

[2009 Chevrolet Express - AWD](#) | [Express, Savana \(VIN G/H\) Service Manual](#) | [Driveline/Axle](#) | [Rear Drive Axle](#) |
[Specifications](#) | **Document ID: 2123417**

Axle Preload and Backlash Specifications

Application	Specification	
	Metric	English
Backlash	0.08-0.25 mm	0.003-0.010 in
Backlash (Preferred)	0.13-0.18 mm	0.005-0.007 in
Pinion and Differential Case Bearing Preload, New Bearings, Except 9.75" and 10.5" Axles	2.0-4.5-3.4-6.2 N·m	25-40 lb in
Pinion and Differential Case Bearing Preload, New Bearings, 9.75" and 10.5" Axles	4.0-6.4 N·m	35-57 lb in
Pinion and Differential Case Bearing Preload, Used Bearings, Except 9.75" and 10.5" Axles	1.1-2.3 N·m	15-30 lb in
Pinion Bearing Preload, New Bearings, Except 9.75" and 10.5" Axles	1.7-3.4 N·m	15-30 lb in
Pinion Bearing Preload, New Bearings, 9.75" and 10.5" Axles	2.3-5.1 N·m	20-45 lb in
Pinion Bearing Preload, Used Bearings, Except 9.75" and 10.5" Axles	1.1-2.3 N·m	10-20 lb in

Differential Adjustment Shim Specifications

8.6 Inch Axle Differential Adjustment Shims Specifications

Number of Notches		Specification	
Inside	Outside	Metric	English
0	3	1.02 mm	0.040"
0	4	1.07 mm	0.042"
0	5	1.12 mm	0.044"
1	1	1.17 mm	0.046"
1	2	1.22 mm	0.048"
1	3	1.27 mm	0.050"
1	4	1.32 mm	0.052"
1	5	1.37 mm	0.054"
2	1	1.42 mm	0.056"
2	2	1.47 mm	0.058"
2	3	1.52 mm	0.060"
2	4	1.58 mm	0.062"
2	5	1.63 mm	0.064"
3	1	1.68 mm	0.066"
3	2	1.73 mm	0.068"
3	3	1.78 mm	0.070"
3	4	1.83 mm	0.072"
3	5	1.88 mm	0.074"
4	1	1.93 mm	0.076"
4	2	1.98 mm	0.078"
4	3	2.03 mm	0.080"
4	4	2.08 mm	0.082"
4	5	2.13 mm	0.084"
5	1	2.18 mm	0.086"
5	2	2.24 mm	0.088"
5	3	2.29 mm	0.090"
5	4	2.34 mm	0.092"
5	5	2.39 mm	0.094"
6	1	2.38 mm	0.096"
6	2	2.49 mm	0.098"
6	3	2.54 mm	0.100"

Fastener Tightening Specifications

Application	Specification	
	Metric	English
Axle Flange Bolts	156 N·m	115 lb ft
Bearing Cap Bolts, 8.6" Axle	75 N·m	55 lb ft
Bearing Cap Bolts, 9.5" Axle	85 N·m	63 lb ft
Bearing Cap Bolts, 9.75", 10.5" and 10.75" Axles	109 N·m	80 lb ft
Brake Backing Plate Bolts, 8.6" Axle	140 N·m	103 lb ft
Brake Backing Plate Bolts, 9.75", 10.5" and 10.75" Axles w/o RPO R05	135 N·m	100 lb ft
Brake Backing Plate Bolts, 10.5" and 10.75" Axles w/ RPO R05	160 N·m + 30 degrees	118 lb ft + 30 degrees
Differential Bearing Adjuster Nut Lock Bolt, 9.5" Axles	26 N·m	19 lb ft
Differential Bearing Adjuster Nut Lock Bolt, 9.75", 10.5" and 10.75" Axles	13 N·m	10 lb ft
Differential Case Bolts (Locking/Limited Slip)	50 N·m	37 lb ft
Differential Housing Cover Bolts, 8.6", 9.5" Axles	40 N·m	30 lb ft
Differential Housing Cover Bolts, 9.75", 10.5" and 10.75" Axles	61 N·m	45 lb ft
Fill Plug	33 N·m	24 lb ft
Pinion Nut, 9.75", 10.5" and 10.75" Axles	339 N·m	250 lb ft
Pinion Shaft Lock Bolt, 8.6" Axle	36 N·m	27 lb ft
Pinion Shaft Lock Bolt, 9.5" Axle	50 N·m	37 lb ft
Pinion Shaft Lock Bolt, 9.75" Axle	27 N·m	20 lb ft
Pinion Yoke Retainer Bolts	25 N·m	18 lb ft
Ring Gear Bolts, 8.6" Axle	120 N·m	89 lb ft
Ring Gear Bolts, 9.5" Axle	140 N·m	103 lb ft
Ring Gear Bolts, 9.75", 10.5" and 10.75" Axles	177 N·m	131 lb ft
Wheel Hub Nut	70 N·m	52 lb ft

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Adhesives, Fluids, Lubricants, and Sealers

Application	Type of Material	GM Part Number
Pinion Yoke Splines	Sealant	12346004 (Canadian P/N 10953480) or equivalent
Rear Axle Housing Cover, 9.75" and 10.5" Axles	Sealant	12346240 (Canadian P/N 10953493) or equivalent
Rear Drive Axle	Lubricant	12378261 (Canadian P/N 10953455) or equivalent meeting GM Specification 9986115
Ring Gear	Marking Compound	1052351 (Canadian P/N 10953497) or equivalent

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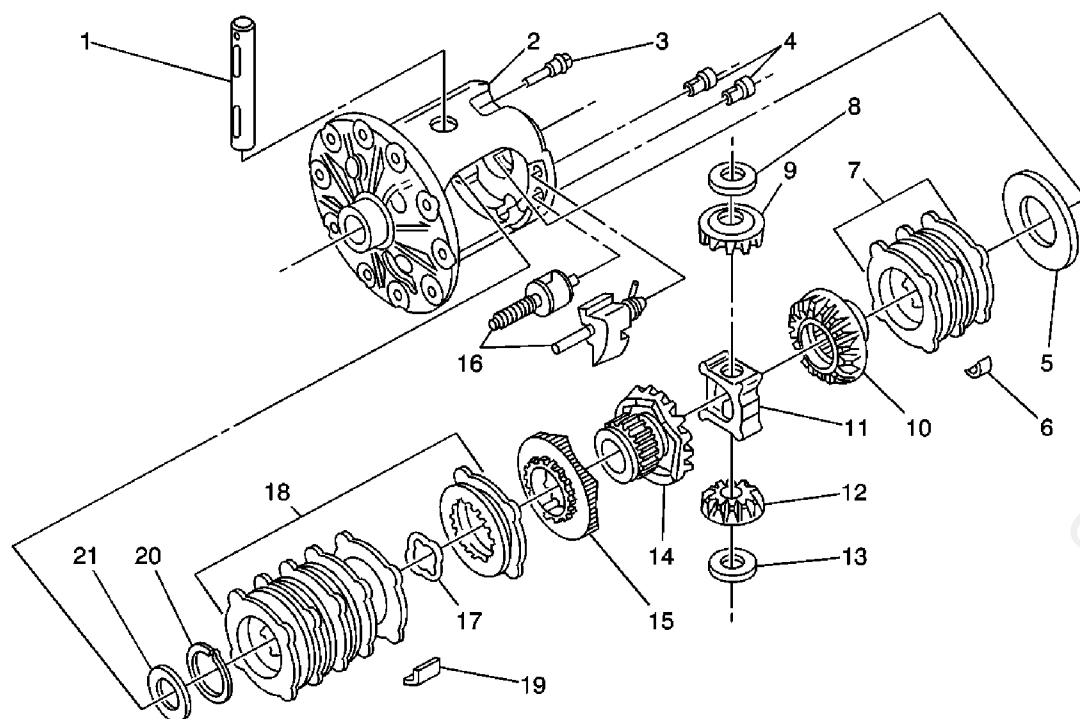
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Locking Differential Thrust Block Sizes

Color Code	8.6" Axle	9.5" and 9.75" Axle	10.5" and 10.75" Axles
Blue	34.290 mm (1.350")	40.49 mm (1.594")	40.49 mm (1.594")
Purple	33.578 mm (1.322")	40.59 mm (1.598")	40.59 mm (1.598")
White	33.680 mm (1.326")	40.69 mm (1.602")	40.69 mm (1.602")
Brown	33.782 mm (1.330")	40.79 mm (1.606")	40.79 mm (1.606")
Yellow	33.883 mm (1.334")	40.89 mm (1.610")	40.89 mm (1.610")
Orange	33.985 mm (1.338")	41.00 mm (1.614")	41.00 mm (1.614")
Pink	34.087 mm (1.342")	41.10 mm (1.618")	41.10 mm (1.618")
Green	34.188 mm (1.346")	41.20 mm (1.622")	41.20 mm (1.622")

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8.6 Locking Differential

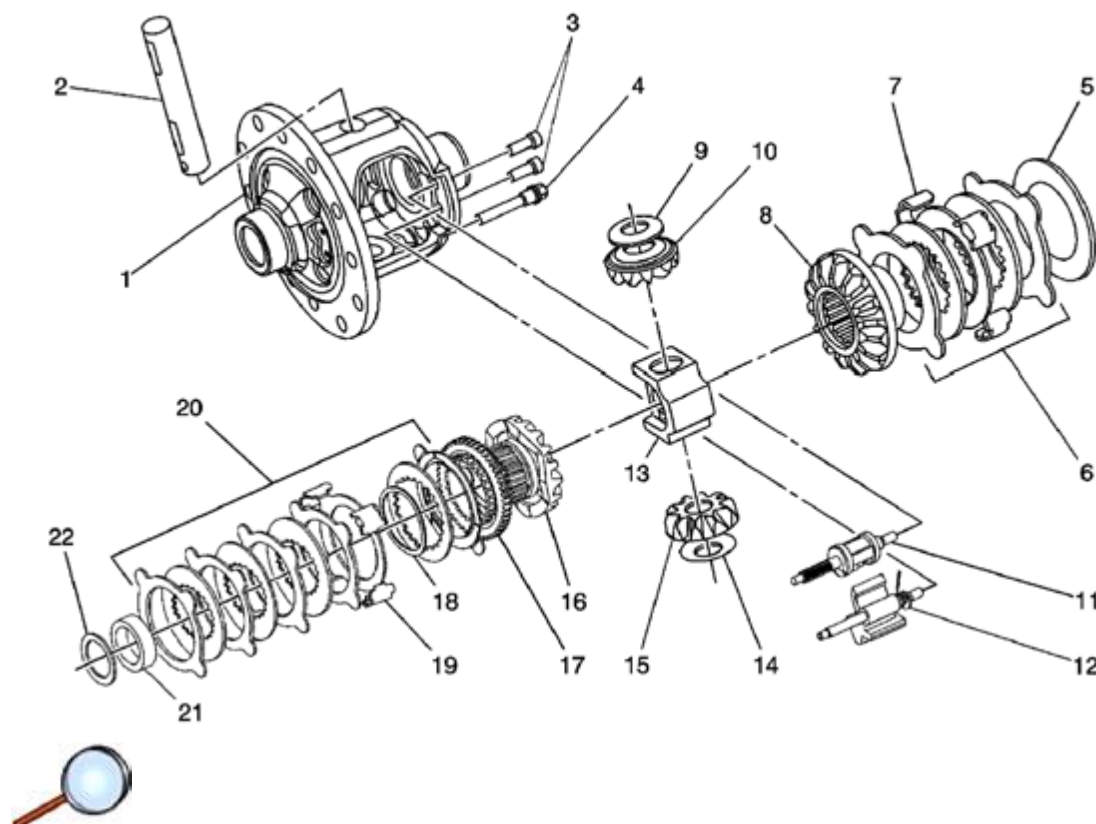


- (1) Differential Pinion Gear Shaft
- (2) Differential Case
- (3) Differential Pinion Gear Shaft Lock Bolt
- (4) Locking Differential Lockout Bushings
- (5) Locking Differential Clutch Disc Thrust Washer
- (6) Locking Differential Clutch Disc Guide
- (7) Locking Differential Clutch Disc Set
- (8) Differential Pinion Gear Thrust Washer
- (9) Differential Pinion Gear
- (10) Locking Differential Side Gear
- (11) Locking Differential Thrust Block
- (12) Differential Pinion Gear
- (13) Differential Pinion Gear Thrust Washer
- (14) Locking Differential Side Gear, Cam-Faced
- (15) Locking Differential Cam
- (16) Locking Differential Governor
- (17) Wave Washer
- (18) Locking Differential CI

- (19) Locking Differential Clutch Disc Guide
- (20) Locking Differential Snap Ring Retainer
- (21) Locking Differential Clutch Disc Thrust Washer

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9.75 Locking Differential

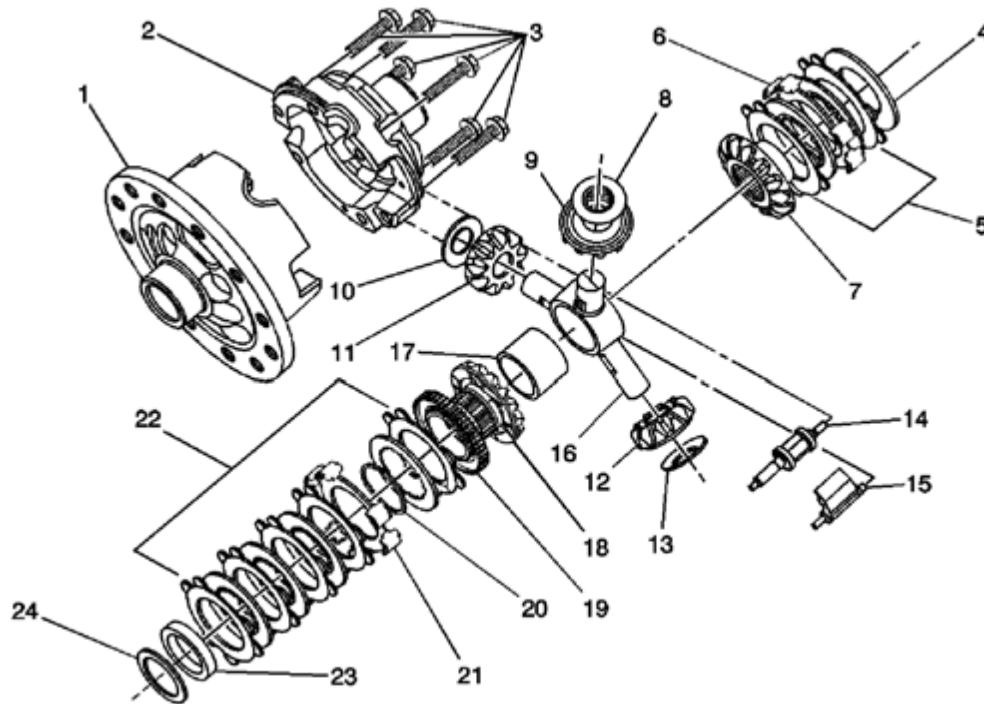


- (1) Differential Case
- (2) Differential Pinion Gear Shaft
- (3) Locking Differential Lockout Bushings
- (4) Differential Pinion Gear Shaft Lock Bolt
- (5) Locking Differential Clutch Disc Thrust Washer
- (6) Locking Differential Clutch Disc Set
- (7) Locking Differential Clutch Disc Guide
- (8) Locking Differential Side Gear
- (9) Differential Pinion Gear Thrust Washer
- (10) Differential Pinion Gear
- (11) Locking Differential Governor
- (12) Locking Differential Latching Bracket and Spring
- (13) Locking Differential Thrust Block
- (14) Differential Pinion Gear Thrust Washer
- (15) Differential Pinion Gear
- (16) Locking Differential Side Gear - Cam-Faced
- (17) Locking Differential Cam
- (18) Wave Washer

- (19) Locking Differential Clutch Disc Guide
- (20) Locking Differential Clutch Disc Set
- (21) Locking Differential Side Gear Thrust Sleeve
- (22) Differential Side Gear Shim

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10.5 and 10.75 Locking Differential

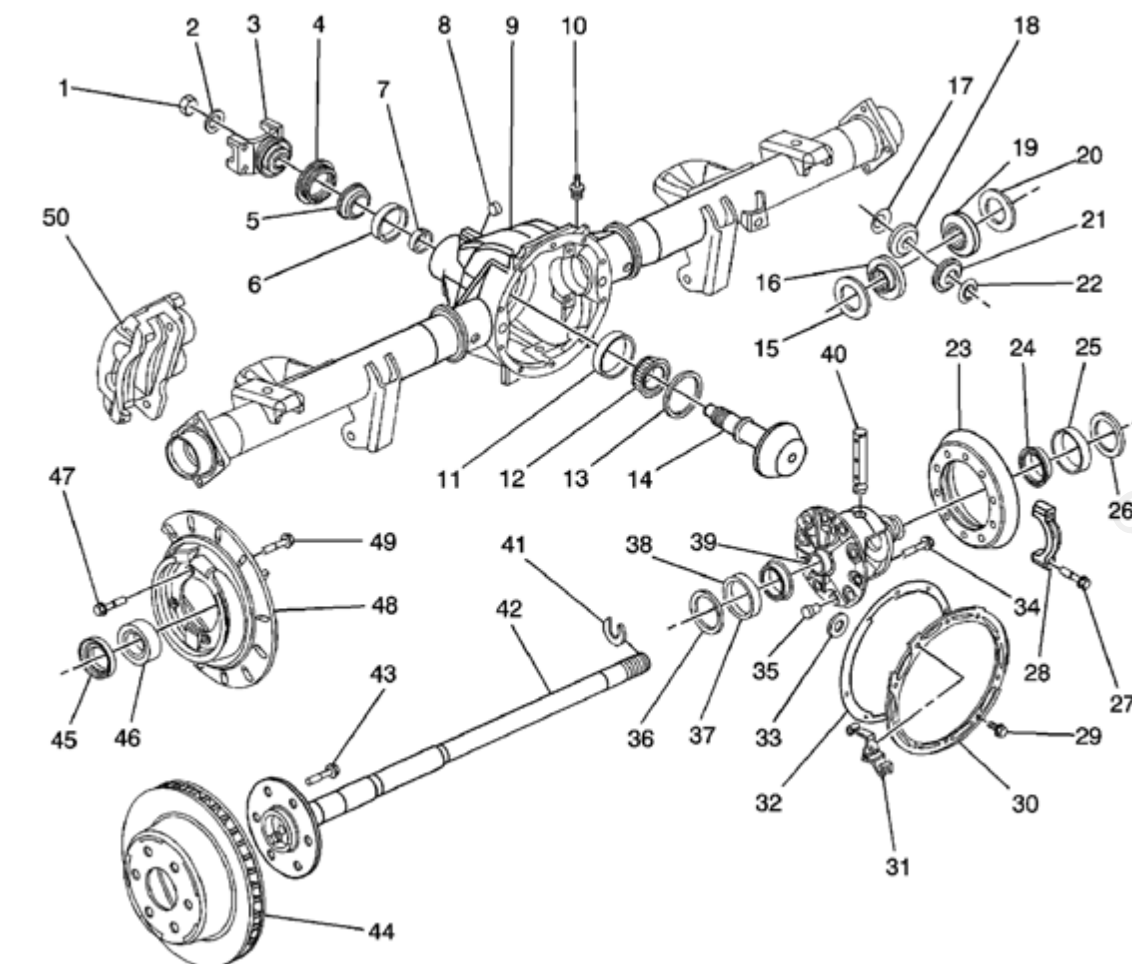


- (1) Differential Case - Left
- (2) Differential Case - Right
- (3) Differential Case Bolts
- (4) Locking Differential Clutch Disc Thrust Washer
- (5) Locking Differential Clutch Disc Set
- (6) Locking Differential Clutch Disc Guide
- (7) Locking Differential Side Gear
- (8) Differential Pinion Gear Thrust Washer
- (9) Differential Pinion Gear
- (10) Differential Pinion Gear Thrust Washer
- (11) Differential Pinion Gear
- (12) Differential Pinion Gear
- (13) Differential Pinion Gear Thrust Washer
- (14) Locking Differential Governor
- (15) Locking Differential Latching Bracket and Spring
- (16) Locking Differential Spider
- (17) Locking Differential Thrust Block
- (18) Locking Differential Si

- (19) Locking Differential Cam
- (20) Wave Washer
- (21) Locking Differential Clutch Disc Guide
- (22) Locking Differential Clutch Disc Set
- (23) Locking Differential Side Gear Thrust Sleeve
- (24) Locking Differential Side Gear Shim

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8.6 Inch Rear Axle

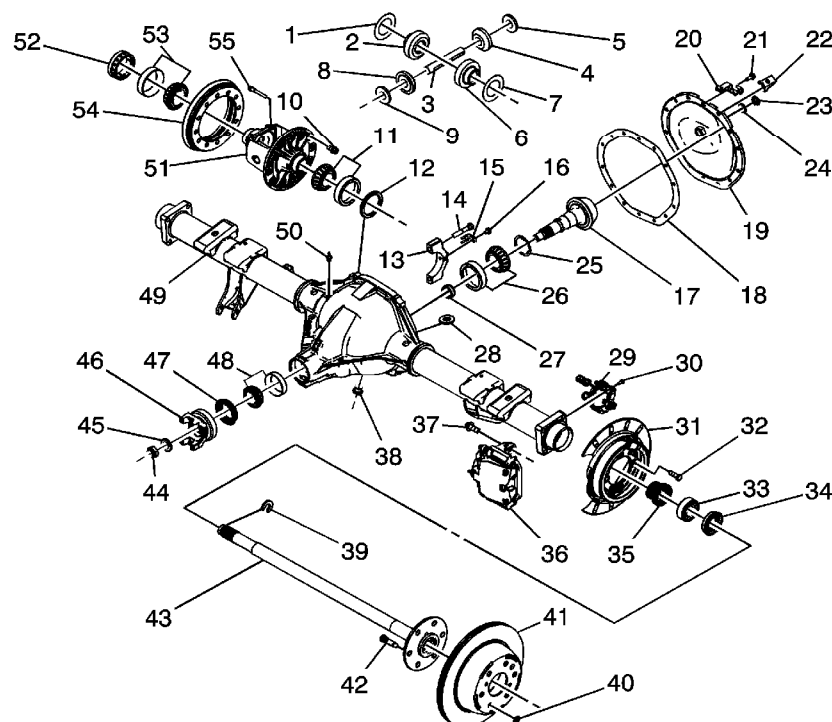


- (1) Differential Drive Pinion Gear Nut
- (2) Differential Drive Pinion Gear Washer
- (3) Differential Drive Pinion Gear Yoke
- (4) Differential Drive Pinion Gear Seal
- (5) Differential Drive Pinion Gear Outer Bearing
- (6) Differential Drive Pinion Gear Outer Bearing Cup
- (7) Differential Drive Pinion Gear Bearing Spacer
- (8) Rear Axle Housing Fill Plug
- (9) Rear Axle Housing
- (10) Rear Axle Vent Hose Connector
- (11) Differential Drive Pinion Gear Inner Bearing Cup

- (12) Differential Drive Pinion Gear Inner Bearing
- (13) Differential Drive Pinion Gear Bearing Shim
- (14) Differential Drive Pinion Gear Shaft
- (15) Differential Side Gear Thrust Washer
- (16) Differential Side Gear
- (17) Differential Pinion Gear Thrust Washer
- (18) Differential Pinion Gear
- (19) Differential Side Gear
- (20) Differential Side Gear Thrust Washer
- (21) Differential Pinion Gear
- (22) Differential Pinion Gear Thrust Washer
- (23) Differential Ring Gear
- (24) Differential Bearing
- (25) Differential Bearing Cup
- (26) Differential Bearing Shim
- (27) Differential Bearing Cap Bolt
- (28) Differential Carrier Bearing Cap
- (29) Rear Axle Housing Cover Bolt
- (30) Rear Axle Housing Cover
- (31) Brake Clip
- (32) Rear Axle Housing Cover Gasket
- (33) Rear Axle Housing Cover Magnet
- (34) Differential Pinion Gear Shaft Lock Bolt
- (35) Differential Ring Gear Bolt
- (36) Differential Bearing Shim
- (37) Differential Bearing
- (38) Differential Bearing Cup
- (39) Differential Case
- (40) Differential Pinion Gear Shaft
- (41) Rear Axle Shaft Lock
- (42) Rear Axle Shaft
- (43) Stud
- (44) Brake Rotor
- (45) Rear Axle Shaft Seal
- (46) Wheel Bearing
- (47) Brake Backing Plate Bolt
- (48) Brake Backing Plate Assembly
- (49) Brake Caliper Bolt
- (50) Brake Caliper

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8.6 Inch Rear Axle with Disc Brake and VSES

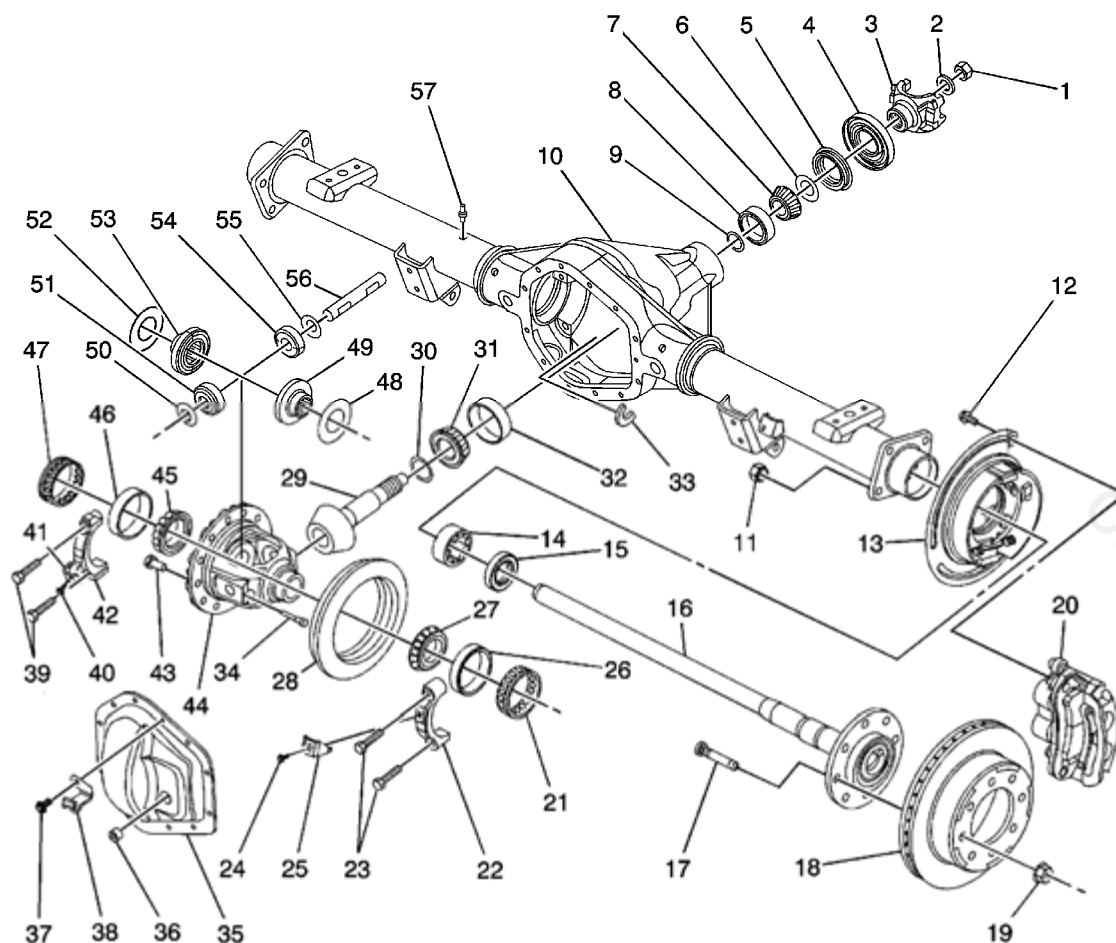


- (1) Differential Side Gear Thrust Washer
- (2) Differential Side Gear
- (3) Differential Cross Shaft
- (4) Differential Pinion Gear
- (5) Differential Pinion Gear Thrust Washer
- (6) Differential Side Gear
- (7) Differential Side Gear Thrust Washer
- (8) Differential Pinion Gear
- (9) Differential Pinion Gear Thrust Washer
- (10) Ring Gear Bolt
- (11) Differential Case Bearing Assembly
- (12) Differential Case Bearing Shim
- (13) Differential Bearing Cap
- (14) Differential Bearing Cap Bolt
- (15) Differential Bearing Adjuster Lock
- (16) Differential Bearing Adjuster Lock Bolt
- (17) Drive Pinion
- (18) Cover Pan Gasket

- (19) Cover Pan
- (20) Brake Cable Bracket
- (21) Cover Pan Bolt
- (22) Brake Line Bracket
- (23) Fill Plug
- (24) Fill Plug Washer
- (25) Pinion Bearing Shim
- (26) Pinion Head Bearing Assembly
- (27) Pinion Bearing Spacer
- (28) Differential Carrier Magnet
- (29) VSES Sensor Assembly
- (30) VSES Sensor Bolt
- (31) Park Brake Assembly
- (32) Park Brake Attachment Bolt
- (33) Axle Shaft Bearing Assembly
- (34) Axle Shaft Seal Assembly
- (35) VSES Exciter Ring Assembly
- (36) Caliper Assembly
- (37) Caliper Bolt
- (38) Carrier Drain Plug
- (39) Axle Shaft C-Lock
- (40) Push Nut
- (41) Brake Rotor
- (42) Wheel Stud
- (43) Axle Shaft
- (44) Pinion Flange Nut
- (45) Pinion Flange Washer
- (46) Pinion Flange Assembly
- (47) Pinion Flange Seal Assembly
- (48) Pinion Tail Bearing Assembly
- (49) Axle Housing Assembly
- (50) Vent Hose Connector
- (51) Differential Case
- (52) Differential Case Bearing Adjuster
- (53) Differential Case Bearing Assembly
- (54) Ring Gear
- (55) Differential Cross Shaft Lock Screw

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9.75 Inch Rear Axle



- (1) Pinion Gear Nut
- (2) Pinion Gear Washer
- (3) Pinion Gear Yoke
- (4) Pinion Gear Yoke Deflector
- (5) Pinion Gear Oil Seal
- (6) Thrust Washer
- (7) Pinion Gear Bearing - Outer
- (8) Pinion Gear Bearing Cup - Outer
- (9) Pinion Gear Preload Shim
- (10) Axle Housing
- (11) Nut

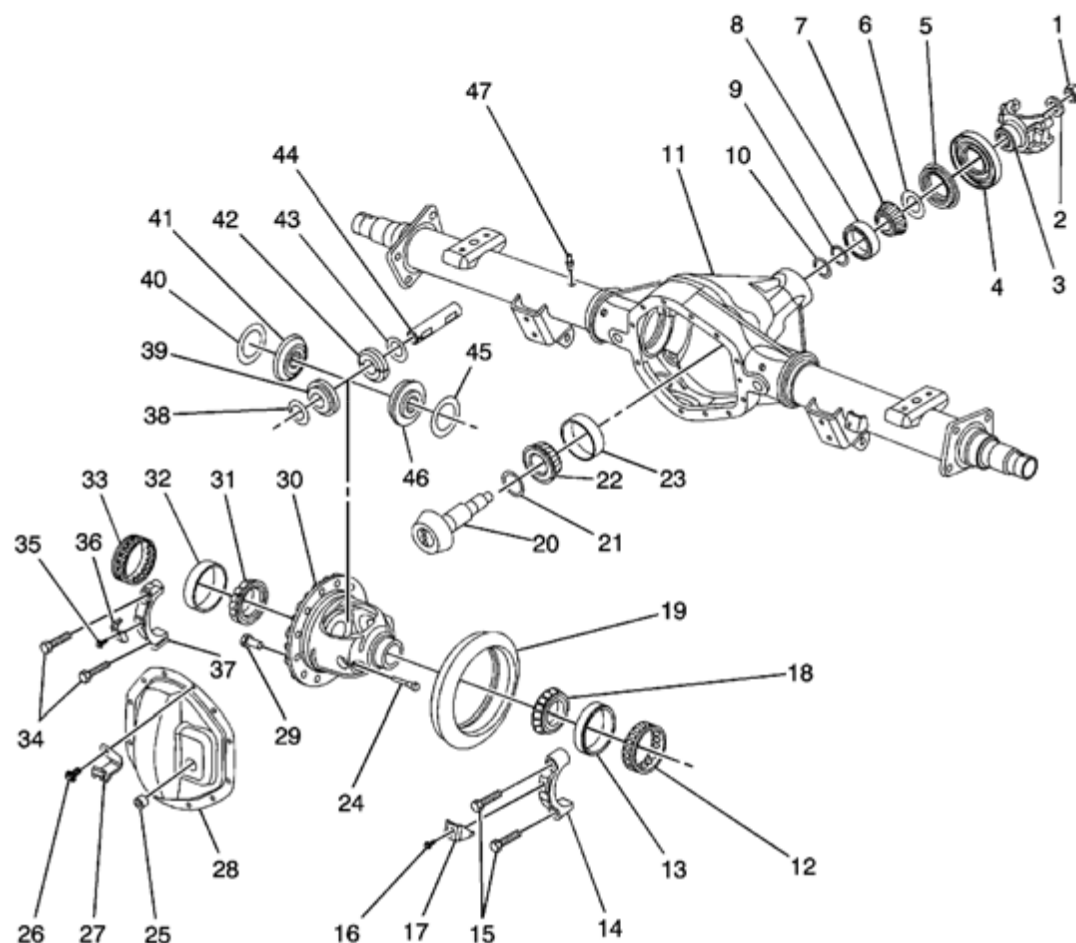
- (12) Brake Caliper Mounting Bracket Bolt
- (13) Park Brake Assembly
- (14) Rear Axle Shaft Wheel Bearing
- (15) Rear Axle Shaft Oil Seal
- (16) Rear Axle Shaft
- (17) Wheel Stud
- (18) Brake Rotor
- (19) Brake Rotor Clip
- (20) Brake Caliper and Mounting Bracket Assembly
- (21) Differential Side Bearing Adjuster
- (22) Differential Bearing Cap
- (23) Differential Bearing Cap Bolts
- (24) Differential Side Bearing Adjuster Nut Lock Bolt
- (25) Differential Side Bearing Adjuster Nut Lock
- (26) Differential Side Bearing Cup
- (27) Differential Side Bearing
- (28) Differential Ring Gear
- (29) Differential Drive Pinion Gear
- (30) Pinion Gear Bearing Shim
- (31) Pinion Gear Bearing - Inner
- (32) Pinion Gear Bearing Cup - Inner
- (33) Rear Axle Shaft Lock
- (34) Pinion Gear Shaft Lock Bolt
- (35) Rear Axle Housing Cover
- (36) Rear Axle Housing Fill Plug
- (37) Rear Axle Housing Cover Bolt
- (38) Park Brake Cable Clip
- (39) Differential Bearing Cap Bolts
- (40) Differential Side Bearing Adjuster Nut Lock Bolt
- (41) Differential Side Bearing Adjuster Nut Lock
- (42) Differential Bearing Cap
- (43) Ring Gear Bolt
- (44) Differential Case
- (45) Differential Side Bearing
- (46) Differential Side Bearing Cup
- (47) Differential Side Bearing Adjuster
- (48) Thrust Washer
- (49) Differential Side Gear
- (50) Thrust Washer
- (51) Differential Pinion Gear
- (52) Thrust Washer
- (53) Differential Side Gear
- (54) Differential Pinion Gear
- (55) Thrust Washer
- (56) Differential Pinion Gear Shaft

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(57) Vent Hose Connector

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10.5 and 10.75 Inch Rear Axle - Axle Housing Components

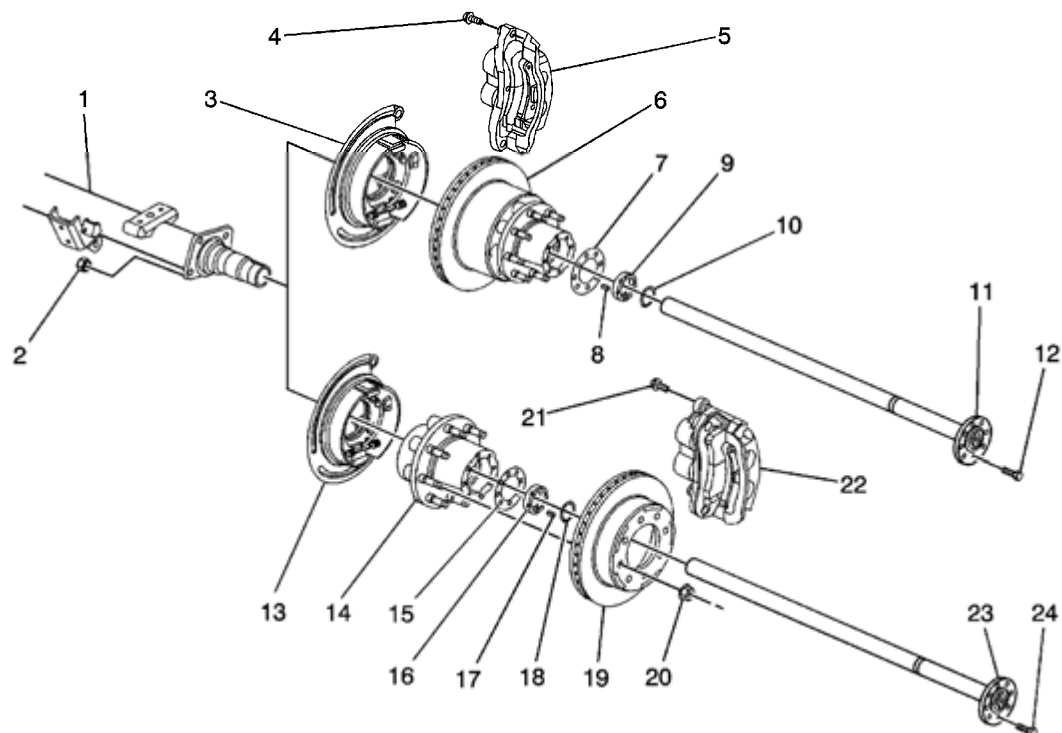


- (1) Pinion Gear Nut
- (2) Pinion Gear Washer
- (3) Pinion Gear Yoke
- (4) Pinion Gear Yoke Deflector
- (5) Pinion Gear Oil Seal
- (6) Thrust Washer
- (7) Pinion Gear Bearing - Outer
- (8) Pinion Gear Bearing Cup - Outer
- (9) Pinion Gear Preload Shim
- (10) Pinion Gear Preload Spacer
- (11) Axle Housing

- (12) Differential Side Bearing Adjuster
- (13) Differential Side Bearing Cup
- (14) Differential Bearing Cap
- (15) Differential Bearing Cap Bolts
- (16) Differential Side Bearing Adjuster Nut Lock Bolt
- (17) Differential Side Bearing Adjuster Nut Lock
- (18) Differential Side Bearing
- (19) Differential Ring Gear
- (20) Differential Drive Pinion Gear
- (21) Pinion Gear Bearing Shim
- (22) Pinion Gear Bearing - Inner
- (23) Pinion Gear Bearing Cup - Inner
- (24) Pinion Gear Shaft Lock Bolt
- (25) Rear Axle Housing Fill Plug
- (26) Rear Axle Housing Cover Bolt
- (27) Park Brake Cable Clip
- (28) Rear Axle Housing Cover
- (29) Ring Gear Bolt
- (30) Differential Case
- (31) Differential Side Bearing
- (32) Differential Side Bearing Cup
- (33) Differential Side Bearing Adjuster
- (34) Differential Bearing Cap Bolts
- (35) Differential Side Bearing Adjuster Nut Lock Bolt
- (36) Differential Side Bearing Adjuster Nut Lock
- (37) Differential Bearing Cap
- (38) Thrust Washer
- (39) Differential Pinion Gear
- (40) Thrust Washer
- (41) Differential Side Gear
- (42) Differential Pinion Gear
- (43) Thrust Washer
- (44) Differential Pinion Gear Shaft
- (45) Thrust Washer
- (46) Differential Side Gear
- (47) Vent Hose Connector

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10.5 and 10.75 Inch Rear Axle - Wheel End Components



- (1) Axle Housing
- (2) Park Brake Backing Plate Nut
- (3) Park Brake Assembly - w/RPO R05
- (4) Brake Caliper Mounting Bracket Bolt - w/RPO R05
- (5) Brake Caliper and Mounting Bracket - w/RPO R05
- (6) Brake Rotor and Hub Assembly - w/RPO R05
- (7) Rear Axle Shaft Gasket - w/RPO R05
- (8) Wheel Bearing Adjuster Nut Key - w/RPO R05
- (9) Wheel Bearing Adjuster Nut - w/RPO R05
- (10) Wheel Bearing Adjuster Nut Retainer Ring - w/RPO R05
- (11) Rear Axle Shaft - w/RPO R05
- (12) Rear Axle Shaft Bolt - w/RPO R05
- (13) Park Brake Assembly - w/RPO R05
- (14) Hub Assembly - w/o RPO R05
- (15) Rear Axle Shaft Gasket - w/o RPO R05
- (16) Wheel Bearing Adjuster Nut - w/o RPO R05
- (17) Wheel Bearing Adjuster Nut Key - w/o RPO R05
- (18) Wheel Bearing Adjust

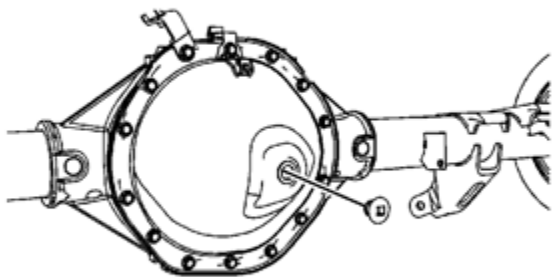
- (19) Brake Rotor - w/o RPO R05
- (20) Brake Rotor Clip - w/o RPO R05
- (21) Brake Caliper Mounting Bracket Bolt - w/o RPO R05
- (22) Brake Caliper and Mounting Bracket - w/o RPO R05
- (23) Rear Axle Shaft - w/o RPO R05
- (24) Rear Axle Shaft Bolt - w/o RPO R05

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Rear Axle Lubricant Level Inspection (8.6, 9.5 Inch Axle)

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. Ensure the vehicle is level.
3. Inspect the rear axle for leaks. Repair as necessary.
4. Clean the area around the rear axle fill plug.



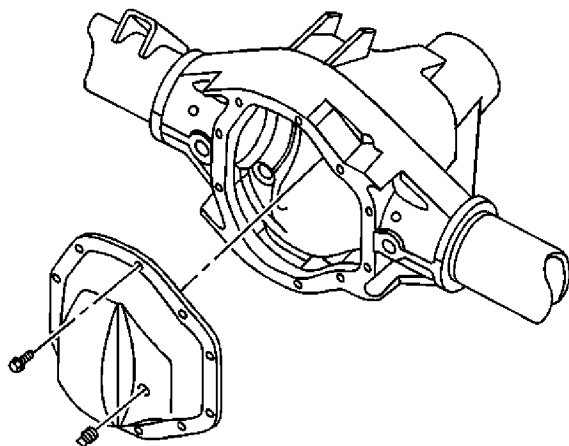
5. Remove the rear axle fill plug.
6. Inspect the lubricant level:
 - For the 8.6 inch axle, the lubricant level should be between **1-19 mm (0.04-0.75 in) below the fill plug opening.**
 - For the 9.5 inch LD axle, the lubricant level should be between **15-40 mm (0.59-1.57 in) below the fill plug opening.**
7. If the level is low, add lubricant until the level is even with the bottom edge of the fill plug opening. Use the proper fluid. Refer to [Fluid and Lubricant Recommendations](#).

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

8. Install the rear axle fill plug and tighten to **33 N·m (24 lb ft)**.
9. Remove the support and lower the vehicle.

Rear Axle Lubricant Level Inspection (9.75, 10.5 and 10.75 Inch Axle)

1. Raise the vehicle. Refer to [Lifting and Jacking the Vehicle](#).
2. Ensure 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 0-6 mm (0-0.25 in) below the fill plug opening.

7. If the level is low, add lubricant until the level is even with the bottom edge of the fill plug opening. Use the proper fluid. Refer to [Fluid and Lubricant Recommendations](#).

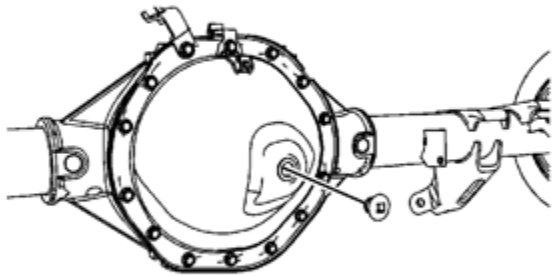
Caution: Refer to [Fastener Caution](#) in the Preface section.

8. Install the rear axle fill plug and tighten to **33 N·m (24 lb ft)**.
9. Lower the vehicle.

Rear Axle Lubricant Replacement (8.6, 9.5 Inch Axle)

Removal Procedure

1. Raise and support the vehicle. Refer to [Lifting and Jacking the Vehicle](#).
2. Clean the area around the rear axle fill plug.

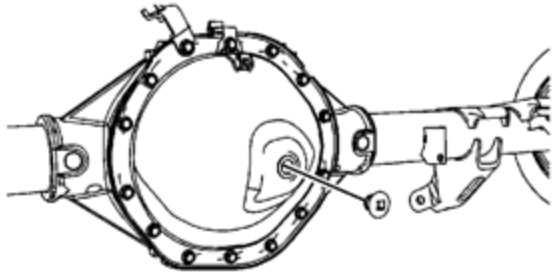


3. Remove the rear axle fill plug.
4. Remove the rear axle cover. Refer to [Rear Axle Housing Cover and Gasket Replacement](#).
5. Drain the lubricant into a suitable container.

Installation Procedure

1. Install the rear axle cover. Refer to [Rear Axle Housing Cover and Gasket Replacement](#).
2. Fill the rear axle with axle lubricant. Use the proper fluid. Refer to [Approximate Fluid Capacities](#) and [Adhesives, Fluids, Lubricants, and Sealers](#).

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



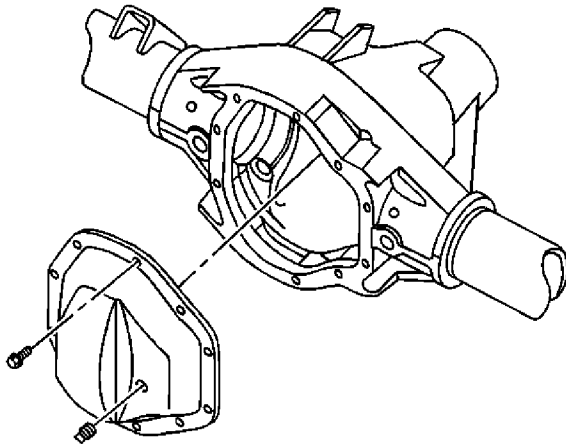
3. Install the rear axle fill plug and tighten to **33 N·m (24 lb ft)**..
4. Remove the support and lower the vehicle.

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Rear Axle Lubricant Replacement (9.75, 10.5 and 10.75 Inch Axles)

Removal Procedure

1. Raise the vehicle. Refer to [Lifting and Jacking the Vehicle](#).



2. Remove the fill plug.
3. Remove the rear axle housing cover bolts.

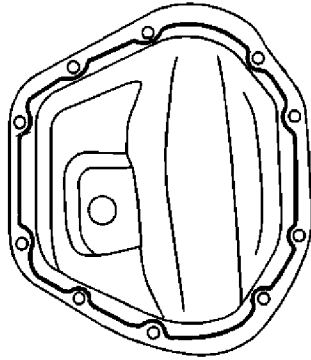
Discard the bolts.

4. Remove the rear axle housing cover.

Drain the lubricant into a suitable container.

