

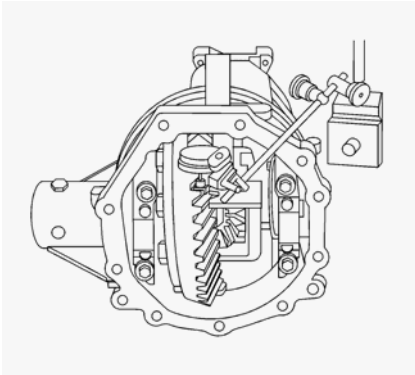
2013 Chevrolet Colorado

Submodel: | Engine Type: | Liters:
Fuel Delivery: | Fuel:

Special Tools

- DT 21777-B Pinion Gauge Set
- GE 8001 Dial Indicator Set

For regional equivalent tools, refer to Special Tools.



1. Position the GE 8001 dial indicator set from the DT 21777-B pinion gauge set (1) so that the it is on the heel of the ring gear tooth.
2. Preload the GE 8001 dial indicator set and zero the gauge.
3. While holding the drive pinion stationary, move the ring gear back and forth. Measure and record the backlash.
4. Repeat the measuring procedure at eight points around the ring gear.
5. The measurement should be **0.127 – 0.203 mm (0.004 – 0.007 in)**.
6. If the difference between the backlash at all of the measuring points varies by more than 0.05 mm (0.002 in), inspect for the following conditions:

- Burrs
- A distorted case flange
- Uneven bolting
- If the difference between all the measuring points is within specifications, the backlash at the minimum lash point measured should be **0.127 – 0.203 mm (0.004 – 0.007 in)**.

Note:

- Adjust the thickness of the shim pack on each side of the differential in equal amounts. This will maintain the correct axle side bearing preload.
- Moving 0.05 mm (0.002 in) of shim thickness from one side of the differential to the other will change the backlash adjustment approximately 0.03 mm (0.001 in).
- If the backlash is too small, increase the backlash using the following procedure:

Note: Mark the bearing caps left or right.

1. Remove the bearing cap bolts and the bearing caps.

Note: Mark the bearing cups and the shims left or right.

2. Remove the differential case assembly with the bearing cups and the shims.

Note: Measure each shim separately and note the left and right orientation.

3. Measure the left and right shim pack using the following procedure:

- Measure the thickness of left side service shim or production shim pack in 3 locations to determine the average of each of the 3 measurements.
- Measure the thickness of right side service shim or production shim pack in 3 locations to determine the average of each of the 3 measurements.
- Moving 0.10 mm (0.004 in) of shim thickness from the left side to the right side of the differential will change the backlash adjustment approximately 0.05 mm (0.002 in).

Note:

- Adjust the thickness of the shim pack on each side of the differential in equal amounts. This will maintain the correct axle side bearing preload.
- Moving 0.05 mm (0.002 in) of shim thickness from one side of the differential to the other will change the backlash adjustment approximately 0.03 mm (0.001 in).
- If the backlash is too large, decrease the backlash using the following procedure:

Note: Mark the bearing caps left or right.

Backlash Inspection and Adjustment

1. Remove the bearing cap bolts and the bearing caps.

Note: Mark the bearing cups and the shims left or right.

2. Remove the differential case assembly with the bearing cups and the shims.

Note: Measure each shim separately and note the left and right orientation.

3. Measure the left and right shim pack using the following procedure:

- Measure the thickness of left side service shim or production shim pack in 3 locations to determine the average of each of the 3 measurements.
 - Measure the thickness of right side service shim or production shim pack in 3 locations to determine the average of each of the 3 measurements.
 - Moving 0.10 mm (0.004 in) of shim thickness from the right side to the left side of the differential will change the backlash adjustment approximately 0.05 mm (0.002 in).
-
- Install the differential case assembly with the bearing cups.
 - Install the left side service spacer between the axle housing and the differential case.
 - Install the right side service spacer between the axle housing and the differential case.

Caution: Refer to Fastener Caution.

- Install the bearing caps and bolts and tighten the bolts to **98 Y (72 lb ft)**.
- Recheck the backlash and adjust, if necessary.
- Once backlash is correct, perform a gear tooth contact pattern check in order to ensure proper alignment between the ring and pinion gears. Refer to Gear Tooth Contact Pattern Inspection.

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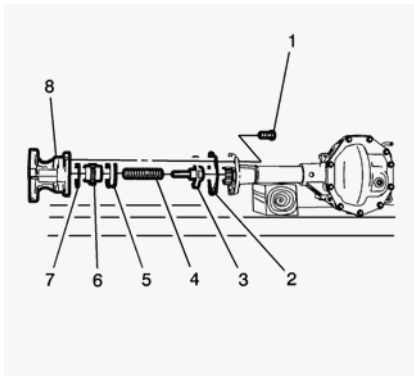
Special Tools

- DT 50813 Pinion Gear Remover
- DT 7817 Outer Pinion Bearing Cup Installer
- GE 8092 Driver Handle
- DT 29609 Inner Pinion Bearing Cup Installer
- DT 5590 Inner Pinion Bearing Installer
- DT 08614-A Pinion Flange Holder and Remover
- EN 21128 Axle Seal Installer
- DT-21784 Bearing Installer

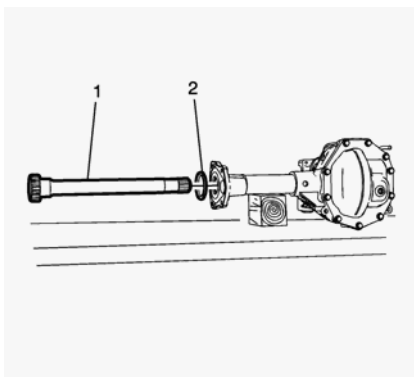
For regional equivalent tools, refer to Special Tools.

Removal Procedure

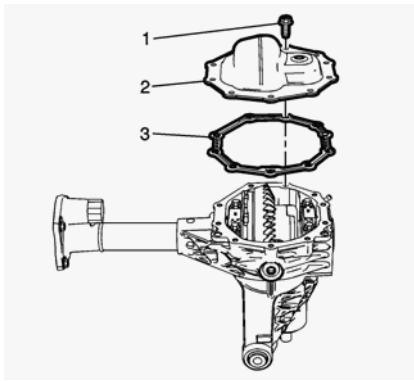
1. Raise the vehicle. Refer to Lifting and Jacking the Vehicle.
2. Remove the drive pinion yoke and the oil seal. Refer to Front Differential Drive Pinion Gear Yoke Replacement.
3. Remove the front drive actuator. Refer to Front Drive Axle Actuator Replacement.
4. Remove the front differential carrier assembly. Refer to Differential Carrier Assembly Replacement.



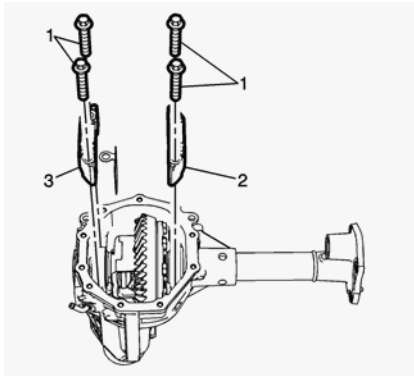
5. Remove the mounting bolt (1), actuator housing (8), shim (7), clutch gear (6), clutch sleeve (5), clutch fork spring (4), clutch fork (3) and the gasket (2) from the front differential carrier.



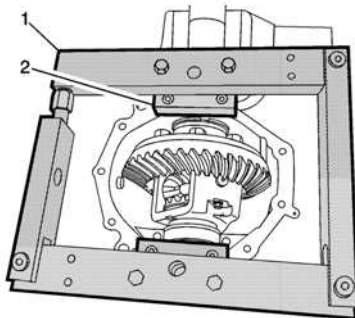
6. Remove the axle shaft (1) and shim (2) from the front differential carrier.



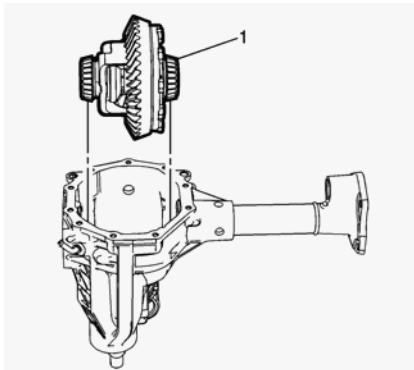
7. Remove the 10 differential cover bolts (1), differential cover (3) and the gasket (2) from the differential carrier.



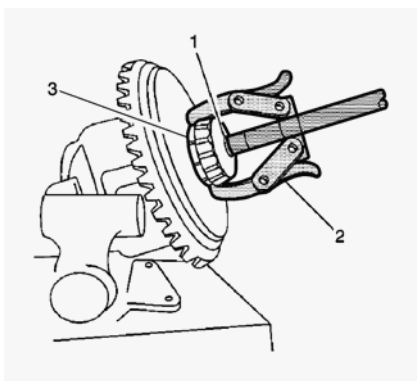
- Note:** Ensure that you mark the left and right bearing caps for the differential case before removing the bearing caps.
8. Remove the left and right bearing cap bolts (1) from the differential case.
9. Remove the left (3) and right (2) differential bearing caps.



10. Using the J 45222 spreader (1) and the J 45222-20 adapter (2), adjust the spreader 0.250 mm to allow the removal of the differential case.

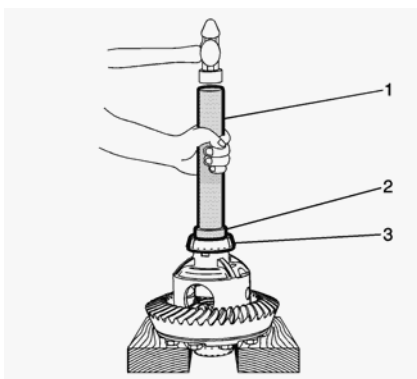


11. Remove the differential case (1) from the rear axle housing.

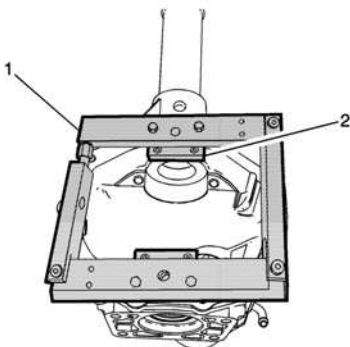


12. Install the differential case in a soft jawed vise.
13. Using the DT-8107-4 puller (2) and the DT-22888-20A puller (2) remove the differential case side bearings (3).

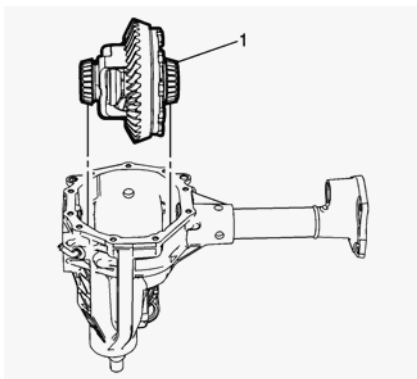
[Installation Procedure](#)



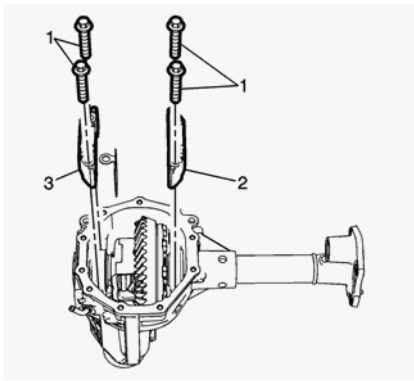
1. Using the GE 8092 handle (1) and the DT-21784 installer (2) install the differential side case bearing (3).



2. Using the J 45222 spreader (1) and the J 45222-20 adapter (2), adjust the spreader 0.250 mm to install in the differential case.

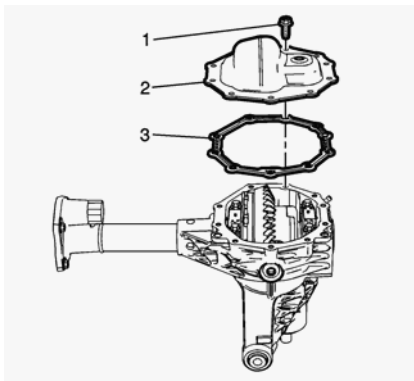


3. Position the differential case (1) in the differential carrier.
4. Remove the case spreader and adapter.

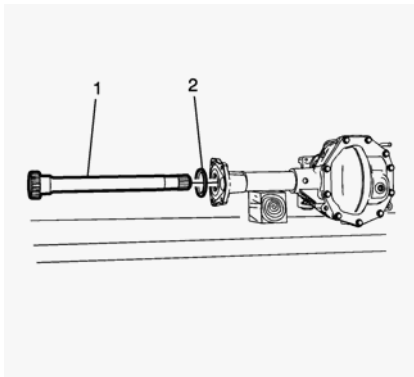


Note: Ensure that the case bearing caps and shims are installed as they were removed.

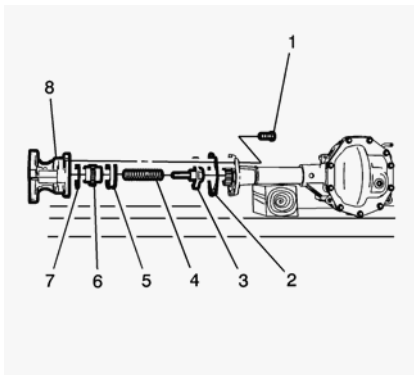
5. Position the left (3) and the right (2) bearing caps in the differential carrier.
6. Install the differential case bearing cap bolts (1) and tighten to **98 Y (72 lb ft)**.
7. Adjust the backlash. Refer to Backlash Inspection and Adjustment.
8. Once the differential side bearing preload and backlash is correct, perform a gear tooth contact pattern check in order to ensure proper alignment between the ring and pinion gears. Refer to Gear Tooth Contact Pattern Inspection.



9. Install the differential cover gasket (3) and the cover (2).
10. Install the 10 differential cover bolts (1) and tighten to **30 Y (22 lb ft)**.



11. Install the wheel drive shaft (1) and shim (2) in the differential carrier.



12. Install the clutch sleeve (5), clutch gear (6), clutch fork spring (4), clutch fork (3), shim (7), gasket (2) and the housing (8).
13. Tighten the clutch housing bolts to **47 Y (35 lb ft)**.

Differential Bearing Replacement

14. Install the differential carrier assembly. Refer to Differential Carrier Assembly Replacement.
15. Install the front drive actuator. Refer to Front Drive Axle Actuator Replacement.
16. Fill up the axle fluid in the differential carrier. Refer to Front Axle Lubricant Replacement.
17. Lower the vehicle.

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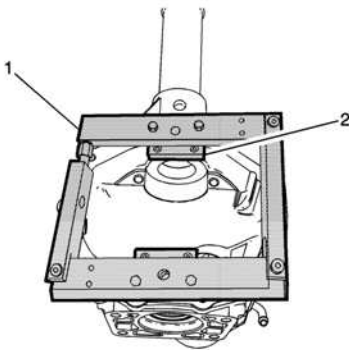
Special Tools

- J 45222 Axle Housing Spreader
- J 45222-20 Axle Housing Spreader Adapter

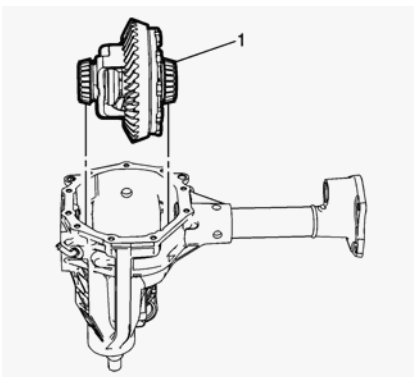
For regional equivalent tools, refer to Special Tools.

Assemble Procedure

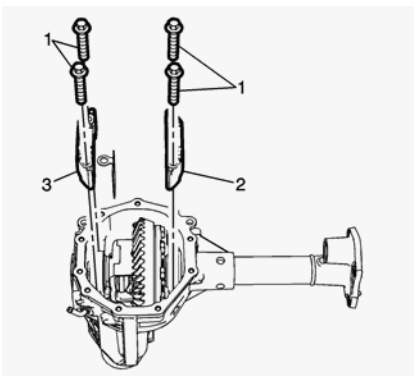
1. Install the pinion gear in the differential carrier. Refer to Differential Drive Pinion Gear Bearing Replacement



2. Install the J 45222 spreader (1) and the J 45222-20 adapter (2), and adjust the spreader 0.250 mm to install in the differential case, if removed.



3. Position the differential case (1) in the differential carrier.
4. Remove the case spreader and adapter.

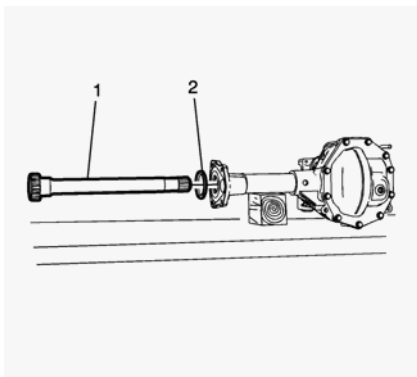


Note: Ensure that the case bearing caps and shims are installed as they were removed.

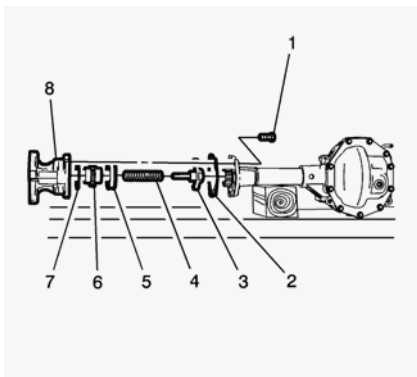
5. Position the left (3) and the right (2) bearing caps in the differential carrier.

Caution: Refer to Fastener Caution.

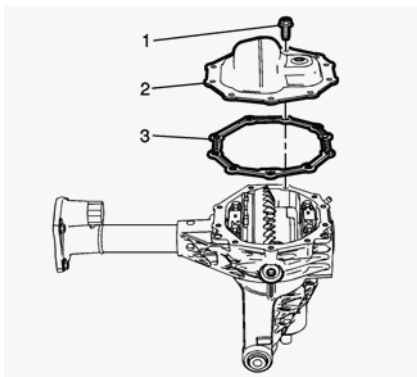
6. Install the differential case bearing cap bolts (1) and tighten to **98 Y (72 lb ft)**.



