch: 1.5 mm)



28-1. Crankshaft pulley (for D60P-8 and D60S-8)

- 1) Install crankshaft pulley.
- 2) Coat bolts with the engine oil, then tighten the bolts as follows.

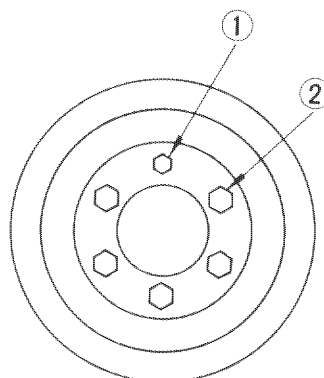
Bolt ①: 18 ± 2 kgm

Bolts ②:

1st step: 15 ± 1 kgm2nd step: 30 ± 1 kgm3rd step: Mark the bolts and the pulley with a felt-tip pen, and turn the bolts $90^\circ - 120^\circ$.

★ Bolt ①: Thread dia.: 14 mm, Pitch: 1.5 mm

Bolts ②: Thread dia.: 16 mm, Pitch: 1.5 mm



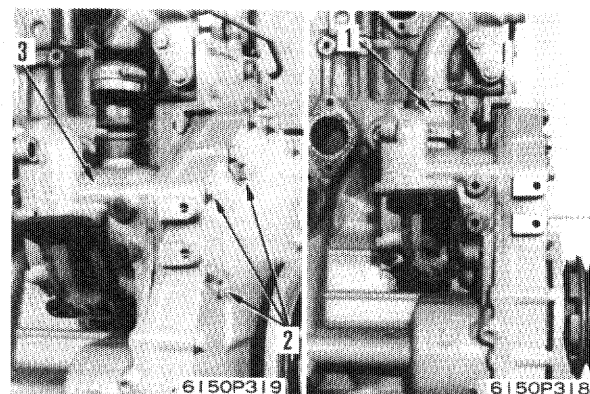
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29. Water pump

- 1) Fit O-ring and install water pump (3), then tighten 3 mounting bolts.

 Mounting bolts: 6.75 ± 0.75 kgm

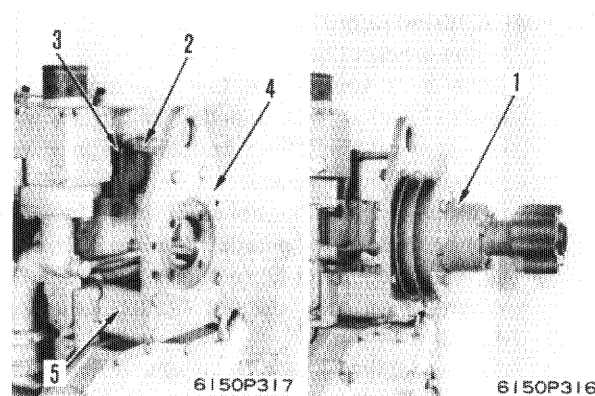
- 2) Connect hose (1) between the water pump and the thermostat housing.



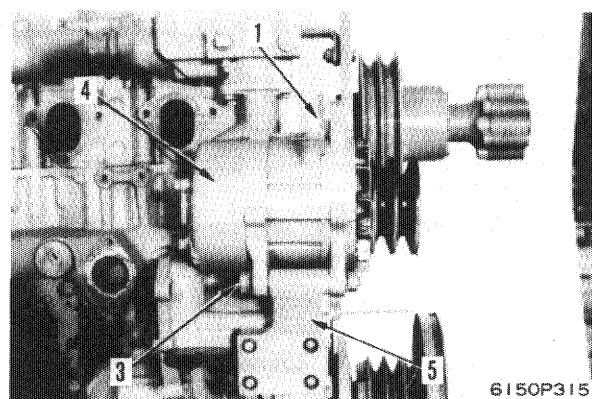
- 3) Install spacer (5) and hanger (4).
- 4) Install 2 spacers (3) and bracket (2).

30. Fan pulley

Install fan pulley (1) and tighten the 4 mounting bolts.

**31. Alternator**

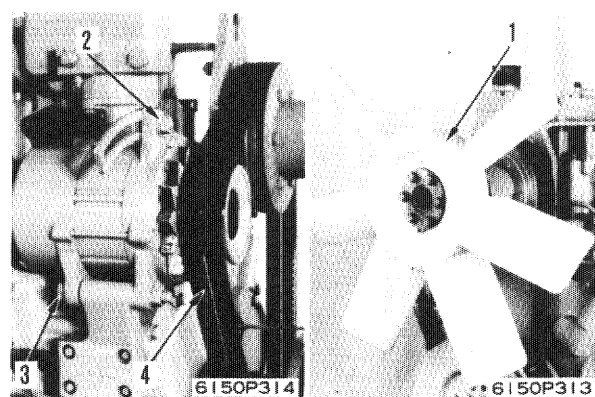
- 1) Install bracket (5).
- 2) Set alternator (4) on the bracket, and loosely tighten fastening bolt (3).
- 3) Install plate (1).

**32. V-belts**

- 1) Install V-belts (4) to the pulley grooves, and install the belt tension adjustment bolt (2).
- 2) Adjust the belt tension by raising the alternator with a bar until the belt deflects about 13 mm when the center of the belt is depressed with a force of 6 kg then tighten bolts (3) and (2).

PC300-3, PC400-3

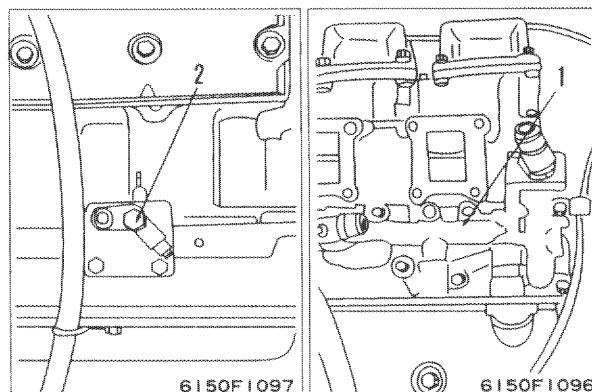
Standard belt tension: about 6 – 7 mm

**33. Fan**

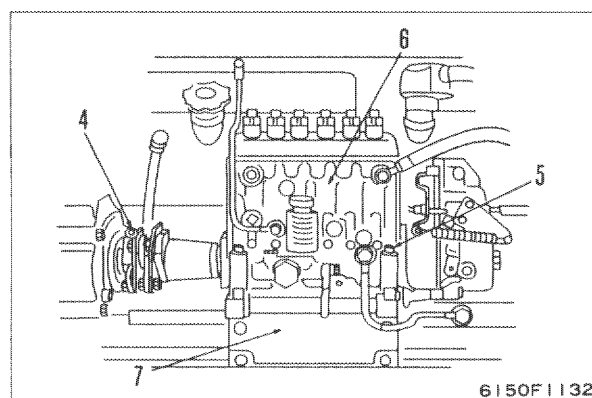
Install fan (1).

34. Lubricating oil valve adapter

- 1) Install adapter (2) for the fuel overflow, and connect the spill hose.
- 2) Fit O-ring and install lubricating oil valve adapter (1).

**35. Fuel injection pump**

- 1) Install bracket (7).
- 2) Drive in a key to the fuel injection pump drive shaft. Position fuel injection pump (6) with the key seat on the pump coupling aligned with pin section on the bracket.
- 3) Remove 2 coupling bolts (8) from fuel injection pump, then install flange coupling (11) and front laminated coupling (9) to engine drive shaft. When doing this, do not tighten coupling connection bolt (4).
- 4) Align coupling key groove with drive shaft key, push in fuel injection pump assembly (6), align with pin portion of bracket, and set in position.
- 5) Tighten 4 mounting bolts (5) of fuel injection pump.



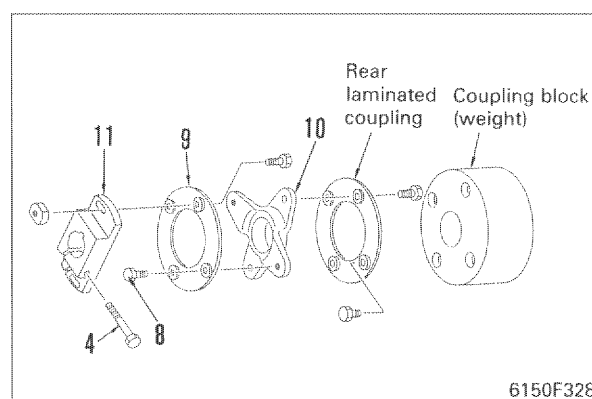
 **Mounting bolt:** 3.2 ± 0.3 kgm (6D125)
 6.75 ± 0.75 kgm (S6D125)
 6.75 ± 0.75 kgm (SA6D125)

- 6) Tighten 2 bolts (8) connecting coupling and drive shaft.

 **Coupling connecting bolt:** 6.25 ± 0.25 kgm

- 7) Tighten bolt (4) connecting pump coupling and drive shaft.

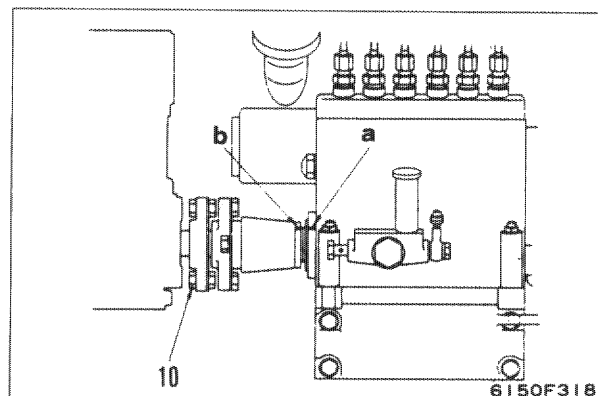
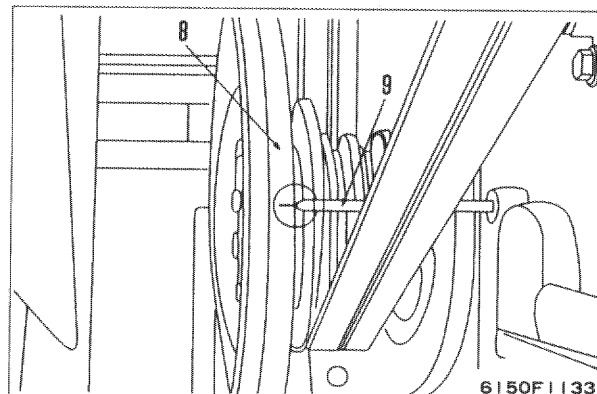
 **Mounting bolt:** $9^{+0.5}_0$ kgm (6D125)
 8 ± 0.5 kgm (S6D125)
 8 ± 0.5 kgm (SA6D125)



- 8) Check the injection timing as follows.
- Rotate the crankshaft in the normal direction and align the injection timing stamp line on vibration damper (8) with pointer (9).
 - ★ If the stamp line on the injection pump coupling is invisible from the front, rotate the crankshaft one more revolution.
 - In the condition described in step i), confirm that stamp line **a** on the injection pump side is aligned with stamp line **b** on the coupling side.
 - ★ If the stamp lines are out of alignment, loosen nut (10), turn the coupling until one stamp line is aligned with the other, and tighten the nut to the specified torque.

 Nut: 6.2 ± 0.2 kgm

- ★ When the fuel injection pump is repaired or replaced, or if the stamp line is missing, adjust the injection timing by the delivery valve method. See 12 CHECKING AND ADJUSTING FUEL INJECTION TIMING.

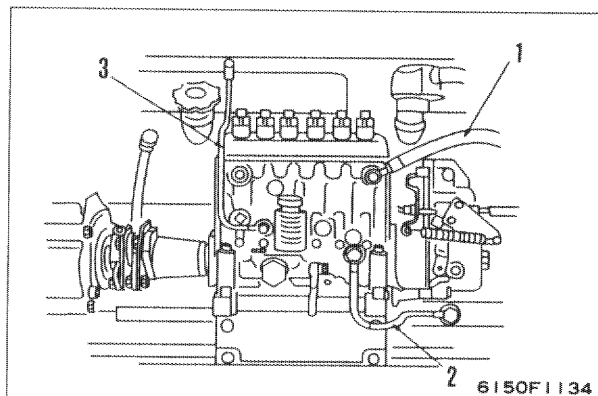


- 9) Fit gaskets to both sides and install lubrication tubes (3) and (2).

 Joint bolt for tube (2): $2.5^{+0.5}_0$ kgm

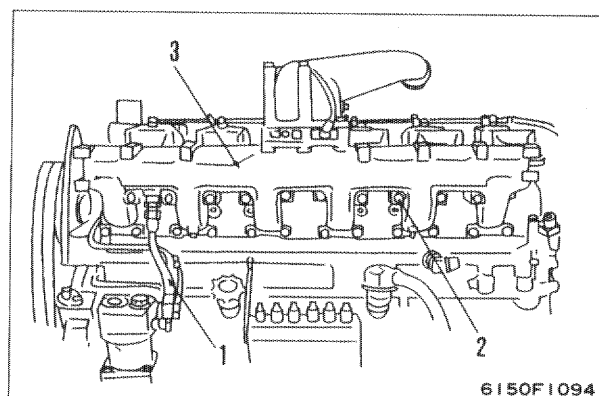
Joint bolt for tube (3): $1.5^{+0.5}_0$ kgm

- 10) Fit gaskets to both sides and connect overflow hose (1).



36. Intake manifold

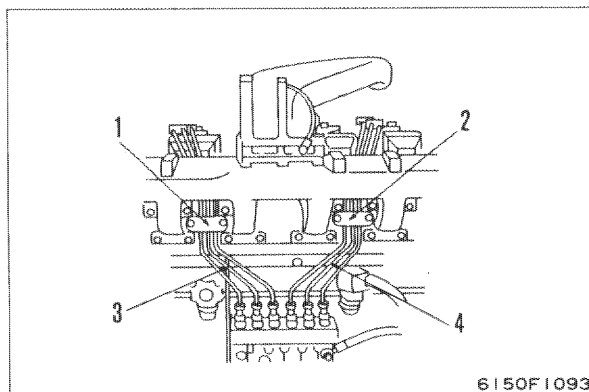
- Fit a gasket, install intake manifold (3), and tighten 24 mounting bolts (2).
- Install tube (1) between the intake manifold and the air compressor.



37. Fuel injection pipe

Install fuel injection pipes (4) and (3), and secure the pipes with clamps (2) and (1).

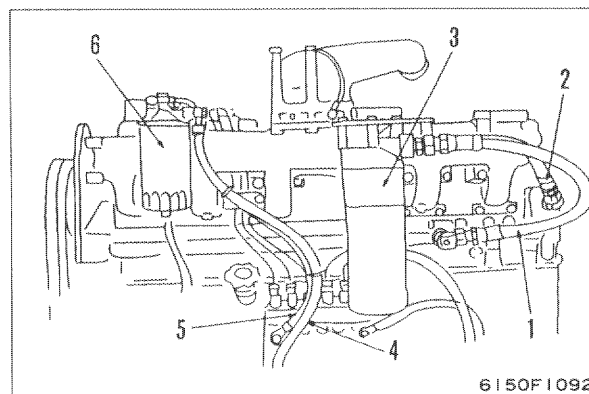
 Sleeve nut: 2.4 ± 0.1 kgm

**38. Fuel filter**

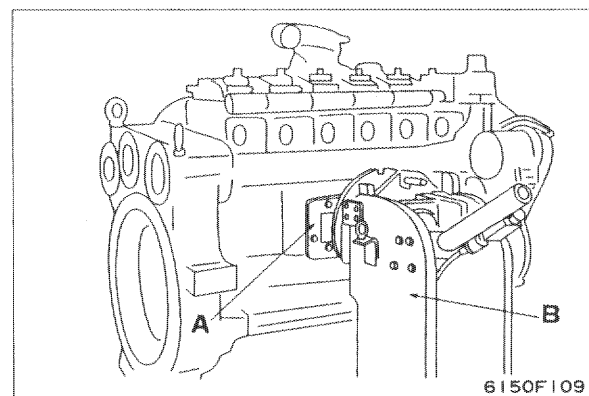
- 1) Install fuel filter (6) and the bracket as a unit.
- 2) Fit gaskets to both sides and install hoses (5) and (4) between the filter and the pump.

39. Oil filter

- 1) Install engine oil filter (3) and the bracket as a unit.
- 2) Connect hoses (2) and (1) between the filter and the adapter.
- ★ Install the hoses without twisting or interference.

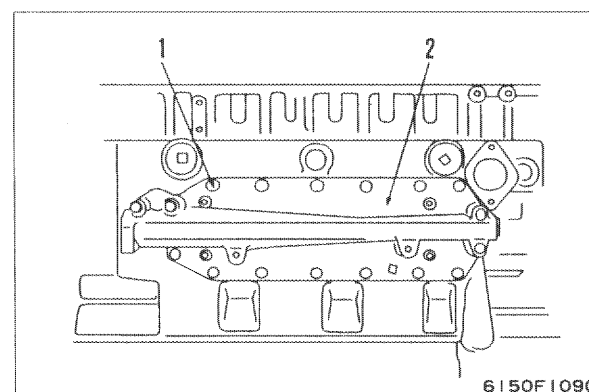
**40. Setting engine assembly on the engine stand**

- 1) Sling the engine assembly, remove the connecting bolts between adapter **A** and engine overhaul stand **B**, to separate the engine assembly from overhaul stand.
- 2) Set the engine assembly on the engine stand.
- 3) Remove adapter **A**.

**41. Engine oil cooler**

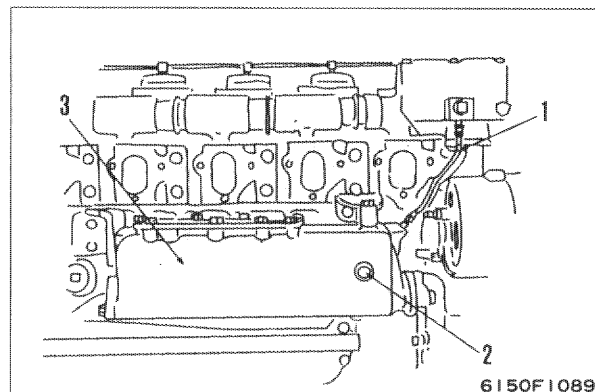
Fit a gasket and install engine oil cooler (2), then tighten 17 bolts (1).

 Mounting bolt: 6.75 ± 0.75 kgm

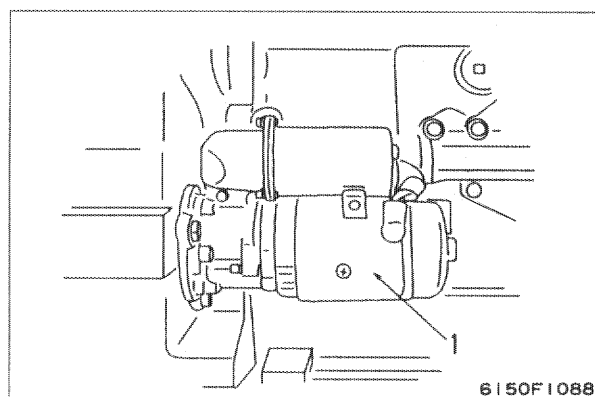


42. Body side oil cooler

- 1) Fit a gasket and install body side oil cooler (3), then tighten 8 bolts (2).
- 2) Install aeration pipe (1).

**43. Starting motor**

Fit a gasket and install starting motor (1).

**44. Turbocharger and exhaust manifold assembly**

- 1) Sling turbocharger and exhaust manifold assembly (3), fit gaskets, and tighten 18 mounting bolts (4).

