WSM

WORKSHOP MANUAL
DIESEL ENGINE

03-M-E3B SERIES,
03-M-DI-E3B SERIES,
03-M-E3BG SERIES

Kubota

KiSC issued 04, 2020 A

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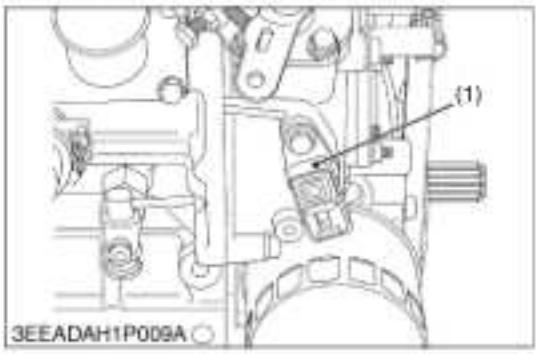
1. TROUBLESHOOTING

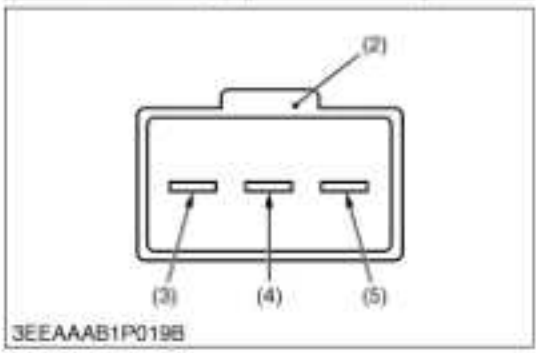
[1] ENGINE BODY

Symptom	Probable Cause	Solution	Reference Page
The engine does not start	No fuel	Fill up the fuel	G-13
	Air in the fuel system	Bleed the air	G-13
	Water in the fuel system	Change the fuel and repair or replace the fuel system	–
	The fuel hose is clogged	Clean or replace	G-13
	The fuel filter is clogged	Replace	G-22
	The viscosity of fuel or engine oil at low temperature is too high	Use the specified fuel or engine oil	I-4, G-11
	The cetane number of fuel is low	Use the specified fuel	I-4
	Fuel leakage because of loose injection pipe retaining nut	Tighten the retaining nut	1-S50
	Incorrect injection timing	Adjust	1-S30, 1-S32
	The fuel camshaft is worn out	Replace	1-S65
	The injection nozzle is clogged	Clean or replace (IDI)	1-S36, 1-S37, 1-S38, 1-S51
		Repair or replace (DI)	1-S36, 1-S37, 1-S51
	The injection pump is defective	Repair or replace	1-S33, 1-S34, 1-S35, 1-S56, 1-S57, 1-S58
	Seizure of the crankshaft, camshaft, piston, cylinder or bearing	Repair or replace	1-S64, 1-S65, 1-S66, 1-S67, 1-S69, 1-S71, 1-S72, 1-S96, 1-S97, 1-S98, 1-S99, 1-S100, 1-S101, 1-S102
	Compression leakage from the cylinder	Replace the head gasket, tighten the cylinder head screw, glow plug and nozzle holder	1-S50, 1-S51, 1-S52, 1-S53

