

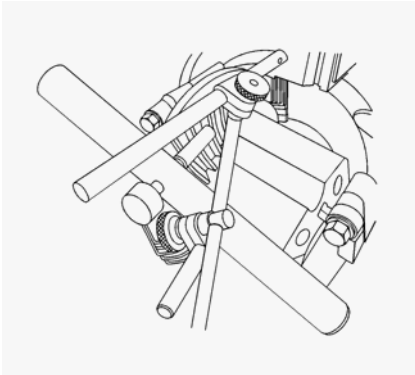
2013 Chevrolet Colorado

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

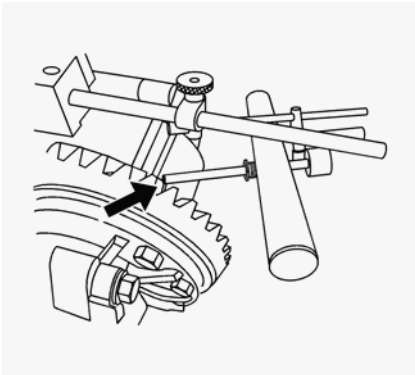
Special Tools

- J 8001 Pinion Setting Gauge Set
- J 8001-3 Dial Indicator

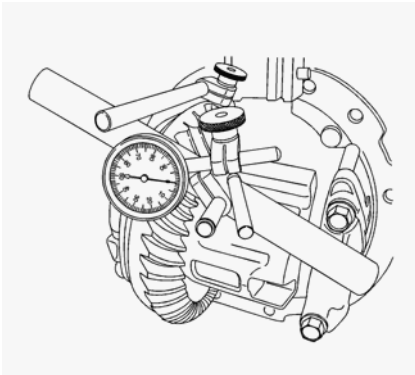
for equivalent regional tools, refer to Special Tools.



1. Install the magnetic base and J 8001 pinion setting gauge set to the axle housing as shown.



2. Place the indicator stem of the J 8001 pinion setting gauge set at the heel end of a gear tooth.



3. Place and set the J 8001-3 dial indicator so that the stem is aligned with the gear rotation and perpendicular to the tooth angle.
4. Preload the dial of the J 8001-3 dial indicator.

Align the needle and the dial face of the J 8001-3 dial indicator to ZERO.
5. While holding the drive pinion stationary, move the ring gear back and forth.

Measure and record the backlash.
6. Repeat the measuring procedure at eight points around the ring gear.

Specification

The difference between the backlash at all of the measuring points should not vary by more than 0.05 mm (0.002 in).

7. 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:

Specification

The backlash between the ring gear and the drive pinion should be between 0.08–0.25 mm (0.003–0.010 in) with a preferred backlash of 0.13–0.18 mm (0.005–0.007 in).

Note:

- Do not use the original cast iron production shims to adjust the backlash. Use service shims and spacers instead.
- 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:

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

Mark the bearing caps left or right.

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

Mark the bearing cups and the shims left or right.

3. Measure the thickness of left side shim pack.

Measure the production shim or the shim and service spacer in 3 locations.

Measure each shim separately.

4. Calculate the average of the 3 measurements for each shim.

Add the average of each of the shim measurements together.

Record the measurement. This is the thickness for the left side shim pack.

5. Assemble a new left side shim pack by decreasing the appropriate amount of thickness from the original left side shim pack. If the original shim is cast iron production shim, assemble the shim pack using a service spacer and service shims. For example, to increase the backlash by 0.05 mm (0.002 in), remove 0.10 mm (0.004 in) of thickness from the left side shim pack.

6. Measure the thickness of right side shim pack.

Measure the shim or the shim and service spacer in 3 locations.

Measure each shim separately.

7. Calculate the average of the 3 measurements for each shim.

Add the average of each of the shim measurements together.

Record the measurement. This is the thickness for the right side shim pack.

8. Assemble a new right side shim pack by increasing the appropriate amount of thickness to the original right side shim pack. If the original shim is cast iron production shim, assemble the shim pack using a service spacer and service shims. For example, to increase the backlash by 0.05 mm (0.002 in), add 0.10 mm (0.004 in) of thickness to the right side shim pack.

- If the backlash is too large, decrease the backlash using the following procedure:

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

Mark the bearing caps left or right.

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

Mark the bearing cups and the shims left or right.

3. Measure the thickness of left side shim pack.

Measure the production shim or the shim and service spacer in 3 locations.

Measure each shim separately.

4. Calculate the average of the 3 measurements for each shim.

Add the average of each of the shim measurements together.

Record the measurement. This is the thickness for the left side shim pack.

5. Assemble a new left side shim pack by increasing the appropriate amount of thickness to the original left side shim pack. If the original shim is cast iron production shim, assemble the shim pack using a service spacer and service shims. For example, to increase the backlash by 0.05 mm (0.002 in), add 0.10 mm (0.004 in) of thickness to the left side shim pack.

6. Measure the thickness of right side shim pack.

Measure the shim or the shim and service spacer in 3 locations.

Measure each shim separately.

7. Calculate the average of the 3 measurements for each shim.

Add the average of each of the shim measurements together.

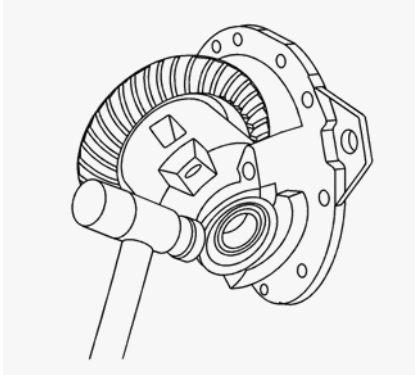
Record the measurement. This is the thickness for the right side shim pack.

8. Assemble a new right side shim pack by decreasing the appropriate amount of thickness to the original right side shim pack. If the original shim is cast iron production shim, assemble the shim pack using a service spacer and service shims. For example, to decrease the backlash by 0.05 mm (0.002 in), remove 0.10 mm (0.004 in) of thickness to the right side shim pack.

- Install the differential case assembly with the bearing cups.

Backlash Adjustment

- 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.



- Install the left side service shim using the plastic hammer, if necessary.
The service shim must be installed between the service spacer and the differential bearing cup.
- Install the right side service shim using the plastic hammer, if necessary.
The service shim must be installed between the service spacer and the differential bearing cup.

Caution: Refer to Fastener Caution.

- Install the bearing caps and bolts:
 - For the 194 mm axle, tighten to **98 Y (72 lb ft)**.
 - For the 220 mm axle, tighten to **108 Y (80 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-45222-20 Dial Indicator Set

For regional equivalent tools, refer to Special Tools.

[Front Differential Bearing Adjustment](#)

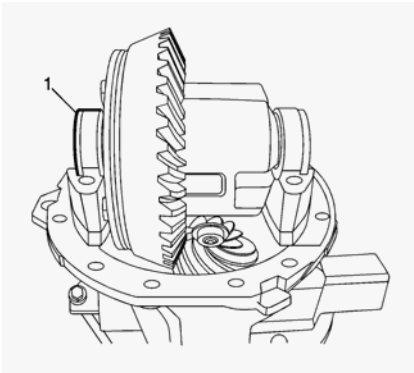
Note:

- 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.

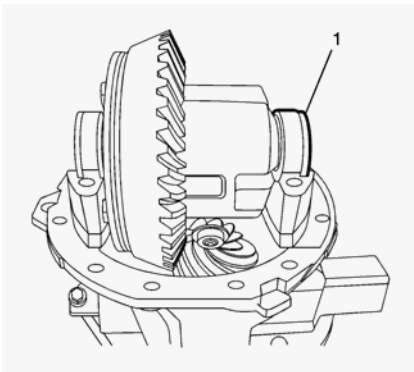
1. Install the drive pinion, if necessary. Refer to Drive Pinion and Ring Gear Replacement.
2. Using an inch-pound torque wrench, measure and record the measurement the rotating torque of the drive pinion gear **1.7–3.4 Y (15–30 lb in) for new bearings or 1.1–2.3 Y (10–20 lb in) for used bearings.**

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.

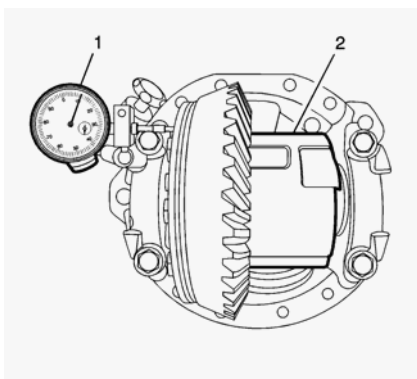
3. Install the differential assembly with the side bearings and bearing cups into the axle housing.



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 Spacer and Shim Specifications.
6. Side the differential assembly towards the service spacer in order to hold the spacer in place.

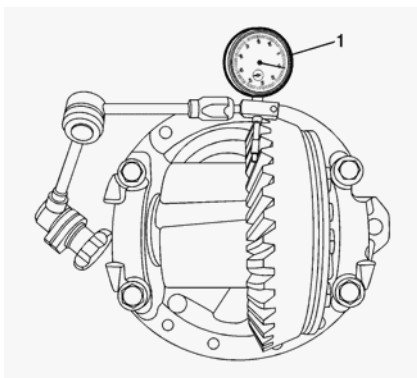


7. Insert one **6.655 mm (0.2620 in)** (1) thick service spacer into the left side of the axle housing.
8. Check the schedule of shims. Refer to Spacer and Shim Specifications.



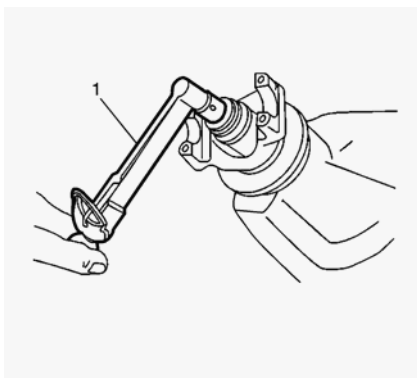
Note: The resulting value is the total service shim thickness without preload for the axle.

9. Position the dial indicator (1) on the heel of the ring gear.
10. Preload the dial 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 dial 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 dial indicator (1) so that it is on the heel of the ring gear tooth.
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. Moving **0.10 Y (0.004 in)** of shim thickness from the right side to the left side of the differential until there is approximately **0.127-0.203 Y (0.005-0.008 in)** of backlash between the ring gear and the drive pinion.
16. Install the differential bearing caps and tighten the bolts. Refer to Differential Case Replacement.



17. 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
18. 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.
19. Once the differential side bearing preload is correct, measure the backlash and adjust, if necessary. Refer to Backlash Adjustment.
20. 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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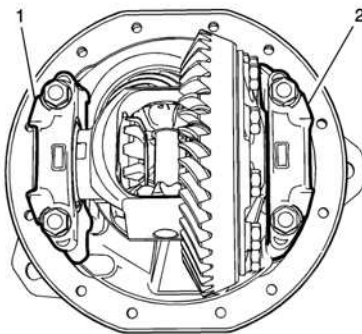
Special Tools

- GE-8092 Driver Handle
- DT-8107-4 Bearing Washer Puller
- DT-21784 Side Bearing Installer
- DT-22888-20A Bearing Puller

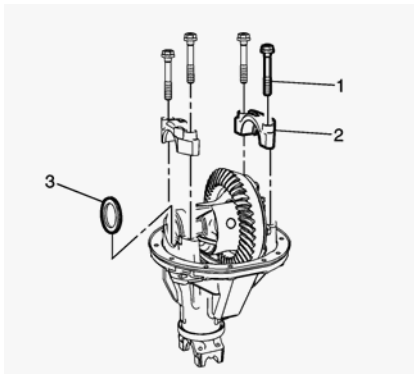
For regional equivalent tools, refer to Special Tools.

Removal Procedure

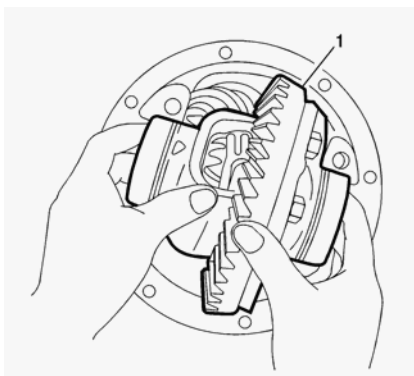
1. Raise and support the vehicle. Refer to Lifting and Jacking the Vehicle.
2. Remove the differential carrier assembly. Refer to Differential Carrier Assembly Replacement.
3. Install the differential carrier in a suitable holding fixture.



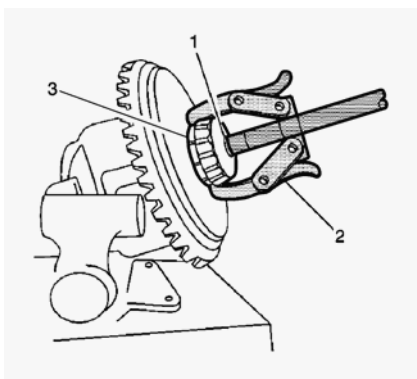
4. Mark the left (1) and right (2) bearing caps before removing from the differential carrier.



5. Remove the bearing cap bolts (1).
6. Remove the left and the right bearing caps (2).
7. Remove the shim (3).

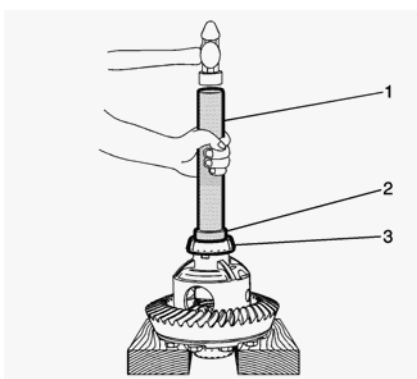


8. Remove the differential case (1).

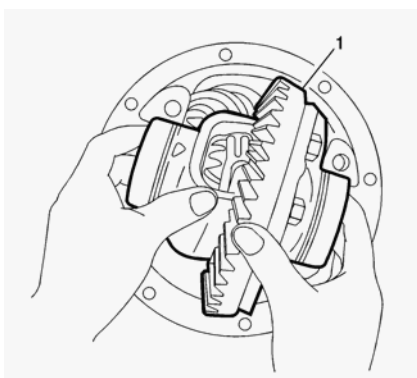


9. Install the differential case in a soft jawed vise.
10. Using the DT-8107-4 puller (2) and the DT-22888-20A puller (2) remove the differential case side bearing (3).

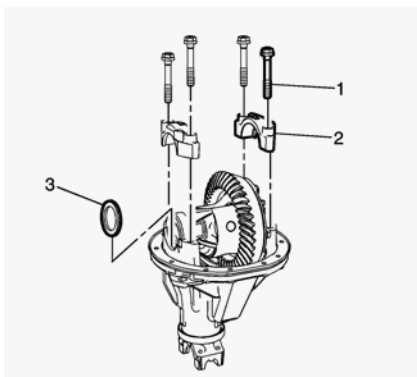
[Install Procedure](#)



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



2. Install the differential case assembly (1) into the differential carrier.



Note: Ensure that the reference marks for the left and right bearing caps are installed correctly.

3. Install the bearing shims (3) and the bearing caps (2).
4. Install and tighten the bearing cap bolts to **98 Y (72 lb ft)**
5. Adjust the back lash. Refer to Backlash Adjustment.
6. Remove the differential carrier in a suitable holding fixture.

Differential Bearing Replacement

7. Install the differential carrier assembly. Refer to Differential Carrier Assembly Replacement.
8. Remove the supports and lower the vehicle.

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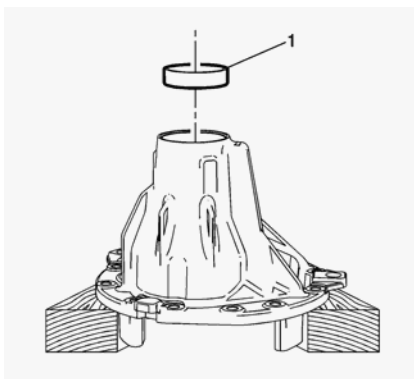
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Special Tools

- DT-7817 Pinion Bearing Cup Installer
- DT-08614-A Flange Remover Installer
- DT-28677 Pinion Bearing Cup Installer
- DT-38694 Seal Installer
- DT-49032 Bearing Installer
- GE-8092 Driver Handle

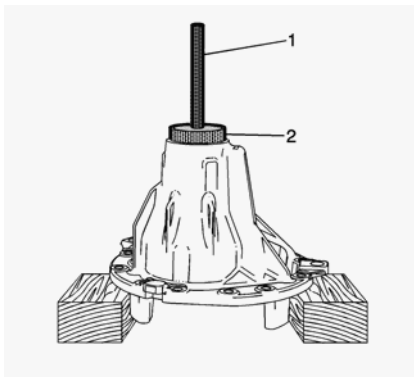
For regional equivalent tools, refer to Special Tools.

[Assemble Procedure](#)

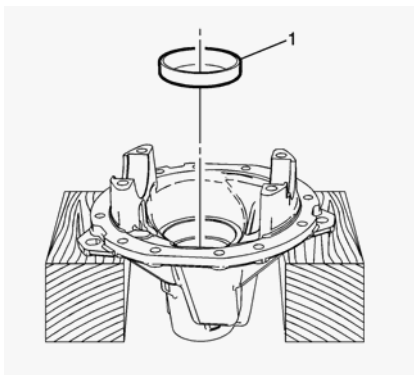


Note: Ensure that the bearing cup is even in the differential carrier.

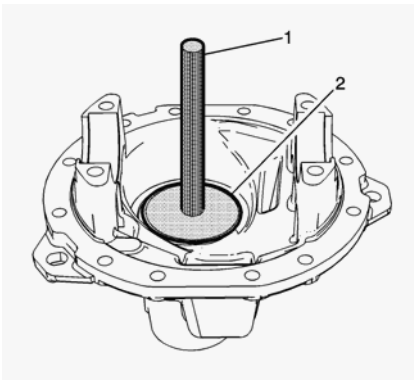
1. Position the outer pinion bearing cup (1) in the differential carrier.



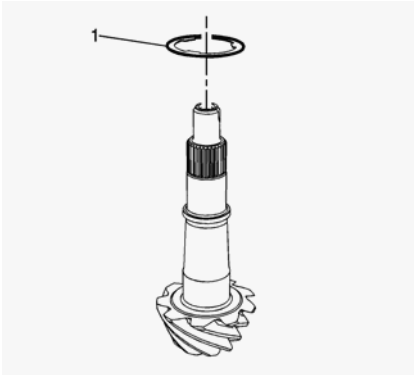
2. Using the GE-8092 handle (1), DT-28677 installer (2) and the hammer, install the outer bearing cup.



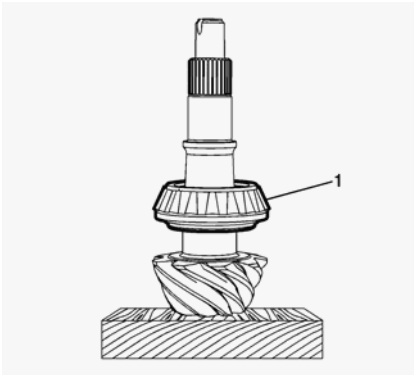
3. Position the inner pinion gear bearing cup (1) in the differential case



4. Using the GE-8092 handle (1) ,DT-49032 installer (2) and the hammer, install the inner differential bearing cup.
5. Set the pinion depth. Refer to Pinion Depth Adjustment.

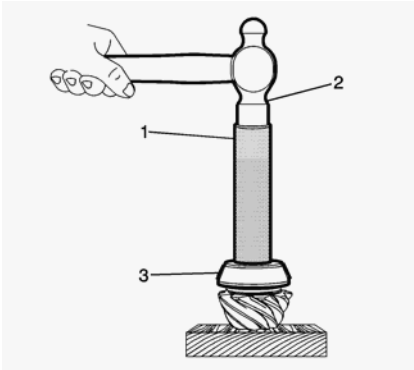


6. Install the correct pinion gear shim (1).

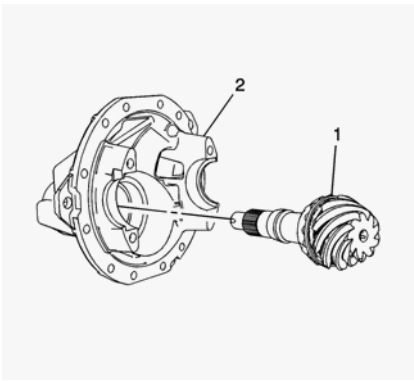


Note: Ensure that the pinon bearing is even on the pinion gear.

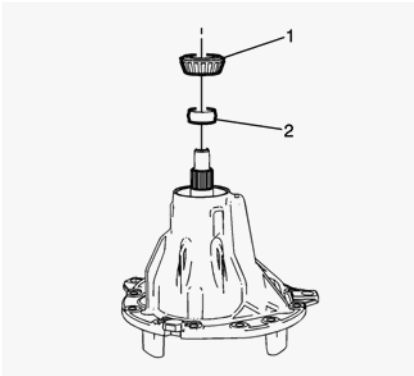
7. Position the pinon inner bearing (1) on the pinion gear.



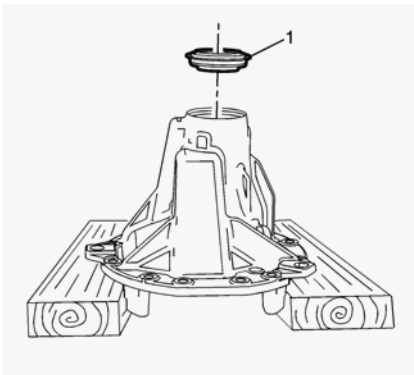
8. Using the DT-7817 installer (1) and a hammer (2), install the inner pinion bearing (3).



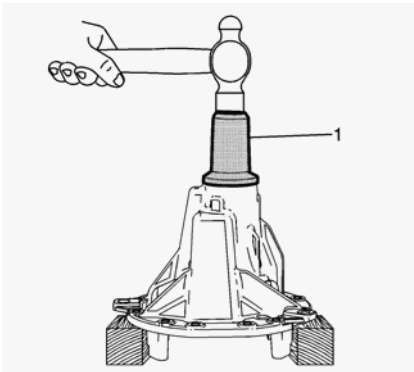
9. Install the pinion gear (1) in the differential carrier (3).



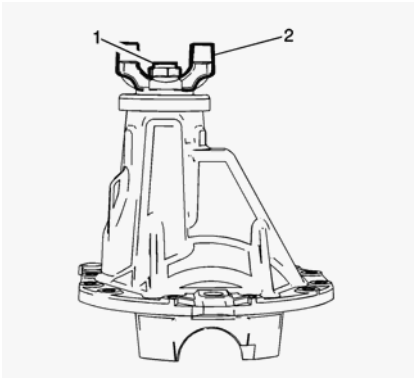
10. Position the New collapsible spacer (2) and the outer pinion bearing (1) on the pinion gear.



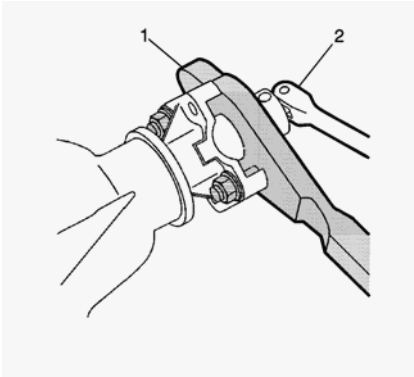
11. Position the pinion gear seal (1) on the differential carrier.



12. Using the DT-38694 installer (1) and the hammer, install the pinion gear seal.



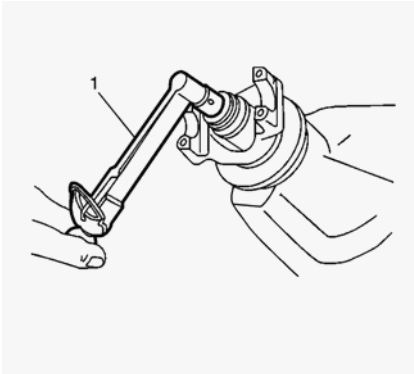
13. Install the NEW pinion nut (1) and the flange (2).
14. Hand tighten the NEW pinion nut (1).



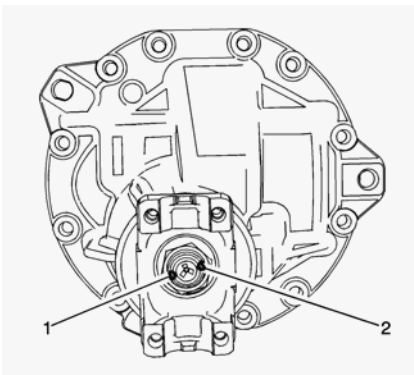
Caution: Refer to Fastener Caution.

Note: In the following procedures, DO NOT loosen and retighten the pinion nut.

15. Using the DT-08614-A installer (1) and (2), tighten the pinion gear nut to **245 – 294 Y (181 – 217 lb ft)** or until the end play is gone.

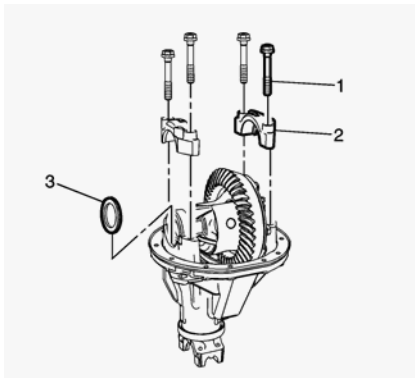


16. Using the inch pound torque wrench and the proper size socket (1), measure the rotational torque of the pinion gear which should be **0.7 – 1.1 Y (6–10 lb in)**.



17. Using the appropriate tools, stake the pinion gear nut (1).
18. Adjust the pinion depth. Refer to Pinion Depth Adjustment.

Differential Carrier Assembly Assemble (.)



19. Install the differential bearing caps (2) and the bolts (1) and tighten to **108 Y (80 lb ft)**.
20. Adjust the backlash. Refer to Backlash Adjustment.

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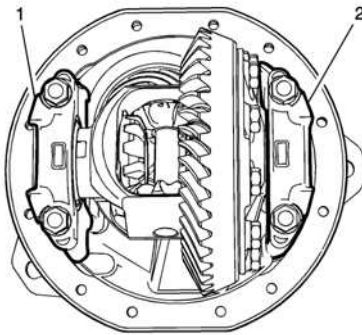
Special Tools

- DT-22912—A Split Plate Bearing Puller
- DT-50813 Pinion Remover Installer
- DT-08614—A Flange Remover Installer
- DT-49275 Pinion Bearing Remover
- EN-45000 Seal Remover

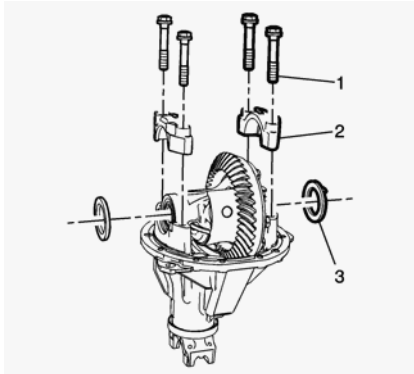
For regional equivalent tools, refer to Special Tools.

