

SECTION : 205-02B Independent Rear Suspension — Full Floating Axle

VEHICLE APPLICATION : 2008.0 Falcon

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SPECIFICATIONS

General Specifications

Description	Specification
Rear Axle Lubrication	
(Level with bottom of filler plug hole with vehicle at curb height.)	
Model 80	
CONVENTIONAL	
Grade	Mobilube SHC ID
Ford Specification	ESZ-M2C190-A
Capacity	1.70 litre
LIMITED SLIP - NOT AVAILABLE IN MODEL 80	
Model 86	
CONVENTIONAL	
Grade	Mobilube SHC ID
Ford Specification	ESZ-M2C190-A
Capacity	1.80 litre
LIMITED SLIP	
Grade	Mobilube SHC ID
Ford Specification	ESZ-M2C190-A
Capacity	1.80 litre + 40ml Mobil 3022L
BEARING PRELOADS	
New Bearings	
Differential	
- Measured without axle shafts or pinion (M80)	8-24 N
- Measured without axle shafts or pinion (M86)	6-20 N
Pinion	
- With oil seal	1.5-2.1 Nm
- Without oil seal	1.5-1.9 Nm
Used Bearings	
Differential	
- Measured without axle shafts or pinion (M80)	5-13 N
- Measured without axle shafts or pinion (M86)	5-11 N
Pinion	
- With oil seal	0.7-1.2 Nm
- Without oil seal	0.7-1.0 Nm
ADJUSTMENTS	
Pinion bearing preload adjustment.	Collapsible spacer
Differential bearing preload adjustment.	Selective spacer
Pinion depth of mesh adjustment.	Selective shim
Backlash between ring gear and pinion.	0.1 to 0.18 mm
Backlash variation between teeth.	0.05 mm max.
Maximum ring gear run out (assembled)	0.13 mm
Limited slip differential torque	
New:	100-300 Nm
Used:	50-150 Nm (Separate cone type)
	To be constant within 10 Nm (continuously rotating)



SPECIFICATIONS (Continued)

Description	Nm
Ring gear bolts (L.H. Thread)	140
Bearing cap bolts	55
Rear cover bolts	30
Axle bearing retainer plate bolts	45
Spring 'U' bolt nuts (Wagon)	60
* Track arms to body	75
* Track arms to pivot link	75
* Pivot link to axle housing cover	15
* Suspension arms to axle housing	75
* Suspension arms to body	75
* Shock absorber to spring plate	75
Caliper to bracket pin nuts	20
Splash shield screws	10
Shock absorber to spring plate nut	45
Stabiliser bar clamp bolt	20
Universal joint bolts	10
Vent - Rear axle housing	15
Pinion flange nut	-
Filler Plug	35
Drain Plug	30

* Items marked thus are to be tightened with the vehicle in the curb load position.



DESCRIPTION AND OPERATION

Description And Operation

Drive Unit Identification

A label identifying the drive unit assembly part number, model, serial number, and final drive ratio is fixed to the carrier casting.

A Decal is attached to the right hand front door hinge pillar. (LSD only).

Drive Unit

The drive unit should be removed from the vehicle for overhaul. Before disassembling the unit the following inspection should be carried out:

1. Remove the rear cover, clean and visually inspect the moving parts for chipped or scuffed surfaces.
2. Use a torque wrench to check the ring gear bolt and pinion flange nut torques.
3. Check the run-out and backlash. Refer to Section 205-00.
4. Carry out the Gear Tooth Contact Pattern Check outlined in Section 205-00.

M80 & M86 IRS (Sedan)

1. A label identifying the drive unit assembly part number, serial number, final drive ratio and model is fixed to the carrier casting.

Two different model final drive units are used in sedan vehicles:

- M80 final drive units are fitted with a 3.27 or 3.45 ratio in an 8" (203mm) diameter gear set. LSD is not available in this drive unit.
- M86 final drive units are fitted with 2.73, 3.46 or 3.73 ratios in a 8.6" (220mm) diameter gear sets, with or without LSDs. M86 final drive units are fitted to all sedan vehicles powered by a V8 or turbo I6 engine and on XR6 LSD sedans. All M86 final drive units should be filled with synthetic oil as per Part 4-5 Specifications.

