

Fastener Tightening Specifications

Application	Specification	
	Metric	English
Auxiliary Battery Cable (6.6L)	15 N·m	11 lb ft
Auxiliary Generator Bolt (6.6L)	50 N·m	37 lb ft
Auxiliary Generator Bracket Bolt (6.6L)	50 N·m	37 lb ft
Auxiliary Positive Battery Cable Bolt (6.6L)	17 N·m	13 lb ft
Auxiliary Positive Battery Cable Nut (6.6L)	8 N·m	71 lb in
Battery Cable to Starter Nut (6.6L)	9 N·m	80 lb in
Battery Hold Down Retainer Bolt	18 N·m	13 lb ft
Battery Tray Bolt -- Auxiliary	25 N·m	18 lb ft
Battery Tray Bolt -- Primary	9 N·m	80 lb ft
Coolant Recovery Reservoir/Surge Tank Bolt	11 N·m	97 lb in
Drive Belt Tensioner Bolt (6.6L)	50 N·m	37 lb ft
Engine Harness Bolt (6.6L)	10 N·m	89 lb in
Engine Wiring Harness Ground Bolt	16 N·m	12 lb ft
Engine Wiring Harness Nut (6.6L)	3.4 N·m	30 lb in
Generator Bolt	50 N·m	37 lb ft
Generator Bracket Bolt (4.8L, 5.3L, 6.0L, 6.6L)	50 N·m	37 lb ft
Generator Bracket Bolt/Nut (4.3L)	41 N·m	30 lb ft
Generator Cable Nut (4.8L, 5.3L, 6.0L)	9 N·m	80 lb in
Generator Extension Bracket Bolt (6.6L)	50 N·m	37 lb ft
Generator Nut (4.3L)	12 N·m	106 lb in
Generator Output (BAT) Nut (4.8L, 5.3L, 6.0L)	18 N·m	13 lb ft
Ground Strap to Front of Dash Nut (4.8L, 5.3L, 6.0L)	9 N·m	80 lb in
Junction Block Nut (4.8L, 5.3L, 6.0L)	10 N·m	89 lb in
Negative Battery Cable to Auxiliary Battery (6.6L)	15 N·m	11 lb ft
Negative Battery Cable Ground Lead to Crossmember Nut (4.3L)	10 N·m	89 lb in
Negative Battery Cable to Inner Fender Panel Nut	10 N·m	89 lb in
Negative Battery Cable Lead to Engine Block Bolt	25 N·m	18 lb ft
Negative Battery Terminal Bolt	17 N·m	13 lb ft
Negative Ground Lead (6.6L)	10 N·m	89 lb in
Oil Fill Tube Bracket Bolt (4.3L)	25 N·m	18 lb ft
Oil Indicator Tube Bracket Bolt (6.6L)	21 N·m	15 lb ft
Positive Battery Cable Bolt (6.6L)	17 N·m	13 lb ft
Positive Battery Cable to Battery Bolt (4.3L)	17 N·m	13 lb ft
Positive Battery Cable to Junction Block Nut (6.6L)	8 N·m	71 lb in
Positive Battery Cable to Underhood Bussed Electrical Center (UBEC) Nut		

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(4.3L)	5 N·m	44 lb in
Positive Cable Nut (6.6L)	9 N·m	80 lb in
Positive Extension Cable to Intake Air Heater Nut (6.6L)	4 N·m	34 lb in
Positive Extension Cable to Junction Block Nut (6.6L)	8 N·m	71 lb in
Positive Lead to Starter Solenoid Nut (4.8L, 5.3L, 6.0L)	10 N·m	89 lb in
Starter Bolt (4.3L, 4.8L, 5.3L, 6.0L)	50 N·m	37 lb ft
Starter Bolt (6.6L)	78 N·m	58 lb ft
Starter Solenoid Nut (4.3L)	9 N·m	80 lb in
Starter Solenoid Nut (4.8L, 5.3L, 6.0L)	3.4 N·m	30 lb in
Transmission Cover Bolt (4.8L, 5.3L, 6.0L)	9 N·m	80 lb in

[2009 Chevrolet Express - AWD](#) | [Express, Savana \(VIN G/H\) Service Manual](#) | [Engine](#) | [Engine Electrical](#) | [Specifications](#) |

Document ID: 2086012

Battery Usage

Application	Specification
GAS	
Cold Cranking Amperage	600 A
Amp Hour Rating	63 AH
Reserve Capacity Rating	110 minutes
Replacement Battery Number	78-6YR
DIESEL	
Cold Cranking Amperage	770 A
Amp Hour Rating	63 AH
Reserve Capacity Rating	120 minutes
Replacement Battery Number	78-7YR

Generator Usage

Generator Usage - P4 (K68)

Application GAS	Specification
Generator Model	P4 (K68)
Rated Output	105 Amps
Load Test Output	85 Amps

Generator Usage - DR44G (K63)

Application GAS	Specification
Generator Model	DR44G (K63)
Rated Output	145 Amps
Load Test Output	105 Amps

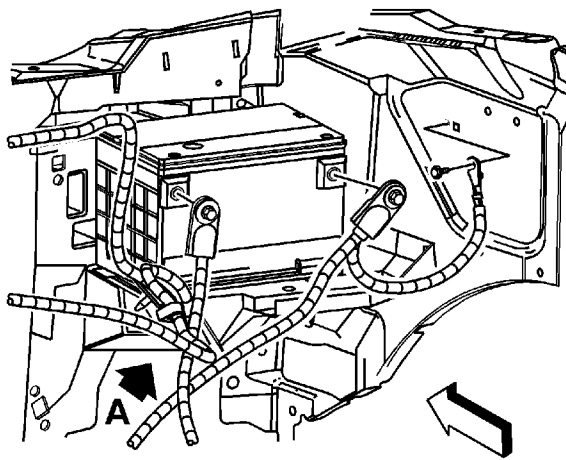
Generator Usage - DR44G

Application DIESEL	Specification
Generator Model	DR44G
Rated Output	145 Amps
Load Test Output	105 Amps

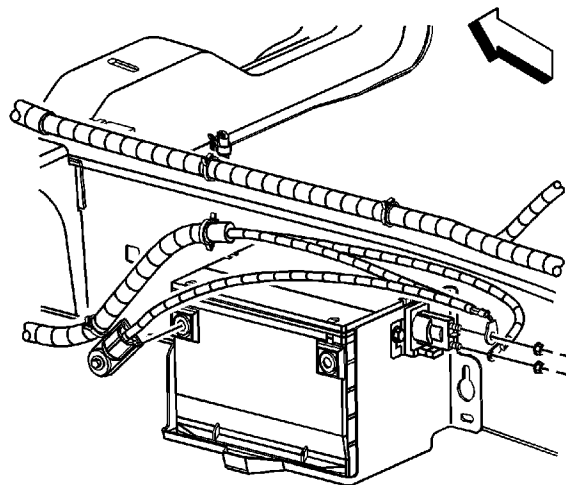
Battery Negative Cable Disconnection and Connection Removal Procedure

1. Turn OFF all the lamps and accessories.
2. Turn the ignition OFF.

Warning: Refer to [Battery Disconnect Warning](#) in the Preface section.



3. Remove the battery negative cable bolt in order to disconnect the negative battery cable from the battery.



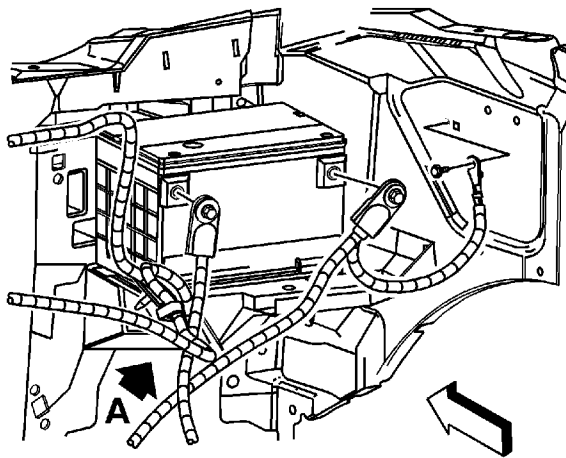


4. If applicable, remove the auxiliary battery negative cable bolt in order to disconnect the negative battery cable from the auxiliary battery.

Installation Procedure

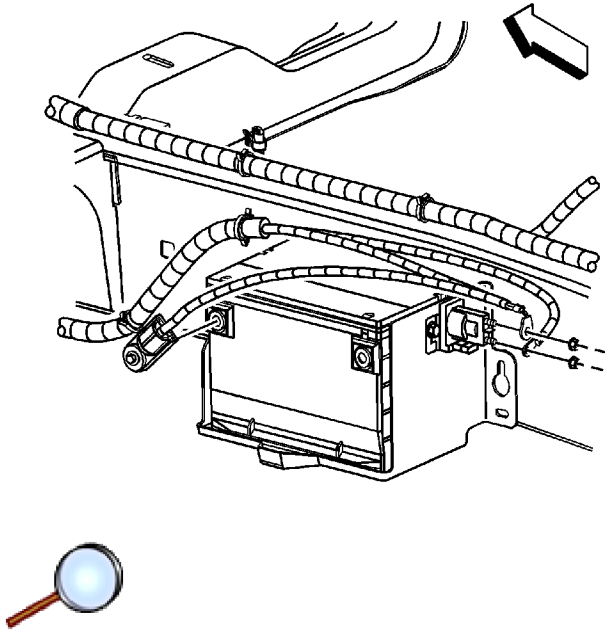
Warning: Refer to [Battery Disconnect Warning](#) in the Preface section.

Caution: Refer to [Fastener Caution](#) in the Preface section.



Note: Clean any existing corrosion from the battery terminal bolt flange and the battery cable end.

1. Install the negative cable terminal bolt and cable to the battery and Tighten to **14 N·m (123 lb in)**.



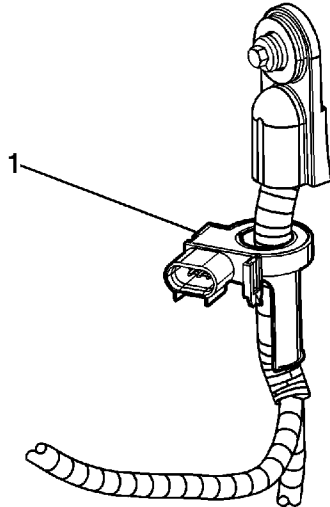
Important: Clean any existing corrosion from the battery terminal bolt flange and the battery cable end.

2. If applicable, install the negative cable terminal bolt and cable to the auxiliary battery and tighten to **14 N·m (123 lb in)** .

Battery Current Sensor Replacement

Removal Procedure

1. Disconnect the instrument panel (I/P) harness electrical connector (1) from the battery current sensor.
2. Remove the negative battery cable. Refer to [Battery Negative Cable Replacement](#) .

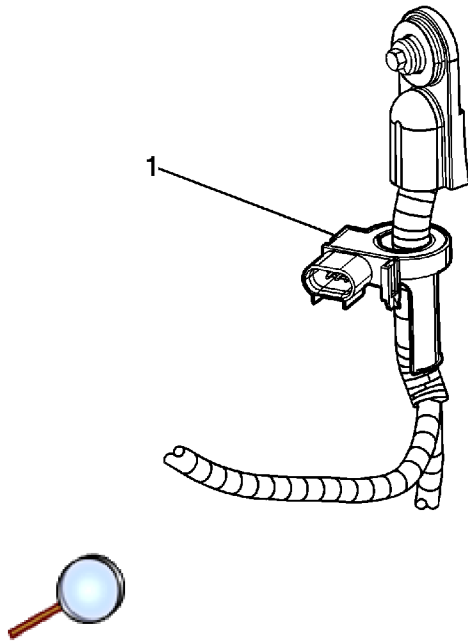


3. Cut the tie straps and electrical tape attaching the battery current sensor to the battery cable.
4. Squeeze the negative battery cable branches together.

Important: Note the position of the battery current sensor prior to removal.

5. Slide the battery current sensor (1) off of the negative battery cable.

Installation Procedure



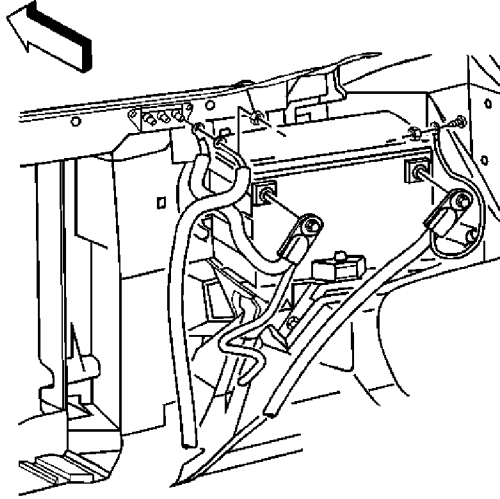
Important: Ensure that the tape tab is pointing away from the battery prior to installation.

1. Slide the NEW battery current sensor (1) up onto the negative battery cable.
2. Using NEW tie straps and electrical tape, attach the battery current sensor to the negative battery cable.
3. Install the negative battery cable. Refer to [Battery Negative Cable Replacement](#) .
4. Connect the I/P harness electrical connector (1) to the battery current sensor.

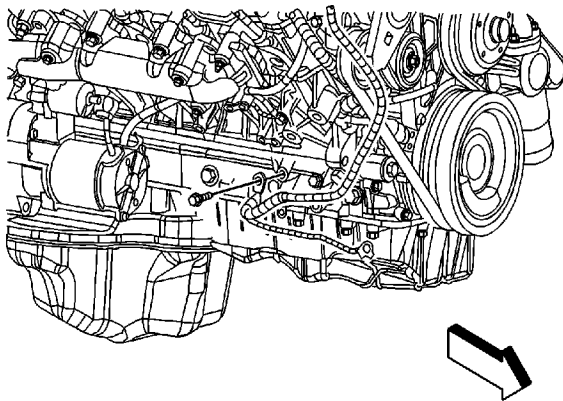
Battery Negative Cable Replacement (With LMM Primary)

Removal Procedure

1. Disconnect the battery negative cable from the battery . Refer to [Battery Negative Cable Disconnection and Connection](#) .



2. Disconnect the battery negative cable lead from the inner fender panel.

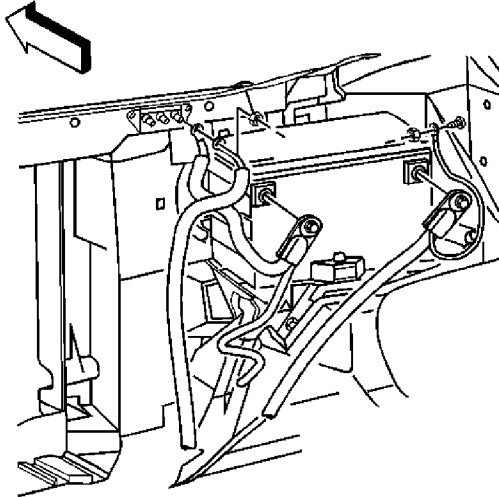


3. Disconnect the battery negative cable lead from the engine block.

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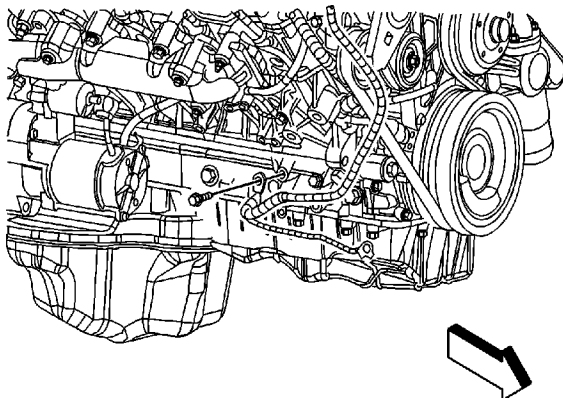
4. Remove the battery negative cable from the vehicle.

Installation Procedure

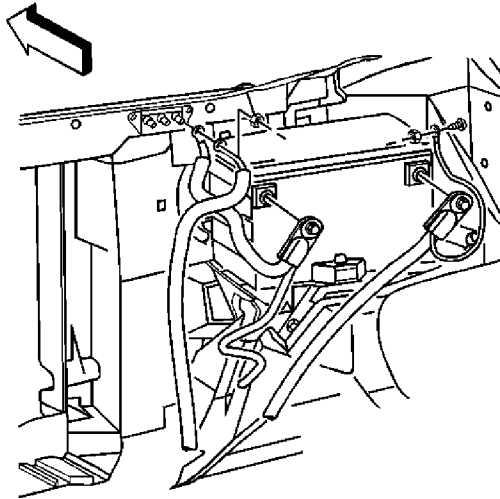


1. Install the battery negative cable to the vehicle.

Caution: Refer to [Fastener Caution](#) in the Preface section.



2. Connect the battery negative cable lead to the engine block and tighten to **25 N·m (18 lb ft)**.



3. Connect the negative cable lead to the inner fender panel.

Tighten

Tighten the nut that retains the negative cable to the inner fender well to 10 N·m (89 lb in).

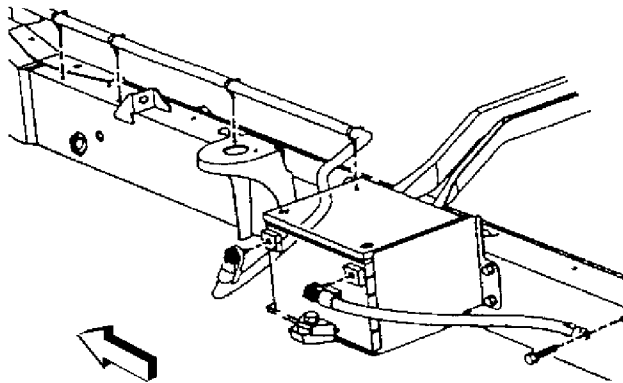
4. Connect the negative cable to the battery. Refer to [Battery Negative Cable Disconnection and Connection](#).

Tighten

Tighten the negative cable terminal bolt to 14 N·m (123 lb in).

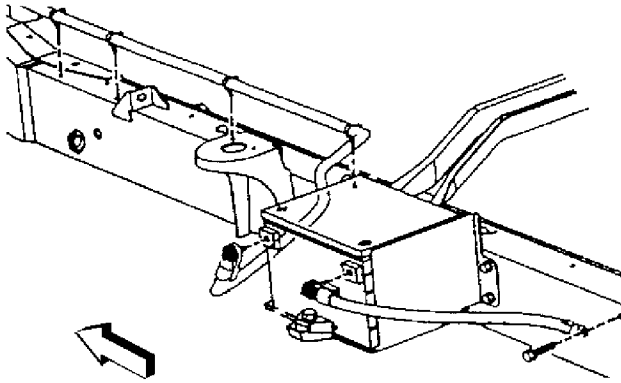
Battery Negative Cable Replacement (With LMM Auxiliary)

Removal Procedure



1. Raise the vehicle. Refer to [Lifting and Jacking the Vehicle](#) .
2. Disconnect the battery negative cable from the auxiliary battery. Refer to [Battery Negative Cable Disconnection and Connection](#) .
3. Disconnect the negative ground leads from the frame.
4. Remove the battery negative cable from the vehicle.

Installation Procedure



1. Install the battery negative cable to the vehicle.

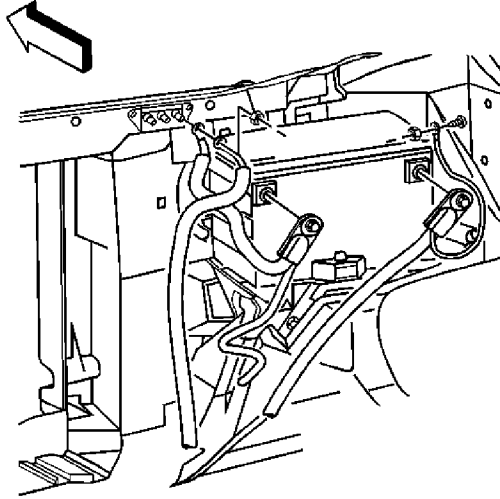
Caution: Refer to [Fastener Caution](#) in the Preface section.

2. Connect the negative ground leads to the frame and tighten to **10 N·m (89 lb in)** .
3. Connect the battery negative cable to the auxiliary battery and tighten to **14 N·m (123 in lb)** .

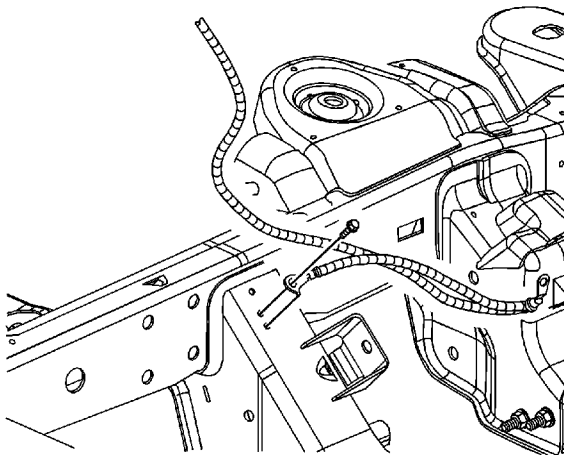
Battery Negative Cable Replacement (With LY2, LMF or LY6)

Removal Procedure

1. On all models, disconnect the battery negative cable from the battery . Refer to [Battery Negative Cable Disconnection and Connection](#) .

