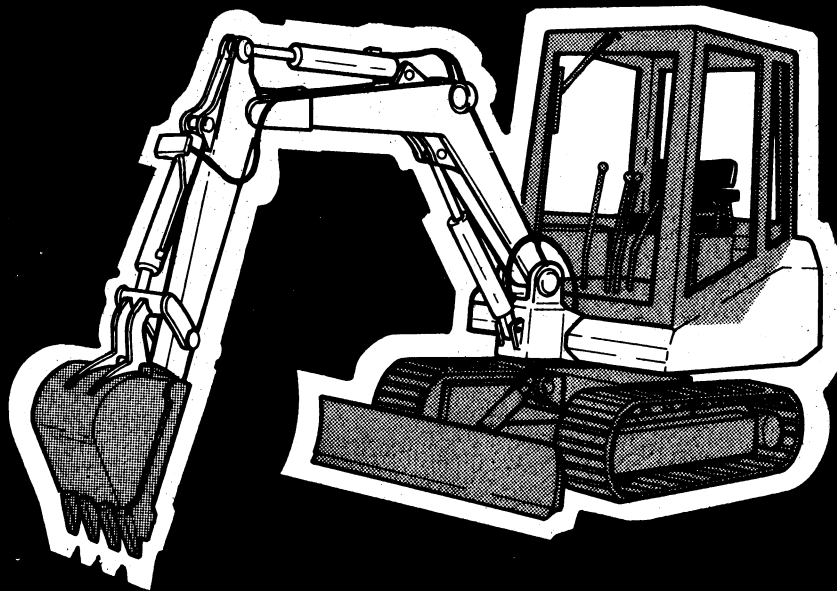




**130
HYDRAULIC
EXCAVATOR**

SERVICE MANUAL



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NOTE: This machine has a 24 volt electrical system.

kgm

STANDARD TIGHTENING TORQUE

1. STANDARD TIGHTENING TORQUE OF BOLTS AND NUTS

The following charts give the standard tightening torques of bolts and nuts. Exceptions are given in sections of "Disassembly and Assembly".

Thread diameter of bolt (mm)	Width across flat (mm)		
		kgm	Nm
6	10	1.35 ± 0.15	13.2 ± 1.4
8	13	3.2 ± 0.3	31.4 ± 2.9
10	17	6.7 ± 0.7	65.7 ± 6.8
12	19	11.5 ± 1.0	112 ± 9.8
14	22	18.0 ± 2.0	177 ± 19
16	24	28.5 ± 3	279 ± 29
18	27	39 ± 4	383 ± 39
20	30	56 ± 6	549 ± 58
22	32	76 ± 8	745 ± 78
24	36	94.5 ± 10	927 ± 98
27	41	135 ± 15	1320 ± 140
30	46	175 ± 20	1720 ± 190
33	50	225 ± 25	2210 ± 240
36	55	280 ± 30	2750 ± 290
39	60	335 ± 35	3280 ± 340

This torque table does not apply to the bolts with which nylon packings or other non-ferrous metal washers are to be used, or which require tightening to otherwise specified torque.

★ Nm (newton meter): 1Nm ≅ 0.1 kgm

2. TIGHTENING TORQUE OF SPLIT FLANGE BOLTS

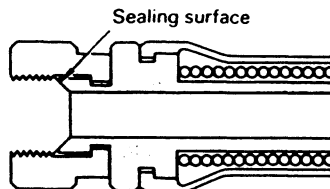
Use these torques for split flange bolts.

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



3. TIGHTENING TORQUE FOR NUTS OF FLARED

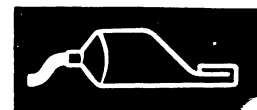
Use these torques for nut part of flared.



FS0068

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

COATING MATERIALS



The recommended coating materials prescribed in Shop Manuals are listed below.

