

SERVICE MANUAL

PROPELLER SHAFT & DIFFERENTIAL CARRIER

شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران



Technical and Engineering Management

دیجیتال خودرو

شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

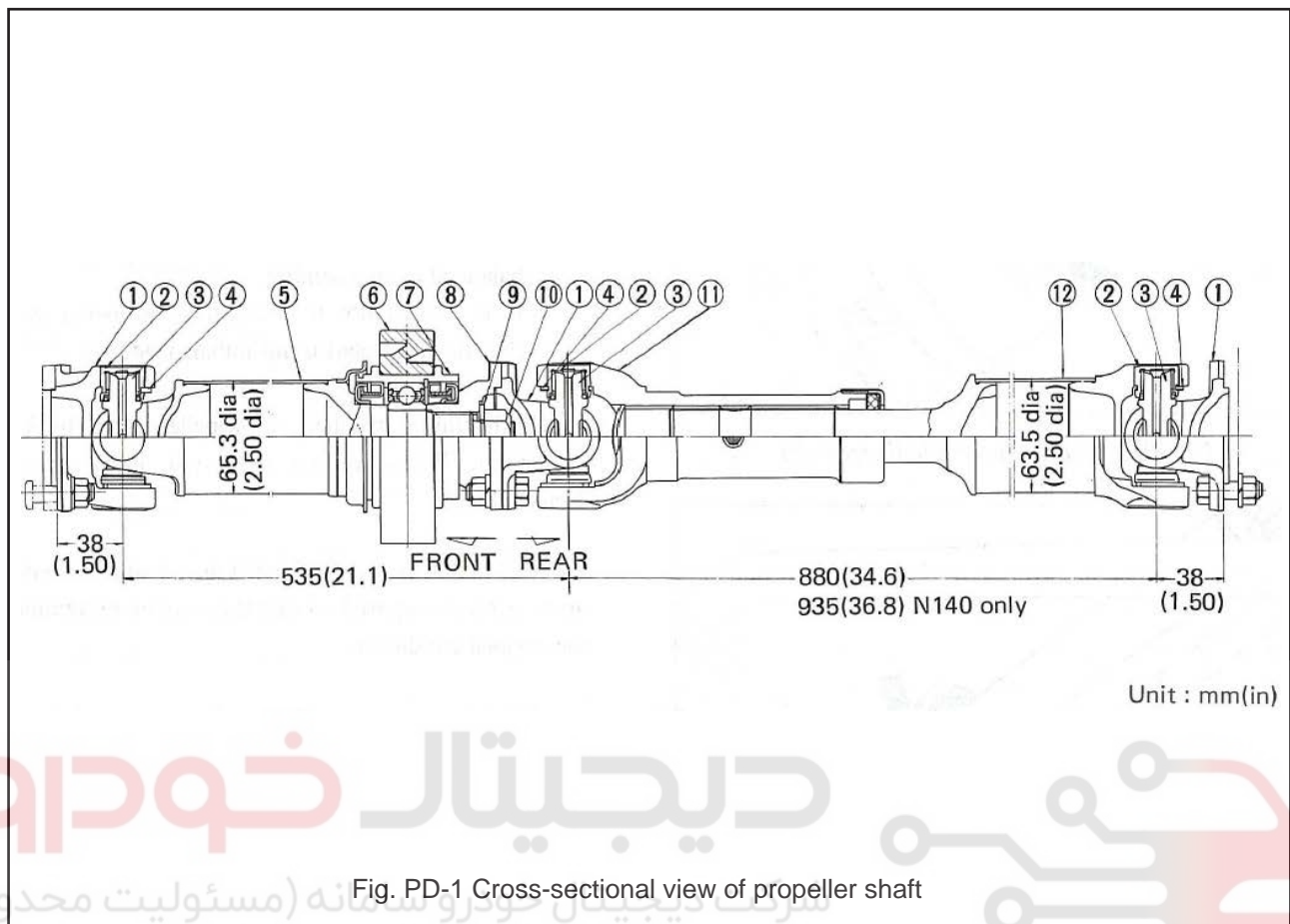
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**MODEL 140 SERIES CHASSIS & BODY SERVICE MANUAL
SECTION PD**

| | | | |
|---|-----------|--|-----------|
| Propeller shaft and universal Joint..... | 4 | Limited slip (optional)..... | 26 |
| Description..... | 4 | From standard differential to limited..... | 28 |
| Removal..... | 5 | Slip differential..... | 29 |
| Journal..... | 6 | Disassembly..... | 29 |
| Disassembly..... | 6 | Inspection and repair..... | 30 |
| Inspection and repair..... | 7 | Inspection of disc and plate..... | 31 |
| Assembly..... | 8 | Inspection of thrust washer..... | 32 |
| Center bearing..... | 9 | Adjustment..... | 33 |
| Disassembly..... | 9 | Side gear end play adjustment..... | 34 |
| Assembly..... | 9 | Assembly..... | 35 |
| Installation..... | 9 | Check..... | 37 |
| Service data..... | 10 | Limited slip differential oil..... | 38 |
| Trouble diagnoses and corrections.... | 10 | Installation..... | 38 |
| DIFFERENTIAL CARRIER..... | 11 | Description..... | 40 |
| Description..... | 11 | Removal..... | 40 |
| PROPELLER SHAFT & DIFFERENTIAL | | Dissassembly..... | 40 |
| CARRIER..... | 12 | Inspection & Repair..... | 40 |
| Removal..... | 13 | Adjustment..... | 41 |
| Disassembly..... | 13 | Assembly..... | 42 |
| Differential case..... | 15 | Service Data & Specifications..... | 44 |
| Inspection and repair..... | 16 | Trouble Diagnoses & Correction..... | 46 |
| Assembly and adjustment..... | 17 | Special Service Tools..... | 48 |
| Differential case..... | 17 | | |
| Drive pinion (2 – ton)..... | 19 | | |
| Drive pinion (1.5 – ton)..... | 22 | | |
| Setting and adjusting differential gear | | | |
| case..... | 24 | | |

PROPELLER SHAFT AND UNIVERSAL JOINT



1. Flange yoke
2. Bearing race assembly
3. Journal assembly
4. Snap ring
5. Propeller shaft tube assembly
6. Center bearing bearing insulator
7. Center bearing companion
8. Companion flange
9. Plain washer
10. Self-locking nut
11. Sleeve yoke assembly
12. Propeller shaft rear tube assembly

DESCRIPTION

The propeller shaft is of a 3-joint and balanced with the center bearing installed on the propeller as an assembly. The sliding parts which slide along the involute spline are installed on the rear propeller shaft and lubricated with grease.

A ball bearing is used for the center bearing, and the center bearing rubber is made of natural rubber having non-linear spring characteristics.

All screws used adopt metric thread series.

REMOVAL

1. Propeller shaft is balanced with center bearing installed on propeller shaft as an assembly. When removing propeller shaft, verify spline / flange yoke match marks in places. When the match marks are unverifiable, put match marks by means of punching for convenience" sake during re-assembling

2. Loosen transmission / final drive connecting bolt and center bearing installation bolt, and remove front and rear propeller shafts from body.

3. The permissible unbalance of the propeller shaft (in condition of an assembly) is 20 gr-cm (0.28 in-oz) at 4,000 rpm.

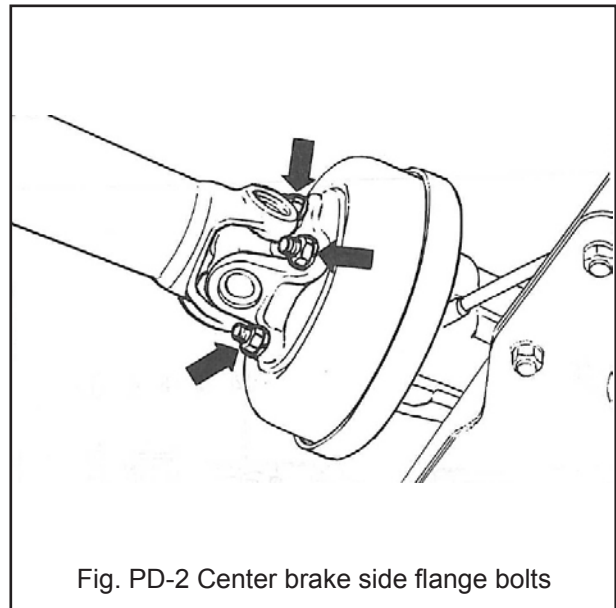


Fig. PD-2 Center brake side flange bolts

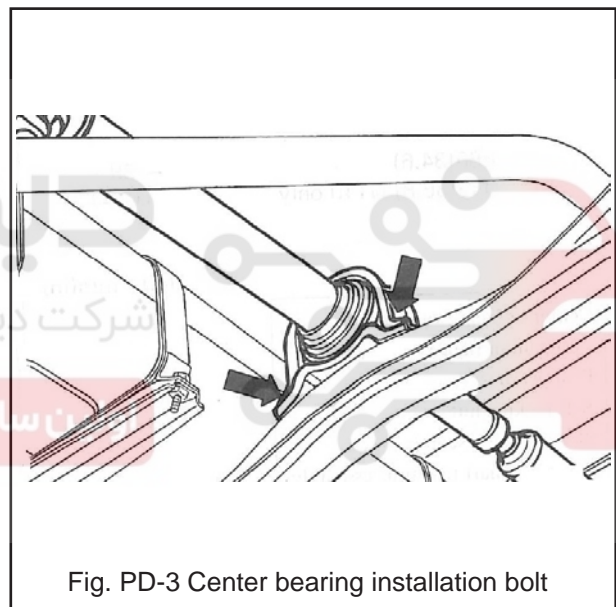


Fig. PD-3 Center bearing installation bolt

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Disassembly

Primarily, do not disassemble shaft because it is balanced as an assembly. When disassembly and repair are required, however, the following procedures apply:

Before disassembling, check journal (without removing from propeller shaft) for the movement: and when, Journal does not operate smoothly {Bending resistance: more than 10 kg-cm (9 in-lb)}, Yoke in one side is set stationarily, a load of 10 kg (22 lb) is applied to the other yoke alternately, and the relative displacement toward yoke axial direction is less than 0.02 mm (0.0008 in), Disassemble journal and inspect the components and alignment.

Before disassembling journal, verify the component alignment and relation so that yoke direction and snap ring thickness are not changed (when yoke direction and / or snap ring thickness is changed, tube and journal center alignment is deviated and propeller shaft is unbalanced.) because journal is balanced as an assembly.

It is desired not to disassemble propeller shaft so that the alignment is not unbalanced.

1. With journal installed on propeller shaft, check it for movement. When journal does not move smoothly, disassemble.
2. Put match marks on flange yoke, propeller shaft, and other parts as required so that they can be reassembled to the original condition.
3. Remove snap ring with an ordinary screw driver.

4. Lightly tap base of yoke with a hummer, and withdraw bearing race.

Note:

When removing journal from yoke, be careful not to damage journal.

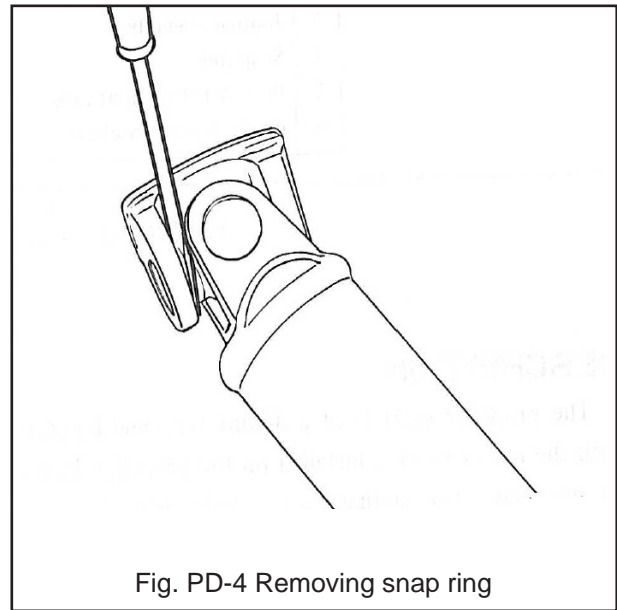


Fig. PD-4 Removing snap ring

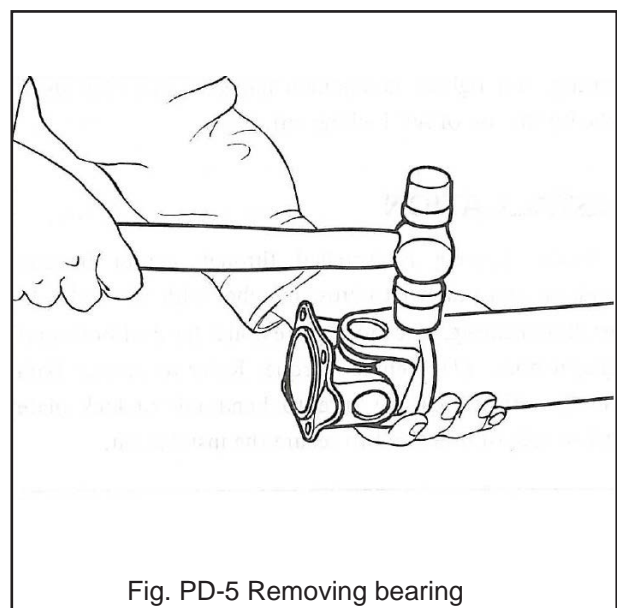


Fig. PD-5 Removing bearing

INSPECTION AND REPAIR

1. When journal pin exterior worn, pitted or cruised, replace.

JOURNAL STANDARD DIAMETER:

14.79 to 14.80 mm (0.5823 to 0.5827 in)

Wear limit: 0.15 mm (0.0059 in)

1. Journal

2. Snap ring

3. Bearing race assembly

2. When yoke hole is worn or damaged, replace.

3. When snap ring is damaged or deformed, replace.

4. When bearing race is damaged or worn, replace.

5. When sleeve yoke and propeller shaft rear tube splined portions are damaged or worn, replace sleeve yoke and propeller shaft rear tube assembly as a set.

Propeller shaft (front or rear) out of round:

Less than 0.6 mm (0.024 in)

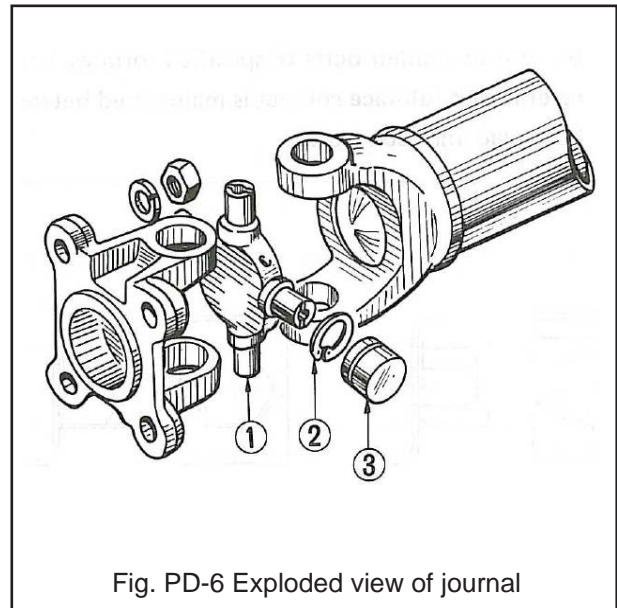


Fig. PD-6 Exploded view of journal

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Assembly

Assemble propeller shaft in reverse sequence to disassembly.

Grease is sealed in joint to require greasing. Fill joint with wheel bearing grease whenever propeller shaft is overhauled.

Snap ring functions also as a shim to adjust gap. Select a proper snap ring so that slackness is 0 to 0.02 mm (0 to 0.0008 in). Moreover, when a snap ring is selected, be sure to select another snap ring having the same thickness for opposite side.

6. When propeller shaft tube surface is dented or cracked, replace.

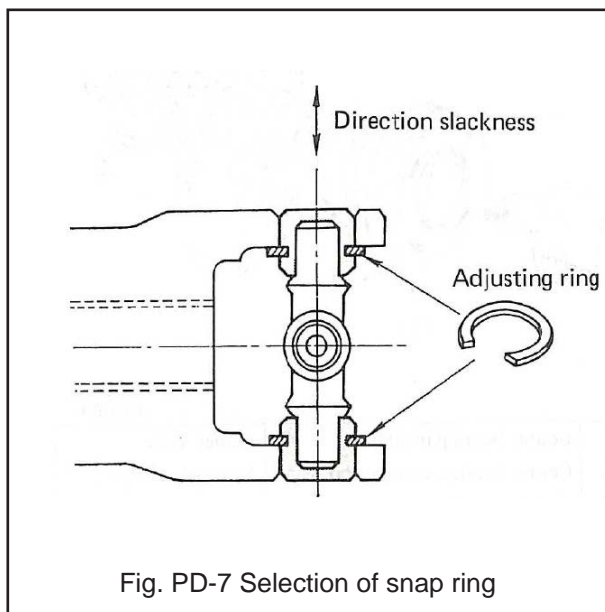


Fig. PD-7 Selection of snap ring

| Snap ring over size | |
|---------------------|----------------------|
| Thickness mm (in) | Color identification |
| 2.00 (0.0788) | White |
| 2.02 (0.0795) | Yellow |
| 2.04 (0.0803) | Red |
| 2.06 (0.0811) | Green |
| 2.08 (0.0819) | Blue |
| 2.10 (0.0827) | Brown |
| 2.12 (0.0834) | No paint |

Install and assemble components correctly so that joint moves under bending friction resistance of less than 10 kg-cm (9 in-lb)



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CENTER BEARING

Disassembly

With ball bearing of center bearing installed on propeller shaft, turn center bearing housing. If unusual sound occurs, bearing housing does not turn smoothly, or the clearance is excessive, disassemble and replace center bearing with a new one.

When a ball bearing is removed from propeller shaft by using of puller, do not use ball bearing again.

Loosen self-locking nut, remove center bearing upper bracket and center bearing insulator, install a puller, and withdraw center bearing companion together with companion flange from front propeller shaft.

1. Center bearing insulator
2. Center bearing companion
3. Companion flange
4. Flange yoke
5. Self-locking nut

Assembly

Fit center bearing companion with oil seals and ball bearing, and tighten companion flange to propeller shaft tube by the use of self-locking nut.

INSTALLATION

Center bearing is installed through center bearing insulator and bracket to cross member with two bolts. In installing bearing, place lock plate under head of bolts and tighten bolts. (Tightening Torque: Refer to Service Data and Specifications). Be sure to bend tab of lock plate against side of bolt head to secure the installation.

1. Center bearing insulator
2. Center bearing bracket
3. Lock plate
4. Center bearing mounting cross member

Note:

Be sure to tighten bolts to specified torques, being careful that full-face contact is maintained between bolt head and lock plate.