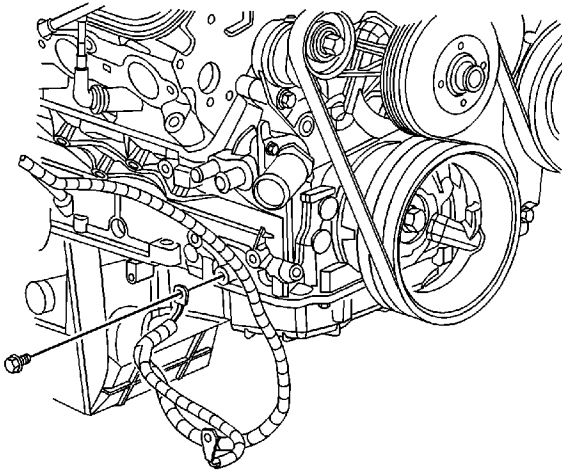


2. Disconnect the battery negative cable lead from the inner fender panel.

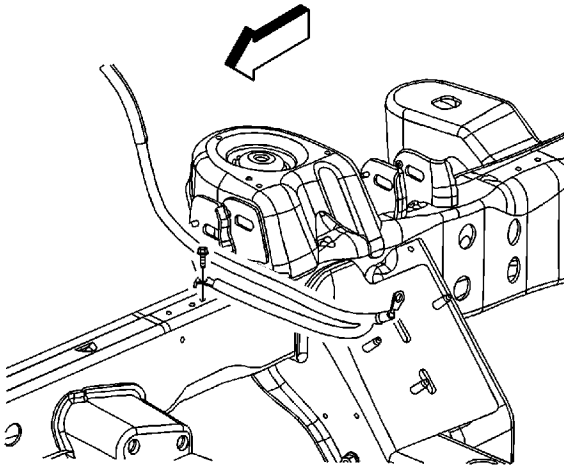


3. On models with 5.3L engine, disconnect the battery negative cable lead from the frame.

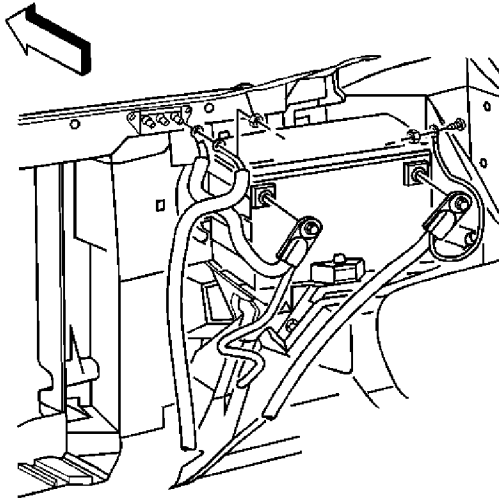
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4. On all models, disconnect the battery negative cable lead from the engine block.

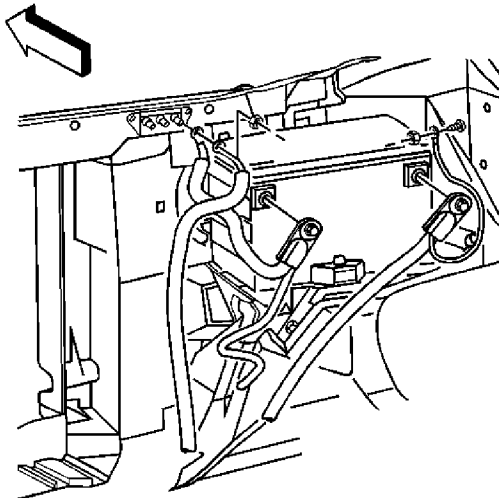


5. On models with 4.8L and 6.0L engine, disconnect the battery negative cable lead from the frame.

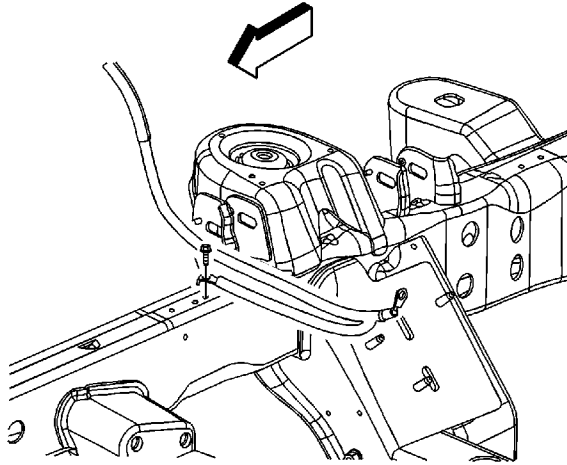


6. On all models, remove the battery negative cable from the vehicle.

Installation Procedure

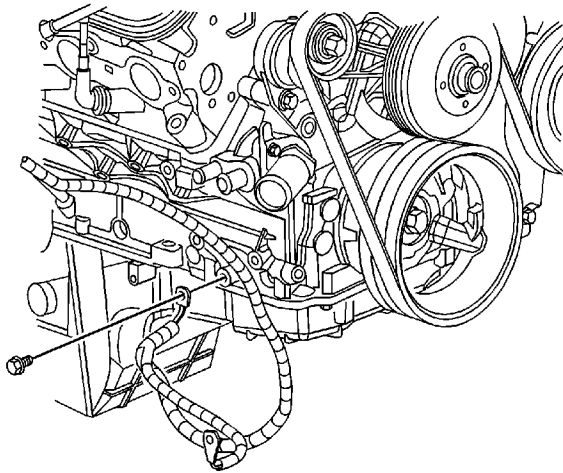


1. On all models, install the negative cable to the vehicle.

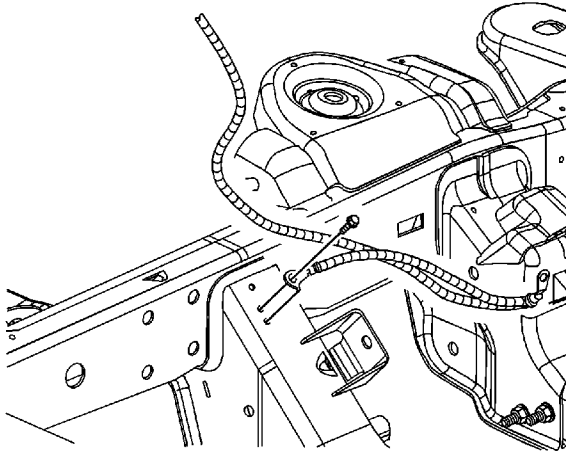


2. On models with 4.8L and 6.0L engine, connect the negative cable to the frame.

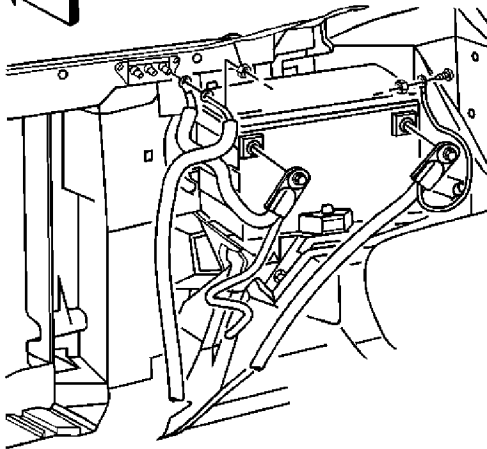
Caution: Refer to [Fastener Caution](#) in the Preface section.



3. On all models, connect the negative cable to the engine block and tighten the bolt to **25 N·m (18 lb ft)**.



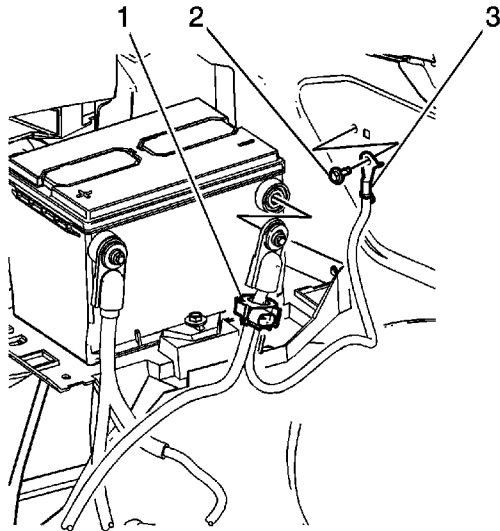
4. On models with 5.3L engine, connect the negative cable lead to the frame.



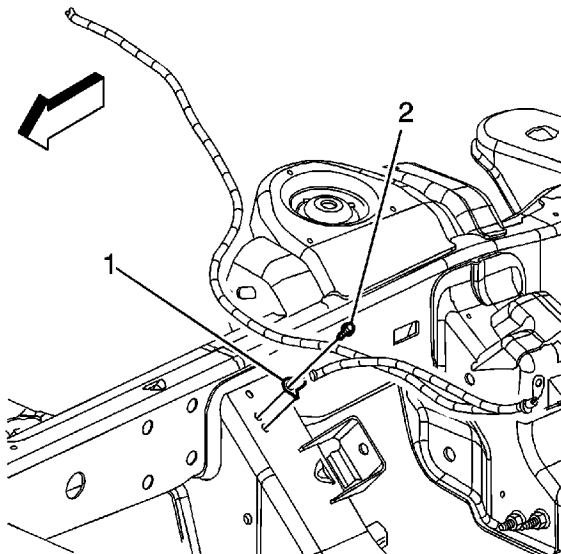
5. On all models, connect the negative cable lead to the inner fender panel and tighten the nut to **10 N·m (89 lb in)**.
6. Connect the negative cable to the battery. Refer to [Battery Negative Cable Disconnection and Connection](#).

Battery Negative Cable Replacement (With LU3 and RVS)

Removal Procedure



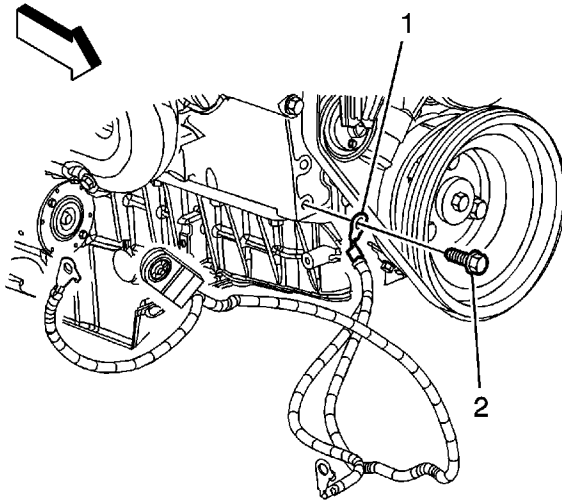
1. Disconnect the negative battery cable. Refer to [Battery Negative Cable Disconnection and Connection](#).
2. Disconnect the battery current sensor (1) harness connector.
3. Remove the negative battery cable ground bolt (2) from the inner fender panel.
4. Remove the negative battery cable ground lead (3) from the inner fender panel.
5. Raise and support the vehicle. Refer to [Lifting and Jacking the Vehicle](#).



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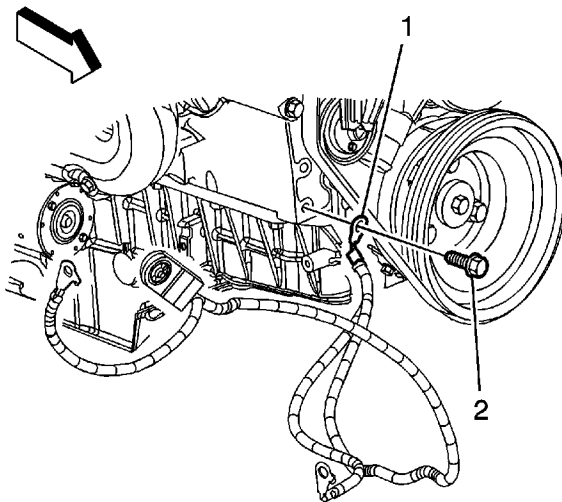


6. Remove the negative battery cable ground lead bolt (2) at the crossmember.
7. Remove the negative battery cable ground (1) from the crossmember.



8. Remove the negative battery cable ground bolt (2) from the engine block.
9. Remove the negative battery cable ground (1) from the block.
10. Lower the vehicle.
11. Remove the negative battery cable from the vehicle.

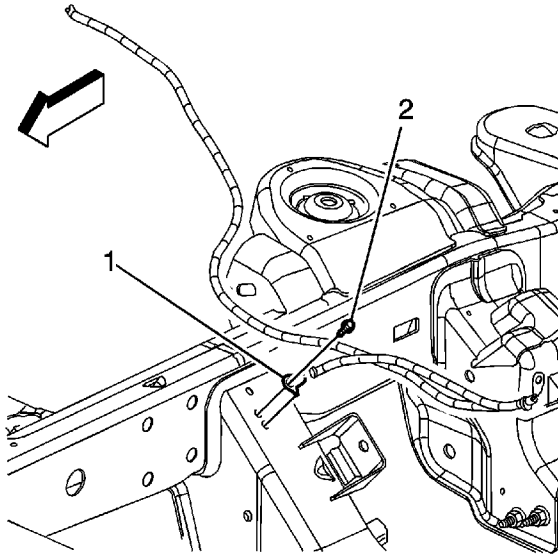
Installation Procedure



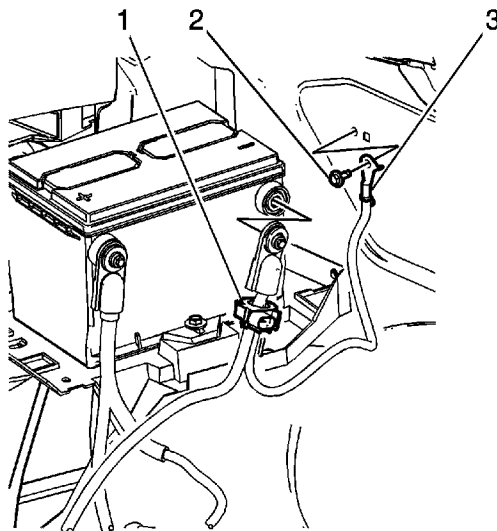
1. Install the negative battery cable to the vehicle.
2. Raise the vehicle.
3. Position the negative cable ground lead (1) to the engine block.

Caution: Refer to Fastener Caution in the Preface section.

4. Install the negative cable ground bolt (2) to the engine block and tighten the bolt to **25 N·m (18 lb ft)**.



5. Install the negative cable ground lead (1) to the crossmember.
6. Install the negative cable ground bolt (2) at the crossmember and tighten to **10 N·m (89 lb in)**.



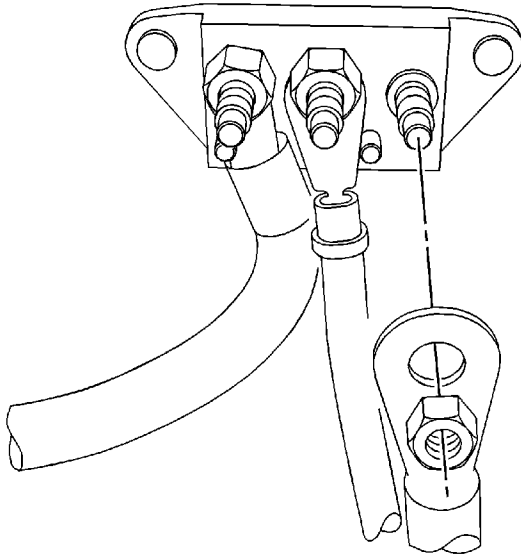
7. Lower the vehicle.
8. Position the negative cable ground (3) to the inner fender panel.

9. Install the negative cable ground bolt (2) to the inner fender panel and tighten to **14 N·m (123 lb in)** .
10. Connect the battery current sensor (1) harness connector.
11. Connect the negative cable to the battery. Refer to [Battery Negative Cable Disconnection and Connection](#) .

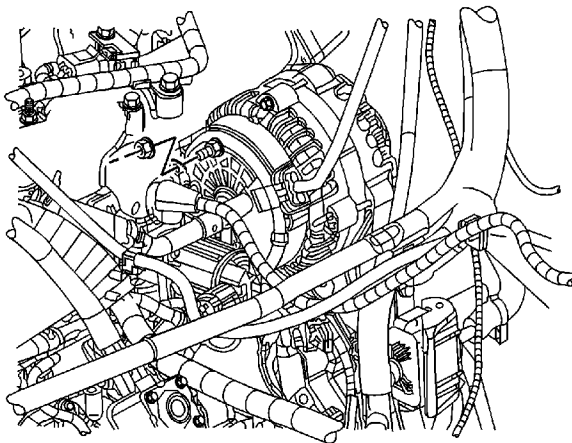
Battery Positive Cable Replacement (With LMM Primary)

Removal Procedure

1. Disconnect the negative battery cable. Refer to [Battery Negative Cable Disconnection and Connection](#).
2. Disconnect the positive battery cable from the battery.

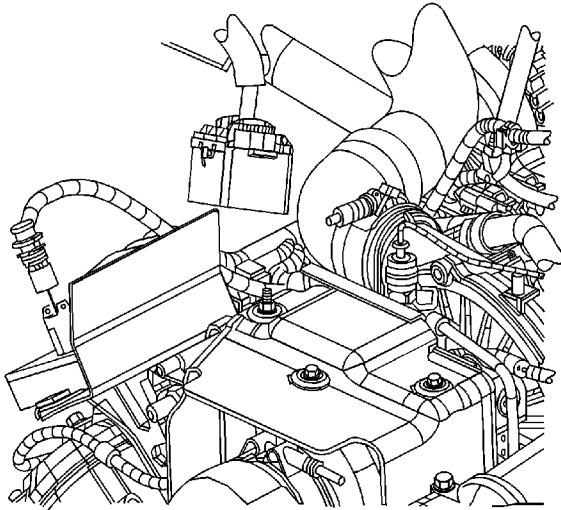


3. Remove the positive cable nut from the junction block and disconnect the cable.

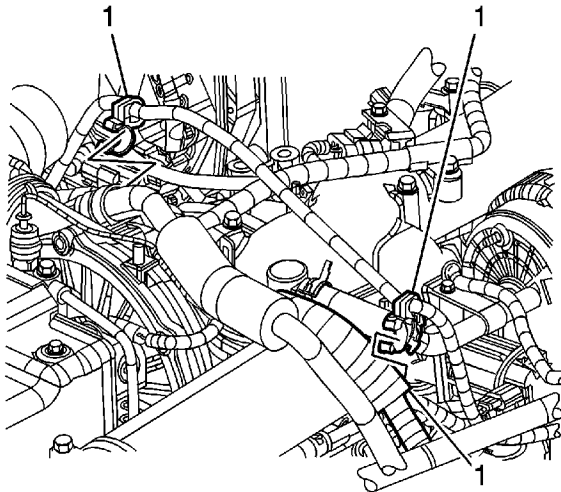




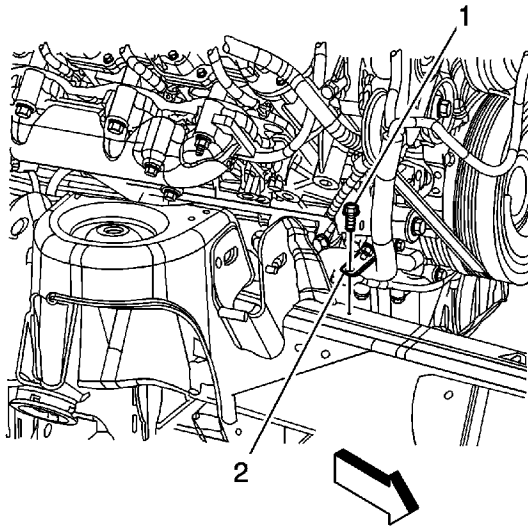
4. Remove the positive cable nut from the generator and disconnect the cable .
5. Remove the engine cover. Refer to [Engine Cover Replacement](#) .



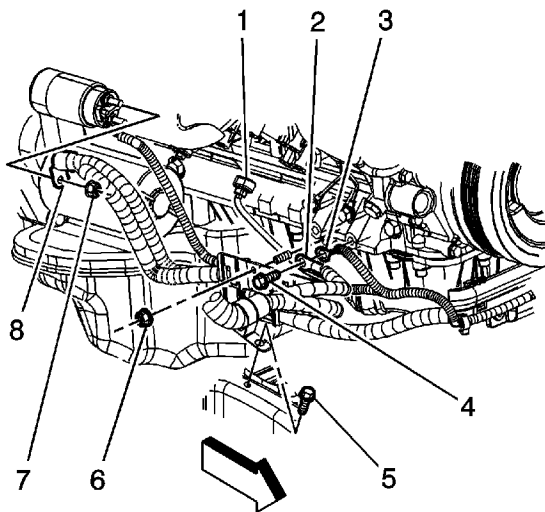
6. Disconnect the wiring harness clips and the positive cable from the glow plug module.
7. Remove the battery positive cable from the engine harness clip.



8. Remove the battery positive cable from the engine harness clips (1).
9. Raise the vehicle. Refer to [Lifting and Jacking the Vehicle](#) .



10. Remove the battery positive cable bolt (1) and clip (2) from the frame.
11. Remove the battery positive cable retaining clip from the transmission line bracket.

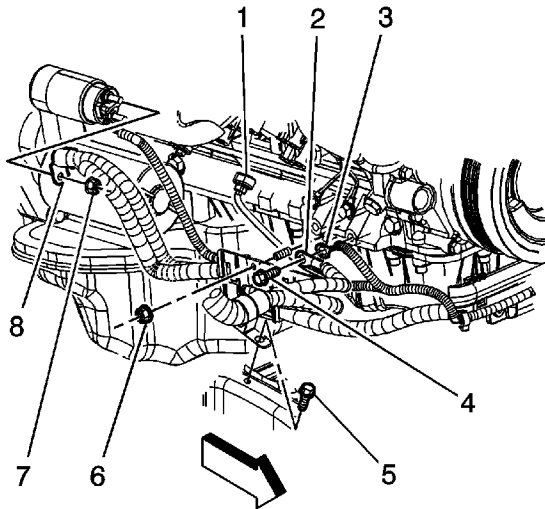


12. Remove the positive battery cable nut (7) from the starter and disconnect the cable (8).
13. Remove the positive battery cable.

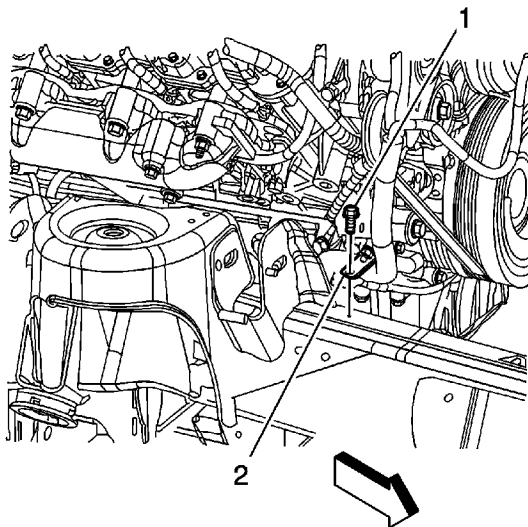
Installation Procedure

1. Position the positive cable to the vehicle using the same cable routing as in removal.

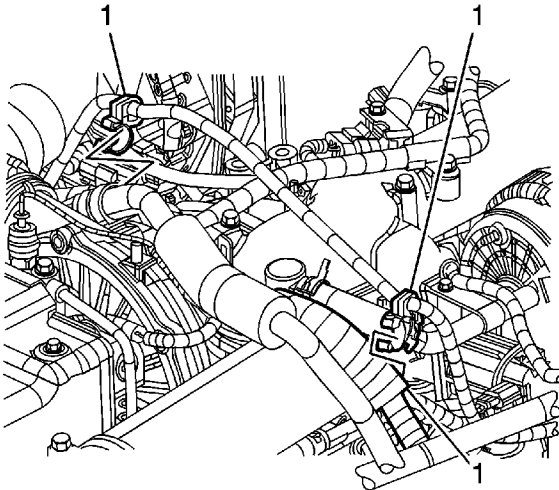
Caution: Refer to [Fastener Caution](#) in the Preface section.