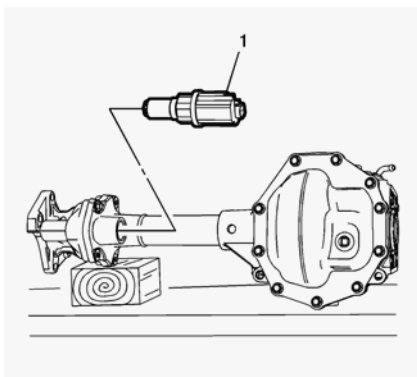
7. Install the wheel drive shaft (1) and shim (2) in the differential carrier.



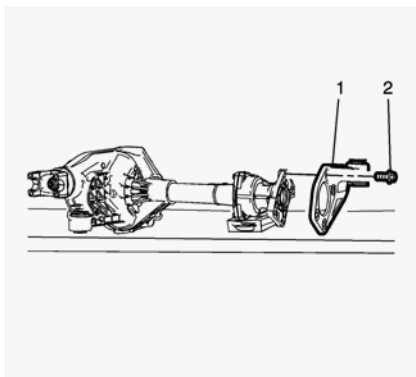
8. Install the clutch sleeve (5), clutch gear (6), clutch fork spring (4), clutch fork (3), shim (7), gasket (2) and the housing (8).
9. Install the 4 bolts housing bolts (1) and tighten to **47 Y (35 lb ft)**.



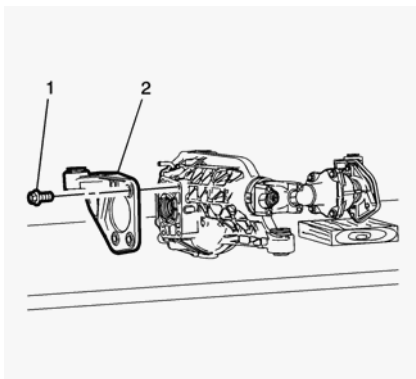
10. Install the differential cover gasket (3) and the cover (2).
11. Install the 10 differential cover bolts (1) and tighten to **30 Y (22 lb ft)**.



12. Install the actuator (1). Tighten the actuator to **30 Y (22 lb ft)**.



13. Install the right mounting bracket (1) and the 4 bolt (2). Tighten the bolts (1) to **160 Y (118 lb ft)**.



14. Install the left mounting bracket (1) and the 4 bolt (2). Tighten the bolts (1) to **160 Y (118 lb ft)**.
15. Install the front differential carrier in the vehicle. Refer to Differential Carrier Assembly Replacement.

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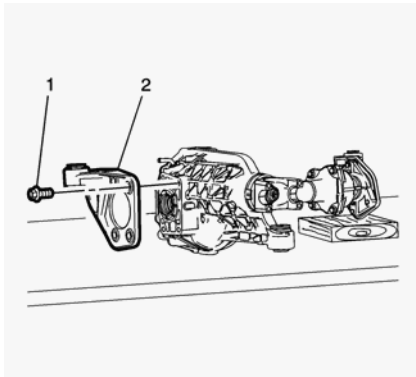
Special Tools

- J 45222 Axle Housing Spreader
- J 45222-20 Axle Housing Spreader Adapter

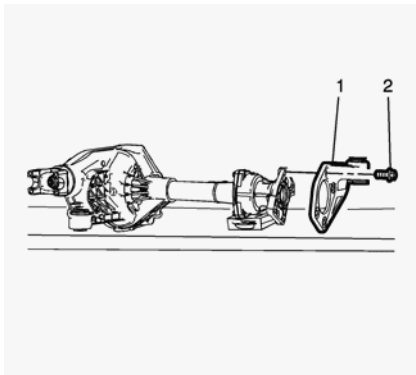
For regional equivalent tools, refer to Special Tools.

[Disassemble Procedure](#)

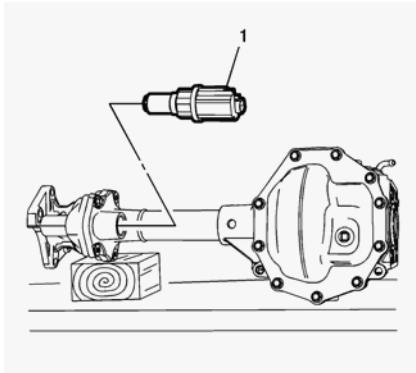
1. Remove the front differential carrier from the vehicle. Refer to Differential Carrier Assembly Replacement
2. Position the front differential in a suitable work area.



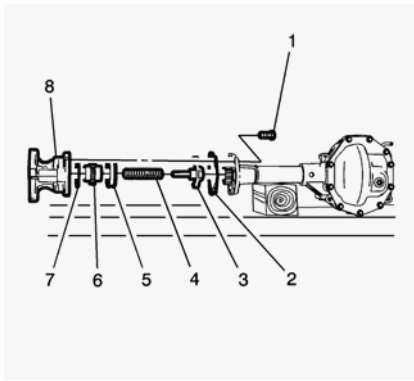
3. Remove the left mounting bracket (2) and the 2 bolts (1) from the differential carrier.



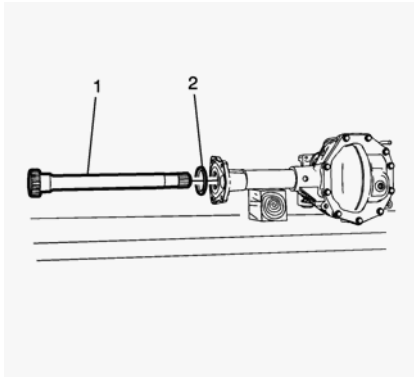
4. Remove the right mounting bracket (1) and the 2 bolts (2) from the differential carrier.



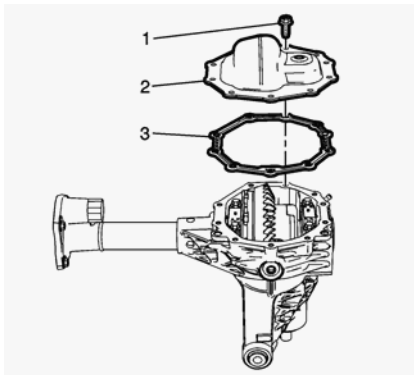
5. Remove the front drive actuator (1) from the front differential carrier.



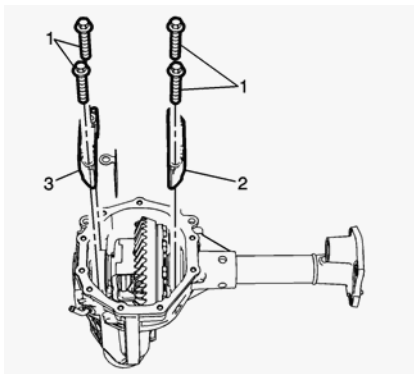
6. Remove the mounting bolt (1), actuator housing (8), shim (7), clutch gear (6), clutch sleeve (5), clutch fork spring (4), clutch fork (3) and the gasket (2) from the front differential carrier.



7. Remove the axle shaft (1) and shim (2) from the front differential carrier.

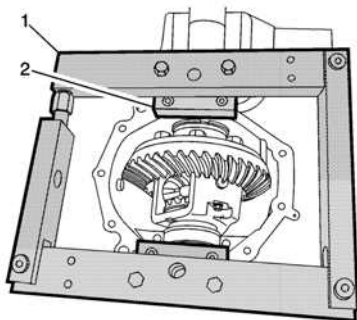


8. Remove the 10 differential cover bolts (1), differential cover (3) and the gasket (2) from the differential carrier.

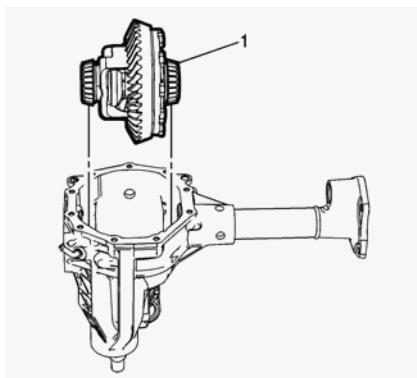


Note: Ensure that you mark the left and right bearing caps for the differential case before removing the bearing caps.

9. Remove the left and right bearing cap bolts (1) from the differential case.
10. Remove the left (3) and right (2) differential bearing caps



11. Using the J 45222 spreader (1) and the J 45222-20 adapter (2), adjust the spreader 0.250 mm to allow the removal of the differential case.



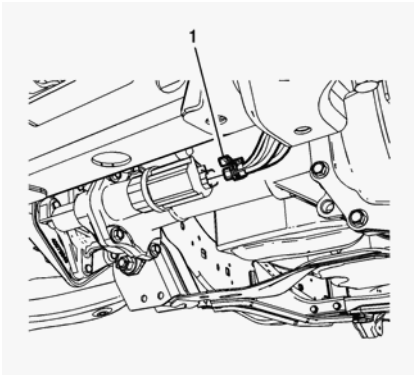
12. Remove the differential case assembly (1) from the differential carrier.
13. Remove the pinion gear from the differential carrier. Refer to Differential Drive Pinion Gear Bearing Replacement.

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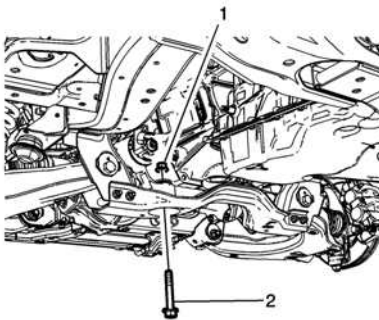
Submodel: | Engine Type: | Liters:
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[Removal Procedure](#)

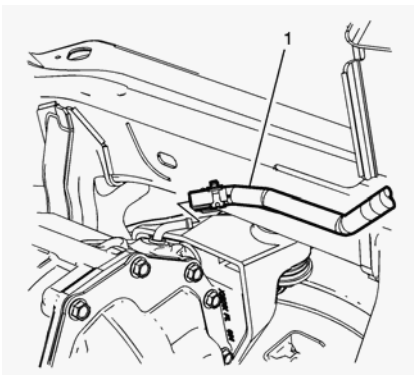
1. Raise and support the vehicle. Refer to Lifting and Jacking the Vehicle.
2. Drain the front differential. Refer to Front Axle Lubricant Replacement.
3. Remove the front propeller shaft. Refer to Front Propeller Shaft Replacement.



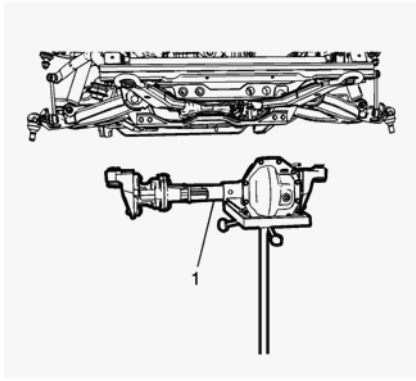
4. Remove the electrical connector (1) from the front actuator.
 5. Remove the front wheel drive shafts. Refer to Front Wheel Drive Shaft Replacement.
- Note:** Ensure that the front differential assembly is securely attach to the transmission jack stand.
6. Support the front differential with a transmission jack stand.



7. Remove the bolt (2) and nut from the crossmember to the front differential.
8. Remove the crossmember. Refer to Drivetrain and Front Suspension Frame Front Crossmember Replacement.
9. Remove the bolts from the front differential bracket to the frame. Refer to Front Differential Carrier Bushing and Bracket Replacement.

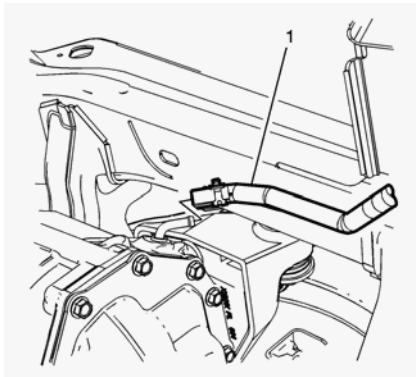


10. Remove the vent hose (1).

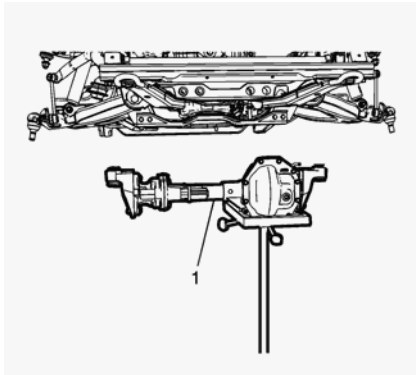


11. Remove the front differential assembly (1).

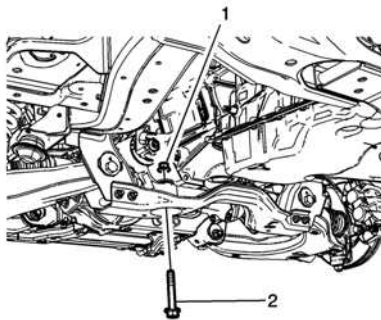
[Installation Procedure](#)



1. Install the vent hose (1) to the front differential.



2. Position the front differential (1) in the vehicle.
3. Install the bolts from the front differential bracket to the frame. Refer to Front Differential Carrier Bushing and Bracket Replacement.
4. Remove the transmission jack stand from the front differential.
5. Install the crossmember. Refer to Drivetrain and Front Suspension Frame Front Crossmember Replacement.

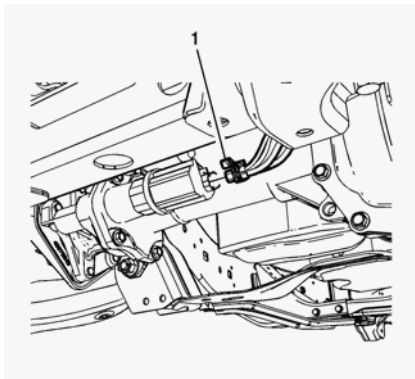


Caution: Refer to Fastener Caution.

6. Install the bolt (2) and nut from the crossmember to the front differential and tighten to **160 Y (118 lb ft)**.
7. Install the front wheel drive shafts. Refer to Front Wheel Drive Shaft Replacement.

Differential Carrier Assembly Replacement

8. Install the front propeller shaft. Refer to Front Propeller Shaft Replacement.



9. Install the electrical connector (1) to the front actuator.
10. Fill the front differential with lubricant. Refer to Front Axle Lubricant Replacement.
11. Remove the supports and lower the vehicle.

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1. Inspect the following components for excessive wear and/or fit:
 - The pinion gear shaft
 - The thrust washers
 - The differential case for wear, cracks and scoring
 - The fit of the pinion gear shaft in the differential case
 - The fit of the differential side gears in the differential case
 - The fit of the side gears on the axle shafts
- Inspect the teeth of the pinion gears and the differential side gears for the following conditions:
 - Wear
 - Cracks
 - Scoring
 - Spalling
- Replace any worn or poor fitting components as necessary.

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Important:

- When replacing the worn or cracked bearings and the cups, replace the bearings in sets.
- The low mileage bearings may have very small scratches and pits on the rollers and the bearing cups from the initial preload.

Do not replace a bearing for this reason.

1. Inspect the bearings for smooth rotation after oiling.
2. Inspect the bearing rollers for wear.
3. Inspect the bearing cups for the following conditions:

- Wear
- Cracks
- Brinelling
- Scoring

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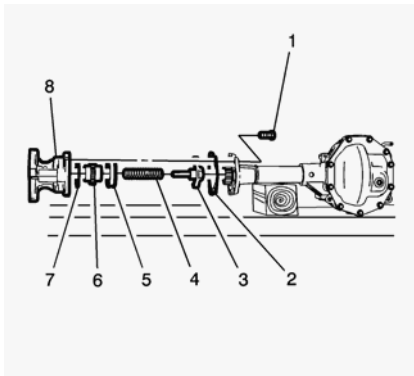
Special Tools

- DT 50813 Pinion Gear Remover
- DT 7817 Outer Pinion Bearing Cup Installer
- GE 8092 Driver Handle
- DT 29609 Inner Pinion Bearing Cup Installer
- DT 5590 Inner Pinion Bearing Installer
- DT 08614-A Pinion Flange Holder and Remover
- EN 21128 Axle Seal Installer
- DT-21784 Bearing Installer

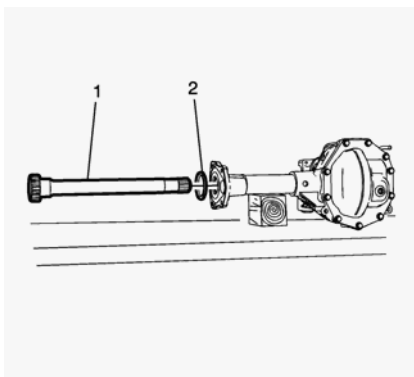
For regional equivalent tools, refer to Special Tools.

Removal Procedure

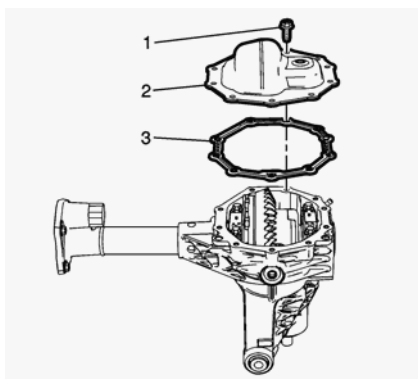
1. Raise the vehicle. Refer to Lifting and Jacking the Vehicle.
2. Remove the drive pinion yoke and the oil seal. Refer to Front Differential Drive Pinion Gear Yoke Replacement.
3. Remove the front drive actuator. Refer to Front Drive Axle Actuator Replacement.
4. Remove the front differential carrier assembly. Refer to Differential Carrier Assembly Disassemble.



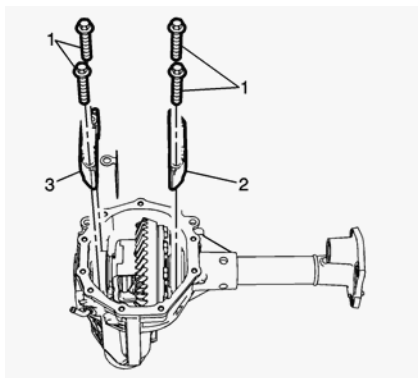
5. Remove the mounting bolt (1), actuator housing (8), shim (7), clutch gear (6), clutch sleeve (5), clutch fork spring (4), clutch fork (3) and the gasket (2) from the front differential carrier.



