WSM

WORKSHOP MANUAL
DIESEL ENGINE

05-E4B SERIES,
05-E4BG SERIES

Kubota

KiSC issued 04, 2014 A

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GENERAL

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Symptom	Probable Cause	Solution	Reference Page
Engine Overheated	Engine oil insufficient	Replenish	G-9
	Fan belt broken or elongated	Replace or adjust	G-12, G-13
	Coolant insufficient	Replenish	G-17
	Radiator net and radiator fin clogged with dust	Clean	–
	Inside of radiator corroded	Clean or replace	G-17
	Coolant flow route corroded	Clean or replace	G-17, G-26
	Radiator cap damaged	Replace	–
	Overload running	Reduce the load	–
	Head gasket damaged	Replace	1-S30, 1-S31
	Incorrect injection timing	Adjust	1-S19
	Unsuitable fuel used	Use specified fuel	I-5, I-6
Battery Quickly Discharged	Battery electrolyte insufficient	Replenish distilled water and charge	G-13
	Fan belt slips	Adjust belt tension or replace	G-12, G-13
	Wiring disconnected	Connect	–
	Rectifier damaged	Replace	–
	Alternator damaged	Replace	–
	Battery damaged	Replace	–

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Alternator on Unit Test

(Before testing)

- Before alternator on unit test, check the battery terminal connections, circuit connection, fan belt tension, charging indicator lamp, fuses on the circuit, and abnormal noise from the alternator.
- Prepare full charged battery for the test.

■ **NOTE**

- **Be careful not to touch the rotating engine parts while engine is running.**
  Keep safety distance from the engine rotating parts.

1. Start the engine.
2. When the engine is operating measure the voltage between two battery terminals. If the voltage is between 13.8 V and 14.8 V, the alternator is operating normally.
3. If the results of alternator on unit test are not within the specifications, disassemble the alternator and check the each component part for finding out the failure. See the **"DISASSEMBLING AND ASSEMBLING"** and **"SERVICING"** for alternator.

Regulating voltage at no load	Factory specification	13.8 to 14.8 V at 25 °C (77 °F)

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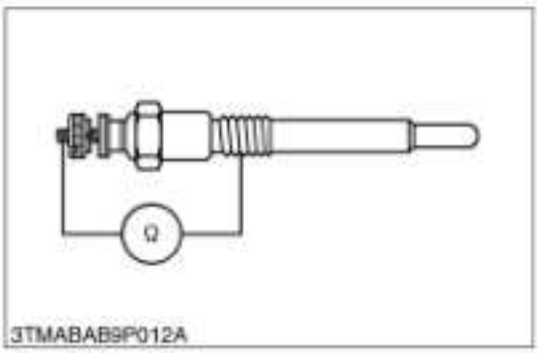


Glow Plug Lead Terminal Voltage

1. Turn the key switch to the **"GLOW (or PREHEAT)"** position, and measure the voltage with a circuit tester between the lead terminal and the engine body.
2. If the voltage differs from the battery voltage, the wiring harness or main switch is faulty.

Voltage	Main switch key at **GLOW** (or **PREHEAT**)	Approx. battery voltage

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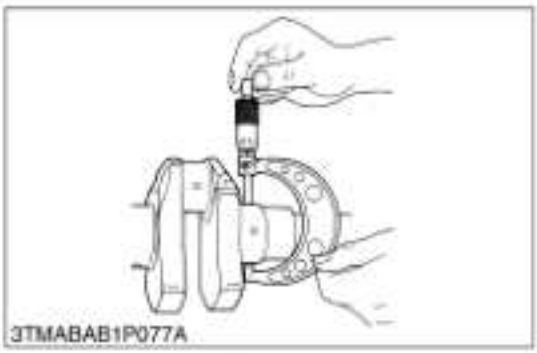
Glow Plug Continuity

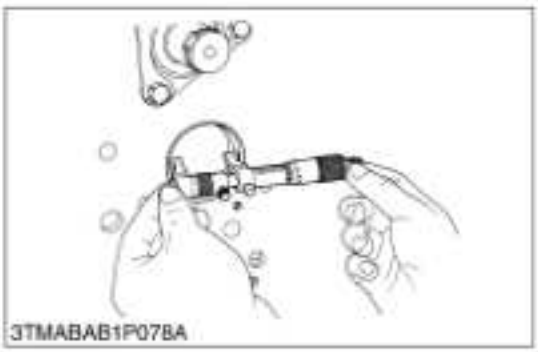
1. Remove the glow plug.
2. Measure the resistance with a circuit tester between the glow plug terminal and the glow plug housing.
3. If the factory specification is not indicated, glow plug is faulty.

