DRIVE AXLE

1986 Isuzu Trooper II

1986 DRIVE AXLES
Isuzu

Impulse Turbo, P'UP & Trooper II

DESCRIPTION

Rear axle housing is banjo type with removable differential carrier and semi-floating drive axles. Front axle has removable differential carrier and full-floating drive axles.

Both differentials are hypoid type ring and pinion gears. Drive axles are retained in housing by cone-type roller bearings and bearing retainers at axle housing outer ends.

AXLE RATIO & IDENTIFICATION

All models are equipped with one type of rear axle. Front axle on 4WD models is similar to rear axle. Gear ratio on 2WD vehicles with manual transmission is 3.42:1 for gasoline model, and 3.73:1 for diesel model.

Gear ratio on automatics and 4WD vehicles front and rear is 4.10:1. Gear ratio for Trooper II is 4.56:1 for front and rear drive axles. Gear ratio for Impulse turbo models is 3.91:1. Gear ratio is determined by dividing number of ring gear teeth by number of drive pinion gear teeth.

REMOVAL & INSTALLATION

NOTE: References to BJ refer to Birfield Joint; DOJ to Double Offset Joint.

DRIVE AXLES & BEARINGS

NOTE: Front axle assembly must be removed prior to removal of drive axles and bearings.

Removal (Front)

1) Raise front of vehicle and support frame on jack stands. Remove wheels and skid plate. Mark drive shaft for reinstallation and disconnect at front differential.

2) Completely loosen torsion bar by turning height control arm adjusting bolts. Remove strut bars. Remove stabilizer bar-to-lower control arm bolts and disconnect stabilizer.

3) Remove brake calipers from supports and hang on frame with wire. Disconnect ball joints at outer tie rods. Remove upper control arms from frame brackets by removing bolts from upper pivot shafts.

4) Tape shim packs together and mark for reinstallation for proper camber and caster adjustments. Remove lower control arm link ends, shock absorber-to-lower control arm bolts and lower control arms.

5) Move transfer shift lever into "2H" position and set locking hub knob to "FREE" position. Remove locking hub assembly. Remove snap ring and shims from end of spindle.

6) Remove hub and rotor assembly along with upper link and front axle (both sides). Disconnect pitman arm and idler arm. Remove steering linkage assembly.

NOTE: See LOCKING HUB article in this section for complete removal and installation procedures of locking hubs.

7) Support front axle assembly on floor jack and remove 4 axle case mounting bolts. Lower and remove front axle assembly. DO NOT damage Birfield Joints (BJ) or Double Offset Joints (DOJ).

8) Drain differential housing. Remove 4 axle mounting bracket-to-axle housing bolts. Pull drive axles from both sides of housing. Remove drive axle bearing from steering knuckle using a puller. Drive out bearing races with brass drift and replace races with hydraulic press. Install new bearings.

Installation

1) Install drive axles in housing and tighten 4 axle retainer mounting bolts. Place front axle assembly on floor jack and position under vehicle frame. Install axle assembly and tighten case mounting bracket bolts.

2) Install Pitman arm to steering sector shaft and idler arm to pivot shaft. Tighten bolts. Install hub and rotor assemblies with upper control arms to drive axle ends. Install pivot shaft to frame bracket.

3) Install camber and caster adjusting shims in original positions. Refit shock absorbers. Connect lower control arms to frame brackets. Connect ball joints to knuckle arms and tighten nuts.

4) Install strut bars and stabilizer bar ends. Tighten control arm adjusting bolts. Install disc brake caliper assemblies. Thoroughly lubricate locking hub body and lock washer. Install snap ring.

5) Push drive axle with hand pressure and set clearance between locking hub body and snap ring to .112" (3 mm) using required shims. Install gasket and locking hub cover, aligning stopper rails during installation.

6) Install wheels and skid plate. Align drive shaft index marks and install drive shaft. Tighten all nuts and bolts to specifications. Fill front differential with lubricant. Bleed hydraulic brake system (if required).

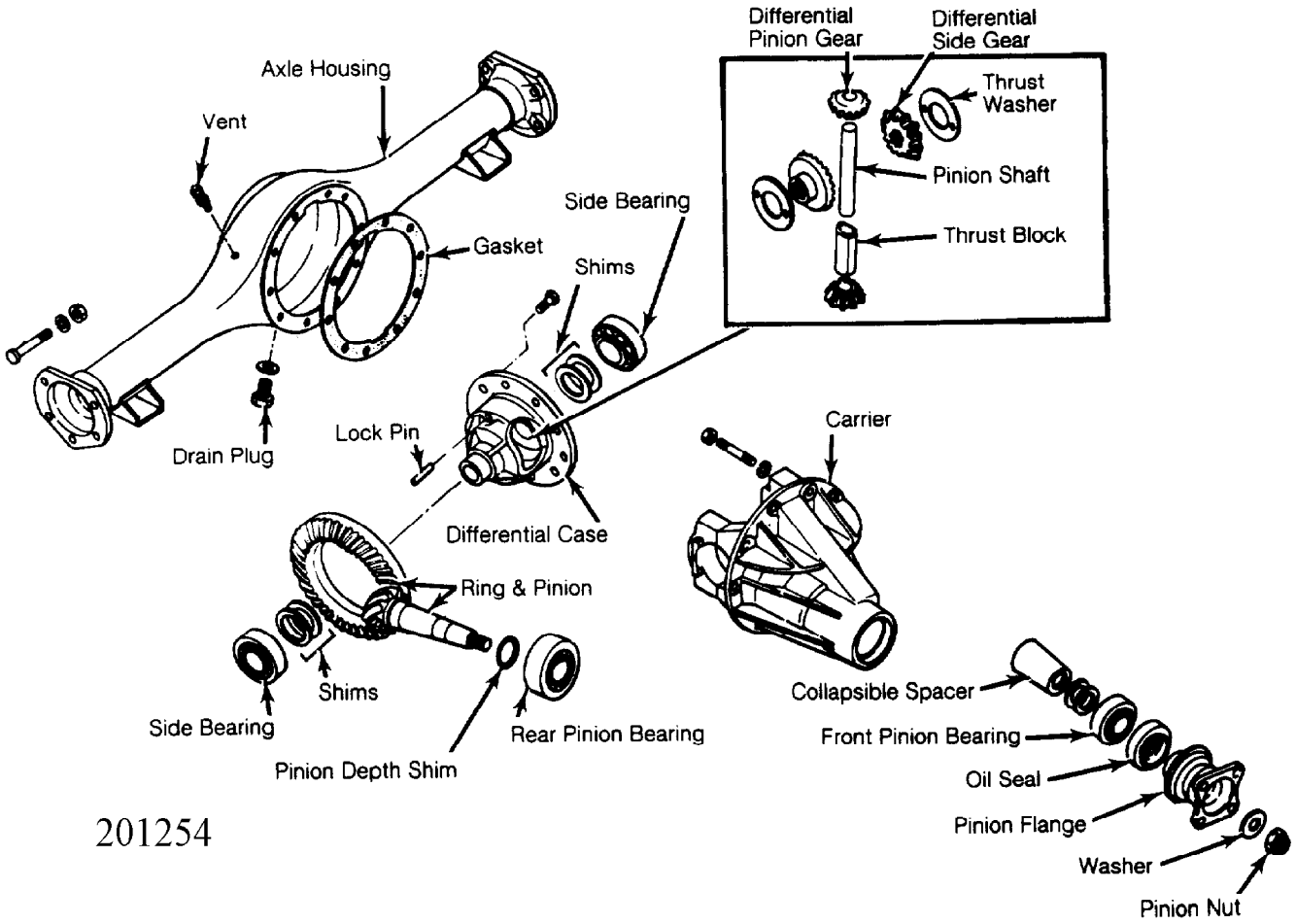

Fig. 1: Exploded View of Isuzu Rear Axle Assembly
Courtesy of Isuzu Motor Co.

Removal (Rear) - Impulse

1) Raise and support vehicle. Remove wheel and tire assembly. Remove and support caliper assembly. Do not disconnect brake hose from caliper. Remove brake rotor.

