WSM

WORKSHOP MANUAL
DIESEL ENGINES

OC60,OC80,OC95

Kubota

KiSC issued 05, 2006 A

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

CONTENTS

SPECIFICATIONS ——— 1
PERFORMANCE CURVES ——— 4
APPEARANCE AND DIMENSIONS ——— 6

M. MECHANISM

F. FEATURE ——— M-1
1. ENGINE BODY ——— M-3
[1] CYLINDER HEAD ····· M-5
[2] CRANK CASE AND CYLINDER LINER ····· M-5
[3] UNIAXIAL BALANCER SYSTEM ····· M-5
2. LUBRICATING SYSTEM ——— M-7
[1] GENERAL ····· M-7
[2] OIL STRAINER ····· M-7
[3] OIL PUMP ····· M-9
[4] OIL PRESSURE SWITCH ····· M-9
3. COOLING SYSTEM ——— M-11
[1] GENERAL ····· M-11
[2] OIL COOLER ····· M-11
4. FUEL SYSTEM ——— M-13
[1] GENERAL ····· M-13
[2] INJECTION PUMP ····· M-13
(1) Pump Element ····· M-13
(2) Delivery Valve ····· M-15
[3] INJECTION NOZZLE ····· M-15
[4] FUEL FILTER ····· M-15
[5] GOVERNOR MECHANISM ····· M-17
5. ELECTRICAL SYSTEM ——— M-25
[1] GENERAL ····· M-25
[2] ALTERNATOR ····· M-25
[3] REGULATOR ····· M-25

S. DISASSEMBLING AND SERVICING

G. GENERAL ——— S-1
[1] ENGINE IDENTIFICATION ····· S-1
[2] GENERAL PRECAUTIONS ····· S-1
[3] TROUBLE-SHOOTING ····· S-3
[4] SERVICING SPECIFICATIONS ····· S-9
[5] TIGHTENING TORQUES ····· S-28
[6] MAINTENANCE CHECK LIST ····· S-31
[7] CHECK AND MAINTENANCE ····· S-33
(1) Daily Chek Point ····· S-33
(2) Chek Points of Initial 25 Hours ····· S-33
(3) Chek Points of Every 50 Hours ····· S-33
(4) Chek Points of Every 100 Hours ····· S-35
(5) Cleaning Fuel Filter ····· S-35
(6) Chek Points of Every 300 Hours ····· S-35
[8] SPECIAL TOOLS ····· S-37
1. ENGINE BODY ——— S-49
CHECKING AND ADJUSTING ····· S-49
DISASSEMBLING AND ASSEMBLING ····· S-51
[1] DRAINING OIL AND FUEL OIL ····· S-51
[2] EXTERNAL COMPORNENTS ····· S-53
[3] CYLINDER HEAD AND VALVES ····· S-53
[4] INJECTION PUMP ····· S-57
[5] SIDE COVER ····· S-59
[6] PISTON AND CONNECTING ROD ····· S-63
[7] SPEED CONTROL LEVER AND GOVERNOR LEVER ····· S-69
SERVICING ····· S-73
[1] CYLINDER HEAD AND CYLINDER ····· S-73
[2] PISTON AND CONNECTING ROD ····· S-79
[3] CRANKSHAFT AND CAMSHAFT ····· S-83
2. LUBRICATING SYSTEM ——— S-89
CHECKING ····· S-89
DISASSEMBLING AND ASSEMBLING ····· S-89
[1] OIL PUMP ····· S-89
[2] RELIEF VALVE ····· S-89
SERVICING ····· S-91
[1] OIL PUMP ····· S-91
3. FUEL SYSTEM ——— S-93
CHECKING AND ADJUSTING ····· S-93
[1] INJECTION PUMP ····· S-93
[2] INJECTION NOZZLE ····· S-95
DISASSEMBLING AND ASSEMBLING ····· S-97
[1] INJECTION PUMP ····· S-97
[2] INJECTION NOZZLE ····· S-97
4. ELECTRICAL SYSTEM ——— S-99
CHECKING ····· S-99
[1] ALTERNATOR ····· S-99
[2] REGULATOR ····· S-99
[3] GLOW PLUG ····· S-101
[4] STARTER ····· S-101
DISASSEMBLING AND ASSEMBLING ····· S-105
[1] STARTER ····· S-105
SERVICING ····· S-109

