WSM

WORKSHOP MANUAL
DIESEL ENGINE

OC60-E4,OC95-E4

Kubota

KiSC issued 03, 2014 A

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INFORMATION

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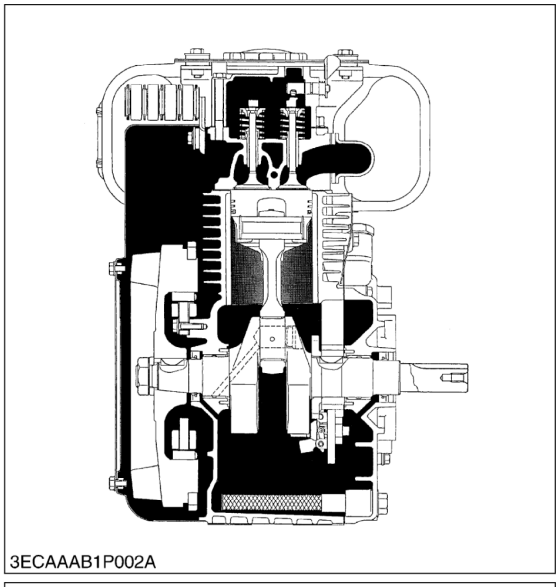
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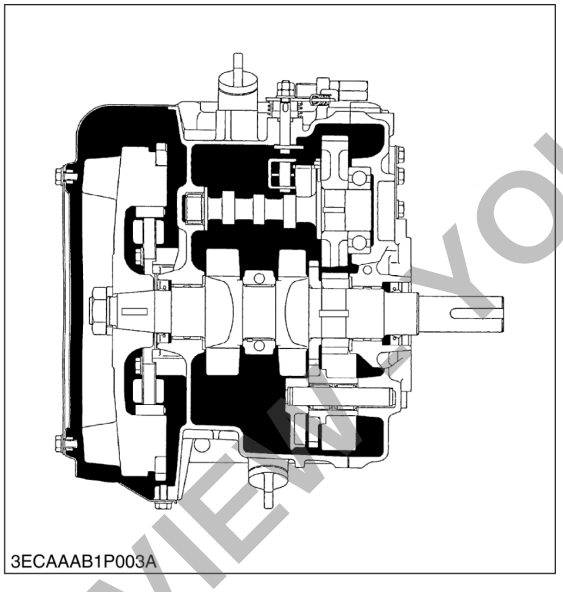
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2. ENGINE BODY



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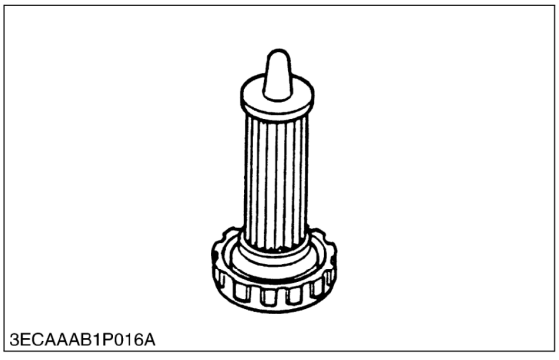
The OC60-E4 and OC95-E4 are a 4-cycle diesel engine. Backed by Kubota's rich experience in engine research and development, this brand-new engine has come up with the ACTV (Advanced Cooling Three Vortex) system, introduced first in the world. The engine features low noise, light weight, compactness, good fuel economy, pollution-free exhaust and many others.

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[4] FUEL FILTER



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The fuel filter is fitted inside the fuel tank with a ring nut. High-quality filter paper is used to filter out fine particles as small as 30 µm.

Air may enter the filter when it is washed clean or replaced with a new one or when the tank is refueled. To cope with the trouble of discharging the air, the filter has an air vent at the end to allow automatic air removal.

