This manual has been developed to diagnose component failures only. It will not indicate a problem in the wiring or terminals. For example, if the troubleshooting guide indicates that the left steering switch is defective and replacing the left steering switch does not solve the problem; then you may have bad terminals or wiring to that switch.

Consult the operator's manual wiring diagram for the specific year and model of the machine you are working on for troubleshooting. For further assistance, contact The Grasshopper Company, service department at (620)345-8621.
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Ignition switch, part no. 183806.
(All Briggs, Kawasaki & Kohler Models).
M Magneto terminal.
S Starter terminal.
B Battery terminal.
L Lights, accessory terminal.
G Ground terminal.

Ignition switch, part no. 183827.
(All Kubota Models).
30 Battery terminal.
50 Starter terminal.
AC Accessory terminal.
17 Glow plug terminal (Diesel only).
19 Glow plug indicator terminal (Diesel only).

Brake switch, part no. 183894.
NC (normally closed) - means that the contact is closed and current will flow between these two terminals. When the button is depressed, these two terminals become open.

NO (normally open) - means that the contact is open with the switch mechanism released. When the button is depressed, these two terminals become closed.

The dotted line indicates an electrical connection between the two terminal posts.
<table>
<thead>
<tr>
<th>Switch Functions</th>
<th>Diagram</th>
<th>Description</th>
</tr>
</thead>
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| Left and right steering switch, part no. 183860.  
NC (normally closed) - means that the contact is closed with the switch mechanism released. The contact position is reversed when the switch lever is depressed.  
NO (normally open) - means that the contact is open with the switch mechanism released. The contact position is reversed when the switch lever is depressed. | ![Diagram](left-right-steering.png) | The dotted line indicates an electrical connection between the two terminal posts. |
| PTO switch, part no. 183925.  
The dotted line indicates an electrical connection between the two terminal posts. | ![Diagram](pto-switch.png) | |
| Seat switch, part no. 183870.  
The dotted line indicates an electrical connection between the two terminal posts. | ![Diagram](seat-switch.png) | |
ALL KUBOTA GASOLINE MODELS

1. Control relay - inspection.
   A. Control relay A has 2 red wires, 1 black wire, 1 yellow wire and 1 green wire in the relay socket.
   B. Control relay B has 3 blue wires and 1 green wire in the relay socket.

2. Assuming the main fuse, PTO fuse, ignition fuse are good, failure of control relay A or associated wiring will be evidenced by the following three symptoms:
   A. PTO clutch will not engage.
   B. Hourmeter will not run.
   C. Ignition coil will not have any voltage on the positive terminal*

3. Assuming the start fuse is good, failure of control relay B or associated wiring will result in starter solenoid not engaging; thus the starter motor will not operate.

ALL KUBOTA DIESEL MODELS

1. Control relay - inspection.
   A. Control relay A has 2 red wires, 1 black wire, 1 yellow wire and 1 green wire in the relay socket.
   B. Control relay B has 3 blue wires and 1 green wire in the relay socket.

2. Assuming the main fuse, PTO fuse, ignition fuse are good, failure of control relay A or associated wiring will be evidenced by the following three symptoms:
   A. PTO clutch will not engage.
   B. Hourmeter will not run.
   C. Fuel solenoid will pull in but not hold.

3. Assuming the start fuse is good, failure of control relay B or associated wiring will result in starter solenoid not engaging; thus the starter motor will not operate.

* (On 432 and 932, the plug which leads to igniter assembly will not have any voltage).
CONTROL RELAY - ALL KUBOTA MODELS

Assuming a normal diode on the circuit, board, relay B is affected by a problem in the circuit containing the PTO switch, and left and right steering switches.

Assuming a normal diode on the circuit board, relay A is affected by a problem in the circuit containing the PTO switch, and left and right steering switches. It is also affected by a problem in the circuit containing the parking brake switch and seat switch.

CIRCUIT BOARD DIODE PROBLEMS - ALL MODELS

Refer to the illustration below (figure 2) to locate the diode on the circuit board between pad R and A.

Open Diode

An open diode will result in the following symptoms:

Assuming steering levers out and PTO switch off, engine can be cranked and started only with driver on the seat and the parking brake in the 'OFF' position.

If driver gets off of the seat or puts parking brake to the 'ON' position, the engine will die.

Shorted Diode

Assuming an operator on the seat and parking brake is 'OFF', engine can be cranked and started with PTO switch in the 'ON' position or steering levers in.
ALL BRIGGS MODELS
ALL KAWASAKI MODELS
ALL KOHLER MODELS

Notes: Proper operation of the safety system indicates that:
1. To start the engine, both steering levers must be out, and the PTO switch must be off.
2. With the engine running and the operator off the seat, the engine will die if either steering lever is brought in or the PTO switch is turned on.
3. The engine will also die if the operator gets off the seat with either steering lever in or the PTO switch turned on.
4. The engine will die if the steering levers are brought in with the parking brake on.
ALL KUBOTA MODELS

Notes: Proper operation of the safety system indicates that:

1. To start the engine, both steering levers must be out, and the PTO switch must be off. The engine will start with the operator on or off the seat and the parking brake either on or off.