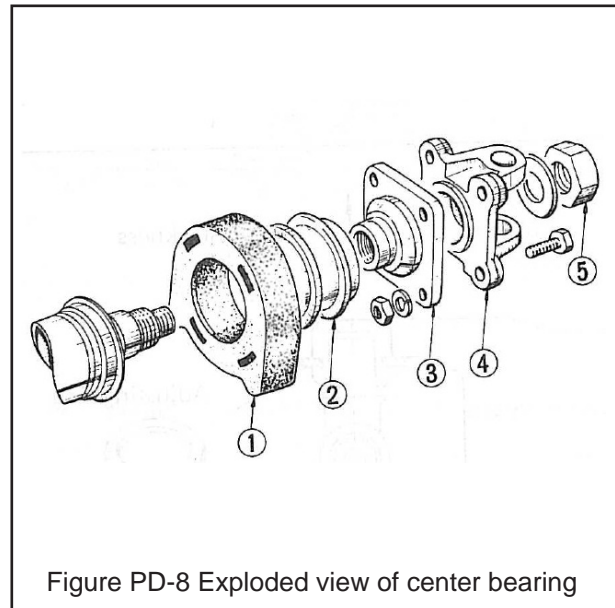


Figure PD-8 Exploded view of center bearing

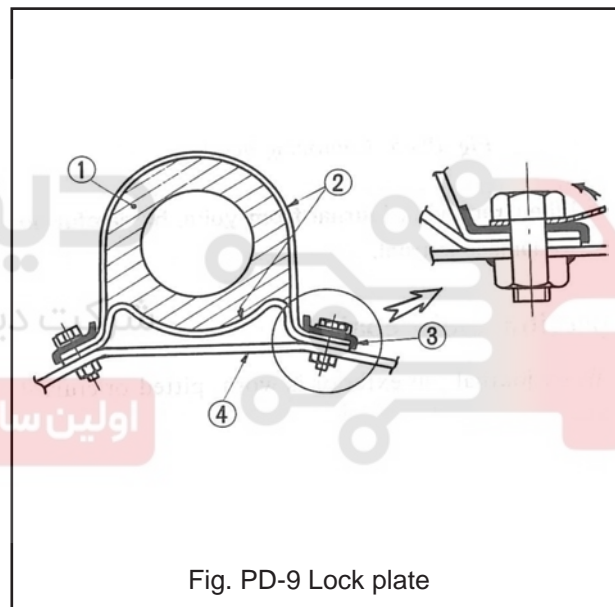


Fig. PD-9 Lock plate

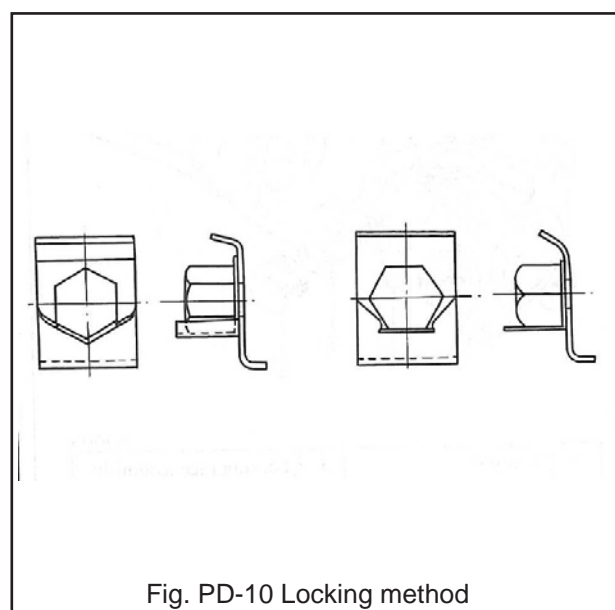


Fig. PD-10 Locking method

SERVICE DATA

| | | |
|---|--------------|---|
| Permissible dynamic unbalance | gr-cm(in-oz) | 20 (0.28) at 4,000 rpm |
| Axial play of spider journal | mm (in) | Less that 0.02 (0.0008) |
| Spider journal swinging torque | kg-cm(in-lb) | Less that 0.02 (0.0008) |
| Propeller shaft(front and rear out of round | mm (in) | Less that 0.02 (0.0008) |
| Tightening torque: | | |
| Flange yoke/fixing nuts | kg-cm(ft-lb) | 4 to 4.5 (29 to 33) |
| Self-locking nut | kg-cm(ft-lb) | 24 to 28 (174 to 202) |
| Center bearing hex nut | kg-cm(ft-lb) | Up to Dec.,1973...3 to 3.8(22 to 27) From Jan.,1974.....4.5 to 4.5(29 to 33) |

TROUBLE DIAGNOSES AND CORRECTIONS

| Condition | Probable cause | Corrective action |
|---|---|-------------------|
| Vibration (vibration occurs on propeller shaft during at medium or high speed and the vibration is transmitted to body.) | Worn or damaged universal joint needle bearing | Replace |
| | Unbalance due to bent or dented propeller shaft | Repair or replace |
| | Loose propeller shaft installation | Retighten |
| | Worn transmission rear extension bushing | Replace |
| | Damaged center bearing | Replace |
| Knocking sound during starting or noise during coasting propeller shaft | Worn universal joint and main shaft spline | Replace |
| | Loose propeller shaft installation | Retighten |
| | Loose joint installation | Adjust snap ring |
| | Damaged center bearing | Replace |

DIFFERENTIAL CARRIER DESCRIPTION

The differential carrier uses a hypoid gear pinion set to transmit engine torque to car rear wheels with extra margine of capacity, A limited-slip differential is also available as a production optional in 2-ton and 1.5-ton pay-load vehicles. In the paragraphs which follow the differences are described independently for the convenience of reference. Adjusting gear teeth contact, bearing per-load and backlash can be adjusted by means of shims, washers and differential side adjust.

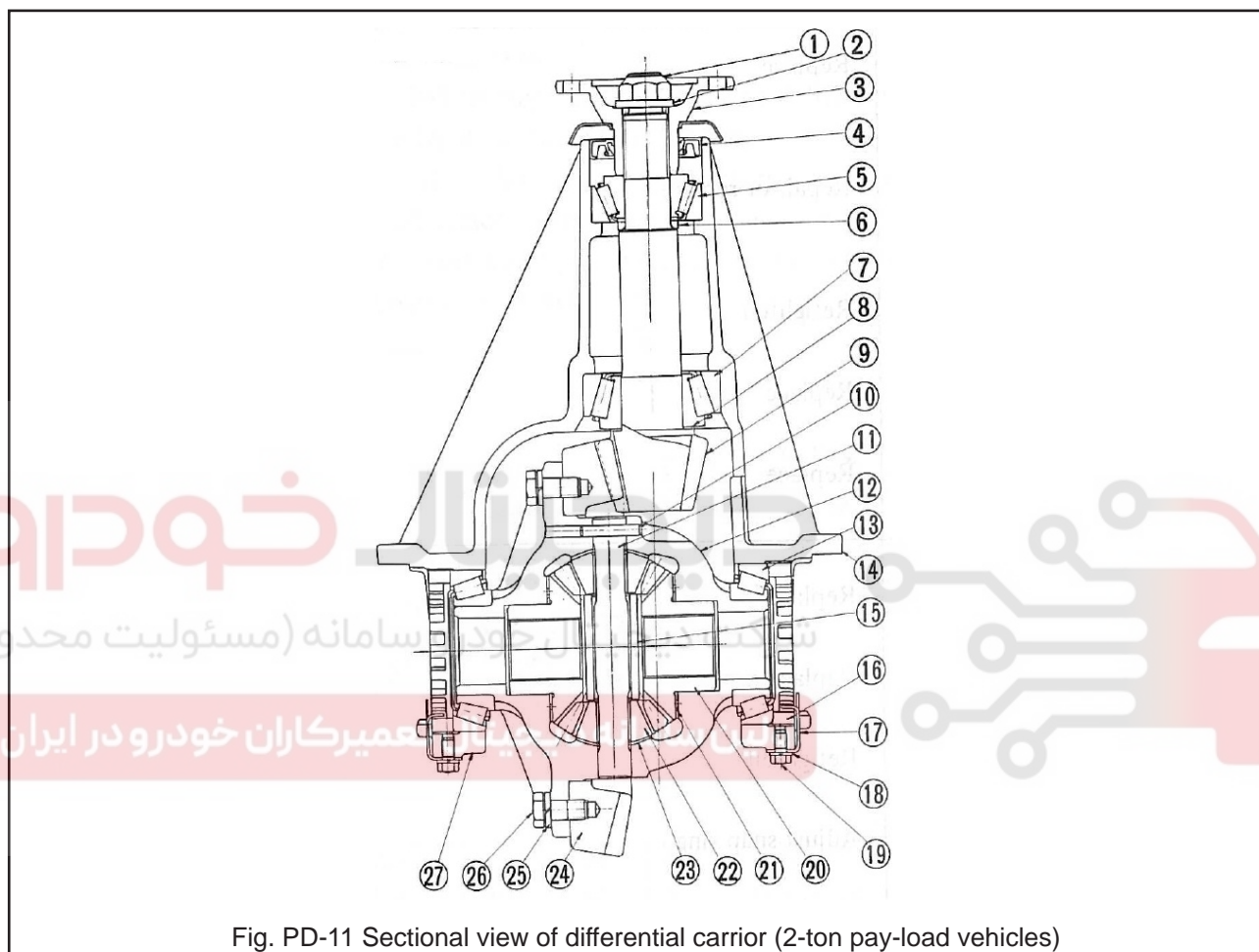


Fig. PD-11 Sectional view of differential carrier (2-ton pay-load vehicles)

- | | |
|--------------------------------|-------------------------------|
| 1. Drive pinion nut | 15. Thrust block |
| 2. Plain washer | 16. Differential side adjust |
| 3. Companion flange assembly | 17. Lock finger |
| 4. Drive pinion oil seal | 18. Lock washer |
| 5. Front bearing assembly | 19. Bolt |
| 6. Drive pinion bearing spacer | 20. Differential side gear |
| 7. Rear bearing assembly | 21. Side gear thrust washer |
| 8. Drive pinion adjust washer | 22. Differential pinion mate |
| 9. Drive pinion | 23. Pinion mate thrust washer |
| 10. Pinion mate shaft lock pin | 24. Drive gear |
| 11. Pinion mate shaft | 25. Lock washer |
| 12. Differential case | 26. Drive gear bolt |
| 13. Side bearing | 27. Bearing cap |
| 14. Gear carrier | |

PROPELLER SHAFT & DIFFERENTIAL CARRIER

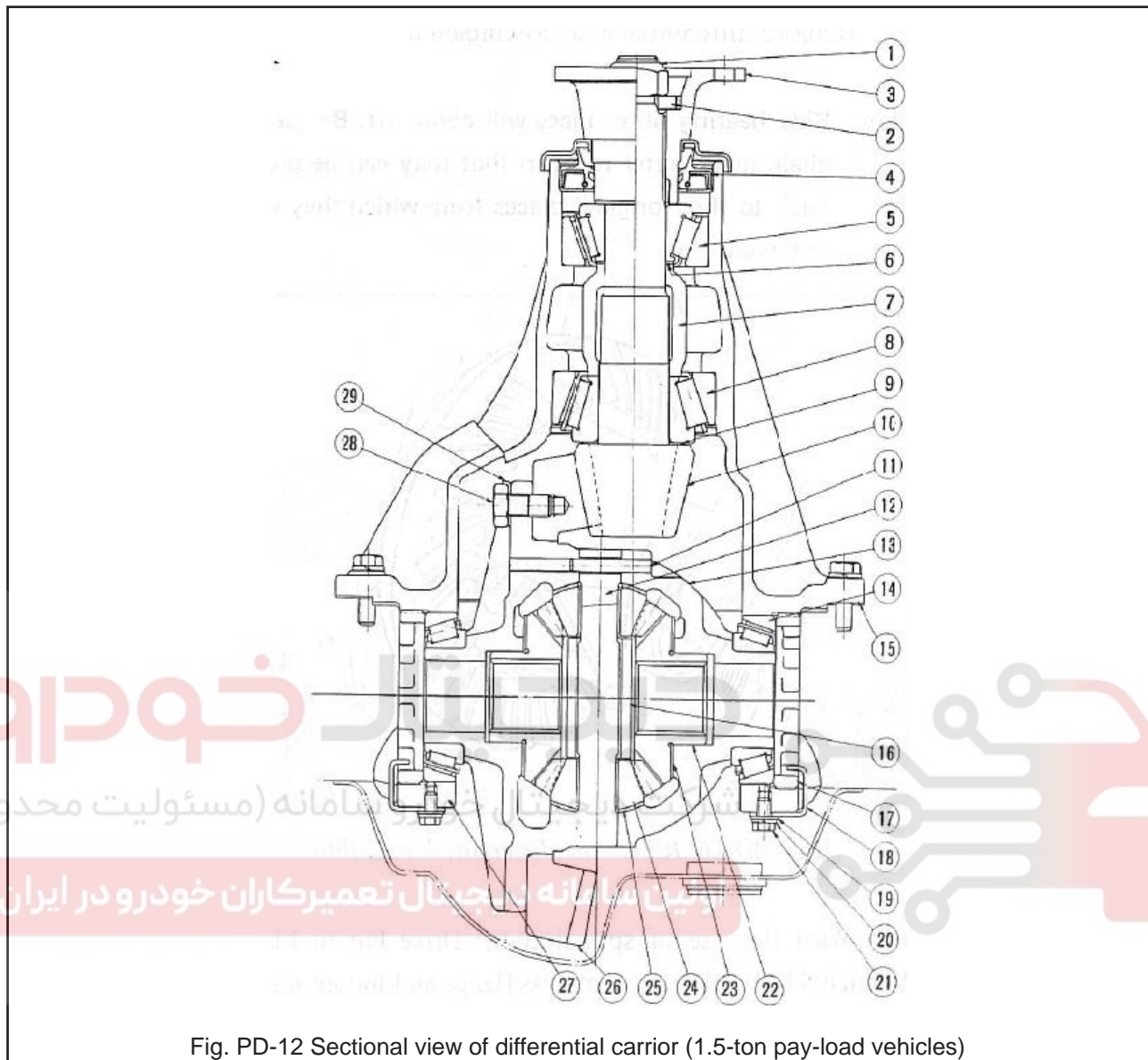


Fig. PD-12 Sectional view of differential carrier (1.5-ton pay-load vehicles)

- | | |
|-------------------------------|---------------------------------|
| 1. Self-locking nut | 16. Thrust block |
| 2. Pinion yoke washer | 17. Differential side adjust |
| 3. Pinion flange assembly | 18. Lock finger |
| 4. Oil seal | 19. Plain washer |
| 5. Front bearing assembly | 20. Lock washer |
| 6. Front bearing shim | 21. Bolt |
| 7. Pinion bearing spacer | 22. Differential side gear |
| 8. Rear bearing assembly | 23. Side gear thrust washer |
| 9. Rear bearing shim | 24. Differential pinion |
| 10. Drive pinion | 25. Pinion pinion thrust washer |
| 11. Lock pin | 26. Drive gear |
| 12. Differential pinion shaft | 27. Bearing cap |
| 13. Differential case | 28. Drive gear bolt |
| 14. Side bearing | 29. Lock washer |
| 15. Gear carrier | |

REMOVAL

Jack up rear end of vehicle and remove bottom plug to drain rear axle housing. Draw out rear axle shaft. Refer to related topic under REAR AXLE as to detailed procedures. Separate propeller shaft from companion flange.

Unscrew nuts holding axle housing to differential carrier:

Take out carrier.

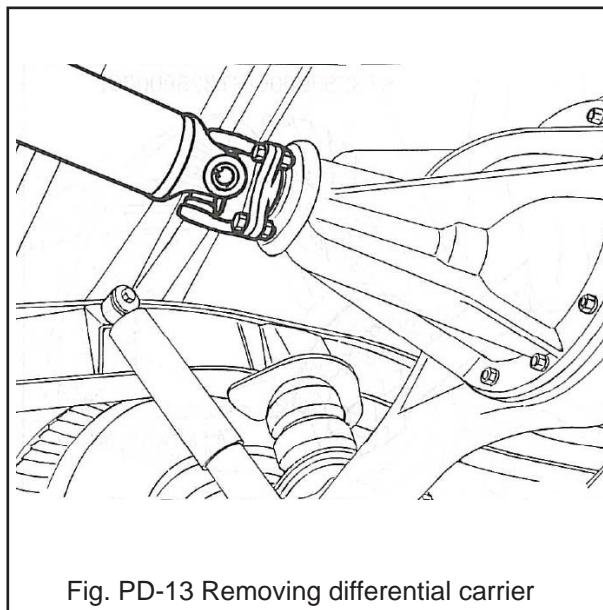


Fig. PD-13 Removing differential carrier

DISASSEMBLY

Prior to disassembling measure and note backlash and bearing pre-load to which reference can be made at assembly.

1. Place carrier on work stand.
2. Scribe aligning marks across side bearing cap and carrier so that original combination is restored at assembly.
3. Remove finger lock and side bearing cap bolts: take out cap lightly tapping with a hammer.

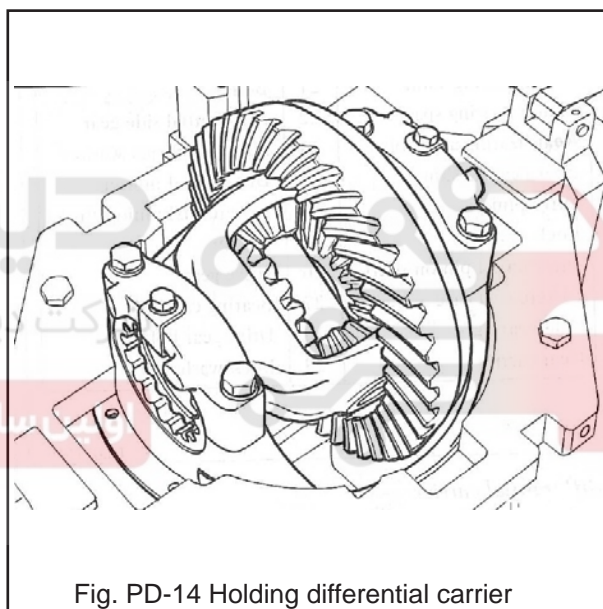


Fig. PD-14 Holding differential carrier

4. Using special tool "Side Bearing Adjust Nut Wrench ST32530000 (1.5-ton ST32580000)", remove adjust nuts.

The special tool number enclosed in parenthesis () indicates 1.5-ton pay-load vehicles.

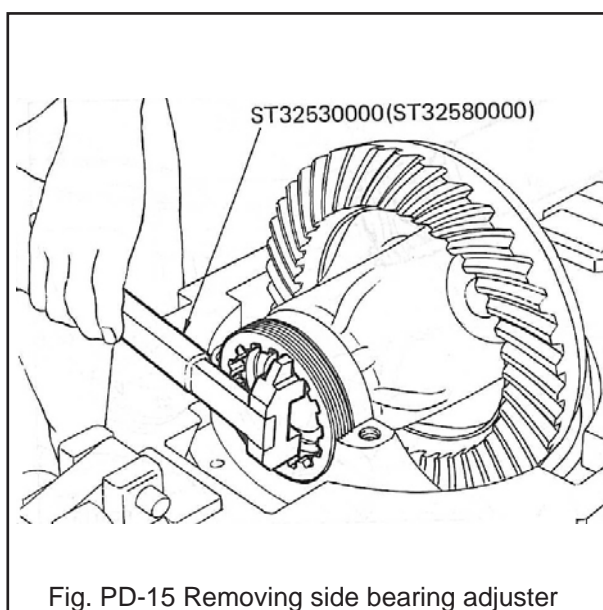


Fig. PD-15 Removing side bearing adjuster

5. Remove differential as an assembled unit.

Note:

Side bearing outer races will come off. be sure to chalk mark outer races so that they can be placed back to their original places from which they were removed.

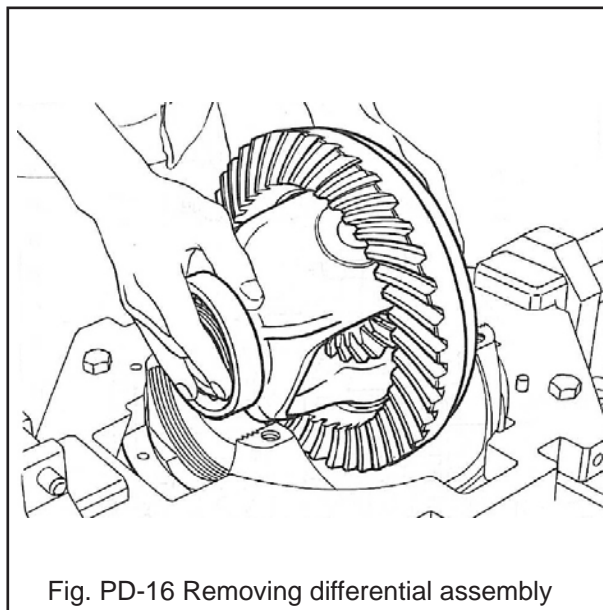


Fig. PD-16 Removing differential assembly

6. With the use of special tool "Drive Pinion Flange Wrench ST31620001", compress flange and loosen nut.

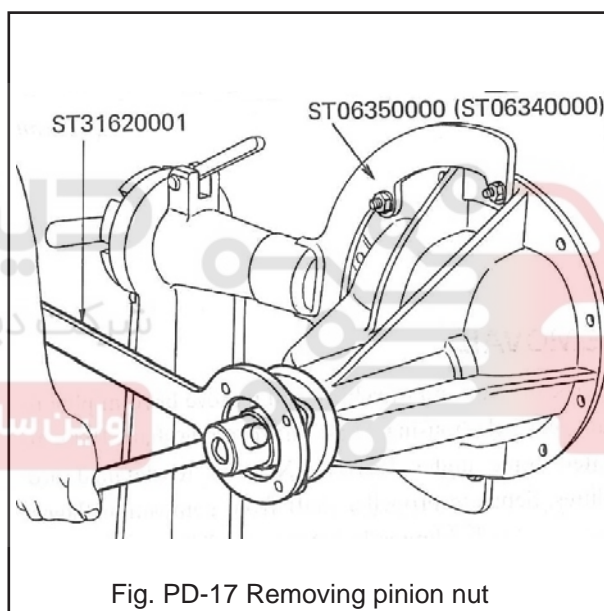


Fig. PD-17 Removing pinion nut

7. While lightly tapping with a hammer on front end of drive pinion, remove pinion toward rear.

8. Remove drive pinion oil seal and front bearing inner race.

9. Remove drive pinion front and bearing outer races.

Note:

To drive out outer races, use hammer and bushing cover and give careful hammer blows to insure even pressure.