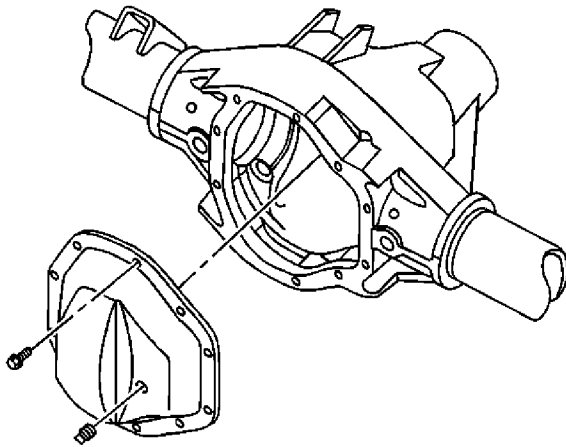
5. Remove the sealant from the rear axle housing and the rear axle housing cover.

Installation Procedure



1. Apply an approximately 3.18-6.35 mm (1/8-1/4 in) high and 3.18-6.35 mm (1/8-1/4 in) wide bead of sealant, GM P/N 12346240 (Canadian P/N 10953493) or equivalent, to the rear axle housing cover.

The sealant is to be applied in the middle of the rear axle housing cover flange and on the inside of all bolt hole openings as shown.



2. Install the rear axle housing cover.

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

3. Install the new rear axle housing cover bolts and tighten to **61 N·m (45 lb ft)**.

Note: Allow the sealant to cure for one hour before filling the axle with axle lubricant.

4. Fill the rear axle with axle lubricant. Use the proper fluid. Refer to [Approximate Fluid Capacities](#) and [Fluid and Lubricant Recommendations](#).
5. Install rear axle fill plug and tighten to **33 N·m (24 lb ft)**.
6. Lower the vehicle.

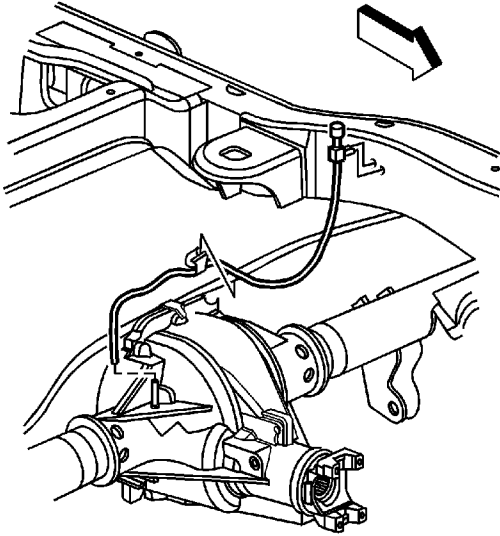
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Vent Hose Replacement

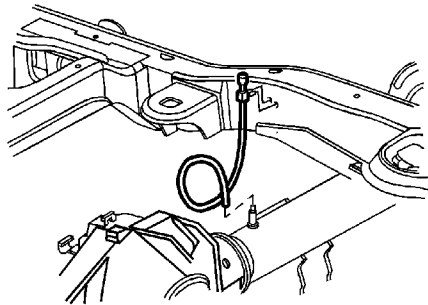
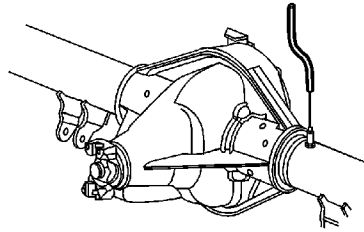
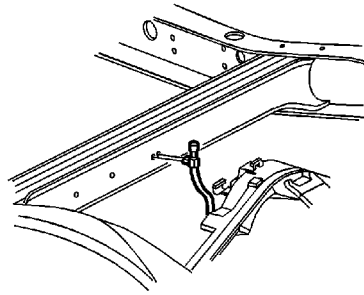
Removal Procedure

Important: Make note of the routing in order to aid in reassembly.

1. Raise the vehicle. Refer to [Lifting and Jacking the Vehicle](#) .



2. For 15 series vehicles, remove the vent hose from the clip attached to the frame.
3. Remove the vent hose from the axle.

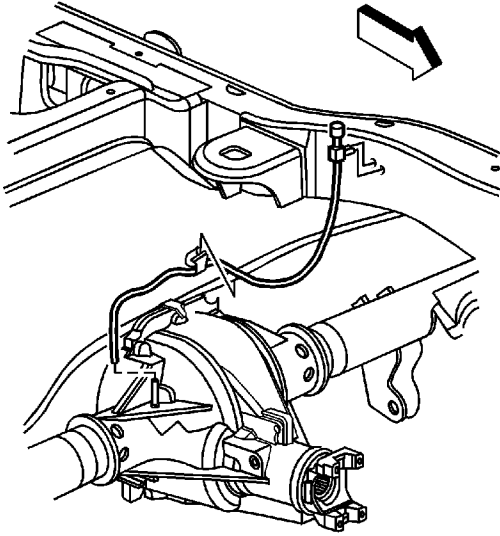


4. For 25/35 series vehicles, remove the vent hose from the clip attached to the frame.
5. Remove the vent hose from the axle.

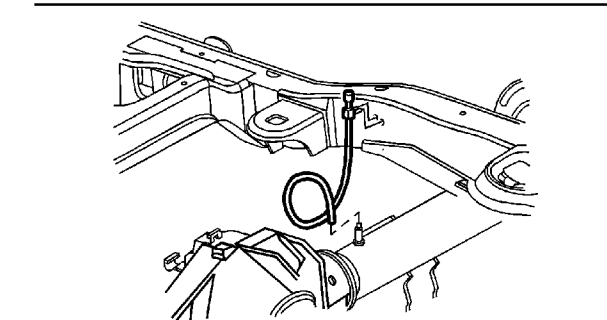
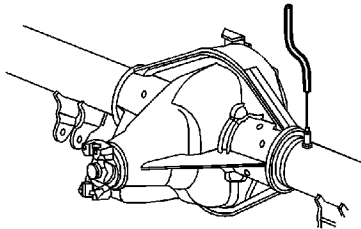
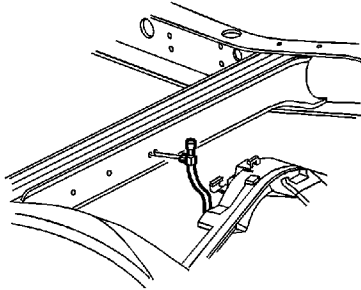
Installation Procedure

Important: When installing the vehicle hose, note the following:

- Route the same way as when removed.
- Ensure that the hose is free of kinks and is routed clear of sharp objects.
- Ensure that the vent is not plugged.



1. For 15 series vehicles, install the vent hose to the axle.
2. Install the vent hose to the clip attached to the frame.



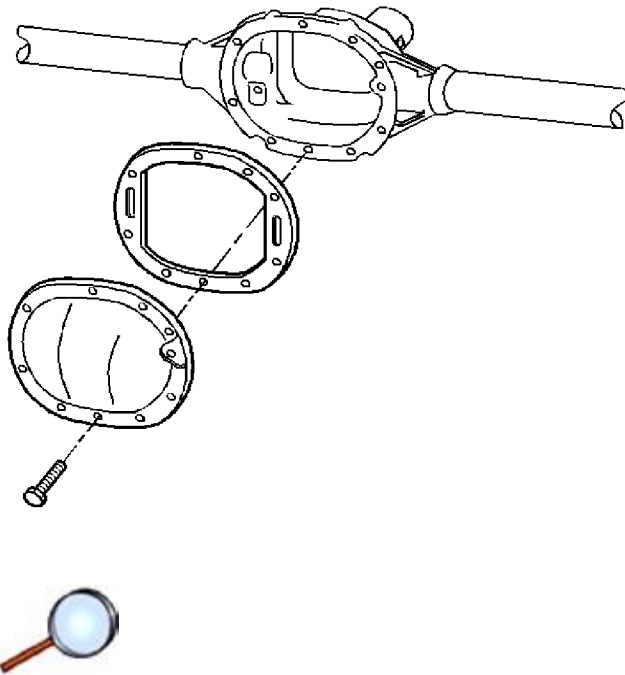
3. For 25/35 series vehicles, install the vent hose to the axle.
4. Install the vent hose to the clip attached to the frame.

5. Lower the vehicle.

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Rear Axle Housing Cover and Gasket Replacement (8.6, 9.5 Inch Axle)

Removal Procedure

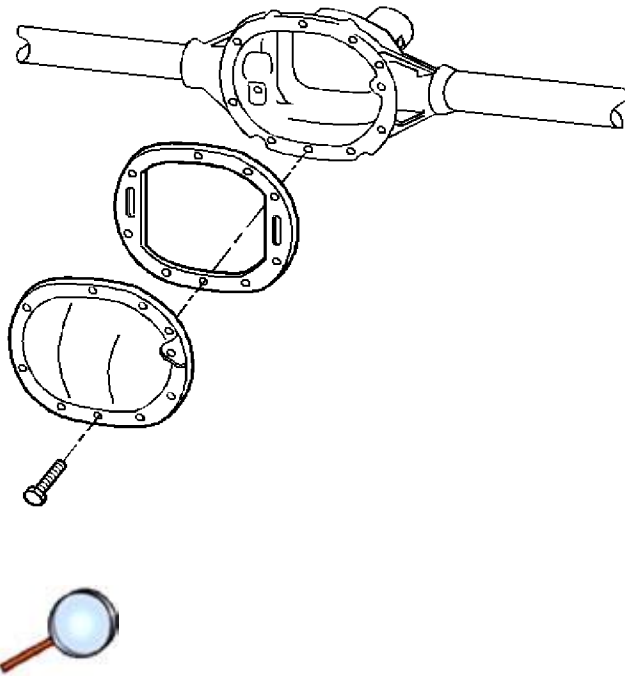


1. Raise and support the vehicle. Refer to [Lifting and Jacking the Vehicle](#).
2. Clean the area around the rear axle fill plug.
3. Remove the rear axle fill plug.
4. Remove the rear axle housing cover bolts.

Discard the rear axle housing cover bolts.

5. Carefully remove the rear axle housing cover from the axle housing and drain the lubricant into a suitable container.
6. Remove any gasket material from the rear axle housing and/or the rear axle housing cover.
7. Inspect the bottom of the rear axle housing for excessive metal particle accumulation. This accumulation may be a indication of extreme wear.

Installation Procedure



1. Install the rear axle housing cover and a new gasket onto the axle housing.

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

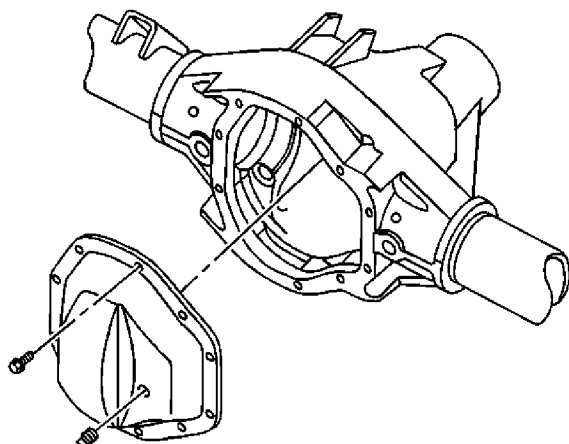
Note: Do not reuse the rear axle housing cover bolts

2. Install the new rear axle housing cover bolts and tighten in a crosswise pattern to **40 N·m (30 lb ft)**.
3. Fill the rear axle using the proper fluid. Refer to [Approximate Fluid Capacities](#) and [Fluid and Lubricant Recommendations](#).
4. Install the rear axle fill plug and tighten to **33 N·m (24 lb ft)**.
5. Remove the support and lower the vehicle.

Rear Axle Housing Cover and Gasket Replacement (9.75, 10.5 and 10.75 Inch Axles)

Removal Procedure

1. Raise the vehicle. Refer to [Lifting and Jacking the Vehicle](#).
2. Clean the area around the rear axle fill plug.
3. Remove the rear axle fill plug.

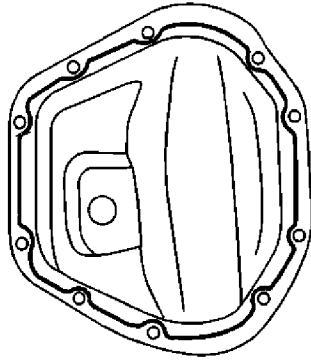


4. Remove the rear axle housing cover bolts.

Discard the rear axle housing cover bolts.

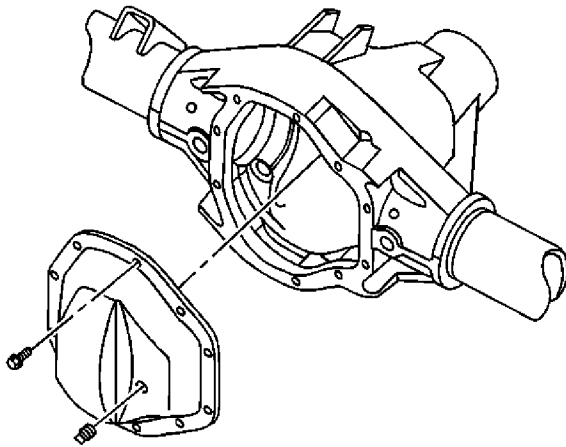
5. Carefully remove the rear axle housing cover from the axle housing and drain the lubricant into a suitable container.
6. Remove any sealant from the rear axle housing and/or the rear axle housing cover.
7. Inspect the bottom of the rear axle housing for excessive metal particle accumulation. This accumulation may be a indication of extreme wear.

Installation Procedure



1. Apply an approximately 3.18-6.35 mm (1/8-1/4 in) high and 3.18-6.35 mm (1/8-1/4 in) wide bead of sealant, GM P/N 12346240 (Canadian P/N 10953493) or equivalent, to the rear axle housing cover.

The sealant is to be applied in the middle of the rear axle housing cover flange and on the inside of all bolt hole openings as shown.



2. Install the rear axle housing cover.

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

Note: Do not reuse the rear axle housing cover bolts.

3. Install the new rear axle housing cover bolts and tighten to **61 N·m (45 lb ft)**.

Note: Allow the sealant to cure for 1 hour before filling the axle with axle lubricant.

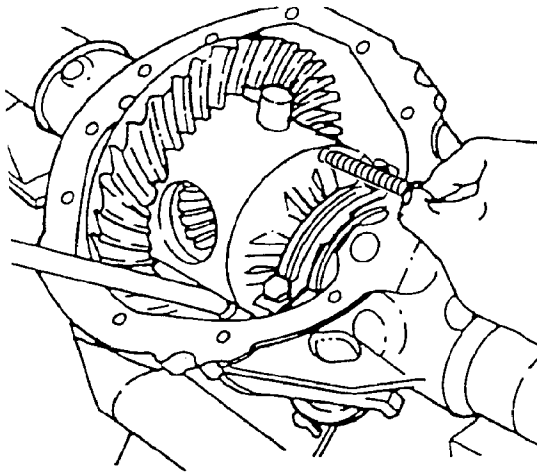
4. Fill the rear axle with axle lubricant. Use the proper fluid. Refer to [Approximate Fluid Capacities](#) and [Fluid and Lubricant Recommendations](#).
5. Install rear axle fill plug and tighten to **33 N·m (24 lb ft)**.
6. Lower the vehicle.

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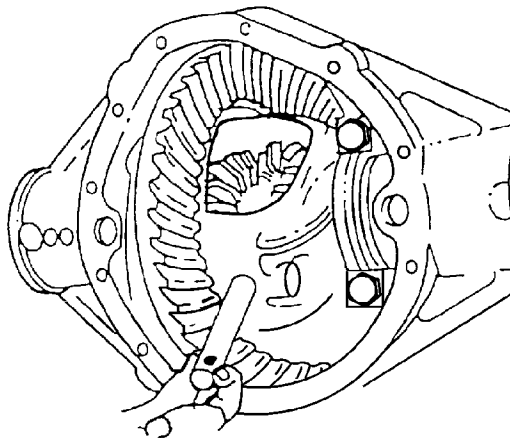
Rear Axle Shaft Replacement (8.6, 9.5 Inch Axles W/O RPO JL4)

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 wheel speed sensor. Refer to [Wheel Speed Sensor Replacement](#).
4. Remove the brake caliper. Refer to [Rear Brake Caliper Replacement](#).
5. Remove the rear axle housing cover and the gasket. Refer to [Rear Axle Housing Cover and Gasket Replacement](#).

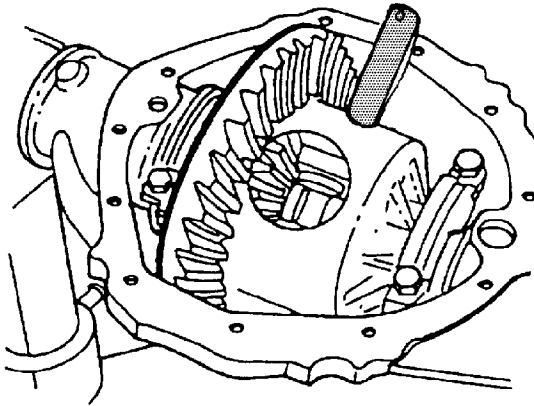


6. Remove the pinion shaft locking bolt.

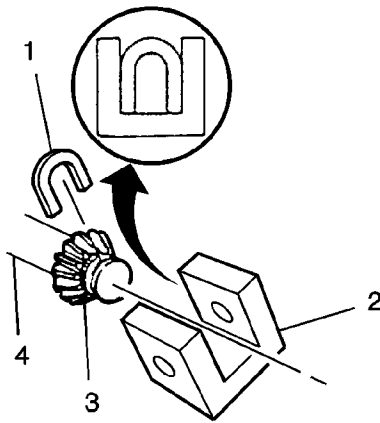




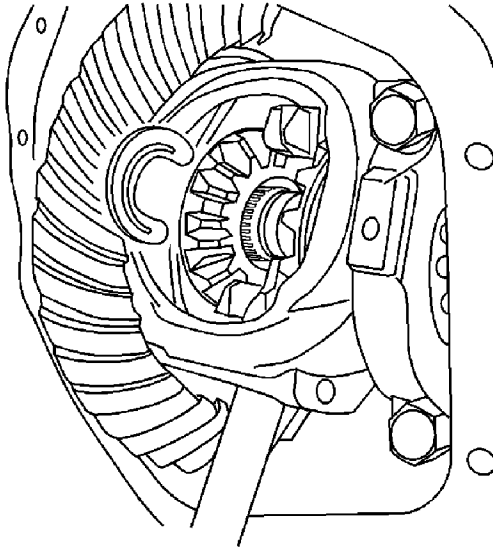
7. On axles without a locking differential, remove the pinion shaft.



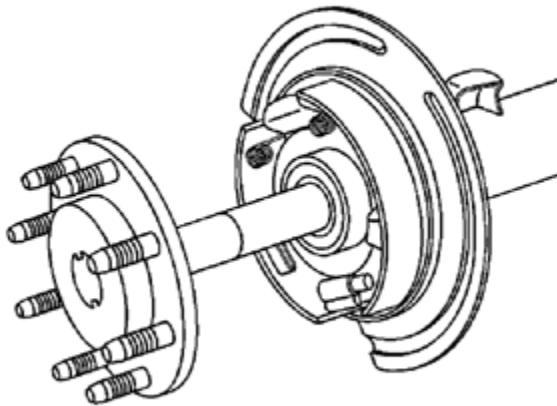
8. On axles with a locking differential, remove the shaft part way. Rotate the case until the pinion shaft touches the housing.



9. On axles with a locking differential, use a screwdriver, or a similar tool, in order to enter the differential case and rotate the rear axle shaft lock (1) until the lock aligns with the thrust block opening (2).
10. Push the flange of the axle shaft into the axle housing.



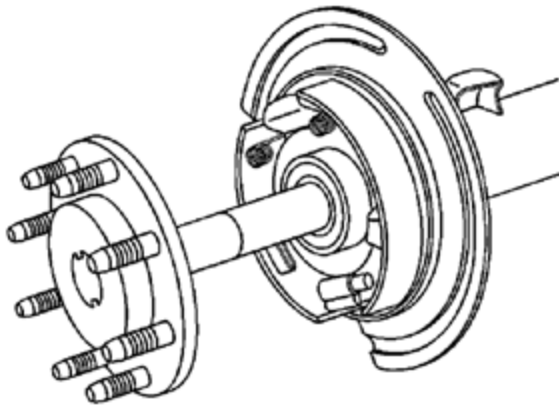
11. Remove the rear axle shaft lock from the button end of the axle shaft.



Note: When removing the axle shaft, do not rotate the shaft. Rotating the shaft will misalign the gears. Misaligning the gears will make assembly difficult

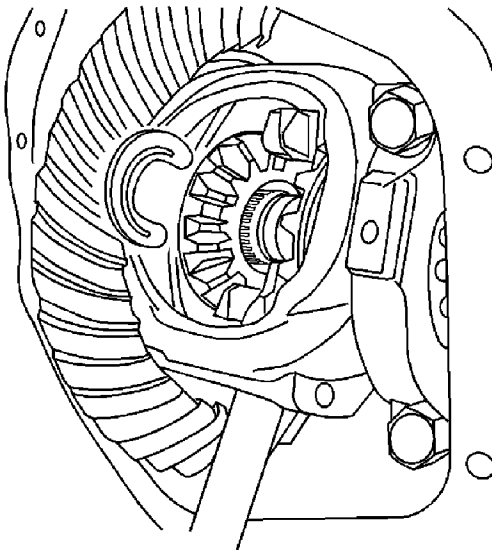
12. Remove the axle shaft from the housing.

Installation Procedure

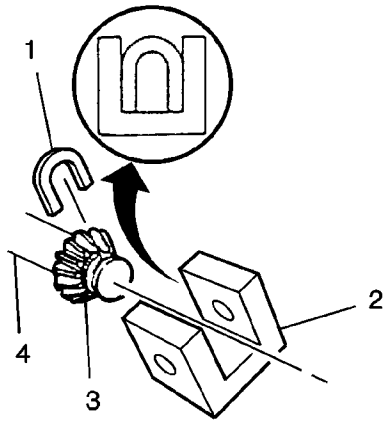


Note: Rotate the axle shaft as necessary in order to align the axle shaft splines with the differential side gear splines and engage the differential side gear and carefully insert the axle shaft in order to not damage the seal.

1. Install the axle shaft into the rear axle housing.



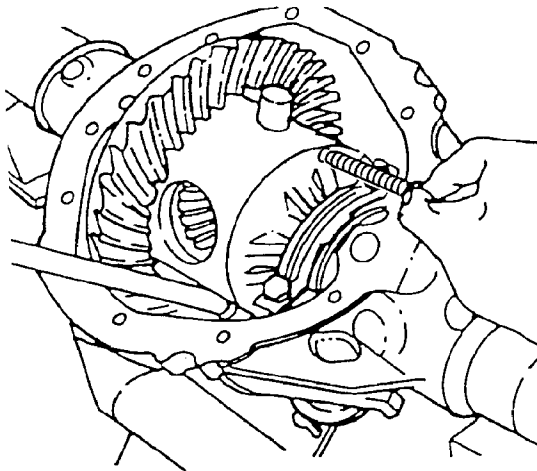
2. On axles without a locking differential, place the rear axle shaft lock on the button end of the axle shaft.



3. On axles with a locking differential, install the rear axle shaft lock (1) on the axle shaft (3) so that the ends are flush with the thrust block (2) as shown.
4. Pull the shaft flange outward in order to seat the rear axle shaft lock in the differential side gear.
5. Install the pinion shaft into the differential case.

Align the hole in the pinion shaft with the bolt hole in the differential case.

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



6. Install the new pinion shaft locking bolt.
 - For the 8.6 inch axle, tighten the pinion shaft locking bolt to **36 N·m (27 lb ft)**.

- For the 9.75 inch axle, tighten the pinion shaft locking bolt to **27 N·m (20 lb ft)**.
7. Install the rear axle housing cover and the gasket. Refer to [Rear Axle Housing Cover and Gasket Replacement](#).
 8. Install the brake caliper. Refer to [Rear Brake Caliper Replacement](#).
 9. Install the speed sensor. Refer to [Wheel Speed Sensor Replacement](#).
 10. Install the tire and wheel assembly. Refer to [Tire and Wheel Removal and Installation](#).
 11. Fill the rear axle. Use the proper fluid. Refer to [Approximate Fluid Capacities](#) and [Fluid and Lubricant Recommendations](#).
 12. Remove the support and lower the vehicle.

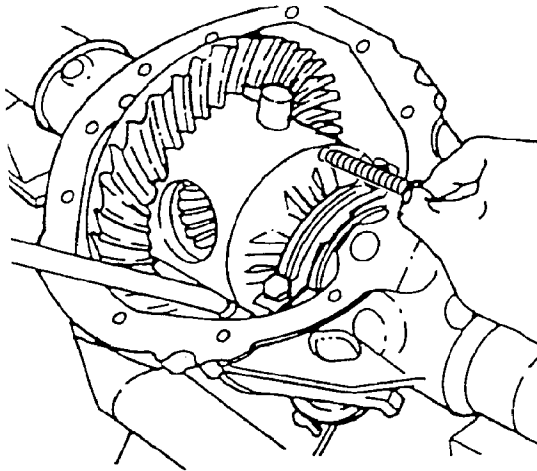
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Rear Axle Shaft Replacement (8.6 Inch Axle W/RPO JL4)

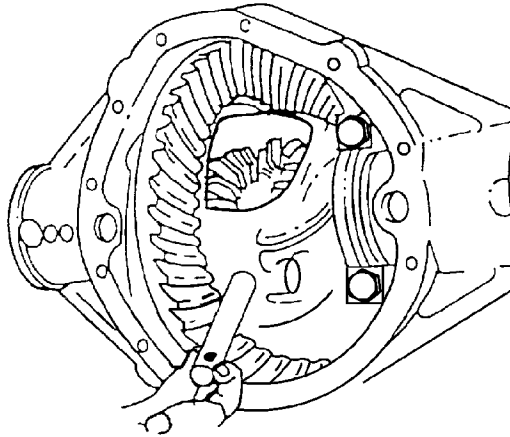
Special Tools

- J 2619-01 Slide Hammer
- J 45859 Axle Remover

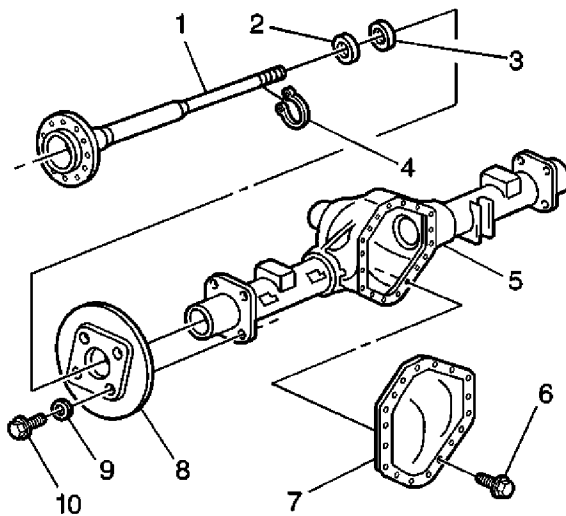
Removal Procedure



1. Raise 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 brake rotor. Refer to [Rear Brake Rotor Replacement](#).
4. Remove the rear cover and the gasket. Refer to [Rear Axle Housing Cover and Gasket Replacement](#).
5. Remove the pinion shaft locking bolt.



6. Remove the pinion shaft.



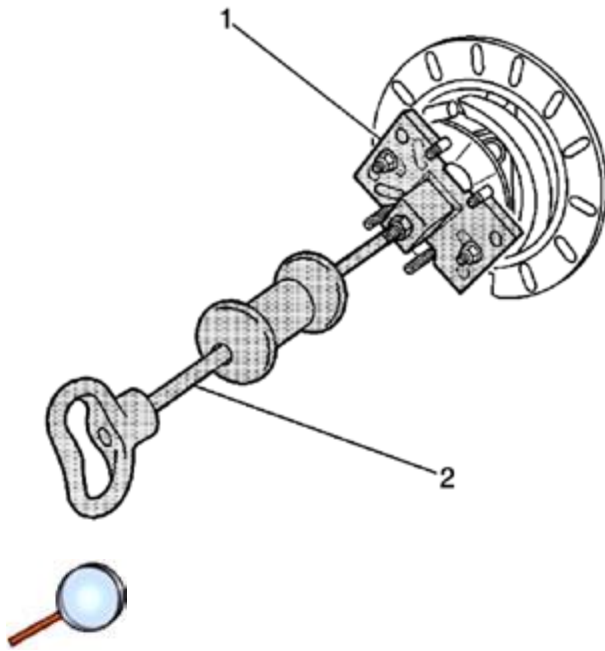
7. Push the flange of the axle shaft (1) toward the differential.

Note: It may be necessary to tap the axle shaft toward the differential with a soft faced mallet to obtain the clearance needed to remove the C-lock.

8. Remove the C-lock (4) from the button end of the axle shaft (1).

Note: When removing the axle shaft, do not rotate the shaft. Rotating the shaft will misalign the gears. Misaligned the gears will make the assembly difficult.

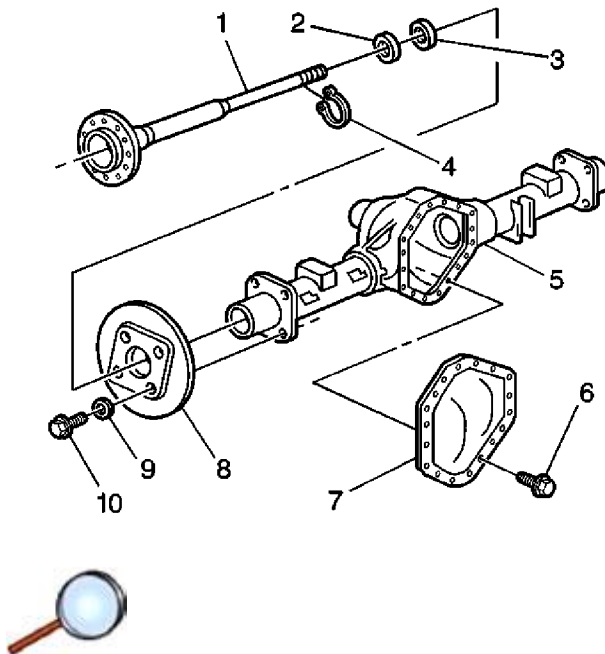
9. Remove the axle shaft (1) from the housing (5) by pulling the axle shaft away from the differential.



Note: If the axle is difficult to remove, preform the following.

10. Using the J 45859 Axle Remover (1) and the J 2619-01 Slide Hammer (2), remove the rear axle shaft.

Installation Procedure

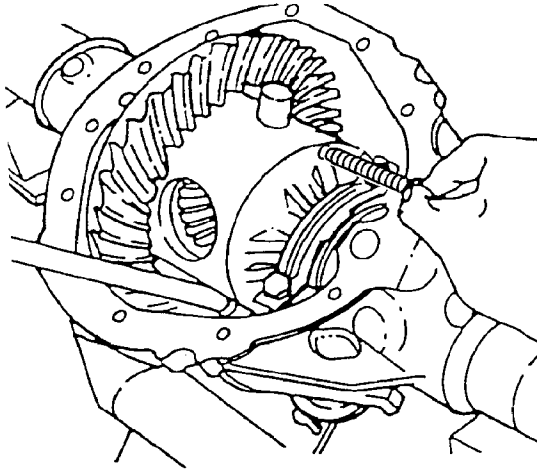


Note: Carefully insert the axle shaft in order to not damage the seal.

1. Install the axle shaft (1) into the rear axle housing (5).
2. Slide the axle shaft (1) into place allowing the splines to engage the differential side gear.

It may be necessary to tap the end of the axle shaft with a soft faced mallet as it is being installed to seat the wheel speed sensor ring on the axle.

3. Place the lock (4) on the button end of the axle shaft (1).
4. Pull the shaft flange outward in order to seat the lock in the differential gear.



5. Align the hole in the pinion shaft with the bolt hole in the differential case.

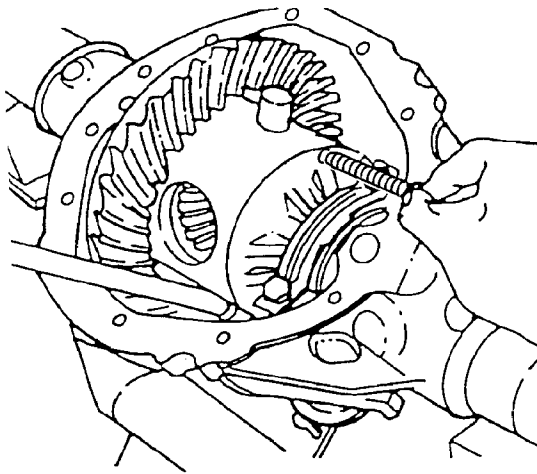
Caution: Refer to [Fastener Caution](#) in the Preface section.

6. Install the new pinion shaft locking bolt and tighten to **36 N·m (27 lb ft)**.
7. Install the rear cover and the gasket. Refer to [Rear Axle Housing Cover and Gasket Replacement](#).
8. Install the brake rotor. Refer to [Rear Brake Rotor Replacement](#).
9. Install the tire and wheel assembly. Refer to [Tire and Wheel Removal and Installation](#).
10. Fill the rear axle. Refer to [Rear Axle Lubricant Replacement](#).
11. Remove the support and lower the vehicle.

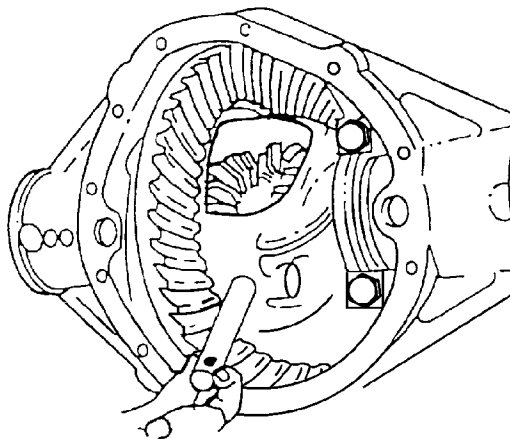
Rear Axle Shaft Replacement (9.5, 9.75Inch Axles)

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 [Wheel Speed Sensor Replacement](#).
4. Remove the brake rotor. Refer to [Rear Brake Rotor Replacement](#).
5. Remove the rear axle housing cover and the gasket. Refer to [Rear Axle Housing Cover and Gasket Replacement](#).

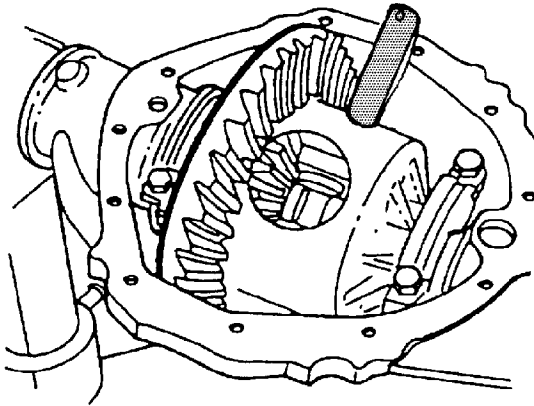


6. Remove the pinion shaft locking bolt.



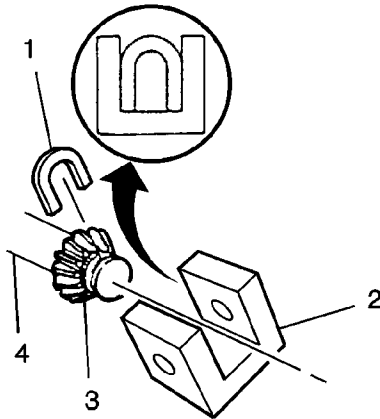


7. On axles without a locking differential, remove the pinion shaft.



Note: Step 8 is for vehicles equipped with the locking differential.

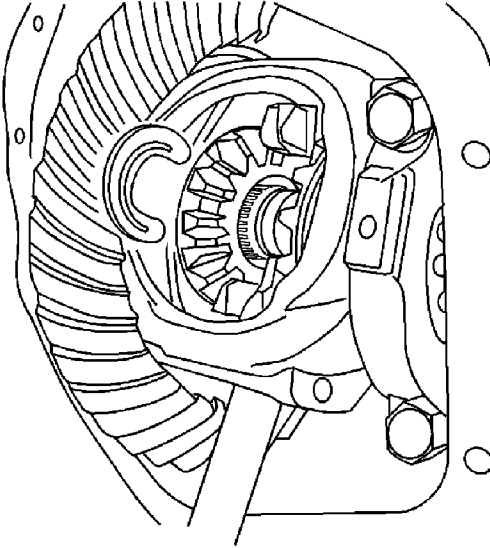
8. Remove the shaft part way then rotate the case until the pinion shaft touches the housing.



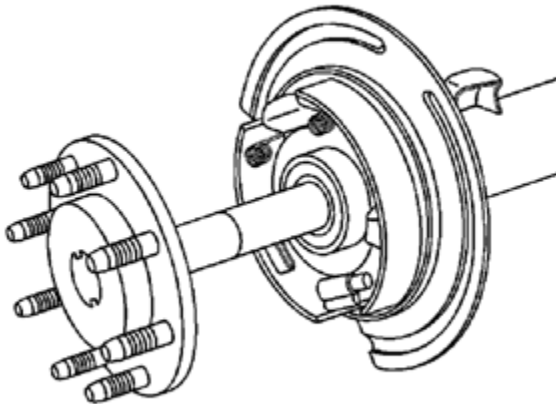
Note: Step 9 is for vehicles equipped with the locking differential.

9. Use a screwdriver, or a similar tool, in order to enter the differential case and rotate the rear axle shaft lock (1) until the lock aligns with the thrust block opening (2).

10. Push the flange of the axle shaft into the axle housing.



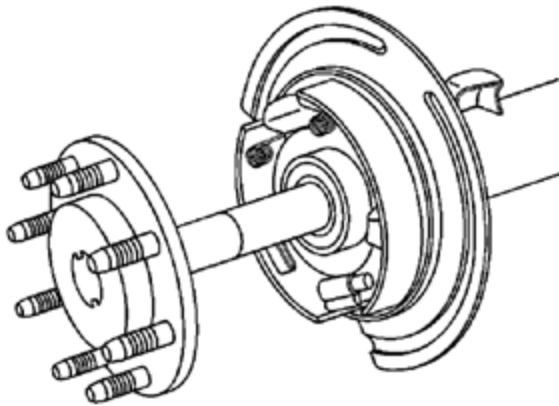
11. Remove the rear axle shaft lock from the button end of the axle shaft.



Note: When removing the axle shaft, do not rotate the shaft. Rotating the shaft will misalign the gears. Misaligning the gears will make assembly difficult.

12. Remove the axle shaft from the housing.

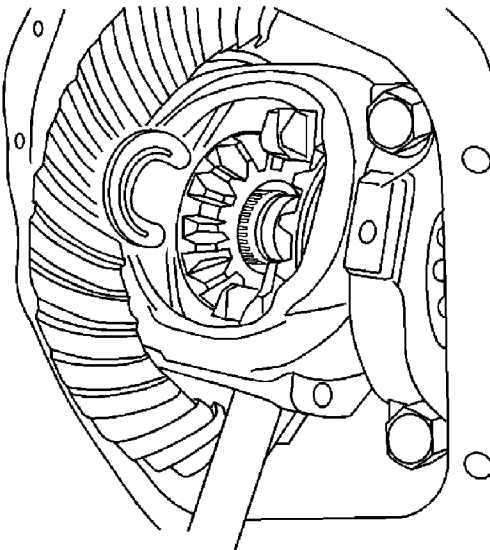
Installation Procedure



1. Rotate the axle shaft in order to align the axle shaft splines with the differential side gear splines

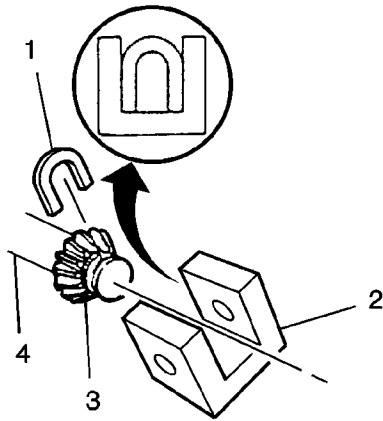
Note: Carefully insert the axle shaft in order to not damage the seal.

2. Install the axle shaft into the rear axle housing.



Note: Steps 3 is for those vehicles equipped the locking type differential.

3. Place the rear axle shaft lock on the button end of the axle shaft.



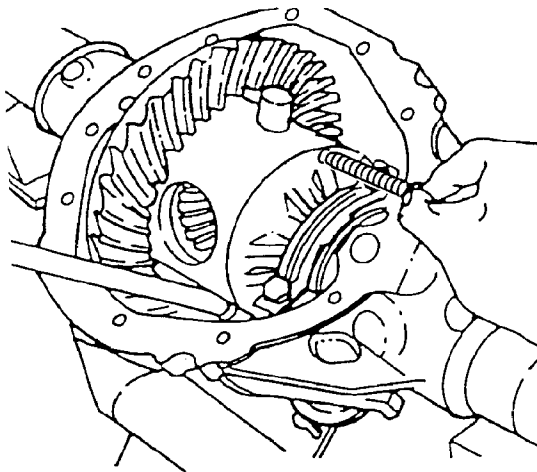
Note: Step 4 is for those vehicles equipped the locking type differential.

4. Install the rear axle shaft lock (1) on the axle shaft (3) so that the ends are flush with the thrust block (2).
5. Pull the shaft flange outward in order to seat the rear axle shaft lock in the differential side gear.

Note: Align the hole in the pinion shaft with the bolt hole in the differential case.

6. Install the pinion shaft into the differential case.

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





7. Install the NEW pinion shaft locking bolt and tighten to:
 - For the 9.5 inch axle, tighten the bolt to **50 N·m (37 lb ft)**.
 - For the 9.75 inch axle, tighten the bolt to **27 N·m (20 lb ft)**.
8. Install the rear axle housing cover and the gasket. Refer to [Rear Axle Housing Cover and Gasket Replacement](#).
9. Install the brake rotor. Refer to [Rear Brake Rotor Replacement](#).
10. Install the rear wheel speed sensor, if equipped. Refer to [Wheel Speed Sensor Replacement](#).
11. Install the tire and wheel assembly. Refer to [Tire and Wheel Removal and Installation](#).
12. Fill the rear axle. Use the proper fluid. Refer to [Approximate Fluid Capacities](#) and [Fluid and Lubricant Recommendations](#).
13. Remove the support and lower the vehicle.

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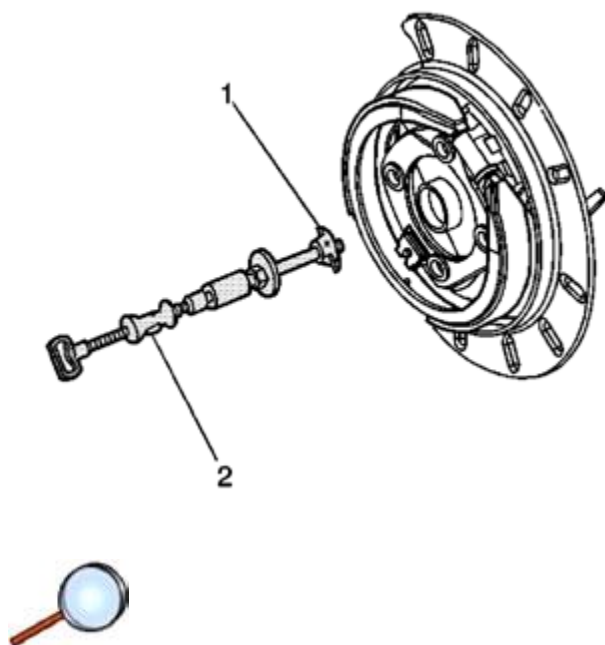
Rear Axle Shaft Seal and/or Bearing Replacement

Special Tools

- J 8092 Universal Driver Handle-3/4-10
- J 21128 Axle pinion Oil Seal Installer (8.6 inch Axle)
- J 23690 Axle Shaft Bearing Installer (8.6 inch Axle)
- J 2619-01 Slide Hammer
- J 29709 Wheel Bearing Installer (9.5, 9.75 inch Axle)
- J 29712 Wheel Bearing Remover (9.5, 9.75 inch Axle)
- J 29713 Axle Seal Installer (9.5, 9.75 inch Axle)
- J 44685 Rear Axle Seal and Bearing Remover (8.6 inch Axle)

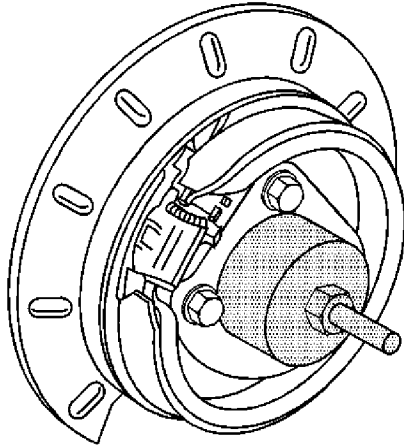
Removal Procedure

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 axle housing cover. Refer to [Rear Axle Housing Cover and Gasket Replacement](#).
4. Remove the axle shaft. Refer to [Rear Axle Shaft Replacement](#).



Note: The following service procedure is for the 8.6 axle.

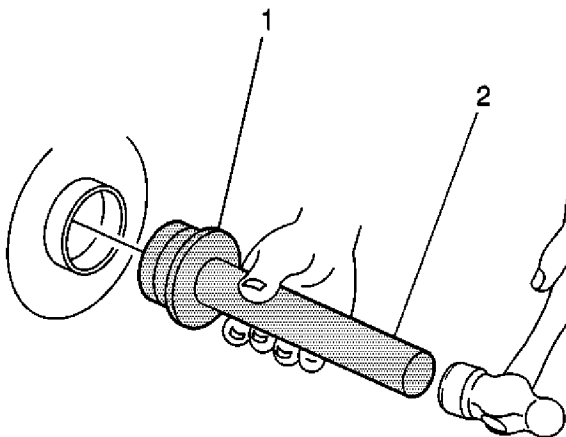
5. Using the J 44685 remover (1) and the J 2619-01 slide hammer (2), remove the axle shaft seal and the bearing from the axle housing.



Note: The following service procedure is for the 9.5 or the 9.75 axle.

6. Using the J 29712 remover , remove the axle shaft seal and the bearing from the axle housing.

Installation Procedure

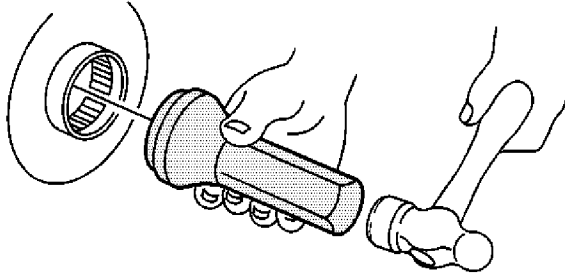


Note: The following service procedure is for the 8.6 axle.

1. Using the J 23690 installer (1) and the J 8092 handle (2), install the axle shaft bearing until the tool bottoms against the axle tube.

Note: The following service procedure is for the 9.5 or the 9.75 axle.

2. Using the J 29712 remover (1) and the J 8092 handle (2), install the axle shaft bearing until the tool bottoms against the axle tube.



Note: The following service procedure is for the 8.6 axle.

3. Using the J 21128 installer, install the axle shaft seal until the axle shaft seal bottoms flush with the axle tube.

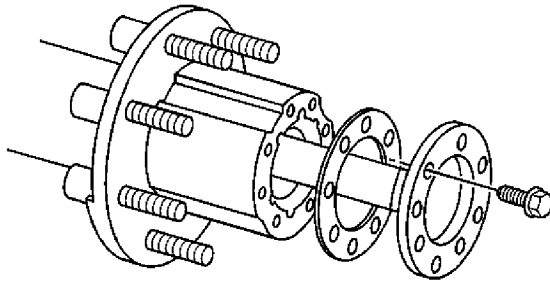
Note: The following service procedure is for the 9.5 or the 9.75 axle.