2. With the engine running and the operator off the seat, the engine will die if either steering lever is brought in or the PTO switch is turned on.

3. The engine will also die if the operator gets off the seat with either steering lever in or the PTO switch turned on.

4. The engine will die if the steering levers are brought in with the parking brake on.

---

Steering levers out, PTO switch 'OFF', parking brake 'OFF', operator OFF seat and engine running.

Does engine die when left steering lever is brought 'IN'?

Yes →Does engine die when right steering lever is brought 'IN'?

Yes →Does engine die when the PTO switch is turned 'ON'?

Yes →To A

No →Adjust or replace left steering switch.

No →Adjust or replace right steering switch.

Replace PTO switch.

---

Does engine die when operator raises up off the seat?

Yes →All safety systems are functioning properly.

No →Replace seat switch.

---

Steering levers out, PTO switch 'OFF', parking brake 'OFF', operator ON seat and engine running.

Does engine die when steering levers are brought 'IN'?

Yes →Replace brake switch.

No →Steering levers in, PTO switch 'OFF', parking brake 'OFF', operator ON seat and engine running.

Does engine die when operator raises up off the seat?

Yes →All safety systems are functioning properly.

No →Replace seat switch.
**ALL KAWASAKI MODELS**

**Notes:**
1. Voltage tests are performed with a DC/AC voltmeter.
2. Tests are performed after regulator fuse is checked.
3. AC voltage tests are performed with engine at 3600 rpm.

---

**Engine is not running.**

Attach DC voltmeter to negative and positive posts of battery.

Does voltmeter read 12.2 DC volts or above?

- Yes: **Battery is in good condition.**
- No: Test and recharge battery.

Start engine and observe battery voltage at full throttle.

Is voltage at battery between 13 and 14.7 DC volts?

- Yes: **Charging system is functioning properly.**
- No: Key switch is in ‘RUN’ position. Voltage test is performed with a voltmeter to battery ground (negative post) unless otherwise noted.

Does DC voltage appear at red wire at voltage regulator plug to ground?

- Yes: TO A (continues on next page)
- No: If regulator fuse is good, red wire on harness side of 6 way engine plug should show battery voltage. Check connections in 6 way plug.
BATTERY CHARGING SYSTEM
(CONTINUED)

ALL KAWASAKI MODELS

---

Keyswitch is in "RUN" position. Does voltage appear at red/white trigger wire at voltage regulator to ground?

Yes

Disconnect regulator-rectifier plug. Place AC voltmeter across AC terminals in plug. Does voltage read less than 28 volts AC at full throttle?

Yes

Service Stator

No

Replace regulator - rectifier

Does voltage appear at red wire on trigger wire relay to ground?

Yes

Replace Light/Aux Fuse

No

No

Replace 30 amp in-line fuse in red wire between regulator - rectifier and relay.

Does voltage appear at black wire at relay to ground?

Yes

Does ground appear at green wire at relay to battery positive side?

Yes

Replace Relay

No

Check ground connection at engine.

---

continued from previous page
**BATTERY CHARGING SYSTEM**

**ALL BRIGGS MODELS**

**ALL KOHLER MODELS**

Notes:
1. Voltage tests are performed with a DC/AC voltmeter.
2. Tests are performed after regulator fuse is checked.
3. AC voltage tests are performed with engine at 3600 rpm.

---

**Engine is not running.**

Attach DC voltmeter to negative and positive posts of battery.

Does voltmeter read 12.2 DC volts or above?

- **Yes**: Battery is in good condition.
- **No**: Test and recharge battery.

Start engine and observe battery voltage at full throttle.

Is voltage at battery between 13 and 14.7 DC volts?

- **Yes**: Charging system is functioning properly.
- **No**: Disconnect regulator-rectifier plug. Place AC voltmeter across AC terminals in plug and read voltage.

Does voltage read less than 28 volts AC with engine running?

- **Yes**: Service stator.
- **No**: If AC voltage measures more than 28 volts replace regulator-rectifier.

For more detailed testing consult the engine repair manual.
BATTERY CHARGING SYSTEM

ALL KUBOTA MODELS WITH SMOOTH ALTERNATORS

Notes:
1. Voltage tests are performed with a DC/AC voltmeter.
2. Tests are performed after regulator fuse is checked.
3. AC voltage tests are performed with engine at full RPM.

Engine is not running.

Attach DC voltmeter to negative and positive posts of battery.

Does voltmeter read 12.2 DC volts or above?

Yes: Battery is in good condition.

No: Test and recharge battery.

Start engine and observe battery voltage at full throttle.

Is voltage at battery between 13 and 14.7 DC volts?

Yes: Charging system is functioning properly.

No: Does AC voltage appear between the 2 blue wires from alternator?
   A. 10 volts* at idle?
   B. 36 volts* AC at full throttle?

   Yes: Does DC voltage appear on white wire to voltage regulator plug to ground?

   Yes: Does green wire on the regulator plug between the two blue wires show ground when tested to battery positive?

   Yes: Replace alternator.

   No: Check ground connection.

   No: Replace alternator.

