WSM

WORKSHOP MANUAL
DIESEL GENERATOR

GL6000,GL7000,
GL9000,GL11000

Kubota

KiSC issued 05, 2006 A

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⚠ SAFETY FIRST

This symbol, the industry's "Safety Alert Symbol" is used throughout this manual and on labels on the machine itself to warn of the possibility of personal injury. Read these instructions carefully.It is essential that you read the instructions and safety regulations before you attempt to repair or use this unit.

⚠ DANGER
- **Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.**

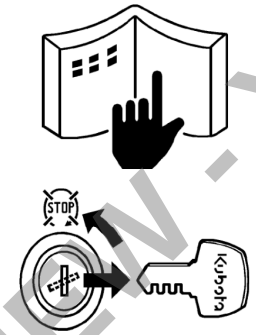
⚠ WARNING
- **Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.**

⚠ CAUTION
- **Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.**

■ IMPORTANT
- **Indicates that equipment or property damage could result if instructions are not followed.**

■ NOTE
- **Gives helpful information.**

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BEFORE SERVICING AND REPAIRING

- Read all instructions and safety instructions in this manual and on your generator safety decals.
- Clean the work area and generator.
- Place the generator on a firm and level ground.
- Allow the engine to cool before proceeding.
- Stop the engine, and remove the key
- Disconnect the battery negative cable

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SAFETY STARTING

- Do not start the engine by shorting across starter terminals.
- Unauthorized modifications to the engine may impair the function and / or safety and affect engine life.

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SPECIFICATIONS

Model		GL6000-STD	GL6000-AUS
Generator	Frequency (Hz)	50	
	Rated output (kW)	5.5	
	Maximum output (kW)	6.0	
	Rated voltage (V)	220	240
	Rated current (A)	25	22.9
	Phrase and wire	1 - 2	
	Number of poles	2	
	Power Factor	1	
	Insulation	Stator coil: B Rotor coil: F	
Engine	Design	Vertical, liquid cooled, 4 cycle, diesel	
	Model name	Z482-E2B-SEC-2	
	Rated output (kW)	6.9	
	Speed (rpm)	3000	
	Number of cylinder - Bore x Stroke (mm (in.))	2 - ϕ67 x 68 (2 - ϕ2.52 x 2.68)	
	Displacement (L (cu.in.))	0.479 (29.23)	
	Fuel tank capacity (L (U.S.qts.))	28 (7.4)	
	Crankcase oil capacity	2.2 (2.3)	
	Starting system	Electric type 12 V / 0.8 kW	
	Battery	38B20R 12 V x 28 Ah / 5 Hr	
Continuous operating hours (at rated load) (hrs)		12	
Net weight kg (lbs)		235 (518)	
Output	Receptacle	6 -15R x 2	15A x 2
	Terminal	2P	—

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2. SERVICING SPECIFICATIONS

ENGINE BODY

Item		Factory Specification	Allowable Limit
Cylinder Head Surface	Flatness	—	0.05 mm 0.0020 in.
Top Clearance		0.50 to 0.70 mm 0.0197 to 0.0276 in.	—
Compression Pressure	—	2.84 to 3.24 MPa 29.0 to 33.0 kgf/cm^2 412 to 469 psi	2.26 MPa 23.0 kgf/cm^2 327 psi
	Variance Among Cylinder	—	10 % or less
Valve Clearance (Cold)		0.145 to 0.185 mm 0.00571 to 0.00728 in.	—
Valve Seat	Angle	0.785 rad 45 °	—
	Width	2.12 mm 0.0835 in.	—
Valve Face	Angle	0.785 rad 45 °	—
Valve Recessing (Intake and Exhaust)		-0.10 to 0.10 mm -0.0039 to 0.0039 in.	0.30 mm 0.0118 in.
Valve Stem to Valve Guide	Clearance	0.030 to 0.057 mm 0.00118 to 0.00224 in.	0.10 mm 0.0039 in.
	Valve Stem (O.D.)	5.968 to 5.980 mm 0.23496 to 0.23543 in.	—
	Valve Guide (I.D.)	6.010 to 6.025 mm 0.23661 to 0.23720 in.	—
Valve Timing (Intake Valve)	Open	0.35 rad 20 ° before T.D.C.	—
	Close	0.79 rad 45 ° after B.D.C.	—
Valve Timing (Exhaust Valve Valve)	Open	0.87 rad 50 ° before B.D.C.	—
	Close	0.26 rad 15 ° after T.D.C.	—

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7. MAINTENANCE CHECK LIST

Observe the following for service and maintenance.