4. Using the J 29713 installer, install the axle shaft seal until the axle shaft seal bottoms flush with the axle tube.
5. Install the axle shaft. Refer to [Rear Axle Shaft Replacement](#)
6. Install the rear axle housing cover. Refer to [Rear Axle Housing Cover and Gasket Replacement](#).
7. Install the tire and wheel assembly. Refer to [Tire and Wheel Removal and Installation](#).
8. Fill the rear axle. Refer to [Rear Axle Lubricant Replacement](#).
9. Remove the support and lower the vehicle.

Rear Axle Shaft and/or Gasket Replacement

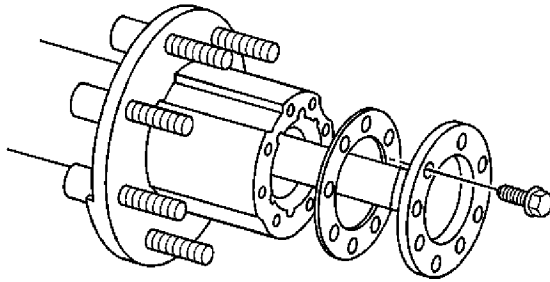
Removal Procedure

1. Raise the vehicle. Refer to [Lifting and Jacking the Vehicle](#).
2. Remove the tire and wheel. Refer to [Tire and Wheel Removal and Installation](#).



3. Remove the flange bolts.
4. Lightly tap the axle shaft with a soft-faced hammer in order to loosen the shaft.
5. Grip the rib on the axle shaft flange with a locking pliers. Twist the axle shaft flange in order to start the axle shaft removal.
6. Remove the axle shaft from the tube.
7. Remove the gasket.
8. Clean the axle shaft flange and the outside face of the hub assembly.

Installation Procedure



1. Install the gasket onto the axle shaft.
2. Install the gasket and the axle shaft into the axle tube.
 - 2.1. Ensure the shaft splines mesh into the differential side gear.
 - 2.2. Align the holes in the axle flange and the gasket with the holes in the hub.

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

3. Install the axle flange bolts.
 - For the 10.5 inch axle, tighten the rear axle flange bolts to **156 N·m (115 lb ft)**.
 - For the 11.5 inch axle, tighten the rear axle flange bolts to **185 N·m (136 lb ft)**.
4. Install the tire and wheel assembly. Refer to [Tire and Wheel Removal and Installation](#).
5. Inspect and add axle lubricant to the axle housing, if necessary. Refer to [Rear Axle Lubricant Level Inspection](#).
6. Lower the vehicle.

Rear Axle Hub, Bearing, Cup, and /or Seal Replacement

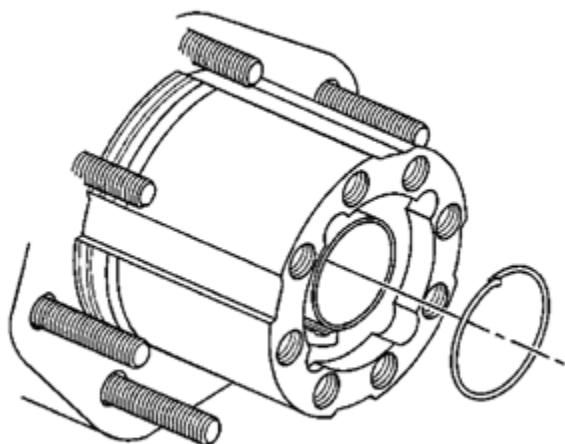
Special Tools

- [J 8092](#) Universal Driver Handle - 3/4 inch - 10
- [J 2222-C](#) Wheel Bearing Nut Wrench
- [J 24426](#) Wheel Bearing Race Installer - Outer
- [J 24427](#) Wheel Bearing Race Installer - Inner
- [J 44419](#) Hub Outer Bearing Race Installer
- [J 44420](#) Differential Bearing and Hub Seal Installer

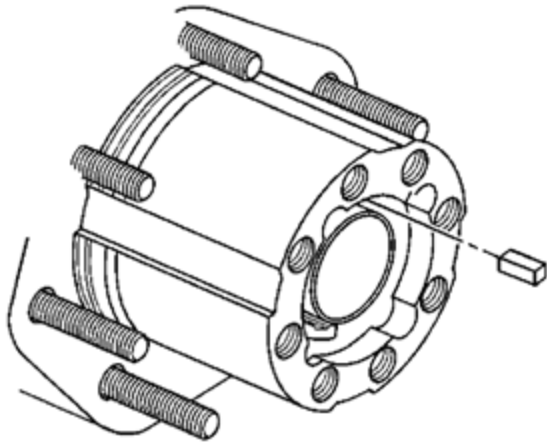
Removal Procedure

Important: The wheel hub seal must be replaced anytime the wheel hub assembly is removed from the axle housing.

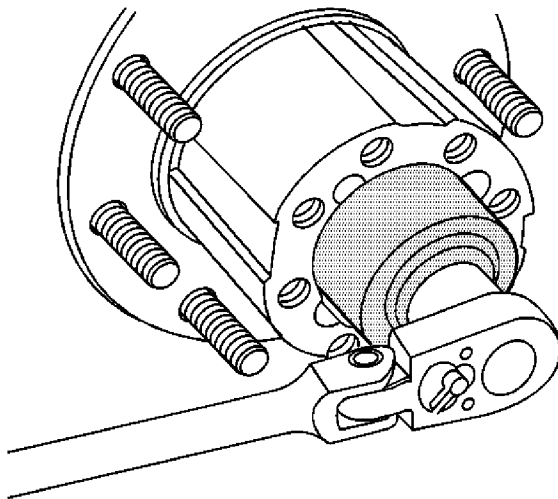
1. Raise the vehicle. Refer to [Lifting and Jacking the Vehicle](#) .
2. Remove the tire and wheel assembly. Refer to [Tire and Wheel Removal and Installation](#) .
3. Remove the brake caliper bracket. It is not necessary to remove the brake caliper from the bracket. Refer to [Rear Brake Caliper Bracket Replacement](#) .
4. Remove the axle shaft. Refer to [Rear Axle Shaft and/or Gasket Replacement](#) .



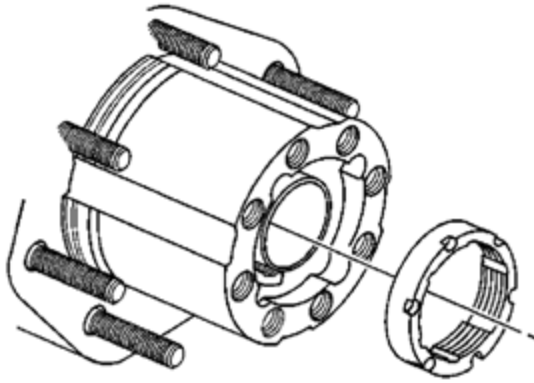
5. Remove the axle nut retaining ring.



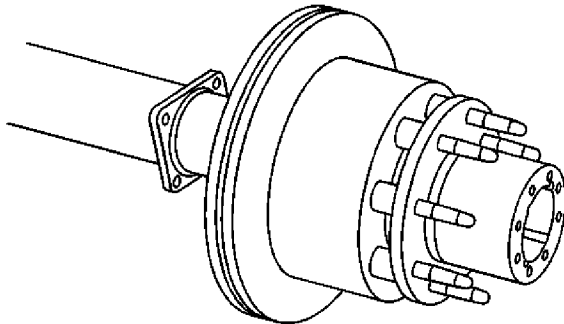
6. Remove the key.



7. Remove the adjusting nut using the [J 2222-C](#).

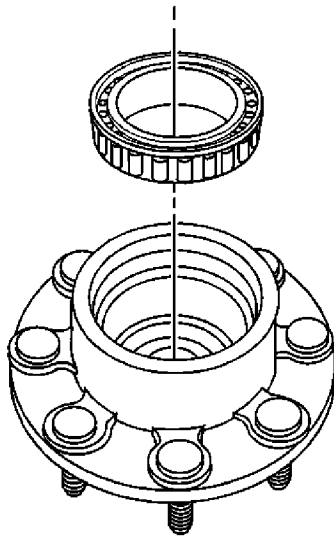


8. Remove the adjusting nut.

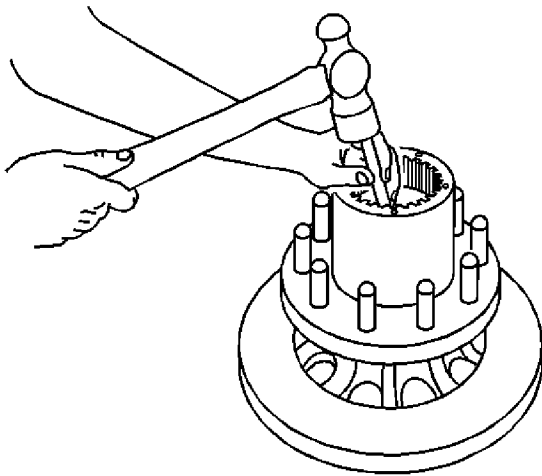


Important: If the oil seal remains on the axle hub, remove the seal using a suitable seal removal tool.

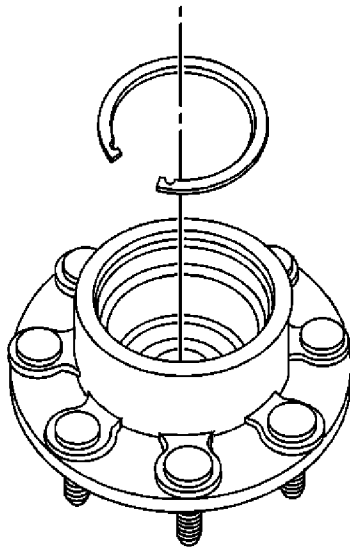
9. Remove the hub from the axle housing.
10. Remove the rotor, if necessary. Refer to [Rear Brake Rotor Replacement](#).
11. Remove the oil seal from the wheel hub using a suitable seal removal tool.



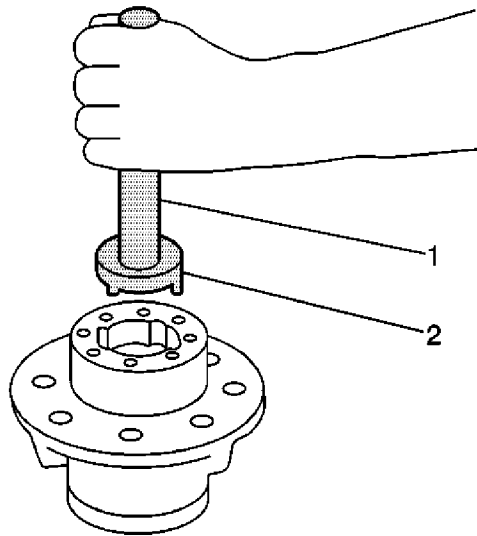
12. Remove the inner hub bearing.



13. Remove the inner hub bearing cup using a brass drift and a hammer.



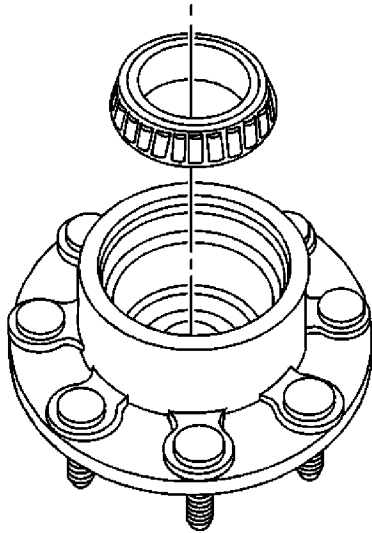
14. Remove the retaining ring from the wheel hub.



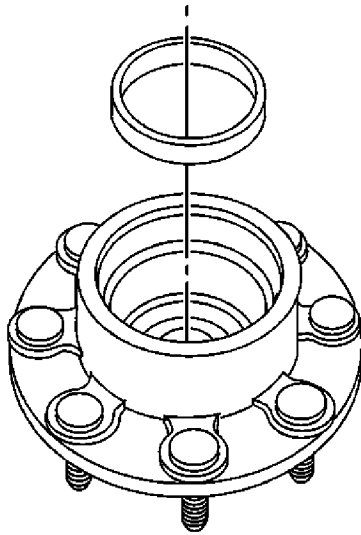
15. Remove the outer hub bearing and bearing cup using the [J 24426](#) (2) and the [J 8092](#) (1).

Installation Procedure

1. Lubricate the following with a light coat of high melting point EP bearing lubricant:
 - The outer wheel bearing
 - The inner wheel bearing
 - The outer wheel bearing cup
 - The inner wheel bearing cup
 - The axle hub spindle

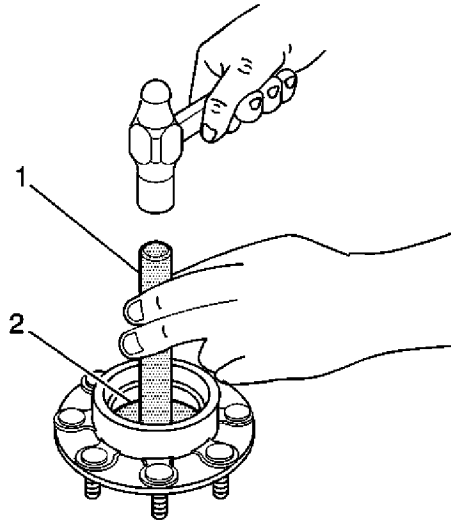


2. Install the outer bearing into the wheel hub.



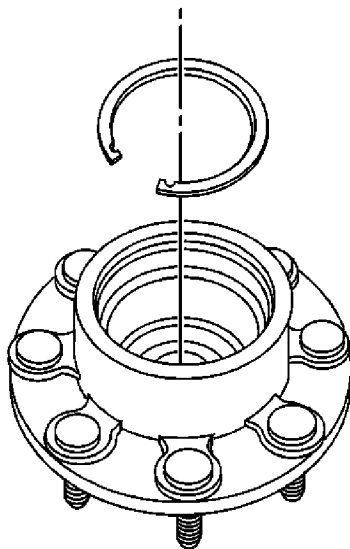
3. Install the outer bearing cup into the wheel hub.

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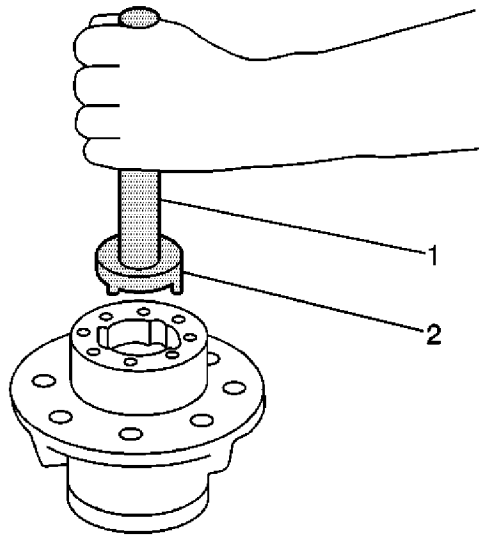


4. Drive the outer bearing cup into the wheel hub using the [J 44419](#) (2) and the [J 8092](#) (1).

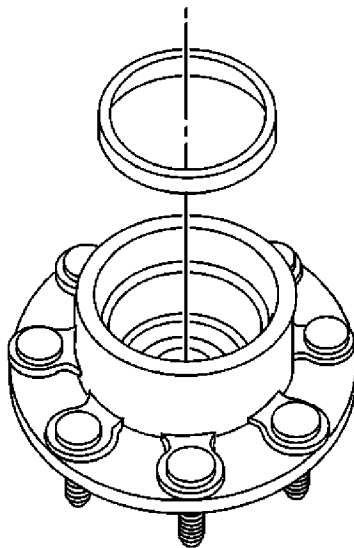
Drive the outer bearing cup into the wheel hub until it is just past the retaining ring groove. Do not bottom out the bearing assembly in the bore.



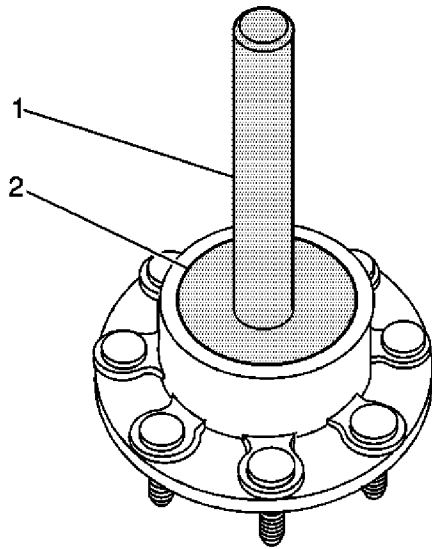
5. Install the retaining ring into the groove. Make sure the retaining ring is fully and evenly seated in the groove.



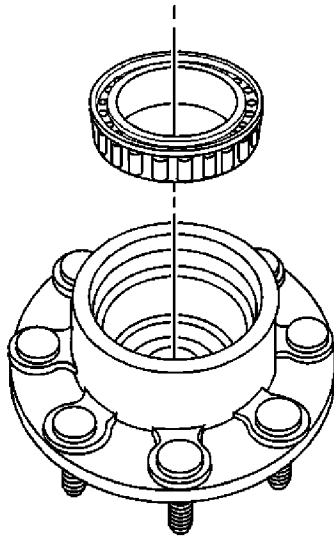
6. Turn the wheel hub over and seat the outer bearing assembly against the retaining ring using the [J 24426](#) (2) and the [J 8092](#) (1).
7. Ensure that the outer bearing assembly rotates freely in the hub.



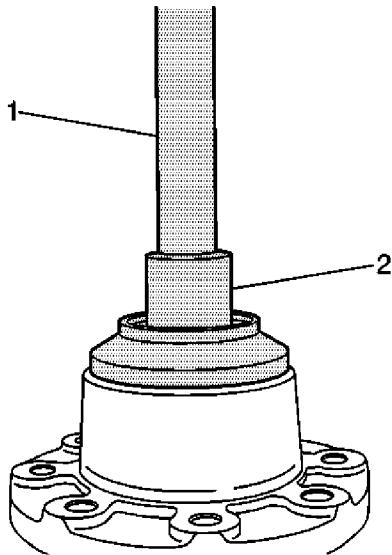
8. Turn the wheel hub over and install the inner bearing cup.



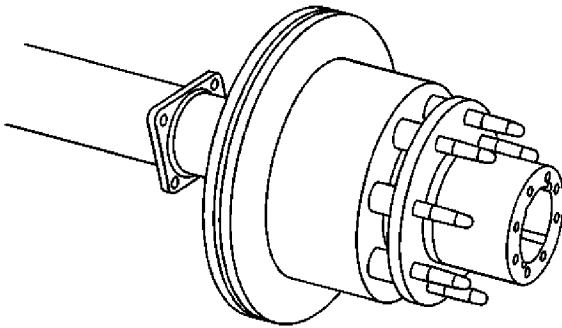
9. Drive the inner bearing cup into the wheel hub using the [J 24427](#) (2) and the [J 8092](#) (1).



10. Install the inner bearing.

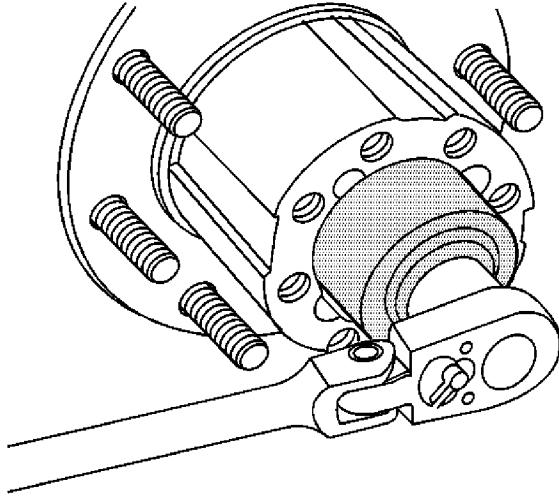


11. Using the [J 44420](#) (2) and the [J 8092](#) (1), install the new oil seal. Ensure the seal is fully seated in the hub bore.
12. Install the rotor, if necessary. Refer to [Rear Brake Rotor Replacement](#).
13. Apply a light coat of high melting point EP bearing lubricant to the axle housing spindle.



Important: If the wheel hub assembly does not fully seat itself onto the axle shaft spindle and is removed, the wheel hub seal must be replaced.

14. Install the wheel hub to the axle housing.



15. Install the adjusting nut to the hub using the [J 2222-C](#) .
16. Adjust the wheel bearings. Refer to [Wheel Bearing Adjustment](#) .
17. Install the axle shaft. Refer to [Rear Axle Shaft and/or Gasket Replacement](#) .
18. Install the brake caliper bracket. Refer to [Rear Brake Caliper Bracket Replacement](#) .
19. Install the tire and wheel assembly. Refer to [Tire and Wheel Removal and Installation](#) .
20. Inspect and add axle lubricant to the axle housing, if necessary. Refer to [Rear Axle Lubricant Level Inspection](#) .
21. Lower the vehicle.

Drive Pinion Flange / Yoke and /or Oil Seal Replacement (8.6, 9.5 Inch Axles)

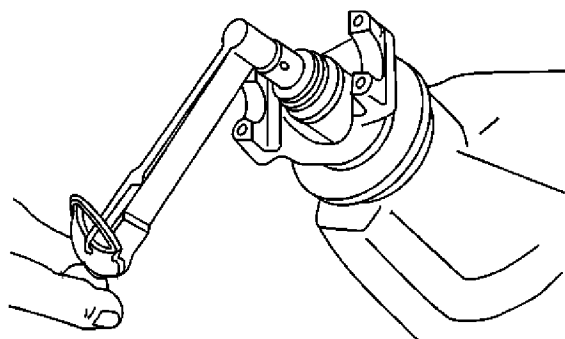
Special Tools

- J 8614-01 Flange and Pulley Holding Tool
- J 38694 Extension Housing Oil Pump/Seal Installer

Removal Procedure

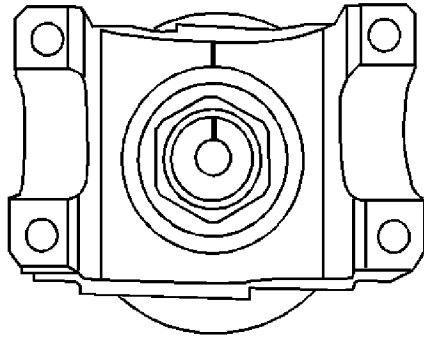
Note: Observe and mark the positions of all the driveline components, relative to the propeller shaft and the axles, prior to disassembly. These components include the propeller shafts, drive axles, pinion flanges, output shafts, etc. Reassemble all the components in the exact places in which you removed the parts. Follow any specifications, torque values, and any measurements made prior to disassembly.

1. Raise and support the vehicle. Refer to [Lifting and Jacking the Vehicle](#).
2. Remove the tire and wheel assemblies. Refer to [Tire and Wheel Removal and Installation](#).
3. Remove the rear brake calipers. Refer to [Rear Brake Caliper Replacement](#).
4. Remove the rear propeller shaft.
 - For the one piece propeller shaft, refer to [One-Piece Propeller Shaft Replacement](#).
 - For the 2 piece propeller shaft, refer to [Two-Piece Propeller Shaft Replacement](#).

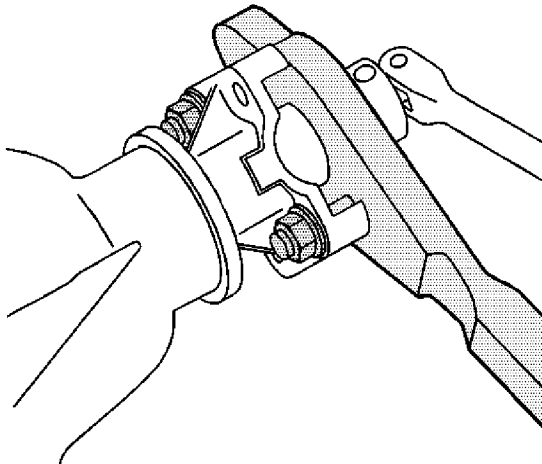


5. Using an inch pound torque wrench, measure the amount of torque required to rotate the pinion. Record this measurement for reassembly. This will give the combined preload for the following components:
 - The pinion bearings

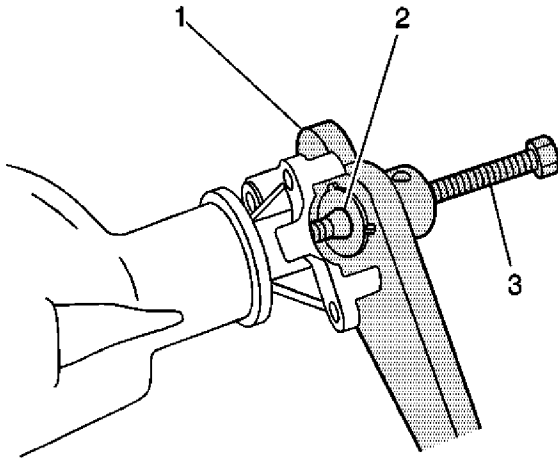
- The pinion oil seal
- The differential case bearings
- The axle bearings
- The axle seals



6. Scribe an alignment line between the pinion shaft and the pinion yoke.



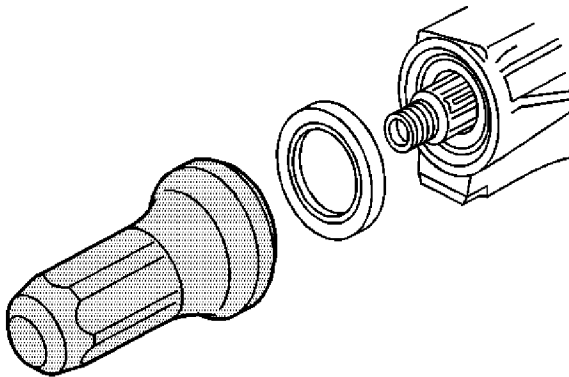
7. Using the J 8614-01 holding tool , remove and discard the pinion nut.
8. Remove the washer.



Note: Use a clean container in order to retrieve the lubricant.

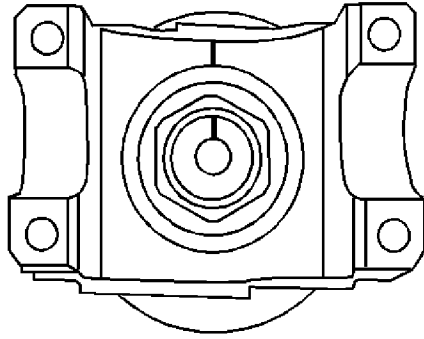
9. Using the J 8614-01 holding tool (1), (2) and (3), remove the pinion yoke.
10. Using a suitable tool, remove and discard the pinion oil seal.

Installation Procedure



1. Using the J 38694 installer , install the NEW pinion seal
2. Apply sealant to the splines of the pinion yoke. Refer to [Adhesives, Fluids, Lubricants, and Sealers](#).

Caution: Refer to [Pinion Flange/Yoke Installation Caution](#) in the Preface section.

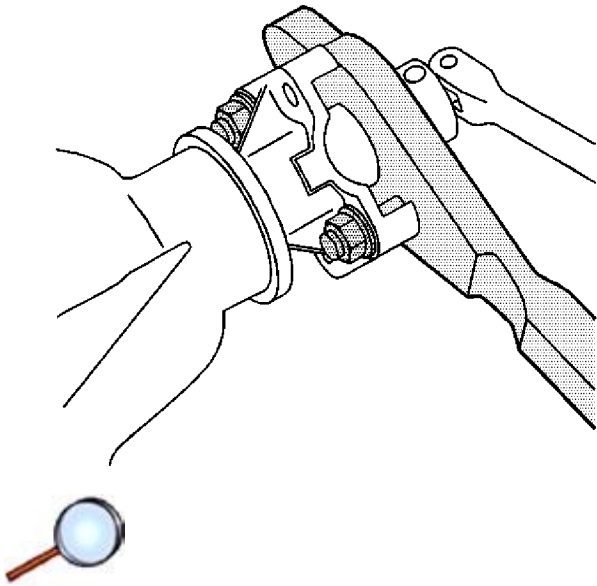


3. Align the reference marks and install the pinion yoke.

Note: Proceed to step 5 if the new pinion nut cannot be installed.

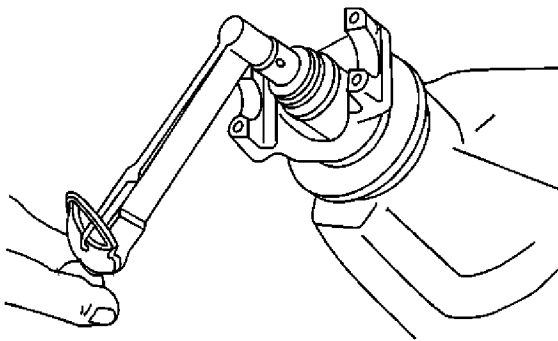
4. Install the washer and the NEW pinion nut.
5. Perform the following steps in order to seat the pinion yoke onto the pinion.
 - 5.1. Remove the pinion nut washer.
 - 5.2. Install the old pinion nut.
 - 5.3. Tighten the nut until a few of the shaft threads show through the nut so that the washer and new pinion nut can be installed.
 - 5.4. Remove the old pinion nut.
 - 5.5. Install the pinion nut washer
 - 5.6. Install the new pinion nut.

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



Note: If the rotating torque is exceeded, the pinion will have to be removed and a new collapsible spacer installed.

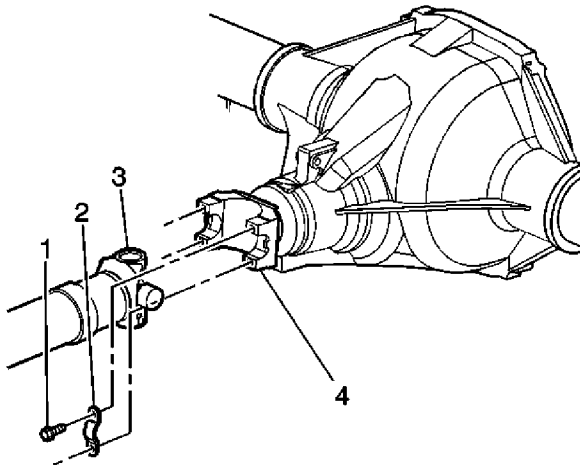
6. Using the J 8614-01 holding tool , tighten the pinion nut until the pinion end play is just taken up.
7. Rotate the pinion while tightening the nut to seat the bearings.



Note: Tighten the pinion nut in small increments until the proper torque is reached.

8. Using a inch pound torque wrench, measure and the rotating torque of the pinion. The rotating torque is **0.40-0.57 N·m (3-5 lb in)** is greater than the rotating torque recorded during removal and compare that to the measurement taken during the removal.

9. Once the specified torque is obtained, rotate the pinion several times to ensure the bearings have seated. Recheck the rotating torque and adjust if necessary.



10. Align the reference marks and install the propeller shaft (3) to the pinion yoke (4).
11. Install the propeller shaft.
 - For the one piece propeller shaft, refer to [One-Piece Propeller Shaft Replacement](#).
 - For the 2 piece propeller shaft, refer to [Two-Piece Propeller Shaft Replacement](#).
12. Install the rear brake calipers. Refer to [Rear Brake Caliper Replacement](#).
13. Install the tire and wheel assemblies. Refer to [Tire and Wheel Removal and Installation](#).
14. Inspect and add axle lubricant to the axle housing, if necessary. Refer to [Rear Axle Lubricant Level Inspection](#).
15. Remove the support and lower the vehicle.

Drive Pinion Flange/Yoke and/or Oil Seal Replacement (9.75, 10.5 and 10.75 Inch Axles)

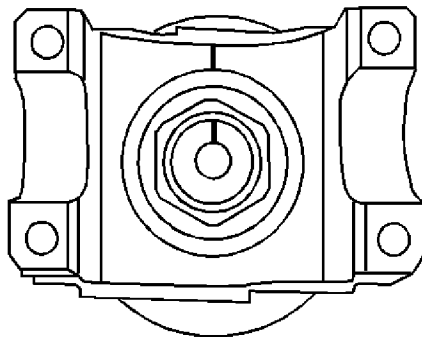
Special Tools

- [J 8614-01](#) Flange and Pulley Holding Tool
- [J 45710](#) Pinion Bearing Oil Seal Installer

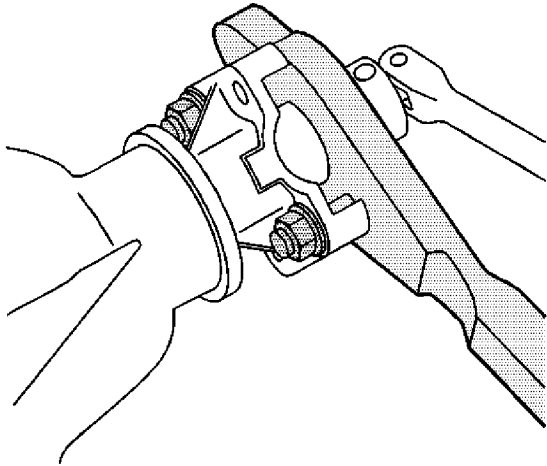
Removal Procedure

Note: Observe and mark the positions of all the driveline components, relative to the propeller shaft and the axles, prior to disassembly. These components include the propeller shafts, drive axles, pinion flanges, output shafts, etc. Reassemble all the components in the exact places in which you removed the parts. Follow any specifications, torque values, and any measurements made prior to disassembly.

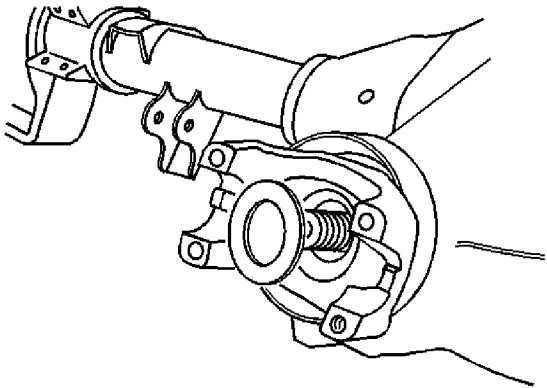
1. Raise the vehicle. Refer to [Lifting and Jacking the Vehicle](#).
2. Disconnect the propeller shaft from the rear axle pinion yoke. Refer to [One-Piece Propeller Shaft Replacement](#) or [Two-Piece Propeller Shaft Replacement](#).



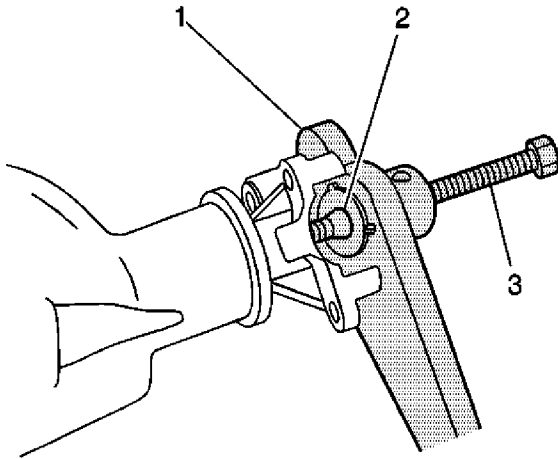
3. Place an alignment mark between the pinion and the pinion yoke.



4. Install the [J 8614-01](#) as shown.
5. Remove the pinion nut while holding the [J 8614-01](#).



6. Remove the washer.

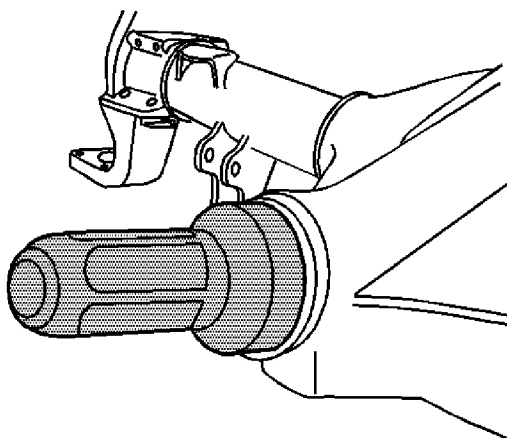


7. Install the J 8614-2 (2) and the J 8614-3 (3) into the [J 8614-01](#) (1) as shown.
8. Remove the pinion yoke by turning the J 8614-3 (3) clockwise while holding the [J 8614-01](#) (1).

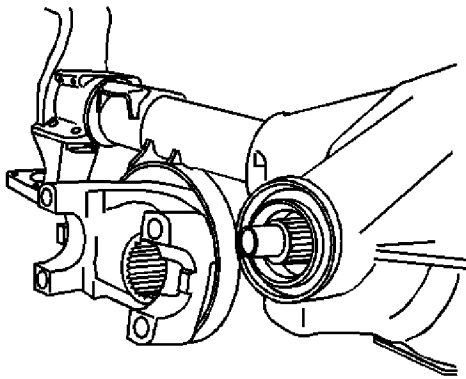
Use a container in order to retrieve the lubricant.

9. Remove the pinion oil seal using a suitable seal removal tool.

Installation Procedure



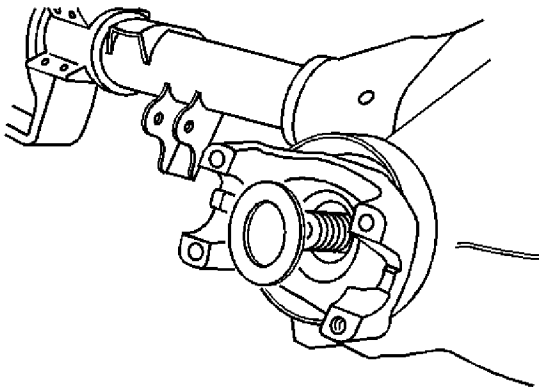
1. Install the new seal using the [J 45710](#) .



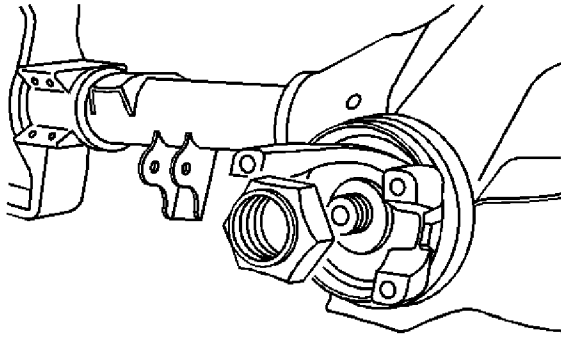
2. Install the pinion yoke.

Caution: Refer to [Pinion Flange/Yoke Installation Caution](#) in the Preface section.

3. Seat the pinion yoke onto the pinion shaft by tapping it with a soft-faced hammer until a few pinion shaft threads show through the yoke.

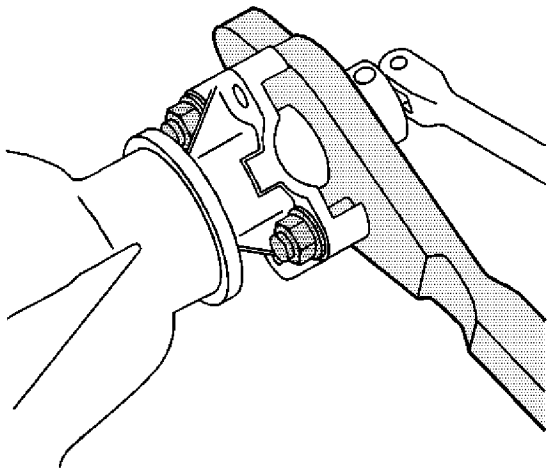


4. Install the washer.



Note: Do not reuse the pinion nut.

5. Install the new pinion nut.



6. Install the [J 8614-01](#) onto the pinion yoke as shown.

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

7. Tighten the pinion nut while holding the [J 8614-01](#) . Tighten the pinion nut to **339 N·m (250 lb ft)**.
8. Install the propeller shaft to the rear axle pinion yoke. Refer to [One-Piece Propeller Shaft Replacement](#) or [Two-Piece Propeller Shaft Replacement](#).
9. Inspect and add axle lubricant to the axle housing, if necessary. Refer to [Rear Axle Lubricant](#)

[Level Inspection.](#)

10. Lower the vehicle.

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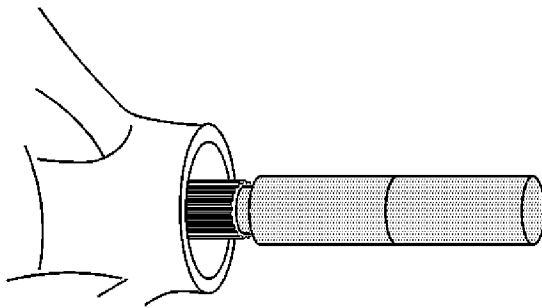
Drive Pinion and Ring Gear Replacement (8.6 Inch Axle)

Special Tools

J 22536 Pinion Driver

Removal Procedure

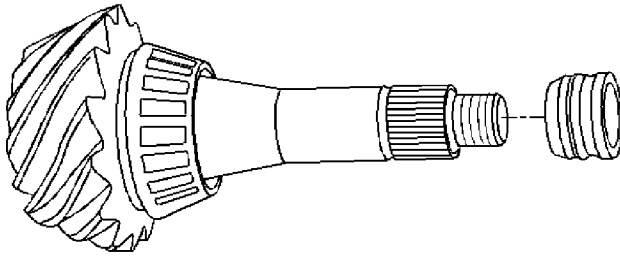
1. Raise the vehicle. Refer to [Lifting and Jacking the Vehicle](#).
2. Remove the differential assembly. Refer to [Differential Replacement](#).
3. Remove the pinion yoke and the oil seal. Refer to [Drive Pinion Flange/Yoke and/or Oil Seal Replacement](#).
4. Install the [J 22536](#) as shown.



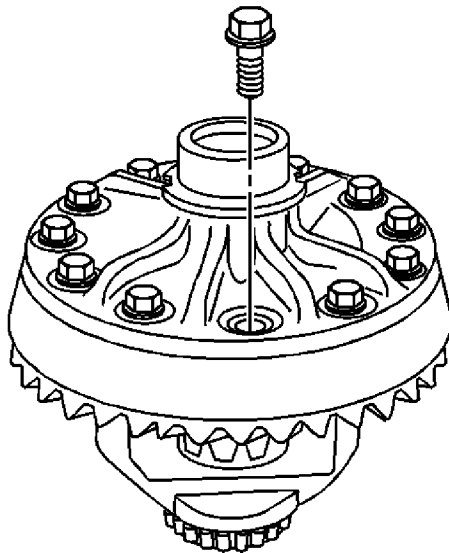
Note: Ensure that the J 22536 driver is firmly seated on the pinion.

Note: Do not let the pinion fall out of the rear axle housing.

5. Using the J 22536 driver and a hammer, remove drive the pinion.



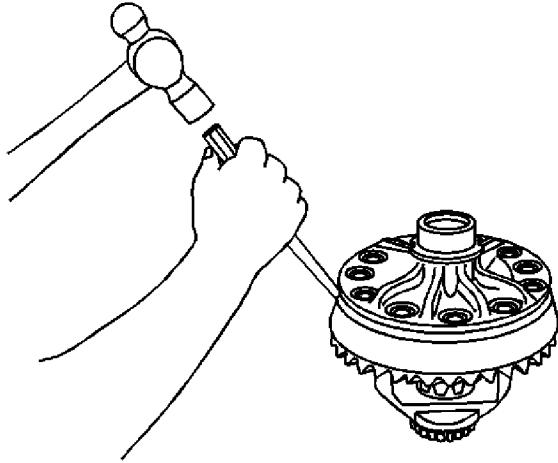
6. Remove and discard the collapsible spacer from the pinion.
7. Remove the drive pinion bearings. Refer to [Drive Pinion Bearings Replacement](#).



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

8. Remove and discard the ring gear bolts.

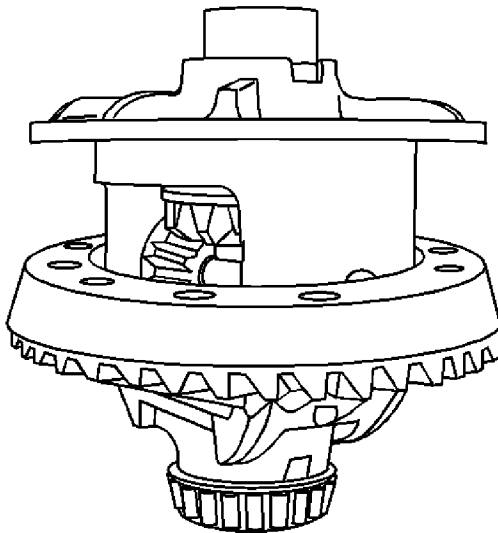
Caution: Refer to [Ring Gear Removal Caution](#) in the Preface section.



9. Using a brass drift and a hammer, remove the ring gear from the differential.

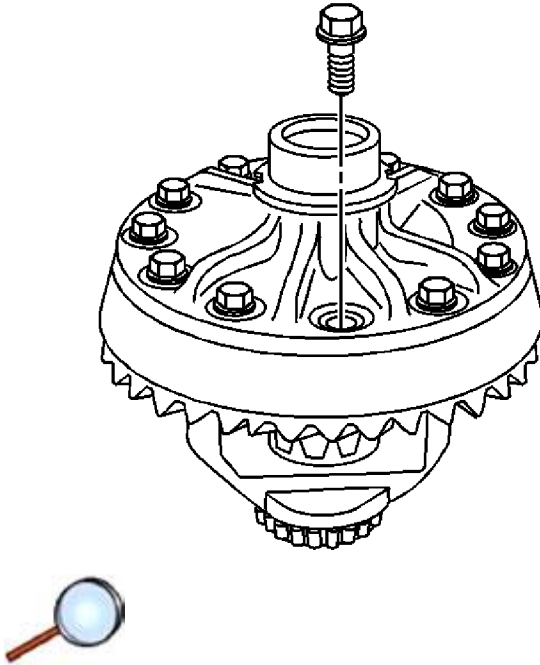
Installation Procedure

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



1. Install the ring gear to the differential case.

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



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

2. Hand start each bolt of the NEW ring gear bolts and then tighten in sequence to **20 N·m (89 lb ft)**.
3. Install the pinion bearing. Refer to [Drive Pinion Bearings Replacement](#).
4. Determine the selective shim thickness for the pinion gear. Refer to [Pinion Depth Adjustment](#).
5. Install the selective shim onto the pinion.
6. Install a new collapsible spacer.
7. Lubricate the pinion bearings with axle lubricant. Refer to [Fluid and Lubricant Recommendations](#).
8. Install the outer pinion bearing into the axle housing.
9. Install the new pinion oil seal. Refer to [Drive Pinion Flange/Yoke and/or Oil Seal Replacement](#).
10. Install the pinion into the axle housing.
11. Install the pinion yoke. Refer to [Drive Pinion Flange/Yoke and/or Oil Seal Replacement](#).
12. Install the differential assembly. Refer to [Differential Replacement](#).
13. Fill the axle with lubricant. Use the proper fluid. Refer to [Rear Axle Lubricant Replacement](#).
14. Remove the support and lower the vehicle.

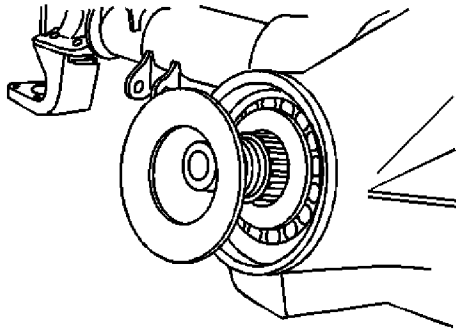
Drive Pinion and Ring Gear Replacement (9.75, 10.5 and 10.75 Inch Axles)

Special Tools

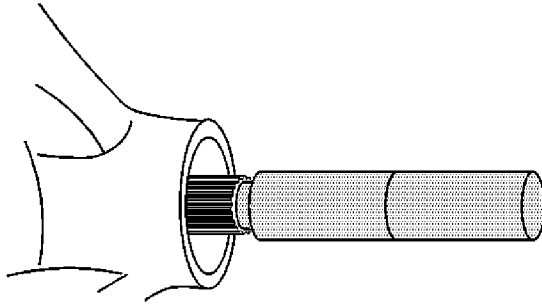
[J 22536](#) Pinion Driver

Removal Procedure

1. Raise the vehicle. Refer to [Lifting and Jacking the Vehicle](#).
2. Remove the differential assembly. Refer to [Differential Replacement](#).
3. Remove the drive pinion yoke and the pinion oil seal. Refer to [Drive Pinion Flange/Yoke and/or Oil Seal Replacement](#).