   No: Does voltage appear on terminal AC of ignition switch to ground?

   Yes: Check white wire and terminals from terminal AC of ignition switch to voltage regulator.

   No: Check ignition switch for continuity from terminal AC to terminal 30.

   Yes: Is voltage at red wire of voltage regulator 13-14.7 DC volts to ground?

   Yes: Check red wire, regulator fuse and terminals from terminal 30 of ignition switch to voltage regulator.

   No: Replace voltage regulator.

   No: Replace voltage regulator.

   No: Check ignition switch for continuity from terminal AC to terminal 30.

   *voltage may vary + or - 3 volts.
ALL KUBOTA MODELS WITH ALUMINUM/FINNED ALTERNATORS

Notes:
1. Tests are performed after regulator fuse is checked.
2. Set voltmeter to DC voltage for testing on this page.

**BATTERY CHARGING SYSTEM**

Engine is not running.

Attach voltmeter to negative and positive posts of battery.

Does voltmeter read 12.2 volts or above?

- **Yes**: Battery is in good condition.
- **No**: Test and recharge battery.

Start engine and observe battery voltage at full throttle.

Is voltage at battery between 13 and 14.7 volts?

- **Yes**: Charging system is functioning properly.
- **No**: Service alternator - regulator assembly.
120, 124 & 126 BRIGGS
226V BRIGGS
ALL 600 SERIES MODELS (EXCEPT 618 2003 & UP)
718 BRIGGS

Notes:
1. Voltage tests are performed with a DC voltmeter.

Test battery for condition and charge.

Steering levers out, PTO switch 'OFF'. Voltage tests are performed with a voltmeter or test light to battery ground.

Key switch is in 'START' position for each test.

Does voltage appear from terminal 'C' of start fuse?
(See Figure 9 or 10)

Yes

Does voltage appear from terminal 'D' of start fuse?

No

Replace start fuse.

Problem is the key switch or the power to the key switch.

Yes

If there is voltage at terminal 'D' of start fuse, there should also be voltage on blue wire at starter solenoid.

To A

continues on next page

Figure 8
ENGINE WILL NOT CRANK
(CONTINUED)

120, 124 & 126 BRIGGS
226V BRIGGS
ALL 600 SERIES MODELS (EXCEPT 618 2003 & UP)
718 BRIGGS

Fuse Block Test Points
120, 124, 126, 226V & 600 Series

Fuse block styles will vary.
Be sure you are checking designated fuse.

Figure 9

Fuse Block Test Points
718 Briggs

Fuse block styles will vary.
Be sure you are checking designated fuse.

Figure 10
ENGINE WILL NOT CRANK

329B, 335B, 729BT®, & 735BT® BRIGGS BIG BLOCK MODELS
120K KOHLER
ALL 200 SERIES MODELS EXCEPT 226V
ALL 700 SERIES KOHLER MODELS
618 2003 & UP
ALL KAWASAKI MODELS

Notes:
1. Do not forget to plug starter relay back in when finished testing.

Figure 11

OK

Test battery for condition and charge.

Steering levers out, PTO switch 'OFF'. Voltage test is performed with a voltmeter or test light to battery ground.

Key switch is in 'START' position for each test.

Does voltage appear from terminal 'C' of start fuse?
Yes

Does voltage appear from terminal 'D' of start fuse?
Yes

Does voltage appear on terminal 85 of starter relay?
Yes

Does voltage appear on terminal 87 (inline fuse wire) of starter relay?
Yes

To A continues on next page

No

Problem is the key switch or the power to the key switch.

No

Replace start fuse.

No

Check wires from start fuse to starter relay.

No

Check 30 amp in-line fuse in wire between starter relay and starter solenoid.

Figure 11

KEY SWITCH
(in start position)

PTO SWITCH
(PTO OFF)

STEERING SWITCHES
RIGHT
(Steering levers out)

LEFT

KEY SWITCH
(in start position)

PTO SWITCH
(PTO OFF)

STEERING SWITCHES
RIGHT
(Steering levers out)
ENGINE WILL NOT CRANK
(CONTINUED)

Does voltage appear on terminal 30 of starter relay?

- Yes: Check starter solenoid. Problem could be starter solenoid or starter.
- No: Key switch is in ‘OFF’ position for each test. You are now testing a ground circuit. All tests will be to the battery positive side.

Remove the starter relay. It is located on the inside of the frame, on the left side of the engine on Kohler models and on the right side of the Kawasaki models.

Does the yellow wire without the in-line fuse show ground when tested?

- Yes: Replace the starter relay.
- No: Replace PTO switch.

Does either yellow wire on PTO switch show ground when tested?

- Yes: Right steering switch is defective or out of adjustment.
- No: Left steering switch is defective or out of adjustment.

Check ground at engine.

329B, 335B, 729BT\(^6\) & 735BT\(^6\) BRIGGS
BIG BLOCK MODELS
120K KOHLER
ALL 200 SERIES MODELS EXCEPT 226V
ALL 700 SERIES KOHLER MODELS
618 2003 & UP
ALL KAWASAKI MODELS

**Fuse Block Test Points**

700 Series Kohler Models
All Kawasaki Models

**Starter Relay Testing**

- If all safety switches are correct, terminal 86 is grounded.
- Terminal 87 is 12 volts.
- Terminal 85 is +12 volts when key switch is in ‘START’ position.
- Terminal 30 is +12 volts when relay is energized.