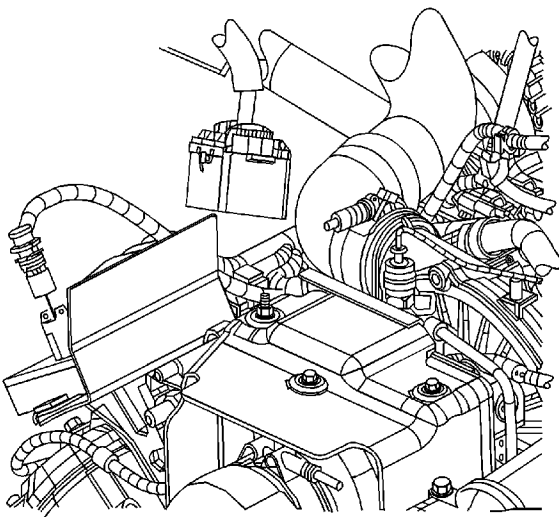
2. Position the positive cable (8) to the starter and install the nut (7) and tighten to **10 N·m (89 lb in)**.
3. Install the positive cable retaining clip to the transmission line bracket.



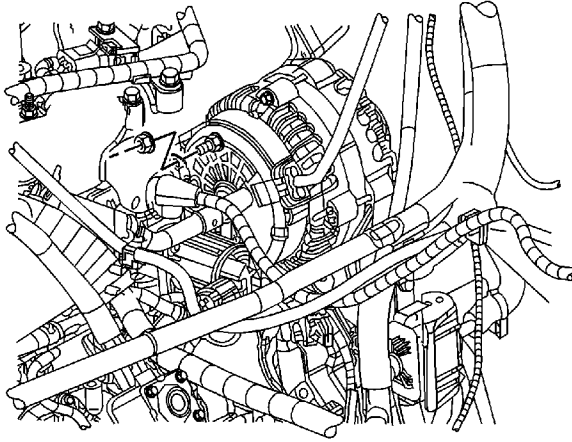
4. Install the battery positive cable nut (1) and clip (2) to the frame.
5. Lower the vehicle.



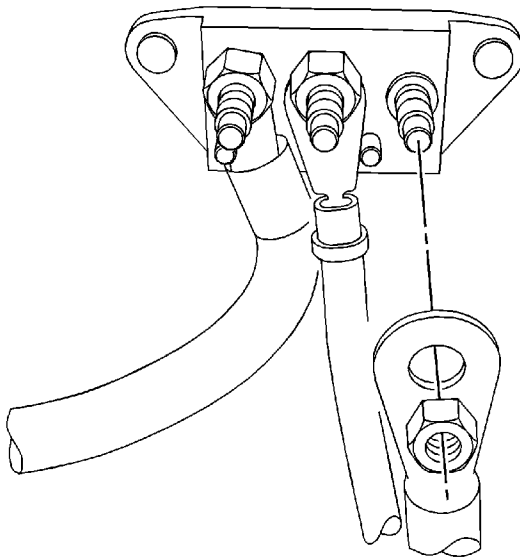
6. Install the positive cable to engine harness clips (1).
7. Install the positive cable to the engine harness clip.



8. Connect the positive cable to the glow plug module and connect the wiring harness clips.
9. Install the engine cover. Refer to [Engine Cover Replacement](#).



10. Install the positive battery cable to the generator and tighten the nut **10 N·m (89 lb in)** .

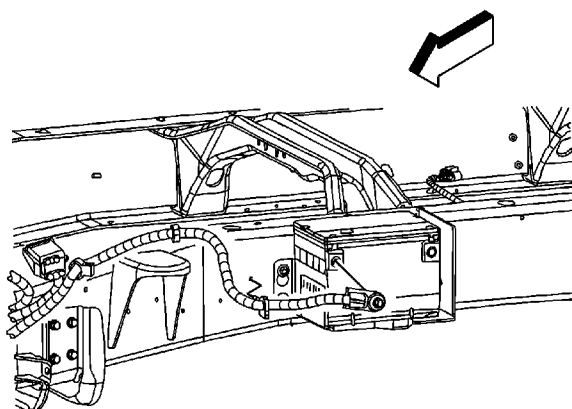


11. Install the positive cable to the junction block and tighten the nut to **8 N·m (71 lb in)** .
12. Connect the positive cable to the battery and tighten the terminal to **14 N·m (123 lb in)** .
13. Connect the negative battery cable. Refer to [Battery Negative Cable Disconnection and Connection](#) .

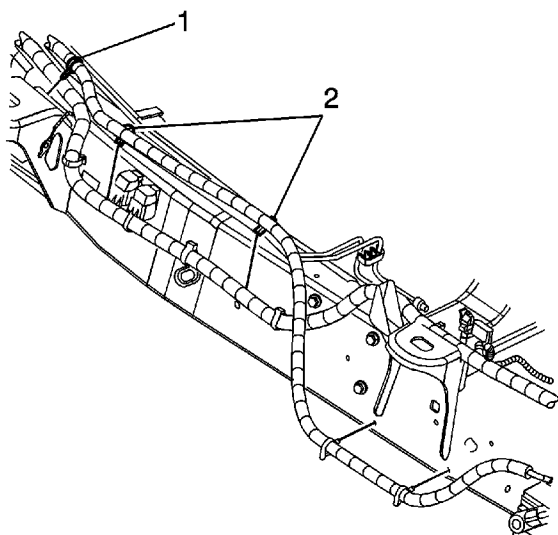
Battery Positive Cable Replacement (With LMM Auxiliary)

Removal Procedure

Warning: Refer to [Battery Disconnect Warning](#) in the Preface section.

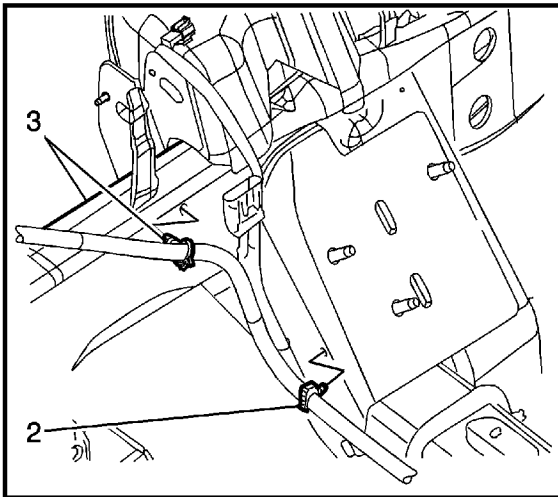
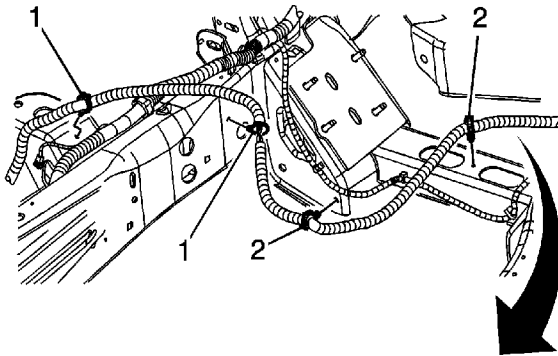


1. Disconnect the auxiliary battery negative cable. Refer to [Battery Negative Cable Disconnection and Connection](#).

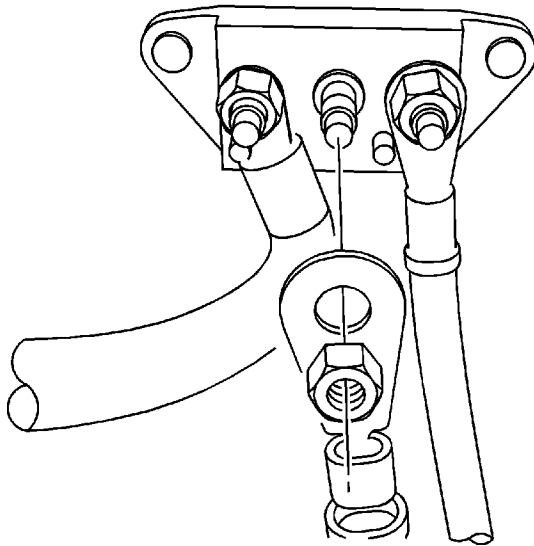




2. Remove the auxiliary positive battery cable to the frame clips (1).
3. Remove the auxiliary positive battery cable to chassis harness clips (2).



4. Remove the auxiliary positive battery cable to frame clips (1).
5. Remove the auxiliary positive battery cable to crossmember clips (2).
6. Remove the auxiliary positive battery cable to frame clip (3).

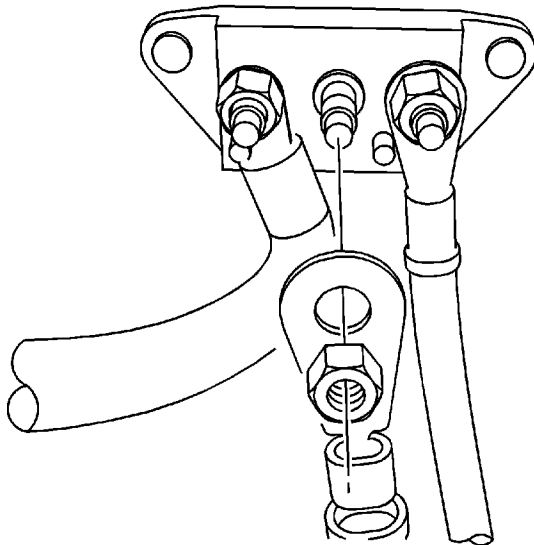


7. Remove the auxiliary positive battery cable nut from the junction block.
8. Disconnect the auxiliary positive battery cable wiring harness clips.
9. Remove the auxiliary positive battery cable from the vehicle.

Installation Procedure

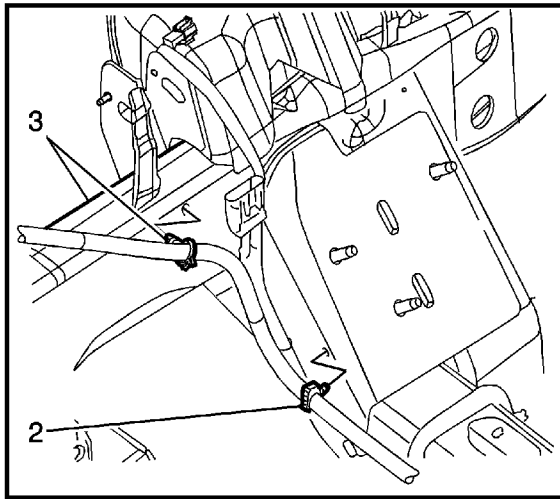
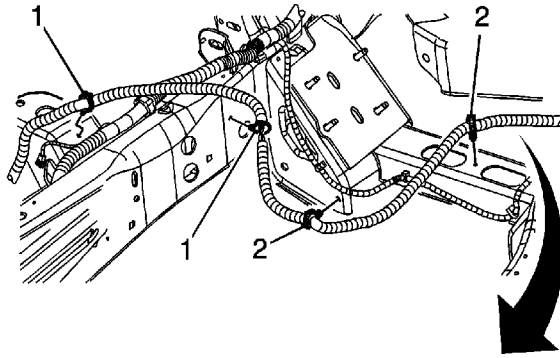
1. Position the auxiliary positive battery cable and connect the wiring harness clips.

Caution: Refer to [Fastener Caution](#) in the Preface section.

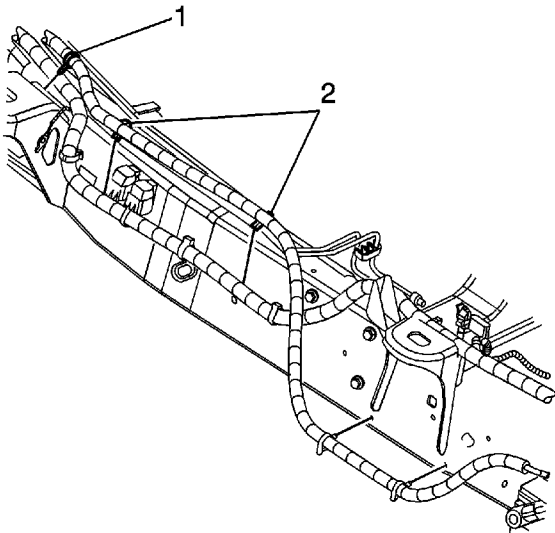


2. Position the auxiliary positive battery cable to the junction block and tighten the cable nut to

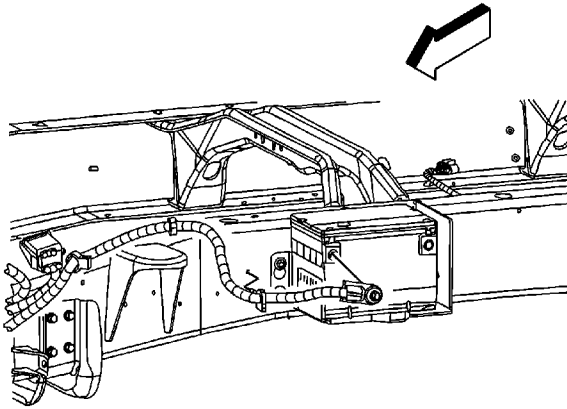
8 N·m (71 lb in).



3. Install the auxiliary positive battery cable to frame clip (3).
4. Install the auxiliary positive battery cable to crossmember clips (2).
5. Install the auxiliary positive battery cable to frame clips (1).



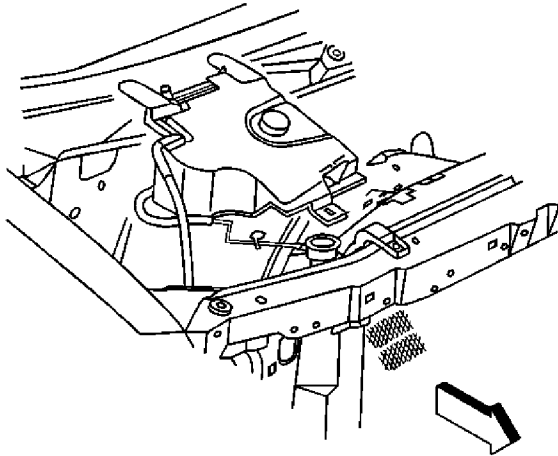
6. Install the auxiliary positive battery cable to the chassis harness clips (2).
7. Install the auxiliary positive battery cable to the frame clips (1).



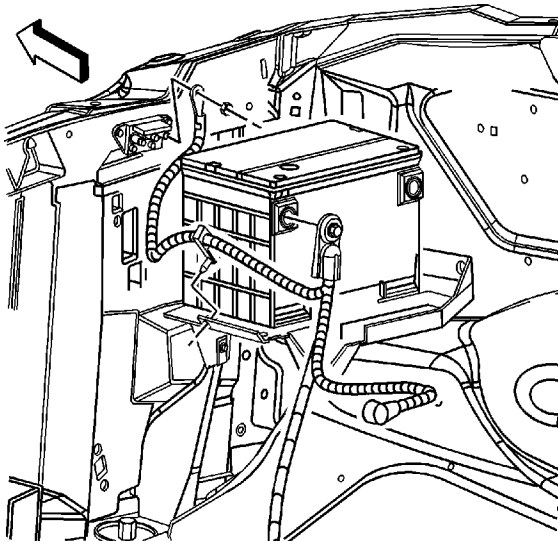
8. Connect the auxiliary positive battery cable to the auxiliary battery and tighten the terminal to **14 N·m (123 lb in)**.
9. Connect the auxiliary negative battery cable. Refer to [Battery Negative Cable Disconnection and Connection](#).

Battery Positive Cable Replacement (With LY2, LME or LY6)

Removal Procedure

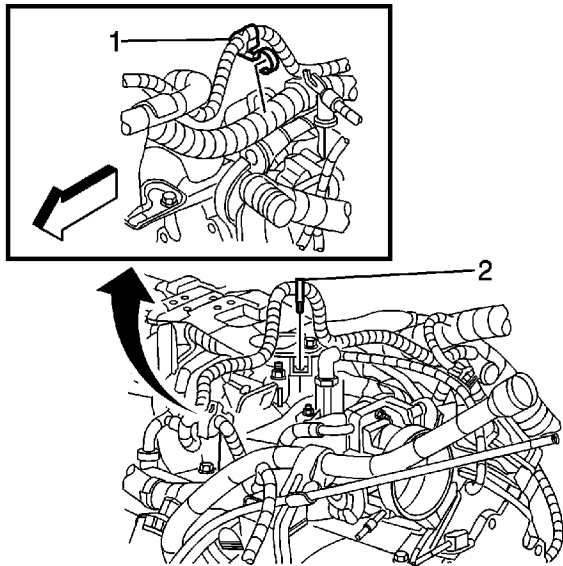


1. On all models, remove the bolt retaining the coolant recovery reservoir or surge tank.
2. Position the coolant recovery reservoir or the surge tank aside.
3. Disconnect the battery negative cable from the battery. Refer to [Battery Negative Cable Disconnection and Connection](#).

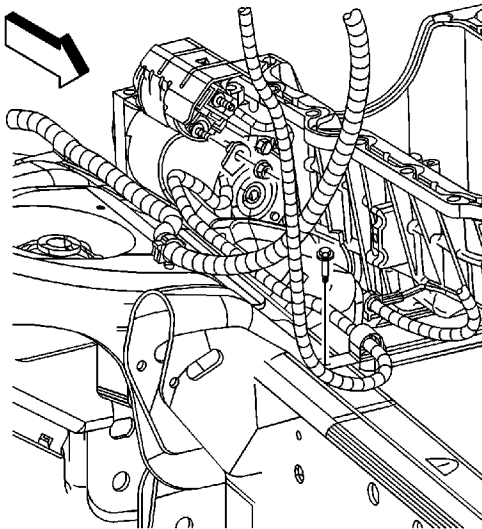




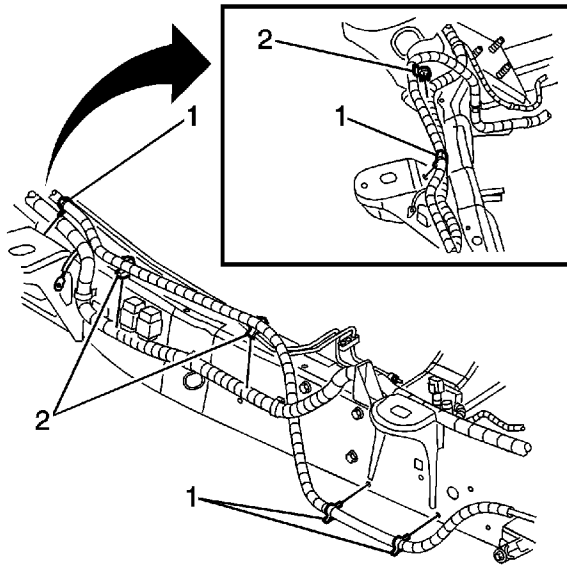
4. Disconnect the battery positive cable from the battery.
5. On models equipped with the 4.8L, or 6.0L engine, disconnect the positive lead to the junction block.



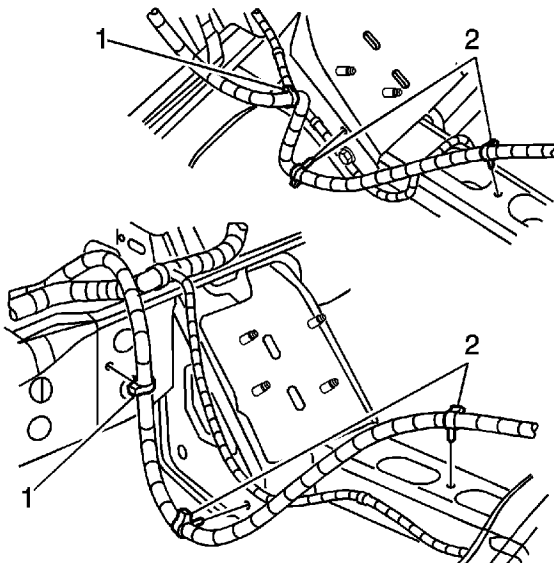
6. On models equipped with 4.8L, 5.3L or 6.0L engine, unclip the battery positive cable from the engine harness clip (1).
7. Unclip the battery positive cable from the engine harness retainer (2).



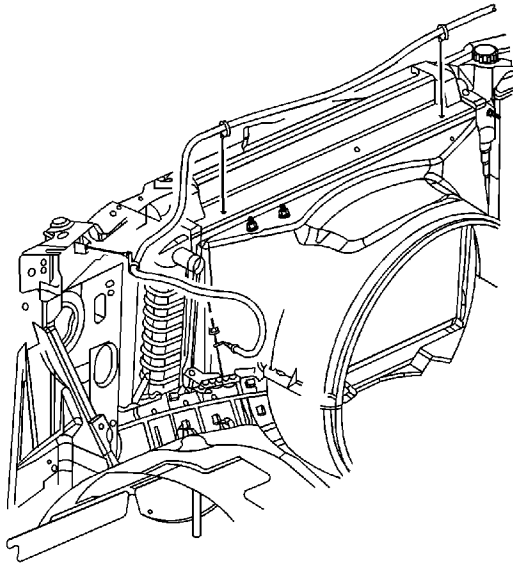
8. On all models, raise the vehicle. Refer to [Lifting and Jacking the Vehicle](#).
9. Disconnect the positive lead at the starter solenoid.



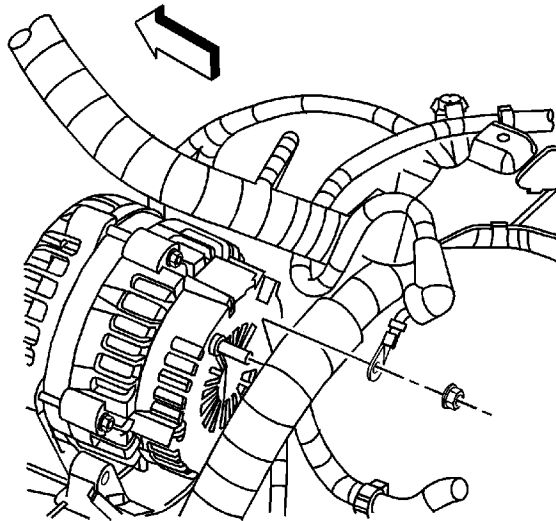
10. On models with 4.8L and 6.0L engine, remove the battery positive cable retainer clips (1).
11. Remove the positive cable to the chassis harness clips (2).