Conventional Differential

This axle is a hypoid type of unitised carrier construction. The two or four-pinion gear split differential case and the drive pinion are mounted in opposed taper roller bearings in the carrier. Differential bearing preload adjustment is provided by the screw adjusters. Pinion bearing preload is regulated by a collapsible spacer and adjusted using the pinion nut. The differential case houses Belleville spring washers between the side gears and the differential case, which maintains a pre-load on the gears to reduce backlash.

Torque is transferred from the drive shaft to the final drive assembly via the constant velocity type companion flange, which is splined to the hypoid pinion. The torque is then transferred from the pinion through the ring gear, differential case, differential

pinion cross shaft, differential pinions and side gears to the axle shafts.

Axle shaft end play is pre-set and is not adjustable. Oil seals are located between the inner axle shafts and the screw adjusters.

Limited Slip Differential

This axle is a hypoid type of unitised carrier construction. The two-pinion gear split differential case and the drive pinion are mounted in opposed taper roller bearings in the carrier. Differential bearing preload adjustment is provided by the screw adjusters. Pinion bearing preload is regulated by a collapsible spacer and adjusted using the pinion nut.

Torque is transferred from the drive shaft to the rear axle assembly via the companion flange which is splined to the hypoid pinion. The torque is then transferred from the pinion through the ring gear, differential case, differential pinion cross shaft, differential pinions and side gears to the axle shafts.

The Model 86 limited slip differential has a multiplate oil bath type design is utilised where alternate plates are splined to the differential case and side gear. Compressive preloading of the plates provides frictional resistance to rotation, providing torque transfer to the rear wheel with the least traction.

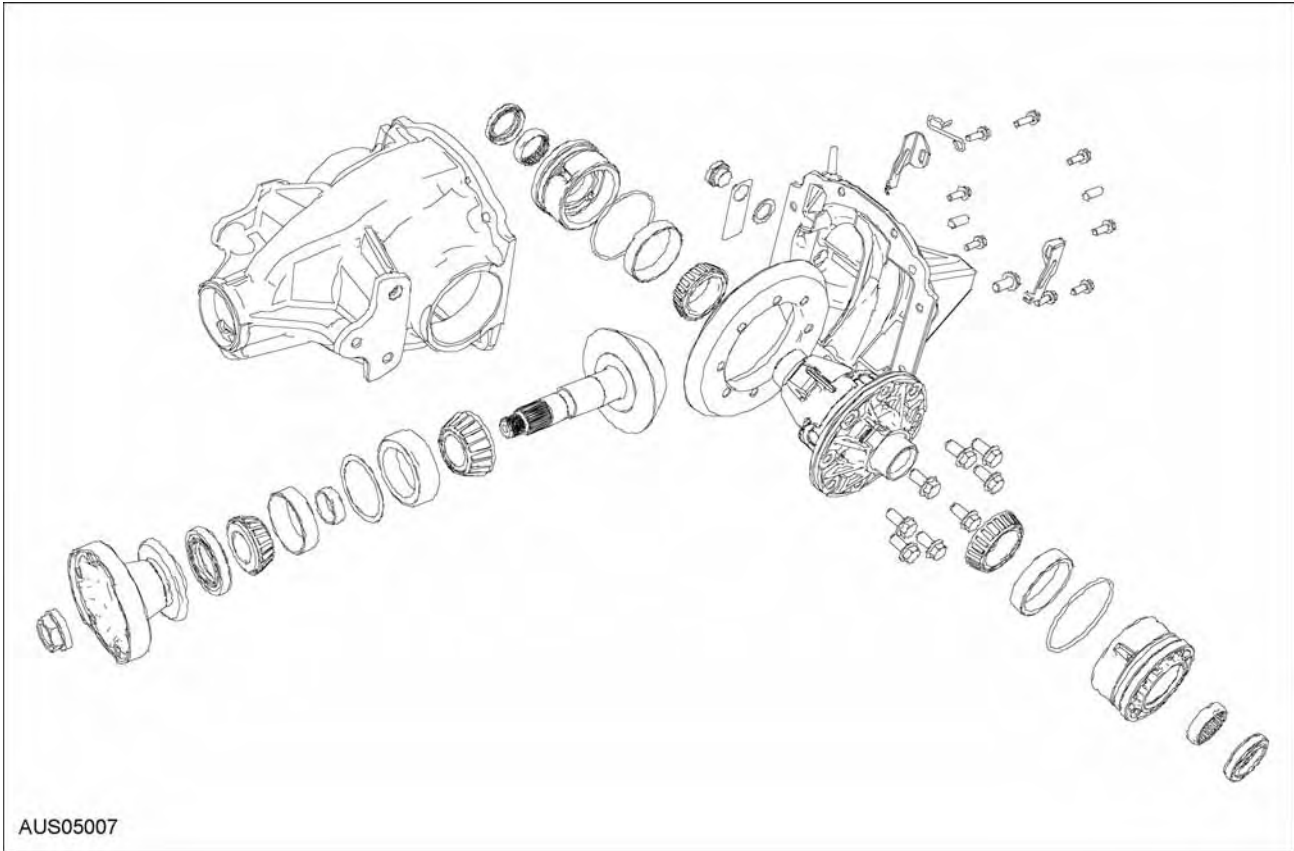
With a conventional differential, when the rear wheels are under extreme unbalance tractive conditions, such as one wheel on dry road and the other in mud or ice, wheel spin will occur if over acceleration is attempted. However, with the limited slip differential, when the tendency for wheel spin occurs, the friction generated between the friction plates transfers a portion of the driving torque to the non-spinning wheel.