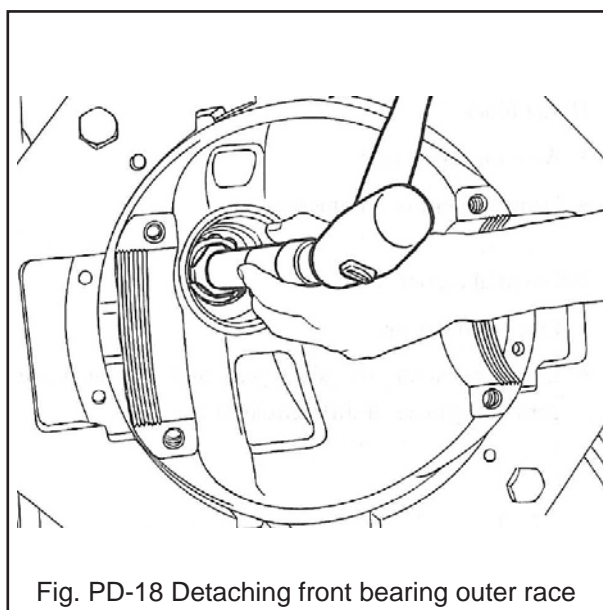
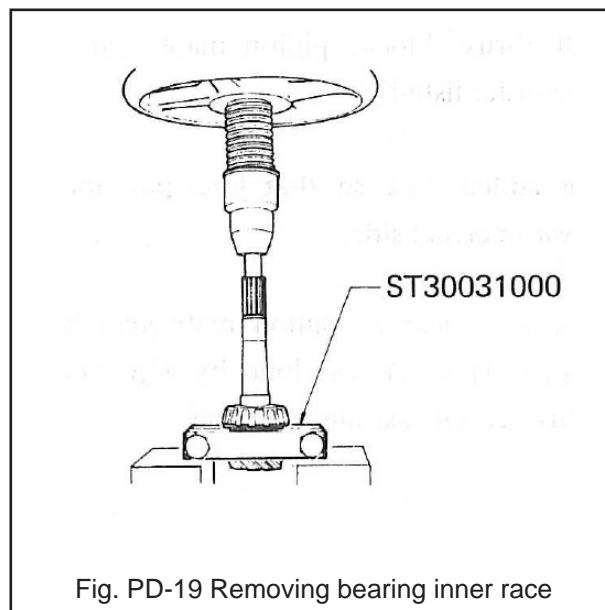
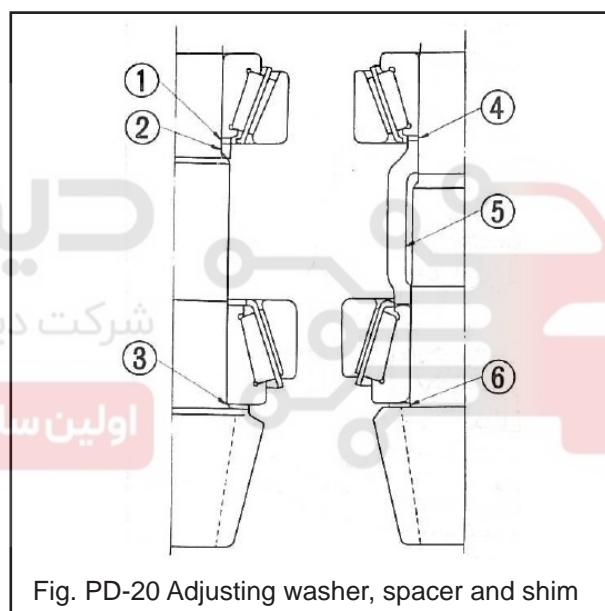


Fig. PD-18 Detaching front bearing outer race

10. Draw out drive pinion rear bearing inner race using Rear Bearing Inner Race Puller ST30031000.



1. Drive pinion bearing adjust washer
2. Drive pinion bearing spacer
3. Drive pinion washer
4. Front bearing shim
5. Pinion bearing spacer
6. Rear bearing shim

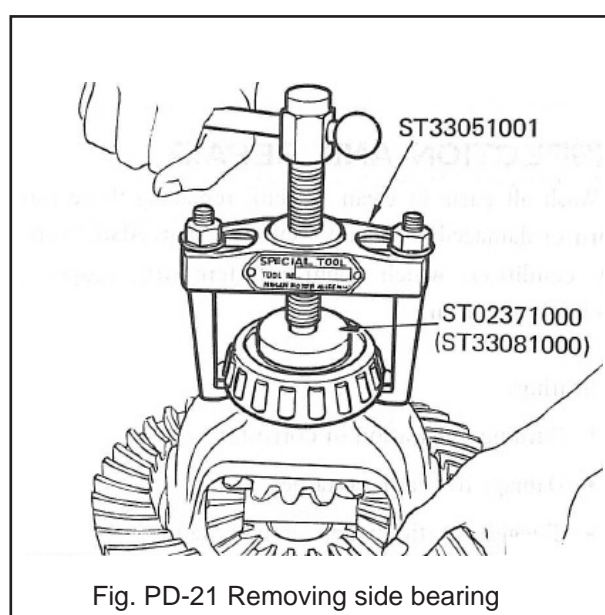


Differential case

1. Unscrew bolts holding drive gear in place: take out drive gear.
2. Using special tool "Differential Side Bearing Puller Assembly ST33051001", remove inner race as shown.

Note:

Do not interchange inner between right and left sides, keeping them in a part rack with outer races with which they were mated.



3. Remove pinion shaft lock pin.

Note:

After removing lock pin from, give care to hammer from the side of drive gear.

Lock pin is staked to case and should not be removed unless it is absolutely necessary.

4. Pull out pinion mate shaft: take out pinion mate gear, side gear and each thrust washer.

INSPECTION AND REPAIR

Wash all parts in clean solvent, replacing those found worn or damaged too badly beyond repair. Also, examine any conditions which might interfere with proper differential operation.

Bearing Checking:

- . Burning separation or corrosion
 - . Damage to bearing retainer
 - . Sluggish rotation when spun by hand
- Drive pinion and drive gear teeth faces:

- . Contact pattern
- . Excessive wear or burning
- . Damage or dent

Note:

Be sure to replace drive pinion and drive gear as a matched set

Side gear and pinion mate gear:

- . Contact pattern
- . Excessive wear or burning on gear teeth and thrust faces
- . Excessive wear on side gear serration with gear shaft. If wear is too great so that backlash exceeds 0.15 mm (0.0059 in), replace whichever worn part.

Side gear pinion mate thrust washer:

- . Wear on thrust face
- . Burning and scratches

Pinion mate and pinion shaft:

- . Excessive wear or burning
- . If play exceeds 0.20 mm (0.0078 in), replace whichever worn part.

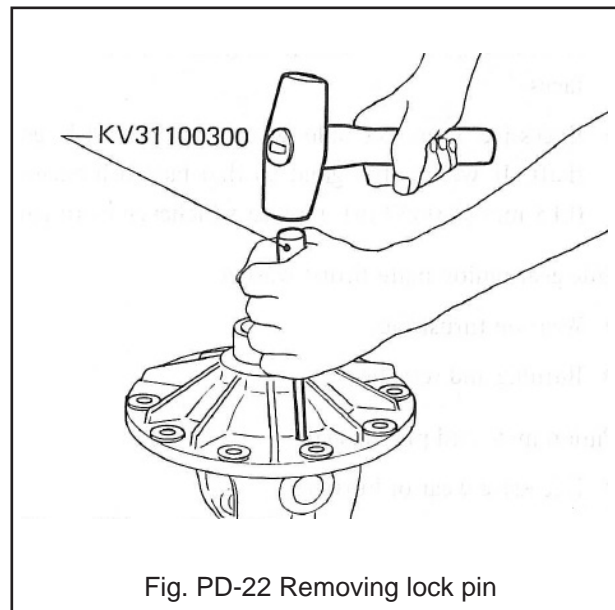


Fig. PD-22 Removing lock pin

Thrust block:

- . Wear on thrust face
- . Damage, dent or hammering

Differential carrier case:

- . Crack and damage
- . Excessive wear on side gear and pinion mate contacting faces of differential case.

ASSEMBLY AND ADJUSTMENT

Differential case:

1. Install side gear in differential case. Do not forget to install thrust washers this time of assembly.
2. Install thrust block, pinion mate gear and pinion shaft in the order listed.

Note:

Use added care so that lock pin hole is facing toward correct side.

3. Adjust side gear to pinion mate gear backlash to specifications. This can be done adjusting clearance between differential case and side gear.

ton pay-load vehicles:

If above procedure is not effective with existing washer, try with other washers available for the purpose. Correct backlash is 0.05 to 0.30 mm (0.0020 to 0.0118 in)

| Side gear thrust washers | |
|--------------------------|-------------------|
| No. | Thickness mm (in) |
| 1 | 1.60 (0.0630) |
| 2 | 1.65 (0.0650) |
| 3 | 1.70 (0.0669) |

1.5ton pay-load vehicles:

If backlash exceeds 0.20 mm (0.0078in), replace washer with a new one. This can also be corrected by using new pinion thrust washer.

4. Drive fit pinion mate shaft lock pin to differential case: crash pin hole at two places to prevent pin from coming during operation.

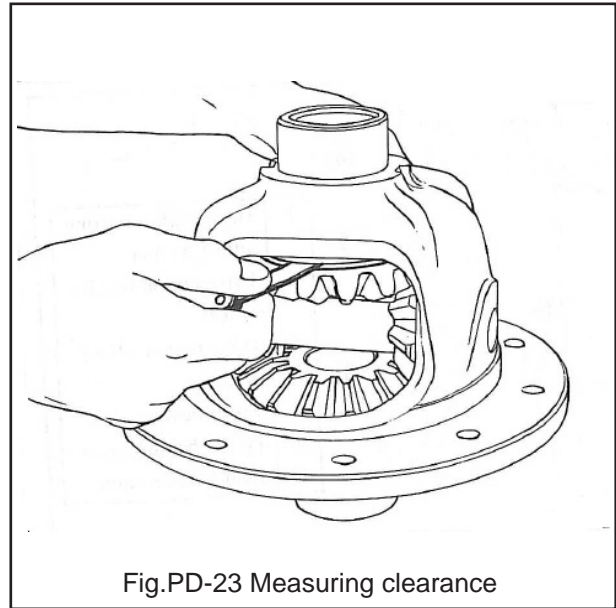


Fig.PD-23 Measuring clearance

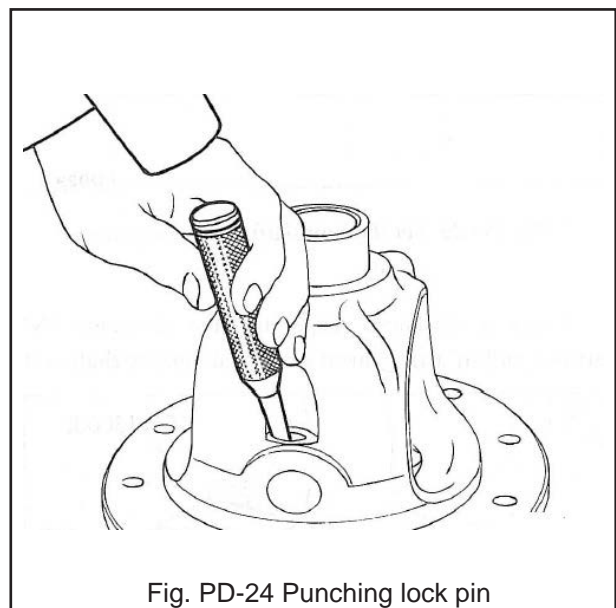


Fig. PD-24 Punching lock pin

5. Coat gear teeth and thrust faces with differential gear oil, examining if gears rotate freely.

6. Install drive gear to differential case: supply attaching bolts lock washers and tighten to correct torque.

Tightening torques:

Refer to Service Data and Specifications.

Note:

Tighten bolts to correct torque while lightly tapping around bolt heads with a hammer. In tightening bolts, use care to shift a wrench from one bolt to the other in a diagonal fashion to exert even pull drive gear.

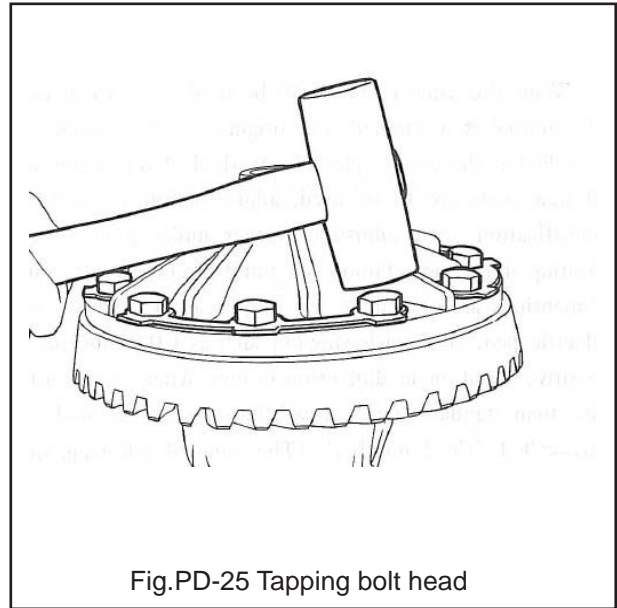


Fig.PD-25 Tapping bolt head

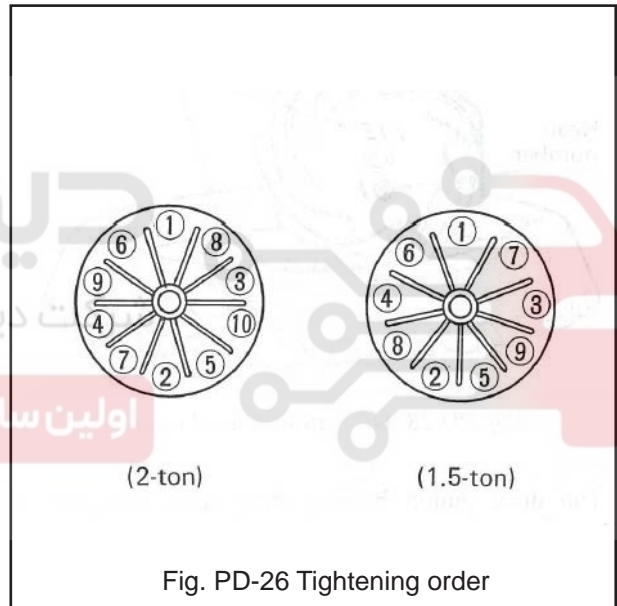


Fig. PD-26 Tightening order

7. Set up side bearing inner race as shown and press it in place on gear case. 1.5-ton pay-load vehicles use special tool " Differential Side Bearing Drift ST33190000"

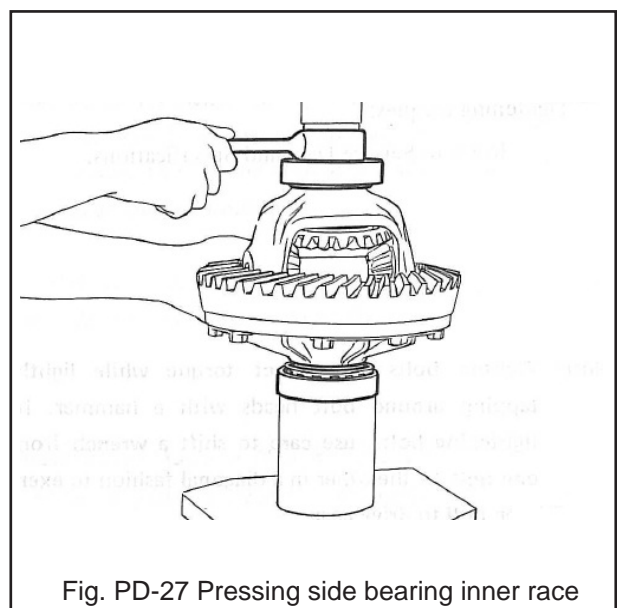


Fig. PD-27 Pressing side bearing inner race

Drive pinion (2-ton)

When the same parts are to be used again when the differential is assembled, the original washer should be installed at the correct place from which it was removed. If new parts are to be used, adjust pinion location to specification with adjusting washer under pinion rear bearing inner race. Pinion set number and variation in dimensions are etched on top of pinion to make use of electric pen. Marking having (+) such as + 0.01 indicates positive variation in dimension in mm. when variation is less that standard, marking will have (-). These numbers are called "Head number". (the numeral following the mark is a figure multiplied by 100.)

1. Tap drive pinion bearing outer races into place in gear carrier. Use special tool.

Front:

Drive Pinion Bearing Outer Race Drift
ST30613000

Drive Pinion Bearing Outer Drift Bar
ST30611000

Rear:

Drive Pinion Bearing Outer Race Drift
ST01500001

2. Put drive pinion rear bearing inner on special tool "Drive Pinion Dummy Shaft ST31241000"

Note:

Drive pinion adjust washer need not be installed at this point of assembly.

3. Insert Dummy Shaft ST31241000 on bearing and place Arrangement Gauge ST31130000 on gear carrier.

4. Using a thickness gauge, measure clearance "N" between end of arrangement gauge and dummy shaft end.

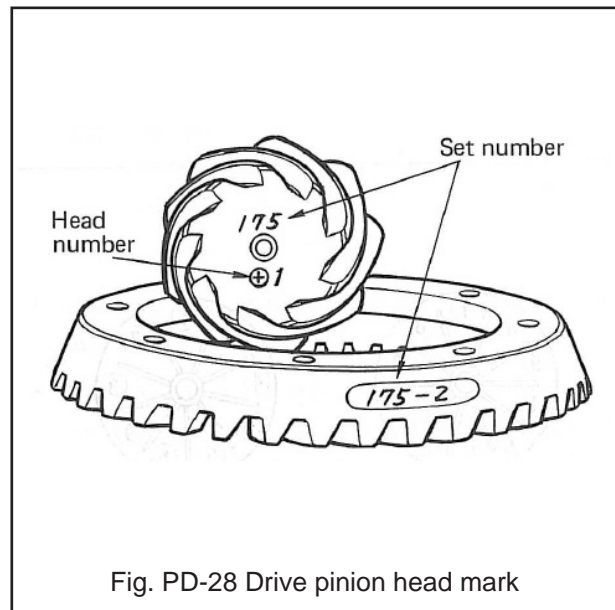


Fig. PD-28 Drive pinion head mark

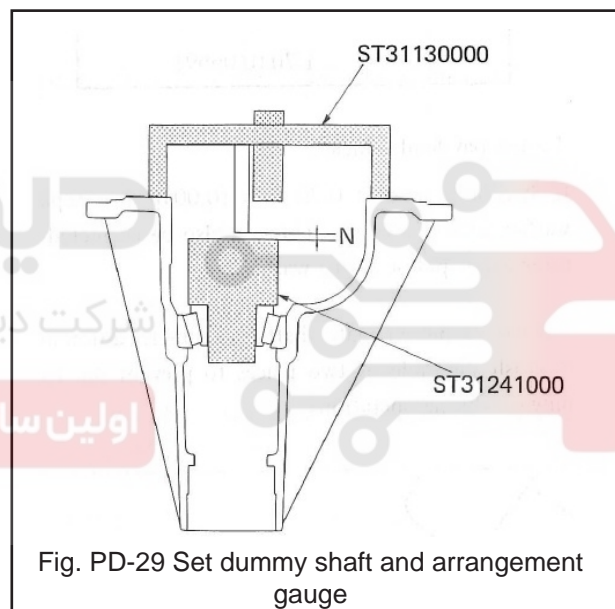


Fig. PD-29 Set dummy shaft and arrangement gauge

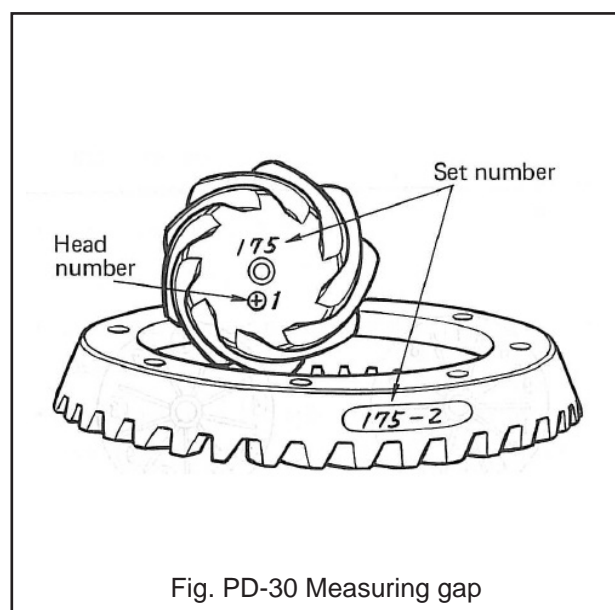


Fig. PD-30 Measuring gap

5. Washer selection procedure for correct pinion location:

$$T=N-(H-D-A)\times 0.01+2.55 \text{ (mm)}$$

Where:

T: Required thickness of adjust washer (mm)

N: Measured clearance from end of gauge to top face dummy shaft (mm)

H: Head number etched on pinion

D: Figure marked on dummy shaft

A: Figure marked on arrangement gauge

Calculation example:

$$N= 0.35 \text{ mm}$$

$$H= +2$$

$$D= +3$$

$$A= -4$$

$$T= 0.35- (2-3-+4) \times 0.01+2.55 =2.87 \text{ mm}$$

Correct thickness of washer is always the one which is nearest the calculated one. That is, 2.87 mm (0.1130 in)

| Drive pinion adjust washer | | | |
|----------------------------|-------------------|-----|-------------------|
| No. | Thickness mm (in) | No. | Thickness mm (in) |
| 1 | 2.63 (0.1035) | 11 | 2.93 (0.1154) |
| 2 | 2.66 (0.1047) | 12 | 2.96 (0.1165) |
| 3 | 2.69 (0.1059) | 13 | 2.99 (0.1177) |
| 4 | 2.72 (0.1071) | 14 | 3.02 (0.1189) |
| 5 | 2.75 (0.1083) | 15 | 3.05 (0.1201) |
| 6 | 2.78 (0.1094) | 16 | 3.08 (0.1213) |
| 7 | 2.81 (0.1106) | 17 | 3.11 (0.1224) |
| 8 | 2.84 (0.1118) | 18 | 3.14 (0.1236) |
| 9 | 2.87 (0.1130) | 19 | 3.17 (0.1248) |
| 10 | 2.90 (0.1142) | | |

6. Pull out arrangement gauge, dummy shaft and rear bearing inner race.

7. Place adjust washer and rear bearing inner race on special tool "Drive Rear Bearing Inner Race Drift ST30911000". Move tool to an arbor press and press bearing until pinion bottoms. Use adjust washer of correct thickness as previously determined.