Nomenclature	code	Applications
Adhesives	LT-1A	Used to apply rubber pads, rubber gaskets, and cork plugs.
	LT-1B	Used to apply resin, rubber, metallic and non-metallic parts when a fast, strong seal is needed.
	LT-2*	Preventing bolts, nuts and plugs from loosening and leaking oil.
	LT-3	Provides an airtight, electrically insulating seal. Used for aluminum surfaces.
Liquid gasket	LG-1	Used with gaskets and packings to increase sealing effect.
	LG-3	Heat-resistant gasket for precombustion chambers and exhaust piping.
	LG-4	Used by itself on mounting surfaces on the final drive and transmission cases. (Thickness after tightening: 0.07 – 0.08 mm)
	LG-5	Used by itself to seal grease fittings, tapered screw fittings and tapered screw fittings in hydraulic circuits of less than 50 mm in diameter.
Antifriction compound (Lubricant including molybdenum disulfide)	LM-P	Applied to bearings and taper shafts to facilitate press-fitting and to prevent sticking, burning or rusting.
Grease (Lithium grease)	G2-LI	Applied to bearings, sliding parts and oil seals for lubrication, rust prevention and facilitation of assembling work.
Vaseline	—	Used for protecting battery electrode terminals from corrosion.

*LT-2 is also called LOCTITE in the shop manuals.



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: 05WB indicates a cable having a nominal number 05 and white coating with black stripe.

CLASSIFICATION BY THICKNESS

Nominal number	Copper wire			Cable O.D. (mm)	Current rating (A)	Applicable circuit
	Number strands	Dia. of strands (mm)	Cross section (mm ²)			
01	11	0.32	0.88	2.4	12	Starting, lighting, signal etc.
02	26	0.32	2.09	3.1	20	Lighting, signal etc.
05	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	Classification		Starting	Charging	Lighting	Signal	Instrument	Other
	Code	Color						
1	Primary	Code	B	W	R	G	Y	L
		Color	Black	White	Red	Green	Yellow	Blue
2	Auxiliary	Code	BW	WR	RW	GW	YR	LW
		Color	Black & White	White & Red	Red & White	Green & White	Yellow & Red	Blue & White
3	Auxiliary	Code	BY	WB	RB	GR	YB	LR
		Color	Black & Yellow	White & Black	Red & Black	Green & Red	Yellow & Black	Blue & Red
4	Auxiliary	Code	BR	WL	RY	GY	YG	LY
		Color	Black & Red	White & Blue	Red & Yellow	Green & Yellow	Yellow & Green	Blue & Yellow
5	Auxiliary	Code	—	WY	RG	GB	YL	LB
		Color	—	White & Yellow	Red & Green	Green & Black	Yellow & Blue	Blue & Black
6	Auxiliary	Code	—	WG	RL	GL	YW	
		Color	—	White & Green	Red & Blue	Green & Blue	Yellow & White	