2) Remove 4 bearing retainer plate bolts. Disconnect parking brake cable. Remove axle shaft using a puller. Remove backing plate, sleeve, bearing, bearing retainer and oil seal.

Removal (Rear) - Except Impulse

1) Raise vehicle. Remove wheel and tire assembly. Remove brake drum and brake shoes, and disconnect parking brake inner cable. Disconnect brake lines from wheel cylinders and plug end to prevent loss of fluid and contamination.

2) From inboard side of brake backing plate, remove 4 nuts from bearing holder through bolts. Pull drive axle from housing.

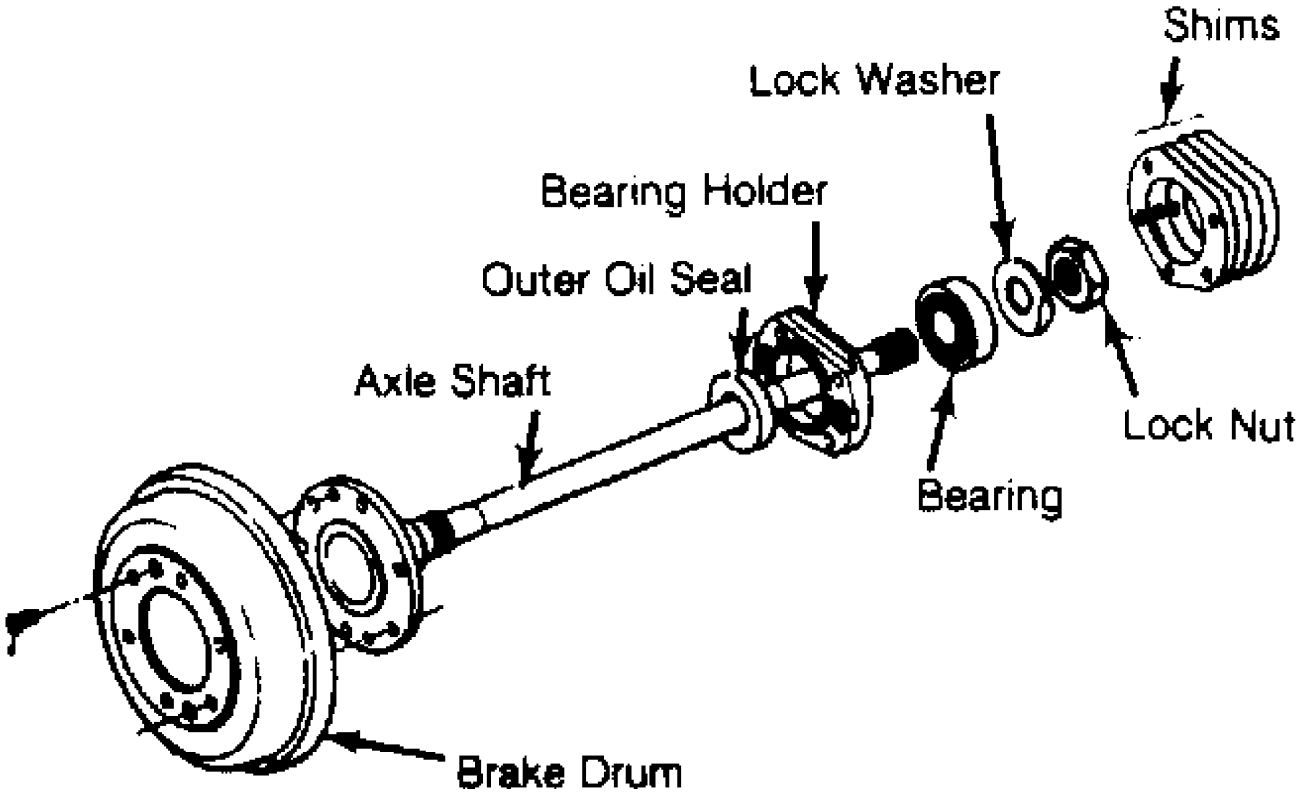

Fig. 2: Exploded View of Rear Axle Shaft Assembly
Courtesy of Isuzu Motor Co.

Bearing Replacement - Impulse

To replace axle bearing, press old bearing from axle shaft, using Bearing Remover (J-33949). Install "O" ring in groove on bearing outer race. Install bearing with "O" ring toward splined end of axle shaft. Install sleeve, with flanged side facing bearing. Press bearing and sleeve on axle shaft using a press and Bearing Installer (J-22912-01).

Bearing Replacement - Except Impulse

1) To replace axle bearing, flatten locking tab of lock washer, and mount drive axle in a vise, clamping vise jaws around lock nut. Using Remover/Installer (J-24226) positioned on lug bolts, turn drive axle to loosen lock nut.

2) Remove lock nut, lock washer, bearing, holder and brake backing plate. Remove oil seal from outboard side of bearing holder. Press off bearing holder and bearing. Drive off bearing outer race with a brass drift.

3) Install bearing outer race and grease seal into holder. Apply wheel bearing grease to bearing holder, rear axle tube and bearing inner race. Insert 4 through bolts into backing plate. Install bearing holder to backing plate. Ensure oil seal side of bearing holder is against backing plate.

4) Place backing plate assembly over drive axle, position bearing over drive axle and press into bearing holder. Install new lock washer with dished side away from bearing. Thread lock nut onto shaft.

5) Place lock nut between vise jaws and using tool used during disassembly, tighten lock nut securely. Bend over portion of lock washer opposite to locating tab to prevent lock nut from turning.

Installation

1) If both drive axles were removed, insert a .079" (2 mm) shim between bearing holder and axle tube flange of first drive axle to be installed. Insert shaft into axle tube and install and tighten bearing holder-to-flange bolts.

2) For the second drive axle (or if only one shaft was removed), insert shaft without shims into axle tube until it comes into contact with thrust block in differential. Measure clearance between bearing holder and axle tube flange. See Fig. 3.

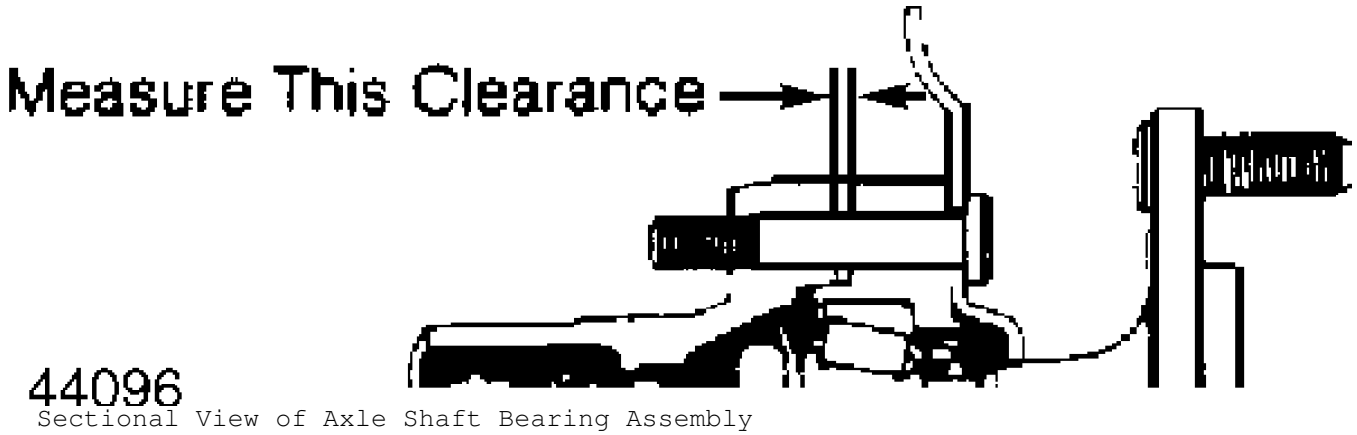

Fig. 3: Sectional View of Axle Shaft Bearing Assembly
Courtesy of Isuzu Motor Co.

3) Proper size shims for this location may be determined by adding .012" (.3 mm) to measurement just obtained. Select a shim or combination of shims, withdraw drive axle and install shims between bearing holder and flange face.