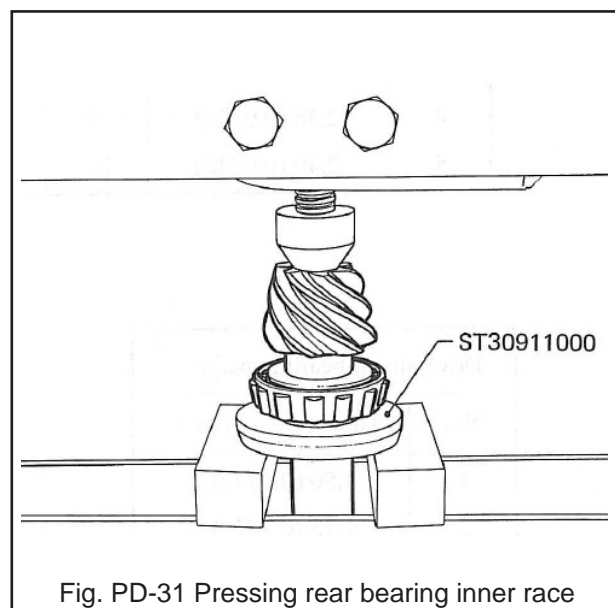


Fig. PD-31 Pressing rear bearing inner race

8. Enter drive pinion into place in gear carrier: install bearing spacer, adjust washer and front bearing inner race in the order listed.

9. After installing companion flange and plain washer, torque pinion nut to specification:

Tightening torque:

17 to 25 kg-m (123 to 181 ft-lb)

10. Adjust pinion rotating torque to 12 to 15 kg-m (10 to 13 in-lb) with adjust washer and bearing spacer. Pinion nut should be kept to specified tension while operation.

Using special tool "Drive Pinion Preload Gauge ST31227S000"

11. After adjustment has been completed, remove drive pinion nut, plain washer and companion flange: install oil seal.

12. Install companion flange and washer again. Torque pinion nut 17 to 25 kg-m (123 to 181 ft-lb) tension.

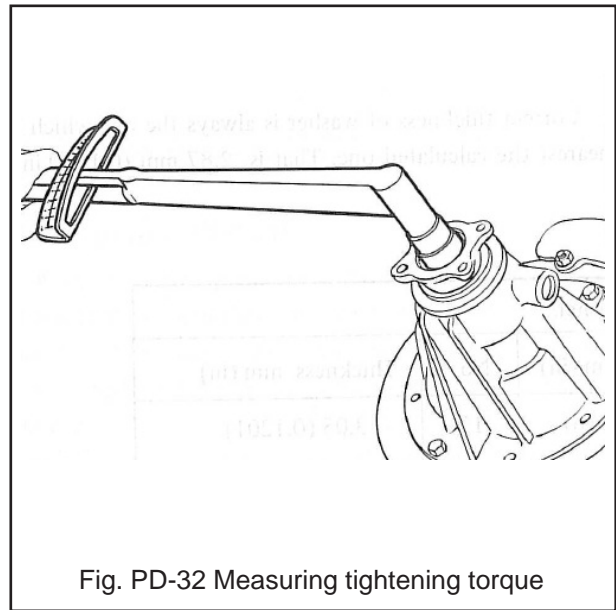


Fig. PD-32 Measuring tightening torque

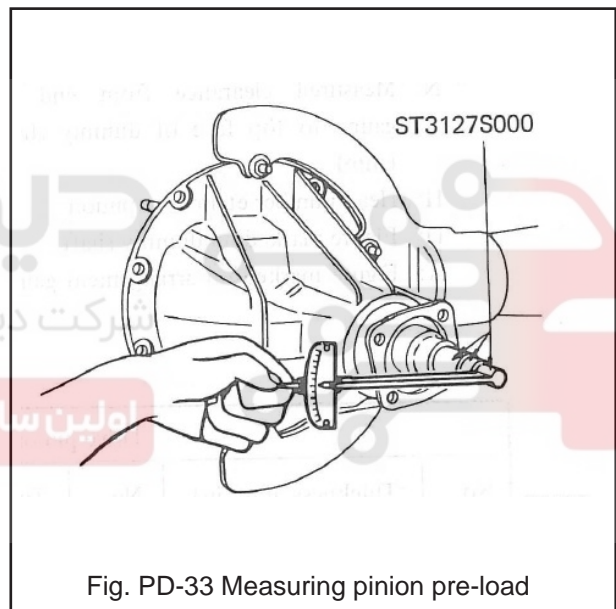


Fig. PD-33 Measuring pinion pre-load

| Drive pinion bearing adjust washer | | | |
|------------------------------------|-------------------|-----|-------------------|
| No. | Thickness mm (in) | No. | Thickness mm (in) |
| 1 | 2.32 (0.0913) | 11 | 2.52 (0.0992) |
| 2 | 2.34 (0.0921) | 12 | 2.54 (0.1000) |
| 3 | 2.36 (0.0929) | 13 | 2.56 (0.1008) |
| 4 | 2.38 (0.0937) | 14 | 2.58 (0.1016) |
| 5 | 2.40 (0.0945) | 15 | 2.60 (0.1024) |
| 6 | 2.42 (0.0953) | | |
| 7 | 2.44 (0.0961) | | |
| 8 | 2.46 (0.0969) | | |
| 9 | 2.48 (0.0976) | | |
| 10 | 2.50 (0.0984) | | |

| Drive pinion bearing spacer | |
|-----------------------------|-------------------|
| No. | Thickness mm (in) |
| 1 | 4.50 (0.1772) |
| 2 | 4.75 (0.1870) |
| 3 | 5.00 (0.1969) |

Drive pinion (1.5-ton)

When the same parts are to be used again when the differential is assembled, the original washer should be installed at the correct place from which it was removed.

If new parts are to be used, adjust pinion location to specifications with correct thickness of under pinion rear bearing inner race. Pinion set number and variation in dimension are etched on top of pinion. Marking having (+) such as +0.01 indicates positive from standard in mm. when variation is less than standard, marking will have (-). These numbers are called "Head number"

1. Using a drift, install drive pinion front and rear bearing outer races in gear carrier.

Front: Drive Pinion Bearing Outer Race Drift ST30613000

Drive Pinion Bearing Outer Drift Bar ST30611000

Rear: Drive Pinion Bearing Outer Race Drift ST30621000

Drive Pinion Bearing Outer Drift Bar ST30611000

2. Put rear bearing inner race on special tool "Drive Pinion Dummy Shaft ST31181001": enter the above assembly into place in gear carrier.

3. Set up special Tool: Drive Pinion Arrangement Gauge ST31251000" in bearing hole in differential case: measure clearance between dummy and gauge.

4. Bearing shim selection procedure:

$$T = N - (H - D - A) \times 0.01 + 0.55 \text{ (mm)}$$

Where:

T: Required thickness of adjust washer (mm)

N: Measured clearance from end of gauge to top face of dummy shaft (mm)

H: Head number etched on pinion

D: Figure marked on dummy shaft

A: Figure marked on arrangement gauge

Calculation example:

$$N = 0.31 \text{ mm}, H = -2, D = -2, A = +1$$

$$T = 0.31 - (-2 + 2 - 1) \times 0.01 + 0.55 = 0.87 \text{ mm}$$

5. Required thickness of shims are always the one which is nearest calculated value. In this case, it is 0.40 + 0.45 mm (0.0334 in)

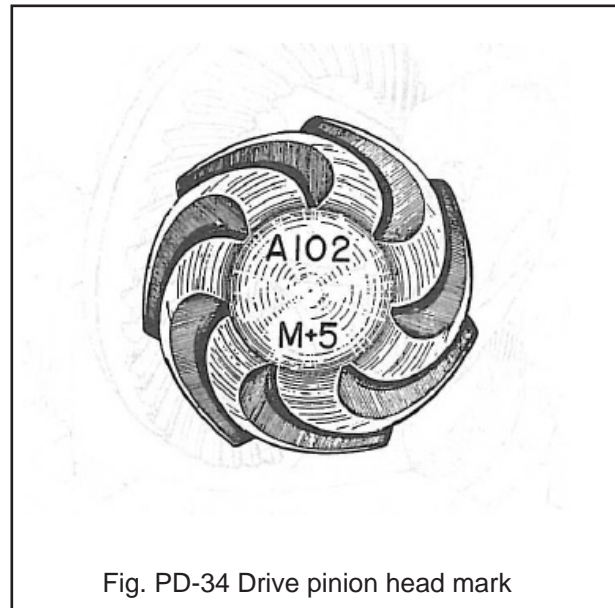


Fig. PD-34 Drive pinion head mark

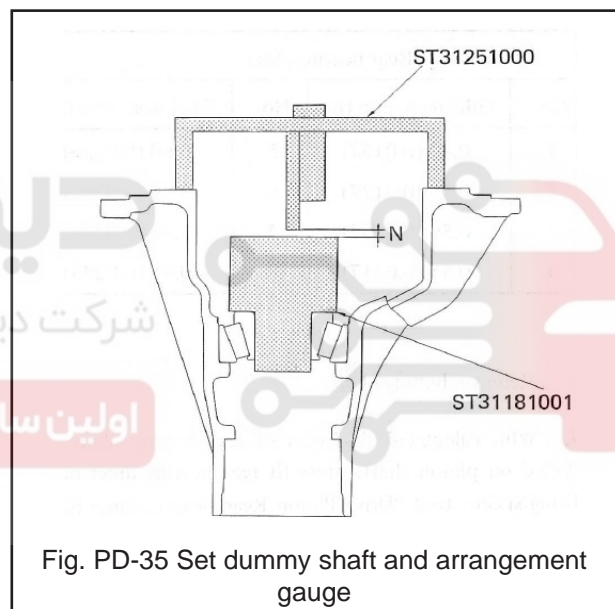


Fig. PD-35 Set dummy shaft and arrangement gauge

| Rear bearing shim | | | |
|-------------------|----------------------|-----|----------------------|
| No. | Thickness mm (in) | No. | Thickness mm (in) |
| 1 | 0.40 (0.0157) | 5 | 0.60 (0.0236) |
| 2 | 0.45 (0.0177) | 6 | 0.65 (0.0256) |
| 3 | 0.50 (0.0197) | 7 | 0.70 (0.0276) |
| 4 | 0.55 (0.0217) | 8 | 0.75 (0.0295) |

6. Remove dummy shaft.

7. With calculated thickness of rear bearing shim installed on pinion shaft, press fit rear bearing inner race.

Using special tool "Drive Pinion Rear Bearing Inner Rear Replacer ST30062000"

8. Enter pinion into place in gear carrier; install pinion bearing spacer, front bearing shim and front bearing inner rear in the order listed.

9. After inserting pinion flange and pinion washer in their respective positions, install and locking nut to correct torque tension.

Correct torque:

20 to 25 kg-m (145 to 181 ft-lb)

10. Adjust drive pinion starting torque to 4 to 9 kg-cm (29 to 65 ft-lb) with front bearing adjust shim.

11. After correct adjustment has been obtained, remove locking nut, pinion washer and pinion flange: install oil seal. Using special tool "Oil Seal Fitting Tool ST33510000"

Note:

Pack grease between sealing lips oil seal.

12. Again install flange and washer: tighten locking nut to 20 to 25 kg-m (145 to 181 ft-lb).

| Rear bearing shim | | | |
|-------------------|----------------------|-----|----------------------|
| No. | Thickness mm (in) | No. | Thickness mm (in) |
| 1 | 0.40 (0.0157) | 5 | 0.60 (0.0236) |
| 2 | 0.45 (0.0177) | 6 | 0.65 (0.0256) |
| 3 | 0.50 (0.0197) | 7 | 0.70 (0.0276) |
| 4 | 0.55 (0.0217) | 8 | 0.75 (0.0295) |

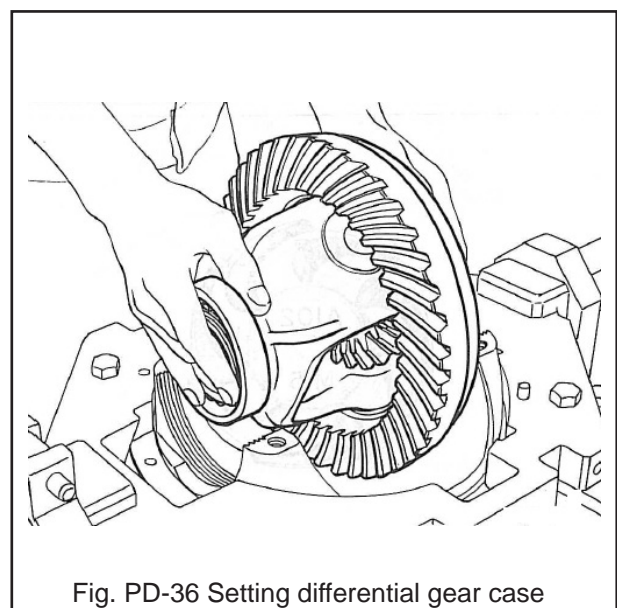


Fig. PD-36 Setting differential gear case

Setting and adjusting differential gear case

1. Install differential case to gear carrier together with side bearing outer race.

Note:

Do not interchange races between right and left sides.

2. Position differential side adjust on gear carrier with threads properly engaged: screw in adjust lightly at this stage of assembly.

3. Install bearing cap.

Note:

Be sure that aligning marks made during disassembling process are properly aligned.

4. Screw in bearing cap bolts, but do not tighten at this point to allow further tightening of differential side adjust.

Note:

To provide for further of tightening of differential side adjust.

5. On 2-ton pay-load vehicles, tighten right and left differential side adjusts until drive pinion to drive gear backlash is 0.15 to 0.20 mm (0.0059 to 0.0078 in).

Backlash can be adjusted by tightening one adjust and loosening the other adjust. If backlash is too great, loosen adjust "B" and tighten adjust "A" by equal amount. After correct backlash has been obtained, tighten bearing cap attaching bolts to specified torque.

Specified torque:

5.5 to 7.5kg-m (40 to45 ft-lb)

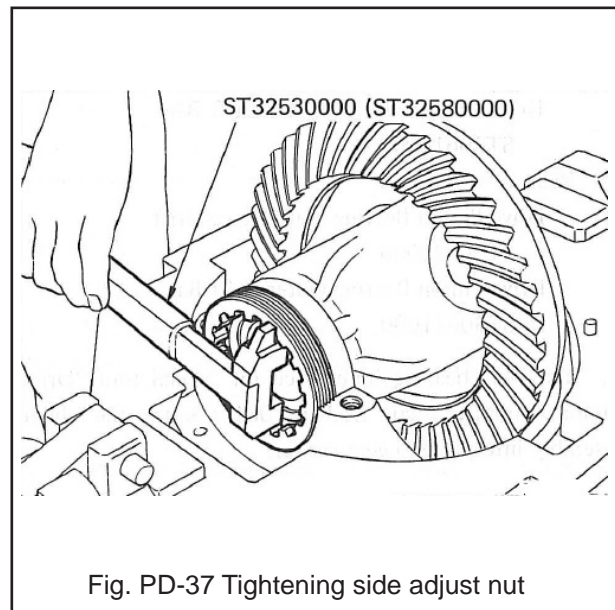


Fig. PD-37 Tightening side adjust nut

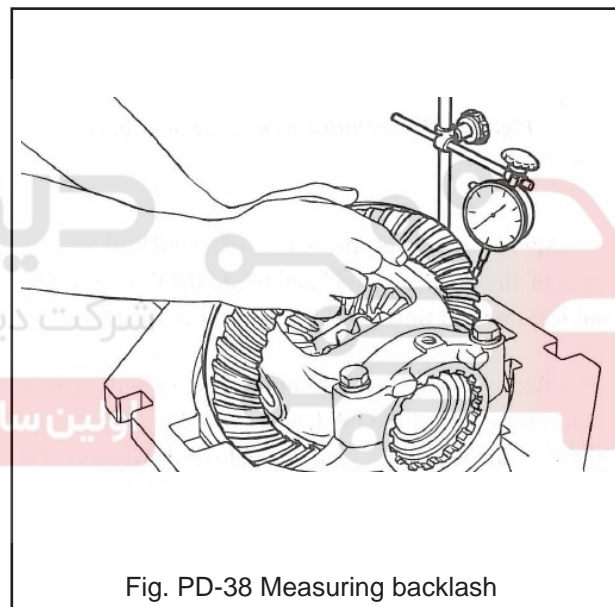


Fig. PD-38 Measuring backlash

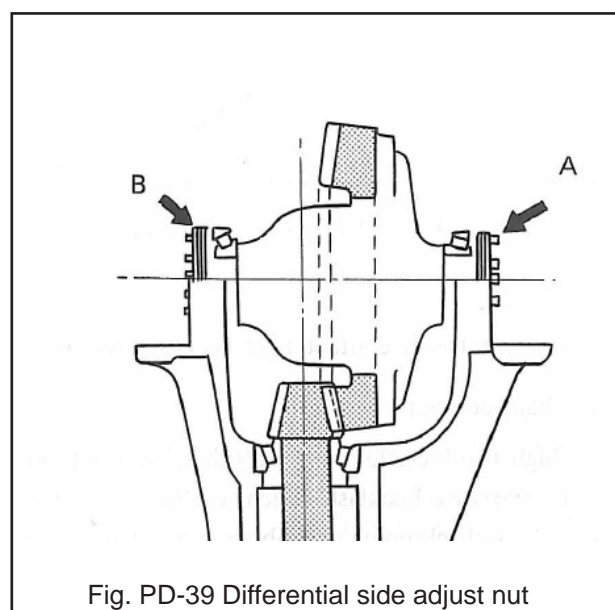


Fig. PD-39 Differential side adjust nut

On 1.5-ton pay-load vehicles, tighten right and left adjusters and adjust drive gear backlash and bearing pre-load at one and the same time. The backlash should be according to the value stamped on the circumference of drive gear, given in units of 1/100 mm (0.0004 in). see Fig. PD-40.

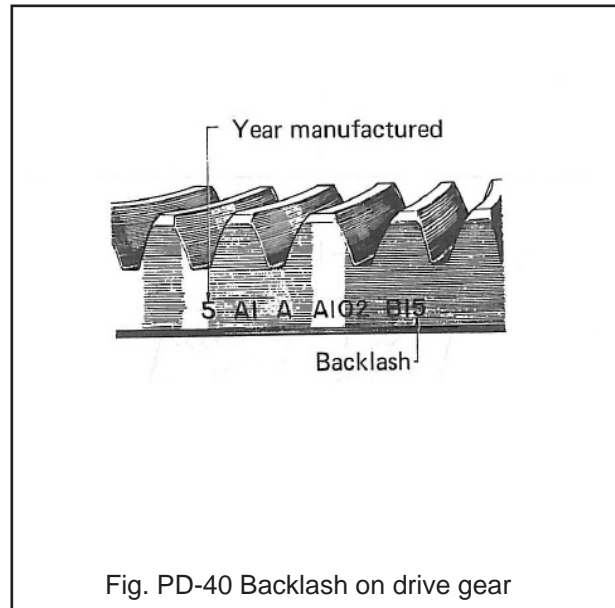


Fig. PD-40 Backlash on drive gear

Bearing pre-load should be held within 12 to 16 kg-cm (10 to 14 in-lb) when differential case is rotated.

Reading beneath spring balance needle when hooked against drive gear bolt should be from 1.3 to 1.8 kg (2.9 to 4.0 lb)

Note:

Prior to measuring pre-load, lightly tap around housing to locate bearing correctly.