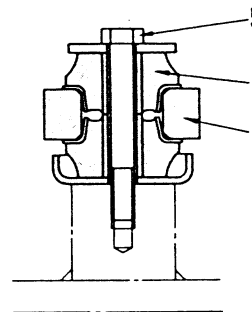
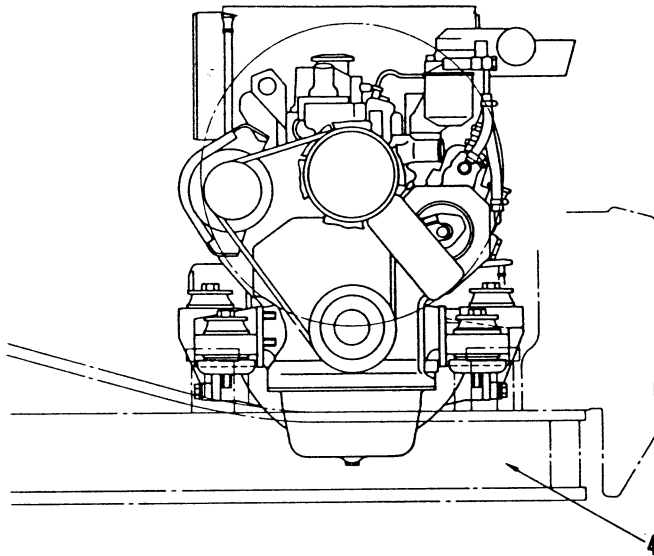
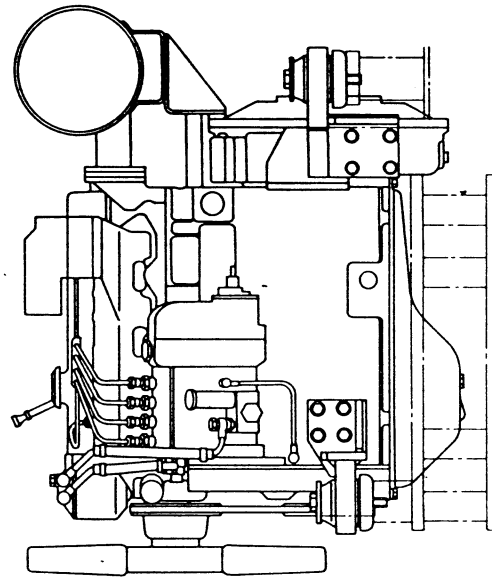
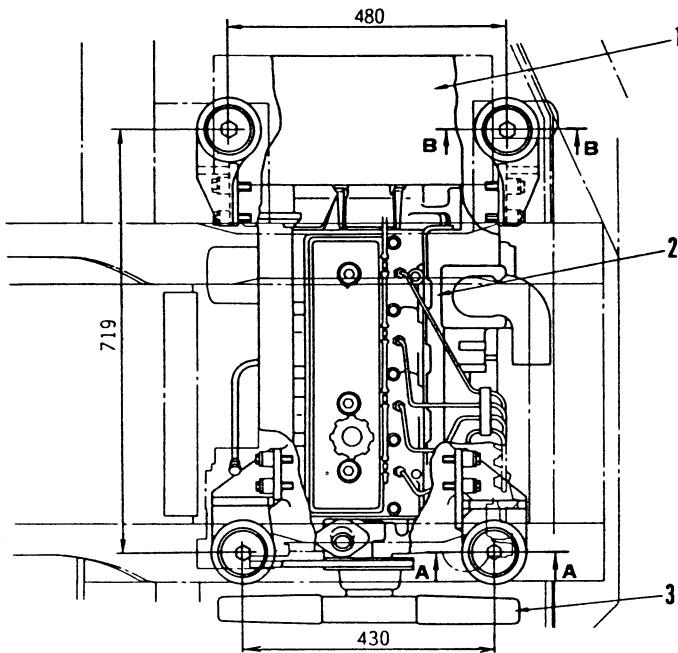
ENGINE