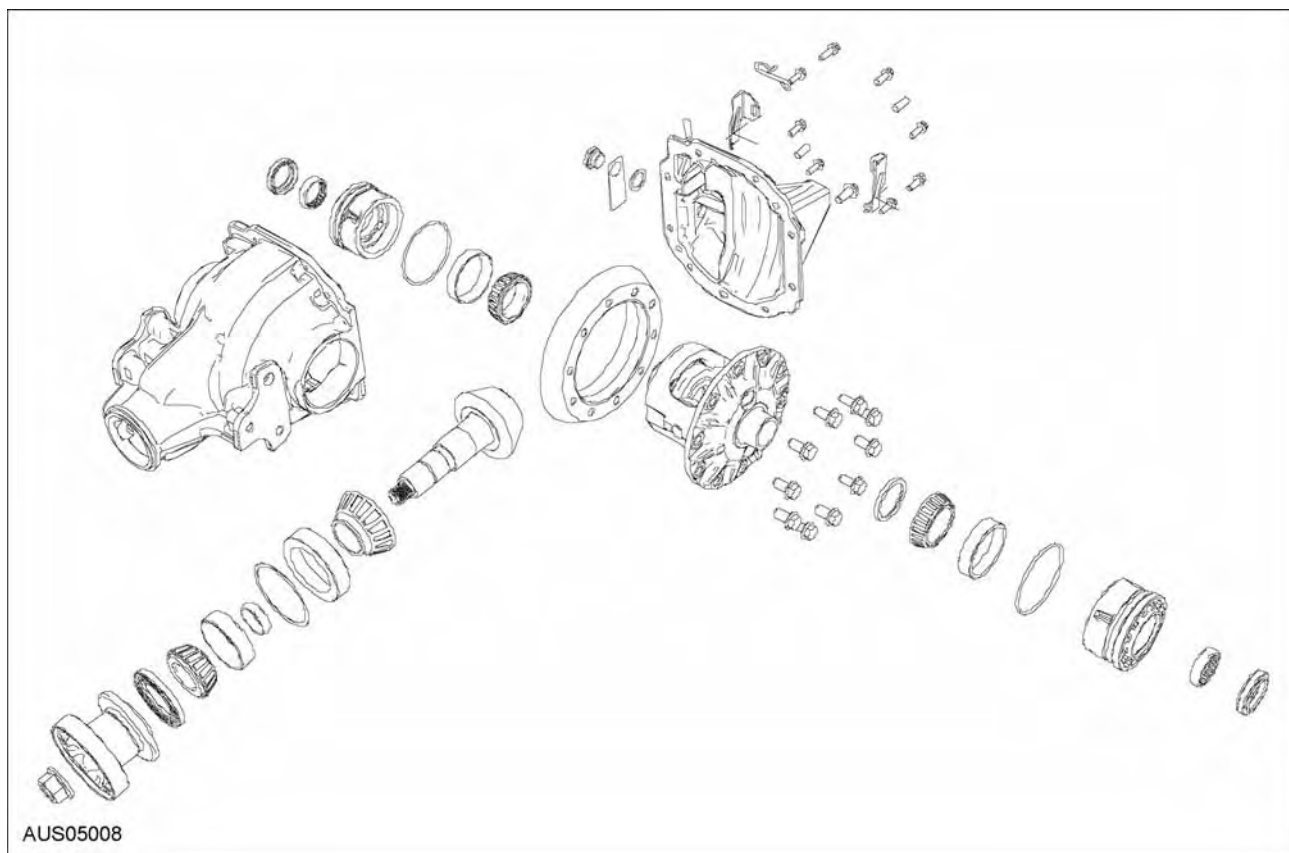
Diff and Pinion Bearings

Construction design is a single row, pre-set tapered roller bearing capable of accepting thrust loads in either direction and radial loads in any combination. The tapered roller unit type bearing consists of five basic parts: the cup or outer race, the cup rib ring, the cone or inner race, the tapered rollers which roll freely between the cup and cone, and the cage which serves as a retainer to maintain the proper spacing between the tapered rollers grouped around the cone.

When the bearing is manufactured, the cup and rib ring are bonded together with an adhesive to facilitate bearing handling and installation. Since the cup and rib ring are clamped together in the axle housing, there is no need for a permanent bond. When the bearing is serviced the cup will usually be separated from the rib ring.



DESCRIPTION AND OPERATION (Continued)**M80 IRS Drive Unit**