4. Remove the thrust washer.



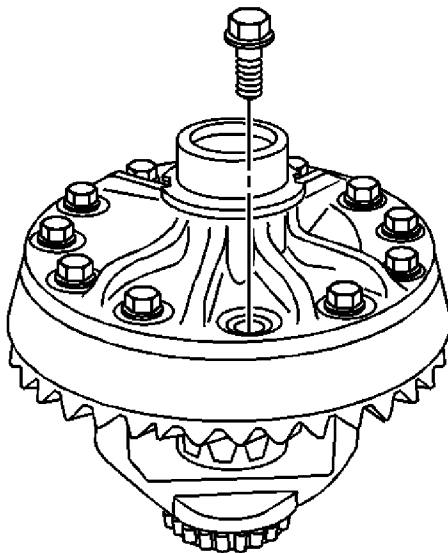
5. Install the [J 22536](#) as shown.

Ensure that the [J 22536](#) is firmly seated on the pinion.

6. Drive the pinion out using the [J 22536](#) and a hammer.

Strike the [J 22536](#) slowly. Do not let the pinion fall out of the rear axle housing.

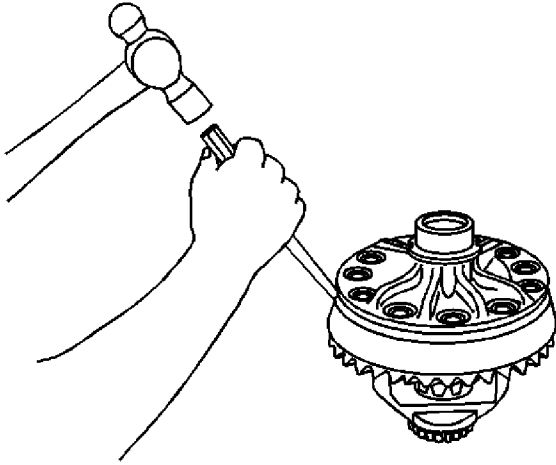
7. Remove the pinion preload shims from the drive pinion and set aside.
8. Remove the inner pinion bearing and the pinion position shim. Refer to [Drive Pinion Bearings Replacement](#).



Note: The ring gear bolts have right-hand threads.

9. Remove the ring gear bolts. Discard the bolts.

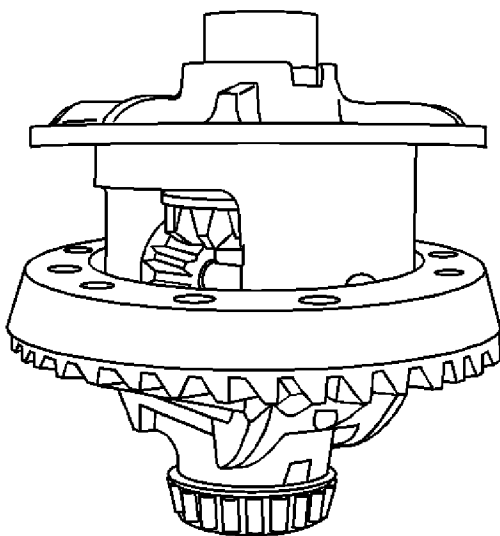
Caution: Refer to [Ring Gear Removal Caution](#) in the Preface section.



10. Remove the ring gear from the differential case. Drive the gear off with a brass drift if necessary.

Installation Procedure

1. Determine the pinion position shim thickness and the pinion preload shim thickness for the drive pinion gear. Refer to [Pinion Depth Adjustment](#).

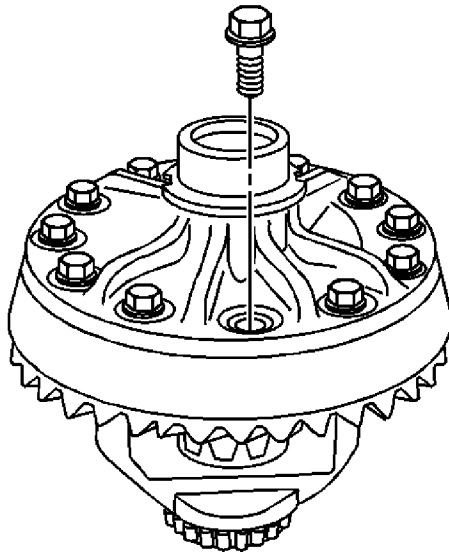


Note: The mating surface of the ring gear and the differential case must be clean and free of burrs before installing the ring gear.

2. Install the ring gear to the differential case.

Align the holes in the differential case to the bolts holes in the ring gear.

Note: The ring gear bolts have right-hand threads.



3. Install the new ring gear bolts.

Hand start each bolt to ensure that the ring gear is properly installed to the differential case.

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

4. Tighten the new ring gear bolts. Tighten the ring gear bolts alternately and in stages, gradually pulling the ring gear onto the differential case. Tighten the new ring gear bolts to **177 N·m (131 lb ft)**.
5. Install the differential assembly. Refer to [Differential Replacement](#).
6. Fill the axle with lubricant. Use the proper fluid. Refer to [Rear Axle Lubricant Replacement](#).
7. Lower the vehicle.

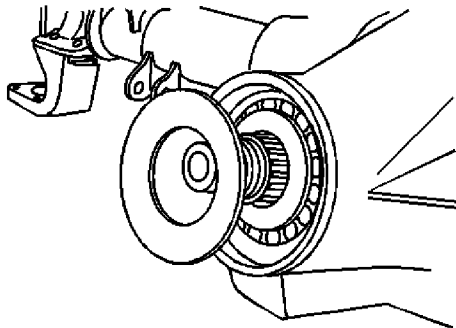
Drive Pinion Bearings Replacement (9.75, 10.5 and 10.75 Inch Axles)

Special Tools

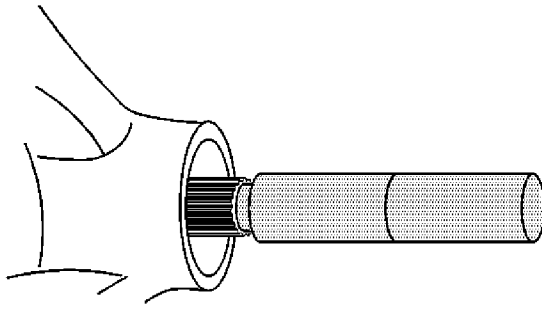
- [J 7818](#) Inner Bearing Race Installer
- [J 8092](#) Universal Drive Handle
- [J 22536](#) Pinion Driver
- [J 22912-B](#) Split-Plate Bearing Puller
- [J 42176](#) Universal Driver Handle - Non-Threaded
- [J 44417](#) Rear Pinion Bearing Race Installer
- [J 45703](#) Pinion Bearing Race Remover - Dana 248
- [J 45704](#) Pinion Bearing Race Installer - Dana 248
- [J 45705](#) Pinion Bearing Race Remover - Dana 248/267
- [J 45706](#) Pinion Bearing Race Remover - Dana 286

Removal Procedure

1. Raise the vehicle. Refer to [Lifting and Jacking the Vehicle](#).
2. Remove the differential assembly. Refer to [Differential Replacement](#).
3. Remove the pinion yoke and the pinion oil seal. Refer to [Drive Pinion Flange/Yoke and/or Oil Seal Replacement](#).



4. Remove the thrust washer.



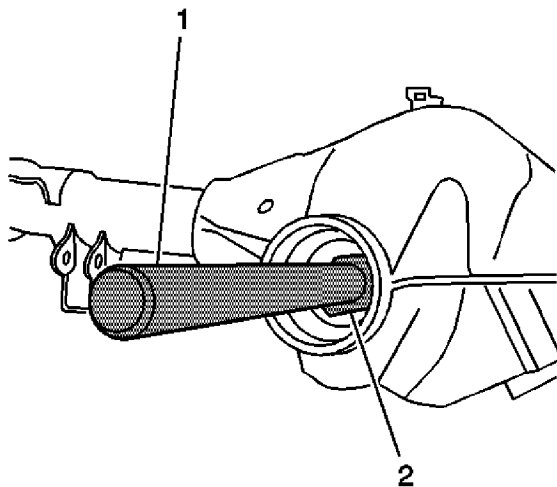
5. Install the [J 22536](#) as shown.

Ensure that the [J 22536](#) is firmly seated on the pinion.

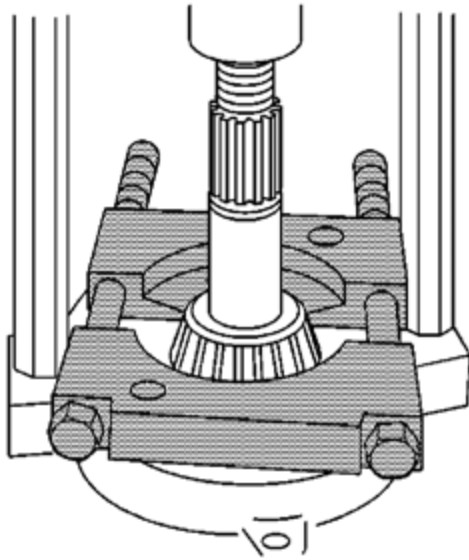
6. Drive the pinion out using the [J 22536](#) and a hammer.

Strike the [J 22536](#) slowly. Do not let the pinion fall out of the rear axle housing.

7. Remove the pinion preload shims, both axles, and the pinion spacer, 10.5 and 10.75 inch axles only, from the drive pinion and set aside.

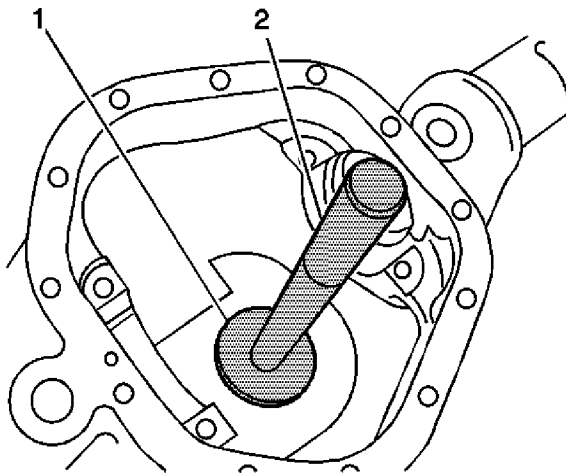


8. Remove the inner pinion bearing cup and the oil deflector using the [J 45703](#) , 9.75 inch axle, or the [J 45706](#) , 10.5 and 10.75 inch axles (2) and the [J 42176](#) (1).
9. Remove the outer pinion bearing cup using the [J 45705](#) and the [J 42176](#) .

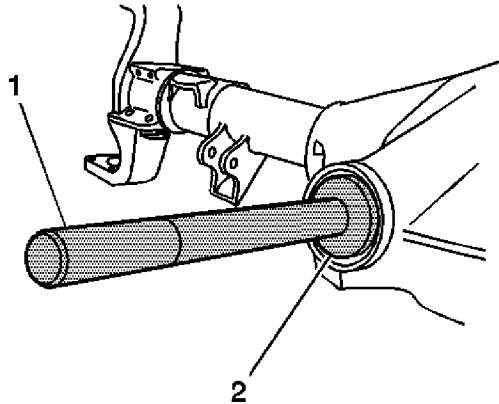


10. Remove the inner pinion bearing using the [J 22912-B](#) and a hydraulic press.
11. Remove the selective pinion shim.

Installation Procedure



1. For the 9.75 inch axle, install the inner pinion bearing cup using the [J 45704](#) (2) and the [J 8092](#) (1).
2. For the 10.5 and 10.75 inch axles, install the inner pinion bearing cup using the [J 44417](#) (2) and the [J 8092](#) (1).



3. Install the outer pinion bearing cup using the [J 7818](#) (2) and the [J 8092](#) (1).
4. Determine the selective pinion shim thickness and the pinion preload shim thickness for the drive pinion. Refer to [Pinion Depth Adjustment](#).
5. Install the differential assembly. Refer to [Differential Replacement](#).
6. Fill the axle with the proper axle lubricant. Refer to [Rear Axle Lubricant Replacement](#).
7. Lower the vehicle.

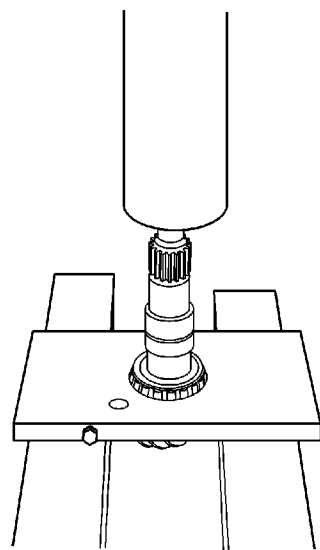
Drive Pinion Bearings Replacement (8.6, 9.5 Inch Axle)

Special Tools

- *DT 47688* Pinion Bearing Remover, 8.6 Inch Axle
- *J 7818* Inner Bearing Race Installer
- *J 8092* Universal Driver Handle 3/4 inch --10
- *J 8611-01* Rear Pinion Bearing Race Installer
- *J 8614-01* Flange and Pulley Holding Tool
- *J 22306* Pinion Cup Bearing Installer-Rear
- *J 22912-B* Split Plate Bearing Installer
- *J 22388* Pinion Oil Seal Installer
- *J 22828* Input/Counterbalance Race Installer
- *J 36614* Inner Pinion Bearing Installer
- *J 45780* Pinion Bearing Cup Installer

Removal Procedure

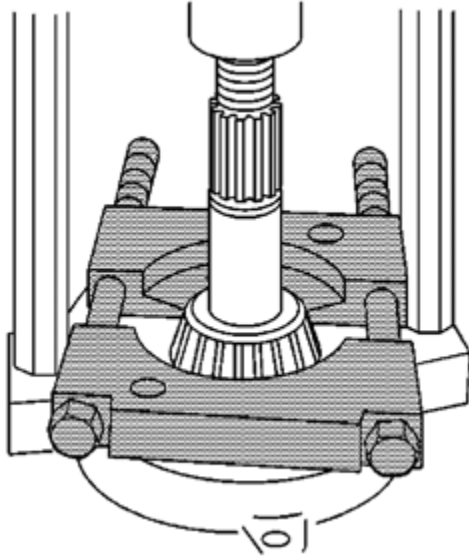
1. Raise the vehicle. Refer to [Lifting and Jacking the Vehicle](#).
2. Remove the differential assembly. Refer to [Differential Replacement](#).
3. Remove the drive pinion from the axle. Refer to [Drive Pinion and Ring Gear Replacement](#).



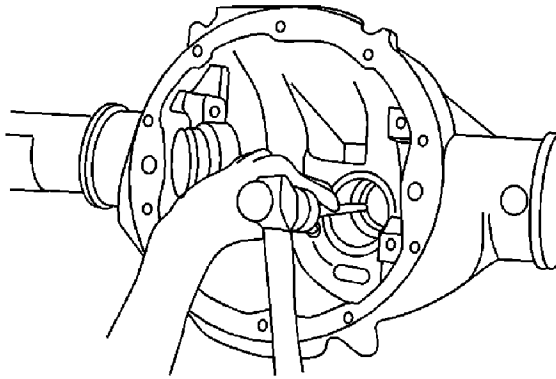
Note: If servicing the 8.6 inch axle go to step 4. If servicing the 9.5 inch axle go to step 5.

4. Using the *DT 47688* _____, remove the pinion

bearing from the drive pinion.



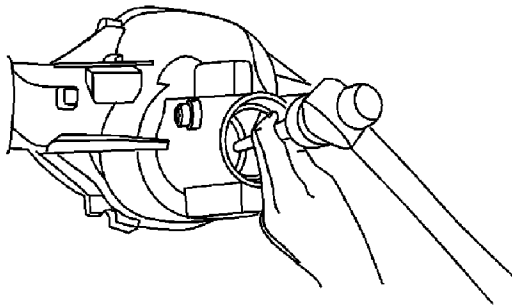
5. Using the *J 22912-B* Split Plate Bearing Installer and a press, remove the bearing from the drive pinion.
6. Remove the selective pinion shim.



Note: Move the drift back and forth between one side of the cup and the other in order to work the cups out of the housing evenly.

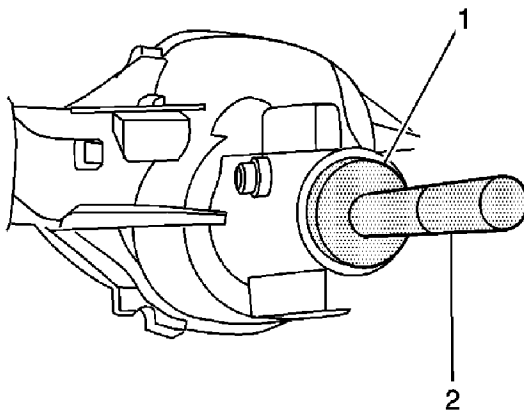
7. Using a hammer and a brass drift in the slots provided, remove the outer pinion bearing cup from the axle housing.

Note: Move the drift back and forth between one side of the cup and the other in order to work the cups out of the housing evenly

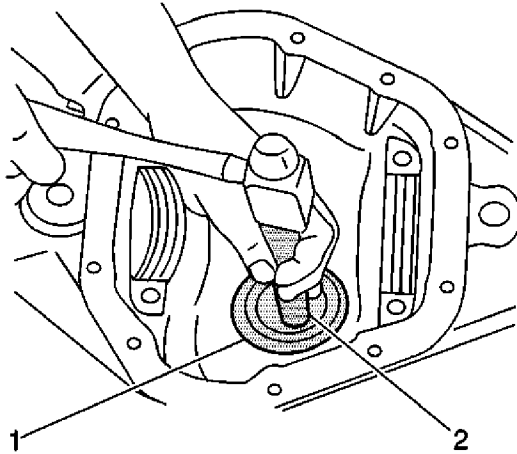


8. Using a hammer and a brass drift in the slots provided, remove the inner pinion bearing cup from the axle housing.

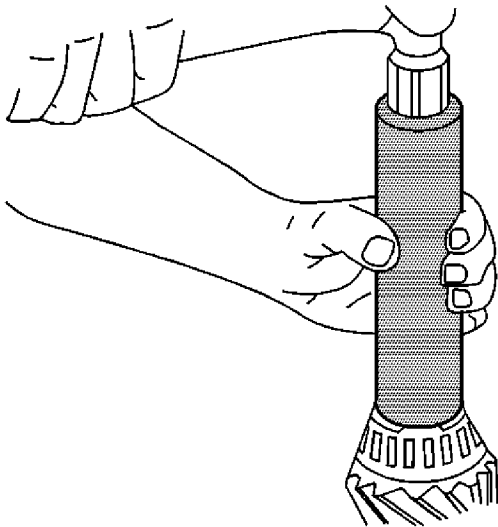
Installation Procedure



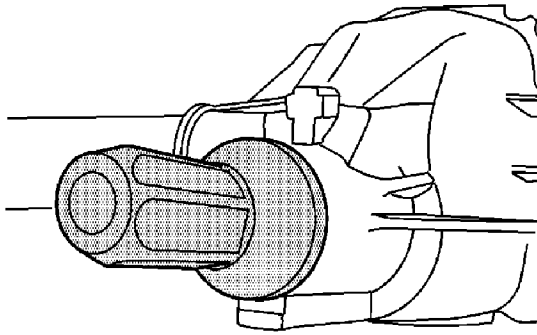
1. Using the J 8611-01 installer (1) for the 8.6 inch axle, or the J 8092 handle (2) for the 9.5 inch axle, install the outer pinion bearing cup.



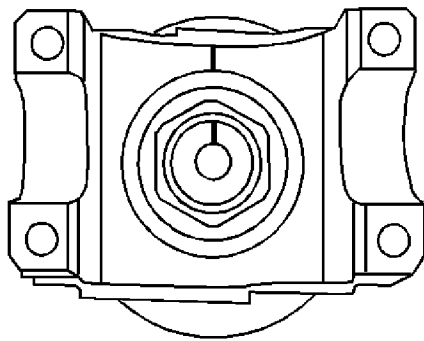
2. Using the *J 45780* installer (2) for the 8.6 inch axle or the *J 22306* installer (1) 9.5 inch axle, install the inner pinion bearing cup.
3. Determine the selective shim thickness for the drive pinion. Refer to [Pinion Depth Adjustment](#).
4. Install the selective shim between the inner pinion bearing and the shoulder on the gear.



5. Using the *J 22828* installer or the *J 36614* installer and a hammer, install the inner pinion bearing.
6. Install a new collapsible spacer.
7. Lubricate the pinion bearings with axle lubricant. Use the proper fluid. Refer to [Fluid and Lubricant Recommendations](#).
8. Install the outer pinion bearing into the axle housing.



9. Using the J 22388 installer , install a NEW pinion oil seal.
10. Install the pinion into the axle housing.
11. Apply sealant to the splines of the pinion yoke. Refer to [Fluid and Lubricant Recommendations](#).



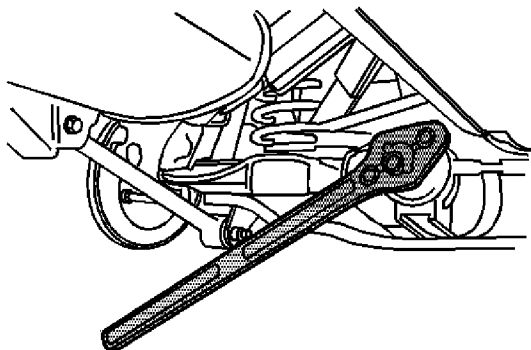
12. Align the marks made and install the pinion yoke.

Caution: Refer to [Pinion Flange/Yoke Installation Caution](#) in the Preface section.

13. Using a soft faced hammer, seat the pinion yoke onto the pinion shaft by tapping it until a few threads show through the yoke.

Note: Do not reuse the pinion nut, use NEW only.

14. Install the new pinion nut and the NEW pinion nut.

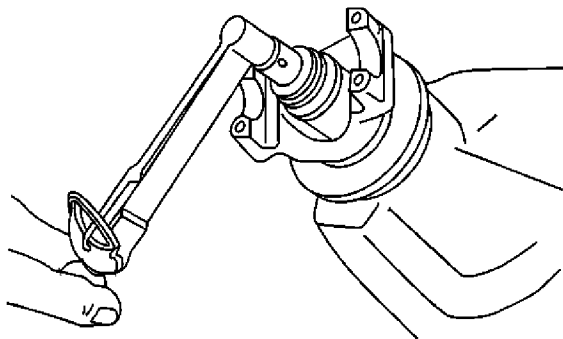


15. Install the [J 8614-01](#) onto the pinion yoke as shown.

Note: If the rotating torque is exceeded, the pinion will have to be removed and a new collapsible spacer installed.

16. Using the J 8614-01 holding tool, tighten the pinion nut until the pinion end play is just taken up. Rotate the pinion while tightening the nut to seat the bearings.

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



17. Using an inch-pound torque wrench, measure the rotating torque of the pinion. The torque

should be between **1.0-2.3 N·m (10-20 lb in)** for used bearings, or **1.7-3.4 N·m (15-30 lb in)** for new bearings.

18. If the rotating torque measurement is below 1.0 N·m (10 lb in) for used bearings, or 1.7 N·m (15 lb in) for new bearings, continue to tighten the pinion nut in small increments until the rotating measurement reads **1.0-2.3 N·m (10-20 lb in)** for used bearings, or **1.7-3.4 N·m (15-30 lb in)** for new bearings.

Note: Recheck the rotating torque and adjust if necessary.

19. Once the specified torque is obtained, rotate the pinion several times to ensure the bearings have seated.
20. Install the differential assembly. Refer to [Differential Replacement](#).
21. Fill the axle with the proper axle lubricant. Refer to [Rear Axle Lubricant Replacement](#).
22. Remove the support and lower the vehicle.

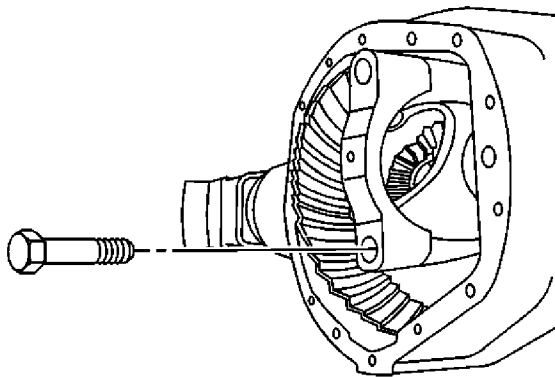
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Differential Replacement (8.6 Inch Axle)

Removal Procedure

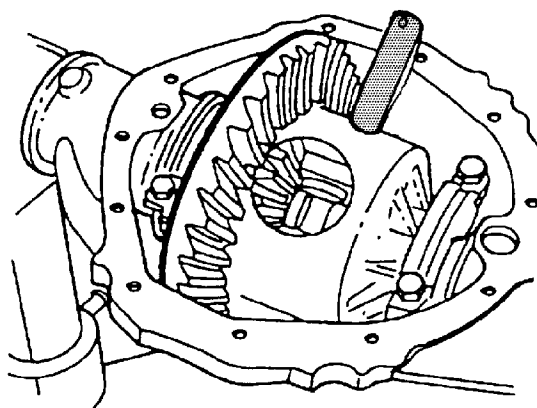
Note: Group and mark the shims together as originally removed. If you remove or replace the ring and pinion gear set, perform the differential side bearing preload, backlash, and gear tooth contact pattern check in order to ensure proper contact of the gears. If you reinstall or replace the differential assembly without replacing any other component (i.e. pinion and ring gear set, differential bearings, etc.) then you may reinstall the differential assembly with the original shims in their original locations. Always perform a gear tooth contact pattern check, even when you remove only the differential assembly.

1. Raise the vehicle. Refer to [Lifting and Jacking the Vehicle](#).
2. Remove the axle shafts. Refer to [Rear Axle Shaft Replacement](#).



Warning: To prevent personal injury and/or component damage, support the differential case when removing the case from the axle housing. If the case is not supported, the differential case could fall and cause personal injury or damage to the differential case.

3. Remove the differential bearing caps and bolts. Mark the differential bearing caps left and right.



4. Install the pinion shaft into the differential case part way and rotate the differential assembly until the pinion shaft contact the top of the axle housing.

Caution: When removing the differential case from the axle housing, do not damage the cover gasket surface. If the cover gasket surface is damaged, lubricant may leak from the axle and cause premature failure of the axle assembly.

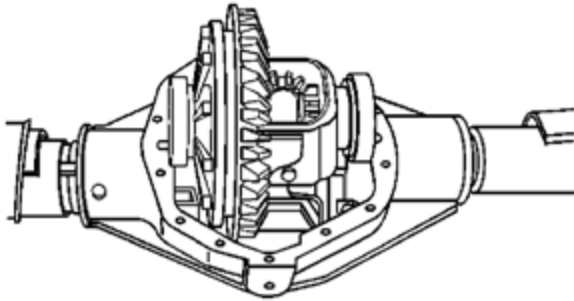
5. Rotate the drive pinion clockwise in order to force the differential assembly out of the axle housing.
6. Remove the differential assembly.
7. Remove the bearing cups, the shims, and the spacers as necessary.

Mark the cups and shims left and right and in the proper order as necessary. Place the cups and the shims with the bearing caps.

8. Remove the differential side bearings, if necessary. Refer to [Differential Side Bearings Replacement](#).
9. Remove the ring gear, if necessary. Refer to [Drive Pinion and Ring Gear Replacement](#).

Installation Procedure

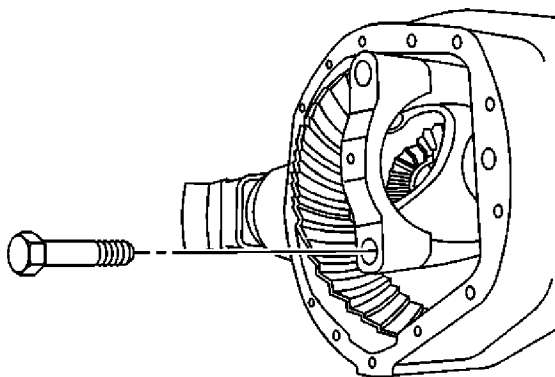
1. Install the ring gear, if necessary. Refer to [Drive Pinion and Ring Gear Replacement](#).
2. Install the differential side bearings, if necessary. Refer to [Differential Side Bearings Replacement](#).
3. Lubricate the differential side bearings with the proper axle lubricant. Refer to [Fluid and Lubricant Recommendations](#).



4. Install the differential assembly, with the differential bearing cups installed, into the axle housing.

Support the differential assembly in order to keep the case from falling out of the axle housing.

5. Adjust the differential side bearing preload. Refer to [Differential Carrier Bearing Preload Adjustment](#).
6. Adjust the drive pinion to ring gear backlash. Refer to [Backlash Adjustment](#).
7. Perform a gear tooth contact pattern check. Refer to [Gear Tooth Contact Pattern Inspection](#).



8. Install the differential bearing caps and the bolts, if necessary.

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

9. Tighten the differential bearing cap bolts to **75 N·m (55 lb ft)**.
10. Install the axle shafts. Refer to [Rear Axle Shaft Replacement](#).
11. Fill the axle with the proper axle lubricant. Refer to [Rear Axle Lubricant Replacement](#).
12. Lower the vehicle.

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Differential Replacement (9.75, 10.5 and 10.75 Inch Axles)

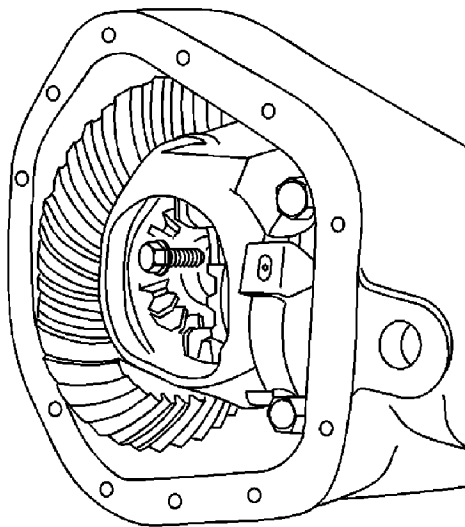
Special Tools

[J 24429](#) Side Bearing Backlash Spanner

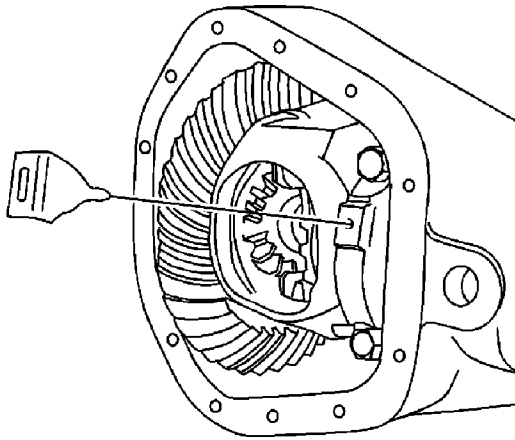
Removal Procedure

Note: If you remove or replace the ring and pinion gear set, perform the differential side bearing preload, backlash, and gear tooth contact pattern check in order to ensure proper contact of the gears. If you reinstall or replace the differential assembly without replacing any other component (i.e. pinion and ring gear set, differential bearings, etc.) then you may reinstall the differential assembly with the original shims in their original locations. Always perform a gear tooth contact pattern check, even when you remove only the differential assembly.

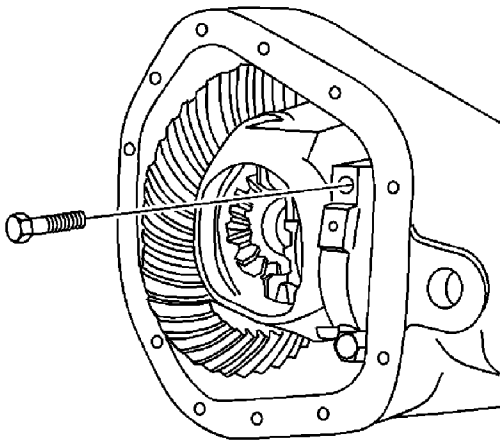
1. Raise the vehicle. Refer to [Lifting and Jacking the Vehicle](#).
2. Remove the axle shafts. Refer to [Rear Axle Shaft Replacement](#) or [Rear Axle Shaft and/or Gasket Replacement](#).



3. Remove the differential bearing adjuster nut lock bolts.

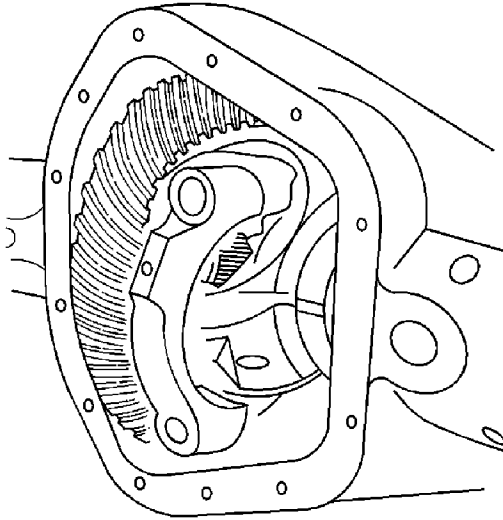


4. Remove the differential bearing adjuster nut locks.

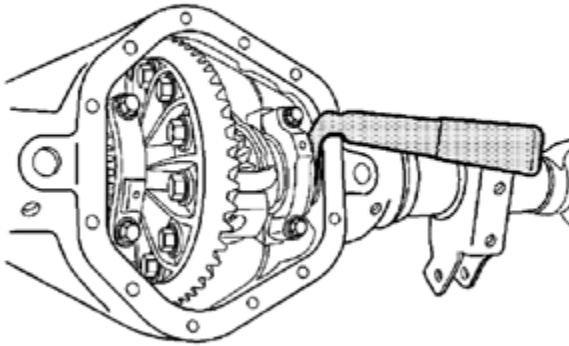


5. Remove the differential bearing cap bolts.

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6. Remove the differential bearing caps. Mark the differential bearing caps left and right.



Warning: To prevent personal injury and/or component damage, support the differential case when removing the case from the axle housing. If the case is not supported, the differential case could fall and cause personal injury or damage to the differential case.

Caution: When removing the differential case from the axle housing, do not damage the cover gasket surface. If the cover gasket surface is damaged, lubricant may leak from the axle and cause premature failure of the axle assembly.

7. Loosen the differential bearing adjusters using the [J 24429](#) .
8. Remove the differential assembly and the differential bearing cups.

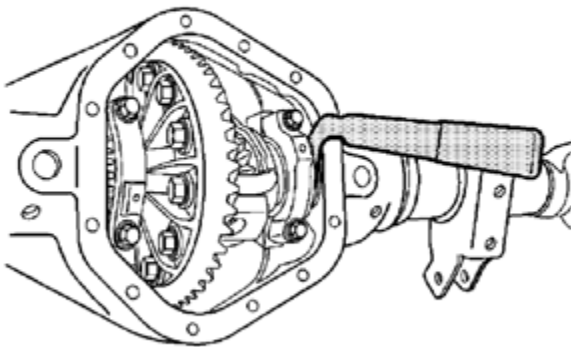
Mark the differential bearing cups left and right. Place the differential bearing cups with the differential bearing caps.

9. Remove the differential side bearings, if necessary. Refer to [Differential Side Bearings Replacement](#).
10. Remove the ring gear, if necessary. Refer to [Drive Pinion and Ring Gear Replacement](#).

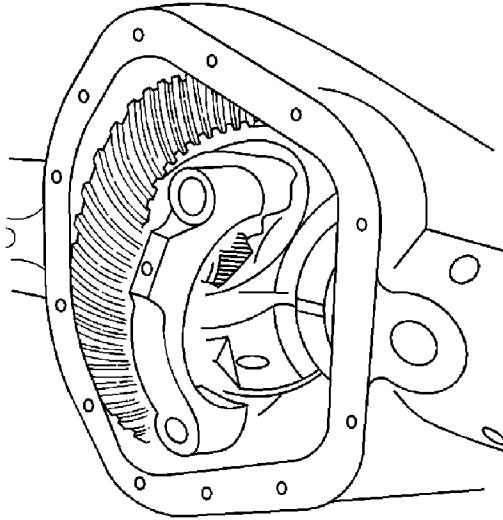
Installation Procedure

1. Install the ring gear, if necessary. Refer to [Drive Pinion and Ring Gear Replacement](#).
2. Install the differential side bearings, if necessary. Refer to [Differential Side Bearings Replacement](#).
3. Lubricate the differential side bearings with the proper axle lubricant. Refer to [Fluid and Lubricant Recommendations](#).
4. Install the differential assembly, with the differential bearing cups installed, into the axle housing.

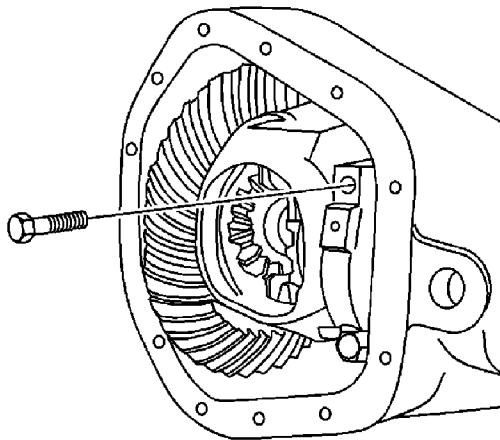
Support the differential assembly in order to keep the case from falling out of the axle housing.



5. Turn the adjusters evenly on each side using the [J 24429](#) until snug against the differential.
6. Adjust the differential side bearing preload. Refer to [Differential Carrier Bearing Preload Adjustment](#).
7. Adjust the drive pinion to ring gear backlash. Refer to [Backlash Adjustment](#).
8. Perform a gear tooth contact pattern check. Refer to [Gear Tooth Contact Pattern Inspection](#).



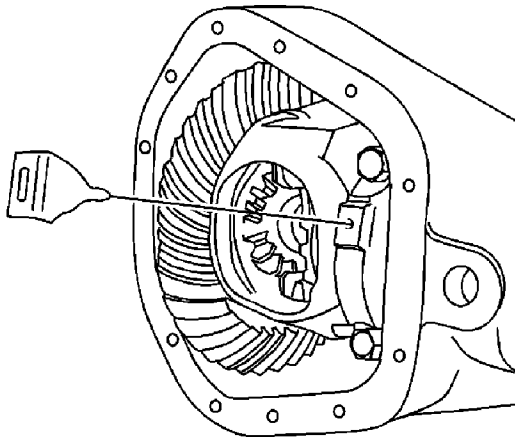
9. Install the differential bearing caps, if necessary.



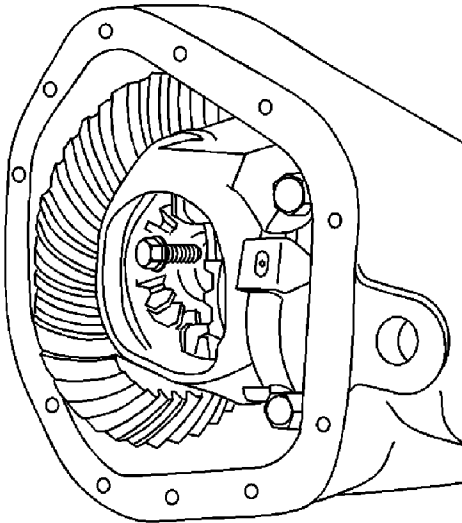
10. Install the differential bearing cap bolts, if necessary.

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

11. Tighten the differential bearing cap bolts to **109 N·m (80 lb ft)**.



12. Install the differential bearing adjuster retainers.



13. Install the differential bearing adjuster retainer bolts and tighten to **13 N·m (10 lb ft)**.
14. For the 9.75 inch axle, install the axle shafts. Refer to [Rear Axle Shaft Replacement](#).
15. For the 10.5 and 10.75 inch axles, install the axle shafts and new axle shaft gaskets. Refer to [Rear Axle Shaft and/or Gasket Replacement](#).
16. Fill the axle with the proper axle lubricant. Refer to [Rear Axle Lubricant Replacement](#).
17. Lower the vehicle.

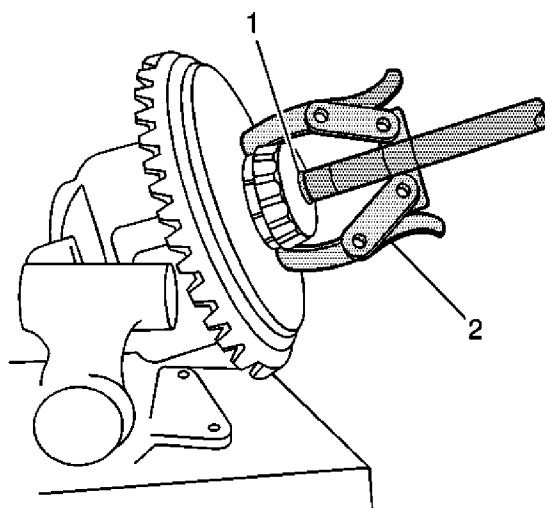
Differential Side Bearings Replacement

Special Tools

- DT 46725 Side Bearing Installer
- J 8092 Universal Driver Handle 3/4 inch Handle-10
- J 8107-3 Side Bearing Remover Plug
- J 8107-4 Side Bearing Remover Plug
- J 21784 Side Bearing Installer
- J 22888 D Side Bearing Remover Kit
- J 24430 Differential Side Bearing Installer
- J 29710 Differential Side Bearing Installer
- J 36597 Side Bearing Puller Pilot--9.25 inch Axle
- J 45711 Differential Side Bearing Remover-Dana 248
- J 45900 Differential Side Bearing Installer-Dana Installer

Removal Procedure

1. Remove the differential assembly. Refer to [Differential Replacement](#).
2. Install the differential assembly in a vise.



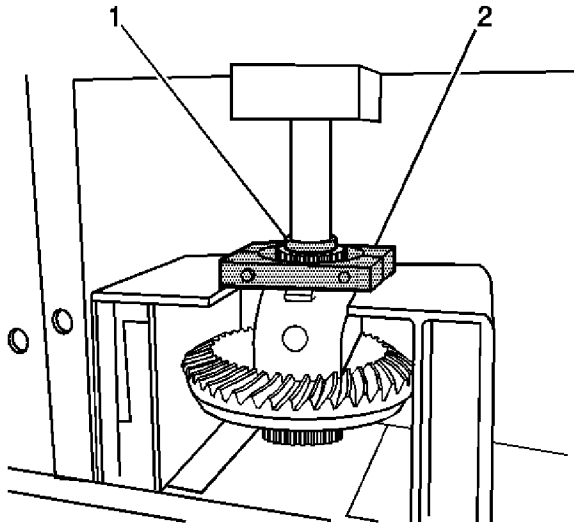
Note: Steps 3 to 7, are for those vehicle equipped with 8.6, 9.5, 9.75 and the 10.5 inch axles and RPO G80. For vehicles equipped with the 10.5 inch and without RPO G80 go to step 8.

3. For the 8.6 inch axle

7-4 remover (1), remove

the differential side bearing.

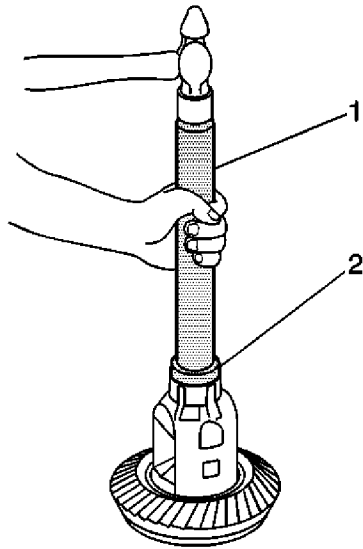
4. For the 9.5 inch axle, use the *J 22888* remover (2) and the *J 36597* pilot (1), remove the differential side bearing.
5. For the 10.5 inch axle, use the *J 22888* remover (2) and the *J 8107-3* remover (1), remove the differential side bearing.
6. Remove the differential assembly from the vise.



7. For the 9.75 inch axle, use the *J 45711* remover-dana 248 (2), *J 36597* pilot (1) and a press, remove the differential side bearing.
8. For the 10.5 inch axle without RPO G80, remove the differential side bearing cage and roller bearings from the inner bearing race.
9. Using a suitable method that will not damage the differential case, remove the inner bearing race from the differential assembly.

Installation Procedure

1. Install the *J 8107-4* remover for the 8.6, *J 36597* pilot for the 9.5, *J 8107-3* remover and the 10.5 on the opposite side of the side bearing being installed.



2. To install the side bearing for the 8.6 inch axle, use the *J 8092* handle and the *J 21784* installer .
3. To install the side bearing for the 9.5 inch axle, use the *J 8092* handle and the *J 29710* installer .
4. To install the side bearing for the 9.75 w/o G80 or the 10.5 inch axle, use the *J 8092* Handle *J 24430* installer and the *J 45900* dana installer .
5. To install the side bearing for the 9.75 with G80, use the *J 8092* handle *DT 46725* installer
6. Install the differential assembly. Refer to [Differential Replacement](#).

Rear Axle Replacement

Removal Procedure

Note: Observe and accurately mark the positions of all driveline components relative to the propeller shaft and axles prior to disassembly. These components include the propeller shaft, drive axles, pinion flanges, output shafts, etc. Reassemble all components in the exact relationship the components had to each other during removal. Follow specifications and torque values. Follow any measurements made prior to disassembly.

1. Raise and support the vehicle. Refer to [Lifting and Jacking the Vehicle](#).
2. Place jack or utility stands at the front end of the vehicle.
3. Support the rear axle with jack or utility stands.
4. Remove the wheel and tire assemblies. Refer to [Tire and Wheel Removal and Installation](#).
5. Remove the stabilizer shaft from the vehicle, if equipped. Refer to [Stabilizer Shaft Replacement](#).
6. For vehicles with RPO JL4, disconnect the electrical connector from the rear wheel speed sensor.

Note: It is not necessary to disconnect the brake hose from the caliper. Support the brake calipers as necessary and set aside.

7. Remove the brake calipers from the rear axle. Refer to [Rear Brake Caliper Replacement](#).
8. Remove the propeller shaft from the vehicle.
 - For vehicles equipped with the one piece propeller shaft, refer to [One-Piece Propeller Shaft Replacement](#).
 - For vehicles equipped with the two piece propeller shaft, refer to [Two-Piece Propeller Shaft Replacement](#).
9. Remove the park brake cables the rear springs and rear axle housing.
 - 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](#).
10. Drain the lubricant from rear axle. Refer to [Rear Axle Lubricant Replacement](#).
11. Remove the rear axle vent hose from the axle.
12. Remove the lower shock absorber bolt from the rear axle. Refer to [Shock Absorber Replacement](#).
13. Remove the rear spring U-bolts, the rear spring anchor plates and the rear spring spacers from the vehicle. Refer to [Leaf Spring Replacement](#).
14. Remove the rear axle from the vehicle.

Installation Procedure

Note: Observe and accurately mark the positions of all driveline components relative to the propeller shaft and axles prior to disassembly. These components include the propeller shaft, drive axles, pinion flanges, output shafts, etc. Reassemble all components in the exact relationship the components had to each other during removal. Follow specifications and torque values. Follow any measurements made prior to disassembly.