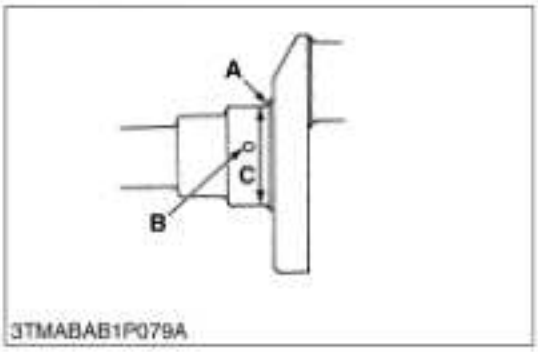
Resistance	Factory specification	Approx. 0.9 Ω

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Oil Clearance between Crankshaft Journal and Crankshaft Bearing 1

1. Measure the O.D. of the crankshaft front journal with an outside micrometer.
2. Measure the I.D. of the crankshaft bearing 1 with an inside micrometer, and calculate the oil clearance.
3. If the clearance exceeds the allowable limit, replace the crankshaft bearing 1.
4. If the same size bearing is useless because of the crankshaft journal wear, replace it with an undersize one referring to the table and figure.

[D1005-E4B/E4BG, D1105-E4B/E4BG, V1505-E4B/E4BG]

Oil clearance between crankshaft journal and crankshaft bearing 1	Factory specification	0.0340 to 0.114 mm 0.00134 to 0.00448 in.
	Allowable limit	0.20 mm 0.0079 in.

Crankshaft journal O.D.	Factory specification	47.934 to 47.950 mm 1.8872 to 1.8877 in.
Crankshaft bearing 1 I.D.	Factory specification	47.984 to 48.048 mm 1.8892 to 1.8916 in.

(Reference)

- Undersize dimensions of crankshaft journal

Undersize	0.20 mm 0.0079 in.	0.40 mm 0.016 in.
Dimension **A**	2.3 to 2.7 mm radius 0.091 to 0.10 in. radius	2.3 to 2.7 mm radius 0.091 to 0.10 in. radius
*Dimension **B**	1.0 to 1.5 mm relief 0.040 to 0.059 in. relief	1.0 to 1.5 mm relief 0.040 to 0.059 in. relief
Dimension **C**	47.734 to 47.750 mm dia. 1.8793 to 1.8799 in. dia.	47.534 to 47.550 mm dia. 1.8715 to 1.8720 in. dia.
The crankshaft journal must be fine-finished to higher than Rmax = 0.8S *Holes to be de-burred and edges rounded with 1.0 to 1.5 mm (0.040 to 0.059 in.) relief.		

[D1305-E4B/E4BG]

Oil clearance between crankshaft journal and crankshaft bearing 1	Factory specification	0.0340 to 0.119 mm 0.00134 to 0.00468 in.
	Allowable limit	0.20 mm 0.0079 in.

Crankshaft journal O.D.	Factory specification	51.921 to 51.940 mm 2.0442 to 2.0448 in.
Crankshaft bearing 1 I.D.	Factory specification	51.974 to 52.040 mm 2.0463 to 2.0488 in.