11 STRUCTURE AND FUNCTION

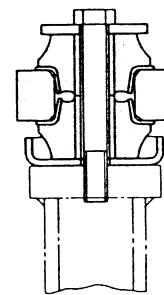


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ENGINE MOUNT



Section A - A



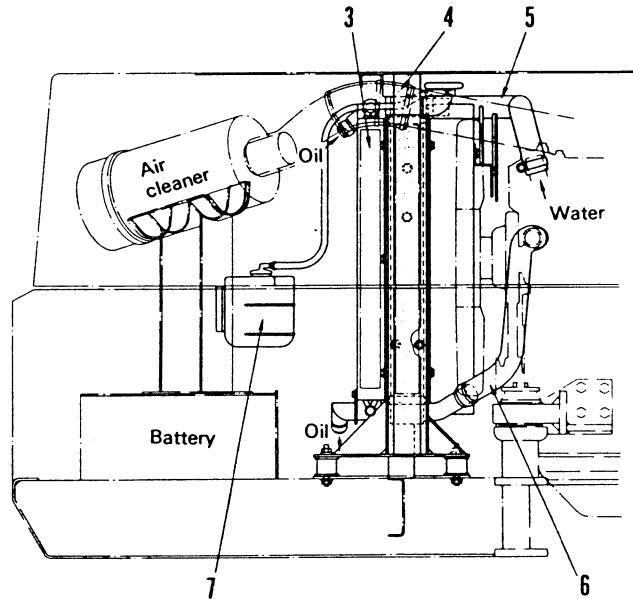
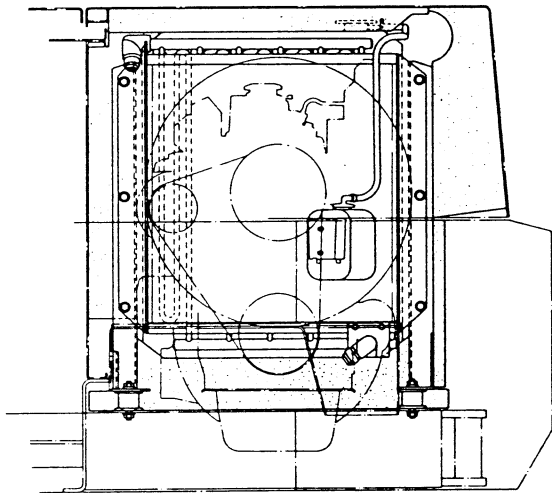
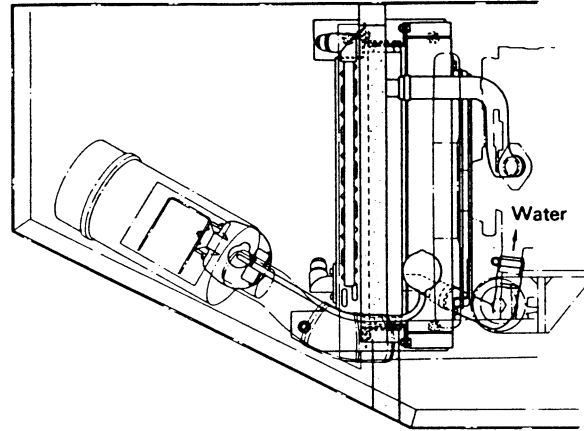
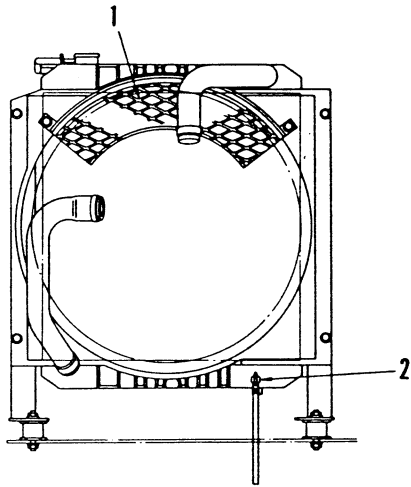
Section B - B

201F5008