KiSC issued 05, 2006 A

PREVIEW OF YOUFIXTHIS.COM
Download full manual at youfixthis.com

SPECIFICATIONS

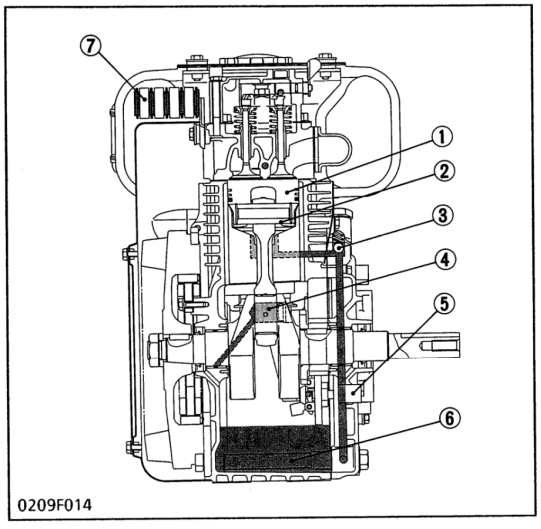
Model			OC60	OC80	OC95
Type			Oil-cooled 4-cycle diesel engine		
Number of Cylinders			1		
Bore and Stroke		mm(in)	72 x 68(2.83 x 2.68)	77 x 77(3.03 x 3.03)	83 x 77(3.27 x 3.03)
Displacement		$cm^3(in^3)$	276(16.8)	358 (21.8)	416(25.4)
Brake Horsepower	SAE Net cont.	kW/rpm (HP/rpm)	4.2/3600 (5.6/3600)	5.2/3600 (7.0/3600)	6.3/3600 (8.5/3600)
	SAE Net Intermittent	kW/rpm (HP/rpm)	4.6/3600 (6.2/3600)	6.0/3600 (8.0/3600)	7.1/3600 (9.5/3600)
	DIN6271-NA	kW/rpm (PS/rpm)	4.0/3600 (5.5/3600)	5.1/3600 (7.0/3600)	6.3/3600 (8.5/3600)
	DIN6271-NB	kW/rpm (PS/rpm)	4.4/3600 (6.0/3600)	5.7/3600 (7.8/3600)	6.8/3600 (9.3/3600)
Max. Bare Speed		rpm	3800		
Min. Bare Speed		rpm	1200		
Combustion System			TVCS (Three-vortex Combustion System)		
Fuel Injection Pump			NC Type (DENSO)		
Injection Timing		(static)	0.26 to 0.30 rad. (15° to 17°) before Top Dead Center		
Injection Pressure			142 to 150 kgf/cm^2 (13.93 to 14.71 MPa, 2019 to 2133 Psi)		
Compression Ratio			24.5:1	24:1	
Governor			Centrifugal Mechanical Governor		
Cooling System			Oil Cooling + Air cooling		
Lubricating System			Forced Lubrication with Trochoid Pump		
Lubricating Oil			Quality better than API service CC class		
Stareing System			Electric Starting with Cell Starter (12V)		
Fuel			Diesel Fuel No.2-D (ASTM D975)		
Fuel tank Capacity			3.6ℓ(0.95 U.S.gal, 0.79 Imp.gal)	5.5ℓ(1.45 U.S.gal, 1.21Imp.gal)	
Lubricant Capacity			1.3ℓ(1.37 U.S.qts, 1.14 Imp.qts)	1.7ℓ(1.80 U.S. qts, 1.49Imp.qts)	
Dry Weight			38 kg (83.8lbs.)	55 kg (121.3lbs)	

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

2 LUBRICATING SYSTEM

[1] GENERAL



0209F014

Lubrication is forced on with a trochoid pump. Lubrication oil is sucked in by the trochoid pump (5) via an oil strainer (6) mounted on the side of the gear case. The pressure of lubricating oil discharged from the trochoid pump is regulated by a relief valve (3) to 147 to 490 kPa (1.5 to 5 kgf/cm^2, 21 to 71 psi) (at the rated revolution speed of the engine) and the pressure-regulated oil then fed to the various portions through the oil gallery in the cylinder block.