**Fuse Block Styles will vary.**

Be sure you are checking designated fuse.

**Figure 13**

**Figure 14**
Test battery for condition and charge.

OK

Steering levers out, PTO switch ‘OFF’. Voltage test is performed with a voltmeter or test light to battery ground.

Key switch is in ‘START’ position for each test.

Does voltage appear from terminal 'I' of start fuse?

Yes

Does voltage appear from terminal 'J' of start fuse?

Yes

Does voltage appear on blue wire at starter solenoid?

Yes

Check starter solenoid. Problem could be starter solenoid or starter.

No

Problem is the key switch or the power to the key switch.

No

Replace start fuse.

To A

continues on next page

Figure 15
ENGINE WILL NOT CRANK
(CONTINUED)

ALL KUBOTA MODELS

Key switch is in 'OFF' position for each test. You are now testing a ground circuit. All tests will be to the battery positive side.

Remove relay 'B'. It is the relay with 3 blue wires and 1 yellow wire in the plug.

Does the green/yellow wire on the plug of relay 'B' show ground when tested?

Do both wires on left steering switch show ground when tested?

Before replacing the steering switch, check adjustment. If it does not click when steering levers are moved in and out adjust the switch.

Replace left steering switch.

Before replacing the steering switch, check adjustment. If it does not click when steering levers are moved in and out adjust the switch.

Replace right steering switch.

Replace relay 'B'.

Do both yellow wires on right steering switch show ground when tested?

Replace PTO switch.

Fuse block styles will vary.
Be sure you are checking designated fuse.

Fuse Block Test Points

Figure 16

Figure 17

Fuse block styles will vary.
Be sure you are checking designated fuse.

Replace relay 'B'. It is the relay with 3 blue wires and 1 yellow wire in the plug.

Does the green/yellow wire on the plug of relay 'B' show ground when tested?

Do both wires on left steering switch show ground when tested?

Before replacing the steering switch, check adjustment. If it does not click when steering levers are moved in and out adjust the switch.

Replace left steering switch.

Before replacing the steering switch, check adjustment. If it does not click when steering levers are moved in and out adjust the switch.

Replace right steering switch.

Replace PTO switch.
If engine cranks, but will not run; the safety switches are functioning properly.

Test engine for spark. Does spark occur at spark plug?

Yes

Check for fuel system problem or engine failure.

No

Disconnect yellow safety wire* from engine and retest. Does spark now occur at spark plug?

Yes

Reconnect yellow safety wire. Replace safety relay in console.

Use part number 184271 relay for all 100, 200, 300 & 600 tractors.

Use part number 184271 relay for 700 series tractors with serial number 6399999 & below.

Use part number 184266 relay for 700 series tractors with serial number 6400000 & above.

No

Reconnect yellow safety wire. There is an engine ignition related problem. Consult engine repair manual.

* Briggs engine excluding Briggs Big Block: Single yellow wire on left side of engine.

Kohler & Briggs Big Block engine: Disconnect plug on left side of engine. Using a small screwdriver, release the lock tab on yellow wire in tractor side plug and remove wire. Reconnect the plug.

Kawasaki engine: Disconnect plug on right side of engine. Using a small screwdriver, release the lock tab on yellow wire in tractor side plug and remove wire. Reconnect the plug.

Notes:
1. Tests are performed after LIGHT/AUX fuse has been checked on all models, check fuel pump fuse on Kawasaki Models.

Warning!
With the yellow wire disconnected from the engine, all safety functions and the key switch will be inoperable in their ability to shutoff the engine. This step is performed for test purposes only. Under no conditions should the PTO be turned ON or the machine be driven with the yellow wire disconnected! Always reconnect the yellow wire to the engine after this test.
Steering levers out, PTO switch 'OFF'. Voltage tests are performed with a voltmeter or test light to battery ground (negative post).

Key switch is in 'RUN' position for each test until otherwise noted.

Does voltage appear from black wire on positive terminal of ignition coil to ground? *

Yes

Problem is in ignition coil or distributor. Consult Kubota engine manual for repair.

No

Does voltage appear from terminal 'G' of ignition fuse to ground?

Yes

Replace ignition fuse.

No

Does voltage appear from terminal 'A' of main fuse to ground?

Yes

Does voltage appear from terminal 'B' of main fuse to ground?

Yes

Replace main fuse.

No

Does voltage appear from terminal 30 (battery) of key switch to ground?

Yes

Test battery.

No

Replace key switch.

* For models 329/729 & 432/932, test for voltage at red wire in white 2-way plug located directly below carburetor on engine.

ALL KUBOTA GASOLINE MODELS

Notes:
1. All tests are made with wires in place on their respective switches.
2. Refer to fuse block diagram for terminal locations.
3. Refer to "Troubleshooting Control Relays" for information on the diode and control relays.
4. If engine will crank, control relay "B" is functioning properly. This means that the PTO switch, right steering switch and left steering switch are functioning properly.