6. Remove the axle shaft (1) and shim (2) from the front differential carrier.

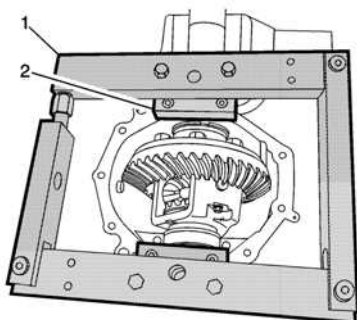


7. Remove the 10 differential cover bolts (1), differential cover (3) and the gasket (2) from the differential carrier.

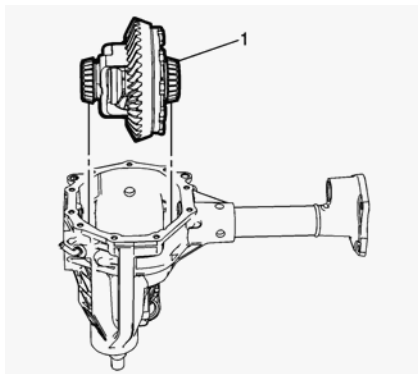


Note: Ensure that you mark the left and right bearing caps for the differential case before removing the bearing caps.

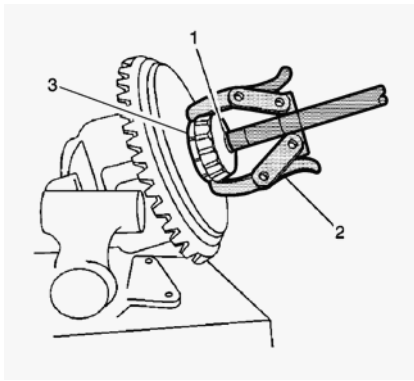
8. Remove the left and right bearing cap bolts (1) from the differential case.
9. Remove the left (3) and right (2) differential bearing caps.



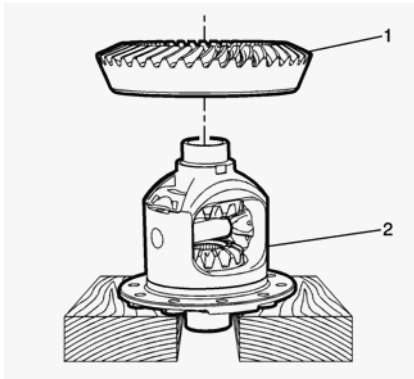
10. Using the J 45222 spreader (1) and the J 45222-20 adapter (2), adjust the spreader 0.250 mm to allow the removal of the differential case.



11. Remove the differential case (1) from the rear axle housing.

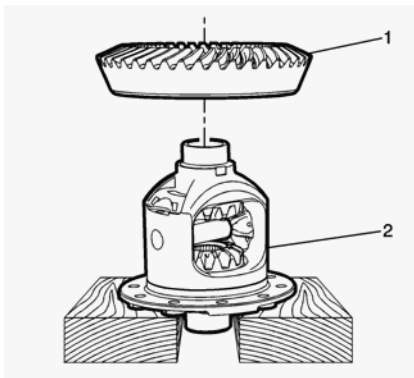


12. Install the differential case in a soft jawed vise.
13. Using the DT-8107-4 puller (2) and the DT-22888-20A puller (2) remove the differential case side bearings (3).



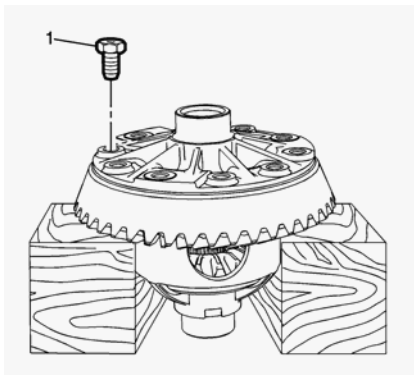
14. Remove the ring gear (1) from the differential case (2). Refer to Front Differential Case Disassemble.

[Installation Procedure](#)



Note: The mating surface of the ring gear and the differential case must be clean and free of burrs before installing the ring gear.

1. Install the ring gear (1) to the differential case (2).

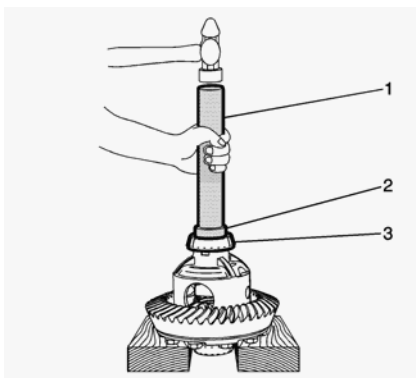


Note: The ring gear bolts have left-handed threads.

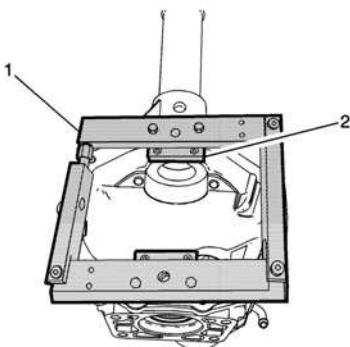
2. Install the NEW ring gear bolts (1).

Caution: Refer to Fastener Caution.

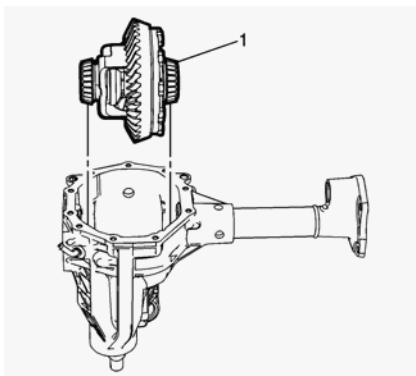
3. Tighten the NEW ring gear bolts alternately and in stages, gradually pulling the ring gear onto the differential case. Tighten the ring gear bolts in sequence to **120 Y (89 lb ft)**.



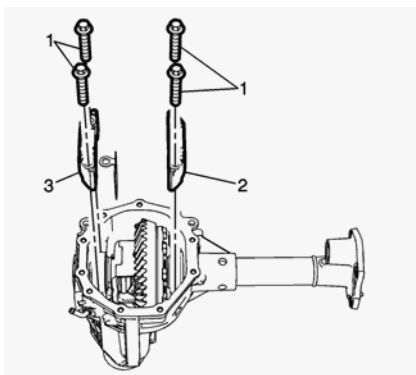
4. Using the GE 8092 handle (1) and the DT-21784 installer (2) install the differential side case bearing (3).



5. Using the J 45222 spreader (1) and the J 45222-20 adapter (2), adjust the spreader 0.250 mm to install in the differential case.



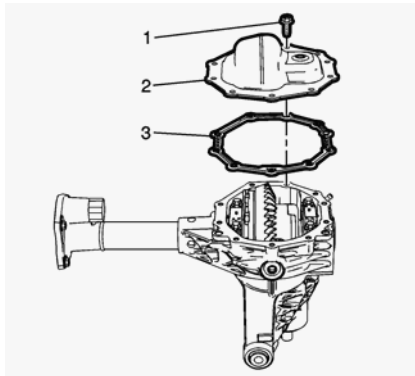
6. Position the differential case (1) in the differential carrier.
7. Remove the case spreader and adapter.



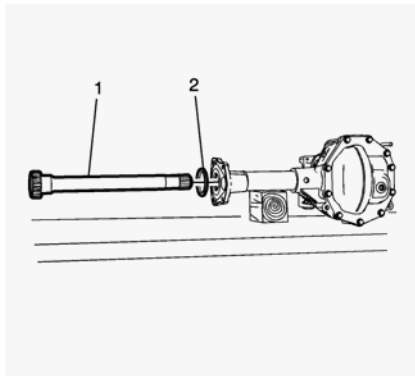
Note: Ensure that the case bearing caps and shims are installed as they were removed.

8. Position the left (3) and the right (2) bearing caps in the differential carrier.
9. Install the differential case bearing cap bolts (1) and tighten to **98 Y (72 lb ft)**.
10. Adjust the backlash. Refer to Backlash Inspection and Adjustment.

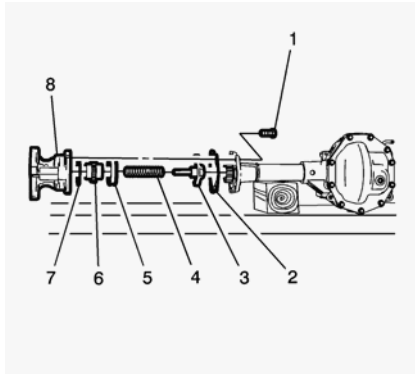
11. Once the differential side bearing preload and backlash is correct, perform a gear tooth contact pattern check in order to ensure proper alignment between the ring and pinion gears. Refer to Gear Tooth Contact Pattern Inspection.



12. Install the differential cover gasket (3) and the cover (2).
13. Install the 10 differential cover bolts (1) and tighten to **30 Y (22 lb ft)**.



14. Install the wheel drive shaft (1) and shim (2) in the differential carrier.



15. Install the clutch sleeve (5), clutch gear (6), clutch fork spring (4), clutch fork (3), shim (7), gasket (2) and the housing (8).
16. Tighten the clutch housing bolts to **47 Y (35 lb ft)**.
17. Install the differential carrier assembly. Refer to Differential Carrier Assembly Replacement.
18. Install the front drive actuator. Refer to Front Drive Axle Actuator Replacement.
19. Fill up the axle fluid in the differential carrier. Refer to Front Axle Lubricant Replacement.
20. Lower the vehicle.

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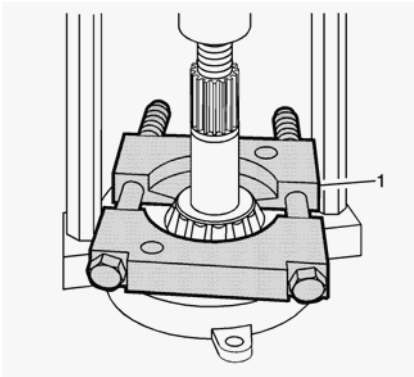
Special Tools

- *DT 5590* Pinion Bearing Race Installer – Rear
- *DT 7817* Outer Bearing Race Installer
- *DT 8614-A* Flange and Pulley Holding Tool
- *DT 22912-B* Split-Plate Bearing Puller
- *DT 29609* Rear Pinion Bearing Cup Installer
- *EN 21128* Axle Pinion Oil Seal Installer
- *EN 45000* Seal Remover
- *GE 8092* Universal Driver Handle– ¾ in – 10

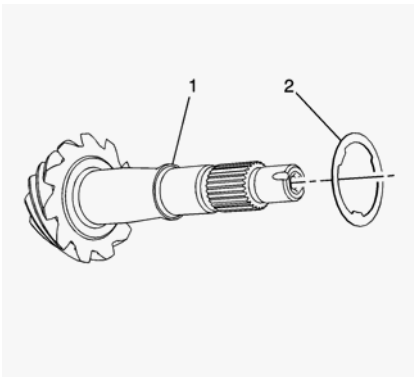
For regional equivalent tools, refer to Special Tools.

Removal Procedure

1. Raise the vehicle. Refer to Lifting and Jacking the Vehicle.
2. Remove the differential carrier assembly. Refer to Differential Carrier Assembly Replacement.
3. Remove the drive pinion from the axle. Refer to Drive Pinion and Ring Gear Replacement.



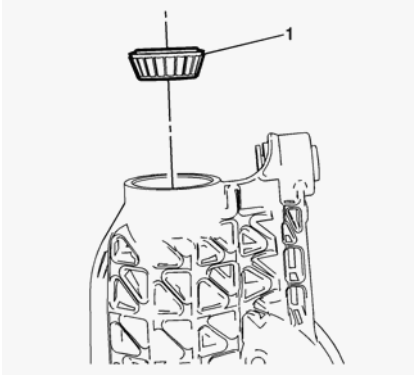
4. Using the hydraulic press and the *DT 22912-B* puller (1), remove the pinion bearing.



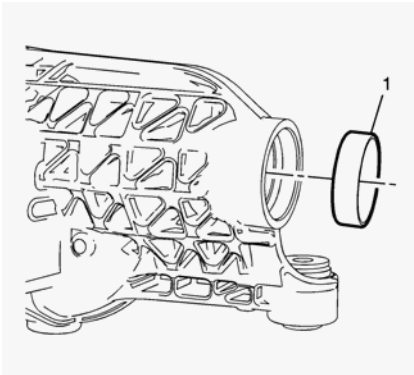
5. Remove the shim (1) from the pinion gear (2).



6. Using the EN 45000 remover (1), remove the pinion seal.

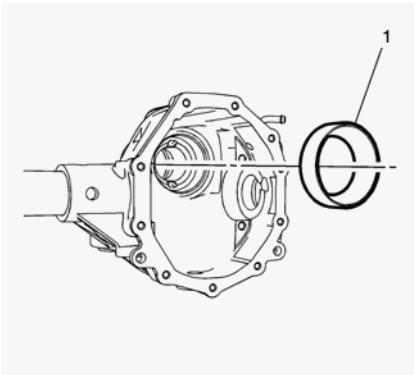


7. Remove the outer pinion bearing race (1) from the differential carrier.



Note: Ensure that the bearing cup is removed evenly from the axle housing.

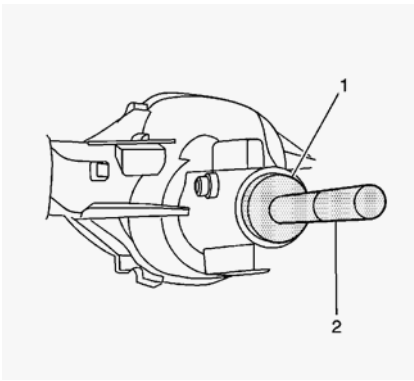
8. Using a hammer and the brass drift, remove the outer pinion bearing cup (1) from the differential carrier.



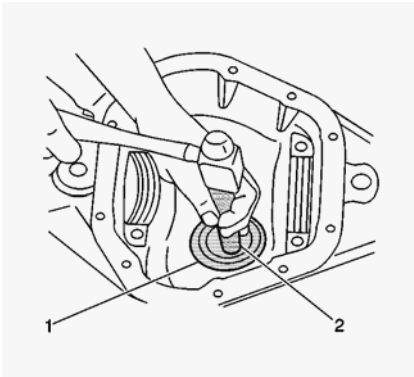
Note: Ensure that the bearing cup is removed evenly from the axle housing.

9. Using a hammer and the brass drift, remove the inner pinion bearing cup (1) from the differential carrier.

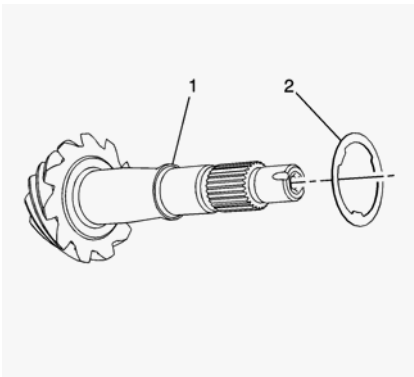
[Installation Procedure](#)



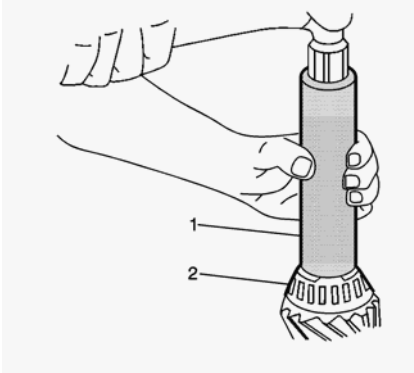
1. Using the *DT 7817* installer (2) and the *GE 8092* handle (1), install the outer pinion bearing cup.



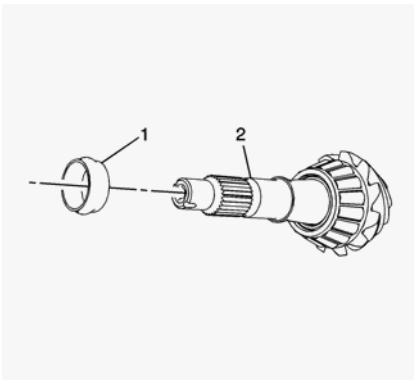
2. Using the *DT 29609* installer (1) and the *GE 8092* handle (2), install the inner pinion bearing cup.
3. Determine the selective shim thickness for the pinion. Refer to Pinion Depth Adjustment.



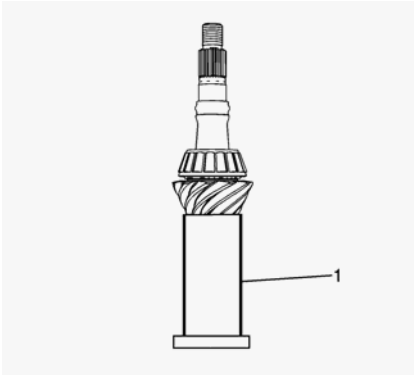
4. Install the selective shim (2) on the pinion gear (1).



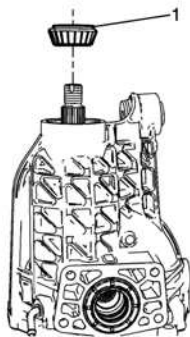
5. Using the *DT 5590* installer (1), install the inner pinion bearing.



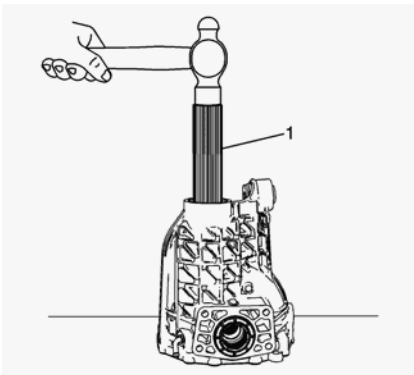
6. Install a NEW collapsible spacer (1) on the pinion gear (2).
7. Lubricate the pinion bearings with axle lubricant.



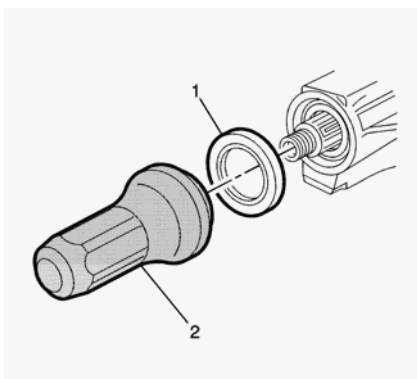
8. Support the pinion gear with a suitable tool (1).



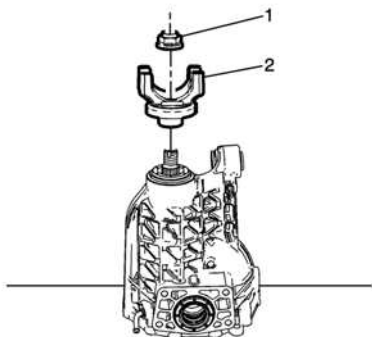
9. Place the differential carrier over the supported pinion gear and position the pinion bearing (1) squarely on the pinion gear.