12. Remove the positive cable retainer clips (1) from the frame.
13. Remove battery positive cable retainer clips (2) from crossmember.

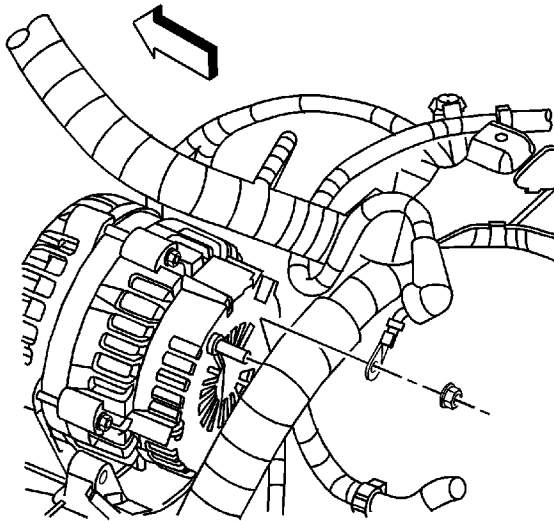


14. On all models, lower the vehicle.
15. On models equipped with the 4.8L, 5.3L or 6.0L engine, unclip the battery positive cable from the fan shroud.



16. On all models, disconnect the positive lead to the generator.
17. Remove the positive cable from the vehicle. Note the location of the retaining clips.

Installation Procedure

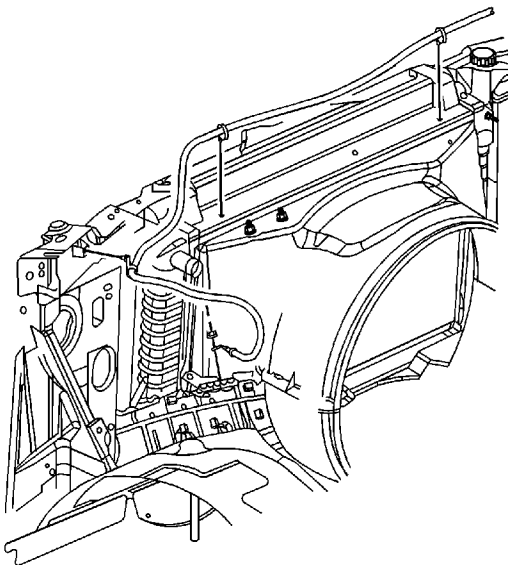


1. On all models, install the positive cable to the vehicle.

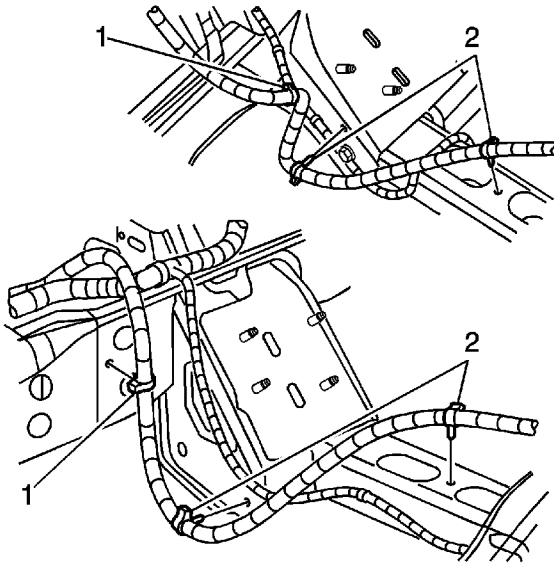
Ensure the cable is routed correctly and installed in the retainer clips.

Caution: Refer to [Fastener Caution](#) in the Preface section.

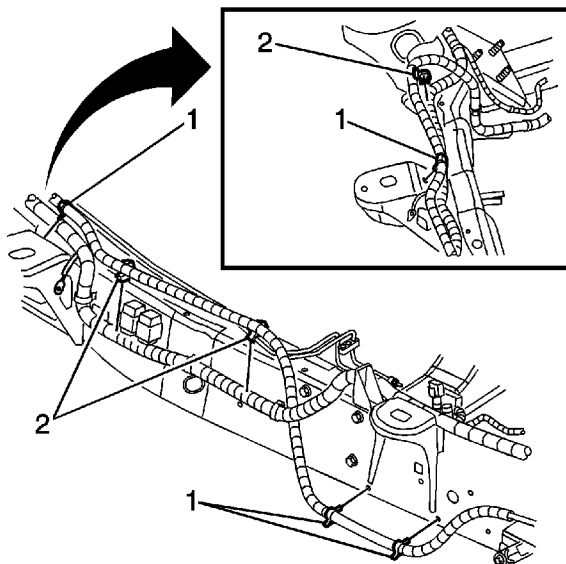
2. Connect the positive lead to the generator output (BAT) terminal and tighten the nut to **10 N·m (89 lb in)**.



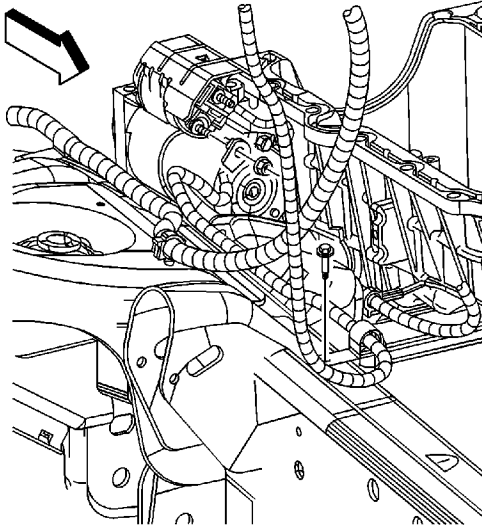
3. On models equipped with the 4.8L, 5.3L or 6.0L engine, clip the positive cable to the fan shroud.
4. On all models, raise the vehicle. Refer to [Lifting and Jacking the Vehicle](#).



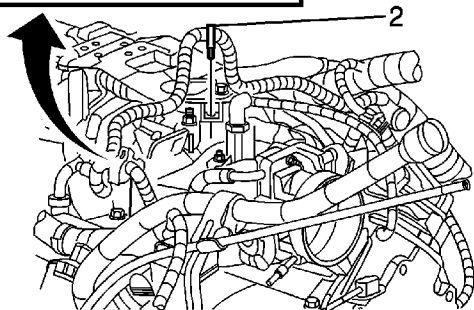
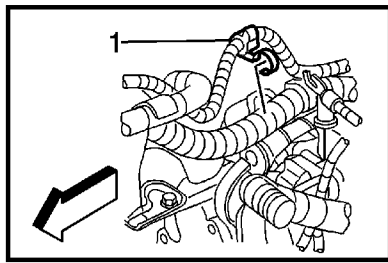
5. On models with 4.8L and 6.0L engine, install the positive cable retainer clips (2) to the crossmember.
6. Install the positive cable retainer clips (1) to the frame.



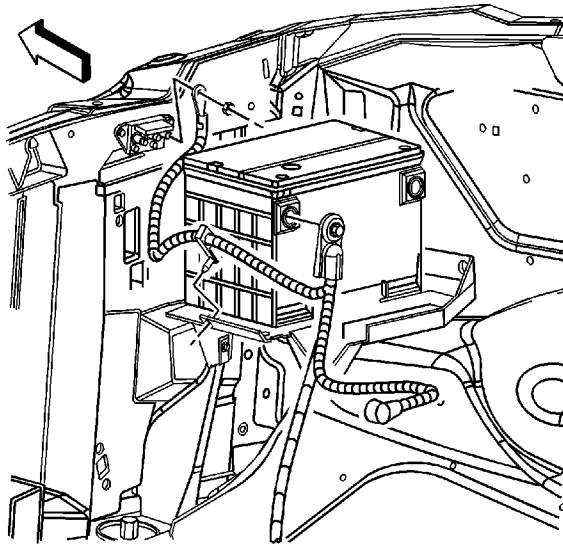
7. Install the positive cable to the chassis harness clips (2).
8. Install the positive cable retainer clips (1).



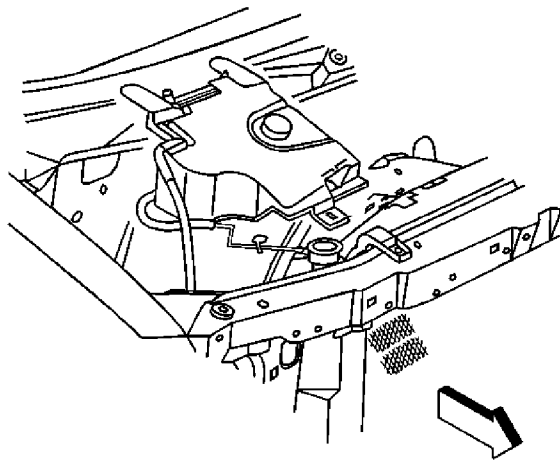
9. Install the positive lead to the starter solenoid and tighten the nut to **10 N·m (89 lb in)** .
10. On all models, lower the vehicle.



11. On models equipped with 4.8L, 5.3L or 6.0L engine, clip battery positive cable to the engine harness retainer (2).
12. Clip the positive cable to the engine harness clip (1).



13. On models equipped with the 4.8L, or 6.0L engine, install the positive lead to the junction block and tighten the nut to **10 N·m (89 lb in)** .
14. On all models, connect the battery positive cable to the battery and tighten to **14 N·m (123 lb in)** .
15. Connect the battery negative cable to the battery. Refer to [Battery Negative Cable Disconnection and Connection](#) .

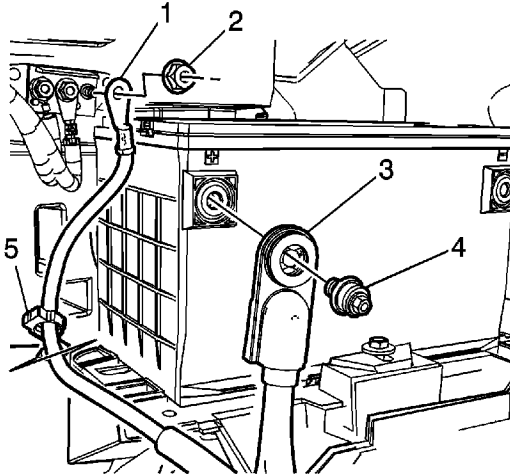


16. Install the coolant recovery reservoir or surge tank and tighten the bolt to **11 N·m (97 lb in)** .

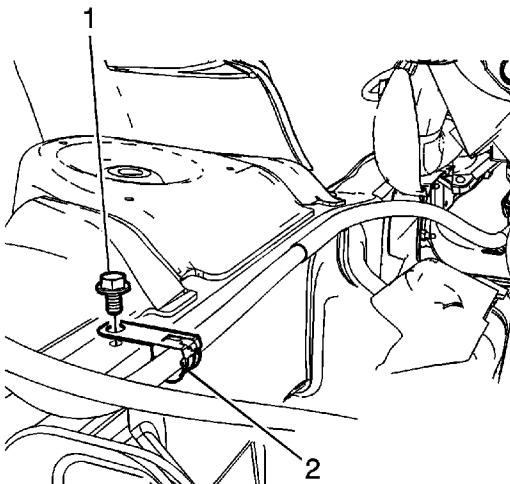
Battery Positive Cable Replacement (With LU3)

Removal Procedure

1. Unbolt and reposition the coolant recovery reservoir. Refer to [Coolant Recovery Reservoir Replacement](#).
2. Disconnect the negative battery cable. Refer to [Battery Negative Cable Disconnection and Connection](#).

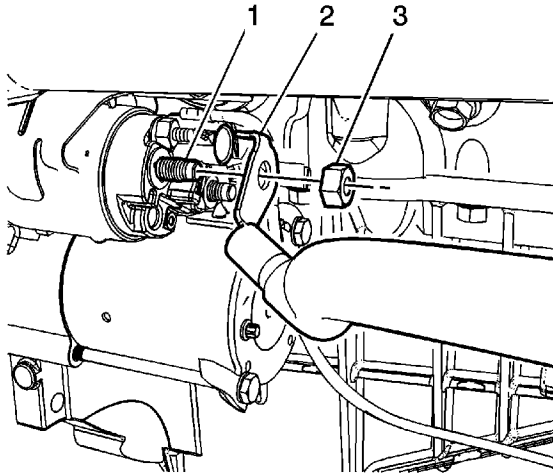


3. Loosen the positive battery cable bolt (4) in order to disconnect the positive battery cable (3) from the battery.
4. Remove the nut (2) retaining the positive battery cable (1) to the junction block.
5. Remove the positive battery cable clip (5) from the battery tray.
6. Raise and support the vehicle. Refer to [Lifting and Jacking the Vehicle](#).

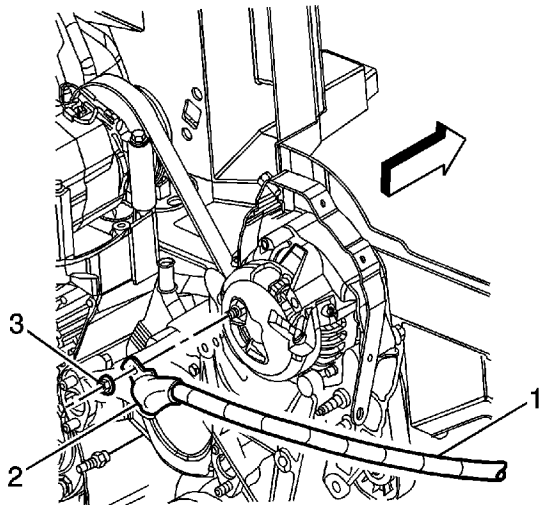




7. Remove the positive battery cable retainer (2) to frame bolt (1).



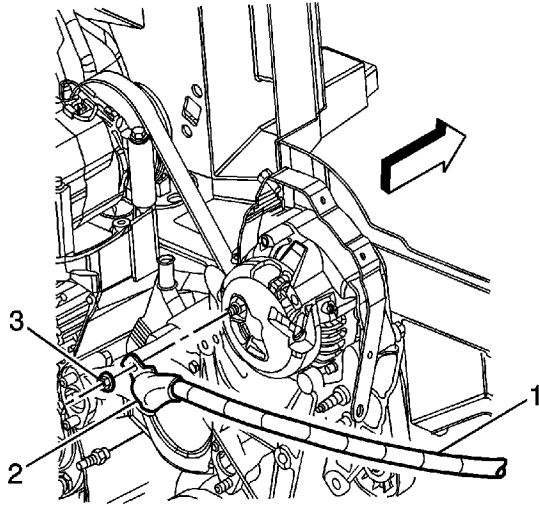
8. Remove the battery terminal nut (3) on the starter solenoid (1).
9. Remove the positive battery cable (2) from the starter solenoid.
10. Lower the vehicle.



11. Reposition the positive battery cable boot (2) at the generator.
12. Remove the generator nut (3).
13. Remove the positive battery cable (1) from the generator.
14. Remove the positive battery cable from the vehicle.

Installation Procedure

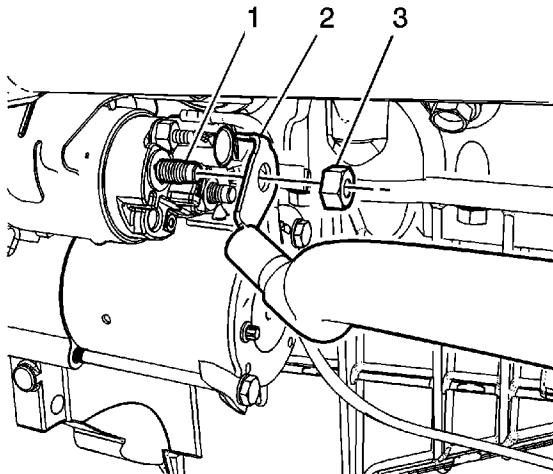
1. Install the positive battery cable to the vehicle.



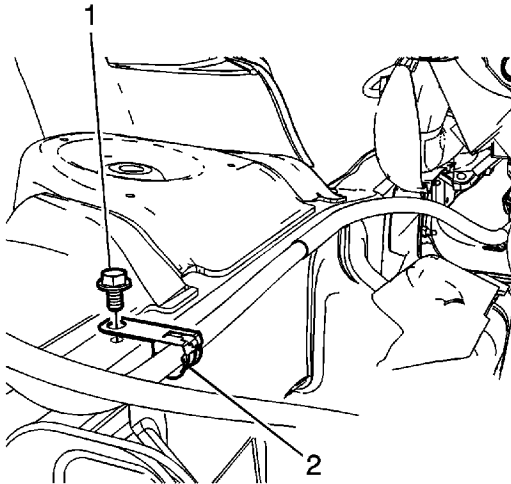
2. Install the positive cable (1) to the generator.

Caution: Refer to [Fastener Caution](#) in the Preface section.

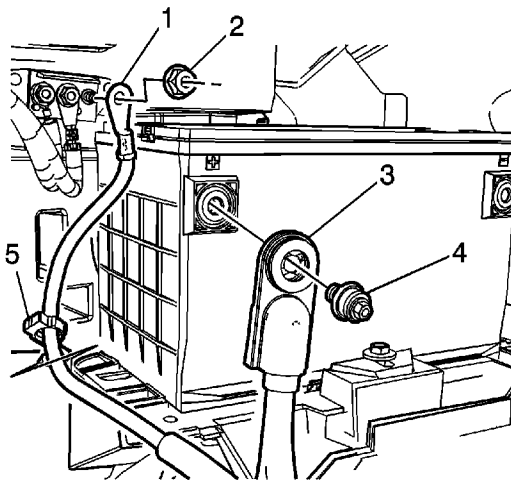
3. Install the generator nut (3) and tighten to **10 N·m (89 lb in)**.
4. Position the positive cable boot (2) at the generator.
5. Raise and support the vehicle.
6. Install the positive cable (2) to the starter solenoid battery terminal (1).



7. Install the battery terminal nut (3) onto the starter solenoid battery terminal (1) and tighten to 10 N·m (89 lb in).



8. Install the positive cable retainer (2) to frame bolt (1) and tighten to **13 N·m (115 lb in)** .
9. Lower the vehicle.

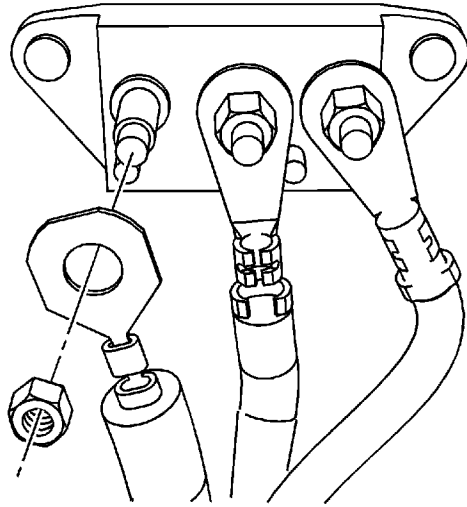


10. Install the positive battery cable (1) to the junction block and tighten to **13 N·m (115 lb in)** .
11. Install the positive battery cable clip (5) from the battery tray.
12. Install the positive battery cable to the battery and tighten the bolt to **14 N·m (123 lb in)** .
13. Connect the negative battery cable. Refer to [Battery Negative Cable Disconnection and Connection](#) .
14. Install the coolant recovery reservoir. Refer to [Coolant Recovery Reservoir Replacement](#) .

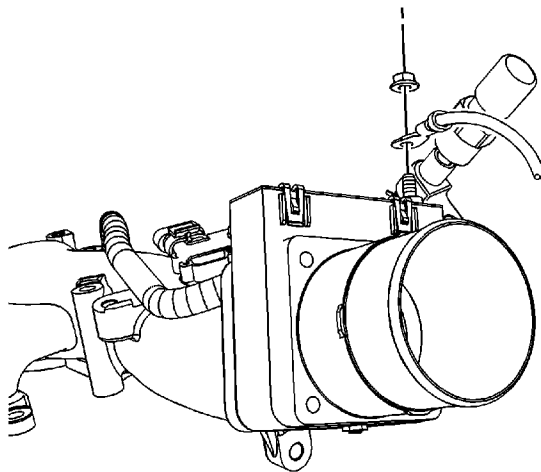
Battery Positive Cable Extension Cable Junction Block Replacement

Removal Procedure

1. Disconnect the auxiliary battery negative cable. Refer to [Battery Negative Cable Disconnection and Connection](#) .



2. Remove the positive extension cable nut from the junction block and disconnect the cable.
3. Remove the air cleaner assembly. Refer to [Air Cleaner Assembly Replacement](#).
4. Remove the air cleaner outlet duct. Refer to [Air Cleaner Outlet Duct Replacement](#).



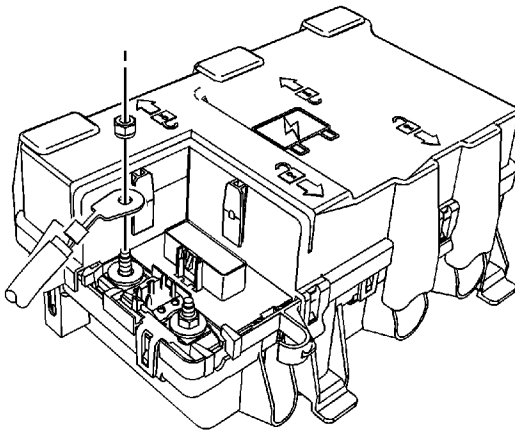


5. Remove the positive extension cable nut from the intake air heater and disconnect the cable.
6. Disconnect the wiring harness clips.
7. Remove the battery positive cover from the underhood based electrical center (UBEC).
8. Remove the positive extension cable nut from the UBEC terminal stud.
9. Remove the positive extension cable.