1. Support the rear axle with jack or utility stands.
2. Install the rear axle t

3. Install the rear spring U-bolts, the rear spring anchor plates and the rear spring spacers to the vehicle. Refer to [Leaf Spring Replacement](#).
4. Install the lower shock absorber bolt to the rear axle. Refer to [Shock Absorber Replacement](#).
5. Install the rear axle vent hose to the rear axle.
6. 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](#).
7. Install the rear propeller shaft.
 - For vehicles equipped with the one piece propeller shaft, refer to [One-Piece Propeller Shaft Replacement](#).
 - For vehicles equipped with the two piece propeller shaft, refer to [Two-Piece Propeller Shaft Replacement](#).
8. Install the brake calipers. Refer to [Rear Brake Caliper Replacement](#).
9. For vehicles with RPO JL4, connect the electrical connector to the rear wheel speed sensor.
10. Install the wheel and tire assemblies. Refer to [Tire and Wheel Removal and Installation](#).
11. Install the rear stabilizer shaft, if equipped. Refer to [Stabilizer Shaft Replacement](#).
12. Fill the rear axle with the proper axle lubricant. Refer to [Approximate Fluid Capacities](#) and [Fluid and Lubricant Recommendations](#).
13. Remove the jack or utility stands.
14. Lower the vehicle.

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Rear Axle Housing Replacement (10.5, 10.75 Inch Axles)

Removal Procedure

1. Raise the vehicle. Refer to [Lifting and Jacking the Vehicle](#).
2. Remove the rear axle assembly. Refer to [Rear Axle Replacement](#).
3. Remove the brake rotors. Refer to [Rear Brake Rotor Replacement](#).
4. Remove the rear axle hub, cup and/or seal replacement. Refer to [Rear Axle Hub, Bearing, Cup, and/or Seal Replacement](#).
5. Remove the rear axle housing cover and gasket. Refer to [Rear Axle Housing Cover and Gasket Replacement](#).
6. Remove the rear brake shields. Refer to [Rear Brake Shield Replacement](#).
7. Remove the differential assembly. Refer to [Differential Replacement](#).
8. Remove the drive pinion shaft yoke and the oil seal. Refer to [Drive Pinion Flange/Yoke and/or Oil Seal Replacement](#).
9. Remove the drive pinion and the ring gear. Refer to [Drive Pinion and Ring Gear Replacement](#).
10. Remove the pinion bearings. Refer to [Drive Pinion Bearings Replacement](#).

Installation Procedure

1. Install the drive pinion bearings. Refer to [Drive Pinion Bearings Replacement](#).
2. Install the drive pinion and the ring gear. Refer to [Drive Pinion and Ring Gear Replacement](#).
3. Install the drive pinion shaft yoke and the oil seal. Refer to [Drive Pinion Flange/Yoke and/or Oil Seal Replacement](#).
4. Install the differential assembly. Refer to [Differential Replacement](#).
5. Adjust the differential side bearing preload. Refer to [Differential Carrier Bearing Preload Adjustment](#).
6. Adjust the drive pinion to ring gear backlash. Refer to [Backlash Adjustment](#).
7. Perform a gear tooth contact pattern check. Refer to [Gear Tooth Contact Pattern Inspection](#).
8. Install the rear brake shields. Refer to [Rear Brake Shield Replacement](#).
9. Install the rear axle hub, cup and/or seal replacement. Refer to [Rear Axle Hub, Bearing, Cup, and/or Seal Replacement](#).
10. Install the rear axle housing cover and gasket. Refer to [Rear Axle Housing Cover and Gasket Replacement](#).
11. Install the brake rotors. Refer to [Rear Brake Rotor Replacement](#).
12. Install the rear axle assembly. Refer to [Rear Axle Replacement](#).
13. Fill the axle with lubricant. Refer to [Rear Axle Lubricant Replacement](#).
14. Remove the support and lower the vehicle.

Rear Axle Housing Replacement (8.6, 9.5, 9.75 Inch Axles)

Removal Procedure

1. Raise and support the vehicle. Refer to [Lifting and Jacking the Vehicle](#).
2. Drain the rear axle lubricant. Refer to [Reed Tachometer Description](#).
3. Remove the rear axle assembly. Refer to [Rear Axle Replacement](#).
4. Remove the rear axle housing cover and gasket. Refer to [Rear Axle Housing Cover and Gasket Replacement](#).
5. Remove the rear wheel speed sensor. Refer to [Rear Wheel Speed Sensor Replacement](#).
6. Remove the rear axle shafts. Refer to [Rear Axle Shaft Replacement](#).
7. Remove the rear brake shields. Refer to [Rear Brake Shield Replacement](#).
8. Remove the differential assembly. Refer to [Differential Replacement](#).
9. Remove the drive pinion shaft yoke and the oil seal. Refer to [Drive Pinion Flange/Yoke and/or Oil Seal Replacement](#).
10. Remove the drive pinion bearings. Refer to [Drive Pinion and Ring Gear Replacement](#).

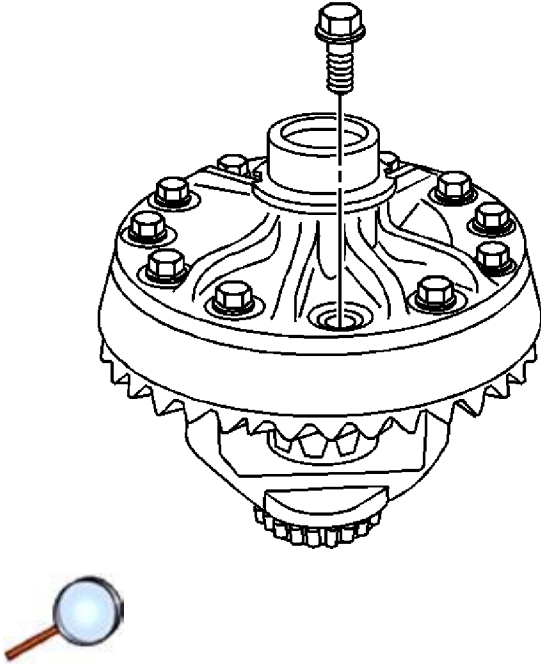
Installation Procedure

1. Install the drive pinion bearings. Refer to [Drive Pinion Bearings Replacement](#).
2. Install the drive pinion and ring gear. Refer to [Drive Pinion and Ring Gear Replacement](#).
3. Install the drive pinion shaft yoke and the oil seal. Refer to [Drive Pinion Flange/Yoke and/or Oil Seal Replacement](#).
4. Install the differential assembly. Refer to [Differential Replacement](#).
5. Adjust the differential carrier bearing preload. Refer to [Differential Carrier Bearing Preload Adjustment](#).
6. Adjust the drive pinion depth adjustment. Refer to [Pinion Depth Adjustment](#).
7. Inspect the gear tooth contact pattern. Refer to [Gear Tooth Contact Pattern Inspection](#).
8. Install the rear brake shields. Refer to [Rear Brake Shield Replacement](#).
9. Install the rear axle shafts. Refer to [Rear Axle Shaft Replacement](#).
10. Install the rear wheel speed sensor. Refer to [Rear Wheel Speed Sensor Replacement](#).
11. Install the rear axle cover and gasket. Refer to [Rear Axle Shaft and/or Gasket Replacement](#).
12. Install the rear axle housing cover and gasket. Refer to [Rear Axle Housing Cover and Gasket Replacement](#).
13. Install the rear axle assembly. Refer to [Rear Axle Replacement](#).
14. Fill the axle with gear lubricant. Refer to [Rear Axle Lubricant Replacement](#).
15. Remove the support and lower the vehicle.

Differential Overhaul

Disassemble Procedure

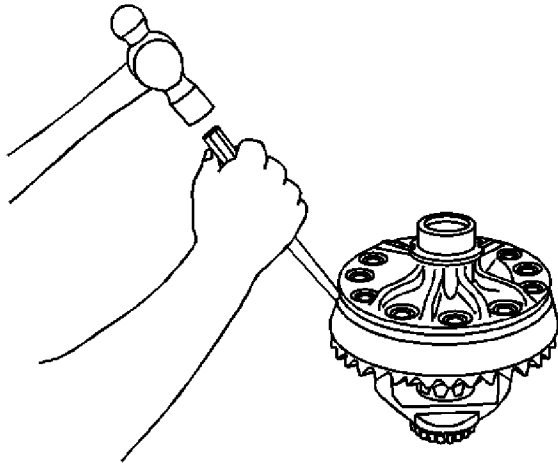
1. Remove the differential side bearings. Refer to [Differential Side Bearings Replacement](#).



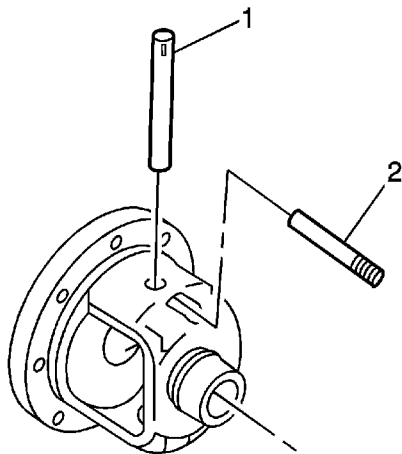
Note: The ring gear bolts on the 8.6 and 9.5 inch axles have left-hand threads. The ring gear bolts on the 9.75, 10.5 and 10.75 inch axles have right-hand threads

2. Remove the gear bolts. Discard the bolts.

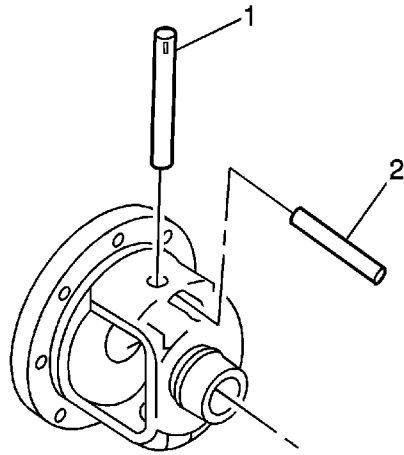
Caution: Refer to [Ring Gear Removal Caution](#) in the Preface section.



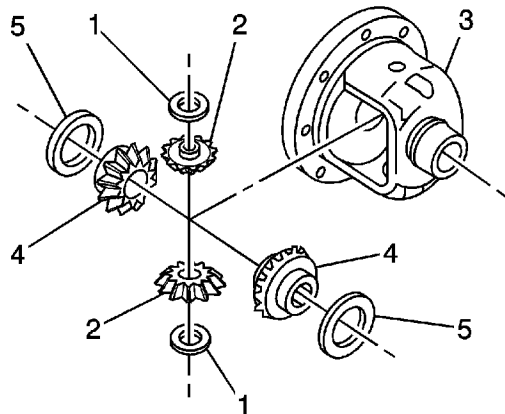
3. Using a brass drift and a hammer, remove the ring gear from the differential case.



4. For the 8.6, 9.5 and 9.75 inch axle, remove the differential pinion gear shaft bolt (2) and the pinion gear shaft (1).



5. For the 10.5 and the 10.75 in axle, use a hammer and the appropriate size drift pin, remove the differential pinion gear shaft pin (2) and the differential pinion gear shaft (1).



Note: Mark the top and bottom pinion gears.

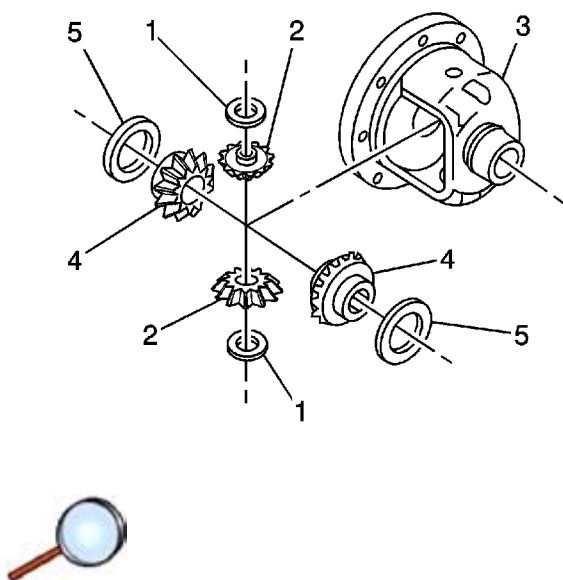
6. Remove the pinion gears (2) and thrust washers (1) by rolling the pinion gears in the differential case (3).

Note: Mark the left and right pinion gear sand thrust washers.

7. Remove the differential side gears (5) and thrust washers (4) from the differential case (3).

Assemble Procedure

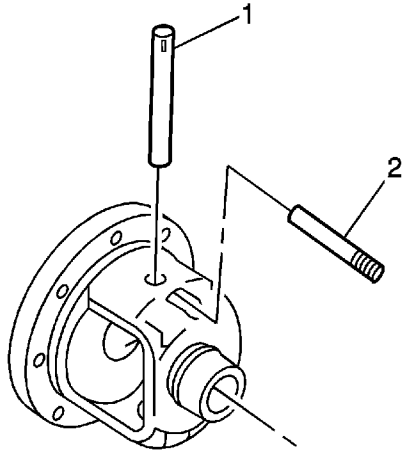
1. Lubricant the pinion and side gears with the proper fluid. Refer to [Adhesives, Fluids, Lubricants, and Sealers](#).



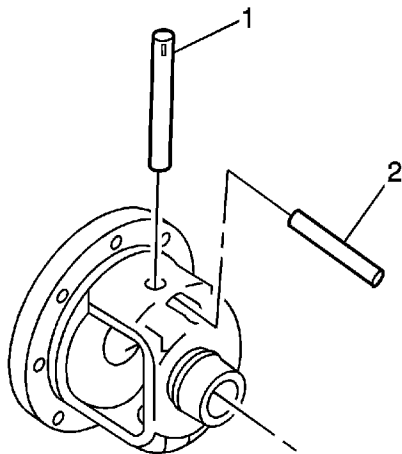
Note: If the same differential side gears and the thrust washers are to be reused, install the gears and thrust washers in their original locations.

2. Install the differential side gears (5) and the thrust washers (4) in the differential case (3).
3. Install the differential pinion gears and pinion gear thrust washers by performing the following steps:
 - 3.1. Position one pinion gear (2) between the differential side gears (5).
 - 3.2. Position the second pinion gear (2) between the differential side gears (5) directly opposite the of the first gear.
 - 3.3. Rotate the differential side gears (5) until the pinion gears is directly opposite the opening in the differential case (3).
 - 3.4. Rotate the pinion gears (2) toward the differential opening to allow the installation the thrust washers (1).
4. Rotate the pinion gears toward the opening in the differential case to allow the installation of the pinion gear shaft.

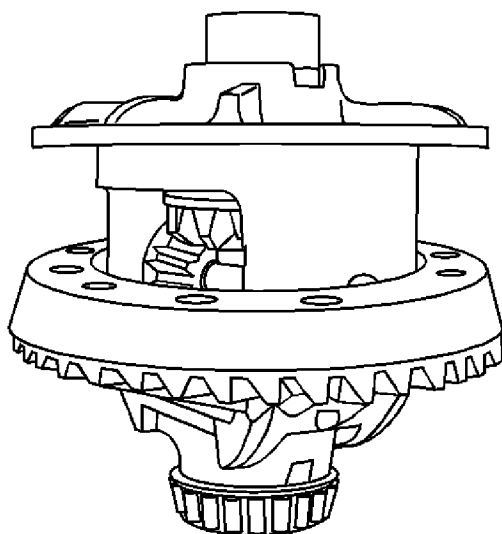
Caution: Refer to [Fastener Caution](#) in the Preface section.



5. Install the pinion gear shaft (1) for the 8.6, 9.5 and the 9.75 inch axles.
6. Install differential pinion gear shaft bolt (2) into the pinion gear shaft (1) and tighten to bolt to:
 - For the 8.6 inch axle tighten the bolt to **36 N·m (27 lb ft)**.
 - For the 9.5 inch axle tighten the bolt to **50 N·m (37 lb ft)**.
 - For the 9.75 inch axle tighten the bolt to **27 N·m (20 lb ft)**.

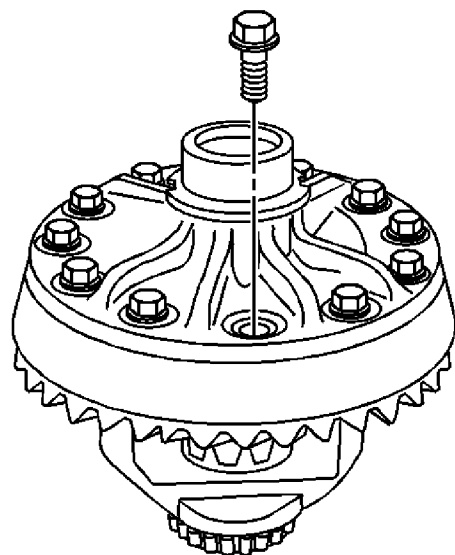


7. For the 10.5 and 10.75 inch axle, install the differential pinion gear shaft (1).
8. Using a hammer and the proper size drift pin, install the NEW differential pinion gear shaft pin (2).



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

9. Install the ring gear to the differential case.



Note: The ring gear bolts on the 8.6 inch axle have left-hand threads. The ring gear bolts on the 9.75, 10.5 and 10.75 inch axles have right-hand threads

Note: Hand start each bolt to ensure that the ring gear is properly installed to the differential case.

10. Install the new ring gear bolts and tighten the bolts to:

- For the 8.6 inch axle, tighten the ring gear bolts in sequence to **120 N·m (89 lb ft)**.
- For the 9.75, 10.5 and 10.75 inch axles, tighten the ring gear bolts in sequence to **177 N·m (131 lb ft)**.

11. Install the differential side bearings. Refer to [Differential Side Bearings Replacement](#).

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Bearings Inspection

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.

Important: The differential bearings and the bearing cups are matched sets. Replace both the bearing and the cup when either part requires replacement.

- Lubricate the bearings with axle lubricant. Inspect the bearings for smooth rotation.
- Inspect the bearing rollers for wear.
- Inspect the bearing cups for wear, cracks, brinelling, and scoring.

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[2009 Chevrolet Express - AWD](#) | [Express, Savana \(VIN G/H\) Service Manual](#) | [Driveline/Axle](#) | [Rear Drive Axle](#) | [Repair Instructions](#) | **Document ID: 687624**

Differential Inspection

- 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.

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[2009 Chevrolet Express - AWD](#) | [Express, Savana \(VIN G/H\) Service Manual](#) | [Driveline/Axle](#) | [Rear Drive Axle](#) |
[Repair Instructions](#) | **Document ID: 687627**

Pinion and Ring Gear Inspection

Ring and pinion gears are matched sets. When replacement of one or the other is necessary, both the ring and pinion gear must be replaced.

- Check the pinion and ring gear teeth for cracking, chipping, scoring, or excessive wear.
- Check the pinion gear splines for wear.
- Check the pinion flange/yoke splines for wear.
- Check the fit of the pinion gear splines on the pinion flange/yoke.
- Check the sealing surface of the pinion flange/yoke for nicks, burrs or rough tool marks that could damage the seal and cause an oil leak.
- Check for worn or broken parts and replace as necessary.

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[2009 Chevrolet Express - AWD](#) | [Express, Savana \(VIN G/H\) Service Manual](#) | [Driveline/Axle](#) | [Rear Drive Axle](#) | [Repair Instructions](#) | **Document ID: 174541**

Rear Axle Housing Inspection

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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Shims Inspection

Important:

- Do not reinstall the original cast iron production shims, if removed. Once the cast iron shims are removed from the axle housing, they must be replaced with service shims and spacers.
- If service shims were previously installed, the shims can be reused.

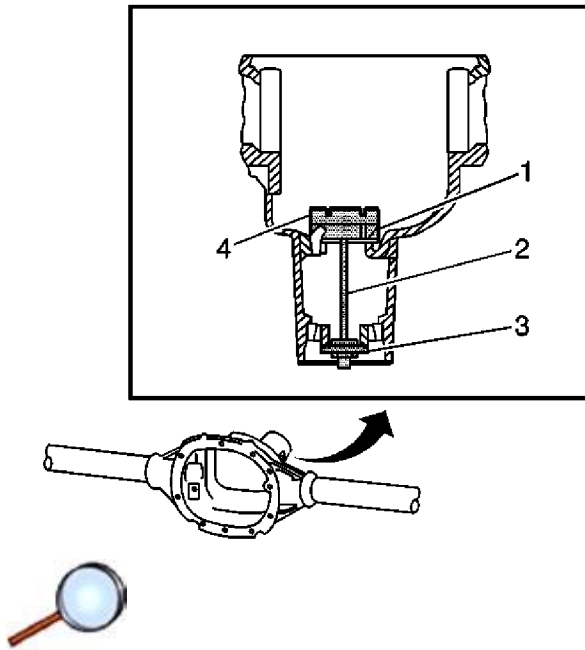
Inspect the shims for cracks and chips. Replace the damaged shims.

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Pinion Depth Adjustment (8.6 Inch Axle)

Special Tools

- [J 34925](#) Pinion Setting Gage and Components
- [J 8001](#) Dial Indicator Set

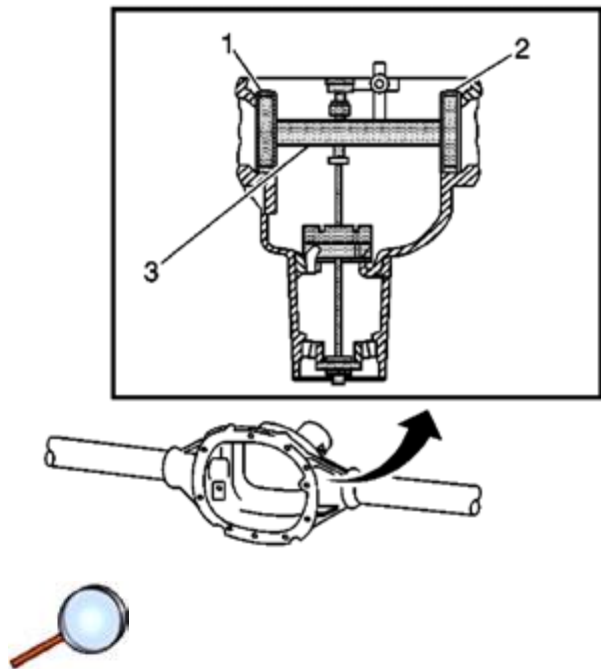


Note: Make sure all of the tools, the differential side bearing bores, and the pinion bearing cups are clean before proceeding.

1. Lubricate the pinion bearings with axle lubricant. Refer to [Fluid and Lubricant Recommendations](#).
2. Install the pinion bearings into the axle housing.
3. Assemble the J 21777-35 (1), the J 21777-43 (2), the J 21777-42 (3), and the J 21777-29 (4) into the axle housing as shown.
4. While holding the J 21777-43 stationary, install an inch-pound torque wrench on the nut of the J 21777-43 and tighten the nut until a rotating torque of 1.7-3.4 N·m (15-30 lb in) for new bearings or 1.1-2.3 N·m (10-20 lb in) for used bearings is obtained.

Rotate the assembly several times in both directions in order to seat the pinion bearings.

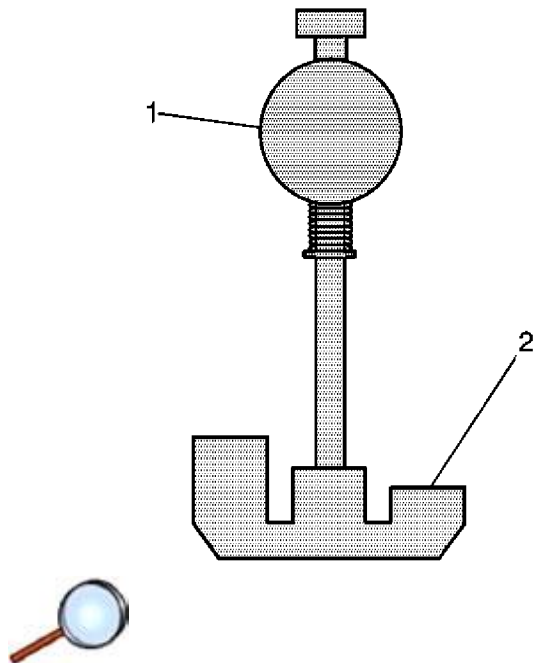
5. Check the rotating torque of the assembly. If the torque is less than 1.7 N·m (15 lb in) for new bearings or 1.1 N·m (10 lb in) for used bearings, continue to tighten the nut on the J 21777-43 until a rotating torque of 1.7-3.4 N·m (15-30 lb in) for new bearings or 1.1-2.3 N·m (10-20 lb in) for used bearings is obtained.



6. Assemble the J 21777-45 (1, 2) to the J 21777-1 (3) into the differential side bearing bore of the axle housing as shown.
7. Install the differential bearing caps.

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

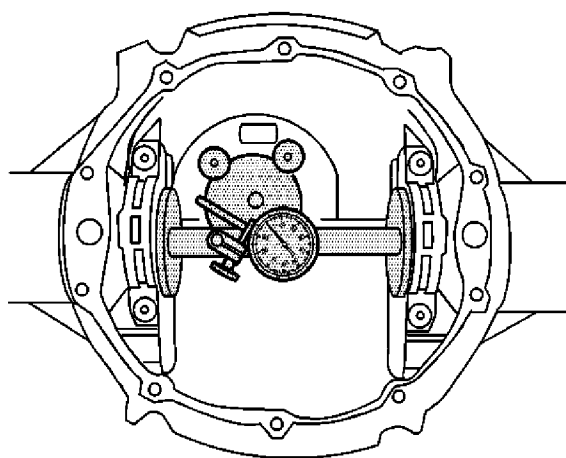
8. Install the differential bearing cap bolts and tighten to **75 N·m (55 lb ft)**.
9. Rotate the J 21777-1 within the J 21777-45. The J 21777-1 must rotate back and forth freely within the discs. If the J 21777-1 does not rotate freely, disassemble the components, inspect for proper seating and/or mis-aligned components and re-assemble.



10. Align the plunger of the J 21777-1 (1) to the 8.5 in gage block setting of the J 21777-29 (2).
11. Install the [J 8001](#) to the J 21777-1 as follows:
 - 11.1. Loosely clamp the [J 8001](#) onto the stem on the J 21777-1.

- 11.2. Place the contact pad of the [J 8001](#) onto the mounting post of the J 21777-1.
- 11.3. With the contact pad of the [J 8001](#) touching the mounting post of the J 21777-1, loosen the lock nut on the [J 8001](#) and push down on the [J 8001](#) until the needle the [J 8001](#) has turned 3/4 of a turn clockwise.
- 11.4. Tighten the clamp on the [J 8001](#) finger tight.
12. Move the plunger of the J 21777-1 back and forth until the needle of the [J 8001](#) indicates the greatest deflection.

The deflection is the point where the needle changes direction.



13. At the greatest point of deflection, move the housing of the [J 8001](#) until the needle indicates zero.
14. Move the plunger of the J 21777-1 back and forth again to verify the zero setting. Adjust the housing of the [J 8001](#) as necessary to set the needle to zero.
15. Rotate the plunger of the J 21777-1 away from the J 21777-29.
16. The value indicated on the [J 8001](#) is the thickness of the shim needed in order to set the depth of the pinion.
17. Select the shim that indicates the proper thickness. Measure the shim with a micrometer in order to verify that the thickness is correct.
18. Remove the pinion depth setting tools.
19. Remove the pinion bearings.
20. Install the pinion shim between the pinion gear and the inner pinion bearing. Refer to [Drive Pinion Bearings Replacement](#).

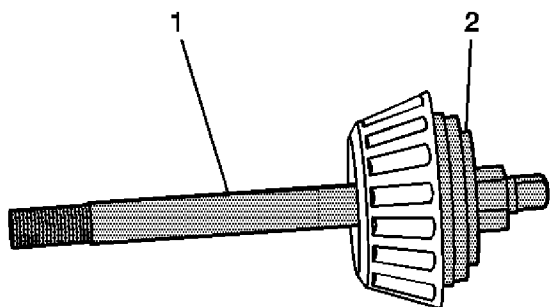
Pinion Depth Adjustment (9.75, 10.5 and 10.75 Inch Axles)

Special Tools

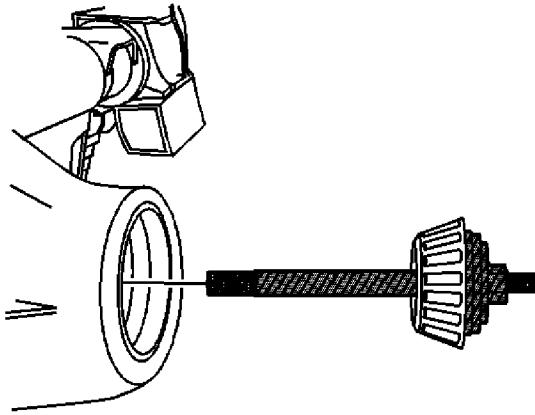
- [J 8001](#) Dial Indicator Set
- [J 8614-01](#) Flange and Pulley Holding Tool
- [J 22536](#) Pinion Driver
- [J 24433](#) Pinion Cone and Side Bearing Installer
- [J 34925](#) Pinion Setting Gage and Components
- [J 45692](#) Pinion Shim Selector Kit - Dana Axles
- [J 45710](#) Pinion Bearing Oil Seal Installer

Note: Make sure all of the tools, the differential side bearing bores, and the pinion bearing cups are clean before proceeding.

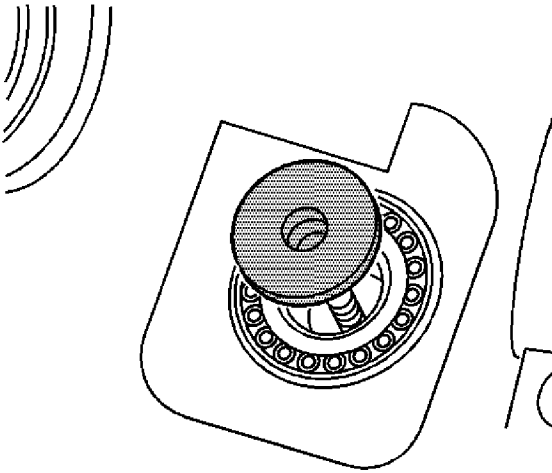
1. Lubricate the pinion bearings with axle lubricant. Refer to [Fluid and Lubricant Recommendations](#).



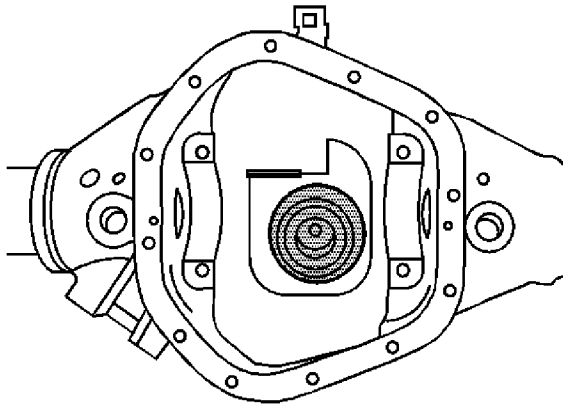
2. Assemble the J 45692-5 (2) and the outer pinion bearing onto the J 21777-43 (1) as shown.



3. Install the J 45692-5, the outer pinion bearing, and the J 21777-43 into the axle housing.
4. Install the inner pinion bearing into the axle housing.



5. Install the J 21777-35, 9.75 inch axle, or the J 45692-3, 10.5 and 10.75 inch axles, into the inner pinion bearing as shown.

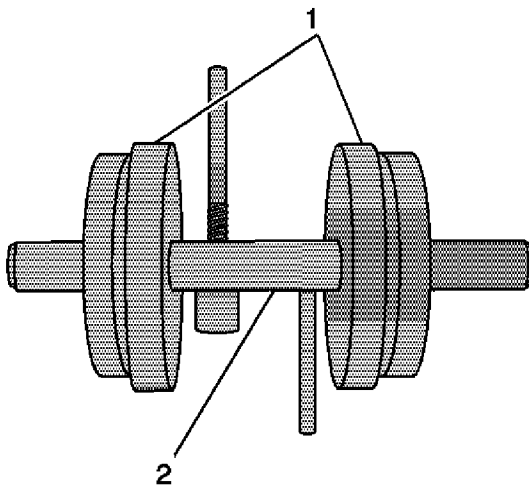


6. Install the J 45692-1 into the axle housing as shown.
7. While holding the J 21777-43 stationary, tighten the nut on the J 21777-43 just until the end play between the pinion bearings is removed.
8. Rotate the assembly several times in both directions in order to seat the pinion bearings.
9. Measure the rotating torque of the assembly using an inch-pound torque wrench.

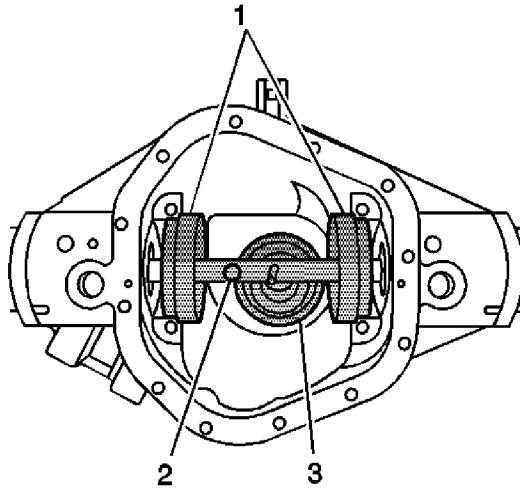
Specification

The rotating torque of the assembly should be between 2.3-5.1 N·m (20-45 lb in).

10. If the rotating torque of the assembly is less than 2.3 N·m (20 lb in), continue to tighten the nut of the J 21777-43 until a rotating torque of 2.3-5.1 N·m (20-45 lb in) is obtained.



11. Assemble the J 45692-2 (1) and the J 21777-1 (2) as shown.

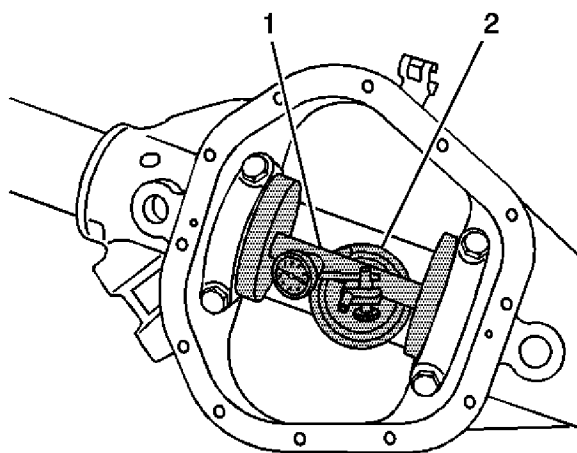


12. Install the J 45692-2 (1) and the J 21777-1 (2) into the axle housing. Place the stem of the J 21777-1 onto the bottom step of the J 45692-1 for the 9.75 inch axle, the middle step for the 10.5 and 10.75 inch axles.

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

Note: Corresponding letters are stamped on the bearing caps and axle housing. The bearing caps must be reassembled in the same position as removed.

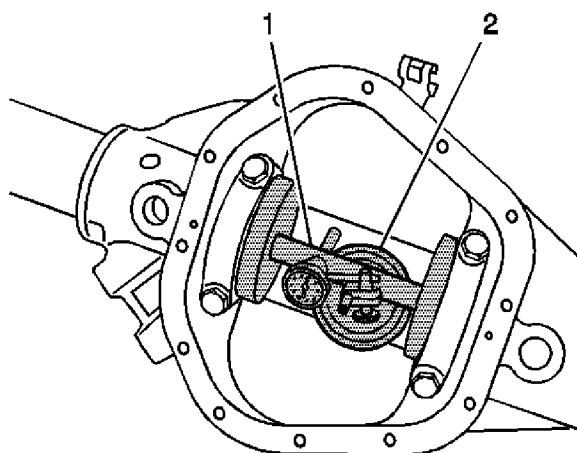
13. Install the bearing caps and bearing cap bolts and tighten to **109 N·m (80 lb ft)**.
14. Rotate the J 21777-1 within the J 45692-2. The J 21777-1 must rotate back and forth freely with the discs. If the J 21777-1 does not rotate freely, disassemble the components, inspect for proper seating and/or mis-aligned components and re-assemble.
15. Install the [J 8001](#) to the J 21777-1 as follows:
 - 15.1. Loosely clamp the [J 8001](#) onto the stem on the J 21777-1.
 - 15.2. Place the contact pad of the [J 8001](#) onto the mounting post of the J 21777-1.
 - 15.3. With the contact pad of the [J 8001](#) touching the mounting post of the J 21777-1, loosen the lock nut on the [J 8001](#) and push down on the [J 8001](#) until the needle the [J 8001](#) has turned 3/4 of a turn clockwise.
 - 15.4. Tighten the clamp on the [J 8001](#) finger tight.



16. Move the plunger of the J 21777-1 (1) back and forth on the bottom step, 9.75 inch axle, or the middle step, 10.5 and 10.75 inch axles, of the J 45692-1 (2) until the needle of the [J 8001](#) indicates the greatest deflection.

The deflection is the point where the needle changes direction.

17. At the greatest point of deflection, move the indicator housing of the [J 8001](#) until the needle indicates ZERO.
18. Move the plunger of the J 21777-1 back and forth again to verify the ZERO setting. Adjust the housing of the [J 8001](#) as necessary to set the needle to ZERO.



19. Rotate the plunger of the J 21777-1 (1) away from the J 45692-1 (2).

The value indicated is the amount of pinion shim thickness required for a nominal pinion

setting.

20. In order to adjust the pinion shim thickness for the drive pinion that is to be installed, do the following:

20.1. Read the number on the button end of the pinion.

If the number on the button end of the pinion is "0", no adjustment of the pinion preload shim pack is necessary.

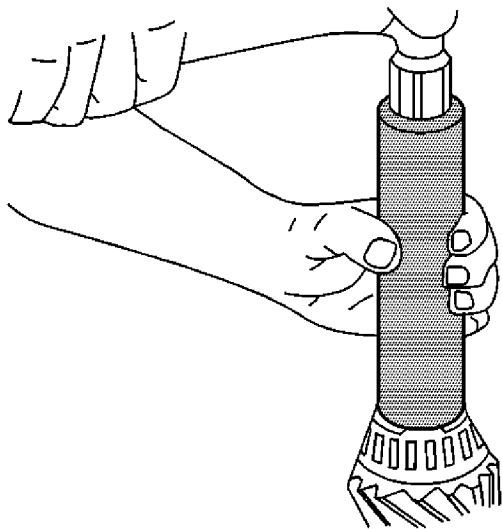
20.2. If the number is not "0", the number will also have a corresponding "+" or "-" in front of it.

The "+" or "-" indicates the amount of pinion preload shim thickness that either needs to be added to or subtracted from the amount determined in step 19 in order to the drive pinion gear to be positioned properly within the axle housing.

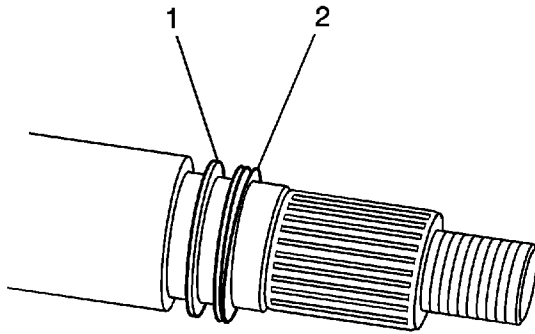
- For example, if the number on the button end of the pinion is a "+3", this indicates that 0.0762 mm (0.003 in) of shim thickness will need to be subtracted from the value determined in step 19 in order to place the teeth of the pinion in the best running position with the teeth of the ring gear. Refer to the table.
- If the number on the button end of the pinion is a "-3", this indicates that 0.0762 mm (0.003 in) of shim thickness will need to be added to the value determined in step 19 in order to place the teeth of the pinion in the best running position with the teeth of the ring gear. Refer to the table.

21. Remove the pinion depth setting tools.
22. Remove the pinion bearings.
23. Install the pinion position shim onto the drive pinion.

Measure the thickness of the shim with a micrometer in order to verify the thickness.



24. Install the inner pinion bearing onto the drive pinion using the [J 24433](#).



25. Install the pinion bearing preload spacer (1) onto the drive pinion, 10.5 and 10.75 inch axles only.
26. Install the original pinion preload shims (2) onto the drive pinion. If the original shims are not available, assemble 1.52 mm (0.060 in) of pinion preload shims to install.

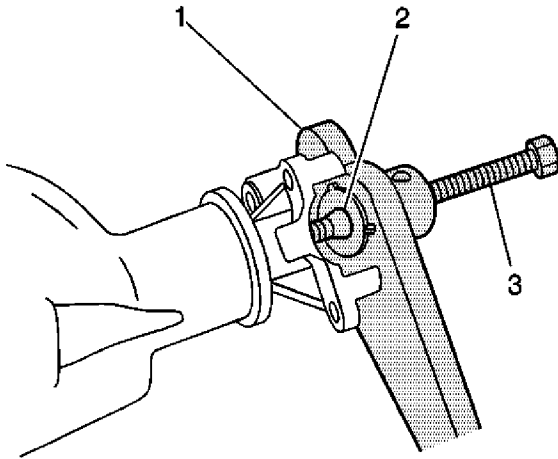
Measure each shim separately with a micrometer and add the thickness together to determine the total shim pack size.

27. Install the drive pinion with the inner pinion bearing and the pinion preload shims into the axle housing.
28. Install the outer pinion bearing.
29. Install the thrust washer.
30. Seat the pinion yoke onto the pinion shaft by tapping it with a soft-faced hammer until a few pinion shaft threads show through the yoke.
31. Install the washer.
32. Install the pinion yoke nut and tighten to **252 N·m (186 lb ft)**.
33. Measure the rotating torque of the drive pinion using an inch-pound torque wrench.

Specification

The rotating torque of the drive pinion should be between 2.3-5.1 N·m (20-45 lb in).

34. If the rotating torque of the drive pinion is not within specifications, adjust the pinion preload shim thickness by doing the following:
 - 34.1. Install the [J 8614-01](#) to the pinion yoke.
 - 34.2. Remove the pinion nut while holding the [J 8614-01](#).
 - 34.3. Remove the washer.



- 34.4. Install the J 8614-2 (2) and the J 8614-3 (3) into the [J 8614-01](#) (1) as shown.
- 34.5. Remove the pinion yoke by turning the J 8614-3 (3) clockwise while holding the [J 8614-01](#) (1).
- 34.6. Remove the thrust washer.
- 34.7. Install the [J 22536](#) .

Ensure that the [J 22536](#) is firmly seated on the drive pinion.

- 34.8. Drive the pinion out using the [J 22536](#) and a hammer.
- 34.9. Remove the outer pinion bearing.
- 34.10. Remove the pinion preload shim(s).
- 34.11. Adjust the amount of pinion preload shim thickness by doing the following:

Note: Removing approximately 0.0254 mm (0.001 in) of shim thickness will increase the rotating torque by approximately 71-89 N·m (8-10 lb in).

- If the rotating torque is too low, remove the appropriate amount of shim thickness from the shim thickness pack using the guideline above.
- Measure each shim separately with a micrometer and add the thickness together to determine the total shim pack size.

Note: Adding approximately 0.0254 mm (0.001 in) of shim thickness will decrease the rotating torque by approximately 71-89 N·m (8-10 lb in).

- If the rotating torque is too high, add the appropriate amount of shim thickness to the shim thickness pack using the guideline above.
- Measure each shim separately with a micrometer and add the thickness together to determine the total shim pack size.

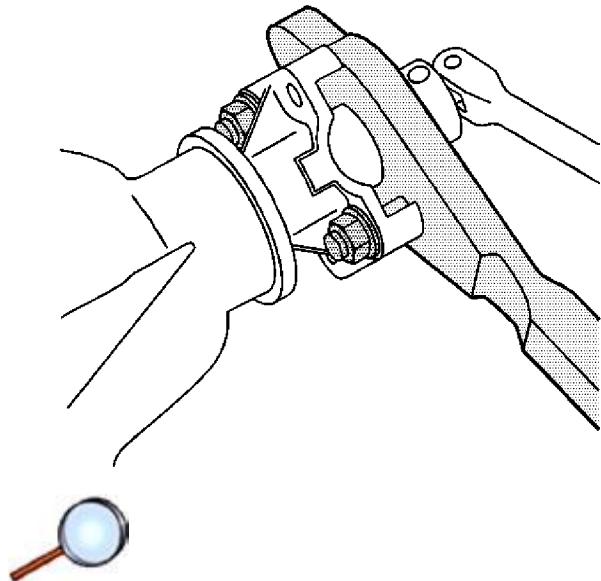
35. Install the new pinion preload shim pack onto the drive pinion.

36. Install the drive pinion with the inner pinion bearing and the pinion preload shims into the axle housing.
37. Install the outer pinion bearing.
38. Install the thrust washer.
39. Seat the pinion yoke onto the pinion shaft by tapping it with a soft-faced hammer until a few pinion shaft threads show through the yoke.
40. Install the washer.
41. Install the pinion yoke nut and tighten to **252 N·m (186 lb ft)**.
42. Measure the rotating torque of the drive pinion using an inch-pound torque wrench.

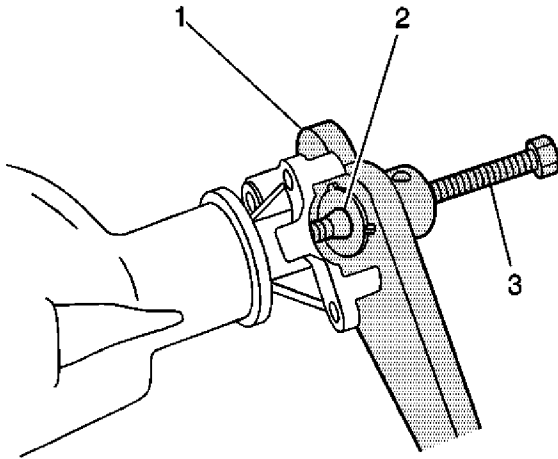
Specification

The rotating torque of the drive pinion should be between 2.3-5.1 N·m (20-45 lb in).

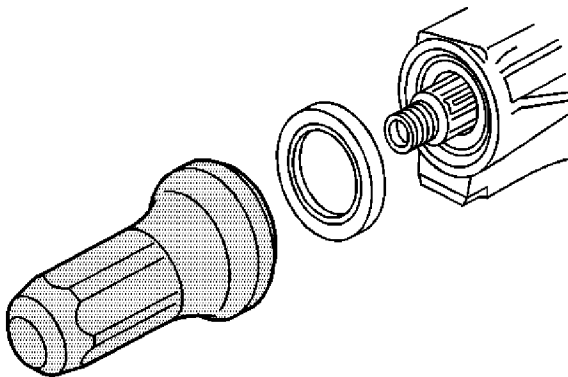
43. If the rotating torque of the drive pinion is not within specification, adjust the pinion bearing preload shim pack as necessary following the steps above.



44. If the rotating torque is within specifications, install the [J 8614-01](#) to the pinion yoke.
45. Remove the pinion nut while holding the [J 8614-01](#).
46. Remove the washer.



47. Install the J 8614-2 (2) and the J 8614-3 (3) into the [J 8614-01](#) (1) as shown.
48. Remove the pinion yoke by turning the J 8614-3 (3) clockwise while holding the [J 8614-01](#) (1).



49. Install the new pinion oil seal using the [J 45710](#).
50. Seat the pinion yoke onto the pinion shaft by tapping it with a soft-faced hammer until a few pinion shaft threads show through the yoke.
51. Install the washer.
52. Install the new pinion yoke nut and tighten to **339 N·m (250 lb ft)**.
53. Measure the rotating torque of the drive pinion using an inch-pound torque wrench.

Specification

The rotating torque of the drive pinion should be between 2.3-5.1 N·m (20-45 lb in).

Pinion Marking Table

Pinion Marking	Increase / Decrease the Distance Between Ring Gear Marking And Pinion Head	Increase / Decrease the Shim Pack Thickness
Positive (+)	Must Increase	Decrease
Negative (-)	Must Decrease	Increase
Zero (0)	OK	Use Nominal Setting

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Differential Carrier Bearing Preload Adjustment (8.6 Inch Axle)

Wedge Method

Special Tools

- J 25588 Side Bearing Shim Installer
- J 22779 Side Bearing Backlash Gage

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](#).

Note: Record the measurement for re-assembly.