4) Reinstall drive axle and tighten 4 through bolts. Connect brake line to wheel cylinder. Install brake shoes, parking brake cable and brake drum. Install wheel and tire assembly, adjust brakes and bleed system.

DIFFERENTIAL CARRIER

NOTE: Front differential carrier is removed from front axle after axle has been removed from vehicle.

Removal (Rear)

1) Raise rear of vehicle and support with jack stands. Remove wheel and tire assemblies. On Impulse models, remove and support calipers. Remove rotors. On all other models, remove brake drums. Disconnect brake lines at wheel cylinders and plug.

2) On all models, disconnect parking brake cable brackets at rear spring location. Drain differential oil. Remove 4 axle retainer mounting bolts from each end flange and partially withdraw drive axles from axle tubes.

3) Disconnect drive shaft from pinion flange and place out of way. Remove nuts attaching carrier to axle housing and remove carrier assembly.

Installation

To install, reverse removal procedure. Refill axle with correct amount of lubricant.

OVERHAUL

DIFFERENTIAL ASSEMBLIES

NOTE: Overhaul procedures of front and rear differentials are similar.

Disassembly

1) Mark side bearing caps for reassembly reference. Remove side bearing caps. Remove differential case assembly. Remove differential side bearings from case. Record thickness of each side bearing and shim pack and place with appropriate bearing race.

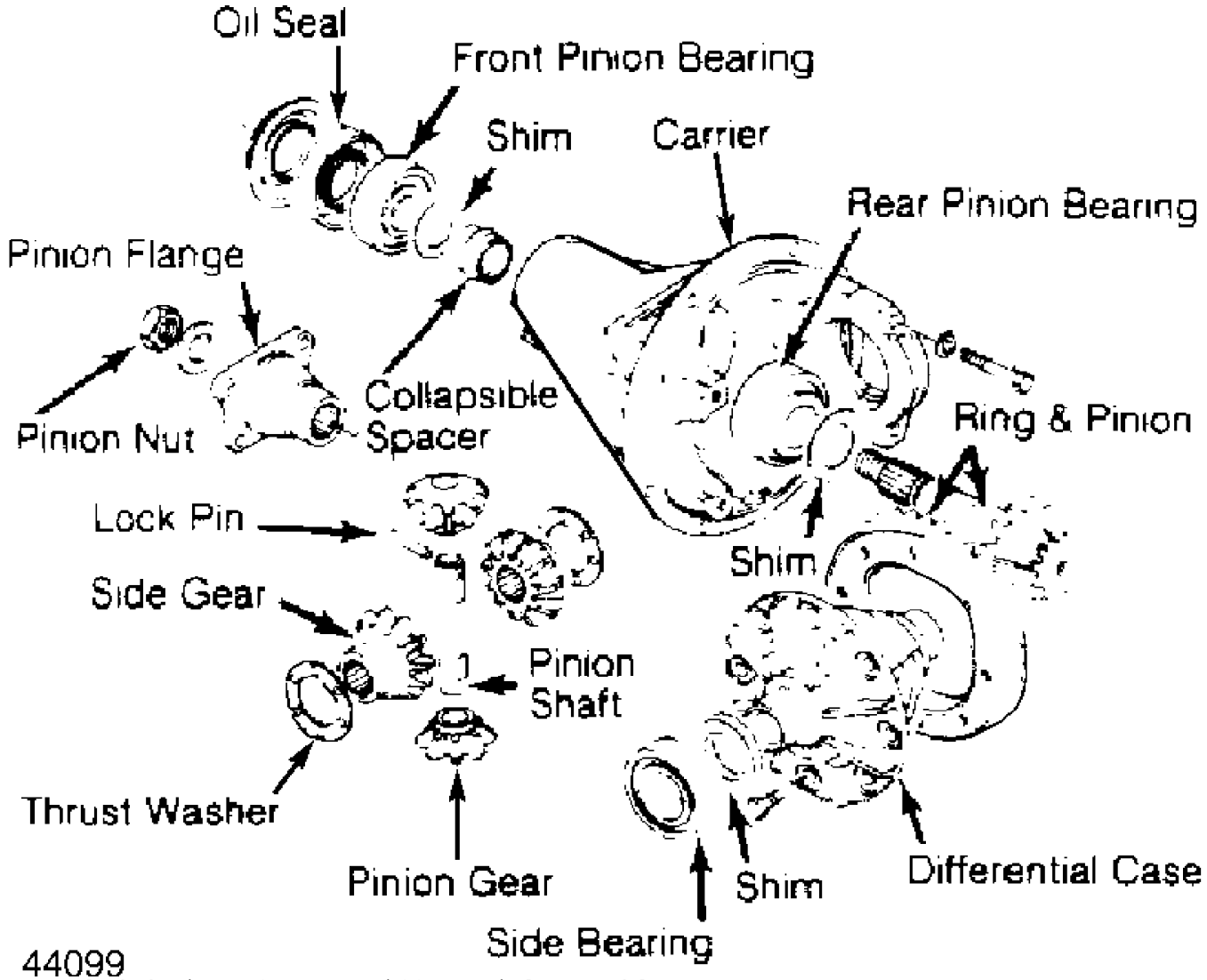

Fig. 4: Exploded View of Front Differential Assembly
Courtesy of Isuzu Motor Co.

2) Remove ring gear bolts and separate ring gear from case. Remove stakes retaining lock pin using .20" (5 mm) drill. Drive out pinion shaft lock pin using a long drift. Check pinion gear-to-side gear backlash before removal.

3) Backlash should be .001-.003" (.03-.08 mm). Remove pinion shaft using a drift. Withdraw thrust block (if equipped), pinion gears, side gears and thrust washers from carrier. It may be necessary to remove stakes retaining lock pin using a 5 mm drill.