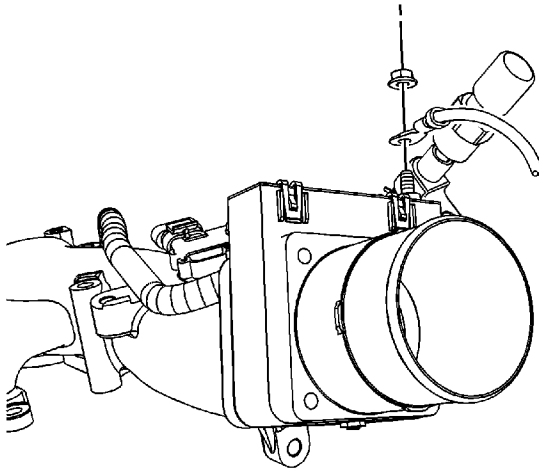
Installation Procedure

1. Position the positive extension cable and connect the wiring harness clips.

Caution: Refer to [Fastener Caution](#) in the Preface section.



2. Position the positive extension cable to the UBEC terminal stud and tighten the nut to **9 N·m (80 lb in)**.
3. Install the battery positive cover to the UBEC.

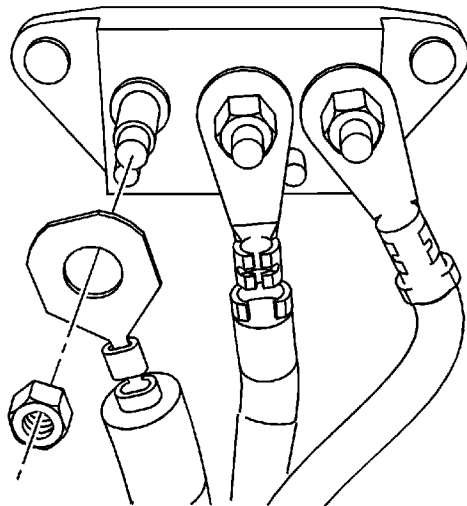


4. Position the positive extension cable to the intake air heater and tighten the nut to **4 N·m (34 lb in)** .

Tighten

Tighten the positive extension cable to intake air heater nut.

5. Install the air cleaner outlet duct. Refer to [Air Cleaner Outlet Duct Replacement](#) .
6. Install the air cleaner assembly. Refer to [Air Cleaner Assembly Replacement](#) .



7. Position the positive extension cable to the junction block and tighten the cable nut to **8 N·m (71 lb in)** .
8. Connect the negative battery cable. Refer to [Battery Negative Cable Disconnection and Connection](#) .

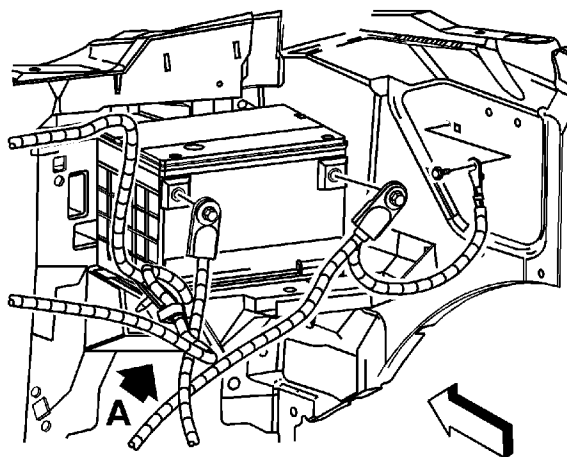
Battery Replacement (Primary)

Removal Procedure

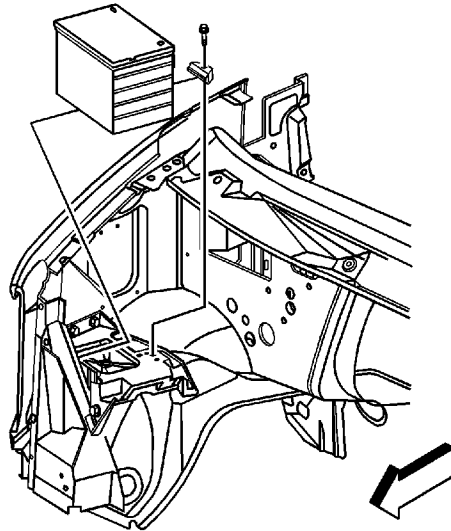
Warning: Batteries produce explosive gases. Batteries contain corrosive acid. Batteries supply levels of electrical current high enough to cause burns. Therefore, in order to reduce the risk of personal injury while working near a battery, observe the following guidelines:

- Always shield your eyes.
- Avoid leaning over the battery whenever possible.
- Do not expose the battery to open flames or sparks.
- Do not allow battery acid to contact the eyes or the skin.
 - Flush any contacted areas with water immediately and thoroughly.
 - Get medical help.

1. Remove the fender brace.

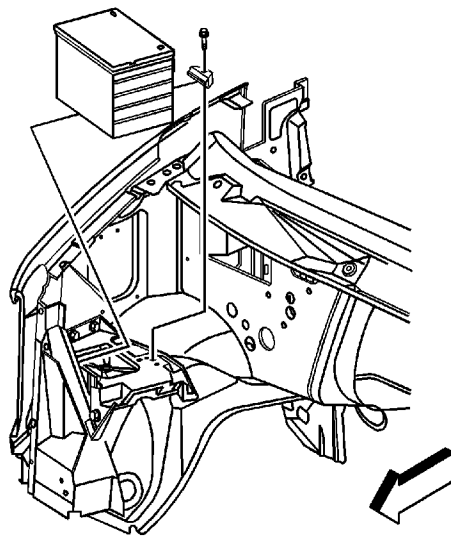


2. Disconnect the battery negative cable from the negative battery terminal. Refer to [Battery Negative Cable Disconnection and Connection](#).
3. Disconnect the battery positive cable from the positive battery terminal. Refer to [Battery Positive Cable Replacement](#).



4. Remove the battery hold-down retainer bolt and retainer.
5. Remove the battery from the vehicle.
6. Inspect the battery for:
 - Damage
 - Worn or corroded cables and connectors
 - Damage or foreign objects in the battery carrier
7. If damage is noted, find and correct the cause.
8. Clean any corrosion from the battery cables and connectors.
9. Clean the battery tray and remove any foreign objects from the tray.

Installation Procedure

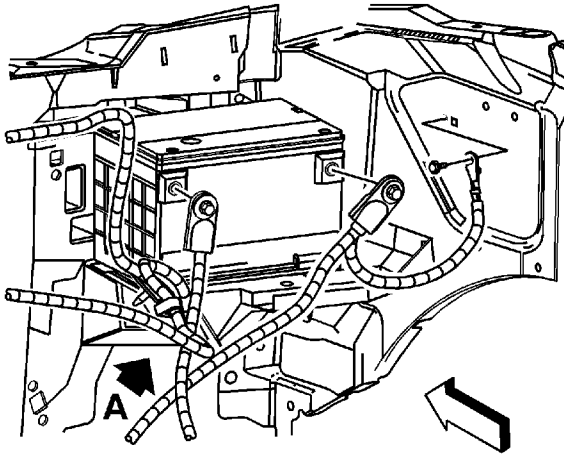




1. Install the battery into the battery tray.

Caution: Refer to [Fastener Caution](#) in the Preface section.

2. Install the battery hold-down retainer and bolt and tighten to **18 N·m (12 lb ft)**.

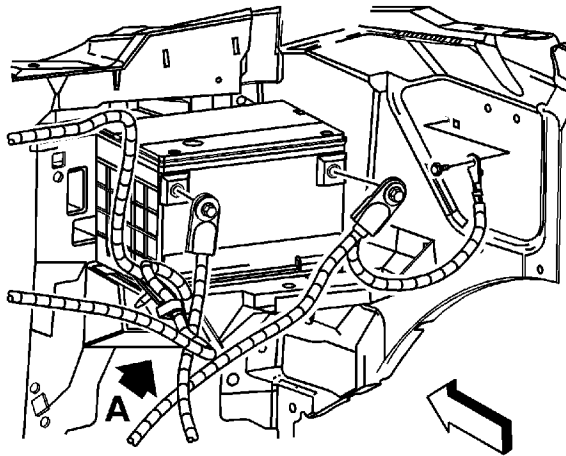


3. Connect the battery positive cable and the positive battery cable terminal to the battery.
Refer to [Battery Positive Cable Replacement](#).
4. Connect the battery negative cable and the negative battery cable terminal to the battery.
Refer to [Battery Negative Cable Disconnection and Connection](#).
5. Install the fender brace.

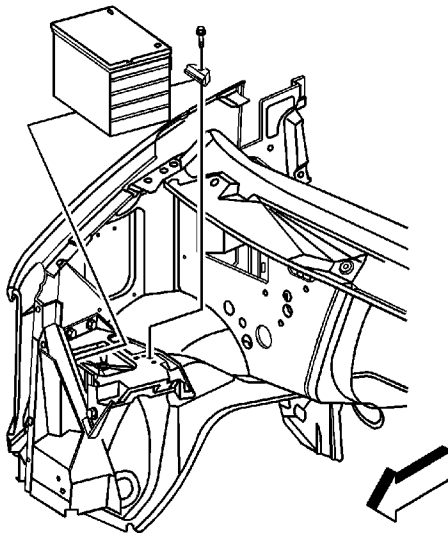
Battery Tray Replacement (Primary)

Removal Procedure

1. Remove the coolant recovery reservoir bolt and reposition the reservoir.

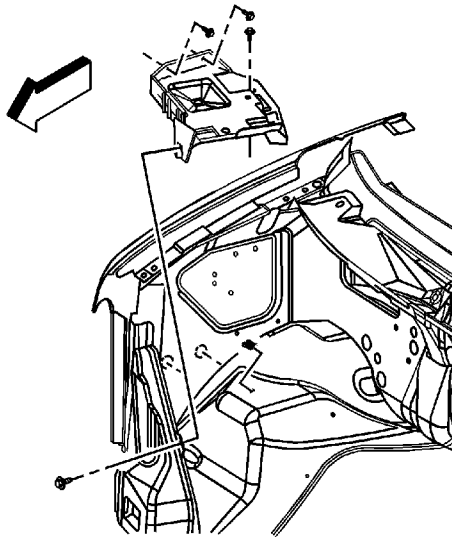


2. Disconnect the battery negative cable from the battery negative terminal. Refer to [Battery Negative Cable Disconnection and Connection](#).
3. Disconnect the battery positive cable from the battery positive terminal. Refer to [Battery Positive Cable Replacement](#).
4. Remove the battery limiter from the vehicle if equipped.
5. Remove the fender brace.



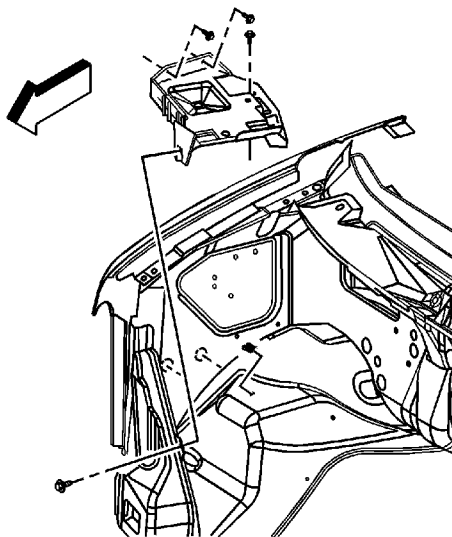


6. Remove the battery hold-down bolt and retainer.
7. Remove the battery.



8. Remove the battery tray bolts.
9. Disconnect the vacuum hoses.
10. Disconnect the vacuum pump electrical connector.
11. Remove the battery tray from the vehicle.

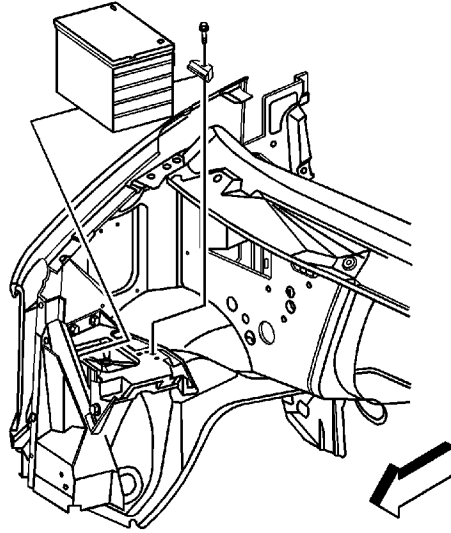
Installation Procedure



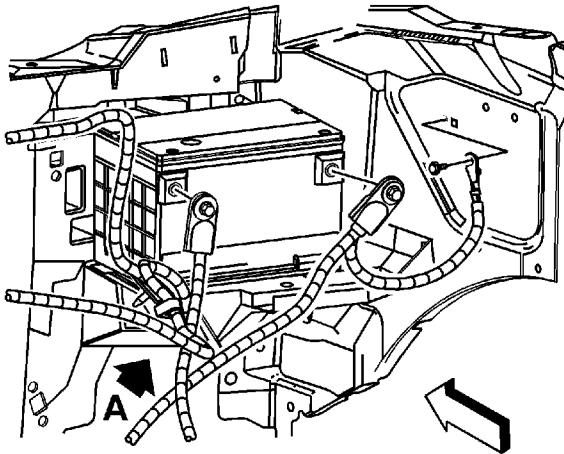
1. Install the battery tray to the vehicle.
2. Connect the vacuum pump hoses and electrical connector.

Caution: Refer to [Fastener Caution](#) in the Preface section.

3. Install the battery tray bolts and tighten to **9 N·m (80 lb in)**.



4. Install the battery.
5. Install the battery hold-down retainer and bolt and tighten to **18 N·m (12 lb ft)**.
6. Install the fender brace.
7. Install the battery limiter to the vehicle if equipped.



8. Install the positive battery cable to the battery and tighten to **17 N·m (13 lb ft)**.
9. Install the battery negative cable to the battery. Refer to [Battery Negative Cable Disconnection and Connection](#).

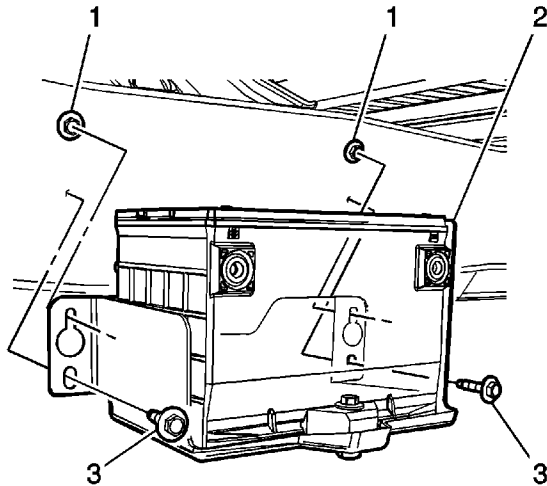
Tighten the terminal bolt to **17 N·m (13 lb ft)**.

10. Install the coolant recovery reservoir and tighten to **11 N·m (97 lb in)**.

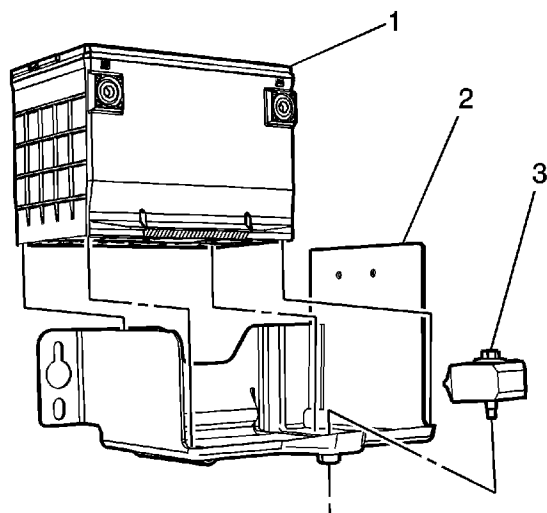
Auxiliary Battery and Tray Replacement

Removal Procedure

1. Disconnect the primary battery and the auxiliary battery negative cables. Refer to [Battery Negative Cable Disconnection and Connection](#)
2. Disconnect the auxiliary battery positive cable from the auxiliary battery.



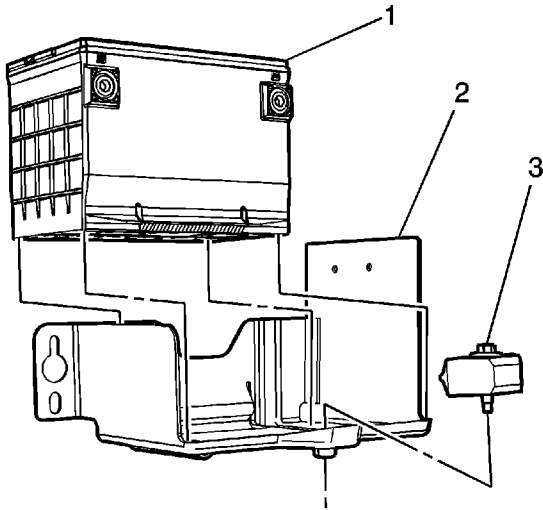
3. Remove the lower auxiliary battery tray to frame bolts (3).
4. Loosen, but DO NOT REMOVE the upper battery tray to frame bolts (1).
5. Lift the battery and tray assembly (2) from the upper frame bolts (1).



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6. Remove the battery retainer bolt and retainer (3).
7. Remove the battery (1) from the battery tray (2).

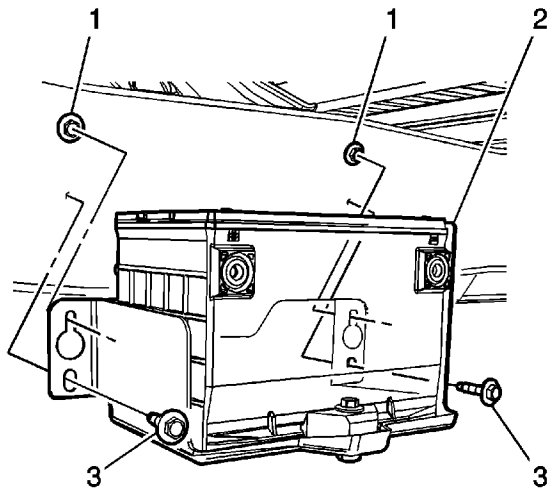
Installation Procedure



1. Install the battery (1) into the battery tray (2).

Warning: Refer to [Fastener Caution](#) in the Preface section.

2. Install the battery bolt and retainer (3) and tighten to **18 N·m (12 lb ft)**.



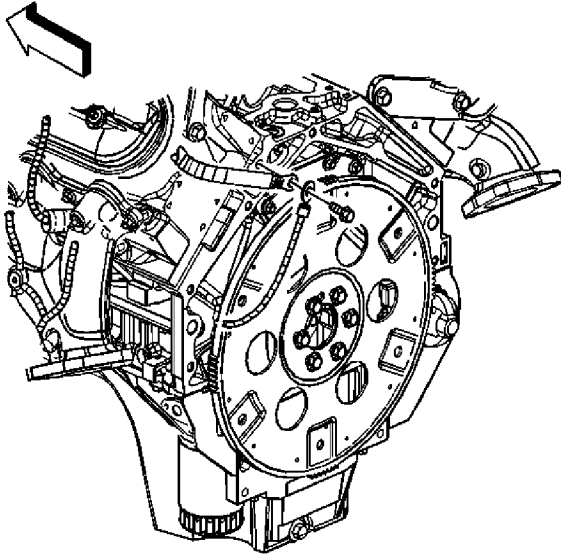
3. Lift the battery and tray assembly (2) onto the upper auxiliary battery tray bolts (1). Do not

tighten the upper bolts at this time.

4. Install the lower battery tray bolts (3) and tighten to **25 N·m (18 lb ft)** .
5. Connect the positive battery cable to the auxiliary battery and tighten the bolt to **14 N·m (123 lb in)** .
6. Connect the negative battery cable to the auxiliary battery and to the primary battery. Refer to [Battery Negative Cable Disconnection and Connection](#) .

Engine Ground Strap Replacement

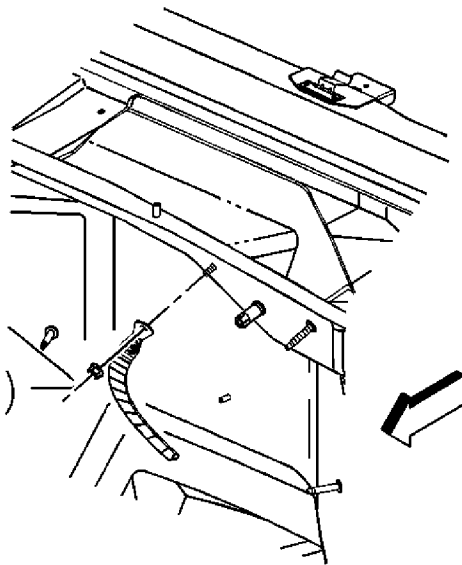
Removal Procedure



1. Remove the engine cover. Refer to [Engine Cover Replacement](#).

Remove the engine wiring harness ground bolt.

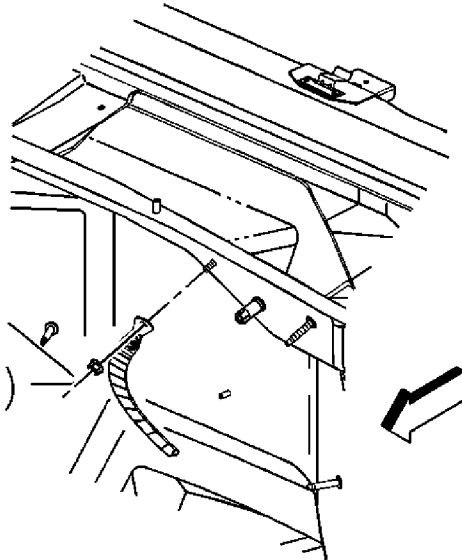
2. Reposition the engine wiring harness ground and ground strap.





3. Remove the ground strap nut from the stud at the front of dash.
4. Remove the ground strap from the stud.

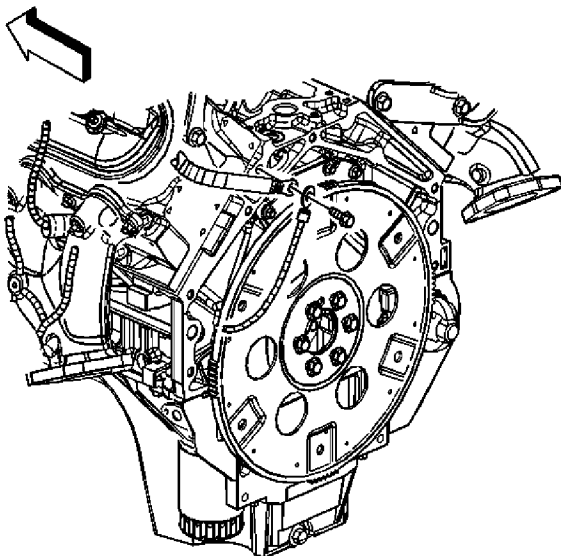
Installation Procedure



1. Install the ground strap to the stud.

Caution: Refer to [Fastener Caution](#) in the Preface section.