[Disassemble Procedure](#)

1. Install the differential carrier in a suitable holding fixture.



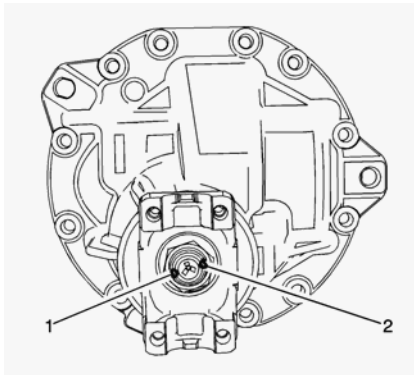
2. Mark the left (1) and right (2) case bearing caps.



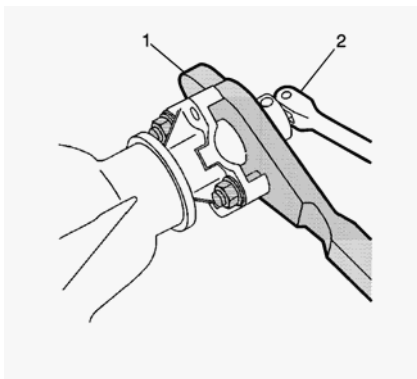
3. Remove the bearing cap bolt (1).

Note: Ensure that the left and right bearing caps and the adjusters are not mixed together. The bearing caps and adjusters are NOT interchangeable.

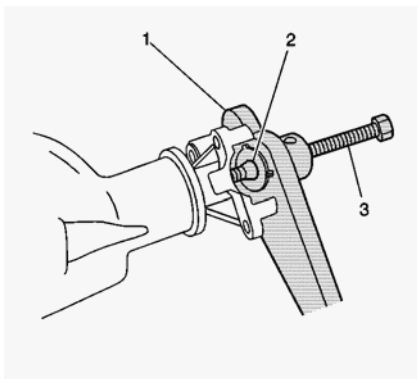
4. Remove the bearing caps (2).
5. Remove the adjusters (3).



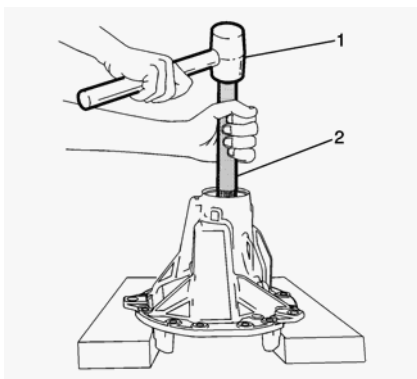
6. Using the appropriate tools, remove the stakes (1) and (2) from the pinion nut.



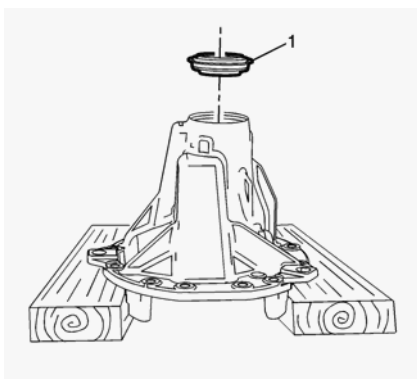
7. Using the *DT-08614-A* remover (1) and (2), remove the pinion flange nut.



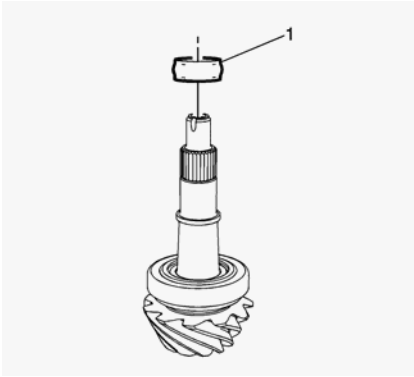
8. Using the *DT-08614-A* remover (1), (2) and (3), remove the pinion flange.



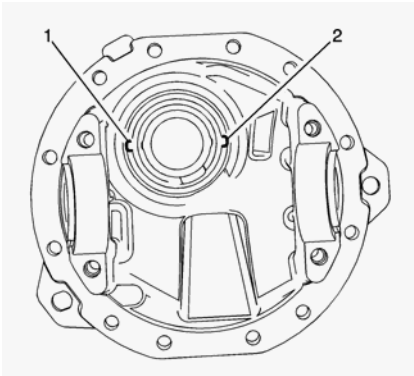
9. Using a hammer (1), and *DT-50813* remover (2), remove the pinion gear assembly.



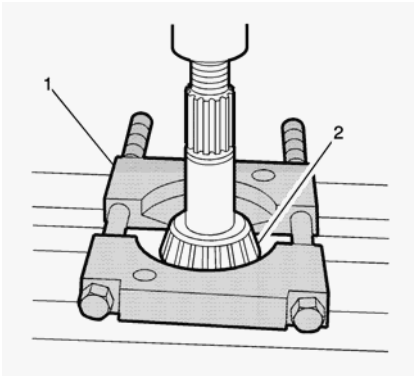
10. Using the *EN-45000* remover, remove the pinion seal (1).



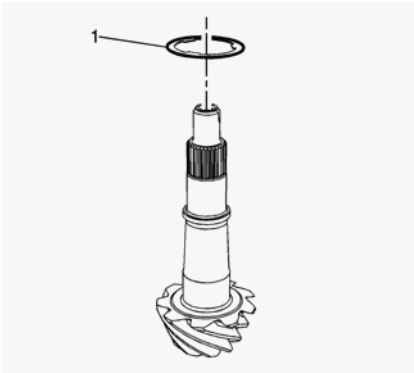
11. Remove the collapsible spacer (1).



12. Using a brass drift and a hammer alternating between slot (1) and (2), remove the outer and inner pinion bearing caps.



13. Using the DT-49275 puller (1), and a hydraulic press, remove the pinion gear bearing (2).



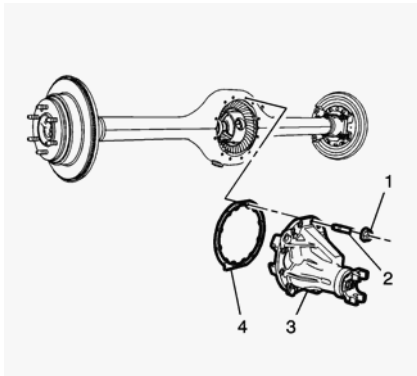
14. Remove the pinion gear shim (1).

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Removal Procedure

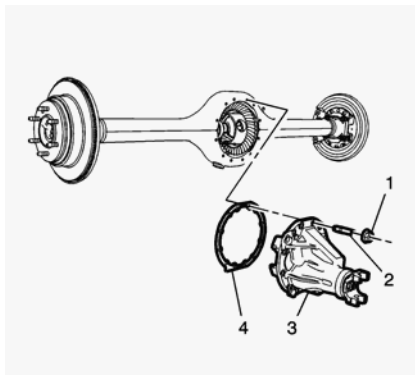
1. Raise and support the vehicle. Refer to Lifting and Jacking the Vehicle.
 2. Drain the rear axle assembly. Refer to Differential Oil Replacement.
 3. Remove the rear propeller shaft.
- For those vehicles equipped with the one piece propeller shaft, refer to One-Piece Propeller Shaft Replacement
 - For those vehicles equipped with the 2 piece propeller shaft, refer to Two-Piece Rear Propeller Shaft Replacement
 - Remove the rear axle shafts assembly from the rear axle. Refer to Rear Axle Shaft Replacement.



- Remove the 12 rear axle carrier nuts (1).
- Remove the differential carrier stud (2), if needed.
- Remove the differential carrier assembly (3).
- Remove the differential carrier gasket (4).

Installation Procedure

1. Clean the gasket area on the rear axle housing and the differential carrier.



Caution: Refer to Fastener Caution.

2. Install the differential carrier stud (2), if needed and tighten to:
 - For the 194 mm axle **25 Y (16 lb ft)**
 - For the 220 mm axle **65 Y (47 lb ft)**
- Install the differential carrier gasket (4) on the rear axle housing.
- Install the differential carrier assembly (3) on the rear axle housing.
- Install the 12 differential carrier nuts (1) and tighten to:
 - For the 194 mm axle **37 Y (27 lb ft)**
 - For the 220 mm axle **44 Y (33 lb ft)**
- Install the rear axle shafts assembly from the rear axle. Refer to Rear Axle Shaft Replacement.
- Install the rear propeller shaft.
- For those vehicles equipped with the one piece propeller shaft, refer to One-Piece Propeller Shaft Replacement
- For those vehicles equipped with the 2 piece propeller shaft, refer to Two-Piece Rear Propeller Shaft Replacement

Differential Carrier Assembly Replacement

- Fill the rear axle assembly. Refer to Differential Oil Replacement.
- Remove the supports and lower the vehicle.

2013 Chevrolet Colorado

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

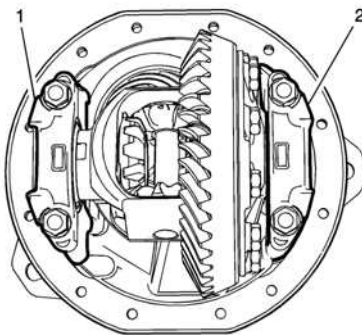
Special Tools

- DT-8092 Driver Handle
- DT-8107-4 Bearing Washer Puller
- DT-21784 Side Bearing Installer
- DT-22888-20A Bearing Puller

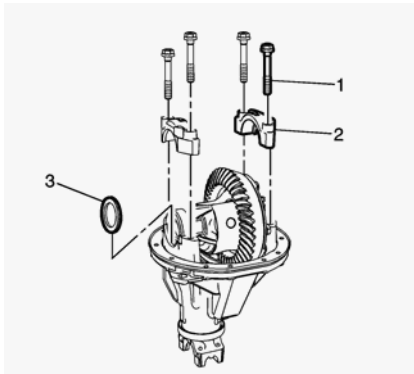
For regional equivalent tools, refer to Special Tools.

Disassemble Procedure

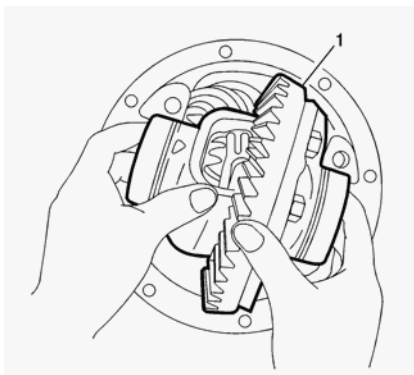
1. Remove the differential carrier assembly. Refer to Differential Carrier Assembly Replacement.
2. Install the differential carrier in a suitable handling devise.



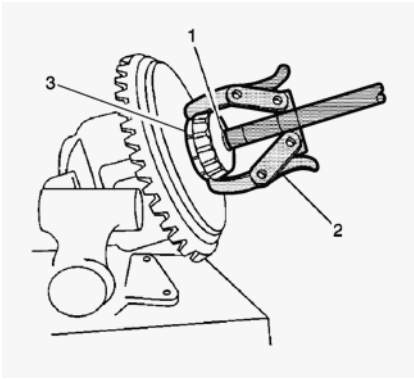
3. Mark the left (1) and the right (2) bearing caps.



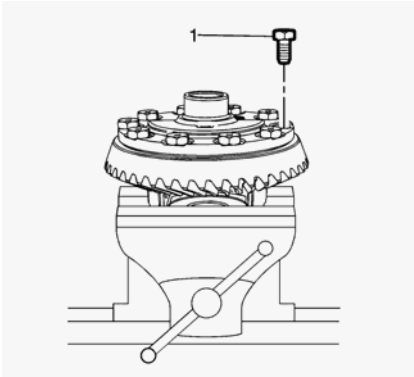
4. Remove the bearing cap bolts (1).
5. Remove the left and the right bearing caps (2).
6. Remove the shim (3).



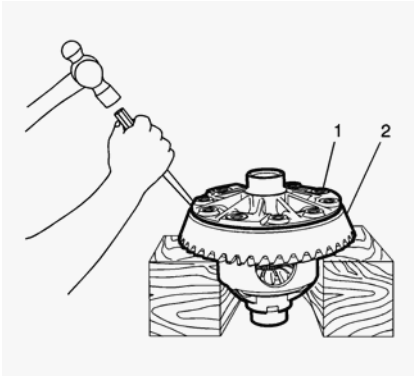
7. Remove the differential case (1).



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

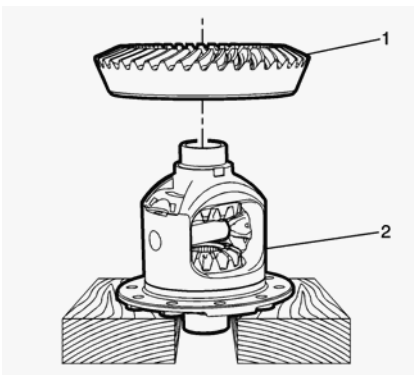


10. Position the differential case in a soft jawed vise.
11. Remove the 10 ring gear bolts (1).
12. Remove the differential case from the soft jawed vise.



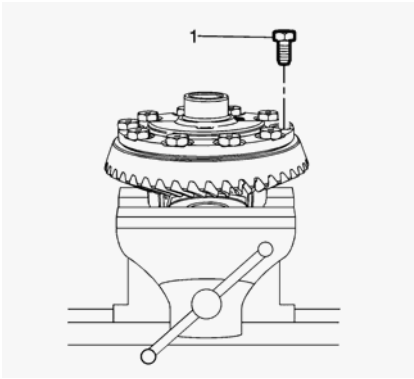
13. Position the differential case on two pieces of wood.
14. Using a hammer and a brass drift (2), remove the ring gear (2) from the differential case (1).

[Assemble Procedure](#)

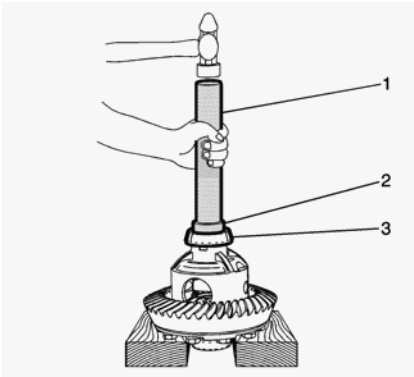


Note: Use a drift or punch to help align the holes in the ring gear and the differential case.

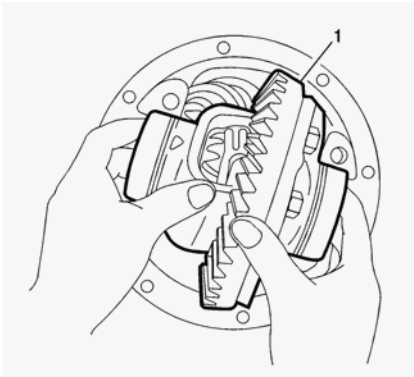
1. Position the ring gear (1) on the differential case (2).



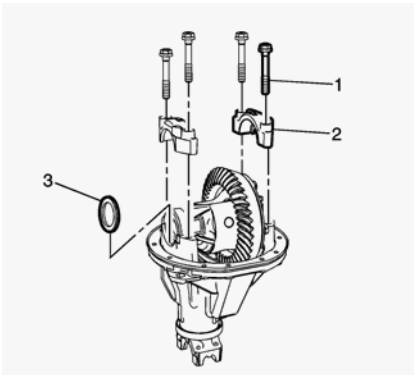
2. Install the differential case in a soft jawed vise.
 3. Finger start the 10 ring gear bolts (1).
- Note:** Tighten the ring gear bolts in a criss cross pattern to ensure that the ring gear is flat against the differential case.
4. Install the 10 ring gear bolts (1) and tighten to **108 Y (80 lb ft)**.



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



6. Install the differential case (1).



- Note:** Ensure that the reference marks for the left and right are bearing caps are installed correctly.
7. Install the bearing cap shims (3) and the bearing caps (2).
 8. Install and tighten the bearing cap bolts (1) to **108 Y (80 lb ft)**.
 9. Remove the differential carrier from the holding devise.

Differential Case Replacement (With G80)

10. Install the differential carrier assembly. Refer to Differential Carrier Assembly Replacement.

2013 Chevrolet Colorado

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

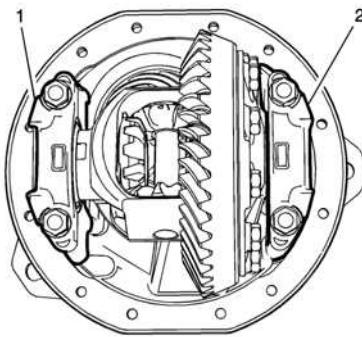
Special Tools

- DT-8092 Driver Handle
- DT-8107-4 Bearing Washer Puller
- DT-21784 Side Bearing Installer
- DT-22888-20A Bearing Puller

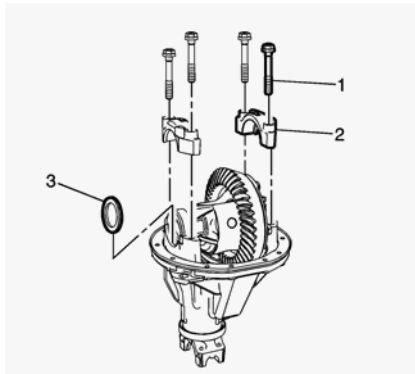
For regional equivalent tools, refer to Special Tools.

Disassemble Procedure

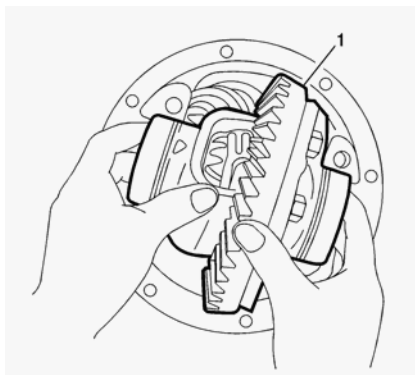
1. Remove the differential carrier assembly. Refer to Differential Carrier Assembly Replacement.
2. Install the differential carrier in a suitable handling devise.



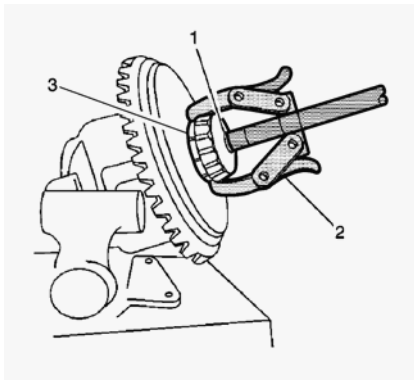
3. Mark the left (1) and the right (2) bearing caps.



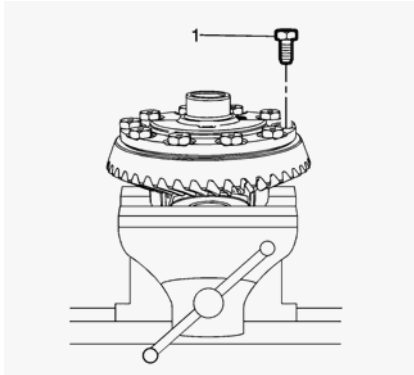
4. Remove the bearing cap bolts (1).
5. Remove the left and the right bearing caps (2).
6. Remove the shim (3).



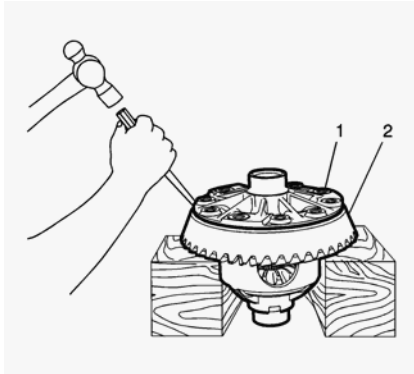
7. Remove the differential case (1).



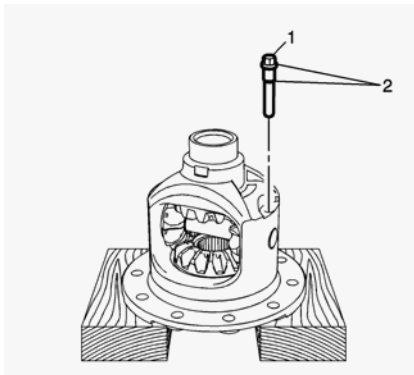
8. Install the differential case in a soft jawed vise.
9. Using the DT-8107-4 puller (2) and the DT-22888-20A puller (2) , remove the differential case side bearings (3).



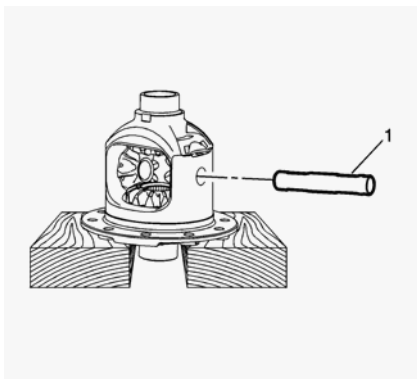
10. Position the differential case in a soft jawed vise.
11. Remove the 10 ring gear bolts (1).
12. Remove the differential case from the soft jawed vise.



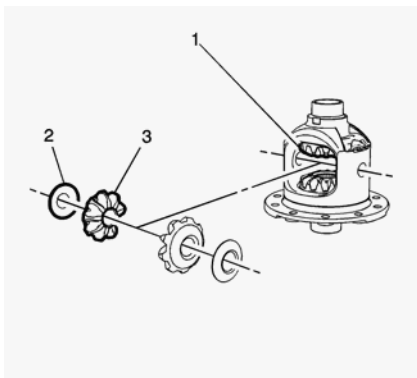
13. Position the differential case on two pieces of wood.
14. Using a hammer and a brass drift, remove the ring gear (2) from the differential case (1).



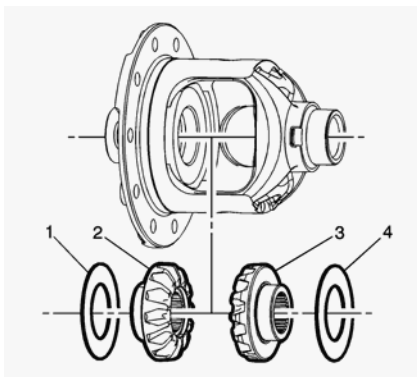
15. Remove the pinion gear lock bolt (1).



16. Remove the differential pinion gear shaft (1).

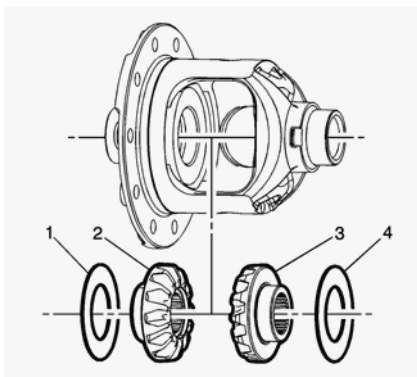


17. Rotate the pinion side gears (1) to allow the removal of the pinion gears (3) and the shims (2).

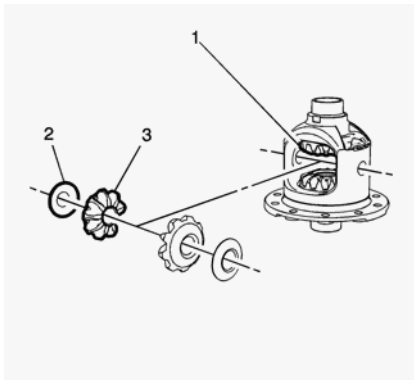


18. Remove the pinion side gears (2) and the shims (1).

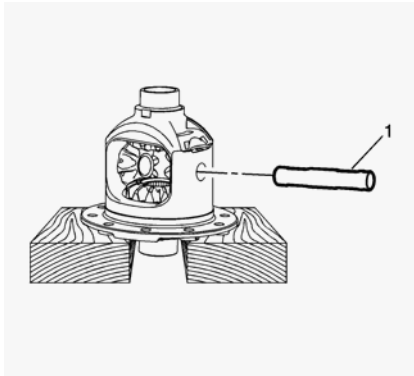
[Assemble Procedure](#)



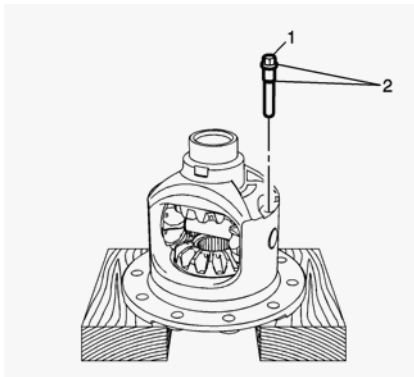
1. Position the pinion side gears (2) and the shims (1) in the differential case.



2. Rotate the pinion side gears to (1) to allow the installation of the pinion gears (3) and the shims (2).

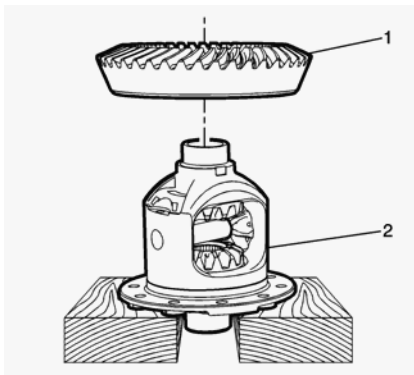


3. Install the differential pinion gear shaft (1).



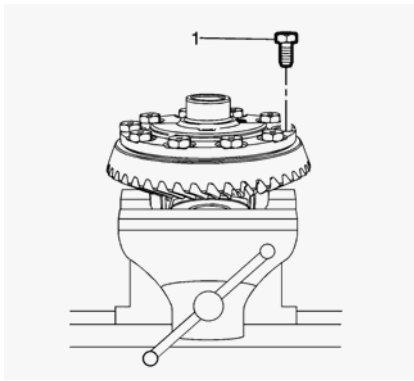
Caution: Refer to Fastener Caution.

4. Install the pinion gear lock bolt (1) and tighten to 50 Y (37 lb ft).

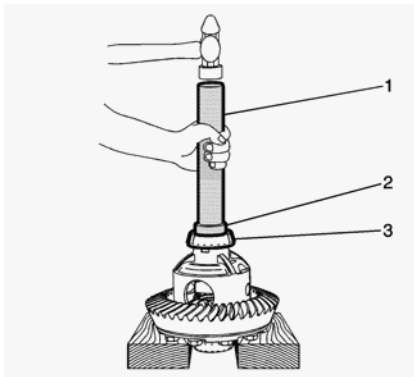


Note: Use a drift or punch to help align the holes in the ring gear and the differential case.

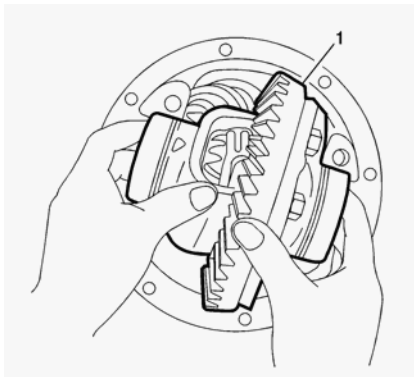
5. Position the ring gear (1) on the differential case (2).



