WSM

WORKSHOP MANUAL

GR1600EC2

Kubota

KiSC issued 07, 2007 A

COOLING SYSTEM

Item		Factory Specification	Allowable Limit
Fan Belt	Tension	7 to 9 mm / 98 N 0.28 to 0.35 in. / 98 N (10 kgf, 22 lbs)	–
Thermostat	Valve Opening Temperature (At Beginning)	80.5 to 83.5 °C 176.9 to 182.3 °F	–
	Valve Opening Temperature (Opened Completely)	95 °C 203 °F	–
Radiator Cap	Pressure Falling Time	10 seconds or more 88 → 59 kPa 0.9 → 0.6 kgf/cm^2 13 → 9 psi	–
Radiator	Water Leakage Test Pressure	No leak at specified pressure 157 kPa 1.6 kgf/cm^2 23 psi	–

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FUEL SYSTEM

Injection Pump	Injection Timing	0.31 to 0.33 rad (18 to 20 °) before T.D.C.	–
Pump Element	Fuel Tightness	–	13.7 MPa 140 kgf/cm^2 1991 psi
Delivery Valve	Fuel Tightness	10 seconds 13.73 → 12.75 MPa 140 → 130 kgf/cm^2 1991 → 1849 psi	5 seconds 13.73 → 12.75 MPa 140 → 130 kgf/cm^2 1991 → 1849 psi
Fuel Injection Nozzle	Injection Pressure	13.73 to 14.71 MPa 140 to 150 kgf/cm^2 1991 to 2134 psi	–
	Valve Seat Tightness	When the pressure is 12.75 MPa (130 kgf/cm^2, 1849 psi), the valve seat must be fuel tightness.	–

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(4) Crankshaft


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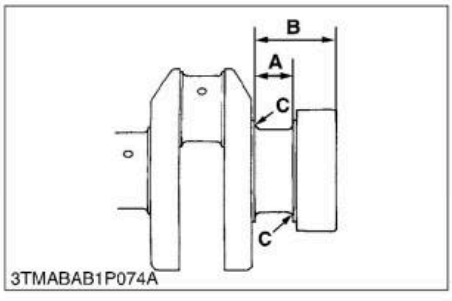

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Crankshaft Side Clearance

1. Set a dial indicator with its tip on the end of the crankshaft.
2. Measure the side clearance by moving the crankshaft to the front and rear.
3. If the measurement exceeds the allowable limit, replace the thrust bearings.
4. If the same size bearing is useless because of the crankshaft journal wear, replace it with an oversize one referring to the table and figure.

Crankshaft side clearance	Factory spec.	0.15 to 0.31 mm 0.0059 to 0.0122 in.
	Allowable limit	0.50 mm 0.0197 in.

(Reference)

- Oversize thrust bearing

Oversize	Bearing	Code Number	Marking
0.2 mm 0.008 in.	Thrust bearing 1 02	15261-23950	020 OS
	Thrust bearing 2 02	15261-23970	020 OS
0.4 mm 0.016 in.	Thrust bearing 1 04	15261-23960	040 OS
	Thrust bearing 2 04	15261-23980	040 OS

- Oversize dimensions of crankshaft journal

Oversize	0.2 mm 0.008 in.	0.4 mm 0.016 in.
Dimension **A**	23.40 to 23.45 mm 0.9213 to 0.9232 in.	23.80 to 23.85 mm 0.9370 to 0.9390 in.
Dimension **B**	46.1 to 46.3 mm 1.815 to 1.823 in.	46.3 to 46.5 mm 1.823 to 1.831 in.
Dimension **C**	1.8 to 2.2 mm radius 0.071 to 0.087 in. radius	1.8 to 2.2 mm radius 0.071 to 0.087 in. radius
The crankshaft journal must be fine-finished to higher than ∇∇∇∇.		(0.8-S)

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Crankshaft Alignment

1. Support the crankshaft with V blocks on the surface plate at both end journals.
2. Set a dial indicator with its tip on the intermediate journal.
3. Measure the crankshaft alignment.
4. If the measurement exceeds the allowable limit, replace the crankshaft.

Crankshaft alignment	Allowable limit	0.02 mm 0.0008 in.