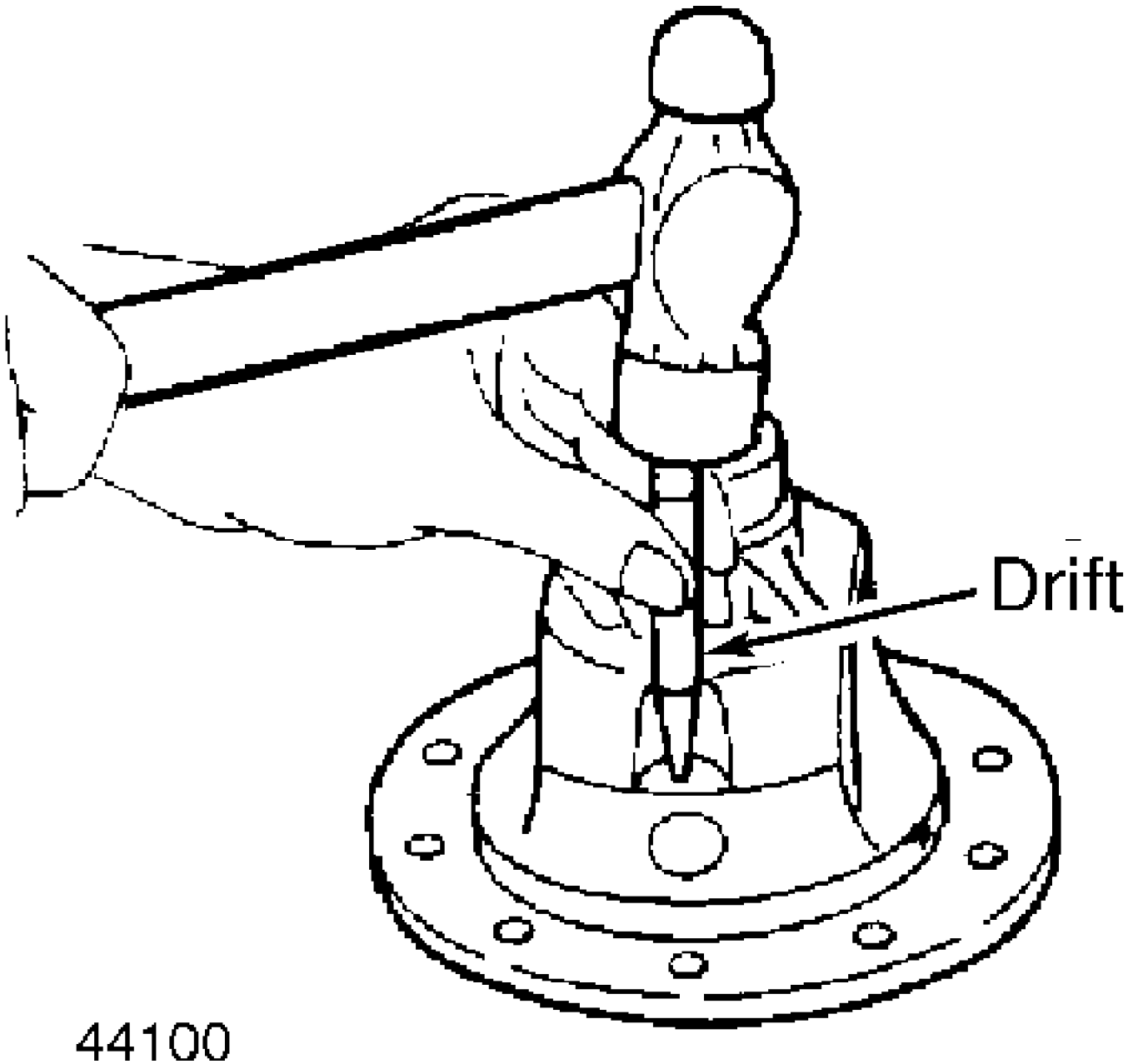

Fig. 5: Removing Pinion Shaft Lock Pin
Courtesy of Isuzu Motor Co.

4) Remove pinion nut and pinion flange using Flange Holder (J-8614-01). Drive pinion gear from carrier using hammer and brass drift. Withdraw front pinion bearing and oil seal.

5) Using a brass drift, remove pinion bearing inner and outer races from carrier. Mount pinion gear in a press and remove rear pinion bearing and depth shim from pinion gear.

Reassembly & Adjustment (Case Assembly)

1) Install side gears and thrust washers in case. Position thrust washers 180 degrees apart, roll gears into position making sure they are in alignment to allow installation of pinion shaft.

2) Place thrust block between pinion gears (if equipped). Drive pinion shaft into position, ensuring lock pin hole aligns with

hole in case. Measure backlash between side gears and pinion gears; if greater than .007" (.18 mm), install selective thrust washers to bring backlash within specifications.

3) Thrust washers are available in thicknesses of .039" (.99 mm), .041" (1.04 mm), .043" (1.09 mm), .045" (1.14 mm), .047" (1.19 mm), .049" (1.24 mm), .051" (1.30 mm), .053" (1.35 mm) and .055" (1.40 mm) for Impulse models and .039" (.99 mm), .041" (1.04 mm) and .043" (1.09 mm) for P'UP and Trooper II models.

NOTE: Increasing thrust washer thickness decreases backlash; decreasing thrust washer thickness increases backlash.

4) Install lock pin in pinion shaft and stake end to prevent loosening. Install ring gear in position on case, apply Loctite to threads and tighten bolts in diagonal sequence to 63 ft. lbs. (85 N.m) on Impulse models and 72-87 ft. lbs. (98-118 N.m) on rear differential or 51-65 lbs. (69-88 N.m) on front differential on all other models.

Reassembly & Adjustment (Drive Pinion Depth)

1) Install front and rear pinion bearing races into carrier bores. Lubricate pinion bearings and position in respective races. Install Gauge Plate (J-23597-7), Preload Stud (J-23597-9) and Pilot (J-21777-42) through front and rear bearing and tighten nut securely.

2) Rotate bearing to ensure proper seating. Tighten pinion lock nut to 8-10 ft. lbs. (10-12 N.m) for used bearings and 17 ft. lbs. (23 N.m) for new bearings. Clean differential case bearing bores.

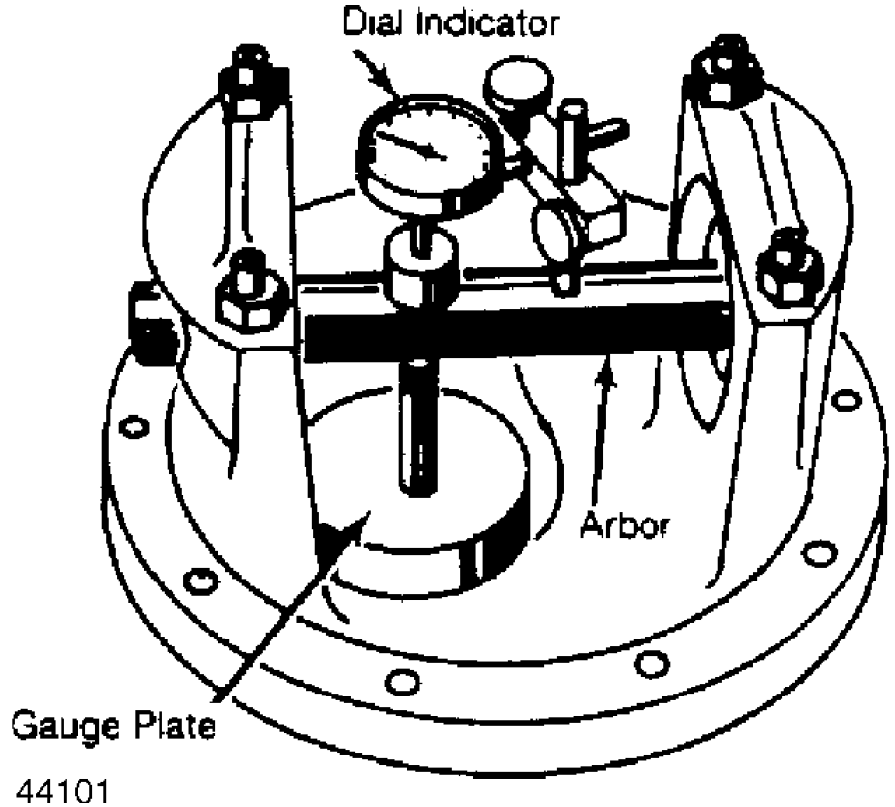

Fig. 6: Installing Pinion Height Gauge
Courtesy of Isuzu Motor Co.

3) Place Mounting Discs (J-23597-8) on Arbor (J-23597-1) and place assembly in position in side bearing bores. Install bearing

caps snugly. Mount dial indicator on arbor post and preload dial indicator 1/2 revolution. Tighten indicator in this position.

4) Position indicator plunger on gauge plate, slowly swing across until highest reading is obtained, and "zero" indicator on highest reading of gauge plate.

5) Carefully swing plunger off gauge plate and note indicator reading. Reading is correct thickness of rear pinion depth shim for a nominal drive pinion.

NOTE: Front differential pinion shims are available in sizes ranging from .055-.070" (1.40-1.79 mm). Rear differential pinion shims are available in sizes ranging from .055-.071" (1.40-1.80 mm) on Impulse models and .086-.101" (2.18-2.56 mm) on all other models. A rear differential indicator reading of 0 (zero) or .001" (.03 mm) requires shims of .100" (2.54 mm) and .101" (2.56 mm) respectively.