Fuse Block Test Points

Fuse block styles will vary. Be sure you are checking designated fuse.

Figure 18

Figure 19

Rev. 01-14
ENGINE WILL CRANK, BUT NOT START

ALL KUBOTA DIESEL MODELS EXCEPT THOSE WITH D902 ENGINES

Notes:
1. All tests are made with wires in place on their respective switches.
2. Refer to fuse block diagram for terminal locations.
3. Refer to “Troubleshooting Control Relays” for information on the diode and control relays.
4. If engine will crank, control relay “B” is functioning properly. This means that the PTO switch, right steering switch and left steering switch are functioning properly.

Figure 20

17 30
2 4 360
19 50
151
183
190
109
106
277
287
253
238
230
226
214
211
202
200
190
189
112
60
61
66
69
KUBOTA DIESEL MODELS WITH D902 ENGINES

If engine will crank, control relay "B" is functioning properly. This means that the PTO switch, right steering switch and left steering switch are functioning properly.

Check if fuel solenoid is binding or has a broken spring. See Owner's Manual for location of the manual fuel stop lever. If lever can be pushed forward against spring pressure, fuel solenoid is operating properly. If lever is already forward, is binding, or has no spring resistance, replace fuel solenoid.
ENGINE STARTS, BUT DIES WHEN STEERING LEVERS ARE BROUGHT IN OR PTO SWITCH IS ENGAGED

ALL BRIGGS MODELS
ALL KAWASAKI MODELS
ALL KOHLER MODELS

Notes:
If engine will crank and start, the PTO switch, right steering switch and left steering switch are functioning properly. The problem must be the parking brake or seat switch.

Steering levers IN, operator ON seat, parking brake 'OFF'. Test will be to the battery positive side.

Does only one side of the seat switch show ground? (Note: wires must be installed on switch and switch must be activated.)

Yes
Replace seat switch.

No
If neither side of the seat switch shows ground, replace parking brake switch.

Rev. 02-16
ENGINE STARTS, BUT DIES WHEN STEERING LEVERS ARE BROUGHT IN OR PTO SWITCH IS ENGAGED

**ALL KUBOTA MODELS**

**Notes:**
If engine will crank and start, control relay A and control relay B are functioning properly. The PTO switch, right steering switch and left steering switch are functioning properly. The problem must be the parking brake or seat switch.

---

Operator OFF seat, parking brake 'OFF', all wires are connected to switches. You are testing a ground circuit. All tests will be to the battery positive side.

Key switch is 'OFF' for this test.

Do both the yellow and green wires on brake switch show ground when tested?

**Yes**
Replace seat switch.

**No**
Replace parking brake switch.

---

**Brake Switch Test Points**

- YELLOW
- GREEN
- NC
- NO

Brake switch view

Figure 21
ENGINE STARTS, BUT DIES WHEN KEY SWITCH IS RELEASED

ALL KUBOTA DIESEL MODELS EXCEPT THOSE WITH D902 ENGINES

Notes:
1. All tests are made with wires in place on their respective switches.
2. Problem is in the 'HOLD' circuit of the fuel solenoid.
3. Relay A is the relay with 1 yellow, 1 black and 2 red wires.

Steering levers OUT, PTO switch 'OFF', parking brake 'OFF'. Voltage tests are performed with a voltmeter or test light to battery ground (negative post), unless otherwise noted.

Key switch is in 'RUN' position for each test unless otherwise noted.

Does voltage appear from terminal 'A' of main fuse to ground? (Refer to figure 23)

No

Replace key switch.

Yes

Does voltage appear from terminal 'B' of main fuse to ground?

No

Replace main fuse.

Yes

Does voltage appear from terminal '1' of fuel solenoid module to ground? (Refer to figure 22)

No

Replace control relay A. This is the relay with 1 yellow, 1 black and 2 red wires.

Yes

Does voltage appear from terminal 'G' of ignition/solenoid fuse to ground?

No

Replace ignition/solenoid fuse.

Yes

To A

continues on next page

Fuel Solenoid Module Test Points

Fuse Block Test Points

Fuse block styles will vary. Be sure you are checking designated fuse.

Figure 22

Figure 23

Rev. 12-16
ENGINE STARTS, BUT DIES WHEN KEY SWITCH IS RELEASED (CONTINUED)

ALL KUBOTA DIESEL MODELS EXCEPT THOSE WITH D902 ENGINES

Does ground appear from terminal '2' of fuel solenoid module to battery positive side?

Yes: Does voltage appear from terminal '4' of fuel solenoid module to ground?

Yes: Does voltage appear from 'HOLD' wire of fuel solenoid to ground?

Yes: Replace fuel solenoid. Solenoid 'HOLD' to 'COMM' wires should test approximately 11 to 16 ohms resistance.

No: Replace fuel solenoid MODULE. IMPORTANT: If fuel solenoid module must be replaced, check fuel solenoid ohms. A defective fuel solenoid could burn out a new fuel solenoid module. Solenoid 'HOLD' to 'COMM' wires should test approximately 11 to 16 ohms resistance.

