SEBMU4230106

SHOP MANUAL

KOMATSU WA380-1

MACHINE MODEL SERIAL No.

WA380-1 **10001 and up**

CONTENTS

WEIGHT TABLE

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

Unit: kg

Machine Model	WA380-1	
Serial No.	10001 – 19999	20001 and up
Engine assembly	750	750
Radiator assembly	160	160
Torque converter assembly	160	160
Transmission assembly	550	550
Center drive shaft	25	25
Front drive shaft	20	20
Rear drive shaft	12	11
Front axle assembly	1,129	1,132
Rear axle assembly	1,109	1,120
Front differential assembly	191	191
Rear differential assembly	176	176
Planetary carrier assembly (1 piece)	68	68
Planetary hub assembly (1 piece)	73	78
Axle support (Rear axle)	61(83)	102
Wheel (1 piece)	100	100
Tire (1 piece)	210	210
Steering valve	32	22
Steering cylinder (1 piece)	27	25
Brake (1 piece)	111	97
Hydraulic tank (dry)	83	235
Hydraulic pump	26	45
Main control valve	57	57
Lift cylinder (1 piece)	164	149
Dump cylinder	185	165
Engine hood	134	134
Front frame	1,308	1,320
Rear frame	1,021	1,095
Bucket link	52	53
Tilt lever	248	310

Unit: kg

Machine Model	WA380-1	
Serial No.	10001 – 19999	20001 and up
Lift arm with bushing	960	998
Bucket with bolt on cutting edge	1,560	1,590
Counterweight	785	885
Fuel tank	204	173
Battery (1 piece)	44	44
Air conditioner unit	57	57
Operator's seat	37	37
Floor plate	75	112
Cab	310	310

TABLE OF OIL AND COOLANT QUANTITIES

RESERVOIR	KIND OF FLUID	AMBIENT TEMPERATURE	CAPACITY (ℓ) Specified	CAPACITY (ℓ) Refill
		−22 −4 14 32 50 68 86 104 122°F −30 −20 −10 0 10 20 30 40 50°C		
Engine oil pan	Engine oil	SAE 30 / SAE 10W / SAE 10W-30 / SAE 15W-40	24 (24)	22 (22)
Brake	Engine oil	SAE 10W	7 (–)	7 (–)
Transmission case	Engine oil	SAE 30 / SAE 10W	55 (55)	53 (53)
Hydraulic system	Engine oil	SAE 10W	120 (140)*1	76 (90)*1
Axle (Front and rear)		See NOTE (4)	each 45 (each 48)	each 45 (each 48)
Fuel tank	Diesel fuel	ASTM D975 No. 1 / ASTM D975 No. 2	240 (270)	–
Cooling system	Water	Add antifreeze	52 (52)	–

( ): For serial No. 20001 and up
*1: Incl. brake system

ASTM: American Society of Testing and Material
SAE: Society of Automotive Engineers

Specified capacity: Total amount-of oil including oil for components and oil in piping.
Refill capacity: Amount of oil needed to refill system during normal inspection and maintenance.

NOTE:

(1) When fuel sulphur content is less than 0.5%, change oil in the oil pan every periodic maintenance hours described in this manual.
Change oil according to the following table if fuel sulphur content is above 0.5%.

Fuel sulphur content	Change interval of oil in engine oil pan
0.5 to 1.0%	1/2 of regular internal
Above 1.0%	1/4 of regular interval

(2) When starting the engine in an atmospheric temperature of lower than 0°C, be sure to use engine oil of SAE10W, SAE10W-30 and SAE15W-40, even though an atmospheric temperature goes up to 10°C more or less in the day time.

(3) Use API classification CD as engine oil and if API classification CC, reduce the engine oil change interval to half.

(4) For axle oil, use only recommended oil as follows.
SHELL: DONAX TT or TD
CALTEX: RPM TRACTOR HYDRAULIC FLUID
CHEVRON: TRACTOR HYDRAULIC FLUID
TEXACO: TDH OIL
MOBIL: MOBILAND SUPER UNIVERSAL

★ It is possible to substitute engine oil CLASS-CD SAE30 for axle oil.

ENGINE
12 TESTING AND ADJUSTING

★ The following precautions are necessary when using the Standard Value Tables to make judgements during troubleshooting or during testing and adjusting.

1. The values in these tables are based on the values for new machines leaving the plant, so they should be used as target values when repairing or when estimating wear after a period of use.
2. The standard values in these tables for judgement when troubleshooting are estimated values based on the standard values for the machine when shipped from the plant, and on the results of various tests. Therefore, they should be used as reference in combination with repair and operating records when making judgements.
3. These standard value tables must not be used for standard values when judging claims. In addition, do not use these values alone to make simple judgements.