• The engine is mounted crosswise at the rear of the upper structure. The front and rear mounts are supported by rubber pads which absorb shock.

- | | |
|--------------------|-------------------|
| 1. Muffler | 5. Mounting bolt |
| 2. Engine | 6. Rubber pads |
| 3. Radiator fan | 7. Engine support |
| 4. Revolving frame | |

RADIATOR

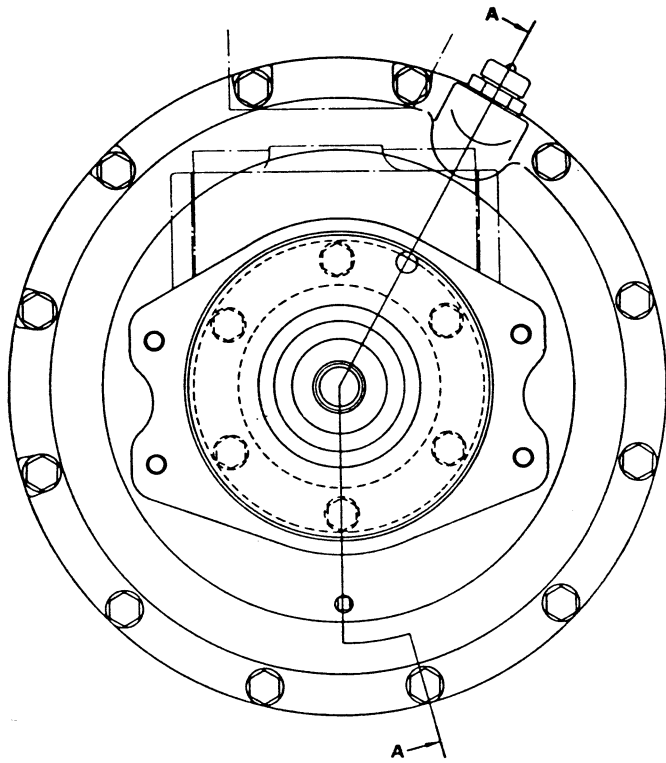
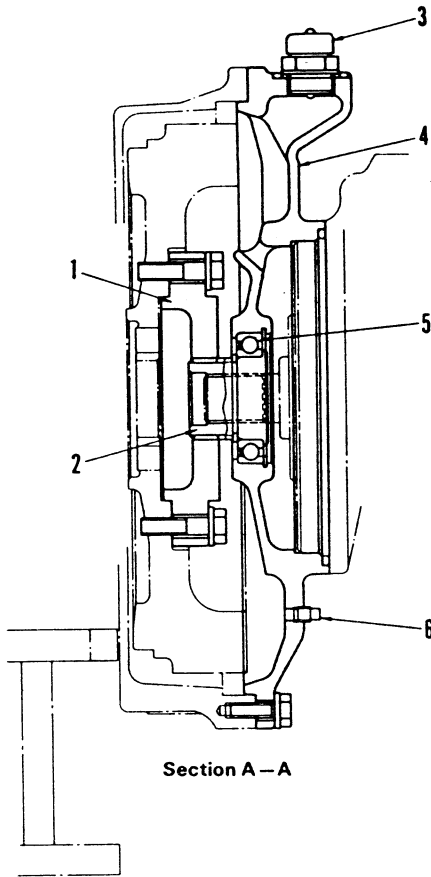