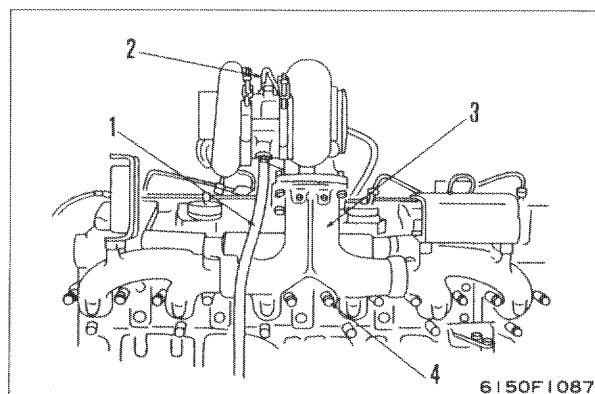
★ Fit the gasket with the marked side facing outward.

 Mounting bolt: 6.75 ± 0.75 kgm

- 2) Assemble exhaust brake.

★ To prevent any excessive force from being brought to bear on the turbocharger when assembling the exhaust brake, position it first and then tighten all the bolts.

- 3) Fit gaskets and install turbocharger inlet tube (2) and outlet tube (1).
- 4) Connect the intake connector hose to the turbocharger.

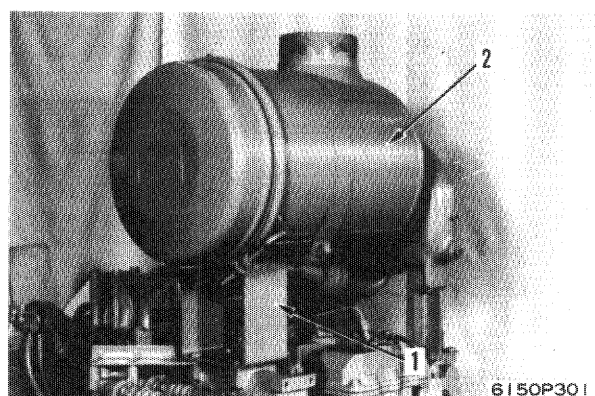
**45. Air cleaner**

Install air cleaner (2) and bracket (1) as a unit, and connect the hose to the turbocharger.

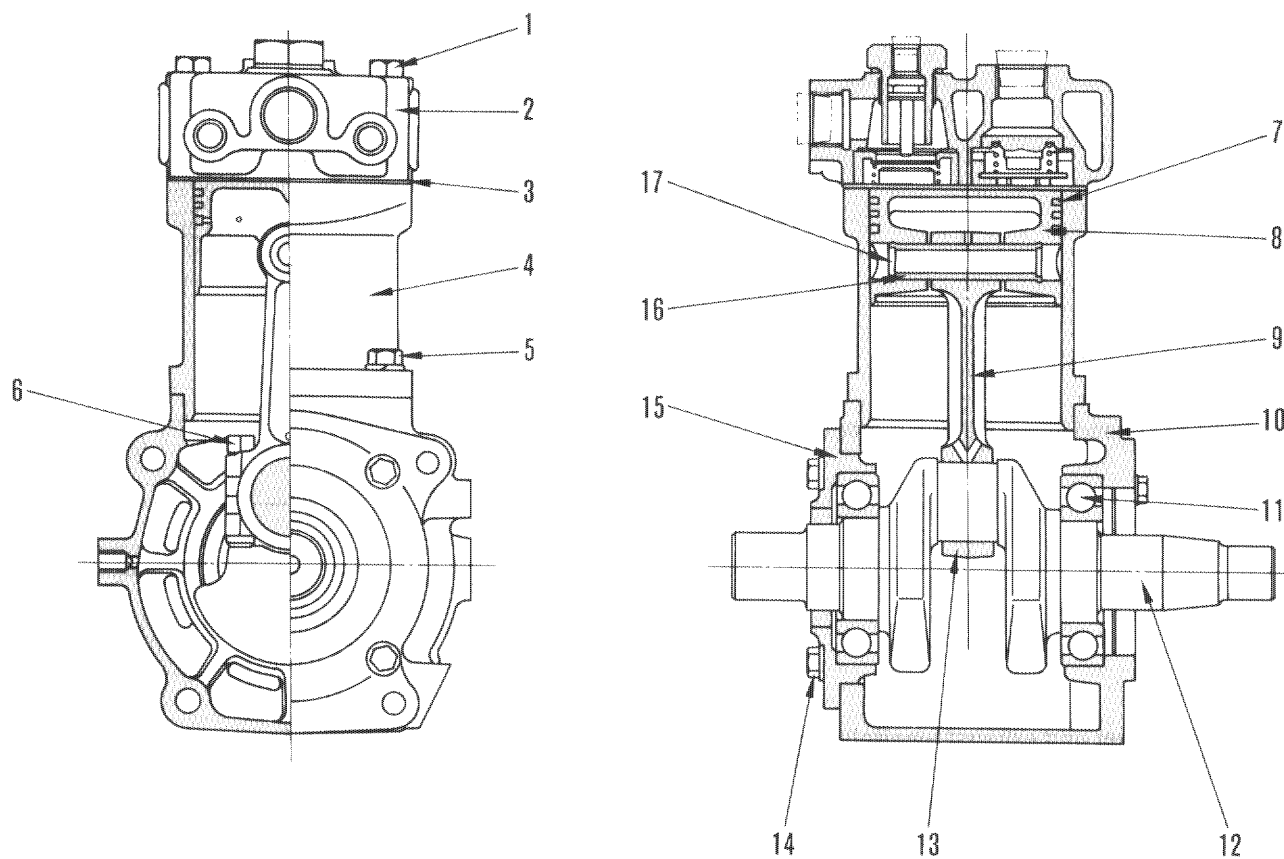
- **Refilling with the engine oil**

- 1) Make sure the engine drain plug is tightened.
- 2) Add engine oil through the oil filler to the specified level.

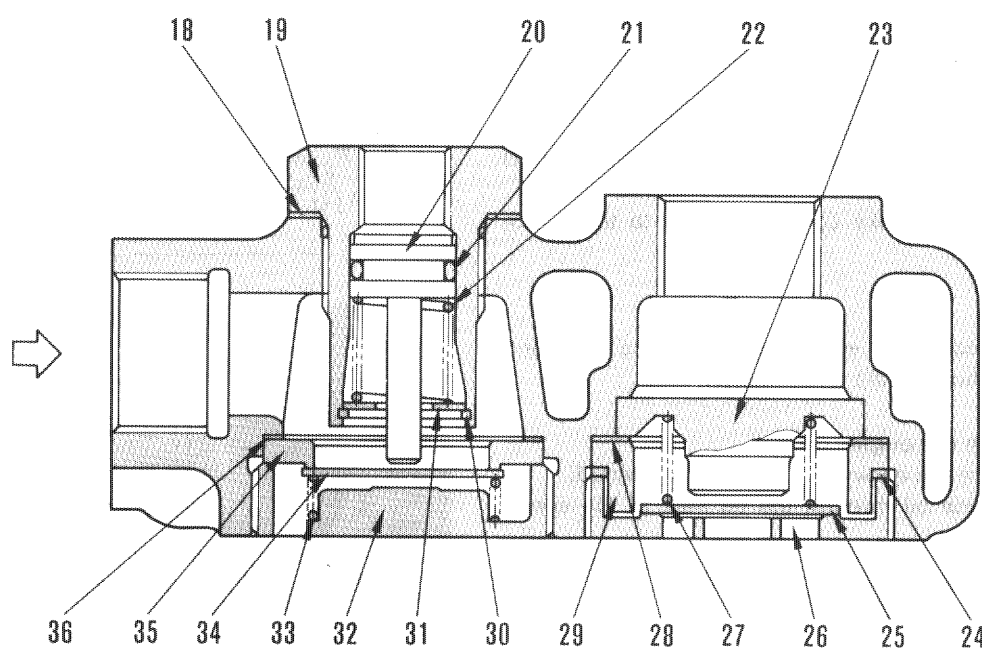
 Engine oil pan: about 26 ℓ



DISASSEMBLY OF AIR COMPRESSOR



6150F140A



6150F322A

OVERALL ASSEMBLY**1. Cylinder head**

- 1) Remove 4 cylinder head mounting bolts (1).
- 2) Tap with a wooden hammer from under cylinder head, and remove cylinder head (2).
- 3) Remove gasket (3) inserted between cylinder and cylinder head.

2. Cylinder, connecting rod, piston

- 1) Remove 4 cylinder mounting bolts (5), then remove cylinder (4) from crankcase (10).
- 2) Remove 2 bolts (6) holding big end of connecting rod.
- 3) Remove piston (8) and connecting rod (9) from crankcase.

3. Bearing cover

- 1) Remove 4 mounting bolts (14) of bearing cover installed to crankcase, then remove cover (15) from crankcase together with oil seal.
- 2) Remove oil seal from bearing cover (15).

4. Crankshaft

- 1) Pull out crankshaft (12) in direction of mounting surface of bearing cover (15) with 2 ball bearings (11) still installed.
- 2) Using a press, remove ball bearings (11) from crankshaft (12).

FINE DIASSEMBLY**1. Piston, connecting rod**

- 1) Remove snap ring (17), then pull out piston pin (16), and remove piston (8).
- 2) Remove piston rings (7) from piston.

2. Unloader valve assembly

- 1) Remove unloader valve body (19) installed on top of cylinder head.
- 2) Remove snap ring (30) from inside unloader valve body (19), then take out washer (31), spring (22), and rod (20).

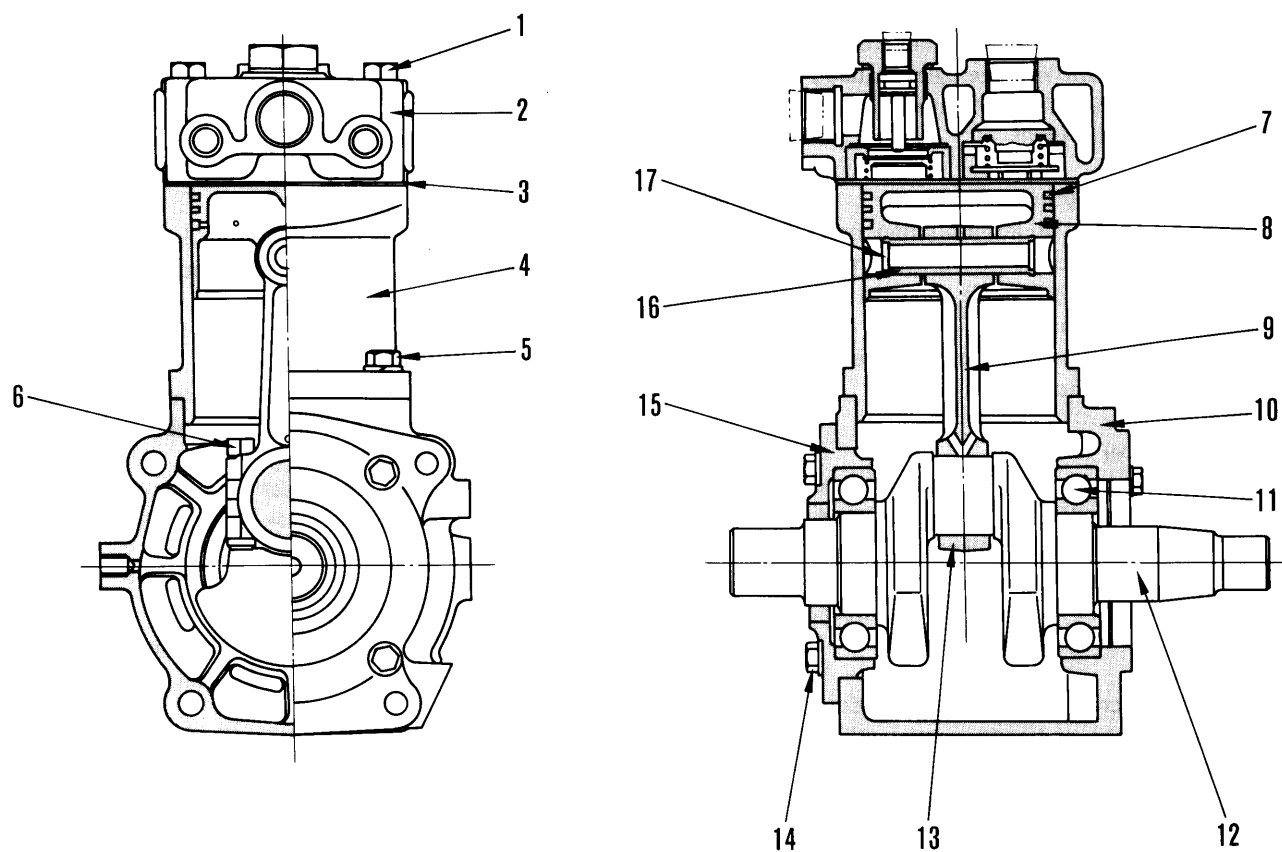
3. Delivery valve assembly

- 1) Seat (26) is screwed in and installed to bottom of cylinder head, and thread is caulked, so remove caulking.
- 2) Remove seat (26), then remove guide (23), spring (27), valve plate (25), guide (29), and gasket (28) from inside.

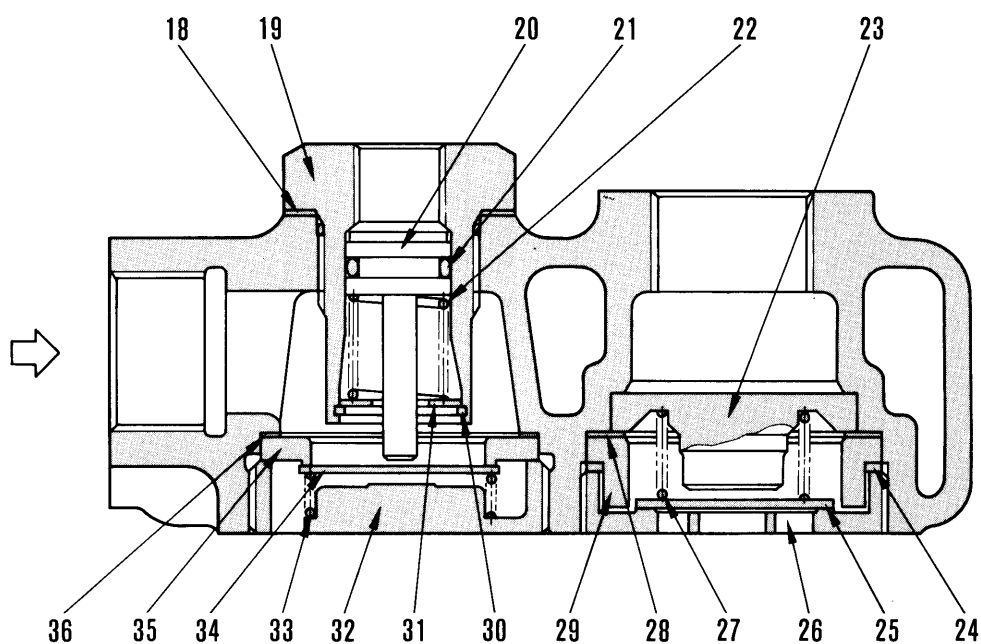
4. Intake valve assembly

- 1) Guide (32) is screwed in to bottom of cylinder head, and thread is caulked, so remove caulking.
- 2) Remove guide (32), then remove spring (33), valve plate (34), seat (35), and gasket (36) at the same time.

ASSEMBLY OF AIR COMPRESSOR



6150F140A



6150F322A

FINE ASSEMBLY

1. Intake valve

- 1) Assemble gasket (36), seat (35), valve plate (34), and spring (33) in turn to cylinder head (1), then temporarily tighten guide (32).
- 2) Check that valve plate and spring move smoothly, then tighten guide (32) to the specified torque.

 Guide: 10 kgm

- ★ If the guide is protruding from the bottom surface of the cylinder head, it will interfere with the piston, so check the condition.

- 3) Caulk guide at three places with a punch.

2. Delivery valve

- 1) Assemble guide (23), spring (27), valve plate (25), gasket (28), guide (29), and gasket (24) in turn to cylinder head (1), then temporarily tighten seat (26).
- 2) Check that valve plate moves smoothly, then tighten seat (26) to the specified torque.

 Seat: 15 kgm

- ★ If the seat is protruding from the bottom surface of the cylinder head, it will interfere with the piston, so check the condition.

- 3) Caulk seat at three places with a punch.

3. Unloader valve

- 1) Fit O-ring (21) to rod (20), then assemble in body (19).

 O-ring: Grease (LM-G)

- 2) Install spring (22) and washer (31) to rod (20), then install snap ring (30).
- 3) Install gasket (18), then assemble unloader valve assembly to cylinder head (1), and tighten to the specified torque.

 Unloader valve: 5 kgm

- ★ Push rod (20) with a screwdriver, and check that the valve moves.

4. Piston, connecting rod

- 1) Set piston (8) to connecting rod (9), then insert piston pin (16), and install snap ring (17).
- 2) Assemble piston rings (7) to piston (8).
 - ★ Install the top ring and second ring with the stamped mark at the top, and make sure that the end gaps are not aligned.

OVERALL ASSEMBLY

1. Crankshaft

- 1) Press fit bearings (11) to both ends of crankshaft (12).
- 2) Insert crankshaft (12) from installation side of bearing cover (15) of crankcase.
- 3) Press fit oil seal to bearing cover (15), and fit O-ring, then install to case and tighten bolts (14).

 Bolt: 2.5 kgm

2. Cylinder, connecting rod, piston

- 1) Insert connecting rod from top of crankcase, then tighten cap (13) with bolts (6).

 Connecting rod bolt: 2.5 kgm

- ★ Check that the connecting rod match marks are aligned.

- 2) Fit O-ring to cylinder mounting surface, then compress piston ring while inserting piston into cylinder (4), and tighten bolts (5).

 Bolt: 3 kgm

3. Cylinder head

- 1) Install gasket (3) to cylinder.
- 2) Install cylinder head (2), then tighten bolts (1) uniformly.

 Cylinder head bolt: 5 kgm

PERFORMANCE TEST AFTER ASSEMBLY

After disassembling, inspecting, and assembling, carry out an air-tightness test and performance test as follows.

- 1) Air tightness test

Apply an air pressure of 7 kg/cm² at the same time to the discharge port and unloader valve, and measure the amount of leakage from the intake port.