No: Check fuel solenoid plug connection.

Does voltage appear from terminal '4' of fuel solenoid module to ground?

No: Does voltage appear from 'HOLD' wire of fuel solenoid to ground?

No: Repair ground.

Figure 24

---

Rear. 02-16
ENGINE STARTS, BUT DIES WHEN KEY SWITCH IS RELEASED

KUBOTA DIESEL MODELS WITH D902 ENGINES

Notes:
1. All tests are made with wires in place on their respective switches.
2. Problem is in the 'HOLD' circuit of the fuel solenoid.
3. Relay A is the relay with 1 yellow, 1 black and 2 red wires.

Steering levers OUT, PTO switch 'OFF', parking brake 'OFF'. Voltage tests are performed with a voltmeter or test light to battery ground (negative post).

Key switch is in 'RUN' position for each test unless otherwise noted.

Does voltage appear from terminal ‘D’ of fuel solenoid module to ground? (Refer to figure 25)

Does voltage appear from terminal ‘E’ of fuel solenoid module to ground?

Does voltage appear from terminal ‘G’ of ignition fuse to ground?

Replace control relay A. This is the relay with 1 yellow, 1 black and 2 red wires.

Replace ignition fuse.

Check for broken wire between fuse block and fuel solenoid module.

Does voltage appear from terminal ‘A’ of main fuse to ground? (Refer to figure 26)

Does voltage appear from terminal ‘B’ of main fuse to ground?

Replace key switch.

Replace main fuse.

Call Grasshopper Service Department

Does voltage appear from terminal ‘F’ of main fuse to ground? (Refer to figure 26)

Fuse block styles will vary. Be sure you are checking designated fuse.
ENGINE STARTS, BUT DIES WHEN KEY SWITCH IS RELEASED

BRIGGS, KAWASAKI & KOHLER MODELS

Notes:
1. If engine cranks and starts but dies when key switch is released, then PTO switch, right and left steering switches, carburetor solenoid and stop relay are functioning properly.
2. Problem is a blown light/aux. fuse, a fuse block connection or a bad key switch.
3. All tests are made with wires in place on their respective switches.

Steering levers out, PTO switch 'OFF'. Voltage tests are performed with a voltmeter or test light to ground (negative post).

Key switch is in 'RUN' position for each test.

Does voltage appear at top of light/aux fuse to ground?

No

Replace Key switch

Yes

Does voltage appear from terminal 'L' of key switch to ground?

Yes

Problem is light/aux fuse clip or wire from key switch to fuse.

Replace fuse.

No

Does voltage appear on bottom of light/aux fuse to ground?

Yes

Problem is fuse clip or wire to carburetor solenoid.

No

Replace fuse.
Turn key switch on, then off. Does voltage appear on terminal B of stop solenoid module to battery ground for approx. 10 seconds from time key was turned off?

Key switch is in RUN position for each test, but engine is not running.

Does coil resistance of stop solenoid measure approx. 1 Ohm to ground?

Replace stop solenoid.

Check linkage to fuel shutoff for binding.

Fuel Solenoid Module Test Points

Fuse Block Test Points

Notes:
1. Check STOP SOLENOID fuse (15 amp). The engine will not shut off if this fuse is blown or if fuse block terminals are loose or corroded.
2. IMPORTANT:
   A. For the tests on this page, unplug stop solenoid.
   B. Before performing tests, check ground source for fuel solenoid module. The starter plate on the right side of the engine has two ground bolts. The fuel solenoid module ground wire is green with a yellow tracer and is connected to the TOP bolt. Tighten this connection if it is loose. If connection is already tight, check for damaged wire at eyelet.
3. Check for DC voltage in all tests.
4. Steering levers out, PTO off for all tests.
5. Remember to reconnect stop solenoid when testing is completed.

Fuse block styles will vary. Be sure you are checking designated fuse.
ENGINE STARTS AND RUNS, BUT WILL NOT SHUT OFF
(CONTINUED)

KUBOTA DIESEL MODELS WITH D902 ENGINES

Figure 29

Rev. 02-16
ALL MODELS EXCEPT KUBOTA

Notes:
1. Test clutch by reading ohm's across clutch plug. Remove wire connector at clutch body or at clutch lead if wires are not removable.
2. See chart on page 38 for acceptable resistance readings.

Key switch is in 'RUN' position for each test, but engine is not running.

Does voltage appear from terminal 'E' of PTO fuse to ground?

Yes → Does voltage appear from terminal 'F' of PTO fuse to ground?

Yes → Does voltage appear from brown wire at PTO clutch plug to ground?

Yes → Replace PTO switch.

No → Problem is the key switch or wiring from key switch to PTO fuse.

No → Replace PTO fuse.

Does green wire of tractor harness plug show ground when tested to battery positive side?

Yes → Test PTO clutch and terminals (see note above).

No → Repair clutch ground circuit.

Fuse Block Test Points

Fuse block styles will vary. Be sure you are checking designated fuse.

Key switch is in 'RUN' position for each test, but engine is not running.