201F5009

- A model CD-3 corrugated fin type radiator core and the suction type of fan are used.
- The water level in the radiator can be visually checked through the sub-tank which is in front of the radiator.

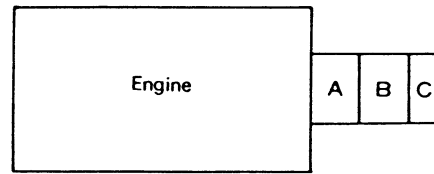
- | | |
|------------------|----------------|
| 1. Fan guard | 5. Inlet hose |
| 2. Drain valve | 6. Outlet hose |
| 3. Oil cooler | 7. Sub-tank |
| 4. Radiator core | |

PTO



201F5010

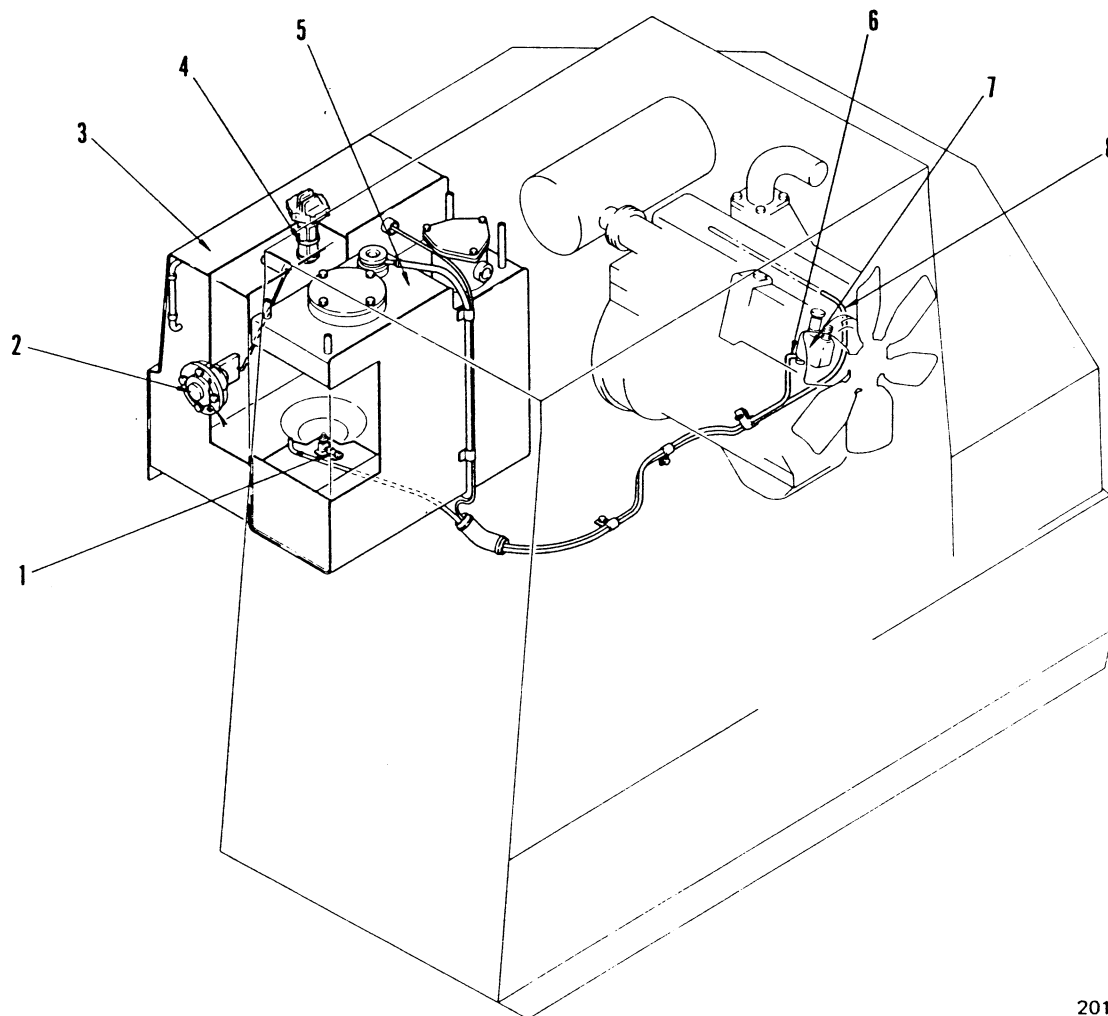
- The pumps are installed to the PTO case through the coupling at the rear of the flywheel housing of the engine.
- The pumps shown in the figure at right have the following functions.
 Pump A (Front main pump): Used for L.H. travel, arm low speed, swinging, boom high speed and service spool.
 Pump B (Rear main pump): Used for R.H. travel, bucket, boom low speed and arm high speed.
 Pump C (Charging pump): Used for driving the auto-deceleration cylinder (if equipped), assisting the hydraulic pressure of the control valves and controlling the main pumps.