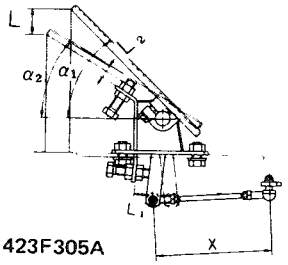
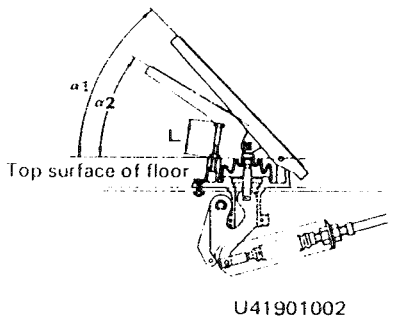
STANDARD VALUE TABLE

(For engine on test bench)

Engine				SA6D110-1	
Category	Item	Condition	Unit	Standard value	Permissible value
Performance	Engine speed	High idling speed Low idling speed	rpm rpm	2480 – 2580 730 – 780	2480 – 2530 730 – 780
	Necessary starting speed	0°C –20°C (using starting aid)	rpm rpm	Min. 150 Min. 100	– –
Intake and exhaust system	Intake resistance Exhaust pressure Exhaust temperature	All speed At rated output All speed (intake air temp.: 20°C)	mmH_2O mmHg 0°C	Max. 300 – Max. 650	635 – 650
	Exhaust gas color	Quick acceleration At high idling	Bosch index Bosch index	Max. 6.0 Max. 1.5	8.0 2.5
	Valve clearance (When engine is cold)	Intake valve Exhaust valve	mm mm	0.25 0.45	– –
Body	Compression pressure	Oil temperature 40 – 60°C (engine speed)	kg/cm^2 (rpm)	Min. 28 (300 – 350)	22 (300 – 350)
	Blow-by pressure	At rated output, oil temperature min. 70°C SAE30 oil	mmH_2O	Max. 150	300
Lubrication system	Oil pressure (Oil temperature min. 80°C)	At rated output SAE30 oil SAE10W oil At low idling SAE30 oil SAE10W oil	kg/cm^2 kg/cm^2 kg/cm^2 kg/cm^2	3.5 – 5.5 – Min. 1.5 –	2.5 – 0.7 –
	Oil temperature	Whole speed range (inside oil pan)	°C	90 – 110	120
	Oil consumption ration	At continuous rated horsepower (proportion of fuel consumption)	%	Max. 0.5	1.0
Fuel system	Fuel injection pressure	Nozzle tester	kg/cm^2	250 ± 10	200
	Fuel injection timing	Before top dead center	Degree	16	16 ± 1
Cooling system	Coolant temperature	Whole speed range (at engine outlet)	°C	70 – 90	100
	Thermostat function	Valve cracking temperature Temperature when fully open Lift when fully open	°C °C mm	74.5 – 78.5 90 10 ± 5	74.5 – 78.5 90 10 ± 5
	Radiator pressure valve function	Opening pressure (Differential pressure)	kg/cm^2	0.5 ± 0.1	0.5 ± 0.1
	Fan speed	At rated speed	rpm	1408 ± 30	1408 ± 30
	Fan belt tension	Deflect when pushed with a force of 6 kg	mm	7.5	5 – 10

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

(For engine on chassis)

Engine					SA6D110-1	
Category	Item		Condition	Unit	Standard value	Permissible value
Engine	Engine speed		High idling	rpm	2430 – 2530 (2480 – 2580)	2430 – 2530 (2480 – 2580)
			Low idling	rpm	730 – 780	730 – 780
	Exhaust gas color		Sudden acceleration	Bosch index	Max. 6.0	8.0
			At high idling	Bosch index	Max. 1.5	2.5
	Valve clearance		Intake valve (20°C)	mm	0.25	–
			Exhaust valve (20°C)	mm	0.45	–
	Compression pressure		Oil temp.: 40 – 60°C Engine speed: 300 – 350 rpm SAE30 oil	kg/cm²	Min. 28	19.5
	Blow-by pressure		(water temperature inside operating range) At rated output SAE30 oil	mmH_2O	Max. 150	300
	Oil pressure		(water temperature inside operating range)			
			At high idling	kg/cm²	3.5 – 5.5	2.5
			At low idling (SAE30, min. 80°C)	kg/cm²	Min. 1.5	0.7
			At low idling (SAE10W, min. 80°C)	kg/cm²	Min. 1.0	0.7
	Oil temperature		Whole speed range (inside oil pan)	°C	80 – 110	120
	Fuel injection timing		Compression B.T.D.C.	degree	16	16 ± 1
	Alternator drive belt tension		Slack when pushed with finger force of 6 kg	mm	7.5	5 – 10
Accelerator pedal	Operating force		**Serial No. 10001 – 19999**	kg	4 – 7	Max. 10.5
	Operating angle	α		degree	α_1 45 α_2 33	–
	Operating travel	L		mm	42	–
	Stopper height	L_1		mm	15 – 25	–
	Stopper height	L_2		mm	15 – 25	–
	Rod length	X	423F305A	mm	136 – 146	–
	Operating force		**Serial No. 20001 and up**	kg	4 – 8.5	Max. 10.5
	Operating angle	α_1		degree	45	–
	Operating angle	α_2		degree	28	–
	Stopper height	L		mm	47 ± 5°	–
			U41901002			