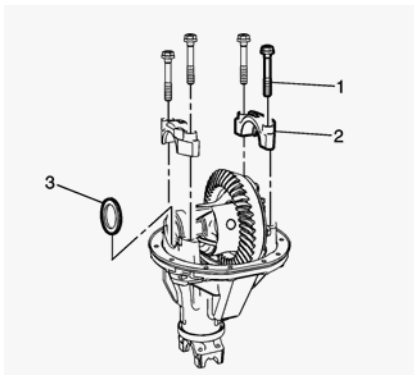
6. Install the differential case in a soft jawed vise.
 7. Hand start the 10 ring gear bolts (1).
- Note:** Tighten the ring gear bolts in a criss cross pattern to ensure that the ring gear is flat against the differential case.
8. Install the 10 ring gear bolts (1) and tighten to **108 Y (80 lb ft)**.



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



10. Install the differential case (1).



- Note:** Ensure that the reference marks for the left and right are bearing caps are installed correctly.
11. Install the bearing cap shims (3) and the bearing caps (2).
 12. Install and tighten the bearing cap bolts (1) to **108 Y (80 lb ft)**.
 13. Remove the differential carrier from the holding devise.

Differential Case Replacement

14. Install the differential carrier assembly. Refer to Differential Carrier Assembly Replacement.

2013 Chevrolet Colorado

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

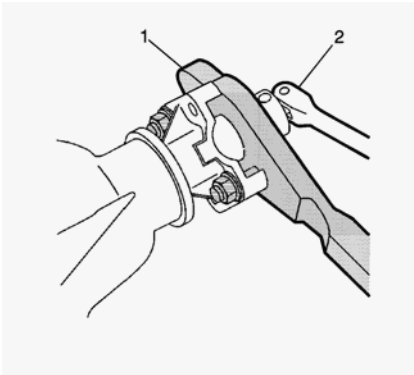
Special Tools

- DT-08614-A Pinion Flange Holder and Remover
- DT-22912-B Split Plate Bearing Puller
- DT-25299 Bearing Installer
- DT-38694 Seal Installer
- DT-50813 Pinion Driver
- EN-45000 Seal Remover
- GE-8092 Driver Handle

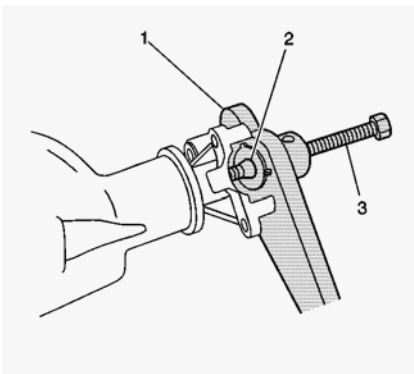
For regional equivalent tools, refer to Special Tools.

Removal Procedure

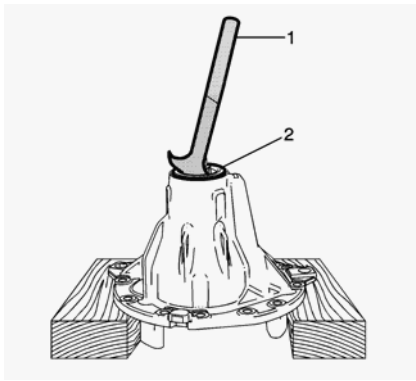
1. Raise and support the vehicle. Refer to Lifting and Jacking the Vehicle.
2. Remove the differential carrier assembly. Refer to Differential Carrier Assembly Replacement.
3. Install the differential carrier in a suitable holding fixture.



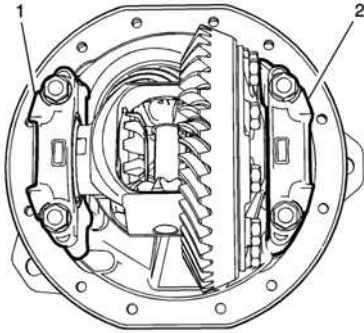
4. Using the DT-08614-A holder (1), breaker bar and the proper size socket (2), remove the pinion gear nut.



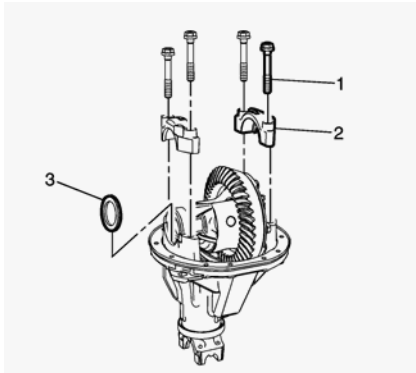
5. Using the DT-08614-A holder (1), (2) and (3), remove the pinion flange.



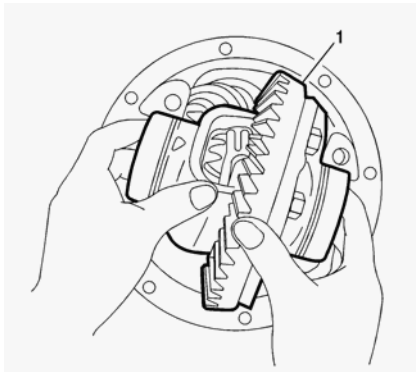
6. Using the EN-45000 remover (1), remove the pinion gear seal (2).



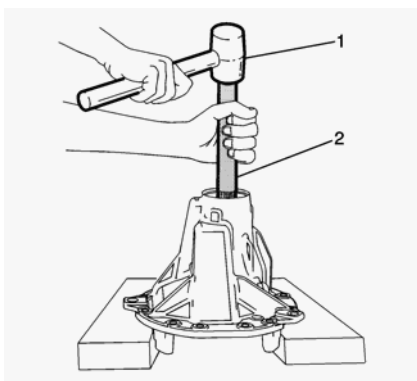
7. Mark the left (1) and right (2) bearing caps before removing from the differential carrier.



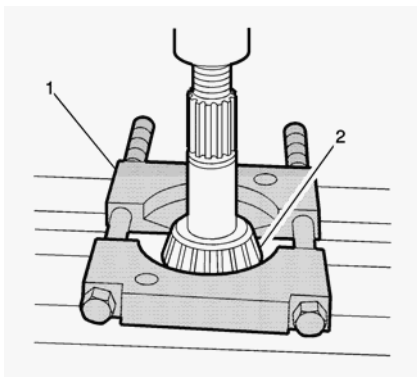
8. Remove the bearing caps (2), bolts (1) and the shims (3).



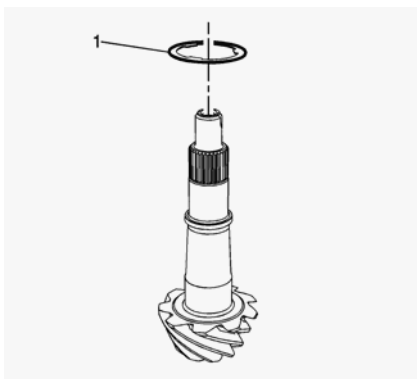
9. Remove the differential case (1).



10. Using the DT-50813 driver (2) and the hammer (1), remove the drive pinion gear.



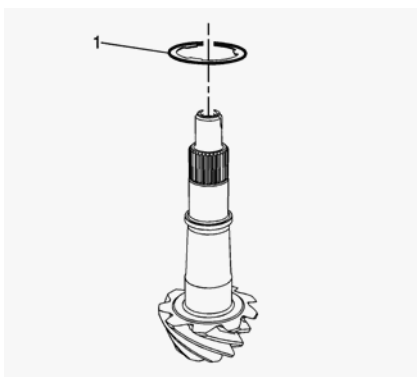
11. Using the hydraulic press and the DT-22912-B puller (1), remove the inner pinion bearing race (2).



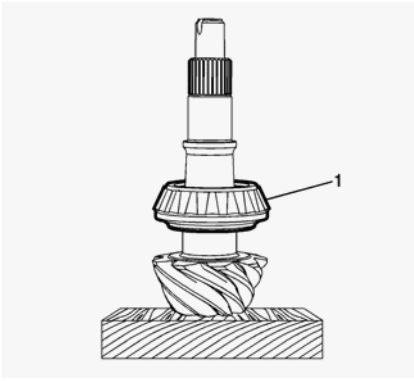
12. Remove the selective shim (1).
13. Remove the inner pinion gear bearing cup. Refer to Differential Carrier Assembly Disassemble.

[Installation Procedure](#)

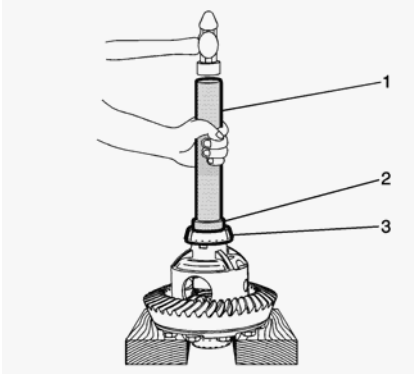
1. Install the inner and outer pinion gear bearing cups. Refer to Differential Carrier Assembly Disassemble.
2. Adjust the pinion gear depth. Refer to Pinion Depth Adjustment



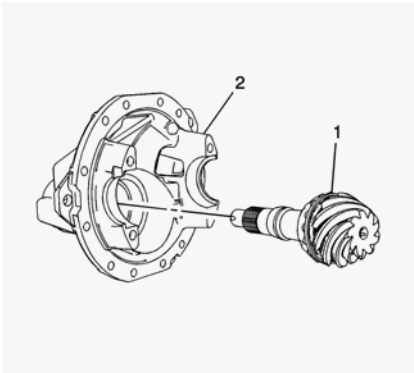
3. Install the selective shim (1) on the pinion gear.



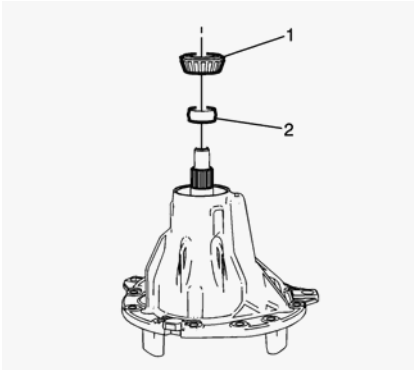
4. Position the inner pinion bearing race (1) on the pinion gear.



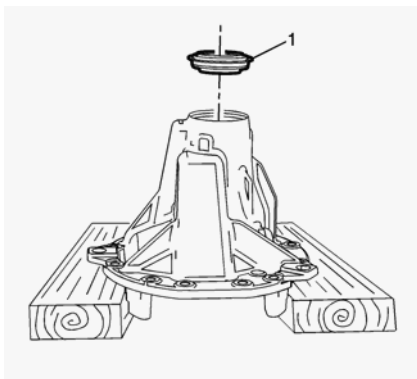
5. Using the GE-8092 handle (1) and the DT-25299 installer (2), install the inner pinion bearing race (3).



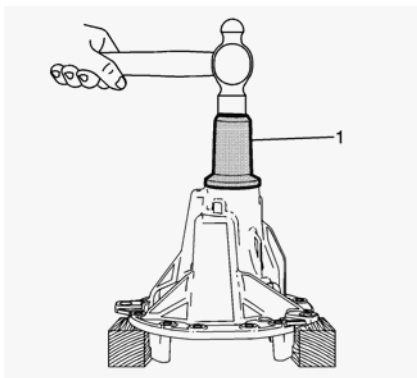
6. Install the pinion gear (1) in the differential carrier (2).



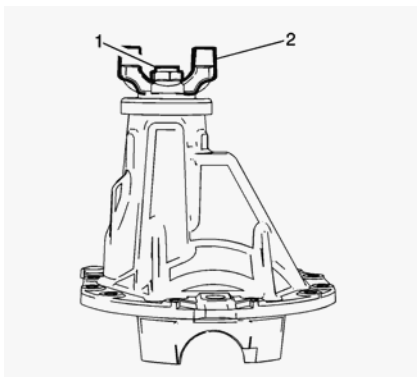
7. Position the collapsible spacer (2) and the outer pinion bearing race (1) on the pinion gear.



8. Position the pinion gear seal (1) in the differential carrier.

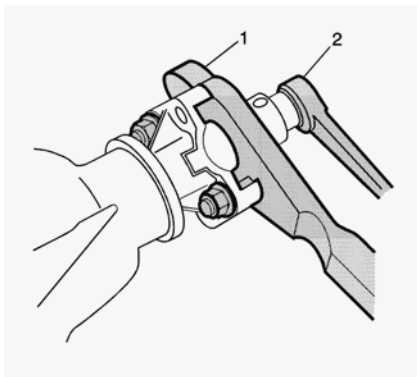


9. Using the DT-38694 installer and the hammer (1), install the pinion gear seal



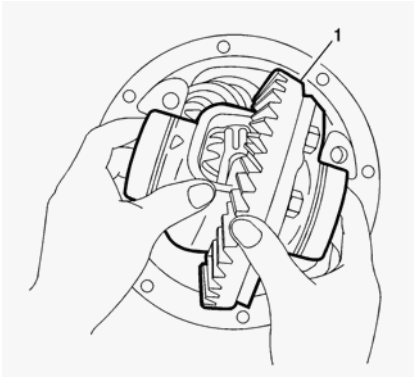
Note: It maybe necessary to use a soft faced hammer to lightly tap the pinion flange on the pinion gear until there enough threads (4 to 5) to hand start the pinion nut.

10. Install the pinion flange (2) and the NEW nut (1).

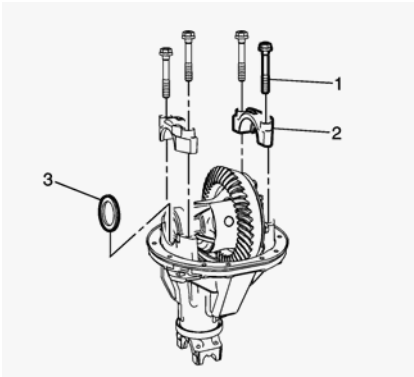


Caution: Refer to Fastener Caution.

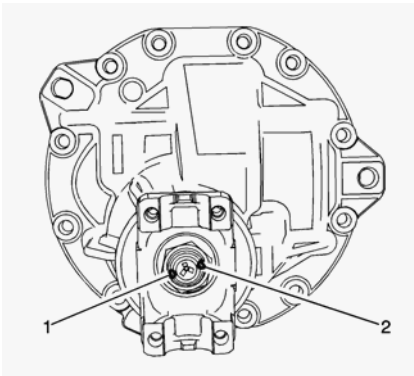
11. Using the DT-08614-A holder (1) and the torque wrench (2), tighten the pinion nut to **177-275 Y (130-203 lb ft)**.



12. Install the differential case assembly (1) in the differential carrier.



13. Install the bearing shims (3), caps (2) and the bolts (1).
14. Tighten the bearing cap bolts to **98 Y (72 lb ft)**
15. Adjust the back lash. Refer to Backlash Adjustment.



16. Using the appropriate tools, stake the pinion gear nut (1).
17. Remove the differential carrier in a suitable holding fixture.
18. Install the differential carrier assembly. Refer to Differential Carrier Assembly Replacement.
19. Remove the supports and lower the vehicle.

2013 Chevrolet Colorado

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

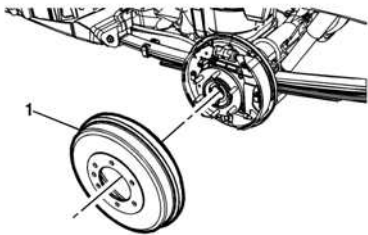
Special Tools

- *DT 08614*—A Pinion Flange Holder
- *DT 38694* Extension Housing Oil Pump/Seal Installer
- *EN 45000* Seal Remover

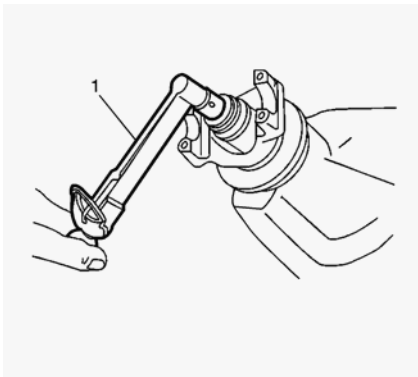
For regional equivalent tools, refer to Special Tools.

Removal Procedure

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

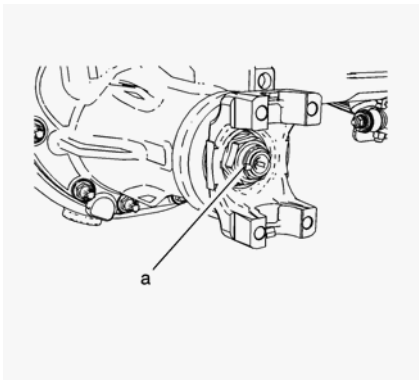


3. Remove the rear brake drums (1).
 4. Remove the propeller shaft from the vehicle.
- For the one piece propeller shaft, refer to One-Piece Propeller Shaft Replacement.
 - For the two piece propeller shaft, refer to Two-Piece Rear Propeller Shaft Replacement.

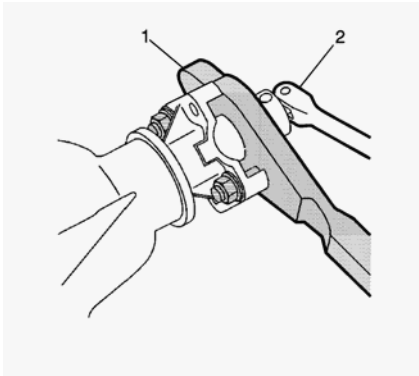


Note: Record the measurement taken in the step 5.

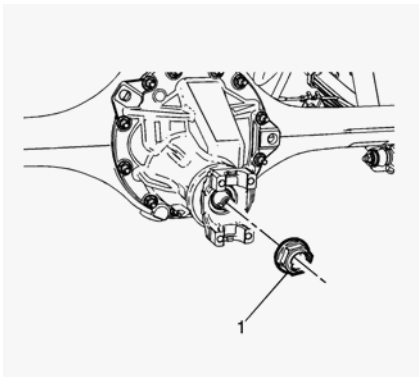
- Use a inch pound torque wrench and the proper size socket (1), record the rational torque of the rear axle. This will give the combined preload for the following components:
 - The pinion bearings
 - The pinion oil seal
 - The differential case bearings
 - The axle seals



- Using a hammer and the appropriate tool, remove the stake on the pinion gear nut (a).

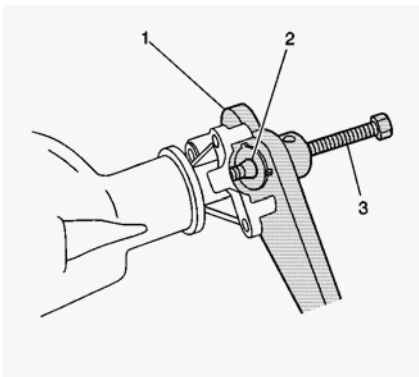


- Using the proper size socket and the breaker bar (2) with the *DT08614-A* remover (1), loosen the pinion nut.

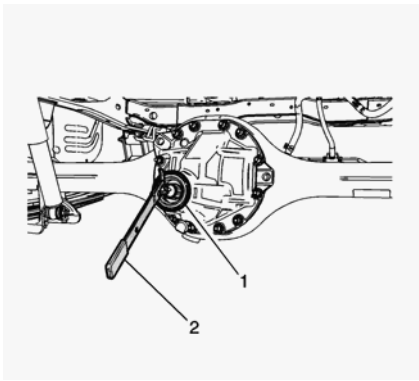


Note: DO NOT re-use the pinion nut. Replace with NEW only.

- Remove and discard the pinion nut (1).

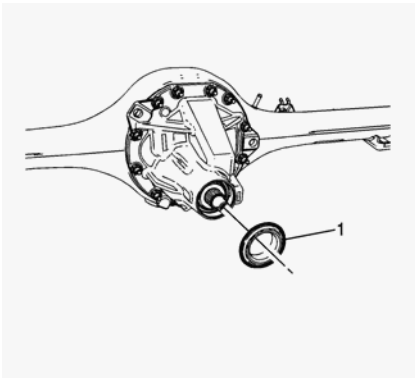


- Using the tools *DT08614-A* holder (1), (2) and (3), remove the differential drive pinion gear yoke from the pinion gear.

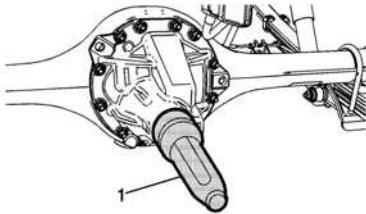


- Using the *EN 45000* remover (2), remove the differential drive pinion gear seal (1) from the differential housing.

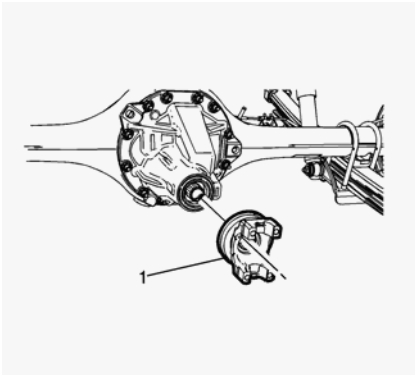
[Installation Procedure](#)



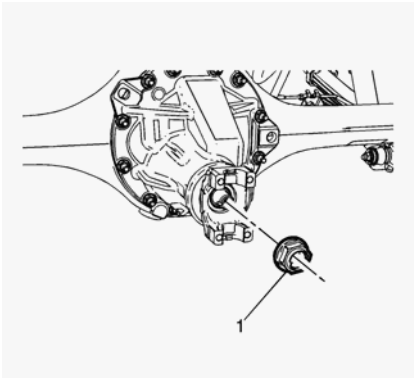
1. Position the differential drive pinion gear seal (1) to the differential housing.



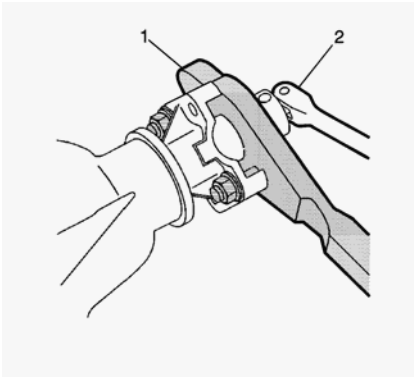
2. Using the *DT 38694* installer (1), install the differential drive pinion gear seal into the differential housing.



3. Position the differential drive pinion gear yoke (1) on the pinion gear.
4. Using a soft face hammer, lightly tap the differential drive pinion gear yoke (1) until the pinion nut can be installed.

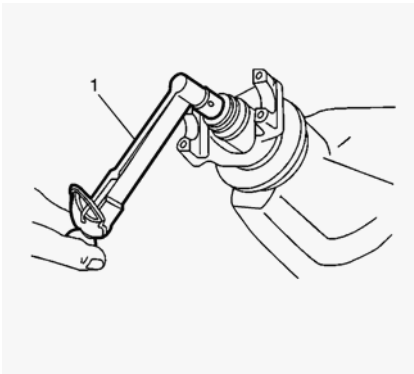


5. Hand start the pinion nut (1).



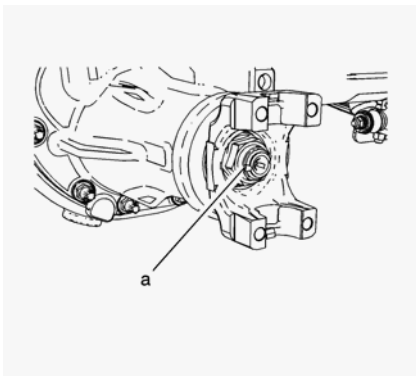
Note: Do Not overtighten or loosen then retighten the pinion nut. Tighten the pinion nut to the lowest torque specification.

6. Using the DT 08614-A holder and the (1) with the proper size socket and torque wrench (2), tighten the pinion nut just until the end play is taken up.



7. Using a inch pound torque wrench and the proper size socket (1), measure the rotational torque. The torque should be:

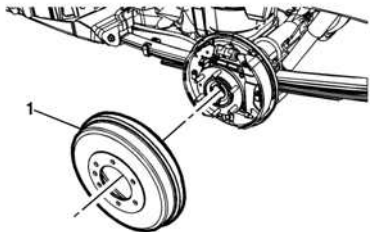
- For the 194 axle **0.7 to 1.3 Y (6 to 11 lb in)**
- For the 220 axle **0.7 to 1.13 Y (6 to 10 lb in)**
- If not, continue to tighten the pinion nut in small increments until the rotational torque is within the proper specifications.
- If the proper rotational torque cannot be met, replace the collapsible spacer.



- Using a hammer and a punch, stake the pinion nut (a).
- Install the propeller shaft in the vehicle.

Differential Drive Pinion Gear Yoke and Seal Replacement

- For the one piece propeller shaft, refer to One-Piece Propeller Shaft Replacement.
- For the two piece propeller shaft, refer to Two-Piece Rear Propeller Shaft Replacement.



- Install the rear brake drums (1).
- Install the rear tire and wheel assembly. Refer to Tire and Wheel Removal and Installation.
- Remove the supports and lower the vehicle.

2013 Chevrolet Colorado

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

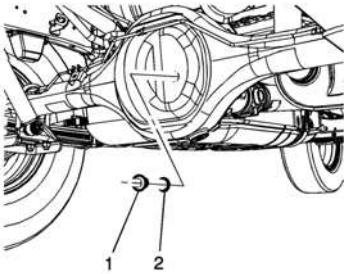
- Check the pinion gear shaft for unusual wear.
- Check the pinion and the side gear teeth for wear, cracks, scoring and spalling.
- Check the thrust washers for wear.
- Check the fit of the side gears in the differential case and on the axle shafts.
- Check the differential case for cracks and scoring and replace all of the worn parts as necessary.

2013 Chevrolet Colorado

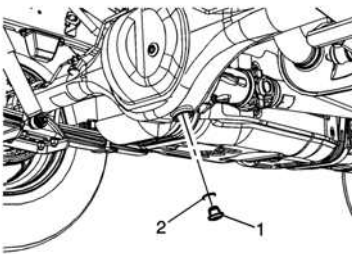
Submodel: | Engine Type: | Liters:
Fuel Delivery: | Fuel:

[Removal Procedure](#)

1. Raise and support the vehicle. Refer to Lifting and Jacking the Vehicle.
2. Position the approved drain container under the rear axle.

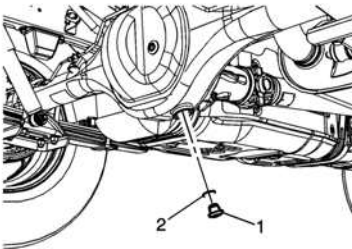


3. Remove the rear axle fill plug (1) and the washer (2).



4. Remove the rear axle drain plug (1) and the washer (2).

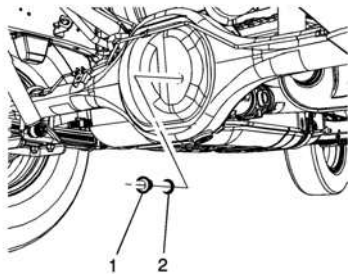
[Installation Procedure](#)



Caution: Refer to Fastener Caution.

1. Install the washer (2) and the drain plug (1) and tighten to **32 Y (24 lb ft)**.
2. Fill the rear axle with the proper type and amount of lubricant. Refer to Approximate Fluid Capacities and Fluid and Lubricant Recommendations.

