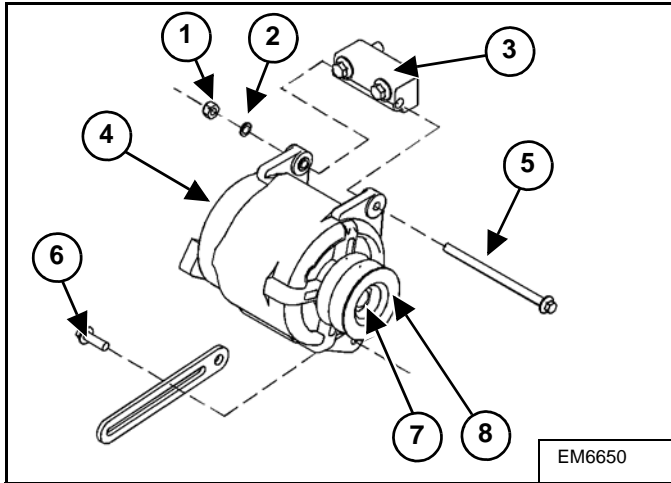


ALTERNATOR (TR45190, TR50210, TR40250)

Alternator Removal (Engines Without An Automatic Belt Tensioner)

Remove the V-belts. (See “V-belts Removal (Engines Without An Automatic Belt Tensioner)” on page 70-100-138.)

Figure 60-30-1



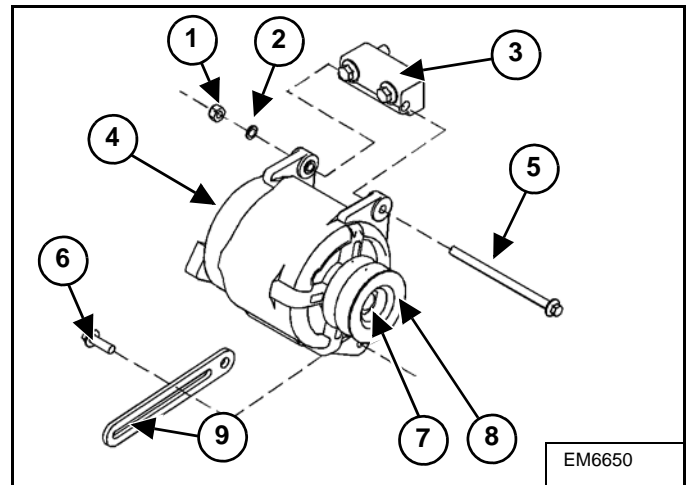
1. Isolate the electrical supply to the engine
2. Make temporary identification marks on the connections of the harness assembly.
3. Disconnect the harness assembly from alternator (Item 1) [Figure 60-30-1].
4. Remove bolt (Item 6) from alternator (Item 4) [Figure 60-30-1].
5. Remove nut (Item 1) and washer (Item 2). Remove bolt (Item 5) from alternator (Item 4). Remove alternator (Item 4) from alternator bracket (Item 3) [Figure 60-30-1].
6. If necessary, remove pulley (Item 8) from alternator (Item 4) [Figure 60-30-1]. Perform the following steps in order to remove the pulley from the alternator:

NOTE: This method can not be suitable for some configurations of pulley.

- Hold the shaft of alternator (Item 4) with an allen wrench. Use a cranked ring spanner (box wrench) in order to loosen nut (Item 7) [Figure 60-30-1].
- Remove nut (Item 7) and pulley (Item 8) from alternator (Item 4) [Figure 60-30-1].

Alternator Installation (Engines Without An Automatic Belt Tensioner)

Figure 60-30-2



1. If necessary, install the pulley to the alternator. Perform the following steps in order to install the pulley to the alternator:

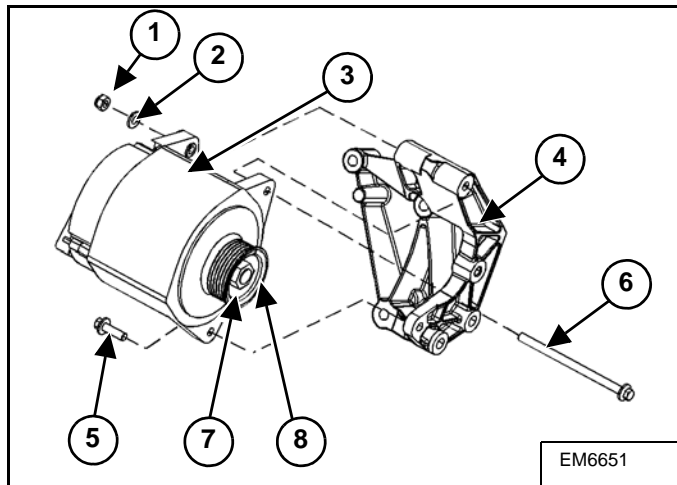
NOTE: This method can not be suitable for some configurations of pulley.