Standard for leakage: Max. 450 cc/min

- 2) Filling performance

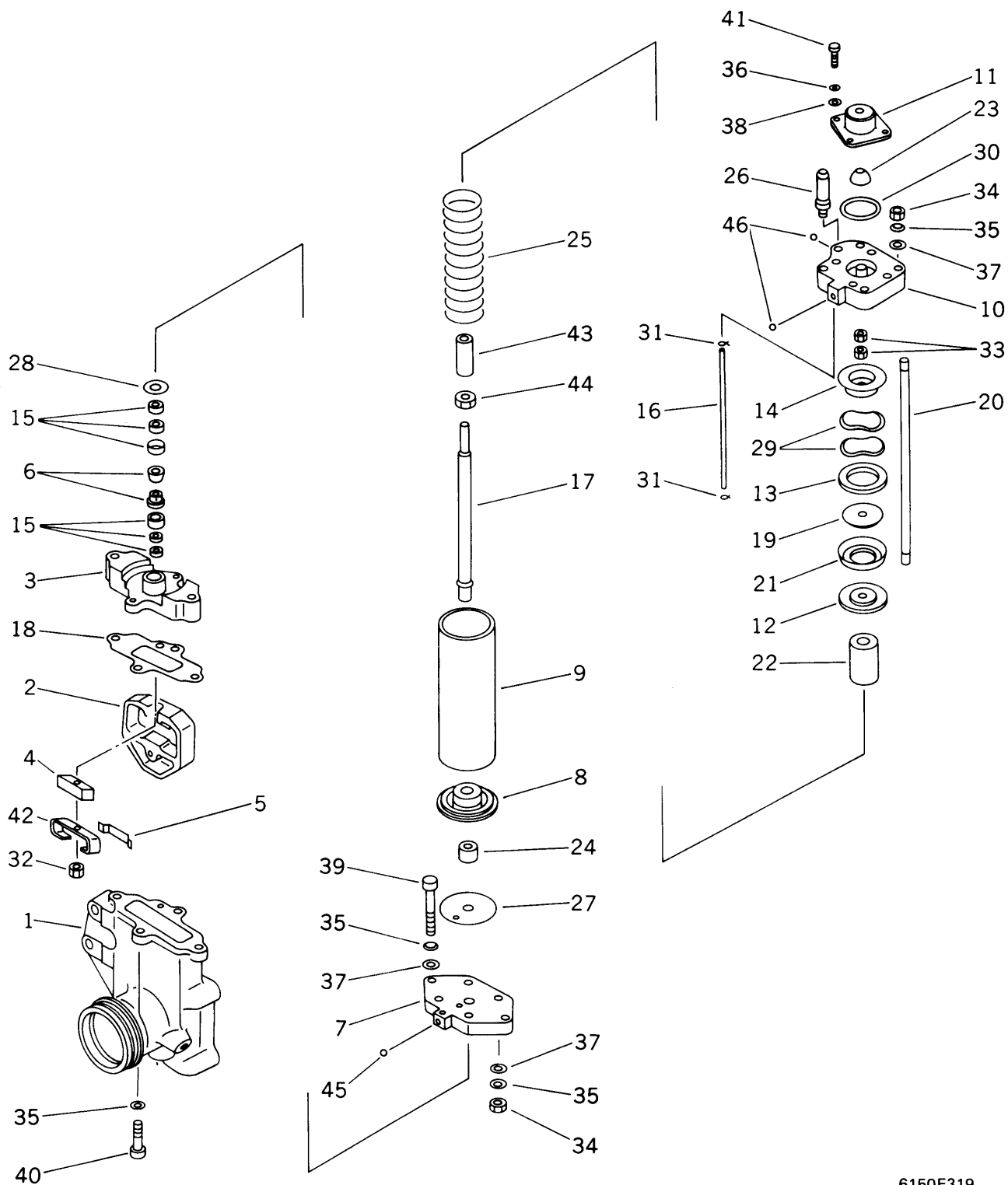
With a tank capacity of 30 litres, the time taken to raise the tank pressure from 0 → 8 kg/cm² must be as follows.

Speed (rpm)	Filling time (sec)
250	Max. 220
1,500	Max. 40

- 3) Oil leaking up

Remove the pipe of the discharge port in the cylinder head, and check the operation. Check that there is no abnormal spray of oil from the discharge port.

DISASSEMBLY AND ASSEMBLY OF EXHAUST BRAKE



6150F319

1. Exchange O-ring (30) and poppet (23).

- 1) Remove bolt (41) after fixing body.
- 2) Exchange O-ring (30) and poppet (23).

 Poppet (23): Silicon grease

 Bolt: 0.8 kgm
2. Exchange liner (5), gate valve (2), gasket (18) and valve housing (1).

- 1) Remove socket head cap screw (39), (40) after fixing valve housing (1).
- 2) Remove valve housing (1).
- 3) Connect air piping to PT 1/4 of poppet cover, raise air pressure to approx. 1 – 2 kg/cm² and float T block (4).
- 4) Remove gate valve (2), liner (5), and gasket (18) in order, and install replacement parts in regular order.
- 5) Remove air piping after reducing air pressure to 0 kg/cm².
- 6) Install valve housing (1) and socket head cap screws (39) and (40).

 Cap screw: Antifriction compound

 Cap screw: 3 kgm
3. Exchange cylinder tube (9), piston portions (12), (13), (14), (19), (21), (29) and spring (25).

- 1) Fix valve housing (1).
- 2) Remove head cover (10) after removing nut (34).
- 3) Remove socket head cap screws (39) and (40) fixing valve housing (1).
- 4) Remove valve housing (1) after pushing retainer (14).
- 5) Remove liner (5) and gasket (18).
- 6) Fix hexagonal nut (32) holding T block (4).
- 7) Remove two hexagonal nuts (33) holding piston portion.
- 8) Remove retainer (14), wave washer (29), taper washer (13), washer (19), and piston packing (21).
- 9) After removing cylinder tube (9) and setting piston (12) on vice, top piston rod (17) with rubber mallet and remove piston (12).
- 10) Remove spring (25).
- 11) Apply silicon grease to one side only of the exchanged cylinder tube (9) to a surrounding width of 40 mm, install the tube turning the grease upwards, into spring holder (8).

 Cylinder tube: Silicon grease

- 12) Install spring (25) into spring holder (8).

- 13) Apply LOCK-TIGHT to surrounding groove of piston (12).

 Piston: Adhesive (LT-2)

- 14) Place piston packing (21) on piston (12) and place the burrless side of washer (19) to the packing (21).

- 15) Apply silicon grease lightly to the edge of packing (21).

 Packing: Silicon grease

- 16) Apply silicon grease to the region surrounding retainer (14) and position two web washers (29) and taper washer (13).

 Retainer: Silicon grease

- 17) Place sub-assembly of piston (12), packing (21) and washer (19) into piston rod (17), while pressing packing (21) with the tapered portion of washer (13).

- 18) Push in sub-assembly of (13), (29), (14) and install them using two nuts (33).

 1st nut: 2 kgm
2nd nut: 2 kgm

- 19) Remove fixing nut (32).

- 20) Install gasket (18) and liner (5).

- 21) Install gate valve (2) while pushing in retainer (14).

- 22) Install valve housing (1) and tighten socket head cap screws (39) and (40).

 Cap screw: 3 kgm

- ★ Install head cover (10) and tighten nut (34).

 Nut: 2.5 kgm

4. Exchange guide bushing (24) and insulating packings (27) and (28).

- 1) Remove spring (25) using similar method to that of item 3.
- 2) Loosen nut (44) holding sleeve (43) after removing (22), and remove (43) and (44) from rod (17).
- 3) Remove fixing nut (32) and draw out rod (17) from base plate (3) and adapter plate (7).
- 4) Remove seal packing sub-assembly (15), relief spacer (6) and guide bushing (24) from plate (3) in that order, and install the exchanged parts in regular order.

★ Face the wider side of spacer (6) to packing sub-assembly (15) side.

- 5) Fix plate (7) by vice and remove (8) and (24), while tapping bushing (24) slightly with bar (a little smaller than hole diameter of plate) from the opposite hole of spring holder (8).

★ When (8) is difficult to remove, turn (8) using a pipe wrench then remove it.

★ In this case, exchange (8) with new part.

- 6) Make a hole (ϕ 5 mm) in plate (7), then apply thread tightener and position packing (27) so that the hole of packing (27) is aligned with the hole of plate (7).

 Plate: Thread tightener (LT-2)

- 7) Place bushing (24) in spring holder (8), then apply thread tightener to pilot portion of plate (7) and align holes of packing (27) and spring holder (8) to install spring holder (8).

 Plate: Thread tightener (LT-2)

- 8) Place insulating packing (28) into plate (7).
- 9) Adjust the pilot of plate (7) to align with base plate (3), and install rod (17) from plate (3) side.
- 10) Place nut (44) onto rod (17) so that the flat face of the nut meets sleeve (43).
- 11) Adjust the distance from the rod (17) end to sleeve (43) to approx. 27 mm, by use of nut (44).
- 12) Fix sleeve (43) by vice and tighten the nut (44).

 Nut: 2.5 kgm

- 13) Place collar (22) on sleeve (43) and apply LOCK-TIGHT to 8 mm screw and 8 mm diameter portions of rod (17).

 Screw, rod: Adhesive (LT-2)

- 14) After this, assemble using similar method to item 3.

5. Exchange piston rod (17)

- 1) Remove rod (17) using similar method to item 4.
- 2) Place T Block (4) and guide (42) onto exchanged rod (17).
- 3) Tighten nut (32) so that the chamfered side of nut (32) faces guide (42).

 Nut: 5.5 kgm

- 4) Calk the nut at three places using a punch to avoid loosening.
- 5) After this, assemble using similar method to item 4.

6. Matters to be attended to before assembly housing (1) when carrying out items 3, 4, and 5.

- 1) Install air piping to PT 1/4 of poppet cover, raise air pressure to approx. 1 — 2 kg/cm², float T block (4) and remove gate valve (2).

★ When reducing air pressure to 0 kg/cm², position an approx. 10 mm block so that T block (4) does not contact base plate (3) directly.

- 2) Then reduce air pressure to 0 kg/cm².
- 3) Adjust by turning T block (4) so that the seat side of gate valve (2) for liner guide (42) is approximately parallel with the longitudinal direction of base plate (3).

- 4) If operation is smooth after carrying out the operation of T block several times, float T block (4) and remove block.

- 5) After this, assemble using similar method to item 2.

★ Silicon grease.

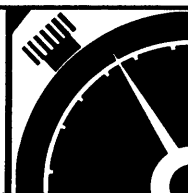
Pertinent brand: SHINETSU KAGAKU (FG721A) or equivalent.

★ Antifriction compound

Pertinent brand: LC-G MORI court 1000 or equivalent.

ENGINE

14 MAINTENANCE STANDARD



INTAKE AND EXHAUST SYSTEM

Turbocharger 14-002

ENGINE BODY

Cylinder head 14-003
Valve and valve guide 14-004
Rocker arm shaft 14-006
Crosshead 14-007
Cylinder block 14-008
Cylinder liner 14-010
Crankshaft 14-011
Camshaft 14-012
Cam follower and push rod 14-013
Piston, piston ring and piston pin 14-014
Connecting rod 14-018
Timing gear 14-019
Flywheel and flywheel housing 14-020
Vibration damper 14-020-1

COOLING SYSTEM

Water pump and thermostat 14-021
Oil cooler 14-022

LUBRICATION SYSTEM

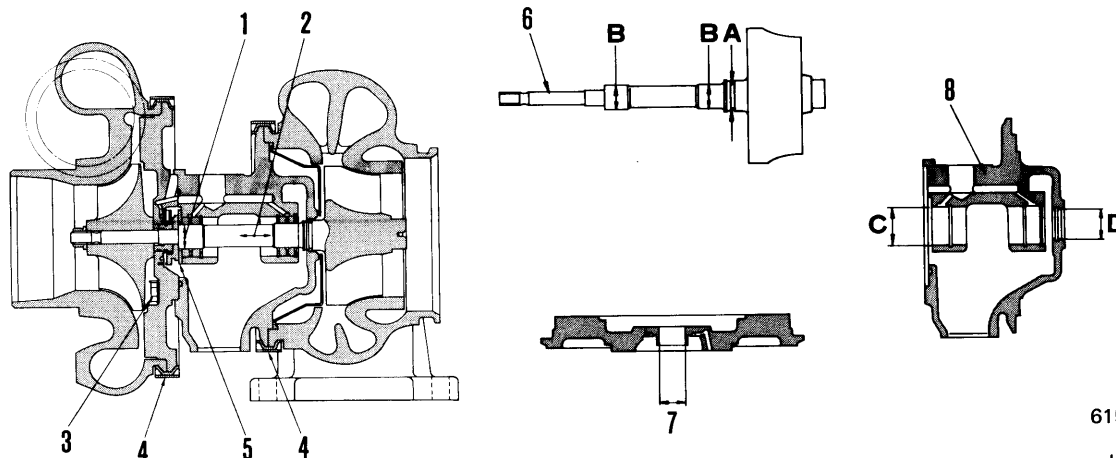
Oil pump 14-023
Main relief valve 14-024
Regulator valve and safety valve 14-025

ACCESSORY

Air compressor 14-026

TURBOCHARGER

TV77

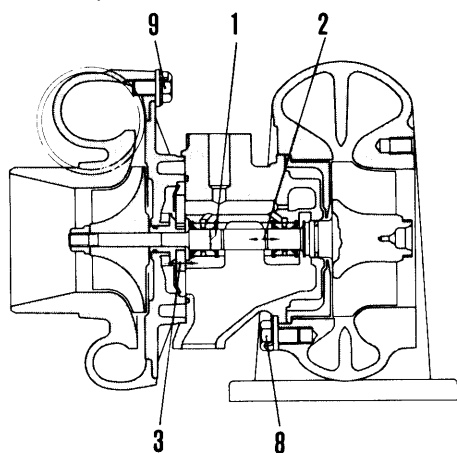


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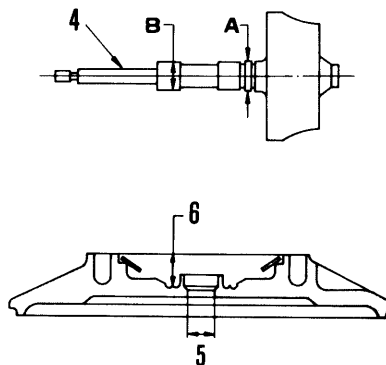
Unit: mm

No.	Item	Criteria			Remedy
1	Radial play of rotor	Standard		Repair limit	Replace
		0.08 – 0.18		0.18	
2	End play of rotor	0.08 – 0.25		0.25	
3	Tightening torque of back plate mounting bolt	Target (kgm)		Range (kgm)	
		1.25		1.15 – 1.38	
4	Tightening torque of V-band locknut	Order	Target (kgm)	Range (kgm)	Retighten
		1st step	1.8	1.6 – 2.0	
		2nd step	0	Loosen completely	
		3rd step	1.4	1.27 – 1.50	
5	Thickness of thrust bearing	Standard		Repair limit	
		2.315		2.29	
6	Outside diameter of wheel shaft	Measuring point	Standard	Repair limit	
		A	17.53	17.48	
		B	15.88	15.88	
	Bend of wheel shaft	Repair limit: 0.010 (Total indicated runout)			
7	Inside diameter of back plate	Standard		Repair limit	Replace
		17.47		17.49	
8	Inside diameter of center housing	Measuring point	Standard	Repair limit	
		C	20.90	20.93	
		D	24.97	24.97	

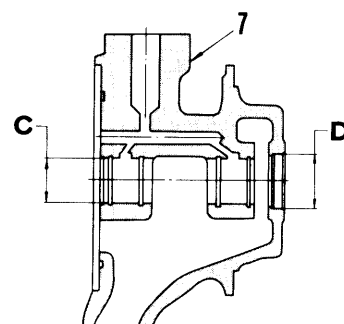
TO4B, E



I4F036A



I4F036-1

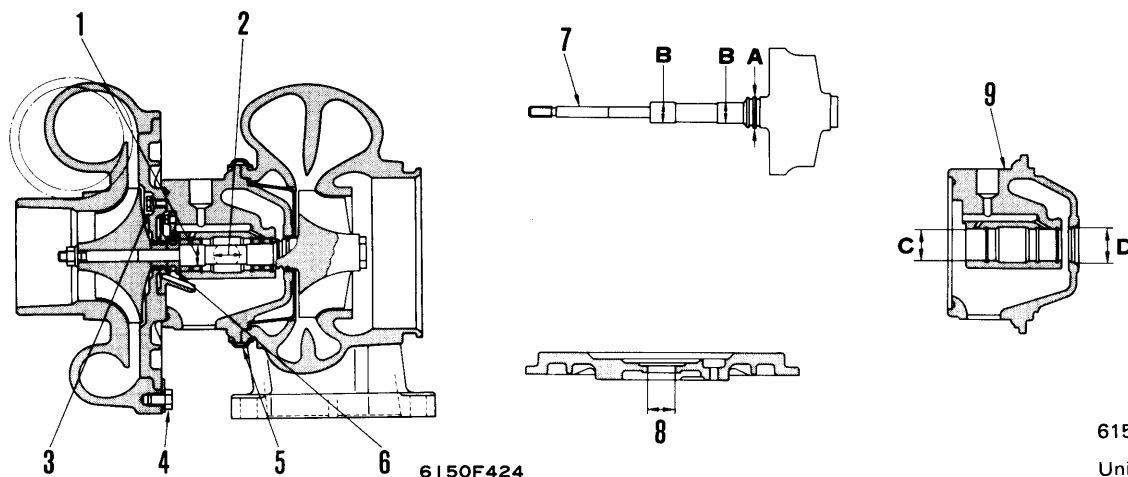


I4F036-2

Unit: mm

No.	Item	Criteria			Remedy
1	Radial play of rotor	Standard		Repair limit	Replace
		0.075 – 0.150		0.180	
2	End play of rotor	0.025 – 0.075		0.10	
3	Thickness of thrust bearing	4.36		4.35	
4	Outside diameter of wheel shaft	Measuring point	Standard	Repair limit	
		A	17.34	17.25	
		B	10.16	10.15	
	Bend of wheel shaft	Repair limit: 0.010 (Total indicated runout)			
5	Inside diameter of back plate	Standard		Repair limit	
		12.70		12.73	
6	Depth of back plate	11.66		11.68	
7	Inside diameter of center housing	Measuring point	Standard	Repair limit	
		C	15.80	15.81	
		D	18.03	18.08	
8	Tightening torque of turbine housing bolt	Target (kgm)		Range (kgm)	Retighten
		2.0		1.8 – 2.2	
9	Tightening torque of blower housing bolt	1.3		1.15 – 1.5	
—	Tightening torque of back plate mounting bolt	0.95		0.86 – 1.04	

T45



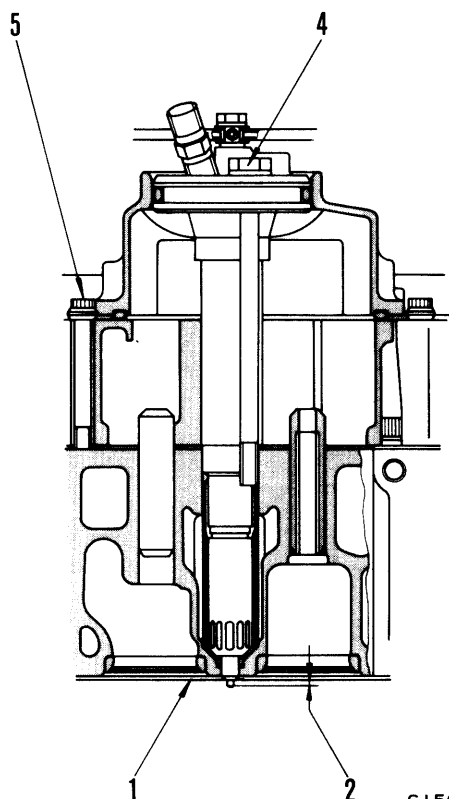
6150F424

6150F425

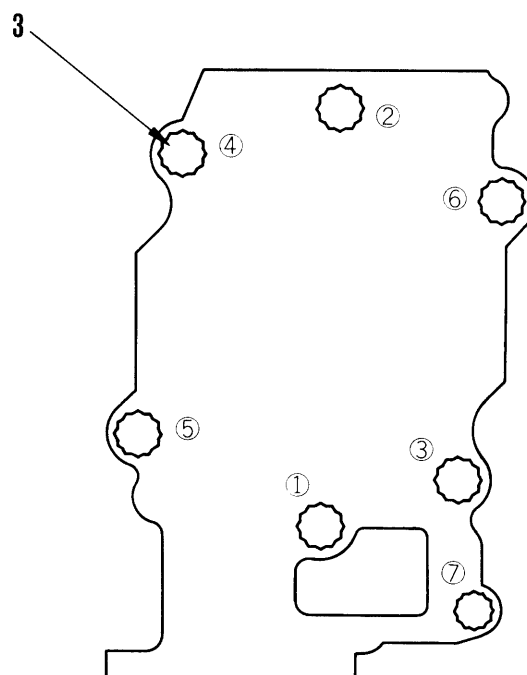
Unit: mm

No.	Item	Criteria			Remedy
1	Radial play of rotor	Standard		Repair limit	Replace
		0.12 – 0.17		0.17	
2	End play of rotor	0.025 – 0.08		0.10	
3	Tightening torque of back plate mounting bolt	Target (kgm)		Range (kgm)	Retighten
		1.13		1.04 – 1.21	
4	Tightening torque of blower housing bolt	1.05		0.92 – 1.15	
5	Tightening torque of V-band locknut	Order	Target (kgm)	Range (kgm)	
		1st step	1.7	1.5 – 1.9	
		2nd step	0	Loosen completely	
		3rd step	1.4	1.28 – 1.50	
6	Thickness of thrust bearing	Standard		Repair limit	Replace
		4.304		4.36	
7	Outside diameter of wheel shaft	Measuring point	Standard	Repair limit	
		A	17.526	17.48	
		B	12.996	12.90	
	Bend of wheel shaft	Repair limit: 0.010 (Total indicated runout)			
8	Inside diameter of back plate	Standard		Repair limit	
		17.475		17.49	
9	Inside diameter of center housing	Measuring point	Standard	Repair limit	
		C	20.181	20.188	
		D	20.904	20.930	

