Instructions for Replacement of Starter Circuit Relay

R170321 (05 Sep 01)
Functional Group:
Product Affected:
Waterloo Built Tractors
Package with: RE170320

John Deere Waterloo Works
CAUTION: Improper wiring may allow machine to start in gear.

Starting system test procedures must be completed after relay installation.

1. Disconnect battery ground cable(s).

2. Make a detailed diagram of your existing wiring connections to the starter circuit relay similar to Figure 1 for existing FOUR wire relay and Figure 2 for existing THREE wire relay.

3. Disconnect wiring from existing relay and remove the relay. Discard the old relay and wiring terminal hardware. Save relay mounting hardware for later use.

Install rubber or hard plastic covers over the wire going to starter “S” terminal and the wire to or from neutral start switch.

NOTE: When replacing a three terminal relay with this four terminal relay, it may be necessary to modify the old relay mounting by drilling two holes that match new relay mounting holes.

4. Mount new relay using the mounting hardware saved in Step 3.

IF YOU ARE REPLACING A FOUR TERMINAL STARTER CIRCUIT RELAY WITH THIS NEW FOUR TERMINAL RELAY: Go to Step 5

IF YOU ARE REPLACING A THREE TERMINAL STARTER CIRCUIT RELAY WITH THIS NEW FOUR TERMINAL RELAY: Go to Step 6

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Figure 1 – Typical FOUR-Terminal Relay Wiring

Connections for terminals A, B, C, & D.
A – To Key Switch or to Neutral Start Switch, Depending on Tractor Model and Engine Harness Part Number
B – To Neutral Start Switch or Ground, Depending on Tractor Model and Engine Harness Part Number
C – To Alternator and Starter Battery Terminal
D – To Starter “S” Terminal

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Figure 2 – Typical THREE-Terminal Relay Wiring schematic for reference only.

A – From Neutral Start Switch
B – Internal chassis ground
C – From Starter Battery Terminal
TO REPLACE A FOUR TERMINAL STARTER CIRCUIT RELAY WITH THIS NEW FOUR TERMINAL RELAY

5. Using new hardware, attach wiring to the new relay per the detailed diagram drawn in Step 2. Eyelets should be placed between lock washers and nuts as shown in Fig. 4.

Proceed to Step 11.

TO REPLACE A THREE TERMINAL STARTER CIRCUIT RELAY WITH THIS NEW FOUR TERMINAL RELAY:

6. Refer to Fig 3. Using new hardware, attach the large gauge wires from the Starter Battery Terminal and Starter “S” Terminal to the large copper terminal posts C and D respectively. Refer to Fig. 4 for proper eyelet/washer installation sequence.

7. Attach small gauge wire from the neutral start switch to the small terminal post A in Fig. 3.

8. Fabricate ground wire from 6” 16 AWG – Stranded wire with ¼” eyelet and No. 10 eyelet.

CAUTION – This wire is only used when converting a three terminal starter relay to a four terminal starter relay. DO NOT ADD THIS WIRE FOR OTHER INSTALLATIONS.

9. Attach the small end of the ground wire shown in Fig. 3, to the remaining small terminal B.

10. Attach the large end of ground wire to the starter circuit relay mounting screw.

FOR ALL STARTER CIRCUIT RELAYS:

11. IMPORTANT: Overtightening of terminal nuts can damage starter circuit relay. Tighten terminal nuts to the following specifications:
   - Small nuts . . . . . . . 1.7 N•m (15 lb-in)
   - Large nuts . . . . . . . 4.0 N•m (35 lb-in)
12. Install rubber or hard plastic covers over large terminal going to starter “S” terminal and small terminal going to or from neutral start switch. Both terminals are to be completely covered.

13. Reconnect battery ground cable(s).

14. Test starting system as follows:

   CAUTION: Start the machine only from the operators seat. Improper wiring may allow machine to start in gear. Make certain everyone is clear of machine before starting engine or operating the machine.

FOR UTILITY TRACTORS:

   TEST A:
   1. Depress clutch and brake pedals.
   2. Place range shift lever in a neutral position.
   3. Attempt to crank engine.
   4. Engine should crank.

   TEST B:
   1. Depress clutch and brake pedals.
   2. Place range shift lever in I (low).
   3. Attempt to crank engine.
   4. Engine should not crank.
   5. Repeat test in “R” (reverse) and II (high range).

If tractor fails either of these tests, contact your John Deere dealer immediately and have the problem corrected.

For 3020 (50000 – 57603) and 4020 (50000 – 75893) Tractors with PST Transmission:

   TEST A:
   Depress clutch and brake pedal. Attempt to crank engine in “Park” or “Neutral” positions. Engine should crank.

   TEST B:
   CAUTION: Tractor can move if neutral start switch malfunctions. Proceed with caution.
   Depress brake pedal. Attempt to crank engine in a forward or reverse gear. Engine should not crank.

If tractor fails either of these tests, contact your John Deere dealer immediately and have the problem corrected.

Figure 4 – Proper eyelet/washer installation

A – Eyelet
B – Lock Washers
C – Nut
D – Relay Body

RE170320 Kit parts list:
-Instructions R170321 (this sheet)
-Starter Relay, RE164448 (1)
-Terminal boots (2)
-0.313” nut, 14H785 (2)
-0.190” nut, 14H631 (2)
-0.331” lock washer, 12M7032 (2)
-0.209” lock washer, 12M7060 (2)
John Deere dealer immediately and have the problem corrected.

For All Other Tractors:

TEST A:
Depress clutch and brake pedals. Move gear shift lever(s) to “Park” or “Neutral” positions. Attempt to crank engine. Engine should crank.

TEST B:
Depress clutch and brake pedals. Move gear shift lever(s) to forward gear. Attempt to crank engine. Engine should not crank. Repeat test in a reverse gear.

If tractor fails either of these tests, contact your John Deere dealer immediately and have the problem corrected.

For Other Machines:
If your machine’s test procedure is not listed here, refer to your operator’s manual for proper starting system test procedures or call your John Deere dealer.
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TEST A:
Depress clutch and brake pedals. Move gear shift lever(s) to “Park” or “Neutral” positions. Attempt to crank engine. Engine should crank.

TEST B:
Depress clutch and brake pedals. Move gear shift lever(s) to forward gear. Attempt to crank engine. Engine should not crank. Repeat test in a reverse gear.

If tractor fails either of these tests, contact your John Deere dealer immediately and have the problem corrected.

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