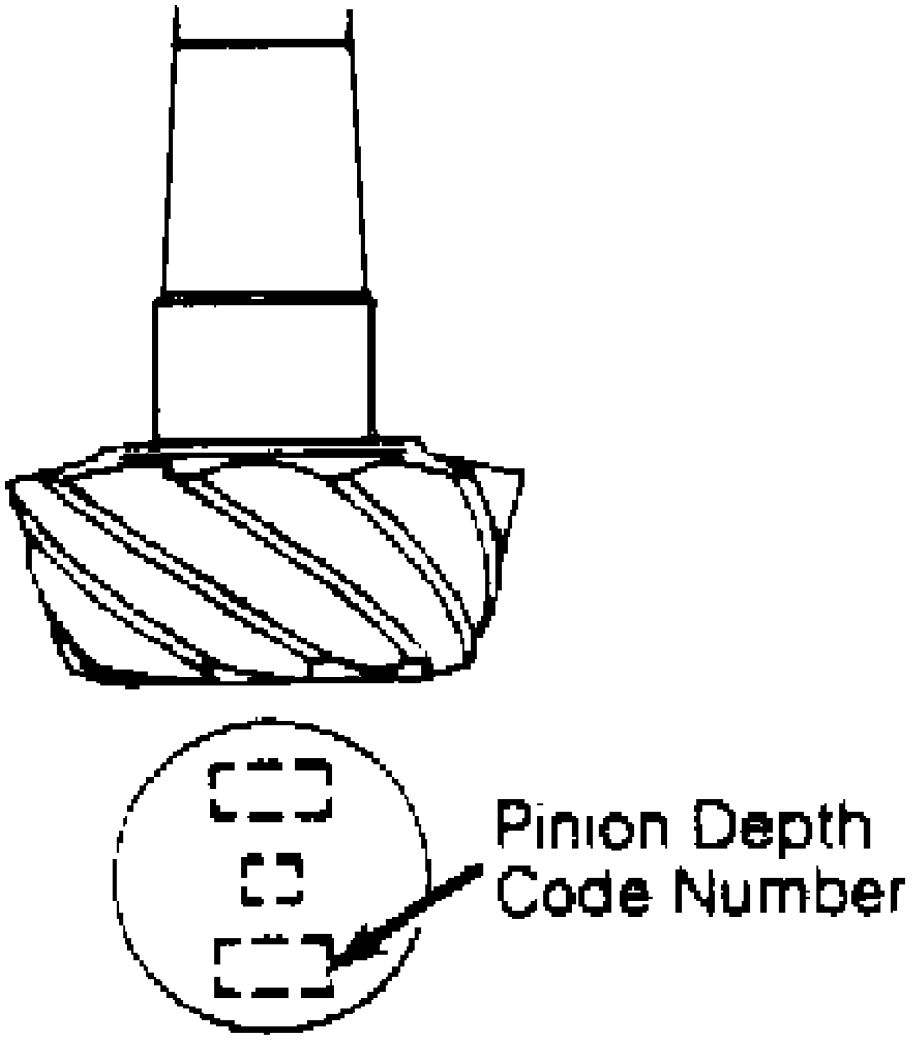

Fig. 7: Pinion Depth Code Location on Pinion Head
Courtesy of Isuzu Motor Co.

6) Examine head of drive pinion. Pinion depth code is stamped by chemical ink and is lower of 3 numbers. A "+" (plus)

number indicates need for greater mounting distance (decreased shim thickness).

7) A "-" (minus) number indicates need for smaller mounting distance (increased shim thickness). See PINION DEPTH SHIM CHART to determine proper shim variation to compensate for plus or minus markings.

8) If pinion depth code is "0", pinion is "nominal" and no dial indicator correction is required. Using Bearing Installer (J-6133-01), place selected shim on drive pinion and press rear bearing onto pinion. Remove depth gauge from carrier.

NOTE: DO NOT press on roller cage. Press only on bearing inner race.

IMPULSE DIFFERENTIAL PINION DEPTH SHIMS

Pinion Code	Correction Required
+ 6	Subtract .0024" (.06 mm)
+ 4	Subtract .0016" (.04 mm)
+ 2	Subtract .0008" (.02 mm)
0	No Correction Required
- 2	Add .0008" (.02 mm)
- 4	Add .0016" (.04 mm)
- 6	Add .0024" (.06 mm)

FRONT DIFFERENTIAL PINION DEPTH SHIM CHART

Dial Indicator reading (Inches)

0.052		
Pinion Marking		
+6		...
+4		...
+2		...
0		...
-2		...
-4		...
-6		1.39(0.0547)
0.053		
Pinion Marking		
+6		...
+4		...
+2		...
0		...
-2		...
-4		1.39(0.0547)
-6		1.41(0.0555)
0.054		
Pinion Marking		
+6		...
+4		...
+2		...
0		...
-2		1.39(0.0547)
-4		1.41(0.0555)
-6		1.43(0.0563)
0.055		
Pinion Marking		
+6		...
+4		...
+2		...

```
   0  ....................................  1.39(0.0547)
  -2  ....................................  1.41(0.0555)
  -4  ....................................  1.43(0.0563)
  -6  ....................................  1.45(0.0571)
0.056
 Pinion Marking
  +6  ..................................................  ...
  +4  ....................................  1.39(0.0547)
  +2  ....................................  1.41(0.0555)
   0  ....................................  1.43(0.0563)
  -2  ....................................  1.45(0.0571)
  -4  ....................................  1.47(0.0579)
  -6  ....................................  1.49(0.0587)
0.057
 Pinion Marking
  +6  ....................................  1.39(0.0547)
  +4  ....................................  1.41(0.0555)
  +2  ....................................  1.43(0.0563)
   0  ....................................  1.45(0.0571)
  -2  ....................................  1.47(0.0579)
  -4  ....................................  1.49(0.0587)
  -6  ....................................  1.51(0.0594)
0.058
 Pinion Marking
  +6  ....................................  1.41(0.0555)
  +4  ....................................  1.43(0.0563)
  +2  ....................................  1.45(0.0571)
   0  ....................................  1.47(0.0579)
  -2  ....................................  1.49(0.0587)
  -4  ....................................  1.51(0.0594)
  -6  ....................................  1.53(0.0602)
0.059
 Pinion Marking
  +6  ....................................  1.43(0.0563)
  +4  ....................................  1.45(0.0571)
  +2  ....................................  1.47(0.0579)
   0  ....................................  1.49(0.0587)
  -2  ....................................  1.51(0.0594)
  -4  ....................................  1.53(0.0602)
  -6  ....................................  1.55(0.0610)
0.060
 Pinion Marking
  +6  ....................................  1.47(0.0579)
  +4  ....................................  1.49(0.0587)
  +2  ....................................  1.51(0.0594)
   0  ....................................  1.53(0.0602)
  -2  ....................................  1.55(0.0610)
  -4  ....................................  1.57(0.0618)
  -6  ....................................  1.59(0.0626)
0.061
 Pinion Marking
  +6  ....................................  1.49(0.0587)
  +4  ....................................  1.51(0.0594)
  +2  ....................................  1.53(0.0602)
   0  ....................................  1.55(0.0610)
  -2  ....................................  1.57(0.0618)
  -4  ....................................  1.59(0.0626)
  -6  ....................................  1.61(0.0634)
0.062
 Pinion Marking
  +6  ....................................  1.51(0.0594)
  +4  ....................................  1.53(0.0602)
  +2  ....................................  1.55(0.0610)
```

```
   0  ....................................  1.57(0.0618)
  -2  ....................................  1.59(0.0626)
  -4  ....................................  1.61(0.0634)
  -6  ....................................  1.63(0.0642)
0.063
 Pinion Marking
  +6  ....................................  1.55(0.0610)
  +4  ....................................  1.57(0.0618)
  +2  ....................................  1.59(0.0626)
   0  ....................................  1.61(0.0634)
  -2  ....................................  1.63(0.0642)
  -4  ....................................  1.65(0.0650)
  -6  ....................................  1.67(0.0657)
0.064
 Pinion Marking
  +6  ....................................  1.57(0.0618)
  +4  ....................................  1.59(0.0626)
  +2  ....................................  1.61(0.0634)
   0  ....................................  1.63(0.0642)
  -2  ....................................  1.65(0.0650)
  -4  ....................................  1.67(0.0657)
  -6  ....................................  1.69(0.0665)
0.065
 Pinion Marking
  +6  ....................................  1.59(0.0626)
  +4  ....................................  1.61(0.0634)
  +2  ....................................  1.63(0.0642)
   0  ....................................  1.65(0.0650)
  -2  ....................................  1.67(0.0657)
  -4  ....................................  1.69(0.0665)
  -6  ....................................  1.71(0.0673)
0.066
 Pinion Marking
  +6  ....................................  1.61(0.0634)
  +4  ....................................  1.63(0.0642)
  +2  ....................................  1.65(0.0650)
   0  ....................................  1.67(0.0657)
  -2  ....................................  1.69(0.0665)
  -4  ....................................  1.71(0.0673)
  -6  ....................................  1.73(0.0681)
0.067
 Pinion Marking
  +6  ....................................  1.65(0.0650)
  +4  ....................................  1.67(0.0657)
  +2  ....................................  1.69(0.0665)
   0  ....................................  1.71(0.0673)
  -2  ....................................  1.73(0.0681)
  -4  ....................................  1.75(0.0689)
  -6  ....................................  1.77(0.0697)
0.068
 Pinion Marking
  +6  ....................................  1.67(0.0657)
  +4  ....................................  1.69(0.0665)
  +2  ....................................  1.71(0.0673)
   0  ....................................  1.73(0.0681)
  -2  ....................................  1.75(0.0689)
  -4  ....................................  1.77(0.0697)
  -6  ..........................................  ...
0.069
 Pinion Marking
  +6  ....................................  1.69(0.0665)
  +4  ....................................  1.71(0.0673)
  +2  ....................................  1.73(0.0681)
```

```
   0  ..................................  1.75(0.0689)
  -2  ..................................  1.77(0.0697)
  -4  ..................................  ...
  -6  ..................................  ...
0.070
 Pinion Marking
  +6  ..................................  1.71(0.0673)
  +4  ..................................  1.73(0.0681)
  +2  ..................................  1.75(0.0689)
   0  ..................................  1.77(0.0697)
  -2  ..................................  ...
  -4  ..................................  ...
  -6  ..................................  ...
0.071
 Pinion Marking
  +6  ..................................  1.75(0.0689)
  +4  ..................................  1.77(0.0697)
  +2  ..................................  ...
   0  ..................................  ...
  -2  ..................................  ...
  -4  ..................................  ...
  -6  ..................................  ...
0.072
 Pinion Marking
  +6  ..................................  1.77(0.0697)
  +4  ..................................  ...
  +2  ..................................  ...
   0  ..................................  ...
  -2  ..................................  ...
  -4  ..................................  ...
  -6  ..................................  ...
```

