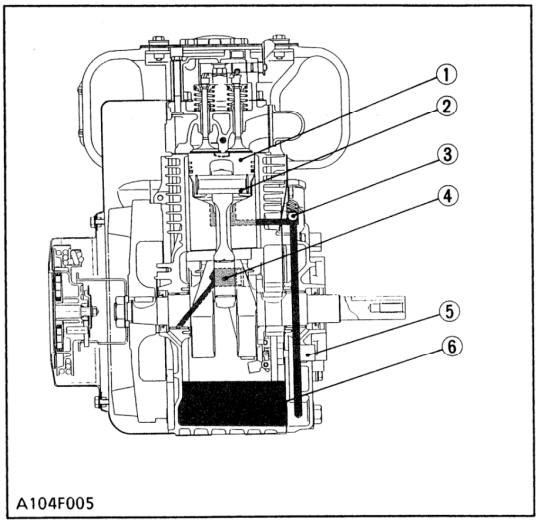
2 LUBRICATING SYSTEM

[1] GENERAL



A104F005

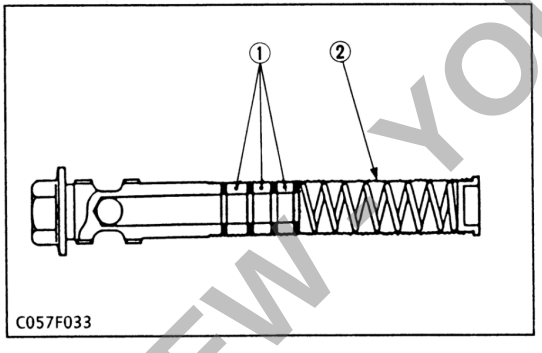
Lubrication is forced on with a trochoid pump. Lubrication oil is sucked in by the trochoid pump (5) via an oil strainer (6) mounted on the side of the gear case. The pressure of lubricating oil discharged from the trochoid pump is regulated by a relief valve (3) to 147 to 490 kPa (1.5 to 5.0 kgf/cm^2, 21 to 70 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).

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

[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 three 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

[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-85
	• Fuel camshaft worn	Replace	S-77
	• Injection nozzle clogged	Clean	S-89
	• Injection pump malfunctioning	Repair or replace	S-93
	• Seizure of crankshaft camshaft, piston, cylinder liner or bearing	Replace	S-73,77
	• Compression leak from cylinder head	Replace head gasket Tighten cylinder head nut and nozzle holder Correct valve seat	S-45
	• Deficient compression	Check and correct valve	S-45
	• Improper valve seat alignment, valve spring broken, valve seized	Replace	S-67
	• Incorrect valve timing	Adjust	S-45
	• Piston rings and liner worn	Replace	S-73,75
	• Excessive valve clearance	Adjust	S-31
Electric starter Type Starter Does Not Run	• Battery discharged	Charge	–
	• Starter malfunctioning	Repair or replace	–
	• Key switch malfunctioning	Repair or replace	–
	• Wiring disconnected	Connect	–
Engine Revolution is not smooth	• Fuel filter clogged or dirty	Clean	S-29
	• Air cleaner clogged	Clean or replace	S-29
	• Fuel leak due to loose injection pipe retaining nut	Tighten nut	S-29
	• Injection pump malfunctioning	Repair or replace	S-93
	• Incorrect nozzle injection pressure	Repair or adjust	S-87
	• Injection nozzle stuck or clogged	Replace	–
	• Fuel overflow pipe clogged	Clean	–
	• Governor malfunctioning	Repair	M-17
Either white or blue exhaust gas is observed	• Excessive engine oil	Reduce to the specified level	S-27
	• Piston rings and liner worn or stuck	Replace	S-73
	• Incorrect injection timing	Adjust	S-85
	• Deficient compression	Check top clearance and correct valve recessing	S-45
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-29
	• Air cleaner clogged	Clean or replace	S-29

KiSC issued 05, 2006 A

PREVIEW ONLY YOUFIXTHIS.COM

Download full manual at youfixthis.com

Valve Spring

Item	Factory Specification	Allowable Limit
Free Length	31.3 to 31.8 mm 1.2323 to 1.2520 in.	31.0 mm 1.2205 in.
Setting Load/Setting Length	59.8 N/27.3 mm 6.1 kgf/27.3 mm 13.5 lbs/1.075 in.	52 N/27.3 mm 5.3 kgf/27.3 mm 11.7 lbs/1.075 in.
Tilt	–	1.2 mm 0.0472 in.