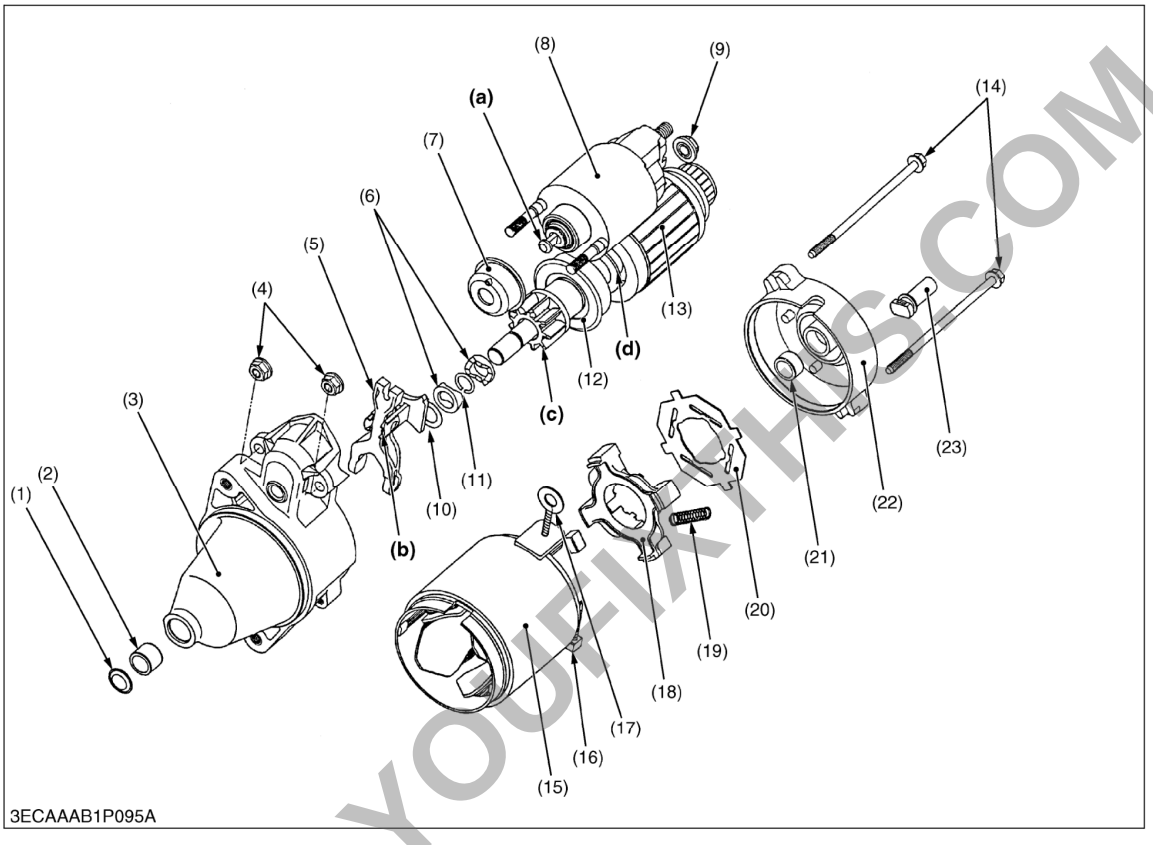
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(10) Starter

Disassembling Starter (OC60-E4)



(1) Plug	(7) Gasket	(13) Armature	(19) Brush Spring
(2) Bushing	(8) Magnet Switch	(14) Through Bolt	(20) Insulator
(3) Starter Drive Housing	(9) Nut	(15) Yoke	(21) Bushing
(4) Magnet Switch Mounting Nut	(10) Washer	(16) Brush	(22) End Frame
(5) Drive Lever	(11) Snap Ring	(17) Connecting Lead	(23) Cover
(6) Pinion Stop Nut	(12) Overrunning Clutch	(18) Brush Holder	

1. Unscrew the mounting nut (9), and disconnect the connecting lead (17).
2. Unscrew the magnet switch mounting nut (4).
3. Remove the magnet switch (8) by sliding it up so that it is disconnected from the drive lever (5).
4. Unscrew the two through bolts (14).
5. Remove the end frame (22).
6. Remove the insulator (20).
7. Remove the brush (16) and brush spring (19), and pull out the brush holder (18).
8. Draw out the yoke (15) from the starter drive housing (3).
9. Draw out the armature (13) with the drive lever (5).