2. Install the ground strap nut to the stud at the front of dash and tighten to **9 N·m (80 lb in)**.





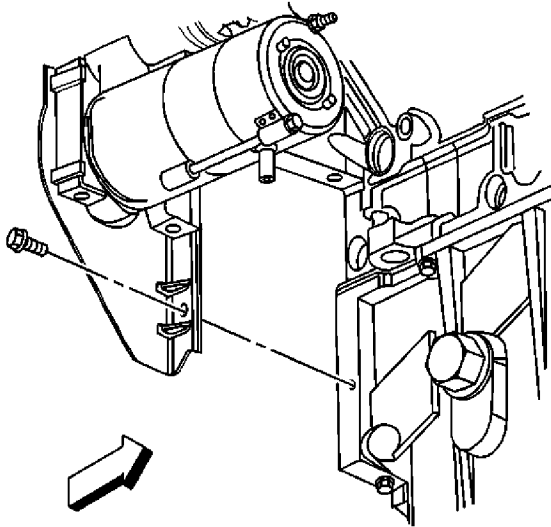
3. Position the ground strap and engine wiring harness ground.
4. Install the engine wiring harness ground bolt and tighten to **16 N·m (12 lb ft)**.
5. Install the engine cover. Refer to [Engine Cover Replacement](#).

Starter Replacement (4.8L/5.3L/6.0L)

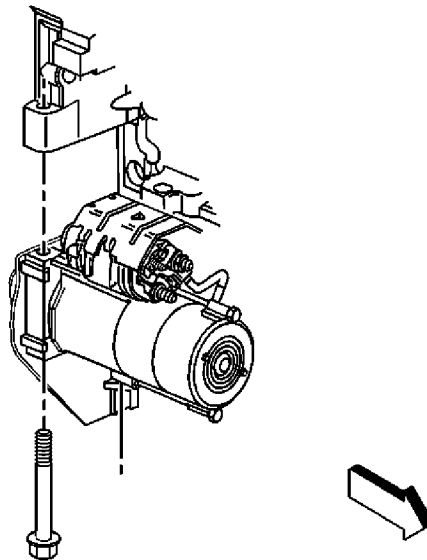
Removal Procedure

Warning: Refer to [Battery Disconnect Warning](#) in the Preface section.

1. Disconnect the negative battery cable. Refer to [Battery Negative Cable Disconnection and Connection](#).
2. Raise and suitably support the vehicle. Refer to [Lifting and Jacking the Vehicle](#).

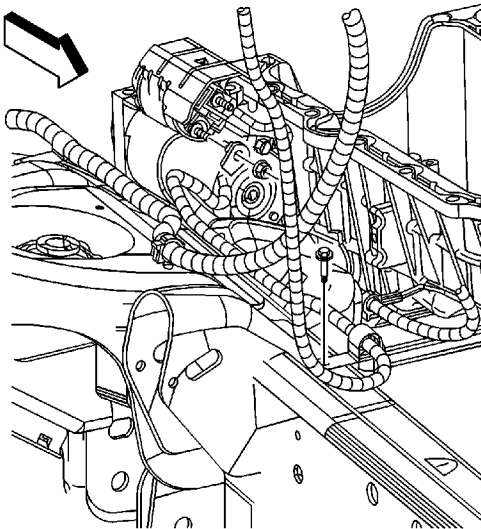


3. Remove the right transmission cover bolt, if equipped.
4. Disconnect the oil level sensor electrical connector.

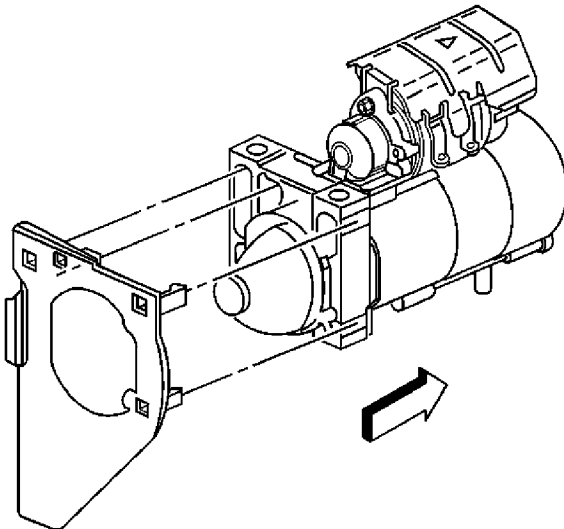




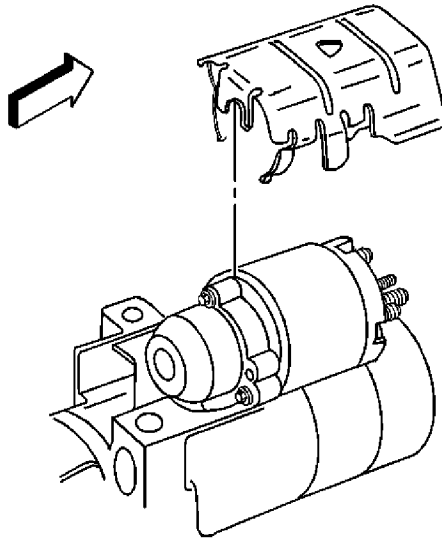
5. Remove the starter bolts.
6. Slide the starter forward until the starter clears the transmission.



7. Remove the starter solenoid nut.
8. Remove the starter lead from the solenoid stud.
9. Remove the starter lead nut.
10. Remove the positive cable from the starter stud.
11. Place the starter on a workbench.

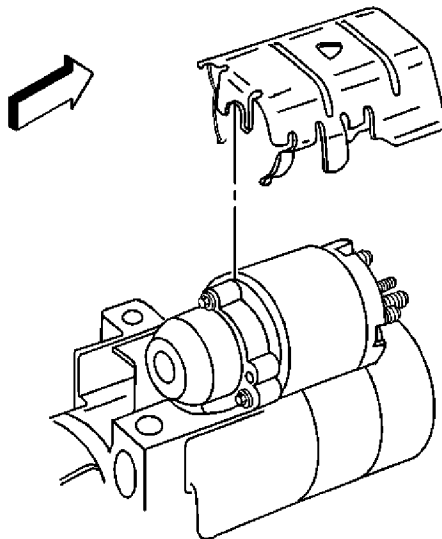


12. Unsnap the transmission cover from the starter, if equipped.

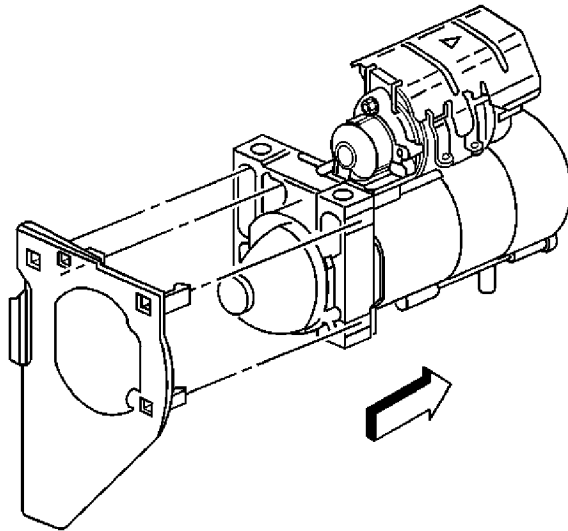


13. If necessary, remove the starter shield.

Installation Procedure

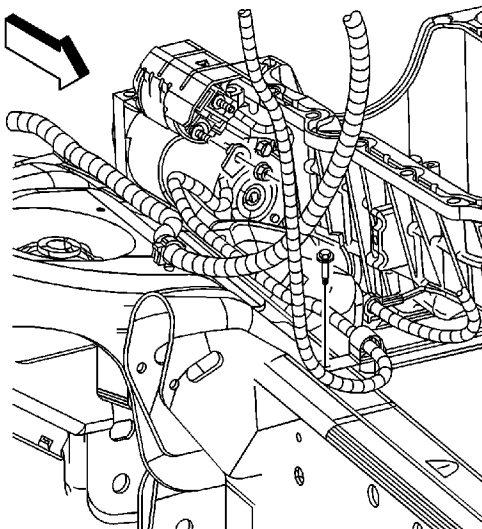


1. If necessary, install the starter shield.

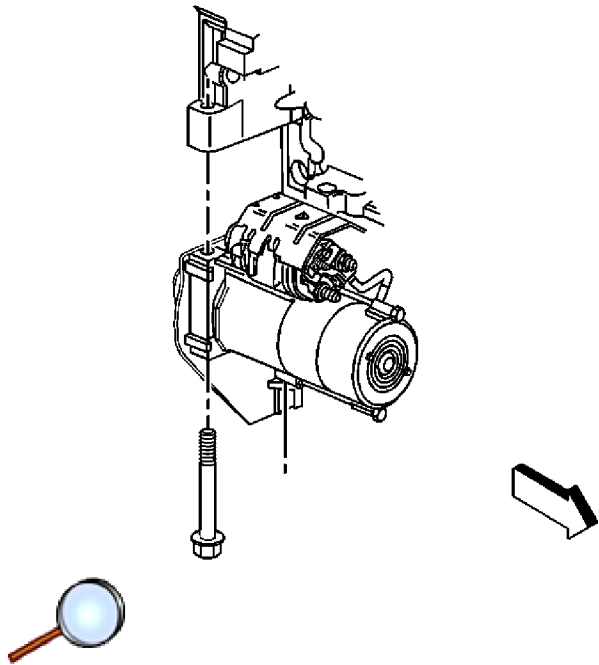


2. Snap the transmission cover to the starter, if equipped.

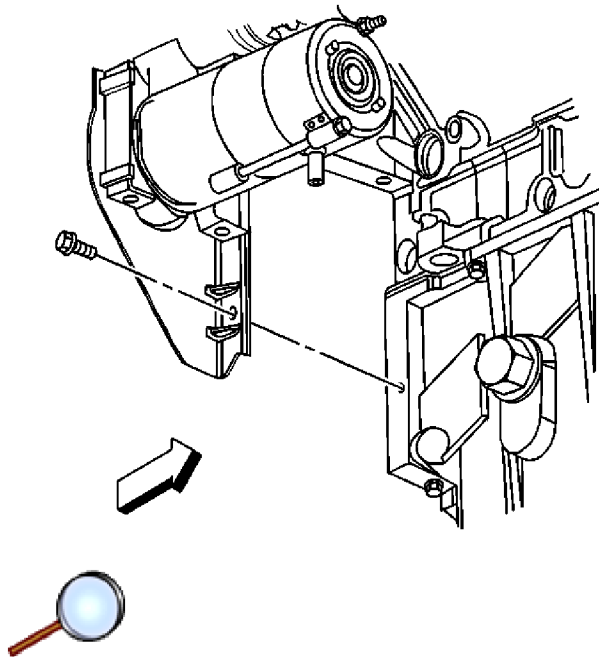
Caution: Refer to [Fastener Caution](#) in the Preface section.



3. Install the positive cable to the starter stud.
4. Install the starter lead nut and tighten to **10 N·m (89 lb in)**.
5. Install the starter solenoid lead to the solenoid stud.
6. Install the starter solenoid nut and tighten to **3.4 N·m (30 lb in)**.



7. Slide the starter rearward.
8. Install the starter bolts and tighten to **50 N·m (37 lb ft)**.

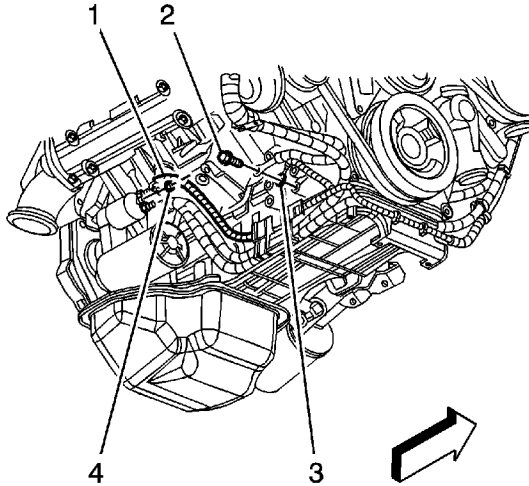


9. Install the right transmission cover bolt, if equipped and tighten to **9 N·m (80 lb in)**.
10. Connect the oil level sensor electrical connector.
11. Lower the vehicle.
12. Connect the negative battery cable. Refer to [Battery Negative Cable Disconnection and Connection](#).

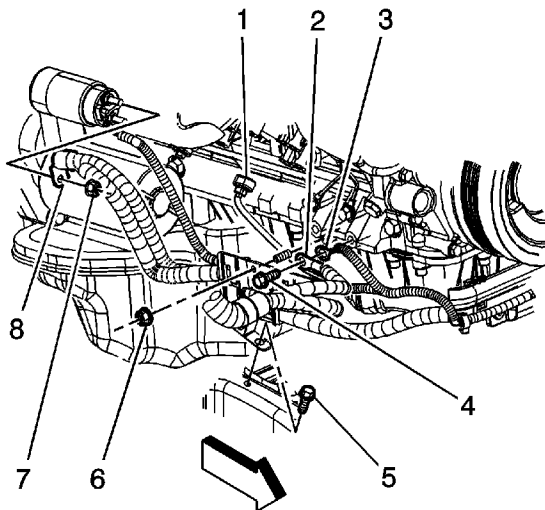
Starter Replacement (6.6L)

Removal Procedure

Warning: Refer to [Battery Disconnect Warning](#) in the Preface section.

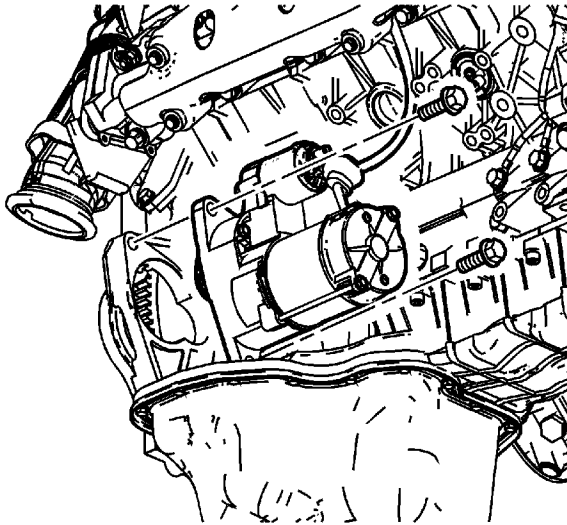


1. Disconnect the negative battery cable. Refer to [Battery Negative Cable Disconnection and Connection](#).
2. Raise and suitably support the vehicle. Refer to [Lifting and Jacking the Vehicle](#).
3. Remove the engine wiring harness nut (4).
4. Remove the engine wiring harness lead (1) from the starter.



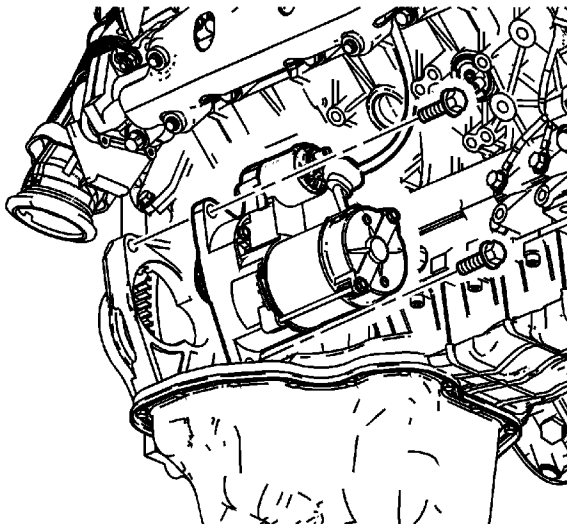


5. Remove the positive battery cable nut (7).
6. Remove the positive battery cable lead (8) from the starter.



7. Remove the starter motor bolts.
8. Remove the starter motor.

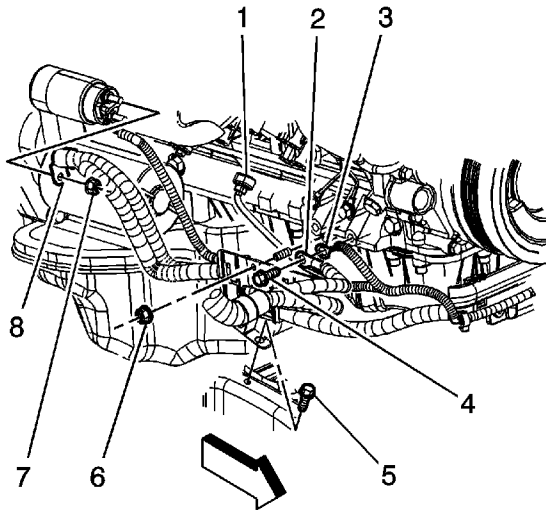
Installation Procedure



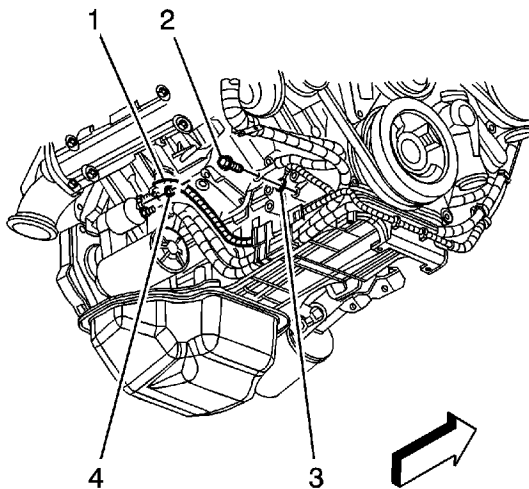
1. Install the starter motor.

Warning: Refer to [Fastener Caution](#) in the Preface section.

2. Install the starter motor bolts and tighten to **78 N·m (58 lb ft)**.

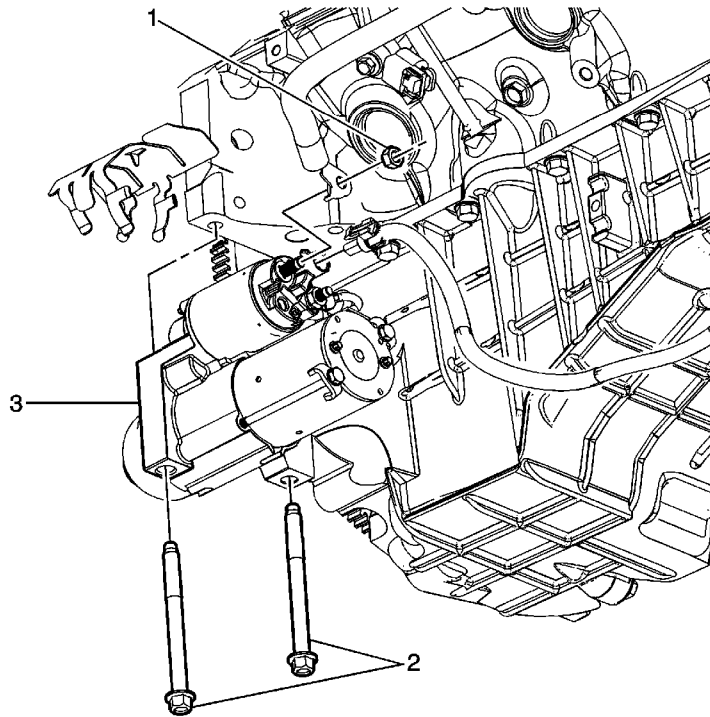


3. Install the positive battery cable lead (8) to the starter.
4. Install the positive battery cable nut (7) and tighten to **9 N·m (80 lb in)**.



5. Install the engine wiring harness lead (1) to the starter.
6. Install the engine wiring harness nut (2) and tighten to **3.4 N·m (30 lb in)**.
7. Lower the vehicle.
8. Connect the negative battery cable. Refer to [Battery Negative Cable Disconnection and Connection](#).

Starter Replacement (V6)



Callout	Component Name
Preliminary Procedures	
<ol style="list-style-type: none">1. Disconnect the negative battery cable. Refer to Battery Negative Cable Disconnection and Connection2. Raise and support the vehicle. Refer to Lifting and Jacking the Vehicle	
1	Battery Terminal Nut Caution: Refer to Fastener Caution in the Preface section. Tighten 9 N·m (80 lb in)
2	Starter Bolt (Qty: 2) Tighten 50 N·m (37 lb ft)
	Starter Procedure

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3

- Disconnect the S terminal harness connector from the starter.

Note: Orient the B+ terminal Harness anti rotation tab to the starter orientation slot.

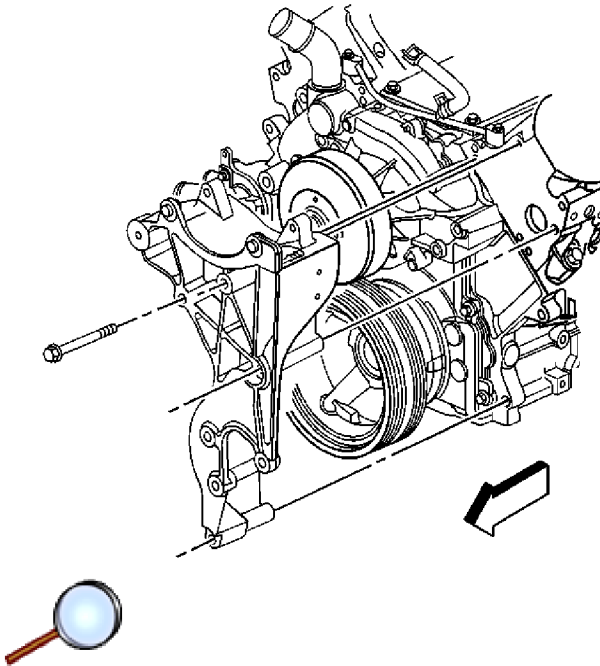
- Remove the B+ terminal harness from the starter.

Note: The starter motor bracketed shield snaps into place on the starter solenoid.

- Remove the starter motor bracket shield from the starter.