( ) : Serial No. 20001 and up

TOOL LIST FOR TESTING AND ADJUSTING

No.	Testing and measuring item	Tool	Part No.	Remarks
1	Engine speed	Tachometer	799-203-8000	Digital display 60-19,999 rpm
2	Battery specific gravity	Battery coolant tester	795-500-1000	1.100 – 1.300
3	Coolant freezing temperature			−5 – −50°C
4	Water temperature, oil temperature, intake temperature	Thermistor temperature gauge	790-500-1300 or 799-101-6000	0 – 200°C
5	Exhaust temperature			0 – 1,000°C
6	Lubricating oil pressure	Engine presssure measuring kit	799-203-2002	0 – 10 kg/cm²
7	Fuel pressure			0 – 20 kg/cm²
8	Intake pressure, exhaust pressure			0 – 1,500 mmHg
9	Blow-by pressure			0 – 1,000 mmH_2O
10	Intake resistance			−1,000 – 0 mmH_2O
11	Compression pressure	Compression gauge	795-502-1204	0 – 70 kg/cm²
12	Blow-by pressure	Blow-by checker	799-201-1503	0 – 500 mmH_2O
13	Valve clearance	Feeler gauge	795-125-1330	0.25, 0.45 mm
14	Exhaust gas color	Smoke meter	Commercially available	Discoloration 0 to 70% standard color (Discoloration % x 1/10 = Bosch index)
15	Fuel on water mixed in oil	Engine oil checker	799-201-6000	Water content 0.1%, 0.2% in standard sample
16	Coolant quality	Water quality tester	799-202-7001	PH, nitrous acid ion concentration
17	Leakage from cooling system	Cap tester	799-202-9001	0 – 2 kg/cm²
18	Fuel injection pressure Nozzle injection condition	Nozzle tester	Commercially available	0 – 300 kg/cm²
19	Electrical circuit	Tester	Commercially available	Current, voltage, resistance
20	Accelerator pedal force	Push-pull scale	7A0-262-0020	Commercially available 0 – 25 kg

⚠ When carrying out testing, adjusting or troubleshooting, stop the machine on level ground, insert the safety pins 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.

ADJUSTING VALVE CLEARANCE

★ Condition: Engine is cold.
★ Adjust clearance between valve and rocker lever as follows.

Unit: mm

	Intake valve	Exhaust valve
Cold	0.25	0.45

Special tool

	Part number	Part name	Q'ty
A	795-125-1330	Feeler gauge	1

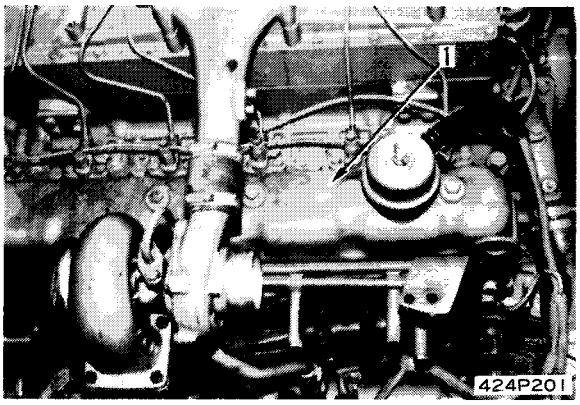
1. Remove air cleaner assembly and intake connector, then remove cylinder head cover (1).
2. Rotate the crankshaft in the normal direction to align pointer (2) with the 1.6 TOP mark on crankshaft pulley. When rotating, check the movement of the valves. When the pointer is in line with the 1.6 TOP mark, No.1 cylinder should be at compression top dead center.
3. When No. 1 cylinder is at compression top dead center, adjust the valve marked •.
   When No.6 cylinder is at compression top dead center, adjust the valves marked ○.

