To the reader

This Workshop Manual has been prepared to provide KUBOTA diesel engine RT, RT DI servicing personnel withinformation on the service and maintenance.

Thr topics are troubleshooting, servicing, specification lists, checking and adjusting, disassembling and assembling, and servicing which cover procedures, precautions, factory specifications and allowable limits.

SIAM KUBOTA hopes that this Workshop Manual will be benefit to the readers, especially to to the SIAM KUBOTA technicians foro their study and work in the future.

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TIGHTENING TORQUES TABLE

Material / Diameter	None ,4 Standard	7,Specail	9,Special
	SS 41 , S 20 C	S 43 C , S 48 C (Refined)	SCr435 , SCM435 (Refined)
M 6	80 - 95 kg.-cm.	100 - 115 kg.-cm.	125 - 145 kg.-cm.
M 8	180 - 210 kg.-cm.	240 - 280 kg.-cm.	300 - 350 kg.-cm.
M 10	400 - 460 kg.-cm.	490 - 570 kg.-cm.	620 - 720 kg.-cm.
M 12	640 - 740 kg.-cm.	790 - 920 kg.-cm.	1,050 - 1,200 kg.-cm.
M 14	1,100 - 1,280 kg.-cm.	1,260 - 1,500 kg.-cm.	1,700 - 2,000 kg.-cm.
M 16	1,700 - 1,950 kg.-cm.	2,000 - 2,300 kg.-cm.	2,650 - 3,100 kg.-cm.
M 18	2,500 - 2,900 kg.-cm.	2,800 - 3,250 kg.-cm.	3,500 - 4,100 kg.-cm.
M 20	3,400 - 4,000 kg.-cm.	3,750 - 4,400 kg.-cm.	5,000 - 5,800 kg.-cm.

The strength of bolt is shown by the indication on the top of it

Please check the indication before tightening.

Indication	Material
None,4	Standard SS 41 , S 20 C
7	Special S 43 C , S 48 C (Refined)
9	Specail SCr 435 , SCM 435 (Refined)

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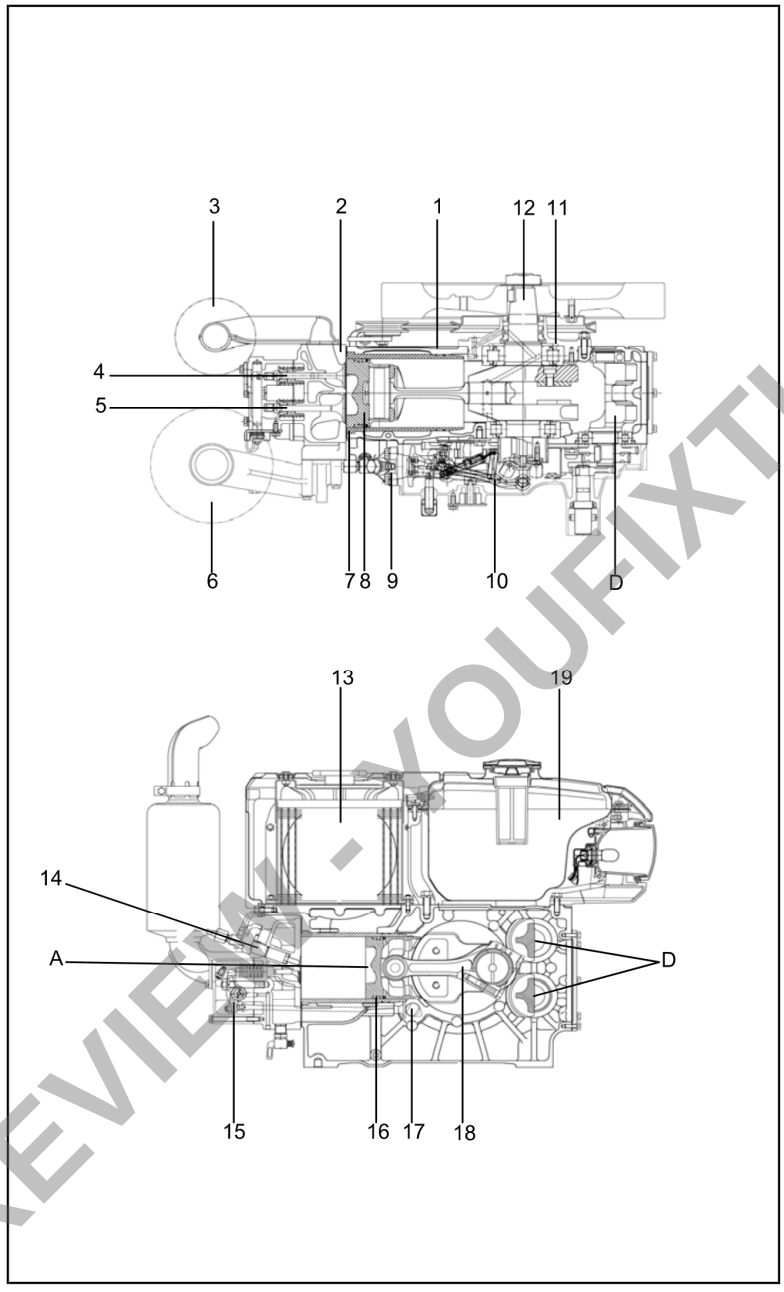
RT Engine Specifications