Differential Oil Replacement



3. Install the washer and the fill plug and tighten to **32 Y (24 lb ft)**.
4. Remove the support and lower the vehicle.

2013 Chevrolet Colorado

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

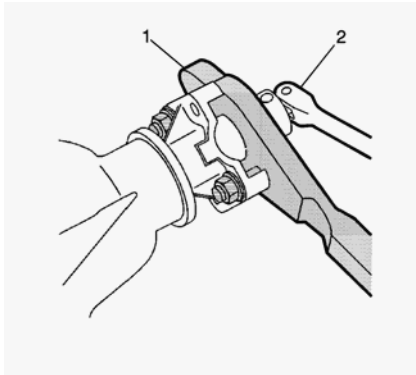
Special Tools

- DT-22912-B Split Plate Bearing Puller
- DT-25299 Bearing Installer
- DT-50813 Pinion Driver
- DT-08614-A Pinion Flange Holder and Remover
- DT-38694 Seal Installer
- EN-45000 Seal Remover
- GE-8092 Driver Handle

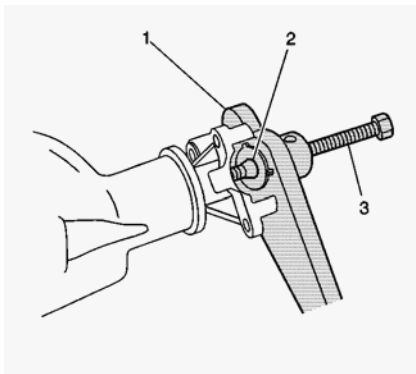
For regional equivalent tools, refer to Special Tools.

Removal Procedure

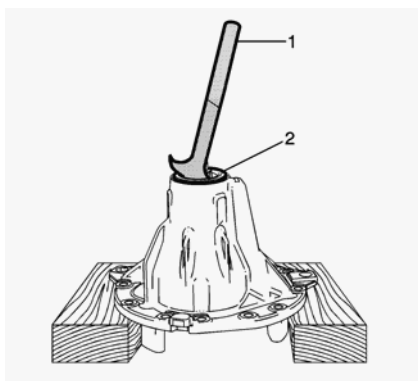
1. Raise and support the vehicle. Refer to Lifting and Jacking the Vehicle.
2. Remove the differential carrier assembly. Refer to Differential Carrier Assembly Replacement.
3. Install the differential carrier in a suitable holding fixture.



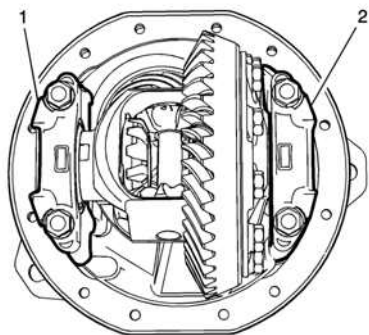
4. Using the DT-08614-A holder (1), breaker bar and the proper size socket (2), remove the pinion gear nut.



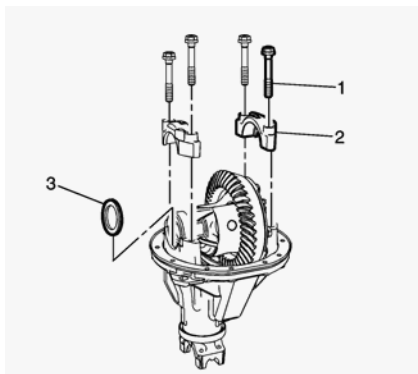
5. Using the DT-08614-A holder (1), (2) and (3), remove the pinion flange.



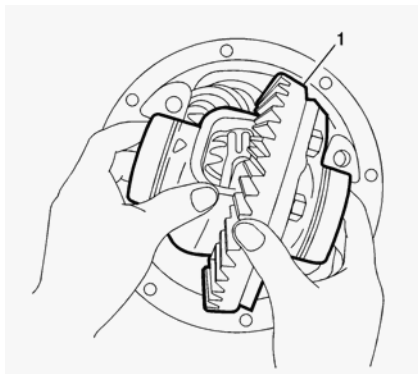
6. Using the EN-45000 remover (1), remove the pinion gear seal (2).



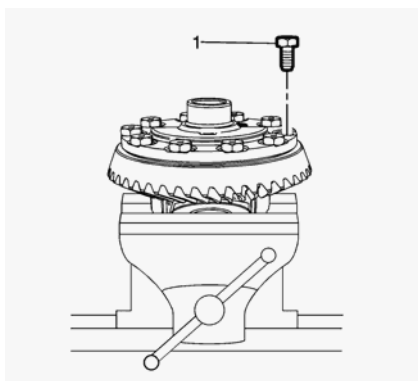
7. Mark the left (1) and right (2) bearing caps before removing from the differential carrier.



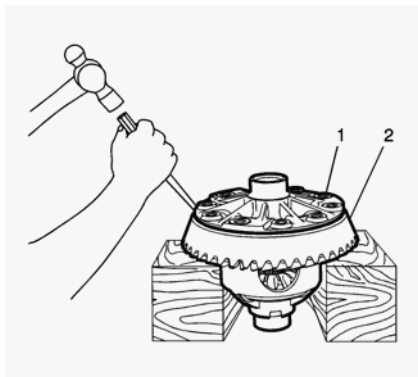
8. Remove the bearing caps (2), bolts (1) and the shims (3).



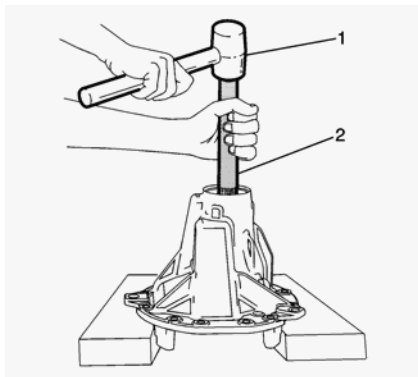
9. Remove the differential case (1).



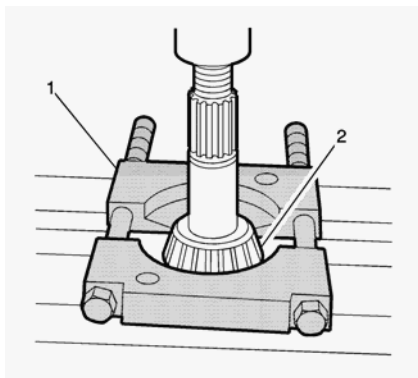
10. Position the differential case in a soft jaw vise.
11. Remove the 10 ring gear bolts (1).



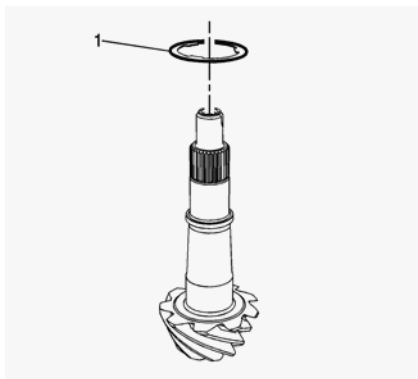
12. Using a brass drift and a hammer, remove the ring gear (2) from the differential case (1).



13. Using the DT-50813 driver (2) and the hammer (1), remove the drive pinion gear.



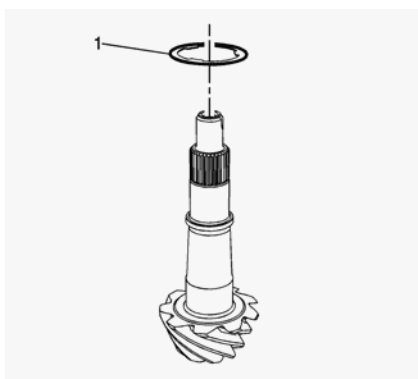
14. Using the hydraulic press and the DT-22912-B puller (1), remove the inner pinion bearing race (2).



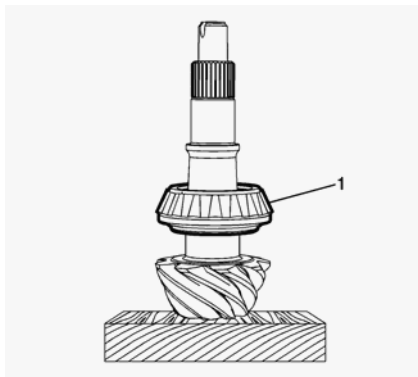
15. Remove the selective shim (1).
16. Remove the inner pinion gear bearing cup. Refer to Differential Carrier Assembly Disassemble.

[Install Procedure](#)

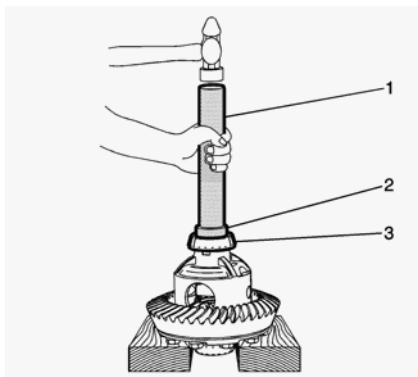
1. Install the inner and outer pinion gear bearing cups. Refer to Differential Carrier Assembly Disassemble.
2. Adjust the pinion gear depth. Refer to Pinion Depth Adjustment



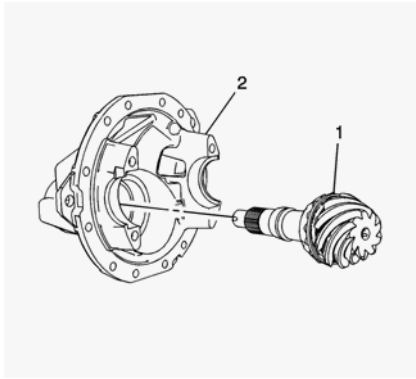
3. Install the selective shim (1) on the pinion gear.



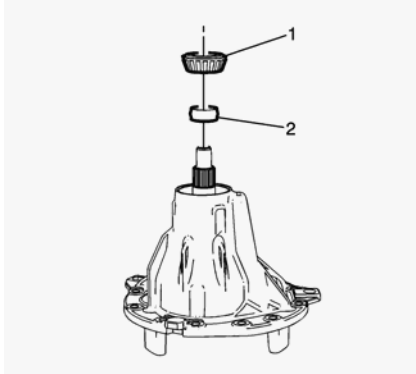
4. Position the inner pinion bearing race (1) on the pinion gear.



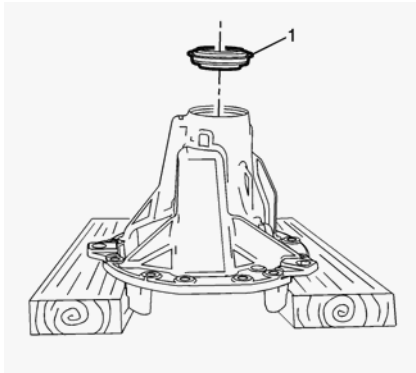
5. Using the GE-8092 handle (1) and the DT-25299 installer (2), install the inner pinion bearing race (3).



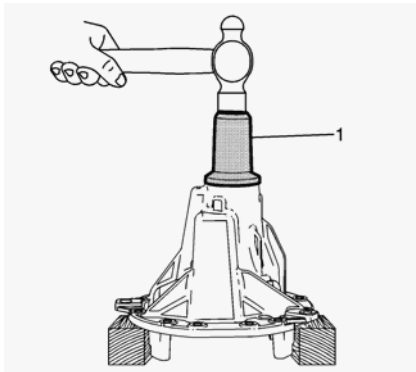
6. Install the pinion gear (1) in the differential carrier (2).



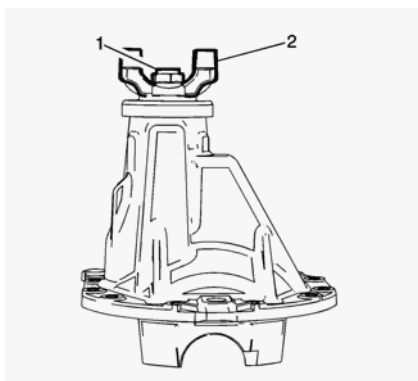
7. Position the collapsible spacer (2) and the outer pinion bearing race (1) on the pinion gear.



8. Position the pinion gear seal (1) in the differential carrier.

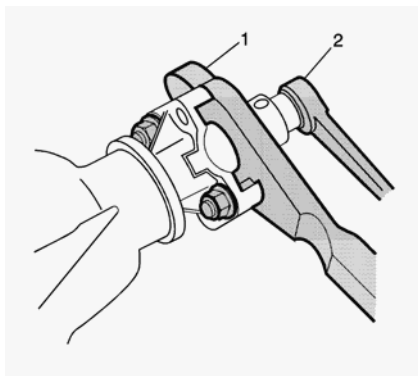


9. Using the DT-38694 installer and the hammer (1), install the pinion gear seal



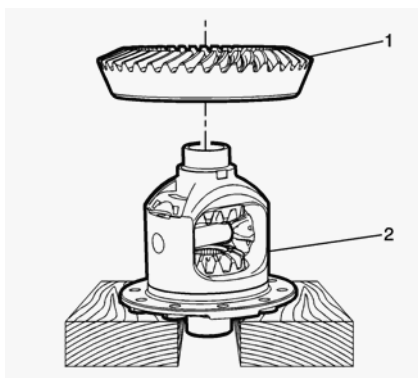
Note: It may be necessary to use a soft faced hammer to lightly tap the pinion flange on the pinion gear until there enough threads (4 to 5) to hand start the pinion nut.

10. Install the pinion flange (2) and the NEW nut (1).

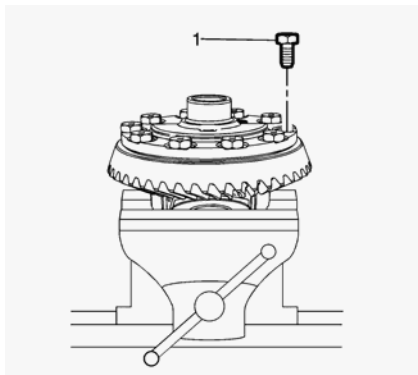


Caution: Refer to Fastener Caution.

11. Using the DT-08614-A holder (1) and the torque wrench (2), tighten the pinion nut to **177-275 Y (130-203 lb ft)**.



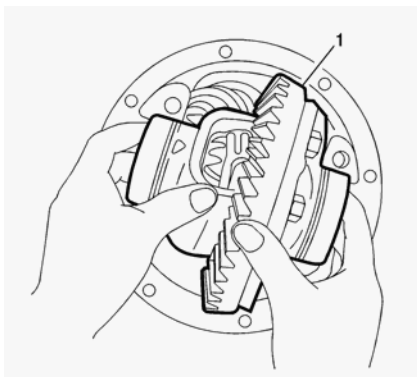
12. Position the ring gear (1) on the differential case (2).



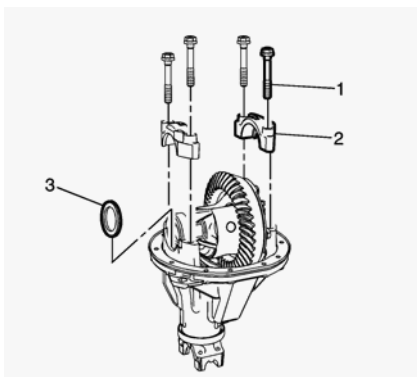
13. Install the ring gear in a soft jaw vise.

14. Hand start the 10 ring gear bolts (1).

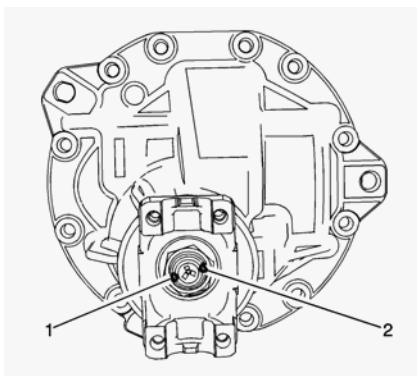
Tighten the 10 ring gear bolts (1) in sequence to **108 Y (80 lb ft)**.



15. Install the differential case assembly (1) in the differential carrier.



16. Install the bearing shims (3), caps (2) and the bolts (1).
17. Tighten the bearing cap bolts to **98 Y (72 lb ft)**
18. Adjust the backlash. Refer to Backlash Adjustment.



19. Using the appropriate tools, stake the pinion gear nut (1).
20. Remove the differential carrier in a suitable holding fixture.
21. Install the differential carrier assembly. Refer to Differential Carrier Assembly Replacement.
22. Remove the supports and lower the vehicle.

2013 Chevrolet Colorado

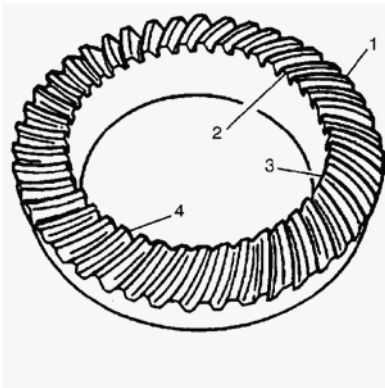
Submodel: | Engine Type: | Liters:
Fuel Delivery: | Fuel:

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.

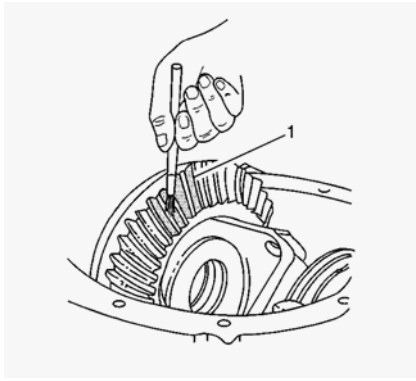
- If the thickness of the right shim is increased or the adjuster sleeve is moved in (if applicable), along with an equal decrease in the thickness of the left shim or the adjuster sleeve is moved out (if applicable), the backlash will increase.
- If the thickness of the left shim is increased or the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

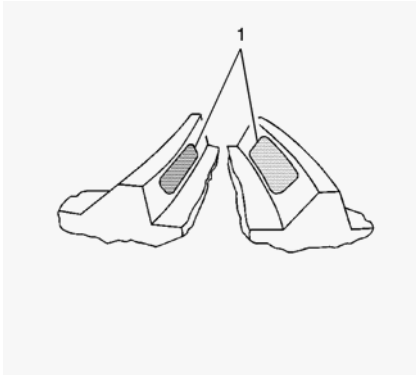
1. Wipe clean the differential case, the ring gear and the axle housing of lubricant. Carefully clean each tooth of the ring gear.



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.
- Note:** 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.

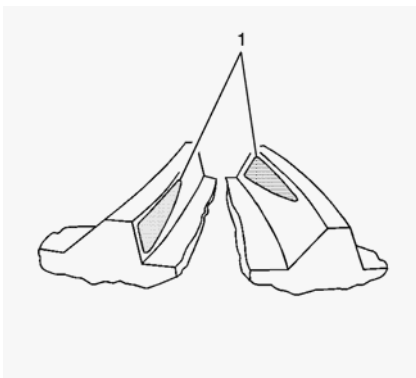
Service Hints

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

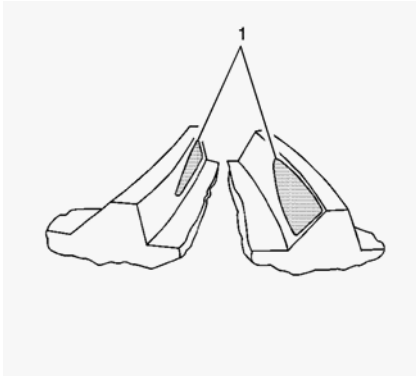
The backlash is incorrect. The ring gear is too far away from the pinion.

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](#)



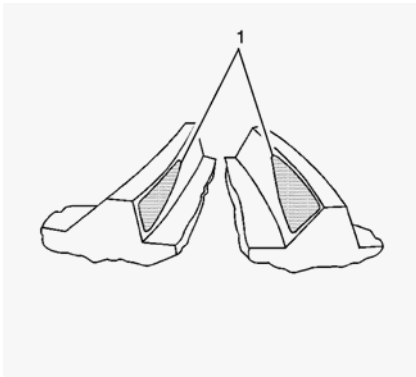
Condition

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](#)



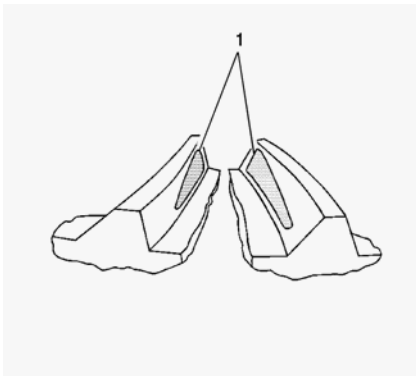
Condition

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

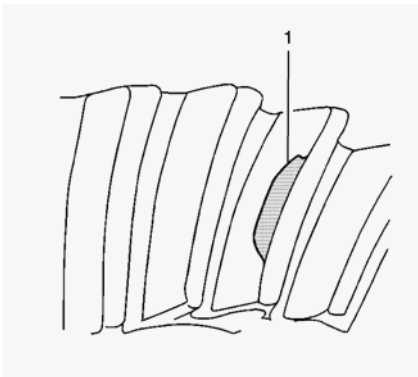
The backlash is incorrect. The ring gear is too close to the drive pinion.

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



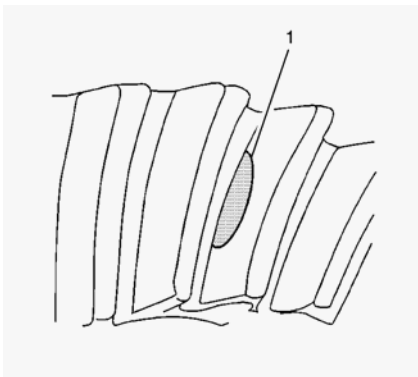
Condition

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:

Special Tools

- J 7872 Magnetic Base Dial Indicator
- J 8001-2 Dial Indicator Sleeve
- J 8001-3 Dial Indicator

for regional equivalent tools, refer to Special Tools.

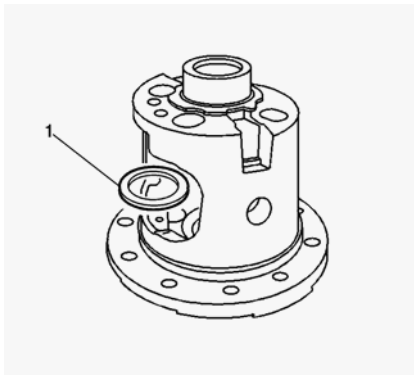
Adjustment of the Differential

Note: If it is necessary to replace the left side gear (cam unit) and disc assembly, the right side gear and disc assembly, or the thrust block, the entire differential must be adjusted. The differential is adjusted using selective thickness thrust washers between the clutch pack assemblies and the case and/or different selective thickness thrust blocks.

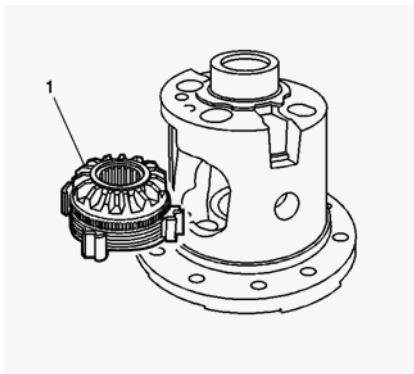
When adjusting the differential, note the following:

- Build up the clutch disc packs properly.
Proper clearance between parts is critical to the operation of the unit.
- Adjust the backlash and thrust block clearance in the following order:
 1. The left side gear backlash
 2. The right side gear backlash
 3. The thrust block clearance

Left Side Gear Backlash Adjustment



1. Install the new left side thrust washer into the flange end of the differential case.



2. Install the left side gear (cam unit) and clutch pack assembly into the differential case.

Note: Align the openings of the pinion gears and the pinion thrust washer to the pinion shaft opening in the differential case.

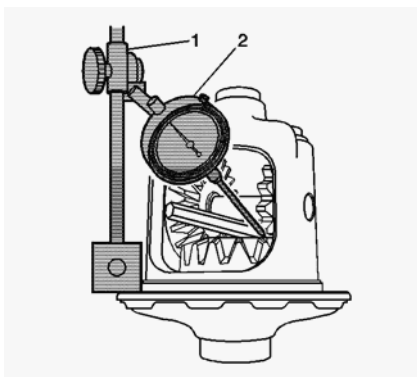
3. Install the pinion gears with the pinion thrust washers into the differential case.

Note: If the pinion shaft cannot be installed after pressing on the side gear, replace the side gear thrust washer with a thinner washer.

4. Install the pinion shaft. It may be necessary to press down on the side gear in order to align the pinion gear shaft opening with the pinion shaft opening in the differential case.
5. Tighten the pinion shaft lock bolt finger tight.
6. Rotate the pinion gear closest to the lock bolt so that one of the teeth is pointing downward, perpendicular to the ring gear flange.

Note: Press the brass drift in far enough in order to compress the clutch discs.

7. Install a brass drift between the side gear and the pinion shaft.



8. Measure the backlash of the pinion gear and the side gear:

1. Install the J 7872 indicator (1) to the ring gear flange.
2. Loosely clamp the J 8001-3 indicator (2) onto the stem on the J 7872 indicator (1).
3. Place the contact pad of the J 8001-3 indicator (2) on one of the teeth of the pinion gear closest to the pinion shaft lock bolt.
4. Turn the dial of the J 8001-3 indicator (2) until the needle and the dial face indicate zero.
5. Tighten the lock nut of the J 8001-2 sleeve (3) finger tight.
6. Pull the pinion gear firmly into the differential case seat.
7. Rotate the pinion gear back and forth.
8. Measure the backlash. The backlash for the pinion gears should be **0.305-0.356 mm (0.012-0.014 in)**.
9. If the backlash is too large, install a thicker side gear thrust washer and inspect the backlash.
10. If the backlash is too small, install a thinner side gear thrust washer and inspect the backlash.

Left side gear thrust washers are available in the following sizes:

Washer Sizes

- 0.56 mm (0.022 in)
- 0.68 mm (0.027 in)
- 0.81 mm (0.032 in)
- 0.91 mm (0.036 in)
- 1.02 mm (0.040 in)
- 1.12 mm (0.044 in)
- 1.22 mm (0.048 in)
- 1.32 mm (0.052 in)

Right Side Gear Backlash Adjustment

1. If necessary, remove the following from the differential case:
 1. The pinion lock shaft bolt
 2. The pinion shaft
 3. The pinion gears
 4. The pinion gear thrust washers
 5. The left side gear (cam unit) and clutch disc assembly
2. Install the right side gear thrust washer into the bell-end of the differential case.
3. Install the right side gear and clutch pack assembly into the differential case.
4. Install the pinion gears with the pinion thrust washers into the differential case.

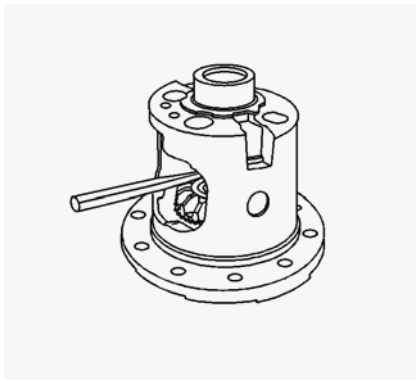
Align the openings of the pinion gears and the pinion thrust washer to the pinion shaft opening in the differential case.