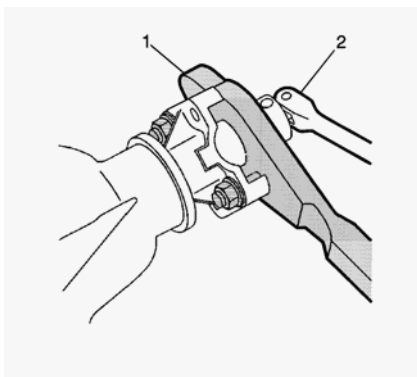
10. Using the DT 5590 installer (1) and a hammer, install the pinion bearing race.



11. Using the *EN 21128* installer (2), install a new pinion oil seal (1).



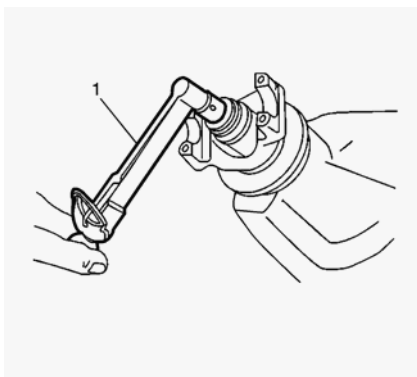
12. Position the pinion flange (2) on the pinion gear.
13. Using a soft faced hammer, tap the pinion flange until a few pinion shaft threads can be seen.
14. Install the NEW pinion nut (1).



Caution: Refer to Fastener Caution.

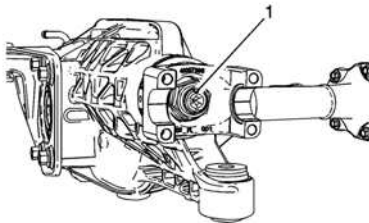
Note: Tighten the NEW pinion nut to the lower torque specification and increase the torque in small until increments until the proper rotational torque specification is achieved.

15. Using the *DT 8614-A* tool (1) and the proper size socket and torque wrench (2), tighten the NEW pinion nut to **177 – 275 Y (130 – 202 lb ft)**.



16. Using an inch pound torque wrench (1), measure the rotating torque of the pinion **0.63 – 1.13 Y (5 – 10 lb in)**.
17. Once the specified torque is obtained, rotate the pinion several times to ensure the bearings have seated.
18. Recheck the rotating torque and adjust if necessary.

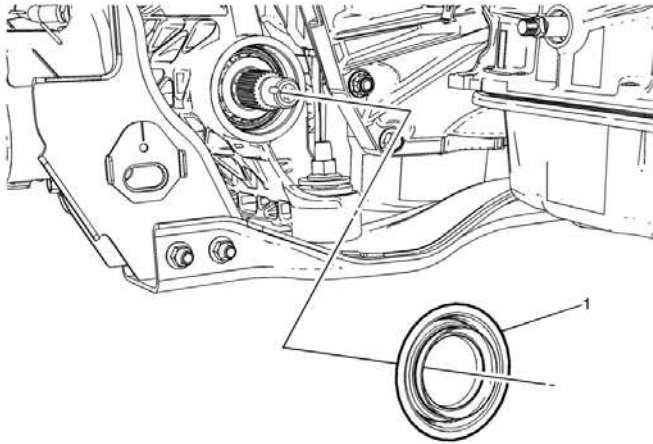
Differential Drive Pinion Gear Bearing Replacement



19. Using a hammer and a punch, stake the pinion nut (1).
20. Install the differential carrier assembly. Refer to Differential Carrier Assembly Replacement.
21. Lower the vehicle.

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Differential Drive Pinion Gear Seal Replacement

Callout

Component Name

Preliminary Procedure

1. Raise and support the vehicle. Refer to Lifting and Jacking the Vehicle.
2. Remove the front differential pinion gear yoke. Refer to Front Differential Drive Pinion Gear Yoke Replacement

Front Differential Drive Pinion Gear Seal

Procedure

1. Using the *EN-45000* remover, remove the pinion seal.
2. Using the *EN-21128* installer, install the pinion seal.

1

Special Tools

- *EN-45000* Seal Remover
- *EN-21128* Seal Installer

For equivalent regional tools, refer to Special Tools.

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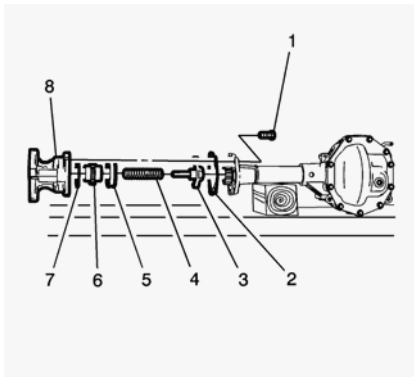
Special Tools

- DT 50813 Pinion Gear Remover
- DT 7817 Outer Pinion Bearing Cup Installer
- GE 8092 Driver Handle
- DT 29609 Inner Pinion Bearing Cup Installer
- DT 5590 Inner Pinion Bearing Installer
- DT 08614-A Pinion Flange Holder and Remover
- EN 21128 Axle Seal Installer

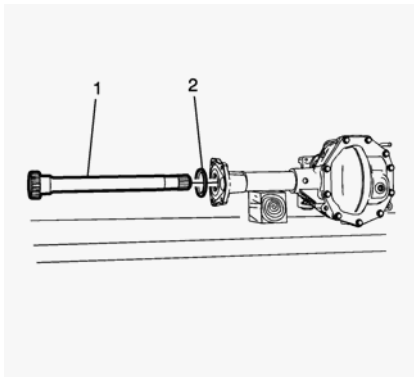
For regional equivalent tools, refer to Special Tools.

Removal Procedure

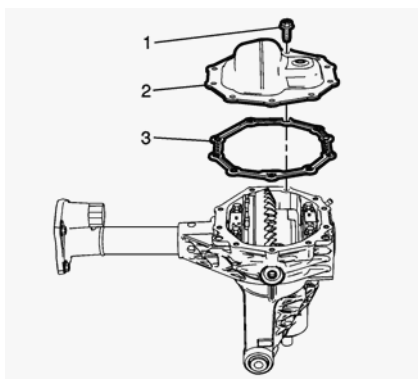
1. Raise the vehicle. Refer to Lifting and Jacking the Vehicle.
2. Remove the drive pinion yoke and the oil seal. Refer to Front Differential Drive Pinion Gear Yoke Replacement.
3. Remove the front drive actuator. Refer to Front Drive Axle Actuator Replacement.
4. Remove the front differential carrier assembly. Refer to Differential Carrier Assembly Disassemble.



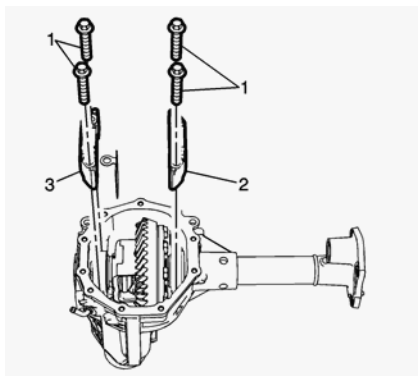
5. Remove the mounting bolt (1), actuator housing (8), shim (7), clutch gear (6), clutch sleeve (5), clutch fork spring (4), clutch fork (3) and the gasket (2) from the front differential carrier.



6. Remove the axle shaft (1) and shim (2) from the front differential carrier.

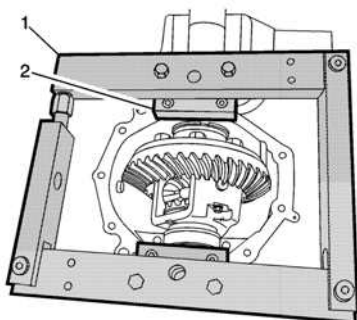


7. Remove the 10 differential cover bolts (1), differential cover (3) and the gasket (2) from the differential carrier.

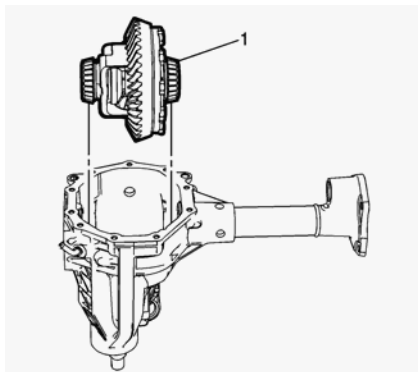


Note: Ensure that you mark the left and right bearing caps for the differential case before removing the bearing caps.

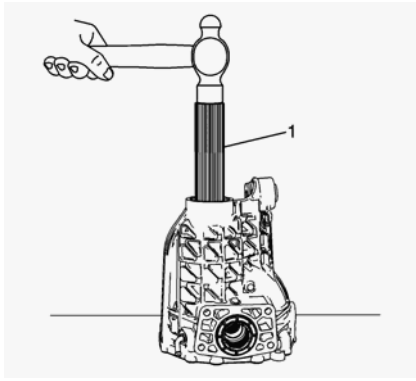
8. Remove the left and right bearing cap bolts (1) from the differential case.
9. Remove the left (3) and right (2) differential bearing caps.



10. Using the J 45222 spreader (1) and the J 45222-20 adapter (2), adjust the spreader 0.250 mm to allow the removal of the differential case.



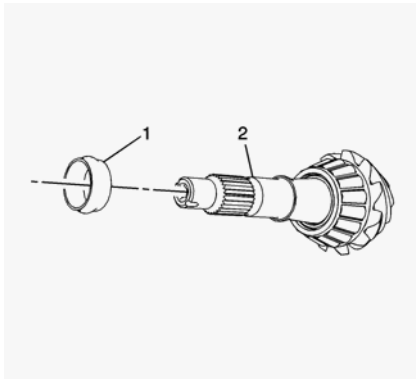
11. Remove the differential case (1) from the rear axle housing.



12. Install the DT 50813 driver (1).

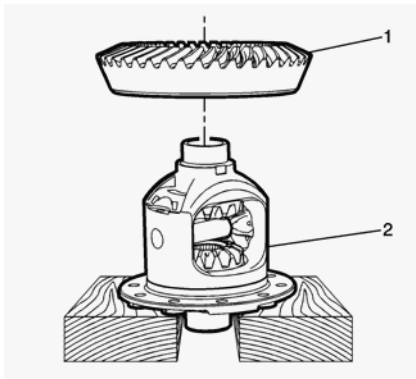
Note: Install clean shop towels under the pinion gear as not to allow the pinion gear to be damaged.

13. Using the DT 50813 driver (1) and the hammer, remove the pinion gear from the rear axle housing.



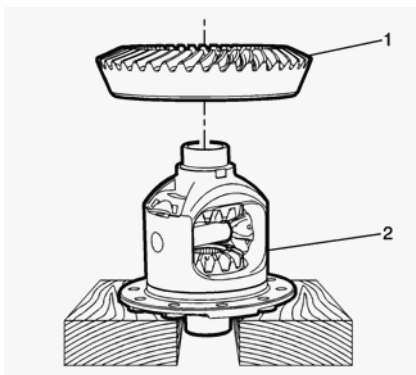
14. Remove and discard the collapsible spacer (1) from the pinion gear (2).

15. Remove the pinion bearings and the cups. Refer to Differential Drive Pinion Gear Bearing Replacement.



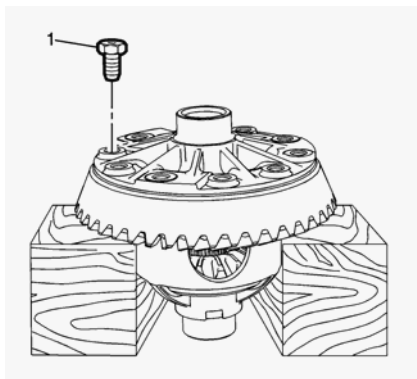
16. Remove the ring gear (1) from the differential case (2). Refer to Front Differential Case Disassemble.

[Installation Procedure](#)



Note: The mating surface of the ring gear and the differential case must be clean and free of burrs before installing the ring gear.

1. Install the ring gear (1) to the differential case (2).



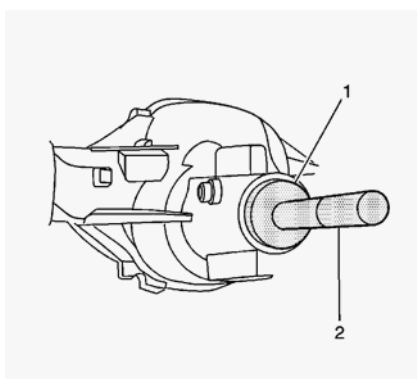
Note: The ring gear bolts have left-handed threads.

2. Install the new ring gear bolts (1).

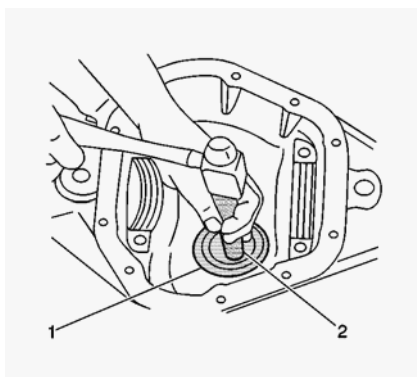
Caution: Refer to Fastener Caution.

3. Tighten the new ring gear bolts alternately and in stages, gradually pulling the ring gear onto the differential case.

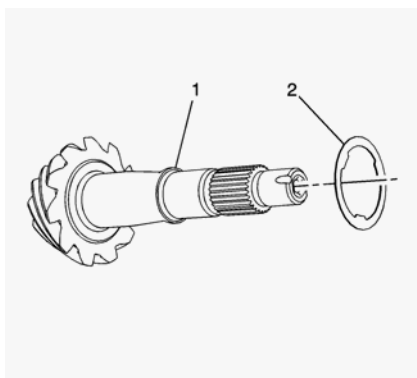
Tighten the ring gear bolts in sequence to **120 Y (89 lb ft)**.



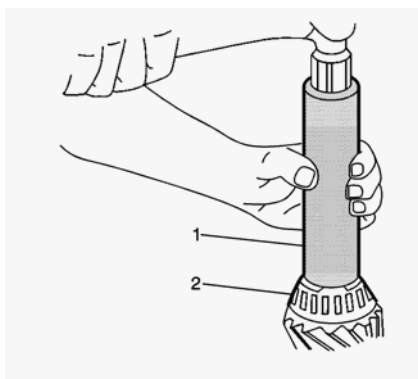
4. Using the DT 7817 installer (2) and the GE 8092 handle (1), install the outer pinion bearing cup.



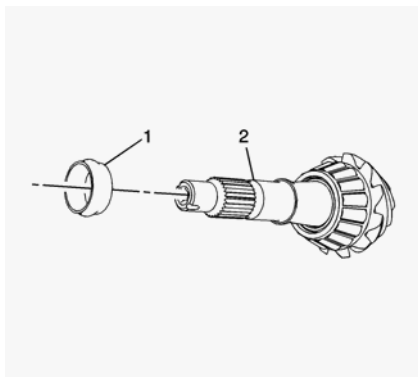
5. Using the DT 29609 installer (1) and the GE 8092 handle (2), install the inner pinion bearing cup.
6. Determine the selective shim thickness for the pinion. Refer to Pinion Depth Adjustment.



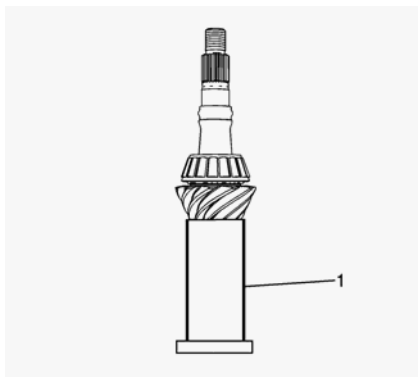
7. Install the selective shim (2) on the pinion gear (1).



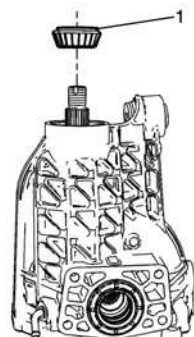
8. Using the DT 5590 installer (1), install the inner pinion bearing.



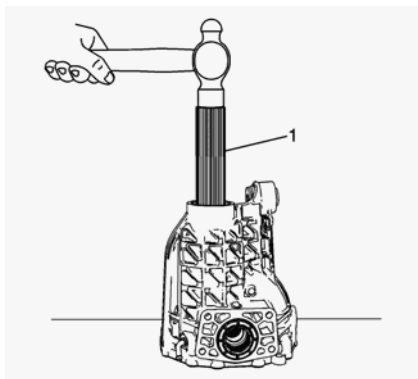
9. Install a NEW collapsible spacer (1) on the pinion gear (2).
10. Lubricate the pinion bearings with axle lubricant.



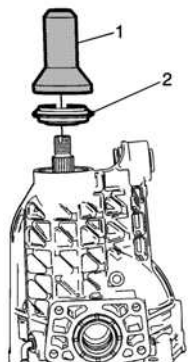
11. Support the pinion gear with a suitable tool (1).



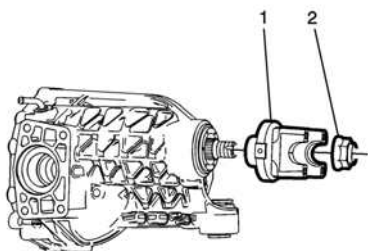
12. Place the differential carrier over the supported pinion gear and position the pinion bearing (1) squarely on the pinion gear.



13. Using the *DT 5590* installer (1) and a hammer, install the pinion bearing race.

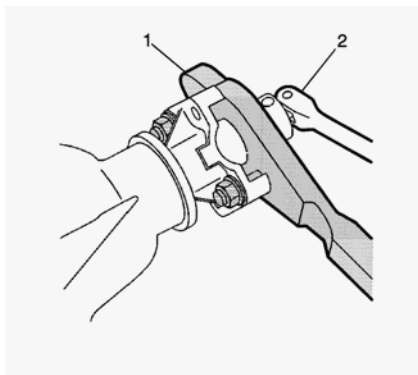


14. Using the *EN-21128* installer (1), install a NEW pinion oil seal (2).



Note: Apply sealant to the splines of the pinion yoke.