DESCRIPTION AND OPERATION (Continued)**M86 IRS Drive Unit**

GENERAL PROCEDURES

Drive Unit Oil Change

1. Raise the vehicle so that it remains level.
2. Remove the bottom rear cover flanged bolt from the drive unit to drain oil.

NOTE: It is preferable to drain the oil while it is warm so that any debris can drain out more easily.

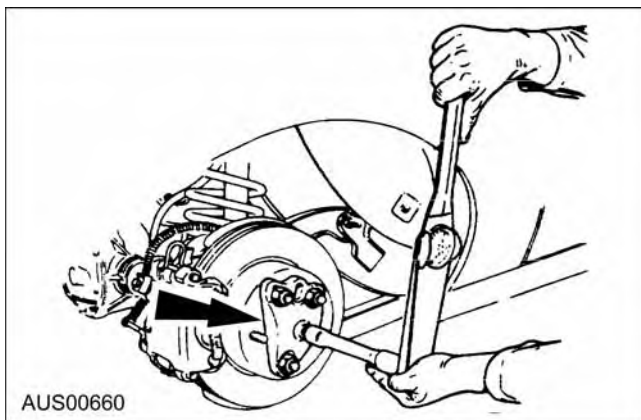
3. Refit the cover bolt and tighten to 23-31 Nm.
4. Remove the filler plug (located on the left-hand side of the drive unit housing ahead of the axle shaft).
5. Fill drive unit with the appropriate lubricant in accordance with Part 4-5 specifications.
6. Replace filler plug and tighten to 35-40 Nm. Use an appropriate thread sealant if required.

In Vehicle Torque Check

Torque Testing

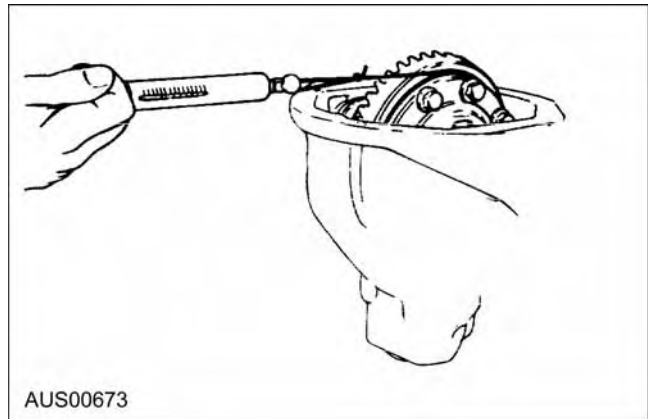
To test the Limited Slip differential for correct operation proceed as follows:

1. Drive vehicle 10 km to warm up axle oil.
2. Chock the front wheels.
3. Raise one rear wheel and attach the Special Tool No. E6662.
4. Place the transmission in neutral and release the park brake.
5. Ensure that there is no brake drag affecting wheel rotation.
6. Attach a torque meter to the special tool, and rotate the axle.
7. The torque required to rotate the axle shaft for a used L.S.D. unit should be between 50 and 150 Nm. Reading should be steady within 10 Nm.
8. If the torque required to continuously rotate the wheel is outside the specification check the differential for improper assembly and/or rework.



Differential Case Preload Setting

1. Hold the differential case in position while inserting screw adjusters until the differential is supported by the bearings. Use special tool 205-463 to fit the screw adjusters.



2. Rotate the differential several times to seat bearings while the screw adjusters are being tightened.
3. Measure the bearing preload.
4. Tighten the screw adjusters until the bearing preload is within the required range. Record the torque required on the screw adjusters to obtain the required preload.

Backlash and Tooth Contact Setting

1. Replace the differential assembly.
2. Ensure that the pinion nut and bearing cap bolts are tightened to the specified torque.
3. Check the backlash on the ring gear as described in Section 205-00.
4. If backlash is excessive move the ring gear towards the pinion by turning the screw adjusters. If the backlash is insufficient move the ring gear away from the pinion by turning the screw adjusters.

NOTE: Turn the screw adjusters the same amount on each side when setting the backlash.

5. Recheck the tooth contact pattern as described in Section 205-00.
6. Make necessary adjustments until tooth contact is appropriate.
7. Replace/Install new seals and silicone sealant that are not already in place.
8. Install rear cover and torque to specification.

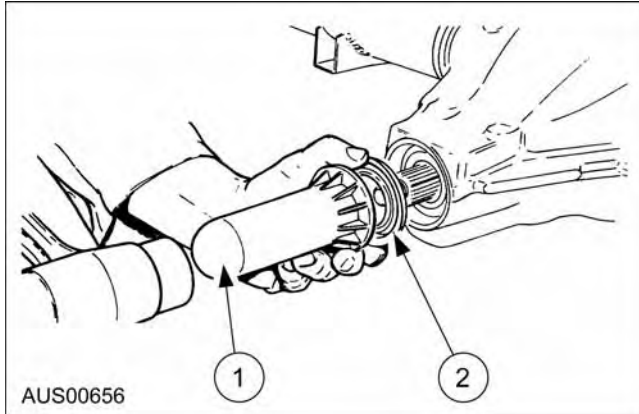


IN-VEHICLE REPAIR

Pinion Oil Seal Replacement

Removal

1. Raise the vehicle on a hoist. Disconnect the drive shaft from the drive pinion flange after marking the drive shaft and pinion flange to ensure correct positioning on reassembly.
2. Mark the pinion shaft and the pinion flange to ensure correct positioning on reassembly. Mark the pinion flange and the pinion nut to establish bearing preload on reassembly.



4. Align the pinion flange spline mark with the pinion shaft spline mark and install the flange with a smear of lubricant on the splines. Tighten the nut until the marks previously made on the pinion flange and the nut are in alignment re-establishing the pinion bearing preload.
5. Install the driveshaft with the marking on the drive shaft and the pinion flange in alignment.
6. Check axle lubricant level and top up if necessary with specified lubricant.
7. Remove the vehicle from the hoist.

Item	Description
1	Oil Seal Tool E9055
2	Drive Pinion Oil Seal

3. Hold the pinion flange using tool EN1205B and remove the self locking nut.
4. Place a drain pan beneath the pinion housing.
5. Mark the ends of the pinion shaft and the pinion flange spline for correct re-alignment during installation.
6. Clean the pinion bearing housing around the oil seal.
7. Remove the pinion flange using tool number E9258B. Under no circumstances should a hammer be used.
8. Remove the pinion oil seal by prying it out with a suitable tool.

Installation

NOTE: Refer to, Section 205-00 for Special Tool(s).