Specified torque:

9.5 to 10.5 kg-m (69 to 76 ft-lb)

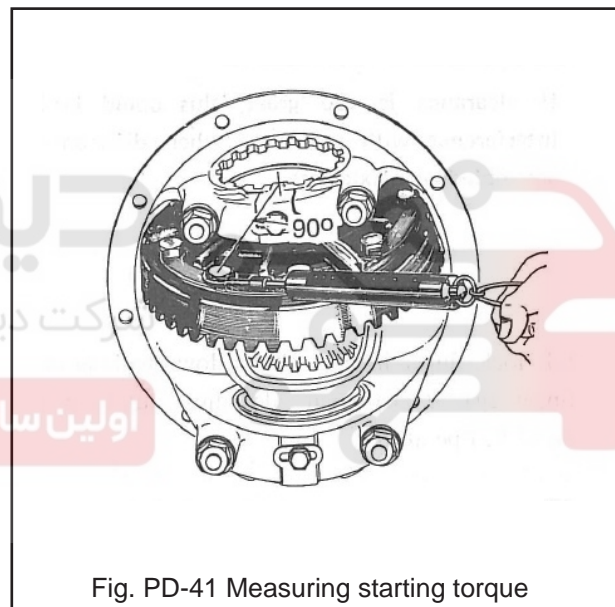


Fig. PD-41 Measuring starting torque

6. On 2-ton pay-load vehicles, bearing cap clearance can be adjusted by rotating right and left adjust nuts. To measure clearance, use micrometer. Correct cap clearance is from 262.85 to 262.90 mm (10.34 to 10.35 in) if clearance is too gear, tighten right and left adjust nuts squally to 8 to 10 kg-m (58 to 72ft-lb)

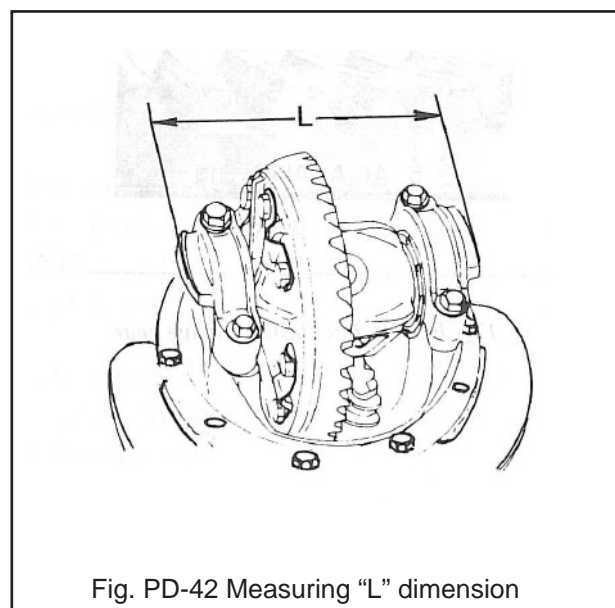


Fig. PD-42 Measuring "L" dimension

Note:

If clearance (L) is too great, this could lead to interference with axle case when differential is assembled with axle case.

7. Bolt lock finger in place: bend down locking tab of lock finger against groove in side adjust nut to prevent rotation while operation.

8. Measure surface run-out of drive gear by means of a dial gauge with its indicating finger resting against back of gear being farthest from gear center. (See Fig. PD 43) Maximum allowable run-out:

2-ton pay-load vehicles 0.08 mm (0.0031 in)

1.5-ton pay-load vehicles 0.06 mm (0.0024 in)

9. Apply a light uniform coat of oiled lead to 3 or 4 teeth of the drive gear and hand rotate the drive gear back and forth several times to check contact of the teeth.

With correct tooth contact, the pattern will be about 50 to 60% of the full length. (See Fig. PD-44)

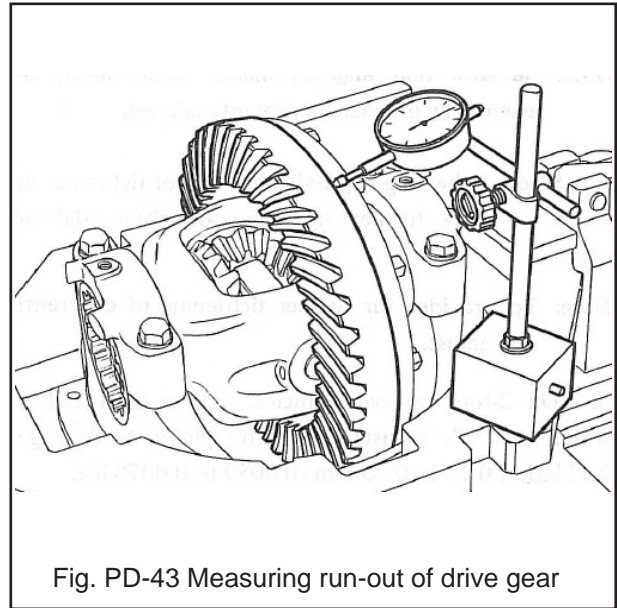


Fig. PD-43 Measuring run-out of drive gear

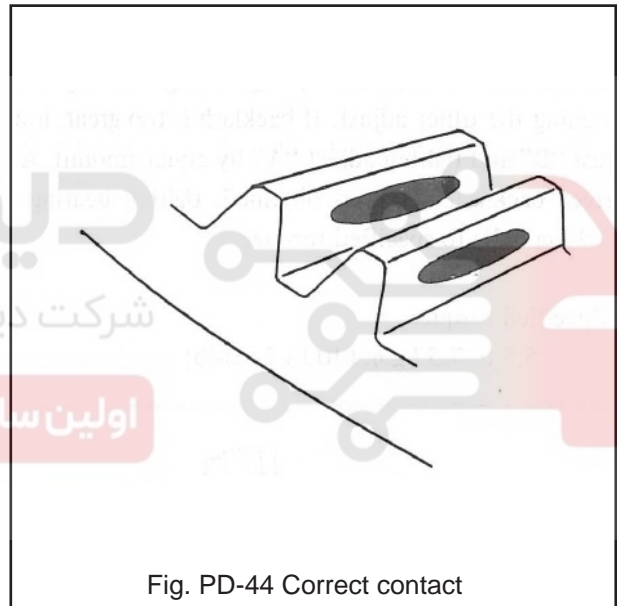


Fig. PD-44 Correct contact

Improper tooth contact may be corrected as follows:

1- Face contact

A high tooth contact indicates the pinion is too far out due. To excessive backlash which results gear noise and possible tooth chipping. To obtain correct tooth contact, adjust the drive pinion toward drive gear by replacing drive

Pinion adjust washer (on 2-ton pay-load vehicles) or rear bearing shims (on 1.5-ton pay-load vehicles) with thicker ones.

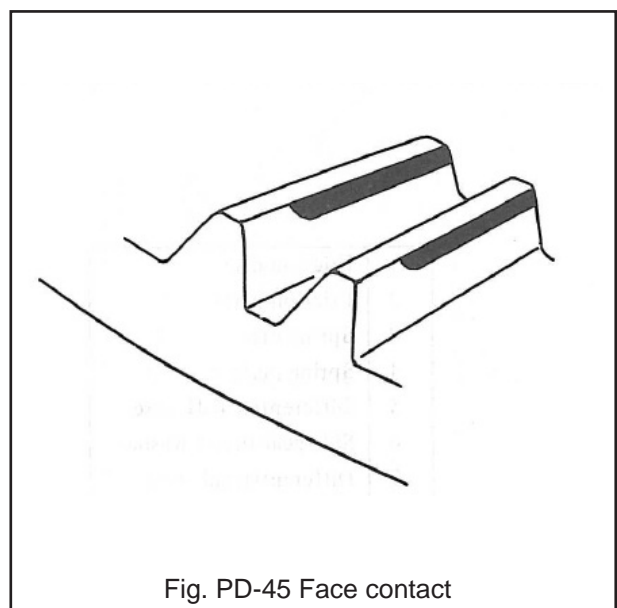


Fig. PD-45 Face contact

2- Flank contact

A low tooth contact indicates the drive pinion is set too deep due to inadequate backlash which causes excessive gear noise and stepped tooth wear. Adjust the drive pinion away from the drive gear by replacing drive pinion adjust washer (or rear bearing shims) with thinner ones.

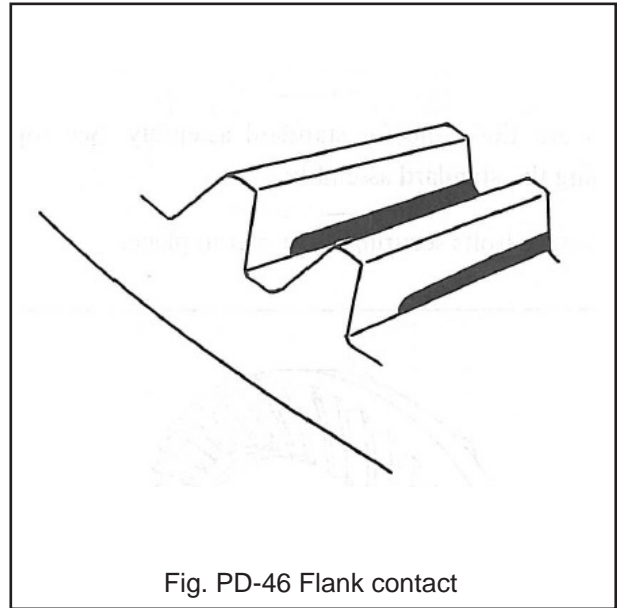


Fig. PD-46 Flank contact

3- Toe contact

A short toe tooth contact indicates the drive gear is too close to the pinion and may cause a damage to the toe.

Loosening the left hand side differential side adjusting nut and tightening the right hand side one.

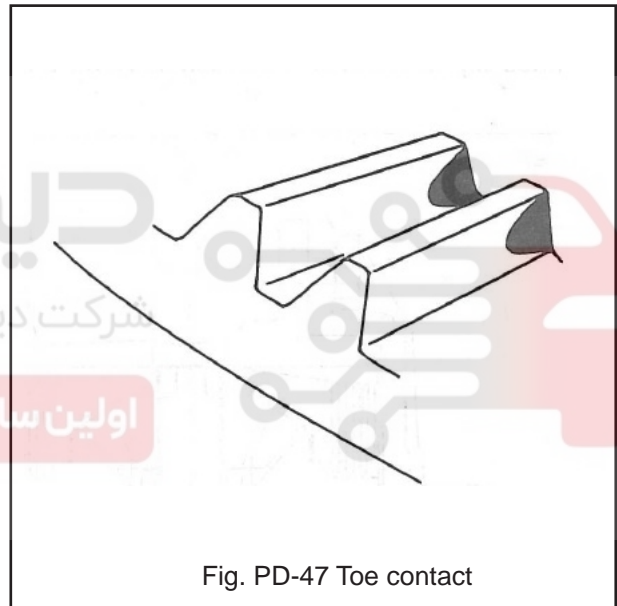


Fig. PD-47 Toe contact

4- Heel contact

A short heel contact indicates the drive gear is too far away from the pinion and may result in a damage to the heel. Loosening the right hand side differential side adjusting nut and tightening the left hand side one.

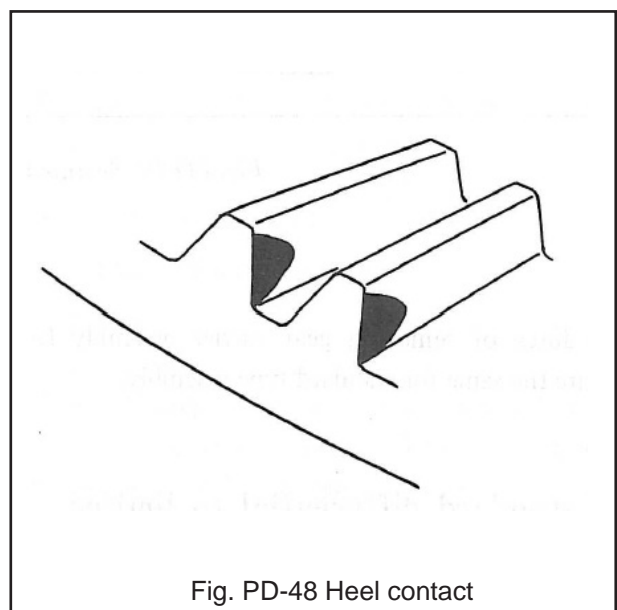
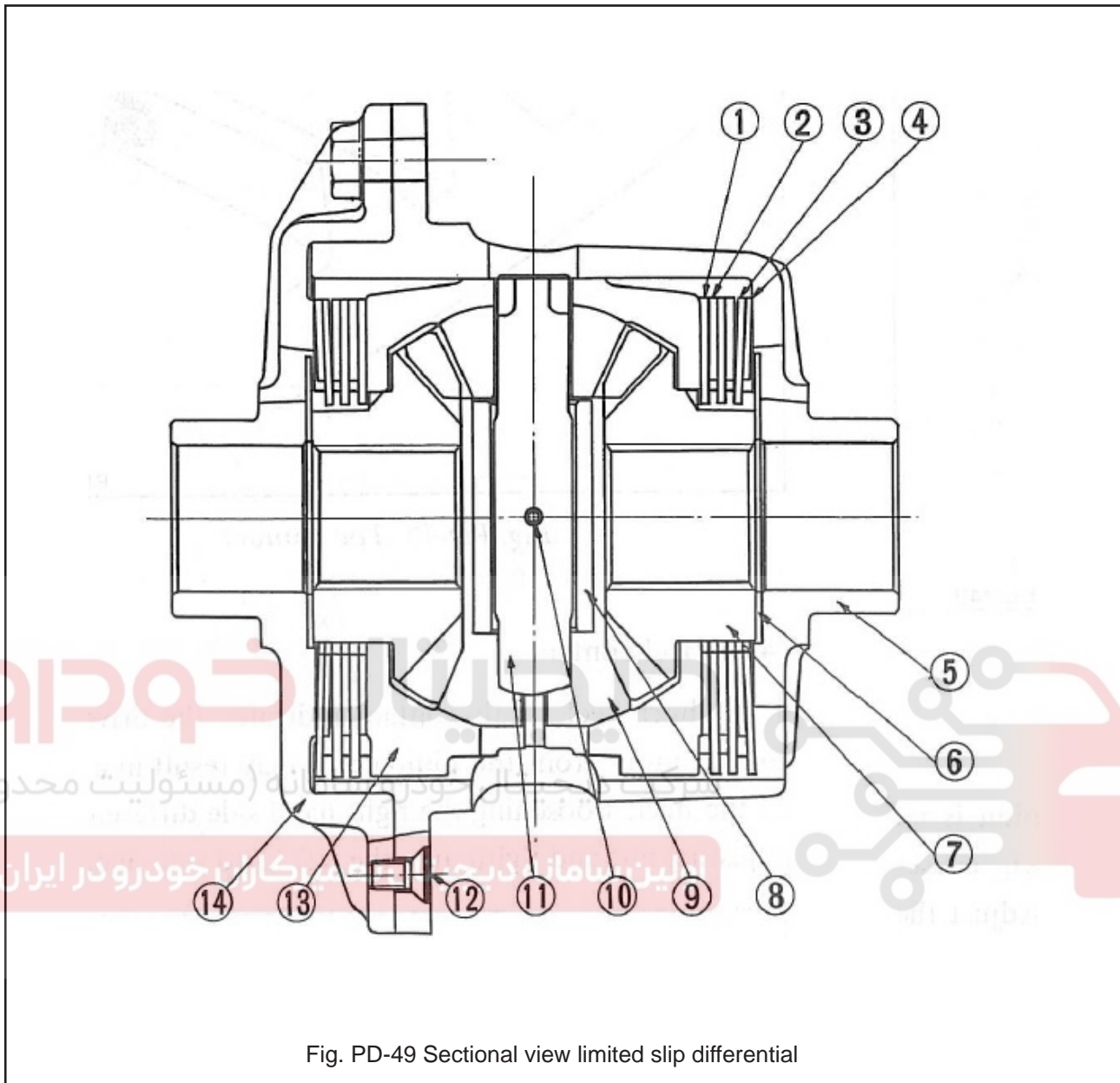


Fig. PD-48 Heel contact

LIMITED SLIP (Optional)

The limited slip differential, unlike ordinary differential units, will prevent car skid even when one drive wheel rebounds on rough roads. Another principle feature of this differential units is its ability to apply more power to the drive wheel that is harder to turn, enabling the drive to get rid of swamps, sand, snow or ice with one drive wheel. In handling the car equipped with this unit, cars should be exercised to have both wheels jacked up if the engine run for any reason

The limited slip differential (2-ton)



1. Friction disc
2. Friction plate
3. Spring disc
4. Spring plate
5. Differential R.H.case
6. Side gear thrust washer
7. Differential side gear
8. Thrust block
9. Differential pinion mate
10. Mate shaft lock pin
11. Pinion mate shaft
12. Differential case screw
13. Differential pressure ring
14. Differential L.H. case

Procedures of removing gear carrier assembly from vehicle are the same for standard type assembly.

From standard differential to limited slip differential

Replacement of a standard type differential with a limited slip differential may be performed at differential carrier assembly or at differential assembly. When replacing at differential assembly, install drive gear and side bearing to the limited slip differential assembly and install the assembly to the differential carrier.

Note:

Use A.P.I. GL-5 gear oil having a viscosity number of 140.

Disassembly

Except for differential assembly, disassembly procedures are the same for standard assembly.

See topics describing the standard assembly.

1. Remove bolts securing drive gear in place.

2. Remove bolt securing R.H. and L.H. differential cases and separate the case.

3. Lift thrust washer, spring plate, spring disc, friction plate and friction disc out of L.H. case.

4. Lift off pressure ring and side gears.

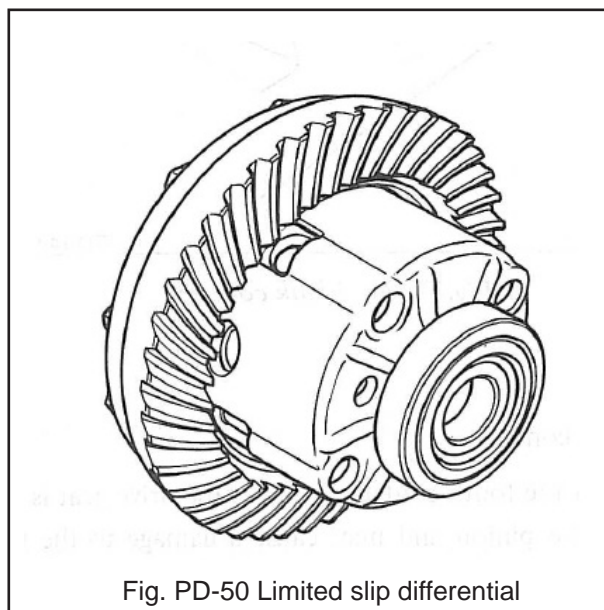


Fig. PD-50 Limited slip differential

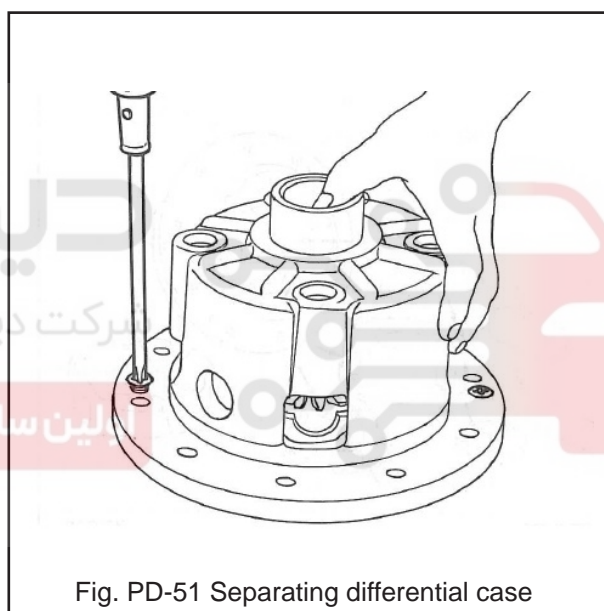


Fig. PD-51 Separating differential case

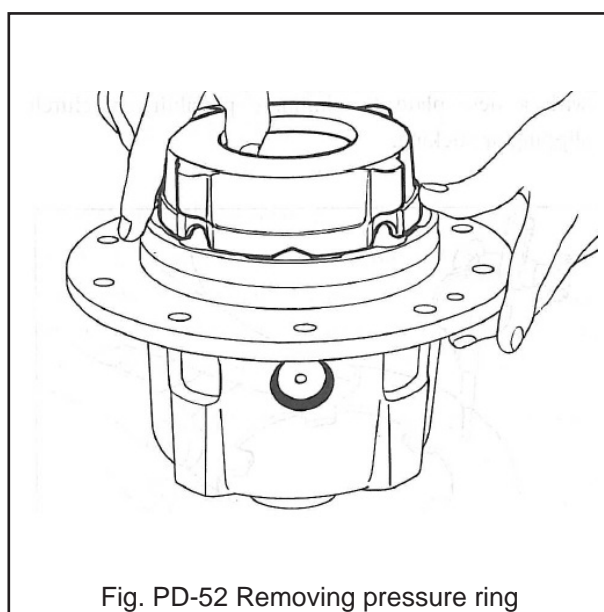
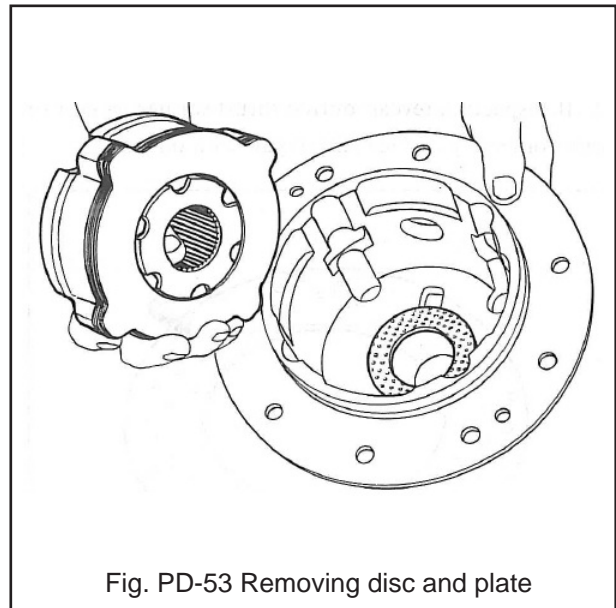


Fig. PD-52 Removing pressure ring

5. Remove pinion, pinion shaft and remove R.H. side gear, pressure ring, discs and plates. Then remove R.H. thrust washer.