5. Press down on the side gear and install the pinion shaft.

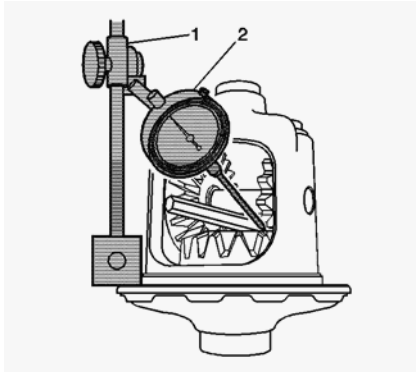
If the side gear cannot be pressed down far enough to install the pinion shaft, replace the side gear shim with a thinner shim.

Note: Tighten the pinion shaft lock bolt finger tight.

6. Install the pinion shaft lock bolt.
7. Rotate the pinion gear so that one of the teeth is pointing downward, perpendicular to the ring gear flange.

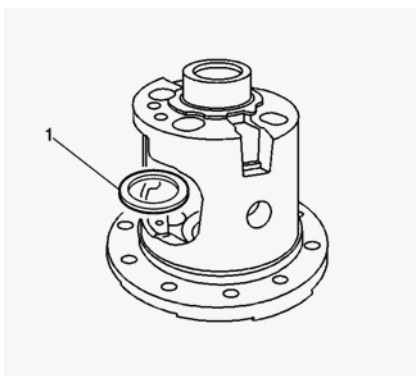


8. Install a brass drift between the side gear and the pinion shaft.
Press the brass drift in enough, in order to compress the clutch discs.



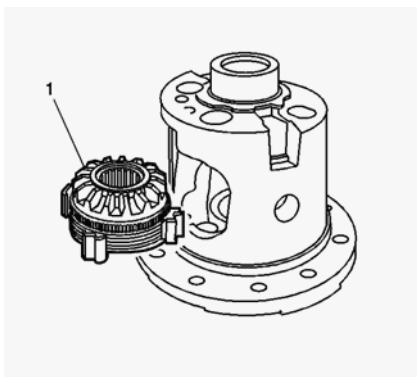
9. Measure the backlash of the pinion gear and the right side gear by doing the following:
 1. Install the J 7872 indicator (1) to the ring gear flange.
 2. Loosely clamp the J 8001-3 indicator (2) onto the stem on the J 7872 indicator (1).
 3. Place the contact pad of the J 8001-3 indicator on one of the teeth of the pinion gear closest to the pinion shaft lock bolt.
Turn the dial of the J 8001-3 indicator until the needle and the dial face indicate zero.
 4. Tighten the lock nut of the J 8001-2 sleeve (2) finger tight.
 5. Pull the pinion gear firmly into the differential case seat.
 6. Rotate the pinion gear back and forth.
 7. The backlash measurement should be **0.025-0.102 mm (0.001-0.004 in)**.
10. Right side gear shims are available in the following sizes:
Shim Sizes
 - o 0.254 mm (0.010 in)
 - o 0.381 mm (0.015 in)
 - o 0.508 mm (0.020 in)
 - o 0.635 mm (0.025 in)
 - o 0.762 mm (0.030 in)
 - o 0.899 mm (0.035 in)
 - o 1.016 mm (0.040 in)
 - o 1.143 mm (0.045 in)
11. If the backlash is too large, install a thicker side gear shim and recheck the backlash.
12. If the backlash is too small, install a thinner side gear shim and recheck the backlash again.

[Thrust Block Clearance Adjustment](#)



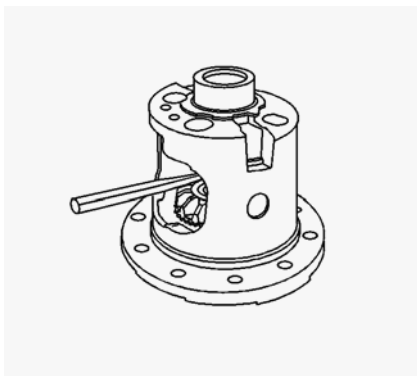
Note: The left and right side gear backlash measurements must be done before the thrust block measurement can be completed.

1. Install the left side gear thrust washer into the differential case.



2. Install the left side gear (cam unit) and clutch disc assembly into the differential case.
3. Install the right side shim into the differential case.
4. Install the right side gear and clutch disc assembly into the differential case.
5. Install the pinion shaft.
6. Install the pinion shaft bolt.

Tighten the pinion shaft bolt finger tight.

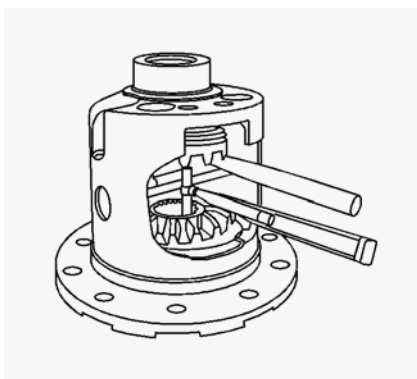


Note: Press the brass drift in far enough in order to compress the clutch disc assembly and hold the left side gear assembly in place.

7. Install a brass drift between the left side gear and the pinion shaft.

Note: Press the brass drift in far enough, in order to hold the right side gear assembly in place.

8. Install a brass drift between the right side gear and the pinion shaft.



Note: Do not measure the distance between the side gear teeth.

9. Using a 25.4–50.8 mm (1–2 in) telescoping gauge, measure the distance between the side gear faces.
10. Remove the telescoping gauge.
11. Measure the telescoping gauge with a micrometer. Record the measurement.
12. Compare the measurement obtained in step 11 to the thrust block sizes available. If the measurement is equal to one of the thrust blocks sizes available, then select that thrust block.
13. If the measurement obtained in step 11 is not equal to one of the thrust blocks sizes available, then select the thrust block that is smaller than the measurement.

For example, if the measurement is 32.13 mm (1.265 in), select the 32.05 mm (1.262 in) thrust block.

Note: The backlash must be rechecked and adjusted to specification anytime the left and/or the right thrust washers are replaced.

14. If the measurement obtained in step 11 is less than 33.58 mm (1.32 in), then reduce the left side gear thrust washer or the right side gear shim thickness in order to increase the thrust block opening.
15. If the measurement obtained in step 11 is greater than 34.19 mm (1.34 in), then increase the left side gear thrust washer or the right side gear shim thickness in order to decrease the thrust block opening.

Locking Differential Adjustment

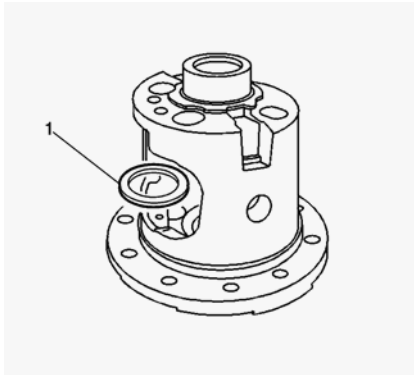
16. Inspect the left and/or right side gear backlash and adjust as necessary.
17. Inspect the thrust block clearance and adjust as necessary.

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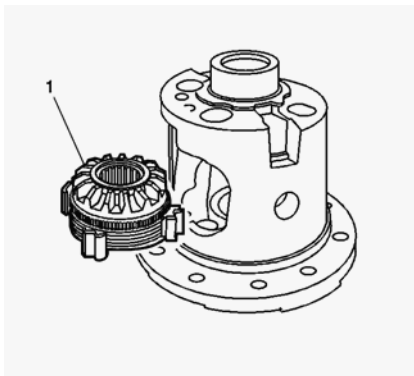
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[Assemble Locking Differential](#)

Note: The left and right side gear backlash and thrust block thickness measurement must be completed before the components of the locking differential can be assembled.



1. Install the left side gear thrust washer.



2. Install the left side gear (cam unit) and clutch disc assembly.
3. Install the right side gear thrust washer.
4. Install the right side clutch pack assembly.
5. Install the right side gear.

Note: If the original pinion gears and thrust washers are being re-used, install the pinion gears and thrust washers on the same side as when removed.

6. Install the pinion gear and the pinion thrust washers.

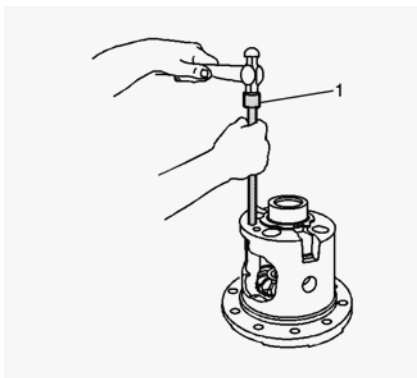
Place the pinion gears and the pinion thrust washers 180 degrees apart.

7. Rotate the pinion gears and the pinion thrust washers 90 degrees and align the pinion gears with the pinion shaft opening in the differential case.
8. Install the thrust block.

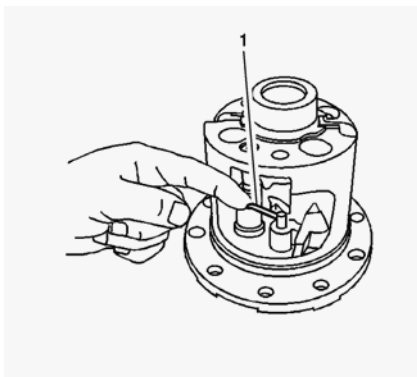
The open side of the thrust block must face the window opening.

9. Install the pinion shaft.
10. Install the new pinion shaft lock bolt.

Tighten the pinion shaft lock bolt finger tight.



11. Install the governor assembly.
12. Using a hammer and a brass drift, install the governor bushing until end play measurement is **0.25–1.27 mm (0.010–0.050 in)**.



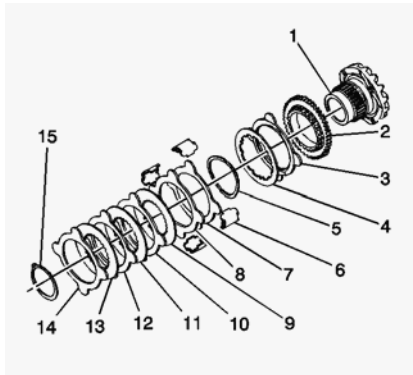
13. Install the latching bracket assembly.
The straight end of the latching bracket spring must be over and outside the governor assembly shaft.
14. Using a hammer and a brass drift, Install the latching bracket bushing until a shaft end plat measurement is **0.000–0.051 mm (0.000–0.002 in)**.
Caution: Refer to Fastener Caution.
15. Tighten the pinion shaft lock bolt to **36 Y (27 lb ft)**.

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[Assemble Locking Differential Cam Unit](#)



1. Apply recommended axle lubricant, to the surface of each disc.
2. Install the following clutch components on the locking differential side gear (1):

1. Cam plate (2).
2. Carbon-faced eared disc (3).
3. Fuse disc (4).
4. 1st non-carbon eared disc (7).
5. 2nd non-carbon eared disc (8).
6. Wave washer (5).
7. 1st splined disc (9).
8. 3rd non-carbon eared disc (10).
9. 2nd splined disc (11).
10. 4th non-carbon eared disc (12).
11. 3rd splined disc (13).
12. 5th non-carbon eared disc (14).

Note: Compress the clutch disc pack and align the teeth on the 3rd splined disc with the teeth on the cam plate in order to seat the retaining ring in the groove on the cam side gear.

13. Retaining ring (15).

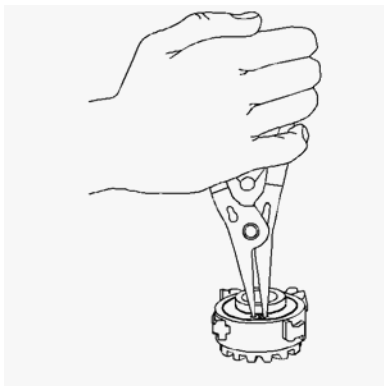
Note: Apply grease to the guide clips in order to hold the clips in place on the disc ears.

14. Guide clips (2) to the clutch disc pack.

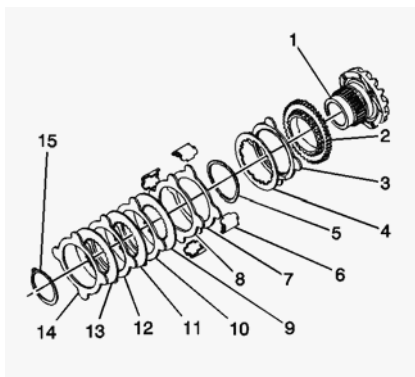
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[Disassemble Locking Differential Cam Unit](#)



1. Remove the retaining ring.



2. Disassemble the cam unit and clutch disc assembly as follows:

1. Guide clips (6).
 2. Clutch discs and the splined discs (7-14).
 3. Wave washer (5).
 4. Fuse disc (4).
 5. Carbon eared disc (3).
3. Disassemble the cam plate (2) from the cam side gear (1).

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Clean and Inspect Locking Differential

1. Clean all the parts with an approved solvent.
2. Visually inspect all the parts for excessive wear or breakage. Replace the parts if necessary.
3. Inspect the pinion gear and the side gear teeth for any the following conditions:
 - Wear
 - Cracks
 - Scoring
 - Spalling
- Inspect the thrust washer and shim for wear.
- Inspect the fit of the side gears on the axle shafts.
- Inspect the differential case for cracks and scoring. Replace the differential if any damage to the case is found.
- Inspect the side gear bore for scoring. If scoring is present, replace the differential.

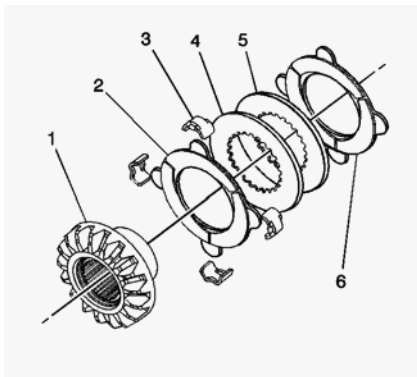
Note: DO NOT replace the thrust block unless it is necessary.

- Inspect the thrust block for excessive wear.

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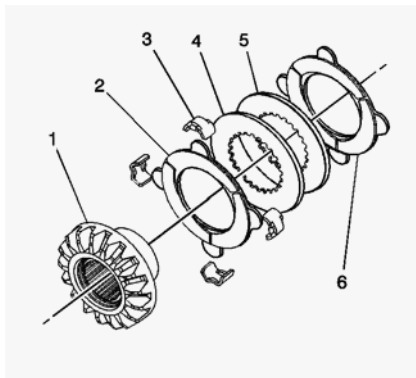
1. Install the clutch discs and the splined discs (2), (4) and 96) on the locking differential side gear (1).
2. Install the guide clips (3).

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[Disassemble Locking Differential Clutch Disc Assembly](#)



1. Remove the guide clips (3).
2. Remove the clutch discs and the splined discs (2, 4–6) from the locking differential side gear (1).

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The locking differential consists of the following components:

- Differential case – 1 or 2 piece
- Locking differential spider – 2 piece case only
- Pinion gear shaft – 1 piece case only
- Differential pinion gear shaft lock bolt – 1 piece case only
- Two clutch discs sets
- Locking differential side gear
- Thrust block
- Locking differential clutch disc guides
- Differential side gear shim
- Locking differential clutch disc thrust washer
- Locking differential governor
- Latching bracket
- Cam plate assembly
- Differential pinion gears
- Differential pinion gear thrust washers

The optional locking differential (RPO G80) enhances the traction capability of the rear axle by combining the characteristics of a limited-slip differential and the ability of the axle shafts to "lock" together when uneven traction surfaces exist. The differential accomplishes this in 2 ways. First by having a series of clutch plates at each side of the differential case to limit the amount of slippage between each wheel. Second, by using a mechanical locking mechanism to stop the rotation of the right differential side gear, in order to transfer the rotating torque of the wheel without traction to the wheel with traction. Each of these functions occur under different conditions.

Limited-Slip Function

Under normal conditions, when the differential is not locked, a small amount of limited-slip action occurs. The gear separating force developed in the right-hand clutch pack is primarily responsible for this.

The operation of how the limited-slip function of the unit works can be explained when the vehicle makes a right-hand turn. Since the left wheel travels farther than the right wheel, it must rotate faster than the ring gear and differential case assembly. This results in the left axle and left side gear rotating faster than the differential case. The faster rotation of the left-side gear causes the pinion gears to rotate on the pinion shaft. This causes the right-side gear to rotate slower than the differential case.

Although the side gear spreading force produced by the pinion gears compresses the clutch packs, primarily the right side, the friction between the tires and the road surface is sufficient to overcome the friction of the clutch packs. This prevents the side gears from being held to the differential case.

Locking Function

Locking action occurs through the use of some special parts:

- A governor mechanism with 2 flyweights
- A latching bracket
- The left side cam plate and cam side gear

When the wheel-to-wheel speed difference is 100 RPM or more, the flyweights of the governor will fling out and one of them will contact an edge of the latching bracket. This happens because the left cam side gear and cam plate are rotating at a speed different, either slower or faster, than that of the ring gear and differential case assembly. The cam plate has teeth on its outer diameter surface in mesh with teeth on the shaft of the governor.

As the side gear rotates at a speed different than that of the differential case, the shaft of the governor rotates with enough speed to force the flyweights outward against spring tension. One of the flyweights catches its edge on the closest edge of the latching bracket, which is stationary in the differential case. This latching process triggers a chain of events.

When the governor latches, it stops rotating. A small friction clutch inside the governor allows rotation, with resistance, of the governor shaft while one flyweight is held to the differential case through the latching bracket. The purpose of the governor's latching action is to slow the rotation of the cam plate as compared to the cam side gear. This will cause the cam plate to move out of its detent position.

The cam plate normally is held in its detent position by a small wave spring and detent humps resting in matching notches of the cam side gear. At this point, the ramps of the cam plate ride up on the ramps of the cam side gear, and the cam plate compresses the left clutch pack with a self-energizing action.

As the left clutch pack is compressed, it pushes the cam plate and cam side gear slightly toward the right side of the differential case. This movement of the cam side gear pushes the thrust block which compresses the right-hand side gear clutch pack.

At this point, the force of the self-energizing clutches and the side gear separating force combine to hold the side gears to the differential case in the locking stage.

The entire locking process occurs in less than 1 second. The process works with either the left or right wheel spinning, due to the design of the governor and cam mechanism. A torque reversal of any kind will unlatch the governor, causing the cam plate to ride back down to its detent position. Cornering or deceleration during a transmission shift will cause a torque reversal of this type. The differential unit returns to its limited-slip function.

The self-energizing process would not occur if it were not for the action of one of the left clutch discs. This energizing disc provides the holding force of the ramping action to occur. It is the only disc which is splined to the cam plate itself. The other splined discs fit on the cam side gear.

If the rotating speed of the ring gear and differential case assembly is high enough, the latching bracket will pivot due to centrifugal force. This will move the flyweights so that no locking is permitted. During vehicle driving, this happens at approximately 32 km/h (20 mph) and continues at faster speeds.

When comparing the effectiveness of the locking differential, in terms of percent-of-grade capability to open and limited-slip units, the locking differential has nearly 3 times the potential of the limited-slip unit under the same conditions.

Locking Differential Torque-Limiting Disc

The locking differential design was modified in mid-1986 to include a load-limiting feature to reduce the chance of breaking an axle shaft under abusive driving conditions.

Locking Differential Description and Operation

The number of tangs on the energizing disc in the left-hand clutch pack was reduced allowing these tangs to shear in the event of a high-torque engagement of the differential locking mechanism.

At the time of failure of the load-limiting disc, there will be a loud bang in the rear axle and the differential will operate as a standard differential with some limited-slip action of the clutch packs at low torques.

The service procedure, when the disc tangs shear, involves replacing the left-hand clutch plates and the wave spring. It is also necessary to examine the axle shafts for twisting because at high torques it is possible to not only shear the load-limiting disc, but to also twist the axle shafts.

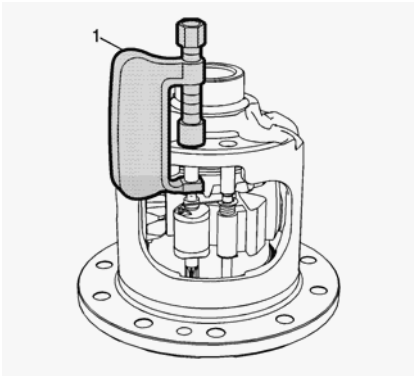
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Special Tools

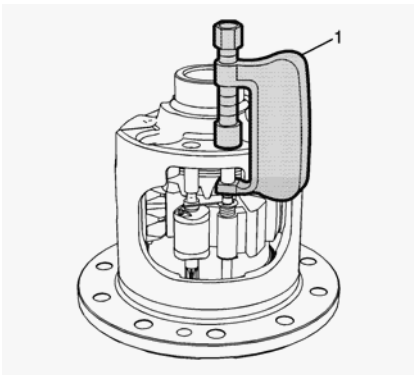
J 26252 Locking Differential Governor Remover

[Disassemble Locking Differential](#)



1. Using the J 26252 Locking Differential Governor Remover (1) remove the governor bushing.
2. Remove the governor assembly.

To aid in the removal of the governor assembly, turn the side gear as necessary to position the governor assembly between two of the side gear teeth.



3. Using the J 26252 Locking Differential Governor Remover (1) remove the latching bracket assembly.

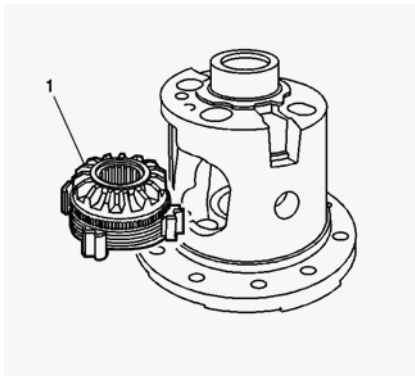
To aid in the removal of the latching bracket assembly, turn the side gear as necessary to position the latching bracket assembly between two of the side gear teeth.

4. Remove the pinion shaft lock bolt.
5. Remove the pinion shaft.
6. Remove the differential pinion gears and the thrust washers.

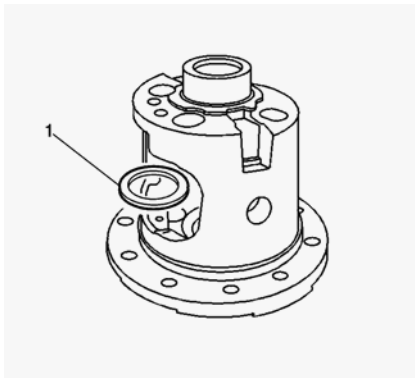
Rotate the pinion gears and roll the pinion gears and the thrust washers out of the case through the differential window.

Mark the pinion gears and thrust washers accordingly for re-assembly.

7. Remove the thrust block.
8. Remove the right side gear and clutch discs assembly.
9. Remove the right side shim.



10. Remove the left side gear (cam unit) and clutch discs assembly.



11. Remove the left side gear thrust washer.

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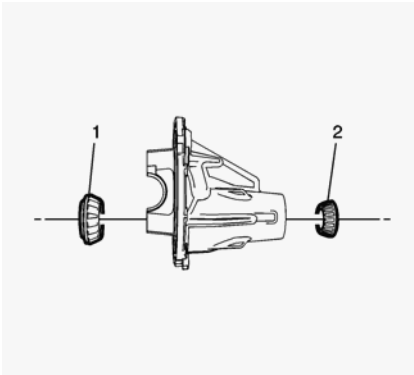
Special Tools

DT 34925 Pinion Setting Gauge and Components

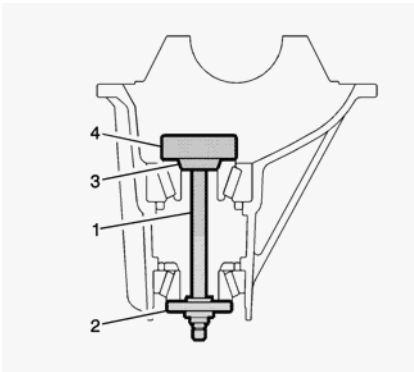
For regional equivalent tools, refer to Special Tools.

Note: Ensure that all of the tools, bearing bores and the bearing cups are clean.

1. Lubricant the pinion bearing with axle lubricant.
2. Install the pinion bearing cups in the differential carrier. Refer to Differential Carrier Assembly Assemble.



3. Position the pinion bearing races (1) and (2) in the differential carrier.

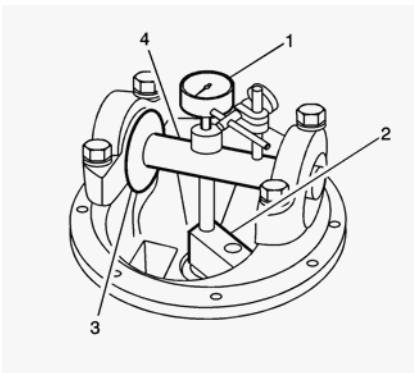


4. Assemble the DT 223597-11 (1), DT 21777-40 (2), DT 21777-43 (3), and the DT 21777-42 (4) in the differential carrier.

Caution: Refer to Fastener Caution.

Note: Hold the DT 21777-42 while tightening the to specification.

5. Using a inch pound torque wrench, tighten the nut on DT 21777-42 (2) to **1.7 – 2.8 Y (15 – 25 lb in)**.
6. Rotate the assembly several times to seat the pinion bearing. Recheck the rotational torque and adjust as needed.



7. Assemble the DT 23957-11 (2), DT 21777-45 (3), DT 23957-1 (4), DT 8001 (1) in the differential carrier.

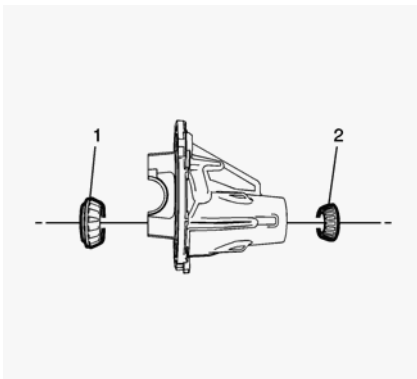
Note: Ensure that all the special tools are properly aligned and seated correctly.

Pinion Depth Adjustment

8. Ensure that DT 23957-1 (4) rotates freely in DT 21777-45 (3). If it does not, disassemble the components and locate the cause of the problem and repair.
9. Align the DT 23957-1 (4) and the DT 23957-11 (2).
10. Loosely clamp the DT 8001 (1) on the DT 23957-1 (4).
11. Adjust the DT 8001 (1) so that it is in contact the with DT 23957-1 (4).
12. Push down on the DT 8001 (1) until the needle has turned 3/4 of a turn on the dial.
13. Finger tighten the clamp on the DT 8001 (1).