The lubricating oil change intervals listed in the table below are for classes CG, CE and CD lubricating oil of API classification with a low-sulfur fuel in use. If the CF-4 of CG-4 lubricating oil is used with a high-sulfur fuel, change the lubricating oil at shorter intervals than recommended in the table below depending on the operating condition.

CAUTION

- **When checking and servicing the generator, be sure to level and stop the engine.**

No.	Item / Period		Daily	Initial 50 hours	Every 50 hours	Every 100 hours	Every 200 hours	Every 300 hours	Every 400 hours	Every 500 hours	Reference page
1	Engine oil	Check	☆								G-13
		Change		☆		☆					G-14, 15
2	Radiator coolant (L.L.C.)	Check	☆								G-13
		Change									G-24
3	Air cleaner element	Clean				☆					G-16
		Change									G-23
4	Fan belt	Check				☆					G-16
		Change									G-22
5	Fuel line (Fuel hose and clamp bands)	Check			☆						G-15
		Change									G-25
6	Battery	Check		☆		☆					G-14, 17
		Change									G-25
7	Radiator hose and clamp bands	Check					☆				G-17
		Change									G-24
8	Oil filter cartridge	Change		☆			☆				G-14, 18
9	Fuel filter element	Clean				☆					G-17
		Change							☆		G-19
10	Valve clearance	Check									G-21
11	Water Jacket (Radiator interior)	Clean								☆	G-19
12	Generator's brush ware	Check						☆			G-18
13	Generator's slip-ring	Check						☆			G-18
14	Generator's ball bearing	Check									G-22
15	Damage in electric wiring and loose connections	Check									G-23
16	Fuel injection pressure	Check									G-22
17	Nozzle spraying condition	Check									G-22
18	Valve seat tightness	Check									G-23

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8. CHECK AND MAINTENANCE

[1] DAILY CHECK



Checking Engine Oil Level

CAUTION

- **Be sure to stop the engine before checking the engine oil level.**

1. Level the engine and check the oil level on the gauge (1).
2. If the level below the lower mark, add new engine oil to the upper mark.

■ IMPORTANT

- **When using an oil of different maker or viscosity from the previous one, drain an old oil.**
- **Never mix two different types' of oil.**
- **Use the proper SAE Engine oil according to ambient temperatures.**
  Refer to "5. LUBRICANTS, FUEL AND COOLANT".

(1) Gauge

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Checking Coolant Level

CAUTION

- **Do not remove the radiator cap while operating or immediately after stopping. Otherwise, hot water will spout out from the radiator. Wait for more than ten minutes to cool the radiator, before opening the cap.**

1. Remove the radiator cap and check to see that the coolant level is just below the port.
2. If low, add coolant to the radiator.
3. Check the reserve tank (1) and keep the coolant level between the **FULL** and **LOW** marks.
4. If low, add coolant to the reserve tank (1).

(1) Reserve Tank

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6. TIGHTENING TORQUES

[1] GENERAL USE SCREWS, BOLT AND NUTS

Screws, bolt and nuts whose tightening torque are not specified in this Workshop Manual should be tightened according to the table below.

Indication on top of bolt	⬡ ④ No-grade or 4T						⑦ 7T					
Material of bolt	SS400, S20C						S43C, S48C					
Material of opponent part	Ordinariness			Aluminum			Ordinariness			Aluminum		
Unit / Diameter	N·m	kgf·m	ft-lbs	N·m	kgf·m	ft-lbs	N·m	kgf·m	ft-lbs	N·m	kgf·m	ft-lbs
M4 (4 mm, 0.16 in.)	1.00 to 2.90	0.10 to 0.30	0.70 to 2.10	-	-	-	-	-	-	-	-	-
M5 (5 mm, 0.20 in.)	1.90 to 3.60	0.20 to 0.40	1.40 to 2.70	-	-	-	-	-	-	-	-	-
M6 (6 mm, 0.24 in.)	7.85 to 9.31	0.80 to 0.95	5.79 to 6.87	7.85 to 8.82	0.80 to 0.90	5.79 to 6.50	9.81 to 11.2	1.00 to 1.15	7.24 to 8.31	7.85 to 8.82	0.80 to 0.90	5.79 to 6.50
M8 (8 mm, 0.31 in.)	17.7 to 20.5	1.8 to 2.1	13.1 to 15.1	16.7 to 19.6	1.7 to 2.0	12.3 to 14.4	23.6 to 27.4	2.4 to 2.8	17.4 to 20.2	17.7 to 20.5	1.8 to 2.1	13.1 to 15.1
M10 (10 mm, 0.39 in.)	39.3 to 45.1	4.0 to 4.6	29.0 to 33.2	31.4 to 34.3	3.2 to 3.5	23.2 to 25.3	48.1 to 55.8	4.9 to 5.7	35.5 to 41.2	39.3 to 44.1	4.0 to 4.5	29.0 to 32.5
M12 (12 mm, 0.47 in.)	62.8 to 72.5	6.4 to 7.4	46.3 to 53.5	-	-	-	77.5 to 90.2	7.9 to 9.2	57.2 to 66.5	62.8 to 72.5	6.4 to 7.4	46.3 to 53.5
M14 (14 mm, 0.55 in.)	108 to 125	11.0 to 12.8	79.6 to 92.5	-	-	-	124 to 147	12.6 to 15.0	91.2 to 108	-	-	-