Generator Bracket Replacement (4.8L/5.3L/6.0L)

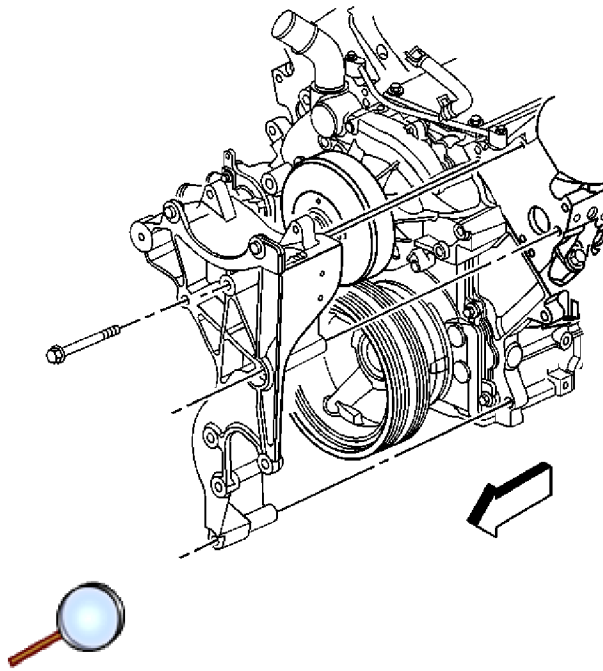
Removal Procedure



1. Remove the generator. Refer to [Generator Replacement](#).
2. Remove the power steering pump. Refer to [Power Steering Pump Replacement](#).
3. Remove the generator bracket bolts.
4. Remove the generator bracket.

Installation Procedure

Warning: Refer to [Fastener Caution](#) in the Preface section.



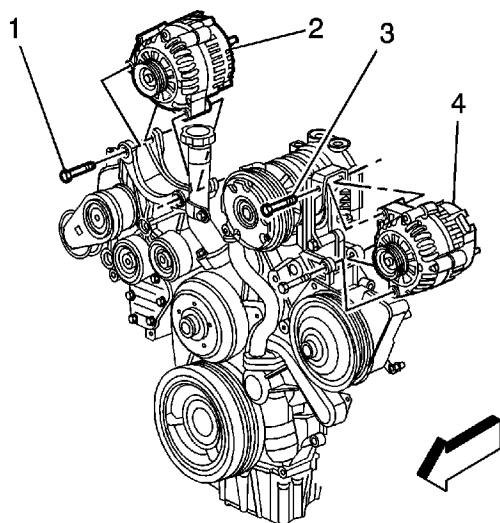
1. Install the generator bracket.
2. Install the generator bracket bolts and tighten to **50 N·m (37 lb ft)**.
3. Install the power steering pump. Refer to [Power Steering Pump Replacement](#).
4. Install the generator. Refer to [Generator Replacement](#).

Generator Bracket Replacement (6.6L)

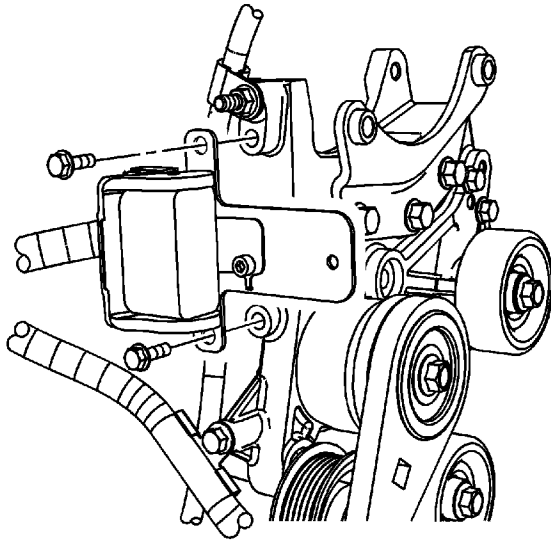
Removal Procedure

Warning: Refer to [Battery Disconnect Warning](#) in the Preface section.

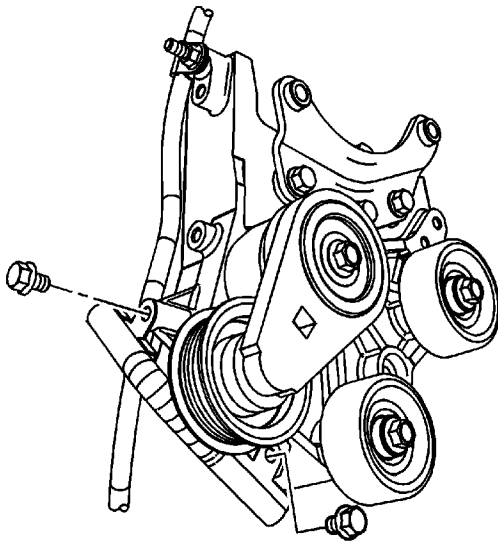
1. Remove the cooling fan. Refer to [Fan Replacement](#).
2. Remove the drive belt. Refer to [Drive Belt Replacement](#).
3. Disconnect the generator electrical connector.



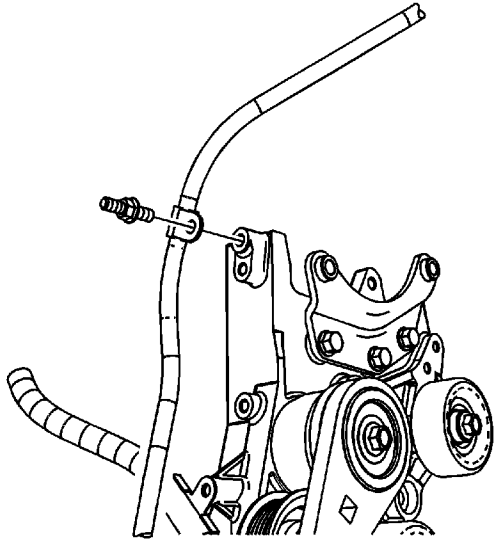
4. Remove the generator bolts (1).
5. Remove the generator (2).
6. Remove the positive battery cable from the generator, perform the following:
 - 6.1. Slide the boot down to access the terminal stud.
 - 6.2. Remove the positive cable nut.
 - 6.3. Remove the positive cable.
7. Disconnect the right engine wiring main harness connector.



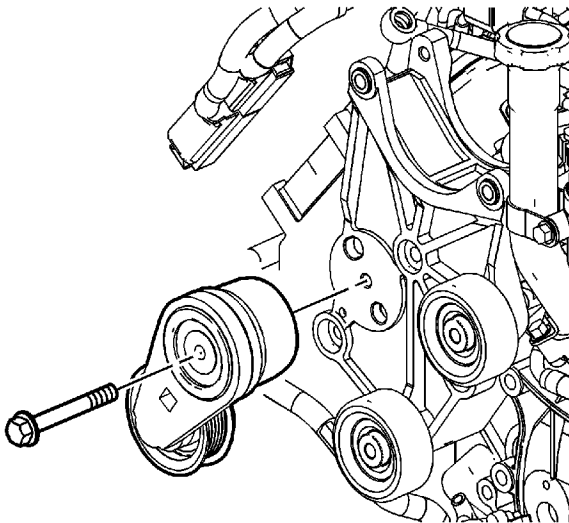
8. Remove the 2 right engine wiring harness bracket bolts and position aside.



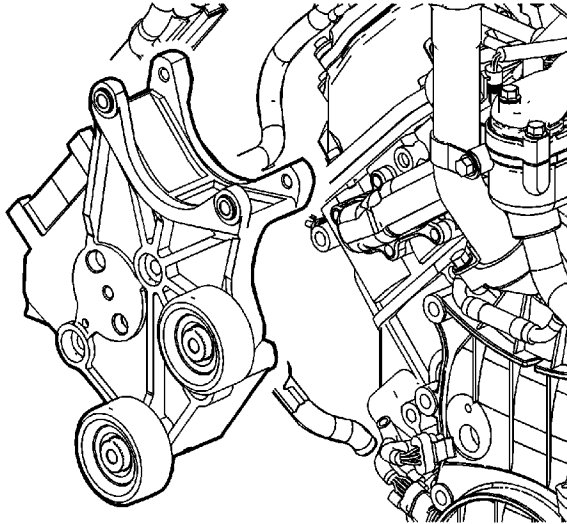
9. Remove the 2 wiring harness routing bolts.



10. Remove the oil indicator tube bracket bolt.



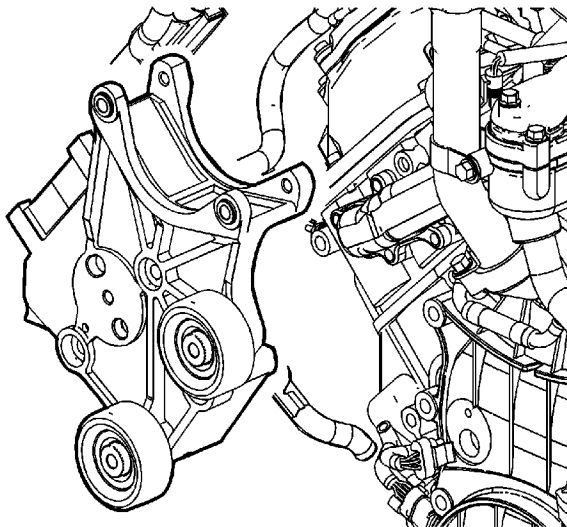
11. Remove the drive belt tensioner bolt and tensioner.



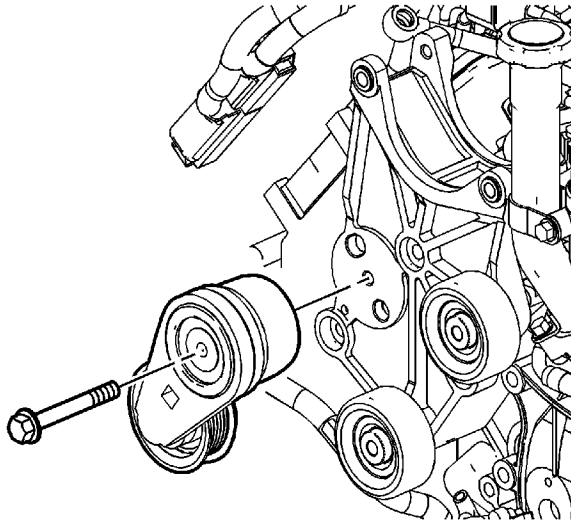
12. Remove the bolts and nut and the generator mounting bracket.
13. Transfer any parts as needed.

Installation Procedure

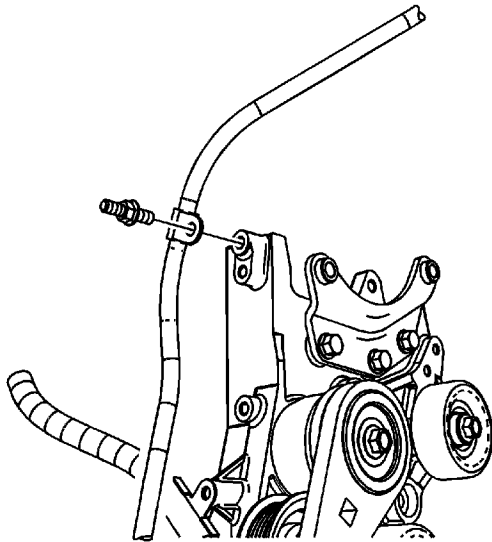
Caution: Refer to [Fastener Caution](#) in the Preface section.



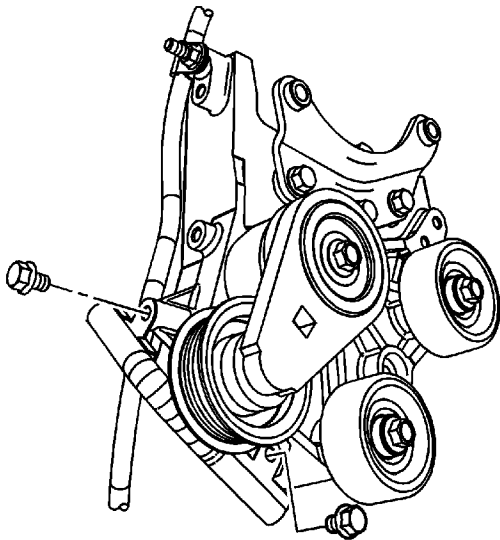
1. Position the generator mounting bracket and install the bolts and tighten to **50 N·m (37 lb ft)**.



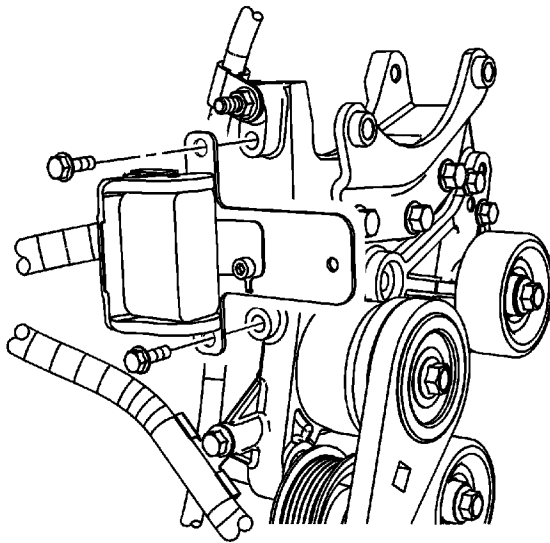
2. Position the drive belt tensioner and install the bolt and tighten to **50 N·m (37 lb ft)**.



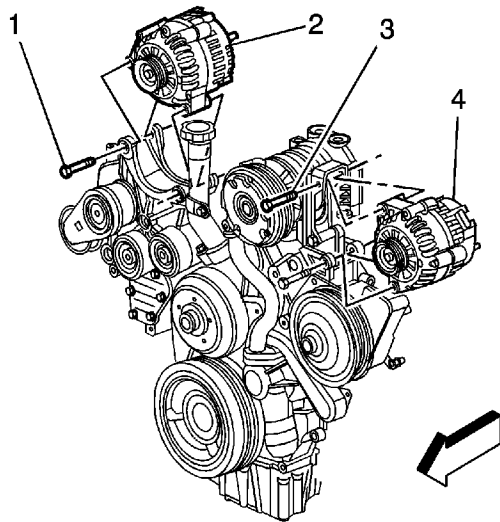
3. Install the oil indicator tube bracket bolt and tighten to **21 N·m (15 lb ft)**.



4. Install the 2 wiring harness routing bolts and tighten to **10 N·m (89 lb in)**.



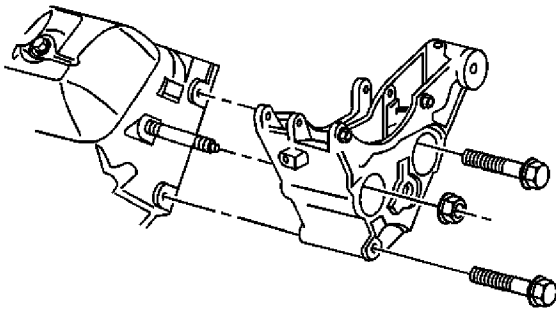
5. Position the right engine wiring harness bracket and install the 2 bolts and tighten to **10 N·m (89 lb in)**.
6. Connect the right engine wiring harness connector.
7. Install the positive cable to the auxiliary generator, perform the following:
 - 7.1. Install the positive cable.
 - 7.2. Install the positive cable nut and tighten to **9 N·m (80 lb in)**.
 - 7.3. Slide the boot to cover the terminal stud.



8. Position the generator.
9. Install the generator bolts (1) and tighten to **50 N·m (37 lb ft)**.
10. Connect the generator electrical connector.
11. Install the drive belt. Refer to [Drive Belt Replacement](#).
12. Install the cooling fan. Refer to [Fan Replacement](#).

Generator Bracket Replacement (4.3L)

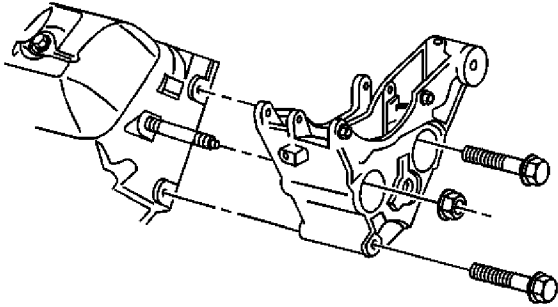
Removal Procedure



1. Remove the generator. Refer to [Generator Replacement](#).
2. Remove the drive belt tensioner. Refer to [Drive Belt Tensioner Replacement](#).
3. Remove the generator bracket bolts and nut.
4. Remove the generator bracket.

Installation Procedure

Caution: Refer to [Fastener Caution](#) in the Preface section.



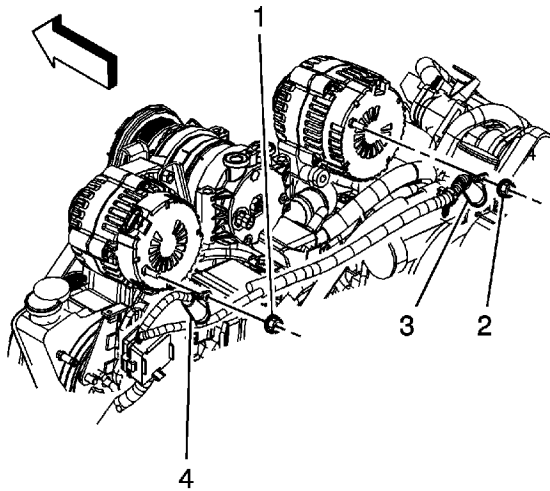
1. Install the generator bracket.
2. Install the generator bracket bolts and nut and tighten to **41 N·m (30 lb ft)**.
3. Install the drive belt tensioner. Refer to [Drive Belt Tensioner Replacement](#).
4. Install the generator. Refer to [Generator Replacement](#).

Auxiliary Generator Bracket Replacement

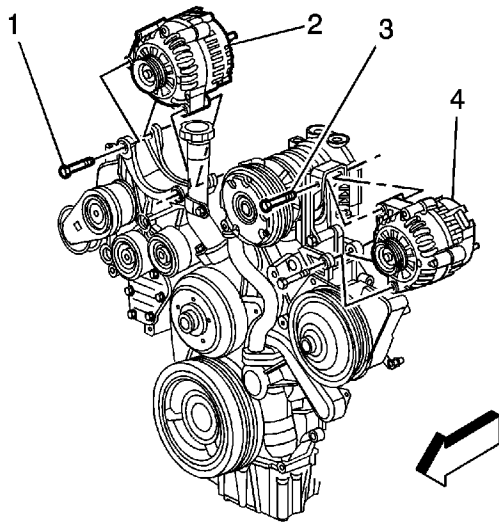
Removal Procedure

Warning: Refer to [Battery Disconnect Warning](#) in the Preface section.

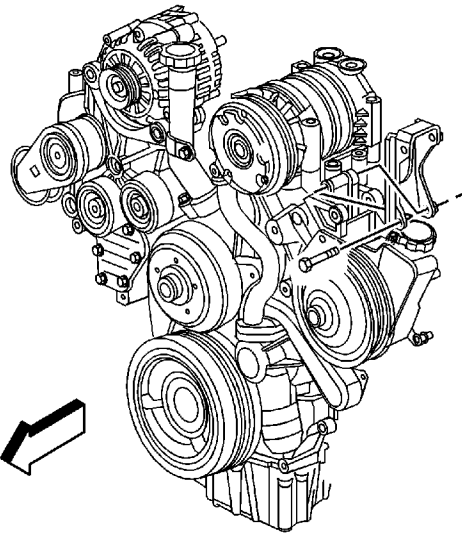
1. Remove the fan shroud. Refer to [Engine Coolant Fan Upper Shroud Replacement](#).
2. Disconnect the auxiliary generator electrical connector.
3. Remove the drive belt. Refer to [Drive Belt Replacement](#).



4. Remove the positive battery cable from the auxiliary generator, perform the following:
 - 4.1. Slide the boot (4) down to access the terminal stud.
 - 4.2. Remove the positive cable nut (1).
 - 4.3. Remove the positive cable.

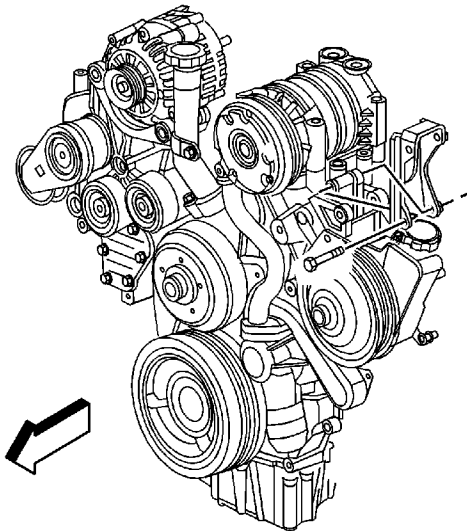


5. Remove the auxiliary generator bolts (3).
6. Remove the auxiliary generator (4).



7. Remove the auxiliary generator bracket bolts.
8. Remove the auxiliary generator bracket.

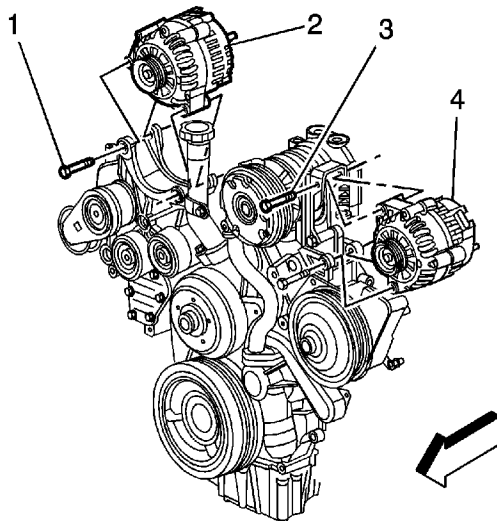
Installation Procedure



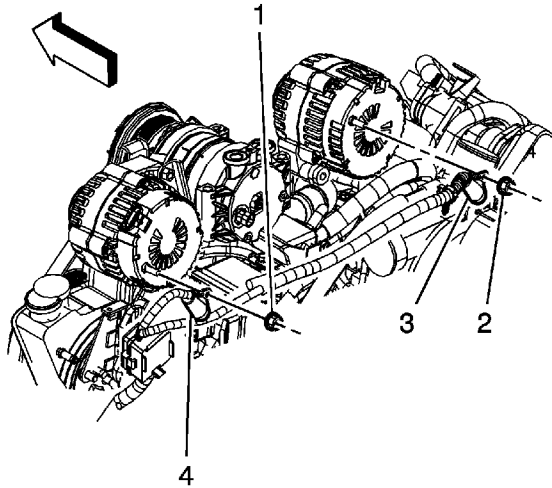
1. Install the auxiliary generator bracket.