CAUTION

- **When removing the brush (16) or insulator (20), prevent the brush spring (19) from popping out like a bullet.**

(To be continued)

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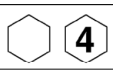
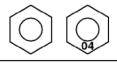
3. TIGHTENING TORQUES

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

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[1] TIGHTENING TORQUES FOR GENERAL USE SCREWS, BOLTS AND NUTS

If the tightening torque is not specified, refer to the table below for the none specified torques values.

Indication on top of bolt	 No-grade or 4T			 7T		
Indication on top of nut	 No-grade or 4T					
Unit	**N·m**	**kgf·m**	**lbf·ft**	**N·m**	**kgf·m**	**lbf·ft**
M6	7.9 to 9.3	0.80 to 0.95	5.8 to 6.8	9.81 to 11.2	1.00 to 1.15	7.24 to 8.31
M8	18 to 20	1.8 to 2.1	13 to 15	24 to 27	2.4 to 2.8	18 to 20
M10	40 to 45	4.0 to 4.6	29 to 33	49 to 55	5.0 to 5.7	37 to 41
M12	63 to 72	6.4 to 7.4	47 to 53	78 to 90	7.9 to 9.2	58 to 66

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1. TROUBLESHOOTING

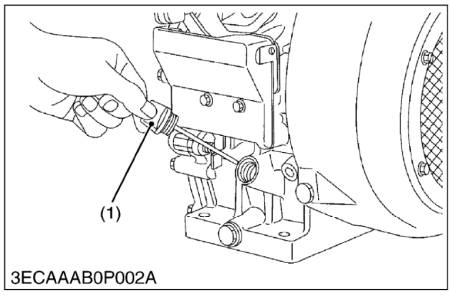
Symptom	Probable Cause	Solution	Reference Page
Engine Does Not Start	No fuel	Replenish fuel	–
	Air in the fuel system	Vent air	–
	Water in the fuel system	Replace fuel and repair or replace fuel system	–
	Fuel pipe clogged	Clean	G-8
	Fuel filter clogged	Clean or replace	G-9
	Excessively high viscosity of fuel or engine oil at low temperature	Use specified fuel	G-6
	Fuel with low cetane number	Use the specified fuel	G-6
	Fuel leak due to loose injection pipe retaining nut	Tighten nut	1-S22
	Incorrect injection timing	Adjust	1-S14
	Fuel camshaft worn	Replace	1-S27, 1-S41
	Injection nozzle clogged	Clean	G-11
	Injection pump malfunctioning	Replace	1-S14, 1-S15, 1-S24
	Seizure of crankshaft, camshaft, piston, cylinder liner or bearing	Replace	1-S27, 1-S28, 1-S40, 1-S41, 1-S42, 1-S43, 1-S44, 1-S45, 1-S46, 1-S47, 1-S48, 1-S49
	Compression leak from cylinder head	Replace head gasket Tighten cylinder head screw and nozzle holder Correct valve seat	1-S22, 1-S23, 1-S37
	Deficient compression	Check top clearance and correct valve recessing	1-S35, 1-S36
	Improper valve seat alignment, valve spring broken, valve seized	Replace	1-S37, 1-S38, 1-S39
	Incorrect valve timing	Adjust	1-S25
	Piston ring and liner worn	Replace	1-S27, 1-S28, 1-S43, 1-S44
	Excessive valve clearance	Adjust	G-10