Inspection and repair

Clean the disassembled parts in suitable solvent (light machine oil) and blow dry with compressed air prior to inspection.

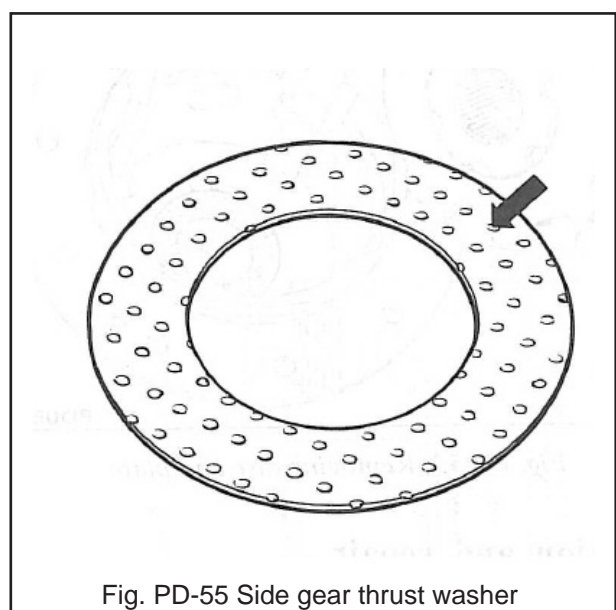
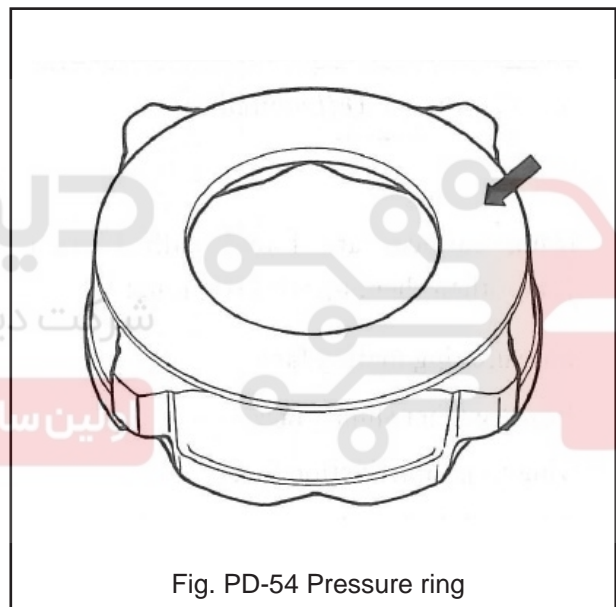
Inspection of contact surfaces:

1. Inspect discs and plates for wear, nicks and burrs. Replace worn or distorted clutch plates which will result in improper clutch pressure.

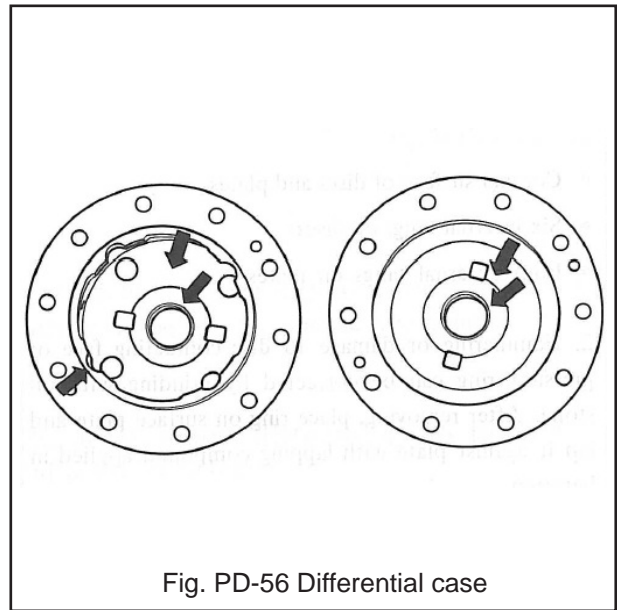
- . Contact surface of discs and plates
- . Six internal tangs on discs
- . Four external tangs on plates

2. Hammering or damage to disc contacting face of pressure ring can be corrected by grinding with oil stone. After removing, place ring on surface plate and lap it against plate with lapping compound applied in between.

3. If inspection reveals burred thrust washer on gear or case contacting surface, also repair with oil stone.

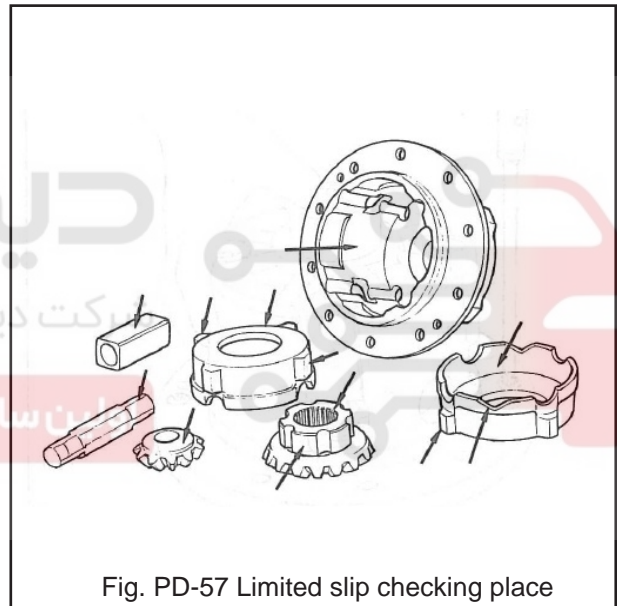


4. If there is hammering or damage to plate, thrust plate, pressure ring or plate contact face of case, repair by grinding with oil stone.



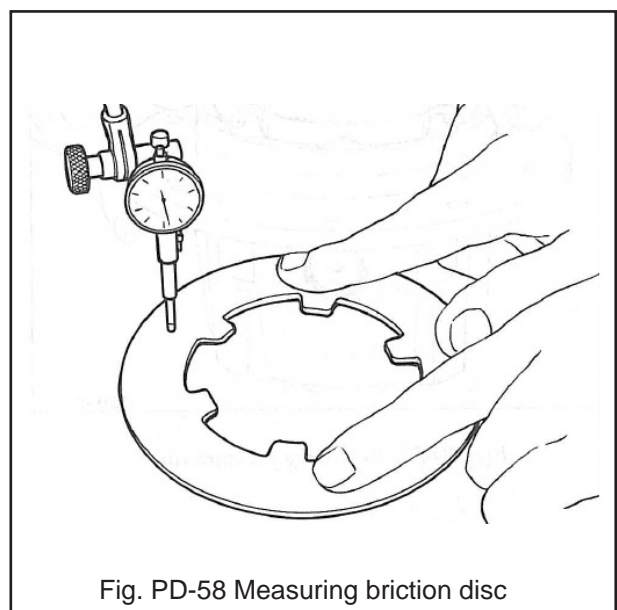
5. If following surfaces are found with burrs or hammering, smoothen them up with oil stone:

- . Gear to pressure ring mating face
- . Gear to washer sliding face
- . Pressure ring to pinion friction face
- . V-shaped face of shaft and pressure ring
- . Thrust block to shaft sliding face
- . Pressure ring outside diameter to case inside diameter



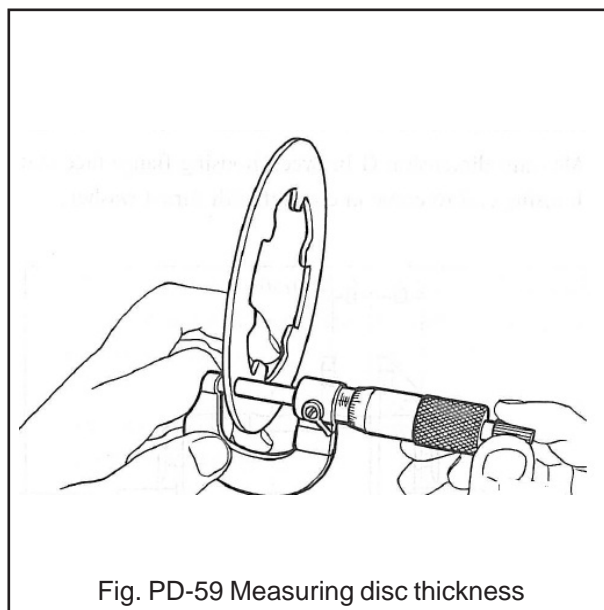
Inspection of disc and plate

1. To examine if friction disc or plate is not distorted, place it on a surface plate and rotate it by hand with indicating finger of dial gauge resting against disc or plate surface. Maximum allowable warpage is 0.04 mm with a new plate to eliminate possibility of clutch slipping or sticking.



2. If inspection reveals excessively burnt or worn friction disc, friction plate, spring disc or spring plate discard.

| Part name | Thickness mm (in) |
|----------------|--|
| Friction plate | 2.40 ± 0.02 (0.0945 ± 0.0008) |
| Friction disc | 2.40 ± 0.02 (0.0945 ± 0.0008) 2.50 ± 0.02 Over size (0.0984 ± 0.0008) |
| Spring plate | 2.40 ± 0.01 (0.0945 ± 0.0004) |
| Spring disc | 2.40 ± 0.01 (0.0945 ± 0.0004) |



دیجیتال خودرو

شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

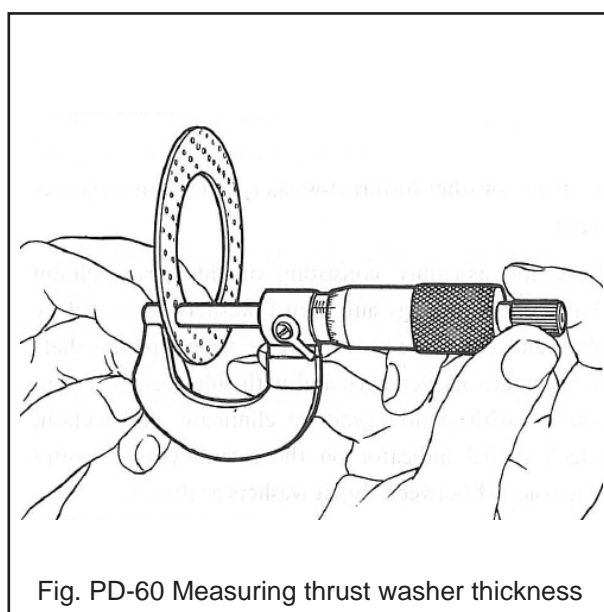
اولین سامانه دیجیتال تعمیرکاران خودرو در ایران



Inspection of thrust washer

Worn thrust washer are most often ascribable to noisy operation or damaged gear teeth due to excessive play in side gear and pinion. If washer is found to be worn too badly beyond limits, replace with new one.

| Part name | Thickness mm (in) |
|---------------|--|
| Thrust washer | 1.60 ± 0.02 (0.0630 ± 0.0008) 1.80 ± 0.02 (0.0709 ± 0.0008) Over size |



Adjustment

Prior to assembling the limited slip differential, clutch and side gear end play adjustment must be performed as follows:

Friction disc and plate end play adjustment Procedures to measure and adjust end play of friction discs, friction plates, spring discs, spring plates and pressure ring on pinion shaft in differential case halves are as follows:

End play specification:

0 to 0.20 mm (0.0079)

1. Measure the depth of right half differential case (housing half of case). A is the dimension between housing end to come in contact with friction plate and bottom end and housing flange face.

2. Measure the depth of left half differential case (cover half of case). C is the dimension between flange face and housing end to come in contact with friction plate. See Fig.PD-61

3. Install pressure rings on pinion shaft and fit four friction discs and four friction plate on back face of each pressure ring. (Individual parts to be assembled must be dry). Then measure plate-to-plate dimension D1 along V groove axis as shown.

Measure thickness of each spring and spring plate and obtain thickness D2 totaling these four.

4. By substituting obtained dimensions A, B, C, D1 and D2 into following equation, estimate existing end play and adjust it to specification with friction discs.

$(A-B)+C-(D1+ D2)=0$ TO 0.20 mm (0.0079 in)

5. Check the left side assembly thickness E1 totaling two friction discs, two friction plates, spring disc and spring plate and the right side counterpart E2 . Select these members in such thickness that E1 and E2 are within 0.2 mm (0.008 in) in difference.

Note:

Care must be taken to install the discs and plates so selected on correct sides without confusion.

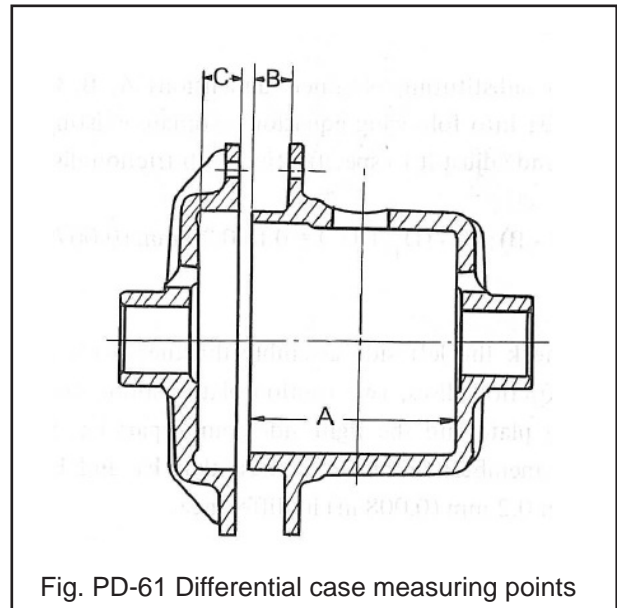


Fig. PD-61 Differential case measuring points

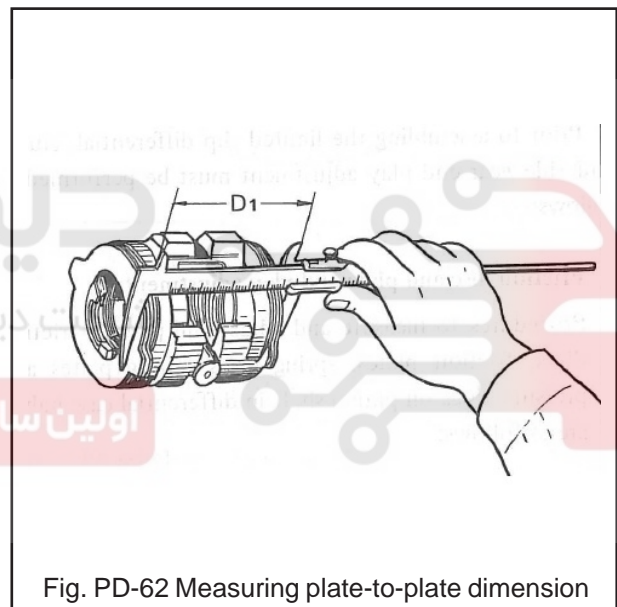


Fig. PD-62 Measuring plate-to-plate dimension

Side gear end play adjustment

Side gear end play must be such that no clearance other than backlash between side gear and differential pinion exists.

Side gear end play:

0.30 to 0.65 mm (0.0118 to 0.0256 in)

1. Right half differential case depth measurement

Measure dimension F between housing end to come in contact with thrust washer and bottom wall of housing. Measure dimension B between the housing end and housing flange face.

2. Left half differential case depth measurement

Measure dimension G between housing flange face and housing end to come in contact with washer.

3. Thrust-washer-to-thrust-washer dimension measurement

Place the assembly consisting of side gears, pinion shaft, pressure rings and thrust washers on a surface plate and force the pressure rings against pinion shaft to eliminate all clearance and with side gears forced in attach a dial indicator on the assembly to measure dimension H between thrust washers as shown.

Note:

Members to be assembled must be dry.

4. By substituting obtained dimensions F, B, G, and H into following equation, estimate and adjust end play with thrust washers.

$$(F - B) + G - H = 0.30 \text{ to } 0.65 \text{ mm} \\ (0.0118 \text{ to } 0.0256 \text{ in})$$

Note:

Care must be taken to install thrust washers so selected on correct sides without confusion.

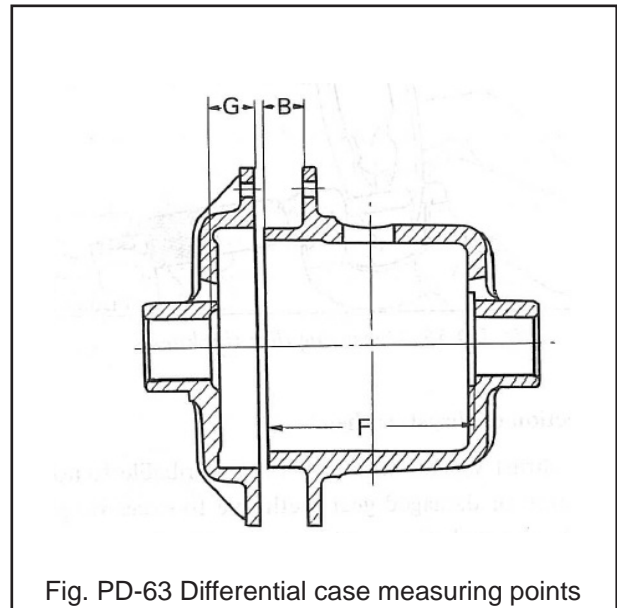


Fig. PD-63 Differential case measuring points

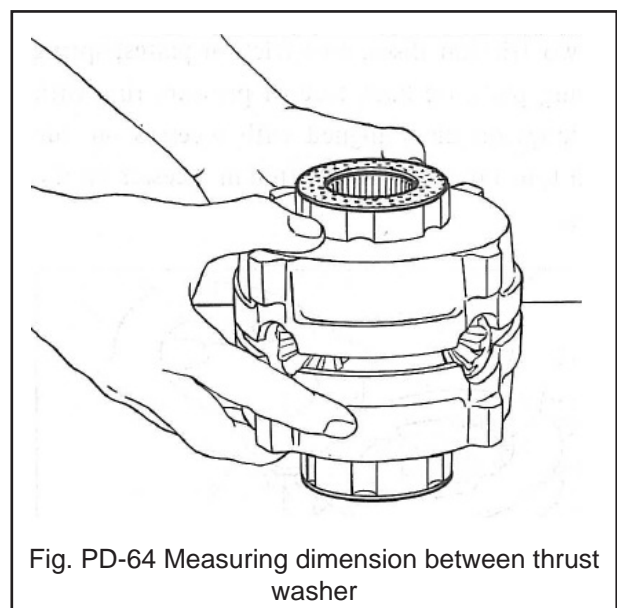


Fig. PD-64 Measuring dimension between thrust washer

Assembly

During limited slip differential assembling, sufficiently lubricate all parts with specified gear oil (particularly sliding surfaces of these members).

1. Position thrust washer in right half differential case (housing half of differential case), install side gears on pressure ring, and fit friction disc, friction plates, friction disc, friction plate, spring disc and spring plate, in this order, into place from pressure ring side of each side gear.

Note:

Failure to follow the stated order of installation will affect limited slip differential performance.

2. Align all four external tangs on pressure ring, friction plate and spring plate with four respective recesses and install the assembly in case, exercising care not to drop side gears, plates and discs. The four external tangs on pressure ring may be engaged with any four of the six recesses provided on side gear, but V grooves must be in alignment with round thru holes in right half differential case.

Note:

During installation, sticking pressure ring, Discs and plates to be assembled with each other by applying sufficient gear oil of specification on their faces will help the job.