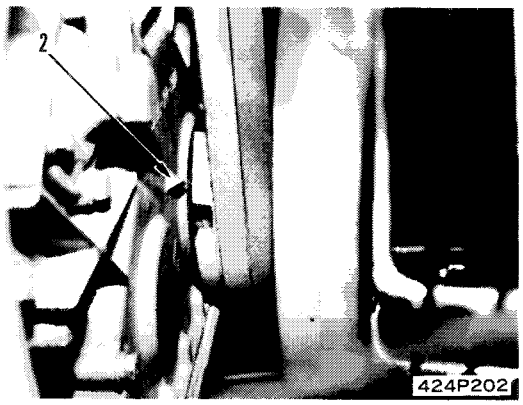
Cylinder No.	1		2		3		4		5		6	
Intake valve		•		•		○		•		○		○
Exhaust valve	•		○		•		○		•		○	

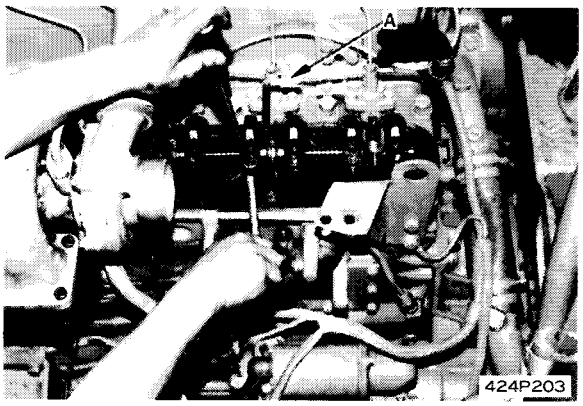
4. To adjust, insert tool **A** between rocker lever (3) and valve stem (4) and turn adjustment screw (5) until clearance is a sliding fit. Then tighten lock nut (6) to hold adjustment screw in position.

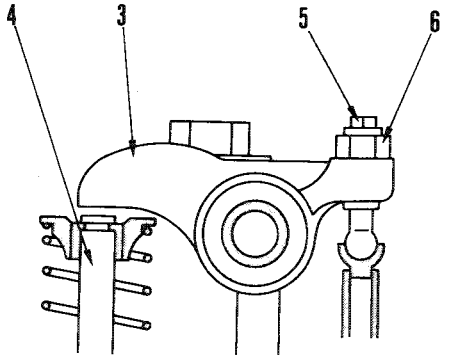
kgm Lock nut: **3.2 ± 0.3 kgm**

5. Next, rotate crankshaft one turn in the normal direction and adjust the valve clearance of the remaining valves marked ○.
   ★ After adjusting No.1 cylinder at compression top dead center, it is also possible to turn the crankshaft 120° each time and adjust the valve clearance of each cylinder according to the firing order.
   • Firing order: 1 – 5 – 3 – 6 – 2 – 4
   ★ After tightening the lock nut, check the clearance again.









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MEASURING COMPRESSION PRESSURE

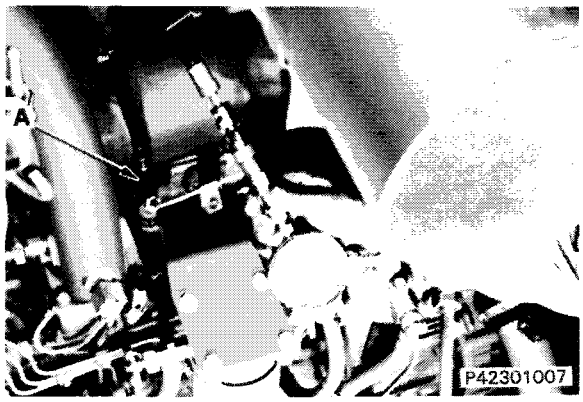
★ Measurement condition
- Coolant temperature: Inside operating range.
- Engine valve clearance: Standard value.
- Engine speed: 360 to 380 rpm

Unit: kg/cm²

Item	Standard value	Permissible value
Compression pressure	Min. 28	Min. 19.5

Special tools

	Part number	Part name	Q'ty
A	795-502-1204	Compression gauge	1
B	799-203-8000	Tachometer	1



★ If performance tests or troubleshooting shows that the piston, piston ring or cylinder liner may be worn, measure the compression pressure.

⚠ When measuring the compression pressure, be careful not to touch the exhaust manifold or muffler, or to get caught in rotating parts.

1. Adjust valve clearance.
   ★ For details, see ADJUSTING VALVE CLEARANCE.

2. Warm up engine (oil temperature 40°C).

3. Remove nozzle holder assembly.

4. Install adapter **A** in mount of nozzle holder assembly, and connect pressure gauge.

5. Set engine tachometer **B** in position.

6. Disconnect fuel CUT-OFF solenoid valve connector.
   Crank engine with starting motor and measure compression pressure.
   ★ Measure the compression pressure at the point where the pressure gauge indicator remains steady.
   ★ When measuring the compression pressure, measure the engine speed to confirm that it is within the specified range.

★ Installing the nozzle holder assembly after measuring the compression pressure.