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(7) Electronic Governor





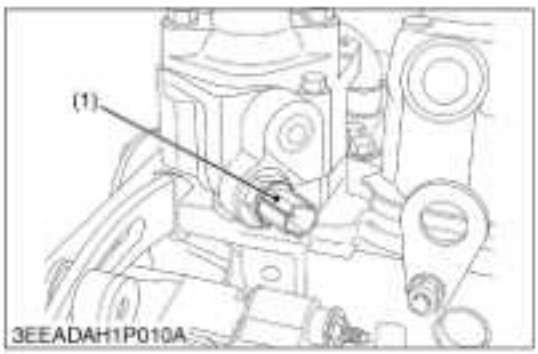
Speed Sensor

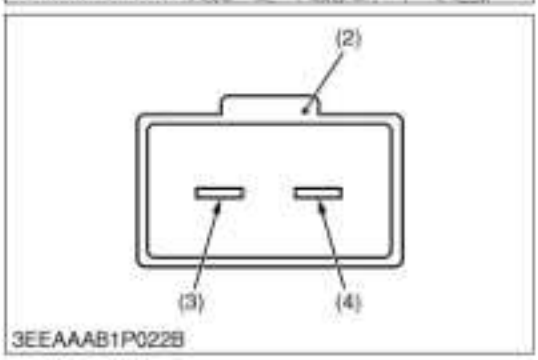
1. Disconnect the connector of the speed sensor (1) (3P).
2. Check the condition of the harness.
3. If the harness is defective, replace it with a new one. Then replace the ECU with a new one.
4. Turn the key switch to the ACC position.
5. Measure the voltage between the terminals of the connector (2) (harness side).
6. If the measurements are not in the factory specifications, the ECU is defective.
7. If the measurements are in the factory specifications, the ECU is correct.
   In this case, the speed sensor is defective. Then replace it with a new one.

Voltage	Factory specification	Terminal **1** – Terminal **3**	12 V
		Terminal **1** – Terminal **2**	5 V

(1) Speed Sensor
(2) Connector (Harness Side)
(3) Terminal **3** (+)
(4) Terminal **2** (Signal)
(5) Terminal **1** (GND)

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Water Temperature Sensor

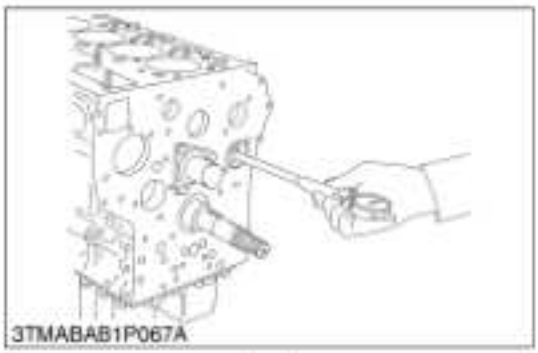
1. Disconnect the connector of the water temperature sensor (1) (2P).
2. Check the condition of the harness.
3. If the harness is defective, replace it with a new one.
4. Turn the key switch to the ACC position.
5. Measure the voltage between the terminals of the connector (2) (harness side).
6. If the measurement is not in the factory specification, the ECU is defective. Then replace the ECU with a new one.
7. If the measurement is in the factory specification, the ECU is correct.
   In this case, the water temperature sensor is defective. Then replace it with a new one.

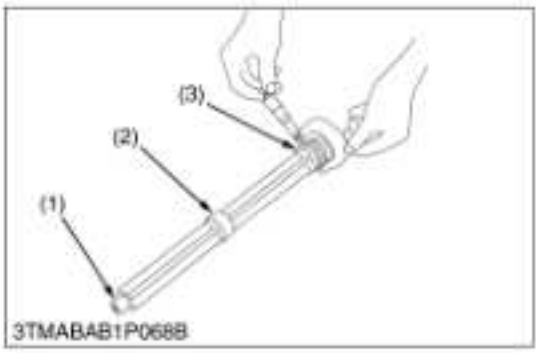
Voltage	Factory specification	Terminal **1** – Terminal **2**	5 V

(1) Water Temperature Sensor
(2) Connector (Harness Side)
(3) Terminal **2** (–)
(4) Terminal **1** (+)

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3TMABAB1P068B

Oil Clearance of Balancer Shaft Journal (for Balancer Model Only)

1. Measure the balancer shaft journal O.D. with an external micrometer.
2. Measure the cylinder block bore I.D. for the balancer shaft with an internal micrometer or cylinder gauge.
3. Calculate the oil clearance.
4. If the oil clearance is more than the allowable limit, replace the balancer shaft.

Oil clearance of balancer shaft journal 1	Factory specification	0.0300 to 0.111 mm 0.00119 to 0.00437 in.
	Allowable limit	0.20 mm 0.0079 in.
Balancer shaft journal 1 O.D.	Factory specification	43.934 to 43.950 mm 1.7297 to 1.7303 in.
Balancer shaft bearing 1 I.D.	Factory specification	43.980 to 44.045 mm 1.7315 to 1.7340 in.
Oil clearance of balancer shaft journal 2	Factory specification	0.0300 to 0.111 mm 0.00119 to 0.00437 in.
	Allowable limit	0.20 mm 0.0079 in.
Balancer shaft journal 2 O.D.	Factory specification	41.934 to 41.950 mm 1.6509 to 1.6515 in.
Balancer shaft bearing 2 I.D.	Factory specification	41.980 to 42.045 mm 1.6528 to 1.6553 in.
Oil clearance of balancer shaft journal 3	Factory specification	0.020 to 0.094 mm 0.00079 to 0.0037 in.
	Allowable limit	0.20 mm 0.0079 in.
Balancer shaft journal 3 O.D.	Factory specification	21.947 to 21.960 mm 0.86406 to 0.86456 in.
Balancer shaft bearing 3 I.D.	Factory specification	21.980 to 22.041 mm 0.86536 to 0.86775 in.