REAR DIFFERENTIAL PINION DEPTH SHIM CHART

Dial Indicator reading (Inches)

```
 0.081
  Pinion Marking
  +10  ..................................  ...
   +8  ..................................  ...
   +6  ..................................  ...
   +4  ..................................  ...
   +2  ..................................  ...
    0  ..................................  ...
   -2  ..................................  ...
   -4  ..................................  ...
   -6  ..................................  ...
   -8  ..................................  ...
  -10  ..................................  2.18(0.0858)
 0.082
  Pinion Marking
  +10  ..................................  ...
   +8  ..................................  ...
   +6  ..................................  ...
   +4  ..................................  ...
   +2  ..................................  ...
    0  ..................................  ...
   -2  ..................................  ...
   -4  ..................................  ...
   -6  ..................................  ...
   -8  ..................................  2.18(0.0858)
  -10  ..................................  2.20(0.0866)
```

0.083
Pinion Marking

+10	...
+8	...
+6	...
+4	...
+2	...
0	...
-2	...
-4	...
-6	2.18(0.0858)
-8	2.20(0.0866)
-10	2.24(0.0882)

0.084
Pinion Marking

+10	...
+8	...
+6	...
+4	...
+2	...
0	...
-2	...
-4	2.18(0.0858)
-6	2.20(0.0866)
-8	2.24(0.0882)
-10	2.26(0.0890)

0.085
Pinion Marking

+10	...
+8	...
+6	...
+4	...
+2	...
0	...
-2	2.18(0.0858)
-4	2.20(0.0866)
-6	2.24(0.0882)
-8	2.26(0.0890)
-10	2.28(0.0898)

0.086
Pinion Marking

+10	...
+8	...
+6	...
+4	...
+2	...
0	2.18(0.0858)
-2	2.20(0.0866)
-4	2.24(0.0882)
-6	2.26(0.0890)
-8	2.28(0.0898)
-10	2.32(0.0914)

0.087
Pinion Marking

+10	...
+8	...
+6	...
+4	...
+2	2.18(0.0858)
0	2.20(0.0866)
-2	2.24(0.0882)
-4	2.26(0.0890)
-6	2.28(0.0898)

```
  -8  ..................................  2.32(0.0914)
 -10  ..................................  2.34(0.0921)
0.088
 Pinion Marking
 +10  ..............................................  ...
  +8  ..............................................  ...
  +6  ..............................................  ...
  +4  ..................................  2.18(0.0858)
  +2  ..................................  2.20(0.0866)
   0  ..................................  2.24(0.0882)
  -2  ..................................  2.26(0.0890)
  -4  ..................................  2.28(0.0898)
  -6  ..................................  2.32(0.0914)
  -8  ..................................  2.34(0.0921)
 -10  ..................................  2.36(0.0929)
0.089
 Pinion Marking
 +10  ..............................................  ...
  +8  ..............................................  ...
  +6  ..................................  2.18(0.0858)
  +4  ..................................  2.20(0.0866)
  +2  ..................................  2.24(0.0882)
   0  ..................................  2.26(0.0890)
  -2  ..................................  2.28(0.0898)
  -4  ..................................  2.32(0.0914)
  -6  ..................................  2.34(0.0921)
  -8  ..................................  2.36(0.0929)
 -10  ..................................  2.38(0.0937)
0.090
 Pinion Marking
 +10  ..............................................  ...
  +8  ..................................  2.18(0.0858)
  +6  ..................................  2.20(0.0866)
  +4  ..................................  2.24(0.0882)
  +2  ..................................  2.26(0.0890)
   0  ..................................  2.28(0.0898)
  -2  ..................................  2.32(0.0914)
  -4  ..................................  2.34(0.0921)
  -6  ..................................  2.36(0.0929)
  -8  ..................................  2.38(0.0937)
 -10  ..................................  2.42(0.0953)
0.091
 Pinion Marking
 +10  ..................................  2.18(0.0858)
  +8  ..................................  2.20(0.0866)
  +6  ..................................  2.24(0.0882)
  +4  ..................................  2.26(0.0890)
  +2  ..................................  2.28(0.0898)
   0  ..................................  2.32(0.0914)
  -2  ..................................  2.34(0.0921)
  -4  ..................................  2.36(0.0929)
  -6  ..................................  2.38(0.0937)
  -8  ..................................  2.42(0.0953)
 -10  ..................................  2.44(0.0961)
0.092
 Pinion Marking
 +10  ..................................  2.20(0.0866)
  +8  ..................................  2.24(0.0882)
  +6  ..................................  2.26(0.0890)
  +4  ..................................  2.28(0.0898)
  +2  ..................................  2.32(0.0914)
   0  ..................................  2.34(0.0921)
  -2  ..................................  2.36(0.0929)
```

-4	.....	2.38(0.0937)
-6	.....	2.42(0.0953)
-8	.....	2.44(0.0961)
-10	.....	2.46(0.0969)

0.093

Pinion Marking

+10	.....	2.24(0.0882)
+8	.....	2.26(0.0890)
+6	.....	2.28(0.0898)
+4	.....	2.32(0.0914)
+2	.....	2.34(0.0921)
0	.....	2.36(0.0929)
-2	.....	2.38(0.0937)
-4	.....	2.42(0.0953)
-6	.....	2.44(0.0961)
-8	.....	2.46(0.0969)
-10	.....	2.48(0.0977)

0.094

Pinion Marking

+10	.....	2.26(0.0890)
+8	.....	2.28(0.0898)
+6	.....	2.32(0.0914)
+4	.....	2.34(0.0921)
+2	.....	2.36(0.0929)
0	.....	2.38(0.0937)
-2	.....	2.42(0.0953)
-4	.....	2.44(0.0961)
-6	.....	2.46(0.0969)
-8	.....	2.48(0.0977)
-10	.....	2.52(0.0992)

0.095

Pinion Marking

+10	.....	2.28(0.0898)
+8	.....	2.32(0.0914)
+6	.....	2.34(0.0921)
+4	.....	2.36(0.0929)
+2	.....	2.38(0.0937)
0	.....	2.42(0.0953)
-2	.....	2.44(0.0961)
-4	.....	2.46(0.0969)
-6	.....	2.48(0.0977)
-8	.....	2.52(0.0992)
-10	.....	2.54(0.1000)