Details		Model	RT				
			80	90	100	110	120
Cylinder head	Cylinder head alignment	Allowable limit (mm./100 mm.	0.05				
	Head gasket thickness	(mm.)	1.28 - 1.48		1.23-1.46		
Valve	Clearance between piston and cylinder head	(mm.)	0.65 - 0.85				
	Valve seat angle	(degree)	45				
	Clearance between valve stem and valve guide	Allowable limit (mm.)	0.1				
	Valve recessing	Standard (mm.)	0.65 - 0.95				
		Allowable limit (mm.)	1.5				
Valve spring	Length	(mm.)	38.5				
	Spring rate	Standard (kg.)	6.8 kg.				
		Allowable limit (kg.)	5.8 kg.				
Rocker arm	Rocker arm O.D.	(mm.)	13.955 - 13.984				
	Rocker arm I.D.	(mm.)	14.000 - 14.018				
	Adjusting valve lifter	(mm.)	0.94 - 1.31 (1.5 rev.)				
Camshaft	Camshaf O.D.	(mm.)	21.946 - 21.980				
	Camshaf I.D.	(mm.)	22.000 - 22.021				
	Clearance between camshaft and cylinder block	Allowable limit (mm.)	0.25				
	Cam height (from Center)	Standard (mm.)	16.0				
		Allowable limit (mm.)	15.5				
	Clearance between camshaft gear and crankshaft gear	Allowable limit (mm.)	0.3				

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Features



1. Cylinder block
2. Cylinder head
3. Exhaust pipe
4. Exhaust valve
5. Intake valve
6. Air filter
7. Liner
8. Piston
9. Fuel injection pump
10. Governor arm
11. Crankshaft bearing housing
12. Crankshaft
13. Radiator net
14. Nozzle
15. Rocker arm
16. piston ring
17. Crankshaft
18. Connecting rod
19. Fuel tank

(A) Combustion chamber

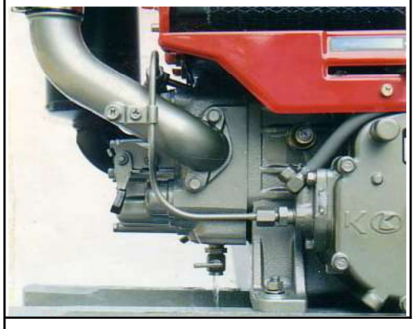
(D) Balancer

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Disassembling KUBOTA Diesel RT, RT DI

Before Disassembling

Task	Disassembling Process	Tools
1. Changing Coolant **(Water drain)** 	1. Turn the drain plug to "open" position. (as the picture) 2. Remove the radiator cap. 3. Completely drain the coolant. **CAUTION** Do not change the coolant while the engine is still hot, this may cause personal injuries and damages to other engine parts.	

