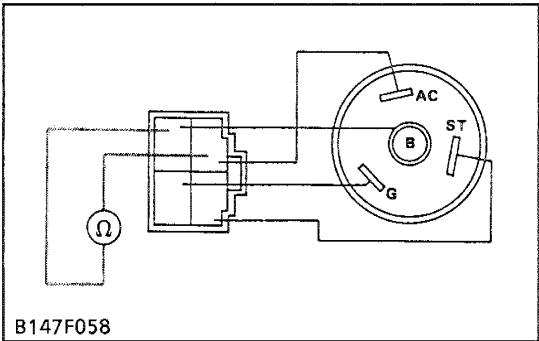
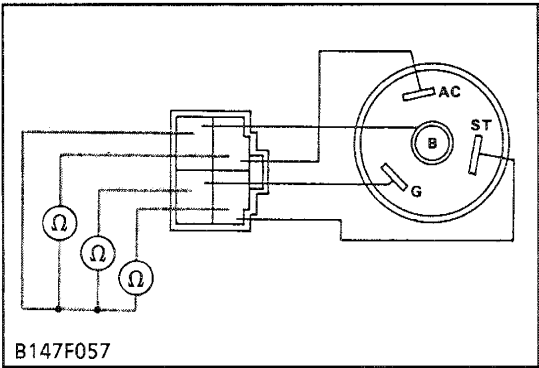
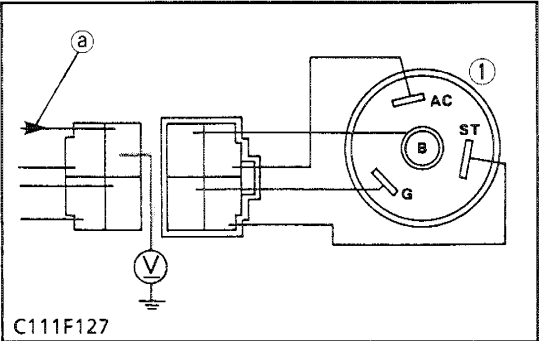
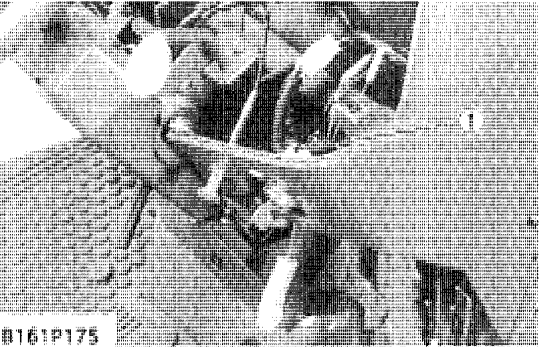


[2] STARTING SYSTEM
CHECKING



Main Switch

- 1. Remove the meter panel, and disconnect the main switch connectors after turning the main switch off.
- 2. Perform the following checking.

(1) Main Switch

Connector Voltage

- 1. Measure the voltage with a voltmeter across the connector B terminal and chassis.
- 2. If the voltage differs from the battery voltage (11 to 14 V), the wiring harness is faulty.

Voltage	Connector B terminal – Chassis	Approx. battery voltage
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(a) From Battery Positive Terminal

(1) Main Switch

Main Switch Key at OFF Position

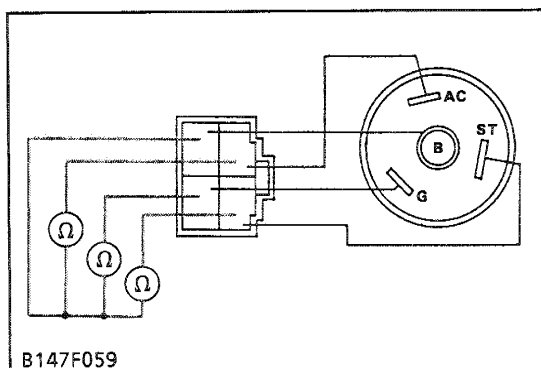
- 1. Turn the main switch off.
- 2. Measure the resistances with an ohmmeter across the B terminal and the AC terminal, B terminal and ST terminal, and B terminal and G terminal.
- 3. If infinity is not indicated, the contacts of the main switch are faulty.

Resistance	B terminal – AC terminal	Infinity
	B terminal – ST terminal	Infinity
	B terminal – G terminal	Infinity

Main Switch Key at ON Position

- 1. Turn the main switch on.
- 2. Measure the resistances with an ohmmeter across the B terminal and the AC terminal.
- 3. If 0 ohm is not indicated, the B – AC contacts of the main switch are faulty.