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

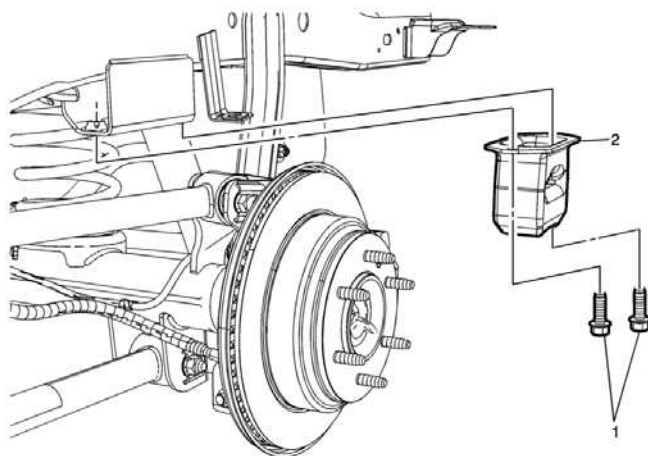
14. Move the DT 23957-1 (4) back and forth until the DT 8001 (1) indicates the greatest deflection.
15. At the greatest point of deflection, ZERO the DT 8001 (1). Recheck the setting and readjust if necessary.
16. Rotate the DT 23957-1 (4) away from the DT 23957-11 (2) until it no longer is touching the DT 23957-11 (2).
17. The value shown on the DT 8001 (1) is the thickness of the shim to properly set the pinion depth.
18. Before installing the NEW shim, measure the thickness of the NEW shim to ensure that it is the correct thickness.
19. Remove the special tools.



20. Remove the bearing races (1) and (2) from the differential carrier.
21. Install the correct shim on the pinion gear and install the pinion gear and bearing. Refer to Differential Carrier Assembly Assemble.

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Rear Axle Bumper Replacement

Callout	Component Name
Preliminary 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.	
	Rear Axle Bumper Bolt (Qty:2)
1	Caution: Refer to Fastener Caution.
	Tighten
	56 Y (41 lb ft)
2	Rear Axle Bumper

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Carefully and thoroughly inspect all drive unit parts before assembly. Thorough inspection of the drive parts for wear or stress with subsequent replacement of worn parts eliminates costly drive component repair after assembly.

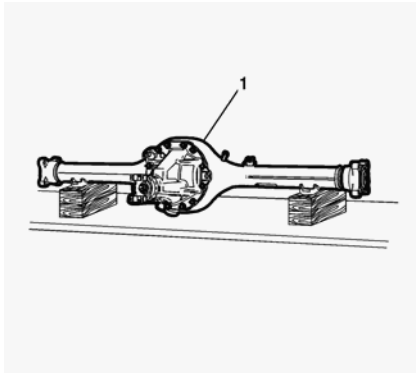
- Inspect for nicks or burrs that could prevent the outer diameter of the pinion seal from sealing. Remove any burrs.
- Inspect the bearing cup bores for nicks or burrs. Remove any burrs that are found.
- Inspect the housing for cracks. Replace the housing if any cracks are found.
- Inspect the housing for foreign material such as metal chips, dirt, or rust.

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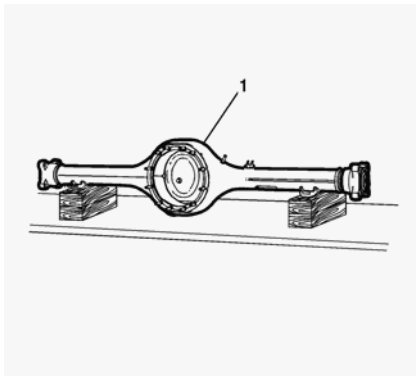
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[Removal Procedure](#)

1. Raise and support the vehicle. Refer to Lifting and Jacking the Vehicle.
2. Remove the rear axle assembly from the vehicle. Refer to Rear Axle Replacement.

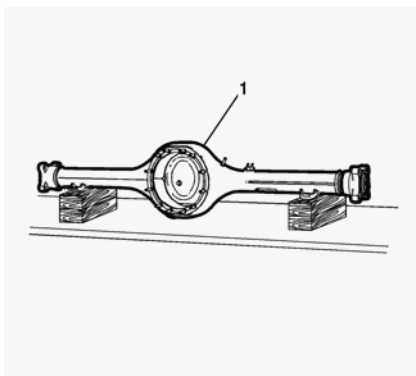


3. With the aid of an assistant, place the rear axle (1) on a suitable work bench.
4. Remove the differential carrier assembly. Refer to Differential Carrier Assembly Replacement.
5. Remove the rear axle shaft seals and bearings. Refer to Rear Axle Shaft Seal and/or Bearing Replacement.



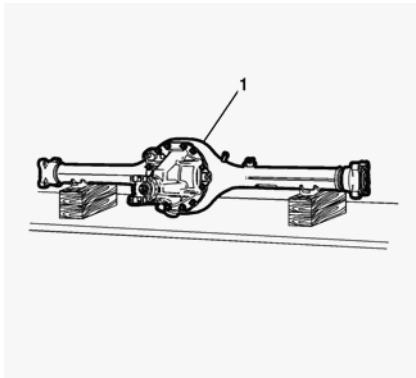
6. Replace the rear axle housing (1).

[Installation Procedure](#)



1. With the aid of an assistant, position the new rear axle housing on blocks of wood.
2. Install the rear axle shaft seals and bearings. Refer to Rear Axle Shaft Seal and/or Bearing Replacement.
3. Install the differential carrier assembly. Refer to Differential Carrier Assembly Replacement.

Rear Axle Housing Replacement



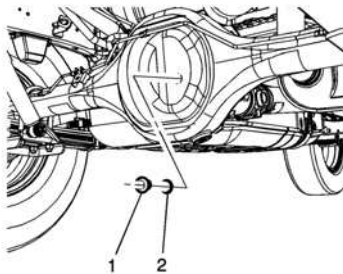
4. Install the rear axle assembly (1) in the vehicle. Refer to Rear Axle Replacement.
5. Fill the rear axle with the proper fluids. Refer to Fluid and Lubricant Recommendations.
6. Remove the supports and lower the vehicle

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Note: All axle assemblies are filled by volume of fluid during production. They are not filled to reach a certain level. When checking the fluid level on any axle, variations in the readings can be caused by factory fill differences between the minimum and the maximum fluid volume. Also, if a vehicle has just been driven before checking the fluid level, it may appear lower than normal because the fluid has traveled out along the axle tubes and has not drained back to the sump area. Therefore, a reading taken five minutes after the vehicle has been driven will appear to have a lower fluid level than a vehicle that has been stationary for an hour or two. Remember that the rear axle assembly must be supported to get a true reading.

1. Raise and support the vehicle. Refer to Lifting and Jacking the Vehicle.
2. Make sure the vehicle is level.
3. Inspect the rear axle for leaks. Repair as necessary.
4. Clean the area around the rear axle fill plug.



5. Remove the rear axle fill plug.
6. Inspect the lubricant level.
Specification
The lubricant level should be between 0–10 mm (0–0.4 in) below the fill plug opening.
7. The fluid level should be just below or level with the bottom threads of the fill plug opening. Use the proper fluid. Refer to Fluid and Lubricant Recommendations.
8. If the fluid level is low, fill the rear axle until the proper level is reached.

Caution: Refer to Fastener Caution.

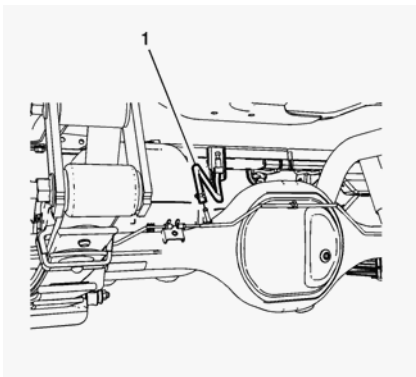
9. Install the rear axle fill plug (1) and tighten to **32 Y (24 lb ft)**.
10. Lower the vehicle.
11. Remove the support and lower the vehicle.

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[Removal Procedure](#)

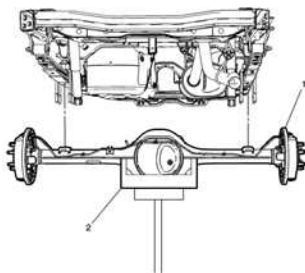
1. Raise and support the vehicle. Refer to Lifting and Jacking the Vehicle.
 2. Remove the tires and wheels. Refer to Tire and Wheel Removal and Installation.
 3. Remove the rear backing plate from the rear axle. Refer to Rear Brake Backing Plate Replacement.
 4. Remove the propeller shaft from the vehicle.
- For the one piece propeller shaft, refer to One-Piece Propeller Shaft Replacement.
 - For the two piece propeller shaft, refer to Two-Piece Rear Propeller Shaft Replacement.
 - Drain the rear axle. Refer to Differential Oil Replacement
 - Remove the rear wheel speed sensor, if equipped. Refer to Rear Wheel Speed Sensor Replacement.



- Remove the vent hose.
- Remove and plug the rear brake hose from the brake junction block to the body. Refer to Rear Brake Hose Replacement.

Note: Ensure that the rear axle is properly secured to the hydraulic jack stand.

- Support the rear axle with a hydraulic jack stand.
- Remove the rear spring anchor plates. Refer to Rear Spring Anchor Plate Replacement.



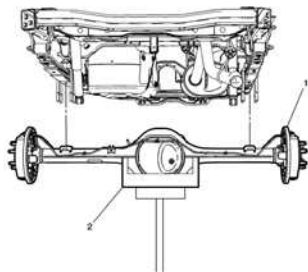
- Using a hydraulic jack stand, lower the then rear axle.

Note: To perform the following two procedures, it is NOT necessary to remove the rear axle from the hydraulic jack stand.

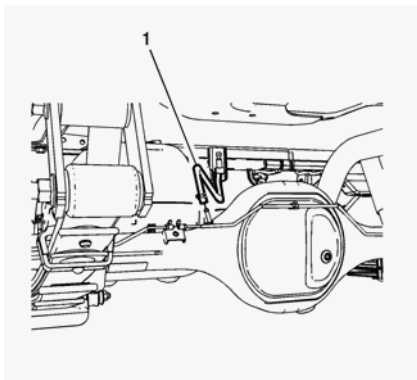
- Remove the rear brake lines from the rear axle housing. Refer to Rear Brake Rear Pipe Replacement.
- With the aid of an assistant, remove the rear axle from the hydraulic jack stand.

[Installation Procedure](#)

Rear Axle Replacement (High Boy)



1. With the aid of an assistant, position the rear axle on the hydraulic jack stand.
2. Install the rear brake backing plates. Refer to Rear Brake Backing Plate Replacement.
3. Install the rear brake lines. Refer to Rear Brake Rear Pipe Replacement.
4. With the aid of an assistant, raise the rear axle assembly into place.
5. Install the rear spring anchor plate nuts to the u-bolts. Refer to Rear Spring Anchor Plate Replacement.
6. Remove the hydraulic jack stand from the rear axle.
7. Install the rear brake hose to the brake junction block to the body. Refer to Rear Brake Hose Replacement.



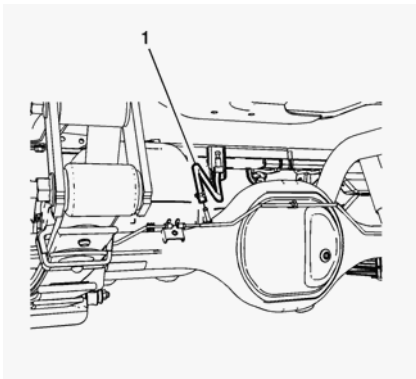
8. Install the rear vent hose.
 9. Install the rear wheel speed sensor, if equipped. Refer to Rear Wheel Speed Sensor Replacement.
 10. Install the propeller shaft in the vehicle.
- For the one piece propeller shaft, refer to One-Piece Propeller Shaft Replacement.
 - For the two piece propeller shaft, refer to Two-Piece Rear Propeller Shaft Replacement.
 - Fill the rear axle assembly with the proper fluid. Refer to Differential Oil Replacement.
 - Bleed the brake system. Refer to Hydraulic Brake System Bleeding.
 - Install the tires and wheels. Refer to Tire and Wheel Removal and Installation.
 - Remove the supports and lower the vehicle.

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[Removal Procedure](#)

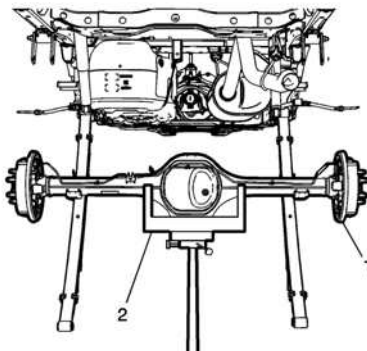
1. Raise and support the vehicle. Refer to Lifting and Jacking the Vehicle.
 2. Remove the tires and wheels. Refer to Tire and Wheel Removal and Installation.
 3. Remove the rear brake backing plate from the rear axle. Refer to Rear Brake Backing Plate Replacement.
 4. Remove the propeller shaft.
- For the one piece propeller shaft, refer to One-Piece Propeller Shaft Replacement.
 - For the two piece propeller shaft, refer to Two-Piece Rear Propeller Shaft Replacement.
 - Drain the rear axle assembly. Refer to Differential Oil Replacement.
 - Remove the rear wheel speed sensor, if equipped. Refer to Rear Wheel Speed Sensor Replacement.
 - Remove the park brake cable from the rear brakes and the retaining brackets on the rear springs.
- For the left side, refer to Parking Brake Rear Cable Replacement - Left Side.
 - For the right side, refer to Parking Brake Rear Cable Replacement - Right Side.



- Remove the rear vent hose (1).
- Remove and plug the rear brake hose from the brake junction block to the body. Refer to Rear Brake Hose Replacement.

Note: Ensure that the rear axle is properly secured to the hydraulic jack stand.

- Support the rear axle with a hydraulic jack stand.
- Remove the rear spring anchor plates and the u-bolts. Refer to Rear Spring Anchor Plate Replacement.
- Remove the lower bolt from the rear shackles. Refer to Rear Spring Replacement.
- Allow rear springs to hang from the front spring mounts on the frame.



- With the aid of an assistant, remove the rear axle from the vehicle.

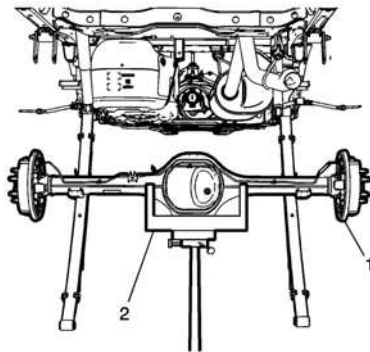
Note: To perform the following two procedures, it is not necessary to remove the rear axle from the hydraulic jack stand.

- Remove the rear brake lines from the rear axle housing. Refer to Rear Brake Rear Pipe Replacement.

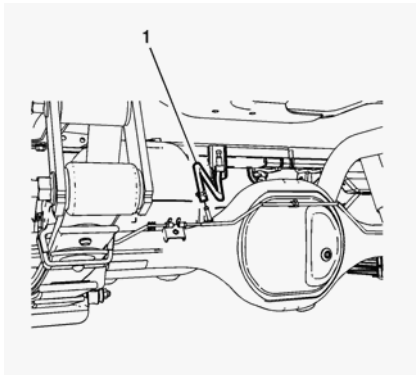
[Installation Procedure](#)

1. Install the rear brake lines. Refer to Rear Brake Rear Pipe Replacement.

Rear Axle Replacement (Low Boy)



2. With the aid of an assistant raise the rear axle assembly into place.
3. With the aid of an assistant, position the rear spring in the rear shackle. Refer to Rear Spring Replacement.
4. Install the rear spring anchor plates and the u-bolts. Refer to Rear Spring Anchor Plate Replacement.
5. Remove the hydraulic jack stand from the rear axle.
6. Install the rear brake hose from the brake junction block to the body. Refer to Rear Brake Hose Replacement.
7. Install the park brake cables. For the left side, refer to Parking Brake Rear Cable Replacement - Left Side. For the right side, refer to Parking Brake Rear Cable Replacement - Right Side



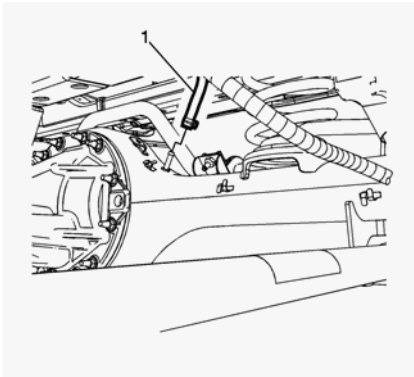
8. Install the rear vent hose (1).
 9. Install the rear wheel speed sensor, if equipped. Refer to Rear Wheel Speed Sensor Replacement.
 10. Install the propeller shaft.
- For the one piece propeller shaft, refer to One-Piece Propeller Shaft Replacement.
 - For the two piece propeller shaft, refer to Two-Piece Rear Propeller Shaft Replacement.
 - Fill the rear axle assembly with the proper fluid. Refer to Differential Oil Replacement.
 - Install park brake cable in the rear brakes and the retaining brackets on the rear springs.
 - For the left side, refer to Parking Brake Rear Cable Replacement - Left Side.
 - For the right side, refer to Parking Brake Rear Cable Replacement - Right Side.
 - Install the rear brake backing plate in the rear axle. Refer to Rear Brake Backing Plate Replacement.
 - Bleed the hydraulic brake system. Refer to Hydraulic Brake System Bleeding.
 - Install the tires and wheels. Refer to Tire and Wheel Removal and Installation.
 - Remove the supports and lower the vehicle.

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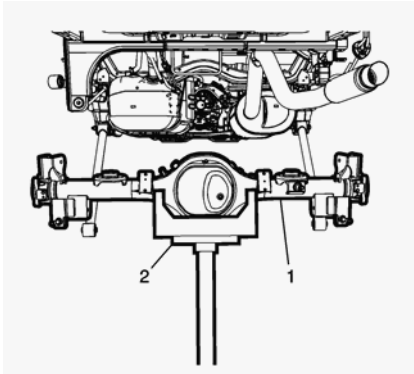
Submodel: | Engine Type: | Liters:
Fuel Delivery: | Fuel:

[Removal Procedure](#)

1. Raise and support the vehicle. Refer to Lifting and Jacking the Vehicle.
 2. Remove the tires and wheels. Refer to Tire and Wheel Removal and Installation.
 3. Remove the propeller shaft from the rear axle.
- For those vehicles equipped with the one piece propeller shaft, refer to One-Piece Propeller Shaft Replacement.
 - For those vehicles equipped with the two piece propeller shaft, refer to Two-Piece Rear Propeller Shaft Replacement.
 - Drain the rear axle assembly. Refer to Differential Oil Replacement.
 - Remove the rear axle shaft (disc brake). Refer to Rear Axle Shaft Replacement.
 - Remove the rear speed sensor wiring harness from the rear axle housing. Refer to Rear Wheel Speed Sensor Replacement.
 - Remove the rear spring travel limiting link. Refer to Rear Spring Travel Limiting Link Replacement.
 - Remove the rear stabilizer shaft. Refer to Stabilizer Shaft Replacement.



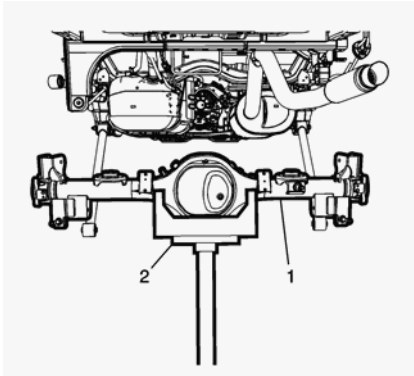
- Remove the vent hose (1) from the rear axle.



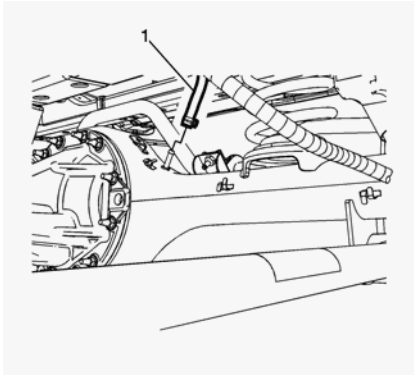
Note: Ensure that the rear axle assembly is properly secured to the hydraulic jack.

- Support the rear axle assembly (1) with a hydraulic transmission jack (2).
- Remove the rear shock absorbers. Refer to Shock Absorber Replacement.
- Remove the upper tie rods from the rear axle. Refer to Rear Axle Tie Rod Replacement - Upper.
- Remove the lower tie rods from the rear axle. Refer to Rear Axle Tie Rod Replacement - Lower.
- Lower the rear axle assembly.

[Installation Procedure](#)



1. Using the hydraulic transmission jack (2), raise the rear axle (1) into position.
2. Install the upper tie rod. Refer to Rear Axle Tie Rod Replacement - Upper.
3. Install the lower tie rod. Refer to Rear Axle Tie Rod Replacement - Lower.
4. Install the rear shock absorbers. Refer to Shock Absorber Replacement.



5. Remove the vent hose (1) from the rear axle.
6. Install the rear stabilizer shaft. Refer to Stabilizer Shaft Replacement.
7. Install the rear spring travel limiting link. Refer to Rear Spring Travel Limiting Link Replacement
8. Remove the hydraulic transmission jack from the rear axle.
9. Install the rear axle shaft (disc brake). Refer to Rear Axle Shaft Replacement.
10. Install the rear speed sensor wiring harness on the rear axle housing. Refer to Rear Wheel Speed Sensor Replacement
11. Install the propeller shaft to the rear axle.

- For those vehicles equipped with the one piece propeller shaft, refer to One-Piece Propeller Shaft Replacement.
- For those vehicles equipped with the two piece propeller shaft, refer to Two-Piece Rear Propeller Shaft Replacement.
- Fill the rear axle assembly with the proper fluid. Refer to Differential Oil Replacement.
- Install the tires and wheels. Refer to Tire and Wheel Removal and Installation.
- Remove the supports and lower the vehicle.

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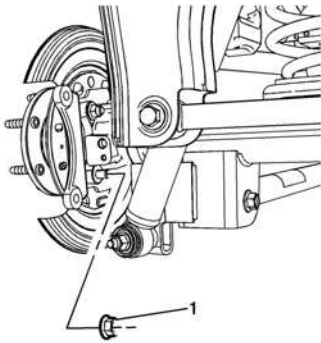
Special Tools

- J-42129 Wheel Hub Puller
- GE-02619-A Slide Hammer

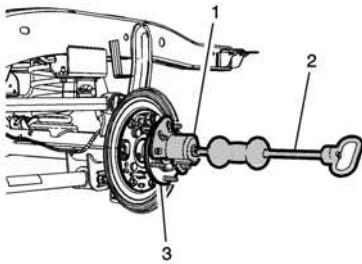
For equivalent regional tools, refer to Special Tools.

[Removal Procedure](#)

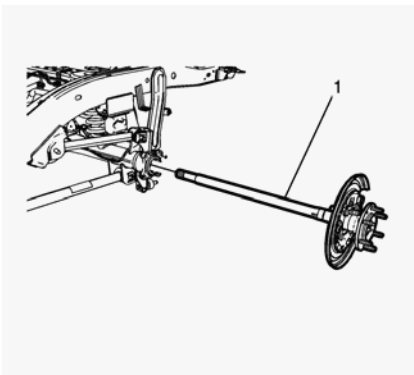
1. Raise and support the vehicle. Refer to Lifting and Jacking the Vehicle.
2. Remove the tire and wheel assembly. Refer to Tire and Wheel Removal and Installation.
3. Remove the rear wheel speed sensor, if equipped. Refer to Rear Wheel Speed Sensor Replacement.
4. Remove the parking brake shoes. Refer to Parking Brake Shoe Replacement.



5. Remove the 4 axle bolts (1) from the axle housing.

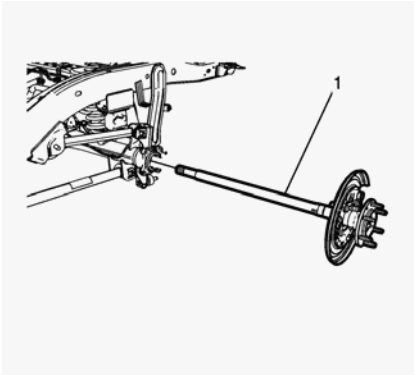


6. Using the GE-02619-A hammer (2) and the J-42129 puller (1), dis-engage the rear axle (3).
7. Remove the GE-02619-A hammer (2) and the J-42129 puller (1) from the rear axle (3).

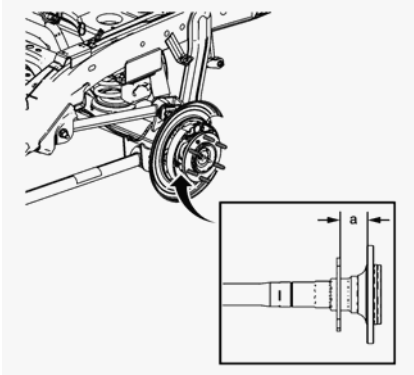


8. Remove the rear axle (1) from the vehicle.
9. If removing the rear axle shaft for service, remove the rear axle shaft seal and bearing. Refer to Rear Axle Shaft Seal and Bearing Replacement.

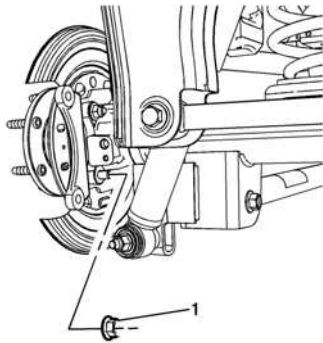
[Installation Procedure](#)



1. Install the rear axle shaft (1) in the rear axle housing.



2. Check the rear axle bearing endplay (a). Ensure that it does not exceed **0.4 mm (0.016 in)**



Caution: Refer to Fastener Caution.

3. Install the 4 rear axle shaft nuts (1) and tighten to **84 Y 62 lb ft**.
4. Install the rear wheel speed sensor, if equipped. Refer to Rear Wheel Speed Sensor Replacement.
5. Install the parking brake shoes. Refer to Parking Brake Shoe Replacement.
6. Install the tire and wheel assembly. Refer to Tire and Wheel Removal and Installation.
7. Remove the support and lower the vehicle

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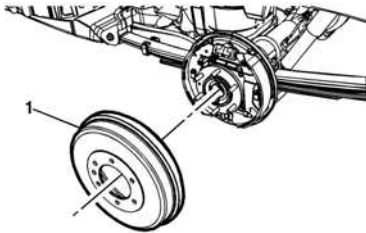
Special Tools

- J-42129 Wheel Hub Puller
- GE-02619-A Slide Hammer

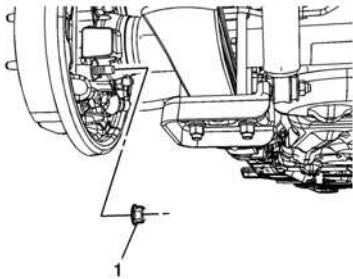
For equivalent regional tools, refer to Special Tools.

[Removal Procedure](#)

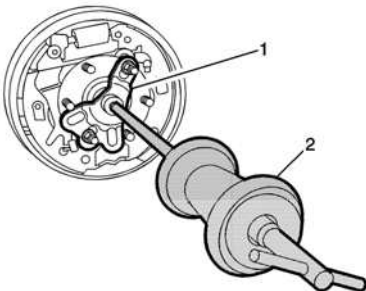
1. Raise and support the vehicle. Refer to Lifting and Jacking the Vehicle.
2. Remove the tire and wheel assembly. Refer to Tire and Wheel Removal and Installation.
3. Remove the rear wheel speed sensor, if equipped. Refer to Rear Wheel Speed Sensor Replacement.