CYLINDER HEAD



6150F402

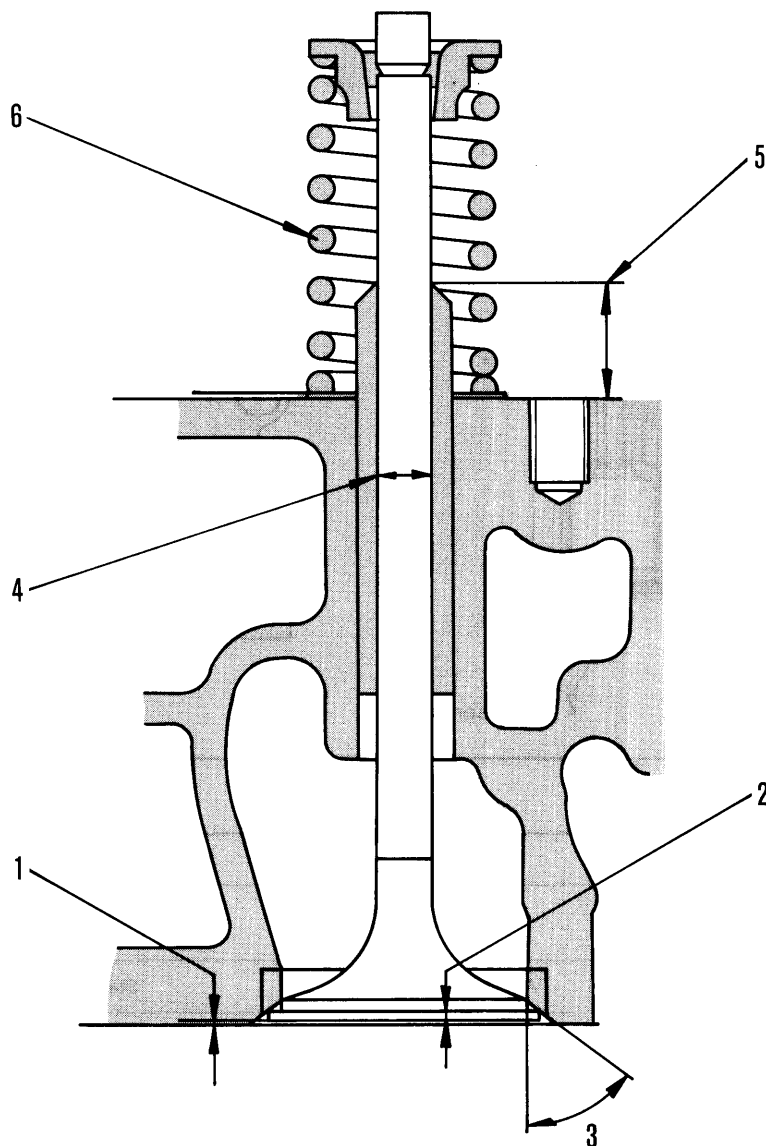


6150F403

Unit: mm

No.	Item	Criteria				Remedy	
1	Distortion of cylinder head mounting surface	Standard		Repair limit		Repair by grinding or replace	
		0 — 0.06		0.09			
2	Protrusion of nozzle	6D125-1	Applicable model		Standard		Replace sleeve
			S.T.D		4.90 — 5.70		
		S6D125-1	S.T.D		3.35 — 4.25		
			D75S-5 (23193 and up) D85E.P-1 PC300-3 (23689 and up) HD205-3 GD705A-4 (23599 and up)		4.90 — 5.70		
			S.T.D.		4.90 — 5.70		
		SA6D125-1	D135A-1		3.35 — 4.25		
3	Tightening torque of cylinder head mounting bolts (Coat the thread areas with molybdenum disulfide or engine oil)	Bolt No.	Order	Target (kgm)	Range (kgm)	Tighten bolts in accordance with bolts No.	
		① — ⑥	1st step	10	9 — 11		
			2nd step	14	13 — 15		
			3rd step	Retighten with 90°	90° — 120°		
		⑦	—	7	6 — 7.5		
4	Tightening torque of nozzle holder mounting bolt	2.2 ± 0.3 kgm				Retighten	
5	Tightening torque of rocker arm housing	6.75 ± 0.75 kgm					

VALVE AND VALVE GUIDE



6150F404

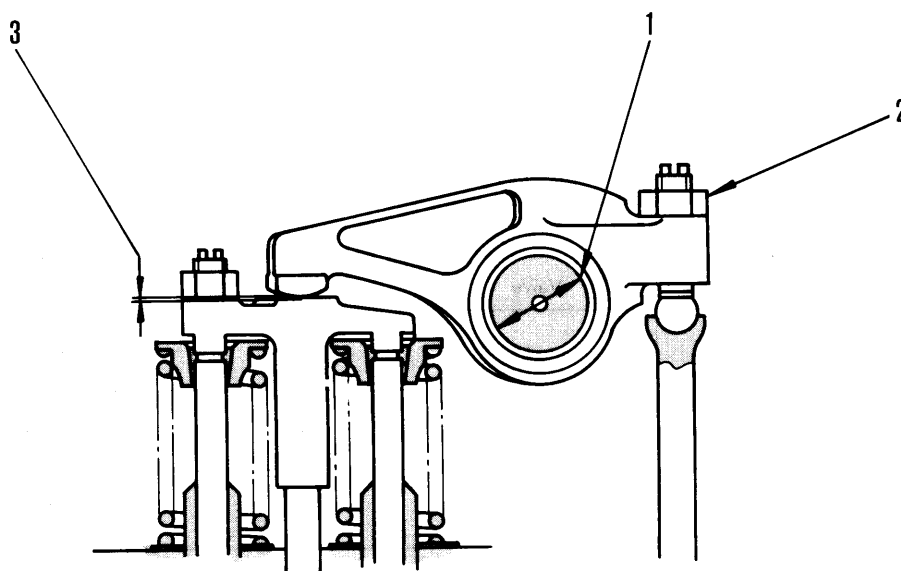
Unit: mm

No.	Item	Criteria				Remedy
		Valve	Standard	Tolerance	Repair limit	
1	Amount of valve sinking	Intake	0	±0.10	0.63	Replace valve or valve seat
		Exhaust	0	±0.10	0.70	

Unit: mm

No.	Item	Criteria					Remedy	
2	Thickness of valve lip	Valve	Standard	Repair limit			Replace	
		Intake	2.10	1.7				
		Exhaust	1.50	1.2				
3	Valve seat angle	Valve	Standard	Tolerance			Repair or replace	
		Intake	60°	±0° 15'				
		Exhaust	45°	±0° 15'				
4	Outside diameter of valve stem	Valve	Standard	Tolerance			Replace	
		Intake	9	-0.045 -0.065				
		Exhaust	9	-0.050 -0.070				
	Inside diameter of valve guide	Before inserting	9	+0.015 -0.005			Replace	
		After inserting	9	±0.010				
	Clearance between valve guide and valve stem	Valve	Standard	Clearance limit			Replace	
		Intake	0.035 – 0.075	0.22				
		Exhaust	0.040 – 0.080	0.24				
	Bend of valve stem	Repair limit: 0.02 (Total indicated runout for 100 mm)					Replace	
5	Protrusion of valve guide	Standard			Tolerance		Repair	
		20			±0.2			
6	Free length of valve spring	Engine	Valve	Color code	Free length	Repair limit	Replace	
		6D125-1	Intake	Yellow	66.9	64.7		
			Exhaust	Yellow	66.9	64.7		
		S6D125-1 SA6D125-1	Intake	Purple	61.3	58.9		
			Exhaust	Yellow	66.9	64.7		
				White	75.2	—		
	Installed load of valve spring	Engine	Valve	Color code	Installed length	Installed load		Repair limit
		6D125-1	Intake	Yellow	56.0	30.0 ± 1.5 kg		27.0 kg
			Exhaust	Yellow	56.0	30.0 ± 1.5 kg		27.0 kg
		S6D125-1 SA6D125-1	Intake	Purple	49.5	40.0 ± 2.0 kg		36.0 kg
			Exhaust	Yellow	56.0	30.0 ± 1.5 kg		27.0 kg
				White	56.0	53.0 ± 2.6 kg		47.7 kg
	Squareness of valve spring	Repair limit: 2° (for both end)						

ROCKER ARM SHAFT

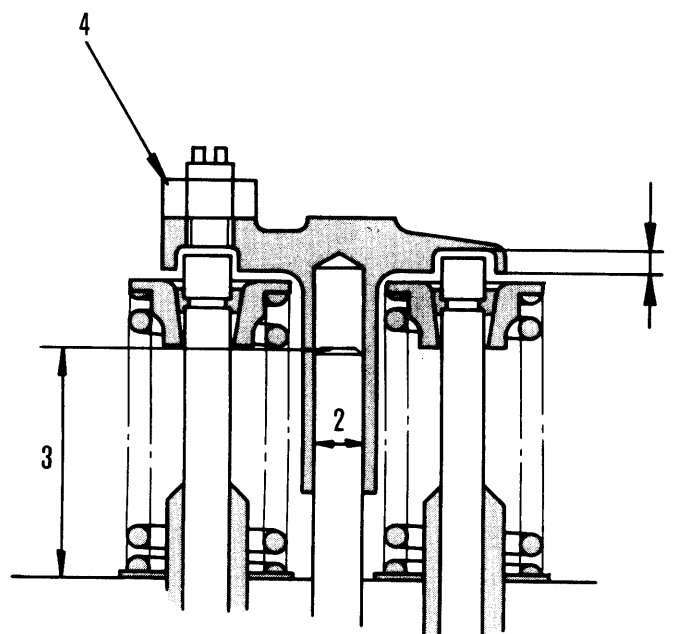


6150F405A

Unit: mm

No.	Item	Criteria			Remedy
1	Outside diameter of rocker arm shaft	Standard	Tolerance		Replace rocker arm shaft
		28.6	−0.055 −0.065		
	Inside diameter of rocker arm shaft hole	28.6	+0.035 −0.025		Replace rocker arm
	Clearance between rocker arm and rocker arm shaft	Standard	Clearance limit		Replace rocker arm or rocker arm shaft
		0.025 – 0.100	0.130		
	Bend of rocker arm shaft	Repair limit: 0.20 (Total indicated runout)			Replace rocker arm shaft
2	Tightening torque of rocker arm adjustment nut	6.75 ± 0.75 kgm			Retighten
3	Valve clearance (at hot or cold)	Valve	Standard	Tolerance	Adjust
		Intake	0.33	±0.02	
		Exhaust	0.71	±0.02	

CROSSHEAD

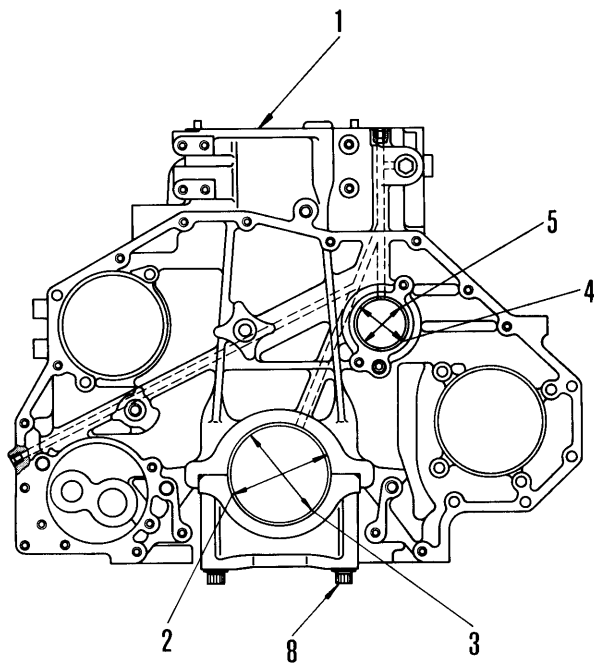


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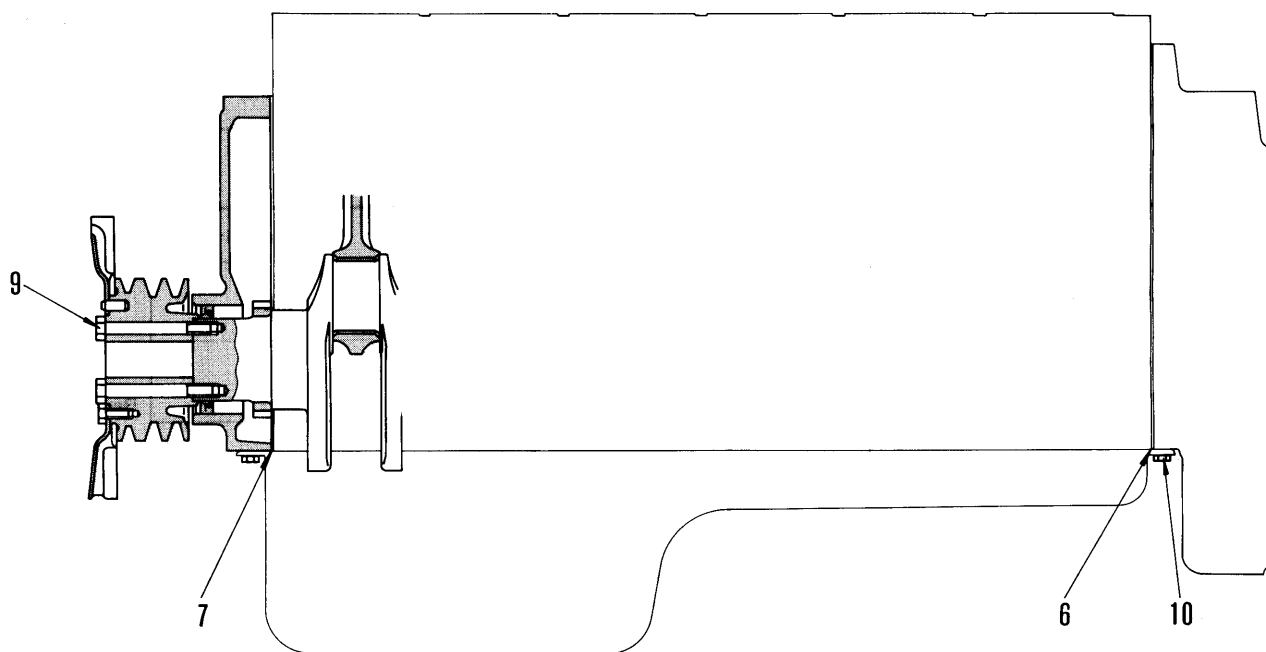
Unit: mm

No.	Item	Criteria			Remedy
		Standard	Tolerance	Repair limit	
1	Depth of crosshead stem	3	+0.56 -0.46	3.67	Replace
	Depth of crosshead stem (For Ex. w/exhaust brake)	5.5	+0.55 -0.45	6.17	
2	Inside diameter of crosshead	11	+0.075 +0.025	11.18	
	Outside diameter of crosshead guide	11	+0.010 0	10.95	
3	Protrusion of crosshead guide	45.5	±0.25	—	Repair
4	Tightening torque of crosshead lock nut	6.75 ± 0.75 kgm			Retighten

CYLINDER BLOCK



6150F407

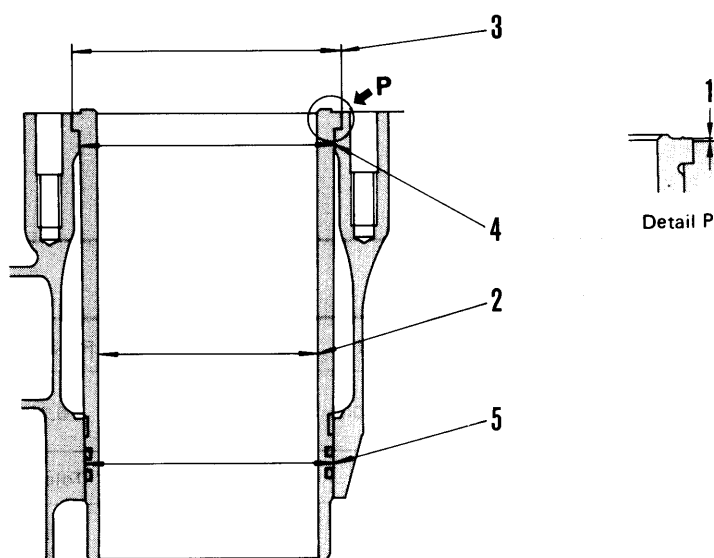


6150F408

Unit: mm

No.	Item	Criteria			Remedy
1	Distortion of cylinder head mounting surface	Standard	Repair limit		Repair by grinding or replace
		0 – 0.080	0.120		
2	Inside diameter of main bearing hole	Standard	Tolerance		Replace main bearing cap
		116	+0.015 –0.010		
	Thickness of main bearing	3	–0.005 –0.020		Replace bearing
	Roundness of main bearing hole	Repair limit: 0.005			
3	Inside diameter of main bearing	Standard	Tolerance	Repair limit	Replace bearing
		110	+0.040 +0.010	110.15	
4	Inside diameter of cam bushing mounting hole	63	+0.030 0		Repair or replace
5	Inside diameter of cam bushing	60	+0.070 0	60.30	Replace
6	Difference between lower face of cylinder block and flywheel housing	Repair limit: 0.35			Repair
7	Difference between lower face of cylinder block and front cover	Repair limit: 0.28			
8	Tightening torque of main bearing cap (Coat thread area with engine oil)	Order	Target (kgm)		Range (kgm)
		1st step	10		9 – 11
		2nd step	20		19 – 21
		3rd step	Retighten with 90°		90° – 120°
9	Tightening torque of crankshaft pulley mounting bolt	M16 (5 bolts), for D60P-8, D60S-8	1st	15	14 – 16
			2nd	30	29 – 31
			3rd	Retighten with 90°	Retighten with 90° – 120°
		M14 (1 bolt)	18		16 – 20
10	Tightening torque of oil pan mounting bolt	5.5 ± 2.0 kgm			