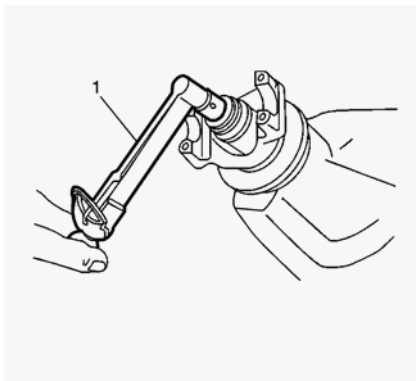
15. Install the pinion yoke (1).
16. Seat the pinion yoke onto the pinion shaft by tapping it with a soft-faced hammer until a few pinion shaft threads show through the yoke.
17. Install the washer and a new pinion nut.
18. Install the *DT-08614-A* remover (1) and (2) onto the pinion yoke.



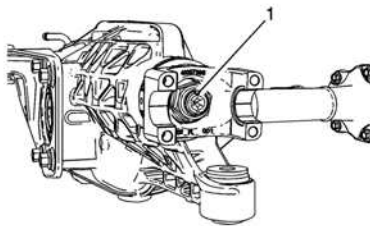
19. Using the *DT-08614-A* remover (1), and appropriate tool (2), remove the pinion flange.

Note: Tighten the NEW pinion nut to the lower torque specification and increase the torque in small until increments until the proper rotational torque specification is achieved.

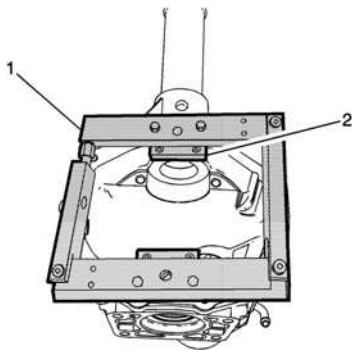
20. Using the *D7 8614-A* remover (1) and the proper size socket and torque wrench, tighten the NEW pinion nut to **177 – 275 Y (130 – 202 lb ft)**.



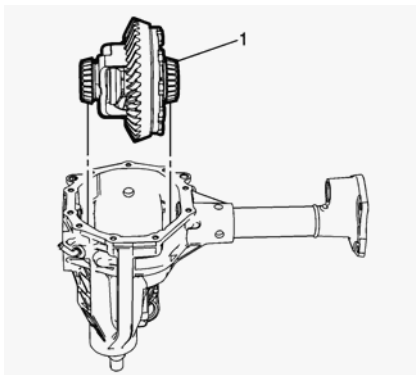
21. Using an inch-pound torque wrench (1), measure the rotating torque of the pinion gear **0.63 – 1.13 Y (5 – 10 lb in)**.
22. Recheck the rotating torque and adjust if necessary.



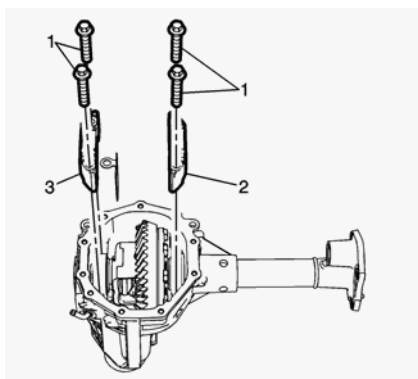
23. Using a hammer and a punch, stake the pinion nut (1).



24. Using the *J 45222* spreader (1) and the *J 45222-20* adapter (2), adjust the spreader 0.250 mm to install in the differential case.

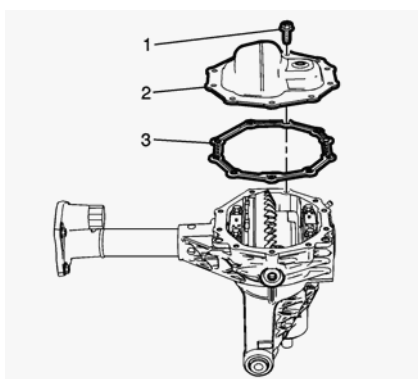


25. Position the differential case (1) in the differential carrier.
26. Remove the case spreader and adapter.

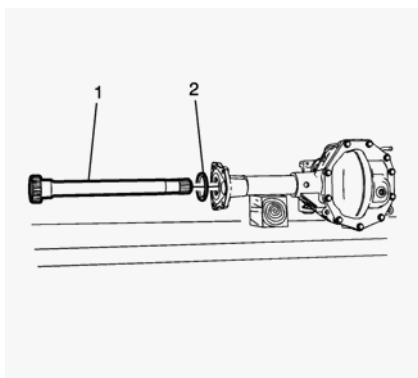


Note: Ensure that the case bearing caps and shims are installed as they were removed.

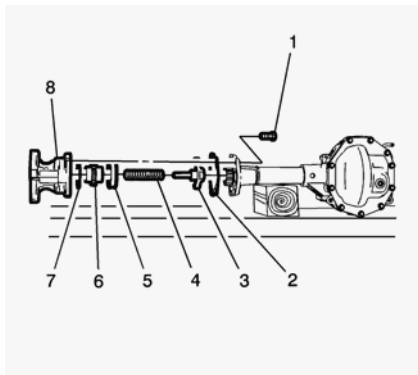
27. Position the left (3) and the right (2) bearing caps in the differential carrier.
28. Install the differential case bearing cap bolts (1) and tighten to **98 Y (72 lb ft)**.
29. Adjust the backlash. Refer to Backlash Inspection and Adjustment.
30. Once the differential side bearing preload and backlash is correct, perform a gear tooth contact pattern check in order to ensure proper alignment between the ring and pinion gears. Refer to Gear Tooth Contact Pattern Inspection.



31. Install the differential cover gasket (3) and the cover (2).
32. Install the 10 differential cover bolts (1) and tighten to **30 Y (22 lb ft)**.



33. Install the wheel drive shaft (1) and shim (2) in the differential carrier.



34. Install the clutch sleeve (5), clutch gear (6), clutch fork spring (4), clutch fork (3), shim (7), gasket (2) and the housing (8).
35. Tighten the clutch housing bolts to **47 Y (35 lb ft)**.

Drive Pinion and Ring Gear Replacement

36. Install the differential carrier assembly. Refer to Differential Carrier Assembly Replacement.
37. Install the front drive actuator. Refer to Front Drive Axle Actuator Replacement.
38. Fill up the axle fluid in the differential carrier. Refer to Front Axle Lubricant Replacement.
39. Lower the vehicle.

2013 Chevrolet Colorado

Submodel: | **Engine Type:** | **Liters:**
Fuel Delivery: | **Fuel:**

1. Raise and support the vehicle. Refer to Lifting and Jacking the Vehicle.
2. Ensure the vehicle is level.
3. Inspect the front axle for leaks. Repair as necessary.
4. Remove the engine protection shield, if needed. Refer to Engine Protection Shield Replacement.
5. Clean the area around the front axle fill plug.
6. Remove the front axle fill plug and the washer.
7. The fluid should be level with the or just below the threads for the fill plug.
8. If the level is low, add fluid until the level is within the proper fluid level specification. Use the proper fluid. Refer to Fluid and Lubricant Recommendations.

Caution: Refer to Fastener Caution.

9. Install the fill plug and the washer and tighten the plug to **32 Y (24 lb ft)**.
10. Install the engine protection shield, if needed. Refer to Engine Protection Shield Replacement.
11. Remove the support and lower the vehicle.

2013 Chevrolet Colorado

Submodel: | Engine Type: | Liters:
Fuel Delivery: | Fuel:

1. Raise the vehicle. Refer to Lifting and Jacking the Vehicle.
2. Ensure that the vehicle is level.
3. Remove the engine protection shield, if equipped. Refer to Engine Protection Shield Replacement.
4. Remove the drain plug.
5. Drain axle fluid into a suitable container.

Caution: Refer to Fastener Caution.

6. Install the drain plug and tighten to **32 Y (24 lb ft)**.
7. Remove the fill plug.
8. Fill the drive axle with the proper fluid. Refer to Fluid and Lubricant Recommendations.
9. Inspect the fluid level. Refer to Front Axle Lubricant Level Inspection.
10. Install the fill plug and tighten to **32 Y (24 lb ft)**.
11. Install the engine protection shield, if equipped. Refer to Engine Protection Shield Replacement.
12. Lower the vehicle.

2013 Chevrolet Colorado

Submodel: | Engine Type: | Liters:
Fuel Delivery: | Fuel:

Special Tools

- DT-45222 Axle Housing Spreader
- DT-45222-20 Axle Housing Spreader Adaptor
- DT-21777-B Pinion Gauge Set
- DT-45222-20 Dial Indicator Set

For regional equivalent tools, refer to Special Tools.

Front Differential Bearing Adjustment

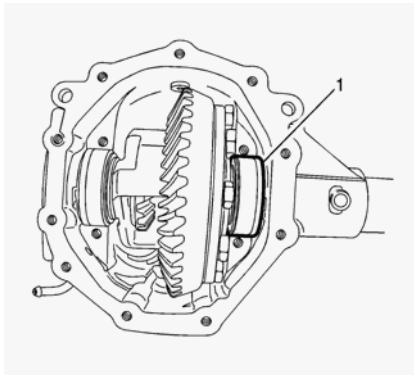
Note:

- The differential side bearing preload adjustment must be completed before the backlash adjustment can be started.
- In order to maintain the original backlash, adjust the differential case side bearing preload by changing the thickness of the left and the right side shim packs equally.
- Measure the service shims and the spacers one at a time. Add the measurements together in order to obtain the total thickness of the left or the right side shim pack.
- Do not use or reuse the original cast iron production shims. Use service shims and spacers instead.

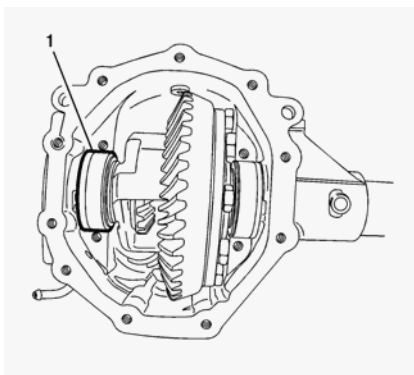
1. Install the drive pinion, if necessary. Refer to Drive Pinion and Ring Gear Replacement.
2. Using an inch-pound torque wrench, measure and record the measurement the rotating torque of the drive pinion gear **1.7–3.4 Y (15–30 lb in) for new bearings or 1.1–2.3 Y (10–20 lb in) for used bearings**.

Note: Before installation of the differential assembly, ensure that the side bearing surfaces in the axle housing are clean and free of burrs. If the original bearings are to be reused, the original bearing cups must also be used.

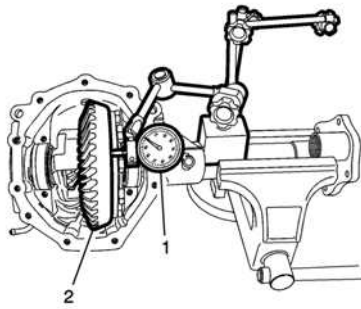
3. Install the differential assembly with the side bearings and bearing cups into the axle housing.



4. Insert one **5.334 mm (0.2100 in)** (1) thick service spacer into the left side of the axle housing.
5. Check the schedule of shims. Refer to Axle Spacer and Shim Specifications.
6. Slide the differential assembly towards the service spacer in order to hold the spacer in place.

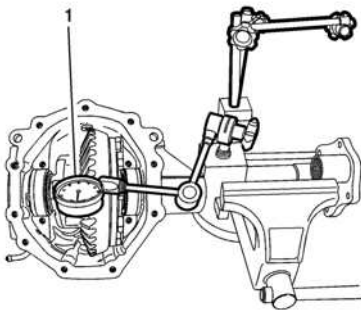


7. Insert one **6.655 mm (0.2620 in)** (1) thick service spacer into the left side of the axle housing.
8. Check the schedule of shims. Refer to Axle Spacer and Shim Specifications.



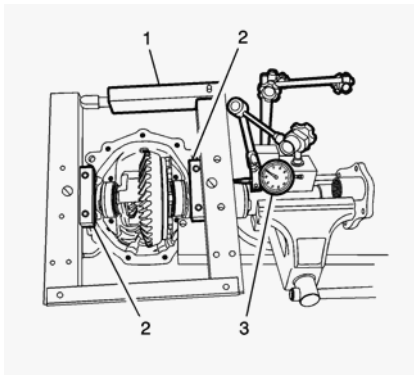
Note: The resulting value is the total service shim thickness without preload for the axle.

9. Position the *GE 8001* indicator (1) from the *DT 21777-B* set.
10. Preload the *GE 8001* indicator (1) and set the gauge to zero. Move the differential case (2) to the left and right sides, and verify the value on the *GE 8001* indicator (1).
11. Add shims to fill both sides without preload.



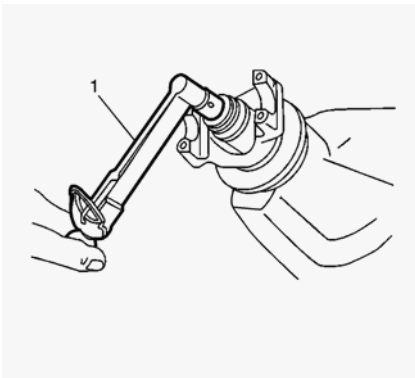
Note: Moving 0.10 Y (0.004 in) of shim thickness from the right side to the left side of the differential will change the backlash adjustment approximately 0.05 Y (0.002 in).

12. Position the *GE 8001* indicator (1) from the *DT 21777-B* set so that it is on the heel of the ring gear.
13. While holding the drive pinion stationary, move the ring gear back and forth. Measure and record the backlash.
14. Repeat the measuring procedure at eight points around the ring gear.
15. Move **0.10 mm (0.004 in)** of shim thickness from the right side to the left side of the differential until there is approximately **0.13-0.18 mm (0.005-0.007 in)** of backlash between the ring gear and the drive pinion.



16. Using the *DT-45222* spreader (1) and the *DT-45222-20* adaptor (2), adjust the spreader using a *GE 8001* indicator (3) until **0.250 mm (0.010 in)** to allow the install of the shims.
17. In order to initially set the preload of the differential side bearings and the backlash to approximately **0.130-0.230 mm (0.005-0.009 in)**, take the value determined in Step 15 and add **0.203 mm (0.008 in)** service shim thickness to this amount.
18. Install the differential bearing caps and tighten the bolts to **98 Y (72 lb ft)**.

Front Differential Bearing Adjustment



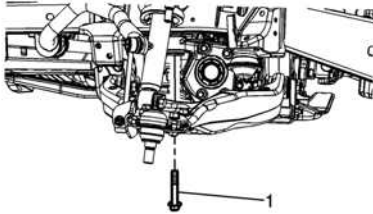
19. Using an inch-pound torque wrench (1), measure the drive pinion and differential side bearing preload. The rotational torque should be **3.9-6.2 Y (30-55 lb in) for new bearings or 2.8-5.1 Y (25-45 lb in) for used bearings**. Record this measurement
20. If the differential side bearing preload is not within specifications, add or subtract shim thickness equally from each shim pack as necessary in order to increase/decrease the side bearing preload.
21. Once the differential side bearing preload is correct, measure the backlash and adjust, if necessary. Refer to Backlash Inspection and Adjustment.
22. Once the differential side bearing preload and backlash is correct, perform a gear tooth contact pattern check in order to ensure proper alignment between the ring and pinion gears. Refer to Gear Tooth Contact Pattern Inspection.

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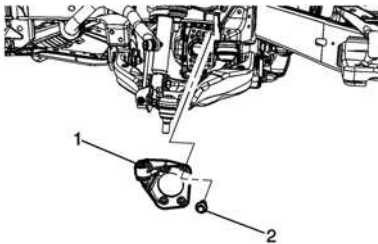
Submodel: | Engine Type: | Liters:
Fuel Delivery: | Fuel:

[Removal Procedure](#)

1. Raise and support the vehicle. Refer to Lifting and Jacking the Vehicle.
2. Remove the wheel drive shaft from the vehicle. Refer to Front Wheel Drive Shaft Replacement.
3. Support the front drive axle with a suitable jack stand.

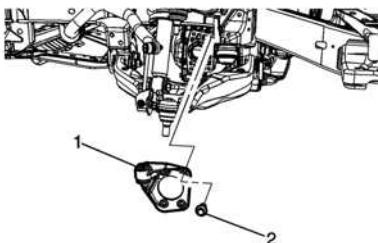


4. Remove the bolt from the carrier bracket (1) to the frame.



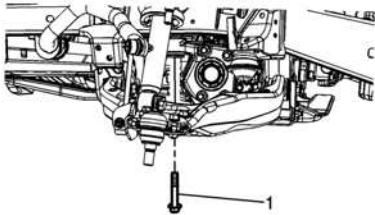
5. Remove the 4 bolts (2) from the carrier bracket to the front axle.
6. Remove the carrier bracket (1) from the vehicle.

[Installation Procedure](#)



1. Position the carrier bracket (1) on the front drive axle.
Caution: Refer to Fastener Caution.
Note: Hand tighten the bolts.
2. Install the 4 bracket bolts (2) and tighten to **130 Y (96 lb ft)**.

Front Differential Carrier Bushing and Bracket Replacement

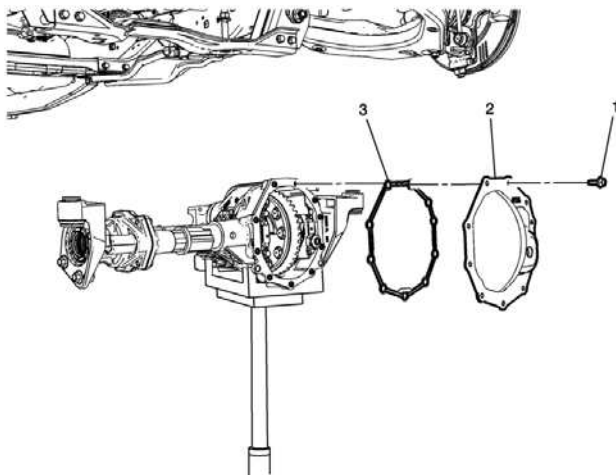


3. Install the carrier bracket bolt (1) and tighten to **160 Y (118 lb ft)**.
4. Install the wheel drive shaft. Refer to Front Wheel Drive Shaft Replacement.
5. Remove the support and lower the vehicle.

2013 Chevrolet Colorado

Submodel: | Engine Type: | Liters:

Fuel Delivery: | Fuel:



Front Differential Carrier Cover and Gasket Replacement

Callout

Component Name

Preliminary Procedure

1. Raise and support the vehicle. Refer to Lifting and Jacking the Vehicle
2. Remove the front differential carrier assembly. Refer to Differential Carrier Assembly Replacement

Front Differential Carrier Cover Bolt (Qty: 10)

Caution: Refer to Fastener Caution.