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[2] STUD BOLTS

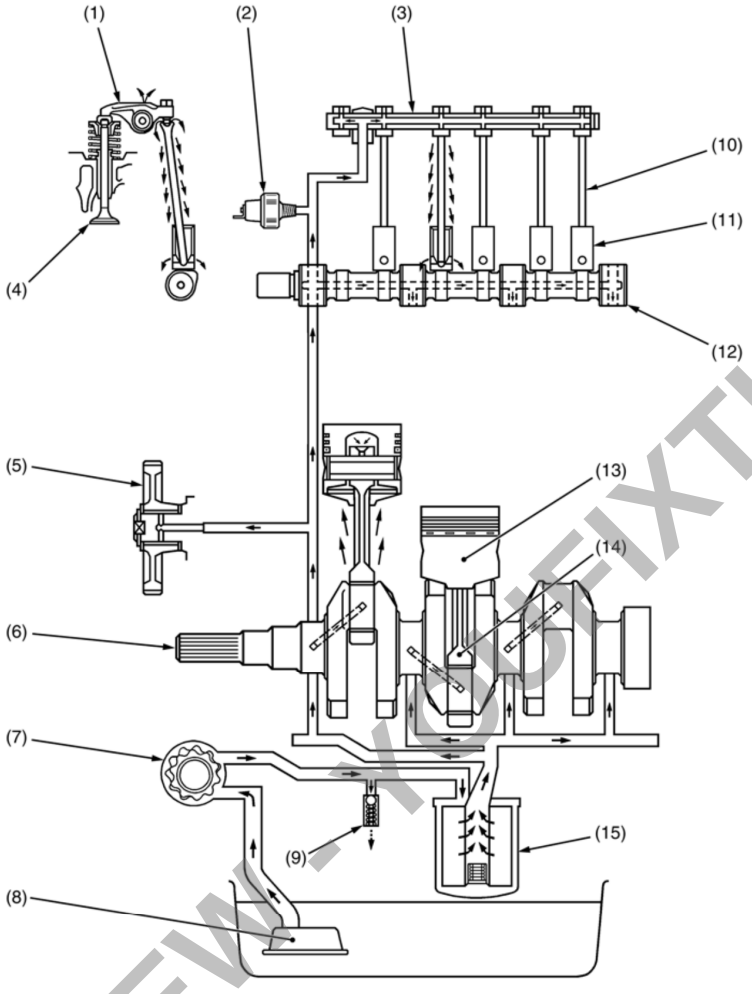
Material of opponet part	Ordinariness			Aluminum		
Unit / Diameter	N·m	kgf·m	ft-lbs	N·m	kgf·m	ft-lbs
M8 (8 mm, 0.31 in.)	11.8 to 15.6	1.2 to 1.6	8.68 to 11.5	8.82 to 11.8	0.90 to 1.2	6.51 to 8.67
M10 (10 mm, 0.39 in.)	24.6 to 31.3	2.5 to 3.2	18.1 to 23.1	19.7 to 25.4	2.0 to 2.6	14.5 to 18.8

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2. LUBRICATING SYSTEM



(1) Rocker Arm
(2) Oil Pressure Switch
(3) Rocker Arm Shaft
(4) Valve
(5) Idle Gear
(6) Crankshaft
(7) Oil Pump
(8) Oil Strainer
(9) Relief Valve
(10) Push Rod
(11) Tappet
(12) Camshaft
(13) Piston
(14) Connecting Rod
(15) Oil Filter Cartridge

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This engine's lubricating system consists of oil strainer (8), oil pump (7), relief valve (9), oil filter cartridge (15) and oil pressure switch (2).

The oil pump sucks lubricating oil from the oil pan through the oil strainer and the oil flows down to the filter cartridge, where it is further filtered. Then the oil is forced to crankshaft (6), connecting rods (14), idle gear (5), camshaft (12) and rocker arm shaft (3) to lubricate each part.