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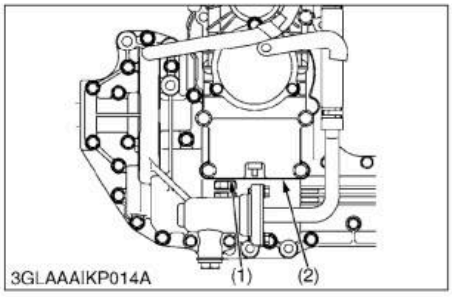

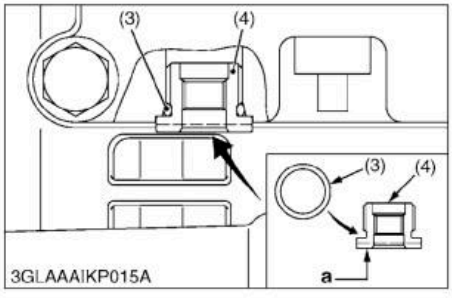

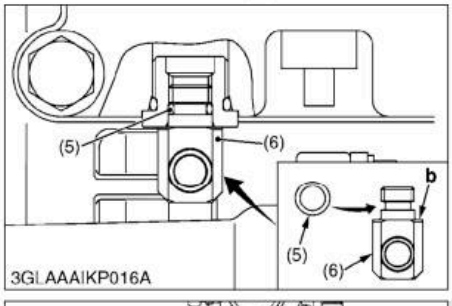

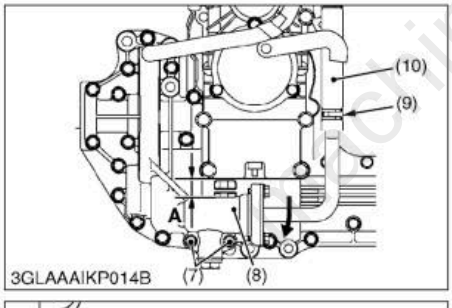

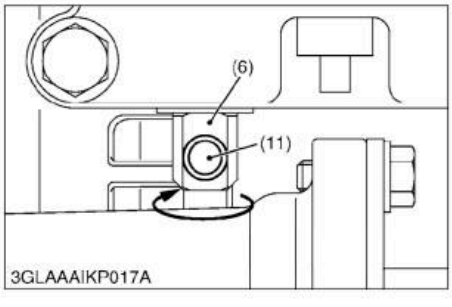

Charge Relief Pressure

CAUTION

- **When checking, park the machine on level ground, apply the parking brake.**

1. Remove the hexagon socket head plug from **P1** (1) or **P2** (2), using the short neck hexagon wrench (Refer to "**8. SPECIAL TOOLS**" at "**G.GENERAL**" section.).
2. Install the O-ring (3) to the adaptor **2** (4). Then, install the adaptor **2** (4) to **P1** (1) or **P2** (2), manually first and then using an adaptor lever (Refer to "**8. SPECIAL TOOLS**" at "**G.GENERAL**" section.).
3. Install the O-ring (5) to the adaptor **1** (6). Then, install the adaptor **1** (6) to the adaptor **2** (4), so that the surface "**b**" of adaptor **1** (6) lightly contacts the surface "**a**" of adaptor **2** (4).

NOTE

- **If the adaptor 1 (6) cannot be installed to the adaptor 2 (4) due to interference with the filter case, adjust a mounting position of the filter case (8) to expand clearance "A", by loosening the filter case mounting screws (7) and the hose clamp (9) and turning the filter case (8) clockwise.**
- **After adjusting a mounting position of the filter case (8), retighten the filter case mounting screws (7) and return the hose clamp (9) to a normal position.**

4. Adjust direction of the port (11) by rotating the adaptor **1** (6) counterclockwise seen from underneath, so that the pressure gauge adaptor can be installed on the port (11). However, do not rotate the adapter **1** (6) more than one rotation.
5. Install the adaptor of pressure gauge to the port (11) of adaptor **1** with seal tape. Then install the cable and pressure gauge.
6. Start the engine and run it at rated speed.
7. Read the pressure gauge to measure the charge relief pressure.
8. If the measurement is not within factory specification, check the charge pump and charge relief valve.