1

Tighten

30 Y (22 lb ft)

2

Front Differential Carrier Cover

3

Front Differential Carrier Cover Gasket

2013 Chevrolet Colorado

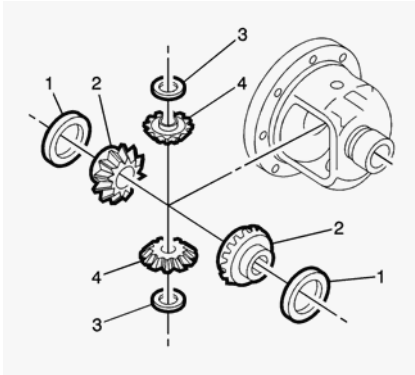
Submodel: | Engine Type: | Liters:
Fuel Delivery: | Fuel:

Special Tools

- GE 8092 Universal Driver Handle – ¾ in – 10
- DT 25299 Differential Side Bearing Installer

For equivalent regional tools, refer to Special Tools.

1. Apply a small amount of lubricate the pinion and side gears.

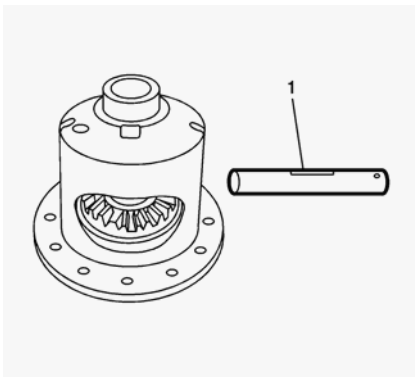


Note: If reusing the side gears and washers, ensure that they are installed in their original positions.

2. Install the differential side gears (2) and thrust washers (1) into the differential case.
3. Install the differential pinion gears (4) and thrust washers (3) by performing the following steps:
 1. Position one pinion gear between the differential side gears.
 2. Position the second pinion gear between the differential side gear directly opposite of the first gear.
 3. Rotate the differential side gears until the pinion gears are directly opposite the opening in the differential case.

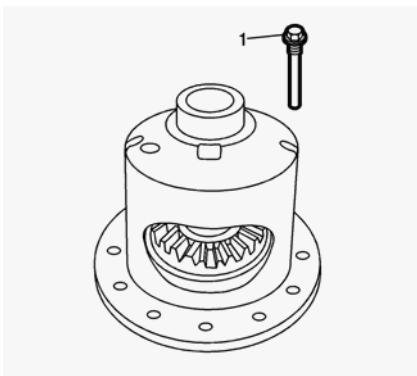
Note: Rotate the pinion gears toward the differential case opening in order to permit the sliding in of the thrust washers.

4. Install the thrust washers.

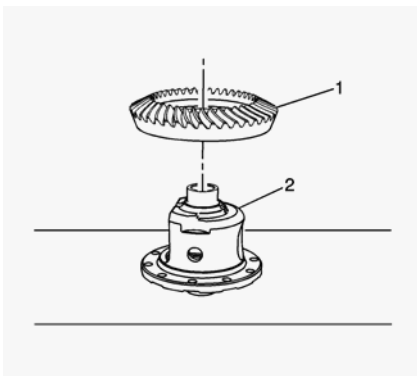


Caution: Refer to Fastener Caution.

4. Install the pinion gear shaft (1).

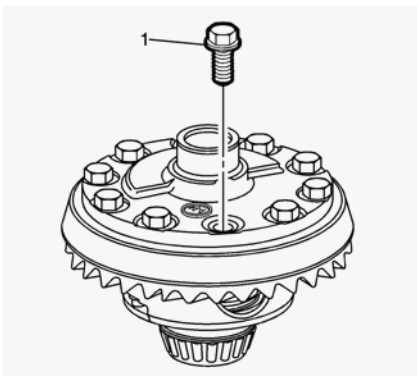


5. Install the new pinion gear shaft lock bolt (1) and tighten to **25 Y (18 lb ft)**.



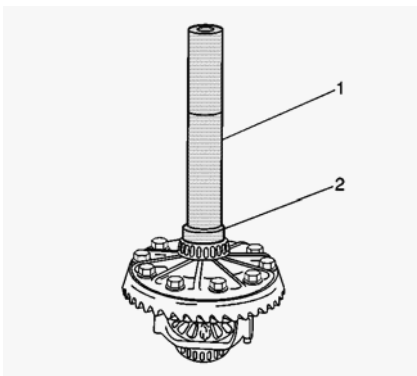
Note: The mating surface of the ring gear and the differential case must be clean and free of burrs before installing the ring gear.

6. Install the ring gear (1) onto the differential case (2).



Note:

- The ring gear bolts have left-hand threads.
 - Hand start each of the ring gear bolts.
7. Install the NEW ring gear bolts and tighten in sequence to **108 Y (80 lb ft)**.
8. Support the differential case with 2 pieces of wood.



9. Using the **GE 8092** handle (1) and the **DT 25299** installer (2), install the differential case bearings

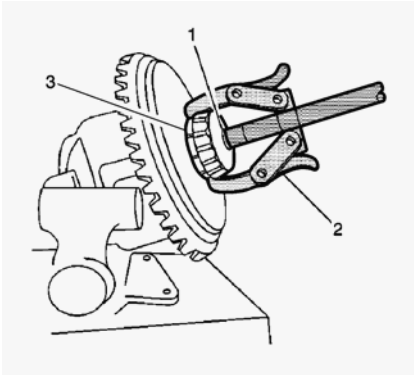
2013 Chevrolet Colorado

Submodel: | Engine Type: | Liters:
Fuel Delivery: | Fuel:

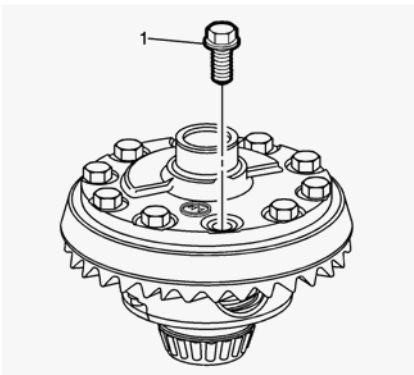
Special Tools

- DT 8107-2 Side Bearing Puller Pilot
- DT 22888-D Side Bearing Remover Kit

For regional equivalent tools, refer to Special Tools



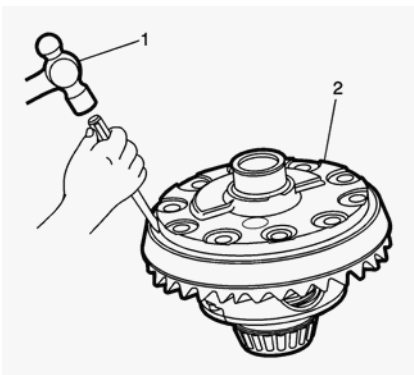
1. Place the differential case in a vise.
2. Using the DT 8107-2 pilot (1) with the J 22888-20A and J 22888-35 (2), remove the differential side bearings.



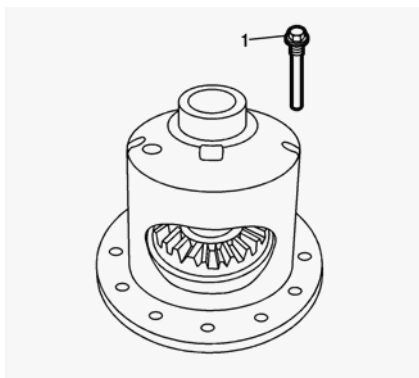
Caution: Do not pry the ring gear from the differential case. Prying the ring gear from the differential case may cause damage to the ring gear and/or the differential case.

Note: The ring gear bolts have left-handed threads.

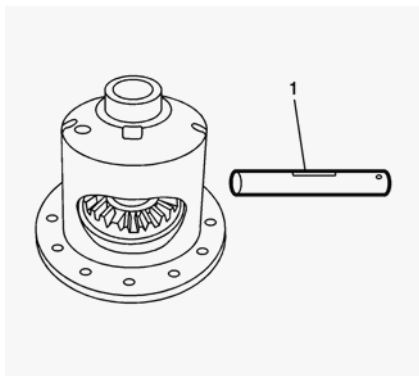
3. Remove the ring gear bolts (1).



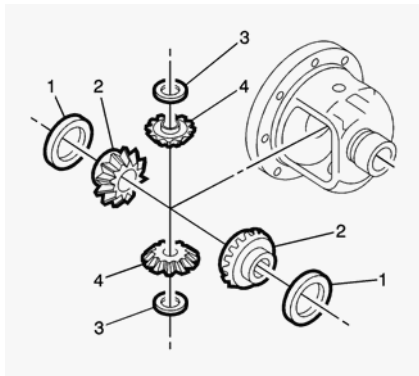
4. Using a hammer and a brass drift (1), remove the ring gear (2).



5. Remove the pinion shaft lock bolt (1).



6. Remove the pinion shaft (1).



Note: Mark the position of each of the pinion and side gears for the proper installation.

7. Remove the differential pinion gears (4) and the washers (3).
8. Remove the differential side gears (2) and the washers (1).

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Special Tools

DT-08614-A Pinion Flange Holder and Remover

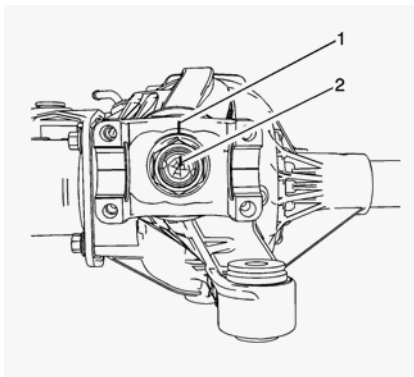
For equivalent regional tools, refer to Special Tools.

Removal Procedure

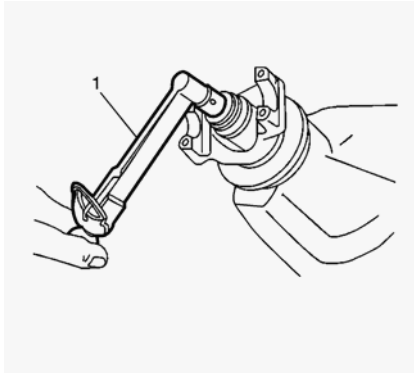
1. Raise and support the vehicle. Refer to Lifting and Jacking the Vehicle
2. Remove the tires and wheels. Refer to Tire and Wheel Removal and Installation.

Note: Removing the front brake pads will eliminate the drag on the front drive axle when measuring the rotational torque of the internal components.

3. Remove the front brake pads. Refer to Front Disc Brake Pads Replacement.
4. Remove the front propeller shaft. Refer to Front Propeller Shaft Replacement.

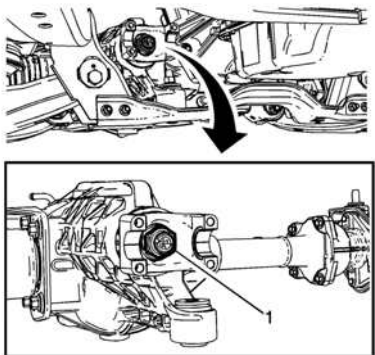


5. Mark the relationship of the pinion gear (2) to the pinion yoke (1).



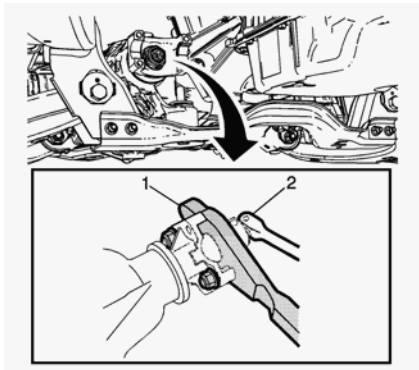
6. Using an inch pound torque wrench (1), record the rotational torque of the front pinion gear. This will give the combined preload for the following components:

- The pinion bearings
- The pinion seal
- The carrier bearings
- The axle bearing
- The axle seals

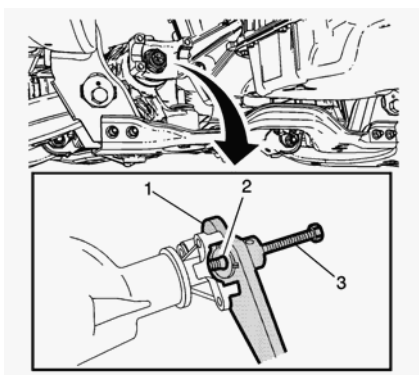


Note: DO NOT reuse the pinion nut. Discard and replace with NEW only.

- Using the proper tools, remove the stake (1) from the front differential pinion nut.

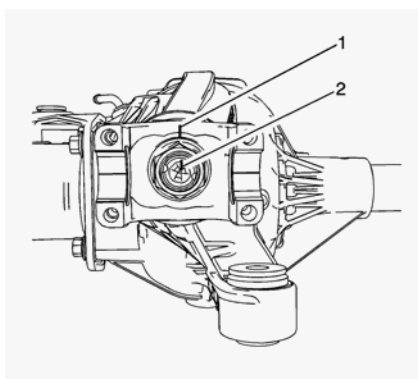


- Using the DT-08614-A remover (1) and the proper size socket and breaker bar (2), remove the pinion flange nut.

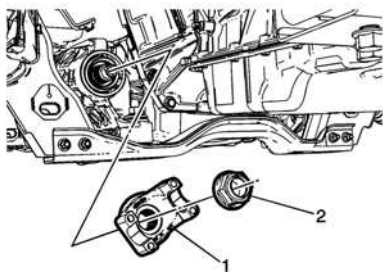


- Using the DT-08614-A remover (1), (2) (3), remove the pinion flange.

[Installation Procedure](#)

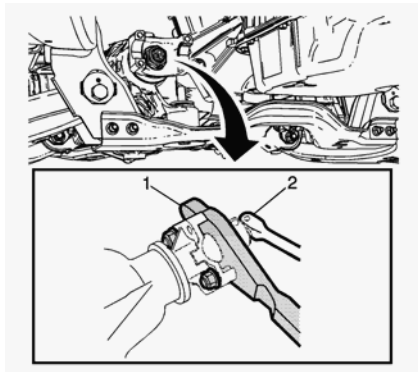


1. Align the reference marks on the pinion gear (2) and the pinion yoke (1).

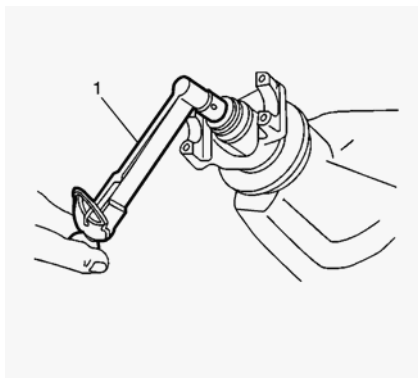


Note: Tighten the NEW pinion nut by hand.

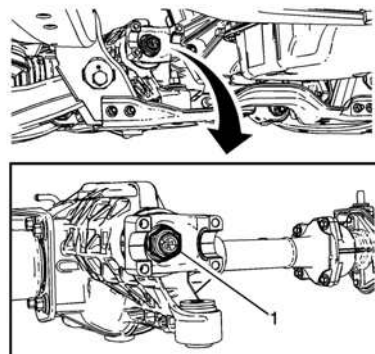
2. Install the pinion flange (1) and the NEW nut (2) pinon the pinion gear shaft.



3. Using the DT-08614-A holder (1) and the proper size socket and torque wrench (2), tighten the pinion nut until the end play is taken up. Rotate the pinion while tightening the pinion nut to seat the bearings.
4. Remove the DT-08614-A holder (1) and the socket and torque wrench (2).



5. Using an inch pound torque wrench (1) the rotational torque should be **0.63 to 1.13 Y (5 to 10 in lb)**. If not, reinstall the tool and tighten in small increments until the torque of **0.63 to 1.13 Y (5 to 10 in lb)** is achieved.
6. If the rotational torque exceeds the **0.63 to 1.13 Y (5 to 10 in lb)**, replace the collapsible spacer.



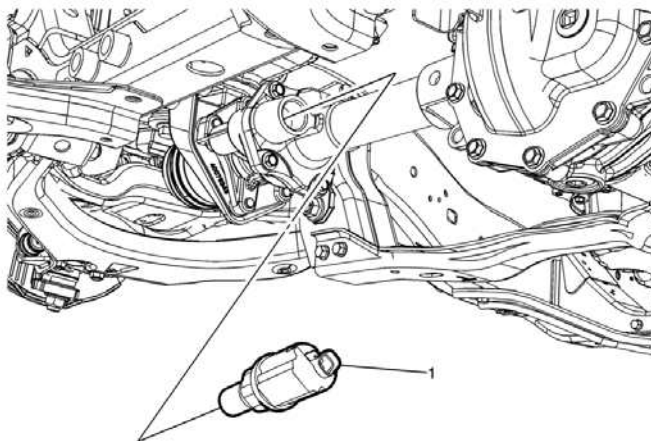
7. Using the appropriate tools, stake NEW the pinon nut (1).
8. Install the front propeller shaft. Refer to Front Propeller Shaft Replacement.
9. Install the tires and wheels. Refer to Tire and Wheel Removal and Installation.

Front Differential Drive Pinion Gear Yoke Replacement

10. Remove the support and lower the vehicle. Refer to Lifting and Jacking the Vehicle

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Submodel: | Engine Type: | Liters:
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Front Drive Axle Actuator Replacement

Callout

Component Name

Preliminary Procedure

1. Raise and support the vehicle. Refer to Lifting and Jacking the Vehicle.
2. Remove the engine protection shield, if equipped. Refer to Engine Protection Shield Replacement.

Front Drive Axle Actuator

Caution: Refer to Fastener Caution.

Procedure

1

Remove the electrical connector from the electric front actuator motor.

Tighten

30 Y (22 lb ft).

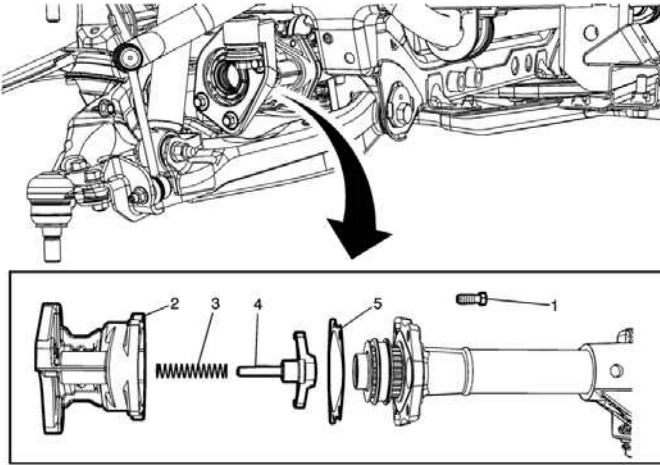
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- Inspect the carrier connector for damaged splines and teeth. Replace as required.
- Inspect the shift fork for wear, scoring, and damage to the thrust surfaces. Replace as required.
- Inspect the differential sleeve and the inner output shaft for damaged splines and teeth. Replace as required.
- Inspect the damper spring for breakage. Replace or repair the damper spring as needed.
- Inspect the differential actuator and the engagement switch for damage and frayed wiring.