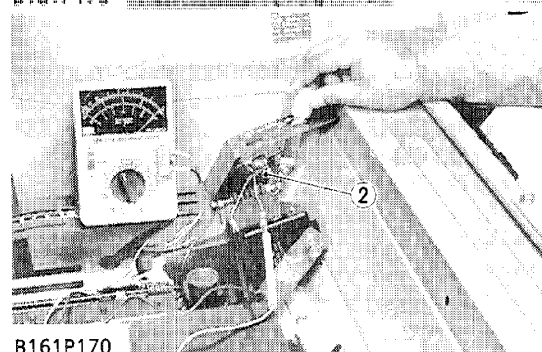
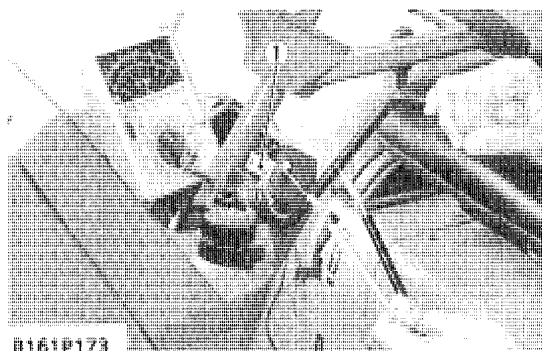
Resistance	B terminal – AC terminal	0 ohm
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Main Switch Key at START Position

1. Turn and hold the main switch key at the **START** position.
2. Measure the resistances with an ohmmeter across the **B** terminal and the **G** terminal, across the **B** terminal and the **ST** terminal and across the **B** terminal and the **AC** terminal.
3. If 0 ohm is not indicated, these contacts of the main switch are faulty.

Resistance	B terminal – G terminal	0 ohm
	B terminal – ST terminal	0 ohm
	B terminal – AC terminal	0 ohm



Check for Mismatching of the Shuttle and PTO Limit Switches

1. Disconnect the leads from shuttle and PTO limit switches.
2. Measure the resistance with an ohmmeter across the limit switch wiring lead and lead.
3. If the ohmmeter reads 0 ohm when the shift lever is in neutral, and infinity when the lever is in other positions, it is an indication that the switch is normal.