Rocker Arm

Clearance between Rocker Arm Shaft and shaft Hole	0.016 to 0.045 mm 0.0006 to 0.0018 in.	0.12 mm 0.0047 in.
Rocker Arm Shaft O.D.	11.973 to 11.984 mm 0.4714 to 0.4718 in.	–
Rocker Arm Shaft Hole I.D.	12.000 to 12.018 mm 0.4724 to 0.4731 in.	–

Tappet

Clearance between Tappet and Guide	0.018 to 0.058 mm 0.0007 to 0.0023 in.	0.1 mm 0.0039 in.
Tappet O.D.	7.972 to 7.987 mm 0.3139 to 0.3144 in.	–
Tappet Guide I.D.	8.005 to 8.030 mm 0.3152 to 0.3161 in.	–

Camshaft

Camshaft Side Clearance	0.05 to 0.25 mm 0.0020 to 0.0098 in.	0.35 mm 0.0138 in.
Cam Height (IN., EX.)	27.0 mm 1.0630 in.	26.5 mm 1.0433 in.
Oil Clearance of Camshaft Journal	0.016 to 0.045 mm 0.0006 to 0.0018 in.	0.08 mm 0.0031 in.
Camshaft Journal O.D.	16.989 to 17.000 mm 0.6689 to 0.6693 in.	–

Timing Gear (Timing Gear Backlash)

Crank Gear — Cam Gear	0.033 to 0.175 mm 0.0013 to 0.0069 in.	0.3 mm 0.0118 in.
Crank Gear — Balancer Gear	0.033 to 0.170 mm 0.0013 to 0.0067 in.	0.3 mm 0.0118 in.

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

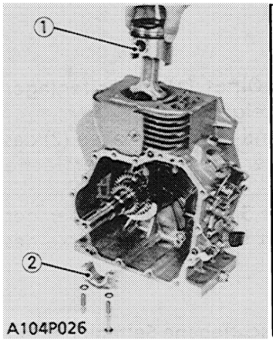
[6] MAINTENANCE CHECK LIST

To maintain long-lasting and safe engine performance, make it a rule to carry out regular inspections using the following table below.

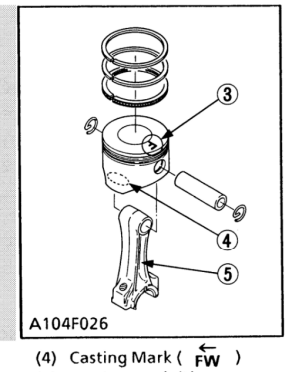
Item	Service interval	Daily	Initial 25 h	Every 50 h	Every 100 h	Every 300 h	Reference Page
Engine Oil	Checking	o					
	Changing		o		o		
Oil Strainer	Cleaning		o		o		
Fuel Piping	Checking			o			
Air Cleaner	Cleaning	o					
	Changing	Once a year or after 6 cleanings					
Valve Clearance	Checking					o	
Nozzle Injection Pressure and Spraying Condition	Checking					o	

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com



(1) Piston
(2) Cap
(3) Marking (F)



(4) Casting Mark (← FW)
(5) Casting Mark (F)

Piston and Connecting Rod

1. Remove the cap (2) at the big end of the connecting rod.
2. Pull out the piston (1) from the cylinder head side.

(When reassembling)

- Insert the piston with a piston ring compressor (Code No.: 07909-32111).

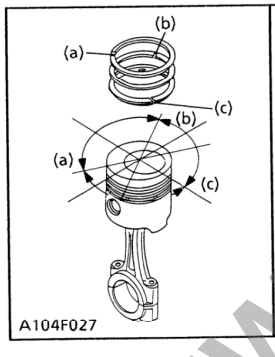
■ IMPORTANT

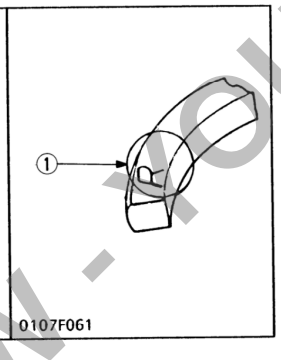
- **Be sure to assemble the connecting rod so that the casting mark (F) of the connecting rod faces toward the flywheel.**
- **Align the marks on the side of the connecting rod and cap.**

(When reassembling piston and connecting rod)

■ IMPORTANT

- **When installing the piston pin, immerse the piston in 100°C (212°F) oil for 10 to 15 minutes and insert the piston pin to the piston.**
- **When installing the connecting rod to the piston, align the mark (5) on the connecting rod and the marking (3) on the piston head or the casting mark (4) on inside of piston.**