0.096

Pinion Marking

+10	.....	2.32(0.0914)
+8	.....	2.34(0.0921)
+6	.....	2.36(0.0929)
+4	.....	2.38(0.0937)
+2	.....	2.42(0.0953)
0	.....	2.44(0.0961)
-2	.....	2.46(0.0969)
-4	.....	2.48(0.0977)
-6	.....	2.52(0.0992)
-8	.....	2.54(0.1000)
-10	.....	2.56(0.1008)

0.097

Pinion Marking

+10	.....	2.34(0.0921)
+8	.....	2.36(0.0929)
+6	.....	2.38(0.0937)
+4	.....	2.42(0.0953)
+2	.....	2.44(0.0961)

```
   0  ....................................  2.46(0.0969)
  -2  ....................................  2.48(0.0977)
  -4  ....................................  2.52(0.0992)
  -6  ....................................  2.54(0.1000)
  -8  ....................................  2.56(0.1008)
 -10  ..................................................  ...
0.098
 Pinion Marking
 +10  ....................................  2.36(0.0929)
  +8  ....................................  2.38(0.0937)
  +6  ....................................  2.42(0.0953)
  +4  ....................................  2.44(0.0961)
  +2  ....................................  2.46(0.0969)
   0  ....................................  2.48(0.0977)
  -2  ....................................  2.52(0.0992)
  -4  ....................................  2.54(0.1000)
  -6  ....................................  2.56(0.1008)
  -8  ..................................................  ...
 -10  ..................................................  ...
0.099
 Pinion Marking
 +10  ....................................  2.38(0.0937)
  +8  ....................................  2.42(0.0953)
  +6  ....................................  2.44(0.0961)
  +4  ....................................  2.46(0.0969)
  +2  ....................................  2.48(0.0977)
   0  ....................................  2.52(0.0992)
  -2  ....................................  2.54(0.1000)
  -4  ....................................  2.56(0.1008)
  -6  ..................................................  ...
  -8  ..................................................  ...
 -10  ..................................................  ...
0.100
 Pinion Marking
 +10  ....................................  2.42(0.0953)
  +8  ....................................  2.44(0.0961)
  +6  ....................................  2.46(0.0969)
  +4  ....................................  2.48(0.0977)
  +2  ....................................  2.52(0.0992)
   0  ....................................  2.54(0.1000)
  -2  ....................................  2.56(0.1008)
  -4  ..................................................  ...
  -6  ..................................................  ...
  -8  ..................................................  ...
 -10  ..................................................  ...
0.101
 Pinion Marking
 +10  ....................................  2.44(0.0961)
  +8  ....................................  2.46(0.0969)
  +6  ....................................  2.48(0.0977)
  +4  ....................................  2.52(0.0992)
  +2  ....................................  2.54(0.1000)
   0  ....................................  2.56(0.1008)
  -2  ..................................................  ...
  -4  ..................................................  ...
  -6  ..................................................  ...
  -8  ..................................................  ...
 -10  ..................................................  ...
0.102
 Pinion Marking
 +10  ....................................  2.46(0.0969)
  +8  ....................................  2.48(0.0977)
  +6  ....................................  2.52(0.0992)
```

```
  +4  ..................................  2.54(0.1000)
  +2  ..................................  2.56(0.1008)
   0  ..................................  ...
  -2  ..................................  ...
  -4  ..................................  ...
  -6  ..................................  ...
  -8  ..................................  ...
 -10  ..................................  ...
0.103
 Pinion Marking
 +10  ..................................  2.48(0.0977)
  +8  ..................................  2.52(0.0992)
  +6  ..................................  2.54(0.1000)
  +4  ..................................  2.56(0.1008)
  +2  ..................................  ...
   0  ..................................  ...
  -2  ..................................  ...
  -4  ..................................  ...
  -6  ..................................  ...
  -8  ..................................  ...
 -10  ..................................  ...
0.104
 Pinion Marking
 +10  ..................................  2.52(0.0992)
  +8  ..................................  2.54(0.1000)
  +6  ..................................  2.56(0.1008)
  +4  ..................................  ...
  +2  ..................................  ...
   0  ..................................  ...
  -2  ..................................  ...
  -4  ..................................  ...
  -6  ..................................  ...
  -8  ..................................  ...
 -10  ..................................  ...
0.105
 Pinion Marking
 +10  ..................................  2.54(0.1000)
  +8  ..................................  2.56(0.1008)
  +6  ..................................  ...
  +4  ..................................  ...
  +2  ..................................  ...
   0  ..................................  ...
  -2  ..................................  ...
  -4  ..................................  ...
  -6  ..................................  ...
  -8  ..................................  ...
 -10  ..................................  ...
0.106
 Pinion Marking
 +10  ..................................  2.56(0.1008)
  +8  ..................................  ...
  +6  ..................................  ...
  +4  ..................................  ...
  +2  ..................................  ...
   0  ..................................  ...
  -2  ..................................  ...
  -4  ..................................  ...
  -6  ..................................  ...
  -8  ..................................  ...
 -10  ..................................  ...
```

Pinion Bearing Preload

NOTE: Install new lock nut on pinion.

1) Place drive pinion and new collapsible spacer into carrier. Lubricate pinion oil seal. Install front pinion bearing and oil seal. Mount pinion flange on drive pinion, apply lubricant to pinion threads and install pinion nut.

2) Hold pinion flange and tighten differential nut to 130-202 ft. lbs. (176-274 N.m) on Impulse models, 108-145 ft. lbs. (146-196 N.m) on Trooper II models and 83-90 (112-122) on P'UP models. Rotate pinion to ensure bearings are seated.

3) Using torque wrench, note reading required to rotate flange. Continue tightening nut in small increments until 6-10 INCH lbs. (.7-1.1 N.m) is required to turn flange.

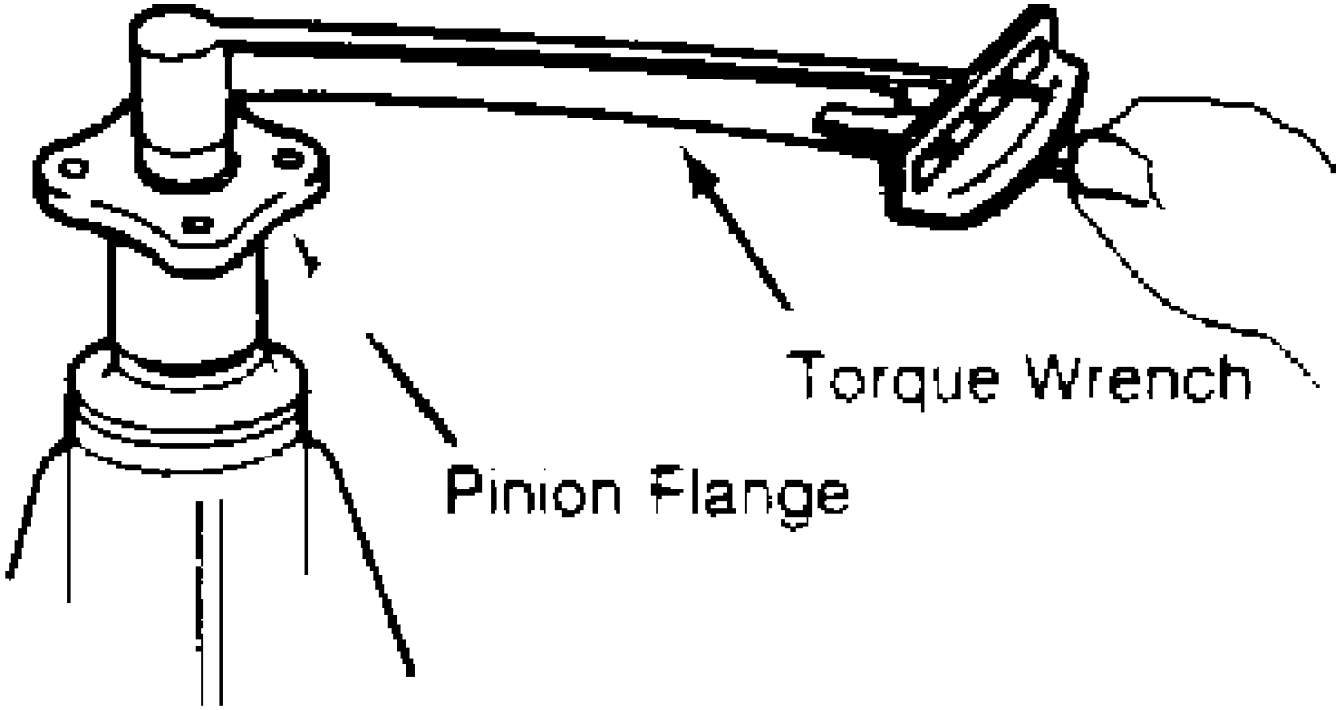

Fig. 8: Using Torque Wrench to Measure Dr. Pin. Brg Preload
Courtesy of Isuzu Motor Co.