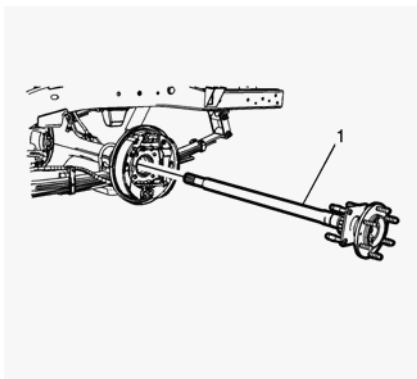
4. Remove the rear brake drum (1).



5. Remove the 4 axle bolts (1) from the axle housing.

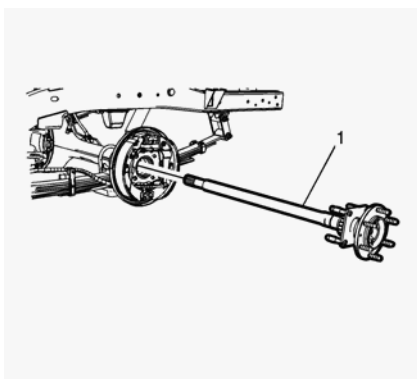


6. Using the GE-02619-A hammer (2) and the J-42129 puller (1), remove the rear axle.
7. Remove the GE-02619-A hammer (2) and the J-42129 puller (1) from the rear axle.

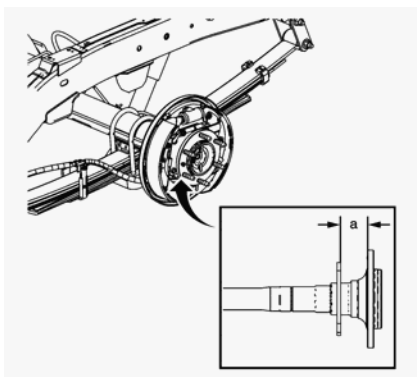


8. Remove the rear axle (1) from the vehicle.
9. If removing the rear axle shaft for service, remove the rear axle shaft seal and bearing. Refer to Rear Axle Shaft Seal and Bearing Replacement.

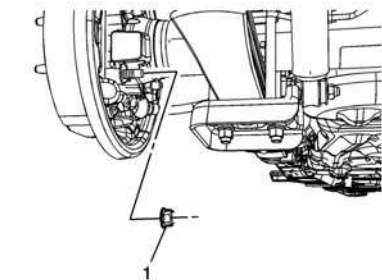
[Installation Procedure](#)



1. Install the rear axle shaft (1) in the rear axle housing.



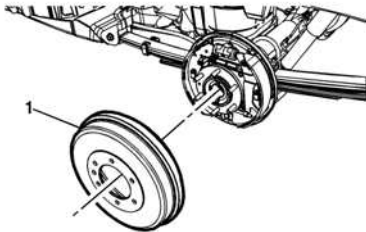
2. Check the rear axle bearing endplay (a). Ensure that it does not exceed **0.4 mm (0.016 in)**



Caution: Refer to Fastener Caution.

3. Install the 4 rear axle shaft nuts (1) and tighten to **84 Y 62 lb ft**.
4. Install the rear wheel speed sensor, if equipped. Refer to Rear Wheel Speed Sensor Replacement.

Rear Axle Shaft Replacement (Drums Brakes)



5. Install the rear brake drum (1).
6. Install the tire and wheel assembly. Refer to Tire and Wheel Removal and Installation.
7. Remove the support and lower the vehicle

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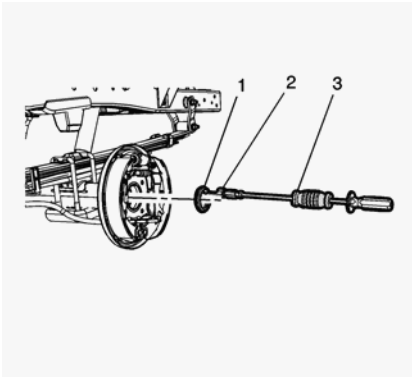
Special Tools

- DT-49275 Pinion Bearing Remover
- DT-50925 Seal Installer
- J-6125-B Slide Hammer
- J-8092 Driver Handle
- J-22912-B Split Plate Bearing Puller
- J-23129 Universal Seal Remover

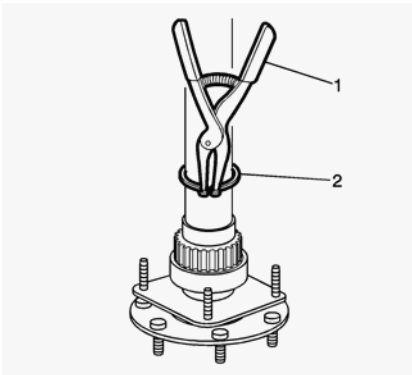
For the equivalent regional tools, refer to Special Tools.

Removal Procedure

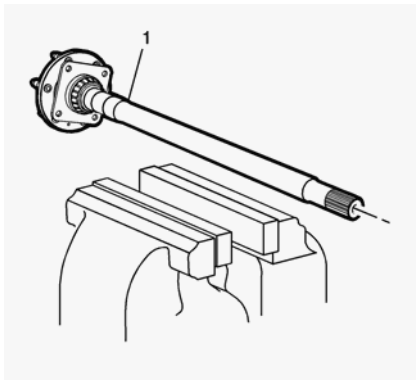
1. Raise and support the vehicle. Refer to Lifting and Jacking the Vehicle.
2. Drain the rear axle. Refer to Differential Oil Replacement.
3. Remove the tire and wheel. Refer to Tire and Wheel Removal and Installation.
4. Remove the rear axle shaft assembly. Refer to Rear Axle Shaft Replacement.



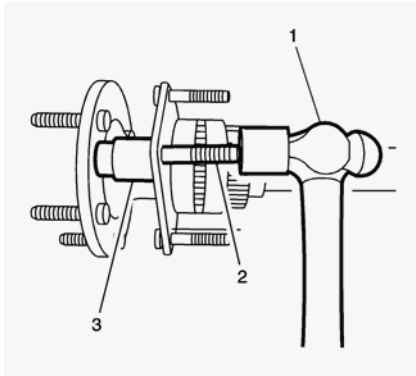
5. Using the J-6125-B hammer (3) and the J-23129 remover (2), remove the inner axle shaft seal (1).



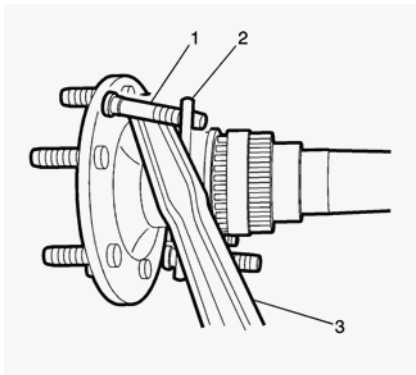
6. Using the appropriate tool (1), remove the retaining ring (2).



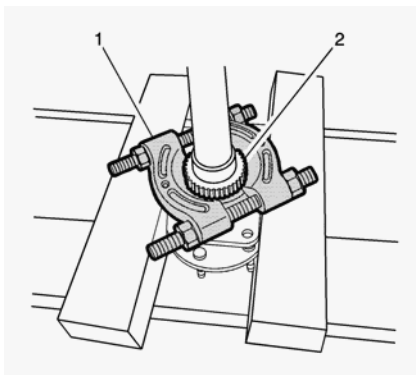
7. Install the rear axle shaft (1) in the vise.



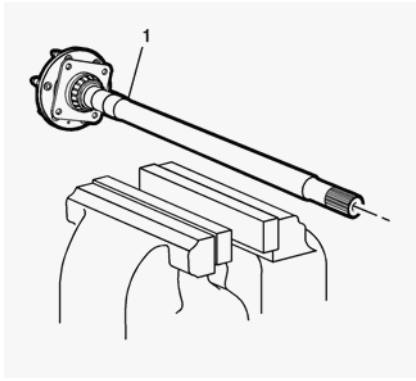
8. Using the socket (3) and the hammer (1), remove the wheel studs (2) from the retaining plate.



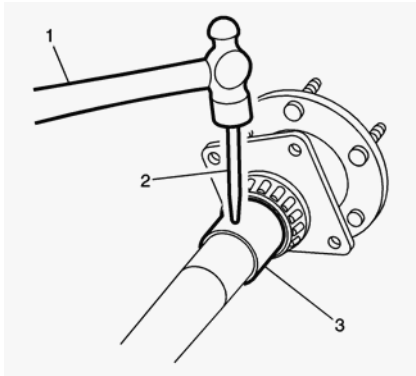
9. Using the appropriate tool (3), move the retaining plate (2) far enough away from the wheel drive axle flange to remove the wheel studs (1).
10. Remove the rear axle shaft from the vise.



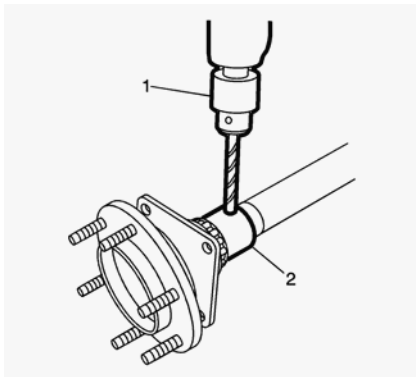
11. Using the J-22912-B puller and the hydraulic press (1), remove the speed sensor gear and the inner bearing cup (2).



12. Install the rear axle shaft (1) in a vise.

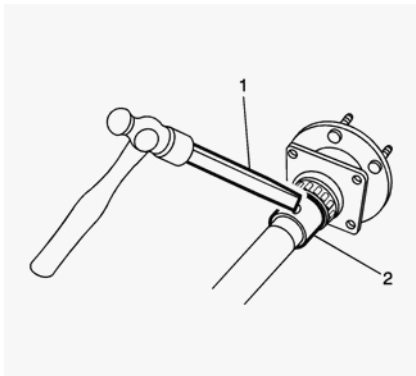


13. Using the hammer (1) and the punch (2), mark the spacer (3).

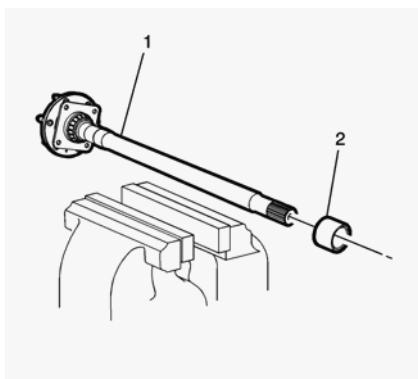


Note: DO NOT drill all the way through the spacer.

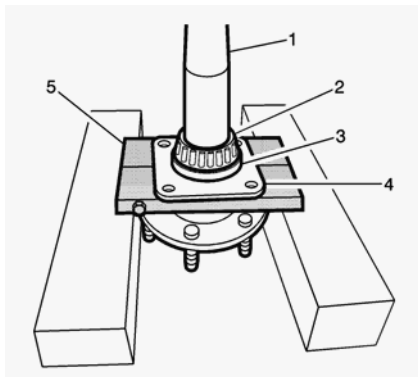
14. Using the drill (1), drill the spacer (2) where marked by the punch.



15. Using the hammer and the chisel (1), break the spacer (2).

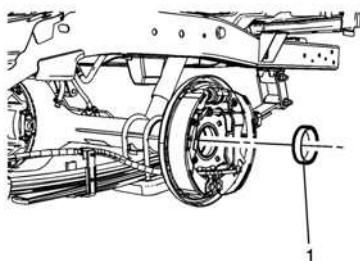


16. Remove the rear axle shaft (1) from the vise.
17. Remove the spacer (2) from the rear axle shaft (1).

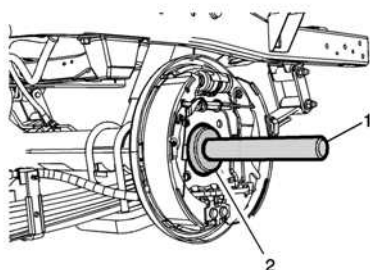


18. Position the axle shaft (1) in the hydraulic press.
19. Using the hydraulic press and the DT-49275 remover (5), remove the wheel bearing race (2), axle outer shaft seal (3) and the retaining plate (4) from the rear axle shaft.

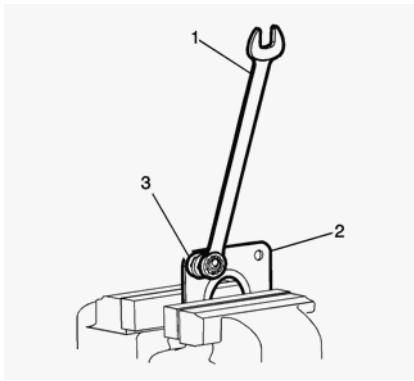
[Installation Procedure](#)



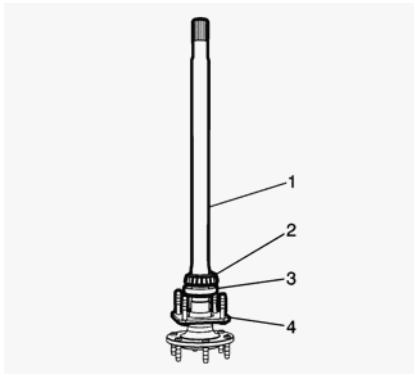
1. Position the inner axle seal (1) in the axle housing.



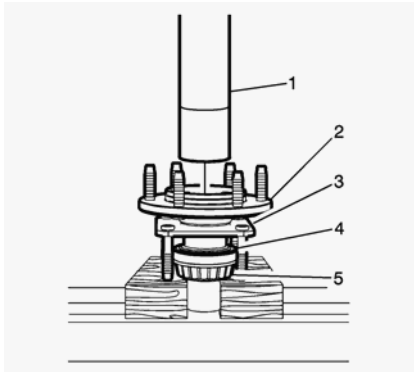
2. Using the J-8092 handle (1) and the DT-50925 installer (2), install the inner axle shaft seal.



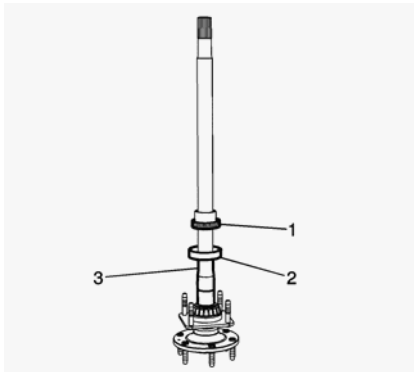
3. Install the retaining plate (2) in the vise.
4. Install the bolts (3) and the 4 nuts in the retaining plate (2).
5. Using the proper size wrench (1), tighten the nuts until the bolt (3) is properly seated in the retaining plate (2).



6. Position the retaining plate (4), the NEW axle outer shaft seal (3) and the axle bearing race (2) on the axle shaft (1).

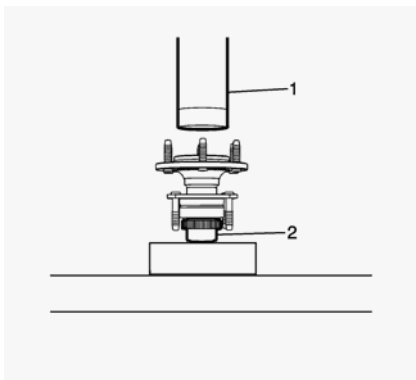


7. Position the rear axle shaft in the hydraulic press (1).
8. Using the hydraulic press (1), install the wheel bearing race (5), axle shaft seal (4) and the retaining plate (3) on to the axle outer shaft (2).

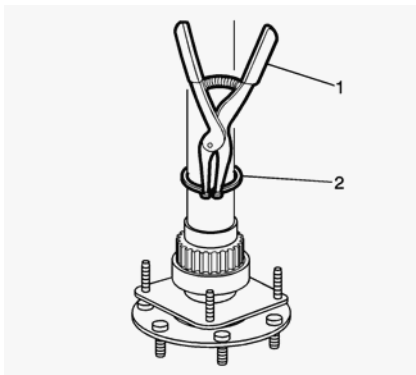


9. Position the wheel bearing cup (2) and the speed sensor gear and spacer (1) on the axle shaft (3).

Rear Axle Shaft Seal and Bearing Replacement (Pick Up With ABS)



10. Using the hydraulic press (1), install the speed sensor gear, spacer and the bearing cup (2).



11. Using the appropriate tool (1), install the retaining clip (2).
12. Install the rear axle shaft assembly. Refer to Rear Axle Shaft Replacement
13. Fill the rear axle. Refer to Differential Oil Replacement
14. Install the tire and wheel. Refer to Tire and Wheel Removal and Installation
15. Remove the support and lower the vehicle.

2013 Chevrolet Colorado

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

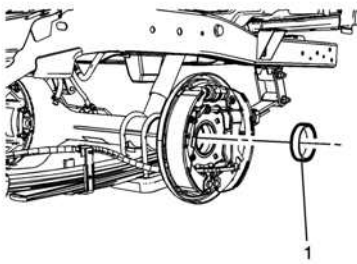
Special Tools

- DT-23129 Universal Seal Remover
- DT-49275 Pinion Bearing Remover
- DT-50925 Seal Installer
- GE-6125-B Slide Hammer
- GE-8092 Driver Handle

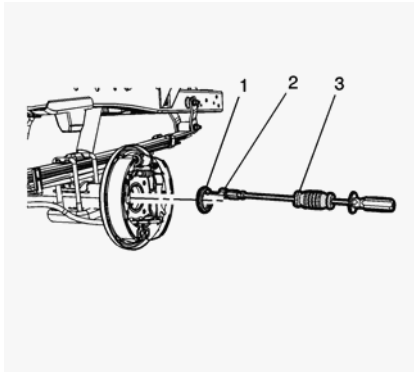
For regional equivalent tools, refer to Special Tools.

Removal Procedure

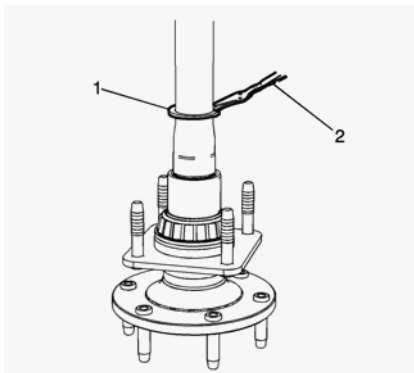
1. Raise and support the vehicle. Refer to Lifting and Jacking the Vehicle.
2. Drain the rear axle. Refer to Differential Oil Replacement.
3. Remove the tire and wheel. Refer to Tire and Wheel Removal and Installation.
4. Remove the rear axle shaft. Refer to Rear Axle Shaft Replacement.



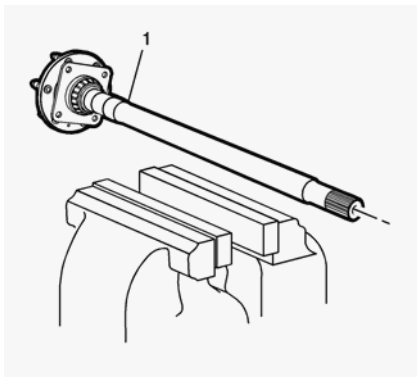
5. Using the appropriate tool, remove the inner bearing cup (1).



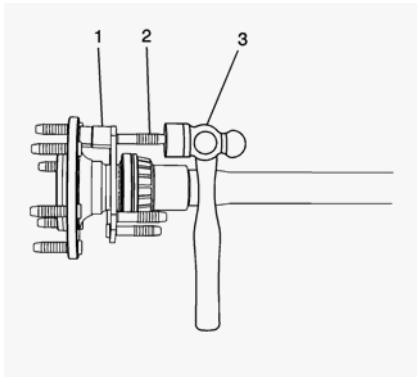
6. Using the GE-6125-B slide hammer (3) and the DT-23129 universal seal remover (2), remove the inner axle seal (1).



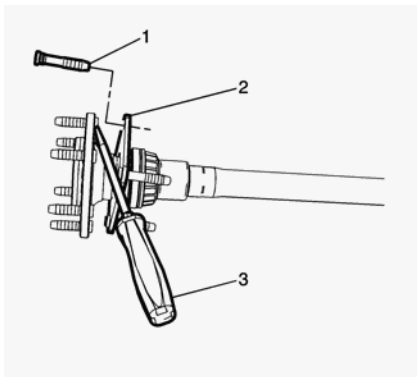
7. Using the appropriate tool (2), remove the retaining clip (1).



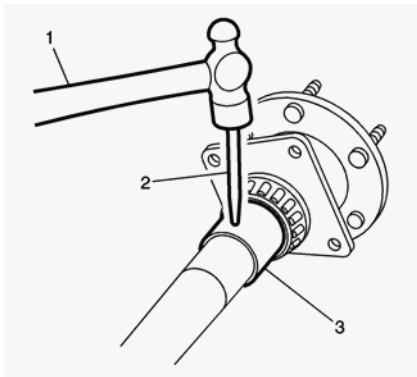
8. Install the rear axle shaft (1) in a suitable vise.



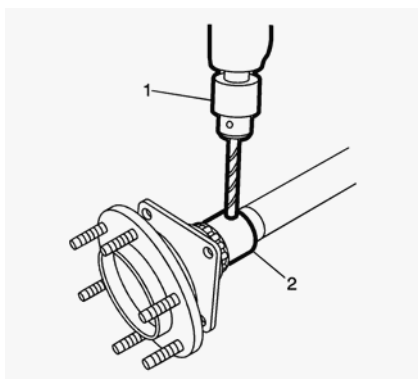
9. Use the appropriate tool (1) and the hammer (3), loosen the stud (2) in the retaining plate.



10. Using the appropriate tool (3), move the retaining plate (2) enough to remove the stud (1) from the retaining plate (3).

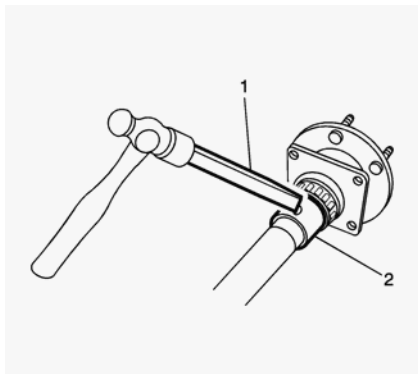


11. Using a hammer (1) and a punch (2), mark the spacer (3).

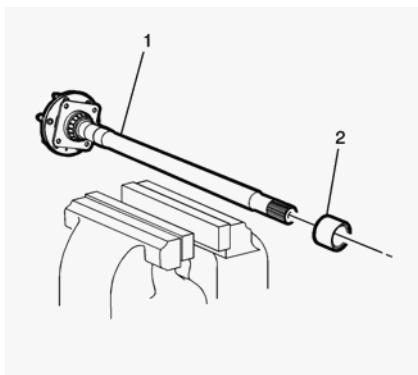


Note: DO NOT drill all the way through the spacer.

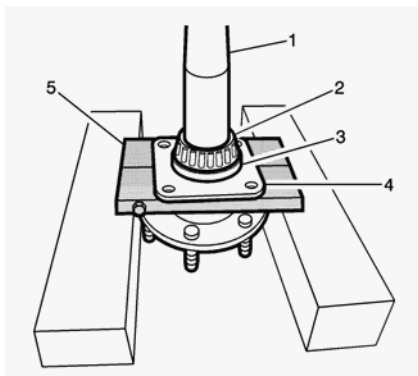
12. Using the drill (1), drill the spacer (2) where marked by the punch.



13. Using the hammer and the chisel (1), break the spacer (2).

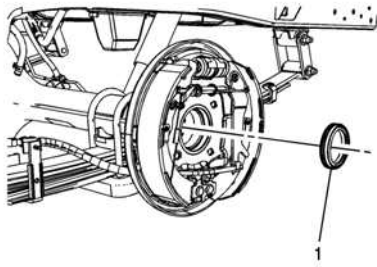


14. Remove the spacer (2) from the rear axle shaft (1).

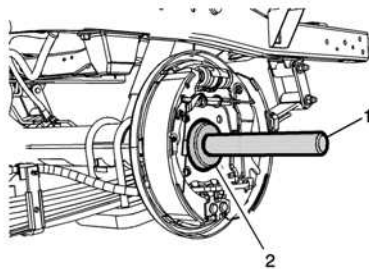


15. Position the rear axle shaft (1) in the hydraulic press.
16. Using the hydraulic press and the DT-49275 pinion bearing remover (5), remove the wheel bearing race (2), the rear axle outer shaft seal (3) and the retaining plate (4) from the rear axle shaft (1).

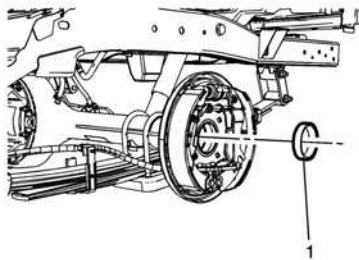
[Installation Procedure](#)



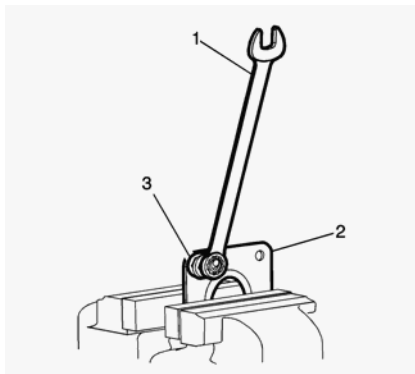
1. Position the inner axle seal (1) in the axle housing.



2. Using the *GE-8092* driver handle (1) and the *DT-50925* seal installer (2), install the inner axle seal.

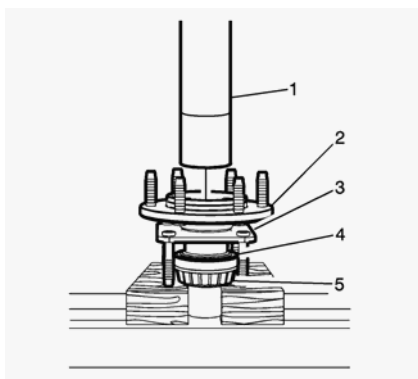


3. Install the inner bearing cup (1) in the rear axle housing.

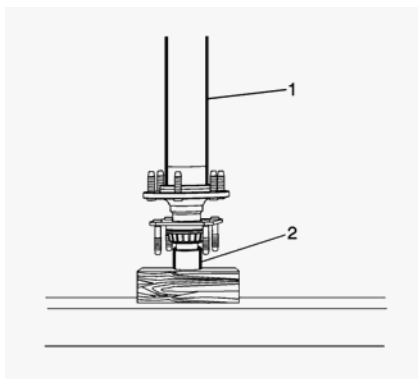


4. Install the retaining plate (2) in the vise.
5. Install the bolts (3) and the 4 nuts in the retaining plate (2).
6. Using the proper size wrench (1), tighten the nuts until the bolt (3) is properly seated in the retaining plate (2).

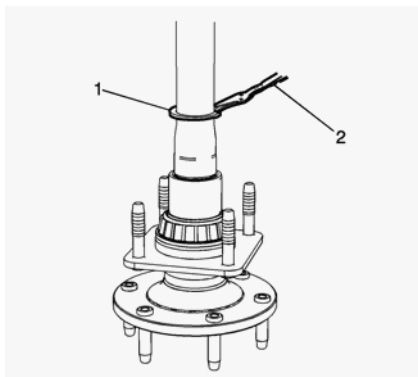
Rear Axle Shaft Seal and Bearing Replacement (Pick Up Without ABS)



7. Position the rear axle shaft in the hydraulic press (1).
8. Using the hydraulic press (1), install the wheel bearing race (5), rear axle shaft seal (4) and the retaining plate (3) on the rear axle shaft (2).