Model / Detail	RT80 - RT90	RT100 - RT120	RT140
Coolant Capacity (L)	1.6	2.2	

Task	Disassembling Process	Tools
2. Draining Engine Oil **(Oil Drain)** 	1. Remove the dipstick. 2. Remove the drain plug to drain oil. 3. Completelt drain the engine oil. (as the picture) **IMPORTANT** All the used oil can be drained out easily when the engine is still warm.	Ring wrench (No. 17)

Model / Details	RT80 - RT90	RT100 - RT140
Capacity (L)	2.4	2.8

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RT Engine Specifications

Details		Model	RT				
			80	90	100	110	120
Liner	Liner O.D.	Standard (mm.)	82.010 - 82.032	86.010 - 86.032	88.010 - 88.032	92.010 - 92.032	94.010 - 94.032
		Allowable limit (mm.)	0.2				
	Liner projection	(mm.)	0.03 - 0.13				
Piston ring	Ring gap 1, 2 , 3 , 4	Standard (mm.)	0.2 - 0.4				
		Allowable limit (mm.)	1.2				
	Clearance between ring 2 , 3 , 4 and piston pin groove	Standard (mm.)	0.020 - 0.052				
		Allowable limit (mm.)	0.15				
Piston	Piston ring I.D.	Standard (mm.)	25.000 - 25.013			27.000 - 27.021	
		Allowable limit (mm.)	25.04			27.04	
	Piston pin O.D.	(mm.)	25.002 - 25.011			27.002 - 27.011	
	Clearance between piston pin and piston pin hole	Standard (mm.)	0.014 - 0.038				
		Allowable limit (mm.)	0.2				
	Connecting rod alignment	Standard (mm.)	0.04				
		Allowable limit (mm.)	0.05				

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Maintenance

Period / Item	Daily	Every week (7 days) (dusty area)	first 50 hours (new engine)	every 100 hours (1 month)	every 300 hours (3 months)
1. Coolant	**Check** (fill clean water in radiator)				**Replace** (Fill in clean water and add anti-rust)
2. Engine oil	**Check** (Fill oil up to the level)		**Replace** (Fill oil up to the level)	**Replace** (Fill oil up to the level)	
3. Air cleaner	**Check** (Fill oil up to the level)	**Clean** (Fill oil up to the level)		**Clean** (Fill oil up to the level)	
4. Solar oil filter		**Clean** (water or dirt in filter) **Replace** (Solar filter is blocked or torn)		**Clean** (water or dirt in filter) **Replace** (Solar filter is blocked or torn)	
5. Fan belt	**Check/Replace** (fan belt is torn) **Adjust** (fan belt tension 10-15 mm.)				
6. Solar oil tank	**Check** (Fill solar oil)				**Clean**
7. Intake/eshaust valve				**Adjust** (clearance 0.20 mm.)	

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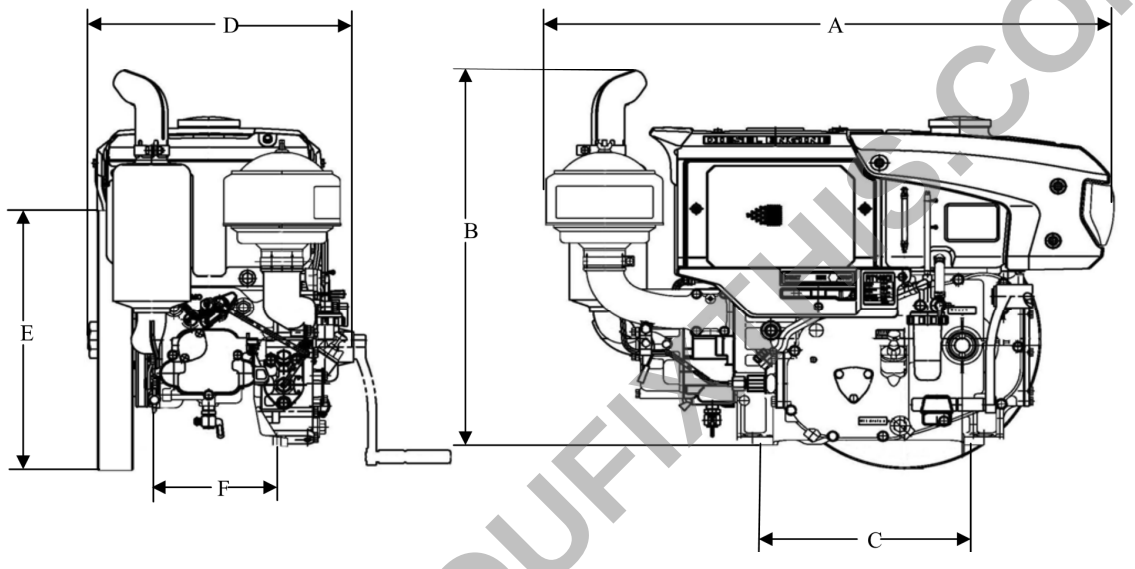
Troubleshooting

