

## GENERAL MOTORS 10 1/2" RING GEAR

**Chevrolet**  
**C20, 30**  
**G30**  
**K20**  
**P30**  
**GMC**  
**C2500, 3500**  
**G3500**  
**K2500**  
**P3500**

### DESCRIPTION

The axle assembly is the hypoid gear type with integral carrier housing. It is used with full floating axles. The drive pinion bearing preload adjustment is made with a collapsible spacer. The differential side bearing preload adjustment and the drive pinion depth adjustment are made by shims. A removeable 14 bolt housing cover permits inspection and minor servicing of differential without removal from vehicle.

### AXLE RATIO & IDENTIFICATION

General Motors uses several types of axles in its vehicles. The 10 1/2" ring gear axle can be distinguished from the others by the configuration of its housing cover (see illustration) and by the number of attaching bolts. To determine axle ratio, divide the number of teeth on ring gear by number of teeth on drive pinion.

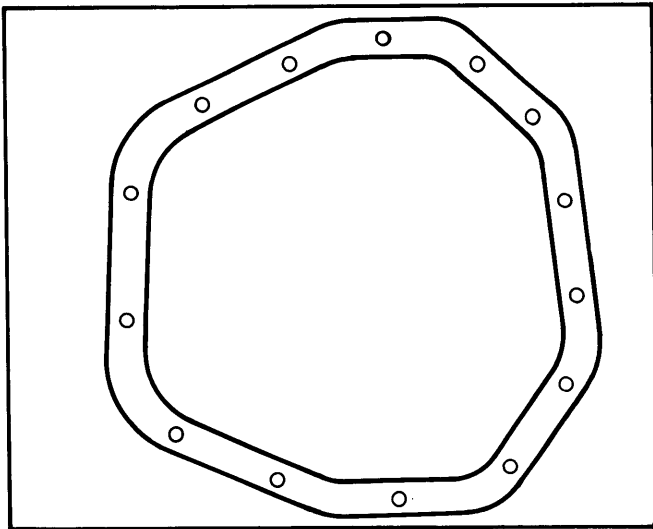


Fig. 1 10 1/2" Ring Gear Housing Cover Gasket for Identification Purposes

### REMOVAL & INSTALLATION

#### AXLE SHAFTS

Remove axle shaft attaching bolts from wheel hub and hit flange on axle shaft with a soft faced hammer to loosen shaft. Grip rib on end of flange with pliers and twist axle shaft to begin removal. When shaft is loose, remove it from housing. To install, reverse removal procedure, using new gaskets.

#### WHEEL HUB & SEAL

Remove axle shaft, then remove lock nut retainer, lock nut, adjusting nut retainer, adjusting nut and thrust washer from axle housing. Pull hub and drum assembly straight off axle housing.

Pry old oil seal from wheel hub, using care not to damage bore surface. Thoroughly clean seal contact area, then pack cavity between seal lips with high melting point wheel bearing lubricant. Position seal in hub bore, then carefully press seal into hub using suitable tool (J-24428) until seal is flush with edge of hub. Install hub onto axle housing and install axle shaft.

### WHEEL BEARINGS

1) With wheel hub removed from vehicle, use a long drift or punch to drive INNER bearing, cup, and oil seal from hub. Remove outer bearing retaining ring, then drive OUTER bearing out of hub using suitable tool (J-24426).

**CAUTION** — Inner bearing cup and outer bearing retaining ring must be removed before attempting to remove outer bearing cup.

2) Place OUTER bearing assembly into hub. Using suitable tool (J-8608), drive bearing past retaining ring groove in hub. **NOTE** — Be sure chamfer of tool J-8608 does not contact bearing cup. Install outer bearing retaining ring and drive outer bearing cup back against ring until seated. Place INNER bearing cup into hub, then using suitable driver (J-24427) drive cup into hub until seated against shoulder. Install new oil seal. Place hub assembly onto axle housing. Install adjusting nut and adjust rear wheel bearing. See Rear Wheel Bearing Adjustment in WHEEL ALIGNMENT Section.

### PINION FLANGE & SEAL

Disconnect propeller shaft and tie out of way, then scribe a line down pinion nut, pinion stem and pinion flange for reassembly reference. Remove pinion nut and pull pinion flange from stem. Pry oil seal from bore, using care not to damage machined surfaces. Clean area thoroughly, then pack cavity between seal lips with high melting point bearing lubricant. Place new seal into bore, then drive seal in until it bottoms against inner shoulder. Install pinion flange, pinion nut and propeller shaft.