(1) Balancer Shaft Journal 3
(2) Balancer Shaft Journal 2
(3) Balancer Shaft Journal 1

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Alternator-on Unit Test

Before testing

- Before the alternator-on unit test, do a check of the list below :
  - Battery terminal connections
  - Circuit connection
  - Fan belt tension
  - Charge indicator lamp
  - Fuses on the circuit
  - Abnormal noise from the alternator
- Prepare full charged battery for the test.

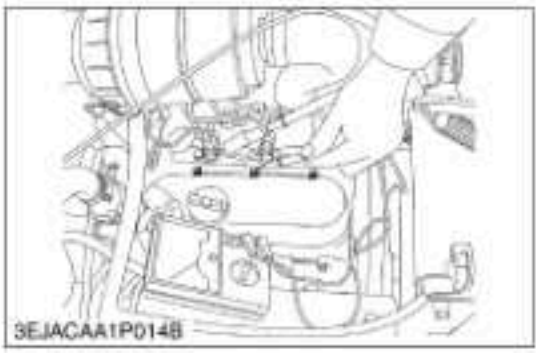
■ **NOTE**

- **Do not touch the engine parts that turns while the engine operates.**
  Keep a safety distance from the engine parts that turn.

1. Start the engine.
2. When the engine operates, measure the voltage between battery terminals. If the voltage is between 13.8 V and 14.8 V, the alternator operates correctly.
3. If the results of alternator-on unit test are not in the factory specifications, disassemble the alternator. Check each component part to find out the problem. Refer to "DISASSEMBLING AND ASSEMBLING" and "SERVICING" for the alternator.

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

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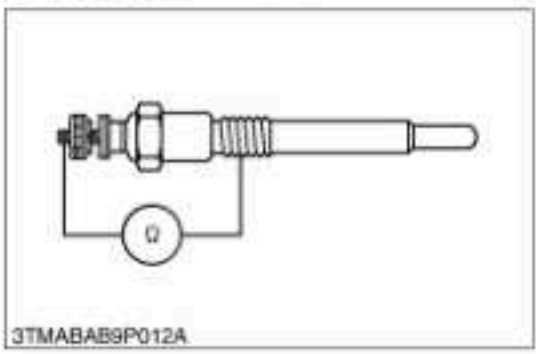


Glow Plug Lead Terminal Voltage

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

Voltage (Main switch key at **GLOW** (or **PREHEAT**))	Factory specification	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 measurement does not show the factory specification, the glow plug is defective.

Resistance	Factory specification	Approx. 0.9 Ω

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[2] ELECTRONIC GOVERNOR

■ **IMPORTANT**

- **The engine trouble divides into an electronic governor, the main body of the engine, and the operating constancy.**
  This manual describes it concerning the check of an electronic governor.
  Refer to WSM of engine and operator's manual if you cannot find trouble related to an electronic governor by checking an electronic governor.

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Engine will not start.

Cause	Corrections	Refer to Checking
Starter Operating but Not Cranking the Engine	Check operation of the solenoid	Solenoid
	Check harness of the solenoid	Solenoid
	Check harness of the glow plug	Glow plug
Starter Does Not Operate	Check emergency stop switch	Emergency stop switch

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Engine stopped automatically. Engine can be started again and stops again 10 seconds later.

Cause	Corrections	Refer to Checking
Trouble in the electronic governor composition parts	Check blinking pattern of the glow lamp (1)  	Signal pattern sheet (1) Glow Lamp

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Engine speed cannot be controlled.

Cause	Corrections	Refer to Checking
Engine speed does not increase / decrease	Check slow down switch	Slow down switch
	Check speed switch	Speed switch
	Check operation of the solenoid	Solenoid
	Check harness of speed sensor	Harness
Engine operates rough	Check operation of the solenoid	Solenoid
	Check harness of speed sensor	Harness

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