204F076

1. Coupling
2. Shaft
3. Breather
4. Case
5. Bearing
6. Oil level plug

FUEL TANK AND PIPING

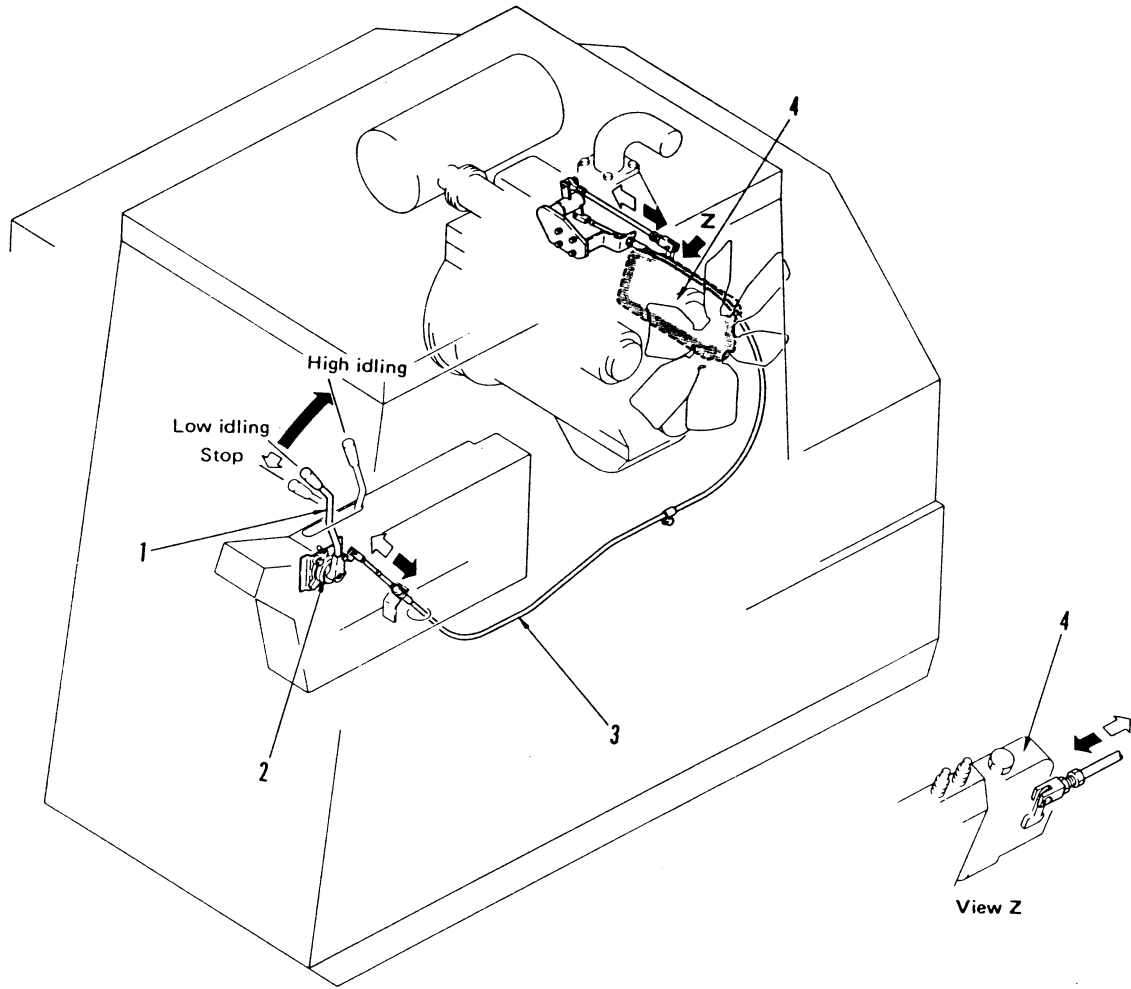


201F5011

- The fuel tank is installed together with the hydraulic tank as a unit.

- | | |
|----------------------|------------------------|
| 1. Drain valve | 5. Hydraulic tank |
| 2. Fuel level sensor | 6. Fuel supply hose |
| 3. Fuel tank | 7. Fuel injection pump |
| 4. Strainer | 8. Fuel return hose |

ENGINE CONTROL

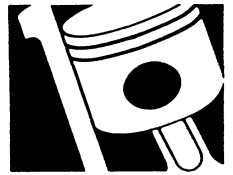


201F5012

1. Engine control lever
2. Stopper
3. Cable
4. Fuel injection pump

ENGINE

12 TESTING AND ADJUSTING



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Measuring compression pressure.....	12-5
Adjusting fuel injection timing.....	12-6
Testing and adjusting fan belt tension.....	12-7
Adjusting fuel control lever.....	12-8



When carrying out testing, adjusting or troubleshooting, stop the machine on level ground, apply the lock levers and block the tracks.



When working in groups, use agreed signals and do not allow unauthorized persons near the machine.



When checking the water level in the radiator wait for the water to cool. Do not remove the radiator cap while the water is hot. Boiling water may spurt out.



Be careful not to get caught in rotating parts.

TESTING AND ADJUSTING DATA

Applicable machine model				130	
Engine model				4D95L-1	
Item	Condition	Unit	Standard value	Permissible value	
Engine speed	High idling speed	rpm	2250 – 2350		
	Low idling speed		850 – 900		
	Rated speed		2100		
Exhaust gas color	Quick acceleration	Bosch scale	4.5	5.5	
	At high idling		–	–	
Valve clearance (at cold)	Intake valve	mm	0.35		
	Exhaust valve		0.50		
Compression pressure (SAE30 oil)	Oil temperature: 40 – 60°C	kg/cm ²	30	21	
	(Engine speed)	(rpm)	(320 – 360)	(320 – 360)	
Blow-by pressure (SAE30 oil)	Water temperature: Inside operating range At high idling	mmH ₂ O	50	100	
Oil pressure (Water temperature: Inside operating range)	At high idling	kg/cm ²	3.0 – 6.0	2.1	
	At low idling (SAE30)		1.0	0.7	
	At low idling (SAE10W)		0.8	0.7	
Oil temperature	All speed (oil in oil pan)	°C	80 – 110	120	
Fuel injection timing	B.T.D.C.	degree	16	16	
Fan belt tension (Alternator side)	Deflection when pushed with a force of 6 kg	mm	8	6 – 8	