1. Check the splines on the pinion shaft and pinion flange for burrs and if necessary clean up with fine crocus cloth. Wipe the flange and shaft clean.
2. Clean the oil seal seat. The lubricant return passage must be clear.
3. Lubricate the seal lips and the outside diameter with oil and install the seal, using the special tool. Correct seal location is from flush to 0.25 mm below the carrier surface.



REMOVAL AND INSTALLATION

Half Shaft

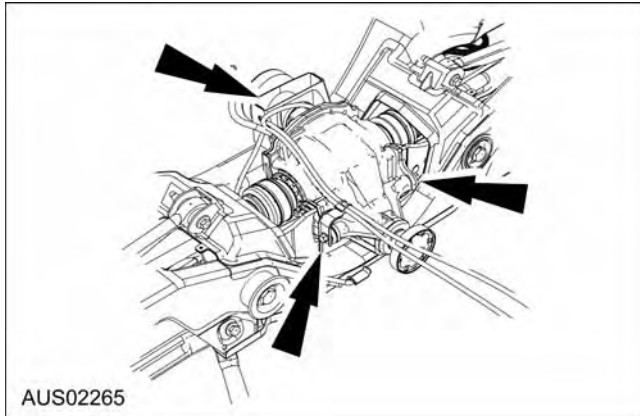
Removal and Installation

Refer to section 205-05.

Drive Unit Assembly

Removal

1. Remove knuckle assembly, refer to Section 204-02a.
2. Remove Rear Drive Halfshafts, refer to Section 205-05.
3. Remove IRS Module, refer to Section 204-02a.
4. Unclip handbrake cables.
5. Remove breather tube.
6. With the Drive Unit Assembly supported, remove the front and rear support bolts.



Installation

1. Installation procedure is the reverse of the removal procedure.
NOTE: Ensure all bolts are torqued to specifications.

Differential Assembly

Removal and Installation

1. Remove the rear cover and screw adjuster locking plates.
2. Remove the screw adjusters using special tool 205-463.
3. Remove the differential assembly.



DISASSEMBLY AND ASSEMBLY

Inner Axle Shaft Seal Replacement

Disassembly

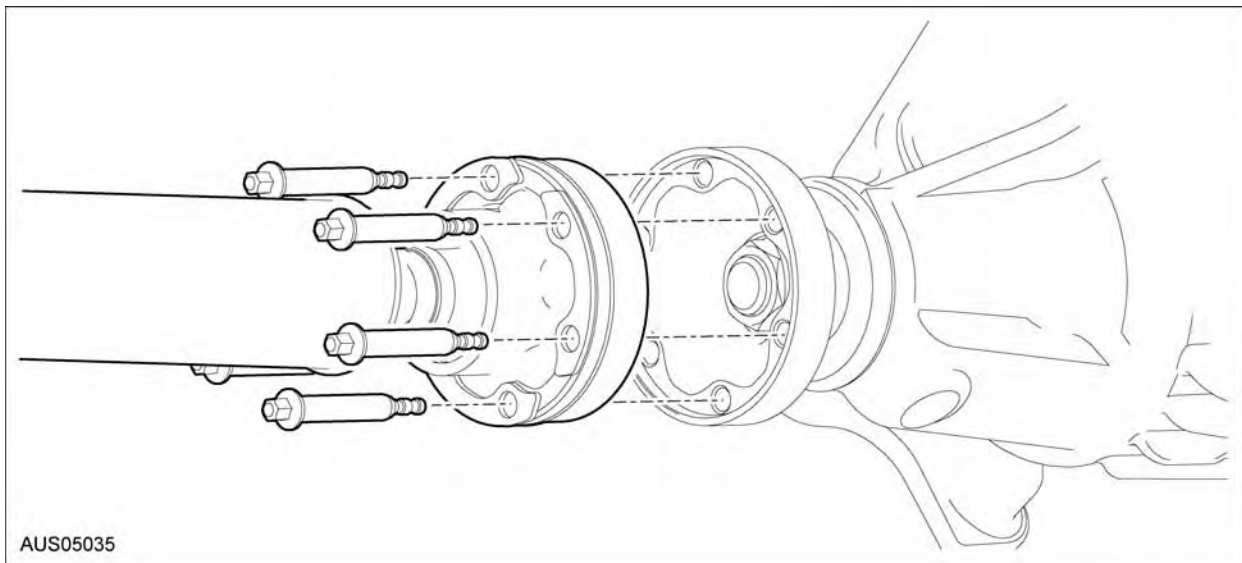
1. Drain lubricant from unit via bottom cover bolt.
2. Remove the half shafts from the assembly. Refer to Section 205-05.
3. Clean around the seal area ensuring there is no ingress of dirt into the axle shaft needle roller bearing.
4. Carefully remove the seal.