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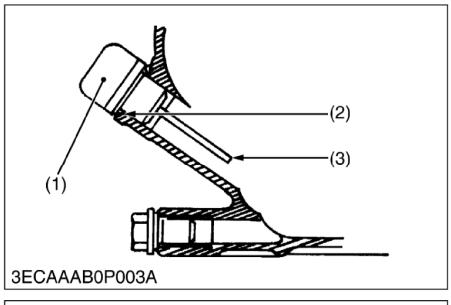
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6. CHECK AND MAINTENANCE

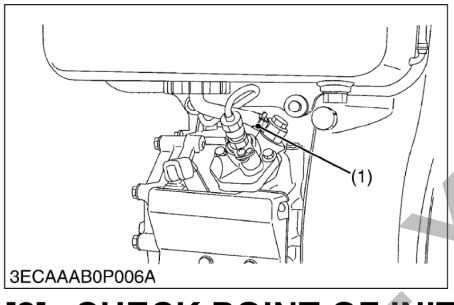
[1] DAILY CHECK



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Checking Engine Oil Level

1. Put the engine on a flat surface, and check the amount and condition of the oil with an oil plug (1).
2. If the oil level is below the lower limit (3), add new oil up to the upper limit (2).
3. When using an oil of different maker or viscosity from the previous one, remove all old oil. Never mix two different types of oil.

■ **NOTE**

- **Use the proper engine oil viscosity (SAE) according to the ambient temperature.**

(1) Oil Plug
(2) Upper Limit
(3) Lower Limit

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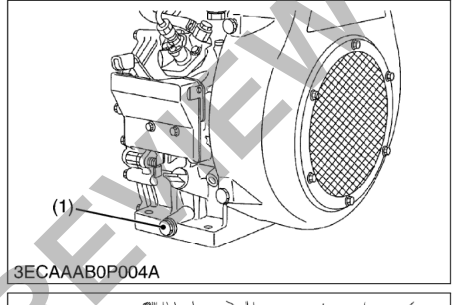
Checking Rubber Hose and Clamp Bands

1. If the clamps (1) are loose, replace with new ones.
2. The fuel and lubricating hoses are made of rubber and ages regardless of period of service. Change the fuel hoses together with the clamps every two year.
3. However, if the fuel and lubricating hose and clamp are found to be damaged or deteriorated earlier than two years, replace with new ones.

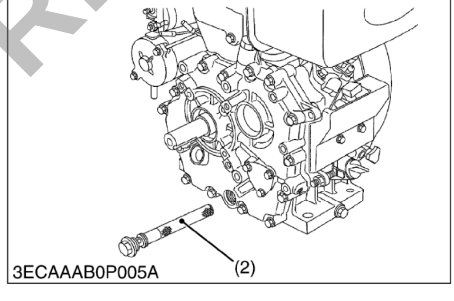
(1) Clamp

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[2] CHECK POINT OF INITIAL 25 HOURS



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Changing Engine Oil and Cleaning Oil Strainer

1. After warming up the engine, remove the drain plug (1) and drain the oil completely.
2. Put the drain plug and supply the specified quantity of the specified oil through the oil inlet.

■ **NOTE**

- **Clean the oil strainer (2) each time oil is changed.**

(When cleaning oil strainer)