(1) Shuttle Limit Switch

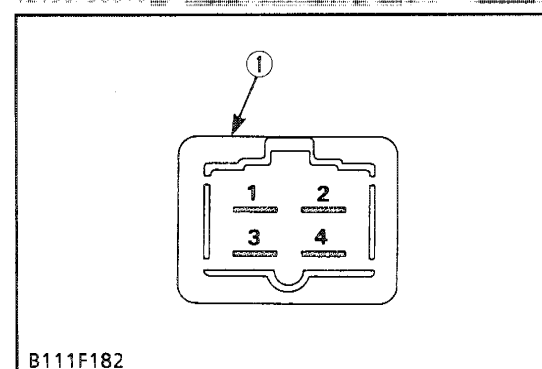
(2) PTO Limit Switch

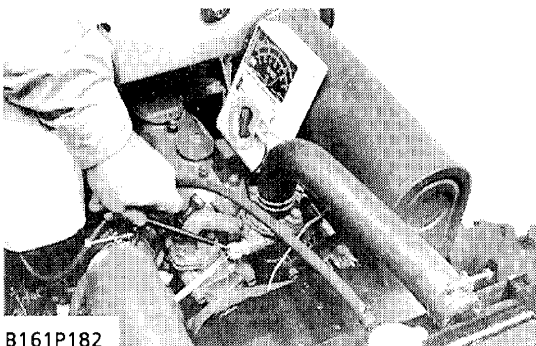
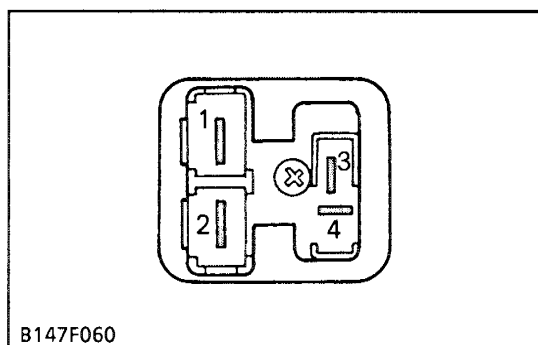
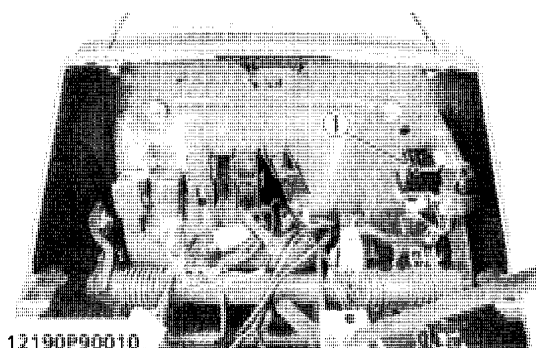
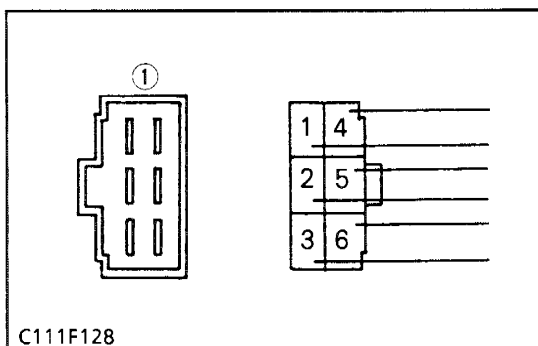
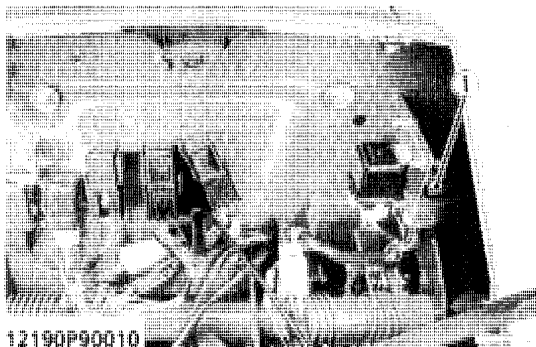


Checking Starter Relay

1. Remove the starter relay (1).
2. Apply battery voltage across terminals 2 and 4, and check for continuity across terminals 1 and 3.
3. If continuity is not established across terminals 1 and 3, renew the starter relay.

(1) Starter Relay





Glow Controller

1. Turn the main switch off.
2. Disconnect the connector from glow controller (1).
3. Check the following using the 6P connector of the wire harness.
4. In cases where all the inspection results are correct but the glow controller does not operate normally, replace the glow controller.

1) Main Switch ON Position

1. Turn the main switch on.
2. Measure the voltage across the terminal 4 and terminal 5 of the wiring harness or the terminal 2 and chassis.
3. The battery is normal if the voltage is 11 to 14 volts. If faulty, inspect the main switch, easy checker, glow relay, and wiring harness.

2) Main Switch Starting Position

1. Hold the main switch at the starting position.
2. Measure the voltage across the terminal 6 and chassis.
3. The battery is normal if the voltage is 11 to 14 volts. If the voltage is not in this range, inspect the main switch and wiring harness.

(1) Glow Controller

Glow Relay

1) Connector Voltage

1. Turn the main switch off.
2. Disconnect the 1P connectors and 2P connector from glow relay (1).
3. Measure the voltage with a voltmeter across the 1P connector R terminal (Positive) and chassis (Negative).
4. If the voltage differs from the battery voltage, the wiring harness is faulty.
5. Turn the main switch on.
6. Measure the voltage with a voltmeter across the 2P connector RW terminal (Positive) and chassis (Negative).
7. If the voltage differs from the battery voltage, the wiring harness is faulty.

2) Glow Relay Test

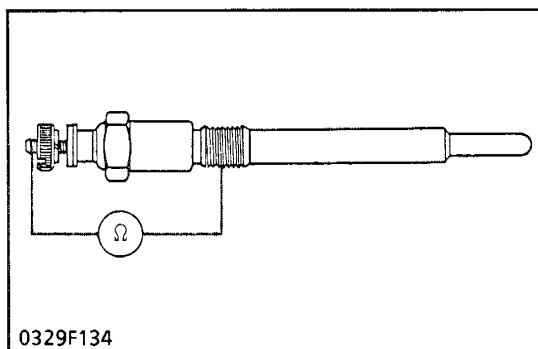
1. Remove the glow relay (1).
2. Apply battery voltage across terminals 3 and 4, and check for continuity across terminals 1 and 2.
3. If continuity is not established across terminals 1 and 2, replace the glow relay (1).