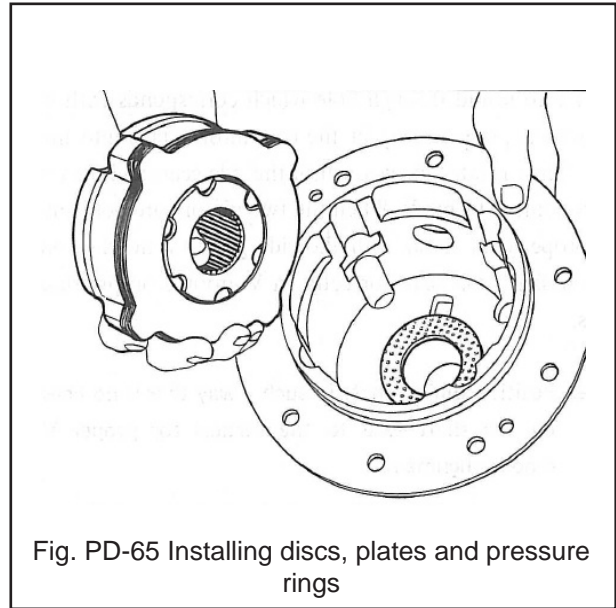


Fig. PD-65 Installing discs, plates and pressure rings

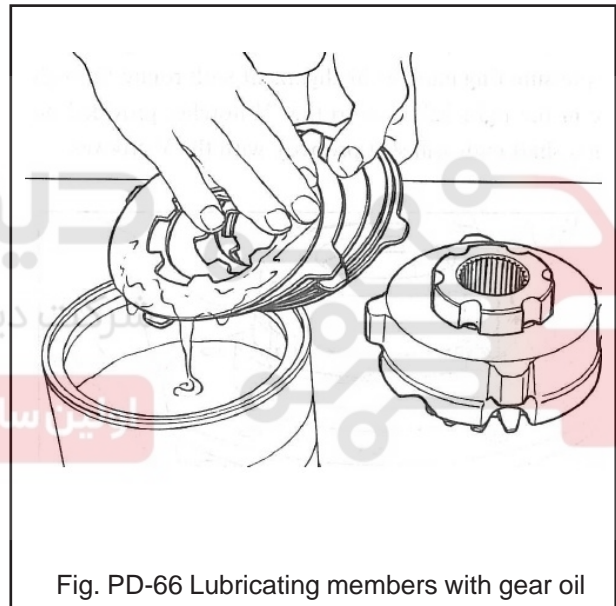


Fig. PD-66 Lubricating members with gear oil

3. Fit thrust block on pinion shaft, place differential pinion on the pinion shaft. Then insert one end of pinion shaft into round through hole which corresponds with V groove on pressure ring in the case until it falls into the case. Then rotate gears until the side gears and pinion gears come into mesh. When the two pinions are properly meshed with the side gears, V notches on pinion shaft will seat correctly in V grooves on pressure ring.

Note:

Position pinion shaft in such a way that V notches on the shaft face to the vertical for proper V groove alignment.

4. Place L. H. side gear on pinion gear and inset pressure ring into position in the right half case. The four external tangs on pressure ring may be aligned with any four of the six recesses on the side gear, but V groove on the pressure ring must be in alignment with round through hole in the right case so that V notches provided on pinion shaft ends will seat properly with the V grooves.

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5. Install two friction discs, two friction plates, spring discs, and spring plate on back face of pressure ring with six external tangs on discs aligned with recesses on side gear and with four tangs on plates fitted in recesses on side on the right half case.

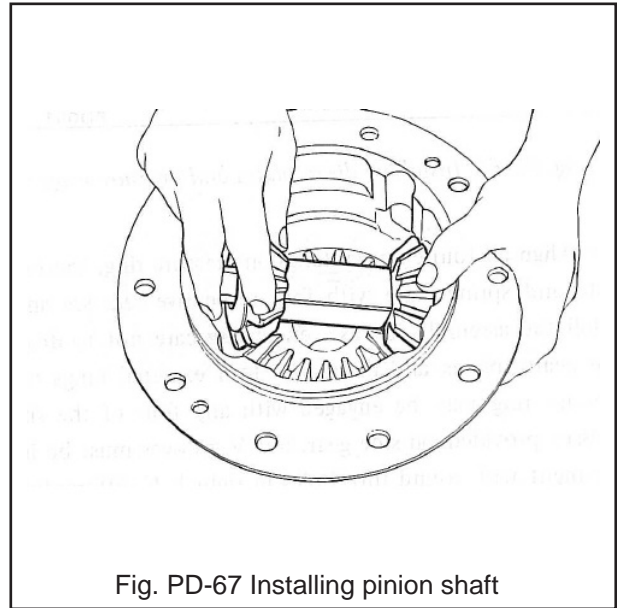


Fig. PD-67 Installing pinion shaft

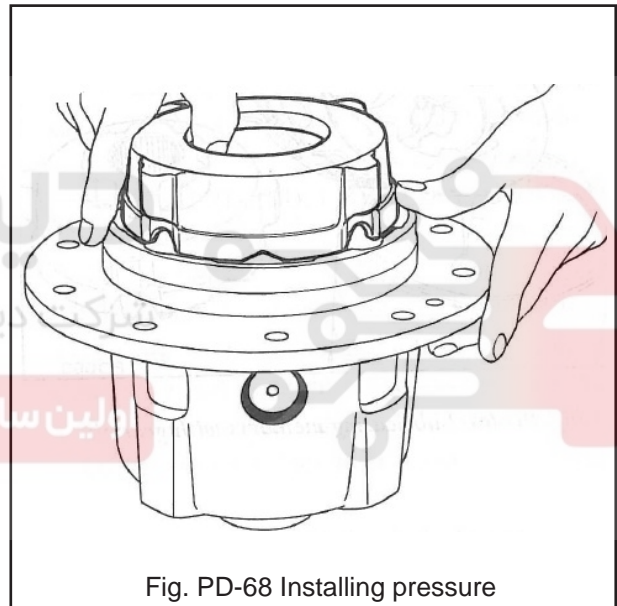


Fig. PD-68 Installing pressure

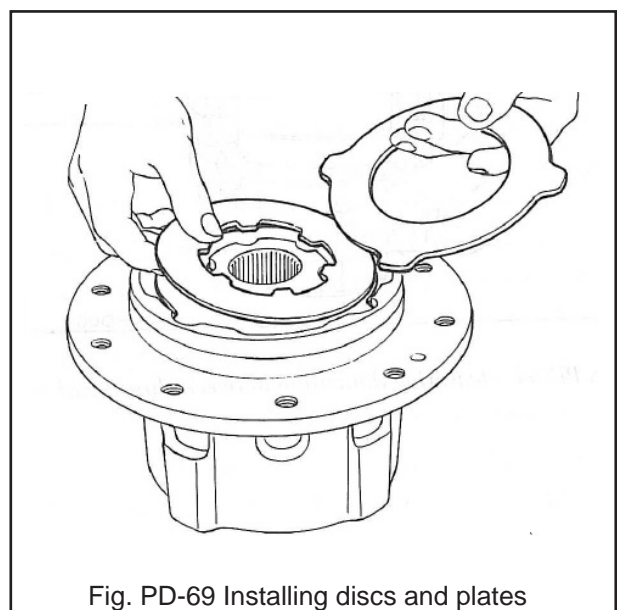


Fig. PD-69 Installing discs and plates

6. Install thrust washer in right half differential case and fit the right half differential case containing all differential parts assembled with the left half differential case with ring gear bolt holes aligned according to numerical mating marks stamped on exterior of differential case halves.

7. Secure the differential case halves together with bolts (cross-slot, flat head).

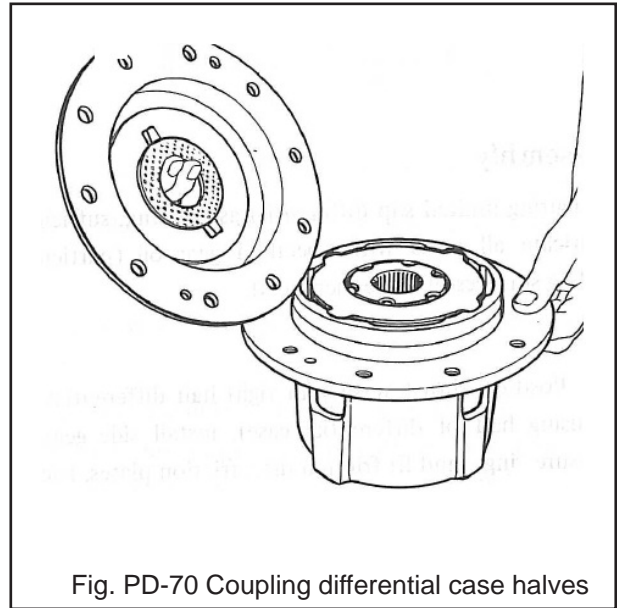


Fig. PD-70 Coupling differential case halves

Check

Upon completion of assembly procedures, check the limited slip differential for operation. With the differential case held stationary, insert splined shafts into the housing to come in mesh with side gears and check the assembly for free turning of the gears by hand rotating the splined shafts so inserted in opposite directions.

Note:

- a. Friction between clutch plates makes the limited slip differential a little heavier than a standard type differential.
- b. If irregularity in differential operation or heavy differential is found, the assembly will have to be disassembled and checked for the cause.

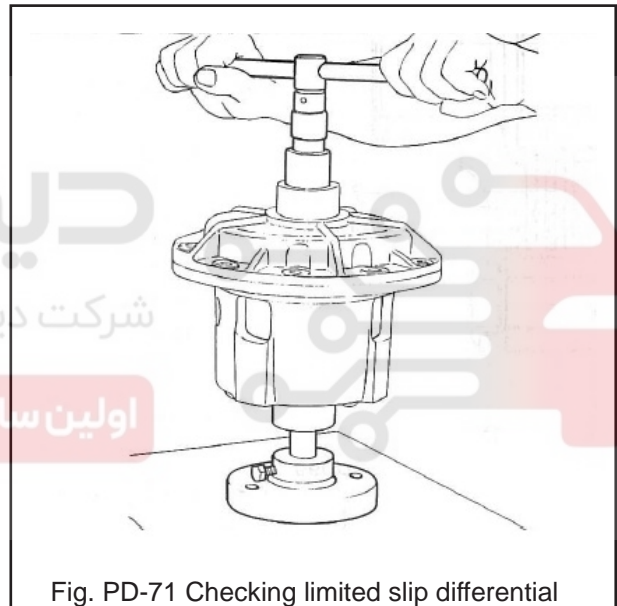


Fig. PD-71 Checking limited slip differential

Limited slip differential oil

Since multi-disc clutches are used in the limited slip differential, use A. P. I. GL-5 gear oil having a viscosity number of 140. Dark colored contamination of oil may be observed when drain plug is removed. This does not necessarily mean an oil deterioration but may be due to mixing of molybdenum bisulfide which has been applied on the surface of friction discs.

INSTALLTION

Reverse the order of removal for installation. When installing, use a new gasket. Fill oil up to filler opening. Use only specified oil.

Oil capacities

2-ton pay-load vehicles:

2.5 liters

1.5-ton pay-load vehicles:

1.5 liters

Note:

When installing a new gasket, observe the following items:

- a. Clean the attaching surfaces of gear carrier and rear axle case with a suitable solvent.
- b. Never coat gasket with any adhesive or solvent to prevent deterioration.



Up march,1978

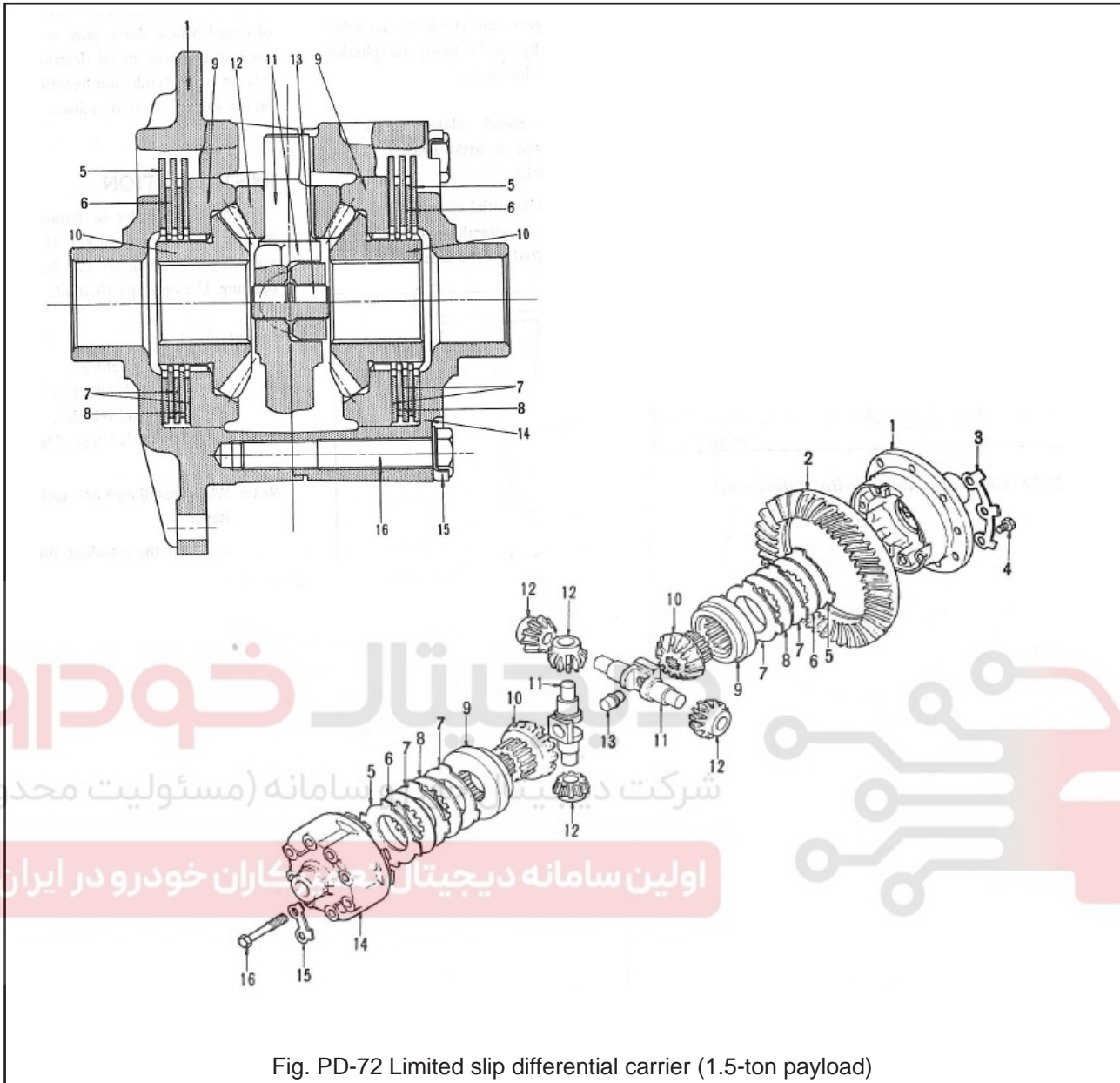


Fig. PD-72 Limited slip differential carrier (1.5-ton payload)

- | | |
|------------------------------|----------------------------|
| 1. Differential case A | 9. Pressure ring |
| 2. Hypoid gear | 10. Differential side gear |
| 3. Lock washer | 11. Differential shaft |
| 4. Hypoid gear securing bolt | 12. Differential pinion |
| 5. Friction dish plate | 13. Thrust piece |
| 6. Friction dish disc | 14. Differential case B |
| 7. Friction plate | 15. Lock washer |
| 8. Friction dish | 16. Differential case bolt |

DESCRIPTION

The limited slip gear carrier used on 1.5-ton payload vehicle differs from the conventional type gear carrier only in the construction of the differential case assembly. The differential function is controlled trolled by wet multi-plate friction type clutches that are composed of the friction plates, friction discs, friction dish plates, friction dish discs, and pressure rings. Instead of single differential pinion shaft for conventional type, two separate differential shafts having V-tapered cam at their each end are used (Fig. PD-72).

REMOVAL

Procedures of removing gear carrier from vehicle and separating differential case assembly from gear carrier are the same for conventional type gear carrier. For details, refer to the related topic of DIFERENTIAL CARRIER in the model 140 series Chassis and body Service Manual.

DISASSEMBLY

1. Bend down lock washer tabs and remove nine (9) hypoid gear securing bolts
2. Bend down lock washer tabs and remove eight (8) differential case bolts, Separate differential case B from case A.
3. Disassemble parts in differential case.

INSPECTION AND REPAIR

Clean the disassembled parts in suitable solvent (light machine oil) and dry them off with compressed air.

1. Check friction plate, friction disc, friction dish for overheating, score, and wear. If found going over excessively, replace with new ones.

Note:

Friction dish plate and friction dish disc are dished and may not require reshaping. Discard if they are distorted excessively. See Fig. PD-74.

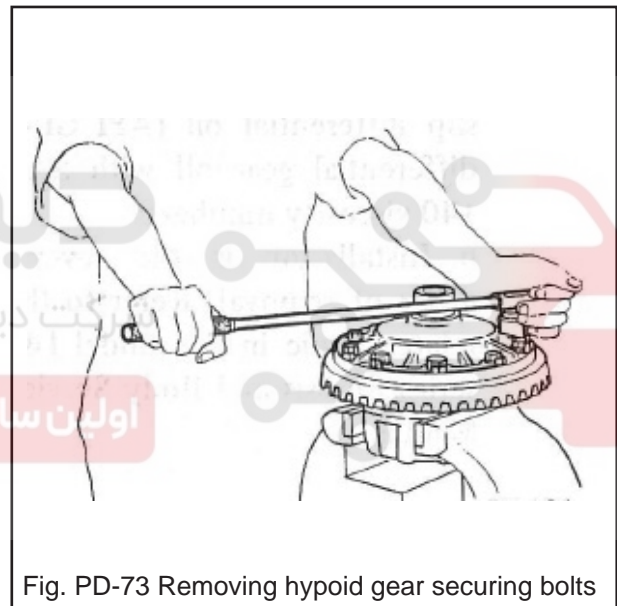


Fig. PD-73 Removing hypoid gear securing bolts

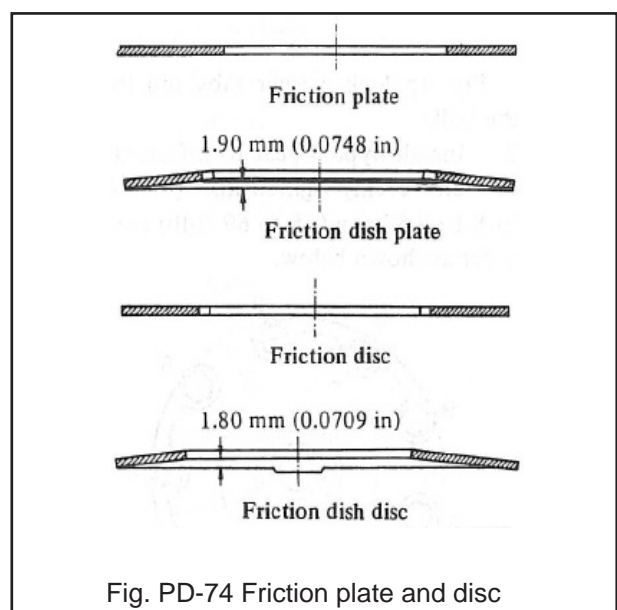


Fig. PD-74 Friction plate and disc

2. Inspect the contacting faces of pressure ring and case with them.

3. Inspect the contacting faces of other parts for wear, crack, and other abnormal conditions.

If necessary, smoothen them up with oil stone or replace with new ones.

ADJUSTMENT

1. Using a vernier caliper, measure the distance A and B.

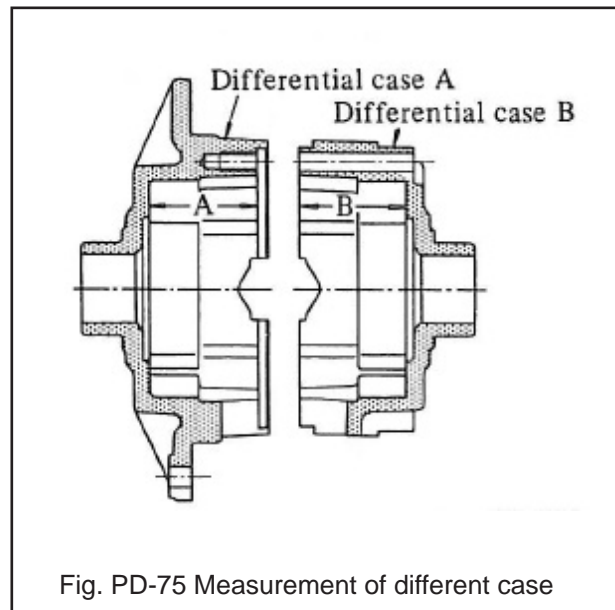


Fig. PD-75 Measurement of different case

2. Assemble two (2) differential shafts, four (4) differential pinions, one (1) thrust piece, two (2) differential side gears, two (2) pressure rings, four (4) friction plates, and two (2) friction discs without applying oil in the order as shown in Fig. PD-72.

Note:

Do not assemble friction dish plates and friction dish discs. Measure the distance C with a vernier caliper.