2. Using an inch pound torque wrench, measure the rotating torque of the drive pinion, it should be **1.7-3.4 N·m (15-30 lb in)** for new bearings or **1.1-2.3 N·m (10-20 lb in)** for used bearings.
3. If the rotating torque for the drive pinion bearings is not within specifications, adjust as necessary. Refer to [Drive Pinion and Ring Gear Replacement](#).

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

4. Install the differential assembly with the differential side bearings and differential side bearing cups into the axle housing.
5. Insert one 4.318 mm (0.170 in) thick service spacer into the left side of the axle housing.
6. Side the differential assembly towards the service spacer in order to hold the spacer in place.

Note: The J 22779 gage must be installed between the service spacer and the differential side bearing cup.

7. Install the J 22779 gage into the right side of the axle housing.

Note: Over-tightening of the J 22779 gage may spread the housing and result in incorrect shim selection.

8. Tighten the knob on the J 25588 installer until there is moderate drag when the J 22779 gage is moved.
9. Remove the J 22779 gage .
10. Remove the service spacer.

Note: Record the measurement.

11. Using a micrometer, measure the thickness of the service spacer.

Note: Record the measurement.

12. Using a micrometer, measure the thickness of the J 22779 gage in 3 locations. Calculate the average of the 3 measurements.
13. Add the thickness of the service spacer, measured in step 11 to the average thickness of the J 22779 gage , measured in step 12. The resulting value is the total service shim thickness without preload for the axle.
14. Insert one BENT 1.016 mm (0.040 in) service shim between the right side differential side bearing cup and the axle housing. The service shim must be installed between the service spacer and the differential side bearing cup.
15. Install the J 22779 gage into the left side of the axle housing. The J 22779 gage must be installed between the service spacer and the differential side bearing cup.
16. While rotating the ring gear back and forth, tighten the knob on the J 22779 gage until there is approximately **0.025-0.051 mm (0.001-0.002 in)** of backlash between the ring gear and the drive pinion.
17. Once the correct amount of backlash is obtained, remove the J 22779 gage .
18. Remove the differential assembly with the differential side bearings and the differential side bearing cups.
19. Remove the BENT service shim.
20. Using a micrometer, measure the thickness of the J 22779 gage in 3 locations. Calculate the average of the 3 measurements. This value is the left side service shim thickness without preload.
21. In order to determine the right side service shim thickness, subtract the service shim thickness for the left side of the axle, calculated in step 20, from the total service shim thickness, calculated in step 13. This value is the service shim thickness for the right side of the axle without preload.
22. In order to preload of the differential side bearings and set the backlash to approximately **0.127-0.223 mm (0.005-0.009 in)** , take the value determined in step 21 and add **0.203 mm (0.008 in)** service shim thickness to this amount.
23. Assemble the left side shim pack using one **4.318 mm (0.170 in)** service spacer and the appropriate amount of service shims equaling the thickness determined in step 20. Measure the service spacer and the service shims separately. Add the measurements together in order to determine the total shim pack thickness.
24. Assemble the right side shim pack using one **4.318 mm (0.170 in)** service spacer and the appropriate amount of service shims equaling the thickness determined in step 22. Measure the service spacer and the service shims separately. Add the measurements together in order to determine the total shim pack thickness.
25. Install the differential assembly with the differential side bearings and the differential side bearing cups.
26. Install the left side service spacer and service shim into the axle housing. The service shim must be installed between the service spacer and the differential side bearing cup.
27. Install the right side service spacer between the axle housing and the differential side bearing cup.
28. Install the right side service shim into the axle housing using the J 25588 installer , if necessary. The service shim must be installed between the service spacer and the differential side bearing cup.

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

29. Install the differential bearing caps and the bolts and tighten to **75 N·m (55 lb ft)**.
30. Rotate the pinion several times to ensure the drive pinion and differential side bearings have seated.

Note: Record the measurement.

31. Using an inch pound torque wrench, measure the rotating torque of the drive pinion and differential side bearings which should be **0.57-1.13 N·m (5-10 lb in)** greater than the rotating torque of the drive pinion measured earlier.
32. Calculate the differential side bearing preload by subtracting the drive pinion preload, measured in step 2, from the drive pinion and differential case bearing preload, measured in step 31. Multiply the value obtained by the axle ratio. The differential side bearing preload should be **1.7-4.0 N·m (15-35 lb in)**.
33. 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.
34. Once the differential side bearing preload is correct, measure the backlash and adjust, if necessary. Refer to [Backlash Adjustment](#).
35. 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](#).

Shim Method

Special Tools

J 25588 Side Bearing Shim Installer

Note:

- The differential side bearings must have preload 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 service 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 service spacers instead.

1. Install the drive pinion, if necessary. Refer to [Drive Pinion and Ring Gear Replacement](#).

Note: Record the measurement.

2. Using an inch pound torque wrench, measure the rotating torque of the drive pinion which should be **1.7-3.4 N·m (15-30 lb in)** for new bearings or **1.1-2.3 N·m (10-20 lb in)** for used bearings.
3. If the rotating torque for the drive pinion bearings is not within specifications, adjust as necessary. Refer to [Drive Pinion and Ring Gear Replacement](#).

Note: Before installation of the case 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.

4. Install the differential assembly with the differential side bearings and bearing cups into the axle housing.
5. Insert one BENT **1.016 mm (0.040 in)** thick service shim into the right side axle housing. Side the differential assembly towards the bent service shim in order to hold the shim in place.
6. While holding the differential assembly against the bent service shim, install one **4.318 mm (0.170 in)** thick service spacer into the left side axle housing.
7. Move the differential assembly to the right until the ring gear contacts the drive pinion. Once the ring gear contacts the drive pinion, continue to move the ring gear towards the drive pinion to until all backlash is removed.
8. While holding the ring gear against the drive pinion, insert progressively larger service shims between the service spacer and the differential side bearing cup until a moderate resistance can be felt.
9. Once the largest service shim has been determined, measure the thickness of the shim using a micrometer. Measure the service shim in 3 locations. Calculate the average of the 3 measurements. Use the average as the thickness for the shim. Record the measurement.
10. Install the service shim that was just measured back into the left side of the axle housing. The service shim must be installed between the service spacer and the differential side bearing cup.
11. Remove the BENT shim from the right side of the axle housing.
12. Insert one **4.318 mm (0.170 in)** thick service spacer into the right side axle housing.
13. Move the differential assembly towards the left side of the axle housing. While holding the differential assembly against the left side shim pack, insert progressively larger service shims between the service spacer and the differential side bearing cup until a moderate resistance can be felt.
14. Once the largest service shim has been determined, measure the thickness of the shim using a micrometer. Verify the thickness of the service shim. Measure the service shim in 3 locations. Calculate the average of the 3 measurements. Use the average as the thickness for the shim. Record the measurement.
15. In order to preload the differential side bearing and set the initial backlash to approximately **0.127 mm (0.005 in)**, adjust the thickness of left and right side shims by doing the following:
 - 15.1. Subtract **0.152 mm (0.006 in)** from the measurement recorded for the left side shim in step 9. Record the measurement.
 - 15.2. Add **0.356 mm (0.014 in)** to the measurement recorded for the right side shim in step 14.

Note: Using a micrometer, verify the thickness of the service shim. Measure the service shim in 3 locations.

16. Select the correct service shim thickness for each side corresponding to the measurements determined above. Calculate the average of the 3 measurements. Use the average as the thickness for the shim.

Note: The service shim must be installed between the service spacer and the differential side bearing cup.

17. Install the left side service shim into the axle housing.
18. Move the differential assembly towards the left side of the axle housing.

Note: The service shim must be installed between the service spacer and the differential side

bearing cup

19. Using the J 25588 installer , install the right side service shim into the axle housing..

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

20. Install the differential bearing caps and bolts and tighten to **75 N·m (55 lb ft)**.
21. Rotate the pinion several times to ensure the bearings have seated.
22. Using an inch-pound torque wrench, measure the rotating torque of drive pinion and differential case side bearings which should be **0.57-1.13 N·m (5-10 lb in)** greater than the rotating torque of the drive pinion measured earlier.
23. Calculate the differential side bearing preload by subtracting the drive pinion preload, measured in Step 2, from the drive pinion and the differential case bearing preload, measured in Step 23. Multiply the value obtained by the axle ratio. The differential side bearing preload should be **1.7-4.0 N·m (15-35 lb in)**.
24. 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.
25. Once the differential side bearing preload is within specifications, measure the backlash between the ring gear and the drive pinion and adjust, if necessary. Refer to [Backlash Adjustment](#).
26. Once backlash and differential side bearing preload is within specifications, 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](#).

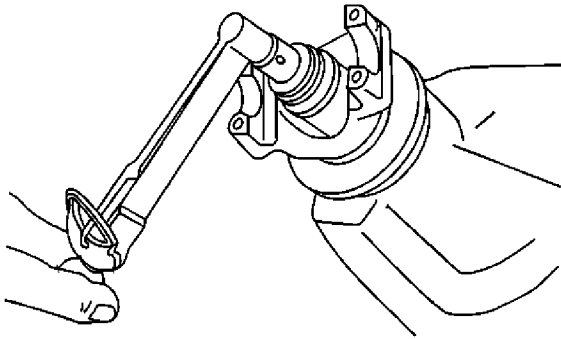
Differential Carrier Bearing Preload Adjustment (9.75, 10.5 and 10.75 Inch Axle)

Special Tools

[J 24429](#) Side Bearing Backlash Spanner

Note: The rotating torque of the drive pinion must be within specifications before the differential case assembly can be installed.

1. Install the drive pinion, if necessary. Refer to [Drive Pinion and Ring Gear Replacement](#).



2. Measure the rotating torque of the drive pinion using an inch-pound torque wrench.

Specification

The rotating torque of the drive pinion should be 2.3-5.1 N·m (20-45 lb in).

3. Record the measurement.
4. Install the differential side bearings, if necessary. Refer to [Differential Side Bearings Replacement](#).
5. Install the differential side bearing adjusters.

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

If the differential case assembly cannot be installed, turn the differential side bearing adjuster into the axle housing until the proper clearance can be obtained.

6. Install the differential assembly.

7. Install the differential bearing caps.
8. Install the differential bearing cap bolts.

Note: In the following service procedure, DO NOT torque the differential bearing cap bolts, only finger tighten them.

9. Install the differential bearing cap bolts.

Note: DO NOT FORCE the ring gear into contact with the drive pinion.

10. Slide the differential case assembly towards the right side axle housing until the ring gear contacts the drive pinion. This is the ZERO backlash point.

Note: If the ZERO backlash cannot be obtained, turn the right side differential bearing adjuster in towards the axle housing until the ring gear fully contacts the pinion to obtain the ZERO backlash.

11. Check for ZERO backlash.
12. While holding the ring gear against the pinion, turn the left differential bearing adjuster out from the axle housing using the [J 24429](#) until it contacts the differential side bearing.
13. Turn the right differential bearing adjuster out from the axle housing using the [J 24429](#) until it contacts the differential side bearing.
14. Back off the left differential adjuster approximately 2 slots using the [J 24429](#) in order to obtain the initial backlash adjustment.
15. Using the [J 24429](#) , tighten the right differential bearing adjuster until the differential case is in contact with the left differential adjuster.
16. Using the [J 24429](#) , tighten the left and the right differential bearing adjuster one additional slot.
17. Rotate the pinion several times in order to seat the bearings.
18. Measure the drive pinion and differential case side bearing preload using an inch-pound torque wrench.

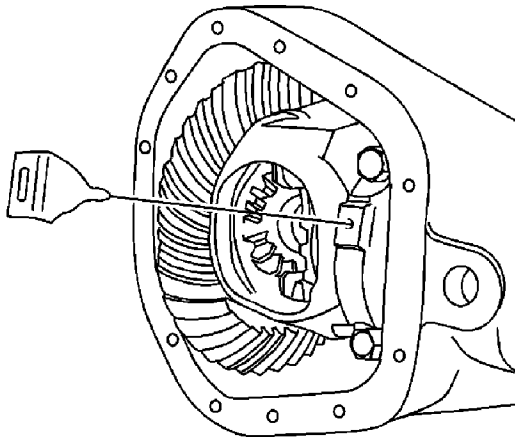
Specification

The rotating torque of the drive pinion and differential case bearings should be 4.0-6.4 N·m (35-57 lb in).

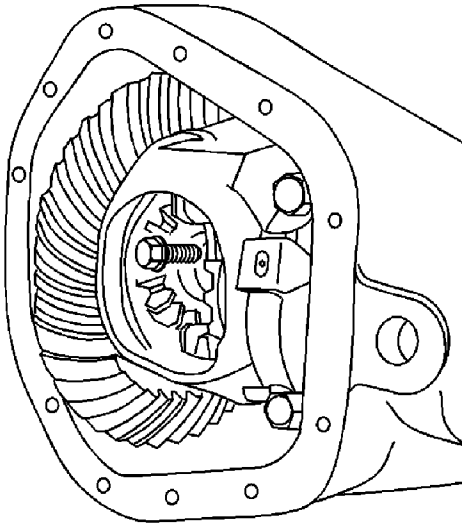
19. If the rotating torque of the drive pinion and differential case is less than 4.0 N·m (35 lb in), continue tighten the left and the right differential side bearing adjuster one slot at a time using the [J 24429](#) until correct rotating torque is obtained.
20. If the rotating torque of the drive pinion and differential case is greater than 6.4 N·m (57 lb in), loosen the left and the right differential side bearing adjuster one slot at a time using the [J 24429](#) until correct rotating torque is obtained.
21. Measure the drive pinion to ring gear backlash and adjust, if necessary. Refer to [Backlash Adjustment](#).
22. Once the backlash is within specifications, measure the rotating torque of the drive pinion to verify that the rotating torque of the drive pinion and differential case is within specifications. If the rotating torque of the drive pinion and differential case is not within specifications, adjust the differential side bearing preload following the steps above. It may be necessary to repeat the differential side bearing preload and backlash adjustment procedures several times until both are within specifications.

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

23. Tighten the differential bearing cap bolts to **109 N·m (80 lb ft)**.



24. Install the differential bearing adjuster locks.



25. Install the differential bearing adjuster lock bolts and tighten to **13 N·m (10 lb ft)**.

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Wheel Bearing Adjustment

Preliminary Inspection

Note: Ensure the brakes are fully released and do not drag.

Pull or push the tire at the top back and forth in order to test the wheel bearing play.

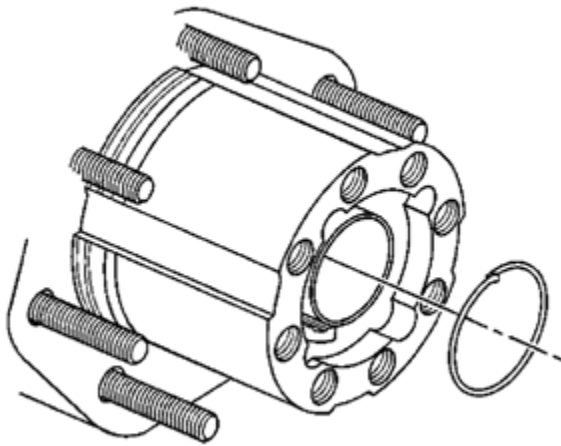
- Use a pry bar under the tire as an alternative.
- If the wheel bearing adjustment is correct, the movement will be barely noticeable.
- If the movement is excessive, adjust the bearings.

Adjustment Procedure

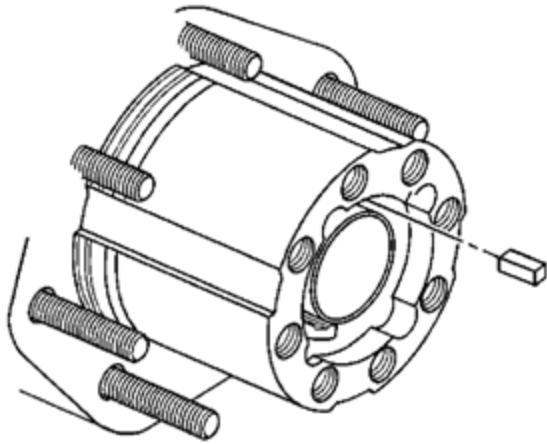
Special Tools

[J 2222-C](#) Wheel Bearing Nut Wrench

1. Raise the vehicle. Refer to [Lifting and Jacking the Vehicle](#).
2. Remove the axle shaft. Refer to [Rear Axle Shaft and/or Gasket Replacement](#).

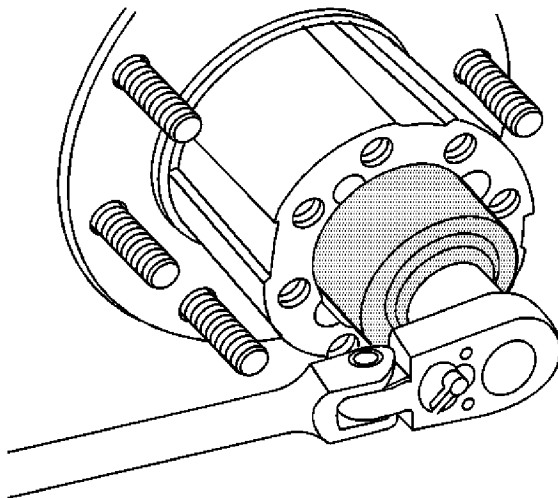


3. Remove the hub adjuster nut retaining ring.



4. Remove the adjuster nut lock key.

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



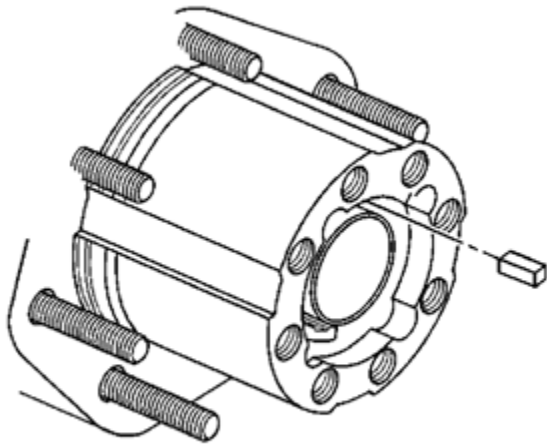
5. Tighten the wheel bearing adjusting nut using the [J 2222-C](#).

Rotate the hub in the opposite direction to the way the adjuster nut is turning.

Ensure the inner bearing and the seal seats against the spindle shoulder and tighten the adjusting nut to **70 N·m (52 lb ft)**.

6. Turn the adjusting nut counterclockwise until the nut is loose using the [J 2222-C](#).

7. Turn the adjusting nut clockwise until the nut contacts the bearing cone. Torque on the nut must be zero to finger tight.

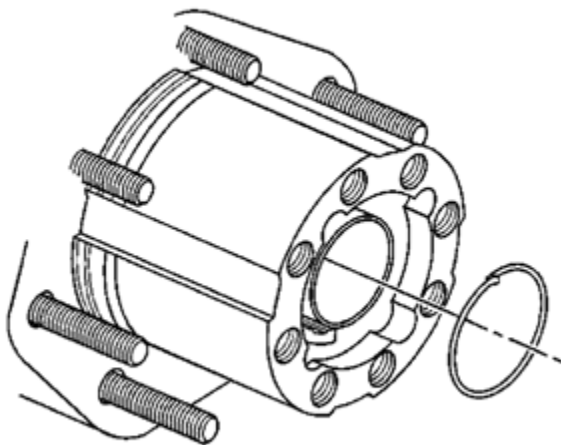


8. Insert the adjusting nut lock key into the keyway using one of the following procedures:

- If the adjusting nut slot is in alignment with the keyway in the axle spindle, insert the adjusting nut lock key into the keyway in the axle spindle.

Note: Do not turn the adjusting nut more than one slot counterclockwise in order to align the adjusting nut slot with the keyway in the axle spindle.

- If the adjusting nut slot is not aligned with the keyway in the axle spindle, turn the adjusting nut counterclockwise until the adjusting nut slot is in alignment with the keyway in the axle spindle and insert the adjusting nut lock key.





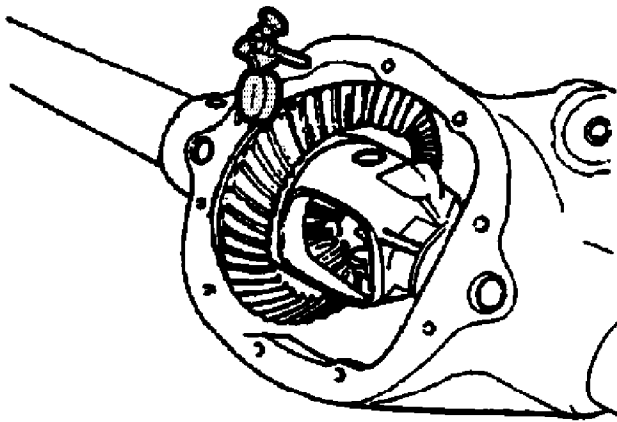
9. Install the retaining ring.
10. Install the axle shaft. Refer to [Rear Axle Shaft and/or Gasket Replacement](#).
11. Inspect the lubricant level and add, if necessary. Refer to [Rear Axle Lubricant Level Inspection](#).
12. Lower the vehicle.

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Backlash Adjustment (8.6 Inch Axle)

Special Tools

- [J 8001](#) Dial Indicator Set
- [J 25025](#) Guide Pins
- [J 25588](#) Side Bearing Shim Installer



1. Install the [J 25025-1](#) and the [J 8001](#) to the axle housing as shown.
2. Place the indicator stem of the [J 8001-3](#) at the heel end of a gear tooth.
3. Set the [J 8001-3](#) 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](#).

Align the needle and the dial face of the [J 8001-3](#) 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),

- Burrs
 - A distorted case flange
 - Uneven bolting
8. 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 differential 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).
9. If the backlash is too small, increase the backlash using the following procedure:
- 9.1. Remove the differential bearing cap bolts and the differential bearing caps.
- Mark the differential bearing caps left or right.
- 9.2. Remove the differential assembly with the differential bearing cups and the shims.
- Mark the differential bearing cups and the shims left or right.
- 9.3. 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.
- 9.4. 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.
- 9.5. 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.
- 9.6. Measure the thickness of right side shim pack.
- Measure the shim or the shim and service spacer in 3 locations.
- Measure each shim separately.

9.7. 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.

9.8. 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.

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

10.1. Remove the differential bearing cap bolts and the differential bearing caps.

Mark the differential bearing caps left or right.

10.2. Remove the differential assembly with the differential bearing cups and the shims.

Mark the differential bearing cups and the shims left or right.

10.3. 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.

10.4. 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.

10.5. 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.

10.6. Measure the thickness of right side shim pack.

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

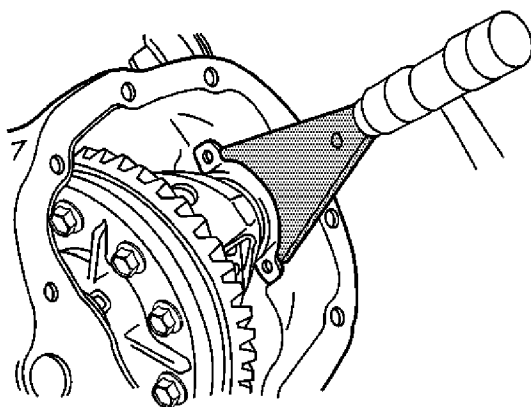
Measure each shim separately.

10.7. 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.

- 10.8. 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.
11. Install the differential assembly with the differential bearing cups.
12. Install the left side service spacer between the axle housing and the differential case.
13. Install the right side service spacer between the axle housing and the differential case.



14. Install the left side service shim or shims using the [J 25588](#) , if necessary.

The service shim or shims must be installed between the service spacer and the differential bearing cup.

15. Install the right side service shim or shims using the [J 25588](#) , if necessary.

The service shim or shims must be installed between the service spacer and the differential bearing cup.

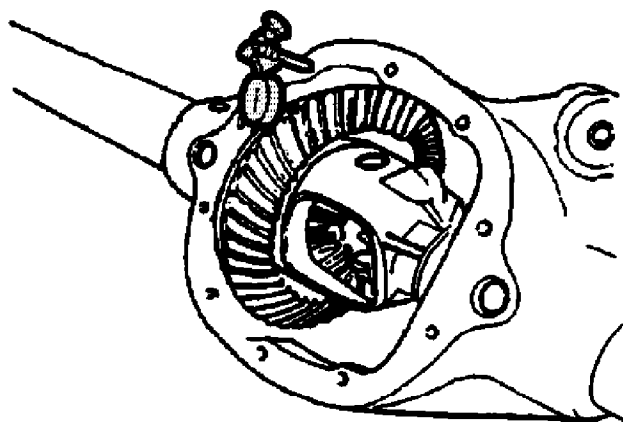
Caution: Refer to [Fastener Caution](#) in the Preface section.

16. Install the differential bearing caps and bolts and tighten to **75 N·m (55 lb ft)**.
17. Recheck the backlash and adjust, if necessary.
18. 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](#).

Backlash Adjustment (9.75, 10.5 and 10.75 Inch Axles)

Special Tools

- [J 8001](#) Dial Indicator Set
- [J 24429](#) Side Bearing Backlash Spanner
- [J 25025](#) Guide Pins



1. Install the [J 25025-1](#) and the [J 8001](#) to the axle housing as shown.
2. Place the indicator stem of the [J 8001-3](#) at the heel end of a gear tooth.
3. Set the [J 8001-3](#) 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](#).

Align the needle and the dial face of the [J 8001-3](#) 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),

- Burrs
 - A distorted case flange
 - Uneven bolting
8. 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).

9. If the backlash is too small, increase the backlash by turning the left differential bearing adjuster in one slot and the right differential bearing adjuster out one slot using the [J 24429](#) until the correct backlash is obtained.
10. If the backlash is too large, decrease the backlash by turning the right differential bearing adjuster in one slot and the left differential bearing adjuster out one slot using the [J 24429](#) until the correct backlash is obtained.
11. Recheck the backlash following the steps above to verify that the backlash is within specifications.

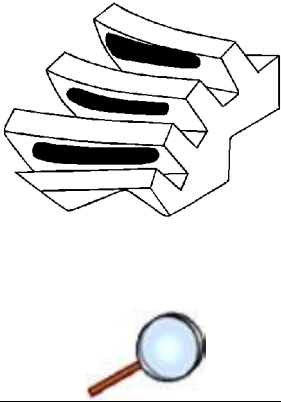
Caution: Refer to [Fastener Caution](#) in the Preface section.

12. Tighten the differential bearing caps and bolts to **109 N·m (80 lb ft)**.
13. Recheck the backlash and adjust, if necessary.
14. 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](#).

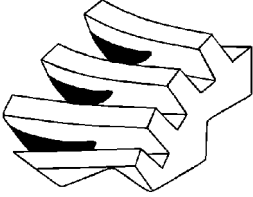
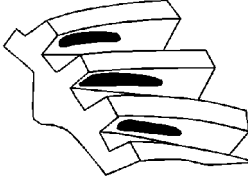
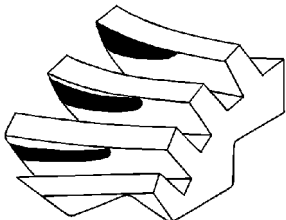
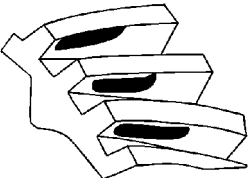
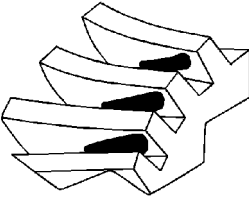
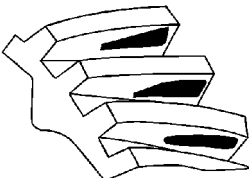
Gear Tooth Contact Pattern Inspection

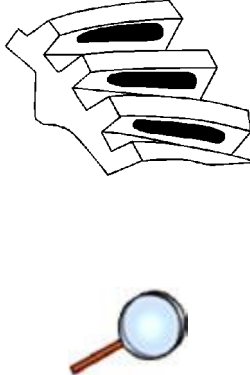
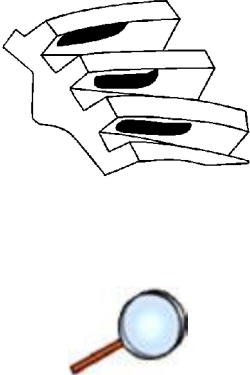
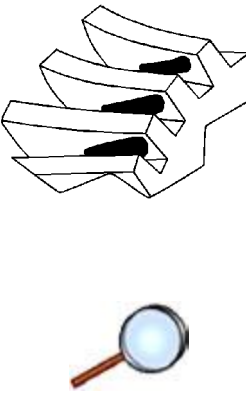
Table 1: [Pattern Evaluation \(Ring Gear\)](#)

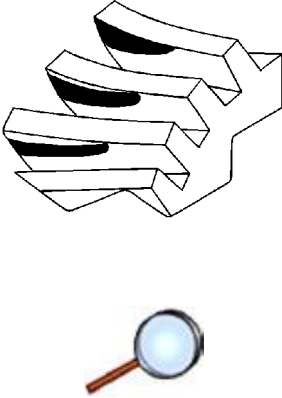
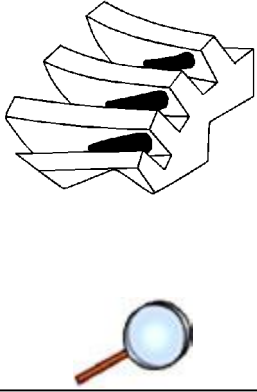
Pattern Evaluation (Ring Gear)

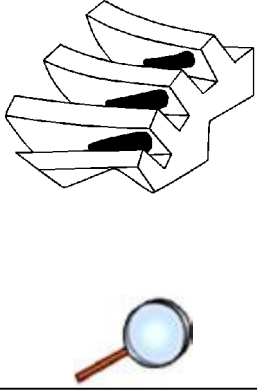
Drive Side Heel Toe	Coast Side Toe Heel	Pattern Condition	Corrective Action
- If the pinion depth needs to be adjusted, refer to Pinion Depth Adjustment. - If the backlash needs to be adjusted, refer to Backlash Adjustment. - For the ring gear to pinion gear wear pattern test and the proper identification of the 2-Cut and 5-Cut, refer to Differential Drive Pinion Gear and Ring Gear Description and Operation.			
		Drive Side Centered - Coast Side Centered	No correction required.
<i>Drive Pinion Issue - 2-Cut Gearset</i>			
		Drive Side Low Heel Contact - Coast Side High Heel Contact	- Inspect the backlash to ensure that it is approximately 0.08-0.13 mm (0.003-0.005 in) - If backlash is correct, move the drive pinion closer to the ring gear by increasing the thickness of the pinion shim on a one-piece axle housing or by decreasing the thickness of the pinion shim on the 10.5 inch two-piece axle housing.
			Inspect the backlash to ensure that it is approximately 0.08-0.13 mm (0.003-

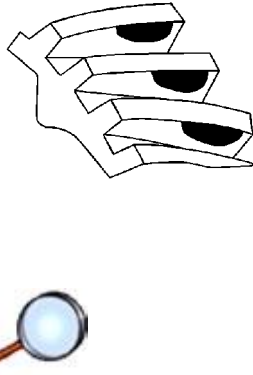
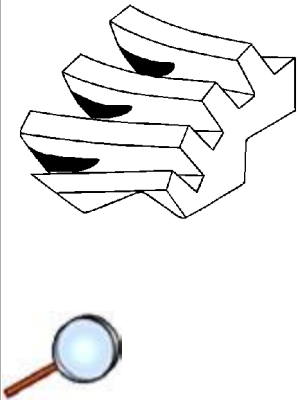
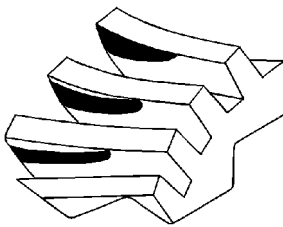
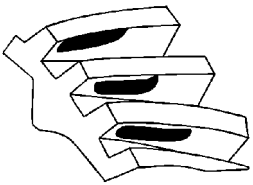
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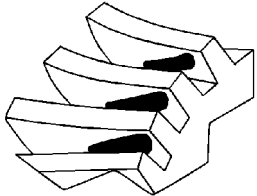
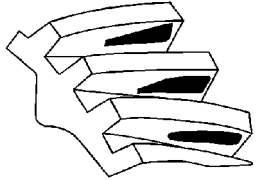
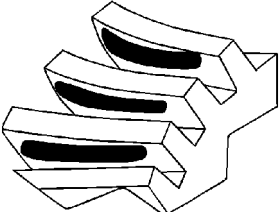
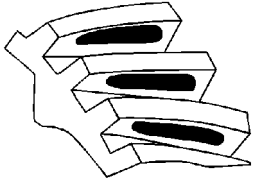
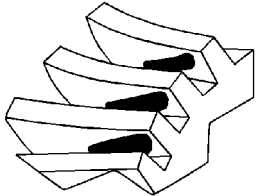
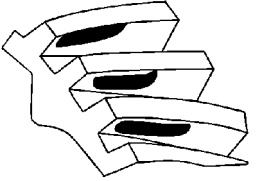
 	 	Drive Side Low Heel Contact - Coast Side Low Toe Contact	0.005 in) 2. If backlash is correct, move the drive pinion away from the ring gear by decreasing the thickness of the pinion shim on a one-piece axle housing or by increasing the thickness of the pinion shim on the 10.5 inch two-piece axle housing.
<i>Backlash Issue</i>			
 	 	Drive Side High Heel Contact - Coast Side High Toe Contact	Backlash incorrect. The ring gear is too far away from the drive pinion. Inspect and adjust the backlash as necessary to ensure that it is approximately 0.08-0.13 mm (0.003-0.005 in).
 	 	Drive Side Low Toe Contact - Coast Side Low Heel Contact	Backlash incorrect. The ring gear is too close to the drive pinion. Inspect and adjust the backlash as necessary to ensure that it is approximately 0.08-0.13 mm (0.003-0.005 in).
		Drive Side Centered - Coast Side Centered	No correction required.

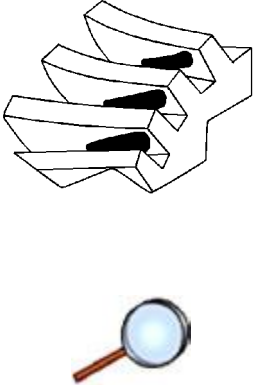
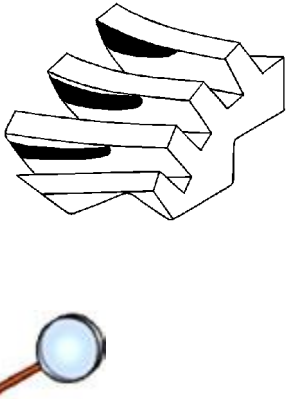
			
<i>Drive Pinion Issue - 5-Cut Gearset</i>			
		Drive Side High and Slightly Heel Contact - Coast Side High and Slightly Toe Contact	1. Inspect the backlash to ensure that it is approximately 0.08-0.13 mm (0.003-0.005 in) 2. If backlash is correct, move the drive pinion closer to the ring gear by increasing the thickness of the pinion shim on a one-piece axle housing or by decreasing the thickness of the pinion shim on the 10.5 inch two-piece axle housing.
		Drive Side Low and Slightly Heel Contact - Coast Side High and Slightly Toe Contact	1. Inspect the backlash to ensure that it is approximately 0.08-0.13 mm (0.003-0.005 in) 2. If backlash is correct, move the drive pinion away from the ring gear by decreasing the thickness of the pinion shim on a one-piece axle housing or by increasing the thickness of the pinion shim on the 10.5 inch two-piece axle housing.
<i>Backlash Issue</i>			

		Drive Side Heel Contact - Coast Side Toe Contact	Backlash incorrect. The ring gear is too far away from the drive pinion. Inspect and adjust the backlash as necessary to ensure that it is approximately 0.08-0.13 mm (0.003-0.005 in).
		Drive Side Toe Contact - Coast Side Heel Contact	Backlash incorrect. The ring gear is too close to the drive pinion. Inspect and adjust the backlash as necessary to ensure that it is approximately 0.08-0.13 mm (0.003-0.005 in).

Drive Side Heel Toe	Pattern Condition	Coast Side Toe Heel	Pattern Condition	Corrective Action
<i>Face Hobbing</i>				
	Toe Contact		Heel Contact	Pinion shim correct. Increase backlash.
	Desirable Pattern -		Desirable Pattern -	

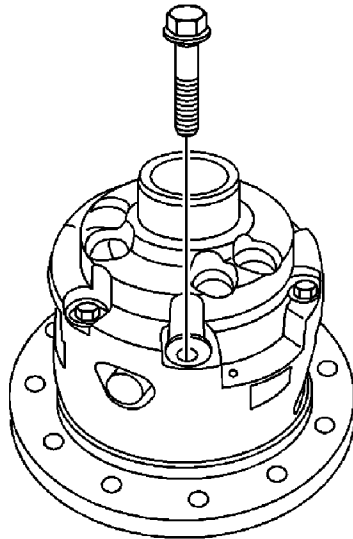
	Drive pattern should be centered on tooth		Coast pattern should be center to slightly toe on tooth	No correction required.
	Top Toe Contact		Top Heel Contact	Backlash correct. Increase in pinion shim.
	Root Heel Contact		Root Toe Contact	Backlash correct. Decrease in pinion shim.
	Top Heel Contact		Top Toe Contact	Pinion shim correct. Decrease backlash.

				
	Root Toe Contact		Root Heel Contact	Pinion shim correct. Increase backlash.
				
<i>Face Milling</i>				
	Desirable Pattern - Drive pattern should be centered on tooth		Desirable Pattern - Coast pattern should be center to slightly toe on tooth	No correction required.
				
	Top and Slightly Heel Contact		Top and Slightly Toe Contact	Backlash correct. Increase in pinion shim.
				

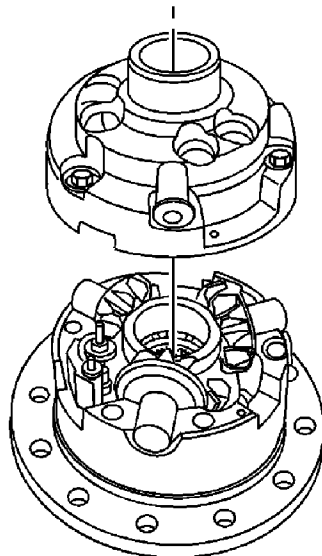
	Root and Slightly Toe Contact		Root and Slightly Heel Contact	Backlash correct. Decrease in pinion shim.
	Heel Contact		Toe Contact	Pinion shim correct. Decrease backlash.

Locking Differential Disassemble (10.5 Inch Axle)

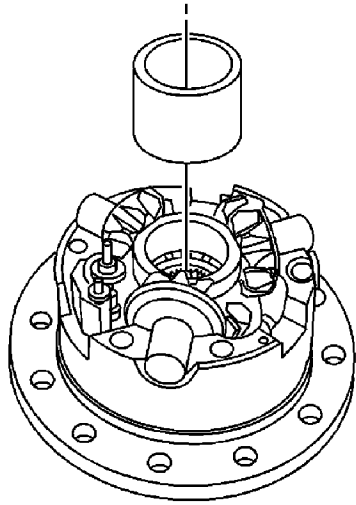
1. Remove the differential assembly. Refer to [Differential Replacement](#).
2. Remove the ring gear. Refer to [Drive Pinion and Ring Gear Replacement](#).
3. Remove the differential side bearings. Refer to [Differential Side Bearings Replacement](#).



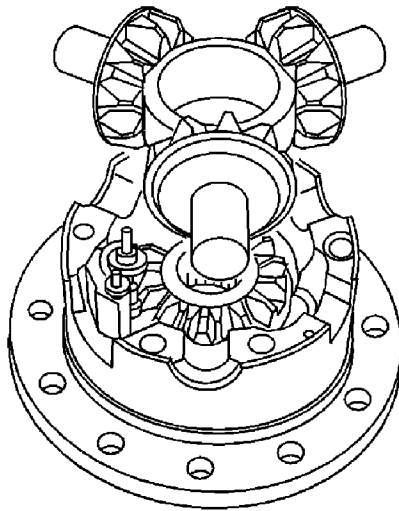
4. Remove the differential case bolts.



5. Separate the case halves by performing the following steps:
 - 5.1. Pry the case halves apart at the yoke hole location.
 - 5.2. Hold the differential side gear and clutch plate assembly in the right side case half.



6. Remove the thrust block.

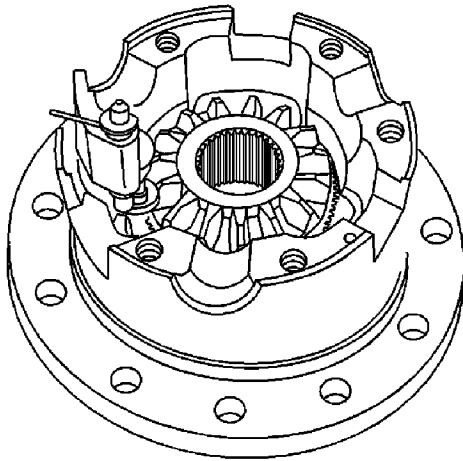


7. Remove the following components from the differential case:

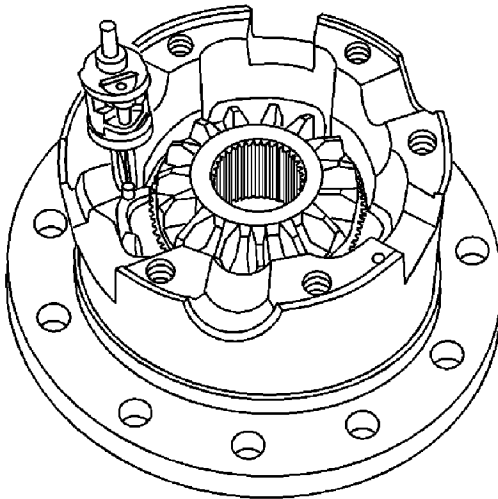
- The locking differential spider
- The differential pinion gears
- The differential pinion gear thrust washers

8. Mark the differential spider, the differential pinion gears and the differential pinion gears accordingly in order to re-assemble the components correctly into the differential case.

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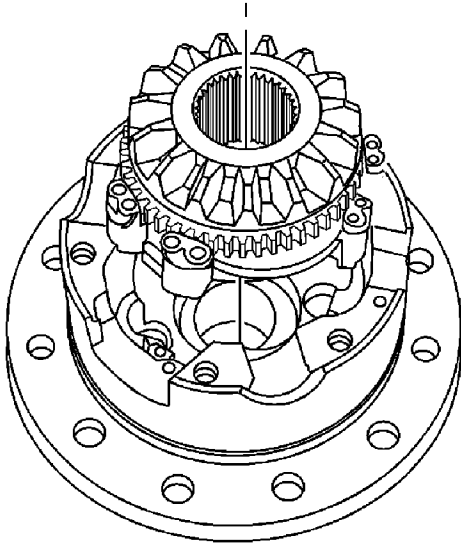


9. Remove the latching bracket.

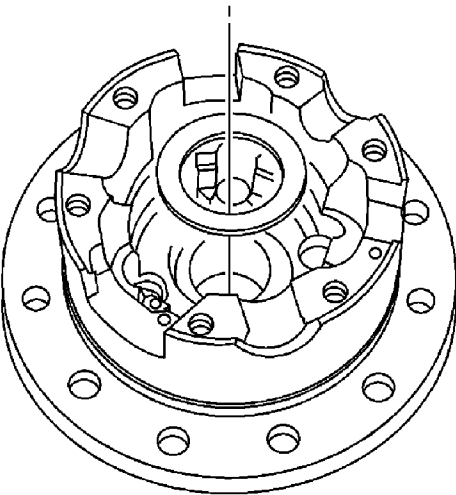


10. Remove the governor assembly.

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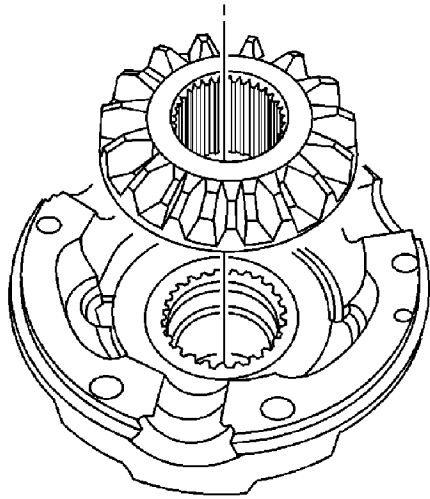


11. Remove the locking differential cam unit and clutch disc assembly.

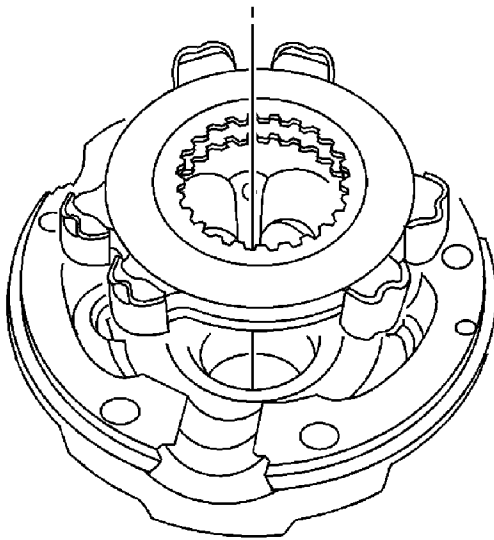


12. Remove the locking differential side gear shim.

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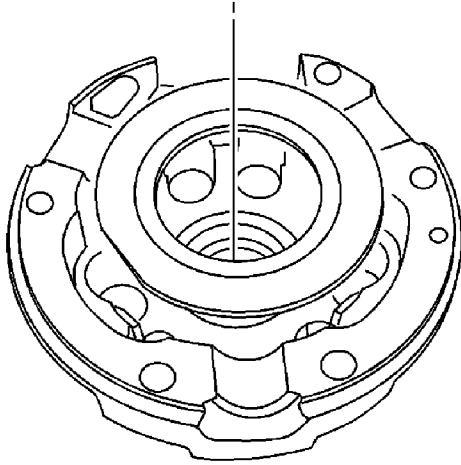


13. Remove the right side differential side gear.



14. Remove the right side differential side gear clutch disc assembly.

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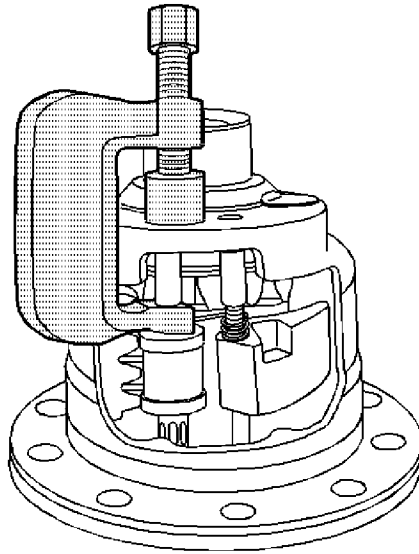
15. Remove the right side differential side gear thrust washer.
16. Disassemble the differential side gear and clutch disc assembly. Refer to [Locking Differential Clutch Disc Assembly Disassemble](#).
17. Disassemble the locking differential cam unit and clutch disc assembly. Refer to [Locking Differential Cam Unit Disassemble](#).

Locking Differential Disassemble (8.6 Inch, 9.75 Inch Axles)

Tools Required

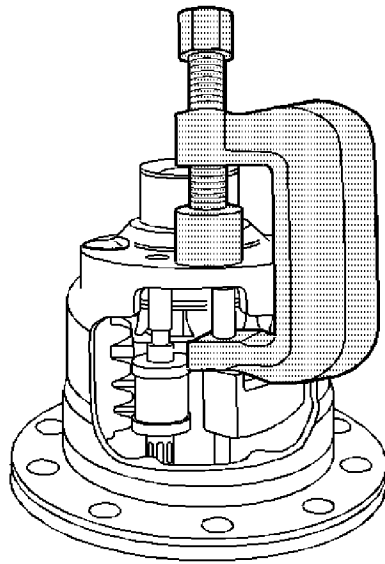
[J 26252](#) Locking Differential Governor Remover

1. Remove the differential assembly. Refer to [Differential Replacement](#).
2. Remove the ring gear. Refer to [Drive Pinion and Ring Gear Replacement](#).
3. Remove the differential side bearings. Refer to [Differential Side Bearings Replacement](#).