(1) Glow Relay

Water Temperature Sensor Continuity

1. Disconnect the connector from the water temperature sensor.
2. Measure the resistance with an ohmmeter.
3. If the measurement is not indicated, the sensor is faulty.

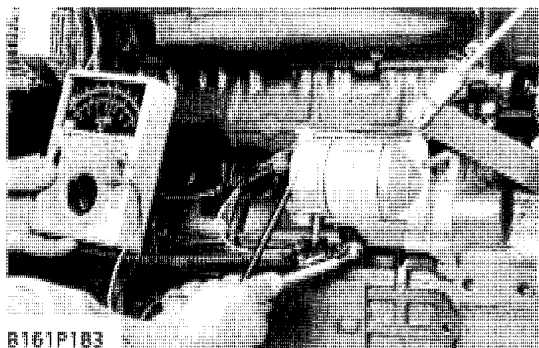
Resistance	Reference value	Approx. 16.2 kΩ at -20 °C (-4 °F) Approx. 3.88 kΩ at 0 °C (32 °F) Approx. 2.45 kΩ at 20 °C (68 °F) Approx. 1.14 kΩ at 40 °C (104 °F) Approx. 0.58 kΩ at 60 °C (140 °F) Approx. 0.32 kΩ at 80 °C (176 °F)
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Glow Plug

1. Disconnect the leads from the glow plugs.
2. Measure the resistance with an ohmmeter across the glow plug terminal and chassis.
3. If 0 ohm is indicated, the screw at the tip of the glow plug and the housing are short-circuited.
4. If the factory specification is not indicated, the glow plug is faulty.

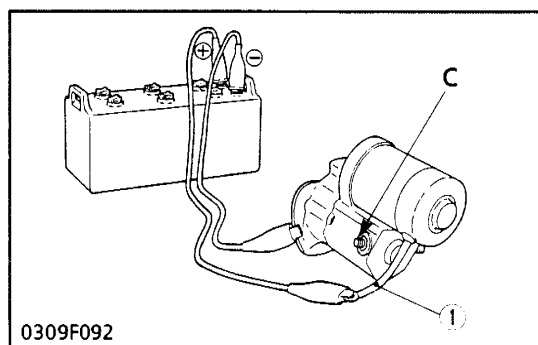
Glow plug resistance	Factory spec.	Approx. 0.5 ohms
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Starter Motor B Terminal Voltage

1. Measure the voltage with a voltmeter across the B terminal and chassis.
2. If the voltage differs from the battery voltage, the battery's positive cable or the battery negative cable is faulty.

Voltage	B terminal – chassis	Approx. battery voltage
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(1) Connecting Lead

Motor Test

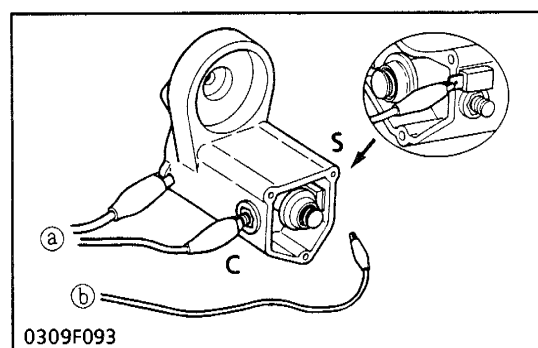


CAUTION

- Secure the starter in a vise to prevent it from jumping up and down while testing the motor.
1. Disconnect the ground cable clamp from the battery negative terminal post.
 2. Disconnect the battery positive cable and the leads from the starter.
 3. Remove the starter motor from the engine.
 4. Disconnect the connecting lead (1) from the starter C terminal.
 5. Connect a jumper lead from the connecting lead (1) to the battery positive terminal post.
 6. Connect a jumper lead momentarily between the starter motor housing and the battery negative terminal post.
 7. If the motor does not run, check the motor.

Magnet Switch Test (Pull-in, Holding Coils)

1. Remove the motor from the starter housing.
2. Prepare a 6 V battery for the test.
3. Connect jumper leads from the battery negative terminal to the housing and the starter C terminal.
4. The plunger should be attached and the pinion gear should pop out when a jumper lead is connected from the battery positive terminal to the S terminal. It's correct.
5. Disconnect the jumper lead to the starter C terminal. Then the pinion gear should remain popped out. It's correct.



(a) To Negative Terminal (b) To Positive Terminal

■ IMPORTANT

- Testing time must be 3 to 5 sec.