### AXLE ASSEMBLY

Raise vehicle and support weight at frame side rails. Remove rear wheels, then disconnect propeller shaft and tie out of way. Remove wheel hub, disconnect parking brake cable at lever and at flange plate, then disconnect hydraulic brake hose at connector on axle housing. Disconnect shock absorbers at axle brackets, then raise axle assembly slightly to relieve tension on springs. Remove spring "U" bolts and lower axle assembly to floor. To install, reverse removal procedure.

## OVERHAUL

### DISASSEMBLY

1) Drain lubricant, then remove housing cover and axle shafts. Note and record ring gear backlash and pinion bearing preload for reassembly reference. Remove adjusting nut lock retainers from bearing caps, mark bearing caps for

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reassembly reference, then remove bearing caps. Loosen side bearing adjusting nuts and remove differential case assembly from axle housing.

2) Remove pinion bearing retainer bolts, then remove pinion and bearing retainer assembly. Note and record number and thickness of shims removed. Remove pinion flange and press pinion gear out of bearing retainer, then press rear pinion bearing from gear. Drive front and rear pinion bearing cups and pinion oil seal from bearing retainer. Drive pinion straddle bearing from axle housing.

3) Mark differential case halves for reassembly reference, then remove ring gear bolts and ring gear and split case halves. Remove side gears, differential spider, differential pinion gears and thrust washers.

### REASSEMBLY & ADJUSTMENT

**Case Assembly** - 1) Lubricate differential pinion gears, side gears and thrust washers with hypoid gear oil, then place pinion gears and thrust washers on differential spider. Install side gears and spider assembly into left half of differential case, then assemble two halves of case, making sure alignment marks on both halves are together.

2) Install two guide pins in ring gear, directly opposite each other. Start guide pins through holes in case flange and tap ring gear lightly with soft face hammer until ring gear attaching bolts can be started. Tighten bolts evenly until ring gear is flush with case flange. Remove guide pins and tighten all ring gear bolts alternately and evenly.

**Pinion Depth & Bearing Preload** - 1) With pinion bearing retainer mounted in vise, install pinion gear and bearing assembly into retainer, then place pinion flange on gear stem. Install new pinion nut and tighten nut in small increments until specified pinion bearing preload is obtained.

2) If original ring and pinion gears are to be reinstalled, use new pinion shims of same number and thickness as those removed. If new gears are to be installed, determine correct shims as follows: Compare pinion depth code number of new pinion gear with that of original pinion gear. From these two codes, determine correction factor by referring to following chart. Combine correction factor with thickness of original shim pack to obtain necessary thickness of new shim pack. Place new shim pack onto carrier housing and install pinion bearing retainer assembly. Tighten retainer bolts in a crosswise sequence.