1. Clean the oil strainer with fuel oil.
2. If the oil strainer is deformed or broken, replace it.

(1) Drain Plug
(2) Oil Strainer

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2. SPECIFICATIONS

Model	OC60-E4(-X)	OC60-E4(-X)-L	OC95-E4(-X)	OC95-E4(-X)-L
Number of Cylinders	1			
Type	Oil-cooled 4-cycle diesel engine			
Bore × Stroke	72.0 × 68.0 mm (2.83 × 2.68 in.)		83.0 × 77.0 mm (3.27 × 3.03 in.)	
Total Displacement	276 cm^3 (16.8 cu.in.)		416 cm^3 (25.4 cu.in.)	
ISO Net Continuous	4.12 kW / 3600 min^{-1} (rpm) (5.52 HP / 3600 min^{-1} (rpm))		6.25 kW / 3600 min^{-1} (rpm) (8.38 HP / 3600 min^{-1} (rpm))	
ISO/SAE Net Intermittent	4.5 kW / 3600 min^{-1} (rpm) (6.0 HP / 3600 min^{-1} (rpm))		7.0 kW / 3600 min^{-1} (rpm) (9.4 HP / 3600 min^{-1} (rpm))	
Maximum Bare Speed	3800 min^{-1} (rpm)			
Minimum Bare Idling Speed	1300 min^{-1} (rpm)			
Combustion System	TVCS (Three-vortex combustion system)			
Fuel Injection Pump	ND type (DENSO)			
Governor	Centrifugal mechanical governor			
Direction of Rotation	Clockwise (View from flywheel side)			
Injection Nozzle	DN4PD82 (DENSO)			
Injection Timing (Static)	0.28 rad (16 °) before T.D.C.		0.24 rad (14 °) before T.D.C.	
Injection Pressure	13.73 MPa (140,0 kgf/cm^2, 1991 psi)			
Compression Ratio	24.5 : 1		24.0 : 1	
Lubricating System	Forced lubrication by trochoid pump			
Oil Pressure Indicating	Electrical Type Switch			
Lubricating Filter	Oil strainer			
Cooling System	Oil cooling + Air cooling			
Starting System	Electric starting with starter			
Starting Motor	12 V, 0.7 kW		12 V, 1.2 kW	
Starting Support Device	By Glow Plug in Combustion Chamber			
EGR	None			
Battery	12 V, 27 AH equivalent		12 V, 36 AH equivalent	
Charging Alternator	12 V, 48 W	12 V, 170 W	12 V, 48 W	12 V, 170 W
Fuel	Diesel Fuel No. 2-D S500 or S15, see page -1.			
Fuel Tank Capacity	3.5 L (0.92 U.S.gals)		5.5 L (1.5 U.S.gals)	
Lubricating Oil	Class CF lubricating oil as per API classification is recommended. For details on recommended lubricating oils, see page -1.			
Lubricating Oil Capacity	1.3 L (1.4 U.S.qts)		1.7 L (1.8 U.S.qts)	
Weight (Dry)	38.0 kg (83.8 lbs)		56.0 kg (123 lbs)	

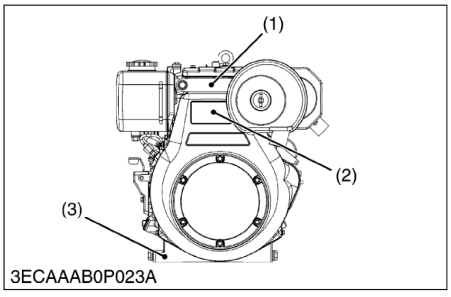
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1. ENGINE IDENTIFICATION

[1] MODEL NAME AND ENGINE SERIAL NUMBER



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You must identify the engine model name and serial number before you start a job. When you get in touch with the manufacturer, always tell your engine model name and serial number.

Engine Serial Number

The engine serial number is an identified number for the engine.
It appears after the engine model name.
It shows the month and year of manufacture as below.

Engine Series

Number or Alphabet	Series	Number or Alphabet	Series
1	05 (include: WG)	6	GZ, OC, AC, EA, E
2	V3	7	03
3	08	8	07
4	SM (include: WG)	A	EA, RK
5	Air Cooled Gasoline	B	03 (KET Production)

Production Year

Alphabet or Number	Year	Alphabet or Number	Year
1	2001	F	2015
2	2002	G	2016
3	2003	H	2017
4	2004	J	2018
5	2005	K	2019
6	2006	L	2020
7	2007	M	2021
8	2008	N	2022
9	2009	P	2023
A	2010	R	2024
B	2011	S	2025
C	2012	T	2026
D	2013	V	2027
E	2014		

(1) Model Name
(2) Emission Label
(3) Engine Model Name and Serial Number

(To be continued)

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