Some part of oil, splashed by the crankshaft or leaking and dropping from gaps of each part, lubricates these parts: piston (13), cylinders, small ends or connecting rods, tappets (11), push rods (10), inlet and exhaust valves (4) and timing gears.

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5. WIRING DIAGRAM

Color of Wiring

B ..... Black	R ..... Red	SB ..... Sky Blue
Y ..... Yellow	W ..... White	LG ..... Light Green
L ..... Blue	BR ..... Brown	P ..... Pink
G ..... Green	O ..... Orange	GR ..... Gray

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1. TROUBLESHOOTING

Symptom	Probable Cause	Solution	Reference Page
Engine Does Not Start	● Terminal cover is open	Close terminal cover	—
	● No fuel	Replenish fuel	—
	● Air in the fuel system	Bleed	—
	● Water in the fuel system	Change fuel and repair or replace fuel system	—
	● Fuel hose clogged	Clean	—
	● Fuel filter clogged	Change	G-19
	● Excessively high viscosity of fuel or engine oil at low temperature	Use specified fuel or engine oil	G-15
	● Fuel with low cetane number	Use specified fuel	—
	● Fuel leak due to loose injection pipe retaining nut	Tighten retaining nut	1-S30
	● Incorrect injection timing	Adjust	1-S18
	● Fuel camshaft worn	Replace	1-S38
	● Injection nozzle clogged	Repair or replace	1-S46
	● Injection pump malfunctioning	Replace	1-S35
	● Seizure of crankshaft, camshaft, piston, cylinder or bearing	Repair or replace	—
	● Compression leak from cylinder	Replace head gasket, tighten cylinder head screw, glow plug and nozzle holder	1-S12
	● Improper valve timing	Correct or replace timing gear	1-S37
	● Piston ring and cylinder worn	Replace	1-S41, S59, S66
	● Excessive valve clearance	Adjust	1-S14
(Starter Does Not Run)	● Battery discharged	Charge	—
	● Starter malfunctioning	Repair or replace	1-S47
	● Wiring disconnected	Connect	—

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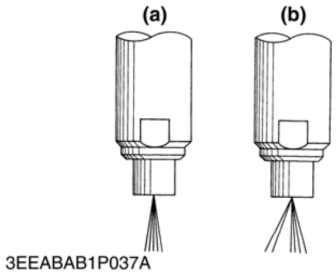
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CAUTION

- **Check the injection pressure and condition after confirming that there is nobody standing in the direction the fume goes.**
- **If the fume from the nozzle directly contacts the human body, cells may be destroyed and blood poisoning may be caused.**

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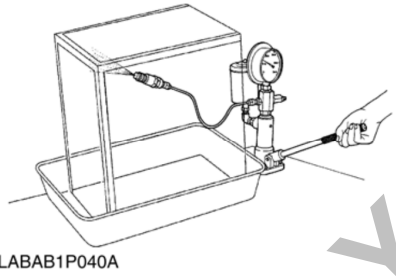
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Nozzle Spraying Condition

1. Set the injection nozzle to a nozzle tester, and check the nozzle spraying condition.
2. If the spraying condition is defective, replace the nozzle piece.

(a) Good **(b) Bad**

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Fuel Injection Pressure

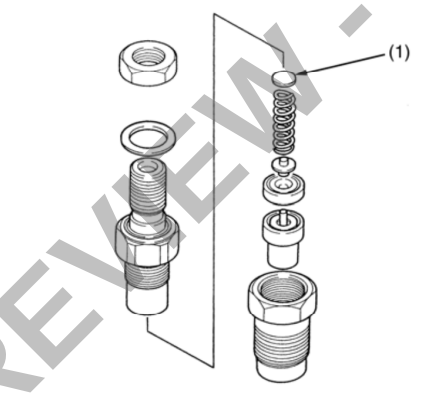
1. Set the injection nozzle to a nozzle tester.
2. Slowly move the tester handle to measure the pressure at which fuel begins jetting out from the nozzle.
3. If the measurement is not within the factory specifications, replace the adjusting washer (1) in the nozzle holder to adjust it.

Fuel injection pressure	Factory spec.	13.73 to 14.71 MPa 140 to 150 kgf/cm^2 1991 to 2134 psi

(Reference)

- Pressure variation with 0.01 mm (0.0004 in.) difference of adjusting washer thickness.
  Approx. 235 kPa (2.4 kgf/cm^2, 34 psi)

(1) Adjusting Washer



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