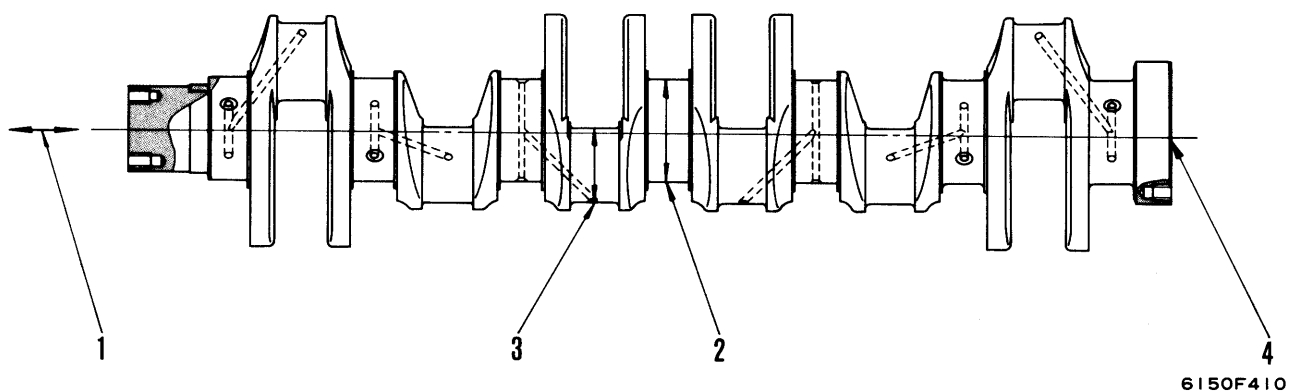
CYLINDER LINER



Unit: mm

No.	Item	Criteria			Remedy
1	Protrusion of cylinder liner	Repair limit: 0.07 – 0.15			Replace liner or block
2	Inside diameter of cylinder liner	Standard	Tolerance	Repair limit	Replace liner
		125	+0.040 0	125.20	
	Roundness of cylinder liner	Repair limit: 0.08			
	Cylindricity of cylinder liner	Repair limit: 0.08			
3	Outside diameter of cylinder liner (Counter bore)	Standard		Tolerance	
		153		±0.025	
	Interference between cylinder liner and block (Counter bore)	Standard: 0 – 0.113			Replace liner or block
4	Outside diameter of cylinder liner (Counter bore bottom)	Standard		Tolerance	Replace liner
		145		+0.090 +0.040	
	Interference between cylinder liner and block (Counter bore bottom)	Standard		Interference limit	Replace liner or block
		0.01 – 0.12		0.01	
5	Outside diameter of cylinder liner (O-ring)	Standard		Tolerance	Replace liner
		141		+0.386 +0.361	
	Clearance between cylinder liner and block (O-ring)	Standard: 0.014 – 0.079			Replace liner or block

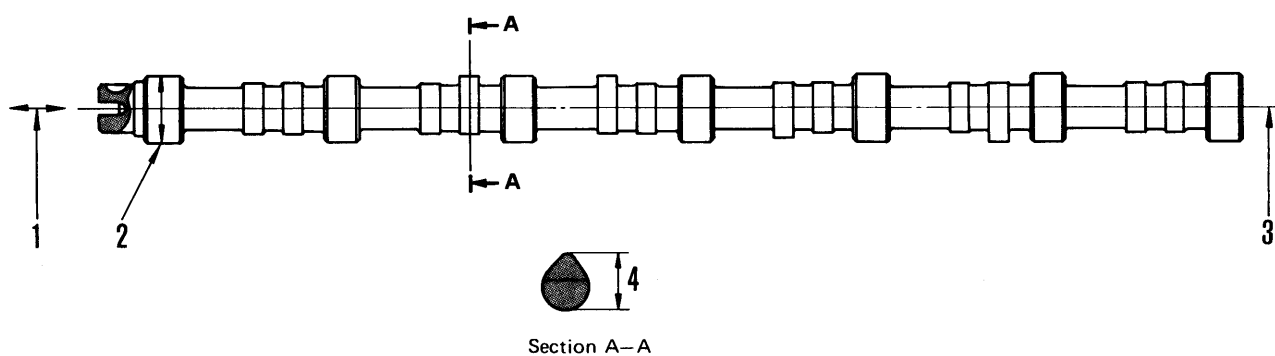
CRANKSHAFT



Unit: mm

No.	Item	Criteria				Remedy
1	End play	Standard		Repair limit		Repair by using over size thrust bearing or replace
		0.0140 – 0.315		0.50		
2	Outside diameter of main journal		Standard	Tolerance	Repair limit	Repair by using under size main bearing or replace
		STD	110	-0.050 -0.070	109.88	
		0.25 U.S.	109.75		109.63	
		0.50 U.S.	109.50		109.38	
		0.75 U.S.	109.25		109.13	
		1.00 U.S.	109.00		108.88	
	Roundness of main journal	Standard		Repair limit		
		0 – 0.010		0.020		
	Clearance of main journal	Standard		Clearance limit		Replace main bearing
		0.062 – 0.106		0.27		
3	Outside diameter of crankpin journal		Standard	Tolerance	Repair limit	Repair by using under size bearing or replace
		STD	80	-0.050 -0.070	79.88	
		0.25 U.S.	79.75		79.63	
		0.50 U.S.	79.50		79.38	
		0.75 U.S.	79.25		79.13	
		1.00 U.S.	79.00		78.88	
	Roundness of crankpin journal	Standard		Repair limit		
		0 – 0.010		0.020		
	Clearance of crankpin journal	Standard		Clearance limit		Replace connecting rod
		0.046 – 0.090		0.24		
4	Bend of crankshaft	Standard		Repair limit		Repair by using under size bearing or replace
		0 – 0.090		0.20		

CAMSHAFT



6150F411

Unit: mm

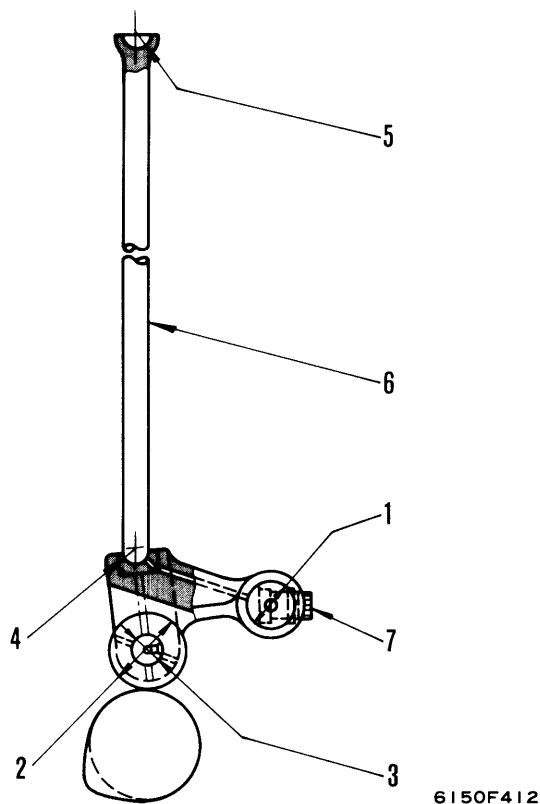
No.	Item	Criteria			Remedy
1	End play	Standard	Repair limit		Replace thrust plate
		0.15 – 0.35	0.50		
2	Outside diameter of camshaft journal	Standard	Tolerance		Replace
		60	−0.080 −0.110		
	Clearance of camshaft journal	Standard	Clearance limit		Replace cam bushing
		0.080 – 0.180	0.28		
3	Bend of camshaft	Repair limit: 0.03 (Total indicator reading)			Replace
4	Cam height	Standard	Tolerance	Repair limit	
		52	+0.395 +0.195	51.73	

CAM FOLLOWER AND PUSH ROD

Engine serial No.

6D125-1: up to 21771

S(A)6D125-1: up to 21839



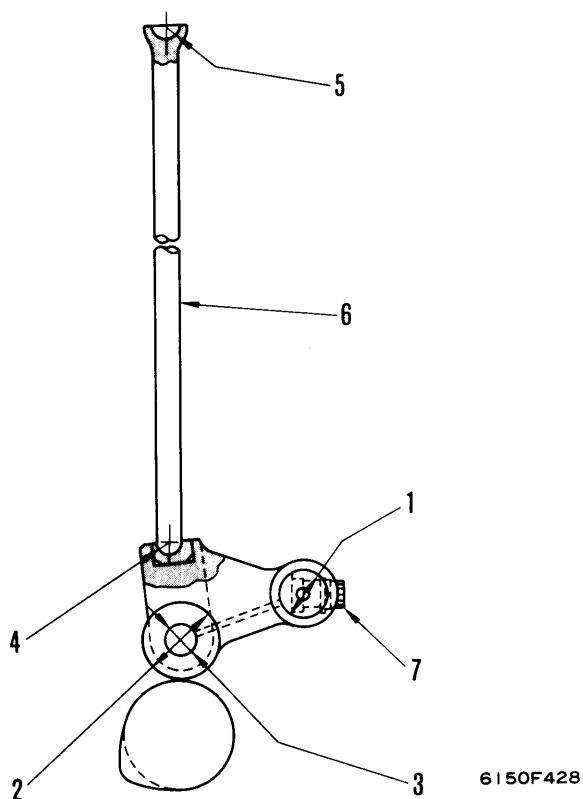
Unit: mm

No.	Item	Criteria			Remedy
1	Outside diameter of cam follower shaft	Standard	Tolerance	Repair limit	Replace
		20	-0.040 -0.050	19.94	
	Inside diameter of cam follower shaft hole	20	+0.020 0		
2	Outside diameter of cam roller	32	-0.250 -0.280	31.71	
3	Inside diameter of cam roller	13	-0.260 -0.285	12.78	
	Outside diameter of cam roller pin	13	-0.300 -0.315	12.62	
4	Radius of push rod ball end	Standard		Tolerance	
		12.7		0 -0.20	
5	Radius of push rod socket end	12.7		0 -0.20	
6	Bend of push rod	Repair limit: 0.50 (Total indicator reading)			
7	Tightening torque of cam follower housing mounting bolt	5.25 ± 0.75 kgm			

Engine serial No.

6D125-1: 21772 and up

S(A)6D125-1: 21840 and up

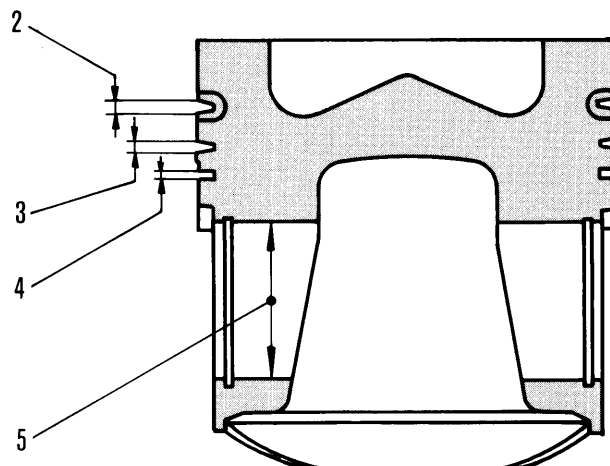
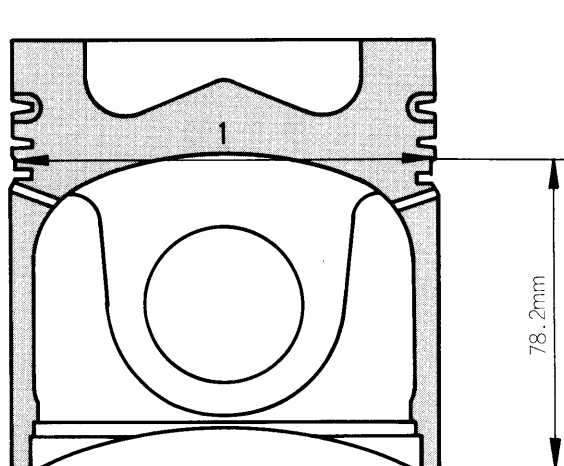


Unit: mm

No.	Item	Criteria			Remedy
1	Outside diameter of cam follower shaft	Standard	Tolerance	Repair limit	Replace
		19.8	-0.040 -0.050	19.73	
	Inside diameter of cam follower shaft hole	19.8	+0.020 0		
2	Outside diameter of cam roller	32	-0.250 -0.280	31.71	
3	Inside diameter of cam roller	13	-0.260 -0.285	12.78	
	Outside diameter of cam roller pin	13	-0.365 -0.375	12.62	
4	Radius of push rod ball end	Standard		Tolerance	
		12.7		0 -0.20	
5	Radius of push rod socket end	12.7		0 -0.20	
6	Bend of push rod	Repair limit: 0.50 (Total indicator reading)			
7	Tightening torque of cam follower housing mounting bolt	5.25 ± 0.75 kgm			

PISTON, PISTON RING AND PISTON PIN

6D125-1 (Aluminum alloy)



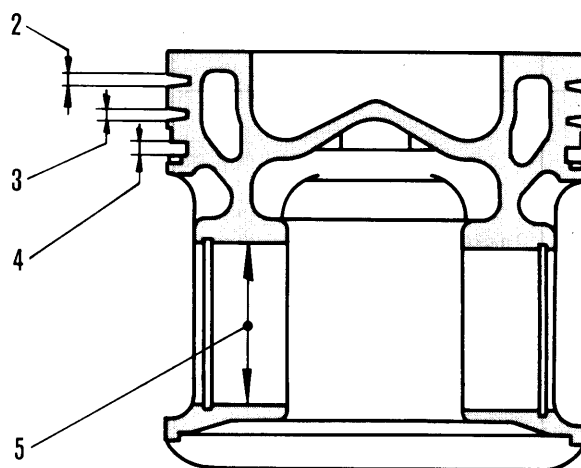
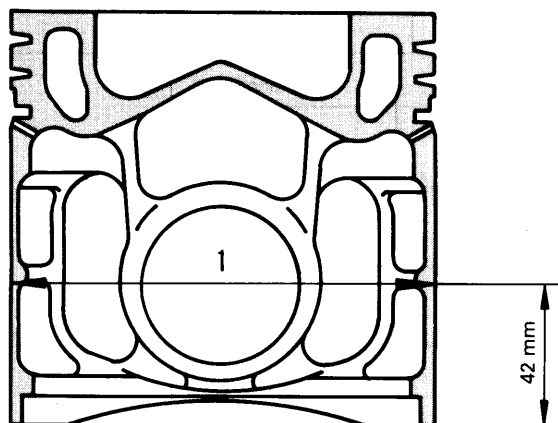
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6D125-1 (Aluminum alloy)

Unit: mm

No.	Item	Criteria				Remedy
1	Outside diameter of piston (Aluminum piston)	Standard		Tolerance	Repair limit	Replace piston
		125		-0.295 -0.325	124.59	
2 3 4	Thickness of piston ring	No.	Measuring point	Standard	Tolerance	Replace piston ring
		2	Top ring	2.4	-0.015 -0.035	
		3	Second ring	2.4	-0.010 -0.030	
		4	Oil ring	4.0	-0.010 -0.030	
	Width of piston ring groove	2	Top ring	Judge using groove wear gauge		Replace piston
		3	Second ring			
		4	Oil ring	4.0	+0.025 +0.010	
	Clearance between piston ring and ring groove	No.	Measuring point	Standard	Clearance limit	Replace piston or piston ring
		2	Top ring	Judge using groove wear gauge		
		3	Second ring			
		4	Oil ring	0.020 – 0.055	0.15	
	Piston ring gap	2	Top ring	0.37 – 0.52	2.0	Replace piston ring or cylinder liner
		3	Second ring	0.33 – 0.48 (No. – 46435) 0.50 – 0.62 (No. 46436 and up)	1.5	
		4	Oil ring	0.28 – 0.43	1.0	
5	Outside diameter of piston pin	Standard			Tolerance	Replace piston pin
		48			0 -0.006	
	Inside diameter of piston pin hole	48			+0.012 +0.004	Replace piston
	Clearance between piston pin and piston	Standard			Clearance limit	Replace piston or piston pin
0.004 – 0.018			0.030			

S6D125-1, SA6D125-1 (Ductile cast iron (FCD))

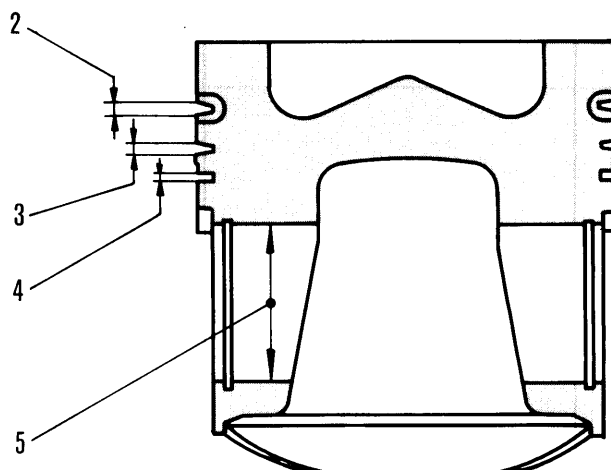
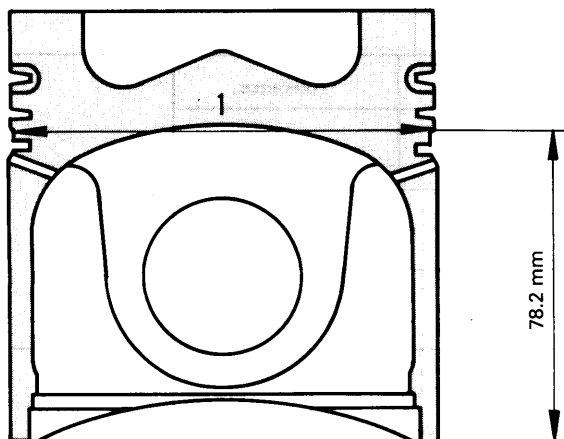


6150F415A

Unit: mm

No.	Item	Criteria				Remedy
1	Outside diameter of piston	Standard		Tolerance	Repair limit	Replace piston
		125		-0.075 -0.105	124.80	
2 3 4	Thickness of piston ring	No.	Measuring point	Standard	Tolerance	Replace piston ring
		2	Top ring	2.4	-0.015 -0.035	
		3	Second ring	2.4	-0.010 -0.030	
		4	Oil ring	4.0	-0.010 -0.030	
	Width of piston ring groove	2	Top ring	Judge using groove wear gauge		Replace piston
		3	Second ring			
		4	Oil ring	4.0	+0.040 +0.020	
	Clearance between piston ring and ring groove	No.	Measuring point	Standard	Clearance limit	Replace piston or piston ring
		2	Top ring	Judge using groove wear gauge		
		3	Second ring			
		4	Oil ring	0.03 – 0.07	0.15	
	Piston ring gap	2	Top ring	0.37 – 0.52	2.0	Replace piston ring or cylinder liner
		3	Second ring	0.33 – 0.48 (No. – 46435) 0.50 – 0.62 (No. 46436 and up)	1.5	
		4	Oil ring	0.28 – 0.43	1.0	
5	Outside diameter of piston pin	Standard			Tolerance	Replace piston pin
		48			0 -0.006	
	Inside diameter of piston pin hole	48			-0.045 -0.035	Replace piston
	Clearance between piston pin and piston	Standard			Repair limit	Replace piston or piston pin
		0.035 – 0.051			0.063	

S6D125-1 (Aluminum alloy)