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Fuel Delivery: | Fuel:



Front Drive Axle Clutch Fork Replacement

Callout

Component Name

Preliminary Procedure

1. Raise and support the vehicle. Refer to Lifting and Jacking the Vehicle.
2. Remove the wheel drive shaft from the vehicle. Refer to Front Wheel Drive Shaft Replacement.
3. Remove the front drive axle actuator from the front axle. Refer to Front Drive Axle Actuator Replacement.

Front Drive Axle Clutch Housing Bolt (Qty: 4)

Procedure

1. Remove the differential carrier bracket from the front axle. Refer to Front Differential Carrier Bushing and Bracket Replacement.

Tighten

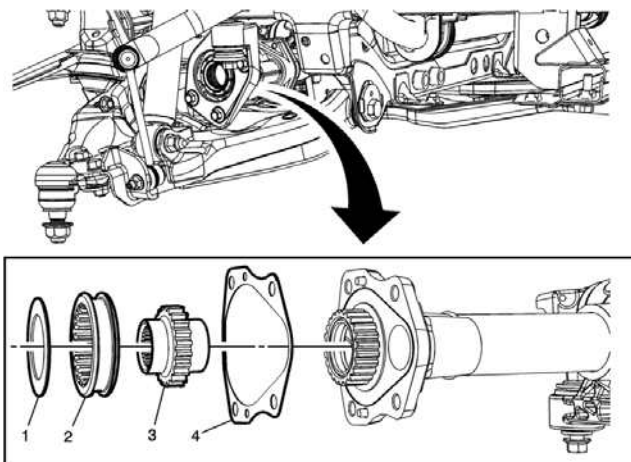
47 Y (35 lb ft)

2. Front Drive Axle Clutch Housing
3. Front Drive Axle Actuator Spring
4. Front Drive Axle Clutch Fork
5. Front Drive Axle Clutch Housing Gasket

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Front Drive Axle Clutch Gear Replacement

Callout

Component Name

Preliminary Procedure

1. Raise and support the vehicle. Refer to Lifting and Jacking the Vehicle.
2. Remove the front wheel drive shaft from the vehicle. Front Wheel Drive Shaft Replacement.
3. Remove the front drive axle clutch fork. Refer to Front Drive Axle Clutch Fork Replacement.

1 Front Drive Axle Clutch Shift Washer.

2 Front Drive Axle Clutch Sleeve

3 Front Drive Axle Clutch Gear

4 Front Drive Axle Clutch Housing Gasket

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Fuel Delivery: | Fuel:

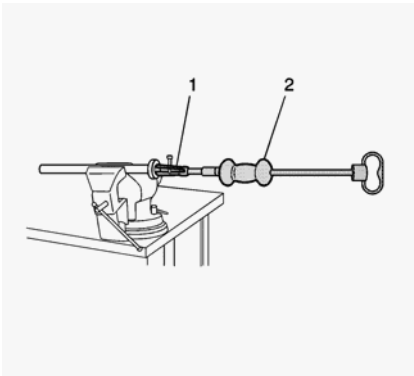
Tools Required

- *DT 29369-1* Bushing and Bearing Remover
- *DT 45233* Bearing Installer
- *GE 23907-1* Slide Hammer
- *GE 8092* Adapter

For regional equivalent tools, refer to Special Tools

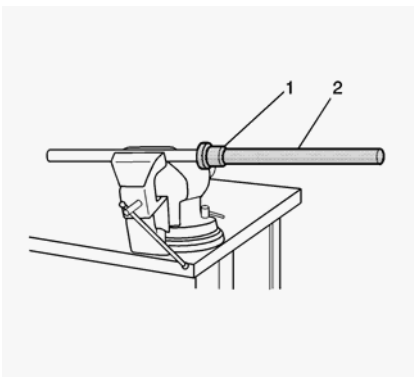
[Removal Procedure](#)

1. Raise and support the vehicle. Refer to Lifting and Jacking the Vehicle.
2. Remove the axle clutch gear. Refer to Front Drive Axle Clutch Gear Replacement.



3. Install the inner shaft in a soft jawed vise.
4. Using the *DT 29369-1* remover (1) with *GE 223907-1* hammer (2), remove the clutch bearing.

[Installation Procedure](#)



1. Using the *DT 45233* installer (1) with *GE 8092* adapter (2), install the clutch bearing.
2. Remove the inner shaft from the soft jawed vise.
3. Install the axle clutch gear. Refer to Front Drive Axle Clutch Gear Replacement.

2013 Chevrolet Colorado

Submodel: | **Engine Type:** | **Liters:**
Fuel Delivery: | **Fuel:**

The Front Drive Axle consist of the following components:

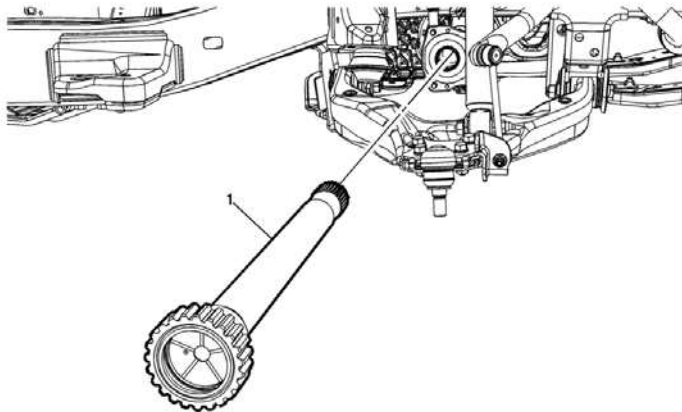
- Differential Carrier Housing
- Differential Assembly
- Intermediate Shaft
- Intermediate Shaft Housing
- Electric Motor Actuator
- Shift Fork /Clutch Assembly

The front axle on four wheel drive model vehicles has a central disconnect feature. The axle uses a conventional ring and pinion gear set in order to transmit the driving force of the engine to the wheels. The open differential allows the wheels to turn at different rates of speed while the axle continues to transmit the driving force. This prevents tire scuffing when going around corners and premature wear on internal axle parts. The ring and pinion set and the differential are contained within the carrier. The axle identification number on top of the differential carrier assembly or on a label on the right half of differential carrier assembly. The drive axles are completely flexible assemblies consisting of inner and outer constant velocity CV joints protected by thermoplastic boots and connected by a wheel drive shaft.

2013 Chevrolet Colorado

Submodel: | Engine Type: | Liters:

Fuel Delivery: | Fuel:



Front Drive Axle Inner Shaft Replacement

Callout

Component Name

Preliminary Procedure

1. Raise and support the vehicle. Refer to Lifting and Jacking the Vehicle.
2. Remove the front drive clutch gear from the inner axle shaft. Refer to Front Drive Axle Clutch Gear Replacement.

Front Drive Axle Inner Shaft

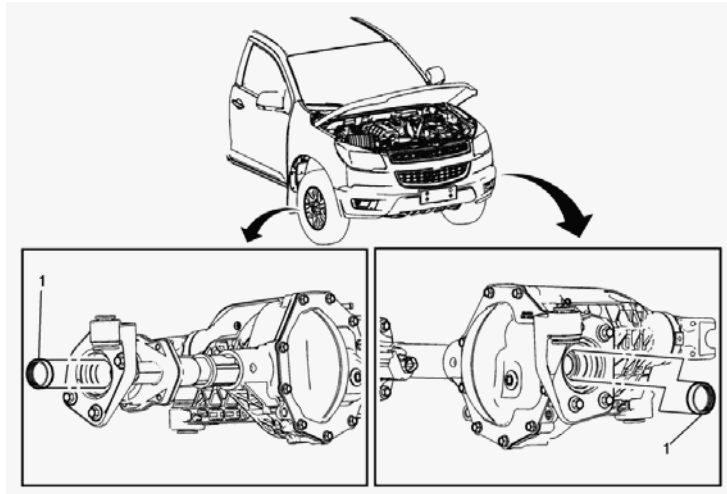
1

Procedure

Using the appropriate tool, remove the inner axle shaft.

2013 Chevrolet Colorado

Submodel: | Engine Type: | Liters:
Fuel Delivery: | Fuel:



Front Wheel Drive Shaft Bearing Replacement

Callout

Component Name

Preliminary Procedure

1. Raise and support the vehicle. Refer to Lifting and Jacking the Vehicle.
2. Remove the appropriate (right or left) wheel drive shaft from the vehicle. Refer to Front Wheel Drive Shaft Replacement.
3. Remove the appropriate (right or left) front wheel drive shaft seal. Refer to Front Wheel Drive Shaft Seal Replacement

Front Drive Axle Bearing

Procedure

1. Using the *GE 23907-1* hammer and the *DT 29369-1* remover, remove the front wheel drive shaft bearing.
2. Using the *DT 8092* Driver Handle and the *DT 45233* installer, install the front wheel drive shaft bearing.

Special Tools

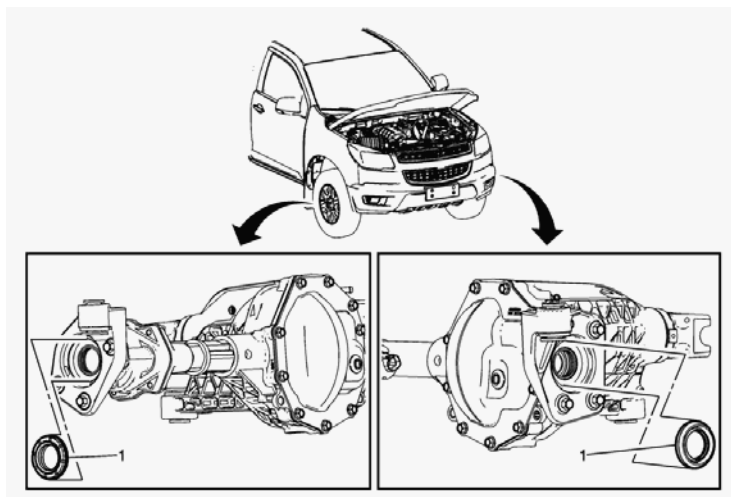
1

- *DT 8092* Driver Handle
- *DT 29369-1* Bushing and Bearing Remover
- *DT 45233* Differential Bearing Adjuster Installer
- *GE 23907-1* Slide Hammer

For regional equivalent tools, refer to Special Tools.

2013 Chevrolet Colorado

Submodel: | Engine Type: | Liters:
Fuel Delivery: | Fuel:



Front Wheel Drive Shaft Seal Replacement

Callout

Component Name

Preliminary Procedure

1. Raise and support the vehicle. Refer to Lifting and Jacking the Vehicle.
2. Remove the appropriate (right or left) wheel drive shaft from the vehicle. Refer to Front Wheel Drive Shaft Replacement.

Front Wheel Drive Shaft Seal

Procedure

1. Using the *DT29369-1* remover and the *GE 23907-1* hammer, remove the front wheel drive shaft seal.
2. Using the *DT 45225* installer and the *DT 8092* handle, install the front wheel drive shaft seal.

Special Tools

1

- *DT 8092* Driver Handle
- *DT 29369-1* Bushing and Bearing Remover
- *DT 45225* Axle Seal Installer
- *GE 23907-1* Slide Hammer

For regional equivalent tools, refer to Special Tools.

2013 Chevrolet Colorado

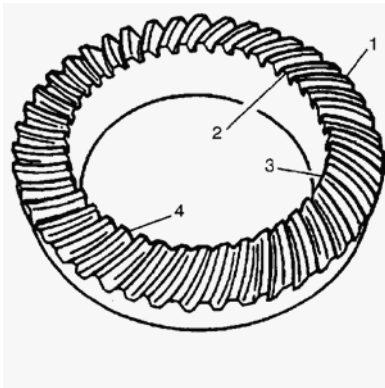
Submodel: | Engine Type: | Liters:
Fuel Delivery: | Fuel:

The gear contact pattern check is not a substitute for adjusting the pinion depth and backlash. Use this method in order to verify the correct running position of the ring gear and the drive pinion. Gear sets which are not positioned properly may be noisy and/or have a short life span. A pattern check ensures that when best contact has been obtained between the ring gear and the drive pinion, the system will produce low noise and have a long life.

Drive Pinion and Ring Gear Identification

Production drive pinion and ring gears are manufactured by using a 2-cut or a 5-cut method. The gear tooth contact patterns that are produced from each style of gear set differ slightly. A 2-cut gear will produce a pattern that is bias from the toe to the heel of the tooth (drive side), while a 5-cut gear set will produce a square pattern from the toe to the heel of the tooth (drive side). When diagnosing the gear tooth contact pattern, regardless of what type of gear set it is, a correct pattern will be centered within the area of the tooth, from toe to heel and from top to bottom.

Gear Tooth Nomenclature



The side of the ring gear tooth which curves outward, or is convex, is the drive side (4). The concave side is the coast side (3). The end of the tooth nearest the center of the ring gear is the toe end (2). The end of the tooth farthest away from the center is the heel end (1).

Adjustments Affecting Tooth Contact

The following 2 adjustments affect the tooth contact pattern:

- Backlash adjustment
- Pinion depth adjustment

The effects of bearing preloads are not readily apparent on hand-loaded tooth contact pattern tests. However, bearing preloads should be within specifications before proceeding with backlash and pinion depth adjustments.

Backlash Adjustment

The backlash can be adjusted by either varying the thickness of the side bearing shims from side to side or by moving the adjuster sleeve(s) in or out, or both. By adjusting the shim thickness or moving the adjuster sleeve(s), the case and ring gear assembly will move closer to or further away from the pinion. In most cases, adjusting the backlash will correct an abnormal contact pattern. This adjustment will also be used to set the side bearing preload.

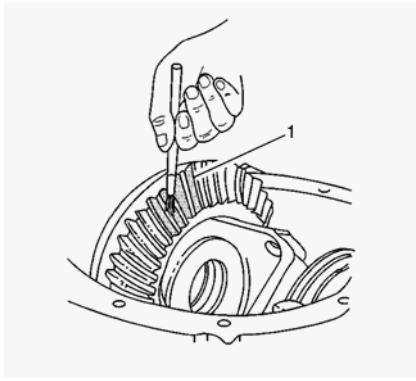
- If the thickness of the right shim is increased or the adjuster sleeve is moved in (if applicable), along with an equal decrease in the thickness of the left shim or the adjuster sleeve is moved out (if applicable), the backlash will increase.
- If the thickness of the left shim is increased or the adjuster sleeve is moved in (if applicable), along with an equal decrease in the thickness of the right shim or the adjuster sleeve is moved out (if applicable), the backlash will decrease.

Pinion Depth Adjustment

Adjust the position of the pinion by increasing or decreasing the distance between the pinion head and the centerline of the ring gear. Decreasing the distance moves the pinion closer to the centerline of the ring gear. Increasing the distance moves the pinion farther away from the centerline of the ring gear.

Testing Procedure

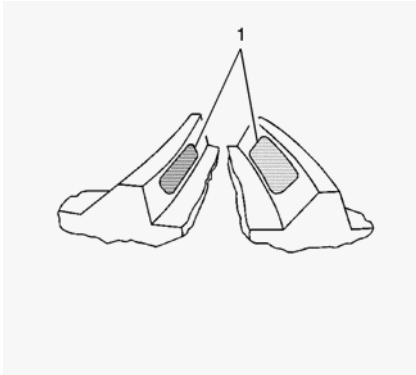
1. Wipe clean the differential case, the ring gear and the axle housing of lubricant. Carefully clean each tooth of the ring gear.



2. Use a medium stiff brush in order to sparingly apply gear marking compound to all of the ring gear teeth.
 3. Torque the bearing caps bolts to specification.
- Important:** Avoid turning the ring gear excessively.
4. Using a wrench, turn the drive pinion flange/yoke so that the ring gear rotates 3 full revolutions.
 5. Turn the drive pinion flange/yoke in the opposite direction so that the ring gear rotates 3 full revolutions in the opposite direction.
 6. Observe the pattern on the ring gear teeth. Compare the pattern with the following illustrations.

Correct Contact Pattern

Condition



The backlash and pinion depth is correct.

Correction

None required.

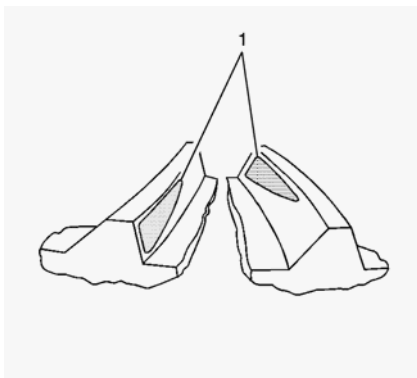
Service Hints

Loose bearings on the drive pinion or in the differential case may cause patterns that vary. If the contact pattern varies, inspect the following preload settings:

- Total assembly
- Differential case
- Pinion

If these settings are correct, inspect for damage or incorrectly assembled parts.

Drive Side Heel – Coast Side Toe Contact Pattern



Condition

The backlash is incorrect. The ring gear is too far away from the pinion.

Correction

Decrease the backlash. Move the ring gear closer to the pinion by adjusting the side bearing shim thickness or the adjuster sleeve(s). Refer to Backlash Inspection

and Adjustment.

[Drive Side Toe – Coast Side Heel Contact Pattern](#)



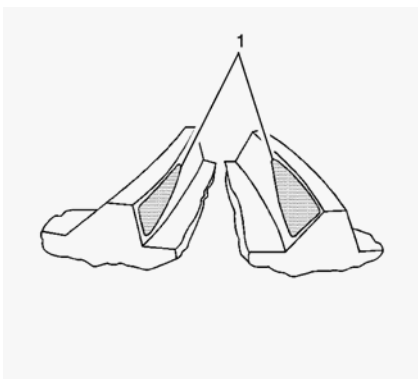
Condition

The backlash is incorrect. The ring gear is too close to the drive pinion.

Correction

Increase the backlash. Move the ring gear away from the pinion by adjusting the side bearing shim thickness or the adjuster sleeve(s). Refer to Backlash Inspection and Adjustment.