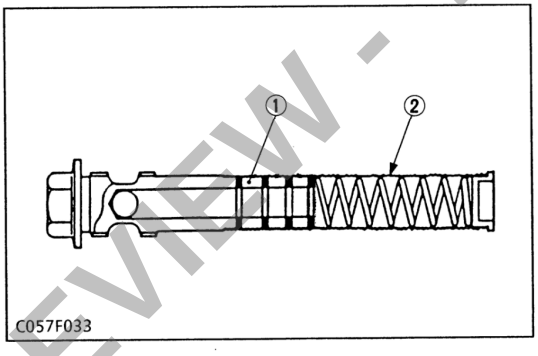
Lubricating oil sent to the oil gallery in the crankshaft lubricates the crank pin portion (4).

The oil passes along the cylinder liner and reaches the cylinder head to cool it down. The oil then flows into the oil cooler (7). The oil cooled there passes through the relief valve opening of the cylinder head and returns into the crankcase.

Other items such as the piston, (1) piston pin, (2) camshaft, tappet, bearing and rocker arm are lubricated by splash of the crankshaft, etc.

(1) Piston
(2) Piston Pin
(3) Relief Valve
(4) Crank Pin
(5) Trochoid Pump
(6) Oil Strainer
(7) Oil Cooler

[2] OIL STRAINER



C057F033

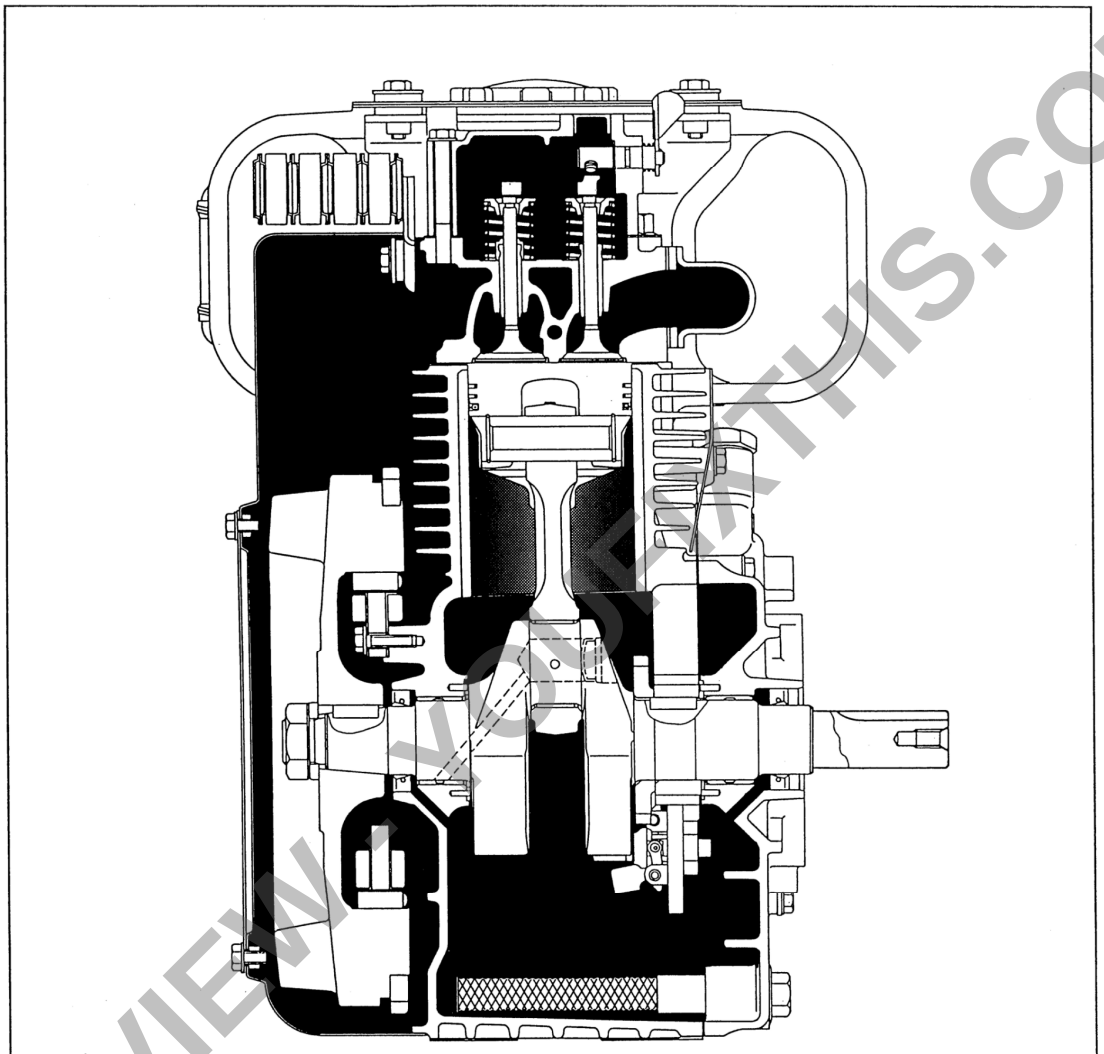
Entry of foreign material such as iron chips, dirt, etc. into the lubricating system may damage the lubricated parts. To prevent this, an oil strainer is equipped prior to the oil pump. This strainer has a double wounds stainless steel net (50 meshes) (2) at the outside, and magnets (1) are mounted inside.