Assembly

NOTE: Before installation of a new seal examine the surface of the axle shafts on which the seal runs and

remove any nicks or burrs. Should this surface be irreparable, a new half shaft should be fitted. Examine the housing bore and remove any nicks and burrs.

1. Lubricate the seal lips and the outside diameter and install. The seal is to be seated on the screw adjuster.
2. Install the half shafts ensuring that the splines do not come into contact with the seal lips. Refer to Section 205-05.
3. Shafts should withstand a pull out force of 1200N.
4. Check lubricant level, top up as required.



Pinion & Pinion Bearings

Disassembly and Assembly

Carry out the following procedure with the differential assembly removed:

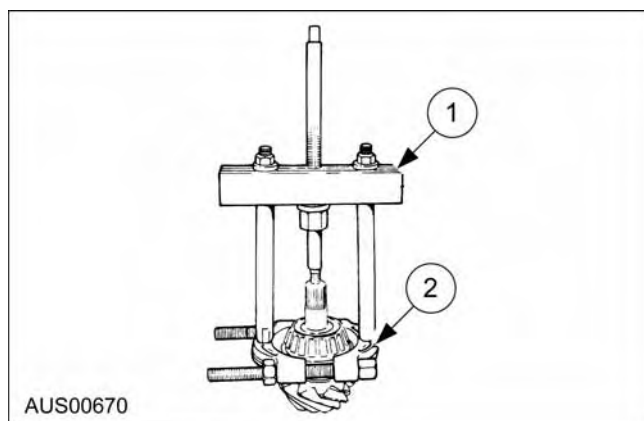
1. Mark the relationship of the companion flange. Hold the companion flange and remove the pinion nut.
2. Remove the companion flange.
3. With a soft hammer, drive the pinion out of the front bearing cone and remove it through the rear of the carrier casting.
4. Drive the pinion seal and the bearing cone out of the carrier casting.

5. If the pinion bearing cups are to be replaced, remove them from the carrier using the special tool.
6. A pinion depth adjusting shim is installed between the rear pinion bearing cup and the axle housing. Discard damaged shims.
7. If the pinion rear bearing cone and roller is to be replaced, lubricate the pinion shaft and remove the bearing cone from the pinion. Discard the bearing whenever it has been removed from the pinion.

NOTE: It is essential to renew the cups one after the other so that in each instance the other cup serves as a guide for the replacer tool.



DISASSEMBLY AND ASSEMBLY (Continued)



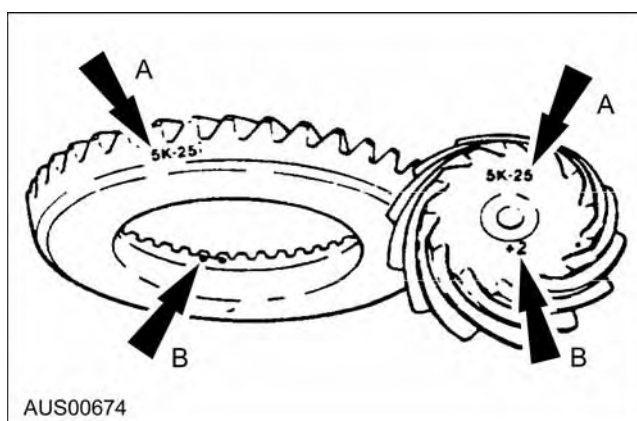
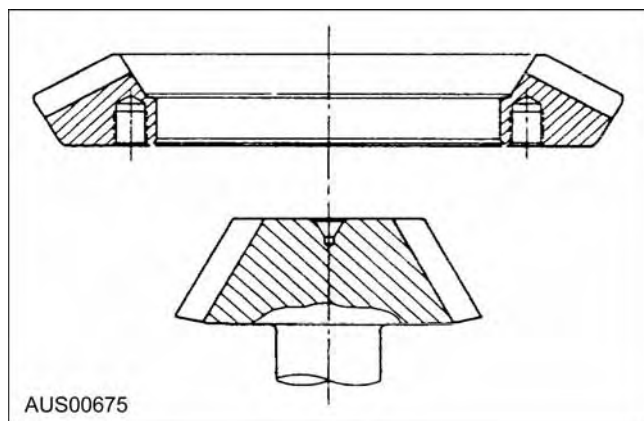
Item	Description
1	Tool-Push/Puller with Legs
2	Tool-Knife Edge Puller