Charge relief pressure	Factory spec.	0.3 to 0.5 MPa 3.1 to 5.1 kgf/cm^2 43.5 to 72.5 psi

IMPORTANT

- **To keep a good fit between the adaptor 1 (6) and the adaptor 2 (4), do not rotate the adaptor 1 (6) while measuring.**

NOTE

- **When installing the adaptor 1 (6), adaptor 2 (4) and hexagon socket head plug, take care not to damage the O-rings.**

Condition

- Engine Speed : Rated Speed
- Oil Temperature : 50 °C (122 °F)

(1) **P1** Port (Reverse)
(2) **P2** Port (Forward)
(3) O-ring (SAE J515 #6 (Tube OD 3/8))
(4) Adaptor **2** (See page G-45)
(5) O-ring (P/N 04811-10060)
(6) Adaptor **1** (See page G-44)
(7) Filter Case Mounting Screw
(8) Filter Case
(9) Hose Clamp
(10) Hose
(11) Port
A : Clearance between the filter case and the bottom of center section.

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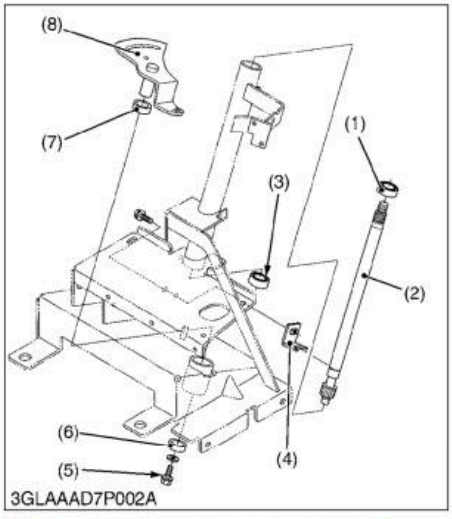
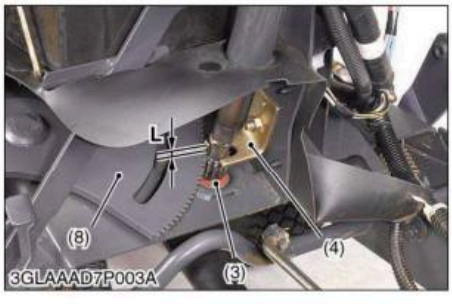
[3] DISASSEMBLING AND ASSEMBLING

(1) Steering Support Assembly





Steering Shaft and Sector Gear

1. Remove the shaft retainer (4).
2. Remove the sector gear mounting screw (5), and remove the sector gear (8).
3. Remove the steering bearing (1) and ball bearing (3).
4. Pull out the steering shaft (2).

(When reassembling)

- Apply to grease to the sector gear teeth.
- Apply to grease to the pinion teeth of steering shaft.
- Apply to grease to the sector bushes (6), (7).
- Apply to grease to the steering bearing.
- Adjust the clearance between the shaft retainer and the pinion gear of steering shaft.

(Reference)

- Length (**L**) : 1 mm (0.040 in.)

Tightening torque	Sector gear mounting screw	48.1 to 55.8 N·m 4.9 to 5.7. kgf·m 35.5 to 41.2 ft-lbs

(1) Steering Bearing
(2) Steering Shaft
(3) Ball Bearing
(4) Shaft Retainer
(5) Sector Gear Mounting Screw
(6) Sector Bush
(7) Sector Bush
(8) Sector Gear

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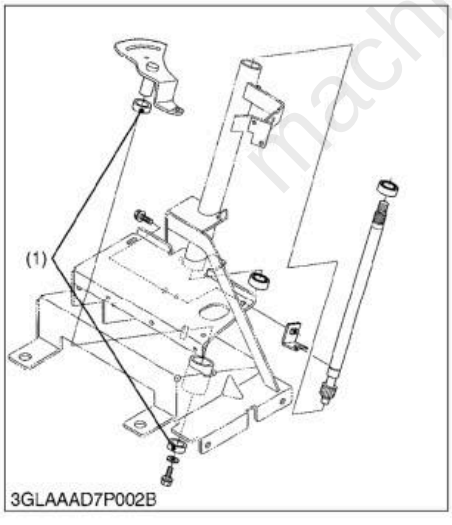
[4] SERVICING



Steering Support Bushing Wear

1. Visually inspect the sector bushes (1) for signs of wear or damage.
2. If defect are found, replace the sector bush (1).

(1) Sector Bush

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