This stainless steel net removes small dirt in the lubricating oil. Further, fine iron chips passing through this net are attracted by these magnets to prevent them from entering the lubricating system.

(1) Magnet
(2) Stainless Steel Net

PREVIEW - YOUFIXTHIS.COM
Download full manual at youfixthis.com

1 ENGINE BODY



0209F012

The OC60,80,95 is a 4-cycle diesel engine. Backed by Kubota's rich experience in engine research and development, this brand-new engine has come up with the ACTV (Advanced Cooling Three Vortex) system, introduced first in the world. The engine features low noise, light weight, compactness, good fuel economy, pollution-free exhaust and many others.

PREVIEW ONLY FIXTHIS.COM

Download full manual at youfixthis.com

[3] TROUBLESHOOTING

Trouble	Probable Cause	Countermeasure	Reference Page
Engine does not start	• No fuel	Replenish fuel	–
	• Air in the fuel system	Vent air	–
	• Water in the fuel system	Replace fuel and repair or replace fuel system	–
	• Fuel pipe clogged	Clean	–
	• Fuel filter clogged	Clean or replace	–
	• Excessively high viscosity of fuel or engine oil at low temperature	Use the specified fuel	1
	• Fuel with low cetane number	Use the specified fuel	1
	• Fuel leak due to loose injection pipe retaining nut	Tighten nut	–
	• Incorrect injection timing	Adjust	S-93
	• Fuel camshaft worn	Replace	S-83
	• Injection nozzle clogged	Clean	S-37
	• Injection pump malfunctioning	Repair or replace	S-97
	• Seizure of crankshaft camshaft, piston, cylinder liner or bearing	Replace	S-79, 85
	• Compression leak from cylinder head	Replace head gasket Tighten cylinder head bolt and nozzle holder Correct valve seat	S-49
	• Deficient compression	Check and correct valve	S-49
	• Improper valve seat alignment, valve spring broken, valve seized	Replace	S-73
	• Incorrect valve timing	Adjust	S-49
	• Piston rings and liner worn	Replace	S-79, 81
	• Excessive valve clearance	Adjust	S-35
Engine Revolution is not smooth	• Fuel filter clogged or dirty	Clean	–
	• Air cleaner clogged	Clean or replace	S-35
	• Fuel leak due to loose injection pipe retaining nut	Tighten nut	S-35
	• Injection pump malfunctioning	Repair or replace	S-97
	• Incorrect nozzle injection pressure	Repair or adjust	S-95
	• Injection nozzle stuck or clogged	Replace	–