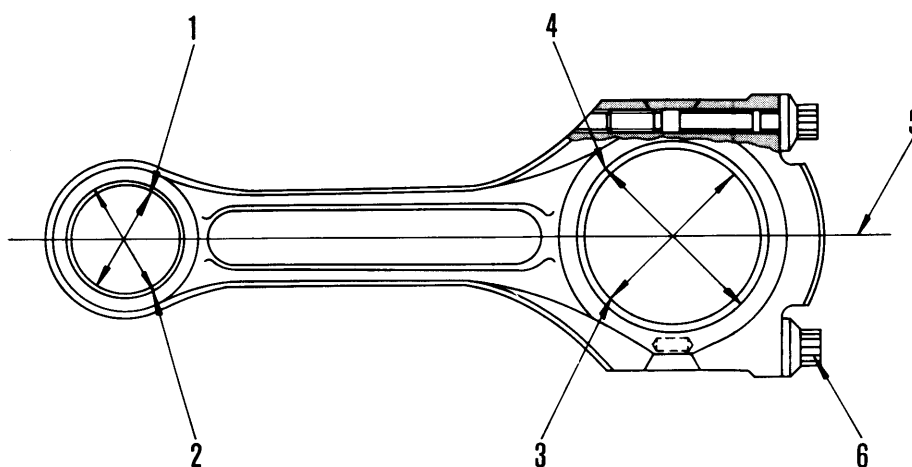


6150F414A

Unit: mm

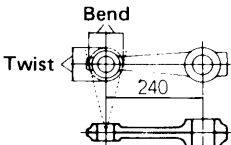
No.	Item	Criteria				Remedy
1	Outside diameter of piston	Standard		Tolerance	Repair limit	Replace piston
		125		-0.255 -0.285	124.59	
2 3 4	Thickness of piston ring	No.	Measuring point	Standard	Tolerance	Replace piston ring
		2	Top ring	2.4	-0.015 -0.035	
		3	Second ring	2.4	-0.010 -0.030	
		4	Oil ring	4.0	-0.010 -0.030	
	Width of piston ring groove	2	Top ring	Judge using groove wear gauge		Replace piston
		3	Second ring			
		4	Oil ring	4.0	+0.025 +0.010	
	Clearance between piston ring and ring groove	No.	Measuring point	Standard	Clearance limit	Replace piston or piston ring
		2	Top ring	Judge using groove wear gauge		
		3	Second ring			
		4	Oil ring	0.020 – 0.055	0.15	
	Piston ring gap	2	Top ring	0.37 – 0.52	2.0	Replace piston ring or cylinder liner
		3	Second ring	0.33 – 0.48 (No. – 46435) 0.50 – 0.62 (No. 46436 and up)	1.5	
		4	Oil ring	0.28 – 0.43	1.0	
5	Outside diameter of piston pin	Standard			Tolerance	Replace piston pin
		48			0 -0.006	
	Inside diameter of piston pin hole	48			+0.012 +0.004	Replace piston
	Clearance between piston pin and piston	Standard			Clearance limit	Replace piston or piston pin
0.004 – 0.018			0.030			

CONNECTING ROD

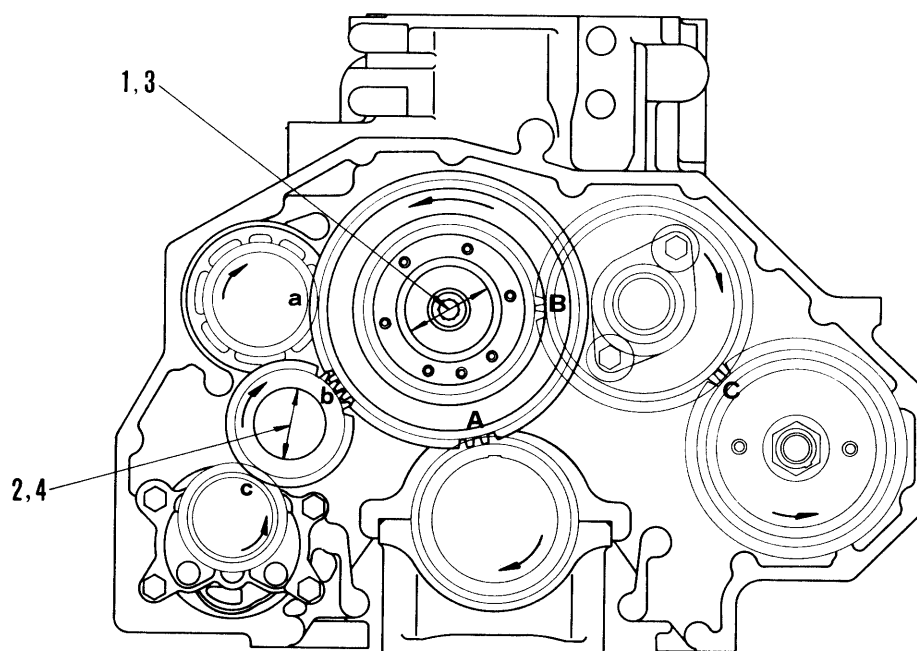


6150F416

Unit: mm

No.	Item	Criteria				Remedy	
1	Inside diameter of bushing at connecting rod small end	Standard	Tolerance	Repair limit		Replace bushing	
		48	+0.041 +0.025	48.08			
	Clearance between bushing at connecting rod small end and piston pin	Standard		Clearance limit		Replace bushing or piston pin	
		0.025 – 0.047		0.10			
2	Inside diameter of bushing hole at connecting rod small end	Standard		Tolerance		Replace connecting rod	
		53		+0.030 0			
3	Inside diameter of bearing at connecting rod big end	Standard	Tolerance	Repair limit		Replace bearing	
		80	+0.020 –0.010	80.12			
4	Inside diameter of bearing hole at connecting rod big end	85	+0.022 –0.004	–		Replace connecting rod	
		Measure after tightening connecting rod cap with specified torque					
	Thickness of connecting rod bearing	2.5	+0.005 –0.005			Replace bearing	
5	Bend and twist of connecting rod				Standard	Repair limit	Replace connecting rod
				Bend	0 – 0.20	0.25	
				Twist	0 – 0.30	0.35	
6	Tightening torque of connecting rod cap mounting bolt (Coat the bolt threads and nut seats with engine oil)	Order	Target (kgm)	Range (kgm)		Retighten	
		1st step	10	9.5 – 10.5			
		2nd step	Retighten with 90°	90° – 120°			

TIMING GEAR



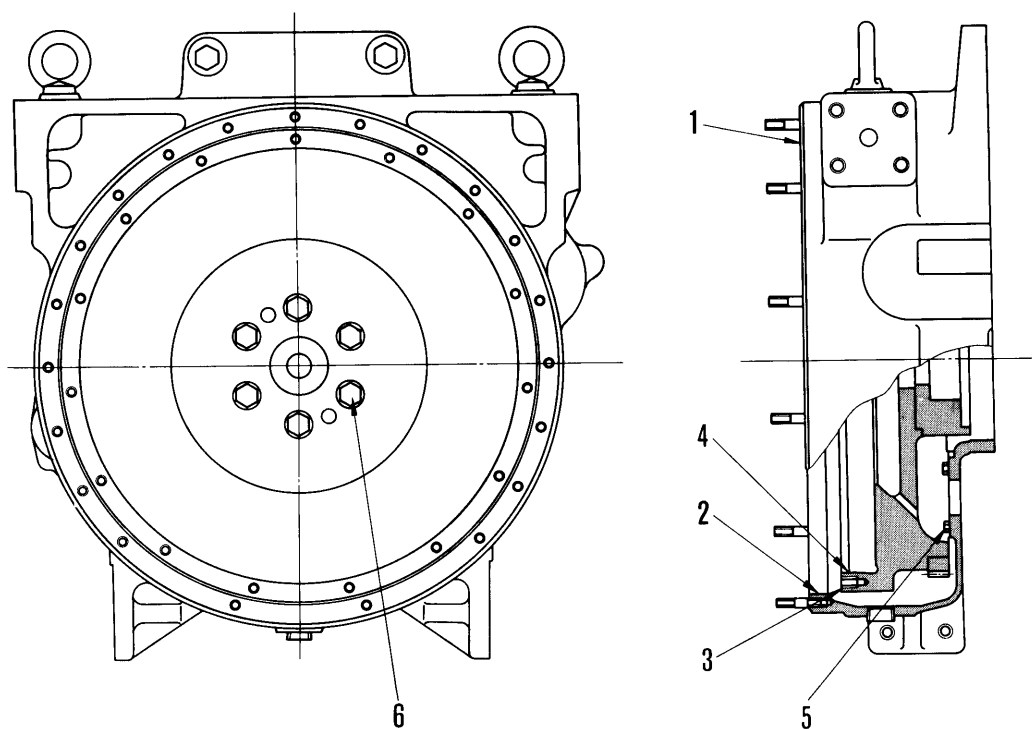
6150F413A

Unit: mm

Unit: mm

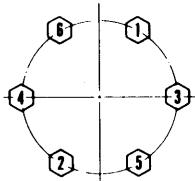
No.	Item	Criteria					Remedy
—	Backlash of each gears	Measuring point	Gears		Standard	Repair limit	Replace
		A	Crankshaft gear and main idler gear (Large)		0.140 – 0.425	0.6	
		B	Main idler gear (Small) and camshaft gear		0.125 – 0.395		
		C	Camshaft gear and fuel injection pump drive gear		0.125 – 0.395		
		a	Main idler gear (Large) and water pump drive gear		0.155 – 0.440		
		b	Main idler gear (Large) and oil pump idler gear		0.130 – 0.405		
		c	Oil pump idler gear and oil pump drive gear		0.080 – 0.390		
1	Clearance between main idler gear bushing and shaft	Standard size	Tolerance		Standard clearance	Clearance limit	Replace bushing
			Shaft	Hole			
		47.5	+0.165 +0.140	+0.115 +0.100	0.025 – 0.060	0.20	
2	Clearance between oil pump idler gear and shaft	35	–0.025 –0.040	+0.065 0	0.025 – 0.105	0.20	
3	End play of main idler gear	Standard			Repair limit		Replace thrust bearing
		0.05 – 0.07			0.4		
4	End play of oil pump idler gear	0.05 – 0.21			0.4		

FLYWHEEL AND FLYWHEEL HOUSING

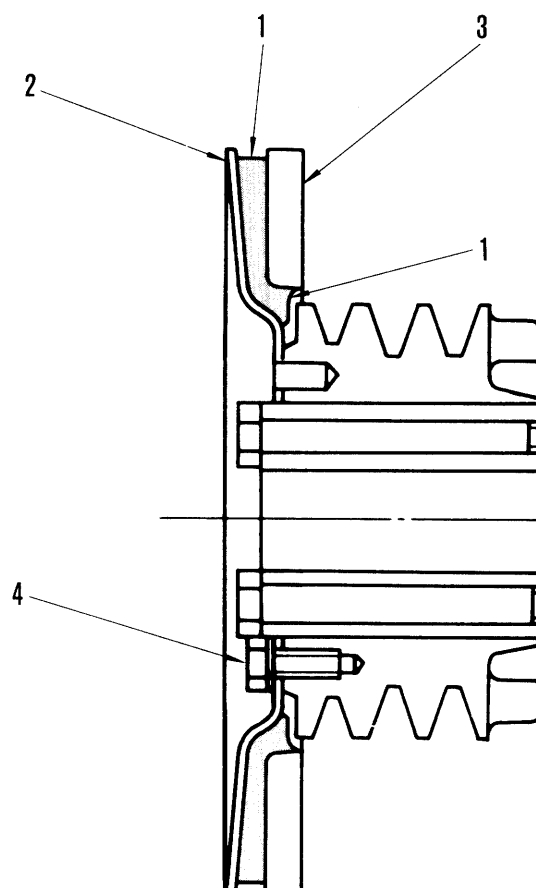


6150F417

Unit: mm

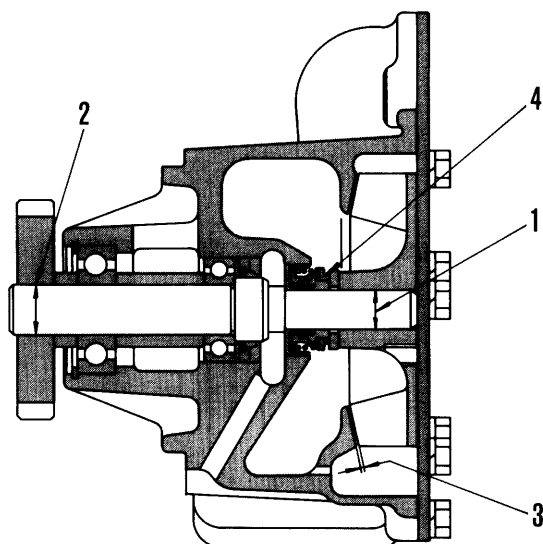
No.	Item	Criteria				Remedy
1	Fase runout of flywheel housing	Repair limit: 0.35				Repair by reassembling
2	Radial runout of flywheel housing	Repair limit: 0.30				
3	Face runout of flywheel	Repair limit: 0.20				
4	Radial runout of flywheel	Repair limit: 0.15				
5	Tightening torque of flywheel housing mounting bolt	Bolt	Order	Target (kgm)	Range (kgm)	Retighten
		M16	1st step	14.5	8.5 – 20	
			2nd step	28.5	25 – 31.5	
		M10	—	7	6 – 7.5	
6	Tightening torque of flywheel mounting bolt (Coat the bolt threads with engine oil)	Tightening order 		1st step	15	
				2nd step	29.5	27.5 – 31.5

VIBRATION DAMPER

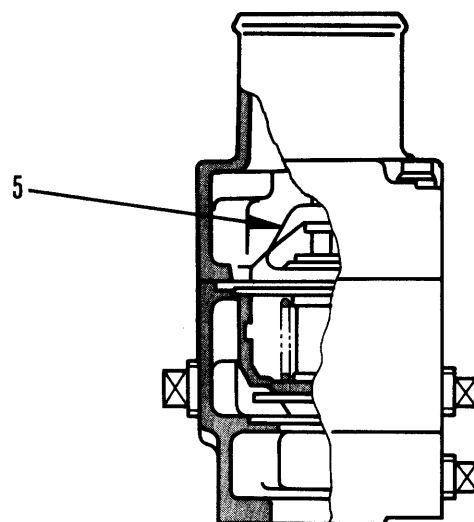


Unit: mm					
No.	Item	Criteria			Remedy
1	Visual check	Not appear any cracks on the rubber part.			Replace
2	Face runout of vibration damper (For D60P-17)	Repair limit: 0.80			Replace
3	Radial runout of vibration damper (For D60P-17)	Repair limit: 0.80			Replace
4	Tightening torque of vibration damper mounting bolt	Bolt	Target (kgm)	Range (kgm)	Retighten
		M12 (Except D60P-17)	11.3	10 – 12.5	
		M14 (For D60P-17)	18	16 – 20	

WATER PUMP AND THERMOSTAT

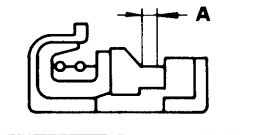


6150F422

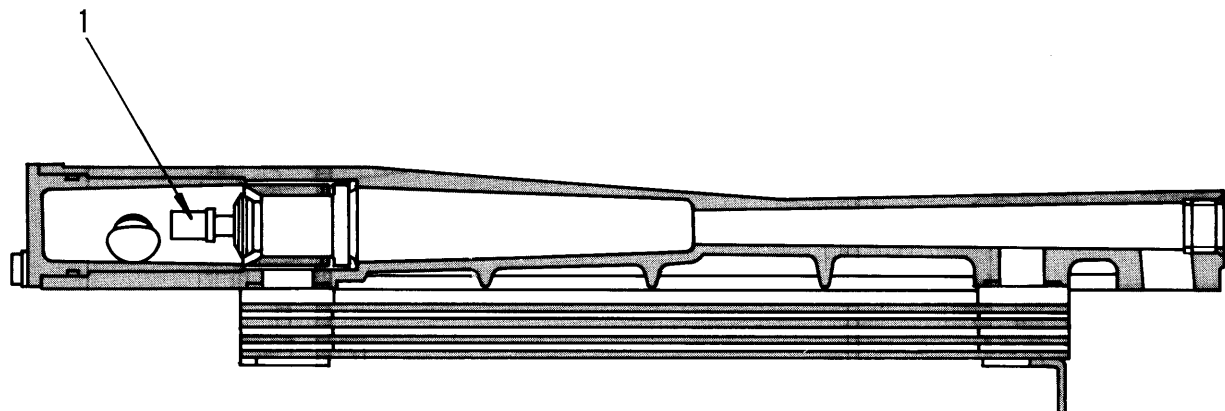


6150F423

Unit: mm

No.	Item	Criteria					Remedy
1	Interference between impeller and shaft	Standard size	Tolerance		Standard interference	Interference limit	Replace impeller
			Shaft	Hole			
		15.9	+0.020 +0.005	−0.020 −0.050	0.025 — 0.070	—	
2	Interference between drive gear and shaft	20.0	+0.015 0	−0.025 +0.055	0.025 — 0.070	—	Replace gear
3	Clearance between impeller and body	Standard: 0.30 — 1.10 (Include end play)					Replace
4	Abrasion of seal ring in water seal	 Repair limit A: 1.5					
5	Lift of thermostat valve	Min. 10 (Check after immersion in a hot water bath of 90°C for 4 or 5 minutes.)					Replace
	Opening and closing of valve in thermostat	Valve must be close fully when immersed in a hot water bath (71°C) for 4 or 5 minutes after being immersed in a hot water bath (90°C) to fully open the valve.					

OIL COOLER

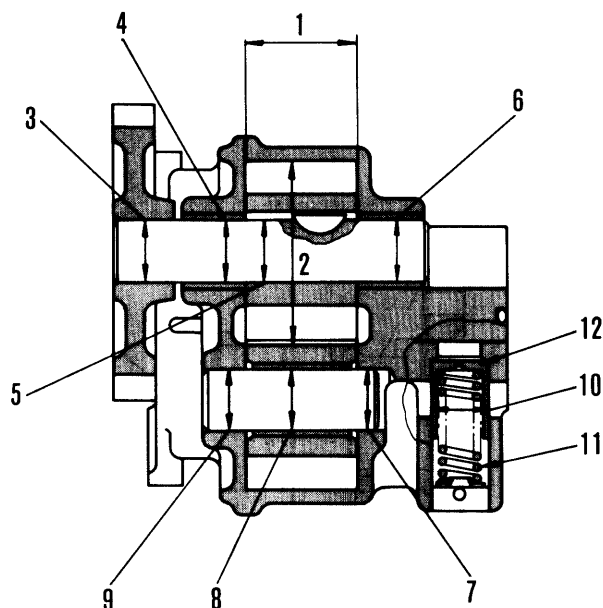


6150F421

Unit: mm

No.	Item	Criteria		Remedy
1	Lift of thermostat valve	6D125 S6D125	Min. 8 (Check after immersion in a hot oil bath of 115°C for 4 or 5 minutes.)	Replace
	Opening and closing of valve in thermostat	Valve must be close fully when immersed in a hot oil bath (104°C) for 4 or 5 minutes after being immersed in a hot oil bath (115°C) to fully open the valve.		