PTO SWITCH (PTO off)

PTO SWITCH (PTO on)

CLUTCH

Figure 30

Figure 31
TROUBLESHOOTING PTO CLUTCH

ALL KUBOTA MODELS

Notes:
1. If engine starts and runs, relay 'A' is working properly.
2. Test clutch by reading ohm's across clutch plug. Remove wire connector at clutch body or at clutch lead if wires are not removable. See chart on page 38 for acceptable resistance readings.
3. Voltage tests are performed with the seat switch wires removed and a jumper installed across the two wires.

Warning!
Jumper must be removed and wires reinstalled on seat switch after test is complete and before machine is returned to operation.

Steering levers OUT, PTO switch 'ON'. Voltage tests are performed with a voltmeter or test light to battery ground (negative post).

Key switch is in 'RUN' position for each test, but engine is not running.

Does voltage appear from terminal 'F' of PTO fuse to ground? Yes

Does voltage appear from brown wire at PTO clutch plug to ground? Yes

Does green wire of tractor harness plug show ground? Yes

Test PTO clutch and terminals (see note above).

No

Replace PTO fuse.

Replace PTO switch.

Repair clutch ground circuit.

Fuse Block Test Points

Fuse block styles will vary. Be sure you are checking designated fuse.

Figure 32

Figure 33

Rev. 01-14
### ACCEPTABLE CLUTCH RESISTANCE RANGE IN OHMS

<table>
<thead>
<tr>
<th>MOUNTS</th>
<th>1&quot; Clutches</th>
<th>1.125&quot; Clutches</th>
<th>1.125&quot; Clutches</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1&quot; Clutch with Center Stop* &amp; 1&quot; Spot Brake Clutch**</td>
<td>1&quot; Clutch without Center Stop</td>
<td>1.125&quot; Clutch with Center Stop &amp; 1.125&quot; Spot Brake Clutch**</td>
</tr>
<tr>
<td>FRONT MOUNTS</td>
<td>100 Series &amp; 226V</td>
<td>2.6 - 3.0</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>200 300 400 Series except 226V</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>All 600 Series except 618 &amp; 620T with Serial # 5300000 &amp; above</td>
<td>2.6 - 3.0</td>
<td>2.4 - 2.6</td>
</tr>
<tr>
<td></td>
<td>618 &amp; 620T with Serial # 5300000 &amp; above</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>700 Series with Briggs engines excluding Briggs Big Block</td>
<td>2.6 - 3.0</td>
<td>2.4 - 2.6</td>
</tr>
<tr>
<td></td>
<td>700 Series with Kohler engines &amp; Briggs Big Block engines</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>All 700 &amp; 900 Series Kubota &amp; Kawasaki Models</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

* 'Center Stop' refers to the stainless steel piece located between the hold magnets. To check if the clutch has this stop, look on the front side of the anti-rotation flange.

** The Spot Brake Clutch can be identified by a one piece plate bolted on the front side of the anti-rotation flange.
ELECTRIC LIFT DOES NOT OPERATE

Notes:
1. For testing refer to 6-way Weather-pack connector under seat.
2. Connector view is from back (wire side) (see Figure 34).
3. Toggle switch is not activated.

NOTE:
All tests are performed with plug connected.

To access Weather-Pack terminals, use a small screwdriver to release latches on either side of cover. Flip up cover and slide green cable seals up the wires to expose terminals.

Do not penetrate wire covering to test. This can lead to wiring component failure.

Rev. 02-16
What is the position of the winch?

- Is winch in the up position and will not lower?
  - YES: Go to page 41
  - NO: Is winch positioned between upper and lower limit switches? But won’t raise or lower?
    - YES: Redo test on previous page
    - NO: Is winch in the down position and will not raise?
      - YES: Go to page 42
Activate electric lift switch to down position

Does black/white wire of Relay 'B' show voltage to ground?

NO → Replace toggle switch

YES → Does yellow wire of Relay 'B' show ground to battery positive side?

NO → Replace lower limit switch. Lower limit switch is nearest winch (see Figure 38)

YES → Does purple wire of winch motor show voltage to ground?

NO → Replace Relay 'B'

YES → Faulty winch motor
Activate electric lift switch to up position.

Does voltage appear on yellow/brown wire of switch to ground? YES

Replace toggle switch NO

Does voltage appear on both yellow/brown wires of upper limit switch? YES

Upper limit switch is farthest from winch motor (see Figure 40). Be sure wire terminals are tight and installed correctly. NO

Replace upper limit switch

Does blue wire of winch motor show voltage to ground? YES

Faulty winch motor NO

Replace Relay 'A'
### Wiring Diagram

#### Item Order Description

<table>
<thead>
<tr>
<th>No.</th>
<th>Order No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>605859</td>
<td>wiring assembly (includes items 1 &amp; 3-7)</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>184969</td>
<td>connector - 6 way</td>
</tr>
<tr>
<td>2</td>
<td>183855</td>
<td>switch</td>
</tr>
<tr>
<td>3</td>
<td>202105</td>
<td>diode</td>
</tr>
<tr>
<td>4</td>
<td>184177</td>
<td>switch - rocker</td>
</tr>
<tr>
<td>5</td>
<td>604712</td>
<td>relay</td>
</tr>
<tr>
<td>6</td>
<td>184926</td>
<td>connector - 5 way female terminal</td>
</tr>
<tr>
<td>7</td>
<td>425217</td>
<td>eyelet insulator</td>
</tr>
<tr>
<td>8</td>
<td>604515</td>
<td>lift drive assembly</td>
</tr>
<tr>
<td>9</td>
<td>184919</td>
<td>connector - pin housing</td>
</tr>
<tr>
<td>10</td>
<td>184921</td>
<td>connector - housing</td>
</tr>
</tbody>
</table>