9. Using the hydraulic press (1), install the spacer (2).



10. Using the appropriate tool (2), install the retaining clip (1).
11. Install the rear axle shaft. Refer to Rear Axle Shaft Replacement.
12. Fill the rear axle. Refer to Differential Oil Replacement.
13. Install the tire and wheel. Refer to Tire and Wheel Removal and Installation.
14. Remove the support and lower the vehicle.

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

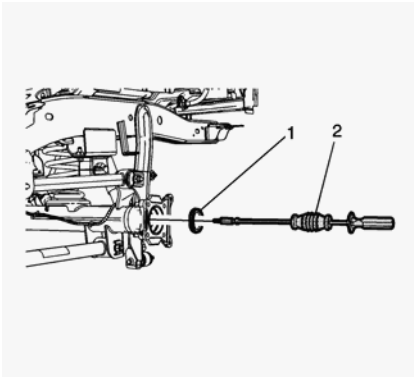
Special Tools

- DT-49275 Pinion Bearing Remover
- DT-50925 Seal Installer
- J-6125-B Slide Hammer
- J-8092 Driver Handle
- J-22912-B Split Plate Bearing Puller
- J-23129 Universal Seal Remover

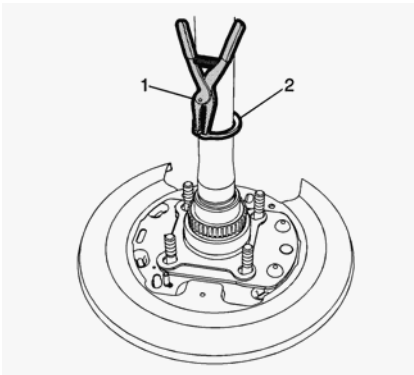
For the equivalent regional tools, refer to Special Tools.

Removal Procedure

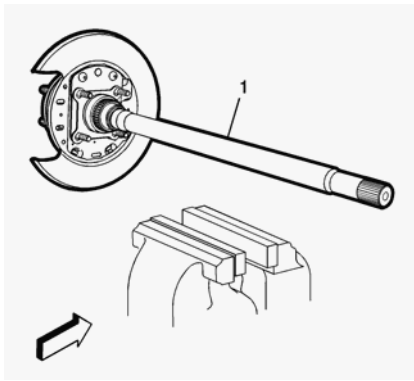
1. Raise and support the vehicle. Refer to Lifting and Jacking the Vehicle.
2. Drain the rear axle. Refer to Differential Oil Replacement.
3. Remove the tire and wheel. Refer to Tire and Wheel Removal and Installation.
4. Remove the rear axle shaft assembly. Refer to Rear Axle Shaft Replacement.



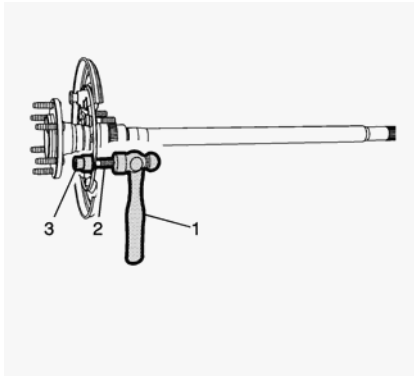
5. Using the J-6125-B hammer and the J-23129 remover (2), remove the axle shaft seal (1).



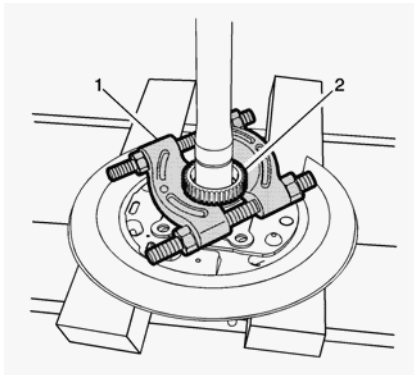
6. Using the appropriate tool (1), remove the retaining ring (2).



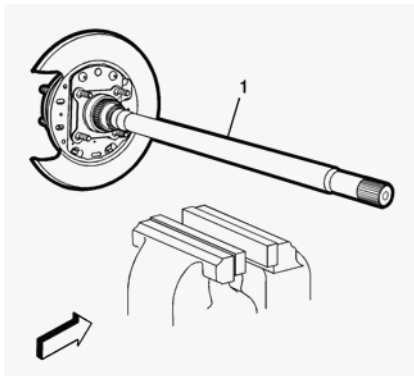
7. Install the rear axle shaft (1) in a suitable vise.



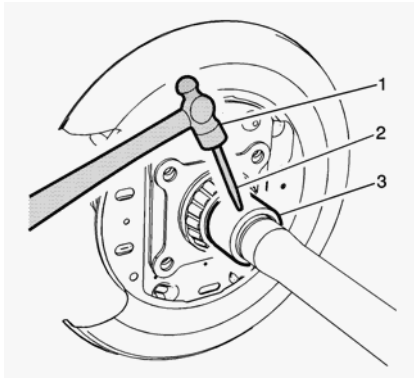
8. Using the appropriate tool (3) and the hammer (1), remove the bolts (2) from the retaining plate.
9. Remove the rear axle shaft from the vise.



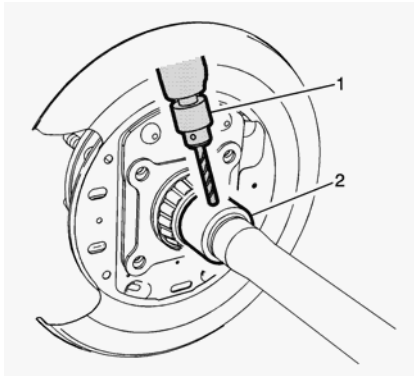
10. Using the J-22912-B puller and the hydraulic press (1), remove the speed sensor gear (2).



11. Install the rear axle shaft (1) in a vise.

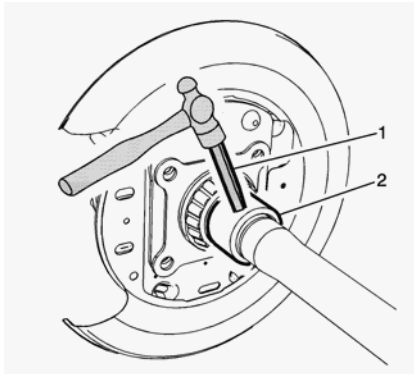


12. Using a hammer (1) and punch (2), mark the spacer (3).

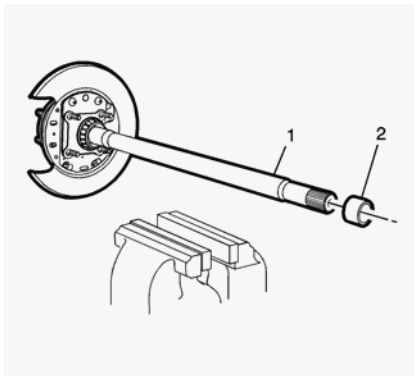


Note: DO NOT drill all the way through the spacer.

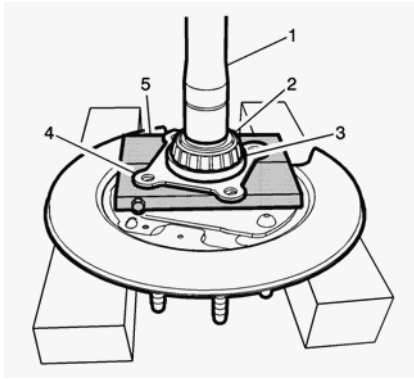
13. Using a drill (1), drill the spacer where marked by the punch marks.



14. Using a hammer and a chisel (1), break the spacer (2).

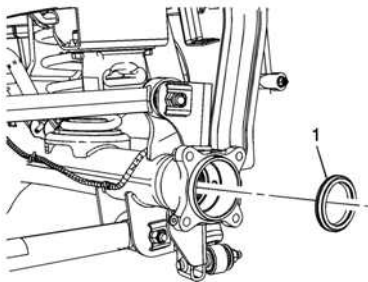


15. Remove the rear axle shaft (1) from the vise and remove the spacer (2).

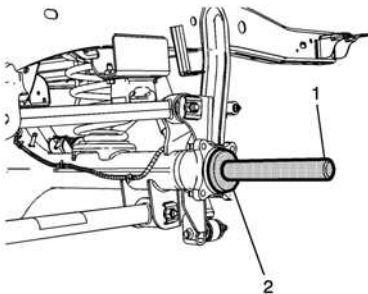


16. Position the axle shaft (1) in the hydraulic press.
17. Using a hydraulic press and the *DT-49275* remover (5), remove the wheel bearing race (2), axle shaft seal (3) and the retaining plate (4).

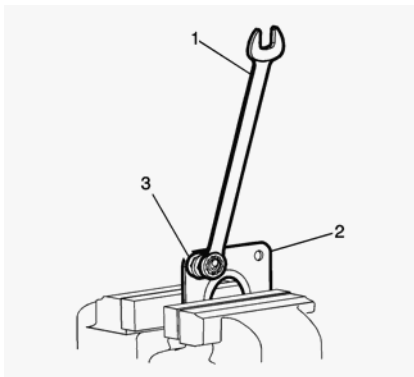
[Installation Procedure](#)



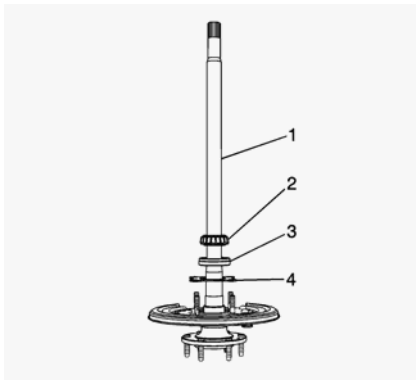
1. Position the inner axle seal (1) in the axle housing.



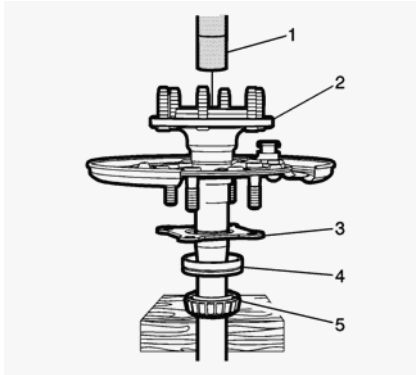
2. Using the *J-8092* handle (1) and the *DT-50925* installer (2), install the inner axle shaft seal.



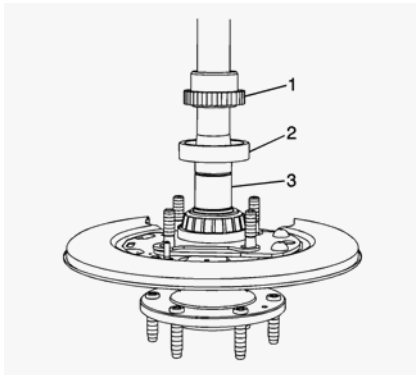
3. Install the retaining plate (2) in a vise.
4. Install the bolts (3) and 4 nuts in the retaining plate (2).
5. Using the proper size wrench (1), tighten the nuts until the bolt (3) is properly seated in the retaining plate (2).



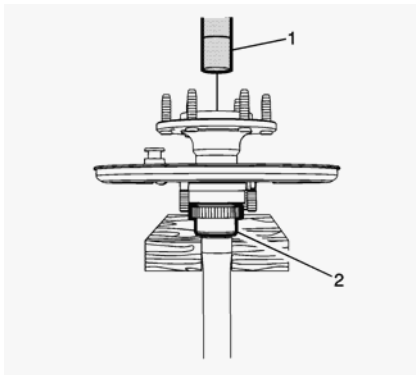
6. Position the retaining plate (4), the NEW axle shaft seal (3) and the axle bearing race (2) on the axle shaft (1).
7. Position the rear axle shaft in the hydraulic press.



8. Using the hydraulic press (1), install the wheel bearing race (5), axle shaft seal (4) and the retaining plate (3) on the axle shaft (2).

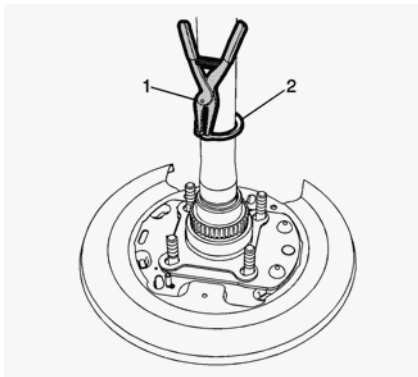


9. Position the inner wheel bearing cup (2) and the speed sensor gear and spacer (1) on the axle shaft (3).



10. Using the hydraulic press (1), install the speed sensor gear, spacer and the bearing cup (2).

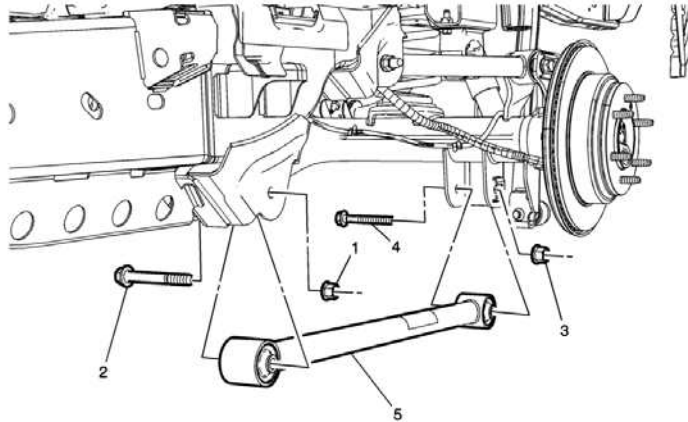
Rear Axle Shaft Seal and Bearing Replacement (SUV With ABS)



11. Using the appropriate tool (1), install the retaining clip (2).
12. Install the rear axle shaft assembly. Refer to Rear Axle Shaft Replacement
13. Fill the rear axle. Refer to Differential Oil Replacement
14. Install the tire and wheel. Refer to Tire and Wheel Removal and Installation
15. Remove the support and lower the vehicle.

2013 Chevrolet Colorado

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



Rear Axle Tie Rod Replacement - Lower

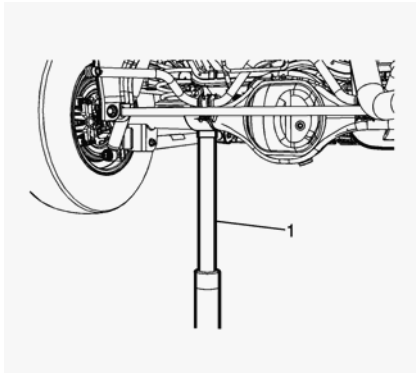
Callout	Component Name
Preliminary Procedure	
1. Raise and support the vehicle. Refer to Lifting and Jacking the Vehicle.	
2. Remove the tire and wheel assembly. Refer to Tire and Wheel Removal and Installation.	
Lower Tie Rod End Nut	
1	Caution: Refer to Fastener Caution. Tighten 137 Y (101 lb ft)
Lower Tie Rod End Bolt	
2	
Lower Tie Rod End Nut	
3	Tighten 137 Y (101 lb ft)
Lower Tie Rod End Bolt	
4	
Lower Tie Rod End	
5	Procedure Support the rear axle with a suitable jack stand.

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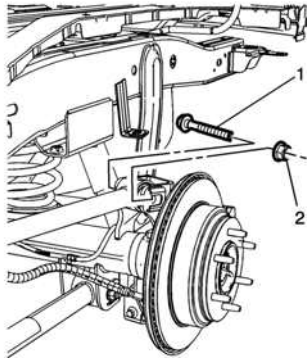
Submodel: | Engine Type: | Liters:
Fuel Delivery: | Fuel:

[Removal Procedure](#)

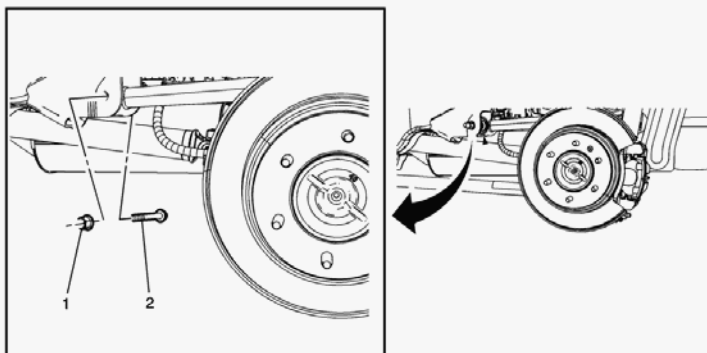
1. Raise and support the vehicle. Refer to Lifting and Jacking the Vehicle.
2. Remove the tire and wheel assembly. Refer to Tire and Wheel Removal and Installation.



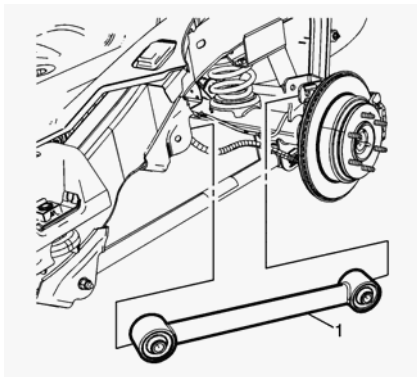
3. Support the rear axle with a suitable jack stand (1).



4. Remove the upper tie rod bolt (1) and nut (2).

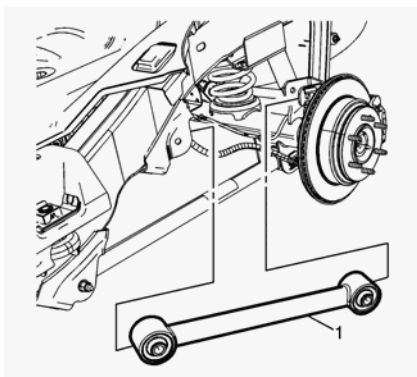


5. Remove the upper tie rod nut (1) and bolt (2).

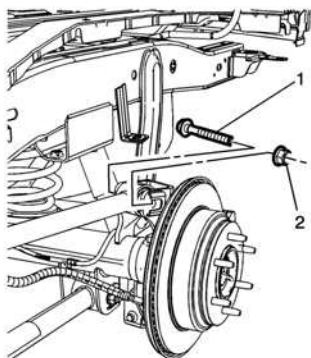


6. Remove the upper tie rod from the rear axle (1).

[Installation Procedure](#)

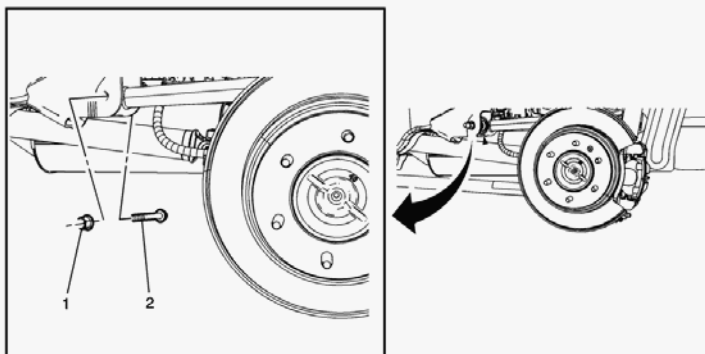


1. Position the upper tie rod (1) in the vehicle.



Caution: Refer to Fastener Caution.

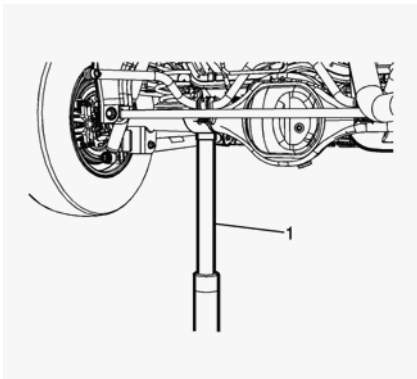
2. Install the upper tie rod rear bolt (1) and nut (2) and tighten to **137 Y (101 lb ft)**.



3. Install the tie rod bolt (2) and nut (1) and tighten to **137 Y (101 lb ft)**.

Rear Axle Tie Rod Replacement - Upper (SUV)

4. Install the tire and wheel. Refer to Tire and Wheel Removal and Installation.

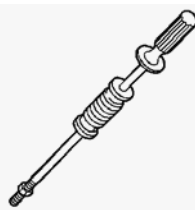
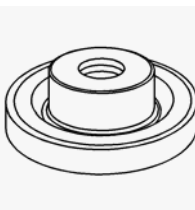
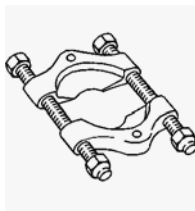
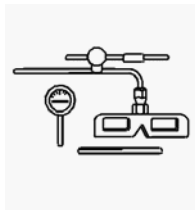
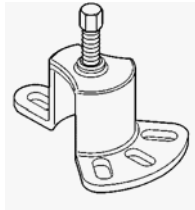


5. Remove the suitable jack stand (1) from the rear axle.
6. Remove the supports and lower the vehicle.

2013 Chevrolet Colorado

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

Illustration



Tool Number/ Description

CH-42129

DT-42129

DT-50188

J-42129

Wheel Hub Remover

CH-45101

GE-571-B

GE-7872

J-7872

J-45101

MKM-571-B

Hub and Wheel Runout Gauge

DT-307-B

DT-22912-B

J-22805-B

J-22912-B

Split Plate Bearing Puller

DT-586

DT-3129

DT-49556

KM-469-A

KM-586

J-23129

Universal Seal Remover

DT-5590

EN-49417

J-5590

Oil Seal Installer, Spark Plug Tube Driver

DT-6125-1B

DT-7004-4

EN-6125

GE-6125-1B

KM-313

J-6125-B

J-61251B

J-46125

Slide Hammer

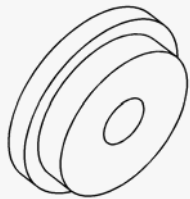
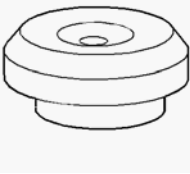
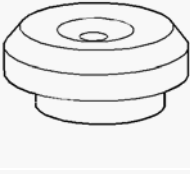
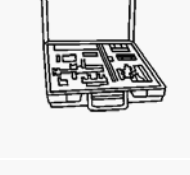
Illustration	Tool Number/ Description
	DT-7817 DT-47817 J-7817 Pinion Bearing Cup Installer
	DT-8092 DT-480921 J-8092 KM-J-8092 Driver Handle
	DT-8107-2 J-8107-2 Side Bearing Puller Pilot (194 mm Axle)
	DT-8107-4 J-8107-4 Side Bearing Puller Pilot (220 mm Axle)
	DT-08614-A J-08614-A Pinion Flange Holder and Remover
	DT-21777-B J-21777-B Pinion Setting Gauge Set
	DT-21784 J-21784 Side Bearing Installer (220 mm Axle)
	DT-22828 J-22828 Inner Pinion Bearing Installer

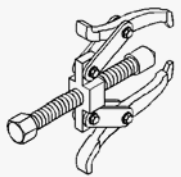
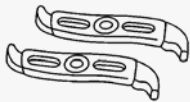
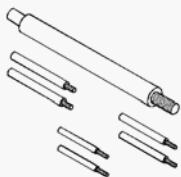
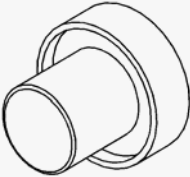
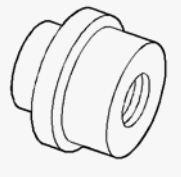
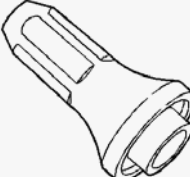
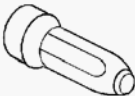
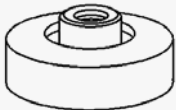
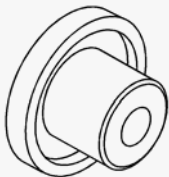
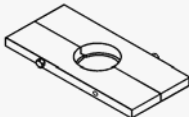
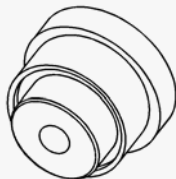
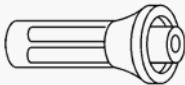
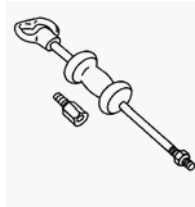
Illustration	Tool Number/ Description
	DT-22888-20-A CH-161-B J-22888-20-A KM-161-B Universal Two Jaw Puller
	DT-22888-35 J-22888-35 Side Bearing Puller Leg Set
	DT-25025-B J-25025-B Dial Indicator Post and Guide Pin Set
	DT-25299 J-25299 Side Bearing Installer (194 mm Axle)
	DT-28677 J-28677 Outer Pinion Bearing Cup Installer
	DT-29609 J-29609 Inner Pinion Bearing Cup Installer
	DT-34925 J-34925 Pinion Setting gage Components
	DT-38694 J-38694 Seal Installer

Illustration	Tool Number/ Description
	DT-42738 Input Shaft Seal Installer
	DT-45225 J-45225 Axle Seal Installer
	DT-49032 Bearing Installer
	DT-49275 Pinion Bearing Remover
	DT-50813 J-22536 Pinion Gear Remover
	DT-50925 Seal Installer
	EN-21128 J-21128 Axle Pinion Seal Installer (220 mm)
	EN-45000 J-45000 KM-374 KM-J-45000 Seal Remover

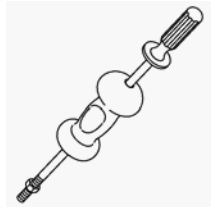
Illustration



GE-8001
J-8001
Dial Indicator Set



GE-02619-A
J-2619-A
Slide Hammer

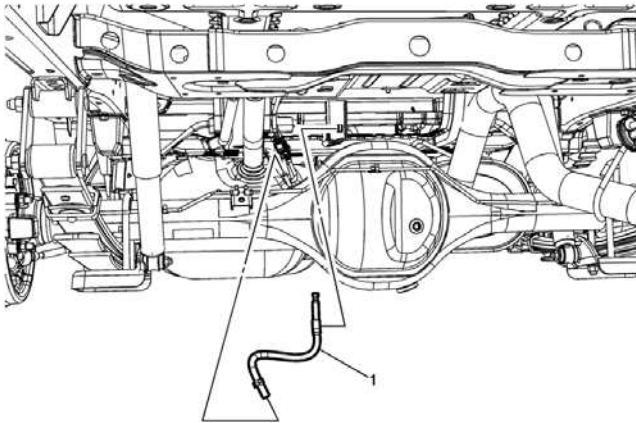


GE-23907-1
J-23907-1
Universal Slide Hammer

2013 Chevrolet Colorado

Submodel: | Engine Type: | Liters:

Fuel Delivery: | Fuel:



Vent Hose Replacement

Callout

Component Name

Preliminary Procedure

Raise and support the vehicle. Refer to Lifting and Jacking the Vehicle.

Rear Axle Vent Hose

Procedure

1

1. Using a small flat bladed screw driver, open the upper retaining clamp for the vent hose.
2. Using the appropriate tool, loosen and relocate the lower vent hose clamp