CAUTION: Preload builds quickly. Nut should be tightened only in small increments and pull scale used after each small amount of tightening. If preload is exceeded, a new collapsible spacer must be installed.

Backlash & Side Bearing Preload

1) If original side bearings, differential case, ring and pinion, and differential carrier are being reused, original shims may be reinstalled in their respective positions.

2) If only new side bearings are being installed, measure new bearings with a micrometer and compare thickness with original bearings. If new bearing is thicker, SUBTRACT difference from shim pack. If new bearing is thinner, ADD difference to shim pack.

3) If new bearings, and/or differential case, ring and pinion, or differential carrier are being installed, new shims must be selected as follows. Install side bearings onto differential case, but do not install shims at this time.

4) Mount case into carrier bores. Move ring gear tightly against carrier on ring gear side (away from pinion), and hold in this position. Using a feeler gauge, measure clearance between bearing and differential carrier on side opposite ring gear. Record clearance.

5) Proper preload is established using predetermined dimension of .002" (.05 mm). Therefore, ADD this dimension to clearance obtained in step 3) for proper preload. This will give required total thickness of both shim packs. Equally divide total dimension for required shim pack thickness for each side.

6) Remove case from carrier. Remove side bearings and install shim packs. Reinstall bearings. Install differential case into carrier, tapping carefully into place.

7) Install side bearing caps in original positions, and install and tighten attaching bolts. Measure runout of ring gear. If runout exceeds .002" (.05 mm), correct by cleaning or replacing parts. See Fig. 9.

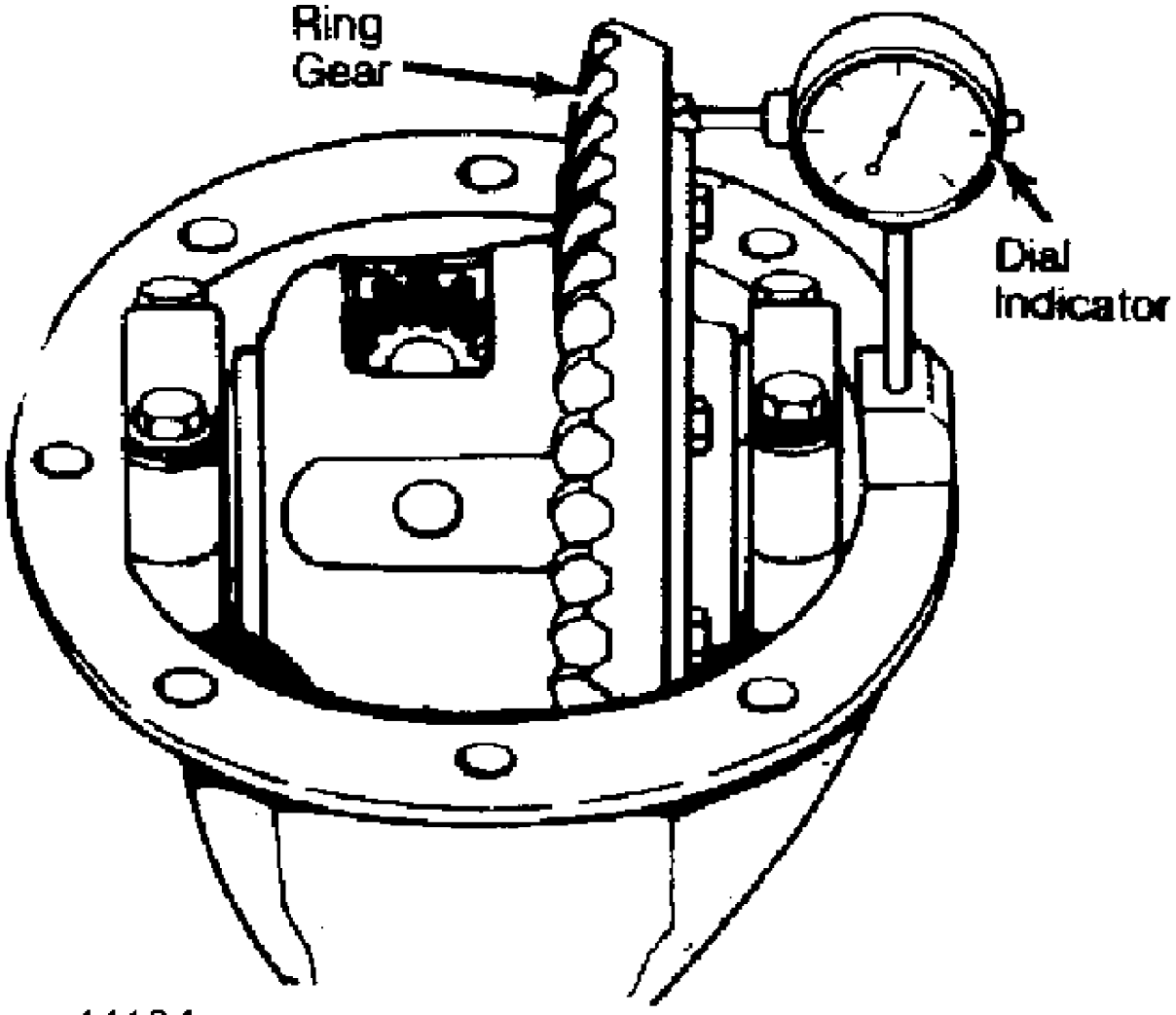

Fig. 9: Checking Ring Gear Runout
Courtesy of Isuzu Motor Co.

NOTE: Backlash changes approximately .002" (.05 mm) for each .003" (.08 mm) shim change.

8) Mount a dial indicator against ring gear teeth and measure backlash in 3 locations. Backlash should be .005-.007" (.13-.18 mm) on rear differential and .004-.006" (.10-.15 mm) on front differential.

9) If not within specifications, shims behind side bearings must be adjusted. To increase backlash, right side bearing shim must be increased and left side bearing decreased. To decrease backlash, right side bearing shim must be decreased and left side bearing increased.

NOTE: To maintain preload when backlash is adjusted, total thickness of both shim packs must not be altered. Therefore, if it is necessary to increase one shim pack, opposite shim pack must be decreased by same amount.

AXLE ASSEMBLY SPECS

AXLE ASSEMBLY SPECIFICATIONS TABLE

Application	In. (mm)
Side & Pinion Gear Backlash	.001-.003 (.03-.08)
Side Bearing Preload	(1) .002 (.05)
Ring Gear Backface Runout	.002 (.05)
Ring Gear Backlash Front & Rear	.005-.007 (.13-.18)

(1) - Add to side bearing "zero clearance" shim pack.

TORQUE SPECIFICATIONS

TORQUE SPECIFICATIONS TABLE

Application	Ft. lbs. (N.m)
Pinion Nut (1)	
Impulse	130-202 (176-274)
P'UP	83-90 (112-122)
Trooper II	108-145 (146-196)
Ring Gear Bolt	
Impulse	62 (85)
P'UP & Trooper II	72-87 (98-118)
Side Bearing Bolt	69-76 (93-103)
	INCH Lbs. (N.m)
Pinion Bearing Preload (2)	6-10 (.7-1.1)

(1) - Initial setting. Continue tightening until proper preload is obtained.
(2) - Measured with torque wrench.