OIL PUMP

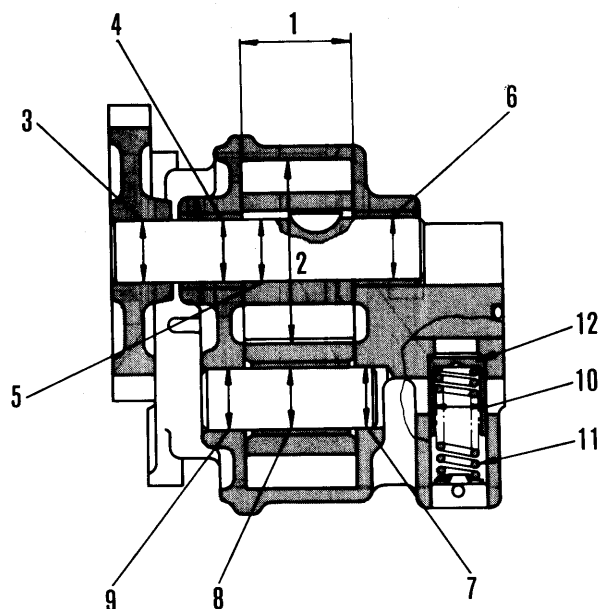


6150F418

Unit: mm

No.	Item	Criteria						Remedy
		Engine	Standard size	Tolerance		Standard clearance	Clearance limit	
1	Axial clearance of pump gear	6D125-1	23	0 -0.021	+0.065 +0.040	0.03 – 0.09	0.10	Replace gear
		S6D125-1 SA6D125-1	47	0 -0.025	+0.065 +0.040	0.03 – 0.09	0.10	
2	Radial clearance of pump gear	Standard size	Tolerance		Standard clearance	Clearance limit		
			Gear O.D.	Gear I.D.				
		51.4	-0.15 -0.21	+0.06 0	0.03 – 0.10	0.13		
3	Interference between pump drive gear and drive shaft	Standard size	Tolerance		Standard clearance or interference	Clearance or interference limit		Replace
			Shaft	Hole				
		18	+0.106 +0.088	+0.065 +0.047	0.023 – 0.059	—		
4	Clearance between drive shaft and cover bushing	18	+0.106 +0.088	+0.173 +0.146	0.040 – 0.085			Replace bushing
5	Interference between pump gear and drive shaft	18	+0.106 +0.088	+0.063 +0.028	0.025 – 0.078	—		Replace
	Clearance between drive shaft and body bushing	18	-0.006 -0.024	+0.061 +0.034	0.040 – 0.085			Replace bushing
7	Clearance between driven shaft and body	18	+0.090 +0.070	+0.129 +0.102	0.012 – 0.059	—		Replace
8	Clearance between driven shaft and gear bushing	18	+0.090 +0.070	+0.147 +0.122	0.032 – 0.077			Replace bushing
9	Interference between driven shaft and cover	18	+0.090 +0.070	+0.040 +0.020	0.030 – 0.068	—		Replace

MAIN RELIEF VALVE

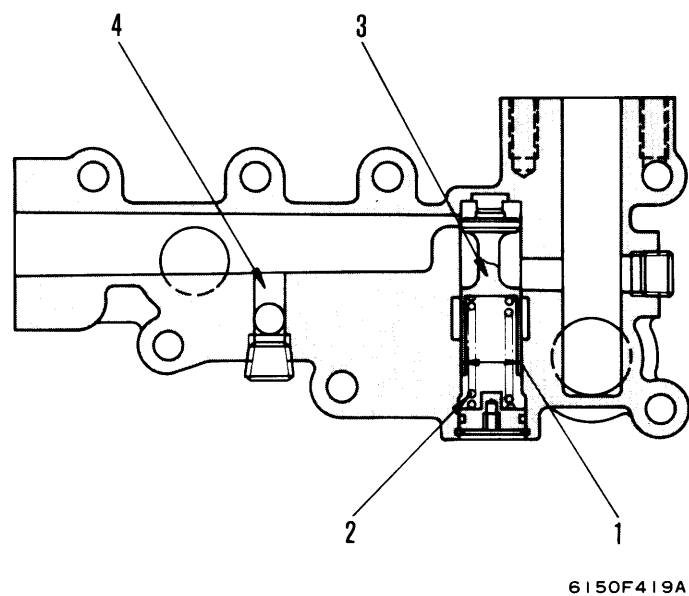


6150F418

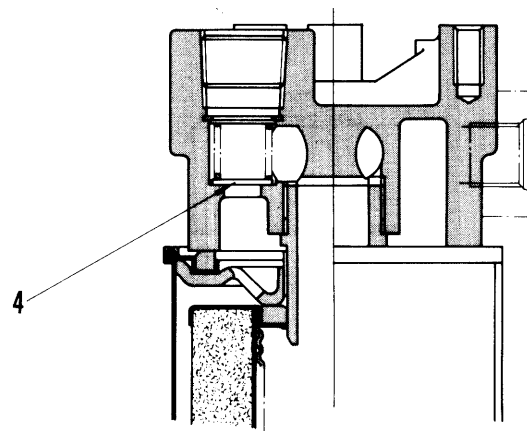
Unit: mm

No.	Item	Criteria					Remedy	
10	Clearance between valve and body	Standard size	Tolerance		Standard clearance	Clearance limit	Replace	
			Shaft	Hole				
		16	−0.040 −0.060	+0.043 0	0.040 – 0.103			
11	Relief valve spring	Standard size			Repair limit			
		Free length	Installed length	Installed load	Free length	Installed load		
		49.1	34.8	10.8 kg		9.8 kg		
12	Relief valve set pressure	7 ⁺¹ ₀ kg/cm ²						

REGULATOR VALVE AND SAFETY VALVE

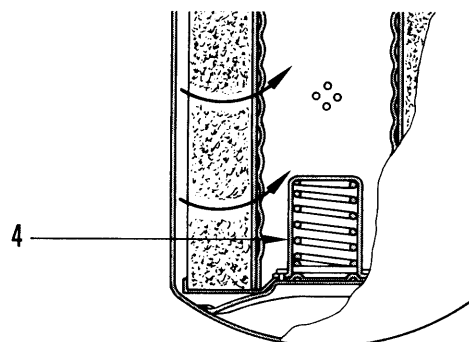


S6D125-1, SA6D125-1



6I50F420A

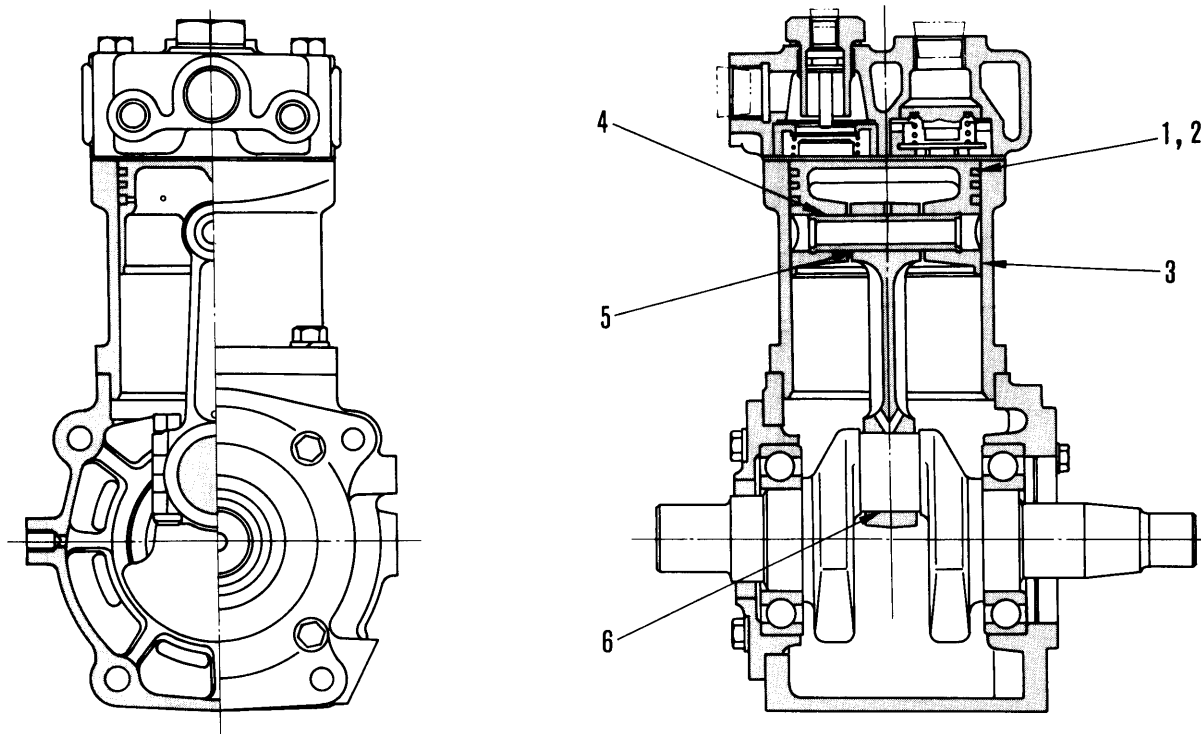
6D125-1



Unit: mm

No.	Item		Criteria				Remedy
1	Clearance between regulator valve and body		Standard size	Tolerance		Standard clearance	Clearance limit
				Valve	Body		
			22	+0.15 +0.12	+0.28 +0.22	0.07 – 0.16	
2	Regulator valve spring		Standard size			Repair limit	
			Free length	Installed length	Installed load	Free length	Installed load
	Remote mounting type	Outer spring	65.0	42.3	8.63 kg		
		Inner spring	56.3		4.248 kg		
	Direct mounting type		106.2	75.5	11.02 kg		
3	Regulator valve set pressure		6D125-1: $3.0^{+0.1}_{-0.2}$ kg/cm ² S6D125-1 : 3.75 ± 0.15 kg/cm ² SA6D125-1				
4	Safety valve set pressure		2.0 ± 0.2 kg/cm ²				

AIR COMPRESSOR



Unit: mm

No.	Item		Criteria			Remedy
			Standard clearance		Repair limit	
1	Piston ring gap	1st, 2nd ring	0.1 – 0.3		2.0	Repair or replace
		Oil ring	0.2 – 0.6		1.5	
2	Clearance between piston ring and ring groove	1st, 2nd ring	Standard size	Standard clearance	Repair limit	
		Oil ring	3	0.015 – 0.050	0.15	
3	Clearance between piston and cylinder		85	0.090 – 0.150	0.25	
4	Clearance between piston pin and piston		16	0.006 – 0.026	0.1	
5	Clearance between piston pin and connecting rod small end		16	0.006 – 0.026	0.1	
6	Clearance between crankpin metal and crankpin		35	0.034 – 0.075	0.15	

ENGINE

15 REPAIR AND REPLACEMENT OF PARTS



Replacing valve seat inserts	15-002
Replacing nozzle holder sleeve	15-006
Replacing valve guide	15-008
Replacing cross head guide	15-008
Grinding the valve	15-009
Replacing cam bushing	15-010
Replacing flywheel ring gear	15-012
Replacing cam gear	15-012
Pressure test	15-013

REPLACING VALVE SEAT INSERTS

Special tools

		Part No.	Part Name	Q'ty
A		795-100-4800	Puller (Valve seat)	1
B		790-101-5001	Push tool (for intake valve and exhaust valve)	1
C	1	795-100-3003	Seat cutter (kit)	1
		795-100-3100	Body assembly	1
		795-100-3200	Micrometer	1
		795-100-3300	Gauge	1
		795-100-3400	Tool head	1
		795-100-3601	Head support	1
	2	795-100-3710	Cutter	1
	3	795-100-3720	Cutter (for 30°)	1
	4	795-100-3730	Cutter (for 45°)	1
		795-100-4110	Pilot (9.00 mm)	1
		795-100-4120	Pilot (9.01 mm)	1
		795-100-4130	Pilot (9.02 mm)	1
		795-100-4140	Pilot (9.03 mm)	1

1. Pulling out the valve seat insert



Before using the grinder, run it for a minute to test it.

- After replacing the grindstone, run the grinder for three minutes to test it.



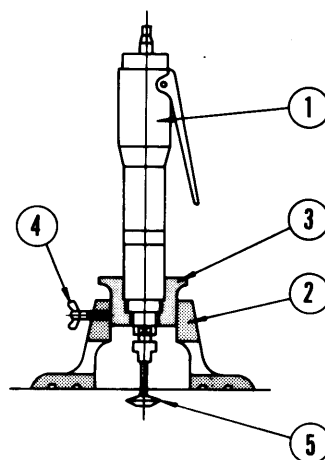
Confirm that the grindstone is not damaged, then install it to the shaft of the grinder without applying excessive force. Confirm that there is no play between the grindstone and shaft.



When using the grinder, wear safety goggles.

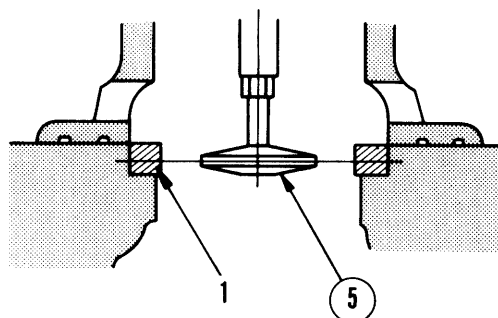
- When using a valve seat puller to remove the valve seat

- 1) Install grindstone ⑤ to grinder ①.
- 2) Align the groove of sleeve ③ with holder ②, then insert.
 - ★ Adjust the position of the grinder with set screw ④.



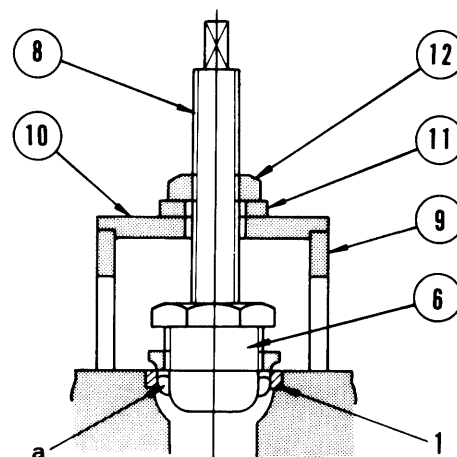
6162F504

- 3) Adjust the position of the grinder so that the center of grindstone ⑤ will be at the center of seat insert (1), then tighten the set screw to secure the grinder.
- 4) Rotate the grindstone and move slowly until it contacts insert (1).



6162F505

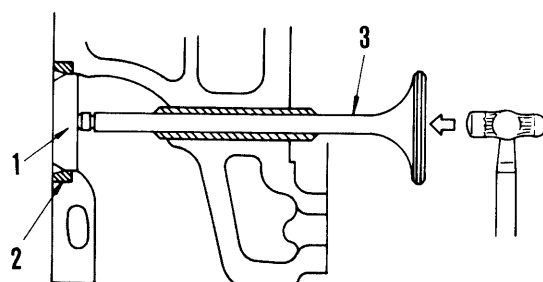
- 5) Press the grindstone against the inside of the insert, move it in a circular pattern, and make a groove about 1 mm deep.
- 6) Push in the three claws (a) on puller head ⑥ of tool A by hand to insert it inside insert (1).
- 7) Tighten screw ⑧ to press the three claws against the groove on the inside surface of the insert.
 - ★ When the claws contact the groove completely, stop tightening.
- 8) Place bridge ⑨ over the puller head, then place plates ⑩ and ⑪ on the bridge. Tighten nut ⑫ to pull out the insert.



6162F506

• **When welding a bar to the insert to remove the seat insert**

- 1) Weld bar (1) of radius approx. $\phi 10$, that is 0.1 — 0.5 mm shorter than the inside diameter to the inside diameter of insert (2).
 - ★ Be careful not to let the welding metal stick to the head itself.
- 2) When the temperature of the weld goes down to around room temperature, insert an old valve (3) in the reverse direction, and tap the head of the valve with a small hammer to knock out the insert.
 - ★ If the valve is hit too hard, the weld may break.



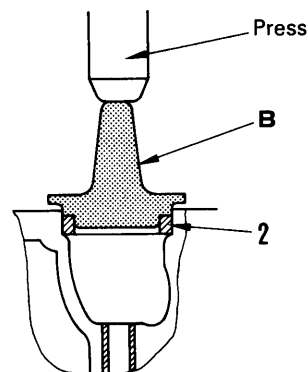
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2. Press fitting the valve seat insert

• When not grinding and correcting the press fitting surface for the valve seat insert

- 1) Using tool **B**, press fit standard valve seat insert (2).

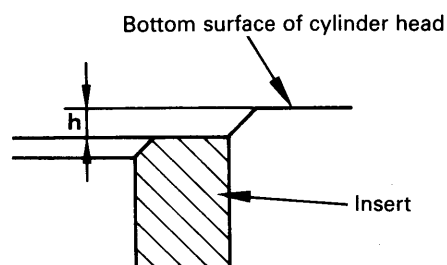
- ★ Do not use a hammer to press fit.
- ★ Press-fitting force for valve seat (intake, exhaust sides): Approx. 1 ton



6150F431

- 2) Check the depth of the insert from the bottom surface of the cylinder head.

- ★ Depth of the insert **h** (intake and exhaust sides): 1.9 – 2.2 mm.



6150F432

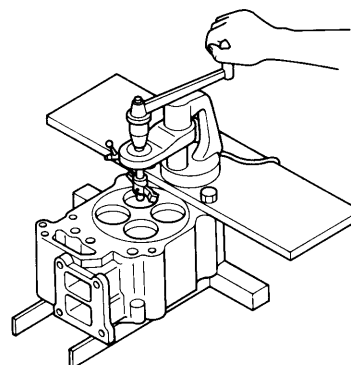
3. Machining valve seat insert mounting hole to oversize

- 1) Using tools **C₁** and **C₂**, grind the hole to a one size larger oversize.

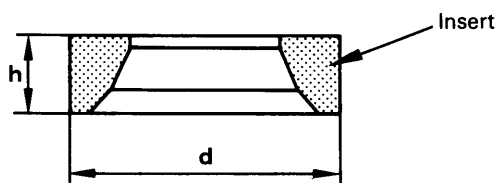
- ★ Machine within a range of 1.0 mm oversize. If it is more than 1.0 mm, replace the cylinder head.

• Dimensions of insert and mounting hole

Insert		Unit: mm	
	Valve	O.D. (d)	Height (h)
S · T · D	Intake	47.50 $^{+0.100}_{+0.090}$	7.5 $^{0}_{-0.1}$
	Exhaust	46.5 $^{+0.080}_{+0.070}$	7.5 $^{0}_{-0.1}$
0.25 O · S	Intake	47.75 $^{+0.100}_{+0.090}$	7.5 $^{0}_{-0.1}$
	Exhaust	46.75 $^{+0.080}_{+0.070}$	7.5 $^{0}_{-0.1}$
0.50 O · S	Intake	48.0 $^{+0.100}_{+0.090}$	7.62 $^{0}_{-0.1}$
	Exhaust	47.0 $^{+0.100}_{+0.090}$	7.62 $^{0}_{-0.1}$
0.75 O · S	Intake	48.25 $^{+0.100}_{+0.090}$	7.75 $^{0}_{-0.1}$
	Exhaust	47.25 $^{+0.080}_{+0.070}$	7.75 $^{0}_{-0.1}$
1.00 O · S	Intake	48.5 $^{+0.100}_{+0.090}$	7.88 $^{0}_{-0.1}$
	Exhaust	47.5 $^{+0.080}_{+0.070}$	7.88 $^{0}_{-0.1}$



6150F433



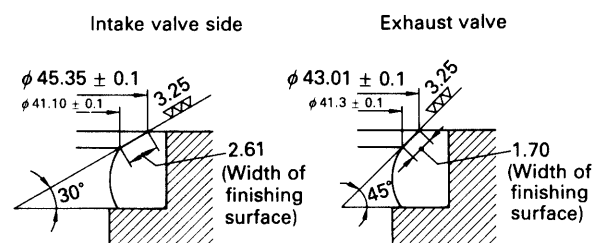
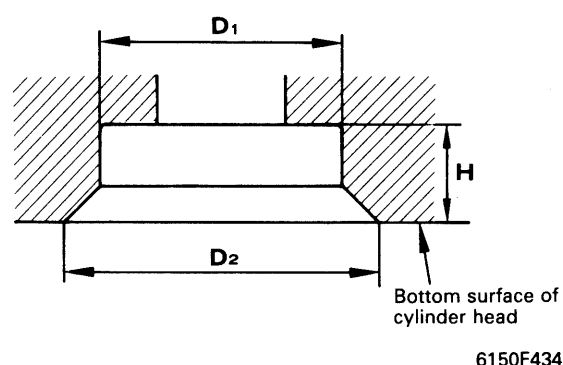
6162F502-1

Mounting hole for valve seat insert

Unit mm

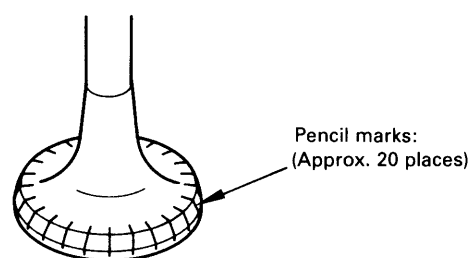
	Valve	D ₁	D ₂	H
S · T · D	Intake	47.5 ^{+0.020} / _{+0.010}	50.30 ± 0.2	9.5 ± 0.1
	Exhaust	46.5 ^{+0.020} / _{+0.010}	49.30 ± 0.2	9.5 ± 0.1
0.25 O · S	Intake	47.75 ^{+0.020} / _{+0.010}	50.55 ± 0.2	9.5 ± 0.1
	Exhaust	46.75 ^{+0.020} / _{+0.010}	49.55 ± 0.2	9.5 ± 0.1
0.50 O · S	Intake	48.0 ^{+0.020} / _{+0.010}	50.80 ± 0.2	9.62 ± 0.1
	Exhaust	47.0 ^{+0.020} / _{+0.010}	49.80 ± 0.2	9.62 ± 0.1
0.75 O · S	Intake	48.25 ^{+0.020} / _{+0.010}	51.05 ± 0.2	9.75 ± 0.1
	Exhaust	47.25 ^{+0.020} / _{+0.010}	50.05 ± 0.2	9.75 ± 0.1
1.00 O · S	Intake	48.5 ^{+0.020} / _{+0.010}	51.30 ± 0.2	9.88 ± 0.1
	Exhaust	47.5 ^{+0.020} / _{+0.010}	50.30 ± 0.2	9.88 ± 0.1

- ★ Inside surface roughness: 12.5S max.
- ★ Mounting hole bottom roughness: 12.5S max.
- ★ Concentricity of valve guide hole and insert:
0.07 mm (T.I.R) max.