Problem	Symptom	Probable Cause	Solution
1. Engine does not start	1. Starter does not run	1.1 Seizure of crankshaft and camshaft	Repair
		1.2 Seizure of piston and piston ring	Replace
		1.3 Seizure of bearing	Repair
		1.4 Lubrication system malfunctioning	Fix
	2. Starter runs	2.1 Injection noise less than normal	
		ก. Fuel insufficient	
		- Fuel line leak or broken	Replace
		- Air in fuel line	Fix
		- Fuel filter clogged	Clean
		- Injection pump malfunctioning	Fix
		ข. Injection pump does not work	
		- Plunger worn or seizing	Replace
		- Delivery valve spring broken	Replace
		- Delivery valve worn or seizing	Replace
		ค. Nozzle does not work (fuel injection pump)	
		- Seizure of nozzle pin	Replace
		- Nozzle spring broken	Replace
		- Improper pressure	Adjust
		- Fuel line not tighten	Tighten
		2.2 Injection noise louder than normal	
		ก. Incorrect injection degree	Fix
		ข. Compression leak	
		- Intake/exhaust valve not tight	Repair
		- Intake/Exhaust valve spring broken or defective	Replace
		- Seizure of intake/exhaust valve	Repair
		- Head gasket broken or cylinder head aligned	Replace
		- Cylinder head mounting nut not tighten	Tighten
		- Piston ring worn or loose	Replace
		- Liner worn or loose	Replace

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DIMENSIONS



Model / Size		A	B	C	D	E	F
RT80	**(mm.)**	722	503	323	358	Ø 362	170
RT90	**(mm.)**	722	503	323	358	Ø 370	170
RT100,RT100 DI	**(mm.)**	769	508	323	369.5	Ø 380	170
RT110,RT110 DI	**(mm.)**	769	508	323	369.5	Ø 380	170
RT120,RT120 DI	**(mm.)**	790	508	323	369.5	Ø 380	170
RT140 DI	**(mm.)**	776	482	323	370	Ø 380	170

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Diesel Engine Part Checking

Cylinder Head Measurement

Task	Measurement Process	Tools
1. Checking Compression Pressure **(Compression pressure)** 	1. Warm the engine then stop it. 2. Remove the nozzle set. 3. Install the compression tester to the cylinder. 4. Run the engine on 100 - 200 rmp without starting it. Then read the pressure. (as the picture)	Compressor Tester T wrench (No. 12)

NOTE

1. Check the compression pressure with the specified valveclearance.
2. If the measurement is below the allowable limit, apply about 10 CCof oil to the intake pipe and measure the compression pressure again.
   - 2.1 If the pressure is in the allowable limit, mean piston , cylinder and piston ring are worn.
   - 2.2 If the pressure is below the allowable limit, mean valve or cylinder is worn.

Compression Pressure

Model / Details	RT80	RT90	RT100 - RT120	RT140
Standard (kg./ cm2)	34.3	33	30.8	30.2
Allowable limit (kg./ cm2)	25.8	24.8	22.8	20.4

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