[Drive Side Heel – Coast Side Heel Contact Pattern](#)



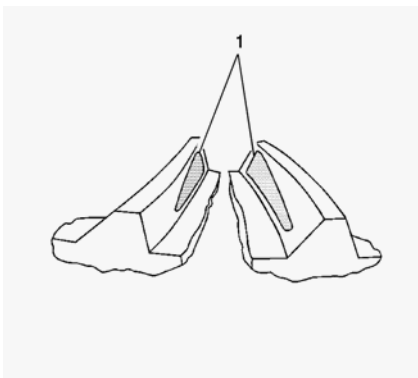
Condition

The backlash is incorrect. The ring gear is too far away from the pinion.

Correction

Decrease the backlash. Move the ring gear closer to the pinion by adjusting the side bearing shim thickness or the adjuster sleeve(s). Refer to Backlash Inspection and Adjustment.

[Drive Side Toe – Coast Side Toe Contact Pattern](#)



Condition

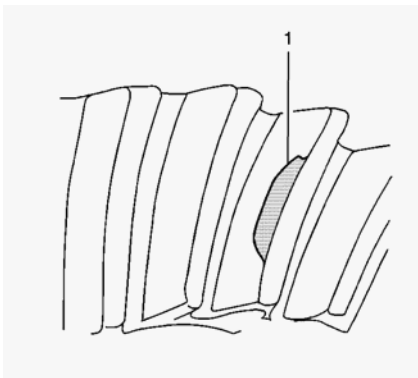
The backlash is incorrect. The ring gear is too close to the drive pinion.

Correction

Increase the backlash. Move the ring gear away from the pinion by adjusting the side bearing shim thickness or the adjuster sleeve(s). Refer to Backlash Inspection and Adjustment.

[High Flank Contact Pattern](#)

Gear Tooth Contact Pattern Inspection



Condition

The pinion depth is incorrect. The pinion gear is too far away from the ring gear.

Correction

Increase the pinion depth. Move the pinion gear closer to the ring gear by increasing the pinion shim thickness. Refer to Pinion Depth Adjustment.

[Low Flank Contact Pattern](#)



Condition

The pinion depth is incorrect. The pinion gear is too close to the ring gear.

Correction

Decrease the pinion depth. Move the pinion gear away from the ring gear by decreasing the pinion shim thickness. Refer to Pinion Depth Adjustment.

2013 Chevrolet Colorado

Submodel: | **Engine Type:** | **Liters:**
Fuel Delivery: | **Fuel:**

1. The ring and pinion gears are matched sets and must be replaced any time a replacement of either is necessary.
2. Inspect the pinion and the ring gear teeth for the following conditions:

- Cracking
 - Chipping
 - Scoring
 - Excessive wear
-
- Inspect the pinion gear splines for wear.
 - Inspect the pinion flange splines for wear.
 - Inspect the fit of the pinion flange on the pinion gear.
 - Inspect the sealing surface of the pinion flange for nicks, burrs, or rough tool marks which will damage the inside diameter of the pinion seal and result in an oil leak.
 - Inspect all of the parts for wear and replace as necessary.

2013 Chevrolet Colorado

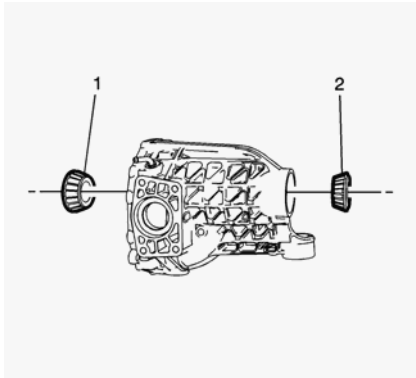
Submodel: | Engine Type: | Liters:
Fuel Delivery: | Fuel:

Special Tools

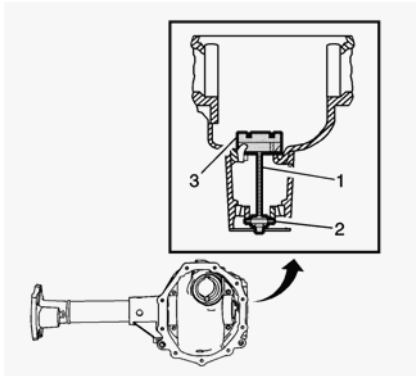
DT 34925 Pinion Setting Gage and Components

For equivalent regional tools, refer to Special Tools.

1. Raise and support the vehicle. Refer to Lifting and Jacking the Vehicle.
 2. Remove the differential carrier assembly. Refer to Differential Carrier Assembly Replacement.
 3. Remove the drive pinion gear bearing. Refer to Differential Drive Pinion Gear Bearing Replacement.
- Note:** Ensure that all of the tools, the differential side bearing bores, and the pinion bearing cups are clean before proceeding.
4. Lubricate the pinion bearings with axle lubricant. Refer to Fluid and Lubricant Recommendations.



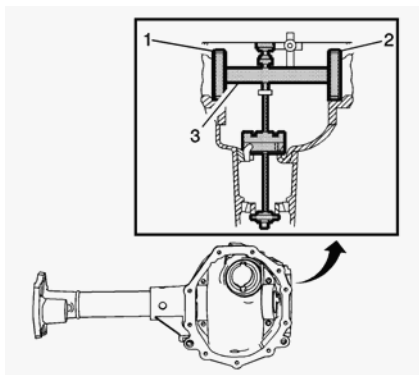
5. Install the pinion bearings (1) and (2) into the axle housing.



6. Assemble the DT 21777-43 stud(1), DT 21777-42 disc(2), DT 23597-11 plate(3), in the differential housing.

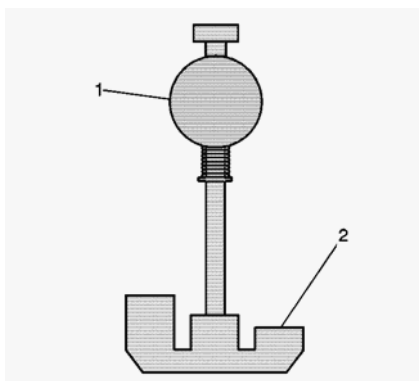
Caution: Refer to Fastener Caution.

7. Using an inch pound torque wrench and holding the DT 21777-43 stud (1) stationary, tighten the nut on the DT 21777-43 stud (1) until a rotating torque of **1.7–2.8 Y (15–25 lb in)** is obtained.
8. Rotate the assembly several times in both directions in order to seat the pinion bearings.
9. Check the rotating torque of the assembly. If the torque is less than **1.7 Y (15 lb in)**, continue to tighten the nut on the tool (1) until a rotating torque of **1.7–2.8 Y (15–25 lb in)** is obtained.



Note: Ensure that it assembly rotates back and forth freely. If the assembly does not rotate freely, disassemble the components, inspect for proper seating and/or mis-aligned components and re-assemble.

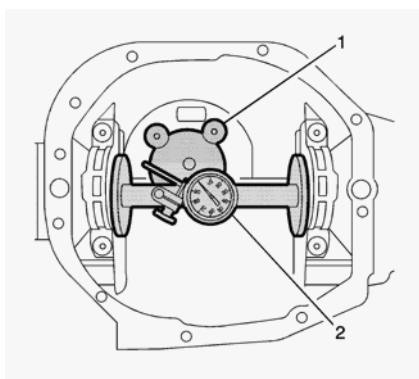
10. Assemble the DT 21777-45 disc (1), DT 21777-45 disc (2) and the DT 23597-1 pinin the differential housing and rotate.



11. Align the plunger of the DT 23597-1 pin (1) to the DT 23597-11 plate (2).
12. Install the tool (1) to the tool (2) and perform the following:
 1. Loosely clamp the DT 23597-1 pin (1) onto the stem of the DT 23597-11 pin (2).
 2. Place the contact pad of the DT 23597-1 pin (1) onto the mounting post of the DT 23597-11 plate (2).
 3. With the contact pad of the DT 23597-1 pin (1) touching the mounting post of the DT 23597-11 pin (2), loosen the lock nut on the DT 23597-1 pin (1).
 4. Push down on the DT 23597-1 pin (1) until the needle of the tool (1) has turned 3/4 of a turn clockwise.
 5. Tighten the clamp on the DT 23597-1 pin (1) is finger tight.

Note: The deflection is the point where the needle changes direction.

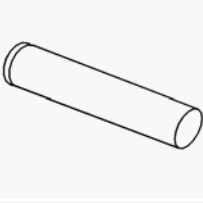
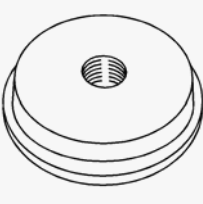
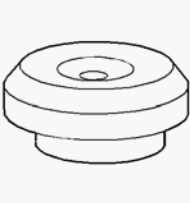
13. Move the plunger of the DT 23597-11 plate (2) back and forth until the needle of the DT 23597-1 pin (1) indicates the greatest deflection.



14. At the greatest point of deflection, move the housing of the DT 23597-1 pin (1) until the needle indicates ZERO.
15. Move the plunger of the tool (2) back and forth again to verify the zero setting. Adjust the housing of the tool (1) as necessary to set the needle to zero.
16. Rotate the plunger of the DT 23597-1 pin (1) away from the gage plates of the DT 23597-1 pin (1) until it no longer touches the tool gage plates.
17. The value indicated on the DT 23597-1 pin (1) is the thickness of the shim needed in order to set the depth of the pinion.
18. Select the shim that indicates the proper thickness. Measure the shim with a micrometer in order to verify that the thickness is correct.
19. Remove the pinion depth setting tools.
20. Remove the pinion bearings.
21. Install the pinion shim between the pinion gear and the inner pinion bearing. Refer to Differential Drive Pinion Gear Bearing Replacement.
22. Install the differential carrier assembly. Refer to Differential Carrier Assembly Replacement.
23. Remove the supports and lower the vehicle.

2013 Chevrolet Colorado

Submodel: | Engine Type: | Liters:
Fuel Delivery: | Fuel:

Illustration	Tool Number/ Description
	BO-38185 J-38185 Hose Clamp Plier
	DT-5590 EN-49417 J-5590 Pinion Bearing Cup Installer
	DT-7817 DT-47817 J-7817 Pinion Bearing Cup Installer
	DT-8092 DT-480921 GE-8092 J-8092 KM-J-8092 M-740463-A 09924-74510 Driver Handle
	DT-8107-A CH-48107 DT-8107-2 J-8107-2 J-8107-4 Washer Bearing Puller
	DT-08614-A KM-468-C J-08614-A J-42066 J-44873 J-45012 70004805 Pinion Flange Holder and Remover

Illustration

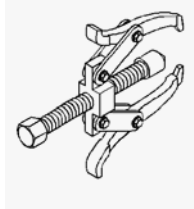
Tool Number/ Description



DT-21777-B

J-2177-B

Pinion Setting Gage and Components



DT-22888-20A

DT-559-A

J-22888-20A

KM-161-A

KM-553-A

KM-559-A

KM-5596-A

V-9304220

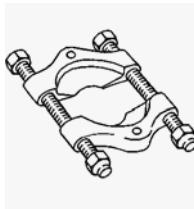
Side Bearing Remover



DT-22888-35

J-22888-35

Side Bearing Puller Leg Set



DT-22912-B

DT-307-B

J-22805-B

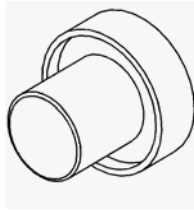
J-22912-A

J-22912-B

KM-307-B

6-9604356

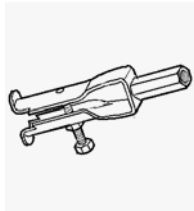
Bearing Remover / Installer



DT-25299

J-25299

Side Bearing Installer

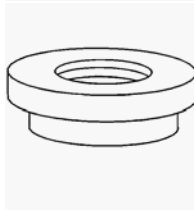


DT-29369-1

J-29369-1

S-9404180

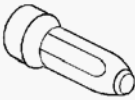
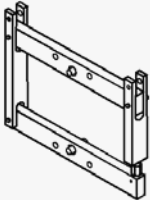
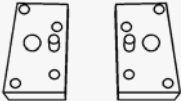
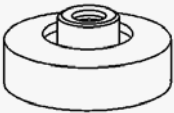
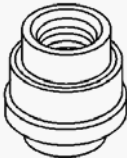
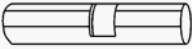
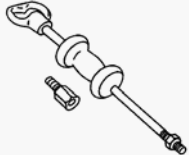
Seal and Bearing Installer



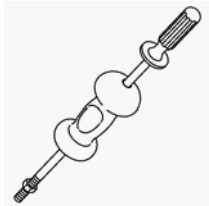
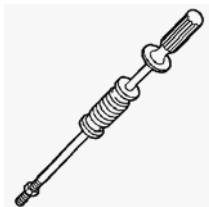
DT-29609

J-29609

Inner Pinion Bearing Cup Installer

Illustration	Tool Number/ Description
	DT-42738 EN-21128 Seal Installer
	DT-45222 J-45222 DT-45222-10 DT-740481 J-45222-10 Axle Housing Spreader
	DT-45222-20 DT-50973 J-45222-20 Axle Housing Spreader Adapter
	DT-45225 J-45225 Seal Installer
	DT-45233 J-45233 Bearing Installer
	DT-50813 J-22536 Pinion Gear Remover
	EN-45000 EN-49482 KM-347 KM-J-23129 KM-J-45000 J-45000 M-720759 8791360 Seal Remover
	GE-02619-A J-02619-A Slide Hammer

Illustration



Tool Number/ Description

GE-6125-1B

J-6125-1B

Slide Hammer

GE-23907-1

J-23907-1

Universal Slide Hammer

2013 Chevrolet Colorado

Submodel: | **Engine Type:** | **Liters:**
Fuel Delivery: | **Fuel:**

1. Inspect the shims and the thrust washers for cracks and chips.
The damaged shims should be replaced with an equally sized service shim.
2. Inspect the adjuster sleeves for damaged threads. Replace if required.

2013 Chevrolet Colorado

Submodel: | Engine Type: | Liters:
Fuel Delivery: | Fuel:

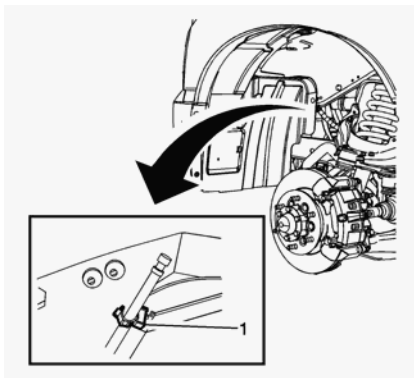
[Special Tools](#)

BO-38185 Hose Clamp Pliers

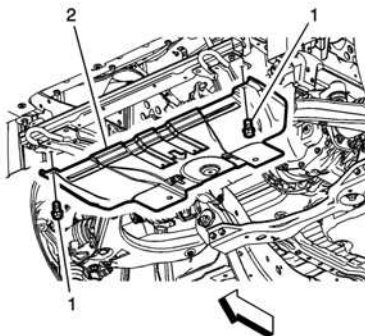
for equivalent regional tool, refer to Special Tools

[Removal Procedure](#)

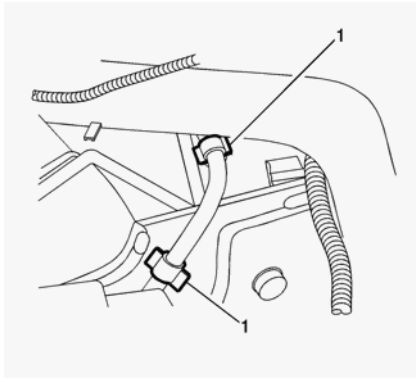
1. Raise and support the vehicle. Refer to Lifting and Jacking the Vehicle
2. Remove the tire and wheel assembly. Refer to Tire and Wheel Removal and Installation



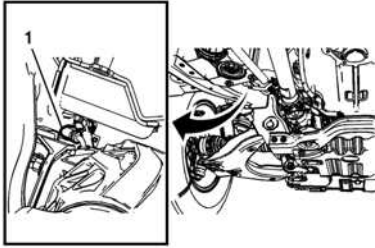
3. Remove the vent hose retaining clip (1).



4. Remove the center shield bolts (1).
5. Remove the center shield (2) from the vehicle.

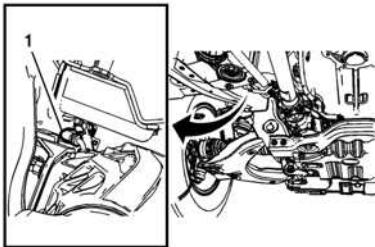


6. Remove the vent hose retaining clips (1).

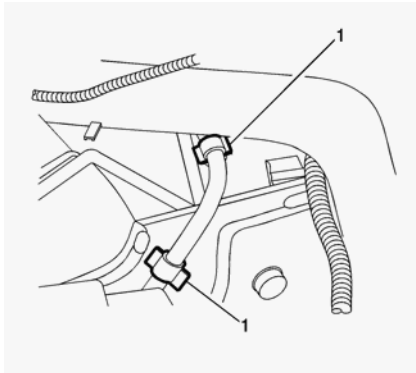


7. Using *BO-38185* pliers, remove the vent hose (1) from the front drive axle housing.

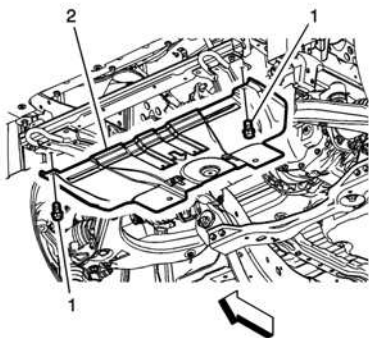
[Installation Procedure](#)



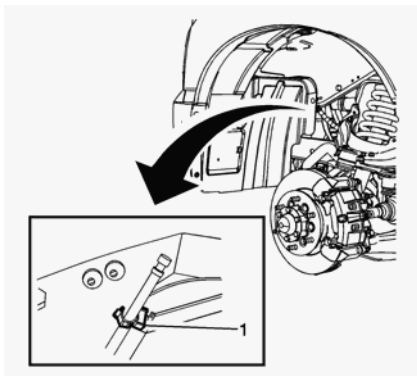
1. Using *BO-38185* pliers, install the vent hose (1) in the front drive axle housing.



2. Install the vent hose retaining clips (1).



3. Install the center shield (2) to the vehicle.
4. Install the center shield bolts (1) and tighten to **51 Y (38 lb ft)**.



5. Install the vent hose retaining clip (1).
6. Install the tire and wheel assembly. Refer to Tire and Wheel Removal and Installation
7. Lower the vehicle.