	• Fuel overflow pipe clogged	Clean	–
	• Governor malfunctioning	Repair	M-17, 21
Either white or blue exhaust gas is observed	• Excessive engine oil	Reduce to the specified level	S-33
	• Piston rings and liner worn or stuck	Replace	S-79
	• Incorrect injection timing	Adjust	S-93
	• Deficient compression	Check top clearance and correct valve recessing	S-49
Either black or dark gray exhaust gas is observed	• Overload	Lessen load	–
	• Low grade fuel used	Use the specified fuel	1
	• Fuel filter clogged	Clean or replace	S-33
	• Air cleaner clogged	Clean or replace	S-35

PREVIEW ONLY YOUFIXTHIS.COM

Download full manual at youfixthis.com

[4] SERVICING SPECIFICATIONS

1. ENGINE BODY

Cylinder Head

Item			Factory Specification	Allowable Limit
Cylinder Head Surface Flatness			–	0.05 mm 0.0020 in.
Top Clearance		OC60	0.60 to 0.75 mm 0.0236 to 0.0295 in.	–
		OC80, 95	0.65 to 0.80 mm 0.0256 to 0.0315 in.	–
Cylinder Head Gasket Thickness (Gromet Section)	Free	OC60	1.05 to 1.20 mm 0.0413 to 0.0472 in.	–
		OC80, 95	1.35 to 1.55 mm 0.0531 to 0.0610 in.	–
	Tightened	OC60	0.95 to 1.05 mm 0.0374 to 0.0413 in.	–
		OC80, 95	1.25 to 1.35 mm 0.0492 to 0.0531 in.	–
Compression Pressure			35 to 40 kgf/cm^2 3.43 to 3.92 MPa 498 to 569 psi	25.2 kgf/cm^2 2.47 MPa 358 psi

Valves

Valve Clearance (Cold)		0.14 to 0.18 mm 0.0055 to 0.0071 in.	–
Valve Seat Width		2.12 mm 0.0835 in.	–
Valve Seat Angle		45° 0.785 rad.	–
Valve Face Angle		45.5° 0.794 rad.	–
Valve Recessing		0.60 to 0.85 mm 0.0236 to 0.0335 in.	1.3 mm 0.0512 in.
Clearance between Valve Stem and Valve Guide	OC60	0.030 to 0.057 mm 0.0012 to 0.0022 in.	0.1 mm 0.0039 in.
	OC80, 95	0.035 to 0.065 mm 0.0014 to 0.0026 in.	0.1 mm 0.0039 in.
Valve Stem O.D.	OC60	5.968 to 5.980 mm 0.2350 to 0.2354 in.	–
	OC80, 95	6.960 to 6.975 mm 0.2740 to 0.2746 in.	–
Valve Guide I.D.	OC60	6.010 to 6.025 mm 0.2366 to 0.2372 in.	–
	OC80, 95	7.010 to 7.025 mm 0.2760 to 0.2766 in.	–

KiSC issued 05, 2006 A

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

[5] TIGHTENING TORQUES

- Screws, bolts and nuts must be tightened to the specified torque with a torque wrench.
- Several screws and nuts such as those used on the cylinder head must be tightened in proper sequence and to the proper torque.