- Install pulley (Item 8) and nut (Item 7) to the shaft of alternator (Item 4) [Figure 60-30-2].
 - Hold the shaft of the alternator with an allen wrench. Use a cranked ring spanner (box wrench) in order to tighten nut (Item 7) [Figure 60-30-2]. Tighten the nut to a torque of 59 ft.-lb. (80 N•m).
2. Install alternator (Item 4) to bracket (Item 3) and install bolt (Item 5) to alternator (Item 4) [Figure 60-30-2].
 3. Install washer (Item 2) and nut (Item 1) to bolt (Item 5) [Figure 60-30-2] finger tight.
 4. Install bolt (Item 6) through adjusting link (Item 9) to alternator (Item 4) [Figure 60-30-2] finger tight.
 5. Install the V-belts. Refer to the Disassembly and assembly, “V-belts - Remove and Install” for the correct procedure.
 6. Tighten nut (Item 1) and bolt (Item 6) [Figure 60-30-2] to a torque of 16 ft.-lb. (22 N•m).
 7. Connect the wiring harness assembly to alternator (Item 4) [Figure 60-30-2].
 8. Restore the electrical supply.

ALTERNATOR (TR45190, TR50210, TR40250) (CONT'D)

Alternator Removal (Engines With An Automatic Belt Tensioner)

Figure 60-30-3



1. If necessary, install pulley (Item 8) and nut (Item 7) to alternator (Item 3). Hold the shaft of the alternator with an allen wrench. Use a cranked ring spanner (box wrench) in order to tighten nut (Item 7) [Figure 60-30-3].

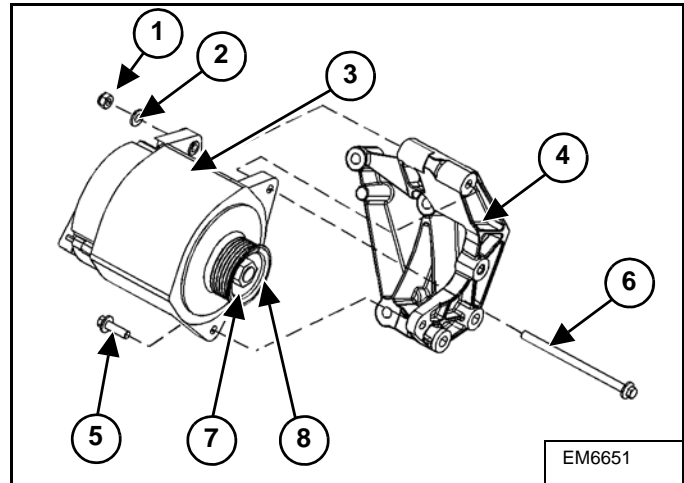
NOTE: Different types of alternator have different sizes of nut. Ensure that the correct torque value is used for the nut.

Tighten M16 and M17 nuts to a torque of 59 ft.-lb. (80 N•m). Tighten 5/8 in. - 18 UNF nuts to a torque of 75 ft.-lb. (102 N•m).

2. Position alternator (Item 3) on alternator mounting bracket (Item 4) [Figure 60-30-3].
3. Install bolt (Item 6) to alternator (Item 3). Install washer (Item 2) and nut (Item 1) to bolt (Item 6) [Figure 60-30-3].
4. Install bolt (Item 5) to alternator (Item 3) [Figure 60-30-3].
5. Tighten nut (Item 1) and bolt (Item 5) [Figure 60-30-3] to a torque of 16 ft.-lb. (22 N•m).
6. Connect the wiring harness assembly to alternator (Item 3) [Figure 60-30-3].
7. Install the alternator belt. (See "Alternator Belt Installation (Engines With An Automatic Belt Tensioner)" on page 70-100-141.)
8. Restore the electrical supply.