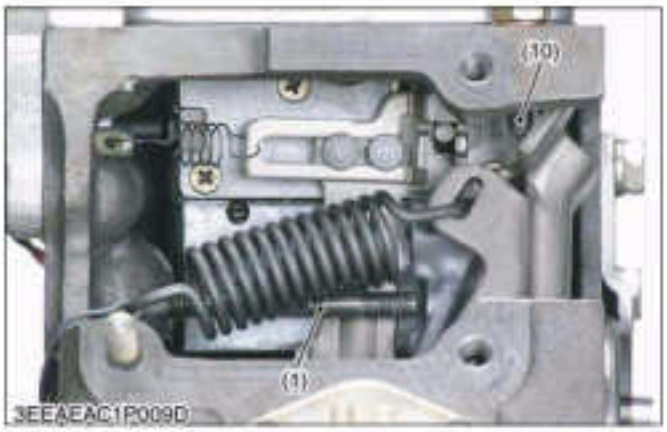
(Reference)

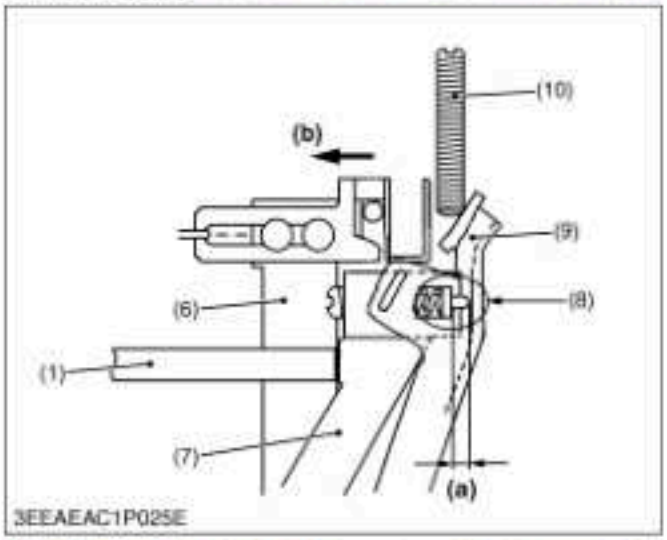
- Undersize dimensions of crankshaft journal

Undersize	0.20 mm 0.0079 in.	0.40 mm 0.016 in.
Dimension **A**	2.3 to 2.7 mm radius 0.091 to 0.10 in. radius	2.3 to 2.7 mm radius 0.091 to 0.10 in. radius
*Dimension **B**	1.0 to 1.5 mm relief 0.040 to 0.059 in. relief	1.0 to 1.5 mm relief 0.040 to 0.059 in. relief
Dimension **C**	51.721 to 51.740 mm dia. 2.0363 to 2.0370 in. dia.	51.521 to 51.540 mm dia. 2.0284 to 2.0291 in. dia.
The crankshaft journal must be fine-finished to higher than Rmax = 0.8S *Holes to be de-burred and edges rounded with 1.0 to 1.5 mm (0.040 to 0.059 in.) relief.		

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(Overloaded Operation)

The amount of the movement of the fork lever assembly is limited with the fuel limitation bolt (10) and can not be moved in the direction of the fuel increase.

As overload reduces the centrifugal force of the governor weight, which is pressing the torque pin (8) into the floating lever (7), the floating lever pushes the fork lever 1 (6) in the way to increase the fuel supply with the help of the torque spring tension.

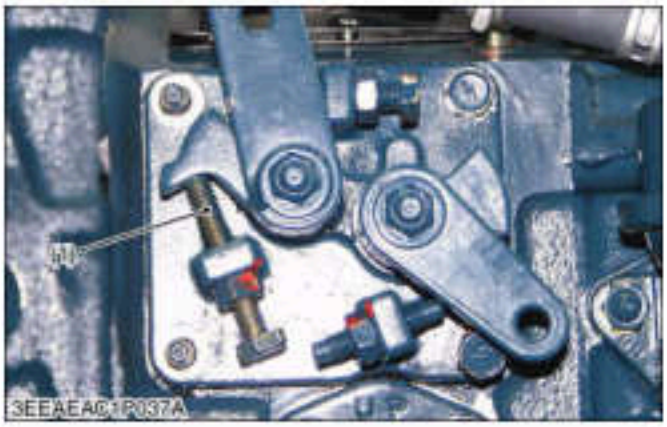
The fuel supply increases **(b)** in relation to the degree of the torque pin motion, thus preventing the engine speed from dropping.