TOOL LIST FOR TESTING AND ADJUSTING

No.	Testing and measuring item	Fault finding tool	Part No.	Remarks
1	Engine speed		MEL-1316	Digital reading: 60–2,000 rpm (L range) 60–20,000 rpm (H range)
2	Water temperature, oil temperature		MEL-1316	-50–1,200°C
3	Lubrication oil pressure		MEL-1189	0–20 kg/cm ²
4	Compression pressure	Compression gauge	795-502-1590	0–70 kg/cm ²
		Adapter	795-414-1110	
5	Valve clearance	Feeler gauge		0.35, 0.50 mm


ADJUSTING VALVE CLEARANCE

Adjust clearance between valve stem and rocker arm with feeler gauge as follows.

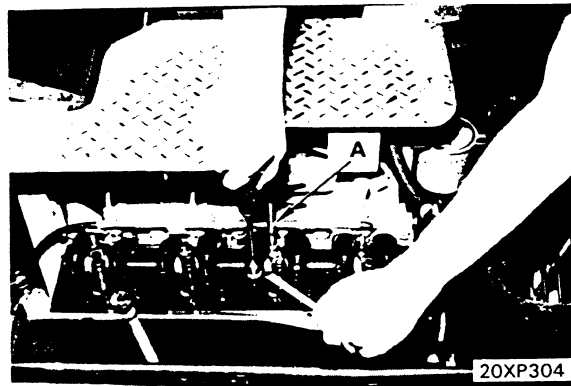
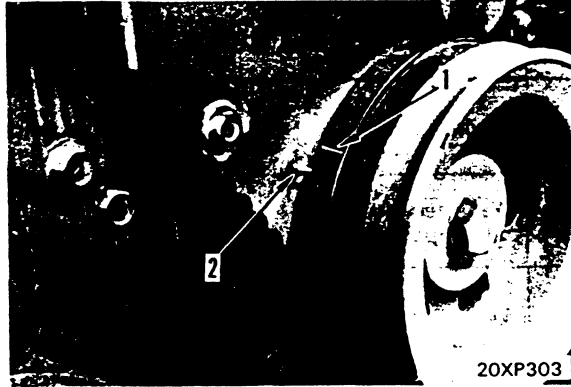
Unit: mm

	Intake valve	Exhaust valve
At cold	0.35	0.5


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.4 cylinder, bring the No.1 cylinder into the top dead center position of the compression stroke and align the "1.4 TOP" mark on crankshaft pulley (1) with pointer (2).
3. When No.1 cylinder is top dead center of compression stroke, adjust the valve clearance for valves marked ● in the valve arrangement chart.
4. To adjust the valve clearance, loosen locknut (6) on adjustment screw (5), insert feeler gauge A corresponding to the specified clearance between valve stem (4) and rocker arm (3), and adjust the clearance with the adjustment screw until the thickness gauge can slide lightly.
5. Rotate the crankshaft in the normal direction by one revolution and adjust the valve clearance for the remaining valves marked ○.
6. After the clearance is properly adjusted, tighten the locknut to secure the adjustment screw.

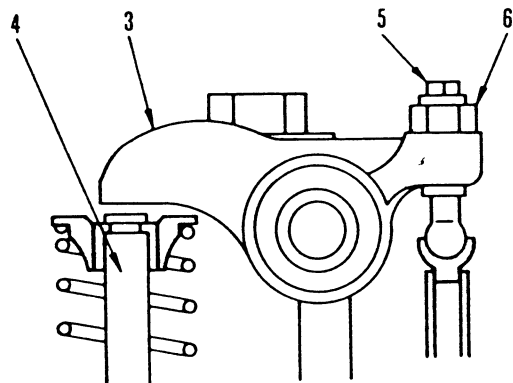
 Locknut: 3.15 ± 0.35 kgm

- ★ Intake and exhaust valve clearances may be adjusted for each cylinder in the firing order by rotating the crankshaft 180° at a time in the normal direction.
- ★ Firing order is 1-2-4-3.
- ★ After tightening locknut, check valve clearance again.



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

Front 



21KF101

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