4. Remove the governor bushing using the [J 26252](#).
5. 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.



6. Remove the latching bracket assembly bushing using the [J 26252](#) .

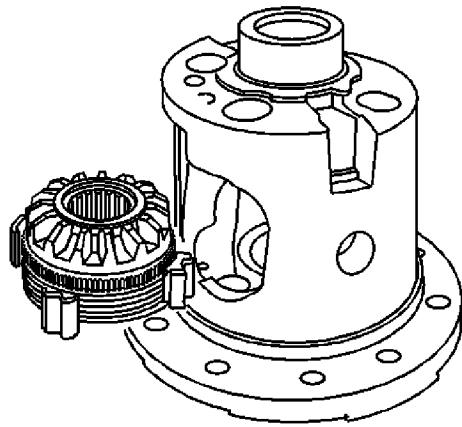
To aid in the removal of the latching bracket assembly, turn the side gear as necessary to position the latching bracket assembly between two of the side gear teeth.

7. Remove the pinion shaft lock bolt.
8. Remove the pinion shaft.
9. Remove the differential pinion gears and the thrust washers.

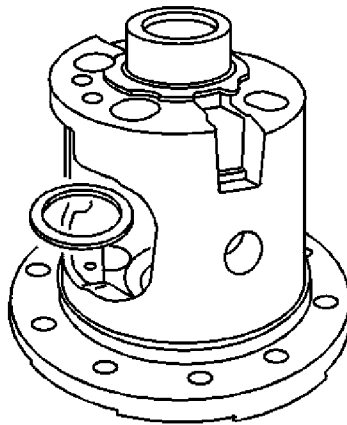
Rotate the pinion gears and roll the pinion gears and the thrust washers out of the case through the differential window.

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

10. Remove the thrust block.
11. Remove the right side gear and clutch discs assembly.
12. Remove the right side shim.



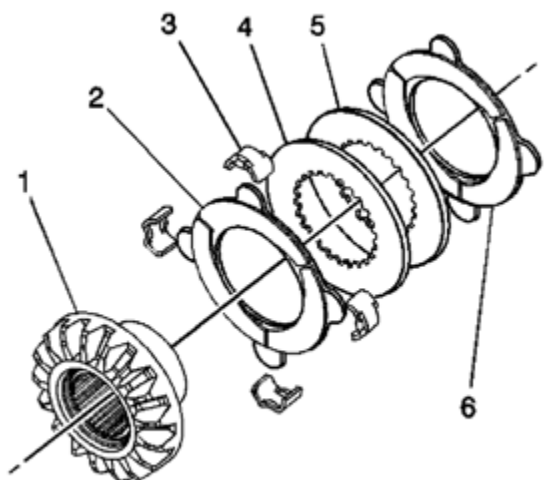
13. Remove the left side gear cam unit and clutch disc assembly.



14. Remove the left side gear thrust washer.
15. Disassemble the differential side gear and clutch disc assembly. Refer to [Locking Differential Clutch Disc Assembly Disassemble](#) .
16. Disassemble the locking differential cam unit and clutch disc assembly. Refer to [Locking Differential Cam Unit Disassemble](#) .

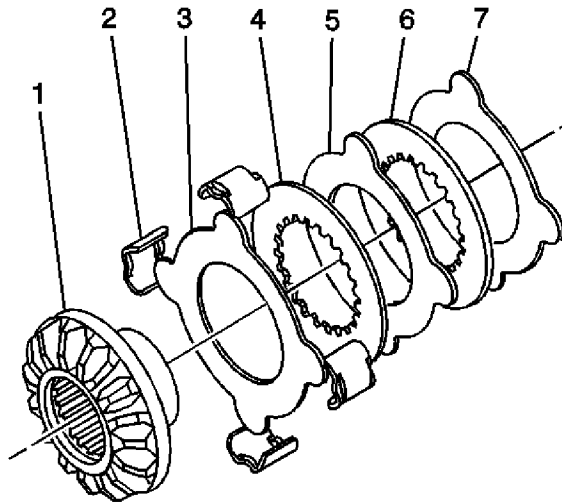
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Locking Differential Clutch Disc Assembly Disassemble (8.6 Inch Axle)



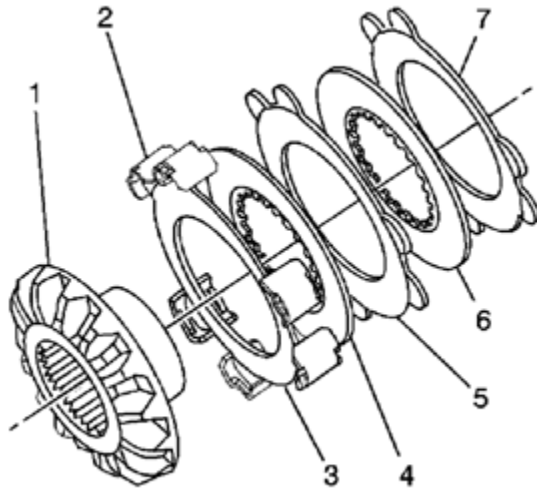
1. Remove the guide clips (3).
2. Remove the clutch discs and the splined discs (2, 4-6) from the locking differential side gear (1).

Locking Differential Clutch Disc Assembly Disassemble (9.75 Inch Axle)



1. Remove the guide clips (2).
2. Remove the clutch discs and the splined discs (3-7) from the locking differential side gear (1).

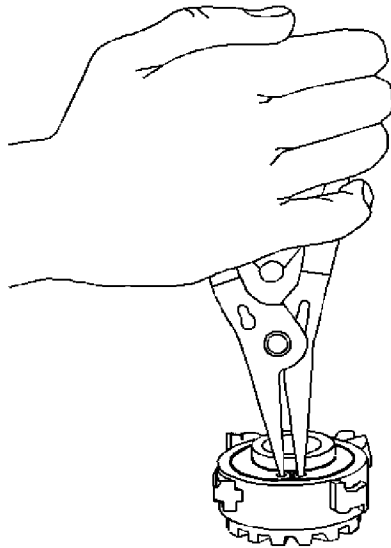
Locking Differential Clutch Disc Assembly Disassemble (10.5 Inch Axle)



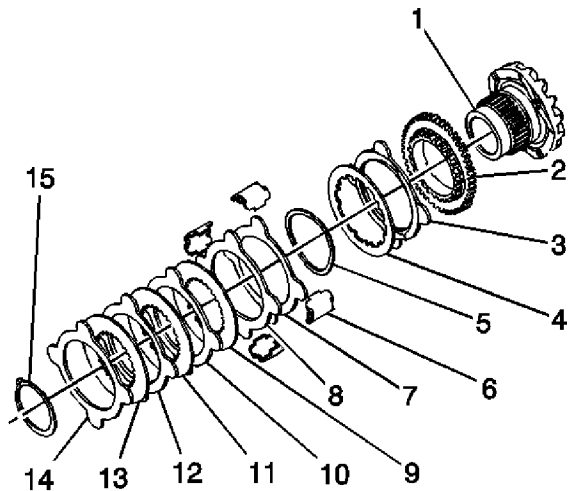
1. Remove the guide clips (2).
2. Remove the clutch discs and the splined discs (3-7) from the locking differential side gear (1).

Locking Differential Cam Unit Disassemble (8.6 Inch Axle)

1. Remove the guide clips.



2. Remove the retaining ring.



3. Disassemble the locking differential side gear cam unit and clutch disc assembly as follows:
 - 3.1. Remove the clutch discs and the splined discs (7-14).
 - 3.2. Remove the wave washer (5).
 - 3.3. Remove the fuse disc (4).

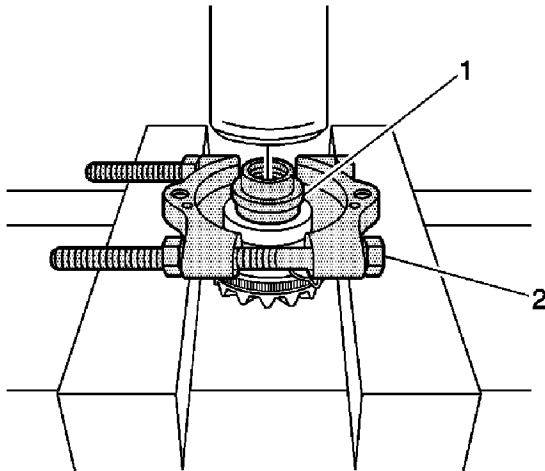
- 3.4. Remove the carbon eared disc (3).
- 3.5. Disassemble the cam plate (2) from the cam side gear (1).

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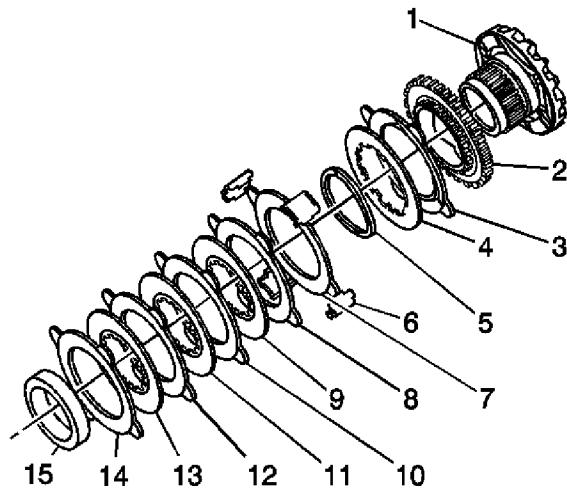
Locking Differential Cam Unit Disassemble (9.75 Inch Axle)

Tools Required

- [J 22912-O1](#) Split Plate Bearing Remover
 - [J 45232](#) Differential Bearing Adjuster Needle Bearing Installer - LH
1. Measure and record the overall length of the gear assembly from the front of the gear to the thrust sleeve, including the side gear thrust washer.
 2. Remove the guide clips.



3. Remove the thrust sleeve using the [J 22912-O1](#) (2) and the [J 45232](#) (1), if necessary, and a hydraulic press.



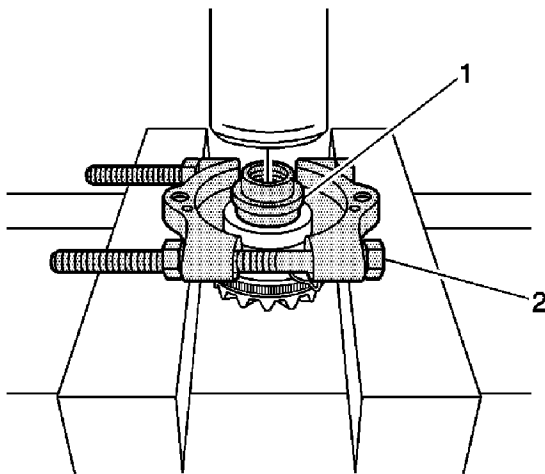
4. Disassemble the locking differential side gear cam unit and clutch disc assembly as follows:
 - 4.1. Remove the clutch discs and the splined discs (7-14).
 - 4.2. Remove the wave washer (5).
 - 4.3. Remove the fuse disc (4).
 - 4.4. Remove the carbon eared disc (3).
 - 4.5. Disassemble the cam plate (2) from the cam side gear (1).

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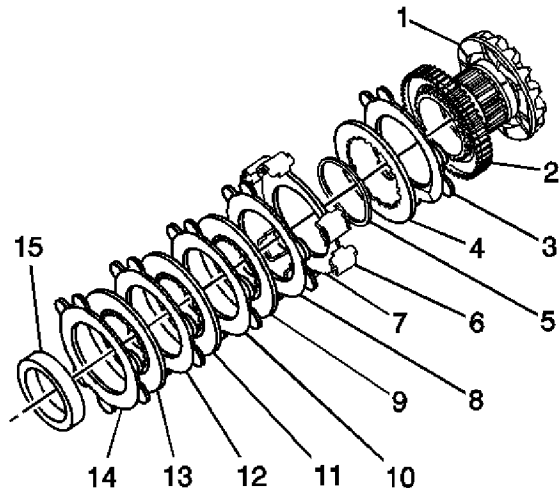
Locking Differential Cam Unit Disassemble (10.5 Inch Axle)

Tools Required

- [J 22912-O1](#) Split Plate Bearing Remover
 - [J 45232](#) Differential Bearing Adjuster Needle Bearing Installer - LH
1. Measure and record the overall length of the locking differential cam, side gear and clutch plate assembly from the front of the gear to the back of the thrust sleeve, including the locking differential clutch disc thrust washer.
 2. Remove the guide clips.



3. Remove the thrust sleeve using the [J 22912-O1](#) (2) and the [J 45232](#) (1), if necessary, and a hydraulic press.



4. Disassemble the locking differential side gear cam unit and clutch disc assembly as follows:
 - 4.1. Remove the clutch discs and the splined discs (7-14).
 - 4.2. Remove the wave washer (5).
 - 4.3. Remove the fuse disc (4).
 - 4.4. Remove the carbon eared disc (3).
 - 4.5. Disassemble the cam plate (2) from the cam side gear (1).

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Locking Differential Cleaning and Inspection

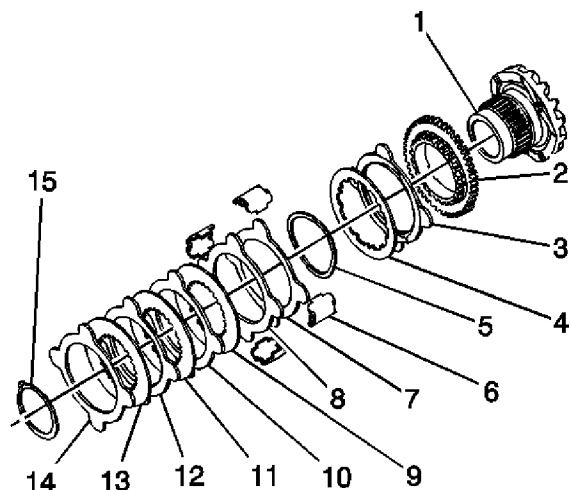
1. Clean all the parts with an approved solvent.
2. Visually inspect all the parts for excessive wear or breakage. Replace the parts if necessary.
3. Inspect the pinion gear and the side gear teeth for any the following conditions:
 - Wear
 - Cracks
 - Scoring
 - Spalling
4. Inspect the thrust washers for wear.
5. Inspect the fit of the side gears on the axle shafts.
6. Inspect the differential case for cracks and scoring.

Important: Do not replace the thrust sleeve unless it is necessary.

7. Inspect the thrust sleeve for excessive wear.
8. Inspect the side gear bore for scoring. If scoring is present, replace the entire differential.
9. Replace the differential assembly if the differential case is damaged.

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Locking Differential Cam Unit Assemble (8.6 Inch Axle)



1. Apply axle lubricant, GM P/N 12378261 (Canadian P/N 10953455) or equivalent meeting GM Specification 9986115, to the surface of each disc.
2. Assemble the left side or the flange-end side locking differential side gear cam unit and clutch disc assembly as follows:
 - 2.1. Install the cam plate (2) to the cam side gear (1).
 - 2.2. Install the carbon-faced eared disc (3).
 - 2.3. Install the fuse disc (4).
 - 2.4. Install the 1st non-carbon eared disc (7).
 - 2.5. Install the 2nd non-carbon eared disc (8).
 - 2.6. Install the wave washer (5).
 - 2.7. Install the 1st splined disc (9).
 - 2.8. Install the 3rd non-carbon eared disc (10).
 - 2.9. Install the 2nd splined disc (11).
 - 2.10. Install the 4th non-carbon eared disc (12).
 - 2.11. Install the 3rd splined disc (13).
 - 2.12. Install the 5th non-carbon eared disc (14).
 - 2.13. Install the retaining ring (15).

Compress the clutch disc assembly 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.

- 2.14. Install the guide clips (2) to the clutch disc assembly.

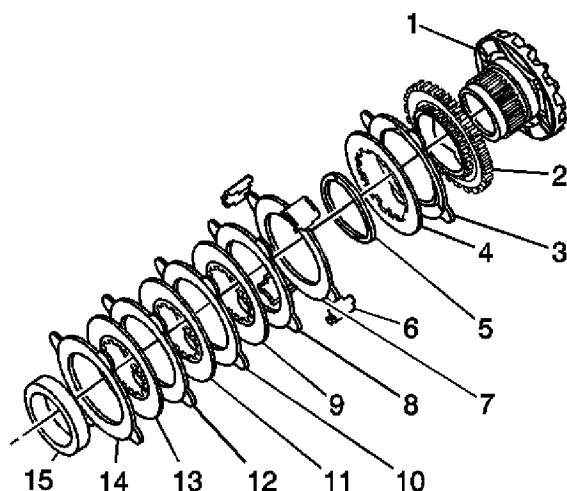
Apply chassis grease, GM P/N 12377985 (Canadian P/N 88901242) or equivalent, to the guide clips in order to hold the clips in place on the disc ears.

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Locking Differential Cam Unit Assemble (9.75 Inch Axle)

Tools Required

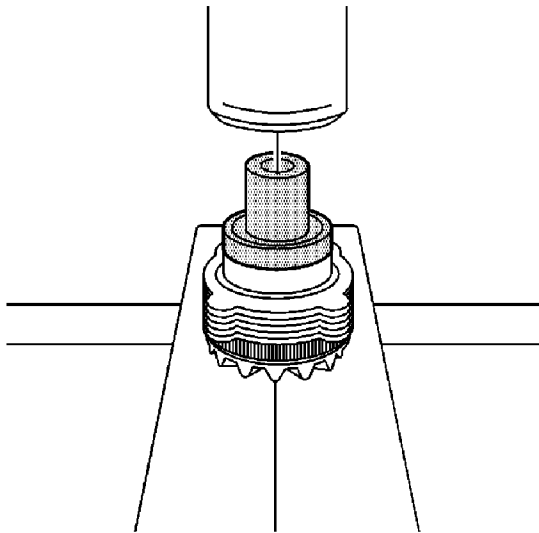
[J 29710](#) Differential Side Bearing Installer



1. Apply axle lubricant, GM P/N 12378261 (Canadian P/N 10953455) or equivalent meeting GM Specification 9986115, to the surface of each disc.
2. Assemble the left side or the flange-end side locking differential side gear cam unit and clutch disc assembly as follows:
 - 2.1. Install the cam plate (2) to the cam side gear (1).
 - 2.2. Install the carbon-faced eared disc (3).
 - 2.3. Install the fuse disc (4).
 - 2.4. Install the wave washer (5).
 - 2.5. Install the 1st non-carbon eared disc (7).
 - 2.6. Install the 2nd non-carbon eared disc (8).
 - 2.7. Install the 1st splined disc (9).
 - 2.8. Install the 3rd non-carbon eared disc (10).
 - 2.9. Install the 2nd splined disc (11).
 - 2.10. Install the 4th non-carbon eared disc (12).
 - 2.11. Install the 3rd splined disc (13).
 - 2.12. Install the 5th non-carbon eared disc (14).
 - 2.13. Align the splined discs with the teeth on the cam plate in order to compress the clutch

disc assembly.

3. Install the thrust sleeve (15) onto the cam side gear.



4. Install the thrust sleeve onto the cam side gear using a hydraulic press and the [J 29710](#) , if necessary, until the thrust sleeve is fully seated onto the locking differential cam gear.
5. If the cam side gear or the thrust sleeve has been replaced, measure the overall length of the gear assembly by doing the following:
 - 5.1. Place the locking differential clutch disc thrust washer on top of the thrust sleeve.
 - 5.2. Measure the overall length of the gear assembly from the front of the cam side gear to the back of the locking differential clutch disc thrust washer.
 - 5.3. Compare this measurement to the measurement obtained during disassembly.
 - 5.4. If the new reading is more than 0.762 mm (0.003 in) higher or lower than the original, select a locking differential clutch disc thrust washer that will return the reading closest to the original reading.
6. Align the ears of all the clutch discs.
7. Install the guide clips to the clutch disc assembly.

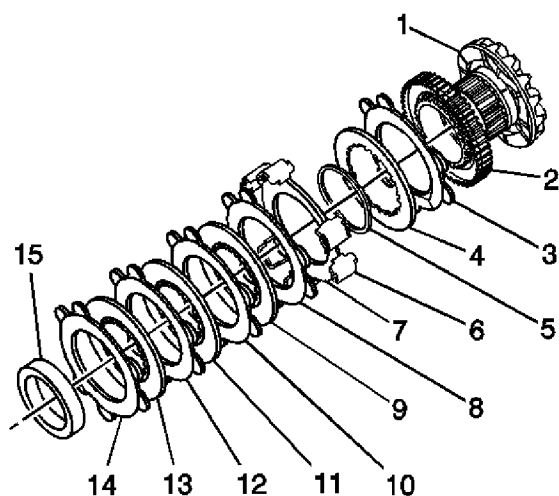
Apply chassis grease, GM P/N 12377985 (Canadian P/N 88901242) or equivalent, to the guide clips in order to hold the clips in place on the disc ears.

Locking Differential Cam Unit Assemble (10.5 Inch Axle)

Tools Required

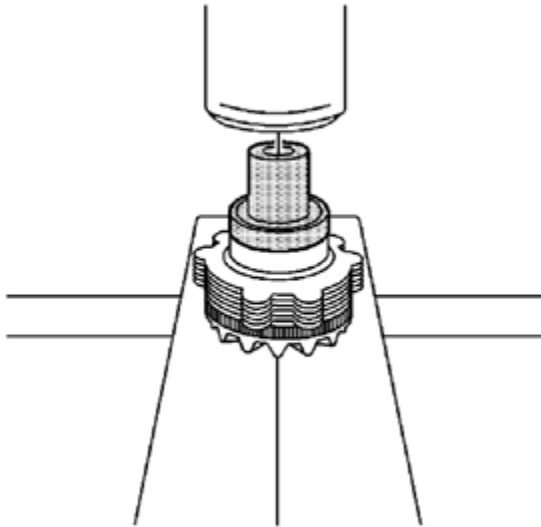
[J 29710](#) Differential Side Bearing Installer

1. Apply axle lubricant, GM P/N 12378261 (Canadian P/N 10953455) or equivalent meeting GM Specification 9986115, to the surface of each disc.



2. Assemble the left side or the flange-end side locking differential side gear cam unit and clutch disc assembly as follows:
 - 2.1. Install the cam plate (2) to the cam side gear (1).
 - 2.2. Install the carbon-faced ear disc (3).
 - 2.3. Install the fuse disc (4).
 - 2.4. Install the wave washer (5).
 - 2.5. Install the 1st non-carbon eared disc (7).
 - 2.6. Install the 2nd non-carbon eared disc (8).
 - 2.7. Install the 1st splined disc (9).
 - 2.8. Install the 3rd non-carbon eared disc (10).
 - 2.9. Install the 2nd splined disc (11).
 - 2.10. Install the 4th non-carbon eared disc (12).
 - 2.11. Install the 3rd splined disc (13).
 - 2.12. Install the 5th non-carbon eared disc (14).
 - 2.13. Align the splined discs with the teeth on the cam side gear in order to compress the clutch disc.

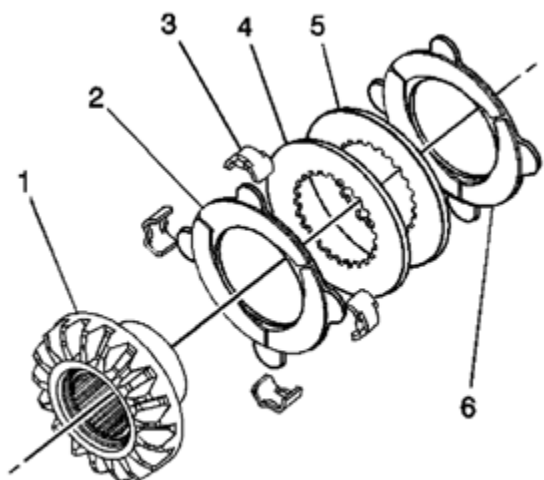
3. Install the thrust sleeve (15) onto the cam side gear.



4. Install the thrust sleeve onto the cam side gear using a hydraulic press and the [J 29710](#) , if necessary, until the thrust sleeve is fully seated onto the cam side gear.
5. If the cam side gear or the thrust sleeve has been replaced, measure the overall length of the gear assembly by doing the following:
 - 5.1. Place the locking differential clutch disc thrust washer on top of the thrust sleeve.
 - 5.2. Measure the overall length of the gear assembly from the front of the cam side gear to the back of the locking differential clutch disc thrust washer.
 - 5.3. Compare this measurement to the measurement obtained during disassembly.
 - 5.4. If the new reading is more than 0.762 mm (0.003 in) higher or lower than the original, select a locking differential clutch disc thrust washer that will return the reading closest to the original reading.
6. Align the ears of all the clutch discs.
7. Install the guide clips to the clutch disc assembly.

Apply chassis grease, GM P/N 12377985 (Canadian P/N 88901242) or equivalent, to the guide clips in order to hold the clips in place on the disc ears.

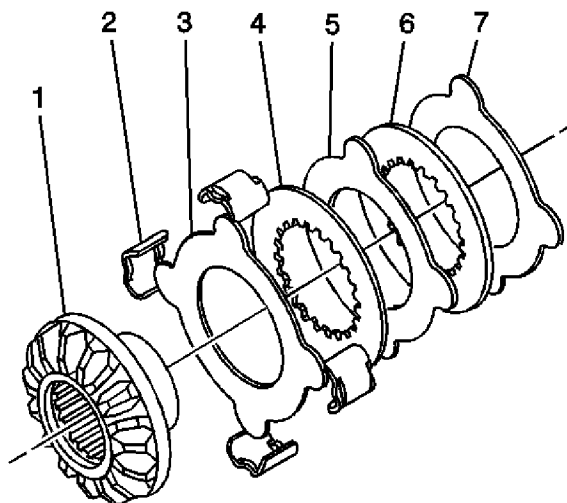
Locking Differential Clutch Disc Assembly Assemble (8.6 Inch Axle)



1. Apply axle lubricant, GM P/N 12378261 (Canadian P/N 10953455) or equivalent meeting GM Specification 9986115, to the surface of each disc.
2. Assemble the right side or bell-end side clutch disc assembly as follows:
 - 2.1. Install the two-sided carbon eared disc (2) to the side gear (1).
 - 2.2. Install the 1st splined disc (4).
 - 2.3. Install the 2nd splined disc (5).
 - 2.4. Install the one-sided carbon eared disc (6).
 - 2.5. Install the guide clips (3) to the clutch discs (2, 4-6).

Apply chassis grease, GM P/N 12377985 (Canadian P/N 88901242) or equivalent, to the guide clips in order to hold the clips in place on the disc ears.

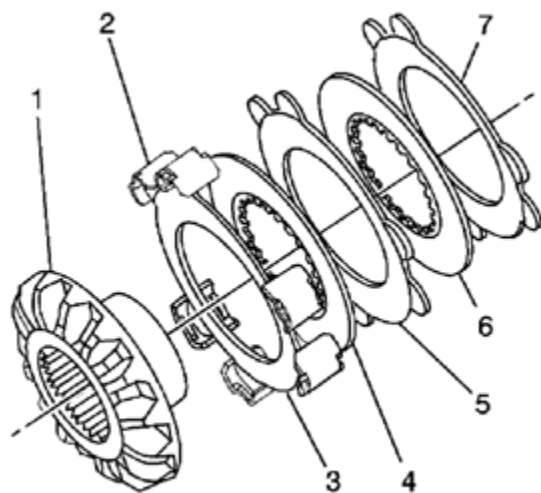
Locking Differential Clutch Disc Assembly Assemble (9.75 Inch Axle)



1. Apply axle lubricant, GM P/N 12378261 (Canadian P/N 10953455) or equivalent meeting GM Specification 9986115, to the surface of each disc.
2. Assemble the right side or bell-end side clutch disc assembly as follows:
 - 2.1. Install the 1st non-carbon eared disc (3) to the side gear (1).
 - 2.2. Install the 1st splined disc (4).
 - 2.3. Install the 2nd non-carbon eared disc (5).
 - 2.4. Install the 2nd splined disc (6).
 - 2.5. Install the 3rd non-carbon eared disc (7).
 - 2.6. Install the guide clips (2) to the clutch discs (2-7).

Apply chassis grease, GM P/N 12377985 (Canadian P/N 88901242) or equivalent, to the guide clips in order to hold the clips in place on the disc ears.

Locking Differential Clutch Disc Assembly Assemble (10.5 Inch Axle)



1. Apply axle lubricant, GM P/N 12378261 (Canadian P/N 10953455) or equivalent meeting GM Specification 9986115, to the surface of each disc.
2. Assemble the left side clutch disc assembly as follows:
 - 2.1. Install the 1st non-carbon eared disc (3) to the side gear (1).
 - 2.2. Install the 1st splined disc (4).
 - 2.3. Install the 2nd non-carbon eared disc (5).
 - 2.4. Install the 2nd splined disc (6).
 - 2.5. Install the 3rd non-carbon eared disc (7).
 - 2.6. Align the ears of all the clutch discs.
 - 2.7. Install the guide clips (2) to the clutch discs (3-7).

Apply chassis grease, GM P/N 12377985 (Canadian P/N 88901242) or equivalent, to the guide clips in order to hold the clips in place on the disc ears.

Locking Differential Adjustment (10.5 Inch Axles)

Tools Required

- [J 7872](#) Magnetic Base Dial Indicator
- [J 34672](#) Depth Micrometer
- [J 34673](#) Flat Gage Bar, 2 required

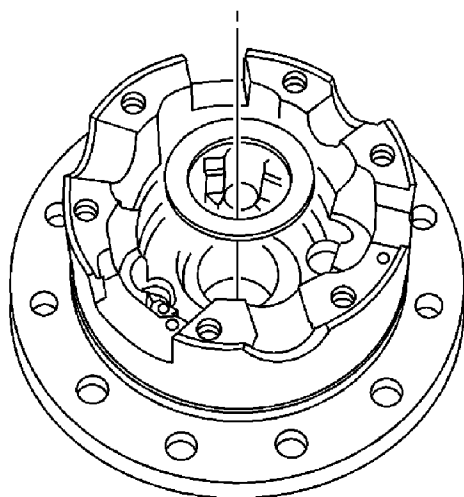
Adjustment of the Differential

Important: If it is necessary to replace the right side cam gear and clutch disc assembly, the left hand side gear and clutch 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 case and/or different selective thickness thrust blocks.

When adjusting the differential, note the following:

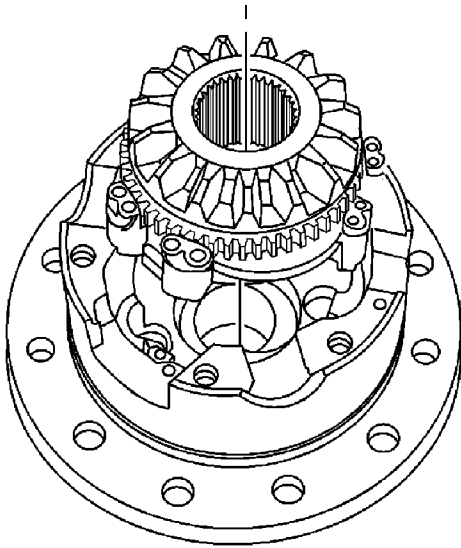
- Build up the clutch disc packs properly.
Proper clearance between the parts is critical to the operation of the unit.
- Adjust the backlash and thrust block clearance in the following order:
 - The left side gear backlash
 - The right side gear backlash
 - The thrust block clearance

Left Side Gear Backlash Adjustment

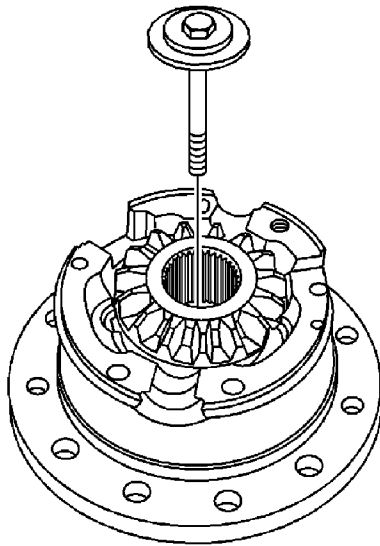




1. Install the original locking differential clutch disc thrust washer into the differential case half.



2. Install the differential side gear cam unit and clutch disc assembly into the differential case half.

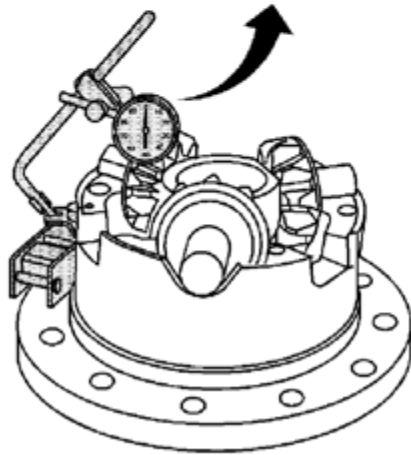
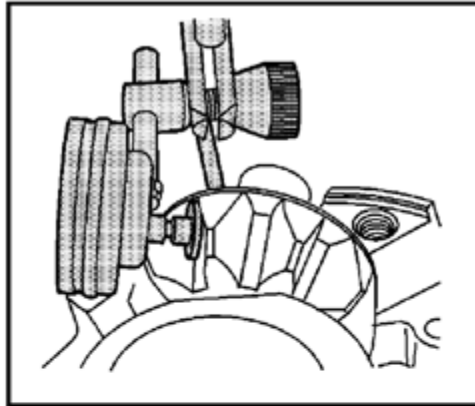


3. Clamp the differential side gear cam unit and clutch disc assembly in place using a set of washers, a nut, and a bolt long enough to hold the side gear in place.
4. Install the differential case half into a vise.

Clamp on the nut on the bottom of the case.

5. Install the differential pinion gears, the differential pinion gear thrust washers and the locking differential spider into the case half.

6. Loosen the bolt in order to turn the differential side gear.
7. Index the pinion gear so that one tooth is pointing downward, perpendicular to the case half face.
8. Tighten the bolt until the clutch plates are compressed.



9. Install the [J 7872](#) onto the differential case.
10. Loosely clamp the [J 8001-3](#) onto the stem of the [J 7872](#).
11. Place the contact pad of the [J 8001-3](#) on the tooth that is perpendicular to the differential side gear.
12. Preload the dial of the [J 8001-3](#) approximately 1 turn clockwise.
13. Tighten the lock nut on the [J 7872](#) finger tight.
14. Turn the dial of the [J 8001-3](#) until the needle and the dial face indicate ZERO.
15. Measure the differential pinion gear to locking differential side gear backlash by performing the following steps:
 - 15.1. Pull the pinion gear firmly into the seat.
 - 15.2. Rotate the pinion gear back and forth while reading the dial indicator.

Do not unseat the locking differential spider. This will make the backlash reading inaccurate.

- 15.3. Record the measurement.
16. Measure the differential pinion gear to locking differential side gear backlash on the other 2 pinion gears following the steps above.

Specification

The backlash between the differential pinon gear and locking differential side gear should be between 0.279-0.432 mm (0.011-0.017 in).

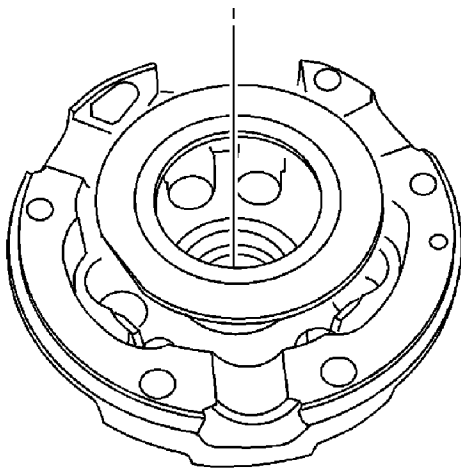
17. If the backlash is too large, install a thicker locking differential side gear thrust washer and check the backlash.
18. If the backlash is too small, use a thinner locking differential side gear thrust washer and check the backlash.

Locking differential clutch disc thrust washers are available in the following sizes:

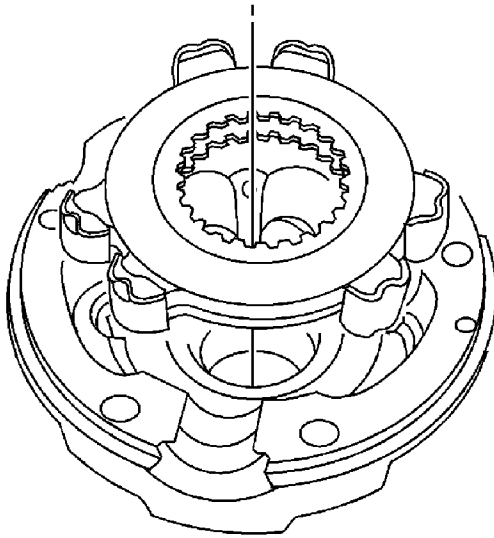
Washer Sizes

- 0.56 mm (0.022 in)
- 0.69 mm (0.027 in)
- 0.81 mm (0.032 in)
- 0.91 mm (0.036 in)
- 1.02 mm (0.040 in)
- 1.07 mm (0.042 in)
- 1.12 mm (0.044 in)
- 1.22 mm (0.048 in)
- 1.32 mm (0.052 in)

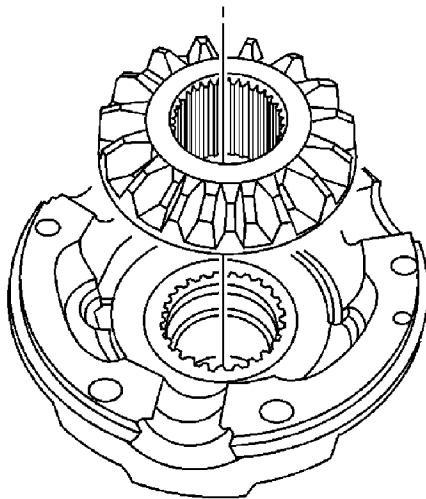
Right Side Gear Backlash Adjustment



1. Install the original differential side gear shim into the differential case half.



2. Install the differential side gear clutch pack assembly into the differential case half.

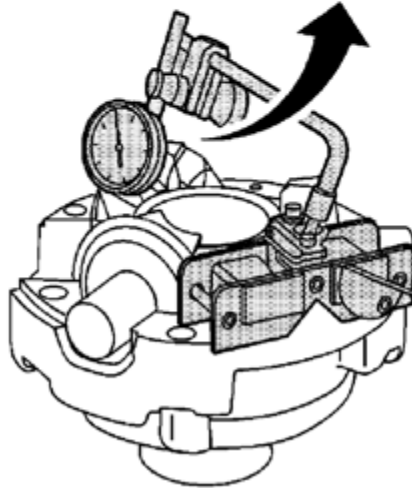
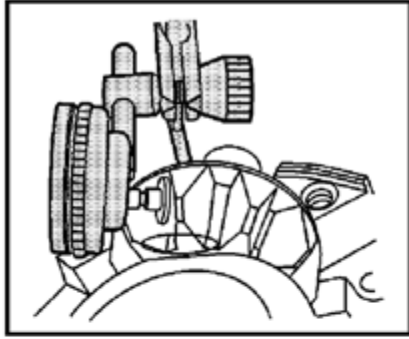


3. Install the differential side gear into the differential case half.
4. Clamp the differential side gear and clutch pack assembly in place using a set of washers, a nut, and a bolt long enough to hold the side gear in place.
5. Install the differential case half into a vise.

Clamp on the nut on the bottom of the case.

6. Install the differential pinion gears, the differential pinion gear thrust washers and the locking differential spider into the case half.
7. Loosen the bolt in order to turn the differential side gear.
8. Index the pinion gear so that one tooth is pointing downward, perpendicular to the case half face.

9. Tighten the bolt until the clutch plates are compressed.



10. Install the [J 7872](#) onto the differential case.
11. Loosely clamp the [J 8001-3](#) onto the stem of the [J 7872](#).
12. Place the contact pad of the [J 8001-3](#) on the tooth that is perpendicular to the differential side gear.
13. Preload the dial of the [J 8001-3](#) approximately 1 turn clockwise.
14. Tighten the lock nut on the [J 7872](#) finger tight.
15. Turn the dial of the [J 8001-3](#) until the needle and the dial face indicate ZERO.
16. Measure the differential pinion gear to locking differential side gear backlash by performing the following steps:
 - Pull the pinion gear firmly into the seat.
 - Rotate the pinion gear back and forth while reading the dial indicator.
 - Do not unseat the locking differential spider. This will make the backlash reading inaccurate.
 - Record the measurement.
17. Measure the differential pinion gear to locking differential side gear backlash on the other 2 pinion gears following the steps above.

Specification

The backlash between the differential pinion gear and locking differential side gear should be between 0.051-0.203 mm (0.002-0.008 in).

18. If the backlash is too large, install a thicker differential side gear shim and check the

backlash.

19. If the backlash is too small, use a thinner differential side gear shim and check the backlash.

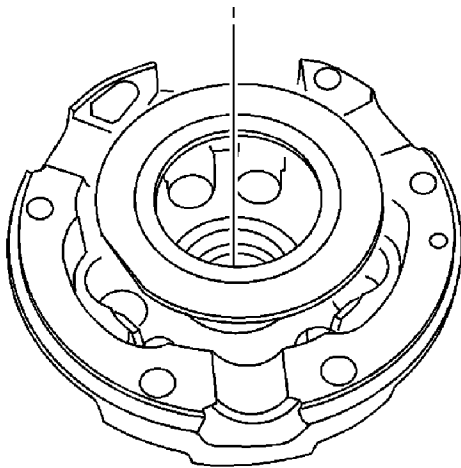
Differential side gear shims are available in the following sizes:

Shim Sizes

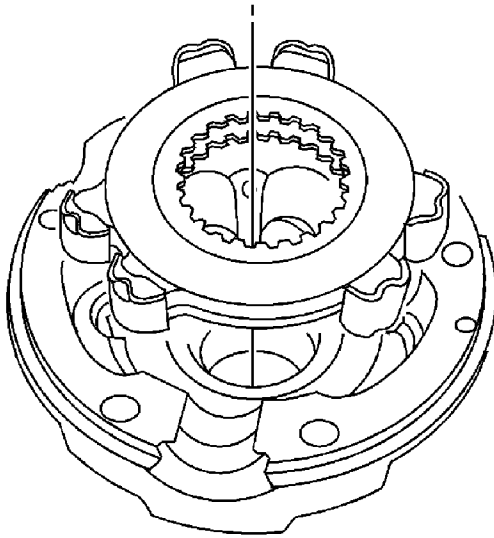
- 0.254 mm (0.010 in)
- 0.381 mm (0.015 in)
- 0.508 mm (0.020 in)
- 0.635 mm (0.025 in)
- 0.762 mm (0.030 in)
- 0.899 mm (0.035 in)
- 1.016 mm (0.040 in)
- 1.143 mm (0.045 in)
- 1.270 mm (0.050 in)
- 1.397 mm (0.055 in)
- 1.524 mm (0.060 in)

Thrust Block Clearance Adjustment

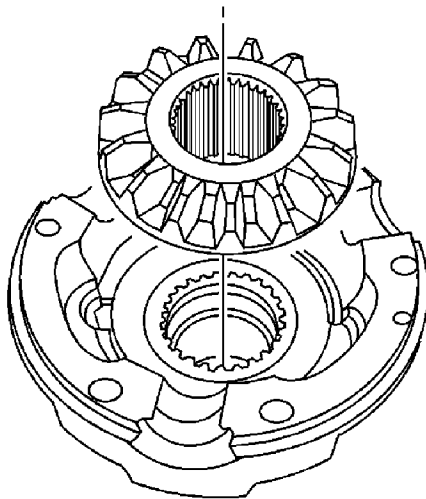
Important: The left and right side gear backlash measurements must be done before the thrust block measurement can be completed.



1. Install the differential side gear shim into the differential case half.



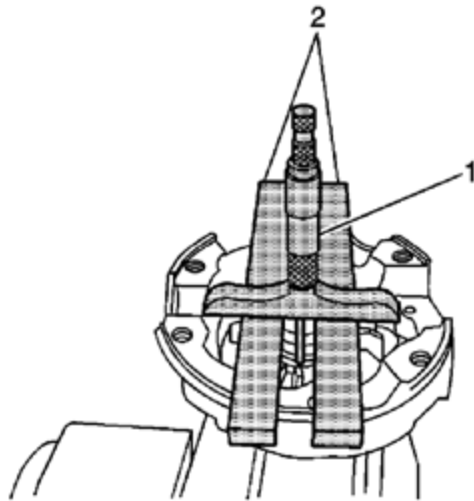
2. Install the differential side gear clutch disc assembly into the differential case half.



3. Install the differential side gear into the differential case half.
4. Clamp the differential side gear and clutch disc assembly in place using a set of washers, a nut, and a bolt long enough to hold the side gear in place.
5. Install the differential case half into a vise.

Clamp on the nut on the bottom of the case.

6. Tighten the bolt until the clutch plates are compressed.



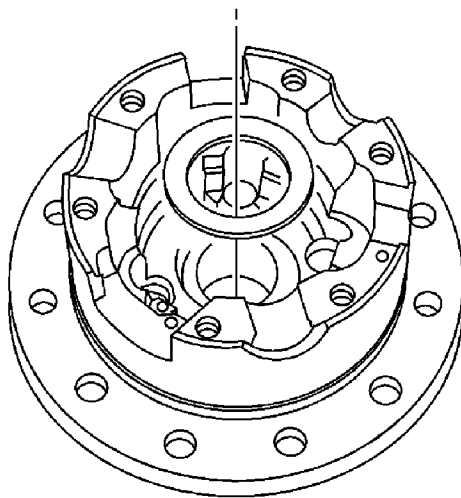
7. Install the [J 34673](#) (2) and the [J 34672](#) (1) onto the differential case as shown.
8. Measure the depth from the face of the [J 34673](#) to the face of the differential side gear using the [J 34672](#).

Record the measurement.

9. Measure the thickness of the [J 34673](#).
10. Subtract the thickness of the [J 34673](#) from the measurement obtained in step 8.

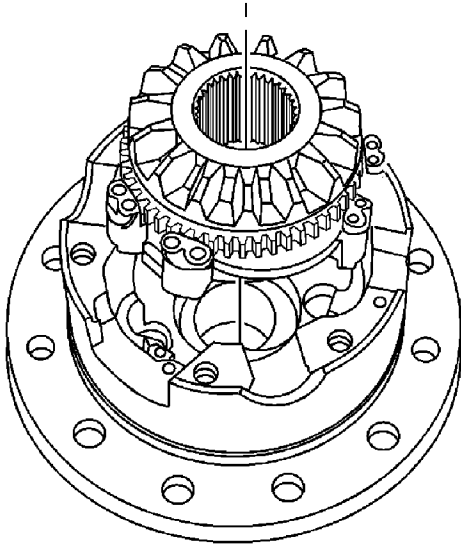
Record the measurement. This measurement is equal to one-half of the thrust block thickness.

11. Remove the [J 34673](#) and the [J 34672](#) from the differential case.
12. Remove the differential case half from the vise.