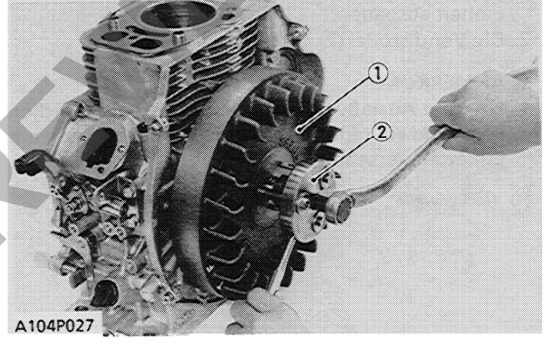
Piston Ring

(When reassembling)

■ IMPORTANT

- **Assemble the piston ring with the manufacture's mark's (1) facing up (As shown in the figure).**
- **When inserting the piston into the cylinder, place the gap of the compression ring 1 on the opposite side of the combustion chamber and stagger the gaps of the compression ring 2 and oil ring making a right angle from the gap of the compression ring 1.**

(1) Manufacture's Mark's



Flywheel

1. Loosen the flywheel nut until it is nearly flush with the crankshaft end.
2. Set a flywheel puller (2) (Code No. 07916-30161) and remove it with the flywheel (1).

(When reassembling)

- The tapered section of the flywheel must be free of oil, etc. The rotor magnet must be free of foreign materials.

Tightening torque	Flywheel mounting nut	137 to 157 N·m 14 to 16 kgf·m 101 to 116 ft-lbs

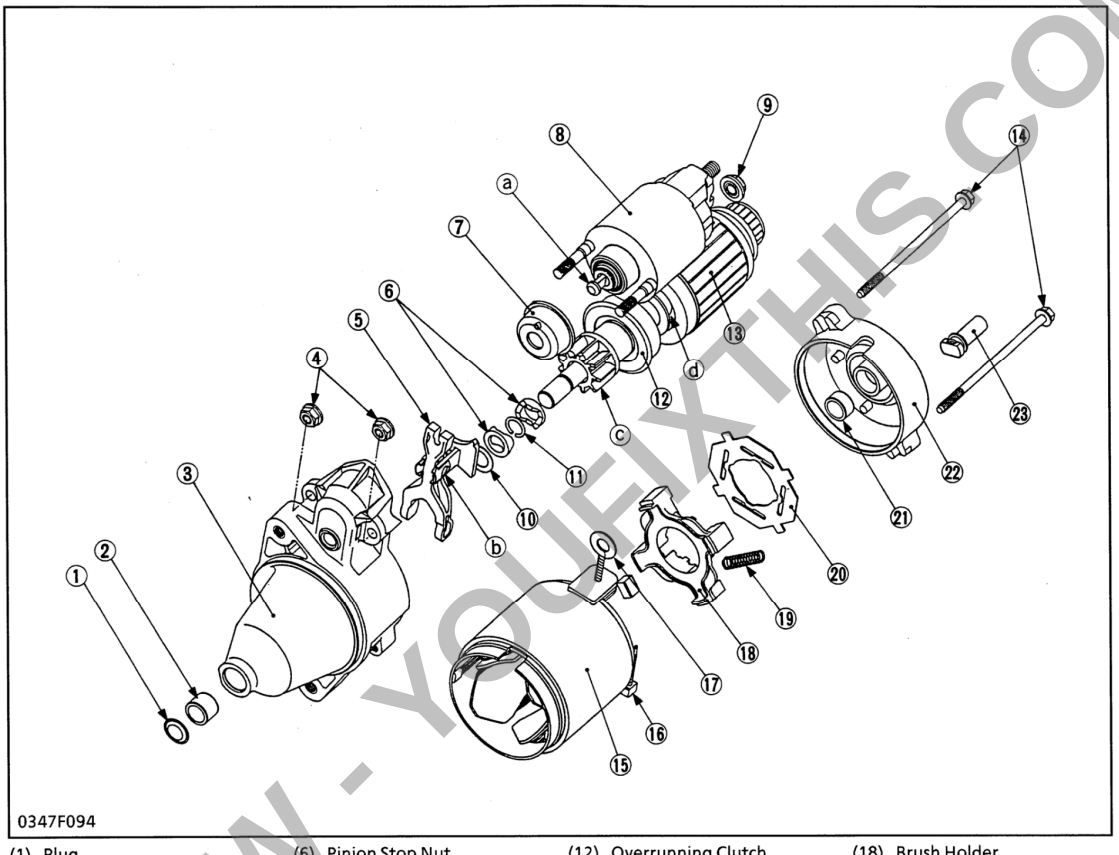
(1) Flywheel (2) Flywheel Puller

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

DISASSEMBLING AND ASSEMBLING

[1] STARTER

Disassembling Starter



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

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, prevent the brush spring (19) from popping out like a bullet.**

■ NOTE

- **Do not damage to the brush and commutator.**

(When reassembling)

- Apply grease (NIPPONDENSO No.50 or equivalent) to the parts indicated in the figure.
  - Joint of magnet switch (a)
  - Drive lever (b)
  - Teeth of pinion gear (c)
  - Armature shaft (d)