(1) Tightening Torques for Special Use Screws and Nuts

Item		Size x Pitch	N·m	kgf·m	ft-lbs
o Cylinder Head Screws	OC60	M10 x 1.5	51.9 to 56.8	5.3 to 5.8	38.3 to 42.0
	OC80,95	M12 x 1.75	68,6 to 73.6	7.0 to 7.5	50.6 to 54.2
o Connecting Rod Screws	OC60	M7 x 1.0	18.6 to 21.6	1.9 to 2.2	13.7 to 15.9
	OC80,95	M8 x 1.25	27.5 to 30.4	2.8 to 3.1	20.3 to 22.4
* Flywheel Nut	OC60	M20 x 1.5	137 to 157	14 to16	101 to 116
	OC80,95	M24 x 1.5	235 to 255	24 to 26	174 to 188
Side Cover Screws		M8 x 1.25	23.5 to 27.4	2.4 to 2.8	17.4 to 20.3
o Rocker Arm Bracket Mounting Nut		M8 x 1.25	23.5 to 27.4	2.4 to 2.8	17.4 to 20.3
Injection Pump Mounting Screw		M6 x 1.0	9.8 to 11.3	1.0 to 1.15	7.2 to 8.3
Injection Pump Eye Joint Bolt		M10 x 1.0	14.7 to 19.6	1.5 to 2.0	10.8 to 14.5
Injection Pipe Retaining Nuts		M12 x 1.5	24.5 to 34.3	2.5 to 3.5	18.1 to 25.3
Oil Pipe Eye Joint Bolt		M12 x 1.25	24.5 to 29.4	2.5 to 3.0	18.1 to 21.7
Glow Plug		M10 x 1.25	19.6 to 24.5	2.0 to 2.5	14.5 to 18.1
Nozzle Holder Mounting Nuts		M8 x 1.25	13.72 to 17.6	1.4 to 1.8	10.1 to 13.0
Oil Switch Taper Screw		PT1/8	14.7 to 19.6	1.5 to 2.0	10.8 to 14.5
Exhaust Manifold Mounting Nuts		M8 x 1.25	23.5 to 27.4	2.4 to 2.8	17.4 to 20.3

* Apply Molycoat oil to the threads of the nuts marked "*" and tighten them up.
o Apply enough engine oil to the threads and bearing surface of the bolts and nuts marked "o" and tighten them up.

(2) Tightening Torques for General Use Screws, Bolts and Nuts

When the tightening torques are not specified, tighten the screws, bolts and nuts according to the table below.

Grade / Nominal Diameter / Unit	Standard Screw and Bolt ⬡ 4			Special Screw and Bolt ⬡ 7		
	N·m	kgf·m	ft-lbs	N·m	kgf·m	ft-lbs
M 6	7.9 to 9.3	0.80 to 0.95	5.8 to 6.9	9.8 to 11.3	1.00 to 1.15	7.23 to 8.32
M 8	17.7 to 20.6	1.8 to 2.1	13.0 to 15.2	23.5 to 27.5	2.4 to 2.8	17.4 to 20.3
M 10	39.2 to 45.1	4.0 to 4.6	28.9 to 33.3	48.1 to 55.9	4.9 to 5.7	35.4 to 41.2
M 12	62.8 to 72.6	6.4 to 7.4	46.3 to 53.5	77.5 to 90.2	7.9 to 9.2	57.1 to 66.5

Screw and bolt material grades are shown by numbers punched on the screw and bolt heads. Prior to tightening, be sure to check out the numbers as shown below.

Punched Number	Screw and Bolt Material Grade
None or 4	Standard Screw and Bolt SS41, S20C
7	Special Screw and Bolt S43C, S48C (Refined)

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

PREVIEW ONLY

You're viewing 8 of 76 pages

The full manual includes:

- All 76 pages, complete
- Searchable PDF (find any keyword)
- No watermarks
- Instant download
- Print-ready quality

GET FULL MANUAL NOW

Kubota OC60, OC80, OC95 Workshop Manual

Scan or click anywhere
youfixthis.com

Click anywhere on this page to get the full manual