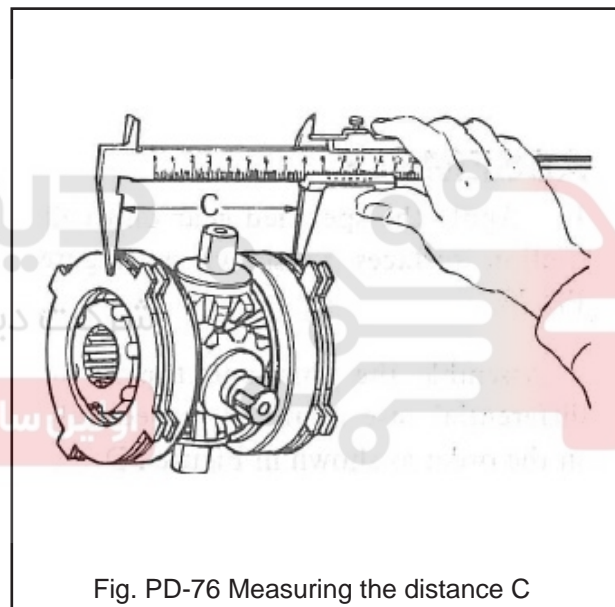


Fig. PD-76 Measuring the distance C

3. Using a micrometer caliper, measure each thickness of friction dish plates and friction dish discs. Then total each measured thickness and calculate the total thickness D.

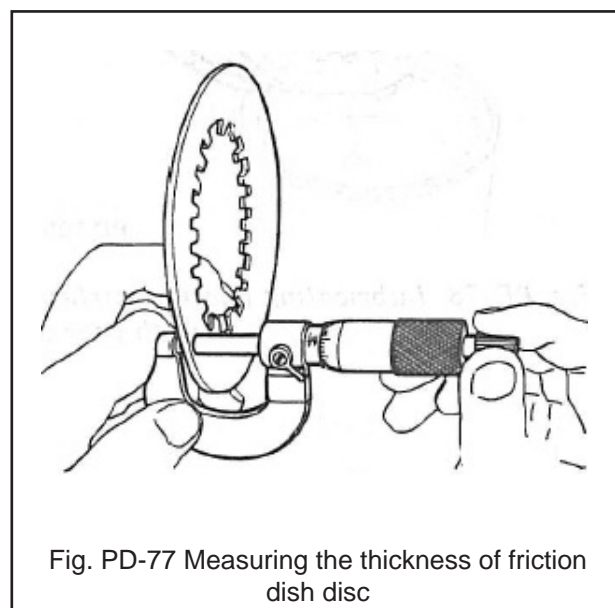


Fig. PD-77 Measuring the thickness of friction dish disc

4. By substituting obtained dimensions A, B, and D into the following equation, estimate the end play E.

$$E = A + B - (C + D)$$

5. Adjust the end play to 0 to 0.18 mm (0 to 0.0071 in) with friction plates.

Friction plate

| Type | Thickness mm (in) |
|------|-------------------|
| A | 2.20 (0.0866) |
| B | 2.30 (0.0906) |

6. Disassemble the parts temporarily assembled.

ASSEMBLY

1. Apply the specified gear oil to all friction surfaces as shown in Fig. PD-78.

Assemble the component parts in differential case A and B respectively in the order as shown in Fig. PD-72.

Note:

Friction to follow the order of discs and plates will affect the performance.

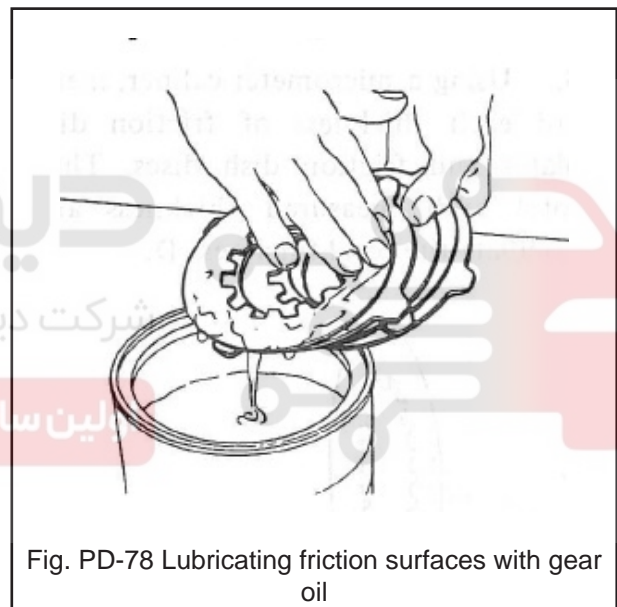


Fig. PD-78 Lubricating friction surfaces with gear oil

2. Couple differential case A and B by evenly tightening eight (8) differential case bolts. The tightening torque is 9 to 10 kg-m (65 to 72 ft-lb). The order of tightening should be as shown in Fig. PD-79.

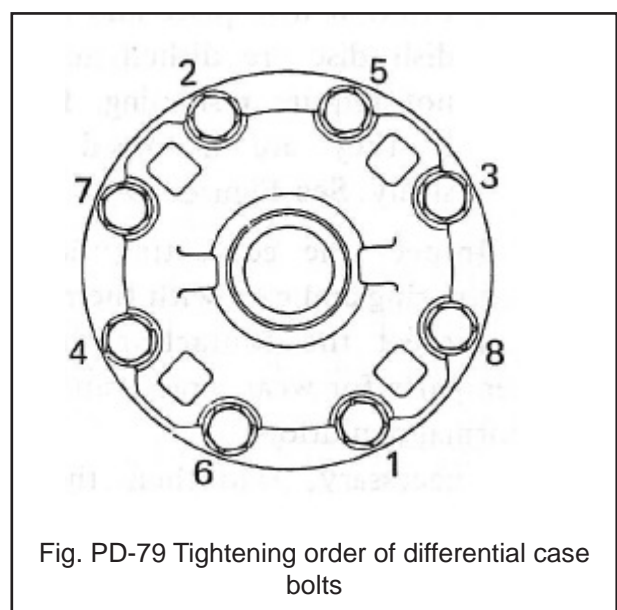
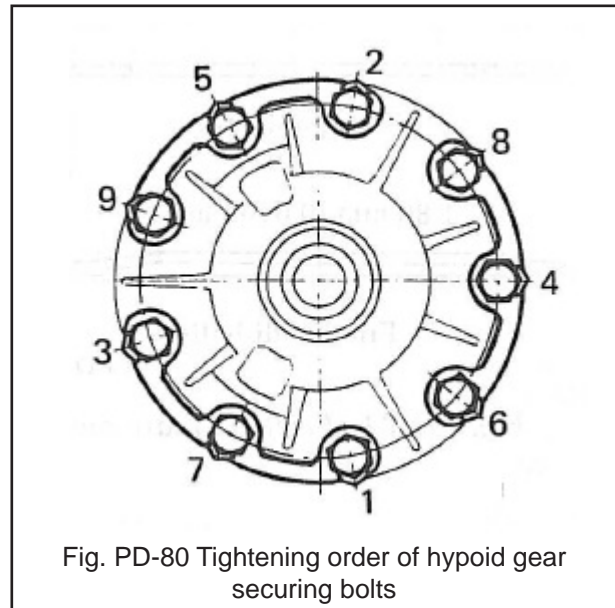


Fig. PD-79 Tightening order of differential case bolts

Pry up lock washer tabs and lock the bolts.
3. Install hypoid gear to differential case and evenly tighten nine (9) bolts to 8 to 9.5 kg-m (58 to 69 ft-lb) in the order as shown below

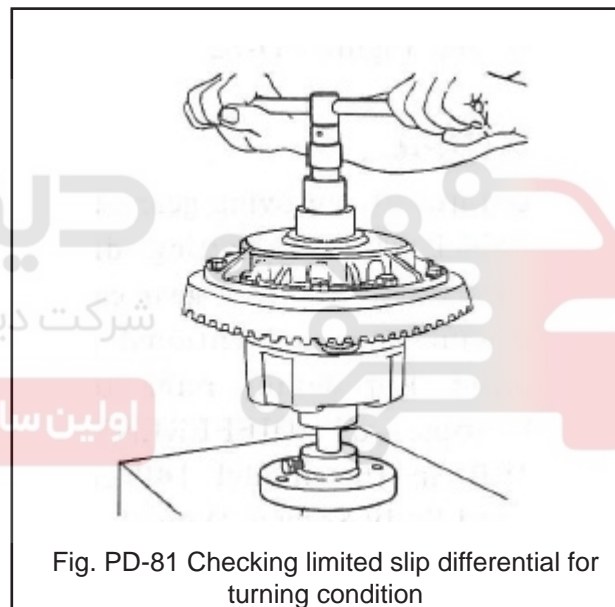


Pry up lock washer tabs and lock the bolts.
4. After completely assembled, check differential case assembly for turning condition. With differential case held stationary, insert splined shafts into both side gears and rotate the shafts in opposite directions by hand. Friction between clutch plates makes limited slip differential a little heavier than conventional type differential (Fig. PD-81)

If irregular or heavy operation is found, disassembly differential case and check for the cause.

Note:

- a. Use the same gear oil for 2-ton payload model' s limited slip differential oil (API GL-5 differential gear oil with SAE 140 viscosity number).
- b. Installation is the reverse order of removal. Refer to the related topic in the model 140 series Chassis and Body Service Manual.



SERVICE DATA AND SPECIFICATIONS

| | | |
|--|--------------|---|
| Final gear type | | H260 (For 2.0-ton) H233* (For 1.5-ton) |
| Final gear ratio | | |
| 2-ton (Up to March, 1978) | | 5.857 (41/7) |
| 2-ton (Carried over) | | 6.143 (43/7) |
| 2-ton (From April, 1978) | | 6.500 (39/6) |
| 1.5-ton | | 6.428 (45/7) |
| Limited slip differential | | Optional |
| Oil capacity | | |
| 2-ton payload vehicles | Liters | 2.5 |
| 1.5-ton* payload vehicles | Liters | 1.5 |
| Drive pinion (2-ton) | | |
| Turning torque (without oil seal) | | |
| (with oil seal) | kg-m (in-lb) | 12 to 15 (10 to 13) |
| Drive pinion adjust washer | kg-m (in-lb) | 15 to 17 (13 to 15) |
| | mm (in) | 2.63 to 3.17: 0.03 interval |
| Drive pinion bearing adjust washer | | (0.1035 to 0.1248 : 0.0012 interval) |
| | mm (in) | 2.32 to 2.60: 0.02 interval |
| Drive pinion bearing spacer | | (0.0913 to 0.1024 : 0.0008 interval) |
| | mm (in) | 4.50 (0.1772) |
| | | 4.75 (0.1870) |
| Drive pinion (1.5-ton) * | | 5.00 (0.1969) |
| Turning torque (without oil seal) | kg-m (in-lb) | 4 to 9 (3 to 8) |
| Rear bearing shim | mm (in) | 0.40 to 0.75: 0.05 interval |
| | | (0.0157 to 0.0295 : 0.0020 interval) |
| Front bearing shim | mm (in) | 0.40 to 0.75: 0.05 interval |
| Drive gear | | (0.0157 to 0.0295 : 0.0020 interval) |
| Backlash between drive gear and drive pinion (2-ton) | mm (in) | 0.15 to 0.20 (0.0059 to 0.0079) |
| Run-out of drive gear (2-ton) | | |
| (1.5-ton) * | mm (in) | Less that 0.08 (0.031) |
| Distance between side bearing cap (2-ton only) | mm (in) | Less that 0.06 (0.024) |
| | mm (in) | 262.85 to 262.90 (10.34 to 10.35) |
| Tightening torque (2-ton) | | |
| Drive pinion nut | | |
| Ring gear bolts | kg-m (in-lb) | 17 to 25 (123 to 181) |
| | kg-m (in-lb) | Up to July,1972 9 to 13(65 to 94) |
| Side bearing cap bolts | | From Aug,1972 9 to13(108to123) |
| Differential carrier to axle housing fixing bolts | kg-m (in-lb) | 8 to 10 (58 to 72) |
| | kg-m (in-lb) | 2.8 to 3.6 (20 to 26) |
| Companion flange to propeller shaft | | |
| Fixing bolts | kg-m (in-lb) | 4.0 to 4.5 (29 to 33) |
| Drain plug and filler plug | | |
| | kg-m (in-lb) | 6 to 10 (43 to 72) |

| | | |
|--|--------------|------------------------|
| Turning torque (1.5-ton) * | | |
| Self-locking nut | kg-m (in-lb) | 20 to 25 (145 to 181) |
| Ring gear bolts | kg-m (in-lb) | 8 to 9.5 (58 to 69) |
| Side bearing cap bolts | kg-m (in-lb) | 9.5 to 10.5 (69 to 76) |
| Differential carrier to axle housing fixing bolts | kg-m (in-lb) | 1.6 to 2.4 (12 to 17) |
| Companion flange to propeller shaft Fixing bolts | kg-m (in-lb) | 4 to 4.5 (29 to 33) |

*Up to January, 1976

دیجیتال خودرو

شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران



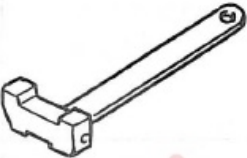
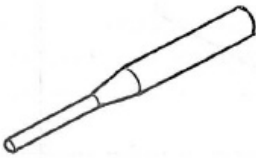

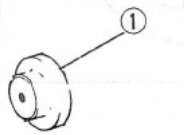
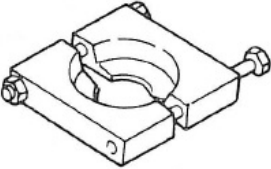
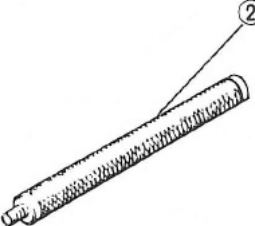




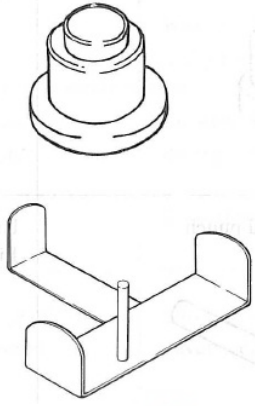
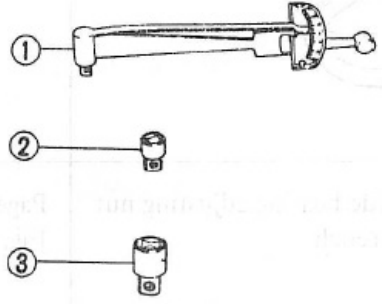

TROUBLE DIAGNOSES AND CORRECTIONS

| Condition | Probable cause | Corrective action |
|--------------------------|--|---|
| Noise on drive | <p>Shortage of oil</p> <p>Incorrect tooth contact drive gear and drive pinion</p> <p>Damaged differential side bearing or improper</p> <p>Damaged gear</p> | <p>Supply gear oil</p> <p>Adjust tooth contact</p> <p>Replace or adjust</p> <p>Replace defective parts</p> |
| Noise on coast | <p>Incorrect backlash between drive gear and drive pinion</p> <p>Incorrect adjustment of drive pinion Bearing</p> | <p>Adjust backlash</p> <p>Adjust correctly</p> |
| Noise on drive and coast | <p>Worn or damaged drive pinion bearings</p> <p>Incorrect tooth contact</p> <p>Damaged side gear drive gear, drive pinion</p> <p>Teeth surface</p> <p>Seized drive gear and drive pinion</p> <p>Pinion bearing under inadequate pre-load</p> <p>Seized damaged or broken pinion bearing</p> <p>Swinging differential case</p> <p>Loosen clamp bolts and nut holding drive gear, side bearing, etc,</p> | <p>Replace</p> <p>Adjust</p> <p>Replace</p> <p>Replace hypoid gear set</p> <p>Adjust pre-load</p> <p>Replace bearing</p> <p>Replace differential case</p> <p>Replace then to the designated tightening torque</p> |

| Condition | Probable cause | Corrective action |
|--------------------------|--|---|
| Noise on turn | Side gear jammed in differential case Pinion gears too tight on their shaft | Replace defective parts Replace as required |
| Excessive backlash | Incorrect backlash between drive gear and drive pinion Worn differential gear or case | Adjust backlash Replace worn parts |
| Breakage of differential | Shortage of oil or use of improper oil Severe service due to an excessive loading Incorrect adjustment of drive gear and drive pinion Excessive backlash due to defacement of side gear and thrust washer Loosen bolts and nut such as drive gear, bolts | Rebuild differential and replace as required. After adjusting pre-load of bearings, backlash and engaging condition of gears, fasten parts and apply specified volume of genuine gear oil Avoid abusing of the car |


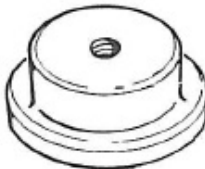
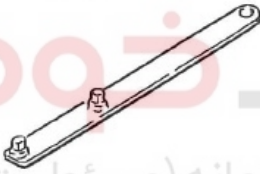
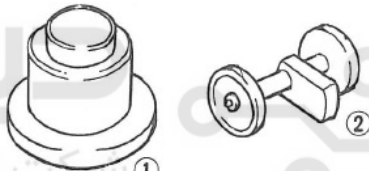

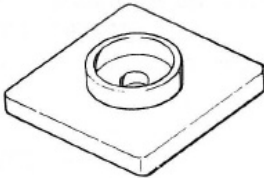
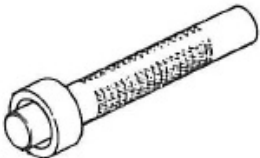
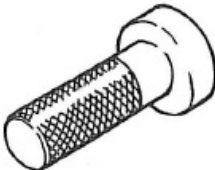
SPECIAL SERVICE TOOLS

| Tool number & tool name | Reference page or fig. no. | Tool number & tool name | Reference page or fig. no. |
|---|----------------------------|--|----------------------------|
| ST06350000 Differential carrier attachment  | Fig. PD-17 | ST02371000 Adapter  | Fig. PD-21 |
| ST32530000 Side bearing adjusting nut wrench  | Fig. PD-15 | KV31100300 Solid punch  | Fig. PD-22 |
| ST3162001* (ST3162000) Drive pinion flange wrench  | Fig. PD-17 | 1. Drive pinion outer race drift 2. ST061300* (ST30670000) 3. Drive pinion outer race drift bar ST30611000*  | Fig. PD-15 |
| ST3003100* Rear bearing inner race puller  | Fig. PD-19 |  | |
| ST33051001* (ST02310000) Dif-ferential side bearing puller  | Fig. PD-21 | Rear bearing outer race drift ST01500001  | Fig. PD-12 |

| Tool number & tool name | Reference page or fig. no. | Tool number & tool name | Reference page or fig. no. |
|---|----------------------------------|---|----------------------------|
| <p>Drive pinion arrangement gauge assembly ST3124S000</p> <ol style="list-style-type: none"> 1. Height ST31130000 2. Dummy shaft ST31241000  | <p>Fig. PD-29 Fig. PD-30</p> | <p>Drive pinion preload gauge ST3127S000* (ST31200000)</p> <ol style="list-style-type: none"> 1. SF type torque washer GG91030000 2. Adapter HT62900000 3. Adapter HT62940000  | <p>Fig. PD-33</p> |
| <p>Drive pinion rear bearing inner race drift ST32530000</p>  | <p>Fig. PD-31</p> | | |

* : Standardized between 1.5-ton and 2.0-ton payload vehicles

() : Indicates former tool number.

| Tools with * sign in previous tables are used for 1.5 ton payload vehicles | | Note: 1.5-ton payload vehicles (Differential carrier type H233) | |
|--|----------------------------|--|----------------------------|
| Tool number & tool name | Reference page or fig. no. | Tool number & tool name | Reference page or fig. no. |
| Differential carrier attachment ST06340000  | Fig. PD-17 | Rear bearing outer race drift ST30621000  | |
| Side bearing adjustment wrench ST32580000  | Fig. PD-16 | Drive pinion arrangement ST3125S000 1. Height gauge ST31251000 2. Dummy shaft ST31181001  | Fig. PD-35 |
| Adapter ST33081000  | Fig. PD-21 | Drive pinion rear inner replacer B ST30062000  | Fig. PD-15 |
| Differential side bearing drift ST33190000  | Fig. PD-11 | Oil seal fitting tool ST33510000  | Fig. PD-16 |

SERVICE MANUAL APPENDIX NISSAN JUNIOR 2400

REAR PROPELLER SHAFT & DIFFERENTIAL CARRIER

شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران



Technical and Engineering Management

دیجیتال خودرو

شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران



Service data and specifications

Rear differential

General specification

| Qualified model | Z 24 | | SD 25 | |
|--------------------------------------|-------------------------|-----------|-----------|-----------|
| | Stand-ard | By choice | Stand-ard | By choice |
| Model | H 260 | | | |
| Type | Integrated differential | | | |
| Diameter of drive gear (in) | 260 (10.24) | | | |
| Gear ratio | 5.71 | 5.857 | 6.143 | 6.500 |
| Teeth number of drive Gear to pinion | 39.7 | 41.7 | 43.7 | 39.6 |
| Oil capacity (L) | 2.4 (4 - 1/4) | | | |

Required torque

| Part name | N.m | Kg.m | Ft.lb |
|------------------------|-------|------|-------|
| Propeller shaft flange | 78-88 | 8-9 | 58-65 |



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SAIPA YADAK

Daroupakhsh St.17th Km Karaj Makhsoos Road-TEHRAN-IRAN

www.saipayadak.org