Drive Pinion Selection - Shim Selection

Disassembly and Assembly

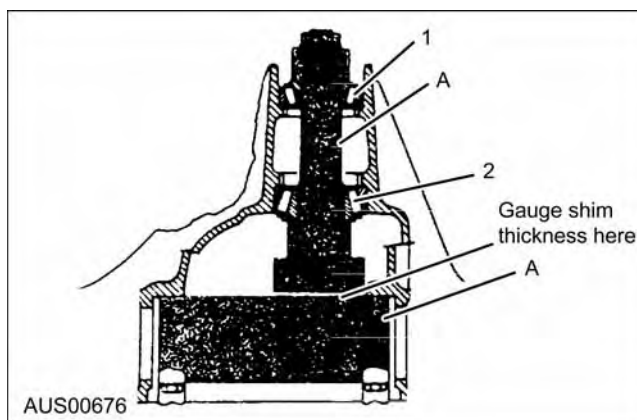
NOTE: The drive pinion and ring gear set identification marking (e.g. number 5K-25) is the matching number that appears on both the drive pinion and the ring gear. When a new gear set is being installed in an axle, be sure that the same matching number appears on both the drive pinion and the ring gear.

Pinion & Ring Gear Identification



1. The ring gear and pinion are manufactured within a tolerance of a specified distance. On the end of each pinion, there is etched a plus (+) number, a minus (-) number, or a zero (0) number which indicates the best running position for each particular gear set. This dimension is controlled by the shimming behind the rear pinion bearing cup.
2. When the shim thickness is decreased, the pinion gear is moved away from the ring gear. When the shim thickness is increased, the pinion is moved closer to the ring gear.
3. A positive (+) number on the drive pinion means that a thinner shim should be installed to move the pinion gear away from the ring gear. A negative (-) number means that a thicker shim should be used to move the drive pinion closer to the ring gear.
4. Lubricate all differential parts with the recommended rear axle lubricant, before they are installed.
5. To select the correct shim thickness follow these steps:

NOTE: The exact same rear pinion bearing that is to be used in the vehicle, is to be used when using the dummy pinion.



6. Install the front and rear pinion bearing cups into the axle housing.



DISASSEMBLY AND ASSEMBLY (Continued)

7. Fit the pinion bearing cone and rollers to the dummy pinion tool. Install the dummy pinion to the axle housing. Fit the pinion front cone and roller to the dummy pinion. Install the tool thrust collar and the nut to the dummy pinion.
8. Tighten the nut until a bearing preload of 1.5 to 2.1 Nm (new bearing), 0.7 to 1.2 Nm (used bearing) is achieved while rotating the dummy pinion back and forth to ensure correct seating of the bearing rollers.
9. Position the depth gauge cylinder in the carrier and fit the bearing caps, tightening lightly. Determine the size of pinion shim that will pass between the depth gauge and the dummy pinion head. Examine the drive pinion installation marking. The size of the pinion shim should then be altered as follows:- A positive (e.g. +0.002 inch) marking means that this pinion has to be set at this number of thousandths of an inch further from the drive gear, i.e. a shim this amount thinner must be used. A negative (e.g. - 0.002 inch) marking means that a shim this size thicker must be used. A zero (0) marking indicates that the shim selected with the gauge is the correct one for this carrier/pinion combination. Position shims are available in .001 in (0.025 mm) increments from .008 to .030 in (0.2 to 0.75 mm).

NOTE: The marking on the pinion is in Imperial measurement.

10. Remove the tools from the carrier.
11. Remove the rear pinion bearing cup from the housing.