Alternator Installation (Engines With An Automatic Belt Tensioner)

Figure 60-30-4



1. If necessary, install pulley (Item 8) and nut (Item 7) to alternator (Item 3). Hold the shaft of the alternator with an allen wrench. Use a cranked ring spanner (box wrench) in order to tighten nut (Item 7) [Figure 60-30-4].

NOTE: Different types of alternator have different sizes of nut. Ensure that the correct torque value is used for the nut.

Tighten M16 and M17 nuts to a torque of 59 ft.-lb. (80 N•m). Tighten 5/8 in. - 18 UNF nuts to a torque of 75 ft.-lb. (102 N•m).

2. Position alternator (Item 3) on alternator mounting bracket (Item 4) [Figure 60-30-4].
3. Install bolt (Item 6) to alternator (Item 3). Install washer (Item 2) and nut (Item 1) to bolt (Item 6) [Figure 60-30-4].
4. Install bolt (Item 5) to alternator (Item 3) [Figure 60-30-4].
5. Tighten nut (Item 1) and bolt (Item 5) [Figure 60-30-4] to a torque of 16 ft.-lb. (22 N•m).
6. Connect the wiring harness assembly to alternator (Item 3) [Figure 60-30-4].
7. Install the alternator belt. (See "Alternator Belt Installation (Engines With An Automatic Belt Tensioner)" on page 70-100-141.)
8. Restore the electrical supply.

**ALTERNATOR (TR45190, TR50210, TR40250)
(CONT'D)**

Alternator Test

1. Put the positive lead “+” of a suitable multimeter on the “B+” terminal of the alternator. Put the negative “-” lead on the earth terminal or on the frame of the alternator. Put a suitable ammeter around the positive output wire of the alternator.
2. Turn off all electrical accessories. Turn off the fuel to the engine. Crank the engine for 30 seconds. Wait for two minutes in order to cool the starting motor. If the electrical system appears to operate correctly, crank the engine again for 30 seconds.

NOTE: Cranking the engine for 30 seconds partially discharges the batteries in order to do a charging test. If the battery has a low charge, do not perform this step. Jump start the engine or charge the battery before the engine is started.

3. Start the engine and run the engine at full throttle.
4. Check the output current of the alternator. The initial charging current should be equal to the minimum full load current or greater than the minimum full load current. (See “Alternator” on page SPEC-20-9.)

Fault Conditions And Possible Causes			
Current At Start-up	The Voltage Is Below Specifications After 10 Minutes.	The Voltage Is Within Specifications After 10 Minutes.	The Voltage Is Above Specifications After 10 Minutes.
Less than the specifications	Replace the alternator. Check the circuit of the ignition switch.	Turn on all accessories. If the voltage decreases below the specifications, replace the alternator.	
Decreases after matching specifications	Replace the alternator.	The alternator and the battery match the specifications. Turn on all accessories in order to verify that the voltage stays within specifications.	Replace the alternator.
The voltage consistently exceeds specifications.	Test the battery. Test the alternator again.	The alternator operates within the specifications. Test the battery.	Replace the alternator. Inspect the battery for damage.

5. After approximately ten minutes of operating the engine at full throttle, the output voltage of the alternator should be 14.0 ± 0.5 volts for a 12 volt system and 28.0 ± 1 volts for a 24 volt system. (See “Fault Conditions And Possible Causes” on page 60-30-3.)
6. After ten minutes of engine operation, the charging current should decrease to approximately 10 amperes. The actual length of time for the decrease to 10 amperes depends on the following conditions:
 - The battery charge
 - The ambient temperature
 - The speed of the engine

ALTERNATOR (TR45190, TR50210, TR40250) (CONT'D)

Charging System Test

The condition of charge in the battery at each regular inspection will show if the charging system is operating correctly. An adjustment is necessary when the battery is constantly in a low condition of charge or a large amount of water is needed. A large amount of water would be more than one ounce of water 28 ml per cell per week or per every 100 service hours. There are no adjustments on maintenance free batteries.

When it is possible, make a test of the charging unit and voltage regulator on the engine, and use wiring and components that are a permanent part of the system. Off-engine testing or bench testing will give a test of the charging unit and voltage regulator operation. This testing will give an indication of needed repair. After repairs are made, perform a test in order to prove that the units have been repaired to the original condition of operation.