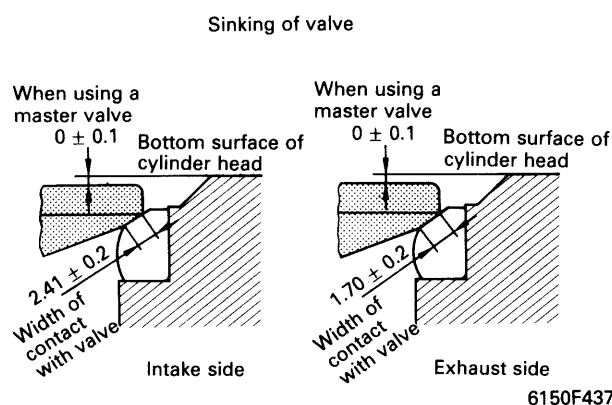
4. Finishing insert seat surface

- 1) Using tools **C₁**, **C₃**, and **C₄**, finish the insert seat surface to the dimensions shown in the diagram.
 - ★ When inserting the pilot into the valve guide, select a pilot that will enter and leave no clearance.
- 2) Fit the seat surface using the compound.



5. Final check

- Coat the seat surface thinly with minimum (red lead), and insert a new valve into the valve guide. Put it lightly in contact with the valve insert surface, and rotate 10°, then check the contact surface with the valve insert. Confirm that the contact is uniform with no breaks.
- Another way is to mark the new valve with pencil marks as shown in the diagram, insert into the valve guide, bring into light contact with the valve insert surface, and rotate 10°. Check that the pencil marks are erased uniformly around the whole circumference.
- ★ If a vacuum tester is available, carry out an air-tightness test to check.



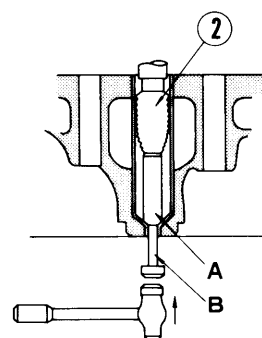
REPLACING NOZZLE HOLDER SLEEVE

Special tools

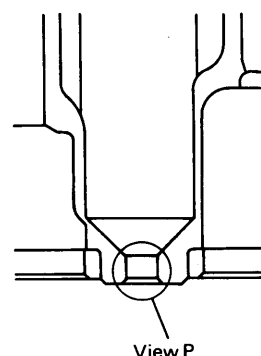
	Part No.	Part Name	Q'ty
A	795-600-1191	Push bar	1
B	795-600-1180	Push bar	1
C	795-600-1540	Sleeve driver	1
D	795-600-1410	Rolling tool	1
E	795-901-1210	Sleeve holder	1
F	795-600-1420	Sleeve expander	1
G	795-901-1230	Guide bushing	1
H	795-600-1430	Sleeve cutter	1

1. Removing the sleeve

- 1) Insert push bar **A** inside the sleeve.
- 2) Using sleeve extraction tap ②, cut tap to about 25 mm depth from top face of sleeve.
Add oil while cutting.
★ Sleeve extraction tap: M2.5, P = 1.5
- 3) Insert push bar **B** from the bottom of the head and tap with the hammer to remove the sleeve.
★ Remove the sleeve material cleanly from portion **P** of the cylinder head.



6162F509



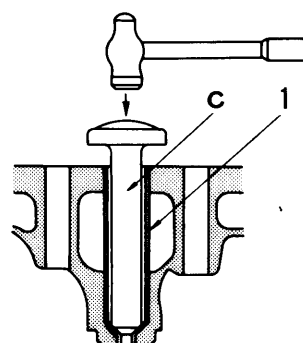
6150F438

2. Press-fitting the sleeve

Insert sleeve (1) into the cylinder head, then using sleeve driver **C**, tap lightly until the sleeve is completely in close contact with the seat surface.

- ★ Before installing the sleeve, clean the sleeve and seat.
- ★ Apply adhesive to the seat around the sleeve.

 Adhesive: Loctite (No. 54)

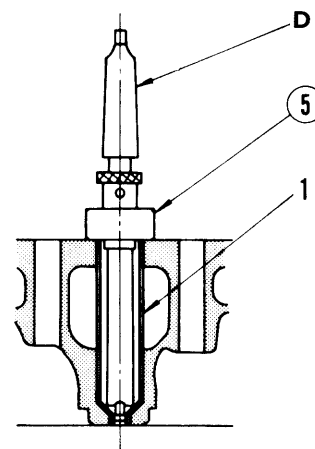


6162F510

3. Roll-fitting the taper section of sleeve

Using rolling tool **D**, roll-fit the taper section of the sleeve.

- ★ Set the roll-fitting amount with stopper **⑤** of the expander.
- ★ Install the expander to a radial drilling machine or upright drilling machine to roll-fit with its own weight.
- ★ Rotating speed: 200 to 300 rpm.



6162F513

4. Roll-fitting press-fitting portion at top of sleeve

- 1) Using sleeve holder **E**, tighten the sleeve from the bottom surface of the cylinder.

 Tightening torque for sleeve holder: 2 kgm

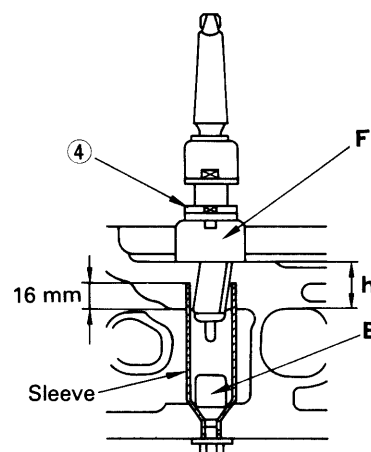
- 2) Using sleeve expander **F**, carry out rolling to caulk the press-fitting portion.

- ★ Rotating speed: 450 rpm
- ★ Inside diameter: 23.9 ± 0.1 mm
- ★ Amount of insertion of roller (**h**): 31 mm
- ★ Adjust the inside diameter with stopper **④**, and fix the position.

- 3) After rolling, turn in the reverse direction and remove the sleeve expander.

- 4) Remove the sleeve holder.

- 5) Roll the sleeve taper portion again.



6150F439

5. Spot-facing the inside seat of the sleeve

- 1) Using guide bushing **G** as the guide, spot-face the seat with sleeve cutter **H**.

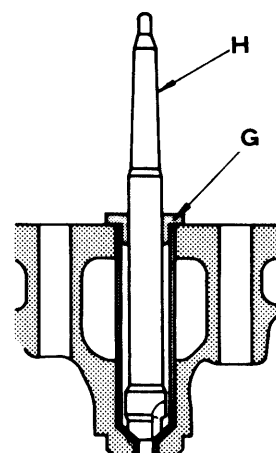
- ★ When grinding the seat surface, insert the nozzle holder, check that the protrusion is within the standard value, and cut a little more each time.
- ★ Rotating speed: 500 to 600 rpm
- ★ Protrusion of nozzle (S.T.D)

6D125: 4.9 – 5.7 mm

S6D125: 3.35 – 4.25 mm

SA6D125: 4.9 – 5.7 mm

- 2) Remove all the metal chips and dust from the machined surface.



6162F514

6. Checking the leakage from the seat

Carry out a water pressure or air pressure test to check that there is no leakage from the sleeve seat surface or upper press-fitting portion.

- ★ When checking for leakage from the seat surface, install a used nozzle holder.

REPLACING VALVE GUIDE

Special tools

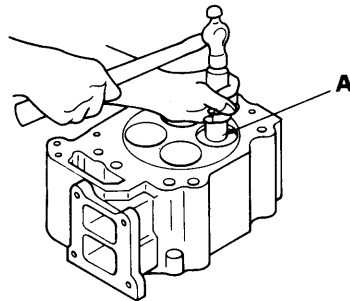
	Part No.	Part Name	Q'ty
A	795-600-2550	Valve guide remover	1
B	795-600-2560	Valve guide driver	1

1. Removing the valve guide

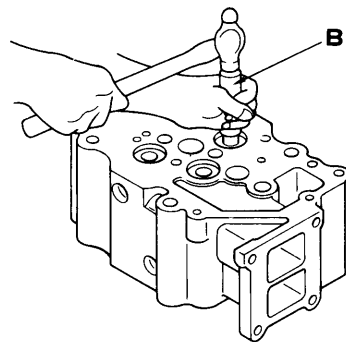
Remove the valve guide with valve guide remover **A**.

2. Press-fitting the valve guide

- 1) Press-fit the valve guide until the tip of valve guide driver **B** contacts the cylinder head.
- 2) Confirm that the protrusion of the valve guide is within specification.
★ Protrusion of valve guide: 20.0 ± 0.2 mm



6150F440



6150F441

REPLACING CROSS HEAD GUIDE

Special tools

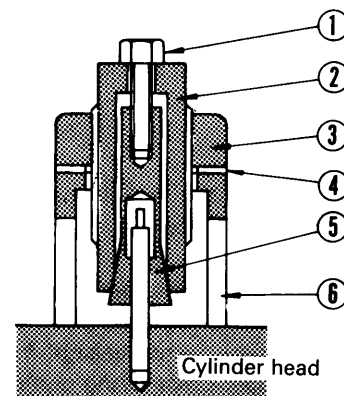
	Part No.	Part Name	Q'ty
A	795-130-3300	Cross head guide puller	1
B	790-471-1120	Cross head guide driver	1

1. Removing the cross head guide

- Using cross head guide puller **A**, pull out the cross head guide.
 - 1) As shown in the figure, hold the cross head guide with collet ⑤ of the puller.
 - 2) Tighten the collet with bolt ① to lock sleeve ②.
 - 3) Rotate nut ③ and pull out the cross head guide.
 - 4) Remove burns, fins, etc. from the mounting place of the cross head guide and clean it.

2. Press-fitting the cross head guide

- Using cross head guide driver **B**, press fit the cross head guide.



615F019

GRINDING THE VALVE

Special tools

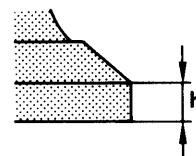
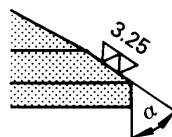
	Part No.	Part Name	Q'ty
A	— (Purchase)	Valve refacer	1

1. Grinding the seat surface

- Grind the seat surface with valve refacer **A**.
 - ★ Angle of valve seat (α): Intake valve: 60°
Exhaust valve: 45°

2. Checking after grinding

- Confirm that the thickness of the valve head, protrusion of the valve, and the contact surface of the valve seat are within specification.
 - ★ Allowable thickness of valve head (**h**)
 - Intake valve: 1.7 mm
 - Exhaust valve: 1.2 mm
 - ★ Sinking distance of valve: 0 ± 0.3



6150F442

REPLACING CAM BUSHING

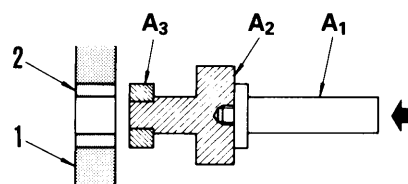
Special tools

	Part No.	Part Name	Q'ty
A	795-225-1200	Push tool	1
A	1	795-225-1310	Push bar
	2	795-225-1210	Push tool
	3	795-225-1220	Collar
	4	795-225-1230	Guide
	5	795-103-0400	Grip

- ★ Before replacing the cam bushing, remove the plug from the rear of the cylinder block.

1. Pulling out No. 1, 7 bushings

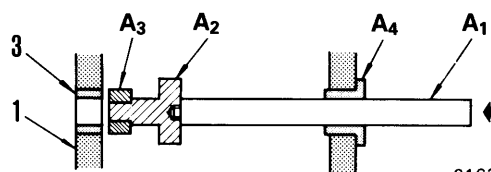
- Assemble push tool **A₂**, collar **A₃**, and push bar **A₁** of push tool **A**, then tap the push bar and remove bushing (2) from cylinder block (1).



6162F518

2. Pulling out No. 2, 6 bushings

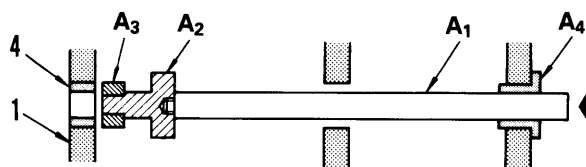
- Assemble push bar **A₁**, push tool **A₂**, collar **A₃**, and guide **A₄** of push tool **A**, then tap the push bar and remove bushing (3) from cylinder block (1).



6162F519

3. Pulling out No. 3, 4, 5 bushings

- Assemble push bar **A₁**, push tool **A₂**, collar **A₃**, and guide **A₄** of push tool **A**, then tap the push bar and remove bushing (4) from cylinder block (1).

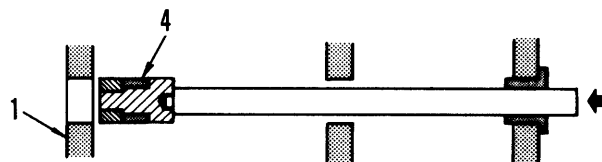


6162F520

- After pulling out the bushing, remove all burrs and clean all dirt and dust from the bushing mounting hole.

1. Press fitting No. 3, 4, 5 bushings

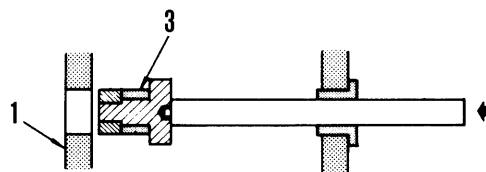
- Assemble bushing (4) to tool **A**, then press fit the bushing until the oil hole in cylinder block (1) is aligned with the oil hole in the bushing.



6202F017

2. Press fitting No. 2, 6 bushings

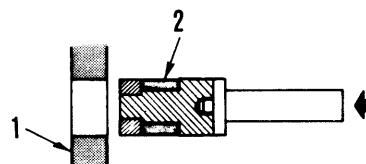
- Assemble bushing (3) to tool **A**, then press fit the bushing until the oil hole in cylinder block (1) is aligned with the oil hole in the bushing.



6162F522

3. Press fitting No. 1, 7 bushings

- Assemble bushing (2) to tool **A**, then press fit the bushing until the oil hole in cylinder block (1) is aligned with the oil hole in the bushing.

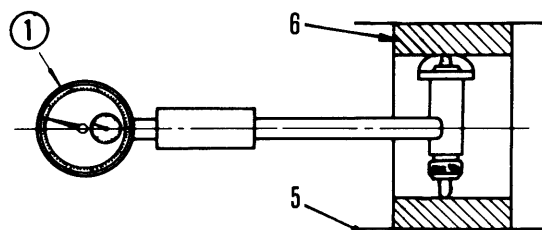


6202F018

- Using inside gauge ①, measure the inside diameter of the bushing.
- Check the clearance between the bushing and the shaft, and if the clearance is not within the standard range, or if the shaft does not pass through smoothly, correct the inside diameter of the bushing with a reamer.
 - After correcting the inside diameter of the bushing with a reamer, clean all chips from the oil hole and oil groove.

★ Inside diameter of cam bushing: $60^{+0.070}_{-0}$ mm

★ Clearance at camshaft journal: 0.080 — 0.180 mm



6202F019

REPLACING FLYWHEEL RING GEAR

 Take care not to let the flywheel fall.

1. Removing the ring gear

- Make a groove on the tooth bottom surface of the ring gear with a grinder, then crack the gear with a chisel.

 Take care in handling the grinder and chisel. For details, see the discussion on safety in the GENERAL section of this Shop Manual.

2. Press-fitting the ring gear

- 1) Check the fitting surface of the ring gear. If any flaw is found, repair it with an oilstone.
- 2) Heat the ring gear at the specified temperature for the specified time for shrinkage fitting.
 - ★ Heating temperature for ring gear: 200°C max.
Heating time: 30 minutes
- 3) With the chamfered side of ring gear facing the flywheel, fit it until its side contacts the flywheel.

REPLACING CAM GEAR

- ★ Heating temperature for cam gear: 220 to 240°C
Heating time: 30 minutes

PRESSURE TEST

- If the area round the head has been corrected, test as follows.

Special tools

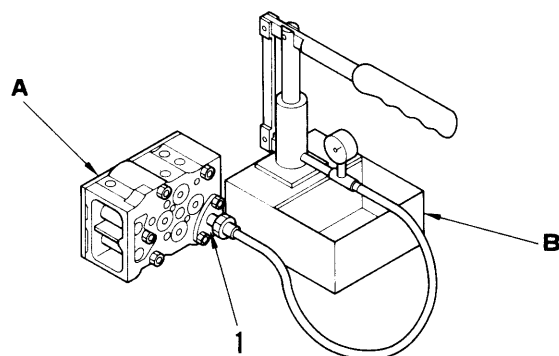
	Part No.	Part Name	Q'ty
A	790-553-1500	Coolant tester kit	1
B	79A-471-1050	Pump ass'y	1

1. Water pressure test

- 1) Tighten the nozzle holder assembly to the specified torque.
 - 2) Assemble tool **A** and tool **B**, and connect a hose to flange (1).
 - 3) Apply water pressure (3.5 — 4.0 kg/cm²) for approx. 10 minutes, and check for any leakage from around the head.
- ★ It is preferable to warm the whole cylinder head and carry out the test with hot water (82 — 93°C).

2. Air pressure test

- 1) Tighten the nozzle holder assembly to the specified torque.
 - 2) Connect the pump hose to flange (1).
 - 3) Place the head in a water bath, apply air pressure (3.0 — 3.5 kg/cm²) for approx. 30 seconds, and check for any air leakage in the water.
- ★ If the above test shows that there are cracks around the nozzle holder and plugs, replace the cylinder head.



6202F019