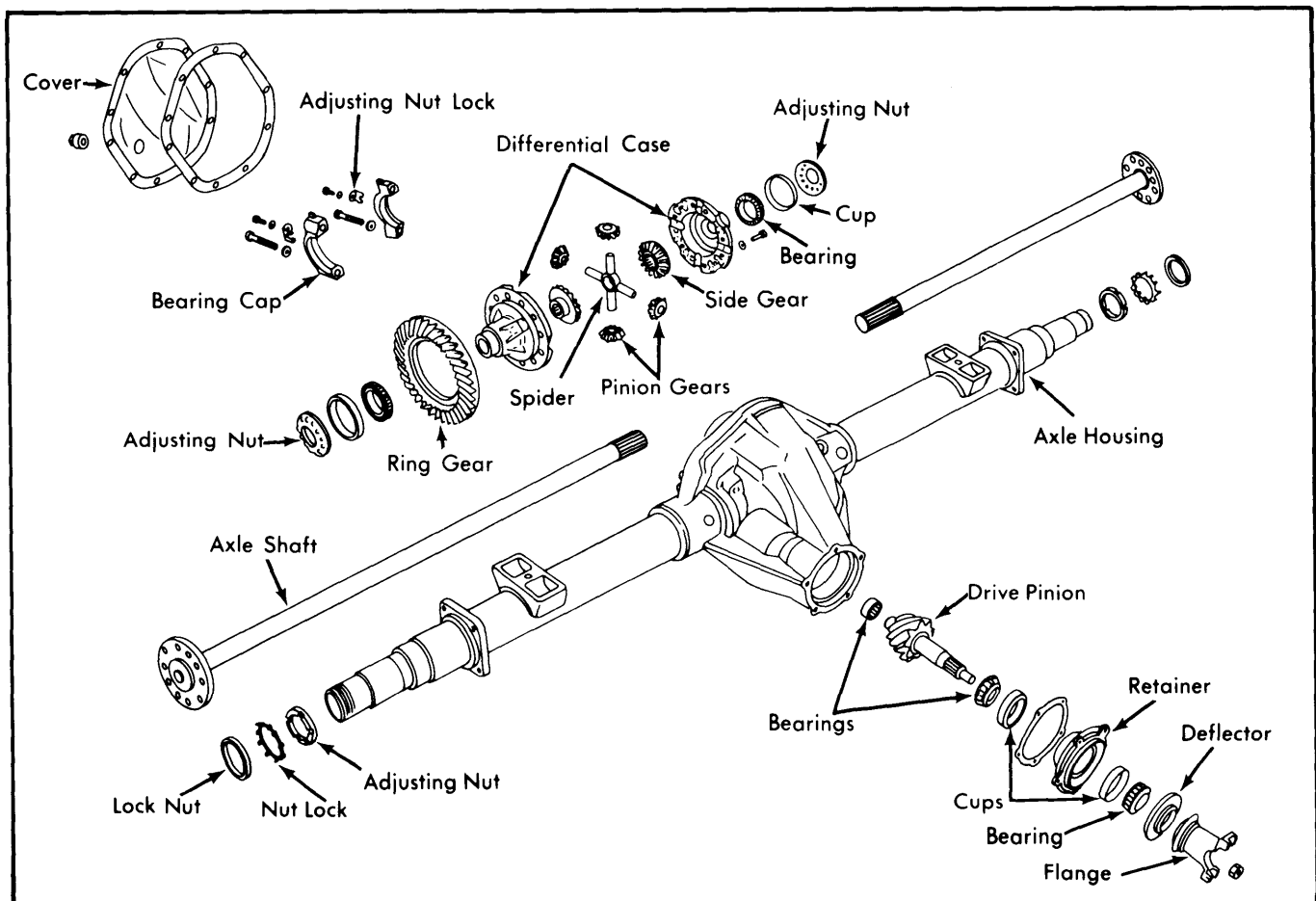


Fig. 2 Exploded View of General Motors 10 1/2" Ring Gear Axle Assembly

# Drive Axles

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Pinion Depth Codes		
Original Code	Service Code	Correction
+2	+2	0
+2	+1	-.001
+2	0	-.002
+2	-1	-.003
+2	-2	-.004
+1	+2	+.001
+1	+1	0
+1	0	-.001
+1	-1	-.002
+1	-2	-.003
0	+2	+.002
0	+1	+.001
0	0	0
0	-1	-.001
0	-2	-.002
-1	+2	+.003
-1	+1	+.002
-1	0	+.001
-1	-1	0
-1	-2	-.001
-2	+2	+.004
-2	+1	+.003
-2	0	+.002
-2	-1	+.001
-2	-2	0

**Backlash & Final Assembly** - 1) Place lubricated bearing cups onto differential side bearings and place differential assembly into carrier. Install bearing caps in their original positions and tighten cap bolts until just snug.

2) Loosen right side bearing adjusting nut and tighten left side adjusting nut until zero backlash is obtained. Back off left adjusting nut two slots to a locking position, then tighten

right adjusting nut until case is in firm contact with left adjusting nut. Loosen right adjusting nut until it is free of bearing, then retighten nut until it just contacts bearing. Tighten right adjusting nut additional two slots (used bearings) or three slots (new bearings) to properly preload differential side bearings.

3) Using a dial indicator, measure ring gear backlash in at least four locations around ring gear. Adjust to specifications by moving adjusting nuts in or out as necessary.

**CAUTION** - If one adjusting nut is loosened the other nut must be tightened an EQUAL AMOUNT to maintain side bearing preload.

4) With backlash adjustment complete, install adjusting nut lock fingers into slots in nuts and attach fingers to bearing caps. Tighten bearing cap bolts and perform gear tooth contact pattern check. Install axle housing cover.

### AXLE ASSEMBLY SPECIFICATIONS

Ring Gear Backlash	
Preferred	.005-.008"
Acceptable	.003-.012"
Pinion Bearing Preload	
New Bearings	25-35 in. lbs.
Used Bearings	5-15 in. lbs.

### TIGHTENING SPECIFICATIONS

Application	Torque (Ft. Lbs.)
Ring Gear	110
Side Bearing Cap	100
Drive Pinion Nut	220
Differential Bearing Adjusting Lock	15
Pinion Bearing Retainer	70
Housing Cover	18