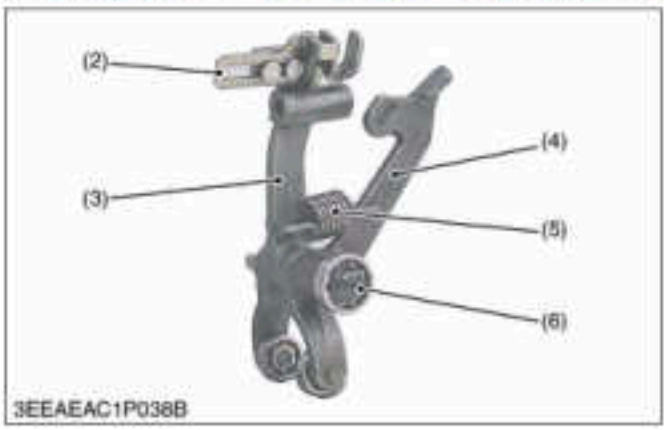
At the time, the maximum torque limiter (1) prevents superfluous fuel supply and suppresses the generation of black smoke.

(1) Max Torque Limiter
(6) Fork Lever 1
(7) Floating Lever
(8) Torque Pin
(9) Fork Lever 2
(10) Fuel Limitation Bolt

(a) Distance to which torque pin (8) pushes fork lever 1 (6) out
(b) Increase of fuel

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Two Lever Type Fork Lever (for BG type)

The engine speed of BG engine 1800 min^{-1} (rpm) specification.

The fork lever assembly of BG series is composed of fork lever 1 (3), fork lever 2 (4).

A slide plate is installed in fork lever 1. The governor spring (5) is hooked to fork lever 2 (4).

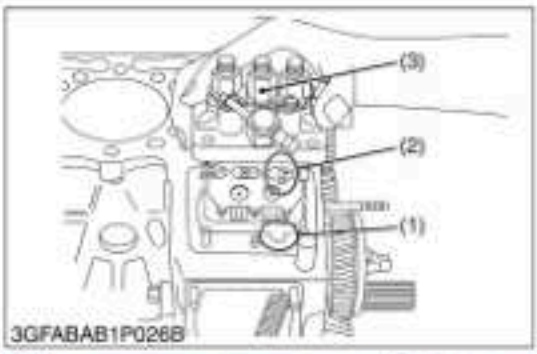
The start spring is hooked to a slide plate, and holds the control rack in the direction of full fuel position.

Fork lever 2 (4) and fork lever 1 (3) are installed with the fork lever shaft (4).

(1) Idle Speed Adjust Bolt
(2) Slide Plate
(3) Fork Lever 1
(4) Fork Lever 2
(5) Governor Spring
(6) Fork Lever Shaft

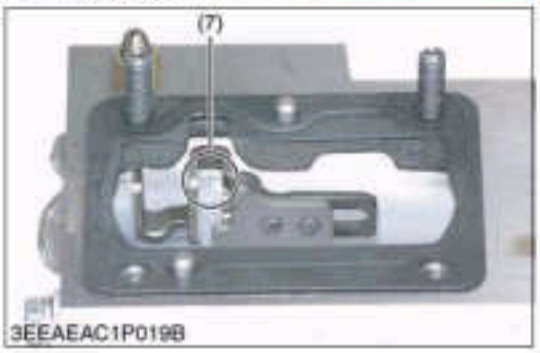
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Injection Pump

1. Disconnect the start spring (4) on the thrust lever side (5).
2. Align the control rack pin (2) with the notch (1) on the crankcase, and remove the injection pump (3).
3. Remove the injection pump shims.
4. In principle, the injection pump should not be disassembled.

(When reassembling)

- When installing the injection pump, insert the control rack pin (2) firmly into the groove (7) of the thrust lever of fork lever.

■ **NOTE**

- **Addition or reduction of shim (0.05 mm, 0.0020 in.) delays or advances the injection timing by approx. 0.0087 rad (0.5 °).**
- **In disassembling and replacing, be sure to use the same number or new gasket shims with the same thickness.**

(1) Notch
(2) Control Rack Pin
(3) Injection Pump
(4) Start Spring
(5) Thrust Lever
(6) Governor Spring
(7) Groove

[A] Basic Model
[B] BG Model

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