Caution: Refer to [Fastener Caution](#) in the Preface section.

2. Install the auxiliary generator bracket bolts and tighten to **50 N·m (37 lb ft)**.



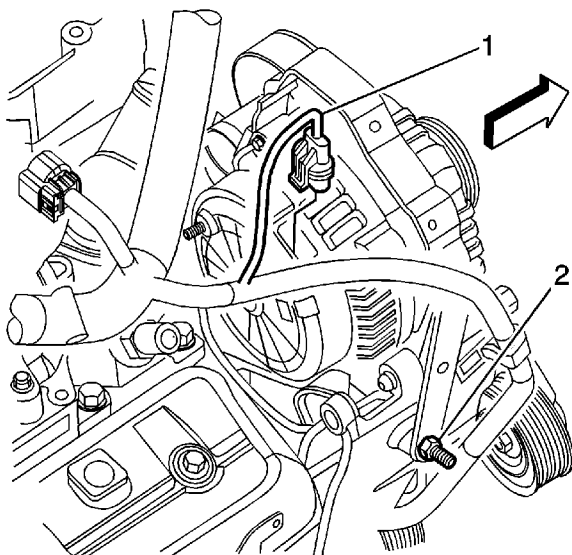
3. Install the auxiliary generator (4).
4. Install the auxiliary generator bolts (3) and tighten to **50 N·m (37 lb ft)**.



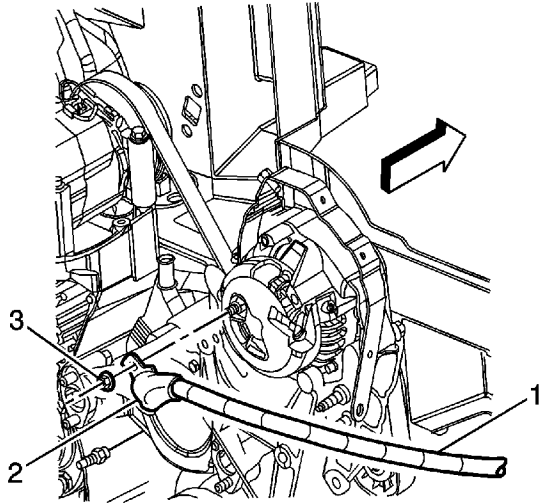
5. Install the positive cable to the auxiliary generator, perform the following:
 - 5.1. Install the positive cable.
 - 5.2. Install the positive cable nut (1) and tighten to **9 N·m (80 lb in)**.
 - 5.3. Slide the boot (4) up to cover the terminal stud.
6. Install the drive belt. Refer to [Drive Belt Replacement](#).
7. Connect the auxiliary generator electrical connector (3).
8. Install the radiator fan shroud. Refer to [Engine Coolant Fan Upper Shroud Replacement](#).

Generator Replacement (With LU3)

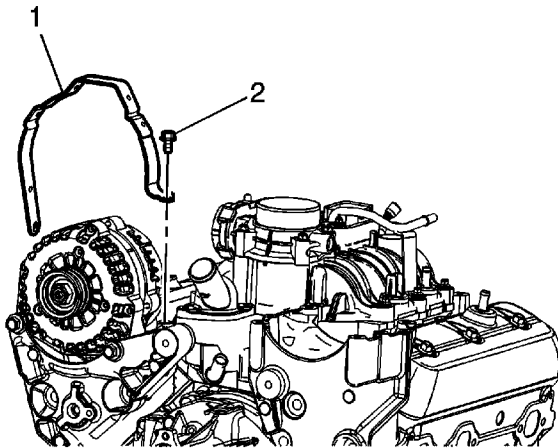
Removal Procedure



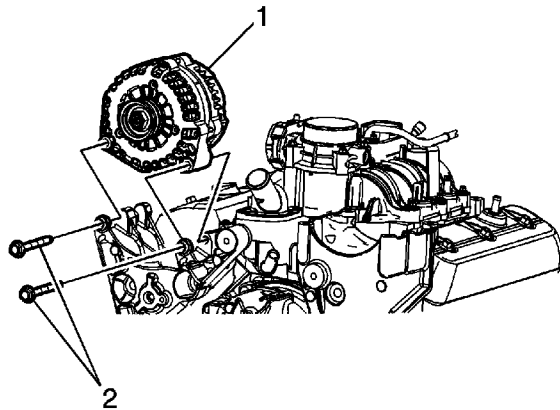
1. Disconnect the negative battery cable. Refer to [Battery Negative Cable Disconnection and Connection](#).
2. Remove the drive belt. Refer to [Drive Belt Replacement](#).
3. Unbolt and reposition the oil level indicator tube. Refer to [Oil Level Indicator and Tube Replacement](#).
4. Unbolt and reposition the oil fill tube. Refer to [Oil Filler Tube Replacement](#).
5. Disconnect the engine wiring harness electrical connector (1) from the generator.
6. Remove the oil fill tube bracket stud (2).
7. Reposition the engine wiring harness clip.



8. Reposition the positive battery cable boot (2) at the generator.
9. Remove the generator nut (3).
10. Remove the positive battery cable (1) from the generator.



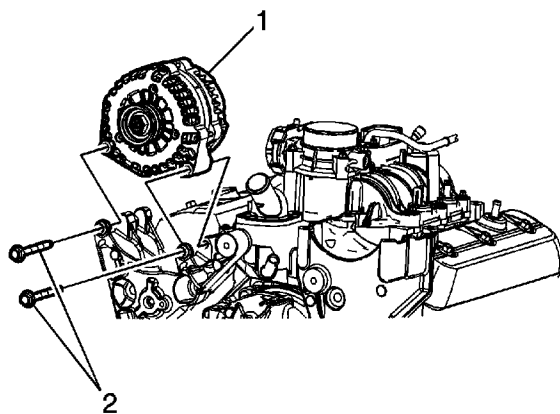
11. Remove the oil fill tube bracket bolt (2) and bracket (1).



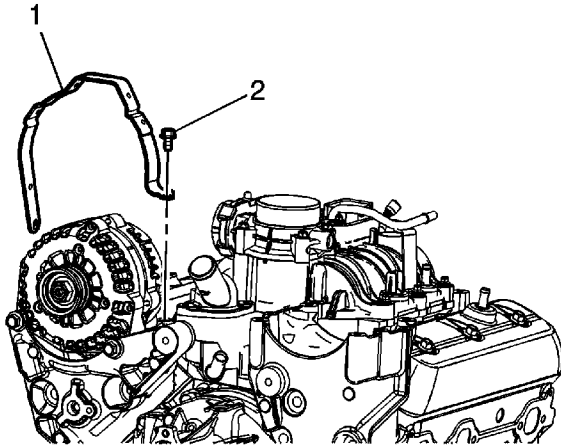
12. Remove the generator bolts (2) and generator (1).

Installation Procedure

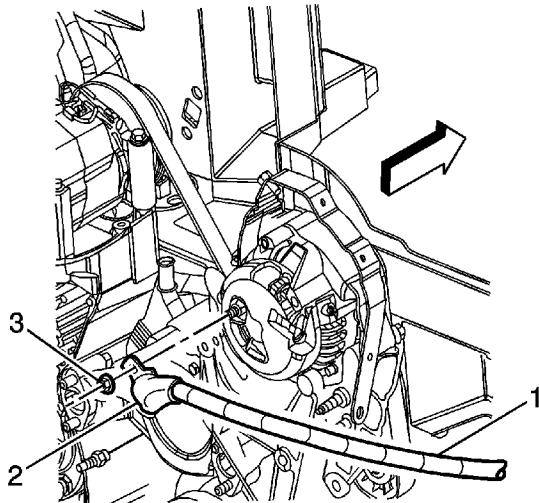
Caution: Refer to [Fastener Caution](#) in the Preface section.



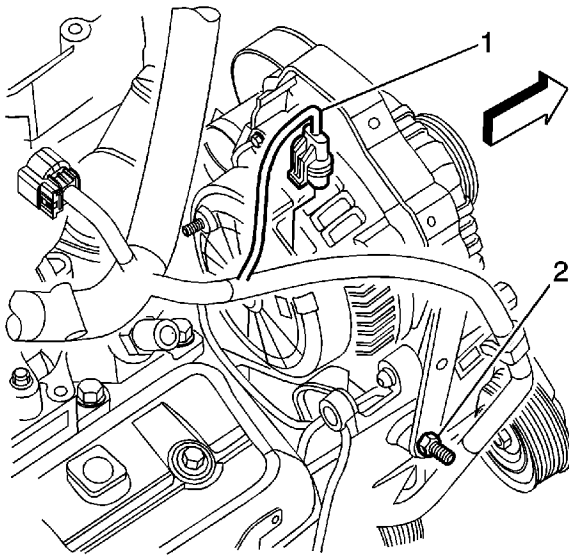
1. Install the generator (1) and bolts (2) and tighten to **50 N·m (37 lb ft)**.



2. Install the oil fill tube bracket (1) and bolt (2) and tighten to **25 N·m (18 lb ft)**.



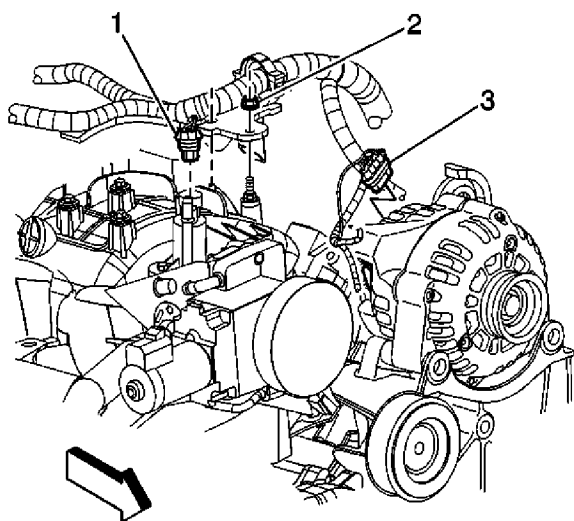
3. Install the positive cable (1) to the generator.
4. Install the generator nut (3) and tighten to **10 N·m (89 lb in)**.
5. Position the positive cable boot (2) at the generator.



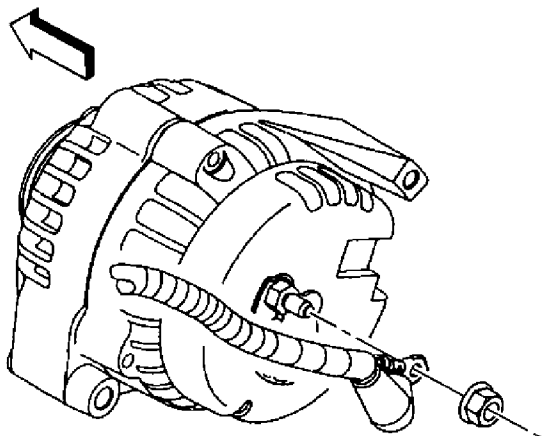
6. Position the engine wiring harness clip to the generator bracket.
7. Install the oil fill tube bracket stud (2) and tighten to **25 N·m (18 lb ft)**.
8. Connect the engine wiring harness electrical connector (1) to the generator.
9. Position and install the oil fill tube. Refer to [Oil Filler Tube Replacement](#).
10. Position and install the oil level indicator tube. Refer to [Oil Level Indicator and Tube Replacement](#).
11. Install the drive belt. Refer to [Drive Belt Replacement](#).
12. Connect the negative battery cable. Refer to [Battery Negative Cable Disconnection and Connection](#).

Generator Replacement (With LY2, LMF and LY6)

Removal Procedure



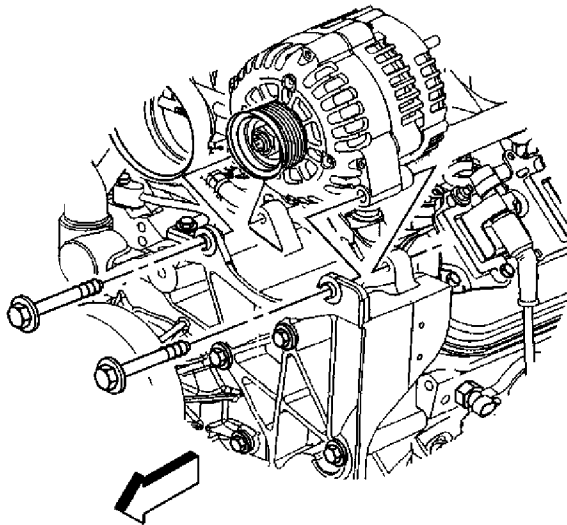
1. Disconnect the negative battery cable. Refer to [Battery Negative Cable Disconnection and Connection](#).
2. Remove the accessory drive belt. Refer to [Drive Belt Replacement - Accessory](#).
3. Disconnect the generator electrical connector (3).



4. Remove the generator cable from the generator, perform the following:

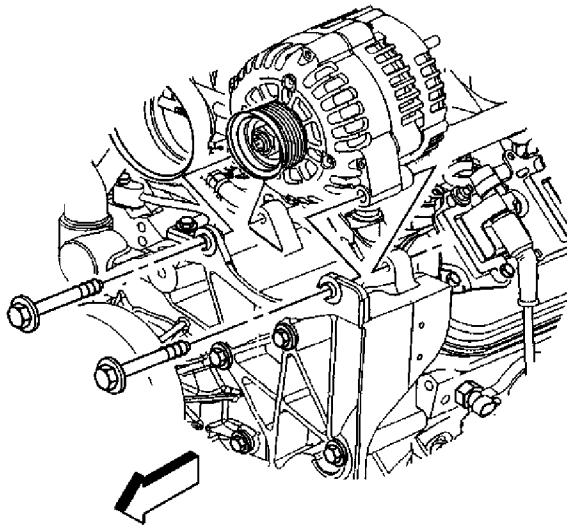
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- 4.1. Slide the boot down revealing the terminal stud.
- 4.2. Remove the generator cable nut from the terminal stud.
- 4.3. Remove the generator cable.



5. Remove the generator bolts.
6. Remove the generator from the bracket.

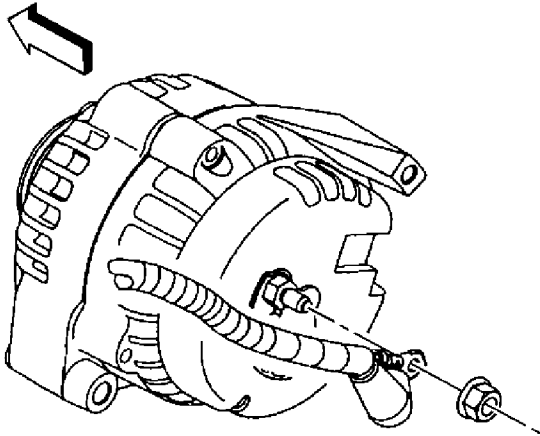
Installation Procedure



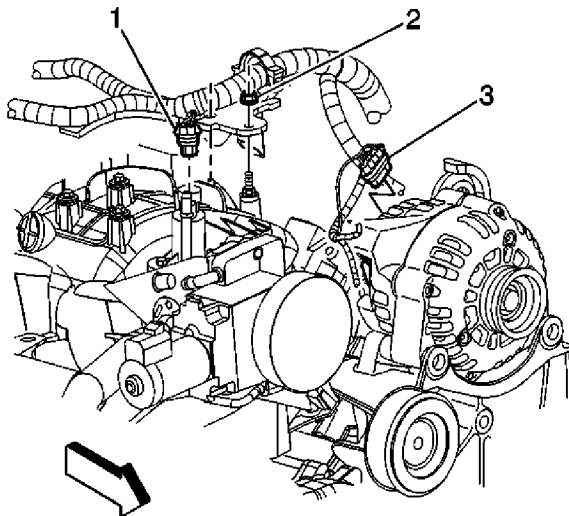
1. Install the generator to the bracket.

Caution: Refer to [Fastener Caution](#) in the Preface section.

2. Install the generator bolts and tighten to **50 N·m (37 lb ft)**.



3. Install the generator cable to the generator, perform the following:
 - 3.1. Install the generator cable.
 - 3.2. Install the generator cable nut to the terminal stud and tighten to **10 N·m (89 lb in)**.
 - 3.3. Slide the boot over the terminal stud.

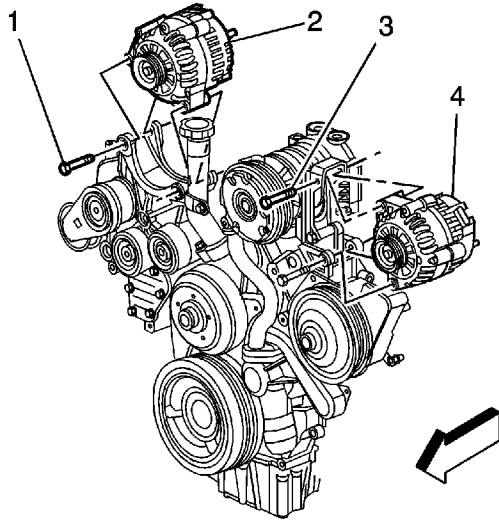


4. Connect the generator electrical connector (3).
5. Install the accessory drive belt. Refer to [Drive Belt Replacement - Accessory](#).
6. Connect the negative battery cable. Refer to [Battery Negative Cable Disconnection and Connection](#).

Generator Replacement (With LMM)

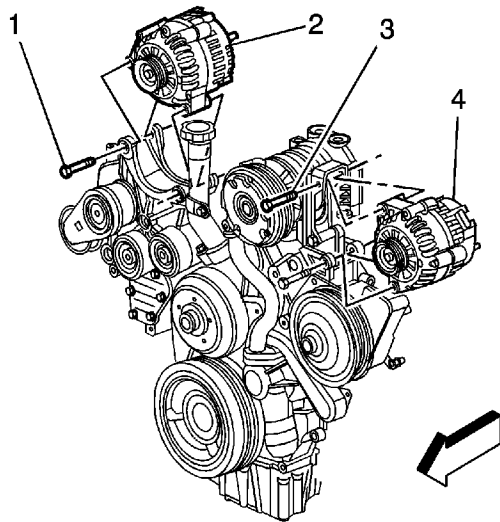
Removal Procedure

1. Disconnect the negative battery. Refer to [Battery Negative Cable Disconnection and Connection](#).
2. Remove the upper fan shroud. Refer to [Engine Coolant Fan Upper Shroud Replacement](#).
3. Remove the drive belt. Refer to [Drive Belt Replacement](#).



4. Remove the generator bolts (1).
5. Remove the generator front support bracket attached to the generator bracket and the generator.
6. Reposition the generator to access wiring.
7. Remove the positive battery cable nut from the generator.
8. Disconnect the generator electrical connector.
9. Remove the generator (2).

Installation Procedure



1. Install the generator (2) to the generator bracket.
2. Connect the generator electrical connector.
3. Install the positive battery cable to the generator stud.

Caution: Refer to [Fastener Caution](#) in the Preface section.

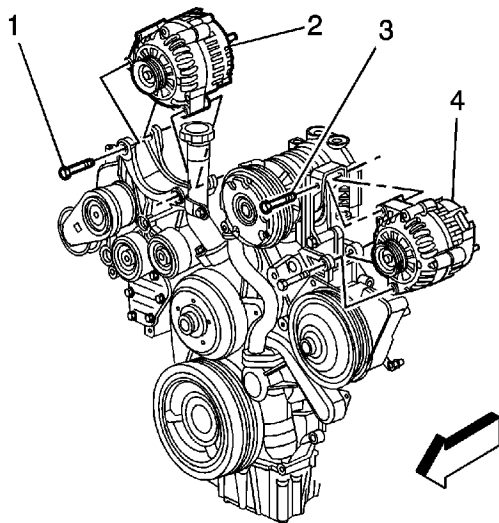
4. Install the cable nut to the generator stud and tighten to **10 N·m (89 lb in)**.
5. Install the generator bolts (1) and tighten to **50 N·m (37 lb ft)**.
6. Install the generator front support bracket and attach it to the generator and the generator bracket.
7. Install the drive belt. Refer to [Drive Belt Replacement](#).
8. Install the upper fan shroud. Refer to [Engine Coolant Fan Upper Shroud Replacement](#).

Auxiliary Generator Replacement

Removal Procedure

Warning: Refer to [Battery Disconnect Warning](#) in the Preface section.

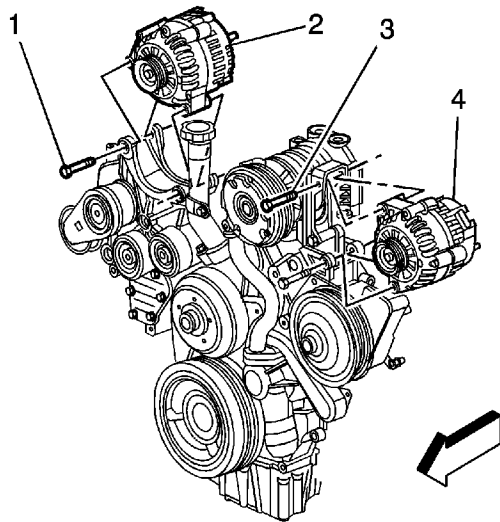
1. Remove the upper fan shroud. Refer to [Engine Coolant Fan Upper Shroud Replacement](#).
2. Remove the drive belt. Refer to [Drive Belt Replacement](#).
3. Disconnect the auxiliary generator electrical connector.
4. Remove the positive cable from the auxiliary generator, perform the following:
 - 4.1. Slide the boot down to access the terminal stud.
 - 4.2. Remove the positive cable nut.
 - 4.3. Remove the positive cable.



5. Remove the auxiliary generator bolts (3).
6. Remove the auxiliary generator (4).

Installation Procedure

Caution: Refer to [Fastener Caution](#) in the Preface section.



1. Position the auxiliary generator (4).
2. Install the auxiliary generator bolts (3) and tighten to **50 N·m (37 lb ft)**.
3. Install the positive cable to the auxiliary generator, perform the following:
 - 3.1. Position the positive cable.
 - 3.2. Install the positive cable nut and tighten to **10 N·m (89 lb in)**.
 - 3.3. Slide the boot to cover the terminal stud.
4. Connect the generator electrical connector.
5. Install the drive belt. Refer to [Drive Belt Replacement](#).
6. Install the upper shroud. Refer to [Engine Coolant Fan Upper Shroud Replacement](#).