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

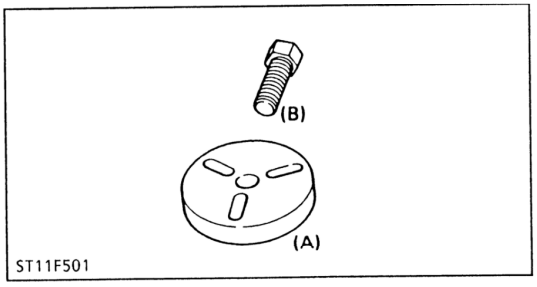
SPECIFICATIONS

Model		AC60-Q/G/D	AC60-R
Type		Forced air-cooled 4-cycle diesel engine	
Number of Cylinders		1	
Bore and Stroke	mm (in.)	72 x 68 (2.83 x 2.68)	
Displacement	cm^3 (in^3)	276 (16.8)	
SAE Net Cont.	kW/rpm (HP/rpm)	4.2/3600 (5.6/3600)	4.2/1800 (5.6/1800)
SAE Net Intermittent	kW/rpm (HP/rpm)	4.6/3600 (6.2/3600)	4.6/1800 (6.2/1800)
DIN6271-NA	kW/rpm (PS/rpm)	4.1/3600 (5.6/3600)	4.1/1800 (5.6/1800)
DIN6271-NB	kW/rpm (PS/rpm)	4.4/3600 (6.0/3600)	4.4/1800 (6.0/1800)
Max. Bare Speed	rpm	3800	
Min. Bare Idling Speed	rpm	1300	
Combustion System		Direct Injection	
Fuel Injection Pump		MD Type Mini Pump	
Injection Timing (static)		0.30 to 0.33 rad (17° to 19°) before T.D.C.	
Injection Pressure		22.41 to 23.44 MPa (228.5 to 239.0 kgf/cm^2 , 3249 to 3399 psi)	
Compression Ratio		20.5:1	
Governor		Centrifugal Mechanical Governor	
Lubricating System		Forced Lubrication with Trochoid Pump	
Lubricating Oil		Quality better than API service CC class	
Starting System		Recoil Starter or Cell Starter	
Fuel		Diesel Fuel No.2-D (ASTM D975)	
Fuel Tank Capacity		3.5ℓ (0.925 U.S. gal, 0.77 Imp.gal)	
Lubricant Capacity		1.3ℓ (1.37 U.S.qts, 1.14 Imp.qts)	
Dry Weight		32kg (70.6 lbs.)	

PREVIEW - YOUFIXTHIS.COM

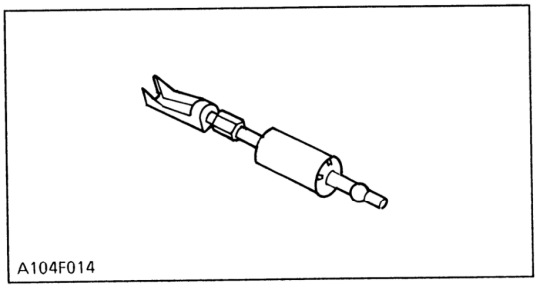
KiSC issued 05, 2006 A

Download full manual at youfixthis.com



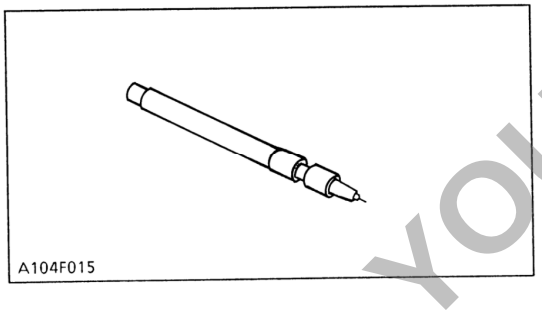
Flywheel Puller

Code No: 07916-30161
Application: Use for removing the flywheel from crankshaft.
(See page S- 61)



Nozzle Replacer

Code No: 07916-32721
Application: Use exclusively for pulling out pencil nozzle with ease and without damaging nozzle.



Nozzle Cleaning Wire and Pin Vise

Code No: 07916-32731
Application: Use exclusively for cleaning nozzle spray orifice.
(See page S-89)

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

PREVIEW ONLY

You're viewing 8 of 70 pages

The full manual includes:

- All 70 pages, complete
- Searchable PDF (find any keyword)
- No watermarks
- Instant download
- Print-ready quality

GET FULL MANUAL NOW

Kubota AC60, AC60-Q, AC60-G, AC60-D, AC60-R Workshop Manual

Scan or click anywhere
youfixthis.com

Click anywhere on this page to get the full manual