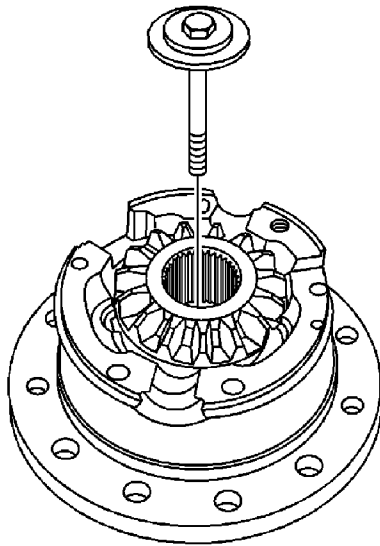




13. Install the locking differential clutch disc thrust washer into the differential case half.



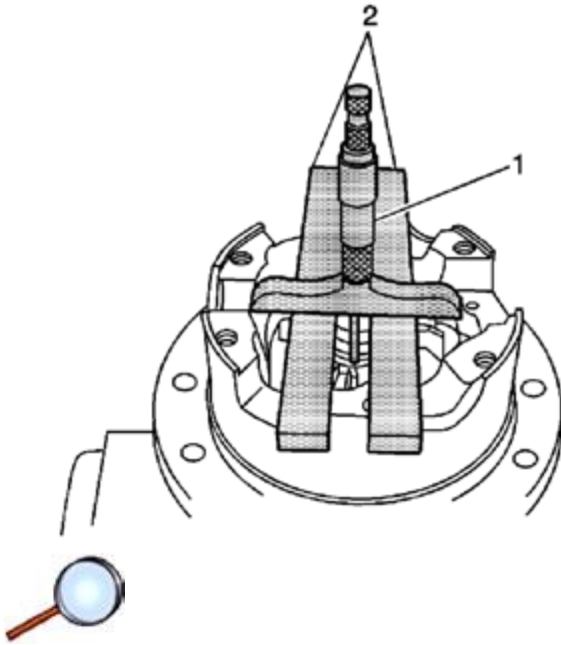
14. Install the differential side gear cam unit and clutch disc assembly into the differential case half.



15. Clamp the differential side gear cam unit and clutch disc assembly in place using a set of washers, a nut, and a bolt long enough to hold the side gear in place.
16. Install the differential case half into a vise.

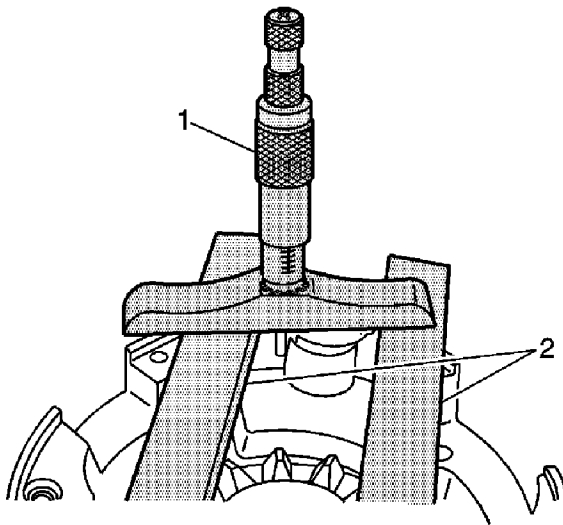
Clamp on the nut on the bottom of the case.

17. Tighten the bolt until the clutch plates are compressed.



18. Install the [J 34673](#) (2) and the [J 34672](#) (1) onto the differential case as shown.
19. Measure the depth from the face of the [J 34673](#) to the face of the differential side gear using the [J 34672](#).

Record the measurement.



20. Measure the depth from the face of the [J 34673](#) to the face of the differential case.
21. Subtract the measurement obtained in step 20 from the measurement obtained in step 19.

Record the measurement. This measurement is equal to one-half of the thrust block thickness.

22. Add the measurements in Step 10 and Step 21 together. This is the thickness for the thrust block.
23. Compare the measurement obtain in Step 22 to the thrust block sizes available. If the measurement is equal to one of the thrust block sizes available, the select that thrust block.
24. If the measurement obtained in Step 22 is not equal to one of the thrust block sizes available, then select the thrust block that is smaller the measurement.

For example, if the measurement is 40.92 mm (1.611 in), select the 40.89 mm (1.610 in) thrust block.

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

25. If the measurement obtained in Step 22 is less then 40.49 mm (1.594 in), then reduce the left differential side gear shim or the right locking differential clutch disc thrust washer thickness in order to increase the thrust block opening.
26. If the measurement obtained in Step 22 is greater then 41.20 mm (1.622 in), then increase the left differential side gear shim or the right locking differential clutch disc thrust washer thickness in order to decrease the thrust block opening.
27. Check the left and/or right side gear backlash and adjust as necessary.
28. Check the thrust block clearance and adjust as necessary.
29. Assemble the differential. Refer to [Locking Differential Assemble](#) .

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Locking Differential Adjustment (8.6 Inch Axles)

Special Tools

- [J 7872](#) Magnetic Base Dial Indicator
- [J 8001](#) Dial Indicator Set

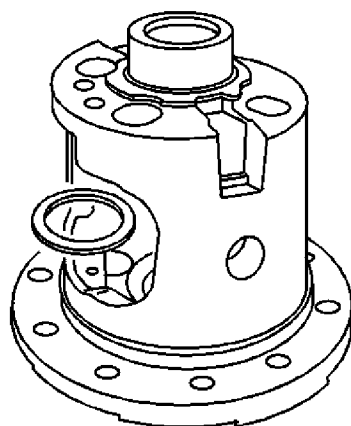
Adjustment of the Differential

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

When adjusting the differential, note the following:

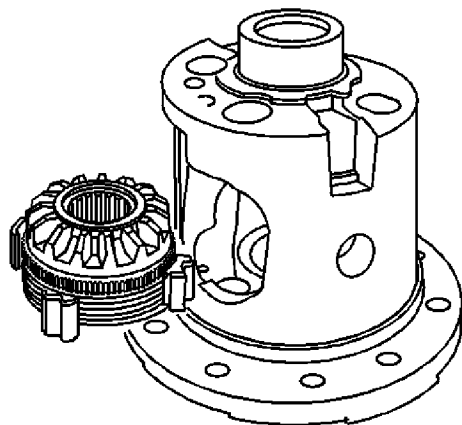
- Build up the clutch disc assemblies properly.
Proper clearance between parts is critical to the operation of the unit.
- Adjust the backlash and thrust block clearance in the following order:
 1. The left side gear backlash
 2. The right side gear backlash
 3. The thrust block clearance

Left Side Gear Backlash Adjustment





1. Install the new locking differential clutch disc thrust washer into the left side or flange-end of the differential case.



2. Install the locking differential side gear cam unit and clutch disc assembly into the left side or flange-end of the differential case.
3. Install the differential pinion gears with the differential pinion gear thrust washers into the differential case.

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

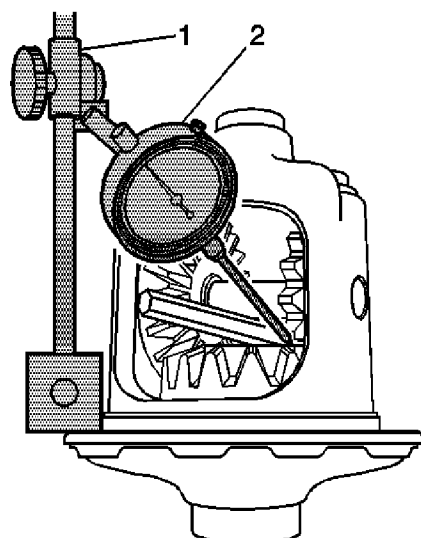
4. Install the pinion shaft. It may be necessary to press down on the locking differential side gear cam unit in order to align the pinion gear shaft opening with the pinion shaft opening in the differential case.

If the pinion shaft cannot be installed after pressing on the locking differential side gear cam unit, replace the locking differential clutch disc gear thrust washer with a thinner washer.

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

5. Install the pinion shaft lock bolt. 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.
7. Install a brass drift between the locking differential side gear cam unit and the pinion shaft.

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



8. Measure the backlash of the differential pinion gear and the locking differential side gear cam unit by doing the following:
 - 8.1. Install the [J 7872](#) (1) to the ring gear flange.
 - 8.2. Loosely clamp the [J 8001-3](#) (2) onto the stem on the [J 7872](#) (1).
 - 8.3. Place the contact pad of the [J 8001-3](#) on one of the teeth of the pinion gear closest to the pinion shaft lock bolt.

Turn the dial of the [J 8001-3](#) until the needle and the dial face indicate ZERO.

- 8.4. Tighten the lock nut of the [J 8001-3](#) finger tight.
- 8.5. Pull the pinion gear firmly into the differential case seat.
- 8.6. Rotate the pinion gear back and forth.
- 8.7. Measure the backlash.

Specification

The backlash between the differential pinion gear and the locking differential side gear cam unit should be 0.254-0.406 mm (0.010-0.016 in).

9. If the backlash is too large, install a thicker locking differential clutch disc thrust washer and recheck the backlash.
10. If the backlash is too small, install a thinner locking differential clutch disc thrust washer and recheck the backlash.

Locking differential clutch disc thrust washers are available in the following sizes:

Washer Sizes

- 0.559 mm (0.022 in)
- 0.686 mm (0.027 in)
- 0.813 mm (0.032 in)
- 0.914 mm (0.036 in)

- 1.016 mm (0.040 in)
- 1.118 mm (0.044 in)
- 1.219 mm (0.048 in)
- 1.321 mm (0.052 in)

Right Side Gear Backlash Adjustment

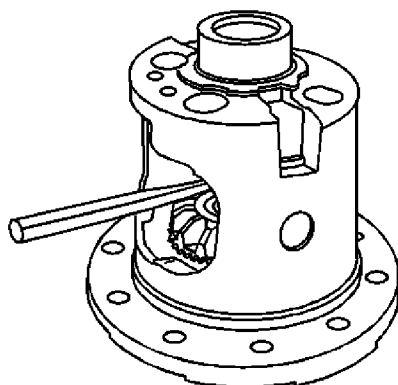
1. If necessary, remove the following from the differential case:
 - 1.1. The pinion lock shaft bolt
 - 1.2. The pinion shaft
 - 1.3. The differential pinion gears
 - 1.4. The differential pinion gear thrust washers
 - 1.5. The left side locking differential side gear cam unit and clutch disc assembly
2. Install the differential side gear shim into the right side or bell-end of the differential case.
3. Install the locking differential side gear and clutch disc assembly into the right side or bell-end of the differential case.
4. Install the differential pinion gears with the differential pinion thrust washers into the differential case.

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

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

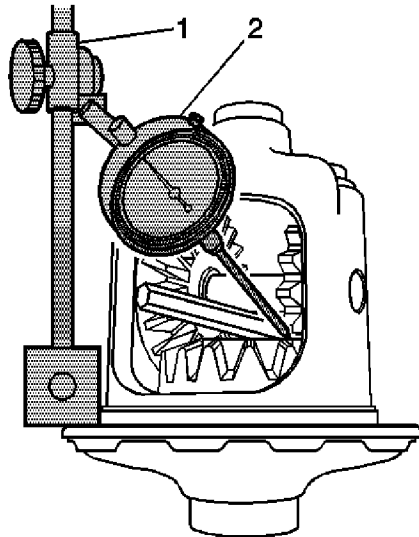
If the side gear cannot be pressed down far enough to install the pinion shaft, replace the side gear shim with a thinner shim.

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



8. Install a brass drift between the locking differential 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:
 - 9.1. Install the [J 7872](#) (1) to the ring gear flange.
 - 9.2. Loosely clamp the [J 8001-3](#) (2) onto the stem on the [J 7872](#) (1).
 - 9.3. Place the contact pad of the [J 8001-3](#) on one of the teeth of the pinion gear closest to the pinion shaft lock bolt.

Turn the dial of the [J 8001-3](#) until the needle and the dial face indicate ZERO.

- 9.4. Tighten the lock nut of the [J 8001-3](#) finger tight.
- 9.5. Pull the pinion gear firmly into the differential case seat.
- 9.6. Rotate the pinion gear back and forth.
- 9.7. Measure the backlash.

Specification

The backlash for the pinion gears should be 0.076-0.229 mm (0.003-0.009 in).

10. If the backlash is too large, install a thicker differential side gear shim and check the backlash.
11. If the backlash is too small, install a thinner differential side gear shim and check the backlash again.

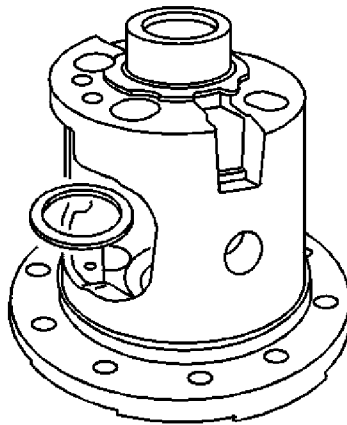
Differential side gear shims are available in the following sizes:

Shim Sizes

- 0.254 mm (0.010 in)

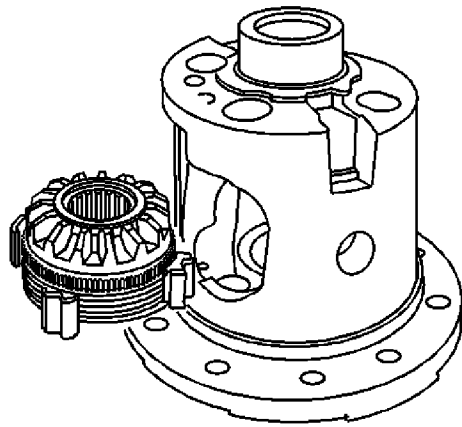
- 0.381 mm (0.015 in)
- 0.508 mm (0.020 in)
- 0.635 mm (0.025 in)
- 0.762 mm (0.030 in)
- 0.889 mm (0.035 in)
- 1.016 mm (0.040 in)
- 1.143 mm (0.045 in)

Thrust Block Clearance Adjustment

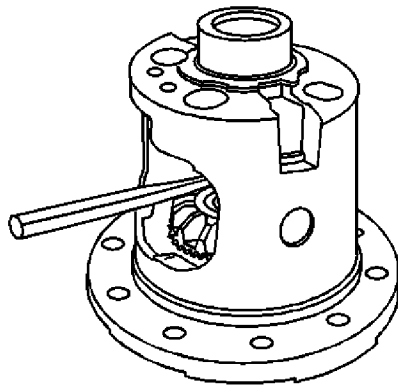


Note: The left and right side gear backlash measurements must be done before the thrust block measurement can be completed.

1. Install the locking differential clutch disc thrust washer into the left side or flange-end of the differential case.



2. Install the locking differential side gear cam unit and clutch disc assembly into the left side or flange-end of the differential case.
3. Install the differential side gear shim into the right side or bell-end of the differential case.
4. Install the locking differential side gear and clutch disc assembly into the right side or bell-end of the differential case.
5. Install the pinion shaft.
6. Install the pinion shaft bolt. Tighten the pinion shaft bolt finger tight.

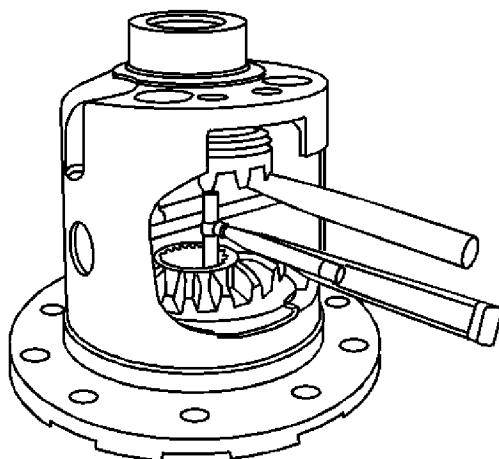


7. Install a brass drift between the left locking differential side gear cam unit and the pinion shaft.

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

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

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



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

9. Measure the distance between the side gear faces using a 25.4-50.8 mm (1-2 in) telescoping gage.
10. Remove the telescoping gage.
11. Measure the telescoping gage 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 33.833 mm (1.332 in), select the 33.782 mm (1.330 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 33.578 mm (1.322 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 34.290 mm (1.350 in), then increase the left side gear thrust washer or the right side gear shim thickness in order to decrease the thrust block opening.

16. Recheck the left and/or right side gear backlash and adjust as necessary.
17. Recheck the thrust block clearance and adjust as necessary.
18. Assemble the differential. Refer to [Locking Differential Assemble](#).

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Locking Differential Adjustment (9.75 Inch Axles)

Special Tools

[J 7872](#) Magnetic Base Dial Indicator

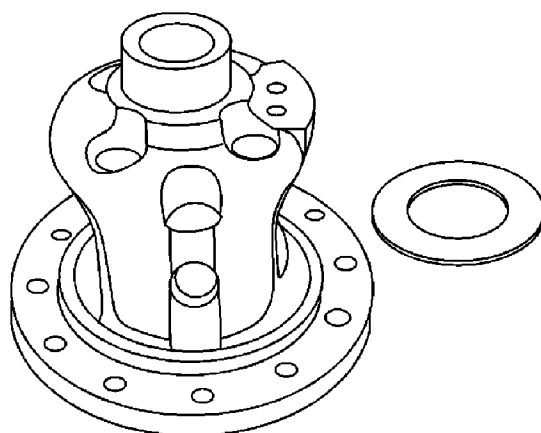
Adjustment of the Differential

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 disc assemblies and the case and/or different selective thickness thrust blocks.

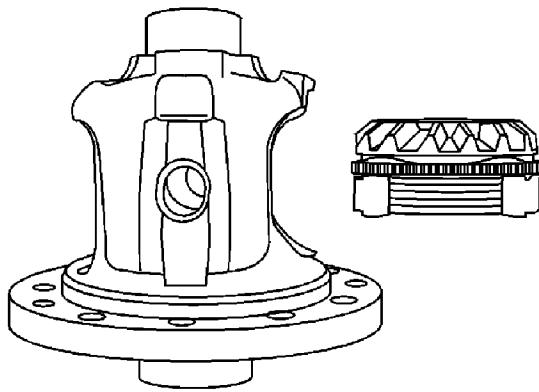
When adjusting the differential, note the following:

- Build up the clutch disc assemblies 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

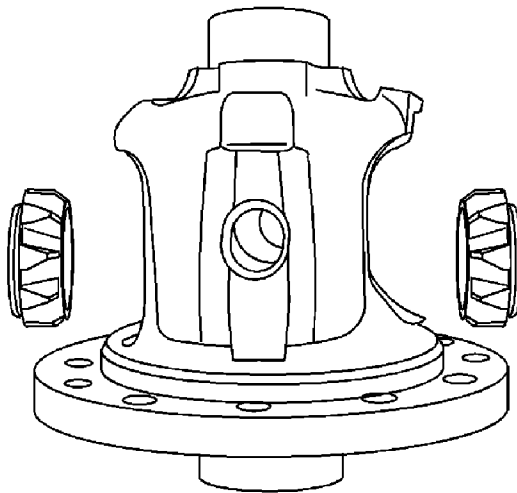
Left Side Gear Backlash Adjustment



1. Install the original left side thrust washer into the left side or flange-end of the differential case.



2. Install the left side locking differential side gear cam unit and clutch disc assembly into the left side or flange-end of the differential case.



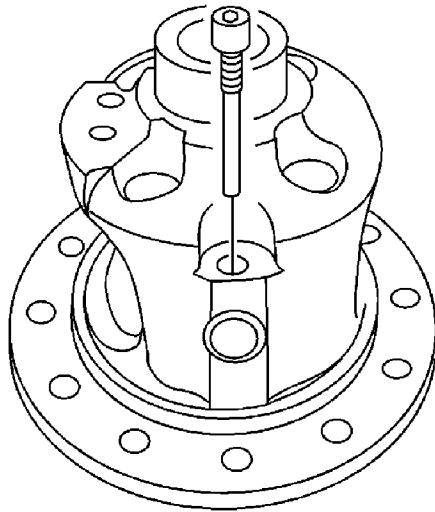
3. Install the differential pinion gears with the differential pinion gear thrust washers into the differential case.

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

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.

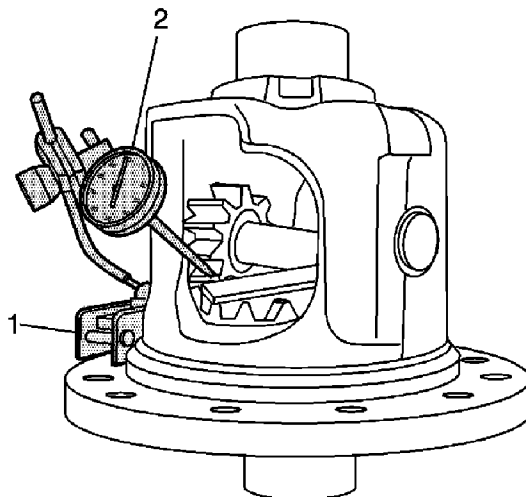
If the pinion shaft cannot be installed after pressing on the side gear, replace the locking differential clutch disc thrust washer with a thinner washer.

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



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

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



8. Measure the backlash of the pinion gear and the side gear by doing the following:
 - 8.1. Install the [J 7872](#) (1) to the ring gear flange.

- 8.2. Loosely clamp the [J 8001-3](#) (2) onto the stem on the [J 7872](#) (1).
- 8.3. Place the contact pad of the [J 8001-3](#) on one of the teeth of the pinion gear closest to the pinion shaft lock bolt.

Turn the dial of the [J 8001-3](#) until the needle and the dial face indicate ZERO.

- 8.4. Tighten the lock nut of the [J 8001-3](#) finger tight.
- 8.5. Pull the pinion gear firmly into the differential case seat.
- 8.6. Rotate the pinion gear back and forth.
- 8.7. Measure the backlash.

Specification

The backlash between the differential pinon gear and locking differential side gear should be between 0.279-0.432 mm (0.011-0.017 in).

9. If the backlash is too large, install a thicker locking differential clutch disc thrust washer and recheck the backlash.
10. If the backlash is too small, install a thinner locking deferential clutch disc thrust washer and recheck the backlash.

Locking differential clutch disc thrust washers are available in the following sizes:

Washer Sizes

- 0.56 mm (0.022 in)
- 0.69 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:
 - 1.1. The pinion lock shaft bolt
 - 1.2. The pinion shaft
 - 1.3. The differential pinion gears
 - 1.4. The differential pinion gear thrust washers
 - 1.5. The locking differential side gear cam unit and clutch disc assembly
2. Install the right side differential side gear shim into the right side or bell-end of the differential case.
3. Install the clutch disc assembly into the right side or bell-end of the differential case.
4. Install the locking differential side gear.
5. Install the differential pinion gears with the differential pinion thrust washers into the differential case.

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

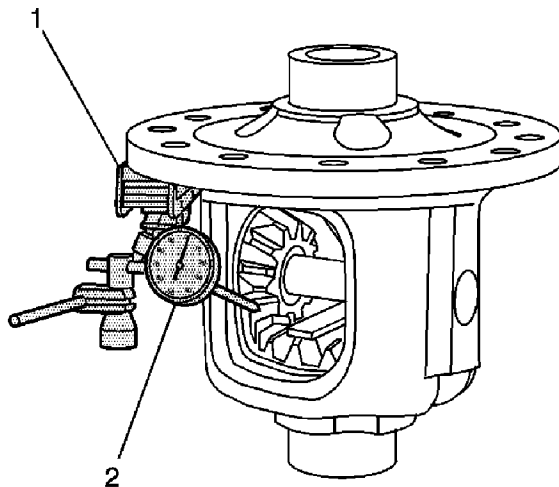
6. Press down on the locking differential side gear and install the pinion shaft.

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

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

7. Install the pinion shaft lock bolt. Tighten the pinion shaft lock bolt finger tight.
8. Rotate the differential pinion gear so that one of the teeth is pointing downward, perpendicular to the ring gear flange.
9. Install a brass drift between the differential side gear and the pinion shaft.

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



10. Measure the backlash of the differential pinion gear and the locking differential side gear by doing the following:
 - 10.1. Install the [J 7872](#) (1) to the ring gear flange.
 - 10.2. Loosely clamp the [J 8001-3](#) (2) onto the stem on the [J 7872](#) (1).
 - 10.3. Place the contact pad of the [J 8001-3](#) on one of the teeth of the pinion gear closest to the pinion shaft lock bolt.

Turn the dial of the [J 8001-3](#) until the needle and the dial face indicate ZERO.

- 10.4. Tighten the lock nut of the [J 8001-3](#) finger tight.
- 10.5. Pull the pinion gear firmly into the differential case seat.
- 10.6. Rotate the pinion gear back and forth.
- 10.7. Measure the backlash.

Specification

The backlash between the differential pinion gear and the locking differential side gear should be 0.051-0.203 mm (0.002-0.008 in).

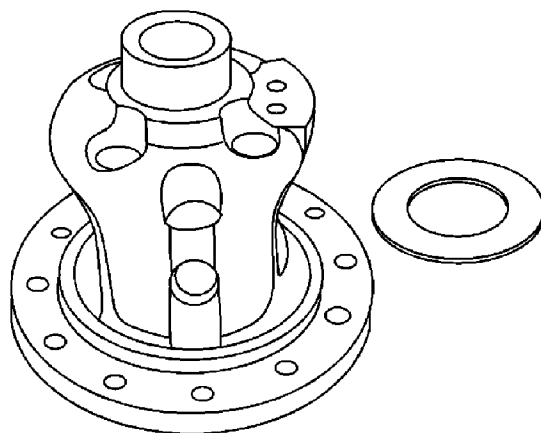
11. If the backlash is too large, install a thicker locking differential side gear shim and check the backlash.
12. If the backlash is too small, install a thinner locking differential side gear shim and check the backlash.

Differential side gear shims are available in the following sizes:

Shim Sizes

- 0.25 mm (0.010 in)
- 0.38 mm (0.015 in)
- 0.51 mm (0.020 in)
- 0.64 mm (0.025 in)
- 0.76 mm (0.030 in)
- 0.89 mm (0.035 in)
- 1.02 mm (0.040 in)
- 1.14 mm (0.045 in)
- 1.27 mm (0.050 in)
- 1.40 mm (0.055 in)
- 1.52 mm (0.060 in)

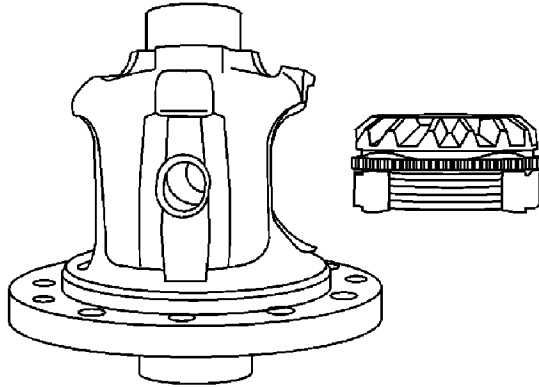
Thrust Block Clearance Adjustment



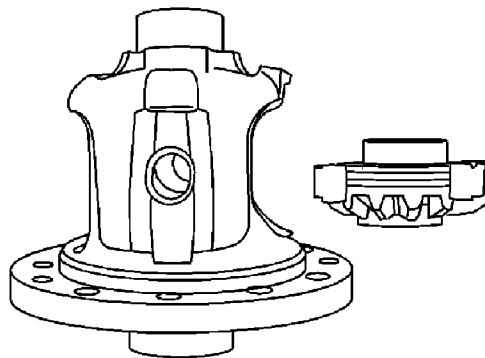
Note: The left and right side gear backlash measurements must be done before the thrust

block measurement can be completed.

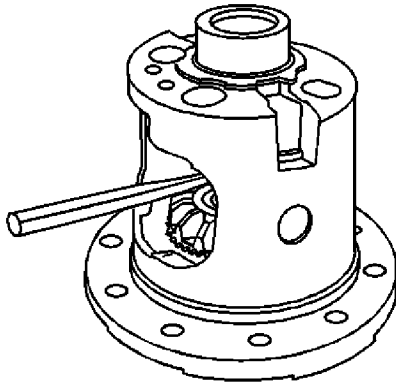
1. Install the locking differential clutch disc thrust washer into the left side or flange-end of the differential case.



2. Install the locking differential side gear cam unit and clutch disc assembly into the left side or flange-end of the differential case.
3. Install the right side differential side gear shim into the right side or bell-end of the differential case.



4. Install the right side locking differential side gear and clutch disc assembly into the right side or bell-end of the differential case.
5. Install the pinion shaft.
6. Install the pinion shaft bolt. Tighten the pinion shaft bolt finger tight.

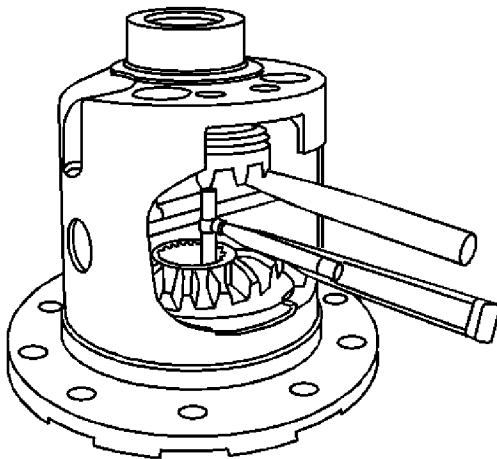


7. Install a brass drift between the left side gear and the pinion shaft.

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

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

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



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

9. Measure the distance between the side gear faces using a 25.4-50.8 mm (1-2 in) telescoping gage.
10. Remove the telescoping gage.
11. Measure the telescoping gage 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 40.87 mm (1.609 in), select the 40.79 mm (1.606 in) thrust block.

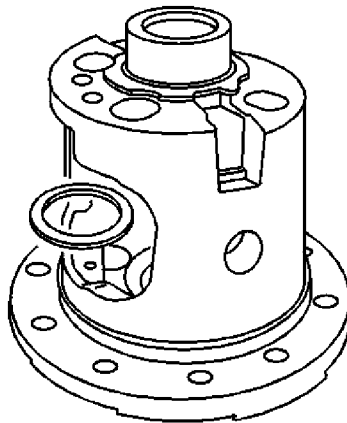
Note: The backlash must be checked and adjusted to specification anytime the left and/or the right thrust washers are replaced.

14. If the measurement obtained in Step 11 is less than 40.49 mm (1.594 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 41.20 mm (1.622 in), then increase the left side gear thrust washer or the right side gear shim thickness in order to decrease the thrust block opening.
16. Check the left and/or right side gear backlash and adjust as necessary.
17. Check the thrust block clearance and adjust as necessary.
18. Assemble the differential. Refer to [Locking Differential Assemble](#).

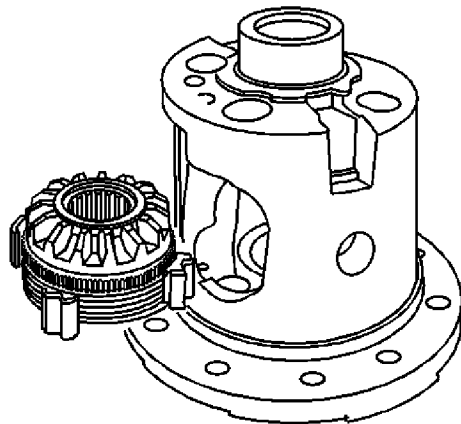
Locking Differential Assemble (8.6 Inch, 9.75 Inch Axles)

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.

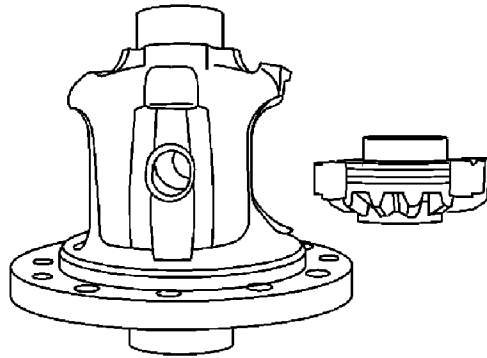
1. Measure the left and right side gear backlash and thrust block. Refer to [Locking Differential Adjustment](#).



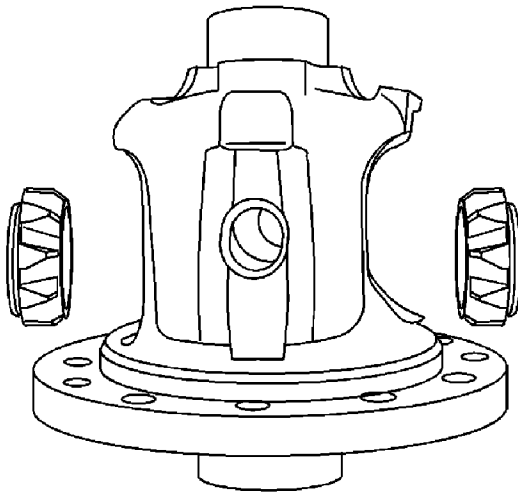
2. Install the locking differential clutch disc thrust washer into the left side or flange-end of the differential case.



3. Install the locking differential side gear cam unit and clutch disc assembly into the left side or flange-end of the differential case.
4. Install the differential side gear shim into the right side or bell-end of the differential case.



5. Install the differential side gear and clutch disc assembly into the right side or bell-end of the differential case.

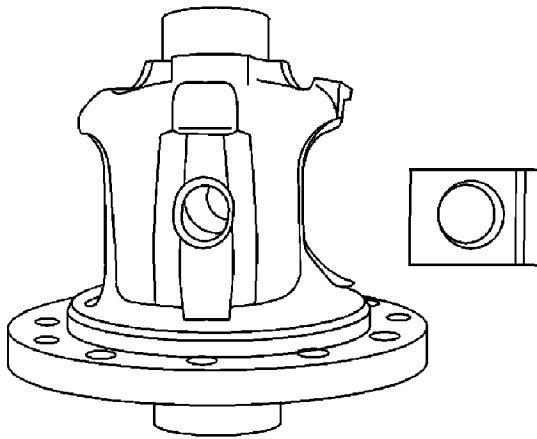


Note: If the original pinion gears and thrust washers are being re-used, install the pinion gears and thrust washers on the same side as when removed.

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

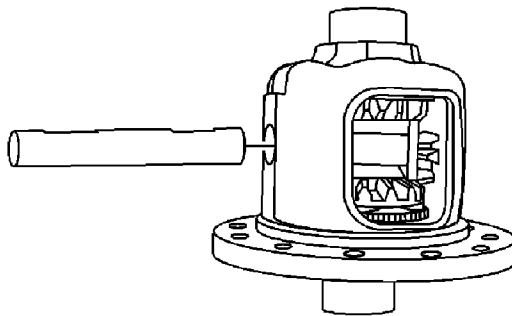
Place the pinion gears and the pinion thrust washers 180 degrees apart.

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.

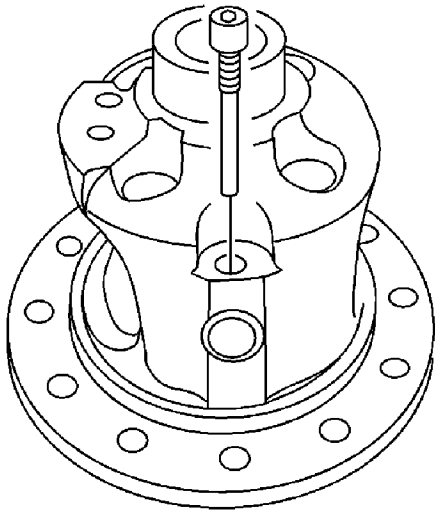


8. Install the thrust block.

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

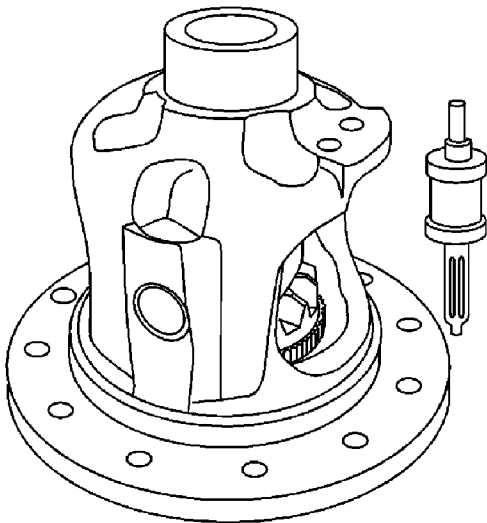


9. Install the pinion shaft.

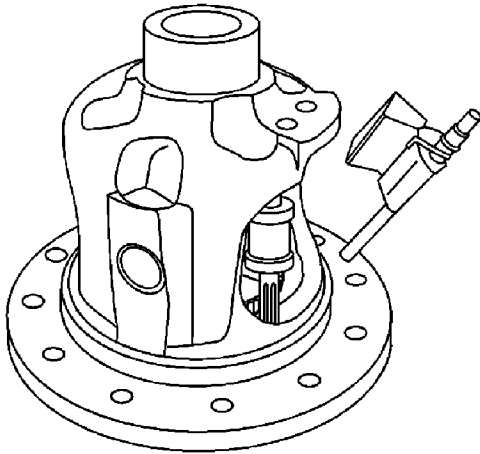


10. Install the new pinion shaft lock bolt.

Tighten the pinion shaft lock bolt finger tight.

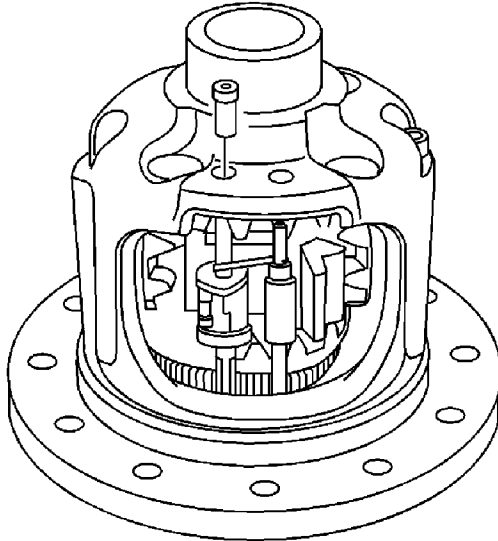


11. Install the governor assembly.

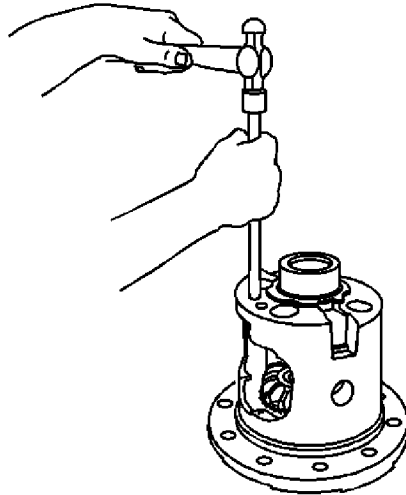


12. Install the latching bracket assembly.

The straight end of the latching bracket spring must be over and outside the governor assembly shaft.



13. Install the latching bracket bushing.
14. Install the governor assembly bushing.



15. Drive the governor bushing into position using a hammer and a brass drift.

Specification

Press the bushing into place until there is 0.25-1.27 mm (0.010-0.050 in) of shaft end play.

16. Drive the latching bracket bushing into position using a hammer and a brass drift.

Specification

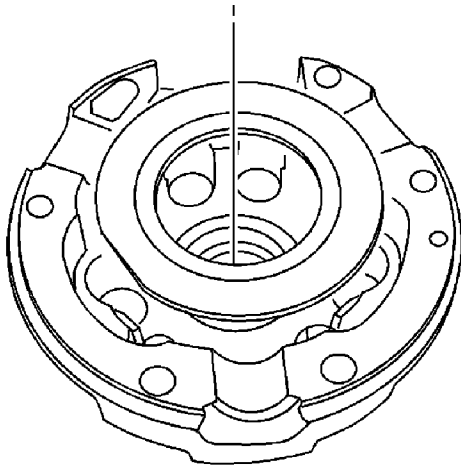
Press the bushing into place until there is 0.000-0.051 mm (0.000-0.002 in) of shaft end play.

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

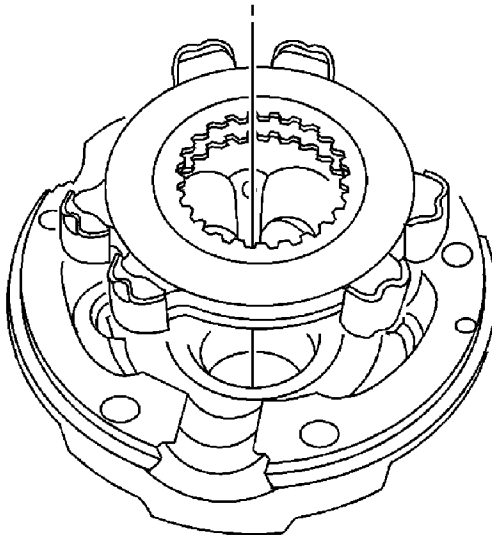
17. Tighten the pinion shaft lock bolt.
- For the 8.6 inch axle, tighten the pinion shaft lock bolt to **36 N·m (27 lb ft)**.
 - For the 9.75 inch axle, tighten the pinion shaft lock bolt to **27 N·m (20 lb ft)**.
18. Install the ring gear. Refer to [Drive Pinion and Ring Gear Replacement](#).
19. Install the differential side bearings. Refer to [Differential Side Bearings Replacement](#).
20. Install the differential assembly. Refer to [Differential Replacement](#).

Locking Differential Assemble (10.5 Inch Axle)

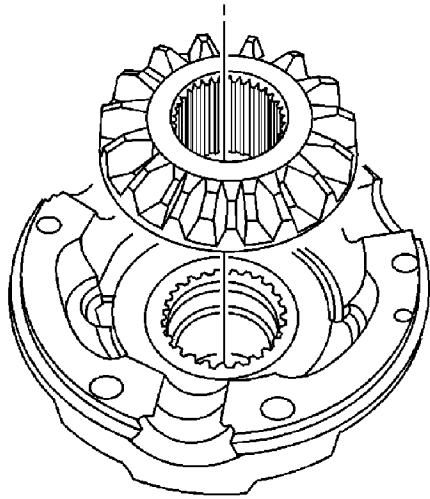
Note: The left and right side gear backlash and thrust block thickness measurement must be completed before the components of the differential can be assembled.



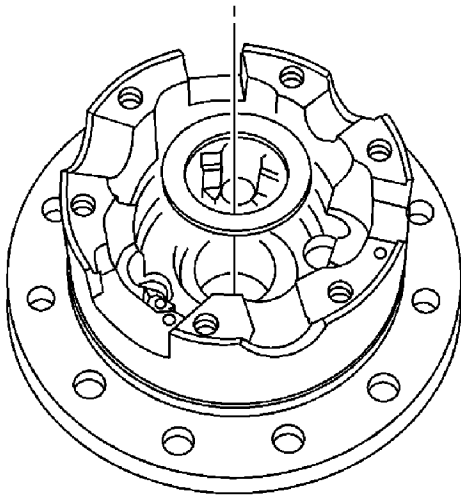
1. Install the differential side gear shim into the right side or bell-end differential case half.



2. Install the differential side gear clutch disc assembly into the right side or bell-end differential case half.

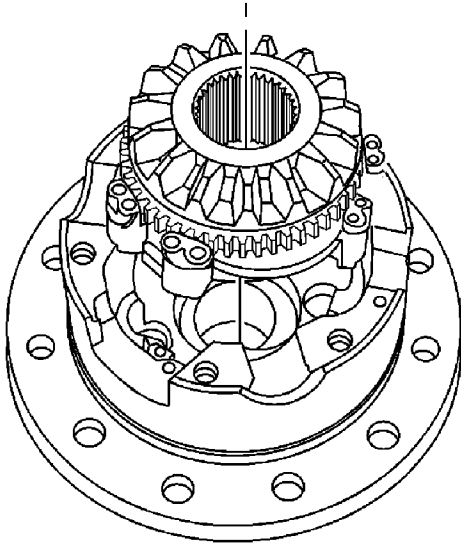


3. Install the differential side gear into the right side or bell-end differential case half.

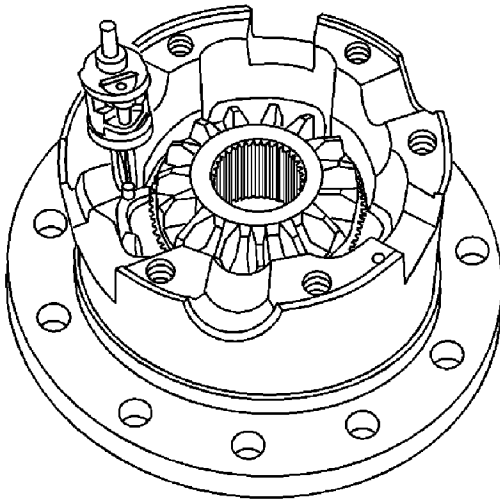


4. Install the locking differential clutch disc thrust washer into the left side or flange-end differential case half.

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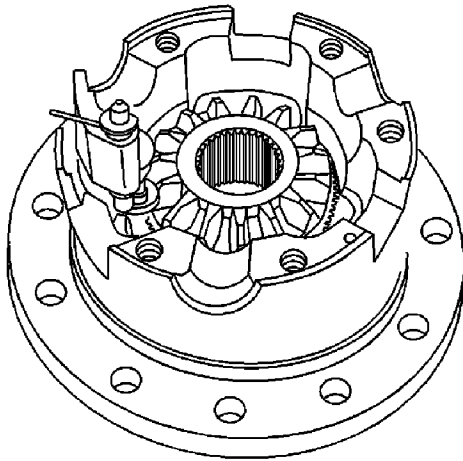


5. Install the locking differential cam unit and clutch disc assembly into the left side or flange-end differential case half.



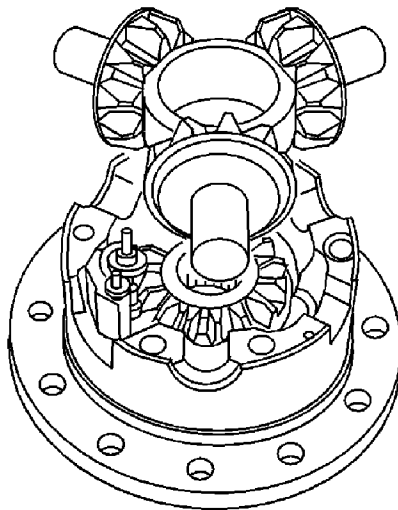
6. Install the governor assembly.

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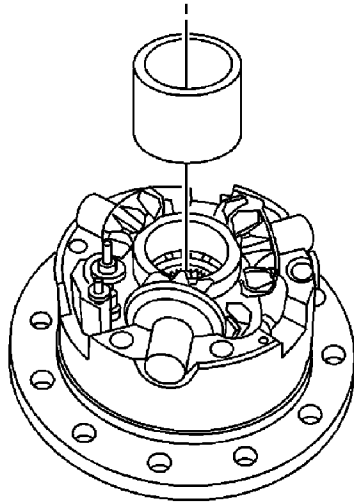


7. Install the latching bracket and spring assembly.

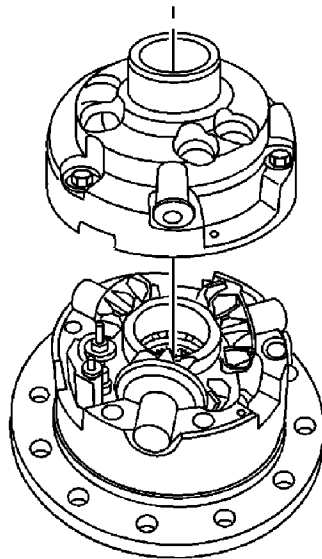
The straight end of the latching bracket spring must be over and outside the governor assembly shaft.



8. Install the locking differential spider, the differential pinion gears, and the differential pinion gear thrust washers into the differential case.



9. Install the thrust block.

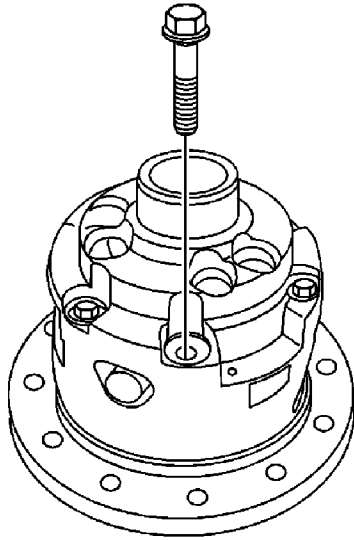


10. Install the right case half to the left case half.

Hold the right side locking differential side gear and clutch disc assembly in the right side case half.

Align the governor and latching bracket assembly shaft with the holes in the left case half.

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



11. Install the differential case bolts and tighten to **50 N·m (37 lb ft)**.
12. Install the ring gear. Refer to [Drive Pinion and Ring Gear Replacement](#).
13. Install the differential side bearings. Refer to [Differential Side Bearings Replacement](#).
14. Install the differential assembly. Refer to [Differential Replacement](#).

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