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**Diagram Notes:***
- BLUE wire must be connected for aripa-vator lift.
- GREEN/YELLOW wire must be disconnected for snowthrower lift.
- RED/WHITE wire is 6-way male black plug from universal tractor harness.
- BLACK/WHITE wire is 6-way female black plug.
- RELAY MOUNT is black on 184083 switch.
- THIS IS A DOUBLE BLACK WIRE ON 184083 SWITCH.
- WHEN REMOVING AERA-VATOR FROM TRACTOR DISCONNECT WIRING AT THIS POINT.
- SWITCH BOX is 07036A.
- UPPER LIMIT SWITCH is black and white.
- LOWER LIMIT SWITCH is black and white.
- Relay must be disconnected for aripa-vator lift.
- Switch towards tractor towards aripa-vator.
- Toward tractor toward aripa-vator.
- This is a double black wire on 184083 switch.
HYDRAULIC LIFT DOES NOT WORK
SEPARATE TILT SWITCH / DELAY TIMER STYLE

**Notes:**
1. "Hydraulic switch" refers to either the push button switch in the steering lever or the toggle switch in the console.
HYDRAULIC LIFT DOES NOT WORK (CONTINUED)
SEPARATE TILT SWITCH / DELAY TIMER STYLE

HYDRAULIC LIFT DOES NOT WORK (CONTINUED)
SEPARATE TILT SWITCH / DELAY TIMER STYLE

Does voltage appear at green/yellow wire at delay timer to ground?

Yes: Does voltage appear at purple wire at delay timer to ground?

Yes: Voltage should also appear at one purple wire at hydraulic switch. Does voltage appear at other purple wire with hydraulic switch activated?

Yes: Check for broken wire between hydraulic switch and solenoid.

No: No

No: Replace delay timer.

No: Replace hydraulic switch.

No: Replace tilt switch.
HYDRAULIC LIFT DOES NOT WORK
ONE PIECE TILT SWITCH / DELAY TIMER STYLE

Notes:
1. "Hydraulic switch" refers to either the push button switch in the steering lever or the toggle switch in the console.

Voltage tests are performed with a voltmeter to battery ground (negative post) unless otherwise noted. Raise the tractor seat to access the hydraulic lift solenoid valve.

Keyswitch is in "RUN" position AND hydraulic switch is activated for each test. Does voltage appear at purple wire at solenoid to ground? Yes

Hydraulic switch no longer needs to be activated, but keyswitch is in "RUN" position. Does ground appear at yellow/brown wire at solenoid to battery positive (hot post)? Yes

Remove solenoid and reconnect wires with key in "RUN" position, but engine NOT running. Does solenoid valve move when hydraulic switch is activated? Yes

Service or replace hydraulic pump.

Yes

No

Replace solenoid.

Does voltage appear at black wire at hydraulic switch to ground? Yes

Replace hydraulic switch.

No

Remove right fender to access hydraulic lift wiring assembly. Keyswitch is in "RUN" position. Does voltage appear at point 1 of 3-way connection to ground? Yes

TO A

continues on next page

No

Check plug connections.

No

Replace accessory fuse.
HYDRAULIC LIFT DOES NOT WORK
ONE PIECE TILT SWITCH / DELAY TIMER STYLE
(CONTINUED)

NOTE:
All tests are performed with plug connected.

To access Weather-Pack terminals, use a small screwdriver to release latches on either side of cover. Flip cover up and slide green cable seals up the wires to expose terminals.

Do not penetrate wire covering to test. This can lead to wiring component failure.

---

**Diagram**: Tilt Switch Box connected to various components including the hydraulic solenoid, fuse, and engine.

---

**Flowchart**: Diagram flowchart with decision points:

1. **A** continued from previous page
2. Does ground appear at point 5 to battery positive (hot side)?
   - Yes → Does ground appear at point 2 to battery positive (hot side)?
     - Yes → Does ground appear at point 3 to battery positive (hot side)?
       - Yes → Does ground appear at point 6 to battery positive (hot side)?
         - Yes → Check for broken wire between 3-way plug and solenoid valve.
         - No → Replace tilt switch box.
       - No → Clean plug connections.
     - No → Check plug connections.
   - No → Check engine ground.

---

NOTE: All tests are performed with plug connected.

To access Weather-Pack terminals, use a small screwdriver to release latches on either side of cover. Flip cover up and slide green cable seals up the wires to expose terminals.

Do not penetrate wire covering to test. This can lead to wiring component failure.